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B. WALKER ET AL

2,433,875

METHOD OF CLEARING MINE FIELDS

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Fig. 1-

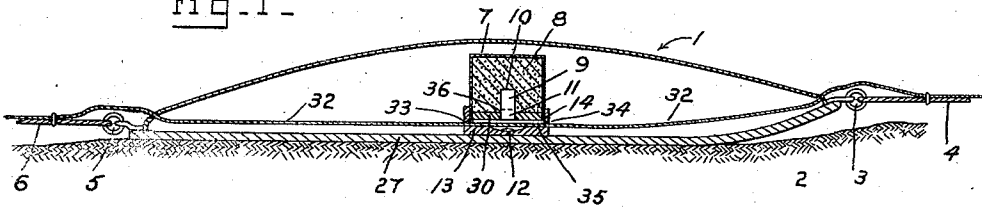


Fig. 2-

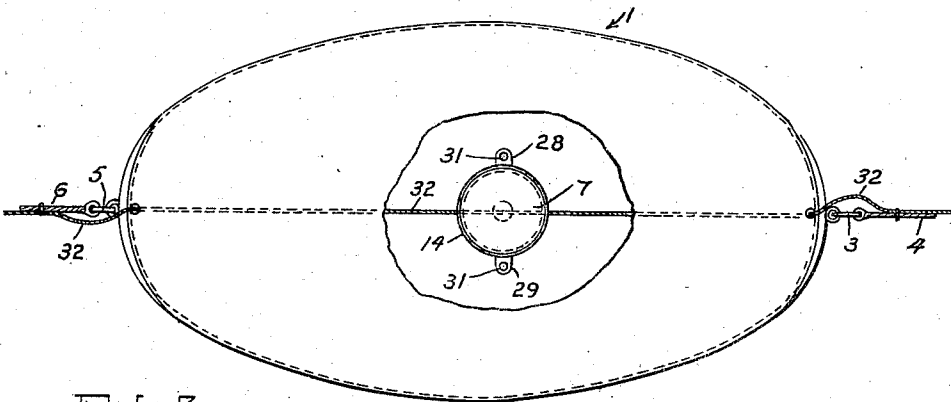


Fig. 3-

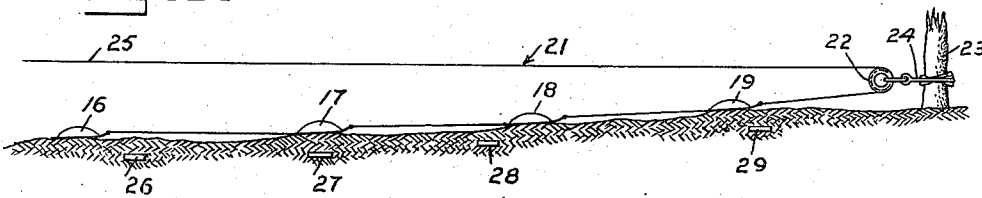


Fig. 4-

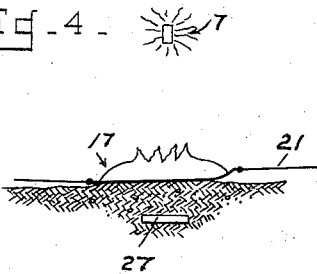
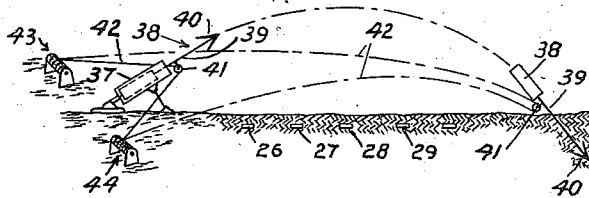


Fig. 5-



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METHOD OF CLEARING MINE FIELDS

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

This invention relates to methods of clearing mine fields. A purpose of the invention is to provide an effective means of quickly and safely clearing enemy mine fields by sympathetic detonation of charges.

Another purpose of the invention is to provide a means of carrying said charges to close proximity with said mines to be detonated.

A further purpose is to provide an effective design of charge for the purposes aforesaid.

Other purposes will become apparent from the description of the invention set forth herein.

One method of clearing a path across mine fields is by placing a number of charges in close proximity to the mines and exploding the charges. The result is that mines close to the charges may be exploded by sympathetic detonation. In this invention it is proposed to clear a path across a mine field by means of a chain of charges placed across the mine field the entire chain adapted to be exploded from one end.

In the drawings,

Figure 1 is a vertical sectional view of an individual mine exploder,

Figure 2 is a plan view of an individual mine exploder,

Figure 3 is a perspective view of a chain of mine exploders lying across a mine field, showing method of pulling the chain of exploders across the mine fields, the foreground being cut away to show enemy mines beneath the surface,

Figure 4 is a view of a mine exploder in close proximity to an enemy mine, showing how the charge in the mine exploder is projected into the air and exploded, and

Figure 5 is a perspective view of an alternate method of getting the mine exploders across the mine field by shooting a line and pulley across, attached to an anchor.

As shown in Figures 1 and 2 of the drawings, each individual mine exploder is housed in a sheet metal container 1 with a low center of gravity which is preferably of some well rounded shape such as an oval, with its forward end 2 sloping upward to enable it more easily to slide along the ground and clear obstacles in its path. A loop 3 is fastened to the forward end of the exploder housing 1 for attaching a rope or cable 4 to it for pulling along the ground.

