No. 698,830. Patented Apr. 29, 1902.

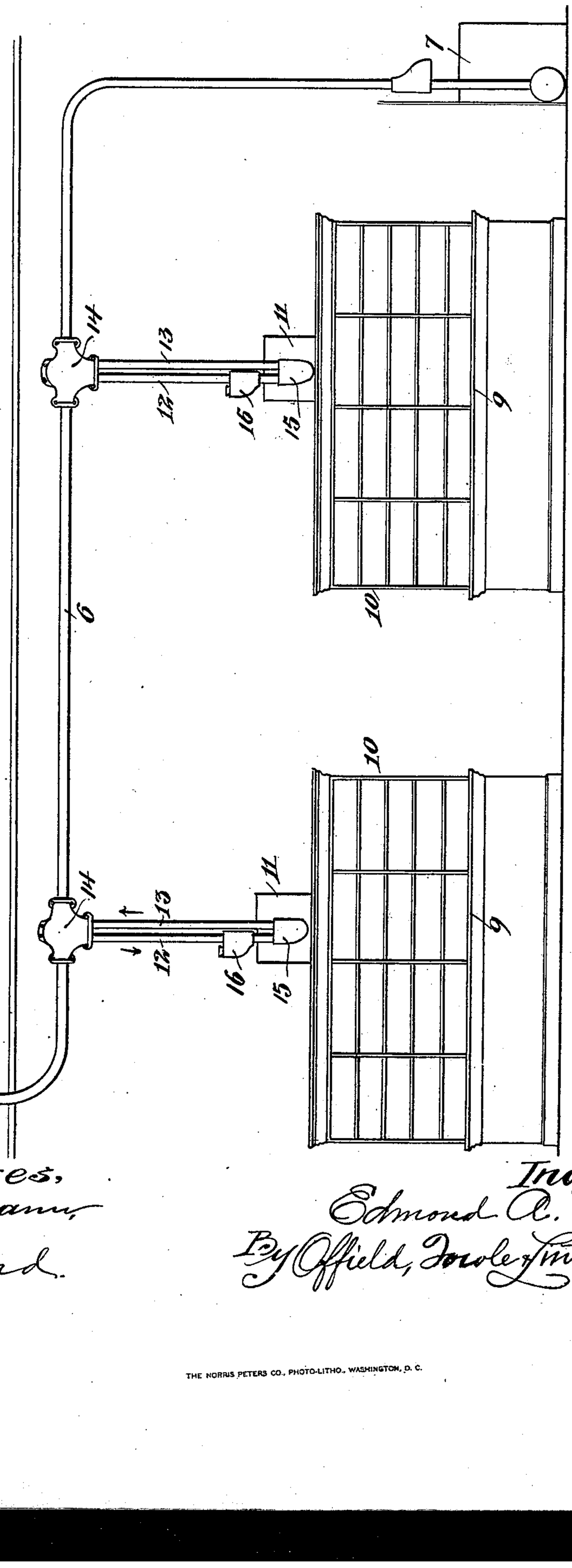
E. A. FORDYCE.

PNEUMATIC DESPATCH TUBE.

