

No. 846,120.

PATENTED MAR. 5, 1907.

R. H. MANSON.
ELECTRICAL SWITCH.

APPLICATION FILED MAR. 31, 1904. RENEWED JAN. 30, 1907.

Fig. 1.

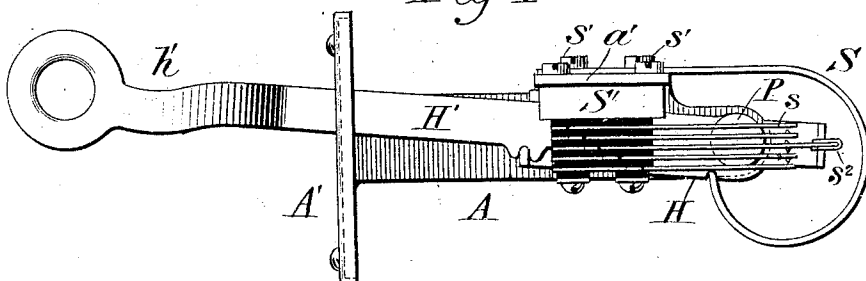


Fig. 2.

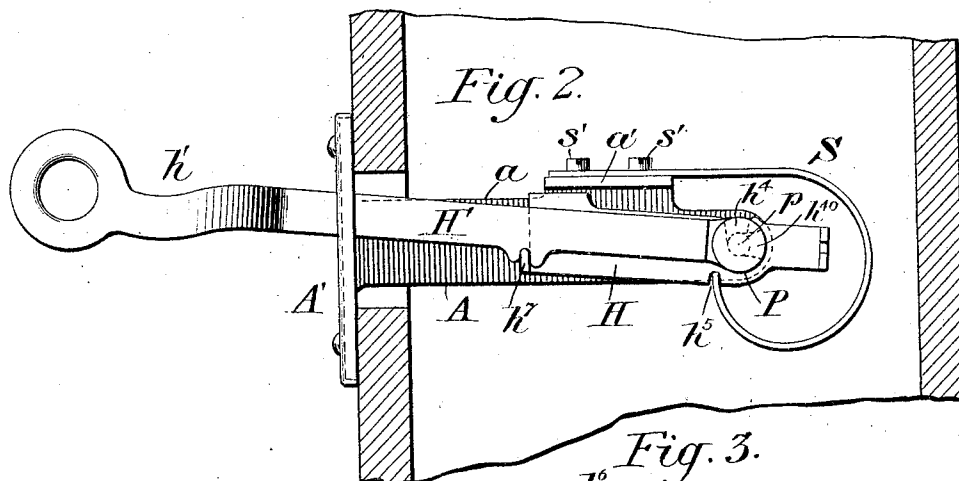


Fig. 3.

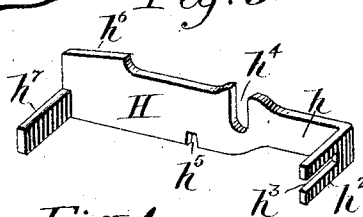
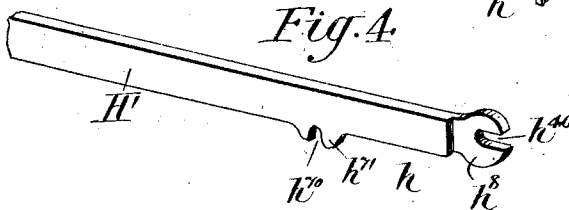


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL SWITCH.

No. 846,120.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed March 31, 1904. Renewed January 30, 1907. Serial No. 354,910.

To all whom it may concern:

Be it known that I, RAY H. MANSON, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Electrical Switches, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to electrical switches, and has for its object the provision of means whereby certain operating parts may be conveniently detached from and attached to the switch mechanism, as will fully appear from the following specification.

The particular type of switch which I have selected for illustration and description herein is that known as the "long-lever" hook-switch, used in subscribers' telephone sets.

