E. A. FORDYCE.

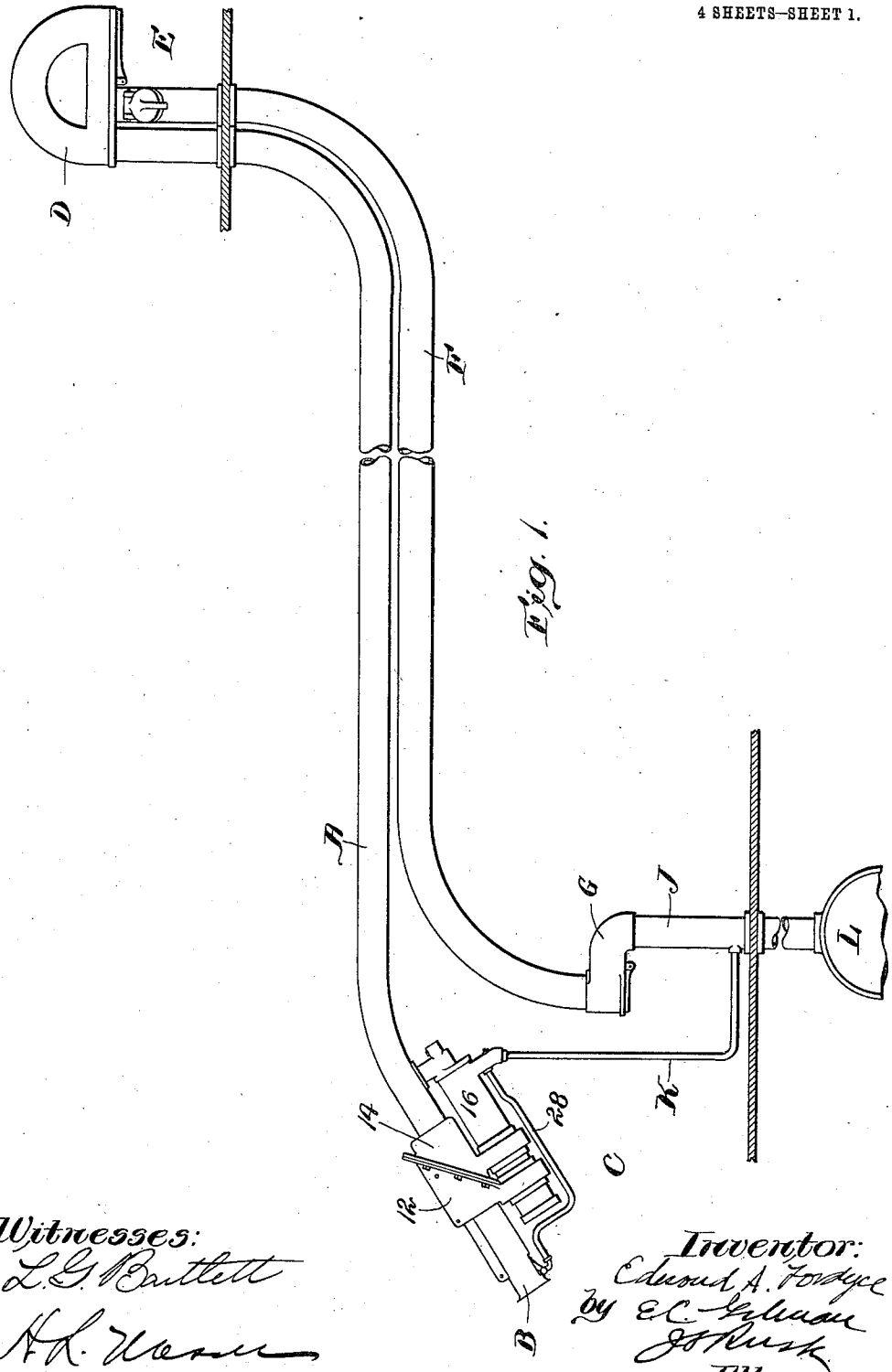
PNEUMATIC DESPATCH TUBE APPARATUS.

APPLICATION FILED FEB. 16, 1907.

