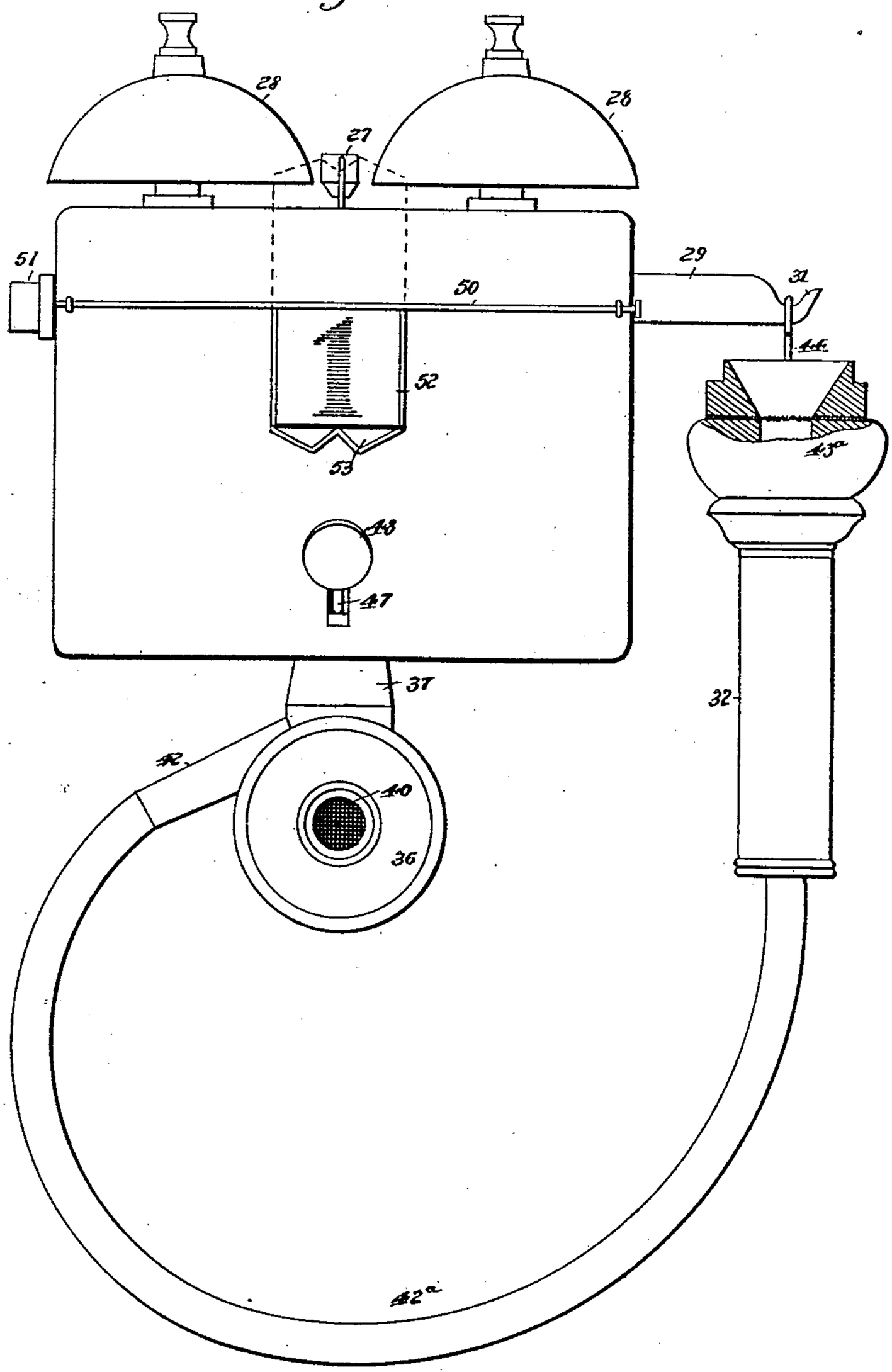
(No Model.) 4 Sheets—Sheet 1.

J. G. NOREAU.

PNEUMATIC TELEPHONE.

No. 424,684. Patented Apr. 1, 1890.

Fig. 1.



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(No Model.)

