

TM 9-1985-6/TO 39B-1A-8

ITALIAN
AND
FRENCH
EXPLOSIVE ORDNANCE



United States Government Printing Office
Washington : 1953

Chapter 5

ITALIAN HAND AND MORTAR GRENADES

Italian high-explosive anti-personnel hand grenades are almost totally of the "offensive" type. Although the loading factor is usually low, the grenade bodies are not adapted for maximum fragmentation. The anti-tank grenades are adaptations of the anti-personnel grenades with an additional charge. There is no evidence of the use of shaped charges in Italian anti-tank grenades. Likewise, the chemical grenades that are not frangible are made of adapted anti-personnel grenade bodies and mechanisms with a chemical filler. The Italians did not make use of the rifle grenade, but did use a small mortar, not unlike a grenade projector, to fire a mortar grenade.

Italian grenades are of the impact type. They incorporate an "all-ways" acting fuze which arms in flight. For that reason, grenades in the armed position are very sensitive.

Breda Hand Grenades Mod 35, Mod 40, and Mod 42

Data

Over-all length	
Mod 35	3.8 in.
Mod 40	9.5 in.
Mod 42	12 in.
Maximum diameter	
Mod 35 and Mod 40	2.1 in.
Mod 42	3.62 in.
Type of filling	TNT
Weight of filling	
Mod 35 and Mod 40	2.1 ounces
Mod 42	Unknown
Color	Body red, Safety cap black
Total weight	
Mod 35	7 ounces
Mod 40	Unknown
Mod 42	2.75 lb.

Description

Types Mod 40 and Mod 42 incorporate the M35 in their construction. The Mod 40 is a Mod

35 with a hollow wooden handle attached, and the Mod 42 is a Mod 40 with a light metal globe $3\frac{5}{8}$ in. diameter screwed onto the bottom to give an additional charge for anti-tank use. The other types are for anti-personnel use.

The Mod 35 grenade is longer and thinner than the S. R. C. M. 35 grenade and has hemispherical ends. It consists of a thin aluminum case in two parts. The safety strip is in the form of an elongated U and passes through the grenade on either side of the channel-shaped safety device. The ends of the strip pass into slots in the top of a loose metal piece which is retained by a pin in the large safety cap (of light aluminum). The striker pin is attached to the heavy head.

Around the detonator tube is a perforated metal tube attached to the striker head. The spring maintains the striker away from the detonator until impact.

Operation

On withdrawal of the safety strip, the safety cap is freed. At one end it is attached to a brass strip which is wound twice around the head of the grenade, and attached at the other end to the safety device. During flight, the safety cap pulls this out, arming the grenade so that it fires on impact.

Hand Grenade O.T.O. Mod 35

Data

Over-all length	3.4 in.
Maximum diameter	2.1 in.
Color	Body red, Safety cap black
Total weight	7.4 ounces
Filling	TNT
Weight of filling	2.5 ounces

Description

This grenade is composed of a very light casing of metal, made in two parts: a flat lower cylinder, and, screwed to this, a cylinder of smaller diameter which has a truncated cone-shaped top.

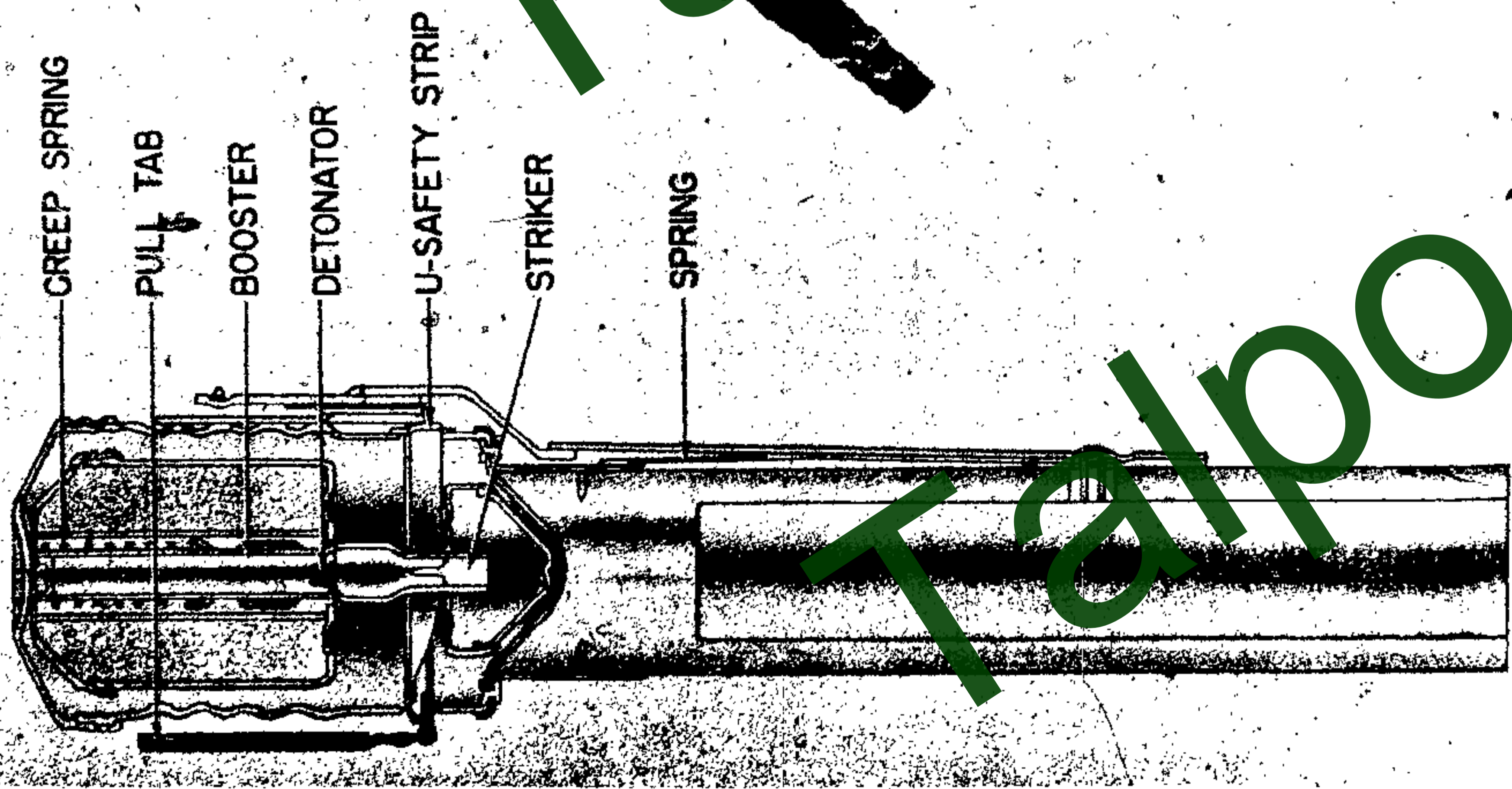


Figure 226 — Breda Hand Grenades M40, M35, and M42

ITALIAN HAND AND MORTAR GRENADES

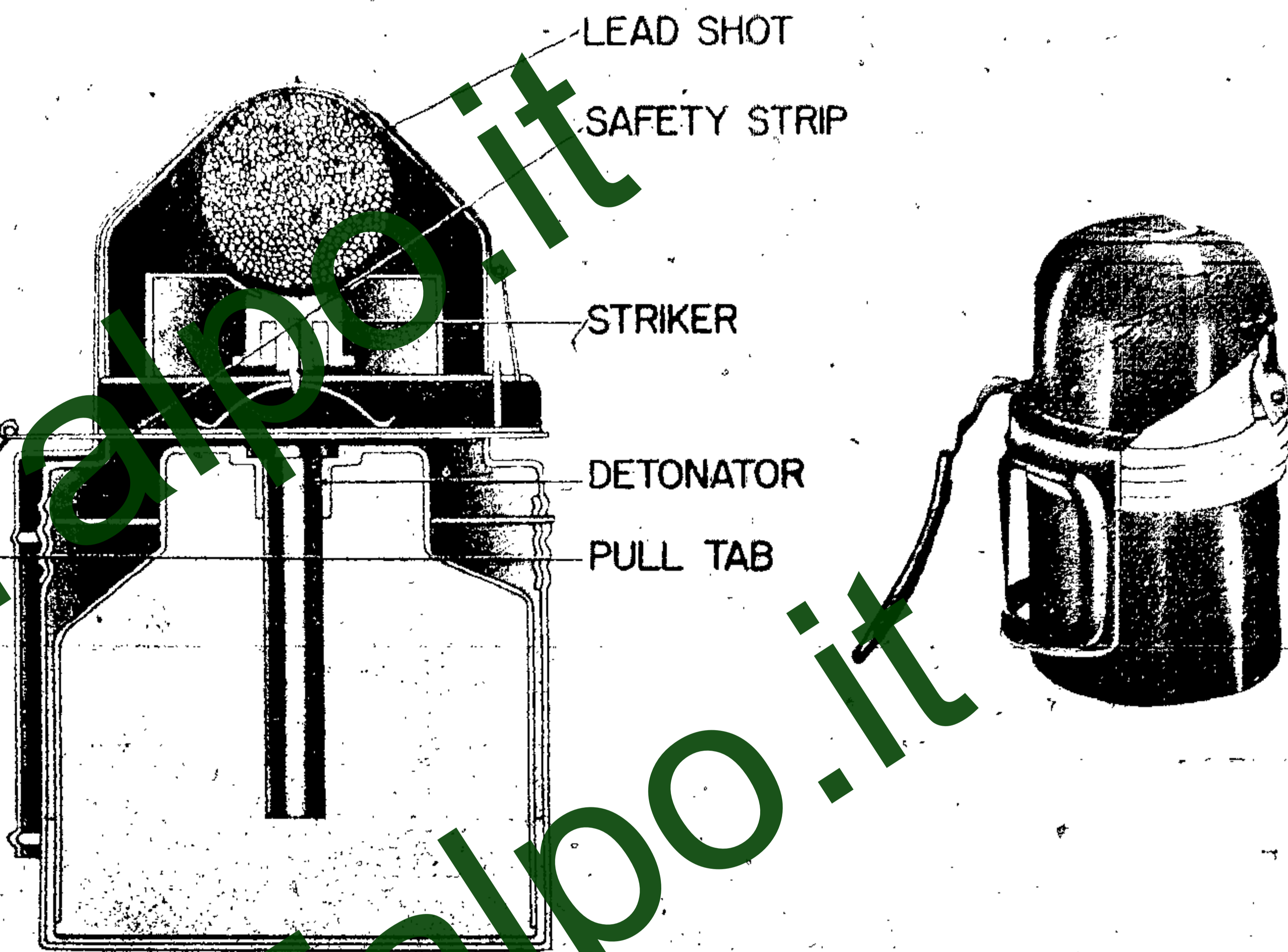


Figure 227. Hand Grenade O.T.O. Mod 35

The safety pin consists of two long brass strips and one short brass strip. The two longer strips pass one on either side of the base of the channel-shaped safety device, and the short strip engages and locks in a slot in the body of the grenade. The striker is riveted to the cap, the top of which is shaped to take the heavy metal ball. The explosive is contained in a metal box which has a well in it for the detonator. A spring holds the striker away from the detonator.

Operation

On withdrawal of the pin, the safety cap (of light aluminum) is freed so that it becomes disengaged during flight. The cap is hinged and by its weight withdraws the channel-shaped safety device. The grenade is then armed to fire upon impact. In trial with this grenade, no ill effects were felt by men standing 25 yards from the burst. There is practically no fragmentation, and the blast is only air.

