

No. 766,213.

PATENTED AUG. 2, 1904.

G. F. ATWOOD.
PNEUMATIC TUBE SYSTEM.
APPLICATION FILED NOV. 28, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

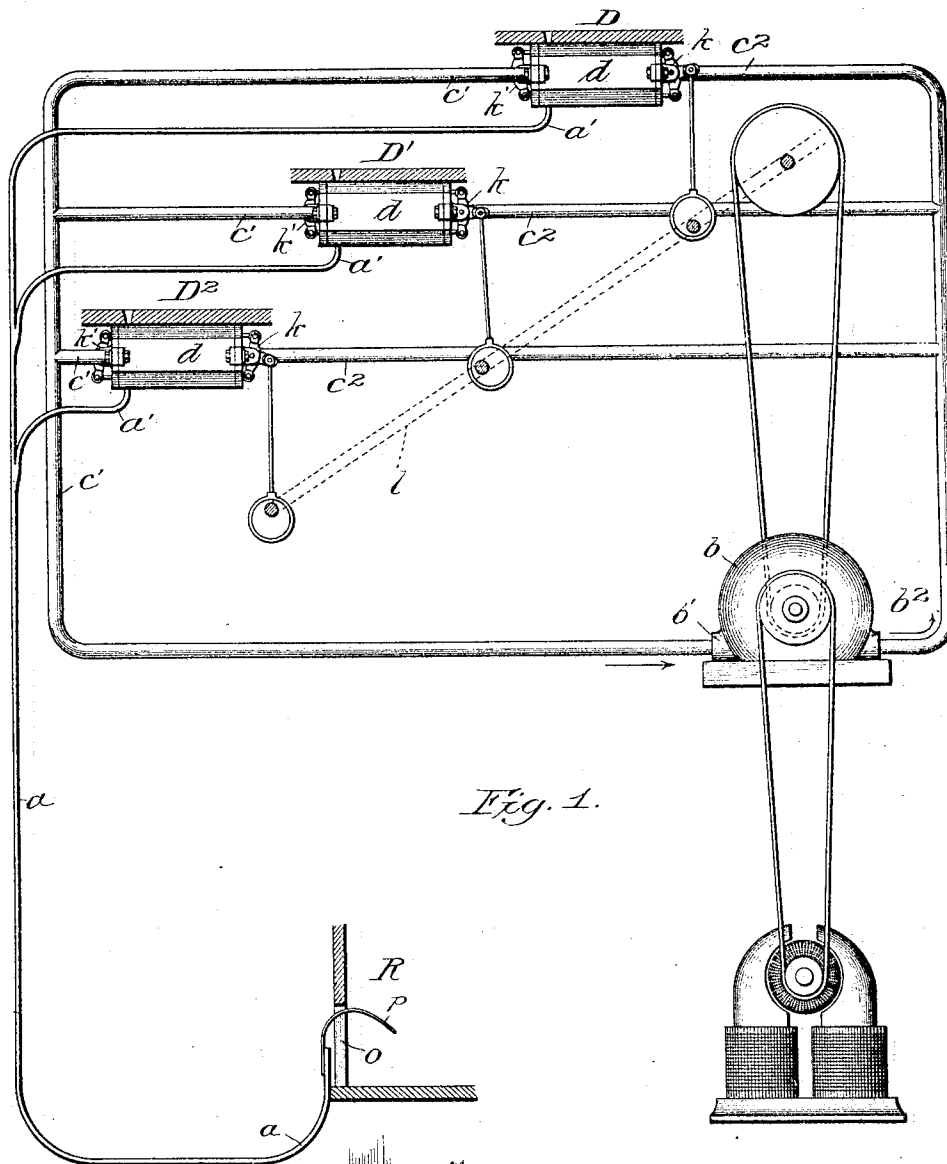


Fig. 1.

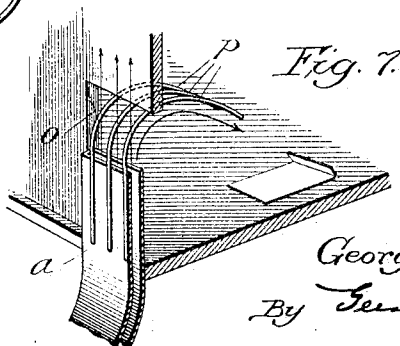


Fig. 7.

