No. 842,836. PATENTED JAN. 29, 1907.

J. S. JACQUES.

PNEUMATIC DESPATCH TUBE SYSTEM.

APPLICATION FILED NOV. 24, 1905.

4 SHEETS—SHEET 1.

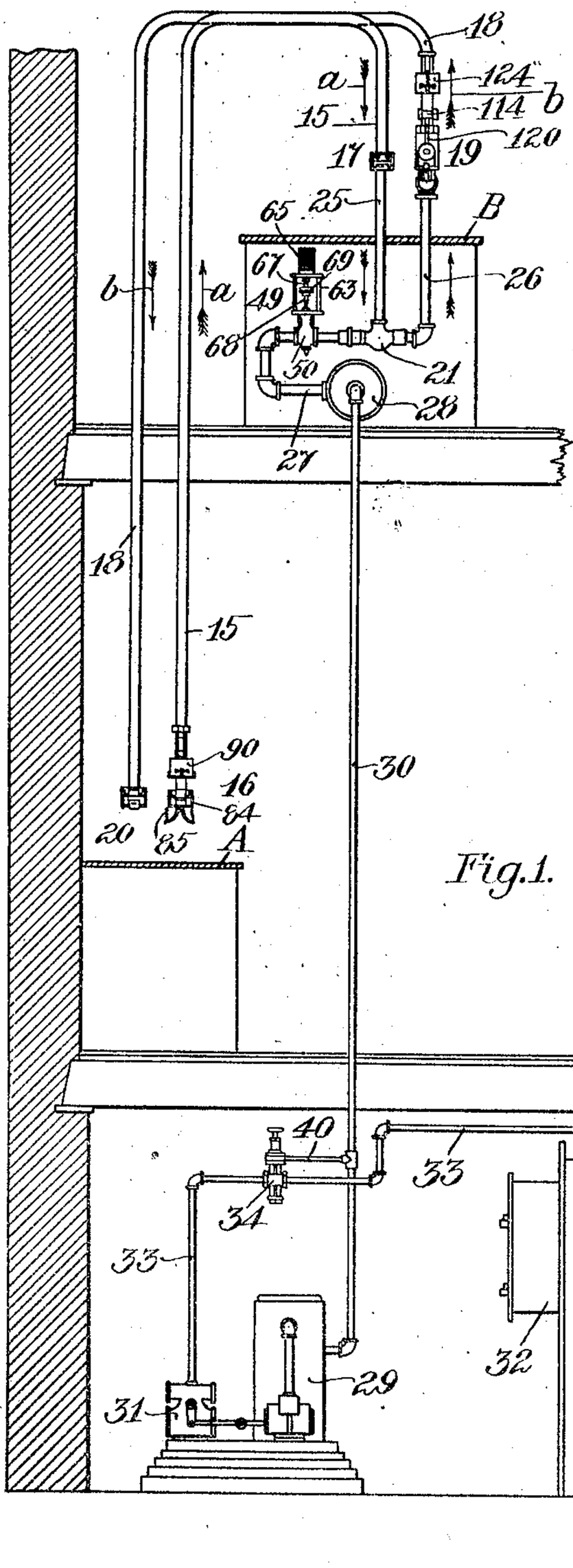

Fig. 1.

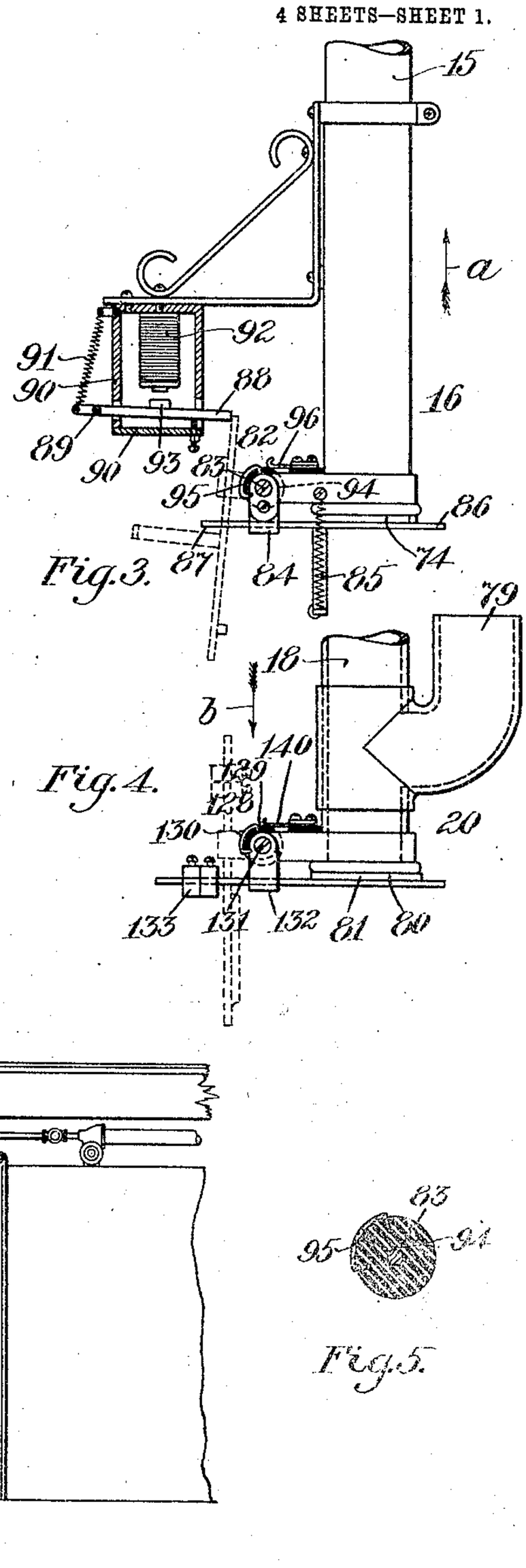

Fig. 3.

Fig. 4.

Fig. 5.

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4 SHEETS—SHEET 2.