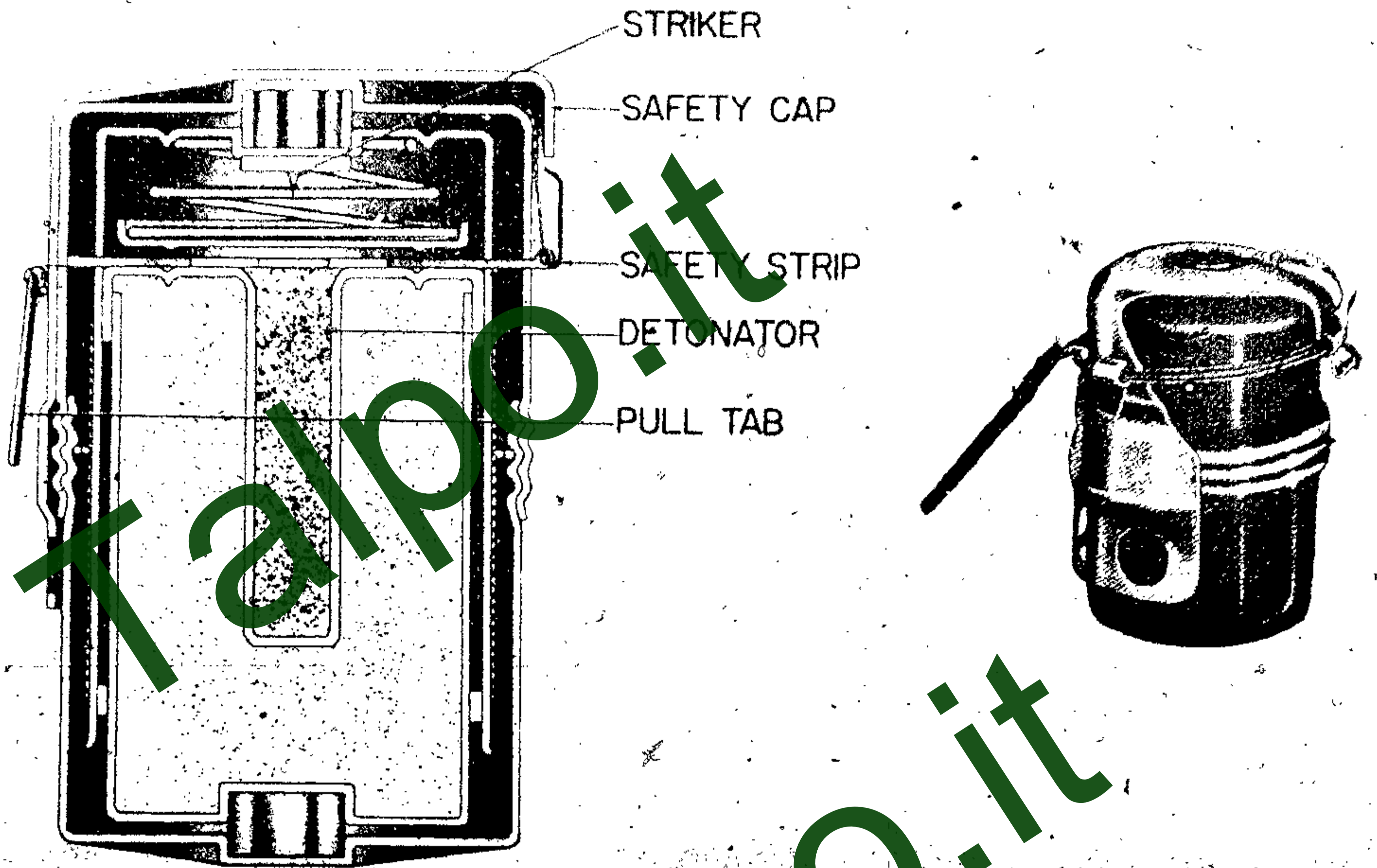


Figure 228 - Hand Grenade S.R.C.M. Mod 35

Hand Grenade S.R.C.M. Mod 35

Data

Over-all length.....	3.1 in. (8 cm)
Maximum diameter.....	2.5 in. (6.4 cm)
Color.....	Grenade red.
	Safety cap unpainted
Total weight.....	7 oz. (200 grams)
Type of filling.....	TNT
Weight of explosive.....	1.5 oz. (43 grams)

Description

The outer case is in two parts which screw together. Both parts are stamped to form a seating for the collar, and the upper part is cut to take the safety bars. Internally the grenade consists of two metal collars and two light metal cylinders. The striker is riveted to the head of the open cylinder, around the outside of which is wound some course wire to form the metal loading. The lower cylinder is a loose fit inside the upper one, and carries the explosive charge, a pressed block of impure TNT recessed to take the detonator. The cap contains the helical spring which holds the striker and detonator apart.

The safety strip passes over the ring and is bent up under it, so securing the safety cap (of light aluminum) to which the ring is attached. Between two safety strips is an elliptical metal strip, with an eccentric hole, whose ends are joined by a spring passing around the side of a cylinder. This acts as a safety shutter, and on impact one end jerks forward to a position in which the striker is centrally behind the hole in the shutter to fire the detonator. Two steel collars rest in recesses in the cylinders. If the grenade falls on its side, these are jerked from their seatings and force the cylinders together.

Operation

When the safety pin is withdrawn, the safety cap is free to disengage during flight and withdraw the second safety strip. The delay in arming is effected by means of a short chain, attached at one end to the safety cap and at the other to a safety strip. The bight of the chain is wound once around the stop. On impact, the safety shutter moves into alignment; the cylinders come together; and the striker impinges upon the detonator. There is only slight fragmentation from this grenade.

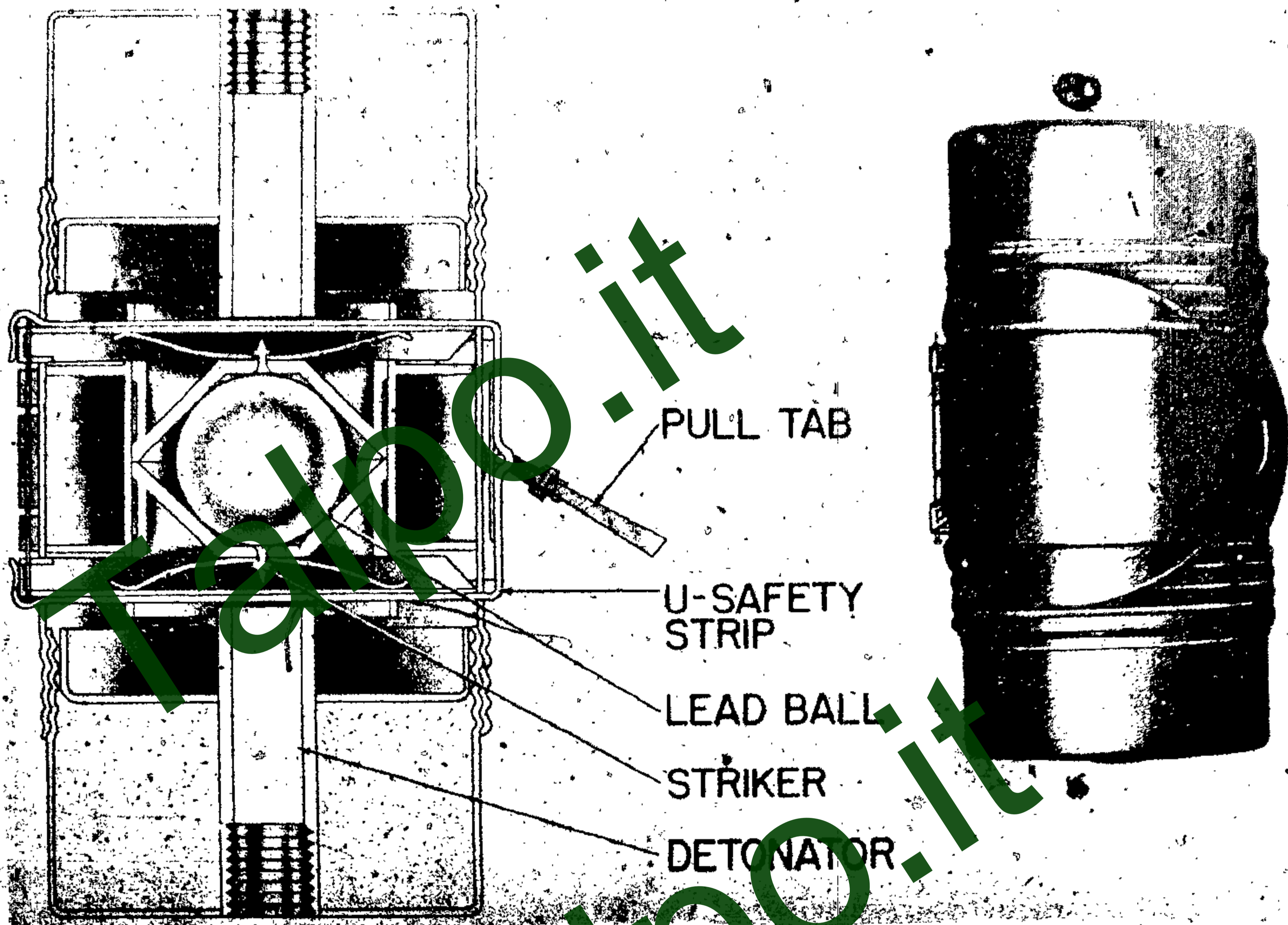


Figure 229 - P.C.R. Grenade

P.C.R. Grenade

Data

Over-all length.....	5½ in.
Maximum diameter.....	2½ in.
Color.....	Unpainted aluminum

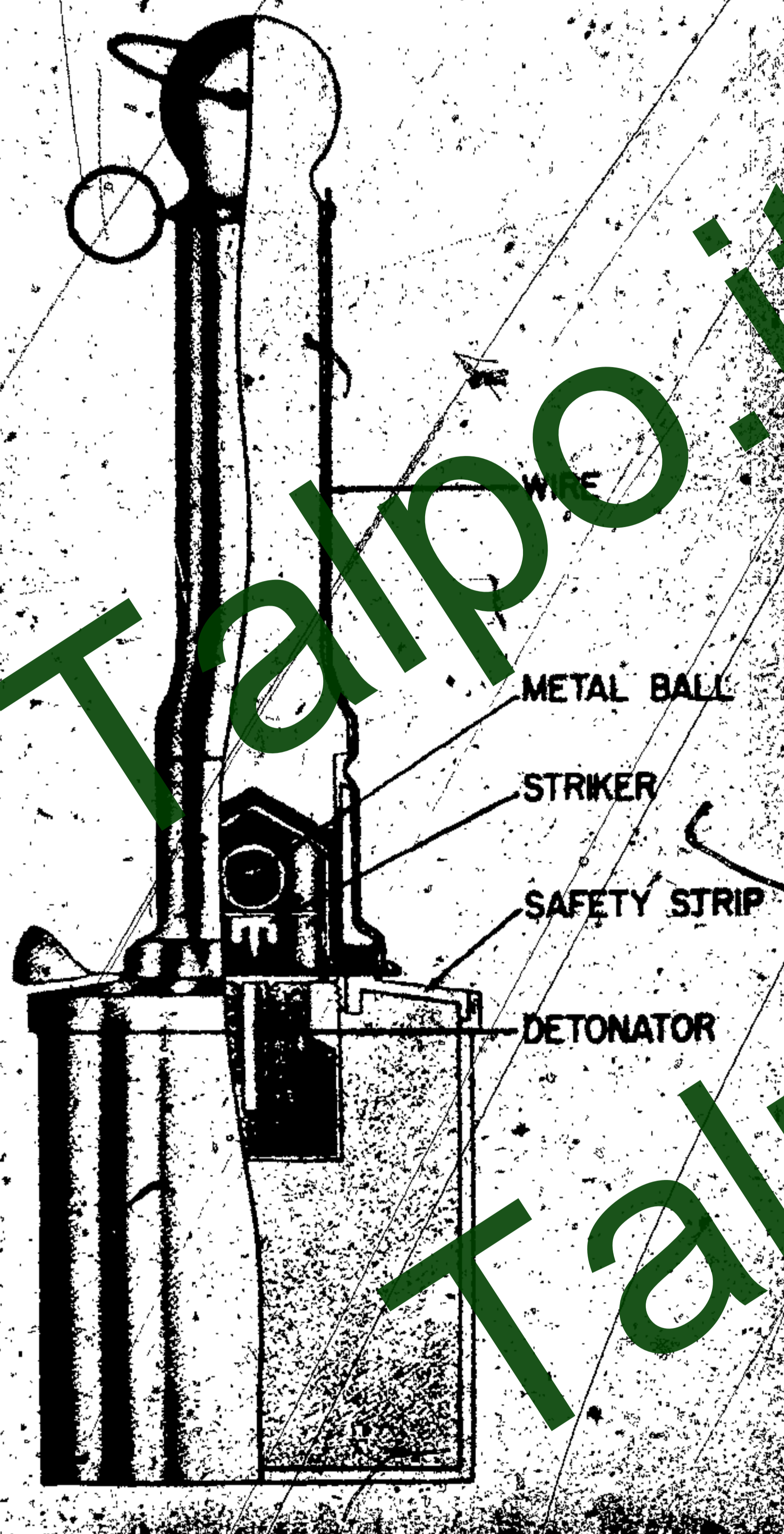
Description

The grenade body is of three parts, the two end caps threading into the middle section. Two shallow cones of aluminum, each with a striker and the center of a four-prong stirrup spring at its apex, are contained in a 1½-in. diameter cylinder held in the middle section by two collars. One of the cones is at each end of this cylinder and, in the space formed, is a heavy lead ball 1 in. in diameter. The action of the ball in this cavity makes the fuze "all-ways" acting. The detonators are held in two cylindrical tubes, one attached to the center of each end cap. The end cap is closed by a metal cover, and the explosive filling is contained there-

in. The first safety strip consists of a rubber pull tab and a one-piece U-shaped bar of light, soft metal. Each end of this passes through an opening in the middle section, between a striker and a detonator, to protrude slightly through the opposite side of the body. The second safety strip is attached to the hinged wing-shaped safety cap which passes around the body over the middle section. There are two bars, each to pass through the body and cover a striker. Thus each striker is held from its detonator by a stirrup spring and two safety bars.

