The Boobytrap Recognition Manual

Volume 1

Australian and British



D.W. Lynn

Copyright © Darryl W. Lynn
2019

Email dwlynn@shaw.ca

This is a free publication, not to be sold.
If used as a reference in other publications credit should be given in the bibliography.

Index

Content	Page
Australian	
Switch, Combination, Aust, Mk 1 (Murray Switch)	1
Switch, Combination, Aust, Mk. II	3
Pistol, Trip Mechanism, Mk. 1 (AUST)	4
Firing Device, Combination, F1	6
Firing Device, Combination, F2, Practice	6
Firing Device, Combination, F3, Inert	6
Firing Device, Combination, F1A1	7
Firing Device, Combination, F2A1, Practice	8
Firing Device, Combination, F3A1, Inert	9
British	
Trip Mechanism No. 4	13
Trip Mechanism No. 5	15
Trip Mechanism No. 6	17
Switch No. 1, Pull, Mk. I	19
Switch, No. 2 Pressure, Mk. I	22
Switch, No. 2 Pressure, Mk. II	24
Switch No. 3, Release, Mk. I	25
Switch, No. 4 Pull, Mk. I	27
Switch, No. 5 Pressure, Mk. I	29
Switch, No. 6 Release, Mk. I	31
Switch, No. 7 Pressure-Pull, Mk. I	33
Switch, No. 8, Anti-Personnel, Mk. I	35
Switch, No. 9, “L” Delay, Mk. I	37
Signal Relay (SR1)	39
Switch, No. 10 Delay, Mk. I	39
Switch, No. 10 Delay, Mk. II	40
Switch, No. 11 Contact Strip, Electrical, Mk. I	43
Switch, No. 12 Release, Mk. I	45
Switch, No. 12 Release, Mk. 2	46
Switch, No. 13 Pull/Pressure/Release, Mk. I	47
Switch, No. 14, Charge Pinning, Mk. I	49
Switch, No. 15, Pressure, Mk. 1	50
Switch, No. 16, Time Pencil, Mk. I	50
AC Delay, Mk. I, IA, IR	51
AC Delay, Mk. II	52
ISRB Anti-Disturbance Fuze (Air Armed)	54
Fog Signal	56
Percussion Igniter, Mk. III	58
Firing Device, Demolition, Delay, L1A1	59
Firing Device, Demolition, Pull, L2A1	60
Firing Device, Demolition, Delay, XL3E1	61
Firing Device, Demolition, Combination, L4A1	62
Firing Device, Demolition, Combination, L5A1	62
Attachments used with Boobytrap Mechanisms	68

Introduction

This publication is a result of my frustration trying to find those little tidbits of information that are spread throughout many books manuals and papers. It is my attempt at putting it all in one place and making it easier to find. I hope you will also find it useful.

This publication will only detail officially manufactured mechanisms, I will not attempt to describe any improvised devices or methods.

It should be noted that the photos are certainly not all mine, I have been collecting photos from other collectors, museums and off the net for years and as a result of poor record keeping in many cases have no idea where I found them. If you find one of your photos in here and your name is not in the credits, please accept my apologies for using it without permission.

This book is not simply my effort, many people have contributed to its completion, have read it over, offered corrections and pointed out blatant errors. You know who you are and my thanks for your help. If you happen to find one of those errors, please let me know so I can correct it.

Enough said, on to the interesting bits……

Boobytraps

A boobytrap is any form of concealed mechanism that is placed in such a manner that it will be set off inadvertently by the enemy or function by means of a delay mechanism. They are designed to destroy personnel, vehicles, equipment, or communications. Normally an explosive charge is employed that is fired by a mechanism but it may make use of incendiary devices as well. Boobytraps are designed to create an atmosphere of uncertainty and impose caution on the enemy and so lower morale and slowing him down. The casualties and damage are merely a means to that end.

It should be noted that in a conventional army boobytrap devices are not issued haphazardly to every soldier to use as he sees fit. The authority to boobytrap an area comes from much higher up the chain of command and when laid the traps are carefully mapped so that they may be lifted safely if and when the area is reoccupied by friendly troops. The exception to this may be on raids deep into enemy territory where the authority to boobytrap has been given prior to the raid, in this case the traps are unlikely to be mapped but will be left for the enemy to deal with. Boobytraps are normally laid by Combat Engineers or Assault Pioneers. These rules apply to normal military units, not to irregular or insurgent forces.

Prior to the Second World War there were few devices developed specifically for the purpose of boobytrapping. There were undoubtedly nasty surprises left behind by withdrawing troops in the trenches of the First World War, but they would have mostly fallen into the improvised boobytrap class.

Boobytraps were used by all sides during the Second World War, the German being quite good at it, the British also became quite good at it and supplied many devices to the Resistance organizations behind enemy lines as well as providing training to those organizations.

A department of the Ministry of Defence, M.D.1, was tasked to develop many of the British boobytrap devices used during the war. They developed "Switches" that were used throughout the war and for many years thereafter. The Second in Command of M.D. 1, Lt Col Stuart Macrae was responsible for developing a number of the switches, notably the pull and release devices. Later in the war he also developed a combination switch. Boobytrap mechanisms were also developed by "Experimental Station 6", a cover name for the SOE (Special Operations Executive) production facilities. The SOE ordered large numbers of switches through the British Security Coordination in the US resulting in the American OSS adopting several British switches or developing their own from the British switches. The A.C. Gilbert Co. in the US in cooperation with the Engineer board was responsible for most of the development and production of American firing devices.

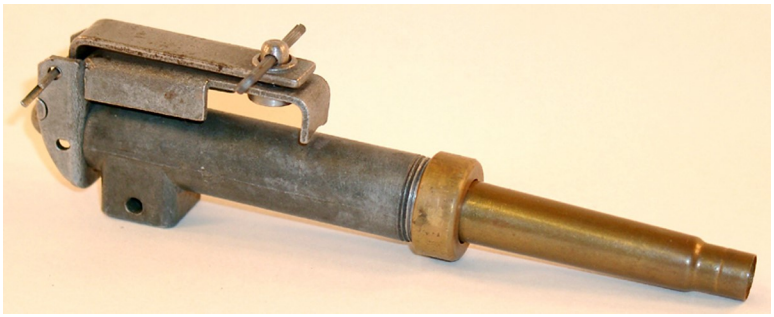
Post war, many countries adopted/copied boobytrap mechanisms that had been developed during the war. British and American designed switches were often copied and many are still in use. Australia developed a combination switch in the 1960's that has been widely adopted.

Boobytrap mechanisms are normally operated by the following methods:
Pressure- Direct pressure by the foot, wheel, or track on the mechanism.
Release- By the removal of a weight on the top of the mechanism or the release of tension on a trip wire.
Pull- By moving some object that is attached to the mechanism or tripping a trip wire.
Delay- By means of a clockwork mechanism or some other form of delay device.

Australian Mechanisms

Switch, Combination, Aust, Mk 1 (Murray Switch)

Type- Combination
Introduced– 1943
Weight- 3.75 oz.
Length- 3.5 in.
Height- 1.5 in.
Width- 5/8 in.



Switch with ignition cartridge

This switch was developed by Major Cyril Stewart Murray in 1943. It was used by Australian forces during WWII and after. It is designed to be used for pressure, release, or pull operation depending on how it is set up.

The main body is made of die cast metal in a tubular form. A square projection is cast onto the tubular section near one end. A hole through the projection was used to wire or tie the switch in position. The opposite end is threaded to accept a collar which may be either brass or another metal. The other end of the body has a hole drilled through for the end of the striker. The main body contains a striker and striker spring. The striker has a striker head at one end and the other end has a slot near the end and slightly further down a groove completely around the shaft.



The remainder of the switch is mostly made of mild steel sheet and includes a release plate, release lever, release pin, trigger pin and safety pin. The release plate is bent into shape and has two shoulders (similar to a Mills bomb) on one end. In between the shoulders is a hole for the striker shaft that has a slot at the bottom. The other end has a hole for the release pin. The release lever is similar to the safety lever from a mills bomb but has a 90 degree bend at one end. The release pin has a head and a hole at the opposite end. The trigger pin is brass and is formed with an eye at one end. The safety pin is a simple split pin with a ring.

The ignition cartridge is a capped .303 cartridge case. Special cases were made for the switch but a normal rifle cartridge with the bullet and powder removed worked equally as well. The special cases are normal cartridge cases that have two cuts made in the top to clamp the fuse or detonator in.

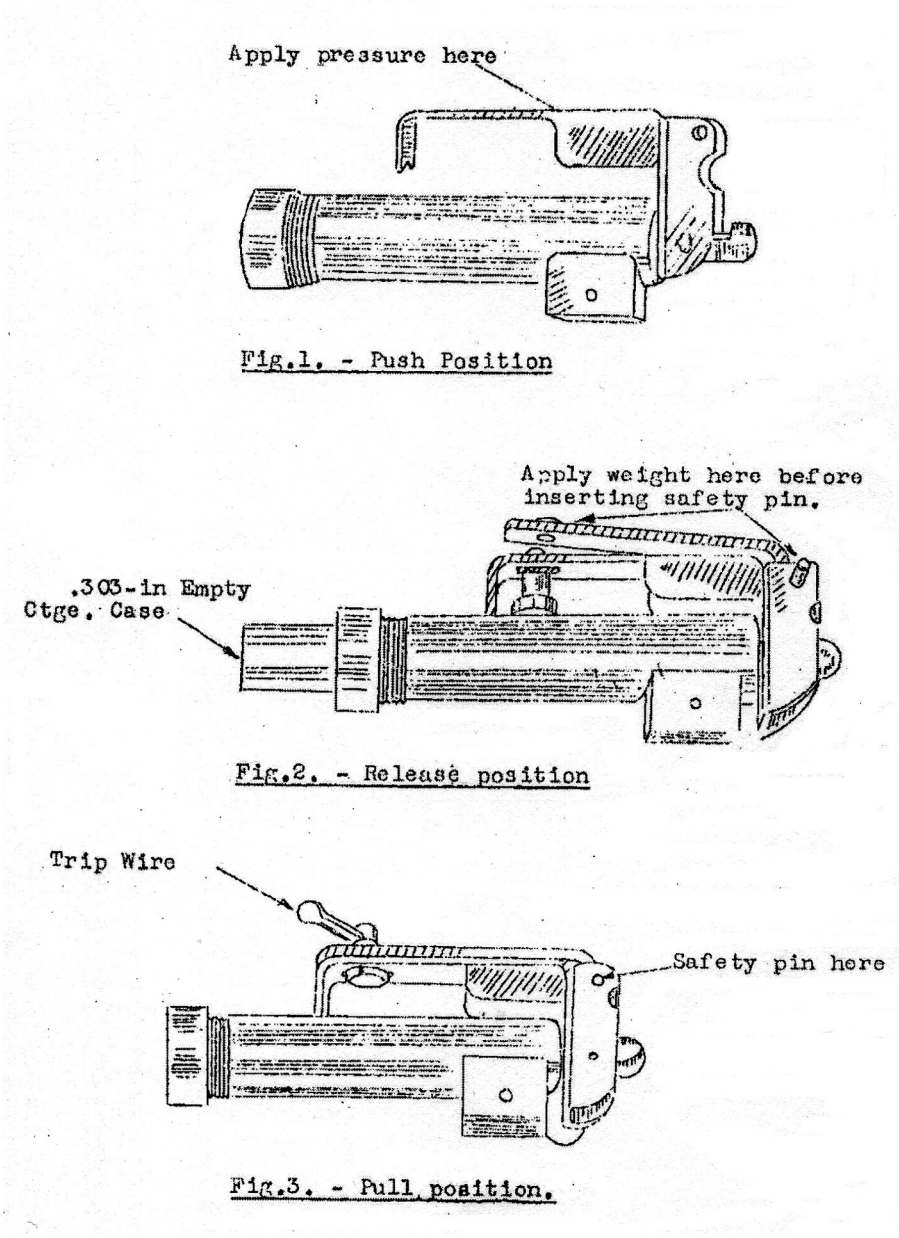


Side view of Switch

The switch was packed in a small box containing the switch, a capped case and a blank cartridge. The blank cartridge was used to test the switch prior to use.

The switch was not painted or marked in any way.

For use as a pressure switch, the release plate was used. It was placed on the switch and the striker pushed through until the slot in the release plate lined up



Instruction sheet included with switch.

with the groove in the striker and then pushed up until it fully engaged. The safety pin was then inserted in the lower holes of the shoulders where it would pass through the groove in the striker. Once laid and armed, a pressure of about 11 pounds on the release plate would cause it to move down and disengage the striker from the slot. Once disengaged the striker under pressure of the striker spring would fly forward and strike the percussion cap in the cartridge.

For use as a release switch, the release plate and release lever are used. The release plate is placed on the body and the striker pushed through until it protrudes out the end. The Release lever was then placed in the notches in the shoulders, engaged in the slot in the striker and pushed down on top of the release plate. The safety pin was then inserted in the top holes in the shoulders to hold the lever down. When laid, a weight of at least 1 lb. 4 oz. was placed on the release lever to hold it in place. Once the weight was removed the striker exerted pressure on the lever causing it to rotate up and release the striker to fly forward under pressure of the striker spring to strike the percussion cap in the cartridge.

For use as a pull switch, the release plate, release lever, release pin and trigger pin are used. The switch is set up as a release switch then the release pin is inserted from the bottom through a hole in the release plate and release lever until the trigger pin can be inserted through the release pin. When laid the switch is fastened in position and a trip wire attached to the trigger pin and a convenient object at the opposite end. When a pull of 10 pounds is applied to the trip wire it pulls the trigger pin out of the release pin which then allows the switch to operate as it would in the release mode.

Switch, Combination, Aust, Mk. II

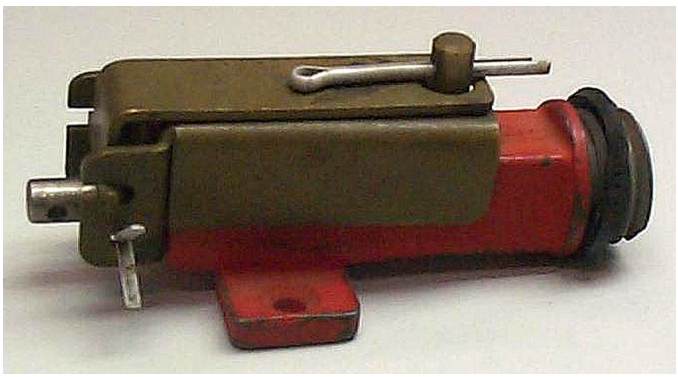
Type– Combination
Introduced– 1943-44

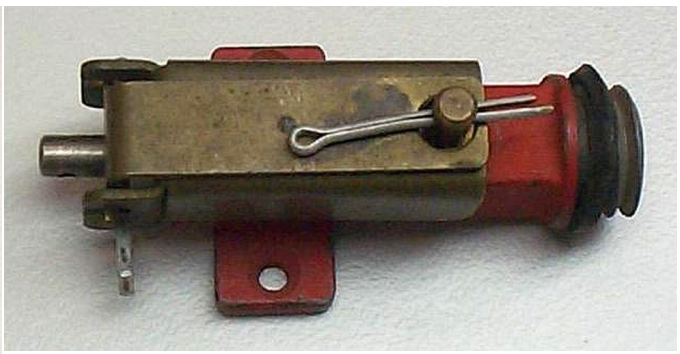


Switch with British Spring Snout

This is a modification of the switch developed by Major Cyril Stewart Murray. Used during and after WWII by Australian forces.

The modifications were mainly cosmetic as the operation and setting of the switch is identical. The body has been modified in that it is now square rather than tubular. In addition two fixing lugs are cast onto the body. The end of the switch is threaded both externally and internally. The internal threading fits a standard British spring snout. As the Australians and Americans worked closely together in the South Pacific, the outer threading is designed to fit the standard American fuze wells in demolition charges and grenades.





Pistol, Trip Mechanism, Mk. 1 (AUST)

Type- Pull
Introduced- WWII
Diameter- 1.125 in.
Length- 3.125 in.



Pistol, Trip Mechanism, Mk. 1 (Aust)

This device was designed during WW II to convert HE shells or mortar bombs to form trip wire operated antipersonnel mines. It could be used with the 3" Mortar HE bomb or any 2 inch gauge nose fuzed shells (QF 25 pdr gun, QF 4.5" Howitzer or BL 6" Howitzer). It was also used as the igniter for the Australian "J" mine.

The device consists of a body, striker, striker spring, release lever, release pin, trigger pin, detonator holder and detonator cap. The body appears to be cast of an alloy. The upper portion has a striker chamber drilled through the centre. A hole in the top fits the shaft of the striker. A pressed sheet metal part is attached to the top of the body forming a set of shoulders and forming part of the release mechanism. A tube on the bottom of the body forms part of the striker chamber and is threaded to fit the brass detonator cap. The striker and striker spring appear to be standard as used in the No. 36M Mk. I grenade. The release lever is pressed sheet metal with a hole in the end to fit the release pin and two projections on the sides to engage the shoulders. The trigger pin is thinner sheet metal and has a keyhole slot in one end to engage a groove in the release pin. The detonator holder is a thin brass tube closed at one end with a flange at the other. The detonator assembly consists of a percussion cap holder, percussion cap and detonator.

The striker and striker spring are inserted through the bottom and pushed up so the striker shaft fits through the top. The release lever engages the slot in the striker and the two projections in the shoulders. When pressed down the hole in the end fits over the release pin. The trigger pin fits over the release lever and the keyhole slot engages in a groove in the release pin holding the lever in place. A safety pin fits through holes in the shoulders to hold the lever down while setting the device. In transit the detonator holder is reversed and inserted into the striker chamber and the detonator cap screwed on to hold it in place.

The devices were shipped in a box containing 40 mechanisms, 44 detonator assemblies, 40 preformed CE pellets, 40 6 ft lengths of anchor wire, 40 trip wires, 40 felt washers, 1 tin of luting, 2 rectifiers, 1 C spanner and 8 adapters for the HE shells.

To assemble the mechanism, unscrew the detonator holder cap and remove the detonator holder. Check the detonator holder and if dented, straighten it using a rectifier No. 2. Insert the detonator holder in the cap so that the tube fits through the hole in the cap and the flange is inside the cap.



Trip mechanism with adapter

Insert a detonator cap assembly into the detonator holder smear luting on the threads and screw the cap back onto the mechanism. The mechanism is now armed.

For use with the 3" mortar bomb, take the normal fuze out of the bomb and insert a felt washer in the vacated fuze well. Place a CE primer over the detonator holder, put luting on the threads and screw the entire mechanism into the mortar bomb.

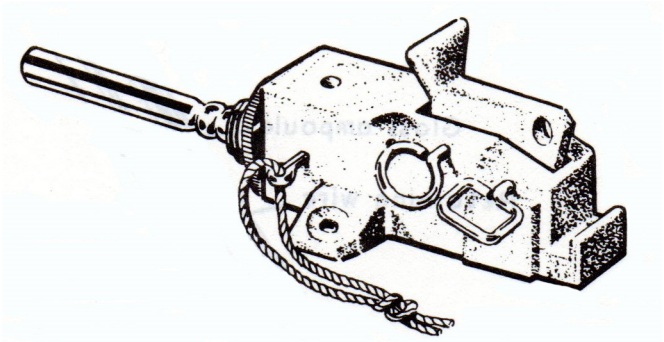
For use with shells, the adapter is required. It is a brass adapter threaded externally to fit the threading on the shells and internally to fit the threading of the mechanism. Remove the normal fuze from the shell using the C spanner. Put luting on the threading of the adapter (internal and external) and screw the adapter into the shell. Put a felt washer into the end of the shell ensuring it is flat against the bottom and then screw in the mechanism.

When laying the mines they should be fixed in position using the anchor wire (normally tied to trees). They should be laid with the trip mechanism down to minimize the effect of rain and weather. When attaching the trip wire it must be a slack wire. When ready to set the mine, ensure that the wire is slack enough and that the trigger pin is in place correctly before removing the safety pin.

When the wire is pulled, it will pull the trigger pin back so that the keyhole slot is disengaged from the release pin. The striker being under pressure of the spring pulls on the release lever and causes it to rotate and disengage from the slot in the striker. The striker, under pressure from the spring is forced down to hit the percussion cap in the detonator assembly. The percussion cap fires into the detonator causing it to fire which fires the CE pellet which in turn causes detonation of the charge in the mortar bomb or shell.

.

Firing Device, Combination, F1



Firing Device, Combination, F1

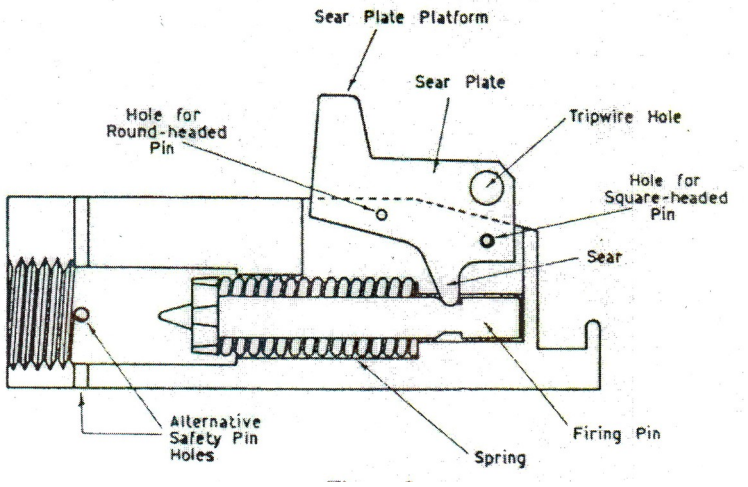
Type– Combination
Introduced 1966

This is the forerunner to the F1A1 firing device. This is the prototype sent to the ABCA (America, Britain, Canada, Australia) countries for evaluation in 1966. The only difference between the two devices is that the F1 is square instead of round in cross section. It was quickly replaced in service by the F1A1.

It uses a coupling base assembly that has a percussion cap and live detonator that is protected by a plastic protective cover.

The device is coloured olive drab with yellow markings on the container and on the protective cover of the detonator.

The device is supplied in a tin containing the combination switch, a "Coupling Base, Firing Device, F1", tension release attachment, 50 feet of trip wire, fastening nails and screws and a sheet of setting instructions.



Side view of device showing sear engaged in detent of firing pin.

Firing Device, Combination, F2 Practice

Type– Combination
Introduced 1966

It uses a coupling base assembly that has a percussion cap and practice detonator containing a small amount of powder. The practice detonator is protected by a plastic protective cover. When fired it makes a sharp report and splits open the practice detonator.

The container and device are coloured blue with yellow markings on the container and on the protective cover of the practice detonator.

Firing Device, Combination, F3, Inert

Type– Combination
Introduced 1966

This is an instructional unit used for classroom instruction. It uses a coupling base assembly that has an inert percussion cap and inert detonator with a hole drilled through it. The inert detonator is protected by a plastic protective cover.

The container and device are coloured dark blue with white markings on the container only.



Firing Device, Combination, F1A1

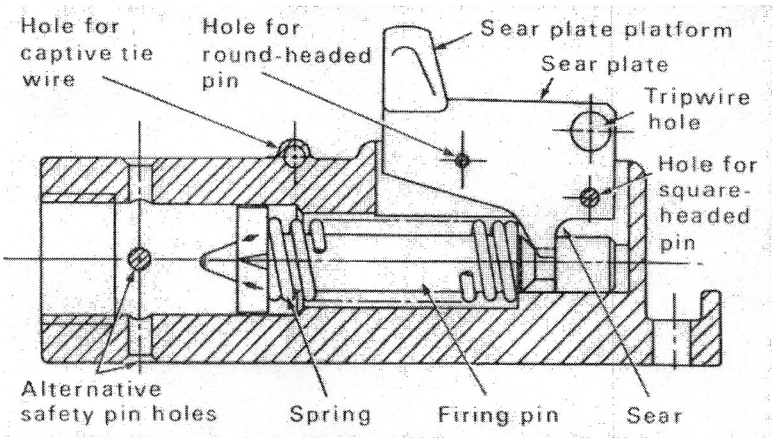
Firing Device, Combination, F1A1

Type– Combination
Introduced 1969
Length- 2.25 in.
Width- 1.6 in.
Height- 1.1 in.
Body Material- Plastic

This device was introduced in 1969 and has since been adopted by a number of nations such as Canada, Britain, United States, Norway, New Zealand and South Korea.

The device is a compact unit capable of initiating a boobytrap via Pull, Pressure, Release, or Tension Release depending on how it is set. The device will operate under a pressure of 11.3 kg, a pull of 3.2 kg, or a release of pressure or tension of 1.1 kg.

The device is made of plastic in a basically cylindrical form. There are lugs and recesses molded onto the body that allows it to be screwed, nailed or wired in almost any position. A slot in the top of the body accepts the sear plate that is held in position by two pins, one with a round head and one with a square head. A positive safety pin fits through the barrel of the body preventing the striker from



Side view of device showing sear engaged in detent of firing pin.



hitting the percussion cap. An alternative set of holes for the positive safety are located at 90 degrees from the normal holes. The striker is made of aluminum with a plastic four pronged guide and spring stop near the point. The rear portion of the striker has a groove that engages the sear. A striker spring fits over the striker. The striker and spring fit into the body compressing the spring until the sear on the bottom of the sear plate engages the groove in the striker.

The device is issued in a round tin or plastic case containing everything required to set the device in any mode. Contained within the case is the device, roll of steel trip wire containing 15 metres of wire, a strip of tape containing screws and nails, a tension release attachment, and an instruction sheet. The F4 coupling base is issued separately.