4 Sheets—Sheet 2.

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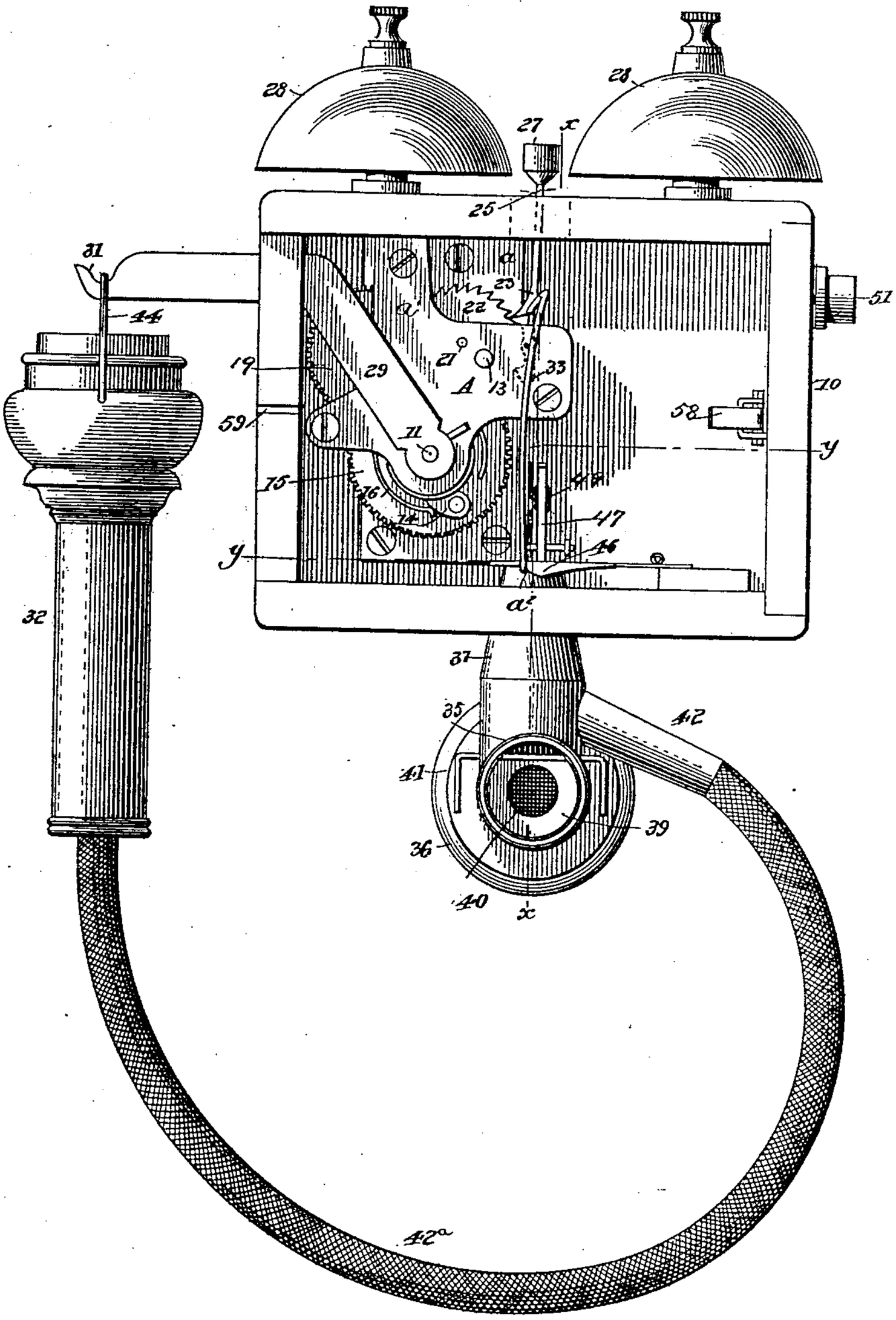
PNEUMATIC TELEPHONE.

No. 424,684. Patented Apr. 1, 1890.

Fig. 2.



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4 Sheets—Sheet 3.

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PNEUMATIC TELEPHONE.

No. 424,684. Patented Apr. 1, 1890.

Fig. 3.

