E. A. FORDYCE.

PNEUMATIC DESPATCH TUBE APPARATUS.

APPLICATION FILED FEB. 4, 1907.

1,044,877.

Patented Nov. 19, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

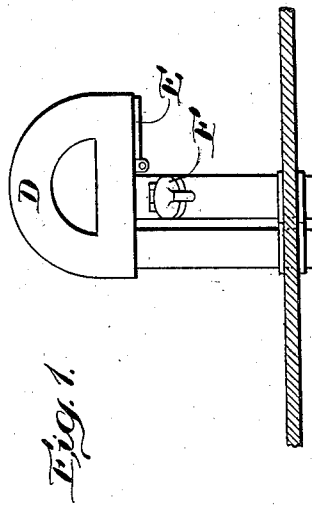

Fig. 2.

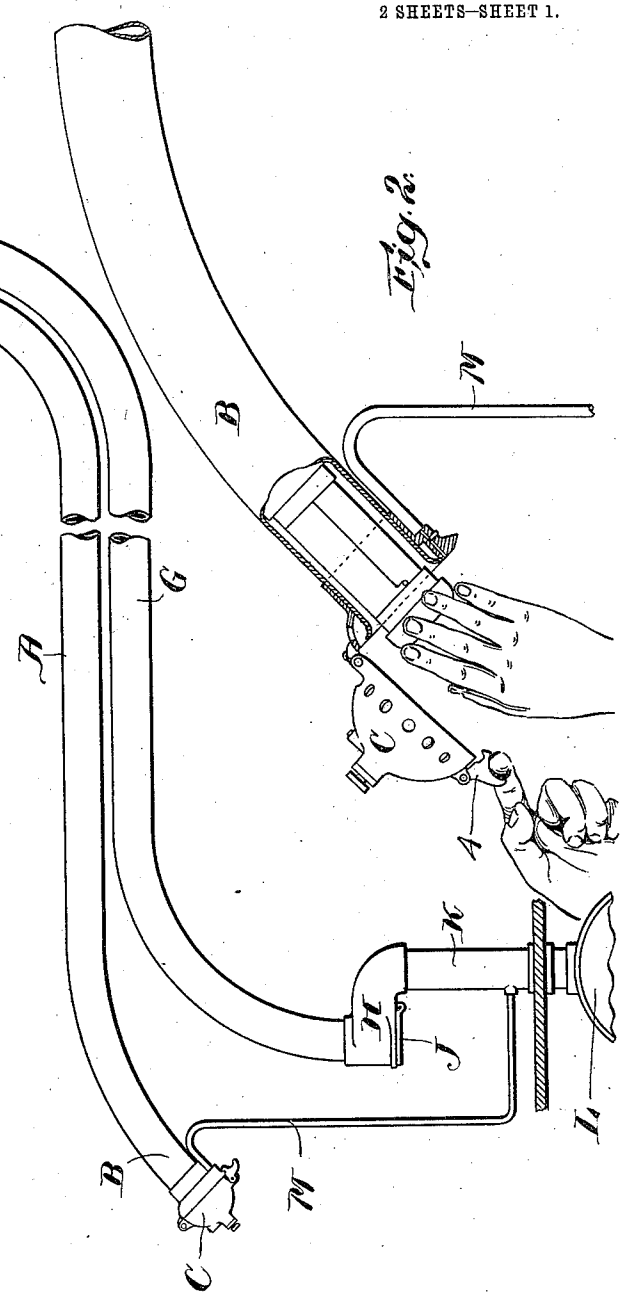

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Fig. 4.

