Aug. 29, 1950 C. LOMHOLT 2,520,158

ONE-PIECE SPRING JACK FRAME

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Fig. 1

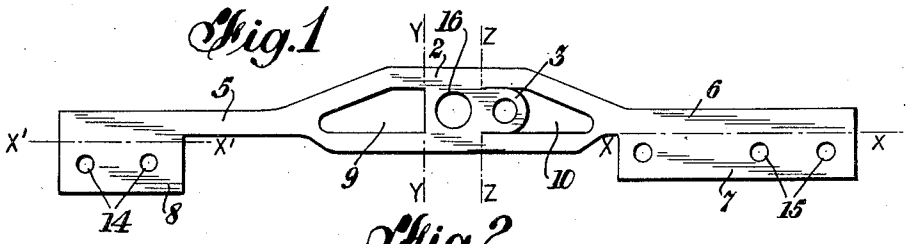


Fig. 2.

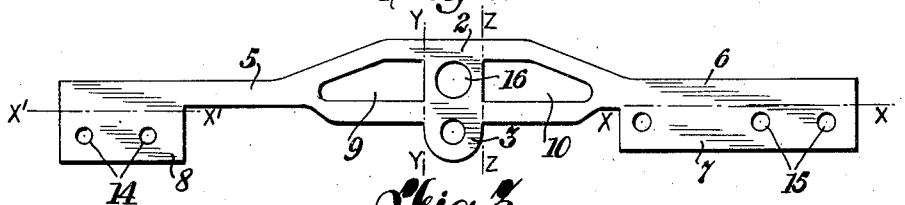


Fig. 3.

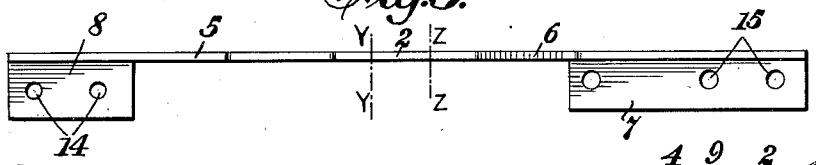


Fig. 4.

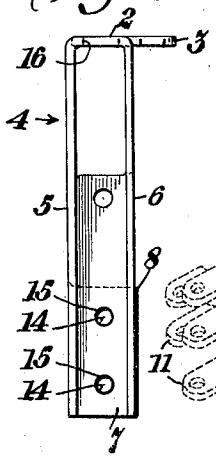


Fig. 5.

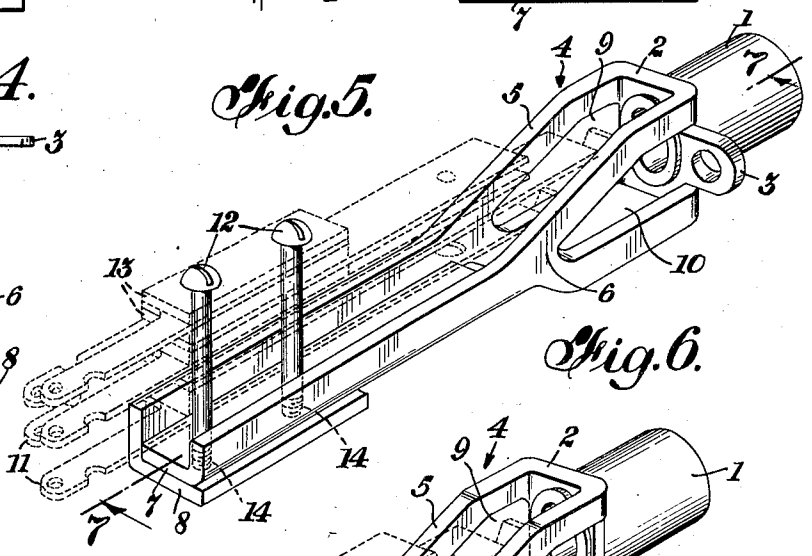
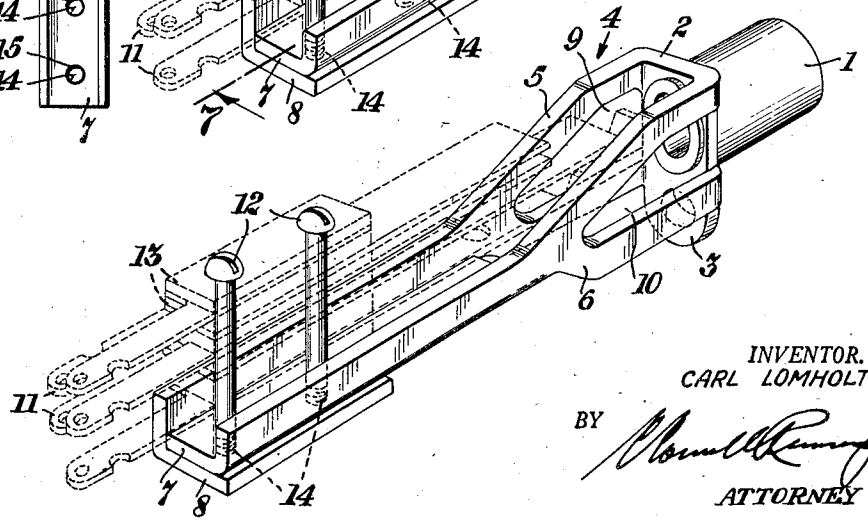


