No. 812,271. PATENTED FEB. 13, 1906.

J. S. JACQUES.

PNEUMATIC DESPATCH TUBE SYSTEM.

APPLICATION FILED MAY 24, 1905.

4 SHEETS—SHEET 1

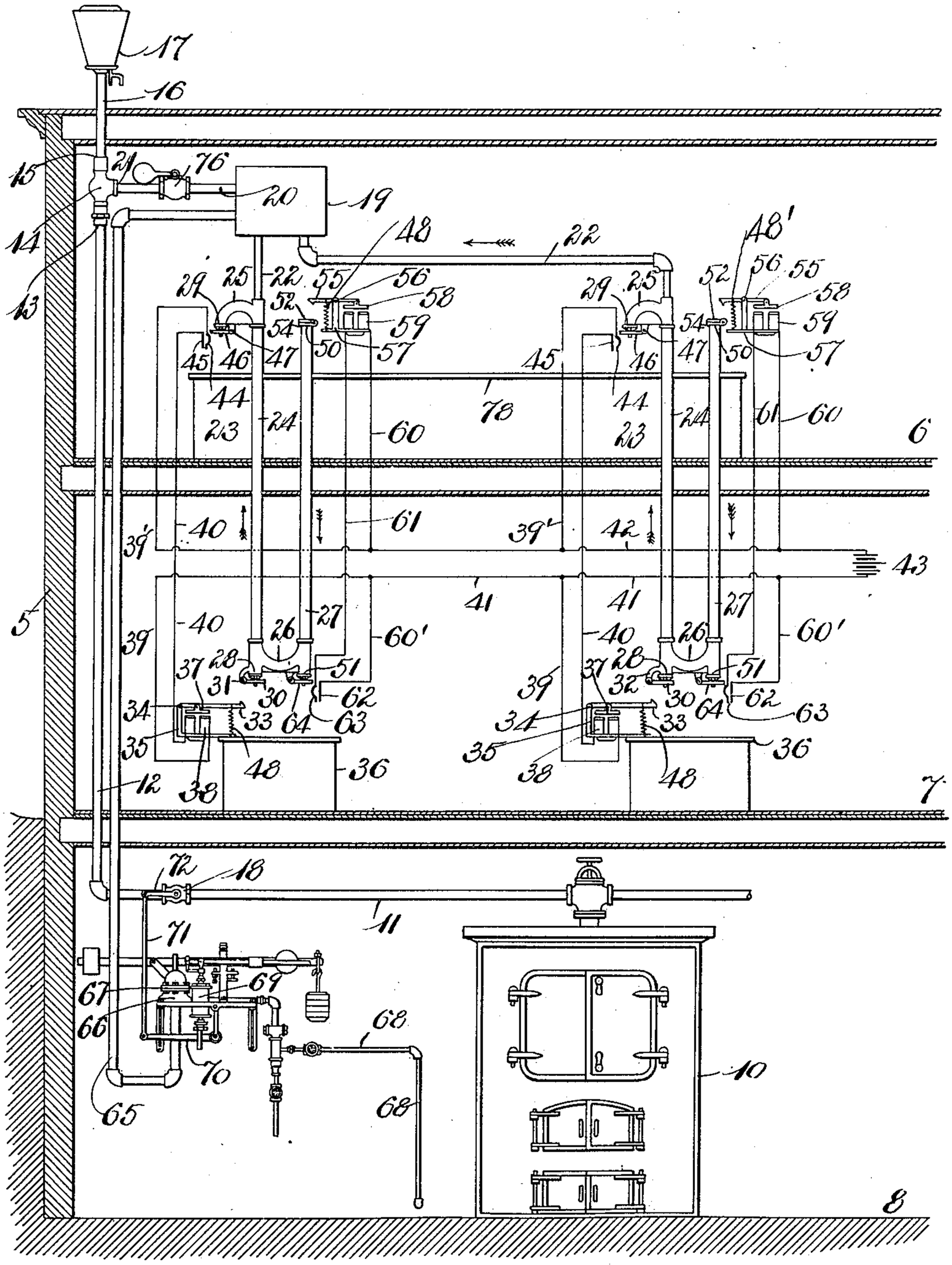

Fig. 1.

Witnesses:
James A. Jones
William C. Glass.

