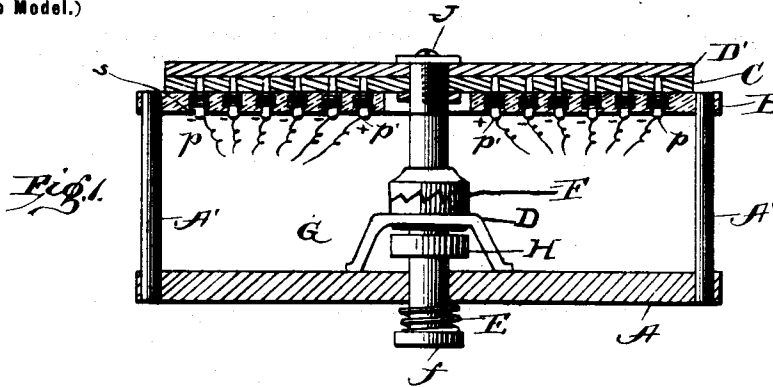
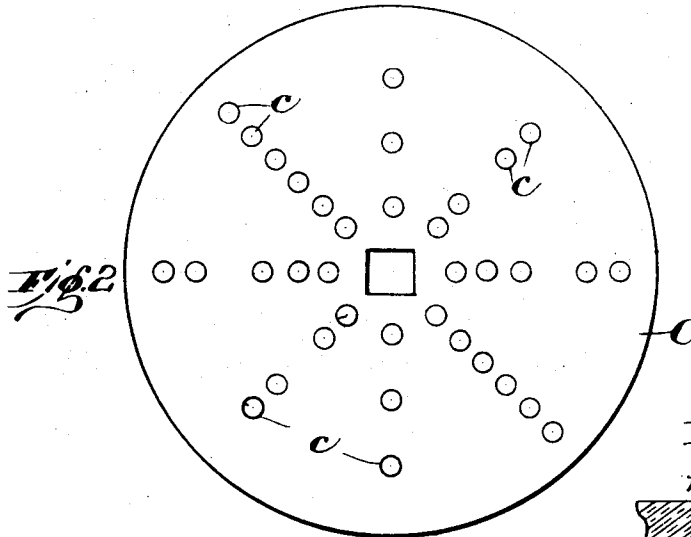
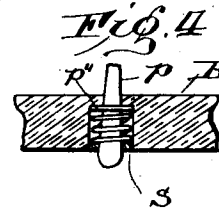
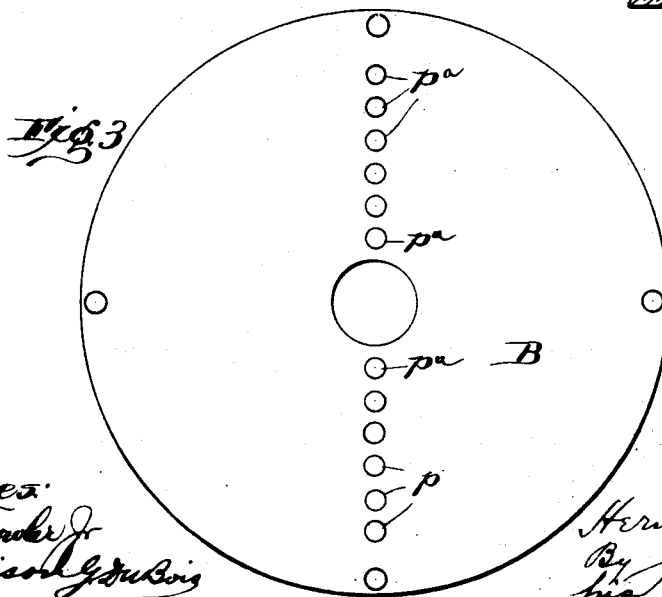


H. A. METZ.  
ELECTRIC SWITCH.

(Application filed July 5, 1899.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

HERMAN AUGUST METZ, OF BROOKLYN, NEW YORK.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 682,729, dated September 17, 1901.

Application filed July 5, 1899. Serial No. 722,841. (No model.)

*To all whom it may concern:*

Be it known that I, HERMAN AUGUST METZ, a citizen of the United States, residing in the borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Switches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to an automatic switch mechanism which is especially adapted for controlling the selection and operation simultaneously of a plurality of electric-lamp circuits, provision being made for readily making and breaking the current from a main source of supply to the several lamp-circuits.

The invention resides in a multiple switch to effect automatically the necessary changes in the distribution of current, and comprises a stationary circular insulated base having arranged in suitable groups a number of spring-actuated contact-pins projecting therefrom and which form terminals of a feed-circuit and a series of leading-wires, and a concentrically-arranged revoluble metallic disk that is provided on its lower face with an interposed insulating stop-disk, having likewise arranged in range and in groups a number of corresponding receiving-perforations which are adapted to be brought progressively in register to allow of the operative relation of the working portions of the face of the metal disk with the selected spring-actuated contacts by means of a rotatable end-wise-moving shaft or spindle, thereby forming a multiple switch in which firm and solid contacts are surely and automatically made on parts that are always bright and clean.

I have deemed it necessary to show only my improved switch, as the lamp-circuits are well known and understood.

