

No. 787,900.

PATENTED APR. 25, 1905.

W. W. DEAN.

PLUG AND SPRING JACK SWITCH.

APPLICATION FILED JAN. 14, 1902. RENEWED SEPT. 28, 1904.

Fig. 1.

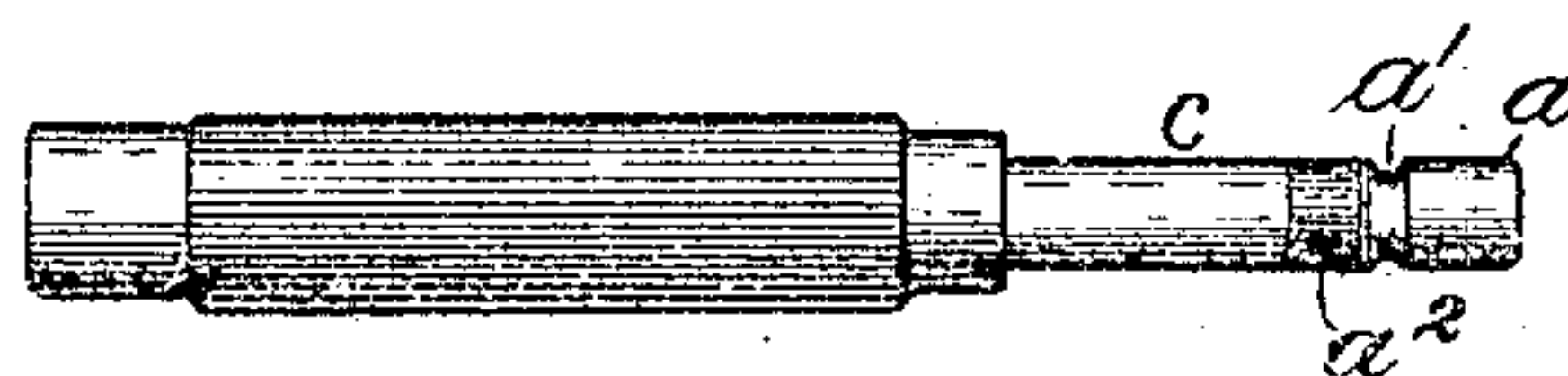


Fig. 2.

