(No Model.) 2 Sheets—Sheet 1.

C. M. JOHNSON.

PNEUMATIC DISPATCH SYSTEM.

No. 541,756. Patented June 25, 1895.

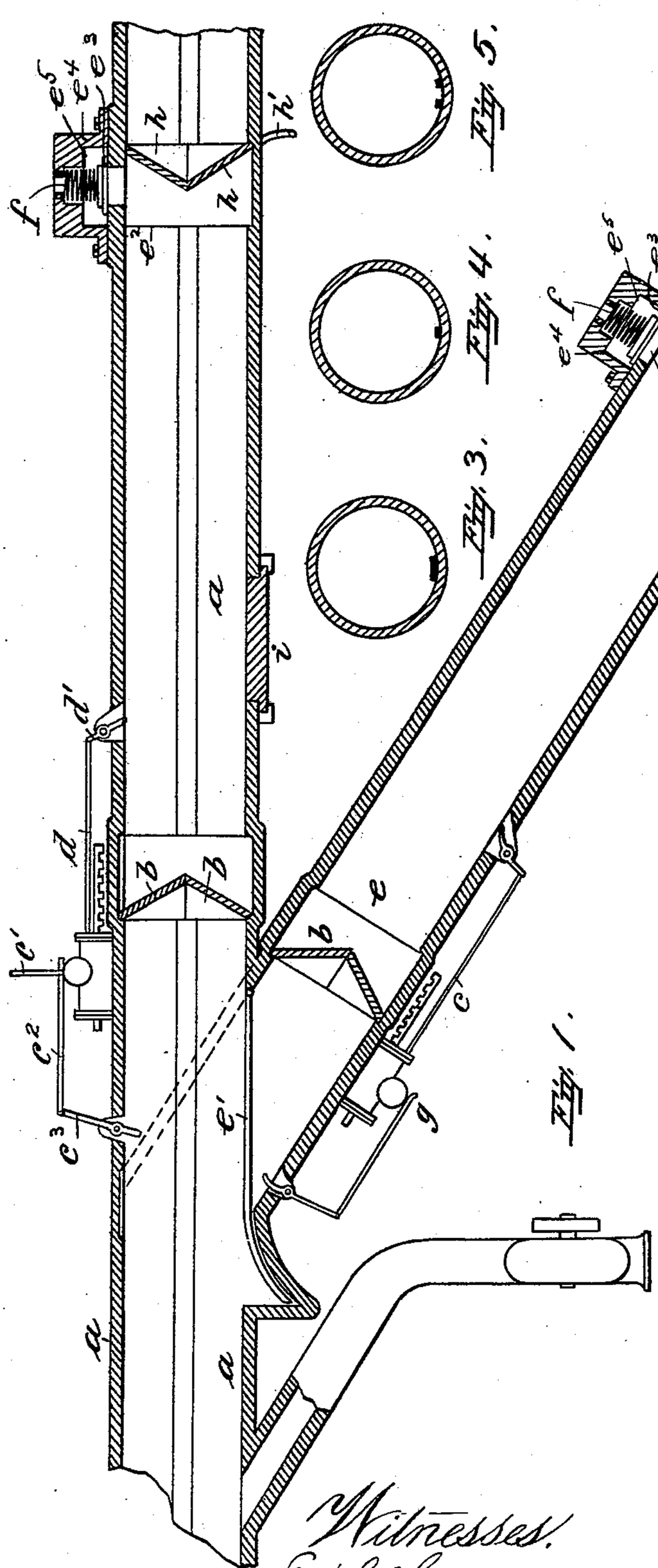

Fig. 1.

Fig. 2.

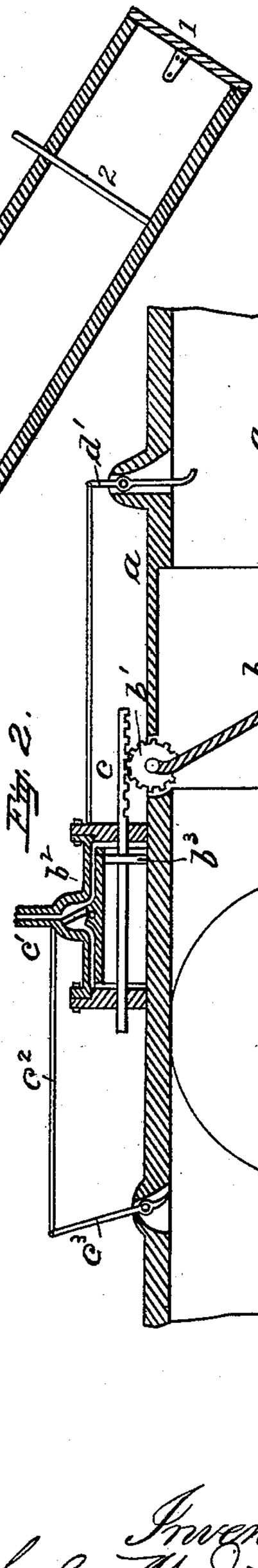

Fig. 4.

