No. 867,050. PATENTED SEPT. 24, 1907.

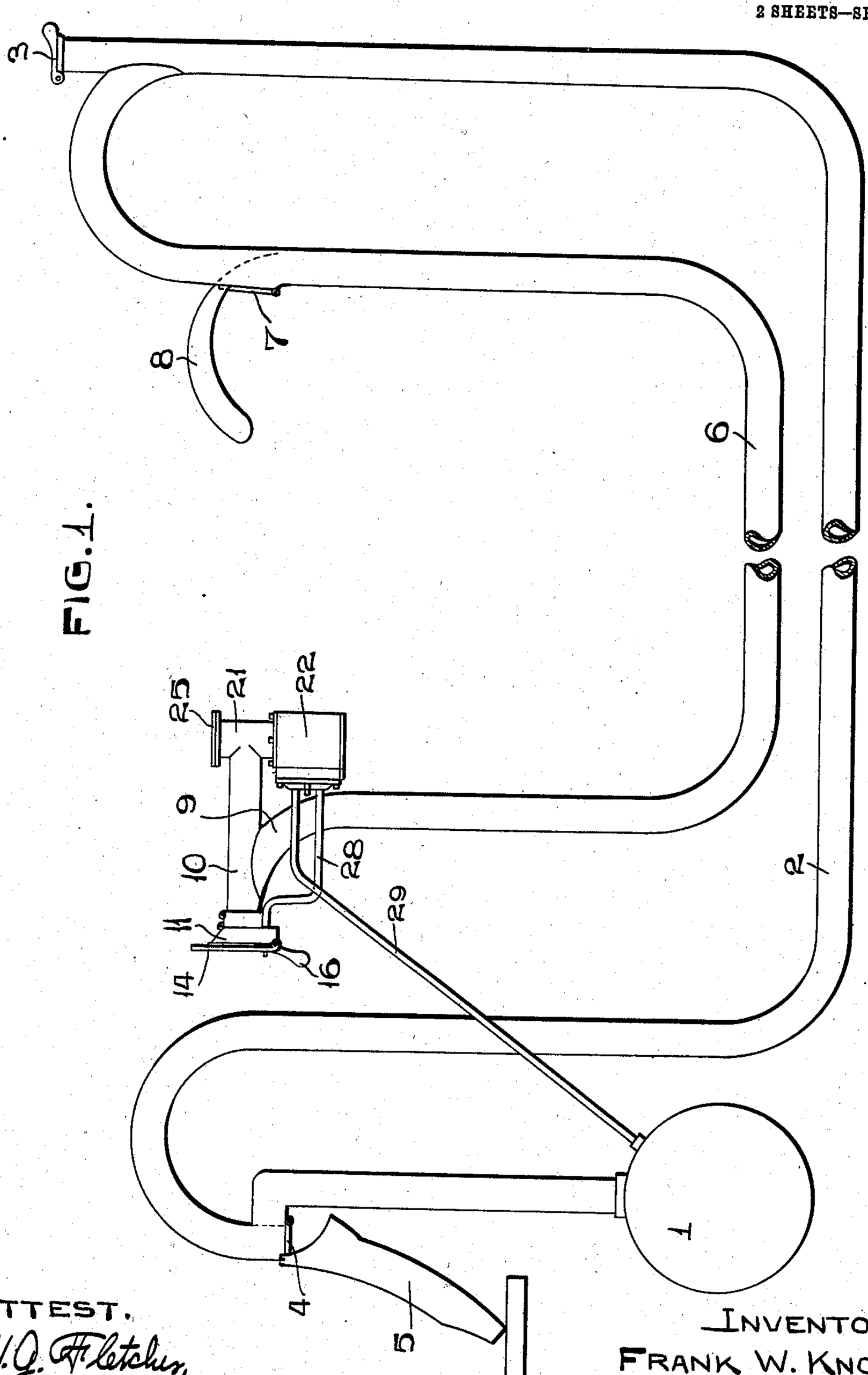
F. W. KNOTT.

PNEUMATIC DESPATCH TUBE APPARATUS.

APPLICATION FILED NOV. 6, 1906.

2 SHEETS—SHEET 1.

FIG. 1.



ATTEST.

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W. P. Smith

INVENTOR.

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BY Higdon & Langan.

ATT'Y'S.

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2 SHEETS—SHEET 2.

FIG. 2.

