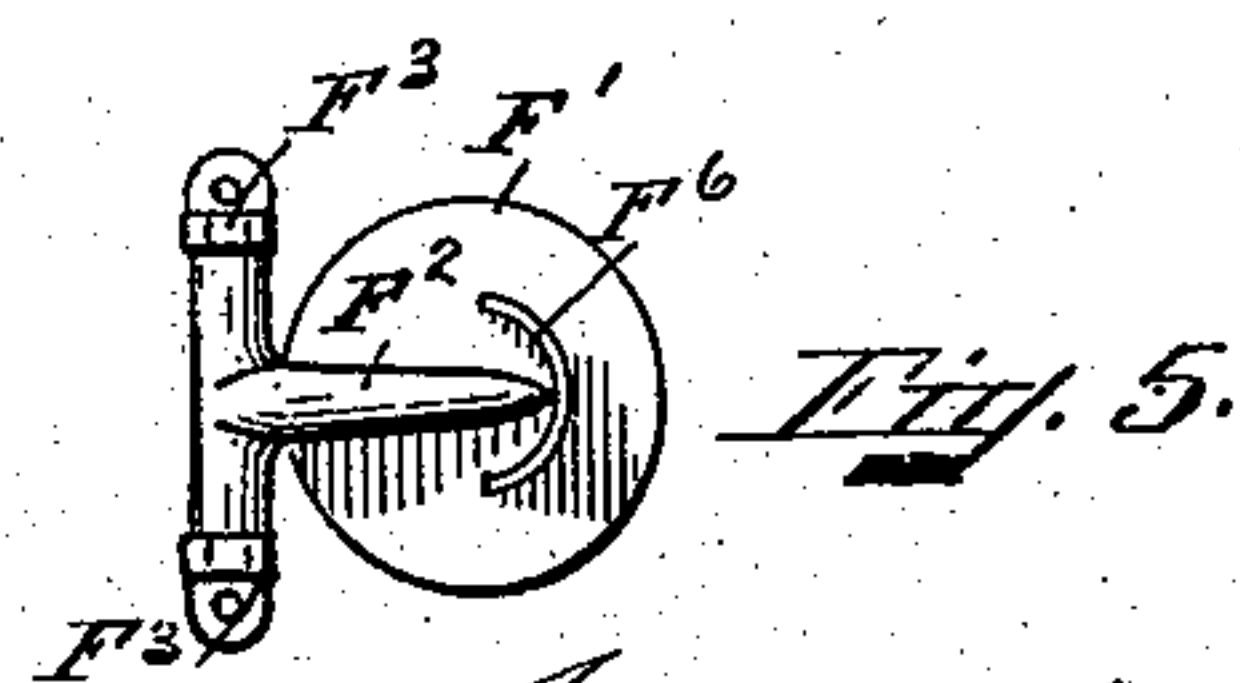
