(No Model.)

3 Sheets—Sheet 1.

S. F. LEAKE.

PNEUMATIC DISPATCH TUBE.

No. 431,699. Patented July 8, 1890.

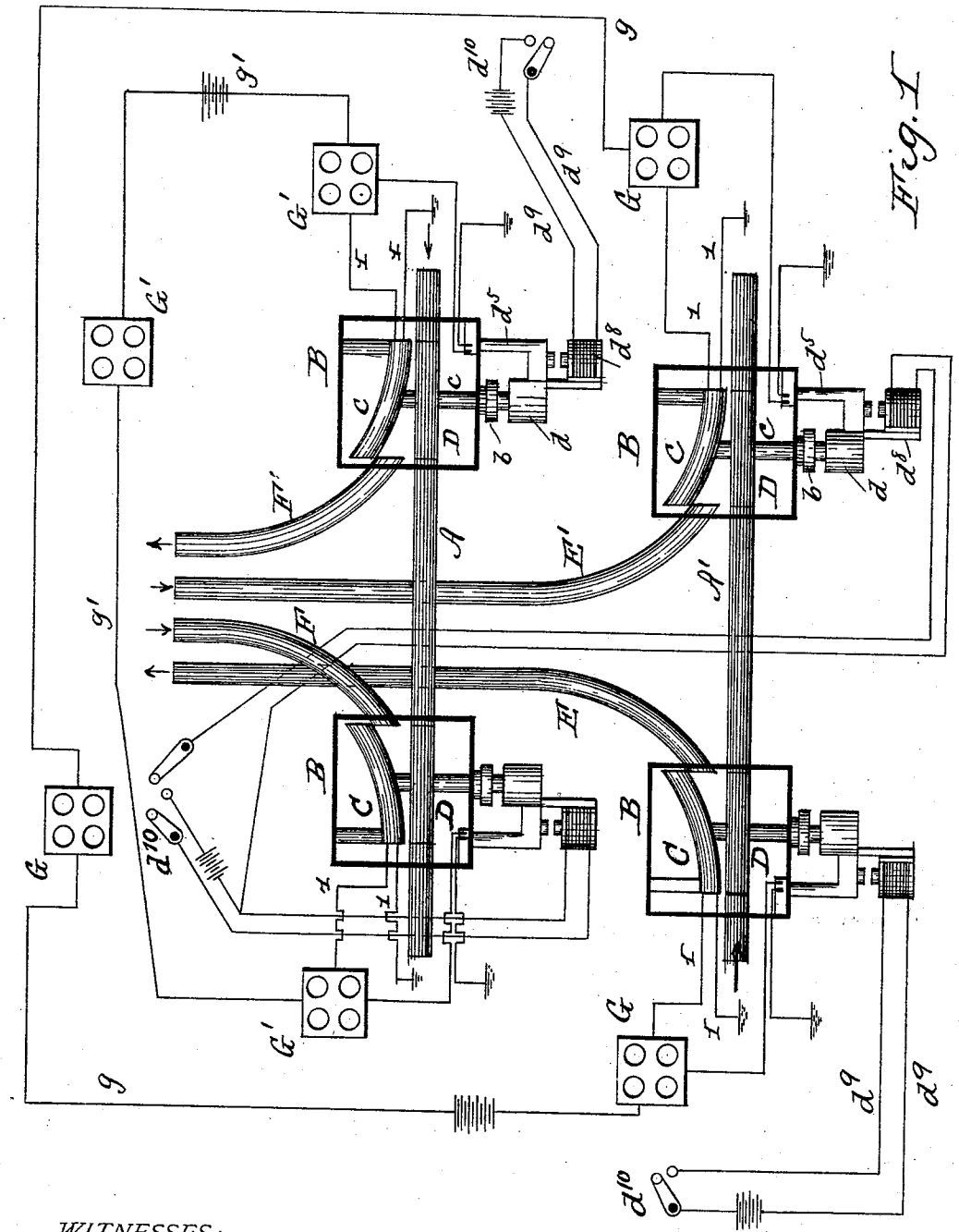


Fig. 1.

