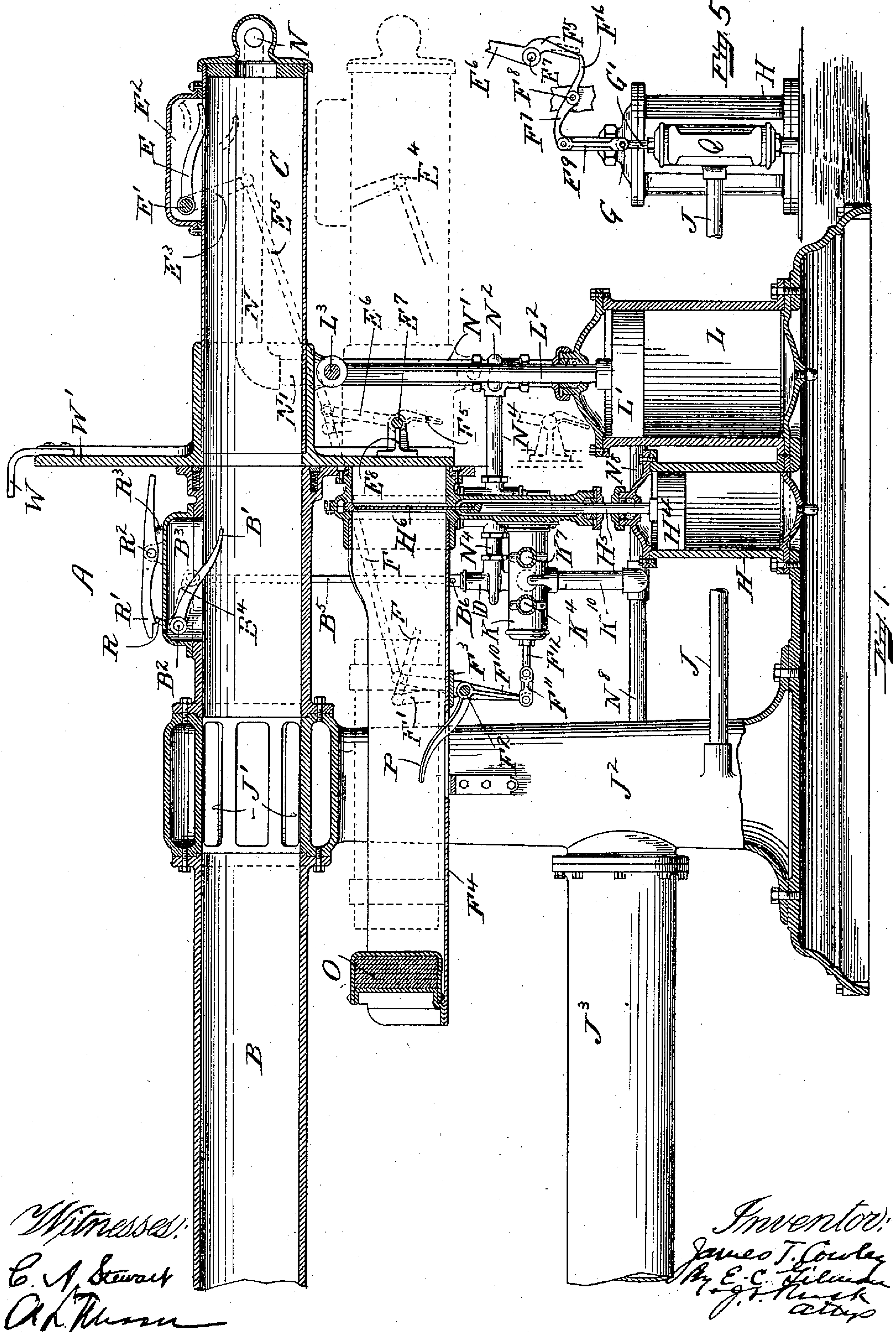
No. 683,387. Patented Sept. 24, 1901.

J. T. COWLEY.

PNEUMATIC DESPATCH TUBE APPARATUS.

(Application filed Feb. 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.