Fig. 6.



INVENTOR.
CARL LOMHOLT

BY

ATTORNEY

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Fig. 7.

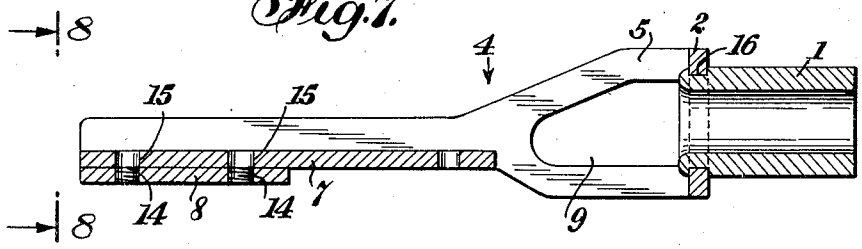


Fig. 8.

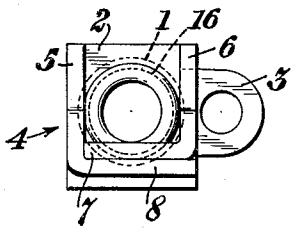


Fig. 9.

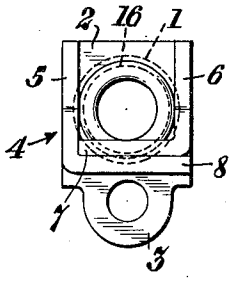


Fig. 10.

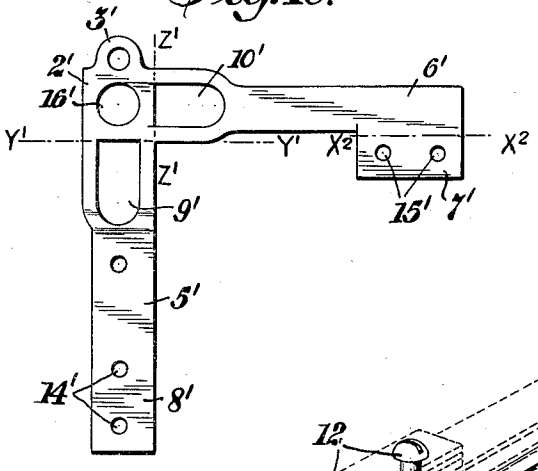


Fig. 11.

INVENTOR.
CARL LOMHOLT

BY

ATTORNEY

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UNITED STATES PATENT OFFICE

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ONE-PIECE SPRING JACK FRAME

Carl Lomholt, Bogota, N. J., assignor to Federal Telephone and Radio Corporation, New York, N. Y., a corporation of Delaware

Application March 30, 1945, Serial No. 585,675

1 Claim. (Cl. 179—96)

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This invention relates to a type of electrical switch commonly known as a spring jack, which jack is adapted to cooperate with a plug in order to detachably connect a plurality of electrical conductors associated with the plug with corresponding conductors associated with the jack. Jacks of this type are commonly employed in telephone switchboards in which a large number of jacks are mounted in close proximity, making it desirable that the jack structure be compact and rigid to prevent lateral displacement of the plug and to maintain the contact springs and sleeve of the jack in alignment so that it will properly cooperate with the plug and will not interfere with adjacent jacks.

