

(No Model.)

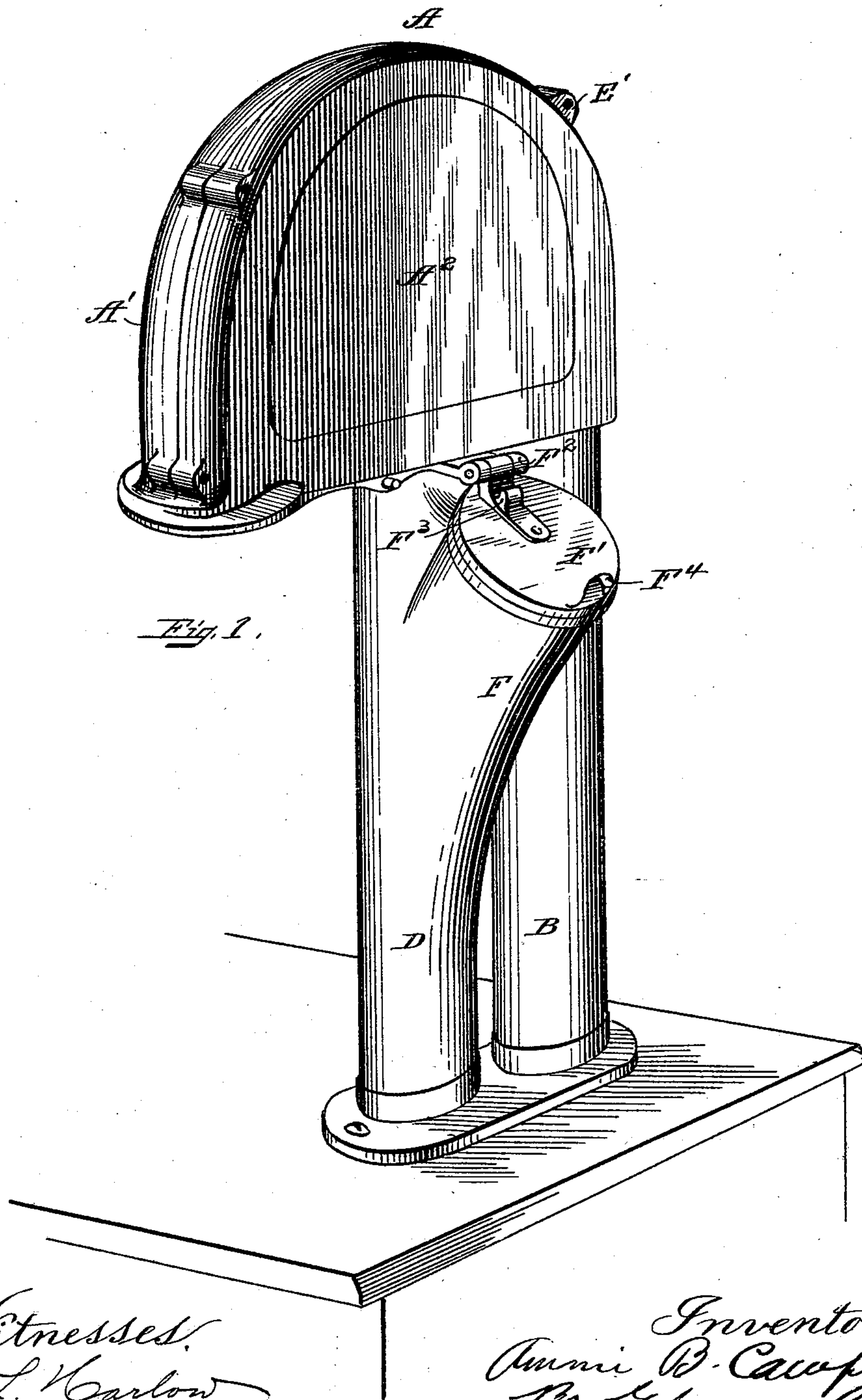
3 Sheets—Sheet 1.

