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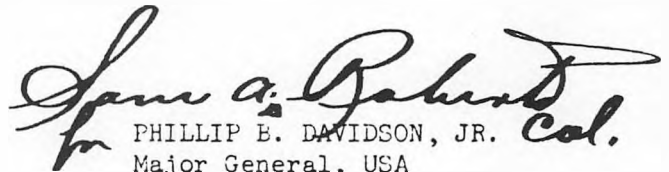
18 December 1968

SUBJECT: Projected Munition Fuzes

SEE DISTRIBUTION

1. Forwarded for your information is CMEC Technical Intelligence Brief No. 3-66, Communist Bloc Projected Munition Fuzes in Vietnam.
2. This publication outlines the technical characteristics, current status, brief history of use, and detailed functioning of Communist Bloc Projected Munition Fuzes encountered in Vietnam. The principal purpose of this manual is to aid technical and nontechnical personnel in identifying Communist bloc fuzes found on explosive projectiles employed against Free World Forces in Vietnam.
3. Comments on this manual are encouraged. Information is solicited on fuzes being encountered in Vietnam which are not listed in this manual. Comments and information should be submitted to J2, ATTN: MACJ231-7.

1 Incl
as


PHILLIP B. DAVIDSON, JR. Col.
Major General, USA
Assistant Chief of Staff, J2

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COMMUNIST BLOC PROJECTED MUNITION FUZES IN VIETNAM, INTRODUCTION

PURPOSE

This manual is designed as an aid in identifying Communist bloc projected munition fuzes employed against Free World Forces in Vietnam. It is a technical catalog with the mission of supplying general technical data to those personnel who require such information. It is believed that this will assist Explosive Ordnance Disposal teams, intelligence activities, Wound Ballistics Teams, ordnance personnel, munition design agencies, and field commanders in the successful accomplishment of their assigned missions.

SCOPE

(a) This publication outlines the technical characteristics, current status, brief history of use, and detailed function of Communist bloc projected munition fuzes encountered in Vietnam. The manual covers only standard production fuzes and does not include improvised fuzes produced in VC clandestine munition shops. This manual does not cover emplaced or air-dropped fuzes, nor does it include hand grenade fuzes. Later additions may include these items to provide a complete fuze catalog.

(b) The fuzes are arranged by tactical class and are subdivided by functioning groups. These groups are further subdivided by country of origin. Within each subdivision the fuzes are arranged alphabetically by designation and by model number of the country of origin. Fuzes with numerical designations are listed in ascending order.

(c) The technical information contained herein is general in nature and, in most instances, has been derived from the actual examination of fuzes. In some instances, parts removed from shell craters have been interchanged to reconstruct fuzes. Some errors in dimensions, weights, and completeness of these fuzes must be admitted. Information on those fuzes that have not actually been examined has been extracted from documents considered accurate. It is known that fuzes other than those reported here exist, but no specimens have been recovered for examination; and reliable data is not available.

GENERAL

Communist bloc fuzes designed and produced since 1950 show a marked improvement over earlier fuzes in the ability to withstand an adverse environment. The bloc armament industry has lavished great effort and expense to insure that fuzes are completely moistureproof and sturdy enough to maintain alignment while penetrating hard media during delay functioning. This munition philosophy is highly commendable and should serve as a guide for future fuze development by the munition industries of Free World Forces.

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Generally, non-Soviet Communist bloc fuzes are exact copies of their Soviet counterparts. However, considerable evidence exists to show that the Chinese Communists are capable of producing efficient indigenous fuzes. This trend is expected to continue, but Soviet munition design philosophies will continue to be followed closely. The ChiComs appear to be adherents to the dual reaction principle for reliable fuze functioning in their indigenous fuzes. This principle includes direct firing pin action upon impact, as well as primer-detonator inertial movement. This principle has been proven sound by its extreme reliability and its graze sensitivity.

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CHAPTER 1

SOVIET FUZES FOR AIRCRAFT AND ANTIAIRCRAFT GUNS

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GENERAL

All fuzes of this classification are improved modifications of earlier known fuzes. They are all mechanical, point-detonating, impact types that are designed to function reliably on light material targets. The aircraft gun fuzes appear to have been based upon World War II German types of proven reliability. In some instances exact copies of internal elements have been noted. In other cases German mechanical principles have been assimilated with Soviet munition designs, resulting in a composite, highly effective design.

The Soviet antiaircraft gun fuzes all employ pyrotechnic type self-destruct features. Precisely the same principles are employed in fuzes used in weapons from 23mm through 57mm calibers. The purpose of the self-destruct feature is to destroy the projectiles that miss targets, at an altitude where the fragmenting projectile will not endanger friendly ground units. A secondary purpose is to provide air bursts as a psychological factor in preventing accurate bombing.

All of the Soviet aircraft and antiaircraft fuzes are bore-safe. This means that they are provided with mechanical features designed to prevent the fuze from arming while in the tube of the weapon. Some of the earlier fuzes are not detonator-safe by American standards, which means that the explosive train is not interrupted to positively preclude an in-bore detonation. However, a major trend is indicated toward both bore-safe and detonator-safe fuzes. This is evidenced by the introduction of the MG and B series fuzes with their out-of-line detonator rotors.

The extreme effort in designing moistureproof and environmentproof fuzes is seen in aircraft and antiaircraft fuzes. It appears that the Soviets have great confidence in the ability of their ammunition to withstand moisture due to the small amount of attention being given to weatherproof packing containers. Soviet shipping containers are little more than a means of protecting the ammunition from the normal hazards of shipping and handling.

Soviet fuzes are marked plainly on the ogive. Each fuze is die-stamped with the fuze nomenclature. Where space is available the lot number, year of manufacture, and plant number are included. Antiaircraft fuzes are normally "blued" or painted black with an additional coating of varnish or epoxy to inhibit external corrosion. If the fuze is cadmium-plated, the exterior epoxy or varnish coating is still applied. Some fuzes have been seen with colored lacquer on the nose. The significance of the color has not been determined but it has been noted that not all fuzes of a specific designation, produced by the same plant, have the color marking.

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Normally, aircraft and antiaircraft fuzes do not require any preparation for firing of linking. The large calibers, such as 57mm, possess fuzes with removable shipping caps to increase impact sensitivity. However, the significance of the cap has not been determined unless it is merely a safety device for shipping.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-20

a. General. The A-20 is similar in construction and operation to the A-23, although the two fuzes differ noticeably in length and shape. The A-20, by comparison, is short and squat. When attached to a projectile, it has a visible length of about 0.56 inch. (The corresponding dimension of the A-23 is about 0.95 inch.) Both the A-20 and the A-23 are bore-safe. The A-20 is used in 20mm aircraft ammunition. The A-20 employs a gaine-type detonator-booster (7). The gaine is common in Soviet fuzes. It was derived from the French Schneider designs, which were the prototype of Russian artillery projectiles and fuzes.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Before firing, the coiled copper arming spring (4) prevents the firing pin (3) from reaching the gaine (7). The coiled spring presents a solid block to the firing pin; it is the only safety device in the fuze. After the projectile has left the bore of the weapon, centrifugal force causes the arming spring to unwind, making the hole in its center large enough to allow the firing pin to pass. On impact with the target, the nose disk (1) is crushed, and the striker (2) drives the firing pin through the firing pin guide (5) and safety disk (6) into the detonator assembly (7), which activates the main charge of the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons

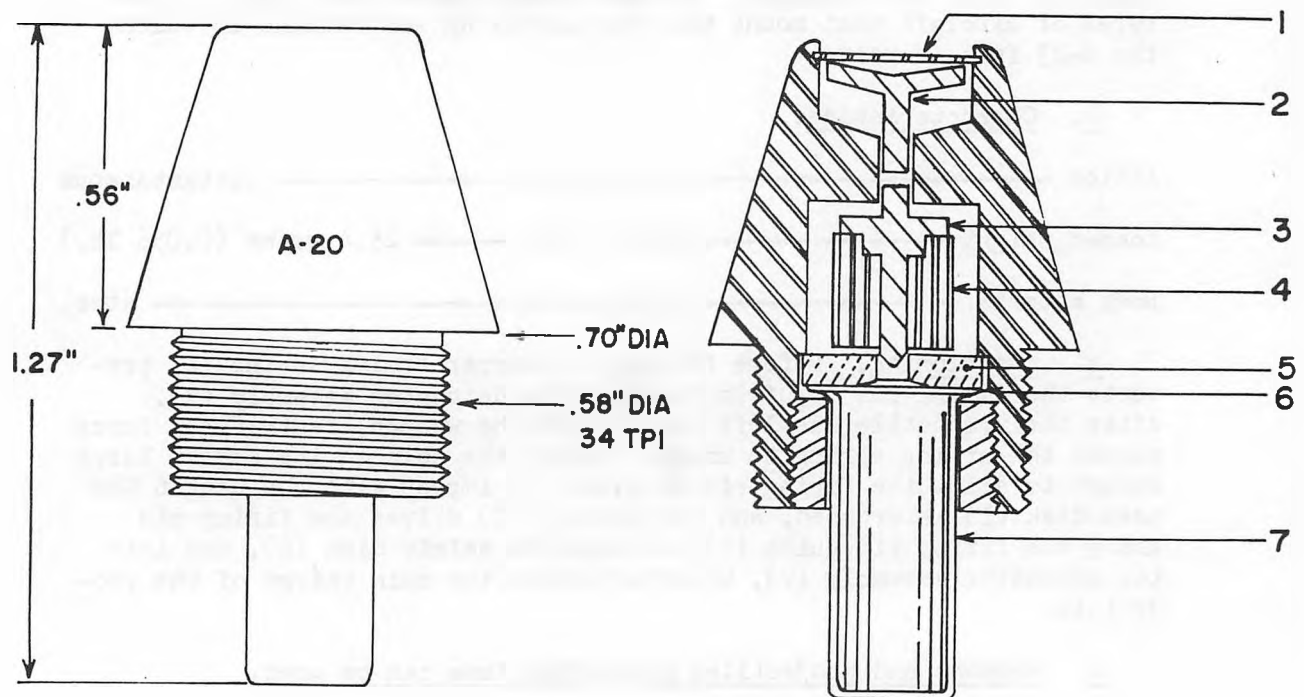
Projectiles

20mm ShVAK aircraft gun

20mm HEI-T ----- OZT

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-20



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-23

a. General. The A-23, although similar to the A-20 in construction and operation, has an elongated shape which contrasts markedly with the A-20's stubby appearance. The A-23 consists of the following components: a steel nose disk, a steel fuze body, an aluminum striker and firing pin, a coiled copper arming spring, a brass spacer, a copper safety disk, a detonator, and an aluminum detonator retainer. The A-23, like the A-20, is bore-safe. The well known MIG-15 and IL-28 are two types of aircraft that mount the 23mm models NR and NS guns in which the A-23 fuze is used.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 25.4 grams (0.056 lb.)

Body material ----- steel

c. Functioning. Before firing, the copper arming spring (4) prevents the firing pin (3) from reaching the detonator assembly (7). After the projectile has left the bore of the weapon, centrifugal force causes the arming spring to unwind, making the hole in its center large enough to allow the firing pin to pass. On impact with the target the nose disk (1) is crushed, and the striker (2) drives the firing pin along the firing pin guide (5), through the safety disk (6), and into the detonator assembly (7), which activates the main charge of the projectile.

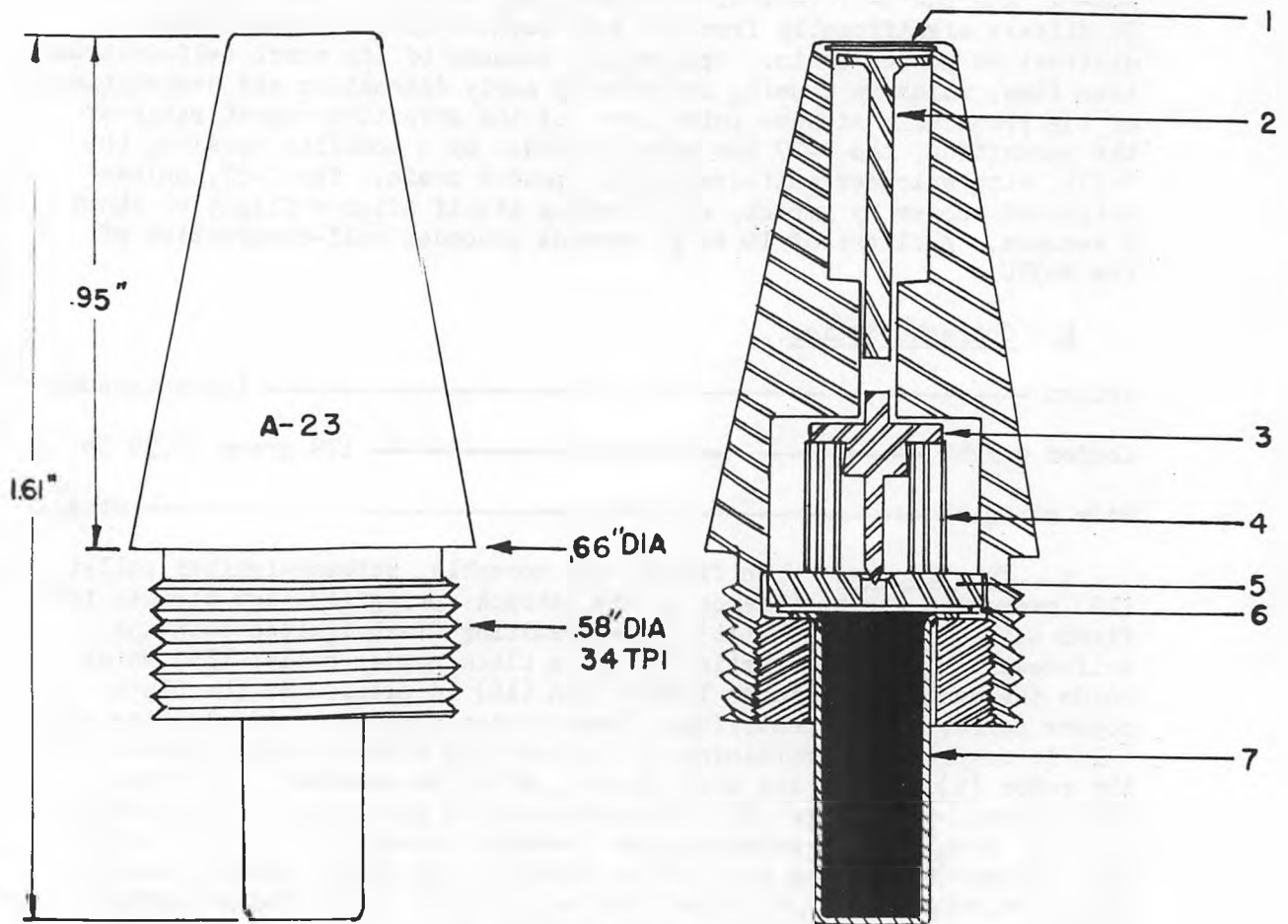
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
23mm aircraft guns, model NR and NS	23mm HEI-T ----- OZT
25mm antiaircraft gun, M1940	25mm Frag-I-T ----- OZR-132

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SOVIET, POINT DETONATING IMPACT FUZE: MODEL A-23



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-37

a. General. The A-37 is a sensitive, bore-safe fuze with a self-destruction feature; it is designed for use with 37mm aircraft guns. It is similar to the MG-8 fuze and almost identical to the MG-37, the MGZ-37, and the B-37 (all of which are used with the 37mm AA gun M1939). It differs significantly from the B-37 because of its shorter self-destruction powder train. Apparently, because of its short self-destruction time, which is causing undesirably early detonation and destruction of the projectile at some point short of the effective combat range of the ammunition, the A-37 has been succeeded by a modified version, the A-37U, with a longer self-destruction powder train. The A-37, unless activated sooner by impact, will destroy itself after a flight of about 3 seconds. A flight of 10 to 12 seconds precedes self-destruction of the A-37U.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 179 grams (0.39 lb.)

Body material ----- steel

c. Functioning. Upon firing, the moveable, setback-igniter pellet (12) overcomes the resistance of the setback spring (13) and strikes the fixed setback firing pin (14). The resulting flash ignites both the self-destruction powder train (7) and a black powder pellet (15) which holds the centrifugal rotor locking pin (16) in place. As the black powder pellet burns, centrifugal force causes a second rotor locking pin (11) to compress its retaining spring and move outward from a recess in the rotor (3). After the black powder pellet is consumed, the first centrifugal locking pin (16) also moves out of its recess in the rotor, which is then free to rotate in the U-shaped trough of the rotor mount (6). Since the locking pin (16) retained by the powder pellet immobilizes the rotor until the other locking pin (11) clears its straight-walled recess in the rotor, any possibility of the rotor jamming the latter pin (11) is precluded. The rotor recess for the pellet-retaining pin (16) has sloped walls, so that the movement of the rotor tends to slide this pin out of the recess, rather than to jam it. Centrifugal force causes the freed rotor, whose center of gravity is located off the axis of rotation, to turn 90 degrees around the pivot pins (10), thus aligning the primer charge (4) with the impact firing pin (2) and the detonator assembly (5). Upon impact with the target, the nose cap is crushed, and the impact striker (1) drives the impact firing pin into the primer charge. The flash from the primer charge passes to the detonator assembly, which activates the booster (9), and the booster in turn activates the projectile's charge. If impact does not occur first,

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-37

the burning powder train in the self-destruction powder train ring (8) will ignite the black powder flash charge in the detonator, and the fuze will detonate from 2.5 to 3 seconds after the round is fired.

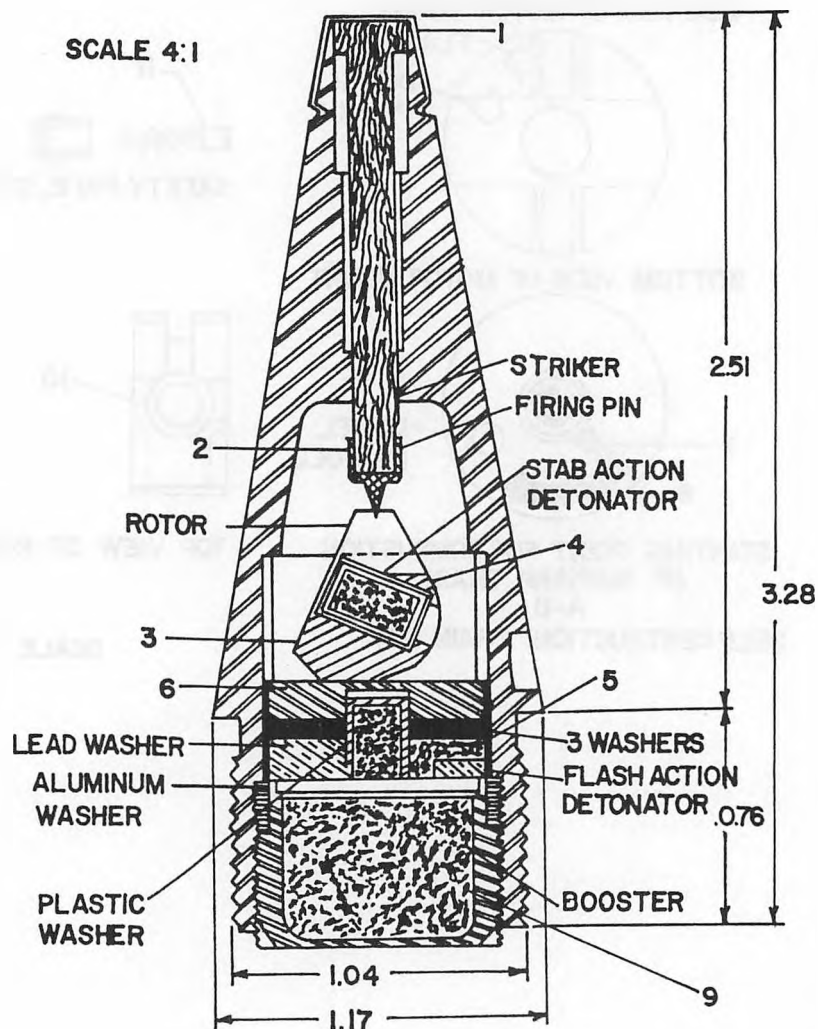
d. Weapons and projectiles with which fuze can be used.

Weapons

37mm aircraft gun, Model N and NS

Projectiles

37mm HEI-T ----- OZT

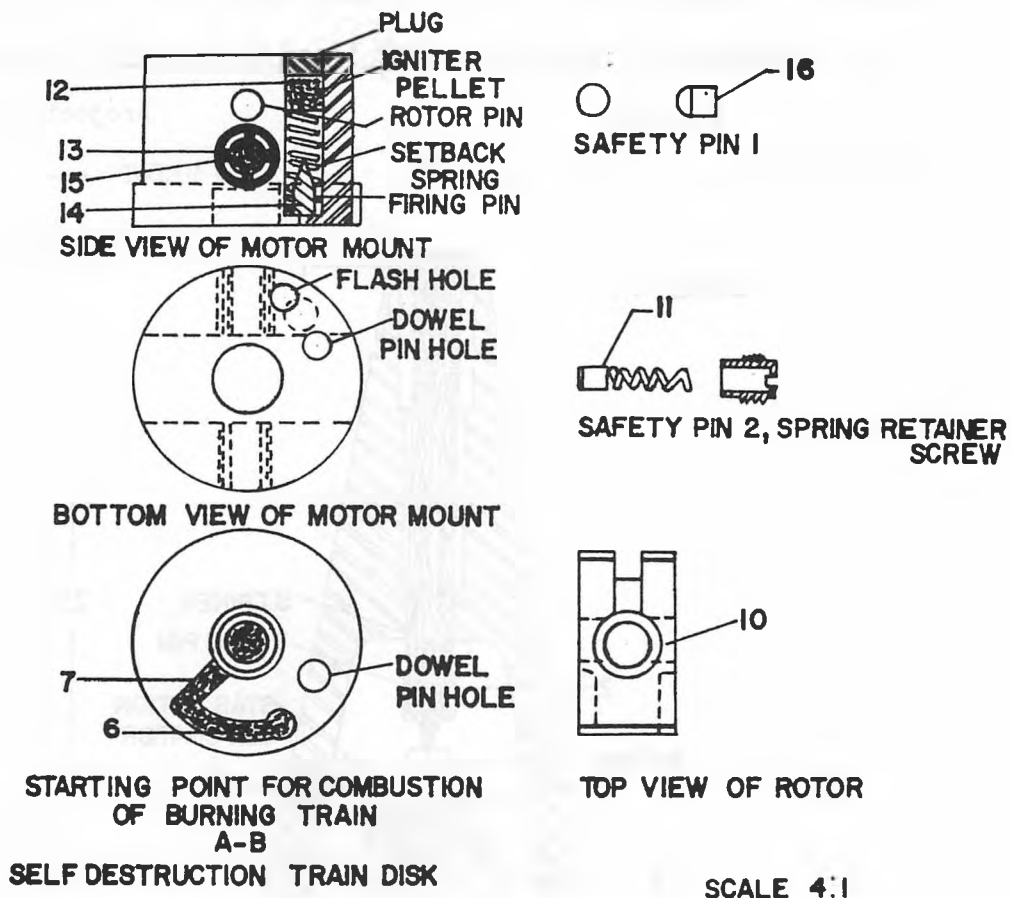


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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-37



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL A-37U

The A-37U, a later version of the A-37, is essentially identical to the A-37 except for having a longer self-destruction powder train. The A-37 destroys itself after a flight of 2.5 to 3 seconds, whereas the A-37U permits a flight of 10 to 12 seconds before self-destruction. It is believed that the time of self-destruction of the A-37U was lengthened in order to prevent detonations from occurring at points short of the effective ammunition combat range. If rounds fuzeed with the A-37U are fired horizontally at altitudes above 2,500 feet, the increased time to self-destruction does not endanger ground personnel. This fuze is used with the same weapon and ammunition as the A-37.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL B-30

a. General. Only a dummy version of the B-30 fuze has been examined. From its internal and external configuration it appears to be a slightly enlarged version of the MG-25 fuze. The self-destruct element may or may not be present. The steel fuze body has a single pin spanner hole near the bottom of the ogive. Threads are right-handed with 34 threads per inch. The fuze is secured with two stab crimps through the projectile. The dummy fuze examined possessed a steel nose-disk and an aluminum striker. The remainder of the components were dummy, and they screwed into the body of the fuze with left hand threads. A recess for a lead sealing ring is present at the bottom of the fuze body to seal the booster to the body.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 83 grams (0.18 lb)

Body material ----- steel

c. Functioning. No information is available.

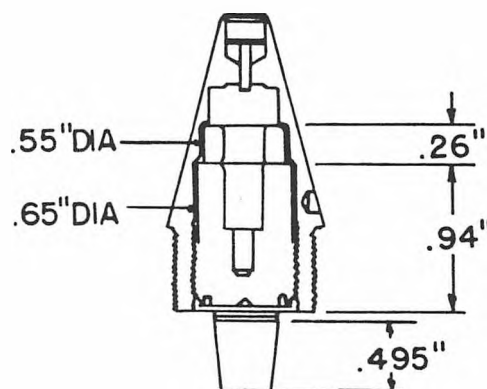
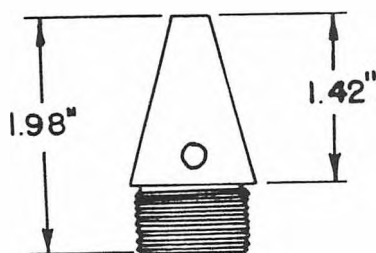
d. Weapons and projectiles with which fuze can be used.

Weapons

30mm aircraft cannon NR-30

Projectiles

30mm HEI-T ----- unknown



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL B-37

a. General. The Soviet B-37 is a modified copy of the Soviet MG-37. The fuzes are essentially identical in construction and operation. The B-37 has a rotor lock and a slot (1) cut into the rotor housing to receive the pin. When the rotor rotates, the lock pin is forced into the slot (2) by centrifugal force. The detonator of the B-37 is retained in the rotor by a threaded keep ring (2) rather than by a press fit as in the case of the MG-37. The keep ring is slotted for a common screw driver. The B-37 has a conical depression (3) in the booster. A metal foil liner also has the same shape, and it covers the shaped explosive in the booster. The B-37 also has a portion of the fuze body and the booster cup relieved and a lead crush ring (4) pressed into the cavity. The lead ring waterproofs the lower part of the fuze. The nose cup also has a vinyl ring (5) in the crimping groove at the nose of the fuze. When the nose cap is crimped into place, the vinyl ring (5) is compressed, waterproofing the nose of the fuze.

b. Characteristics.

Action -----instantaneous
Loaded weight -----172 grams (0.38 lb)
Body material ----- steel

c. Functioning. This fuze is identical to the Soviet MG-37 except for the additional function of the rotor lock pin.

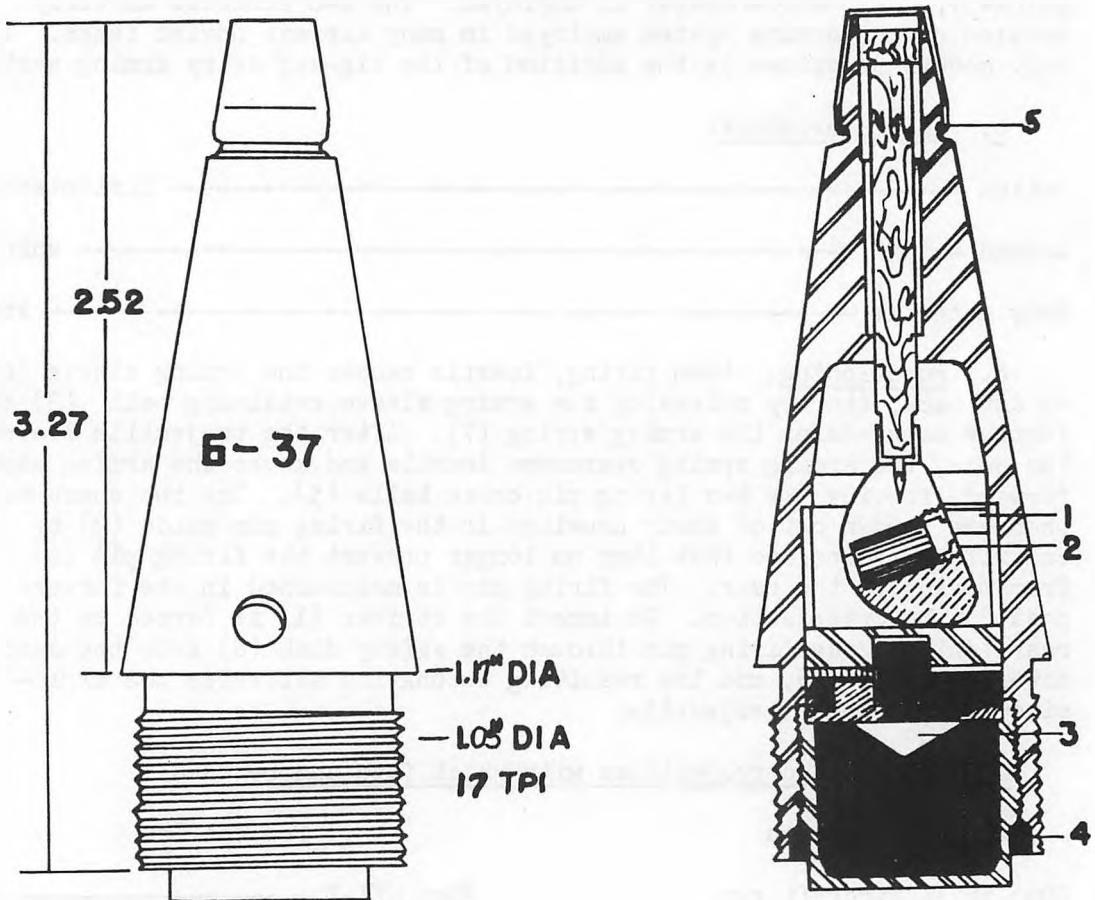
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
37mm antiaircraft gun, M1939	37mm Frag-T ----- OR-167

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL B-37



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL K-6

a. General. The K-6 is similar to the K-20 in construction and functioning, but it is considerably smaller. It is a single-action fuze, requires no special adjustments prior to firing, and is bore-safe. A gaine-type detonator-booster is employed. The K-6 exhibits an early version of the arming system employed in many current Soviet fuzes. The only modern departure is the addition of the zig-zag delay arming system.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Upon firing, inertia causes the arming sleeve (4) to set back, thereby releasing the arming sleeve retaining ball (3) and further compressing the arming spring (7). After the projectile leaves the bore, the arming spring overcomes inertia and moves the arming sleeve forward, freeing the two firing pin check balls (5). The two check balls then are thrown out of their housings in the firing pin guide (2) by centrifugal force, so that they no longer prevent the firing pin (6) from moving to the rear. The firing pin is maintained in the forward position by creep action. On impact the striker (1) is forced to the rear, driving the firing pin through the safety disk (8) into the detonator assembly (9), and the resulting detonation activates the explosive charge of the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons

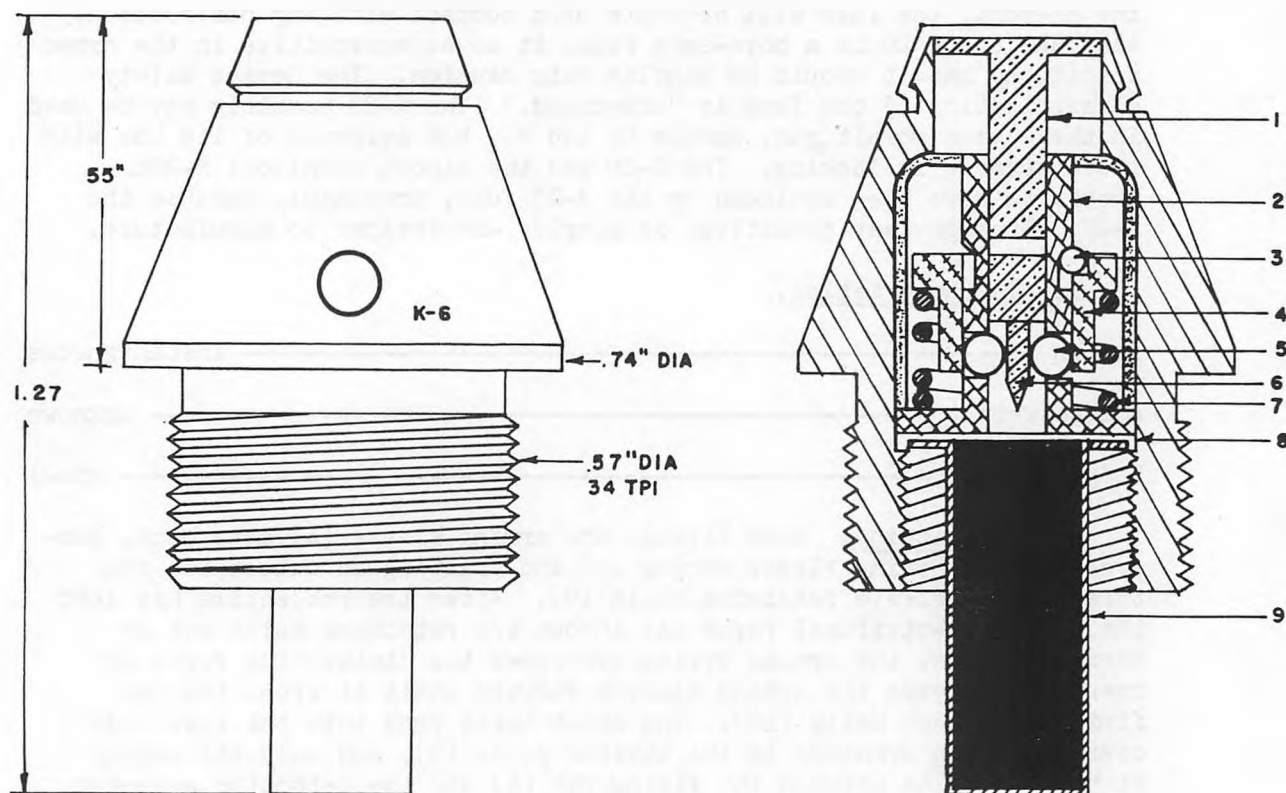
Projectiles

20mm ShVAK aircraft gun

20mm HEI-T ----- OZT

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL K-6



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL K-20

a. General. The K-20 is used with projectiles fired from 23mm aircraft and 25mm antiaircraft guns. Since it does not have a self-destroying element, the fuze will detonate upon contact with any obstruction. Although the K-20 is a bore-safe fuze, it is supersensitive in the armed condition, and it should be handled with caution. The Soviet safety classification of the fuze is "unsecured." The K-20 possibly may be used in the 23mm aircraft gun, Models NH and NS, but evidence of its use with these weapons is lacking. The K-20 and the almost identical K-20m appear to have been replaced by the A-23 fuze, presumably because the A-23, although less sensitive, is simpler and cheaper to manufacture.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

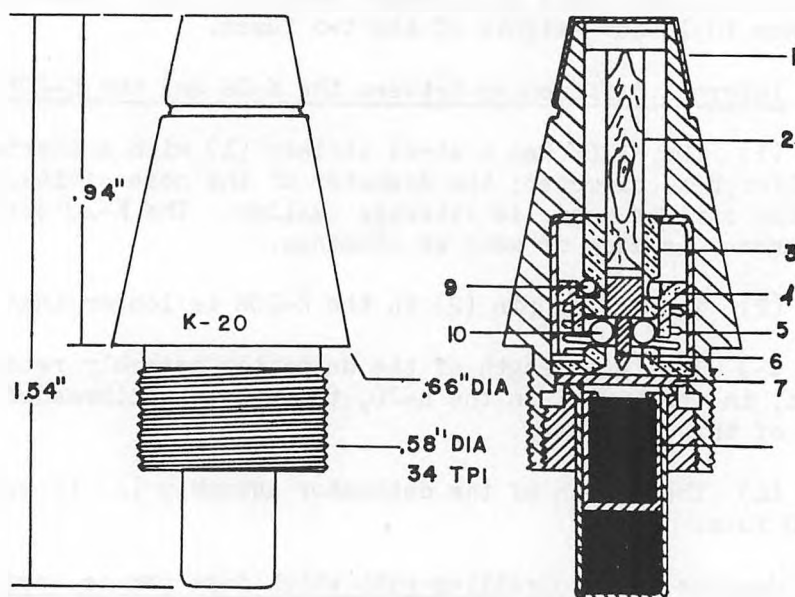
c. Functioning. Upon firing, the arming sleeve (4) sets back, compressing the arming sleeve spring (5) and creating an outlet for the three arming sleeve retaining balls (9). After the projectile has left the gun and centrifugal force has thrown the retaining balls out of their housings, the arming spring overcomes the diminishing force of inertia and moves the arming sleeves forward until it frees the two firing pin check balls (10). The check balls pass into the fuze body cavity through openings in the striker guide (3), and only the safety disk (7) remains between the firing pin (6) and the detonator assembly. Upon impact, the foil cap (1) is crushed inward, the striker (2) drives the firing pin through the safety disk into the detonator initiating pellet (8), and the resulting detonation activates the projectile's explosive charge.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
23mm aircraft gun, Model VYa	23mm HEI ----- unknown
	HEI-T ----- OZT
25mm antiaircraft gun, M1940	25mm Frag-I-T ----- OZR-132

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL K-20



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL K-20M

a. General. The K-20M is identical to the K-20 in external dimensions, body material, functioning, and (except for sizes and the materials of certain parts) internal construction. It differs from the K-20 in outer appearance only by having a smooth, ungrooved body contour, and by mounting a foil disk in the top of the nose cavity instead of having a foil cap crimped over the nose. There is little difference in loaded weights of the two fuzes.

b. Internal differences between the K-20 and the K-20M.

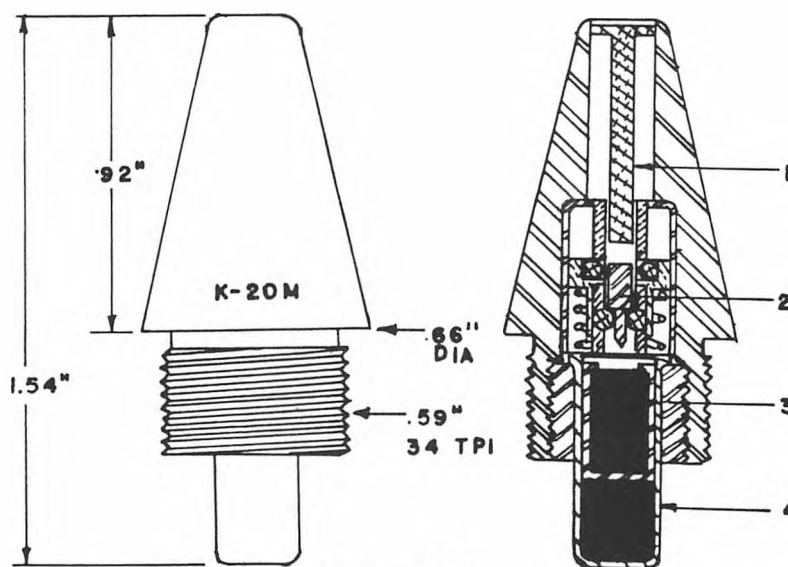
(1) The K-20M has a steel striker (1) with a shorter length and smaller head diameter; the diameter of the nose cavity, corresponding to the striker head, is likewise smaller. The K-20 striker, besides being larger, is made of wood or aluminum.

(2) The firing pin (2) in the K-20M is longer than the K-20.

(3) The full length of the detonator assembly retainer (3) is threaded, in the K-20M; in the K-20, there is an unthreaded shoulder at the top of this retainer.

(4) The length of the detonator assembly (4) is greater for the K-20 fuze.

c. Weapons and projectiles with which fuze can be used. The K-20M can be used with the same weapons and ammunitions as the K-20. Both fuzes appear to have been replaced by the A-23.



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-8

a. General. The MG-8 (Malokaliberny, Golovnoy, 8-y Obozrets (small-caliber, point detonating, Model 8) is a bore-safe fuze which arms at approximately 50 to 100 meters from the muzzle of the gun. It incorporates a setback-actuated, self-destruction feature which will cause the projectile to detonate 8 to 11 seconds after leaving the bore, provided that the target is not struck beforehand. The Soviet safety classification of the fuze is "safe." The MG-8 is similar in external appearance and internal construction to the later MG-37 antiaircraft fuze, and it also closely resembles the A-37 and A-37U aircraft fuzes.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Upon firing, the setback ignitor pellet (13) overcomes the resistance of the safety spring (14) and impinges on the setback firing pin (15). The resulting flash simultaneously ignites the self-destruction powder train (11) in the powder train ring (10) and the black powder pellet (7) which holds the rotor locking pin (8) in place. The flash presumably reaches the powder pellet (7) through a channel not visible in the drawing. When the black powder pellet has burned away, centrifugal force moves the rotor locking pin out of the groove in the rotor (3), which is then free to rotate in the trough of the U-shaped rotor mount (4). Centrifugal force causes the freed rotor, whose center of gravity is located off the axis of rotation, to turn 90° around the pivot pins (6), thus aligning the primer charge (5) with the impact firing pin (2) and the detonator assembly (9). Upon impact with the target, the nose cap is crushed and the striker (1) drives the impact firing pin into the primer charge. The flash from the primer charge passes to the detonator assembly, which activates the booster (12), thereby detonating the projectile. Should the projectile fail to hit the target, the burning self-destruction powder train ring (10) will ignite the detonator, and the fuze will function from 8 to 11 seconds after the round is fired. This time is sufficient to permit the projectile to travel beyond the maximum range at which it is normally used.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-8

d. Weapons and projectiles with which fuze can be used.

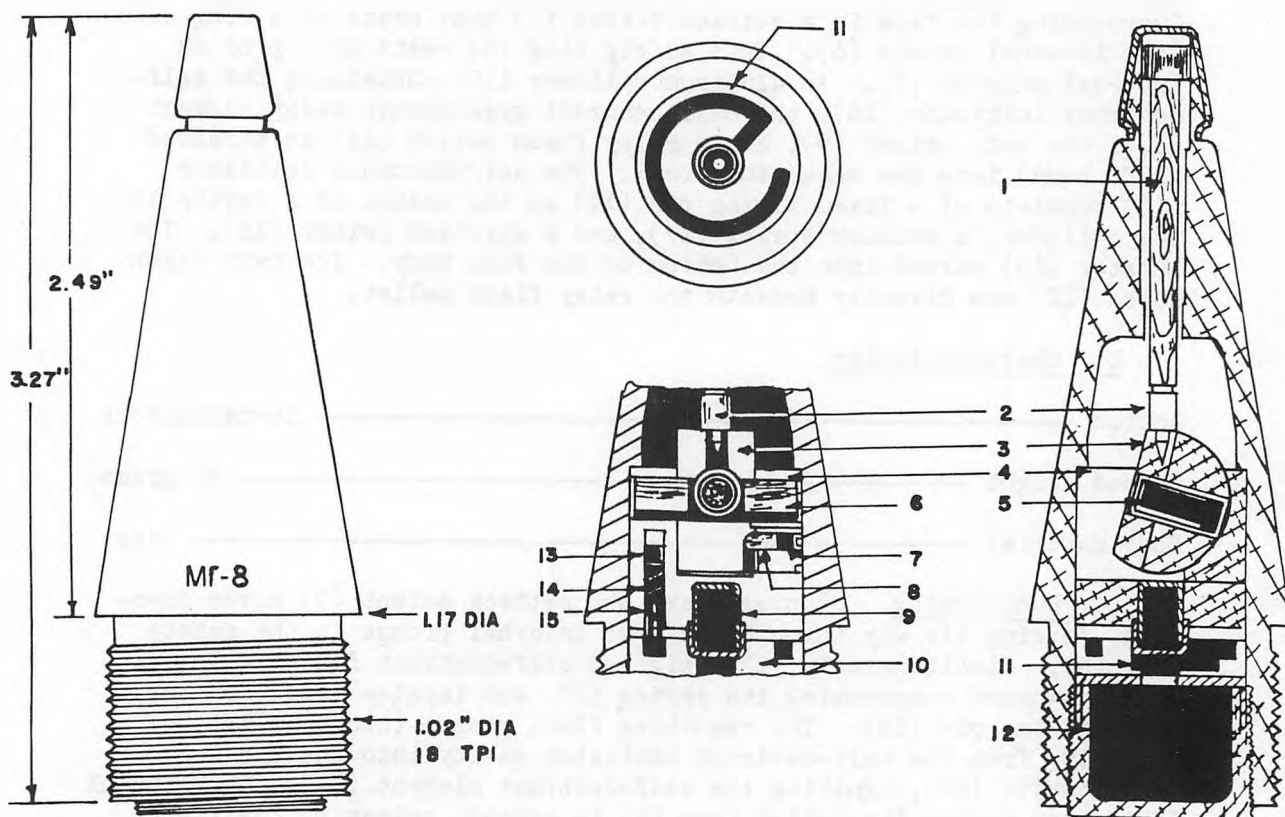
Weapons

Projectiles

37mm antiaircraft gun M1939

37mm Frag T -----

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-25

a. General. The MG-25 fuze is bore-safe and is supersensitive in the armed condition. It contains a setback actuated self-destruction feature that destroys the projectile between five and eight seconds after firing, provided the target has not been hit beforehand.

The fuze has a thin aluminum foil membrane (1) over the firing pin cavity in the nose. Beneath the membrane is a floating firing pin extension (2). The floating firing pin extension projects into the main fuze cavity, through a solid bulkhead which it is retained by. In this cavity, the firing pin (5) rests on a coiled centrifugal spring tape (4). The tape prevents the firing pin from reaching the primer. Surrounding the tape is a setback detent (3) that rests on a ring with four internal prongs (6). This safety ring (6) rests on top of an internal support (7). An aluminum cylinder (10) containing the self-destruct initiator (16), the self-destruct pyrotechnic delay element (22), the body primer (9), and a relay flash pellet (11) is threaded (left hand) into the steel fuze body. The self-destruct initiator (16) consists of a fixed firing pin (19) in the bottom of a cavity in the cylinder, a setback spring (17), and a weighted primer (16). The booster (13) screws into the bottom of the fuze body. Its twin flash holes (12) are directly beneath the relay flash pellet.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 38 grams

Body material ----- steel

c. Functioning. Upon setback, the setback detent (3) moves downward, forcing its way through the four internal prongs in the safety ring (6). Simultaneously, the weighted self-destruct flash pellet (16) moves downward compressing its spring (17) and impales itself on the fixed firing pin (19). The resulting flash passes through a lateral hole (18) from the self-destruct initiator cavity into the pyrotechnic delay cavity (20), igniting the self-destruct element (22). Centrifugal force then causes the coiled tape (4) to expand, releasing the firing pin (5). The firing pin (5) and the firing pin extension (2) move forward into their cavity by creep action. Upon impact, the firing pin extension (2) is driven rearward forcing the firing pin downward into the body primer (9). The resulting flash ignites the relay pellet (11) which causes a flame to flash through the two flash holes in the booster cap, detonating the booster (13).

If the fuze fails to impact with the target, the pyrotechnic self-

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-25

destruct element (22) will burn into a flash pellet (21) which flashes into the two flash holes (12) in the booster cap causing a detonation.

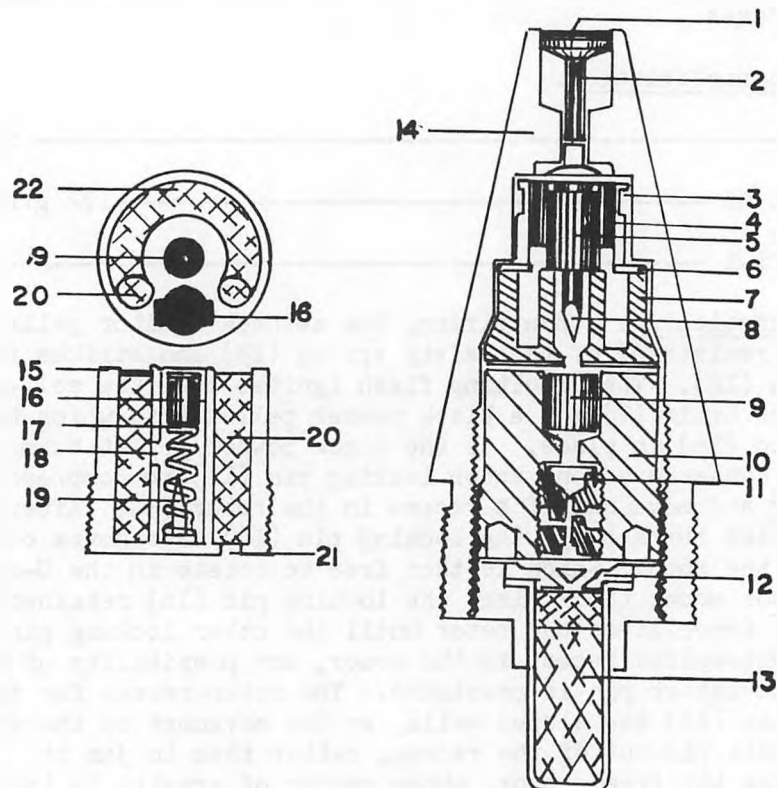
d. Weapons and projectiles with which fuze can be used.

Weapons

23mm antiaircraft gun ZU-23

Projectiles

23mm Frag HEI-T ----- OFZT



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-37

a. General. The MG-37, a later version of the World War II MG-8, is a bore-safe fuze with a setback-actuated, self-destruction feature that will detonate the fuze 10 to 12 seconds after the round is fired. It is almost identical to the MG-8 in external appearance, and its only major internal differences appear to be a redesigned rotor and an improved arming safety arrangement involving the use of two rotor locking pins instead of one. The MG-37 also bears a close resemblance to the A-37 and A-37U aircraft fuzes in external appearance, internal construction, and dimensions. Available evidence indicates that the MG-37 is restricted to antiaircraft gun fire and is not interchangeable with aircraft fuzes.

b. Characteristics.

Action ----- instantaneous

Loaded weight -----172 grams (0.38 lb)

Body material ----- steel

c. Functioning. Upon firing, the setback ignitor pellet (12) overcomes the resistance of the safety spring (13) and strikes the setback firing pin (14). The resulting flash ignites both the self-destruction powder train (7) and a black powder pellet (15) which holds a rotor locking pin (16) in place. As the black powder pellet burns, centrifugal force causes a second rotor locking pin (11) to compress its retaining spring and move out of a recess in the rotor (3). After the black powder pellet burns away, the locking pin (16) also moves out of its recess in the rotor, which is then free to rotate in the U-shaped trough of the rotor mount (6). Since the locking pin (16) retained by the powder pellet immobilizes the rotor until the other locking pin (11) clears its straight-walled recess in the rotor, any possibility of the rotor's jamming the latter pin is precluded. The rotor recess for the pellet-retained pin (16) has sloped walls, so the movement of the rotor tends to slide this pin out of the recess, rather than to jam it. Centrifugal force causes the freed rotor, whose center of gravity is located off the axis of rotation, to turn 90° around the pivot pins (10), thus aligning the primer charge (4) with the impact firing pin (2) and the detonator assembly (5). Upon impact with the target, the nose cap is crushed, and the impact striker (1) drives the impact firing pin into the primer charge. The flash from the primer charge passes to the detonator assembly, which activates the booster (9), and the booster in turn activates the projectile's explosive charge. If impact does not occur

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-37

first, the burning self-destruction powder train in the powder train ring (8) will ignite the detonator, and the fuze will explode from 10 to 12 seconds after the round is fired.

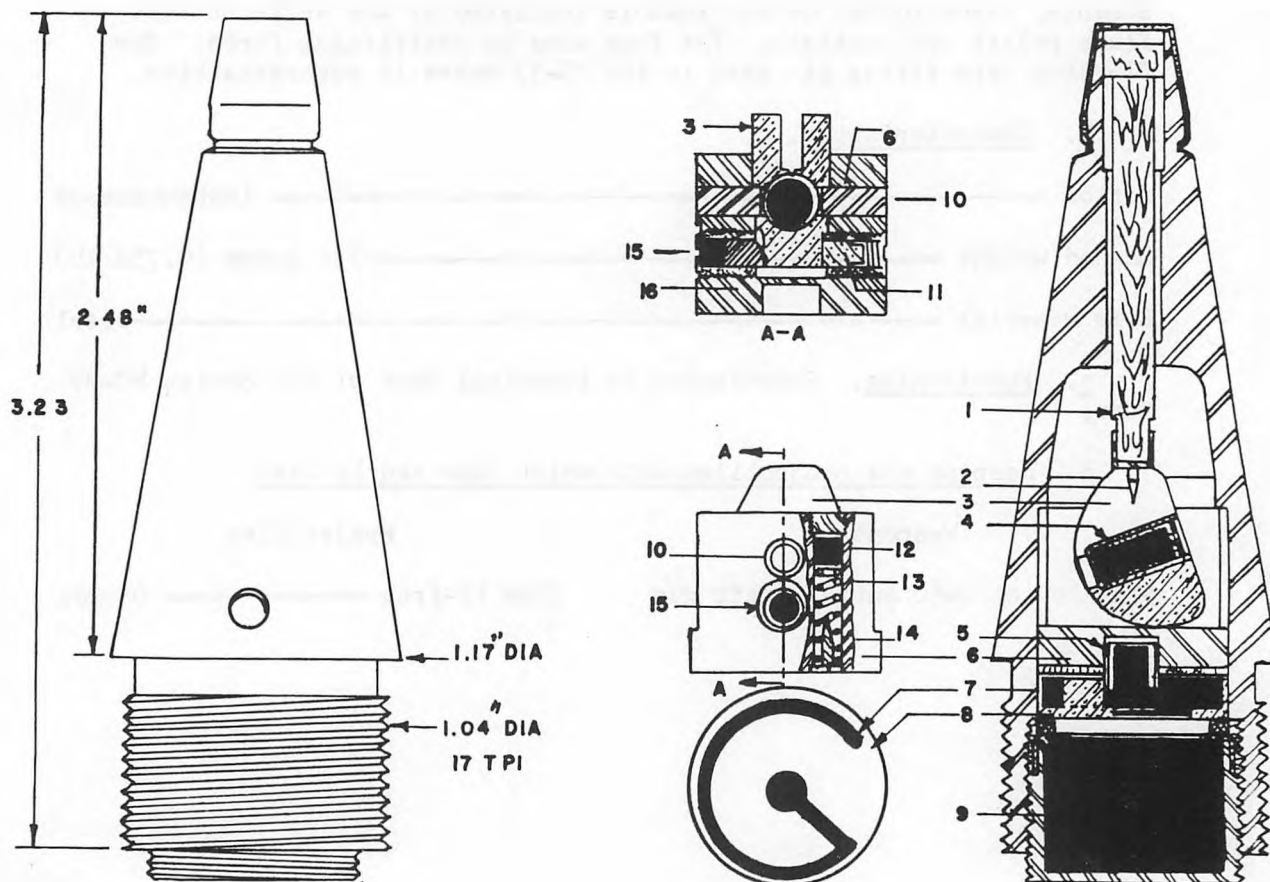
d. Weapons and projectiles with which fuze can be used.

Weapons

37mm anti-aircraft gun M1939

Projectiles

37mm Frag T ----- OR-167



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-57

a. General. The MG-57 is a bore-safe, out-of-line detonator fuze. It employs a setback-actuated, self-destruction feature that will cause the projectile to detonate 19 seconds after leaving the bore, providing no prior target impact occurs. A metal shipping cap (1) with pull wire protects the firing pin membrane during shipping. The firing pin is composed of a metal firing pin (4) attached to a wooden shaft (3). It locks the rotor (5) during setback. The rotor housing contains the self-destruct-initiating mechanism. This consists of a weighted, moveable detonator, spring, and fixed firing pin. This assembly is parallel to the fuze axis. The main fuze detonator (7) sits in the center of the pyrotechnic self-destruct disk. The fuze features a delay arming, consumable, black powder detent that is initiated by the self-destruct flash pellet upon setback. The fuze arms by centrifugal force. The floating type firing pin used in the MG-57 makes it supersensitive.

b. Characteristics.

Action ----- instantaneous

Loaded weight -----335 grams (0.738 lb)

Body material -----steel

c. Functioning. Functioning is identical that of the Soviet MG-37 fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons

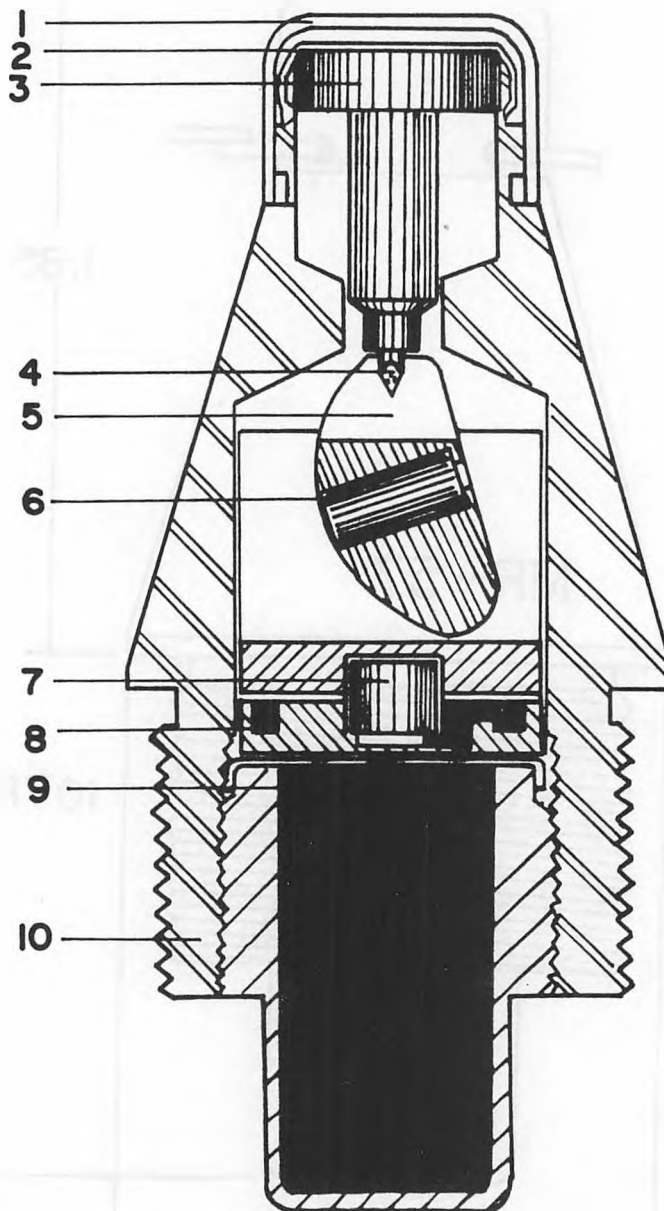
Projectiles

57mm Soviet S-60 antiaircraft gun

57mm HE-Frag ----- OR-281

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SOVIET, POINT DETONATING IMPACT FUZE: MODEL MG-57

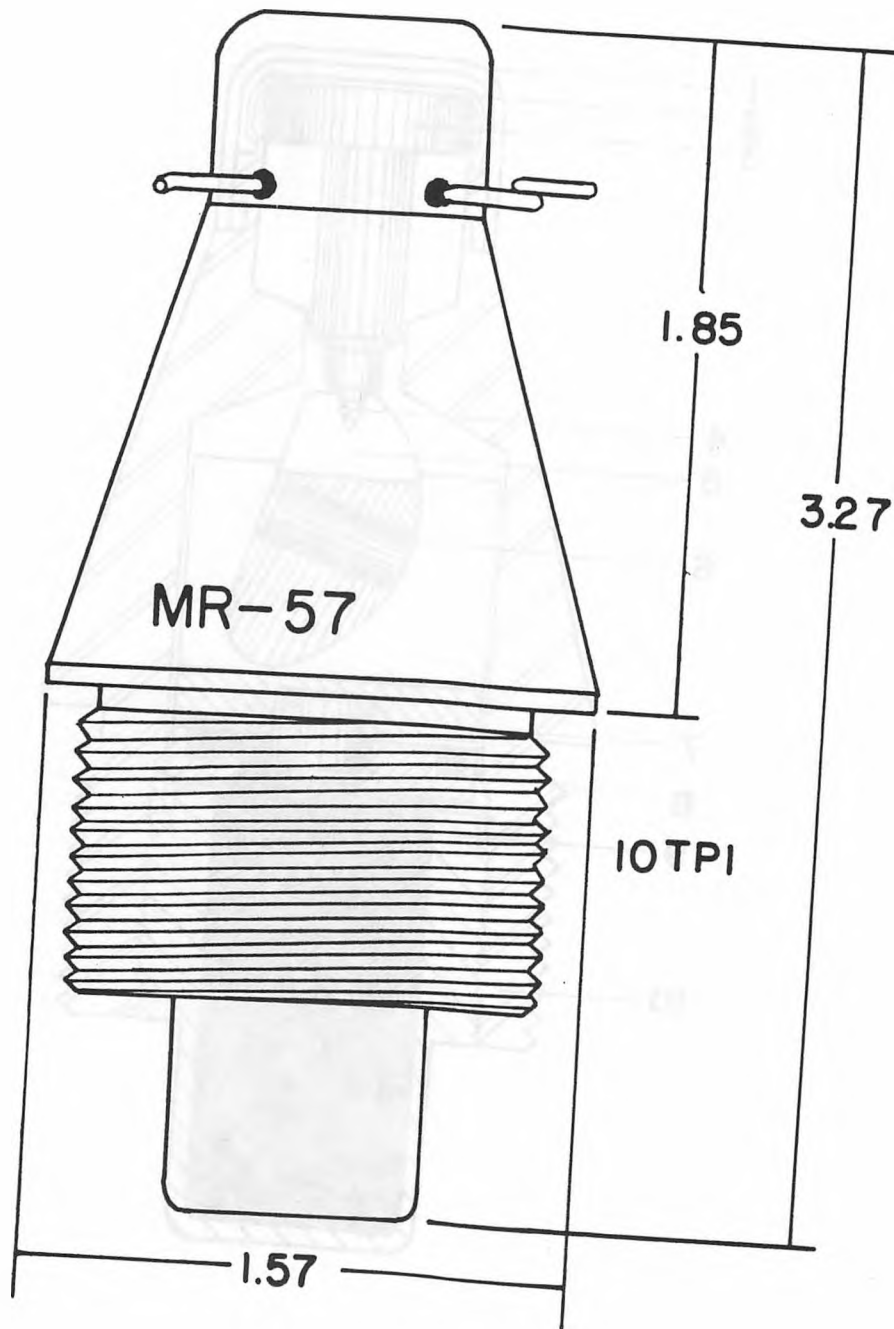


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SOVIET, POINT DETONATING IMPACT FUZE: MODEL MG-57



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MGZ-57

a. General. The MGZ-57 fuze is similar to the MG-57, with certain modifications. It has a threaded metal shipping cap with four equidistant holes near its upper rim. The thin aluminum crush cap is crimped into a groove cut into the fuze body. A vinyl sealing ring occupies the groove and makes the upper part of the fuze waterproof. The firing pin is all metal rather than metal and wood as in the MG-57. There is also a spring under the firing pin head in lieu of a wax filler in the MG-57. The detonator in the rotor is held in position by a threaded ring. In the MG-57, the detonator is pressed and stab crimped in the rotor. The fuze body is recessed at the booster cavity to accept a vinyl waterproofing ring and a steel lock ring. The lock ring employs the booster threads to compress the vinyl ring. The copper foil seal over the booster is conical-concave. This same shape is formed into the PETN booster explosive. The booster on the MG-57 has a flat surface. The rotor has centrifugal locking pins to lock the rotor in the armed position.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 314 grams (0.691 lb)

Body material ----- steel

c. Functioning. When fired, setback causes the same functioning as that which occurs in the MG-57 fuze. Centrifugal force moves the spring retaining the rotor lock pin out of the rotor. When the delay arming black powder pellet is consumed, the detent is moved into the evacuated cavity. The rotor then rotates to the armed position. Simultaneously, the rotor lock pin moves into a slot cut into the rotor cavity in the rotor housing, locking the rotor in the armed position. Functioning then continues in a manner identical to that of the MG-57 fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons

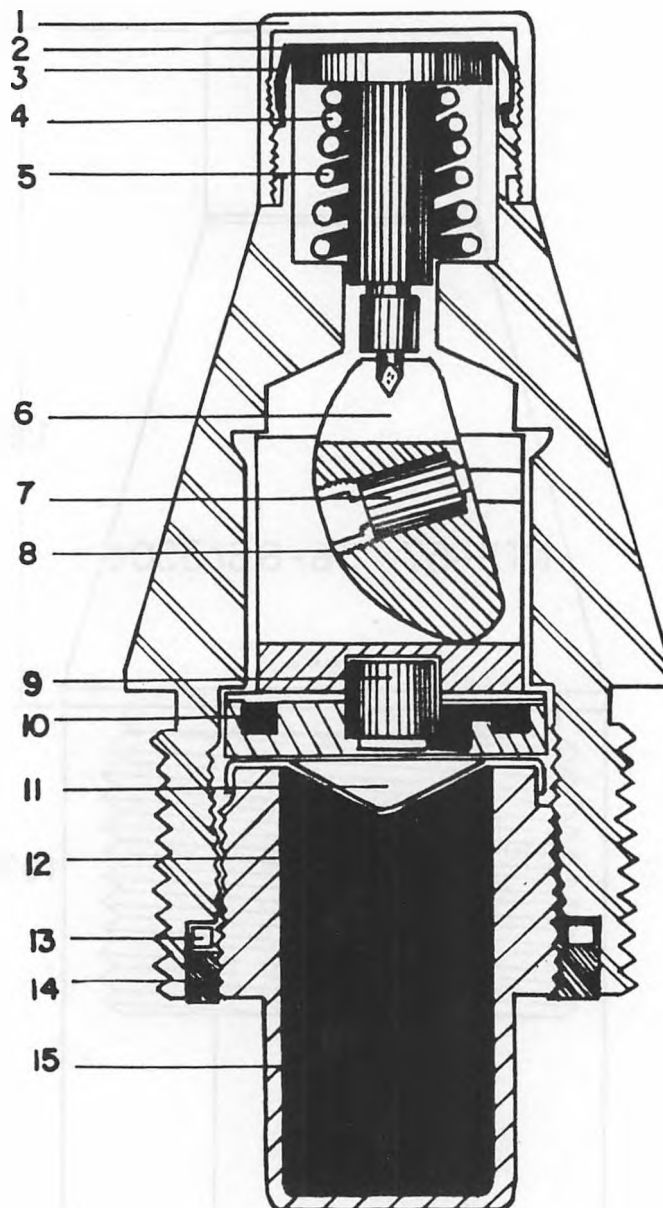
Projectiles

57mm Soviet S-60 antiaircraft gun

57mm HE-Frag ----- OR-281

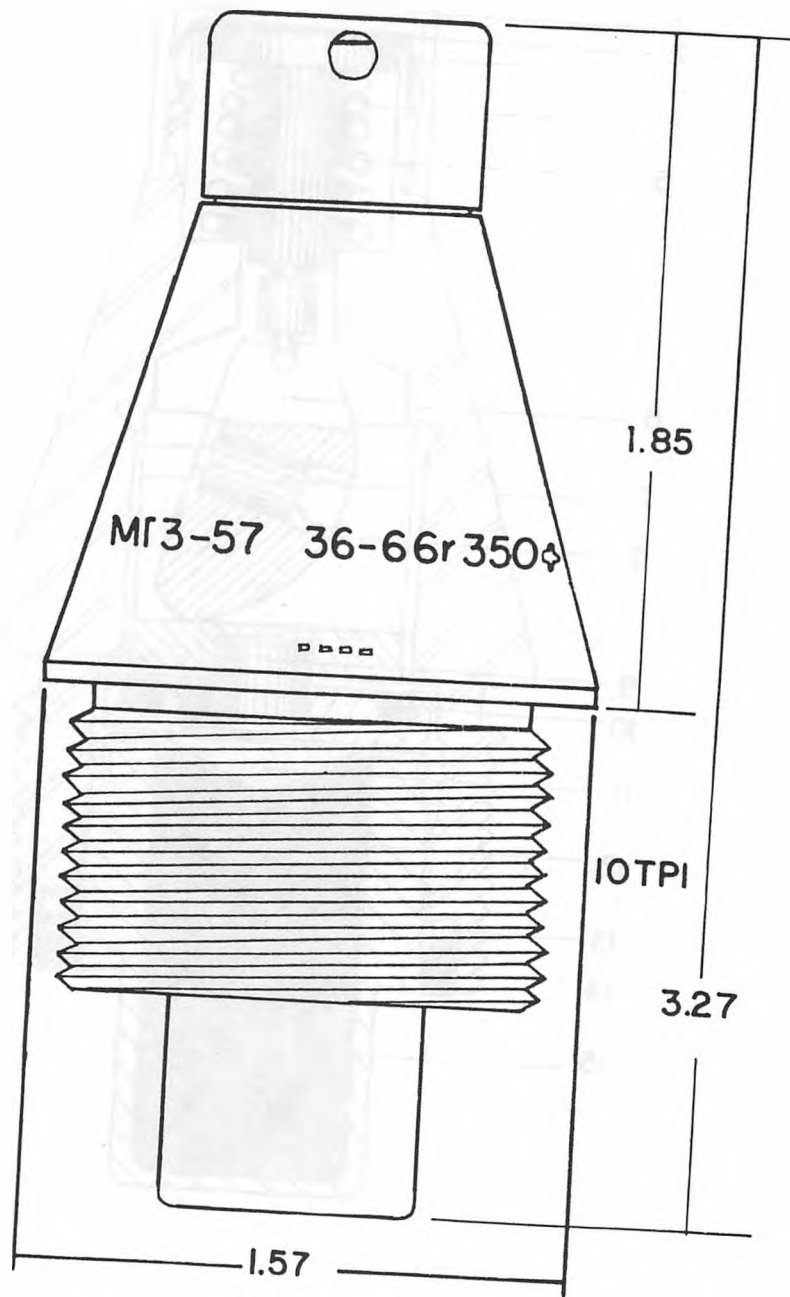
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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MGZ-57



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MGZ-57



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CHAPTER 2

CHINESE COMMUNIST FUZES FOR AIRCRAFT AND ANTIAIRCRAFT GUNS

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GENERAL

ChiCom aircraft and antiaircraft fuzes appear to be exact copies of their Soviet counterparts. In most instances, materials, workmanship, and components are identical. ChiCom fuzes are designated by the Chinese character suffix for "Type." The prefix character normally represents a Chinese character which is similar to the sound of the Russian letter of the model designation. These Chinese characters and the Arabic number for the fuze type are die-stamped into the fuze metal in the same manner as those on Soviet fuzes.

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 37

a. General. The ChiCom type 37 fuze is identical to the Soviet B-37 point detonating impact fuze.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 172 grains (0.38 lb)

Body material ----- steel

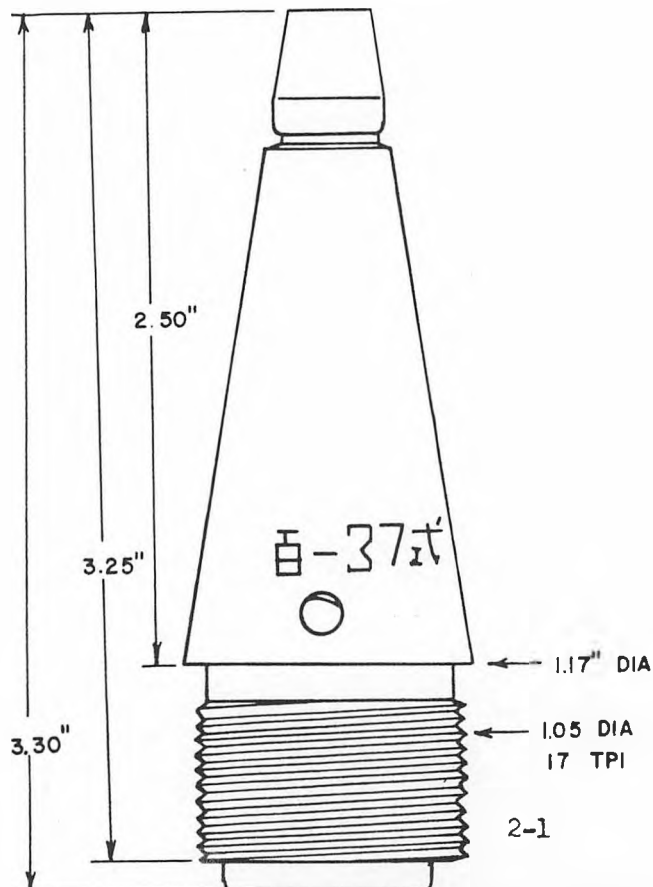
c. Functioning. The functioning of this fuze is identical to the workings of the Soviet B-37 and MG-37 point detonating impact fuzes.

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

37mm antiaircraft gun, type unknown



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CHAPTER 3

SOVIET POINT-DETONATING FUZES

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SOVIET POINT-DETONATING FUZES

Early Soviet fuze designs were based on principles seen in French Schneider fuzes. The Schneider Company built and operated cannon and projectile manufacturing plants in Tzarist Russia and, quite naturally, exerted a great influence in early Russian artillery. When the Soviets gained control of Russia, after the Russian Revolution in 1917, the French Schneider plants fell under their control. Even though these heavy industrial facilities were completely Sovietized, they continued to exert French influence on Soviet artillery munition designs. This condition continued until World War II when German munition philosophies severely modified the original French influence.

Today basic fuze principles originating in all the major munition-producing countries of the world may be seen in Soviet fuzes. Soviet espionage collected the data, and Soviet ordnance engineers incorporated the most desirable features into current designs. Because of this, current Soviet designs show a marked improvement in safety, reliability, and workmanship. The most notable improvement is seen in weatherproofing Soviet fuzes. Soviet fuzes, with some minor exceptions, are completely waterproof. It was learned, much to the consternation of Free World Forces, that the Viet Cong and North Vietnamese Army stored Soviet fuzes, rockets, and some other ammunition items underwater as a normal procedure. Soviet point-detonating fuzes completely exhibit indigenous characteristics and, in a reverse pattern, influence Western fuze design philosophies.

