M. D. GREENGARD.

ELECTRICAL SWITCH.

APPLICATION FILED OCT. 14, 1910.

1,038,567.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

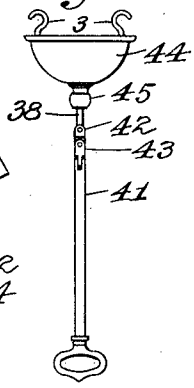


Fig. 2.

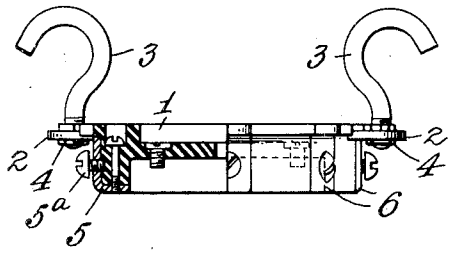


Fig. 3.

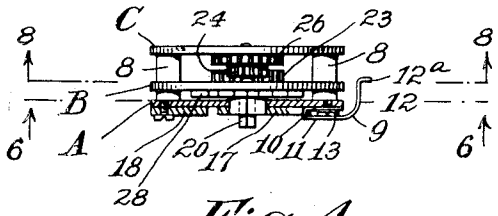


Fig. 4.

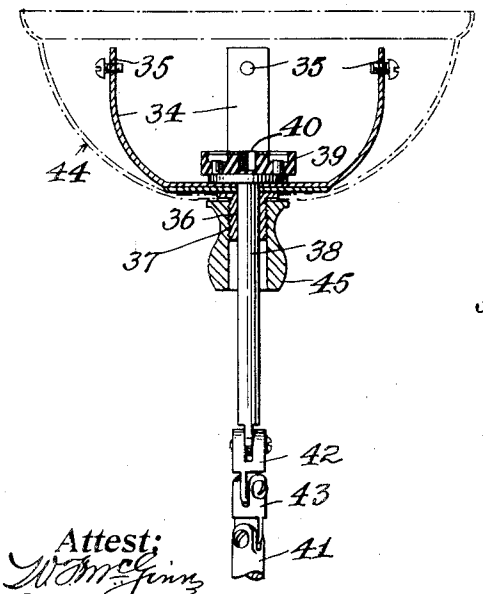
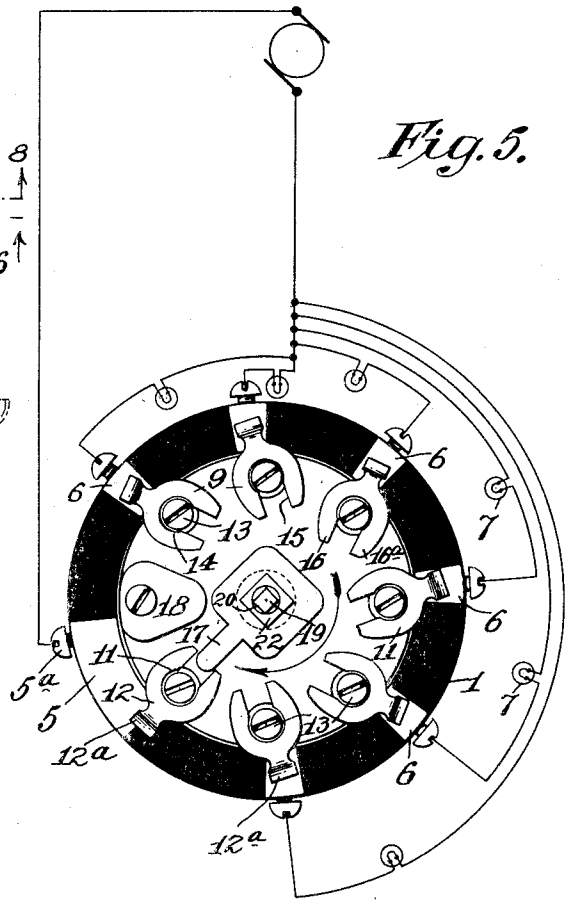


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6

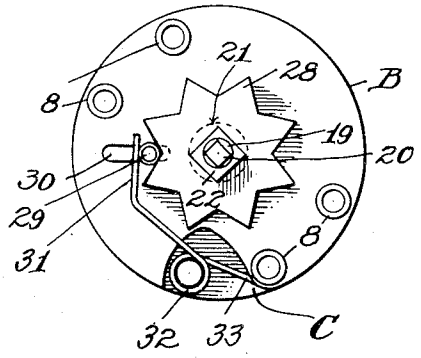


Fig. 8.

