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A. O. DODGE

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AUTOMATIC FIRING DEVICE

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Fig. 1.

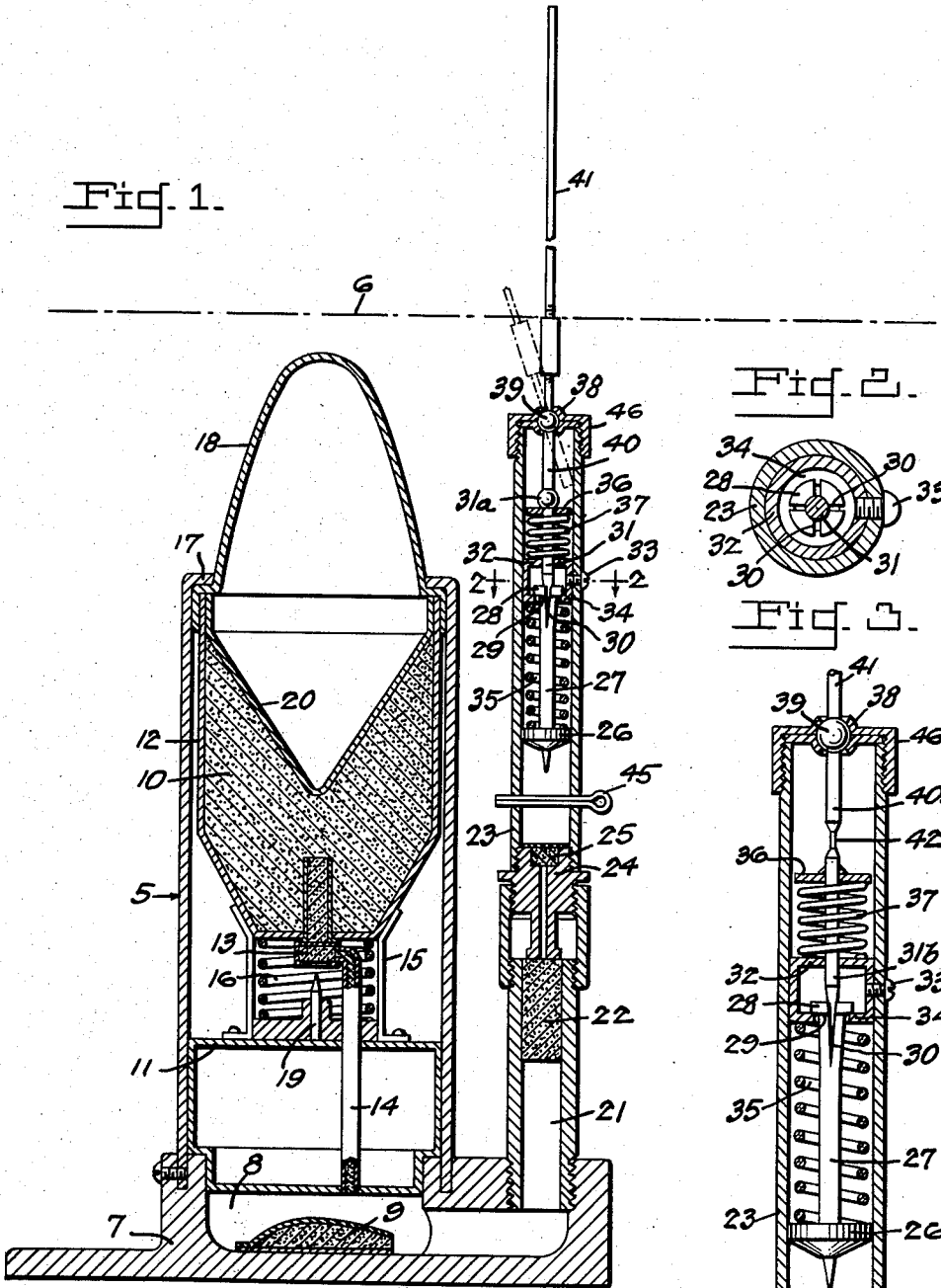


Fig. 2.

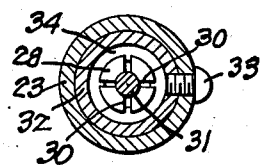


Fig. 3.