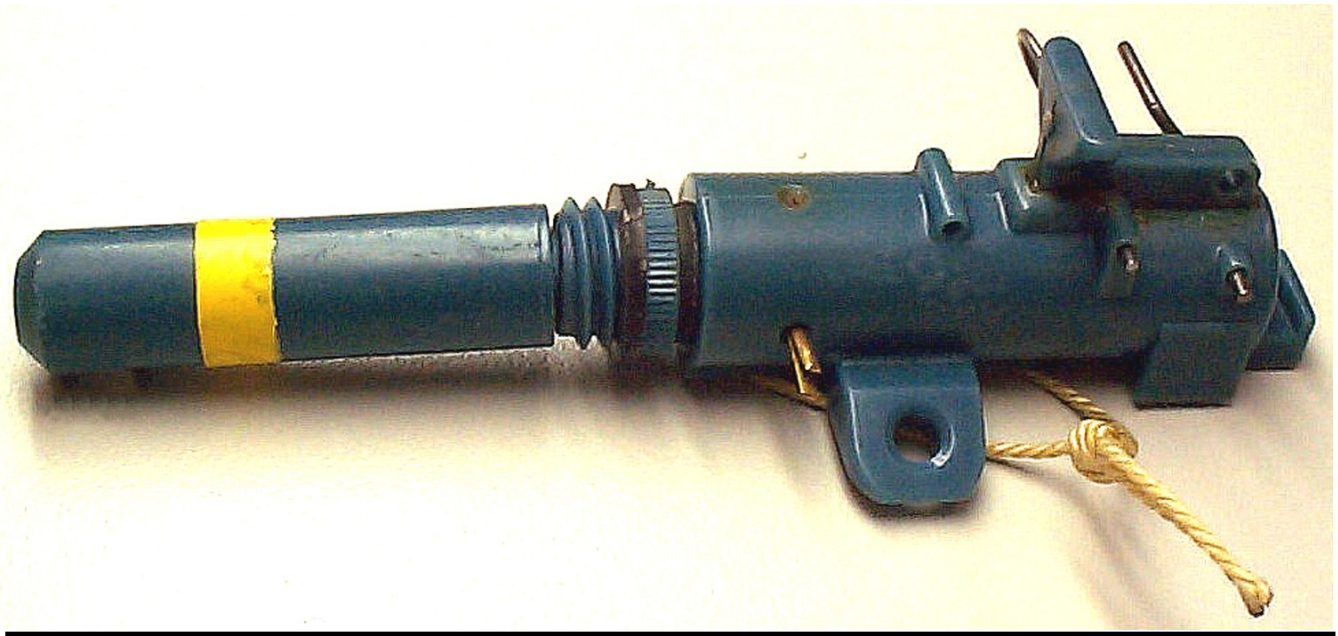
It was initially used with the "Coupling Base, Firing Device F1". It was fitted with a No. 2A primer and had a No. 27 detonator machine crimped on. It was protected in transit by a heavy walled plastic sheath. The firing device is now normally used with the F4 Coupling base. The "Coupling Base, Firing Device, F4" is more versatile than the F1 base as it can be used with Fuse Instantaneous, Safety Fuse, Detonators, the US style demolition block and grenades. It can also be used with the "Adapter fuze hole cavity 2 in, F5" for initiation of any projectile with a 2 inch fuze cavity. The F4 Coupling Base is fitted with the M42 primer but no detonator which reduces the hazards involved with transit and storage. The US M1 Base coupler can also be used with this device.

The device is made of olive green plastic, as are the F4 base couplers.

The mode of use determines which pins are taken out to set the device. For use as a release device, the round headed pin is removed. For use as a pressure device, the square headed pin is removed, for use as a pull device, the square headed pin is removed, and for use as tension release it must be fitted with the attachment and have the round headed pin removed. It should be noted that the two pins are not interchangeable as they are made from different gauges of wire with corresponding holes.

Firing Device, Combination, F2A1, Practice

Length- 2.25 in.
Diameter- 1.6 in.
Height- 1.1 in.
Body material- Plastic



Firing Device. Combination, F2A1, Practice showing protective cap on detonator.

This is the practice version of the F1A1. It is exactly the same as the live version but is designed for practice. Live detonators or detonating cord are not to be used with the F2A1.



Firing device as issued

The device is supplied with an F5 Coupling base which contains a live M42 primer. The primers in the F5 base can be replaced by using a special Cap Replacement device. It can also use the earlier "Coupling base F1" with practice detonator.

The device is blue to indicate practice. The F5 Coupling base is also blue but has a yellow hazard band to indicate the live primer. The earlier Coupling base has a yellow band around the detonator protector to indicate a practice item.

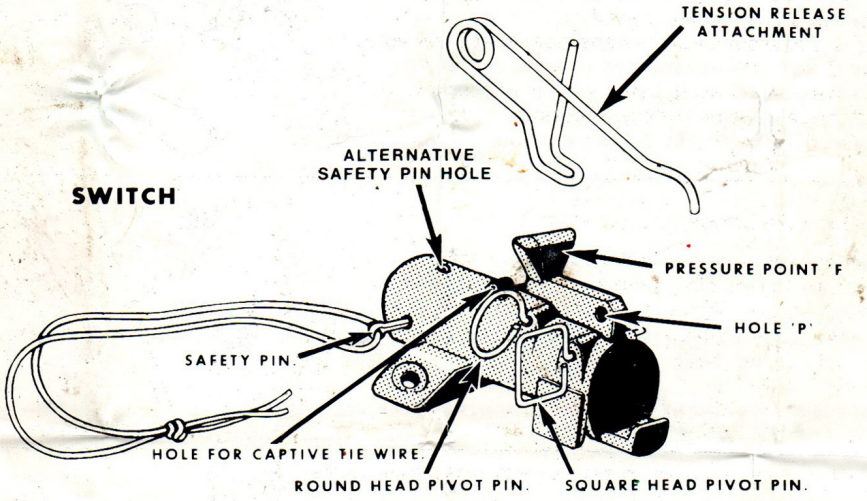
Firing Device, Combination F3A1, Inert

Type– Combination
Introduced 1969
Length- 2.25 in.
Diameter- 1.6 in.
Height- 1.1 in.
Body material- Plastic

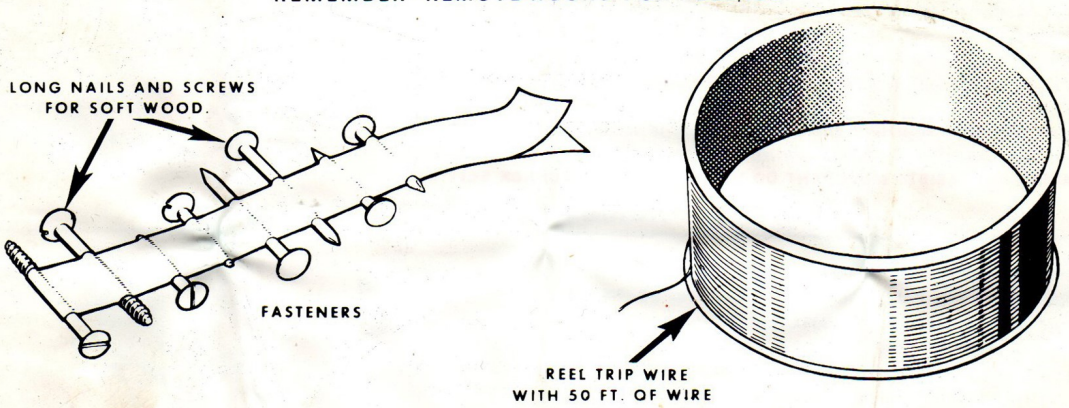
This is the inert version of the F1A1. It is exactly the same as the live version but is designed for classroom instruction. It is supplied with an F6 Coupling base which contains an inert M42 primer.

Both the device and coupling base are coloured dark blue but the F6 base does not have the yellow hazard band.

FIRING DEVICE, DEMOLITION F1A1.
Combination Booby Trap



REMEMBER—REMOVE ROUND FOR RELEASE



*FOR SETTING INSTRUCTIONS, SEE OTHER SIDE.

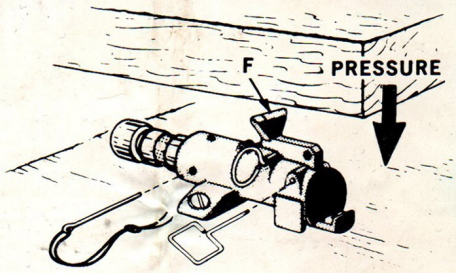
IF RESETTING, ENSURE THAT THE EYE IS NOT IN LINE WITH THE EJECTION OF THE STRIKER

Front of instruction sheet included with each switch.

SETTING INSTRUCTIONS

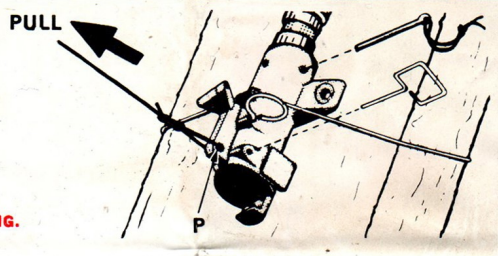
PRESSURE 25 LB OR MORE TO FUNCTION.

(1) CHECK SAFETY PIN FOR EASE OF REMOVAL AND RE-INSERT.
(2) SECURE SWITCH IN POSITION WITH EITHER NAILS, SCREWS OR WIRE.
(3) SCREW IN COUPLING BASE FIRING DEVICE F4.
(4) PLACE A SUITABLE PRESSURE PLATE IN POSITION TO REST ON POINT 'F'.
ENSURE PLATE IS NOT HEAVY ENOUGH TO ACTIVATE THE SWITCH.
(5) REMOVE PIN WITH **SQUARE** HEAD, USING WIRE IF NECESSARY.
(6) WITHDRAW SAFETY PIN, USING WIRE IF NECESSARY.
IF SAFETY PIN RESISTS MOVEMENT DO NOT WITHDRAW, RE-CHECK SETTING.



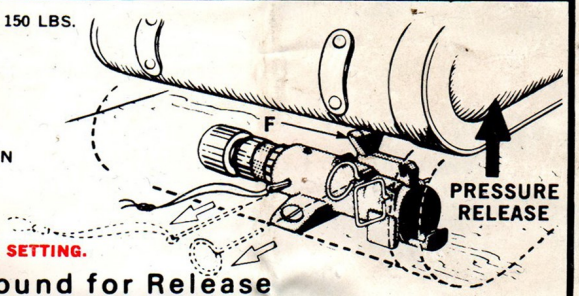
PULL 7 LB OR MORE TO FUNCTION.

(1) CHECK SAFETY PIN FOR EASE OF REMOVAL AND RE-INSERT.
(2) SECURE SWITCH TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN COUPLING BASE FIRING DEVICE F 4 .
(4) ATTACH TRIP WIRE TO HOLE 'P', SO THAT PULL IS IN DIRECTION SHOWN.
(5) REMOVE PIN WITH **SQUARE** HEAD.
(6) WITHDRAW SAFETY PIN.
IF SAFETY PIN RESISTS MOVEMENT DO NOT WITHDRAW, RE-CHECK SETTING.



PRESSURE RELEASE 2 LB. OR MORE TO SET BUT NOT MORE THAN 150 LBS.

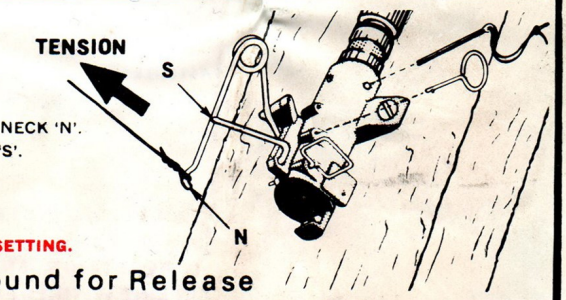
(1) CHECK SAFETY PIN FOR EASE OF REMOVAL AND RE-INSERT.
(2) PLACE SWITCH IN POSITION AND SECURE WITH EITHER NAILS, SCREWS OR WIRE.
(3) SCREW IN COUPLING BASE FIRING DEVICE F4.
(4) PLACE AN OBJECT SO THAT **AT LEAST 2 LBS FORCE** PRESSES DOWN ON POINT 'F'.
(5) REMOVE PIN WITH **ROUND** HEAD USING A WIRE IF NECESSARY.
(6) WITHDRAW SAFETY PIN, USING A WIRE IF NECESSARY.
IF SAFETY PIN RESISTS MOVEMENT DO NOT WITHDRAW, RE-CHECK SETTING.



Remember—Remove Round for Release

TENSION RELEASE

(1) CHECK SAFETY PIN FOR EASE OF REMOVAL AND RE-INSERT.
(2) SECURE SWITCH TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN COUPLING BASE FIRING DEVICE F4.
(4) FIT TENSION RELEASE DEVICE AND LOOP END OF WIRE OVER CURVED NECK 'N'. ADJUST TENSION IN TRIP WIRE UNTIL 'N' LINES UP WITH SET POINT 'S'. MAKE SURE PULL IS IN THE DIRECTION SHOWN ON THE DIAGRAM.
(5) REMOVE PIN WITH **ROUND** HEAD.
(6) WITHDRAW SAFETY PIN.
IF SAFETY PIN RESISTS MOVEMENT DO NOT WITHDRAW, RE-CHECK SETTING.



Remember—Remove Round for Release

Back of instruction sheet included with each switch.

British Mechanisms

Trip Mechanisms

It is thought that these devices were developed prior to the Second World War, but no confirming references have been found. They are listed in a 1941 Boobytrap manual indicating that possibility. They were quickly replaced by the MD1 designed switches and were officially declared obsolete on 9 February 1950, well after use had been discontinued.

Trip Mechanism No. 4

Type– Pull
Introduced– Prior to WWII
Length– 6.25 in. total
Diameter– upper tube 5/8 in.
Lower tube 3/4 in.

This mechanism operates on a hair trigger principle. It is operated by a trip wire attached to the spindle. It was intended for use with movable objects, windows, chairs, pieces of equipment or weapons, souvenirs or any other item that was likely to be moved.

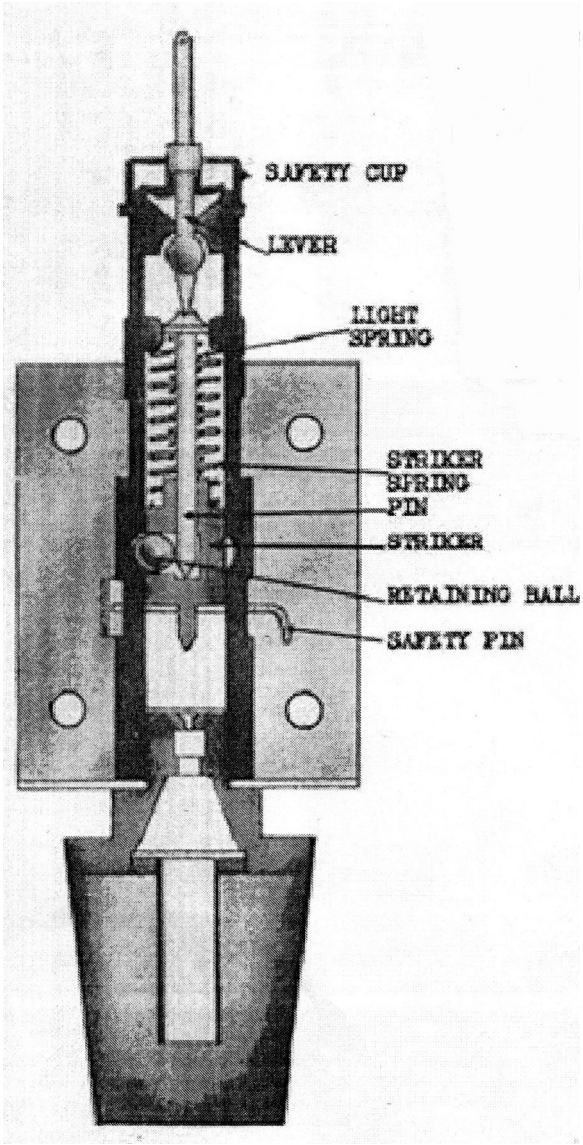


Diagram of Trip Mechanism No. 4 showing internal arrangement.



Trip Mechanism No. 4

The mechanism is made mostly of brass, the upper housing contains a striker, striker spring, retaining pin, light spring and 3 retaining balls. A lever projects from the top of the device. The lever on top holds the retaining pin down against the pressure of the light spring. The retaining pin fits down into the striker pushing the three retaining balls outwards into an annular groove on the inside of the barrel. When the lever is pivoted it moves out of the way freeing the retaining pin to move upwards under the pressure of the spring. The upward movement pulls the pin out of the striker releasing the retaining balls. When the retaining balls are free, the striker spring forces down on the striker pushing it into the percussion cap and firing the device. A safety pin fits through the lower housing below the firing pin preventing it from moving down. The safety pin is "L" shaped and has a spring clip that prevents its

movement until removed. When issued the lever is prevented from moving by a sheet metal safety cap that can be removed after the trip wires are attached.

The base assembly contains a 1.7 grain detonating cap, No. 27 service detonator and standard C.E. primer. It is screw threaded to screw into the upper housing. It is common to all the trip mechanisms. As an alternative a fuse adapter is provided that screws into the base of the assembly that allows either instantaneous or safety fuse to be crimped in and ignited by the mechanism.

There is an “L” shaped bracket that can be used to fix the mechanism. There are four holes in the back of the bracket so it can be nailed into position. On the lower bracket a hole in the centre is used to attach the bracket to the mechanism. The upper housing fits on top and the base assembly screwed up through the hole to hold the device.

The device will operate no matter which direction a pull is applied. Several trip wires can be attached to the lever and a pull of 1.5 to 3 pounds on any of them will cause the mechanism to function.

Trip Mechanism No. 5

Type– Pressure/Release/Pull
Introduced– Prior to WWII

This mechanism operated on the ball release principle. It could be operated by a direct downward pressure, release of pressure, or by a twist applied by means of a trip wire.

The upper housing contains the operating parts of the mechanism. It is made of an alloy in two parts, an inner casing and an outer casing. The inner casing houses the firing pin, firing pin spring and retaining ball. The firing pin is held by the retaining ball riding in a groove in the striker and a hole in the inner casing. The outer casing is cast with a wider head and a central ring around the lower half. The outer casing fits over the inner casing covering the hole in the inner casing and holding the retaining ball in. The firing pin spring is compressed against the firing pin and a stud on the interior of the top of the outer casing. There are two holes, upper and lower, in the outer casing that line up with the hole in the inner casing in two positions. On the opposite side to the holes there is a "Z" shaped slot with a setting stud screwed through the slot into the inner casing. A safety bolt fits through both casings in the lower section.



Trip Mechanism No. 5

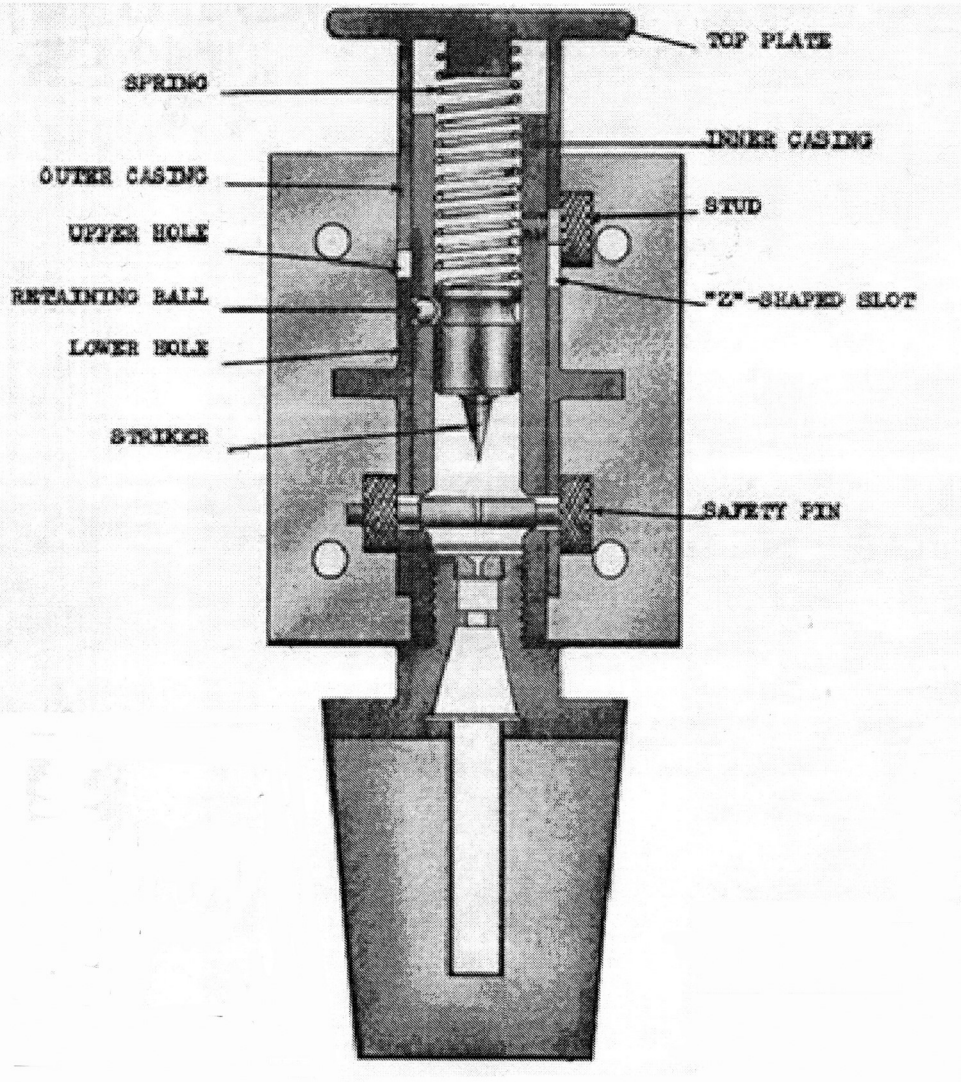


Diagram of Trip Mechanism No. 5 showing internal arrangement.

Two firing pin springs are supplied with the mechanism, one giving an operating force of 4 pounds, the other to give an operating force of 12 pounds.

The base assembly contains a 1.7 grain detonating cap, No. 27

service detonator and standard C.E. primer. It is screw threaded to screw into the upper housing. It is common to all the trip mechanisms. As an alternative a fuse adapter is provided that screws into the base of the assembly that allows either instantaneous or safety fuse to be crimped in and ignited by the mechanism.

There is an "L" shaped bracket that can be used to fix the mechanism. There are four holes in the back of the bracket so it can be nailed into position. On the lower bracket a hole in the centre is used to attach the bracket to the mechanism. The inner housing fits on top and the primer housing is screwed up through the hole to hold the device.

This mechanism can be used for pressure, release, or pull operations. To use in the pressure mode, the setting stud is moved to the "PRESS" position in the "Z" shaped slot. Depending on the spring used a pressure of 4 or 12 pounds will push down on the head, forcing the outer housing down and bringing the upper hole in line with the hole in the inner housing. This allows the retaining ball to move outward and release the striker to move down under pressure of the firing pin spring to hit the primer and fire the mechanism. To use in the release mode, the setting stud is moved to the "LIFT" position in the "Z" shaped slot. Again, depending on the spring used, a weight of over 4 or 12 pounds is placed on the mechanism. When the weight is removed, the spring will force the outer housing up, bringing the lower hole in line with the hole in the inner housing. This allows the retaining ball to move outward and release the striker to move down under pressure of the firing pin spring to hit the primer and fire the mechanism. For use as a pull mechanism, the setting stud is moved to the "PRESS" position in the "Z" shaped slot. A trip wire is attached to the central ring in such a manner that a light pull on the wire will rotate the outer housing to the "LIFT" position and since there is no weight to restrain it, the device will then operate as a release mechanism.

Trip Mechanism No. 6

Type– Pull
Introduced– Prior to WWII

This mechanism depended on a trip wire being completely withdrawn from the device. Similar in use to the Trip Mechanism No. 4 it was smaller and easier to conceal.

This is a very simple mechanism, it consists of an alloy housing that contains a spring loading striker. A wire attached to the striker protrudes from the top of the mechanism and is used to cock the mechanism. The striker is held in the cocked position by the end of a special composition wire. There are two feet of the wire supplied with the mechanisms wrapped around the mechanism when issued. The wire fits through holes in the side of the housing and firing pin. No other safety device is fitted.



Trip Mechanism No. 6

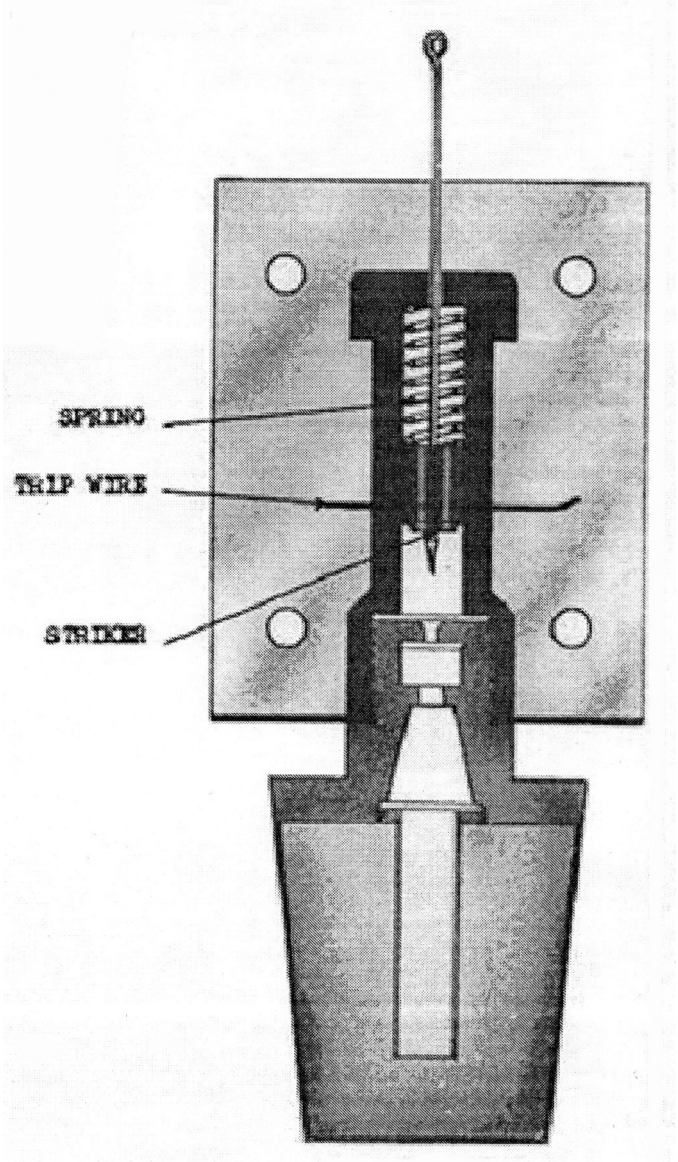


Diagram of Trip Mechanism No. 6 showing internal arrangement.

The base assembly contains a 1.7 grain detonating cap, No. 27 service detonator and standard C.E. primer. It is screw threaded to screw into the upper housing. It is common to all the trip mechanisms. As an alternative a fuse adapter is provided that screws into the base of the assembly that allows either instantaneous or safety fuse to be crimped in and ignited by the mechanism.

There is an "L" shaped bracket that can be used to fix the mechanism. There are four holes in the back of the bracket so it can be nailed into position. On the lower bracket a hole in the centre is used to attach the bracket to the mechanism. The inner housing fits on top and the primer housing is screwed up through the hole to hold the device.

For use, a standard trip wire is attached to the free end of the special composition wire. A pull on the trip wire will withdraw the wire from the mechanism freeing the striker to drive down under influence of the striker spring to hit the

percussion cap and fire the mechanism. For the device to operate the wire had to be completely withdrawn from the mechanism.

Switch No. 1, Pull, Mk. I

Type- Pull
Introduced- November 1939
Weight- 2.5 oz.
Length- 3.75 in. wo fuse adapter
Diameter- 5/8 in.