The Soviets classify fuzes in two major categories: "igniferous" and "disruptive." "Igniferous" fuzes (Trubki) contain low explosives, and they serve as initiators to produce the operation of expelling charges, detonators and detonator-booster combinations. "Disruptive" fuzes (Vzryvalety) contain a stab-sensitive detonator, or detonator-booster assembly and are intended to initiate direct functioning only in high explosive, armor piercing ammunition.

The two major Soviet fuze classifications are further subdivided into classes that are directly comparable to their American counterparts. These are point-detonating fuzes and base-detonating fuzes. The type of action is a basis for a further division into impact, combination time and impact, and time and proximity fuzes. Fuzes of the impact type are armed by setback, centrifugal force, or a combination of both; they function by direct action upon impact with a target. Some incorporate selective instantaneous or delay features.

The degree of safety in handling and firing forms the basis of an additional Soviet fuze classification. "Unsecured" fuzes are unsafe in handling or firing. In this class the primer and detonator are not shielded or separated from booster. "Semisecure" fuzes are safe for transport, but are not detonator-safe. In this class the primer is isolated from the detonator, but the detonator has free access to the

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booster. "Safe" fuzes are bore-safe and detonator-safe. Newly adopted Soviet fuzes show a marked increase in out-of-line detonator designs, indicating a trend toward eliminating all but "safe" fuzes.

Soviet artillery fuzes are of conventional design and function on accepted mechanical and explosive principles. Point-detonating fuzes are constructed from a wide range of materials. The majority of Soviet fuzes have components of steel and are exceedingly robust in design. All point-detonating fuzes incorporating selective instantaneous and delay features are made of steel and are designed to remain intact and in line even though the fuze may have impacted against a solid target. Fuzes employed in point-initiating base-detonating modes are normally made of aluminum. This material has proven sufficiently rigid to maintain high explosive, antitank projectiles at a proper stand off for maximum penetration. Fuzes which function instantaneously are being constructed of plastic. Urea formaldehyde with a cellulose filler is the most common plastic encountered. Since these fuzes need not withstand impact stresses, a molded plastic offers an economical medium from which to mass-produce fuze bodies.

Point-detonating fuzes are generally equipped with a removable nose cap. If a slight delay is desired (nondelay) the fuze is fired with the cap in place. For instantaneous fuze action, the cap is removed before firing. Soviet fuze terminology defines a "delay fuze" as one whose functioning delay is 0.01 second or greater. The US definition is 0.02 second or greater.

The Soviets have apparently abandoned black powder delay pellets as being inconsistent with their weatherproof munition design philosophy. Black powder is notoriously hygroscopic. For this reason, nonhygroscopic, nongaseous compounds are currently being pressed into delay pellets.

Soviet fuze markings are die-stamped into fuze bodies on or near the greatest diameter. The markings normally consist of a single line of cyrillic letters and Arabic numbers. The line of markings is separated by dashes into groups which identify the manufacturing plant, fuze designation, lot number, and year of manufacture. Sometimes, these markings are found at random and may be stenciled rather than die-stamped.

Certain fuzes have different colored nose caps or colored bands around the membrane caps. These markings apparently are employed to identify fuzes which are identical in appearance, but which have different functioning action. Where the color coding is known, it is explained in the text.

The Soviets appear to have adopted the principle of dual fuze action in their point-detonating fuzes. Basically, this fuze design philosophy utilizes the principle of forcing a firing pin rearward upon impact, and moving the primer-detonator forward by inertia. To increase the sensitivity of inertial-actuated primer-detonator carriers, graze sensitive cam weights are employed to slide the carrier forward on impact at flat angles. This principle is commendable, and it appears to have resulted in great fuze reliability.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL AD

a. General. The AD fuze is a copy of an old French fuze. It is used with 76mm and 152mm high-explosive projectiles of French design, and is made of old French parts. It is a double-action type and has two settings: instantaneous and nondelay. If the fuze cap is removed, the action is instantaneous; with cap on, a nondelay action is obtained.

b. Characteristics.

Action ----- instantaneous and nondelay

Loaded weight ----- 150 grams (0.33 lb)

Body material ----- brass

c. Functioning. Upon firing, the stirrup (4) sets back, overriding the primer carrier (6), and compressing the stirrup safety spring (11). The stirrup clips (5) engage the step on the inner circumference of the stirrup, thereby locking the primer carrier to the stirrup. Simultaneously, the primer carrier sets back, firmly pressing the lead gas check ring (7) against the base plug, and the stud on the base of the primer carrier enters the hole in the base plug, effectively sealing off the detonator (8) from the primer (12); this prevents the fuze from detonating in the weapon, should premature ignition of the primer occur. After the projectile leaves the bore, the stirrup safety spring (11) decompresses and moves the stirrup, with the attached primer carrier, forward into position directly beneath the firing pin (3). Upon impact, at the instantaneous setting (fuze cap (1) removed), the striker (10) and firing pin are driven rearward, overcoming the firing pin spring (2). The firing pin strikes the primer, successively initiating the primer, detonator, and booster (9), thus exploding the shell. At the nondelay setting (fuze cap (1) left in place), the fuze cap (1) prevents the movement of striker and firing pin; instead, the primer carrier sets forward at impact, forcing the primer against the firing pin, and in this way initiating the explosive train.

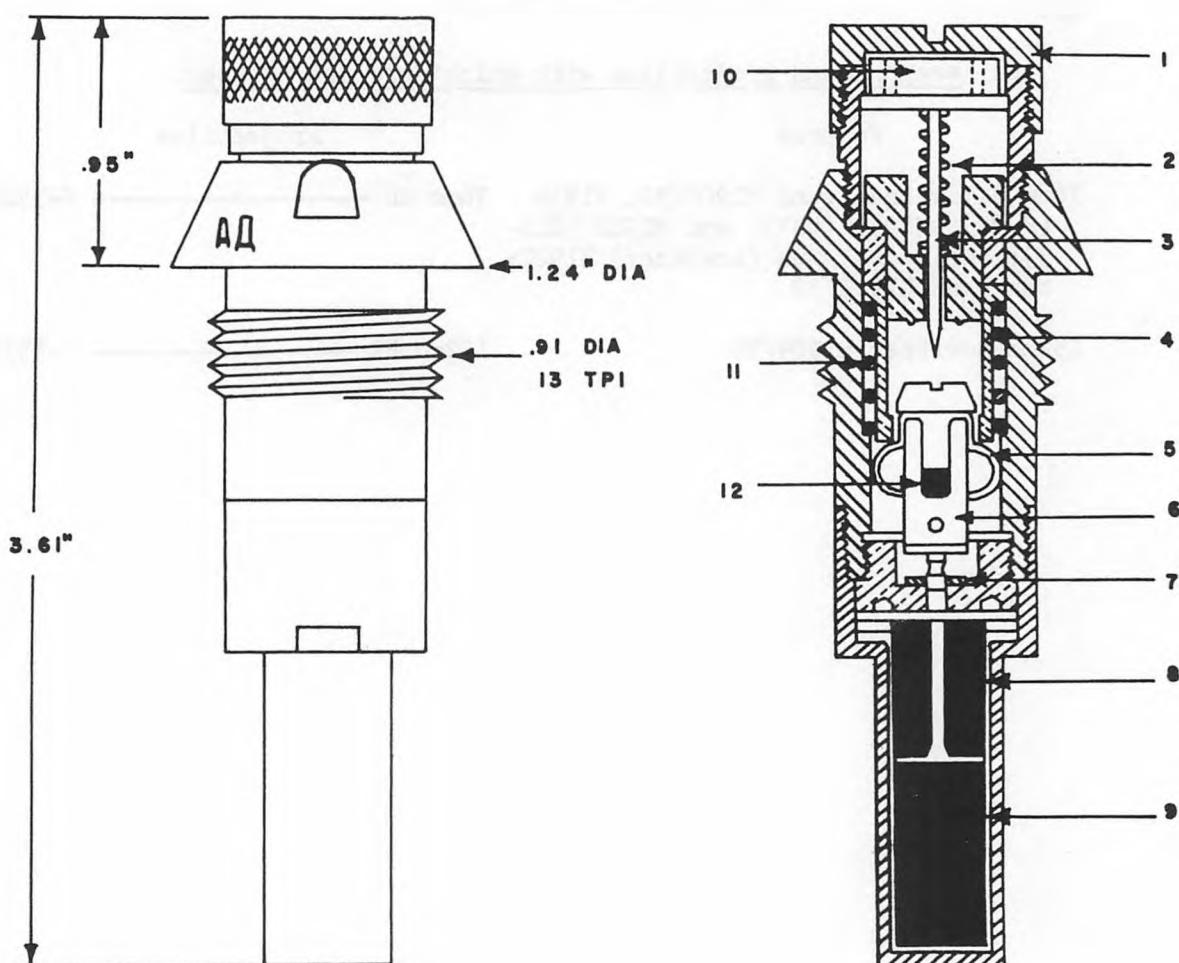
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933, M1936 (F-22), M1938/39, M1939, (USV), and 1942 (ZIS-3); regimental gun (howitzer) M1927; tank gun M1927/32	76mm HE ----- F-354F
152mm howitzer M1909/30	152mm HE ----- F-533F

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL AD



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL AD-2

a. General. This fuze is similar in construction, action, and settings to the Model AD, but it differs from the AD fuze in the shape of the nose. The AD-2 fuze is a copy of the French point-detonating fuze Mark 24/31 of the 1899/16 design and is interchangeable with the AD.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); regimental gun (howitzer) M1927; tank gun M1927/32	76mm HE ----- F-354F
152mm howitzer M1909/30	152mm HE ----- F-533F

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL AD-N

a. General. The AD-N is similar in construction, action, and settings to the AD and AD-2 fuzes, and it differs significantly from them only in that it is not assembled from remade or salvaged parts, but from newly manufactured components. It is interchangeable with the AD and AD-2 fuzes.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); regimental gun (howitzer) M1927; tank gun M1927/32	76mm HE ----- F-354F
152mm howitzer M1909/30	152mm HE ----- F-533F

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL BM

a. General. The BM fuze was designed for use with HEAT ammunition. Its main components are a body, an arming mechanism, a direct-action percussion mechanism, and a detonator assembly. The striker (2) is made of a light alloy; it has a head of large sectional area, thereby insuring high sensitivity on impact. Although the fuze is apparently safe to handle and fire, its Soviet safety classification is "unsecured."

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Upon firing, the arming sleeve (4) sets back and compresses the arming sleeve spring (5), whereupon the arming sleeve retaining balls (11) fall away. When the projectile leaves the bore of the gun, the arming sleeve spring decompresses, thereby moving the arming sleeve forward until the firing pin retaining balls (6) are released from their housings in the firing pin guide (3). The release of the firing pin retaining balls frees the striker (2) and firing pin (7) for rearward movement. Impact drives the striker and firing pin to the rear, so that the firing pin pierces the brass foil safety disk (8) and penetrates the detonator assembly (10), which explodes, activating the projectile.

d. Weapons and projectiles with which fuze can be used.

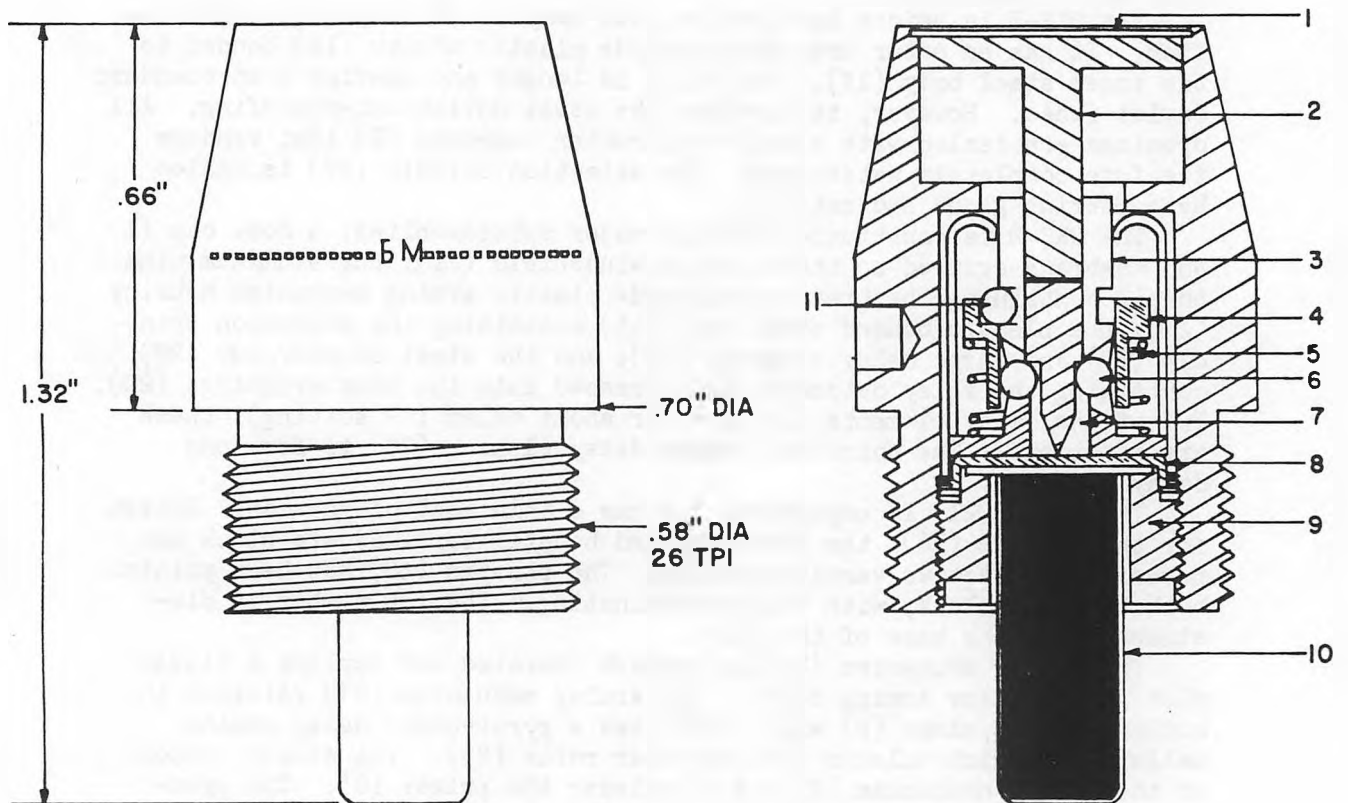
Weapons

Projectiles

76mm divisional guns M1902/30, M1933, M1936 (F-22), M1938/39, M1939 (USV), and M1942 (ZIS-3); regimental guns (howitzers) M1927 and M1943; tank gun M1927/32	76mm HEAT ----- BP-344A; BP-350M; BP-353A; BP-353AM; BP-354AM
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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL BM



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B

a. General. The Soviet DKZ-B point-detonating fuze has been encountered only on the 122mm fin-spin stabilized rocket DKZ-66. All fuzes recovered have been sanitized. The only marking exhibited on the fuze is the lot number.

The DKZ-B is unique because the fuze body is of composite construction. It has an outer urea formaldehyde plastic sheath (16) bonded to the inner steel body (15). The DKZ-B is longer and heavier than standard Soviet fuzes. However, it displays the usual Soviet waterproofing. All openings are sealed with a synthetic rubber compound (2) that renders the fuze completely waterrroof. The selection spindle (27) is sealed by a packing gland and nut (34).

The DKZ-B is constructed of four major subassemblies: a nose cap (1) and membrane crimped to the aluminum windshield (21); the aluminum windshield containing the urea formaldehyde plastic arming mechanism housing (23); the plastic bonded steel body (15) containing the selection spindle (27) and three delay elements (17); and the steel booster cup (28) containing the relay detonator (19) pressed into the booster charge (20). Two of the delay elements (17) are for short delay ("B setting), these are redundant. The third and longer delay element (29) is for long delay.

The ogive (21) is unpainted, but has a thin coat of varnish. Except for the plastic (16), the fuze body and booster cup (28) are black and possess a protective varnish coating. The plastic (16) has been painted both blue and black, with blue predominating. The lot number is die-stamped near the base of the ogive.

The arming mechanism (23) is setback operated and employs a zigzag slot governor for arming delay. The arming mechanism (23) releases the cocked arming primer (8) which initiates a pyrotechnic delay arming pellet (13) which unlocks the detonator rotor (25). The single purpose of the arming mechanism (23) is to release the primer (8). The pyrotechnic delay arming mechanism (14) consists of a pressed, nongaseous powder (13) blocking a detent (14), which in turn locks the detonator rotor (25) in the safe position. When the pyrotechnic element (13) is consumed, cam action from the spring loaded detonator rotor (25) forces the detent (14) into the evacuated cavity, unlocking the rotor (25). An acceleration weight (30), is setback upon launch against its spring (31) and also unlocks the rotor (25). Without sustained acceleration locking the weight (30) down until after the delay arming detent (14) is withdrawn, the fuze will not arm.

The selection spindle (27) controls the instantaneous ("O" setting), short delay ("B" setting), and long delay ("M" setting) of the fuze. On instantaneous, a straight-through flash channel (32) permits flame from the detonator (26) in the rotor (25) to flash directly into the relay detonator (14). On short delay, the spindle (27) presents a

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B

solid block in the flash channel (32) so that the short delay pellets are ignited by flame that is reflected upward and outward by the blocked flash channel (32). On long delay, the spindle (27) has a short longitudinal channel (33) that leads a flame to the long delay pellet (29). Functioning of either one, or both, of the short delay pellets (17), or the single long delay pellet (29), produces flame from their respective flash pellets (18) which flashes directly into the heat sensitive relay detonator (19) in the booster (28).

b. Characteristics.

Action ----- instantaneous or delay

Loaded weight ----- 908 grams (2.0 lbs)

Body material ----- steel, aluminum, and plastic

c. Functioning. When the DKZ-66 rocket is fired, setback causes the setback sleeve (22) to move rearward while being retarded by the zig-zag slot governor and the sleeve spring (4). When the setback sleeve reaches the bottom of its travel, two levers (5) are moved inward, releasing the lock ball (6) which releases the spring-loaded arming primer (8). The arming primer (8), propelled by its spring, (7) impinges on the fired firing pin (10). The primer (8) flashes and flame travels through the three flash holes in the firing pin housing (10). This ignites the flash pellet (11) whose flame ignites the relay pellet (12). The relay pellet ignites the delay arming pellet (13). Simultaneously, setback and sustained acceleration cause the weight (30) to move to the rear and remain there partially unlocking the detonator rotor (25). When the delay arming pellet (13) burns out, the locking detent (14) is moved into the pellet cavity by the rotating rotor (25) powered by the rotor spring (35). The fuze is now armed. Upon impact, the nose cap membrane (1) is crushed so that the firing pin plunger (3) is forced downward driving the firing pin (9) downward against its spring into the detonator (26). If the spindle is set for instantaneous action, the straight-through flash channel (32) permits flame from the detonator (26) to flash directly into the relay detonator (19) functioning the warhead. If the spindle is set for short delay, the flash channel is blocked, and the delay pellets are ignited. When they burn through, the flash pellets flash into the detonator producing warhead functioning. If the spindle is set on long delay, the flash channel (33) transmits a flame from the detonator to the long delay pellet (29). When the pellet burns out, the burn-out flame completes fuze functioning.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

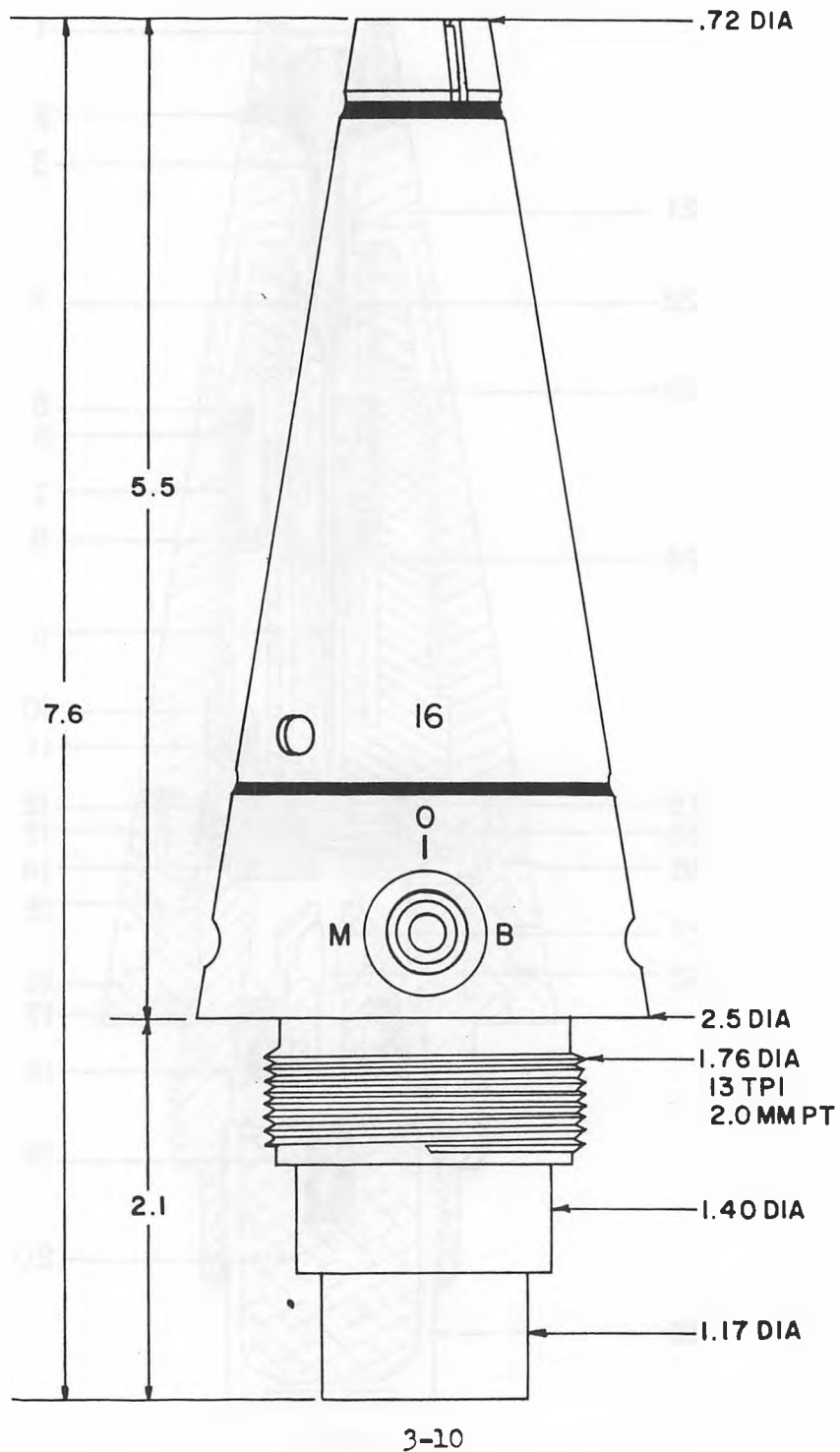
122mm rocket launcher, type unknown

122mm HE-PEFrag ----- 9M22M

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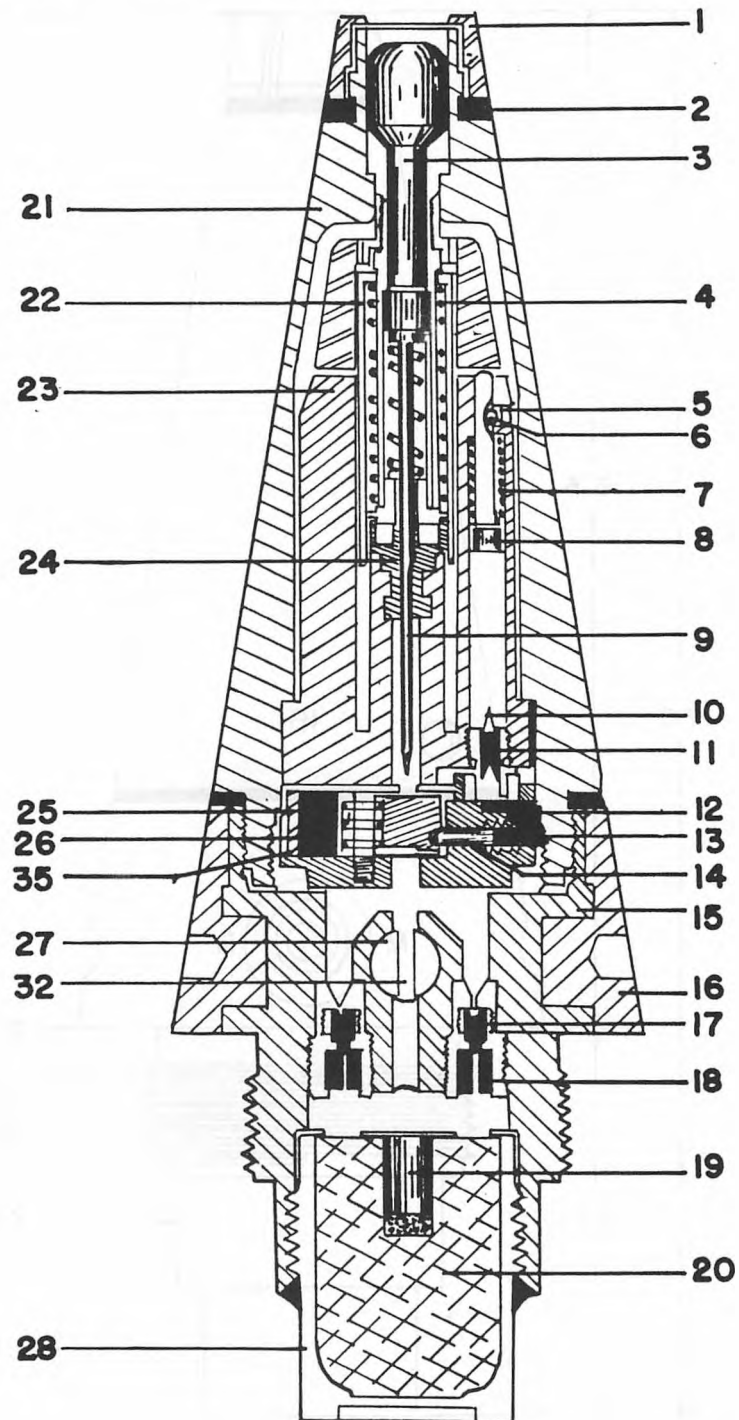
SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B

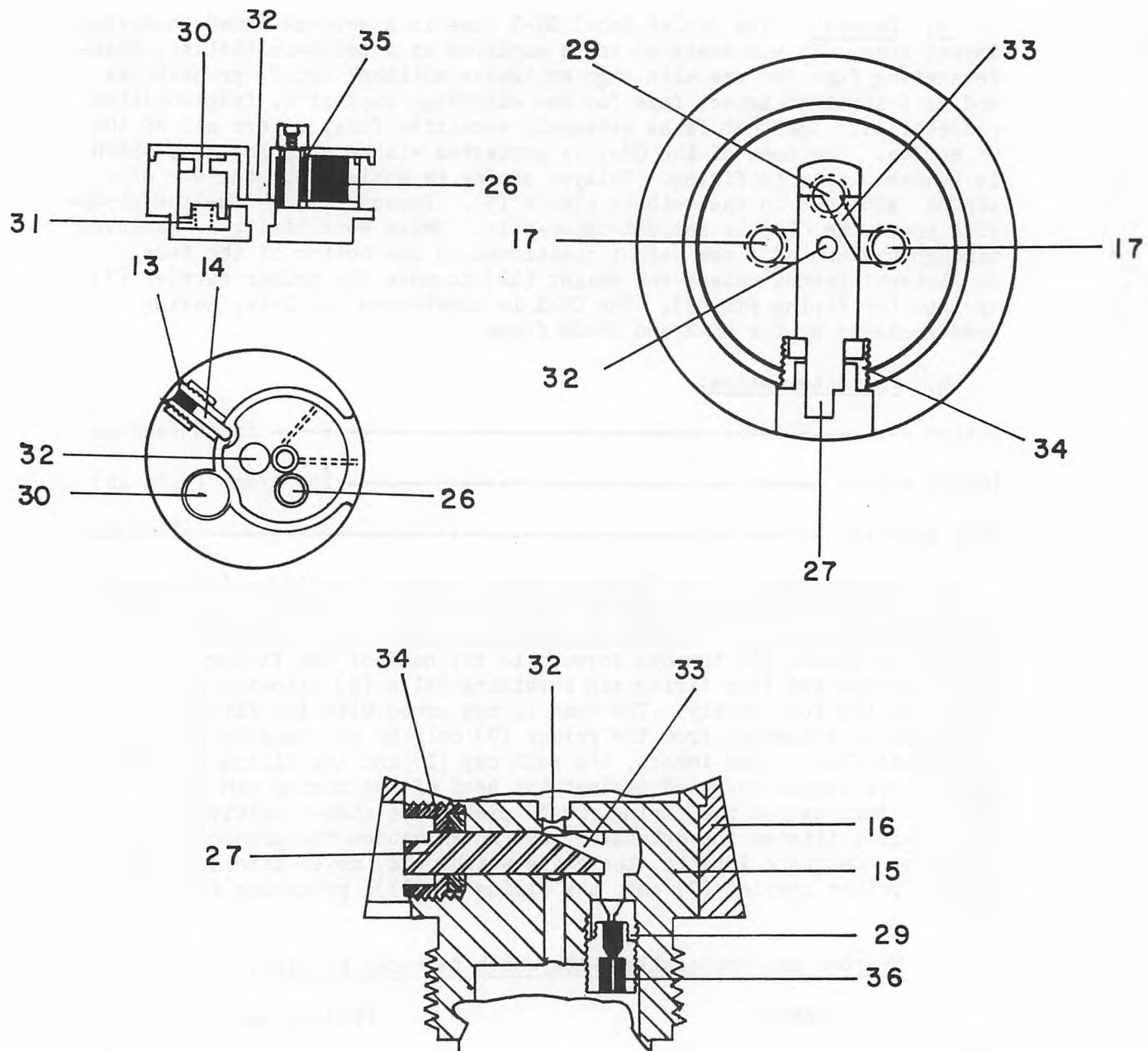


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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL DKZ-B



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SOVIET, POINT-INITIATING, BASE-DETONATING IMPACT FUZE: MODEL GK-1

a. General. The Soviet Model GK-1 fuze is a setback armed, nondelay, impact fuze. It was designed to be employed as a point-initiating, base-detonating fuze for use with high explosive antitank (HEAT) projectiles and as a straight impact fuze for use with high explosive, fragmentation projectiles. The GK-1 is an extremely sensitive fuze, as are all of the GK series. The nose of the GK-1 is protected with a shipping cap, which is removed prior to firing. Delayed arming is achieved by the use of a zigzag slot cut in the setback sleeve (5). Because of the in-line explosive train, the GK-1 is not detonator-safe. Graze sensitivity is achieved through the use of a cam weight positioned in the bottom of the fuze. Any lateral impact causes the weight (12) to move the primer carrier (7) up into the firing pin (3). The GK-1 is considered obsolete, having been replaced by the GK-2 and GK-2M fuzes.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 155 grams (0.34 lb)

Body material ----- aluminum

c. Functioning. Upon firing, setback causes the sleeve (5) to move to the rear, releasing the sleeve retaining ball (9), which falls into the fuze body cavity. As setback diminishes, the sleeve spring (4) forces the sleeve (5) to move forward to the head of the firing pin (3). This releases the four firing pin retaining balls (6) allowing them to fall into the fuze cavity. The fuze is now armed with the firing pin, (3) which is separated from the primer (7) only by the expanded firing pin spring (11). Upon impact, the foil cap (1) and the firing pin plunger (2) are driven downward against the head of the firing pin (3), which in turn causes the firing pin to pierce the stab-sensitive primer (7). This initiates the detonator, (8) which causes the projectile to detonate. On graze impacts, the graze weight (12) moves laterally moving the primer carrier (7) onto the firing pin (3), producing functioning.

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

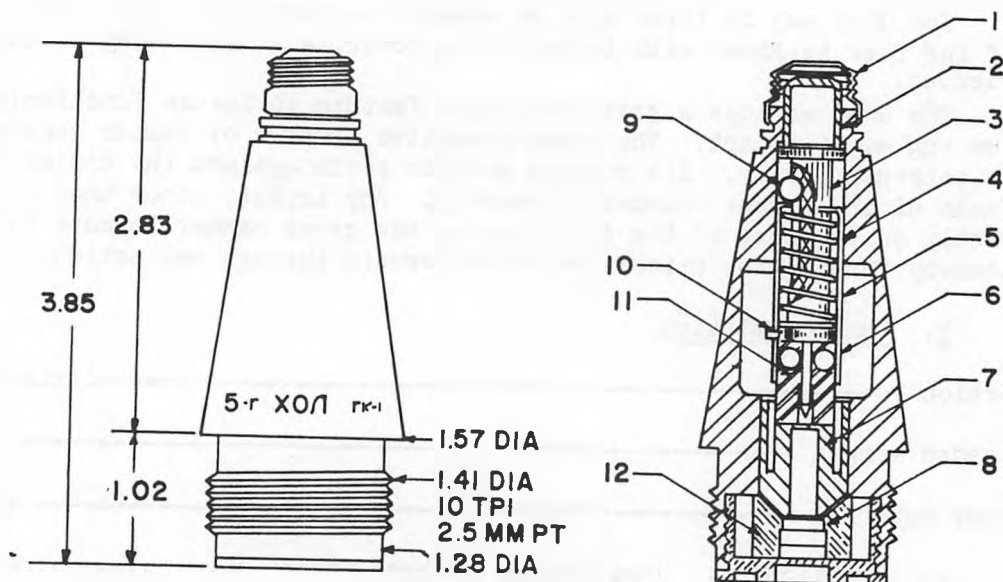
82mm Soviet AT rocket launcher,
Model SFG-82

82mm HEAT ----- PG-82

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SOVIET, POINT-INITIATING, BASE-DETONATING IMPACT FUZE: MODEL GK-1



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GK-2

a. General. The GK-2 is similar in construction and functioning to the Soviet GK-1. The only noticeable difference between the GK-2 and the GK-1 is the zigzag delay arming assembly. This element provides a greater safe arming distance for the GK-2. The basic design for the GK-2 appeared in the Soviet M-50 mortar fuze, and it is almost identical to the current Soviet M-6 mortar fuze. Due to the in-line explosive train, the GK-2 is not considered detonator-safe.

The GK-2 may be fired with or without the shipping cover in place. If the fuze is fired with the shipping cover, a slight delay is experienced.

The GK-2 employs a graze sensitive feature to insure functioning at low angles of impact. The graze sensitive plunger or hammer resides in an enlarged cavity. Its concave surface rests against the conical surfaces of the primer detonator assembly. Any impact, other than one directly on the nose of the fuze, causes the graze hammer to move laterally, thereby forcing the primer-detonator forward through cam action.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 0.39 lb

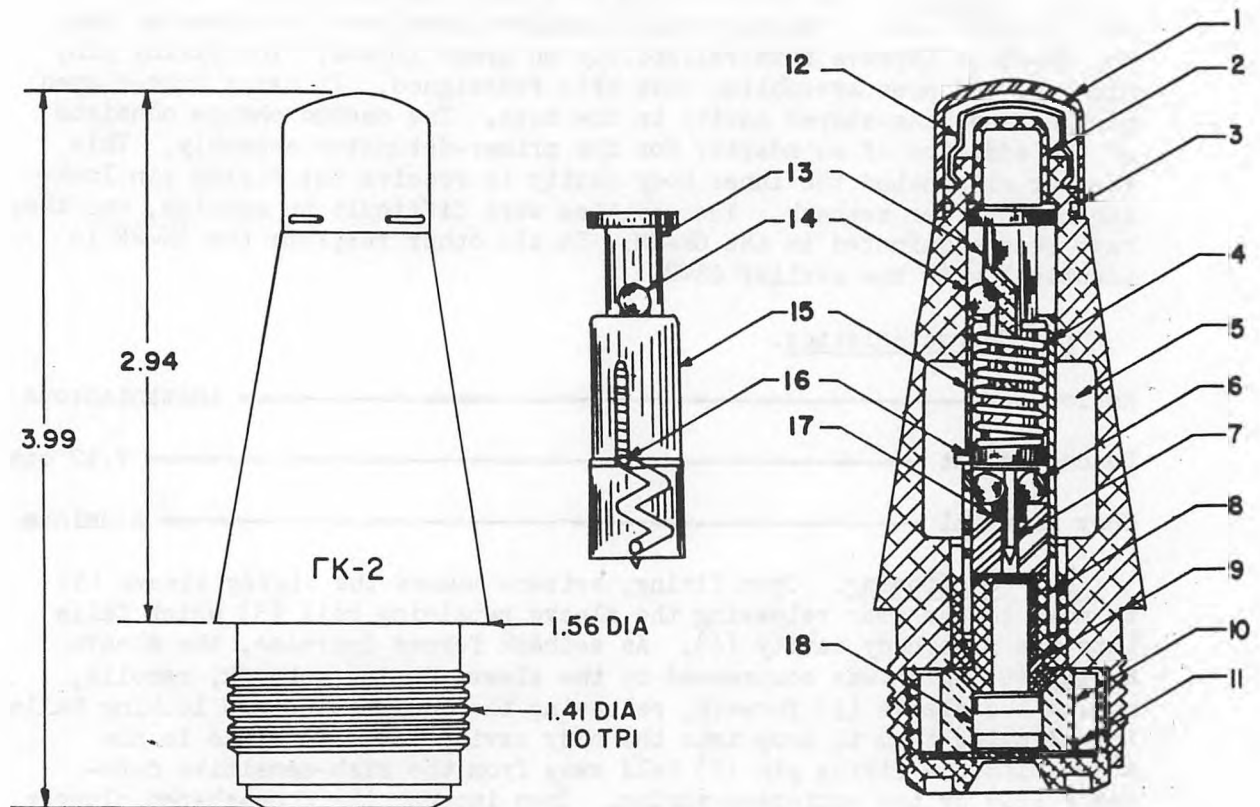
Body material ----- aluminum

c. Functioning. Upon firing, setback forces the zigzag sleeve (15) to the rear, releasing the sleeve retaining ball (14) which falls into the fuze body cavity. As setback decreases the sleeve spring (4), which was compressed by the sleeve, expands and moves the sleeve (15) forward beneath the head of the firing pin assembly (13), releasing the four firing pin locking balls (6) and allowing them to drop into the fuze body cavity (5). The fuze is now armed. The firing pin is held apart from the primer detonator (9) by the firing pin spring (17). Upon impact, the plunger (2) is driven against the head of the firing pin assembly (13) which pierces the primer detonator (9) causing it to detonate and, in turn, detonate the booster.

If the fuze impacts at a flat angle so that the plunger (2) is not depressed, the graze sensitive plunger moves laterally, overcoming the retaining disc (11) and forcing the primer-detonator assembly (9) forward onto the firing pin (9), thus achieving detonation.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GK-2



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SOVIET, POINT-INITIATING IMPACT FUZE: MODEL GK-2M

a. General. The Soviet GK-2M is a later version of the GK-1 and GK-2 Soviet fuzes. Two major modifications have been incorporated into the GK-2M to improve fuze reliability on graze impact. The firing pin, plunger, and nose assemblies have been redesigned. It has a cone-shaped plunger and cone-shaped cavity in the nose. The second change consists of the addition of an adapter for the primer-detonator assembly. This adapter eliminated the inner body cavity to receive the firing pin locking balls after setback. The cavities were difficult to machine, and they have been eliminated in the GK-2M. In all other respects the GK-2M is identical with the earlier GK-2.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 7.12 ozs
Body material ----- aluminum

c. Functioning. Upon firing, setback causes the zigzag sleeve (5) to move to the rear releasing the sleeve retaining ball (3) which falls into the fuze body cavity (6). As setback forces decrease, the sleeve spring (4) which was compressed by the sleeve during setback, recoils, moving the sleeve (5) forward, releasing the four firing pin locking balls (8) allowing them to drop into the body cavity (6). The fuze is now armed with the firing pin (2) held away from the stab-sensitive detonator (10) by the anticreep spring. Upon impact, the cone-shaped plunger (1) is driven against the firing pin assembly (2) which causes the firing pin to pierce the primer-detonator, detonating the booster. On low angles of impact, the graze impact feature causes the booster impact weight to move laterally overcoming the retainer washer (12), moving the primer-detonator assembly (10) forward into the firing pin (9) causing it to function. If the nose cone strikes at an angle, and it is crushed out of line with the plunger (2), the cone-shaped cavity in the nose causes the plunger to move downward against the firing pin head, causing it to function.

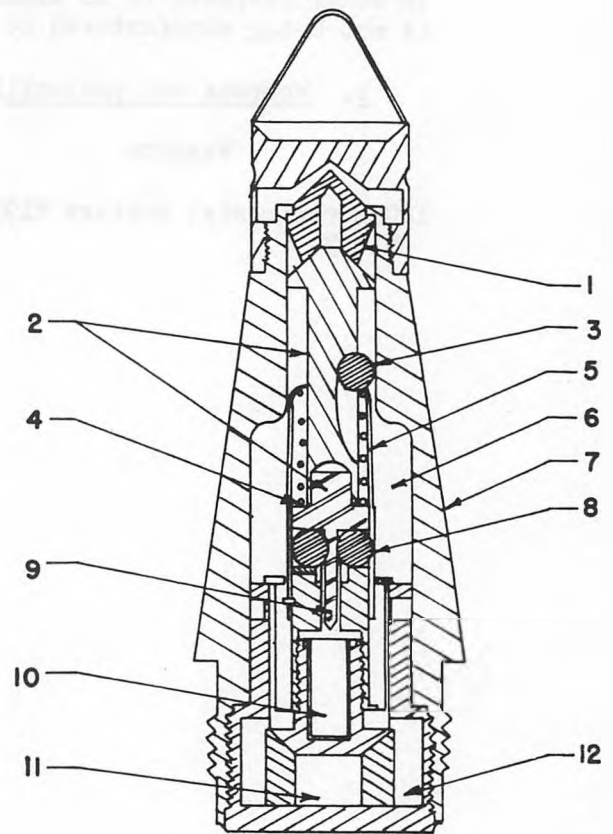
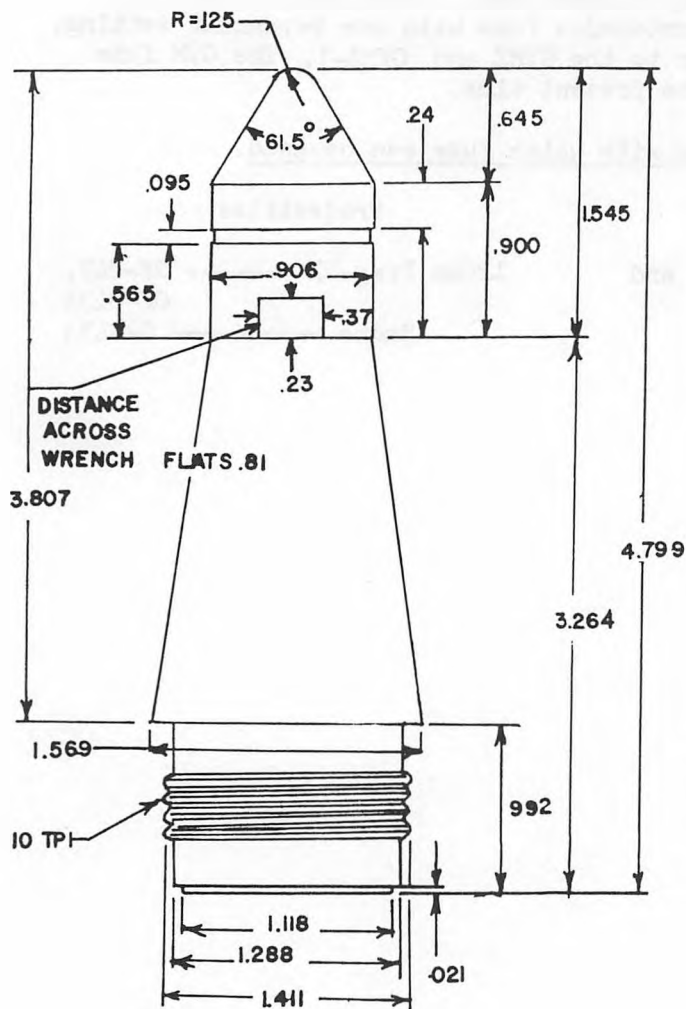
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
82mm recoilless rifle, B-10	82mm HEAT ----- Bk-881M

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SOVIET, POINT-INITIATING IMPACT FUZE: MODEL GK-2M



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVM

a. General. The GVM fuze differs from the GVMZ and the GVMZ-1 fuze inasmuch as it has no delay element and, consequently, no fuze setting device. It is an instantaneous fuze with one permanent setting. In other respects it is similar to the GVMZ and GVMZ-1. The GVM fuze is not being manufactured at the present time.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
120mm regimental mortars M1938 and M1943	120mm Frag-HE ——— OF-843, OF-843A Smoke ——— D-843A

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVMZ

a. General.

(1) The GVMZ fuze was originally designed for 122mm howitzer Frag-HU and Frag shells and 230mm Frag shells; however, because of membrane ruptures and premature bursts when used for fire from howitzers, it was discontinued for use in gunfire. The weight of the powder delay element was reduced and the fuze was then used with 107mm and 120mm Frag-HE and smoke mortar shells. At present the GVMZ is used only with 120mm Frag-HE mortar shells.

(2) The GVMZ fuze is a departure from the usual Soviet fuze design because it is termed a "thermo-pneumatic" fuze which operates on the "air column" principal of activating the initiating pellet rather than the conventional percussion striker. The air, trapped in a compression cup, is compressed to a density sufficient to generate enough heat to ignite an initiation pellet of black powder, lead azide, etc. No bore-safe mechanism is incorporated in its design, but its principle of operation makes it bore-safe under normal operating conditions (at low velocities). The safety cap (1) must be removed prior to firing the fuze. The settings for the GVMZ are as follows:

<u>Setting</u>	<u>Action</u>
"0" -----	instantaneous and delay
"3" -----	delay (0.05 - 0.09 second)

b. Characteristics.

Action ----- instantaneous and delay
Loaded weight ----- 430 grams (0.946 lb)
Body material ----- steel

c. Functioning. When fired, no movement of the component parts takes place until the projectile strikes the ground. Upon impact, when the fuze is set for instantaneous action, the nose bushing and diaphragm (3) are driven inward. They in turn drive the compression plug (2) rearward, compressing the air in the compression cup (9) to a point where sufficient heat is generated to ignite the black powder initiating pellet (3). The flame jet travels down the flash channel (5) through the transverse hole in the setting selector (4), and sets off the detonator pellet (6), which detonates the booster (7). When

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVMZ

set for delay action, the flame jet travels through a longitudinally drilled hole in the setting selector (1), down the delay channel (10) to the delay pellet (11), and sets off the detonator pellet (6), which in turn detonates the booster (7).

d. Weapons and projectiles with which fuze can be used.

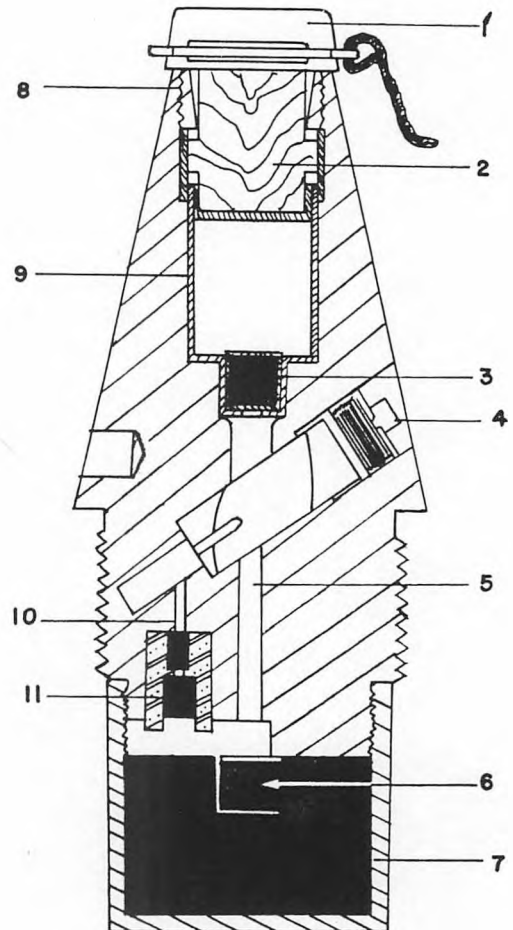
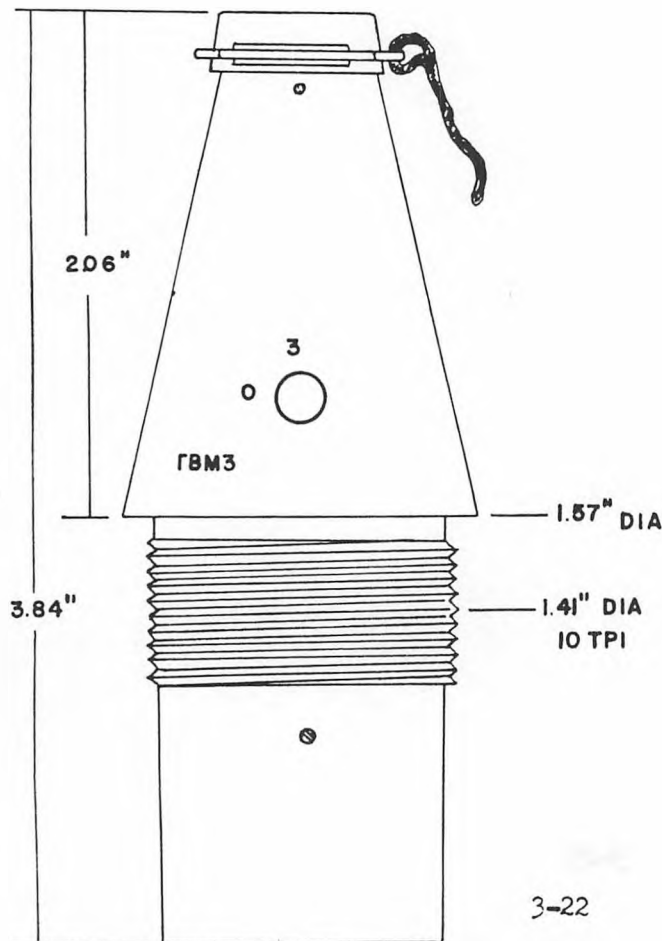
Weapons

107mm mountain-pack regimental mortar, M1938

120mm regimental mortars M1938 and M1943

Projectiles

107mm Frag-HE ----- OF-841;
OF-841A, OF-841T
Smoke ----- D-841
120mm HE ----- F-843
Frag-HE ----- OF-843; OF-843A
Smoke ----- OF-843A



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVMZ-1

This fuze is similar in construction and functioning to the GVMZ fuze, but it has a simplified percussion mechanism with a wooden striker and a copper membrane. The clogging of powder between the delay element and the detonating cap is impossible. Like the GVMZ, the GVMZ-1 fuze also has two settings: instantaneous (device set on "0") and delay (device set on "3"). It is used in the same projectiles and fired from the same weapons as the GVMZ.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVMZ-7

a. General. The GVMZ-7 is a point-detonating fuze used in the 107mm and 120mm mortars and 122mm and 152mm howitzers. This fuze is safe to transport and is bore-safe. The fuze is prepared for firing by removing the shipping cap, pulling the safety cap retaining wire out of the cloth tab, and removing the safety cap (5). The fuze has settings for either delay or instantaneous action, as indicated below:

<u>Setting</u>	<u>Action</u>
"0" -----	instantaneous
"3" -----	delay

b. Characteristics.

Action ----- instantaneous and delay

Loaded weight ----- unknown

Body material ----- steel

c. Functioning.

(1) Upon firing, setback causes the firing pin (8) to be driven into the safety pellet (10). The flame from the pellet passes through the grooves in the firing pin and ignites the black powder pellet (3). After the black powder pellet has burned, it allows a centrifugal segment (2) to move outward, which then allows the interrupter (7) to move outward through one or both flash channels, depending on the setting.

(2) Upon impact with the target, the piston (1) is driven rearward compressing the air which ignites the primer (6). The flash from the primer then passes directly to the detonator (14) via the instantaneous flash channel (9), or to the delay pellet (13), depending on the setting. Setting "3" allows the interrupter (7) to move only far enough to uncover the delay flash channel (12), forcing the flash from the primer to ignite the delay pellet (13) which activates the detonator (14), and in turn the booster (4). Setting "0" allows the interrupter to move over far enough to uncover both flash channels so that the flash from the primer will pass directly to the detonator (14) and booster (4), resulting in instantaneous action.

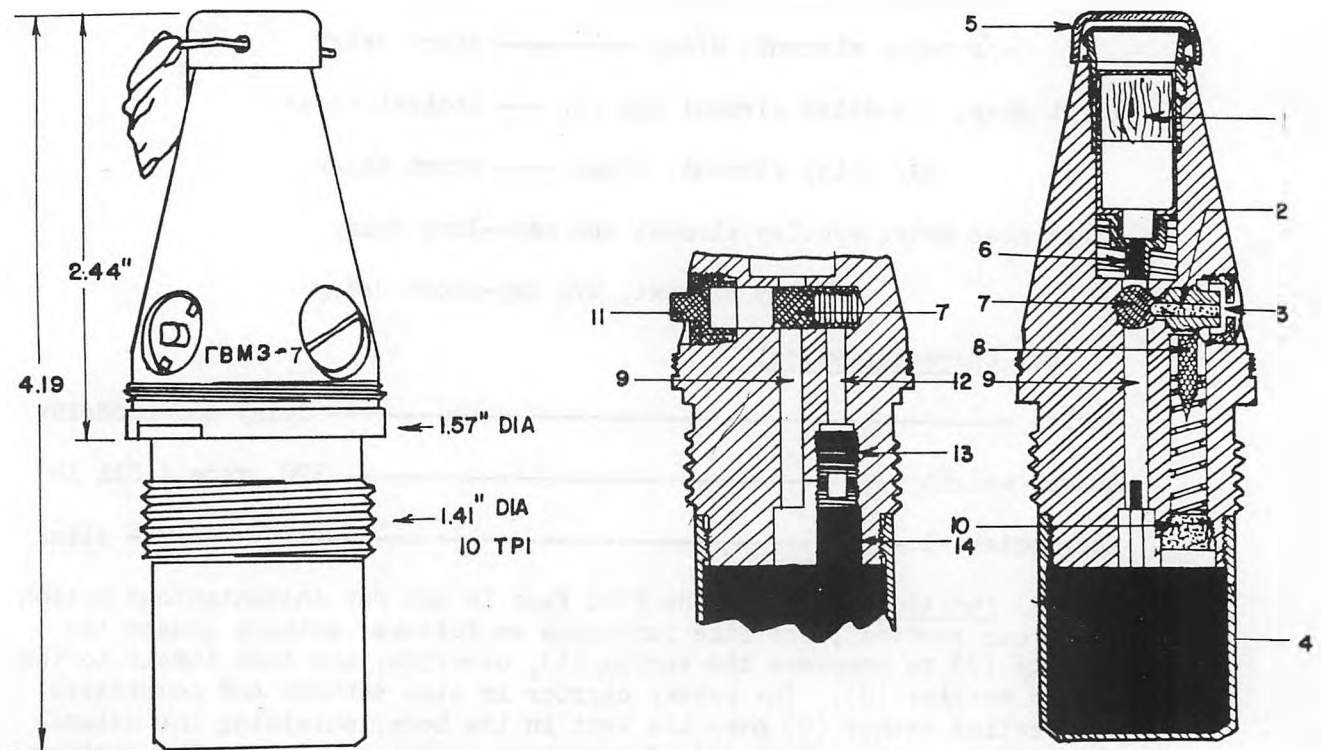
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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL GVMZ-7

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
107mm mountain-pack regimental mortar M1938	107mm ----- unknown
120mm regimental mortars M1938 and M1943	120mm ----- F-843
122mm howitzer M1938 (M-30)	122mm ----- unknown
152mm howitzer M1938 (M-10) and M1943 (D-1)	152mm ----- unknown



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KT-1

a. General. The KT-1 is a point-detonating, setback-armed fuze used with Frag and Frag-HE projectiles of 45mm, 57mm, and 76mm caliber sizes. The Soviets refer to this fuze as "semisecure" and bore-safe. The fuze is capable of nondelay and delay action depending on the use of the fuze cap and the compressed black powder delay pellet (10), which is sometimes inserted in this fuze for special demolition purposes. Fuzes containing the delay pellet are painted black; models without the delay pellet are painted light gray. The fuze action is regulated as indicated below:

<u>Fuze color</u>	<u>Action</u>
Black, w/delay element and cap -----	long delay
w/delay element, w/o cap -----	short delay
w/o delay element and cap -----	instantaneous
w/o delay element, w/cap -----	short delay
Light gray, w/o delay element and cap ---	instantaneous
w/o delay element, w/cap ----	short delay
Black nose only, w/delay element and cap--	long delay
w/delay element, w/o cap--	short delay

b. Characteristics.

Action ----- delay and nondelay

Loaded weight ----- 370 grams (.814 lb)

Body material ----- steel

c. Functioning. When the KT-1 fuze is set for instantaneous action (nose cap removed), the fuze functions as follows: setback causes the stirrup (7) to compress the spring (6), override, and lock itself to the primer carrier (8). The primer carrier is also setback and compresses the sealing washer (9) over the vent in the body, shielding the detonator (11) from the primer (5) if premature ignition occurs. The striker (1) and firing pin (3) are also setback, but the firing pin does not reach the primer. After the projectile leaves the bore, the spring (6) raises the primer carrier (8) and stirrup (7) to a position directly

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KT-1

under the firing pin (3). At the same time, the spring (2) returns the firing pin (3) and the striker (1) to their original positions. On impact, the striker (1) is driven rearward, forcing the firing pin (3) into the primer (5) which successively sets off the primer, the detonator (11) and the booster (12). When the fuze is set for delayed action (nose cap in place), the action is identical to that of instantaneous action except that on impact the cap prevents the striker (1) and the firing pin (3) from being driven to the rear. At the same time, inertia drives the primer carrier (8) forward, forcing open the segmented safety shutter (4) and driving the primer (5) against the firing pin to activate the explosive train.

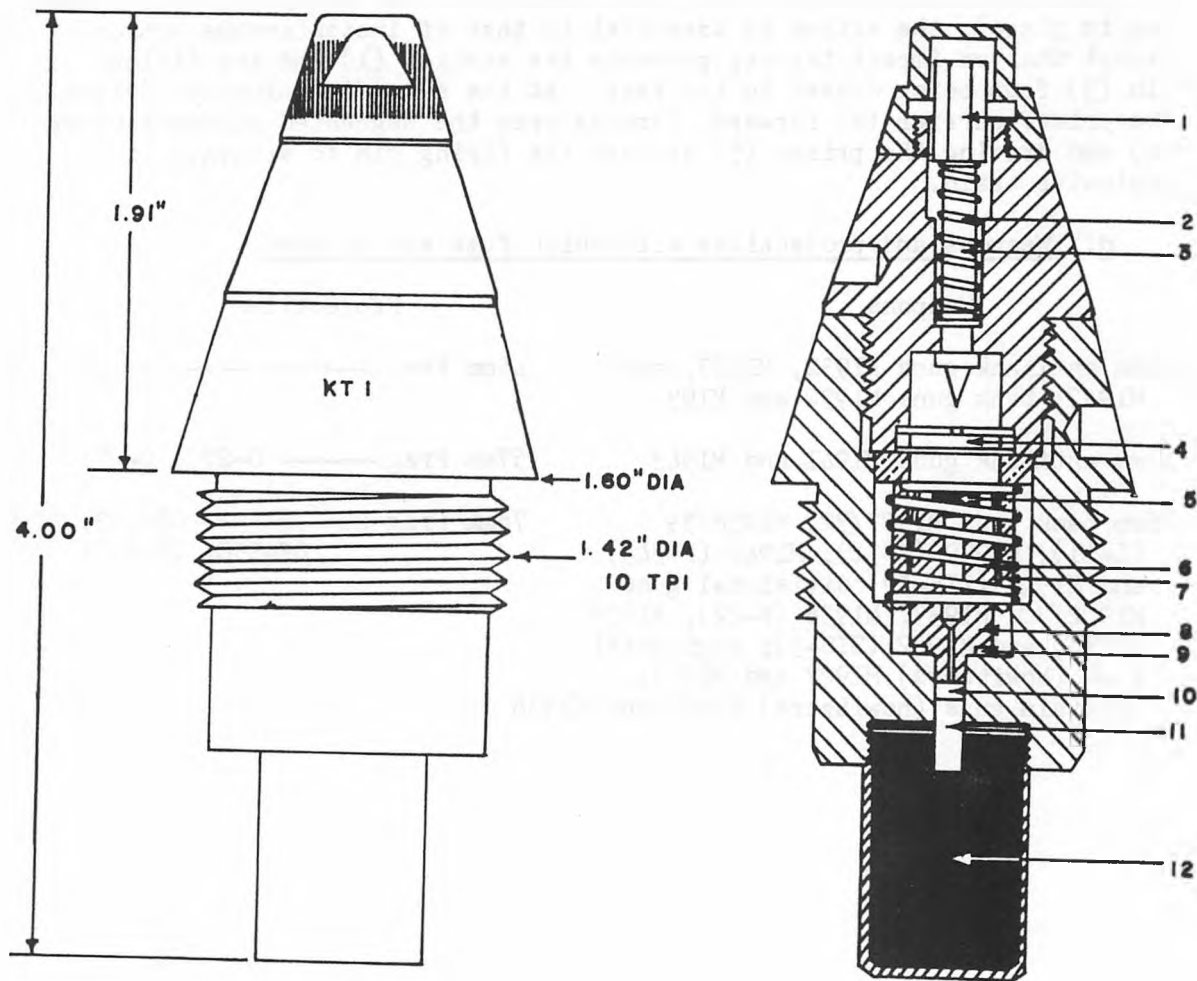
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
45mm antitank guns M1932, M1937, and M1942; tank guns M1932 and M1934	45mm Frag ----- O-240
57mm antitank guns M1941 and M1943	57mm Frag ----- O-270; O-271
76mm tank guns M1927/32, M1938/39 (I-11), M1939 (F-32), M1940 (F-34), and M1941 (ZIS-5); divisional guns M1902/30, M1933, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); regimental guns (howitzers) M1927 and M1943; mountain guns (howitzers) M1909 and M1938	76mm Frag-HE ----- OF-343; OF-350; OF-350A

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KT-1



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KT-2

a. General. This fuze is almost identical in construction and operation to the KT-1 and KTM-1 fuzes. It differs from the latter only in the smaller diameter of its base threads. It is designed to screw into a booster cup (adapter) which screws into the well of the projectile. The KT-2 fuze is interchangeable with the KTM-2 fuze.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933, M1936 (F-22), M1939 (USV, and M1942 (ZIS-3); tank guns M1938/39 (L-11), M1939 (F-32), M1940 (F-34), and M1941 (ZIS-5).	76mm Smoke ----- D-350
122mm howitzers M1938 (M-30), M1909/37, and M1910/30	122mm Smoke ----- D-462

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KT-3

a. General. This fuze is almost identical in construction and operation to the KT-1 and KTM-1 fuzes, and it is used with old 76mm high-explosive projectiles, which have a well for the 3GT fuze. The KT-3 differs from the KT-1 and KTM-1 fuzes only in the smaller size of its base threads. The KT-3 fuze is interchangeable with the KTM-3 fuze.

b. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

76mm divisional guns M1902/30, M1936 76mm HE ----- F-354
(F-22), M1939 (USV), and M1942 (ZIS-3);
tank guns M1927/32, M1938/39 (L-11),
M1939 (F-32), M1940 (F-34), and M1941
(ZIS-5); regimental gun (howitzer)
M1927; mountain gun (howitzer) M1909

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTM-1

a. General. The KTM-1 is a point-detonating, setback-armed fuze used with 45mm, 57mm, 76mm, and 85mm projectiles. The Soviets refer to this fuze as "semisecure" and bore-safe. It is capable of nondelay and delay action depending on the fuze coloring and the use of the fuze cap. Projectiles using the KTM-1 are reported to give greater fragmentation effect than those using the KT-1 fuze; use of the black-bodied KTM-1 fuze results in camouflets, duds, or sometimes a slight cratering effect if used for ranges over 2 miles and if striking soft ground. The fuze action is regulated as indicated below:

<u>Fuze color and use of cap</u>	<u>Action</u>
Body and cap painted green, w/cap w/o cap	Short delay Instantaneous
Tin plated body with red nose, w/cap w/o cap	Long delay Short delay
Body and cap painted black, w/cap w/o cap	Short delay Instantaneous
Unplated body with red cap, w/cap w/o cap	Long delay Short delay

b. Characteristics.

Action ----- nondelay and delay
Loaded weight ----- 370 grams (.814 lb)
Body material ----- steel

c. Functioning. On firing, the arming sleeve (10) sets back, compresses the arming sleeve spring (9), overrides the stirrup (8), and locks itself to the primer holder assembly (11). The lower end of the primer holder assembly holds the aluminum sealing cushion (14) over the vent in the fuze body, shielding the detonator (12) from the primer (7), should accidental ignition occur. The striker (3) and the firing pin (5) are also set back, but the firing pin cannot reach the primer (7) at this time. After the projectile leaves the bore, the arming sleeve spring (9) raises the arming sleeve (10) and primer holder assembly (11) to a position directly under the safety disk (6). During the flight of the projectile, the firing pin spring (4) returns the striker (3) and the firing pin (5) to their original positions. On impact, when the fuze is set for instantaneous action (cap in place), the striker (3)

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTM-1

drives rearward and forces the firing pin (5) through a hole in the safety disk and into the primer. The primer is thus ignited, and it in turn sets off the detonator (12) and the booster (13). When the fuze is set for delay action (cap in place), the action is identical with that for nondelay action except that, on impact, the cap (2) prevents the striker (3) from being driven rearward. The primer holder assembly (11) moves forward and, overcoming the resistance of the safety disk (6), drives the primer (7) against the firing pin to initiate the explosive train of the fuze.

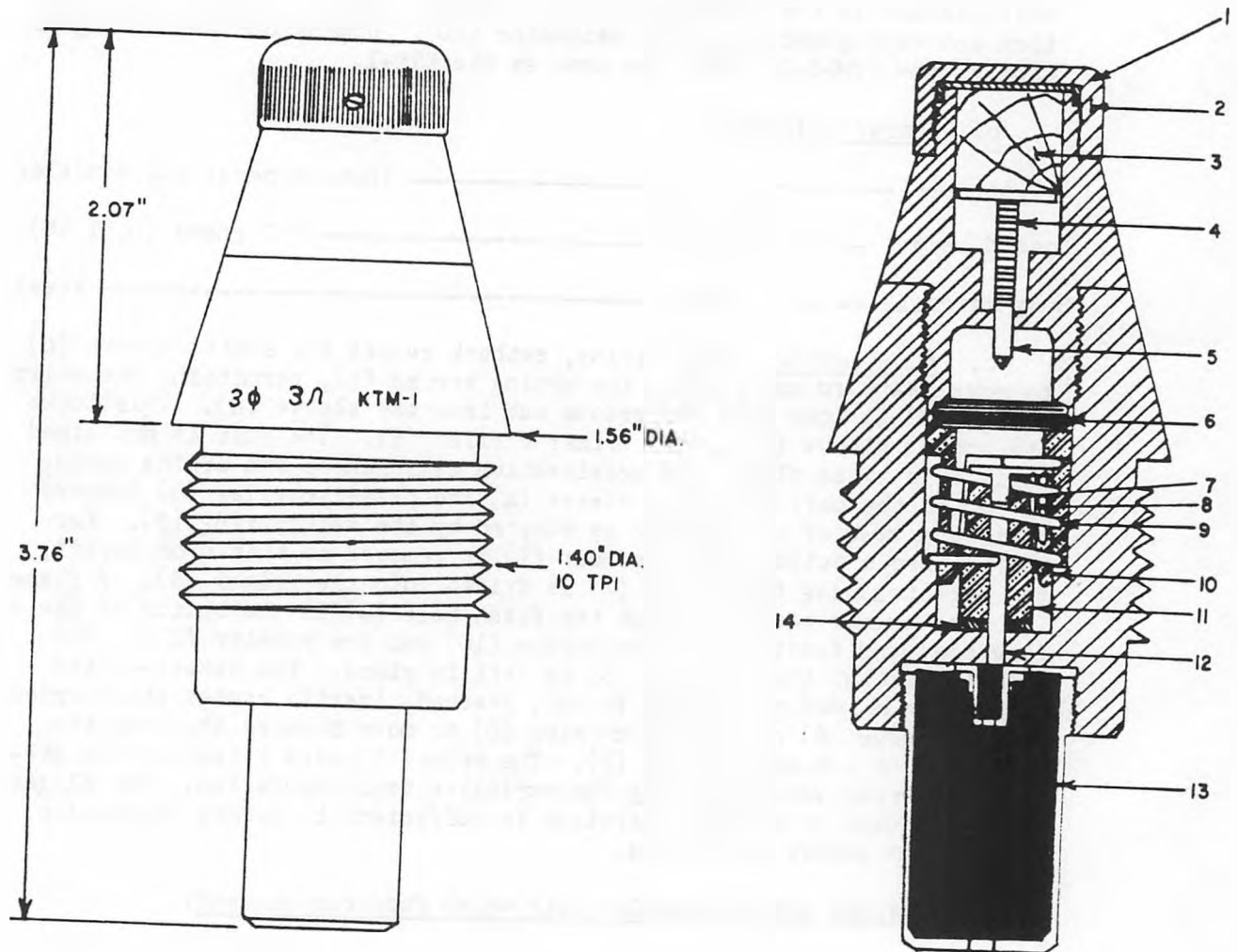
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
45mm tank guns M1932, M1934, & M1938; antitank guns M1932 M1937, and M1942	45mm Frag ----- O-240; O-240A O-240M
57mm antitank guns M1941, M1943 (ZIS-2), and M1949	57mm Frag ----- O-271; O-271U
76mm divisional guns M1902/30, M1936 (F-22), M1939 (USV), & M1942 (ZIS-3); regimental gun (howitzer) M1927; mountain gun (howitzer) M1938; tank guns M1938/39 (L-11) & M1939 (F-32)	76mm Frag ----- O-350; O350A Frag HE -- OF-343; OF-350; OF-350A Frag-Gas ----- OKh-350 HE ----- F-354
85mm antiaircraft gun M1939; Tank gun M1943 (D-5T85) and M1944 (ZIS-S53); SP gun M1944 (D5-S85)	85mm Frag ----- O-365K

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTM-1



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SOVIET, POINT-DETONATING IMPACT FUZE: KTM-1-U

a. General. The Soviet KTM-1-U point-detonating fuze is an improved, modified version of the earlier KTM-1, and it is employed in the same manner. Like the KTM-1, the KTM-1-U is not detonator-safe, but is bore-safe. Arming is entirely by setback. The KTM-1-U displays a slight modification in the wooden firing pin plunger assembly and in the position and configuration of the detonator (10). Dimensions and configuration of the KTM-1-U remain the same as the KTM-1.

b. Characteristics.