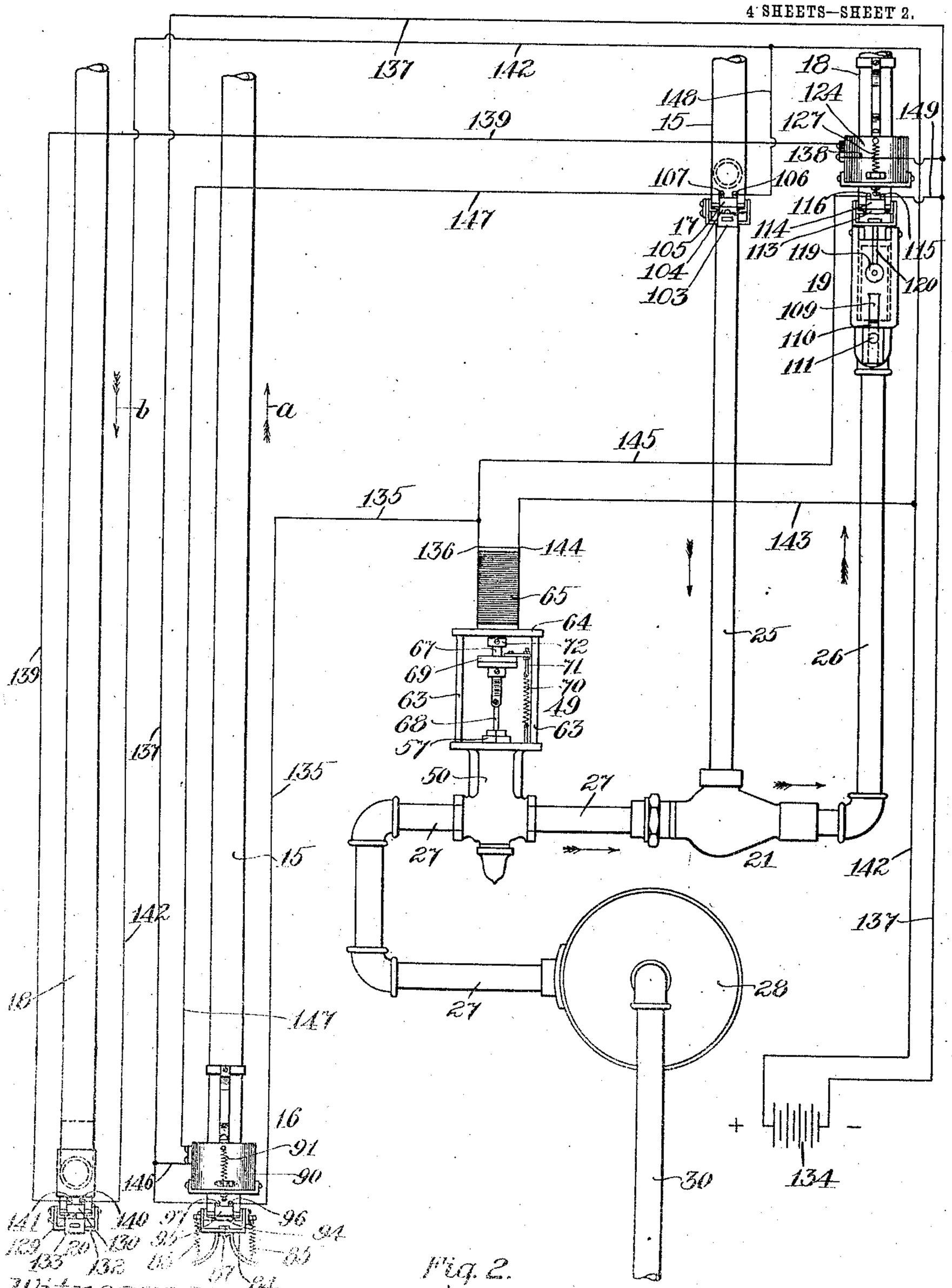

Fig. 2.

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4 SHEETS—SHEET 3.

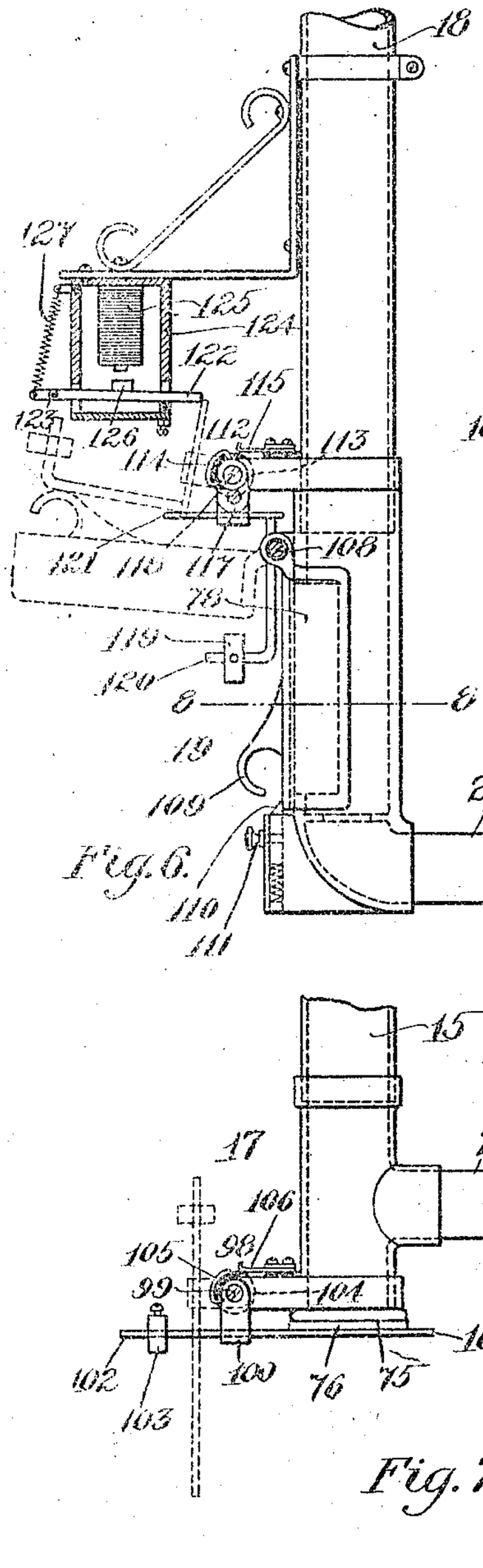

Fig. 6.

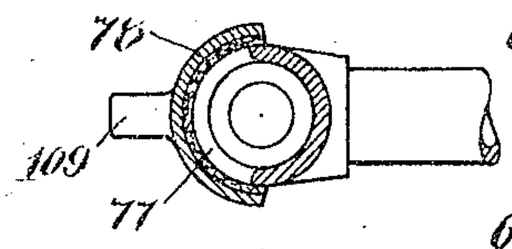

Fig. 8.

