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T. KIGHT

2,227,350

ELECTRIC SWITCH

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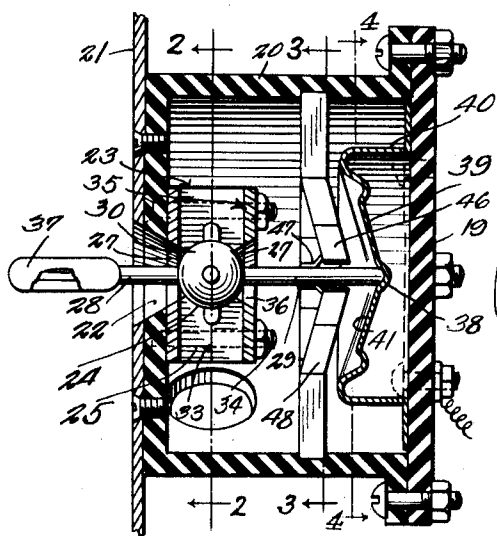


Fig. 1.

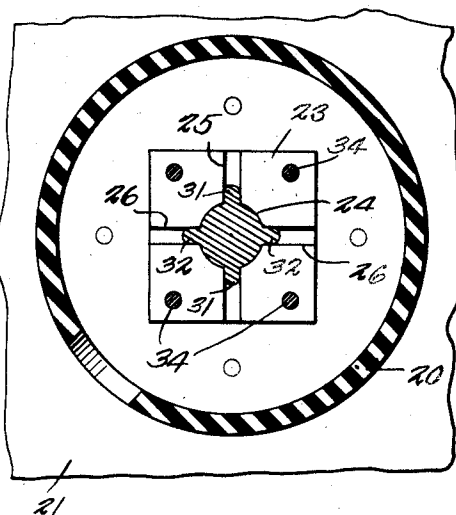


Fig. 2.

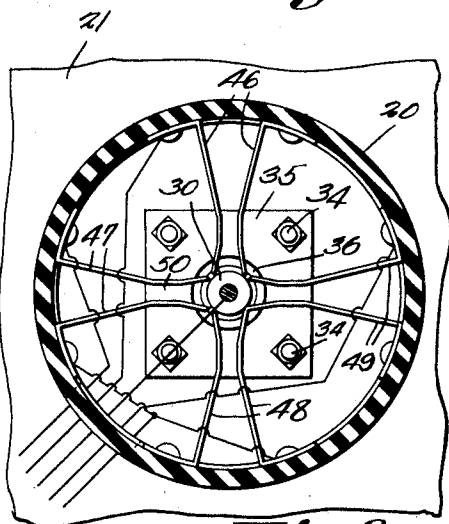


Fig. 3.

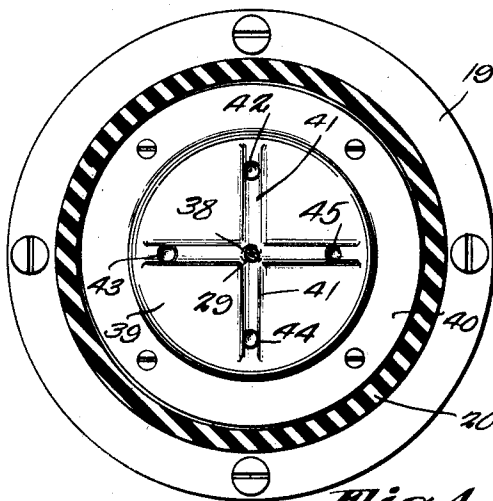


Fig. 4.

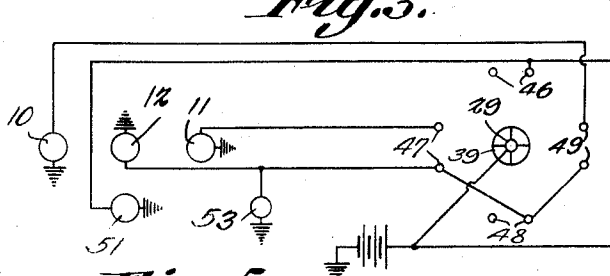


Fig. 5.

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## UNITED STATES PATENT OFFICE

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## ELECTRIC SWITCH

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Application October 7, 1938, Serial No. 233,855

## 1 Claim. (Cl. 200—6)

This invention relates to electric switches designed primarily for use with the traffic signal systems of motor vehicles, one of the objects being to provide a switch of novel construction having a movable member readily shiftable radially from a central point into any one of several directions for closing different circuits, means of novel form being employed for guiding the movable switch member and holding it in shifted position.

Another object is to provide a switch of this character which is simple and inexpensive in construction, can be installed readily, and will not easily get out of order.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing the preferred form of the invention has been shown.

In said drawing:

Figure 1 is a central section through the switch.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a section on line 4—4, Figure 1.

Figure 5 is a diagram of a signal system controlled by the switch.

Referring to the figures by characters of reference, 10, 11 and 12 designate lamps of a signal system to be used on vehicles. The switch constituting this invention and used with said system includes a base or attaching plate 19 to which is secured a housing 20 adapted to be fastened to an instrument board 21 or the like and provided with a conical opening 22 at the center extending through the instrument board.

