No. 840,194. PATENTED JAN. 1, 1907.

B. C. BATCHELLER.

PNEUMATIC TUBE SYSTEM.

APPLICATION FILED MAY 1, 1905.

3 SHEETS—SHEET 1.

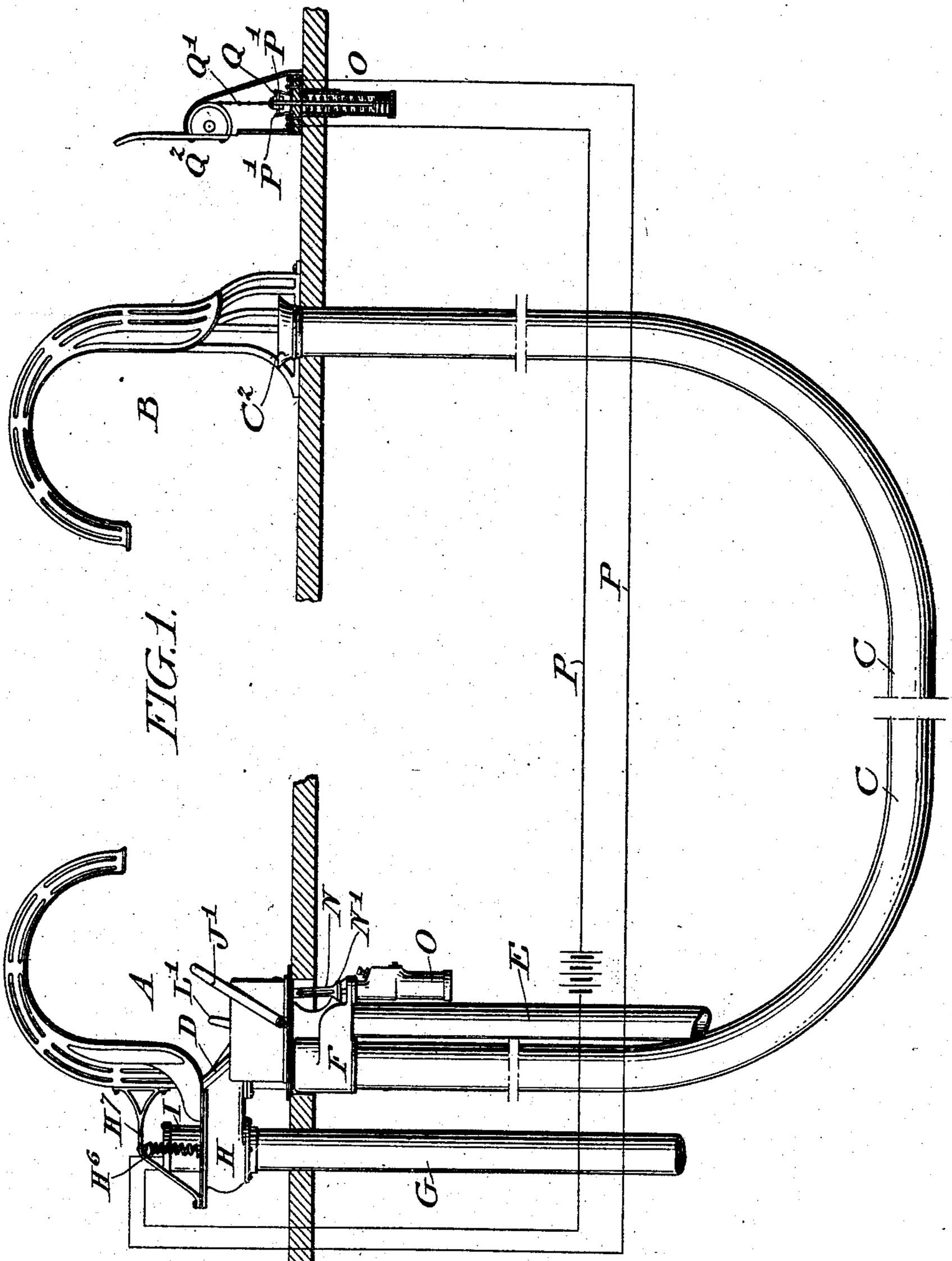

FIG. 1.

