

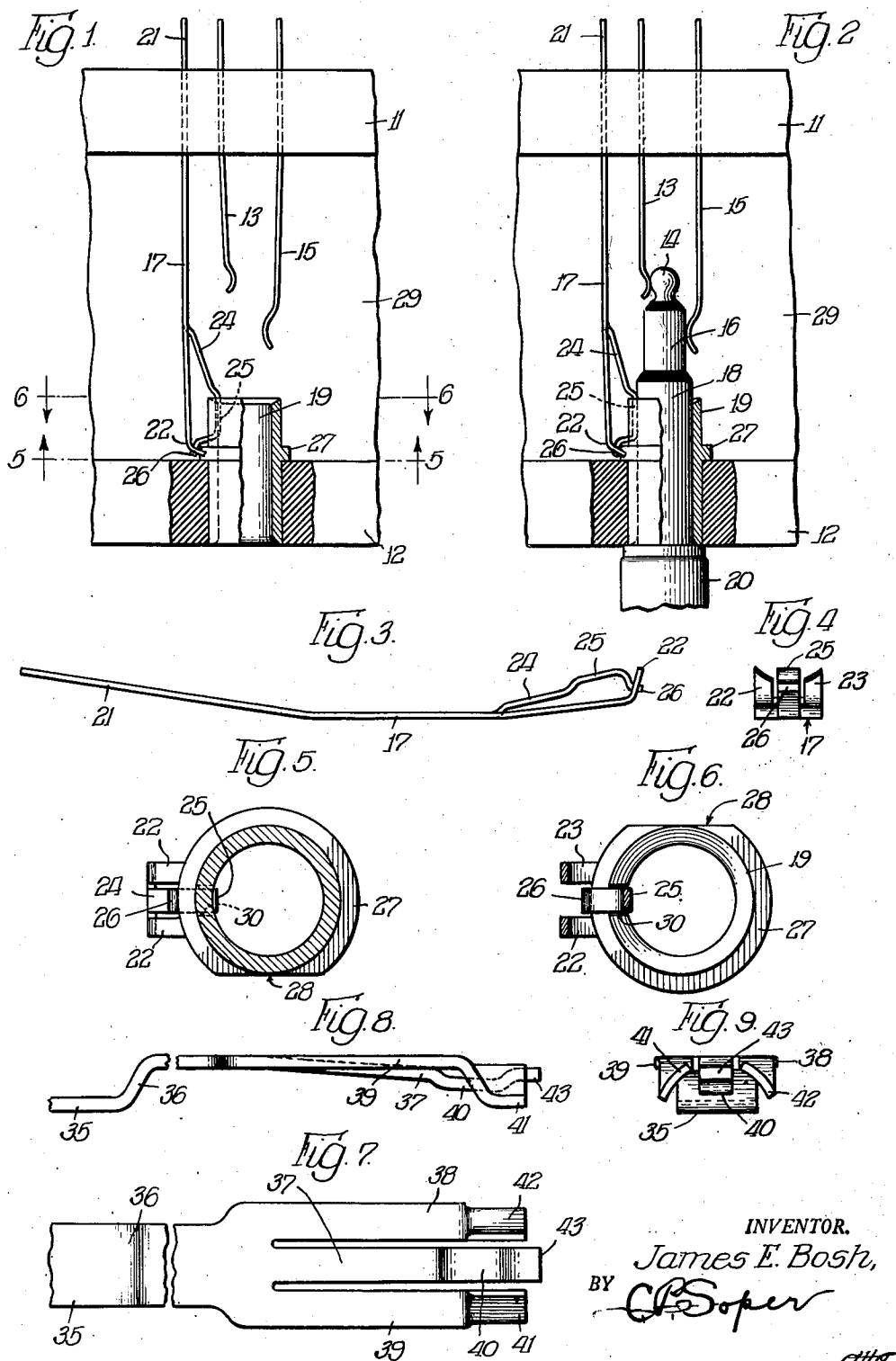
May 24, 1949.

