

(No Model.)

2 Sheets—Sheet 1.

E. J. P. MERCADIER & J. M. ANIZAN.  
MICROPHONE.

No. 539,437.

Patented May 21, 1895.

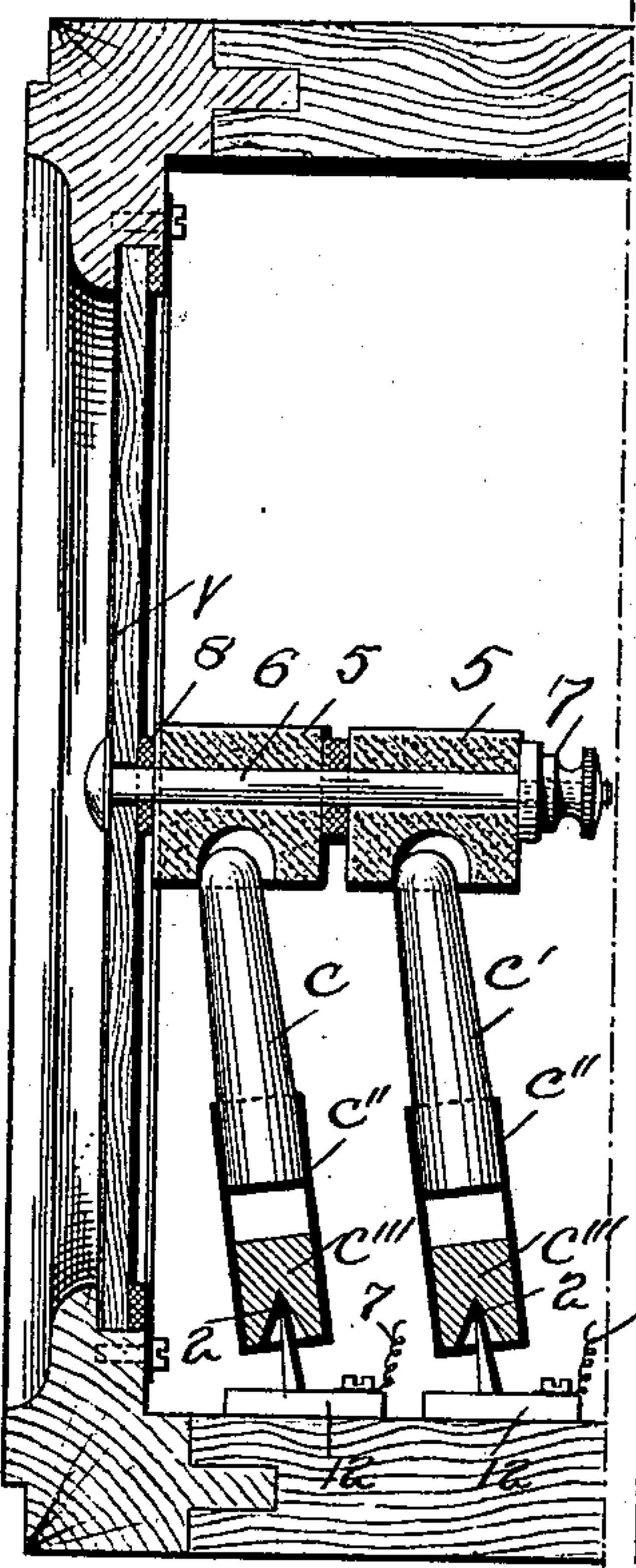


Fig. 1.