Inventor:
John S. Jacques
by his attorney Charles S. Fooding

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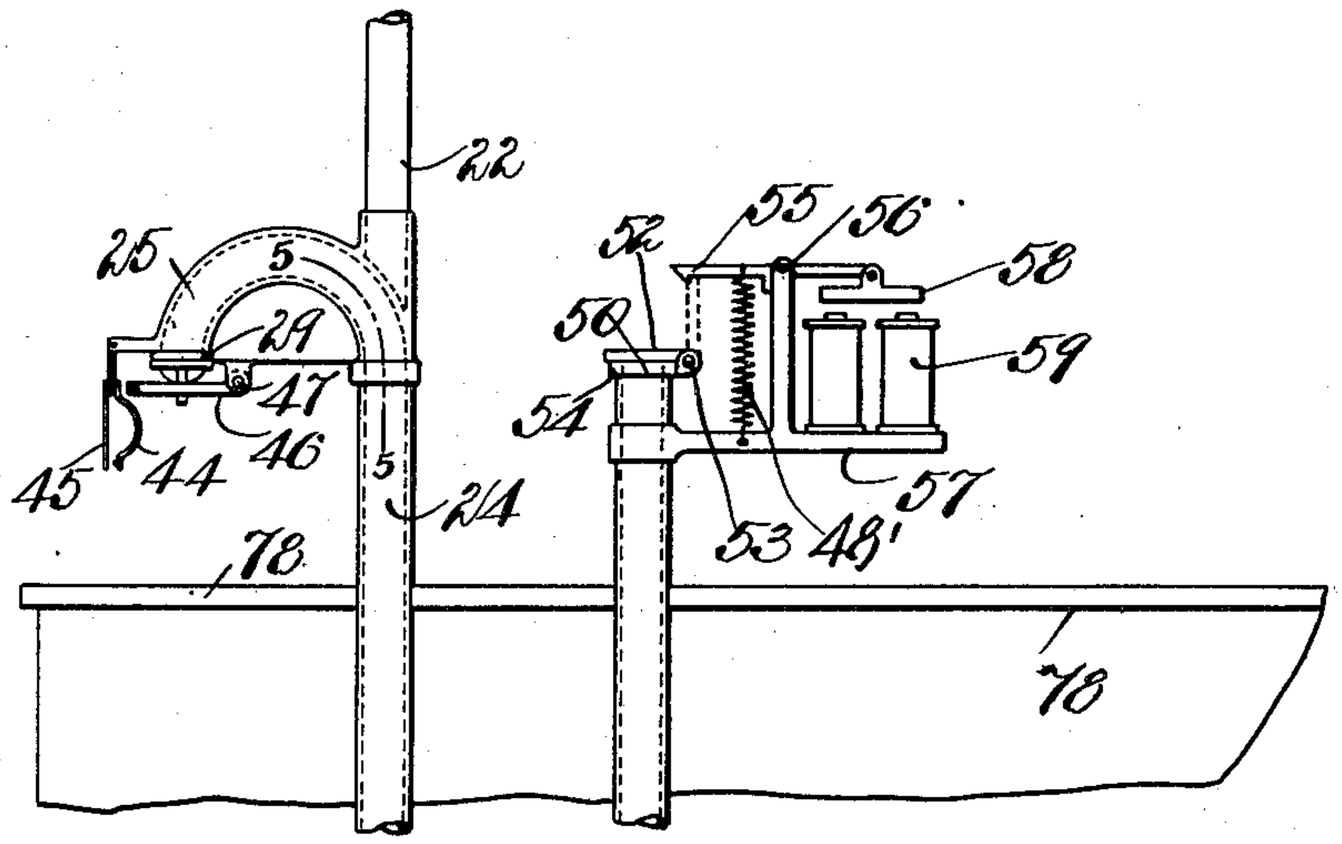
4 SHEETS—SHEET 2.



