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DELIVERY TERMINAL FOR PNEUMATIC TRANSMISSION SYSTEMS

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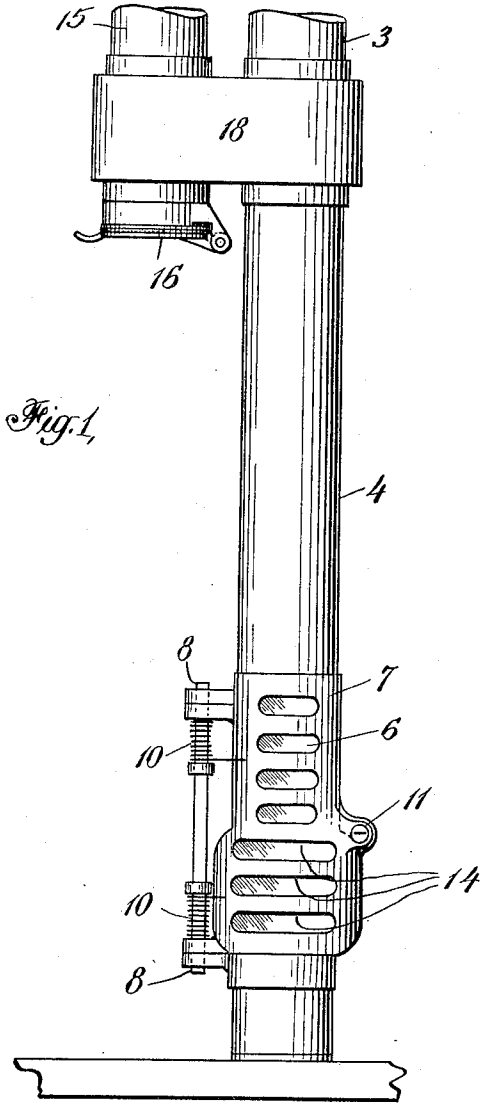


Fig. 1.

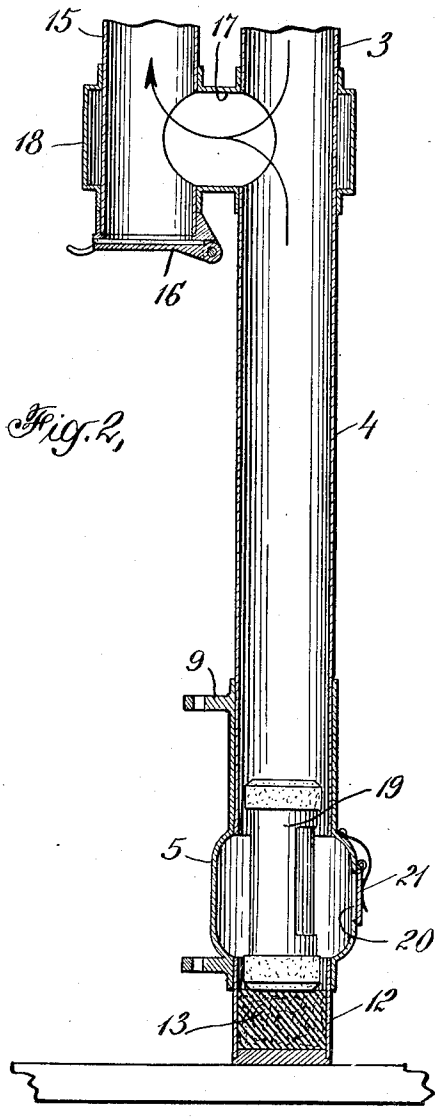


Fig. 2.

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UNITED STATES PATENT OFFICE.

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DELIVERY TERMINAL FOR PNEUMATIC TRANSMISSION SYSTEMS.

Application filed October 11, 1921. Serial No. 507,093.

To all whom it may concern:

Be it known that I, WILLIAM H. DINSPEL, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Delivery Terminals for Pneumatic Transmission Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a delivery terminal for pneumatic dispatch tube systems and involves the provision of a terminal for receiving carriers from the transit tubes without appreciable noise or shock.

