

Feb. 28, 1939.

J. F. MERKEL

2,149,226

CONTROL SWITCH

Original Filed June 21, 1932

FIG. 1.

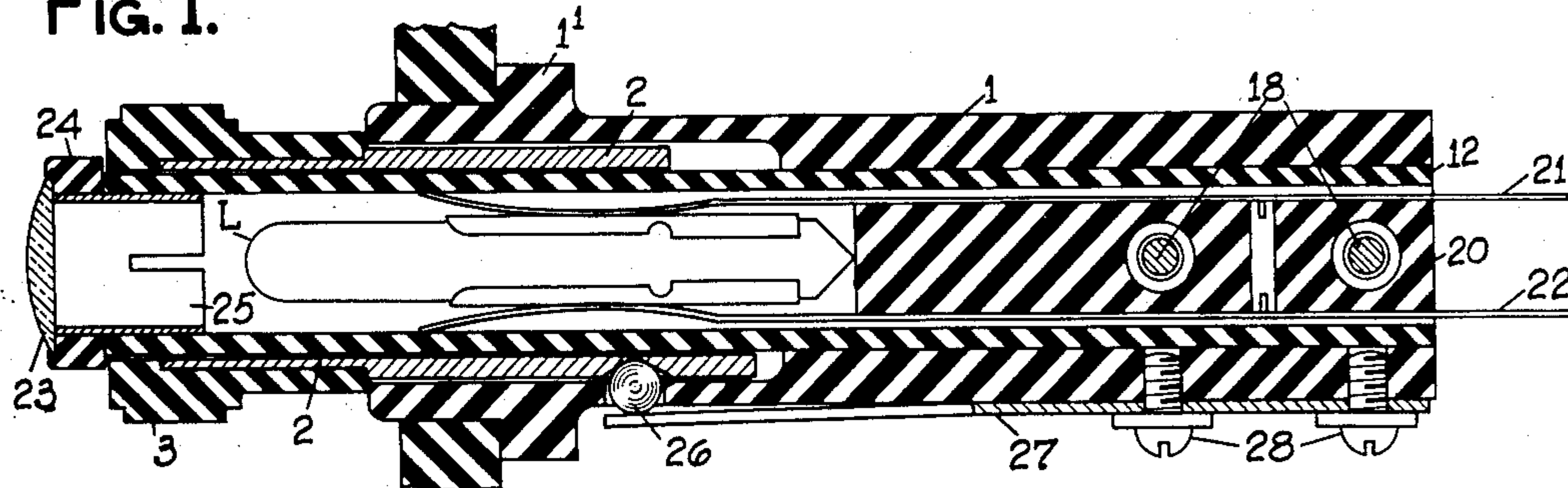


FIG. 2.

