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Patented Aug. 27, 1901.

E. A. FORDYCE.

TERMINAL DEVICE FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

(Application filed July 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.

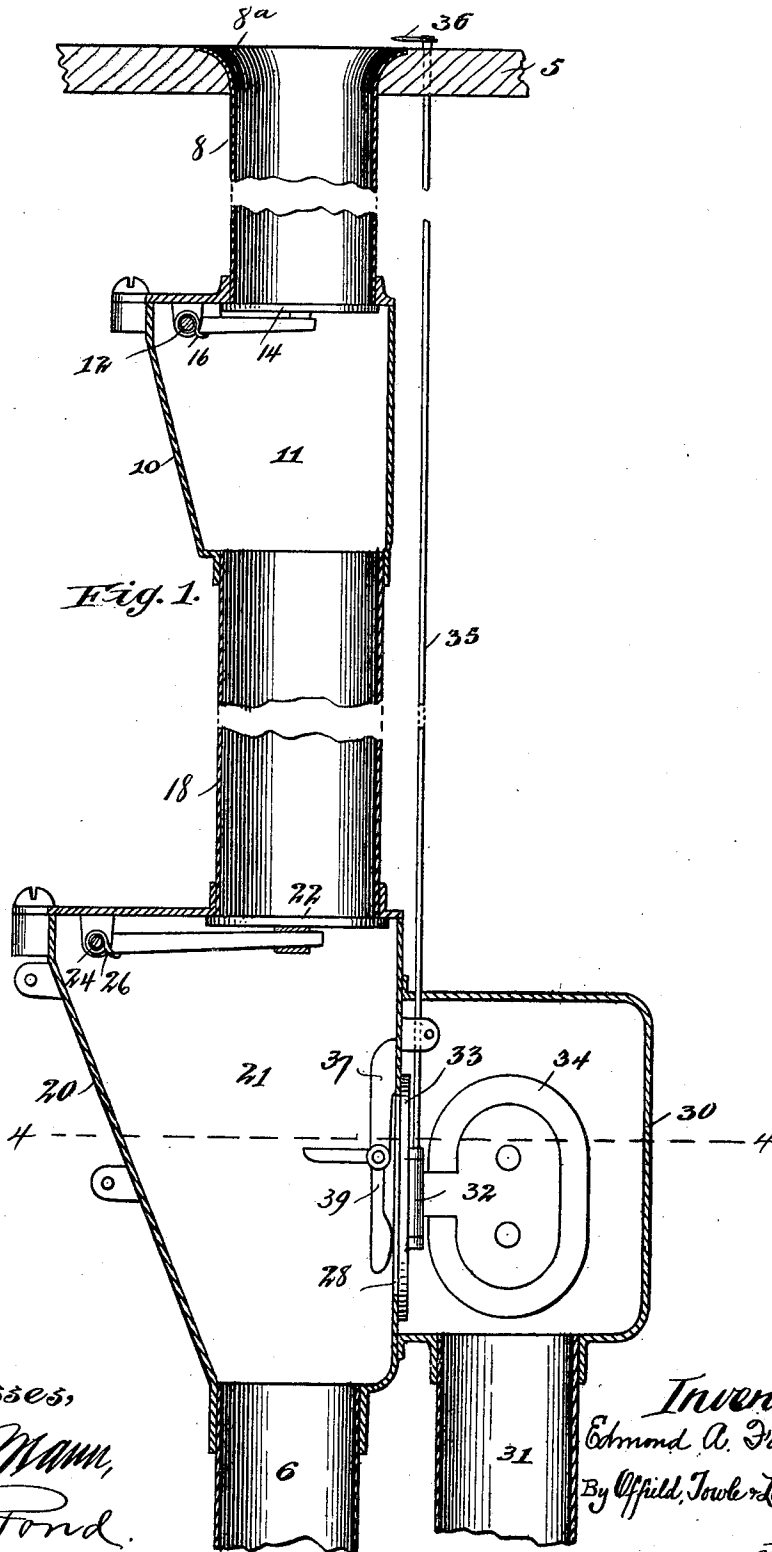


Fig. 1.

