(No Model.) 2 Sheets—Sheet 1.

A. S. FONTAINE.

SPEAKING TUBE.

No. 336,479. Patented Feb. 16, 1886.

Fig. 1.

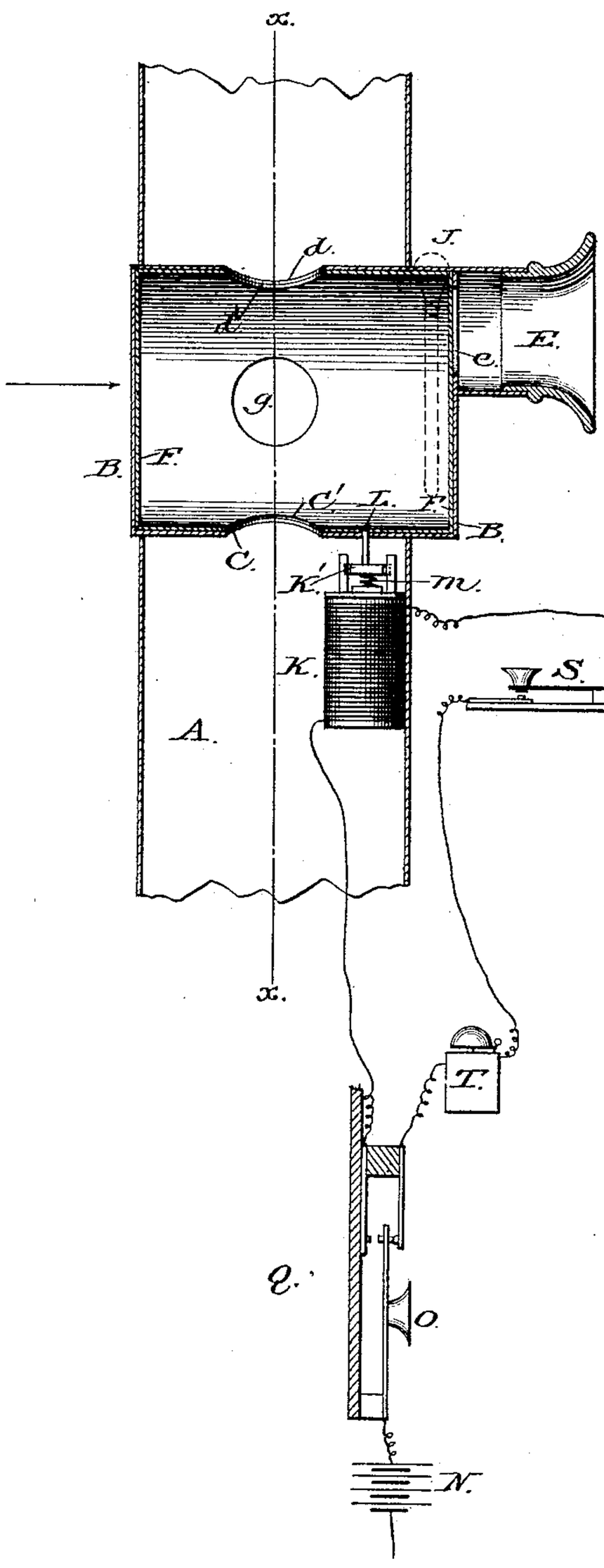
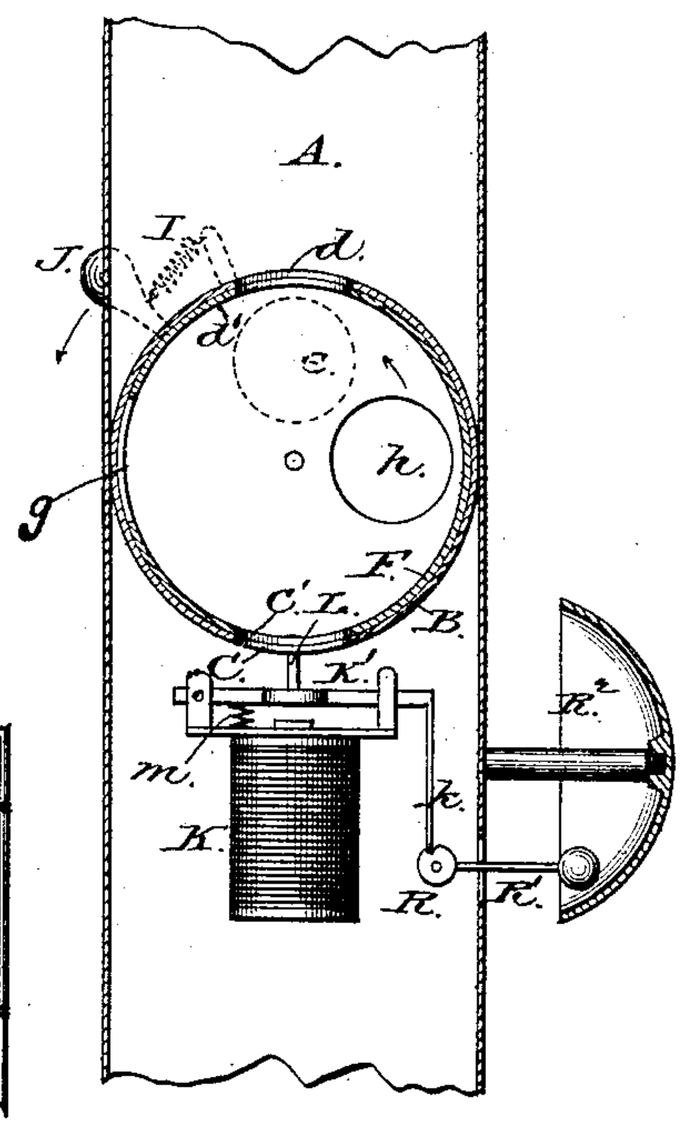


