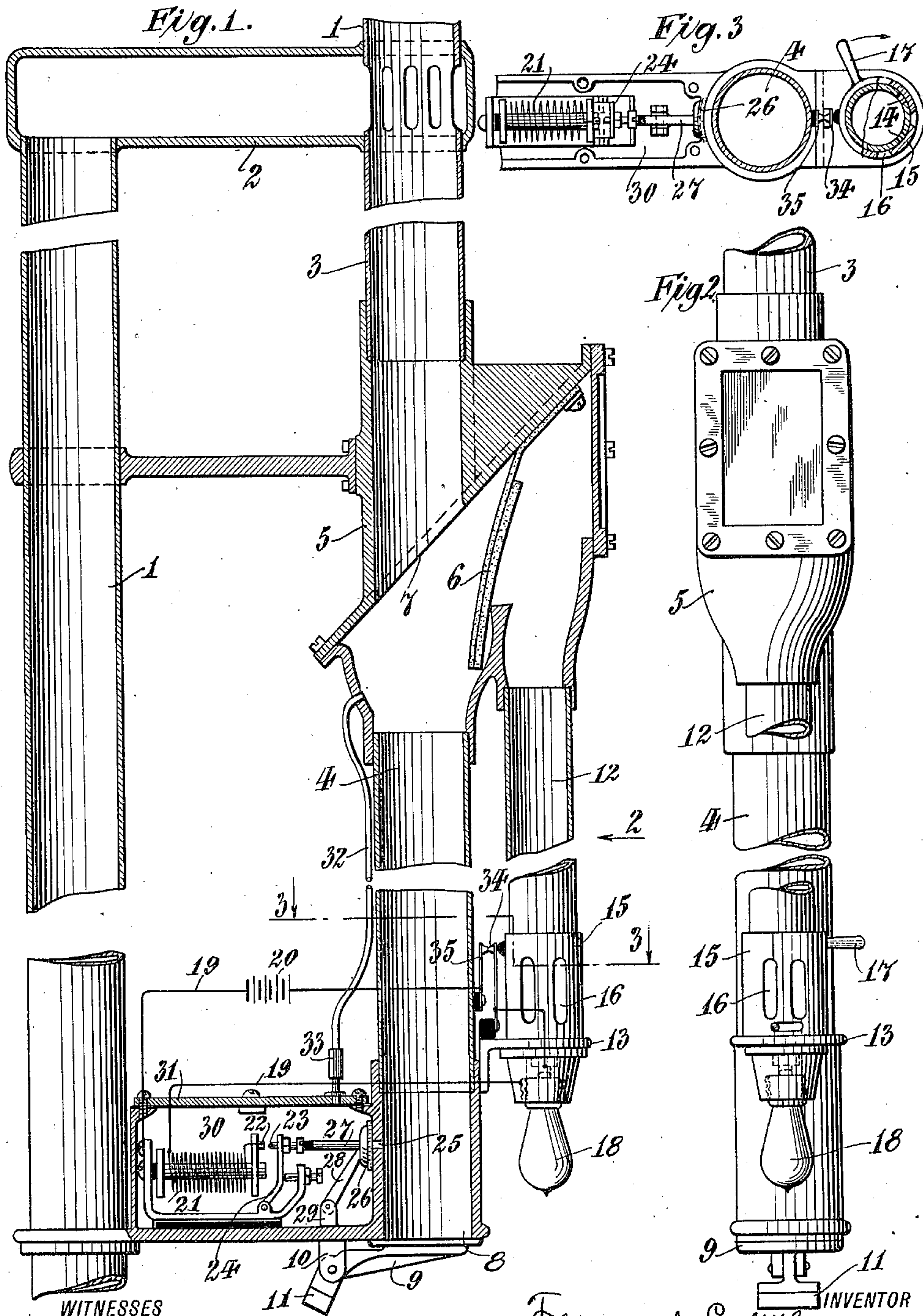


F. E. D'HUMY.
PNEUMATIC TRANSMISSION SYSTEM.
APPLICATION FILED MAR. 25, 1912.

1,092,982.

Patented Apr. 14, 1914.

