

(No Model.)

W. H. POWELL.
ELECTRIC SWITCH.

2 Sheets—Sheet 1.

No. 569,302.

Patented Oct. 13, 1896.

Fig. 1

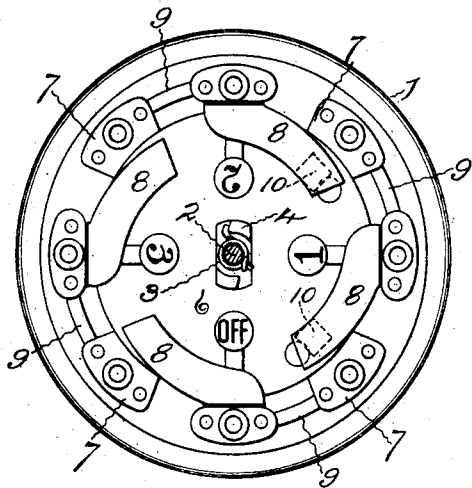


Fig. 2

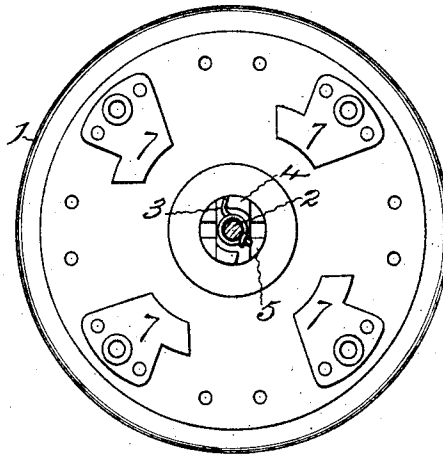
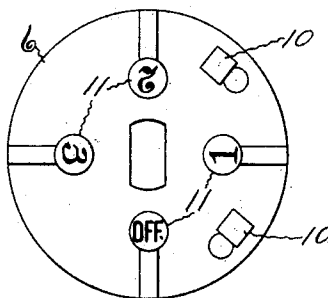


