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R. K. WINNING

1,908,204

ELECTRIC SWITCH

Filed Sept. 2, 1930

FIG. 1.

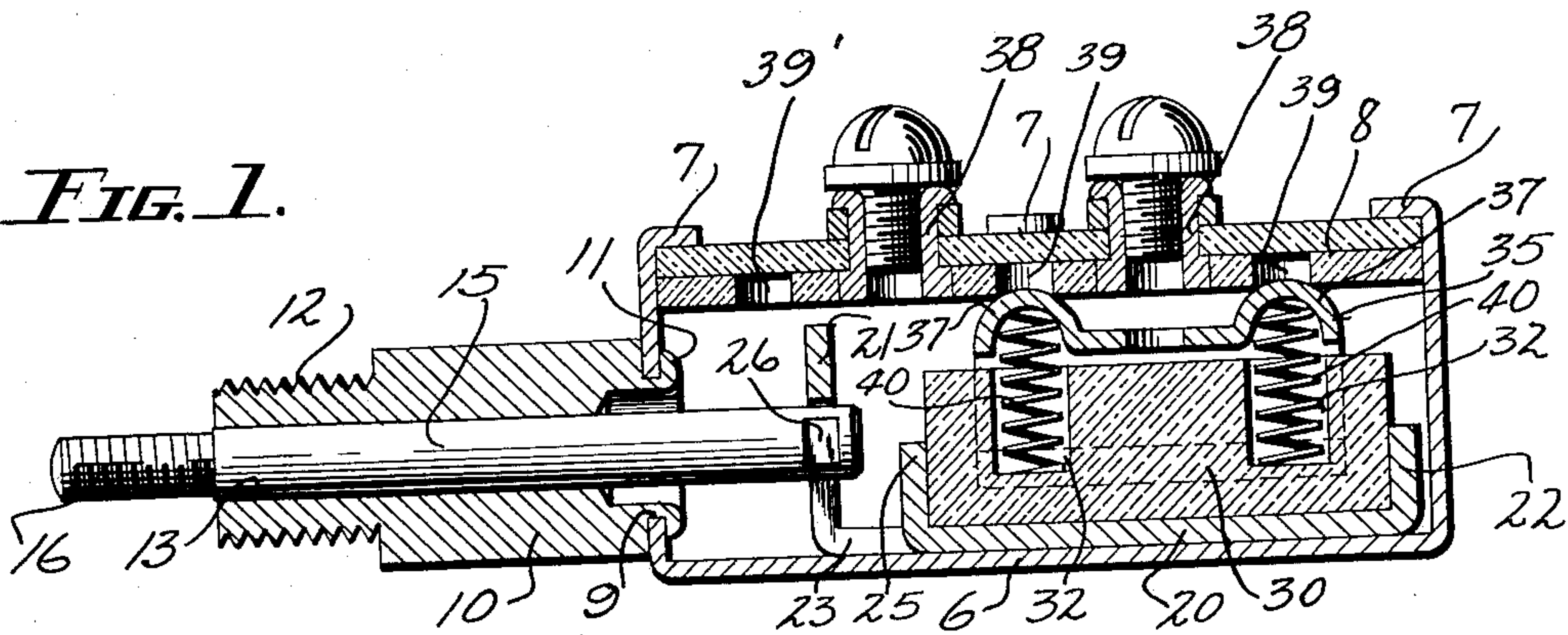


FIG. 2.

