

July 11, 1961

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2,991,547

TOOL FOR REPLACING JACK STUDS

Filed Nov. 26, 1957

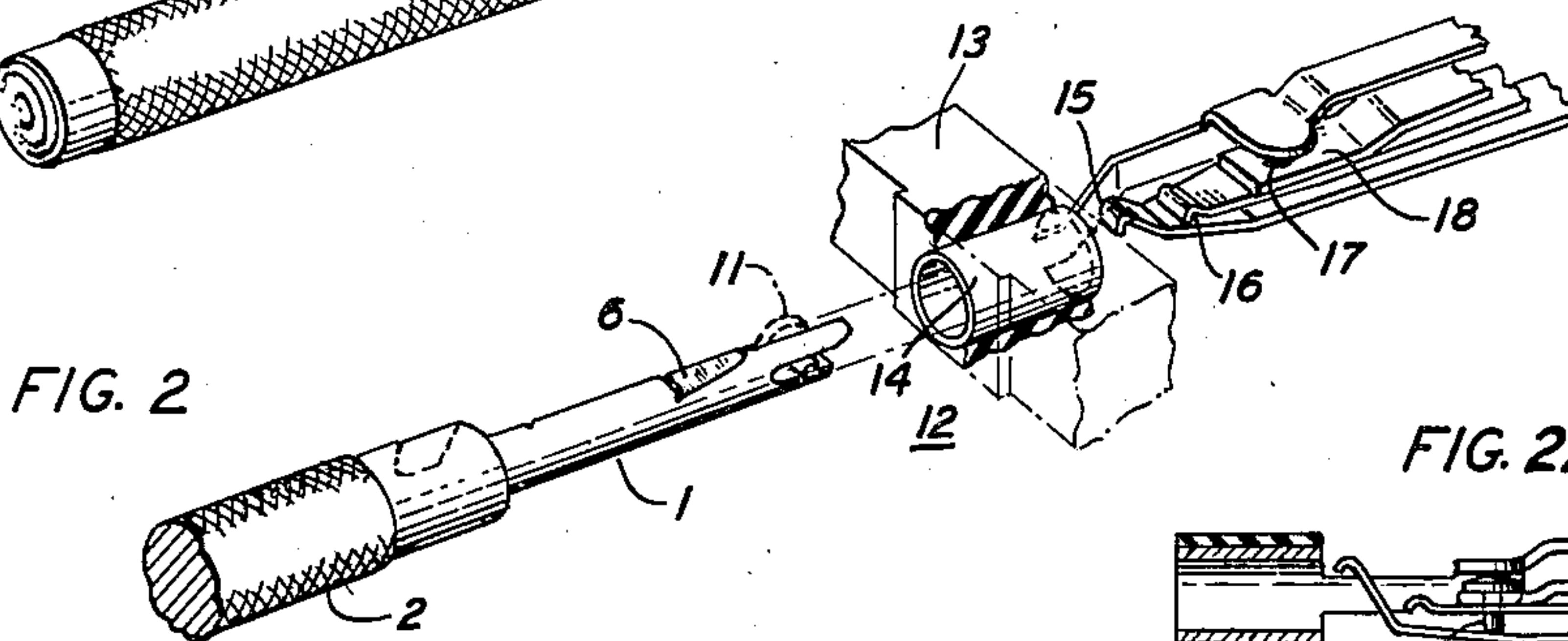
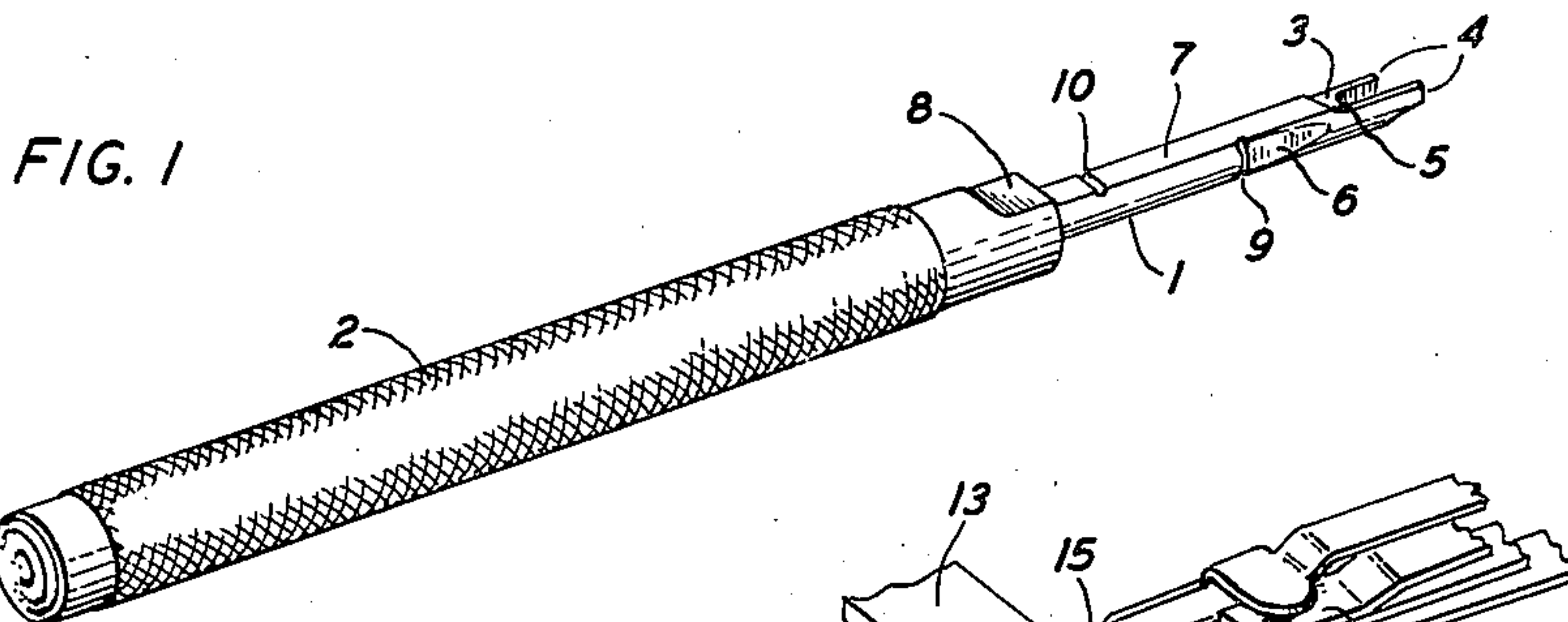
