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J. BROTHERS

3,092,697

ARMING SWITCH

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Fig. 1.

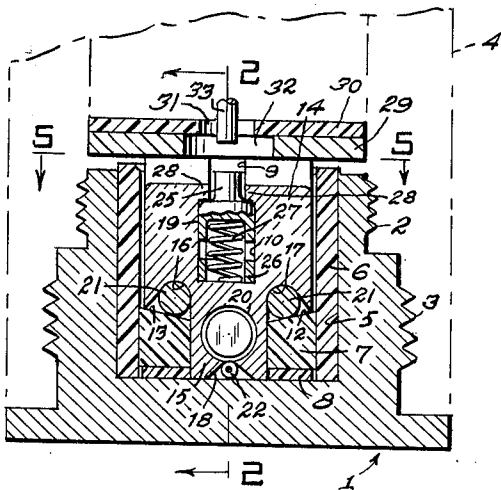


Fig. 2.

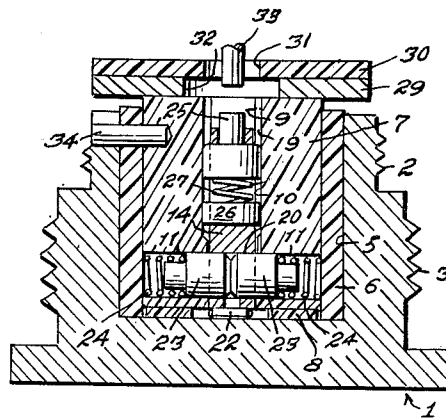


Fig. 3.

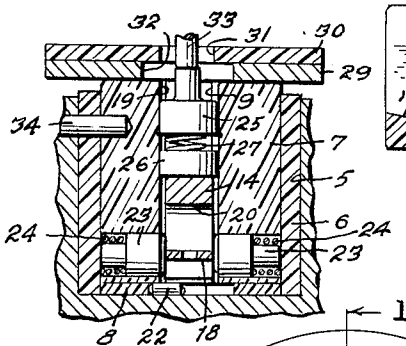


Fig. 4.

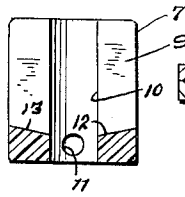


Fig. 5.

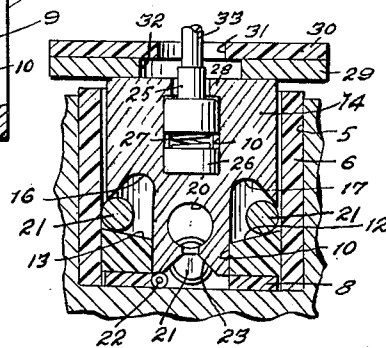


Fig. 6.

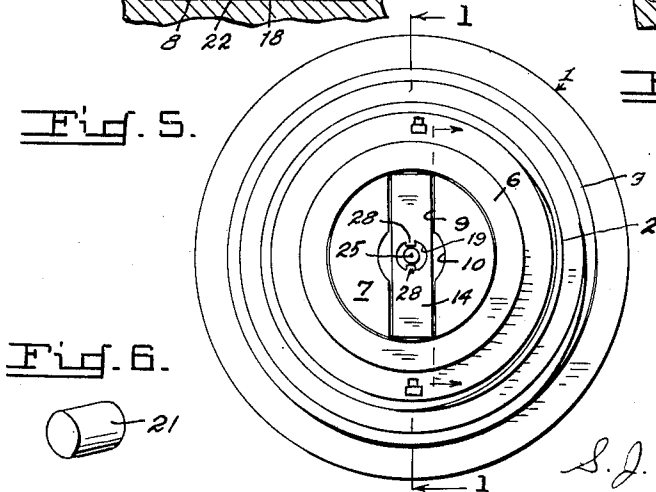
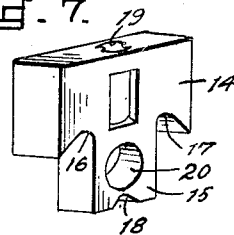


Fig. 7.