Fig. 3



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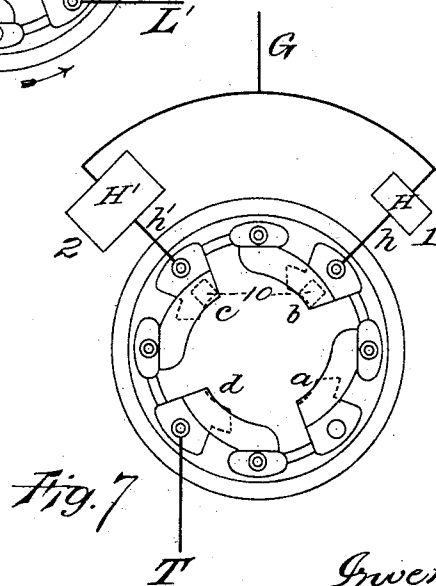
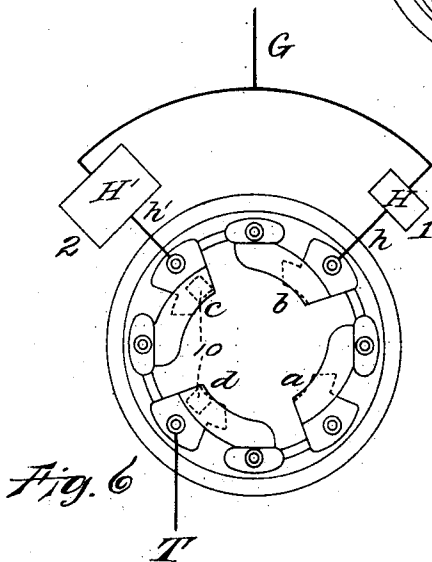
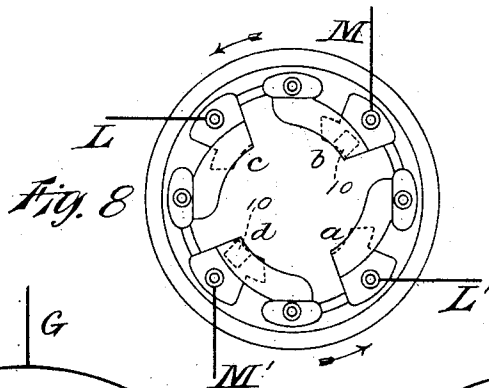
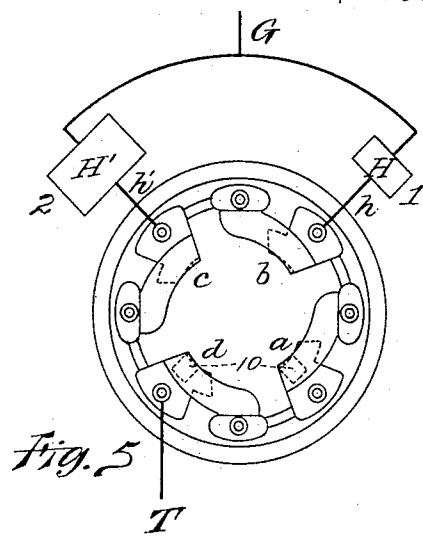
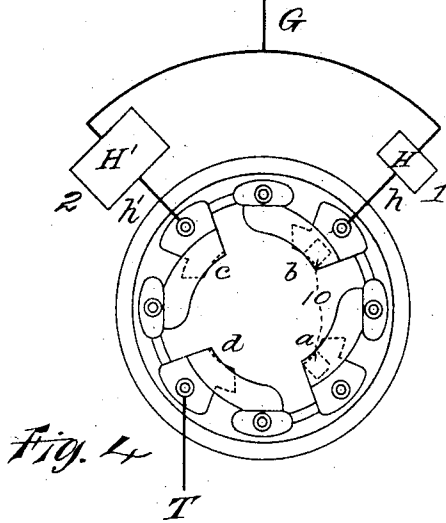
(No Model.)

2 Sheets—Sheet 2.

W. H. POWELL.
ELECTRIC SWITCH.

No. 569,302.

Patented Oct. 13, 1896.



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UNITED STATES PATENT OFFICE.

WILLIAM H. POWELL, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PERKINS ELECTRIC SWITCH MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 569,302, dated October 13, 1896.

Application filed June 29, 1896. Serial No. 597,306. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. POWELL, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

The invention relates to those electric snap-switches which have a base with a plural number of stationary contacts adapted to be connected with the wires of several circuits and a plural number of posts borne by a part supported by a rotary spindle in such manner that the parts will be moved when the spindle is rotated to connect different sets of stationary contacts for cutting in and out different circuits or combinations of circuits.

The object of this invention is to provide a simple and cheap switch of this nature which by simply rotating the spindle will, as a single-pole switch, successively cause the various connections to be made for cutting in or out the circuits, and which can, if desired, be so wired as to be capable of use as a three-way or four-way switch.

To this end the invention resides in a snap-switch having a base with a plural number of sets of stationary contacts that are adapted to be connected with the various circuit-wires, one contact of each set being connected with one contact of the set next in advance, a rotary spindle supporting a block bearing conducting connecting-posts, and means whereby the block with the posts is given a sudden rotary movement when the spindle is turned, as more particularly hereinafter described, and pointed out in the claims.

The switch is applicable to all classes of circuits, such as light, heat, and power circuits, where there are various pieces of apparatus or different groups of apparatus to be cut in or out by the same switch; but this switch is particularly designed and intended for use in connection with heater-circuitssuch as are used in railway-cars. Therefore the invention in this application is illustrated and described as arranged for car-heating circuits.