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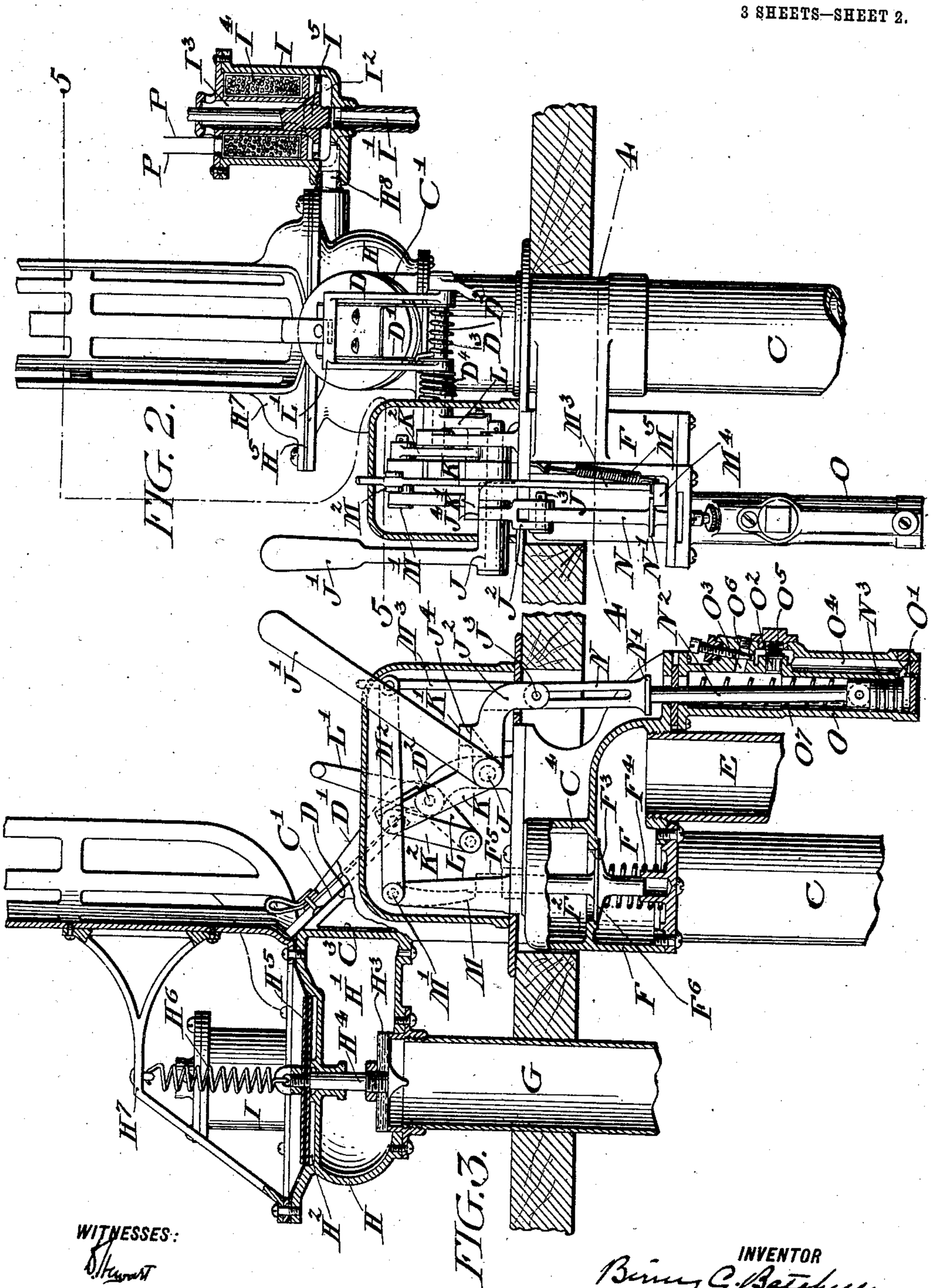

FIG. 2.

FIG. 3.

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3 SHEETS—SHEET 3.

FIG. 4.