(Application filed Feb. 14, 1902.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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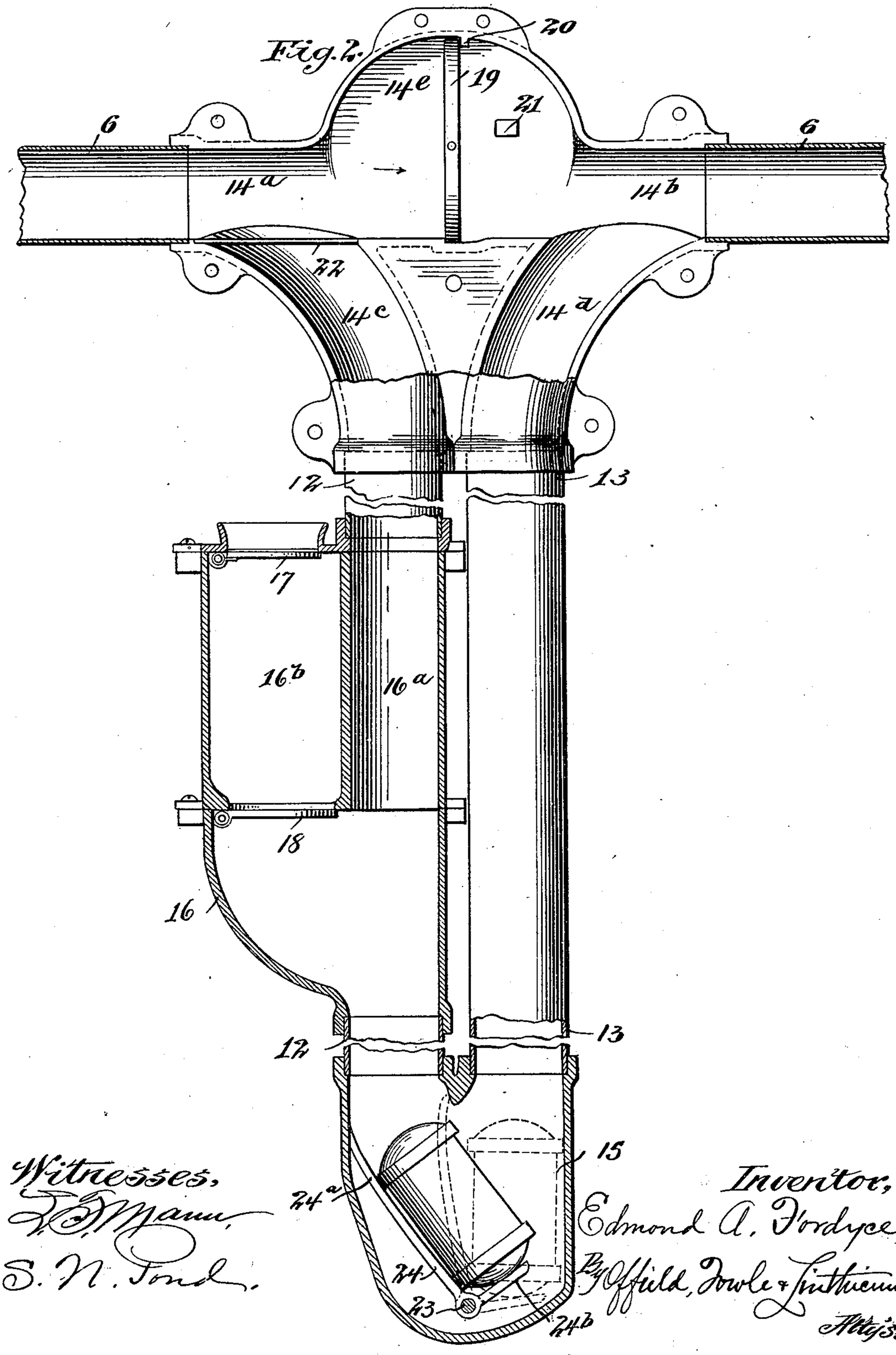
(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

