

(No Model.)

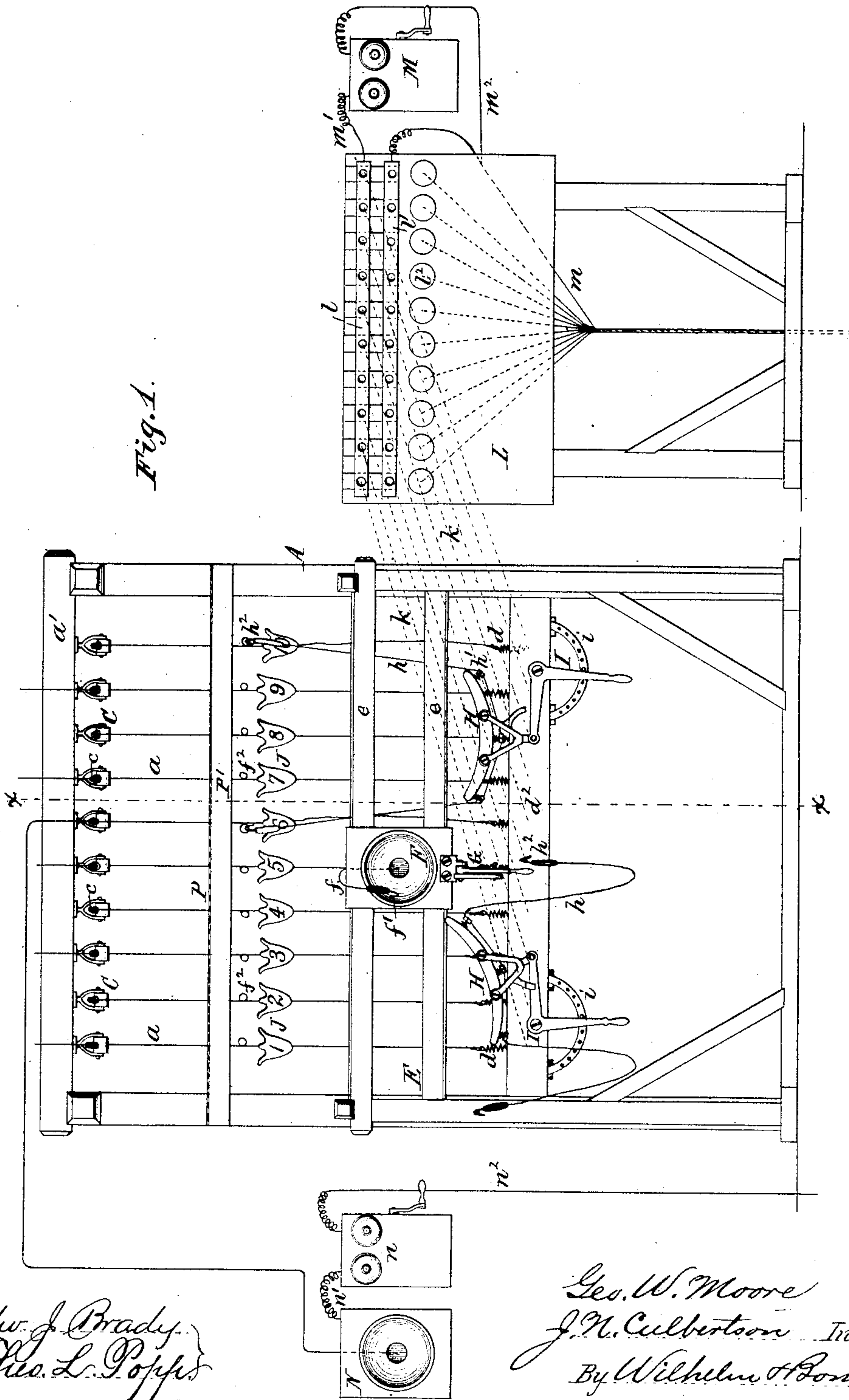
2 Sheets—Sheet 1.

G. W. MOORE & J. N. CULBERTSON.

ACOUSTIC TELEPHONE EXCHANGE.

No. 328,243.

Patented Oct. 13, 1885.



Edw. J. Brady
Thos. L. Popp
Witnesses.

Geo. W. Moore
J. N. Culbertson Inventors.
By Wilhelm H. Bonnier
Attorneys.