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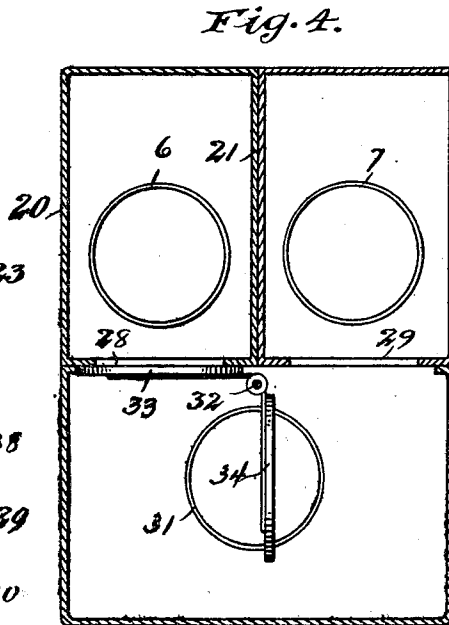
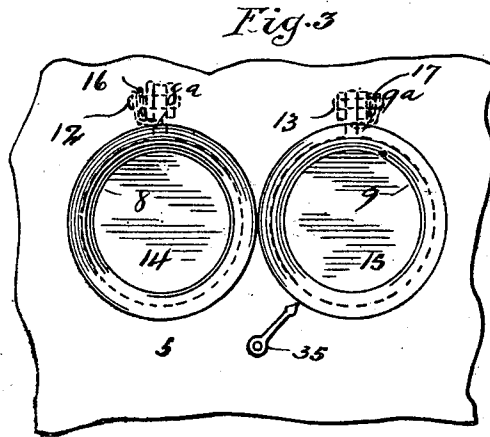
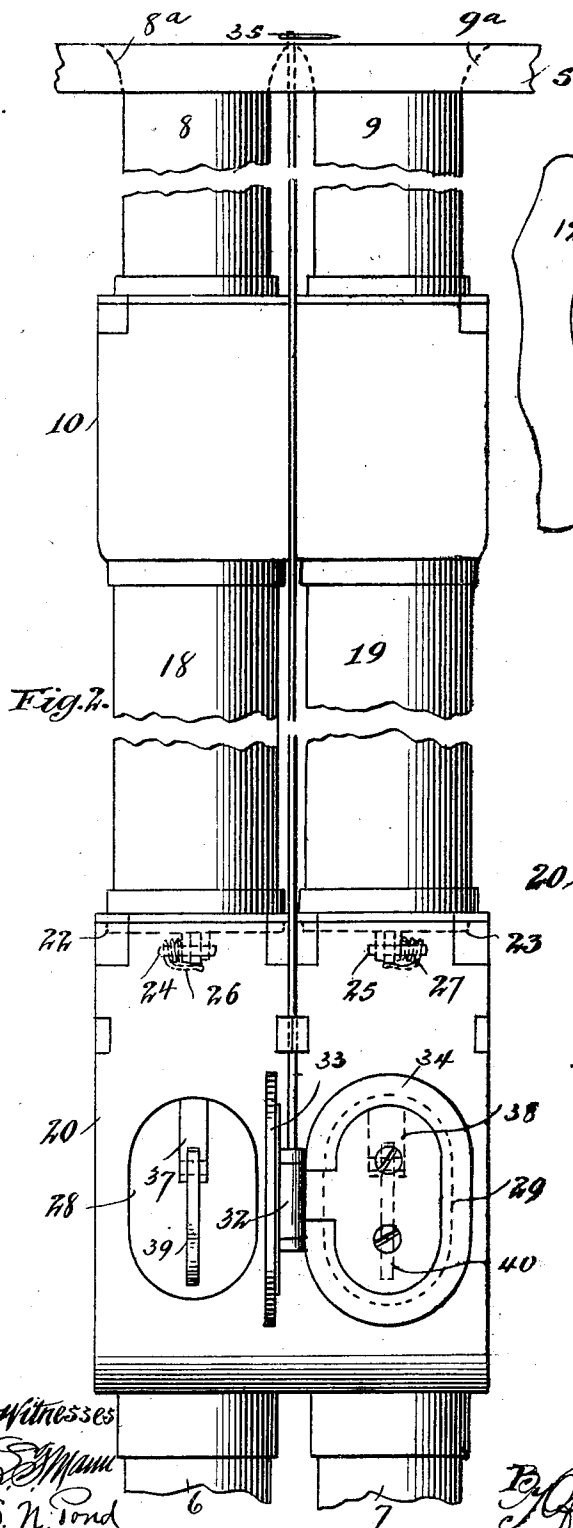
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(Application filed July 10, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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TERMINAL DEVICE FOR PNEUMATIC-DESPATCH-TUBE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 681,534, dated August 27, 1901.

