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[54] ROCKET LAUNCHER

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[51] Int. Cl. ² **F41F 3/04**

[58] Field of Search. **89/1.814, 1.816, 1.815, 89/28, 135; 102/70, 84, 8, 16**

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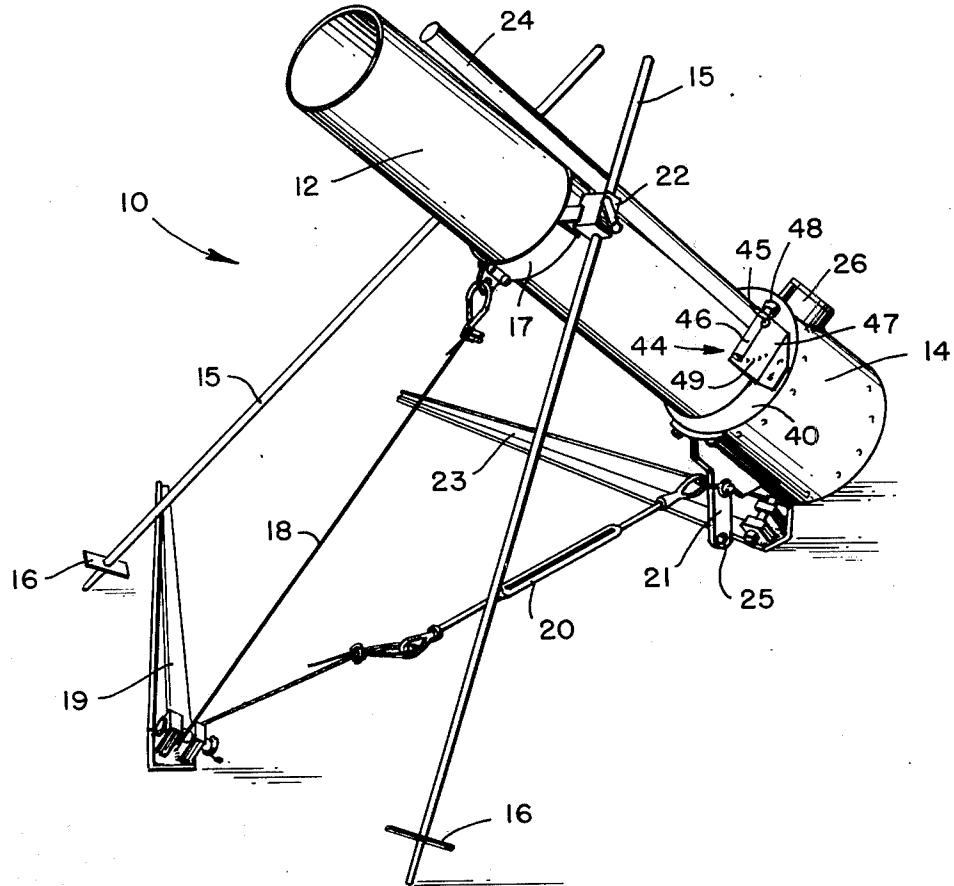
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[57] ABSTRACT

An easily portable rocket launcher is provided with remote firing capability, an antidisturbance mechanism, a time delay mechanism for delayed firing and a second time delay means for operation of a self-destruction device. The launcher includes one or more tubes of fiberglass or the like bonded together with epoxy cement, for example, and supported on three legs. The two forward legs are adjustable to facilitate aiming of the launcher.