J. E. BOSH

2,470,915

DUAL PURPOSE SLEEVE-SPRING SPRING JACK

Filed July 5, 1945



UNITED STATES PATENT OFFICE

2,470,915

DUAL PURPOSE SLEEVE-SPRING
SPRING JACKJames E. Bosh, Berwyn, Ill., assignor to Kellogg
Switchboard and Supply Company, Chicago,
Ill., a corporation of Illinois

Application July 5, 1945, Serial No. 603,321

10 Claims. (Cl. 179-96)

1

This invention relates to spring jacks and is particularly concerned with a new dual purpose sleeve-spring contact arrangement for use in spring jacks of the type employed, for example, in telephone switchboards.

The principal objects and features of the invention reside, first, in the provision of means for maintaining at all times good electrical contact between the jack sleeve and the sleeve-spring, which is important, for example, in case of line jacks, to permit testing of the jack sleeve by the operator for the purpose of determining if the line is busy, before inserting the plug; and, second, in the provision of means for establishing positive contact between the sleeve-spring and the sleeve of the plug inserted into the jack sleeve.

The invention realizes these objects by the provision of a new jack sleeve and a new sleeve-spring coacting therewith. The new jack sleeve is made in the form of a fixedly disposed bushing-like member which projects from its mounting. The new sleeve-spring is fixedly attached at one end and carries at its free end a pair of contact members or fingers for engagement with the projecting portion of the stationary jack sleeve to maintain at all times good electrical contact therewith. Between the contact fingers at the free end of the sleeve-spring is disposed a shear-formed tongue which is movable within a radially extending slot or cutout in the projecting portion of the jack sleeve for establishing positive contact with the sleeves of the plug inserted therein.

The objects and features briefly outlined above, and additional objects and features, will be brought out in detail in the description which is rendered below with reference to the accompanying drawings. In these drawings,

Fig. 1 illustrates in more or less diagrammatic manner an embodiment of the invention showing part of a spring jack provided with the new jack sleeve and the new sleeve-spring coacting therewith;

Fig. 2 is a view of the arrangement shown in Fig. 1, with the plug inserted into the jack sleeve;

Fig. 3 shows the new sleeve-spring of Figs. 1 and 2 in edge view;

Fig. 4 is an end view of the new sleeve-spring as seen from the right of Fig. 3;

Figs. 5 and 6 represent the contact arrangement as seen along the sectional lines 5-5 and 6-6 in Fig. 1; and

Figs. 7, 8 and 9 are fragmentary, somewhat enlarged top, edge and end views, respectively, of another embodiment of a sleeve-spring.

The drawings are more or less diagrammatic and are intended for descriptive and illustrative purposes only. Like parts are indicated by like reference numerals throughout the drawings. Known details and elements will be referred to

2

only to the extent required for conveying an understanding of what is new.

The new arrangement may be used in connection with practically any desired spring jack structure. Accordingly, the spring jack frame is shown in Figs. 1 and 2 diagrammatically as comprising a rear strip or bar indicated by numeral 11 and a front strip or bar indicated by numeral 12. The strip 11 is provided for the purpose of mounting the various springs, and the strip 12 is provided for mounting the jack sleeves. One set of springs is diagrammatically shown, including spring 13, for engagement with the tip 14 of the plug, and spring 15 for engagement with the ring conductor 16 of the plug. Numeral 17 in Figs. 1 and 2 indicates the central portion of the new sleeve-spring; numeral 18 indicates the sleeve of the plug; and numeral 19 indicates the portion of the new jack sleeve which projects inwardly from the mounting bar or strip 12. The plug handle is indicated in Fig. 2 at 20.

The new sleeve-spring comprises a mounting portion 21 which is attached in a suitable manner to the rear strip or bar 11 of the spring jack frame, as shown in Figs. 1 and 2. This rear portion of the sleeve-spring is angularly displaced with respect to the central portion, as indicated in Fig. 3, for the purpose of providing tension and spring pressure when the spring is mounted as shown in Figs. 1 and 2. The free end of the sleeve-spring is shear-formed to provide a pair of contact fingers 22-23 and a tongue 24 which has a contact making portion 25 and a stop extension 26.

