June 25, 1929. P. G. EDWARDS 1,718,280

SPRING JACK CONNECTION

Filed May 4, 1928

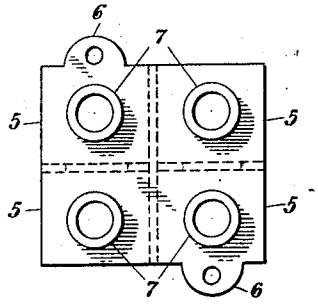


Fig. 1

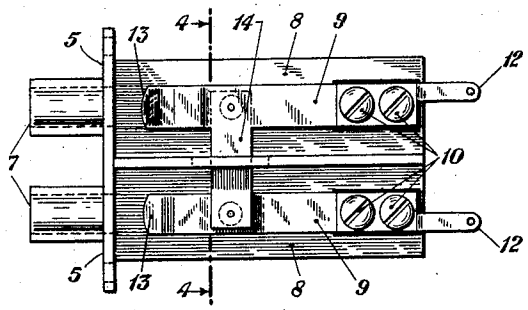


Fig. 2

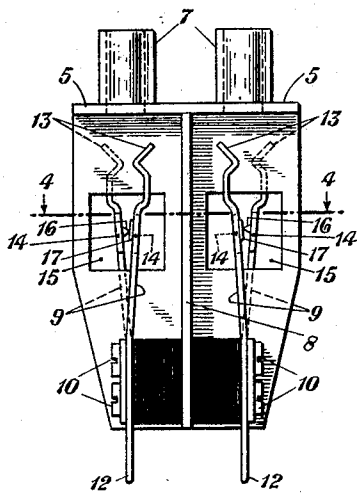


Fig. 3

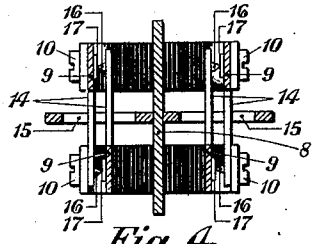


Fig. 4

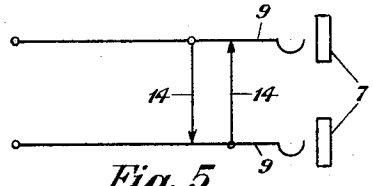


Fig. 5

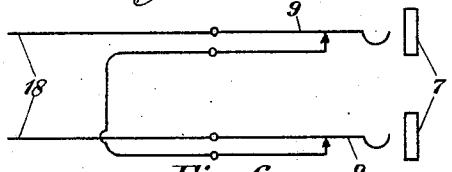


Fig. 6

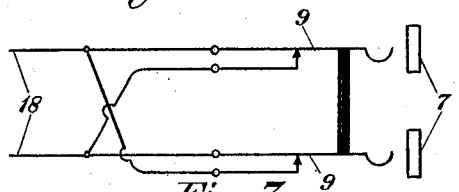


Fig. 7

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UNITED STATES PATENT OFFICE.

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SPRING-JACK CONNECTION.

Application filed May 4, 1928. Serial No. 275,106.

This invention relates to telephone spring jacks, and more particularly to interconnecting the springs of such jacks.

In practice, distant telephone stations are interconnected by means of toll lines which are relayed through central offices intermediate the telephone stations to be connected. In establishing the connection between the distant telephone stations therefor, the toll lines have included in their circuit considerable equipment including test boards which are provided with spring jacks whereby they may be tested. These spring jacks are made up of usual elements, including springs and their contacts, and the toll lines have been heretofore connected in series through such springs and contacts. The springs and their contacts present considerable trouble due to contact resistance, wearing out, corroding, and other defects, which occur between these elements. The toll line will cease to function when any of these troubles occur in the circuit. It will be apparent that with the increase in the length of the toll line there will be a corresponding increase in the number of springs and their contacts connected in series relation in said toll line so that the trouble which may arise from these elements becoming defective will be augmented in accordance with the length of the line. For instance, a toll line from New York to Chicago includes approximately 800 springs and associated contacts.

It is therefore an object of this invention to provide a spring jack which will reduce the probability of circuit troubles due to contact resistance and other defects between the elements of the spring jack practically to zero.

Another object of the invention is to accomplish this result without changing any of the circuit features or the appearance or use of the standard spring jacks.

It is a further object to provide a spring jack of simple construction and economical manufacture.

These and further objects will be apparent from the following description, when considered in connection with the accompanying drawing, in which one embodiment of the invention is illustrated.

Referring to the drawing, Figure 1 illustrates an elevation of a plurality of plates for spring jacks which are attached to the rear face of a switchboard. Fig. 2 is a side elevation of the improved spring jacks; Fig. 3 is a top plan view of said spring jacks; Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1 and 4—4 of Fig. 3. Fig. 5 is a diagrammatic view of the circuit connections of the improved arrangement and Figs. 6 and 7 are further diagrammatic representations of the former and improved arrangements, respectively.