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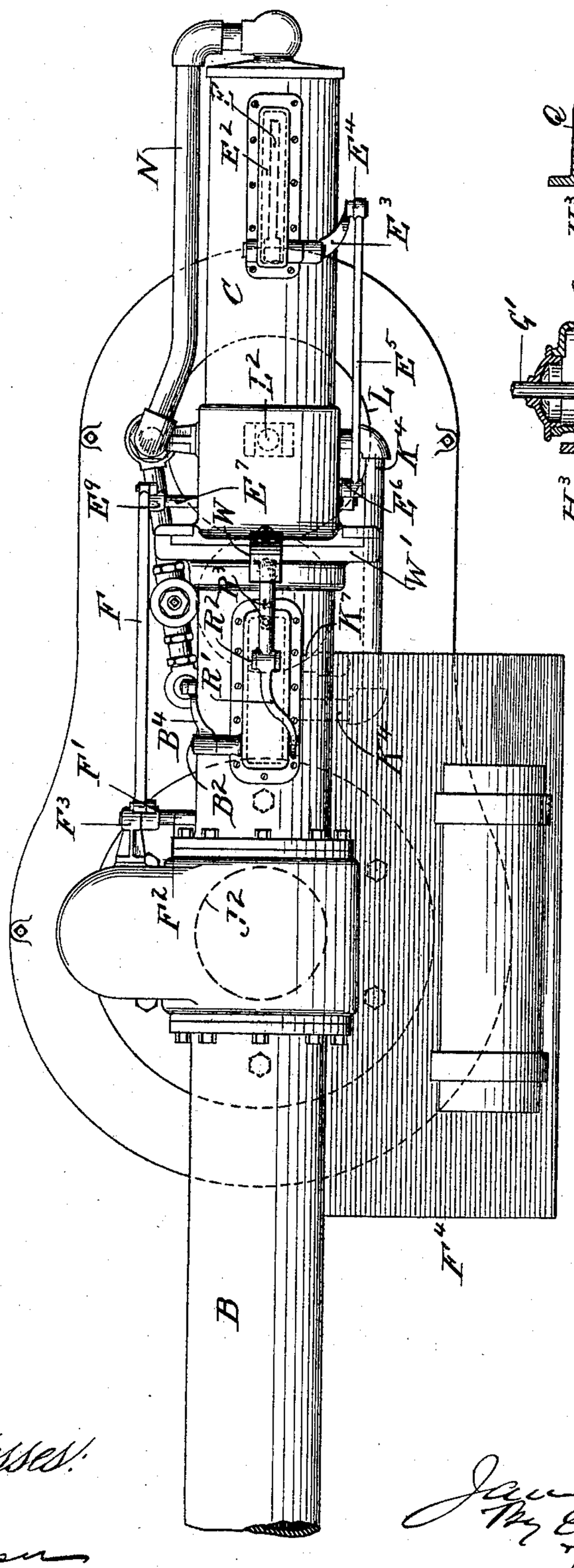

Fig. 2.

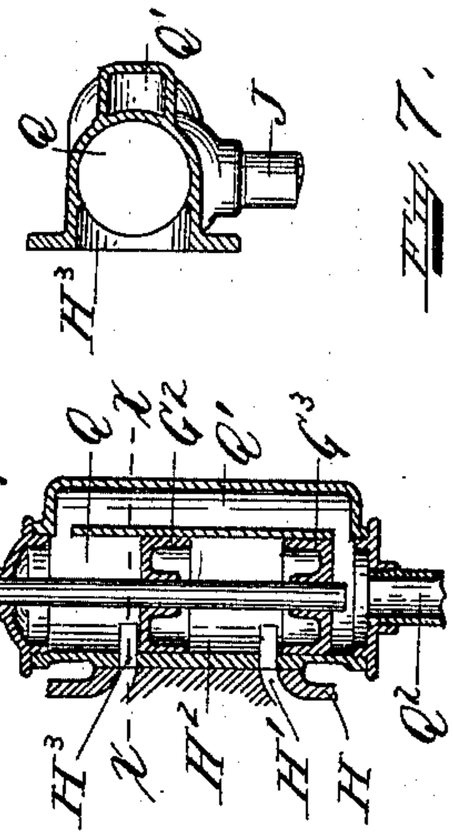

Fig. 7.

Fig. 6.