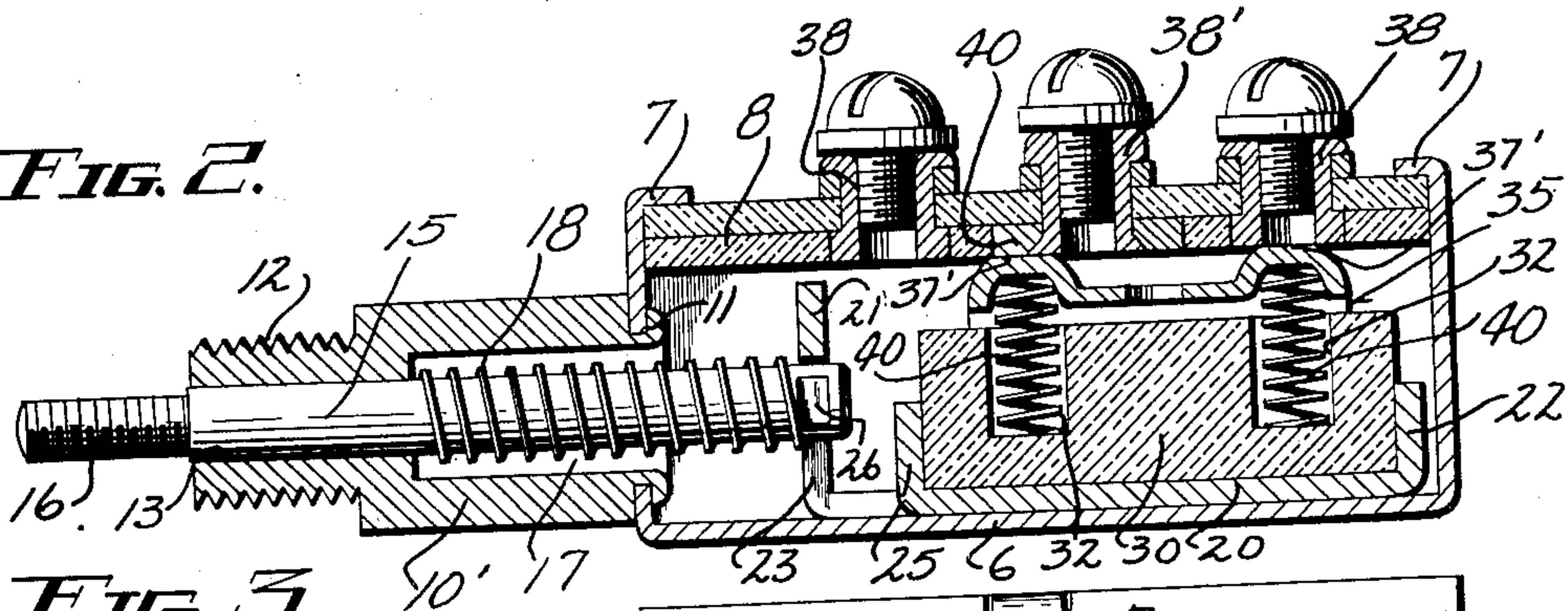


FIG. 3.

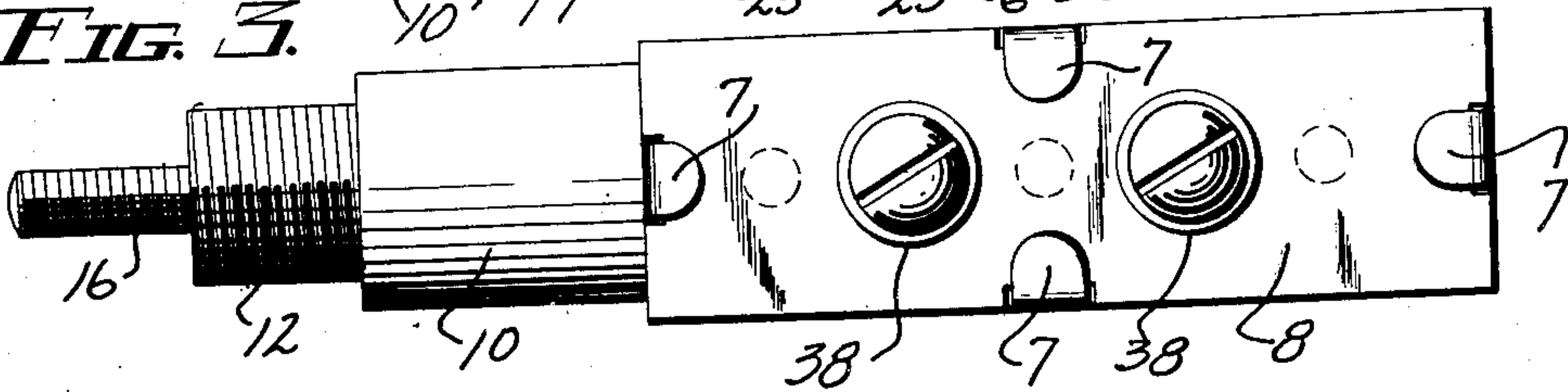


FIG. 4.