Operation

The first safety strip is removed before throwing, and, when the grenade is thrown, the wing-shaped safety cap will open and pull off, extracting the second safety strip. Then each striker is held from its detonator by the light spring only, and the grenade will fire on impact.



Description

This grenade consists of a metal casing with a wooden throwing handle. A tab protrudes from the top of the casing. Pulling this tab removes a safety strip which, while in, blocks the striker from the detonator. There is also a small metal strip protruding from the base of the handle. This strip is held in position by a wire in the side of the handle. The wire is held in position by a piece of tape secured by a pin. The firing mechanism is always on, much like the O. T. O. Mod 35 Hand Grenade.

Operation

Before throwing this grenade, remove the safety strip attached to the tab. Then, holding the handle firmly, remove the pin. Be sure that the wire is held securely. When the grenade is thrown, the wire is released; this releases the small metal strip, which then moves over into a position so that the hole in it is in alignment with the striker and detonator. On impact, the striker and detonator are brought together, firing the grenade.

Remarks

This grenade was designed for use against vehicles and tanks. The grenade should be thrown at a distance of 5 to 20 meters from the target, and cover should be taken as protection against fragmentation. In the armed position, the grenade is very sensitive.

Breda Mortar Grenade

Data

Over-all length	5 1/4 in.
Maximum diameter	1 3/4 in.
Color	Body black; tail red
Type of filling	TNT

Description

The body of this grenade is steel, while the tail is of aluminum alloy. The two are screwed together. The steel cap is attached to a steel strip, and a double brass safety strip holds the cap in place. The safety strip passes through two slots near the head of the grenade, and lies in the recess of the zinc striker holder. The tail of the H. E. grenade is painted red to distinguish it from practice and instructional grenades, which have yellow and unpainted aluminum tails, respectively. It is fired from the 45-mm Light Mortar, Model 35-Brixia.

Figure 230 -- "L" Type Anti-Tank Hand Grenade

"L" Type Anti-Tank Hand Grenade

Data

Over-all length	15 in.
Maximum circumference	14 1/4 in.
Color	Body red; handle unpainted
Total weight	4 1/2 lb.
Length of handle	10 3/4 in.

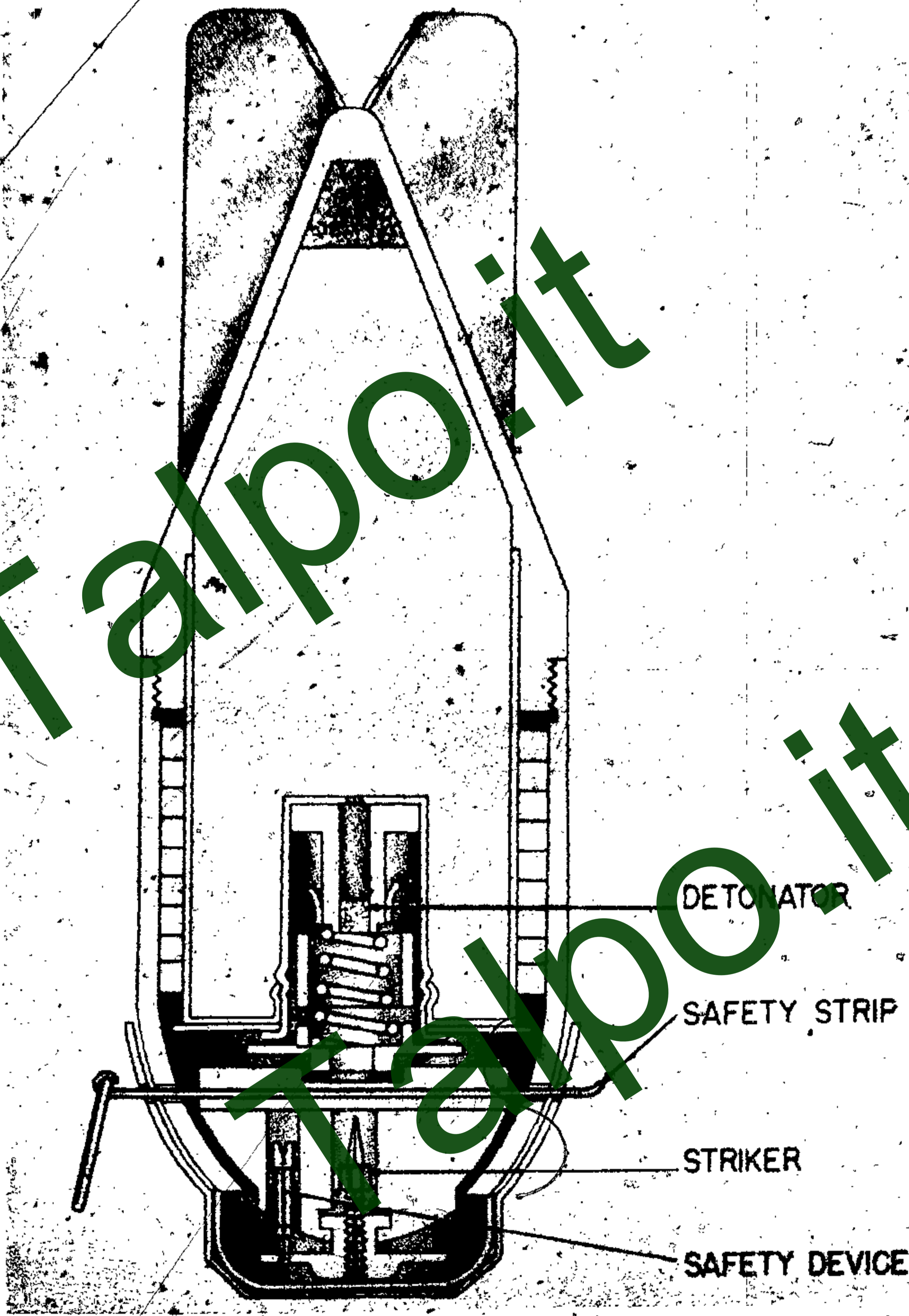


Figure 231 - Breda Mortar Grenade

Operation

On withdrawing the safety strip, the cap is freed; and, on firing, the setback causes the safety device to move down into its slot. This safety device consists of a short brass rod which projects into one of the holes in the disc and holds the disc from rotating. Four light brass spring strips hold the rod in the "setback" position. At the same time, the collar also sets back onto the firing-cap holder,

being held in position by the detent spring. The collar and holder then act as one, and can move under the influence of the spring. During flight, the disc rotates as air passes through the oblique holes near the edge of the disc. The striker, being prevented from rotating by the square shape of the portion moving in a square-shaped channel, is thus moved toward the detonator. The grenade is then armed. On impact, the detonator rides forward on the spring and hits the striker.



Figure 232 - Incendiary Bottle Grenade

Incendiary Bottle Grenade

Data

Bottle	-----	1-liter size
Color	-----	Transparent
Filling	-----	Inflammable liquid

Description

The incendiary grenade is made from an ordinary one-liter glass bottle, fitted with a metal pressure cap, and containing an inflammable liquid. A fuse match, protected by a canvas cover, is fixed to the side of the bottle by two rings of cord. To the top of the fuse is attached a fine cord, which, on being pulled, fires the fuse. To avoid accidental ignition by a chance drawing of the cord, the cord has a small wooden handle and is fixed to the neck of the bottle by a ring of thread.

Operation

Just before use, the wooden handle is freed by a

light pull on the ring of thread which is securing it to the neck of the bottle. The handle is then given a sharp pull, and a small flame will appear at the lower end of the fuze. The bottle should then be thrown with force against the target. If the bottle is not thrown immediately, it may burst before reaching the target. A minimum of two seconds is given between the lighting of the fuse and the bursting of the bottle. The Italians consider the grenade to be a good weapon for defense against F. V.'s at close quarters.

Miscellaneous Hand Grenades

SMOKE HAND GRENADES

Types

- S. R. C. M. Model 35 F
- O. T. O. Model 35 F
- Breda Model 35 F

Markings

Top part red; lower part black; white letter F (Fumogeno) on black background.

Description

These grenades are similar in construction to H. E. equivalents, but contain a liquid smoke filling, mixture of chlorosulfonic acid and sulphur trioxide. They produce a fairly dense white smoke cloud of two to three yards front, but cannot be used if wind strength is above 7 m. p. h.



Figure 233 - Breda Drill Grenade

Operation

Same as H. E. equivalents

SMOKE INCENDIARY HAND GRENADES

Types

- | | |
|---------------------|-------------|
| 1. S. R. C. M. | Model 35 FI |
| 2. O. T. O. | Model 35 FI |
| 3. Breda | Model 35 FI |

Markings

Top part red; lower part black; letters FI on black background.

Description

Correspond to H. E. equivalents, with explosive filling replaced by a charge of white phosphorus. The burst creates a dense white smoke covering an area of about 10 by 4 yards.

Operation

Same as H. E. equivalents.

PRACTICE AND DRILL GRENADES

1. The grenade containing a small charge is white, with a 1/2-in. red band around the place where the two parts of the body join.

2. The instruction or drill grenade is unpainted or black.

3. The practice grenade with a smoke filter is yellow.

S. R. C. M. Mod 35 Practice Grenade is recognizable by six large holes cut in its body above and below the screw threads. The lower cylinder containing the H. E. charge is replaced by a brass

cylinder having a truncated conical bottom with four holes in it. This cylinder holds smoke-producing charge in a celluloid container. The shutter is simplified so that there is no "safe" position at impact.

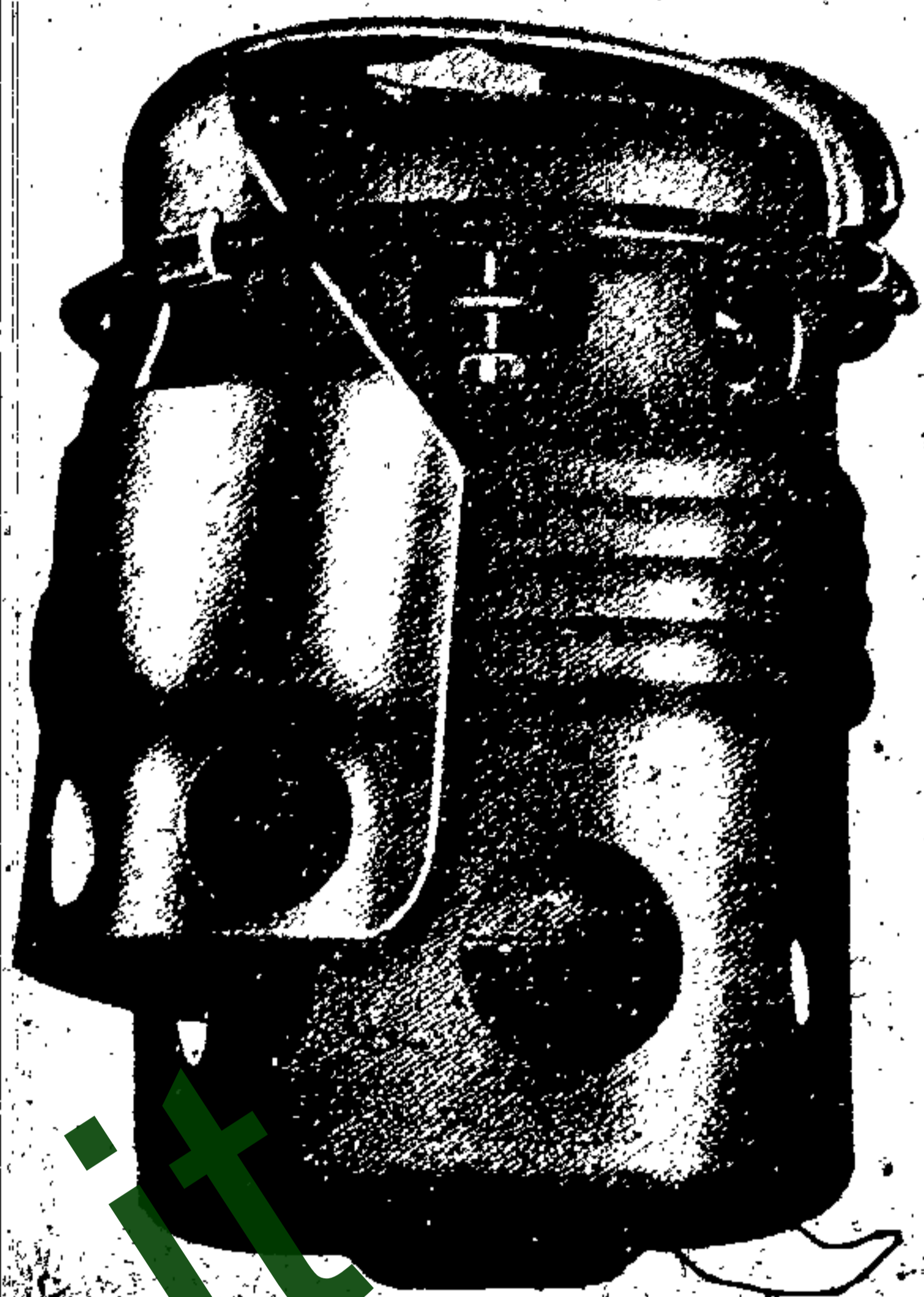


Figure 234 - S.R.C.M. Practice Grenade

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Figure 235 – Picket Mine (Anti-Personnel)

ITALIAN MINES AND TRAPS

Italian anti-personnel mines are operated by pressure or trip wires. They were often difficult to detect, especially those operated by pressure in which only a portion of the lid or igniter may appear above the ground. The Italians used bakelite and wood in the construction of some mines to prevent detection by magnetic instruments.