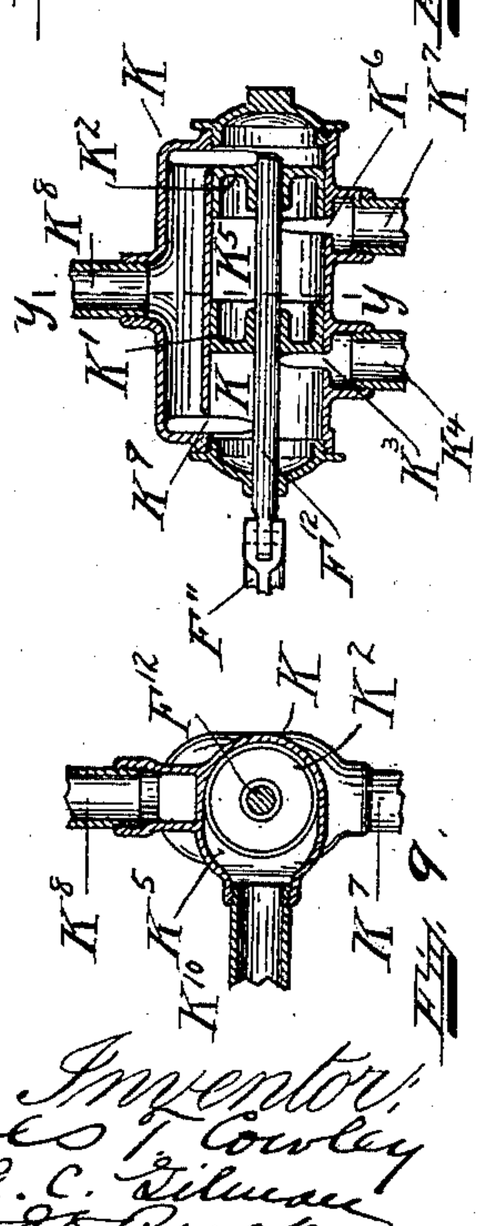

Fig. 8.

Fig. 9.

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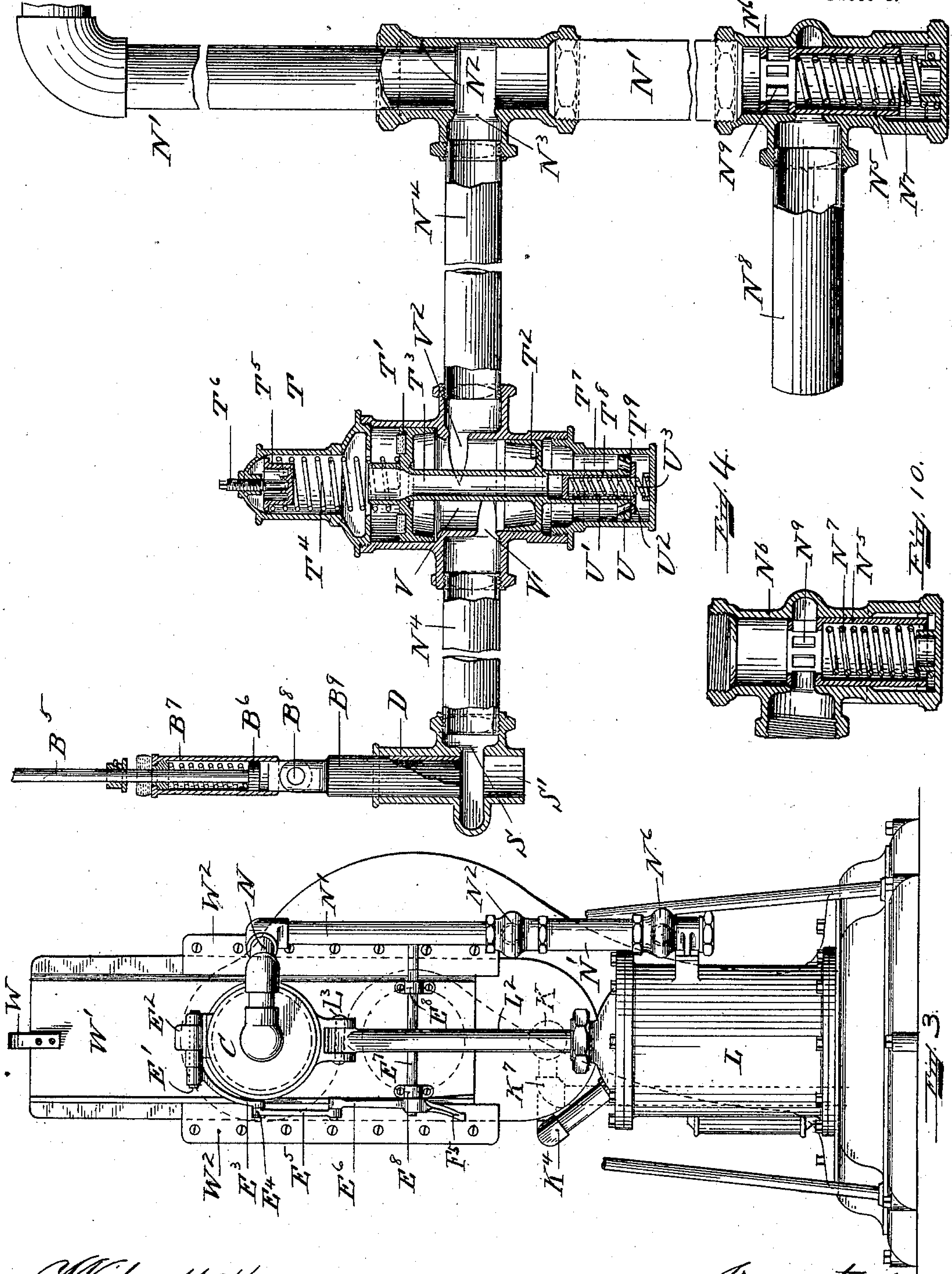

