No. 681,414. Patented Aug. 27, 1901.

E. A. FORDYCE.

PNEUMATIC DESPATCH TUBE SYSTEM.

(Application filed Feb. 4, 1901.)

(No Model.) 3 Sheets—Sheet 1.

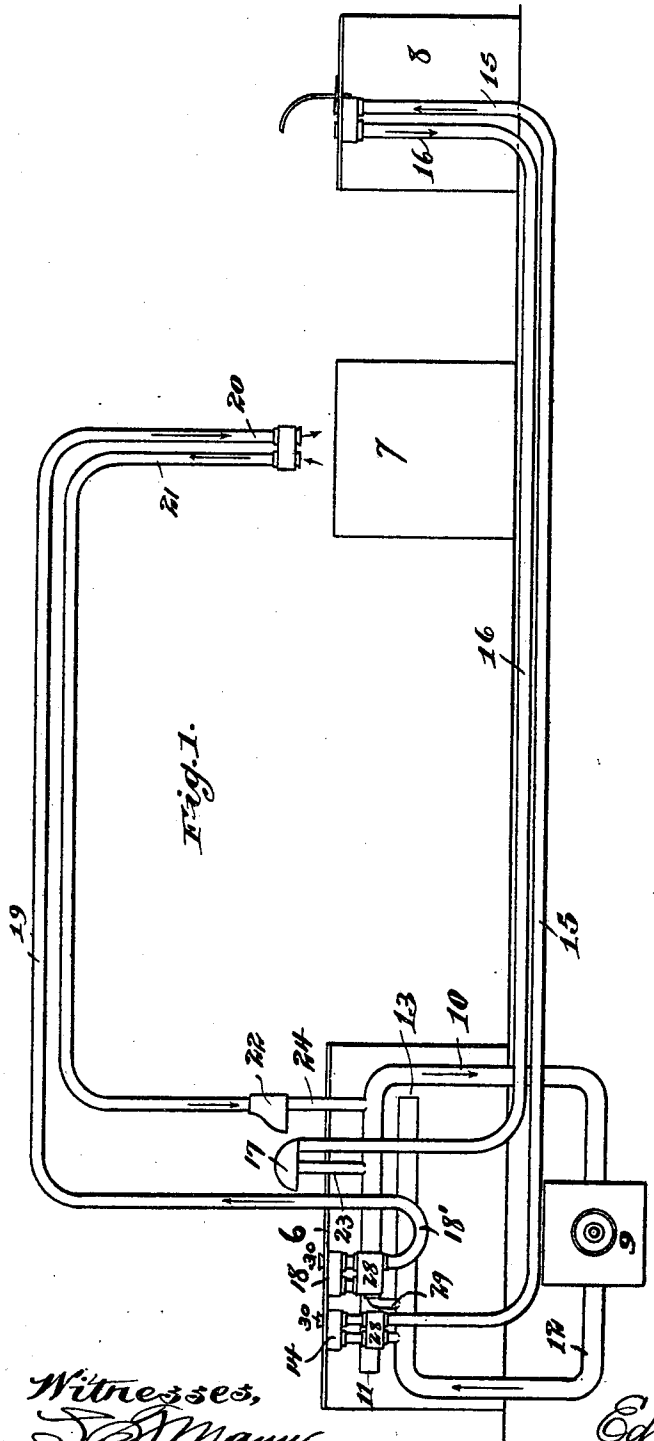


Fig. 1.

Witnesses,
L. D. Mann.
S. N. Pond.