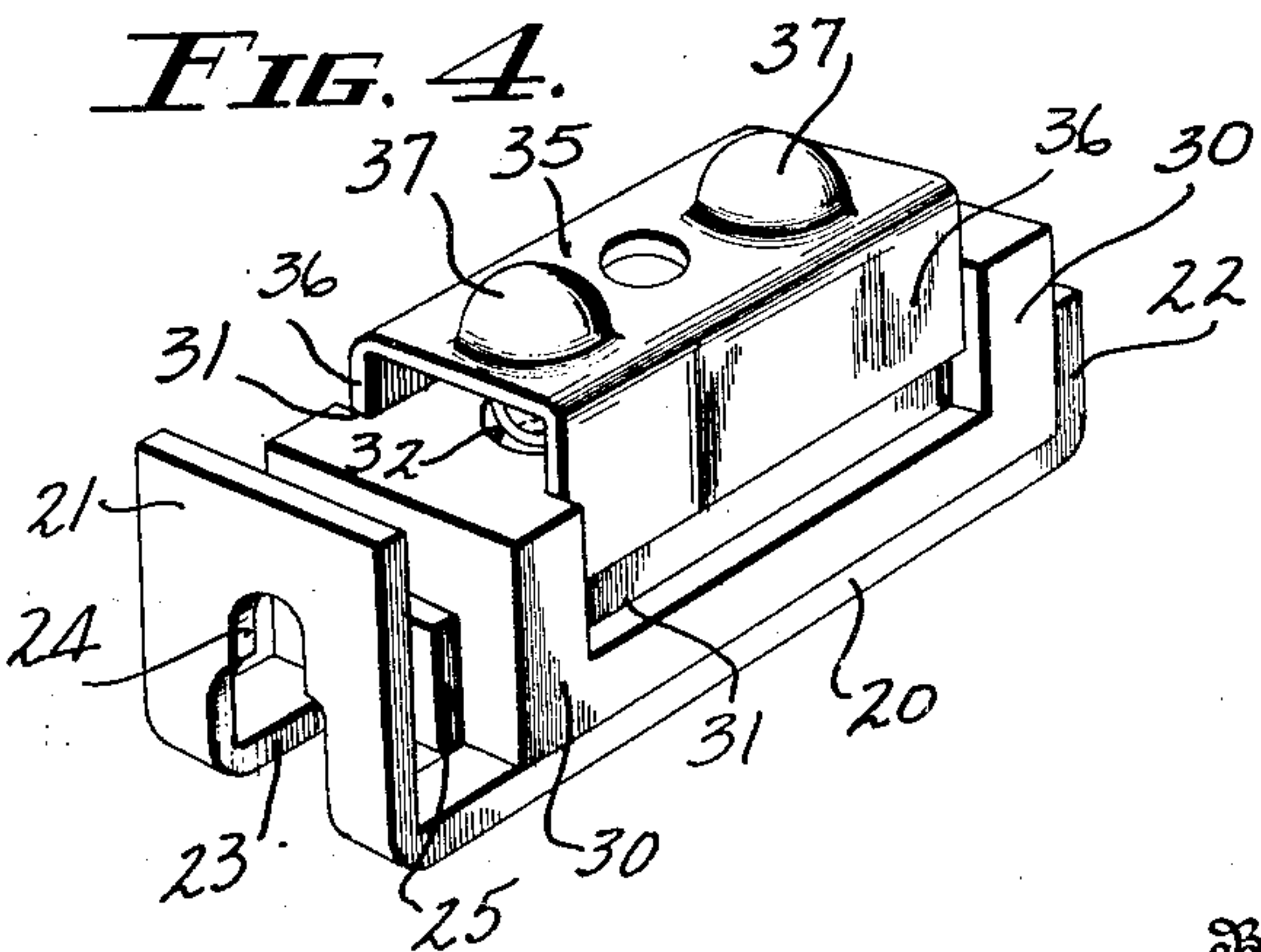
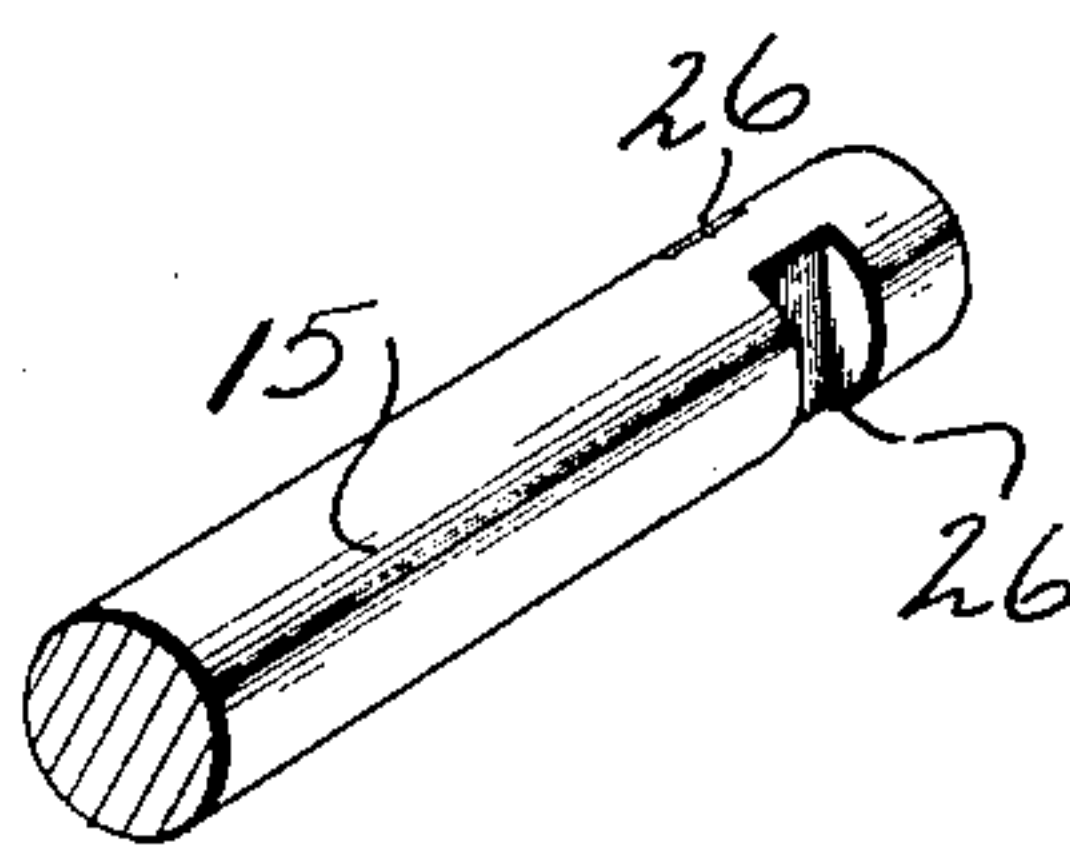