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UNITED STATES PATENT OFFICE.

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PNEUMATIC-DESPATCH-TUBE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 683,387, dated September 24, 1901.

Application filed February 26, 1900. Serial No. 6,464. (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 receivers for use in pneumatic-despatch-tube apparatus; and its object is to provide a receiver which will receive and automatically deliver the carrier.

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 longitudinal vertical section through my improved receiver. Fig. 2 is a top plan view of the same. Fig. 3 is a front end elevation. Fig. 4 is a detail view, partly in section, of certain valves and connections. Fig. 5 is a detail view of the cylinder for operating the gate. Fig. 6 is a sectional view of the valve for admitting air to one of the cylinders. Fig. 7 is a sectional view on the line X X, Fig. 6. Fig. 8 is a cross-sectional view of the valve for admitting air to the cylinder for operating the receiver. Fig. 9 is a sectional view on the line Y Y, Fig. 8. Fig. 10 is a detail view of the valve for admitting air to discharge a carrier.

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

A represents a receiving-terminal at one end of a pneumatic-despatch tube B, with which the receiver C is in alinement. As the carrier passes through the tube B and engages with the lever B′, pivoted at B^2 within the casing B^3 on the upper side of the tube B, the lever B′ is raised and moves with it the arm B^4 on the outer end of the shaft B^2. Pivoted at the outer end of this arm B^4 is a rod B^5, extending downwardly and provided at its lower end with the collar B^6 within the sleeve B^7. This sleeve B^7 is pivoted at B^8 to the valve B^9 within the valve-casing D, so that when the carrier engages with the lever B′ through the connections of the shaft B^2, lever B^4, and rod B^5 the valve-plunger B^9 is raised. The carrier will then continue its movement by momentum and be cushioned upon the air confined within the receiver C. Located near the end of the receiver C is a lever E, pivoted on the shaft E′ within the chamber E^2 on the upper part of the receiver C. The shaft E′ extends outwardly and has mounted on its outer end the lever E^3, and on the lower end of this lever is pivoted at E^4 the rod E^5. The opposite end of this rod is connected to the lever E^6, secured on the shaft E^7, Figs. 1, 2, and 3, journaled in the bracket E^8. On the opposite end of this shaft E^7 and in line with the lever E^6 is mounted another lever E^9, Fig. 2, and to the upper end of this lever is pivoted the link F, and the opposite end is pivoted to the upper end of the lever F′, mounted on the shaft F^2 and journaled in the bearings F^3, secured on the under side of the receiving-table F^4, upon which the carriers are delivered from the receiver C. Extending downwardly from the lever E^6 is a dog F^5 in position to engage with the end F^6 of the lever F^7, pivoted at F^8. (See Fig. 5.) Pivoted to the opposite end of the lever F^7 is a link F^9, the opposite end of which is connected at G to the valve-stem G′. This valve-stem G′ passes downwardly and enters the valve-chamber Q, and within said chamber and on the valve-stem G′ are mounted the plungers G^2 G^3, Fig. 6. These plungers are adapted to move within the chamber Q, and with the plungers in the position shown in Fig. 6 air is admitted into the cylinder through the port H′ from the chamber H^2 between the plungers G^2 G^3, air being supplied to this chamber H^2 from the air-supply pipe J, Fig. 5, connected to the column J^2, which is in communication with the transmission-tube B through the ports J′, and from this column J^2 and through the return-pipe J^3 air is returned to the opposite end of the line. When the plungers G^2 G^3 are raised to the opposite position to that shown in Fig. 6, air will be supplied from the chamber H^2 through the port H^3 to the top of the cylinder H, and the piston H^4 within said cylinder will be lowered, carrying with it the piston-rod H^5 and gate H^6, for a purpose hereinafter described. When a carrier enters the receiver C, it raises the lever E and through the connections of the lever E^3, rod E^5, lever E^6, shaft E^7, rod F, shaft F^2, lever F^{10}, link F^{11}, and