A. B. CAMPBELL.

VALVE FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

No. 551,616.

Patented Dec. 17, 1895.



Witnesses.
E. L. Harlow
L. H. Brown.

Inventor.
A. B. Campbell
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Att'y

(No Model.)

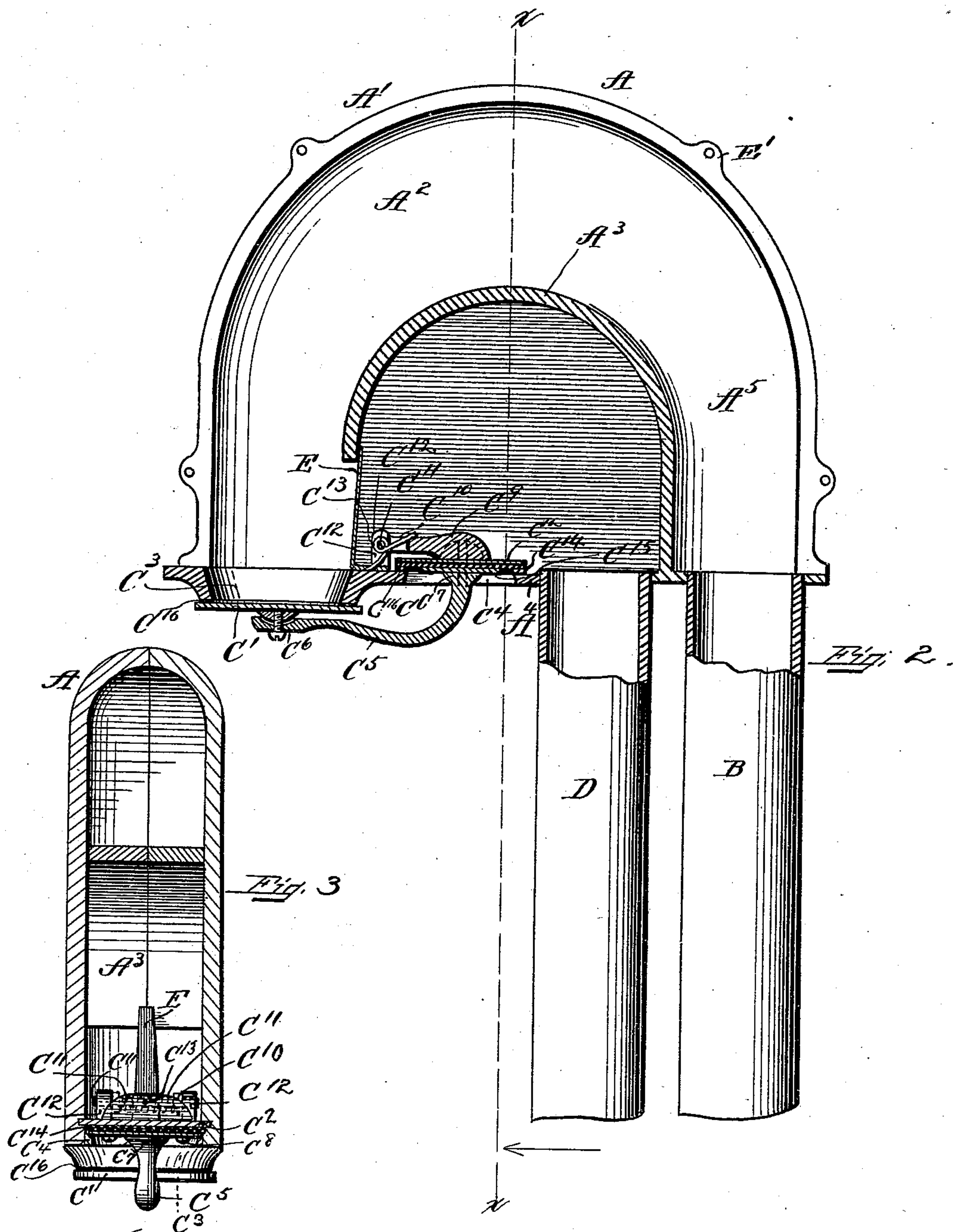
3 Sheets—Sheet 2.