Application filed July 10, 1901. Serial No. 67,702. (No model.)

To all whom it may concern:

Be it known that I, EDMOND A. FORDYCE, of Chicago, Illinois, have invented certain new and useful Improvements in Terminal
5 Devices for Pneumatic-Despatch-Tube Systems, of which the following is a specification.

My invention relates to pneumatic-despatch-tube systems, and more particularly to terminal devices for use at the cashier's
10 station; and the primary object of my invention is to effect an economy in the power required to operate the system, and consequently in the expense of such operation, by effecting an automatic reduction in the number of tubes through which the impelling-current
15 is caused to flow at any given time.

In pneumatic-tube systems as at present constituted and operated a constant air-current is maintained throughout all the tubes
20 of the system during the entire period of operation of the latter in order to maintain each tube constantly in a "live" condition and ready to transmit carriers with whatever degree of frequency they may be required for
25 this purpose. In view of the fact that even in busy systems many of the tubes are idle or inactive through a considerable percentage of the time it is obvious that the energy spent in forcing a current of air through the tubes
30 at such times as they are not needed for actual service represents simply power thrown away and adds largely to the expense of operating the system. With a view to eliminating this waste of power several devices have
35 heretofore been devised designed to automatically cut down the number of live tubes in a system at any given time to such as were actually performing service in the transmission of carriers; but, so far as I am aware,
40 such devices have heretofore, on account of their complexity and liability to disorder as well as their expense of production, proved impracticable. My present invention does not contemplate such a complete automatic
45 control as shall limit the flow of the air-current only to those tubes through which a carrier may be traveling; but, as above stated, it has for its object to effect a decided economy in the cost of operation through a simple and reliable current-shifting device associated with the terminal devices of a pair of

adjacent outgoing tubes at the cashier's station, whereby the current is automatically directed through the sending-tubes upon the insertion of the carriers therein, and the actual flow of the current is made to comport
55 with the practical needs of the system by automatically cutting out of the system one tube of each pair for such time as said tube may be idle and its service not required.

To this and other ends my invention resides in a terminal device and a current-shifting mechanism combined and associated therewith, all as hereinafter more fully described, and pointed out in the appended
60 claims.

A preferred embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation in substantially central vertical section of a terminal constructed in accordance with my invention. Fig. 2 is a front elevation of the same, with certain parts removed for greater clear-
70 ness. Fig. 3 is a top plan view, and Fig. 4 is a horizontal section substantially on the line 4 4 of Fig. 1.

Referring to the drawings in detail, 5 designates the cashier's counter or desk, and 6 and 7 designate, respectively, a pair of outgoing or sending tubes leading to outlying individual stations. The upper adjacent ends of the tubes 6 and 7 are located at some distance below the top surface of the desk 5, and between the latter and the upper ends of said
80 tubes is located a pair of connected sending-terminals, which are constructed and arranged as hereinafter described.

Seated in and depending from the desk or counter 5 are a pair of short tubes 8 and 9,
85 disposed side by side and closely adjacent and provided with flaring or bell-shaped mouths 8^a and 9^a to facilitate the insertion of the carriers therein. The tubes 8 and 9 may be made of any desired length best suited to the conditions or requirements of each particular system; but in general they will be made of a length equal to or slightly exceeding the length of the carriers to be used in connection therewith.