7 Claims, 5 Drawing Figures



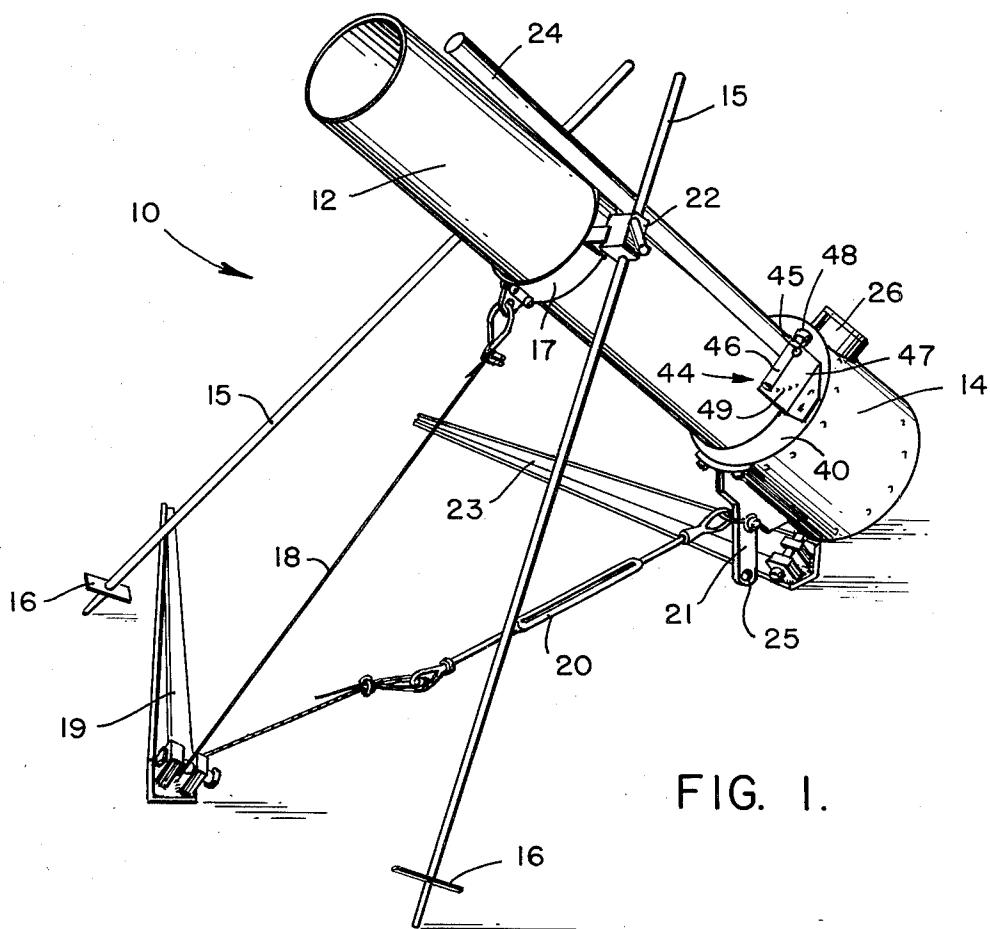
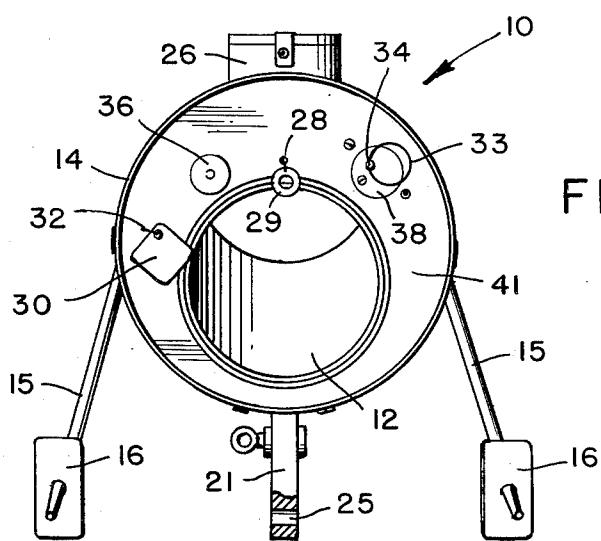


FIG. 2.