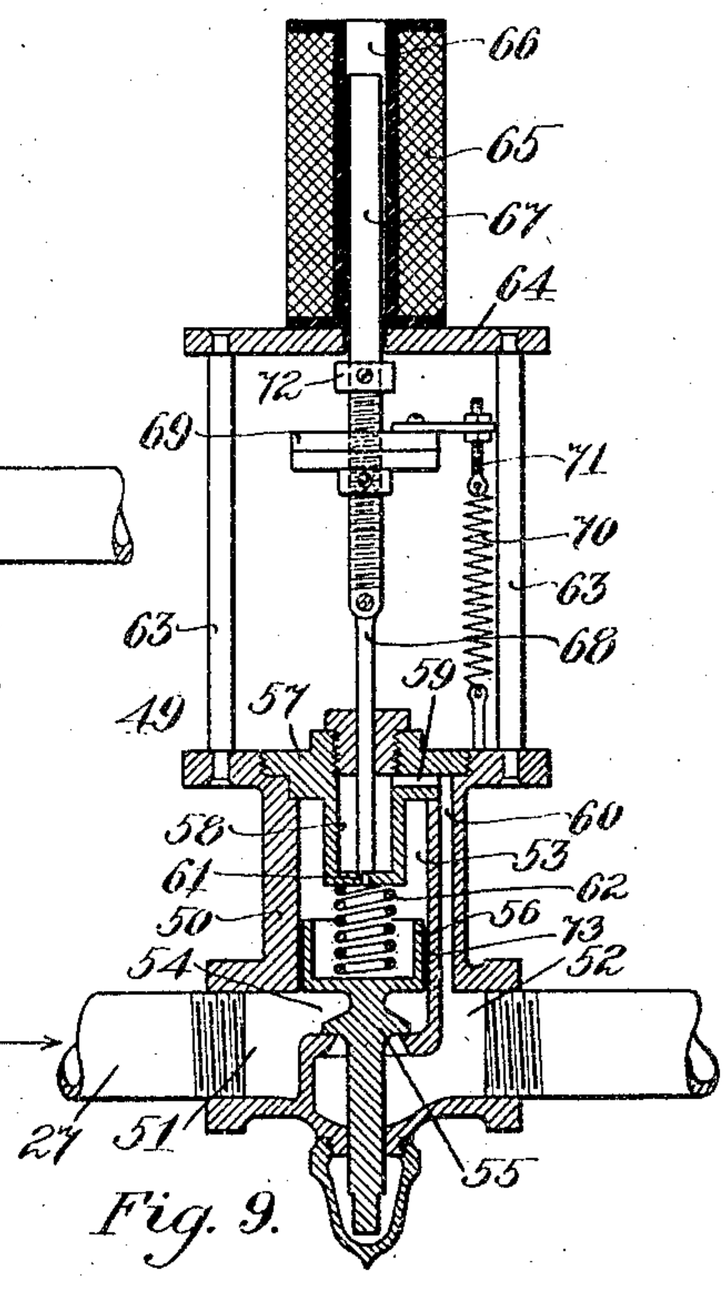

Fig. 9.

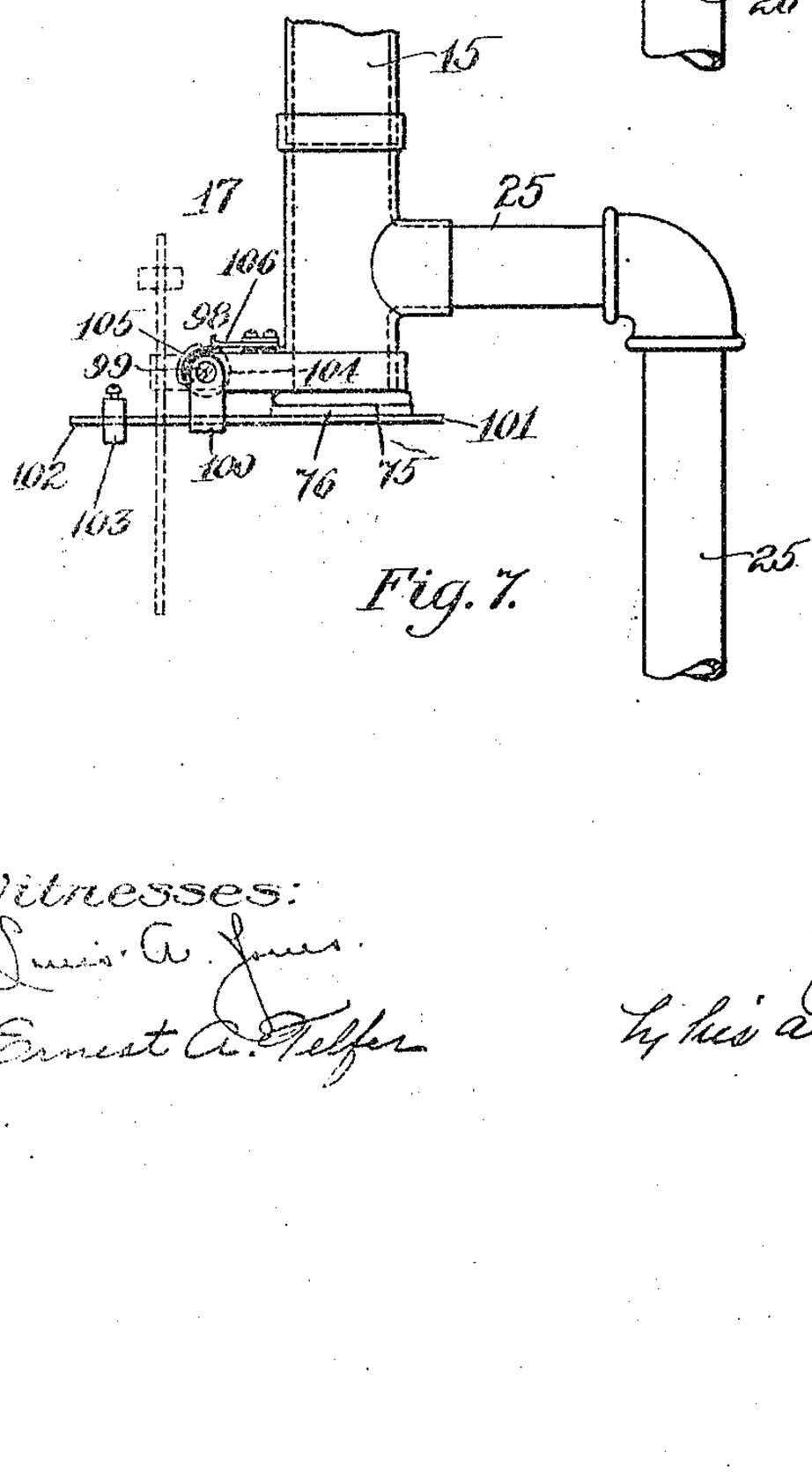

Fig. 7.

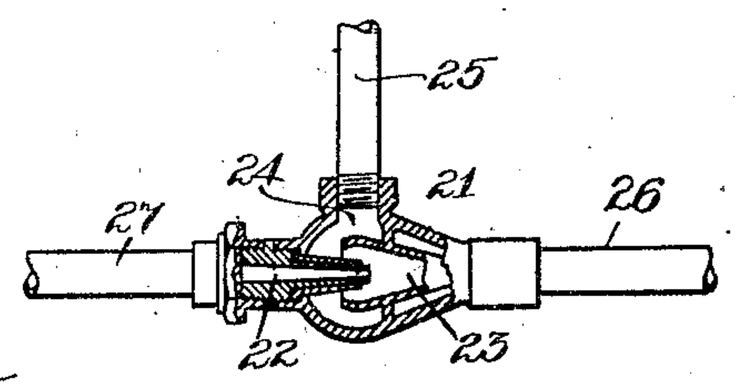

Fig. 10.

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PNEUMATIC DESPATCH TUBE SYSTEM.

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4 SHEETS—SHEET 4.

Fig. 13.