2 SHEETS—SHEET 1.

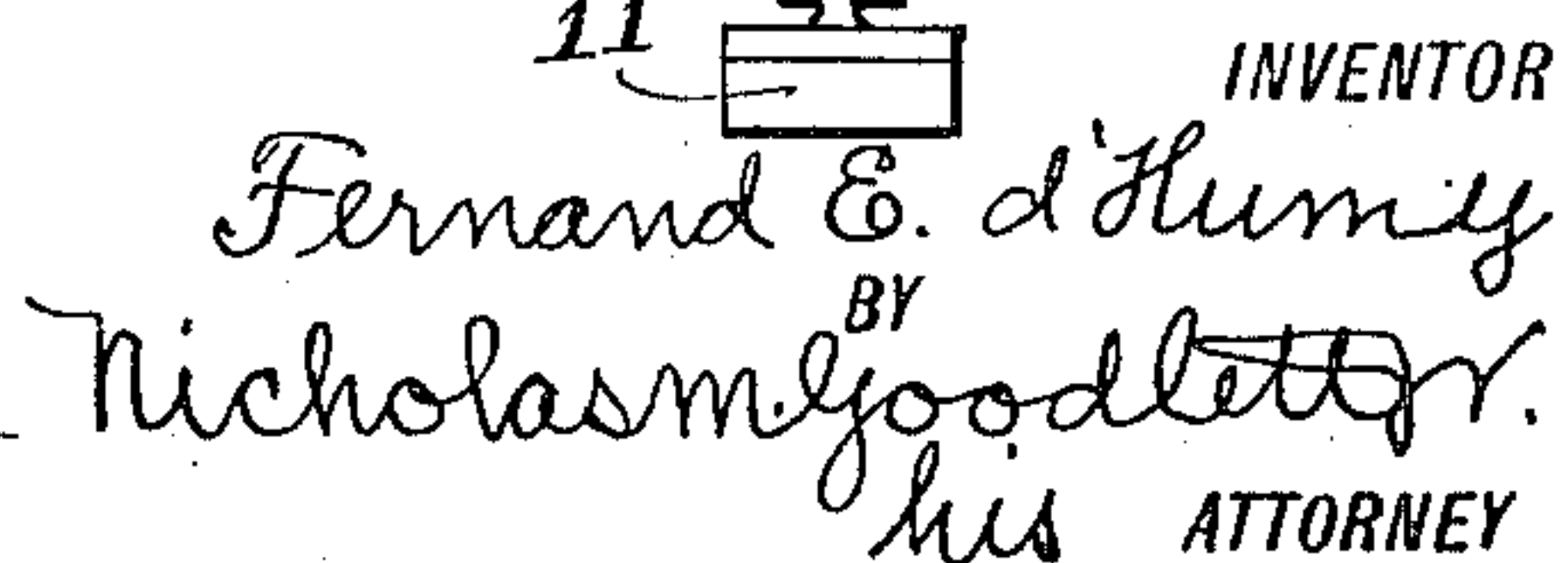
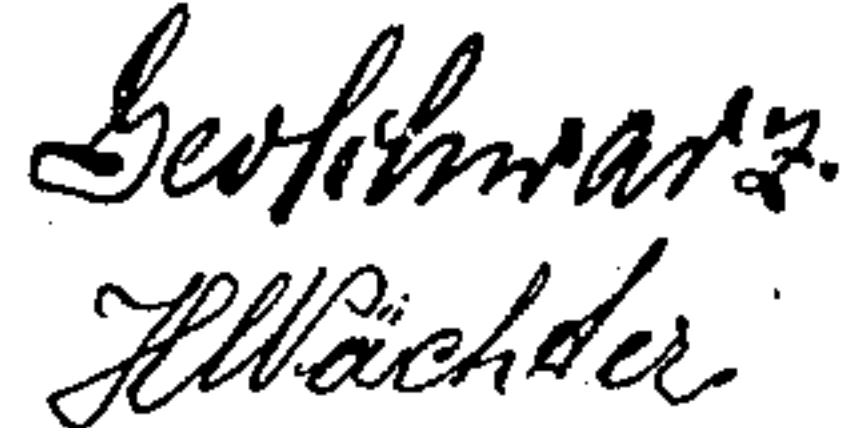


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1,092,982.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

FERNAND E. D'HUMY, OF ENGLEWOOD, NEW JERSEY, ASSIGNOR TO THE WESTERN UNION TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

PNEUMATIC TRANSMISSION SYSTEM.

1,092,982.

Specification of Letters Patent.

Patented Apr. 14, 1914.

Application filed March 25, 1912. Serial No. 685,908.

To all whom it may concern:

Be it known that I, FERNAND E. D'HUMY, a citizen of the United States, and a resident of Englewood, county of Bergen, and State of New Jersey, have invented certain new and useful Improvements in Pneumatic Transmission Systems, of which the following is a specification.