Another loop 5 is fastened to the rearward end of the exploder housing 1 for attaching a rope

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or cable 6 leading to other exploders in the chain to the rear of the individual exploder. Inside the mine there is a container 7 normally cylindrical in shape, containing a high explosive main charge 8, a booster charge 9 in a central tube 10 in said container 7, and a delay charge 11 in the lower portion of said central tube 10.

A circular, cup shaped base 13 having a peripheral raised portion 14 with an inside diameter only slightly larger than the outside diameter of the container 7, is bolted or screwed down to the bottom 27 of the exploder housing 1 by means of bolts 31 secured through lugs 28 and 29 on base 13. The side walls and top of container 7 may be of light material such as fibre or sheet metal, but the base 30 of the said container and the base 13 should be of heavy material such as iron inasmuch as the lifting charge 12 is exploded in the cavity between the two bases 30 and 13.

A detonating line 32 made of primacord passes through the mine exploder from front to rear as shown and through a pair of holes 33 and 34 formed in the raised portion 14 of the base 13 and through a diametral channel 35 connecting said two holes. The channel is open at its top between said holes, and crosses through the central depression containing the lifting charge 12. The delay charge 11 is located in a central vertical bore 36 in the base 30 and hence the primacord when detonated will set off both the lifting charge 12 and the delay charge 11. The high explosive 8 consists of about 10 pounds of explosive or even more, if desired, to provide a powerful explosion, and the delay charge 11 is designed to delay the detonation of the main charge 8, until the container 7 has been lifted to a height of about ten feet above the ground where it will have a considerable percussive effect on the mines in the mine field in the immediate area around the mine exploder, causing them to explode.

As all the mine exploders in the chain are connected together by a primacord 32, it is possible to cause them all to explode by detonating the primacord at either end in the usual manner, by attaching a percussion fuse to the end of the primacord and releasing the striker of the fuse against the percussion cap. The detonator primacord passing through the channel 35, ignites both the lifting charge 12 and the delay charge 11. The lifting charge 12 explodes, causing the container 7 to be lifted upwardly, breaking through the top of the mine exploder housing as shown in Fig. 4 and when it reaches the desired height above the ground the main charge 8 explodes, detonating adjacent enemy mines.

In Figure 3, the chain of mine exploders 16, 17, 18 and 19, is hauled across the portion of mine field comprising mines 26, 27, 28 and 29 by means of a rope 21 passing over a pulley 22 attached around a tree trunk 23 by means of a rope 24, tension applied at the end 25 of the rope 21 by hand, horse, or a motor vehicle, serving to pull the chain of exploders across the mine field. The pulley 22 having a light rope threaded through it may be carried across the mine field at night by trained sappers, and the heavy rope 21 attached to the light rope and pulled through the pulley 22 when the sapper gets back to his own side of the mine field. Where no tree or other fixed object is available a hooked anchor may be used instead. As the mine exploder 17 is set off as shown in Figure 4, the container 7 is thrown into the air, causing the mine 27 to explode.

Or, as shown in Figure 5, a mortar 37 may be used to shoot a projectile 38 having a central rod 39 firmly fastened into the projectile and having an extension to which are attached a plurality of metal prongs 40 forming a pointed end. A pulley 41 is fastened to the extension of the rod 39 as shown, and has a light rope 42 passed through it. The two ends of the rope 42 are wound on reels 43 and 44 which are designed to have a minimum of friction so as not to impede the unreeling of the rope 42. The reels 43 and 44 may be provided with any usual device for preventing backlash. The projectile is provided at its lower end with a propellant charge and fuse similar to those used on mortar shells and adapted to be ignited by impact against a firing pin inside the mortar barrel in the usual manner when the projectile 38 is inserted into the mortar barrel and allowed to drop against the firing pin. The projectile is thus carried across the mine field where its pronged end forces itself into the earth. A heavier rope 21 is attached to one end of the light rope 42 and is pulled across through the pulley 41 by means of tension on the light rope. A chain of mine exploders attached to the end of the heavy rope 21 is then pulled across the mine field as previously described and shown in Fig. 3.

The mine exploders may alternatively be equipped with electric primers and connected by electric wires carrying a current for setting them off.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size, arrangement and materials may be resorted to without departing from the spirit and scope of the invention claimed as hereinafter.

We claim:

1. A device for clearing a path into a field of land mines by exploding the mines in said path, comprising a plurality of individual explosive charges, means for elevating said charges to a predetermined substantial altitude above the ground, fuse means for exploding said charges, means for linking said charges together in substantially spaced relationship to form a flexible chain of charges, drawing means for disposing said chain of charges into said mine field, and means for actuating said elevating means and said fuse means from a single location whereby all said charges are exploded at substantially the same time.

2. A device for clearing a path into a field of land mines by exploding the mines in said path, comprising a plurality of individual explosive charges, explosive means for elevating said charges to a predetermined substantial altitude above the ground, fuse means for exploding said charges, means for linking said charges together in substantially spaced relationship to form a flexible chain of charges, drawing means for disposing said chain of charges into said mine field, and means for actuating said elevating means and said fuse means from a single location whereby all said charges are exploded at substantially the same time.

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