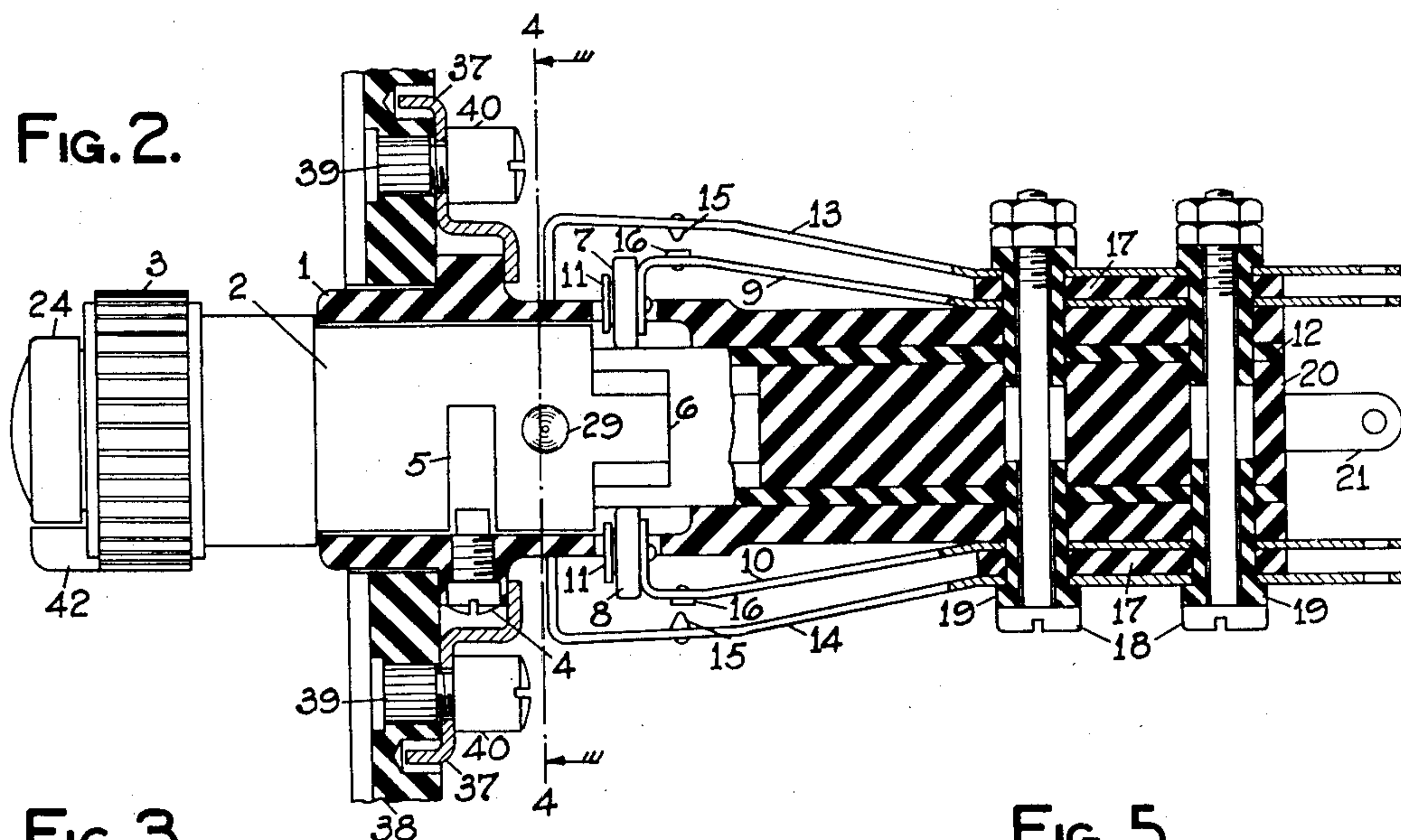


FIG. 3.