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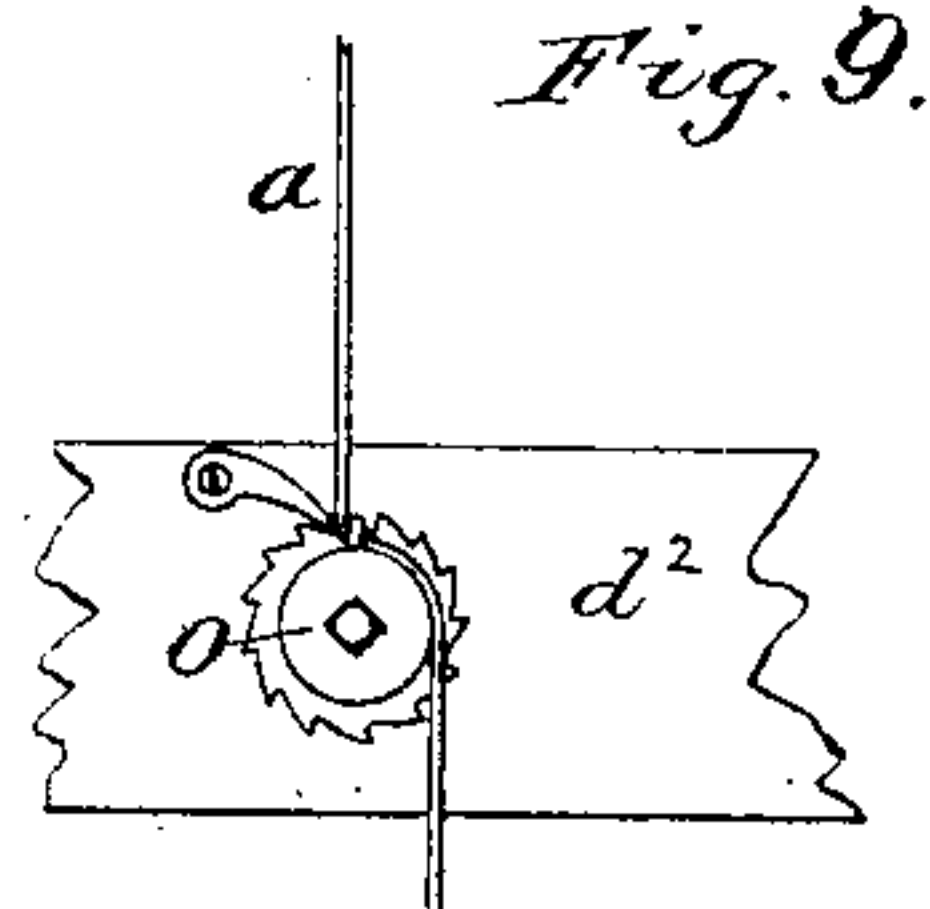