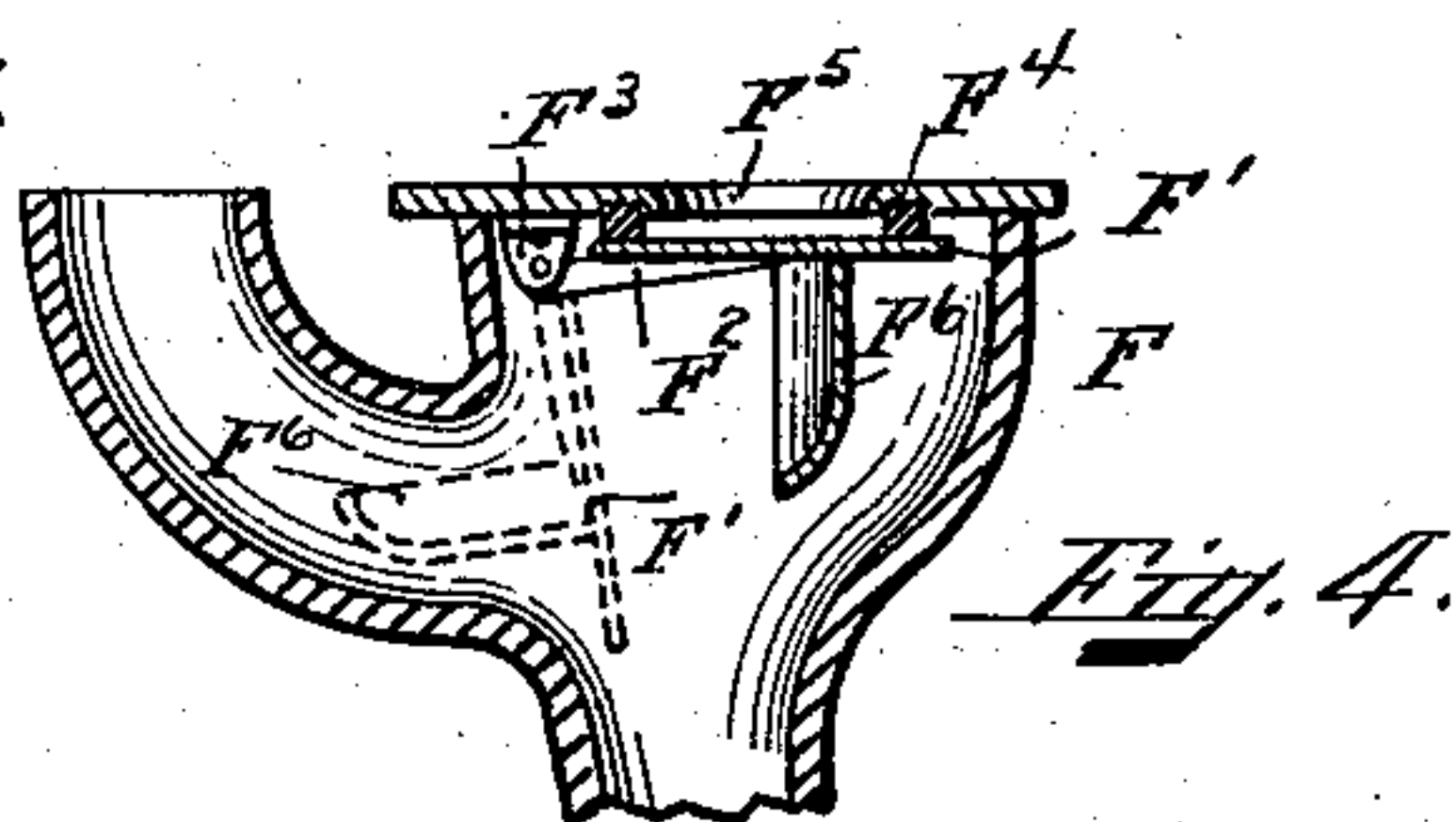
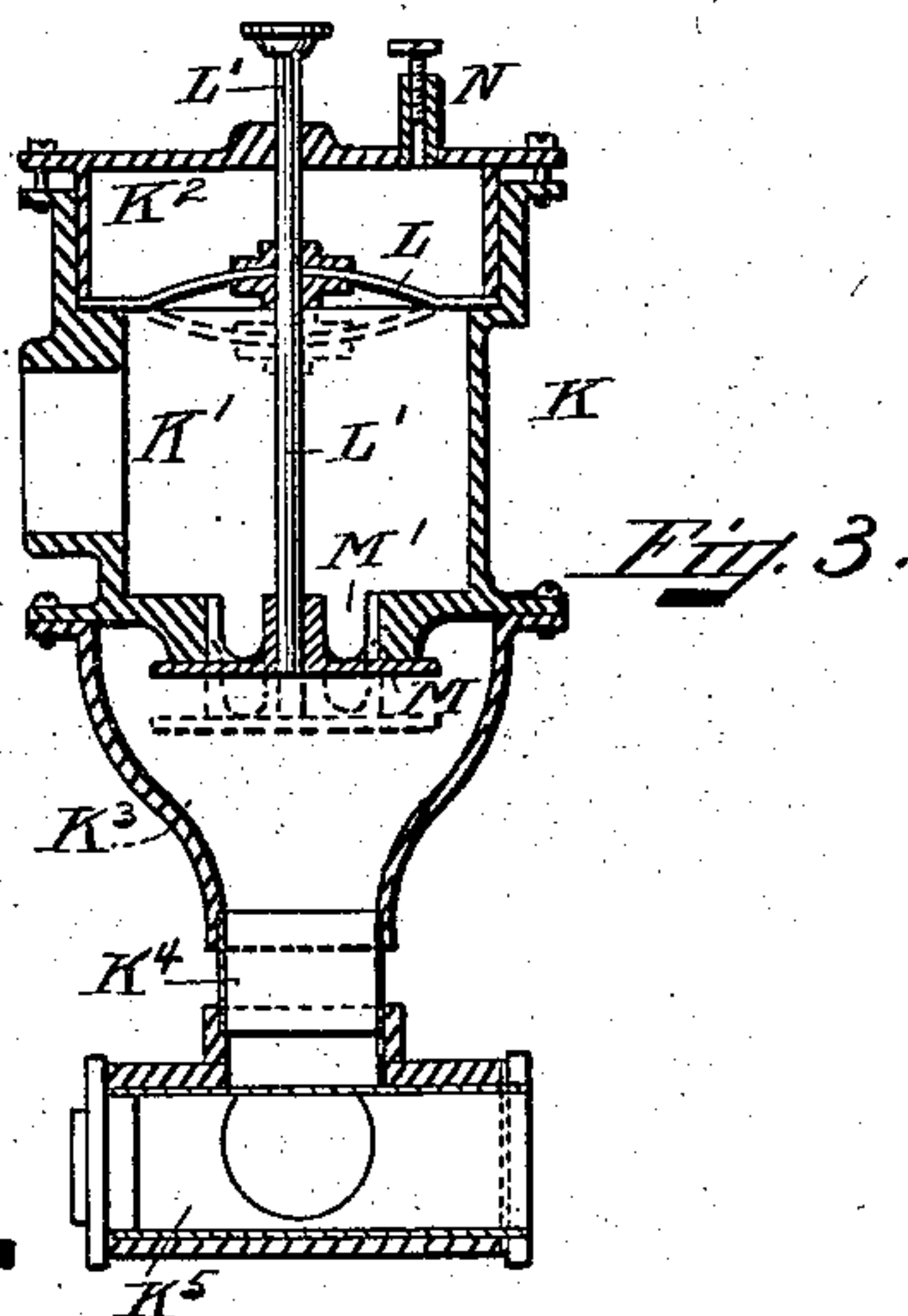