FIG. 5.



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ELECTRIC SWITCH

Application filed September 2, 1930. Serial No. 479,198.

This invention relates to improvements in electric switches.

It is the primary object of the present invention to provide, in unusually compact form, an electric switch capable of carrying heavy currents for prolonged periods of time. The particular switch herein disclosed has been used to advantage on the instrument panel of a motor bus where it is necessary to have a very large number of separate switches to handle the multiplicity of circuits which supply current to lights and electrical apparatus in various parts of the bus. Some of these pieces of apparatus draw heavy current and yet, in order to concentrate all of the switches on a relatively small portion of the instrument panel, it is necessary that each switch be extremely compact.

More specifically stated, I propose to provide a switch in which the contact carrier is reciprocable, and in which the contact is nevertheless a spring supported floating contact so arranged that no current is required to pass through the supporting springs.

It is a further specific purpose of this invention to provide a switch which can be made at extremely low cost due to economies of manufacture and to structure which permits of easy and quick assembly.

In the drawing:

Figure 1 illustrates my improved switch in longitudinal section on a scale which is twice the actual size of the switch as made.

Figure 2 is a similar view showing a slightly modified switch construction.

Figure 3 is a plan view of the switch shown in Fig. 1.

Figure 4 is a view in perspective, of the assembled parts comprising the movable unit of the switch.

Figure 5 is a perspective view of the inner end portion of the operating rod of the switch.

Like parts are identified by the same reference characters throughout the several views.

The switch case 6 comprises a shell stamped from sheet metal and provided with marginally disposed tongues 7 which are upset over the composite terminal plate 8 to complete the assembly of the switch. The ter-

минаl head comprises two pieces of dielectric sheet material, so that the sockets or recesses formed on its inner face may be made by a simple punching operation performed wholly on one of the pieces of material which is to be comprised in the finished terminal head.