As will sufficiently appear from the specific description, the invention may be adapted to various types of switch without changing its essential features. Hence it will be understood that this description is made specific for convenience only and not for purposes of limitation.

The accepted type of telephone hook-switch or switch-hook at the present time is that wherein a base or support carries a long lever pivoted at or near one end and provided with a strong actuating-spring normally tending to force the lever upward. The free end of the lever is bifurcated for the purpose of supporting the telephone-receiver, whose weight, with the leverage afforded, is sufficient to overcome the spring and hold the lever down. At some point or points along its length the lever engages contacts whose relations are altered to appropriately change the connected circuits as the hook is moved up and down. The general adoption of this type of switch is due to the necessity for positive action, inasmuch as the operativeness of the modern systems of telephone signaling, as well as the correct transmission of speech, depends upon reliable and positive action in opening and closing the several talking and signaling circuits. A strong spring which will not easily acquire a "set" or lose its resilience is the first desideratum, and a sufficient leverage to overcome the spring without unduly increasing the weight of the receiver follows as a corollary. In designing such switches some makers assemble the sev-

eral parts in the telephone instrument, attaching the contacts or the actuating-spring or the hook-lever or all these parts individually to the telephone-casing. Others assemble the switch as a unit before mounting it in the telephone set, thus securing more uniform adjustments and greater convenience in handling. Both designs, however, are subject to certain inconveniences and contain certain inherent defects which have heretofore been regarded as unavoidable and which it is my present object to obviate and eliminate. Of the inconveniences the most salient is that caused by the size of the bifurcated hook, which must project without the instrument-casing while the operating parts are inclosed therein. According to the best practice the hook is assembled as a unit before being mounted, and hence some opening must be provided in the casing large enough to permit either the hook or the operating parts to pass through. Where the hook is located below the desk, as in a centralized-energy telephone, the side brackets are frequently divided, one part being hinged to fall away from the other and the opening being made for the hook on the division-line. This, however, necessitates a two-part escutcheon. In other cases the opening is made large enough to admit the operating parts and a large one-piece escutcheon is fixed on the frame. The long lever is separable and can conveniently be inserted after the operating parts have been attached, the latter being applied from the inside, if desired.

Of the defects the most objectionable is the constant protrusion of the hook from the instrument at all times, making it liable to injury in handling and shipping and rendering it necessary to increase the size of packing-cases and other receptacles, as well as to exercise great care in securing the instruments therein for storage or shipment. I call this a defect, because it is inherent in the primary design of a switch of this character. So far as I know all hooks heretofore used have had fixed levers with constantly-projecting ends, and while it might be possible to unship the levers at the pivots such unshipping would involve the use of tools and usually the reassembling of all parts when the instrument came to be used. By my present invention the hook is removed without the use of tools when the instrument is not in use, leaving

the switch parts proper intact, and when required is as easily replaced.

Stated in brief, my invention comprises a frame carrying a short or stub lever pivoted in the usual manner and engaged by the usual strong actuating-spring and the contact-springs, together with a long-lever having a shank adapted to be conveniently latched and held by spring-pressure on the stub and carrying the bifurcated hook at its extremity. It will be understood that the terms "long" and "short" as here used are relative merely. The stub may be of any convenient length, likewise the hook-lever, and various forms of both may be devised, according to the uses to which they are to be applied. In a wall set the long lever would be straight, as herein shown. In a desk set it might be a bell-crank or curved; but in any case the hook would be separable.

My invention is illustrated in the accompanying drawing, wherein—

Figure 1 is a side view of the complete switch with separable lever. Fig. 2 is a similar view with the contact-springs removed. Fig. 3 is a perspective view of the stub-lever removed, and Fig. 4 is a perspective view of one end of the long or hook lever.

In the drawings, A is a metal frame or support attached to the escutcheon-plate A' and provided with a turned-over flange a', carried on the upper portion of a longitudinal member a. At the end of the member a I provide a pivot-post P, having an annular groove midway of its length to form a pivot p with an overlying flat head. This post is riveted to the extended end of the member a, so that accidental displacement is impossible.