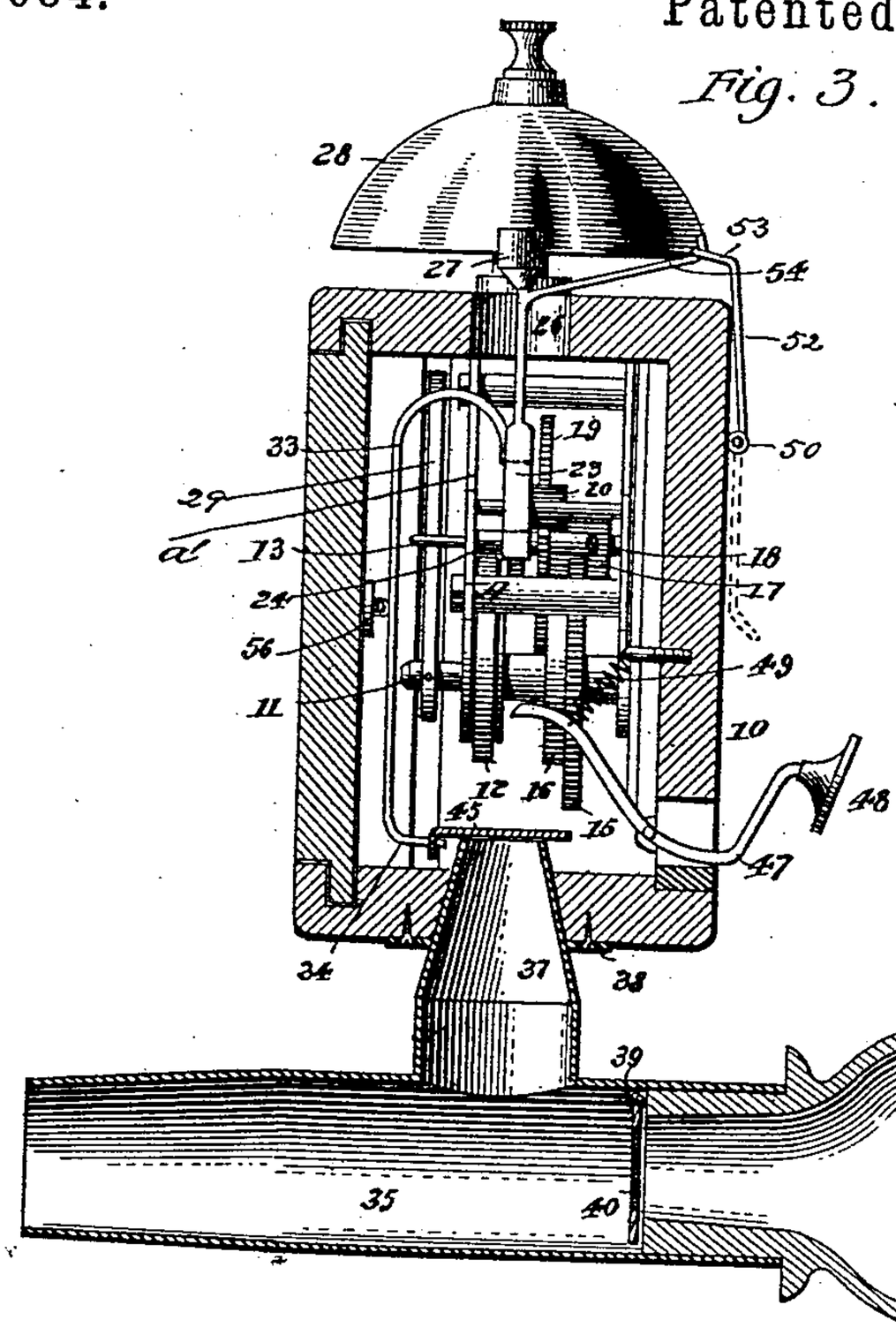

Fig. 6.

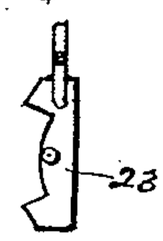

Fig. 4.

