

No. 706,639.

Patented Aug. 12, 1902.

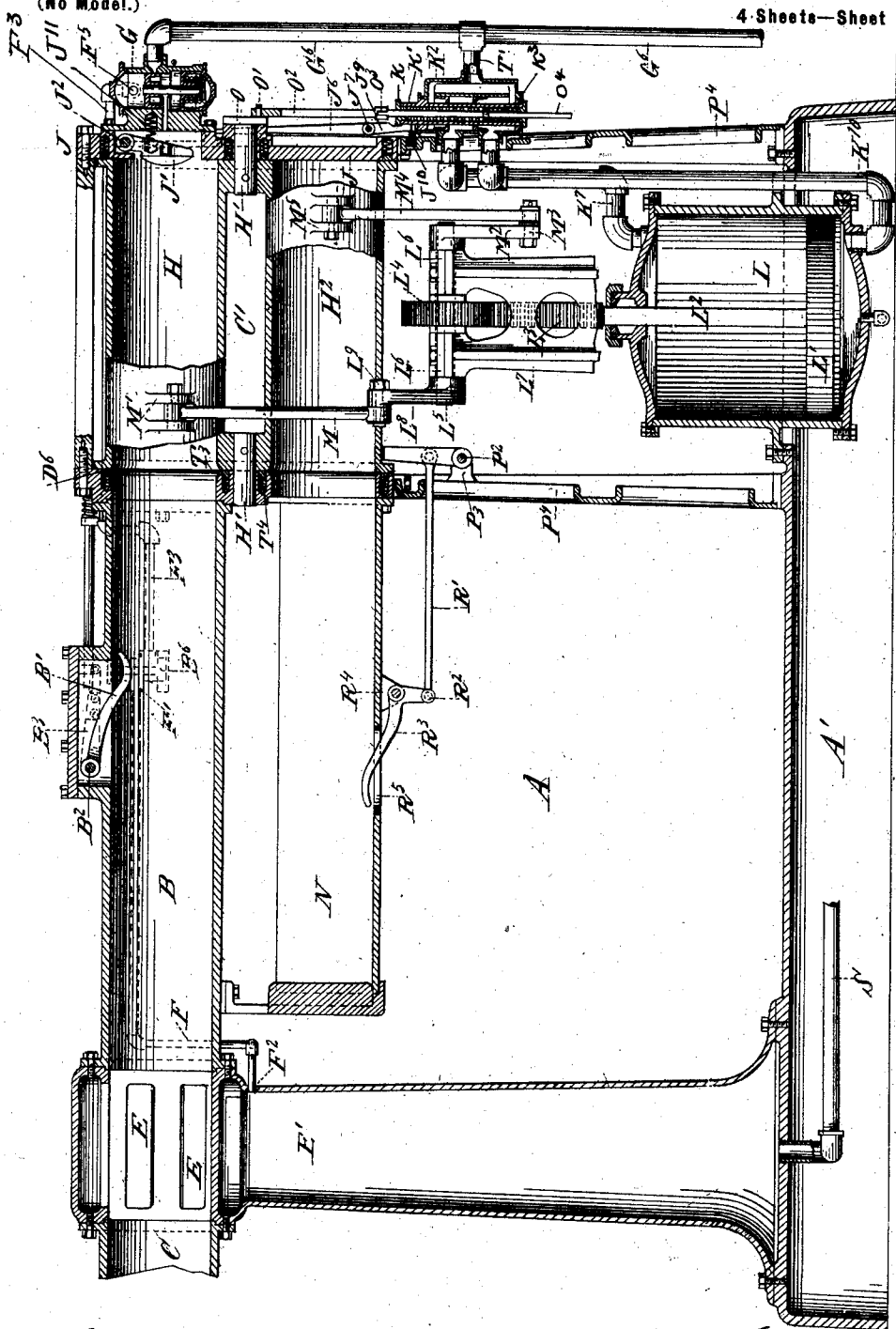
J. T. COWLEY.

PNEUMATIC DESPATCH APPARATUS.

