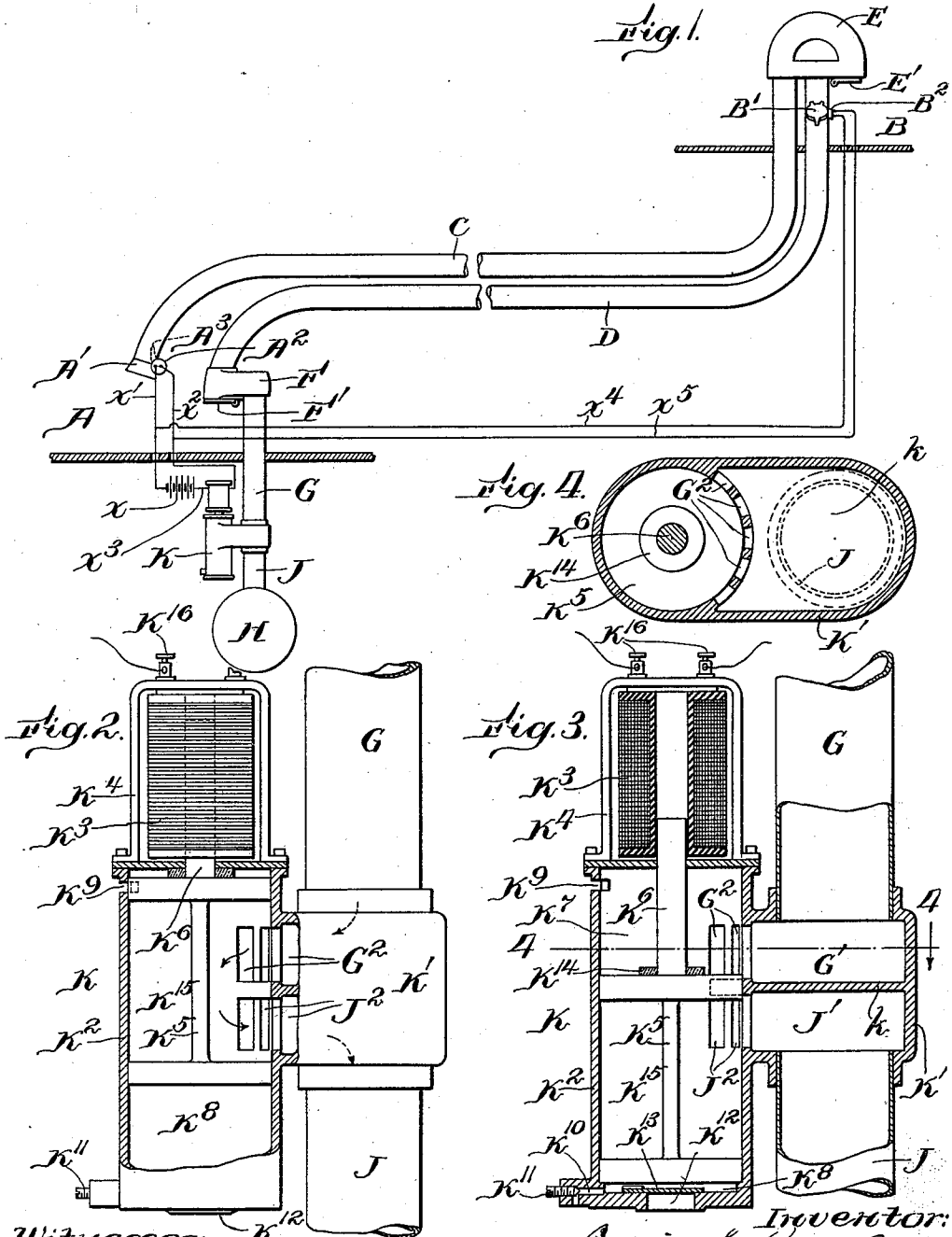


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 PNEUMATIC DESPATCH TUBE APPARATUS.
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Witnesses:
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UNITED STATES PATENT OFFICE.

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PNEUMATIC-DESPATCH-TUBE APPARATUS.

1,000,979.

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To all whom it may concern:

Be it known that I, LOUIS G. BARTLETT, of East Somerville, 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 and its object is to automatically control the flow of air through the apparatus for driving carriers and to limit the same to the interval necessary for the proper transmission and delivery of said carriers. This object is accomplished by providing an air valve controlling communication between the vacuum drum and the transmission tube, which valve is electro-magnetically operated, upon the despatching of carriers, to be immediately opened causing a flow of air through the tube for driving the carriers. Means are provided for timing the closure of the valve to insure the delivery of carriers. The air valve is preferably balanced to permit of easy operation and is not affected by and is operated independent of the vacuum whether the system is open or closed.