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1

3,092,697

ARMING SWITCH

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3 Claims. (Cl. 200—61.53)

(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.

This invention relates to an arming switch, and more particularly to an arming switch for closing an arming circuit or the like in a projectile fuze.

The present invention consists of a contact body with a movable cam slider detented by pins which are released by centrifugal force. Cylinders, moved radially by centrifugal force propel the cam slider towards armed position and a spring loaded electrical contact on the forward end of the cam slider makes contact with a fixed electrical contact to complete an arming circuit in the fuze.

It is a primary object of this invention to provide an arming switch that is operated by centrifugal force due to projectile spin.

It is another object of the invention to provide a switch in which a movable cam slider carrying a spring biased contact is released by a pair of, spring biased detents responsive to centrifugal force to move forward and cause the spring biased contact to abut a fixed contact and complete an arming circuit in a fuze.

It is another object to provide an arming lock to prevent the cam slider from returning to an unarmed position, once released therefrom.

It is still another object to provide an arming switch having axial symmetry in the armed position and possessing advantages over plunger type arming switches that cause a lateral load which is difficult to overcome in graze action.

It is a final object of the invention to provide an arming switch that is compact and simple in operation.

The specific nature of the invention as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

FIG. 1 is a cross sectional view of the arming switch of the invention taken along line 1—1 of FIG. 5, the switch being locked in unarmed position, and a projectile being indicated in broken lines;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary sectional view showing the switch being in unlocked and armed position, the plane of the section being similar to that of FIG. 2;

FIG. 4 is a view similar to FIG. 3 but showing the plane of the section as in FIG. 1;

FIG. 5 is a plan view taken along a plane as indicated by line 5—5 of FIG. 1;

FIG. 6 is a perspective view of one of the rollers;

FIG. 7 is a perspective view of the cam slider; and

FIG. 8 is a sectional view of the contact body taken on line 8—8 of FIG. 5.

Referring to the drawing, reference character 1 indicates a housing generally, which is externally threaded as at 2 and 3 for attachment to the base well of a projectile or the like indicated by broken lines, 4.

Body 1 is provided with a well 5.

An insulating sleeve 6 is fitted in well 5.

A contact body 7 is fitted within sleeve 6 and rests on an insulating washer 8 at the bottom of well 5.

2

Contact body 7 is provided with a rectangular, diametrically disposed slot 9, an axial bore 10 and a transverse bore 11 adjacent its lower end for housing operating elements.

The floor of slot 9 is provided with upwardly inclined surfaces 12 and 13.

A cam slider 14 is slidable in slot 9, and comprises a flat plate having a thickness substantially equal to the width of slot 9 in contact body 7 to allow slider 14 to slide therein.

Slider 14 is provided with a reduced lower portion 15 which is notched at its sides at 16 and 17 and at its bottom as at 18.

An axial bore 19 is provided at the upper portion of slider 14 and also a transverse bore 20 is provided in the reduced portion 15.

Notches 16 and 17 forming camming surfaces receive rollers 21 which ride on inclined camming surfaces 12 and 13.

Notch 18 receives a plastic arming lock 22 which also is cylindrical in shape.

Bore 11 in contact body 7 receives a pair of plunger detents 23 which are biased inwardly by coil springs 24.

Axial bore 19 in slider 14 receives a switch contact 25 and a setback sleeve 26 which are biased in opposite directions by a coil spring 27. Inturned portions 28 at the orifice of bore 10 prevent switch contact 25 and sleeve 26 from displacement from bore 10.

Arranged above and contacting contact body 7 is a contact washer 29.

An insulating washer 30 is mounted on top of washer 29.

Both washers 29 and 30 are provided with central openings 31 and 32 and a fixed contact 33 protrudes through openings 31 and 32 and is aligned with contact 25.

A pin 34 entering fuze body 1, sleeve 6 and contact body 7, prevents movement of the parts during handling, prior to assembly. When the switch is assembled to the fuze, pin 34 is no longer functional.

Fixed contact 33 may be connected to an electric detonator (not shown) in an explosive powder train (also not shown) of the fuze.

The other side of the circuit is connected to the contact washer 29 which may be connected to a power source.

