No. 681,108. Patented Aug. 20, 1901.

J. T. COWLEY.

PNEUMATIC DESPATCH TUBE APPARATUS.

(Application filed Dec. 21, 1899.)

(No Model.) 3 Sheets—Sheet 1.

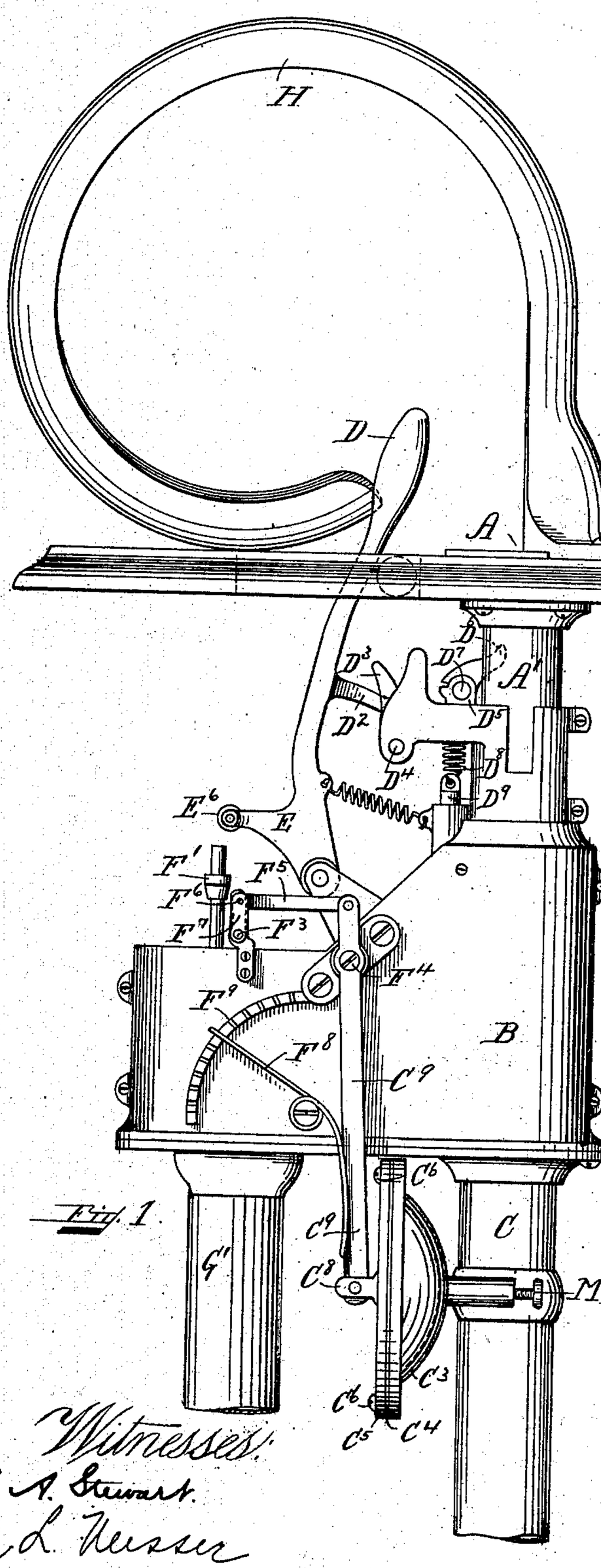

Fig. 1.

