

Aug. 2, 1938.

S. R. DU BRIE

2,125,432

SPRING SWITCH WITH HANDLE

Filed Dec. 2, 1936

2 Sheets-Sheet 1

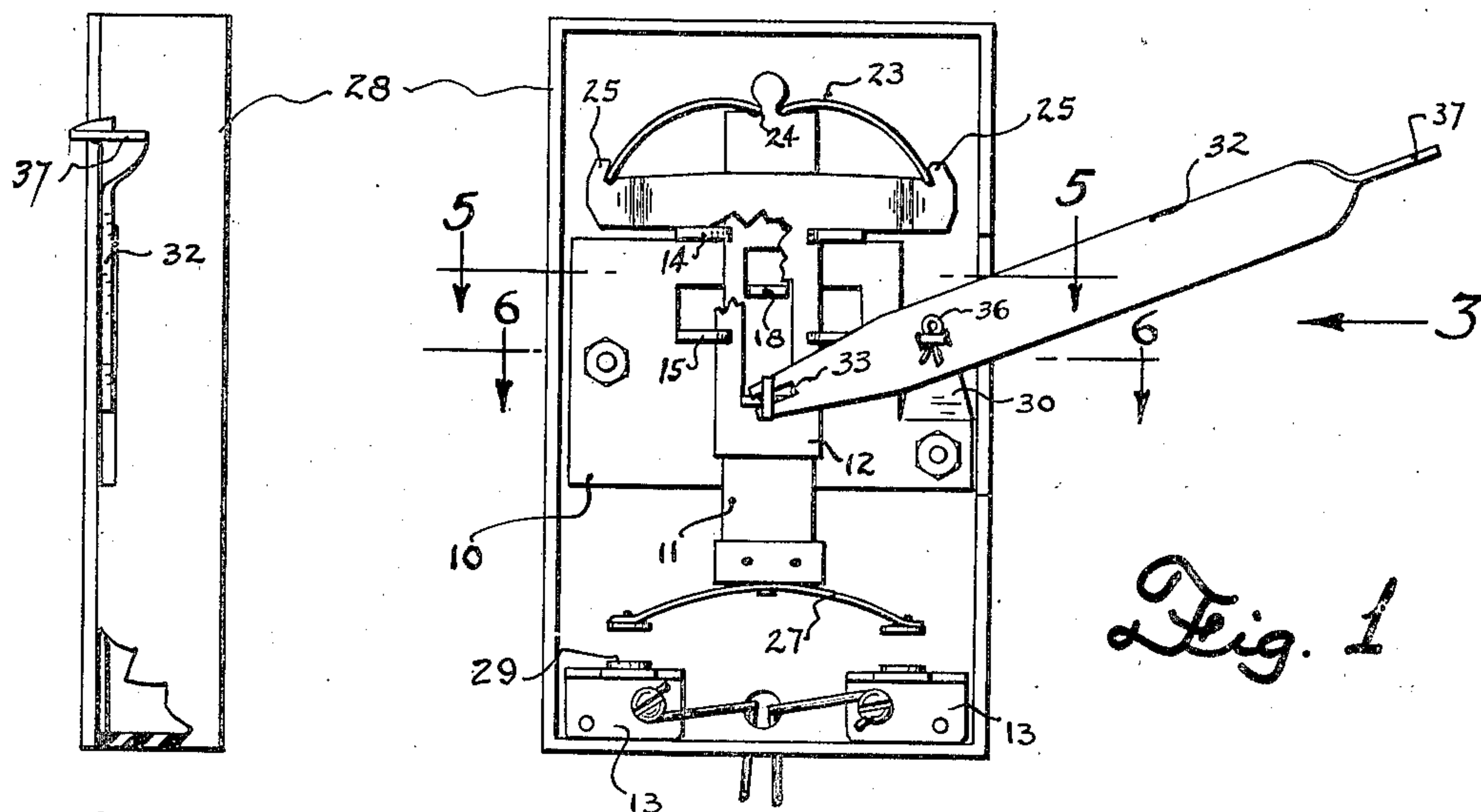


Fig. 1

Fig. 3

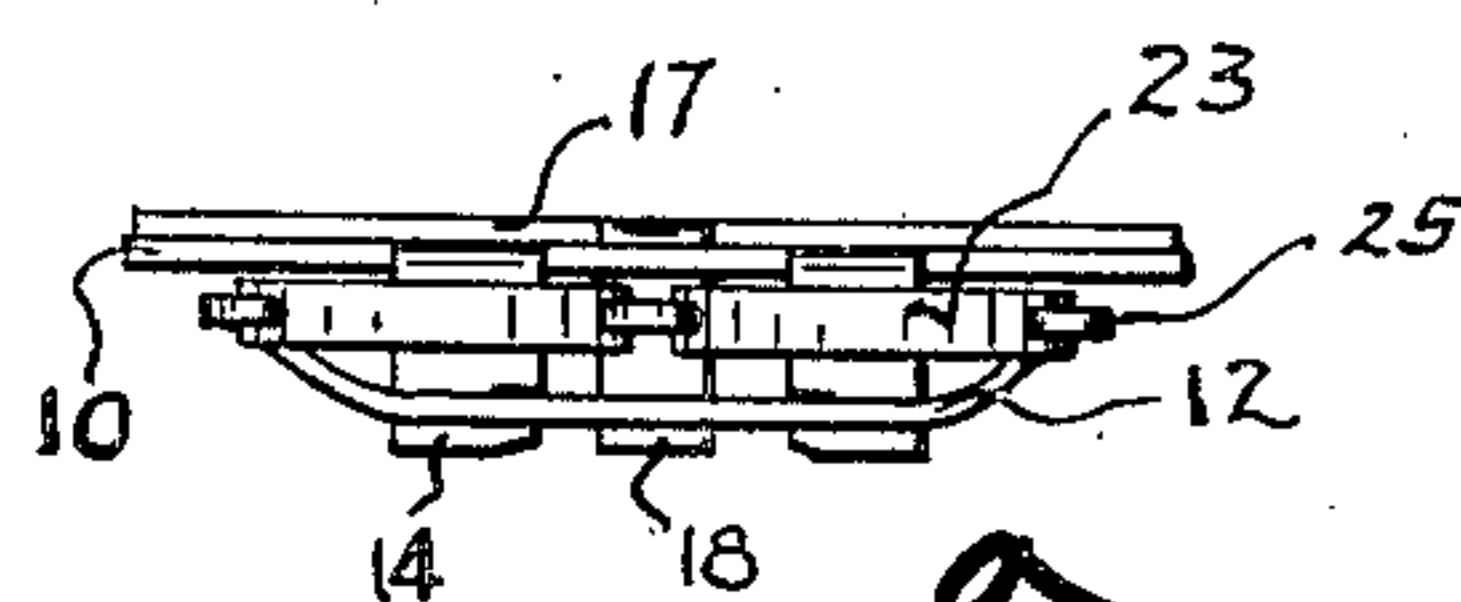


Fig. 4

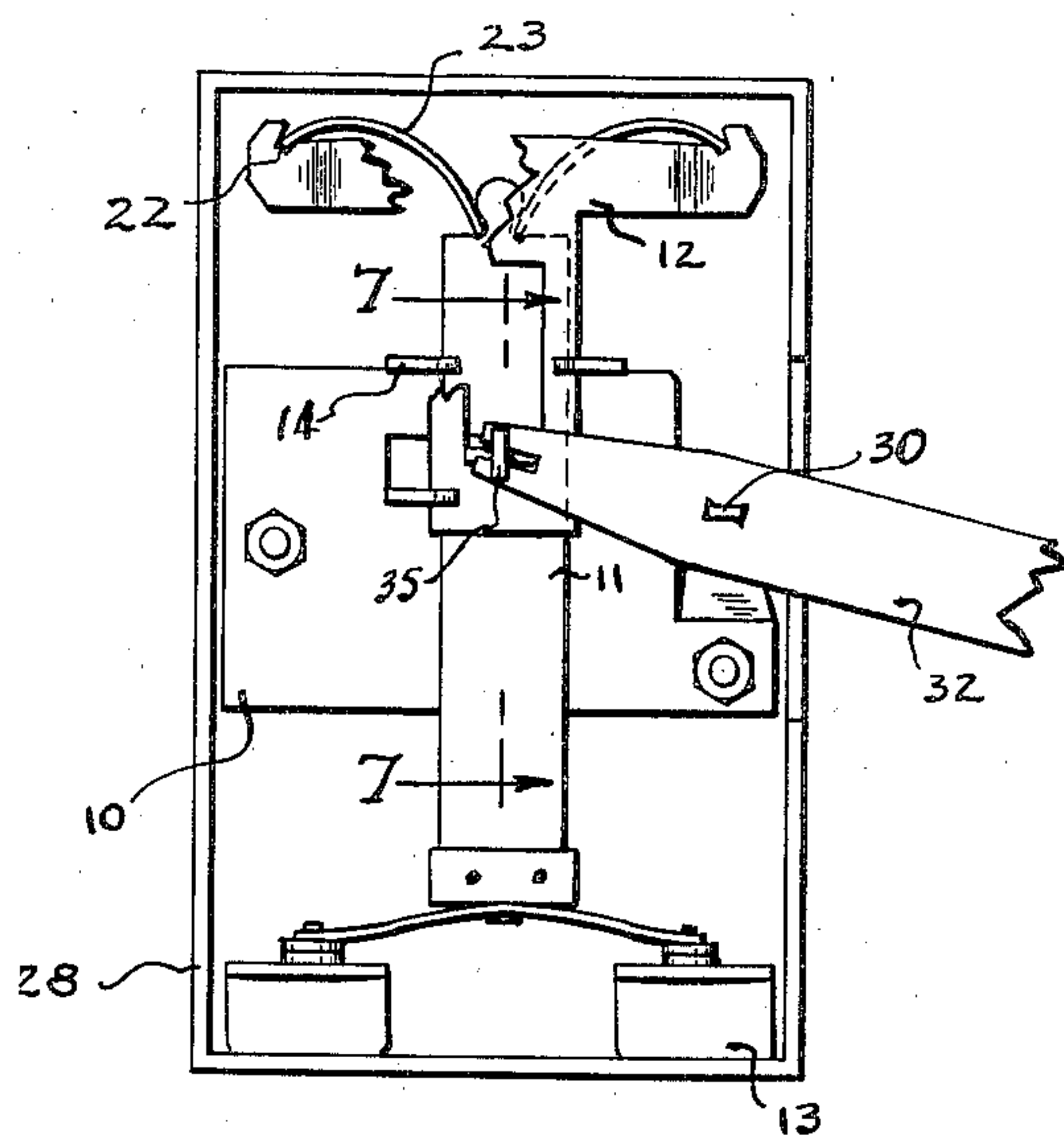


Fig. 2

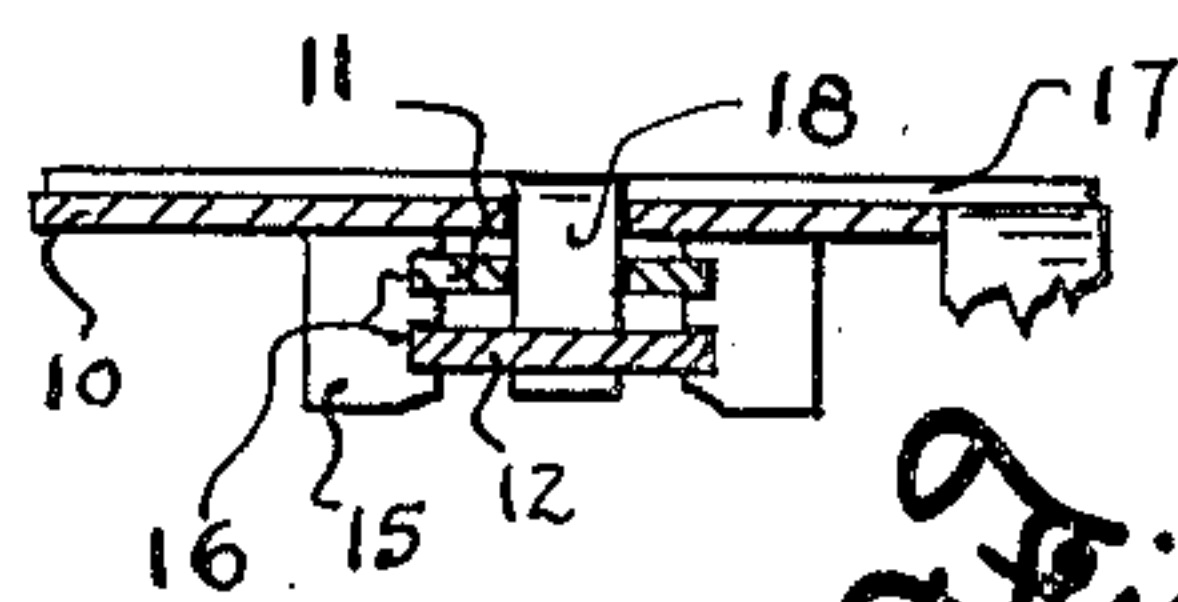


Fig. 5

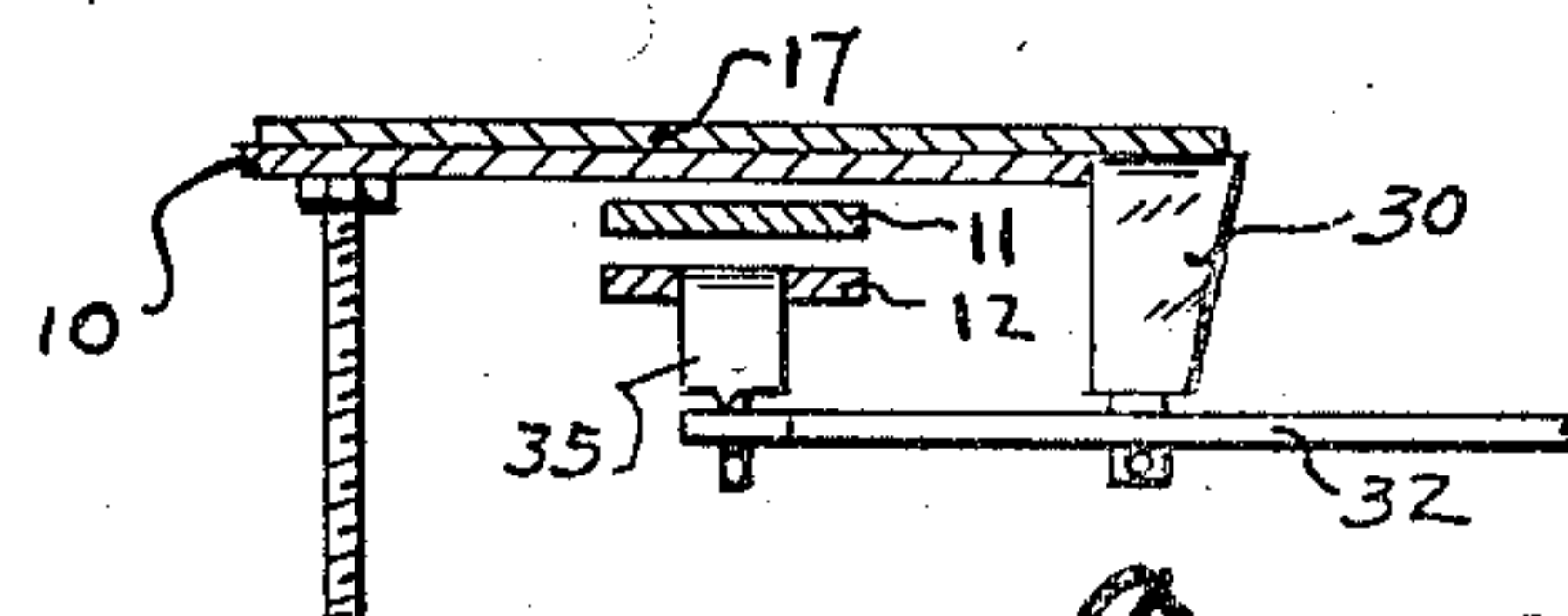


Fig. 6

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2 Sheets-Sheet 2

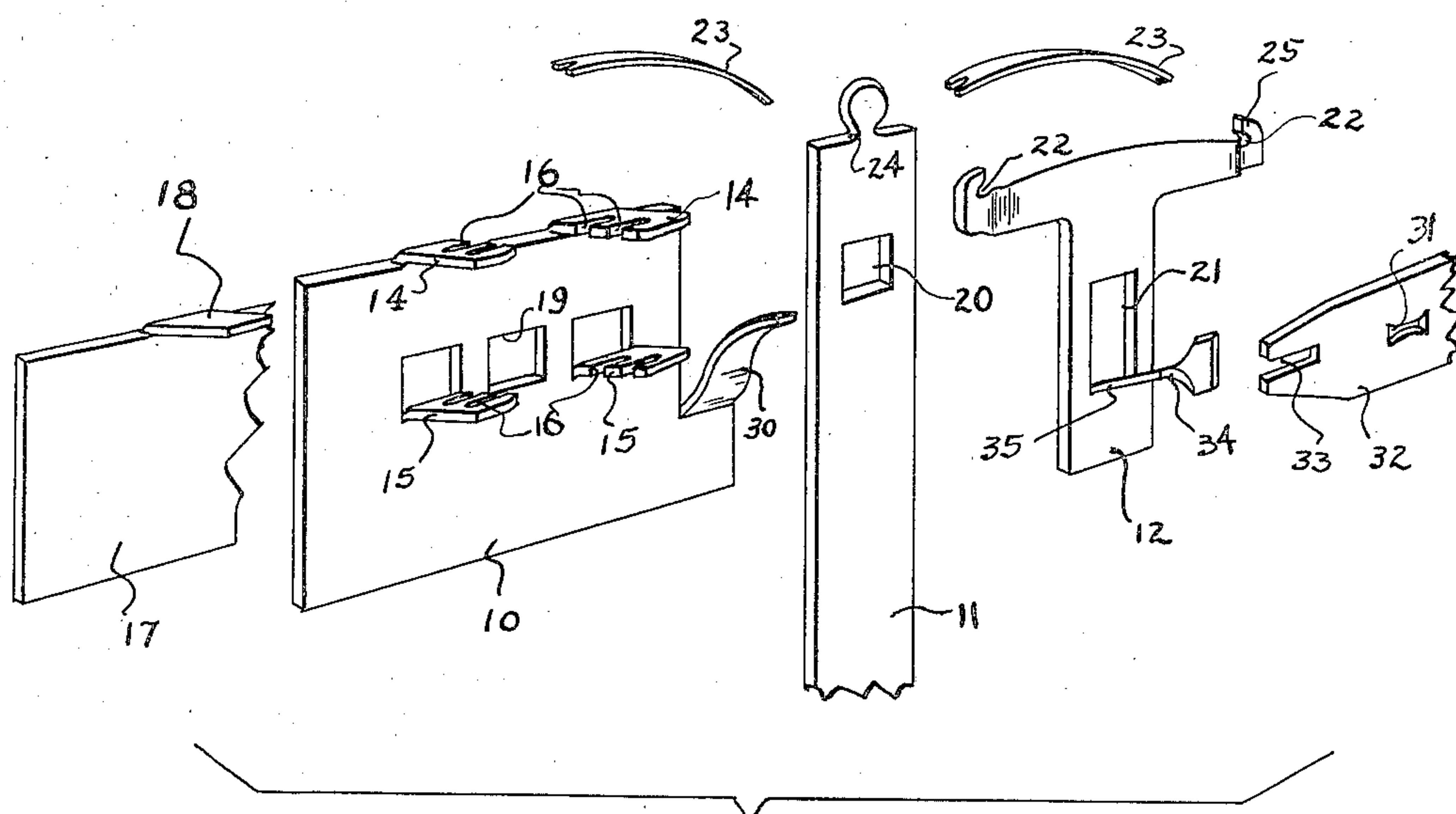


Fig. 9

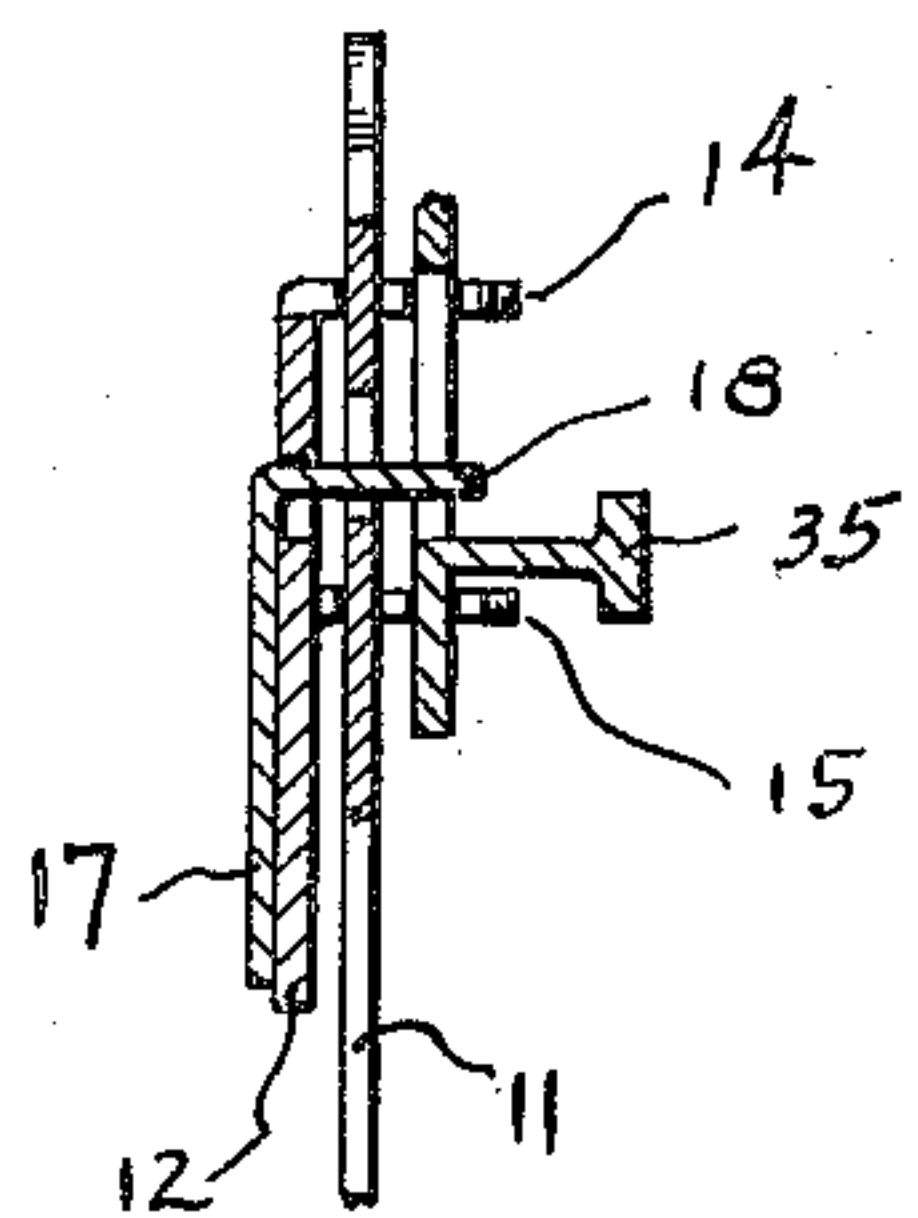


Fig. 7

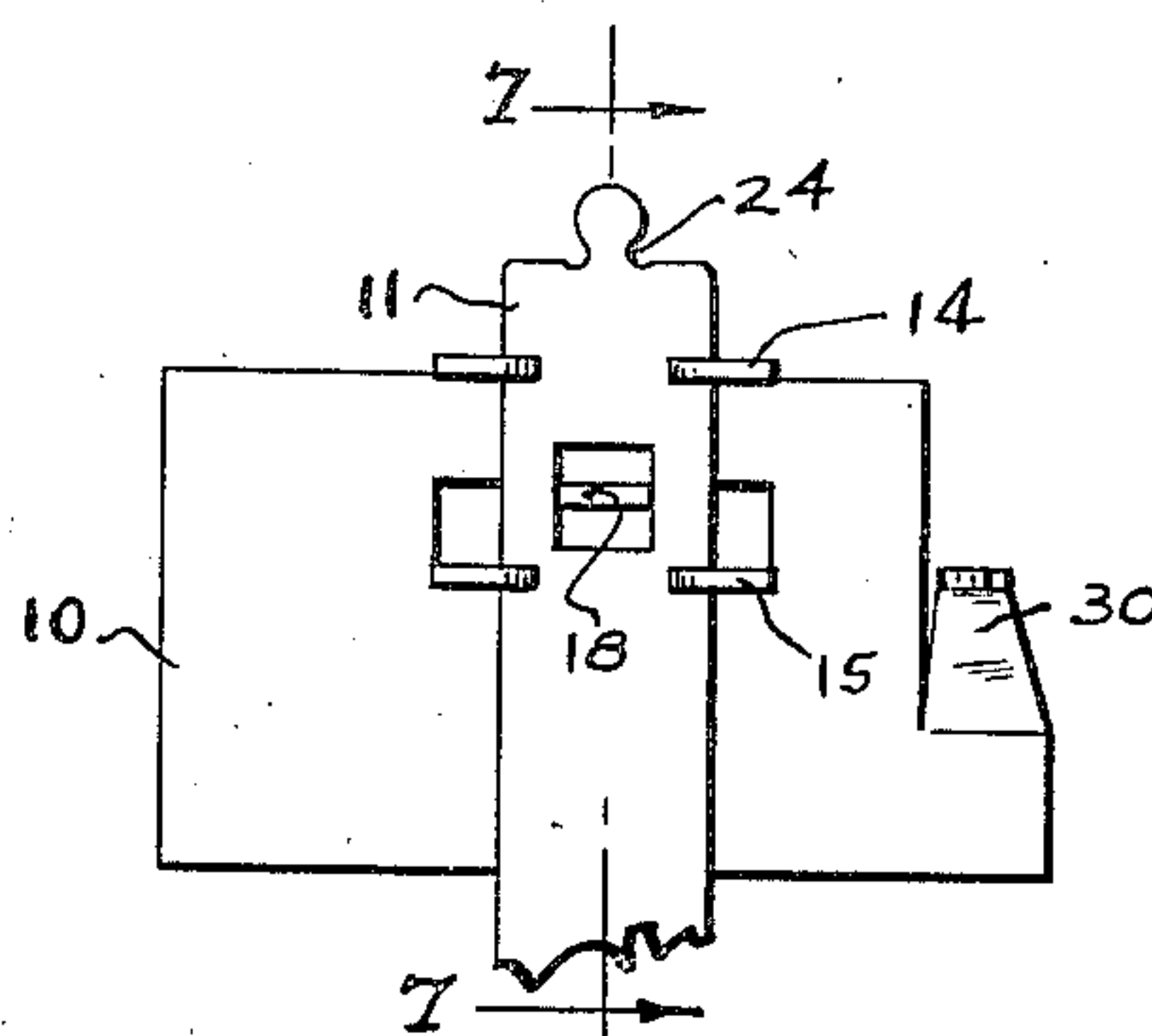


Fig. 8

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UNITED STATES PATENT OFFICE