H is a stub-lever, in which I form an upper notch h⁴ and a lower notch h⁵. The upper side of one end is inclined, as shown at h⁶, and the lower portion of the same end is turned over to form a finger h⁷. The opposite end is turned over and slotted to form a fork h². The stub is mounted on the frame member a by slipping it under the head of the post P, with the pin p in the notch h⁴. The spring S is then placed in the position shown in Figs. 1 and 2 and secured to the flange a' by the screws s', its free end lying in the notch h⁵ of the stub. The spring when in this position is under tension, and its end tends to force the stub upward, preventing it from leaving the pivot p, and as the notch h⁵ is displaced to the left of the notch h⁴ also tending to throw the end h⁶ of the stub up against the flange a', which acts as a stop for it.

The lever H', which has been referred to as the "long" lever or "separable" cipher lever, carries the hook h' at one end, and at the other end h of its straight shank it has a reduced portion h⁸, notched as shown at h¹⁰. At a point removed a certain distance from the end another notch h⁷⁰ is produced between two

projecting teeth, that on the right, h⁷¹, having its outer face inclined, and the bottom of the notch being substantially in the same line as the lower side of the lever.

The mode of attaching the lever H' to the stub is indicated in Fig. 2. The end h of the lever H' is inserted through the slot in the escutcheon A', passed backwardly over the latch-finger h', and finally brought to rest with the notch h¹⁰ on the pivot p, the reduced flat part h⁸ lying under the head of the post P and upon the stub. The parts are so proportioned that as spring S forces the stub upwardly the latter will force the lever H' up, and the latter will strike the top of the slot in the escutcheon before the face h⁶ strikes the flange a'. As the lever moves into position the inclined face of the tooth h⁷¹ rides down the finger h' against the pressure of the spring, and the finger finally snaps into the notch h⁷⁰, preventing the withdrawal of the lever. The lever is thus latched and is securely held against all attempts that may be made to remove it by moving the hook h'. The spring S maintains a constant pressure upward on the stub, and the finger h⁷ follows the lever H', staying in the notch therein unless forcibly depressed, and as the limit of the lever movement is determined by the escutcheon-slot unlatching from without, intentional or unintentional, is impossible. To unlatch from within the casing, however, is but the work of an instant. The pressure of a finger on the part h' moves the latter out of its notch, when the lever H' may be pulled out through the escutcheon. The contact-springs s, carried on a removable block S', secured to the flange a', are moved and their relations changed by the fork h² on the stub. This fork receives at h³ the insulated end s² of an intermediate long spring; and as it is moved on the pivot p by the lever H' the spring is also moved to make and break the respective contacts. It will be observed that the relation of the springs and the fork of the stub and, in fact, the relations of all the parts of the switch which require adjustment for proper operation remain unchanged by the withdrawal of the lever or its replacement.

It is now apparent that I have succeeded in attaining my objects without the sacrifice of a single meritorious feature of the regular long lever-hook. Telephones provided with my switch-hook may be packed and shipped without danger of breakage of hooks or disarrangement of contacts and in smaller boxes than heretofore, and handling in the factory is simplified. The hooks themselves may be packed more readily and the assembled switches finished and adjusted with still greater certainty than before. I believe I am the first to provide a separable hook-switch of this kind and the first to provide a switch of any kind with removable operating

parts, such as handles and levers, requiring no tools and no tedious mechanical operations to take them off or to reassemble them, and I shall claim the same broadly herein.

5 I am aware that many changes may be made in matters of detail without sacrificing the distinguishing features of my invention, and some of these changes I shall embody in specific forms which I shall claim in separate
10 applications; but all such are intended to be included within the scope and purview of the claims in the present case.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

15 1. An electrical switch comprising a base or support, an operating-stub pivoted thereon, contact members controlled by said stub, an inclosure for said base, contacts and stub, and a lever lying partly within and partly
20 without the inclosure, together with means detachably connecting the lever and stub, said means operable for connection from without the inclosure, but for disconnection
25 operable only within the same, substantially as described.