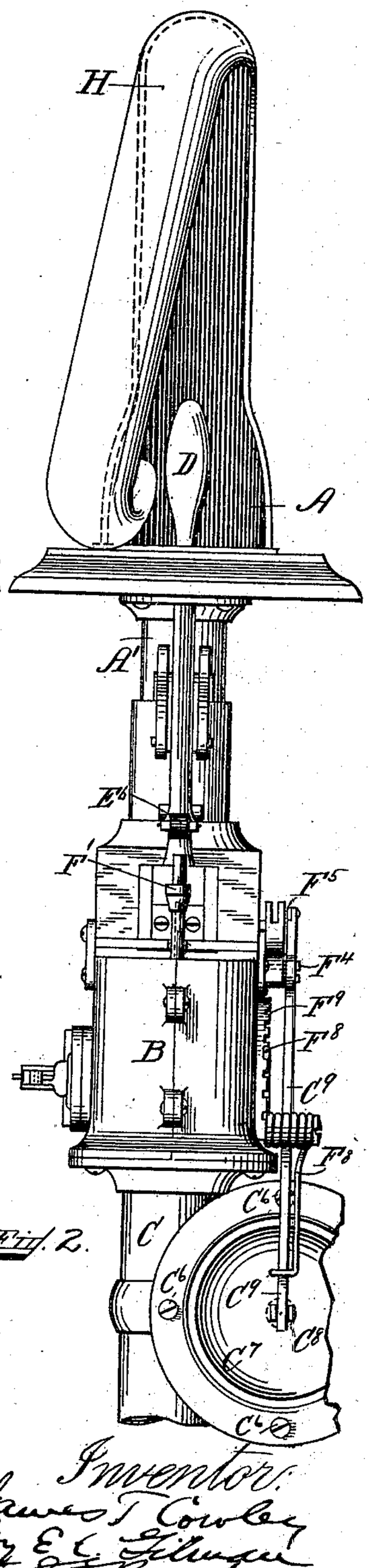

Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

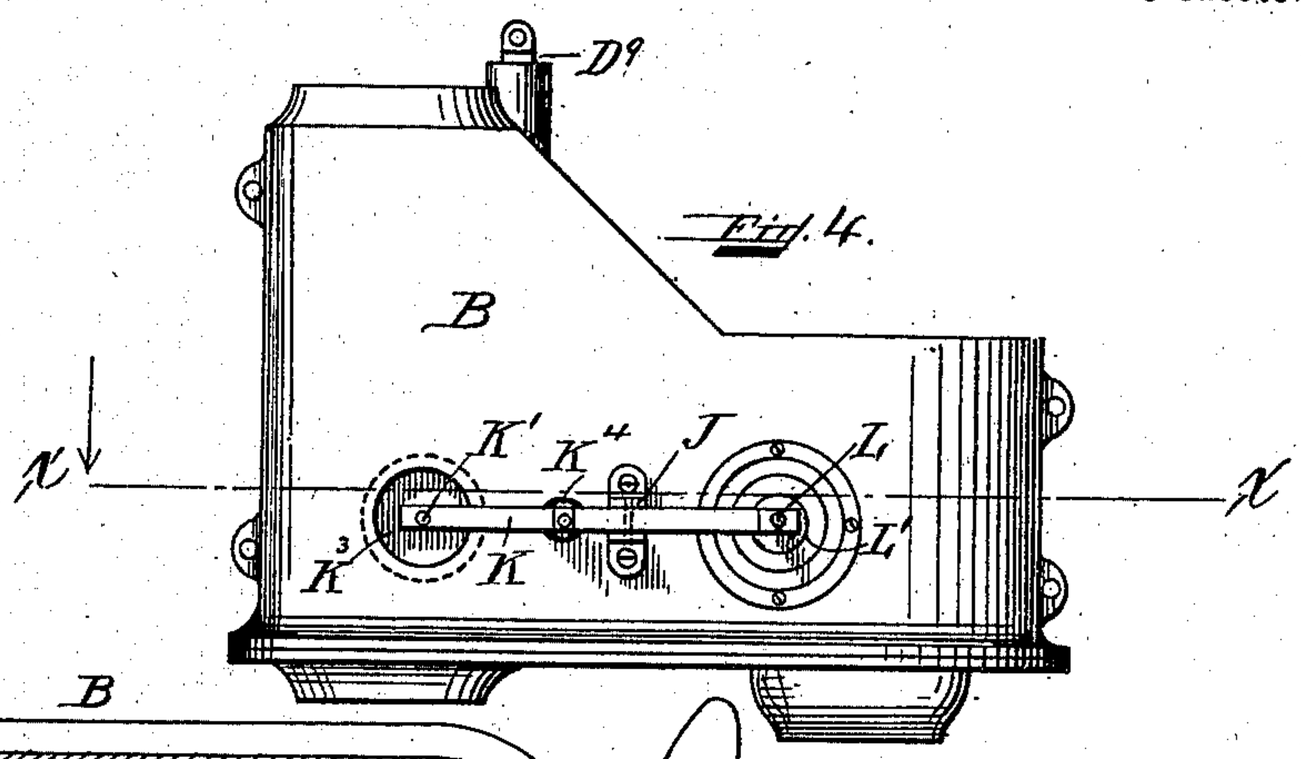

Fig. 4.