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Fig. 2

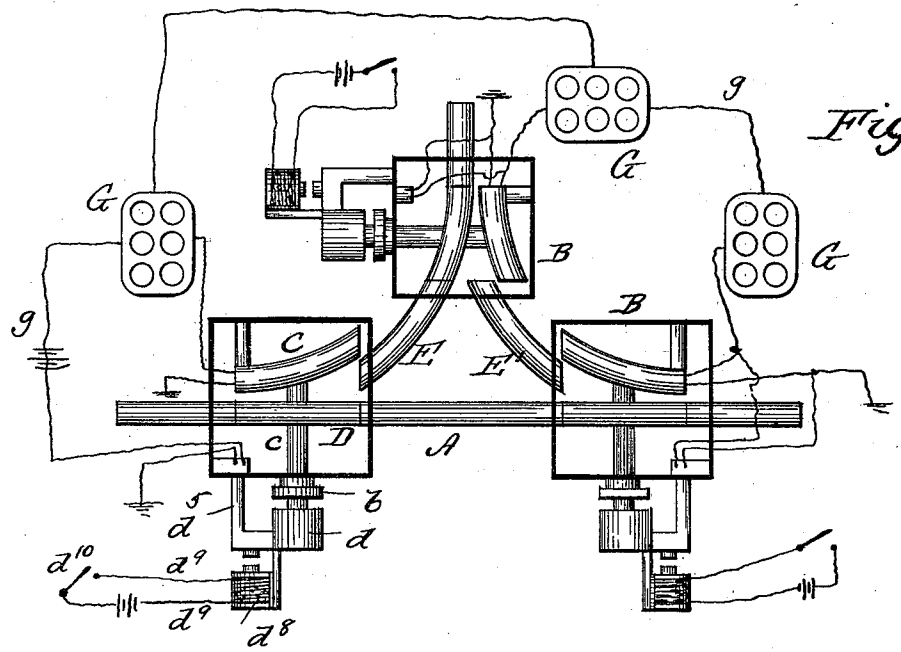
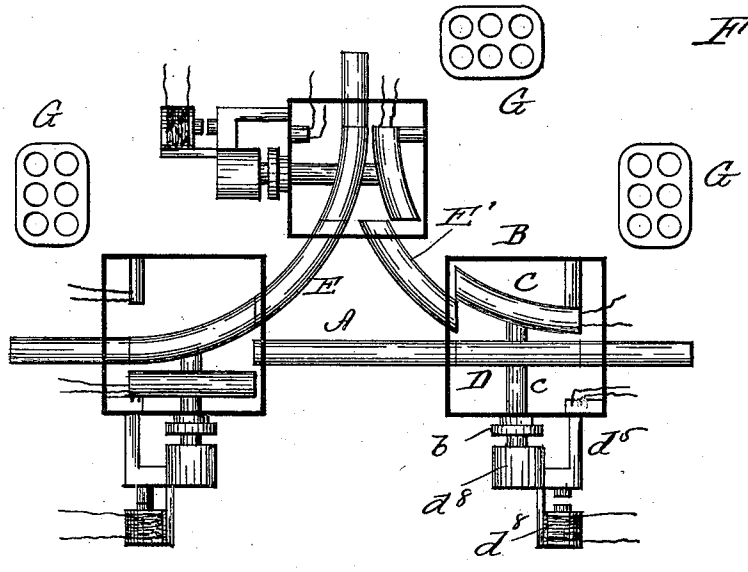


Fig. 3



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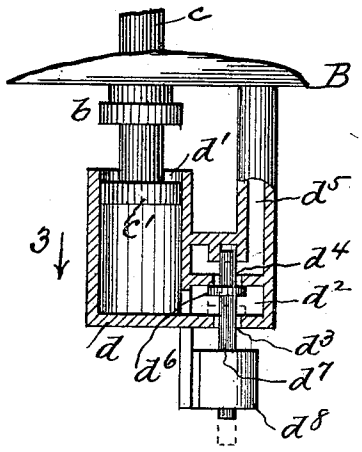
(No Model.) 3 Sheets—Sheet 3.