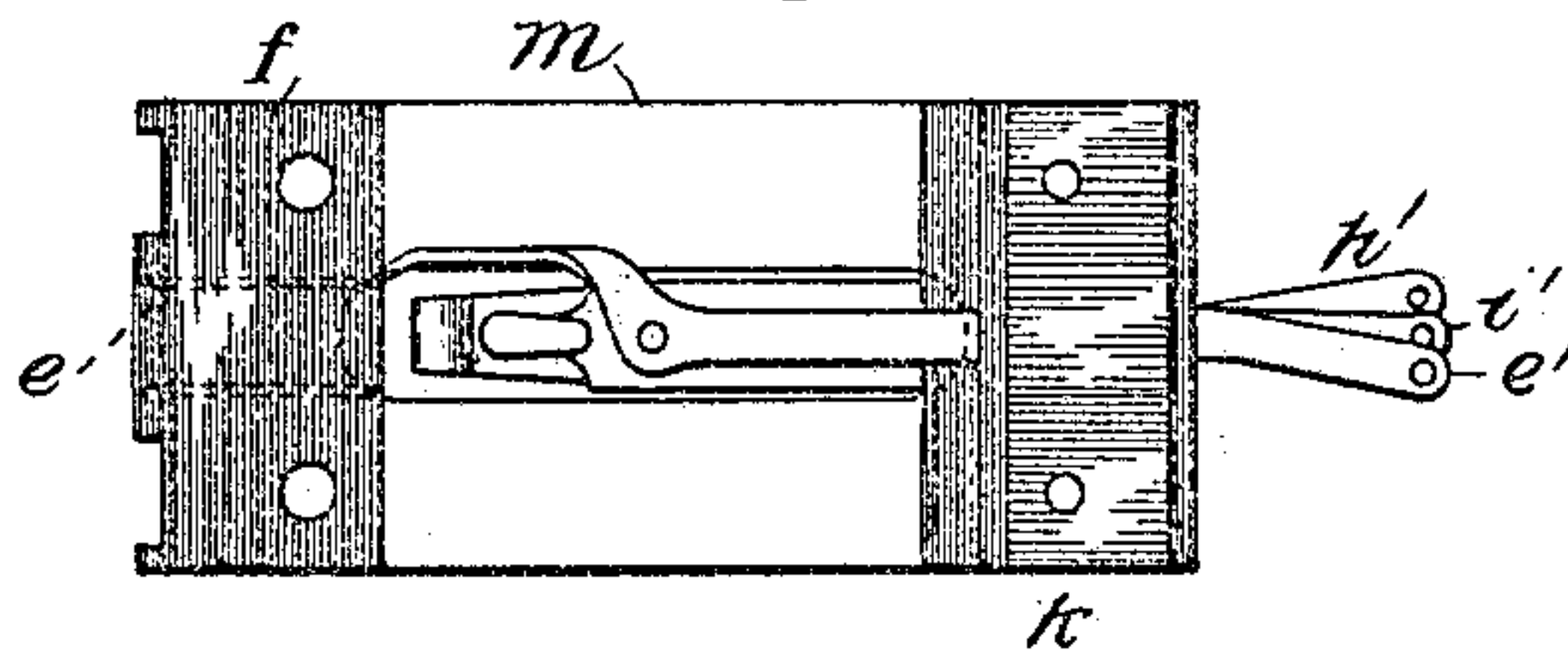


Fig. 3.

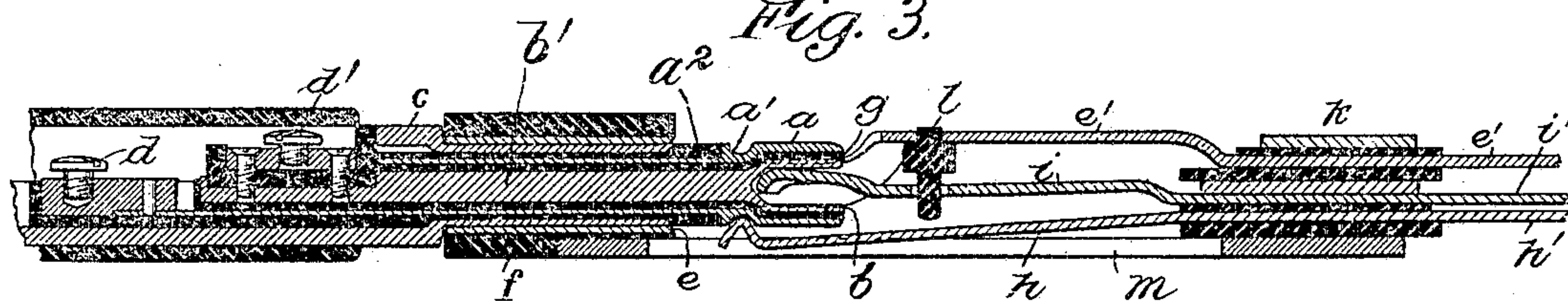
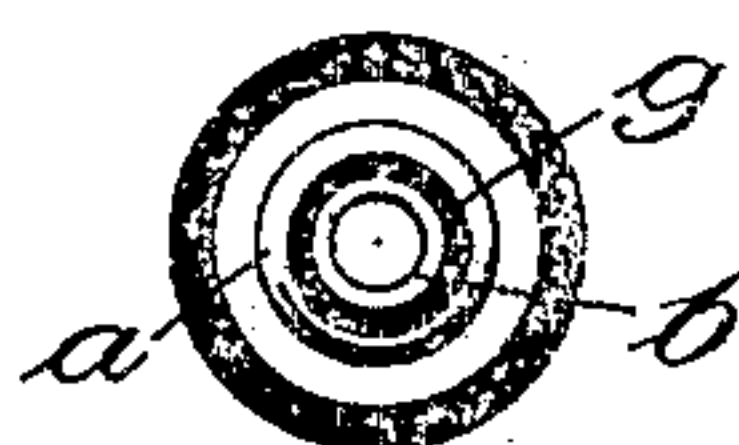


Fig. 4.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## PLUG AND SPRING-JACK SWITCH.

SPECIFICATION forming part of Letters Patent No. 787,900, dated April 25, 1905.

Application filed January 14, 1902. Renewed September 28, 1904. Serial No. 226,283.

