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2,096,745

ROTARY SWITCH

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Fig. 1.

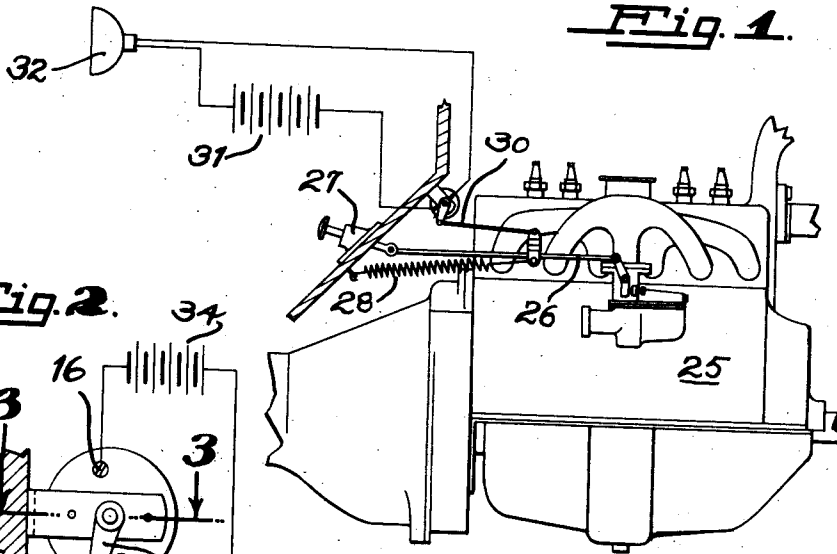


Fig. 2.

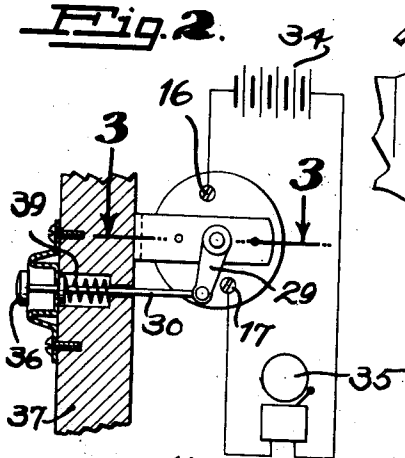


Fig. 3.

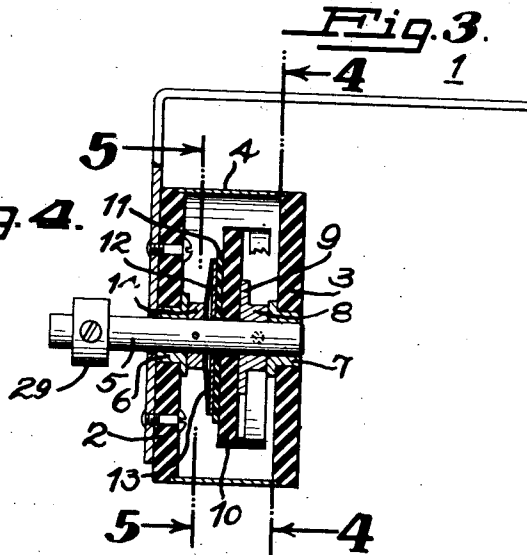


Fig. 4.

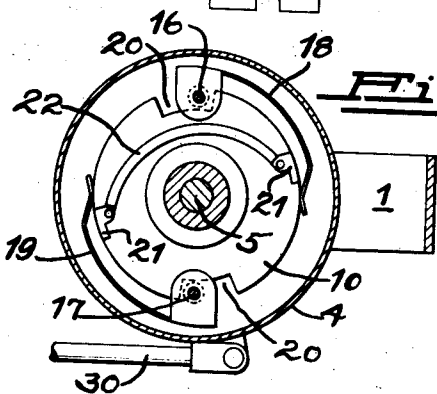
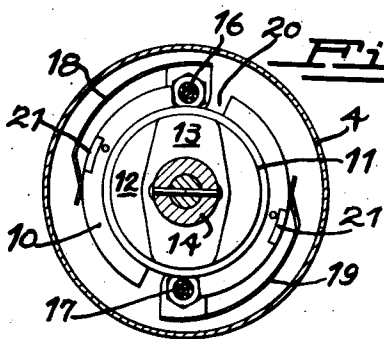


Fig. 5.



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ROTARY SWITCH

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4 Claims. (Cl. 200—59)

My invention relates to rotary switches, and more particularly to that type of switch wherein rotation in one direction makes contact in an electrical circuit and rotation in the opposite direction breaks the contact, the rotation of the main operating shaft of the switch being capable of continuous progression.