First, safety pin 34 is removed.

When the projectile 4 starts to accelerate, such as when fired from a gun (not shown), setback forces will force all movable parts towards the rear, momentarily holding the cam slider 14 tightly against the fuze body 1 as seen in FIG. 1 and therefore shorting slider 14 to fuze body 1.

When projectile 4 starts to spin due to rifling in the barrel of the gun (not shown), centrifugal force will be applied on all parts of the arming switch.

After set back has decayed to a certain value, centrifugal force will overcome the set back force and plunger detents 23 will separate and permit cam slider 14 to be moved forwardly by rollers 21 which ride outwardly upon inclined surfaces 12 and 13 and the wall of notches 16 and 17.

Contact 25 will be pressed against fixed contact 33 to close the switch and maintain a positive contact.

Arming lock 22 will also move radially from the central position shown in FIGURE 2 under contact body 7 to prevent the return of cam slider 14 and shorting of the switch.

Use of the switch of the invention is not necessarily limited to completing an electrical circuit, but could be altered to be used in a fuze using a stab type detonator.

Contact 25 could be a firing pin used to detonate a primer or other firing element if desired.

Variations and modifications may be effective without departing from the scope of the novel concept of the present invention as set forth in the appended claims.

What is claimed is:

1. An arming switch for a projectile fuze comprising an externally threaded body for attachment to the projectile, there being an axial well in said body; an insulating sleeve fitted within said well; a contact body fitted within said sleeve, there being a diametrical slot in said contact body; a cam slider slidably mounted in said slot; a spring biased switch contact in said slider; a fixed contact disposed on the outer side of said contact body; a first means for normally locking said slider in an unarmed position within said slot, comprising a transverse bore in the inner portion of said contact body, a transverse bore in the inner portion of said slider and a pair of inwardly biased detents slidably mounted in said transverse bore in said contact body and normally entering said transverse bore in said slider when said slider is in an unarmed position in said slot, said detents separating outwardly upon projectile spin to leave said transverse bore in said slider and free said slider for outward movement in said slot; a second means in said contact body for moving said slider outwardly in said slot to press said switch contact in said slider into contact with said fixed switch contact and a third means for preventing the return of said cam slider to its unarmed position in said slot.

2. An arming switch for a projectile fuze comprising an externally threaded body for attachment to the projectile, there being an axial well in said body; an insulating sleeve fitted within said well; a contact body fitted within said sleeve, there being a diametrical slot in said contact body; a cam slider slidably mounted in said slot; a spring biased switch contact in said slider; a fixed contact disposed on the outer side of said contact body; a first means for normally locking said slider in an unarmed position within said slot; a second means in said contact body for moving said slider outwardly in said

slot to press said switch contact in said slider into contact with said fixed switch contact, said second means comprising a reduced inward portion on said slider; a pair of diametrically disposed notches formed by the intersection between the reduced inner and outer portion of said slider, there being a pair of diametrically opposed, outwardly inclined cam surfaces formed on the floor of said slot in said slider and a pair of rollers in said slot normally retained by said notches and riding on said inclined surfaces, said rollers being arranged, one each in a said notch, said rollers riding outwardly upon projectile spin to move said slider outwardly in said slot; and a third means for preventing said slider from returning to its unarmed position in said slot.

3. An arming switch for a projectile fuze comprising an externally threaded body for attachment to the projectile, there being an axial well in said body; an insulating sleeve fitted within said well; a contact body fitted within said sleeve, there being a diametrical slot in said contact body; a cam slider slidably mounted in said slot; a spring biased switch contact in said slider; a fixed contact disposed on the outer side of said contact body; a first means for normally locking said slider in an unarmed position within said slot; a second means in said contact body for releasing said slider whereby said first means will move said slider outwardly in said slot to press said switch contact in said slider into contact with said fixed switch contact; and a third means for preventing said slider from returning to its unarmed position in said slot comprising a notch having beveled edges in the inner edge of said slider; a roller in said notch and riding on the floor of said well in said body, said roller moving radially upon projectile spin to ride under said slider and prevent its return to the unarmed position in said slot.

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