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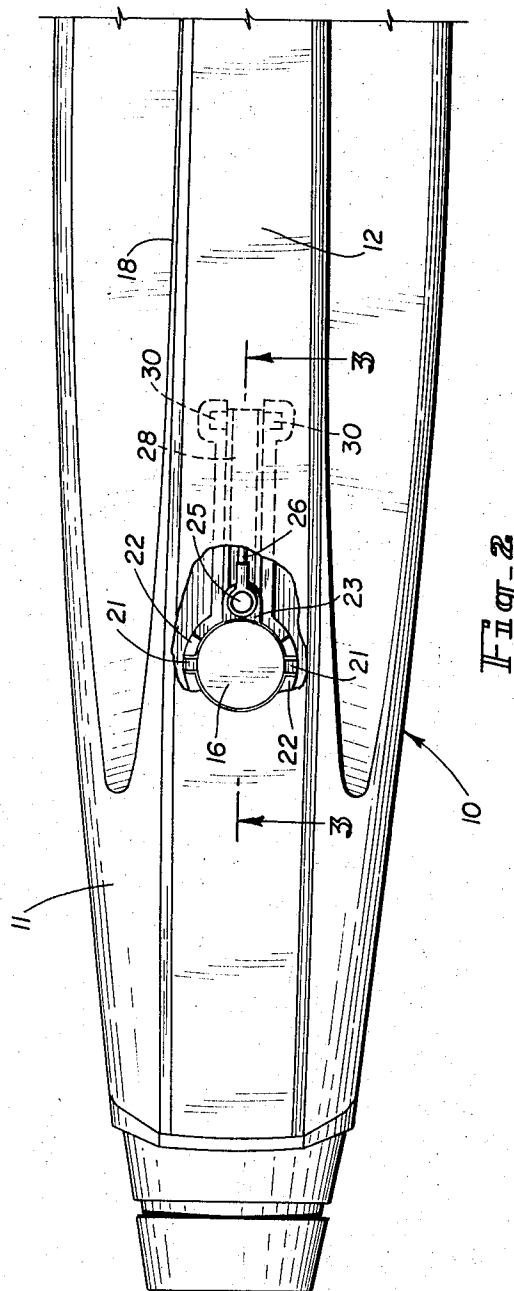
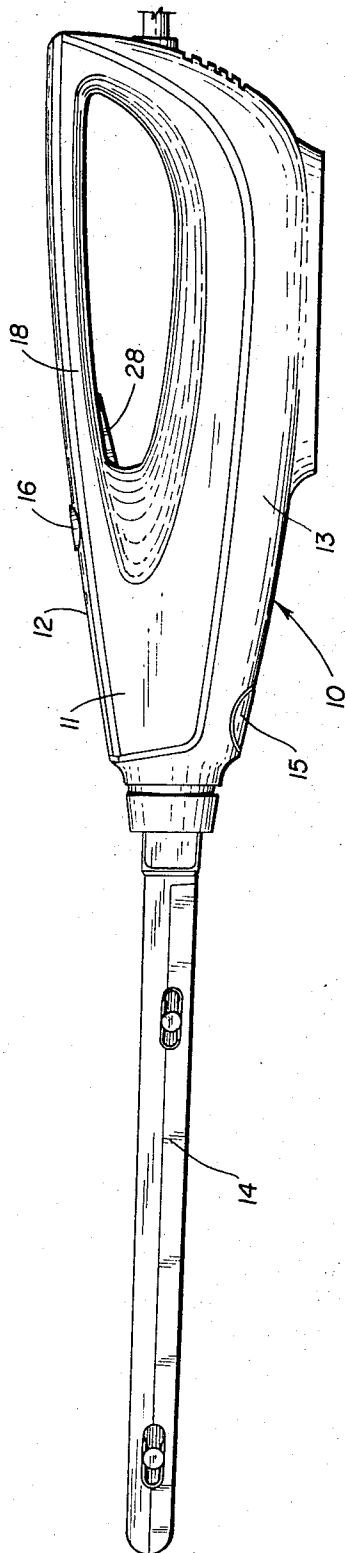
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3,366,764