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Inventor:

George F. Atwood,
By *Samuel P. Barton*
Att'y

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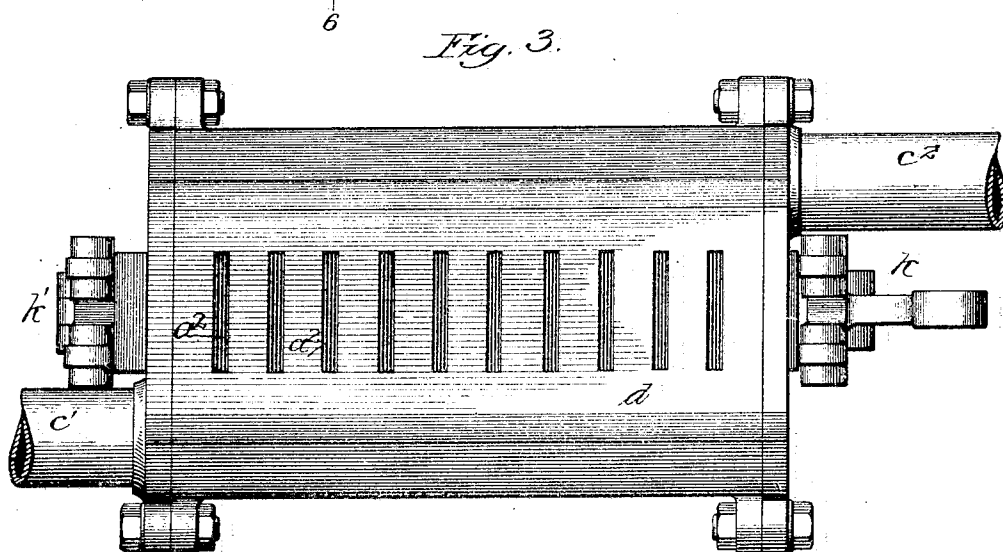
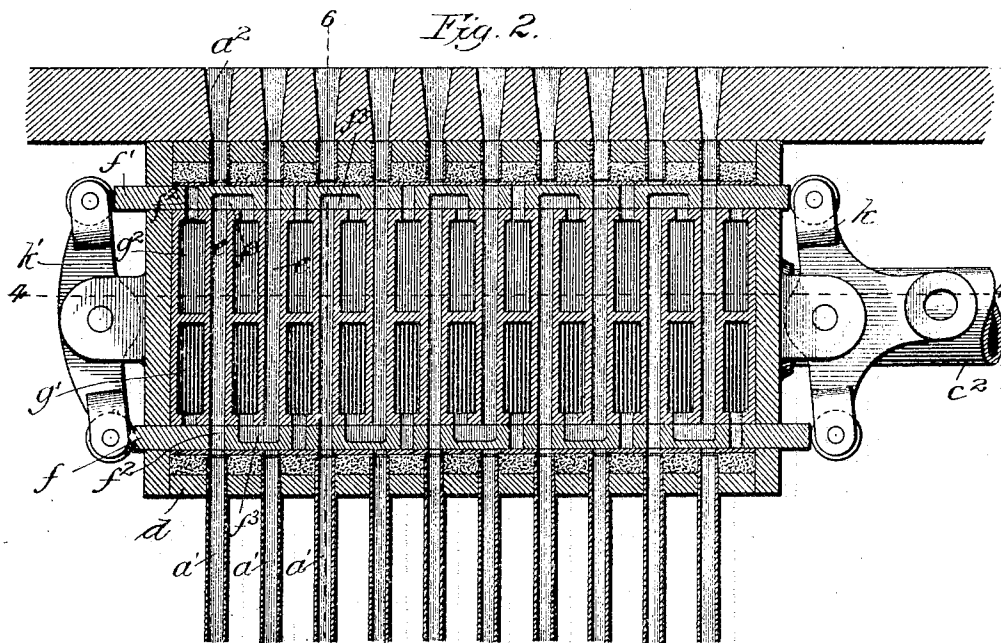
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PNEUMATIC TUBE SYSTEM.

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NO MODEL.

3 SHEETS—SHEET 2.



witnesses:
C. C. Taylor.
John Enders Jr.

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3 SHEETS—SHEET 3.