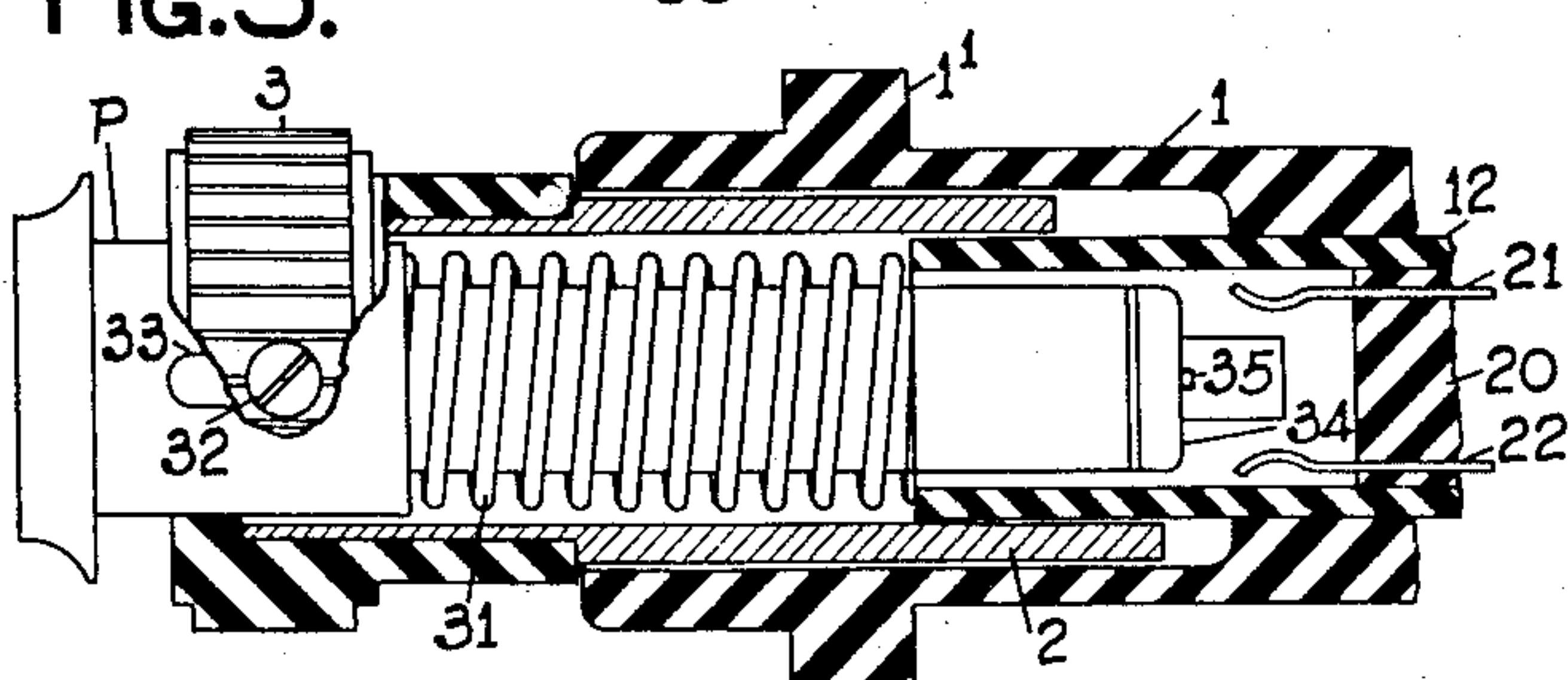


FIG. 4.