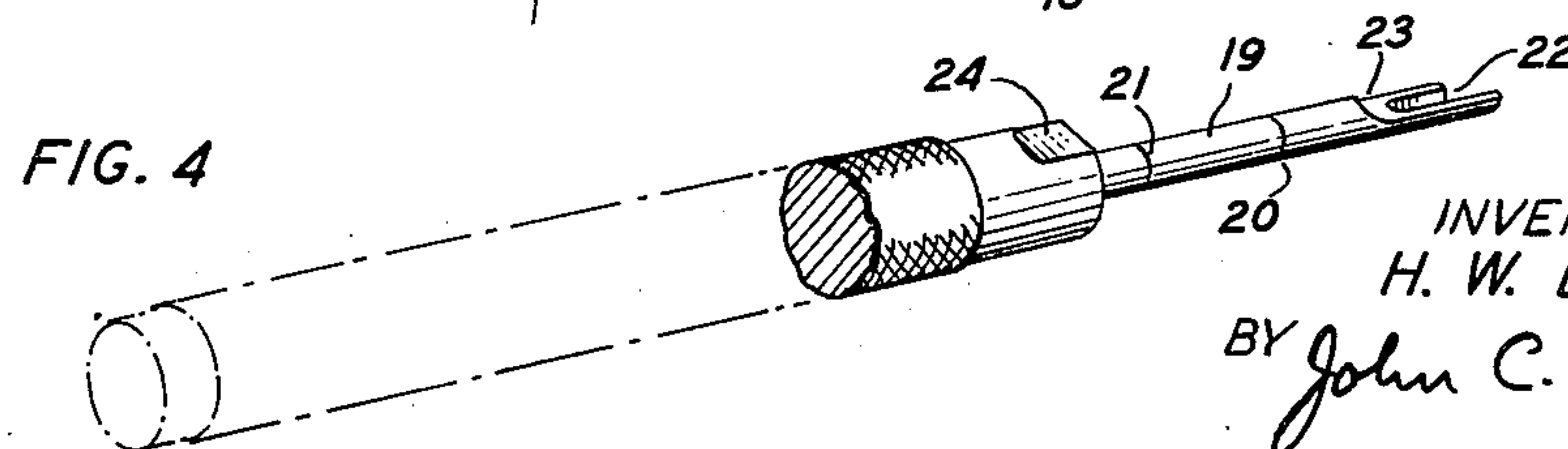
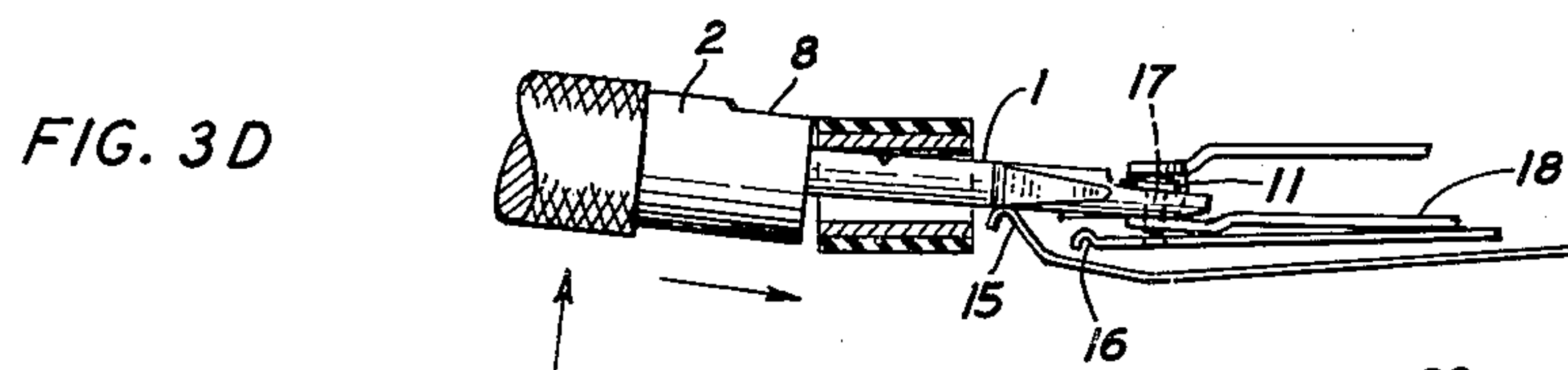
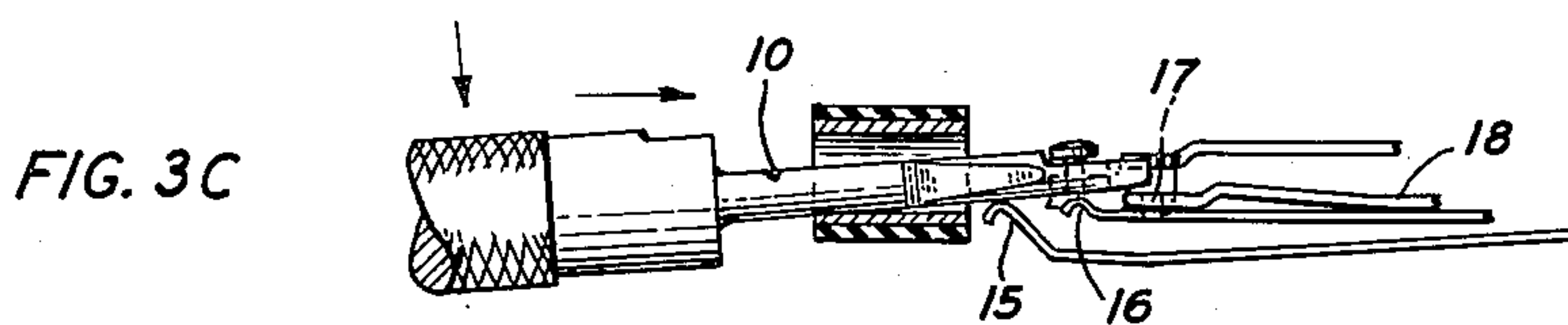
