

No. 751,829.

PATENTED FEB. 9, 1904.

E. T. BILLIG.
TELEPHONE.

APPLICATION FILED DEC. 2, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

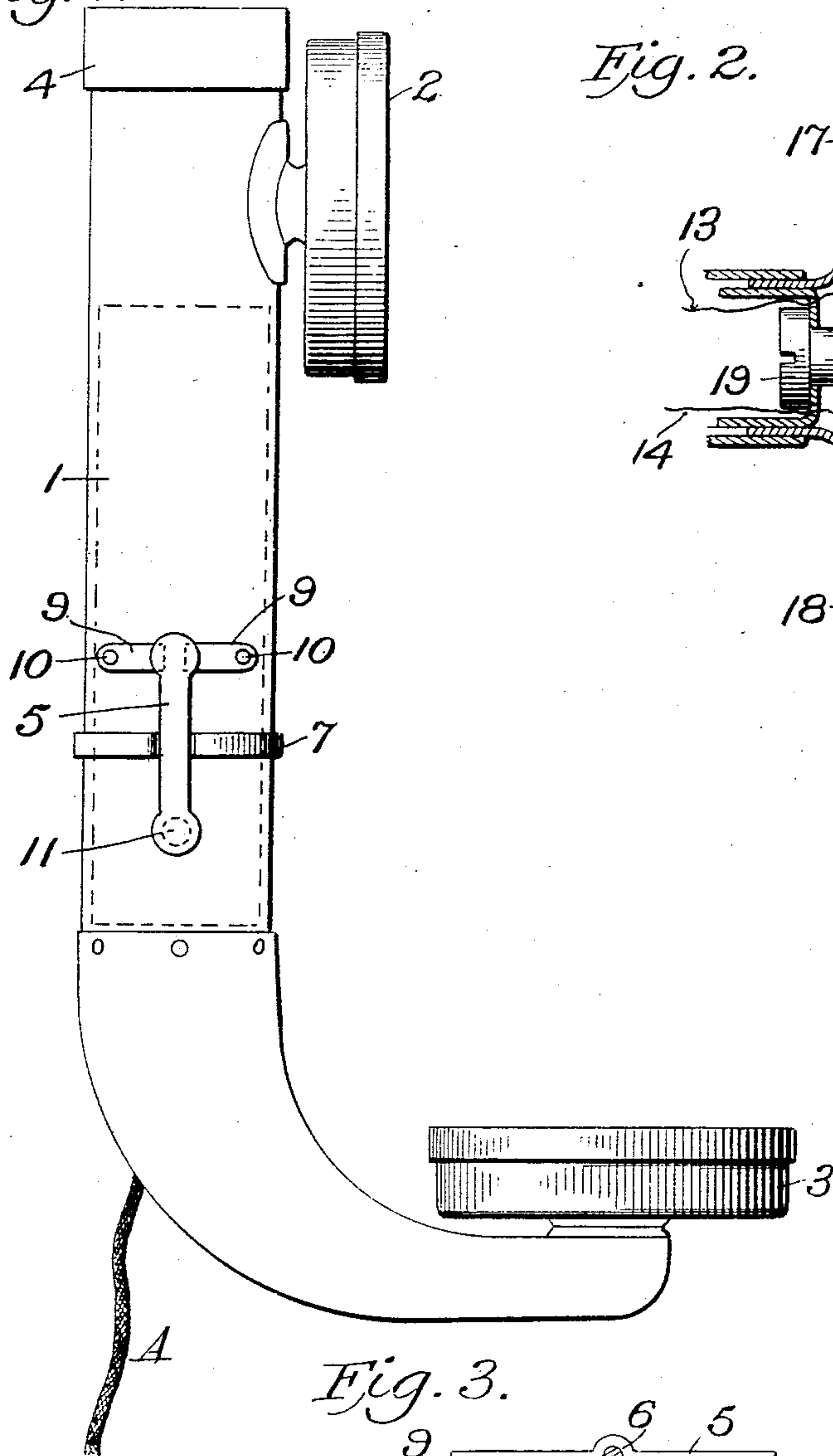


Fig. 2.