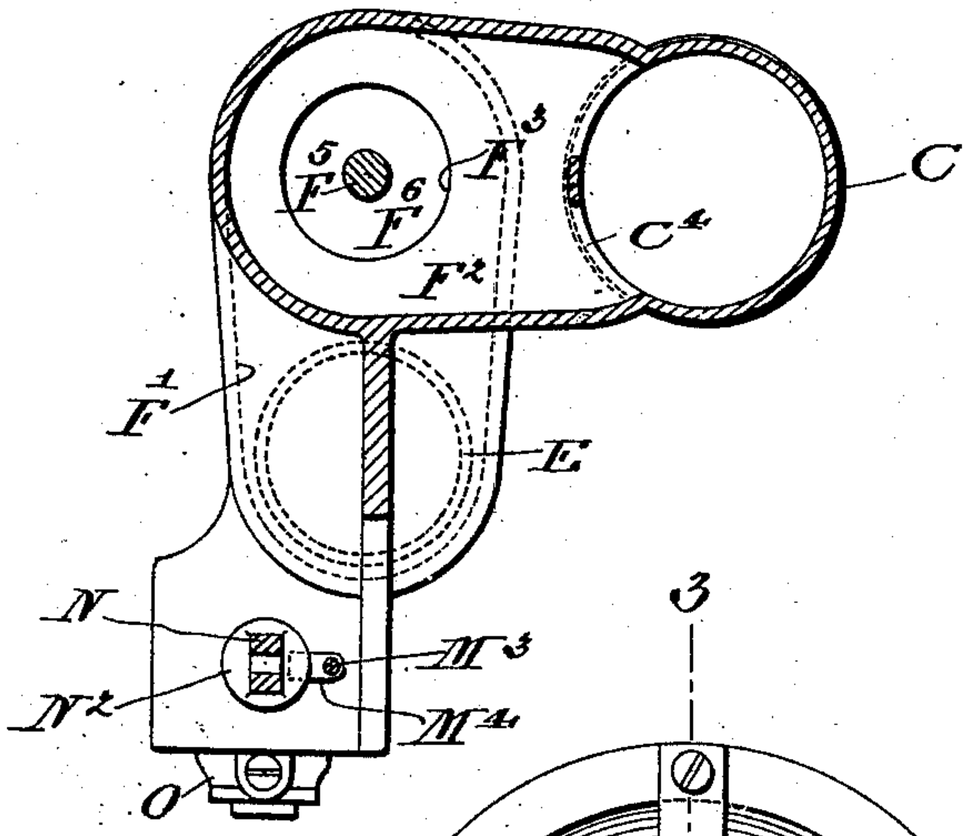
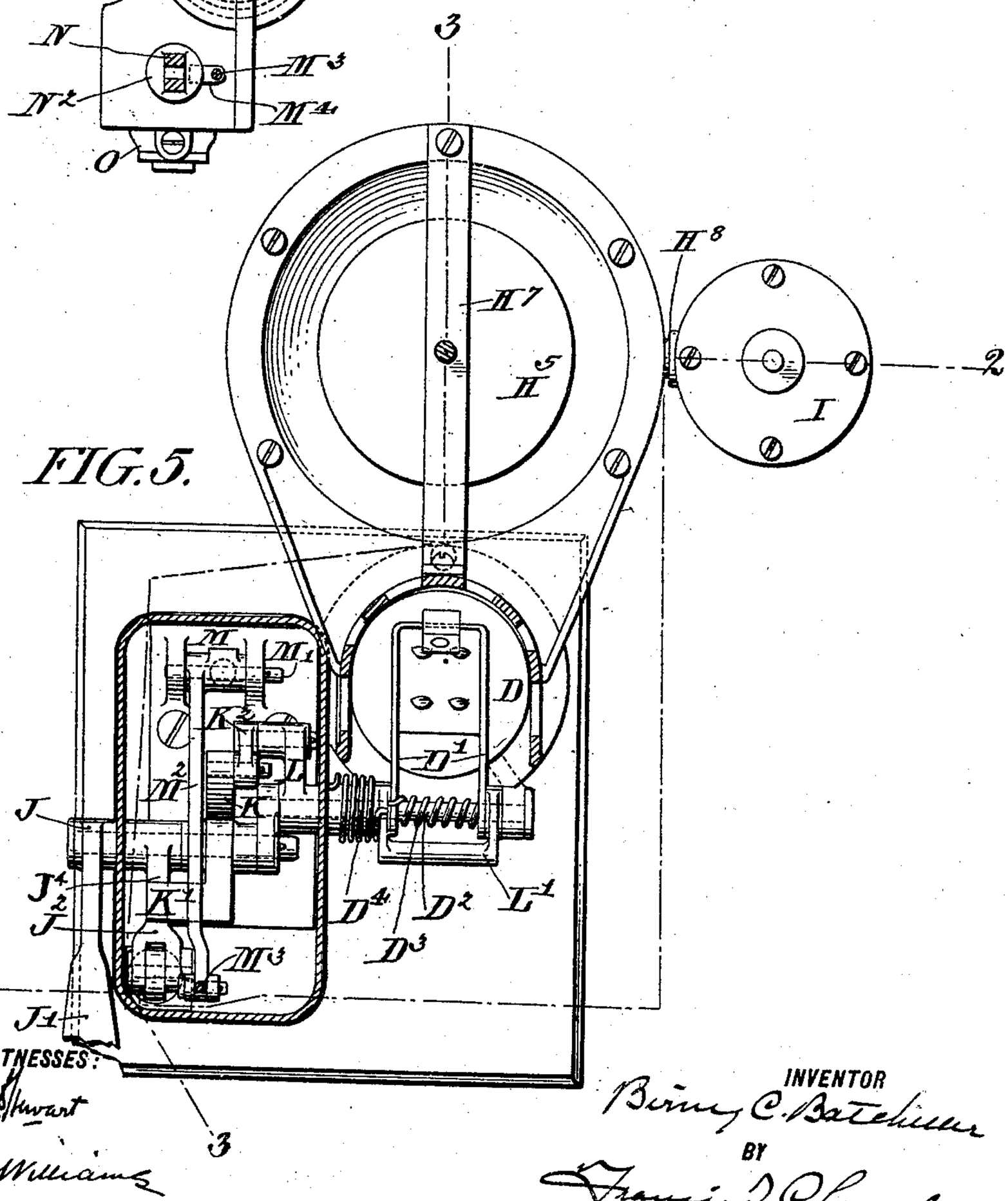