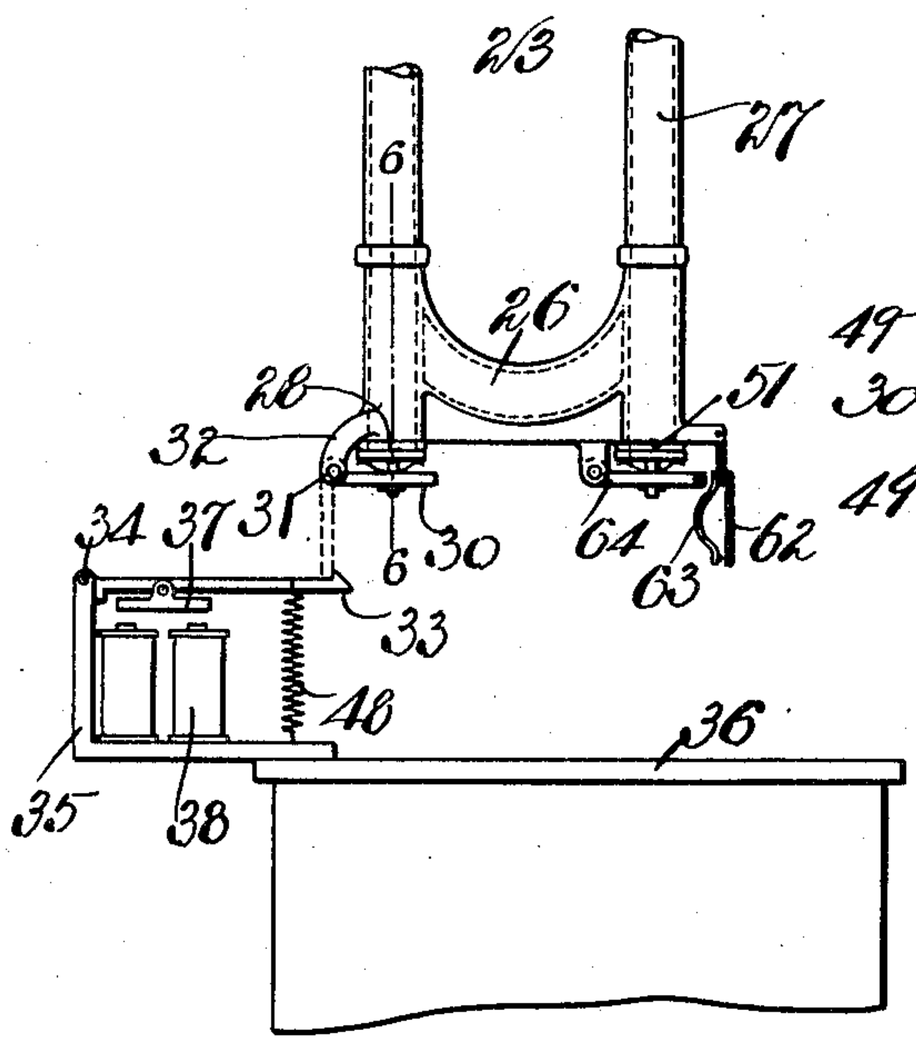


Fig. 2.

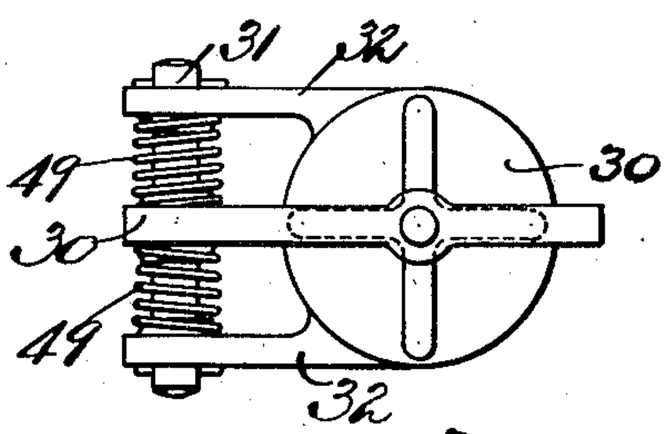


Fig. 3.

Witnesses:
Louis A. Jones.
William C. Glass.

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John S. Jacques,
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4 SHEETS—SHEET 3.