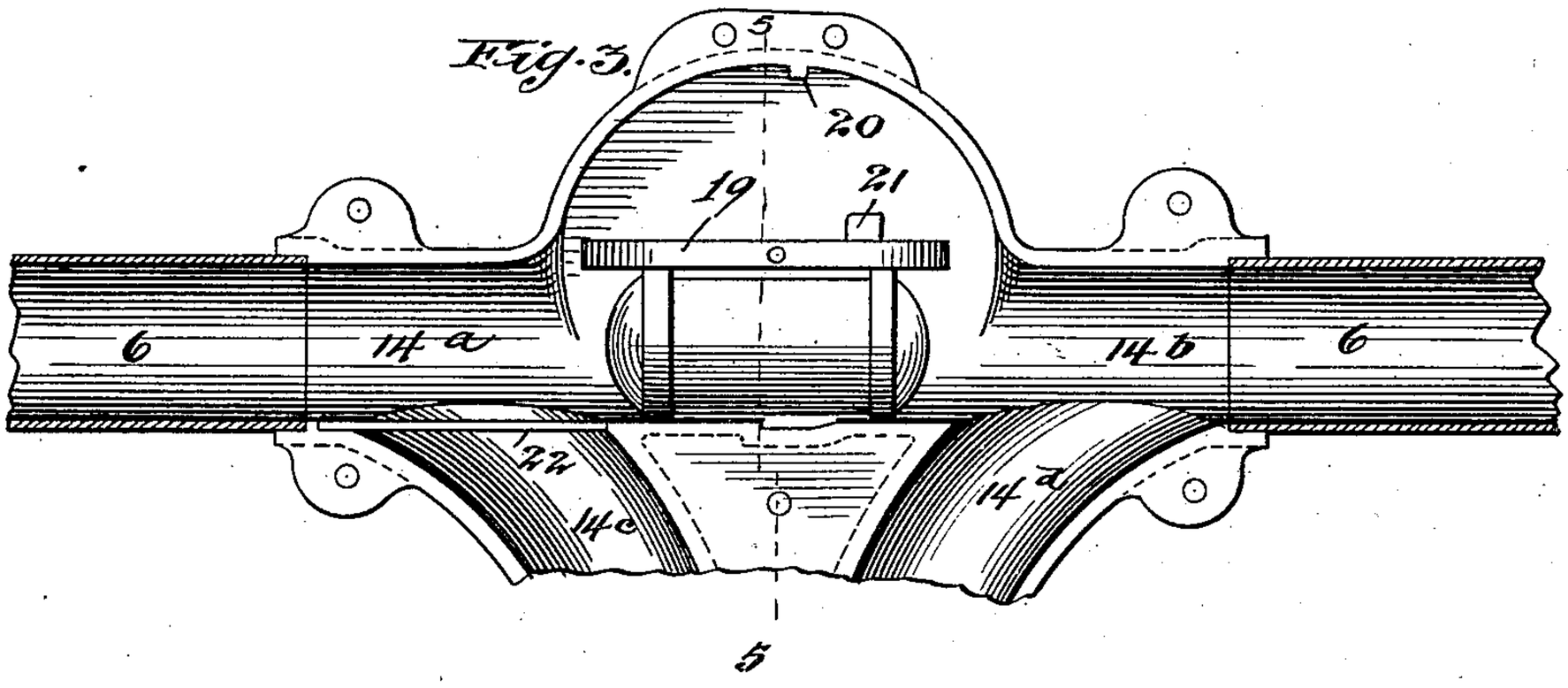


Fig. 4.

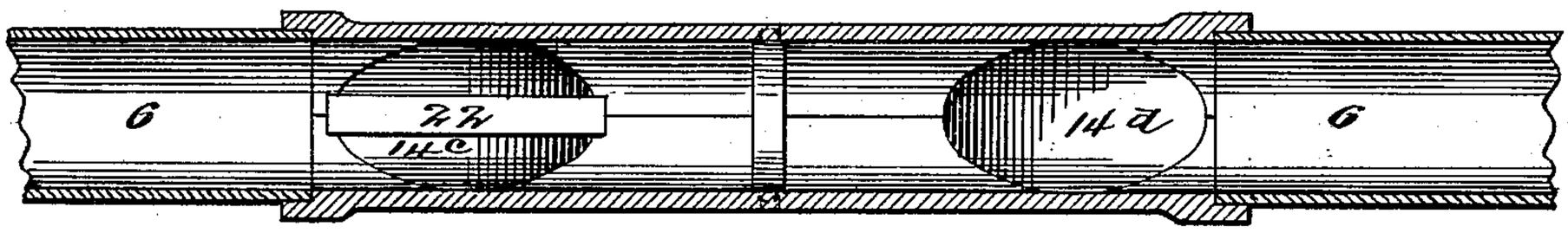
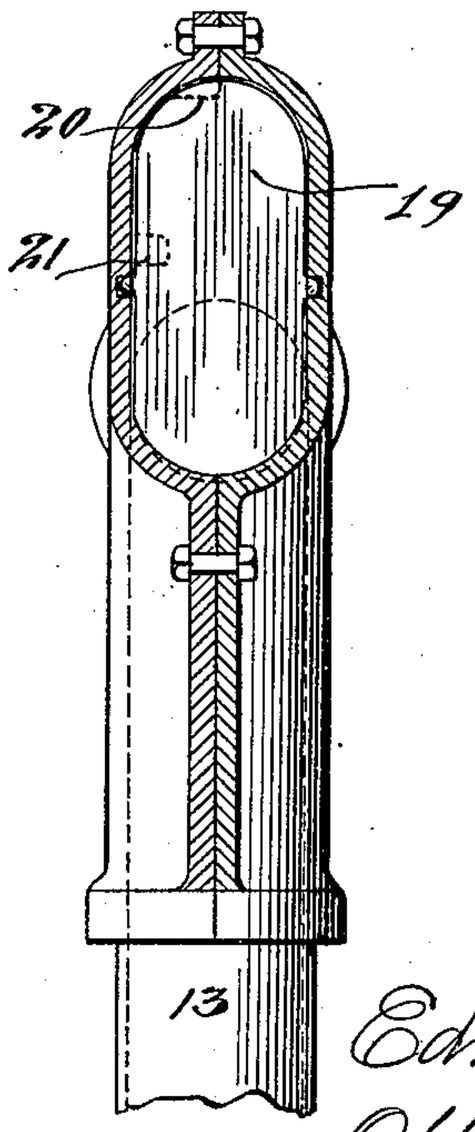


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDMOND A. FORDYCE, OF CHICAGO, ILLINOIS.