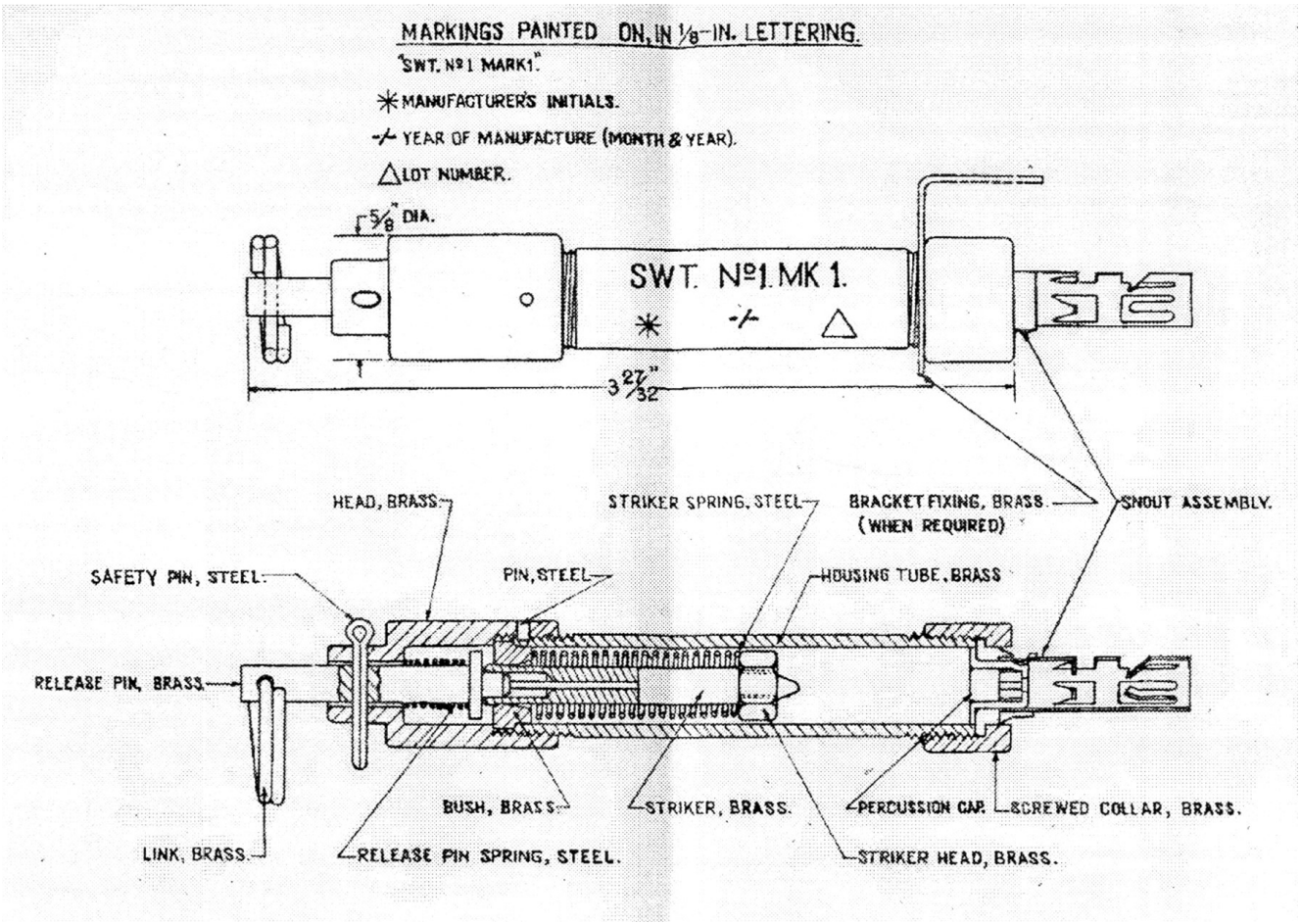


Switch No. 1, Pull, Mk. I
From the left, with solid snout, with spring snout, sectioned, mounting brackets.

Initially known only as the "Pull Switch" this device was designed near the end of 1939 by Lt. Col. Stuart Macrae of M.D.1 (Ministry of Defence 1). It came about because the only device the British had to set off a boobytrap with a trip wire was the standard service igniter, a device actually designed to replace matches for lighting a length of safety fuse. The service igniter worked perfectly well for the purpose it was designed but left something to be desired as a boobytrap device.

Lt. Col Macrae in fact designed the pull switch from a shirt stud that worked in a way that he considered quite clever. The stud had a detachable head that remained firmly in place normally but when a centre pin was pulled out could easily be removed. The head was attached to a thin split tube with the end slightly bulged out. The body of the stud was a hollow button with another small tube projecting out from it. The stud was assembled by pulling out the centre pin as far as possible, pushing the split tube through the other tube until it passed through and pushing in the centre pin again. Pushing in the centre pin expanded the split tube so that it would not pass through the other tube until the centre pin was pulled out again. It was from this small device that Macrae got the idea of how to design the pull switch. Once Macrae had the idea he designed the pull switch in an hour. The prototype was made the next day and two weeks later MD1 was in full production of the switch. It was a very successful design that worked perfectly from the start. Over three million were made during the war at a cost of 2/6d. It is a measure of its success that it was not redesigned throughout the war but remained in its original form.

The official description of the switch was: "The Pull Switch is a device to be used in conjunction with a trip wire for firing a mine. It is particularly useful for booby trap work. Designed to operate when a direct pull of about 4 lbs. is applied to the release pin it fires a percussion cap in a holder exactly the same as that supplied with the Mk. III Service Igniter. With the cap holder in position the switch measures approximately 4" overall by 5/8" in diameter and weighs 2 ½ oz. It consists of a head into which is screwed a housing tube containing a plug with a restricted opening. At the other end of the tube is a screwed collar for attachment of the cap holder. Inside the housing tube is a striker head attached to a hollow spindle, which runs inside a compression spring. The end of the hollow spindle carries a small head which is split, so that when it is compressed the diameter is reduced. When this split head is forced through the small hole in the housing tube plug, a spring loaded release pin at once enters and expands the head so that it cannot return, although it is now under the influence of the compression spring.



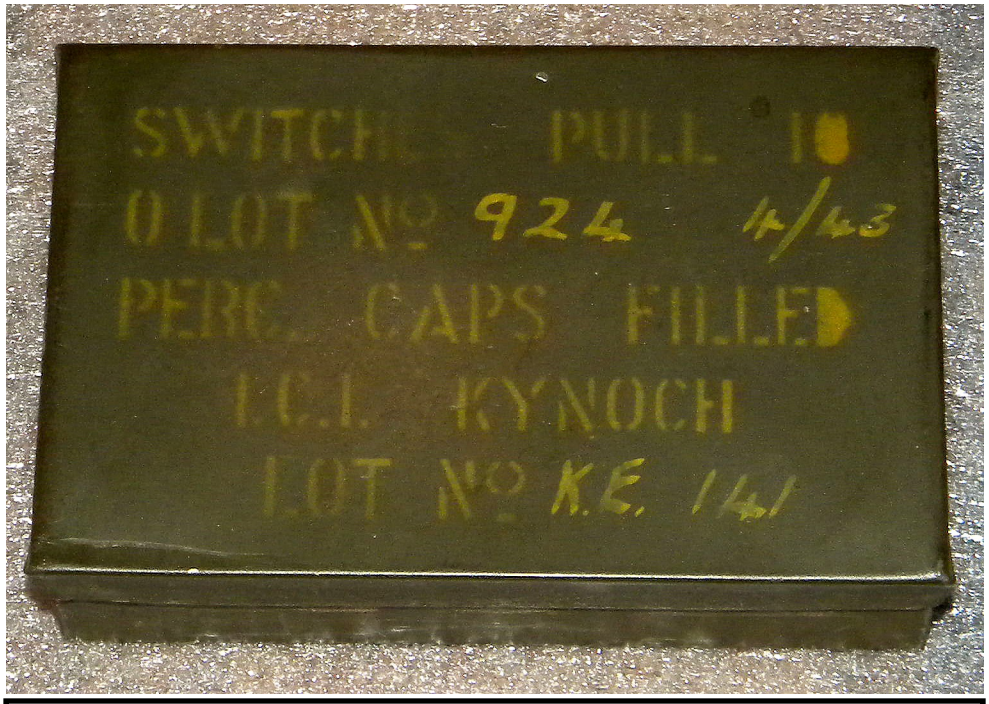
A safety pin can be inserted through the head and release pin so that the latter cannot be disengaged from the split head and it is impossible for the striker to fire the cap. Without a loading spring on the release pin, a pull of 1 lb. will free the striker. The pull required can therefore be varied by having a stronger or weaker loading spring. The standard spring used calls for a 4 lb. pull."

The device consists of a brass tube threaded on both ends. A threaded collar on the bottom end holds a standard fuse adapter with percussion cap. The upper end has a threaded housing that is fitted with the release pin and spring. A brass plug with a hole through the centre is fitted into the top end of the brass tube before the housing is screwed on. A striker and striker spring fit in through the bottom of the tube. The split stem of the striker fits through the plug up into the housing until the release pin penetrates and expands the striker stem. A safety pin fits through the housing and release pin preventing it from moving. A split ring is fitted through a hole in the end of the release pin so a trip wire can be easily attached. An anchor bracket may or may not be fitted by removing the collar and slipping the bracket over the tube and replacing the collar.

The switch is not actually painted but it is darkened and may appear either black or green. It is marked on the housing with the manufacturer "MD1" and a number that is an inspectors mark. The switches are packed in sheet metal boxes, with ten switches completely assembled with fuse adapter and percussion cap. There are also enough anchor brackets for one per switch. The box is painted olive drab with markings in yellow. Markings give the designation, quantity, lot number and date of manufacture of the switches. It is also marked with the manufacturer and lot number of the percussion caps.

When laid the switch is anchored either by tying it to an immovable object or through use of the anchor bracket. A trip wire is attached to the split ring at the switch end and to another object at the other. The safety pin is then removed. When a pull of about 4 pounds is applied to the trip wire, it pulls on the release pin and withdraws it from the striker stem. The stem is then free to close up and

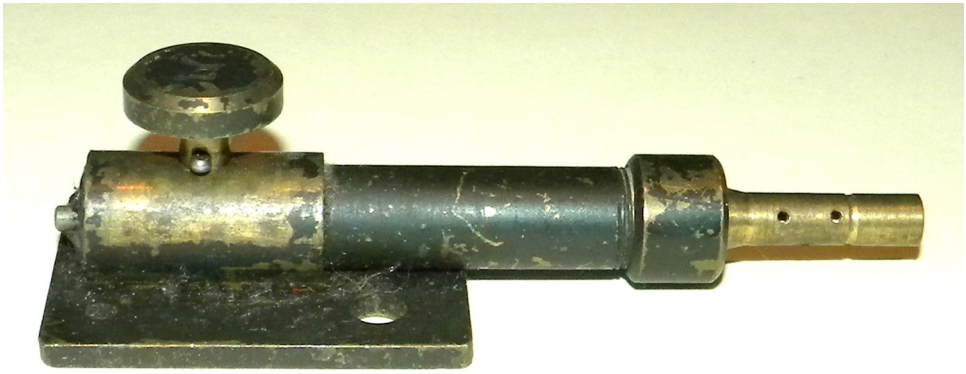
fit through the brass plug and under pressure of the striker spring is driven down onto the percussion cap. The cap fires and ignites the fuse or fires the detonator.



Packaging for Switch, No. 1 Mk. I

Switch, No. 2 Pressure, Mk. I

Introduced- 1941
Weight- 6.25 oz.
Length- 3.25 in.
Width-1.5 in.
Height-1 3/16 in.



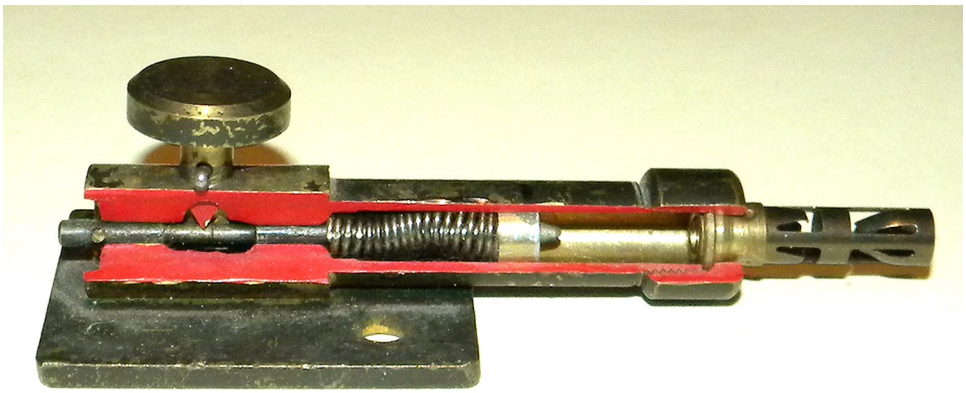
Switch, No. 2 Pressure, Mk. I ready for installation. Note the early type solid snout.



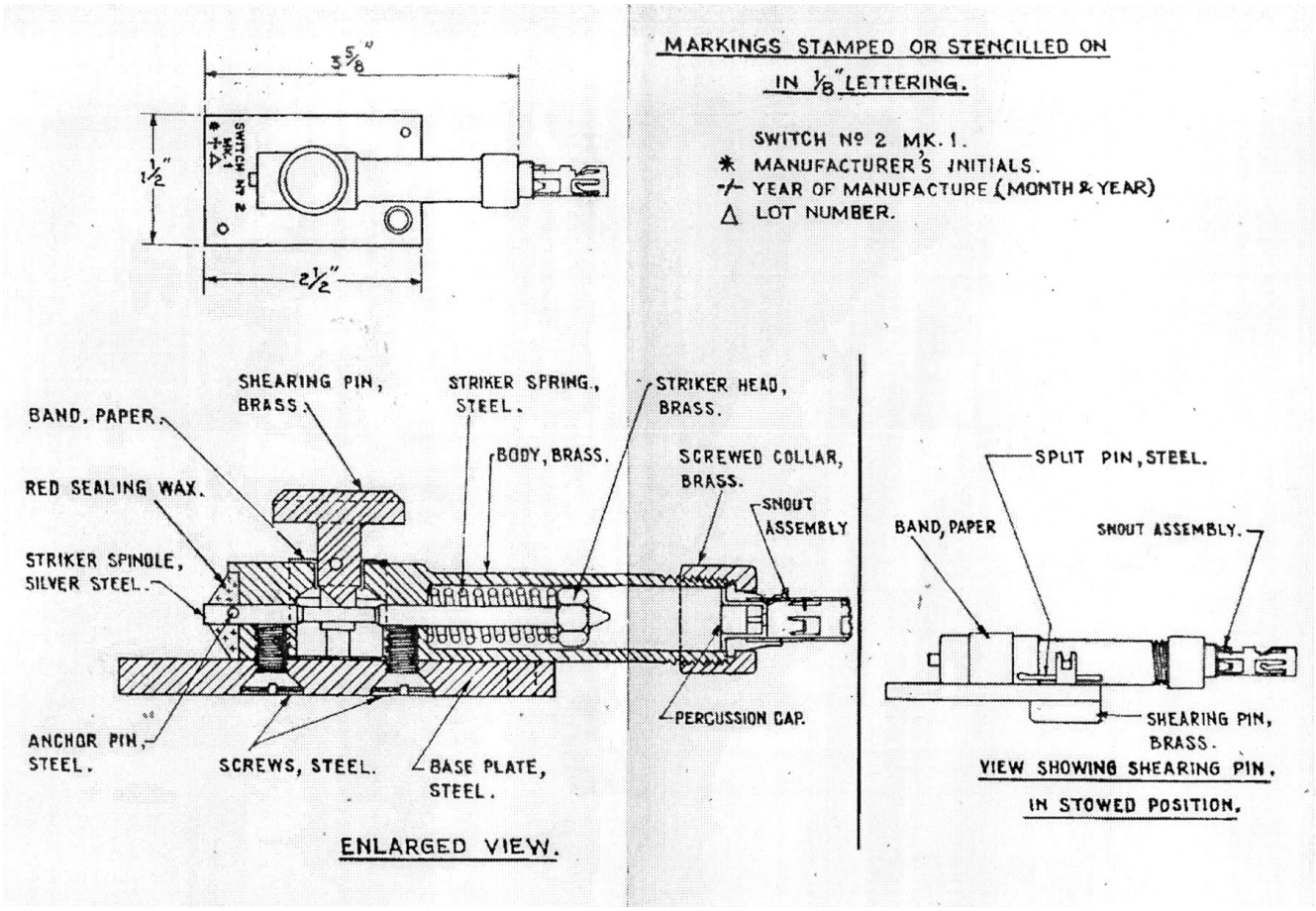
Switch, No. 2 Pressure, Mk. I in stowed position. Note the later spring snout.

The original pressure switch was designed by Millis Jefferis (Later Major-General Sir Millis Jefferis, K.B.E., M.C.) in early 1939. His first pressure switch, originally designed for destroying railway lines, was based on a large brass casting. It used a conventional spring -loaded striker in a partitioned barrel. The striker was maintained in the cocked position by a steel rod that had been hardened to the point of brittleness. The rod was secured to the closed end of the barrel with a pin. It ran through the partitioned off section and had the spring and striker head after the partition. A hole with a boss bearing was placed over the partitioned off section. A plunger was dropped into the hole so that its "V" end straddled the hardened steel rod. A safety pin fit through the boss and plunger preventing the plunger from being depressed. While the design of the switch was good, it was too heavy to be practical. It was redesigned to become a device weighing only 6 ounces and costing only 3/6d.

The pressure switch as designed and issued by MD1 was constructed of brass except for the steel rod, striker head, and striker spring. The barrel is cast as one piece with an enlarged section at the closed end. The opposite end is drilled out to a depth of about 2 inches to form the barrel. The bottom of the enlarged section is flattened and is drilled out from the bottom to form a partitioned section. A hole is then drilled from the top for the plunger. A small hole for the steel rod is drilled from the closed end completely through into the barrel. The barrel is threaded on the open end to fit a screwed collar. The



Sectioned No. 2, Pressure, Mk. I showing internal construction



base plate is a 1/8 inch rectangular piece of brass that is attached by two bolts to the flattened portion of the barrel. There are five holes in the base plate, two countersunk holes for the bolts, two in opposite corners to allow the switch to be screwed in position, and one large one to hold the pressure plunger in transit. The pressure plunger is turned out of brass with a stem and large pressure head. The bottom of the stem is slotted for a short distance and has the bottom of the slot formed into a "V" shaped cutting head. A safety pin passes through the stem.

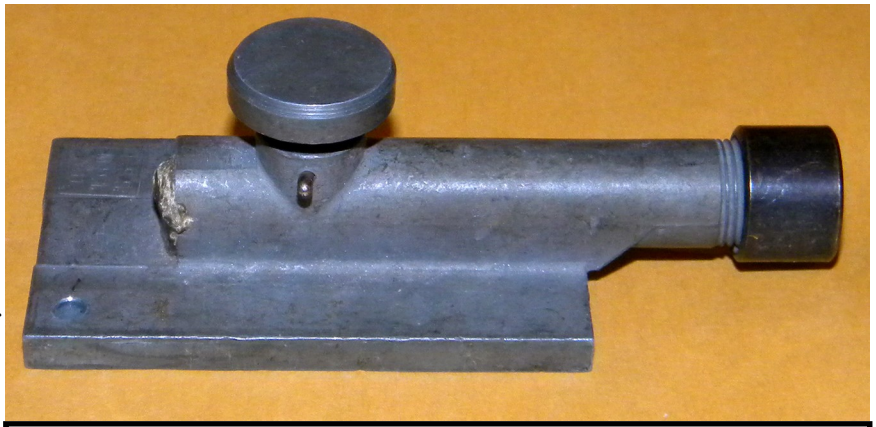
The steel rod is assembled with the striker head and striker spring. It is passed through the hole in the barrel assembly compressing the spring. It is then pinned in the cocked position. All holes into the partitioned section are then sealed with sealing wax.

The switch is painted olive green. It is normally stamped with a marking of “M.D.1” on the top of the base plate. Along with the marking is a number like “A14” which is an inspectors stamp.

The switch must be laid under an object that can move downward when weight is applied. Loose floorboards, stair treads, furniture or other such objects are suitable. It must not apply too much weight on the switch or it could cause it to fire prematurely. After the safety pin is removed, a weight applied to the pressure head will cause it to move downwards applying pressure from the cutting head to the hardened striker. When sufficient weight is applied the striker will fracture releasing it to fly forward under pressure of the striker spring and cause the striker head to strike the percussion cap and fire the switch.

Switch, No. 2 Pressure, Mk. II

Type– Pressure
Introduced– 1943
Length– 3 5/8 in.
Width– 1.5 in.
Height– 1 1/8 in.



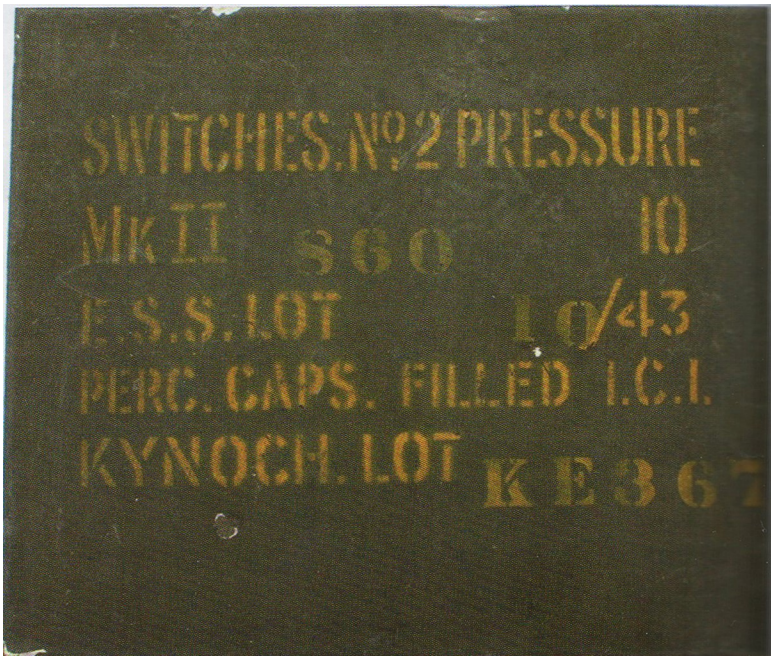
Switch, No. 2, Pressure, Mk. II, Side view

The Mk. II version of the pressure switch has a body and base cast from alloy in a single piece. A small boss is formed on the top of the body to accept the pressure plunger. The safety pin is fitted through holes in the boss and through the pressure plunger. Because of this design change the plunger is assembled to the body when issued rather than being held in the base plate as in the Mk. I version. The bottom is bored out directly below the boss to form a partitioned section and is closed by a brass cap soldered in place after assembly. In addition the switch has improved waterproofing. The base of the striker where it protrudes through the bottom of the tube is closed by wax.



Switch, No. 2, Pressure, Mk. II, bottom view

The body is stamped in the bottom corner with the manufacturers markings and inspectors mark, e.g. “ESS M.D.1 A11”.



Switch, No. 2, Pressure, Mk. II Packaging dated 1943

Switch No. 3, Release, Mk. I



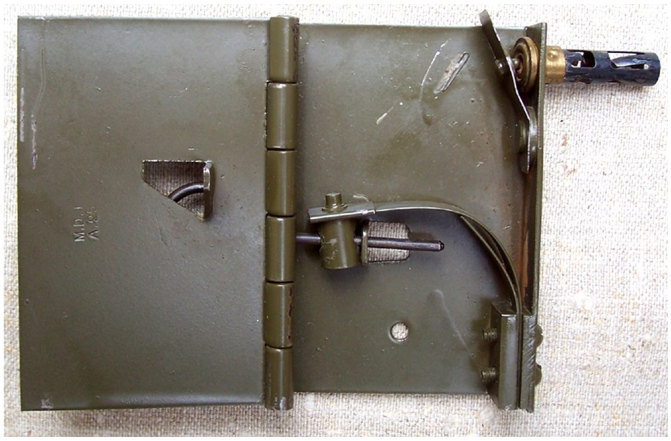
Switch No. 3, Release, Mk. I
Note Six section hinge.

Type- Release
Introduced- 1941
Weight- 1.5 oz.
Length- 3 in.
Width- 2 1/8 in.
Height- 5/8 in.

This switch was also designed by Lt. Col Stuart Macrae of MDI. It was another of the successful devices that worked correctly the first time and needed no improvements throughout the war. From design to full production took only two weeks. About two million were made during the war at a cost of 2/3d each. It was introduced for service in 1941.

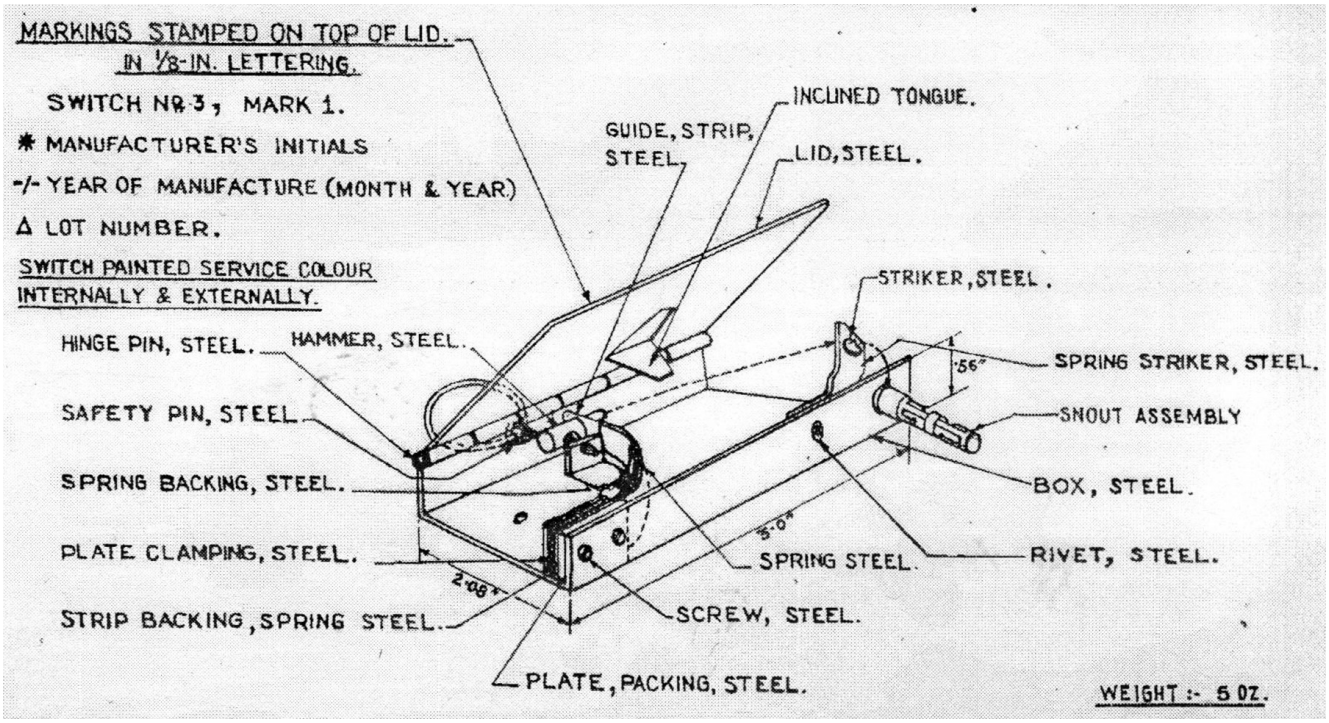
The switch resembles a small open ended box with a hinged lid. The main casing is constructed of sheet steel and has a lid, hinged on the long side of the box. The hinge my have either five or six sections. There are two punch-outs in the body, one in the bottom that is rectangular and bent up to form an anchor bracket for the safety pin. The other is in the lid and has an angled side forming part of the release mechanism of the switch. There is a hole drilled through the base to allow it to be screwed or nailed in position. A strong leaf spring with a hammer head mounted on the free end is attached on the side of the box opposite the hinge. An additional half-length leaf spring is attached on top to give a stronger spring. The springs are retained in position by two small bolts that screw into a small rectangular plate over the end of the springs. The hammerhead attached to the end of the longer spring has a large hole drilled through the head to correspond with a hole in the side of the case and a hole in the anchor tab. The safety pin fits through the case, the hammerhead, and finally the tab to retain it in the cocked position. The opposite end of the box has a hole to accept a fuse adapter. A short piece of spring steel with a striker mounted is riveted in position so that the striker is positioned over the hole where the percussion cap of the fuse adapter would sit. This piece also serves to keep the fuse adapter in position after it is fitted.