To the lower ends of the tube-sections 8 and 9 is secured a substantially rectangular
90 100

valve box or casing 10, which is interiorly divided into two equal-sized sealing-chambers by means of a central vertical partition 11, thus forming a sealing-chamber below each tube-section, the transverse dimensions of which are somewhat in excess of the diameter of the tube-sections themselves. To the under side of the cap or cover of the valve-box 10 are pivoted at 12 and 13 a pair of disk valves 14 and 15, respectively, which seat normally against and seal the lower ends of the tubes 8 and 9, respectively. That side of the box 10 on which the valves 14 and 15 are pivoted is formed of sufficient lateral depth to afford an ample recess or space which the valves may occupy when open, so as to be entirely out of the path of the entering carrier and not interfere with its passage through the terminal. The valves will preferably be held to their seats by light springs 16 and 17, respectively, as shown.

In the base of the box 10 and in vertical alinement with the tube-sections 8 and 9 are secured the upper ends of a pair of intermediate tube-sections 18 and 19, respectively, these latter being preferably made of a diameter slightly exceeding the diameter of the tubes 8 and 9 and the heads of the carriers intended to pass therethrough, so as to provide a slight clearance between the carriers and the tube-sections 18 and 19, for a purpose hereinafter disclosed. The intermediate sections 18 and 19 are preferably made of a length somewhat exceeding the length of the carrier, and at all events must be of such a length that the distance between the point at which the carriers clear the valves 14 and 15 and the lower ends of the tube-sections 18 and 19 shall exceed the length of the carriers, so that the valves 14 and 15 may be automatically closed before the carriers emerge from the tube-sections 18 and 19, for a reason which will be set forth later in the description of the operation.

To the lower ends of the tube-sections 18 and 19 and between the latter and the upper ends of the sending-tubes 6 and 7 is secured a lower valve-box (designated as an entirety by 20) similar in construction to, but somewhat larger in dimensions than, the upper valve-box 10. This lower valve-box 20 has a vertical partition 21, dividing the same into a pair of parallel equal-sized sealing-chambers disposed directly below and communicating with the intermediate tube-sections 18 and 19, respectively. A pair of disk valves 22 and 23, pivoted at 24 and 25, respectively, to the under side of the cover of the valve-box, serve to seal the lower ends of the tube-sections 18 and 19, respectively, said valves being normally held to their seats by light springs 26 and 27. The valve-box 20, as thus far described, is a substantial duplicate, somewhat enlarged, of the upper valve-box 10.

The vertical front wall of the valve-box 20 is provided with a pair of openings 28 and 29, formed therethrough, said openings being

preferably made in the elliptical form shown in Fig. 2 and communicating with the two parallel chambers of the box 20, respectively. To the said front vertical face of the box 20 and completely covering and inclosing the openings 28 and 29 is secured a casing 30, constituting the containing-walls of a pressure-chamber. One side of this casing 30, preferably its lower or bottom wall, is entered by a tube 31, leading from a suitable blower, air-pump, or other air-forcing device.

From the foregoing it will be seen that a body or current of air under pressure entering the pressure-chamber 30 through the tube 31 will be free to pass through the openings 28 and 29 and thence through the outgoing tubes 6 and 7, communicating with the valve-box 20. My invention contemplates the employment of a current-shifting device in connection with the pressure-chamber 30 and the openings 28 and 29 and automatically operated by the carriers for directing the air-current from the pressure-chamber through either of the tubes 6 and 7, accordingly as a carrier is to be transmitted through one or the other of said tubes, at the same time excluding the current from the other or idle tube. The preferred means which I employ for effecting this result are as follows:

Hinged on a vertical pivot 32, centrally between the openings 28 and 29, is a butterfly-valve, the two wings 33 and 34 of which are rigidly united at an angle to each other, (preferably at right angles,) so that when either wing of the valve is closing its appropriate opening the other opening will necessarily be maintained open. The wings on clacks 33 and 34 correspond in shape to and somewhat exceed in size the openings which they are intended to guard. From the hinge 32 there extends upwardly a rod 35, the upper end of which passes through the top of the desk or counter 5 and carries at its upper end an indicator-finger 36, which latter will point alternately toward the open mouths of the tube-sections 8 and 9, according to the location of the butterfly-valve beneath.

