Nov. 16, 1948. L. K. LILJEGREN ET AL 2,453,715

GRENADE MINE

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Fig. 1.

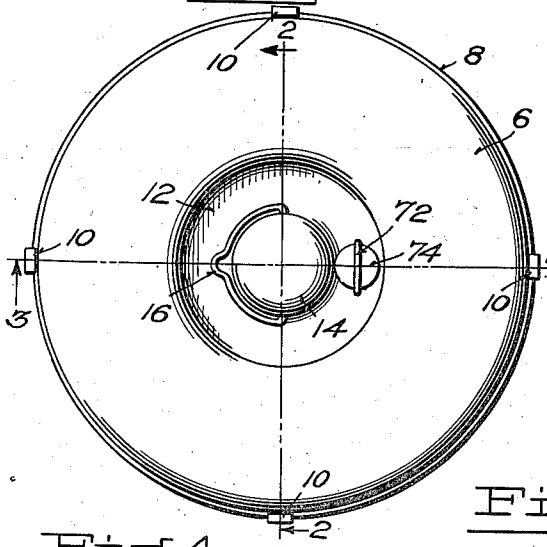


Fig. 6.

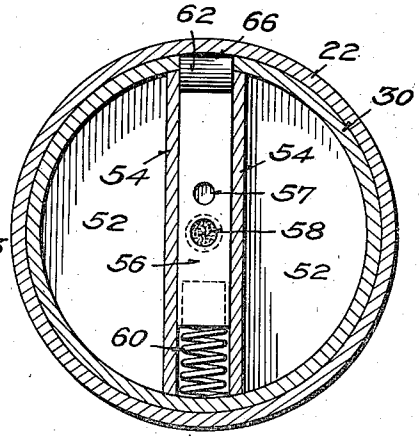


Fig. 4.

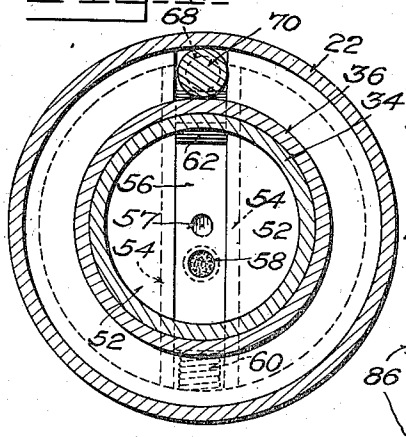


Fig. 7.

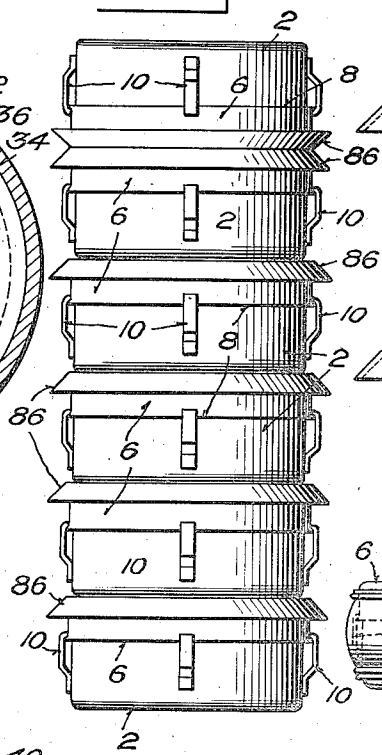


Fig. 8.

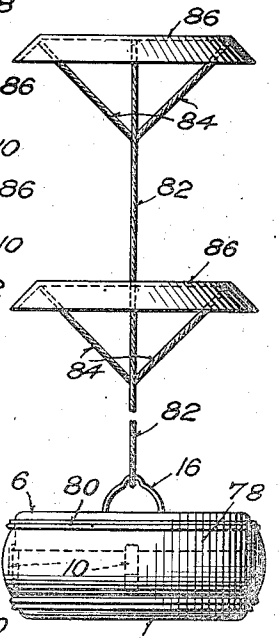
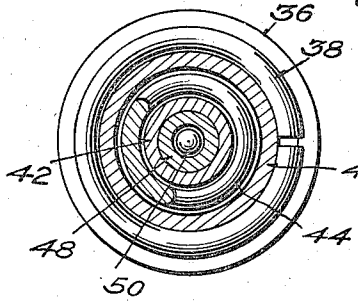


Fig. 5.