Anti-tank mines vary in appearance. They are tubular, rectangular or circular in shape. Some are made of bakelite or wood to prevent detection.

Improvised mines seem to have been the Italian specialty in the field. They used a majority of the improvised mines in Abyssinia, since the supply of standard mines was apparently limited. Most of these mines were of wooden construction and used blocks of TNT for the explosive. Sometimes shells were used for explosive and shrapnel for mines.

Picket Mine—Anti-Personnel Mine**Data**

Over-all length	17.6 in. (with picket)
Over-all length	5.7 in. (without picket)
Body diameter	1.6 in.
Type of filling	TNT
Weight of filling	100 grams
Total weight	1.75 lb.

Description

The mine proper consists of a thin sheet metal cylinder around which is wound the strip metal loading. The mine is mounted on a wooden picket and contains a 100-gram cartridge of TNT. The mine is closed by a screw-on lid which carries the spring-loaded striker.

Riveted to the underside of the lid is the stirrup-shaped holder, into the center of which is pressed the detonator-locating tube. Passing diametrically through the lid, through slots in the side, is the aluminum cap holder, which is located in the armed and unarmed positions by the spring. The coiled end of the spring engages in the groove in the armed position and in the groove in the unarmed position.

The loops at the ends of the cap holders enable the cap holders to be pulled into the armed position by remote control and at the same time prevent it from being pulled out completely.

Operation

To arm the mine, the striker is pulled out, and a pin is inserted in the lower hold. A trip wire is attached to the pin. Then a detonator cap is inserted in the cap holder, and the holder pulls into the armed position.

Functioning

The trip wire is pulled, and the spring-loaded striker hits the detonator.

Mine B-4—Anti-Personnel Mine**Data**

Over-all length	8 in. (approx.)
Type of filling	TNT
Weight of filling	25 lb.
Total weight	3.0 lb.

Description

The mine consists of two cylinders, one inside the other. The space between the walls is filled with scrap metal. The outer cylinder is flattened on one side, where there are six sharp projections for attaching the mine to a tree or post. Two clips are provided with fireproof cord for securing the mine by special rings.

The cylinders are held together at their common base and by a cover at the top. Into one end of the brass moulding, screws a brass cap carrying the striker and the spring. Below this there is the percussion cap in the holder which is inserted from the side. The lower portion of the moulding takes the detonator and the charge. The open end of the moulding is closed by the plug. The cavity between the brass moulding and the inner cylinder is filled with powdered TNT. The trip-release system consists of a trip-key having a ring at one end, to which the cords are attached.

The key is held by the grooves in the brass cap so that it can move slightly in a direction parallel to the end of the mine. This allows the key to fit

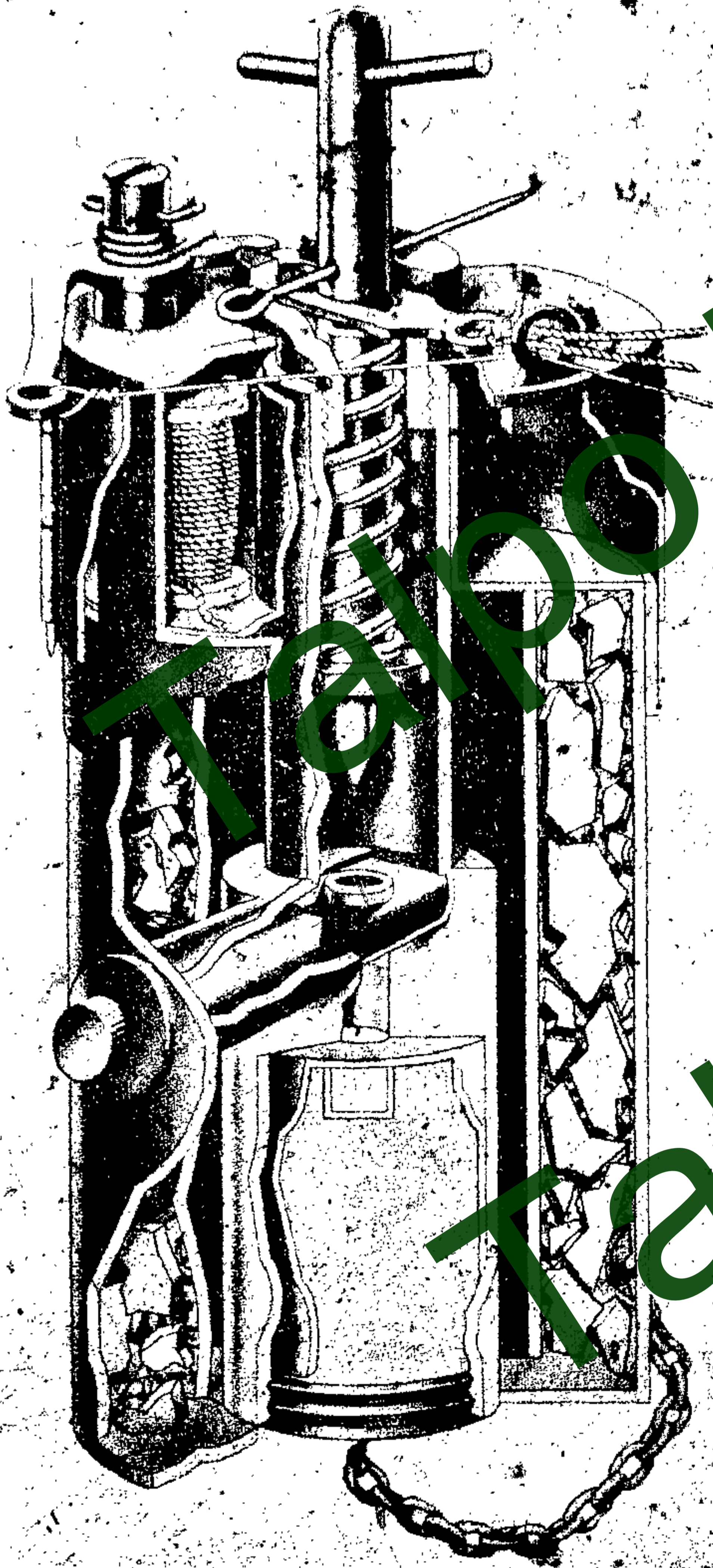


Figure 236 -- Mine B-4 -- Anti-Personnel Mine

into the groove on the striker when in the armed position. A ring guides the cords which are wound on a bobbin, the latter being covered by a hinged flap, held closed by the pin. The pin is used as the safety pin before setting the mine.

There is a special mechanism for detonating the mine, when a cord attached to the trip-release is cut. This mechanism is in the form of a hammer on the cover which is set by attaching the thin cord to the eye and stretching it under sufficient tension to hold the hammer at least 4 mm from the end of the trip-key. When the cord is cut, the hammer drives the trip-key forward, releasing the striker. This hammer is not provided on all B-4 mines.

Italian Bakelite and Wooden 1-Lb. Mine—
Anti-Personnel

Data

Over-all length	-----	5.5 in.
Over-all width	-----	2.5 in.
Over-all height	-----	1.5 in.
Type of filling	-----	TNT
Wooden	-----	.33 lb.
Total weight (wooden)	-----	1 lb.

Description

These two mines are similar except that one case is bakelite and the other is wood. The igniter used has a spring-loaded striker held in the cocked position by a trip key, and has a cap and detonator leading into the main charge. The lid of the mine has, in one end, a slot which fits around the striker and rests on the trip-key. The mine also contains metal fragmentation plates on three sides of the charge.

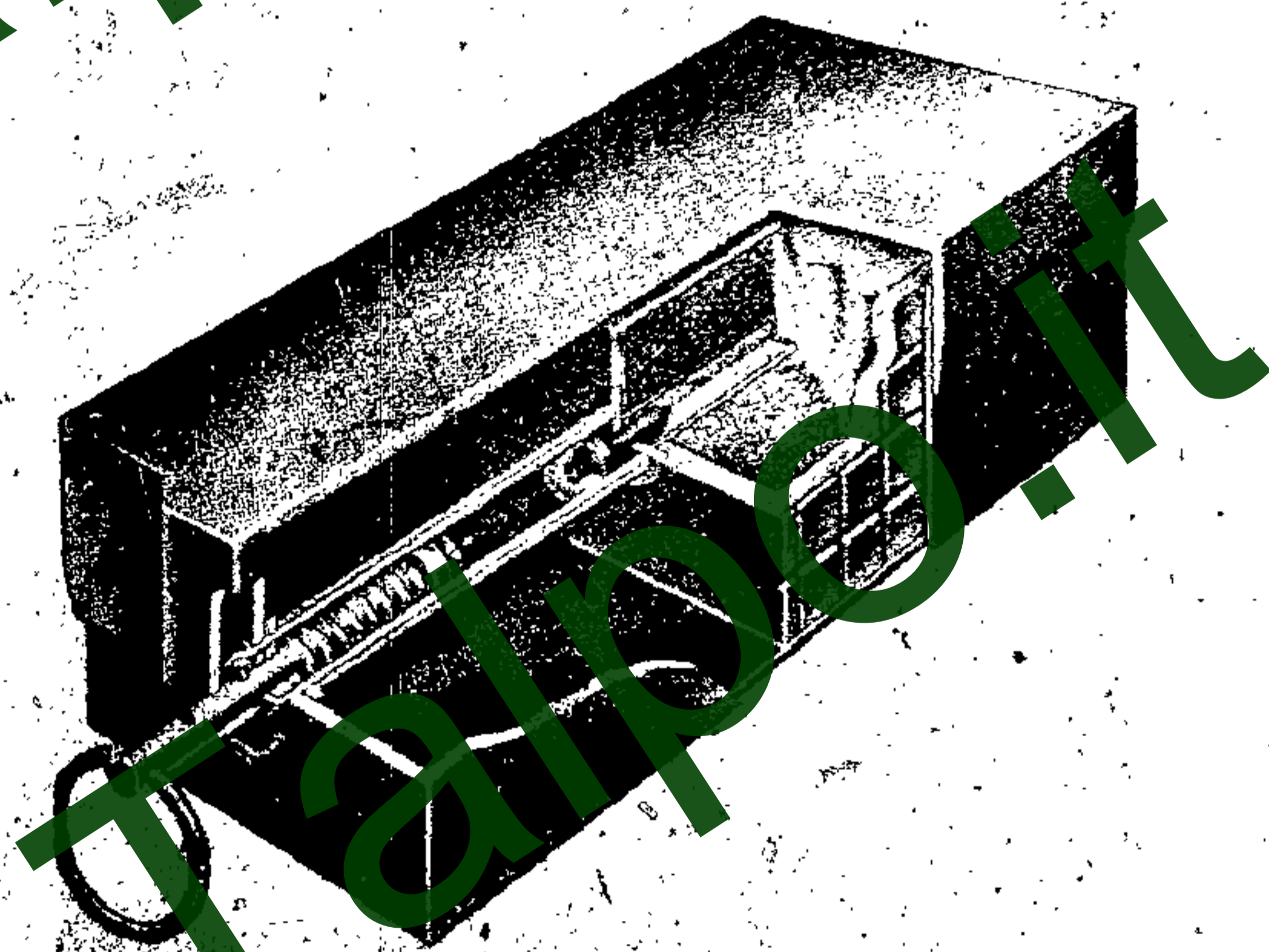


Figure 237 -- Bakelite Mine -- Anti-Personnel

Operation

One to five pounds pressure on the hinged lid presses the trip-key out of the hole in the striker. This action releases the striker, which is driven by the striker spring into the cap, detonating the main charge.