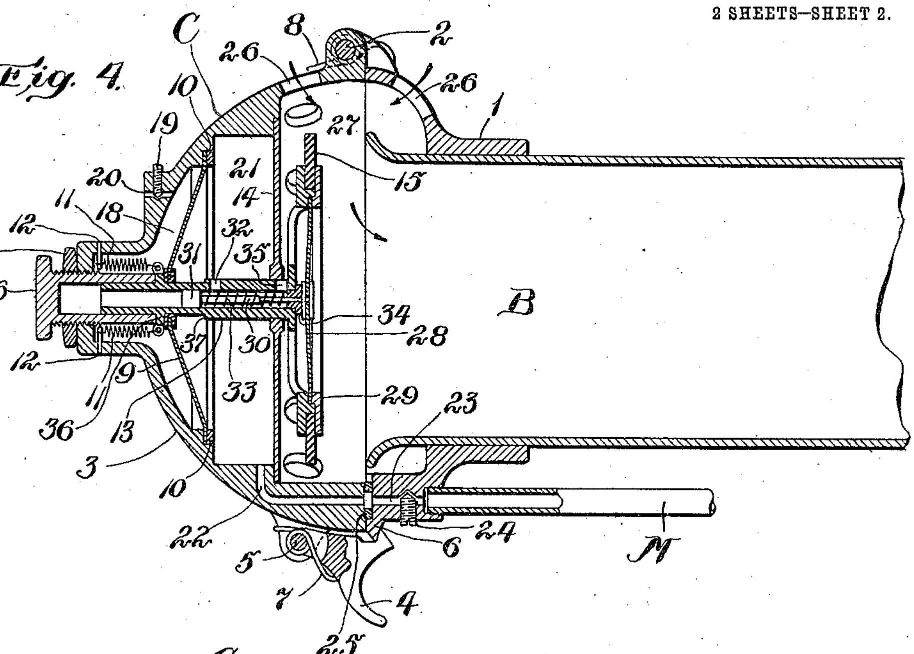
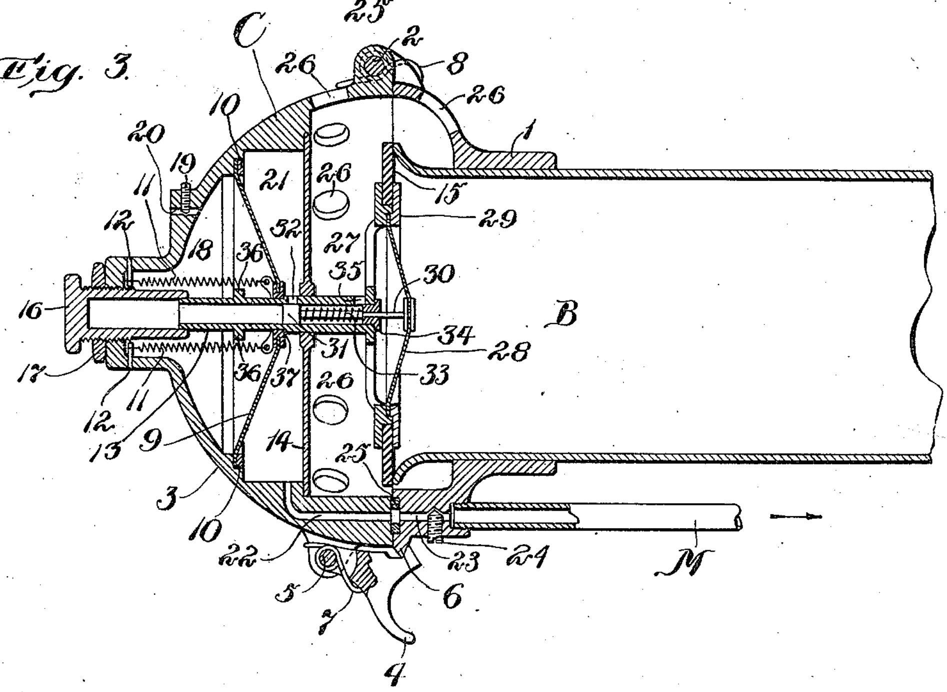


Fig. 3.



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EDMOND A. FORDYCE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO AMERICAN PNEUMATIC SERVICE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE.

PNEUMATIC-DESPATCH-TUBE APPARATUS.

1,044,877. Specification of Letters Patent. Patented Nov. 19, 1912.

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To all whom it may concern:

Be it known that I, EDMOND A. FORDYCE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic-Despatch-Tube Apparatus, of which the following is a specification.

This invention relates to improvements in pneumatic despatch tube apparatus, and particularly to those normally closed systems wherein a vacuum is maintained and the carriers are propelled therethrough by the admission of atmospheric pressure.

The object of my invention is to supply a simple and efficient device which will permit the admission of atmospheric pressure directly through the bell mouth when a carrier is to be despatched and automatically time and control the admission of said atmospheric pressure, and which device can be thrown out of communication with the pressure in the system for the purpose of inserting carriers into the bell mouth.

In the accompanying drawings which illustrate a construction embodying my invention, Figure 1 is a diagrammatic view of an ordinary vacuum system showing the device in controlling connection with the bell mouth; Fig. 2 shows the device opened for inserting a carrier into the bell mouth; Fig. 3 is an enlarged sectional view of the device showing the normal or closed position; Fig. 4 is a similar view to Fig. 3 showing the mechanism in open position admitting air for driving carriers.

Like letters of reference refer to like parts throughout the several views.

Referring to Fig. 1: A is a transmission tube connecting the bell mouth B at the central station controlled by the device C with the terminal D at the sub-station having the usual delivery valve E.