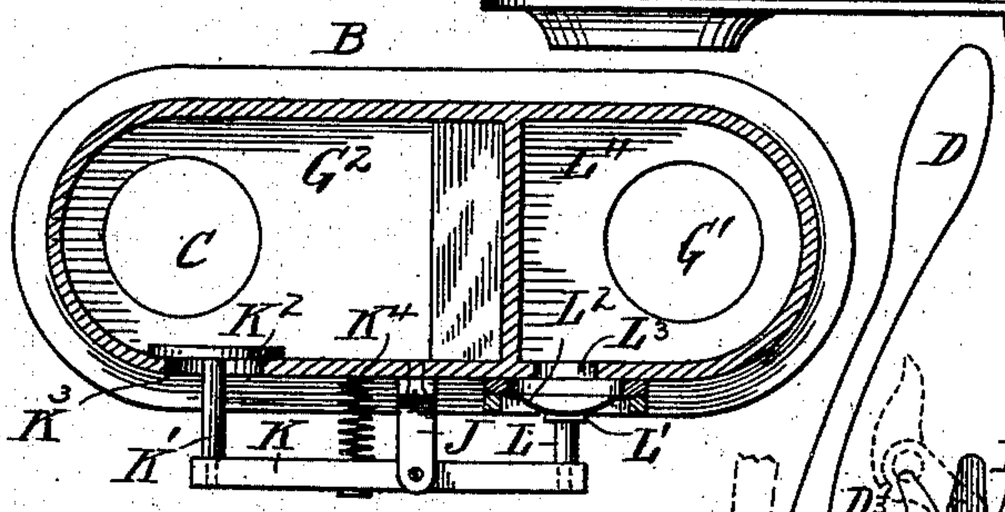

Fig. 5.

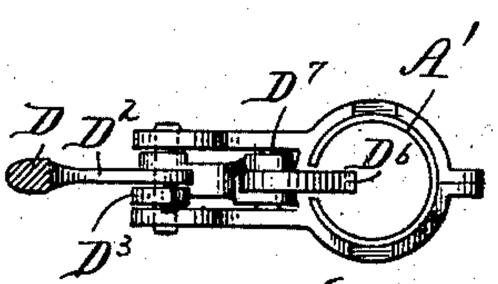

Fig. 6.