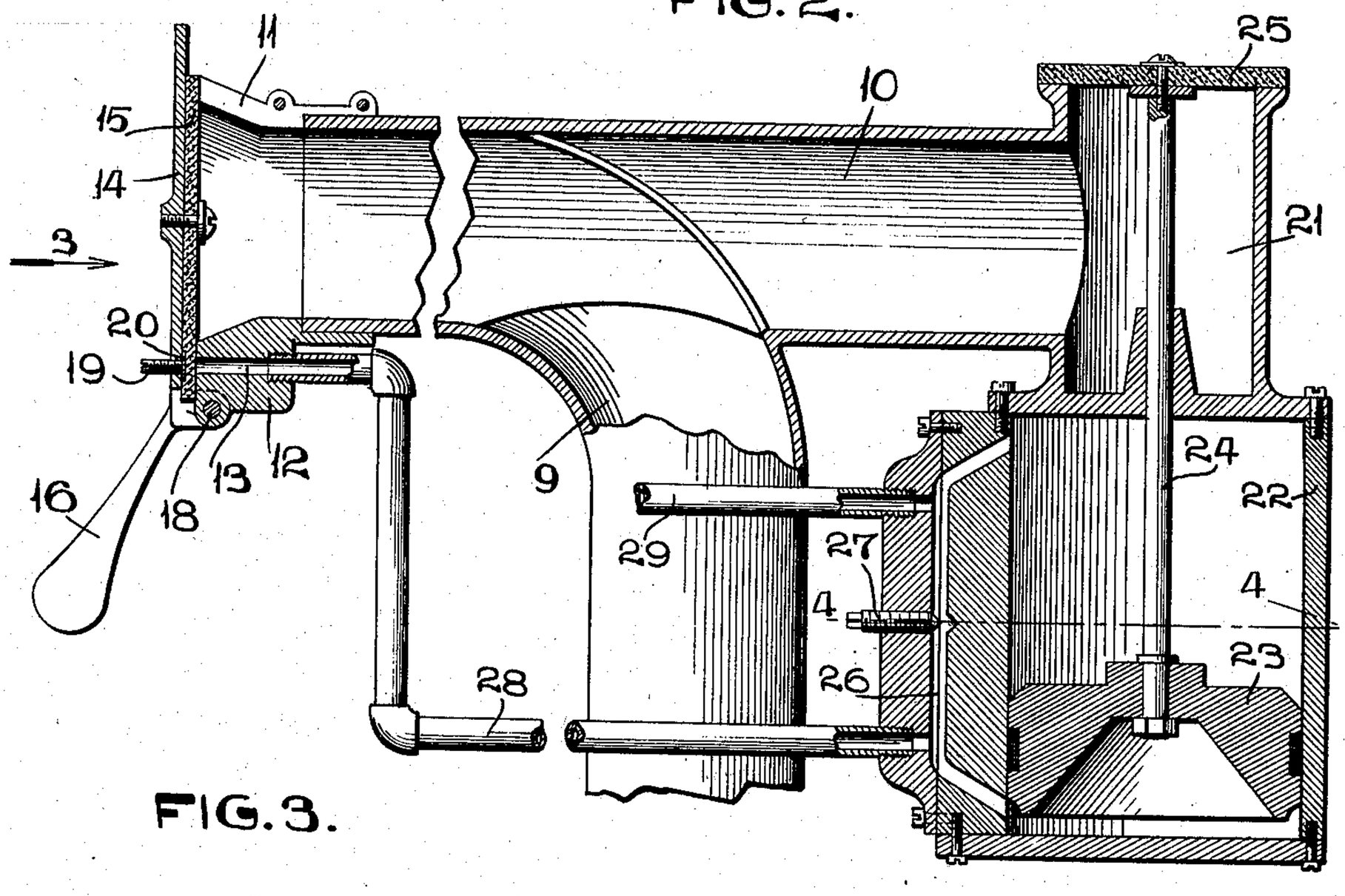


FIG. 3.