In the drawing, the numeral 5 designates sheet metal plates which are adapted to be secured to the rear face of a switchboard by means of screws which pass through openings in semi-circular lugs 6, 6. Each of the plates is provided with a circular opening through which the tubular sleeves 7 extend. The distance of such extension may correspond to the thickness of the insulating blocks (not shown), through which they pass so that the outer ends of the sleeves terminate near the outer vertical surface of such blocks to permit the insertion of plugs in such sleeves. The inner ends of the sleeves 7 are suitably attached to the metal plates 5. The plates 5 form portions of frames which support the elements of the spring jack. The remainder of such frames, as indicated by the numeral 8, extend at right angles therefrom, and may be of the usual character of well-known construction.

A contact spring 9 is associated with each frame and is secured to one end thereof by means of screws 10. The contact springs may be provided with extensions which form terminal lugs 12 to which electrical conductors may be attached. The lugs are held in position on the jack frame by screws 10, and suitable means are provided to properly insulate the terminal lugs from the jack frame. The contact springs are placed in a longitudinal position in the jack frame and are of substantially flat character, with bent ends 13 which are connected to the main portions by intermediate angular shoulders. The bent ends are adapted to co-operate with plugs when they are inserted in the sleeves 7. The springs 9 which are mounted in pairs in parallel relation in jack frames are each provided with arms or projections 14 which extend at right angles therefrom and make contact with the flat surface of a companion spring. These arms or projections extend in opposite directions from their respective springs and are similarly related to each other. Openings 15 are provided in the jack frame to permit

the passage of the arms or projections therethrough so that they make contact with the parallel companion contact spring. Each arm or projection carries a contact point 16 which normally bears against a contact piece 17 formed on the spring 9 of the companion parallel spring, so that a pair of such springs will be normally connected by means of their respective arms or projections in parallel relation with each other. It will be apparent that this parallel connection between the pairs of springs will reduce circuit problems to a minimum, for if the contact between one arm or projection and the contact spring against which it bears for any reason becomes defective, then the contact between the other arm or projection and its contact spring will be maintained. If there is a probability of trouble of one per hundred for each set of contacts, the probability for the former series arrangement is two per hundred. For the improved parallel arrangement, above described, the probability of trouble would be one per ten thousand. The probability of trouble between the contacts of a spring jack by means of the improved arrangement is thus reduced in a very large ratio.

The advantages of the improved arrangement are more clearly illustrated in the diagrammatic representations shown in Figs. 6 and 7. In Fig. 6, which shows a former arrangement, it will be noted that the spring jacks 9 are connected in series relation. A defective condition between either the upper or lower spring 9 and the jack associated therewith to complete the circuit, for instance through the plugs of a patching cord inserted in each jack and over the conductors 18, would render such circuit in operative. If a defective condition between the contacts of one spring jack causes a line to be inoperative, it will readily be understood that the chances of defects arising through the many spring jacks which are serially connected in the toll line would greatly increase the inoperation thereof.

Fig. 7 illustrates the principle of the new arrangement as applied to Fig. 6. It consists essentially of connecting each set of contacts of springs 9 in parallel with line 18, and of causing these sets of contacts to be broken simultaneously, upon the insertion of a plug in either jack, by mechanically interlocking the moving springs 9, shown for instance by the connection of a strip of insulation thereto. It will be obvious that a defect in one or the other of the sets of contacts will not affect the operation of the line over conductors 18. Fig. 7 is electrically equivalent to Fig. 5, the latter showing the actual contact arrangement and the former illustrating its operation as compared with the present arrangement.

What is claimed is:

1. A spring jack comprising a frame, a pair of parallel contact springs extending longitudinally thereon and each adapted to be operated independently by plugs, and extensions carried by each spring normally contacting with the other spring whereby a parallel connection is made over conductors connected to said springs.

2. A spring jack comprising a frame, a pair of parallel contact springs extending longitudinally thereon and each adapted to be operated independently by plugs, said springs being adapted to be moved laterally, and extensions carried by each spring and normally contacting with the other spring, said extensions breaking contact with the springs upon the lateral movement thereof.

3. A spring jack comprising a frame, an upper contact spring and a lower contact spring extending longitudinally in the frame and in parallel relation with each other and each adapted to be operated independently by plugs, a perpendicular extension from each spring in normal contact with the other spring, said springs being movable laterally to break the contacts of the extensions therewith.

4. A spring jack comprising a frame, an upper contact spring and a lower contact spring extending longitudinally in the frame and in parallel relation with each other and each adapted to be operated by plugs, a perpendicular extension from each spring in normal parallel contact connection with the other spring, either spring being movable laterally to simultaneously break the contacts of both extensions.

5. A spring jack comprising a frame, an upper contact spring and a lower contact spring extending longitudinally thereon in parallel relation, and arms carried by each spring in normally parallel contacting connection with the other spring, said arms extending in opposite directions to each other from their respective springs and being similarly related to each other.

6. A spring jack comprising a frame, a pair of contact springs extending longitudinally thereon in parallel relation and each adapted to be operated independently by plugs, and arms carried by each spring normally contacting with the other springs, said arms extending in opposite directions to each other from their respective springs and being similarly related to each other and either spring being movable laterally to simultaneously break the contacts of the extensions.

In testimony whereof I have signed my name to this specification this 2nd day of May, 1928.

PAUL G. EDWARDS.