The jack sleeve which is mounted in the front strip or bar 12 of the frame is provided with a flange 27 and with the previously mentioned inwardly projecting portion 19. The flange 27 is flattened at one side, as indicated in Figs. 5 and 6 at 28, for the purpose of alignment with the intermediate wall or rib 29 of the frame. The inwardly projecting portion 19 of the jack sleeve is also provided with a radially extending cutout or slot 30 (see Figs. 5 and 6) which is radially properly aligned with respect to the tongue 24 of the sleeve-spring by the alignment of the flattened portion 28 with the frame rib or wall 29. The slot 30 is provided for receiving the contact making portion 25 of the tongue 24. The stop extension 26 of the tongue or contact finger normally engages the flange 27 of the jack sleeve peripherally, as seen in Figs. 1, 5 and 6, and thus limits the inward displacement of the contact making portion 25 radially inwardly of the jack sleeve. In normal position, as seen in Fig. 1, the contact making portion 25 of the tongue or contact finger 24 projects slightly inside of the reamed boring of the jack sleeve and thus projects into the path of the plug which is to be inserted into the jack spring. When the plug is inserted, as seen in

Fig. 2, the inward pressure of the contact making portion 25 of the contact tongue or finger 24 is exerted against the sleeve portion 18 of the plug. Positive contact is thus made with the plug sleeve and is maintained throughout the operative position of the various parts as shown in Fig. 2.

The structure, as described above, thus provides a sleeve-spring carrying a plurality of contact means for elastic contact engagement with the bushing-like jacket sleeve, and spring means extending from the sleeve-spring for elastic contact engagement with the sleeve contact surface of the plug inserted into the jack sleeve.

The operation of the arrangement and function of the various parts are believed to be obvious from the drawings and from the foregoing description. For the sake of completeness, however, they are briefly summarized as follows:

It may be assumed that the spring jack shown in Figs. 1 and 2 is a line jack. Accordingly, tip and ring springs 13 and 15 are connected with line conductors and the sleeve-spring 17 is connected with the test conductor of the line. Before inserting a plug the operator must make a test to determine the busy or idle condition of the line. This is done by contacting the jack sleeve with the tip of a plug. If the operator finds that the line is idle, that is, if no busy potential is found on the jack sleeve, the connection may be established by inserting the plug. It is therefore important that the sleeve-spring is at all times connected with the jack sleeve. In the present structure such connection is reliably maintained by the contact fingers 22—23 of the structure.

The sleeve contact surface 18 of the plug, which is inserted into the jack spring, as shown in Fig. 2, must be positively connected with the sleeve-spring in order to provide the contact for reliably and positively extending the potential on the plug sleeve to the sleeve-spring. Such positive contact is established by the contact portion 25 of the tongue 24 which is part of the sleeve-spring.

The present structure thus fulfills the two principal functional requirements of coaction between the sleeve-spring and the jack sleeve and between the sleeve-spring and the sleeve portion of the plug, respectively.

The new structure is simple and efficient from the manufacturing and maintenance point of view. The parts are easily produced and assembled without requiring any particular skill, and readjustments, if necessary, are easily carried out. The new sleeve-spring forms functionally an integral part of the new jack sleeve and provides the dual functions as noted, without introducing any complications in production, assembly and maintenance. It will be easily understood that complications would result if it were attempted to make the sleeve-spring structurally an integral part of the jack sleeve. Such a structure would be costly to produce, unwieldy in assembly, clumsy in appearance and operation, and would lack the flexibility and adaptability which are a characteristic feature of the invention, as shown, for example, by reference to the embodiment illustrated in Figs. 7, 8 and 9. This is particularly true where the jack sleeve is molded into the switchboard structure which is one of the methods of manufacture contemplated in the present case.