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GRENADE MINE

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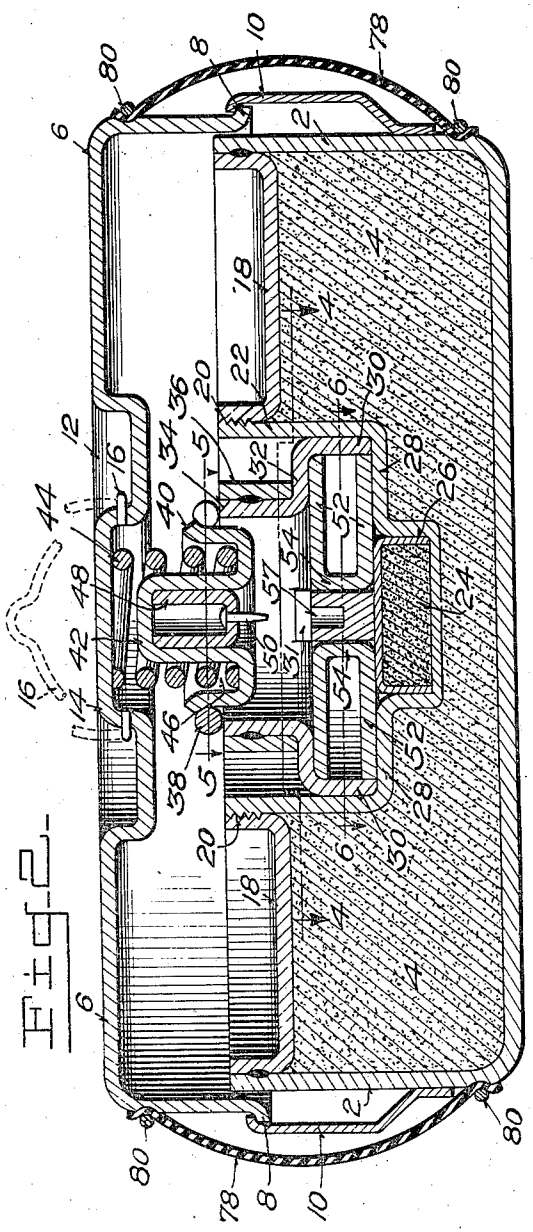


Fig. 2.

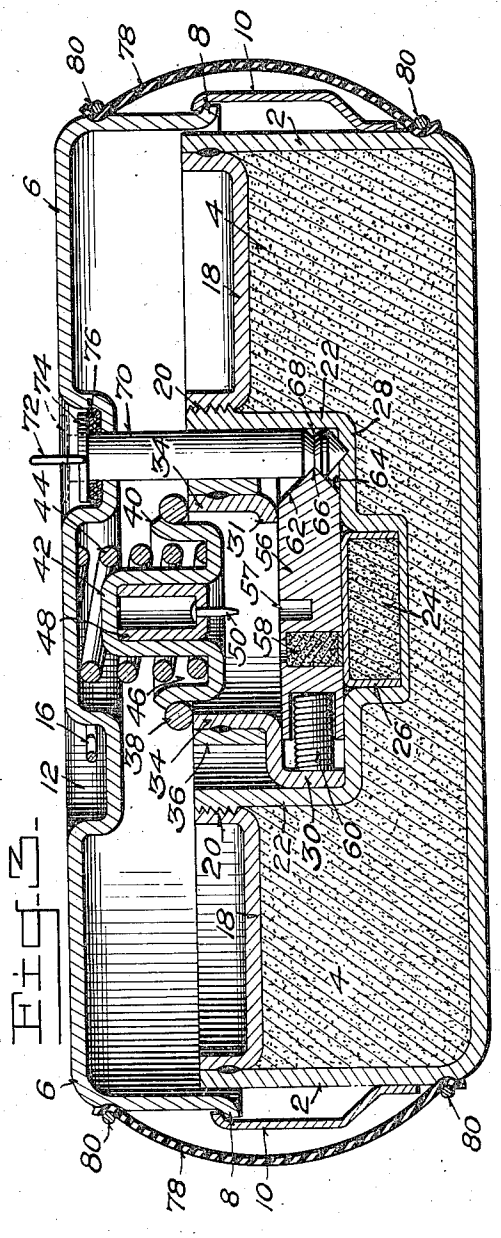


Fig. 3.

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2,453,715

GRENADE MINE

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Application August 28, 1944, Serial No. 551,590

7 Claims. (Cl. 102—8)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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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.

Our invention relates to improvements in grenade mines and more particularly to that type of mine known as "land mines," in which the mine is adapted to function when a heavy object, such as a tank or the like, is placed on top of the mine, and its principal object is to provide a mine of this character adapted to be "laid" or "sown" by launching or dropping from an airplane.

A further object of our invention is to provide a device of this character which may be locked in unarmed position and which may be launched from an airplane or the like in unarmed position and which will move to armed position after being launched.