Fig. 4.

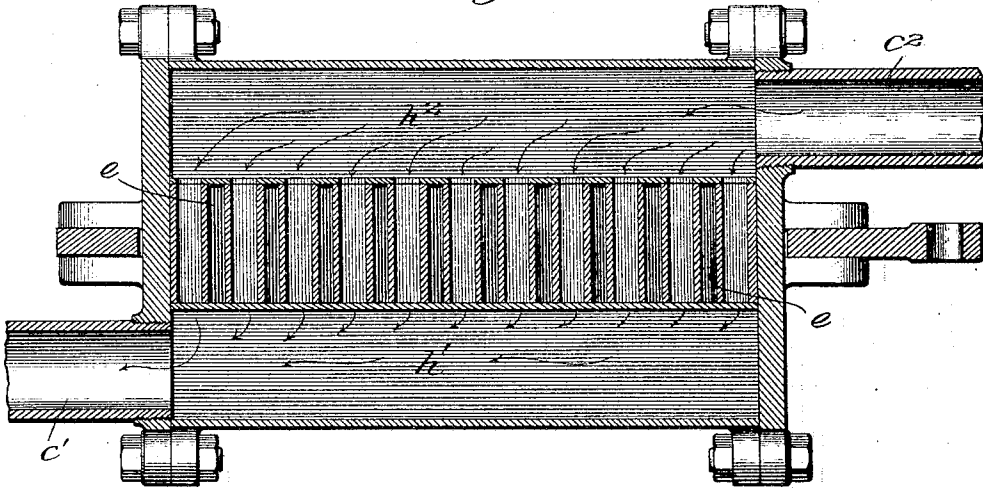


Fig. 5.

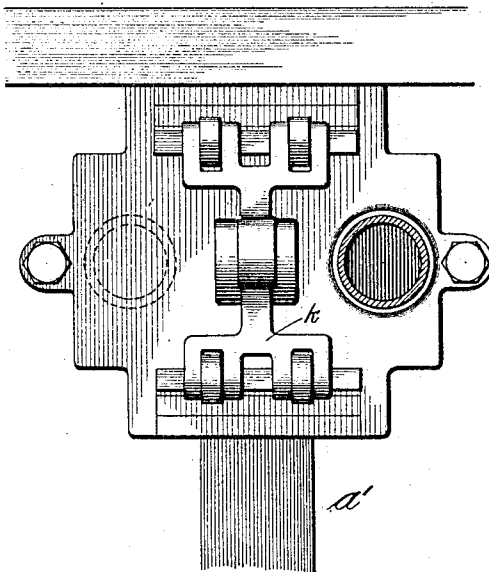
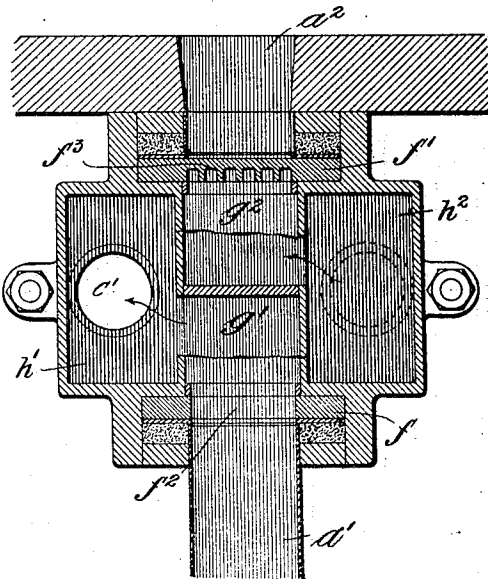


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE F. ATWOOD, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PNEUMATIC-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 786,213, dated August 2, 1904.

Application filed November 28, 1902. Serial No. 132,979. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. ATWOOD, a citizen of the United States, residing at Hoboken, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Pneumatic-Tube Systems, (Case No. 3,) of which the following is a full, clear, concise, and exact description.

My invention relates to a pneumatic ticket-distributing system, more particularly for telephone-exchanges; and its object is to provide an improved organization whereby folded paper tickets may be quickly carried from any one of several distributing-points to any one of several receiving-points without requiring the complication of pneumatic tubes heretofore considered necessary.