To the inner side of the front vertical wall of the box 20 and directly above the openings 28 and 29 therein are secured a pair of pendent arms or brackets 37 and 38, in the lower ends of which are pivoted a pair of bell-crank push-levers 39 and 40, respectively, said levers each having a horizontal arm extending out into the path of the descending carrier and a vertically-depending arm, which at its lower end lies in contact with the plane of the opening and which when the appropriate wing of the butterfly-valve is closing such opening contacts the inner face of such wing, as shown in Fig. 1.

The operation of my improved terminal as hereinabove described is as follows: Assuming the parts to be in the positions shown in Fig. 1, it will be seen that the air-current entering the pressure-chamber 30 by way of the tube 31 is flowing through the open port 29,

through the remote chamber of the box 20, and the sending-tube 7 to the distant outlying terminal, the sending-tube 6, which is idle, being cut off from the air-current through the closing of the port 28 by the wing 33 of the butterfly-valve. Supposing now it is desired to transmit a carrier to the outlying station served by the sending-tube 6, the operator simply drops the carrier into the upper open end of the upper tube-section 8. The carrier by gravity opens and passes the disk valve 14 and continuing to drop through the intermediate tube-section 18 similarly opens the lower valve 22, the valve 14 having automatically closed before the carrier impinges the lower valve 22. After the carrier has thus opened valve-box 20, lying therebeneath, it strikes the horizontal arm of the push-lever 39, rocking the same through a right angle on its pivot, and thereby pushing the butterfly-valve through a quarter-turn on its hinge, thus opening the port 28 and simultaneously closing the port 29. The air-current is thus shifted from the sending-tube 7 to the sending-tube 6 and acting upon the rear of the carrier quickly drives it to its destination. As the air enters the underlying chamber of the valve-box 20 it immediately flows past the carrier up through the tube-section 18 until it impinges and finds an abutment against the lower face of the closed valve 14. Thereupon the pressure becomes effective upon the carrier to impel it to its destination, while the lower valve 22 is free to close under the impulse of its closing-spring by reason of the substantial equality of air-pressure existing on its upper and lower faces. In order to facilitate the dropping of the carriers through the sections 18 and 19, as well as to facilitate the passage of the air-pressure past the carriers in such tube-sections, the latter are made of a diameter slightly exceeding that of the regular sending-tubes 6 and 7. The air-current continues to flow through that one of the tubes through which a carrier has last been transmitted, and in case it is desired to send another carrier through the same tube while the air-current is still flowing therethrough such second carrier is despatched and operates in the manner already described, save that it idly trips the pusher of its appropriate valve-chamber, since the valve of such chamber is already open. The function of the index-finger 36 is simply to serve as a convenience in indicating that tube through which a carrier was last sent, so that in case of any accident or failure of the tubes to work properly, owing to a carrier sticking therein or for any other reason failing to reach its destination, the superintendent or operator can tell at once in which tube of the pair the trouble lies. The time required to transmit a carrier to the outlying station is but a few seconds at most, and hence the operator can easily avoid clogging the tubes or shifting the current while a carrier is still in transit by allowing the proper interval to elapse be-

tween the sending of successive carriers. In practice, however, this interval is so short as to practically preclude the necessity on the part of the operator of giving any attention thereto, since ordinarily the traveling carrier will make its journey in less time than that occupied by the manual effort of the operator in charging and transmitting successive carriers.

From the foregoing it will be seen that my invention effects a substantial economy in the cost of operating the system, since it cuts out of the system one-half of the tubes at such times as the latter are temporarily idle and not called upon for service.