2,125,432

SPRING SWITCH WITH HANDLE

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Application December 2, 1936, Serial No. 113,790

4 Claims. (Cl. 200—76)

This application relates to an improvement in electric switches and more particularly to a novel construction in a spring switch. The purpose of the invention is to provide a simple construction and easy operation. This purpose is accomplished by so shaping the parts that they are held together by being assembled into each other in such a manner that very few screws or other fastenings are required. A further object is to provide a switch in which a strong positive snapping action may be obtained in making and breaking the electric contacts.

Another object is to provide a switch which may be adapted to be operated by an automatic device controlling pressure or a related function in a water or air pumping system. For this reason a relatively small switch is provided with a relatively large handle.

In order to enhance both the appearance and the safety of the present switch, it is encased in a cabinet made of insulating material.

Other objects and features will become apparent to those skilled in the art upon examination of the following detailed description of an embodiment of the invention which is to be read with reference to the accompanying drawings.

In these drawings,

Fig. 1 is a view of the switch in its cabinet and in the off position;

Fig. 2 is a similar view in the on position;

Fig. 3 is a side view in the direction of the arrow of Fig. 1;

Fig. 4 is a top view of the switch per se;

Fig. 5 is a section on lines 5—5 of Fig. 1 with some parts removed;

Fig. 6 is a section on lines 6—6 of Fig. 1;

Fig. 7 is a section on line 7—7 of Fig. 2;

Fig. 8 is a view of part of the switch mechanism;

Fig. 9 is an exploded view showing the parts that go to make up the switch mechanism.

Construction