The switch is painted olive green with no other markings. The switch may or may not be stamped





Left– MD 1 Release Switch
Right- Switch No. 3, Release, Mk. I



Internal Diagram of MD 1 Release Switch.

with an "MD1" mark.

This is the original design of the switch and is only known as the "Release Switch". It was used prior to official adoption as a service store and after until stocks were exhausted.

The switch that was adopted as a service store as the No. 3 Mk. I was later slightly modified from the earlier release switch. This version has the second shorter piece of spring steel shortened and an additional wire spring fitted to give a stronger hit when released.

The switch is painted olive green with no other painted markings. The only other mark is the British Broad arrow marking.

The use of the switches is identical. For use, it must be cocked by drawing back on the hammer head until the safety pin can be inserted and retain it in the cocked position. At this point the pressure placed on the safety pin makes it very difficult to remove. A fuse adapter or spring snout is then inserted in the hole at the end of the box under the firing pin. The fuse is placed in position and the charge attached. An object weighing at least 1.5 lbs. is then placed on the top of the lid. This forces the lid closed which causes the inclined tab on the lid to push the spring back slightly. This action releases the safety pin allowing it to be easily removed. When removing the safety pin, if there is any resistance, the switch is not laid properly and must be reset. If the safety pin comes out without resistance, it is laid correctly.

Once the switch is laid if the restraining weight is removed the cocked hammer will push against the inclined surface on the tab in the lid. This will force the lid up until the striker is released. The hammerhead will fly forward under pressure of the springs until it hits the striker head which then hits the percussion cap or 1.7 grain detonator. The cap ignites the fuse or fires the detonator

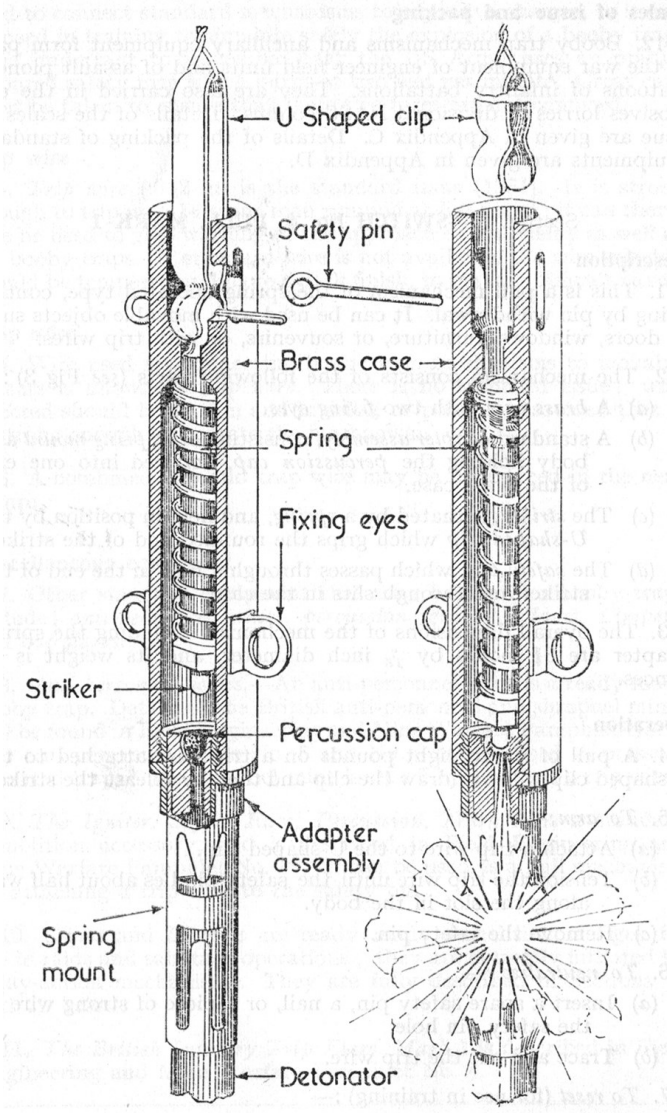
Switch, No. 4 Pull, Mk. I

Type- Pull
Introduced- 1941
Weight- 1.25 oz.
Length- 3.75 in.
Diameter- 7/16 in.



Switch, No. 4 Pull, Mk. I

This switch was designed in 1941 by Major Ramsey Green and Mr. Billinghurst at Station XII; a cover name for the SOE production establishment. Originally known as "Type 6 Pull" it was designated No. 4 Mk. I when it became a service store in 1942/43. Production to the end of 1944 was 750,000 with 95,000 of those supplied to the Army, the remainder were retained by SOE. It remained in service with the army for a great number of years after the war, being used well into the 1980's, and may still be in service. Switches dated as late as 1984 have been noted.



Internal view showing mechanism

The mechanism consists of a brass body with a clip bearing two eyes attached near the bottom end. The bottom end is internally threaded to accept a "Snout, Switch, Capped Mk. 1". The top end has two elongated slots opposite each other and has an internal constriction formed at the bottom end of the slots. The striker has a shoulder and firing pin formed at one end and a rounded head at the other. A safety pin hole is drilled through the rounded head. A "U" shaped clip is formed in such a manner that the ends conform to the rounded head of the striker.

When assembled the striker and striker spring are put in through the bottom end of the body and forced up through the constriction far enough so the head protrudes past the top end of the body. The "U" shaped clip is put over the head of the striker and the striker allowed to move back into the body. At this point the clip will not open enough to release the striker to pass back through the constriction. A safety pin is pushed through the slots in the side of the body and through the hole in the striker head to ensure the device remains safe.

The body is left with the natural brass colour although a varnish is applied. SOE switches were not marked. Post war the body is marked in black with the designation, manufacturers mark, date of manufacture, and lot number.

When the switch is set with a trip wire, a tension is put on the line to pull back on the "U" shaped clip so the safety pin will come out easily. At

this point the safety pin will be somewhere near the centre of the elongated slots. With the safety pin out: a pressure or pull of six to eight pounds applied to the trip wire will pull the "U" shaped clip and the striker with it, out of the body. When the clip clears the top end of the body it will release the striker to move forward under pressure of the striker spring. The firing pin strikes the percussion cap and sets of the trap.





Packaging for No. 4, Pull, Mk. I Switch
Dated 1963

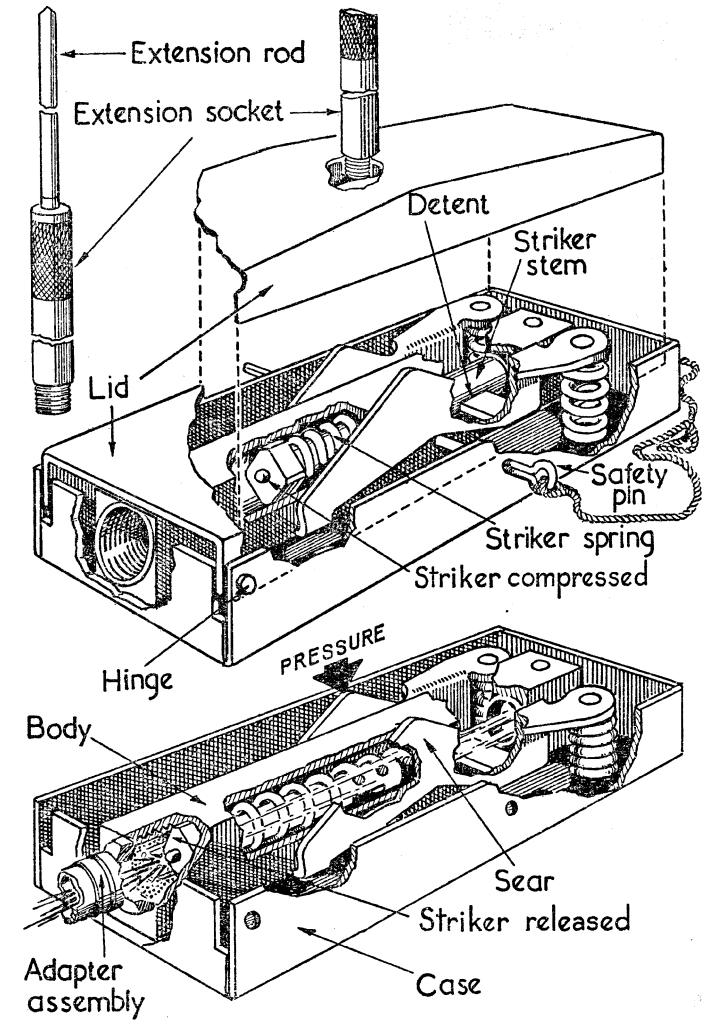
Switch, No. 5 Pressure, Mk. I

Type- Pressure
Introduced- 1941
Weight- 4.75 oz.
Length- 3.75 in.
Width- 1.25 in.
Height- .75 in.



Switch, No. 5 Pressure, Mk. I and extension rod.

This switch was designed in 1941 by Major Ramsey Green and Mr. Billinghurst at Station XII; a cover name for the SOE production establishment. Originally known as "Type 6 Pressure" it was designated No. 5 Mk. I when it became a service store in 1942/43. Production to the end of 1944 was 502,000 with 105,000 supplied to the army, the remainder being retained by SOE. It remained in service with the army for a great number of years after the war, being used well into the 1980's, and may still be in service. It was also in Canadian service for many years. An American produced copy was in service with the OSS and later CIA as "Firing Device-Pressure Type A3".



Internal diagram showing method of operation.

The switch consists of a steel case with a hinged steel lid fitting inside the case. A zinc alloy body is fixed inside the case by a countersunk bolt. The end of the body is threaded to accept a " Snout, Switch, Capped Mk. 1". There are two holes in the bottom of the case for use in securing the switch. Two studs on the bottom of the case keep the sear springs in position. The lid has a centre threaded hole to screw an extension into. The striker is formed with a shoulder and firing pin on one end and a detent on the other. The sear is formed of steel and has two studs riveted on to correspond with the studs on the case to retain the sear springs. The pressure points on the sear project up on either side of the body. A safety pin passes through the case, body, and striker to ensure the device will not fire when it is in position.

An extension rod is made in two parts, a brass socket that screws into the top of the lid and a steel rod that screws into the socket. The extension is adjustable in height by

about one inch by varying the amount that the rod is screwed into the socket. If a shorter extension is required, the socket may be used without the rod.

WWII issued switches are painted dark green with no markings, postwar switches are painted tan with markings in black. Markings give the designation, manufacturers mark, date of manufacture and lot number.

When the switch is assembled, the striker and striker spring are inserted in the end of the body with the detent facing down. The striker is pressed back until the detent engages the sear and holds the striker in the cocked position. The safety pin is then passed through the holes in the side of the body to make the switch safe.

The pressure necessary to operate the device varies with the position the pressure is applied on the lid. At the farthest from the hinge pin it requires a pressure of 21 pounds, at the centre a pressure of 50 to 60 pounds is required. When pressure is applied to the switch the lid presses down on the sear, when the sear is pressed down it disengages from the detent allowing the striker to fly forward under pressure of the striker spring. The firing pin hits the percussion cap and fires the charge.



Packaging for No. 5, Pressure, Mk. I switch, dated 1954

Switch, No. 6 Release, Mk. I

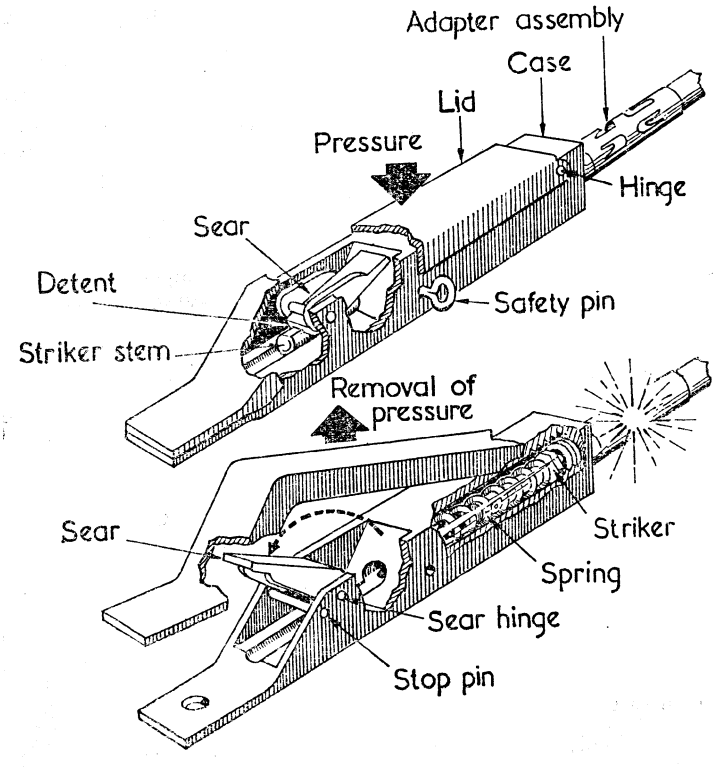


Switch, No. 6 Release, Mk. I

Type- Release
Introduced- 1941
Weight- 3.5 oz.
Length- 4.5 in.
Width- 5/8 in.
Height- 9/16 in.

This switch was designed in 1941 by Major Ramsey Green and Mr. Billinghurst at Station XII; a cover name for the SOE production establishment. Originally known as "Type 6 Release" it was designated No. 6 Mk. I when it became a service store in 1942/43. Production to the end of 1944 was 410,000 with 94,000 being supplied to the army, the remainder were retained for SOE use. It remained in service with British and Canadian forces for a number of years after the war, being used well into the 1980's, and may still be in service. Also listed as an issue item to the American OSS during WWII. An American produced version with slight differences was designated as “Firing Device, Release, A2”.

The switch consists of a zinc alloy body threaded at one end to receive the "Snout, Switch, Capped, Mk. 1". The other end is flattened to allow it to be inserted into narrow openings. A hole drilled in the flattened end enabled the switch to be fastened in position. A steel lid is hinged at the threaded end and fits over the body. The sear is hinged at the opposite end. The striker is formed with a shoulder and firing pin at one end and a detent cut on the other. A safety pin hole is drilled through the body and another through the striker.



Internal diagram showing method of operation.

SOE switches were not marked. Post war the switch is painted dark green with markings in black. Markings give the designation, manufacturers mark, date of manufacture, and lot number.

When assembled, the striker and striker spring are inserted in the threaded end with the detent facing up. The striker is pushed back until the sear engages in the detent and holds the striker. The safety pin must be put in place or the switch will operate. The safety pin is the only thing holding the switch in the cocked position at this point.

When the switch is set in position and a weight of 3.5 lbs. minimum is applied to the lid, it forces down on the lid and sear forcing the striker back slightly releasing the safety pin. The safety pin can then be easily

removed without force. A seven pound weight is the minimum weight recommended to hold the switch.

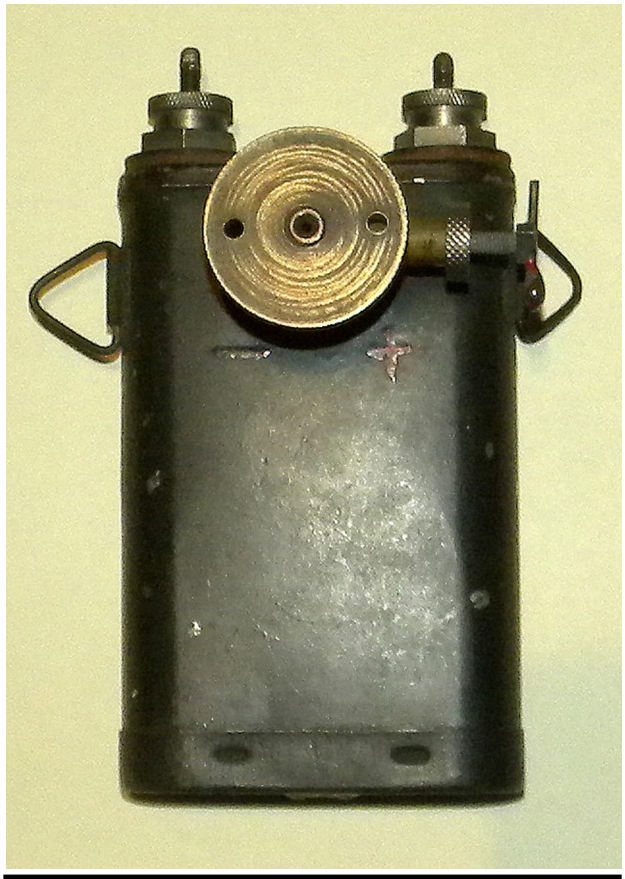
When the restraining weight is removed, the striker stem pushes against the sear causing it to rotate which pushes up the lid. When the sear has rotated enough, the striker is released to fly forward under pressure of its spring to strike the cap in the snout. The cap fires and either fires the detonator or ignites the fuse attached.

Switch, No. 7 Pressure-Pull, Mk. I

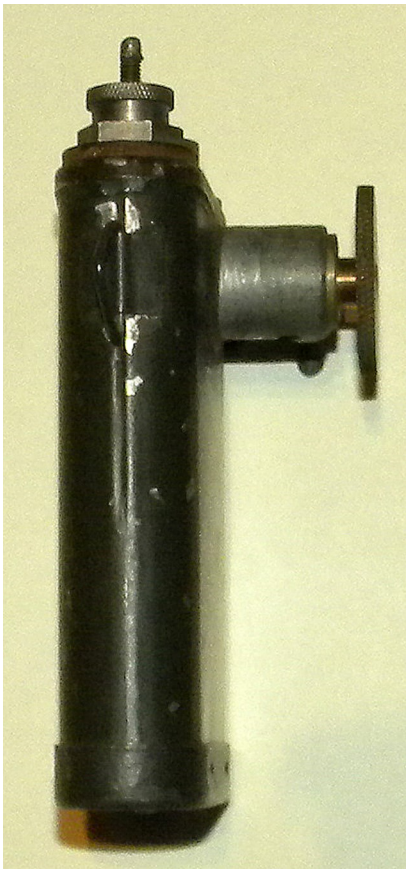
Type- Electrical, Pressure/Pull
Introduced- 1941
Weight- 8 oz.
Height- 4 7/8 in.
Width- 2 5/8 in.
Depth- 2 in.

This is an electrical contact switch introduced for service in 1941. It can be used as a pressure or pull switch. It is used only with electrical detonators.

The main body is a flat tin with the top soldered on and a cap on the bottom to allow a "Battery, Dry, W, Mk. I" or a standard 3 cell flat torch (flashlight) battery to be fitted. It has two mounting rings soldered to either side just below the top. There are two electrical terminals on the top of the switch. Mounted on the flat side is the operating mechanism with a plunger. The plunger has a switch bar internally and a brass plate on the external end. The plate has two holes for attachment of a trip wire and a central threaded hole for an extension rod. The tension required to operate the switch can be adjusted by a ball release catch located on the side of the plunger housing. It is adjusted by screwing in or out a setting stud. A safety pin with a lock nut fits through the plunger housing and plunger preventing its movement. The safety pin cannot be removed unless the plunger is in the neutral position and held by the ball release catch.



Switch, No. 7 Pressure-Pull, Mk. I
Front view



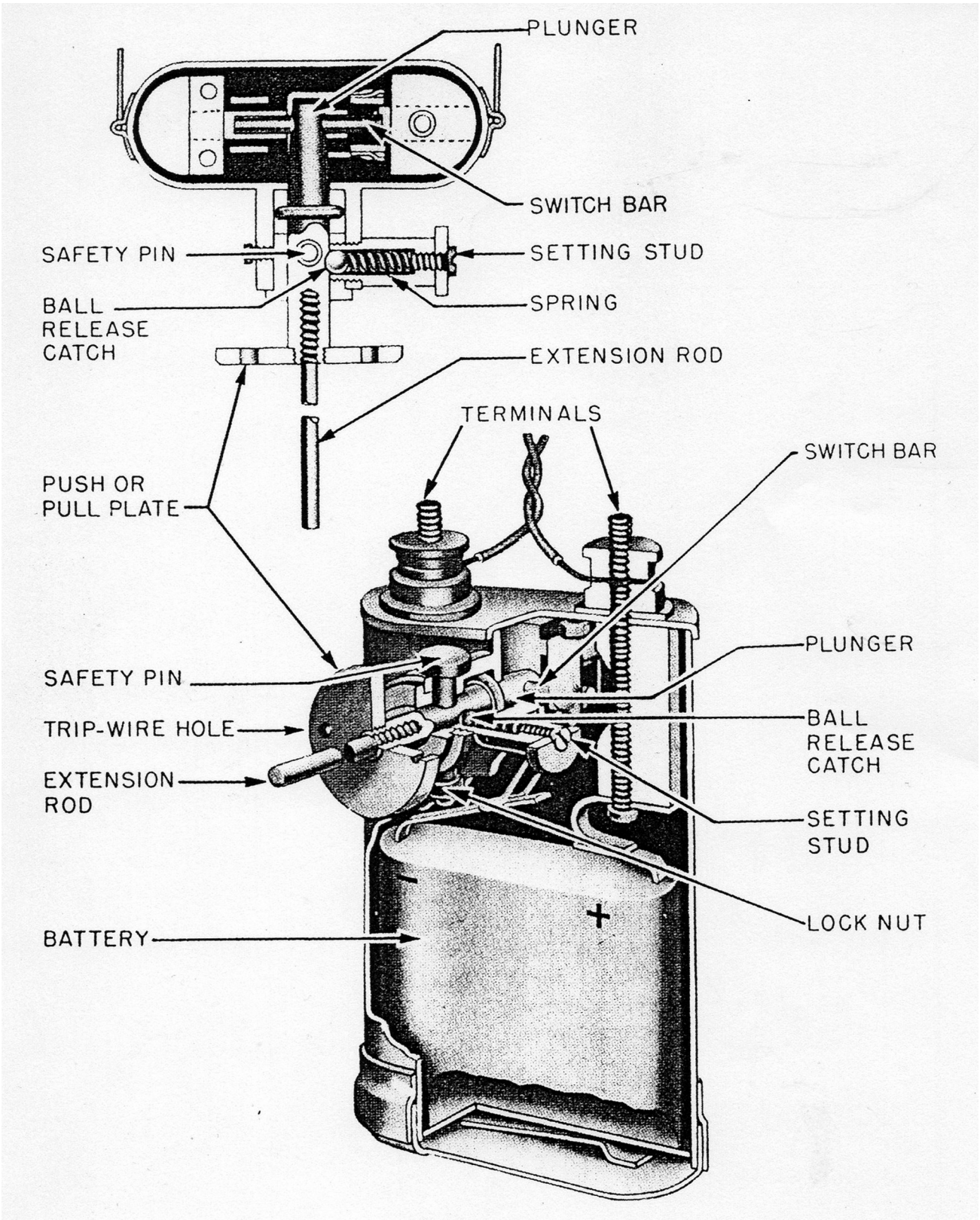
Switch, No. 7 Pressure-Pull, Mk. I
Side view

The minimum operating tension is about 2.2 Kg and can be adjusted up from that.

The switch is painted olive green and has a white star marked in the centre of the body In addition the positive and negative terminals are marked in red and black on the side of the case.

When the device is laid, pressure on the brass plate will cause it to move downward pushing the plunger in. When the plunger is pushed in, the switch bar will connect with contacts within the device and complete the circuit. If used as a pull device, a pull on the trip with will cause the plunger to pull outward causing the switch bar to connect with two other contacts within the device and complete the circuit.

Switch, No. 7 Pressure-Pull, Mk. I
Internal Diagram



Switch, No. 8, Anti-Personnel, Mk. I

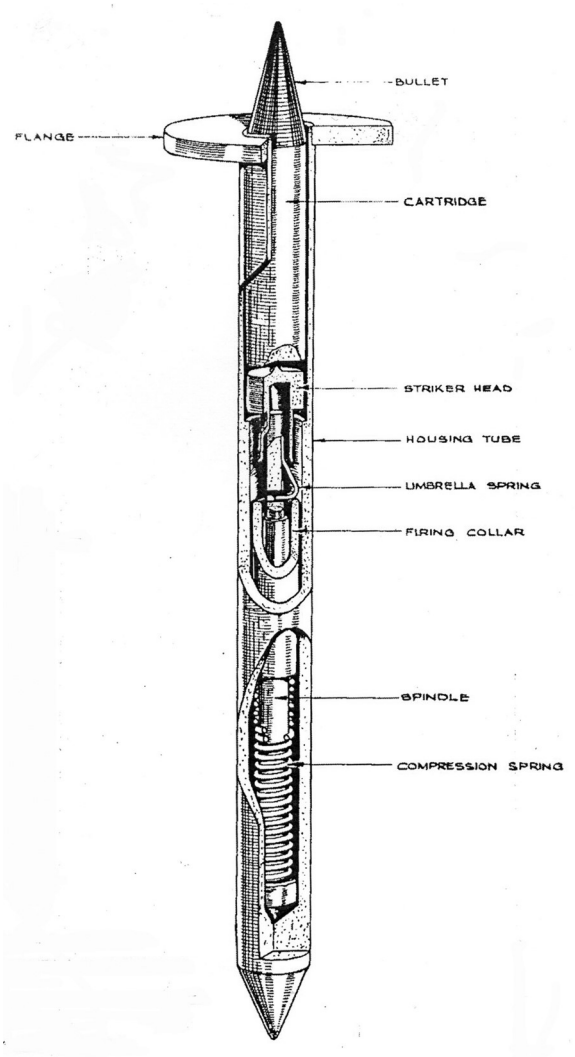
Type- Pressure
Introduced- 1940
Weight-
Length- 5.25 in.
Diameter- max 1.5 in.
min .5 in.

Developed by MD1, production of this switch commenced in January of 1940. It is in reality a small anti-personnel land mine that was also useful against wheeled vehicles. It was designed to be laid in paths, roads, and tracks so that when pressure is applied it would fire a bullet upwards through a man's foot or into a tire.



Switch, No. 8, Anti-Personnel, Mk. I
Upper Right– early one piece body
Lower Left– later version with two piece body

The switch is comprised of a hollow metal spike with a flange at the top end. In the earliest versions the flange is attached to the spike, in later versions the spike is belled out at the top and a washer slipped over the spike being held in place by the belled out portion. The firing mechanism is inserted into the spike. It consists of a metal spindle with a flange at the base and an umbrella catch at the top. A firing spring and spring retaining sleeve are threaded over the spindle and held in compression by the umbrella catch. Once the firing mechanism is inserted, a striker with a short sleeve on the bottom is inserted with the sleeve over the spindle.