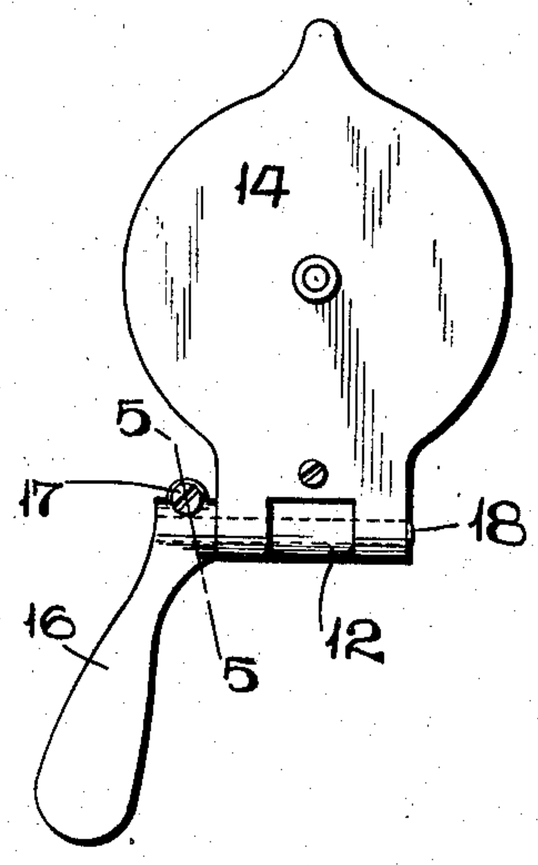


FIG. 4.

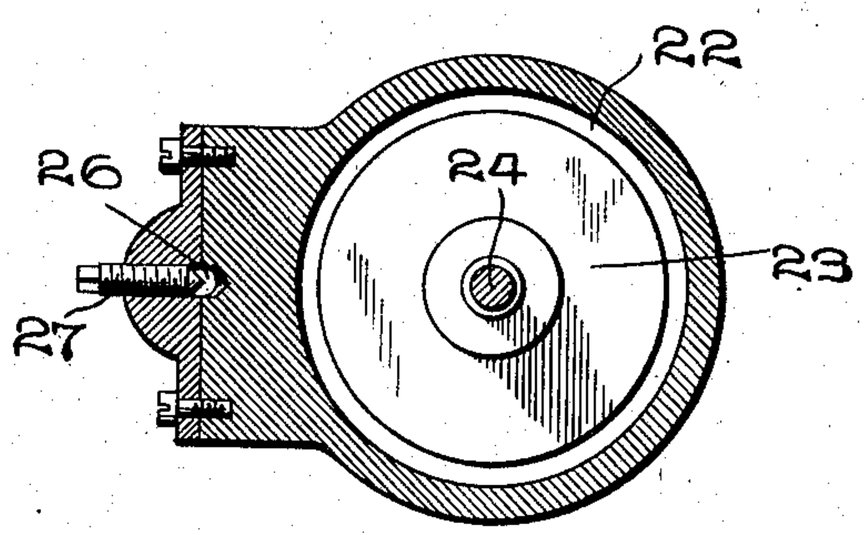
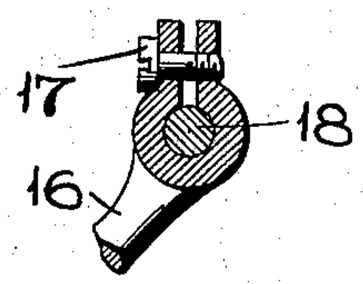


FIG. 5.



ATTEST.

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UNITED STATES PATENT OFFICE.

FRANK W. KNOTT, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO EMANUEL J. WALDECK, OF ST. LOUIS, MISSOURI.

PNEUMATIC-DESPATCH-TUBE APPARATUS.

No. 867,050. Specification of Letters Patent. Patented Sept. 24, 1907.

Application filed November 6, 1906. Serial No. 342,292.

To all whom it may concern:

Be it known that I, FRANK W. KNOTT, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Pneumatic-Despatch-Tube Apparatus, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a pneumatic despatch-tube apparatus, particularly adapted for store service, and the particular object of my invention is to save power in a pneumatic tube system by providing means whereby the constant suction of air through the transmission tubes is done away with, thus doing away with the constant actuation of the vacuum pump connected to the vacuum drum.

A further object of my invention is to simplify and cheapen the construction of pneumatic despatch tube systems, and to do away with electrical connections and small control pipes that are usually employed between the sending and receiving stations of tube systems for the actuation of certain valves.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a diagrammatic view of my improved pneumatic despatch-tube; Fig. 2 is a vertical section taken through the end of one of the transmission tubes, and which is located at the central station, or at a cashier's desk; Fig. 3 is an elevation of a combined door and inlet valve, which view is taken in the direction indicated by the arrow 3, (Fig. 2;) Fig. 4 is a horizontal section taken approximately on the line 4—4 of Fig. 2; Fig. 5 is a detail section taken on the line 5—5 of Fig. 3.