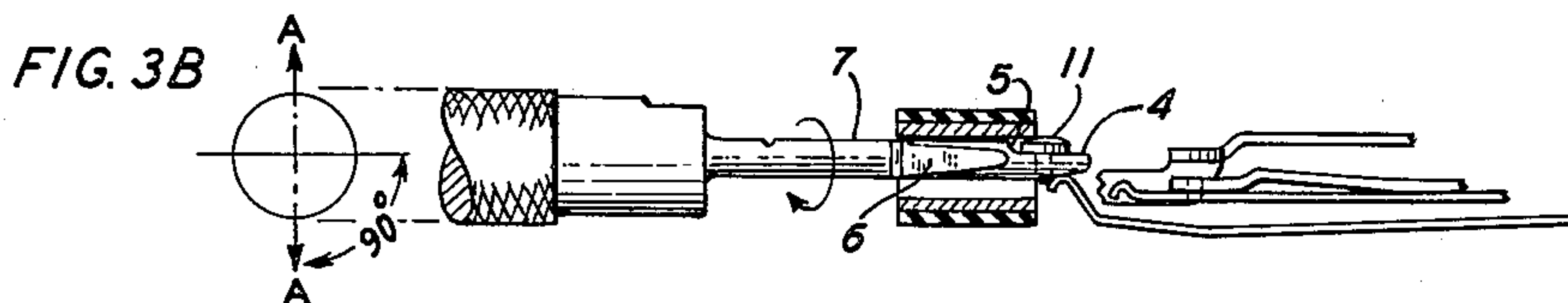
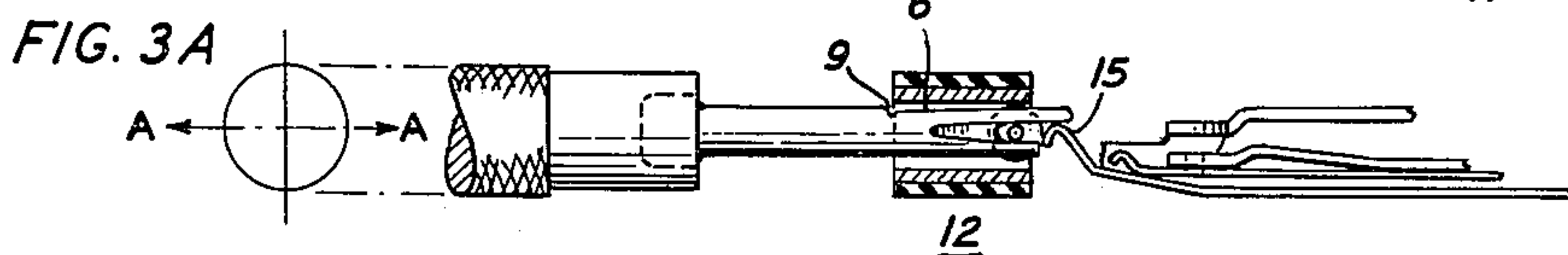
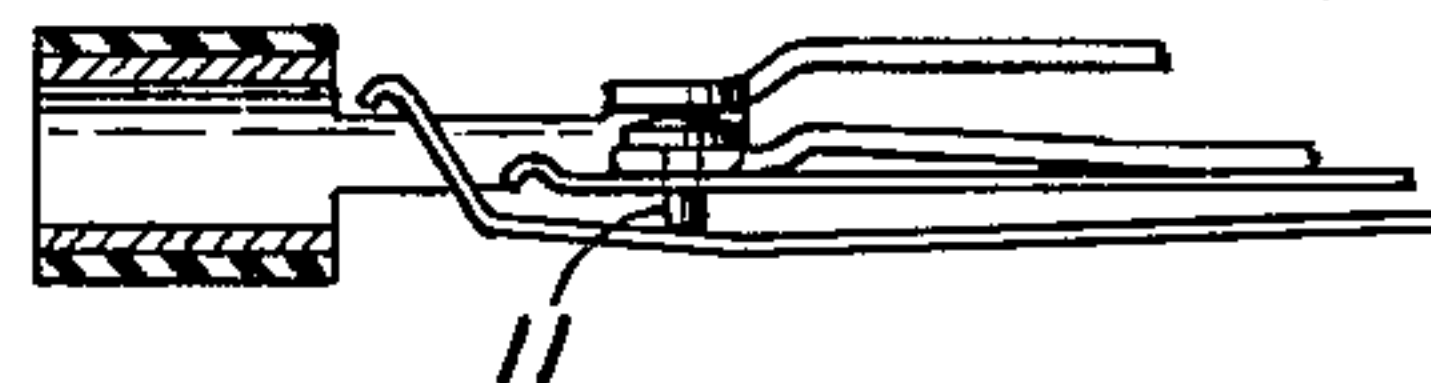