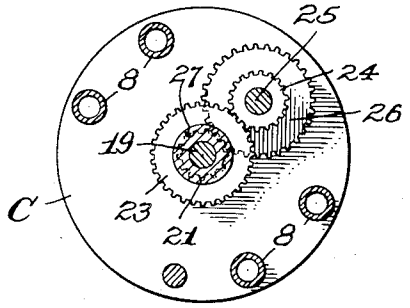


Fig. 7.

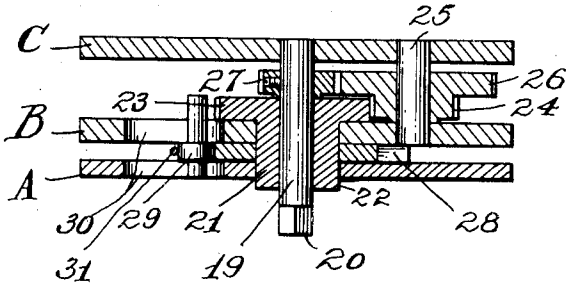
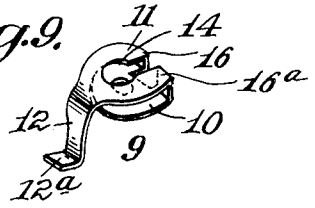


Fig. 9.



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UNITED STATES PATENT OFFICE.

MORRIS D. GREENGARD, OF NEW YORK, N. Y.

ELECTRICAL SWITCH.

1,038,567. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed October 14, 1910. Serial No. 586,966.

To all whom it may concern:

Be it known that I, MORRIS D. GREENGARD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification.

My present invention relates to an improvement in electrical switches suitable for a variety of uses including its use as a cluster switch in connection with an electrolier having a plurality of lights.

The advantages of the switch construction will appear to those skilled in the art from an understanding of the following description in connection with the annexed drawings.

In the drawings which show one of the specific forms which my switch may take, Figure 1 shows in side elevation a switch within my invention; Figs. 2, 3 and 4 are views partly in vertical section and partly in elevation of the switch of Fig. 1 on an enlarged scale, the switch being shown dismembered into three main parts, Fig. 2 showing the base part, Fig. 3 the middle portion and Fig. 4 the remaining portion; Fig. 5 is an underneath plan of the assembled base and middle portions of the switch after the portion shown in Fig. 4 has been removed; Fig. 6 is a horizontal section partly in underneath plan on the line 6—6 in Fig. 3 looking in the direction of the arrow; Fig. 7 is an enlarged vertical section partly in elevation of parts of the middle portion shown in Fig. 3; Fig. 8 is a horizontal section partly in underneath plan on the line 8—8 in Fig. 3, looking in the direction of the arrow; and Fig. 9 is a perspective view on an enlarged scale of one of the pivoting contacts detached.

I will now describe the particular devices of the drawings, reserving it to the claims to point out the novel features and to define the scope of the invention, it being understood that the claims will be given due range of equivalents.

1 is the base of the switch consisting of a cup of insulating material (see Fig. 2). It supports the other parts of the switch and is itself in turn supported from the fixture. Thus, it has lugs 2 to receive the shanks of hooks 3 which take over the arms of the fixture. Nuts 4 engage the threaded shanks of the hooks where they project through the apertures in the lugs. Of course, other means for securing the switch to the fixture or elsewhere may be adopted.

Arranged around the rim of the insulating cup are stationary contacts. There is one common contact 5 with which the common return wire of the fixture connects by a screw 5^a. Further there are as many other stationary contacts 6 as there are lamps. The switch shown has six of these individual contacts because it is intended for a six-lamp fixture. Of course, a greater or lesser number can be employed. The wiring is best shown in Fig. 5, the wires of the individual lamps being designated 7.

The middle portion of the switch shown in Fig. 3 consists of three metal disks A, B and C, secured rigidly together by post and screw connections 8. The disks B and C are spaced farther apart than the disks A and B.

9 designates a plurality of pivoting contacts arranged around the periphery of disk A, best shown in Fig. 5. Each pivoting contact (see detail view of Fig. 9) consists of a piece of sheet metal having a base portion 10, a middle portion 11 directed rearwardly to overlie the base portion, and a foot portion 12 bent at an angle to the middle portion and having a toe 12^a to bear upon the rim of the cup 1 and on the countersunk stationary contacts in said rim. The screw 13 passes through an aperture in the base portion of each contact and pivotally secures it to the disk A. An opening 14 is cut through the middle portion of the contact to give access to the head of this screw. Further, the base portion and middle portion of each contact where they join together is cut away at the middle 15 to provide a pair of projections 16 and 16^a, one at each side of the cut-away space.