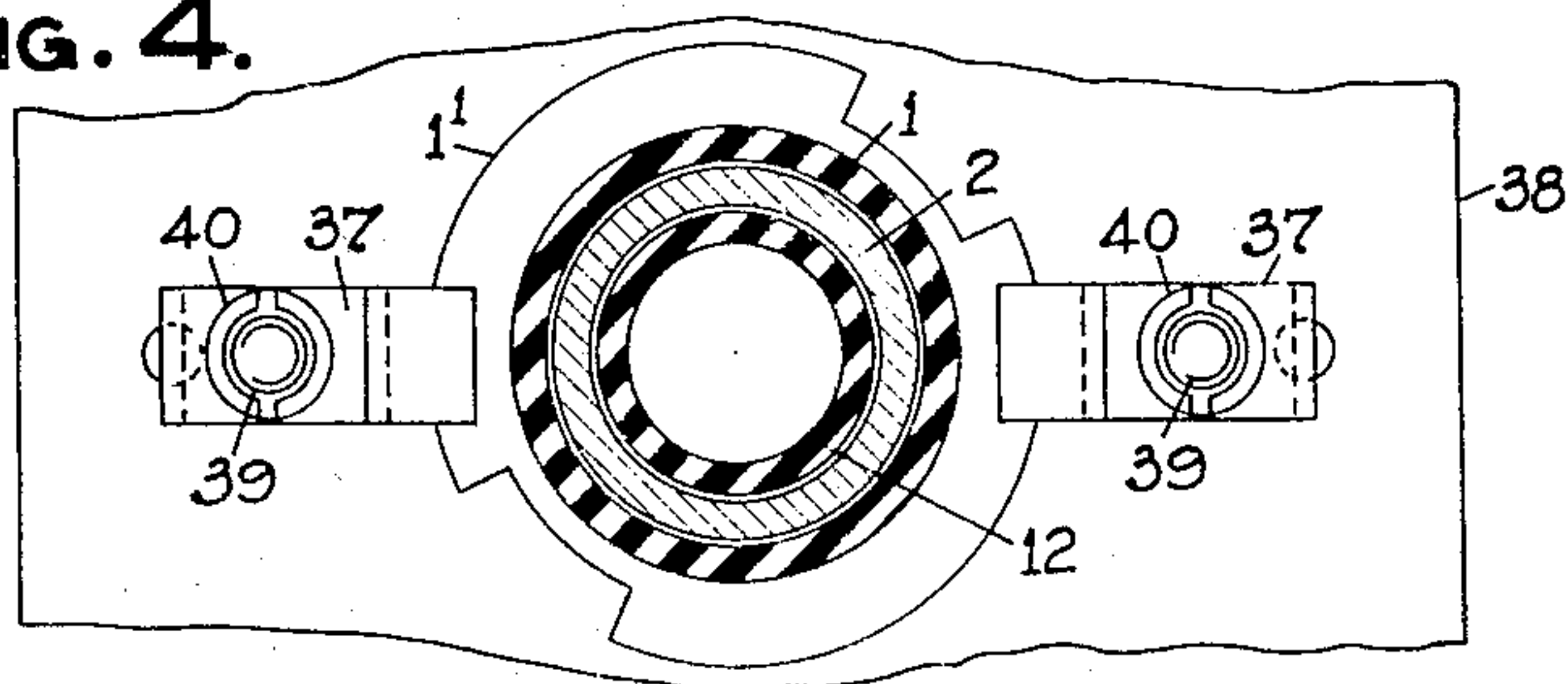
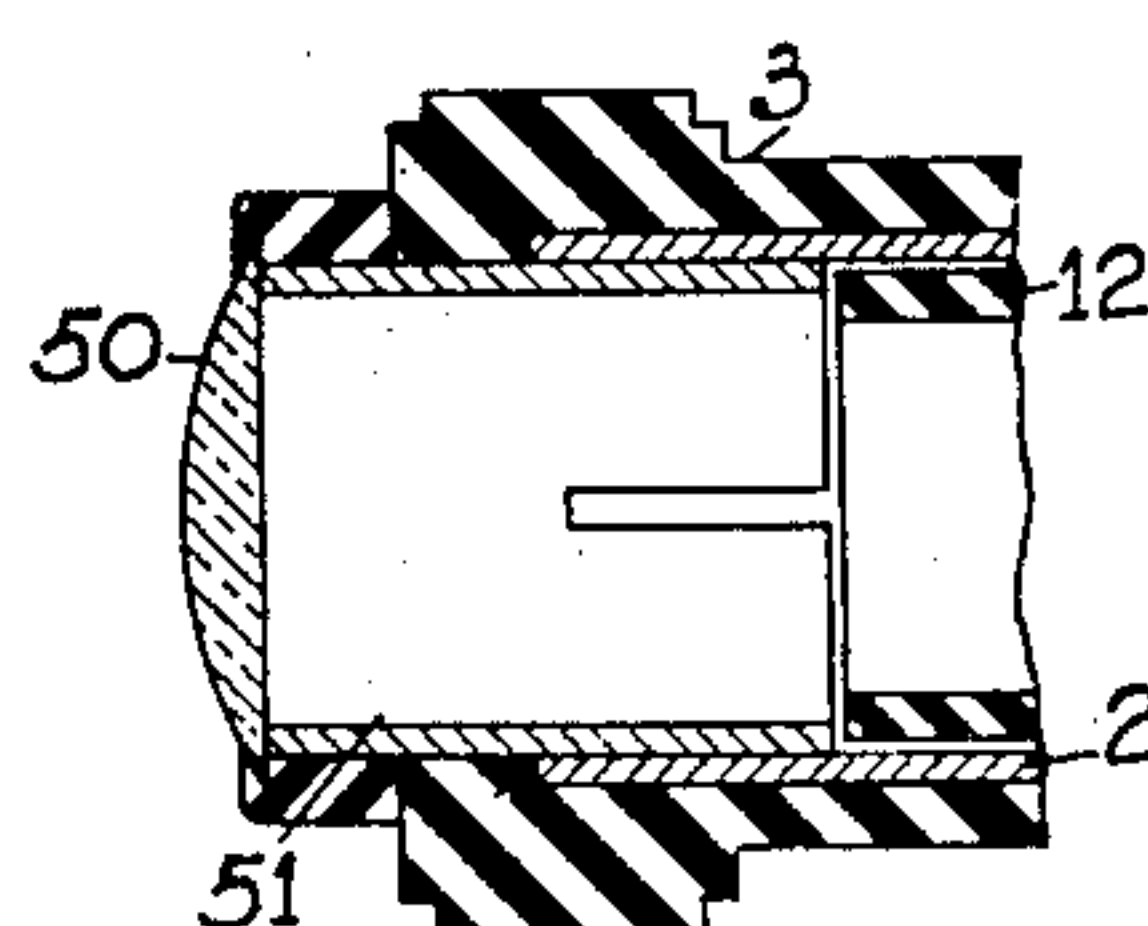


