

INTRODUCTION TO BOOBY TRAPS

The basic idea behind a booby trap is that the victim does his or her own trapping. This is done by using the normal behavior of the victim to push, pull, lift or turn a switch that closes a circuit or releases a spring loaded firing pin in some simple manner.

METHODS OF SWITCH OPERATION

The imagination and ingenuity of the designer only limit the techniques of getting a switch to operate. However there are several standard principles that are utilised by just about all the military booby trap systems around the world. Either this indicates that military minds think alike or they all copy good ideas when and where they find them.

These basic principles are:

- Applying a weight,
- Removing a restraining device or weight.

and they rely on releasing a spring loaded firing pin allowing it to fire some form of percussion device or closing a circuit to fire an electric detonator, which commences a chain reaction resulting in an explosion.

Some of the methods used to control the release of the firing pins or close the circuit until the crucial moment are:

Shear pins,
Ball control,
Pin or Plate removal,
Bellville springs,
Chemical reactions,
Friction compounds,
Electrical contacts,
Chemical-Electrical reactions,
Chemical corrosion

Remember these are only the basic principles. The ways of achieving the control and release are legion.

Shear pins or rings

When the mechanism is cocked and the last safety device is removed all that is left holding the striker is a pin, ring or plate of sufficiently weak construction so that the application of the desired force by the victim causes the pin, ring or plate to be cut or sheared by that applied force. This action releases the striker.

Ball control

When the last safety pin is removed all that is left holding the striker are a series of balls or a ball acting as a retainer and which is held in place by a sleeve or some other device which prevents movement of the ball. Any movement of the restraining device allows the ball or balls to move into slots, grooves, recesses or channels thus permitting the striker to move under the force of the firing pin spring.

Pin or plate removal

When the last safety pin is removed all that is left holding the striker is a pin, plate or clip. Attached to this pin, plate or clip is usually a wire which when pulled withdraws the pin, plate or clip thus releasing the firing pin. The numbers of ways in which this arrangement can be made are far too numerous to mention.

Bellville spring

This type of mechanism utilises the property of a curved plate to suddenly invert when a pressure is applied to the centre of the plate. Many hermetically sealed coffee tins use this principle so that you can tell instantly that the tin is still sealed or has been opened as the spring won't go back to its original position once it has sprung. When the last safety device has been removed all that is preventing the Bellville spring from inverting is a light coil spring holding the pressure plate away from the Bellville spring. Pressure of the desired magnitude pushes the pressure plate onto the Bellville spring which does its magic inversion trick and the firing pin, which is mounted on the inside of the Bellville spring, impacts with a percussion cap. Another name for this type of mechanism is "Diaphragm"

Chemical reaction

The most common of this type of switch is the "Buck chemical igniter" qv. These switches contain two chemicals that are hypergolic and are kept separate by mechanical means. Pressure applied to the container crushes the container thereby causing the two chemicals to come into contact and the resulting flames produced by the hypergolic reaction is utilised to function a detonator.

Friction igniters

These switches operate in exactly the same manner as the common household match. A tube lined with a friction sensitive compound has a friction wire placed in such a manner that pulling the wire causes it to pass through the tube and over the compound. The resulting flash is utilised to ignite a piece of fuze blasting time or a detonator.

Electrical contact

The numbers of ways in which an electric contact can be made are far too numerous to consider. The principle is simple, an electric detonator is wired into a circuit with some form of switch and closure of the switch by the victim causes the detonator to function.

Chemical/Electrical reaction

The most common and most well known of this type of switch is the contact horn on a sea mine. The horn, which is made of a light non-corrosive metal, is filled with a glass ampoule full of acid. At the bottom of this horn is a set of battery plates. When the horn is crushed the ampoule is broken thus releasing the acid into the battery plates. The normal battery reaction takes place and creates an electric current that is directed to the electric detonator wire into the battery circuit.

Chemical corrosion

These switches are much beloved by Hollywood and seen in many spy type movies. They consist of a soft copper tube inside of which is a glass vial of acid. Running alongside this vial is a wire attached to the end of the tube and holding the striker in the cocked position. At the other end is the percussion cap. Crushing of the copper tube allows the acid to begin corroding the wire holding the striker. The length of the delay is dependent on several factors, the most important being:

Thickness of the wire, Strength of the acid, Temperature in which the reaction is taking place.

Where Hollywood gets it wrong is in the accuracy portrayed. The reality is that the timing has a very large margin of error and the amount of error depends on the factors mentioned above.