This invention relates to pneumatic transmission systems of a class to be herein known as exhaust systems or systems of the exhaust type.

Pneumatic transmission systems may be divided into three general classes. In the first class the carrier is despatched through the tube by a propelling blast of air pumped into the sending side of the tube circuit. In the second class the carrier is despatched through the tube by exhausting the air at a pumping station from the return side of the tube circuit. The third class combines the characteristics of both of the other classes, the carrier being despatched through the tube by exhausting air from the return side of the tube circuit and also by a propelling air blast injected into the sending side of the tube circuit. The last two classes of such systems may be designated as systems of the exhaust type since transmission of the carrier is effected in whole or in part by exhausting air from the return side of the tube circuit.

The present invention has reference to the terminal at the receiving station.

One feature relates to an arrangement for providing an air cushion stop in the terminal for the carrier combined with a relief valve controlled by the attendant and adapted to admit atmospheric pressure to the terminal for the discharge of the carrier. Each carrier upon its arrival is regularly brought to a complete stop in the terminal by the air cushion stop and there remains until it is discharged at the will of the attendant by the opening of the relief valve.

Another feature of the invention relates to the provision of a signal to indicate the arrival of the carrier at the receiving station.

Another feature of the invention relates to a novel arrangement in a double valve terminal, which is simple and reliable in operation, for reestablishing the vacuum in the terminal or pocket after the vacuum has

been broken to facilitate the discharge of the carrier from the terminal.

In the accompanying drawings forming part of this specification, and in which like reference numerals designate corresponding parts in the several figures, the invention is shown in its preferred form in Figures 1, 2, and 3 and in a modified form in Figs. 4, 5 and 6. Fig. 1 is a vertical sectional elevation of the invention in its preferred form. Fig. 2 is an elevation looking in the direction of the arrow 2 of Fig. 1. Fig. 3 is a sectional plan view on the line 3—3 of Fig. 1. Fig. 4 is a view similar to Fig. 1 showing a modification. Fig. 5 is an elevation looking in the direction of the arrow 5 of Fig. 4. Fig. 6 is a sectional plan view on the line 6—6 of Fig. 4.

Referring now to the particular features shown in Figs. 1, 2 and 3 of the drawings, 1 is the main tube or passage-way of the system having an elbow 2. 3 is a downwardly directed tube leading from the main tube at the elbow and communicating with a receiving pocket 4. Between the tube 3 and receiving pocket 4 is a valve casing 5 provided with a check valve 6 having a valve seat 7 and adapted when closed to cut off communication between the main tube and the receiving pocket. As shown, this valve consists of a leather or other flexible disk sufficiently weighted to open the valve when the air pressure in the valve casing on both sides of the valve is substantially equal, it being preferable to arrange this valve so as to be normally open and to be closed by air pressure when the relief valve is opened. The pocket 4 is provided at its lower end with a discharge opening 8 for the carrier. This opening is provided with a closure which is preferably in the form of a self-closing valve 9. This valve is pivoted on a bracket 10 and is provided with a counterweight 11 so that the valve acts to close itself when not prevented from so doing. 12 is a tube or passage-way secured to the valve casing 5 and communicating with the receiving pocket 4 forward of the valve 6. The lower end of the tube 12 rests upon and is closed by a bracket 13. The tube 12 is provided with peripheral slots 14 arranged to be closed by the relief valve 15 comprising a rotatable sleeve having peripheral slots 16 and handle 17. By means of this valve

15 air pressure from a suitable source preferably outside air may be admitted to or cut off from the tube 12.

The parts are shown in their normal position in Figs. 1, 2 and 3 in which position the valve 6 is open and valves 9 and 15 are closed, a partial vacuum being maintained in the main tube, in the receiving pocket and the tube 12. As is usual in such systems, the carrier closely fits the main tube. It also closely fits the tube 3, the valve casing 5 and receiving pocket 4. When the carrier arrives by way of the main tube, it passes through the tube 3, the valve casing 5 and into the receiving pocket 4, wherein it crowds the air in front of it against the valve 9 to form an air-cushion stop for the carrier. The attendant then opens the relief valve 15 to admit outside air, the pressure of which immediately closes the valve 6 and cuts off communication between the receiving pocket and the main tube. At the same time the pressure of the outside air is admitted to the receiving pocket 4 behind the carrier or behind the stopping place for the carrier so that the carrier thereupon presses open the valve 9 and drops out of the pocket. When the carrier has passed out, the valve 9 closes itself owing to its counter-weight 11. The attendant then closes the valve 15 whereupon the air in receiving pocket 4 and tube 12 is drawn out through the elbow 2 and the main tube 1, leaking past the valve 6 which, although closed, is arranged to admit of such leakage. When the air pressure in the pocket 4 and the tube 12 have been so reduced as to establish substantially equal pressure on both sides of the valve 6, this valve may drop to open position thereby bringing the parts into their normal state, as shown in Fig. 1.