1,044,878.

Patented Nov. 19, 1912.

4 SHEETS—SHEET 1.



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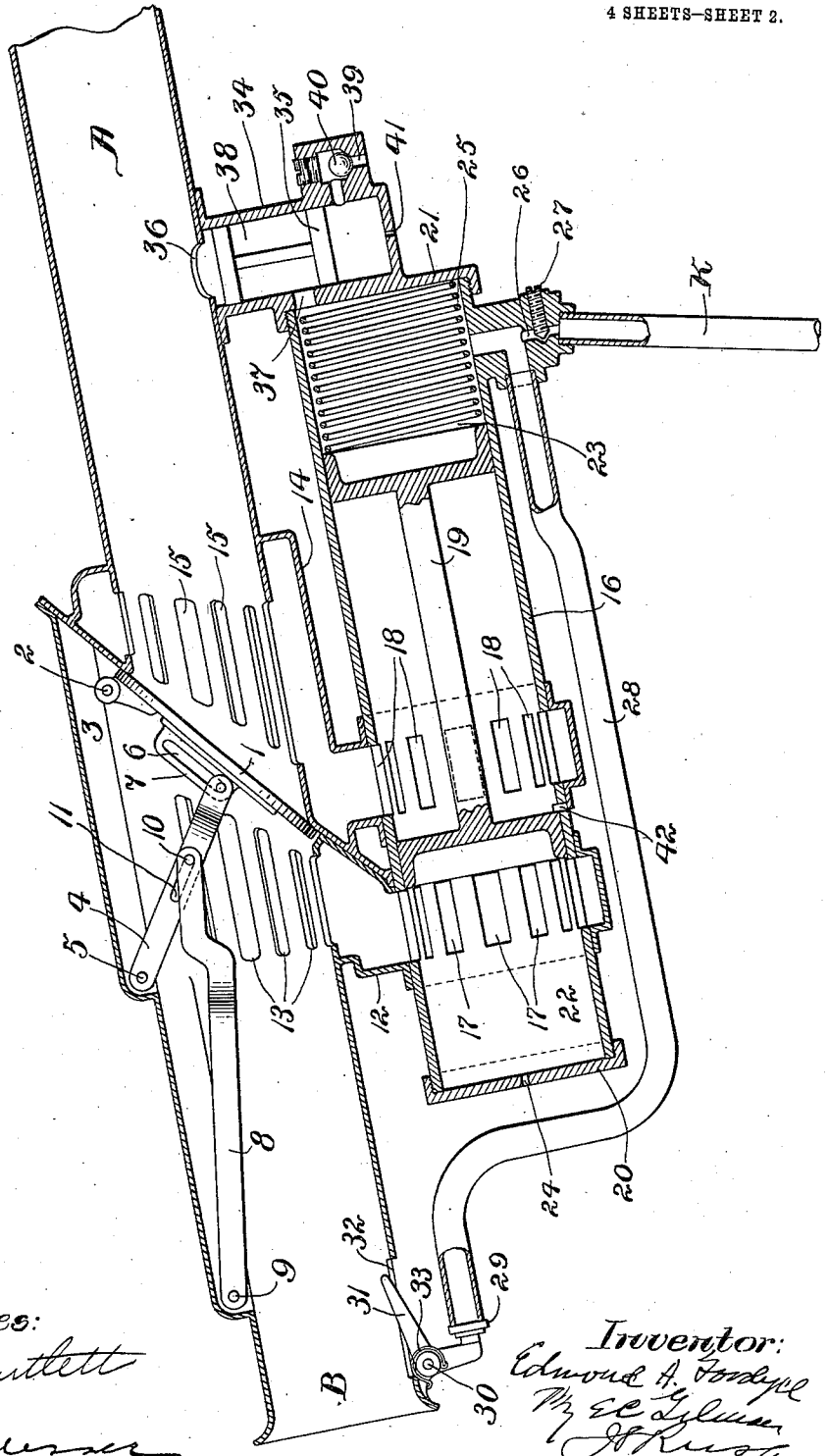

Fig. 2.