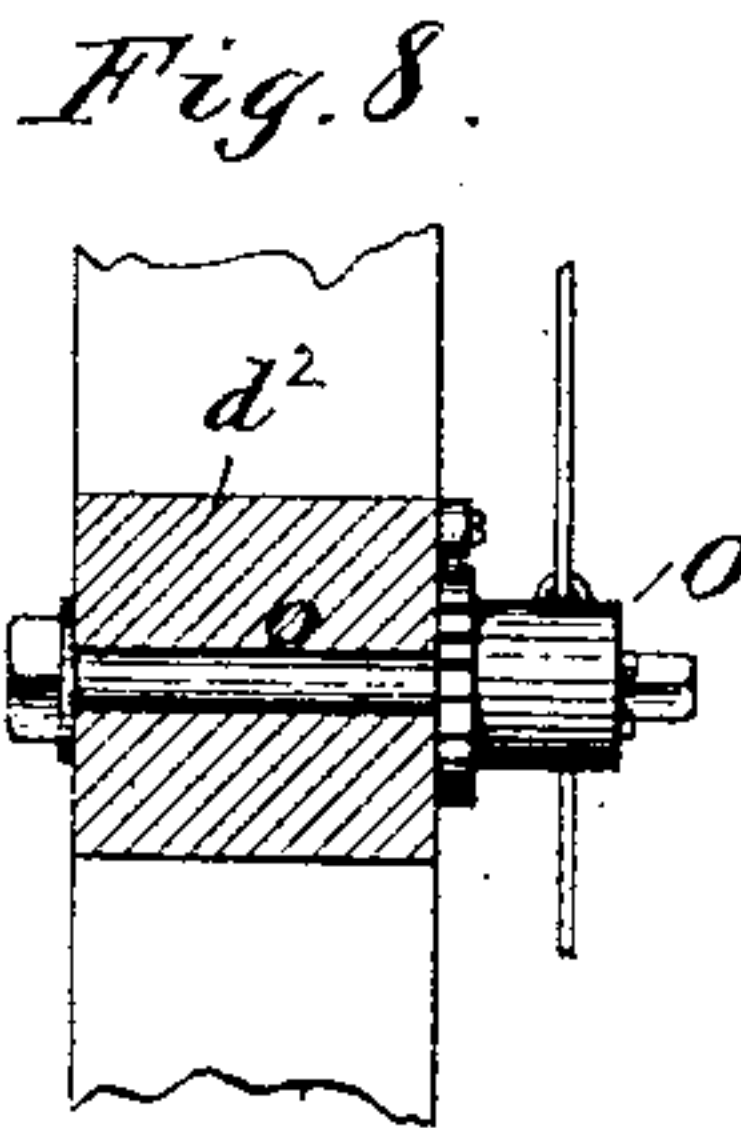
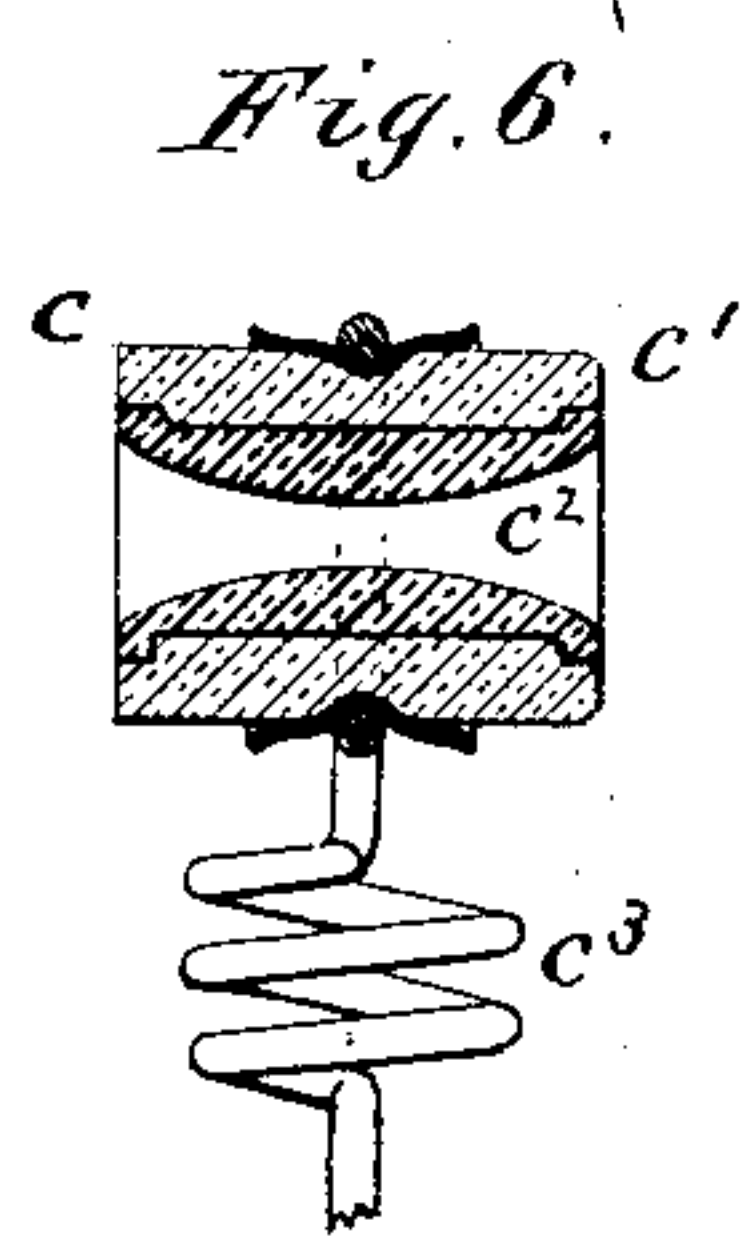