PNEUMATIC-DESPATCH TUBE.

SPECIFICATION forming part of Letters Patent No. 698,830, dated April 29, 1902.

Application filed February 14, 1902. Serial No. 94,144. (No model.)

To all whom it may concern:

Be it known that I, EDMOND A. FORDYCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic-Despatch Tubes, of which the following is a specification.

My invention relates to pneumatic-despatch tubes, and has for its object more particularly to provide means for the introduction of carriers to an overhead through-line of the system from a point or points located below said through-line in such a manner as to insure the employment of a minimum amount of tubing for this purpose, thereby effecting an economy in construction and at the same time to prevent any interruption or break in the continuity and integrity of the impelling-current flowing in the through-tube. I carry out this object in my present invention by means of peculiarly-constructed loops depending from the through-tube to an underlying sending-station and so formed and arranged as not to interrupt the passage of through-carriers, while permitting the introduction and despatch of local carriers without affecting the air-current in the through-tube, and further characterized by the fact that the carrier is automatically reversed or turned end for end in the bottom of the loop, whereby the latter can be made narrow with a sharp turn at its bottom, thus dispensing with the long curves for changing the direction of movement of the carrier, which are uneconomical both in respect to material used therefor and space occupied thereby.

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

Figure 1 is a side elevational view of a portion of a pneumatic-despatch-tube system, illustrating the application of my invention thereto. Fig. 2 is a detail view enlarged, principally in longitudinal central vertical section, broken away, of a portion of the main or through tube and one of the sending-loops depending therefrom and equipped with my carrier-reversing device. Fig. 3 is a detail view, in central vertical section, of the top portion of Fig. 2, illustrating a different position of the current-diverting valve and the manner in which the same is actuated by and to permit the passage of a through-carrier. Fig. 4 is a horizontal central sectional view through the main tube as shown in Figs. 2 and 3; and Fig. 5 is a vertical sectional detail on the line 5 5 of Fig. 3, the current-diverting valve being shown in closed position.

In the drawings, 6 designates a section of a main or through line of tubing connecting the cashier's desk 7 with one or more outlying sending-terminals, such as 8, located on the various overlying floors of a store-building or the like. In practice it is often found convenient to carry the through-line on the several floors overhead—that is, along beneath the ceiling, where it is well out of the way and does not occupy space otherwise required for counters, shelves, and other appurtenances of a properly-equipped modern retail store. In such stores the selling-counters, which are indicated at 9 in the drawings, are frequently backed by a tier of shelving 10 for the support and display of goods to be sold, and on top of the cases of shelving are commonly located small desks or stands 11, to be occupied by an attendant whose duty it is to wrap parcels and transmit cash-carriers passed upwardly by the salesman or saleslady. It is obvious that in such an arrangement the sending-terminals located at these points must either be provided with individual and independent lines of tubes running to the cashier's desk or they must be connected by auxiliary or branch tubes with a main or through line of tubing, such as is indicated at 6. My present invention is concerned with the problem of effecting such a connection between these sending-stations and the cashier's desk as will conduce to cheapness and economy in respect to material and labor required in the installation of a system and will at the same time insure no less reliable results and as much certainty of operation as the use of individual tubes. I will therefore next describe the means I have devised for effecting this object, remarking the while that my invention is not limited to the precise form and arrangement of elements shown nor to the exact described location and connection in which they are used.