Fig. 3.

Fig. 5.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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PNEUMATIC DISPATCH SYSTEM.

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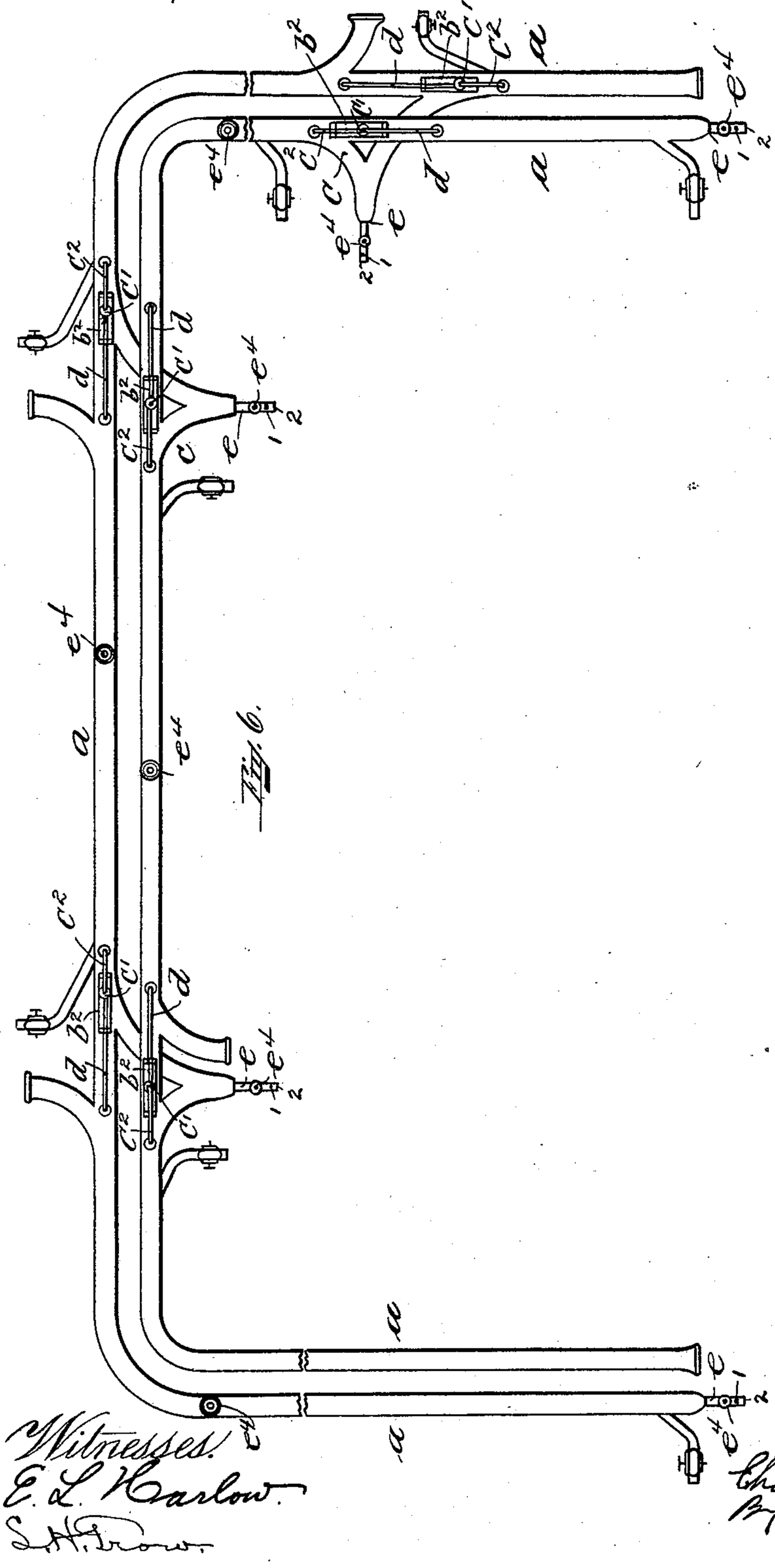

Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES M. JOHNSON, OF NEW YORK, N. Y.

PNEUMATIC DISPATCH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 541,756, dated June 25, 1895.