(Application filed Nov. 27, 1899. Renewed Dec. 14, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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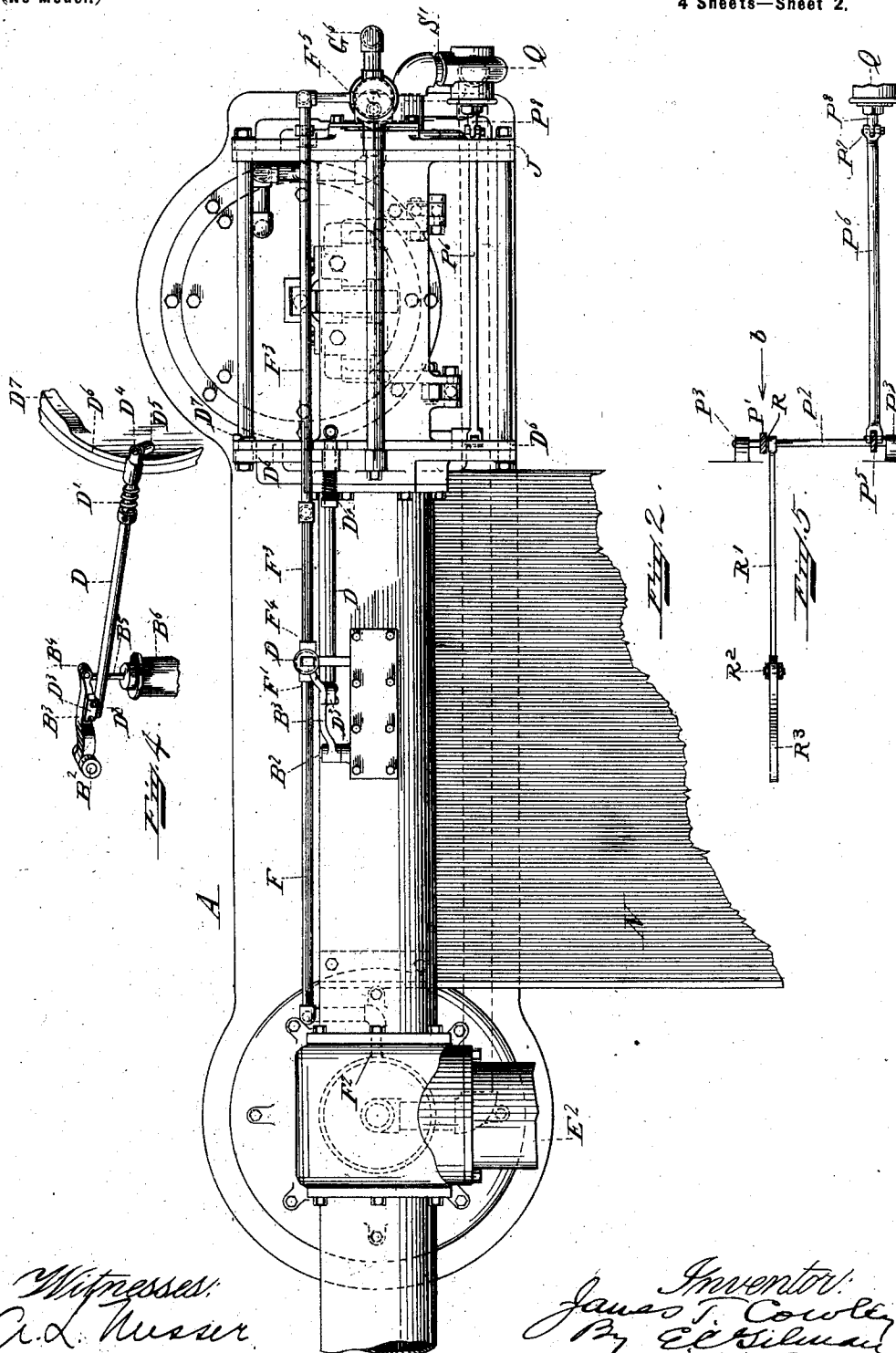
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(No Model.)

