

June 2, 1942.

R. T. MASON

2,285,121

SWITCH

Filed Sept. 23, 1939

2 Sheets-Sheet 1

Fig. 1

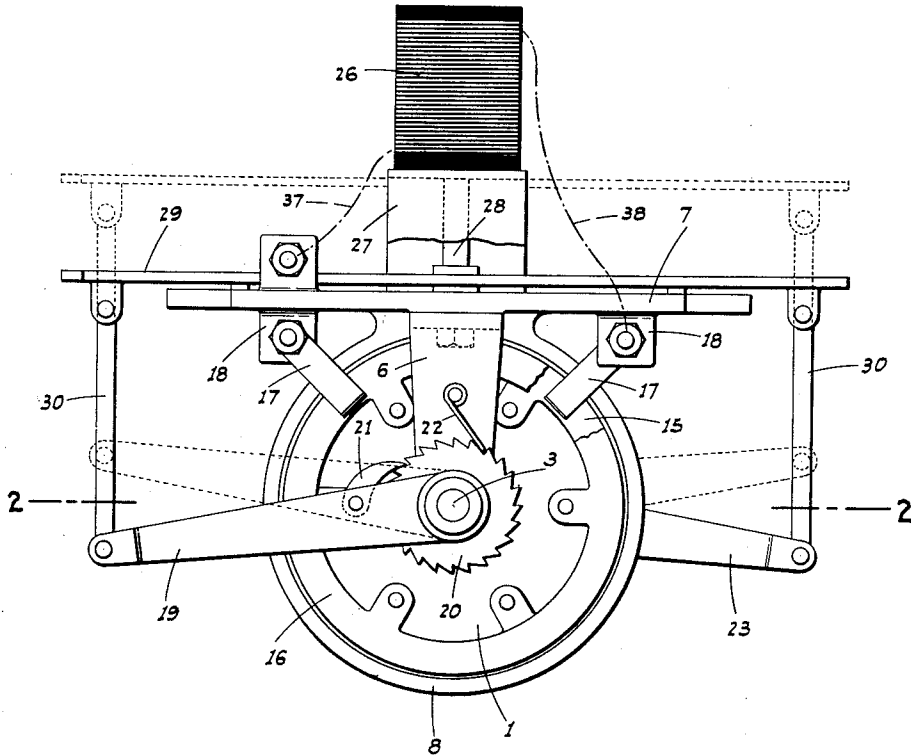
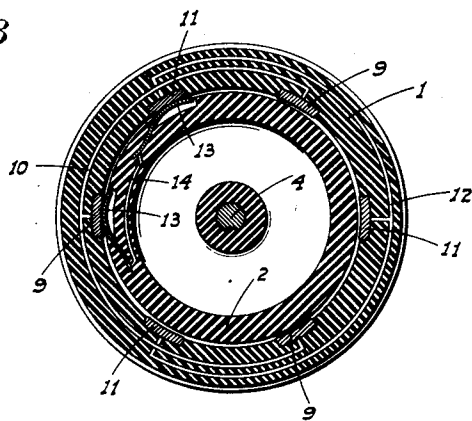