Ratchet Mine (Railroad Mine)

Data

Over-all length	9 1/2 in.
Over-all width	6 in.
Over-all height	4 1/8 in.
Type of filling	Unknown
Weight of filling	6.1 lbs.
Total weight	18 lbs.

Description

The mine consists of two parts: the explosive container and the housing for the ratchet mechanism. A hinged wooden device with the leather strap is provided for carrying the mine. The wooden base is screwed to the base of the mine, and a loop in the strap holds the ratchet winding key.

The explosive container of the mine is fitted with a short skirt which is a sliding fit over the upper portion of the housing. The two parts are attached to each other by two bolts and held apart by two springs, which are canvas-covered to insure their free movement when buried below ground. The bolt heads are protected by the covers.

Through the top of the housing projects a spring-loaded plunger, which operates the ratchet mechanism. The striker, which initiates the detonation of the mine, is retained by a ratchet wheel having 60 teeth on its periphery. This latter may be set to release the striker after any desired number up to 59 depressions of the explosive container. The setting is made by the use of a key inserted in the hole situated below the setting observation window in the side of the mine.

The mine is designed for use under railway tracks, and the ingenious use of lead shot in the hollow spring-loaded platform insures a continuous rigid contact between the explosive container and the underside of the railway sleeper or rail. The lead shot is inserted before laying the mine by removal of the screw in the center of the platform. The platform is released, when the mine has been positioned, by removing the retaining pin.

Repeated operations of the ratchet mechanism by successive wheels of the same train is obviated by means of a delayed return of the ratchet pawl.

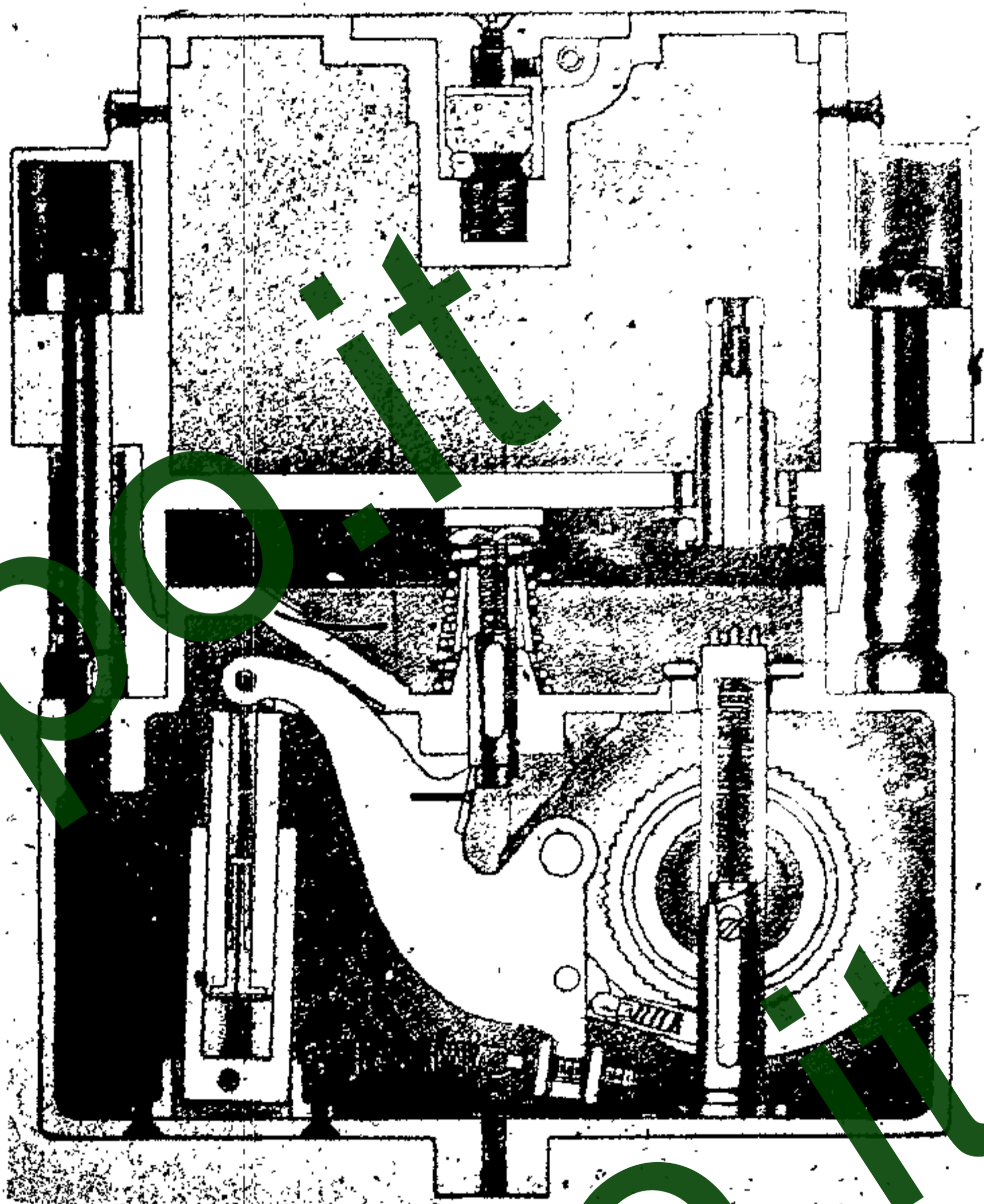
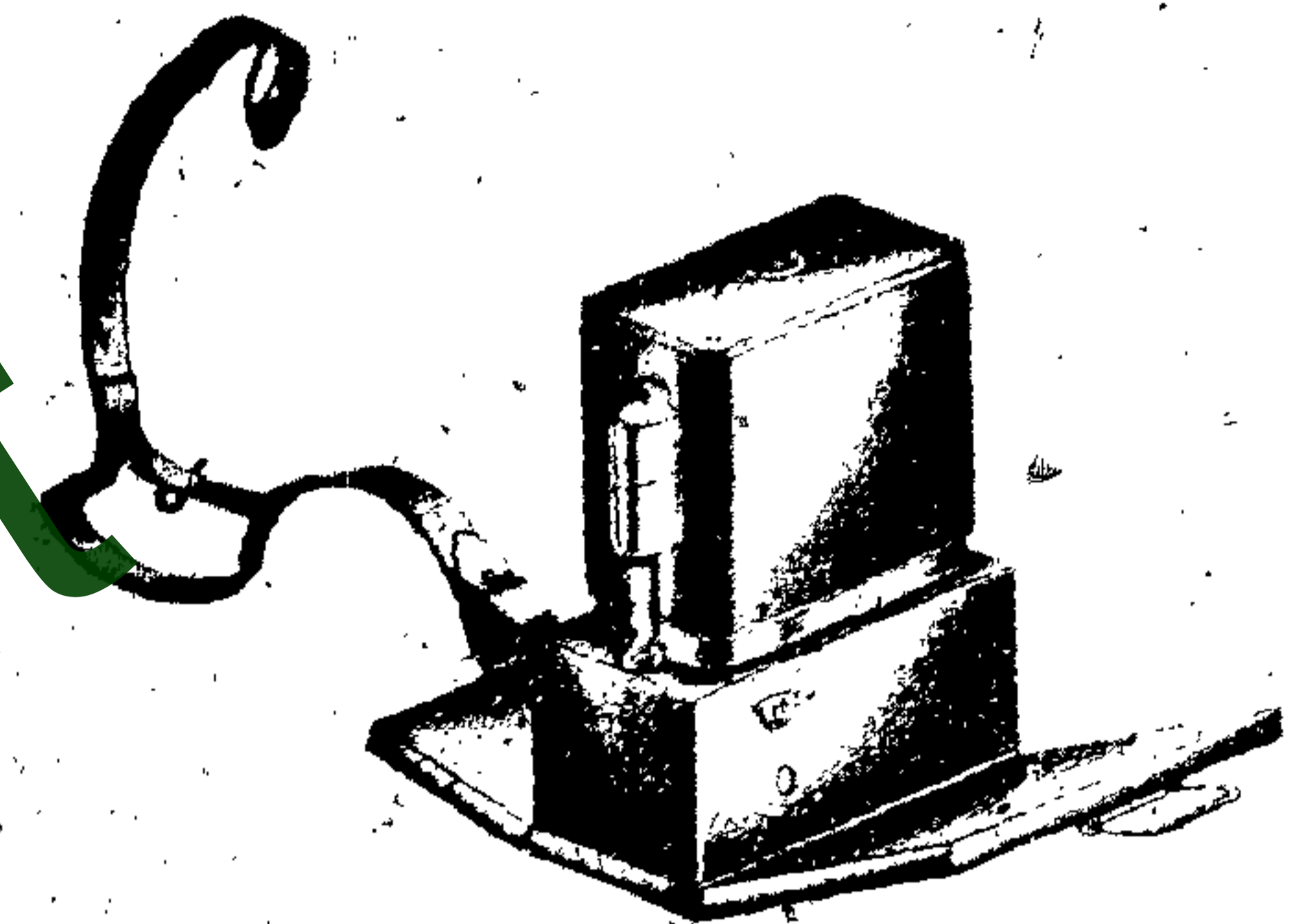


Figure 238 - Ratchet Mine (Railroad Mine)

Provision is made for the attachment of an additional igniter by the screw-threaded adapter in the side of the explosive container.

Railway Mine

Data

Over-all diameter	12 in.
Over-all height	4 in.
Type of filling	Gelignite

Description

This mine is made of a light alloy. The lid, which

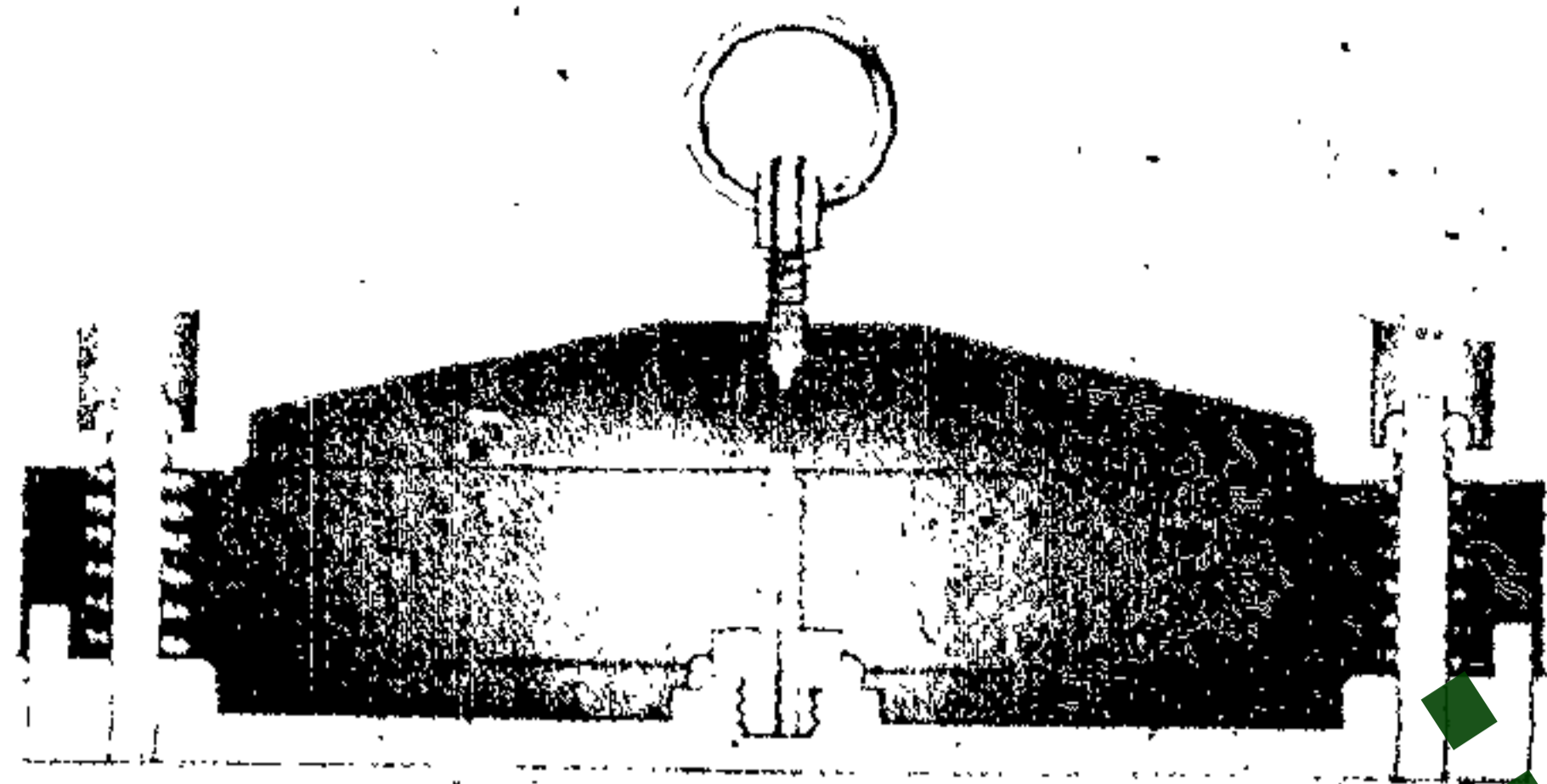


Figure 239 - Railway Mine

is attached to body by four bolts, is recessed to take the four bolts with hexagonal nuts. The lid is supported on four springs and thus holds the striker away from the detonator.