valve-stem F^{12}, secured to the plungers K' K^2 within the valve-chamber K, said plungers K' K^2 will be moved to the opposite position to that shown in Fig. 8 and air will be admitted through the branch pipe K^{10}, connected to the chamber K^5, and from said chamber through the port K^3 into the supply-pipe K^4, leading to the top of the cylinder L, Fig. 3, and the plunger L' within said cylinder will be moved to its lower position, carrying with it the piston-rod L^2, the upper end of which is secured to the receiver C at L^3, and the receiver C will be lowered to the position shown in dotted lines, Fig. 1, and in alinement with the receiving-table F^4. The branch pipe K^{10} is connected to the supply-pipe N^8 in communication with the column J^2.

In communication with the outer end of the receiver C is a pipe N. This pipe passes downwardly at M' and into the valve-casing N^2 and is adapted to slide freely therein. When the pipe N' is in its raised position, as shown in Fig. 4, the end of the pipe is above the opening N^3, so that air can pass from the pipe N' into the pipe N^4, but when the pipe N' is lowered by the lowering of the receiver C the opening N^3 will be shut off and prevent the escape of air from the pipe N'. When the pipe N' is lowered to its lowest position, the end of the pipe will engage with the top of the plunger N^5 within the valve-casing N^6 and lower the plunger N^5 against the tension of the spring N^7 from the position shown in Fig. 4 to that shown in Fig. 10, so that air will be admitted from the air-supply pipe N^8, connected to the column J^2, through the ports N^9 into the pipe N' and through the pipe N' into the receiver C behind the carrier, so that when the receiver is lowered to its lowest position and is opposite the receiving-table F^4 air will be admitted through the pipes N' and N behind the carrier and the carrier will be discharged out upon the table F^4 and will strike against the cushion O, the gate H^6 having been previously lowered in the manner just described. As the carrier passes out of the receiver C and onto the table F^4 it engages with the lever P, secured fast upon the shaft F^2, and through the connections of the lever F^{10}, link F^{11}, and piston-rod F^{12} the plungers K' K^2, secured upon the piston-rod F^{12}, will be moved to the position shown in Fig. 8, and the air-passage from the chamber K^5 between the plungers K' K^2 will be shut off from the port K^3 and pipe K^4, leading to the top of the cylinder L, and the port K^6 will be opened in communication with the chamber K^5, and air will pass from the branch pipe K^{10}, Figs. 1 and 9, leading from the air-supply pipe N^8, connected to the column J^2, into the chamber K^5, and from the chamber K^5 through the port K^6 into the pipe K^7, leading to the bottom of the cylinder L and below the piston L', Fig. 3, and the piston L' will be raised to the position shown in Fig. 1, carrying with it the connecting-rod L^2 and receiver C. The air above the piston L' will escape through the pipe K^4 and ports K^3 and K^9 into the exhaust-pipe K^8, Fig. 8, and thence to the atmosphere. With the receiver returned to its normal position, as just described and as shown in Fig. 1, the parts will again be in position to receive another carrier and the operations will be repeated in the receiver C.