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VALVE FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

No. 551,616.

Patented Dec. 17, 1895.



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(No Model.)

3 Sheets—Sheet 3.

A. B. CAMPBELL.

VALVE FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

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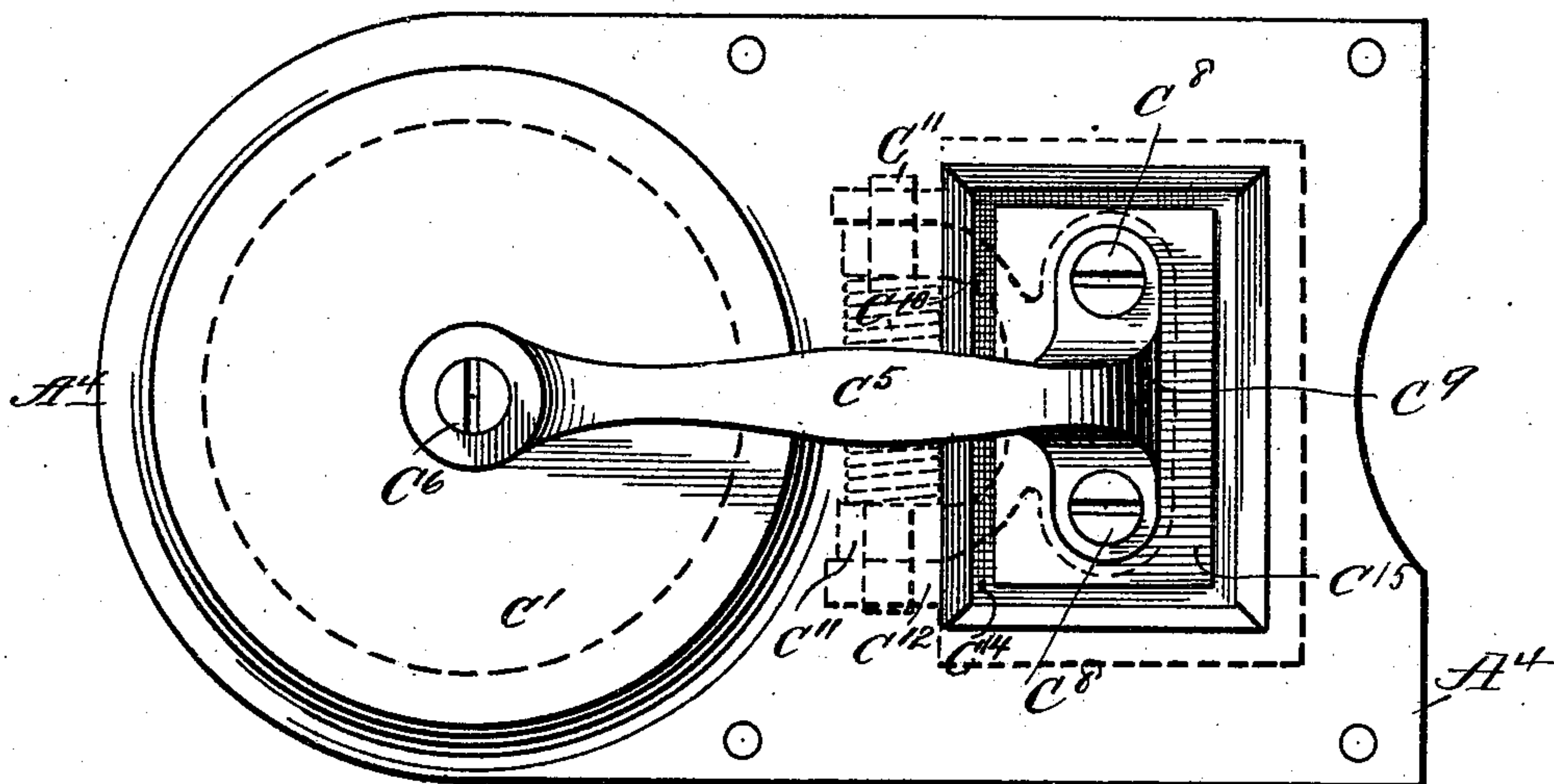


Fig. 4.