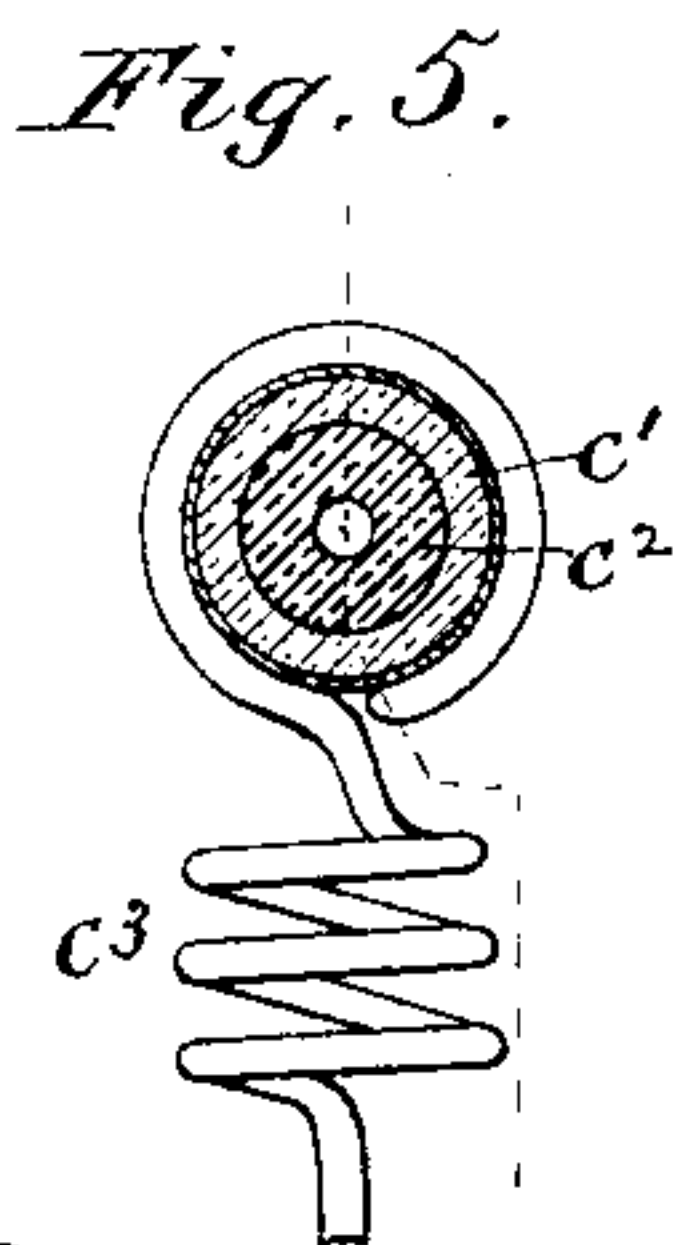
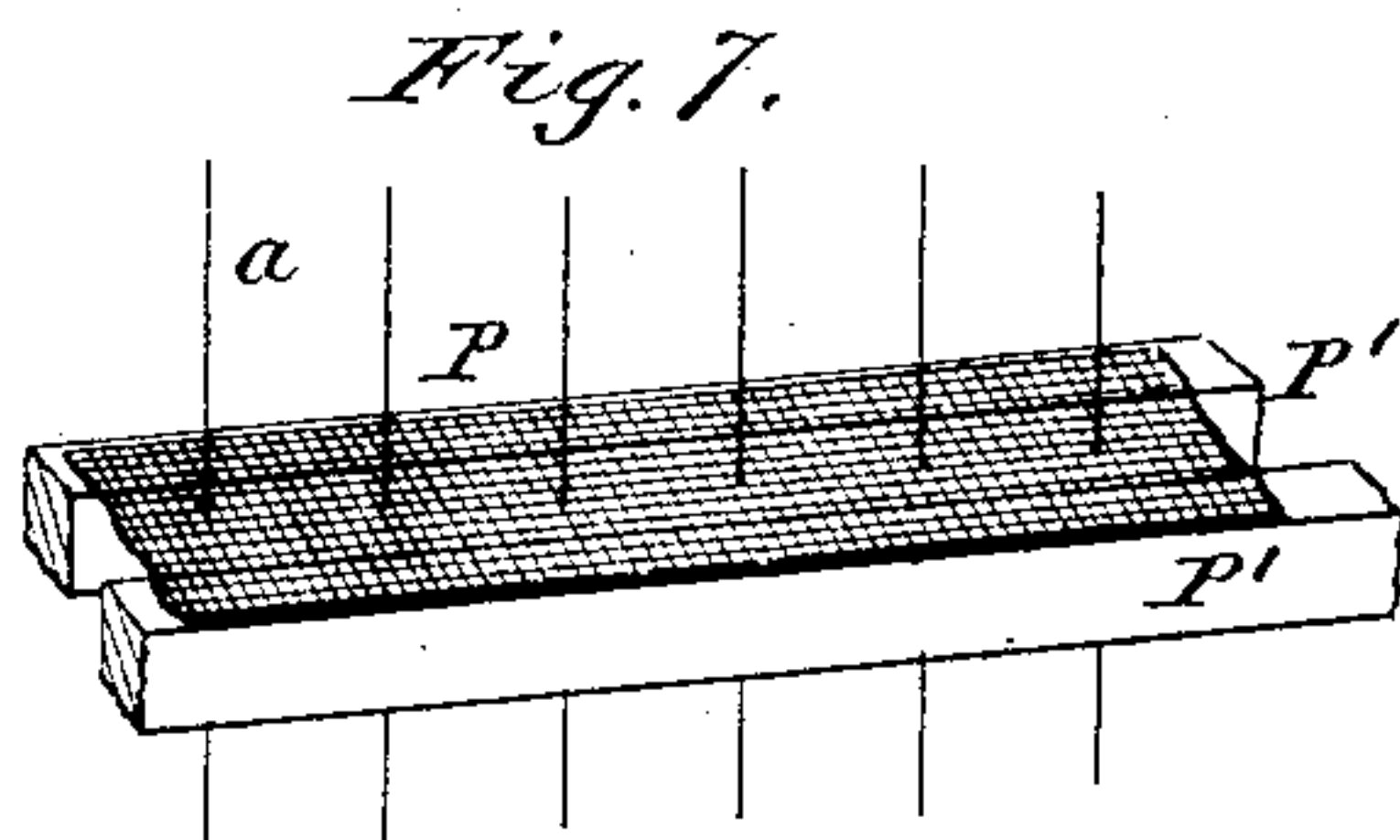