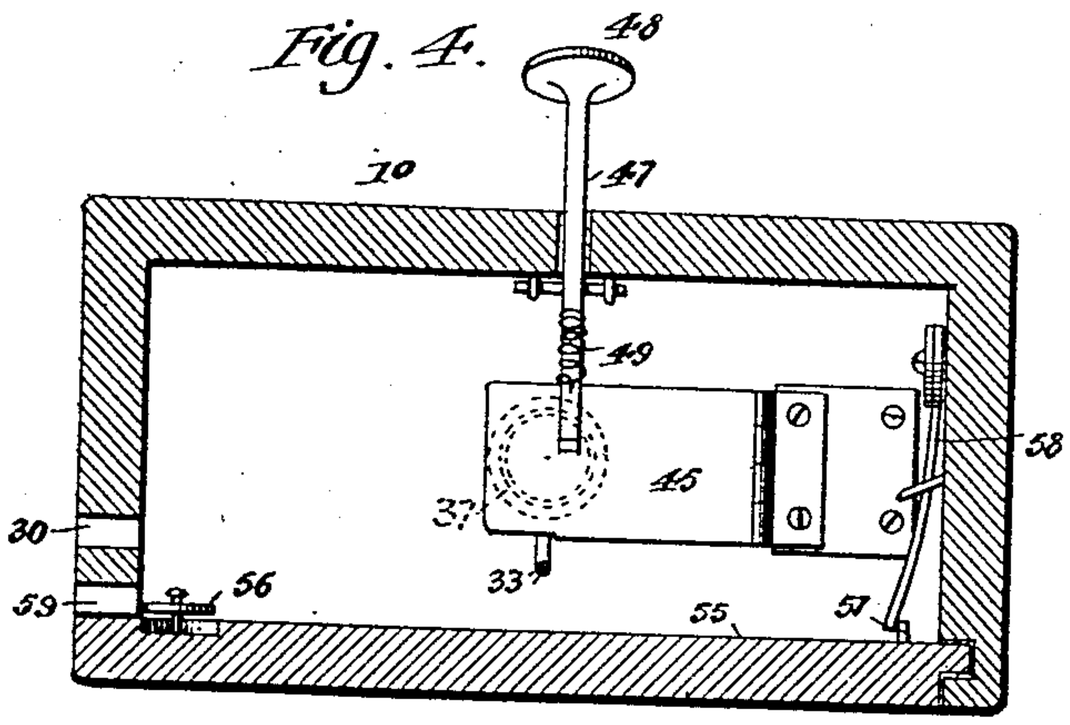

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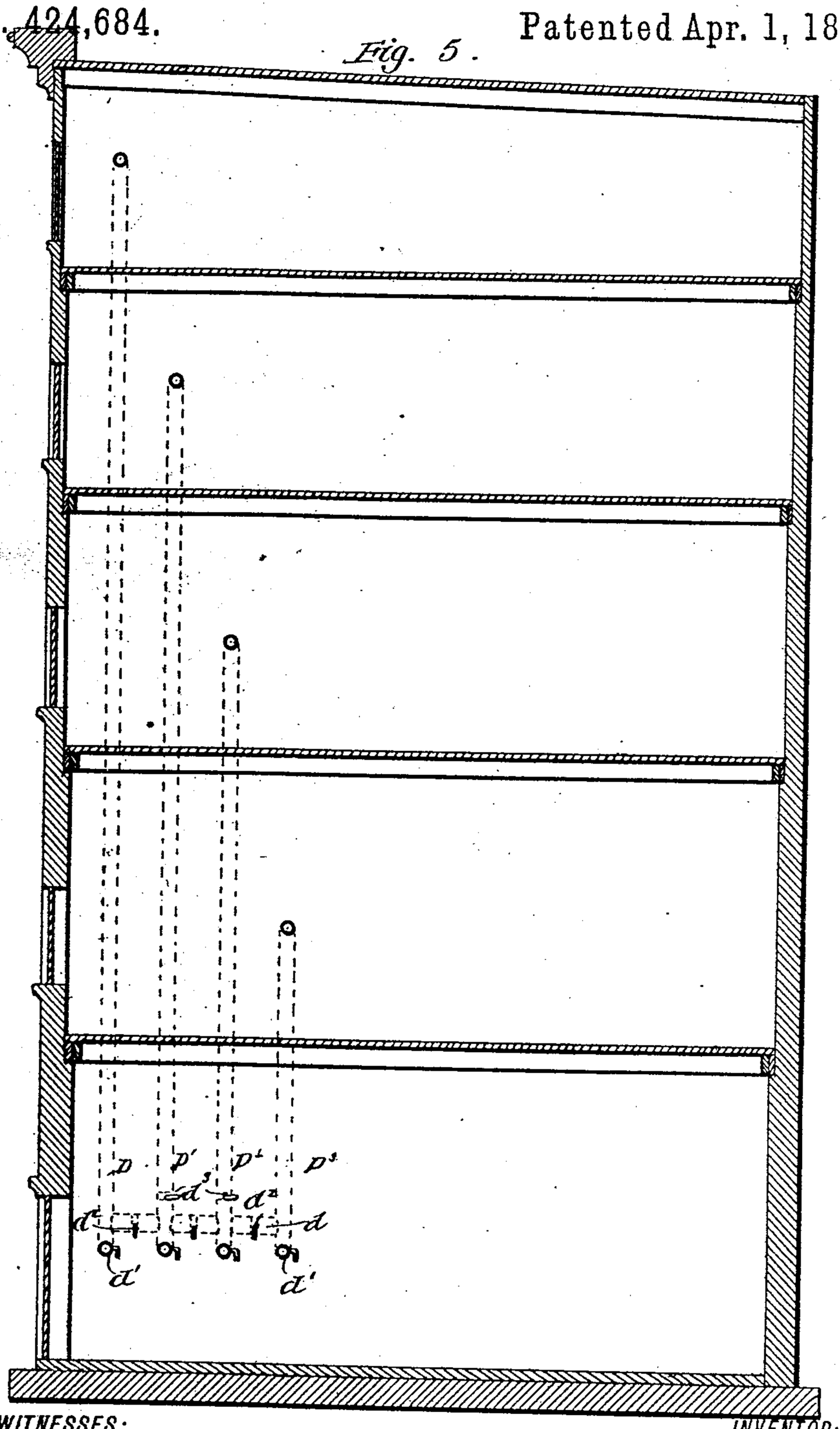
Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH GEORGE NOREAU, OF QUEBEC, QUEBEC, CANADA.