There are as many pivoting contacts as there are stationary contacts on the cup 1. Further, the former are arranged to register with the latter, and more particularly so that each contact can be pivoted into one position where it is in contact with its particular stationary contact, and reversely into the opposite position in which it is out of contact. (Compare Fig. 5) Briefly, the means for pivoting or operating these contacts 9 is a rotatable arm 17. This can be rotated by the operator of the switch in either direction and as it rotates, it engages one pivoting contact after the other and operates

them into contacting or non-contacting position, depending upon the direction of rotation of the arm. It is the projections or horns 16 and 16ª of the pivoting contacts that the arm 17 strikes when it operates the contacts.

Referring to Fig. 5 it will be seen that rotating the arm 17 in the direction of the arrow will pivot the contacts 9 successively into electrical contact with their stationary contacts, and consequently will light one lamp after the other until all of the lamps have been lighted, whereupon still further rotation of the arm will pivot the last contact out of contact with the common stationary contact 5 and will extinguish all of the lights. Reversely, rotating the arm in the opposite direction to the arrow will first pivot the common contact 9 into engagement with the common stationary contact 5, whereupon all of the lamps will light up. Continuing the rotation of the arm will cause it to strike the horns of the pivoting contacts one after the other and to swing said contacts successively out of electrical connection with their respective stationary contacts 6 with the result that one lamp after the other will be extinguished until finally all of them will be extinguished.

18 is a stop on the disk A which stops the rotation of the arm 17 after it has been rotated in the direction of the arrow in Fig. 5 to the full extent described above, where it has extinguished all of the lights, and which further acts as a stop for said arm when rotated in the opposite direction by which, as described, it extinguishes the lamps successively until all are extinguished.

Of course, it will be understood that other arrangements are possible besides that specifically shown and described, as, for example, in some respects it is not desirable to have the arm 17 operate the common pivoting contact 9 out of connection with the common stationary contact 5 to extinguish all of the lights, for the reason that by so doing the full current of all the lamps is broken, thereby leading to undesirable arcing. Accordingly, the stop 18 could be arranged to engage the arm on its rotation in the direction of the arrow in Fig. 5 and to stop said rotation before it can operate the common pivoting contact to extinguish all of the lights.

I will now proceed to describe the further features of improvements relating to the means for operating the arm 17. Thus, 19 is a spindle passing vertically through central apertures in the disks A and B and having an end-bearing in disk C. The opposite end 20 of this spindle is squared. The central aperture in disk A is larger than the diameter of the spindle and receives through it a sleeve 21 which in turn surrounds the spindle. Where this sleeve projects below the disk A in Fig. 7, it is squared at 22, said squared portion being received through a corresponding opening in the base of the operating arm 17. Above the disk A in Fig. 3, viz. between the disks A and B, said sleeve 21 carries a gear wheel 23. This gear is in mesh with a smaller gear 24 on a counter-spindle 25 having its bearings in the disks B and C. This same spindle further has a larger gear 26 which meshes with a smaller gear 27 on the previously referred to main spindle 19. The result is that turning the main spindle 19 by means of its squared head brings about the rotation of the sleeve 21 and consequently of the arm 17 by means of the intermediate train of gears. In this train of gears the power is delivered by the small to the large gears with a resultant increase of leverage and with the further result that a relatively large arc of rotation of the main spindle is reduced to a relatively small arc of rotation of the arm 17.

To compel the rotation of the arm 17 to proceed in definite successive stages, I provide a star-wheel 28 on the squared portion of the sleeve 21 between the disks A and B so as to rotate with said sleeve. I further provide a pin or roller 29 located vertically at the periphery of the star-wheel with its ends in radial slots 30, one in each disk A and B whereby the pin or roller can move to and away from the wheel in following its periphery. Finally, this roller is at all times spring-pressed against the periphery of the star-wheel by the free end 31 of a coiled spring 32 surrounding one of the post connections between the disks B and C, said spring having its other end 33 bearing against another similar post between said disks. The result is that the roller 29 is powerfully pressed against the periphery of the star-wheel and as the wheel is rotated along with the arm 17 and other parts by the operator of the switch, it is, of course, pressed back whenever a point of the star-wheel is rotated past it, but is instantly forced inwardly by the spring 31 down the other side of said point and stops when it reaches the base of the notch, with the result that the star-wheel, and consequently the arm 17, is kept rotating a definite distance and then stops, it being remembered that the roller 29 is confined against lateral displacement by the radial slots in the disks A and B.