Internal diagram showing mechanism

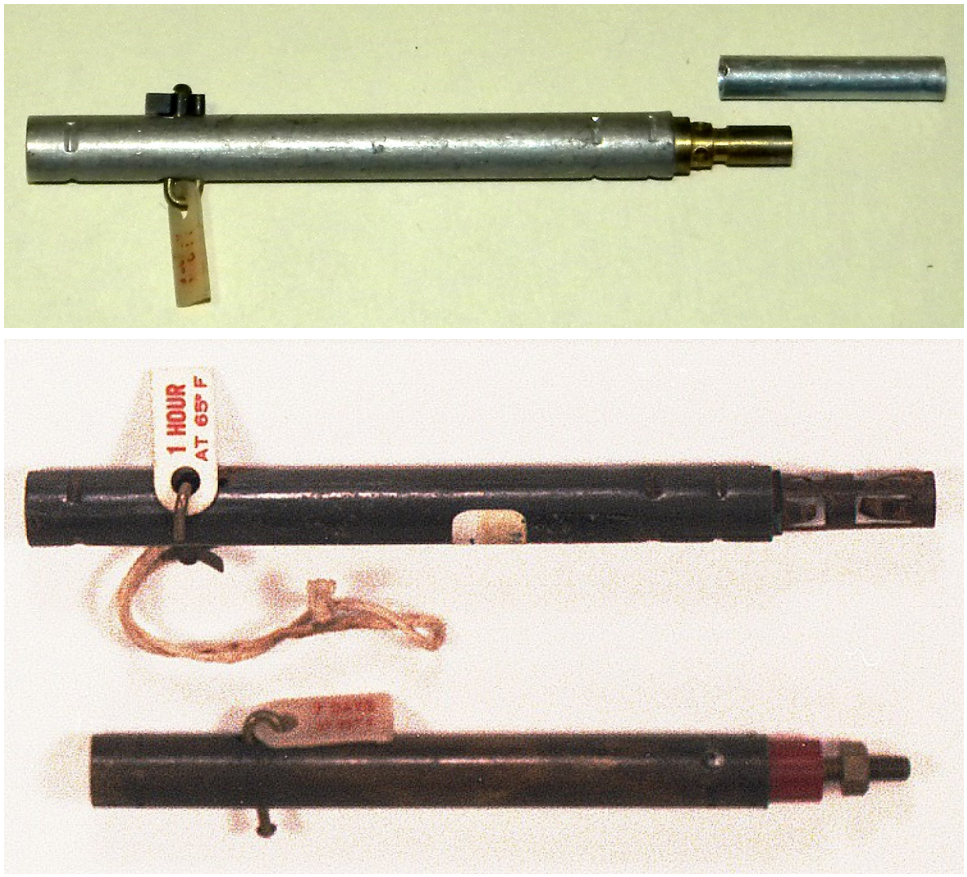
When the spike is driven into the ground, the switch is carefully loaded with a special cartridge that rests on top of the striker with the point of the cartridge protruding above the switch. When a pressure of about 4 pounds is applied to the top of the cartridge it pushes it down forcing the striker down. The sleeve on the striker contacts the umbrella catch and forces it in to release the spring retaining sleeve. Once released the firing spring forces upward on the retaining sleeve which then hits the sleeve on the bottom of the striker with a sharp blow. The blow is transmitted to the striker head and thus the percussion cap in the cartridge causing it to fire.



Switch, No. 8, Anti-Personnel, Mk. I with packing box and anvil used for pounding the spike into the ground.

Switch, No. 9, "L" Delay, Mk. I

Type- Delay
Introduced- Oct 1940
Weight- 1 oz.
Length- 4.5 in.
Diameter- 3/8 in.



Top- Switch with early MD1 adapter and connecting sleeve
Centre- Switch with spring snout
Bottom- Switch with electrical contact assembly.

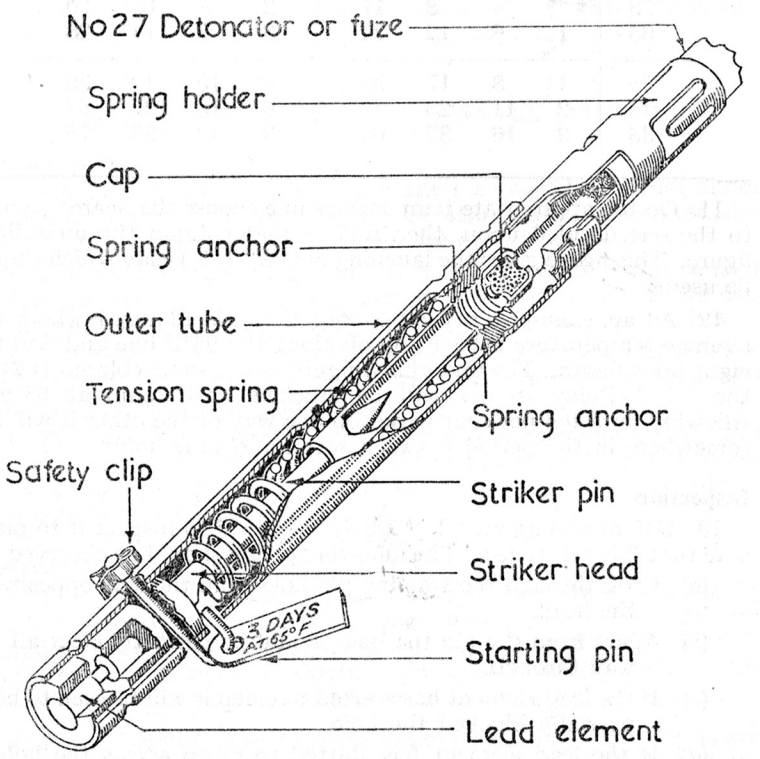
This delay switch was developed by MD1 in February 1940 and was in full production from October of 1940. It is based on the fact that Tellurium lead under load, will stretch uniformly and eventually break.

The switch is housed in a tubular body made either of brass or steel. The lead rod is turned down to form a small dumbbell shaped element that is then pegged at its upper end into a brass collar. The brass collar is then crimped into the top end of the body tube. The striker pin is pegged into a brass collar at its upper end which has the lower end of the lead element pegged into it. This brass collar is an easy sliding fit in the body tube. The tension spring is attached to another collar that has a guide tube for the striker attached and is crimped into the bottom end of the body tube. The upper end of the spring is hooked into a slot in the upper end of the striker. At this point the spring is under tension. An adapter or spring clip with percussion cap or 1.7 grain detonator is crimped into the extreme bottom of the body tube. The starting pin fits through the body and striker collar preventing movement of the collar and thus relieves any tension being put on the lead element. A small clip on the end of the starting pin prevents it from falling out accidentally. A small plastic tab on the starting pin gives the delay time of the switch.

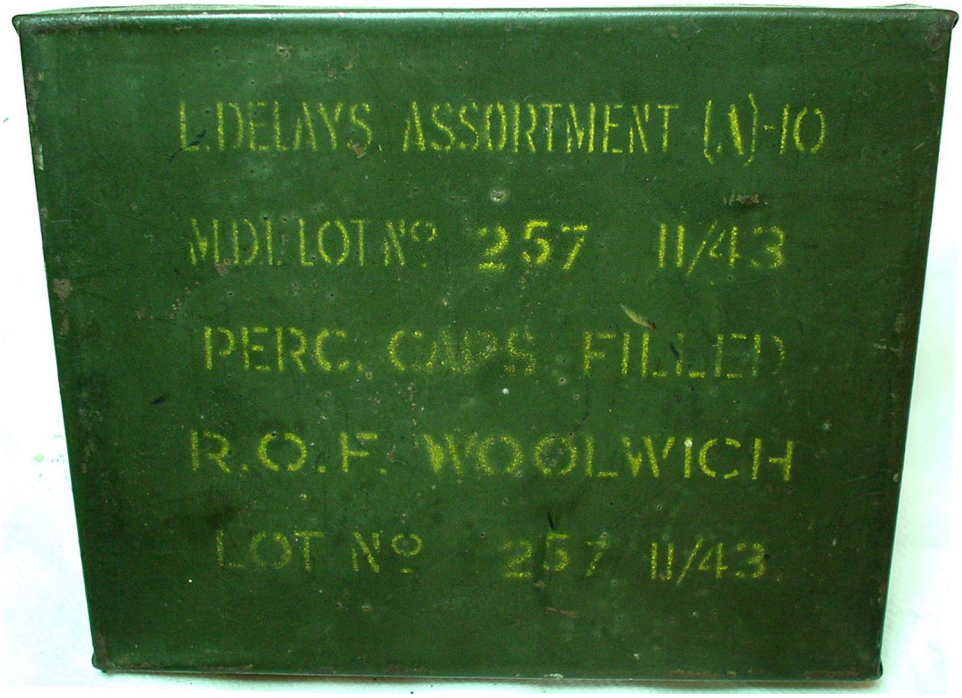
When the starting pin is removed, tension is transferred to the lead element. The lead begins to stretch and will eventually break releasing the striker to hit the cap to ignite a fuse or fire the detonator.

"L" delays may be found with the early type MD1 brass adapters, spring clip adapters and even with an electrical contact assembly.

The switches were issued in a number of different delays. The delay times were varied by the diameter of the centre portion of the lead element. Delays were 1, 6, 12 and 24 hours and 3, 7, 14, and 28 days, measured at a temperature of 65 degrees. At higher temperatures the delay was reduced, at lower temperatures the delay was increased.



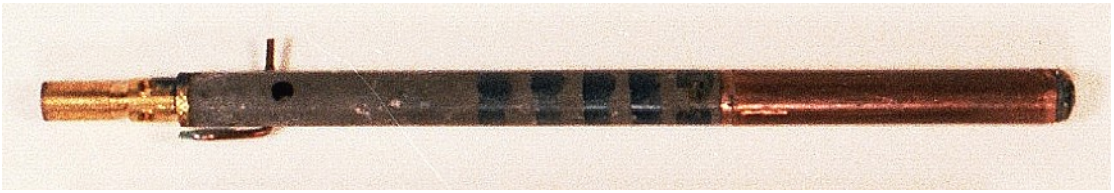
Switch, No. 9, "L" Delay, Mk. I internal diagram showing mechanism



Switch, No. 9, "L" Delay, Mk. I Packing box

Signal Relay (SR1)

Type- Delay, Chemical
Introduced 1939
Weight- 1 oz.
Length- 5 7/8 in.
Diameter- 9/32 in.



Signal Relay (SR1E)

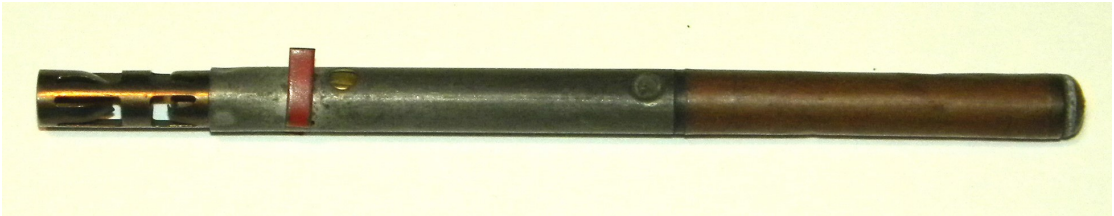
The earliest version of the time pencil was devised by Commander John Langley of Section D SIS. The device was nicknamed "Signal Relay" and given a number of "SR1". Modifications were denoted by adding a letter to the end. By the time it entered service it was "SR1E". Production was undertaken from the spring of 1939 by Joseph Lucas Ltd. Further modifications advanced it to "SR1G" which became the "Switch, No. 10 Delay Mk. 1".

It consists of a two part cylindrical case, the upper section of copper, and the lower section of tinned or zinc plated brass. A brass adapter with percussion cap is screwed in to the bottom end. The lower section contains the spring-loaded striker held in the cocked position by a wire running from the striker through the top section to a retaining screw at the top. There is an inspection hole drilled through the lower end of the bottom section. A safety pin is fitted through the body below the inspection hole. The top end contains a glass ampoule containing a corrosive liquid and two pieces of cotton wicking. The top portion of the switch is sealed by plugs and by a lead washer on the retaining screw.

Coloured bands painted on the lower section denote the delay time. Black bands 10 minutes, Red 30 minutes, White 2 hours, Green 6 hours, Yellow 12 hours and Blue 30 hours.

Switch, No. 10 Delay, Mk. I

Type- Delay, Chemical
Introduced 1940
Weight- 1 oz.
Length 5 1/8 in.
Diameter- 5/16 in.



Switch, No. 10 Delay, Mk. I

This switch was developed from the SR1. It was also on issue to the American OSS during the war. The American M1 Delay Firing Device was designed from this switch being modified only by fitting an American Base Coupler to it instead of the spring snout.

The switch is of the chemical delay type. It consists of a two part cylindrical case, the upper section of copper, and the lower section tinned or zinc plated brass. A spring snout with percussion cap is

attached at the bottom end. The lower section contains the spring-loaded striker held in the cocked position by a wire running from the striker through the top section to a retaining screw at the top. There is an inspection hole drilled through the lower end of the bottom section. Below the inspection hole is a rectangular hole to fit a safety strip. The top end contains a glass ampoule containing a corrosive liquid (Cupric Chloride) and two pieces of cotton wicking. The top portion of the switch is sealed by plugs and by a lead washer on the retaining screw.

When the switch is to be used, either a detonator can be fitted to the spring snout or a piece of safety fuse. Before use the switch must be examined by looking through the inspection hole to ensure the striker is still held in position. If not, the switch is discarded. When laid the upper copper portion of the casing is crushed from both sides causing the glass ampoule to break and release the corrosive liquid. The corrosive liquid acts on the retaining wire eventually weakening it enough to break under the pressure of the striker spring. When the wire breaks, the striker, under pressure from the striker spring is forced down onto the percussion cap. The percussion cap fires igniting either the safety fuse or detonator.

The safety strip is colour coded according to the nominal delay of the switch. When initially developed there were six different delay periods that were later reduced to three. The nominal delay times for the earlier switches were timed at 77 degrees Fahrenheit. The delay strips were painted in six different colours giving delays of: black 10 min, red 19 min. White 1 hr. 19 min., Green 3 hrs. 10 min, yellow, 6 hrs. 30 min. and blue 14 hrs. 30 min. Later issues eliminated three of the delays leaving the following: A white strip gives a delay of 1.5 hours, yellow a delay of 6 hours, and blue a delay of 16-18 hours timed at 65 degrees Fahrenheit. The delay times are effected by atmospheric temperatures.



Left- Switch, No. 10 Delay, Mk. I
Right- Switch, No. 10 Delay, Mk. II

The switch is normally unpainted, the top is natural copper coloured, the bottom portion depending on the age of the switch may be grey in the earliest models, silver, or brass coloured. The safety strip is painted to denote the delay times as listed above.

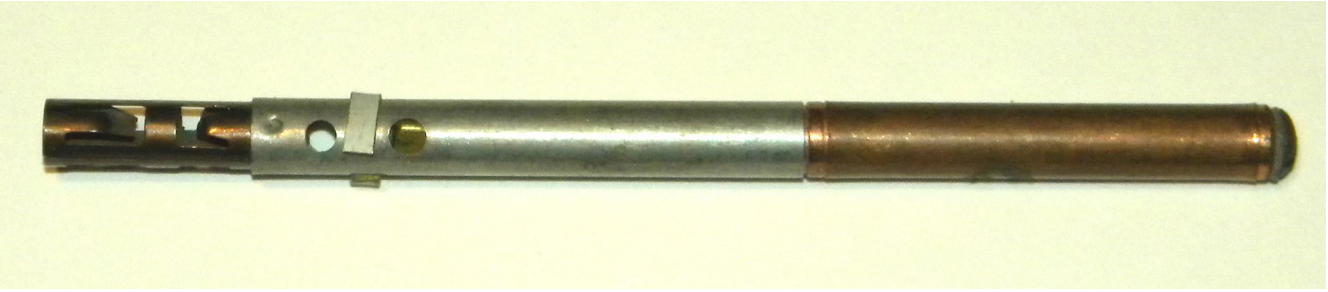
The switches were initially issued in tin boxes containing 5 switches of the same delay period the tape sealing the box was the same colour as the safety strips.

Switch, No. 10 Delay, Mk. II

Type- Delay, Chemical
Introduced 1943
Weight- 1 oz.
Length 5 1/8 in.
Diameter- 5/16 in.

The specifications for this version were amended in November 1943 and the designation changed to No. 10 Mk. II.

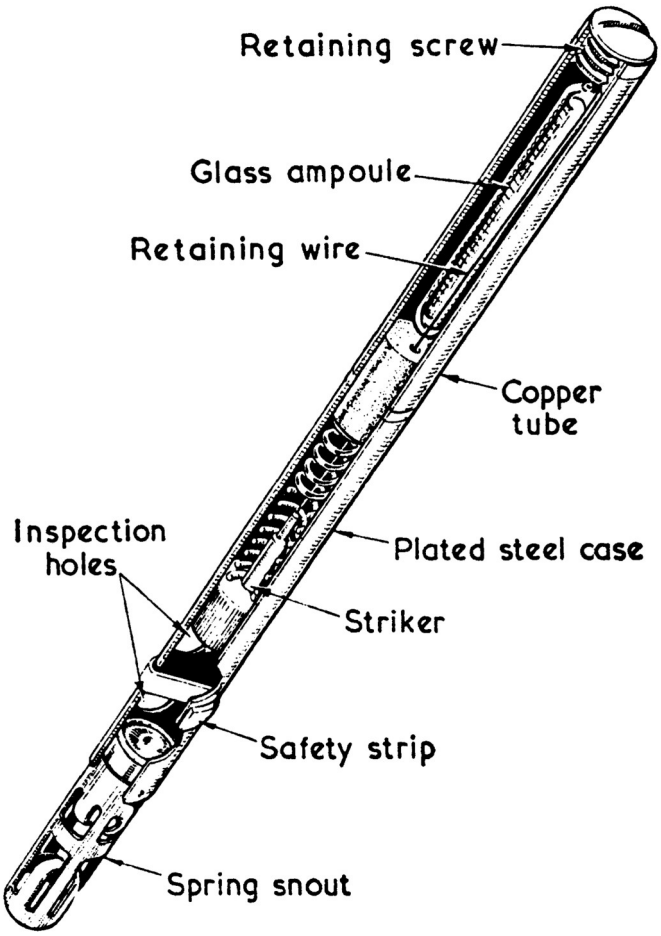
The switch is of the chemical delay type. It consists of a two part cylindrical case, the upper section



Switch, No. 10 Delay, Mk. II

of copper, and the lower section tinned or zinc plated brass. A spring snout with percussion cap is attached at the bottom end. The lower section contains the spring-loaded striker held in the cocked position by a wire running from the striker through the top section to a retaining screw at the top. There are two inspection holes drilled through the lower end of the bottom section. Between the inspection holes is a rectangular hole to fit a safety strip. In the Mk. II the hole for the safety strip was moved about 1/16 of an inch higher than on the Mk. I The top end contains a glass ampoule containing a corrosive liquid (Cupric Chloride) and two pieces of cotton wicking. The top portion of the switch is sealed by plugs and by a lead washer on the retaining screw.

When the switch is to be used, either a detonator can be fitted to the spring snout or a piece of safety fuse. Before use the switch must be examined by looking through the inspection hole to ensure the striker is still held in position. If not, the switch is discarded. When laid the upper copper portion of the casing is crushed from both sides causing the glass ampoule to break and release the corrosive liquid. The corrosive liquid acts on the retaining wire eventually weakening it enough to break under the pressure of the striker spring. When the wire breaks, the striker, under pressure from the striker spring is forced down onto the percussion cap. The percussion cap fires igniting either the safety fuse or detonator.



Switch, No. 10 Delay, Mk. II internal diagram showing mechanism

The safety strip is colour coded according to the nominal delay of the switch. When initially developed there were six different delay periods that were later reduced to three. The nominal delay times for the earlier switches were timed at 77 degrees Fahrenheit. The delay strips were painted in six different colours giving delays of: black 10 min, red 19 min. White 1 hr. 19 min., Green 3 hrs. 10 min., yellow, 6 hrs. 30 min. and blue 14 hrs. 30 min. Later issues eliminated three of the delays leaving the following: A white strip gives a delay of 1.5 hours, yellow a delay of 6 hours, and blue a delay of 16-18 hours timed at 65 degrees Fahrenheit. The delay times are effected by atmospheric temperatures.

The switch is normally unpainted, the top is

natural copper coloured, the bottom portion depending on the age of the switch may be grey in the earliest models, silver, or brass coloured. The safety strip is painted to denote the delay times as listed above.

The switches were initially issued in tin boxes containing 5 switches of the same delay period, the tape sealing the box was the same colour as the safety strips.

Special Notes:

SOE contracted for the manufacture of these Switches in the USA. Some 12 million were made in the USA with only minor differences from UK production. US manufactured switches were not tinned or zinc plated.

The switch was the basis for the American M1 Delay firing device.

The switch was used as the basis for a number of other devices. An igniter for the US Pocket Incendiary.



Pocket Incendiary Igniter, US Manufacture

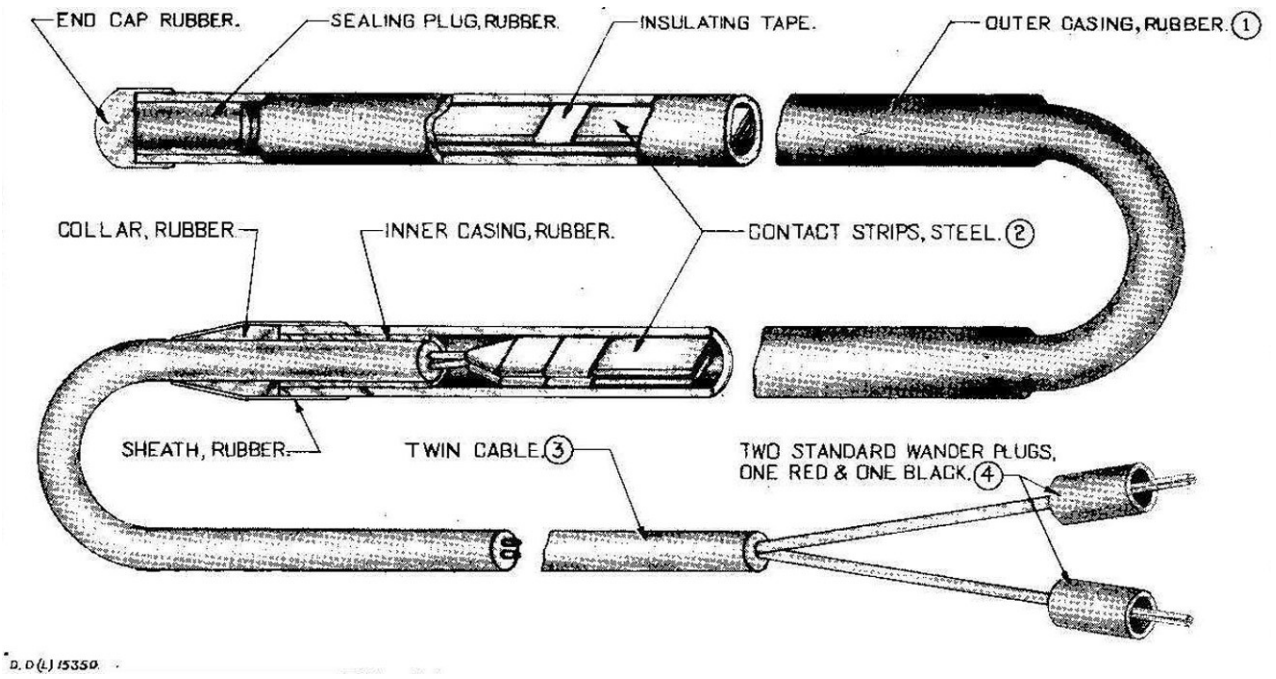
It was also fitted with attachments to fit the trigger guard and trigger for the US M3 Submachine Gun for use as a decoy device.

A version without spring clip was used as a delay firing device with the Tree Spigot Mortar.

Switch, No. 11 Contact Strip, Electrical, Mk. I

Type- Pressure
Introduced 1943
Weight- with battery 80 oz.
Length- 70 in.
Diameter- 3/8 in.

This switch was introduced for service in 1943 primarily as an electrical contact anti vehicular pressure switch. It is designed to be laid across a road or track to destroy wheeled or tracked vehicles. Because it is an electrical switch the charge can be a considerable distance from the switch if required.



Late version with the switch contained in a single rubber tube.

It consists of two sections 2' 9" long connected by a flexible electrical wire 9" long. Each section consists of two strips of chromium plated brass held apart by insulating spacers every six inches. The strips are contained in rubber tubing closed at the ends by rubber plugs. From the join, two electrical leads fitted with plugs connect to the battery. Each set comes complete with a 9 volt battery. The battery is specially designed with sockets for the leads from the switch and two screw terminals that will connect to an electrical detonator. One battery pole is attached directly to one of the terminals the other is attached to one of the sockets which is coupled to the other terminal.

In a later model the two pairs of strips are contained in a single rubber tube that can be folded in the middle. The connecting leads are then taken from one end of the tube. Items required for use but not issued with the switch were a “Detonator, electric, No. 9 Mk. IV” and three “Fuses, Electric, No. 14, Mk. IV”. The electric fuses were used to test the switch, not for its final operation.

It was important that the switch be tested before laying and after laying, but before attaching it to the detonator.

The tubing covering the brass contact strips is red. This switch had to be concealed or it would easily be seen on a road. It could be buried in soft ground up to 1.5 inches so that a vehicle would operate it

but it was unlikely that a person or bicycle would.

When a vehicle passes over the switch it crushes the tubing and forces the brass strips to contact each other completing the circuit to the detonator. It would also operate if stepped on so could also be used against personnel. It was only necessary that one of the sections be crushed to complete the circuit.

.

Switch, No. 12 Release, Mk. I

Type- Release
Introduced 1943
Weight- 31.75 oz.
Length- 5.75 in.
Diameter- 3 in.
Filling- RDX/TNT 50/50

This switch was developed and manufactured by MD1 and introduced in 1943 as an anti-lift device to be placed under anti-tank mines. It was in fact a combination of the AP Switch (No. 8 Mk. I) and Pull Switch (No. 1 Mk. I). It was possible to use it as a boobytrap but such use was not recommended.