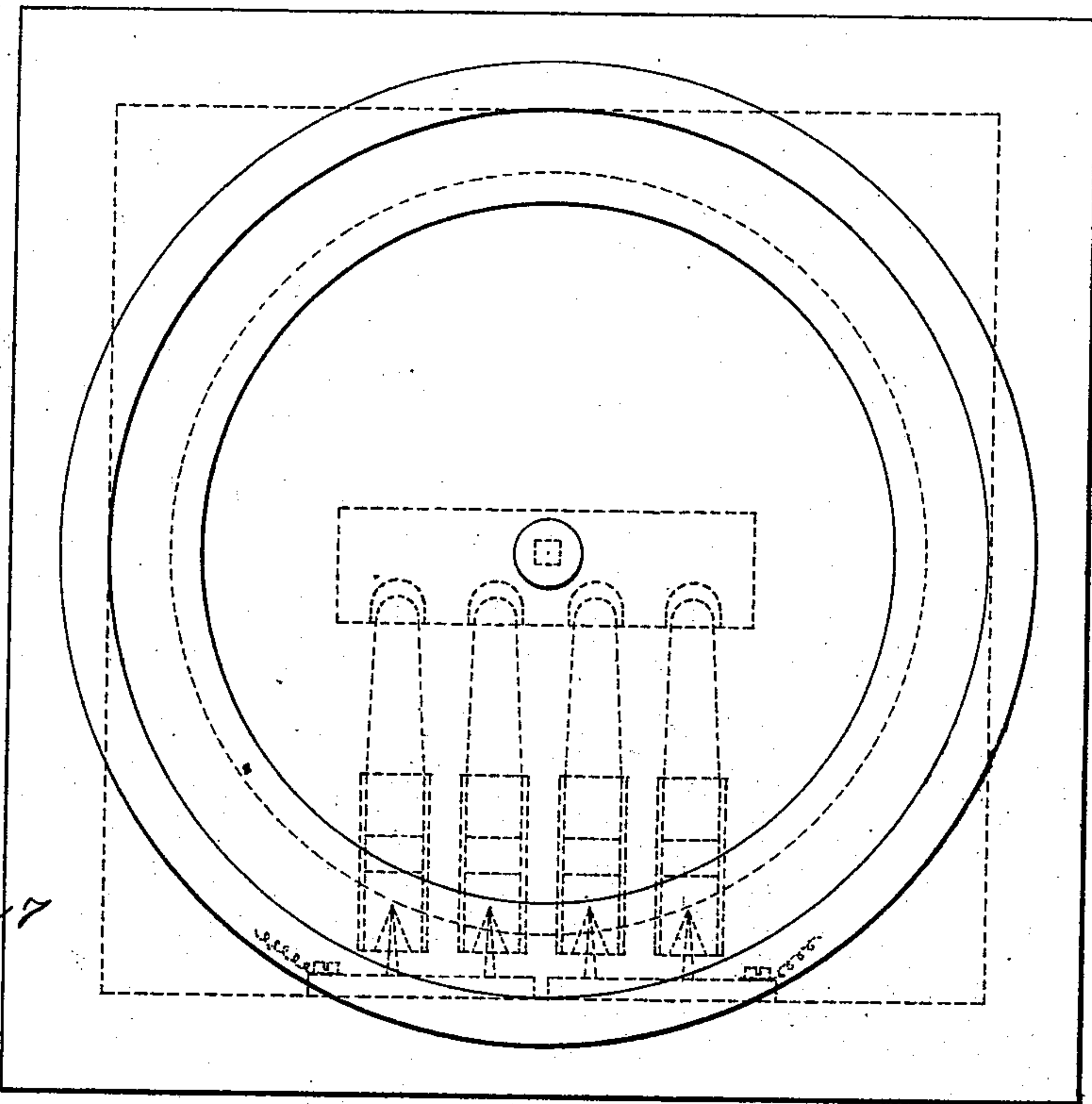


Fig. 2.

Fig. 3.

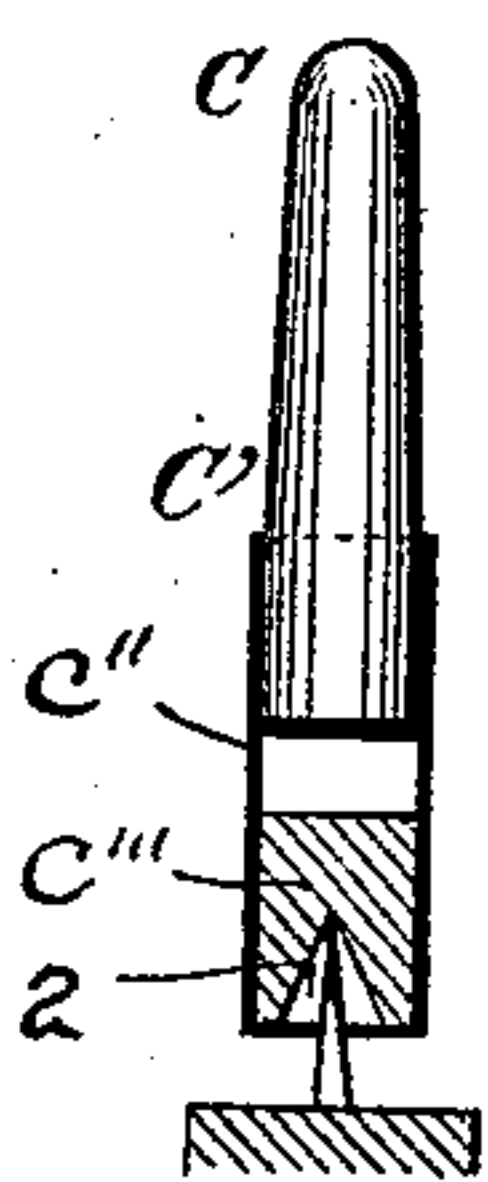


Fig. 4.