The sleeve-spring shown in these figures is provided for mounting in a plane disposed in parallel with the plane of the intermediate rib or wall 29 of the spring jack frame instead of alongside the jack springs such as 13 and 15, as shown in

Figs. 1 and 2. In other words, the sleeve-spring 17 of the previously described structure is disposed just like the tip and ring springs 13 and 15, edgewise with respect to the rib 29 of the jack frame in a plane which extends in parallel with the plane of the springs 13 and 15, while the sleeve-spring illustrated in Figs. 7—9 may be disposed on top of the tip and ring springs such as 13 and 15, as seen in Figs. 1 and 2. The tip and ring springs such as 13 and 15 then underlie the sleeve-spring shown in Figs. 7, 8 and 9 and are disposed edgewise with respect thereto or in planes which extend perpendicular to the plane of the sleeve-spring.

The modified sleeve-spring comprises the mounting portion 35 which may be attached to the strip or bar 11 of a jack frame such, for example, as shown in Figs. 1 and 2. The spring extends forwardly and is crimped as indicated at 36, so as to lift its free end to provide clearance for the plug. The free end of the spring is somewhat wider than its mounting portion 35, as is particularly apparent from Figs. 7 and 9, and is provided with the tongue 37 and the contact fingers 38—39. The tongue 37 forms at its forward end the contact member 40 for engagement with the sleeve contact of a plug in a similar manner as described before with respect to the contact member 25 of the tongue 24 carried by the sleeve-spring 17 in Figs. 1 and 2. The fingers 38—39 are twisted at their free ends and are of the arcuate shape, as indicated at 41—42, for engagement with the flange of a jack sleeve such as the flange 27 indicated in the structure Figs. 1 and 2. The jack sleeve coacting with the sleeve-spring, Figs. 7, 8 and 9, is generally similar to the one described before and is also provided with a slot or cutout for receiving the contact portion 40 of the tongue 37. The stop 43 at the free end of the tongue 37 corresponds to the stop 26 of the tongue 24 of the previous embodiment. It limits the displacement of the tongue radially inwardly within the slot of the jack spring.

The invention is useful in single-jack as well as in multiple-jack structures, and also in connection with any type of plug and jack combinations that may be desired. The spring jack frame shown in Figs. 1 and 2, and also the plug and spring combination shown in these figures are examples of how the invention may be used and are not intended to indicate any particular inherent limitations.

Changes may be made within the scope and spirit of the appended claims in which I have defined what is considered new and desired to have protected by Letters Patent of the United States.

I claim:

1. A sleeve-spring contact device for use in spring jacks of the class described, comprising a bushing-like sleeve for receiving a plug, and a sleeve-spring secured at one end and carrying at the free end thereof a plurality of contact means for the dual purpose, first, of maintaining at all times contact with said bushing-like sleeve and, second, of establishing positive contact engagement with the sleeve contact surface of a plug inserted therein.

2. The structure and combination defined in claim 1, wherein said sleeve-spring is shear-formed to provide at its free end a plurality of contact fingers which constitute said contact means.

3. The structure and combination defined in claim 1, wherein the free end of said sleeve-spring

is shear-formed to provide a pair of contact fingers constituting contact means for maintaining at all times contact with said bushing-like sleeve and to provide a contact member constituting contact means for establishing positive contact engagement with the sleeve contact surface of said plug.

4. The structure and combination defined in claim 1, together with means forming a flange radially extending from said bushing-like sleeve and a tubular extension projecting axially therefrom, the free end of said sleeve-spring being shear-formed to provide a pair of contact fingers constituting contact means for maintaining at all times contact with said bushing-like sleeve by elastic contact engagement with the flange thereof and to provide a movable contact tongue projecting radially through said tubular sleeve extension and constituting contact means for establishing positive contact engagement with the sleeve contact surface of said plug.