FIG. 5.



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UNITED STATES PATENT OFFICE

2,149,226

CONTROL SWITCH

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Original application June 21, 1932, Serial No.
618,500, now Patent No. 2,091,155, dated August
24, 1937. Divided and this application July 29,
1937, Serial No. 156,355

3 Claims. (Cl. 200—4)

This invention relates to control switches, and more particularly to a rotary type of switch incorporating a push button contactor.

The present application is a division of my pending application Ser. No. 618,500, filed June 21, 1932, (and now Patent 2,091,155, granted August 24, 1937) for Control switch for railway traffic controlling systems.

In railway centralized traffic controlling systems in which remote switches and signals are controlled from a central point, it is found convenient to employ a compact control panel on which the controls for the complete system may be easily reached by a single operator. It is also expedient to mark a miniature diagram of the railway system on the control panel and to locate the controls on the panel in such a manner that they may be readily associated with the function which they perform. Various indicating means are necessary in such a centralized traffic controlling system and when small indicating lights are employed on the control panel, the problem arises of associating such lights with their particular part of the system as well as distinguishing a plurality of characters of indications from a single light.

In view of the above and other considerations it is proposed in accordance with the present invention to provide a compact and sturdy control switch which may be easily mounted on a panel and which may incorporate an auxiliary push button contactor arranged to give various indications associated with the switch and its operated position.

Other objects, purposes and characteristic features of the invention will appear as the description thereof progresses during which reference will be made to the accompanying drawing, in which:—

Fig. 1 is an enlarged elevational sectional view of a switch incorporating an indication light constructed in accordance with the present invention.

Fig. 2 is a plan sectional view of the device shown in Fig. 1.

Fig. 3 is a partial view of the switch of Fig. 1 incorporating a push button circuit controller instead of an indicating light.

Fig. 4 is an end view of a section taken on line 4—4 of Fig. 2 viewed in the direction indicated by the arrows.

Fig. 5 is a partial view of a modified form of an operating knob which may be used in the present invention.

The specific embodiment of the present invention shown herein is assembled about a tubular

insulating member 1 which may be molded from suitable material such as Bakelite. A metallic sleeve 2 having a knurled insulating knob 3 molded thereon rotates inside one end of the tubular member 1 and is held therein by a screw 4 which is threaded into the member 1 with an extension resting in an annular slot 5 in the metallic sleeve 2. This screw 4 in the slot 5 retains the sleeve 2 within the member 1, and also serves to limit the rotation of the sleeve 2, which in the form illustrated is allowed to rotate through approximately 180° as determined by the length of the slot 5.

A cam 6 is formed integral with the sleeve 2 by allowing a section of the circumference of the sleeve to extend outwardly with its edges beveled as shown. This cam 6 is operable by rotation of the knob 3 to engage either a roller 7 or a roller 8 spaced at approximately 180° on the member 1 and these rollers 7 and 8 are secured to respective spring contact fingers 9 and 10 by pins 11. These rollers 7 and 8 are normally biased by their spring contact fingers through rectangular openings in the side of the member 1 against opposite sides of a tube 12 of insulating material, which tube 12 in Fig. 1 and Fig. 2 extends the total length of the switch.

It is then obvious that when either roller 7 or 8 is engaged by the cam 6 its associated spring contact 9 or 10 is forced outwardly to engage associated stationary spring contacts 13 or 14. These stationary spring contact fingers 13 and 14 are biased so that inwardly extending ends thereof rest against the side of the member 1 when not engaged by the associated movable spring contact fingers and are provided with low resistance contact points 15 which are engageable with low resistance contacts 16 on the movable spring fingers 9 and 10.