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

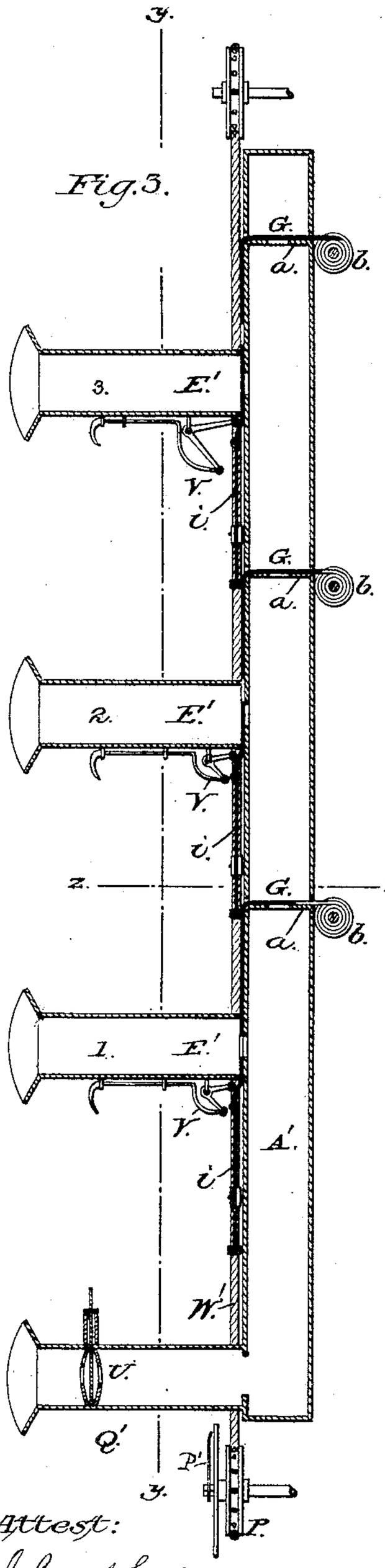


Fig. 4.