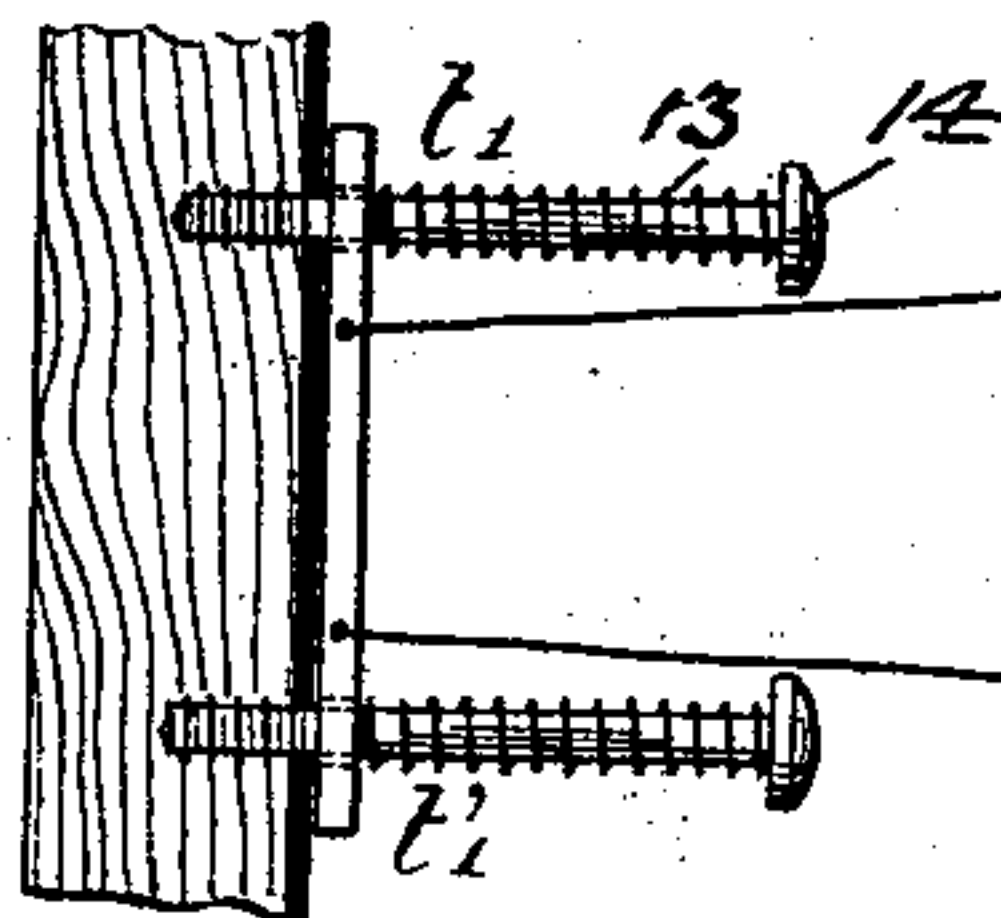
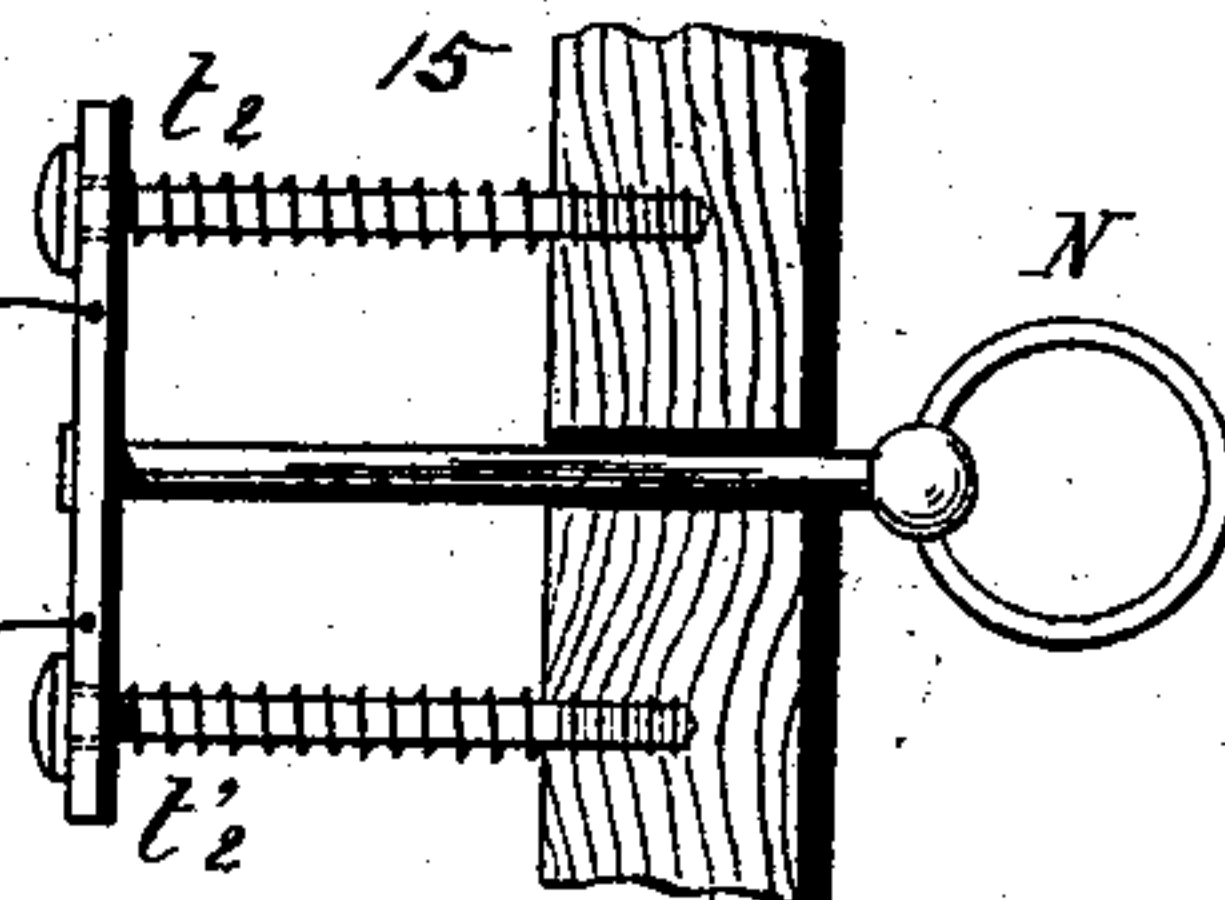
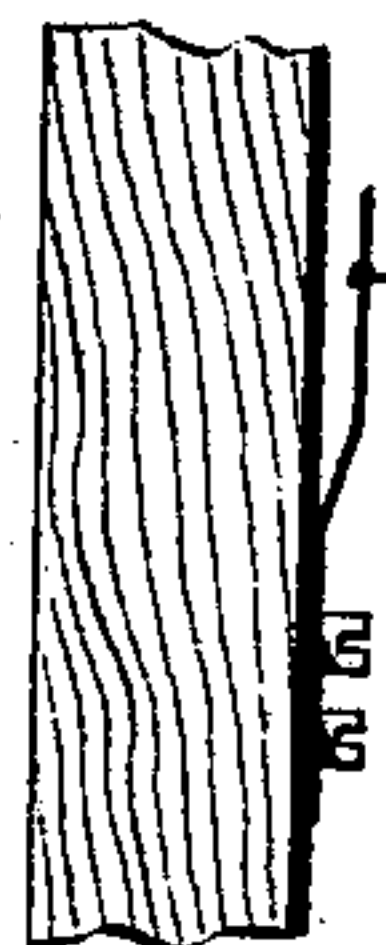