Action ----- instantaneous and nondelay

Loaded weight ----- 370 grams (0.81 lb)

Body material ----- steel

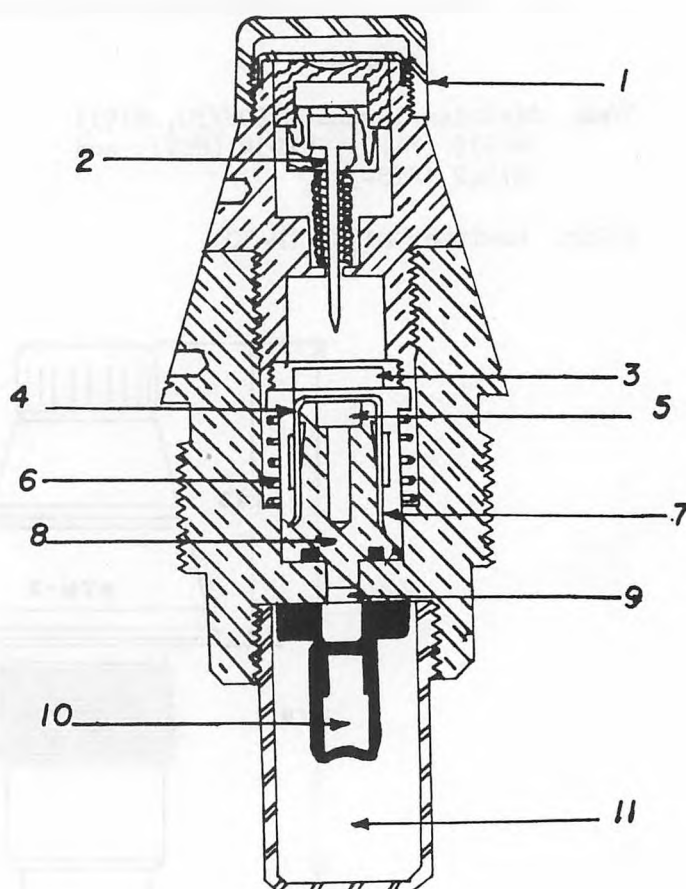
c. Functioning. Upon firing, setback causes the arming sleeve (4) to move rearward compressing the arming spring (6), permitting the stirrup prongs (7) to lock into the groove cut into the sleeve (4). This locks the arming sleeve (4) to the primer carrier (8). The fuze is not armed until this takes place. As acceleration diminishes, the arming spring (6) moves the married arming sleeve (4) and primer carrier (8) forward until the nose of the carrier is stopped by the safety ring (3). For instantaneous action, the nose cap (1) is removed so that upon impact, the direct acting firing pin (2) is driven into the primer (5). A flame from the primer passes through the flash hole (9) in the bottom of the fuze body and functions the detonator (10) and the booster (11). For nondelay action the nose cap (1) is left in place. The direct-acting firing pin is not moved upon impact, instead, inertia causes the married arming sleeve (6) and primer carrier (8) to move forward shearing the four lugs on the safety ring (3). The primer impales itself on the stationary firing pin initiating the explosive train operation. The slight delay produced by inertia operation is sufficient to permit projectile penetration before detonation.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
Same as those listed with the Soviet KTM-1.	Unknown

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SOVIET, POINT-DETONATING IMPACT FUZE: KTM-1-U



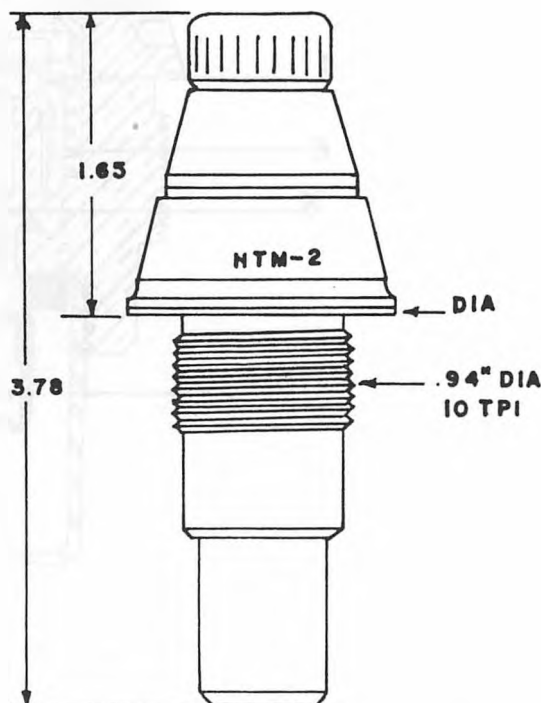
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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTM-2

a. General. This fuze is almost identical in construction and design to the KTM-1 fuze and is used with 76mm divisional guns and 122mm howitzer smoke projectiles. The KTM-2 and KT-2 fuzes are interchangeable. They differ from the KTM-1 fuzes in the thread size; the thread diameter is somewhat smaller in the KTM-2 and KT-2.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933 M1936 (F-22), M1939 (USV), and M1942 (ZIS-3)	76mm Smoke ----- D-350
122mm howitzer M1938 (M-30)	122mm Smoke ----- D-462



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTM-3

a. General. This fuze is almost identical in construction and operation to the KTM-1 fuze and is interchangeable with the KT-3 fuze. The KTM-3 fuze differs from the KTM-1 in thread size; the former has a somewhat smaller thread size. The KTM-3 and KT-3 fuzes are used with old 76mm high-explosive projectiles which have a well for the 3GT fuze.

b. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm regimental gun (howitzer) M1927;	76mm HE ----- F-354
tank gun M1927/32; mountain gun	Frag-HE ----- OF-350
(howitzer) M1909	

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTMZ-1

This fuze is almost identical in construction and operation to the KTM-1 fuze, although it differs from the KTM-1 by having a delay pellet pressed into the powder plug. It possesses the same delay action, whether capped or uncapped. The KTMZ-1 may be identified by the color of its head plug and setting cap, which are painted either black or red.

SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTMZ-2

This fuze is almost identical in construction and operation to the KTM-2 and KT-2 fuzes, except it has a delay pellet pressed into the powder plug. It possesses the same delay action whether it is capped or uncapped.

SOVIET, POINT-DETONATING IMPACT FUZE: MODEL KTZ-2

The KTZ-2 differs from the KT-2 fuze by having a delay pellet, which is pressed into the powder plug. The two fuzes are otherwise identical in construction and operation.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-1

a. General. The M-1 is a point-detonating, nondelay fuze of conventional design. It is known to be used with 50mm, 82mm, and 120mm Soviet Mortars, and it can be used with 170mm and 160mm mortars. This fuze is considered obsolete; however, it is possible that the fuze is still being used. The Soviets refer to the fuze as "unsecured". During storage and transport the fuze is protected by a metal cap (1) which may be removed prior to firing. If a red stripe is visible on the side of the projecting striker head, the fuze is armed and must not be fired.

b. Characteristics.

Action _____ nondelay
Loaded weight _____ 250 grams (.55 lb)
Body material _____ unknown

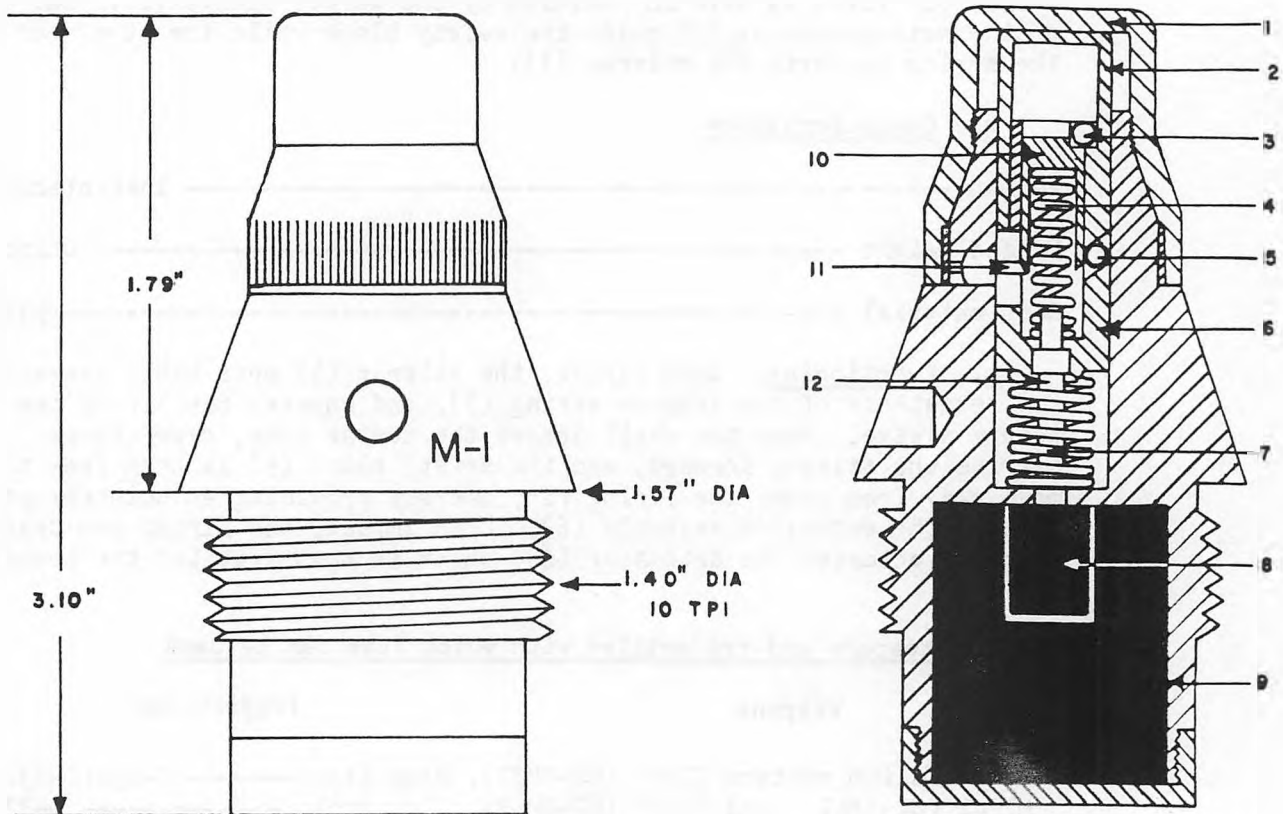
c. Functioning. Upon discharge, the arming sleeve (10) sets back and its beveled edge cams the safety pin (11) outward, and the upper check ball (3) drops into the recessed portion of a well on top of the arming sleeve (10), thus freeing the sleeve for forward movement. When the projectile leaves the bore, the arming sleeve spring (4) decompresses and forces the sleeve forward permitting the lower check balls (5) to drop inside a well in the sleeve. This frees the striker (6) for rearward movement. During the flight of the projectile, tension of the safety spring (7) prevents the striker and firing pin (12) from moving rearward and detonating the projectile. Upon impact, the striker (2) is driven rearward, and the firing pin (12) sets off the detonator, (8) which in turn actuates the booster (9) and the explosive charge of the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
50mm Company mortars M1938, M1940 and M1941	50mm Frag----- O-822; O-822A; O-822Sh
82mm battalion mortars: M1937 (82-BM-37), M1941 (82-BM-41) and M1943 (82-BM-43)	82mm Frag ----- O-832; O-832D D-832
120mm regimental mortars: M1938 and M1943	120mm Frag-HE----- OF-843 Incendiary----- Z-843A

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-1



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-2

a. General. The M-2 is a point-detonating, nondelay action fuze consisting of a plastic body on a wire armature, a direct-action type percussion mechanism, and a detonator. Although the Soviets refer to this fuze as "unsecured," it is sufficiently safe in spite of its simplicity of structure. Until discharge the firing pin (2) is separated from the detonator pellet by the safety block (5), which is a steel disc. The safety block is held in position by the safety sleeve (4). One end of the setback spring (3) holds the safety block while the other end of the spring supports the stirrup (1).

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- unknown
Body material ----- plastic

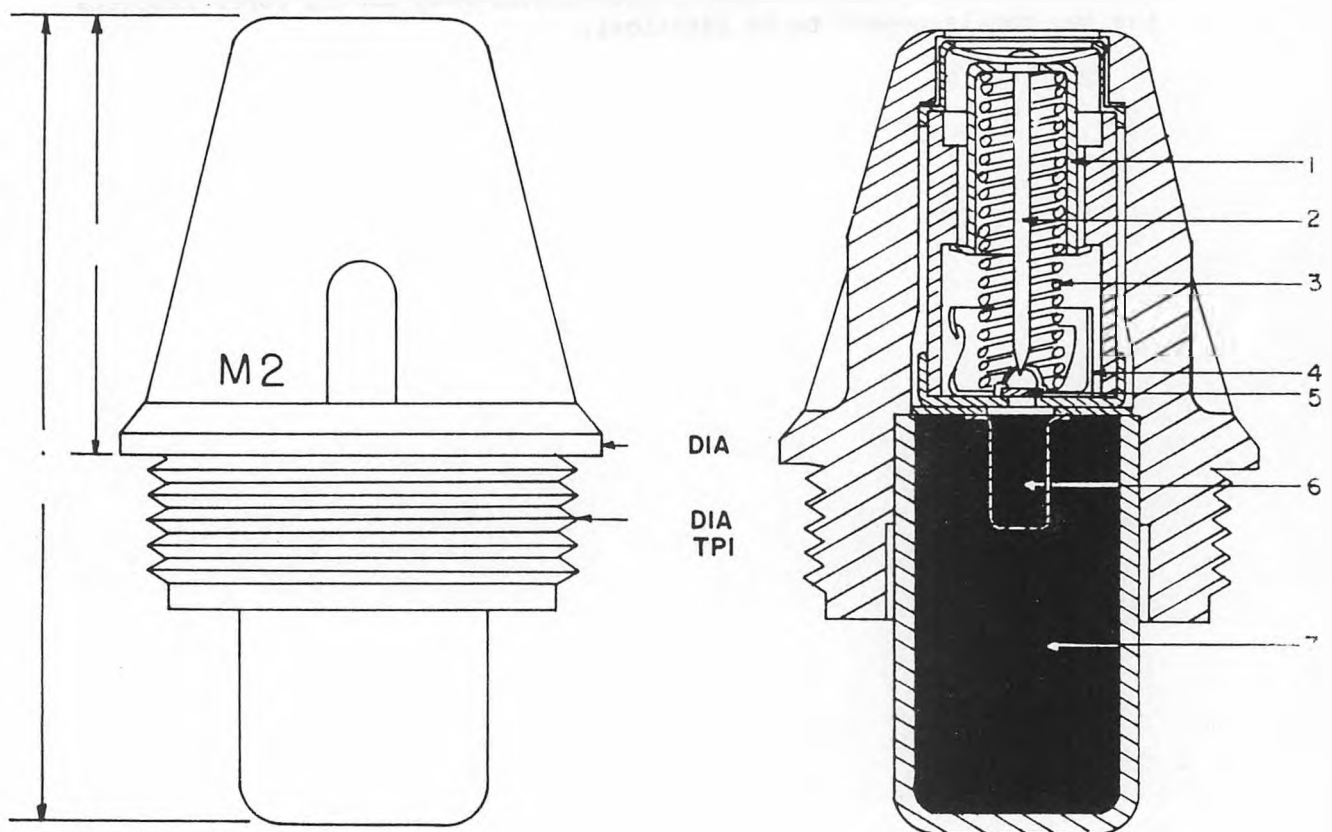
c. Functioning. Upon firing, the stirrup (1) sets back, overcomes the resistance of the setback spring (3), and engages the lip of the safety sleeve. When the shell leaves the mortar tube, creep force carries the stirrup forward, and the safety block (5) is then free to move away from under the firing pin, thereby providing an uninterrupted path to the detonator assembly (6). Upon impact, the firing pin drives into and actuates the detonator (6), which in turn actuates the booster (7).

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
82mm battalion mortars M1937 (82-BM37), M1941 (82-BM41), and M1943 (82-BM43)	82mm Frag ----- O-832; O-832D Smoke ----- D-832

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-2



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-3

The M-3 is a point-detonating, nondelay fuze which is similar in design and operation to the M-2 fuze, and is used with the same projectiles as the M-2 fuze. The body of the M-3 fuze is constructed of steel, rather than the plastic material used in the M-2; in all other respects the two models appear to be identical.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-4

a. General. The M-4 is the fourth model of the "M" series of Soviet mortar fuzes. It is usually used for explosive mortar shells, but it can be used with smoke and incendiary shells. It is known to be used with 82mm mortars and can be used with 107mm and 120mm mortars. There is no visible means to determine whether the fuze is armed or unarmed.

b. Characteristics.

Action ----- nondelay

Loaded weight -----300 grams (.66 lb)

Body material ----- steel or plastic

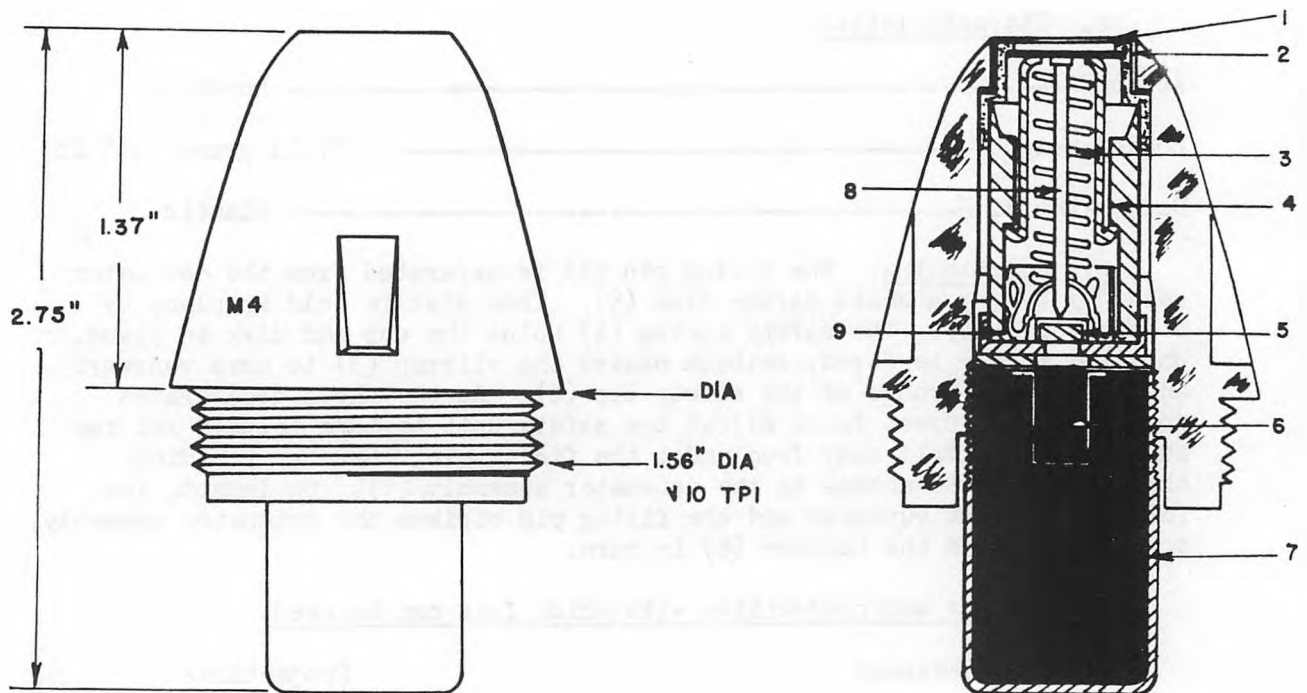
c. Functioning. Upon firing, the stirrup (4) setback, forces its flanged lower end down into the hollowed-out safety block retainer (9), and compresses the spring (3). This action retains the safety block (5) between the firing pin (8) and the detonator (6) until the projectile has left the mortar tube. After the projectile has left the tube, the spring (3) decompresses and forces the stirrup (4) upward. During this upward movement of the stirrup, its flanged lower end carries the safety block retainer (9) with it. As the safety block retainer moves upward, the cammed surface on its outer circumference engages a vertical tongue, extending upward from the safety block (5) and cams the block outward, away from its position over the detonator (6), thus allowing the firing pin (8) free access to the detonator. On impact, the foil membrane (1) is ruptured and the firing pin is driven rearward, forcing its pointed lower end into the detonator, successively actuating the detonator and the booster (7) which, in turn, detonate the shell.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
82mm battalion mortars M1937, M1941, etc.	82mm Frag ----- O-832; O-332D Smoke ----- D-832
	120mm Frag-HE-OF-343; OF-343A Incendiary ----- Z-343A Smoke ----- D-343A

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-4



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-5

a. General. The M-5 is a point-detonating, setback-armed, nondelay action fuze. It is used in projectiles fired from 82mm mortars. The fuze is considered bore-safe; however, the Soviets refer to it as "unsecured." The M-5 fuze functions nearly the same as the M-2 and M-3 fuzes and is considered almost identical to the M-4 in construction and operation.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 77.11 grams (.17 lb)

Body material ----- plastic

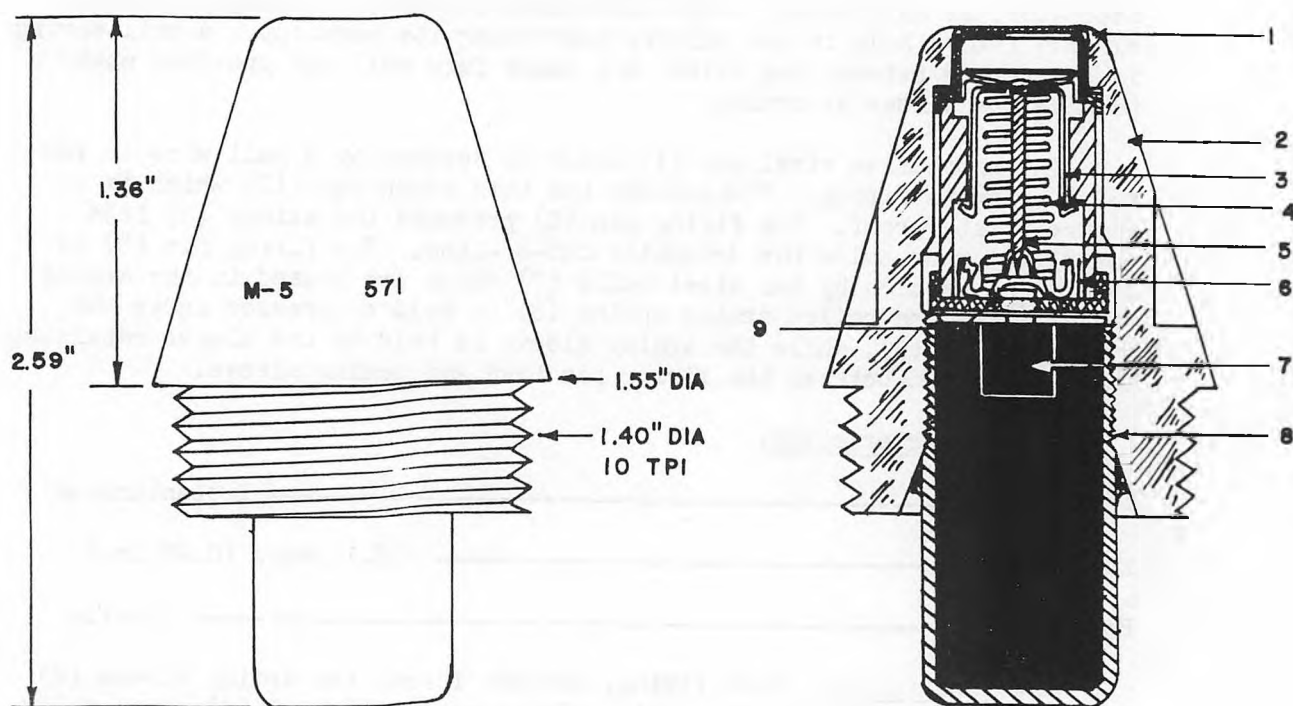
c. Functioning. The firing pin (5) is separated from the detonator assembly (7) by a small safety disk (9). This disk is held in place by a safety cup (6). The safety spring (4) holds the cup and disk in place. When the mortar is fired, setback causes the stirrup (3) to move rearward and engage the prongs of the safety cup (6). As the shell decelerates during flight, creep force allows the safety unit to move forward and the safety disk to fall away from under the firing pin, thereby providing the pin with free access to the detonator assembly (7). On impact, the foil disk (1) is ruptured and the firing pin strikes the detonator assembly, actuating it and the booster (8) in turn.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
82mm battalion mortars M1937 (82-BM37), M1941 (82-BM-41), and M1943 (82-BM43)	82mm Frag ----- O-832; O-832D Smoke ----- D-832

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-5



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-6

a. General. The M-6 fuze has become the standard 82mm Mortar fuze almost to the total exclusion of all other fuzes. The M6 is a superquick fuze used with low velocity projectiles. It is bore-safe and detonator - safe possessing a lateral-moving detonator slider. The fuze consists of a brown plastic body made from compression molded, thermosetting, urea formaldehyde with a cotton filler, arming assembly, slider, detonator, lead charge and booster.

A steel sleeve with a zigzag slot, a spring, three steel balls and a slider comprise the arming assembly. The slider, with its out-of-line detonator, is maintained in the safe condition by the firing pin, which extends into a hole in the slider, preventing its movement. A coil spring is compressed between the slider and inner fuze wall and provides power to move the slider at arming.

The protective steel cap (1) which is secured by a pull wire is removed prior to firing. This exposes the thin crush cap (12) which is entirely waterproof. The firing pin (8) prevents the slider (9) from moving and thus holds the detonator out-of-line. The firing pin (8) is locked in position by two steel balls (7) which are housed in the arming sleeve (2). The coiled arming spring (6) is held compressed under the arming sleeve (2), while the arming sleeve is held by the sleeve retaining ball (3) wedged between the firing pin head and arming sleeve.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 127.1 grams (0.28 lb.)

Body material ----- plastic

c. Functioning. Upon firing, setback forces the arming sleeve (2) downward. This releases the arming sleeve retaining ball (3) which falls into the fuze body cavity (4). The arming sleeve (2) continues rearward, delayed by the zigzag slot in the arming sleeve and guided by a pin on the slide's holder (5) until it reaches the end of its travel. As setback ceases, the arming spring (6) expands moving the arming sleeve (2) forward, releasing the two firing pin retaining balls (7), which fall into the body cavity. This permits the firing pin (8) to rise, powered by the arming spring (6), moving the point of the firing pin (8) out of its hole in the slider (9). The slider (9), powered by the slider spring (10), moves laterally, aligning the detonator (11) with the firing pin (8). The fuze is now armed. Upon impact, the firing pin (8) is driven downward by a combination of compressed air and debris crushing the copper membrane. The point of the firing pin pierces the detonator (11), initiating the lead charge (13) and the booster (14).

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-6

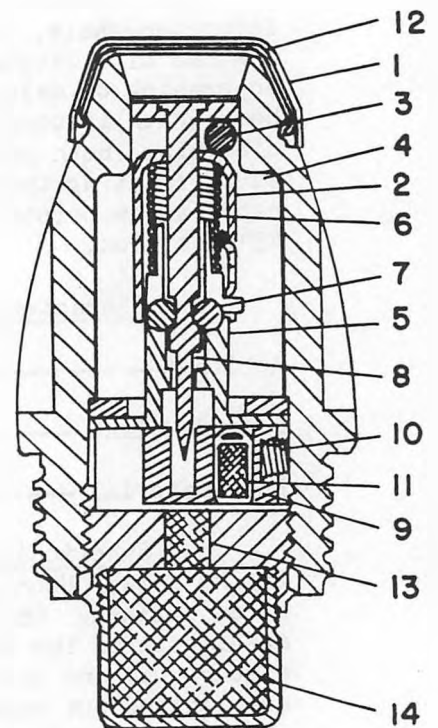
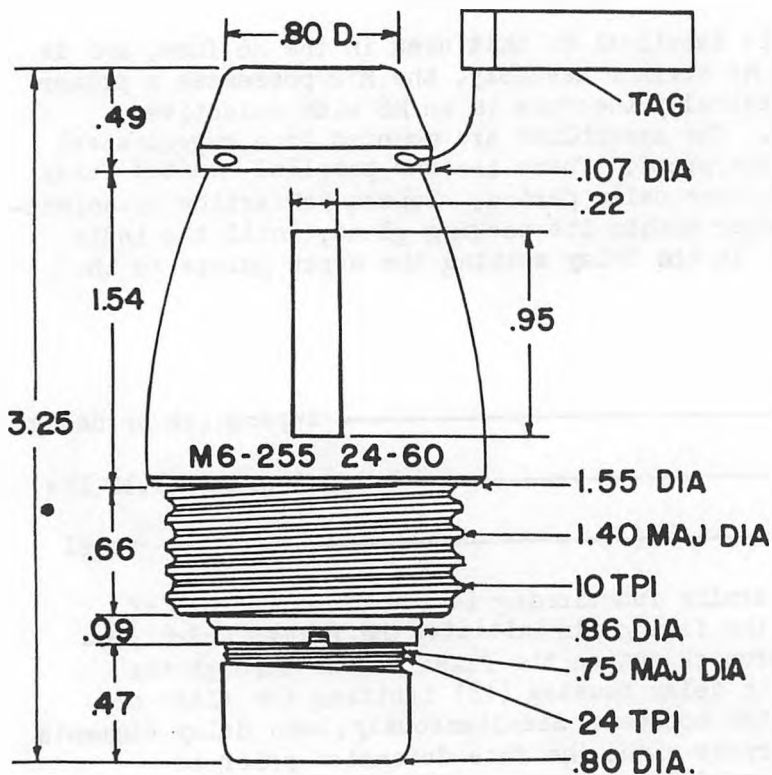
d. Weapons and projectiles with which fuze can be used.

Weapons

82mm mortars M1937, M1942 and M1943

Projectiles

82mm HE-Frag ----- O-832; O-832D



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M12

a. General. The M12 fuze is a setback-armed, point-detonating fuze with optional superquick and fractional-second delay functioning upon impact. The fuze consists of three assemblies: The striker assembly, the delay assembly, and the booster assembly.

The striker assembly is identical to that used in the M6 fuze, and is interchangeable, with the M6 striker assembly, the M12 possesses a primer instead of a detonator. Basically the fuze is an M6 with selective superquick or delay action. The assemblies are mounted in a rugged steel body which is completely waterproof. There are two parallel-mounted delay elements. Both provide the same delay period, Superquick action is selected by rotating the interrupter within its packing gland, until the indicator arrow points to "0." In the delay setting the arrow points to the "3" position.

b. Characteristics.

Action ----- superquick or delay
Loaded weight ----- 536.3 grams (1.18 lbs)
Body material ----- steel

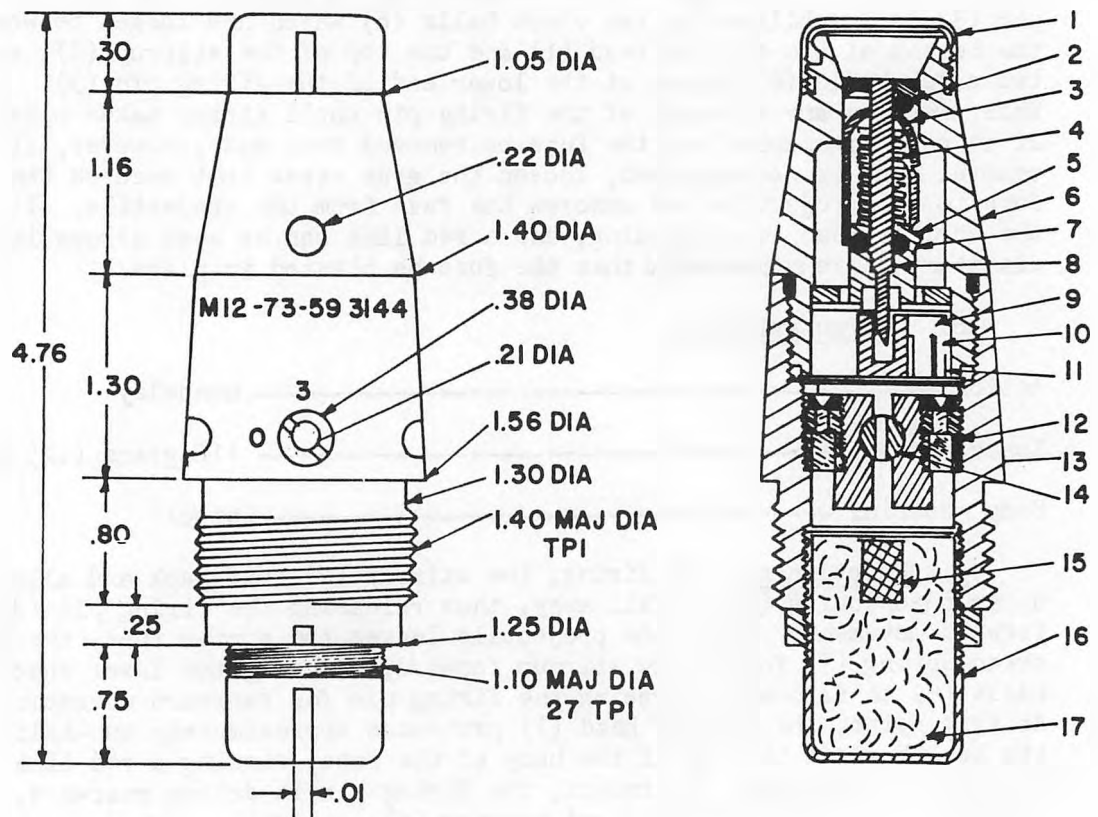
c. Functioning. The arming functioning is identical to that of the M6 fuze. Upon impact, the firing pin initiates the primer which produces a flash. On the superquick option the flash passes through the axial hole in the body of the delay housing (13) igniting the flash detonator (15) and detonating the booster. Simultaneously, both delay elements are ignited but serve no purpose since the fuze detonates prior to their functioning the attached flash pellets. If the interrupter (14) is set for delay action, the primer flash is blocked in the axial hole and the black powder in the upper chamber of both delays (12) is ignited. After the delays burn through, the flash charge in the bottom of each delay is ignited, which then flashes into the detonator (15) producing fuze detonation.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
120mm mortars M1938 and M1943	120mm Frag ----- F-843, OF-843 OF-843A

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL 12



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-50

a. General. The M-50 is a point-detonating, setback-armed, nondelay action fuze used only with fragmentation projectiles. The M-50 is an extremely sensitive fuze which the Soviets consider "unsecured." Prior to use, the nose of the fuze is covered with a lead foil cap. This cap must be removed before firing. The firing pin (3) is immobilized by two check balls (6) which are lodged between the bottom of the striker head (1) and the top of the stirrup (2), and two check balls (8) lodged at the lower end of the firing pin (3). This prevents any movement of the firing pin until firing takes place. It is not recommended that the fuze be removed from duds; however, if removal must be accomplished, loosen the grub screw that secures the fuze to the projectile and unscrew the fuze from the projectile. If the striker head is protruding, and a red line can be seen across its diameter, it is recommended that the fuze be blasted in place.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 112 grams (.25 lb)

Body material ----- steel

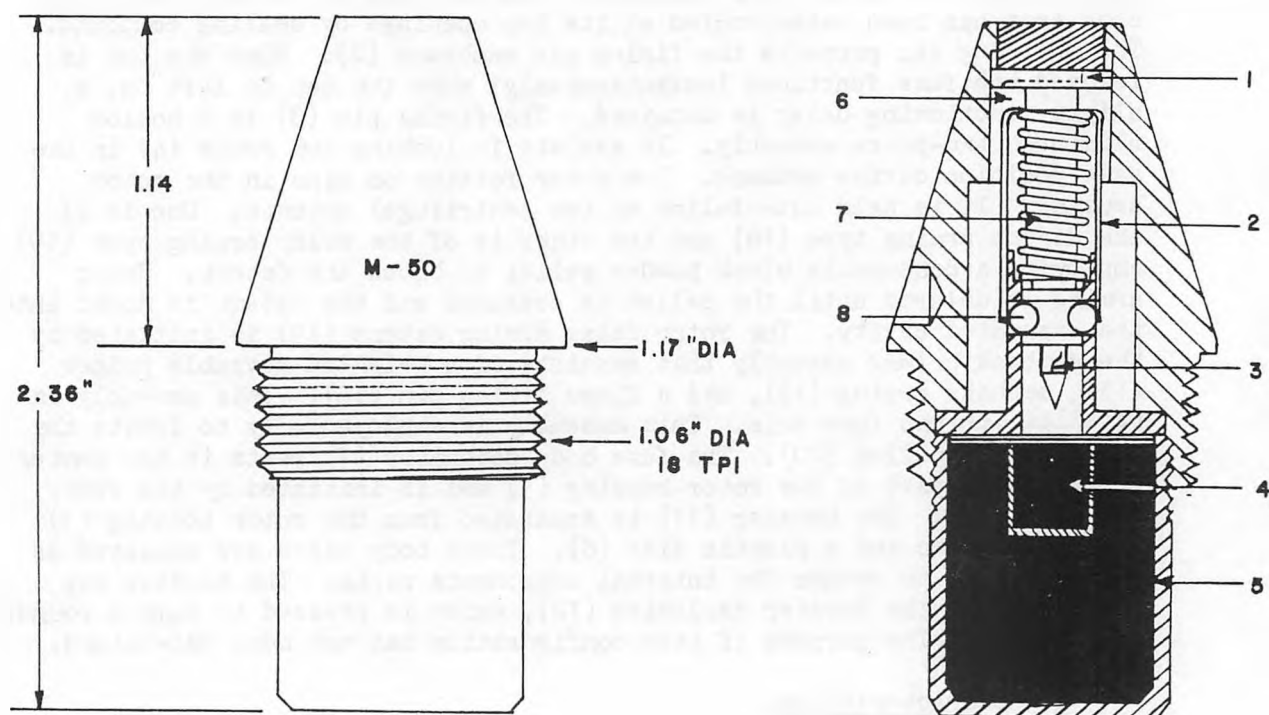
c. Functioning. On firing, the stirrup (2) sets back and allows the upper check balls (6) to fall away, thus releasing the firing pin (3) for forward movement. After the projectile leaves the mortar tube, the anti-creep spring (7) forces the stirrup forward, allowing the lower check balls (8) to fall away, freeing the firing pin for rearward movement. At this point, the striker head (1) protrudes approximately one-half its length above the top of the body of the fuze, showing a red line across its diameter. On impact, the firing pin is driven rearward, initiating the detonator (4) and booster (5), activating the fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
50mm company mortars M1938, M1940, and M1941	50mm Frag ----- O-822; O-822A; O-822Sh

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL M-50



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-N

a. General. The MG-N is a bore-safe, out-of-line detonator fuze. It employs a setback-initiated, pyrotechnic, arming delay feature seen in the MG-57 fuze. The MG-N is a representative of the current Soviet effort to produce bore-safe, detonator-safe fuzes to replace the earlier "unsecured" and "semisecure" fuzes. It is expected that the MG-N will replace the KTM series fuzes in all applications. The MG-N has a single-piece steel body that has been waterproofed at its two openings by sealing compound. The shipping cap protects the firing pin membrane (2). When the cap is removed the fuze functions instantaneously; when the cap is left on, a slight functioning delay is obtained. The firing pin (3) is a hollow aluminum, two-piece assembly. It assists in locking the rotor (4) in the safe position during setback. The rotor rotates on pins in the rotor housing. It is held out-of-line by two centrifugal detents. One is of the direct arming type (18) and the other is of the delay arming type (19) employing a consumable black powder pellet to block the detent. Rotor arming is delayed until the pellet is consumed and the detent is moved into the evacuated cavity. The rotor delay arming detent (19) is initiated by the setback primer assembly that consists of a weighted moveable primer (13), setback spring (15), and a fixed firing pin (16). This assembly is parallel to the fuze axis. This assembly is employed only to ignite the delay arming pellet (20). The fuze body detonator (7) rests in the center of the lower part of the rotor housing (5) and is initiated by the rotor detonator (6). The booster (11) is separated from the rotor housing (5) by a paper disc and a plastic disc (8). These body discs are employed as space fillers to render the internal components rigid. The booster cup (11) contains the booster explosive (12), which is pressed to form a rounded, convex head. The purpose of this configuration has not been determined.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 347 grams (0.76 lb)
Body material ----- steel

c. Functioning. When fired, the setback causes the weighted delay arming primer (14) and weight (13) in the rotor housing (5) to move rearward against its spring (15) and impale itself upon the firing pin (16). The resulting flame flashes through a groove (21) in the side of the rotor housing, initiating the black powder delay arming pellet (20) holding the rotor locking detent (19) in position. The rotor (4) remains locked. As the powder (20) burns, the rotor-locking detent moves into the evacuated area by centrifugal force and cam action of the rotor (4). Simultaneously, the opposite rotor locking detent (18) moves outward against its spring by centrifugal force. This unlocks the rotor (4). The rotor is now turned

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-N

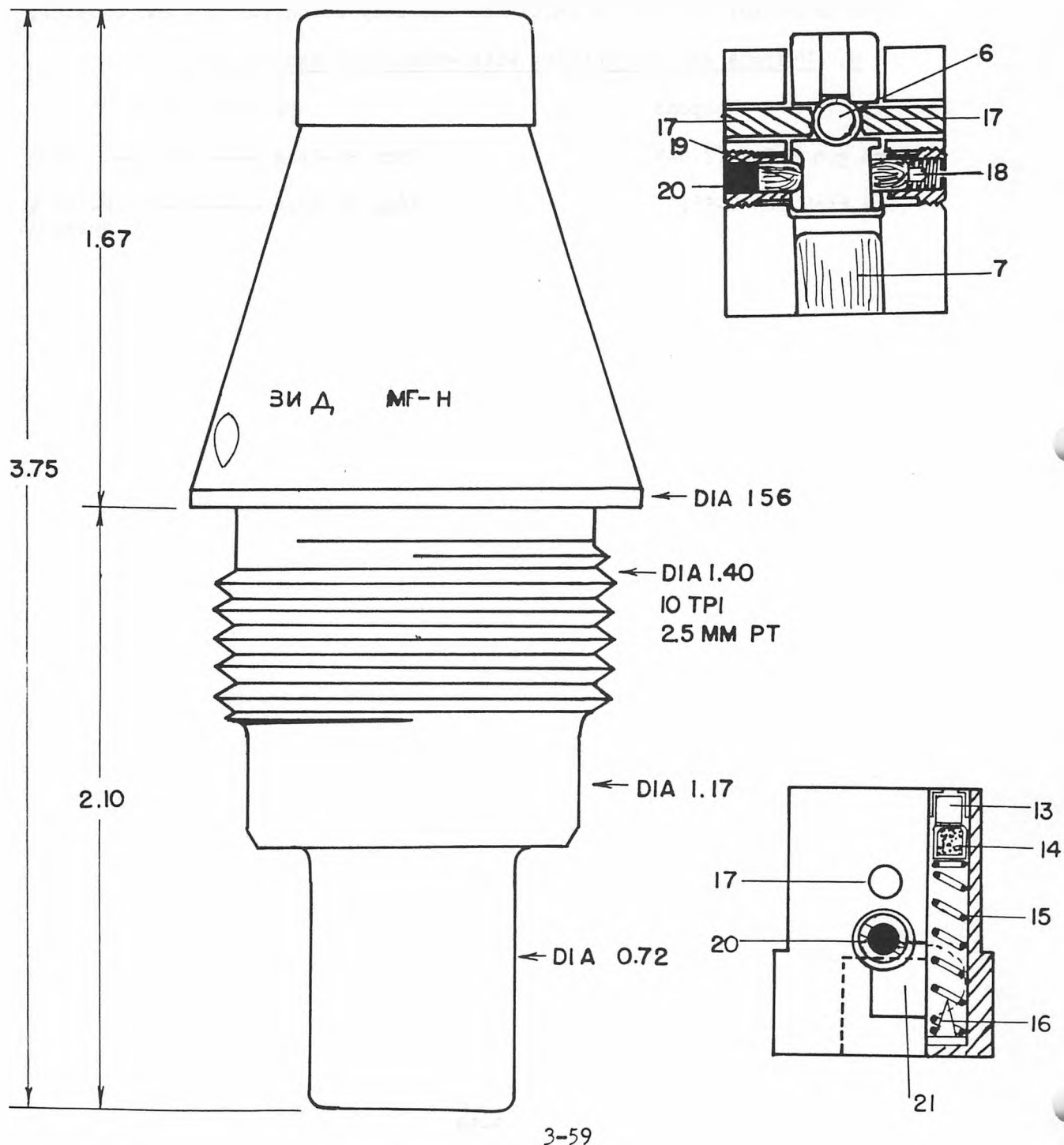
by centrifugal force until the detonator (6) is aligned under the firing pin (3). Upon impact, the firing pin is driven into the stab-sensitive rotor detonator (6) which initiates the body detonator (7) and booster.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm gun M1942 (ZIS-3)	76mm HE-Frag -----O-350A
76mm tank gun D-56T	76mm HE-Frag ----- OF-350 & OF-350A

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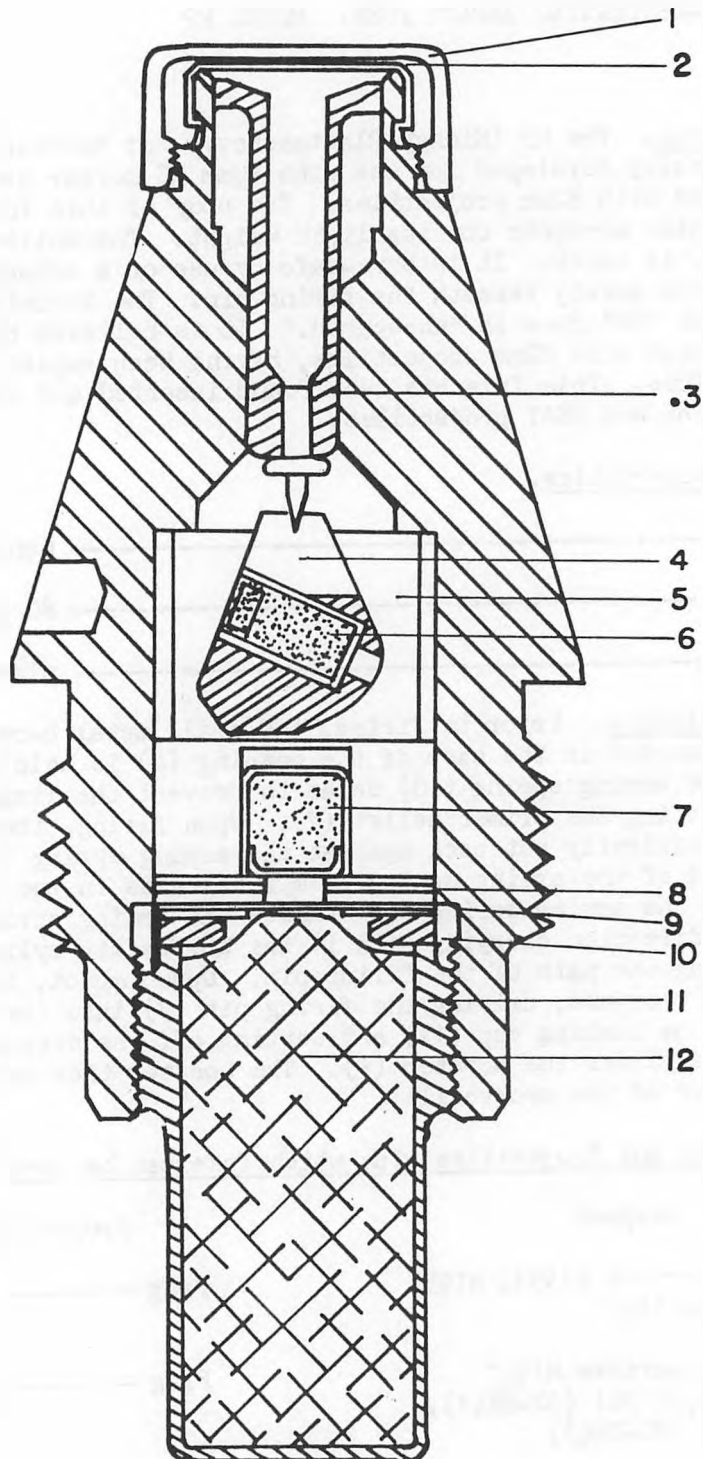
SOVIET, POINT-DETONATING IMPACT FUZE, MODEL MG-N



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MG-N



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MP

a. General. The MP (Minnyy Plastmassovyy, or "Mortar, Plastic") fuze was originally developed for use with 50mm HE mortar projectiles, but can be used with 82mm projectiles. The body of this fuze is made of plastic, which accounts for its light weight. The entire fuze, including the metal cap, is black. It is bore-safe by use of a setback-actuated mechanical block safety beneath the firing pin. The Soviet safety classification of the "MP" fuze is "unsecured." It is believed that the fuze is no longer used with 82mm projectiles, having been replaced with the MP-82 mortar fuze. This fuze has been found inserted and used as a closing plug in 122mm HE and HEAT projectiles.

b. Characteristics.

Action ----- nondelay
Loaded weight ----- 80 grams (176 lb.)
Body material ----- plastic

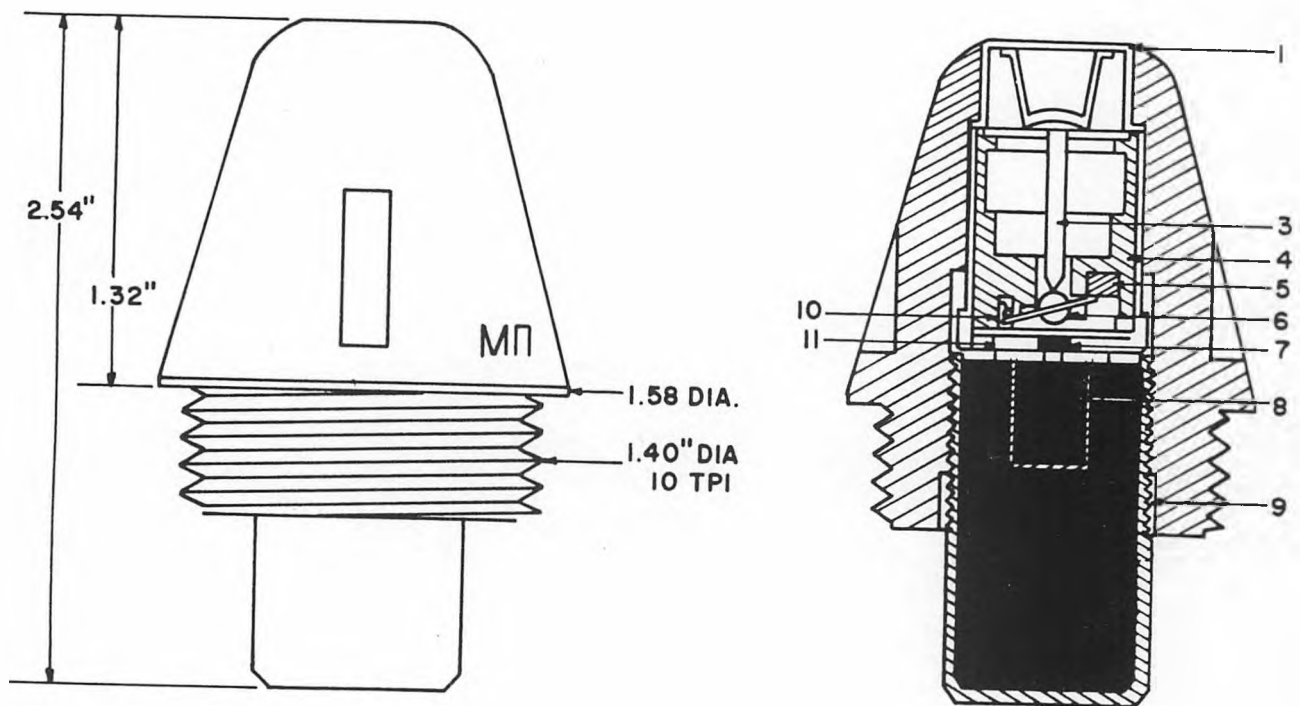
c. Functioning. Prior to firing, the small metal boresafety cylinder (6) located in the base of the bushing (4) is held in position by the arming spring (10) so as to prevent the firing pin (3) from contacting the primer pellet (7). Upon firing, the arming weight (5) is violently set back against the arming spring (10), freeing one end of the arming spring from its recess in the bushing (4). The tension of the arming spring then causes the arming spring to move in an oblique direction carrying with it the boresafety cylinder (6), thereby clearing the path of the firing pin. Upon impact, the nose cap (1) is crushed rearward, driving the firing pin (3) into the primer pellet (7) in the bushing cup (11) and setting off the detonator (8), which in turn explodes the booster (9). The booster then detonates the explosive filler of the projectile.

d. Weapons and Projectiles with which fuze can be used.

Weapons	Projectiles
50mm company mortars M1938, M1939 M1940, and 1941	Frag ----- O-822 O-822A
82mm battalion mortars M1937 (82-BM37), M1941 (82-BM41), and M1943 (82-BM43)	Frag ----- O-832

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MP



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL MP-82

This fuze is similar in construction to the MP fuze, differing only by the increased resistance of its membrane. The MP-82 is interchangeable with the MP mortar fuze and is used in 82mm mortar shells. This fuze may be used in the same shells and fired from the same weapons as the MP fuze. This fuze is considered "unsecured" according to the Soviet safety classification.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RG-6

a. General. The RG-6 has been replaced by the later RGM and RGM-2 fuzes because its striker action is less sensitive than that of the other two fuzes, and it is unsafe to fire when set for delay action. It is not to be used at temperatures below freezing, or in firing guns and howitzers with a full charge. The Soviets consider the fuze to be "safe", presumably because a sliding block interrupts the explosive train between the detonator and the booster until the projectile leaves the bore of the weapon. In the case of premature primer ignition at the delay setting, however, the powder delay element would burn until the elements of the explosive train were aligned, so that the projectile would burst dangerously close to the weapon.

The RG-6 differs in construction from the RGM and RGM-2 in several ways. It has an elongated nose cap with a rounded top, into which the head of its striker extends; the other fuzes have a relatively short, flat-topped cap, a striker which does not extend beyond the nose of the fuze proper, and membranous metal cover cup designed to prevent air pressure from activating the fuze when it is fired without the nose cap. Another major difference is that the RG-6 has no safety device to prevent premature activation at the delay setting; the RGM and RGM-2 have been provided with a safety plunger to eliminate this drawback.

The different settings of the RG-6 give a fragmentation, high-explosive, ricochet, or delayed high-explosive effect.

<u>Setting</u>	<u>Action</u>
"0" w/o cap -----	instantaneous (Frag)
"0" w/cap -----	nondelay (HE)
"3" w/o or w/cap -----	delay (delayed HE or ricochet)

NOTE: The fuze cap may be either removed or left in place when the fuze setting is "3," since its influence at this setting is insignificant.

b. Characteristics.

Action ----- instantaneous, nondelay, and delay
Loaded weight ----- 430 grams (0.946 lb)
Body material ----- steel

c. Functioning. On firing, the arming sleeve (2) sets back, compresses

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RG-6

the arming sleeve spring (3), and locks with the retaining ball sleeve (4). Simultaneously the inertia sleeve (17), overcoming the opposition of the prongs of the inertia pin safety clamp (18), sets back, compresses the inertia sleeve spring (19), and locks with the inertia pin (20). The springs (3) and (19) remain compressed until the shell leaves the bore of the gun, after which they overcome the force of inertia. Then the arming sleeve spring moves the arming sleeve and the retaining ball sleeve forward, releasing the three retaining balls (11), and centrifugal force causes the balls to escape from their housings in the striker (1) so that they no longer prevent the movement of the striker or the primer holder (5). At the same time, the inertia sleeve spring moves the inertia sleeve forward, drawing the attached inertia pin out of its socket in the relay charge housing (16) and thereby unlocking the rotor body (14). The rotor body turns under the influence of the spiral spring (8) and brings the detonator (15) into alignment with the relay charge (9) leading to the booster (10), and comes to rest on a check pin.

If the fuze is set to instantaneous action ("0"), with fuze cap removed, the striker (1) is driven rearward on impact with the target, overcoming the anticreep spring (12), and the firing pin strikes the primer (6). At the same setting, but with the fuze cap on, the primer holder and primer move forward, and the primer strikes the firing pin. In either case, the flash passes directly through an opening in the setting selector (13), and into the detonator in the rotor body. The detonation wave from the detonator travels through the relay charge and activates the booster.

If the fuze is set for delayed action ("3"), the setting selector blocks the direct channel from the primer to the detonator, and the flash must pass to the detonator by way of the powder delay pellet (7). The fuze cap has the same effect on the operation at the delay setting as at the instantaneous setting: without fuze cap, the primer moves forward to strike the firing pin.

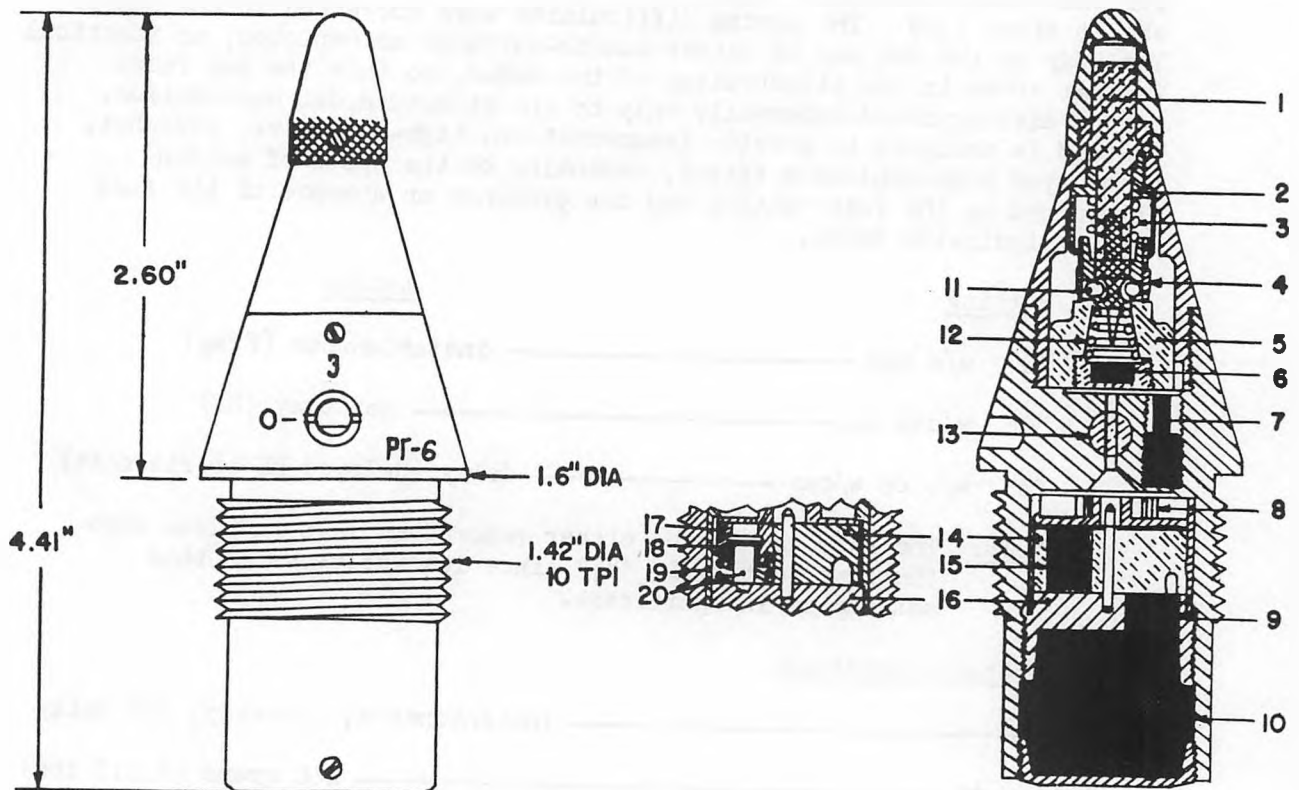
d. Weapons and Projectiles with which fuze can be used.

Weapons	Projectiles
122mm howitzers M1910/30, M1909/37, and M1928 (M-30); corps guns M1921 and M1921/37 (A-19)	122mm HE ----- F-460; F-460A; F-460K; F-460N; F-460U Frag HE--OF-462; OF-462A; OF-462L; OF-462N

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RG-6

152mm howitzers M1909/30, M1938 (M-10), 152mm HE ——— F-533; F-533K;
and M1943 (D-1; tank howitzer F-533L; F-533M; F-533N; F-533U
M1938/40; gun-howitzer M1937 (ML-20);
gun M1910/34; SP gun M1937/43 (ML-
20S) Frag HE — OF-530; OF-530A
Frag ————— O-430A



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM

a. General. The RGM and RGM-2 fuzes have replaced the RG-6, which they closely resemble in design and operation, largely because they are more sensitive than the RG-6 when set at instantaneous action and are bore-safe at all three settings. The chief disadvantage of the RGM lies in the relatively high resistivity of its safety devices, which may prevent the fuze from arming when setback is insufficient (a condition sometimes occurring in howitzer fire with low charges). It is presumably for this reason that the Soviets, have not issued the RGM with howitzer shells since 1949. The arming difficulties were corrected in the RGM-2. The body of the RGM may be either smooth-surfaced as depicted, or identical to that shown in the illustration of the RGM-2, so that the two fuzes may be distinguished externally only by the stamped model designation. The RGM is designed to provide fragmentation, high-explosive, ricochet, or delayed high-explosive effect, depending on the speed of action determined by the fuze setting and the presence or absence of the fuze cap, as indicated below.

<u>Setting</u>	<u>Action</u>
"0" w/o cap -----	instantaneous (Frag)
"0" w/cap -----	nondelay (HE)
"3" w/o or w/cap -----	delay (delayed HE or ricochet)

NOTE: The fuze cap may be either removed or left in place when the fuze setting is "3," since its influence at this setting is insignificant.

b. Characteristics.

Action ----- instantaneous, nondelay, and delay
Loaded weight ----- 460 grams (1.012 lbs)
Body material ----- steel

c. Functioning.

(1) Upon firing, the arming sleeve (2) sets back, compresses the arming sleeve spring (3), and locks with the retaining ball sleeve (5). Simultaneously, the inertia sleeve (16), overcoming the opposition of the prongs of the inertia pin safety clamp (17), sets back, compresses the inertia sleeve spring (18), and locks with the inertia pin (19). The

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM

springs (3 and 18) remain compressed until the shell leaves the bore of the gun, at which time they overcome the force of inertia. Then the arming sleeve spring moves the arming sleeve and the retaining ball sleeve forward, releasing the three retaining balls (6) centrifugal force causes the balls to escape from their housings in the striker (4) so that they no longer prevent the movement of the striker or the primer holder (8). At the same time, the inertia sleeve spring moves the inertia sleeve forward, drawing the attached inertia pin out of its socket in the relay charge housing (12) and thereby unlocking the rotor body (11). The rotor body turns under the influence of the spiral spring (10), brings the detonator (21) into position opposite the relay charge (23) leading to the booster (13) and comes to rest on a check pin.

(2) If the fuze is set to instantaneous action ("0"), with fuze cap removed, the striker (4) is driven rearward on impact with the target, and the firing pin (14) strikes the primer (9). At the same setting, but with fuze cap on, the primer holder and primer move forward, shearing the claws of the primer holder retainer (7), and the primer strikes the firing pin. In either case, the flash passes directly through an opening in the setting selector (15) and into the detonator (21) in the rotor body. The detonation wave from the detonator travels through the relay charge (23) and activates the booster.

(3) If the fuze is set on delayed action ("3"), the setting selector blocks the direct channel from primer to detonator, and the flash must pass to the detonator by way of the powder delay pellet (22). The fuze cap has the same effect on the operation at the delay setting as at the instantaneous setting: Without fuze cap, the firing pin moves rearward to strike the primer; with cap, the primer moves forward to strike the firing pin. A safety plunger (20) prevents muzzle bursts at this setting, should the fuze primer ignite while the shell is in the bore of the weapon. Premature action of the primer forces the safety plunger to shear its retaining pin, move rearward, and immobilize the rotor body, thereby preventing the rotor body from moving the detonator into alignment with the delay charge and booster. Accordingly, the flash travels from the powder delay pellet to the detonator but, unable to pass from the detonator to the relay charge and booster, cannot activate the projectile.

d. Weapons and projectiles with which fuze can be used.

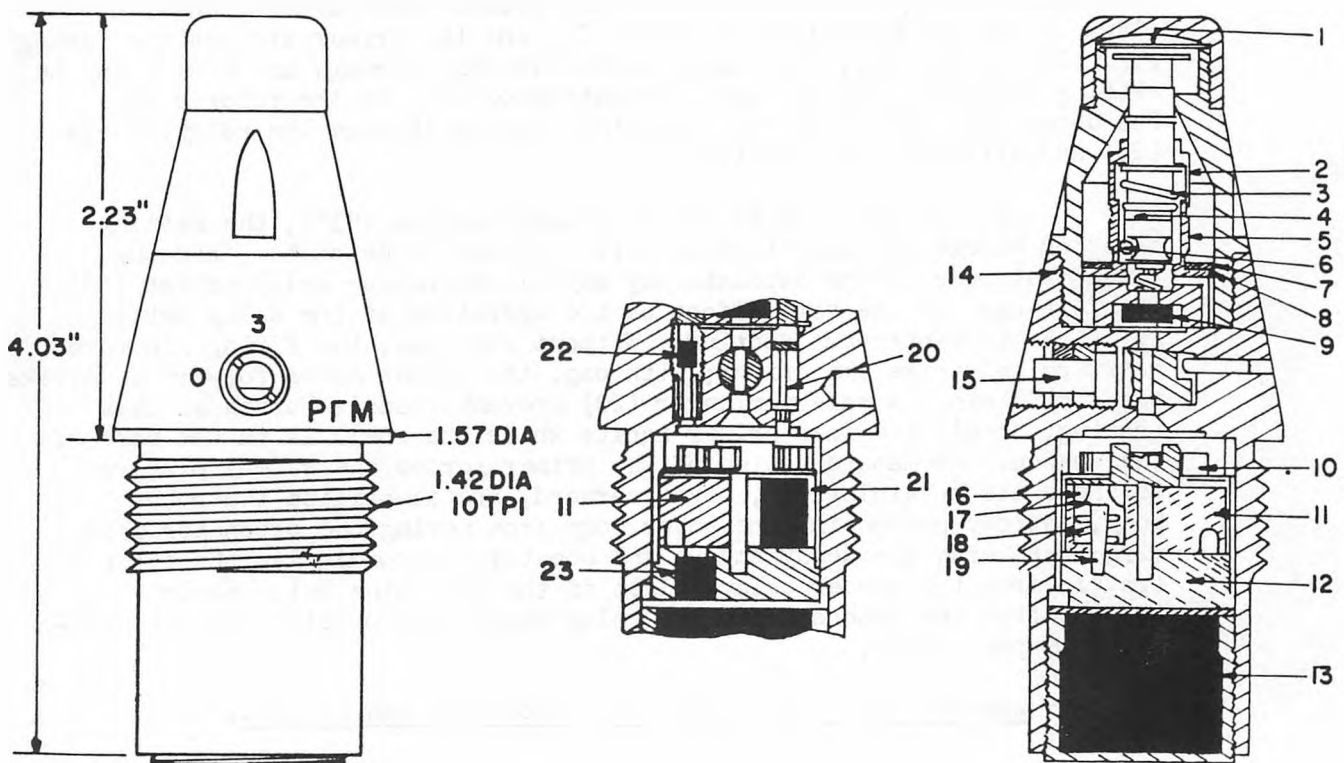
Weapons	Projectiles
100mm field (AT) gun M1944 (BS-3); SP gun M1944 (D-10S)	100mm HE ----- F-412

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM

Weapons	Projectiles
107mm corps gun M1910/30 and M1940 (M-60)	107mm HE ----- F-422L; F-422M Frag HE ----- OF-420
122mm howitzers M1910/30, M1909/37, and M1938 (M-30); corps gun M1931 and M1931/37 (A-19); tank gun M1943 (D-25); SP guns M1944 (D-25S) and M1931/44 (A-19S)	122mm HE ----- F-460; F-460K; F-460N; F-460U Frag HE ----- OF-462L; OF-462M OF-471; OF-471N
152mm howitzers M1909/30, M1938 (M-10), and M1943 (D-1); guns M1910/34 and M1935; gun-howitzer M1937 (ML-20); SP gun M1937/43 (ML-20S)	152mm HE ----- F-533; F-533K; F-533I; F-533M F-533N; F-533U; F-540Sh; F-542 Frag HE OF-530; OF-530A OF-540



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SOVIFT, POINT-DETONATING IMPACT FUZE: MODEL RGM-2

a. General. The RGM-2 (Rdultovskogo, Golovnoy, Membrannyy, 2-y Obrazets; "Rdultovskiy (designer's name), point-detonating, membrane, model 2") differs structurally from the RGM only in the percussion safety mechanism and in the rotor body locking device. This objectionable rigidity (and the consequent high resistance to setback) of these parts in the RGM, which led to arming failures in low-velocity fire, has been corrected in the RGM-2 principally by using springs instead of rigid parts. According to a Soviet publication, the RGM-2 is used in fragmentation, fragmentation high-explosive, and high-explosive shells for guns and howitzers of 122mm caliber and above. The fuze is bore-safe and falls under the Soviet classification "safe" because the explosive train from the detonator to the booster is interrupted until the fuze arms. Like the RGM, the RGM-2 provides fragmentation, high-explosive, ricochet, or delayed high-explosive effect. The effect is determined by the fuze setting and by the use or omission of the fuze cap, as shown below.

<u>Setting</u>	<u>Action</u>
"0" w/o cap	instantaneous (Frag)
"0" w/cap	nondelay (HE)
"3" w/o or w/cap	delay (delayed HE or ricochet)

NOTE: The fuze cap may be either removed or left in place when the fuze setting is "3", since its influence at this setting is insignificant.

b. Characteristics.

Action ----- instantaneous, nondelay, and delay
Loaded weight ----- 470 grams (1.034 lbs)
Body material ----- steel

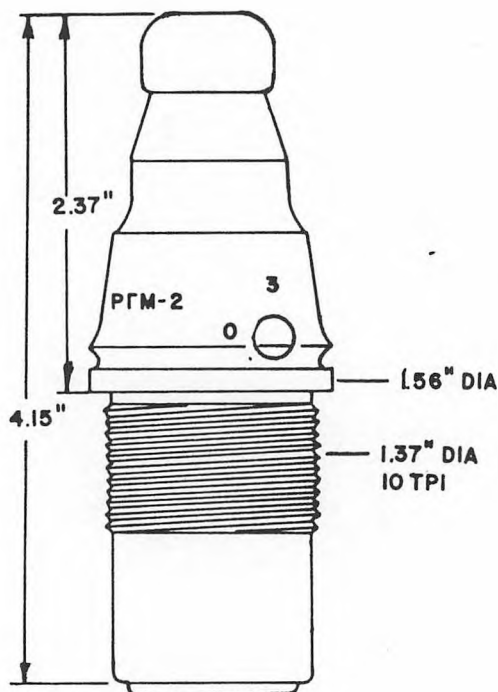
c. Functioning. The functioning of the RGM-2 is identical to that of the RGM.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM-2

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
122mm howitzer M1938(M-30); corps guns M1931 and M1931/37 (A-19); tank gun M1943 (D-25); SP guns M1944 (D-258) and M1931/44 (A-19S)	122mm Frag-HE ----- OF-462; OF-471N
152mm howitzers M1938(M-30); corps guns (D-1); tank howitzer M1938/40; gun M1910/34; gun-howitzer M1937 (ML-20); SP gun M1937/43 (ML-20S)	122mm Frag HE ----- OF-530; OF-530A; OF-540



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM-3

The RGM-3 fuze is known to exist, but no information as to its design and functioning is available. It is believed, however, that the RGM-3 is similar in construction and operation to the RGM-2 fuze.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM-6

a. General. The Soviet RGM-6, selective point-detonating and delay fuze closely resembles the RGM-2 and is almost identical with the later U-429, both externally and internally. The lower fuze body is chemically coated with a black finish. The upper fuze body is cadmium plated. Both sections of the body are sprayed with varnish. All joints are sealed with lead crush washers, rendering the fuze waterproof. The selector spindle passes through a three element packing gland.

The major identification feature of the RGM-6 is the circumferential groove cut around the upper fuze body. This groove gives the upper body the appearance of two piece construction, which may be the case, since the inner body contains a non-removable sleeve.

b. Characteristics.