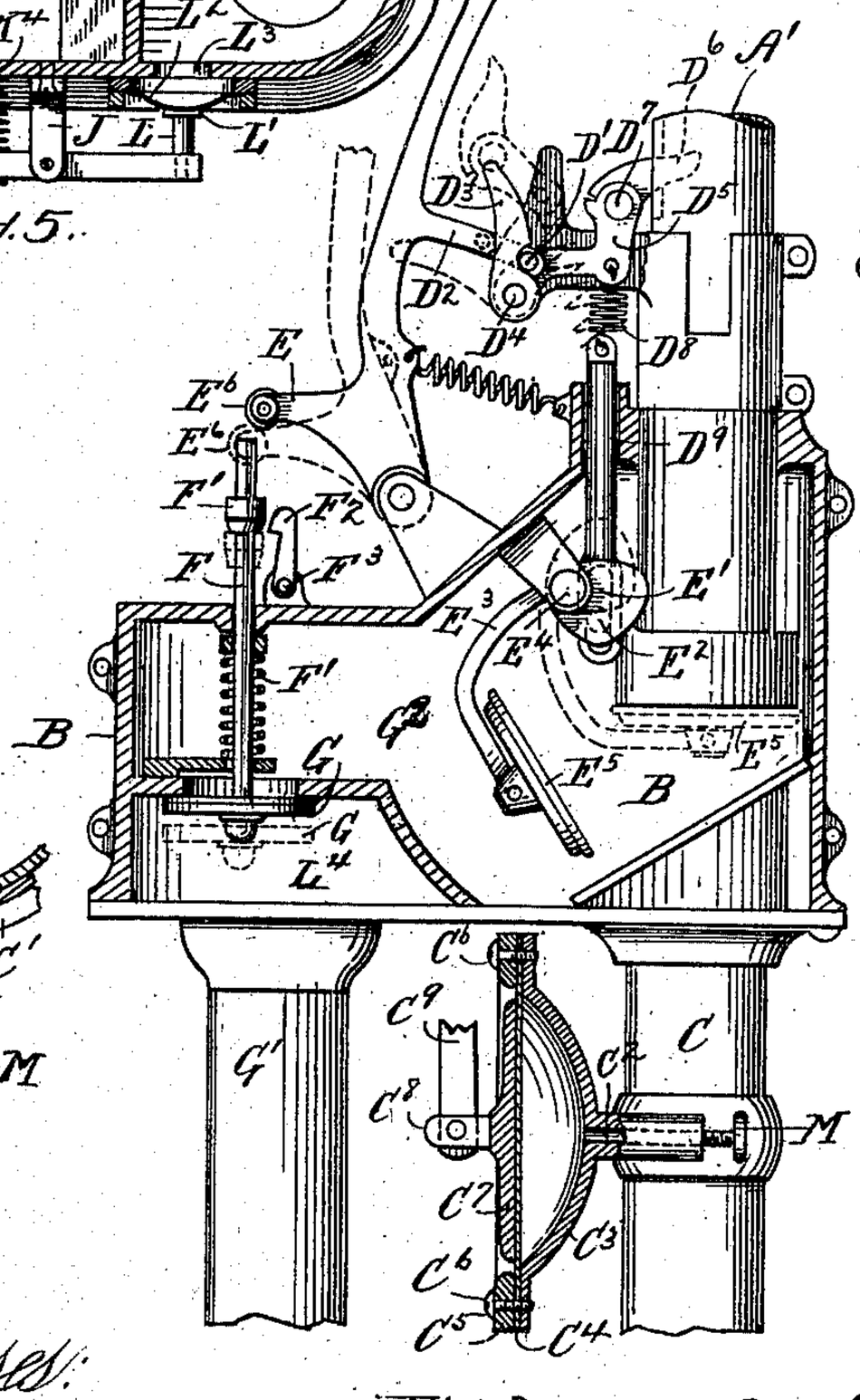

Fig. 3.

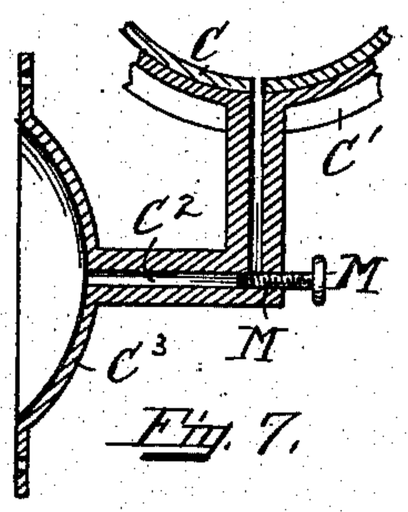

Fig. 7.

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PNEUMATIC DESPATCH TUBE APPARATUS.

(Application filed Dec. 21, 1899.)

(No Model.) 3 Sheets—Sheet 3.