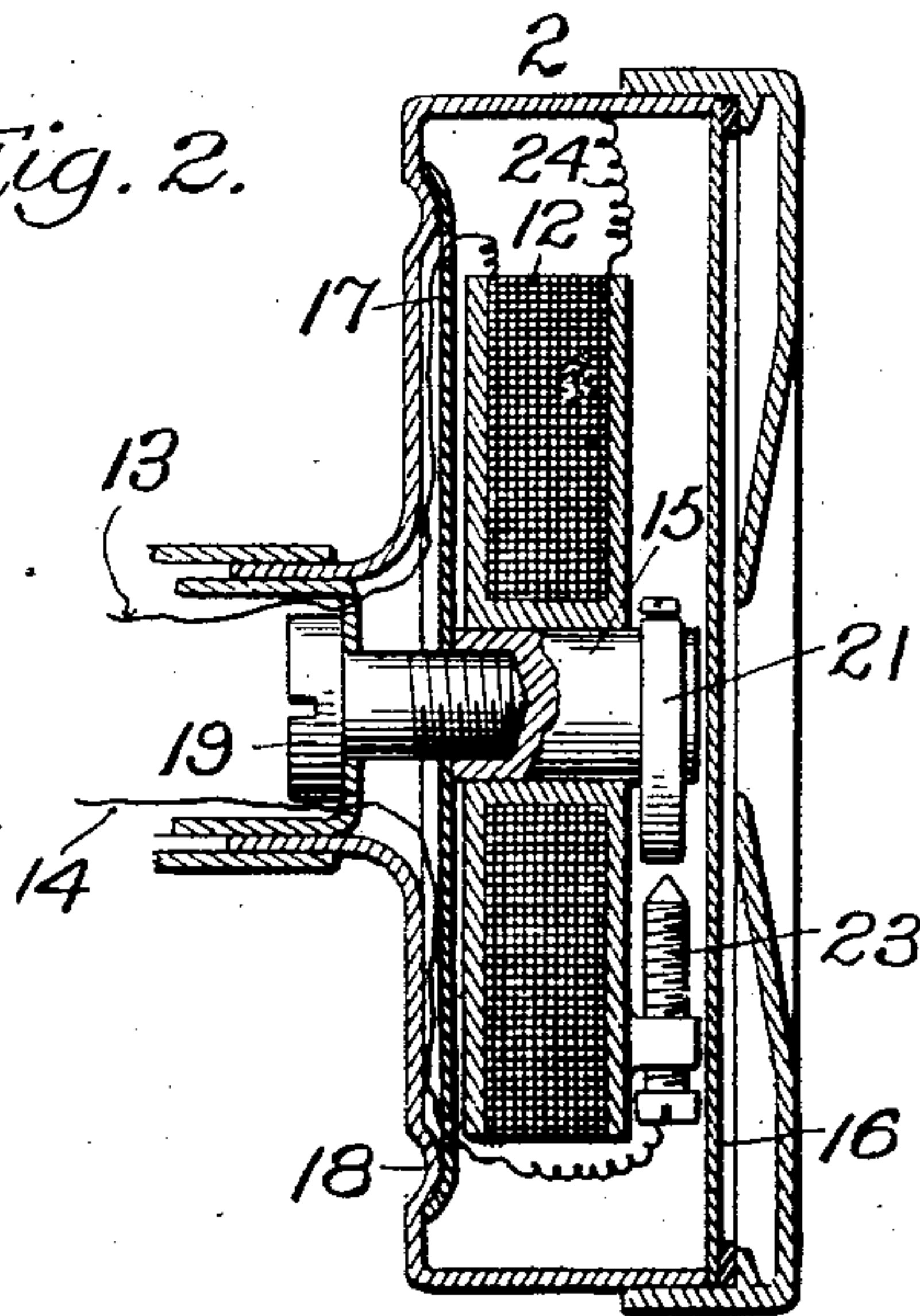