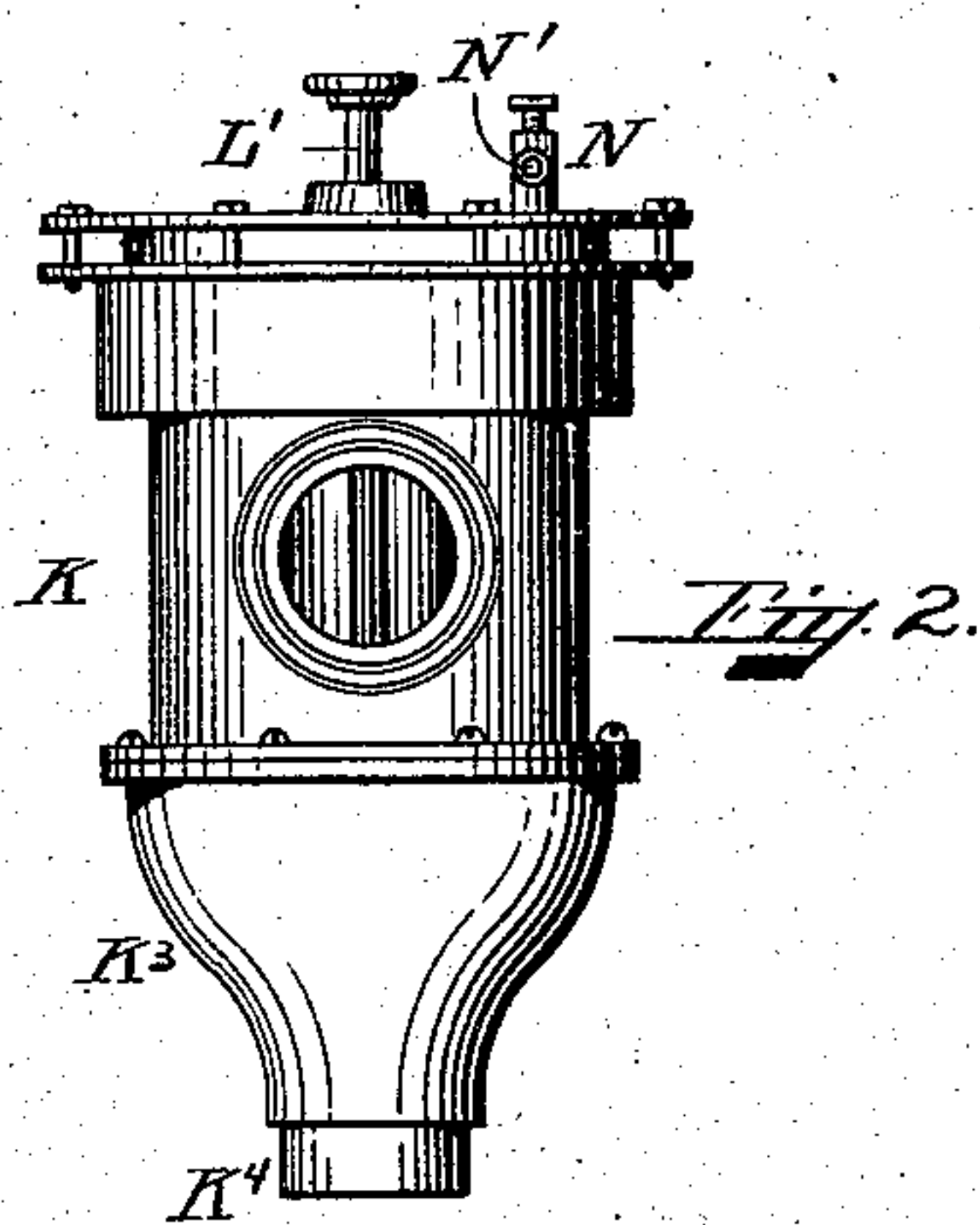