In the accompanying drawings which illustrate a construction embodying my invention, Figure 1 is a diagram of a pneumatic tube system showing electric controlling mechanism and circuits. Fig. 2 is an enlarged elevation partly in section showing the controlling mechanism or air valve in open or operating position with the direction of the air current indicated by the arrows. Fig. 3 is a similar view to Fig. 2 showing the mechanism and air valve in closed or non-operating position. Fig. 4 is a sectional view on line 4-4 Fig. 3.

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

Referring to Fig. 1: A represents a cashier's or central station and B a sub or sales station; C is a tube for the transmission of carriers connecting the central station A with the terminal E controlled by the usual delivery valve E' at the substation B. D is a transmission tube for the return of carriers and connects the terminal E with the terminal F at the central station A. The terminal F is controlled by the delivery valve F'. G is an air supply pipe connecting the terminal F with the controlling

mechanism K and J is a vacuum tube connecting the controlling mechanism K with the vacuum drum H. A' is the bell mouth for the insertion of carriers into the tube C and B' is an ordinary despatching inlet for the insertion of carriers into the tube B. Located at the bell mouth A' is a normally open switch A² having a trip or switch arm A³ projecting into the tube into the path of the carriers. At the substation B there is a normally open switch B² connected with and adapted to be closed upon the opening of the despatching inlet B'. The controlling mechanism K consists of the casing K' having a dividing partition $\frac{1}{2}$ forming a chamber G' above said partition connecting with the air supply pipe G, the chamber J' below said partition K connecting with the vacuum tube J. K² is a cylinder in casing K' having the balanced valve K⁵ reciprocally mounted therein. The ports J² in cylinder K² are adapted to place the chamber J' in communication with chamber K¹⁵ between the upper and lower pistons of the balanced valve. The ports G² normally connect the chamber G' with chamber K⁷ in the upper part of the cylinder K², but upon the balanced valve K⁵ being raised, the ports G² and J² are placed in communication through chamber K¹⁵. K⁶ is a soft iron stem connected with the balanced valve K⁵ and forms an armature for the magnet or solenoid K³ mounted above the cylinder K² and held in place by frame K⁴ secured to said cylinder. K¹⁶ are the binding posts of the magnet, one of which is connected with battery X by wire X³ and the other of which is connected with switch A³ by wire X², the switch A³ being in turn connected with battery X by wire X'. The switch B² is connected with wire X' by wire X⁴ and also with wire X² by wire X⁵. The upper part of cylinder K² is normally open to the atmosphere through port K⁹, and the lower part of the cylinder or chamber K⁸ is connected with the atmosphere by port K¹² controlled by an inwardly opening check valve K¹³ which permits the unrestricted upward movement of the balanced valve K⁵. The chamber K⁸ is also connected with the atmosphere through a port K¹⁰ restricted by a timing screw K¹¹ to time the descent of the balanced valve K⁵. The operation is as follows: In despatching a carrier from central station A to the substation B, the cashier inserts the carrier

into bell mouth A' whereupon the carrier closes the switch A² through engagement with trip A³, energizing the solenoid or magnet K³ and through armature K⁶ lifting the balanced valve K⁵ to the upper part of the cylinder K² placing the chamber G' into communication with chamber J' through ports G², chamber K¹⁵ and ports J². The unrestricted opening of the valve K⁵ is permitted by the check valve K¹³ which allows the air to freely enter the lower chamber K³ as the valve K⁵ moves upward. This causes a flow of air from the bell mouth A' through the tube C and tube D to drum H and the carrier is driven through the tube C toward the substation B. In the meantime, the carrier having passed over the trip A³, the switch A² is opened and the solenoid or magnet K³ is deenergized; the balanced valve K⁵ now begins to drop by gravity, its movement being restricted and timed by the gradual escape of air from chamber K³ through port K¹⁰ regulated by the timing screw K¹¹, the check valve K¹³ in the meantime having closed preventing any escape of air from the chamber K³ except through the port K¹⁰. By the time the carrier has discharged through the delivery valve E' at the substation B, the balanced valve K⁵ has reached the bottom of the cylinder K² and closed communication between ports G² and J² shutting off the flow of air.

In returning a carrier from the substation B to the central station A, the operation is almost identical with the exception that the solenoid or magnet K³ is energized by the opening of the despatching inlet B', but it is not necessary that said switch B² be operated by the despatching inlet B' as it might be operated by a trip in tube B similar to the trip A³ shown at the bell mouth A'.

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 tube for the transmission of carriers, an exhaust tube in which a constant vacuum is maintained and through which air may be exhausted from said transmission tube, a normally closed valve adapted to control the flow of air through said transmission tube and said exhaust tube, mechanism connected to said valve and adapted to be electrically energized to open the same upon the insertion of a carrier into said tube to create a flow of air through said tube for driving carriers and to permit the closure of said valve when deenergized, and means for timing the closure of said valve.