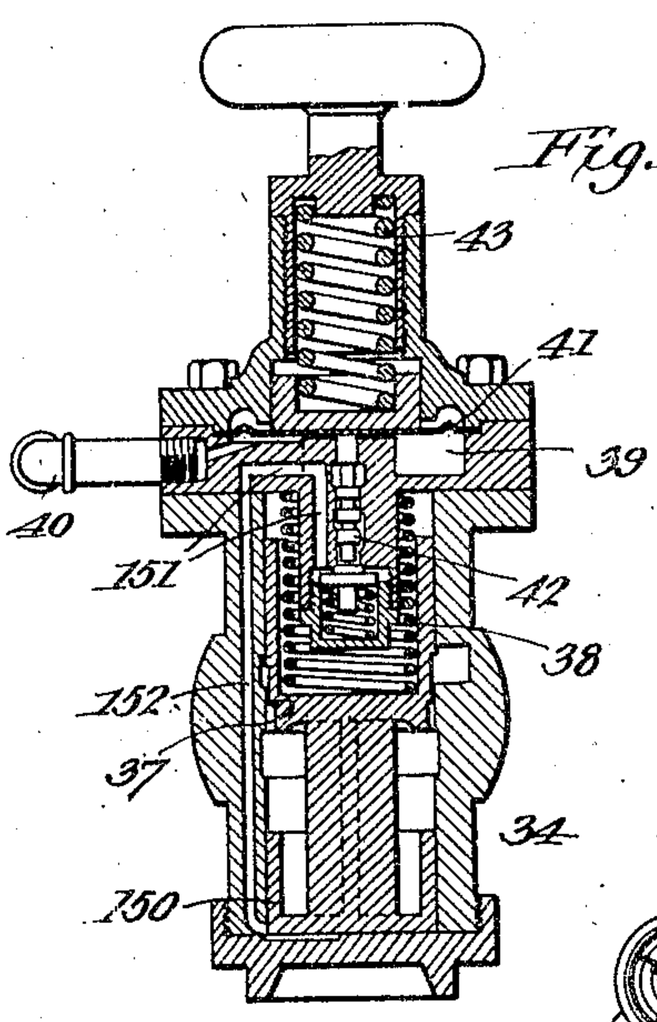


Fig. 11.

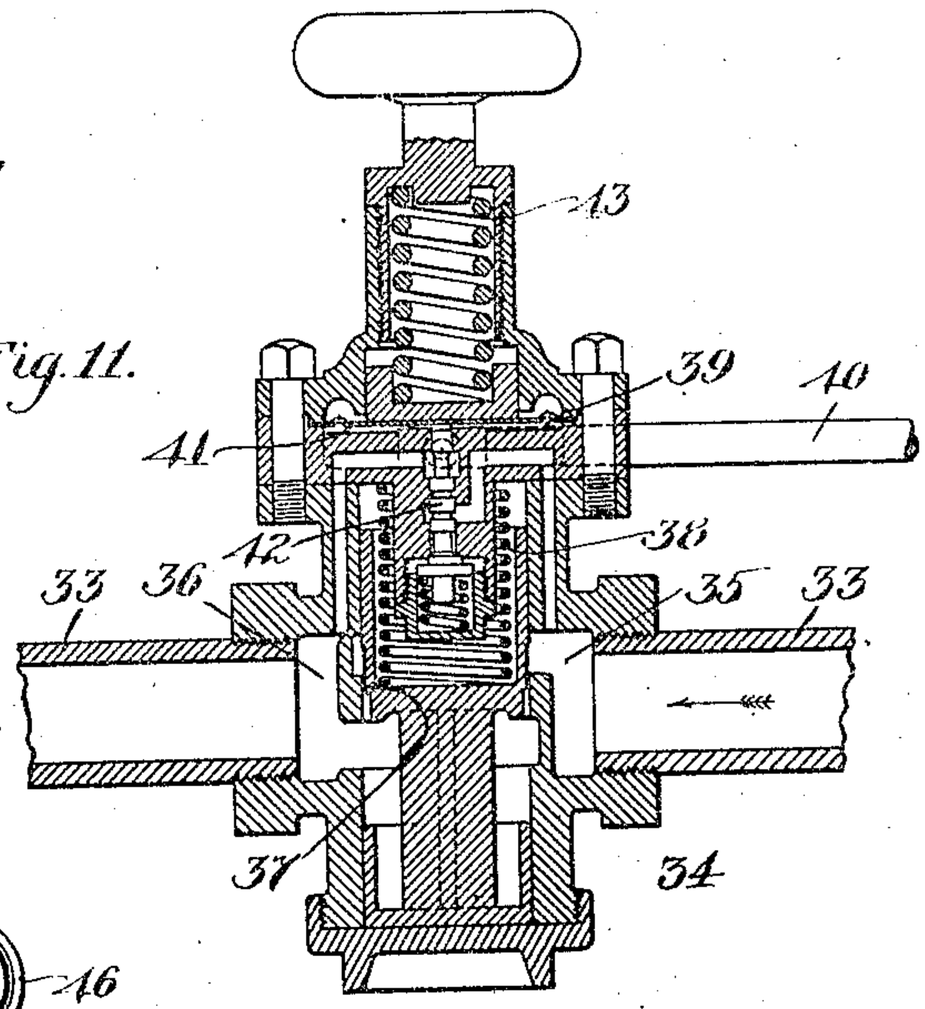
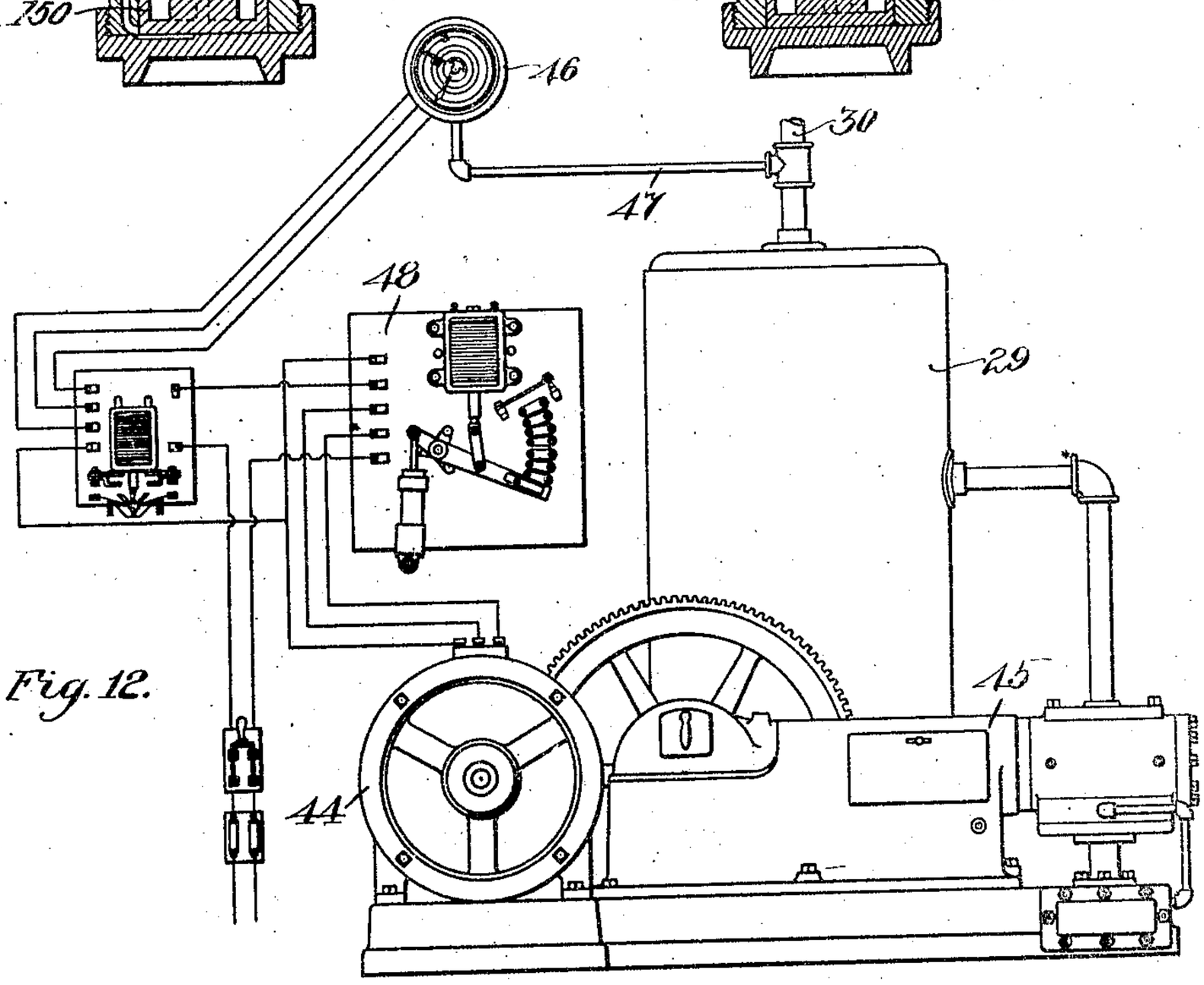


Fig. 12.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN S. JACQUES, OF BOSTON, MASSACHUSETTS.