Fig. 5.



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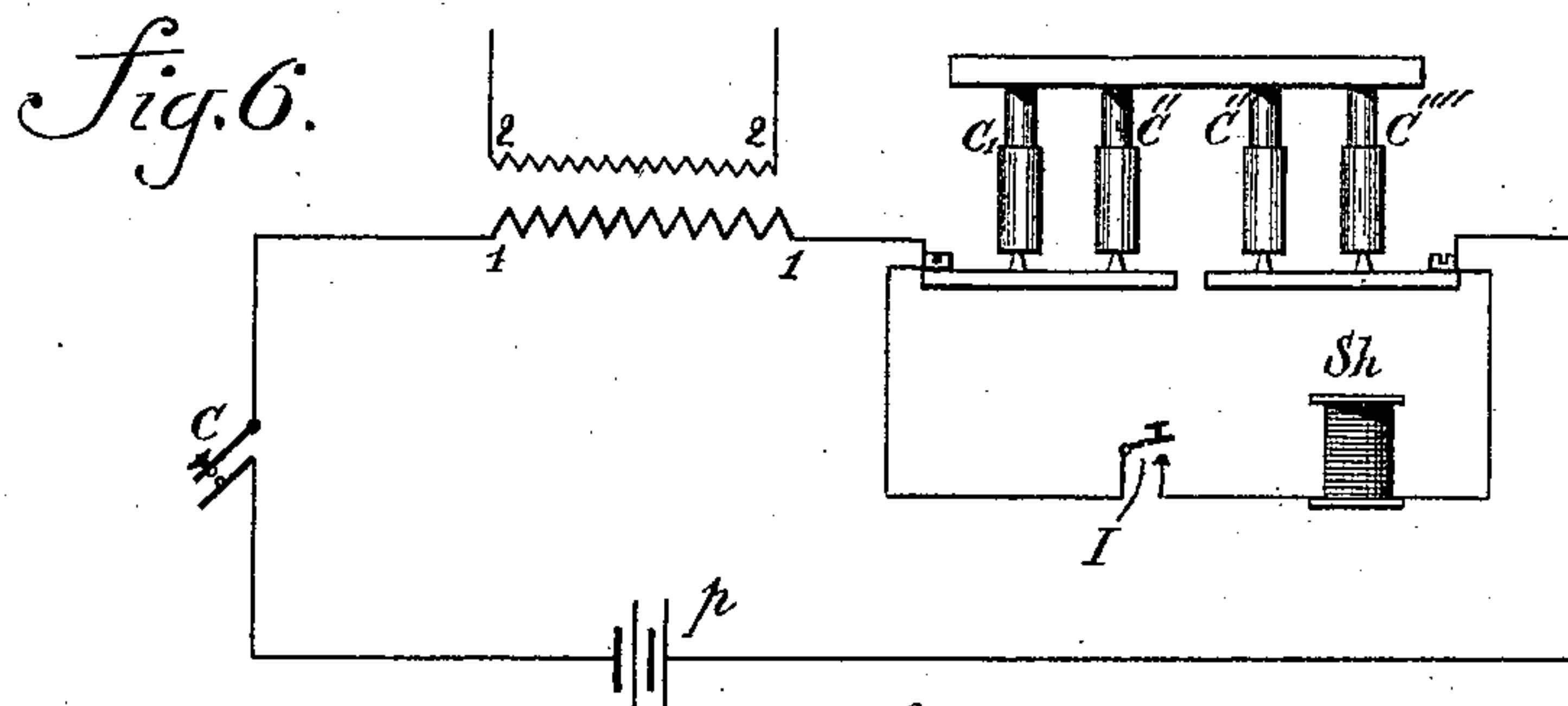
(No Model.)