The drawings are as follows:

Figure 1 shows a central vertical section. Fig. 2 is a plan view of the upper rotary disk member. Fig. 3 shows a plan view of the upper base or contact-carrying block, while Fig. 4 shows in detail and detached the construction of the spring-actuated contact.

The structure shown in the drawings con-

sists of a pair of concentrically-arranged circular base-blocks A and B, that are of suitable insulating material and of sufficient thickness to afford the necessary strength and which are shown as being held in spaced parallelism in braced position by means of the posts A'. From the upper face of the insulated block B project vertically independent contacts or pins  $p$  and  $p'$ , that are disposed equidistant apart in radial rows and which are yieldingly supported by encircling coiled springs  $s$ , that are socketed in the base B and held confined therein by reason of the headpiece  $p''$ , formed on each, and through the medium of which springs the contacts are adapted to adjust themselves vertically, according to their required action. The respective pins  $p$  and  $p'$  may be provided with binding-posts, (not shown,) to which the respective circuit-wires are connected.

The electrical connections, as shown, include twelve terminals, as follows: The common return-wires  $p' p'$  are led from the common source of supply, while the remaining ten contacts  $p$  form the terminals of the individual leading-wires to the lamp-circuits. These wires are insulated and may be led in a bunch or in a cable through the central space formed by the separated insulated base-blocks to the points to which it is desired that the current shall be directed.

Extending centrally through both blocks A and B is an operating shaft or spindle D, that is adapted to rotate loosely in bearings formed centrally through said blocks. To the upper end of the shaft D is rigidly keyed by a head-screw J or otherwise the rotary commutator members C and D' of the switch, while at the other end of the shaft there is provided an encircling helical spring E, the tendency of which is to press the disks C and D' in the direction of the projecting contacts. The disk D' is made of sheet metal, such as copper or other good electrical conducting material, and is provided on its under face with a plate of rubber or like insulating material, that is punched or cut by suitable dies, so as to provide a plurality of groups of perforations or slots C of a size and depth to accommodate the free ends of the corresponding groups of projecting contacts, thus admitting

of a positive contact of the working portions of the face of the metal disk with the free ends of like groups of contacts when brought into operative relation or engagement.

5 Mounted on said shaft between its ends is a pulley H, which may be connected with an electric motor or any other suitable power. The controller which acts in coöperation with the helical spring to reciprocate the shaft

10 while it is revolving is mounted alongside of the pulley on the shaft and comprises a ratchet or cam-faced wheel F, the cam-teeth of which are held in yielding engagement with the teeth of a fixed cam-faced gear-wheel G. The

15 ratchet-wheel F when rotated operates against the action of the spring and in its cam-bearings against the teeth of the cam-faced gear G, thereby providing a means for lifting the disks C and D' together sufficiently

20 to break the contacts of the plate D' with and clear the independent contacts  $p$  and  $p'$  when the cams are reaching their limit of travel. When the cam-teeth have reached their highest pitch, a step is provided, which allows

25 the shaft to drop back under the influence of the spring E. It will be observed that by such an arrangement of gears the operating-spindle may be simultaneously rotated and reciprocated and that the reciprocation can

30 be determined, so as to provide for the timely raising and lowering of the disks C and D' for the accomplishment of the predetermined making and breaking of the different groups of circuits.

35 The different combinations of circuits which may arise from the registering of certain rows of perforations with the radial rows, as shown, can be understood by referring to Fig. 2 in connection with Fig. 3. It will be noticed

40 on Fig. 2 that the vertical row contains six receiving-holes and the horizontal row ten, while the intersecting oblique rows contain eight and twelve, respectively. When any one of these rows are brought into alinement

45 with the radial row of contacts to be found on Fig. 3, those contacts that register with the receiving-holes will be admitted in contact with the metal disk D' at those points, while the other non-registering contacts will

be held depressed by the interposed insulating-disk C.

Having described my invention, what I desire to claim as new and useful is—

1. The combination of a circular insulated base having a central opening, provided on its upper face with vertically-yielding contacts projecting therefrom, a shaft projecting loosely through the central opening of said base and that is adapted to be reciprocated therethrough, an electrical contact-disk that is adapted to be mounted axially on the upper projecting end of said shaft, and that is provided with an under face of insulating material, said insulating-face being slotted at predetermined points therein to the depth of the contiguous metal face to provide working contact portions thereon; and means for controlling the rotation and reciprocation of said shaft and disks, whereby the contacts may be brought into operative contact with the working portions of the metal disk, as and for the purpose set forth.

2. A switch mechanism containing the following instrumentalities, viz., an insulated base having yielding contact projections, a rotary metal contact-disk, and an interposed insulating-disk provided with perforations, and that is combined with said metal disk, a shaft projecting centrally through said base, upon the upper projecting end of which said disks are axially mounted; an encircling helical spring sleeved on the opposite end of said shaft in a manner tending to move it in the direction to bring the disks in engagement with the contacts, and a rotary multiple cam-faced gear mounted on said shaft, and a fixed gear that is arranged in operative engagement with said rotary gear to operate against the action of the spring to reciprocate the shaft and thereby raise the disks away from the contacts, substantially as described.

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

HERMAN AUGUST METZ.

Witnesses:

LOUIS I. WALDMAN,  
GEO. S. MASON.