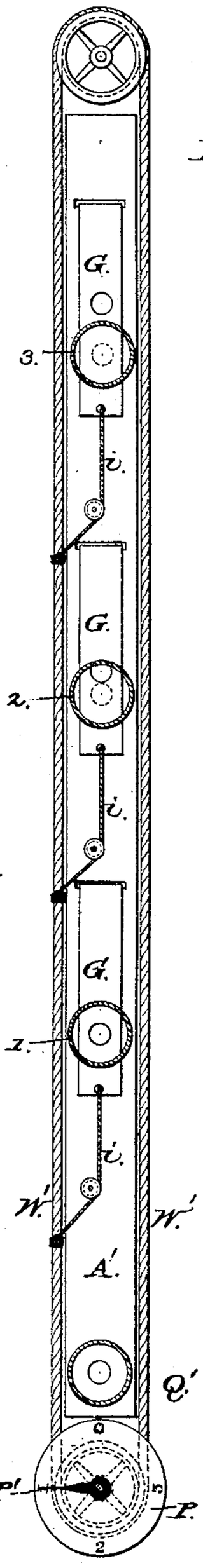


Fig. 5.

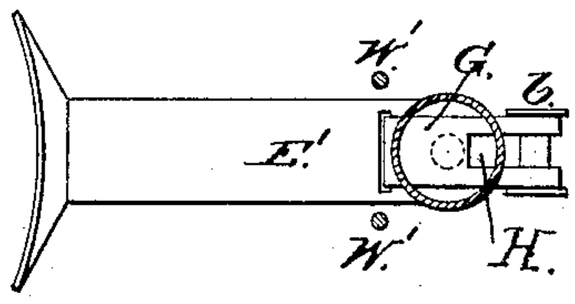
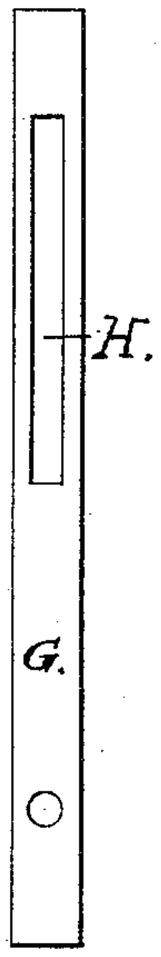


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALLEN S. FONTAINE, OF NEW YORK, N. Y.

SPEAKING-TUBE.

SPECIFICATION forming part of Letters Patent No. 336,479, dated February 16, 1886.

Application filed February 9, 1885. Serial No. 155,350. (No model.)

To all whom it may concern:

Be it known that I, ALLEN S. FONTAINE, of the city, county, and State of New York, have invented a new and useful Improvement in Speaking-Tubes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to speaking-tubes, and has for its object the use of a single tube as a means of oral communication between any one room—as, for example, the office of a hotel or the janitor's room in an apartment-house—and the other rooms in a building.

In the accompanying drawings, Figure 1 is a sectional view of one of the annunciators used with the single tube and of its valves, illustrating, partly by a diagram, the combination therewith of an electrical detent and call-belt. Fig. 2 is a similar section in line *x x* of Fig. 1, looking toward the mouth-piece of the annunciator. Fig. 3 is a longitudinal sectional view illustrating a modification of the apparatus, in which the valves are operated by means of an endless chain instead of by electricity, Fig. 4 being a similar section in line *y y* of Fig. 3. Fig. 5 is a transverse section in line *z z* of Fig. 3, and Fig. 6 is a plan view of one of the valve-tapes detached.

A represents the single speaking-tube used in my apparatus, and which is led from the office or point at Q in the building with which it is desired that the several rooms shall communicate to each of said rooms, a suitable annunciator and mouth-piece being made to open into the tube from each room.