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Fig. 5



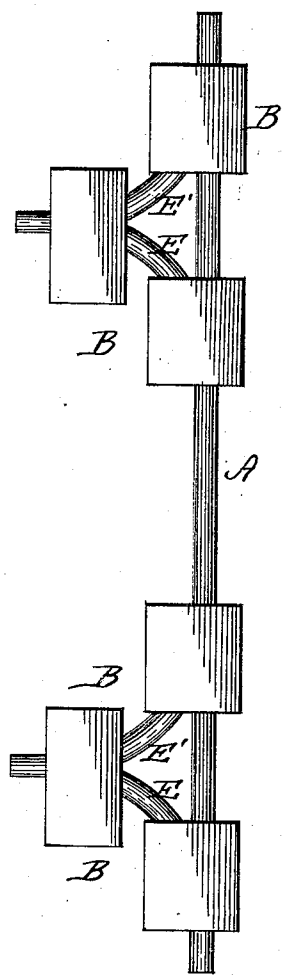


Fig. 4

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UNITED STATES PATENT OFFICE.

SAMUEL F. LEAKE, OF PHILADELPHIA, PENNSYLVANIA.

PNEUMATIC DISPATCH-TUBE.

SPECIFICATION forming part of Letters Patent No. 431,699, dated July 8, 1890.

Application filed October 26, 1889. Serial No. 328,246. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. LEAKE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Dispatch-Tubes, of which the following is a specification.

My invention has relation to pneumatic dispatch-tubes or systems of the form comprising main and branch or sub lines, and having at the junctions of said lines movable tubular switches, which form part of the dispatch-tubes; and it has for its object devices for controlling the movement of the switches and indicating their positions from the various stations, whereby carriers may be propelled or caused to move through the system in either direction on schedule time, as is done for railway-trains.

My invention has for its further object a simple, durable, and easily-controlled actuating devices for positively moving or setting the switches, which devices are suitably controlled, preferably by electric appliances, and are moved in one direction by the vacuum-pressure in the system and in the other direction by the external atmosphere.

My invention accordingly consists of the combinations, constructions, and arrangements of parts, as hereinafter more particularly described in the specification and pointed out in the claims.

Reference is had to the accompanying drawings, wherein—

Figure 1 is a diagrammatic plan of a portion of a pneumatic dispatch-tube system having double line of tubes embodying my improvements. Figs. 2 and 3 are like views of a single-line system, showing some of the different positions of the switches. Fig. 4 is a plan of same without switch-actuating devices and electrical-controlling appliances, and showing more plainly the air-tight or vacuum boxes for the switches; and Fig. 5 is a detail sectional elevation of the switch-actuating devices and part of the electrical-controlling appliances.

A A′, Fig. 1, represent the main-line tubes of a double-tube system, having at suitable locations along the line of the same air-tight or vacuum boxes B, in which are inclosed and suitably mounted the tubular switches C and D, and with which boxes the branch tubes E E′ and F F′ suitably connect, as fully shown, described, and claimed in another pending application, filed by me on the 26th day of October, 1889, Serial No. 328,245.

The switches C D may be connected together and mounted upon suitable bearings, so as to slide or otherwise move, and having actuating devices, as fully set forth in said other pending application; but I have shown each pair of switches C and D in this case connected to and sliding with a plunger *c*, which passes through a stuffing-box *b* on the air-tight or vacuum boxes B. The outer end of plunger *c* has an enlarged head *c′*, (see more plainly Fig. 5,) so that the plunger-stem and its head are of different cross-sectional areas. Said head *c′* enters a cylinder *d*, having an open top *d′*, a lower side chamber d^2, with outlet or opening d^3 to the external air, and a top opening d^4, leading to a pipe-connection d^5 with the boxes B.

In chamber d^2 is a disk or other suitable valve d^6 for alternately closing openings d^3 and d^4 to respectively place the interior of cylinder *d* in communication with the pipe d^5 and with the external air. The stem d^7 of valve d^6 has suitable bearings, and preferably forms the core of a solenoid d^8, suitably supported upon boxes B. If desired, however, equivalent electrical devices may be substituted for the solenoid. Each one of the latter is included in a battery-circuit d^9 d^9, having a switch d^{10}, so that when the latter is closed the solenoid d^8 draws down the valve d^6 from the position shown in full lines, Fig. 5, to that indicated in dotted lines to close communication between the external air and the interior of the cylinder and open the cylinder to the vacuum in the boxes B, whereupon the difference of pressure of external air on the top of the different sectional areas of the piston-head moves the plunger C in the direction indicated by arrow 3, Fig. 5, to set or move the switches C D in one direction As soon as the electric switch d^{10} is open, the solenoid is inactive, whereupon vacuum in boxes B sucks the valve d^6 to the position shown in full lines, Fig. 5, to close the cylinder *d* against such

vacuum and open it to the external air, which then moves the plunger *c* in a reverse direction to oppositely move or set the switches C D.