PNEUMATIC TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 424,684, dated April 1, 1890.

Application filed June 29, 1889. Serial No. 316,032. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GEORGE NOREAU, of Quebec, in the Province of Quebec and Dominion of Canada, have invented a new and useful Improvement in Pneumatic Telephones, of which the following is a full, clear, and exact description.

My invention relates to an improvement in pneumatic telephones, especially to the construction of the indicator employed in connection with such telephones, and has for its object to provide an indicator having a bell attachment of simple, durable, and effective construction and capable of signaling for a length of time to the occupant of one room the intention of parties in another room quite remote to communicate with him, and also to provide a means whereby when the receiver is removed from the indicator the alarm will be stopped, and to provide a means for confining the sound to the tubes connecting the mouth-piece to the indicator and receiver.

A further object of the invention is to provide a train of clock-work to ring the alarm, which will be automatically wound up when the receiver is disengaged therefrom.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter more fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and figures of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of an indicator constructed in accordance with my improvement, illustrating the mouth-piece attached thereto and the receiver suspended therefrom. Fig. 2 is a rear elevation with the back of the indicator-box removed. Fig. 3 is a transverse section on line *x x* of Fig. 2, and Fig. 4 is a horizontal section taken on line *y y* of Fig. 2. Fig. 5 is a sectional view of a building, illustrating the preferred system of tubing. Fig. [illegible] detail view to better show the escapement.

In carrying out the invention the body of the indicator consists, preferably, of a box 10, in which at one side a train of clock-work A is secured in a frame consisting of two parallel plates *a* and *a'*, held a suitable distance apart, the plate *a* being rigidly secured in any approved manner to the inner side of the front face of the box 10, as best illustrated in Fig. 2. This train of gearing consists of a lower main shaft 11, projecting beyond the rear plate *a'*, upon which shaft one end of a coil-spring 12 is secured, the other end being fastened to a post 13, projected forward from the inner face of the plate *a'*. Upon the shaft 11, carrying the spring 12, a ratchet-wheel is securely fastened, engaged by a pawl 14, pivoted upon the rear face of a gear-wheel 15, which gear-wheel is loosely mounted upon the shaft 11 to the rear of the said ratchet. The ratchet is not shown in the drawings, being hidden by a spring 16, secured to the rear face of the gear-wheel 15, and having a bearing against the pawl 14, whereby the said pawl is normally kept in engagement with the ratchet. The gear-wheel 15 meshes with a pinion 17, secured upon a shaft 18, journaled between the plates *a* and *a'*, above the main or spring shaft 11, which shaft 18 has secured thereto a spur-wheel 19, meshing with a pinion 20, rigidly secured to a third transverse shaft 21, carrying also an escapement-wheel 22. An escapement 23 is secured upon a shaft 24, which escapement is weighted at its upper end to normally contact with the escapement-wheel 22. From the upper end of the said escapement 23 a rod 25 is projected upward through a suitable slot or opening 26 in the top of the box 10 and made to terminate in a perpendicular hammer 27, the slot or opening 26 being of such dimension that the said rod will have considerable lateral play, whereby the hammer, when the rod is thus laterally agitated, may alternately contact with two gongs or bells 28, fastened upon the upper face of the said box 10—one at each side of the opening 26—as illustrated in Fig. 2.

A crank-arm 29 is rigidly fastened to the rear projecting end of the main spring-shaft 11, the horizontal member of which arm is carried outward through a vertical slot 30, formed in one side of the box, the extremity of the vertical arm being made to terminate in a hook 31, as best shown in Figs. 1 and 2. The crank-arm 29 is so attached to the spring-shaft 11 that when a weight—as, for instance, the receiver 32—is suspended from the outer end of the arm it will serve to unwind the

spring 12 and set the train of gearing in motion upon the release of the escapement, in a manner hereinafter described. When, however, the horizontal member of the crank-arm is carried upward to its normal position, (illustrated in Figs. 1 and 2,) whatever portion of the spring that is unwound to force the movement of the gear will be again wound up upon its shaft.

From the side of the escapement 23 an arm 33 is projected horizontally in the direction of the rear and vertically downward, as illustrated in Fig. 3, the end of said arm 33 being bent horizontally forward in the direction of the front face of the box, as shown at 34 in Fig. 3.