In telephone-exchanges where long-distance or toll connections are handled it is customary for the operator who receives the call to make out a ticket showing what lines are to be connected, and this ticket is then transmitted to the receiving operator and constitutes an order to her to put up the connection. The receiving operator by means of a time-stamp notes the duration of the conversation upon the ticket, which is kept as a record.

In a large exchange a number of operators will be kept busy receiving calls and making out tickets, and each of these operators must have means for quickly sending her tickets to any one of a number of receiving operators who put up the connections. Various systems have been devised for distributing the tickets. One of the latest involves a separate pneumatic tube from each distributing-board to each receiving-station. By my invention I am enabled to unite branches from several distributing-boards in a single tube which extends to the receiving-station, so that the amount of tubing required in a given exchange will be very greatly reduced.

In cash-carrier systems where cartridges are forced through pneumatic tubes it has been common to provide multiple connections or branches to a single pipe; but where the ticket is simply folded and placed directly in the pneumatic tube instead of in a carrier it has heretofore been found to be impracticable

to provide such multiple connections, because a greater increased air-pressure is necessitated. Such increased pressure renders the system inoperative, because when the tickets reach the single tube the pressure is so great that the tickets are unfolded or flattened out and may be stuck in the tube. I have overcome this difficulty by providing a relay-valve between each branch "sending end" and the main tube. The relay-valve is connected with a suction device and with a source of air under pressure. The ticket is drawn through the tube as far as the relay-valve by suction, after which the valve is moved to deliver air behind the ticket above atmospheric pressure and blow it through to the receiving end.

My invention contemplates mechanism for opening and closing the several relay-valves which feed into a single main tube in a regular sequence, so that only a given small number of the valves will be open to the air at any given instant, thus preventing the increase of pressure behind the ticket, which would result if all the valves were open at once.

A further feature of my system lies in an improved arrangement for delivering the tickets to the receiving operator without the necessity of a current of air blowing directly upon her table.

I will describe my invention by reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating the pneumatic ticket-distributing system of my invention. Fig. 2 is a detail sectional view of a compound relay-valve for ten tubes. Fig. 3 is a plan view thereof. Fig. 4 is a transverse sectional view on line 4 4 of Fig. 2. Fig. 5 is a detail end view of the compound relay-valve. Fig. 6 is a cross-sectional view on line 6 6 of Fig. 2, and Fig. 7 is a detail view illustrating how the tubes are arranged to deliver the tickets to the operators.

The same letters of reference are used to designate the same parts wherever they are shown.

Referring first to Fig. 1, a pneumatic tube *a* is shown extending from the receiving-switchboard *R* to a group of distributing-tables *D D' D''*, said tube being branched to re-

lay-valves at each of the distributing-tables. A blower b is provided in association with the several relay-valves, said blower having a suction end b' and a blowing end b'' . Each of the
 5 compound relay-valves at the tables $D D' D''$ is connected by pipes $c' c''$ with both sides of the blower, the mechanism of each being arranged to connect the receiving-chamber alternately with the suction-pipe c' or the pres-
 10 sure-pipe c'' .

The mechanism of the valves will be understood most clearly by reference to Figs. 2 to 4. The valves may be arranged to accommodate as many tubes as may be desired. I have
 15 shown the same arranged for ten tubes leading to ten different receiving-points. The branch a' of each tube a is led into the bottom of the valve-box d in position to register with a receiving-chamber e . The upper
 20 end of said receiving-chamber registers with the end of a sending-tube a'' , which is, in effect, a continuation of the tube a' . Slide-valves $f f'$ are provided between the receiving-chamber e and the tubes $a' a$, respectively. Each of these slide-valves is provided
 25 with a hole or passage f'' , which is adapted when the valve is in the proper position to register with the receiving-chamber and the tube a' or a'' , as the case may be, so that the
 30 receiving-chamber will form a continuation of the tube when the valve is in the proper position. Each valve is also provided with a series of channels f^3 , which are arranged to connect the receiving-chamber e with the
 35 source of air under pressure or with the suction-pipe, as the case may be, when the valve is in an alternative position to that just described. Between each of the receiving-chambers e are passages or compartments $g' g''$,
 40 which are connected, respectively, with the suction-pipe c' and the pressure-pipe c'' of the blower through chambers $h' h''$, respectively, which extend along the sides of the compound valve. The chambers g'' are provided with
 45 ports controlled by the valves f' , and the chambers g' are provided with similar ports controlled by the valves f . The valves $f f'$ are arranged to slide to and fro in suitable
 50 guideways, and motion is imparted to them by means of the rocking levers $k k'$, as shown most clearly in Fig. 2. The rocking levers k
 at the several distributing-tables $D D' D''$ are connected to eccentrics carried by a common shaft l , which is kept continuously in rotation
 55 by any suitable motor device, so that the valves $f f'$ will be constantly moving to and fro.