FIG. 2A



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TOOL FOR REPLACING JACK STUDS

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Filed Nov. 26, 1957, Ser. No. 699,123

3 Claims. (Cl. 29-271)

This invention relates to tools and more particularly to a novel and useful tool and method of operation thereof for repairing telephone system equipment.

In the conventional telephone jack employed, as for example, in a manual switchboard, the tip spring is biased in such a manner that it engages the ring spring unless a spacer is placed between the springs. Normally, a flat head stud of insulating material is positioned in the jack so that the shank of the stud is arranged to serve as the spacer between the tip and ring springs. It is common in such jacks for the head and shank of the stud to split apart and fall out of the jack, causing the tip spring to engage the ring springs and short circuit the jack. The standard procedure for remedying this defect is to remove from the switchboard the jack strip of which the jack is part and insert a new stud into the jack. The removal of the jack strip is a time-consuming operation and when performed on an energized switchboard, constitutes a safety hazard. Also, in removing the jack strip, cable must be separated which places considerable tension on all leads and may result in other switchboard failures in the form of broken or loose connections, insulator slipping, et cetera.

It is an object of the present invention to provide a simple tool and method of operation for repairing defective telephone switchboards.

It is a particular object of the invention to provide a tool and method of operation thereof for replacing broken studs in telephone jacks in a relatively safe and expeditious manner.

In an illustrative embodiment, the tool comprises a rigid bar, one end of the bar being flattened and appropriately bifurcated, and suitable surfaces and markings along the length of the bar to facilitate operation thereof.

According to one feature the tines of the tool hold the replacing stud and are of unequal length for manipulating the contacts of the jack when the tool is appropriately rotated.

According to another feature gauge marks are located along the length of the tool at predetermined points to indicate the correct distance for inserting the tool into the jack to perform an appropriate movement in replacing a jack stud.

According to still another feature the tool is inserted into the front end of a jack and subjected to a series of elevational, longitudinal and rotational movements to employ the structural characteristics of the tool to seat a stud into the jack.

These and other features of the tool and method of operation thereof will be more fully apprehended from the following detailed specification taken in conjunction with the drawing in which:

FIG. 1 is a perspective view of an illustrative embodiment of the tool;

FIG. 2 indicates a manner of loading the tool and orienting it for insertion into a defective jack;

FIG. 2A shows a jack stud installed in a telephone jack;

FIGS. 3A through 3D indicate the sequence of operations employed in using the tool to replace a jack stud in a short circuited jack; and

FIG. 4 is a perspective view of a portion of another embodiment of the tool.

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Referring to FIGS. 1, 2 and 2A, a cylindrical rod member 1 is shown having a knurled handle 2 attached at one end thereof. It should be understood that member 1 may be of other geometrical shapes, but a cylindrical rod has been selected for purposes of illustration only. The working end of the tool has a flat portion 3 which is bifurcated with tines 4 being of unequal length for reasons which will become apparent hereinafter. The flat portion 3 is terminated in a shoulder 5 which is transverse to the portion 3.