In the unarmed condition, the striker with its ring is screwed into a recess in the side of the mine. When arming the mine, the striker is placed in position over the detonator.

Operation.

Pressure on the lid forces the springs down, and the striker pierces the detonator, setting off the main charge.

Wooden Box Mine (Anti-Tank)

Data

Over-all length.....	9.5 in.
Over-all width.....	8.0 in.
Over-all height.....	8.0 in.
Type of filling.....	Gelignite
Weight of filling.....	2.5 kg.
Total weight.....	3.3 kg.

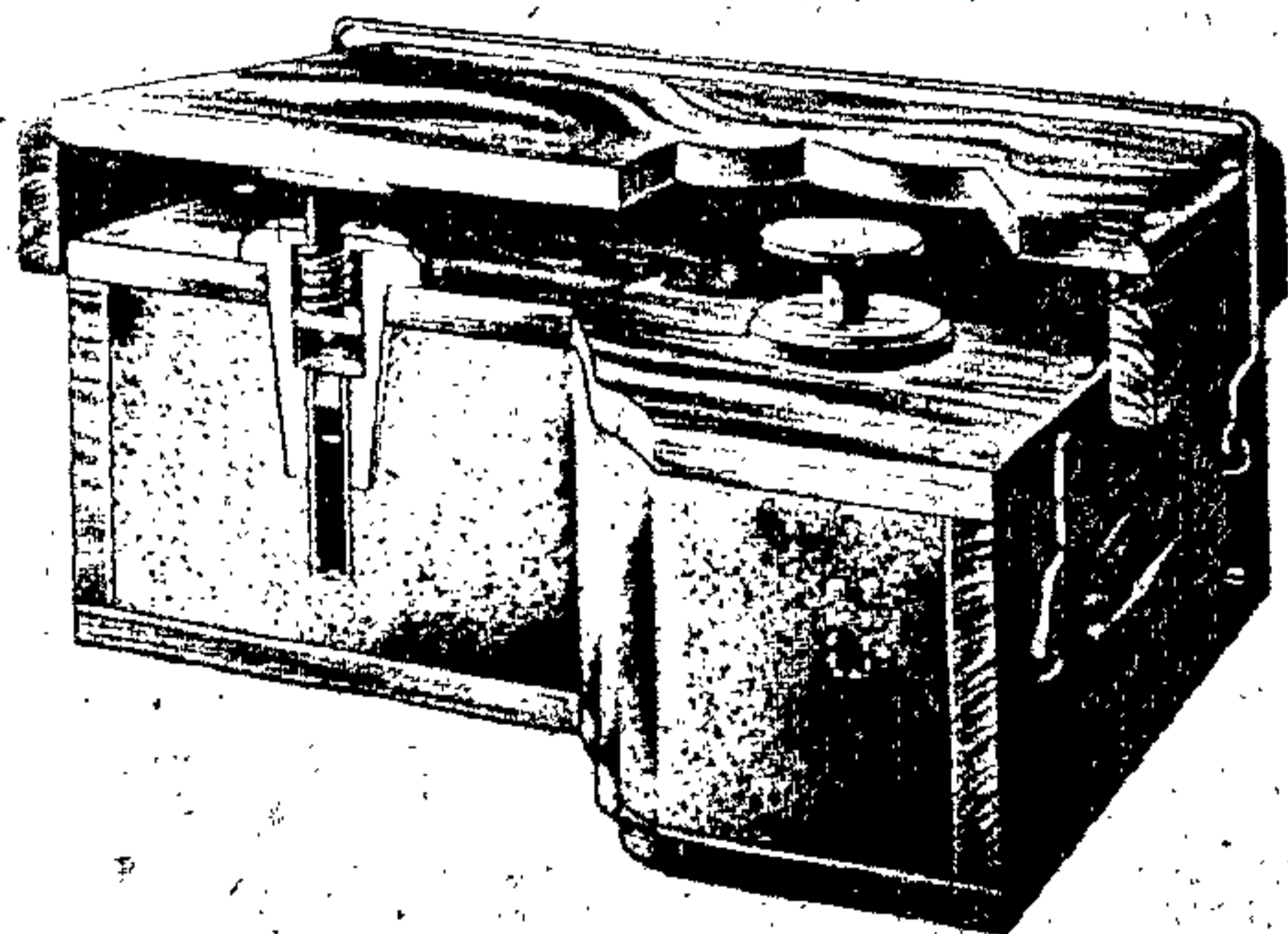


Figure 240 - Wooden Box Mine (Anti-Tank)

Description

The mine consists of a wooden box which houses the explosive charge, a false lid, two igniters, and a separate wooden cover. The explosive charge smells strongly of almonds; it consists of 24 cartridges, weighing 100 grams; is 5 in. long and 1 1/2 in. in diameter.

In the false lid are two holes, each 1/4 in. in diameter, to receive the igniters. Igniters have an aluminum alloy body which tapers slightly and has a mushroom-shaped head. The head is recessed to accommodate a steel washer, through which passes the shank of the striker. The striker spring is maintained compressed between this washer and the striker head by means of a copper shear pin.

Below the striker is the detonator, and the latter is a push-fit into the base of the igniter. On the underside of the mine cover are two metal plates, located above the igniters and intended to bear upon the strikers. The mine cover is held in position by two wire retaining straps, which can rotate about the pins, securing them to the mine body. All the parts are nailed together. The mine is crossed inside and out.

Operation

Pressure from 185 to 380 lb. on the cover shears the copper shear pins, and the springs drive the strikers onto the detonators.

Four Igniter Mine—Anti-Tank Mine

Data

Over-all length.....	12.25 in.
Over-all width.....	10 in.
Over-all height.....	6.25 in.
Type of filling.....	TNT
Weight of filling.....	11 lb.

Description

Four holes in the lid of this box accommodate four igniters, and the mine is completed by the addition of a false lid which consists of a movable pressure platform attached to a wooden frame by means of canvas.

When assembled, the framework is secured to the mine body by four clips, and the pressure platform rests on top of the four igniters with the canvas fully stretched. The whole mine is painted for camouflage. There is a single rope, carrying handle.

Two types of igniters have been used in this mine. One consists of a bakelite cone to which a bakelite lid is cemented. A projection below the cone fits into an ordinary detonator, and the latter is then pressed on. Within the cone is a small paper cylinder

containing small pieces of hard limestone mixed with a small quantity of a chlorate flash mixture. Pressure on the mine lid, the bakelite cones, and friction between the hard limestone and the chlorate mixture, produces a flash which ignites the detonators, initiating the mine. The other igniter is also bakelite, but is of more robust construction.

The base of the body is screw-threaded to take the plug which retains the detonator. The detonator contains a cap, and a thin bakelite washer is inserted above this cap to give clearance for the striker needle and to insure that the detonator is held securely by the plug.

The striker holder rests on a conical boss within the body of the igniter, and the latter is closed by a push-fit cover. The igniter functions when pressure on the lid of the mine causes the igniter body to break down and force the needle onto the cap. Trials have shown that the mine, when fitted with this igniter, functions under a static load of approximately 300 lb.

Operation

Pressure on the lid causes the igniters to function, detonating the main charge.

Anti-Tank Mine B-2

Data

Over-all length	3 ft. 6 in.
Over-all width	5 in.
Height	4.7 in.
Type of filling	TNT
Weight of filling	7 lb.
Total weight	33 lb.
Firing pressure (On each spring)	220 lb.

Description

This mine, the latest development of older types "S. C. G." and "hinged lid," consists of a welded sheet-metal box with a metal lid resting on two springs. The lid has two openings covered by hinged flaps corresponding to the positions of the striker assembly and the wire-tensioning screw.

At the ends of the box are charges, each consisting of eight 200-gram slabs of TNT. On the underside of the lid are welded two short lengths of steel tube to fit into springs; two similar lengths of tube are welded on the base of the box; all four serve to locate the springs.

The explosive compartments and the foundation of the ignition mechanism are wood. In the center of the lid, a knife is located directly above the guides.



**Figure 241.—Four-Igniter Mine —
Anti-Tank Mine**

Through these guides passes a tension wire, fastening the striker to a brass adjustable hook.

The striker mechanism consists of a body with a slot for the percussion cap and holder, and the striker and spring. The nut retains one end of the spring; the thread takes the nut which retains the detonator (open and toward the percussion cap); a short length of D. I. D., and a long length of D. I. D. connecting the detonator with a second charge.

A tie-rod with a spring provides against premature firing in the event of damage to the tension wire, and, when the lid is depressed, insures normal

V-3 and V-5—Anti-Tank Mines

Data

Over-all length	3 ft. 8.9 in.
Over-all width	2.4 in.
Over-all height	2.7 in.
Type of filling	TNT
Weight of filling	16 lb.
Total weight	17 lb.

Description

V-3: The mine is made of sheet steel, its body strengthened by two partitions. The charge extends between two firing mechanisms. The cover is secured to the body by concave-headed nuts, engaging on actuating bolts positioned by springs resting between a nut on the underside of the cover and a plate covering the firing mechanism.

When the nuts beneath the lid are screwed down, the springs compress, increasing the pressure required to operate the mine. Unscrewing the nuts makes the mine more sensitive to pressure; as little as 22 lb. weight can be made to trip the striker. The underside of the cover has two knives engaging in guides provided to take copper pins. (A weight of 264 lb. is required to shear the pins.) At each end of the body are cocking grips, pulled to cock the firing pins. The mechanism is shown. When the striker spring is compressed, the flange of the striker is held by a cotter on a U-shaped spring clip. A percussion cap is accommodated in a holder which is inserted in a hole in the side of the mine. The holder passes into an annular space in the striker body, held there by a blade retaining spring engaging in the slot. The actuating pin inserted through a hole in the side of the body is the connection between an actuating bolt and the U-shaped spring clip carrying the cotter.

The pressure applied to the mine cover forces down the actuating bolt against the spring, which comes into contact with the actuating pin, causing a



Figure 242—Anti-Tank Mine B-2

function by pressure on the lever, which releases the detent. This additional safety device is not found on all types.

A safety pin placed on a hole in the body of the striker remains in position until the mine is loaded, the hinged flaps are closed, and the mine is covered with earth. The mine functions when pressure on the lid overcomes the resistance of springs, the cutting blade descends to sever the wire holding the striker, and the lid depresses the detent lever.

Remarks

1. Type S. C. G. differs in that the lid has only one opening and has a small charge.
2. Type (Hinged Lid) was the earliest type, was smaller, and was made of wood.



Figure 243—V-3 Anti-Tank Mine

U-shaped spring clip to depress against the retaining spring. The flange thus freed allows the striker to initiate the percussion cap and fire the detonator.

V-8. Similar to V-3, except for reduction of charge to 2 pounds of cylindrical borehole charge, omission of shear wire, and inversion of parts so V-5 has appearance of V-3 upside down.

Pignone Type I and Type II—Bakelite Anti-Tank Mines

Data

	Type I	Type II
Overall diameter	13 in.	13 in.
Diameter of casing	11.87 in.	11.87 in.
Overall height	5.42 in.	5.5 in.
Weight of casing	3 lb.	5 lb.
Type of filling	TNT	TNP
Weight of filling	7 lb.	7 lb.
Activating pressure	110 lb.	300 lb.

Description

Mines are constructed of moulded bakelite; both types are of waterproof design. Metal parts in the

mines when armed are:

1. The case of the detonator
2. The brass striker pellet and its helical spring
3. The brass bush which houses the striker pellet, two steel balls, and brass shear pins
4. A perforated steel bar which slides to prevent the striker from the detonator in the inactive position.
5. Brass tumblers in the igniter locking device
6. Nine steel helical creep springs supporting the pressure plate.
7. In Type I, the steel wires supporting the pressure plate.