4 Sheets—Sheet 2.



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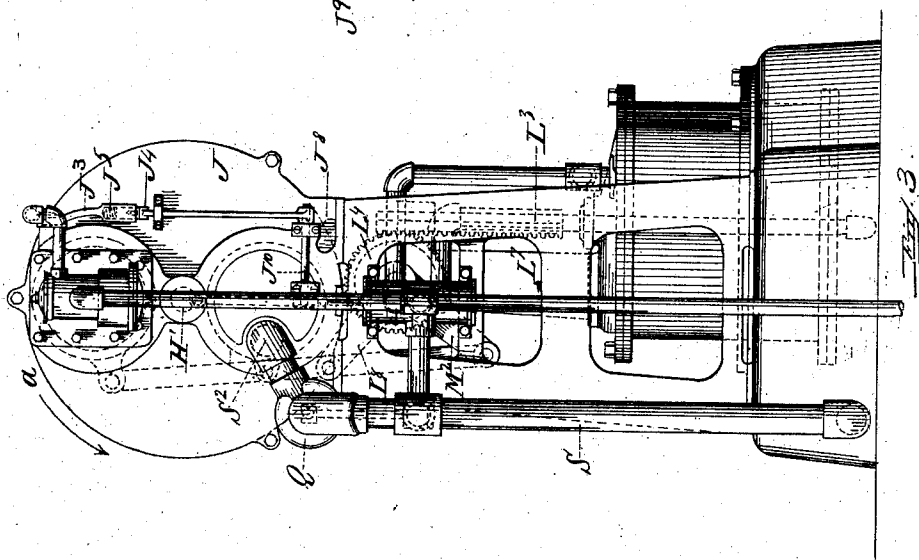
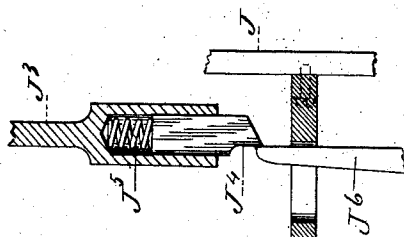
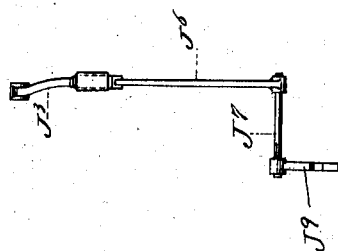
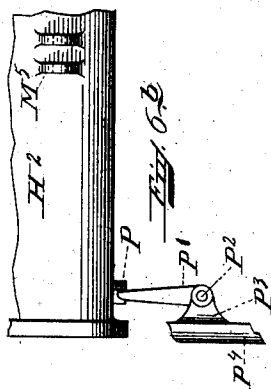
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(Application filed Nov. 27, 1899. Renewed Dec. 14, 1901.)

(No Model.)

4 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC-DESPATCH APPARATUS.

SPECIFICATION forming part of Letters Patent No. 706,639, dated August 12, 1902.

Application filed November 27, 1899. Renewed December 14, 1901. Serial No. 85,912. (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 Apparatus, of which the following is a specification.

My invention relates to improvements in receivers for use in pneumatic-despatch apparatus; and its object is to provide a receiver which will receive and automatically deliver a 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 central section through the receiving-terminal with some of the parts in full lines. Fig. 2 is a top plan view of the receiving-terminal. Fig. 3 is a front end elevation of the receiving-terminal. Fig. 4 is a detail view of a tripping device hereinafter described. Fig. 5 is a plan detail view of valve-operating levers hereinafter described. Fig. 6 is an end view of a tripping device for reversing one of the valve mechanisms. Fig. 6^a is an enlarged detail sectional view of a pawl mechanism hereinafter described. Fig. 6^b is a detail view of part of the receiver and valve-operating mechanism hereinafter described. Figs. 7, 8, and 9 are respectively sectional, top, and front views of the valve mechanism which regulates the escape of air after the carrier has been cushioned in the receiving-terminal. Figs. 10, 11, and 12 are respectively top, sectional, and front views of the valve mechanism for controlling the air which discharges the carrier from one of the receiving-tubes. Figs. 13, 14, and 15 are respectively sectional top, longitudinal central, and side views of the valve mechanism for controlling the air which reverses the receiving-tubes. Figs. 16 and 17 are respectively sectional and top views of the valve mechanism which regulates the flow of air to operate the valve mechanism which controls the escape of air which cushions the carrier.