G is a transmission tube for the return of carriers having the ordinary despatching inlet valve F and connecting the terminal D with the delivery terminal H at the central station. The terminal H is connected with a vacuum drum L by a pipe K; connecting the pipe K with the casing I which is mounted upon the bell mouth B is a small vacuum tube M. The outer swinging valve 3 is pivoted to the casing I on the pin, 2 and is normally held closed by a spring 8 and latch 4 which is adapted to engage the catch 6. This latch 4 is pivoted to the outer valve 3 at 5 and is held closed by spring 7. Mounted in the outer valve 3 is a diaphragm 9 held in position by a ring 10. Springs 11 are attached to the diaphragm 9 and to the pins 12 fixed in the valve 3. The diaphragm 9 is slidably mounted over the hollow valve stem 13 and between the shoulder 37 and collar 36 and which stem 13 is centrally mounted and slidable in the plate 14 mounted in the valve 3. The leather valve 15 is carried on the outer end of the valve stem 13 and normally closes the bell mouth B (Fig. 3). The movement of the valve 15 is limited by the adjustable screw 16 held in position by the check nut 17. The inclosed chamber 18 is controlled by a timing screw 19 adapted to regulate the passage 20. The chamber 21 between the diaphragm 9 and the plate 14 is adapted to communicate with the vacuum tube M through passages 22 and 23 when the outer valve 3 is closed (Fig. 3) and with the atmosphere through passage 22 when the valve 3 is opened (Fig. 2). The exhaust of air from chamber 21 is timed by the adjustable screw 24 and leakage is prevented by the rubber gasket 25. The chamber 27 is open to the atmosphere through apertures 26. Inclosing an aperture in the valve 15 is a diaphragm 28 held in position by the retaining ring 29 and exposed to the vacuum in the bell mouth B on one side and to the atmosphere in chamber 27 on the opposite side.

A valve stem 30 connected with the diaphragm 28 carries the piston valve 31 which is mounted in the hollow valve stem 13 and normally closes the port 32. A spring 33 is confined between the piston 31 and a bushing 34. A port 35 connects the hollow valve stem 13 with the chamber 27.

The operation is as follows: The operator in despatching a carrier from the central station to the sub-station grasps the handle or latch 4 releasing the same, and raising the valve 3 inserts the carrier into the bell mouth B (Fig. 2). The opening of valve 3 opens the passage 22 admitting air to the chamber 21 breaking the vacuum therein. The springs 11 now pull the diaphragm 9 back as fast as the air in the chamber 18 is expelled through the passage 20. When the diaphragm 9 has slid upon the valve stem 13 a short distance it engages collar 36 and through the valve stem 13 moves the valve 15 backward until the collar 36 en-

gages the screw 16. In the meantime, the air entering the bell mouth B drives the carrier through the tube A and the operator has released the valve 3 which by tension of spring 8 closes, the latch 4 engaging the stop 6 locking the valve closed. The parts are now in the position shown in Fig. 4 with the air entering through apertures 26 as shown by arrows. The vacuum now acting through the tube M and passages 23 and 22, gradually exhausts the air in the chamber 21 and when the diaphragm 9 has been pulled along the valve stem 13 a short distance, it engages the shoulder 37 and the valve 15 now begins to close. By the time the valve 15 has closed, the carrier has discharged through the valve E at the sub station. This timing of the closure of the valve 15 is regulated by the screw 24.

In returning a carrier from the sub station to the central station, the inlet valve F is opened and the carrier inserted into tube G. The opening of valve F breaks the vacuum in tube A and releases the diaphragm 28 at the bell mouth B, the spring 33 causing the piston 31 to move back uncovering the port 32 and admitting air from chamber 27 through the port 35 and port 32 to the chamber 21 and breaking the vacuum therein. The valve 15 is now opened in the manner hereinbefore described and the air is admitted to the system (see Fig. 4). As soon as the operator closes the valve F, the slight vacuum due to the resistance to the air entering the bell mouth B draws the diaphragm 28 outward moving the piston 31 and closing the port 32. The air now begins to exhaust from the chamber 21 through the tube M until the valve 15 is closed and the carrier has discharged through the valve J at the central station. The vacuum at the bell mouth B when the valve 15 is open may be regulated by the screw 16 which limits the opening of said valve and increases the resistance to the air entering. The lost motion of the diaphragm 9 between the shoulder 37 and collar 36 is to prevent the momentary breaking of the vacuum in the tube A when a carrier discharges from reopening the valve 15.