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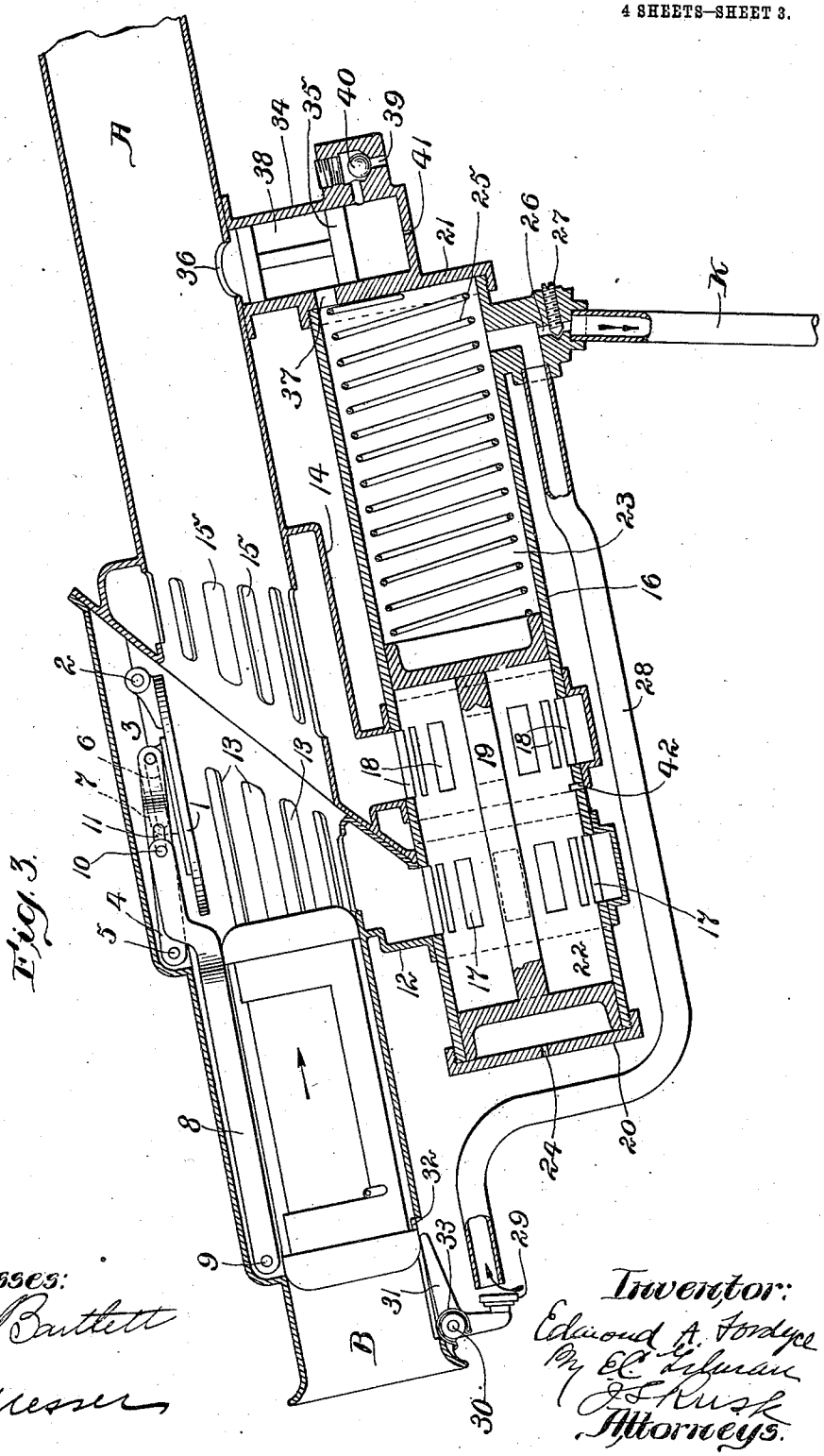

Fig. 3.

