

Nov. 27, 1956

A. J. DE FINO

2,771,841

BELT LINE CHARGE

Filed Aug. 15, 1947

2 Sheets-Sheet 1

Fig. 1.

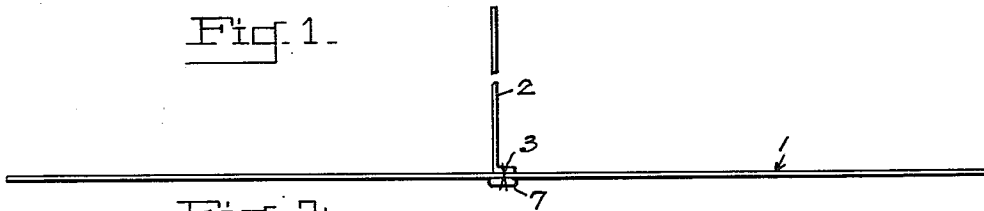


Fig. 2.

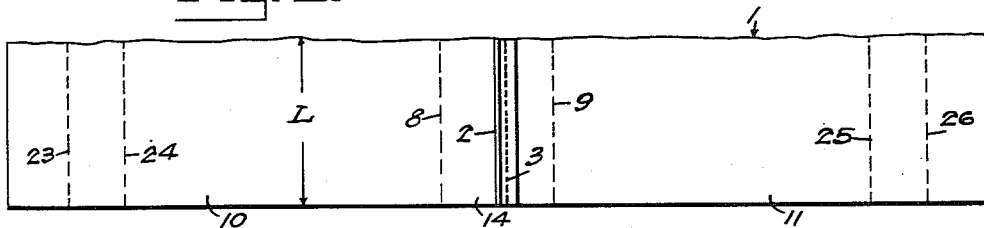


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

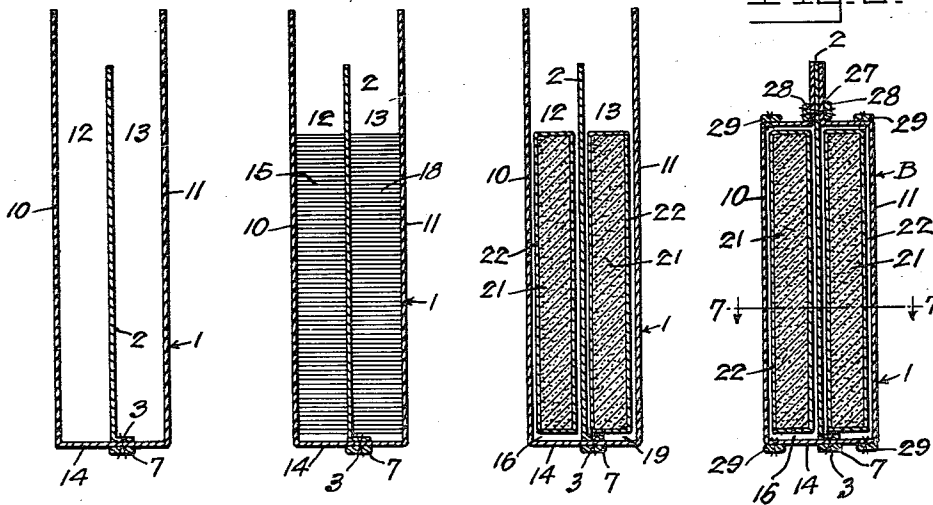


Fig. 7.

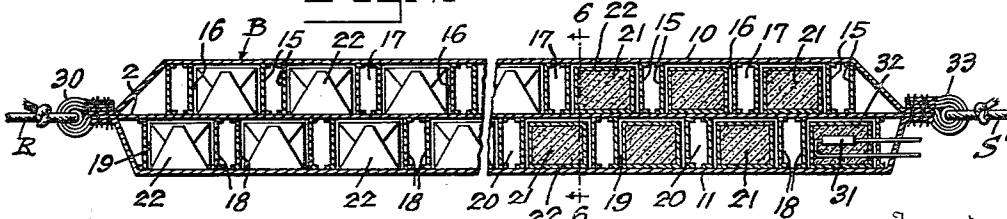
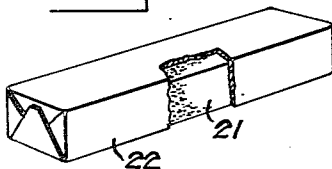


Fig. 8.



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Fig. 9.