Referring to the drawings, it will be seen that the switch consists of a base 10 on which are slideably mounted a contact carrying slide 11 and a slide actuator 12. The base 10 carries four fingers 14 and 15 which are formed integral with the base, the fingers 14 being formed at the top of the base, and the lower ones 15 being struck up therefrom near the center. In the fingers 14 and 15 are grooves 16 which retain the sliding parts 11 and 12. In back of the base 10 is a smaller plate 17 whose bent-up lug 18 projects through a hole 19 in plate 10 and through the holes 20 and 21 in the parts 11 and 12 respec-

tively. This lug 18 serves as a stop, both in holding the parts together, and in regulating their movement in the operation of switching, as will later appear. The actuator 12 is made in a T-shape and at the ends of the top bar are recesses 22, each adapted to retain one end of one of the flat springs 23 whose other end is retained in a recess 24 of slide 11. The ears 25 at the ends of the top bar are offset from the remaining portion of the actuator 12 so that, when assembled, they will be in a line with slide 11 and thus the springs 23 may be installed with their axes in one straight line. Furthermore, springs 23 are formed with notches in their ends so that they will remain in engagement with recesses 22 and 24. At the other, or lower, end of the slide 11 is mounted, by means of an insulating block, a contact carrying spring 27.

The base 10 and the parts carried by it are mounted in a box, or cabinet, 28, made of insulating material, such as hard rubber or a molded plastic. At the lower end of the cabinet are electrical connectors 13 which support the stationary contact points 29, adapted to be met by the contacts carried by the spring 27.

At one side of base 10 is a struck up part 30 which serves as a fulcrum for the bearing 31 of handle 32. In the end of the handle there is a notch 33 which engages the neck 34 of a finger 35, struck up from the member 12. The handle 32 is retained on the pivot 30 by means of a pin 36.