A still further object of our invention is to provide a device of this character to which an individual parachute or two or more parachutes may be attached to insure that the mine lands right side up, and to lessen the force of impact upon striking the ground.

A still further object of our invention is to provide a device of this character which may be hastily "sown" or "laid" in large quantities, whereby tank or other armored attacks may be broken up or stopped.

A still further object of our invention is to provide a device of this character in which the mines may be launched or dropped in "clusters", and which may be launched or dropped in "safe" or unarmed position, if desired, in the event, for instance, it is deemed necessary to jettison the load of the airplane over neutral or friendly territory.

A still further object of our invention is to provide a device of this character which may be economically manufactured in quantities as by stampings; which may be quickly and readily assembled; which may be positively locked in unarmed position, thereby insuring safety in handling the mine; and in which the functioning of the mine is assured when a heavy object is placed upon or the necessary force applied to the top of the mine.

With these and other objects in view, as will hereinafter more fully appear, and which will be more particularly pointed out in the appended claims, reference is now made to the accompanying drawings forming a part of this application, in which:

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Figure 1 is a top plan view, illustrating our improved grenade mine;

Figure 2 is a vertical, sectional view, taken on the line 2—2 of Fig. 1;

Figure 3 is a view similar to Fig. 2, taken on the line 3—3 of Fig. 1;

Figure 4 is a horizontal, sectional view taken on the line 4—4 of Fig. 2;

Figure 5 is also a horizontal, sectional view taken on the line 5—5 of Fig. 2;

Figure 6 is still another horizontal, sectional view, taken on the line 6—6 of Fig. 2;

Figure 7 is a side elevation view, illustrating a plurality of the mines stacked or arranged in "cluster" formation with parachutes attached, ready for launching or dropping from an airplane; and

Figure 8 is a side elevation view, illustrating a single mine in flight with parachute attached and in extended position.

Referring now to the drawings in which similar reference characters represent similar parts, our invention comprises a hollow annular body 2, adapted to be filled with a suitable explosive 4. The body is provided with a cover 6, having a peripheral flange 8, and retained in extended position by means of a plurality of identical spring clamps 10, one end of which is secured to the body 2 by any conventional means, such as welding, by bolts, etc. Cover 6 is provided with an annular recess 12 on the outside surface thereof, and a circular center portion 14, the periphery of which forms the inside wall of recess 12. A suitable bail 16 is secured to portion 14 and adapted to pivotally move into and out of recess 12. Secured inside the body by welding is an annular intermediate cover 18, provided with a circular opening, threaded as at 20 to engage corresponding threads on the outer surface of container 22, a circular cup-shaped container adapted to receive the primer and detonator mechanism hereinafter referred to. Container 22 is provided with a central circular recess in the bottom thereof, adapted to receive a suitable booster charge 24, sealed in the recess by inverted cup-shaped liner 26. Container 22 is provided with an annular shoulder 28, on which rests the bottom rim of circular, hollow support member 30, which support member has a shoulder 32, and reduced portion 34, around which is positioned an annular collar 36, secured thereto by welding. An opening is provided in one side of support 30, that portion adjacent the top of the opening being crimped inwardly as at 31, adapted to slidably receive detonator carrier 56,

and to permit ingress and egress of said carrier through the support. Resting upon the rim of reduced portion 34 is a split ring 38, maintained in position by the flared rim 40 of annular striker support 42, which support is pressed downwardly by force stored in coil spring 44, compressed between the recess formed by portion 14 of top 6, and annular recess 46 formed between support 42 and the flared rim 40. The striker member, positioned in the support 42, comprises a cup-shaped member 48 welded to the support, and integrally formed with firing pin 50. Supported by the shoulder 28 of container 22, and positioned within the support 30, are oppositely disposed identical, semicircular channel members 52, the oppositely disposed base portions of which 54 form the wall of a passageway for detonator carrier 56, carrying a suitable detonating charge 58. One end of the detonator carrier is provided with a circular recess, in which one end of coil detonator spring 60 is positioned, the other end of said spring abutting the inner surface of support 30, and being compressed therebetween, while the other end of detonator carrier is provided with oppositely inclined cam faces 62 and 64 which intersect to form wedge 66, adapted to engage in annular notch-shaped recess 68 of safety pin 70. Detonator carrier 56 is provided with a circular recess 57, adapted to receive firing pin 50 in the event the striker member and firing pin are forced downwardly when in the unarmed position. Safety pin 70 is provided with a bail 72, pivotally connected to base 74 of the pin 70, which base forms an annular shoulder on said pin. Pin 70 is positioned between the inner surface of container 22 and the outer surface of collar 36, through a circular opening in the base of recess 12 of top 6. Positioned about the pin 70 and compressed between the base 74 thereof and the base of recess 12, is a coil spring 76, which spring will force pin 70 upward when the wedge 66 becomes disengaged from recess 68. This disengagement may be effected by manual force applied to bail 72.