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

A represents a receiving-terminal at one end of the pneumatic-despatch tube, and consists of a tube B in alinement with the pneumatic tube C, and at the end of the tube B is a receiver C', consisting of two receiving-tubes, to be hereinafter described. As a carrier enters the tube B from the pipe C it strikes the lower end of the lever B', secured fast on the shaft B², to which is also secured fast the lever B³, and the outer end of the lever B³ is connected to the eye B⁴ on the valve-rod B⁵, and within the valve-casing B⁶ the rod B⁵ is connected to the plungers B⁷ B⁸, and as the lever B' is raised by the movement of the carrier through the connections above described the plungers B⁷ B⁸ are raised, closing the port C², and at the same time the rod D is forced by the spring D' so that its end D² comes under the lug D³ on the lever B³ and holds said lever and valve-rod D⁵ in the upper position, Fig. 4, and to the opposite end D⁴ of said rod D is secured the roll D⁵, which as the rod D moves forward under the influence of the spring D' comes in contact with the inner flange D⁶ on the inner end of the receiver C'. This flange D⁶ is provided with a cam D⁷, for a purpose hereinafter described.

The pressure which has driven the carrier into the tube B passes through the perforations E down into the column E' and, with the parts in normal position, would all pass out through the opening E², either returning to another tube to the starting-point or to the atmosphere. The valve-casing B⁶ is connected to the pipe F at F', and the opposite end of said pipe is connected to the column E' at F² and is supplied with air-pressure from said column. The pipe F³ is connected at F⁴ to the valve-casing B⁶, and the opposite end of the pipe F³ is connected at the outlet F⁵ in the upper end of the valve-casing G. Within the valve-casing G are disks G' G², connected to the stem G⁴. Before the lever B' is raised by the carrier, as previously stated, the air-pressure from the column E' will pass through the pipe F, the ports C³ and C² of the valve-cas-

ing B, and through the pipe F³ into the top of the valve-casing G through the inlet F⁵ and will exert a pressure upon the upper side of the plunger G', holding the plungers G' G² in the position shown in Fig. 7 against the tension of the spring G⁴, thereby closing the exhaust-port G⁵, leading to the exhaust-pipe G⁶. In this condition of the parts the plunger G' closes the port G⁵, thereby closing the outlet 10 from the tube H of the receiver C' through the passage G⁷ and the exhaust-pipe G⁶, as shown in Fig. 1, where it is also shown that the valve-casing G is secured to the fixed head J, and by means of the pins H' the receiving-tubes H and H² of the receiver C' are pivotally mounted and adapted to revolve so as to bring one or the other into alinement with the tube B to receive a carrier coming through the despatch-tube C. When the carrier has 20 entered and raised the lever B' and moved the connected parts as previously described, the plunger B³ will be raised above the port C² and the pressure in the pipe F³ will be released to the atmosphere through the opening C⁴, which will relieve the pressure on top of the plunger G' and allow the spring G⁴ to raise the plungers G' G² and open the port G⁵, allowing the air to escape from the tube H through the passage G⁷ into the exhaust-pipe 30 G⁶. Before the plungers G' G² have moved as above described the carrier in its forward movement will compress the air in the receiving-tube H, thereby forming a cushion for the carrier. This increased air-pressure in front 35 of the carrier will pass through the passage G⁷ and will act upon the plunger G², which is greater in area than the plunger G', and will hold the plunger G² down against the tension of the spring G⁴, thereby holding the port G⁵ closed by the plunger G' until the increased pressure in front of the carrier is relieved, which will take place when the carrier is brought to a stop.

As soon as a carrier has come to a stop and 45 the increased pressure in front of the carrier is removed the spring G⁴ will raise the plungers G' G², opening the port G⁵ and allowing the air to escape from the tube H through the passage G⁷ and port G⁵ into the exhaust-pipe 50 G⁶ and thence to the atmosphere, as previously described. The pressure being entirely removed from in front of the carrier, the carrier will be moved forward in the tube H by the pressure of the air in the tube B until the 55 forward end of the carrier strikes the lever J', secured to the shaft J², mounted in the head J. To the outer end of this shaft J² is secured the lever J³, which has at its lower end the pawl J⁴, held in its outer position by the spring J⁵. This pawl is adapted to engage 60 with the upper end of the lever J⁶, mounted on the shaft J⁷, which is journaled in the bearings J⁸ on the head J. To the opposite end of this shaft J⁷ is secured the lever J⁹, the lower end of which engages with the flange K on the valve-stem K' in the valve-casing K² and holds the valve-stem K' in its

