

Dec. 17, 1963

L. R. LITTLETON
MINE CLEARING DEVICE
Filed April 29, 1953

3,114,316

Fig. 1.

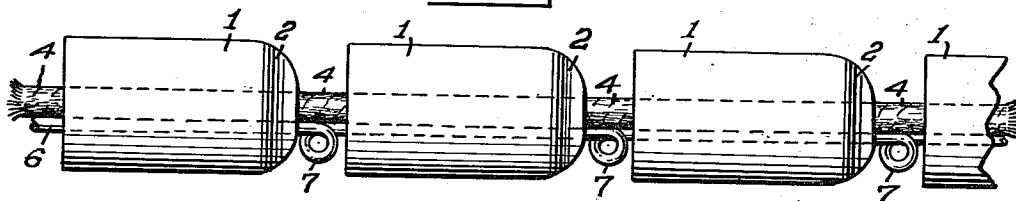


Fig. 2.

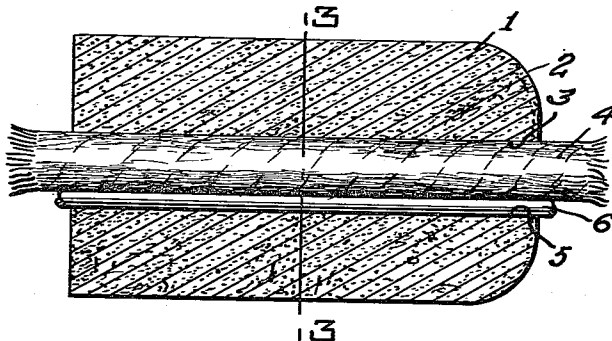


Fig. 3.

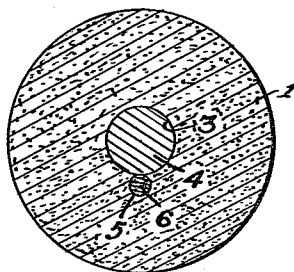
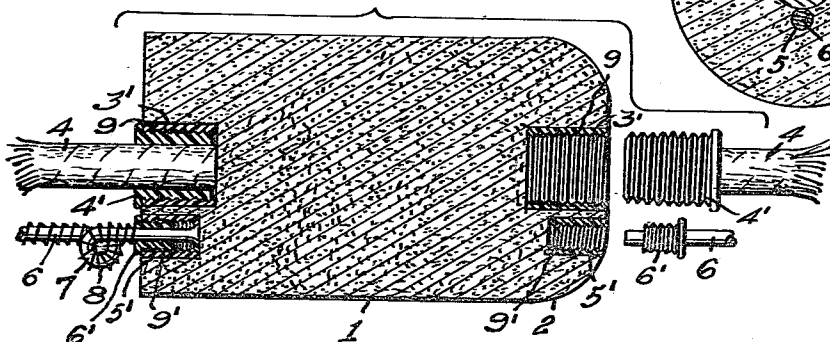


Fig. 4.



INVENTOR
Leonidas R. Littleton

BY
W. E. Thibodeau, A. W. Dew
and S. J. Rotondi, Jr.
ATTORNEYS.

1

3,114,316

MINE CLEARING DEVICE

Leonidas R. Littleton, Arlington, Va., assignor to the United States of America as represented by the Secretary of the Army

Filed Apr. 29, 1953, Ser. No. 352,066

1 Claim. (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 royalty thereon.

The present invention relates to a detonating cable or line charge.

Various methods and devices have been proposed for clearing mine fields, for cutting pathways through dense forests and underbrush. Among some of the mechanical devices used for these purposes may be numbered, bombs, snakes, hose filled with liquid explosives, explosive sprays, projected line charges etc.

So also in ground warfare it is frequently desirable to have available a device that can quickly and easily be laid out in any desired pattern to function as an anti-personnel weapon. To this end it is necessary that the assembly be light, easily, and safely handled, and positive in action so that a very flexible and versatile ordnance mechanism is produced.

Detonating cables and line charges in present use generally include a plastic explosive charge which is first wrapped around a nylon rope, then encased in a pliable plastic envelope, and the whole then covered with a plurality of nylon sleeves. This device is then tied tightly at regular distances to simulate a "sausage shape," wherefore the explosive is separated into short segments to make the cable flexible.

The aforementioned nylon sleeves are not only expensive but difficult to procure. Additionally the method of loading, assembling and tying the devices is laborious, tedious and consequently excessively expensive.

It is accordingly a primary object of this invention to provide a detonator cable in which the materials and elements are relatively cheap and readily available, and can easily be assembled to provide an inexpensive device.

Another object of this invention is to provide a flexible detonator cable in which solid cylindrical blocks of preformed explosives are strung along a flexible rope to produce an ordnance weapon which is easily handled, easily shipped, stored and used, and inexpensive.

A further object is to provide a detonator cable for clearing mine fields, underbrush, wooded areas, and for anti-personnel use, in which the separate explosive blocks are capable of assembly to produce an inexpensive line charge of greater flexibility to facilitate handling and storing.

A still further object of this invention is to provide a novel detonating cable, having the foregoing recited characteristics, which will be positive in action and of decreased risk in handling.

Other features and advantages of the invention will become apparent from a consideration of the following specification, and of the drawing wherein

FIGURE 1 is a view in elevation of the device of the instant invention wherein several of the explosive blocks are shown joined together to form a flexible cable.

FIGURE 2 is a longitudinal section through one of the explosive blocks of FIGURE 1.

FIGURE 3 is a transverse section on line 3-3 of FIGURE 2 and,

FIGURE 4 is a modification according to FIGURE 2 to illustrate an alternate method for joining the explosive blocks together.