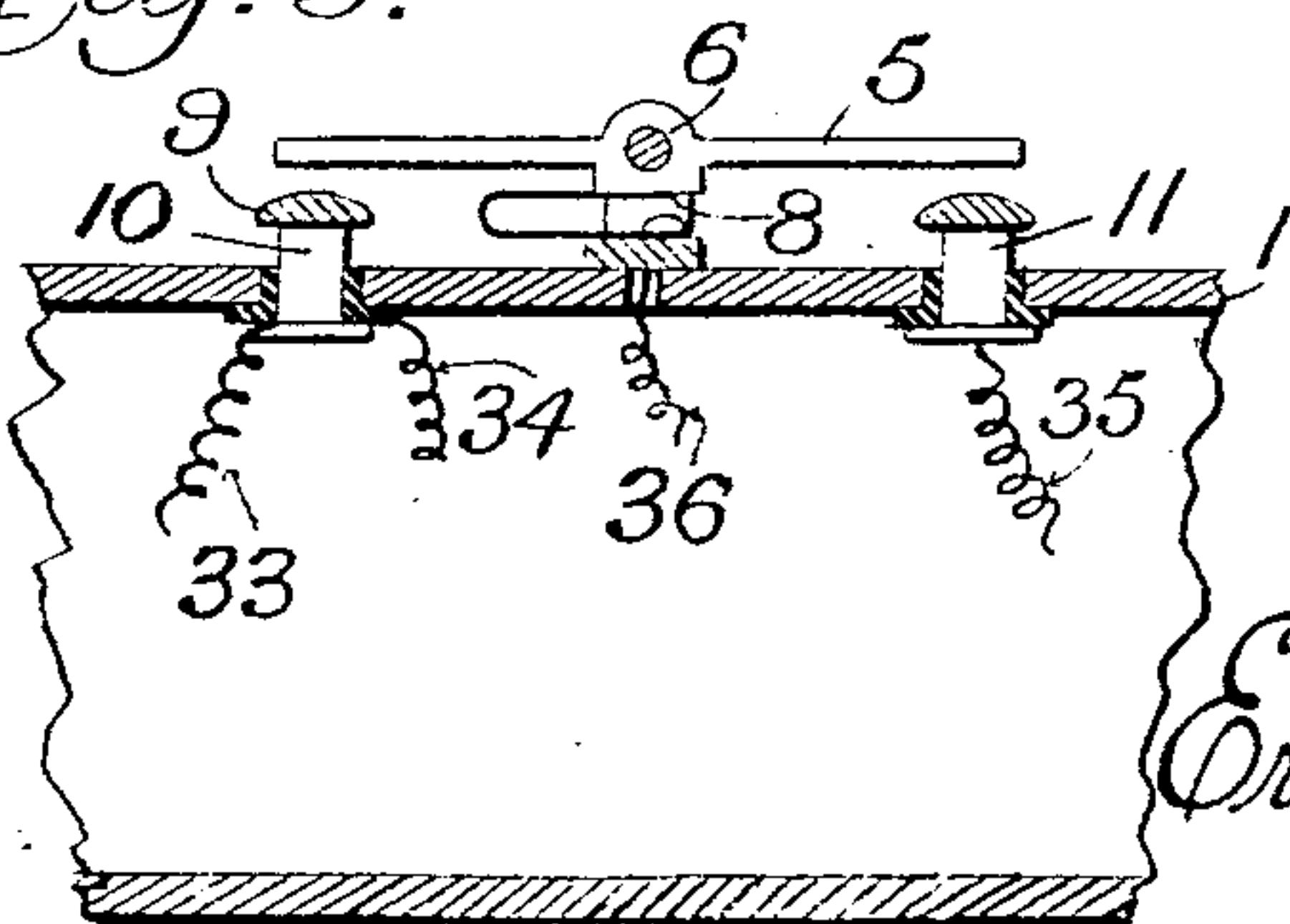