When the valve mechanism is in one position, the upper end of the receiving-chamber e is opened to the receiving-tube a'' , while the
 60 lower end of said chamber e is connected by the channel f^3 with the suction-chamber g' , which is connected, through chamber h' and pipe c' , with the suction end of the blower. In this position of the valves the ticket placed
 65 in the tube a'' will be drawn through said tube

into the receiving-chamber, being stopped there by the lower valve f . Bars are left between the channels f^3 in the valves, forming a grid instead of leaving an unobstructed passage through the valve. In the alternative
 70 position of the valves the lower end of the receiving-chamber is connected with the pipe a' to form a continuation thereof, and the upper end of said chamber is opened to the pressure-chamber g'' , which is connected, through
 75 the chamber h'' and pipe c'' , with the pressure side of the blower. As the valves are thus moved reciprocally the ticket is first drawn by suction through the receiving-tube into the
 80 receiving-chamber and is then blown through the transmitting-tubes $a' a$ to the receiving-point R .

The eccentrics which operate the valve mechanism of the several relay-valves are arranged in different relative positions upon the
 85 shaft l , so that the valves which feed a given tube a will not be opened and closed together, but in sequence one after the other—that is to say, first the tube a' at the table D
 90 will be opened to the blower, then as it is closing the branch a' at table D' will be opened, and finally the branch at table D'' . By this arrangement the pressure in the tube
 95 a is kept down to approximately the same as that which would be used in a system of single tubes.

I prefer to deliver the tickets to the receiving operators at the switchboards R , as shown most clearly in detail in Fig. 7. The delivery
 100 end of the tube is arranged vertically at the back of the switchboard behind an opening o . Deflecting-fingers p are provided, which receive the ticket as it is blown out of the tube and direct the same directly upon the table
 105 of the switchboard immediately in front of the operator. The current of air, however, passes directly up behind the vertical part of the switchboard. The ticket is thus laid flat upon the table in front of the operator without
 110 any action on her part and without subjecting her to the annoyance of a current of air.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The combination with a main pneumatic
 115 tube and a receiving branch thereof, of a source of air under pressure and a source of suction, a relay device having a receiving-chamber, and valve mechanism adapted to connect the receiving branch through said re-
 120 ceiving-chamber with the source of suction and alternatively to connect the main tube through said receiving-chamber with the source of air under pressure, whereby a ticket placed in the receiving branch is drawn into
 125 the relay device and thence blown through the main tube, as set forth.

2. The combination with a pneumatic tube having a number of multiple receiving
 130 branches, of a relay-valve for each branch,

and mechanism for continuously opening and closing said valves in sequence.

3. The combination with a series of receiving-tubes a^2 and transmitting-tubes a' , of an
5 air-pump adapted for suction and compression, a relay device comprising receiving-chambers e , suction and pressure chambers suitably connected to said air-pump, valves
10 f' adapted to connect one end of each of said chambers e alternatively with the suction-chambers or with the transmitting-tubes, and valves f'' adapted to connect the other end of
15 each of said chambers e alternatively with the receiving-tubes or with the pressure-chambers, and mechanism for reciprocally moving the valves.

4. The combination with a receiving-board

R having a vertical face and a table portion, of a pneumatic ticket-delivery tube at the back of the board near an opening in the face there- 20 of, said tube being arranged to direct its current of air behind the board along the vertical portion thereof, and an open-work deflector p arranged to receive the tickets from the mouth of the tube, and adapted to direct the 25 same through said opening onto the table while allowing the current of air to pass behind the board.

In witness whereof I hereunto subscribe my name this 18th day of September, A. D. 1902. 30

GEORGE F. ATWOOD.

Witnesses:

H. W. JACKSON,

HENRY F. WHITE.