Among the objects of my invention are:

- To provide a rotary switch operating only upon change of direction of rotation; to provide a continuously rotatable switch member operating electrical contacts only upon change in direction of rotation; to provide a switch having a wiping contact; and to provide a simple, efficient and self-cleaning rotary switch.

My invention possesses numerous other objects and features of advantage, some of which, together with the foregoing, will be set forth in the following description of specific apparatus embodying and utilizing my novel method. It is therefore to be understood that my method is applicable to other apparatus, and that I do not limit myself, in any way, to the apparatus of the present application, as I may adopt various other apparatus embodiments, utilizing the method, within the scope of the appended claims.

Referring to the drawing:

Figure 1 is a diagrammatic representation of the switch of my invention as applied for use in controlling a vehicle stop light.

Figure 2 is a diagrammatic view partly in section, showing the switch of my invention utilized in a doorbell circuit.

Figure 3 is a longitudinal view through one preferred form of rotary switch.

Figure 4 is a view partly in section and partly in elevation, taken as indicated by the line 4—4 in Figure 3.

Figure 5 is a similar view, taken as indicated by the line 5—5 in Figure 3.

The great majority of rotary switches now in use are operated through the medium of a main shaft rotatable to open or close electrical contacts. They are so connected to the operating mechanism that continuous rotation of the operating shaft is not possible in either direction. My switch, herein described and claimed, differs from this type of switch in that continuous rotation of the main operating shaft is possible, the switch contacts being operated only upon change of rotational direction. The switch, thus operated, has many uses, several of which will be described later.

Referring directly to the figures for a more detailed description of a preferred embodiment

of my invention, and particularly to Figure 3, I provide a mounting bracket 1 to which is attached an upper casing disc 2 and a lower casing disc 3, preferably of insulating material, the two being joined by a casing side wall 4. This latter may of course be of metal, if desired. A main operating shaft 5 is journaled in end walls 2 and 3 in bearings 6 and 7 so that it may rotate freely in either direction.

Mounted on the shaft adjacent the bottom bearing 7 is a collar 8 bearing a friction flange 9. Also slipped over the shaft is a contact disc 10, free to rotate on the shaft, and one side of this disc bears against friction flange 9.

On the other side of the contact disc 10 I prefer to mount a friction clutch comprising a friction disc 11 of insulating material, a spring bearing disc 12 and a spring 13, this latter spring being slightly bowed, and applying pressure on the clutch discs. The spring is tensioned by locking collar 14.

It can be readily seen that the switch can be assembled quickly by mounting collar 8 on the shaft 5, dropping the end of the shaft into bearing 7, placing on the shaft contact disc 10, clutch discs 11 and 12, then spring 13 and finally collar 14. Top casing disc 2 is then slipped over the shaft to clamp side wall 4 between the two casing discs.

Before final assembly, however, I prefer to mount between casing discs 2 and 3 a pair of upright pins 16 and 17. These pins carry stationary contacts 18 and 19 in the form of springs extending peripherally on the outside of the contact disc 10 to terminate on the disc, opposite each other. I also prefer to provide notches 20 in the contact disc 10, and position the pins 16 and 17 so that they will be within these notches as they pass through the switch chamber. The edges of these notches will then determine the arc of rotation allowed to the contact disc 10. I also prefer to use these pins 16 and 17 to clamp the case together after switch assembly, and inasmuch as contacts 18 and 19 are attached to these pins, they may also be used conveniently for exterior connection to the switch, as shown in Figure 3.

Mounted on the periphery of the contact disc 10 are a pair of segmental contacts 21, preferably connected together by conducting link 22 crossing the disc, and in assembling the switch mechanism I prefer to position notches 20 such that at one end of the disc travel contacts 21 and link 22 will complete the circuit between stationary contacts 18 and 19, whereas when the rotation

of the disc is reversed and the edges of notches 20 limit the travel of the disc in the opposite direction, the segmental contacts 21 are removed from contact with stationary contacts 18 and 19, thus providing a break. I have therefore allowed only a short arc of rotation to disc 10. At one end of this arc the circuit is made; at the other end of the arc the circuit is broken.

While I have shown double contacts in the present example, it is obvious that a single contact disc may also be used, and in this case one of the contacts 21 and contact 19, for example, may be omitted and link 22 connected frictionally to the shaft of the switch so that an operating connection may be made, for example, to bearings 6 or 7, but I prefer to use double contacts.