Having thus described the nature of my invention and set forth a construction embodying the same, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In pneumatic despatch tube apparatus, a carrier transmission tube provided at one end with a mouth to receive carriers, an air-exhaust pipe communicating with the other end of said tube, a by-pass leading from a point adjacent the mouth of the transmission tube to the air-exhaust pipe, a hinged head normally closing the mouth of the transmission tube and comprising inner and outer chambers with the inner chamber having a comparatively large opening to the outside air and the outer chamber having a comparatively restricted opening to the outside air and said outer chamber also having a passage to communicate with said by-pass when the head is closed and to communicate with the outside air when the head is open, a valve movably mounted in the inner chamber of the head opposite the mouth of the transmission tube, resilient means normally holding the valve away from the mouth of the transmission tube, and a diaphragm in the outer chamber of the head between the restricted opening of said chamber to the outside air and the passage of said chamber to the by-pass, said diaphragm being connected with said valve to move the latter against the action of said resilient means to close the mouth of the transmission tube when the air is exhausted from the outer chamber through the latter's passage to the by-pass when the head is closed.

2. In pneumatic despatch tube apparatus, a carrier transmission tube provided at one end with a mouth to receive carriers, an air-exhaust pipe communicating with the other end of said tube, a by-pass leading from a point adjacent the mouth of the transmission tube to the air-exhaust pipe, a hinged head normally closing the mouth of the transmission tube and comprising inner and outer chambers with the inner chamber having a comparatively large opening to the outside air and the outer chamber having a comparatively restricted opening to the outside air and said outer chamber also having a passage to communicate with said by-pass when the head is closed and to communicate with the outside air when the head is open, means to regulate the flow of air from the outer chamber through the passage to the by-pass, a valve movably mounted in the inner chamber of the head opposite to the mouth of the transmission tube, and a diaphragm in the outer chamber of the head between the restricted opening of said chamber to the outside air and the passage of said chamber to the by-pass, said diaphragm having a sliding connection with said valve to move the latter against the action of said resilient means to close the mouth of the transmission tube when the air is exhausted from the outer chamber through the latter's passage to the by-pass when the head is closed.

3. In pneumatic despatch tube apparatus, a carrier transmission tube provided at one end with a mouth to receive carriers, an air-exhaust pipe communicating with the other end of said tube, a by-pass leading from a point adjacent the mouth of the transmission tube to the air-exhaust pipe, a hinged hollow head normally closing the mouth of the transmission tube, a partition dividing said

head into inner and outer chambers, said inner chamber communicating with the mouth of the transmission tube and having a comparatively large opening to the outside air, said outer chamber having a comparatively restricted opening to the outside air and also having a passage to communicate with said by-pass when the head is closed and to communicate with the outside air when the head is open, a valve movably mounted in the inner chamber of the head opposite to the mouth of the transmission tube, a valve-stem on said valve projecting through said partition into the outer chamber, resilient means connected with said valve-stem normally holding the valve away from the mouth of the transmission tube, adjustable means for regulating the movement of the valve-stem, and a diaphragm in the outer chamber of the head between the restricted opening of said chamber to the outside air and the passage of said chamber to the by-pass, said diaphragm having a sliding connection with said valve-stem to move the same against the action of said resilient means to close the valve against the mouth of the transmission tube when the air is exhausted from the outer chamber through the latter's passage to the by-pass when the head is closed.

4. In pneumatic despatch tube apparatus, a carrier transmission tube provided with a mouth at one end to receive carriers, an air-exhaust pipe communicating with the other end of said tube, carrier-admission means in said tube intermediate of its ends, a by-pass leading from a point adjacent the mouth of the transmission tube to the air-exhaust pipe, a hinged head normally closing the mouth of the transmission tube comprising communicating inner and outer chambers with the inner chamber having a comparatively large opening to the outside air and the outer chamber having a comparatively restricted opening to the outside air and said outer chamber also having a passage to communicate with said by-pass when the head is closed and to communicate with the outside air when the head is open, a valve movably mounted in the inner chamber of the head opposite to the mouth of the transmission tube, resilient means normally holding the valve away from the mouth of the transmission tube, a diaphragm in the outer chamber of the head with the restricted opening of said chamber to the outside air on one side of the diaphragm and on the other side of the diaphragm the communication of the outer chamber with the inner chamber and also the passage of the outer chamber to the by-pass, said diaphragm being connected with said valve to move the latter against the action of said resilient means to close the mouth of the transmission tube when the air is exhausted from the outer chamber through the latter's passage to the by-pass when the head is closed, a second diaphragm mounted in said valve to be actuated by the differences of pressure in the inner chamber and transmission tube when said valve closes the mouth of the tube, means connected with the second diaphragm controlling the communication between the inner and outer chambers of the head to be actuated to open such communication between the chambers when said second diaphragm is moved by a fluctuation of pressure in the transmission tube occasioned by the opening of the carrier-admission means intermediate of the ends of the transmission tube.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this twenty-eighth day of January A. D. 1907.

EDMOND A. FORDYCE.

Witnesses:
MARY G. SMITH,
L. G. BARTLETT.