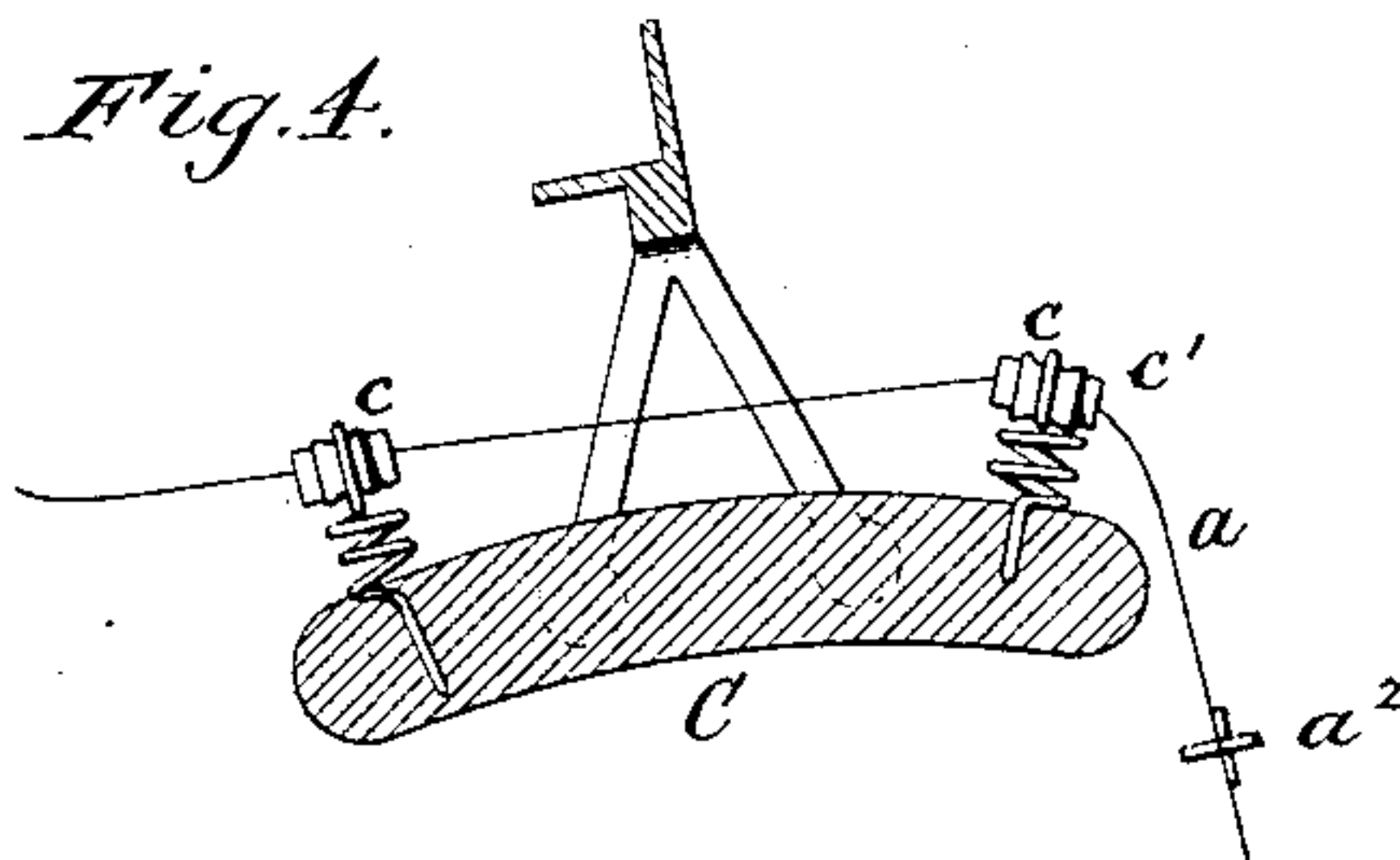
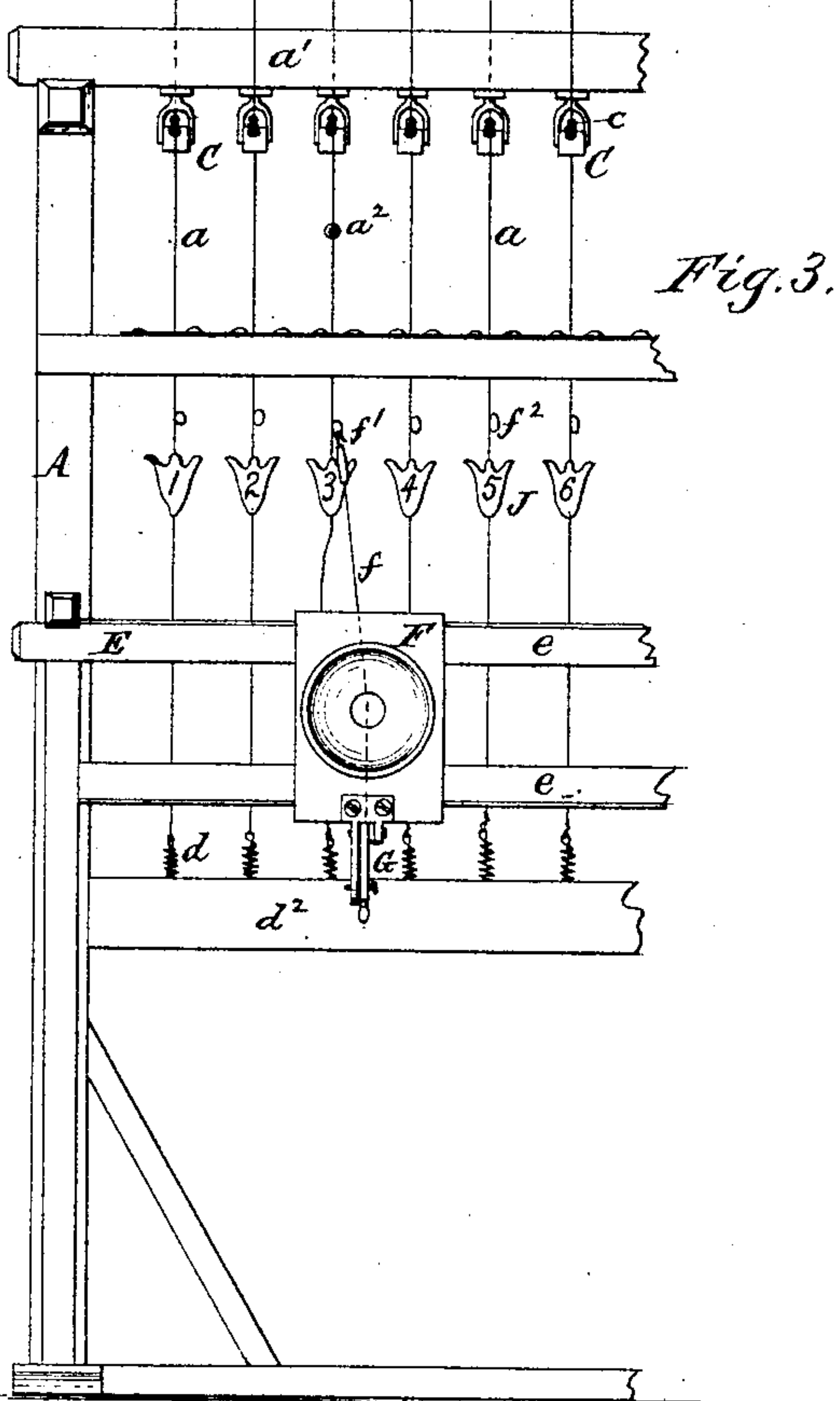
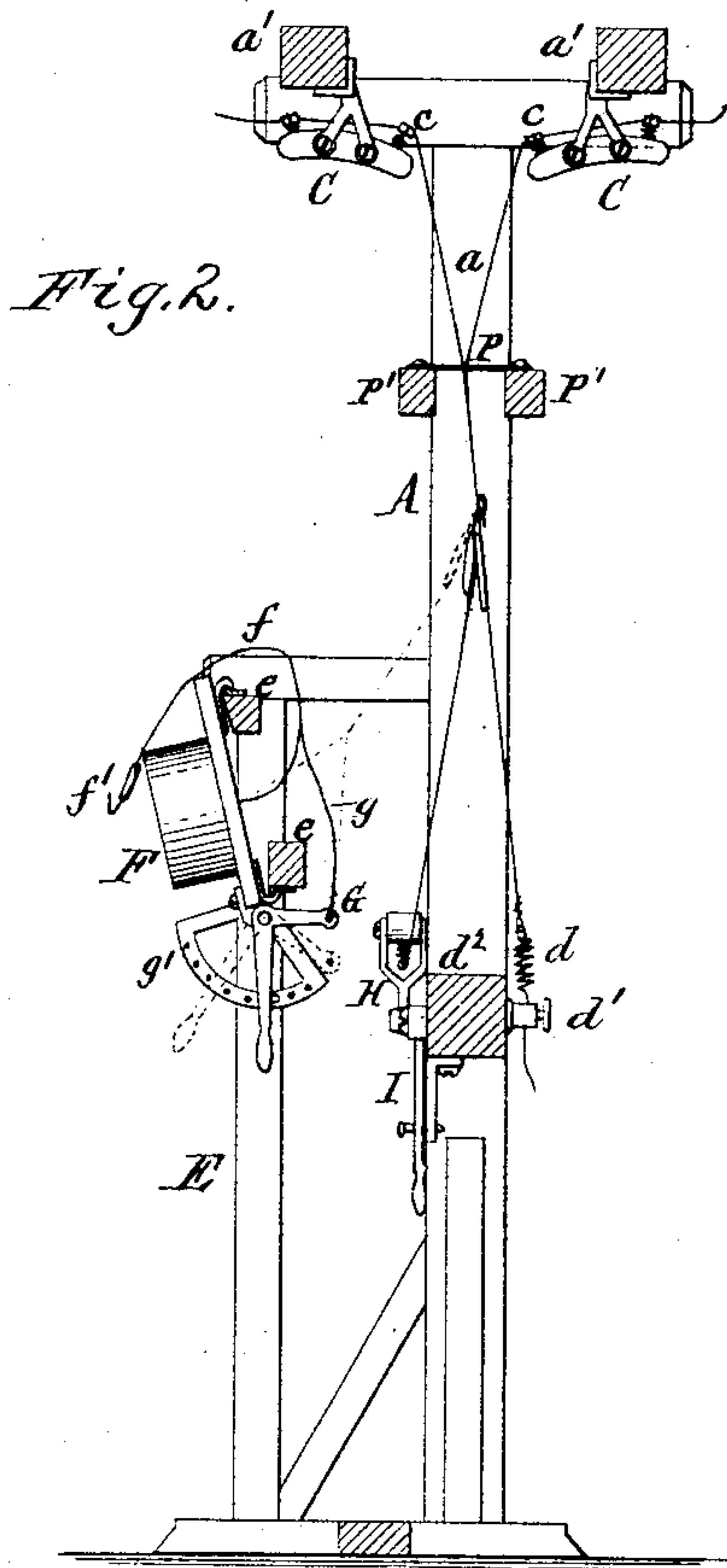
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UNITED STATES PATENT OFFICE.