Action ----- instantaneous or delay

Loaded weight ----- 454 grams (1.0 lb)

Body material ----- steel

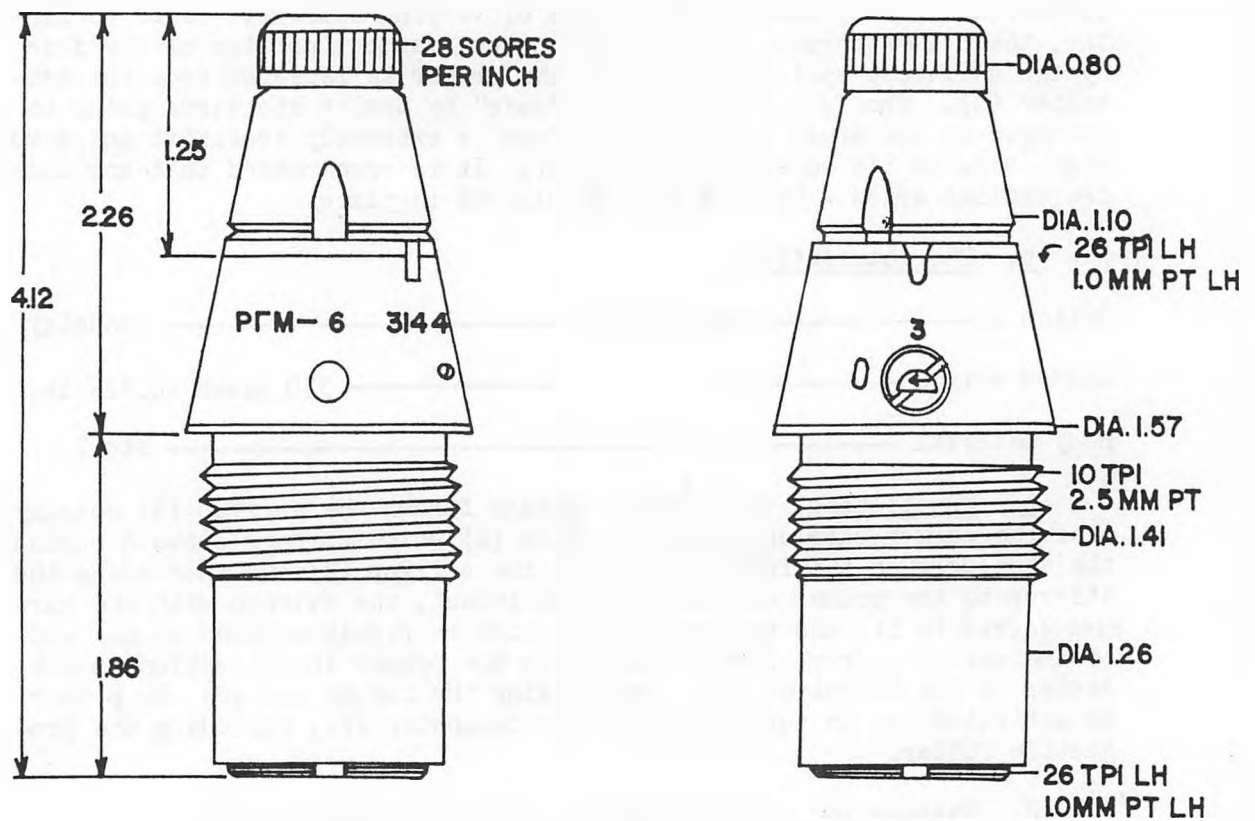
c. Functioning. Functioning of the RGM-6 appears identical to the V-429.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
100mm gun, D-44; gun, D-74	100mm ----- F-412
122mm gun-howitzer M1963, gun M1931/37 (A19)	122mm ----- OF-472, OF-462
130mm gun M46	130mm ----- OF-482M
152mm gun ML-20, gun D-20	152mm ----- OF-540

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL RGM-6



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL UGT

a. General. The UGT fuze (Universal'nyy Golovnoy, Tetrilovyy or "Universal, Point detonating, Tetryl") is a nondelay fuze of early Soviet design which has been replaced by the Model UGT-2 fuze. HE projectiles of old design are currently using the UGT; however, new model projectiles now use the UGT-2. The UGT is termed "universal" because of its versatility of use in projectiles of varying caliber. Prior to firing, the primer carrier (5) is held in the rearmost portion of the fuze by the anticreep spring (1) so that the primer is isolated from the detonator (6). The fuze is considered "safe" by Soviet standards prior to firing. In the armed position this fuze is extremely sensitive and a very light blow on its nose may detonate it. It is recommended that any dud projectiles armed with this fuze be blasted in place.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 330 grams (0.726 lb)

Body material ----- steel

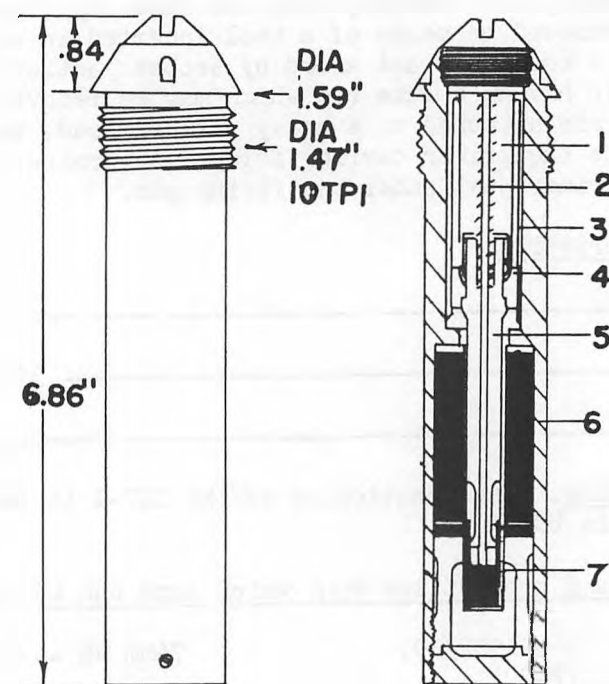
c. Functioning. On firing, setback forces the stirrup (3) rearward over the primer carrier clamping spring (4) which springs outward behind the shoulders on the inner surface of the stirrup (3) and thus locks the stirrup to the primer carrier (5). On impact, the stirrup with the carrier locked to it, and the primer (7) which is firmly affixed to the end of the carrier, drive forward and bring the primer into position in the center of the detonator (6). On striking the firing pin (2) the primer is activated and in turn activates the detonator (6), exploding the projectile filler.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
107mm corps guns M1910/30, M1940 (M-80), and M1941	107mm HE ----- F-422L
152mm gun M1910/34; gun-howitzer M1937 (ML-20)	152mm HE ----- F-542G
203mm howitzer M1931 (B-4)	203mm HE ----- F-621
305mm howitzer M1940 (BR-18)	305mm ----- unknown

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL UGT



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL UGT-2

a. General. The UGT-2 fuze (Universal'nyy, Golovnoy, Tetril'nyy, S Dvumya Ustanovkami of "Universal, Point detonating, Tetray, with two settings") was designed for use with high-explosive and fragmentation high-explosive projectiles of 76mm, 107mm, 122mm, and 152mm calibers. The fuze is capable of nondelay action with fuze cap removed and delay action (approximately 0.01 second) with the fuze cap attached. The fuze cap may be removed by means of a tool inserted in a slot in the cap. This fuze is bore-safe and armed by setback action; it differs from the UGT chiefly in having a fuze cap which may be removed to vary the action, a firing pin attached to a heavy striker head, and an arming spring that forces the primer carrier forward on arming, thereby positioning the primer just under the firing pin.

b. Characteristics.

Action ----- nondelay or delay
Loaded weight ----- 330 grams (0.726 lb.)
Body material ----- steel

c. Functioning. The functioning of the UGT-2 is essentially the same as that of the UGT fuze.

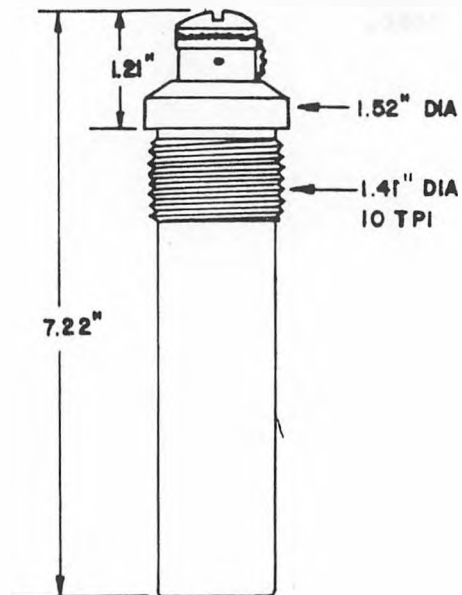
d. Weapons and projectiles with which fuze can be used.

76mm divisional guns M1902/30, M1933, M1936 (F-22), M1938/39, M1939, (USV), & M1942 (ZIS-3)	76mm HE ----- F-354U
107mm corps guns M1910/30 and M1941	107mm HE ----- F-420U Frag-HE ----- OF-420U Smoke ----- D-422; D-422U
122mm tank gun M1943 (D-25); corps guns M1931 and M1931/37 (A-19); SP gun M1944 (A-19S); howitzers M1910/30 and M1909/37	122mm HE ----- F-460K; F-460N; F-460U
152mm gun M1910/34, M1910/30; gun-howitzer M1937 (ML-20); howitzers M1909/30 and M1910/37	152mm HE - F-533; F-533K; F-533L F-533M; F-533N; F-533U; F-542ShU; F-542U

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL UGT-2



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL UGT-3

This fuze is the third model of the UGT series and is similar in design and operation to the UGT-2 fuze. The UGT-3 differs from the UGT-2 only in the shape of the nose.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-25

a. General. The Soviet V-25 is a selective superquick or delay point-detonating fuze employed in the 140mm rocket. The V-25 employs graze sensitive weights and detonator carrier producing impact inertia nondelay functioning when impacting at flat angles. The entire fuze is made of cadmium-plated steel, except for the selector assembly which is brass. The steel body is heavy and sturdy and is capable of attacking reinforced structures. An indication of its penetration capabilities is the 1-second delay feature. The fuze is well constructed making extensive use of plating of setback and centrifugal detents as well as plastic sealing rings at all fuze body openings, rendering the fuze body completely waterproof.

The V-25 is considered bore-safe and provides handling and shipping safety. The fuze nose is protected by a shipping cap (1) that may or may not be removed for firing. The striker head and firing pin assembly (11) are maintained in the upper part of the fuze by the striker spring (2). The striker is held away from the detonator (16) by two centrifugal detents (14). The detents (14) are maintained under the firing pin (11) by the detent springs (13). The detents and springs are loaded through the closing cap (12) which is sealed by a plastic ring. The centrifugal detents (14) are further held in the locked position by two setback detents (3) and springs (4). The graze sensitive weights (17) move the detonator carrier (6) upward into the firing pin (11) upon flat impact. The delay assemblies (19) consist of nongaseous powder pressed into threaded housings that screw into the fuze body. The selector (18) is a cylindrical piece of brass in which two holes have been drilled. The superquick hole provides a straight flash channel from the upper detonator (16) to the lower detonator (7); the second hole is the short delay channel (21). It is drilled at a 45 degree angle and when the selector is turned to "M," it accepts the flash from the upper detonator and transmits it to the short delay pellet which burns for 0.5 seconds. With the selector set on **S**, the central flash hole is completely blocked. This permits the long delay pellets (20) to be ignited and produce their 1-second delay. It should be noted that the long delay pellets are ignited during superquick and short delay action, but are not permitted to complete their function prior to detonation of the fuze.

<u>Setting</u>	<u>Action</u>
"Q"	superquick
"S"	long delay (1.0 second)
"M"	short delay (0.5 second)

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-25

b. Characteristics

Action ----- superquick or delay
Loaded weight ----- 605 grams (1.30 lbs.)
Body material ----- steel

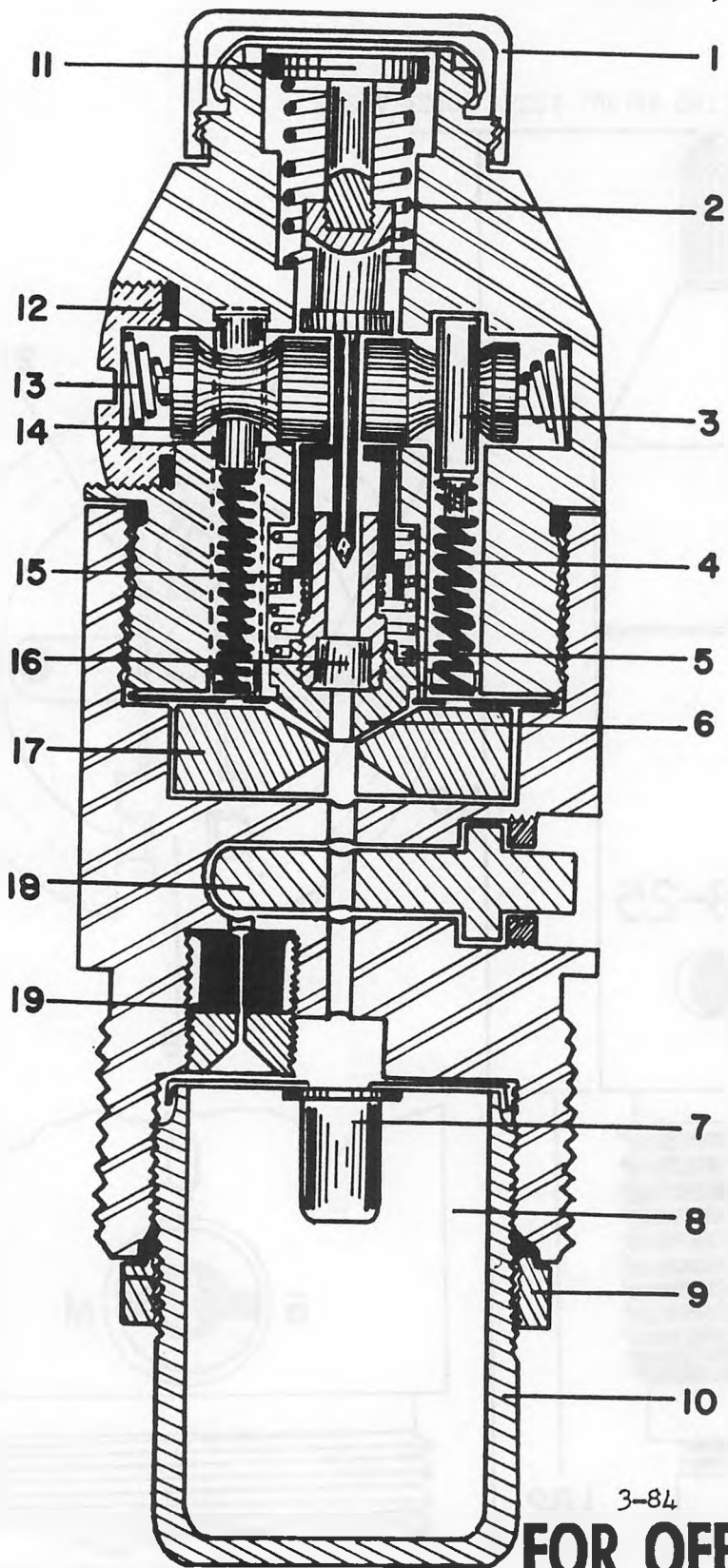
c. Functioning. When the rocket is fired, setback causes the two setback detents (14) to move downward against their springs, unlocking their centrifugal weights (14) which move outward against their springs (13) by centrifugal force. As the centrifugal detents (14) move outward the positive block is removed from the firing pin (11). The striker is prevented from firing the detonator by the striker spring (2). When setback ceases, the centrifugal detent blocking cup (15) rises under the influence of its spring to prevent the centrifugal detents from returning to their original positions and blocking the striker. The fuze is now armed and will function upon impact or grazing action. Upon impact, the striker assembly (11) is driven rearward. Simultaneously, the graze weights (17) slide laterally, cam the detonator carrier (6) forward. The firing pin pierces the detonator, initiating the explosive train. If the fuze strikes a target at a low angle, the striker assembly (11) may not be driven rearward. The graze weights (17) move laterally, cam the detonator carrier (6) upward. The detonator carrier overcomes the resistance of the carrier spring (5) and impales itself on the detonator, initiating the explosive train.

d. Weapons and projectiles with which fuze can be used.

140mm Soviet rocket launcher,
model unknown

140mm HE-Frag ----- M140F

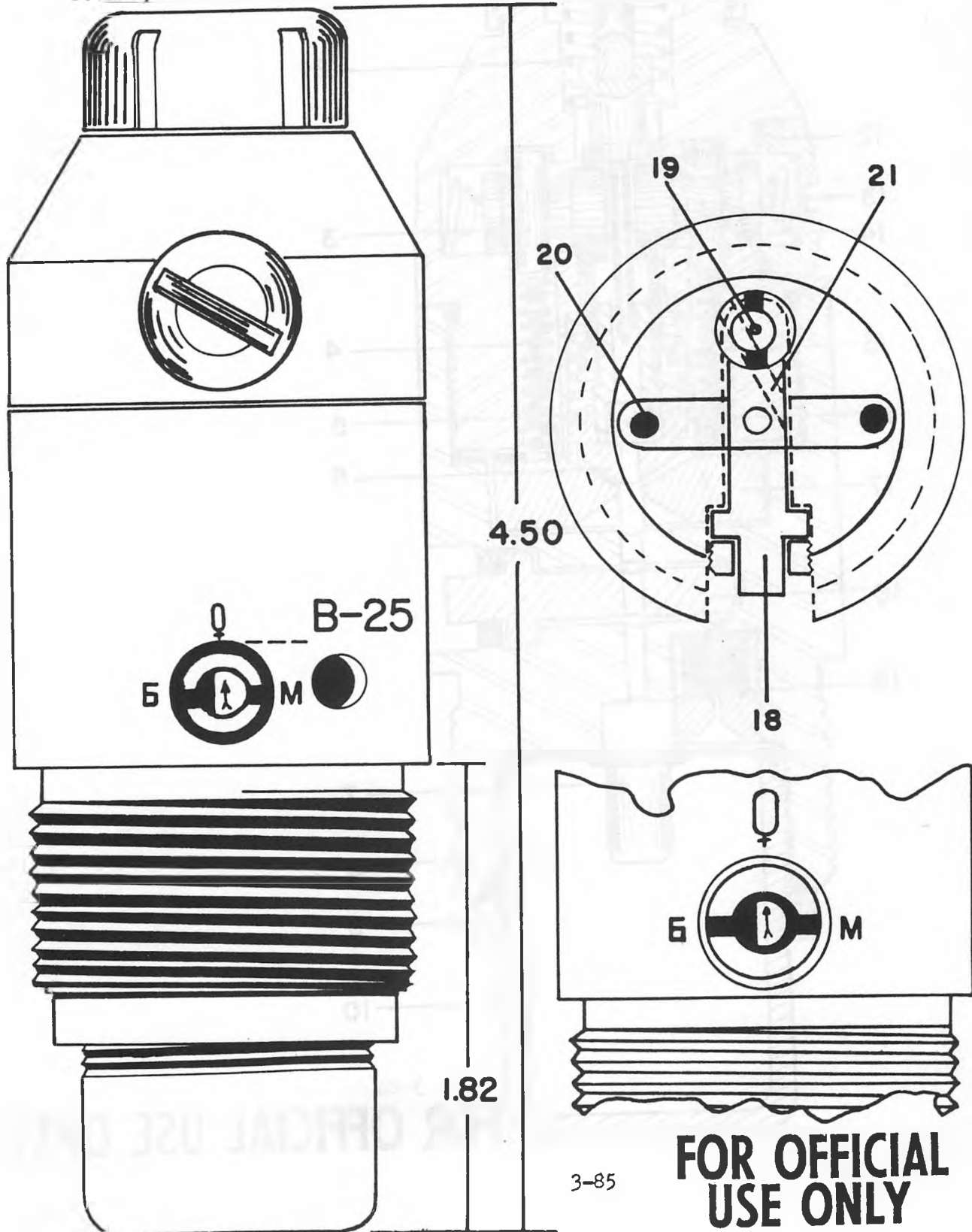
SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-25



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-25



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-229

a. General. The V-229 is an instantaneous, nose-percussion type fuze of conventional design, used only on HE, AT projectiles fired from 122mm howitzers. The fuze body is plastic. Three check balls, positioned above the stirrup to prevent forward movement of the firing pin, and three steel rollers, positioned at the lower end of the striker to prevent rearward movement, make this fuze mechanically bore-safe. The fuze is extremely sensitive when armed and caution should be exercised in handling it. To remove it from the dud or an unfired projectile, loosen the grub screw which secures it to the projectile nose and unscrew the fuze (left-hand thread). A visual examination will not reveal whether the fuze is armed or unarmed.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- plastic

c. Functioning. Upon firing, the stirrup (4) sets back and compresses the arming spring (5) and, at the same time, frees the check balls (3) from the recess and allows them to drop down into the fuze body. This frees the stirrup for forward movement, although it is momentarily held rearward by the force of inertia. After the projectile has left the gun tube, the arming spring (5) decompresses and forces the stirrup forward until it contacts the under surface of the striker head (2). This frees the safety rollers (6) and permits them to drop down into the fuze body, freeing the striker for rearward movement. On impact, the foil cap (1) is ruptured and the striker is driven downward, forcing the firing pin (7) into the detonator assembly (8) and exploding the projectile.

d. Weapons and projectiles with which fuze can be used.

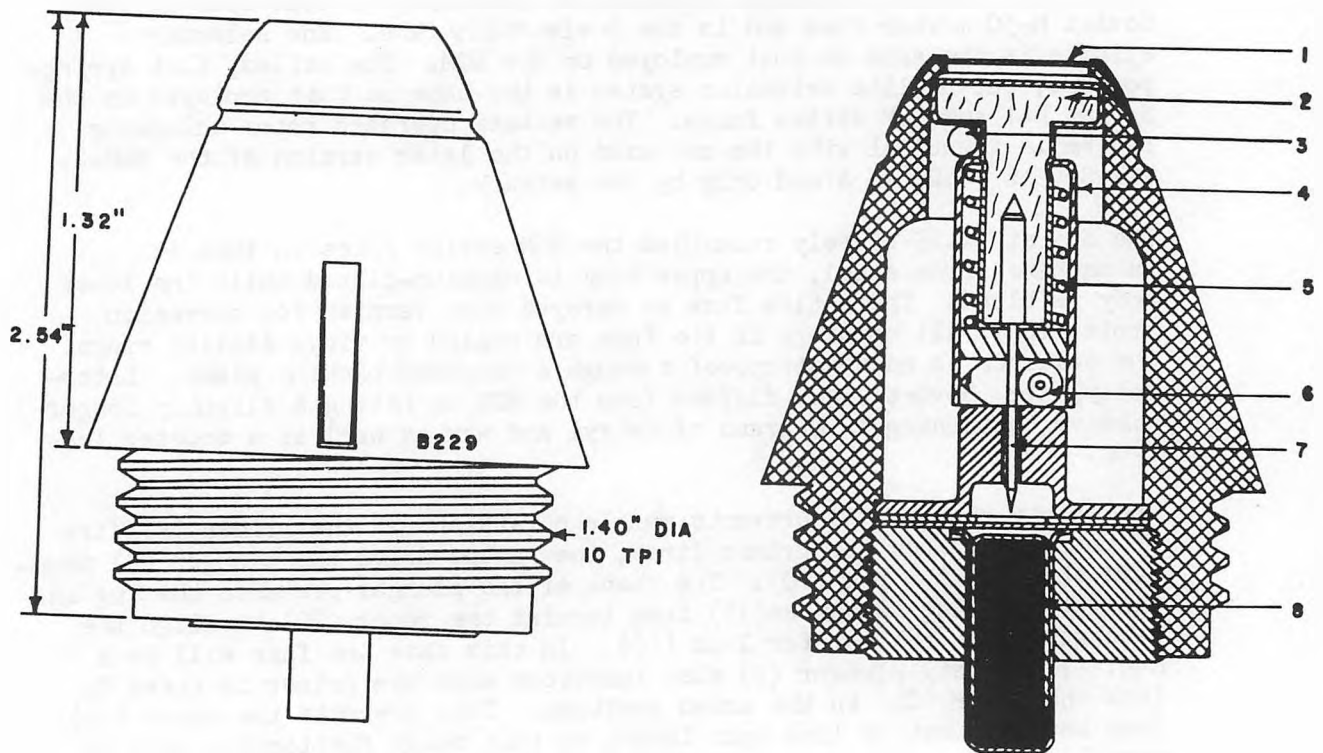
Weapons

Projectiles

122mm howitzers M1910/30, M1909/37, 122mm HE, AT ----- BF-460A
and M1933 (M-30)

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-229



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-429

a. General. The Soviet V-429 is the latest product in the evolution of the Soviet RG-6 and RGM series fuzes. The V-429 contains a firing pin arming mechanism identical in principle to that seen in the Soviet M-50 mortar fuze and in the Soviet V-229 fuze. The selector spindle is the same as that employed on the RGM. The coiled, flat spring-powered, out-of-line detonator system is the same as that employed on the Soviet D-1 and RGM series fuzes. The setback operated rotor unlocking system is identical with the one used on the later version of the RGM-2. The Soviet V-429 is armed only by the setback.

The Soviet V-429 closely resembles the RGM series fuzes in that it is machined from steel, the upper body is cadmium-plated while the lower body is blued. The entire fuze is sprayed with varnish for corrosion protection. All openings in the fuze are sealed by vinyl sealing rings. The selector is made waterproof through a compound packing gland. Externally, the Soviet V-429 differs from the RGM in having a slightly longer booster containing 12.0 grams of tetryl and wax as well as a booster lock ring.

The safety plunger (9) prevents muzzle bursts should the primer (8) fire prematurely. When the primer fires, the gasses drive the plunger (9) downward shearing the pin (10). The shank of the plunger prevents the lug on the rotor spring mechanism (11) from turning the rotor (20) to align the detonator with the booster lead (16). In this case the fuze will be a dud. The safety plunger (9) also functions when the primer is fired to lock the rotor (20) in the armed position. This prevents the rotor (20) from bouncing out of line upon impact so that delay functioning will be normal.

b. Characteristics.

Action ----- instantaneous and delay

Loaded weight ----- 434 grams (0.95 lb)

Body material ----- steel

c. Functioning. Prior to firing a selection is made of the desired fuze function. The nose cap (1) may be removed for superquick functioning or left in place for nondelay functioning. The selector is turned to the "0" position for superquick or to the "3" position for a delay setting.

Upon setback the setback sleeve (5) moves down, compressing its spring (4) and releasing the locking ball (3). The setback collar (13) moves downward against its spring (15) and the lock pin (14) releases its pressure on the ball (12). Setback and centrifugal force causes the ball (12) to move into the collar (13) cavity. As acceleration diminishes.

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-429

the setback sleeve (5) moves forward, powered by its spring (4) into the space occupied by the locking ball. This uncovers the firing pin locking balls (6), which are removed from their cavities by centrifugal force. The lock pin (14) is also forced upward by its spring, withdrawing its shank from the lock pin-hole in the booster lead disc. This unlocks the out-of-line rotor (20). The rotor (20) is then rotated by the clock type spring (11) aligning the detonator with the booster lead (16). The stop pin (21) limits the travel of the rotor to assure that it stops in line with the detonator and booster lead.

Upon impact the firing pin (2) is driven into the primer (8) if the shipping cap is removed. If the cap remains in position the primer cover moves forward impaling the primer (8) on the firing pin (7). When the primer fires, the flash passes through the flash channel and ignites the delay element (17) and drives the safety plunger (9) downward, shearing its pin (10). The safety plunger locks the rotor in the armed position. If the selector (18) is set for superquick functioning, the primer flash initiates the detonator in the rotor (20) which in turn operates the booster lead and booster. If the selector (18) is set on delay, the flash channel is blocked, and the delay initiates detonator functioning.

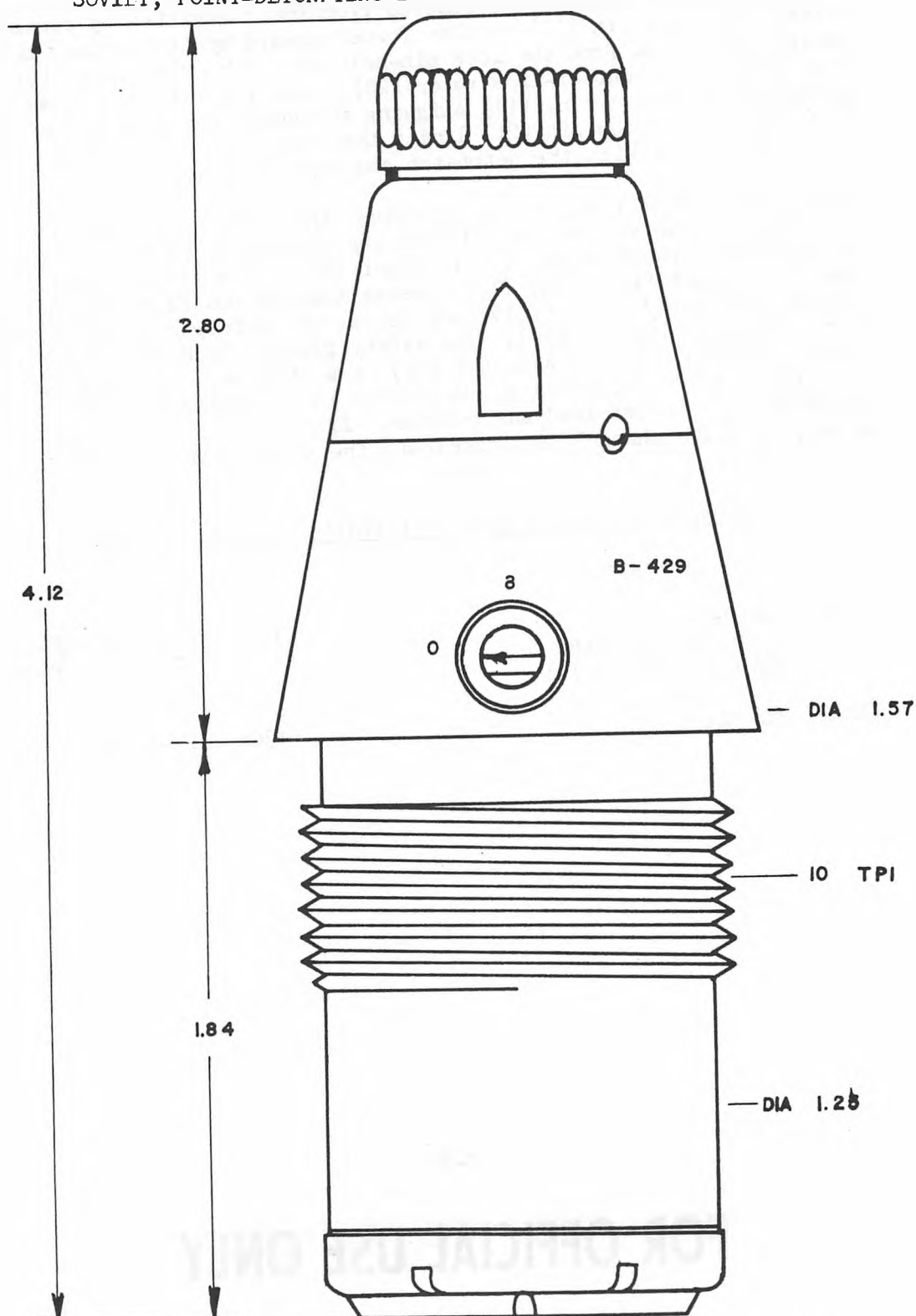
d. Weapons and projectiles with which fuze can be used.

Weapons		Projectiles	
122mm	gun D-74	122mm	HE-Frag CF-472
	gun-howitzer M1963		HE-Frag CF-462
	gun M1931/37 (A-19)		
130mm	gun M46	130mm	HE-Frag CF-540

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL V-429



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL 3GT

a. General. The 3GT fuze (Golovnoy, Tetrilovy, 3-y Obrazets or "Point-detonating, Tetryl, 3rd Model") is used on old high-explosive projectiles. It has been replaced on later model projectiles by the UGT series of fuze (UGT, UGT-2, and UGT-3). The 3GT fuze is painted black. When the fuze is properly seated, only its nose plug (1) protrudes from the projectile (approximately one-half inch). The fuze is considered semi-secured by Soviet standards because the primer is isolated from the detonator until the projectile leaves the bore of the gun.

b. Characteristics.

Action -----nondelay

Loaded weight ----- 720 grams (1.58 lbs)

Body material ----- steel

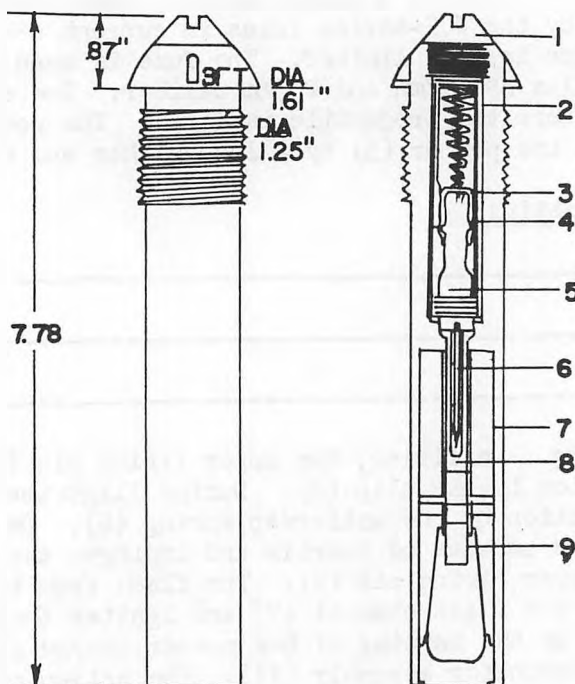
c. Functioning. Upon firing, the stirrup (3) sets back, overrides the stirrup clamp (4) and is locked to the striker (5). On impact the stirrup (3), striker (5), firing pin (6), primer carrier (8), moves forward, compressing the antireep spring (2). When the spring is fully compressed, the sleeve, striker, and firing pin stop while the primer continues forward, forcing the pellet against the firing pin and igniting the primer which successively actuates the detonator (7) and explodes the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933 M1936(F-22); M1939(USV), and M1942(ZIS-3); tank guns M1927/32, M1938/39 (L-11), M1939 (F-32), M1940 (F-34), and M1941 (ZIS-5); mountain gun (howitzer) M1909; regimental gun (howitzer) M1927	76mm HE ----- F-354;F-354G

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL 3GT



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL 4GT

a. General. The 4GT is a single action, short delay type fuze which has been replaced by the UGT-series fuzes in current use. Information related to this fuze is very limited. The fuze is used in old type high-explosive projectiles of 152mm and 203mm caliber. The safety pin (1) must be removed before the projectile is fired. The powder charge (9) is sealed off from the primer (5) by a lead washer and a shaft (8).

b. Characteristics.

Action ----- short delay

Loaded weight ----- unknown

Body material ----- unknown

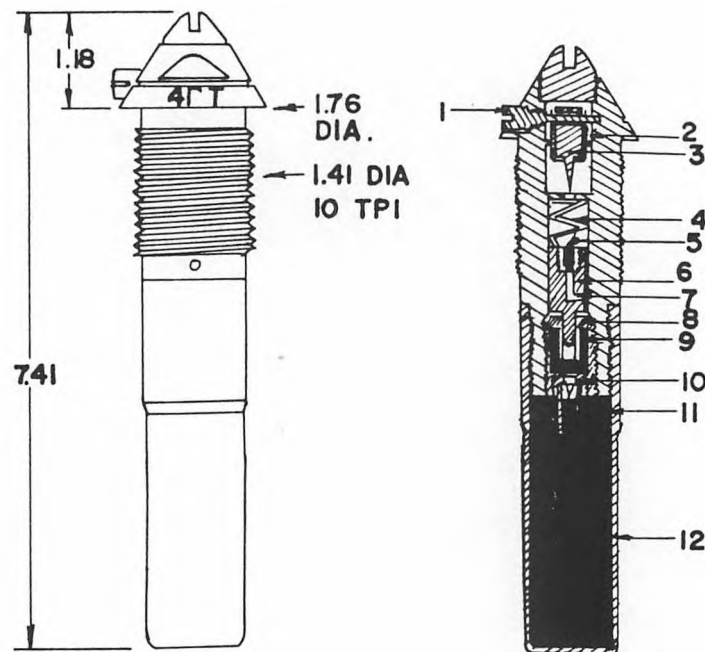
c. Functioning. On firing, the upper firing pin (3) sets back and is locked in position by the clip (2). During flight the primer holder (6) is held in position by the anticreep spring (4). On impact the primer holder moves forward because of inertia and impinges the primer (5) on the point of the upper firing pin (2). The flash from the primer (5) passes through the flash channel (7) and ignites the powder charge (9). The gases produced by the burning of the powder charge forces the firing pin (10) into the detonator assembly (11). The action of the detonator causes the booster (12) to explode, thus actuating the main charge of the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
152mm guns M1910/30 and M191034; gun-howitzer M1937 (ML-20)	152mm HE ----- F-542G; F-542ShG; F-542Sh
203mm howitzer M1931 (B-4)	203mm HE ----- F-621G

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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL 4GT



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CHAPTER 4

CHINESE COMMUNIST POINT-DETONATING FUZES

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CHINESE COMMUNIST POINT-DETONATING FUZES

The greater population of ChiCom fuzes, regardless of class, have been direct copies of standard Soviet designs. However, a trend toward indigenous fuze designs has been noted. This is manifest in artillery calibers peculiar to the ChiComs. Where common caliber and projectile designs exist between the ChiComs and Soviets, the Soviet fuze copy is normally employed.

In all cases workmanship has been excellent, indicating careful adherence to quality control procedures and employment of machine tools to western standards. Soviet fuze design philosophy, including environmental proofing, has been carefully incorporated into ChiCom fuze designs and workmanship. This reflects mastery of intricate machine tools, plating, plastics, and assembly line procedures.

Those fuzes that are direct copies of Soviet fuzes are in practically every case exact copies, down to identical tool marks. In these cases it is quite evident that Soviet drawings and Soviet built machine tools and dies have been employed to produce the fuze. The only departure from Soviet ordnance drawings are in the fuze markings.

Chinese Communist fuze designations at first appear to have no meaning. The Arabic number is simply a type designation. The key lies in the Chinese character that precedes the Arabic number. These characters are sometimes abbreviations of more complex Chinese characters. In other cases the characters represent a "phonetic" that resembles the Soviet spoken word. For example, mortar fuzes that are copies of the Soviet M series have a Chinese character that translates into "MU" ("EM in English") which is as close as the Chinese phonetic can come to the Russian Cyrillic sounds. A second example is the Chinese character appearing on their copy of the Soviet V-429 fuze. The character represents "FU" phonetically which approximates the "V" sound.

There are some designation markings on copies of Soviet fuzes, appearing both in Chinese characters and English type letters, that have not been deciphered. This may represent a new type designation system, but only one fuze possessing this type designation has been examined.

The Vietnam conflict caused large quantities of Soviet and ChiCom "sanitized" ordnance to be produced. The ChiComs produced weapons and ammunition with no designations, lot numbers, or manufacturing dates at all, or exerted great effort to grind this information off the fuzes. Where this was done on metallic fuzes, the markings were restored by etching and appear in this report.

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A direct comparison of current ChiCom fuzes with those of Korean war vintage shows remarkable advances in design and quality. Currently, ChiCom fuzes appear on a direct par with those of all other countries. The greater portion of ChiCom fuzes are direct copies of Soviet fuzes, but this does not detract from ChiCom workmanship or quality.

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CHICOM, POINT-INITIATING, BASE-DETONATING IMPACT FUZE: TYPE UNKNOWN

a. General. The ChiCom fuze for the 57mm HEAT projectile is a centrifugally armed, point-detonating fuze with a superquick action. Externally, the ChiCom fuze resembles the U.S. 57mm HEAT fuze. Internally, the fuzes are vastly different. Operation of the ChiCom fuze is almost identical with the ChiCom Type 57 and early Type 53 fuzes. It has brass centrifugal detents that are mated together and lock each other in position. They are retained in the unarmed position by a brass, leaf type, centrifugal spring. A wooden firing pin plunger transmits the force of impact to a brass firing pin. The firing pin plunger transmits the impact to a brass firing pin. The firing pin is maintained forward in its cavity, away from the primer, by a spring. The 57mm RR fuze is machined from a solid block of aluminum and is assembled entirely from threaded components except for the nose diaphragm disc. There is no preparation for firing required.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 175 grams (0.38 lb)
Body material ----- aluminum

c. Functioning. Upon firing, setback seats the firing pin (2) firmly on the centrifugal detents (4) and restrains any outward rotation. After setback decreases, centrifugal forces cause the detents (4) to rotate about their pins against the tension of the centrifugal spring (3), which encircles the detents (4). When the noses of the detents (4) reach their outermost travel, they tend to engage the rear of the detent in front of it. As spin decreases, the centrifugal spring attempts to force the detents inward, and they become locked in the open position. The firing pin is maintained in the upper end of its cavity by the firing pin spring. Upon impact the wooden firing pin plunger (1) forces the firing pin (2) downward into the primer (6). The primer flashes into the detonator (7), which, because of its shaped charge design, sends a "spit-back" jet of incandescent particles into the base detonator of the HEAT projectile.

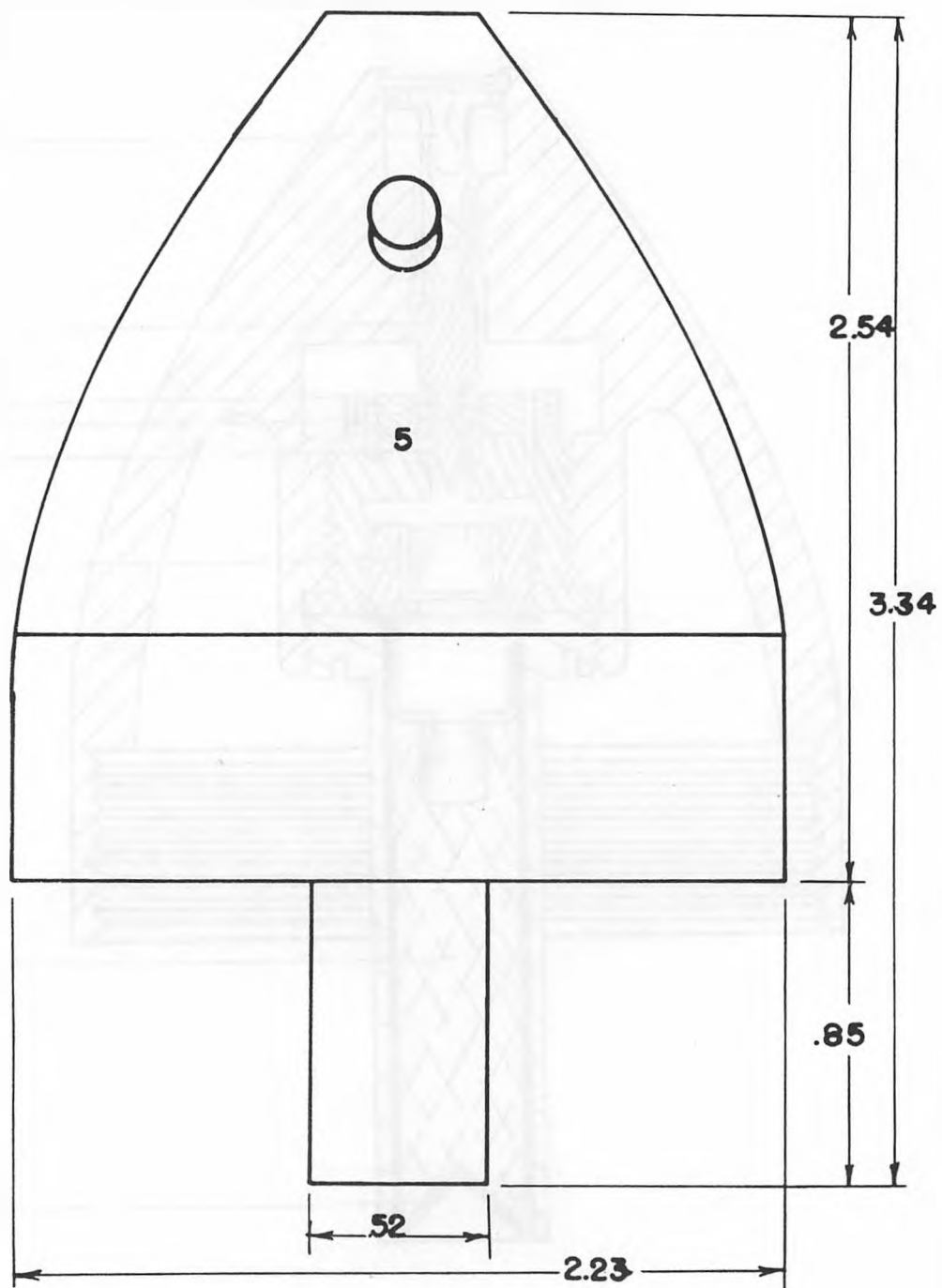
d. Weapons and projectiles with which fuze can be used.

57mm ChiCom Type 36 RR

57mm HEAT ----- Type unknown

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CHICOM, POINT-INITIATING, BASE-DETONATING IMPACT FUZE: TYPE UNKNOWN

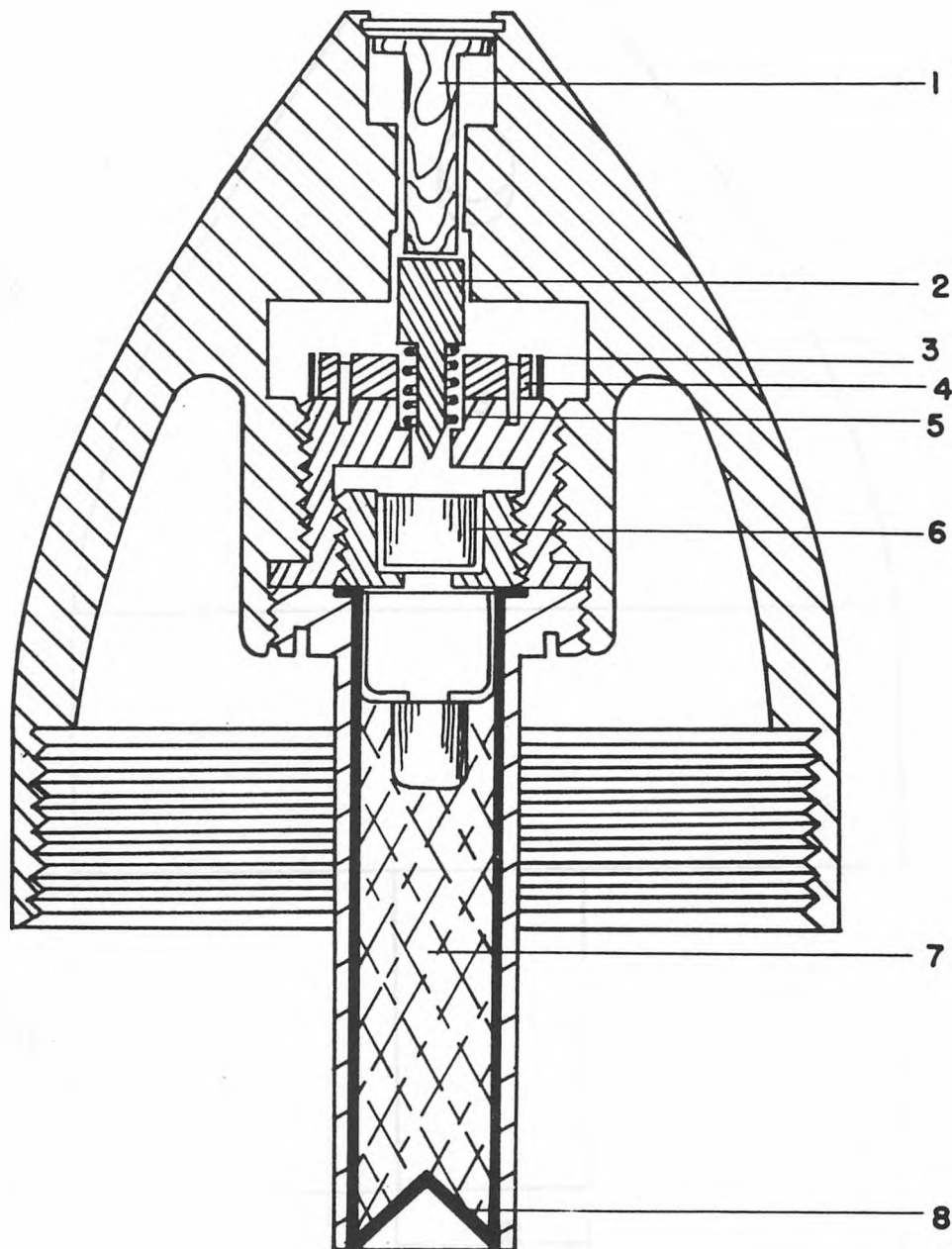


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CHICOM, POINT-INITIATING, BASE-DETONATING IMPACT FUZE: TYPE UNKNOWN



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ROCKET)

a. General. The ChiCom Type 1 (Rocket) fuze is a modified version of the Soviet V-25 rocket fuze and is employed interchangeably with the C-25 on the Soviet 140mm rocket, M14OF. It is a selectable superquick or delay impact fuze that arms entirely by centrifugal force. The Type 1 is very sturdy. Each opening is sealed with a plastic ring so that the fuze is completely waterproof. The fuze is cadmium-plated internally and certain moveable parts, such as detents, are chrome-plated. All setback detents seen in the Soviet V-25 have been eliminated in the ChiCom Type 1 and an additional centrifugal element has been added. This additional component increases the length of the Type 1 over that of the Soviet V-25. The Type 1 has only one delay setting of 0.025 seconds. The Soviet V-25 has two selectable delays of 0.025 and 0.1 second. In all other ways the fuzes are identical. The centrifugal safety device added to the Type 1 consists of a flat, circular housing machined from steel. All parts are chrome-plated against corrosion and to reduce friction. The housing has a central flash channel that aligns with the upper detonator and the flash channel in the fuze body. Two lateral grooves act as a track for a "U" shaped, sliding detent. This detent is rectangular in shape with a notch in each leg as a recess for a spring-loaded detent to lock. The detents are located in cavities drilled through the housing. A thin cup is pressed over the machined housing to secure all components within the housing.

b. Characteristics.

Action ----- selective instantaneous or delay

Loaded weight ----- 694 grams (1.53 lbs)

Body material ----- steel

c. Functioning. Upon firing, setback causes the firing pin (2) to seat firmly upon the centrifugal detents (4) locking them in place. The detent locking cup (6) is also setback, compressing its spring. As acceleration ceases and centrifugal forces increase, the centrifugal detents (4) under the firing pin (2) move outward against their springs (5). The detent blocking cup spring forces the detent blocking cup (6) upward until it rests against the shoulder of the firing pin. In this position it blocks any return of the detents (4). Simultaneously, centrifugal force causes the sliding detent to move outward along its track opening the flash channel. The fuze is now armed. With the selector set on superquick, the flash channel is open from the upper detonator (8) to the lower detonator (14) in the booster cup. Upon impact the firing pin is driven into the upper detonator (8) upon impact at flat angles the graze weights (10) move laterally and cam the detonator carrier (9) upward so that the detonator (8) is impaled on the firing pin (2). The detonator flashes down into the lower detonator (14) which initiates the booster.

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ROCKET)

If the selector (13) is set on delay, the delay elements (20) are ignited upon functioning of the upper detonator (8). However, the selector blocks the flash channel on the delay setting so that the flash from the upper detonator cannot reach the lower detonator (14). When the delays (20) burn through after approximately 0.025 seconds, they flash into the lower detonator (14) causing the booster to detonate.

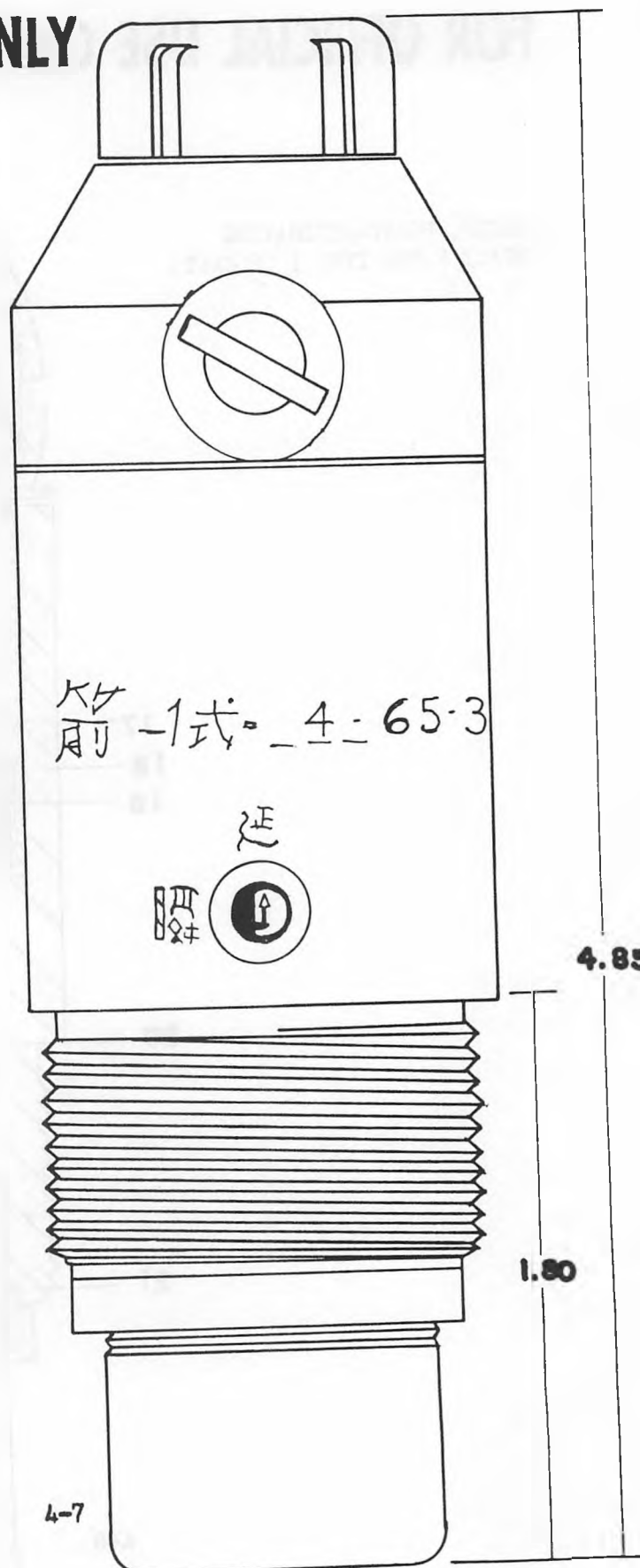
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
107-mm rocket launcher type unknown	107-mm HE-Frag ----- Type H-12

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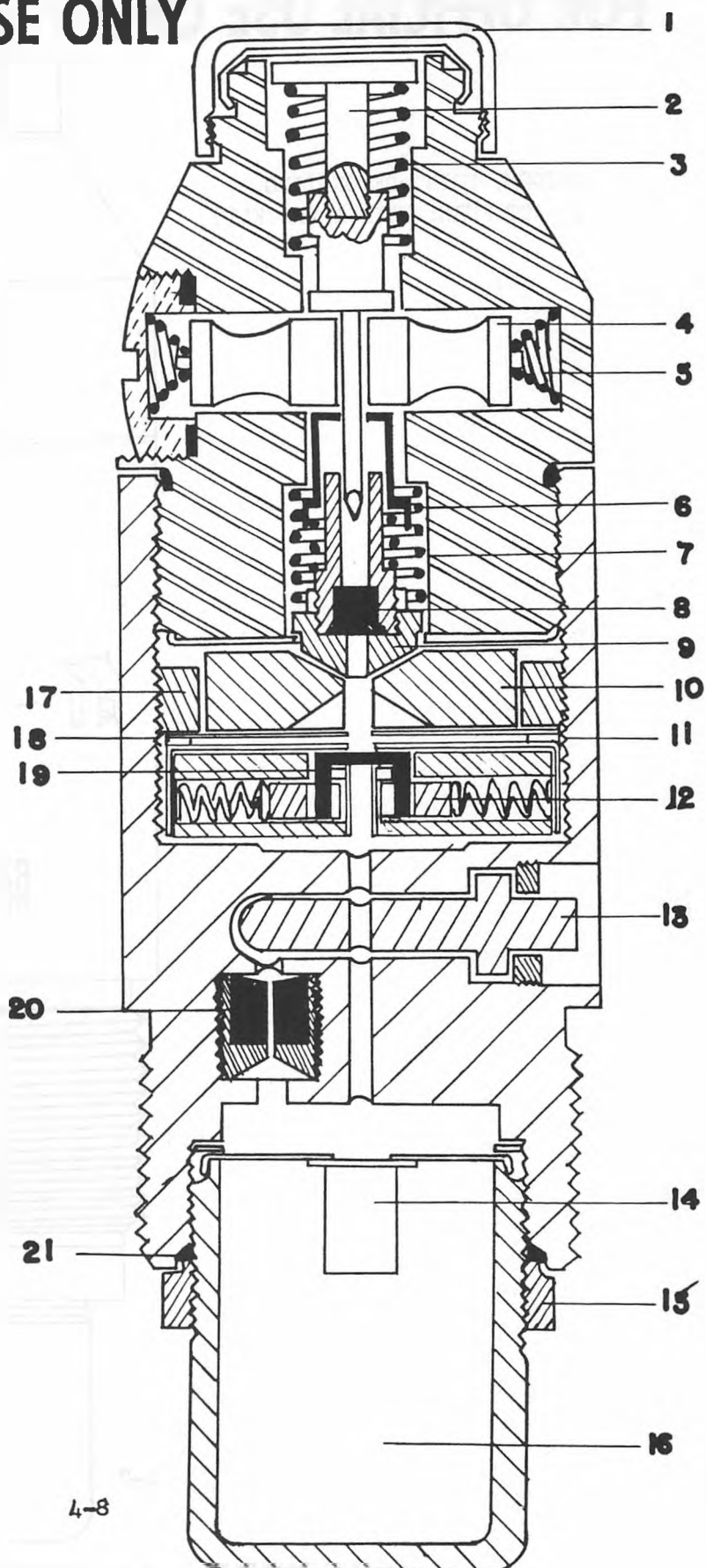
CHICOM, POINT-DETONATING
IMPACT FUZE: TYPE 1 (ROCKET)



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CHICOM, POINT-DETONATING
IMPACT FUZE: TYPE 1 (ROCKET)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (RECOILLESS RIFLE)

a. General. The ChiCom Type 1 recoilless rifle fuze is an exact copy of the Soviet GK-2. Its relationship with the Type TS-2 is not understood. The Type TS-2 examined was manufactured earlier than the Type 1. Both were produced by plant 34 and appear to be identical. The booster cup is sealed with nylon pipe sealant and the entire fuze appears waterproof. Workmanship appears to be excellent.

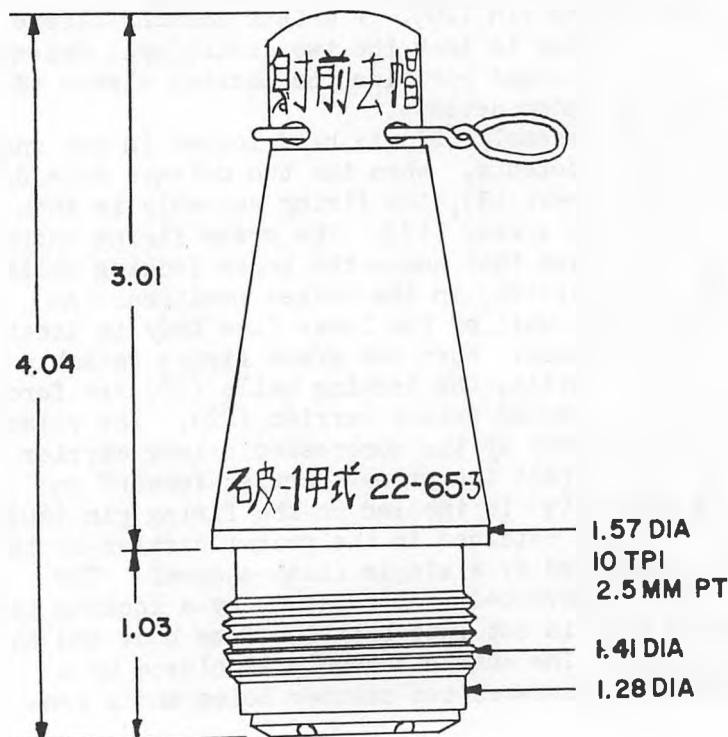
b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 176 grams (0.38 lb)
Body material ----- aluminum

c. Functioning. The operation of the Type 1, is identical to that of the Soviet GK-2.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
75mm recoilless rifle, Type 52	75mm RR Fin-Stabilized HEAT



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)

a. General. The ChiCom type 1 is a setback and centrifugal force armed fuze, with pyrotechnic delay arming and a graze sensitive feature. Its most notable feature is its cocked detonator. Overall color is black and the markings are stamped into the upper fuze body. The type 1 is very sturdy, but the design does not display the current trend toward extreme waterproofing noted in other ChiCom/Soviet fuzes. The type 1 is indigenous to Communist China and is not a copy of any known fuze.

The type 1 has an upper and lower fuze body that are threaded together. The upper body is then roll-crimped with the lower body. The cap at the nose of the fuze is normally removed for instantaneous action or left on for nondelay, graze-sensitive action. A thin metal membrane covers the firing pin opening in the fuze and is securely crimped to an annular groove. The firing pin head (1) is a separate flanged metal disc that fits over the firing pin shank (2). The firing pin is of two-piece construction. The firing pin is not restrained by an anticreep spring. The firing pin is locked in the unarmed position by two centrifugal detents. One detent (7) is a direct arming type that is spring-loaded inward by the detent spring (6). The detent and spring are retained in the cavity by the detent plug (5). The opposite detent is of the delay arming type. Its housing (18) contains a solid, consumable, black powder pellet (19) that is ignited by the setback primer (29). As the pellet is consumed, centrifugal force causes the detent to retract into the evacuated cavity, unlocking the firing pin (20). A detent locking sleeve (8) is forced forward by its spring to lock the two centrifugal detents in the armed position. In the unarmed position the locking sleeve (8) is held downward by the two extended detents.

The graze-sensitive firing assembly (21) is held locked in the unarmed position by the two centrifugal detents. When the two detents move out and are locked by the locking sleeve (8), the firing assembly is then held in position by the anticreep spring (17). The graze firing assembly has three locking ball recesses that house the three locking balls (10) which lock the primer carrier (22) in the cocked position. An annular groove cut into the inner wall of the lower fuze body is located just above the locking ball recesses. When the graze firing assembly (21) moves forward from impact inertia, the locking balls (10) are forced into the groove and release the cocked primer carrier (22). The primer carrier (22) is spring-loaded upward by the compressed primer carrier spring (11). The spring (11) propels the primer carrier forward on graze impacts so that the primer (9) is impaled on the firing pin (20). The primer carrier spring (11) is retained in the primer carrier by the thread plug (12) that is perforated by a single flash channel. The graze firing mechanism (21) is prevented from rotating by a locking ball (23) positioned in a recess that is cut into both the fuze body and the graze firing mechanism housing. The entire assembly is closed by a threaded plug (13). This plug possesses two spanner holes and a cen-

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)

tral flash channel leading to the detonator (15). The detonator rests on a shaped detonator holder (14), which in turn is separated from the booster explosive (16) by cardboard discs (24). The booster is sealed to the fuze body by an epoxy sealing compound.

A vertical cavity in the upper fuze body houses the setback primer (29) and firing pin assembly (27). The primer is fixed in the bottom of the cavity. The firing pin is moveable and is separated from the primer by the setback spring (28). The firing pin has two vertical grooves cut into its surface that act as flash channels. The firing pin (27) and primer (29) are retained in the cavity by a slotted plug (25). A horizontal flash channel (30) connects the primer cavity with the consumable black powder pellet (19) in the delay arming detent assembly. The flash channel (30) permits flames from the primer (29) to be transmitted to the delay arming pellet (19). Dud type 1 and type 3 fuzes are considered hazardous due to the armed, cocked primer assembly.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 405 grams (0.87 lb)
Body material ----- steel

c. Functioning. Prior to firing, the fuze cap may be removed for instantaneous action or left on for nondelay action. Upon firing, the detent locking collar (8) moves down, compressing its spring and removing frictional resistance from the centrifugal detents. Simultaneously, the setback firing pin (27) moves downward against the spring (28), firing the primer (29). The resulting flame passes through the flash channels (26) in the firing pin (27) and passes through the channel (30), igniting the delay arming pellet (19). Centrifugal force causes the detent (7) to move outward against its spring (6), partly unlocking the firing pin (20). As the pellet (19) is consumed, centrifugal force causes the delay arming detent to move into the evacuated cavity. This produces delay arming of the firing pin (20) and the graze firing assembly (21). As acceleration diminishes, the locking collar spring forces the collar (8) forward, preventing the centrifugal detents from extending upon spin decay. The fuze is now armed. In flight the anticreep spring prevents the graze firing assembly (21) from moving forward prematurely, firing the fuze. Upon impact the firing pin (20) is driven downward into the primer (9), which flashes through the channel into the detonator (15) initiating the booster (16). On graze impacts, inertia causes the graze firing mechanism (21) to move forward until the locking balls (10) are forced out of their recesses into the annular groove. The compressed primer carrier spring (11) propels the primer carrier (22) forward,

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)

impaling the primer (9) on the sharp pointed firing pin (20) and initiating functioning. Dud type 1 and type 3 fuzes are rare due to the combined impact and graze action operation.

d. Weapons and projectiles with which fuze can be used.

Weapons

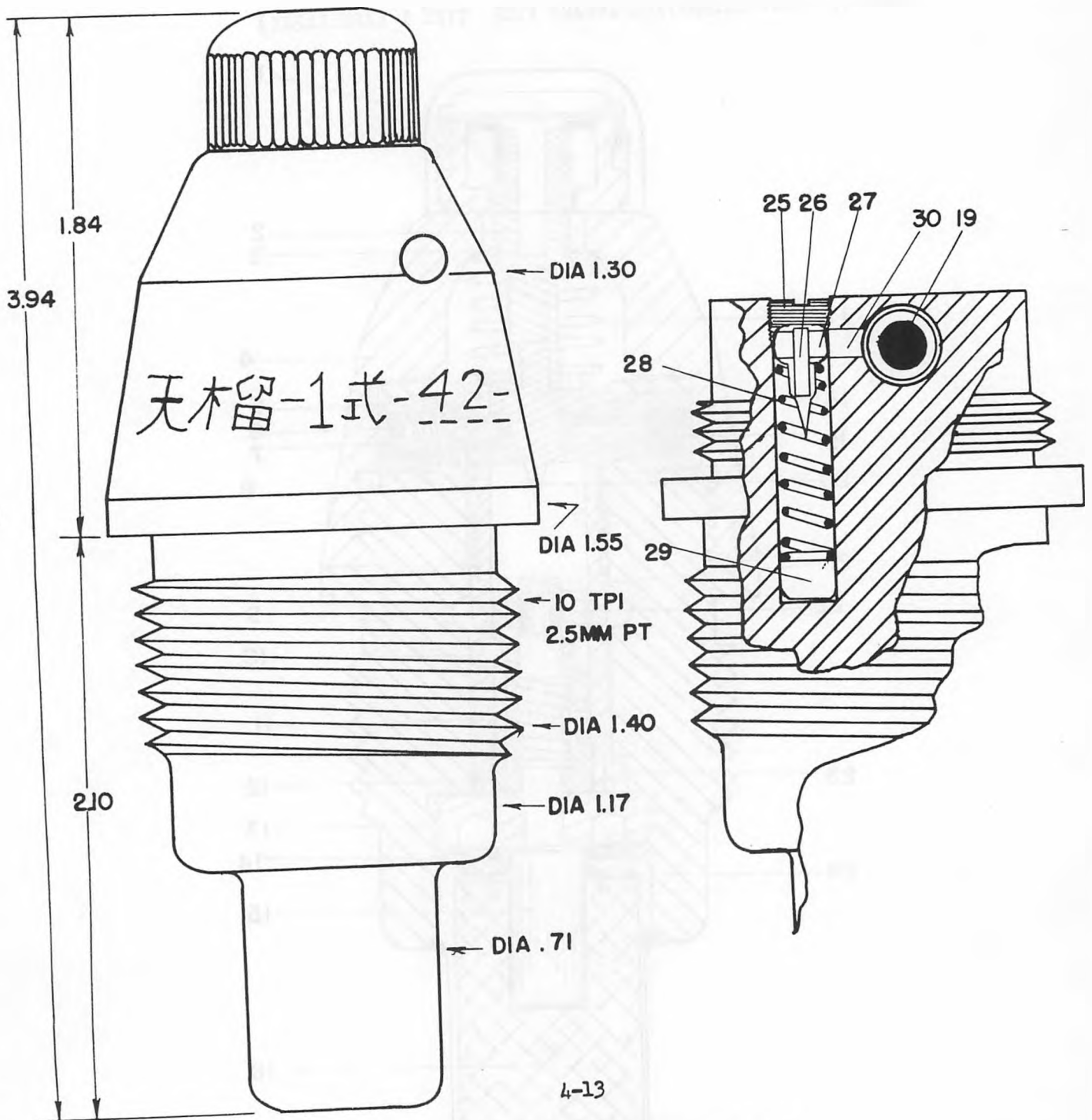
75mm recoilless rifle, type 52

Projectiles

75mm RR HE-Frag --- type unknown

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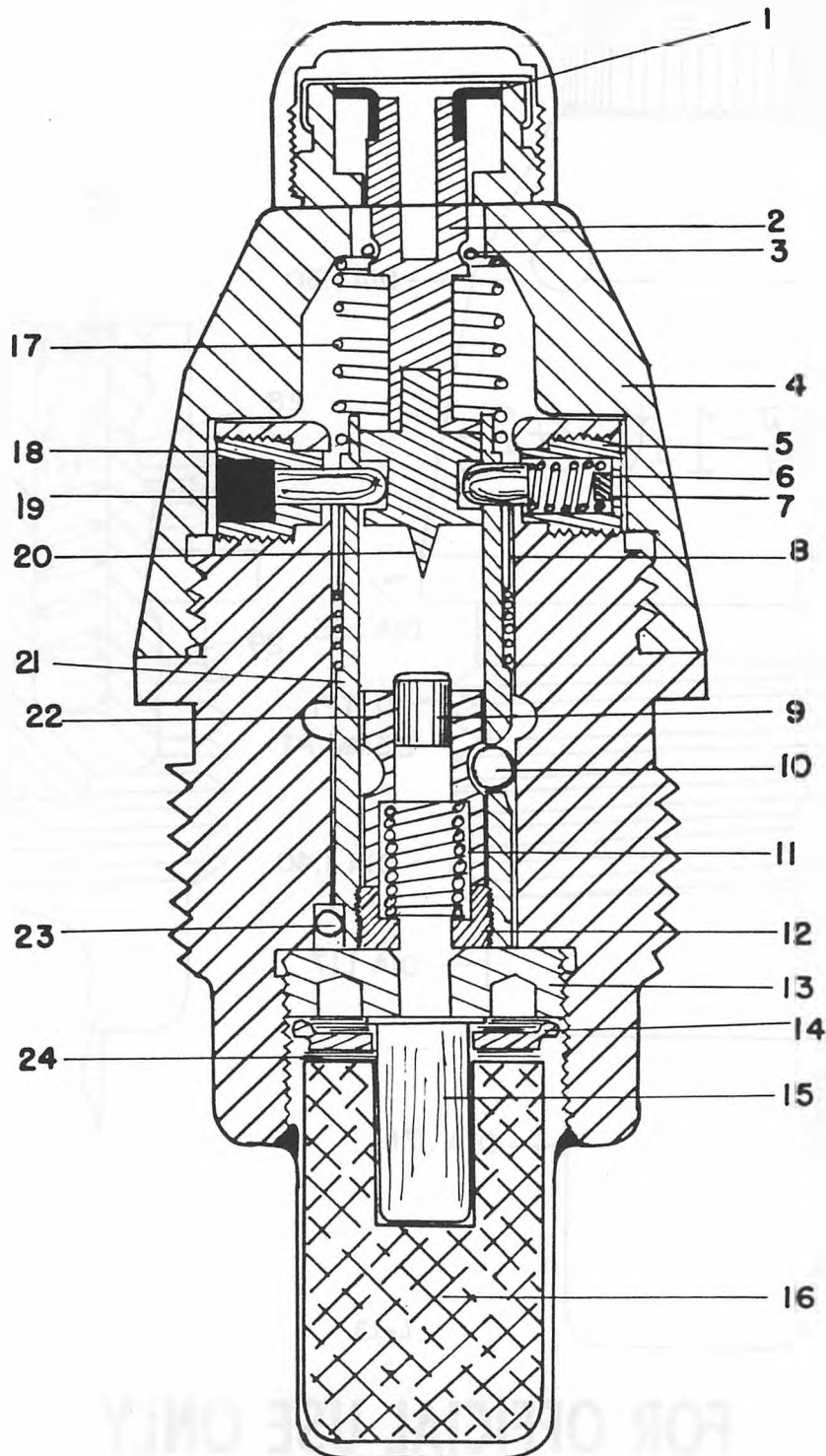
CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)

a. General. The ChiCom type 1 (Artillery) fuze is an exact copy of the Soviet KTM-1. The upper portion of the fuze body is cadmium-plated, while the lower fuze body is blued. The entire fuze is sprayed with varnish as a corrosion resistant. The type 1 (Artillery) is entirely waterproof. This is in keeping with current ChiCom and Soviet fuze design philosophy.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 365 grams (0.80 lb)
Body material ----- steel

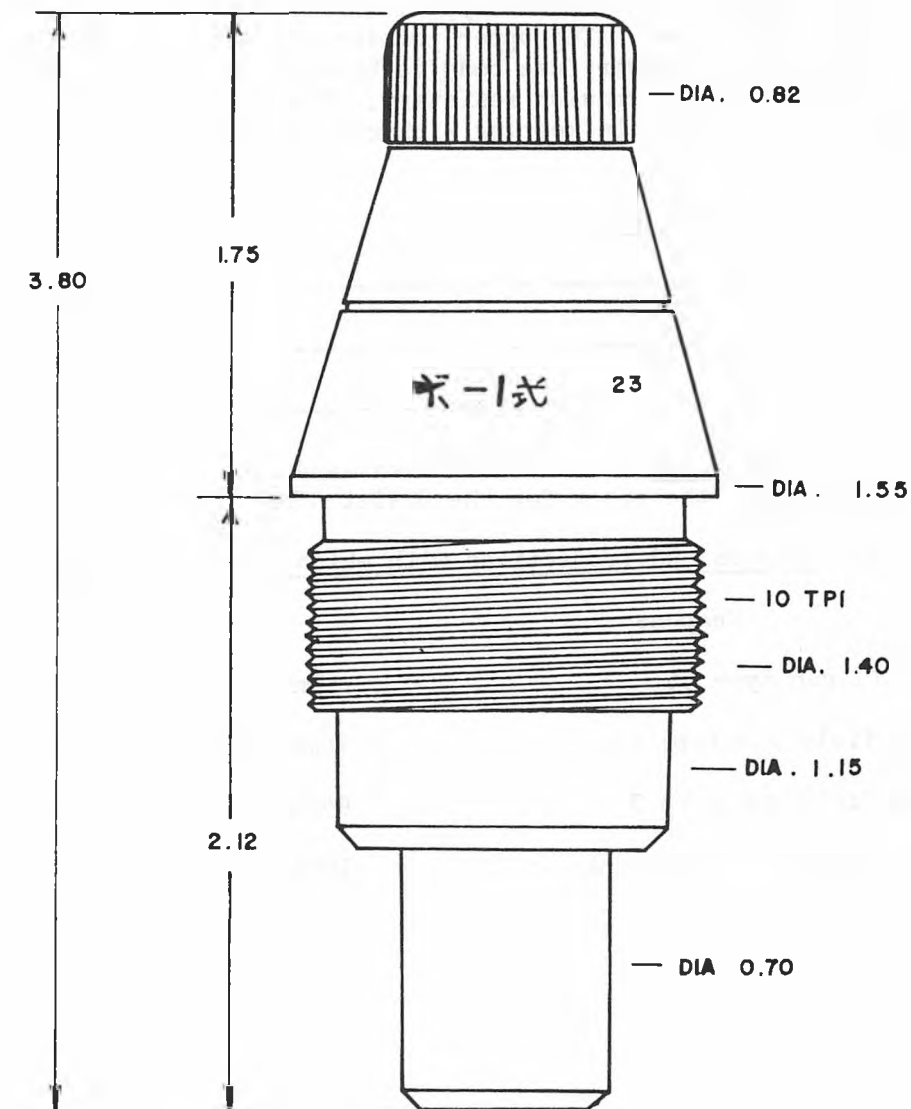
c. Functioning. For detailed explanation of the ChiCom type 1 (Artillery) see the entry for the Soviet KTM-1.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
57mm AT gun type 55	57mm HE-Frag ----- Type 271
76mm field gun type 54	76mm HE-Frag----- Type 354
85mm field gun type 7	85mm HE-Frag ----- Type 367
100mm field gun type unknown	100mm HE-Frag ----- Type 412

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 1 (ARTILLERY)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE TS-2

a. General. The ChiCom type TS-2 is an exact copy of the Soviet GK-2 fuze. The only major departure from normal ChiCom practices is the fuze designation. The TS-2 is the first ChiCom fuze encountered with an alphabetical designation and may signal the arrival of a new nomenclature. Like its Soviet counterpart the TS-2 is employed on fin-stabilized recoilless rifle ammunition.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 130 grams (0.39 lb)

Body material ----- aluminum

c. Functioning. The operation of the ChiCom type TS-2 is identical to that of the Soviet GK-2 fuze.