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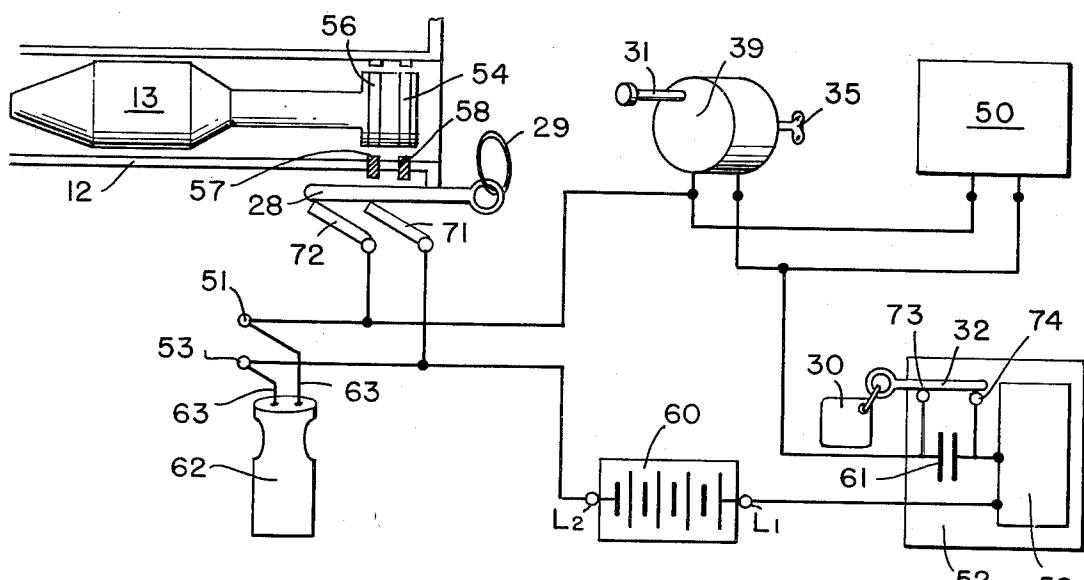


FIG. 3.

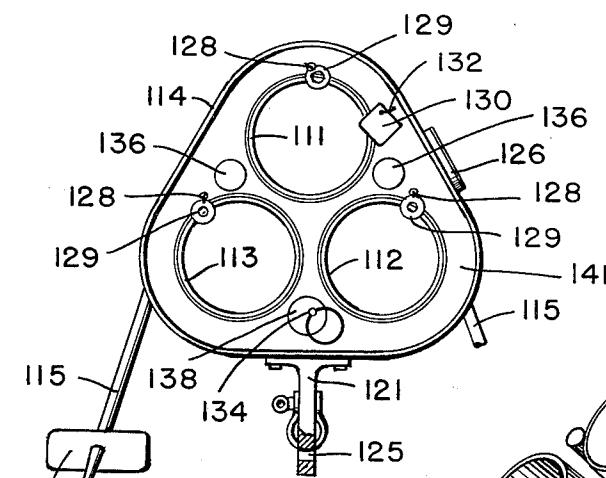
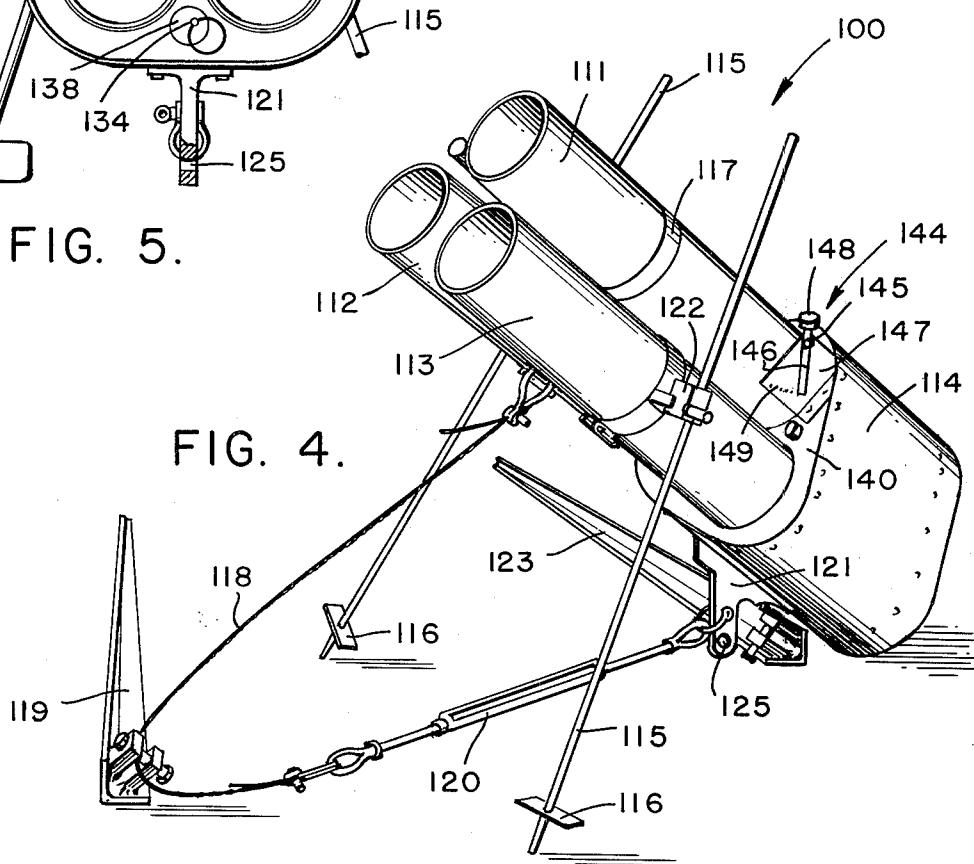