2

Referring more particularly to the drawing wherein like reference characters designate like or corresponding parts through the several views, 1 designates a series of rigid, cylindrical blocks of explosive, each preformed to have at least one rounded end 2 to prevent fouling of the device and to decrease resistance while being projected over land or water, and having axial bores 3 whereby the blocks may be strung in equally spaced relation upon a flexible, elongated rope or cable 4, of suitable material such as nylon, sisal, hemp or any other kind of rope, which may or may not be reinforced by metal as desired.

One or more radially displaced, longitudinal bores 5, parallel to and in close proximity to axial bore 3 are also preformed in each block to receive a Primacord 6 to insure a continuously progressing detonating chain for each successive explosive block, in the event the spaced relation between adjacent blocks is too great to transmit detonation.

The Primacord 6 is preferably looped between adjacent blocks, as at 7 to aid in providing a flexible cable and to prevent strain and breakage of the Primacord when the line charge is under tension. If desired, a helical reinforcing wire 8 as shown in FIGURE 4 may be provided coextensive with loop 7 on the Primacord to insure retention of the loop.

In the species illustrated in FIGURE 4, instead of longitudinal bores 3 and 5, each end of each block 1 is provided with preformed central cavities 3' of the same diameter as bores 3, and preformed radially displaced cavities 5', equal in diameter to bores 5. Cavities 3' are provided to receive the ends of shorter pieces of flexible rope 4, which are rigidly secured to the blocks in any convenient manner. In like manner cavities 5' are provided to receive looped sections 7 of Primacord 6 which again are secured to the blocks 1 to provide a rigid connection, but in a manner to insure sufficient contact between each Primacord end and its respective block. A suggested, though not necessarily preferred or limiting method for insuring rigid connections between blocks 1, rope 4 and Primacord 6, is to provide cavities 3' and 5' respectively with press fitted internally threaded plastic sleeves or sockets 9, 9' and the ends of nylon rope 4 and Primacord 6, with externally threaded sleeves 4' and 6' respectively. In this manner the preformed blocks 1, ends of rope 4, and looped ends of Primacord 6 may be boxed and shipped separately and assembled prior to use. With this modification the length of each line charge may be limited to depend on its particular use. Additionally the savings are greater due to the need to provide much shorter lengths of expensive nylon rope 4, and Primacord 6 for each respective detonator cable length.

In making the explosive block forming a part of this invention, the explosive may either be extruded or pressed with a binder, or molded with a thermosetting plastic, proper means also being included to preform the flexible rope and Primacord bores or cavities, and the rounded block end. Examples of the type of explosive utilized to form the blocks are the well known explosives commonly designated as RDX, PETN, or compositions containing a proper mixture of both. Any suitable binder such as a resin or wax may be used, which will combine with the explosive to form a rigid mass. Any suitable thermosetting plastic with a proper accelerator which does not react with the explosive may also be used to preform the block. It is proposed to make each explosive block of a length such that the assembled device may be conveniently folded into a shipping or dispensing pallet, with the finished article containing from 2 to 8 pounds of explosive per linear foot of cable.

It can readily be seen, therefore, that the above description discloses a flexible detonating cable or line charge, which is made of explosive blocks that are rigid and may

3

be stored, shipped, and handled with ease and facility, and without the need for the usually provided expensive inner envelope and outer sleeves. The cable is flexible and can be quickly laid out in any desired length or pattern by a minimum of personnel. It can be fired or set off by a trip wire, step on attachments, or by remote control by an operator. It can be buried, laid on the ground, hung in trees or on poles, along road sides, in mine fields, planted on beaches, or hedgerows and in any pattern depending on its intended use. For anti-personnel work the weapon may be made more effective by encircling each explosive block with fracturable metal rings.

Thus a simple, flexible, compact, reliable, inexpensive and easily handled detonating cable has been described. Other modifications and alterations to the structure disclosed will be apparent to one skilled in the art, and it is obvious that the same may be made without departing from the spirit and scope of the invention defined in the following claims.

I claim:

In a projectile line charge, a plurality of generally cylindrical solid charges of explosive, each said charge having a planar face at one end and being rounded at the other end and having a first axial bore and a second bore of smaller diameter than said first bore and arranged in parallel contiguous relation therewith, said first and second bores opening through the ends of the respective charges, a continuous length of flexible tow rope extending through all of said first bores, said charges being secured to and along said rope in equally spaced relation

4

and with said rounded ends arranged to face in the direction of travel of said line charge to prevent fouling, and a continuous length of Primacord extending through all of said second bores in succession and lying in snug relation along said rope in each said charge and forming a single loop between each said charge, said loop having a diameter less than the distance between said tow rope and the outer circumference of a said charge, said Primacord extending at least the length of said line charge from one end thereof through the charge remote from said one end.

References Cited in the file of this patent

UNITED STATES PATENTS

224,024	Mason	Feb. 3, 1880
1,140,980	Haynes	May 25, 1915
2,433,875	Walker et al.	Jan. 6, 1948
2,455,354	Bisch	Dec. 7, 1948
2,586,541	Horn et al.	Feb. 19, 1952
2,675,882	Bazzoni et al.	Apr. 20, 1954
2,697,399	McAdams	Dec. 21, 1954
2,721,617	Piety	Oct. 25, 1955
2,750,884	Gaines	June 19, 1956
2,775,200	Guenter	Dec. 25, 1956

FOREIGN PATENTS

5,883	Great Britain	of 1887
20,110	Great Britain	of 1911
76,705	Austria	June 10, 1919
493,862	Canada	June 23, 1953