raised position (shown in Figs. 1 and 14) 70 against the tension of the spring K³. As the carrier strikes the lever J' through the connections above described the lever J⁹ is released from the flange K on the valve-stem K' and allows the spring K³ to lower the valve-stem K' to the lower position from that shown in 75 Figs. 1 and 14, so as to bring the top of the plunger K⁸ below the ports K⁹. The lower end of the lever J⁹ will then be moved outwardly by the action of the spring J¹⁰, so that the lower end of the lever J⁹ will pass above the flange K and prevent the valve-stem K' 80 from rising until the lever J⁹ is again released from the top of the flange K. In this position the air from the supply-pipe K⁴ will enter the chamber K⁵ and pass through the port K⁹ into the pipe K¹⁰ and thence be carried 85 to the bottom of the cylinder L and below the piston L'. The pressure of the air acting on the piston L' will raise the plunger to an upper position in the cylinder L. As the piston L rises, carrying with it the piston-rod 90 L², the rack L³, mounted on the upper end of said piston-rod L², is moved upward, and said rack being in mesh with the gear L⁴ will rotate the said gear. The gear L⁴ is secured to the shaft L⁵, mounted in the bearings L⁶ on 95 the bracket L⁷, Fig. 1, secured to the top of the cylinder L, Fig. 3. On one end of the shaft L⁵ is mounted fast the lever L⁸, having a stud L⁹, on which is loosely mounted the connecting-rod M. The upper end of the 100 connecting-rod M is journaled in the lugs M' on the receiving-tube H. On the opposite end of the shaft L⁵ is mounted fast the lever M², having a stud M³ in its opposite end, on which is journaled one end of the connect- 105 ing-rod M⁴, the opposite end of the rod M⁴ being journaled in the lugs M⁵ of the receiving-tube H². The levers L⁸ and M² are located on the shaft L⁵ at an angle to each other in the positions shown in Fig. 3, the 110 lengths of the connecting-rods M and M⁴ being equal, and also the distance from the centers of the lugs M' and M⁵ and the bearings H' and the distance from the centers of the studs L⁹ and M³ and the shaft L⁵ are equal, 115 so that when the shaft L⁵ is rotated by the rack L³ working in the gear L⁴ (the carrier being located in the receiving-tube H, as above described, and having caused the operation of the valve to admit air to the bot- 120 tom of the cylinder L, as above stated) the receiver C' is rotated in the direction of the arrow a, Fig. 3, so that the receiving-tube H will be moved to the position before occupied by the receiving-tube H², Fig. 1, and 125 the receiving-tube H² will be rotated to occupy the former position of the receiving-tube H. In this reversed position of the receiving-tubes the carrier will be lowered to the position opposite the receiving-table N 130 and in position to be discharged thereon. As the receiver C' rotates the cam D⁷ on the flange D⁶, Fig. 4, passing under the roll D⁵, mounted on the end of the rod D, moves the

end D² of the rod D from under the lug D³ of the lever B³ and allows the lever B³ to drop, carrying with it the lever B' within the tube B back to its normal position, Fig. 1, and in position to be again operated by the incoming carrier, and the operation will be the same as previously described for the carriers entering a receiving-tube of the receiver C'. As the receiver C' rotates to reverse the positions of the receiving-tubes H and H² the cam P, Fig. 6^b, will engage with the upper end of the lever P', mounted on the shaft P², journaled in the lugs P³ of the frame P⁴, and move the lever P' in the direction of the arrow b, Fig. 5. On the shaft P² is secured the lever P⁵, to the upper end of which is secured the connecting-rod P⁶. The opposite end of this connecting-rod is secured to the eye P⁷ of the valve-stem P⁸ in the valve-casing Q. Pivoted to the lever P' at R is the connecting-rod R', the opposite end of which is pivoted at R² to the lower arm of the lever R³, which is pivoted to the lug R⁴. The upper end of this lever projects up through the slot R⁵ in the receiving-table N in position to be engaged by the carrier when it is discharged on said receiving-table. As the valve-stem P⁸ is moved outwardly, as above described, carrying with it the plunger Q', so that the plunger will move beyond the port Q², Fig. 11, air will be admitted from the supply-pipe S through the circular ports Q³ into the pipe S', leading to the opening S² (dotted lines, Fig. 3) in the head J. The said opening S² connects with the lower receiving-tube and allows the air to pass through said opening into the receiving-tube H, which, as above described, has been brought around to the lower position into alinement with the table N and ejects the carrier from the tube H onto the receiving-table N. As the carrier passes onto the receiving-table N it will engage with and depress the lever R³ and through the connections of the rod R', lever P⁵, and connecting-rod P⁶ the plunger Q' in the valve-casing Q will be moved to close the port Q², Fig. 11, shutting off the supply of air from the supply-pipe S and the opening S².