The movable spring contact fingers 9 and 10 are separated from the stationary fingers 13 and 14 by insulating spacers 17, and are held against opposite flat side of the member 1 by through screws 18 which pass through bushings 19, two of which bushings are placed on each screw so that enlarged heads thereof rest against the outside surface of the stationary fingers 13 and 14 with the smaller body portion insulating the fingers from the body of the screws 18. It is desired to be understood that, although only a single movable contact finger with its associated stationary finger is shown on each side of the member 1, a plurality of such groups of associated stationary and movable fingers could be assembled in a pile and operated by a single roller

through insulating pushers if the switch is required to control a plurality of independent circuits. Also, some applications may require a normally closed contact and in such a case an insulated contact finger may be mounted between the tubular member 1 and the fingers 9 and 10 so as to engage therewith when the rollers 7 and 8 are not engaged by cam 6.

The rear end of the tube 12 is closed by a plug 20 of insulating material which is held by the screws 18 and bushings 19. Two spring contact strips 21 and 22 are held between opposite sides of the block 20 and the inside of the tube 12 and arranged at right angles to the contact fingers which are actuated by the cam 6. These contact strips 21 and 22 are held in place by center punched portions which are turned inwardly to rest in a transverse hole in the block 20 with the inwardly biased to the shape shown in Fig. 1. A small incandescent lamp L is placed within the tube 12 so that contacts arranged on the side thereof engage the inwardly biased ends of the terminal strips 21 and 22. A lens 23 moulded into suitable insulating material 24 which is held on a spring sleeve 25 is pressed into the open end of the tube 12 in the embodiment shown in Fig. 1 and Fig. 2.

The form of the switch shown in Fig. 1 and Fig. 2 is of the three-position type, or that is, it has a center position at which both contacts 9 and 10 are out of engagement with their associated contacts 13 and 14, and is operable approximately 90° either side of this position to engage contact fingers 9 and 13 when operated to one side, or to engage contact fingers 10 and 14 when operated to the other side. When the knob 3 has been turned to any one of these three operated positions a ball 26 is forced into a depression on the surface of the sleeve 2 by a leaf spring 27 held against the member 1 by screws 28. These depressions 29 as shown in Fig. 2 are so spaced that when the knob 3 has been turned at its desired position, the ball 26 resting therein resiliently checks rotation and holds the switch in its operated position. This arrangement also allows the operator to accurately position the switch for proper closing of the selected contacts.

In some applications of this switch, a movement to two positions only is required, or that is, a movement from center to either right or left which is approximately 90 degrees. To limit the rotation of the knob 3 in this case a small arcuate 90° sector may be placed in one end of the slot 5 to prevent movement of the screw 4 in this half of the slot 5. When such a two position switch is employed to control a switch machine, it is necessary to have one contact closed when the control switch is operated to one position and the other contact closed when operated to the opposite position.

In the optional arrangement shown in Fig. 3, a push button contactor is substituted for the indicating lamp arrangement shown in Fig. 1 and Fig. 2, and this push button consists of a plunger P having an enlarged end extending beyond the knob 3 and entering within the metallic sleeve 2. A smaller circular portion of the plunger P carries a spring 31 resting between the shoulder formed by this smaller portion and the end of the tube 12, which tube 12 is made shorter in this embodiment as clearly shown in Fig. 3.

The plunger P is held within the knob 3 by a screw 32 threaded into the knob 3 and extend-

ing into a slot 33 in the circular portion of the plunger P, and obviously this arrangement also limits the operating motion of the plunger. The extreme rear end of this plunger P has a still smaller circular portion upon which is placed a metallic ring 34 and held in place by a pin 35. In this embodiment the inside ends of the contact strips 21 and 22 are shortened so that they extend only a slight distance beyond the insulating plug 20. These ends are shaped as shown in Fig. 3 so as to be engageable by the metallic ring 34 when the plunger P of the push button is depressed to thereby electrically connect the two contact strips 21 and 22.