SWITCH ACTUATING MEANS FOR POWER OPERATED KNIFE AND OTHER TOOLS

Filed July 2, 1965

2 Sheets-Sheet 1



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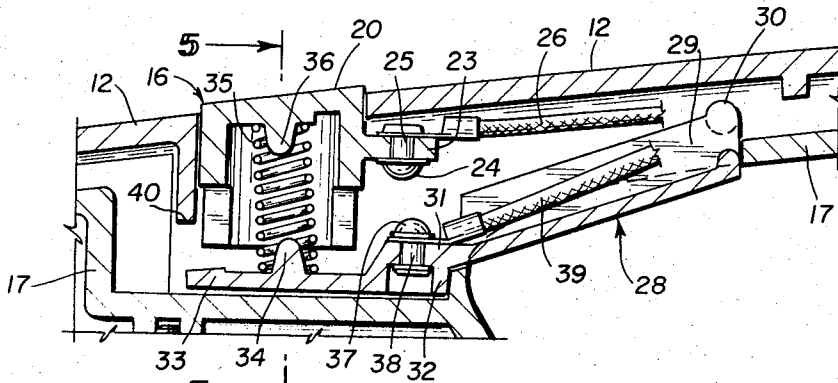


Fig. 3

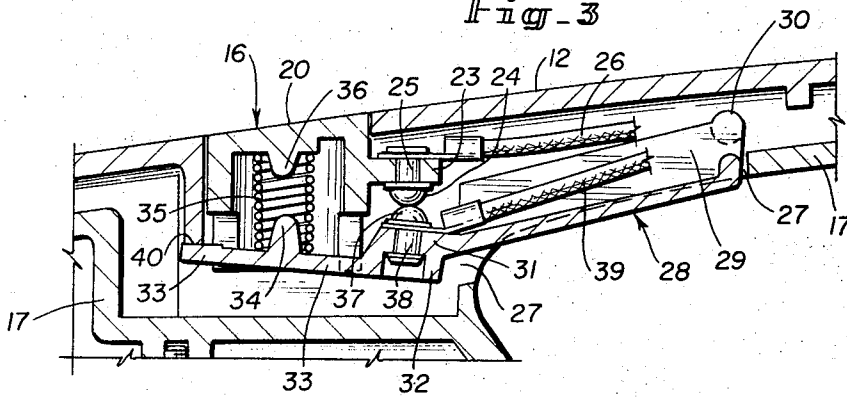


Fig. 4

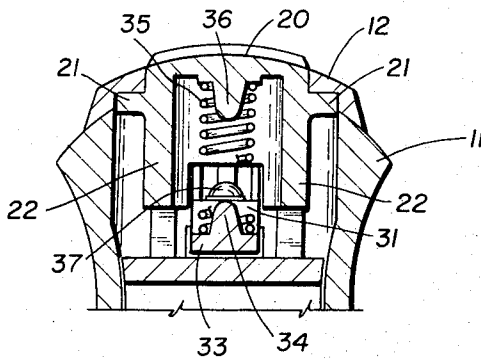


Fig. 5

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1 Claim. (Cl. 200—157)

ABSTRACT OF THE DISCLOSURE

Switch actuating means for a power operated knife and other tools, comprising a housing having mounted therein a pair of independently movable manually operable contact actuating members, a pair of electrical contacts each connected to one of the actuating members and when in contact with each other close an electrical circuit, and means limiting the maximum movement of each contact to a distance less than the distance between the contacts of said pair, whereby simultaneously applied and maintained pressure on the actuating members are required to produce circuit closing engagement of the contacts.

This invention relates to switch actuating means for power operated knives and other motor driven tools.

The main object of the invention is to provide switch actuating means comprising a pair of electrical contacts which cannot be moved accidentally or unintentionally into circuit closing engagement with each other. This object is achieved by providing a pair of contacts each of which is movable toward the other, and each of which must be moved a predetermined distance by independent means before circuit closing contact is established.

In constructions where one contact is mounted for actuation by a depressible button or other means for moving that contact into engagement with a stationary contact, unintentional closing of the circuit may result from accidental pressure on the button or other operating part, resulting in reciprocation of the knife blades and possible injury to the user of the knife.

In our invention, the switch actuating means comprises a pair of movable contacts each mounted for movement independently of the other. In the embodiment shown herein, one of the two contacts is connected to a button depressibly mounted in the knife housing, and the other of the two contacts is connected to a lever pivotally mounted in the housing and accessible through an opening in the housing. The depressible button and the pivoted lever are located relatively to each other for manual actuation by the thumb and a finger of one hand of the user exerting pressure in opposite directions.

The construction and arrangement are such that pressure must be applied in opposite directions to the button and lever in order to move both contacts toward each other and thus close the circuit which energizes the knife motor for transmitting movement to the blades. The application of pressure on the button alone, or on the lever alone, cannot move the contacts into engagement with each other, and therefore accidental or unintentional actuation of the switch is impossible.

The improved switch actuating means are particularly adapted for embodiment in knives and the like where accidental operation of the blades may cause serious injury, but the described construction also may be embodied in other motor operated tools such as drills and the like.