The switch was comprised of two main assemblies, the explosive container and the main housing tube. The explosive container was a shallow tapered drum (3" x ¾") with an extension tube attached to the bottom but which passes completely through the container. It contained a charge of 4 ounces of RDX/TNT. The extension tube contains the firing mechanism consisting of a striker, firing pin spring and a bush at the bottom. The striker has a hollow spindle and is split at the bottom end. The main housing tube contains a retaining rod, lifting spring and has a flange at the top. The explosive container is held to the main housing tube by a self-trapping safety pin fitting through an eyelet on the base of the explosive container



Switch, No. 12 Release, Mk. I



Switch, No. 12 Release, Mk. I
Markings on top of switch

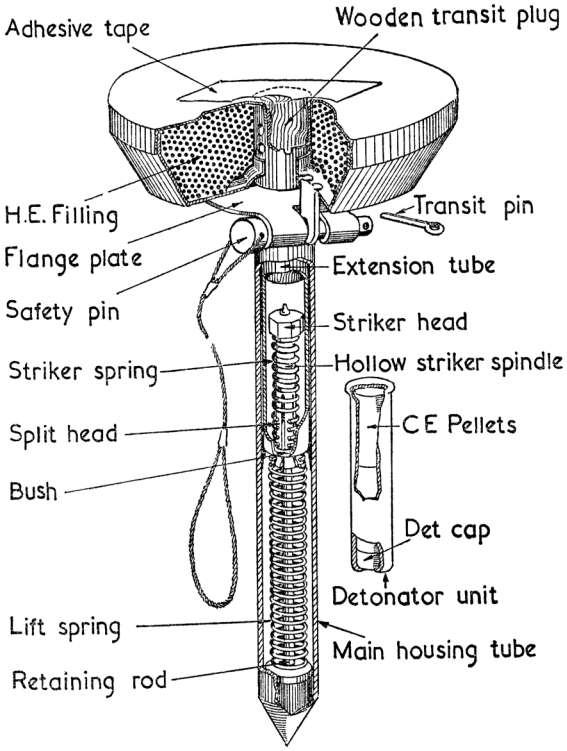
and a turned over portion of the flange on the main tube. A transit pin through the end of the safety pin ensures it does not come out accidentally. The safety pin has a steel wire attached to remove it after laying the device. A wooden plug closes the extension tube in storage and transit. The detonator assembly has a primer at the bottom end and two CE pellets.

When cocked, the extension tube fits into the main housing tube and compresses the lifting spring. The bottom of the striker is pushed through a hole in the centre of the bush and onto the retaining rod. The retaining rod enters the end of the hollow spindle pushing it open so that it cannot pass through the hole in the bush. The safety pin holds everything together.

When laid, the weight (at least 2.5 lbs) of the AT mine holds the head of the switch down. If the

weight is not fully down on the switch the self -trapping safety pin cannot be removed. If the mine is lifted, the lifting spring forces the extension tube up and after about ¾ inch of travel the retaining rod is pulled out of the striker allowing it to pass through the hole in the bush. The striker spring then drives the striker up onto the primer. When the primer fires it causes the CE pellets to fire and in turn the main explosive filling of the device. In turn that will likely cause the AT mine to detonate.

The device is painted black with markings in white. The type of explosive is marked in yellow and in addition a red mark indicates a filled device.



Switch, No. 12 Release, Mk. 2

Type– Release
Introduced 1960
Weight- 31.75 oz.
Length- 5.75 in.
Diameter- 3 in.
Filling- RDX/TNT 60/40

Introduced in 1960 the No. 12 Mk. 2 was very similar to the Mk.1 version. Differences included a slightly longer safety pin and changes to the filling. The single RDX/ TNT pellet is replaced by an RDX/TNT 60/40 pellet perforated in the centre to accept a granulated CE initiating pellet. A plastic plug closes the extension tube.

The device is painted black with yellow markings.



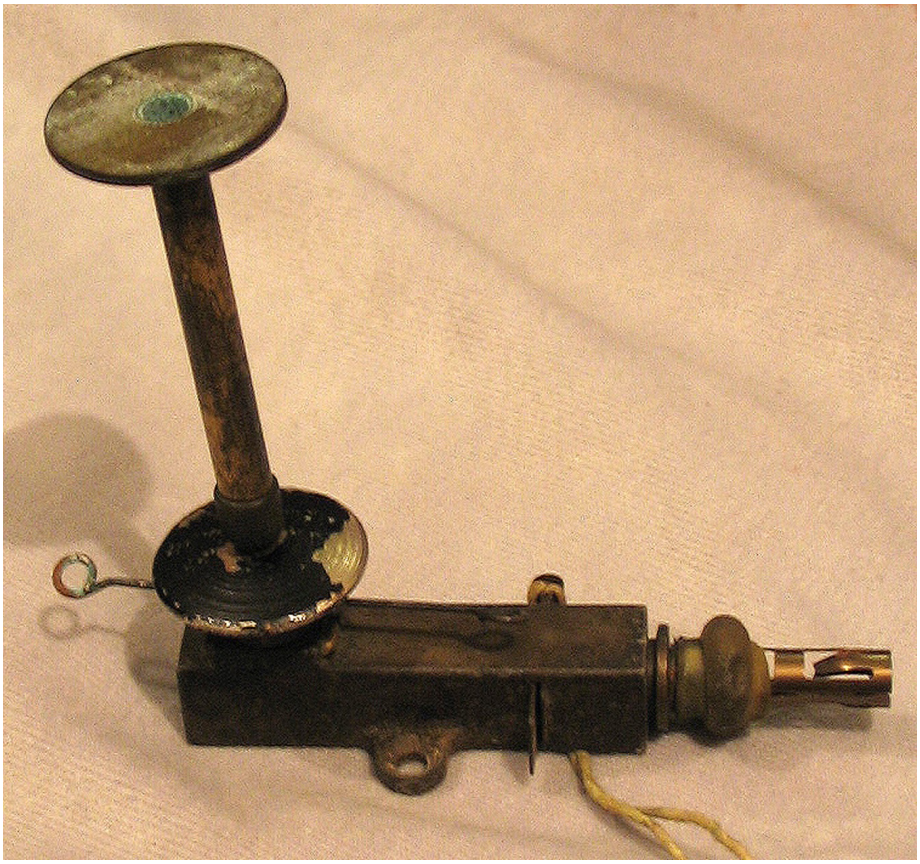
Switch, No. 12 Release, Mk. 2
Markings on top of switch



Switch, No. 12 Release, Mk. 2

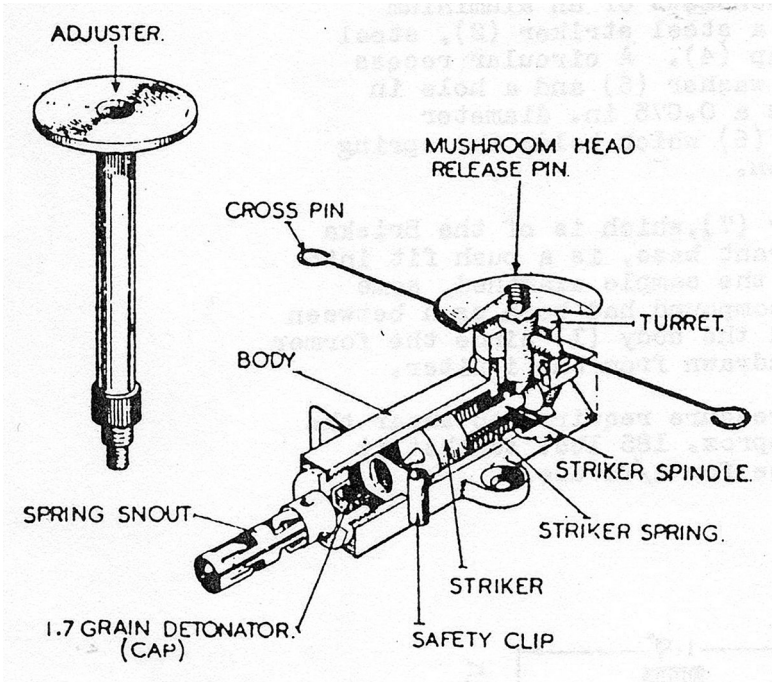
Switch, No. 13 Pull/Pressure/Release, Mk. I

Type- Combination
Introduced 1943
Weight- 3 oz.
Length- 2 13/64 in.
Width- ½ in.
Height- 1 in.



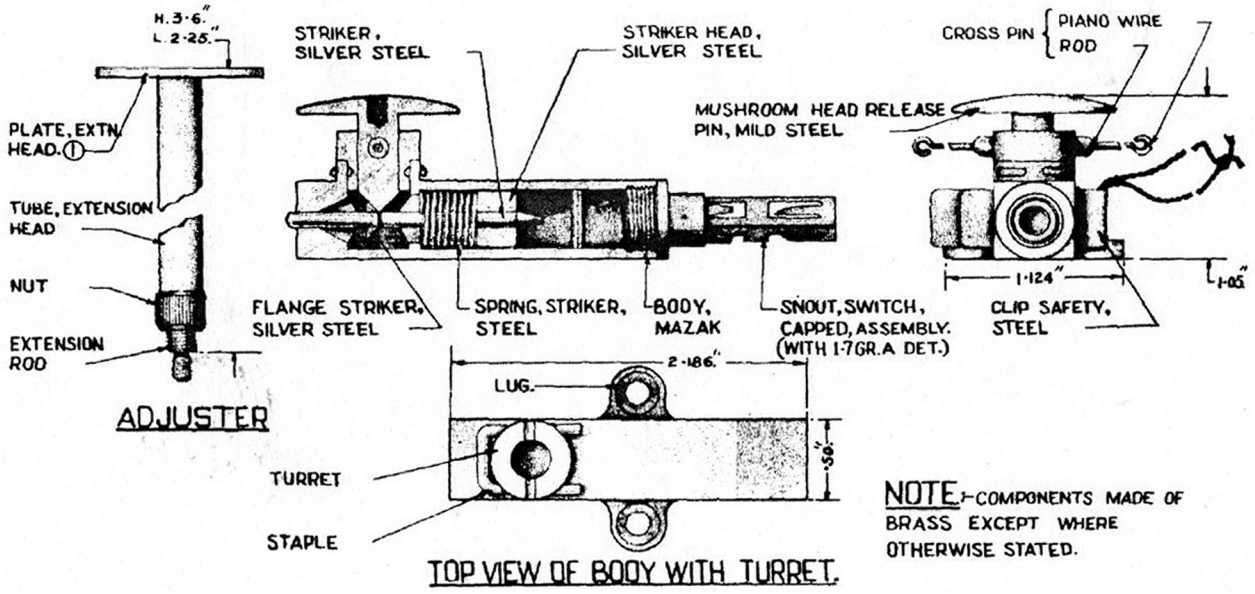
Switch, No. 13 Pull/Pressure/Release, Mk. I

This switch was developed at MD 1 by Lt. Col. Macrae in 1943. Realizing that when troops were dropped behind enemy lines or into the jungle where the weight they carried was very important he attempted to do something about it. Carrying a dozen each of the various different switches created more weight than necessary and he thought that if he could develop a universal switch that combined the three basic functions it would be easier for the troops. The completed devices cost about 3/6d each and about 30000 were made and issued. Unfortunately this switch did not find favor with the troops that were to use them, they were quite happy with the standard pull, pressure, and release switches.



Switch, No. 13 Pull/Pressure/Release, Mk. I
Internal diagram

The body is a Mazak die casting with two lugs cast on the sides. Holes are drilled through the lugs for fixing the switch in position. The body is drilled longitudinally to accept the spring loaded striker. The striker is a hardened steel spindle with a head at one end and a beveled flange at the other. A boss is formed on the top of the body near the closed end. A rotatable turret is fixed into the boss by a wire staple. A hole is drilled vertically through the turret to accept a steel release pin with a one inch mushroom head. The turret and release pin are drilled to take a cross pin that prevents vertical movement. The cross pin has a short piece of thin piano wire secured through the centre of the pin. The piano wire is looped on both ends. The top of the turret is slotted down to the cross holes so that the piano wire can fit through the slots but the cross pin cannot. A slot through the body enables



a self- trapping safety clip to be inserted between the striker and percussion cap. If the striker is released the point of the striker passes through a hole in the clip but further movement is stopped by the clip. The end of the body is internally threaded to accept a standard spring snout.

An adjuster is provided consisting of a tube with a flat head that slides over a threaded rod. A knurled nut on the rod allows for height adjustment between 3.25 inches and 4.75 inches. The bottom of the threaded rod screws into the mushroom head on the switch.

The switches were packed individually with a switch, 2 percussion caps, 1 extension piece, spare striker, and two woodscrews. Ten switches were then packed in an outer tin box with a few extra cap holders. The tin box was 6.5" X 2.75" X 3.375" and weighed 1 lb. 9 oz.

For use as a pressure switch it is fixed under a railway line normally with use of the adjuster. When set, the cross pin is removed and the safety clip removed. When a load of 35-50 pounds is applied the release pin will press down on the shaft of the striker and fracture it, releasing the remainder of the striker, under pressure of the spring to fly forward and hit the detonator cap. It is important that a weight of at least two pounds be applied to the head otherwise it will operate as a release switch and fire immediately upon withdrawing the cross pin.

For use as a release switch, it is laid under a weight of at least two pounds and the cross pin removed. When the weight is removed the beveled flange on the striker will push the release pin up and release the striker. Alternatively if a weight of 35-50 pounds is applied to the restraining weight, the switch will then act as a pressure switch.

For use as a pull switch, it is put in position and a trip wire attached to the loops in the piano wire in the cross pin. Because of the rotatable turret it will self-align along the trip wire. When the safety clip is removed a pull of 3 pounds on the wire will withdraw the cross pin and allow the switch to operate in the release mode.

Switch, No. 14, Charge Pinning, Mk. I

Type- Release
Introduced 1943
Weight- 13.4 oz.
Length- 6.75 in.
Diameter- 1 in.

While this is not actually a boobytrap mechanism, it is included in the series. It was designed for pinning the Type 6 Limpet mine to either wooden or steel hulled vessels. There is a special bracket fitted to the charge to allow the use of the switch. It was initially known as the "ISRB Limpet Pin-up Device". There are two versions, "Switch, No. 14, Charge Pinning, Mk. I – Wood" and "Switch, No. 14, Charge Pinning, Mk. I – Steel".



Switch, No. 14, Charge Pinning, Mk. I

The switch is composed of two main sections, both made of steel. The upper section is the breech section. It contains a striker and striker spring. The end of the striker is threaded to accept a knurled nut that retains the striker in its cocked position. A safety pin fits through a reduced head of the body and striker. The lower piece is the barrel containing a hardened steel nail mounted on a piston. The piston is held in the breech end by a flange which will shear on discharge. The bottom of the barrel is closed by a soldered brass cap and the other end is threaded to fit into the upper breech section. When loaded the piston is fitted with a propelling cartridge and a separate firing pin in the form of a pipped disc. A copper sealing disc fits over the firing pin and open end of the piston and acts as a seal between the barrel and breech section.

For use, the device is fitted into the limpet and the knurled nut removed. The limpet is held against the target and the safety pin pulled out. This allows the striker under pressure of its compressed spring to fly forward to hit the copper sealing disc. The strike is transmitted through the disc to the firing pin which then hits the cap in the propelling cartridge. The propelling cartridge firing forces the piston to shear the flange and forces it to the end of the barrel and through the brass sealing disc. The nail penetrates the target but shoulders formed in the barrel stop it from leaving the device completely. The Limpet it then firmly fixed to the target. The piston retains a seal with the barrel which ensures that the firing of the device is relatively silent and there is no release of propelling gases to form tell tale bubbles.

The differences in the devices are that the nail for the wood version is slightly longer than that of the steel version. In addition, the propelling cartridge for the wood version contains 0.2 g Cordite and the steel version contains 0.5 g Ballistite.

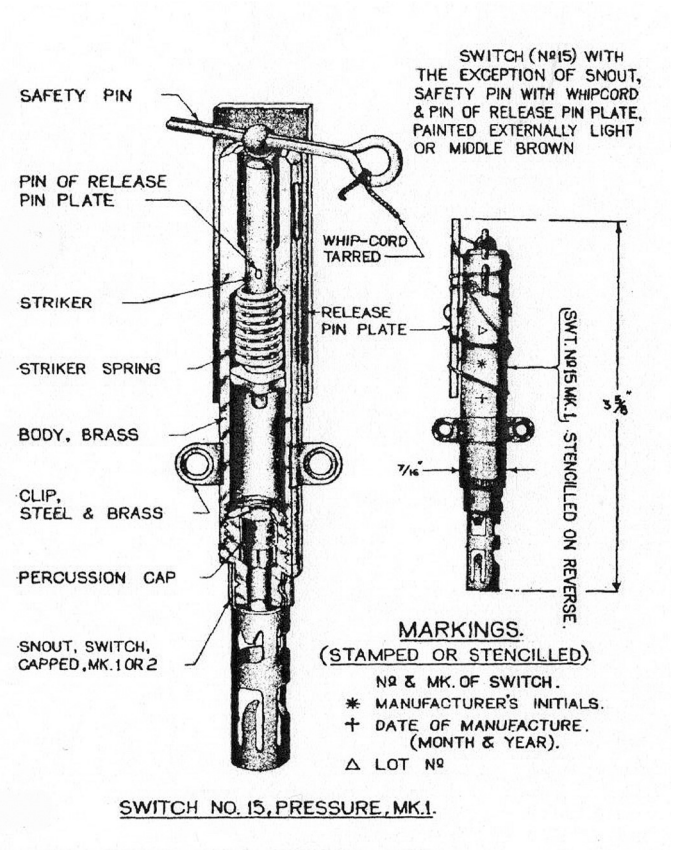
Switch, No. 15, Pressure, Mk. 1

Type– Pressure
Introduced– Post 1945
Length– 3 5/8 in.
Diameter– 7/16 in.

This was a post war modification of the "Switch, No. 4, Pull, Mk. I". It was produced in India for use as an igniter for the "Schumine India Pattern Mk. I", a copy of the German Schumine 42. They were produced to meet an urgent operational requirement.

The modification did away with the release clip. The striker head and safety pin was positioned outside the body by compressing the striker spring further. A hole in the body and striker allowed a new release pin plate to be fitted. Once assembled the switch was converted to a pressure device.

The switch was painted a light or mid brown colour. The designation was stencilled on the barrel of the device.



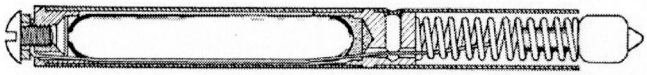
Switch, No. 15, Pressure, Mk. 1

Switch, No. 16, Time Pencil, Mk. I

Type– Time
Introduced– Post 1945

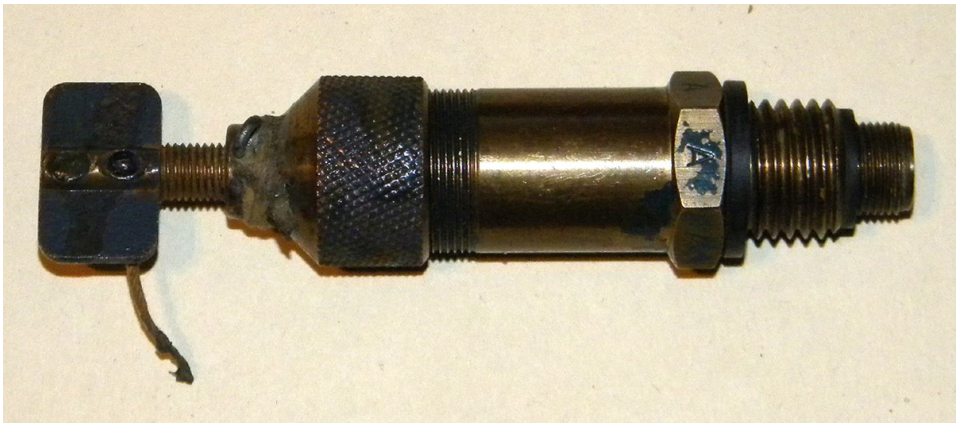
This was a post war development using a portion of the No. 10 for the igniter for a decoy device, the "Simulator Signal Airborne No. 2.

In effect it was simply the top 2/3 of the time pencil with the lower portion removed from slightly above the top inspection hole.



Switch, No. 16, Time Pencil, Mk. I

AC Delay, Mk. 1, 1A, 1R

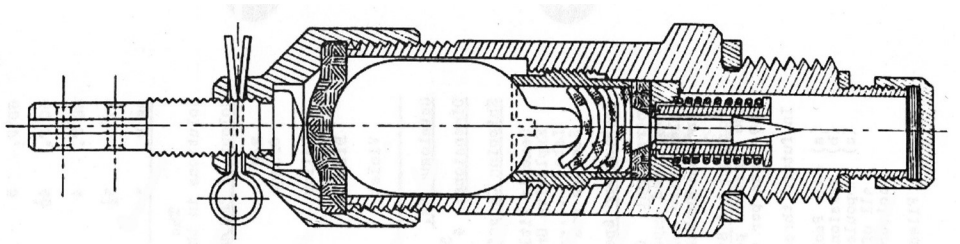


AC Delay, Mk. 1

Type- Delay
Introduced 1940
Weight- 6 oz.
Length- 4.5 in.
Diameter- 1 in.

The AC delay is more of a sabotage device rather than a boobytrap mechanism. It was used for the most part as an igniter for the Limpet mines (normally ES6 Limpet).

They are comprised of a round brass body made with a two stepped threaded end, the smaller set of threads for the burster and the larger set to screw into the limpet or charge container. It could also be fitted with a fuse cap instead of the burster. The opposite end is threaded to fit an end cap that is drilled and threaded to accept a thumb screw. A safety pin with cord attached fits through the end cap and thumb screw preventing it from being screwed in. Contained within the body is a spring loaded striker that is held in the loaded position by a celluloid disc attached to a tapered tail on the striker. Lint is packed in a brass sleeve screwed into the body just above the striker holding the striker in place.



AC Delay, Mk. 1 internal diagram

For use, the device is loaded with an ampoule containing acetone to give the desired delay time. The ampoule is loaded by removing the end cap, inserting the ampoule and replacing the end cap. When ready to initiate the device, remove the safety pin and screw the thumb screw in until the ampoule breaks. The acetone soaks into the lint and begins to work on the cellulose disc softening it. When the disc is softened enough, the striker under load of its spring will pull through the disc and fly forward to hit the cap in the burster.

The device is normally painted grey with no other markings other than some stampings on the hexagonal surfaces just above the threads on the bottom. The box is painted light grey with black markings. Markings give the designation, lot number, date of manufacture, manufacturers marking and burster type.

The AC Delay is issued in a sheet metal box containing the device, six ampoules, a burster in a wooden container, a tube of luting and an instruction sheet giving the nominal delay times. Depending on the temperature, the delays differ, at lower temperatures the delay times are increased, at higher temperatures the delays are shortened. As an example, at 60 degrees F the nominal delay times are: Red- 4.5 hours, Orange- 7.5 hours, Yellow- 15 hours, Green- 26 hours, Blue- 42 hours and Violet- 5.5 days.

Differences between the Marks are the Mk. 1 has a slightly thinner central body, the Mk. 1A has improved waterproofing and the Mk 1R is a post war refurbished model that has some internal changes and uses a split ring safety pin.



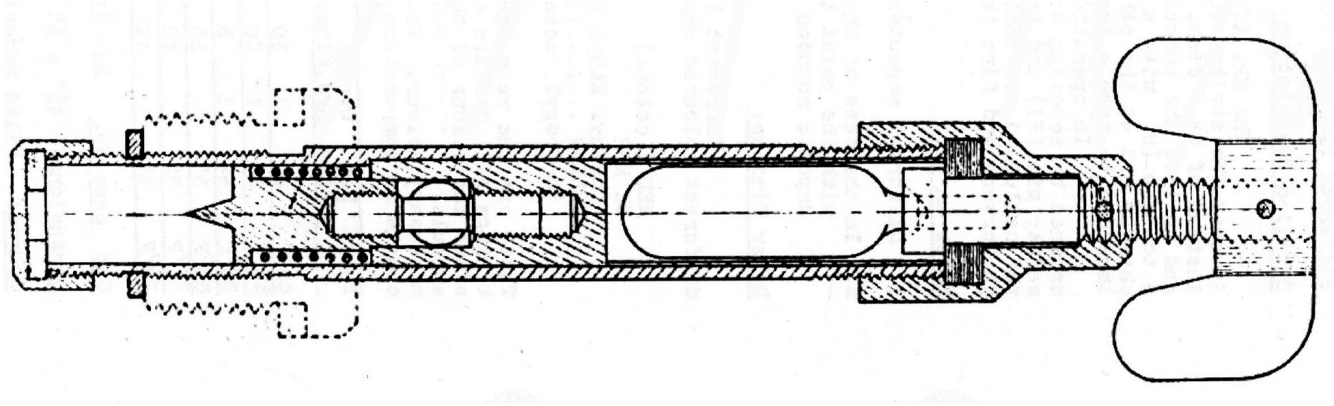
AC Delay, Mk. 1 in packing box with all parts. The burster is contained in the wooden block.

AC Delay, Mk. II

This delay was designed to meet a requirement for waterproof delays with shorter delay times than those provided by the Mk. I. It was primarily designed for use by Combined Operations. Only 5000 were produced to the end of 1944.



AC Delay, Mk. II



AC Delay, Mk. II Internal diagram

It differs from the Mk. I mainly in that the striker is held back by a celluloid rod threaded into the striker at one end and the switch body at the other. Two pieces of lint pass around the rod and up into the ampoule chamber. As a result of the different method of release, the body of the delay is much thinner than the Mk. I.

When the ampoule is broken, the fluid soaks into the lint and begins to weaken the celluloid rod. When sufficiently weakened the rod will break and allow the striker to fly forward under pressure of the striker spring to hit the primer in the burster.

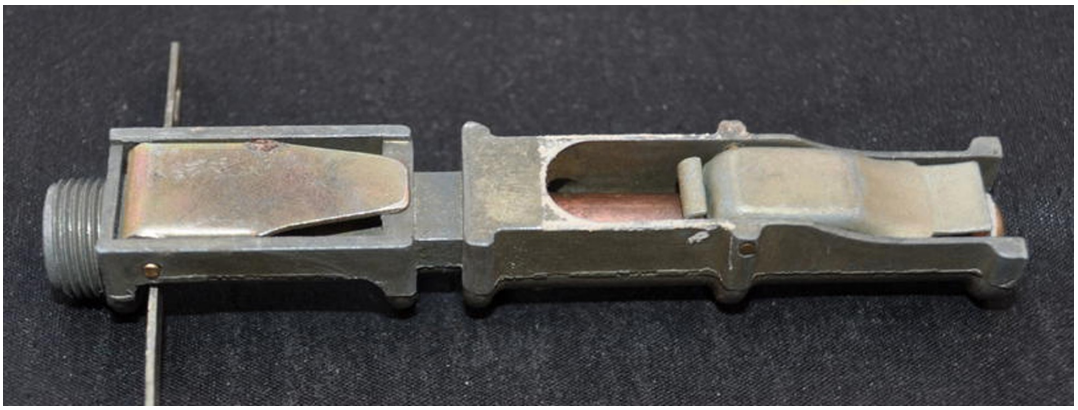
Different delay times are determined by the various ampoules supplied with the switch. Depending on temperature the times are either increased in colder temperatures or shortened in warmer temperatures. At a nominal temperature of 60 degrees the delay times are: Red- 40 min., Orange- 60 min., Yellow- 120 min., Green- 4 hrs., Blue- 14 hrs. and Violet- 40 hrs.

ISRB Anti-Disturbance Fuze (Air Armed)

Type- Release
Introduced 1943
Length- 3 7/8 in.
Width- 5/8 in.



Introduced in 1943 by ISRB this device was designed to be assembled into an explosive device or charge when it is laid to prevent anyone from removing it.



