

June 25, 1929.

P. G. EDWARDS

1,718,280

SPRING JACK CONNECTION

Filed May 4, 1928

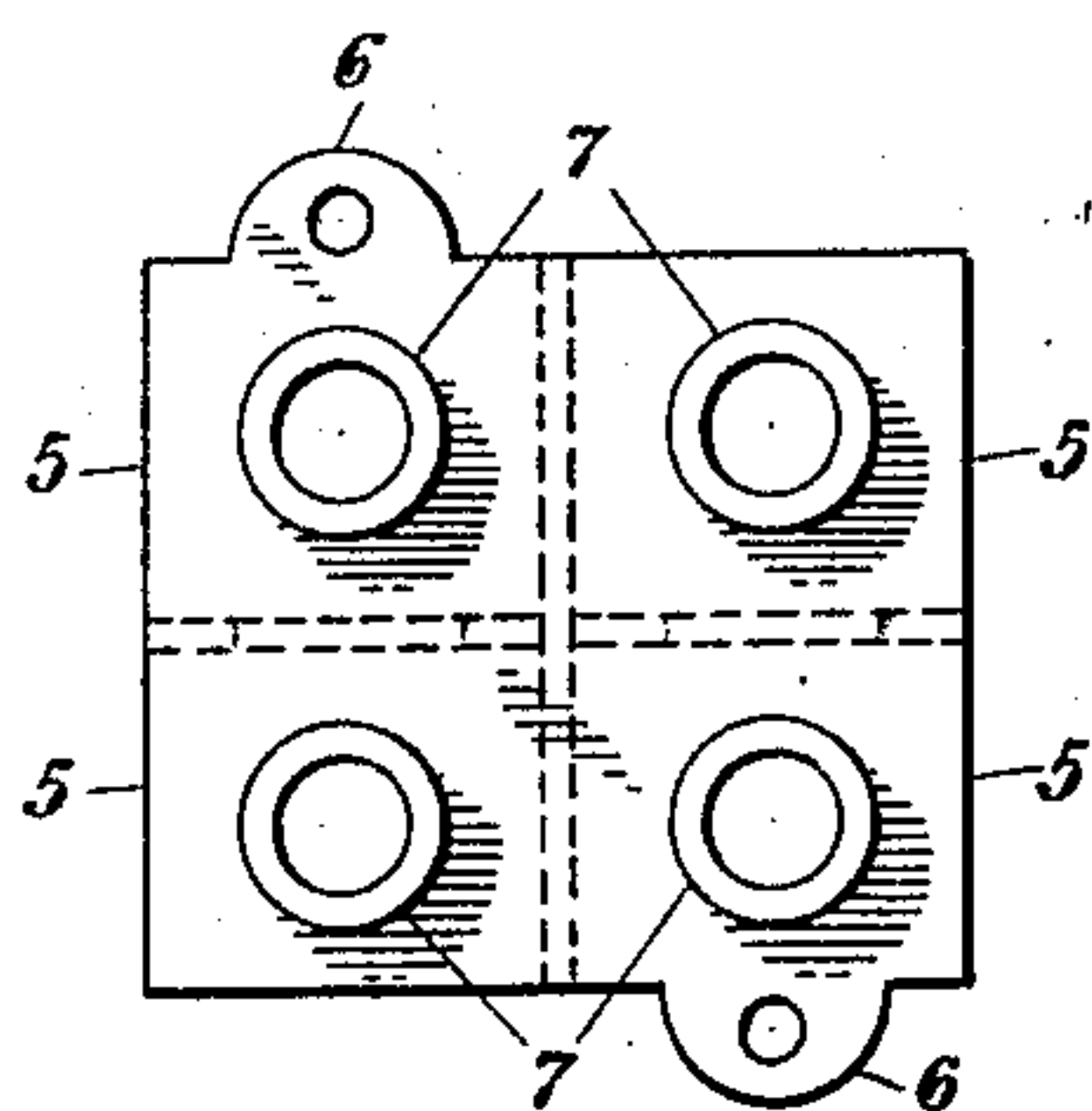


Fig. 1

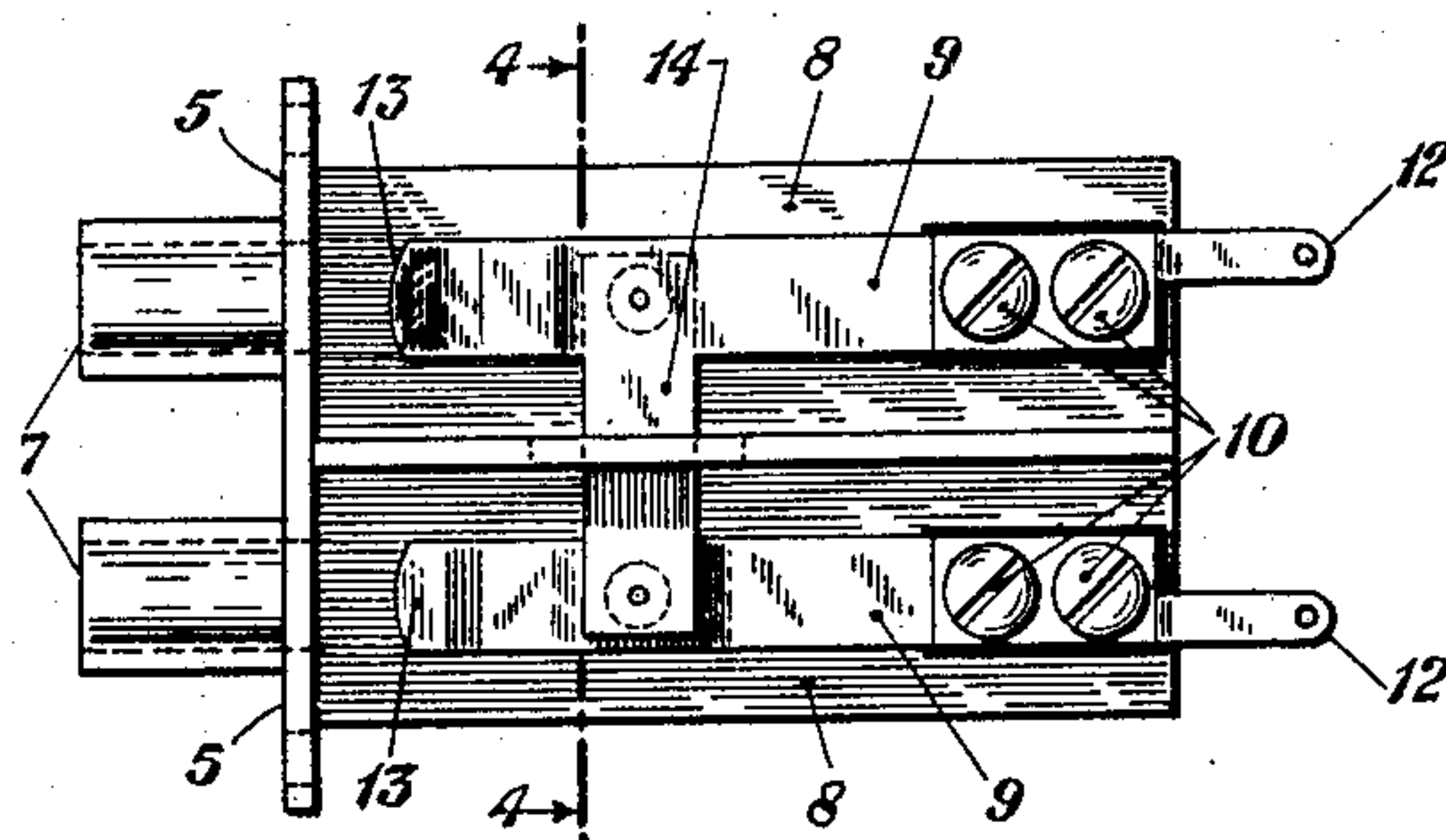


Fig. 2

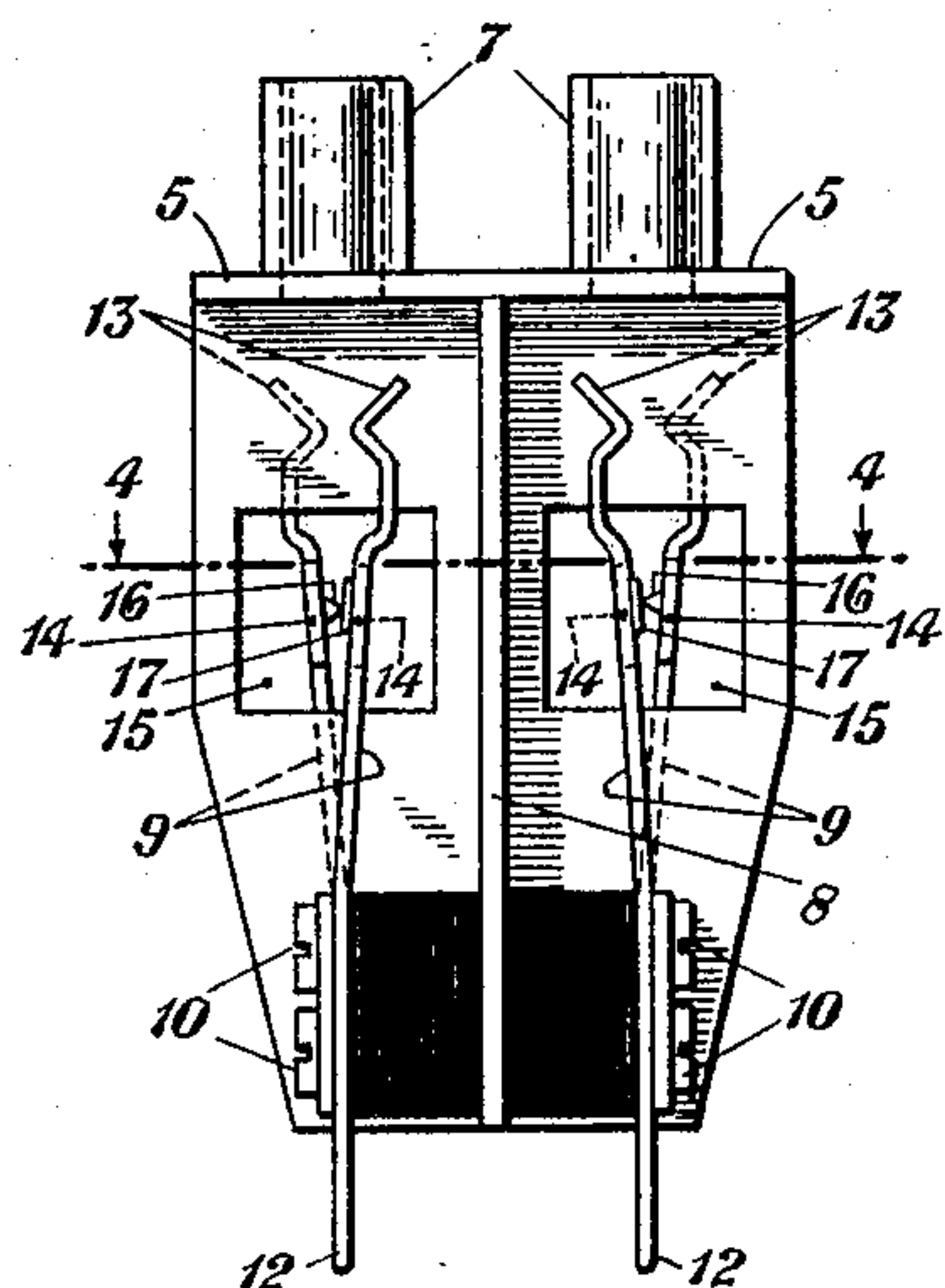


Fig. 3

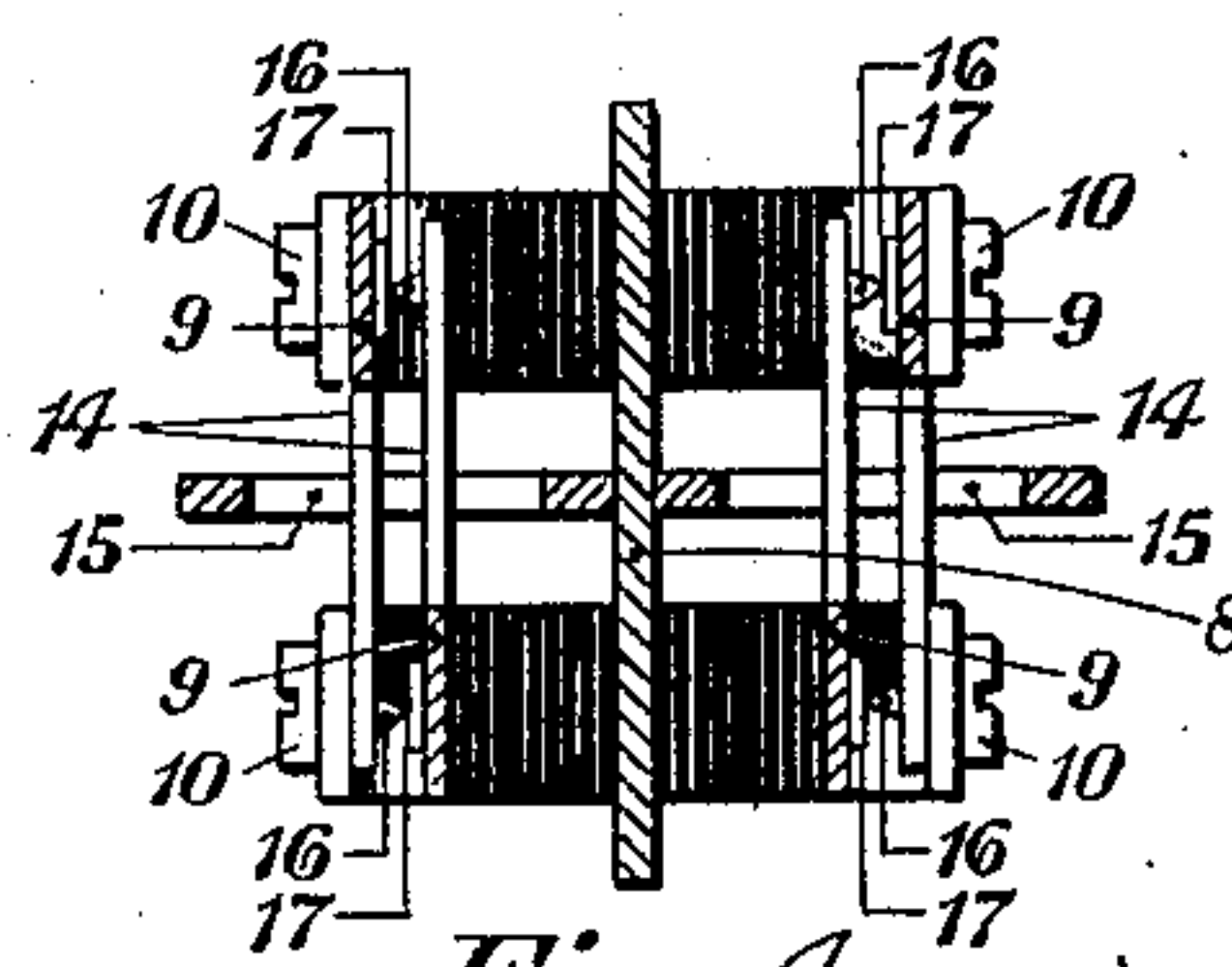


Fig. 4

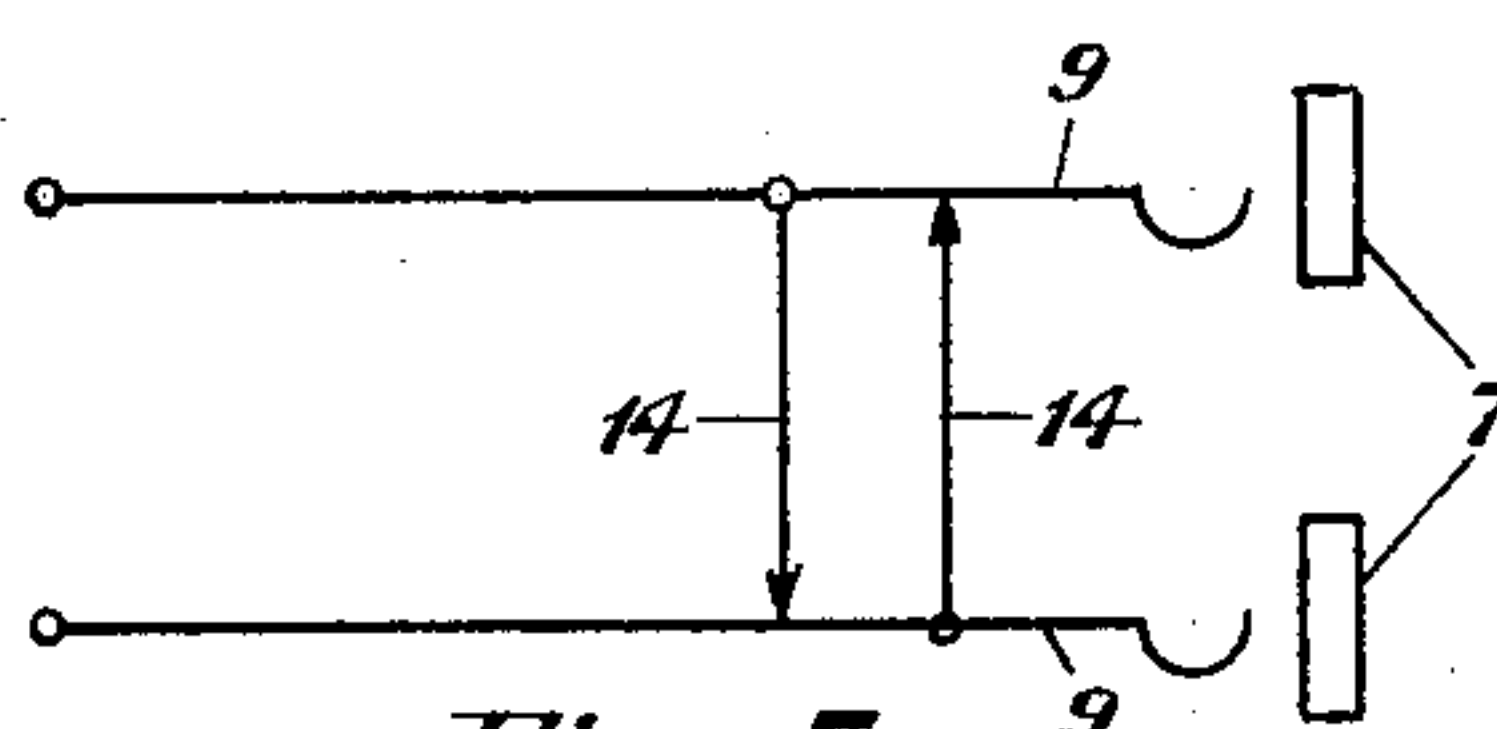


Fig. 5

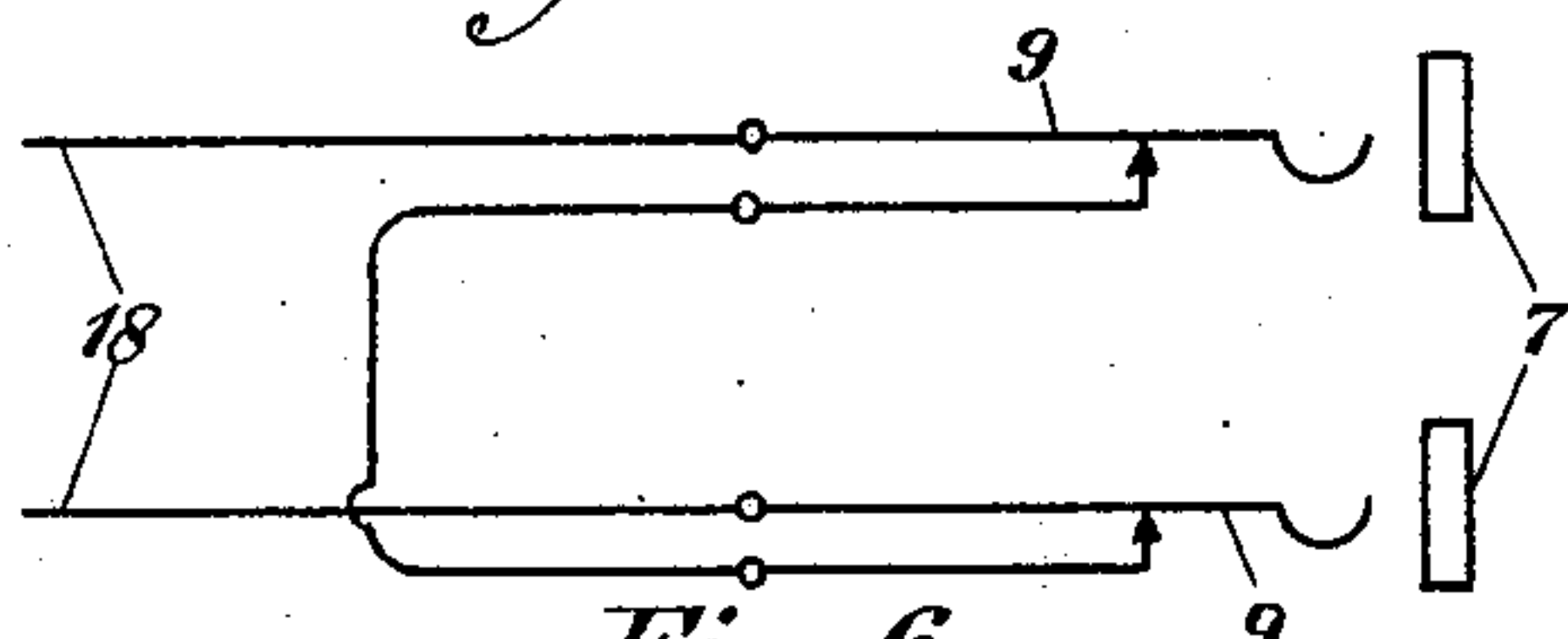


Fig. 6

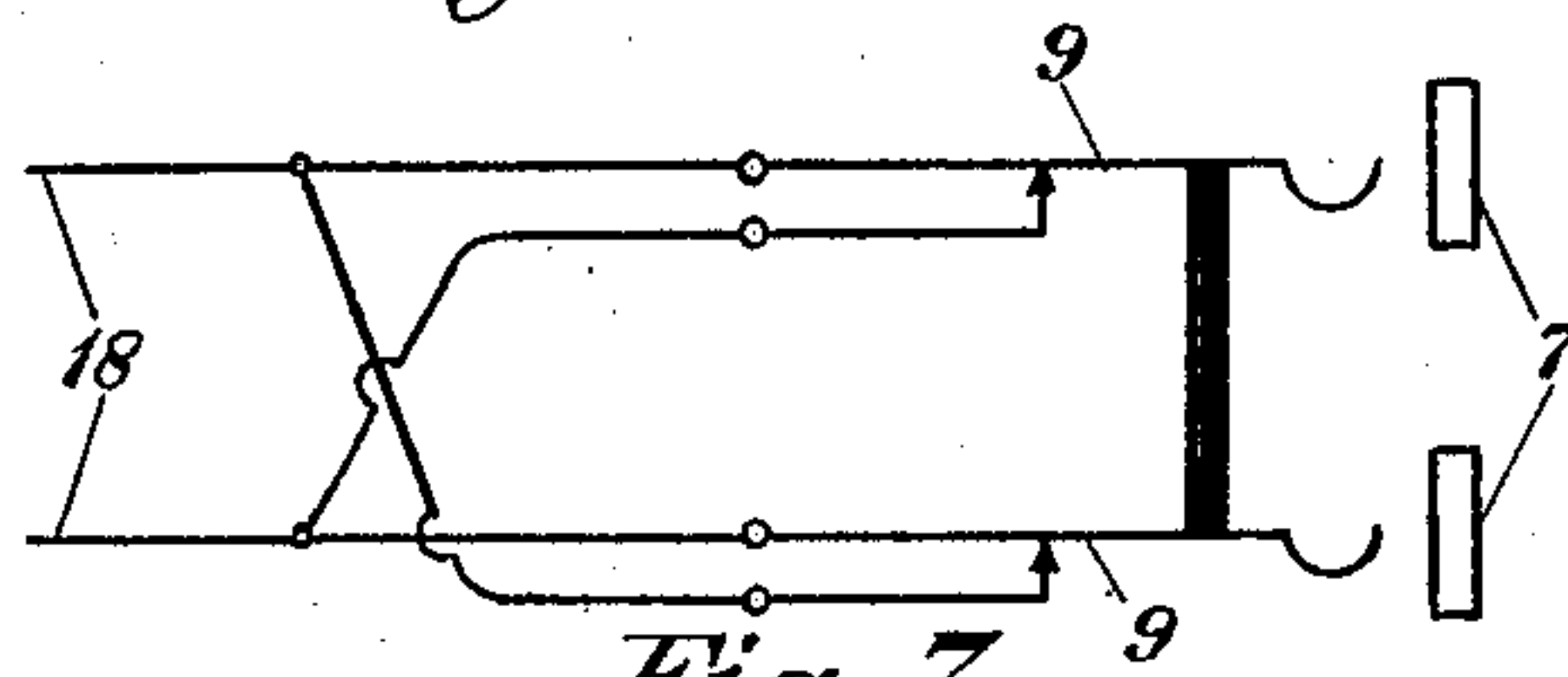


Fig. 7

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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 there-