2 Sheets—Sheet 2.

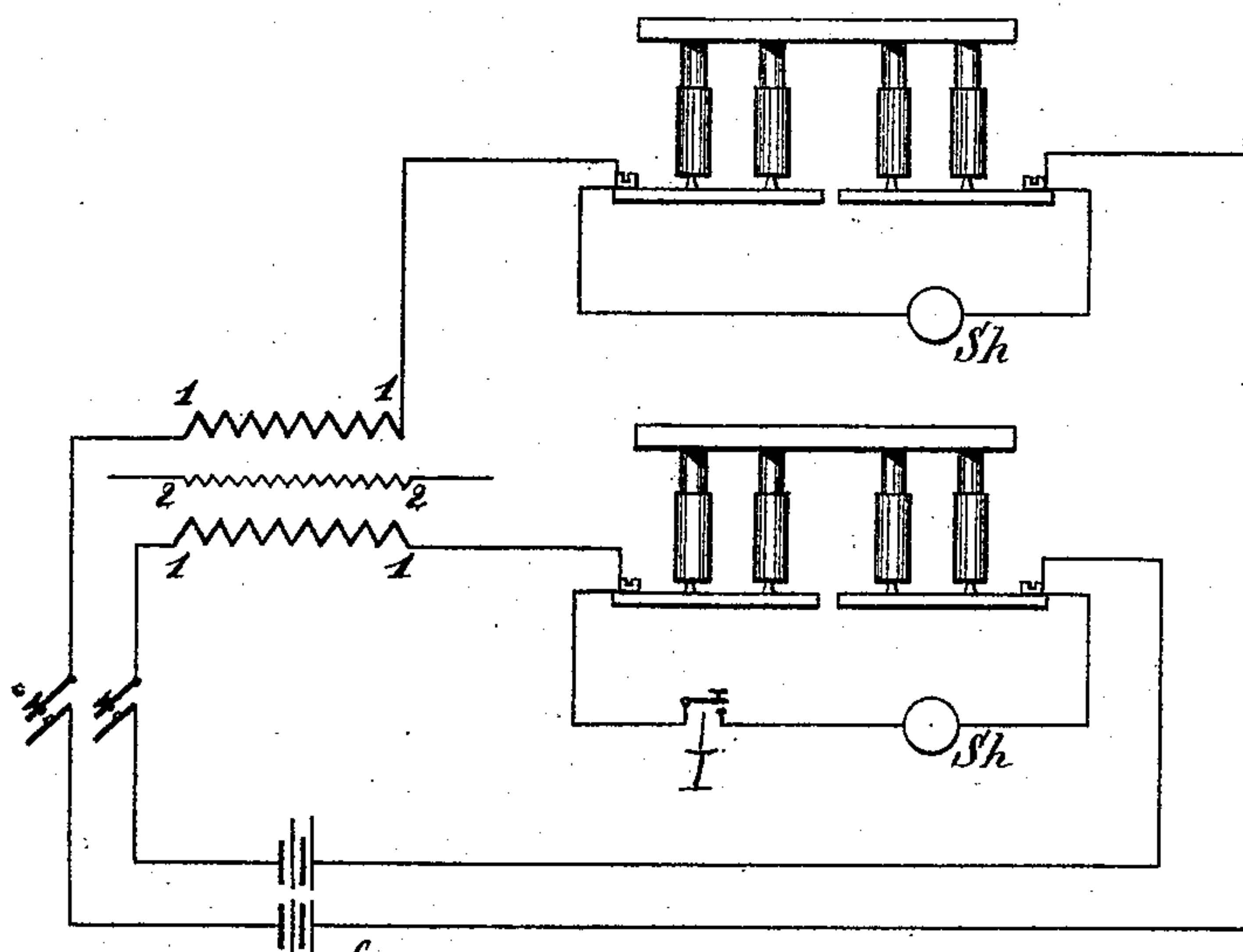
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