GEORGE W. MOORE, OF NORTH EAST, PENNSYLVANIA, AND JOHN N. CULBERTSON, OF BUFFALO, NEW YORK, ASSIGNORS TO THE CONSOLIDATED TELEPHONE COMPANY, OF NEW JERSEY.

ACOUSTIC-TELEPHONE EXCHANGE.

SPECIFICATION forming part of Letters Patent No. 328,243, dated October 13, 1885.

Application filed November 7, 1882. Renewed September 18, 1885. Serial No. 177,501. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. MOORE, of North East, in the county of Erie and State of Pennsylvania, and JOHN N. CULBERTSON, of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Acoustic-Telephone Exchanges, of which the following is a specification.

This invention relates to certain improvements in acoustic-telephone exchanges in which a number of sound-transmitting wires converge, and in which means are provided whereby any two of said wires can be connected together, so as to transmit the sound from the telephone at one end of the wire through the exchange to the telephone at the end of another wire.

The object of our invention is to provide ready means for establishing communication between the exchange or central office in which the wires converge and the telephones at the ends of such wires, and also to provide ready means for connecting any two of the converging wires.

Our invention consists in constructions and combinations, all as will hereinafter be described and claimed.

In the accompanying drawings, consisting of two sheets, Figure 1 is a front elevation of our improved telephone-exchange; Fig. 2, a cross-section in line $x x$, Fig. 1. Fig. 3 is a partial front elevation of the switch-board. Fig. 4 is a sectional elevation of the wire-supports. Fig. 5 is a cross-section, and Fig. 6 a longitudinal section, of an insulator. Fig. 7 is a perspective view of a portion of the switch-board. Fig. 8 is a sectional elevation of the wire-tightening device. Fig. 9 is an elevation thereof at right angles to Fig. 8.

Like letters of reference refer to like parts in the several figures.

A represents the frame of the switch-board or device upon which the ends of the sound-transmitting wires are secured and placed in communication with each other.

a represents the ends of a series of sound-transmitting wires which converge in the exchange. These wires run from various direc-

tions to the upper portion of the frame A, where they are supported by hangers C, provided with insulators c . The hangers C are rigidly secured to longitudinal pieces a' , which form part of the upper portion of the frame A. The insulators c consist of a sleeve, c' , made of glass, and provided, preferably, with a lining of rubber, c^2 . The sleeves c' are supported by springs c^3 , which permit the wire passing through the sleeve to vibrate freely.

a^2 represents a stop, which is secured to each wire a below the insulators c to prevent the wire from being drawn through the insulator if the wire should break. The stop may consist of a disk of metal or a ball of india-rubber, and it may be secured to the wire by a wedge, key, or other suitable means. The wires a are arranged side by side and extend downwardly from the hangers C to the lower part of the frame A, where their lower ends are secured to springs d , by means of which the slack of the wires can be taken up. The lower ends of the wires a extend through insulators d' , which are attached to a horizontal piece, d^2 , which connects the upright posts of the main frame A. The wires a are firmly clamped in the insulators d' , so as to maintain the tension required to transmit the sound-vibrations.

E represents an auxiliary frame, arranged in front of the main frame A, for the support of a traveling telephone, F. This frame is provided with two horizontal rails, e , to which the telephone F is attached in such manner that it can be moved horizontally and placed in front of any of the wires a .

f represents the wire which is attached to the diaphragm of the telephone F, and provided at its end with a hook, f' , whereby it can be attached to a loop, f^2 , formed in each of the wires a .

g represents a branch wire, which is attached with one end to the wire f between the diaphragm of the telephone and the hooks f' , and with its other end to the bell-crank lever G, which is pivoted to the lower side of the movable-telephone frame, so that by turning the bell-crank lever in the proper direction the

branch wire is drawn downwardly and the wire f tightened after its hook f' has been connected with the loop f^2 of one of the wires a , as represented by dotted lines in Fig. 2. The bell-crank lever is secured in position, after the wire has been so tightened, by means of a peg or pin placed in one of a series of holes formed in a segment g' , which is attached to the frame of the movable telephone F. If preferred, a hanger provided with insulators c may be attached to the bell-crank lever G, and the wire f may be drawn through the insulators and adjusted by means of the lever G, whereby the branch wire g is dispensed with.

H represents one or more yokes arranged in front of the lower horizontal piece, d^2 , and provided with connecting or switch wires h , which are attached to the yokes H by means of insulators h' , constructed like the insulators c , and applied to the lower sides of the yokes. The wires h are provided at both ends with hooks h^2 , adapted to engage with the loops f^2 of the wires a . The yokes H are each attached to a bell-crank lever, I, which is pivoted to the longitudinal piece d^2 , and whereby the yokes H can be raised and lowered.

i are segments secured to the under side of the longitudinal piece d^2 and provided with perforations, in which can be inserted pegs or pins for securing the bell-crank lever I against backward movement when the yokes have been adjusted.

The auxiliary frame E is arranged at a sufficient distance from the main frame to permit the free movement of the telephone F and the tightening device attached thereto without interfering with the yokes H and connecting parts.