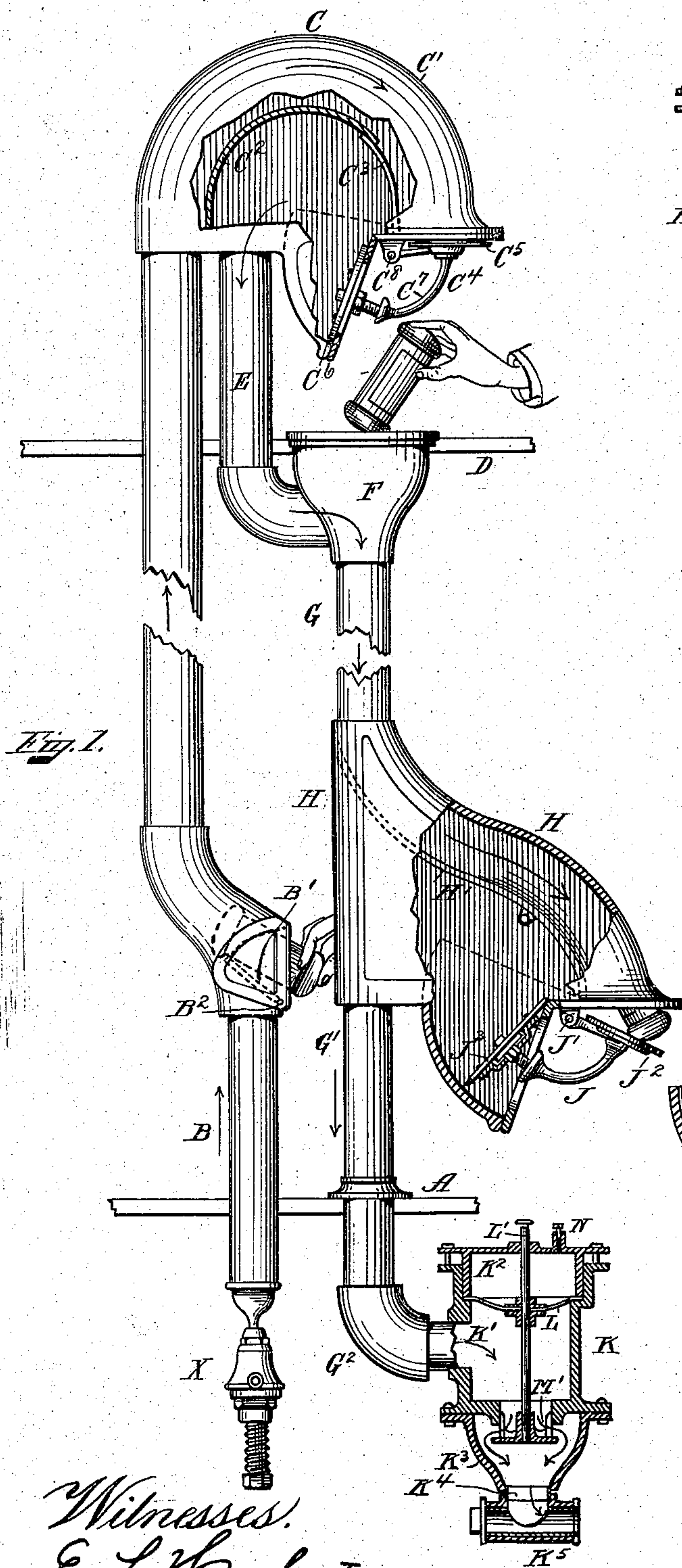