B represents a cylindrical case of a diameter slightly less than that of the tube A, to admit of being inserted therein transversely to its length and completely closing the same. This cylinder B is made long enough to project out from the tube, and its periphery is pierced with two apertures, *c d*, at diametrically-opposite points centrally within the tube, and with a third similar opening, *e*, in its front face, to which a mouth-piece, E, is fitted. Within the cylinder B a second concentric rotating cylinder, F, is closely fitted. The periphery of this inner valve-cylinder, F, is provided with diametric openings *c' d'*, corresponding precisely with the openings *c d* in the stationary cylinder B. It is also pierced with a third peripheral opening, *g*, in the same plane as the openings *c d*, midway between them, and with a fourth opening, *h*, (see Fig. 2,) in its front face in the same plane as said peripheral opening *g*, so that when, by a quarter-revolution of the inner cylinder, F, the opening *g* is brought into register with the lower opening, *c*, in the outer stationary cylinder, B, the opening *h* will be brought into register with the front opening, *e*, while the upper opening in the outer cylinder will be closed.

The inner revolving cylinder, F, is held normally in position with the openings *c d* and *c' d'* in register with each other, and the face opening *e* closed by means of a spring, I, (see dotted lines, Fig. 2,) which engages a lever or handle, J, projecting from the front end of the inner revolving cylinder, F, radially through a slot in the outer stationary cylinder, B; or a coiled spring may be interposed between the two cylinders at the rear end thereof as an equivalent device to retain the cylinder F in position, as described.

By moving the handle J one-quarter of a circle the apertures *g* and *h* are brought into register with the apertures *c* and *e*, respectively, so that communication is thereby established between the mouth-piece E and the tube A, while the tube is closed above or beyond the mouth-piece by the closing of the upper aperture, *d*. So soon as the handle J is released, the action of its spring I will operate automatically to close the mouth-piece and open communication past it through the tube.

An electro-magnet, K, is placed immediately under the cylinder B, at one end of it, and its armature K' is attached to a bolt or catch, L, which is fitted to play up through an opening in said cylinder, to engage the inner valve cylinder, F, and prevent its rotation, its engagement being produced automatically by a spring, *m*, and its retraction and disengagement by the excitation of the magnet through the influence of an electric current. The end of the armature is fitted with an elastic rod, *k*, which engages a notch upon the periphery of a pivoted disk, R, (see Fig. 2,) to which is attached the hammer R'

of a bell, R². When the armature is depressed, it causes a partial rotation of the disk, thereby elevating the hammer. As the disk rotates the rod *k* slips off from its point of engagement, and thereby allows the hammer to drop and ring the bell R, placed in position to receive the blow.

The magnet K is placed in circuit with a battery, N, which is closed by means of a key or button, O, placed in the office Q, in which the speaking-tube terminates.

A key or button, S, is placed near the annunciator in each room in connection with a second circuit from the battery N, in which a call-bell, T, (located in the office Q,) is placed, this second circuit being connected with the battery by means of the key O, when the key stands open, so that the circuit may be closed by pressure upon the key or button S when the said key O is thus open. Both the electro-magnet and the call-bell circuits may be led to the ground by connection with the gas or water pipe W in the building.

In the operation of the device thus constructed and arranged, whenever the occupant of a room in which one of the annunciators, E, connected with the single tube A, is placed, desires to communicate with the office Q, he touches the button S and thus rings the call-bell T in the office. The clerk, janitor, or other person in the office thereupon pushes the button O, and, closing the circuit through the electro-magnet K, releases the valve-cylinder, the fact being indicated by the tap of the bell R², so that the person at E may, by moving the handle J, open the tube and speak to the office. When communication between the tube and the annunciator and mouth-piece E is thus established, communication through the tube beyond said annunciator is entirely cut off and all other annunciators on the tube remain also automatically closed. When the clerk or janitor desires to communicate with any one of the rooms, he rings the bell R² in that room by rapidly vibrating the key O until the occupant of the room opens his annunciator and answers orally or by ringing the call-bell T.

A separate electro-magnet and call-bell is required for each room.