A tube 35 is located transversely beneath the box 10, in the forward end of which tube a mouth-piece 36 of any approved construction is inserted, and from the upper portion of said tube 35 a conical branch 37 is projected upward through the bottom of the box and into the same, as shown in Figs. 2 and 3, the said branch being firmly attached to the box by an integral flange 38 or equivalent device, as best shown in Fig. 3. The rear end of the tube 35 is adapted for connection with a line of pipe leading from other rooms or places, and in said tube 35 a cut-off 39 is hinged directly to the rear of the mouth-piece, which cut-off has a center formed of perforated or reticulated material 40, the said cut-off being operated by projecting a pivot-pin 41 outward through the tube in the usual manner.

From one side of the conical branch tube 37 a smaller and preferably downwardly-inclined tube 42 is projected, to which is attached a flexible hose 42^a, carrying the receiver 32, which receiver may be constructed in any well-known manner, the approved construction of the said receiver consisting, however, of a tube having a reduced lower end to receive the hose 42^a, and being provided at its upper end with a diaphragm 43^a of perforated or reticulated material, as best shown in Fig. 1. The receiver is also provided with a bail 44, pivoted thereto, whereby it is suspended from the crank-arm 29 when not in use.

Upon the bottom of the box 10 a disk or plate valve 45 is hinged, and is adapted to normally cover the inner end of the conical branch tube 37. It is constructed of a material sufficiently light to yield to the pressure of air in the conduits or conducting-tubes when forced therein by reason of the operator blowing in the mouth-piece. This valve is provided upon one side, at or near its center, with a perpendicular flange 46, forming a shoulder a^2 and slanting backward, as shown in Fig. 2. The shoulder a^2 of the flange is adapted for contact with the lower curved end 34 of the escapement rod or arm 33, and when the said rod or arm is in contact with the said shoulder the upper weighted portion of the escapement is held out of contact with the escapement-wheel 22, and the lower member of the escapement contacts with the said wheel, acting as a dog to prevent the revolution of the same. When the valve 45 is elevated, the upper weighted member of the escapement falls in contact with the escapement-wheel, as the lower end of the escapement rod or arm 33 is free to move in the direction of the hinge of the valve. When the valve is elevated and the escapement allowed to intermittently contact with the escapement-wheel, the train of gearing is set in motion by the releasing of the said escapement-wheel, and also by the weight of the receiver upon the outer end of the crank-arm 29. Thus by the vibration of the escapement the hammer 27 attached thereto is vibrated also, and, contacting alternately with the two bells 28, sounds the alarm, which alarm will continue to ring until the valve is brought down to its closed position and the escapement rod or arm 33 is in contact with the shoulder a^2. In order to close this valve and restore the escapement arm or rod to its normal position when the valve does not contact properly with the arm upon the escapement, and also to effectually prevent the escape of air into the interior of the box 10, a lever 47 is pivoted in a slot formed in the front of the box, the inner end of which lever curves upward, as shown in Fig. 3, and the outer end is provided with a knob or key-plate 48. The inner end of the lever is normally held at an elevation above the valve 45 through the medium of a spring 49. Thus the party desiring to answer the alarm, and also to stop the same should the valve cease to properly act, need only press inward upon the key, whereupon the inner end of the lever will be made to bear against the upper surface of the valve. This operation of the lever 47 is also deemed advisable whenever the alarm is to be sounded at a distant point by the operator blowing into the mouth-piece 36, as in this event it is desirable that none of the air forced into the tube 35 should escape upward into the box 10.

Upon the front face of the box a horizontal shaft 50 is journaled, provided with a weight 51 at one end and an indicating-card 52 secured to its center, the upper portion of which card is bent over upon itself at a right angle to its body and notched, as illustrated at 53 in Figs. 1 and 3. Upon the back of the card the number of the indicator-box is produced, and normally the card is thrown upward until its upper bent portion extends over the top of the box, whereupon the blank side of the card is exposed to view, and the walls of the notch 53 in the card are engaged by an arm 54, projected forwardly from the hammer. When the hammer commences to vibrate to sound the alarm, the rod 54 is also vibrated, and is shaken thereby from contact with the indicating-card, and the said card is permitted to drop. This indicating-card attachment is a very important one where a series of indi-

cators are employed leading to various rooms in a building—as, for instance, in a hotel, warehouse, or other establishment where such instruments are employed.