ISRB Anti-Disturbance Fuze (Air Armed)

It is a zinc alloy casting that is drilled out longitudinally to accept a delay arming mechanism and is threaded at the other end to accept a Type 6 burster. The delay mechanism is made from the striker, striker spring, and complete copper tube assembly of a "Switch, No. 10, delay, Mk. I or II". The mechanism is held in the fuze by a brass screw in the bottom. Located between the striker and burster is a flat release lever that retains a ball. When closed the lever forces the ball down in front of the striker preventing it from moving forward. At the other end of the fuze is a crushing lever that when lifted with crush the copper tube assembly. A safety strip fits through the body in front of the burster. It has a slot in it, that will trap the striker point and prevent its removal if the striker is released.

For use, the fuze is placed into a cavity in the bottom of a charge with the safety strip protruding out the side and the release lever facing down. The weight of the charge is used to hold the release lever in the closed position. Just prior to placing the charge in position, the crushing lever is lifted until the copper tube is crushed starting the arming delay. The charge is then placed in position and the safety strip removed. Once in position if someone attempts to remove the charge, the release lever is free to move, the striker pushes against the ball forcing it out of the way and continues on to hit the detonator in the burster. When the burster fires it will set off the main explosive charge.

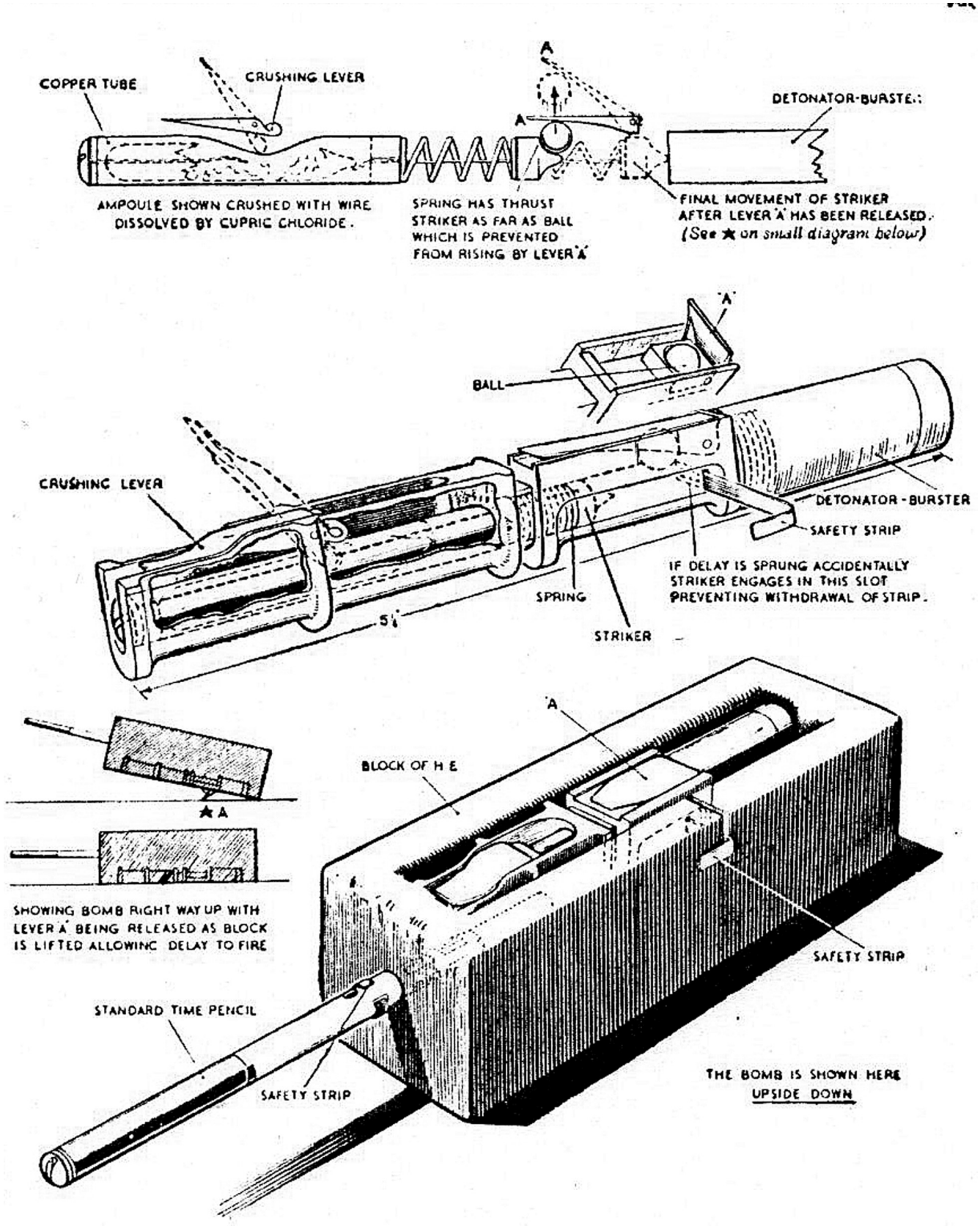
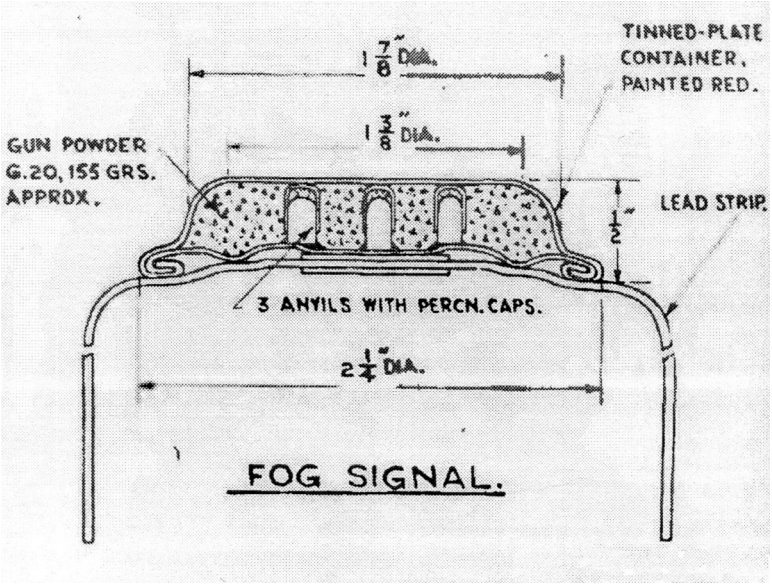


Diagram showing internal mechanism and method of use

Fog Signal



A fog signal is a railway device that is used to warn engineers of a danger or obstruction ahead on the track. This can be in a time of restricted visibility such as fog when normal signals are hard to see, or if there is a stopped train ahead, or damaged track or any other thing that would cause a danger to the train. They are placed on the rail and ignited by the wheels of the engine when it passes over them. The signals explode with a loud report that can be heard by the engineer. They are normally used in pairs, placed about 20 yards apart on the track.

They consist of a round brass container about 2 inches diameter and ½ inch depth. Internally they have three anvils fitted with percussion caps. Quick match is wound around the anvils and the remainder of the container filled with gunpowder. There is a wire clip or lead strip attached to the base that is used to fix it on the rail. The device is painted red.

As the container is crushed by the wheel, the percussion caps fire and ignite the quick match which in turn ignites the gunpowder resulting in a loud report.

Igniter, Fuse, Fog Signal

Type- Pressure
Introduced 1941
Diameter- 1.5 in.
Height- ½ in.

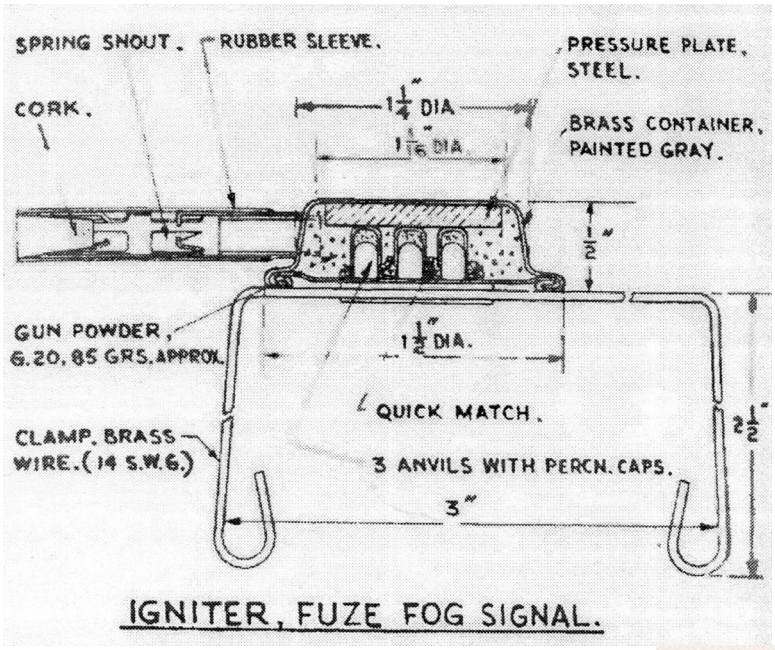


Igniter, Fuse, Fog Signal

Developed by SOE this device was intended to closely resemble the Fog Signal. It was designed to ignite a length of safety or instantaneous fuse attached to an explosive charge laid on the rails and so derail a train.

The device is a round brass container about 1.5 inches diameter and ½ inch in depth. The container has three anvils fitted with percussion caps. The top of the container has a steel pressure plate inserted to ensure pressure is transmitted to all of the percussion caps. Quick match is wound around the anvils and the remainder of the container filled with gunpowder. A snout is attached to the side of the container and is fitted with a spring snout covered by a rubber sleeve. A wire clamp made of brass wire is attached to the bottom.

When laid, it was important that the snout faced the outside of the rail or it could be cut off by the flange on the train wheels and so prevent detonation. When the wheel of the engine contacted the signal it would be crushed forcing the pressure plate down on the percussion caps. The percussion caps would fire and ignite the quick match and the gunpowder filling. This would send a flash of flame through the snout to the fuse and ignite it.



The main container is painted grey.

Igniter, Fuse, Fog Signal, Dummy

Produced for training purposes the Dummy version was identical to the service store but has no explosive content.

It was painted white with a black marking of "Dummy" on the top of the igniter.



Igniter, Fuse, Fog Signal, Dummy

Percussion Igniter, Mk. III



Percussion Igniter, Mk. III

Type- Igniter
Introduced Prior to 1939
Length- w/o adapter 2 1/8 in.
Diameter- 9/16 in.

This was a simple igniter, used normally to ignite safety or instantaneous fuse. It was possible to use it as a pull switch. This was available for use at the start of WWII and was used for many years, examples dated 1953 have been noted.

It consists of a brass barrel with threading on both ends. On the top end it has a cap with a hole through the centre for the shaft of the striker. On the other end is a threaded cap to retain the fuse adapter. A striker with spring is inserted with the shaft protruding out the top and a safety pin fitting through the shaft. The safety pin holds the striker in the cocked position with the striker spring compressed.

Normal use is for engineers or pioneers to use it as a water resistant igniter for safety fuse. When the fuse is crimped into the adapter, it was a simple matter to pull the safety pin and allow the striker to fly forward to hit the percussion cap in the adapter. When the cap fired it ignited the fuse.

For use as a pull switch, it was fixed in position with the charge connected by instantaneous fuse or by a detonator fixed in the adapter. A trip wire was attached to the safety pin, and the pin pulled most of the way out. A further pull on the trip wire would withdraw the safety pin the rest of the way and allow it to operate in the normal manner. It was not ideal as a boobytrap mechanism leading the British to develop purpose made switches.

Firing Device, Demolition, Delay, L1A1

Type– Delay

This electronic delay firing unit could be set for any delay from 12 minutes to 99 days. Information on the device is limited.

The casing appears to be plastic and has two electrical connectors near the bottom. Between the two connectors it has a test light. A metal screw cap covers the controls consisting of a row of numbers (days, hours, minutes) to set the delay, two test buttons (black and white), and a run button (red).

Actual operation of the device is unknown.



Firing Device, Demolition, Delay, L1A1



Firing Device, Demolition, Pull, L2A1

Type- Pull
Introduced 1954

This pull switch was designed by the "Fuzes Branch" of the "Armaments Design Department" at Fort Halsted in 1954 to replace the "Switch, No. 4, Pull, Mk. 1. It has since been replaced by the Combination switch L4A1 and subsequently L5A1.

The switch is cylindrical with a larger section at the bottom end that is internally threaded to accept a "Flash Initiator, L3A1". The housing contains a bush and spring loaded striker that has a slotted end. The top end of the tube has a plunger release mechanism. The end of the plunger release fits into a slot at the bell mouthed end of the striker keeping the striker in place by retaining the splayed end behind an angled step on the bush. The safety mechanism is also located at the top end. A safety pin fits through the side of the plunger release and plunger housing. The safety pin is secured by a split pin through a hole at the free end of the safety pin. The safety pin has a flange on the other end.



Firing Device, Demolition, Pull, L2A1

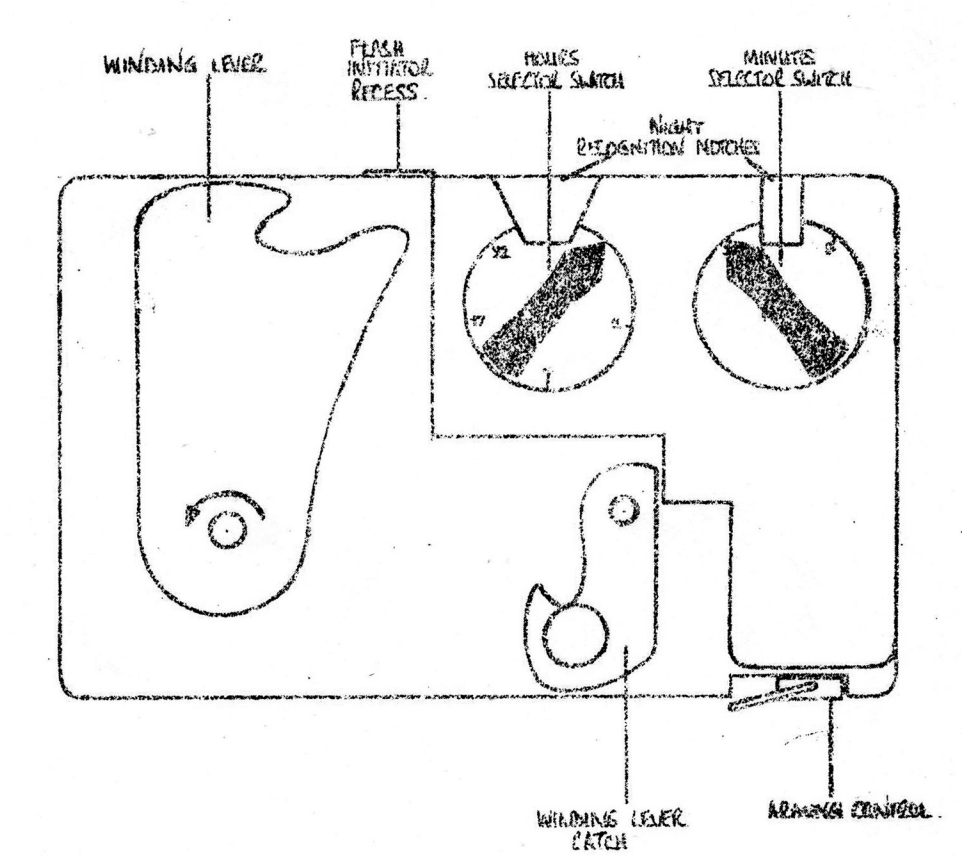
When the device is laid, if there is too much tension on the trip wire, the flange on the safety pin will engage under a lip in the plunger housing preventing its removal. When the tension is slackened sufficiently the safety pin can be removed. A pull of 12 pounds on the wire will free the plunger release from the slotted end of the striker and allow the striker spring to reassert itself driving the striker onto the percussion cap in the flash initiator.

Firing Device, Demolition, Delay, XL3E1

Type- Delay
Introduced Late 1960's
Length- 127mm
Width- 79mm
Height- 26.5mm

This device was developed in the late 1960's but was not adopted as a service store. It was designed against a requirement for a variable delay firing device.

It was basically a clockwork mechanism designed to mechanically operate a firing pin to hit a percussion primer at the time set by the operator. There were six settings available, 5 minutes, 30 minutes, 2.5 hours, 7.5 hours, 17.5 hours or 22.5 hours.



XL3E1 Firing Device in fully disarmed state.

The device is housed in a green plastic box with controls recessed into the box on the outside. The controls consist of two time delay selectors, a winding lever, arming control, and winding lever catch. Other than the controls there is a threaded recess on the side to accept a "Flash Initiator L3".

The device cannot operate until it is set and armed nor can it operate until the mechanism has run for at least 5 minutes on any setting from the time arming is completed.

The minute selector (right hand selector) has two positions, anti-clockwise marked 5, and clockwise marked 30. The hour selector (left hand selector) has five positions, fully anti-clockwise is 0 and unmarked, then four positions marked 2,7,17 and 22. The hour selector cannot be moved unless the minute selector is set at 30 nor can the minute selector move unless the hour selector is set to 0. The winding lever has two positions, rest and wound. The device is packed with the lever in the rest position and has to be rotated 270 degrees in an anti-clockwise direction to the wound position. The lever is held in the wound position by the winding lever catch. When the winding lever is moved to the wound position three things happen, the clock springs become fully wound, the firing pin spring is tensioned and the safety interlocks engage. The safety interlocks prevent the time selectors from moving.

The arming control when fully depressed prevents the clock from running. When the arming control is pulled out the clock starts.

Setting the device is simple, set the time desired, wind the device, connect the flash initiator and demolition train. Once set, pull out the arming control to set the clock ticking. The device can be disarmed by pushing in the arming control to stop the clock.

Firing Device, Demolition, Combination, L4A1

Type– Combination
Introduced
Length- 2.25 in.
Width- 1.6 in.
Height- 1.1 in. without spacer
Body Material- Plastic

This is the Australian F1A1 firing device, known in British service as the L4A1. As it is normally used with a flash initiator it must be fitted with the spacer.



Firing Device, Demolition, Combination, L4A1

Firing Device, Demolition, Combination, L5A1

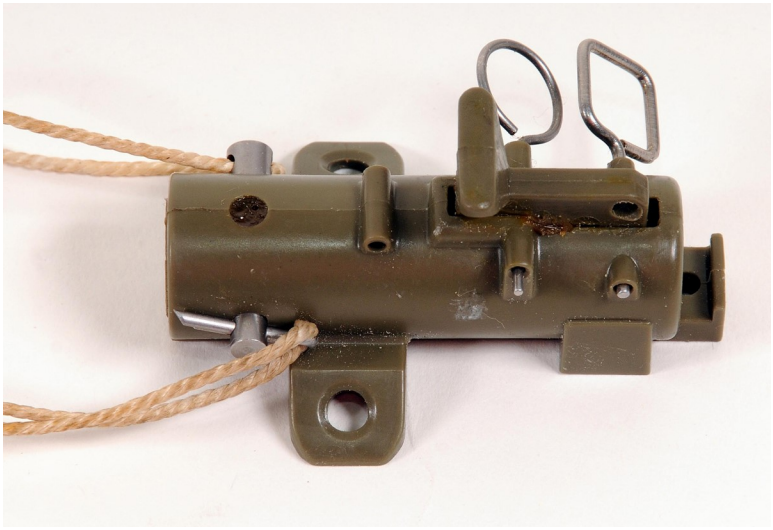
Type– Combination
Introduced
Length- 2.25 in.
Width- 1.6 in.
Height- 1.1 in. without spacer
Body Material- Plastic

This is a British modification of the Australian F1A1. The most obvious difference is in the positive safety pin. The British device has a much heavier pin that is held in place by a cotter pin through the positive safety pin preventing its removal.



The device is a compact unit capable of initiating a boobytrap via Pull, Pressure, Release, or Tension Release depending on how it is set. The device will operate under a pressure of 11.3 kg, a pull of 3.2 kg, or a release of pressure or tension of 1.1 kg.

The device is made of plastic in a basically cylindrical form. There are lugs and recesses molded onto the body that allows it to be screwed, nailed or wired in almost any position. A slot in the top of the body accepts the sear plate that is held in position by two pins, one with a round head, one with a square head. A positive safety pin fits through the barrel of the



Firing Device, Demolition, Combination, L5A1

body preventing the striker from hitting the percussion cap. An alternative set of holes for the positive safety are located at 90 degrees from the normal holes. The striker is made of aluminum with a plastic four pronged guide and spring stop near the point. The rear portion of the striker has a groove that engages the sear. A striker spring fits over the striker. The striker and spring fit into the body compressing the spring until the sear on the bottom of the sear plate engages the groove in the striker.

The device is issued in a round tin or plastic case containing everything required to set the device in any mode. Contained within the case is the device, roll of steel trip wire containing 15 metres of wire, a strip of tape containing screws and nails, a tension release attachment, spacer and an instruction sheet. The Flash Initiator is issued separately.

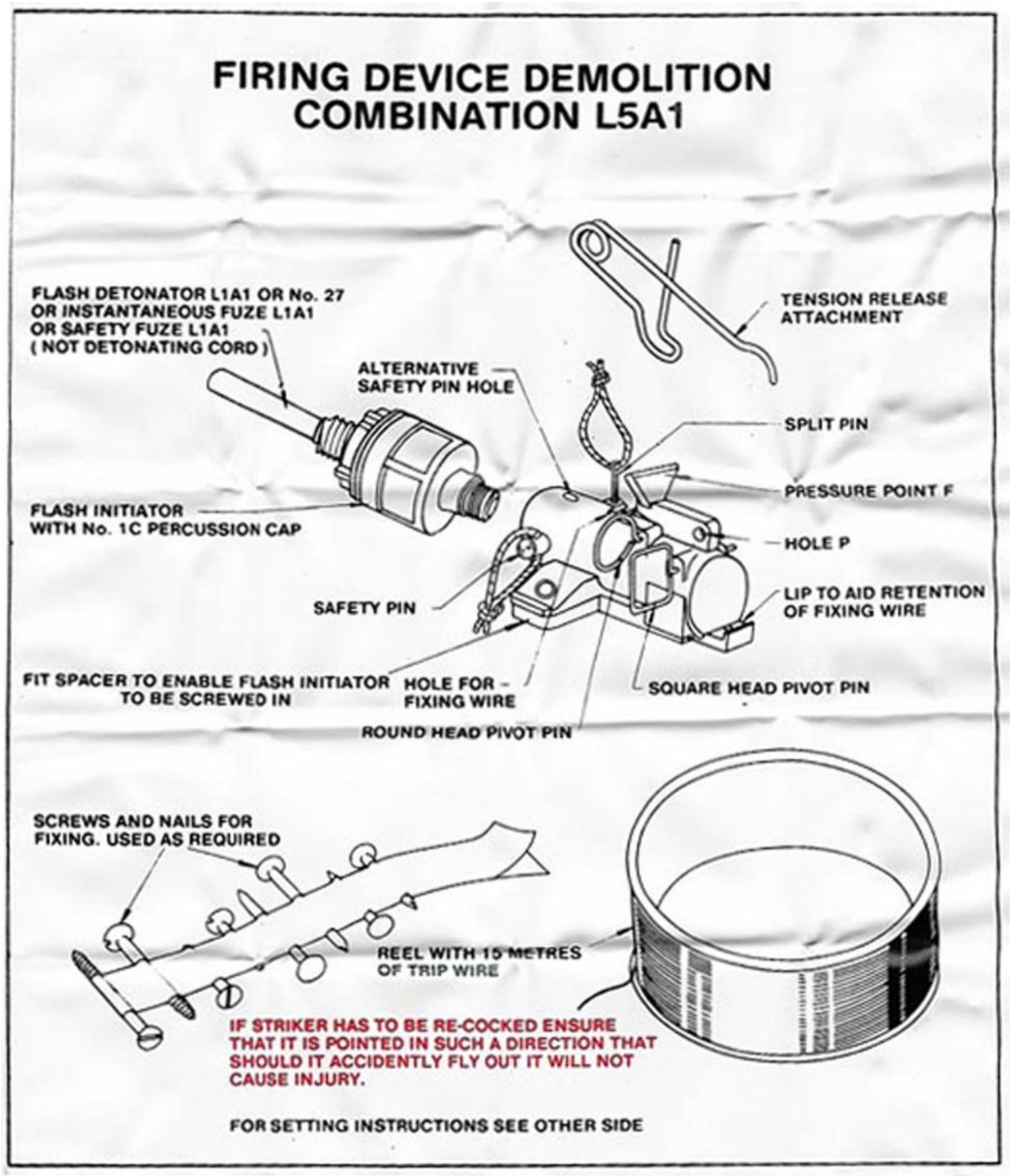
The firing device is normally used with the Flash Initiator with a 1C percussion cap but the US M1 Base coupler can also be used. When used with the Flash Initiator a spacer is added to the bottom of the device to allow enough room for the Initiator to screw in.

The device is made of olive green plastic.

The mode of use determines which pins are taken out to set the device. For use as a release device, the round headed pin is removed. For use as a pressure device, the square headed pin is removed, for use as a pull device, the square headed pin is removed, and for use as tension release it must be fitted with the attachment and have the round headed pin removed. It should be noted that the two pins are not interchangeable as they are made from different gauges of wire with corresponding holes.

Firing Device Kit, Demolition, Combination, L26

These kits were introduced to provide a device with all necessary accessories in a kit form. The kits comprise of a Firing Device L5A1, flash initiator, and the accessories for the firing device. The L26A1 is issued with an L3A3 Flash Initiator, the L26A2 is issued with an L3A4 Flash Initiator, and the L26A3 is issued with an L3A5 Flash Initiator.



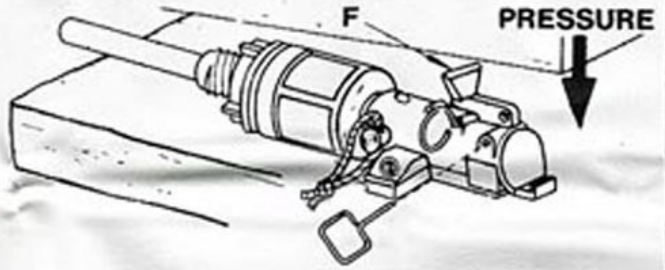
Front of Instruction Sheet for L5A1. These were included with each switch.

SETTING INSTRUCTIONS

PRESSURE 11kg LOAD OR MORE TO FUNCTION

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE DEVICE IN POSITION WITH NAILS SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) PLACE A SUITABLE PRESSURE PLATE IN POSITION TO REST ON POINT 'F'. ENSURE WEIGHT OF PLATE WILL NOT ACTIVATE THE DEVICE.
(5) REMOVESQUARE HEAD PIVOT PIN, USING WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN. AFTER WITHDRAWING ITS SPLIT PIN, USING WIRE IF NECESSARY.

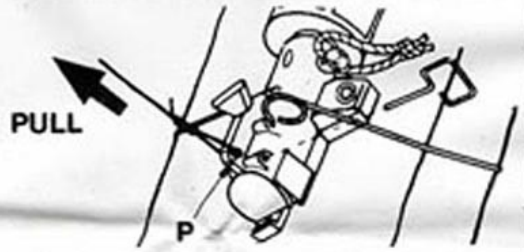
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ON TO IT.