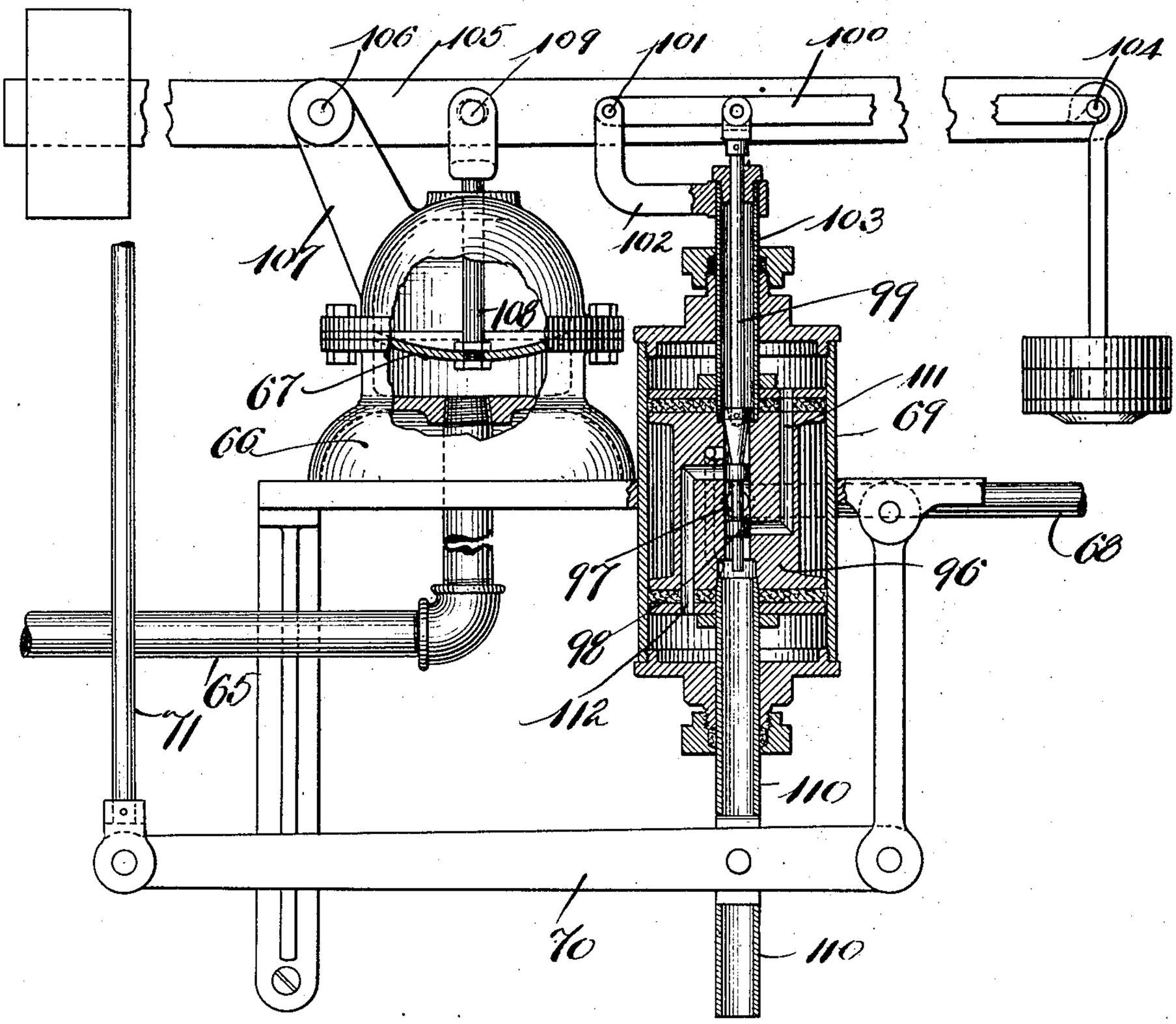

Fig. 4.

Witnesses:
Louis A. Jones.
Ernest A. Telfer.

Inventor:
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4 SHEETS—SHEET 4.

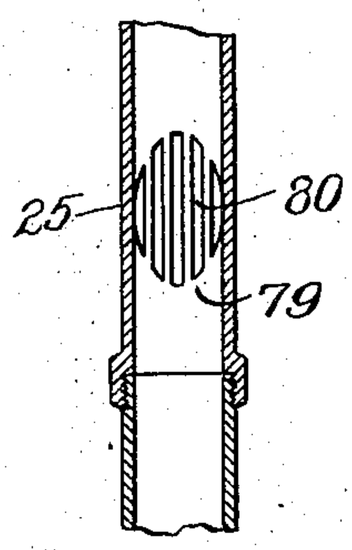

Fig. 5.