2. An electrical switch comprising a base, contact devices mounted thereon, an operating member for said contact devices, a spring-latch normally holding said member in operative position, and a hook-lever detachably
30 engaging said operating member and having movement relative to said operating member.

35 3. An electrical switch comprising a base or support, contact members mounted thereon, an operating-lever therefor removably pivoted to the base, and an extension-lever connected to said operating-lever but manually detachable therefrom, substantially as
40 described said extension-lever and said operating-lever being capable of relative movement.

4. A telephone hook-switch comprising the
45 following instrumentalities: a frame or support, a set of contact-springs mounted thereon, a short lever pivoted thereon and connected with said springs to alter the relations thereof in its movements, a long lever carrying
50 a receiver-hook at one end and adapted to engage the short lever at the other end with a latch connection, substantially as described.

5. A telephone hook-switch comprising a
55 frame, contact members and a pivot-post immovably mounted on said frame, an operating-lever adapted to detachably engage said post and to actuate said contact members in its movements, a hook-lever adapted to
60 move said operating-lever, and a spring-latch operating in conjunction with said operating-lever to hold said hook-lever in position.

6. A telephone hook-switch comprising the
65 following instrumentalities: a frame com-

posed of a longitudinal member having a pivot-post at one end, and a transverse member secured thereto at the other end, contact-springs carried by said longitudinal member, a short lever pivoted on said post and coöperating with said springs, an actuating-spring for said lever, a long lever extending through the transverse member of the frame and to the pivot-post, and a latch connection between the levers controlled by the actuating-spring, substantially as described. 70 75

7. A telephone hook-switch comprising the following instrumentalities: a frame, two limiting-stops on said frame, a pivot-post also thereon, a short lever pivoted on said post and limited in movement by one stop, a long lever also pivoted on said post and having a shorter path of travel due to the other stop, together with an integral latch-finger carried by the short lever and a shoulder engaged
85 thereby on the long lever; substantially as described.

8. A telephone hook-switch comprising the following instrumentalities: a frame, a short actuating-lever thereon and contact-springs controlled thereby, a detachable long lever adapted to be engaged with the short lever to form an extension thereof, and a spring-catch adapted to maintain the same in engagement, substantially as described. 90 95

9. A telephone hook-switch comprising the following instrumentalities: an escutcheon-plate, a supporting-frame projecting from and carried by said plate, contact-springs secured to said frame, a detachable operating-lever adapted to be extended through said
100 escutcheon-plate into operative engagement with said springs and a latch for maintaining the same normally in engagement, substantially as described. 105

10. In a telephone hook-switch, the combination with a frame and contact members carried thereby, of a fixed pivot-post on said frame, an operating-lever for said contact members detachably held on said pivot-post, an extension-lever detachably engaging said post and said operating-lever, and means for holding said levers on said post and for holding said operating-lever in engagement with said extension-lever. 110 115

11. A telephone hook-switch comprising the following instrumentalities: a frame A, a pivot-post P thereon, a flange on said frame and contact-springs s carried thereon, a lever H pivoted on said post, a forked member h^2 on said lever engaging one of said springs, a latch-finger h^7 at the other end of the lever, and a separate overlying lever H' having the terminal notch h^{40} to engage the pivot and a notch h^{70} to engage the finger h^7 , together with an actuating-spring exerting upward pressure on the lever H, substantially as described. 120 125

12. In a telephone hook-switch, the combination with a base and contacts mounted 130

thereon, of an operating-lever pivoted to said base and controlling said contacts, and an actuating-lever slipped into engagement with said operating-lever and readily removable therefrom, substantially as described.

13. In a telephone hook-switch, the combination with a base, of a two-part hook-lever comprising a member pivoted to the base and a second member slipped into engage-

ment with the first member and working on the same pivot, substantially as described.

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

RAY H. MANSON.

Witnesses:

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WM. W. DEAN.