Referring by numerals to the accompanying drawings:—1 designates a vacuum drum in which a partial vacuum is constantly maintained by a suitable vacuum pump, (not shown,) and leading from said drum is a transmission tube 2, the outer end of which is normally closed by a suitable inlet valve 3; and arranged in the tube 2, at the central station, or adjacent the cashier's desk, is a normally closed discharge valve 4; and positioned immediately below this valve is a hopper 5, which receives the carriers as they discharge from the tube 2 through said valve, 4.

Leading from the outer end of the transmission tube 2, at a point below the inlet valve 3, is a return transmission tube 6, in the outer portion of which is arranged a discharge valve 7, above which is positioned a deflector, or goose neck, 8.

All of the parts just described are of ordinary well known construction, and form no part of my invention.

The inner end of the transmission tube 6, at the central station or cashier's desk, terminates in a curve 9, and rigidly fixed in any suitable manner to this curved end is a short horizontal tube 10. Rigidly fixed on the front end thereof is an inlet valve housing 11 provided on its lower side with an extension 12, through which is formed a small aperture 13. Hinged to the extension 12 is a disk 14 carrying on its inner face a packing disk 15, of rubber, leather, or analogous material, and which normally closes the opening through the valve housing 11 and the aperture 13. A weighted handle 16 is adjustably held by means of a set screw 17 on the pin 18 which hinges the disk 14 to the extension 12, and passing through the lower part of the disk 14 is a set screw 19, which bears upon a small disk 20 located against the rear side of the disk 15 immediately opposite the forward end of the aperture 13.

Formed on or fixed to the rear end of the tube 10 is a short tubular section 21, and arranged beneath the same is a cylinder 22, closed at both ends, and in which operates a piston 23, and the piston rod 24 thereof passes upwardly through the tubular portion 21, and is provided on its upper end with a disk valve 25 which normally rests on the upper end of said tubular extension 21. Formed in the wall of the cylinder 22 is a vertically disposed passage-way 26, the ends of which are extended laterally and communicate with the upper and lower ends of said cylinder 22. A valve screw 27 passes through the wall of the cylinder, and is adapted to close or partially close the passage-way 26. Leading from the rear end of the aperture 13 to the lower end of the passage-way 26 is a small controlling tube 28; and leading from the upper end of said passage-way 26 to the vacuum drum 1 is a controlling tube 29.

The operation of my improved apparatus is as follows: The vacuum pump exhausts the air from the vacuum drum 1, and from the transmission tubes 2 and 6, thus forming a partial vacuum in said tubes, and the resulting suction due to said partial vacuum normally maintains the combined valves and doors 3, 4, 7, 14, and 25, in closed positions. To send a carrier through the transmission tube 6 from the central station, the valve comprising the disks 14 and 15 is swung open, and the carrier is inserted through the valve housing 11 into the forward end of the tube 10. As soon as the valve is thus opened, the partial vacuum in the tubes 2 and 6 is broken by the inrushing air, and the resulting suction draws said carrier through the tube 6, and it discharges therefrom through the valve 7, and is deflected downwardly into a suitable receptacle by the goose neck 8. When the valve comprising the disks 14 and 15 is opened, air will pass through the aperture 13, and from thence through the tube 28 into the lower end of the cylinder 22 beneath the piston therein, and this

action will cause said piston and parts carried thereby to be instantly elevated owing to the normal pressure of the air and the partial vacuum in the cylinder 22 above the piston, which is maintained by means of the tube 29 connected to the vacuum drum. As soon as this elevation of the piston takes place, the valve 25 is lifted from the upper end of the tubular extension 21, and as soon as the valve comprising the disks 14 and 15 closes, following the insertion of a carrier, the air necessary to insure the travel of the carrier through the transmission tube 6, is supplied through the open upper end of the tubular extension 21, and passes from thence through the tube 10 into said transmission tube 6. When the valve comprising the disks 14 and 15 closes, the air supply is cut off through the aperture 13 and pipe 28 to the lower end of the cylinder 22, and the piston therein carrying the rod 24 and valve 25 will start to move downwardly, but said movement will be comparatively slow owing to the small diameter of the passage-way 26, which is more or less closed by the valve screw 27, and the air discharging through said passage-way 26 passes through the tube 29 to the vacuum drum, and is exhausted therefrom by the vacuum pump. Thus the valve 25 is held open long enough to permit the carrier to pass through the transmission tube 6 and discharge therefrom through the valve 7; and when said valve 25 is again seated, the normal vacuum is maintained in both the transmission pipes, and the power utilized in maintaining this vacuum is reduced while the apparatus is not in operation, or while there are no carriers traversing the transmission tubes. When the inlet valve 3 is open to permit the insertion of a carrier in the transmission tube 2, the normal vacuum maintained in the transmission tubes is broken, and the weighted handle 16 causes the valve comprising the disks 14 and 15 to swing open, thus allowing air to enter the aperture 13 and pass to the lower end of the cylinder 22 to act in the same manner as just described; and as soon as said inlet valve 3 is closed, the valve comprising the disks 14 and 15 will swing shut, and the air necessary to assist the carrier in traversing the transmission tube passes through the open end of the tubular extension 21, from thence through the tube 10, through the tube 6, and from thence to the tube 2, and the carrier passes through said last mentioned tube and finally discharges through the valve 4 into the hopper 5.