I am aware that current-shifting devices employed in connection with hand or foot operated systems employing an intermittent current and manually-operated shifting devices are old; but, so far as I am aware, my present invention discloses the first current-shifting mechanism employed in connection with a continuous current and automatically operated and controlled by the carriers themselves in transit. Hence my invention is not limited to the precise construction and arrangement of the several cooperating devices hereinabove shown and described, but obviously may be considerably and widely varied as to form and arrangement of the several parts without departing from the principle and spirit of my invention.

I claim as my invention—

1. A pneumatic-tube terminal adapted to communicate with two outgoing tubes of the system and also with a pressure-tube from the blower and provided with a double valve controlling the communication between the pressure-tube and the outgoing tubes, and devices automatically operated by the carriers in transit for shifting the current to that tube in which a carrier has been introduced; substantially as described.

2. A pneumatic-tube terminal having a pair of sealing-chambers communicating respectively with a pair of outgoing tubes of the system and also with a pair of tube-sections through which the carriers are introduced, a pressure-chamber, a double valve located in said pressure-chamber and controlling the flow of the air-current alternately to said sealing-chambers, and devices automatically operated by the carriers in transit for actuating said double valve to simultaneously admit pressure behind a carrier and cut out the other tube, substantially as described.

3. A pneumatic-tube terminal comprising in combination a valve-box divided by a vertical partition into a pair of sealing-chambers which are adapted to communicate respectively with a pair of outgoing tubes of the system, a pair of valve-controlled tube-sections superimposed on said valve-box and communicating respectively with the chambers thereof, a pressure-chamber communicating with the sealing-chambers of the valve-box through openings in the side wall there-

of, a double valve hinged between said openings, and valve-operating devices located in the sealing-chambers and disposed in the path of the carriers therethrough and operating when struck by a carrier to shift said valve and admit pressure in rear of the carrier, at the same time cutting off the current from the other tube, substantially as described.

4. A pneumatic-tube terminal comprising in combination a valve-box divided by a vertical partition into two chambers each of which is adapted to communicate through its bottom wall with an outgoing tube of the system and said box having also a pair of openings formed through one of its side walls communicating with said chambers respectively, a casing applied to and covering the apertured side of said valve-box and constituting a pressure-chamber and adapted to be entered by a tube from the blower, a double valve in said pressure-chamber controlling said openings, a pair of valve-controlled tube-sections entering the top of said valve-box, and devices automatically operated by the carriers in transit for actuating said double valve to simultaneously uncover one of said openings for the admission of pressure to the carrier and close the other, substantially as described.

5. A pneumatic-tube terminal, comprising in combination upper and lower valve-boxes, each divided by a vertical partition into a pair of sealing-chambers, a pair of valve-controlled tube-sections entering the tops of the upper sealing-chambers, a pair of valve-controlled tube-sections connecting said upper and lower sealing-chambers, a pressure-chamber communicating with said lower sealing-chambers through openings in the side wall of the latter, a valve hinged between said openings and having two rigidly-united wings controlling the same and so disposed as that

the uncovering of one opening simultaneously closes the other, and a pusher device located in each sealing-chamber and engaging the adjacent wing of the valve and automatically actuated by a carrier in its descent to force such member of the valve from its seat and uncover the opening for the admission of air from the pressure-chamber, substantially as described.

6. In a pneumatic terminal, the combination with a valve-box having therein two sealing-chambers in communication with a common pressure-chamber through adjacent openings in a common side wall of the box, of a butterfly-valve having two wings rigidly united at right angles to each other and pivoted between said openings so that the covering of one opening automatically and simultaneously uncovers the other, and means located in said sealing-chambers and tripped by the carriers in transit for actuating said valve, substantially as described.

7. In a pneumatic terminal, the combination with a valve-box having therein two sealing-chambers in communication with a common pressure-chamber and adapted for connection with a pair of outgoing tubes of the system, of a butterfly-valve pivoted to a side wall of the valve-box and controlling the communication between the pressure-chamber and the sealing-chambers, means actuated by the carriers in transit for simultaneously admitting pressure to one sealing-chamber and cutting it off from the other through the operation of said valve, and an indicator connected with the hinge of the valve and serving to show which tube is in communication with the pressure-chamber, substantially as described.

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