FIG. 5.

FIG. 4.



ROCKET LAUNCHER

BACKGROUND OF THE INVENTION

Weapons of the rocket launching type have been heretofore constructed of heavy metal and, thus, have been difficult to transport and as a result were quickly compromised when troops suddenly withdrew from the position leaving the weapons on the field. These weapons were usually not provided with anticompromise devices because of the difficulty of destroying a weapon made of such heavy material and, further, an anticompromise device sufficient to destroy such a weapon would be a serious burden and hazard to troops utilizing the weapon.

SUMMARY OF THE INVENTION

By this invention we have provided an extremely lightweight portable rocket launcher having many features not found on previous launchers and including a lightweight safe self-destruct type anticompromise device. The launcher is constructed of lightweight materials and incorporates timing mechanisms which allow it to be armed in the field, fired, and/or destroyed automatically after a predetermined time. The launcher is also provided with remote firing capability and an anti-disturbance device which causes the launcher to destroy itself if it is disturbed at any time after arming. However, the launcher system and especially the destruct devices according to the invention incorporate safety features which protect the operator from accidental firing before the system is in readiness.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 is a perspective view of a single tube embodiment of the invention;

FIG. 2 is a rear plan view of the device of FIG. 1;

FIG. 3 is a block diagram of the system;

FIG. 4 is a perspective view of a three tube embodiment of the invention; and

FIG. 5 is a rear plan view of the rocket launcher according to FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

As shown in FIG. 1 the launcher 10 comprises a launcher tube 12 protruding from bulkhead 40 of housing 14 and supported by two forward legs 15 attached to the tube 12 by adjustable means 22 and a third leg 21 attached to the housing 14. Legs 15 have cross pieces 16 near their ground engaging ends to prevent the legs from entering the ground to an undesirable depth when the ground is soft. Also protruding from housing 14 is a destruct tube 24 which may be filled with explosive material to destroy the launcher under conditions which will be later described. Because of its light weight it may be found desirable to fasten the launcher to the ground by ground stakes 19, 23. Ground stake 19, for example, may be attached to the tube 12 at ring 17 by a cable 18 and also to leg 21 by adjustable cable assembly 20. Ground stake 23 may be bolted to leg 21 by passing the bolt provided through hole 25.