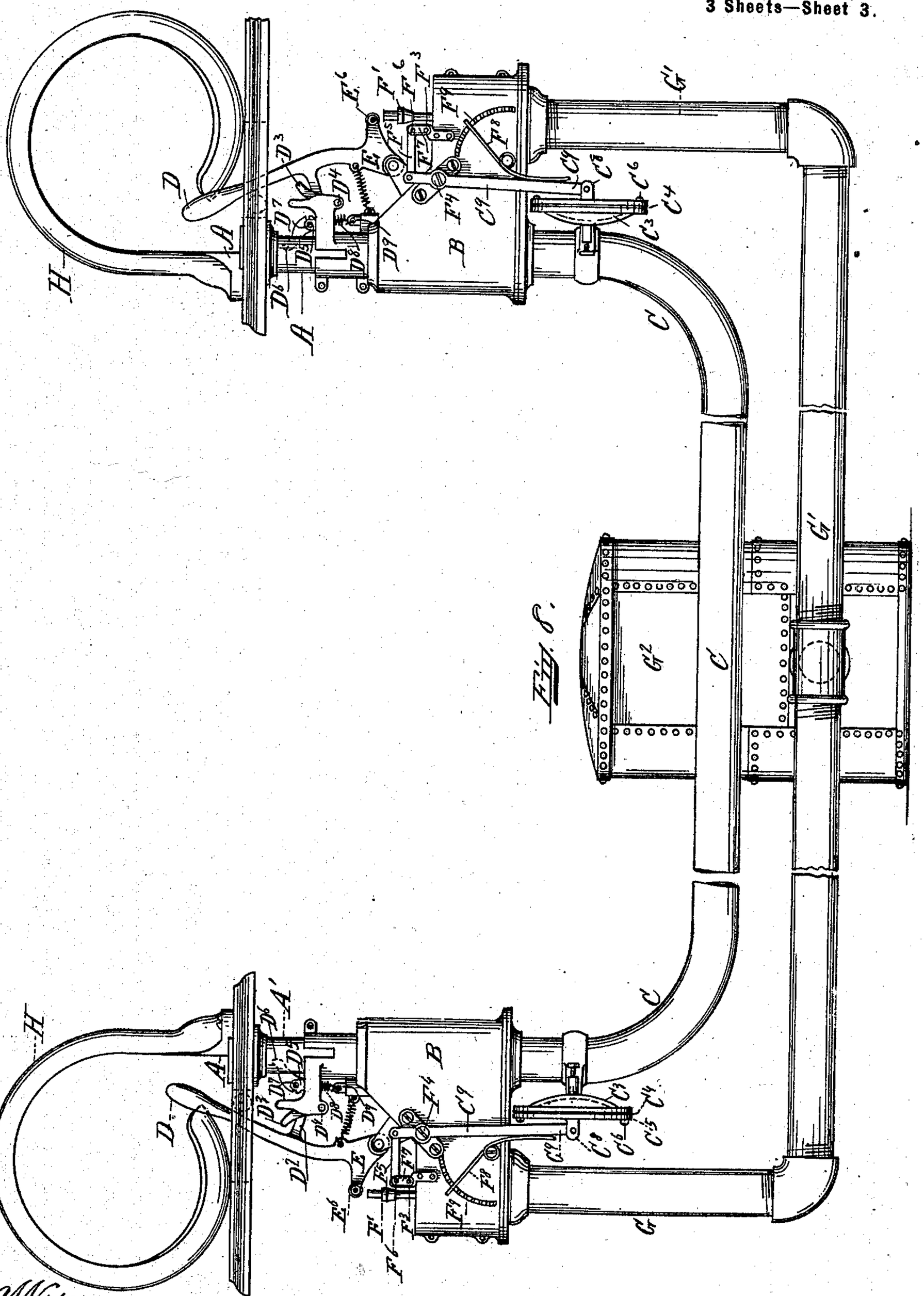

Fig. 6.

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UNITED STATES PATENT OFFICE.

JAMES T. COWLEY, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE LAMSON CONSOLIDATED STORE SERVICE COMPANY, OF NEWARK, NEW JERSEY.

PNEUMATIC-DESPATCH-TUBE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 681,108, dated August 20, 1901.

Application filed December 21, 1899. Serial No. 741,112. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. COWLEY, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic-Despatch-Tube Apparatus, of which the following is a specification.

My invention relates to improvements in pneumatic-despatch-tube apparatus in which the carriers are propelled by air-pressure through a single tube in both directions and in which the air-pressure which drives the carrier is cut off when the carrier is delivered at one of the terminals, and is an improvement on the despatch apparatus shown, described, and claimed in United States Letters Patent No. 640,020, dated December 26, 1899, and issued to the Lamson Consolidated Store Service Company, of New Jersey, as the assignee of Albert W. Pearsall.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 is a side elevation of the terminal. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation of a portion of the terminal with parts in section. Fig. 4 is a side elevation of the valve-box, taken on the opposite side of Fig. 1. Fig. 5 is a sectional view taken on the line X X, Fig. 4. Fig. 6 is a top plan view of a portion of Fig. 3. Fig. 7 is a detail sectional view of the passage leading to the diaphragm. Fig. 8 is a side elevation of the line, showing the terminal at each end of the line.

Like letters of reference refer to like parts throughout the several views.