PNEUMATIC-DESPATCH-TUBE SYSTEM.

No. 842,836. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed November 24, 1905. Serial No. 288,874.

To all whom it may concern:

Be it known that I, JOHN S. JACQUES, a citizen of the United States, residing at Boston, 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, and more particularly to that class of pneumatic-despatch-tube systems in which an ejector is employed to create an air-current in the despatch-tubes, although some of the features of the device of this invention are applicable to systems other than those in which an ejector is employed to create the air-current.

The object of this invention is to provide means whereby the motive fluid used to create an air-current within the despatch-tubes shall be expended only during the passage of carriers through said despatch-tubes and means whereby the motive-fluid pressure apparatus shall be required to operate only when the pressure becomes diminished by the demand upon it, the attainment of this object resulting in a very marked economy in the operation of the system.

Another object of this invention is to provide means whereby the rapidity of travel of carriers within the despatch-tubes shall be increased, this object being attained by the employment of a device which causes a current of air to be drawn in at one open terminal and forced out of a second open terminal, or, in other words, causes a vacuum to be created in one despatch-tube and an air-pressure in the other despatch-tube.

The invention 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. Fig. 2 is an enlarged front elevation of the same, partly broken away to save space in the drawings, the wiring for the electrical functions being shown diagrammatically in said figure. Fig. 3 is an enlarged detail side elevation of the lower sending-terminal. Fig. 4 is an enlarged detail side elevation of the lower receiving-terminal. Fig. 5 is an enlarged detail section of one of the switches. Fig. 6 is an enlarged detail side elevation of the upper sending-terminal. Fig. 7 is an enlarged detail side elevation of the upper receiving-terminal. Fig. 8 is a plan section taken on line 8 8 of Fig. 6. Fig. 9 is an enlarged vertical section, partly in elevation, of the shut-off valve. Fig. 10 is an enlarged vertical section, partly in elevation, of the ejector. Fig 11 is an enlarged vertical longitudinal section, partly in elevation, of the air-compressing pump-governing valve. Fig. 12 is an enlarged front elevation of a modified form of air-compressing apparatus. Fig. 13 is an enlarged vertical cross-section, partly in elevation, of the pump-governing valve.

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

In the drawings, 15 is a despatch-tube provided with a sending-terminal 16 and a receiving-terminal 17 and is adapted to transmit carriers from said sending-terminal to said receiving-terminal.

18 is a despatch-tube provided with a sending-terminal 19 and a receiving-terminal 20 and is adapted to transmit carriers from said sending-terminal to said receiving-terminal.

An ejector 21, provided with a pressure-inlet orifice 22, an outlet-orifice 23, and an intermediate inlet-orifice 24, is connected at said intermediate inlet-orifice to the receiving-terminal 17 by means of a pipe 25. The outlet-orifice 23 is connected to the sending-terminal 19 by means of a pipe 26. The pressure-inlet orifice 22 is connected by means of a pipe 27 to a secondary compressed-air reservoir 28, said secondary reservoir being connected to a main compressed-air reservoir 29 by means of a pipe 30. A steam-operated air-compressing pump 31, supplied with steam from a boiler 32 through a pipe 33, is adapted to supply compressed air to the main reservoir 29.

A pump-governing valve 34 of well-known construction is interposed between the steam-operated air-compressing pump 31 and the boiler 32 and is adapted to control the supply of steam from the boiler 32 to the steam-operated air-compressing pump 31. The pump-governing valve 34 is provided with an inlet-orifice 35 and an outlet-orifice 36, said inlet-orifice connected to the boiler 32 and said outlet-orifice connected to the pump 31. A main valve 37 is adapted to open or to close communication from the

inlet-orifice 35 to the outlet-orifice 36, said main valve being held normally closed by a helical compression-spring 38. The pump-governing valve 34 is also provided with an air-chamber 39, connected by a pipe 40 to the air-pressure pipe 30.

A diaphragm 41 is adapted to be forced upwardly by the air-pressure in the air-chamber 39. An auxiliary valve 42, actuated by the diaphragm 41, is adapted to open the main valve 37. In the operation of the pump-governing valve should the air-pressure within the main reservoir 29, the pipe 30, the pipe 40, and the chamber 39 become diminished the diaphragm 41 will be forced downwardly by a helical compression-spring 43, thus actuating the auxiliary valve 42, which in turn actuates the main valve 37 by supplying steam to the under side of the piston 150 through passages 151 and 152, formed in the casing of the valve 34, thereby causing said main valve to open communication between the boiler 32 and the pump 31, whereupon said pump will operate to compress air into the main reservoir 29 until the air therein is restored to its normal pressure. The pump-governing valve 34 is a well known and patented device providing a convenient means for controlling the pump 31, and thereby maintaining a substantially constant pressure within the reservoirs 28 and 29, and I do not claim any of the features of said pump-governing valve.

In Fig. 12 I have illustrated a modified form of air-compressing apparatus in which 44 is an electric motor adapted to drive an air-compressing pump 45, said motor 44 driven by an electrical current from any suitable source. A pressure-regulator gage 46 is connected by a pipe 47 to the pipe 30 and is adapted to control the motor 44 through the medium of a "self-starter" 48 and the apparatus connected therewith. Said pressure-regulator gage 46 and said self-starter 48 are well known and patented devices, forming a convenient means for controlling the motor 44 and maintaining a substantially constant pressure within the main reservoir 29. When the pressure within the main reservoir 29 and the pipes connected therewith becomes diminished because of the demand upon it, the pressure-regulator gage acts to start the motor 44 through the medium of the self-starter 48, said motor operating the air-compressing pump 45 until the air within the reservoir 29 is restored to its normal pressure, whereupon the pressure-regulator gage acts through the medium of the self-starter 48 to stop the motor 44.

A magnetically-operated shut-off valve 49, interposed between the secondary reservoir 28 and the pressure-inlet orifice 22, is adapted to control the supply of compressed air to the pressure-inlet orifice 22, said magnetically-operated shut-off valve forming the subject-matter of a separate application filed of even date herewith, Serial No. 288,960. In the magnetically-operated shut-off valve 50 is a valve-casing provided with an inlet-orifice 51, an outlet-orifice 52, and a cylindrical chamber 53, connected to said inlet-orifice by a passage 54. A main valve 55 is adapted to normally close communication from said inlet-orifice to said outlet-orifice and has formed integral therewith a piston 56, which loosely fits the cylindrical chamber 53. Into the upper part of the valve-casing 50 is screwed a bushing 57, provided with a chamber 58 and an outlet-passage 59 formed therein, said passage intersecting a passage 60 formed in the valve-casing 50, said passages forming an outlet from the chamber 58 to the outlet-orifice 52.