(No Model.)

A. W. PEARSALL.  
PNEUMATIC DESPATCH TUBE SYSTEM.

No. 551,602.

Patented Dec. 17, 1895.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## PNEUMATIC-DISPATCH-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 551,602, dated December 17, 1895.

Application filed April 25, 1895. Serial No. 547,138. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT W. PEARSALL, of New York, county of New York, and State of New York, have invented new and useful  
5 Improvements in Pneumatic-Dispatch-Tube Systems; and I hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to  
10 make and use the same.

My invention relates to a new and useful improvement in pneumatic-dispatch-tube systems in which pressure behind the carriers is used to dispatch the same from one  
15 part of the system to the other, in distinction from vacuum systems in which the carriers are drawn along by the vacuum created in front thereof, and it especially relates to means for starting into circulation the air-  
20 pressure which is normally dormant when carriers are not being passed through the system—that is, I mean there is no circulation of pressure through the system—so that in the normal condition of the apparatus the pressure is not continually circulating through the  
25 system, but there is only a certain pressure in the system, which is sufficient to hold the valves and other necessary parts of the system in their closed positions, and the said  
30 pressure is not in circulation, but simply lies dormant.

My invention further relates to a valve by means of which the pneumatic circuit is opened or closed, depending entirely upon  
35 the pressure acting on said valve, which, when the pressure is full and not circulating, has the effect of closing said valve and cutting off the pneumatic circuit—that is, it cuts off the outlet for the air from the system and  
40 thereby prevents circulation of the pressure through the system, and consequently prevents a loss of power in the pneumatic-dispatch-tube system, which as at present constructed and arranged has a large percent-  
45 age of loss, owing to the circuit being open and the pressure constantly passing through the tubes whether the carriers are passing therethrough or not, but by the arrangement I have provided the pressure passes through  
50 the system and continues so in circulation only when a carrier has been inserted into

the system to be dispatched from one point to another.

By my invention I have provided means for starting into circulation this latent power  
55 by permitting a certain portion of the air in the system to escape by the insertion of a carrier, which escape of air so reduces the pressure in the system as to cause the pneumatic-circuit valve to drop and thereby open  
60 the pneumatic circuit through the system, which acts as a propulsive force against the carriers and propels the same from the point of insertion to the point of discharge. Without providing means for a certain escape of  
65 the air from the system it would be impossible to open the said valve; but by permitting a temporary discharge of the pressure from the system, caused by the insertion of the carriers, the free air remaining in the  
70 system is not sufficient to hold the valve closed, and the same opens by gravity and provides an outlet for the pressure and thus completes the pneumatic circuit through the system, and the carrier driven along the  
75 system by the pressure in its rear passes to the desired point where it is discharged, and the pressure which had been started into circulation to propel the carrier by pressure on its rear immediately passes, after the dis-  
80 charge of the carrier, onto the circuit-regulating valve and closes the same and cuts off the outlet of the pressure and thereby stops the circulation of said pressure through the system, and the system is then in its normal  
85 condition and has no circulation of pressure therethrough, which, however, is started into circulation and draws its supply from a suitable source at the insertion of each carrier.