Lastly, it remains to describe the actual means for engaging the squared or flatted portion 20 of the main spindle by which the operator manipulates the switch. Thus, 34 is a cage surrounding the middle portion of the switch and having arms which screw-connect at 35 with the sides of the insulating cup or base 1. 36 is a sleeve supported by the bottom of this cage or yoke, said sleeve

being externally threaded at 37. The bore of this sleeve is in line with the main spindle 19. It receives loosely through it a headed rod 38 having a piece of insulating material 39 secured to its upper end within the cage. A squared socket 40 is provided in the upper side of this piece of insulating material, said socket receiving the squared portion 20 of the main spindle into it and acting as a wrench to rotate said main spindle. The lower end of the rotatable rod 38 connects by a universal joint with another rod 41 having a key or fingerpiece on its end. The universal joint in the particular form shown consists of two short links 42 and 43 pivotally connected with each other by tongue and notch connections, and further connecting respectively with the two rods 38 and 41 by similar pivotal tongue and notch connections. This gives three tongue and notch connections and they are all located at different angles so that a true universal joint connection is provided, whereby the lowermost rod 41 having the key can swing freely when struck from any direction. On the other hand, when the key is twisted to rotate the rod 41, it correspondingly rotates the main spindle 19 through the intermediate connections, quite irrespective of whether said lowermost rod 41 is twisted in perfectly vertical position or at any inclination to the horizontal. In short, from this point of view, the rods and universal joint connection between the key and the main spindle 19 amounts to a flexible shaft.

The bottom shell of the fixture is indicated at 44 in Fig. 1. It has an opening through its bottom through which projects the threaded portion of the sleeve 36 and the referred to flexible shaft and key. The shell is upheld in said position by an ornamental nut 45 which screw-connects with said threads of the sleeve and bears against the underside of the shell.

The switches are turned out at the factory with the externally threaded sleeves 36 extra long so that they can be cut off afterward to the proper length to correspond with the depth of the particular bottom shell 44 used in connection with the fixture. Thus, some shells are deep while others are relatively shallow like that shown. It is only necessary that the threaded sleeve project a short distance through the bottom aperture of the shell sufficiently for the shell-supporting nut 45 to engage its threads.

Having thus described my invention, what I claim is:

1. In an electrical switch, the combination of rotary contact-operating means including a vertical spindle having a flatted lower end-portion, an apertured support detachably secured to the switch in underneath alinement with the spindle, and a rod passing through said aperture having a head above the support too large to pass through the aperture, said head having a socket fitting the flatted end-portion of the spindle, said rod below the support having a grip for twisting it to operate the switch.

2. In an electrical switch, the combination of rotary contact-operating means including a vertical spindle having a flatted lower end-portion, an apertured support detachably secured to the switch in underneath alinement with the spindle, a rod passing through said aperture having a head above the support too large to pass through the aperture, said head having a socket fitting the flatted end-portion of the spindle, said rod below the support having a grip for twisting it to operate the switch, and insulating means between said rod and spindle.

3. In an electrical switch, the combination of rotary contact-operating means including a vertical spindle having a flatted lower end-portion, an apertured support detachably secured to the switch in underneath alinement with the spindle, a rod passing through said aperture having a head above the support too large to pass through the aperture, said head having a socket fitting the flatted end-portion of the spindle, said rod below the support having a grip for twisting it to operate the switch, and a universal joint connection in the rod below the apertured support.

4. In combination with a fixture and its apertured bottom shell, an electric switch attachable to said fixture having a rotary contact-operating means, including a rod which is twisted to operate the switch, an externally threaded downwardly extending sleeve supported from the switch body of a length adapting it to be cut off to correspond with the depth of the particular bottom shell and so that said threaded sleeve projects downwardly a short distance through the aperture in said shell when the latter is in position, and a shell-supporting nut on said projecting end of the threaded sleeve.

In testimony whereof I affix my signature in presence of two witnesses.

MORRIS D. GREENGARD.

Witnesses:
E. W. SCHERR, Jr.,
ALAN C. MCDONNELL.