Looking at the tool from the working end, a first flat surface 6 is located on member 1. The surface 6 is rotationally displaced 90 degrees counter-clockwise from portion 3 and it extends toward handle 2 for a predetermined distance from a plane passing through shoulder 5. A second flat surface 7 is located on member 1. The surface 7 is in parallel planar relation with portion 3 and it extends from the shoulder 5 to the handle 2. A third flat surface 8 of convenient length is located on handle 2 in parallel planar relation with surfaces 3 and 7.

A first gauge mark 9 is located at the handle end of the surface 6 and similarly a second gauge mark 10 is located on surface 7. The mark 9 is located a predetermined distance from shoulder 5. The gauge marks may be etched on the member 1 and they are transverse to their associated surfaces. These marks serve as tool positioning guides to an operator for performing a particular sequence of operations with the tool in replacing a jack stud. The sequence of operations will be described hereinafter. It is apparent that the marks need not be etched on the member 1, but may, of course, be painted or placed on the bar by other means.

In FIG. 2, the tool is shown loaded with an insulating jack stud 11 and in proper position for insertion into a short circuited jack 12 located in a manual switchboard 13. Another method of loading the tool (not shown) is to place a stud in the tool in an upright position and insert the tool into the jack until the shoulder 5 is coincident with the outer edge of the jack 12. Then, the tool is rotated 90 degrees counter-clockwise, which places it in a position similar to that shown in FIG. 2. The former method of loading the tool has been chosen hereinbelow for reasons of convenience in describing the operation of the tool. The jack, as is well understood in the art, comprises a sleeve 14, tip and ring springs 15 and 16, respectively, stud holes 17, and stop spring 18. The stud holes 17 pass through the ring spring 16 and the stop spring 18. The jack is short circuited due to the fact that no jack stud 11 is located in stud hole 17, as shown in FIG. 2A, which enables the tip and ring springs to engage one another and short circuit, as explained hereinbefore.

The sequence of operations employed in using the tool will now be described in conjunction with FIGS. 3A through 3D. In FIG. 3A the loaded tool is shown properly inserted into jack 12 with the gauge mark 9 coincident with the outer edge of the jack and the flat surface 6 facing upward. The purpose of flat surface 6 is to provide positive clearance between the cylindrical rod and jack sleeve to enable longitudinal, vertical and rotational movement of the tool within the jack. In this position of the tool the long tine 4 overhangs the tip spring 15. The short tine 4 abuts the end of the spring 15, which prevents further entry of the tool into the jack.

The next operation of the tool is shown in FIG. 3B and involves rotating the tool clockwise 90 degrees until the flat surface 7 becomes the upper surface of the tool in the jack sleeve. It is evident in performing this operation that tip spring 15 is depressed underneath the tool by the action of the longer tine. Also it will be noted

that the jack stud 11 has been rotated from a horizontal to a vertical position. After rotation the handle is depressed and the tool thrust further into the jack, as shown in FIG. 3C, until the gauge mark 10 is coincident with the outer edge of the jack. This action enables the tool to ride over the tip and ring springs and places the head of the jack stud in contact with the jack sleeve portion overhanging the stud hole 17. In this position the handle 2 is raised and the tool thrust further into the jack until the handle is contiguous to the outer edge of the jack, as shown in FIG. 3D. This action widens the separation between the stop spring and the jack sleeve portion overhanging the stud hole 17 so that the jack stud can fit in between these surfaces. It will be noted that the length along the bar from the handle to the stud 11 is substantially the same as the axial distance from the outer edge of the jack to the stud holes 17. Thus, the shank end of the stud can be placed into the stop spring portion of stud hole 17 by lowering the handle 2 to a horizontal position and moving the tool sideways in the jack. The flat surface 8 serves as a guide to the operator for keeping the tool in a horizontal plane. The stud is seated in the stud hole 17 by the ring spring 16 and the stop spring 18 returning to their normal position when the tool is withdrawn from the jack. The tool should be withdrawn from the jack without turning or up and down movement which could possibly interfere with the seating of stud 11.