The bushing 57 is provided with an orifice 61, which forms an outlet from the cylindrical chamber 53 to the chamber 58. A helical compression-spring 62, bearing at its upper end against the bushing 57 and at its lower end against the piston 56, is adapted to normally seat the main valve 55.

Vertical standards 63 63 are fast at their lower ends to the valve-casing 50 and support at their upper ends a plate 64. Mounted upon the plate 64 is a solenoid 65, provided with a preferably cylindrical hole 66, whose axis is coincident with the common axis of the cylindrical chamber 53 and the piston 56. A core 67 loosely fits the hole 66 and is connected to a valve 68, said valve adapted to normally close the orifice 61. A weight 69, fast to the core 67, is adapted to normally seat the valve 68 upon the orifice 61 and is assisted by a helical extension-spring 70, whose tension may be adjusted by means of an adjusting-screw 71. A stop-collar 72, fast to the core 67, is adapted to limit the upward movement of said core. The cross-sectional area of the orifice 61 is greater than that of the annular space 73, surrounding the piston 56.

In the operation of the valve when the solenoid 65 is energized by electrical means, hereinafter described, the core 67 is lifted, together with the valve 68 connected thereto. A balance of pressure normally exists on the upper and lower sides, respectively, of the piston 56; but when the orifice 61 is uncovered by the valve 68 the air under pressure within the cylindrical chamber 53 escapes through the orifice 61 into the chamber 58 faster than the annular space 73 admits the compressed air to the cylindrical chamber 53. Therefore the pressure within the cylindrical chamber 53 having become reduced, the pressure on the under side of the piston 56 acts to force said piston upwardly against the tension of the spring 62, thereby opening the main valve 55 and allowing compressed air to pass from the secondary reservoir 28 to the inlet-orifice 22 of the ejector 21.

The lower sending-terminal 16 of the despatch-tube 15 is provided with an orifice 74, which is at all times open to the atmosphere. The upper receiving-terminal 17 of the despatch-tube 15 is provided with an orifice 75, which is normally closed to the atmosphere by a valve 76. The upper sending-terminal 19 is provided with an orifice 77, normally closed to the atmosphere by a valve 78, and the lower receiving-terminal 20 is provided with an upwardly-turned outlet-orifice 79, open at all times to the atmosphere, and is also provided with an orifice 80, normally closed by a buffer-plate 81.

In the operation of the system when the magnetically-operated shut-off valve 49 is opened by the energizing of the solenoid 65 compressed air is admitted to the pressure-inlet orifice 22 of the ejector 21 from the secondary reservoir 28, said compressed air passing outwardly through the outlet-orifice 23, thence through the pipe 26, the air-current thus created producing a vacuum acting to draw a current of air in at the orifice 74 through the despatch-tube 15, thence through the pipe 25 to the inlet-orifice 24 of the ejector 21, said current of air then passing outwardly through the outlet-orifice 23, pipe 26, past the valve 78, through the despatch-tube 18, and outwardly through the orifice 79. Said air-current acts to draw carriers inserted in the sending-terminal 16 through the despatch-tube 15 and discharge them through the orifice 75. Said air-current also acts to force carriers inserted in the sending-terminal 19 through the despatch-tube 18 and outwardly through the orifice 80.

The lower sending-terminal 16 is provided with an oscillatory switch 82, pivoted at 83 to the terminal 16. A lever 84, also pivoted at 83, is operatively connected to the switch 82 and is adapted to rock said switch upon its pivot. Said lever is normally held by helical extension-springs 85 85 in the position shown it full lines in Fig. 3. The right-hand end 86 of the lever 84 normally extends across the orifice 74, and thereby prevents the introduction of carriers into said orifice until said lever is swung into the position shown in dotted lines, Fig. 3. When the lever 84 is swung to the position shown in dotted lines, Fig. 3, the left-hand end 87 of said lever engages a latch 88, pivoted at 89 to a magnet-casing 90, said latch held normally in the position shown in Fig. 3 by a helical extension-spring 91.

An electromagnet 92 is adapted to lift an armature 93, fast to the latch 88, and withdraw said latch from engagement with the left-hand end 87 of the lever 84. The oscillatory switch 82 consists of a cylindrical commutator 94, formed of insulating material and provided with a segmental contact-plate 95. When the lever 84 is swung into the position shown in dotted lines, Fig. 3, the segmental contact-plate 95 is adapted to engage two terminals 96 and 97, mounted upon the terminal 16 and insulated therefrom.

The upper receiving terminal 17 is provided with an oscillatory switch 98, pivoted at 99 to said terminal. A lever 100, also pivoted at 99, is operatively connected to the oscillatory switch 98 and is adapted to rock said switch upon its pivot. The right-hand end 101 of the lever 100 is fast to the terminal valve 76, and upon the left-hand end 102 of said lever is mounted a weight 103. When a carrier is passing outwardly through the orifice 75, it strikes the terminal valve 76, rocking the lever 100 upon its pivot into the position shown in dotted lines, Fig. 7, the weight 103 acting to check the momentum of the carrier and acting to return the terminal valve 76 to the position shown in full lines in said figure after said carrier has passed through the orifice 75. The oscillatory switch 98 is identical in construction with the switch 82 and consists of a cylindrical commutator 104 formed of insulating material, upon which is mounted a segmental contact-plate 105. Terminals 106 and 107 are mounted upon the terminal 17 and insulated therefrom. The contact-plate 105 is adapted to engage the terminals 106 and 107 when the lever 100 is rocked into the position shown in dotted lines, Fig. 7.

The terminal valve 78 of the terminal 19 is pivoted at 108 to said terminal and is provided with a finger-hook 109, by means of which said terminal valve may be opened. A spring-pressed latch 110 is adapted to lock the terminal valve 78 in the position shown in full lines, Fig. 6, and may be withdrawn from engagement with said terminal valve by a handle 111, said spring-pressed latch acting to hold said terminal valve closed against the pressure within the terminal 19.

An oscillatory switch 112, identical in construction with the switches 82 and 98, consists of a cylindrical commutator 113, formed of insulating material, upon which is mounted a segmental contact-plate 114. Terminals 115 and 116 are mounted upon the terminal 19 and insulated therefrom. A bell-crank lever 117, pivoted at 118, is operatively connected to the oscillatory switch 112 and is adapted to rock said switch upon its pivot. A weight 119, fast to the arm 120 of the bell-crank lever 117, is adapted to normally hold said bell-crank lever in the position shown in full lines, Fig. 6 and to return said bell-crank lever to said position when it has been swung from said position, as hereinafter described. The left-hand arm 121 of the bell-crank lever 117 is adapted to engage a latch 122, pivoted at 123 to a magnet-casing 124, said latch acting to lock said bell-crank lever when said lever is in the position shown in dotted lines, Fig. 6.

The terminal valve 78 is adapted to en-

gage the arm 120 of the bell-crank lever 117 when said valve is opened and is adapted to rock said lever, together with the oscillatory switch 112, to the position shown in dotted lines, Fig. 6, at which time the contact-plate 114 engages the terminals 115 and 116.