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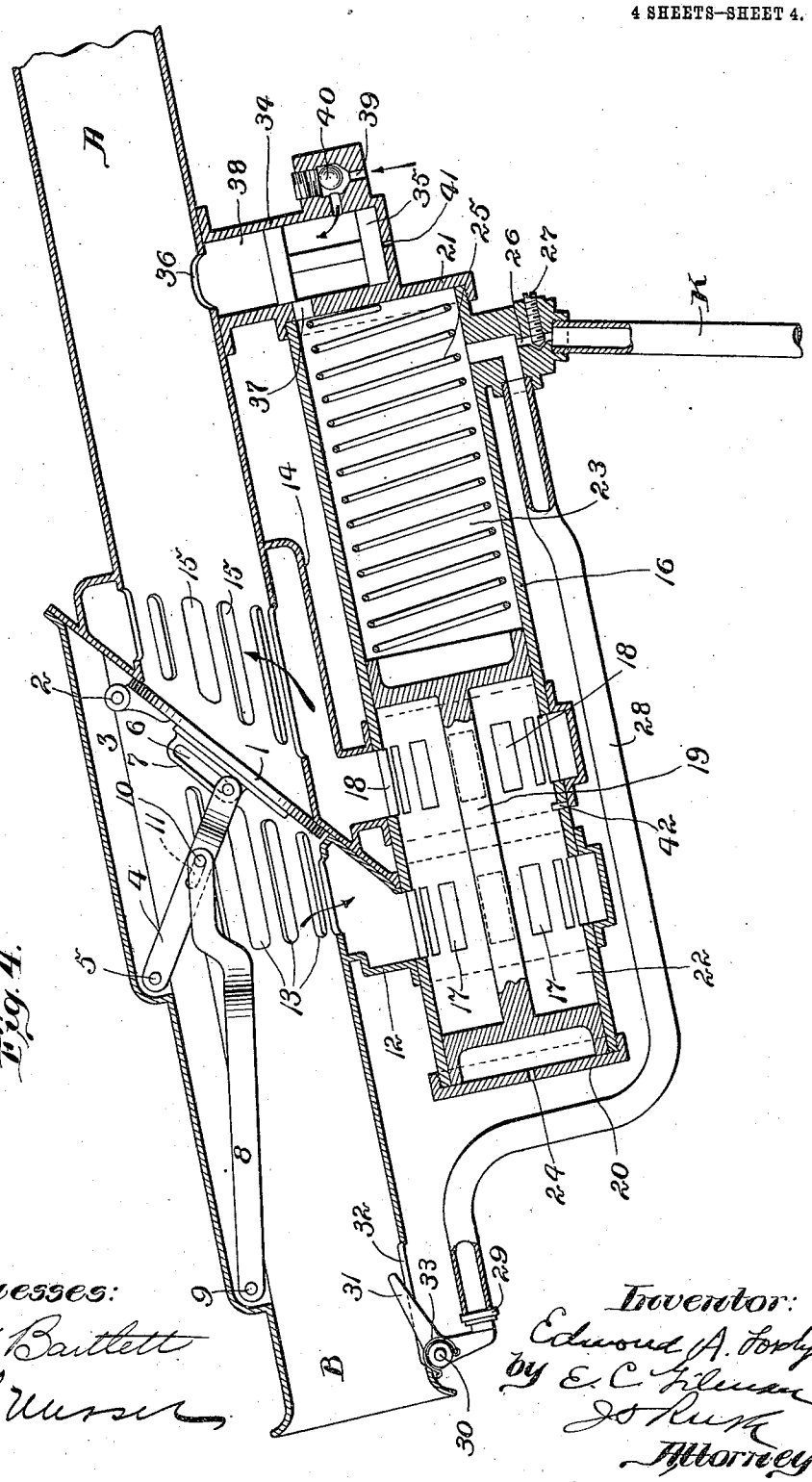

Fig. 4.

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UNITED STATES PATENT OFFICE.

EDMOND A. FORDYCE, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN PNEUMATIC SERVICE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE.

PNEUMATIC-DESPATCH-TUBE APPARATUS.

1,044,878. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed February 16, 1907. Serial No. 357,618.