The back 55 of the box is preferably made to slide from the body, in order that the mechanism may be repaired when necessary, and is usually attached, as illustrated in Fig. 4, by means of a button 56, loosely mounted upon a pin secured within a recess produced upon the inner face of the back near one end. Near the other edge of the inner face of the back a pin 57 is secured, adapted for contact with a spring 58, secured to one inner side of the box 10. To place the back in position upon the body of the box, the face of the box is turned uppermost and the inner face of the back or cover carried to the same position, whereupon the button 56 will drop down in the recess of the back or cover flush with its inner face. The back or cover is then slid to place, the pin holding the disk passing through a suitable slot 59 in the body, (illustrated in Fig. 2,) and the pin 57 passes the spring 58 and contacts with its outer surface, as shown in Fig. 4. When the box is again brought to an upright position, the button 56 falls out to contact with the head of the pin supporting it, and also contacts with the inner face of the box adjacent thereto. Thus while the box 10 is in this upright position the back, lid, or cover cannot under any possibility be removed unless force be employed.

In operation, if a party desires to signal to another in a room quite distant, which room is provided with an indicator like that above described, by blowing in the mouth-piece the air forces the valve 45 upward and releases the escapement, permitting the spring to act and set the train of gearing in motion. The alarm is thus sounded by the hammer 27 contacting with the bells, and the movement of the train of gearing is augmented by the weight of the receiver 32. As the train of gearing operates, the outer and horizontal member of the crank-arm 29, carrying the receiver, drops downward, and when the party answering the alarm removes the receiver 32 and carries the said horizontal member of the crank-arm upward the main shaft 11 is revolved in a direction contrary to that which it travels when sounding the alarm, and the spring is thereby rewound for use upon another occasion.

It is very obvious that the alarm will be sounded as long as the operator continues to blow in the tube connected with the indicator. The reticulated diaphragm 40 is placed in the cut-off, in order that when the party answering the alarm speaks through the mouth-piece 36 the sound can freely travel through the diaphragm, and yet the air will be retarded or prevented, substantially, from entering the tube, and thereby interfering with or unseating the valve 45 in the indicator and sounding an alarm. By pressing upon the lever 47, however, and causing it to contact with the face of the valve 45, the cut-off may be entirely opened if the party at the other end of the line does not hear distinctly with the said cut-off in its normal position. A reticulated diaphragm is also placed in the receiver for a similar purpose. In connection with this indicator any known system of piping may be employed; but I prefer to use the system illustrated in Fig. 5. In this figure the tubes are shown arranged for a five-story building, all the tubes D, D′, D^2, and D^3 having their lower ends located in the first story, the upper extremities being located, respectively, one in each of the upper stories. The main tubes D, D′, D^2, and D^3 are all united in the first story by a cross or branch pipe or pipes *d*, and each main tube at its lower end is provided with a valve *d′* of any approved construction. A valve d^2 is likewise placed in the cross tube or tubes between each of the main tubes, and the intermediate main tubes D′ and D^2 are also provided above the cross tube or tubes with a valve d^3.

By locating the valves as shown and described a person or persons in the first story may communicate with any of the upper stories, or any two stories in the building may be readily placed in communication—for instance, if a person in the second story desires to communicate with one in the third, by signaling the operator in the first story the valves *d′* of all the main tubes are closed, likewise the valve d^2 in the cross-tube between the main tubes D′ and D^2, and the valve d^3 in the main tube D^2 and the valve d^2 in the cross-tube between the main tubes D^2 and D^3 are opened.

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

1. In a pneumatic telephone or speaking-tube indicator, the combination, with a train of gearing provided with a spring-actuated main shaft, a crank-arm secured to said shaft, an escapement having its upper member weighted, and a valve controlling the movement of the escapement, of a system of tubing comprising main tubes of various lengths, having a valve at one end and connected with the indicator at the other end, and provided with a second valve between their extremities, cross-tubes connecting the main tubes, and a valve located in the cross-tubes between the several main tubes, substantially as and for the purpose specified.

2. In a pneumatic telephone or speaking-tube indicator, the combination, with a train of gearing, substantially as described, provided with an actuating-shaft controlled by a spring attached to the said shaft and coiled around the same, and also attached to the frame containing the gearing, of a crank-arm secured to the said shaft, an escapement having its upper member weighted, and a valve controlling the movement of the escapement, all combined for operation as set forth.

3. In a pneumatic telephone or speaking-

tube, the combination, with a train of gearing, substantially as described, provided with an actuating-shaft controlled by a coil-spring secured thereto and to the frame containing the gearing, of a crank-arm rigidly secured to one end of the spring-actuated shaft, an escapement having its upper member weighted and provided with a downwardly-extending rod or arm, a valve provided with a shoulder capable of contact with the said escapement arm or rod, and a weight suspended from the horizontal member of the crank-arm, as set forth, whereby when the escapement rod or arm is released the train of gearing will be automatically set in motion, and when the weight is removed from the crank-arm and the said arm elevated the spring controlling the gearing will be automatically rewound, substantially as shown and described.