An electromagnet 125, mounted within the magnet-casing 124, is adapted to lift the armature 126, together with the latch 122, to which said armature is fast. A helical extension-spring 127 is adapted to normally hold the latch 122 in the position shown in Fig. 6.

An oscillatory switch 128, identical in construction with those hereinbefore described, consists of a cylindrical commutator 129, formed of insulating material, upon which is mounted a segmental contact-plate 130, said switch being pivoted at 131 to the terminal 20. A lever 132, also pivoted at 131, is fast at its right-hand end to the buffer-plate 81 and has a weight 133 fast to the left-hand end thereof, said weight adapted to hold said buffer-plate normally in contact with the orifice 80 and to return said buffer-plate to the position shown in full lines, Fig. 4, after a carrier has passed through said orifice. Terminals 140 and 141 are fast to the terminal 20 and insulated therefrom. When the lever 132 is moved to the position shown in dotted lines, Fig. 4, the contact-plate 130 is adapted to engage the terminals 140 and 141.

Referring to Fig. 2, in which a battery 134 and the wiring connecting said battery to the various electrical devices of the system are shown diagrammatically, the terminal 96 is connected by a wire 135 to the terminal 136 of the solenoid 65, and the terminal 97 is connected by a wire 137 and a wire 138 to one of the terminals of electromagnet 125. The other terminal of the electromagnet 125 is connected by a wire 139 to the terminal 141. The terminal 140 is connected by a wire 142 and a wire 143 to the terminal 144 of the solenoid 65. The terminal 116 is connected by a wire 145 to the wire 135. One of the terminals of the electromagnet 92 is connected by a wire 146 to the wire 137. The other terminal of the electromagnet 92 is connected by a wire 147 to the terminal 107. The terminal 106 is connected by a wire 148 to the wire 142, and the terminal 115 is connected to the wire 137 by a wire 149. The wires 142 and 137 are connected to the positive and nagative poles, respectively, of the battery 134.

The operation of my improved pneumatic-despatch tube system is as follows: A salesman stationed at a counter A desiring to send a carrier to a cashier stationed at a counter B swings the lever 84 into the position shown in dotted lines, Fig. 3, the latch 88 locking it in said position. An electric circuit is thus completed by the contact-plate 95, sending the current from the battery 134 through the solenoid 65, energizing the same and opening the valve 49 in a manner hereinbefore described. A current of air is instantly created within the despatch-tube 15 in the direction indicated by the arrows *a* and in the despatch-tube 18 in the direction indicated by the arrows *b*. The salesman now inserts the carrier into the terminal 16, and the vacuum created within the despatch-tube 15 by the ejector 21 draws the carrier through said despatch-tube to the terminal 17, the carrier by its momentum passing by the opening of the pipe 25 and outwardly through the orifice 75, throwing the valve 76 downwardly and causing the contact-plate 105 to complete an electric circuit to the electromagnet 92. The electromagnet 92 now energized by an electric current from the battery 134 lifts the armature 93, together with the latch 88, thus releasing the left-hand end 87 of the lever 84 and allowing said lever to be returned to its normal position by the springs 85 85. The lever 84 in returning to its normal position brings the contact-plate 95 out of contact with the terminals 96 and 97, breaking the electric circuit to the solenoid 65. The solenoid 65 thus deënergized allows the valve 49 to close in a manner hereinbefore described. The valve 49 now being closed the air within the despatch-tubes 15 and 18 becomes restored to atmospheric pressure. The cashier stationed at the counter B desiring to send a carrier to the salesman at the counter A presses the latch 110 downwardly, opens the terminal valve 78, and inserts a carrier in the terminal 19 through the orifice 77. The terminal valve 78 in its opening movement acts to swing the bell-crank lever 117 to the position shown in dotted lines, Fig. 6, the latch 122 acting to lock said bell-crank lever in the position shown by said dotted lines. The contact-plate 114 is thus brought into contact with the terminals 115 and 116, thus completing an electric circuit to the solenoid 65, thereby energizing the same and opening the valve 49 in a manner hereinbefore described. The cashier now closes the terminal valve 78. The compressed air in the secondary reservoir 28 passes through the pipe 27 and the valve 49 to the ejector 21, thus creating an air-current within the despatch-tubes 15 and 18, as hereinbefore described. The air-pressure now existing within the pipe 26 and beneath the carrier in the terminal 19 forces said carrier through the despatch-tube 18 and outwardly through the terminal 20. The carrier striking the buffer-plate 81 swings the lever 132 into the position shown in dotted lines, Fig. 4, thereby causing the contact-plate 130 to complete a circuit to the electromagnet 125. The electromagnet 125 thus energized lifts the armature 126, together with the latch 122, to which said armature is fast, disengaging said latch from the left-

hand arm 121 of the bell-crank lever 117, and allowing the weight 119 to return said bell-crank lever to the position shown in full lines, Fig. 6. The contact-plate 114 is thus brought out of contact with the terminals 115 and 116, thereby breaking the circuit. The solenoid 65 thus deënergized by the breaking of the circuit allows the valve 49 to close in a manner hereinbefore described. The compressed air now having ceased to flow through the ejector 21, the air within the despatch-tubes 15 and 18 is restored to atmospheric pressure.

It will be evident that any number of sets of despatch-tubes may be connected to the main air-pressure reservoir 29 and that the number of these will be limited only by the capacity of the reservoir 29 and the air-compressing pump which supplies compressed air thereto. The air-compressing apparatus (illustrated in Fig. 12) is particularly adapted to stores or other establishments having no steam-boiler plant.

It will be evident that I may employ any other suitable form of electromagnet in place of the solenoid 65, and I do not desire to limit myself to the use of said solenoid.

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

1. In a pneumatic-despatch-tube system, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, and air-pressure means connected to said pressure-inlet orifice.

2. In a pneumatic-despatch-tube system, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, air-pressure means connected to said pressure-inlet orifice, and a magnetically-operated shut-off valve located between said air-pressure means and said pressure-inlet orifice.

3. In a pneumatic-despatch-tube system, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, air-pressure means connected to said pressure-inlet orifice, a magnetically-operated shut-off valve located between said air-pressure means and said pressure-inlet orifice, and means adapted to control said air-pressure means whereby a substantially constant pressure is automatically maintained in the connections leading from said air-pressure means to said pressure-inlet orifice.

4. In a pneumatic-despatch-tube system, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, a source of compressed air connected to said pressure-inlet orifice, and a valve adapted to control the supply of said compressed air to said pressure-inlet orifice.

5. In a pneumatic-despatch-tube system, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, a steam-operated air-compressing pump connected to said pressure-inlet orifice, a valve adapted to control the supply of compressed air to said pressure-inlet orifice, and a pump-regulating valve adapted to automatically control the supply of steam to said steam-operated air-compressing pump.

6. In a pneumatic-despatch-tube system, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, an air-compressing pump connected to said pressure-inlet orifice, a magnetically-oper-

ated valve adapted to control the supply of compressed air to said pressure-inlet orifice, and means operated by the fluctuations in the air-pressure for controlling said air-compressing pump and maintaining a substantially constant air-pressure in the connections from said pump to said pressure-inlet orifice.