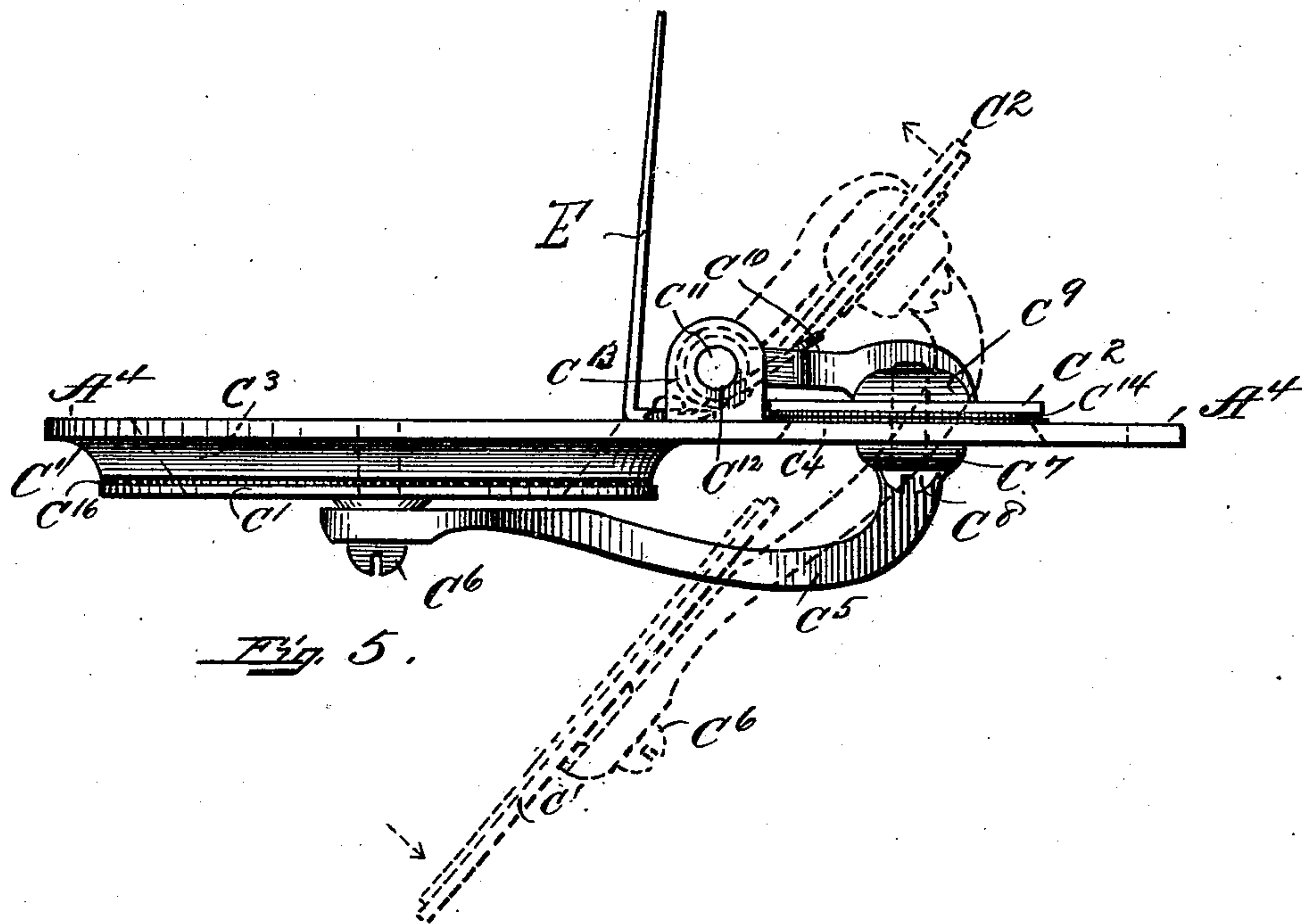


Fig. 5.

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UNITED STATES PATENT OFFICE.

AMMI B. CAMPBELL, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE
METEOR DESPATCH COMPANY, OF PORTLAND, MAINE.

VALVE FOR PNEUMATIC-DISPATCH-TUBE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 551,616, dated December 17, 1895.

Application filed December 10, 1894. Serial No. 531,344. (No model.)

To all whom it may concern:

Be it known that I, AMMI B. CAMPBELL, of Lowell, county of Middlesex, and State of Massachusetts, have invented new and useful
5 Improvements in Valves for Pneumatic-Dispatch-Tube Systems; and I hereby declare that the following is a full, clear, and exact description of the invention, which will enable
10 others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in valves for terminals for pneumatic-dispatch-tube systems, and is especially adapted for those systems in which
15 the carriers are propelled by suction—i. e., by withdrawing the air-pressure from the front of the carrier as it travels through the system; and it consists of certain novel features, arrangements and combinations hereinafter described, and particularly pointed out in the
20 claims.

In the drawings, Figure 1 represents a perspective view of the terminal at the salesman's station. Fig. 2 is a side view of the interior
25 of the terminal with one of the sides A^2 removed. Fig. 3 is a vertical cross-section through the terminal on the line $x x$, Fig. 2. Fig. 4 is an inverted plan view of about one-half of the bottom wall, showing the valve in