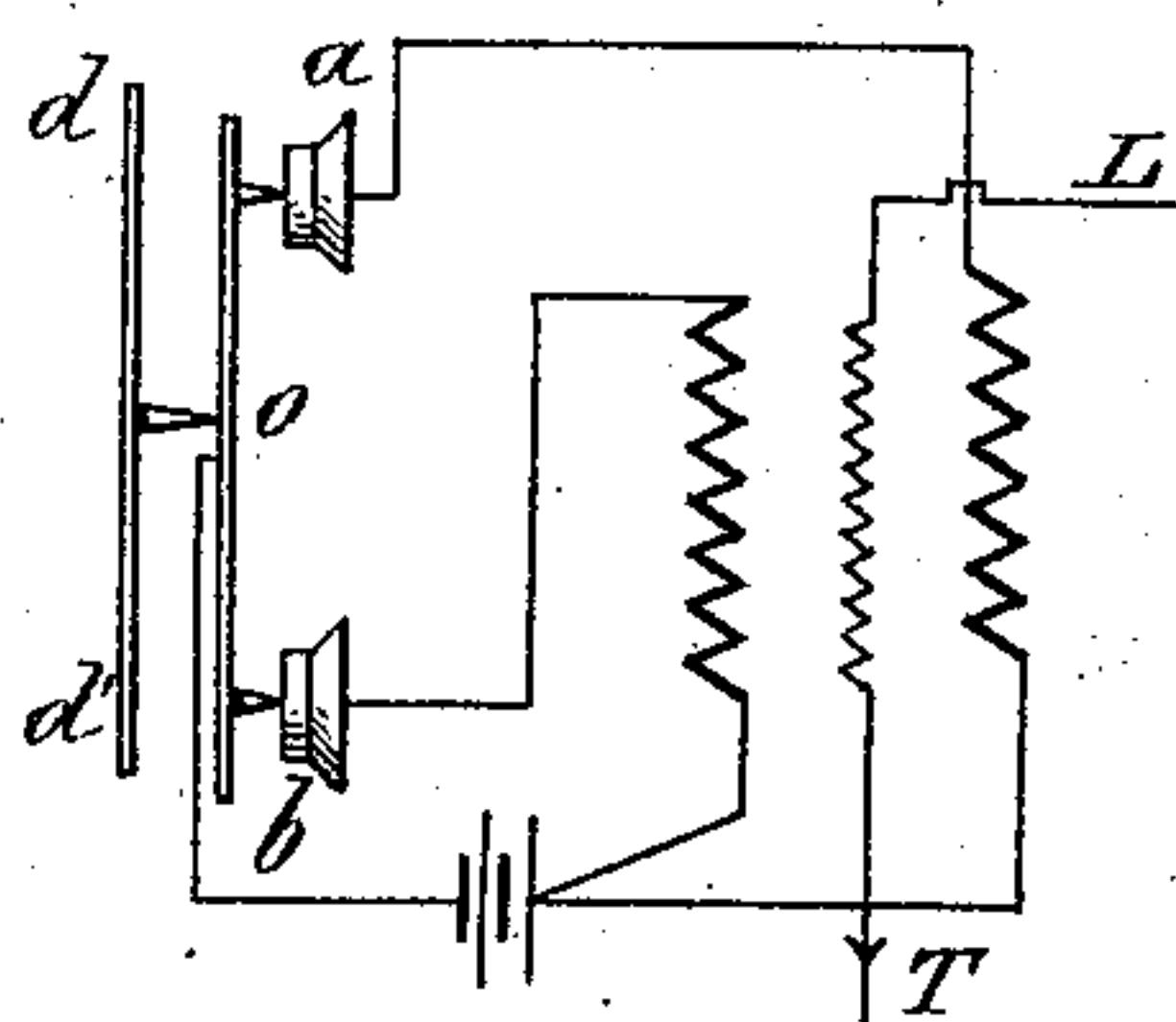
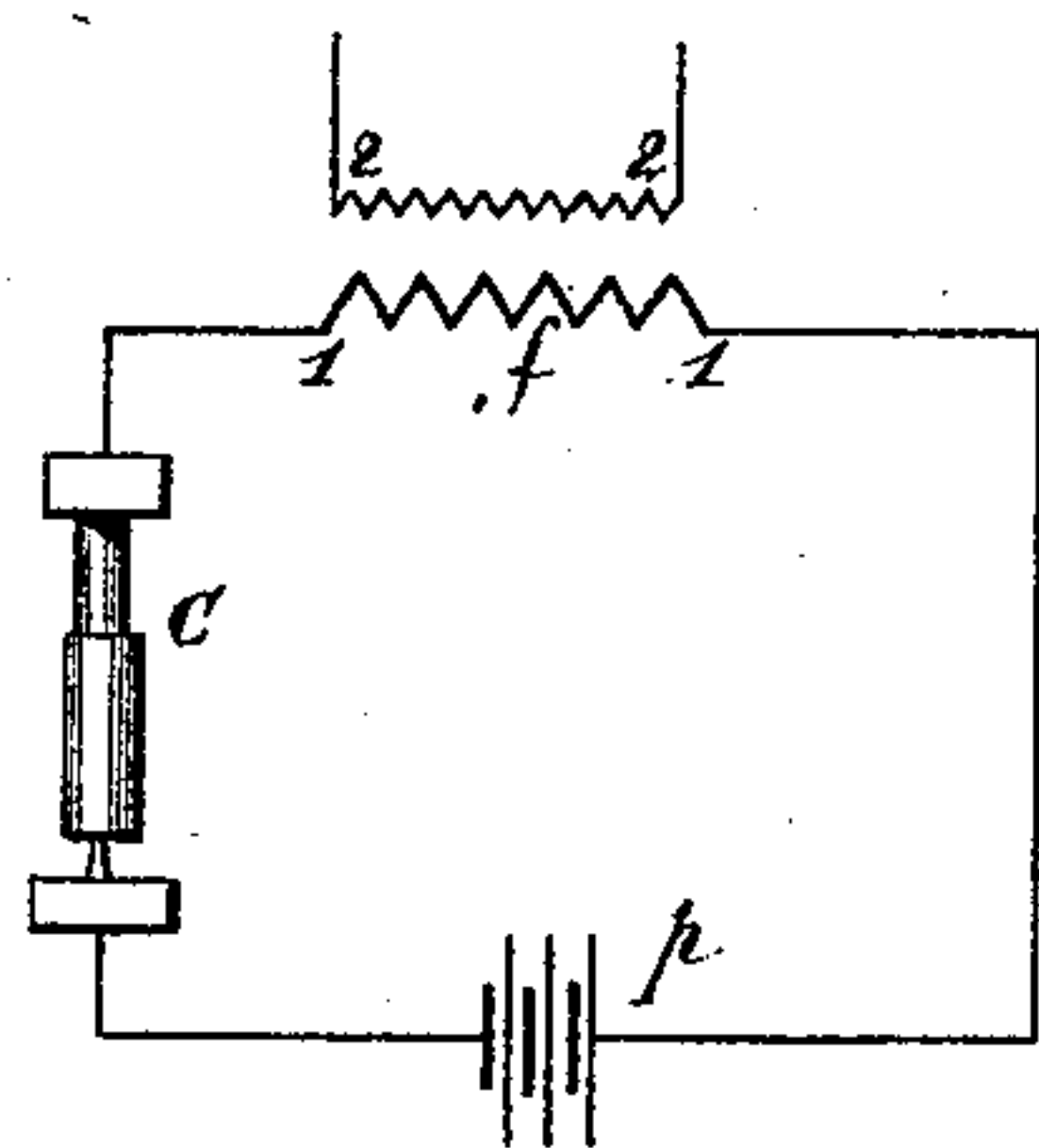