To all whom it may concern:

Be it known that I. EDMOND A. FORDYCE, of Boston, in the county of Suffolk 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 and particularly to the so-called sealed systems wherein a vacuum is maintained and carriers are driven therethrough by the admission of atmospheric pressure behind said carriers.

The objects of this invention are to provide a simple and automatic device for controlling and timing the admission of air to the system and limiting the same to the interval necessary for the proper transmission and delivery of the carriers, also to relieve the pressure on the valve which normally seals the bell mouth or air inlet to the system permitting the valve to be easily opened by a carrier to permit the passage of said carrier.

In the accompanying drawings which illustrate the form of construction embodying my invention, Figure 1 is a diagrammatic view of an ordinary vacuum pneumatic tube system showing the device in operating connection therewith. Fig. 2 is an enlarged view of the device partly in section showing the normal or closed position of the parts. Fig. 3 is a similar view to Fig. 2 showing a carrier inserted into the bell mouth with the parts in open or operating position. Fig. 4 is an enlarged view showing the position of the controlling mechanism where a carrier is being despatched at the sub-station; the direction of the air current being indicated by the arrow.

Referring to Fig. 1, A is a tube for the transmission of carriers connecting the bell mouth or air inlet B at the central station C with the ordinary delivery terminal D at the sub-station E. F is a transmission tube for the return of carriers connecting the terminal D at the sub-station E with the delivery terminal G located at the central station C. J is a supply pipe connecting the terminal G with the vacuum drum L. K is a small vacuum tube connecting the supply pipe J with the controlling mechanism located at the bell mouth B.

1 is a valve pivoted at 2 in the chamber 3, and normally closing the bell mouth or air inlet B from the transmission tube A. (See Fig. 2.)

4 is a lever pivoted at 5 in the chamber 3, the opposite end of said lever carrying a pin adapted to coöperate with the slot 6 in member 7 secured to the back of valve 1. A cam lever 8 pivoted at one end at 9 carries at its opposite or bifurcated end a pin 10 adapted to coöperate with a slot 11 in lever 4.

The casing 12 communicates with the bell mouth B on the outer side of valve 1 by means of slots or apertures 13 and the casing 14 surrounding the transmission tube A communicates with said tube A on the inner side of said valves by means of ports or apertures 15.

The cylinder 16 is mounted in the lower chambers of casings 12 and 14 and communicates with said chambers respectively by means of ports 17 and 18. Mounted within cylinder 16 is a balance piston valve 19 adapted to throw ports 17 and 18 into or out of communication with each other. Inclosing the ends of cylinder 16 are heads 20 and 21 forming chambers 22 and 23 respectively. A spring 25 is mounted in chamber 23 and is adapted to operate the piston valve 19 in one direction.

24 is an aperture adapted to graduate the escape of air from chamber 22 and cushion piston valve 19 when thrown over by spring 25.

Vacuum tube K communicates with chamber 23 through passage 26 and is adapted to gradually exhaust the air from the chamber 23, the exhaust being regulated by the timing screw 27 controlling the passage 26. A tube 28 also communicates at one end with the chamber 23 the other end of said tube being controlled by a valve 29 pivoted at 30 to the bell mouth and adapted to be operated by a trip 31 projecting within the bell mouth through a slot 32. This valve is normally held closed by a spring 33.

The cylinder head 21 carries a small cylinder in which is mounted a balance piston valve 35 the upper head of which is adapted to be operated by the vacuum with-

in the tube A acting through the aperture 36. A port 37 connects the chamber 23 with the balance chamber 38 in the piston valve 35. When the valve 35 drops through the breaking of the vacuum in the tube A a passage 39 controlled by the ball check 40 is brought into communication with and adapted to admit atmospheric pressure through the port 37 into the chamber 23. A small opening 41 is adapted to regulate and time the drop of the valve 35.