*To all whom it may concern:*

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented a certain new and useful Improvement in Plug and Spring-Jack Switches, of which the following is a full, clear, concise, and exact description.

My invention relates to a plug and spring-jack switch, and has for its object to provide a plug and spring-jack of improved construction in which certain defects inherent in devices of the kind heretofore in use will be avoided.

15 My invention concerns particularly the plugs and spring-jacks of telephone-exchange switchboards. Heretofore it has been usual to provide a plug having three contact-pieces insulated from one another at different points  
20 along the surface of the plug. The tip of the plug constituted one contact. Next to this tip and insulated therefrom was a brass ring forming a second contact-piece, and back of the ring was a long shank or sleeve, which was  
25 the third contact. Each operator of a telephone-exchange switchboard is usually provided with a number of pairs of switch-plugs for making connection between any two telephone-lines terminating in spring-jacks upon  
30 her section of the board, the members of each pair of plugs being united by flexible conductors. In the process of completing a connection the operator is required to test the jack of the called line before plugging into it,  
35 this test being made by touching the tip of the connecting-plug to the thimble of the jack. The electrical contact thus made controls a circuit which includes the operator's head telephone, so that by listening in the telephone  
40 she may ascertain the electrical condition of the spring-jack thus tested. With plugs as heretofore constructed, however, false tests have frequently been caused by the ring-contact of the plug accidentally touching the thimble or test-ring of the jack, as when the plug  
45 is inserted a little way into the jack instead of merely touching the thimble with its tip. To avoid such accidental contacts and the re-

sultant false-test signals, I have devised an improved form of switch, the plug portion 50 whereof has a hollow tip corresponding to the ring-contact of an ordinary plug, the inner and outer surfaces of said tip being insulated from one another and constituting separate terminal pieces which may be connected, respectively, with the two line conductors of the cord-circuit. The plug has the usual  
55 shank or sleeve for engaging the test-ring or thimble of the jack, said sleeve inclosing a central stem which is enlarged at the tip, this enlarged portion being centrally bored for a short distance to provide an inner contact-surface. The spring-jack has a pair of line-springs, one of which is adapted to engage the outer surface of the tip of the plug and the  
60 other to enter the bore in the tip and make contact with the inner surface thereof. In order that good electrical contact may be made, it is necessary to make the line-springs of the spring-jack strong and have them bent  
65 so that they will be moved to some extent when the plug is inserted, and in spring-jacks as heretofore constructed it has been usual to provide an additional thick stiff metal strip carrying studs to form stops for the line-  
70 springs. In the spring-jack which I have invented no such extra metal strip is necessary. In its stead I carry the tongue which leads from the thimble of the jack in the front supporting-strip back over the line-springs to the  
75 rear supporting-strip, and I mount the insulating stud or stop upon this tongue. I find that the tongue as thus fastened at both ends of the front and rear strips forms a sufficiently rigid support for the stop. 85

I will describe my invention more particularly by reference to the accompanying drawings, in which—

Figure 1 is a side view of the plug. Fig. 2 is a plan view of the spring-jack. Fig. 3 is an enlarged vertical sectional view showing the plug inserted in the spring-jack, and Fig. 4 is an end view of the plug. 90

Similar letters of reference are used to designate the same parts wherever they are shown. 95

The body portion of the plug consists of a



long hollow metallic shank or sleeve *c*, the forward portion of which is designed to engage the test-ring or thimble *e* of the spring-jack, the rear portion of said shank being surrounded by an insulating-sleeve to be grasped by the operator. Beyond this shank *c* and separated therefrom by an insulating-ring *a*<sup>2</sup> is the hollow tip of the plug, formed of inner and outer concentric barrel or ring contact-pieces separated from one another by insulating material. The outer barrel-contact *a* corresponds to the tip of an ordinary plug and is provided with a rearwardly-extending sleeve which passes through the shank to a binding-screw *d* within the hollow handle of the plug, by which connection may be made with the proper strand of the flexible conducting-cord. The barrel *a* is provided with an annular groove *a'* to form a seat for the line-spring of the jack with which it is designed to engage. The inner ring-contact *b* at the tip of the plug is formed by boring a short distance into the enlarged end of a central stem *b'*, which supports the other parts of the plug. The stem *b'* is provided with a binding-screw *d'* in the hollow handle of the plug, to which a strand of the cord-circuit may be fastened. By providing the central stem *b'* with an enlargement at the end and boring only a short distance into this enlargement a suitable inner ring contact-surface is provided without weakening the plug by having it hollow the full length of the shank.