Inventor,
Edmond A. Fordyce
By Offield, Towle & Linthicum
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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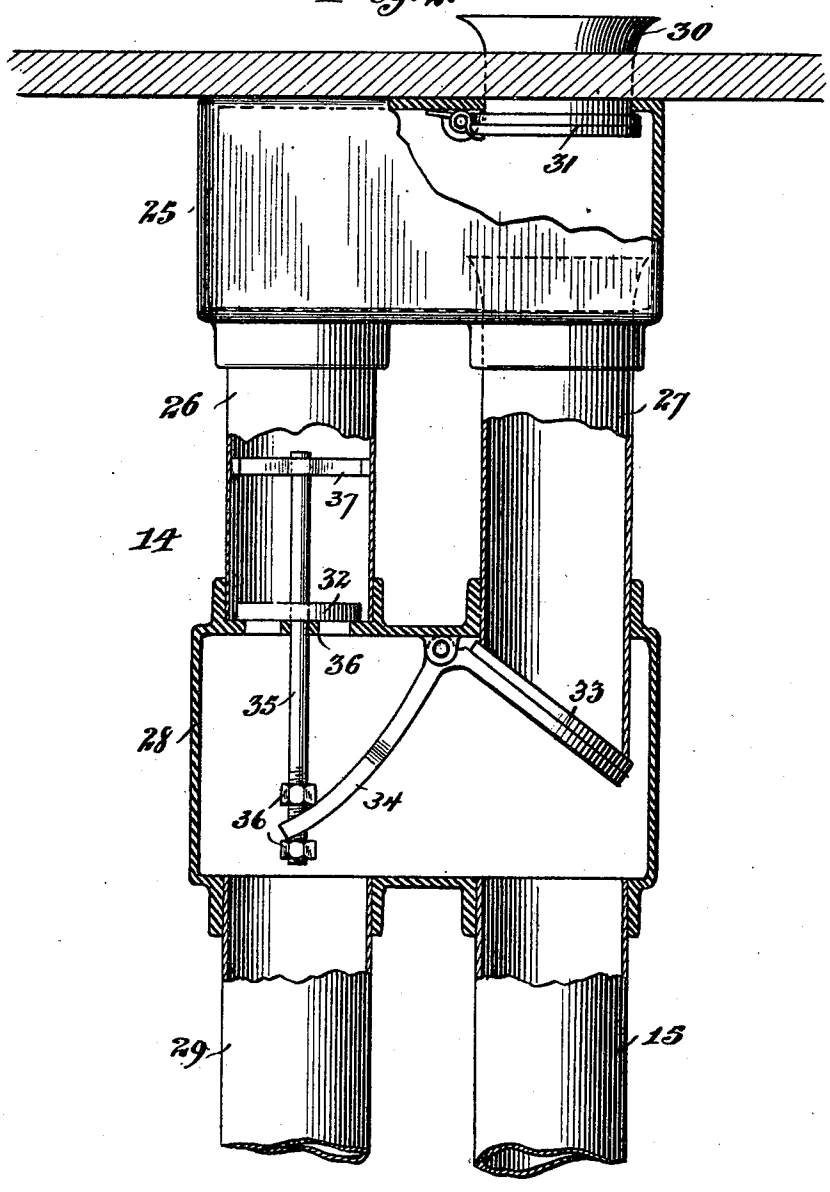
E. A. FORDYCE.

PNEUMATIC DESPATCH TUBE SYSTEM.

(Application filed Feb. 4, 1901.)

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Fig. 2.



Witnesses,
F. G. Myann,
S. N. Pond.