The switches C D in each vacuum-box B form part of or bridges for separate branch circuits *i i*, one side of which is shown grounded, and the other is connected or in circuit with indicator-boxes or annunciators, one of the latter being provided for each set of switches C D or vacuum-boxes B, which annunciators are divided into two series for the double-line system, as indicated in Fig. 1, and these separate series of annunciators, as indicated at G G′, are included in separate battery-circuits *g g* and *g′ g′*, respectively. In single-line systems only one series of annunciators is used. (See Figs. 2 and 3.)

At each station all the electrical switches d^{10} thereat are under the control of the attendant, and when opened or closed to set the tube-switches C D, as above described, the movement or setting of the latter in position is indicated to all attendants by the annunciators G G′ at the stations, so that the safety of the system, as well as the required position of the switches for use, are known to the attendants at the sub-stations, as well as to those at the main stations, and by proper and simultaneous setting of the switches throughout the whole line or any part thereof the switches can be adjusted and duly maintained to send the carriers as the requirements of service demand—that is to say, an attendant at any one station knows the exact condition of the business being done in the system at all times, and his annunciators indicate at what time to open or close the switches for his station. This being the case, in sending out carriers from a station they can be sent from any one station to another intermediate of the terminal ends of the system without necessitating first sending the carriers to a main station and then from the latter to the sub-station. Furthermore, the carriers can be sent at stated or schedule time in a manner similar to railway-trains.

It is obvious that various systems of electrical connections for the tube-switches C and D and the annunciators G G′ may be used without departing from the spirit of my invention, and that any number of electrical switches d^{10} may be assembled at the different stations, depending upon the number of different switches C D to be controlled from said station; but in practice I prefer that each station be furnished with only those switches d^{10} which control the switches C D for that station. Again, if desired, instead of electrically controlling one of the movements of the valve d^6, such movement may be manually or mechanically made in any of the well-known ways.

What I claim is—

1. In a pneumatic dispatch-tube system, the combination of main and sub station switches C D with annunciator-circuits for said switches, substantially as set forth.

2. In a pneumatic dispatch-tube system, the combination of a double line of main and sub station tubes, vacuum or air-tight boxes, and carrier-diverting switches at the juction of said tubes, devices for actuating or setting said switches, and annunciator-circuits for said switches, substantially as set forth.

3. The combination, with a dispatch-tube system, of carrier-diverting switches, air-tight or vacuum box B, and devices in engagement with said switches and actuated by the vacuum-pressure in box B to move the switches in one direction, and actuated by the external air to oppositely move said switches, substantially as set forth.

4. In a pneumatic dispatch-tube system, the combination of carrier-diverting switches, air-tight or vacuum boxes for said switches, devices in engagement with said switches and actuated in one direction by the vacuum-pressure in said boxes, and in an opposite direction by the external air, and electrical appliances for controllling the operation of said devices, substantially as set forth.

5. In combination with tube A, vacuum-box B, switches C D, plunger *c*, having head *c′* of different cross-sectional area, cylinder *d*, having chamber d^2, pipe-connection d^5 between box B and cylinder-chamber *d*, opening d^3 in chamber d^2, leading to the external air, and valve d^6 in chamber d^2, substantially as and for the purpose set forth.

6. In combination with a pneumatic dispatch-tube A, its vacuum-boxes B, and tubular switches C D, an annunciator-circuit for said switches, actuating devices for setting said switches, and electrical appliances for controlling said actuating devices, substantially as set forth.

7. In combination with a pneumatic dispatch-tube A, its vacuum-boxes B, and tubular switches C D, an annunciator-circuit for said switches, air-pressure actuating devices for setting said switches, and electrical appliances for controlling said actuating devices, substantially as set forth.

8. In a pneumatic dispatch-tube system, the combination of main and sub station switches C D, mechanism for setting said switches, and annunciator-circuits for and controlled by said switches to indicate their setting, whereby the carriers may be run on schedule time, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL F. LEAKE.

Witnesses:
S. J. VAN STAVOREN,
CHAS. F. VAN HORN.