At each of the sending-stations 11 is located a tube-loop constituted by a pair of parallel closely-adjacent tubes 12 and 13, which de-

pend from the through-tube 6, being connected with the latter by means of a suitably-chambered and air-tight casting, (designated as an entirety by 14.) The lower ends of the tubes 12 and 13 are united by a pocket-shaped air-tight casting 15, a feature of which latter resides in the fact that it provides a connection between the lower ends of tubes 12 and 13 of a sharp curvature and wherein the direction of travel of the carrier is reversed from down to up by a reversal of the carrier itself relatively to the sending-tube rather than by the usual provision of a section of tube of sufficient curvature to permit the continuous travel of the carrier in the same relative relation to the tube. At a convenient point in the tube 12 is introduced a sending-terminal, which may conveniently be in the form of the casting 16 shown in Fig. 2, having a bore 16^a, registering with and constituting a section of the tube 12, and a branch 16^b, constituting a receiver for the carrier to be despatched, this receiver being equipped with upper and lower sealing-valves 17 and 18, adapted to prevent interruption of the current by the introduction of the carrier. The casting 14, as shown in Fig. 2, has formed therein two opposite end passage-ways 14^a and 14^b in direct line with the interrupted ends of the through-line tube 6, which enter the same, a pair of oppositely and symmetrically curved depending passage-ways 14^c and 14^d, connecting and registering with the upper ends of the tubes 12 and 13, respectively, and a valve-chamber 14^e, intermediate and above the passage-ways 14^a and 14^b, this valve-chamber being equipped with a valve-plate 19, pivotally mounted in the side walls thereof and adapted to oscillate between the position shown in Fig. 2, wherein it diverts the current flowing through the through-tube 6 and causes it to flow through the depending loop, and the position shown in Fig. 3, wherein it lies in line with the upper wall of the through-tube and permits the passage of a through-carrier therebeneath. It will be observed that this valve is pivoted eccentrically of its longitudinal extent, whereby the suction or pressure (as the case may be) flowing through the through-tube normally maintains said valve in its closed position, wherein the current is deflected through the loop. The closing movement of the valve is limited by a lug 20, depending from the inner wall of the roof of the valve-chamber 14^e, while the open position of the valve is defined and limited by a corresponding stop in the nature of a cross-bar 21, extending between the sides of the valve-chamber. The junction of the through-line tube with the branch 14^c is bridged by a strip 22, which prevents the through-carriers from being deflected into the branch. The junction of the opposite branch 14^d with the through-tube is so formed relatively to the direction of travel of the through-carriers that the latter will severally jump across the same without the necessity of a bridge at this junction.

Referring again to the casing or pocket 15, which joins the lower ends of the tubes 12 and 13, 23 designates an arbor or spindle extending transversely through the bottom of the pocket substantially in a vertical plane lying centrally between the parallel tubes 12 and 13, upon which spindle is pivoted a carrier-reversing device in the nature of a rocker, (designated as a whole by 24,) this rocker comprising an inclined and slightly-concaved plate 24^a, disposed across that side or compartment of the pocket which is in line with the tube 12, and a foot 24^b, extending substantially at right angles to the plate 24^a and lying partly across the opposite compartment of the pocket, which is in line with the tube 13. The normal position of the rocker is in the full-line position shown in Fig. 2; but when impacted by a carrier dropped into the sending-terminal 16 it is rocked or tilted by the carrier into the dotted-line position shown in said figure, wherein the carrier is brought into line with the tube 13.

Preferably the several castings indicated at 14, 15, and 16 are all formed in longitudinal vertically-disposed halves bolted together through meeting flanges for convenience in casting and assembling the parts. This construction, however, is not of the essence of my invention, since it is old and common, and may be departed from, if desired, without affecting my invention.

The operation may be briefly described as follows: The impelling-current normally flows through the tube 6 and down through all of the looped branches which are connected therewith, the valves 19 being normally held closed by the current and serving to effect the deflection of the latter. Through-carriers introduced at one of the upper terminals, as the terminal 8, are drawn or impelled by the current flowing through the main tube 6 to the cashier's desk 7, and in passing the junctions of the branches with said main tube travel straight through the castings 14, the momentum of the carriers being sufficient to tilt the valves 19 to a position longitudinally of the upper wall of the tube. Immediately after a carrier has passed the valve 19 the latter automatically returns to the closed position shown in Fig. 2, thereby restoring the current to its normal path through the looped branch therebeneath. When a local carrier is to be transmitted from one of the stations 11, it is dropped into and falls through the double-trapped sending-terminal 16, and upon entering the descending current flowing through tube 12 is impelled by the latter, supplemented by gravity, with considerable force to the bottom of the pocket 15, where it slidingly engages and is partially deflected by the long arm or plate 24^a of the rocker 24 and impacts the foot 24^b of said rocker with sufficient force to tilt the rocker on its pivot, as shown in dotted lines in Fig. 2, whereby the carrier itself is rocked over into line with the outgoing tube 13, through which the current is flowing

in an upward direction. The carrier instantly resumes its travel under the impelling force of the current, but in the opposite direction to its previous travel, and turned about, so that the rear end of the carrier as it was dropped in the transmitter now becomes its forward or advance end. From the tube 13 the carrier is quickly drawn through the passage-way 14^d of the casting 14 into the main tube 6, passing thence to the cashier's stand.