CONSTRUCTION

The launcher tube 12 and the self-destruct tube are made of fiberglass or the like. The housing 14 is closed at each end by bulkheads 40 and 41, respectively, and

the skin of the housing is manufactured of a lightweight material, for example, such as aluminum. The bulkheads are preferably of Micarta or the like. As may be seen from FIG. 1 the rocket may be adjusted in elevation by means of the adjustment 22 holding legs 15 to the tube 12. The legs 15 are preferably of stainless steel rod with flanges 16 of sheet metal. Aiming of the launcher is aided by two leveling devices one of which is shown at 44 in FIG. 1. In use, it is contemplated that the launcher be transported fully loaded but with the clockwork mechanism and battery removed. Waterproof caps are provided for the muzzle, breach and clock openings. The battery compartment is also rendered waterproof when the cover 36 is in place.

A leveling device 44 is provided to facilitate aiming the launcher and, as shown, comprises a leveling tube 46 pivoted at 45 to a bracket 47 fastened to bulkhead 40. The tube 46 may be capped by a simple bubble type leveling device 48 and may be held in place by raised detents 49, for example, on bracket 47.

The housing 14 is surmounted by a clock housing 26 and, as shown in FIG. 2, provides space for a battery compartment closed by a cover 38. Opposite battery housing cover 38 is the cover 36 which closes the destruct tube 24 described above.

Between the two covers is a rocket contact retaining pin 28 identified by an annular tag 29 and to the left of rocket tube 12 is a launcher safety pin 32 identified by a square tag 30.

The cylindrical battery compartment cover 38 is flush with bulkhead 41 when properly emplaced. A pin 34, in cover 38, blocks a trip device, not shown, to allow removal of cover 38. Pin 34 is provided with a pull ring 33 and when pin 34 is extracted, cover 38 can not then be removed.

The rocket tube 12 is schematically depicted in FIG. 3 with a round 13 in place and schematically connected to the battery 60, clock mechanism 39, trembler switch 40 50 and electronic timer means 52. The system may also include an explosive squib 62 which is preferably of the time delay type. The terminals 51, 53 are placed outside the housing 14 near clock case 26 for easy access.

CLOCK MECHANISM

The clock mechanism is a conventional timer switch which may be set for operation delay from 10 minutes to 11½ hours. The clock mechanism is wound with a key which may be removed or simply folded down when the clock is placed in position on the launcher. When the clock is wound, a pin is inserted into the face of the clock and extends into the clock mechanism to block the gearing and prevent the clock from running down. The clock cannot be set or run with this pin in place. The clock is preferably provided with a removable dial indicating the position of the switch operating mechanism and the time period remaining until the clock switch will close. The dial may be attached in any well known manner but is preferably manufactured of a sheet material with a pressure sensitive adhesive backing. A flat web cord is preferably placed under a portion of the dial to facilitate removal when desired. In addition to the other indicia on the clock dial, there may be also instructions in printed form for operation and installation. When desired, the clock and clock receptacle can be so constructed that when the clock is installed it can not be removed.

OPERATION

As noted in FIG. 3 after the pin 31 has been removed from clock 39, pin 28 has been removed from its position holding open and shorting contacts 71, 72, and the main rocket launcher safety pin 32 has been removed to allow the capacitor 61 to be charged, with a battery inserted and the clock in place, battery current is available through either the trembler switch 50 or the clock mechanism delay switch 39 to fire the rocket. The rocket is fired when current is passed through a circuit in the missile between rings 54, 56. Remote firing may be accomplished by connecting any well known remote firing device to the contacts 51, 53, provided on the housing 14. When it is desired that the rocket launcher be destroyed after firing, a delay cap 62 is fastened to contacts 51, 53 by means of its lead wires 63 and, as will be obvious from viewing the circuit of FIG. 3 the delay cap 62 will be actuated at the same instant that rocket contact rings 54, 56 are energized. Because of the inherent delay in delay cap 62, the self-destruct charge will be detonated until after the rocket has cleared the launcher.

THREE TUBE LAUNCHER

Turning now to FIG. 4 we will describe a similar launcher having a plurality of launcher tubes. The launcher shown designated as 100 comprises three launcher tubes 111, 112, and 113. The legs 115 are identical with legs 15 of the single tube launcher and have metal crosspieces 116 fastened to the ground engaging end. The legs 115 are respectively fastened to the outboard tubes 112, 113 and are adjustable through adjustment members 122 fastened to the tubes 112, 113. The three tube launcher also has a leveling device 144 similar to the leveling device 44 of the single tube launcher.