30 its closed position. Fig. 5 is a side view of the same parts shown in Fig. 4, and showing in full lines the normal position of said valve and in dotted lines the position of the parts as the valve is opened by the impact of the
35 carriers.

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

The terminal A, which is known in the art as an "upwardly-discharge" terminal, can be
40 used at either the cashiers' or the salesmen's stations, and consists of an outer curved guiding-wall A' and flat sides A^2 , with a flat bottom A^4 , so that it presents to the view a box of an oval form, curved on top and with a flat bottom. There is provided on the inside of this
45 box an inner curved guiding-wall A^3 , which may be cast or otherwise secured to the sides A^2 of the box, or it may be cast or otherwise secured to the bottom wall of the terminal.
50 This wall extends around in the arc of a circle and terminates a short distance above the bot-

tom wall of the terminal, and with the outer curved guiding-wall A' it forms between them for the carriers a passage A^5 , which is a continuation of the inlet-tube B, through which
55 the carriers are sent to the terminal, and said tube is secured to the bottom wall A^4 of the terminal between the outer wall A' and inner wall A^3 , so that the carrier on entering the terminal passes up between the side walls and
60 around the passage A^5 to the valve C at the bottom of the terminal, which is opened by the impact of the carrier as it passes from the inlet-tube B around the passage A^5 to said valve, and the air-current passes under the lower
65 end of the wall A^3 into the return-tube D, through which the carriers are returned, and thus keeps up a continuous air-current in the system.