By adjusting the valve screw 27, the discharge of air from the lower end of the cylinder through the passage-way 26 can be easily regulated, and thus the downward movements of the piston 23 and the valve 25 are correspondingly regulated.

An apparatus of my improved construction is simple, easily installed, reduces the power necessary to maintain the vacuum in the transmission pipes, and greatly simplifies the construction and cost of pneumatic despatch tube systems.

I claim:—

1. In an apparatus of the class described, the combination with the usual transmission tubes provided with the usual inlet and discharge valves, of an air inlet valve connected to one of the transmission tubes, a cylinder arranged beneath said valve, a piston operating in the cylinder and connected to said valve, a tubular connection from one of the inlet valves of the transmission pipes to the lower end of the cylinder, and an exhaust tube leading from the upper end of the cylinder; substantially as specified.

2. In an apparatus of the class described, the combination with the usual transmission tubes provided with the usual inlet and discharge valves, of an air inlet valve connected to one of the transmission tubes, a cylinder arranged beneath said valve, a piston operating in the cylinder and connected to said valve, a tubular connection from one of the inlet valves of the transmission pipes to the lower end of the cylinder, an exhaust tube leading from the upper end of the cylinder, there being a passage-way formed between the tubular connection and the exhaust tube; and a regulating valve in said passageway; substantially as specified.

3. In an apparatus of the class described, the combination with the usual transmission tubes provided with inlet and discharge valves, of an air inlet valve connected to one of the transmission tubes, a cylinder arranged beneath said valve, a piston operating in the cylinder and connected to said valve, a tubular connection from one of the inlet valves in the transmission tube to the lower end of the cylinder, and an exhaust tube leading from the upper end of the cylinder, said inlet valve having a disk normally closing the inlet valve in the transmission tube and the end of the tubular connection thereto.

4. In an apparatus of the class described, the combination with the usual transmission tubes provided with inlet and discharge valves, of an air inlet valve connected to one of the transmission tubes, a cylinder arranged beneath said valve, a piston operating in the cylinder and connected to said valve, a tubular connection from one of the inlet valves in the transmission tube to the lower end of the cylinder, an exhaust tube leading from the upper end of the cylinder, said inlet valve having a disk normally closing the inlet valve in the transmission tube and the end of the tubular connection thereto, and there being a passageway formed between the lower end of the cylinder and the exhaust tube, and a regulating valve located in said passageway.

5. In an apparatus of the class described, the combination with the usual transmission tubes provided with the usual inlet and discharge valves, of an air inlet valve connected to one of the transmission tubes, a cylinder arranged beneath said valve, a piston operating in the cylinder and connected to said valve, a tubular connection from one of the inlet valves of the transmission pipes to the lower end of the cylinder, an exhaust tube leading from the upper end of the cylinder, and there being a passageway formed between the lower end of the cylinder and the exhaust tube.

6. In an apparatus of the class described, the combination with the usual transmission tubes provided with inlet and discharge valves, of an air inlet valve housing connected to one of the transmission tubes, a cylinder fixed to the lower end of said valve housing, a piston operating in the cylinder, a piston rod rigidly fixed to the piston and extending upwardly through the valve housing, a valve fixed on the upper end of the piston rod and arranged to close the upper end of the valve housing, a tubular connection from one of the inlet valves of the transmission tube to the lower end of the cylinder, an exhaust tube leading from the upper end of the cylinder, there being a passageway connecting the tubular connection and the exhaust tube, and a valve arranged in said passageway.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

FRANK W. KNOTT.

Witnesses:
M. P. SMITH,
E. L. WALLACE.