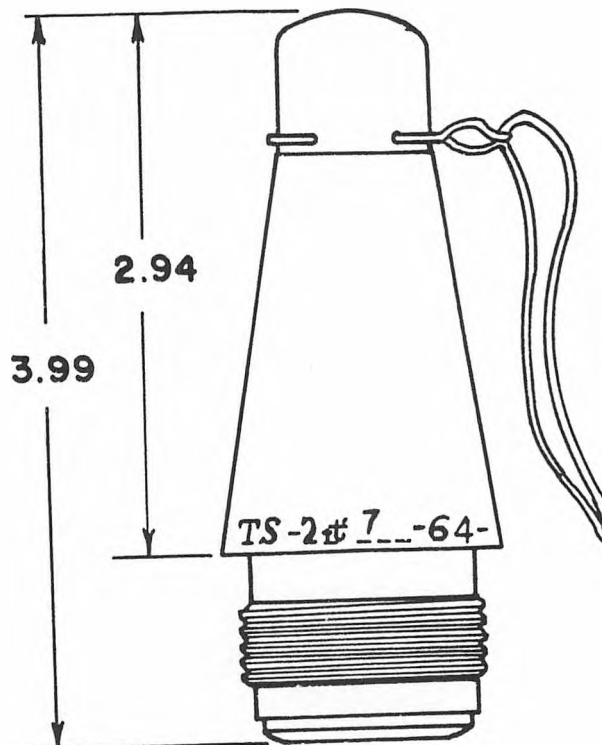
d. Weapons and projectiles with which fuze can be used.

Weapons

75mm recoilless rifle type 52

Projectiles

75mm Fin Stabilized HEAT ---Type
unknown



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 3 (SPECIAL)

a. General. The ChiCom type 3 (Special) is identical in every detail with the type 1, except for color and markings. Parts are interchangeable between fuzes and it is apparent the same drawings were used for both fuzes. The reason for the different nomenclature on identical fuzes is unknown. The fuzes have been employed interchangeably. The ChiCom type 3 (Special) fuze has a black lower fuze body. The upper fuze body is cadmium-plated and presents a slightly yellow appearance. The ChiCom type 1 fuze is entirely black.

b. Characteristics.

Action ----- instantaneous
Loaded weight ----- 405 grams (0.87 lb)
Body material ----- steel

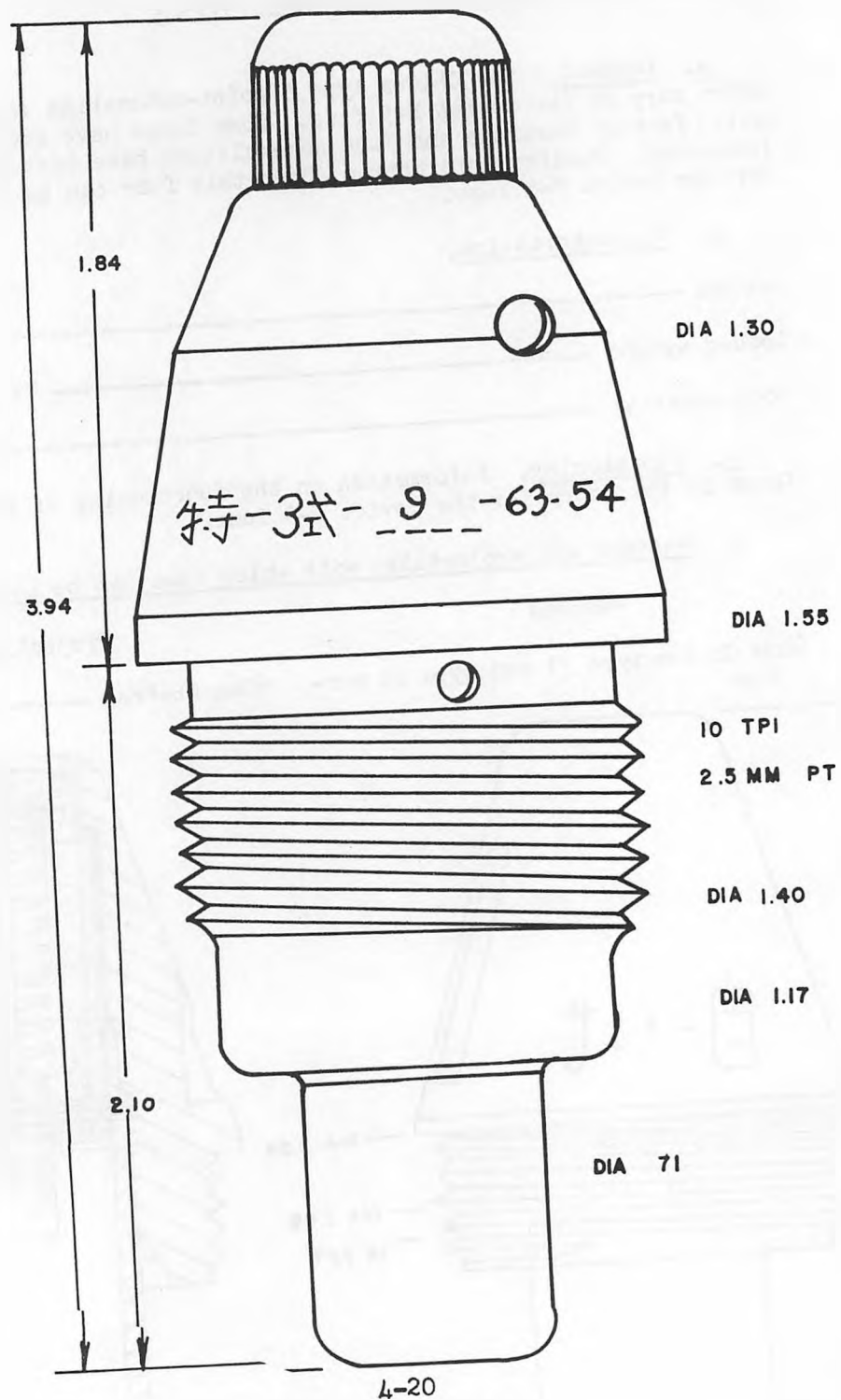
c. Functioning. Information on the functioning of the type 3 (Special) can be found in the entry under the ChiCom type 1 fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
75mm ChiCom recoilless rifle, type 52	75mm HE-Frag ----- T28

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 3 (SPECIAL)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 5

a. General. The ChiCom type 5 point-detonating impact fuze is an exact copy of the Soviet M-5 fuze. Some fuzes have been "sanitized," (i.e., factory markings and fuze nomenclature have been machined off the fuze body). Further information about this fuze can be found in the entry for the Soviet M-5 fuze.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 77 grams (0.16 lb)

Body material ----- plastic

c. Functioning. Information on the functioning of this fuze can be found in the entry for the Soviet M-5 fuze.

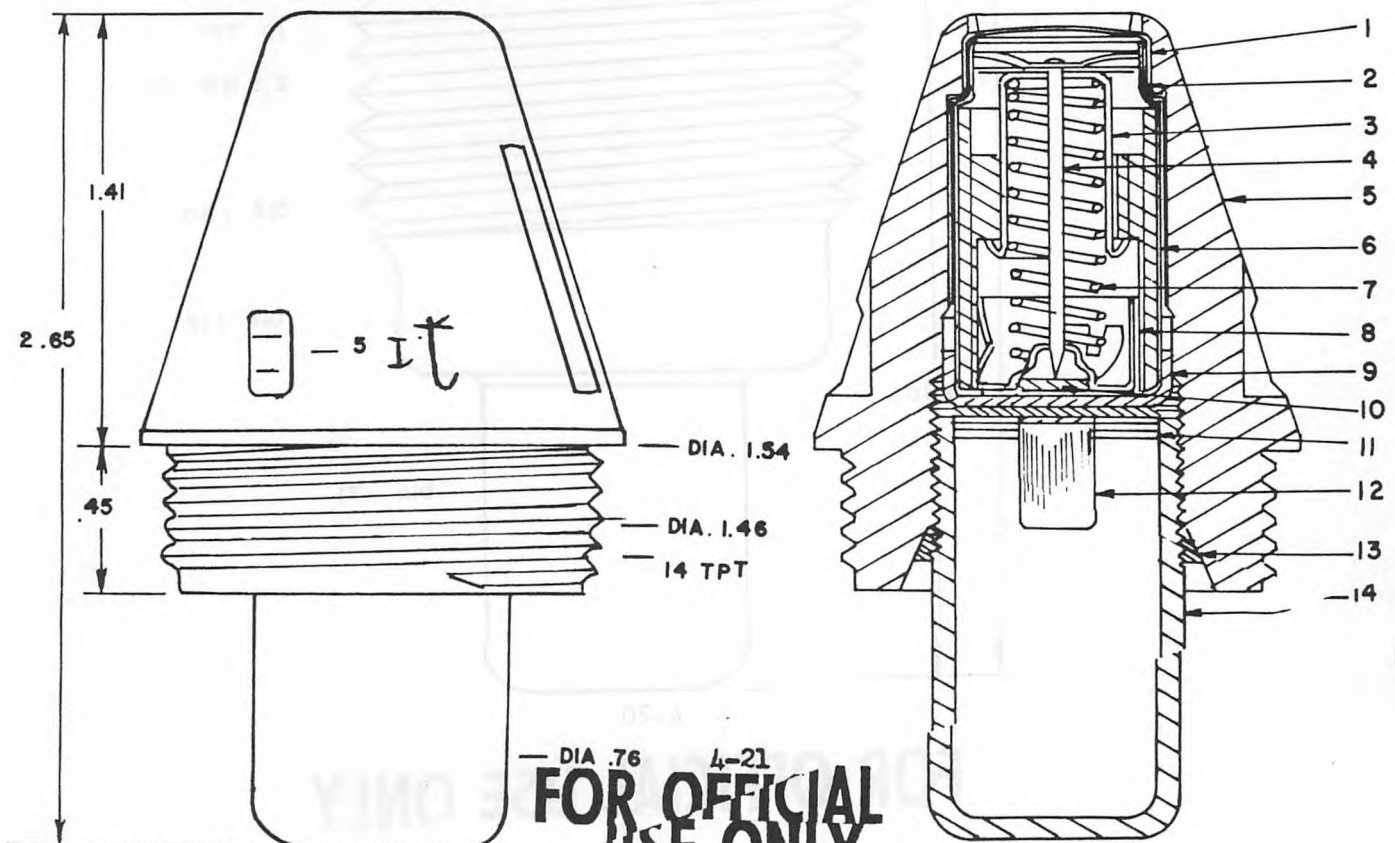
d. Weapons and projectiles with which fuze can be used.

Weapons

60mm ChiCom type 31 and type 63 mortars

Projectiles

60mm HE-Frag ----- Type 7



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 6

a. General. The ChiCom type 6 fuze is an exact copy of the Soviet M-6 mortar fuze, using the same body and internal components. A detailed description of the ChiCom type 6 is, therefore, found in the entry for the Soviet M-6.

b. Characteristics.

Action ----- superquick

Loaded weight ----- 127.1 grams (0.28 lb)

Body material ----- plastic

c. Functioning. The operation of the ChiCom type 6 fuze is identical to that of the Soviet M-6 mortar fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

82mm ChiCom type 53

82mm HE ----- Type 53; M-80



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 7 (ARTILLERY)

a. General. The ChiCom type 7 (Artillery) fuze is an identical copy of the Soviet GVMZ-7 fuze. It is employed in the same 120mm mortar applications. The type 7 (Artillery) appears to be obsolescent and is being replaced by the ChiCom type 12 fuzes in all 120mm mortar applications. See the entry under the Soviet GVMZ-7 for more detailed information.

b. Characteristics.

Action ----- instantaneous or delay

Loaded weight ----- 460 grams (1.01 lbs)

Body material ----- steel

c. Functioning. See the entry under the Soviet GVMZ-7 for detailed functioning of this fuze.

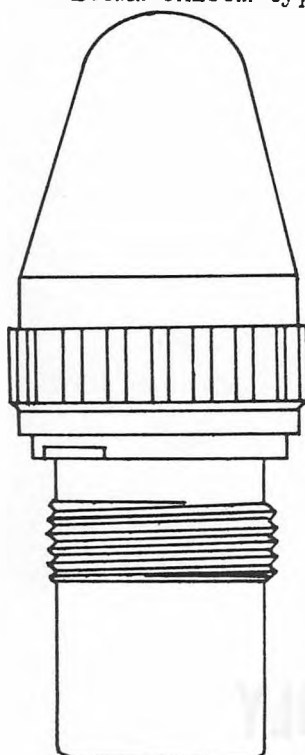
d. Weapons and projectiles with which fuze can be used.

Weapons

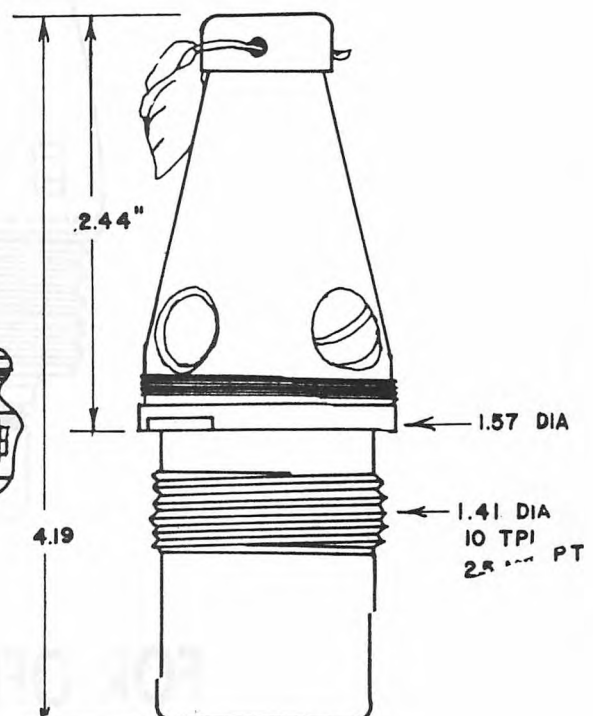
120mm ChiCom type 53 mortar

Projectiles

120mm HE-Frag ----- type unknown



WITH SHIPPING CAP



WITHOUT SHIPPING CAP

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 7 (MORTAR)

a. General. The ChiCom point-detonating impact fuze type 7 (mortar) consists of a brass body, firing pin assembly, primer assembly, and a detonator assembly. It is a setback-armed, bore-safe fuze. The firing pin assembly consists of a firing pin (4), an arming sleeve (2), an arming sleeve retaining ball (1), two firing pin locking balls (5), an arming sleeve spring (3), and a firing pin guide. The type 7 fuze is considered an improved version of the Soviet M-50. The head of the firing pin is raised above the head of the fuze body producing superquick functioning rather than nondelay as in the case of the M-50. The type 7 has a clear cellulose cover glued over the nose of the fuze, partially waterproofing this end of the fuze. The type 7 is considered obsolete, having been replaced almost completely by the ChiCom type 100-3 fuze.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 156 grams (0.34 lb)

Body material ----- brass

c. Functioning. Once the fuze is connected to the round no further preparation is necessary before firing. Upon firing, setback causes the arming sleeve (2) to move rearward, compressing its spring (3). This releases the arming sleeve retaining ball (1), which falls down into the fuze body. When setback diminishes, the arming sleeve spring (3) forces the sleeve retaining ball. This uncovers the two firing pin locking balls (5), which escape from their cavities into the fuze body, completely unlocking the firing pin (4). Upon impact, the firing pin is driven into the primer (7) which in turn initiates the gain (8).

d. Weapons and projectiles with which fuze can be used.

Weapons

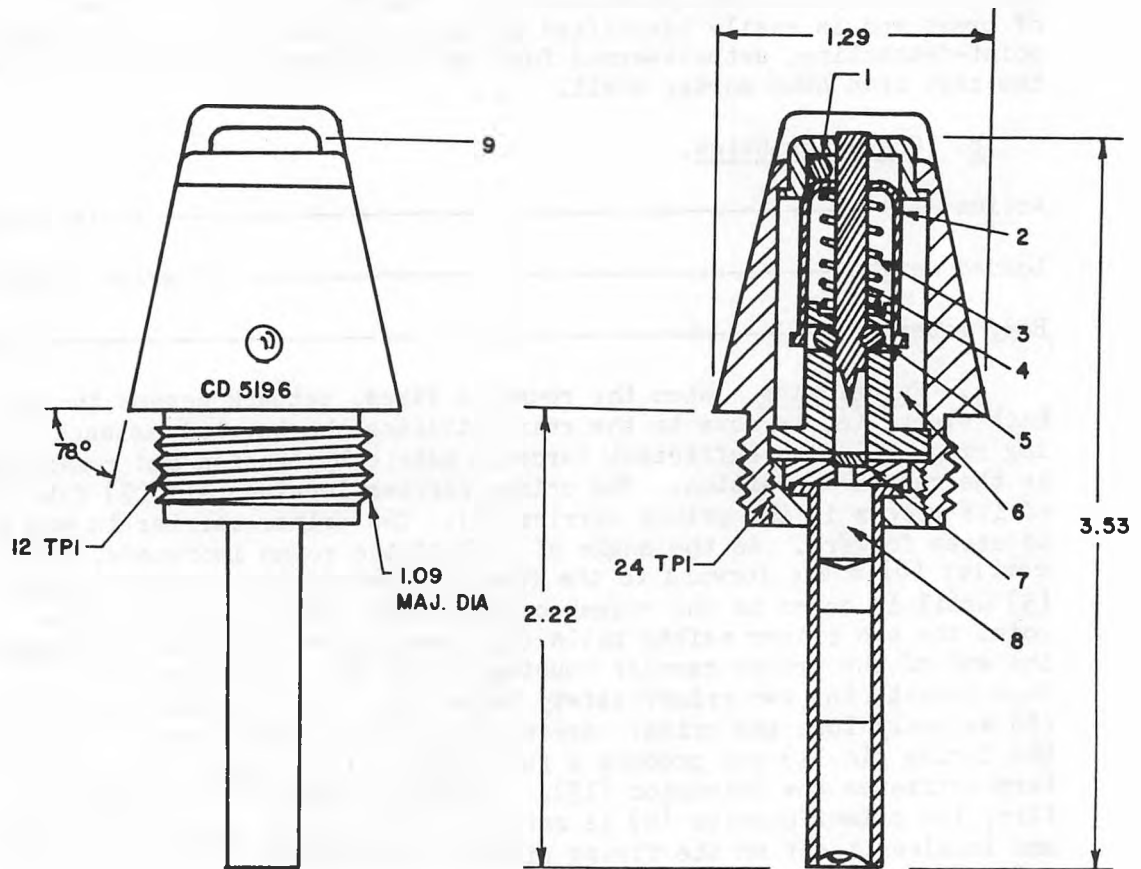
Projectiles

60mm ChiCom type 31 and type 63

60mm HE-Frag ----- type 7

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 7 (MORTAR)



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 8

a. General. The ChiCom type 8 fuze was first encountered during the Korean War. It has largely been superseded by more modern fuzes but is still periodically encountered. The type 8 fuze is constructed of brass and is easily identified by its configuration. It is a straight point-detonating, setback-armed fuze and is currently employed only in the cast iron 60mm mortar shell.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 167 grams (0.36 lb)

Body material ----- brass

c. Functioning. When the round is fired, setback causes the setback sleeve (6) to move to the rear, striking the beveled setback locking ring (10) with sufficient force to adhere by tension and remain secured in the rearward position. The primer carrier locking ball (7) falls out of its recess in the primer carrier (8). The primer carrier is now free to creep forward. As the angle of fall of the round increases, the primer carrier (8) moves forward to the front of the primer carrier housing (5) until it comes to the primer carrier stop collar (4). At this point the two primer safety balls (14) are pushed out into the recess in the end of the primer carrier housing (5) by the tip of the striker. Upon impact, the two primer safety balls (14) in the primer carrier housing (5) securely lock the primer carrier (8) in the forward position so that the firing pin (1) can produce a full blow on the primer (9), which in turn activates the detonator (13). At short ranges or low angles of fire, the primer carrier (8) is carried forward upon impact by inertia and impales itself on the firing pin (1), thereby activating the detonator.

d. Weapons and projectiles with which fuze can be used.

Weapons

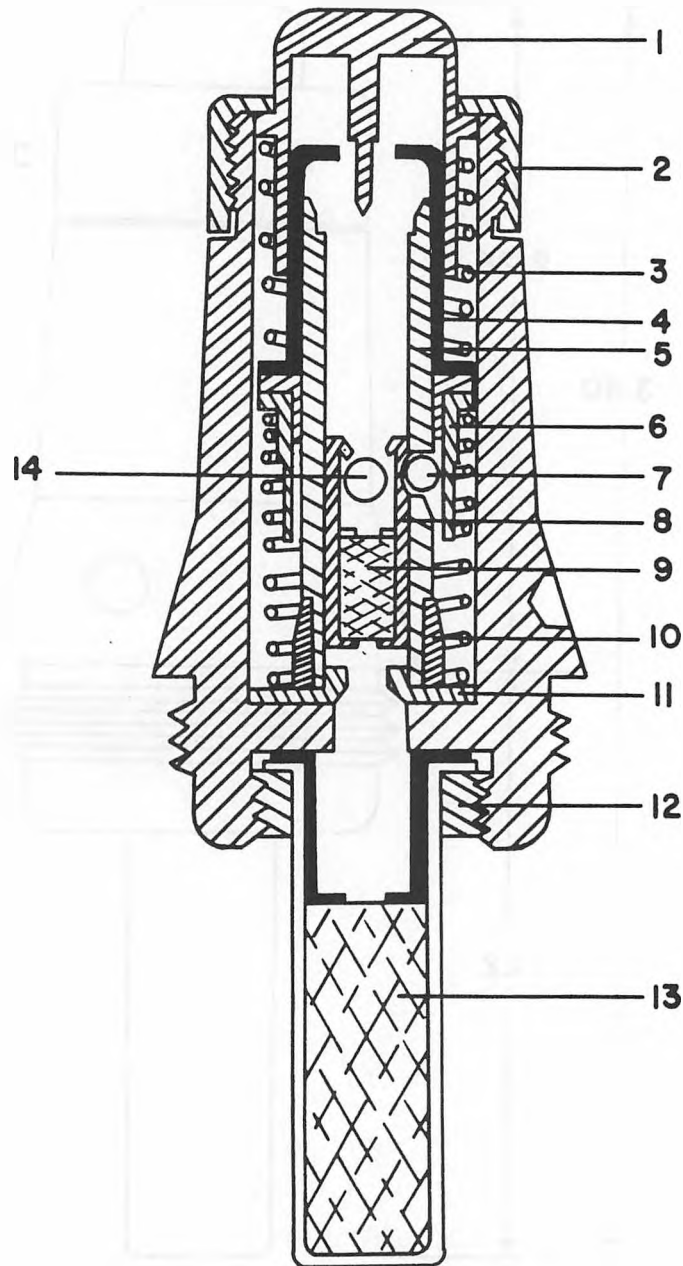
Projectiles

60mm ChiCom type 31 and type 63

60mm HE-Frag ----- type unknown

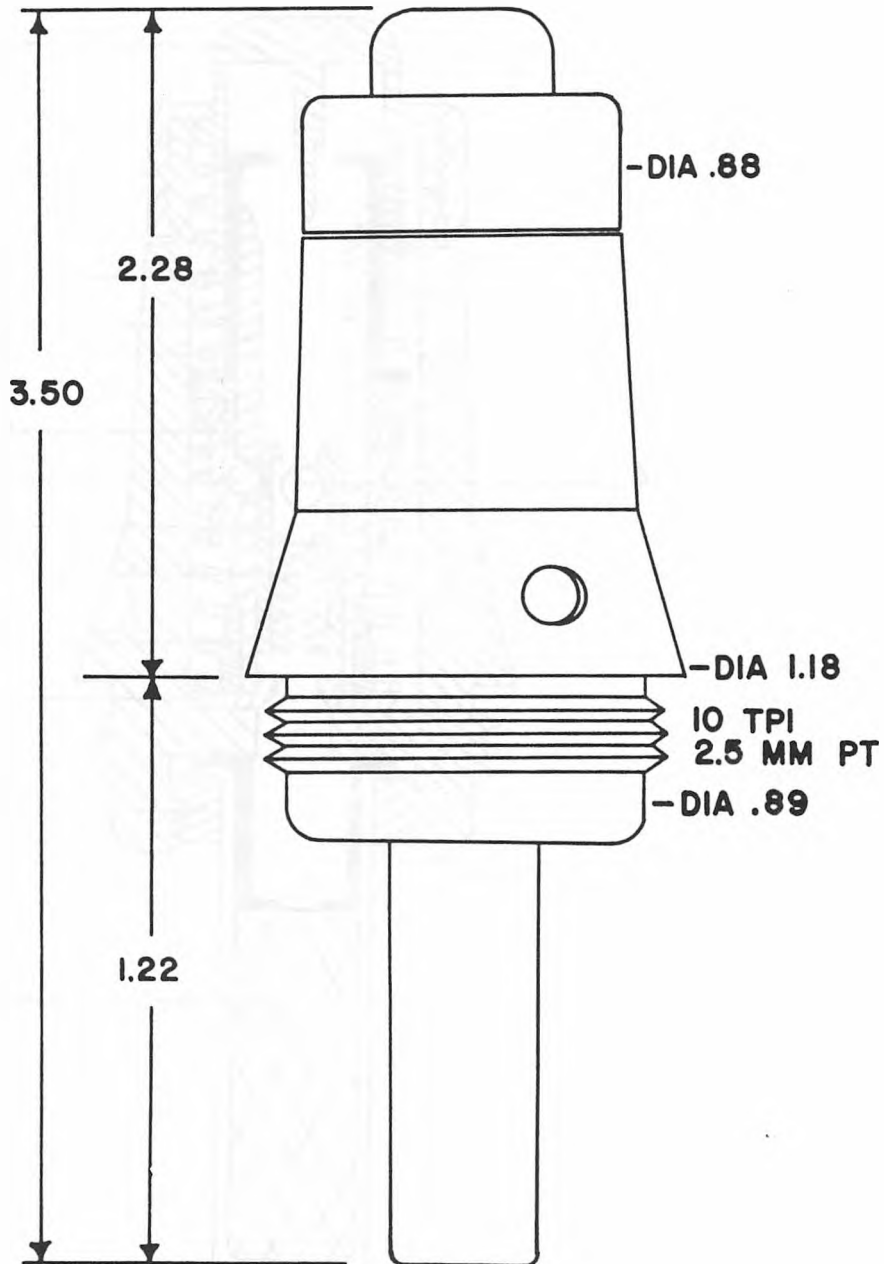
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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 8



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 8



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 9

a. General. The ChiCom type 9 point-detonating fuze is setback-armed and functions nondelay. It has been employed in the 60mm, 82mm, and 120mm mortars but is currently considered obsolete in the ChiCom inventory. The type 9 is identified by the markings stamped on the ogive; however, in most cases there are no markings at all. The type 9 is identical internally to the type 10 fuze which has been employed on the ChiCom 120mm mortar projectile. The type 9 has a brass body, threaded at the nose to receive a fixed firing pinnose plug. Internally, a cylindrical arming sleeve (3) rests on top of the arming clip (5). The arming clip is a U-shaped brass clip with the ends of its legs curving outward. The arming clip (5) fits over the end of the primer holder (7). The arming sleeve (3) is prevented from moving downward, removing its solid mass from between the primer and the firing pin, by the outward bent legs of the arming clip (5). The primer (6) is secured in the primer holder by a threaded plug. The detonator-booster is composed of a copper tube containing the initiating charge, in an inverted clip, and the base charge. The booster is enclosed by a copper cup perforated by a single hole. The booster is assembled to the fuze body by an externally threaded brass plug with spanner wrench slots.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 172 grams (0.38 lb)

Body material ----- brass

c. Functioning. The safety wire (4) is removed prior to the fuze's being screwed into the projectile. The fuze cannot be connected to the round until the safety wire (4) is removed. Thus, there are no dud rounds because of a safety wire being left in the fuze. Upon firing, setback causes the arming sleeve (3) to move rearward slipping over the arming clip (5). Movement over the arming clip (5) causes the legs to bend inward slightly, permitting the arming sleeve (3) to move completely over the primer holder (7). With the arming sleeve (3) fully to the rear, the solid block it presented between the primer (6) and the firing pin (1) is removed. The arming sleeve is held to the rear by the spring action of the legs of the arming clip (5). The primer holder (7) and the arming sleeve (3) are locked together and held away from the firing pin by the anti-creep spring (2). Upon impact, the primer carrier (7) moves forward and the primer (6) is impaled upon the sharp pointed firing pin (1). The primer (6) flashing initiates the detonator-booster (9).

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 9

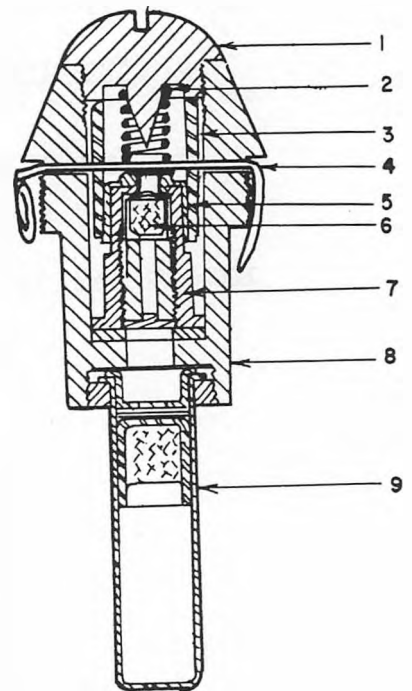
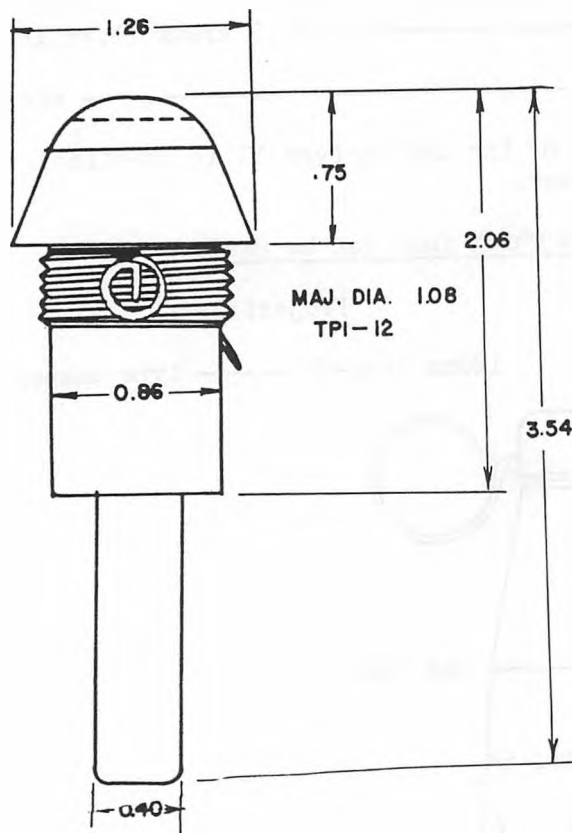
d. Weapons and projectile with which fuze can be used.

Weapons

60mm mortar, type 31 and 63
82mm mortar, type 53
120mm mortar, type 53

Projectiles

60mm HE-Frag ----- type unknown
82mm HE-Frag ----- type unknown
120mm HE-Frag ----- type unknown



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 12

a. General. The ChiCom type 12 fuze is an exact copy of the Soviet M-12 mortar fuze. The type 12 fuze is employed interchangeably with its Russian counterpart in 120mm mortar ammunition. For description and operation of the ChiCom type 12, see the Soviet M-12 mortar fuze.

b. Characteristics.

Action ----- instantaneous and delay

Loaded weight ----- 536.3 grams (1.18 lbs)

Body material ----- steel

c. Functioning. The operation of the ChiCom type 12 is identical to that of the Soviet M-12 mortar fuze.

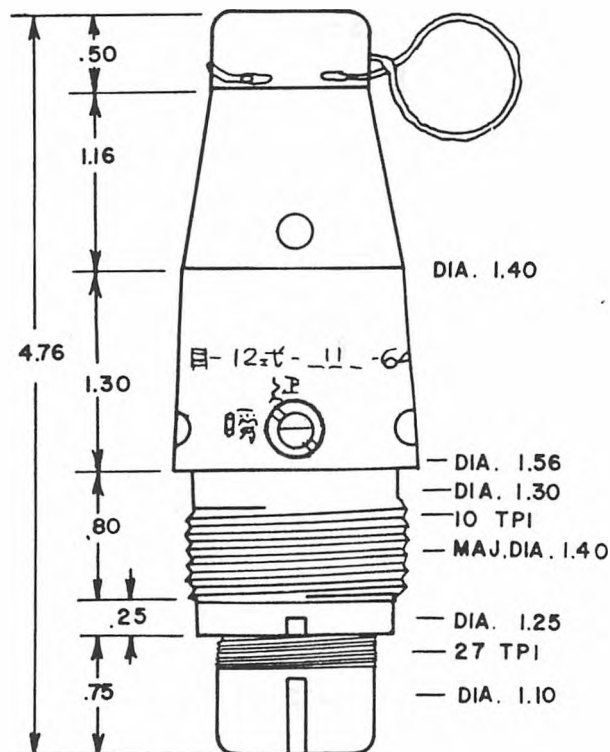
d. Weapons and projectiles with which fuze can be used.

Weapons

120mm ChiCom, type 53 mortar

Projectiles

120mm Frag-HE ----- type unknown



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 51

a. General. The drawing of this fuze has been made from information taken from two impacted fuzes that were removed from shell craters after detonation had taken place. Internally, the fuzes were distorted and out-of-line. Some errors may therefore be expected in the internal configuration. The ChiCom type 51 fuze was first encountered in Korea. It has been changed slightly in configuration, but basically the fuze is identical with its earlier counterparts. It employs 5 centrifugal detents nested together under the firing pin that prevent the firing pin from moving downward into the armed position. The detents are prevented from moving outward by a coiled brass spring. The detents are arranged so that they are interlocked and must rotate in a specific order to open the firing pin cavity. The shipping cap may be removed for instantaneous fuze action or left on for nondelay action. Impacted fuzes have been recovered with caps painted red as well as unpainted. The color code is unknown. The type 51 fuze is normally made in Communist China at a plant designated as Factory Number 524 and later as Factory Number 54.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 380 grams (0.83 lb)

Body material ----- steel

c. Functioning. Upon firing, setback causes the firing pin (3) to move downward compressing its spring (4) and locking the centrifugal detents in position. As acceleration diminishes, the firing pin spring (4) moves forward permitting centrifugal force to act upon the detents. The first detent has its weighted end moved outward against the coiled spring (5), which has been expanded by centrifugal force. When the first detent has rotated out of the path of the second detent, the second detent rotates out of the path of the third. This action continues until all detents have rotated from beneath the firing pin. The fuze is now armed. Upon impact the wooden plug drives the firing pin (3) down into the primer (8). When the nose cap (1) is left on, the wooden nose plug (2) and firing pin cannot move a sufficient distance to strike the primer (8). In this instance, the primer carrier moves forward impaling the primer (8) on the sharp-pointed firing pin (3), producing a detonation.

d. Weapons and projectiles with which fuze can be used.

Weapons

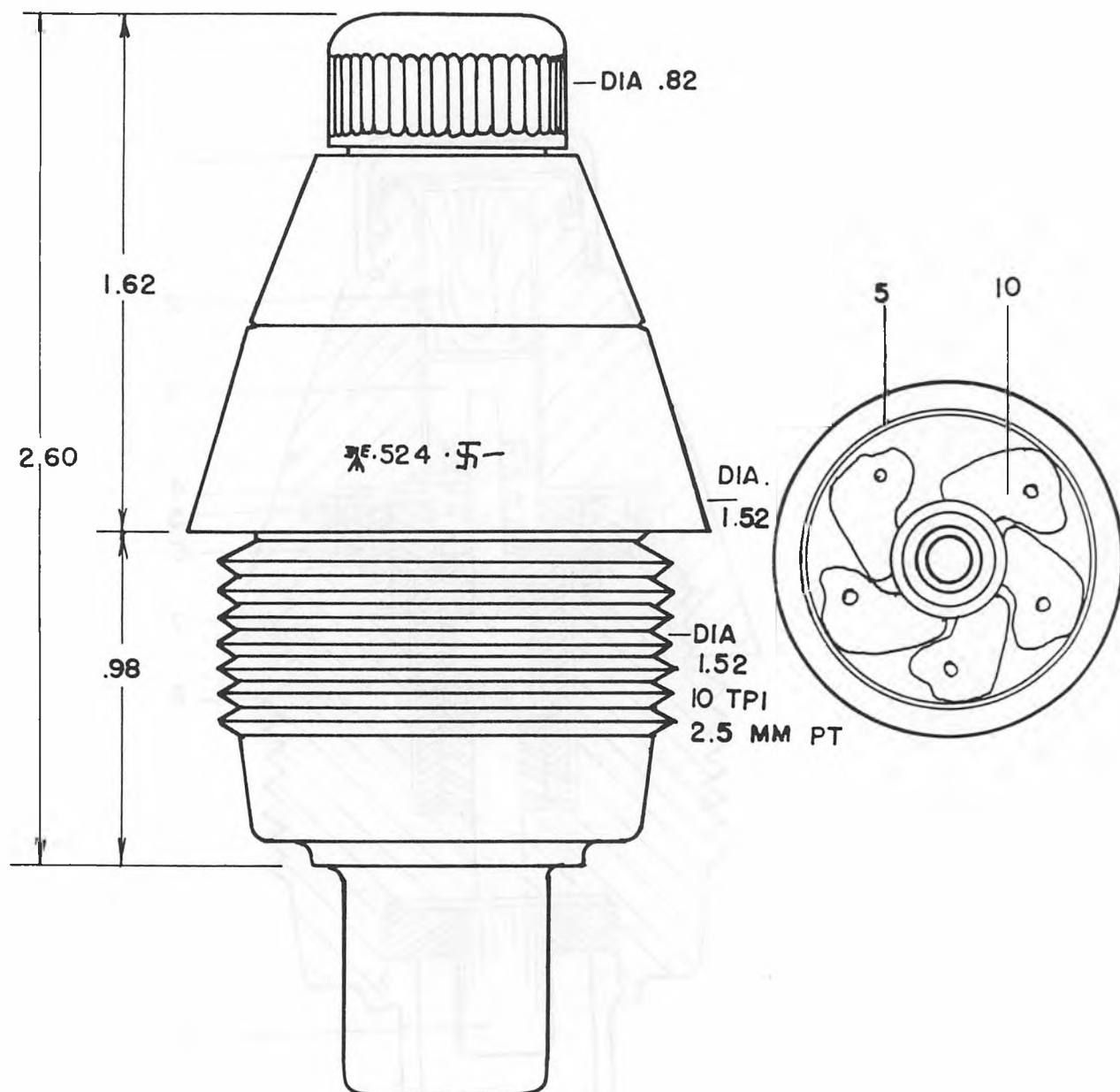
Projectiles

105mm ChiCom howitzer, type unknown

105mm HE-Frag ----- type unknown

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 51

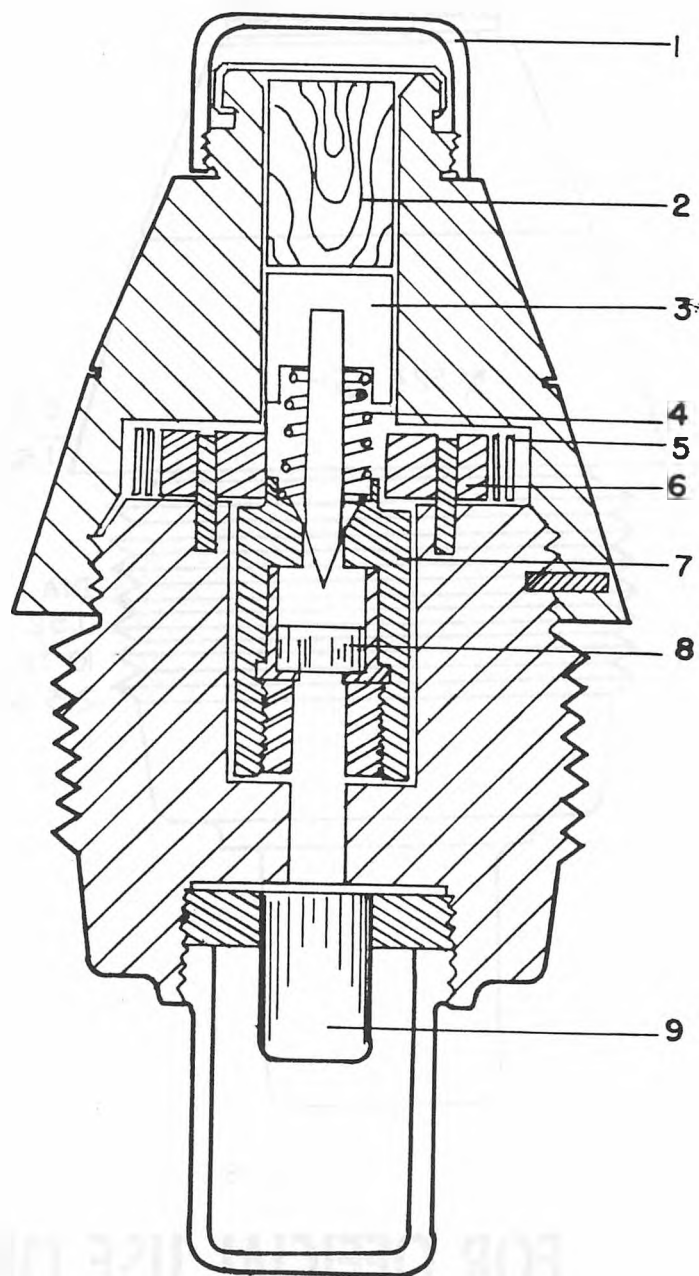


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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 51



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53

a. General. The ChiCom point-detonating impact fuze type 53 is a copy of the ChiCom type 51 fuze. Internally the fuzes are identical and they function in the same manner. The only difference noted between the type 53 and the type 51 is that the type 53 has a larger diameter booster, a thicker detonator, and slightly longer detonator cavity. The type 53 is the father of the improved type 53 mod 1 and mod 2 fuzes being used in the 75mm recoilless rifles.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 380 grams (0.83 lb)

Body material ----- steel

c. Functioning. Functioning is identical to that of the ChiCom type 51 fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons

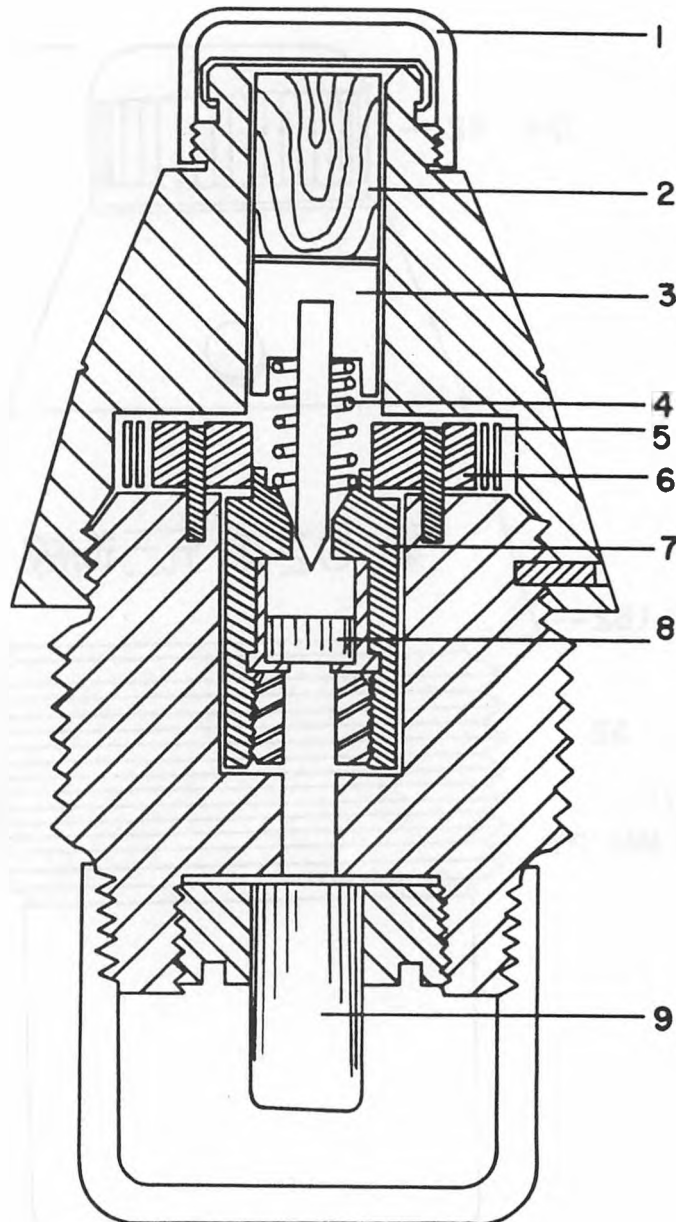
Projectiles

105mm ChiCom howitzer, type unknown

105mm HE-Frag -----type unknown

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53

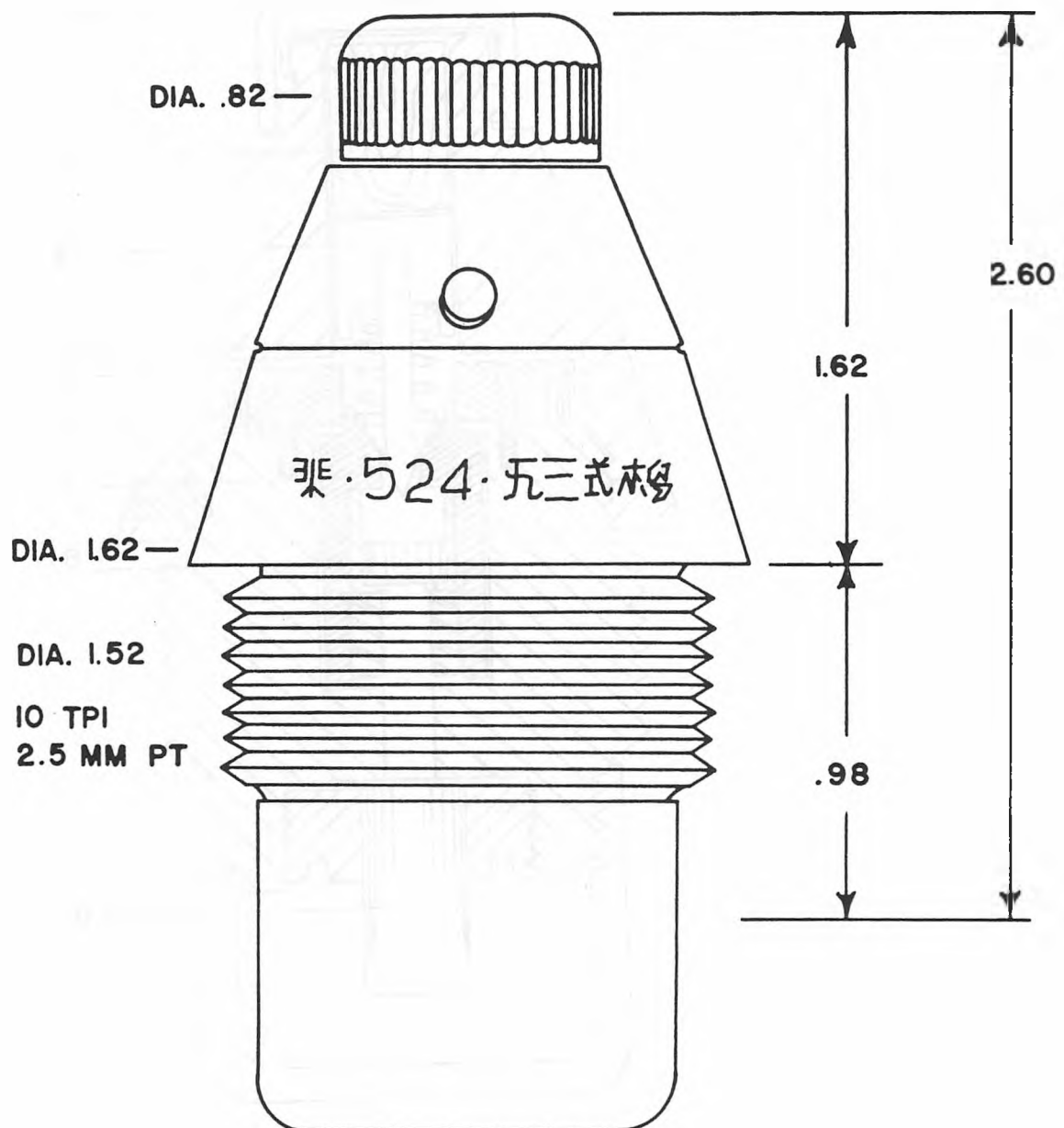


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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53 Mod 1

a. General. The ChiCom type 53 mod 1 fuze is practically identical to the earlier type 51 and type 53 ChiCom fuzes. The type 53 mod 1 uses the small booster seen on the type 51. Construction and materials seem to be identical with the type 53. The type 53 mod 1 is a centrifugal force armed, superquick action fuze that possesses a graze-sensitive capability. The fuze is not detonator-safe nor bore-safe. It consists of an upper and lower fuze body machined from bar stock. A groove is cut into the fuze body surface at the junction of the upper and lower sections. This groove apparently has no purpose. The upper and lower bodies are secured by a single stake, rather than with a pin as in the type 51 and type 53 fuzes. Internally the fuze is identical with the type 51 and type 53 fuzes. It contains a firing pin assembly, with a wooden plunger and a steel firing pin spring. There are five brass centrifugal segments enclosed by a brass, coiled, leaf spring that form the arming elements. The primer assembly consists of a brass primer holder, two chip board spacers, a primer, and a retaining slug. The centrifugal detents rotate on pins seated in the lower fuze body. The nose cap is painted red and the fuze body appears to be made from stainless steel.

b. Characteristics.

Action -----instantaneous

Loaded weight ----- 393 grams (0.86 lb)

Body material ----- steel

c. Functioning. When the round is loaded into the weapon the firing pin (4) is seated on the coil spring (5) which holds the firing pin (4) above the centrifugal segments (7). The centrifugal segments are prevented from moving outward by the centrifugal spring (6). Upon firing, setback causes the firing pin to move rearward compressing the spring (5) until it is seated on the centrifugal segments, holding them in position. As acceleration ceases and centrifugal force increases, the spring forces the firing pin forward. The centrifugal segments rotate about their pins simultaneously as the centrifugal spring (6) expands. This leaves an unobstructed passage for the firing pin (4) to reach the primer (9). Creep action moves the firing pin forward into the nose of the fuze against the wooden plunger. The coil spring (5) prevents the primer holder from moving forward onto the firing pin. Upon impact the firing pin is driven rearward by the wooden plunger. Impact at flat angles causes the primer holder to move forward permitting the primer (9) to hit the firing pin. This initiates the booster (11), which detonates the projectile.

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53 MOD 1

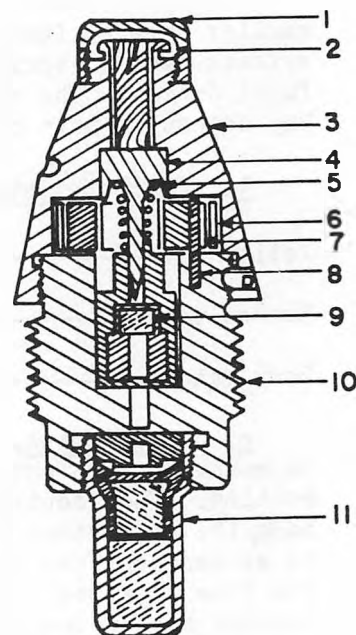
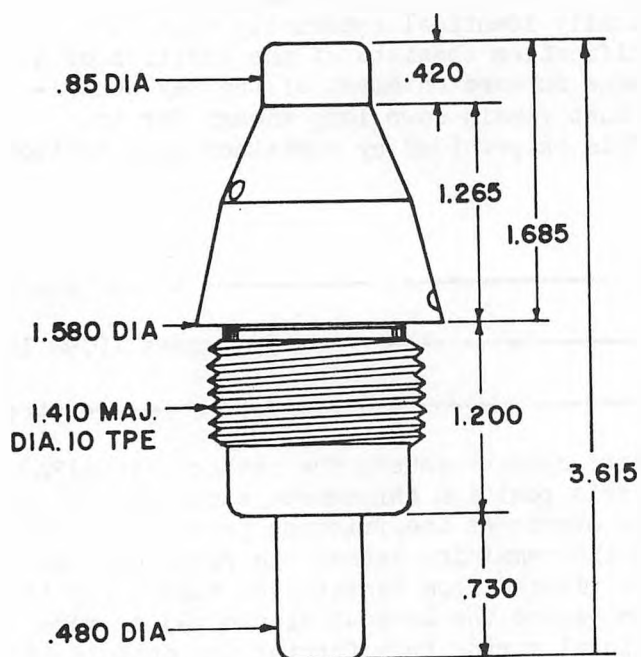
d. Weapons and projectiles with which fuze can be used.

Weapons

105mm howitzer, type unknown

Projectiles

105mm HE-Frag ——— type unknown



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53 MOD 2

a. General. The ChiCom type 53 mod 2 fuze is the latest fuze in the type 53 family that has been identified. All fuzes recovered of this type to date have been "sanitized." Markings were restored by etching. Externally the type 53 mod 2 appears identical to the type 1 and type 3 specials. All are employed on the 75mm recoilless rifle type 52. The cocked detonator fuzes, the type 1 and type 3, have slightly longer nose caps and a spanner wrench hole between the shoulder and threads. The type 53 does not possess the hole. All nose caps of the type 1 and type 3 are also black, while the type 53 nose cap is cadmium-plated.

The type 53 mod 2 is practically identical internally with the earlier type 53 fuzes. The modification consists of the addition of a setback pin and spring that blocks outward movement of the key centrifugal detent. The setback pin must remain down long enough for the key detent to move outwards. This is provided by sustained acceleration.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 299 grams (0.88 lb)

Body material ----- steel

c. Functioning. Upon firing, setback causes the setback pin (13A) to move downward and remain in this position throughout sustained acceleration. When centrifugal force overcomes the friction produced by setback, the key detent (7) permits the remaining detents to pivot outward in sequence. When all have base pivoted from beneath the firing pin (5), the fuze is armed. Creep action causes the lockout sleeve (9) to move forward and prevents the centrifugal spring from forcing the detents (7) to return to their original positions upon spin delay. With the detents (7) locked out by the sleeve (9) the firing pin (5) is separated from the detonator (11) by the anticreep spring (6).

Upon impact the firing pin (5) is driven downward by the impact plunger (3), piercing the detonator (11). The detonator (11) flashes through the flash channel initiating the lead cup (15) and boosters (16). If the projectile impacts at a flat angle, or the nose cap (1) is left in position, the detonator housing (10) slides forward in its cavity impaling the detonator (11) on the primer, initiating fuze action. This twin movement of the firing pin and detonator is characteristic of the new Soviet/ChiCom fuze series and results in excellent fuze confidence.

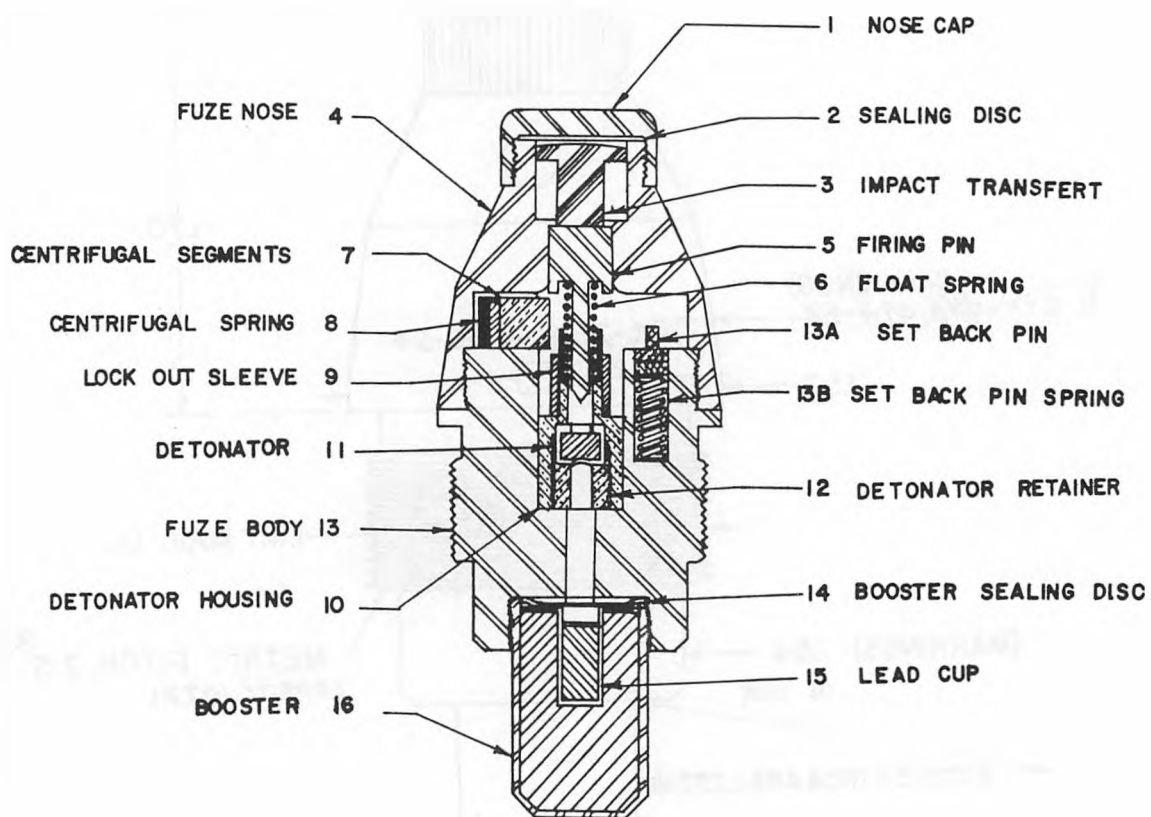
d. Weapons and projectiles with which fuze can be used.

75mm ChiCom, type 52 RR

75mm RR HE ----- type 52

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CHICOM, POINT-DETONATING IMPACT FUZE, TYPE 53 MOD 2

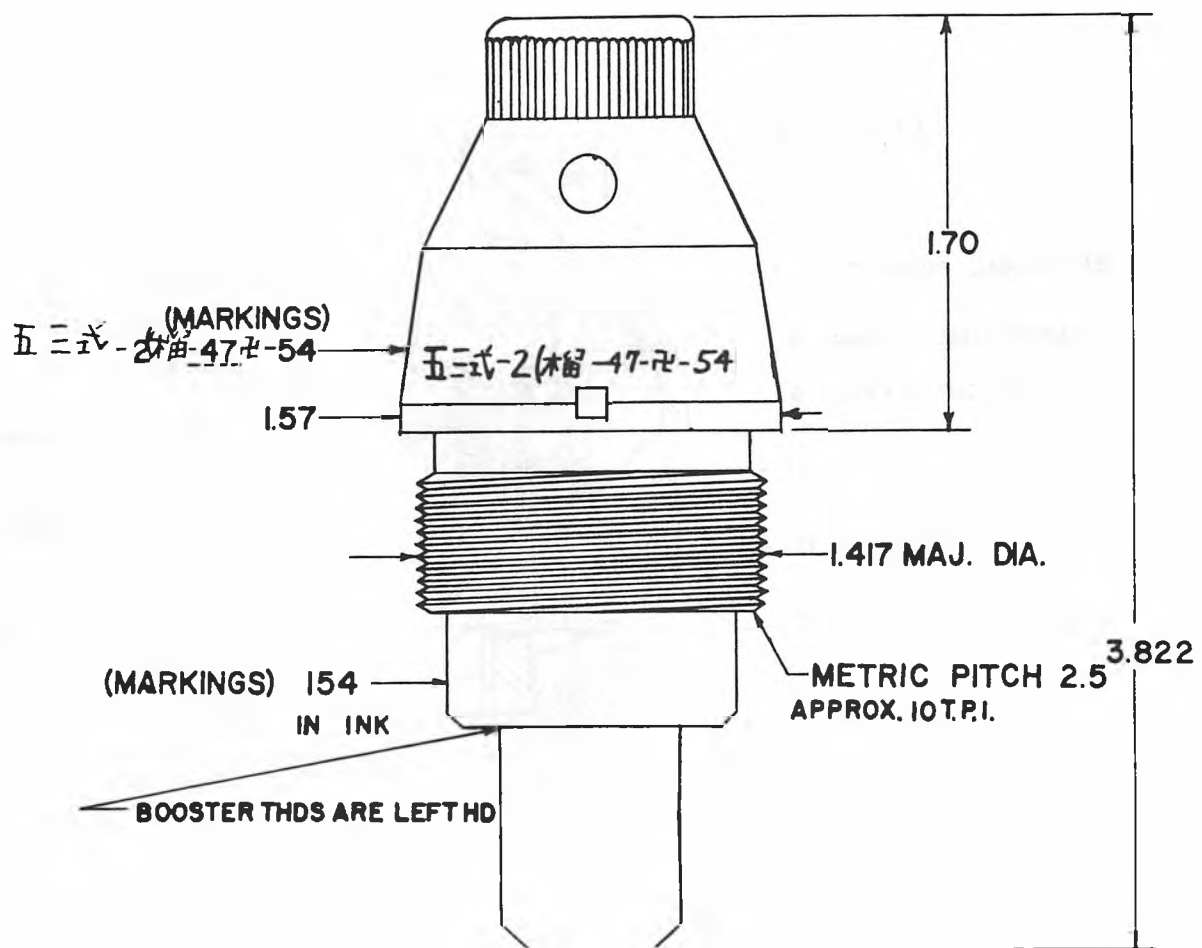


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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 53 MOD 2



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 88

a. General. The ChiCom tyre 88 point-detonating fuze is an exact copy of the World War II Japanese type 88 fuze. Prior to and during the Korean War, the fuze was produced for several applications. In Vietnam it has been observed only on the ChiCom copy of the Japanese 70mm howitzer projectile. According to markings, the fuze was produced in North-east China (Manchuria) by factory 724. This factory and factory 524 were noted for their fuze production during the Korean War.

The type 88 fuze is bore-safe, but is not detonator-safe. It is made of brass and employs the typical Japanese "gaine" explosive train. The upper fuze body (8) threads into the lower fuze body (10) by left hand threads. The gaine has right hand threads. All threaded sections are secured by stab crimps. The fuze is given a coating of varnish to render the fuze corrosion resistant. No effort was made toward water-proofing. The firing pin plunger (1) is machined from aluminum. The firing pin (11) is steel.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 170 grams (0.37 lb)

Body material ----- brass

c. Functioning. The safety fork (9) must be removed prior to firing. Upon firing, setback causes the setback sleeve (2) to move rearward compressing the four legs of the stirrup (4). When the internal circumferential groove in the setback sleeve (2) is presented to the legs of the stirrup (4), these legs snap into the groove locking the setback sleeve (2) to the stirrup (4). This frees the four safety segments (3) which are moved from under the firing pin (11) by centrifugal force. The fuze is now armed. Upon impact the plunger is driven downward, permitting the firing pin (11) to pierce the primer (5), initiating the detonator (6), which initiates the projectile.

d. Weapons and projectiles with which fuze can be used.

Weapons

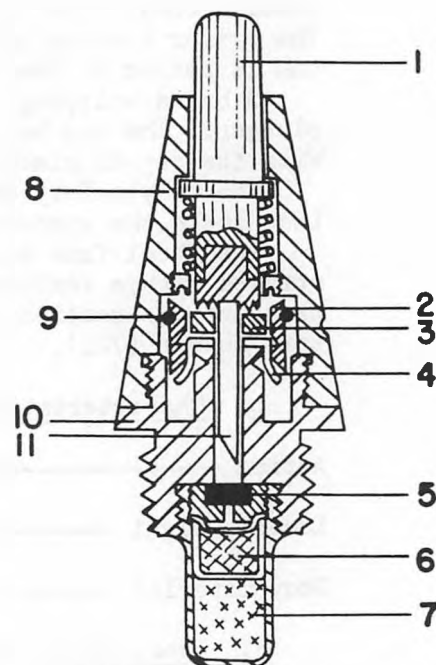
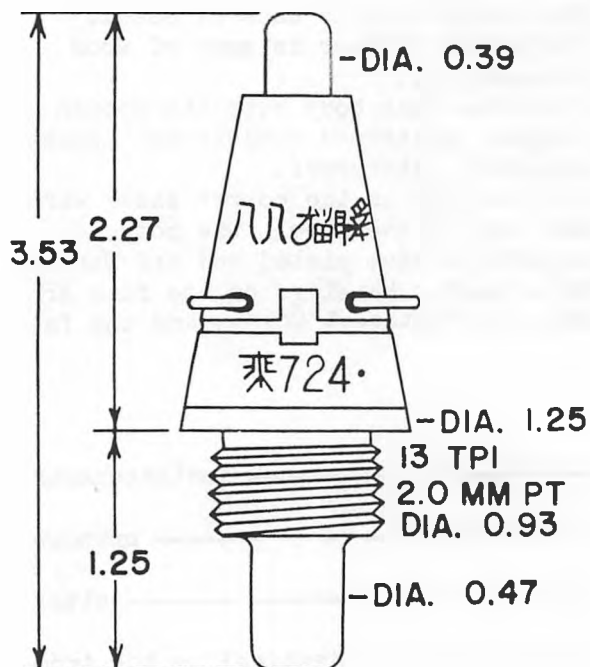
Projectiles

70mm ChiCom copy of Japanese, type
92 howitzer

70mm HE-Frag ----- type unknown

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 88



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 100

a. General. The ChiCom type 100 point-detonating fuze represents an intermediate step in the development of the type 100 series fuzes. The fuze system began with the "universal" fuzes in the Korean war and has now evolutionized to the type 100-3. The type 100 has been employed in the ChiCom copy of the U.S. 60mm mortar projectile, M49A2, but has since been replaced in this application by the 100-3 fuze. Its only known current application is the ChiCom 102mm rocket type 488.

The type 100 is nearly identical to the 100-3. Differences are in details only. The fuze body is slightly larger and is made of steel. The primer housing is smaller. The firing pin plunger is made of wood and is seated in the aluminum primer housing cap.

A brass shipping cap is threaded onto the fuze body over the wooden plunger. The cap has four vertical flanges positioned equidistant apart. With the cap in place the fuze is essentially waterproof.

The only safety device exhibited by the fuze is the copper shear wire that locks the wooden plunger and primer cup to the steel fuze body.

The steel fuze body and booster cup are cadmium plated and are further sprayed with a semitransparent yellow varnish. Markings on the fuze are the fuze designation, the Chinese symbol for northeast China, and the factory number (724).

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Functioning of the type 100 is identical to the type 100-3.

d. Weapons and projectiles with which fuze can be used.

Weapons

60mm mortar type 53

102mm rocket launcher, type 3

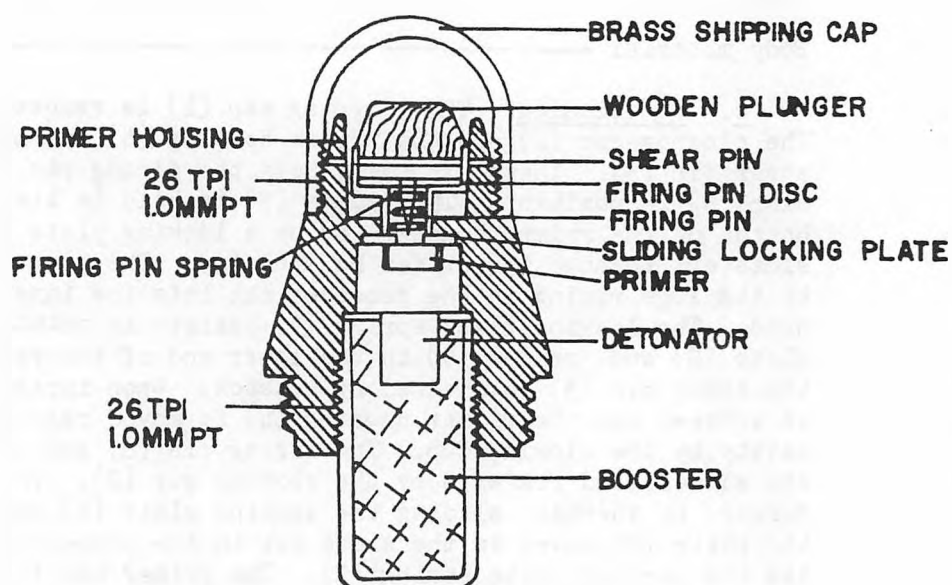
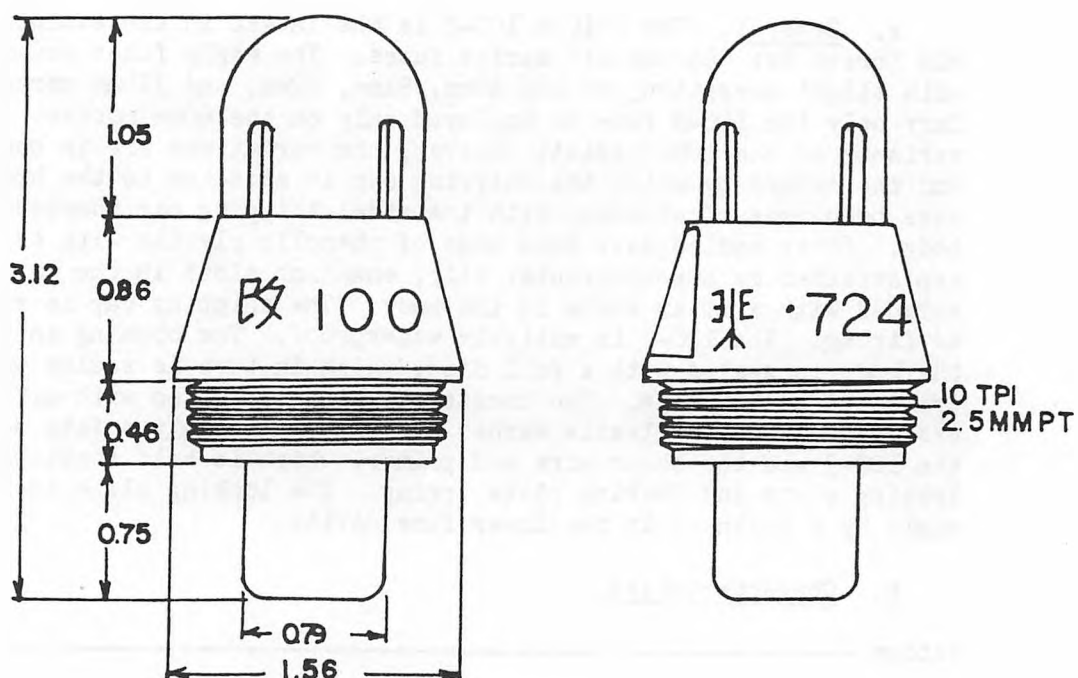
Projectiles

60mm HE-Frag ----- type unknown

102mm HE-Frag --- rocket type 488

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 100



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 100-3

a. General. The ChiCom 100-3 is the latest in the evolution of the old Korean War "Universal" series fuzes. The early fuzes could be employed, with slight exception, on the 60mm, 81mm, 82mm, and 120mm mortar projectiles. Currently the 100-3 fuze is employed only on the 60mm mortar. Several variants of the 100-3 exist; however, the variations are in body materials and the method by which the shipping cap is attached to the body. Bodies have been made of aluminum with the steel shipping cap threaded to the body. Other bodies have been made of phenolic plastic with the shipping cap attached by a semicircular clip, engaging slots in the cap that are aligned with similar slots in the body. The shipping cap is removed prior to firing. The 100-3 is entirely waterproof. The opening in the nose of the body is sealed with a foil disc, which in turn is sealed with a ring crimp around the nose. The booster opening is sealed with either a lead washer and glue or plastic washer and glue. The only safety devices in the 100-3 are the shear wire and primer, which is held stationary by the locking plate and locking plate spring. The locking plate is also held rigid by a bulkhead in the inner fuze cavity.

b. Characteristics.

Action ----- nondelay
Loaded weight -----129.5 grams (0.28 lb)
Body material ----- aluminum or plastic

c. Functioning. The shipping cap (1) is removed prior to firing. The closing cup (2) and the primer housing (4) are held immovable by the shear pin (3). These, in turn, hold the firing pin (6) and firing pin disc (5) in position. The primer (9) is held in its position at the bottom of the primer housing (4) by a locking plate (8) which rides in slots cut through the primer housing (4). The plate is held stationary by its lugs riding in the recesses cut into the inner fuze cavity bulkhead. The locking plate spring (7) assists in maintaining the locking plate (8) and primer (9) in the lower end of the primer housing (4), if the shear pin (3) is sheared by setback. Upon impact the shear pin (3) is sheared and the primer housing (4) is moved rearward into the inner fuze cavity by the closing cup. The firing pin (6) and the firing pin disc (5) are also forced rearward by the closing cup (2). The primer (9) moves forward by inertia, sliding the locking plate (8) ahead of it. The locking plate (8) moves in the slots cut in the primer housing (4), compressing the locking plate spring (7). The primer and firing pin (6) make contact, initiating the primer (9), which activates the detonator and booster (11).