An annular, waterproof cover 78 is provided around the circumference of the mine maintained in position in annular recesses in the top and body portions by identical wires 80 or the like.

Secured to bail 16 is one end of a tie member 82, such as a rope or the like, to which is secured by one of their ends, a plurality of identical shrouds 84, the other ends of which are secured to a disk 86, near the outer edge thereof, forming a parachute. It will be understood that while we have shown two such parachutes, only one can be used, or more than two if deemed advisable. When the mines are stacked in "cluster" formation the tie member 82 and shrouds 84 may be coiled in recess 12 of the mine top and/or between the identical disks 86.

In operation, the mines to be used are stacked in a plane in "clusters," as shown in Fig. 7, the safety pin 70 first being pulled to the dotted position shown in Fig. 3. The weight of the mine on top of each succeeding mine from the bottom prevents the safety pin from being ejected, but holds the top end of the pin flush with the mine cover, from which position the pin will be ejected when the weight is released. It will be noted, from Fig. 7 that the mine on top of the stack or cluster is turned bottom side up, which prevents the ejection of the safety pin from that particular mine, as well as from the mine directly underneath. The group of mines are placed thus in the cluster mechanism of the plane, and dropped as desired. Upon dropping the cluster, the mines become separated, the safety pin 70 is removed under action of the safety pin spring 76, the tie member 82 and shrouds 84 are extended by air resistance against the disks 86 and the mines fall to the ground in armed position. While we have illustrated the disks 86 as having downwardly turned edges, they may be flat if desired.

If it is desired to drop the cluster of mines "safe," this may be done by dropping the cluster as one unit, whereby the safety pins are not ejected, but hold the detonator out of line with the firing pin, or the safety pin may be retained in the unarmed position, the position shown in full lines in Fig. 3, in which case the mine cannot function until the safety pin is manually released.

In operation, the safety pin having been released and ejected from the mine, the detonator is forced to move, under action of detonator spring 60, to the armed position, wherein the detonator rests directly underneath the firing pin. When a heavy object is placed on top of the mine, such as a tank for instance, this weight forces the cover downward, at the same time storing force in the coil spring 44. The top coming into contact with striker support 42 forces same downward, carrying the striker member 48 and firing pin 50. The load continues to force the striker support 42 past the strong split ring 38, and the coil spring 44 forces the striker support 42, the striker member 48 and the firing pin 50 downward until firing pin 50 is forced into the detonator, which initiates the explosion.

While we have illustrated and described the invention in some detail, it is to be understood that the invention is not to be limited to such details, but only by the spirit of the invention and the scope of the appended claims.

We claim:

1. A fuse having a movable striker member, a compression spring for actuating said striker member, a depressible member for compressing said spring, an expansible member normally supporting said striker member against movement and means for expanding said expansible member to inoperative position when said spring has been operatively compressed.

2. A fuze having a movable striker member, an annular support for said striker member, said annular support having an upwardly flared periphery, a compression spring for actuating said striker member and said annular support, a depressible member for compressing said spring, a split ring normally supporting said striker member and said annular support, and means for expanding said split ring to permit passage of said striker member and said annular support, whereby the detonating of an explosive charge may be effected.

3. In a fuze, a body, a detonator carrier slidably positioned in said body, a detonator and an adjacent recess in said detonator carrier, a movable striker member adjacent said recess when in unarmed position, a compression spring for actuating said striker member, a depressible member for compressing said spring, an expansible member normally supporting said striker member against movement, means for expanding said expansible member to inoperative position when said spring has been operatively compressed, and spring means for moving said detonator carrier from unarmed to armed position.

4. A mine comprising a movable detonator carrier, a spring urging said carrier to armed posi-

tion, a bolt comprising cam locking means for said carrier, yieldable against the resilience of the spring for withdrawal from the mine, and spring means for ejection of the locking means, said locking means having a portion for continued blocking of the carrier short of deenergization of the spring means.

5. A mine comprising a movable detonator carrier, a spring urging said carrier to armed position, a locking bolt for said carrier having cam means compressing the spring on manual withdrawal of the bolt and successive cam means assisting withdrawal of the bolt, and spring means urging the bolt to withdrawal, said successive cam means constituting a block for the carrier upon interruption of withdrawal thereof.

6. The device of claim 5 wherein the first cam means comprises a wedge on the carrier and a complementary wedge groove in the bolt and the second cam means comprises a conical end on the bolt.

7. The invention of claim 6 wherein said bolt has a head lying in a depression in the mine and said spring means engages between said head and the bottom of the depression.

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