FIG. 5.



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BIRNEY C. BATCHELLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PEARSALL PNEUMATIC TUBE AND POWER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PNEUMATIC-TUBE SYSTEM.

No. 840,194. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed May 1, 1905. Serial No. 258,290.

To all whom it may concern:

Be it known that I, BIRNEY C. BATCHELLER, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Pneumatic-Tube Systems, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to an improved pneumatic-tube system adapted to operate both as a pressure and vacuum system, the object of my invention being to provide for the operation of the system from one station as a pressure system and from a connected station as a vacuum system, also to provide improved mechanism for the operation and regulation of the system as a whole.

Broadly speaking, my invention consists in providing a system of the kind indicated with means for actuating it as a pressure system at one station and with means for actuating it as a vacuum system controlled and operated from the other connected station.

The nature of my improvements as a whole will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a side elevation indicating the general character of the system. Fig. 2 is a front view of the valves and valve-actuating mechanism at the home station, shown on the section-line 2 2 of Fig. 5. Fig. 3 is a side elevation of the same appliances, shown on the section-line 3 3 of Fig. 5. Fig. 4 is a cross-sectional view on the line 4 4 of Fig. 2; and Fig. 5, a plan view, partly sectioned, on the line 5 5 of Fig. 2.

A and B indicate two connected stations, C being the pneumatic tube connecting said stations. The end C′ of the tube at station A, or the home station, is indicated as beveled to afford a seat for the flap-valve, (indicated at D,) D′ indicating the hinge-arms to which the valve is attached, while the end C^2 at station B is normally open. The tube C at the home station connects, through lateral ports C^3, with a chamber H′ of a casing H, which is formed with a diaphragm-chamber H^2 at its top and which is in communication with the upper end of a vacuum pipe or reservoir G. The valve H^3 normally closes the mouth of the vacuum-pipe and is connected, through a spindle H^4, with the diaphragm H^5, which extends across the diaphragm-chamber H^2 and is drawn upwardly a spring H^6, fastened to a bracket H^7. The vacuum-chamber H^2 connects, through a port H^8, (see Fig. 2,) with a chamber I^2 of a casing I, the lower portion of which connects, through a pipe I′, with a vacuum-reservoir (not shown) and through a port I^3 with the atmosphere.

I^5 is a valve which when drawn up closes the port I^3 and when allowed to fall closes the vacuum-pipe I′, and I^4 indicates an electromagnet acting on the valve is an armature and connected with the circuit-wires P P, which wires extend to the station B and are there connected with spring-terminals P′ P′, normally connected by a plate Q, drawn toward and held in contact with the spring-terminals by a time escapement device, (indicated at O,) the contact-plate being drawn up and the time escapement set in operation through a lever Q^2 and chain Q′.