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 100-3

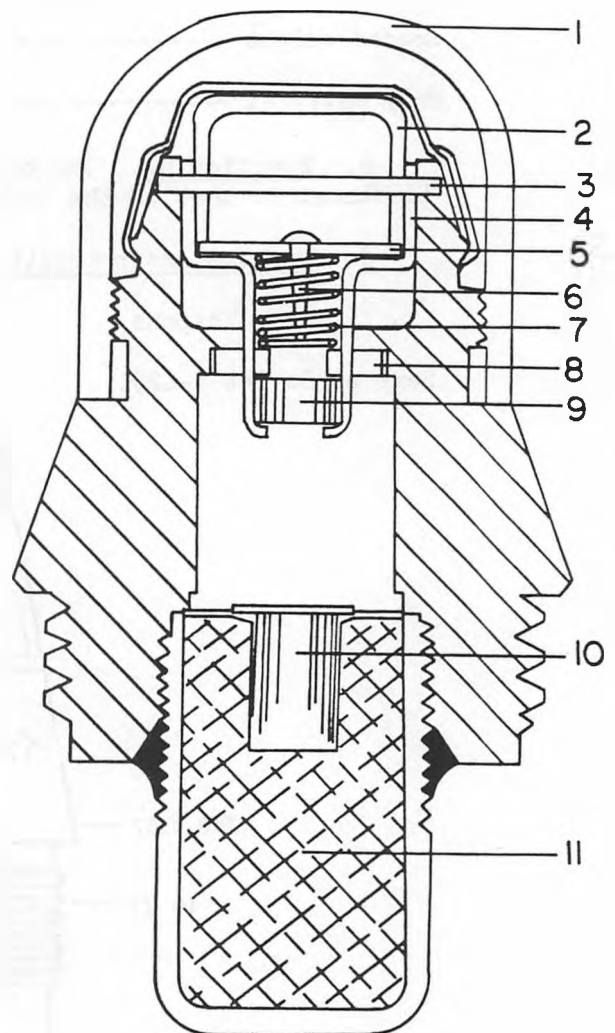
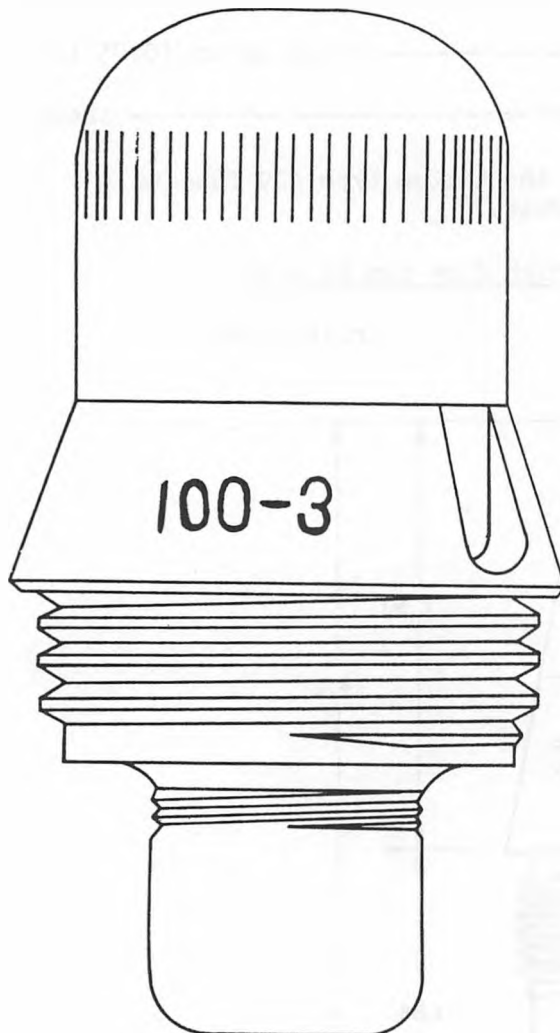
d. Weapons and projectiles with which fuze can be used.

Weapons

60mm ChiCom, type 31 and type 63

Projectiles

60mm HE-Frag ----- type 7



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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE 429

a. General. The ChiCom type 429 is an exact copy of the Soviet V-429 fuze. Design, material, and workmanship appear to be identical between the two fuzes. Further details can be found in the section covering the Soviet V-429 fuze.

b. Characteristics.

Action ----- instantaneous and delay

Loaded Weight ----- 434 grams (0.95 lb)

Body material ----- steel

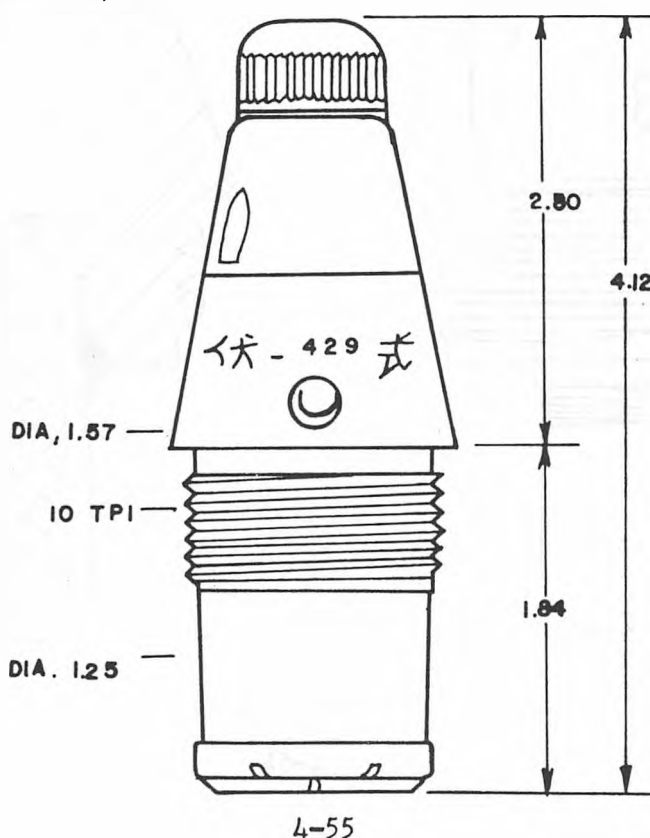
c. Functioning. The operation of the ChiCom type 429 fuze is identical to that of the Soviet V-429 fuze.

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

Same as Soviet V-429.



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CHICOM, POINT-DETONATING, IMPACT FUZE: TYPE UNKNOWN

a. General. The ChiCom designation for this fuze has not been determined. Markings are sparse; they consist only of those illustrated plus individual inspectors or department stamps scattered on various fuze components.

The fuze is a copy of the US M43A1 selective point-detonating delay fuze, and it is provided with a copy of the US M20A1 booster. The fuze is made entirely of brass, except for the striker, springs, and delay mechanism housing. Its US counterpart is constructed of cadmium-plated steel. Markings, fuze body materials, rough workmanship, and minor detail differences readily differentiate the US fuzes from ChiCom fuzes. Since US boosters are made of brass, it requires great care to accurately identify the ChiCom and US boosters.

This ChiCom fuze has been recovered only on US or ChiCom copies of the US 75mm HE, M48 pack howitzer, projectile. Extreme caution is necessary to accurately differentiate between the US and ChiCom projectiles. They are identical except in the rotating band keyway and base plate. The differences in these elements are quite minor.

b. Characteristics.

Action ----- instantaneous and delay
Loaded weight ----- unknown
Body material ----- brass

c. Functioning. The fuze has been reconstructed from fragments recovered from shell craters. Functioning appears to be identical with the US M48A1 fuze with M20A1 booster.

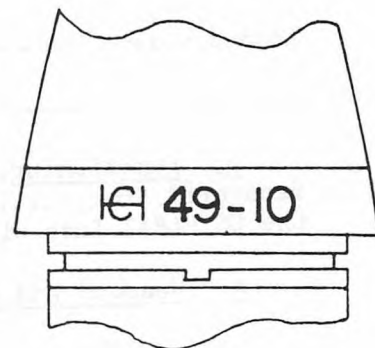
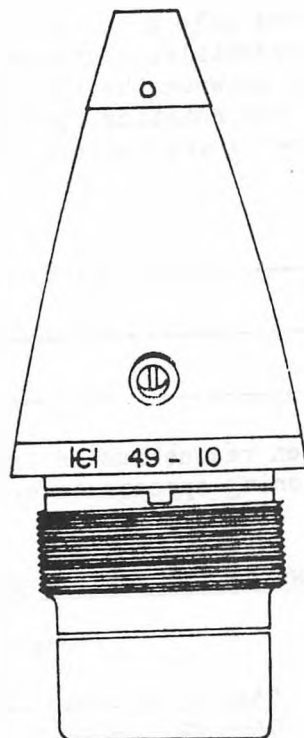
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
75mm US or ChiCom copy of US pack howitzer, M1A1	75mm US HE-Frag ----- M48 75mm ChiCom HE-Frag ----- type 48

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CHICOM, POINT-DETONATING IMPACT FUZE: TYPE UNKNOWN



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CHAPTER 5

SOVIET, BASE-DETONATING FUZE

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SOVIET, BASE-DETONATING FUZES

The majority of the base-detonating fuzes employed by the Communist bloc are direct copies or modifications of Soviet base-detonating fuzes. The Soviet fuzes, when taken as a group, are conventional in all respects, and they offer few remarkable features. The mechanical characteristics of individual fuzes, especially in later designs, possess features that reveal a trend toward increased safety in handling and firing. The piezo-electric VP-7 displays the greatest departure from the standard Soviet base-detonating fuze design. This fuze is the first piezo-electric recovered, revealing positive Soviet acceptance of the importance of the principle. It also is the first detonator-safe base-detonating fuze, incorporating a vertically sliding detonator carrier in lieu of the normal detonator rotor.

Soviet base-detonating fuzes are employed in concrete-piercing and armor-piercing ammunition that is fired from field, antitank, or antiaircraft artillery or grenade and rocket launchers. All Soviet base-detonating fuzes, less the point-initiating, base-detonating types, are designed to function by impact inertia. Some incorporate delay pellets that may have the conventional pressed black powder pellet or the newer, nongaseous, dichromate pellet. A few base-detonating fuzes have an automatic deceleration discrimination feature that acts as a delay feature to regulate delay fuze operation until the projectile has achieved complete target penetration, regardless of target thickness.

The Soviets place as much emphasis upon weatherproofing base-detonating fuzes as with the other fuze classes. Lead sealing rings, nylon pipe threads sealant, plastic rings, and sealing compounds are all employed for complete waterproofing. Although base-detonating fuzes are mounted inside explosive ordnance and do not require the same lavish effort toward weatherproofing, it appears that current Soviet munition designs require that all explosives receive this treatment.

Base-detonating fuzes receive the same care in marking as do the other classes of fuzes. Each is die-stamped with the fuze designation, lot number, and factory, when space permits. Those base-detonating fuzes that are permanently mounted in projectiles are marked on body flanges so that the information can be read directly from that portion of the fuze that protrudes from the projectile.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DBR

a. General. The base detonating fuze DBR is new in the Soviet inventory; it has been seen only in large caliber armor-piercing projectiles. It features a delay pellet to provide maximum penetration of projectile prior to detonation. Its companion fuze, the DBR-2, does not possess a delay pellet. Basic operation of the DBR and DBR-2 fuzes is nearly identical.

The DBR is fired directly by impact inertia; it has a graze sensitive weight (14) in the bottom that is retained in position by a thin metal clip (15). This same type arrangement is employed in the GK-2 series fuze. The arming mechanism is contained within a cylindrical housing (24). This housing contains the primer carrier (13) and primer (21). This assembly is also the inertial assembly that causes fuze operation upon impact. The primer carrier (13), thereby, securely locks the carrier against all movement. The detents are prevented from moving outward until setback ceases by a setback collar (11) which moves rearward covering the detent stems (22). Upon impact, an impact collar (23) moves forward restraining the detents (22) from moving inward under the influence of their springs. The detents (22) are retained in their cavities by the detent springs and a hollow cap.

An anticreep spring (9) maintains separation of the primer carrier (13) and the fixed firing pin (7) when the fuze is armed. The primer end of the anticreep spring (9) contains a desensitizer cup (10). The cup has a central hole for the firing pin to pass through, but the hole is smaller in diameter than the firing pin. It requires more than a normal amount of force for the firing pin to enlarge the hole so that it can reach the primer (21).

The firing pin (7) rests on top of the delay pellet (6). The firing pin has three holes through its body and grooves in its side to permit the flame from the primer (21) to reach the delay pellet (6). The delay pellet is pressed black powder; it also possesses three deep depressions in its upper surface to increase its ignition area. The delay pellet (6) and fixed firing pin (7) are secured in the delay pellet housing by a threaded slug (8). The entire assembly threads into an adapter (20) that screws into the fuze body. The booster (1) contains the detonator (3) and detonator cushion (2). These components are retained in the booster cup by the threaded plugs (4) and (5).

The tracer element (17) is contained in an aluminum cup that is sealed at its open end by a celluloid disc (18). Two gas escape ports (16) are drilled through the tracer-housing to permit hot air to escape so that the tracer will not be blown from the tracer-housing.

The fuze is entirely waterproof. The booster (1) is sealed to the fuze body by a vinyl ring and a lead crush ring (19). In addition, the fuze is secured to the fuze adapter by a lead crush ring (25). The presence of the ring (25) requires considerable force to remove the fuze

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DBR

from the adapter.

The DBR fuze is bore-safe but is not detonator-safe by US standards. Arming is by centrifugal force only. Firing is accomplished by straight impact through the inertial movement of the primer carrier (13) or upon graze impacts by the lateral movement of the graze weight (14) forcing its way through the legs of the clip (15). This action cams the primer carrier (13) onto the firing pin (7).

b. Characteristics.

Action ----- impact inertia

Loaded weight -----420 grams (0.94 lb)

Body material ----- steel

c. Functioning. When the round is fired, setback causes the setback collar (11) to move downward compressing its spring (12) and covering the detents (22) so they cannot retract until after setback diminishes. When setback ceases, the spring (12) forces the collar (11) forward uncovering the detents (22). Centrifugal force acting on the three detents (22) causes them to be withdrawn from the annular groove in the primer carrier (13). This compresses the detent springs. With the detents withdrawn from the primer carrier (22), the fuze is now armed. The carrier is prevented from moving forward only by the anticreep spring (12).

Upon impact, the impact collar (23) moves forward against the spring (12) restraining the detents (22) from prematurely moving inward locking the primer carrier (13). Simultaneously, inertia causes the primer carrier (13) to move forward compressing the anticreep spring (9) and seating the desensitizer cups (10) and primer (21). The primer then flashes through the grooves and holes in the firing pin housing (7). The flame ignites the delay pellet (6) which, in turn, flashes into the flame sensitive detonator (3). This initiates the booster (1) and projectile.

If the projectile impacts at flat angles, the graze weight (14) is forced laterally by inertia. The graze weight (14) bends down one or more of the legs of the clip (15) caging the weight. With the weight (14) free it continues to move laterally so that its conical cam surface contacts the cam on the primer carrier (13) forcing the carrier forward onto the firing pin (7). Action then continues as described.

d. Weapons and projectiles with which fuze can be used.

Weapons

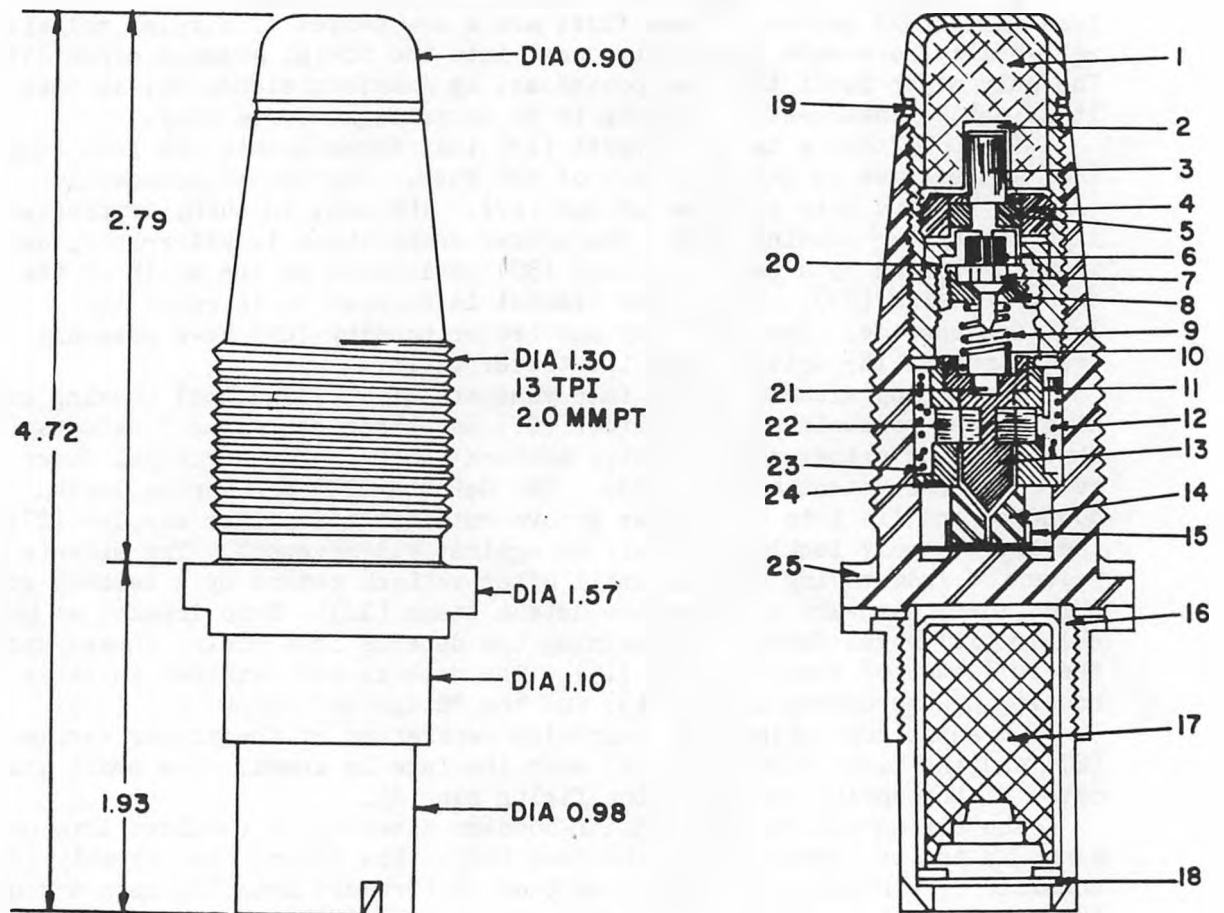
122mm Soviet D-74 gun

Projectiles

122mm Soviet APC BC HE-7-BR-472

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DBR



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DBR-2

a. General. The DBR-2 base-detonating-fuze represents the second fuze in the DBR series. These fuzes are a new series of simple, reliable, well-built, bore-safe fuzes introduced into the Soviet arsenal since 1950. The only major fault the fuze possesses, by American standards, is that it is not detonator-safe. Arming is by centrifugal force only.

The DBR-2 has a tracer element (18) that threads into the fuze body (28) and becomes an integral part of the fuze. The tracer composition (18) is pressed into an aluminum cup (17). The cup, in turn, is pressed into the tracer housing (29). The tracer composition is waterproof, and it is protected by a celluloid disc (30) positioned at the mouth of the tracer housing (29). The tracer element is stepped to increase its ignition surface. The fuze body and tracer housing (29) have pressure escape ports (16) drilled into the tracer cavity.

The arming element of the fuze consists of a cylindrical housing containing the moveable primer carrier (27) and three centrifugal detents (12) that lock the primer carrier until setback ceases and centrifugal force overcomes the detent springs (13). The detents (12) are spring loaded downward and fit into an annular groove cut into the primer carrier (27), thereby securely locking the carrier against all movement. The detents are prevented from moving outward until after setback ceases by a setback collar which moves downward covering the detent stems (12). Upon impact, an impact collar (14) moves forward restraining the detents from moving inward under the influence of their springs (13). The detents are retained in their housing by the detent spring (13) and the "doughnut" shaped cap (11).

An anticreep spring (23) maintains separation of the primer carrier (27) and the fixed firing pin (8) when the fuze is armed. The small diameter of the spring surrounds the firing pin (8).

The firing pin relay detonator-booster assembly is combined into one assembly and is threaded into the fuze body. The firing pin assembly (8) consists of a hollow, threaded plug that is threaded into the open end of the booster housing (2). The firing pin housing (9) possesses a vertical and horizontal, combination flash channel and gas expansion channel (7). These channels relay the flame from the primer to the flash pellet (6). The flash pellet consists of a wheel and hub-shaped assembly. The wheel is perforated with by-pass flash holes. The center of the wheel has a single tapering hole filled with a flash composition (6). The flash pellet assembly (6) is maintained in correct position with the flash channel in the retaining cup (21) by a single coil lock spring.

The detonator is covered by a convex plate (5) that has a single flash hole in the center. This insures that only the flame from the flash pellet (6) reaches the detonator (3). The detonator (3) rests inside an aluminum collar (20) that sits on shoulders inside the booster cup (2). The collar rests on a lead and felt ring. The open end of the detonator is closed by a cap perforated by a single hole.

The booster cup is sealed in the fuze body (28) by a lead caulking ring (4) that is pressed into an annular dovetail groove cut into the base of the fuze body. The fuze body is sealed to the projectile body by a

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DBR-2

lead crush washer (26). The combination of these lead rings effectively seals and waterproofs the fuze.

b. Characteristics.

Action ----- impact inertia

Loaded weight -----372 grams (0.81 lb)

Body material ----- steel

c. Functioning. When the round is fired, setback causes the setback collar to move downward, compressing the spring (25) and covering the detent cups (11) preventing the detents (12) from retracting until after acceleration ceases. As setback diminishes, the spring (25) forces the setback collar (10) forward uncovering the detent stems (12). Centrifugal force acting on the three detents (12) causes them to move outward, compressing their springs (13). With the detents withdrawn from the annular groove in the primer carrier, the carrier is prevented from moving forward only by the anticreep spring (23). The fuze is now armed. Upon impact, the impact collar moves forward placing frictional restraint on the detent. This is done to prevent the detents from moving inward prematurely. Simultaneously, inertia causes the primer carrier (27) to move forward against the anticreep spring (23) permitting the primer (24) to impale itself on the fixed firing pin (8). When the primer (24) flashes, flame and hot gasses pass into the flash channels (7), igniting the flash pellet (6). The flash pellet sends its flame through the flash channel in the convex plate (5) into the heat sensitive detonator (3). This causes the detonator (3) to initiate the booster and projectile main charge.

If the projectile strikes at a flat angle so that friction restrains the forward movement of the primer carrier, (27) the split, graze sensitive cam weights (15) move laterally camming the primer carrier into the firing pin, producing operation

d. Weapons and projectiles with which fuze can be used.

Weapons

100mm field gun M1944; tank gun
M1944 (D10-T); AA Gun KS-19
SP assault gun M1944

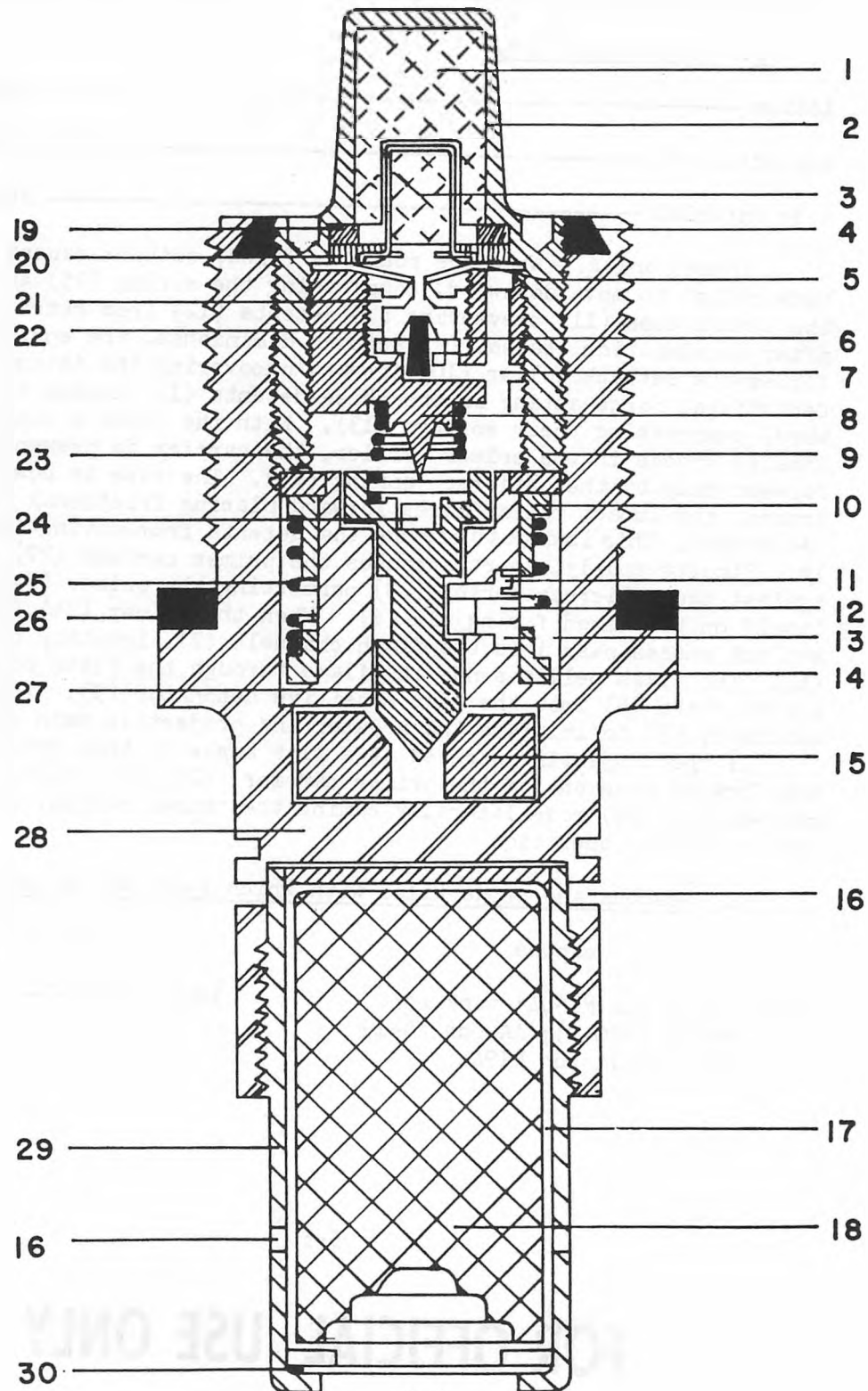
Projectiles

100mm APCBC-T-----BR-412D

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SOVIET, BASE-DETONATING IMPACT FUZE: DBR-2

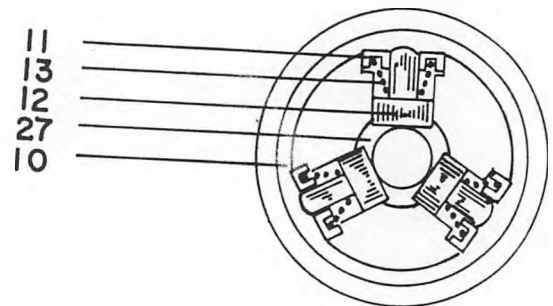
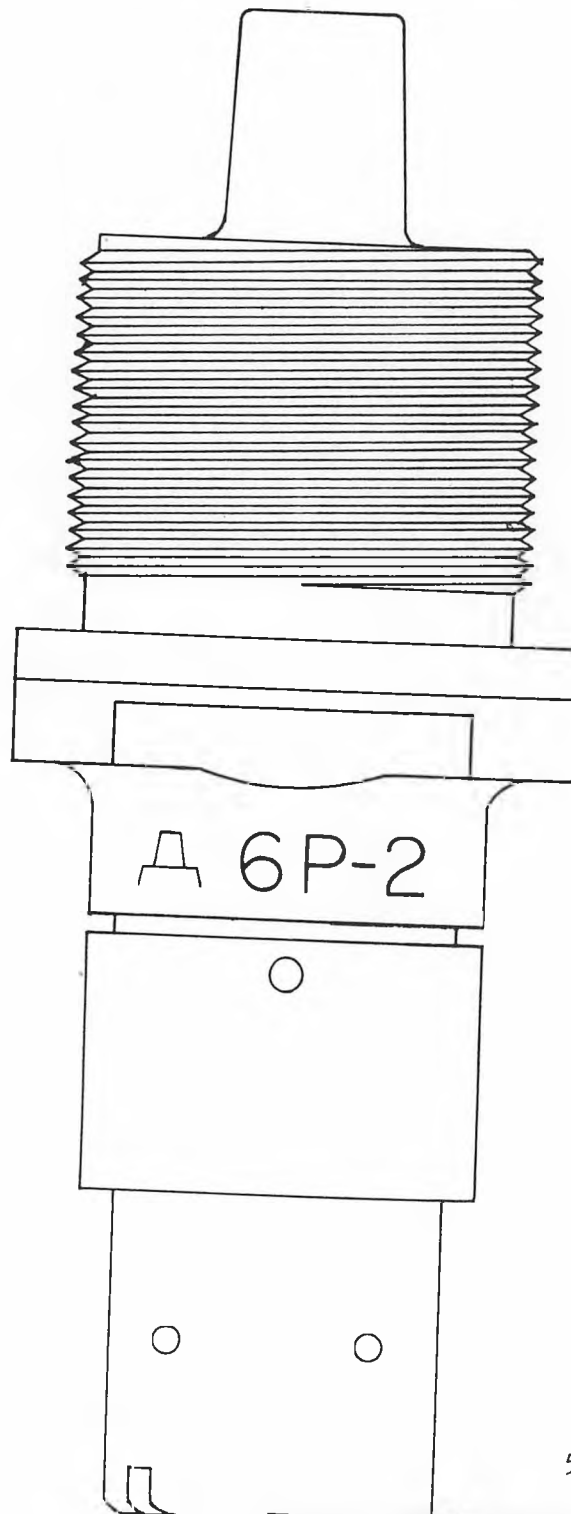


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SOVIET, BASE-DETONATING IMPACT FUZE: DBR-2



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DK-2

a. General. The Soviet base detonating fuze DK-2 is one of the many in the Soviet family of fuzes that employ the zigzag delay arming feature originated by the French and employed in the Energa rifle grenade.

The DK-2 is setback armed and impact fired; it contains a graze sensitive feature. The in-line explosive train classifies the fuze as non-bore-safe.

The DK-2 is a small, hollow cylinder with a separate booster (1) crimped to the fuze body. The detonator (2) is retained in the end of the fuze by a threaded, hollow plug. The fuze end cap (8) is threaded into the fuze body. The firing pin (9) is weighted, containing a lead core. It has a transverse plunger (5) with a large lug at one end and a smaller one on the other end. The plunger is spring-loaded toward the small lug. The firing pin assembly (10) resides inside a sleeve (11) flanged at the rear. The tube has a longitudinal slot to accommodate the small end of the plunger after setback and a single opposed hole for the larger plunger end. The zigzag sleeve (4) contains two opposed zigzag slots: one narrow one for the small plunger end and a wider one for the large end. The setback spring (6) is compressed between the inner sleeve (11) and the zigzag sleeve. In the unarmed condition, the larger end of the transverse plunger (5) is in its slot. The small plunger end is depressed inside the firing pin assembly (10) by the zigzag sleeve (4). The large plunger end protrudes into the small hole in the flanged sleeve locking the firing pin to the fixed sleeve against all movement until setback.

b. Characteristics.

Action -----non delay

Loaded weight -----unknown

Body material-----unknown

c. Functioning. Upon firing, setback causes the zigzag arming sleeve (4) to compress the setback spring (6) as it moves rearward. The end of the transverse plunger (5) rides through the large zigzag slot to the forward end of the sleeve. This allows the small end of the plunger to move to the right, forced by the plunger spring (10), and into the small slot. The setback spring (6) then forces the sleeve forward. The zigzag slot causes the sleeve to move forward by a reciprocating action. This action produces sufficient arming delay until the grenade has traveled a safe distance from the launcher. Upon impact, the striker assembly (9) moves forward overcoming the anticreep spring (3) and the sharp-pointed firing pin pierces the primer detonator. This initiates the detonator and booster. If the round impacts at a low angle, the steel

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DK-2

hammer (7), placed below the striker assembly (9), moves laterally in its cavity camming the firing pin assembly into the primer detonator.

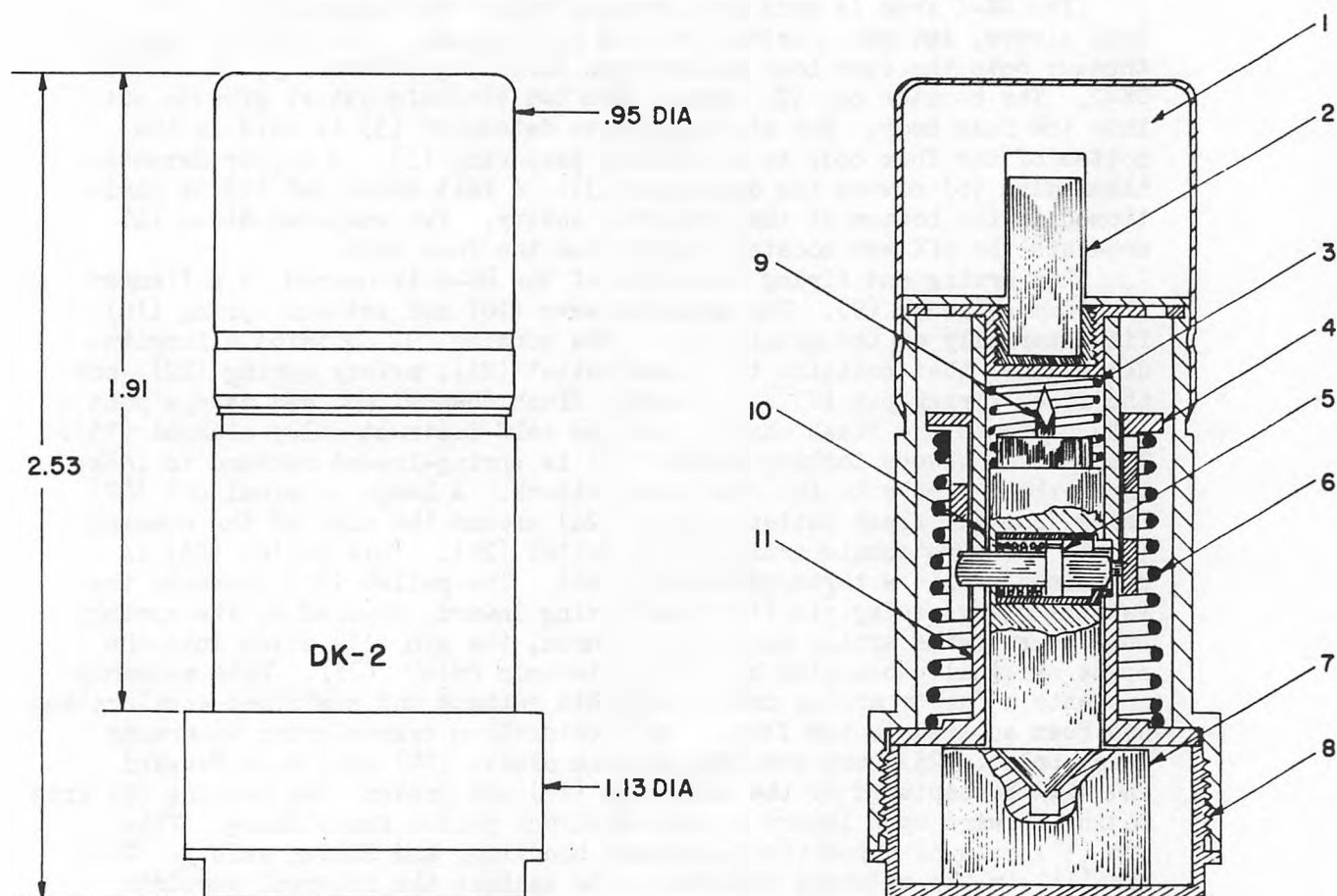
d. Weapons and projectiles with which fuze can be used.

Weapons

RPG-2 antitank grenade launcher

Projectiles

PG-2 grenade



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DK-4

a. General: The Soviet DK-4 base-detonating fuze is employed on the FG-2 grenade projectile. It is setback-armed and impact-fired, and it incorporates a self-destruct feature. The DK-4 is considered an improved version of the DK-2. The purpose of the self-destruct feature is not understood, but it does possess an air burst capability.

The DK-4 fuze is made of aluminum, except for the springs, setback sleeve, detents, firing pin, and closing cap. The closing cap (18) threads onto the fuze body rather than threading internally, as in the DK-2. The booster cap (2) crimps into two circumferential grooves cut into the fuze body. The stab sensitive detonator (3) is held in the bottom of the fuze body by a threaded keep ring (5). A copper desensitizer disc (6) covers the detonator (3). A felt shock pad (2) is positioned in the bottom of the detonator cavity. Two waxpaper discs (4) separate the RPX wax booster charge from the fuze body.

The arming and firing mechanism of the DK-4 is housed in a flanged aluminum cylinder (9). The arming sleeve (10) and setback spring (16) fit externally on the housing (9). The housing (9) contains a longitudinal channel that contains the flash pellet (21), safety spring (22), and the fixed firing pin (23). A lateral flash channel and gas escape port (13) connects the flash channel and the self-destruct delay element (15). The setback sleeve locking detent (12) is spring-loaded outward to lock the setback sleeve to the rear upon setback. A large external cut (27) leads from the flash pellet channel (24) around the side of the housing (9) to the pyrotechnic arming delay pellet (25). This pellet (25) is contained within a threaded housing (26). The pellet (25) prevents the setback sleeve delay pin (11) from moving inward, powered by its spring, until a suitable arming delay has occurred, the pin (11) moves into the space originally occupied by the pyrotechnic delay (25). This assembly prevents a fuze's arming unless suitable setback and sustained acceleration has been applied to the fuze. If acceleration ceases prior to arming delay pellet (25) burn out, the setback sleeve (10) will move forward and will be captured by the delay pin (11) and prevent the housing (9) from moving forward upon impact or self-destruct pellet functioning. This pin (11) acts as a positive shipping, handling, and firing safety. The pin (11) in the extended position rests against the internal shoulder in the fuze body positively blocking all movement by the housing (9) until the arming delay pellet (25) has been consumed and the pin (11) has moved into the evacuated space. The pin (11) is notched near the end. The notch rides in a partial zigzag groove (28) cut into the setback sleeve (10). This is a further arming delay feature.

b. Characteristics:

Action ----- instantaneous

Loaded weight ----- 76 grams (0.16 lbs)

Body material ----- aluminum

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c. Functioning: Upon firing, setback causes the weighted primer (21) to move rearward against its spring (22). If setback is of sufficient magnitude, the primer (21) is impaled upon the fixed firing pin (23). The resulting flash travels through the flash channel (13) and ignites the self-destruct ignitor (14) starting the self-destruct delay element (15) burning. Flame also passes into the large cut (24) and ignites the pyrotechnic arming delay pellet (25). Simultaneously, the setback sleeve (10) moves rearward, compressing its spring (16). When the mouth of the sleeve (10) clears the lock pin (12), the pin is forced outward by its spring, locking the sleeve (10) to the rear. At this time the pyrotechnic delay pellet (25) burns out permitting the fuze (11) to be forced into the evacuated cavity by its spring. The fuze is now armed. The housing (9), acting as an inertia weight, is restrained only by the anticreep spring (11).

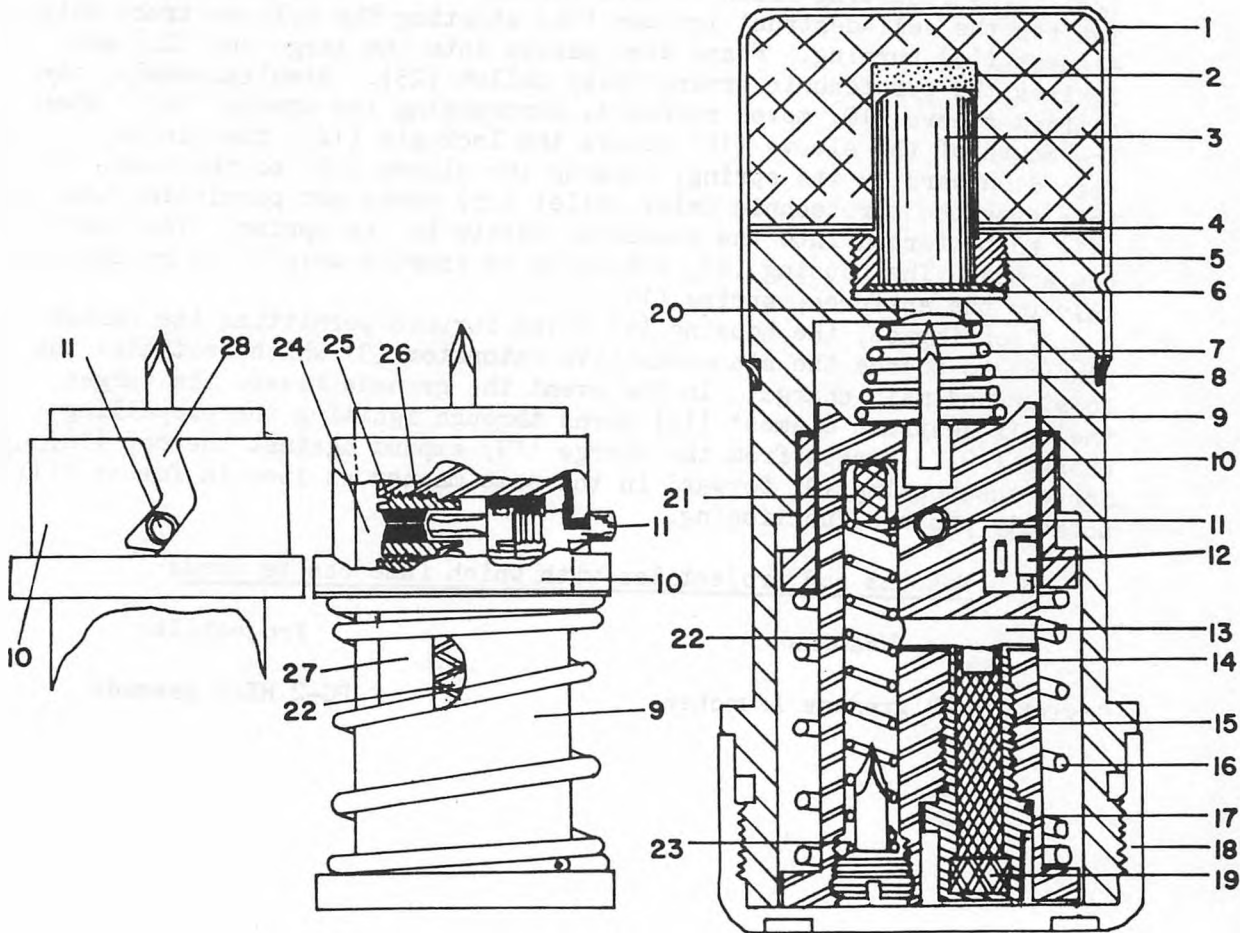
Upon impact, the housing (9) moves forward permitting the firing pin (8) to pierce the stab-sensitive detonator (3) which initiates the booster and main charge. In the event the grenade misses the target the self-destruct element (15) burns through igniting the propelling charge (19). Forces from the charge (19) expand against the cap (18) and force the housing (9) forward in the same manner as inertia forces will normally produce functioning.

d. Weapons and projectiles with which fuze can be used:

Weapons	Projectiles
Soviet RPG-2 grenade launcher	PG-2 HEAT grenade

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DK-4

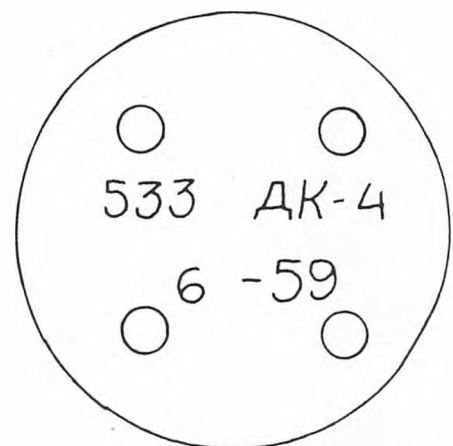
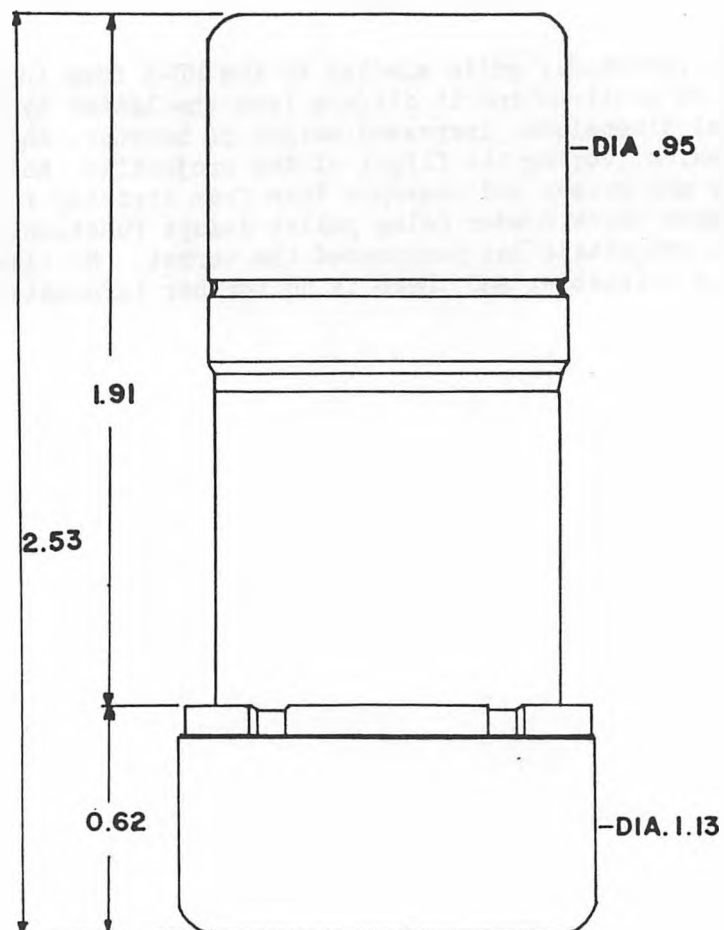


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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DK-4



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DP

The DP fuze is reportedly quite similar to the MD-5 fuze in functioning; however, in construction it differs from the latter by having larger external dimensions, increased weight of booster, and an anti-creep spring which, during the flight of the projectile, holds the primer carrier and primer and prevents them from striking the firing pin. The pressed black powder delay pellet delays functioning of the fuze until the projectile has penetrated the target. No illustration of this fuze is available, and there is no further information on it at this time

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DR-5

a. General. The DR-5, because of manufacturing difficulties attributed to its complex design, is no longer in production. No preparation of the fuze is required before loading.

b. Characteristics.

Action ----- short delay

Loaded weight ----- unknown

Body material ----- unknown

c. Functioning. Upon discharge, the tracer (9) is ignited by the burning propellant. The stirrup (6) sets back, overcoming the resistance of claws on the striker safety clamp (8). The striker safety clamp then engages the striker (7). Simultaneously, the bolt (13) sets back into a recess in the body of the fuze, locking the centrifugal shutter (1) until the shell has left the bore. It is necessary for the bolt (13) to immobilize the shutter because the only other shutter locking devices, two centrifugal segments (not shown), move free of the shutter while the shell is still traveling through the bore of the gun. When the shell leaves the bore, the centrifugal shutter is released and comes into the armed position, in which the detonator (12) lies opposite the relay charge (11). The striker (7) is prevented from moving during the flight of the shell by the anticreep spring (5). Upon impact, the striker and the stirrup (6) move forward, driving the firing pin (15) into the primer (4). The flash from the primer passes to the powder delay element (14) by traveling along the lateral grooves of the set-forward valve (3). On impact, inertia forces the set-forward valve against the powder delay element; the gases generated by the combustion of the delay composition, however, pass through grooves on the front and sides of the set-forward valve and escape from the powder delay element casing (2), thereby providing an even pressure and a normal rate of delay composition combustion. When the force of inertia exerted on the set-forward valve decreases until its intensity is less than that of the pressure of the gasses on the valve, the valve is forced rearward by the gas pressure, and it closes the exit from the delay element casing. The gas pressure in the casing is sharply increased and the delay element burns more rapidly. Its flame passes to the detonator (12) whose flash reaches the booster (10) by way of the relay charge (11). The force of inertia decreases when the shell has pierced the armor, and this insures the automatic regulation of the delay for the perforation of any given thickness of armor within the limits of the armor-piercing capacity of the given shell.

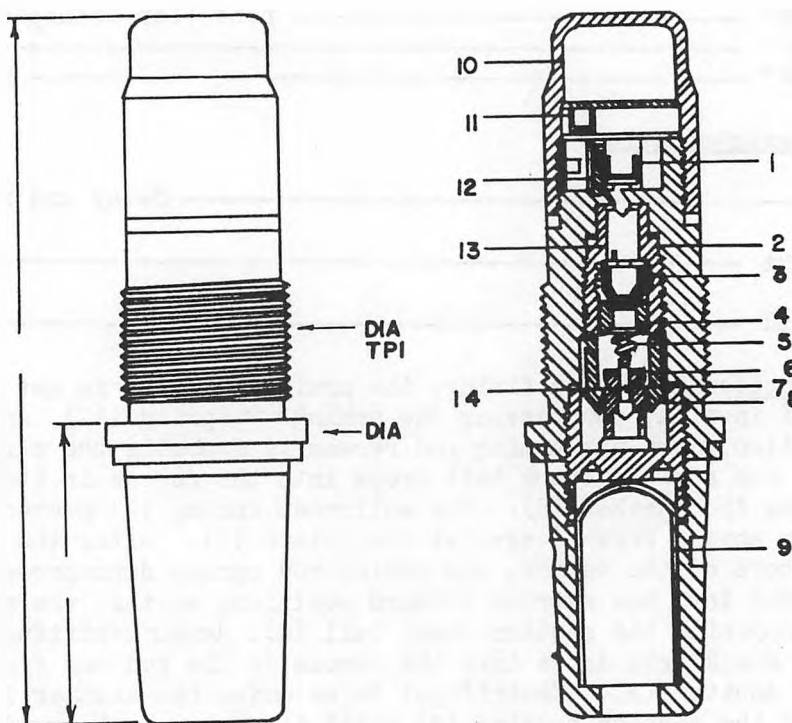
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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL DR-5

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
107mm corps guns M1910/30 and M1940 (M-60)	107mm AP-T -----BR-240
122mm corps guns M1931 and M1931/37 (A-19); tank gun M1943 (D-25); SP gun M1944 (D-258)	122mm AP-T -----BR-471 & BR-471B



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL KTD

a. General: The KTD (Kollektiv Trubochnikov, Donnyy: literally, "group of base-detonating, fuze designers") fuze is the safety type and is used with a concrete-piercing projectile in both 122mm and up to 280mm caliber sizes. The fuze consists of a striking mechanism, safety mechanism, a setting selector, and a detonating device, all assembled in a sturdy steel body which is provided with a left-hand thread for attachment to the projectile. Settings for the fuze are as follows:

Setting

"K" ----- none (for transportation)
"3" ----- delay
"0" ----- nondelay

b. Characteristics:

Action ----- delay and nondelay

Loaded weight ----- unknown

Body material ----- steel

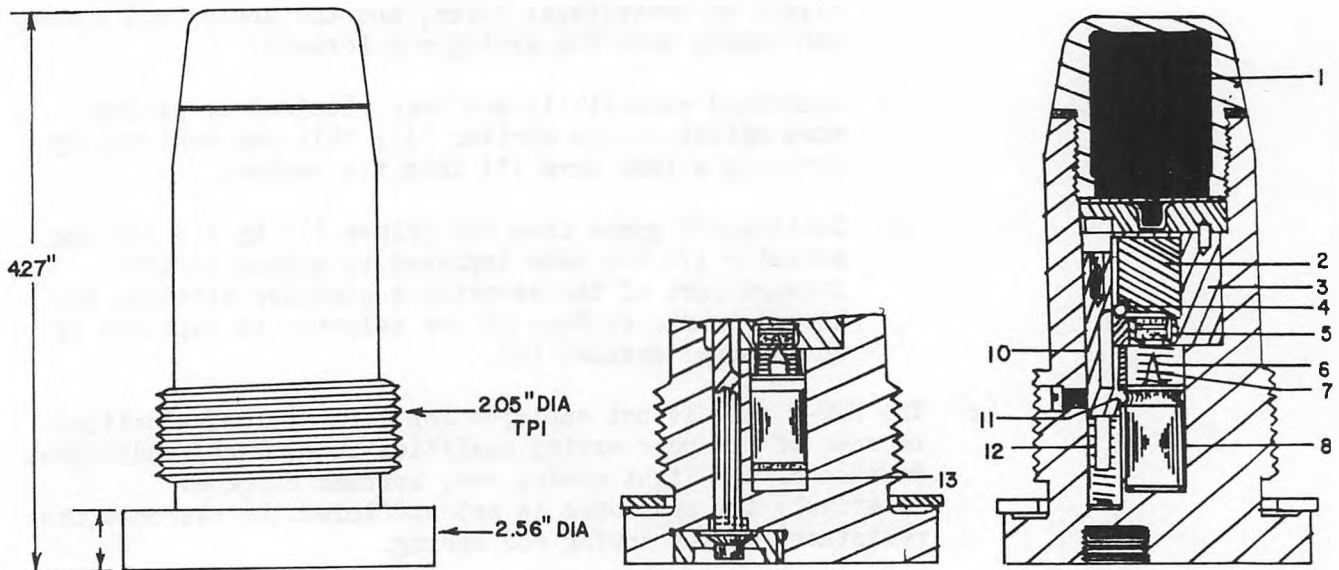
c. Functioning: Upon firing, the arming rod (10) is set back by the force of inertia, compressing the arming rod spring (12), and it comes into a position where the arming rod recess is opposite the striker check ball (11). The striker check ball drops into the recess in the arming rod and frees the striker (8). The anticreep spring (6) prevents the striker from moving forward against the primer (5). After the projectile leaves the bore of the weapon, the arming rod spring decompresses, forcing the arming rod into the extreme forward position, so that the recess in the rod is opposite the shutter check ball (4). Under centrifugal force, the shutter check ball drops into the recess in the rod and frees the centrifugal shutter (2). Centrifugal force moves the shutter in the guide way of the shutter housing (3) until it stops on the wall of the fuze body, thereby aligning the detonator (located in the shutter, but not shown) with the relay charge (9). Upon impact, inertia drives the striker forward, and the firing pin (7) strikes the primer. If the fuze is set for nondelay action ("0"), the flash from the primer passes along a groove in the setting selector (13) and ignites the detonator. The detonator activates the relay charge, which initiates the booster (1), and the booster detonates the projectile. When the fuze is set for delay action ("3"), the groove in the setting selector is turned 180 degrees away from the primer (5), and the direct passage from primer to detonator is closed. As a result the flame from the primer is transmitted through a powder delay element (located in the shutter housing, beside the primer; not shown in the drawing) to the detonator. The detonation wave then travels through the relay charge to the booster, just as in nondelay action.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL KTD

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
122mm corps guns M1931 and M1931/37 (A-19); tank gun M1943 (D-25) SP gun M1944 (D-25S)	122mm CP ----- G-471
152mm guns M1910/34 and M1935; gun-howitzer M1937 (ML-20); howitzers M1909/30 and M1938 (M10); tank howitzer M1938	152mm CP ----- G-530; G-540; G-545
203mm howitzer M1931 (B-4)	203mm CP ----- G-620
280mm mortar (howitzer) M1939 (BR-17)	280mm CP ----- G-675



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL KTD-2

a. General:

- (1) The KTD-2 (Kollektiv Trubochnikov, Donnyy, 2-y Obrazets: literally, "group of fuze designers, base-detonating, 2nd model") is an improved model of the KTD fuze. However, the KTD has not been replaced altogether, because the KTD-2 cannot be used for low-velocity fire. For this reason the KTD-2 fuze is employed for priming 122mm and 152mm CP gun shells. The KTD-2 is almost identical in construction to the KTD, except as described below:
 - (a) The steel arming rod of the KTD has been replaced in the KTD-2 by a lighter, aluminum arming rod, in order to improve the arming qualities at high muzzle and angular velocities. Because of the rod's lighter weight, there is less friction arising from the effect of centrifugal force, and the arming rod spring can easily move the arming rod forward.
 - (b) Increased sensitivity has been obtained by giving more weight to the striker (4); this was achieved by pressing a lead core (5) into its center.
 - (c) Sealing-off gases from the primer (3) by the setting selector (7) has been improved by adding to the forward part of the selector a circular section; the groove in the surface of the selector is replaced by an internal channel (6).
- (2) The KTD-2 fuze is not employed for fire at low velocities because of its poor arming qualities under such conditions. Because of the light arming rod, setback force at relatively low pressures is not sufficient to overcome the resistance of the arming rod spring.
- (3) Both the KTD and KTD-2 fuzes are completely safe, should spontaneous action of the primer (3) occur at both non-delay and delayed action settings. If the fuze is set for delayed action ("3"), premature action is impossible since the primer's explosion would cause a bulge in the thin floor of the centrifugal shutter housing (2) that would jam the centrifugal shutter (1) in the safe position.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL KTD-2

b. Characteristics.

Action ----- nondelay and delay

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. The KTD-2 is identical in functioning to the KTD.

d. Weapons and projectiles with which fuze can be used.

Weapons

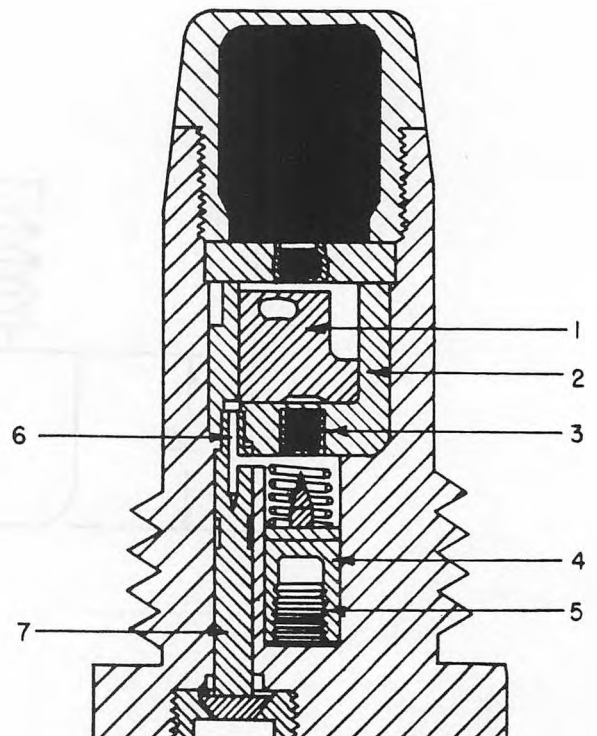
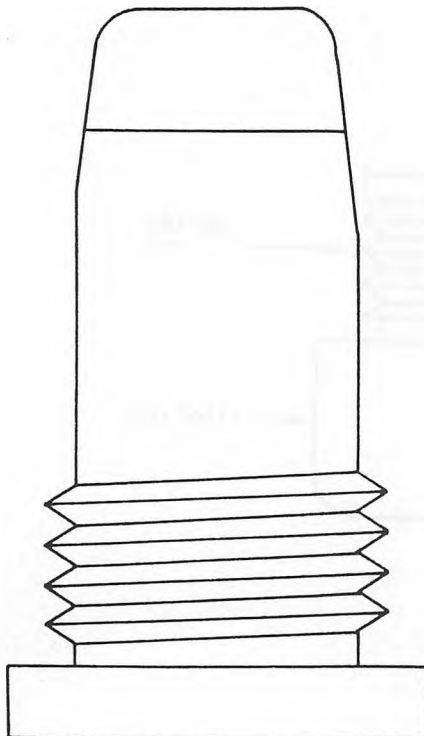
122mm corps guns M1931 and M1931/37
(A-19); tank gun M1943 (D-25); SP gun
M1944 (D-258)

152mm guns M1910/34 and M1935; gun-
howitzer M1937 (ML-20)

Projectiles

122mm CP -----G-471

152mm CP -----G-530; G-545



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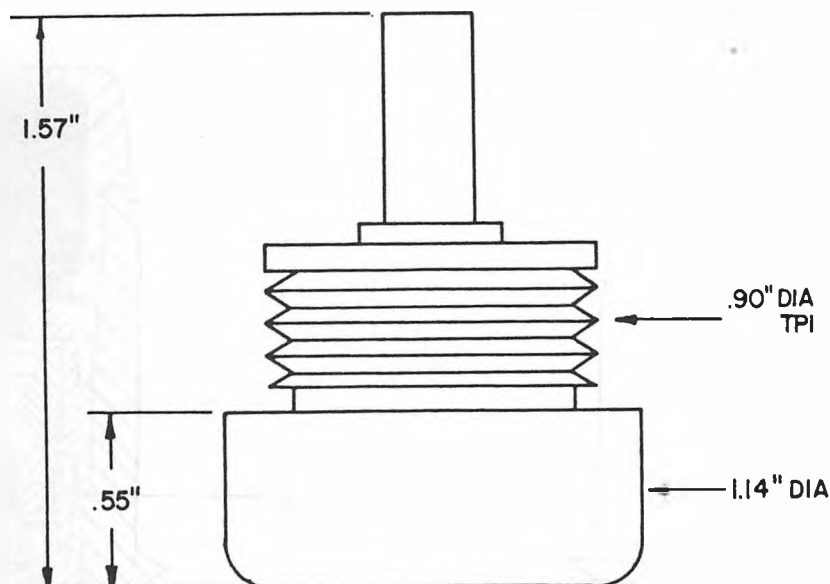
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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL KTMF

The KTMF fuze is known to exist, but information on it is quite limited. Reportedly a modification of a French base detonating fuze, it is used with the "Morskoy" ("Naval") semi-armor-piercing, high-explosive projectile in the 152mm howitzers M1938 (M-10) and M1943 (D-1). Its overall length is 4.60 inches; its maximum diameter is 2.70 inches; and its major thread diameter is 2.15 inches.

SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-1, MD-2, MD-3 & MD-4

These are earlier models in the series of MD (Malokalibernyy, Donnyy: small caliber, base detonating) fuzes. Although there is little available information on them, they are thought to be essentially very similar, but they are presumably obsolete. The MD-2 is illustrated below.



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-5

a. General. The MD-5 (Malokalibernyy, Donnyy, 5-y Obrazets: small caliber, base-detonating, 5th model) is the fifth model of the MD series of Soviet fuzes used with armor-piercing, high-explosive projectiles. Previous models of this series are numbered MD-1 through MD-4, and known later models are the MD-6, MD-7, MD-8, and MD-10. The MD-5 has the conventional design, and it incorporates a primer, a delay pellet, and a detonator in the explosive train. It is equipped with a removable tracer. An "initiator," which is inserted separately in the projectile, is used to initiate the main charge. This initiator is kept separate from the fuze and projectile, and it is inserted in the fuze well just prior to use. The Soviet safety classification of the MD-5 is "unsecured."

b. Characteristics.

Action -----short delay

Loaded weight ----- 110 grams (0.242 lb)

Body material ----- steel

c. Functioning. Upon firing, the tracer mixture (8) is ignited by the propellant gases. Flame from the tracer is prevented from entering the fuze body and causing premature detonation by the solid end of the fuze body. Simultaneously, the stirrup (5) sets back over the primer carrier (7) and clamps itself to the carrier. This action brings the primer (6) flush with the forward end of the stirrup in a position to impinge upon the firing pin (4) at impact. Upon impact, the stirrup and primer carrier set forward driving the primer against the firing pin. The primer ignites and emits a jet of flame through holes drilled in the firing pin holder and through a hole in the base plug (2) to the black powder delay pellet (3). The pellet burns long enough to permit the projectile to penetrate the armor; it then activates the detonator (1), which in turn detonates the explosive filler of the projectile. CAUTION: When armed, this fuze is extremely sensitive, and a light blow upon the nose of the projectile may detonate it.

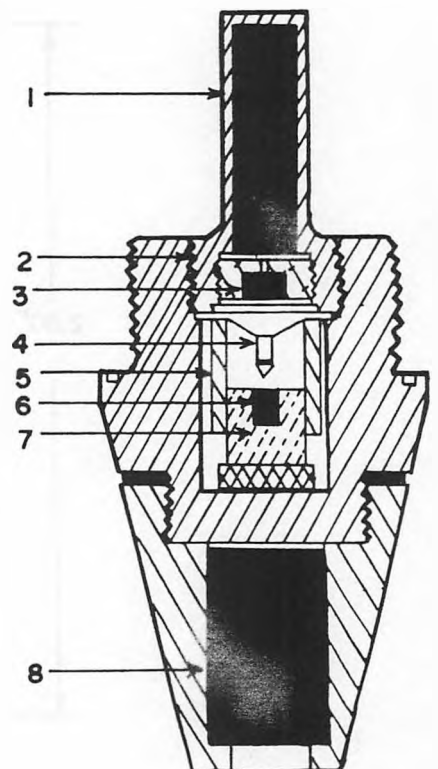
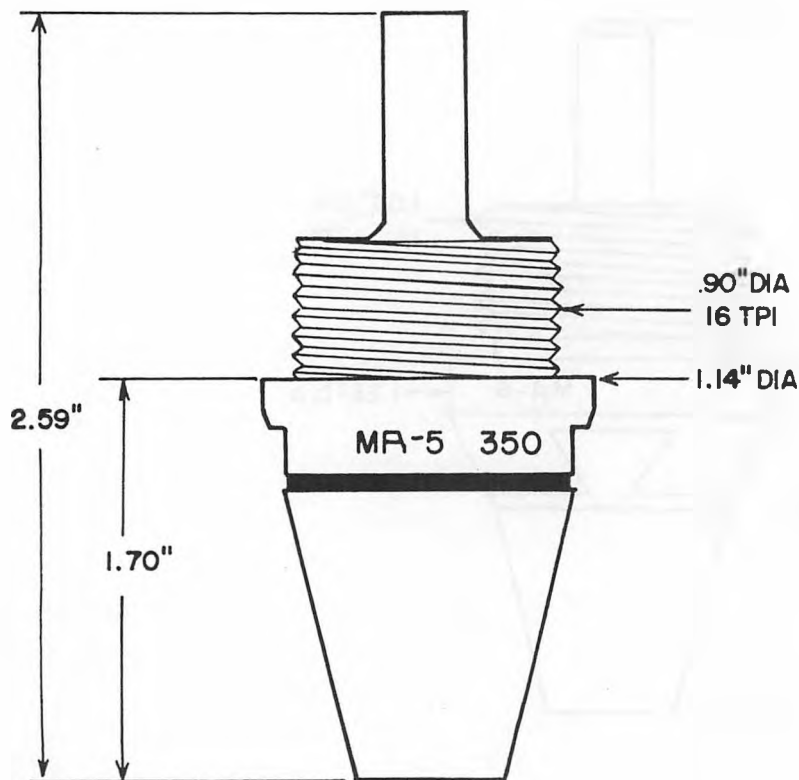
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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-5

d. Weapons and projectiles with which fuze can be used.

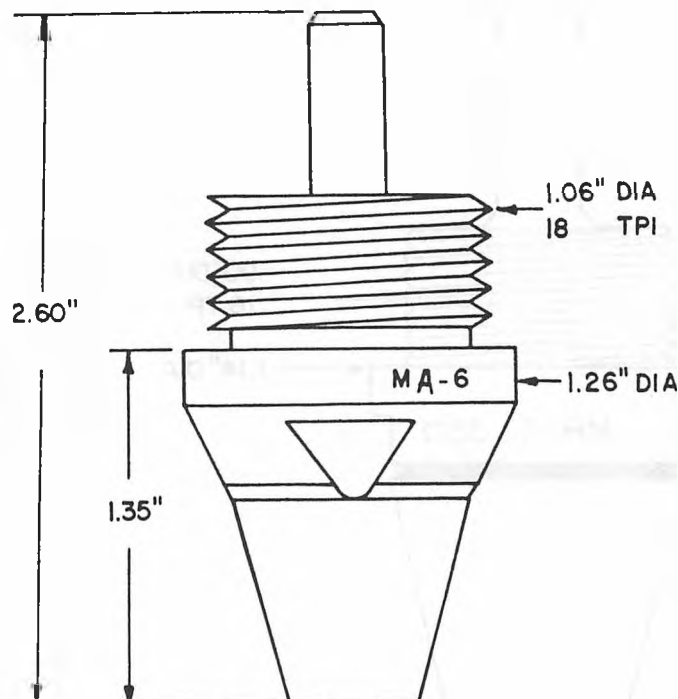
Weapons	Projectiles
45mm antitank guns M1932, M1937, and M1942; tank guns M1932, and M1934	45mm AP-T ----- BR-240; B-240
57mm antitank guns M1941 and M1943 (ZIS-2)	57mm AP-T ----- BR-271
76mm divisional guns M1902/30, M1933, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); tank guns M1938/39 (L-11) and M1939 (F-32); regimental guns (howitzers) M1927 and M1943	76mm AP-T ----- BR-350; BR-350A; BR-361



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-6

This is the sixth model of the MD series of Soviet fuzes used with armor-piercing, high-explosive projectiles. Previous models of this series are numbered MD-1 through MD-5, and known later models are MD-7, MD-8, and MD-10. The MD-6 differs from the MD-5 only in thread size. Accordingly, it cannot be used in the same projectiles as the MD-5. The designs of the two fuzes are otherwise identical. The MD-6 is interchangeable with the MD-8 and MD-10 fuzes. The main drawback of the MD-6 is the constant delay. This time cannot be varied according to the thickness and hardness of the armor plate target. The result is that the fuze action is not always effective against different armor plate thicknesses. The automatic retarding feature of the fuze models DR-5, MD-7, and MD-8 has partly corrected this fault.



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-7

a. General. The MD-7 (Malokalibernyy, Donnyy, 7-y Obrazets: small caliber, base-detonating, 7th model) is similar to the MD-5 in internal structure, but it differs from the MD-5 by having an anticreep spring, a tin foil safety disk, and an automatically regulated delay. The anticreep spring and the tin foil safety disk on the primer insure a high degree of safety from premature bursts of the shell while in the tube of the weapon. The Soviets classify the MD-7 as "safe". There are further differences in the shape of the tracer nut. This fuze is used with armor-piercing, tracer projectiles.

b. Characteristics.

Action ----- delay

Loaded weight ----- unknown

Body material ----- unknown

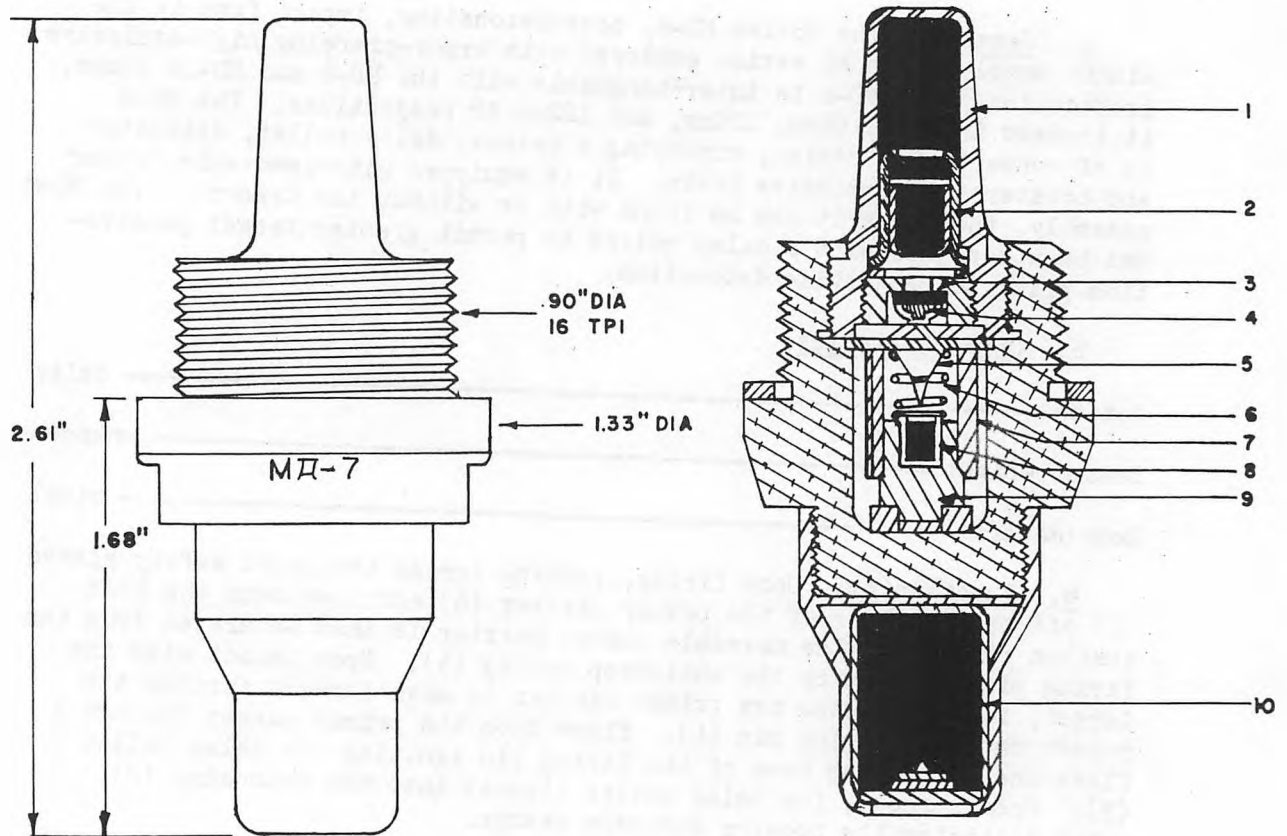
c. Functioning. Upon firing, the burning propellant ignites the tracer (10) and setback causes the stirrup (7) to move rearward, overriding the primer carrier (9), which is then held in the rearward position only by the anticreep spring (6). Upon impact with a target, the primer (8) and primer carrier move forward against the firing pin (5). The flash from the primer passes through a hole drilled in the firing pin holder and ignites the delay composition (3). The set-forward valve (4) moves forward, because of inertia, and remains in the forward position until the projectile has penetrated the armor. At this time the gases produced by the delay pellet force the valve rearward, thus sealing off the gases. This causes a rapid increase in pressure which in turn causes the delay element to burn almost instantaneously. When the delay element has burned through, it actuates the detonator (2), which detonates the booster (1).

d. Weapons and projectiles with which the fuze can be used.