Secured to the inner surface of the housing so as to extend about the opening 22 is a holding block 23 having a central spherical opening 24 intersected by crossed slots 25 and 26 disposed at right angles to each other. Outwardly flared apertures 27 extend in opposite directions from the spherical opening 24 and provide clearances for oppositely extending stems 28 and 29 respectively of a switch lever projecting radially from a ball 30 which is fitted snugly in the opening 24. This ball is formed with radially disposed pivot studs 31 and 32, the studs 31 being extended in opposite directions into the slots 25 while the

studs 32 are extended in opposite directions into the slots 26. At this point it might be stated that the slots are provided by forming the block 23 of spaced corner pieces each of which consists of superposed pieces which come together at their inner faces as indicated at 33, these parts being held together securely and also to the housing 20 by bolts 34 which extend through the block and through an inner clamping plate 35 bearing on the block and provided with an opening 36 constituting a continuation of the opening 27.

Stem 28 projects outwardly beyond the instrument board 21 and is provided with a handle 37. Stem 29 is extended inwardly within housing 20 and is normally seated in a recess or socket 38 provided at the end of a concave diaphragm 39 formed of resilient metal and supported at its periphery by a flange 40 bearing against the base 19.

It will be apparent that by mounting the ball 30 in the manner disclosed, it becomes possible for said ball to be given a rotating motion about either the studs 31 or the studs 32. When the studs 31 provide the axis about which the ball turns, the studs 32 will swing within the slots 26 and when the studs 32 provide the axis about which the ball is to be turned, the studs 31 will swing within the slots 25. Thus the stems 28 and 29 are free to be swung in either of two planes, these planes intersecting each other at right angles.

Diverging from the socket 38 in the diaphragm 39 are radial grooves 41 lying within the planes of movement of the stem 29 and at the ends of these grooves, which constitute guides for the stem, are located sockets 42, 43, 44 and 45 respectively, any one of which is adapted to receive the end of stem 29 when the same is shifted thereto.

Supported by the wall of casing 20 are separate pairs of spring fingers constituting resilient contacts, these pairs being indicated at 46, 47, 48 and 49 respectively. The fingers of each pair converge inwardly toward each other to a point between their ends and then diverge inwardly to points near the center of the casing. Thus the contacts of each pair cooperate to form throats or restricted portions and these throats or restricted portions, indicated generally at 50, are located in the planes of movement of the stem 29.

As shown particularly in Figure 3 one of the contacts 46 can be electrically connected to a

light 51 forming part of a signal system. One of the contacts 47 is electrically connected to one terminal of the lamp 11 while the other contact 47 is electrically connected to one terminal of the lamp 12. One terminal of lamp 10 is electrically connected to one of the contacts 49 and the other contact 49 as well as the contact 48 are also electrically connected to lamp 12 as shown.

All of the lamps are grounded as shown and the switch stem 29 can be electrically connected to one terminal of a battery the other terminal of which is grounded as indicated. The several contacts and the stem 29 are of course all insulated from each other and circuits can be established only by shifting stem 29 into engagement with the contacts of any of the pairs.

When the switch is shifted so that stem 29 is swung out of its intermediate or neutral position into socket 44, the stem 29 will be swung into engagement with the contacts 48 and a circuit will be completed through lamp 12 which will result in its illumination. Thereafter the stem 29 is swung in the opposite direction so as to become seated in socket 42 at which time the stem will have been brought into engagement with contacts 46 and completed the circuit to the light 51. It might be stated at this point that, in vehicle construction, this light can also be provided with the usual means under the control of a brake pedal 52 for lighting the lamp when the brake is applied. This supplemental circuit has been shown in Figure 5.

Should it be desired to light lamp 12, the operator moves the stem 29 from neutral position into engagement with the contacts 48. By swinging

stem 29 back to neutral position and then into engagement with contacts 47, both lamps 11 and 12 will be energized. When the operator shifts the stem 29 into engagement with the contacts 49, the lamp 10 is illuminated.

As the diaphragm 39 is formed of resilient material, it will yield sufficiently to permit the stem 29 to be shifted from one position to another but will at the same time spring back to hold the end of the stem within the selected socket when it is brought to proper position.

As shown in Figure 5, a lamp 53 can be located where it will be illuminated when any one of the other lamps 10, 11 and 12 is operated.

What is claimed is:

A switch including an insulating housing, a block supported therein having crossed open ended slots and a socket at their point of crossing, a switch lever, a ball thereon seated in the socket to provide a fulcrum, said lever being positioned to swing into any one of the slots, a resilient diaphragm fixed in the housing and having guide grooves upwardly diverging from a central point and in the same planes with the respective slots, there being sockets in the diaphragm at the outer ends of the grooves and at the said central point, one of the stems of the lever being proportioned to seat in any one of the sockets, those portions of the diaphragm between the sockets constituting means for yieldingly resisting the movement of said stem from one socket to another, and contacts positioned for engagement by said stem when seated in any one of the end sockets.

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