Application filed October 11, 1889. Serial No. 326,758. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. JOHNSON, of the city, county, and State of New York, have invented and made a new and useful Improvement in Pneumatic Dispatch Systems, of which the following is such a full, clear, and exact description as will enable others skilled in the art to make and use the same, when taken in connection with the accompanying drawings, in which—

Figure 1 is a longitudinal horizontal section of a part of a dispatch system. Fig. 2 is an enlarged detail section of the valve, and its automatic operating devices. Fig. 3 is a cross section of the tube. Figs. 4 and 5 are modifications of the same. Fig. 6 is a diagrammatic view showing a series of independent sections, each provided with an air supply and exhausting apparatus.

This invention relates to improvements in pneumatic dispatch tube systems, and it consists of certain novel features, arrangements and combinations hereinafter described and particularly pointed out in the claims.

In the drawings *a* represents the tube in which the carriers are guided from point to point, which I form of papier maché, cast iron, wrought iron or steel, or other suitable material, as strong and durable, yet light and economical to make and lay. The tube is provided on one side of the interior with a flat bed plate, rail or track as shown in Figs. 1, 3, 4 and 5, and the tube is so laid that the bed plate, rail or track will be at the bottom of the tube when the same is in position. The bed plate, rail or track may be cast in cast tubes, rolled in wrought tubes, or may be riveted or otherwise fastened in any of the tubes. The bed plate shown in Fig. 3 is simply a flat plate; the rail in Fig. 4 is narrow and will answer in some places; the track shown in Fig. 5 providing two rails for the carrier gives it guidance; and they all accomplish the result of making a small point of contact for the spherical carrier and decreasing the friction.

In practice I intend to construct the main line in sections of suitable length divided by valves, that prevent the passage of air from one section to the other, but which readily yield to the onward flight of the carrier, as described in Letters Patent granted to me on the 22d day of December, 1885, No. 332,905. Each section is provided with an exhaust fan for drawing the air out of the section, and thus allowing the air coming in at the other end, to force the carrier forward, or a blower to force air in at one end, and an escape opening at the other end to force the carrier forward. Each station is also provided with a receiving or cushioning tube into which the carrier is shunted, if it is to be stopped, at that point, and all this will be found fully shown in said patent, with the valves, gates, switches, &c., that are used to control the carrier as described. In my experiment I have used a tube of nearly three feet diameter, and a carrier which when loaded, weighed nearly a thousand pounds, and have developed a speed of two miles a minute, with the same. This speed is so great that the shock of the carrier striking and forcing aside the section or division valve of the main line (as described in my former patent) soon destroys the valve, and for this reason I use the one herein shown and described.

The valve *b* is made in two or more parts, hinged to the sides of the tube, and opening outwardly to allow the carrier to pass, and folding in again at once to cut off the passage of air from one section of the tube to the other. To perform this I connect the parts of the valve so as to be moved in unison, by links or gearing or any other well known mechanical device, and upon the hinge of one of them I secure a gear segment b' as in Fig. 2. Upon the outer side of the tube *a*, I secure a steam cylinder b^2, provided with a piston b^3, the rod *c*, of which is at one end formed with a rack to engage and operate the segment on the valve. A steam valve c' is employed to admit and exhaust the steam from this cylinder, and is provided with a connection c^2, which is extended back a short distance alongside the tube, and connected to a small lever or trip c^3, pivoted with its end projecting into the path of the carrier. A second rod *d* is extended from this steam valve in the opposite direction, past the section valve *b*, and is connected to a trip d', pivoted and projecting into the path of the carrier. From this it will be seen that as the carrier approaches it strikes and moves the first trip c^3, and thereby moves the steam valve so as to admit steam behind the piston, and the latter

is quickly forced backward and opens the section valve. The carrier passes on and immediately upon entering the next section, it strikes the second trip *d'* and reverses the steam valve, the piston is moved forward again, and the section valve closed so that no air can be drawn backward into the first section of the tube from the second section. This renders the action automatic, but the carrier does not come in contact with the section valve directly and cannot injure it.

As seen clearly in Fig. 1, the air chamber *e* is connected with the main line, and a switch *e'*, is placed at the junction, which is at any desired time thrown across the main tube and thus cuts the carrier out of the main line, and directs it into the air chamber. This air chamber is closed at its end by a gate 1 and a slide 2 and when the carrier is projected into it, the air that may be therein, is compressed ahead of the carrier, and forms an elastic cushion that checks and stops the flight with ease and without jar, no matter what the speed. Aside from the speed, the cushioning force required to stop the carrier, will vary as the weight varies and to equalize the distance which different carriers will enter the cushioning tube, so that all may be stopped as nearly as may be at the same point, I have provided the inner end of the air chamber with an opening e^2, over which is placed a plate or air valve e^3, in a suitable frame e^4. Springs *f* are used to hold this valve against its seat in position to allow air to escape from the chamber when the valve is raised from the seat. It will be evident that the air cannot escape as fast as it is compressed, and a force is thus developed that forces the valve away from the normal seat and toward its seat e^5 to partially or wholly cut off this escape, and that the rapidly increasing pressure formed by the ingress of a heavy carrier may entirely close the air port, and thus the air retained in the cushion is automatically graduated to correspond exactly with the force to be checked, and all carriers are stopped near the same point and are removed through the door and slide.