4. In a pneumatic telephone or speaking-tube, the combination, with a box containing a train of gearing, substantially as described, a shaft actuating the said gearing, controlled by a coil-spring attached thereto and to the casing inclosing the gearing, and a crank-arm secured to one end of the said spring-actuated shaft and adapted to sustain a weight, of an escapement having its upper member weighted and an arm projected downward from the said member, and a valve hinged in the box and covering an opening therein, and provided with a shoulder capable of receiving the lower end of the escapement-rod, all combined for operation substantially as shown and described.

5. In a pneumatic telephone or speaking-tube, the combination, with a box containing a train of gearing, substantially as described, a shaft actuating the said gearing and controlled by a coil-spring attached thereto and to the casing inclosing the gearing, of an escapement having its upper member weighted and an arm projected downward from the said member, a valve hinged in the box and covering the opening therein, and provided with a shoulder capable of receiving the lower end of the escapement-rod, and a spring-actuated lever fulcrumed in the face of the box, having a curved inner end and provided with a knob or button upon its outer extremity, said lever being capable of retaining the valve in a closed position when pressed inward, as and for the purpose specified.

6. In a pneumatic telephone or speaking-tube, the combination, with a box containing a train of gearing, substantially as described, a shaft actuating the said gearing and controlled by a coil-spring attached thereto and to the casing inclosing the gearing, and a crank-arm secured to one end of the said spring-actuated shaft, adapted to sustain a weight, of an escapement provided with an upper weighted member and a rod or bar curved downward therefrom within the box, a tube projected upward within the box, a valve hinged in the bottom of the box, normally closing the mouth of the said tube and provided with a shoulder capable of contact with the lower end of the escapement-rod, bells fixed upon the upper face of the box, and a hammer located between the said bells and connected with the escapement, all combined for operation substantially as shown and described.

7. In a pneumatic telephone or speaking-tube, the combination, with a box containing a train of gearing, substantially as described, a shaft actuating the said gearing and controlled by a coil-spring attached thereto and to the casing inclosing the gearing, and a crank-arm secured to one end of the said spring-actuated shaft and adapted to sustain a weight, of an escapement having a weighted upper member and provided with a downwardly-extending rod or arm, a tube projected upward within the box, a valve hinged within the said box, closing the mouth of said tube, bells attached to the box, a hammer located between the bells and connected with the escapement, a shaft carrying an indicating-card and journaled upon the exterior of the box, and an arm projecting from the hammer and contacting with the indicating-card when the latter is in its upper vertical position, substantially as and for the purpose specified.

8. In a pneumatic telephone or speaking-tube, the combination, with an indicator-box provided with a train of gearing, the main shaft of which has attached thereto one end of a coil-spring, the other end of the said spring being secured to the casing inclosing the gearing, a crank-arm secured to the outer end of the main shaft, capable of carrying a weight upon its outer end, and an escapement having its upper member weighted and provided with a rod or arm extending downwardly from the said member, bells secured to the exterior of the box, and a hammer located between said bells and attached to the said escapement, of a tube located beneath the box, a conical branch tube projected from the main tube upward within the box, a valve hinged within the said box and covering the upper end of the conical tube, and provided with a shoulder adapted for contact with the escapement rod or arm, and a cut-off pivoted in the main tube and provided with a reticulated center, substantially as shown and described.

9. In a pneumatic telephone or speaking-tube, the combination, with an indicator-box provided with a train of gearing, the main shaft of which has attached thereto one end of a coil-spring, the other end of the said spring being secured to the casing inclosing the gearing, a crank-arm secured to the outer end of the main shaft, and an escapement having its upper member weighted and provided with a rod or arm extending downwardly from the said member, bells secured to the exterior of the box, and a hammer located between said bells and attached to the said escapement, of a tube located beneath

the box, a conical branch tube projected from the main tube upward within the box, a valve hinged within the said box and covering the upper end of the conical tube, and provided with a shoulder adapted for contact with the escapement rod or arm, a cut-off pivoted in the main tube and provided with a reticulated center, a tube projected from the conical branch, a receiver provided with a bail for attachment to the outer end of the crank-arm, and a flexible tubular connection between said receiver and the branch tube, all combined for operation substantially as and for the purpose specified.

10. In a pneumatic telephone or speaking-tube, the combination, with a tube and a mouth-piece secured in said tube, of a cut-off pivoted in the tube to the rear of the mouth-piece, having a center of reticulated material, substantially as described, and for the purpose specified.

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Witnesses:
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