The employment of a relief valve whose opening is controlled by the attendant, instead of the employment of a valve opened automatically by each carrier upon its arrival in the terminal, is an important feature. This arrangement enables one or more carriers to closely follow the first carrier into the terminal and to be discharged together and at one opening of the relief valve. Thus, it would not be necessary to delay the despatch of a carrier until the one preceding it had ample time to enter and be discharged from the terminal. Where a relief valve is employed which is opened automatically by each carrier such carrier must be discharged from the terminal and the parts restored to normal condition, including the restoration of the vacuum in the terminal, before a second carrier arrives in the terminal or reaches the check valve between the terminal and the main tube. The number of carriers which could be despatched without time allowance from the sending station, between the carriers, or

which could simultaneously occupy the terminal at the same time, where the opening of the relief valve is controlled by the attendant, is merely dependent upon the length of the terminal below the check valve. In the accompanying drawings, the terminal is shown as being of a length and sufficient to contain several carriers at the same time. A second carrier following closely the preceding carrier into the terminal would form its own air cushion stop in the terminal immediately in advance of itself and behind the preceding carrier, just as the first carrier forms its own air cushion stop in advance of itself.

It will be seen that in the arrangement described, the carrier is brought to rest and discharged without shock to the parts and without noise incident to an inrush or out-rush of air which usually characterizes other pneumatic transmission systems and is objectionable.

Referring now to the signaling device, 18 is a signal lamp which may be located at any convenient point but, as shown in the drawings, is fixed to the under side of the bracket 13 near the discharge opening of the pocket 4. The lamp is arranged in a circuit 19 which includes the generator 20 and the coils of a magnet 21 having a fixed contact 22 and a movable contact 23 carried by the armature 24. The contacts 22 and 23 are included in the lamp circuit and are normally open. When these contacts are closed, the lamp circuit is closed and the lamp is illuminated. Contacts 22 and 23 are controlled by the air pressure in the pocket 4, being open when such air pressure is at its normally reduced state and closing upon the increase of pressure due to the formation of the air-cushion produced by the arrival of the carrier. Thus, when the carrier arrives, its air-cushion stop closes contacts 22 and 23 and illuminates lamp 18. When once these contacts have been closed, they are held closed by magnet 21 until the lamp circuit has been broken. The control of contacts 22 and 23 by the air pressure in the pocket 4 is effected, in the present instance, by providing a port 25 near the lower end of the receiving pocket and the valve 26 therefor which carries a rod 27 designed to push against the armature 24 to close these contacts. This valve 26 is carried on the arm 28 pivoted to a bracket 29 and the rod 27 is disconnected from the armature 24 so that the valve 26 may close while the armature 24 is still attracted by the magnet. The valve 26, port 25 and magnet 21 are inclosed in a chamber 30 having a removable cover 31.

32 is a tube having a coupling 33 which connects the chamber 30 with the pocket 4 behind the stopping place of the carrier. The purpose of this chamber and tube is to

equalize the pressure on both sides of the valve 26 after the valve 9 has been closed subsequent to the discharge of the carrier, so that the valve 26 may operate. This valve 5 automatically closes as soon as the carrier has been discharged.

34 and 35 are contacts in the lamp circuit controlled by the relief valve 15. When this valve is closed, the contacts are closed and 10 when the valve is opened to discharge the carrier, these contacts are opened to extinguish the lamp.

Although it is preferred to employ a hand-operated relief valve, one form of which is 15 shown in Figs. 1, 2 and 3, the invention contemplates an automatically operated relief valve, as well. One arrangement of such automatically operated relief valve is shown in Figs. 4, 5 and 6. As there shown, the 20 lower end of the tube 12 is provided with a horizontally slotted flat plate 36 having a similarly slotted valve plate 37 arranged to reciprocate in two vertical guides 38. To the lower end of this valve plate 37 is at- 25 tached a piston rod 39 and piston 40 working in a piston chamber 41. The port 42 opens into the piston chamber from near the lower end of receiving pocket 4. 43 is a tube having a similar function and purpose to that 30 of tube 32 of Fig. 1.