The main valve C consists of two leaves C'
70 and C^2 , covering respectively the openings C^3 and C^4 in the bottom wall A^4 of the terminal. The said leaves are connected together by a lever C^5 , which at one end is secured to the leaf C' by a screw C^6 , which leaves a
75 small amount of play between the lever C^5 and the bottom of said leaf C' . The object in providing such a loose joint is that the leaf C' may find a perfect seat against the leather packing C^{16} around the bottom of the
80 opening C^3 without regard to the exact position of the lever itself, it being borne in mind, of course, that the suction against the leaf would have a tendency to draw it up firmly on all points, provided it is not pre-
85 vented from so doing on account of its rigidity to the lever C^5 , as would be the case if the leaf C' were attached solidly to the lever and the lever should become bent or misplaced. The other end of the lever C^5 is broad-
90 ened, as shown at C^7 , and is secured to the leaf C^2 by screws C^8 , which pass up through the end C^7 , thin metal plate C^{15} , leather packing C^{14} and leaf C^2 into the plate C^9 on top of the leaf C^2 , so that the lever C^5 , leaf C^2 and
95 plate C^9 are rigidly and firmly held together. The said plate C^9 is provided on its upward end with two arms C^{10} , which encircle the shaft C^{11} , and are firmly secured thereto. Said shaft is mounted in the journals C^{12} se-
100 cured to the upper side of the bottom wall A^4 , and in said journals the shaft is adapted

to revolve. A spring C^{13} is wound around the shaft C^{11} , and has one of its ends bearing against the bottom wall A^4 and the other end bearing on the top of the plate C^9 , so as to assist in holding said leaf C^2 in its closed position over the opening C^4 . The leather packing C^{14} is held in close contact with the under side of the leaf C^2 by the thin metal plate C^{15} . A leather packing C^{16} is located around the upper edge of the opening C^4 , and with said packing the leather packing C^{14} contacts and forms a close joint to prevent escape of air.

The two leaves C' and C^2 , forming the valve C , are connected together by the lever C^5 in the manner shown, so as to provide a long leverage for the leaf C' to permit its easy opening by the impact of the carriers—that is, the said leaf C' is provided with a longer leverage and swings farther out of the way of the carriers by providing a lever of the construction shown, and the force applied to the upper side of the leaf C' by the discharging-carriers is directly applied to the under side of the leaf C^2 by means of the lever C^5 .

If the two leaves were connected together and pivoted in the center between the two openings C^3 and C^4 , the throw of the leaf C' would be so short that it would be hard for the carrier to deliver from the terminal, whereas by increasing the leverage of the said leaf C' the carrier more easily opens said leaf in order to deliver from the terminal, and the impact of the carrier on the leaf C' is directly applied to the under side of the leaf C^2 , so as to give a greater force in raising up the said leaf C^2 . By means of the increased leverage and the direct connection of the lever C^5 to the bottom of the said leaf C^2 , a quicker action is given to the said leaf C^2 when the front leaf C' is opened by the impact of the carrier.

The arrangement shown in the present case also provides a much more perfect arrangement of the valve and also insures the better fitting of the valve to prevent escape of air.

The leaf C' fits closely against the bottom of the opening C^3 and is exposed on its upper surface to the suction of the system, and its lower surface has a greater area exposed to the atmospheric pressure than the lower surface of the leaf C^2 , also exposed to said pressure. The carriers coming through the passage A^5 impact with the leaf C' and open the same by the momentum thereof, and the valve moves toward a vertical position, as indicated by dotted lines, Fig. 5, as the carrier is discharged from the terminal. The leaf C^2 when in its vertical position contacts with the under side of the inner wall A^3 , which closes the air-passage under the end of said wall between the passage A^5 and the return suction-tube D ; but as soon as the carrier passes from the terminal and passes the leaf C' the air-current between the passage A^5 and the suction-tube D on the top side of the leaf C^2 forces said leaf, and also the leaf C' , back to their normal positions, as shown in full lines, Fig. 5, and thus closes the terminal to the

atmosphere, and the air-current continues through the tube B , terminal A and return suction-tube D .