Fig. 3.



WITNESSES:

James J. Duhamel.
A. L. Samuel.

INVENTOR

Ernest Theodore Billig
BY
Fred W. Vasker
ATTORNEY

No. 751,829.

PATENTED FEB. 9, 1904.

E. T. BILLIG.
TELEPHONE.

APPLICATION FILED DEC. 2, 1902.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 4.

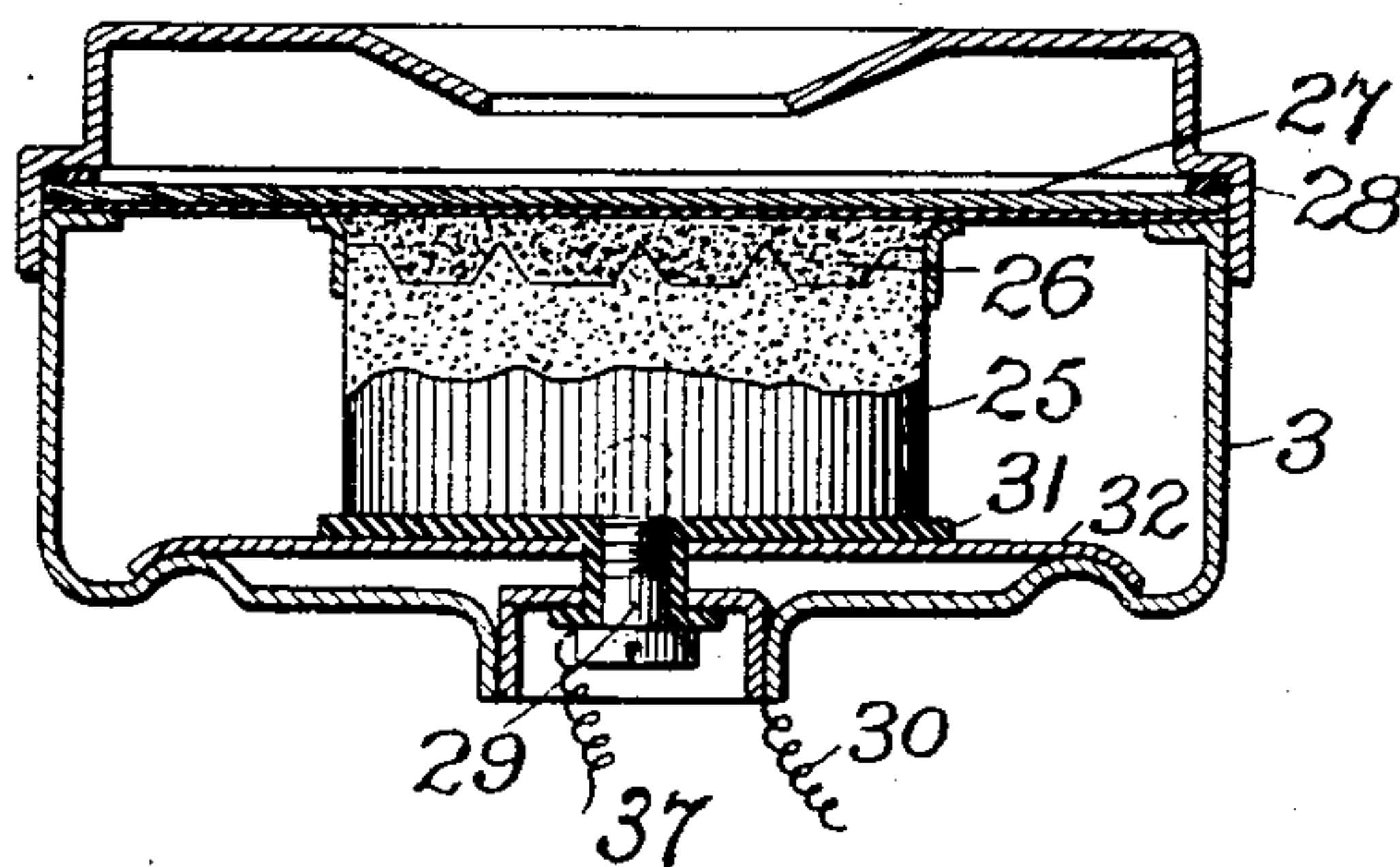


Fig. 5.