From the above it will be seen that my in-  
90 vention broadly consists in a new and useful improvement in pneumatic-dispatch-tube systems, whereby the power, which, in systems as at present constructed, is constantly in motion, in my system is only applied or put  
95 into circulation to act as a propelling medium by a reduction of pressure in said system when a carrier has been introduced, and my invention includes a valve adapted in the normal condition of the parts to prevent the  
100 continuous passage through the system of the pressure, and which allows the starting up of



the pressure upon the introduction of the carrier into the system, so that the carrier is transmitted from one point to another, and immediately upon its discharge the pressure which has driven it acts on said valve and cuts off the outlet for the pressure and thereby stops the circulation of said pressure.

In the accompanying drawings, which form a part of this application, and which illustrate a construction embodying my invention, Figure 1 is a side elevation of a pneumatic-dispatch-tube system and showing the terminals with their valves and the circuit-regulating valve in section. Fig. 2 is a detail side elevation of the circuit-regulating valve. Fig. 3 is a central cross-section through the circuit-regulating valve. Fig. 4 is a detail sectional view of a part of the system and showing therein a valve closing and opening at either the cashier's or salesman's station, through which the carriers are introduced into the system. Fig. 5 is a reversed detail plan view of said valve.

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

From the salesman's station A is a line of tubing B, which passes to the terminal C located at the cashier's station D. In the tubing at said station there is provided a valve B' pivoted at B<sup>2</sup>, and normally closing an opening into the tubing by the pressure in said system, and when it is desired to insert a carrier the operator presses the carrier against said valve, which yields to said pressure, and when the carrier is introduced the valve closes the opening by the pressure in the system. The terminal C consists of an outer curved guiding-plate C' and an inner curved guiding-plate C<sup>2</sup>, between which the carrier passes when received from the tube B, and at the extreme inner end of the said terminal at the extremity of the inner curved guiding-plate C<sup>2</sup> a guiding-strip C<sup>3</sup> is secured, which extends to the bottom of the terminal, and it permits the pressure coming through the terminal C to pass across and down through the tube E, but at the same time guides the carrier to the outlet of the terminal closed by the valve C<sup>4</sup>, and this valve consists of two leaves C<sup>5</sup> and C<sup>6</sup>, joined together by a suitable connecting-rod C<sup>7</sup>, and is pivoted to the terminal at C<sup>8</sup>. The area of the leaf C<sup>6</sup> exposed to the pressure in the system being greater than the area of the leaf C<sup>5</sup>, the said valve is held in this closed position by the pressure in the system, and the momentum of the discharging carrier is sufficient to open the valve C<sup>4</sup> to permit the discharge of the carrier, and instantly upon said discharge the pressure on the larger leaf closes the said valve and holds it in its closed position, as shown.

The tube E is connected to a chamber F, located at the cashier's station D, and it has at its upper end a valve F' secured to an arm F<sup>2</sup> and pivoted in the interior of said chamber to lugs F<sup>3</sup>, cast or otherwise secured to the chamber F, and on its upper side is provided with a

suitable soft washer F<sup>4</sup> fitting against the upper side of the chamber F and around and closing the opening F<sup>5</sup>, and there projects downwardly from said valve a shield F<sup>6</sup>, against which the pressure passing through the system acts, and assists in holding said valve F' closed against the opening F<sup>5</sup>, and in the normal condition of the parts the valve remains closed, due to the pressure against the under side, but when a carrier is forced against said valve through the opening F<sup>5</sup> the valve opens and the carrier passes into the chamber F and down through the tube B into the downwardly-discharging terminal H, which is provided with a thin strip of metal or guide-rod H' to deflect and guide the carrier to the valve J, which is pivoted at J' and consists of two leaves J<sup>2</sup> and J<sup>3</sup>, which are of a construction and operate the same as described for the valve C<sup>4</sup>, and as soon as the carrier is discharged the pressure acting on the leaf J<sup>3</sup>, which has a greater area, closes the valve and holds it in its closed position. The pressure in the system then continues downwardly through the tube G' to the circuit-regulating valve K, and acts on said valve as hereinafter described.