It will be observed that by my invention I provide for the transmission of carriers from one or more local stations to the cashier's desk through a main or through line tube without interfering with the travel of the current or the through-carriers in the latter, and, furthermore, by the form of local transmitter herein shown and described I provide for the introduction of carriers from the local stations into the through-line through a downwardly-sending terminal, in which the force of gravity may be taken advantage of without interrupting the continuity and integrity of the main current and with a minimum amount of line-tubing to form the connection. The presence of the rocker 24, serving to automatically shift the carrier bodily from one leg to the other of a loop in which the current is traveling in opposite directions, entirely obviates the necessity of connecting the lower ends of the two legs of the loop by a line-tube of sufficient curvature to permit the carrier to travel continuously therethrough without danger of being stuck therein. This turning of the carrier while *en route* end for end at the situation described thus effects a material economy both in respect to the material required for the installation of a plant and the time of travel required for the carrier to reach the cashier's desk from one of the stations 11.

It is evident that the underlying principle of my invention might be embodied in other and mechanically equivalent forms, and hence I do not limit myself to the precise form and relative arrangement of the elements as hereinabove described, and shown in the drawings. To provide for the reversal of the direction of a carrier's travel where such reversal is necessary by the expedient of briefly halting the carrier and causing the same to then continue its travel rear end foremost I believe to be entirely new in this art, and hence I do not limit myself to the particular means shown and described for effecting this result, except to the extent that such means may be made the subject of specific claims.

I claim—

1. In a pneumatic-tube system, the combination with an overhead main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of a looped branch connected with and depending from said main-line tube at a local sending-station, a valve at the junction of said main tube and branch normally deflecting the current through the latter but permitting the uninterrupted travel of through-carriers past the junction, and a sending-terminal located in said looped branch, substantially as described.

2. In a pneumatic-tube system, the combination with an overhead main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of a looped branch connected with and depending from said main-line tube at a local sending-station, a valve at the junction of said main tube and branch normally deflecting the current through the latter but permitting the uninterrupted travel of through-carriers past the junction, and a double-trapped sending-terminal located in that branch of the loop through which the current descends, substantially as described.

3. In a pneumatic-tube system, the combination with a main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of a branch tube communicating with said main-line tube, a sending-terminal in said branch tube, and means located in said branch tube for turning the carrier end for end while *en route* through the latter, substantially as described.

4. In a pneumatic-tube system, the combination with an overhead main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of a looped branch connected with and depending from said main-line tube at a local sending-station, said branch comprising two parallel tubes lying close together and connected at their lower ends by a pocket, a valve at the junction of said main tube and branch normally deflecting the current through the tubes and pocket of the latter but permitting the uninterrupted travel of through-carriers past the junction, a sending-terminal located in that branch of the loop through which the current descends, and means located in said pocket serving, upon the descent of the carrier, to automatically transfer the carrier laterally into line with the outgoing branch of the loop, substantially as described.

5. In a pneumatic-tube system, the combination with an overhead main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of a looped branch connected with and depending from said main-line tube at a local sending-station, said branch comprising two parallel tubes lying close together and connected at their lower ends by a pocket, a valve at the junction of said main tube and branch normally deflecting the current through the tubes and pocket of the latter but permitting the uninterrupted travel of through-carriers past the junction, a sending-terminal located in that branch of the loop through which the current descends, and a rocker pivoted in the bottom of the loop adapted to receive the descending carrier and to be tilted by the impact thereof to bodily transfer the carrier laterally into line with the outgoing branch of the loop, substantially as described.

6. In a pneumatic-tube system, the combi-

nation with an overhead main-line tube adapted to transmit carriers from an outlying station to the cash-desk, of an air-tight casing interposed in said main tube above a local sending-station, said casing having a horizontal passage-way therethrough in line with the main tube, and a pair of oppositely-curved depending passage-ways communicating at their upper ends with said horizontal passage-way, a looped branch containing a sending-terminal and connected to and communicating with the depending curved passage-ways of the casing, and a current-deflecting valve consisting of a plate pivotally mounted between the side walls of the casing above the path of carriers therethrough and having unequal areas exposed to the effect of the current on opposite sides of its pivotal axis, substantially as described.

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