through so that they make contact with the
parallel companion contact spring. Each arm
or projection carries a contact point 16 which
5 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 rela-
10 tion with each other. It will be apparent that
this parallel connection between the pairs of
springs will reduce circuit problems to a mini-
mum, for if the contact between one arm or
projection and the contact spring against
15 which it bears for any reason becomes defect-
ive, 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 con-
20 tacts, the probability for the former series
arrangement is two per hundred. For the
improved parallel arrangement, above de-
scribed, the probability of trouble would be
one per ten thousand. The probability of
25 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 arrange-
ment are more clearly illustrated in the dia-
30 grammatic representations shown in Figs.
6 and 7. In Fig. 6, which shows a former ar-
rangement, it will be noted that the spring
jacks 9 are connected in series relation. A
defective condition between either the upper
35 or lower spring 9 and the jack associated
therewith to complete the circuit, for in-
stance through the plugs of a patching cord
inserted in each jack and over the conduc-
tors 18, would render such circuit in opera-
40 tive. 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 con-
45 nected 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 con-
sists essentially of connecting each set of con-
50 tacts 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 inter-
locking the moving springs 9, shown for in-
55 stance by the connection of a strip of insula-
tion 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 con-
ductors 18. Fig. 7 is electrically equivalent
60 to Fig. 5, the latter showing the actual con-
tact 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 65
pair of parallel contact springs extending
longitudinally thereon and each adapted to
be operated independently by plugs, and ex-
tensions carried by each spring normally con-
tacting with the other spring whereby a 70
parallel connection is made over conductors
connected to said springs.

2. A spring jack comprising a frame, a
pair of parallel contact springs extending 75
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 80
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 85
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 there- 90
with.

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 95
each adapted to be operated by plugs, a per-
pendicular extension from each spring in nor-
mal parallel contact connection with the other
spring, either spring being movable laterally
to simultaneously break the contacts of both 100
extensions.

5. A spring jack comprising a frame, an up-
per contact spring and a lower contact spring
extending longitudinally thereon in parallel
relation, and arms carried by each spring in 105
normally parallel contacting connection with
the other spring, said arms extending in op-
posite directions to each other from their
respective springs and being similarly related
to each other. 110

6. A spring jack comprising a frame, a
pair of contact springs extending longitudi-
nally thereon in parallel relation and each
adapted to be operated independently by 115
plugs, and arms carried by each spring nor-
mally 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 simul- 120
taneously 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.