The electromagnetic mechanism shown and the general system of which it forms a part form the subject-matter of my copending applications for Letters Patent, Serial No. 251,208, filed March 21, 1905, and Serial No. 249,569, filed March 11, 1905, and are therefore not specifically claimed in the present application.

At the home station the tube is also connected, through lateral passages, (indicated at C^4,) with a chamber F^2 of a casing F, said casing having also a chamber F′, which is in constant communication with a pressure or supply pipe E, the chambers F′ and F^2 communicating through the valve-seated port F^3. The valve F^6 normally closes this port, being held to its seat by a spring F^4, and the valve is provided with a spindle F^5, which projects up through the casing and through which the valve is opened.

J′ is a hand-lever pivoted on or to the shaft J and having a lever extension J^2, which connects, through a pin J^3, with the slotted head N of the time escapement mechanism to be described. The lever or its arm J^2 has also attached to it the laterally-extending arm J^4, placed to contact with a finger or arm K′ of a lever-arm K, which is pivoted on the shaft J, and connected at its outer end with a link K^2, which in turn is pivotally connected to a le-

ver-arm L, pivoted on an extension of the pivot-pin D^2 of the flap-valve D and having connected to it the locking-lever L′.

M is a latch adapted to engage the end of the lever-arm K when it is turned down to a horizontal position, the latch being pivoted at M′ and having a laterally-extending arm M^2, which is connected to a rod M^3, having a laterally-extending finger M^4 arranged in the path of the shoulder N′, M^5 being a spring which tends to draw up the rod M^3 and to hold the latch-lever M in engaged position.

The slotted head N, having the shoulder N′ at its bottom, is attached to the upper end of the piston-rod N^2, the piston N^3 moving in the time escapement cylinder O and being pressed downward by a spring O′. The cylinder O has a lower port O′ connecting, through a lateral passage O^4, with an intermediate port O^2, closed by a spring-valve O^5, and with an upper restricted port O^3, the orifice of which is regulated by an adjusting-needle O^6.

It will be undertsood that in a system of this kind the end of the tube at the home station must be normally closed against the passage of either compressed air or air at atmospheric pressure. This may be accomplished in many ways; but it is simply and efficiently accomplished by the provision of the flap-valve D, normally held to its seat by light spring-pressure, such a spring being indicated, for instance, at D^3, Fig. 5, while a locking-lever L′ is provided to hold the valve D positively closed at certain times, D^4 in the same figure indicating a spring which normally holds the locking-lever L′ in non-operative or retracted position, as shown in Fig. 3. When it is desired to send a carrier from the home station to the outer station B, the operator raises the flap-valve D and inserts the carrier into the end of the tube, the valve closing after the insertion. The operator then turns the lever J′ toward the left, the arm J^4 impinging against the finger K′ of the lever K and turning this lever downward and through the link K^2 and connected arm L turning the locking-lever L′ down on the flap-valve D, the motion being comparatively rapid at the beginning and as the lever-arm K and link K^2 approach parallelism the force being greatly increased, so that finally the flap-valve is held positively locked to its seat. The downward motion of the lever-arm K brings it finally into contact with the valve-spindle F^5, opening the pressure-valve F^6, and at the end of its movement the lever K is engaged in practically horizontal position by the latch-lever M. The described movement of the lever-arm J′ also effects a lifting movement of its connected arm J^2, which draws up the piston of the time escapement device, the fluid in the top of the cylinder O escaping freely through the spring-valve O^5, and when the air-valve has been latched open the arm J′ can be turned back to normal non-operative position without affecting any of the parts which it has moved in its working stroke. The admission of compressed air by the opening of the valve F^6 propels the carrier to the out station, and of course the time escapement device is operating, the piston N^3 moving downward while the carrier travels, the fluid in the bottom of the cylinder O escaping gradually upward through the restricted port O^3 until finally the shoulder N′ of the piston-rod comes in contact with the finger M^4 of the rod M^3, drawing it downward and throwing the latch-lever M out of engagement with the end of the lever K, whereupon the valve F^6 closes and the locking-lever L′ moves out to its normal non-operative position.