As the carrier passes onto the receiving-table F^4 and lowers the lever P through the connections of the shaft F^2, rod F', link F, and shaft E^7 the dog F^5 is moved out of engagement with the lever F^6, and with the dog F^5 moved out of engagement with the lever F^6 the valve-stem G', carrying the plungers G^2 G^3 within the chamber Q, will be allowed to drop by gravity, and air will be admitted from the pipe J through the chamber H^2, into the port H', into the cylinder H below the piston H^4, and the piston H^4 will be raised, carrying with it the rod H^5 and gate H^6, returning these parts to their normal positions, as shown in Fig. 1, and the air above the piston H^4 will escape through the port Q' into the exhaust-pipe Q^2 and from thence into the atmosphere. The shaft B^2, upon which is mounted the lever B', has fastened upon its outer end the finger R, in position to engage with the catch R', pivoted at R^2 on the top of the casing B^3, so that when the lever B' is raised by the action of the carrier, as above described, moving with it the lever B^4, the catch R', actuated by the spring R^3, will engage with the finger R and hold the lever B' and the rod B^5 in their raised positions. Mounted upon the lower end of the rod B^5 is the valve-plunger B^9, working within the chamber D, which with the valve-plunger B^9 in its lowest position will close the port S and prevent the escape of air from the pipe N^4, and with the valve-plunger B^9 raised to the position shown in Fig. 4 air will be free to pass from the pipe N^4 through the port S and out through the opening S' to the atmosphere. Located on the pipe N^4 is a valve T, having the plungers T' T^2, connected together by the hollow sleeve T^3. These plungers are held in their lowered positions by the spring T^4, one end of the spring bearing against the plunger T' and the opposite end bearing against the cupped washer T^5. This washer bears against one end of the adjusting-screw T^6 for regulating the tension of the spring T^4.

Extending downwardly from the plunger T^2 and within the chamber T^7 is a sleeve T^8, having on its end the plunger T^9, provided with the holes U. Located within the sleeve T^8 is a sleeve U', having the valve U^2 on its lower end and adapted to close the holes U when in its raised position. This sleeve U' is held in its raised position by the spring U^3. On each side of the valve T and communicating with the chamber V of the said valve are the ports V' V^2. The port V' is adapted to be closed by the plunger T^2 when said plunger is raised to close the passage of air tbrough the ports V' V^2. The carrier passing through the tube B will engage with and

raise the lever B′ and plunger B⁹, and these parts will be held in their raised positions. As the carrier continues its movement and passes in through the receiver C air will be compressed ahead of the carrier and the carrier will be cushioned. A portion of the compressed air ahead of the carrier will pass outwardly through the pipe N and down through the pipe N′ and through the pipe N⁴, and the pressure of air within the pipe N⁴ and valve T will act upon the plungers T′ T² within the valve T, and by reason of the plunger T′ being of greater area than the plunger T² the more pressure being exerted upon the plunger T′ the plungers T′ T² will be raised and the port V′ will be closed by the plunger T². This will prevent the escape of air from the pipe N⁴ until the pressure ahead of the carrier in the receiver C has been relieved, which will take place when the carrier is brought to a stop. When the carrier comes to a stop and the pressure within the tube N⁴ is relieved, the spring T⁴ will force the plungers T′ T² downwardly and again open the ports V′ and allow the air to escape to the atmosphere through the opening S′ from in front of the carrier entering the receiver C, and the pressure within the tube B will gradually move the carrier to the end of the receiver C. As the plungers T′ T² rise the liquid within the chamber T⁷ passes down through the openings U in the plunger T⁹ and moves the valve U², so that the liquid passes from the top to the bottom of the chamber T⁷, and upon the descent of the plunger T⁹ the openings U are closed by the valve U² and the liquid passes up around the edges of the plunger T⁹, as a slight space is left around the plunger, as shown in Fig. 4, for the movement of the liquid when the plungers T′ T² move downwardly. As the carrier approaches the end of the receiver C it will engage with and raise the lever E, and through the connections previously described the plungers K′ K², Fig. 8, will be moved and air admitted above the piston L′ within the cylinder L, and the receiver C will be lowered to the position shown in dotted lines, Fig. 1, in which position the carrier will be discharged upon the receiving-table F⁴, as above described. As the receiver C approaches its lowest position the finger W, fastened on the upper end of the vertically-movable plate W′ of the receiver C′, working within the guide W², will release the catch R′ from the finger R, allowing the rod B⁵ and plunger B⁹ to drop and close the port S and prevent a further escape of air to the atmosphere from the pipe N⁴. With the receiver C in its lowest position the plate W′ will close the opening of the tube B and prevent the escape of air therefrom.