7. In a pneumatic-despatch-tube system, two tubes adapted to transmit carriers in opposite directions, respectively, said tubes open to the atmosphere at one pair of terminals, said tubes normally closed to the atmosphere at a second pair of terminals, an ejector provided with a pressure-inlet orifice, an outlet-orifice, and an intermediate inlet-orifice, said intermediate inlet-orifice connected to one of said normally closed terminals, said outlet-orifice connected to the other of said normally closed terminals, a main air-pressure reservoir, a secondary air-pressure reservoir, connected together, said secondary air-pressure reservoir connected to said pressure-inlet orifice, a magnetically-operated shut-off valve interposed between said secondary air-pressure reservoir and said pressure-inlet orifice, and means for maintaining a substantially constant pressure within said main air-pressure reservoir.

8. In a pneumatic-despatch-tube system, a despatch-tube provided with a sending-terminal and a receiving-terminal, an air-current-creating device connected therewith, a source of compressed air connected to said air-current-creating device, a shut-off valve adapted to control the supply of compressed air to said air-current-creating device, a solenoid adapted to operate said shut-off valve, a manually-operatable electric switch in circuit with said solenoid and located at said sending-terminal, a spring or weight adapted to return said switch to its opened position, an armature adapted to lock said switch in its closed position, a spring adapted to hold said armature in engagement with said switch, an electromagnet adapted to release said armature from engagement with said switch, an automatic switch in circuit with said electromagnet and adapted to be closed by the receiving-terminal valve when said terminal valve is opened by a carrier passing therethrough, and a weight acting to close said shut-off valve when a carrier has passed through said receiving-terminal.

9. In a pneumatic-despatch-tube system, a despatch-tube provided with a sending-terminal and a receiving-terminal valve, means for creating an air-current therein, means for supplying compressed air to said air-current-creating means, a shut-off valve adapted to control the supply of compressed air to said air-current-creating means, a solenoid adapted to operate said shut-off valve, a source of electric current, an electric switch manually operatable in circuit with said solenoid and said source of electric current, means for locking said manually-operatable switch in its closed position, an electromagnet adapted to withdraw said locking means from engagement with said manually-operatable switch, an automatic switch in circuit with said electromagnet and closed by the opening movement of the receiving-terminal valve, and means for returning said automatic switch to its opened position.

10. In a pneumatic-despatch-tube system, a despatch-tube provided with a sending-terminal and a receiving-terminal, an air-current-creating device connected therewith, a source of compressed air connected to said air-current-creating device, a shut-off valve adapted to control the supply of compressed air to said air-current-creating device, a solenoid adapted to operate said shut-off valve, a sending-terminal valve manually operatable, an electric switch in circuit with said solenoid adapted to be closed by the opening movement of said sending-terminal valve, an armature adapted to lock said electric switch in its closed position, an electromagnet adapted to withdraw said armature from engagement with said switch, means for returning said switch to its opened position, a receiving-terminal closure adapted to check the momentum of a carrier passing out of said receiving-terminal, an automatic switch in circuit with said electromagnet operatively connected to said receiving-terminal closure and adapted to be closed by the opening movement of said closure, and means for closing said closure and returning said automatic switch to its opened position.

11. In a pneumatic-despatch-tube system, a despatch-tube provided with an inlet and an outlet orifice, a terminal valve adapted to close said outlet orifice, an ejector provided with an inlet-orifice, an outlet-orifice, and an intermediate orifice, said despatch-tube connected to said intermediate orifice, a receptacle for compressed air connected to said ejector-inlet orifice, a shut-off valve interposed between said ejector and said receptacle, electrically-operated means to open said shut-off valve, said means controlled by said terminal valve, and a spring adapted to close said shut-off valve.

12. 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 connected to said ejector intermediate said ejector inlet and outlet orifices, an air-pressure reservoir connected to said ejector-inlet orifice, a terminal valve adapted to close said despatch-tube-outlet orifice, an electric switch operatively connected to said terminal valve, a pivoted arm normally extending across said despatch-tube-inlet orifice, an electric switch connected to said pivoted arm, an electromagnet in

circuit with said terminal-valve switch, a latch adapted to hold said pivoted arm out of its normal position, said terminal valve adapted to actuate said switch connected thereto to close said circuit and operate said latch to release said arm held thereby, a shut-off valve interposed between said reservoir and said ejector-inlet orifice, and a solenoid adapted to open said shut-off valve, said pivoted arm adapted to actuate said switch connected thereto to complete a circuit to said solenoid to open said shut-off valve controlled thereby.

13. 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 connected to said ejector-outlet orifice, an air-pressure reservoir connected to said ejector-inlet orifice, a terminal valve adapted to close said despatch-tube-inlet orifice, a pivotally-mounted buffer-plate adapted to close said despatch-tube-outlet orifice, an electric switch adapted to be closed by the opening movement of said terminal valve, an electric switch operatively connected to said buffer-plate, an electromagnet in circuit with said buffer-plate switch, a latch adapted to hold said terminal-valve switch closed, said pivoted buffer-plate adapted to actuate said switch connected thereto to close said circuit and operate said latch to release said switch held thereby, a shut-off valve interposed between said reservoir and said ejector-inlet orifice and a solenoid adapted to open said shut-off valve, said terminal valve adapted to actuate said switch connected thereto to complete a circuit to said solenoid to open said shut-off valve controlled thereby.

14. In a pneumatic-despatch-tube system, a despatch-tube provided with an inlet and an outlet orifice, a terminal valve adapted to close said despatch-tube-outlet orifice, a pivoted arm normally extending across said despatch-tube-inlet orifice, an ejector provided with an inlet-orifice, an outlet-orifice, and an intermediate orifice, said despatch-tube connected to said intermediate orifice, a receptacle for air under pressure connected to said ejector-inlet orifice, a shut-off valve interposed between said ejector and said receptacle, and electrically-operated means to open said shut-off valve, said means controlled by said terminal valve and said pivoted arm.

15. In a pneumatic-despatch-tube system, a despatch-tube provided with an inlet and an outlet orifice, a terminal valve adapted to close said despatch-tube-inlet orifice, a pivotally-mounted buffer-plate adapted to close said despatch-tube-outlet orifice, an ejector provided with an inlet-orifice, an outlet-orifice, and an intermediate orifice, said despatch-tube connected to said ejector-outlet orifice, a receptacle for air under pressure connected to said ejector-inlet orifice, a shut-off valve interposed between said ejector and said receptacle, and electrically-operated means to open said shut-off valve, said means controlled by said terminal valve and said buffer-plate.

16. In a pneumatic-despatch-tube system, a despatch-tube, a sending-terminal, a receiving-terminal, a device adapted to create an air-current within said despatch-tube, a source of motive fluid connected to said air-current-creating device, a shut-off valve interposed between said source of motive fluid and said air-current-creating device, a solenoid adapted to open said shut-off valve, a manually-operatable switch located at said sending-terminal and adapted to complete an electric circuit to said solenoid, an automatic switch located at said receiving-terminal, said automatic switch adapted to be operated by the passage of a carrier outwardly through said receiving-terminal, a latch adapted to lock said manually-operatable switch in its closed position, an armature mounted upon said latch, and an electromagnet adapted to withdraw said latch from said manually-operatable switch and controlled by said automatic switch, whereby said solenoid opens said shut-off valve when a carrier is introduced into said sending-terminal and closes said shut-off valve upon the passage of a carrier outwardly from said receiving-terminal.

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

JOHN S. JACQUES.

Witnesses:
LOUIS A. JONES,
CHARLES B. GOODING.