The operation of the switch is simple. The disc is free to move with the shaft as it is rotated within the limits of notches 20, due to the friction in the clutch assembly. As soon as the edges of notches 20 are engaged, however, by pins 16 and 17, rotation of the disc will stop. Rotation of the operating shaft, however, can continue, the friction clutch assembly merely slips. The instant the direction of rotation is reversed the disc will immediately rotate across the arc of notches 20. The circuit is made or broken in accordance with the direction of rotation of shaft 5.

Such a switch has several uses, one of the most important being as a stop light control for automobiles, as shown in Figure 1. Here, an engine 25 is controlled by a throttle rod 26 leading to a throttle control or accelerator 27. Spring 28 tends normally to keep the throttle closed, or nearly so.

An operating arm 29 is placed on the operating shaft 5 and connected to the throttle rod through a link mechanism 30 in such a manner that as the throttle rod moves to open the throttle, circuit from battery 31 to stop light 32 is broken. However, the instant pressure on accelerator 27 is removed and the throttle starts to close through the action of spring 28, the direction of rotation of shaft 5 is reversed and contact is made in the switch, thus lighting the stop light and indicating to those behind the vehicle that deceleration may be expected. Immediately upon the throttle being opened again the stop light will go out, due to rotation of shaft 5 in the opposite direction. Inasmuch as shaft 5 may rotate any desired amount without operating the switch, unless direction of rotation is changed, the stop light will operate in any position of the throttle, either full open, fully closed or at any intermediate stage.

At all times the switch will indicate whether or not the throttle is being opened or closed. Furthermore, if the throttle is being opened continuously to a certain point, and this point maintained without closing the throttle at any time, the disc 10 will stay in position so that the light will not light. Likewise, if the throttle is reduced the stop light goes on, and if the throttle is not again advanced immediately the stop light will stay on during further reduction or until the throttle is again opened.

One of the advantages of my switch, as applied to the throttle, is that it does not have to be adjusted to any particular location or to any particular part of the throttle rod. Inasmuch as the main operating shaft is continuously rotat-

able, arm 29 may be loosened on the shaft, the switch placed at any desired location, and the operating rod 30 may then be clamped onto the throttle rod, as may be convenient. The arm 29 may then be fastened to the shaft, and the switch is ready for operation.

A further use of my invention is shown in Figure 2, where the current from source 34 is controlled by the switch of my invention to a doorbell 35. In this case, the arm 29 is connected to a link 30, which in turn is connected to a push-button 36 mounted on any convenient foundation 37. In this case I use a special return spring 39 to return the switch to off-position. I have found that such a switch, used as a doorbell, is exceptionally reliable, and it is well known that doorbell switches in general use do not retain their original switching properties for any great length of time.

Inasmuch as many other uses of the switch of my invention will be obvious to those skilled in the art, I will not cite many other examples, which will be at once apparent as falling within the scope of the claims appended hereto.

I claim:

1. A rotary switch comprising a shaft to be rotated, a disc free to revolve on said shaft, a friction clutch connecting said shaft and said disc, a segmental contact on said disc, a stationary contact positioned to bear against said segmental contact upon one rotational position of said disc, and means for limiting the rotation of said disc to an arc including both make and break of said contacts irrespective of the amount of rotation of said shaft, said means including a recess in said disc and a stop member fixed relative to said disc and adapted to engage in said recess.

2. A rotary switch comprising a casing, a shaft journaled in said casing, a disc within said casing and frictionally rotated by said shaft, a pair of opposite peripheral and electrically connected contacts on the periphery of said disc, a pair of opposite conductive risers fixed to said casing, spring contacts attached to said risers and bearing against the periphery of said disc, and positioned to be electrically connected at one rotational position by said peripheral contacts, said disc being notched to form a recess for said risers, the edges of the notches forming stops limiting rotation of said disc to an arc including make and break of said contacts by engagement with said risers.

3. In a vehicle driven by an engine having a movable speed control and a stop light circuit, a rotary switch in said circuit comprising a shaft to be rotated, a disc frictionally mounted on said shaft, a segmental contact on said disc, a stationary contact positioned to bear against said segmental contact upon one rotational position of said disc, means for limiting the rotation of said disc to an arc including both make and break of said contacts irrespective of the amount of rotation of said shaft, said limiting means comprising a recess in said disc and a stop member, supporting said stationary contact, adapted to engage in said recess, and means connecting said movable control to said shaft to cause rotation thereof upon movement of said control.

4. In a rotary switch according to claim 1, a casing for said switch held together by the stop member.

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