With the common forms of delivery terminals now extensively used, such as the down-delivery or over-delivery types, the carriers are discharged from the terminal at a high velocity and with a considerable report, which is annoying and distracting to the operators and is distinctly audible for some distance. The disturbance attendant upon the delivery of carriers is particularly objectionable at out-stations where sales are being conducted, or, for example, in banking room, offices, or other locations where it is desired to maintain silence. The noise resulting from the delivery of carriers is caused by the impact of the carrier against the doors or flaps closing the discharge opening, by the inrush of air following the discharge of a carrier while the doors remain open and it is also due in a measure to the fall of the carriers into the receptacles for receiving them.

Whether of the common types or of other proposed types designed to eliminate noise in the delivery of carriers, terminals heretofore used in practice are all provided with one or more flaps or valves closing the discharge openings of the tubes and terminals and the carriers are delivered from the tubes into a basket or other receptacle. Not only is it impossible to obtain a silent delivery of carriers with such terminal construction, but it will be evident that the consecutive order of discharge of carriers can not be followed in handling the carriers after their discharge, especially so in the event of heavy traffic resulting in the accumulation of carriers in the receptacles. Moreover, after their discharge into a basket or other open receptacles, no safeguards exist against unauthorized handling of the carriers.

The present invention provides a delivery terminal into which carriers are delivered from the transit line with scarcely if any audible sound, thus eliminating all the objectionable sounds of this kind existent in all the present forms of delivery terminals.

In accordance with the invention, the delivery terminal, which is provided with an opening for the removal of carriers, is in open communication with the transit tube so that no doors or flaps are encountered by the carrier in discharging from the transit tube into the terminal as is now generally the case and one of the principal causes of noisy delivery is thus eliminated.

A desirable form of the terminal is one in which the carriers are received and stacked up end to end and so retained in the consecutive order in which they are delivered from the transit tube, and one which is provided at its end with means for cushioning the impact of the carriers as they are delivered. To this end the terminal may consist of a length of tubing, preferably larger in diameter than the transit tubes, including a chamber for receiving the carriers provided with an opening for their removal, adjacent to the bottom of which are the cushioning means for the carriers.

The opening in the terminal, or in the chamber of the terminal, as the case may be, for the removal of carriers is, in the preferred form of the invention, provided with a door, as for example, a hinged spring pressed door, for closing the opening in which case the operation of the terminal is improved by the provision therein of a port for the escape of air, which is compressed in the end of the terminal by the carriers as they are delivered, so that the cushioning effect of the compressed air will not be such as to interfere with the proper delivery of the carriers.

Where cushioning means are employed in the end of the terminal, the delivery of the carriers will be practically inaudible, and so it is desirable to provide the terminal door with openings or slits covered with transparent material through which the carriers

delivered into the terminal may be seen. Moreover, the door may be provided with locking means to insure removal of the carriers only by those authorized to handle them.

A silent delivery terminal of the character of that constituting the present invention is particularly desirable at outlying stations as before pointed out. Commonly at such a station the sending tube from the central tube-room and the return tube to the latter are connected by means of a by-pass to form one continuous line or circuit for air to the suction drum. As a means of eliminating the noise in the delivery of carriers arising from the inrush of air during the discharge of carriers, the invention comprehends as a separate and distinct feature, a delivery terminal for a pneumatic dispatch tube system comprising a plurality of tubes connected by means of a by-pass, the delivery terminal being in open communication with the transit line and extending beyond the by-pass. Since the by-pass completes the circuit for air through the line, the air propelling the carriers will not follow the latter into the terminal, with the result that the flow of air past the upper opening of the terminal and through the by-pass will create a suction setting up a current of air in the terminal opposed in direction to the direction of discharge of the carriers. In this way not only is the noise incident to the inrush of air in the existing forms of terminals eliminated, but the propelling air current is utilized to cut down the velocity of the carriers after they have traveled beyond the by-pass by setting up a counter current of air which produces in itself a cushioning effect on the carriers descending into the terminal. In this form of terminal, one or more of the features of the invention earlier described may be included, and in the dispatch system constituting the specific embodiment of the invention described hereinafter there is a transit line comprising a plurality of tubes connected by means of a by-pass situated near the end of the line, that is to say near the end of the sending tube and the inlet opening of the return tube. The delivery terminal is extended beyond the by-pass and includes a chamber for receiving the carriers, and is provided with an opening for their removal consecutively in the order in which they are delivered. The opening in the chamber is closed by means of a spring pressed door having openings therein covered with transparent material and the door is provided with means for locking it in closed position. At the end of the terminal are means for cushioning the impact of the carriers and the chamber is provided with a port for permitting the escape of air compressed in the terminal by the carriers.