Referring to the accompanying drawings, Figure 1 is a plan of the switch with the handle and cover removed. Fig. 2 is a plan of

the base with the brushes, which are one element of each of the sets of stationary contacts, and the block omitted. Fig. 3 is a detail plan of the block. Fig. 4 is a diagram illustrating the locations of the posts when the block is turned to the "off" position, as when all of the circuits are cut out. Fig. 5 is a diagram illustrating the location of the posts when the block is in the first position and the circuits are connected so as to give one degree of heat. Fig. 6 is a diagram illustrating the location of the posts when the block is in the second position and the circuits are connected to throw in another heater or group of heaters and give an additional degree of heat. Fig. 7 is a diagram illustrating the location of the posts with the block in the third position and so connecting the circuits as to give a still greater degree of heat. In this position the heaters or groups of heaters are connected in parallel. Fig. 8 is a diagram illustrating the method of connecting circuit-wires to the contacts when a four-way switch is desired.

In the views, 1 indicates the base, which may be made any desired size and shape of suitable insulating material, as wood or porcelain. Supported by this base is a spindle 2, which may be provided with any common form of handle. Upon the spindle is a spring 3. One end of the spring is attached to the spindle and the other end is connected with a nut 4, that is supported by the spindle. The base beneath the nut is provided with a plate 5, that has its face cut so as to form ratchet-teeth with indentations between them. The spring pressing between the spindle and the nut tends to rotate the nut, as is fully described in United States Letters Patent No. 517,100, dated March 27, 1894. Held by the nut and rotating with it is a block 6 of insulating material. When the handle is turned, the spring is made tense and the block is thrown suddenly forward a given distance, as set forth in the above-mentioned Letters Patent, to which reference is made for a fuller description of this operation.

On the base of the switch are secured any desired number of contacts. These contacts are arranged in sets, and one of each of the

sets is formed as a flat plate 7, while the other of each of the sets is formed as a brush 8. In the switch shown there are four of the lower stationary contact-plates 7, held close to the base, and all of these may be provided with binding-posts for the attachment of circuit-wires, and, of course, there are four brushes 8, which correspond with and project over these plates. If desired, the brushes may also be provided with binding-posts for the attachment of circuit-wires. Each of the plates 7 is connected with the brush 8 next in advance by a metallic wire or strip 9. These wires or strips may be placed upon the upper surface of the base or on the under side of the base and held by the screws which hold the plates and brushes.

Loosely held by the insulating-block 6 are conducting-posts 10. These posts are formed to provide an electrical path from top to bottom of the block, and are located so as to connect different sets of brushes and plates as the block is revolved. In the switch illustrated there are two of these connecting-posts or movable contacts held by the block, and in Figs. 1 to 7 these posts are shown arranged a distance apart equal to the distance between each brush or the distance between each plate, so that two adjacent sets will always be connected by these movable contacts or posts. In Fig. 8 these posts are shown as located diametrically opposite each other, so that the opposite sets of plates and brushes will be connected at the same time.

To the binding-post of one of the plates 7 is connected the wire T, that may lead from the source of electrical supply, and to the binding-posts of two of the other plates are attached the wires *h h'*, that lead to the heaters H H' and then to the ground G. In each of the circuits *h h'* there may be any desired number of heaters, and the heaters of the different circuits are preferably of different capacity. In the views a single heater H is shown connected with the wire *h*, and a single heater H' of a larger size is shown connected with the wire *h'*, but these may represent combinations of heaters.

When the handle of the switch is turned so as to revolve the insulated connecting-posts or movable contacts to the position shown in Fig. 4, these posts stand as shown by the dotted lines connecting the sets of contacts and brushes *a* and *b* only, the sets *c* and *d* being disconnected. When the posts are in this position, the switch is off, as there is no path for current through the switch from the wire T, for the plate at *d* is not connected with the brush at *d* nor is the brush at *c* connected with the plate at *c*.