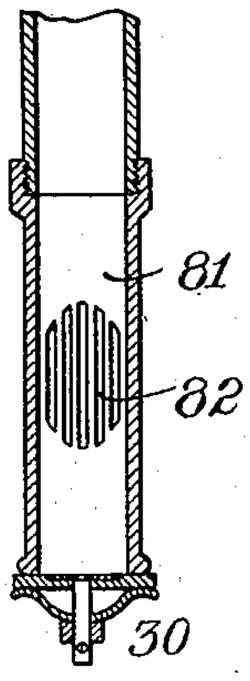

Fig. 6.

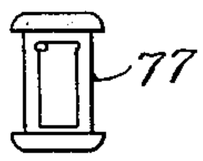

Fig. 7.

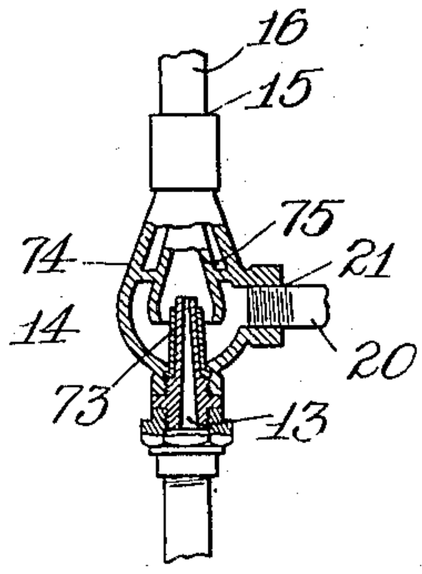

Fig. 8.

Witnesses:
Louis A. James.
Ernest A. Telfer

Inventor:
John S. Jacques
by his attorney, Charles B. Gooding.

UNITED STATES PATENT OFFICE.

JOHN S. JACQUES, OF DORCHESTER, MASSACHUSETTS.

PNEUMATIC-DESPATCH-TUBE SYSTEM.

No. 812,271. Specification of Letters Patent. Patented Feb. 13, 1906.

Application filed May 24, 1905. Serial No. 261,963.

To all whom it may concern:

Be it known that I, JOHN S. JACQUES, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Pneumatic-Despatch-Tube Systems, of which the following is a specification.

This invention relates to an improved pneumatic-despatch-tube system, the object of the invention being to provide a simple, cheap, and efficient system whereby carriers containing money or other articles may be moved from one place to another by means of a vacuum which is produced in the tubes of the system, as hereinafter fully described.

The device of my invention is particularly adapted for use in store-service cash-carrier systems.

The invention consists in the combination of an ejector with a system of tubes, as hereinafter described, whereby a vacuum may be produced in said tube system which, properly controlled by devices and mechanism hereinafter described, causes a carrier inserted at the inlet-orifice of one of said tubes to pass through said tube and be delivered at the outlet-orifice of said tube.