Type I. The casing containing the explosive is in two halves, top and bottom, being respectively $\frac{1}{2}$ in. and $\frac{1}{32}$ in. thick. They are moulded to form a central circular chamber for the explosive. The top is strengthened with ribs. The two halves are assembled with an outer circumferential rounded sunk joint and an inner spigoted joint.

The outer joint has rubber sealing ring and is secured by hollow plastic rivets passing through 12 pairs of lugs. The inner joint is secured by a base

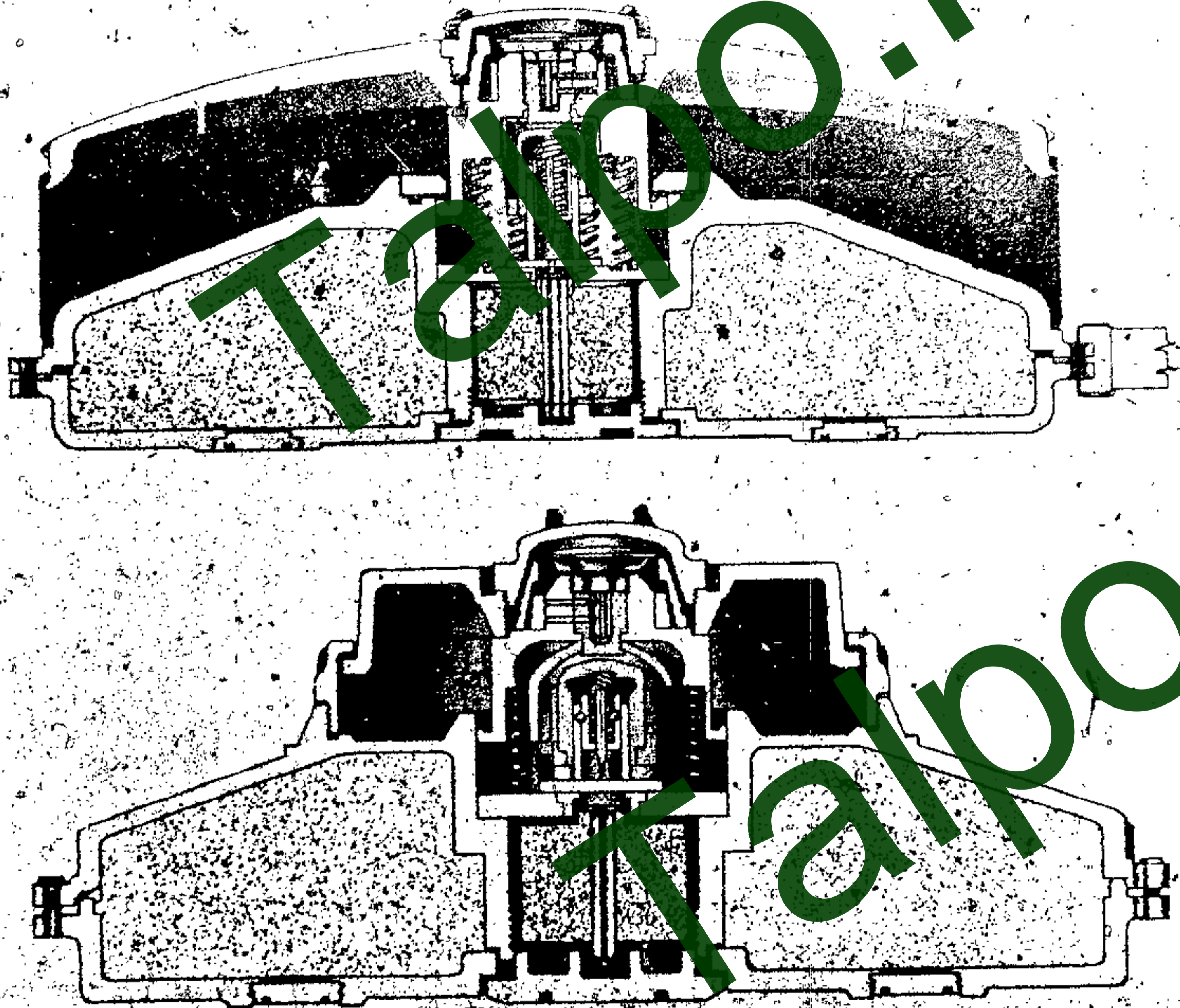


Figure 244 — Pignone Anti-Tank Mines Types I and II

ITALIAN AND FRENCH EXPLOSIVE ORDNANCE

plug threaded into the center tube formed in the top half of the casing; this joint is sealed by a rubber gasket under the flange of the plug.

The plug also gives access to the booster charge and detonator, placed in the central chamber closed at the top by the base of the igniter assembly. A webbing carrying handle is attached to the casing by wire loops which pass through the hollow rivets in two pairs of lugs. There are two filler plugs threaded into $1\frac{1}{8}$ in. diameter holes in the bottom. The holes might be adapted for anti-lifting igniters; they are, diametrically opposite, approximately $2\frac{1}{2}$ in. from the edge, but are not placed in any fixed position relative to the handle.

The igniter assembly slides in the central tube formed in the top half of the casing and is retained by a locking ring. A rubber ring seals this joint. The pressure plate, $\frac{1}{2}$ in. thick, is heavily ribbed underneath and is the full diameter of the mine casing. It rests on the top of the igniter assembly and is held in position by steel wires which are looped through four lugs, set at 90° around the mine, and fastened with two plastic rivets instead of one.

The air space between the pressure plate and the top of the main casing is closed, around the circumference, by a strip of impregnated canvas fixed by two steel wires. The igniter assembly and arming arrangement are closed by the cap screwed into the pressure plate.

TYPE II: The main casing is similar to that of Type I. The pressure plate, ribbed on the underside, is only $5\frac{1}{2}$ in. in diameter; it is $\frac{3}{8}$ in. thick. It bears on the top of the igniter assembly, as in Type I, but on the outside circumference is held by the ring which screws into a threaded socket, formed on the top of the main casing. The igniter assembly is sealed by two rubber rings, the latter making a joint due to the upward pressure from the helical creep springs in the igniter.

A third type of bakelite mine is stated to have been produced by Pignone. It was similar to Type I, but smaller and having a $1\frac{1}{2}$ kg. charge. Because of the reduced diameter, the activating pressure was about twice the figure for Type I. It is understood that this smaller type was not produced in any quantity.

Igniter

From the center of the base a brass tube projects upwards as a guide to the brass striker pellet. A steel bar slides through the tube to act as a safety device by screening the detonator in the unarmed position; in the armed position a hole in this bar is presented to the striker pin.

The striker, loaded by pressure on the helical spring, is cocked against two steel balls. The balls sit in the upper half of the striker pellet, and are retained by the sides of the cap, of tough plastic material, which slides over the brass tube. This cap is located by two brass shear pins set into the tube. It also carries a double cam-shaped collar which is free to swivel independently and control the position of the screening bar.

Added safety devices are the moulded projections, which support the cam collar in the unarmed position.

The position of the cam collar is controlled by an inverted tough plastic cup, slotted down the center to take the arming key of 'Yale' pattern, which operates against two spring-loaded double tumblers, sliding into the spindle from the side.

The key is of brass, held in a bakelite button, which is knurled at the edge and provided with an indicating nib. The nib swings between two projections on the pressure cap, marked 'S' (Securo-Safe) and 'A' (Armato-Armed). A bakelite collar fits over the head of the pressure cap and is slotted so that it is held by the projections to lock the arming key in the unarmed position.

ITALIAN IGNITERS

Chemical Delay Igniter

Data

Mines used in	Demolition charges
Color	Unpainted aluminum
Over-all length	2 1/8 in.
Over-all width	7/8 in.
Material	Light aluminum alloy
Position and method of fixing in mine	Connected to charge by threads in base

Delay times

The delay time can be varied by the number of celluloid washers, and igniters of various times are differentiated by the colors of the large threads on

the upper part of body, as follows:

- Screw thread unpainted aluminum—1 hour 45 min.
- Screw thread painted steel grey—2 hours 20 min.
- Screw thread painted red—3 hours
- Colors are not seen when the igniter is armed.

Description

The body houses a steel striker retained against a compression of a steel spring by a celluloid washer which projects into a cylindrical chamber at the upper-end of the body. A detonator fitted with a flanged cap is secured to the lower end of the body by a washer and a screw-threaded adapter slotted laterally at the lower extremity to permit the

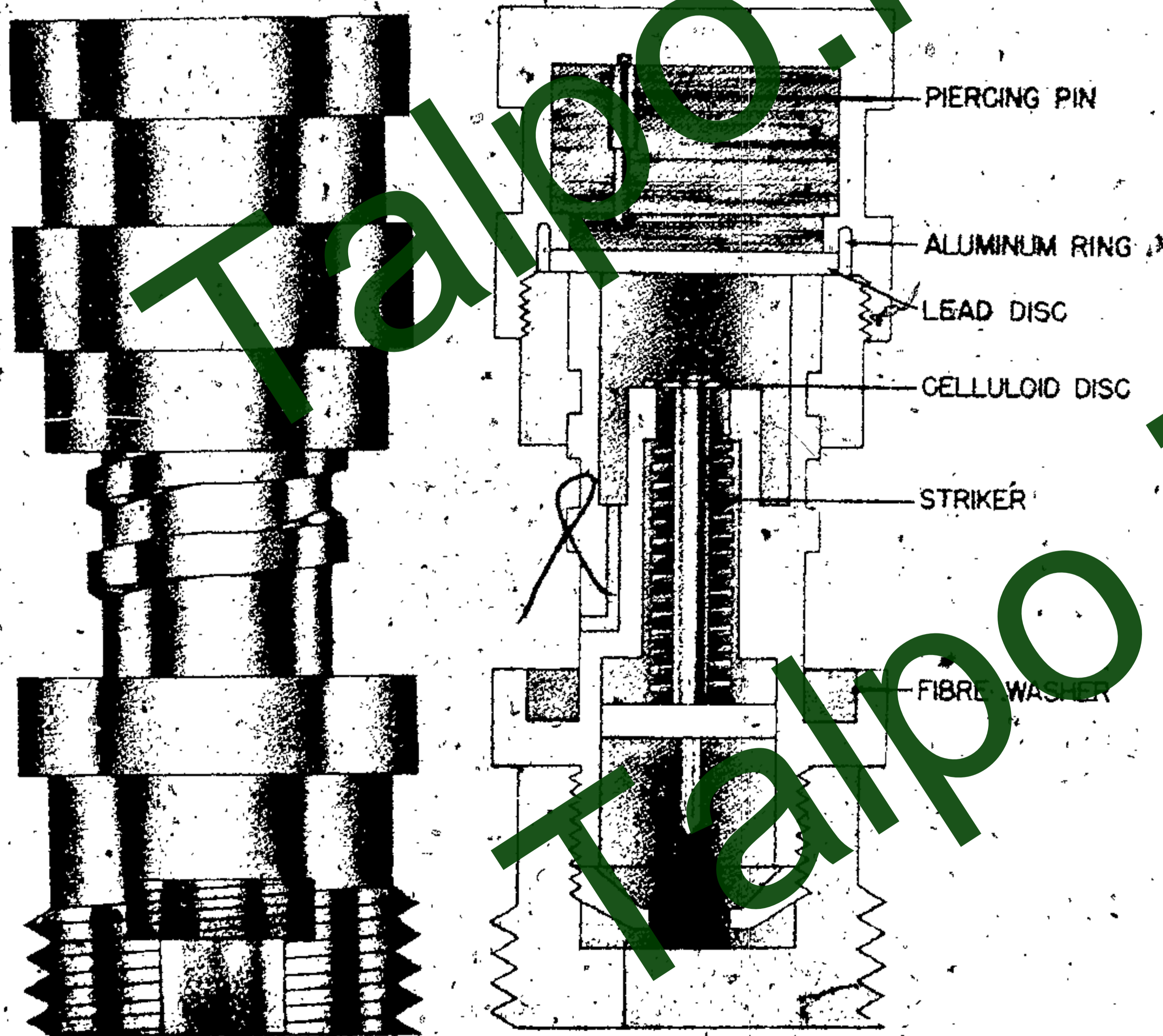
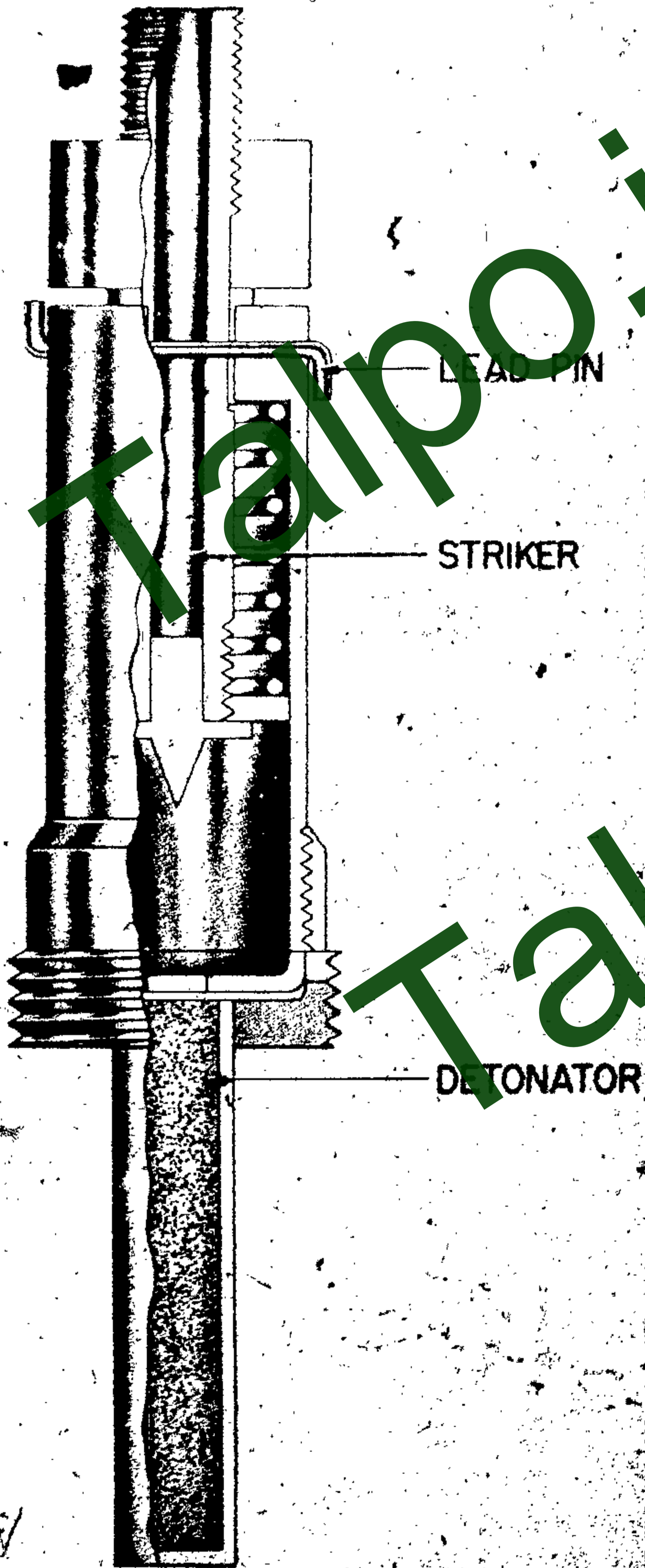