J represents shields or plates which are attached to the wires a below the loops f^2 , and which bear numbers or letters whereby the different wires are designated.

K represents electric conducting-wires, which extend from the lower ends of the wires a to the upper bar, l , of an electric annunciator-board, L.

l' represents the lower bar of the electric annunciator-board, and l'' represents the drop-plates which cover the numbers on the annunciator-board. The numbers on the annunciator-board correspond with the numbers on the wires with which the respective drop-plates are connected by the wires K.

m represents the ground-wire of the annunciator-board, and M represents an electric call-bell, which is connected with the annunciator-board by a wire, m' , and with the ground-wire by a wire, m^2 . The electric annunciator-board and call-bell may be of any suitable and well-known construction.

N represents a subscriber's telephone connected with the end of one of the wires a , and n represents an electric call-bell connected with the wire of the telephone N by a wire, n' , and with the ground by a wire, n^2 .

The operation of our improved apparatus

is as follows: When the subscriber who uses one of the telephones, N, desires to be put in communication with another subscriber, he rings the call-bell n , whereby the number corresponding with the caller's wire is exposed on the electric annunciator-board L in the exchange. In the case represented in Fig. 1 the wire marked 6 calls the main office, and the operator places the movable telephone near the wire 6 on the frame A, and connects the wire f by its hook f' with the loop f^2 of the wire 6, and then tightens the wire f by means of the bell-crank lever G, whereby the telephone F is placed in communication with the telephone at the end of wire 6. The operator now ascertains what is wanted by the caller at the end of wire 6. Assuming that the caller desires to be put in communication with wire 10, the operator disconnects the wire f from wire 6 and attaches one end of the switch-wire h with the wire 6 and the other end of wire h with wire 10, as represented in Fig. 1. He then tightens the switch-wire h by means of the bell-crank lever I, whereby the caller at the end of wire 6 is placed in communication with wire 10, and enabled to communicate directly with the telephone at the end of wire 10, which he can call directly by means of the electric call-bell with which the subscribers' telephones N are provided. If preferred, the operator at the central office can first call the subscriber at the end of wire 10 by means of the electric switch-board L, and after receiving a reply connect the switch-wire h with the wires 6 and 10, and thereby place both subscribers in communication. If desired, the lower ends of the wires a may be attached to drums O, which are mounted in suitable bearings, o , secured to the horizontal piece d^2 , so that by turning the drum in the proper direction the wire is wound upon the same and the slack of the wire taken up and the proper tension produced. These drums are each provided with a ratchet and a pawl, which prevent the backward movement of the drum after the wire has been tightened, and the shafts of the drums are preferably made square or otherwise constructed so that a removable crank can be applied to each shaft when the drums are required to be turned. This construction is clearly represented in Figs. 8 and 9.

P represents a strip of fabric or rubber which is secured horizontally in the upper portion of the main frame A, and through which the wires a pass. As shown in the drawings, the strip P is secured to horizontal pieces P' P' , arranged, respectively, in front and in rear of the wires a . The strips P retain the wires in their proper relative positions, and prevent the wires from crossing each other when a lateral strain is applied to the wires by connecting the same to the wires h .

If preferred, an insulator of the construction represented in Figs. 5 and 6 may be applied to each wire a at this point, for the purpose of

preventing the lateral displacement of the wires, instead of the strip P. The insulators *c* enable the sound-transmitting wires *a* to conduct at the same time the electric currents whereby the calls are made without in any manner interfering with the vibration of the wires, thereby doing away with the use of separate lines for the conveyance of the sound and the electric current, and the insulators also permit the wires to run at comparatively sharp angles without interfering with the transmission of the sound.

By this apparatus all the wires converging in the central office can be communicated with by a single telephone, whereby the noise and confusion arising from the use of a separate telephone for each wire is avoided, and the operation of making the communication greatly facilitated.

We claim as our invention—

1. In a mechanical telephone-exchange, the combination of a frame having wires *a*, attached to said frame by springs *d* or equivalent means, and an annunciator having wires *K*, connecting it with wires *a*, substantially as described.

2. The combination, with a series of sound-transmitting wires, *a*, of a traveling telephone, *F*, provided with a connecting-wire, *f*, a branch

wire, *g*, and a tension-lever, *G*, substantially as set forth.

3. The combination, with a series of sound-transmitting wires, *a*, of a yoke, *H*, a switch-wire, *h*, attached thereto and adapted to be attached with its ends to two of the wires *a*, and a bell-crank lever, *I*, whereby the yoke *H* is adjusted, substantially as set forth.

4. In a mechanical telephone-exchange, a rigidly-supported frame having a spring-supported insulating sleeve, *c'*, substantially as described.

5. The combination, with a series of sound-transmitting wires, *a*, having loops *f*², of a traveling telephone, *F*, provided with a connecting-wire, *f*, having a hook, *f'*, substantially as set forth.

6. The combination, with the frame *A* and sound-transmitting wires *a*, of the strips of fabric *P* or equivalent means whereby the wires are retained in their proper relative positions against the lateral strain of the switch-wires, substantially as set forth.

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