E represents an upright piece of thin metal having one end secured to the bottom wall A^4 and the other end resting against the inner side of the wall A^3 , and it acts as a guide to prevent the carrier being drawn by suction into the opening beneath the inner curved wall A^3 as said carrier passes toward the valve C' covering the outlet-discharge C^3 of the terminal for the carriers. A preferable construction of said terminal consists in casting the same in two upright parts, which are firmly held together by suitable bolts passing through the ears E' on the two parts of the terminal. Supposing this terminal is located at the cashier's station and it is desired to return a carrier to the salesman from whom it was sent, it is placed in a branch tube F connected with the return-tube D and said branch tube F is covered by a self-closing clapper F' hinged at F^2 and at this point provided with a projection F^3 , which limits the upward throw of the clapper, and on its opposite side with a finger F^4 by which the clapper is raised by the hand to permit the insertion of the carrier, and after the carrier has been pushed in the clapper is drawn to its seat and held closed by the suction of the system.

As the area of the bottom of the leaf C^2 exposed to atmospheric pressure is less than the area of the bottom of the leaf C' also exposed to said atmospheric pressure, the difference in amount of pressure on the bottom of the two leaves of the valve C will hold said valve C sufficiently tight against the openings C^3 and C^4 , thus preventing any leakage, and at the same time make it easy for the carrier to operate the leaf C' of the valve C . If none of the bottom surface of the leaf C^2 were exposed to atmospheric pressure, it would be difficult for the carriers to open the valve by their impact with the top of the leaf C' ; but the provision by which the amount of area on the bottom of the leaf C^2 exposed to atmospheric pressure is less than the area on the bottom of the leaf C' also exposed to atmospheric pressure not only holds the valve C closed, but at the same time permits the easy operation of the valve by the impact of the carrier on the top of the leaf C' . It is obvious that if the above arrangement were not provided to produce a difference of area of the bottom of the leaves C' and C^2 exposed to atmospheric pressure and the area exposed to said atmospheric pressure on both leaves was the same there would be produced an exact balance, which would not hold the valve to its seat, and the leaves would more or less swing away from the openings which they were intended to close. Of course it will be understood that the construction shown simply illustrates one manner of carrying out my invention, as it is obvious that other constructions could be adopted which would embody the main principles of my invention.

I do not limit myself to the exact arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

5 Having thus ascertained the nature and set forth the construction of my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

10 1. In a pneumatic dispatch tube system, the combination with a terminal having an opening for the discharge of carriers, of a valve consisting of two leaves one of which normally closes said opening and is adapted to be opened by the impact of the carriers there-
15 with, and a connecting rod to which said leaves are connected, the said leaf which is opened by the impact of the carriers being connected to the said rod by a loose joint.

20 2. In a pneumatic dispatch tube system, the combination with a terminal having an opening for the discharge of carriers, of a valve consisting of two leaves one of which normally closes said opening and is adapted to be opened by the impact of the carriers, and
25 a connecting rod from said leaf to the other leaf which is pivoted in said terminal.

30 3. In a pneumatic dispatch tube system, the combination with a terminal having an opening for the discharge of carriers, of a valve consisting of two leaves one of which normally closes said opening and is adapted to

be opened by the impact of the carriers therewith, and a connecting rod from said leaf to the other leaf which is pivoted in said terminal, the said connecting rod being connected
35 to the leaf with which the carriers impact by a loose joint.

4. A terminal for pneumatic dispatch tube systems having a base plate provided with a discharge outlet for the carriers, and with
40 openings in which are secured the inlet and return tubes, curved inner and outer guiding plates forming a passage for the carriers through the terminal from the inlet tube to the discharge outlet, the said curved inner
45 plate being cut away to provide communication for the air current between the said passage and the said return tube, a guide secured to the base plate and extending to the
50 said curved inner plate to prevent the carrier being drawn by the suction from the said passage to the said return tube, and a valve normally closing the said discharge outlet in the base plate.

In testimony whereof I have signed my
55 name to this specification, in the presence of two subscribing witnesses, on this 5th day of December, 1894.

AMMI B. CAMPBELL.

Witnesses:

B. F. K. JENNINGS,
SAML. E. KIMBALL.