Figure 245 - Chemical Delay Igniter



**Figure 246 - Time Delay Igniter
(Lead Shear Wire)**

insertion of the flanged detonator head beneath the detonator locating ring.

The exterior of the body's upper portion has a large-pitch square thread onto which screws the cap assembly with acetone sealed in the hollow-end cap by screwing the adapter collar hard-down on the aluminum ring.

The ring presses the circumference of the lead closing disc into a groove in the wall of the end-cap, as shown. For transport, the end-cap is screwed down and the long leg of the wire safety pin passed through a hole in the upper end of the body, while the short leg is passed through a hole in the collar.

Operation

The safety pin is withdrawn and the end-cap assembly screwed down. A lead closing disc, cut by the chamfered edge of the upper end of the igniter body and projection from the end-cap, permits acetone to enter the chamber and surround the celluloid washer.

Unless the arming operation is carried out with the end-cap down, the acetone leaks out the air-escape hole. When the end-cap is screwed down, the adapter collar bears hard against the fiber washer to form an effective seal. When the acetone dissolves the celluloid washer, the striker is released to initiate detonation.

Time Delay Igniter (Lead Shear Wire)

Data

Over-all length	3.5 in.
(with detonator)	(approx.)
Length of body	2.3 in.
Width of body	0.625 in.

Description

The igniter has a striker, consisting of a hollow tube threaded externally at each end, projecting through one end of the igniter casing, which is of galvanized mild steel.

Pressed into one end of the striker is a steel firing pin. The striker is surrounded by a spring which presses at one end against a screwed flange and at the other against the inside of the casing.

Rotation of a galvanized mild-steel nut retracts the striker and compresses the spring, the striker being prevented from turning by a set screw riding in a groove. The striker is provided with a flange which prevents withdrawal beyond a certain point; when this point is reached, a hole through the striker coincides with a hole in the casing, thus

permitting insertion of a $\frac{1}{8}$ -in. diameter lead shear pin.

To the other end of the igniter is screwed an aluminum adapter which is threaded externally for insertion into the charge. A detonator with a flanged percussion cap pressed into its open end is fitted into the base adapter, which for this purpose is unscrewed sufficiently to allow the flange of the cap to be inserted from the side into a slot in the adapter. The detonator and cap are then secured by screwing up the adapter.

Operation

To arm the igniter, the mild nut is unscrewed, causing the lead shear pin to retain the spring. Under the pressure of the spring, the shear pin eventually fails, allowing the starter to fire the cap and detonator. The time delay varies up to 26 hours.

Friction Delay Igniters—Micca Da 40 and 60

Data	Micca da 40	Micca da 60
Length	3.7 in.	4.5 in.
Diameter	0.25 in.	0.25 in.
Delay	10 sec.	15 sec.

Description

This prepared detonator consists essentially of a short length of safety fuse accommodated in an aluminum tube between a detonator and a friction igniter. This latter is initiated by a sharp pull on a galvanized iron wire.

Resistance to the pull is provided by a flange on the aluminum tube. The assembly may be prepared for delays of 10 or 15 seconds, and the aluminum tube is then 93 or 113 millimeters respectively in length. The exterior of the tube surrounding the detonator itself is painted red, but the remainder of the assembly is left unpainted.

Operation

The galvanized wire is pulled, igniting the friction mix and starting the safety fuse burning. After 10 to 15 seconds delay the safety fuses burn to the end and ignite the detonator.

50-Day Clock

Data	
Over-all diameter	16 in.
Over-all height	8 in. (approx.)

Description

This device consists of a dry-cell battery and an electrical clock with adjustable dial that can be set

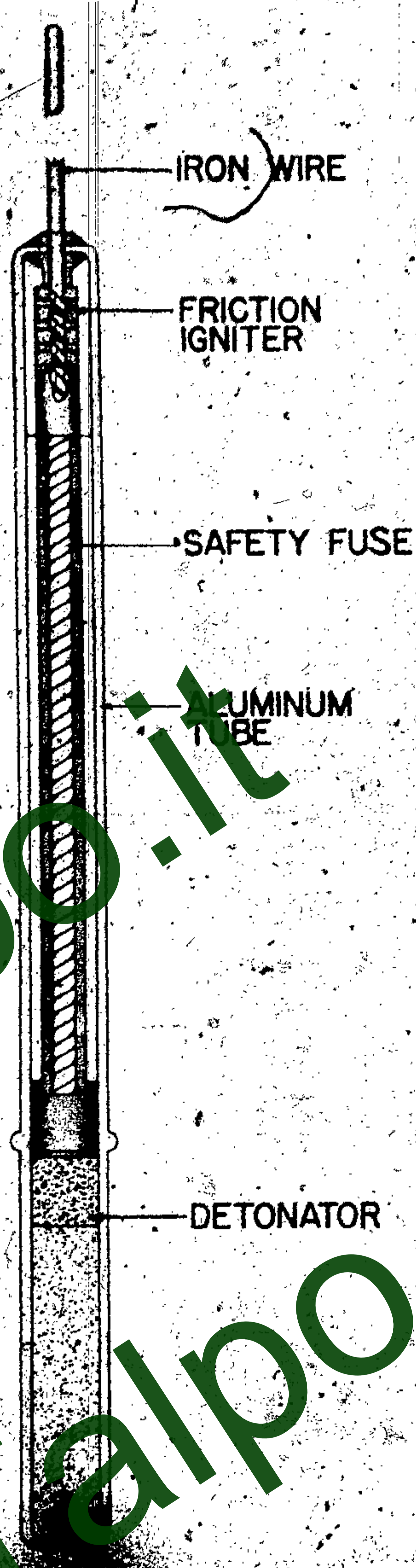


Figure 247 - Friction Delay Igniter

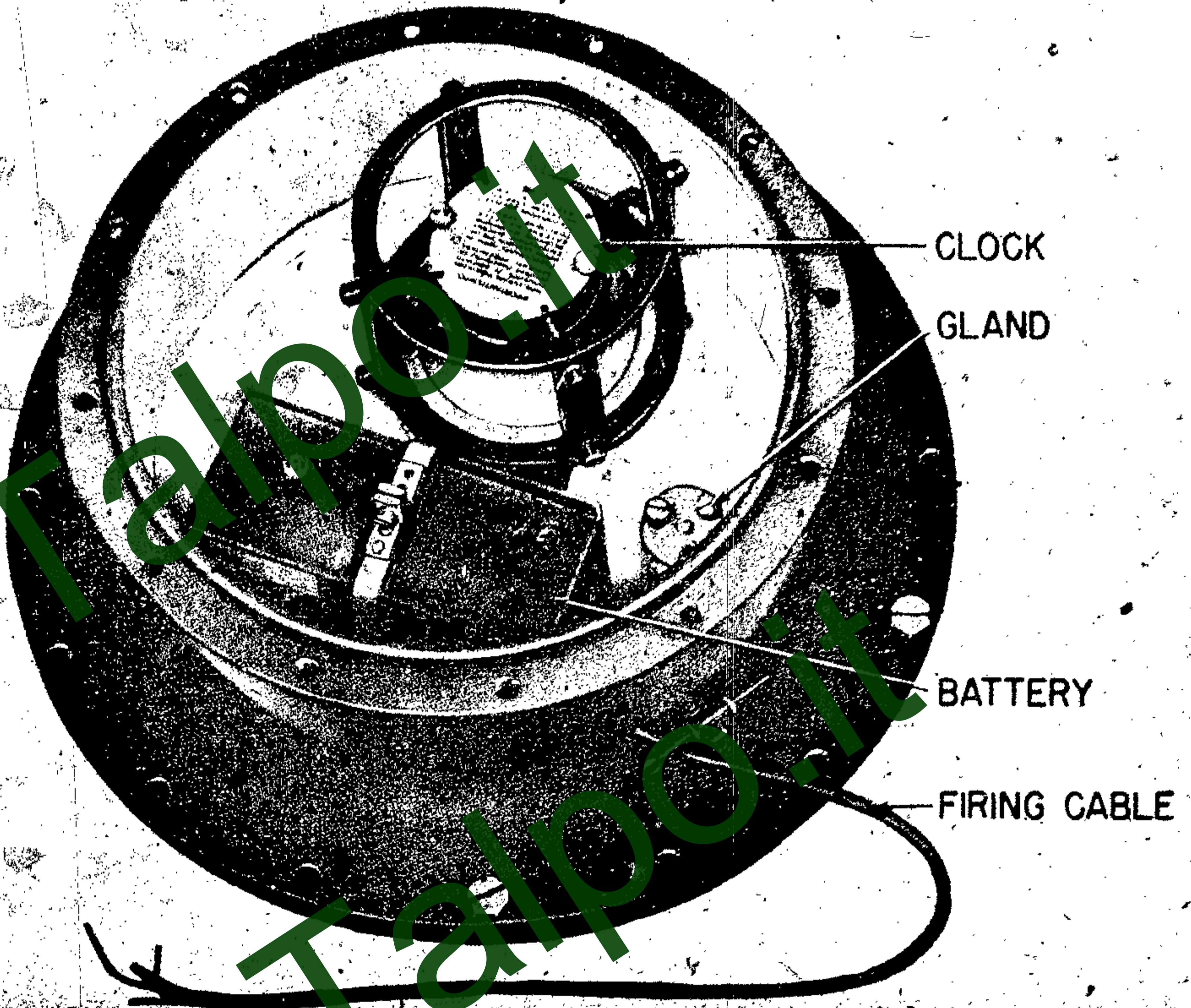


Figure 248 - 50-Day Clock

up to fifty days. By means of a solenoid, the clock is rewound every five minutes instead of being a constant drain on the battery. This accounts for the relatively long life of the battery, which will stay active an entire fifty-day period and still produce enough current to fire the detonator.

At the end of the set period, the setting dial closes the main switch which puts the detonator in

series with the battery. A block of approximately one-quarter pound of Italian explosive T-4 is hollowed out to house the detonator and the block is inserted in the main charge in the space provided.

The main charge consists of approximately fifteen pounds of T-4 in a steel container which is bolted to the clock case. This entire unit is then attached to the sabotage charge.