Fig. 3



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Fig. 2

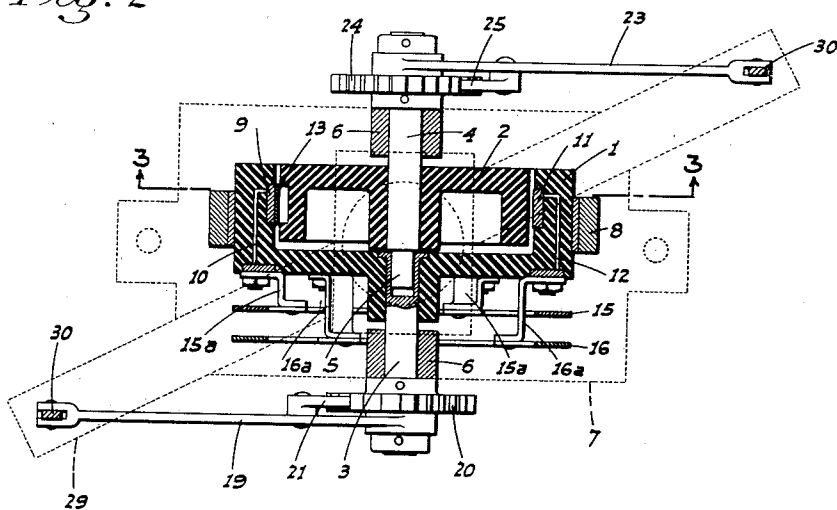
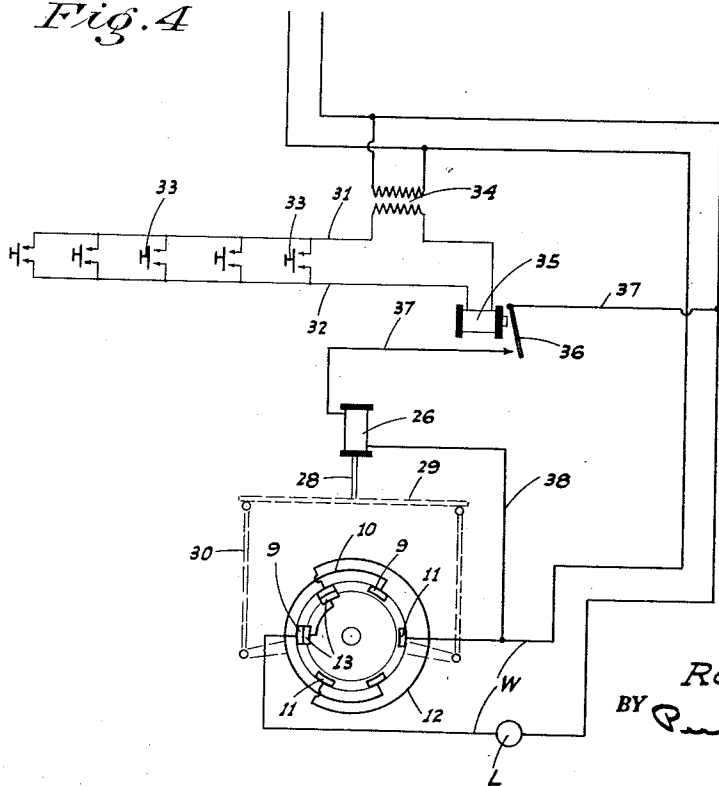


Fig. 4



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2,285,121

SWITCH

Roy T. Mason, Newman, Calif., assignor of one-half to Norbert R. Schiernbeck, Modesto, Calif.

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3 Claims. (Cl. 200-105)

This invention relates in general to electrical apparatus, and in particular the invention is directed to an improved switch.

The principal object of the present invention is to provide an improved and rapid action rotary switch, and a switch especially adapted for actuation from a remote point and through the medium of a low voltage circuit.

Another object of the invention is the provision of a rotary switch of the type described which, while being of relatively light weight construction, is adapted for heavy duty or high tension service and without external or exposed arcing occurring.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of the improved switch.

Figure 2 is a sectional plan on line 2-2 of Fig. 1.

Figure 3 is a cross section on line 3-3 of Fig. 2.

Figure 4 is a diagrammatic illustration of a circuit incorporating the improved switch.

Referring now more particularly to the characters of reference on the drawings, the switch comprises an exterior rotary shell 1 and an interior rotor 2, both of insulation material. The shell and rotor are provided with separate aligned shafts 3 and 4 respectively which may have supporting connection with each other at adjacent ends if desired, and as indicated at 5. The shafts beyond the shell and rotor are turnably supported in bearings 6 depending from a switch mounting plate 7. The casing 1 may also be turnably supported in a bearing ring 8 depending from said plate.

An even number of evenly and circumferentially spaced contacts are mounted within the shell and are exposed to the bore thereof. Alternate ones 9 of these contacts are electrically connected with each other within the shell, as by an embedded wire 10, while the remaining contacts 11 are similarly electrically connected with each other within the shell as by a separate embedded wire 12. The rotor is provided with a pair only of contacts 13 exposed to the periphery thereof and spaced apart the same distance as adjacent shell contacts. Contacts 13 are electrically connected to each other within the rotor as by an embedded wire 14.

Disposed in spaced relation to each other and

to the shell beyond one end of the same (preferably that end from which shaft 3 projects) are contact rings 15 and 16. These are separately engaged by brushes 17 extending to binding posts 18 mounted in connection with plate 7, and to which are connected the circuit wires W in which the light L or appliance to be actuated are interposed, as indicated in Fig. 4.

Ring 15 is connected to shell 1 to rotate therewith by metal legs 15a one of which is connected to wire 10 as shown in Fig. 2, while ring 16 is separately connected to the shell by legs 16a one of which is connected to wire 12. A ratchet wrench device is applied to the shafts 3 and comprises a substantially horizontal lever 19 turnable on the shaft, a ratchet wheel 20 fixed on the shaft and a lever mounted pawl 21 engaging the wheel. A holding pawl 22 is also provided to prevent retraction of the ratchet wheel. A similar but oppositely disposed device is mounted in connection with shaft 4, and includes a lever 23, ratchet wheel 24 and actuating pawl 25. When both levers are moved upwardly therefore, the shell will be rotated in one direction while the rotor will be rotated in the opposite direction.

