

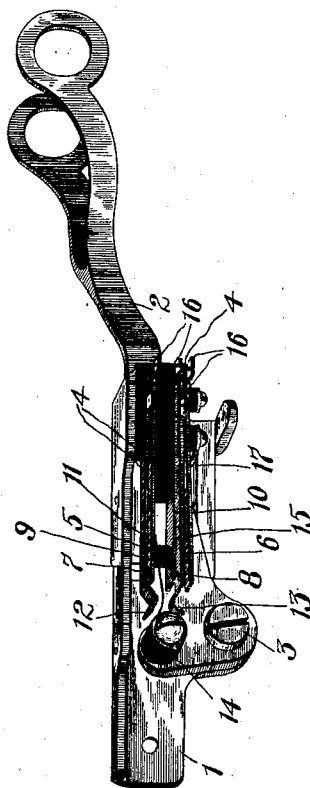
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PATENTED DEC. 8, 1903.

N. A. ENGSTROM.
TELEPHONE-SWITCHING APPARATUS.

APPLICATION FILED NOV. 10, 1902.

NO MODEL.



Witnesses:
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NELS AUGUST ENGSTROM, OF CHICAGO, ILLINOIS, ASSIGNOR TO STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

TELEPHONE SWITCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 746,314, dated December 8, 1903.

Application filed November 10, 1902. Serial No. 130,801. (No model.)

To all whom it may concern:

Be it known that I, NELS AUGUST ENGSTROM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone Switching Apparatus, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in telephone switching apparatus, and more particularly to receiver-hooks such as are usually employed in making and changing electrical connections at subscribers' substations.

Receiver-hooks such as have heretofore been employed have been open to the objection of poor mechanical and electrical design. One of the principal causes of trouble in such receiver-hooks came from the fact that thin and delicate springs have been employed for the purpose of making electrical contacts. Receiver-hooks as heretofore constructed have frequently given trouble, due to the accumulation of dirt and due to the wear upon the moving parts.

My invention contemplates the provision of a receiver-hook whose spring-contact mechanism is of a design which I have found to give particularly good satisfaction under severe and long-continued usage.

My improved switch-hook is of a compact and generally efficient design. Furthermore, I have found that notwithstanding the improved efficiency of my switch-hook I can manufacture the same at a comparatively low cost.

My invention will be best understood by reference to the accompanying drawing, in which I have represented at 1 a base or frame portion on which the forked receiver-arm 2 is pivoted on the screw 3. Mounted upon a suitable portion of the frame, but insulated therefrom, is the switching mechanism 4, which consists of a pair of movable springs 5 and 6, adapted when in their normal position to make contact, respectively, at 7 and 8 with the springs 9 and 10, which springs are preferably separated and retained in relative

position by means of the short cylinder 11, of insulating material. The springs 5 and 6 are provided at their outer ends, as shown, with outwardly-flaring lips 12 and 13. A stud 14, of insulating material, is desirably carried upon the switch-arm 2 in such a position that the depression of the receiver-arm due to the weight of the receiver placed in the fork thereof forces the stud between the lips 12 and 13, thereby spreading the springs 5 and 6 apart and breaking their electrical connection with the springs 9 and 10. It is usually found desirable to provide an additional contact-spring 15, adapted to be engaged by one or the other of said springs 5 and 6 upon their being spread apart, due to the engagement thereof by the stud 14. The contact-springs referred to are held in position and insulated from each other by means of the clamps of insulating material shown. The contact-springs are desirably provided with connecting-nibs 16 16, from which conductors may be run to desired points. A spring 17, interposed between the frame 1 and the receiver-arm 2, is adapted to raise the switch-arm into its normal position (shown in the drawing) when relieved of the weight of the receiver. When the receiver is placed within the fork, this spring is deflected to permit the actuation of the contact-springs, as will be well understood by those skilled in the art.

It will be apparent to those skilled in the art that by connecting together the two springs 9 and 10 and connecting together the springs 5 and 6 I provide a means whereby what may be termed a "double" contact is afforded between these springs—that is to say, the current which it is desired to have flow between the springs 5 and 6 and the springs 9 and 10 is provided a double path, one path being between the springs 5 and 9 and the other path being between the springs 6 and 10. The advantages of this arrangement will be at once apparent to those skilled in the art, as it is well known that trouble frequently arises from an accumulation of dirt or moisture or grease between a pair of contacts. The provision of two parallel connections for making and breaking the same circuit is almost certain to prevent imperfect operation.

While it has been necessary for a clear understanding of my invention to describe one particular embodiment thereof, it will be apparent to those skilled in the art that many changes and modifications therein might be made without departing from the spirit of my invention, and I do not, therefore, wish to limit myself to the precise disclosure herein set forth; but,

10 Having described my invention, I claim as new and desire to secure by Letters Patent—

1. In telephone switching apparatus, the combination with a pivoted receiver-hook, of a stud of insulating material carried thereby, and a pair of contact-springs, each normally engaging other contact-springs to close one electric circuit and adapted to be spread apart by the interposition of said stud upon the depression of the receiver-hook, substantially as described.