When the handle of the switch is turned to move the posts to the next position, that shown in Fig. 5, the plates and brushes at *d* and *a* are connected so that current from the wire T may pass through the plates and brushes *d* and *a* to the plate at *b*, and thence through the heater 1 to the ground. There being now

no connection between the plate and brush at *c*, no current can pass through the heater 2. When the current passes in this direction through the heater 1, the first degree of heat is obtained.

When the handle is again turned and the posts are moved forward, they occupy the position shown in Fig. 6, in which case they connect the brushes and plates at *d* and *c*. When these brushes and plates are connected, current will pass from the wire T through the brushes and plate *c* and *d* to the heater 2 and thence to the ground. As the plates and brushes at *a* and *b* are not connected current cannot pass through the heater 1. The heater or group of heaters 2 has larger capacity than the heater or group of heaters 1, so this gives a second degree of heat.

When the handle is turned to move the block to the next position, as shown in Fig. 7, the posts join the plates and brushes *b* and *c*. When these plates and brushes are joined, current from the wire T can pass through the plate and brush at *c* to the heater 2 and also through the plate and brush at *b* to the heater 1, so that the heaters 1 and 2 will be in parallel, and a third degree of heat is obtained.

The different positions of the switch may be indicated by placing lettering or figures upon hubs 11, connected with the commutator-block or by lettering a disk, which may be connected so as to rotate with the block or spindle.

When the posts or movable contacts are placed diametrically opposite each other, as in Fig. 8, the mains M from the source of supply may be connected with the plates at *b* and *d*, and the line-wires that run to the apparatus may be connected with the plates at *c* and *a*. When the posts join the contacts at *b* and *d*, current from M will pass through the plate and brush at *b* to the plate *c* and thence out through the line L, and current from the main M' will pass through the plate and brush at *d* to the plate at *a* and out through the line L'. When the block is rotated so that the posts connect the plates and brushes at *a* and *c*, current from the line M will pass through the plate at *b* to the brush and plate at *a* and out through the line L', and current from the main M' will pass through the plate *d* to the brush and plate at *c* and out through the line L'. In this manner a four-way switch is provided. If there are but three wires connected, for instance L, L', and M', a three-way switch is provided without changing the construction.

The switch is simple, cheap, and efficient. It has a very desirable quick opening and closing movement and a large number of places of disruption of the current. At each movement there are four different places of break, which will divide up the current so as to prevent arcing. A switch constructed in this manner is very safe for use in connection with the currents employed in car-lines and is particularly desirable for cutting in

and out the different circuits arranged in cars, so that different degrees of heat may be obtained by simply turning the handle of the switch from one position to another, which positions are readily indicated on the switch, as above set forth.

I claim as my invention—

1. In an electric switch, in combination, a base with a plural number of sets of stationary contacts, one of each of the sets of contacts being electrically connected with one of the sets next in advance, a handle-spindle supported by the base and adapted to be given an intermittent rotation, and a plural number of insulated conducting-contacts connected with and moved by the turning of the spindle and adapted to connect certain different sets of stationary contacts at each movement of the spindle, substantially as specified.

2. In an electric switch, in combination, a base with a plural number of contact-plates and brushes arranged in sets, the contact-plate of each set being electrically connected with the brush of the set next in advance, a handle-spindle supported by the base and

adapted to be given an intermittent rotation, and a plural number of conducting-posts connected with and moved by the turning of the spindle and adapted to connect certain different sets of plates and brushes at each movement of the spindle, substantially as specified.

3. In an electric switch, in combination, a base with a plural number of contact-plates and brushes arranged in sets, the contact-plate of each set being electrically connected with the brush of the set next in advance, a handle-spindle supported by the base and adapted to be given an intermittent rotation, and a pair of conducting-posts located a distance apart equal to the distance between each set of plates and brushes and connected with and moved by the turning of the handle-spindle so as to connect the sets of brushes and contacts in pairs successively as the posts are revolved about the spindle, substantially as specified.

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Witnesses:

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