On the end of the outer bearing H' is mounted the flange O, having a pin O', upon which is mounted one end of the connecting-rod O². The opposite end of this connecting-rod is secured to the eye O³ on the rod O⁴ in the valve-stem K'. The rod O⁴ has a collar O⁵, Fig. 14, secured to it within the valve-stem K' above the spring K³. Within the valve-stem K' is also located the spring O⁶, in position to be acted upon by the collar O⁵ when the rod O⁴ is raised. As the receiver C' rotates, carrying with it the bearing H', the flange O, and pin O', through the connections above described, raise the rod O⁴ and move with it the collar O⁵, compressing the spring O⁶ and relieving the tension of the spring K³. The action of the spring O⁶ will then be to lift the valve-stem K'; but as the valve-stem K' is held down by the lever J⁹ being above the

flange K the valve-stem K' cannot be raised by the spring O⁶ until the lever J⁹ is released, which will take place when another carrier enters one of the receiving-tubes of the receiver C'. When another carrier enters one of the receiving-tubes and moves the lever J' against the tension of the spring J¹¹ and releases the lever J⁹, as above described, and allows the spring O⁶ to raise the valve-stem K', the plunger O⁷ will be raised to the position shown in Fig. 14, admitting air from the valve-chamber K⁵ through the port K⁶, into pipe K⁷, leading to the upper end of the cylinder L, and the air-pressure on the piston L' in the cylinder L will lower the piston to the position shown in Fig. 1, restoring all the parts to their normal positions, as shown in Fig. 1.

It will be noted that with the plungers in the valve-casing K² in the positions shown in Fig. 14 the exhaust-air passing through the pipe K¹⁰ and port K⁹ will pass out through the port T, and thence to the exhaust-pipe T', then into the exhaust-pipe G⁶, and with the plungers in the valve-casing K² in the lower position, as above described, the exhaust-air will pass through the pipe K⁷ and port K⁶, and through the port T² into the pipe T, and thence to the exhaust-pipe G⁶.

Located on opposite ends of the receiver C' are a series of packing-rings T³ and spring T⁴, packing the receiver C', so as to prevent leakage of the air.

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 despatch-tube, a terminal, a receiver for the carriers consisting of two receiving-tubes, mechanism consisting of a shaft having arms for moving said tubes and connecting-rods engaging with said arms and with said tubes, the connections on said arms and on said tubes being of equal distances from the centers of revolution, and mechanism for operating said shaft and connecting-rods.

2. In a pneumatic-despatch apparatus, a despatch-tube, a terminal, a receiver for the carriers consisting of two receiving-tubes, mechanism consisting of a shaft having arms for moving said tubes and connecting-rods engaging with said arms and with said tubes, the connections on said arms and on said tubes being of equal distances from the centers of revolution, a gear-wheel fast on said shaft, a cylinder, a piston located on said cylinder and provided with a piston-rod to engage with said gear-wheel and operate the same upon the movement of the piston, and an air-supply for operating said piston.

3. In a pneumatic-despatch apparatus, a despatch-tube, a terminal, a receiver for the carrier consisting of two receiving-tubes, mechanism consisting of a shaft having arms for moving said tubes and connecting-rods en-

gaging with said arms and with said tubes, the connections on said arms and on said tubes being of equal distances from the centers of revolution, a gear-wheel fast on said shaft, a cylinder, a piston located on said cylinder and provided with a piston-rod having on its outer end a rack adapted to engage with said gear-wheel and operate the same upon the movement of the piston, and an air-supply for operating said piston.

4. In a pneumatic-despatch apparatus, a despatch-tube, a receiver, means for cushioning the carrier by the air compressed ahead of the traveling carrier, and means for releasing the compressed air ahead of the carrier after the carrier has been cushioned so that the pressure behind the carrier will move it to the end of the receiver.