2. In a subscriber's substation switching apparatus, the combination with a pair of substantially parallel contact-springs, of a second pair of substantially parallel contact-springs adapted to normally close a single electric circuit between said pairs of springs, and a stud of insulating material adapted to be wedged between the said second pair of springs to spread the same apart upon the depression of the receiver-hook, substantially as described.

3. In telephone switching apparatus, the combination with a switch-hook, in the shape of a bell-crank lever, pivoted at its elbow, the long arm on the lever extending forward and terminating in a hook for holding the receiver, a short arm extending upwardly and at right angles to said hook-arm, of a cylindrical stud of insulating material at the end of said short arm, and contact-springs disposed above said hook-arm and substantially parallel thereto, the depression of said hook-arm causing said stud to enter between said springs to spread them apart, substantially as described.

4. In telephone switching apparatus, the combination of a switch-hook, in the shape of a bell-crank lever, pivoted at its elbow, a long arm of the lever extending forward and terminating in a hook for holding the receiver, a short arm extending from said pivot at right angles to said hook-arm, a cylindrical stud of insulating material at the end of said short arm, and contact-springs terminating in flared ends disposed in the path of said stud about the lever-pivot, a depression of said long arm causing said stud to engage said flared ends to spread the springs apart, substantially as described.

5. In telephone switching apparatus, the combination with a receiver-hook, in the shape of a bell-crank lever, pivoted at its elbow, of a stud of insulating material carried at the end of a short arm of said lever, a long arm of the lever terminating in the hook for holding the receiver, and a pair of contact-springs each normally engaging other contact-springs to close the electric circuit, and

adapted to be spread apart by the interposition of said stud upon a depression of the long arm of the lever, substantially as described.

6. In telephone switching apparatus, the combination with a receiver-hook, in the shape of a bell-crank lever, pivoted at its elbow, of a stud of insulating material carried at the end of said lever, a long arm of the lever terminating in a hook for holding the receiver, the weight of the receiver serving to cause a movement of said lever-arm in one direction, spring mechanism acting in opposition to the weight of said receiver to cause a movement of said lever in the reverse direction, and a pair of contact-springs each normally engaging other contact-springs to close the electric circuit, and adapted to be spread apart by the interposition of said stud upon a suitable movement of the long arm of the lever, substantially as described.

7. In telephone switching apparatus, the combination with a switch-hook, in the shape of a pivoted bell-crank lever, a long arm of the lever extending forward and terminating in a hook for holding the receiver, a cylindrical stud of insulating material mounted on said lever, and contact-springs terminating in flaring ends disposed in the path of said stud about the lever-pivot, a suitable movement of the long arm of said lever causing said stud to engage said flaring ends to spread the springs apart, substantially as described.

8. In telephone switching apparatus, the combination with a pivoted receiver-hook, of a stud of insulating material carried thereby, a pair of substantially parallel contact-springs provided at their outer ends with outwardly-flaring lips, and a suitable contact-point adapted to be engaged by each of said parallel contact-springs, said springs being adapted to be spread apart by the interposition of said stud between said outwardly-flaring lips upon a suitable movement of the receiver-hook, substantially as described.

9. In telephone switching apparatus, the combination with a pivoted receiver-hook, of a stud of insulating material carried thereby, and a pair of contact-springs provided at their outer ends with outwardly-flaring lips, each contact-spring normally engaging another contact-spring to close one electric circuit, said springs being adapted to be spread apart by the interposition of said stud between said outwardly-flaring lips upon a depression of the receiver-hook.

10. In a subscriber's substation switching apparatus, the combination with a pair of contact-springs, provided at their outer ends with outwardly-flaring lips, of a stud of insulating material adapted to be wedged between said lips to spread the springs apart upon the depression of the receiver switch-hook, and an electric circuit adapted to be broken at two points upon a suitable actuation of said pair of contact-springs.

11. In telephone switching apparatus, the

combination with a pivoted receiver-hook, of
a stud of insulating material carried thereby,
contact-springs adapted to be actuated by the
interposition of said stud of insulating ma-
5 terial upon a suitable movement of said re-
ceiver-hook, and a pair of electrical contacts,
each normally engaging one of said contact-
springs to close one and the same electrical
circuit.

10 12. In telephone switching apparatus, the
combination with a switch-hook, in the shape
of a bell-crank lever, pivoted at its elbow,
the long arm of the lever extending forward
and terminating in a hook for holding the
15 receiver, a short arm extending substantially
at right angles to said hook-arm, of a cylin-
drical stud of insulating material carried on
said short arm, a pair of contact-springs hav-
ing outwardly-flared ends, adapted to be en-
20 gaged and spread apart by the interposition
of said stud of insulating material, due to a

suitable movement of the switch-hook, a pair
of contact-springs interposed between said
first pair of contact-springs, one spring of
each pair normally making contact with one 25
spring of the other pair, to close one and the
same electrical circuit, said circuit being
adapted to be broken upon the interposition
of said stud of insulating material upon a
suitable movement of the switch-hook, and a 30
contact-point adapted to be engaged by one
of said first-mentioned contact-springs upon
the interposition of said stud of insulating
material, as aforesaid, substantially as de-
scribed.

35 In witness whereof I hereunto subscribe my
name this 7th day of November, A. D. 1902.

NELS AUGUST ENGSTROM.

Witnesses:

LYNN A. WILLIAMS,
CHARLES A. BROWN.