Weapons	Projectiles
57mm antitank gun M1941 and M1943 (ZIS-2)	57mm AP-T ----- BR-270; BR-271
152mm gun M1910/34; gun-howitzer M1937 (ML-20)	152mm AP-T ----- BR-540

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-7



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-8

a. General. The Soviet MD-8, base-detonating, impact fuze is the eighth model in the MD series employed with armor-piercing high-explosive projectiles. The MD-8 is interchangeable with the MD-6 and MD-10 fuzes, it is used in 76mm, 85mm, 100mm, and 122mm AP projectiles. The MD-8 is of conventional design, employing a primer, delay pellet, detonator and booster-type explosive train. It is equipped with removable tracer assembly, therefore it can be found with or without the tracer. The MD-8 has been designed with a delay pellet to permit greater target penetration prior to projectile detonation.

b. Characteristics.

Action ----- delay

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. Upon firing, setback forces the split safety sleeve (7) off the shoulder of the primer carrier (6) and down onto the lead cushion ring (8). The moveable primer carrier is then separated from the firing pin (4) only by the anticreep spring (5). Upon impact with the target, inertia causes the primer carrier to move forward forcing the primer onto the firing pin (4). Flame from the primer passes through a flash channel at the base of the firing pin igniting the delay pellet (3). Upon burnout, the delay pellet flashes into the detonator (2) which initiates the booster and main charge.

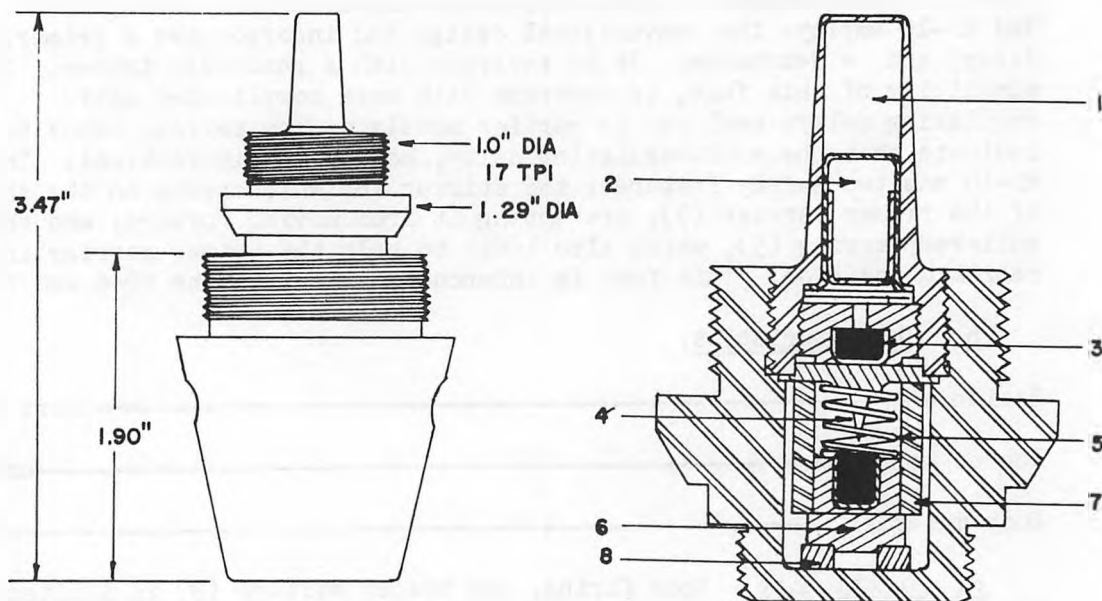
d. Weapons and projectiles with which the fuze can be used.

Weapons

The various types of ammunition which fit the 76mm, 85mm, 100mm, and 122mm guns are too numerous to list here.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-8



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-10

a. General. The MD-10 is the tenth model of the MD series of Soviet fuzes used with armor-piercing, high-explosive projectiles. Previous known models of this series are numbered MD-1 through MD-8. The MD-10 employs the conventional design and incorporates a primer, a delay, and a detonator. It is equipped with a removable tracer. The simplicity of this fuze, in contrast with more complicated self-regulating delays employed in earlier models of the series, tends to indicate that the self-regulating delay, has proven impractical. The MD-10 has two safety features: the stirrup (6) which rests on the shoulder of the primer carrier (7), preventing it from moving forward; and the anticreep spring (5), which also tends to hold the primer carrier in the rearward position. This fuze is interchangeable with the MD-6 and MD-8.

b. Characteristics.

Action -----short delay

Loaded weight -----unknown

Body material -----steel

c. Functioning. Upon firing, the tracer mixture (8) is ignited by the propellant gasses. The flame from the tracer is prevented from entering the fuze body, thus causing premature detonation by the solid end of the fuze body. Simultaneously, the stirrup (6) sets back over the primer carrier (7) and clamps itself to the primer carrier. The fuze is then armed, and the primer carrier is prevented from carrying the primer (10) forward only by the resistance of the anticreep spring (5). Upon impact, inertia causes the primer carrier to overcome the anticreep spring and move forward driving the primer into the firing pin (4). The flash from the primer passes through the flash channel (9) in the firing pin and ignites the delay element (3). The delay element burns through and actuates the detonator (2), which initiates the booster (1).

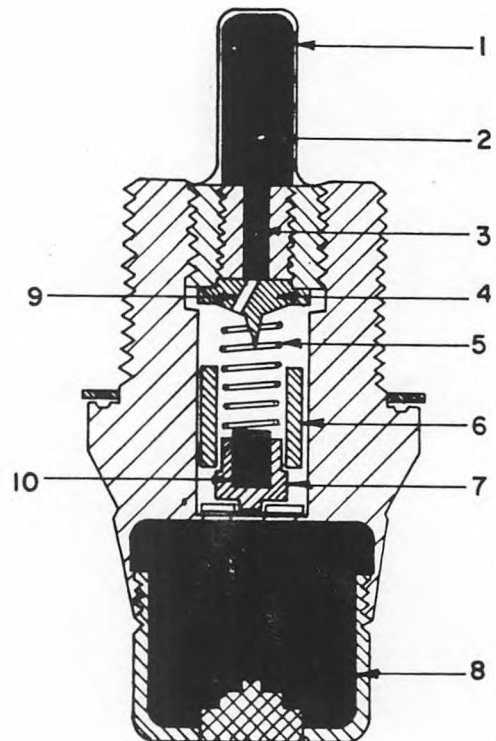
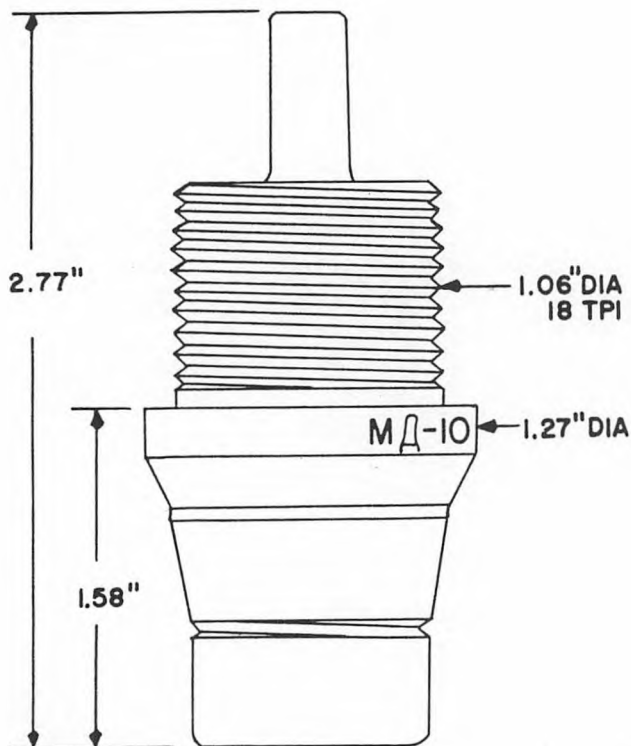
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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-10

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933 M1936 (F-22), M1939 (USV), and M1942 (ZIS-3; tank guns M1938/39 (L-11) and M1939 (F-32)	76mm AP-T ----- BR-350B
85mm antiaircraft gun M1939; tank guns M1943 (D-5T85) and M1944 (ZIS-S53); SP gun M1943 (D5-S85)	85mm AP-T ----- BR-365K; BR-365
122mm corps guns M1931 and M1931/37 (A-19); tank gun M1943 (D-25; SP guns M1943 (D-25S) and M1944 (A-19S)	122mm AP-T -----BR-471B



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MD-76

An MD-76 fuze is reported to exist and is said to be a conventional base-detonating type designed for use with 76mm armor-piercing projectiles. No further information on this fuze is available at this time.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MR-Z

a. General. The Soviet MR-Z base-detonating impact fuze is a set-back armed, bore-safe fuze that may incorporate a delay pellet. The fuze has a steel body, and it employs large pitch, modified-buttress type threads. It is employed on large caliber concrete-piercing and armor-piercing projectiles.

b. Characteristics.

Action -----delay

Loaded weight-----unknown

Body material-----steel

c. Functioning. The fuze diagram depicts the fuze in the armed condition. Prior to being fired, the arming sleeve (4) is in the forward position, resting against the primer housing (2). This effectively masks the firing pin, preventing contact with the primer. Upon being fired, set-back causes the arming sleeve (4) to move to the rear, coming the legs of the stirrup (5) inward so that they can expand into the internal groove cut into the arming sleeve (4), locking the sleeve to the movable firing pin (6). The firing pin is held away from the primer by the anticreep spring (3). When the projectile is fired, a lock pin (not shown) moves to the rear permitting the rotor to turn by centrifugal force. When the flash channel is opened between the primer and the detonator, a spring locks the rotor in position. Upon impact, inertia causes the firing pin with the added weight of the arming sleeve (4), to move forward, piercing the stab sensitive primer and initiating the explosive train.

d. Weapons and projectiles with which fuze can be used.

Weapons

130mm field gun M1946

Projectiles

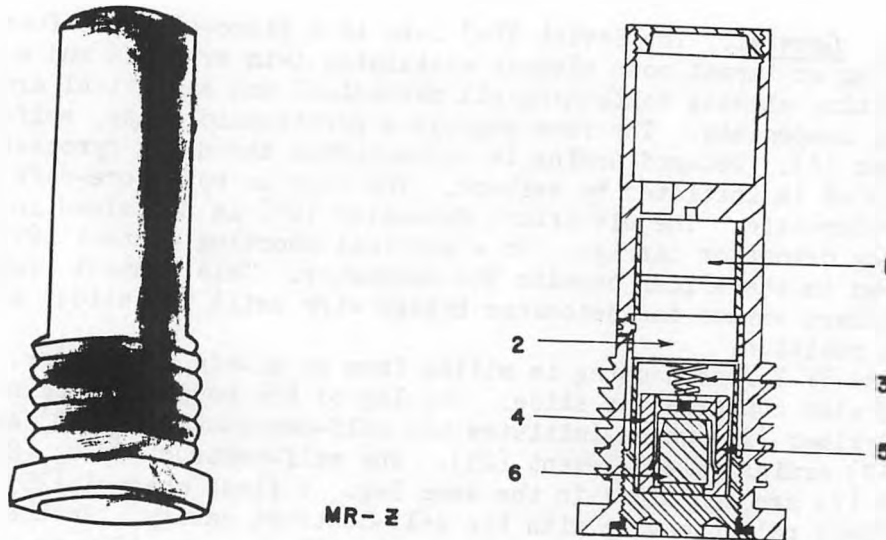
130mm APC-----BR-482, BR-482B

130mm CP-----G-482

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL MR-Z



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SOVIET, PIEZO-ELECTRIC, POINT-INITIATING, BASE-DETONATING, IMPACT FUZE:
MODEL VP-7

a. General. The Soviet VP-7 fuze is a piezo-electric fuze incorporating an impact nose element containing twin crystals and a base-detonating element containing all mechanical and electrical arming and firing components. The fuze employs a pyrotechnic delay, self-destruct element (8). Delayed arming is accomplished through a pyrotechnic delay (23) that is initiated by setback. The fuze is both bore-safe and detonator-safe. The electrical detonator (29) is contained in a vertical sliding detonator carrier. An electrical shorting contact (27) is mounted in the slider beneath the detonator. This contact provides a dead short across the detonator bridge wire until the slider is in the armed position.

The VP-7 fuze housing is milled from an aluminum cylinder. The vertical slot contains the slide. One leg of the housing contains the setback primer (17) which initiates the self-destruct delay (8) and detonator (7) arming delay element (23). The self-destruct delay (8) and detonator (7) are contained in the same leg. A flash channel (20) connects the flash pellet cavity with the self-destruct cavity. Another flash channel (21) connects with an external-milled groove (22) so that the delay arming pellet can be ignited. Ignition of the self-destruct delay train is accomplished by a flame passing through the four holes (9) in the self-destruct housing. The delay arming pellet (32) blocks the retraction of the locking pin (26), which holds the detonator slides in the safe position. When the pellet (32) is consumed, the pin (26) is forced into the evacuated cavity by the camming surface on the slider. The slide is further held locked by a setback pin (24) that holds the locking ball (11) in a groove in the slide. The ball (12) prevents the pin (24) from moving too far forward. The slide is powered downward by two springs that rest in the twin cavities (13). The cover (28) compresses the springs. A blast channel (6) leads from the self-destruct detonator (7) to the electric detonator (29) in the slide. When the self-destruct delay (8) burns out, the detonator (7) is initiated. The detonating wave passes through the channel (6) and simultaneously detonates the electric detonator, which initiates the explosive train. A steel block (5) protects the booster lead (3) should the electric detonator prematurely detonate with the slide in the unarmed position.

The piezo-electric nose element employs the warhead body as one electrical lead and an inner cone as the other. Contact is made with the electric detonator by the pin (1) and the integral stud on the closing cap (10). The contact (29) completes the circuit when the slide is armed.

b. Characteristics.

Action -----piezo-electric instantaneous
Loaded weight ----- not applicable, internal, nonremovable
Body material -----aluminum and plastic

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SOVIET, PIEZO-ELECTRIC, POINT-INITIATING, BASE-DETONATING, IMPACT FUZE:
MODEL VP-7

c. Functioning. Upon firing, setback causes the weighted flash primer (17) to move rearward compressing its spring (18) and impales itself on the fixed firing pin (19). The resulting flame travels up the flash channel (20), ignites the self-destruct delay element (8) through the holes (9) in the delay housing, and continues on up the flash channel (21), where the flame spreads in the groove (22) and ignites the arming delay pellet (23) that begins to burn.

Simultaneously, the setback pin (24) moves rearward against its spring (14) depositing the ball (12) in the fuze cavity (15). The slight rotation of the rocket plus the cam surface on the slider causes the slide lock bail (11) to move inward, unlocking one side of the slider. As the arming delay pellet (23) is consumed, the slider moves downward under action of the twin compressed springs (23), camming the lock pin (26) into the evacuated pellet cavity (23). When completely unlocked the slide moves downward, aligning the electric detonator (29) with the booster lead (3) and further aligning the self-destruct blast cavity (6) with the hole in the slide leading to the detonator (29). With the downward movement of the slider, the shorting pin (27) is disconnected from the stud on the closing cap and the electric detonator contact (29) moves with the stud. The fuze is now mechanically and electrically armed.

Upon impact with a target the twin piezo-electric crystals in the nose element are stressed. This generates a pulse of current that travels through the inner and outer cones of the ogive, through the pin (1), through the fuze housing, onto the bridge wire of the electric detonator. The detonator is initiated, which functions the explosive train.

If the rocket does not impact with a target, the self-destruct delay (8) burns into the self-destruct detonator (7) which flashes through the channel (6) to detonate the electric detonator, initiating the rocket explosive train in the normal manner.

d. Weapons and projectiles which with fuze can be used.

Weapons

Projectiles

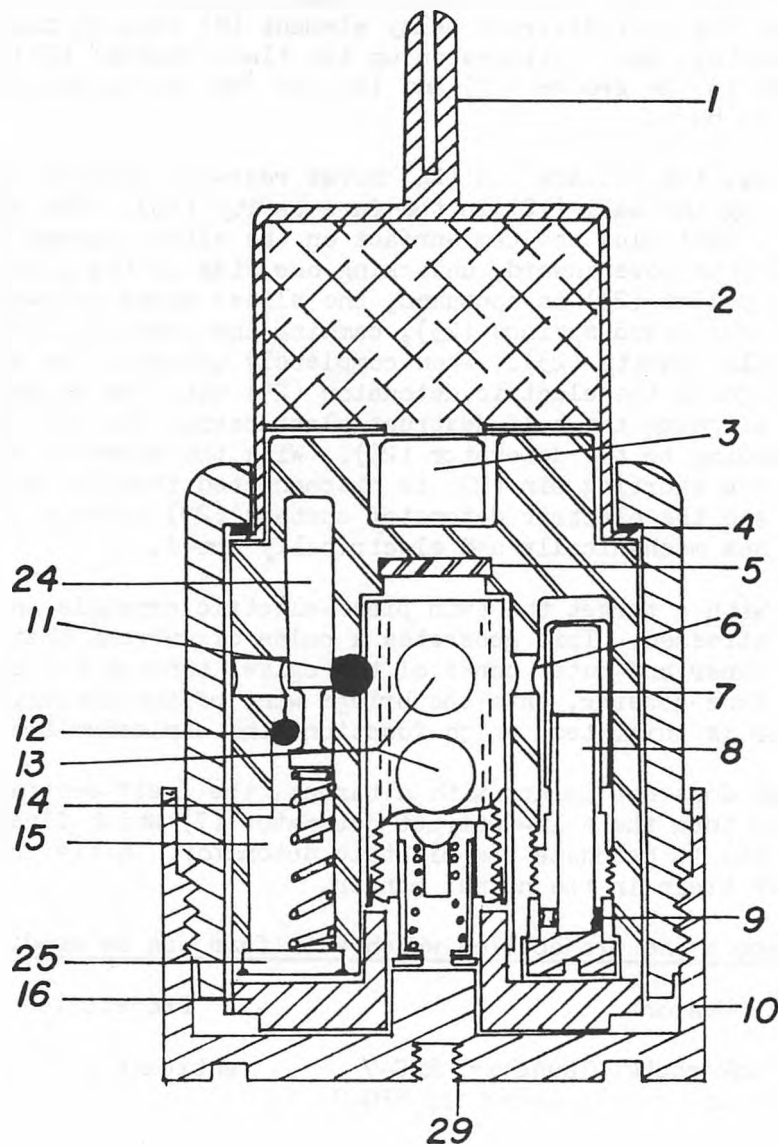
Soviet antitank rocket launcher, RPG-7
Rumanian antitank rocket launcher, RPG-7

antitank rocket PG-7

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SOVIET, PIEZO-ELECTRIC, POINT-INITIATING, BASE-DETONATING, IMPACT FUZE:
MODEL VP-7

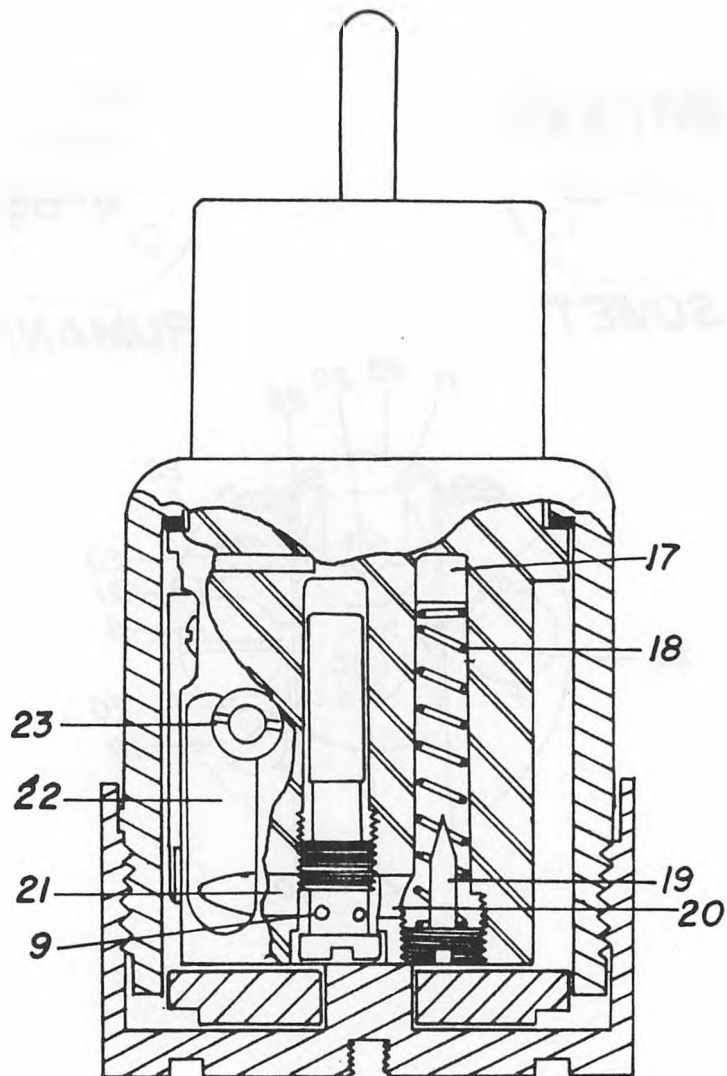


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SOVIET, PIEZO-ELECTRIC, POINT-INITIATING, BASE-DETONATING, IMPACT FUZE:
MODEL VP-7



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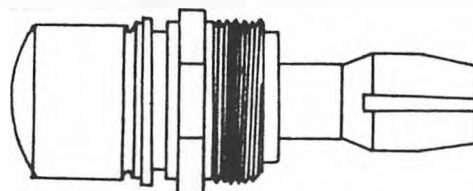
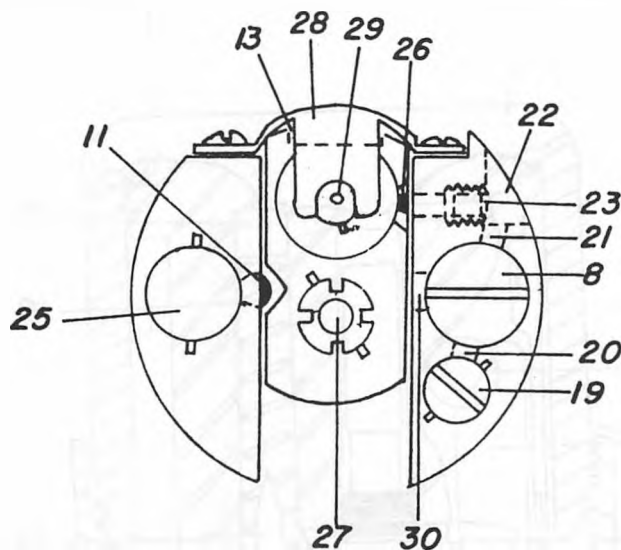
SOVIET, PIEZO-ELECTRIC POINT-INITIATING, BASE-DETONATING, IMPACT FUZE:
MODEL VF-7



SOVIET



RUMANIAN



PIEZO ELECTRIC NOSE ELEMENT

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 5DM

a. General. Information on the 5DM is based entirely on documentary sources, and it is extremely limited.

b. Characteristics.

Action -----delay

Loaded weight ----- unknown

Body material -----unknown

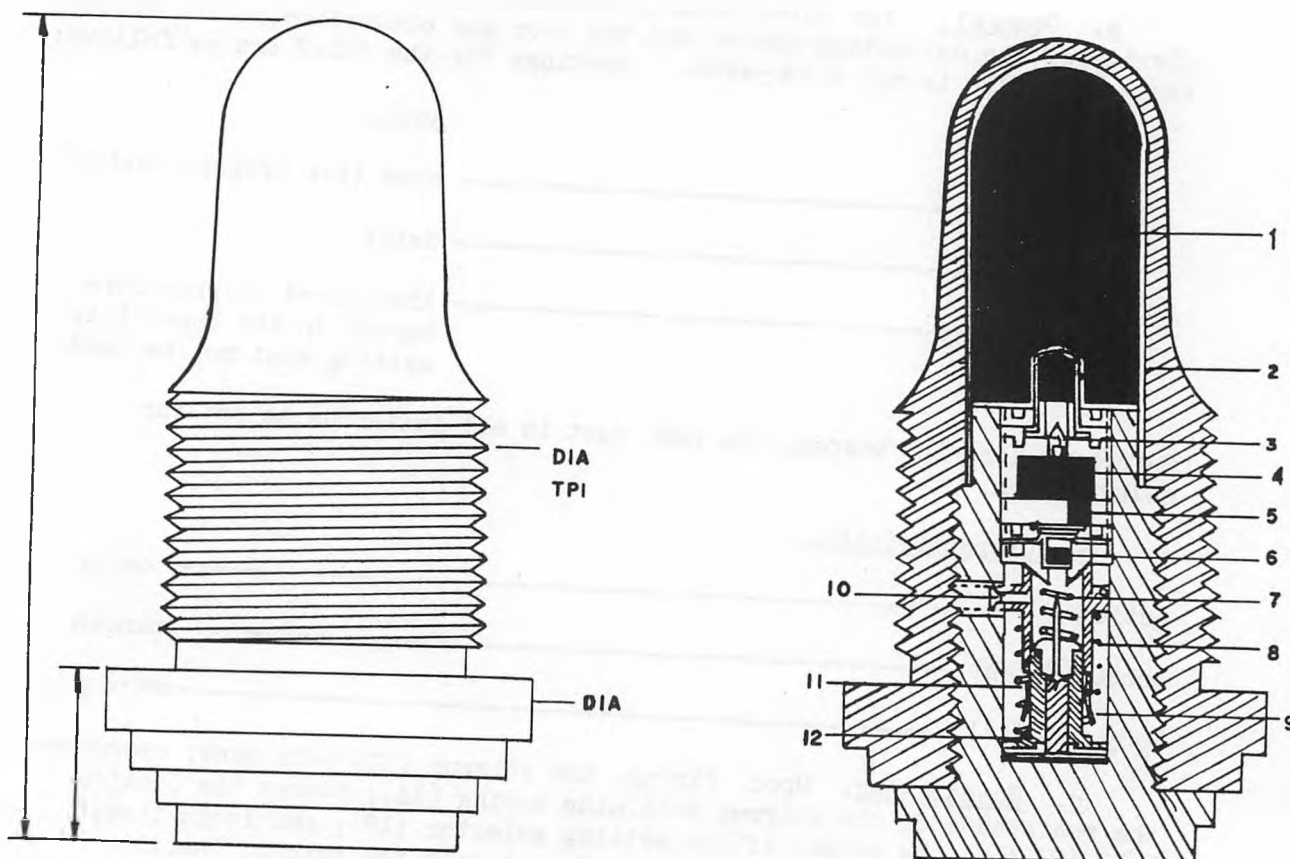
c. Functioning. Apparently, upon firing, setback causes the stirrup (8) to shear the safety pin (10), to move rearward, and to override the striker clip (9), an action which secures the stirrup to the striker (12). Then only the anticreep spring (7) prevents forward movement of the striker. Upon impact with the target, inertia causes the striker to overcome the anticreep spring and drive the firing pin (11) forward into the primer (6). The primer emits a jet of flame through a flash channel, igniting the delay element (5). When the delay burns through, it ignites the powder charge (4) which forces the firing pin (3) into the detonator (2). The detonator activates the booster (1), which detonates the main charge.

d. Weapons and projectiles with which the fuze can be used.

Information on this subject is not available.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 5DM



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 5DT-2

a. General. The 5DT-2 is an inefficient fuze because of the complexity of its detonating device and the poor gas obturation of its closing cap. This fuze is not bore-safe. Settings for the 5DT-2 are as follows:

<u>Setting</u>	<u>Action</u>
"II" -----	none (for transportation)
"3" -----	delay
"M" -----	likelihood of premature bursts in the bore; this setting must not be used

Before loading the weapon, the fuze must in all instances be set for delay action.

b. Characteristics.

Action ----- delay

Loaded weight ----- unknown

Body material ----- unknown

c. Functioning. Upon firing, the stirrup (12) sets back; overcomes the resistance of the stirrup retaining spring (14); pushes the locking ball (8) into the socket of the setting selector (10); and locks itself to the stirrup retaining spring. On impact with the target, inertia causes the striker (9) to overcome the anticreep spring (7) and to drive the impact firing pin (13) forward into the primer (6). The flash from the primer passes through the powder delay pellet (11) to the powder magazine (5). Under the pressure of the gases produced by the burning of the powder magazine, the detonator firing pin (4) breaks through the brass disk (3) and pierces the detonator (2). The resulting explosion then detonates the booster (1).

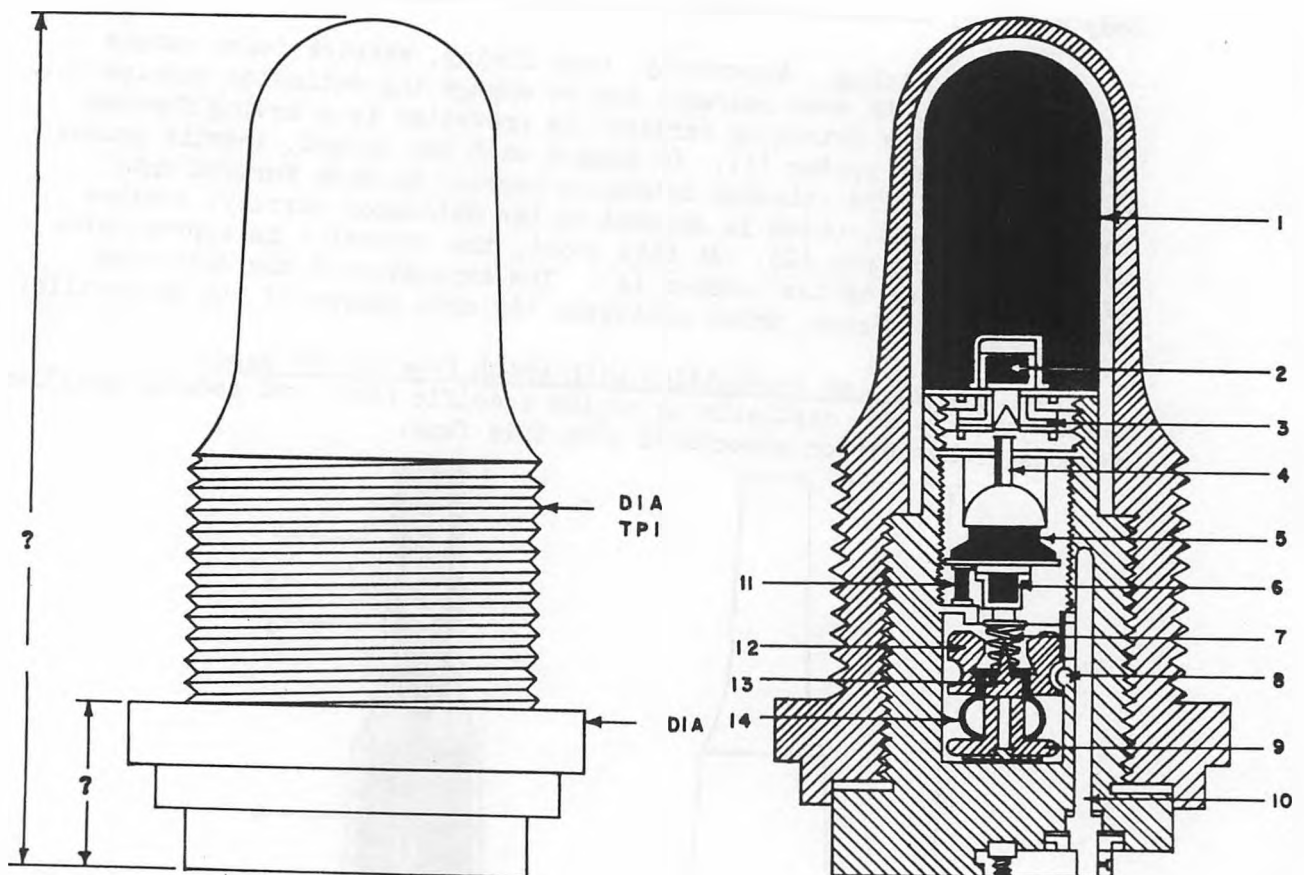
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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 5DT-2

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
203mm howitzer M1931 (B-4)	203mm HE ----- F-620
280mm mortar (howitzer M1939 (BR-5)	280mm HE ----- unknown
305mm howitzer M1915	305mm HE ----- unknown



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 7DT

a. General. Information on the 7DT is limited and unverified. The fuze appears to be a conventional base-detonating type, and it is reportedly used in medium and large caliber naval and coastal artillery in both high-explosive and armor-piercing projectiles.

b. Characteristics.

Action ----- nondelay

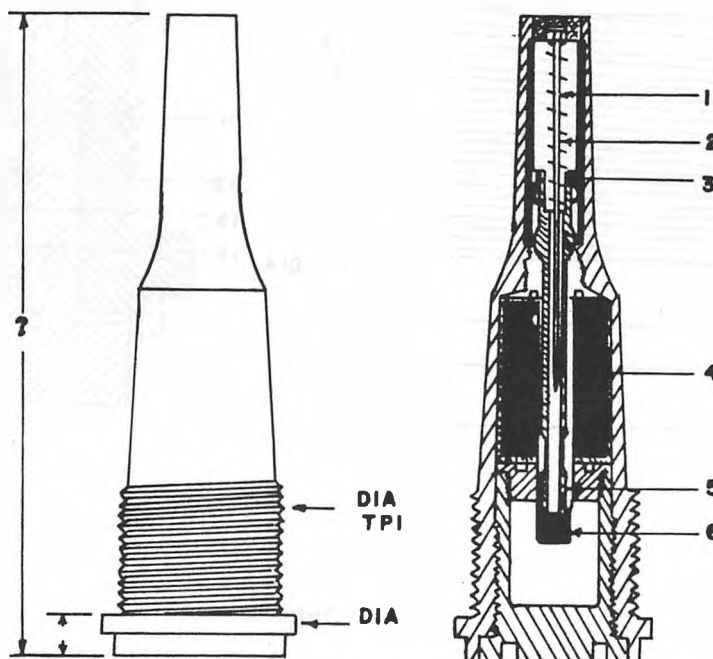
Loaded weight ----- unknown

Body material ----- unknown

c. Functioning. Apparently, upon firing, setback force causes the stirrup (3) to move rearward and to engage the detonator carrier (5). During flight the detonator carrier is prevented from moving forward by the anticreep spring (1). On impact with the target, inertia causes the stirrup and the attached detonator carrier to move forward until the detonator (6), which is secured to the detonator carrier, strikes the fixed firing pin (2). At this point, the detonator is approximately in the center of the booster (4). The explosion of the detonator initiates the booster, which activates the main charge of the projectile.

d. Weapons and projectiles with which fuze can be used.

Information is not available as to the specific naval and coastal artillery weapons or ammunition associated with this fuze.



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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 10 DT

a. General. The 10 DT is unusual in that it has an automatic mechanism which enables it to function as either a nondelay or delay action fuze without setting previous to firing. This feature enables the fuze to detonate a projectile almost instantaneously upon encountering a thin-skinned target, or after a delay upon encountering a thick-skinned target, thus allowing the time necessary to embed the projectile in the target before detonation. The 10 DT, which is fired only in large caliber weapons, differs slightly for each type weapon in which it is used. This difference is necessitated by the difference in terminal velocity, which dictates the tensile strength of the shutter wire (12) that controls the action of the fuze (see c below).

b. Characteristics.

Action ----- nondelay and delay

Loaded weight ----- unknown

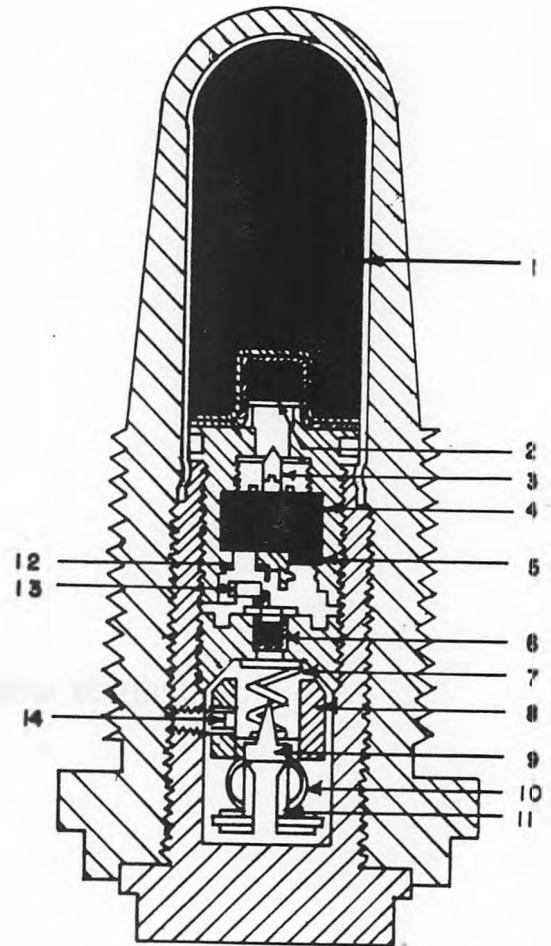
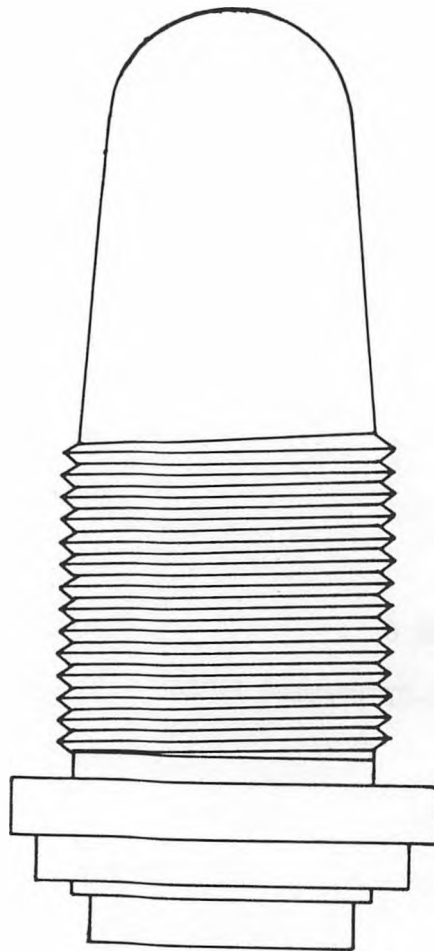
Body material ----- unknown

c. Functioning. Upon firing, the stirrup (8) sets back, cutting the shear pin (14). The stirrup safety clamp (10) is crushed, and the stirrup remains in the rear, fixed with the striker (11) as one piece. The striker, though its forward movement is no longer prevented by the stirrup, is held to the rear by the anticreep spring (7) until impact. On impact with a thick skinned target, the stirrup and striker move forward, carrying the impact firing pin (9) into the primer (6). At the same time the metal shutter (13) cuts the shear wire (12), and sets forward to plug the direct flash channel that leads to the black powder pellet (4). The flash from the primer (6) ignites the delay pellet (5) which burns through and ignites the black powder pellet. Gases from the burning black powder pellet drive the detonator firing pin (3) into the detonator. The detonator actuates the booster (1), which in turn explodes the projectile. On impact with a thin-skinned target, the force of inertia is not sufficient for the metal shutter (13) to cut the shear wire (12) and plug the direct flash channel to the black powder pellet (4). Therefore, the primer flash is transmitted directly to the black powder pellet, by passing the delay pellet (5), so that the action of the fuze is accelerated.

d. Weapons and projectiles with which fuze can be used. The 10 DT is used with armor-piercing and concrete-piercing projectiles in weapons of 152mm or larger. The specific weapon and projectile which use the 10 DT has not been identified.

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SOVIET, BASE-DETONATING IMPACT FUZE: MODEL 10 DT



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CHAPTER 6

CHINESE COMMUNIST, BASE-DETONATING FUZES

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CHINESE COMMUNIST BASE-DETONATING FUZES

Chinese Communist (ChiCom) base-detonating fuzes are all exact copies of their Soviet counterparts. In many instances it appears that the ChiCom fuzes were made on the same machines that produced the Soviet fuzes. The only difference noted was in the marking of the fuzes. For this reason all general remarks made on Soviet base detonating fuzes are equally applicable to the ChiCom fuzes.

Since the ChiCom munitions industry has displayed the ability to produce quality explosive ordnance from indigenous designs, it is expected that new base detonating fuzes will appear based entirely upon native designs. This trend is evident in projectiles and point-detonating fuzes. However, Soviet munitions designs will continue to be employed as standard guides.

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CHICOM, BASE-DETONATING IMPACT FUZE: TYPE 2 (ARTILLERY)

a. General. The ChiCom base detonating fuze, Type 2, is an exact copy of the Soviet DBR-2 base detonating impact fuze. Differences were noted only in the paint and markings. For a more complete description of the ChiCom Type 2 see the Soviet DBR-2.

b. Characteristics.

Action ----- impact inertia

Loaded weight ----- 372 grams (0.81 lb)

Body material ----- steel

c. Functioning. See the Soviet DER-2 for functioning information.

d. Weapons and projectiles with which fuze can be used.

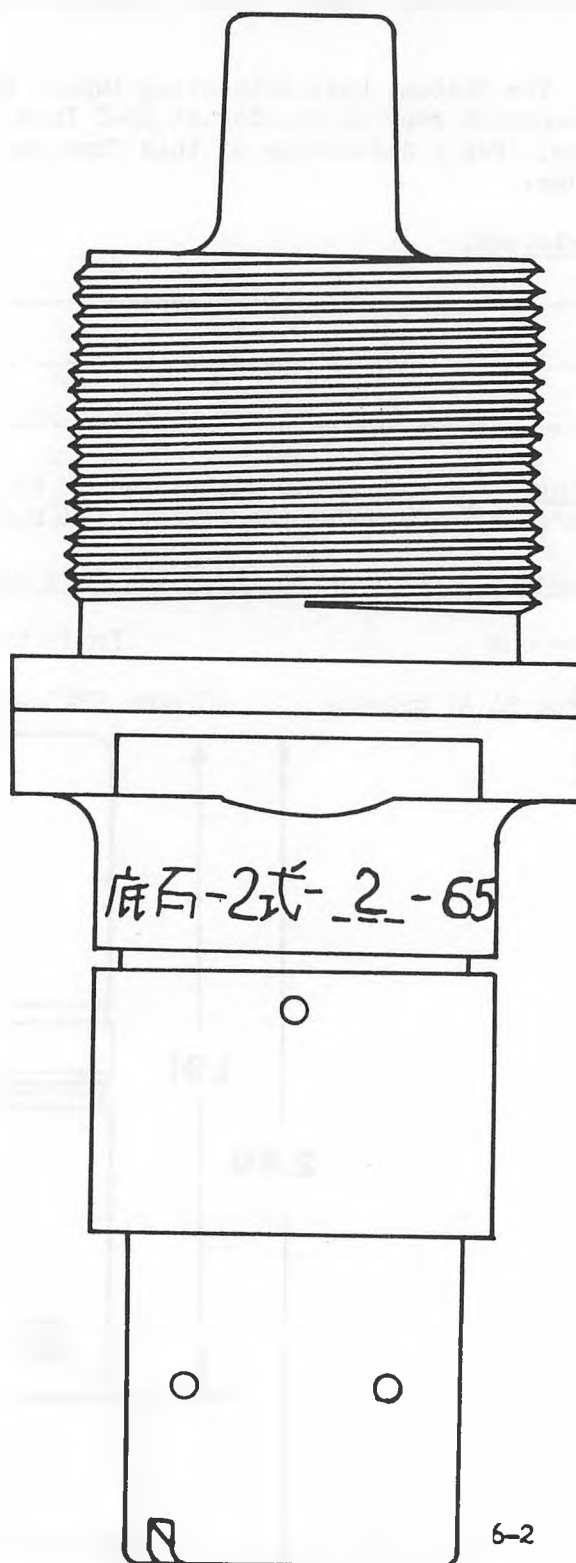
85mm ChiCom field gun type unknown

85mm APBC-T-----367 Series

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CHICOM, BASE-DETONATING IMPACT FUZE: TYPE 2 (ARTILLERY)



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CHICOM, BASE-DETONATING IMPACT FUZE: TYPE 2 (GRENADE LAUNCHER)

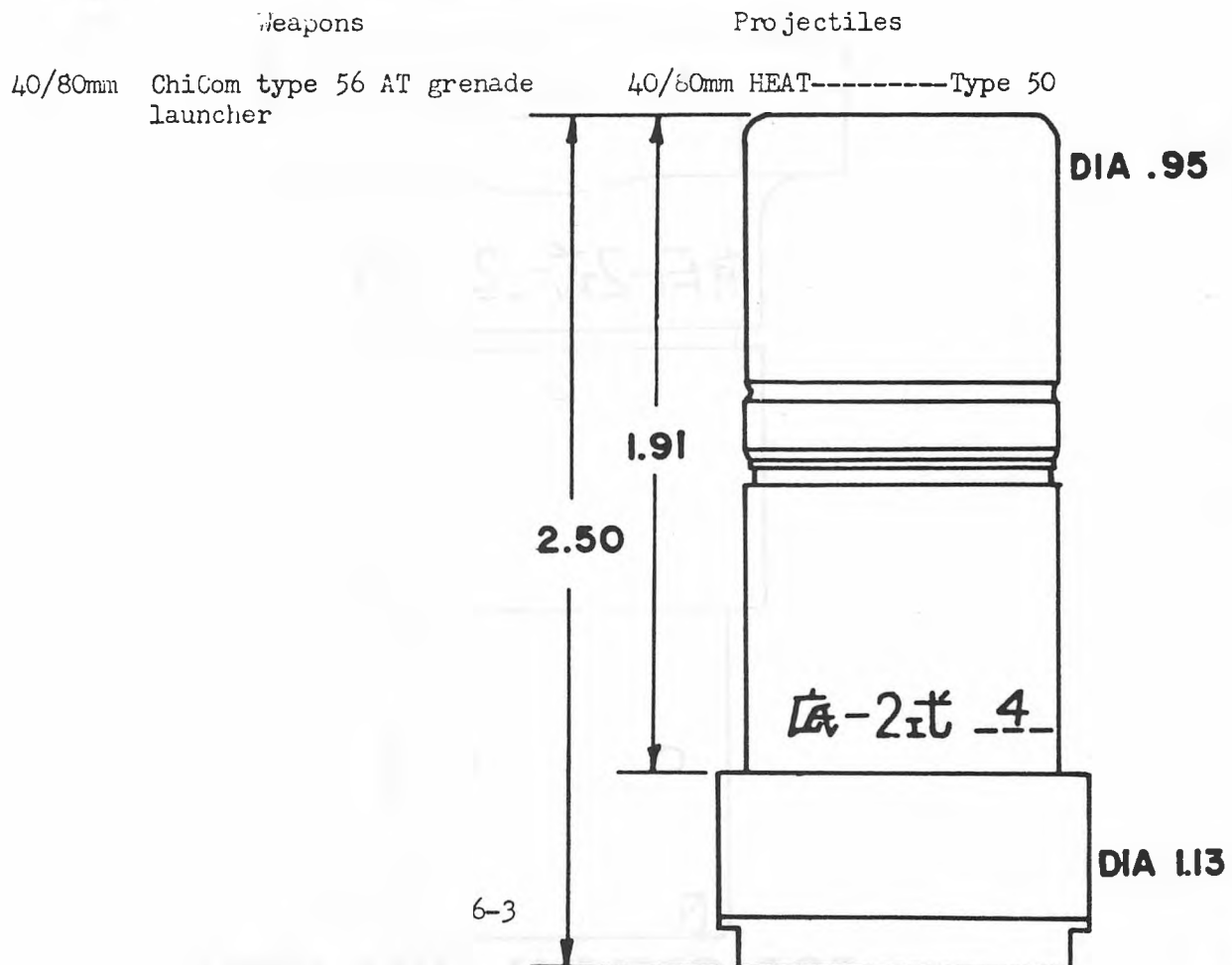
a. General. The ChiCom, base-detonating impact fuze, Type 2 (grenade launcher) is an identical copy of the Soviet DK-2 fuze employed in the Soviet PG-2 grenade. For a discussion of this fuze, see the entry under the Soviet DK-2 fuze.

b. Characteristics.

Action ----- instantaneous
 Loaded weight ----- 98 grams (0.23 lb)
 Body material ----- aluminium

c. Functioning. For a detailed discussion of the functioning of this fuze, see the entry made under the Soviet DK-2 fuze.

d. Weapons and projectiles with which the fuze can be used.



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CHAPTER 7

MISCELLANEOUS, COMMUNIST BLOC, BASE-DETONATING FUZES

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MISCELLANEOUS, COMMUNIST BLOC, BASE-DETONATING FUZES

This chapter about miscellaneous, Communist bloc, base-detonating fuzes is necessary due to the increasing number of base-detonating fuzes credited to countries in the bloc other than the major suppliers; Soviet Russia and Communist China. Fuzes have been recovered which are native to Poland and North Vietnam. In addition, fuzes produced in North Korea and Rumania that are copies of their Soviet counterparts have been recovered and examined.

Since the Rumanian VP-7, piezo-electric, point-initiating, base-detonating fuze is an exact copy of the Soviet VP-7, and markings appear in Gothic letters and Arabic numerals, which are readily identifiable in English, it is not necessary to make a separate listing of the fuze under the heading of Rumanian fuzes. The fuze is adequately described under the heading of its Soviet counterpart.

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NORTH KOREAN, BASE-DETONATING IMPACT FUZE: TYPE 2 (GRENADE LAUNCHER)

a. General. The North Korean, base-detonating impact fuze, type 2 (grenade launcher) is practically an identical copy of the Soviet DK-2 and the ChiCom type 2 employed in the PG-2 grenade. The only major difference is in the body material. The North Korean fuze employs cadmium-plated steel instead of aluminum, as in the case of its Soviet and ChiCom counterparts. Workmanship and close adherence to tolerances leave little to be desired. The fuze is entirely waterproof. For a discussion of the fuze employed in the PG-2, boosted grenade, see the entry under the Soviet DK-2.

b. Characteristics.

Action ----- instantaneous

Loaded weight ----- 105 grams (0.23 lb)

Body material ----- steel

c. Functioning. For a detailed discussion of the functioning of this fuze, see the entry for the Soviet DK-2 fuze.

d. Weapons and projectiles with which the fuze can be used.

Weapons

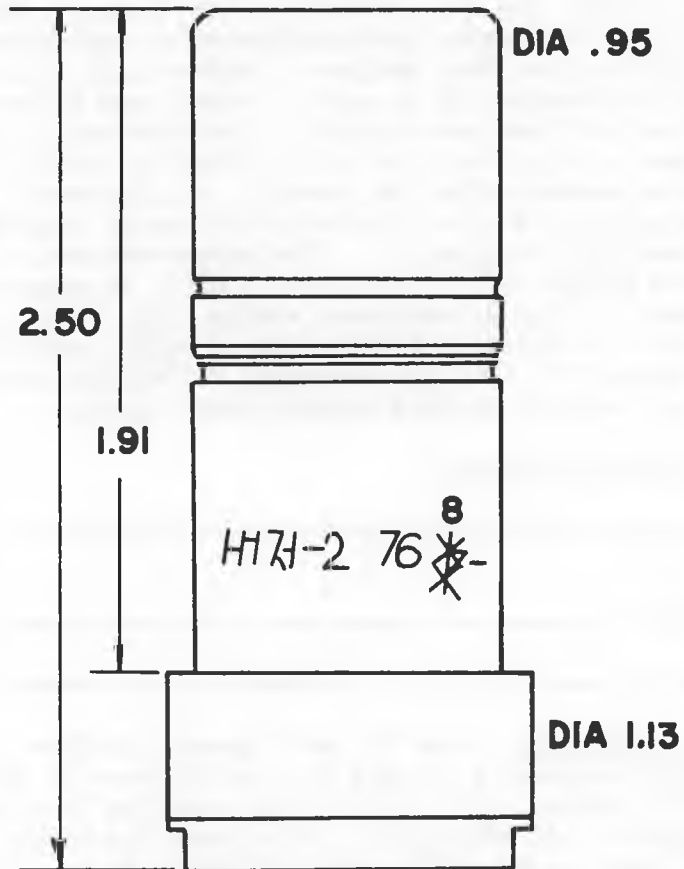
Projectiles

40/80mm North Korean copy of RPG-2

40/80mm HEAT grenade

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NORTH KOREAN, BASE-DETONATING IMPACT FUZE: TYPE 2 (GRENADE LAUNCHER)



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NORTH VIETNAMESE, BASE-DETONATING IMPACT FUZE: MODEL B-50

a. General. The B-50 base-detonating fuze is employed in the B-50 boosted grenade. The fuze presents no new features worthy of note. However, it is bore-safe, nondetonator-safe, and reliable. It is an impact, inertia fuze that employs a jump-out pin as its lone safety device.

The fuze housing (2) is made of steel, and it is an integral part of the warhead-to-stabilizer boom adapter. The booster cup (1) and lock plug (3) are made of aluminum; the cup (1) fits inside the plug (3). The plug has two wrench flats for assembly and disassembly. The internal fuze housing (11) is made of aluminum; directly houses the stainless steel, inertia firing pin (5). The primer-detonator (8) is secured by an aluminum adapter (9). The firing pin (5) is separated from the primer-detonator (8) by an anticreep spring (10). Prior to firing, the firing pin is retained in a locked state by the brass jump-out pin (6) and spring (7). The fin assembly of the B-50 grenade retains the jump-out pin within the fuze housing until firing.

b. Characteristics.

Action ----- nondelay (impact
inertia)

Loaded weight ----- N/A

Body Material ----- steel and aluminum

c. Functioning. When the B-50 grenade is fired, inertia causes the fin assembly to shear a pin and move to the rear of the wooden boom. This uncovers the jump-out pin (6) which is expelled from the fuze housing (2), by the jump-out pin spring (7). This frees the firing pin (5) which is held away from the primer/detonator (8) only by the anticreep spring (10). The fuze is now armed. When the grenade impacts, the inertia firing pin (5) moves forward and presses the stab-sensitive primer/detonator (8). This initiates the booster (1) and the shaped-charge warhead of the B-50 grenade.

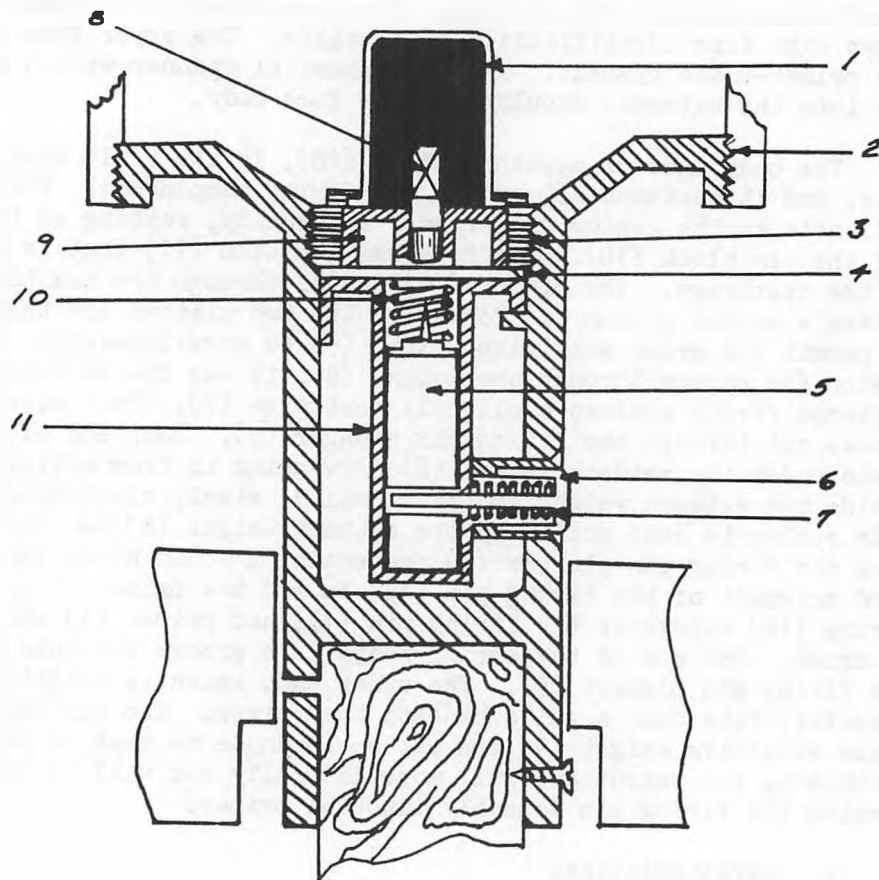
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
50/100mm VC/NVA grenade launcher B-50	50/100mm HEAT grenade----Type B-50

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NORTH VIETNAMESE, BASE-DETONATING IMPACT FUZE: B-50



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POLISH, BASE-DETONATING IMPACT FUZE: MODEL DC-1

a. General. The Polish DC-1 base-detonating, impact, inertia fuze functions nondelay upon direct impact with a target. It is an extremely safe, very reliable fuze which incorporates a graze-sensitive weight. In the unfired condition, all internal components are interlocked, effectively producing handling and bore-safety. The fuze is not detonator-safe. Following the practice of the French STRIM rifle grenade fuze, the DC-1 arms only upon the positive application of high pressure propelling gases on the rear diaphragm (12) and setback.

The fuze is a completely sealed, waterproof assembly, made from a machine made steel cylinder with closing disks at each end. The fuze body is roll crimped at each end to hold the disks in place. The disks are further sealed with shellac. The lower disk is embossed in three lines with fuze identification information. The upper fuze disk contains the primer-flash element. Two hemispherical spanner wrench grooves are cut into the external shoulder of the fuze body.

The body made of machined steel (18), is the rigid element of the fuze, and it contains all arming and firing components. The lower disk (12) acts as the arming diaphragm. Internally, resting on the diaphragm and the cam block (10) there is a small piston (11) that is forced upward by the diaphragm. The piston (11) passes through the cam block (10) and forces a second piston (8) forward. The two pistons are then disengaged to permit the graze sensitive weight (9) to move laterally. The second piston (8) passes through the weight (8); it has its enlarged head positioned firmly against a slightly bent wire (7). This wire rests in a groove cut through the firing pin plunger (5). Each end of the wire (7) rests under the setback weight (6) preventing it from moving downward. Inside the setback weight (6) is a coiled, steel, clock-type spring (4). This spring is held coiled by the setback weight (6) and is positioned over the firing pin plunger (5) presenting a solid block against any forward movement of the firing pin (13) toward the primer (1). An anticreep spring (14) separates the firing pin (13) and primer (1) when the fuze is armed. One end of the spring rests in a groove cut into the face of the firing pin plunger (5). The other end, which is slightly larger in diameter, fits over a guide beneath the primer. The cam block (10) and graze sensitive weight (9) are cut on an angle so that at near flat angles of impact, the weight (9) will move laterally and will be cammed forward, forcing the firing pin assembly into the primer.

b. Characteristics.

Action ----- nondelay

Loaded weight ----- 57 grams (0.12 lb)

Body material ----- steel

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POLISH, BASE-DETONATING IMPACT FUZE: MODEL DC-1

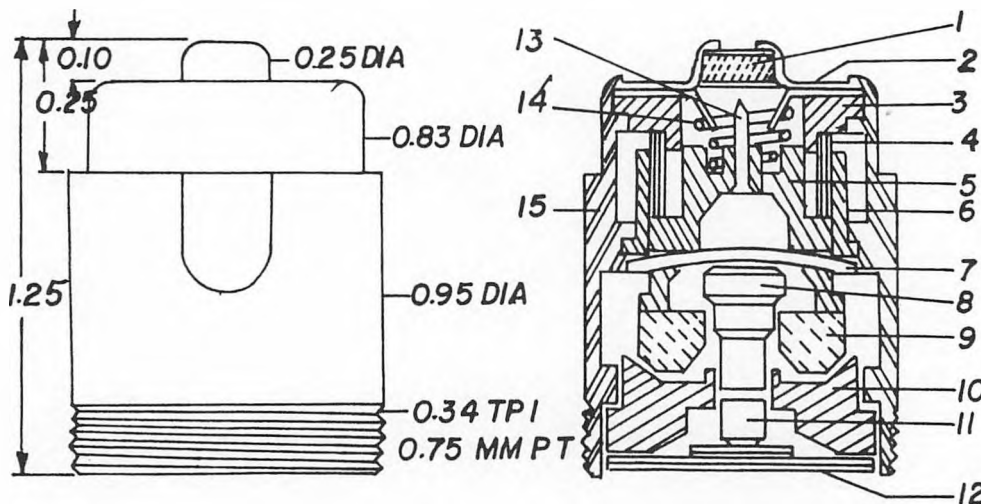
c. Functioning. There are no fuze safety devices to be removed prior to firing. When the high-pressure, propelling gases force the diaphragm (12) inward, the lower piston (11) moves forward against the upper arming piston (8). The upper piston bends the wire (7) inward causing the wire ends to be pulled inward and unblocks the setback weight (6). At this time the two pistons are disengaged, permitting free, lateral movement of the graze sensitive weight (9). Setback causes the weight (6) to move downward, releasing the coiled safety spring (4), which uncoils and expands into the fuze cavity. The positive block has now been removed from the firing pin (13), and the fuze is armed.

Upon impact, the firing pin assembly (5) compresses the anticreep spring (14), and the sharp pointed firing pin (13) pierces the stab-sensitive primer (1) initiating the grenade explosive train. If the grenade impacts at a flat angle or attempts to ricochet, the graze sensitive weight (9) will move laterally, because of inertia, and it will be moved forward by the cam block (10), moving the firing pin assembly (5) into the primer (1).

d. Weapons and projectiles with which fuze can be used.

Polish rifle grenade, HEAT FGN-60

Polish rifle grenade, fragmentation, F-IN-60



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Yes
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CHAPTER 8

SOVIET, TIME AND COMBINATION FUZES

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SOVIET, TIME AND COMBINATION FUZES

The Soviets possess and distribute to the Communist bloc a complete range of time fuzes and combination and impact fuzes. These fuzes are both the mechanical time and powder time train types.

Tactically, the major portion of these fuzes are employed in an antiaircraft role. However, it appears that an increasing proportion are being employed for air burst on antipersonnel missions. Currently, both powder time train fuzes and mechanical time fuzes have been seen only in medium caliber projectiles, such as the 85mm and 100mm. This suggests that the antiaircraft guns are being employed as terrestrial artillery on certain fire missions.

The greater majority of the time fuzes recovered have been the powder time train T-5 and the mechanical time VM-30. Both of these fuzes require a wide mouth projectile capable of accepting a 2.03 inch diameter intrusion at 9 threads per inch. Standard point-detonating fuzes with their 1.40 inch intrusion at 10 threads per inch cannot be fitted to the wide mouth 85mm O-365 projectile and the 100mm F-412 projectile. The projectiles may be employed interchangeably between antiaircraft and terrestrial field artillery weapons.

Powder time train fuzes employing pressed black powder in time rings are highly affected by altitude and humidity. Burning rates may vary enough to render the fuze ineffective for antiaircraft purposes. For this reason most countries now employ mechanical time fuzes in the antiaircraft role. However, mechanical time fuzes are more expensive and more difficult to manufacture. The Soviets took cognizance of the advantages and disadvantages of powder time train fuzes, and they initiated a redevelopment program. Since the pressed black powder delay train produces the undesirable factor, this material is being replaced by a nongaseous, dichromate, burning mixture that is relatively unaffected by the antiaircraft envelope. Because of this redevelopment, powder time train fuzes have retained their position within the Soviet fuze family.

It is known that the Soviets have developed mechanical time and powder time train fuzes that are not covered in this document. The VM-60 and TM-16L are notable examples. There have not been sufficient fuze fragments collected to positively identify these fuzes.

It is also known that the Soviets and other members of the Communist bloc possess variable time (VT) fuzes. There is evidence that this class of fuze may have been employed in Vietnam, but this has not been solidified by fuze fragments or fuzes.

Currently, no time fuzes or combination fuzes of ChiCom manufacture have been recovered. It is certain that such fuzes exist, if only for antiaircraft purposes, but all dud ChiCom 85mm and 100mm antiaircraft projectiles recovered have been equipped with Soviet fuzes.

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL D

a. General. The Model D fuze is provided with a threaded protective cover (not shown). The initial setting of the fuze, when issued, is "K", for canister action. When the shell is loaded the protective fuze cover is removed (right-hand thread); and the fuze is set by turning the bottom time ring until the desired graduation of the scale is in line with the setting index on the platform of the fuze body. The burning time may be adjusted from 1 through 21 seconds. The time mechanism consists of two time rings. On the external surface of the bottom time ring there is engraved a scale of 100 or 130 sight graduations; the value of each graduation is 50 m., and, in addition to this, two lines are marked with the Russian letters "K" and "YA", which correspond to the settings of the fuze for canister effect and for nondelay (impact) action, respectively. The graduation scale of the fuze corresponds to the sights of the 76mm regimental gun (howitzer) M1927. Special firing tables are required to use the fuze in other 76mm guns. The Model D fuze is believed to be obsolete.

b. Characteristics.

Action ----- time and nondelay

Loaded weight ----- 400 grams (0.882 lb)

Body material ----- brass

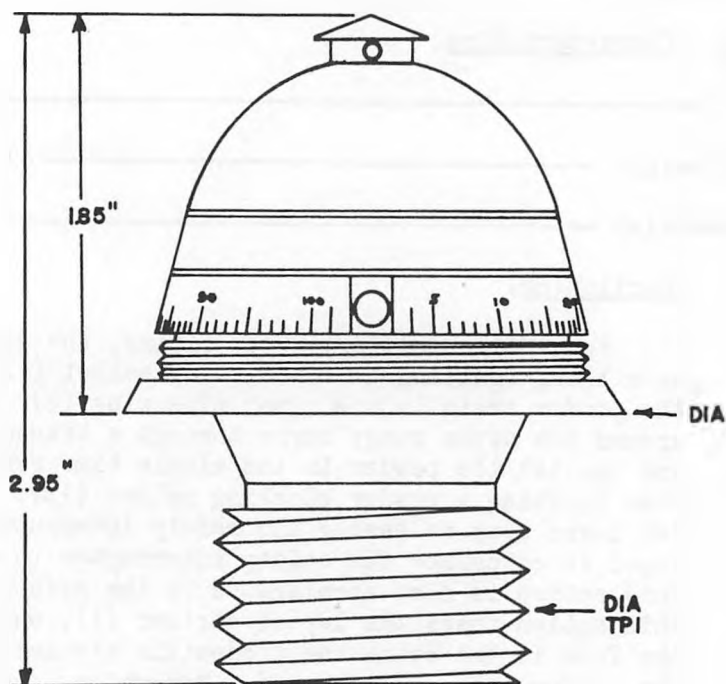
c. Functioning. No reliable information on the functioning of this fuze is now available.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm divisional guns M1902/30, M1933, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); regimental gun (howitzer) M1927; tank guns M1927/32 and M1938/39 (L-11); mountain gun (howitzer) M1909	76mm shrapnel ----- Sh-354 incendiary ----- Z-354S

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL D



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL D-1

a. General. The maximum burning time of the D-1 fuze varies from 35 to 45 seconds, depending on the conditions under which it is used. The bottom time ring (6) has a scale of 125 graduations; the minimum setting on this scale is 10 graduations on the older D-1 fuzes and 5 graduations on the newer ones. If the fuze is set between 115 and 125, the impact mechanism will not arm. Nondelay (impact) action is obtained by setting the bottom time ring at "YA"

b. Characteristics.

Action ----- time and nondelay

Loaded weight ----- 430 grams (0.946 lb.)

Body material ----- brass

c. Functioning.

(1) For a time setting: Upon firing, the setback striker (11) sets back, igniting the initiating pellet (12), which ignites the powder train in the upper time ring (2). The flame travels around the upper ring; burns through a transmission hole; and ignites the powder in the middle time ring (4), at the same time igniting a powder blocking pellet (13). The blocking pellet burns away releasing the safety interrupter (3). Centrifugal force causes the safety interrupter to move outward. This action is also accelerated by the safety interrupter spring. This action frees the impact striker (1), which will activate the fuze in the event the projectile strikes an object before the powder train is consumed. Meanwhile, the flame from the middle time ring passes into the lower time ring (6) through the flash channel (14) and then through a flash channel in the safety rotor (8), which has been centrifugally rotated to align its flash channel with the detonator pellet (9). The flame thus reaches the detonator pellet (9), which activates the booster (10), exploding the projectile filler.

(2) For nondelay (impact) action (setting "YA"): The "YA" setting positions the time rings so that the maximum burning time of 45 seconds is assured. Until the moment of impact the fuze functions exactly as described above. Upon impact the impact striker (1) is driven rearward forcing the firing pin (5) into a primer (7) aligned with the flash channel of the safety rotor (8). This primer passes the flame to the detonator pellet (9), which then sets off the booster (10) and the projectile filler.

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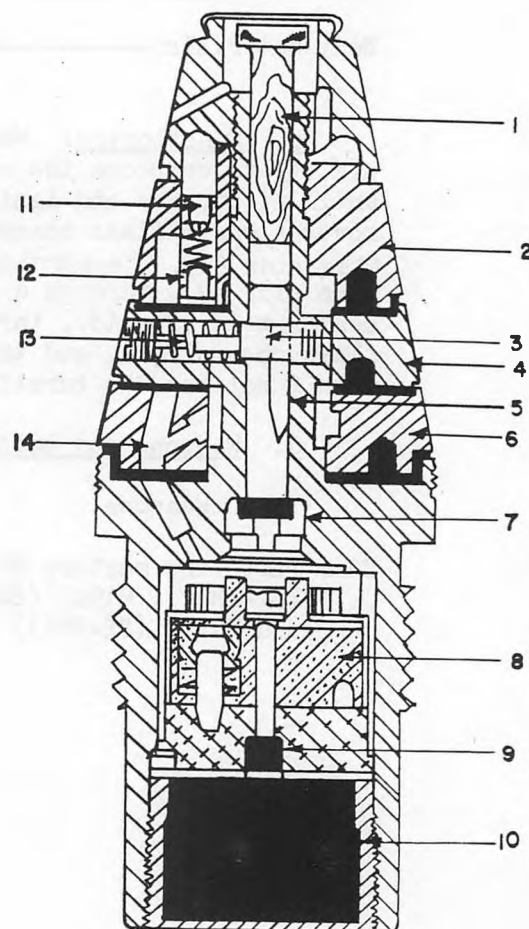
d. Weapons and projectiles with which fuze can be used.