*Fig. 7*



*Fig. 9*

*Fig. 8*



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# UNITED STATES PATENT OFFICE.

ERNEST JULES PIERRE MERCADIER AND JOSEPH MICHEL ANIZAN, OF  
PARIS, FRANCE.

## MICROPHONE.

SPECIFICATION forming part of Letters Patent No. 539,437, dated May 21, 1895.

Application filed June 3, 1893. Serial No. 476,454. (No model.) Patented in France December 9, 1892, No. 226,288; in Belgium December 17, 1892, No. 102,597, and in England May 3, 1893, No. 8,901.

*To all whom it may concern:*

Be it known that we, ERNEST JULES PIERRE MERCADIER and JOSEPH MICHEL ANIZAN, residing at Paris, in the Department of the Seine, France, have invented certain new and useful Improvements in Microphones, of which the following is a specification.

Patents have been granted in the following countries: France, No. 226,288, dated December 9, 1892; Belgium, No. 102,597, dated December 17, 1892, and Great Britain, No. 8,901, dated May 3, 1893.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of the vibrating plate and frame with the contacts. Fig. 2 is a front view of Fig. 1. Fig. 3 is a detail view of one of the carbon pencils. Figs. 4 and 5 show means for changing the position of the contacts. Figs. 6, 7, 8, and 9 are diagrammatic views showing the primary and secondary circuit and shunts and resistances.

The vibrating plate V carries at its center a metallic rod 6 which has thereon the carbon strips 5, one or more of these being used and held in place by the nut 7 on the end of the rod. The strips 5 have concave recesses in their under sides there being four shown in the present instance in each strip. The carbon strips are separated from the vibrating plate by the caoutchouc washer 8.

The carbon pencils  $c, c'$  are mounted in tubes  $c''$  of brass having their lower ends closed by plugs  $c'''$  also of brass and these plugs have conical cavities 2 at the apex of which the points 3 bear and support the carbon pencils. The upper ends of the carbon pencils bear in the recesses in the lower sides of the carbon strips 5. The metallic points 3 extend up from the metal plates 12 and to these plates the conducting wires 7 are connected. By the construction and arrangement of the carbon pencils described the movable microphonic contact of the carbon material is at the upper end of the pencil only, the lower end of said carbon pencil being incased in the brass tube and the movable contact at this end being between the fixed point and the metallic block. By reason of this construction and arrangement also the carbon pencil is rendered easily

movable and therefore being sensitive in adjusting or changing the position of the points of contact.