The operation is as follows: The cashier at the central station C desiring to despatch a carrier to the salesman at the sub-station E inserts the carrier into the bell mouth B whereupon the carrier striking the trip 31 depresses the same opening the valve 29 allowing the air to enter through tube 28 into the chamber 23, breaking the vacuum therein, whereupon the valve 19 is thrown by the spring 25 from the normal position shown in Fig. 2 to that shown in Fig. 3. This movement of the piston is cushioned by the gradual escape of the air from the chamber 22 through the aperture 24. The ports 17 and 18 now being thrown into communication with each other, the vacuum in the tube A acts through the ports 13, causing the carrier to be driven into the bell mouth B by the atmospheric pressure and said carrier engaging the cam lever 8 opens the valve 1 permitting the carrier to pass into the transmission tube A. This opening of the valve 1 by the carrier is easily accomplished owing to the equalization of the pressure on said valve caused by the switching of the vacuum through piston valve 19 to the back of the valve 1. After the passage of the carrier the valve 29 is closed by spring 33 and the valve 1 drops by gravity and the air entering through the bell mouth B and through ports 13, 17, 18 and 15 drives the carrier through the tube A. The vacuum in the tube K gradually exhausts the air from the chamber 23 and draws the piston valve 19 gradually back against the tension of the spring 25 until it engages the stop 42 and cuts off communication between the ports 17 and 18. By this time the carrier has delivered at the sub-station E. This movement of the valve 19 is timed by the screw 27. The salesman at sub-station E in despatching a carrier to the cashier at the central station C opens the inlet valve at said station and inserts the carrier into the tube F closing the valve. The opening of this valve breaks the vacuum in the tube A and causes the valve 35 to drop admitting air through the passage 39, chamber 38, and port 37 (see Fig. 2) breaking the vacuum in the chamber 23 causing the spring 25 to move the piston valve 19 to the position shown in said Fig. 4 allowing air to enter through bell mouth B, ports 13, 17, 18 and 15 into the tube A, causing the carrier to be driven through the tube F toward the central station C. The closing of the inlet valve causes the vacuum in the tube A to rise slightly (the area of the air inlet ports 17 being less than the area of the said inlet valve at the sub-station E) causing the valve 35 to be lifted, cutting off the admission of air to the chamber 23 whereupon the vacuum acts through the tube K, moving the valve 19 as hereinbefore described, cutting off the admission of air through port 17, the carrier in the meantime having delivered at the central station C. The secondary fluctuation of the vacuum caused by the delivery of the carriers does not act to operate valve 19 as the drop of the valve 35 being retarded by the slow escape of air through the opening 4 does not have time to pass the opening 39 before the vacuum is restored and the valve again lifted to the position shown in Fig. 2.

Having thus described 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 normally closed tube for the transmission of carriers, a despatching inlet located in said tube, means for exhausting air from said tube, a normally closed inlet valve adapted to be opened by a carrier and normally held closed by the vacuum within said tube, and means for opening communication around said valve to actuate said carrier to open said valve to permit the passage of said carrier into said transmission tube.

2. In a pneumatic despatch tube apparatus, a normally closed tube for the transmission of carriers, a despatching inlet located in said tube, means for exhausting air from said tube, a normally closed inlet valve adapted to be opened by a carrier and normally held closed by the vacuum within said tube, means for opening communication around said valve to actuate said carrier to open said valve to permit the passage of said carrier into said transmission tube, and means normally urging the closing of said opening means.

3. In a pneumatic despatch tube apparatus, a normally closed tube for the transmission of carriers, a despatching inlet located in said tube, means for exhausting air from said tube, a normally closed inlet valve adapted to be opened by a carrier and normally held closed by the vacuum within said tube, means for opening communication around said valve to actuate said carrier to open said valve to permit the passage of said carrier into said transmission tube, means normally urging the closing of said switching means, and means for timing the closure of said opening means.

4. In a pneumatic despatch tube appara-

tus, a normally closed tube for the transmission of carriers, a despatching inlet located in said tube, means for exhausting air from said tube, a normally closed inlet valve adapted to be opened by a carrier, and means for opening communication around said valve to actuate said carrier to open said valve to permit the passage of said carrier through said transmission tube.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 11th day of February A. D. 1907.

EDMOND A. FORDYCE.

Witnesses:
MARY G. SMITH,
HOWARD R. DUNBAR.