PULL 3KG OR MORE TO FUNCTION.

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE DEVICE TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) ATTACH TRIP WIRE TO HOLE 'P', SO THAT PULL IS IN DIRECTION SHOWN.
(5) REMOVESQUARE HEAD PIVOT PIN, USING WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN, AFTER WITHDRAWING ITS SPLIT PIN, USING WIRE IF NECESSARY.

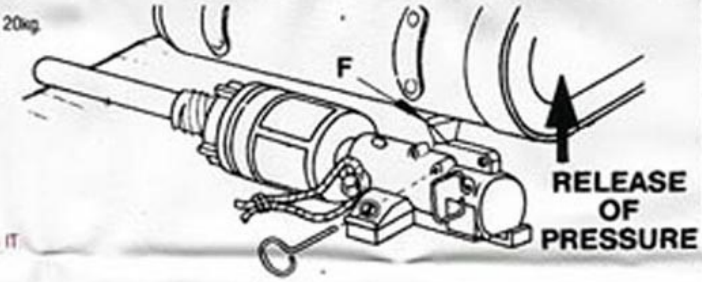
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ON TO IT.



RELEASE OF PRESSURE LOAD TO SET TO BE BETWEEN 1kg AND 20kg.

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) PLACE DEVICE IN POSITION AND SECURE WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) PLACE AN OBJECT SO THAT A LOAD OF BETWEEN 1kg AND 20kg PRESSES DOWN ON POINT 'F'.
(5) REMOVEROUND HEAD PIVOT PIN, USING WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN, AFTER WITHDRAWING ITS SPLIT PIN, USING WIRE IF NECESSARY.

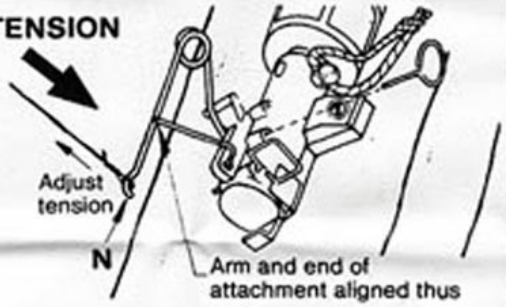
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ON TO IT.



RELEASE OF TENSION

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE DEVICE TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) FIX TENSION-RELEASE ATTACHMENT AND LOOP END OF TRIP WIRE OVER CURVED NECK END 'N'. ADJUST TENSION IN TRIP WIRE UNTIL ARM OF ATTACHMENT IS ALIGNED WITH ITS OTHER END AS SHOWN.
(5) REMOVEROUND HEAD PIVOT PIN.
(6) SLOWLY WITHDRAW SAFETY PIN, AFTER WITHDRAWING ITS SPLIT PIN, USING WIRE IF NECESSARY.

SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ON TO IT.



CHECK OF SAFETY PIN FOR ALL MODES OF OPERATION

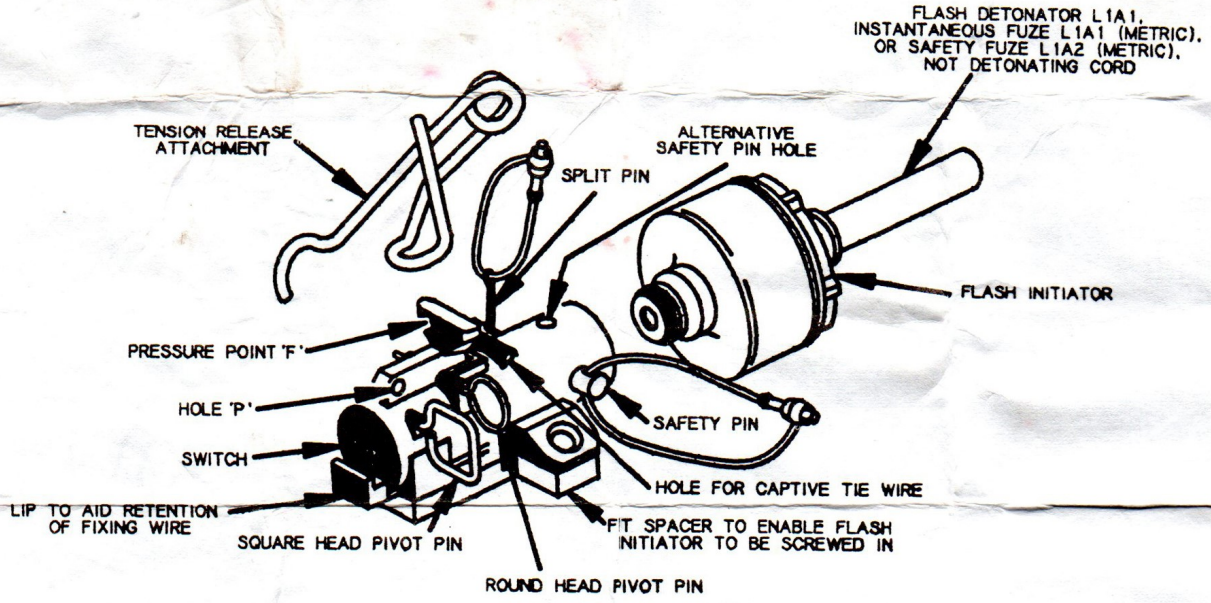
SPLIT PIN MUST FIRST BE REMOVED TO ALLOW WITHDRAWAL OF SAFETY PIN.

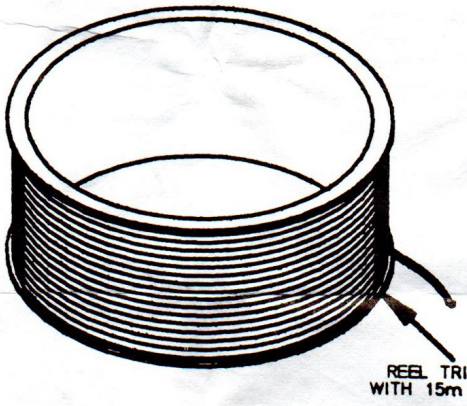


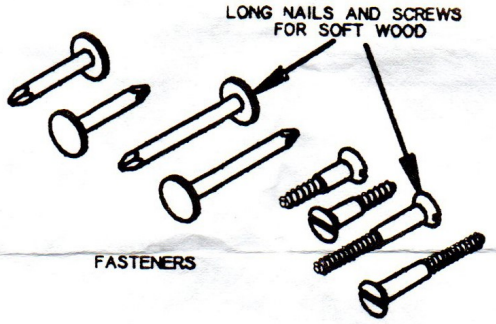
NOTE:- BEFORE PLACING SWITCH IN POSITION, CHECK SAFETY PIN FOR EASE OF REMOVAL, THEN REASSEMBLE IT WITH ITS SPLIT PIN. TO ENSURE EASE OF WITHDRAWAL AFTER THE SWITCH HAS BEEN PLACED AND SET, REASSEMBLE SAFETY PIN IN THE MOST CONVENIENT OF THE FOUR POSSIBLE WAYS.

Back of Instruction Sheet for L5A1

FIRING DEVICE KIT, DEMOLITION, COMBINATION, L26A3







*FOR SETTING INSTRUCTIONS. SEE OTHER SIDE.

IF STRIKER HAS TO BE RE-COCKED ENSURE THAT IT IS POINTED IN SUCH A DIRECTION THAT SHOULD IT ACCIDENTALLY FLY OUT IT WILL NOT CAUSE INJURY

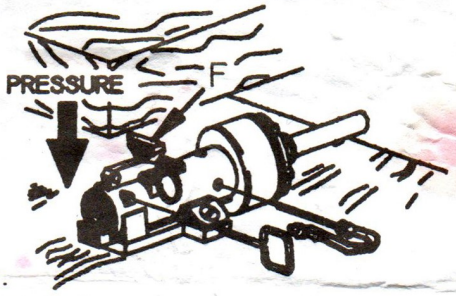
Front of Instruction Sheet for Kit L26A3. These were included with each kit.

SETTING INSTRUCTIONS

(NB) PINS CAN BE INSERTED FROM EITHER DIRECTION WHEN SETTING DEVICE.

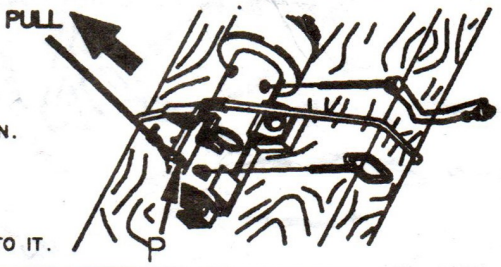
PRESSURE 12kg OR MORE TO FUNCTION.

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE SWITCH IN POSITION WITH EITHER NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) PLACE A SUITABLE PRESSURE PLATE IN POSITION TO REST ON POINT 'F'. ENSURE PLATE IS NOT HEAVY ENOUGH TO ACTIVATE THE SWITCH.
(5) REMOVE PIN WITH SQUARE HEAD, USING A WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN, AFTER WITHDRAWING ITS SPLIT PIN, USING A WIRE IF NECESSARY.
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ONTO IT.



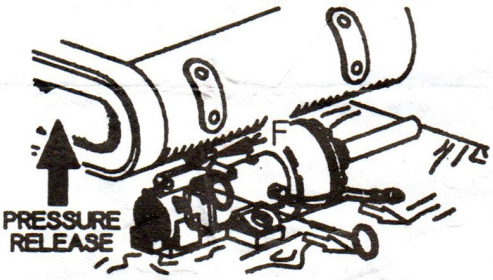
PULL 4kg OR MORE TO FUNCTION.

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE SWITCH TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) ATTACH TRIP WIRE TO HOLE 'P', SO THAT PULL IS IN DIRECTION SHOWN.
(5) REMOVE PIN WITH SQUARE HEAD, USING A WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN. AFTER WITHDRAWING ITS SPLIT PIN, USING A WIRE IF NECESSARY.
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ONTO IT.



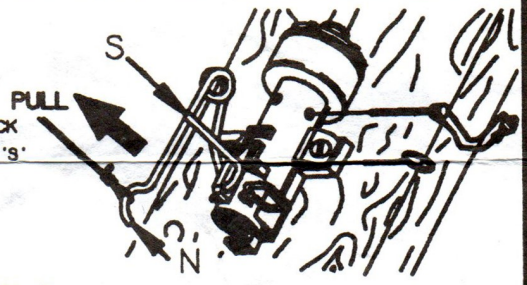
PRESSURE RELEASE 1kg OR MORE TO SET BUT NOT MORE THAN 70kg

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) PLACE SWITCH IN POSITION AND SECURE WITH EITHER NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) PLACE AN OBJECT SO THAT AT LEAST 1kg FORCE PRESSES DOWN ON POINT 'F'.
(5) REMOVE PIN WITH ROUND HEAD, USING A WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN, AFTER WITHDRAWING ITS SPLIT PIN, USING A WIRE IF NECESSARY.
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ONTO IT.

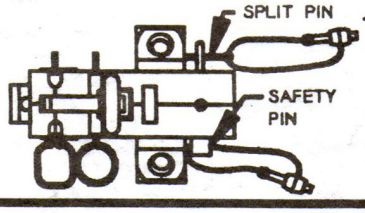


TENSION RELEASE

(1) CHECK AND REASSEMBLE SAFETY PIN AS DESCRIBED BELOW.
(2) SECURE SWITCH TO A FIXED OBJECT WITH NAILS, SCREWS OR WIRE.
(3) SCREW IN FLASH INITIATOR.
(4) FIT TENSION RELEASE DEVICE AND LOOP END OF WIRE OVER CURVED NECK 'N' ADJUST TENSION IN TRIP WIRE UNTIL 'N' LINES UP WITH SET POINT 'S' MAKE SURE PULL IS IN THE DIRECTION SHOWN ON THE DIAGRAM.
(5) REMOVE PIN WITH ROUND HEAD. USING A WIRE IF NECESSARY.
(6) SLOWLY WITHDRAW SAFETY PIN. AFTER WITHDRAWING ITS SPLIT PIN, USING A WIRE IF NECESSARY.
SAFETY PIN CANNOT BE WITHDRAWN IF STRIKER HAS BEEN RELEASED ONTO IT.



SPLIT PIN MUST FIRST BE REMOVED TO ALLOW WITHDRAWAL OF SAFETY PIN



CHECK OF SAFETY PIN FOR ALL MODES OF OPERATION

NOTE: BEFORE PLACING SWITCH IN POSITION CHECK SAFETY PIN FOR EASE OF REMOVAL THEN REASSEMBLE IT WITH ITS SPLIT PIN. TO ENSURE EASE OF WITHDRAWAL AFTER THE SWITCH HAS BEEN PLACED AND SET, REASSEMBLE SAFETY PIN IN THE MOST CONVENIENT OF THE FOUR POSSIBLE WAYS.

Back of Instruction Sheet for Kit L26A3

Attachments used with Boobytrap mechanisms

Crimp Adapters

Introduced 1939

This is the earliest type of adapter. Designed by MD1 these were normally found on early "L" delay switches and time pencils. A detonator could be directly crimped onto the adapter, with the use of the aluminum tube a fuse could be crimped onto the switch. There are four gas escape holes located just above the crimping groove.



MD1 Crimp Adapter

Snout adapter

Introduced prior to WWII

Prior to adoption of the spring snout, this brass snout would fit the MD1 switches as well as the Percussion Igniter No. 3. The adapter has a flange on upper end to fit the switches. A percussion cap is crimped into the end. There are six holes drilled through the adapter to provide air. A groove is crimped near the bottom end that provided a measure as to how deep the fuse or detonator should be pushed in.



Snout adapter

This snout required that the fuse or detonator be crimped into the snout.

MD1 Spring Snout

Introduced 1940

The MD1 spring snout was developed by Commander John Langley in 1940. He handed his sketches over to Major Ramsey Green in August 1940 who worked with the Perry Pen Company to develop production models of the spring snout.



MD1 Spring Snout

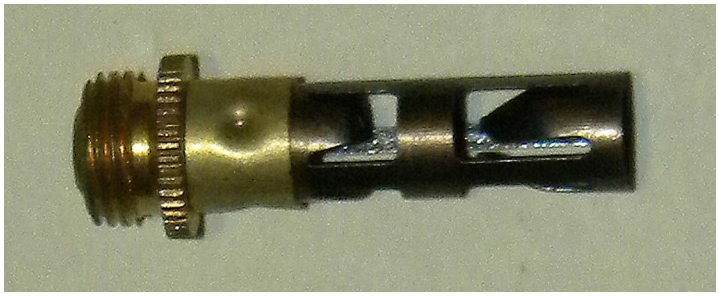
The snout has a brass cap holder with a sleeve by which the spring steel fuse holder was crimped to the cap holder. This adapter could have a detonator or fuse pushed in that would be held in place by the spring steel sleeve, no crimping was necessary.

A rubber sleeve was normally used to waterproof the attachment once fitted.

SOE Spring Snout (Snout, Switch, Capped, Mk. I)

Introduced 1941

This version of the spring snout was used with the SOE type switches. Developed by SOE this version survived the war and was used for many years after. Similar to the MD1 snout, this one screwed into the switches rather than being held in place by screw caps.



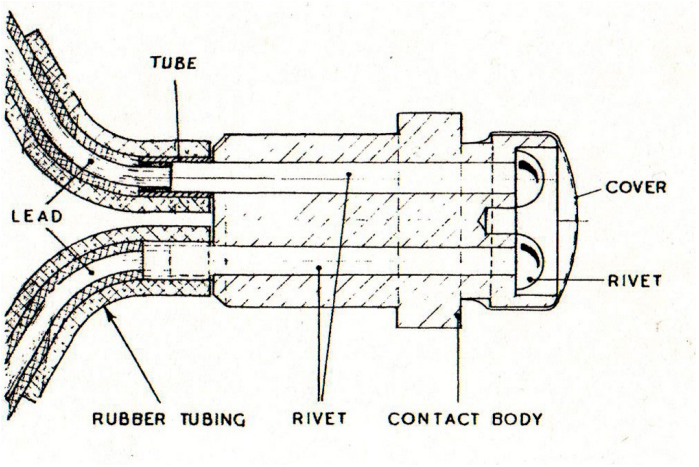
Snout, Switch, Capped, Mk. I

A rubber sleeve was normally used to waterproof the attachment once fitted.

Adapter, Electric, Mk. I

Type– Electric Adapter
Introduced 1940
Length- 19mm
Diameter- 11mm

This was an adapter produced by MD1 used to convert either an MD1 Pull Switch or Pressure Switch to an electrically fired device. Introduced for use in 1940.



Adapter, Electric, Mk. I

The adapter consisted of a small plug of insulating material enclosing two contact rivets. Two 300mm lengths of rubber covered wire are attached to the rivets and protrude through the bottom of the plug. The top of the plug is covered by a tinned copper cover spun onto the plug.

For use, the adapter replaces the percussion cap holder on the switch. When the switch operates, the striker hits the copper cover and drives it down onto the contact rivets closing the electric circuit.

The wire insulation is coloured black and the plug is red. An MD1 inspection mark may be noted on the plug.

Burster, Detonator, Type 6 Mk. I, II, and 3

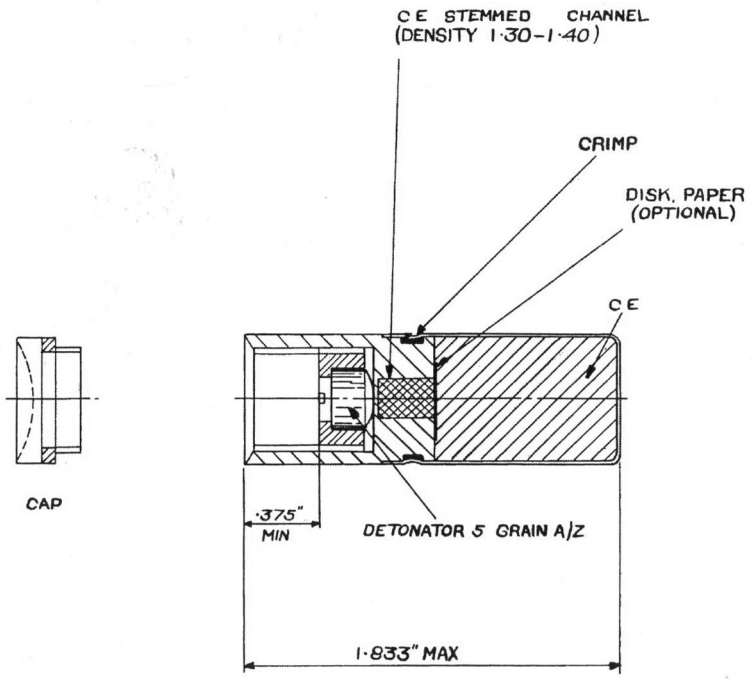
Introduced 1943
Weight- 35 g.
Length- 1 11/16 in.
Diameter- 5/8 in.
Filling– CE



Burster, Detonator, Type 6

The burster consists of a brass tube that is closed by a cap at one end and has the other end threaded internally to accept a percussion cap holder. A brass washer is inserted into the tube and crimped in place by three indentations in the tube wall. The cap holder is in the form of a threaded brass plug. The cap holder screws into the burster tube until it reached the brass washer which leaves about 8mm of thread to screw onto a firing device such as an AC Delay. The burster is filled with a 5 grain detonator cap and about 13 g of CE. The Mk. 3 is constructed differently with a brass cap holder and CE chamber

crimped on to the cap holder. Both styles have a brass closing cap that is removed for use.

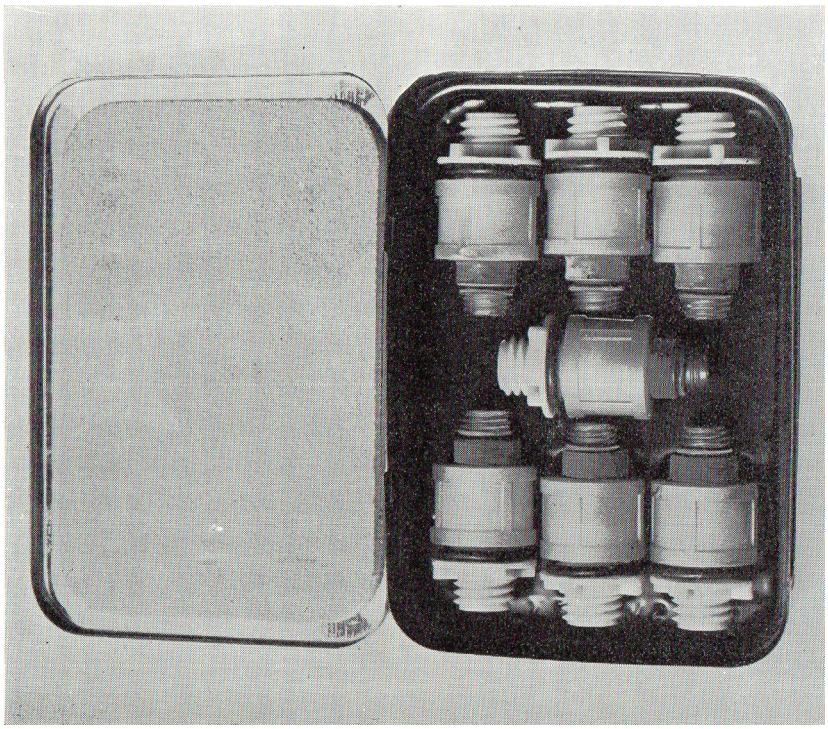


Burster, Detonator, Type 6, Mk. II
Internal diagram

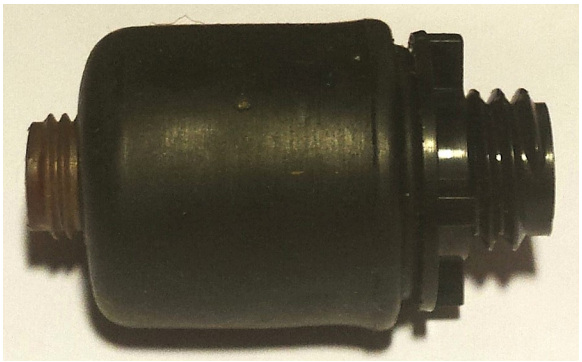
Flash Initiator, L3A1, L3A2, L3A3, L3A4

Introduced 1960's

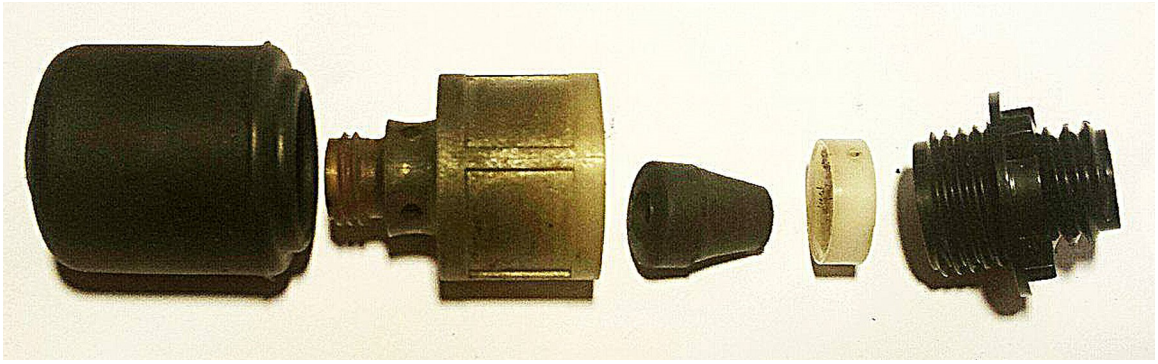
Flash Initiators are the link between the mechanism and fuse or detonator. The body is made of plastic and contains an explosive cap (percussion cap). Internally there is a conical rubber grommet and plastic collar that will grip the fuse and provide a watertight seal. One end of the initiator is threaded to fit the firing device, the other end has a cap that screws into the main body, the outer end of the cap is also threaded to fit demolition blocks. The fuse or detonator is inserted through the end of the cap and into the rubber grommet. When the cap is tightened down, it presses on the plastic collar which compresses the rubber grommet around the fuse.



Flash Initiator, L3A2 in packing box



Flash Initiator, L3A4



Above- Flash Initiator, L3A4 component parts
Below- Flash Initiator, L3A4 in packing box showing box marking, dated 1982



Manufacturers

	US	A. C. Gilbert Co.
	US	Automatic Temperature Control Co. Philadelphia, PA
ADI	AUS	Australian Defense Industries
B&P	UK	Boon & Porter Ltd.
BUL	US	
CMZ	US	Whittaker Corp, Columbus Milpar Div.
CRC	UK	Cravens Railway Carriage and Wagon Co. Ltd. Darnall, Sheffield
CY	UK	Chorley
EMI	UK	Electric and Musical Industries
FHH	UK	
GHG	UK	G. H. Garland & Co. Ltd, Nibthwaite Road, Harrow, Middlesex, England
	US	Geometric Stamping Co. Euclid, OH (M1 Release)
KYC	US	Keystone Alloys Co. Ltd.
Kynoch	UK	Kynoch Ltd.
LNO	US	
MAI	US	Maryland Assemblies Inc.
MD1	UK	Ministry of Defence 1
MDSL	UK	Mondial Defence Systems Limited.
ME	AUS	Maribyrmong Explosives
MMC	US	Marquette Corp.
MTL	US	Mast Technology Inc. Independence MO
NJD	US	Navajo Army Depot
OPI	US	Ordnance Prod Inc.
PA	US	Picatinny Arsenal
PXC	US	Ambac Ind Inc, Pace Co. Div.
RHN	US	United States Army Ammo Depot.
RM LTD	UK	
SND	US	Seneca Army Depot
SGK	US	Security Signals Inc.
PE	POR	Sociedede Portuguesa de Explosivos
TGCo	UK	The Gramophone Co.
TGSR	UK	The Gramophone Co. Springfield Road
UDD	US	
WWE	US	
	US	Universal Match Corp. Ferguson Mo.

The manufacturers list is not limited to any specific country, it will be updated in future volumes.

Credits

This is by no means a complete list of credits or references. Many other people and institutionshave helped in the production of this publication.

Australian War Memorial
Norman Bonney
Jim Geibel
Timothy Holland
Scott Lynch
Leo Monkivitch
Drew Prater
Dave Sampson
T. Mathew Smith
Colin MacGregor Stevens

References

Many Official Documents, Military Manuals, Training Circulars and Notes

Commercial Books

Tombe Du Ciel	Eric Pierret
SOE Equipment Air dropped in Europe	Anders Thygesen & Michael Sode
Malice Aforethought	Ian Jones MBE
The British Spy Manual	IWM
Winston Churchills Toyshop	Stuart Macrae
Station 12, SOE's Secret Centre	Des Turner
Secret Agents Handbook of Special Devices	Mark Seaman
The Plumber's Kitchen	Donald B. McLean
OSS Weapons II, Second Edition	Dr. John W. Brunner, Ph.D.
SOE, The Scientific Secrets	Frederick Boyce and Dougles Everett

Websites

http://tgrm.foxed.ca/
http://visualcollector.com/VisualCollectorLinks/Traps.htm
http://www.bocn.co.uk/vbforum/
http://www.millsgrenades.co.uk/
http://www.lexpev.nl/
https://www.wk2ammo.com/forum.php?s=2acb9706ceecdd4ff1a5074bde7eaed8