FIG. 5 is a view of the breech end of the three tube embodiment of the rocket launcher wherein there are three rocket contact shorting pins 129, one for each of the three rocket tubes. However, only one main launcher safety pull pin 132 is provided. In the three round launcher there are two destruct tubes one of which is the full length of the launcher tubes and one which is only so long as the housing 114. The rear covers 136, 137 of the destruct tubes may be removed for loading. Between the two lower rocket tubes is the battery compartment 138 and the clock mechanism 134 is installed in the receptacle 126 on the right side of the housing 114 as viewed from the breech end.

This embodiment of the launcher is designed to simultaneously launch three bazooka type rockets and is adapted to be destroyed in the same manner as the single tube launcher by fastening a delayed action blasting cap in the firing circuit. Also, as in the single tube device, firing may be initiated either by the clockwork mechanism and antisturbance trembler switch, or remotely by a blasting machine or the like. Launcher elevation angle is set by means of a leveling device 144 which comprises a leveling tube 146 having a bubble type leveling means 148 and tube 146 is pivoted at 145 to a plate 147 attached to housing 114. The leveling tube 146 is held in place between 0° and 45° by means of detents 149 placed at 5° intervals on plate 147.

The block diagram of the single tube embodiment (FIG. 3) shows schematically the operation of pin 29 holding the contacts 71, 72 away from the launcher

contacts and at the same time serving as a short between the contacts 71, 72. Also shown is the safety pin 32 which shorts the condenser 61 in the electronic timer 52. With the shorting pin 29 and the safety pin 32 removed, however, and a battery 60 is connected to terminals L₁, L₂ of the battery compartment, either the trembler switch 50 or clock switch 38 may actuate the rocket firing mechanism through contact rings 54, 56 after the condenser 61 has been sufficiently charged. The electronic timer 52 is a solidstate delay timing circuit which may be found more fully disclosed in patent application Ser. No. 753,260, filed Aug. 16, 1968. The delay circuitry uses a dual unijunction relaxation oscillator which triggers a silicon-controlled switch. After a 2 minute and 45 second delay time has elapsed the silicon control switch is triggered, which reduces the current drain on the battery. As the unijunction oscillator is turned off, a 300 μfd capacitor is charged up. This part of the circuitry has a 15 second delay time. As soon as this capacitor is charged, the circuit is energized and may be fired either by the trembler switch or the clock.

What is claimed is:

1. A lightweight easily portable rocket launcher comprising:
a lightweight sheet metal housing having two opposing side walls and a peripheral wall; at least one launcher tube protruding slightly through one side wall of said housing and also protruding to a greater degree through the opposite side wall of said housing; contact means associated with each said tube for conduction of electrical energy to a rocket round; a source of electrical energy; timer means electrically connected to each said launcher tube and to said source of electrical energy; said timer means including a settable clockwork switch and an electronic delay timer switch connected in series with said source and said contact means; and removable means for positively blocking operation of said timer means.
2. A rocket launcher according to claim 1 including tube angle indicating means adjustable from 0° to at least 45° to facilitate aiming of the launcher.
3. A rocket launcher according to claim 1 wherein said clockwork switch may be set for delay firing from $\frac{1}{2}$ hour to 11½ hours.
4. A launcher according to claim 1 further comprising explosive means substantially coextensive with said tube for self-destruction of the launcher after use or upon sufficient angular movement of the launcher, when armed.
5. A launcher according to claim 4 further comprising means for remotely firing said launcher and detonating said explosive means.
6. A launcher according to claim 1 further comprising removable means for disabling said contact means.
7. A launcher according to claim 1 further comprising:
means in said housing for receiving said clockwork switch and for receiving said battery; and means for preventing removal of said clock and said battery from said receiving means when such is desired.

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