L. H. SNYDER.
SWITCHBOARD PLUG.
APPLICATION FILED MAY 17, 1909.

1,106,118. Patented Aug. 4, 1914.

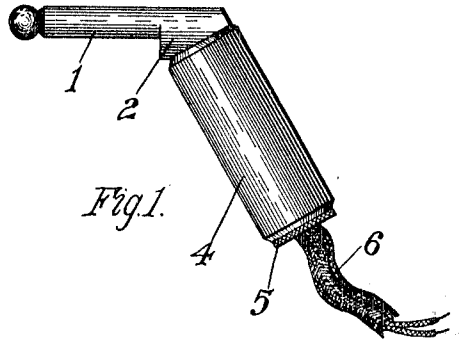



Fig. 1.

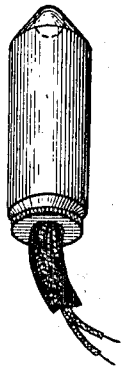


Fig. 2.

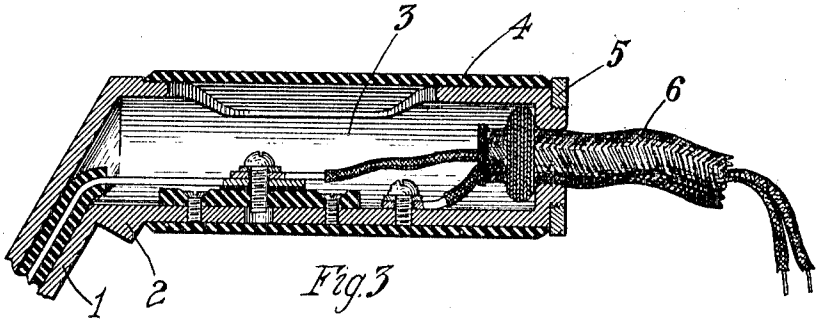



Fig. 3

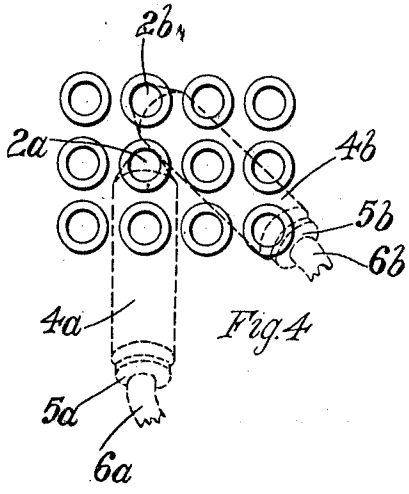



Fig. 4

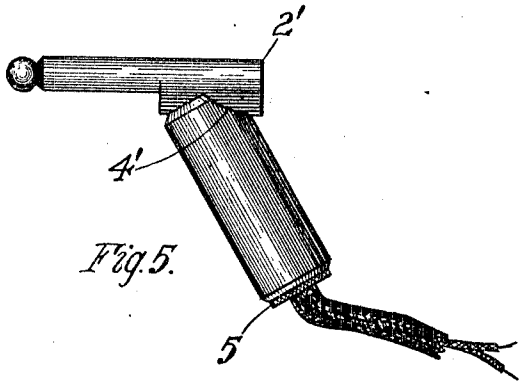



Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## SWITCHBOARD-PLUG.

1,106,118. Specification of Letters Patent. Patented Aug. 4, 1914.

Application filed May 17, 1909. Serial No. 496,613.

*To all whom it may concern:*

Be it known that I, LEMUEL H. SNYDER, a citizen of the United States of America, and a resident of White Lake, county of Aurora, and State of South Dakota, have invented a new and useful Improvement in Switchboard-Plugs, of which the following is a specification.

My invention pertains to the design of switching plugs used as connecting terminals for flexible connecting cords on manual switchboards.

My object is to provide a switch plug having novel features of construction, and designed particularly to protect its attached cord from damage by careless and unskillful use on the part of the switchboard operator.

In manual switchboards, the one piece of apparatus which is subjected to the most severe usage in view of its fragile construction, is the flexible connecting cord. While many different features of the use and abuse of such a cord might be cited, the two features of greatest importance when the resultant damage to the cord is considered, are, without doubt, the features of the abrupt bending of the cord near the base of the plug at the time the plug is inserted in the jack, and the pulling of the plug from the jack by a jerk on the cord. The feature of the abrupt bending of the cord at the base of the plug is accentuated by the habit common to most operators of pushing the plug home in the jack by a pressure of the finger or a stroke from the palm of the hand against the bend of the cord behind the plug, and still further by the intermittent pulls upon the cord of a connected plug caused by manipulation by the operator of other cords of her keyboard near the connected cord affected, or crossing it to reach the multiple jacks. A pull upon the cord to remove the plug from the jack is customarily a sharp jerk straightening the bend of the cord behind the plug abruptly and placing the cord and its conductors under strain at the same time. This is still more harmful to the cord when the line of direction of the pull is not upon the axis of the plug but is at a slight angle, the tendency then being to produce a most abrupt bend of the cord at the back end of the plug.