The end wall of the switch case 6 is apertured at 9 to receive the reduced end of a bearing sleeve 10 which is assembled to the switch case by being upset or spun over against its inner face at 11. The bearing sleeve has a threaded portion at 12 whereby the entire switch is mounted upon the switch panel. The internal bore 13 of the bearing sleeve receives and guides a reciprocable actuating rod 15 which is threaded at 16 to receive a knob or handle.

In the case of the bearing sleeve 10' shown in Fig. 2, an interior socket is provided at 17 for a compression spring 18 which acts to maintain the movable contact carrier normally in one of its extreme positions.

The movable contact mechanism is identical with the two pieces of apparatus disclosed. The contact actuator 20 comprises a metal slide fitted for reciprocation in the interior of the switch case 6 for guidance by the side walls thereof. This slide comprises a plate of sheet metal having upturned ends 21 and 22. The plate has a slot at 23 in its bottom surface and extending upwardly into the end wall 21. At 24 the transverse dimension of this slot is reduced as clearly shown in Fig. 4. The material pressed from the slot 23 is formed upwardly to provide a lug at 25 which is integral with the plate.

The maximum width of slot 23 is as great as the diameter of rod 15. The width of the narrower portion 24 of the slot corresponds rather closely to the transverse dimension of rod 15 at a point near its end where notches 26 are milled in its side at opposite points. The arrangement is such that with the rod 15 in place in bearing member 10, it is possible for a person assembling the switch to effect engagement between the rod 15 and contact actuator 20 by merely inserting the contact actuator 20 into the case in such a position that the end of the rod will pass

through the slot 23, and its portion reduced in diameter by notches 26 will enter the narrower portion 24 of the slot. In this position of the parts the rod will be effectively engaged with the actuator to manipulate it backward and forward along its path of reciprocation within the case.

Mounted on the contact actuator slide 20 is a contact carrier comprising a dielectric block 30 having recesses 31 in its sides and spring sockets 32 in its top. The length of block 30 is such that it fits closely between lug 25 and the upturned end 22 of the slide, whereby the block is restrained to move with the slide. The width of the block is preferably such that it fits slidably between the side walls of the switch casing to be centered thereby upon the slide.

The contact member 35 comprises a channel of some electrically conductive metal such as brass, copper or bronze. It is fitted like a saddle upon the intermediate portion of the dielectric block 30. Its depending side flanges 36 are vertically reciprocable against the intermediate side walls of the block, and the ends of these flanges are confined between the shoulders of the block at the ends of the recesses 31 therein. Obviously, the thickness of flanges 36 will be less than the depth of recesses 31, so that there will be no possibility of contact between member 35 and the switch casing 6. It will be observed that an extended bearing surface is provided for the contact member whereby it is free for the very limited vertical movement required of it, and it is nevertheless restrained against longitudinal, lateral, or tilting movement with respect to the carrier 30.

The upper surface of the contact member 35 is provided with embossed contact areas 37 which, in the case of the switch shown in Fig. 1, are preferably hemispherical and in the case of the switch shown in Fig. 2, are preferably flattened on their upper surfaces as shown at 37'.

In the first form of switch it is desired that the switch position be maintained by impositive engagement of the embossed contacts 37 in the openings of terminals 38 and the recesses 39 formed in the dielectric composition which constitutes the terminal head.

In the form of switch shown in Fig. 2, the provision of a compression spring makes it undesirable to have any detent action, and the flattened surfaces of 37' are sufficient in extent to prevent any interengagement of the contacts with the openings in the terminals. In both constructions the compression springs 40 receive in sockets 32 of the contact carrier, and in the interior of the contact bosses 37 and 37' yieldably support the contact member.

It will be noted that in Fig. 1 the construction is such that in the "off" position of the switch each of the contact bosses is

engaged with a recess 39 in the terminal head. In the "on" position of the switch each of the bosses will be engaged with the opening in the terminal. In each specific switch position the recess 39' will not be used, but it is found that the provision of this recess is very important since it makes the terminal head interchangeable, end for end and, by actual test, is shown to speed up assembly by forty per cent.

In the construction shown in Fig. 2 the central terminal 38' is electrically connected in each extreme position of the moving parts with one or the other of the terminals 38. It will be noted that the effective area of the contact end of terminal 38' has been increased by mounting thereon a metallic washer 41.