The invention further consists in the combination and arrangement of parts set forth in the following specification, and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a front elevation of my improved despatch-tube system, showing the same in position in relation to the different floors of a building, said building being shown in section and broken away to save space in the drawings. Fig. 2 is an enlarged front elevation of the transmission and return tubes of a portion of my system, the same being broken away to save space in the drawings and shown in connection with a portion of a cashier's desk and sales-counter. Fig. 3 is an underneath plan of the transmission terminal valve for the inlet-orifice thereof. Fig. 4 is an enlarged front elevation, partly broken away and shown in section, of the diaphragm-regulator mechanism. Fig. 5 is a sectional elevation taken on line 5 5 of Fig. 2. Fig. 6 is a sectional elevation taken on line 6 6 of Fig. 2. Fig. 7 is a side elevation of one of the carriers. Fig. 8 is an enlarged sectional elevation of the ejector.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, referring to Figs. 1, 2, and 3, 5 is the wall of a building; 6, 7, and 8, the different floors thereof. 10 is a boiler of any suitable design and construction, and 11 a steam-pipe leading from said boiler to the stand-pipe 12. The stand-pipe 12 is connected to the inlet-orifice 13 of an ejector 14. The outlet-orifice 15 of said ejector is connected by a pipe 16 to an exhaust-head 17. A throttle-valve 18 is inserted in the pipes connecting the boiler 10 with the ejector 14, and said throttle-valve is opened or closed automatically to supply steam to the ejector 14 by mechanism hereinafter described, said mechanism being operated to open or close said throttle-valve, according as the vacuum increases or diminishes in the vacuum tank or reservoir 19. This vacuum-tank 19 is connected by a pipe 20 to an orifice 21, provided in the ejector 14 intermediate the inlet and outlet orifices thereof, and said vacuum-tank is connected by pipes 22 22 to the different systems of pneumatic-despatch tubes 23 23. Each of these systems is substantially a duplicate of the other, and a description of one will therefore suffice for all of said systems. By reference to Figs. 2 and 3 it will be seen that the pipe 22 is connected to a transmission-tube 24, which at its upper end is provided with a transmission-terminal 25 and at its lower end is fastened to a U-shaped connection 26. The return-tube 27 is also fastened to said U-shaped connection. The transmission-tube 24 has an inlet-orifice 28 and an outlet-orifice 29. The inlet-orifice 28 is provided with a terminal valve 30, pivoted at 31 to ears 32, formed upon the U-shaped connection 26. The valve 30 may be held open by a catch-lever 33, pivoted at 34 to a bracket 35, fast to a sales-counter 36. An armature 37 is fast to the catch-lever 33 and forms, in effect, a single piece therewith, and is attracted by an electromagnet 38 in electric circuit with wires 39 39′ and 40, 41, and 42 and battery 43. The wires 39′ and 40 terminate in contact-plates 44 and 45, respectively, and these plates are brought into contact with each other by the terminal valve 46, which is adapted to close the outlet-orifice 29 of the transmission-tube 24 and is pivoted at 47 to an ear formed upon the under side of the transmission-terminal 25. A spiral compression-spring 48 holds the catch-lever 33 normally in the position illustrated in Fig. 2.

The transmission inlet terminal valve is

illustrated in detail in Fig. 3, in which it will be seen that the valve 30 is pivoted to the stud 31 midway between the ears 32 32 and is held normally in the position illustrated in Fig. 2 or in its closed position by spiral springs 49 49, which are fastened at one end to said valve and at the other ends thereof, respectively, to the ears 32 32. The return-tube 27 is provided at its upper end with an inlet-orifice 50 and at its lower end with an outlet-orifice 51. The inlet-orifice 50 is closed by means of a terminal valve 52, pivoted at 53 to ears formed upon a collar 54, fast to the upper end of the return-tube 27. When said terminal valve 52 is in the position illustrated in dotted lines, Fig. 2, it engages a catch-lever 55, pivoted at 56 to a bracket 57, fast to the return-tube 27. An armature 58 is attracted by an electromagnet 59, which is in electric circuit with wires 60 60′ and 61 41 42 and battery 43, said wires 60′ and 61 terminating in contact-plates 62 and 63, respectively. The circuit is completed by the terminal valve 64, which when it swings on its pivot presses the plate 63 against the plate 62, said terminal valve 64 being the valve which closes the outlet-orifice 51 of the return-tube 27. A spring 48′ holds the lever 55 against the valve 52 in the position shown in Fig. 2 in dotted lines.

The vacuum-tank 19 is connected by a pipe 65, Figs. 1 and 4, to a casing 66, in which is located a diaphragm 67. Water under pressure is admitted through a pipe 68 to a cylinder 69, which cylinder contains a piston 96, operated by the pressure of water entering through the pipe 68 into the valve-chamber 97 contained in said piston 96. The piston-valve 98 is constructed to move longitudinally of the valve-chamber 97 and is connected by a valve-rod 99 to a lever 100, pivoted at 101 to a bracket 102, fast to a tubular piston-rod 103, which in turn is fastened to the piston 96. The lever 100 is pivotally connected at 104 to a lever 105, pivoted at 106 to a bracket 107, fast to the casing 66. A rod 108 is pivotally connected at 109 to the lever 105 and is connected at its lower end to a suitably-weighted diaphragm 67. The piston 96 is connected by a tubular piston-rod 110 at its lower end to a lever 70, which in turn is connected by a rod 71 to an arm 72. The arm 72 opens and closes, according to the direction in which it is rocked, the throttle or shut-off valve 18. Ports 111 and 112, provided in the piston 96, lead, respectively, to the upper and lower ends of the cylinder 69 from the valve-chamber 97.