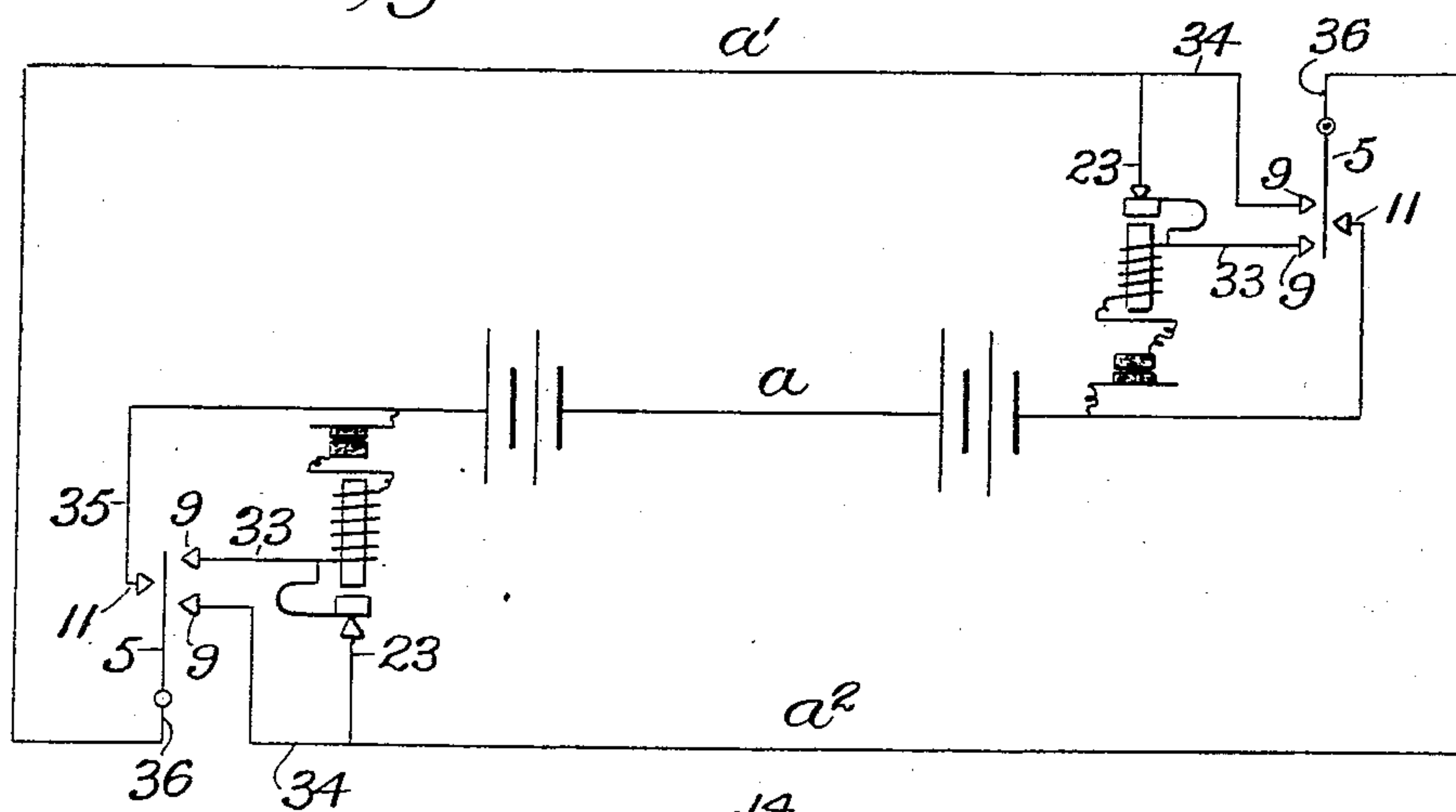