Projectiles

107mm Frag-HE ----- OF-420

122mm Frag-HE ----- OF-462
OF-471; OF-471N

152mm Frag-HE ----- OF-530; OF-540



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL OM-82

a. General: The OM-82 is a powder train time fuze used to ignite the expelling charge in the Soviet 82mm mortar propaganda shells. The base portion of the body is threaded, apparently to receive a safety cap. No data is available on the safety cap.

b. Characteristics:

Action ----- time

Loaded weight ----- unknown

Body materials ----- brass and steel

c. Functioning: When the round is fired, setback causes the firing pin (1) to overcome the resistance of the spring (2) and to move rearward until it strikes and ignites the primer (4). The flash from the primer moves along a flash channel until it ignites the powder train in the upper time ring (3). The burning powder train follows a path within the upper time ring (3), through a passage to the center time ring (5), within the center time ring (5), through a passage to the lower time ring (6), to flash channel (8), and then ignites the powder magazine (7), which in turn functions the bursting charge of the projectile.

d. Weapons and projectiles with which fuze can be used:

Weapons

Projectiles

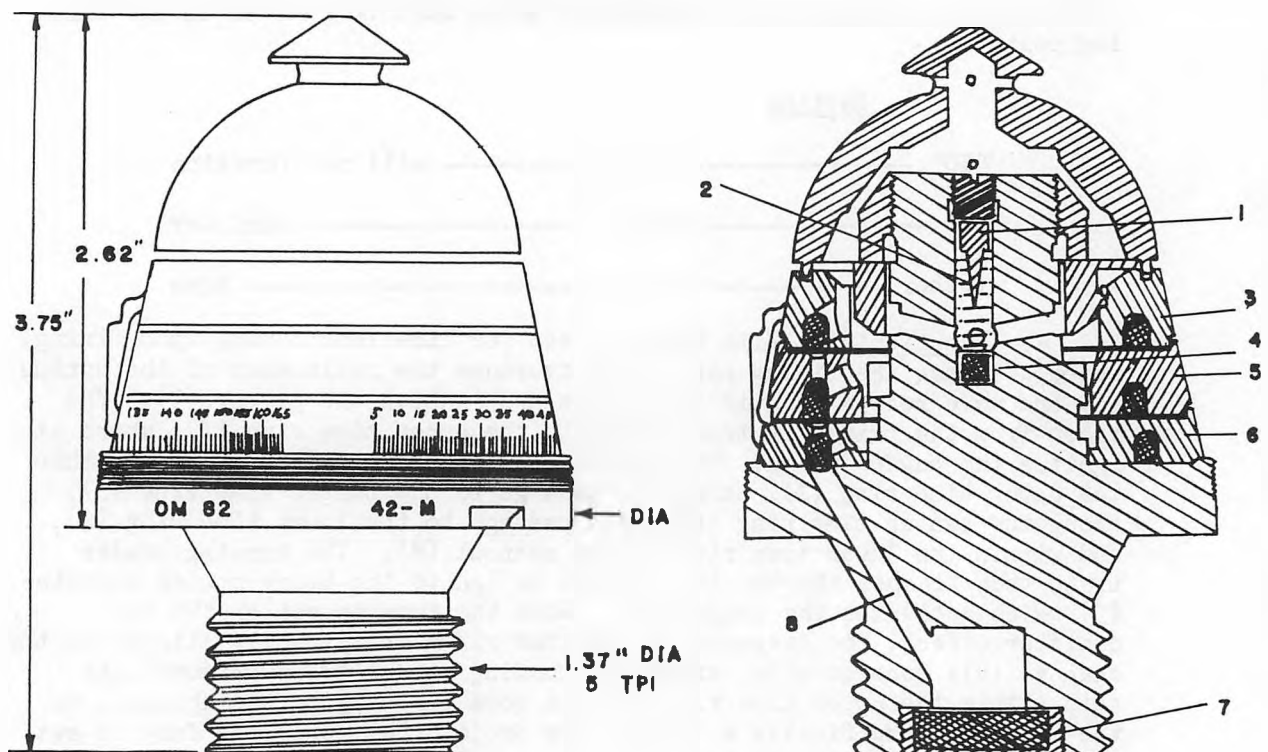
82mm battalion mortars M1937
(82-BM37), M1941 (82-BM41),
and M1943 (82-BM43)

82mm Propaganda-----A-832

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL OM-82



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SOVIET, POINT-DETONATING TIME FUZE: MODEL T-3

a. General. The T-3 fuze is used with shrapnel shells in 76mm divisional, tank, and antiaircraft guns. It is used for both ground and antiaircraft fire. Construction of the T-3 fuze is simple in comparison to fuzes in the 22-second series and other time fuzes, but it is subject to failure during flight. This fuze has a setting scale graduated up to 32. This fuze will arm at a distance of 30 to 60 feet from the muzzle of the gun and has a maximum burning time of 21.7 seconds. The T-3 fuze does not have percussion action upon impact. The base portion of the fuze body is threaded for a safety cap which must be removed at the firing point.

Setting

"YD" ----- will not function

"K" ----- canister

(Other) ----- time

b. Functioning. With the fuze set for time functioning upon firing, setback causes the firing pin (1) to overcome the resistance of the spring (6) and move rearward until it strikes and ignites the primer (7). The flash from the primer is transmitted to the upper time ring (2), where it ignites the powder train. The burning powder train follows a path within the upper time ring (2), through a passage to the center time ring (3), along the center time ring through a passage to the lower time ring (4), and within the lower time ring to the channel (8). The burning powder train then flashes through the channel to ignite the black powder magazine (5) which activates the projectile. When the fuze is set on "K" for canister effect, the passages of the time rings are directly aligned to the channel (8); consequently, after the burning powder train consumes the path within the upper time ring (2), it goes directly to the channel, to the magazine, and finally activates the projectile. When the fuze is set on "YD", then it will not function. The powder train in the upper time ring (2) is consumed, but the time rings have been positioned so that the passages are blocked and the powder train is prohibited from burning beyond the upper time ring. The "YD" setting results in the projectile having a solid shot effect against the target.

c. Characteristics.

Action ----- time, canister effect, and
solid shot effect

Loaded weight ----- 650 grams (1.43 lbs.)

Body material ----- steel

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SOVIFT, POINT-DETONATING TIME FUZE: MODEL T-3

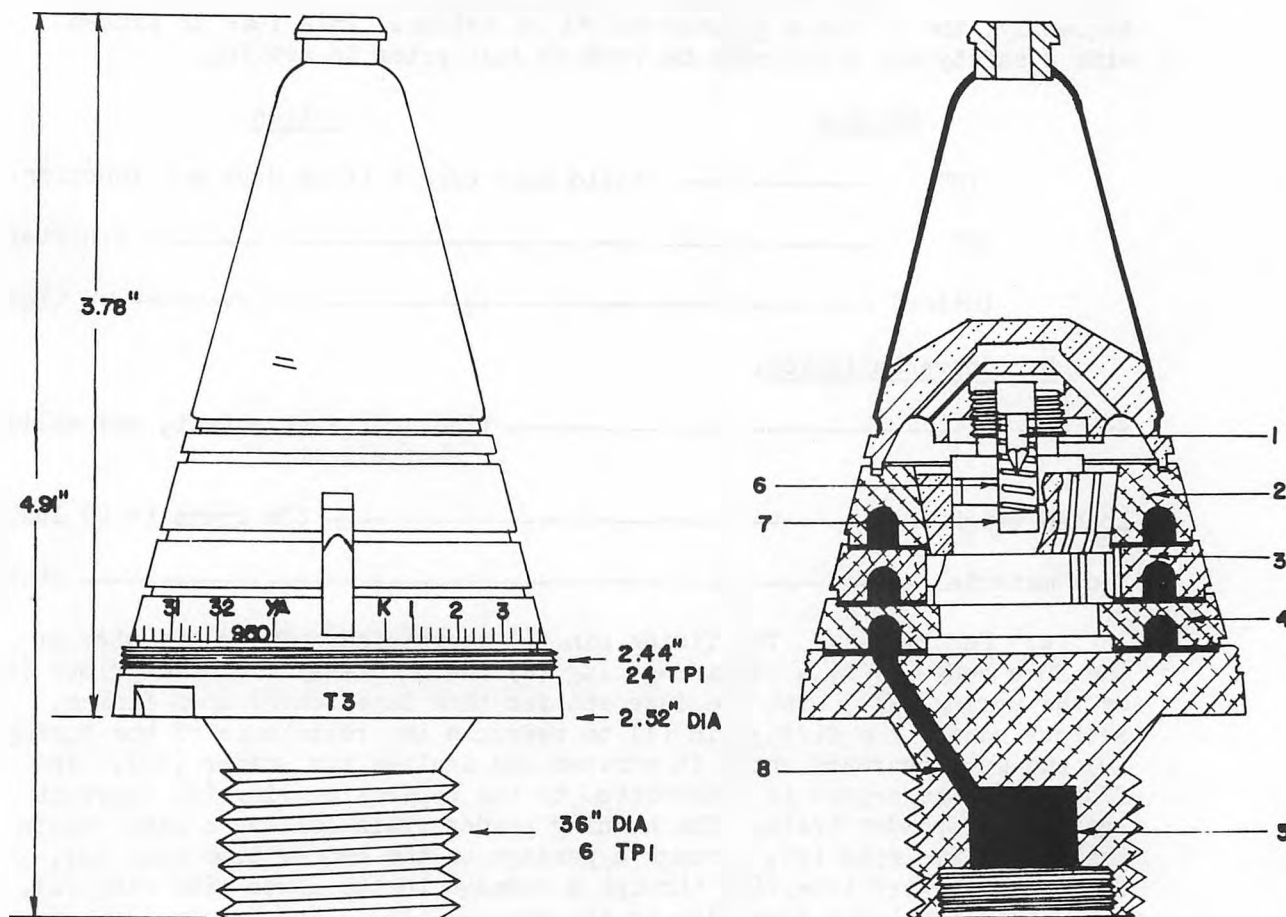
d. Weapons and projectiles with which fuze can be used.

Weapons

76mm divisional guns M1902/30, M1933, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); tank guns M1938/39 (L-11) and M1939 (F-32); antiaircraft guns M1931, M1931/33, and M1938

Projectiles

76mm Shrapnel ----- Sh-361;
Sh-361A; Sh-354R;
Sh-355



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SOVIET, POINT-DETONATING TIME FUZE: MODEL T3(UG)

a. General. The T3 (UG) (Trubka, 3-go Obraztsa, Uluchshennogo Gabarita: literally, "Fuze, 3rd Model, Improved Dimensions") was designed for use with bar shrapnel shells used in 76mm antiaircraft guns and has been used with shrapnel projectiles for Soviet 76mm divisional, regimental, and tank guns. This fuze is designed only for an air burst since it contains no arrangement for impact functioning. This fuze has 165 graduations on the time scale ring. The maximum burning time of the T3 is 32 seconds. The powder train of the T3 fuze burns more uniformly than the powder train of the 45-second fuze because of the arrangement of openings in the nose and sides of the streamlined fuze windshield; consequently, the T3 has a greater height of action. This fuze is fitted with a safety cap which must be removed just prior to setting.

<u>Setting</u>	<u>Action</u>
"YD" -----	solid shot effect (fuze does not function)
"K" -----	canister
(Other) -----	time

b. Characteristics.

Action ----- time, canister effect, and solid shot effect

Loaded weight ----- 636 grams (1.40 lbs.)

Body material ----- steel

c. Functioning. The firing pin (1) is retained within the stem of the fuze body (5) by a retaining plug (8) and held away from the primer (10) by the spring (9). With the fuze set for time functioning upon firing, setback causes the firing pin (1) to overcome the resistance of the spring (9) and move rearward until it strikes and ignites the primer (10). The flash from the primer is transmitted to the upper time ring (2) where it ignites the powder train. The burning powder train follows a path within the upper time ring (2), through a passage to the center time ring (3), within the center time ring through a passage to the lower time ring (4), and within the lower time ring to the channel (11). The burning powder train then flashes through the channel to ignite the black powder magazine (6) and send a jet of flame through base plug (7) to explode the projectile. When the fuze is set on "K" for canister effect, the passages of the time rings are directly aligned to the channel (11); consequently, after the burning powder train consumes the path within the upper time ring (2), it

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SOVIET, POINT-DETONATING TIME FUZE: MODEL T3(UG)

goes directly to the channel, then to the magazine, and finally explodes the projectile at about 100 to 165 feet from the gun muzzle. Normally the T3(UG) fuze is not fired with the setting of "YD"; the exception would arise when no armor-piercing rounds were available and direct fire against tanks was needed. In this case, with the fuze set on "YD", the fuze would not function and the projectile would produce a solid shot effect against the target. When the fuze is fired with the "YD" setting, the powder train in the upper time ring (2) is consumed, but the time rings have been positioned so that the passages are blocked and the powder train is prohibited from burning beyond the upper time ring.

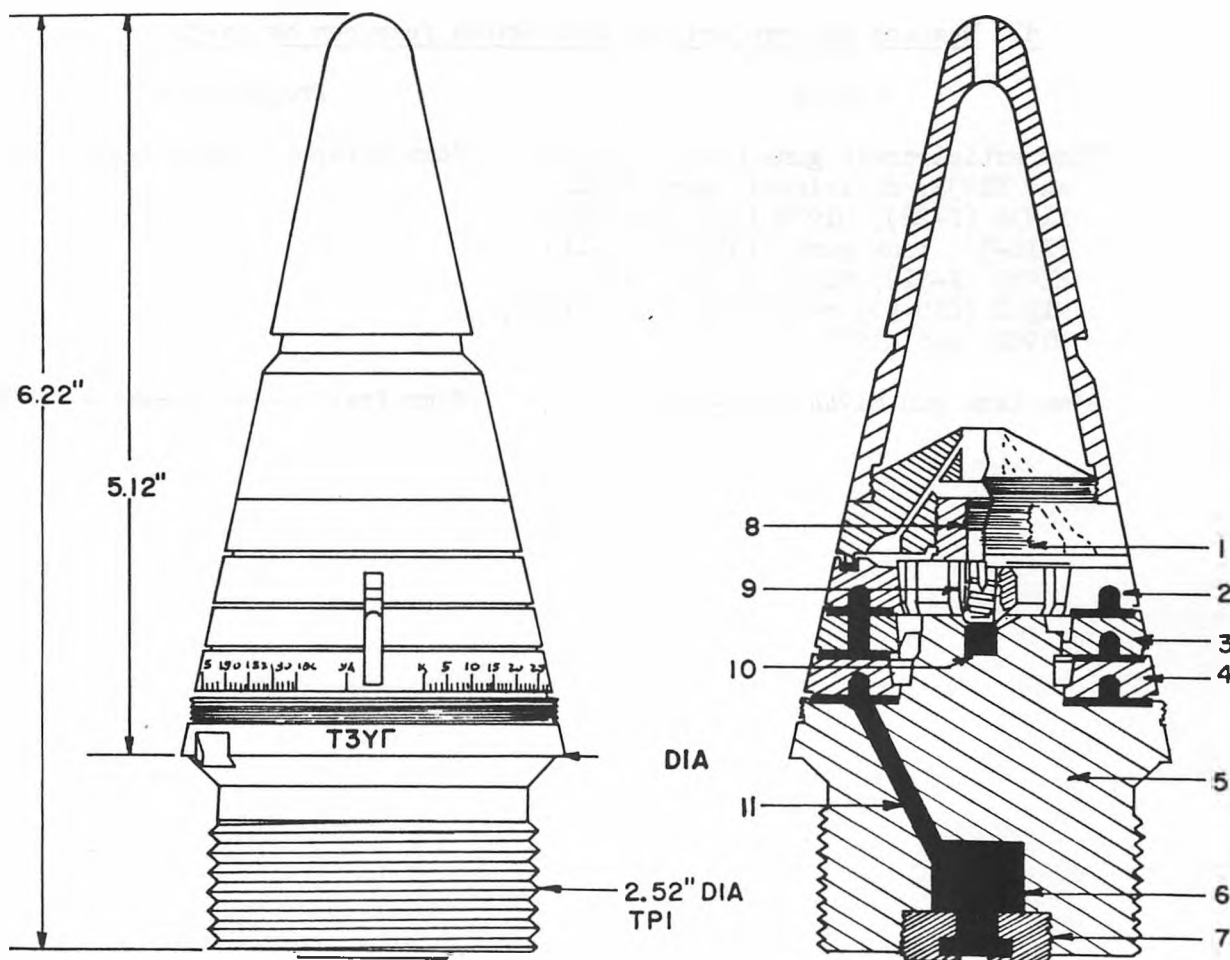
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm antiaircraft guns M1931, M1931/33 and M1938; divisional guns M1902, M1936 (F-22), M1939 (USV) and M1942 (ZIS-3); tank guns M1938/39 (L-11) M1939 (F-32), M1940 (F-34), and M1941 (ZIS-5); regimental guns M1900, M1902, and M1927	76mm Shrapnel ----- Sh-361
85mm tank gun M1944 (ZIS-S-53)	85mm Frag ----- O-365

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SOVIET, POINT-DETONATING TIME FUZE: MODEL T3(UG)



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SOVIET, POINT-DETONATING TIME FUZE: MODEL T-5

a. General. The T-5 fuze is the fifth model of "T"-series Soviet fuzes. Other Known "T" fuzes are the T-3 (UG), T-6, T-7, and T-11. The T-5 fuze was designed for fragmentation shells used in medium caliber antiaircraft guns. It is a bore-safe powder train fuze having the Soviet safety classification of "safe." The T-5 fuze has no provision for other than time functioning. It has a maximum burning time of approximately 32 seconds. The time scale ring is graduated from 5 to 165. Models of recent manufacture discard the settings "YA" and "K"; the former is a setting whereby the fuze does not function and the projectile has a solid shot effect at the target, and the latter, a zero point setting which produces a canister burst about 10 to 32 feet from the gun muzzle. The fuze is shipped with a setting of "10." According to regulations the lowest permissible setting is "8"; lower settings are used only for self-defense of a gun battery against ground-attacking aircraft. Externally the T-5 fuze compares favorably with the T-6 fuze except for stampings, threaded base diameter, and color bands. The T-6 time scale ring is graduated from 10 to 139. The diameter of the threaded base of the T-5 fuze is much larger than that of the T-6 fuze. The T-5 fuze windshield and safety cap, which is removed before firing, have a black color band, whereas the T-6 fuze windshield has one red color band and the safety cap has two red color bands. These windshield and safety cap color bands are always present. Internally the T-5 fuze compares favorably with the T3 (UG) fuze. The train of action of the T-5 is essentially the same as that of the T3 (UG), the difference being in the addition of an operation in the base of the fuze between the flash channel and the magazine charge.

b. Characteristics.

Action-----time, canister effect, and solid shot effect

Loaded weight-----710 grams (1.562 lbs)

Body material-----aluminum

c. Functioning. Regardless of the setting of the time scale ring (3), when the projectile is fired the slider setback locking pin (7) overcomes the tension of its spring and sets back into the slider which houses the detonator to hold it immovable. As the projectile rotates through the bore, centrifugal force causes the two slider locking pins, one on each side of the slider to compress their springs and move outward, away from the slider. After the projectile has left the bore and the setback force ceases, the slider setback locking pin spring returns the slider setback locking pin to its original position away from the slider.

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SOVIET, POINT-DETONATING TIME FUZE: MODEL T-5

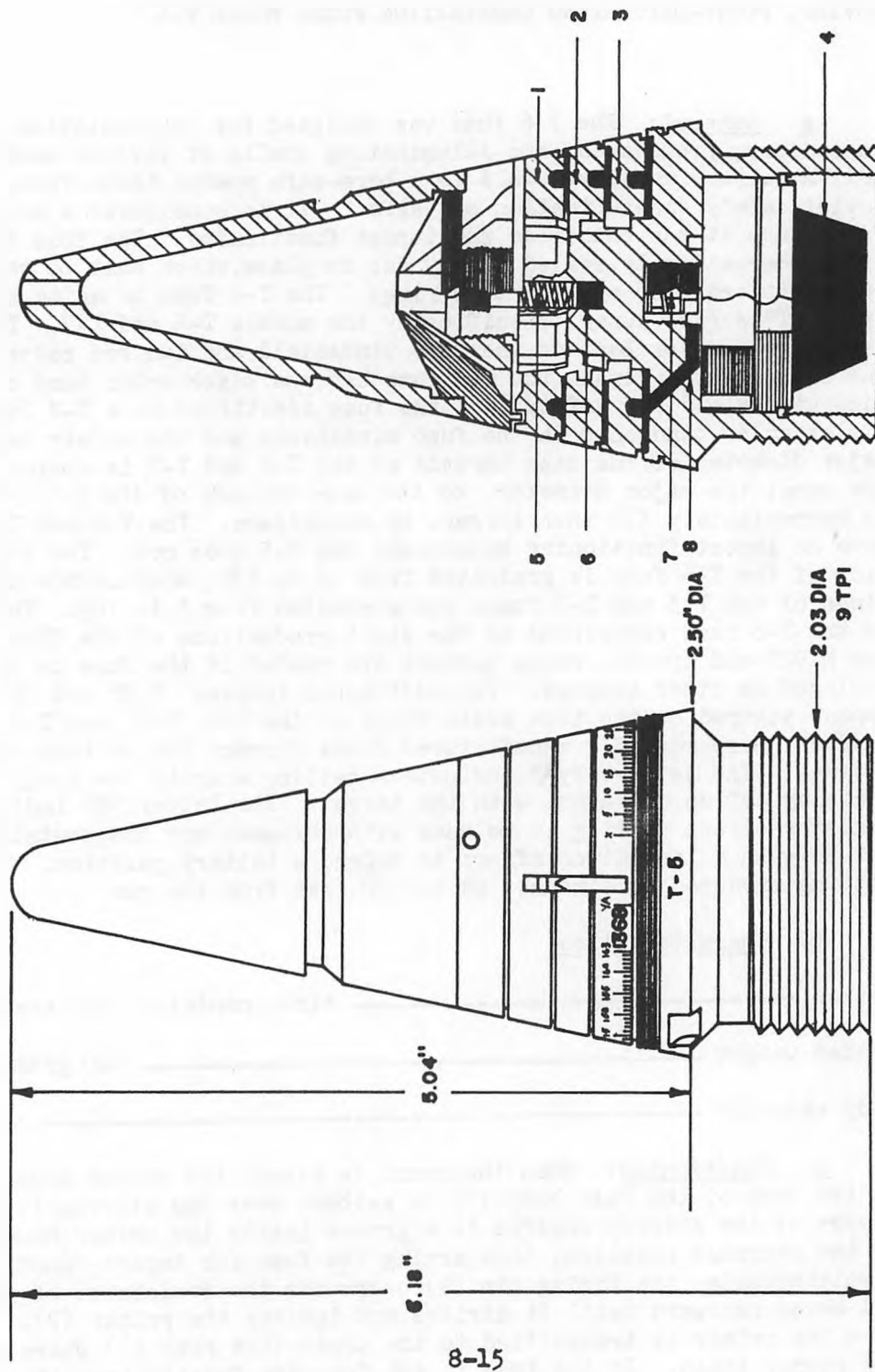
Centrifugal force then acts upon the counterweight in the slider to move the slider so that the detonator in the slider becomes aligned with the flash channel (8) and the magazine charge or booster (4). At the same time, the firing pin (5) overcomes the resistance of its spring and moves rearward until it strikes and ignites the primer (6). The flash from the primer is transmitted to the upper time ring (1) where it ignites the powder train. If the fuze is set for time functioning, the powder train burns successively through the center time ring (2), and the lower time ring (3) passes the flame through the flash channel (8) to ignite the detonator in the slider; the detonator functions the booster, and the booster in turn explodes the projectile. If the fuze is set for canister effect, the action is essentially the same except that the powder train burns through the time rings in the most direct manner, and the projectile bursts dangerously close to the gun muzzle. If the fuze is set so as not to function, the time rings are positioned to stop the powder train from burning beyond the upper time ring.

d. Weapons and projectiles with which fuze can be used.

	Weapons	Projectiles
76mm	antiaircraft guns M1931, M1931/33, and M1938	76mm Frag -- 0-361; 0-361D
85mm	antiaircraft gun M1939; tank guns M1943 (D-5T85) and M1944 (ZIS-S53); SP guns M1943 (D5-S85 and D5-S85A)	85mm Frag ----- 0-365

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SOVIET, POINT-DETONATING TIME FUZE: MODEL T-5



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL T-6

a. General: The T-6 fuze was designed for fragmentation, shrapnel, incendiary, propaganda, and illuminating shells of various models of medium caliber weapons. This is a bore-safe powder train fuze, having a Soviet safety classification of "safe." It is considered a double action fuze since it has both time and impact functioning. The fuze is shipped with a hermetically sealed safety cap in place, which must be removed before firing in order to set the time rings. The T-6 fuze is quite similar to other "T"-series fuzes, specifically the models T-5 and T-7. The T-6 fuze has one red color band on the fuze windshield and two red color bands on the safety cap, whereas the T-5 fuze has one black color band on both the fuze windshield and safety cap; the fuze identified as a T-7 fuze has one violet color band on both the fuze windshield and the safety cap. The major diameter of the base threads of the T-6 and T-7 is approximately the same; the major diameter of the base threads of the T-5 fuze is approximately 5/8 inch larger, by comparison. The T-6 and T-7 fuzes have an impact functioning mechanism; the T-5 does not. The time scale ring of the T-6 fuze is graduated from 10 to 139, whereas the time scale rings of the T-5 and T-7 fuzes are graduated from 5 to 165. The graduation on the T-6 fuze correspond to the sight graduations of the 76mm regimental gun M1927 and special range tablets are needed if the fuze is to be employed in other weapons. Two additional indexes, "yA" and "K", may appear stamped on the time scale rings of the T-5, T-6, and T-7 fuzes; however, more recently manufactured fuzes discard one or both of these indexes. The letters "yA" indicate a setting whereby the shell functions nondelay action on impact with the target. The letter "K" indicates a canister-effect setting to be used with shrapnel and fragmentation shells, but only in a last-ditch effort to defend a battery position. The "K" setting produces an airburst 65 to 100 feet from the gun.

b. Characteristics:

Action ----- time, nondelay, and canister effect

Loaded weight ----- 540 grams (1.19 lbs)

Body material ----- aluminum

c. Functioning: When the round is fired, the primer housing (12) in the base of the fuze body (5) is setback over the stirrup (7), and the prongs of the stirrup engaged in a groove inside the primer housing in the rearmost position, thus arming the fuze for impact functioning. Simultaneously, the firing pin (9) overcomes the resistance of its spring and moves rearward until it strikes and ignites the primer (2). The flash from the primer is transmitted to the upper time ring (1) where it ignites the powder train. If the fuze is set for time functioning, the powder train continues to burn successsively through the center time ring (3) and the lower time ring (4); the flame passes through the flash channel (11) to ignite the black powder base charge (8) which sets off the bursting charges in the shell.

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL T-6

If the fuze is set for canister effect (the minimum burning time setting), the action is essentially the same except that the powder train burns in a straight passage through the time rings to the flash channel, and then to the base charge. Because of dispersion at the beginning of the powder train combustion, the projectile may burst dangerously close to the gun muzzle when the canister setting is used. If the fuze is set for impact functioning, or if the fuze fails to function on the time or canister settings, upon impact the primer holder (13), the stirrup (7), and the primer housing (12) are thrown forward to overcome the tension of the anticreep spring and cause the impact primer (6) to impinge against the fixed firing pin (10). This action causes a projection on the base of the primer holder to be moved out of the central hole in the primer housing retainer (14), thereby opening this orifice to allow the flame from the ignited primer to pass to the base charge and then to the shell.

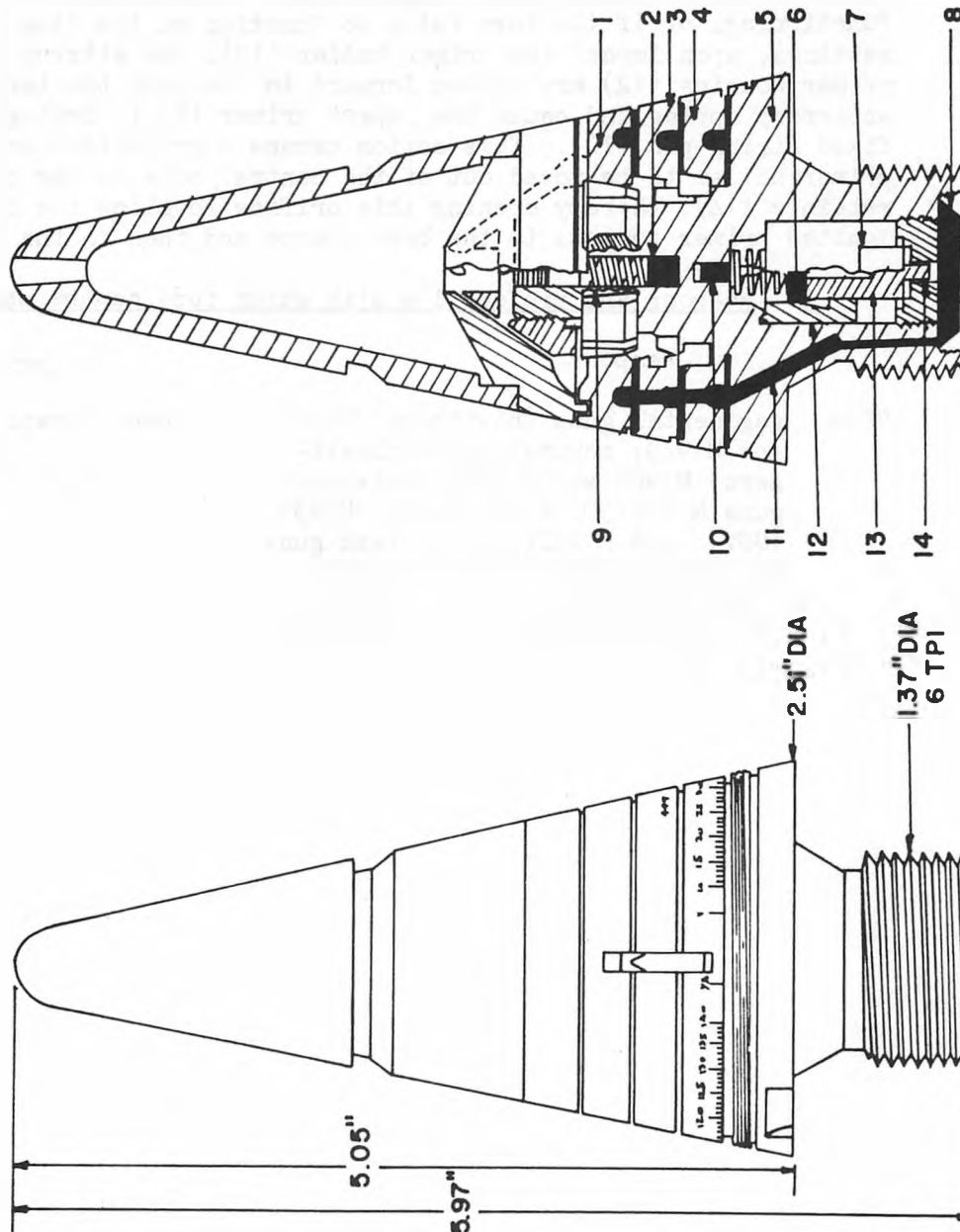
d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
76mm regimental guns (howitzers) M1927 and M1943; mountain guns (howitzers) M1909 and M1938; divisional guns M1902/30, M1936(F-22) M1939 (USV) and M1942(ZIS-3); tank guns M1927/32, M1938/39(L-11), M1939 (F-32), M1940(F-34), and M1941 (ZIS-5); SP gun M1942/43 (SAU-76)	76mm Shrapnel --- Sh-354T; Sh-354U Incendiary --- Z-350; Z-354

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SOVIET. POINT-DETONATING COMBINATION FUZE: MODEL T-6



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL T-7

a. General. The Soviet T-7 fuze is a time and point-detonating superquick fuze with settings for time and instantaneous action. It is of the powder train type and is bore-safe. The T-7 is nearly identical to the T-6 fuze in design and operation differing in that the T-7 time scale is graduated from 5 to 165, instead of 10 - 139 as in the T-6. The T-7 is identified by the violet-colored band on the shipping cap and on the fuze windshield. It can be employed on the same projectiles and fired from the same guns as the T-6. It is transported with a shipping cap, which moistureproofs the fuze. The cap must be removed to set the time rings. There are additional indexes marked "Y" and "K" on the time ring scales. These settings indicate nondelay impact functioning and muzzle burst action respectively.

b. Characteristics.

Action ----- time and superquick
Loaded weight ----- 540 grams (1.19 lbs)
Body material ----- aluminum

c. Functioning. Upon firing, with the fuze set on time, setback causes the firing pin (1) to move rearward against its spring (2) and activate the powder train primer (4). Flame from the primer ignites the powder train in the upper time ring (3), which burns until the flame reaches the transfer channel to the center time ring (5) igniting its powder train. This sequence is repeated in the lower time ring (7). When the flame reaches the flash channel (6), a flash pellet sends the flame to the magazine charge (10), which activates the projectile. When the fuze is set for nondelay, the flash channel to the time rings is blocked. Upon being fired setback forces the safety bushing (11) down over the primer carrier (13). The legs on the primer carrier engage the internal groove in the bushing (11), locking the bushing and carrier together in the rearward position. The fuze is now armed. Upon impact the primer carrier (13) and bushing (11) move forward by inertia, impaling the primer (8) on the fixed firing pin (9). Flame from the primer flashes into the magazine charge (10) activating the projectile. When the fuze is set for muzzle burst action, the flame transfer channels in the three time rings are all set in line with the flash channel (6). The projectile will travel 65 to 100 feet from the muzzle before detonating. This setting is normally employed in cannister ammunition.

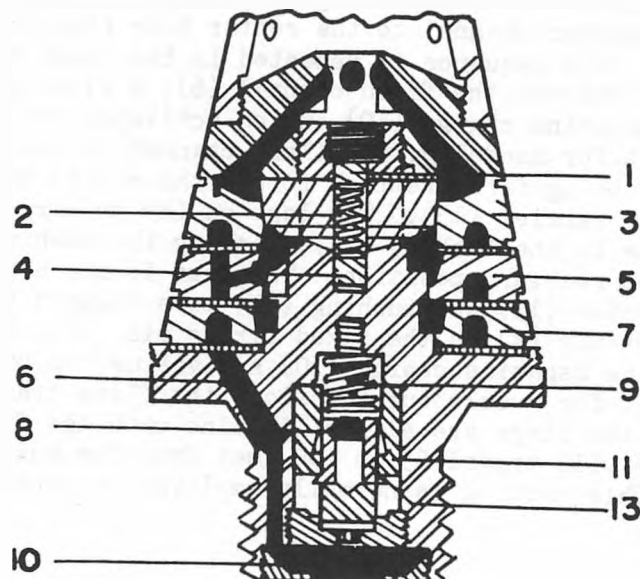
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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL T-7

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
122mm howitzer M1938	122mm Shrapnel----- Sh-460T Illuminating ----- S-426 Propaganda ----- A-462
152mm howitzer M1943	152mm Shrapnel ----- Sh-501T



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SOVIET, POINT-DETONATING IMPACT FUZE: MODEL T-11

The T-11 time fuze is similar in overall appearance and construction to the T-5 fuze but differs from the latter in having a time powder train of an improved slow-burning gasless powder composition. This composition burns more slowly than the usual powder used and does not fail at high altitudes as does the powder used in the T-3 fuze. The T-11 does not have a percussion arrangement for impact firing and must, therefore, be set only for aerial bursts. It is used with the O-361 and O-361D projectiles in the 76mm antiaircraft guns: M1931, M1931/33, and M1938.

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SOVIET, POINT-DETONATING TIME FUZE: MODEL VM-2

a. General. The VM-2 is believed to have been designed mainly for antiaircraft fire since it functions only through the action of its clockwork mechanism and has no provision for function upon impact. It can be set for longer burning time than any other Soviet fuze known to be used in the 85mm antiaircraft gun, M1939. The windshield and fuze body are made of aluminum; the locking ring and internal mechanism are made of brass. The settings in seconds are inscribed on the windshield and the time setting indicator point is inscribed on the fuze body. The fuze is set to desired time of function by rotating the windshield until the desired time graduation lines up with the indicator line on the fuze body. The entire fuze mechanism closely resembles the German ZT. Z S/30 artillery fuze which was used with 88mm antiaircraft guns.

b. Characteristics.

Action ----- mechanical time

Loaded weight -----755 grams (1.66 lbs)

Body material ----- aluminum

c. Functioning. On firing, setback causes the trigger (8) to move rearward and release the hand (7). The hand, upon being released, is rotated in a counterclockwise direction by the main spring and clockwork mechanism. The complete clockwork mechanism has not been shown in the drawing. When the hand has cleared the safety bridge (1), it is pressed up against the hand race on the under surface of the top of the retainer cup (9) by a spring (2) under the center of the hand (7). When the hand reaches the portion of the hand race which is cut out to receive it, it is forced upward by its spring, and the ring-like section of the hand clears the prong of the safety lever (3), allowing it to move outward under the pressure of its spring and centrifugal force. This pulls the lower section of the safety lever out of the safety slot of the firing pin (4), allowing the firing pin to go rearward under the influence of its spring and activate the primer (6), which in turn detonates the booster (10). The fuze has an additional safety feature in its spring-loaded shutter (5) which remains in place, blocking the primer from the firing pin until the centrifugal force of the rotation of the shell in flight pulls it to the side and leaves a clear passage to the primer.

d. Weapons and projectiles with which fuze can be used.

Weapons

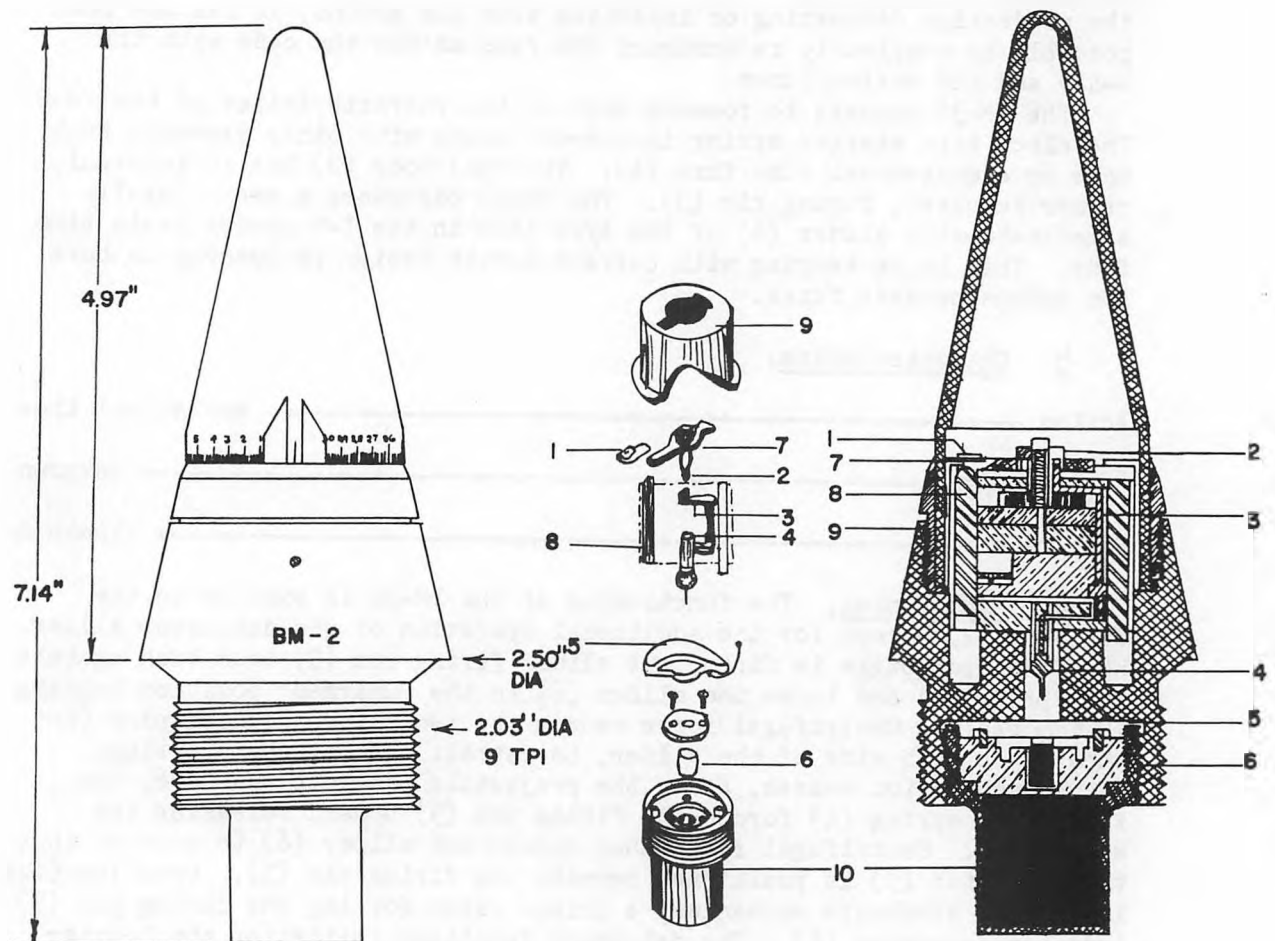
Projectiles

85mm antiaircraft gun M1939

85mm Frag----- O-365M

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SOVIET, POINT-DETONATING TIME FUZE: MODEL VM-2



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SOVIET, MECHANICAL TIME FUZE: MODEL VM-30

a. General. The Soviet mechanical time fuze VM-30 has not been recovered intact. Only fragments of various components and the main body have been studied. Due to the distortion of fragments caused by the projectile detonating or impacting with the ground, it has not been possible to completely reconstruct the fuze as was the case with the V-429 and RGM series fuzes.

The VM-30 appears to possess most of the characteristics of the VM-2. The clock type starter spring is present along with other elements that make up a mechanical time fuze (1). The fuze body (2) has an internal, primer actuated, firing pin (3). The VM-30 possesses a centrifugally armed detonator slider (6) of the type seen in the T-5 powder train time fuze. This is in keeping with current Soviet design philosophy on bore and detonator-safe fuzes.

b. Characteristics.

Action ----- mechanical time

Loaded weight ----- unknown

Body material ----- aluminum

c. Functioning. The functioning of the VM-30 is similar to the Soviet VM-2, except for the additional operation of the detonator slider. When the projectile is fired, the slider firing pin (3) sets back against its spring (4) and locks the slider (6) in the "unarmed" position holding it immovable. Centrifugal force causes the two slider locking pins (not shown), on each side of the slider, to retract against their springs. When acceleration ceases, after the projectile has left the bore, the firing pin spring (4) forces the firing pin (3) upward releasing the slider (6). Centrifugal force then causes the slider (6) to move so that the detonator (5) is positioned beneath the firing pin (3). Upon functioning of the clockwork mechanism, a primer fires forcing the firing pin (3) into the detonator (5). The detonator functions initiating the booster (7) and projectile. The slider housing is prevented from rotating inside the fuze body by twin alignment pins (9).

d. Weapons and projectiles with which fuze can be used.

Weapons

Projectiles

85mm antiaircraft gun M1939, field
gun D-44

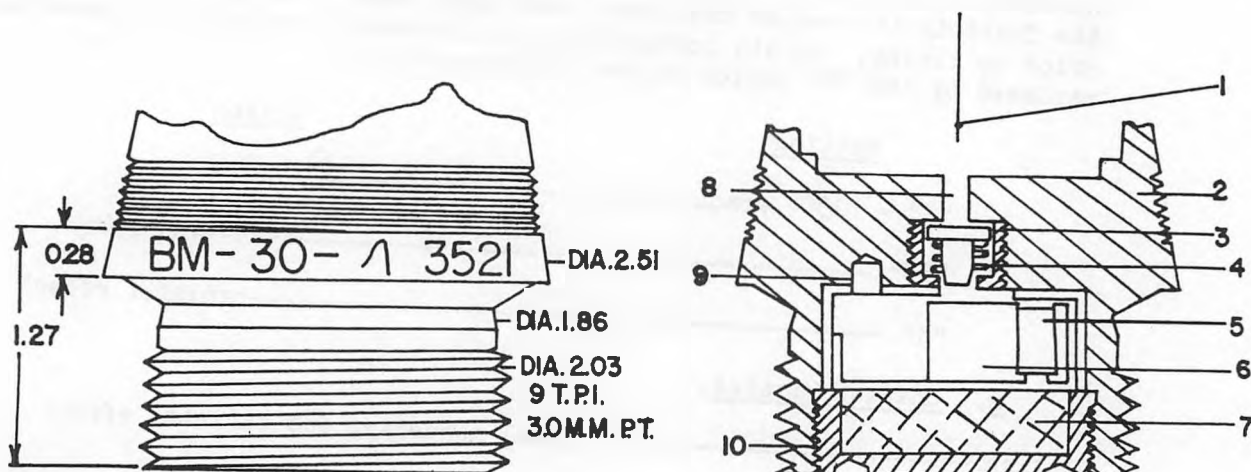
85mm HE-Frag ----- O-365M

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SOVIET, MECHANICAL TIME FUZE: MODEL VM-30

100mm antiaircraft gun model unknown, 100mm HE-Frag ----- F-412
field gun M1944



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 22G

a. General. The 22G is one of the fuzes in the 22-second series, which also includes the models 22-sec., 22P, and 22PG. The Model 22-sec. fuze appeared in 1899 and was standard until the outbreak of World War II. The 22G is similar to all other fuzes in the 22-second series in internal construction. The major difference between these fuzes lies in the arming safety arrangements. The 22G fuze may be set for time, canister, or nondelay action, as can all other fuzes of the 22-second series. Some of the fuzes in the series have been found with safety caps which are removed prior to firing. In all probability, the 22-second series fuzes have been replaced by the "T" series in the Soviet services.

<u>Setting</u>	<u>Action</u>
"0" - "130" graduations	-----time
"YD"	-----nondelay
"K"	-----canister effect

b. Characteristics.

Action ----- time, nondelay, and canister effect
Loaded weight ----- unknown
Body material ----- aluminum

c. Functioning. On firing, when the fuze is set for time action, the setback firing pin (1) overcomes the resistance of the primer carrier spring (2) and ignites the primer (10), which ignites the upper time ring (3) and lower time ring (4). When the lower time ring burns through, the flame passes through the flash channel (11) and actuates the detonator assembly (9). When set for instantaneous action, setback causes the arming sleeve (7) to move rearward and over the safety ring (8), compressing the arming spring (6) and temporarily holding the split safety ring (8) closed. This action prevents the split safety ring from opening to release the detonator assembly for forward movement while the round is in the bore of the weapon. After the projectile leaves the bore, the arming spring (6) lifts the arming spring upward, making it possible for the split safety ring (8) to spread apart (by centrifugal force) and free the detonator assembly (9) for forward movement. On impact with the target the detonator moves forward and strikes the impact striker (5) and the explosive train is actuated. When set for canister, the time rings (3 and 4) are lined up; and the flash from the primer (1), after burning through the

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 22G

aligned time rings, passes directly into the flash channel (11) and actuates the detonator assembly.

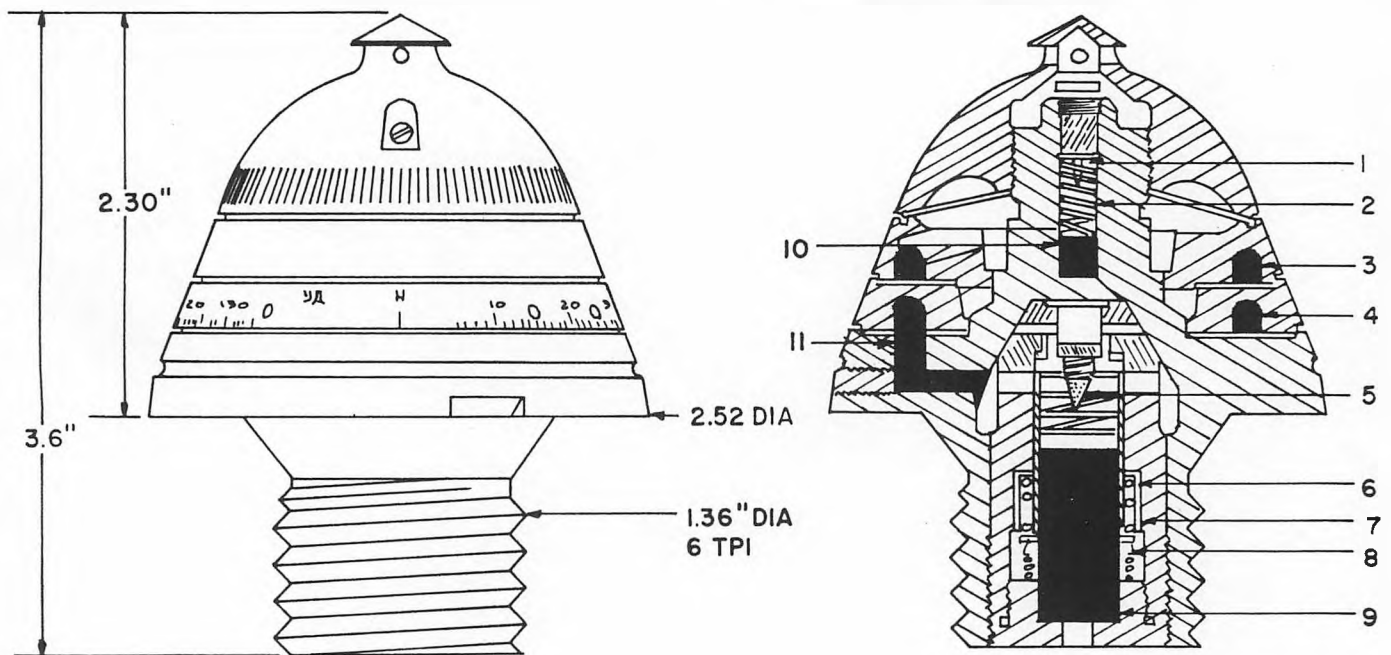
d. Weapons and projectiles with which fuze can be used.

Weapons

76mm mountain guns (howitzers) M1909
and M1938

Projectiles

76mm Shrapnel --- Sh-354; Sh-354P



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 22P

a. General. Except that it differs slightly in the arming safety arrangement, the 22P fuze is virtually identical to the 22G.

b. Weapons and projectiles with which fuze can be used.

Weapons

76mm divisional guns M1902/30,
M1936 (F-22), M1939 (USV),
and M1942 (ZIS-3)

Projectiles

76mm Shrapnel - Sh-354; Sh-354G;
Sh-354U
Incendiary -----Z-354

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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 22PG

a. General. The 22PG fuze is almost identical to the 22G and 22P fuzes, except that it differs slightly in arming safety arrangements.

b. Weapons and projectiles with which fuze can be used.

	Weapons	Projectiles
76mm	guns M1900, M1902, and M1902/30; tank guns M1938/39 (L-11), M1939 (F-32), M1940 (F-34), and M1941 (ZIS-5); mountain gun (howitzers) M1909 and M1938; divisional guns M1902/30, M1936 (F-22), M1939 (USV), and M1942 (ZIS-3); regimental gun (howitzer) M1927	76mm Shrapnel-Sh-354; Sh-354G; Sh-354U; Sh-352P Incendiary ----- Z-354

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SOVIET, POINT-DETONATING TIME FUZE: MODEL 32-SEC

a. General. The 32-sec time fuze has three settings. When set at "K," the projectile will travel only a short distance before it is activated, giving a canister effect. The fuze may also be set for time functioning (1-32 seconds) by use of the firing ring. When set at "YA" all flash channels are closed off, and the fuze will not function.

b. Characteristics.

Action ----- time, canister

Loaded weight ----- unknown

Body material ----- steel

c. Functioning. On firing, setback causes the firing pin (1) to overcome the resistance of the spring (2) and strike the primer (3). The flash from the primer travels through the upper flash channel and ignites the powder train in the upper time ring (4) which burns successively through the middle time ring (5) and lower time ring (6). The flash from the lower time ring passes through the flash channel (7) and ignites the powder magazine (8) which in turn explodes the projectile.

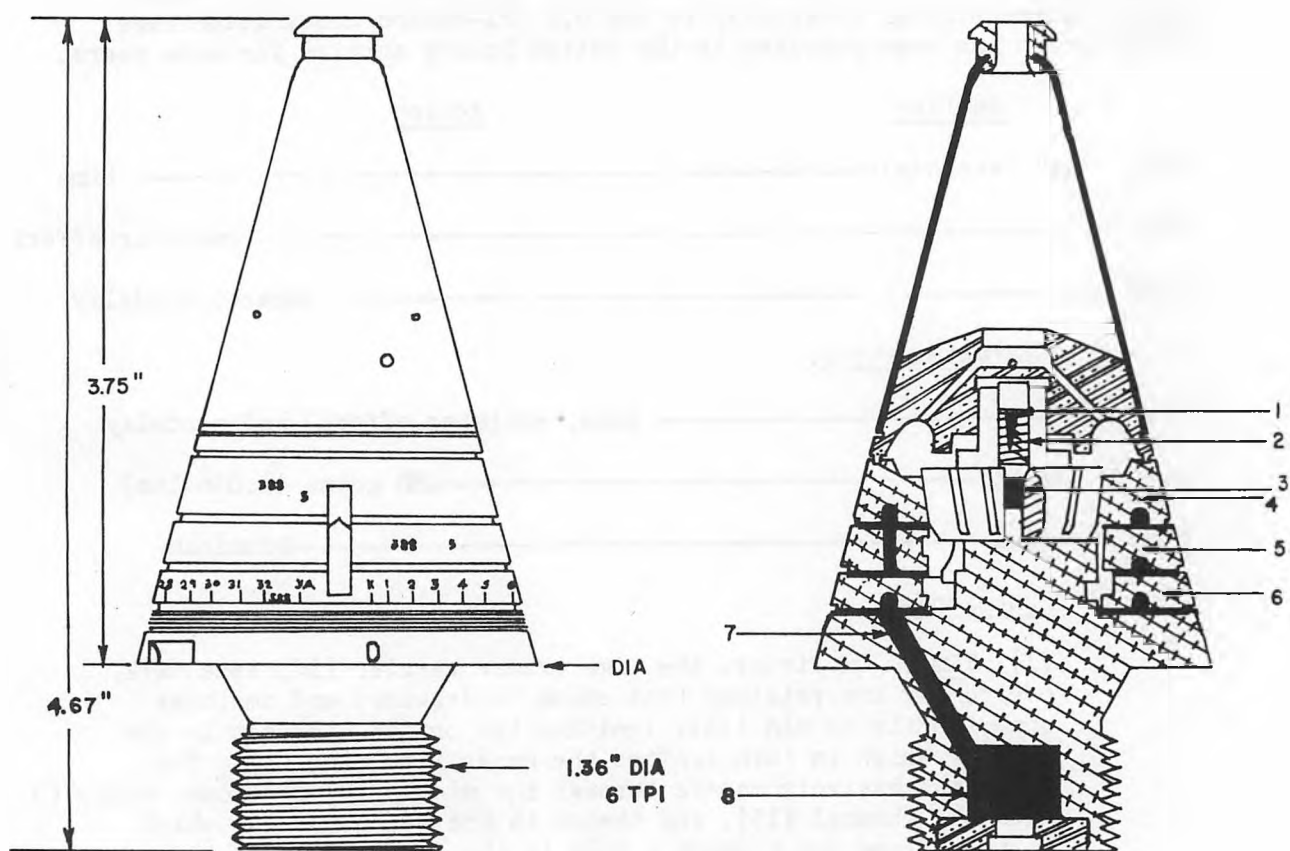
d. Weapons and projectiles with which fuze can be used.

Information not available.

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SOVIET, POINT-DETONATING TIME FUZE: MODEL 32-SEC



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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 45-SEC

a. General. The 45-second fuze has three settings: time, impact, and canister. The time graduation marks on the lower time train ring, and the graduation index mark are on the fuze body. This fuze is used with low velocity howitzers as well as high velocity guns. The safety pins (11) are used to pin the time primer carrier (12) and the impact stirrup (5) to the fuze body for safety during transport and handling. These pins are removed prior to use. This fuze is of very old design and is quite similar internally to the U.S. 21-second combination fuze M1907 which has been obsolete in the United States service for some years.

<u>Setting</u>	<u>Action</u>
"0" - "45" (seconds)-----	time
"0" -----	canister effect
"YA" -----	impact, nondelay

b. Characteristics.

Action ----- time, canister effect, and nondelay

Loaded weight -----480 grams (1.056 lbs)

Body material -----aluminum

c. Functioning.

(1) Time. On firing, the time primer carrier (12) sets back, overcoming its retainer (not shown in drawing) and impinges upon the firing pin (14), igniting the primer (13) set in the carrier which in turn ignites the upper time ring (1). The flame successively passes through the middle (2) and lower rings (3) into the channel (15), and thence to the detonator (9) which emits a flame jet through a hole in the plug (16) into the burster tube of the projectile.

(2) Canister. Same as above except that the fuze setting "0" aligns holes in all three rings with the channel (15), and the flame jet passes directly to the detonator (9) without passing around the time rings.

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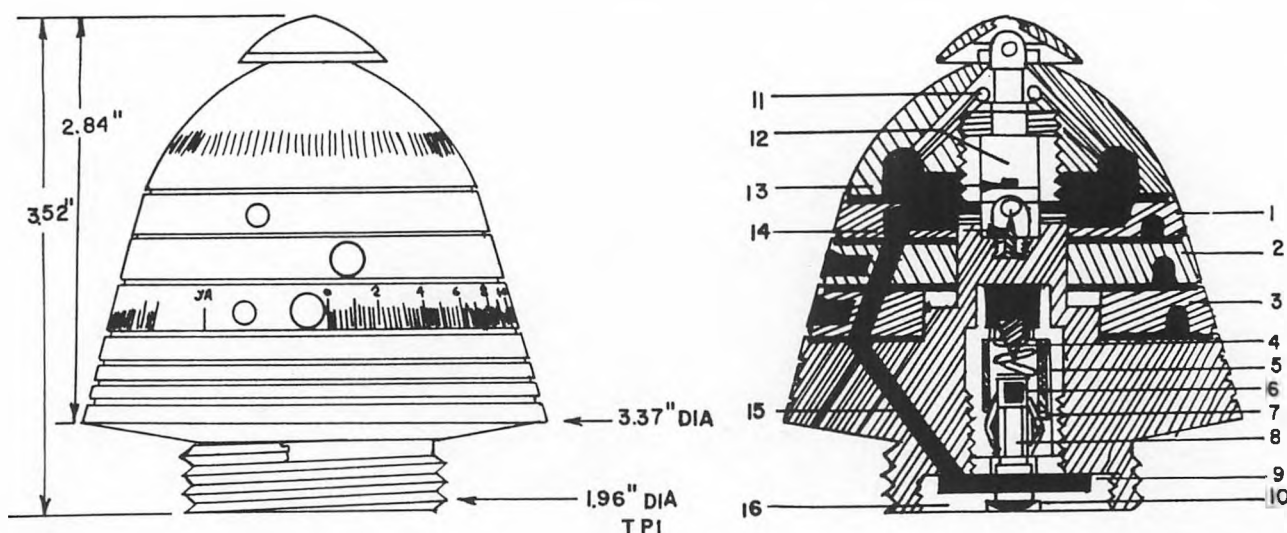
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SOVIET, POINT-DETONATING COMBINATION FUZE: MODEL 45-SEC

(3) Impact (nondelay). The setting of "JA" blocks the flame holes in the time rings. Upon firing, setback forces the impact stirrup (5) rearward over the impact primer carrier (8) and retainer (7), where it is held during the flight of the projectile. On impact, carrier (8) and stirrup (5) go forward, overcoming the resistance of the retainer (7) and the anticreep spring. The impact primer (6) is ignited by the firing pin (4) and activates the detonator (10), which in turn actuates the time detonator (9). The flame jet then passes through the hole in the plug (16) into the burster tube of the projectile or, in the case of a conventional shrapnel shell, into the detonator-booster.

d. Weapons and projectiles with which fuze can be used.

Weapons	Projectiles
107mm corps guns M1910/30, M1940 (M-60), and M1941	107mm Shrapnel ----- Sh-422
122mm howitzers M1910/30, M1909/37, and M1938 (M330)	122mm Shrapnel ----- Sh-460
152mm howitzers M1909/30, M1938 (M-10), and M1943 (D-1)	152mm Shrapnel ----- Sh-501



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1. The purpose of this document is to provide information on the use of the system.

2. The system is designed to provide a secure and reliable method of communication.

3. The system is capable of handling a large volume of data and is designed to be easy to use.

4. The system is designed to be flexible and can be adapted to a wide range of applications.

5. The system is designed to be secure and reliable and is capable of handling a large volume of data.



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CHAPTER 9
MISCELLANEOUS FUZES

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MISCELLANEOUS FUZES

This chapter includes those fuzes that do not, by definition, fit securely in the other sections of this document. However, these fuzes are no less important than those residing in conventional classification.

A case in point is the long delay fuze, NNC-82. This fuze holds a unique position in the world's explosive ordnance in that it is the only known long delay fuze employed with projected munitions. Employment of the fuze has been limited, but the threat the fuze presents is real.

The NNC is bore-safe, well constructed, and unique in that it arms only upon impact. By American standards its only disadvantage is its lack of detonator safety.

The VC/NVA air burst fuze is designed to fill a void in their ordnance family. They currently lack a fuze for use in infantry weapons that will produce air bursts for antipersonnel or antiaircraft purposes. It is expected that additional fuzes of this classification will appear.

Since the Vietnamese conflict may be classed, in some stages, as a clandestine guerrilla war, it can be assumed that additional special purpose fuzes will be developed and will be listed under miscellaneous classification.

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VC/NVA, AIR-BURST MORTAR FUZE: MODEL UNKNOWN

a. General. The VC/NVA air-burst mortar fuze has not been recovered. The drawing is an artists conception of the fuze, drawn from a detailed description of fuze manufacture taken from a captured document. The fuze employs the Soviet/ChiCom M-6 mortar fuze body, booster, and detonator. The membrane section of the fuze body is cut off as is one thread from the bottom. The inside of the arming mechanism support bulkhead is drilled out slightly to accommodate a greater diameter firing mechanism. All internal components are different from the M-6 fuze, except for the locking balls.

The nose cap (1) is made from sheet metal welded to form an ogive for the fuze, and the cap is held on by wire clips (5) in the same manner as the nose cap is held to the M-6 fuze. The firing pin housing (13) contains the firing pin (14) and spring. The locking balls (4) lock the firing pin (14) in the cocked position. The firing pin housing threads into the delay housing (15). The delay housing (15) contains a ruffled primer (7) and safety fuze (8) with a burning time of 2.5 to 3.0 second. This time may be varied during manufacture of the fuze. The detonator holder (9) fits inside the delay housing (15) and contains the modified M-6 fuze detonator. The firing pin housing (13) and the delay housing (15) are the ridged elements of the fuze. They are locked into position by the booster adapter (11). The booster (12) is the conventional M-6 fuze booster.

b. Characteristics.

Action ----- air burst

Loaded weight -----unknown

Body material ----- plastic

c. Functioning. Upon firing, the setback sleeve (3) moves rearward compressing its spring. The ball (2) falls into the ogive cavity. When the compressed setback spring overcomes the forces of acceleration, it forces the setback sleeve (3) upward into the space formally occupied by the ball (2). This uncovers the locking ball recess. The locking balls are moved out of their recess by the cocked firing pin (14). This releases the firing pin which strikes the primer. The primer (7) flashes, igniting the safety fuze (8) which burns for 2.5 to 3.0 seconds. Upon safety fuze burnout, flame initiates the detonator (10), which functions the booster. The height of the burst is dependent entirely upon the number of increments employed on the projectile and the angle of the mortar tube.

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VC/NVA, AIR-BURST MORTAR FUZE: MODEL UNKNOWN

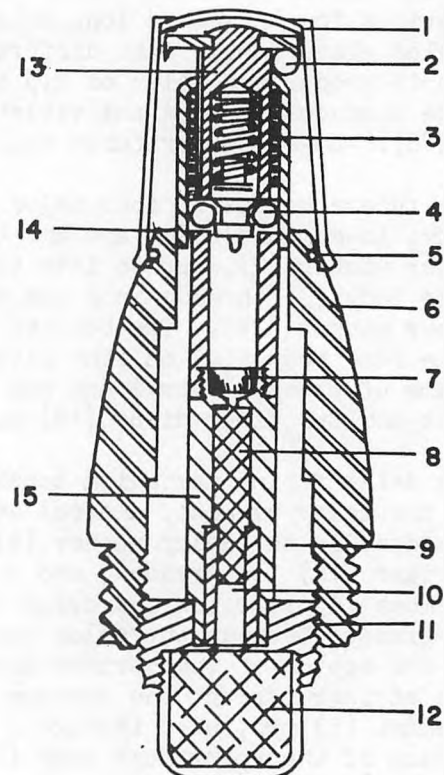
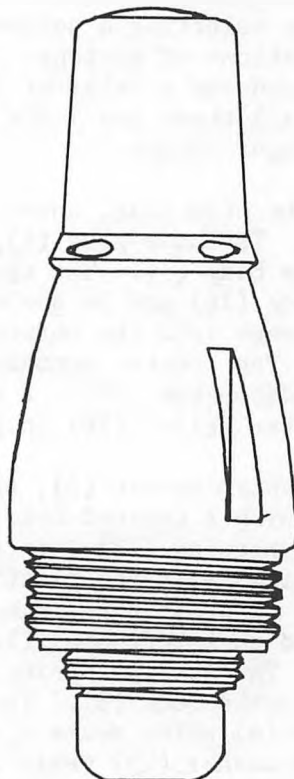
d. Weapons and projectiles with which fuze can be used.

Weapons

Soviet or ChiCom 82mm mortars

Projectiles

82mm HE-Frag -- Soviet or ChiCom



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NORTH VIETNAMESE, CHEMICAL LONG DELAY FUZE: MODEL NNC 82

a. General. The North Vietnamese 82mm chemical long delay fuze, Model NNC 82 is the only known long delay fuze employed with projected munitions. For this reason it occupies a unique position in the world's family of fuzes. To use the fuze, the explosive in the fuze well cavity of the mortar shell is drilled out to a depth of 2.5 inches. The fuze provides four standard long delay periods by selecting a colored acetone-filled glass ampule with different concentrations of acetone. A yellow ampule produces a delay of 2.5 hours; red produces a delay of 3.5 hours; blue produces 5 hours and violet 8 hours. All times are $\pm 20\%$ at 86°F (30°C). Lower temperatures will produce longer delays.

The fuze consists of four major sections: the nose plug, upper fuze body, lower fuze body, and the booster cup. The nose plug (1), with fiber washer (2), screws into the upper fuze body (3). The upper fuze body (3) threads into the main fuze body (14) and is sealed by a fiber washer (21). The booster cup (19) screws into the bottom of the main fuze body (14) on fine pitch threads. The booster contains 12.5 grams of pressed tetryl and wax (18) and a detonator (17). A copper disc and two fiber discs (16) hold the booster pellet (18) in position.

The delay firing mechanism consists of a plastic washer (5), which is the delay element, a steel striker (12) with a tapered head (4) embedded in the delay washer (5), a striker housing (10) into which the striker (12) is threaded, and a striker spring (9). The plastic delay element (5) rests on the delay support (8). The striker spring (9) is compressed between the delay support (8) and an interrupted flange (24) at the bottom of the striker housing (10). The striker spring (9) pulls the striker through the acetone softened plastic body (5). The delay element (5) protrudes through a body washer (6) which rests against the bottom of the upper fuze body (3). A fiber washer (23) seals the bottom of the ampule cavity (22). The delay element support (8) rests under the body washer (6). The firing mechanism housing (15) is the rigid support for all fuze components. It threads into the bottom of the main fuze body and has recesses for the locking balls (11) and an annular groove for the balls to fall into. The two 0.25 inch locking balls (11) positively lock the striker (12) until impact frees them. The locking balls (11) are further retained in their recesses by a brass impact arming collar (13). The collar is maintained in the rear position by the impact arming spring (7).

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NORTH VIETNAMESE, CHEMICAL LONG DELAY FUZE: MODEL NNC 82

b. Characteristics.

Action -----chemical long delay

Loaded weight ----- 232.5 grams

Body material ----- aluminum

c. Functioning. Prior to firing, an ampule is installed in the fuze and crushed by tightening the nose plug (1). This releases acetone onto the delay element (5) that retains the striker (10) in the cocked position. The striker is further held in the safe position prior to impact by the two locking balls (11) seated under the striker housing flange (24). Nose impact is the only force that arms the fuze. Upon firing, setback locks all moveable parts firmly together. No arming movement occurs. Upon impact, the impact arming collar (13) moves forward compressing the impact spring (7). Simultaneously, the locking balls (11) fly out of their recesses due to inertia. The balls move into the circumferential grooves in the firing mechanism housing (15) and are held in this groove when the impact arming collar (15) is forced rearward by the spring (11). The striker (12) is now unlocked and the fuze armed. As the acetone softens the plastic delay element (5), the striker spring (9) pulls the head of the striker (4) through the softened plastic and propels the sharp pointed striker (12) into the stab sensitive detonator (17), causing the detonator and booster to detonate.

It is apparent the fuze may have the fuze ampule crushed at any time prior to firing. Until impact the fuze remains unarmed and safe. If the long delay period expires prior to firing, the fuze will detonate nondelay upon impact.

d. Weapons and projectiles with which fuze can be used.

Weapons

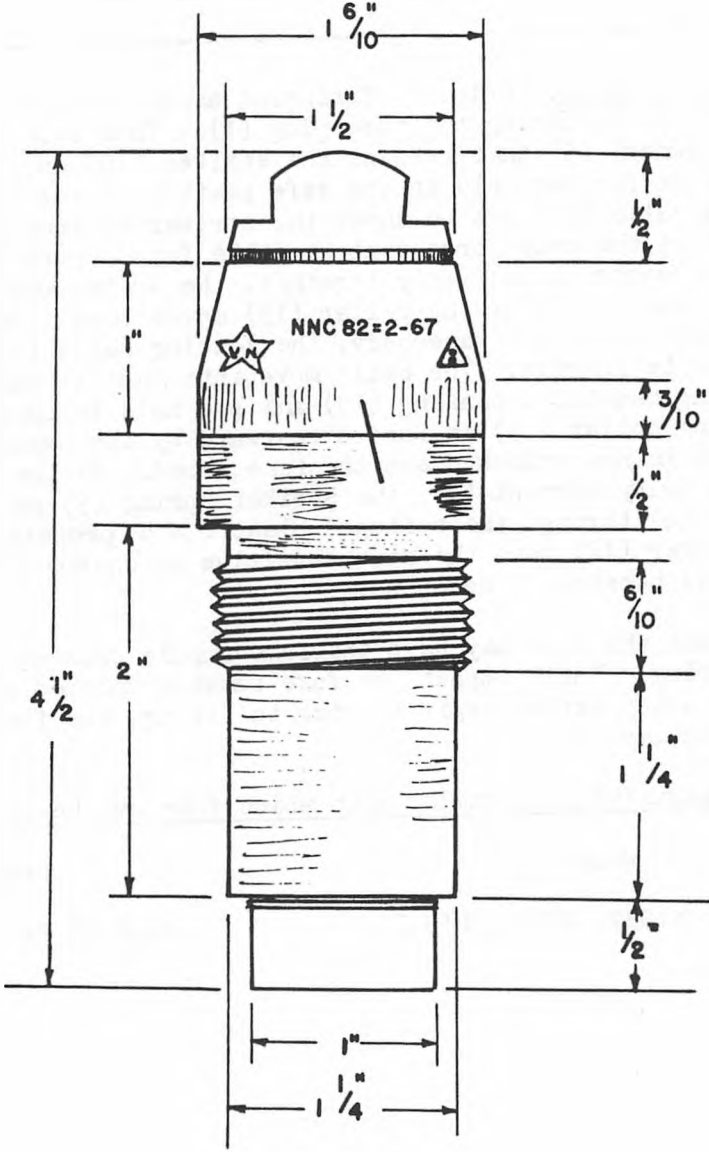
82mm mortar M1937, M1942, M1943

Projectiles

82mm HE Frag ----- O-832; O-832D

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NORTH VIETNAMESE, CHEMICAL LONG DELAY FUZE: MODEL NNC 82

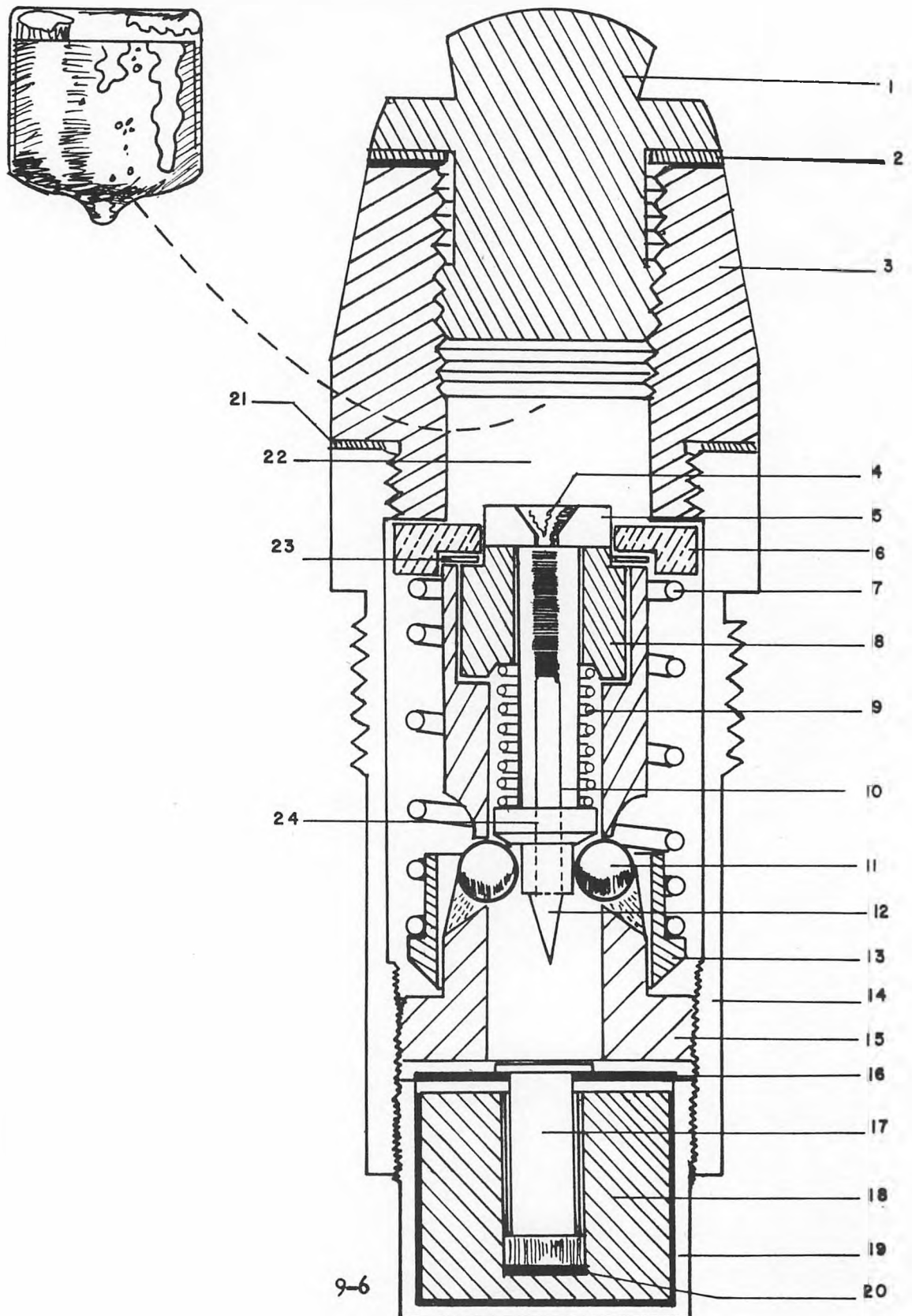


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NORTH VIETNAMESE, CHEMICAL LONG DELAY FUZE MODEL: NNC 82



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