Jacks of such type have been used before and it is the main object of the present invention to provide a jack which is also compact and rigid yet formed of a single piece of sheet metal.

It is another object of the present invention to connect the portions of the sheet metal forming the jack by pile-up screws used for securing the springs on the jack.

It is still another object of the present invention to provide a method of forming a jack structure which is particularly economical and simple.

With these and other objects in view which will become apparent from the following description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

Figures 1 and 2 show two different sheet metal blanks for jack structures having a lug extending sidewards and downwards respectively;

Figs. 3 and 4 show two different stages of the bending process necessary for forming the jack structure shown in Fig. 1;

Fig. 5 is a perspective view seen from the rear of a jack having a sidewards extending lug;

Fig. 6 is the same perspective view as shown in Fig. 5 showing a jack having a downwards extending lug;

Fig. 7 is a vertical cross-section along the lines 7—7 of Fig. 5;

Figs. 8 and 9 are end views of the structures shown in Fig. 5 and Fig. 6, respectively;

Fig. 10 shows a blank of another embodiment of a jack structure, and

Fig. 11 is a perspective view seen from the rear of a jack structure formed from the blank shown in Fig. 10.

Referring first to the general form of the invention shown in Figs. 1 to 9, the jack comprises a sleeve 1 which is secured at a right angle

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to a sheet metal plate 2. The plate 2 is provided with a lug 3 extending sidewards (Fig. 5) or downwards (Fig. 6) having an aperture therein by means of which the jack is adapted to be attached to a mounting panel (not shown).

Integrally formed with the plate 2 is the jack frame 4 which together with the plate 2 is punched out of a single piece of sheet metal which is bent along lines, to be described later, to form two side portions 5 and 6 and a base portion. The side portions 5 and 6 and the base portion are bent in such a manner that they form together a U-form. The base portion of the U-shaped frame consists of two overlapping portions 7 and 8 which extend over at least a part of the length of the frame and are integrally formed with the respective side portions 5 and 6. The side portions have cut-away parts 9 and 10, one or both of which may be formed to the lug 3 as shown in the embodiment of Fig. 5.

Mounted on the base 7 of the U-shaped frame 4 is a series of contact springs 11 which are secured to the base by means of pile-up screws 12 which pass through the rear end of the contact springs 11 and through a plurality of strips 13 of insulating material which serve to insulate the springs 11 from each other and from the jack frame 4. The screws 12 are insulated from the springs 11 by sleeves of insulating material, not shown. Depending upon whether the apertures in the lug or lugs 3 for securing the jack to the panel are arranged at the sides above or below the opening of the plate 2 receiving the sleeve 1, the form shown in Fig. 5 or the one shown in Fig. 6 will be applied.

The overlapping parts 7 and 8 forming the base portion of the U-shaped frame 4 are equipped with aligned apertures 14 and 15, respectively, which are adapted to received the lower ends of the pile-up screws 12, thereby holding together the overlapping portions 7 and 8 of the frame 4 and hence the side portions 5 and 6 in their bent-over positions.

Figs. 1 to 4 illustrate the method of forming the jack structure shown in Figs. 5 and 6, respectively. The first step in this forming process is the cutting of a blank of proper shape out of sheet metal. As shown in Figs. 1 and 2 this blank is of longitudinal shape and has a center portion which forms later the plate 2 having an opening 16 for receiving the sleeve 1. Branches extending from the center part to the left and to the right in an angle of 180° to each other form after the bending process the side portions 5 and 6, re-

spectively. These branches have cut-away parts 9 and 10. In the embodiment shown in Fig. 1 the cut-away part 10 is partly formed to an integral lug 3, though a second lug 3 (not shown) can be provided from cut-away part 9, whereas in the embodiment shown in Fig. 2 the blank has a downward extension forming the lug 3 though a second upward extension forming another lug 3 (not shown) can be provided. As shown quite clearly in Figs. 1 and 2 the ends of the branches have extensions which form after the bending process the overlapping portions 7 and 8 representing the base portion of the U-frame.