To despatch a carrier, it is dropped into the mouth A of the tube A′ and passes down through the valve-box B into the transmission-tube C. Then the lever D is pulled toward the left, (shown partly in dotted lines, Fig. 3,) and the arm E of said lever pushes down the valve-rod F against the tension of the spring F′ and opens the valve G and allows the compressed air to flow in from the pipe G′ by the valve G and through the chamber G^2 into the transmission-tube C. The movement of the lever D to the left, as above described, carries with it the pin D′ on the arm D^2, and this pin, acting against the cam-surface of the lever D^3, secured to the shaft D^4, moves the lever D^3 to the position shown in dotted lines, Fig. 3. Secured also on the shaft D^4 is the arm D^5, having at its outer end the loose dog D^6, pivoted on the arm D^5 at D^7 and projecting into the transmission-tube A′ and held by a suitable spring in the position shown in Fig. 3.

Secured to the arm D^5 is a spring D^8, the opposite end of which is secured to the rod D^9, which passes downwardly within the valve-box B. The lower end of this rod D^9 is provided with a slot E′, through which the pin E^2 passes, the outer ends of the pin being secured in the weighted end of the valve-lever E^3, pivoted at E^4 within the valve-box B. The opposite end of this valve-lever E^3 carries the valve E^5, adaped to be swung upwardly and close the open end of the tube A′, as shown in dotted lines, Fig. 3, when the lever D is moved to the left, as above described. This closing of the valve E^5 is accomplished through the connections of the pin D′, lever D^3, arm D^5, spring D^8, and rod D^9. As the lever D is moved to the left and before the roll E^6 on the lever E comes into contact with the upper end of the rod F, the valve E^5 is closed before the valve G begins to open. By the continued movement of the lever D the pin D′ will pass over the cam-surface of the lever D^3 without raising the rod D^9 more than is sufficient to close the valve E^5. After the lever D has moved to the position shown in dotted lines, Fig. 3, the collar F′ on the rod F will engage with the catch F^2, pivoted at F^3, and the valve G will be held open and air will pass from the supply-pipe G′ through the valve-box B into the transmission-tube C and the carrier will be despatched to the opposite end of the line. Located around the transmission-tube C below the terminal is a ring C′, having a passage C^2, connecting with the flange C^3, to which is secured the diaphragm C^4, held in place by the ring C^5 and the screws C^6. Resting on the outer side of the diaphragm C^4 is a plate C^7, having the lugs C^8, to which is pivoted the arm C^9. This arm is pivoted near the opposite end at F^4 to

the side of the valve-box B, and to the upper end of the arm C^9 is pivoted the link F^5, the opposite end being pivoted at F^6 to the arm F^7, secured to the shaft F^3. The plate C^7 is held in engagement with the diaphragm by the action of the spring F^8, one end of which is in engagement with the lever C^9, the opposite end being adjustable in the rack F^9 to vary the tension of the spring F^8.

With the arrangement of the diaphragm and lever as above described, when the air-pressure within the tube C is raised the action of the air on the diaphragm C^4 through the connections of the lever C^9, link F^5, and arm F^7 will release the catch F^2 from the collar F′ on the valve-stem F, and the valve G will be allowed to close by the action of the spring F′. At the opposite end of the line, Fig. 8, the terminal is identical in construction to that shown at the right-hand end, Fig. 8, and the carrier passing from the transmission-tube will pass upwardly through the tube C into the tube A′ at the left-hand end and out through the opening A and around the chute H onto the receiving-table. As the carrier passes upwardly at the right hand of Fig. 8 through the tube A′ it will engage with the finger D^6, mounted on the lever D^5, and the lever D^5 will be raised, and through the connections of the spring D^8 and rod D^9 the valve E^5 will be closed behind the carrier. As the valve G at the right-hand end has not yet been closed, the air-pressure within the transmission-tube C will be raised to the pressure within the supply-pipe G′ and supply-tank G^2, into which air is forced by any suitable air-compressing apparatus and stored. This increased pressure within the transmission-tube C will act upon the diaphragm C^4, and through the connections of the lever C^9, link F^5, and arm F^7 the catch F^2 will be released from the collar F′ on the valve-stem F, and the valve G at the left-hand end of the line will be allowed to close, thus shutting off the supply of air to the transmission-tube C.