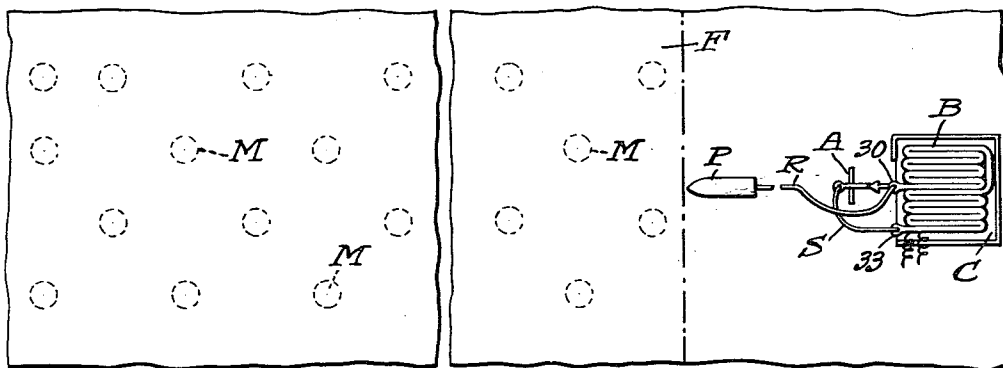


Fig. 10.

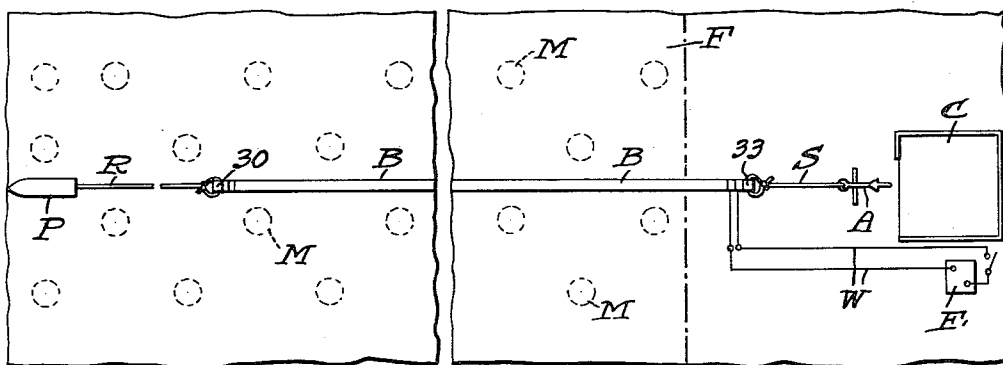
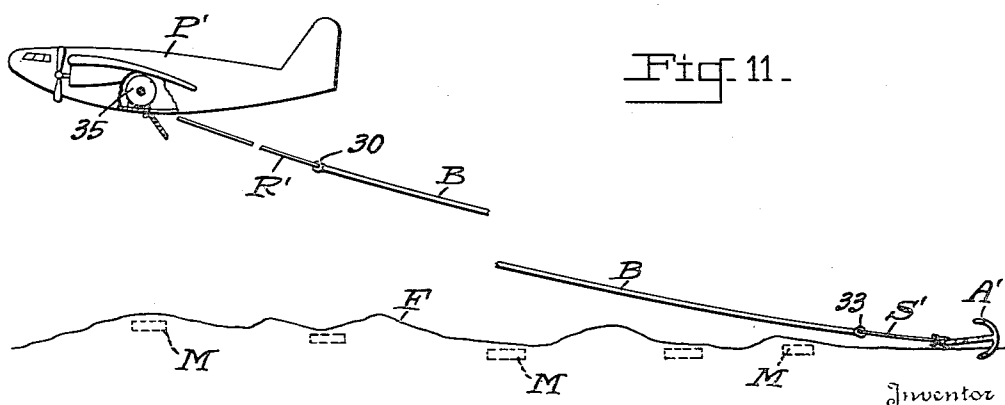


Fig. 11.



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BELT LINE CHARGE

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2 Claims. (Cl. 102—22)

(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 royalties thereon.

This invention relates to improvements in mine field clearing.

An object of the invention is to provide a flexible elongated casing containing a number of separate charges of high explosive material, closely spaced within the casing.

Another object of the invention is to provide a casing having uniformly spaced pockets for receiving and holding the charges at a predetermined spaced distance apart.

A further object of the invention is to provide a casing having two or more tiers of pockets in overlapping relationship so as to cause detonation of the entire train of explosives in the event that any part of the casing stretches during use.