When the carrier arrives in the pocket 4, as shown in Fig. 4, the accumulating air pressure of the air-cushion passes through the port 42 underneath the piston 40, there- 35 by lifting this piston and opening valve 37, whereupon the carrier pushes open the valve 9 and drops out of the pocket. The piston 40 is so weighted that it does not operate in response to the pressure of the air-cushion 40 until the carrier has been arrested. After the carrier has been discharged and the pressure in the piston chamber above and below the piston 40 has been equalized, piston 40 drops to its lower position and closes valve 37.

45 A different arrangement of signal is shown in Figs. 4, 5 and 6. As here shown, the lamp 44 is fixed in alinement with glass disks 45 and 46 which cover alined openings in the walls of the pocket 4. The lamp 44 is per- 50 manently illuminated and its light is visible to the attendant at the glass disk 46 which is preferably ground to disperse the light rays. When there is no carrier in the pocket, the light is visible but when the carrier arrives 55 at the pocket, it cuts off the light from the lamp and thereby indicates the presence of the carrier.

What is claimed and what is desired to be secured by Letters Patent is:—

60 1. In a pneumatic transmission system of the exhaust type, the combination of a main tube; a receiving pocket connecting with the main tube and normally containing substantially the same working pressure as the main 65 tube and designed to closely fit the carrier to

provide for forming in said pocket an air cushion stop designed and adapted to bring the carrier to a complete stop within the pocket, said pocket having a valved discharge opening for the carrier; a check valve 70 between the pocket and the main tube; and a valve controlled by the attendant for opening the pocket to atmospheric pressure to discharge the carrier.

2. In a pneumatic transmission system of 75 the exhaust type, the combination of a main tube; a receiving pocket connecting with the main tube and normally containing substantially the same working pressure as the main tube and designed to closely fit the carrier to 80 provide for forming in said pocket an air cushion stop within the pocket, said pocket having a valved discharge opening for the carrier; a check valve between the pocket and the main tube, said valve having pro- 85 visions for leakage therethrough in closed position to equalize the pressure on both sides of the valve; and a valve controlled by the attendant for opening the pocket to at- 90 mospheric pressure to discharge the carrier.

3. In a pneumatic transmission system, the combination of a main tube; a receiving pocket connecting with the main tube and 95 designed to closely fit the carrier to provide for forming in said pocket an air-cushion stop for the carrier; a relief valve to admit pressure behind the stopping place of the carrier; and a signal to denote the arrival 100 of the carrier controlled by the air pressure in said pocket and by said relief valve.

4. In a pneumatic transmission system, the combination of a main tube; a receiving pocket connecting with the main tube and 105 designed to closely fit the carrier to provide for forming in said pocket an air-cushion stop for the carrier; a signal circuit and signal to denote the arrival of the car- 110 rier; and a circuit closer in said circuit controlled by the air pressure in the receiving pocket.

5. In a pneumatic transmission system, the combination of a main tube; a receiving pocket connecting with the main tube and 115 designed to closely fit the carrier to provide for forming in said pocket an air-cushion stop for the carrier; a signal circuit and signal to denote the arrival of the carrier; a circuit closer in said circuit; and a valve con- 120 trolling a port near the outer end of the receiving pocket and also controlling said circuit closer.

6. In a pneumatic transmission system, the combination of a main tube; a receiving pocket connecting with the main tube and 125 designed to closely fit the carrier to provide for forming in said pocket an air-cushion stop for the carrier; a relief valve to admit pressure behind the stopping place of the carrier; and a signal to denote the arrival of 130 the carrier and provisions for causing the

signal to be displayed operable upon the arrival of the carrier in said pocket, the withdrawal of the signal being controlled by the relief valve.

7. In a pneumatic transmission system, the combination of a main tube; a receiving pocket connecting with the main tube and designed to closely fit the carrier to provide for forming in said pocket an air-cushion stop for the carrier; a relief valve to admit pressure behind the stopping place of the carrier; a signal circuit and signal to denote

the arrival of the carrier; a circuit closer in said circuit operable upon the arrival of the carrier in said pocket; and a contact device in said circuit operable by the relief valve. 15

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

FERNAND E. D'HUMY.

Witnesses:

H. W. MOREHOUSE,
IDA G. GILMORE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."