2. A pneumatic despatch tube system, having, in combination, transit tubing

through which carriers are transmitted, a valve for controlling the passage of air through the tubing, mechanism for opening the valve upon the despatching of a carrier, means for closing the same, a timing mechanism separate and distinct from the valve opening mechanism for controlling the closing of the valve comprising a chamber provided with a movable wall connected with the valve, means for admitting air freely to the chamber during the opening of the valve, and means for regulating the escape of air during the closing of the valve.

3. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, a valve for controlling the passage of air through the tubing, a solenoid connected to open the valve, means for making and breaking the circuit for the solenoid when despatching a carrier, and timing mechanism for timing the closing of the valve.

4. A pneumatic despatch tube system, having, in combination, transit tubing, a plurality of despatch stations therein, an air valve for controlling the passage of air through the tubing, valve opening mechanism, means for controlling said mechanism from each station, and a single timing mechanism separate and distinct from the valve opening mechanism for automatically timing the closing of the valve.

5. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, means for exhausting air therefrom, an air valve between the transit tubing and said means, mechanism for opening the valve upon despatching a carrier, and a single timing mechanism separate and distinct from the valve opening mechanism for timing the closing of the valve.

6. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, an air valve for controlling the passage of air through the tubing, mechanism for opening the valve upon the despatching of a carrier, a timing mechanism for controlling the closing of the valve comprising an air chamber having a movable wall connected with the valve, a check valve arranged to freely open upon a reduction of pressure in the chamber to allow ingress of air to said chamber, and to close to prevent the free escape of air upon an increase of pressure in the chamber, and means controlling the egress of air from said chamber.

7. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, a plurality of stations therein, an air valve for controlling the passage of air through the tubing, an electrically controlled mechanism for opening the valve, devices for

making and breaking the circuit for said mechanism at each station when despatching a carrier, and means separate and distinct from the valve opening mechanism for timing the closing of the valve after the circuit has been made and broken.

8. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, means for exhausting air from said tubing, an air valve between the transit tubing and said means, electrically controlled mechanism for opening said valve, means for making and breaking the circuit for said mechanism when despatching a carrier, and means separate and distinct from valve opening mechanism for timing the closing of the valve after the circuit has been made and broken.

9. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, an air valve for controlling the passage of air through the tubing, mechanism operating independently of variations in pneumatic pressure to open the valve upon the despatching of a carrier, and a timing mechanism separate and distinct from the valve opening mechanism acting to control the closing of the valve.

10. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, an air valve for controlling the passage of air through the tubing, mechanism operating independently of variations in pneumatic pressure to open the valve upon the despatching of a carrier, and pneumatic timing mechanism acting to control the closing of the valve.

11. A pneumatic despatch tube system, having in combination, transit tubing, a plurality of despatch stations therein, an air valve for controlling the passage of air through the tubing, an exhaust device, mechanism operating independently of the exhaust device for opening said valve, means for controlling the operation of said mechanism from each station, and a timing mechanism for automatically controlling the closing of the valve.

12. A pneumatic despatch tube system, having in combination, transit tubing through which carriers are transmitted, an air valve for controlling the passage of air through the tubing, an exhaust device, means operating independently of the exhaust device for opening the valve upon the despatch of a carrier, and a timing mechanism for automatically controlling the closing of the valve.

13. A pneumatic despatch tube system, having, in combination, transit tubing

through which carriers are transmitted, a plurality of stations therein, an air valve, for controlling the passage of air through the tubing, electrically operated mechanism connected to open the valve, devices for making and breaking a circuit for said mechanism at each station when despatching a carrier, and timing mechanism for automatically controlling the closing of the valve.

14. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, means for exhausting air from said tubing, an air valve between the transit tubing and said means, electrically operated mechanism connected to open the valve, means for making and breaking the circuit for said mechanism when despatching the carrier, and a timing mechanism for automatically timing the closing of the valve.

15. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, an air valve for controlling the passage of air through the tubing, mechanism for opening the valve, a timing mechanism for controlling the closing of the valve comprising an air chamber normally open to the atmosphere, and having a movable wall connected with the valve, an automatic check valve arranged to readily open upon the decrease of pressure in the chamber to admit air to said chamber, and to close to prevent free escape of air on the increase of pressure in the chamber, and means controlling the egress of air from said chamber.

16. A pneumatic despatch tube system, having, in combination, transit tubing through which carriers are transmitted, a plurality of stations therein, a valve for controlling the passage of air through the tubing, a solenoid connected, to open the valve, means for making and breaking the circuit for the solenoid when despatching a carrier, and timing mechanism for controlling the closing of the valve comprising a chamber having a movable wall connected with the valve, means for admitting air freely to the chamber during the opening of the valve, and means for regulating the escape of air from said chamber during the closing of the valve.

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

LOUIS G. BARTLETT.

Witnesses:

ARTHUR F. RANDALL,
H. C. BOWSER.