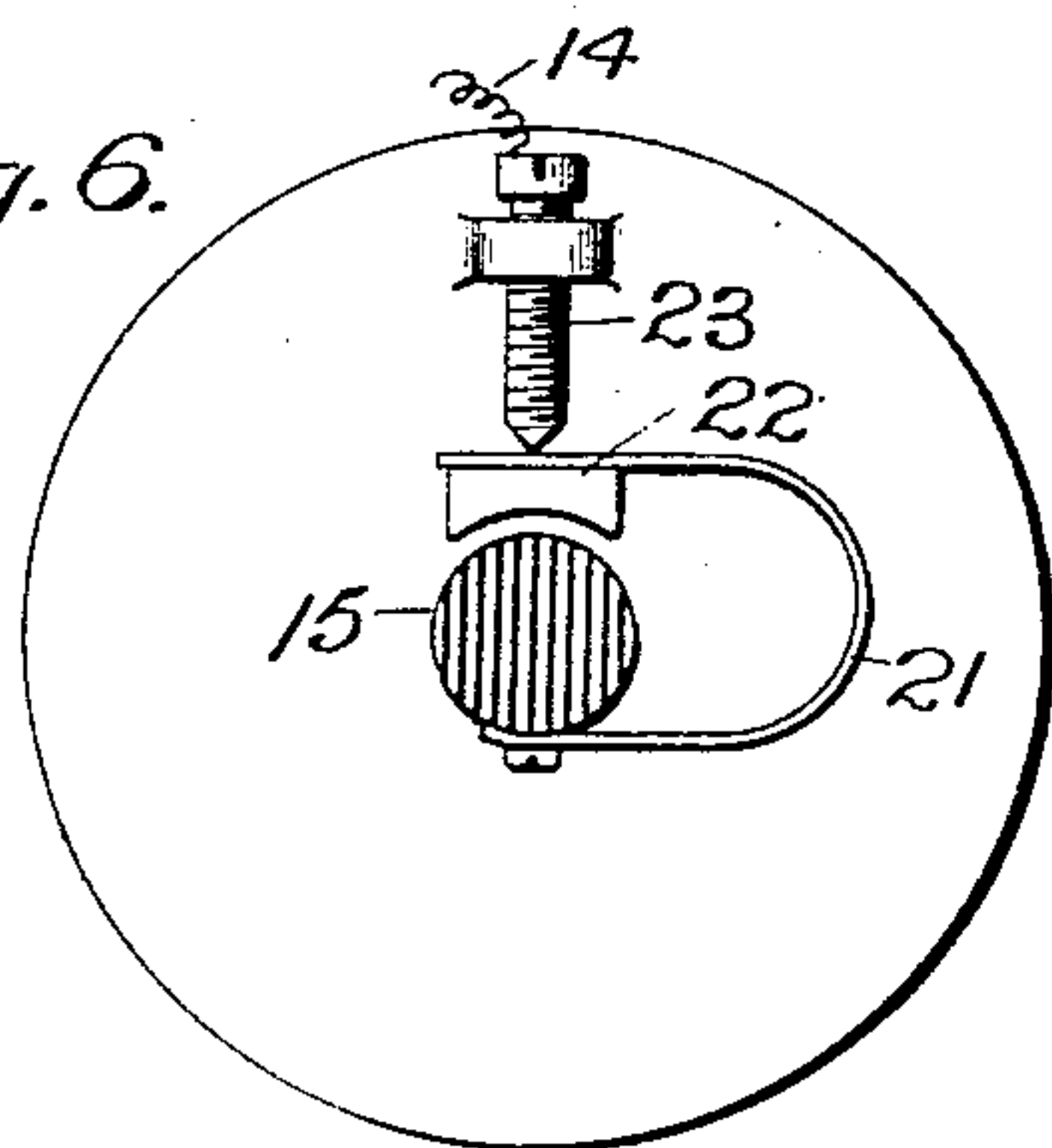