The invention is illustrated in the accompanying drawings in application, as an example, to an outlying station in which,

Fig. 1 illustrates an out station at which the silent delivery terminal is shown at the end of a sending tube for the dispatch of carriers from the tube room, and a portion of the return tube for returning carriers to the tube room, together with the by-pass connecting the tube.

Fig. 2 is a sectional view of the terminal and tubes illustrated in Fig. 1.

Referring to the drawings, the sending tube 3 terminates in a length of tubing 4 which comprises a part of the delivery terminal. Secured to the end of this length of tubing is a chamber 5 which is provided with a suitable opening 6 for the removal of carriers, and this opening is closed by a door 7, hinged at 8 on lugs 9 extending outwardly from the chamber, and is normally held in closed position by means of springs 10. The door is provided with suitable locking means 11 for locking it in closed position. The lower end of the chamber 5 is secured to a short length of tube 12 in which a cushion 13 of rubber or other resilient substance is held.

In order that carriers delivered into the terminal may be seen, the door 7 is provided with openings or slits 14 covered with transparent material such as glass, mica, or the like. Adjacent the sending tube 3 is a return tube 15 running to the tube room and having a connection through a suction tube with a vacuum drum (not shown), and this tube has at its end an intermediate hinged door 16, closing the inlet opening thereof. The air circuit through the sending tube, return tube, and suction tube to the exhaust means is completed through a by-pass 17 connecting the sending and return tubes and formed in a clamping member 18 for holding the tubes together at the out station. The terminal tubing 4 extends, as indicated, in the drawings, beyond the by-pass 17. In operation, when the carrier 19 is discharged from the tube 3 and passes beyond the by-pass 17 into the terminal 4, the air, instead of following the carrier into the terminal tube, flows through the by-pass into the return tube. The rush of air past the upper opening of the tube 4 forms a suction which creates an upward current of air opposed in direction to the direction of travel of the carrier, thus not only eliminating the noise which would otherwise be caused by the inrush of air following the carrier, but as well producing a cushioning effect on the carrier.

To provide against compression of the air in the terminal to an extent such as would result in the noisy opening and closing of the door, or so excessive in amount as to hold the carriers in suspension in the termi-

nal, the chamber 5 is provided with a port 20 for the escape of air compressed into the end of the terminal by the carriers. The compression of air and consequently the amount of air pressure in the end of the terminal is regulated by a spring pressed valve 21 closing the port.

Preferably the length of tubing 4 together with the chamber 5 have an inner diameter slightly larger than the transit tube in order that there may be sufficient space between the carrier and the inner wall of the terminal to permit the passage of the counter current of air in the terminal cushioning the descent of the carrier.

I claim:

1. In a pneumatic dispatch tube system of the open or continuous flow type, a transit line comprising a tube for transmitting carriers from a sending to a receiving station, a normally closed delivery terminal for the tube at the receiving station, which is constructed and arranged to receive carriers and retain them consecutively in the order in which they are discharged into the terminal, the latter being provided with an opening for the removal of the carriers, and means at the end of the terminal for cushioning the impact of the carriers as they are delivered.