In the drawings:

FIG. 1 is an elevational side view of a power operated

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knife embodying the switch actuating means of our invention.

FIG. 2 is a top plan view of the same on an enlarged scale, with the blades omitted, and part of the top plate broken away to reveal the switch actuating mechanism.

FIG. 3 is a longitudinal vertical sectional view of the switch actuating means, on an enlarged scale, in the plane of the line 3—3 of FIG. 2, showing the switch in open position.

FIG. 4 is a view similar to FIG. 3, showing the switch contacts and mechanism in circuit closing position.

FIG. 5 is a transverse vertical sectional view in the plane of the line 5—5 of FIG. 3.

In that embodiment of the invention shown in the drawings, the knife 10 as a whole comprises an upper housing 11, top plate 12, lower housing 13, and reciprocable blades 14 having tangs mounted in the housings 11, 13. A blade release button is indicated at 15, and switch button at 16.

The switch actuating means is mounted in the knife 10 in a space between a part 17 of the upper housing and the top plate 12 adjacent and slightly forwardly of the handle 18.

The top plate 12 is provided with a round opening adapted to receive the round top portion 20 of the switch button 16. The button 16 is provided with oppositely located ears 21 which project from the side walls 22 of the button beneath the top plate 12 whereby the button is prevented from moving out of the recessed housing 17. A horizontally extending arm 23 projects from one side of the wall 22 of the button 16 in a plane below the top plate 12. The arm 23 serves as mounting means for an electrical contact 24 connected to the arm by a rivet 25. The contact 24 faces downwardly. A lead assembly 26 is connected to the contact 24 by the rivet 25.

The part 17 of the upper housing 11 is provided with an elongated opening beneath the handle 18, in communication with the space between the housing 17 and top plate 12. A lever 28 comprising an exposed arm 29 is pivotally connected by a pin 30 to the housing 11. The arm 29 is U-shaped in cross section and is inclined longitudinally downwardly toward and is integral with a normally horizontal contact support 31 which has a depending leg 32. The support 31 is integral with a normally horizontal arm 33 provided with a spring retaining projection 34. A coiled spring 35 is located in the hollow switch button 16 and bears against the underside of the top 20 of the button 16 and against the upper surface of the arm 33 of the lever 28, surrounding the spring retaining projection 34 of the lever arm and the depending projection 36 on the underside of the button top 20. An electrical contact 37 is connected to the support 31 by rivet 38, and a lead assembly 39 is connected to the contact 37 by the rivet 38.

As shown in FIG. 3, the contacts normally are in open position. When the user of the knife depresses the button 16 and applies upward pressure on the lever arm 29, the contact 24 is moved downwardly and the contact 37 is moved upwardly, as shown in FIG. 4, into engagement and circuit closing position. Depression of the button 16 alone cannot move the contact 24 into engagement with contact 37, and pressure applied to the lever 29 alone cannot move the contact 37 into engagement with the contact 24. Pressure must be applied simultaneously to the parts 16 and 29, in opposite directions, to produce circuit closing contact of the contacts. The spring 35 normally urges the button 16 and arm 33 of lever 28 into the positions shown in FIG. 3.

It will be noted that the contacts 24 and 37, when in the open circuit position of FIG. 3, are spaced, but when the lever 28 is moved about the pivotal point 30, and the

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button 16 is depressed as shown in FIG. 4, the contacts move into facing engagement. Such circuit closing engagement cannot be achieved without the cooperative movement of both contacts by independent actuating means. The movement of the lever 28 is limited by the depending stop 40 engaging the arm 33 before the contact 37 can engage the contact 24 when the button 16 is not depressed. Downward movement of the button is limited by its contact with the lever arm 33.

Changes may be made in details of construction and form of the parts without departing from the invention as defined by the appended claims.

We claim:

1. Switch actuating means for a power operated knife, having a body with a hollow hand-gripped portion, comprising

- (a) an externally accessible actuating member mounted in the top of the portion for an unrestrained free vertical travel for a distance,
- (b) a lever mounted in the portion for an unrestrained free pivotal travel for a distance, a part of the lever being accessible through an opening in the bottom of the hand-gripped portion,

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(c) a pair of electrical contacts, one mounted on the actuating member and the other on the lever, the contacts being normally spaced apart from each other,

(d) means limiting the respective distances of travel of each of said actuating member and lever to less distance than the space normally between the electrical contacts, and

(e) spring means biasing the lever and actuating member away from each other in all positions along their respective travels whereby the contacts engage each other only when and as long as pressure is applied manually to said actuating member and said lever simultaneously.

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