A means by which the push button may be mounted upon the control panel is clearly shown in Fig. 2 and Fig. 4 which comprises two holding strips 37 clamped to the control panel 38 by screws 39, which screws have enlarged heads with a knurled portion pressed into holes in the panel 38 and hold the strips 37 by nuts 40 threaded thereon. An annular shoulder 41 is moulded on the tubular member 1 which rests against the rear side of the panel 38 and has opposite sectors cut therefrom which allows the strips 37 to pass through these sectors and the shoulder 41 to be placed against the rear side of the panel 38. The tubular member 1 may then be turned so that the retaining strips 37 engage the rear side of the shoulder 41 to hold the complete switch on the panel 38. These strips 37 also have small extensions which are turned inwardly and rest in holes drilled in the panel 38 to prevent turning when the switch is removed.

It will be noted that in the embodiment shown in Fig. 1 and Fig. 2 the knob 3 rotates about the stationary lens 23 which is held within the end of the stationary tube 12, and to indicate the position of the knob a pin 42 is inserted in the front edge of the knob 3 which may be conspicuously colored so as to readily indicate the operated position of the switch. However, in some cases, it is desired to have the lens 23 rotate with the knob 3, and in which case, an arrangement may be employed such as shown in Fig. 5, or that is, the tube 12 may be made shorter and a lens 50 held by a member 51 may be pressed directly inside of the knob 3 so as to rotate therewith.

In cases in which an indication is only desired when the lamp L is energized suitable marking such as an arrow or a distinctive number may be placed on the inside of the lens 23 so that when the lamp L is not energized, this arrow is not visible but becomes visible due to the light from the lamp L when energized. In other cases, it is desirable to have a marking on the front of the control switch which will designate its function and to have this marking, such as a number or an arrow, visible at all times, and in such cases the mark may be placed on the outside of the lens, or if an indication light is not provided, a solid non-transparent insert arranged as the lens 50 and holder 51 may be cemented directly to the knob 3 or the tube 12 according to whether it is desired to be stationary or rotatable.

Having thus shown and described one specific embodiment of the present invention it is desired to be understood that the specific construction shown is susceptible of considerable modifications to adapt the invention to the particular interlocking or traffic controlling system to which it may be applied, all without departing from the spirit or scope of the present invention, except as limited by the appended claims.

What I claim is:

1. In a control switch, an elongated tubular mounting member, contacts on the outside of the member and having operating pushers extending to the inside of the member, an elongated cylinder rotatable within said tubular member through a predetermined sector to contact said pushes and operate said contacts and extending beyond the front end of the tubular member, a hollow knob on said cylinder where it extends in front of said tubular member, insulated spaced contact springs held in the rear end of said tubular member, a slidable plunger within said cylinder having one end extending through and in front of said hollow knob, a metal ring on the other end of said plunger arranged to electrically connect said contact springs by a rearward movement of the plunger, and a spring outwardly biasing said plunger.

2. In a control switch, an elongated tubular mounting member, an elongated cylinder rotatable within said tubular member through a predetermined sector and projecting beyond one end of the member, a hollow knob on said cylinder where it projects from said tubular member, insulated spaced contact springs held in the rear end of said tubular member, a plunger within said cylinder having one end extending in front of said knob, a metal ring on the other end of

said plunger arranged to electrically connect said contact springs by a rearward movement of the plunger, and a spring outwardly biasing said plunger, spaced groups of insulated contact means mounted on the outside of said tubular member, and a cam on said cylinder arranged to selectively operate said groups of contacts by rotation of said knob.

3. In a control switch, a tubular mounting member, a cylinder rotatable within said tubular member through a predetermined sector, a hollow knob on said cylinder extending in front of said tubular member, insulated spaced contact springs held in the rear end of said tubular member, a plunger slidable within said cylinder and having one end extending in front of said knob, a longitudinal slot in the plunger, a stop pin in the knob and projecting into the slot, a metal ring on the other end of said plunger arranged to electrically connect said contact springs by a rearward movement of the plunger, a spring outwardly biasing said plunger, and spaced groups of insulated contact means mounted on said tubular member, a cam on said cylinder arranged to selectively operate said groups of contacts by rotation of said knob.

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