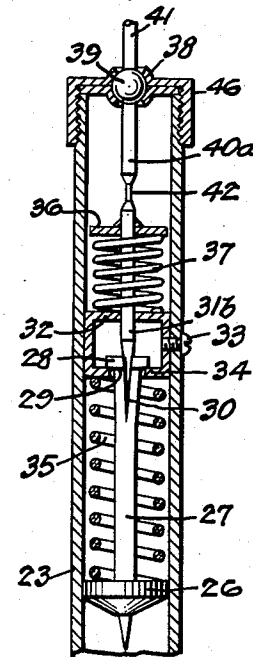
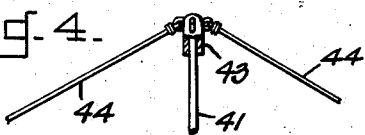


Fig. 4.



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AUTOMATIC FIRING DEVICE

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1 Claim. (Cl. 102-8)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to explosive land mines.

An object of the invention is to provide an explosive land mine which can be concealed beneath the ground surface and detonated by pressure, or by disturbing the coincidental axial alignment of an upwardly extending trip rod and a triggering mechanism.

Another object of the invention is to provide an explosive land mine with a main charge and a propelling charge therefor and a time delay fuze train to delay the firing of the main charge until it is above the ground surface.

Another object is to provide a land mine which can be detonated by a very slight lateral deflection in any direction, of a trip rod.

A still further object is to provide a highly sensitive "all-ways" land mine which can be detonated by a slight pull on any one of a plurality of trip or antenna wires extending in various radial directions from the emplaced mine.

Other objects and advantages will be apparent from the following detailed description and the accompanying drawings, in which:

Figure 1 is a vertical longitudinal sectional view of a mine and detonating means therefor.

Figure 2 is a transverse sectional view on the line 2-2 of Figure 1.

Figure 3 is a longitudinal sectional view of a slightly modified form of the detonating means, and

Figure 4 is a view of an attachment which may be placed on the end of the trip rod when it is desirable to use trip wires.

The present invention was devised for use mainly in brush covered terrain which offers cover to advancing tanks or troops. The brush also conceals the trip rod of the mine detonator. Foot soldiers are always on the alert for trip wires therefor the trip rod is less conspicuous among bushes. However under some conditions trip wires may be added to increase the chances of contact by any moving body.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 indicates a mine buried below a ground surface 6. A base member 7 having a chamber 8, receives a propelling charge 9 which ejects the main bursting charge 10, as will be more fully explained. A spacer 11 has a diametrically reduced end which is seated in the chamber 8 and receives the blast from the propelling charge 9 during ejection of the main charge 10. The main charge shown merely for example as a shaped or cavity charge is confined in a casing 12 and is provided with a primer 13 which is ignited by means of a time delay fuze 14. Bars 15 and a helical spring 16 hold the main charge casing in contact with a restraining flange 17 on the mine 5.

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An ogive 18 above the main charge receives pressure from the ground surface if a vehicle passes over and depresses the main charge downward until its primer 13 contacts a firing pin 19 carried by the spacer 11. The ogive 18 also serves as a stand-off spacing means when the main charge 10 is shaped and lined as shown at 20 in Figure 1.

A flash tube 21 houses a flash igniter compound 22 which detonates the propelling charge 9. Secured to the upper end of the flash tube is a tubular housing 23 which is attached to a percussion cap receptacle 24 and which receives the detonator 25 for the flash igniter 22.

A striker member 26 is slidable in the housing 23 and has formed thereon a diametrically reduced portion 27. At its upper or outer end the reduced portion has an enlarged head 28 to form a shoulder 29. The portion 27 of the striker adjacent the head 28 is longitudinally slit as at 30 to form resilient fingers which may tend to flex radially inwardly, while yielding outwardly to the pressure of the tapered end of a release pin 31 when inserted centrally between the fingers. In the drawing, four fingers are shown but the number may be varied within limits, as desired. A hollow guide member 32 is fixed to the tubular housing 23 as by a screw 33 or other suitable means and guides the release pin for translation in and along the axis of the housing. At its inner end the guide has an inturned flange 34 which is so formed as to permit easy passage of the head 28 of the striker 26 when the fingers are released for inward contraction by removal of release pin 31, but which engages under shoulder 29 of said head when the fingers are spread radially outwardly by the tapered end of the release pin 31. The flange 34 thus serves as a sear to restrain the striker against the downward urge of a firing spring 35 until released by withdrawal of the release pin from between the fingers of the striker. The release pin 31 has a disk shaped stop member 36 for receiving the thrust of a release spring 37 which acts between this member and upper flange of member 32 to normally urge the release pin upwardly or away from the striker head 28.