5. The structure and combination defined in claim 1, together with means forming a flange radially extending from said bushing-like sleeve and a tubular extension projecting axially therefrom, the free end of said sleeve-spring being shear-formed to provide a pair of contact fingers constituting contact means for maintaining at all times contact with said bushing-like sleeve by elastic contact engagement with the flange thereof and to provide a movable contact tongue projecting radially through said tubular sleeve extension and constituting contact means for establishing positive contact engagement with the sleeve contact surface of said plug, and means for limiting the radial displacement of said movable contact tongue.

6. The structure and combination defined in claim 1, together with means forming a flange radially extending from said bushing-like sleeve and a tubular extension projecting axially therefrom, the free end of said sleeve-spring being shear-formed to provide a pair of contact fingers constituting contact means for maintaining at all times contact with said bushing-like sleeve by elastic contact engagement with the flange thereof and to provide a movable contact tongue projecting radially through said tubular sleeve extension and constituting contact means for establishing positive contact engagement with the sleeve contact surface of said plug, and means for angularly aligning said bushing-like sleeve with respect to the contact means of said sleeve-spring.

7. The structure and combination defined in claim 1, together with means forming a flange radially extending from said bushing-like sleeve and means forming a radially slotted tubular extension projecting axially therefrom, said flange forming an angularly confined flat surface for engagement with a mounting member for the purpose of angularly aligning said bushing-like sleeve and said slotted extension thereon with respect to said contact means carried by said sleeve-spring at the free end thereof, said contact means comprising a contact finger for elastic engagement with said flange to maintain at all times contact between said sleeve-spring and said bushing-like sleeve and a contact tongue extending radially movably through said slotted extension of said bushing-like sleeve for elastic positive contact engagement with the sleeve contact surface of said plug.

8. The structure and combination defined in

claim 1, together with means forming a flange radially extending from said bushing-like sleeve and means forming a radially slotted tubular extension projecting axially therefrom, said flange forming an angularly confined flat surface for engagement with a mounting member for the purpose of angularly aligning said bushing-like sleeve and said slotted extension thereon with respect to said contact means carried by said sleeve-spring at the free end thereof, said contact means comprising a contact finger for elastic engagement with said flange to maintain at all times contact between said sleeve spring and said bushing-like sleeve and a contact tongue extending radially movably through said slotted extension of said bushing-like sleeve for elastic positive contact engagement with the sleeve contact surface of said plug, and a stop member extending from said tongue for limiting the displacement thereof by engagement with said flange.

9. In a spring jack of the class described having a first mounting member for securing a plurality of contact springs extending therefrom and a second mounting member carrying a bushing-like sleeve for receiving a plug provided with contact surfaces for engagement with said contact springs, a sleeve spring secured at one end in said first mounting member and extending therefrom alongside said contact springs substantially in parallel therewith, the free end of said sleeve spring being shear-formed to provide a pair of contact fingers for contact engagement at all times with said bushing-like sleeve and to provide a contact tongue intermediate said contact fingers for contact engagement with the sleeve contact surface of a plug inserted therein.

10. In a spring jack of the class described having a first mounting member for securing a plurality of contact springs extending therefrom in parallel planes and a second mounting member, carrying a bushing-like sleeve for receiving a plug provided with contact surfaces for engagement with said contact springs, a sleeve-spring secured at one end on said first mounting member and projecting therefrom in a plane which extends perpendicular to the planes of said contact springs, the free end of said sleeve-spring being shear-formed to provide a pair of contact fingers for contact engagement at all times with said bushing-like sleeve and a contact tongue disposed intermediate of said contact fingers for contact engagement with the sleeve contact surface of a plug inserted therein.

JAMES E. BOSH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
673,039	Thomson	Apr. 30, 1901
1,126,193	Glunt	Jan. 26, 1915
1,151,274	Kaisling	Aug. 24, 1915
1,531,606	Grebe	Mar. 31, 1925
1,603,391	Leich	Oct. 19, 1926
1,699,678	Schellinger	Jan. 22, 1929
1,880,824	Copenhaver	Oct. 4, 1932

FOREIGN PATENTS

Number	Country	Date
2,701	Great Britain	May 22, 1902