Since the tool operations are performed at the various gauge marks it is important that the marks be placed accurately on the tool from measurements made on the particular jack to be repaired by the tool. Otherwise, the tool could cause damage to the jack from the various operations. Thus, in FIGS. 1 and 2, the axial distance along the bar 1 from gauge mark 9 to the outer end of the longer tine should be slightly more than the axial distance of the jack from the outer edge thereof to the outer edge of tip spring 15. And, the axial distance from gauge mark 10 to the outer end of the longer tine should be slightly more than the axial distance of the jack from the outer edge thereof to the outer edge of stop spring 18.

It is apparent that the total time for performing these operations is a matter of minutes and not hours as may be the case in the removal of the jack strip from the switchboard and the repair of the jack. Also, the tool being inserted into the front of the jack enables the replacement of the stud to be done in comparative safety since the energized leads of the switchboard or jack strip need not be exposed in order to complete the repair of the jack.

On some telephone jacks depressing the tip ring and stop springs does not require substantial leverage and tools for this type jack may be simplified as shown in FIG. 4. In such cases the diameter or thickness of the bar 19 may be made substantially less than the diameter of the jack sleeve which eliminates the necessity for flat surfaces, as shown in the embodiment of FIG. 1. Also, the gauge marks 20 and 21 may be painted on instead of being etched on as disclosed in the embodiment of FIG. 1. The tines 22 and flat portions 23 and 24 are the same as those in FIG. 1 but the tool is more readily fabricated than that of FIG. 1. With such a tool the flats 23 and 24 would be oriented vertically and to the left side in the positions of FIGS. 2 and 3A.

It will be seen from the above-disclosed structures and method of operation that a simple tool has been devised which is readily adaptable to manufacture on a mass production basis. The tool is of unique shape for employing a distinctive combination of operations adapted to replace efficiently a stud in a telephone jack in a short interval of time and in a relatively safe manner.

Numerous modifications of the tool and method of operation may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A stud inserting tool for replacing broken studs in a telephone jack that includes a sleeve, tip and ring springs and a stop spring, said tool comprising a cylindrical bar, a handle attached to one end of said bar having a level surface at its bar end, the unattached end of said bar having a flat portion in parallel planar relation with said level surface, the bar including a shoulder terminating the flat portion and transverse thereto, said flat portion being bifurcated to form a pair of tines of unequal length having a tapered slot therebetween, and first and second gauge marks placed on the bar, the first gauge mark being spaced from the outer end of the longer tine a distance slightly more than the axial distance of the sleeve from the outer end thereof to the tip spring, the second gauge mark being spaced from the outer end of the longer tine a distance slightly more than axial distance of the sleeve from the outer end thereof to the stop spring.

2. A stud inserting tool as defined in claim 1 wherein said markings are means for indicating particular distances for inserting the tines into the jack and performing preselected operations at each marking to place a stud loaded in the tines into the jack.

3. A stud inserting tool for replacing broken studs in a telephone jack that includes a sleeve, tip and ring springs being hooked at their contact ends, a stop spring and a stud hole that extends through the tip and ring springs and the stop spring, said tool comprising a bar having a length slightly longer than the distance of the sleeve from the outer end thereof to the stud hole of the telephone jack, a handle attached to one end of said bar having a level surface at its bar end, the unattached end of said bar having a flat portion in parallel planar relation with said level surface, the bar including a shoulder terminating the flat portion and transverse thereto, said flat portion being bifurcated to form a pair of tines of unequal length having a tapered slot therebetween, the longer tine extending beyond the shorter tine a distance substantially equal to the hooked end of the tip spring, a first gauge mark spaced from the outer end of the longer tine a distance slightly more than the axial distance of the sleeve from the outer end thereof to the tip spring, and a second gauge mark spaced from the outer end of the longer tine a distance slightly more than the axial distance of the sleeve from the outer end thereof to the stop spring.

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