Pivoted to the lugs J, mounted on the side of the valve-box B, as shown in Figs. 4 and 5, is a lever K, and mounted on the left-hand end of the lever K is a rod K′, having on its opposite end the valve K^2, within the valve-box B and closing the opening K^3 and held in the position shown in Fig. 5 by the action of the spring K^4. On the opposite end of the arm K is a rod L, having a flange L′ in engagement with the diaphragm L^2, secured to the side of the valve-box B and closing the opening L^3. The opening L^3 communicates with the chamber L^4, and the opening K^3 communicates with the chamber G^2 within the valve-box B. The tension of the spring K^4 is so regulated that when the valve G is closed and the air-pressure within the chamber L^4 is at its highest point the action of the pressure upon the diaphragm L^2 is sufficient to overcome the tension of the spring K^4 and allow the valve K^2 to be opened; but when the valve G is open and air is passing from the supply-pipe G′ into the transmission-tube C the pressure upon the diaphragm L^2 will be reduced and the action of the spring K^4 will depress the diaphragm and allow the valve K^2 to close, shutting off the opening K^3. The object of this valve K^2 and diaphragm L^2 is to release the pressure within the despatch-tube C after the valve G is closed when the carrier is delivered at the opposite end of the line, and from the above description it will be seen that when the valve G is closed and the pressure within the chamber L^4 rises and pushes out the diaphragm L^2 the valve K^2 will be pushed inwardly and allow the air within the transmission-tube C to escape through the opening K^3. This opening will remain open until another carrier is despatched and the pressure within the chamber L^4 reduced, when the action of the spring K^4 will again close the opening K^3, which will remain closed until the carrier is delivered at the opposite end of the line. The screw M is for the purpose of regulating the flow of air through the passage C^2 behind the diaphragm C^4, so that the air will pass through the passage C^2 slowly, and any sudden increase of pressure in the tube caused by the starting or stopping of the carrier will not operate the diaphragm C^4 sufficiently to release the catch F^2 and close the valve.

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatch end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve.

2. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be oper-

ated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of the air-inlet valve.

3. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet respectively after the insertion and discharge of the carriers, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, a lever for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, a catch for holding said air-inlet valve open at the despatching end of the tube, a flexible diaphragm to which said catch is connected on one side and having its opposite side exposed to the pressure in the tube and adapted when actuated by the increased pressure in the tube to operate said catch and thereby release and permit the closing of the air-inlet valve.

4. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for said inlet and outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism connected to said valves controlling said inlet and outlet and adapted to allow the insertion of carriers at the inlet end without closing the valve and to be operated by the traveling carriers at the outlet end of the line to close the valve controlling said outlet to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve.

5. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve located in the path of the compressed air from the air-inlet to the transmission-tube and adapted to be operated by mechanism to close the inlet to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, a valve for closing the outlet of the transmission-tube, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of the air-inlet valve.

6. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing the inlet to the transmission-tube and for opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve, and means for releasing the air-pressure within the transmission-tube to allow the valves controlling the inlet and outlet of the transmission-tube to open.

7. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing the inlet to the transmission-tube and for opening said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve, and means consisting of a valve controlling an exhaust-opening in communication with the transmission-tube and operated by air-pressure from the source of compressed air to operate said valve to open the exhaust to allow the valves controlling the inlet and outlet of the transmission-tube to open.

8. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for clos-

ing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing the inlet to the transmission-tube and for opening said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve, means consisting of a valve controlling an exhaust-opening in communication with the transmission-tube and operated by air-pressure from the source of compressed air to operate said valve to open the exhaust to allow the valves controlling the inlet and outlet of the transmission-tube to open, and a spring for operating the valve controlling the exhaust to close said opening.

9. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for opening said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve after the carrier has passed said valve, a catch for holding said air-inlet valve open at the despatching end of the transmission-tube, a flexible diaphragm to which said catch is connected on one side and having its opposite side exposed to the pressure in the transmission-tube and adapted when actuated by the pressure in said tube to operate said catch and thereby release and permit the closing of the air-inlet valve, and means for regulating the admission of air-pressure from the tube to the diaphragm.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of December, A. D. 1899.

JAMES T. COWLEY.

Witnesses:
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C. A. STEWART.