Since the drawings show the switch twice its actual size, it will be appreciated that in practice it may be made very small. It is, nevertheless, capable of carrying at least 50 amperes of current continuously without injury. It will be obvious to those skilled in the art that the operation of assembly is unusually simple and the change of only a very few parts is necessary in the assembly of one type of switch or the other.

I claim:

1. In a switch, the combination with a case having a terminal head provided with fixed contacts, of a contact carrier reciprocable in the case and provided with supporting springs, a saddle-like contact member mounted on said springs and spanning said carrier from side to side, said member being provided with contact portions adapted to interact with the contacts at said head, and means confining said member for reciprocation with said carrier and relative thereto.

2. In a switch, the combination with a rod having recessed sides, of a contact actuator slotted to receive the ends of the rod, the width of the slot being reduced for engagement in the recesses of the rod.

3. In a switch, the combination with an actuating rod, of a contact actuator comprising a plate having upturned ends and an intermediate upturned lug adjacent one of said ends, said rod being interlocked with said last mentioned end, and a contact carrier mounted on said plate between said lug and the end of said plate remote therefrom.

4. In a switch, the combination with a switch case, of a slide reciprocable therein and comprising a plate laterally fitted to said case for guidance thereby and having longitudinally spaced upturned portions, a contact carrier confined between the upturned portions of the plate and the sides of the case for reciprocation with the plate, and contact means mounted on said carrier, said carrier having opposite sides laterally recessed to provide dielectric shoulders, and said contact means having guide flanges re-

reciprocable in the lateral recesses and abutting said shoulders.

5. The combination with a switch case, of a contact actuator reciprocably guided between the side walls thereof and comprising a plate having upturned portions longitudinally spaced, a contact carrier comprising a dielectric block confined between the upturned portions of the plate and the side walls of the case and provided with spaced sockets and lateral recesses, a contact member comprising a channel having flanges reciprocably fitted to said lateral recesses, and springs supporting the intermediate web of the channel from the carrier and seated in said sockets.

6. In a switch, the combination with a casing having a terminal supporting head, of a contact carrier reciprocable in said casing and comprising a plate, a dielectric block secured to the plate and having its opposite sides recessed, and a channeled contact member spanning said block and having the sides of said channel disposed in the side recesses for reciprocation therein.

7. In a switch, the combination with a casing having a terminal supporting head, of a contact carrier reciprocable in said casing and comprising a plate, a dielectric secured to the plate and having its opposite sides recessed and sockets disposed between said recesses, a channeled contact member spanning said block and having the sides of said channel disposed in the side recesses for reciprocation therein, and springs disposed in said sockets and urging said member from said block.

8. In a switch, the combination with a casing having a terminal supporting head, of a contact carrier reciprocable in said casing and comprising a plate, a dielectric block secured to the plate and having its opposite sides recessed and sockets disposed between said recesses, a channeled contact member spanning said block and having the sides of the channel disposed in the side recesses for reciprocation therein and having also bosses each providing a socket opposed to a socket in said block, and springs disposed in the sockets in said block and said member, said bosses serving as areas contacting with said terminal head or contacts thereon as may be predetermined by the switch operator.

9. In a switch the combination with an actuating rod having recessed sides of a contact actuator comprising a plate having upturned ends, a portion of one end being cut out to form a slot in said end of a size sufficient to admit said rod, said portion being upturned to provide a lug intermediate said ends, said slot having a narrowed upward extension, the sides thereof engaging the recesses in said rod, and a contact carrier mounted on said plate between said lug and the end of said plate remote therefrom.

10. In a switch the combination with an actuating rod of a contact actuator comprising

a plate having upturned ends, said rod being interlocked with one of said ends, and a contact carrier comprising a block of insulating material mounted on said plate between said ends and provided with side recesses extending from points remote from said plate, but terminating short of said plate to provide shoulders, and a movable contact carried by said block and having side extensions slidable in said recesses, said shoulders being interposed between said side extensions and said plate.

11. In a switch, the combination with a case and a contact carrier provided with contact means reciprocable therewithin of a terminal head for said case provided with a central detent recess and a plurality of spaced terminal contacts symmetrically disposed at opposite sides of said central recess, and a plurality of detent recesses also symmetrically disposed at opposite sides of said central recess.

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