Inventor,
Edmond A. Fordyce
By Offield, Towle & Linthicum
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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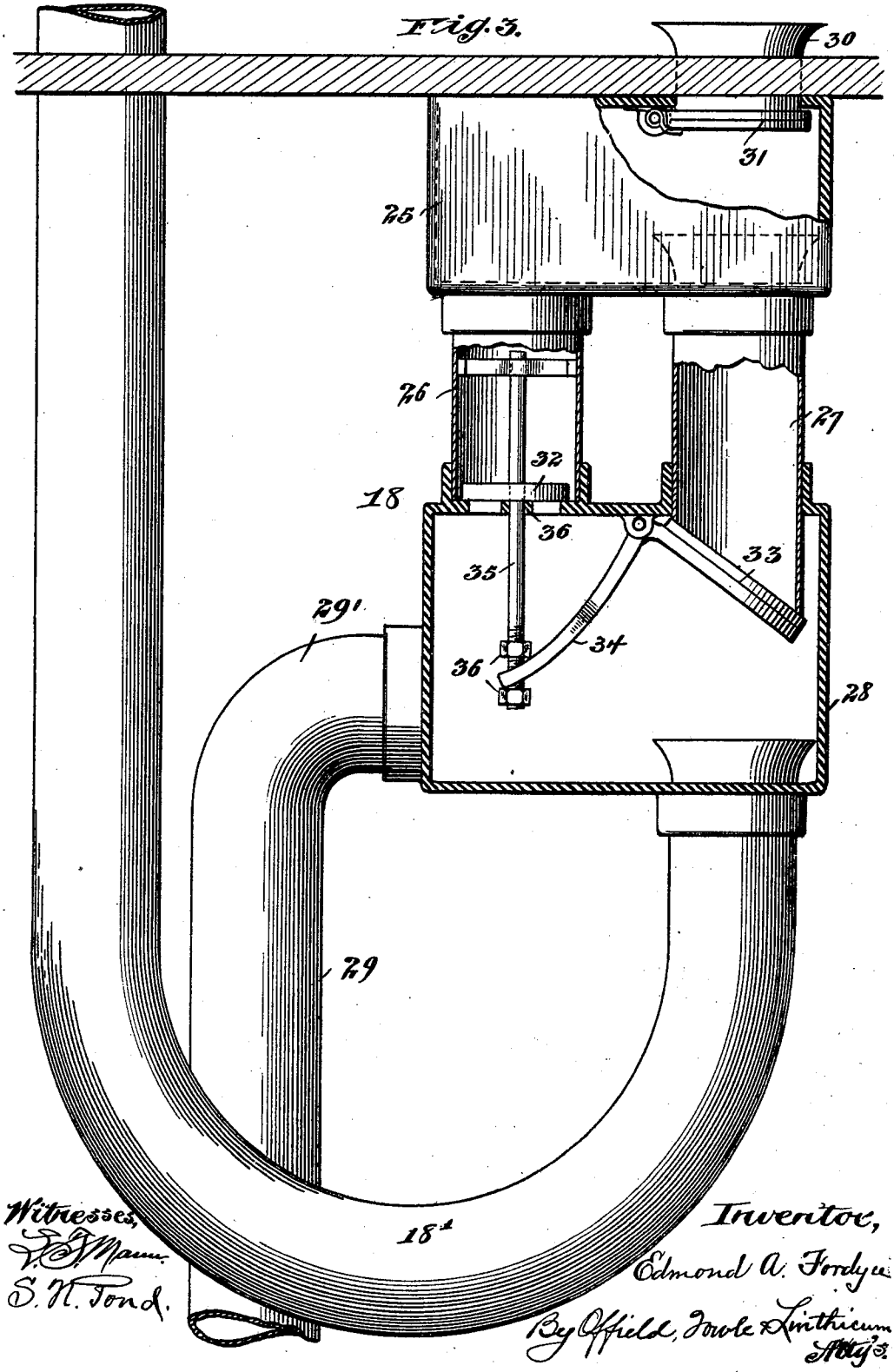
E. A. FORDYCE.

PNEUMATIC DESPATCH TUBE SYSTEM.

(Application filed Feb. 4, 1901.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



Witnesses,
V. B. Mann.
S. N. Pond.

Inventor,
Edmond A. Fordyce
By Offield, Towle & Linthicum
Atty's.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDMOND A. FORDYCE, OF CHICAGO, ILLINOIS, ASSIGNOR TO ARTHUR S. TEMPLE, TRUSTEE, OF BOSTON, MASSACHUSETTS.

PNEUMATIC-DESPATCH-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 681,414, dated August 27, 1901.

Application filed February 4, 1901. Serial No. 45,957. (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 Pneumatic-Despatch-Tube Systems, of which the following is a specification.

My invention relates to pneumatic-despatch-tube apparatus such as is employed in large stores and similar commercial houses for transmitting cash and small parcels by pneumatic agency between a main cashier's office and a number of outlying salesmen's stations located throughout the building; and my invention is more specifically directed to certain improvements in sending-terminals for use at the cashier's station, the object of said improvements being to effect the admission of carriers to the system at such point in a simple, expeditious, and efficient manner, and without any impairment of the air-current traversing the system through leakage of said current in the operation of inserting the carrier.

To these ends my invention consists in a sending-terminal provided with a double sealing-chamber, whereby the carrier is introduced into the terminal and the latter is closed and sealed in rear of the carrier before the air-current is made effective upon the latter, all as hereinafter described, and more particularly set forth in the appended claims.

My invention in its preferred form is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view, somewhat in the nature of a diagram, of a pneumatic-despatch system having my invention applied thereto. Fig. 2 is an enlarged detail, partly in central vertical section broken away, of a sending-terminal embodying my present invention for use at the cashier's station and adapted to be connected to a downwardly-extending sending-tube; and Fig. 3 is a similar view showing the same terminal adapted for connection with an upwardly-extending sending-tube.