When it is desired to send a carrier from the out station to the home station, the operator at the out station inserts the carrier in the end C^2 of the tube and then turns the lever Q^2, setting the time-escapement O at the out station and through the plate Q opening the circuit through the wires P P, with the result that the electromagnet I^4 is deënergized and the valve I^5 moves downward, opening the port I^3 and closing the vacuum-pipe I′. This permits atmospheric air to enter through the port I^3, chamber I^2, and port H^8 into the diaphragm-chamber H^2, whereupon the spring H^6 raises the diaphragm H^5, and the connected vacuum-valve H^3, the vacuum communicating, through the ports C^3, with the tube and causing the flow of air from the out station to the in station, with consequent transmission of the carrier, which on arrival at the home station impinges against and opens the flap-valve D, the time escapement at the out station in the meanwhile gradually bringing the circuit-closing plate to operative position in contact with the spring-terminals P′, the contact restoring the current through the wires P P and energizing the magnet I^4, so that the valve I^5 is drawn up, closing the port I^3, opening the vacuum-pipe I′, drawing down the diaphragm, and closing the valve H^3. The air is admitted to the chamber H′ by the opening of the flap-valve D and of course aids in closing the vacuum-valve.

The specific mechanism shown is well adapted for the purposes had in view and described, but is not essential to the broad utilization of my invention, and I therefore do not wish to be understood as in any way limiting my claims on such specification except where it is especially and clearly referred to in the claims as limiting elements therein.

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

1. A pneumatic-tube system comprising a transmission-tube, in combination with com-

pressed-air and vacuum supply chambers connected to one end of said tube, normally closed valves for controlling the connection of said supply-chambers with the tube, means for closing the end of the tube which is connected with the supply-chamber to the passage of outer air, means for opening the compressed-air-supply valve situated and actuated at the end of the tube which is connected with the supply-chambers and means for opening the vacuum-supply valve having actuating means located at the other end of the tube.

2. A pneumatic-tube system comprising a transmission-tube, in combination with compressed-air and vacuum supply chambers connected to one end of said tube, normally closed valves for controlling the connection of said supply-chambers with the tube, means for closing the end of the tube which is connected with the supply-chamber to the passage of outer air, means for opening the compressed-air-supply valve situated and actuated at the end of the tube which is connected with the supply-chambers, means for opening the vacuum-supply valve having actuating means located at the other end of the tube, and means for closing the open supply-valves after a carrier has passed through the tube.

3. A pneumatic-tube system comprising a transmission-tube, in combination with compressed-air and vacuum supply chambers connected to one end of said tube, normally closed valves for controlling the connection of said supply-chambers with the tube, means for closing the end of the tube which is connected with the supply-chamber to the passage of outer air, means for opening the compressed-air-supply valve situated and actuated at the end of the tube which is connected with the supply-chambers, means for opening the vacuum-supply valve having actuating means located at the other end of the tube and time escapement means for closing the open supply-valves set in operation by the means employed to open said valves.

4. In a pneumatic-tube system adapted to operate both as a pressure and vacuum system and having pressure and vacuum supply chambers connected to one end thereof, the combination therewith of normally closed valves controlling the pressure and vacuum connections, a flap-valve D, at the end of the tube, normally held closed by resilient means, means located and actuated at the valved end of the tube for opening the pressure-supply valve and locking the flap-valve and means for opening the vacuum-valve actuated from the other end of the tube.

5. A pneumatic-tube system comprising a transmission-tube, in combination with compressed-air and vacuum supply chambers connected to one end of said tube, normally closed valves for controlling the connection of said supply-chambers with the tube, a gate-valve at the end of the tube which is connected with the supply-chambers, means for opening the compressed-air-supply valve and for locking the gate-valve situated and actuated at the end of the tube which is connected with the supply-chambers and means for opening the vacuum-supply valve having actuating means located at the other end of the tube.

6. In a pneumatic-tube system adapted to operate both as a pressure and vacuum system and having pressure and vacuum supply chambers connected to one end thereof, the combination therewith of normally closed valves controlling the pressure and vacuum connections, a flap-valve D, at the end of the tube normally held closed by resilient means, a pivoted lever K, arranged when actuated to open the pressure-valve after moving through a determined angle, a flap-valve locking-lever L′, having a lever-arm L, extending from it, a link K^2, connecting arm L, and lever K, as described, a latch for holding lever K, and connected parts in position to keep the pressure-valve open, a time escapement device for releasing the latch and manually-operated means for actuating lever K, and setting the time escapement in operation.

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