In order to arrive from the blank shown in Figs. 1 and 2 to the final frame shown in Figs. 5 and 6, the following bending steps take place. First, the upper part of the blank in its entire length is bent over 90° along the lines X—X and X_1—X_1, respectively, which brings the blank into the shape shown in Fig. 3. The bending lines X—X and X_1—X_1 are parallel but just the thickness of the sheet metal apart from each other. Then the entire left side of the blank is bent over 90° along the line Y—Y thereby forming the side portion 5 and the base portion 8. Finally the entire right side of the blank is bent over 90° along the lines Z—Z, providing the side portion 6 and the base portion 7 of the frame as shown in Fig. 4. In all bending steps the lug portion 3 extending sidewards (Fig. 1) or downwards (Fig. 2) remains in the plane of the center plate 2. The succession of the described bending steps can be changed and still the same final result obtained.

Fig. 10 of the drawing shows a blank cut out of metal sheet of another embodiment of the present invention and Fig. 11 shows the jack formed from the blank illustrated in Fig. 10. The blank shows here again a center plate 2' from which two branches 5' and 6' extend in an angle of 90° to each other. An extension of the plate 2' is formed to a lug 3' and both branches have cut-out parts 9' and 10'. One of the branches has at its end an extension 7' adapted to form the base for the contact springs 11.

In order to transform the blank (Fig. 10) to the frame 4' (Fig. 11), several bending operations have to be performed. First, one part of the branch 5' is raised in such a way that the raised and the remaining part of the branch 5' are in parallel arrangement (Fig. 11). Then the extension of the branch 6' is bent up for 90° along the line X^2—X^2 then the other branch 5' is bent up for 90° along the line Y'—Y' and finally the branch 6' is bent over 90° along the line Z'—Z'. The last operation puts the portion 7' above the end of the branch 5', the end of which 8' is equipped with two tappings 14' which are aligned with the borings 15' of the portion 7'. Mounted on the portion 7' is again a series of contact springs 11 which are secured to the frame by pile-up screws 12 which extend through the apertures 15' and into the tapping 14' thereby not only securing the contact springs on the base 7' but at the same time holding together the portions 5' and 6' in the bent-over position.

The present invention shows as a special characteristic the forming of a spring jack in a very economical way by cutting out a blank of sheet metal and forming the jack by several bending operations. One single assembly operation not only secures the springs to the jack, but at the same time connects the bent-over portions of the jack frame together to a U-shaped frame in the embodiment shown in Figs. 5 and 6 and to an L-shaped frame in the embodiment shown in Fig. 11. Both embodiments have as a special feature of the present invention the pile-up screws for the contact-springs as a connecting means for the bent-over parts of the frame. This arangement provides a possibility of low price manufacturing, by combining the jack frame and contact spring pile-up assembly into only one operation.

In both embodiments of the jack structure the branches are preferably provided with cut-outs 9, 10 and 9', 10', respectively, and a part of the material of one or both of the cut-outs can be used for the lug when the form with sideward extension of the lug is used. Such a construction is shown in Fig. 1 but can in the same manner apply to the cut-out 9 of Figs. 1 and 2 or for one of the cut-outs 9', 10' of Fig. 10.

While I have disclosed the principles of my invention in connection with several different embodiments, it will be understood that these embodiments are given by way of example only and not as limiting the scope of the invention as set forth in the objects and the appended claim.

What I claim is:

A one-piece spring jack frame comprising an end plate having an opening therein for reception of a plug sleeve, and two side arms disposed at right angles to and formed integral with said end plate, each of said side arms having a flange portion disposed at right angles thereto and extending for at least part of the length of said arms, said flanges being in overlapped relation and having aligned apertures internally tapped to receive pile-up screws for mounting contact springs thereon and mounting means formed integral with said end plate.

CARL LOMHOLT.

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