Fig. 6.



WITNESSES:

James P. Duhamel.

A. E. Samuels

INVENTOR

Ernest Theodore Billig

BY
Fred W. Parker
ATTORNEY

UNITED STATES PATENT OFFICE.

ERNEST THEODORE BILLIG, OF NEW YORK, N. Y.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 751,829, dated February 9, 1904.

Application filed December 2, 1902. Serial No. 133,586. (No model.)

To all whom it may concern:

Be it known that I, ERNEST THEODORE BILLIG, a subject of the German Emperor, and a resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Telephones, of which the following is a specification.

This invention relates to certain improvements in telephones, more particularly of the class intended and adapted for house use.

The object is to provide a simple, cheap, and efficient portable telephone.

The invention consists, essentially, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a side view of the hand-piece of my improved telephone instrument, the same carrying a receiver and a transmitter. Fig. 2 is a cross-section of the receiver. Fig. 3 is a partial sectional view of the hand-piece with the pivoted switch thereon. Fig. 4 is a cross-section of the transmitter. Fig. 5 is a diagrammatic view of the wiring and other parts of the system, two stations being shown, though the wiring may be arranged to have any number of stations. Fig. 6 is a detail view of a call device or buzzer arranged in conjunction with the diaphragm and electromagnet of the receiver.

Like characters of reference denote like parts in all the figures.

1 denotes the portable handpiece, that supports a receiver 2 and a transmitter 3. This is simply a short hollow tube and contains the batteries, which may be dry batteries, as shown in dotted lines, or of any other kind. One end of the tube is preferably closed by a removable screw-cap 4. Its form, shape, and size may vary as desired. The cord A, containing the live wires, leads to a similar instrument at the other end of the line.

On the outside of handpiece 1 is a switch or key consisting of a lever 5, pivoted at 6 to a rib 7 on the handle, said rib being slotted to receive lever 5, while centrally beneath the lever is a spring 8, which sustains the lever 5

in such a position that normally neither end touches the contacts beneath, though when desired it can be shifted on its pivot, so as to depress one end or the other and make contact with one point or the other. Beneath one end of lever 5 are the two separated contact-springs 9 9, fastened to the pins 10 10, to which the interior wires 33 and 34 are connected. By depressing the lever 5 into contact with springs 9 9 the latter will be temporarily connected together to close a circuit. Beneath the other end of lever 5 is a contact-pin 11. When lever 5 is depressed against it, a circuit will be temporarily closed through the pin 11 and lever 5. Leading from pin 11 is a conducting-wire 35, and leading from lever 5 is a conducting-wire 36.

Proceeding now to describe in detail the receiver, it will be seen that 12 denotes an electromagnet having the line-wire 13 running to it and having also the wire 24 running to and connecting with the casing 2 and the central iron core 15, all located within the shell or casing 2, wherein is also the elastic vibratory disk or diaphragm 16. A flexible plate 17 bears against a rib 18, spun or otherwise formed in the shell 2, and through the center of plate 17 passes an adjusting-screw 19, that engages the core 15 of the electromagnet and is used for the purpose of adjusting the position of said core relatively to the vibratory diaphragm 16. Further, there is contained within the receiver a calling or signaling means consisting, preferably, of a buzzer having a flexible spring-arm 21, fastened at one end to core 15 and provided at the opposite end with a plate 22, that is sometimes attracted toward and at other times drawn away from the core 15, accordingly as the electromagnet 12 is energized or not. An adjustable screw 23 is carried in a support on the frame of the electromagnet 12. Its head connects with the line by means of a wire 14, and the point of the screw is normally in contact with the spring-supported plate 22 except when the energizing of the core 15 draws the plate against the core. A buzzing will result from the contact of screw and plate and the rattling of the plate between the screw and the core following upon the

electrical pulsations, and a sound will also be produced by the vibrations of the diaphragm 16 against the end of the iron core 15.