5. In a pneumatic-despatch apparatus, a despatch-tube, a receiver, means for cushioning the carrier by the air compressed ahead of the traveling carrier, and means operated by the carrier for releasing the compressed air ahead of the carrier after the carrier has been cushioned so that the pressure behind the carrier will move it to the end of the receiver.

6. In a pneumatic-despatch apparatus, a despatch-tube, a receiver, means for cushioning the carrier, means operated by the air compressed ahead of the carrier for preventing the escape of the compressed air ahead of the carrier until the carrier has been cushioned, and means for releasing the compressed air ahead of the carrier after the carrier has been cushioned so that the pressure behind the carrier will move it to the end of the receiver.

7. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carriers consisting of receiving-tubes, mechanism for moving one of said tubes out of alinement with the despatch-tube for the discharge of the carrier and for moving another tube into alinement with the despatch-tube to receive a carrier from said despatch-tube, and mechanism located in the path of the carrier and operated thereby to actuate the mechanism for moving the receiver to discharge a carrier.

8. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carriers consisting of receiving-tubes, mechanism for moving one of said tubes out of alinement with the despatch-tube for the discharge of the carrier and for moving another tube into alinement with the despatch-tube to receive a carrier from said despatch-tube, mechanism located in the path of the traveling carrier and operated thereby to admit air for operating said receiver-moving mechanism, and an air-supply for operating said receiver-moving mechanism.

9. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carriers consisting of receiving-tubes, mechanism for moving one of said tubes out of alinement with the despatch-tube for the discharge of

the carrier and for moving another tube into alinement with the despatch-tube to receive a carrier from said despatch-tube, an air-supply for operating said receiver-moving mechanism, mechanism located in the path of the traveling carrier and operated thereby to actuate the receiver-moving mechanism by air from said supply, and means for discharging the carrier.

10. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carriers consisting of receiving-tubes, mechanism for moving one of said tubes out of alinement with the despatch-tube for the discharge of the carrier and for moving another tube into alinement with the despatch-tube to receive a carrier from said despatch-tube, an air-supply for operating said receiver-moving mechanism, mechanism located in the path of the traveling carrier and operated thereby to actuate the receiver-moving mechanism by air from said air-supply, an air-supply for discharging the carrier, and means for admitting air to discharge the carrier.

11. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carriers consisting of receiving-tubes, a source of compressed air, mechanism operated by compressed air from said source for moving one of said tubes out of alinement with the despatch-tube for the discharge of the carrier and for moving another tube into alinement with the despatch-tube to receive a carrier from said despatch-tube, an air-supply for operating said receiver-moving mechanism, mechanism located in the path of the traveling carrier and operated thereby to admit air to said receiver-moving mechanism for operating said receiver-moving mechanism, and means for discharging the carrier.

12. In a pneumatic-despatch apparatus, a despatch-tube, a receiver for the carrier, mechanism for removing said receiver out of alinement with the despatch-tube for the discharge of a carrier, an air-supply for operating said mechanism, mechanism located in the path of the carrier and operated thereby to actuate said mechanism for moving the receiver for the discharge of a carrier, an air-supply for discharging said carrier, means for admitting air from said air-supply to discharge a carrier, and means operated by the discharged carrier for cutting off the air-supply which discharges the carrier.

13. 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, and a valve controlling the flow of air-pressure into said receiver to discharge

the carrier and adapted to be operated by the movement of the receiver from alinement with the transmission-tube to admit air into said receiver to discharge the carrier.

- 5 14. 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
 10 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
 15 transmission-tube for the discharge of the carrier, an outlet from said receiver for the escape of the air compressed by the traveling carrier, and a valve actuated by the air compressed by the traveling carrier and
 20 adapted to close the escape of compressed air from the receiver to cushion the carrier in the receiver.

- 15 15. In a pneumatic-despatch apparatus, a transmission-tube for the carriers, a movable
 25 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
 30 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 the air compressed by the traveling
 35 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 the carrier in the receiver, and means for opening said valve after the carrier has been cushioned.
 40

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 11th day of November, A. D. 1899.

JAMES T. COWLEY.

Witnesses:

A. L. MESSER,
 C. A. STEWART.