A still further object of the invention is to provide a flexible casing constructed of light weight material that will permit the casing when loaded to be coiled on a platform, in a receptacle or on a reel and to be projected over a mine field by attaching one end thereof to a rocket projectile.

A still further object of the invention is to provide a flexible casing that can be coiled within the bomb bay of an airplane and released upon a mine field.

A still further object of the invention is to provide a flexible casing which when loaded with high explosive material and dropped on the ground surface will adjust itself to lie in close proximity therewith, and when detonated will exert its forces to set off buried mines along its entire length.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same.

Figure 1 is an end view of a length of webbing of which the present invention is constructed, illustrating the first step in the method of assembly, wherein a second strip of webbing is stitched centrally and longitudinally to the first strip of webbing.

Figure 2 is a top plan view of Figure 1,

Figure 3 is a cross sectional view after the first strip of webbing is bent to shape,

Figure 4 is a similar view after the connecting strips or threads are sewed in place to form longitudinally disposed compartments,

Figure 5 is a similar view after the formed charges are placed in the compartments,

Figure 6 is a cross section taken on the line 6—6 of Figure 7 after the open longitudinal flaps are sewed in place to completely enclose the charges,

Figure 7 is a longitudinal section of the completed casing taken on the line 7—7 of Figure 6,

Figure 8 is a perspective view of one of the formed charges,

Figure 9 is a diagrammatic plan view of a mine field

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showing the casing secured to a rocket projectile and ready to be projected over the field,

Figure 10 is a similar view showing the casing after it has been projected to its full length and preparatory to detonation, and

Figure 11 is a diagrammatic view showing the casing being positioned on a field by an airplane.

Heretofore in the use of devices similar to the present disclosure one disadvantage has been observed, and that is that the fabric casing stretched when projected to such a degree that detonation from adjacent charges ceased at the point where the stretch occurred.

The present invention was devised to overcome this and other difficulties as will be apparent as the description proceeds.

Referring now to the drawings, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the numeral 1 designates an elongated strip of webbing which may be of woven fabric or of any light weight flexible material tough enough to withstand the stresses imposed in use.

For the purpose intended, the strip of webbing 1 may vary in length up to several hundred feet. The reference character L indicates the direction of length of said strip.

Centrally of the width of webbing 1 and longitudinally thereof a second strip 2 of webbing having similar characteristics to the strip 1 is stitched or sewed as at 3. A longitudinal reinforcing element such as a cord, rope or braid 7 is sewed on the side of webbing 1 opposite to the side on which the webbing 2 is attached.

The webbing 1 is bent on the dotted lines 8 and 9 of Figure 2 to form outer walls 10 and 11, parallel to each other and to the webbing 2 as shown in Figure 3. At this step in assembly of the device, two separate longitudinally spaced identical compartments 12 and 13 are formed, each compartment open at one side, and closed at its opposite side by the portion 14 of the webbing 1.

The central strip of webbing 2 and the formed outer walls 10 and 11 are held in the position shown in the drawings while spaced partitions 15 are sewed to the webbing 2 and to the outer wall 10. These partitions 15 are positioned at predetermined spacings to produce pockets 16 for receiving formed charges which will be described hereinafter.

The partitions 15 are also positioned so as to produce hollow gaps 17 between each pocket 16 to increase flexibility of the completed structure.

Various methods of forming the partitions 15 may be resorted to. One method being to sew single threads close together to form a continuous partition, or strips of tape may be substituted for the threads and either sewed or cemented to the webbing 2 and to the outer wall 10.

Similar partitions 18 are secured to the central strip of webbing 2 and the outer wall 11. These partitions 18 are spaced similarly to the partitions 15 to form pockets 19 for the charges and hollow gaps 20 for longitudinal flexibility of the structure. The pockets 16 and 19 are thus placed on opposite sides of the central strip of webbing 2 in relative overlapping position as shown in Figure 7.

Formed charges 21 having the desired explosive characteristics are first wrapped in a covering 22 of a material impervious to oil and water and then placed in the pockets 16 and 19.

After the charges 21 are in place, the open portion of wall 10 is bent on the dotted lines 23 and 24 to close one row of pockets, and the open partition of wall 11 is bent on the dotted lines 25 and 26 to close the outer row of pockets.

The outer portions of walls 10 and 11 fold against the sides of the outwardly extending portion of the central strip of webbing 2, and are securely sewed as at 27 to

the webbing 2 to form a continuous belt like casing B. Longitudinal reinforcing elements 28 such as shown at 7 may be sewed at this point throughout the length of the casing B.