The construction of the transmitter is quite similar in many respects to that of the receiver. It is shown in Fig. 4. 3 denotes the shell or casing having the usual mouthpiece. 25 indicates a carbon block, and 26 a mass of pulverized or granulated carbon between the block 25 and the vibratory diaphragm, the latter consisting of a membrane or thin disk of wood 27, covered on the under side with gold-leaf or similar thin foil or metallic tissue. A ring 28 of elastic material surrounds the front part of the outer edge of disk 27 between the latter and the rim of the mouthpiece and assists in giving it an elastic support. An adjusting-screw 29 is employed to regulate the pressure of the carbon against the vibratory wooden membrane 27. This screw passes through a plate 32, between which and the solid carbon 25 is a layer of insulating material 31, and engages the solid carbon 25. A wire 37 connects with screw 29. A wire 30 is fastened to the casing 3, so that the current passes through said casing.

I will now describe the wiring and the operation. It will be understood, of course, that at both ends of line A there are duplicate instruments, each having a battery-containing handle 1 and the other appurtenances I have described, so that perfect portability and ease in handling and location are assured. When, for example, a call is to be made, the person calling will grasp the handle 1 of his instrument and depress the key 5 into contact with the pin 11, to which the wire 35 is connected, leading to battery and out on the line-wire a to the other instrument, so that the current will pass through the receiver of the other instrument, for a complete circuit will be made over the wires just mentioned and the wire 36, connecting with the pivoted part of lever 5, the line-wire a' , and the buzzer-screw 23, whereby the buzzing device will be actuated and a call made by the buzzing devices arranged in connection with the receiver of the other instrument. If then the party called responds, both parties will place the keys 5 on the two instruments in such a position that the springs 9 9 will be connected, which springs, we have seen, are fastened to pins 10 and to them the wires 33 and 34, the former running to the receiver and transmitter and the latter to the line-wire a^2 , so that a talking-circuit will be made complete between the two instruments along the line-wires. All three wires a , a' , and a^2 are used in talking, and the key 5 makes at this time a short circuit for the buzzer, so it will not sound. Tracing the talking-circuit more fully, the following-described course will be apparent. Consider first the left-hand station or instrument in Fig. 5. The lever 5 connects the springs 9 9, so that the current runs through battery, microphone, and re-

ceiver through one spring 9, lever 5, wire 36, line-wire a' to the right-hand station or instrument, where it passes through wire 34, spring 9, and lever 5. At the same time when the current flows through the lever 5 of the left-hand station or instrument into one of the springs 9, as just stated, it will also flow into the other spring 9, likewise connecting with the said lever 5, and thence to wire 34, line-wire a^2 to the right-hand station or instrument, through the wire 36 and the lever 5 thereof, said lever 5 being in a position where it connects the two springs 9 9, and we have already seen that the current is passing through one of said springs. Consequently the current will pass from the lever 5 through the other spring 9, through wire 33, and through the receiver, the microphone, and the battery belonging to the right-hand station or instrument, and then through the line-wire a connecting the two batteries.

Of course it is obvious that there may be any number of stations, and the wiring, the instruments, and the other parts may be changed to suit.

The battery can be arranged between the transmitter and receiver or between the transmitter and the wire a . This latter change should be made for a circuit for more than two stations. It may be placed elsewhere, and many other changes may be made. Unless necessary to suspend the instrument I prefer simply to lay it down when not in use.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a telephone, the combination with a battery-carrying handle for supporting the receiver and transmitter, of means for making a call or signal consisting essentially in an electromagnet, a spring-arm fastened to the core of said magnet at one end and carrying a plate that is attracted toward and away from the core, and a screw that is normally in contact with the spring-supported plate, said signaling means being arranged in proximity to the receiver-diaphragm.

2. In a telephone, the combination with a battery-carrying handle, of a receiver and also a transmitter supported by said handle, a switch on a handle controlling the signaling-circuit and a talking-circuit, a signaling means consisting essentially of an electromagnet situated in proximity to the receiver-diaphragm, a spring-arm fastened to the core of said electromagnet and carrying a plate, and adjustable means bearing on the spring-supported plate, substantially as described.

Signed at New York city this 22d day of November, 1902.

ERNEST THEODORE BILLIG.

Witnesses:

HENRY HOFFA,

JOHN H. HAZELTON.