Operation

The switch is operated in the following manner: When the end 37 of the handle 32 is moved downward from the position of Fig. 1, it slides the actuator 12 upwardly by means of the finger 35. The upward movement of the part 12 raises the outer ends of springs 23, thus deflecting the springs until that point is reached at which both ends of both springs 23 are in a straight line. This, of course, occurs when the points of support of the springs, i. e., the pivotal recesses 22 and 24, lie in a straight line, or, in other words, when, in the position shown in Fig. 1, the horizontal plane containing the pivots in recesses 22 is brought into coincidence with the horizontal plane containing the pivots in recesses 24. Until this point is reached the tendency of the springs is to push the slide 11 upwardly. But at the instant that this point is passed, the springs react to push the slide 11 downward and the actuator 12 upward. Since it is so arranged that after a very slight additional upward movement of actuator 12 its further movement is arrested by the

arrival of finger 35 against the stop 18, the force of the energy in the springs is permitted to be used in pushing the slide 11 downward to make an electric contact between the points 29. The parts
5 are so proportioned that when a contact has been made and spring 27 has been put under some deflective tension, the upper surface of hole 20 in slide 11 comes into contact with stop 18, bringing the parts to rest.

10 In the reverse direction of operation a similar action takes place. When the handle end 37 is pushed upward to urge part 12 downward it deflects the springs 23 until that point is again reached where the ends of the springs are in a
15 straight line with their supports. At the instant this point is passed the springs react to snap the slide 11 upward and to break the electric contact. It will be noted that due to the deflection of spring 27 in making contact, and due to the
20 resultant reaction of the spring in returning to normal position as soon as slide 11 begins to move upward, a sliding, or wiping, action is obtained between the contact points when they separate.

25 It will also be noted that the springs 23 may be made of a suitable stiffness to secure a strong reaction, and yet the force required to operate the switch handle 32 need not be relatively great. And this advantage is obtained by the
30 provision of approximately a three to one ratio of leverage in the switch handle.

An embodiment of the invention now having been described, reference will be had to the following claims for a determination of the scope
35 of the invention.

I claim:

1. In a switch, two slideably mounted rigid parallel plates arranged adjacent each other, one over the other, means for retaining the plates in
40 the switch and constructed to provide guides for the plates as they slide lengthwise, the plates being relatively slidable on each other, the first of said plates having rigid arms extending laterally therefrom, leaf springs connecting the ends
45 of the arms to the second plate, the latter having a contact thereon, and a handle for sliding the first plate, movement of such plate beyond the over center positions of the springs causing snap sliding movement of the second plate and
50 consequent movement of the contact thereon into and out of its two positions.

2. In a switch, two slideably mounted rigid parallel plates arranged adjacent each other,

one over the other, means for retaining the plates in the switch and constructed to provide guides for the plates as they slide lengthwise, the plates being relatively slidable on each other, the first of said plates being T shaped and hav-
5 ing rigid arms extending laterally therefrom leaf springs connecting the ends of the arms to the second plate, the latter having a contact thereon, and a handle for sliding the first plate, move-
10 ment of such plate beyond the over center positions of the springs causing snap sliding movement of the second plate and consequent movement of the contact thereon into and out of its two positions.

3. In a switch, a sheet metal base plate hav-
15 ing four tongues bent therefrom and arranged with pairs of facing edges, each having two notches therein, a sliding plate between the tongues having its edges in four notches of the four tongues, a second sliding plate between the
20 tongues and alined with the first sliding plate and also having its edges in four notches of the four tongues, the two sliding plates having registering slots, a tongue in said slots forming a bearing and stop for the sliding plates, a tongue
25 bent up from the second sliding plate, a handle having a slotted end receiving the latter tongue and thus pivotally connected to the second sliding plate, and a tongue bent up from the base plate, the handle having a slot receiving the lat-
30 ter tongue and thus pivotally mounted on the base plate.

4. In a switch, a sheet metal base plate having four tongues bent therefrom and arranged with pairs of facing edges, each having two notches
35 therein, a sliding plate between the tongues having its edges in four notches of the four tongues, a second sliding plate between the tongue and alined with the first sliding plate and also having its edges in four notches of the four tongues, the
40 two sliding plates having registering slots, a tongue in said slots forming a bearing and stop for the sliding plates, a tongue bent up from the second sliding plate, a handle having a slotted end receiving the latter tongue and thus pivotally
45 connected to the second sliding plate, and a tongue bent up from the base plate, the handle having a slot receiving the latter tongue and thus pivotally mounted on the base plate, the second sliding plate having laterally extending
50 arms, and leaf springs connecting such arms to the end of the first sliding plate.

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