The operation of the regulating device hereinbefore specifically described is as follows: Water enters through the pipe 68 into the valve-chamber 97, and as the pressure in the vacuum-tank 19 varies the variation is communicated to the interior of the casing 66 through the pipe 65 and the diaphragm 67 is moved upwardly or downwardly, in accordance with the variation of pressure in said tank. This upward and downward motion of the diaphragm 67 is communicated by the rod 108 to the lever 105 and through the lever 105 to the lever 100, thus moving the valve-rod 99 upwardly or downwardly and allowing the water to enter from the pipe 68 through the valve-chamber 97 and through either one of the ports 111 or 112, as the case may be, thus allowing the water to enter the upper or lower end of the cylinder 69 and drive the piston 96 downwardly or upwardly therein, respectively. The piston 96 being connected by the piston-rod 110 to the lever 70, any motion of the piston will be communicated to the lever 70 and through the rod 71 to the arm 72, which opens and closes, according to the direction in which it is rocked, the throttle-valve 18, as hereinbefore described, so that when the vacuum in the tank 19 is diminished by the use of the carrier system the diaphragm 67 will be actuated by the decrease of the vacuum in the tank 19 to admit water through the pipe 68 to actuate the piston in the cylinder 69 and to rock the lever 70 to open the throttle-valve 18. When the vacuum is increased in the tank 19 to the desired amount, the pressure upon the diaphragm 67 will act to reverse the motion of the lever 70 and to close the throttle 18 and shut off the steam from the ejector 14.

The ejector 14 is illustrated in enlarged section in Fig. 8, it being understood that any of the well-known forms of siphon ejectors may be used in order to produce vacuum in a carrier system, acting upon the general well-known principle of a nozzle 73, Fig. 8, arranged to discharge steam or compressed air, as the case may be, inside a casing 74 and at the entrance to a funnel-shaped pipe 75, leading to the outlet-orifice 15, the intermediate orifice 21 being located in such position as to communicate with the interior of the casing 74, so that when the steam or compressed air discharges from the nozzle 73 into the funnel-shaped pipe 75 it will suck or draw the air into the interior of the casing 74 through the intermediate orifice 21 from the vacuum-pipe 20 and vacuum tank or reservoir 19. A check-valve 76 is inserted in the connecting-pipe 20 between the vacuum-tank 19 and the ejector 14, so that when the throttle-valve 18 is closed, as hereinbefore described, air will not enter the tank 19 through the pipe 16 and diminish the vacuum in the tank and in the tubes of the carrier system attached thereto by the pipes 22 22.

The operation of the form of my invention hereinbefore specifically described and illustrated in Figs. 1 to 4, inclusive, is as follows: A carrier 77, Fig. 7, of suitable size and form is inserted by the salesman in the transmis-

sion-tube 24 by first opening the valve 30 and moving the same into the position illustrated in dotted lines, Fig. 2, so that the catch-lever 33 holds the same open while inserting said carrier, it being assumed that the tubes of the system are supplied with the proper vacuum. Said carrier will be drawn upwardly through the transmission-tube 24 and will pass around the curved portion of the transmission-terminal 25, passing outwardly through the outlet-orifice 29, opening the valve 46, and falling into a suitable receptacle placed upon the cashier's desk 78, and as the carrier passes out of the orifice 29 and rocks the terminal valve 46 the insulated outer end of said valve presses upon the contact-plate 44 and presses it into contact with the terminal plate 45, thus completing the circuit and energizing the electromagnet 38, which then draws the armature 37 downwardly, together with the catch-lever 33, and releases the inlet-terminal valve 30, so that the spring 49 may close said valve. It will therefore be seen that when the carrier is delivered at the outlet end of the transmission-tube the terminal valve at the outlet end of said tube completes the circuit and closes the terminal valve at the inlet end of said transmission-tube. The operation of the return-tube and its terminal valves is substantially the same as hereinbefore described in relation to the transmission-tube and its terminal valves. The cashier having made the proper change inserts the carrier 77 in the upper end of the return-tube 27 by opening the inlet-terminal valve 52, moving the same from the position illustrated in full lines, Fig. 2, to that shown in dotted lines therein, the same being held in the position shown in dotted lines by engagement with a catch-lever 55, and said catch-lever is detached from engagement with the terminal valve 52 by the circuit being completed through the wires 60 and 61. As the carrier is discharged through the outlet-orifice 51 and upon the sales-counter 36 as said carrier passes through the outlet-orifice 51, the valve 64 will be opened thereby, and its insulated outer end will contact with the plate 63, moving the same into contact with the terminal 62 and completing the circuit to energize the electromagnet 59, drawing the armature 58 downwardly and rocking the catch-lever 55 to disengage the terminal valve 52. It will thus be seen that as the carrier is placed in the transmission-tube or in the return-tube and delivered to the cashier's desk or sales-counter, respectively, the tube through which the carrier is passing will be open at the rear of the carrier and closed in advance thereof until such time as the carrier passes out of the outlet-orifice of said tube, when electric connection will be made and the tube through which the carrier has just passed closed at its inlet-orifice. Each of the systems illustrated in Fig. 1 operates in the manner hereinbefore described, and a vacuum is kept in the tank 19 by the automatic opening and closing of the throttle-valve 18 by means of the mechanism hereinbefore described. It will thus be seen that steam is used only at such times as may be necessary, thus resulting in a great degree of efficiency in comparison with the amount of steam used.