Other similar reinforcing elements 29 may be secured to the corners of the completed structure, if necessary, as shown in Figure 6.

The front end of the casing is formed into a loop 30 to which a flexible element such as a rope R may be secured for attachment to a rocket projectile P, as shown in Figure 9, whereby the device is projected in a straight line across a mine field.

Any suitable means, such as a squib 31, may be inserted in the rear end charge 32, whereby detonation of the entire train of charges is accomplished.

When the casing B is dropped from an airplane, it may be provided with a time fuze or other suitable delayed action detonator to allow the airplane sufficient time to move out of the danger zone.

At its rear end the casing B is formed into a loop 33 similar to the loop 30 at its front end, and receives a flexible element S for limiting the travel of the casing as will be explained.

Referring to Figures 9 and 10 wherein a diagrammatic layout is shown, illustrating the use of the present invention, the reference character F designates a portion of a field to be cleared and M designates buried mines.

Located at a safe distance from the mine field is an open top receptacle C in which the casing B is coiled. The rocket projectile P is secured by any preferred means to the flexible element R, which is attached to the front end of the belt. The flexible element S is secured to the rear end of the belt B and to any suitable form of anchor A whereby the belt is prevented from being carried too far into the mine field.

Detonating means including a source of electrical energy such as a battery E and wires W are electrically connected to the squib 31 after the casing B is projected onto the field F.

Figure 11 shows a modified method of positioning the casing onto a mine field. By this method the casing is carried on a reel 35 within an airplane P' and released by a crew member.

By this modified method a flexible element R' similar to the one R but much longer is wound on the reel 35. This flexible element R' is secured to a loop 30 formed on the casing B. A flexible element S' similar to the flexible element S is secured at one end to a loop 33 in the rear end of the casing B and at its other end to any suitable anchoring means A'.

The operation of the device is as follows:

In clearing a mine field, it is desirable to cause detonation of all mines in a selected straight line path so as to avoid leaving pockets of undetonated mines.

The receptacle C is set up at a safe distance from the suspected mined area and the casing B is coiled thereon. The flexible element S is secured to the anchoring means A and to the casing B, and the anchor is placed in the ground at a predetermined distance from the danger area so that the rear end of the casing will extend slightly onto the safe area. This will safeguard the operator while attaching the wires W to the squib 31.

The rocket P is then secured to the front end of the casing B by means of the flexible element R which is of sufficient length to prevent detonation of the explosive charges from the rocket blast.

When the rocket propelling charge is ignited in any well known manner, the rocket will be projected forwardly across the field pulling the coiled casing from the receptacle and across the field. The flexibility of the casing will permit it to easily uncoil itself from the receptacle and to accommodate itself to irregularities in contour of the terrain over which it is projected.

Propellant charges in the rocket P will be determined by the length of the casing used so as not to impose unnecessary stresses thereon.

In the modified method of laying the casing on the mine field, as shown in Figure 11, an airplane P' serves as the projecting means and the reel 35 serves in place of the receptacle C. This method is used when the ground surface is too irregular to use a rocket projector.

By this method the flexible element R' is wound on the reel 35 but is not secured to it. The casing C and the flexible element S' are also wound thereon leaving the anchor resting on the bomb-bay door.

The airplane will fly low over the field and when the bomb-bay door is opened the anchor A' will fall out pulling the casing B off the reel 35.

The flexible element R' is of sufficient length to aid in holding the casing in a straight line from its anchor A' until the forward end of the casing is low enough to the ground to avoid air currents which might force it off its intended path.

When the flexible element R' is entirely unwound from the reel 35, it will fall to the ground thus aiding in preventing the forward end of the casing from forming kinks or bends in its unsupported end.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A mine detonator for detonating substantially simultaneously a plurality of explosive charges comprising a longitudinal partition formed of flexible material, an elongated strip of webbing formed of said flexible material, means for securing one side of said partition to said strip centrally and longitudinally thereof, a plurality of transversely spaced partitions fastened at one end thereof to said strip and at the other end thereof to said partition thereby forming a plurality of pockets, one pocket overlapping two pockets on the opposite side of said partition by an amount sufficient to maintain overlap thereof during stretched conditions of said flexible material, a formed, detonating explosive charge substantially filling each of said pockets, means for providing hollow gaps between adjacent explosive charges on each side of said partition to increase the flexibility of said mine detonator, and means for securing the longitudinal edges of said strip to the other side of said partition.

2. The mine detonator according to claim 1 further comprising external detonating means connected to one of said charges for detonating substantially simultaneously all of said charges.

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