Many improvements in the structure of cords either throughout their length or locally at the plug end, and many improvements in method and means for attaching the cord to the plug have been devised and adopted to prevent or reduce the disastrous wear and consequent high maintenance expense which has been inherent to use of this item of the equipment of a manual switchboard.

My invention provides a switching plug of such design that the two features of use, or perhaps it may be well said abuse, of the connecting cord are rendered impossible by the design of the plug itself. I provide a plug, which, in itself, contains conductors embodying much of the angle necessary between the direction of the plug shaft and the direction of the connecting cord. My improved plug, also, offers a point of attachment for the flexible cord so far from the axis of the plug shaft that a pull upon the cord in any direction will tend only to revolve the plug in the jack or to bind the body of the plug within the body of the jack by tilting it at an angle, and will not effect the withdrawal of the plug from the jack. It will be seen that with a bend in the plug, the cord is not bent at the face of the plug, and that if the operator can not remove the plug from the jack by jerking upon the cord, the habit of jerking upon the cord will cease by reason of the removal of the cause for its existence.

I provide, as a further optional detail of my improved plug, a projection offering an exposed surface in the line of the axis of the plug which will form a convenient abutment against which the operator may push to force the plug into the jack. I provide also novel means for securing an insulating cover upon the plug, and my plug also embodies features of design which permit the use of a tubular cover, producing economy in manufacturing and repair. I place the cylindrical handle at an angle which makes it convenient both for inserting and withdrawing the plug, and I construct the insulated and conducting exposed portions of the plug in such proportion and relation as to permit the insertion of two plugs into adjacent switchboard jacks without rendering possible any contact between conducting portions of the two plugs thus inserted.

The following drawings, in which like labels refer to like parts throughout, accompany and form a part of these specifications: Figure 1 shows side elevation of a simple form of my improved plug. Fig. 2 shows another elevation of the same, being

taken as viewing the plug alone from a position opposite the face of the switchboard when the plug is inserted in a switchboard jack. This may be termed a rear view of the plug, being a rear view with reference to the axis of the shaft which is inserted into the jack. Fig. 3 shows a section in double scale of the handle portion of the plug of Figs. 1 and 2, showing the details of connections and of the attachment of the insulating shell, the shaft and tip of the plug being broken away for convenience in drawing. Fig. 4 is a diagrammatic representation of a group of a dozen jacks upon a manual switchboard with two of my improved switch plugs inserted into two jacks adjacent vertically. Fig. 5 shows an alternative form of my improved plug. While the plug of Fig. 5 is slightly more complex in manufacture, I deem it the most complete and most desirable form.

In general my improved plug comprises a straight shaft 1 with metal body 2 integral therewith and extending in line therewith. Upon the metal body 2 is an integral extension 3 at an angle thereto, the extension being so conformed as to take the tubular protecting cover 4, which is slid over the part 3 from the rear and is held in place by knurled lock ring 5. Cord 6 is attached to terminals within the part 3 in any of the many methods well known to the art.

In Fig. 1, the part 2 and its extension 3 are so conformed as to receive a tubular protecting insulating shell 4 which is cut squarely at each end as the shells of ordinary switchplugs are cut. In Fig. 5 the part 2 is extended at the rear of the plug, offering a surface at 2′ transverse to the axis of the plug, which gives a convenient surface upon which the operator may push to force the plug into its jack. The most convenient construction, when this extension abutment is to be provided, is to cut the tubular shell in the manner shown at 4′, the shell being passed over the handle of the plug from the rear and fastened by the lock ring 5 as is the case with the type shown in Figs. 1, 2 and 3.

In Fig. 4 a detail of proportion of parts is shown. The rule governing this proportion of parts is, that when any two inserted plugs make contact with each other, one or the other of the plugs shall present an insulating surface at the point of contact. In the application of this rule the exposed surface of the lock ring 5 may be neglected. When the lock ring is smaller than the outside diameter of the tube 4, as is shown clearly at $5^a$ and $5^b$ in Fig. 4, those parts could be made to make contact only with the greatest difficulty or under the most unusual circumstances in view of the interference not only of the shells $4^a$—$4^b$, but of the cords $6^a$—$6^b$, no matter what distance might be selected for the jacks into which the plugs are inserted. Contact of any ring 5 can not be made with any part other than another ring 5, since the ring 5 is too far from the face of the switchboard to make accidental contact with body 2 of any other inserted plug, no matter at what distance in the face of the switchboard.

In this application I have selected and described a specific application of my improvements in the embodiment of two types of improved switching plugs. It is manifest that further modifications in structure may be made in the plug shown, and that some of the points of improvement may be omitted without reducing the value or efficiency of the points remaining. I do not wish to have this description interpreted as limiting my invention to the exact details herein shown and described.

Having thus described my invention what I claim as new and desire to secure by United States Letters Patent is:

In a switchboard plug, a sleeve contact member, a tubular handle member integral therewith and extending at an angle therefrom, a tip contact member extending through said sleeve contact member into said handle member, cord connection terminals for said tip and sleeve contact members within said handle member, an insulating covering member over said handle member inclosing said terminals and a lock-ring securing said insulating covering member on said tubular handle member, substantially as described.

Signed by me at White Lake, county of Aurora and State of South Dakota, in the presence of two witnesses.

LEMUEL H. SNYDER.

Witnesses:

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