Just within the entrance of the cushioning tube I have placed a steam actuated cut off valve *b*, in all respects made and actuated as previously described for the main section valve, and which is normally closed so that no air may pass from the air chamber into the main tube, under the influence of the fan, or when the exit opening is open for any cause.

While I prefer to use an air chamber branching from the main tube, in order that when the carriers are traveling closely, one may be cut out and leave the main line wholly free for the passage of the next, yet it is evident that if desired, the carrier may be stopped in the main tube, and removed therefrom. Thus in Fig. 1, I have provided a second division valve as *h*, beyond the section valve *b*, with sufficient distance between them to form an air chamber. This valve is not intended for use except when a carrier is to be cut out and I therefore do not make it automatic, but open or close it by means of a handle *h'* projecting through the side of the tube. An exit opening *i* is also provided in the main tube, and an air valve similar to the one already described upon the special cushioning tube, and it will be evident that a portion of the main line may be thus quickly formed into a receiving cushion, and after use, the valve *h* is thrown open, and the main line is free as before. In this case some means is needed to close the air escape valve except at such times as it is needed for use, and this may be readily done as in Fig. 1 by so locating it that its opening is covered by the valve *h* when the latter is in its normal position.

I do not desire to confine myself to the particular construction herein shown, in the details of the steam valve, air valve, &c., but have shown herein what I consider the best means of accomplishing the purpose in view, and may alter the details of the device as may be demanded by circumstances, but without departing from the nature of my invention.

Compressed air will be sometimes used instead of steam to actuate the valve; and I may admit compressed air, gas or other volatile fluid to the air chamber or section instead of the natural air as described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pneumatic dispatch tube system, a main tube, an air cushioning chamber for receiving and cushioning the carriers, a valve normally closing communication between the main tube and cushioning chamber, and mechanism actuated by the carrier for opening said valve to permit the passage of the carrier into the cushioning chamber.

2. In a pneumatic dispatch tube system, a main tube, an air cushioning chamber for receiving and cushioning the carriers, a valve normally closing communication between the main tube and cushioning chamber, and an air opening in the cushioning chamber controlled by a valve for regulating the escape of the air from the cushioning chamber.

3. In a pneumatic dispatch tube system, a main tube, an air cushioning chamber for receiving and cushioning the carriers, a valve normally closing communication between the main tube and cushioning chamber, mechanism actuated by the carrier for opening the said valve to permit the passage of the carrier into the cushioning chamber, and an air opening in the cushioning chamber controlled by a valve for regulating the escape of the air from the cushioning chamber.

4. In a pneumatic dispatch system the combination with the tube in which the carrier travels, of a cut-off valve therein, having a connection with the outside of the tube, a

cylinder provided with a piston and rod connected to said cut-off valve to open and close it, and a supply and exhaust valve for said cylinder connected in opposite directions to trip levers projecting into the path of the carrier, one upon each side of the valve in the main tube, whereby the carrier in its flight engages the trips, and causes the automatic opening and closing of said valve, substantially as described.

5. In a pneumatic dispatch system the combination with the tube a, of the valve b, provided with the gear b', the steam or air cylinder b^2, having a piston head and rack bar b^3, c, the valve c', rods c^2 d and trip levers c^3, d', projecting into the path of the carrier substantially as described.

6. In a pneumatic dispatch tube system, a main tube, an air cushioning chamber for receiving and cushioning the carriers, a valve normally closing communication between the main tube and cushioning chamber, mechanism actuated by the carrier for opening said valve to permit the passage of said carrier into the cushioning chamber, and mechanism actuated by the said carrier after passing said valve to close the same.

7. In a pneumatic dispatch tube system, a main tube formed of independent sections each provided with an air supply and an exhausting apparatus, a valve normally closing communication between the said sections, and mechanism actuated by the carrier for opening said valve to permit the passage of the carrier from one section to another.

8. In a pneumatic dispatch tube system, a main tube formed of independent sections each provided with an air supply and an exhausting apparatus, a valve normally closing communication between the said sections, mechanism actuated by the carrier for opening said valve to permit the passage of the carrier from one section to another, and mechanism actuated by the said carrier after passing said valve to close the same.

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