The construction of the transmission-terminal 25 is illustrated in Fig. 5, in which a curved slotted partition 79 guides the carrier around the curved terminal 25 and at the same time allows the air to pass through the slots 80 in said partition. The interior construction of a portion of the U-shaped terminal 26 is illustrated in Fig. 7, in which a partition 81 is provided with slots 82, so that the carrier is prevented by said partition from passing around the curved portion of the U of said partition; but the transmission and return tubes 24 and 27, respectively, are connected one to the other through said slots 82 and through the curved portion of said U-shaped connection.

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

1. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, said tube connected to said ejector intermediate said ejector inlet and outlet orifices, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet and a catch adapted to hold one of said terminal valves open and to be operated by said electromagnet, the other of said terminal valves adapted to close the circuit of said magnet and operates said catch to release the valve held thereby.

2. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, said tube connected to said ejector intermediate said ejector inlet and outlet orifices, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves and an electromagnet having an armature formed as a catch to engage one of said terminal valves, the other of said terminal valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby.

3. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a transmission and a return tube, each of said tubes provided with an inlet and an outlet orifice, respectively, one of said tubes connected to said ejector intermediate said ejector inlet and outlet orifices, a terminal valve adapted to close each of said tube-outlet orifices, respectively, means for normally closing said valves, a connecting-tube join-

ing said transmission and return tubes together, an electromagnet and a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, one of the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby.

4. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet, and a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby.

5. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube-outlet orifices, respectively, means for normally closing said valves, an electromagnet, a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby, and a check-valve located between said vacuum-reservoir and ejector.

6. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet, a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby, and a receptacle adapted to contain steam, air, or the like under pressure connected to the inlet-orifice of said ejector.

7. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet, a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby, a receptacle adapted to contain steam, air, or the like under pressure connected to the inlet-orifice of said ejector, and a throttle-valve interposed between said ejector and receptacle.

8. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet, a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby, a receptacle adapted to contain steam, air or the like under pressure connected to the inlet-orifice of said ejector, a throttle-valve interposed between said ejector and receptacle, and mechanism to open and close said throttle-valve.

9. In a pneumatic-despatch-tube system, an ejector provided with an inlet and an outlet orifice, a despatch-tube provided with an inlet and an outlet orifice, a vacuum-reservoir connected to said despatch-tube and to said ejector intermediate the inlet and outlet orifices of said ejector, a terminal valve adapted to close each of said despatch-tube orifices, respectively, means for normally closing said valves, an electromagnet, a catch adapted to hold one of said terminal valves open, and to be operated by said electromagnet, the other of said valves adapted to close the circuit of said magnet and operate said catch to release the valve held thereby, a receptacle adapted to contain steam, air or the like under pressure connected to the inlet-orifice of said ejector, a throttle-valve interposed between said ejector and receptacle, fluid-pressure-controlled mechanism to open and close said throttle-valve, and a pipe operatively connecting said vacuum-reservoir to said mechanism, whereby said mechanism is operated and said throttle-valve opened and closed.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN S. JACQUES.

Witnesses:
JOHN W. CONVERSE,
ANNIE J. DAILEY.