My invention is herein shown as applied to a combination pressure and vacuum system in which the carrier-transmitting tubes extending between the cashier's office and the outlying salesmen's stations are placed in closed communication, at one end thereof, with the pressure and suction sides of a blower located beneath or adjacent to the cashier's desk and while the said tubes communicate at their other end with the terminals at the salesmen's stations.

Referring to the drawings in detail, 6 designates a main cashier's office or station, and 7 and 8 designate a pair of outlying salemen's stations. At a suitable point, preferably beneath and in the near vicinity of the cashier's office, is located a blower or other similar air-forcing device, (designated by 9.) To the suction side of this blower is connected a short section of tube 10, extending up and beneath the cashier's desk and having a closed end at 11. From the pressure side of the blower a similar section of tube 12 also extends up and beneath the cashier's desk and has a similar closed end 13.

14 designates as an entirety my improved form of sending-terminal, one leg of which is connected with the tube 12, as shown in Fig. 1, and the other leg of which connects with a downwardly-extending carrier-conveying tube 15, leading from the cashier's station to the salesman's station 8. From the latter station extends another carrier-conveying tube 16, the latter leading back to the cashier's station and terminating at the latter station in an ordinary form of upward-discharge terminal 17.

At 18 is indicated another sending-terminal for the cashier's station, this terminal being similar in all respects to the terminal 14, except that it is adapted to communicate, through a semicircular section of tube 18′, with an upwardly-extending sending-tube 19, which leads overhead to a point above the salesman's desk 7, terminating at such desk in an open-ended downwardly-discharging tube-section 20, integral with the tube 19. Another carrier-conveying tube 21 extends from such station back to the cashier's desk, terminating in an ordinary form of downwardly-discharging receiving-terminal 22. The tubes 16 and 21 are in free communication with the suction-tube 10, connected with the blower through the receiving-terminals

17 and 22, respectively, by means of short sections of tubing 23 and 24, intermediate said terminals and the suction-tube 10.

The blower being set in operation, a current of air under gradually-diminishing pressure is caused to flow through the tube-section 12, through the terminals 14 and 18, and thence through the sending-tubes 15 and 19 to the substations 8 and 7, respectively. A carrier inserted in the terminal 14 or 18 will be impelled by the pressure of the air-current in its rear to the station 8 or 7, as the case may be. The sending side of the system relatively to the cashier's station operates, therefore, on the plenum or pressure principle. On the other hand, a carrier inserted in the open end of tube 16 or 21 will be drawn to the cashier's station by reason of the gradually-increasing suction exerted thereon through pipes 16 or 21 and the suction-tube 10, connected with the suction side of the blower. This side of the system therefore operates on the vacuum principle.

Figs. 2 and 3 illustrate in detail the construction of the sending-terminals 14 and 18, respectively, employed at the cashier's station. Referring to the construction of said terminals in detail, 25 designates a box constituting a sealing-chamber, which may conveniently be secured to the under side of the cashier's desk. In the bottom of the box 25 are secured a pair of short parallel tube-sections 26 and 27, the lower ends of which are secured to the top of another closed box or sealing-chamber 28, similar in construction and general purpose to the box 25. In the bottom of the box 28 is secured the upwardly-extending end of the conveying-tube 15 of the system and also a short section of tubing 29, which places the box 28 in free communication with the pressure-tube 12. A bell-shaped receiver 30 is set in and through the desk and the upper surface of the box 25, and its lower end is closed by an ordinary spring-actuated flap-valve 31. This receiver 30 is located in direct vertical alinement with the tube-section 27 and the sending-tube 15 of the system, while the tube-section 26 is arranged in direct vertical alinement with the short connecting-section 29, leading to the pressure-tube 12. The lower ends of the tube-sections 26 and 27, which communicate with the sealing-chamber 28, are closed by valves 32 and 33, respectively, these valves being connected so as to open and close together and so constructed and adjusted with reference to the action of the air-current upon them that they will normally remain closed, but are so nearly balanced that the gravity impact of a carrier on the upper face of valve 33 will overcome their normal tendency to remain closed and will open the same simultaneously, thus permitting the carrier to pass through the chamber 28 into the sending-tube 15 and at the same time switching or shunting the air-current from its normal passage between tubes 29 and 15 directly through the chamber 28 to a longer passage across one end of said chamber, up through tube-section 26, through the upper chamber 25, down through tube-section 27, and across the other end of chamber 28. The simultaneous opening and closing of the valves 32 and 33 is effected by the simple connecting means shown in the drawings, the same consisting of a bifurcated arm 34, connected to the heel of valve 33, engaging the vertical stem 35 of valve 32 between a pair of adjustable collars 36, screwed on the latter, the valve-stem 35 being suitably guided in a pair of grids or spiders 36 and 37. The two sending-terminals 14 and 18 are practically alike in all constructional details, the former being adapted for use as a downward-sending terminal and the latter being employed as an upward-sending terminal. Where the exigencies of space require or other considerations make desirable a connection between the pressure-tube and the terminal at some other point than through the base or bottom thereof, the pressure-tube connection 29 may be provided with an elbow 29′ and caused to enter the sealing-box 28 through one side thereof, as shown in Fig. 3. Such an arrangement is the equivalent of that shown in Fig. 2 and makes no appreciable difference in the operation or efficiency of the terminal as a whole.