Secured to the outer end of the housing by screw-threads or other suitable means is a spherical bearing 38 in which is mounted for universal pivotal movement a spherical enlargement 39, to which a release finger or trigger pin 40 is connected. The finger is of a length to contact a spherical or otherwise rounded end 31a of the release pin 31 to hold the tapered end of said release pin between said resilient fingers on the striker. A relatively thin rod 41 is shown secured to the spherical enlargement and extends outwardly in a direction opposite to the said release finger and has its longitudinal axis coincident with the longitudinal axis of the finger 40. In the model shown the striker, the rod 41, the finger 40 and the release pin 31 are shown coincident. The contacting surfaces of the end 31a of the release pin and the release finger constitute a slip connection for releasing the striker as soon as the axial alignment is disturbed.

In Figure 3 is shown a slightly modified form of connection between the release finger 40a and the release pin 31b. It is sometimes desirable to have a less sensitive connection between the finger and pin if the mine is planted on a slope or other location where the tubular housing would not be vertically disposed. In such instance the frangible or shearing connection 42 between pin 31b and finger 40a may be substituted to yieldably hold the rod 41, the finger 40 and the release pin in longitudinal axial coincidence. Otherwise the structure and operation of the species shown at Figure 3 remains the same as with Figure 1. It will be noted that to detonate a mine so equipped, the rod 41 must be given a lateral force or blow sufficient to shear off the connection 42, which with-

in reasonable limits may be made in any desired size and strength. If circumstances demand trip wires may be installed as shown in Figure 4 wherein a hollow cap 43 is slipped over the end of the rod 41 and trip wires 44 are attached as shown to initiate the mine in response to a very slight tension on any one of them. Various safety devices such as a withdrawal pin 45 may be provided. Also pin 40 may be substantially immobilized until the mine is planted and armed, by turning down threaded cap 46, Figures 1 and 3 to thereby clamp rod 40 in the safe position. Various other safety features may be added as desired.

The operation is clear from the foregoing description; and it will be noted that I have provided an extremely sensitive detonator for a land mine wherein initiation is effected by a slight pivotal movement in any radial direction of rod 40 to thereby release the energy in force spring 37.

While I have disclosed two forms of the invention presently preferred by me, various changes and modifications will occur to those skilled in the art after a study of the present disclosure. Hence the disclosure is to be taken in an illustrative rather than a limiting sense; and it is my desire and intention to reserve all modifications falling within the scope of the subjoined claims.

Having now fully disclosed the invention, what I claim and desire to secure by Letters Patent is:

In a triggering mechanism for releasing a striker, a tubular housing having a detonator therein, a striker member slidable therein and having a diametrically reduced portion extending axially therefrom, the distal end of said reduced portion being longitudinally split to form resilient fingers, a head formed on said distal end to provide a shoulder, a hollow cylindrical guide member fixed within the said housing and having an axial opening in one end thereof to slidably receive said head and resilient fingers when said striker member is in normal retracted position, an axially slidable release pin in said guide member having a spherical enlargement on one end and a

tapered portion on its other end for spreading the resilient fingers on the distal end of said reduced portion of the striker whereby said shoulder is caused to overlie the inner surface of said guide member adjacent the axial opening therein to secure the striker against axial movement, stop means on said release pin adjacent its spherical end, a first helical spring surrounding said release pin and confined between the guide member and the stop means on the release pin to normally urge the tapered end of the release pin from between the fingers of the striker, a second helical spring surrounding the reduced portion of the striker and confined between the striker and the guide member for normally urging the striker toward said detonator, a trip mechanism comprising an elongated rod rotatably mounted by said tubular housing, and extending externally thereof and a finger integral with and in axial alignment with the rod, said finger when in safe position abutting the spherical end of said release pin to hold the same against the urge of said first spring, a spherical enlargement on the rod at the junction of said rod and finger, and a two-part bearing formed with complementary semi-spherical depressions to universally rotatably support said spherical enlargement said bearing comprising a first member abutting the outer end of said tubular housing and a second member screw-threadedly secured to the outer end of the housing whereby said second member is impinged on said spherical enlargement to effect a desired resistance to the movement of said trip mechanism, angular movement of said rod and finger releasing said release pin to the action of said first spring and said striker to the action of said second spring.

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