The spring-jack consists of a metallic thimble or test-ring *e*, mounted in the front supporting-strip *f*, and the two line-springs *h* *i*, mounted in the rear supporting-strip *k* and extending forward in the line of the thimble *e*. When the plug is inserted within the spring-jack, the spring *h* is adapted to engage with the groove *a'* in the tip of the plug and hold the plug in position, and the spring *i* is provided with a finger upon its end substantially in alinement with the axis of the thimble *e*, adapted to enter the bore in the end of the central stem *b'* and make contact with the inner surface *b* thereof. The springs *h* *i* are provided with extensions or tongues *h'* *i'*, to which the line-wires may be soldered, and the thimble *e* is provided with a tongue *e'*, which, starting at the side of the thimble, extends rearwardly for a short distance at the side of the springs *h* *i* and then is twisted around above the springs and extends back parallel with said springs, finally being attached to the rear supporting-strip *k*, from which its end projects rearwardly to afford means for attaching the wire of the local switchboard-circuit. The two supporting-strips may be rigidly united by a metallic plate *m*, upon which they are mounted. An insulating-stud *l* is mounted upon the tongue *e'*, as shown most clearly in Fig. 3, and projects downward through a hole in the spring *i*, the end of the

stud forming a stop for the lower spring *h*. The stud is also provided with a shoulder forming a stop for the upper spring *i*, as shown.

I am aware that it is not broadly new to construct a plug with a hollow shank having inner and outer contact-surfaces insulated from one another, the plug being designed to fit over a contact-pin while a contact-spring bears on the outside; but

What I claim is—

1. The combination with a spring-jack having a thimble or test-ring *e* and a contact-spring *i* substantially in alinement with the axis of the thimble, of a connecting-plug having an outer shank or sleeve adapted to engage the thimble of the jack, and an inner contact-piece *b* inclosed by said shank and insulated therefrom, said contact-piece *b* having an axial bore at the end, the said contact-spring *i* being adapted to enter said bore and make engagement with the inner surface thereof when the plug is inserted in the jack.

2. The combination with a spring-jack having a test-ring or thimble, a line-spring *h* adapted to engage the outer surface of the tip of an inserted plug and a contact *i* having a narrow tongue in substantial alinement with the axis of the thimble, of a connecting-plug having a shank or sleeve *c* for engaging said thimble, a barrel or ring contact on the outside of the tip of the plug, and a central stem inclosed by the shank and ring, said stem having a bore in its tip, adapted to be engaged by the contact *i* of the jack.

3. The combination with a spring-jack frame having front and rear supporting-strips, of a pair of contact-springs secured to the rear strip and extending forward, one above the other, the upper spring having a hole therein, a contact ring or thimble in the front strip, having a tongue extending over the two contact-springs back to the rear strip, to afford means for attaching the connecting-wire, and an insulating-stud attached to the under side of the aforesaid tongue and projecting through the hole in the upper contact-spring, to form a stop for the lower spring, said stud having a shoulder forming a stop for the upper spring, as set forth.

4. The combination with a tubular plug having inner and outer contact-surfaces, insulated from one another, of a spring-jack having front and rear supporting-strips, a thimble *e* adapted to be engaged by an outer contact of the plug, a contact-spring *i* adapted to engage the inner contact of the plug, a tongue *e'* extending from the thimble *e* back to the rear supporting-strip, and a stop for a contact-spring of the jack, mounted upon said tongue between the two supporting-strips.

5. The combination with front and rear supporting-strips, of a contact-spring secured to the rear supporting-strip and extending to-

ward the front, a contact ring or thimble in  
the front strip, having a tongue extending  
back to the rear strip to afford means for at-  
taching the connecting-wires, and an insulat-  
5 ing-stud mounted upon said tongue between  
the supporting-strips to serve as a stop for the  
contact-spring, as set forth.

In witness whereof I hereunto subscribe my  
name this 18th day of December, A. D. 1901.

WILLIAM W. DEAN.

Witnesses:

DE WITT C. TANNER,  
W. W. LEACH.