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 apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, and mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier.

2. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, and mechanism located in the path of the discharged carrier and operated thereby to move said valve to admit air into said cylinder to move the receiver to its normal position in alinement with the transmission-tube.

3. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, and mechanism located in the receiver in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier.

4. In a pneumatic-despatch-tube apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, mechanism located in the receiver in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder, to move the receiver from alinement with the transmission-tube for the discharge of the carrier, a valve controlling the flow of air-pressure into said receiver to discharge a carrier and adapted to be operated by the movement of the receiver from alinement with the transmission-tube to admit air to said receiver to discharge a carrier, and mechanism located in the path of the discharged carrier and operated thereby to move said cylinder-controlling valve to admit air into said cylinder to move the receiver to its normal position in alinement with the transmission-tube.

5. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston con-

nected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, and mechanism located in the receiver in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier.

6. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a vertically-reciprocating receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, a receiving-table for receiving the discharged carrier, a gate closing the entrance to said table, a cylinder, a piston located in said cylinder and connected to said gate for operating the same, a valve controlling the admission of air-pressure to said gate-operating cylinder, mechanism for operating said valve and adapted to be operated by the movement of the receiver to admit air into said gate-operating cylinder to move the same and open the gate to allow the discharge of the carrier from the receiver onto the receiving-table.

8. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, a receiving-table for receiving the discharged carrier, a gate closing the entrance to said table, a cylinder, a piston located in said cylinder and connected to said gate for operating the same, a valve controlling the admission of air-pressure to said gate-operating cylinder, mechanism for operating said valve and adapted to be operated by the movement of the receiver to admit air into said gate-operating cylinder to move the same and open the gate to allow the discharge of the carrier from the receiver onto the receiving-table, mechanism located in the path of the discharged carrier and operated thereby to move the valve controlling the flow of air to the receiver-operating cylinder to actuate the piston therein to move the receiver from alinement with the receiving-table into alinement with the transmission-tube, and mechanism operated by the movement of the receiver into alinement with the transmission-tube to cause the movement of the valve controlling the entrance of air into the gate-operating cylinder to operate the piston therein and close the said gate.

9. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air-pressure into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, a valve controlling the flow of air-pressure into said receiver to discharge a carrier and adapted to be operated by the movement of the receiver from alinement with the transmission-tube to admit air to said receiver to discharge a carrier, and mechanism located in the path of the discharged carrier and operated thereby to move the valve controlling the flow of air-pressure to the receiver-actuating cylinder to admit air into said cylinder to move the receiver to its normal position in alinement with the transmission-tube.

10. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, an outlet from said receiver for the escape of air compressed by the traveling carrier, a valve actuated by the air compressed by the traveling carrier and adapted to close the escape of compressed air from the receiver to cushion a carrier in the receiver, and a valve located in the outlet from said receiver and operated by the traveling carrier to open said outlet to the atmosphere.

11. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of the air into said

cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, an outlet from said receiver for the escape of air compressed by the traveling carrier, a valve actuated by the air compressed by the traveling carrier and adapted to close the escape of compressed air from the receiver to cushion a carrier in the receiver, a valve located in the outlet from said receiver and operated by the traveling carrier to open said outlet to the atmosphere, and a catch adapted to hold said valve in its open position and adapted to be operated by the movement of the receiver to release said valve and allow the same to close.

12. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable receiver, a source of air-pressure, a cylinder having a piston connected to said receiver, a valve controlling the flow of air into said cylinder to operate the piston therein, mechanism located in the path of the traveling carrier and operated thereby to actuate said valve to admit air to said cylinder to move the receiver from alinement with the transmission-tube for the discharge of the carrier, a pipe communicating with said receiver and forming an exhaust from said cylinder, a valve actuated by the air compressed by the traveling carrier and adapted to close the escape of compressed air from the receiver to cushion the carrier in the receiver, means for opening said valve after the carrier is cushioned, an air-supply for discharging the carrier from the receiver, and a valve normally controlling the flow of air from said air-supply through said pipe and adapted to be opened by the movement of the receiver from alinement with the transmission-tube to admit air into said pipe to discharge the carrier from said receiver.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of February, A. D. 1900.

JAMES T. COWLEY.

Witnesses:
A. L. MESSER,
C. A. STEWART.