For changing the contacts of the carbon pencils we use the device of Figs. 4 and 5. Upon the left wall of the frame that carries the vibrating plate we arrange a spring or springs 13 of spiral or other form arranged about pins 14 to press on a rigid cross piece  $t' t'$ . Upon the interior right wall of the frame there is a rigid cross piece  $t^2 t^2$  ending in a rod that passes through the frame and in a ring N that projects outside of the apparatus. The piece  $t^2$  is pressed in by springs 15. Between the two cross pieces  $t', t'$  and  $t^2 t^2$  are silk threads the length of which is calculated so as to surround the setting of the two carbon pencils corresponding to each row and to remain slack when at rest. If we pull the ring N from left to right the silk strings are tightened, squeeze the carbon pencils and carry them slightly along in their motion from left to right. If we let the spring free, the pencils which pivot upon the points 11 revolve in a reverse direction. The numerous experiments we have made have shown that the second action upon the pencils is more active than the first and that the initial point of contact of said pencils with the reglet is thereby changed. The silk strings which are loose when at rest, have no action upon the vibrations of the carbon pencils. Fig. 5 shows the device for two carbon pencils only.

The plates 12 that carry the points (the latter carrying the carbon pencils) being fixed upon the frame of the apparatus, the vibrating plate only supports the strips of microphonic contacts. This arrangement allows the regulating of the device, not by inclining of the vibrating plate as has been done heretofore, but by the inclination of the carbon pencils themselves by advancing or pushing back the point carrying plates. These plates can be separated from the frame by strips of rubber or felt or of any substance that deadens the vibrations which might be transmitted by said frame to the carbon pencils.

The connections of the primary circuit of our microphone are the same as those of all microphones, in regard to each group of mi-



crophonic contacts. We connect two points around the contacts by a shunt containing an electrical resistance which enables us to reduce the intensity of the telephonic effects. By using this means a microphone constructed for corresponding at long distances can by the use of an interrupting circuit closer I, Fig. 6, be used at pleasure either for the long distance or for city or local communications or correspondence.

In Fig. 6  $c'$   $c''$   $c'''$  and  $c''''$  are the carbon pencils. The resistance  $sh$  acts or does not act upon the carbon pencils to modify their action according to whether the circuit closer I is open or closed. When said circuit closer I is closed the shunting resistance is thrown into action. If the plate V is made to vibrate by speaking into the telephone the carbon pencils vibrate and the electric resistance of the microphonic contacts varies with each vibration. This variation of the resistance increases proportionately to the increase of the amplitude of the vibrations. If it is desired to telephone to a great distance, the sensibility of the microphonic contacts is regulated so as to obtain the greatest possible amplitude of vibration; but a telephone with its microphonic contacts thus adjusted while good for great distances is not suitable for short distances on account of the sputtering or disagreeable noise produced. For the purpose of a short distance telephone therefore we use the electric shunting resistance  $sh$  closing at the same time the circuit closer I.

When more strips are used, placed the one behind the other and corresponding rows of carbon pencils we can utilize induction coils having several primary circuits with one secondary common circuit. In that case each primary circuit has a set of microphonic contacts, a special pile and a special shunt  $sh$ . The handle of the circuit closer is disposed in such a manner as to close or open at pleasure all the circuits of the shunts together. (Fig. 7).

The herein described system differs essentially from those using the simultaneous and

opposed effects of the microphonic contacts in which for instance (Fig. 8) the resistances  $a$  and  $b$  are alternately increased and diminished. Our system is entirely different. We unite upon the same membrane two or more different microphones, the effects of which instead of being opposed are parallel and are added without difference of phase.

We claim—

1. In combination in a microphone the vibrating plate and the carbon pencils comprising the carbons, the metallic sockets about the lower ends thereof and the lower bearings for the carbons consisting of the metallic points engaging the conical cavities in the metallic bearing blocks.

2. In combination in a microphone, the vibrating plate, the rotatable carbon pencils and flexible spring wires arranged for mechanically changing the microphonic contact points of the said carbon pencils, substantially as described.

3. In combination in a microphone, the vibrating plate, the carbon pencils, the electric resistance  $sh$  in direct connection with the binding screws of the said carbon pencils and the circuit closer I for preventing sputtering and for diminishing the sensitiveness of the carbon pencils when the microphone is used for short distances, substantially as described.

4. In combination, the vibrating plate, the two or more strips arranged one behind the other, the corresponding sets of carbon pencils, the induction coils with several primary circuits and one common secondary circuit, each circuit having a set of microphonic contacts and independent batteries and shunts  $sh$ , and the circuit closer I arranged to open or close all circuits of the shunts together, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

ERNEST JULES PIERRE MERCADIER.

JOSEPH MICHEL ANIZAN.

Witnesses:

ROBT. M. HOOPER,  
JULES FAYOLLET.