The levers are thus moved simultaneously, and so that the arc of rotation of the shell and rotor will be the same, by means of a single solenoid 26. This is mounted above plate 7 on a bracket 27 supported thereby, and its movable core 28 is connected to a horizontal diagonally extending bar 29 which at its ends is connected by depending links 30 to the outer ends of levers 19 and 23. The solenoid and parts connected therewith are arranged so that the vertical movement of the bar 29, when the solenoid is energized, will cause the shell and rotor to be each rotated through an arc one-fourth the distance between adjacent shell contacts, or so that the arc of combined rotation of the shell and rotor is equal to one-half the distance between said contacts. The shell and rotor are disposed relative to each other so that such rotation will either place bridging contacts 13 in engagement with adjacent contacts 9 and 10, or centrally between the latter contacts. In the first instance, the circuit will be closed through said contacts, wires 11 and 12, rings 15 and 16 and wires W. In the second instance, the circuit will be broken as will be obvious.

When the solenoid is de-energized, the core, bar, links and levers drop of their own weight, but the rotor and shell remain in the position to which they were moved by energizing of the

solenoid. Successive energizations of the solenoid therefore impart rotative movements to the shell and rotor so as to cause the circuit to be alternately closed and opened.

The improved switch is therefore admirably suited for use in a circuit assembly wherein the actuation of a relatively high voltage electric light or appliance circuit is controlled from one or more remote points by a relatively low voltage circuit; such a circuit assembly being shown diagrammatically in Fig. 4 and to which I now specifically refer.

In this illustrative circuit assembly, the circuit W is of relatively high voltage; the electric light or appliance L of the switch, indicated generally at 4, being wired in series in said circuit.

In order to actuate the solenoid and the switch from a number of remote points and through the medium of a low voltage circuit. I provide an actuating circuit including wires 31 and 32 having a plurality of push button switches 33 wired thereacross in parallel. These push button switches may be positioned at separate and widely remote points from the electric light or appliance L which is to be controlled. Current for circuit wires 31 and 32 is supplied by a step-down transformer 34 connected to high voltage circuit wires W. Wires 31 and 32 lead to the coil of a relay 35 whose switch 36 is interposed in a wire 37 leading from one high voltage wire W to one terminal of the solenoid 25; the other terminal of the solenoid being connected to the other high voltage wire W by a wire 38.

By depressing any one of the push button switches 33 the relay 35 operates, closing the solenoid circuit and actuating the switch; recurring closing of the low voltage push button circuit alternately opening and closing the switch as has been previously explained.

The advantage of the above circuit and switch assembly is that it is much cheaper to install the two-wire low voltage push-button switch circuit than the relatively costly three or four wire 110 v. or higher voltage circuits with snap switches thereon, as is now done in residences etc. to control an electric light or appliance from more than one relatively remote point.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I

claim as new and useful and desire to secure by Letters Patent is:

1. In a switch having a pair of separate members, means supporting the members in relatively turnable and coaxial relation, and contacts on the members adapted to cooperate with each other but normally spaced apart circumferentially a predetermined arcuate distance; operating means applied to both members to normally maintain them in such relative position that the contacts are spaced apart a predetermined arcuate distance and operable to rotate the members from such position in opposite directions and at the same speed and to an arcuate extent only sufficient to bring the contacts into engagement with each other; said operating means including separate arms operatively connected to and projecting radially from the members in opposite directions and a single movable member connected to the arms at their outer end.

2. A switch comprising a shell mounted for rotation, an even number of equally spaced contacts in the shell disposed in a path concentric with the axis of rotation, a pair of binding posts, means connecting alternate contacts to one post and the remaining contacts to the other post, a pair of connected contacts within the shell spaced the same as the shell contacts and adapted to alternately engage adjacent shell contacts and to occupy a position therebetween, a rotor on which said pair of contacts are mounted, said rotor being disposed coaxially with the shell for rotation independently thereof and means to simultaneously rotate the shell and rotor in opposite directions a combined arcuate distance equal to one-half the arcuate spacing between adjacent shell contacts; said last named means including a solenoid mounted as a unit with the switch and adapted to be energized from a relatively remote point.

3. A switch comprising a shell mounted for rotation, an even number of equally spaced contacts in the shell disposed in a path concentric with the axis of rotation, a pair of binding posts, means connecting alternate contacts to one post and the remaining contacts to the other post, a pair of connected contacts within the shell spaced the same as the shell contacts and adapted to alternately engage adjacent shell contacts and to occupy a position therebetween, a rotor on which said pair of contacts are mounted, said rotor being disposed coaxially with the shell for rotation independently thereof, the shell and rotor being adapted to be rotated simultaneously and in opposite directions a combined arcuate distance equal to one-half the spacing between adjacent shell contacts.

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