The operation and advantages possessed by the improved form of sending-terminal hereinabove described, may be briefly set forth as follows: The course of the air-current through said terminal both when the latter is idle and when a carrier is being transmitted has already been pointed out. It will be observed that the lower sealing-chamber 28 and its contained valves 32 and 33 constitute a seal against the loss of air-current while the carrier is being inserted through the receiver 30 and its valve 31 and also permit the carrier to enter the terminal freely and without encountering the resistance of the air-current. I have found by repeated experiments that the carrier enters this terminal with marked ease and freedom from lateral friction caused by the sidewise pressure or suction of the impelling-current which is common in all forms of sending-terminals at present in use with which I am acquainted. The instant the carrier by its gravitation effect has struck the valve 33, thereby opening said valve and the connected valve 32, the air-current is shunted, as hereinbefore described, so as to bear with full force against the rear of the carrier, thereby insuring its clearance of the terminal and its prompt transmission to its destination. After the carrier has fully cleared the chamber 28 and has entered the sending-tube 15 or the curved extension 18′ thereof, Fig. 3, the connected valves 32 and 33 close automatically and the propelling-current is thereby cut out of the upper portion of the terminal and finds its way from tube 29 to tube 15 directly through the lower sealing-chamber 28.

I claim as my invention—

1. A sending-terminal for use in pneumatic-tube systems, comprising in combination a sealing-chamber communicating at its lower end with the air-pressure and carrier-sending tubes of the system, through which sealing-chamber the propelling air-current normally passes, a second sealing-chamber located above and communicating with the top of said first-named sealing-chamber by twin passages, connected valves normally closing said passages and permitting the insertion of a carrier into and through the upper sealing-chamber without effect upon the air-current, said carrier acting later to open said connected valves and thereby shunt the propelling-current up through the upper sealing-chamber and in rear of the carrier being transmitted, substantially as described.

2. A sending-terminal for use in pneumatic-tube systems, comprising in combination upper and lower sealing-chambers, tube-sections connecting said chambers near their opposite ends, a valved receiver in the top of the upper chamber and in alinement with one of said connecting tube-sections, a pressure-tube and a carrier-conveying tube communicating with the bottom of the lower sealing-chamber and in alinement with said connecting-tubes, and connected valves normally closing the communication of said tube-sections with the lower sealing-chamber, said valves normally tending to confine the passage of the propelling air-current to and through the lower sealing-chamber, but, on being opened by the impact of the carrier, acting to shunt the air-current up through the upper sealing-chamber and in rear of the carrier, substantially as described.

3. The herein-described sending-terminal for pneumatic-tube systems, the same comprising the upper and lower sealing-chambers 25 and 28 respectively, the latter being connected through its bottom wall with the air-pressure and carrier-sending tubes of the system, a valved receiver in the top of the upper chamber, connecting-tubes 26 and 27 between said sealing-chambers, the receiver, connecting-tube 27, and carrier-sending tube being all located in vertical alinement, and the connected valves 32 and 33 normally closing the lower ends of tube-sections 26 and 27 respectively, whereby the normal passage of the propelling-current, when the terminal is idle, is through the lower chamber 28, but on the passage of a carrier through said terminal the air-current is shunted so as to flow through the upper chamber 25 and become effective on the rear of the carrier, substantially as described.

EDMOND A. FORDYCE.

Witnesses:
SAMUEL N. POND,
FREDERICK C. GOODWIN.