As a modification of my invention (in which a single speaking-tube is made serviceable for a number of separate rooms) I contemplate opening and closing the valves governing the several annunciators, and the connection of the tube therewith, by means of wires or chains, instead of by electric circuits. Such a modification is illustrated in Figs. 3, 4, 5, and 6 of the drawings.

A′ represents the speaking-tube, extending from the office at Q′ to the several annunciators, in each of which is fitted a mouth-piece, E′, communicating with the tube. An endless cord, W′, is carried along the tube from end to end over suitable friction-rollers and over the periphery of an index-wheel, P, located in the office Q. Within the tube, and immediately above each mouth-piece E′, a diaphragm, *a*, is placed, having a central opening therein, and over this diaphragm a valve-strip, G, of flexible material, is led, this strip being carried into the tube at one side and out of it at the other through transverse slots cut therein on a line with the upper face of the diaphragm. The rear end of the strip is wound upon a spring-actuated reel, *b*, which tends normally to keep it wound up. Its forward end, after passing over the diaphragm *a*, is carried down through the inner end of the mouth-piece over the opening in the tube A′, with which the mouth-piece communicates, and is made fast by a cord, *i*, to the endless cord W′.

When the index-pointer P′, projecting from the index-wheel P, points at O′, the openings in the several diaphragms and annunciators of the tube are all closed by the valve-strips led over them. When, however, the wheel is turned to bring its index to No. 1, representing the annunciator of the first room from the office Q′, the movement of the endless cord will draw all the valve-strips forward, and thereby bring an aperture in the strip of room No. 1 in register with the opening in its annunciator, so that communication will thereby be established between that room and the office, the tube remaining closed beyond it. If communication is desired with room No. 2 instead of No. 1, the movement of the index to No. 2 will draw the valve-strip forward far enough to carry the opening for the annunciator in the strip No. 1 over and beyond the opening in said annunciator, so that it shall remain closed, and will bring the opening in strip of No. 2 into register with the annunciator of room No. 2, and simultaneously bring an extended slot, H, (see Fig. 6,) in the valve-strip of No. 1 over the opening of the first diaphragm *a*, so that the tube will be opened through said diaphragm to afford communication with room No. 2. The slot H in the valve-strip over the diaphragm will allow it to remain open during the opening of all the annunciators above it. The annunciator of No. 3 and of all the rooms are in like manner opened by a proper movement of the cord W′, the opening of any one serving to close all the others, and to open the tube up to the point of connection of the particular annunciator with the tube.

To enable the occupant of any one of the rooms to open communication with the office through the tube, a lever, V, is fitted in each room to engage the endless cord W′, the lever being so made and adjusted as to impart to the cord the precise length of movement required to properly set the valve-strips, as above described, to open the tube for that room, and the annunciator in the office is fitted with a whistle, U, in the customary manner, to permit a signal to be sounded.

I claim as my invention—

1. The combination, with a single speaking-tube, of a series of independent mouth-pieces

or annunciators, a valve closing each mouth-piece, and a second valve closing the tube above or beyond said mouth-piece, and which is coupled with the first to open when the latter closes and close when it opens, substantially in the manner and for the purpose herein set forth.

2. The combination, with the valve closing the mouth-piece or annunciator in a speaking-tube, of a bolt locking said valve, and an electro-magnet actuating said bolt, substantially in the manner and for the purpose herein set forth.

3. The combination, with a speaking-tube, of a cylindrical valve-chamber fitted transversely in said tube, and provided with peripheral openings in register with the tube, a mouth-piece at one end of said valve-chamber opening thereinto, and a hollow valve-piece within the chamber formed to open and close the mouth-piece, and provided with openings registering with both of the peripheral openings in the chamber when the mouth-piece is closed, and with one of said openings and the mouth-piece when the latter is open, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALLEN S. FONTAINE.

Witnesses:
P. ELBERT NOSTRAND,
A. B. MOORE.