2. In a pneumatic dispatch tube system of the open or continuous flow type, a transit line comprising a tube for transmitting carriers from a sending to a receiving station, and a normally closed delivery terminal for the tube at the receiving station which is in open and continuous communication with the tube, said terminal having an opening in its side for the removal of the carriers and a closed end provided with means for cushioning the impact of the carriers.

3. In a pneumatic dispatch tube system, a transit line comprising a tube for transmitting carriers from a sending to a receiving station, a delivery terminal for the tube at the receiving station which is in open communication with the tube, and which is provided with an opening for the removal of the carriers, a door for closing said opening and means for locking said door.

4. In a pneumatic dispatch tube system, a transit line comprising a tube for transmitting carriers from a sending to a receiving station, a delivery terminal for the tube at the receiving station which is in open communication with the tube, and which is provided with an opening for the removal of the carriers, and a door for closing said opening, said door having openings therein covered with transparent material.

5. In a pneumatic dispatch tube system, a transit line comprising a tube for transmitting carriers from a sending to a receiving station, a delivery terminal for the tube at the receiving station which is in open communication with the tube, said terminal including a chamber for receiving the carriers discharged from the transit line, provided with an opening for the removal of the carriers, a hinged door for closing said opening, a spring for normally holding the door in a closed position, means adjacent the bottom of the chamber for cushioning the impact of the carriers, and a valve in said chamber for permitting the escape of air from the terminal.

6. In a pneumatic dispatch tube system, a transit line comprising a plurality of tubes for transmitting carriers in opposite directions, said tubes having a by-pass connection near the end of the line, and a delivery terminal in open communication with the transit tubes and extending beyond the by-pass, the latter completing the circuit for air through the transit line whereby a suction is created in the delivery terminal setting up a current of air opposed in direction to the direction of travel of the carrier discharging into the terminal from the transit line.

7. In a pneumatic dispatch tube system of the open or continuous flow type, a transit line comprising a plurality of tubes for transmitting carriers in opposite directions, said tubes having a by-pass connection near the end of the line, and a normally closed delivery terminal in open communication with the transit tubes and extending beyond the by-pass, the latter completing the circuit for air through the transit line whereby a suction is created in the delivery terminal setting up a current of air opposed in direction to the direction of travel of the carrier discharging into the terminal from the transit line, and means at the end of the terminal for cushioning the impact of the carriers.

8. In a pneumatic dispatch tube system of the open or continuous flow type, a transit line comprising a plurality of tubes for transmitting carriers in opposite directions, said tubes having a by-pass connection near the end of the line and a delivery terminal in open communication with the transit tubes, and extending beyond the by-pass, the latter completing the circuit for air through the transit line whereby a suction is created in the delivery terminal setting up a current of air opposed in direction to the direction of travel of the carrier discharging into the terminal from the transit line, said delivery terminal having its outer end closed and being provided with an opening for the removal of the carriers, and a spring-pressed door for closing said opening.

9. In a pneumatic dispatch tube system of the open or continuous flow type, a transit line comprising a plurality of tubes for transmitting carriers in opposite directions, said tubes having a by-pass connection near the end of the line, and a delivery terminal

in open communication with the transit tubes extending beyond the by-pass, the latter completing the circuit for air through the transit line whereby a suction is created in the delivery terminal setting up a current of air opposed in direction to the direction of travel of the carrier discharging into the terminal from the transit line, said delivery terminal having its outer end closed and being provided with an opening for the removal of the carriers, a spring-pressed door for closing said opening and a valve for permitting the escape of air from the terminal.

10. In a pneumatic dispatch tube system, a transit line comprising a plurality of tubes connected by means of a by-pass situated near the end of the line, a delivery terminal extending beyond the by-pass, said terminal including a chamber for receiving the carriers provided with an opening for the removal of the carriers consecutively in the order in which they are delivered, a spring-pressed door for closing the opening, said door having openings therein covered with transparent material, and means for locking the door in closed position, means at the end of the terminal for cushioning the impact of the carriers and a port in said chamber for permitting the escape of air from the terminal.

In testimony whereof I affix my signature.

WILLIAM H. DINSPEL.