The pressure-valves C<sup>4</sup> and J are substantially of a construction and operate substantially the same as the pressure-valve shown, described, and claimed in Letters Patent No. 527,073, dated October 9, 1894, and granted to the Meteor Despatch Company of Maine, as my assignee. The pressure coming from a suitable source of supply passes through a suitable reducing-valve X, and then through the tubing B, terminal C, tube E, chamber F, tube G, terminal H, tube G', and through a coupling G<sup>2</sup> into a central chamber K' of the regulating-valve K. This valve has an upper chamber K<sup>2</sup> and a lower chamber K<sup>3</sup>, which latter chamber is provided with a coupling K<sup>4</sup> leading to an outlet-pipe K<sup>5</sup> to the atmosphere. The chambers K' and K<sup>2</sup> are separated by a flexible diaphragm L, secured to a vertical rod L', which, at its lower end, has a suitable valve M adapted to open and close the opening M' between the chambers K' and K<sup>3</sup>. The pressure in the system, as previously described, upon reaching the chamber K' of the circuit-regulating valve K acts on the diaphragm L and valve M, and the said diaphragm having a larger area of surface exposed to said pressure is moved upwardly, as shown in full lines, Fig. 3, and raises the valve M, thereby closing the opening M', and said opening being closed and there being no outlet for the pressure the circulation is immediately stopped and the pressure in the system lying dormant is sufficient to close all the valves in the system and prevent loss of pressure. Now when a carrier is introduced through the valve B' or valve F' a certain amount of the dormant pressure in the system escapes to the atmosphere, and the pressure being thus reduced the valve M drops by gravity and provides an opening to the atmosphere for the pressure, as the free air in the



system is not sufficient to close the same, and the carrier having been inserted prevents the pressure started into circulation from a suitable supply from passing through the system and acting on the diaphragm, as all of said pressure cannot pass the carrier in the tube; but the carrier on delivering at its station allows the full volume of the air contained in the system to rush on and act on the diaphragm L, and closes the opening M' by lifting the valve M, as shown in full lines, Fig. 3. The chamber K<sup>2</sup> is provided to act as a cushion to the upward movement of the diaphragm L to prevent the too rapid closing of the same, and the valve N is provided with an opening N' located in the top of said chamber, and as said diaphragm drops atmospheric pressure is drawn into the chamber through the opening N', and as said diaphragm L rises the pressure in the chamber retards the too rapid rise of said diaphragm and thus acts to cushion the upward movement of the same, as the pressure in said chamber is retarded in its escape through the small opening N'. The valve N thus acts as a means for allowing the air to pass into the chamber K<sup>2</sup>, and also acts to regulate the passage of air, so that the upward movement of the diaphragm L is regulated by the air in the chamber K<sup>2</sup>.

From the above it will be seen that in the normal condition of the parts and when no carrier is being transmitted through the system, the pressure in said system closes the valve M and thus closes the outlet, which is necessary to create a circulation through the system, and as long as no carrier is introduced the pressure lies dormant in the system and holds all the working parts in proper position; but when a carrier is introduced, a certain portion of the air escaping, the pressure is reduced and the valve M drops from the opening M' and thus provides an opening to the atmosphere for the pressure, and the pressure is immediately started into circulation to drive the carrier to its proper station, and im-

mediately upon the discharge of the carrier the pressure coming from the suitable source of supply passes on and acts on the diaphragm L and immediately closes the outlet to the atmosphere, and consequently the circulation of pressure is immediately stopped. From this it will be seen that the pressure for transmitting of carriers is only used when the carriers are introduced into the system to be dispatched from one point to another, and from this a great saving of power necessarily results, whereas in the old system a great loss of power is incurred by the continued use of the pressure at all times without regard to whether the carriers are being transmitted or not.

Having thus ascertained the nature of my invention, what I claim is—

1. In a pneumatic dispatch tube system, provided with valved inlets and outlets for the carriers, an air outlet, and a valve for said outlet adapted to be opened by the reduction of pressure in the system and closed by the restoration of the normal pressure whereby on the introduction of the carrier the said valve opens to establish a propelling current and closes on the exit of the carrier.

2. In a pneumatic dispatch tube system, provided with valved inlets and outlets for carriers and with a regulated air inlet, an air outlet, and a valve for said outlet adapted to be opened by the reduction of pressure in the system and closed by the restoration of the normal pressure whereby on the introduction of the carrier the said valve opens to establish a propelling current and closes on the exit of the carrier.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 11th day of April, A. D. 1895.

ALBERT W. PEARSALL.

Witnesses:

S. H. TROW,  
E. L. HARLOW.