

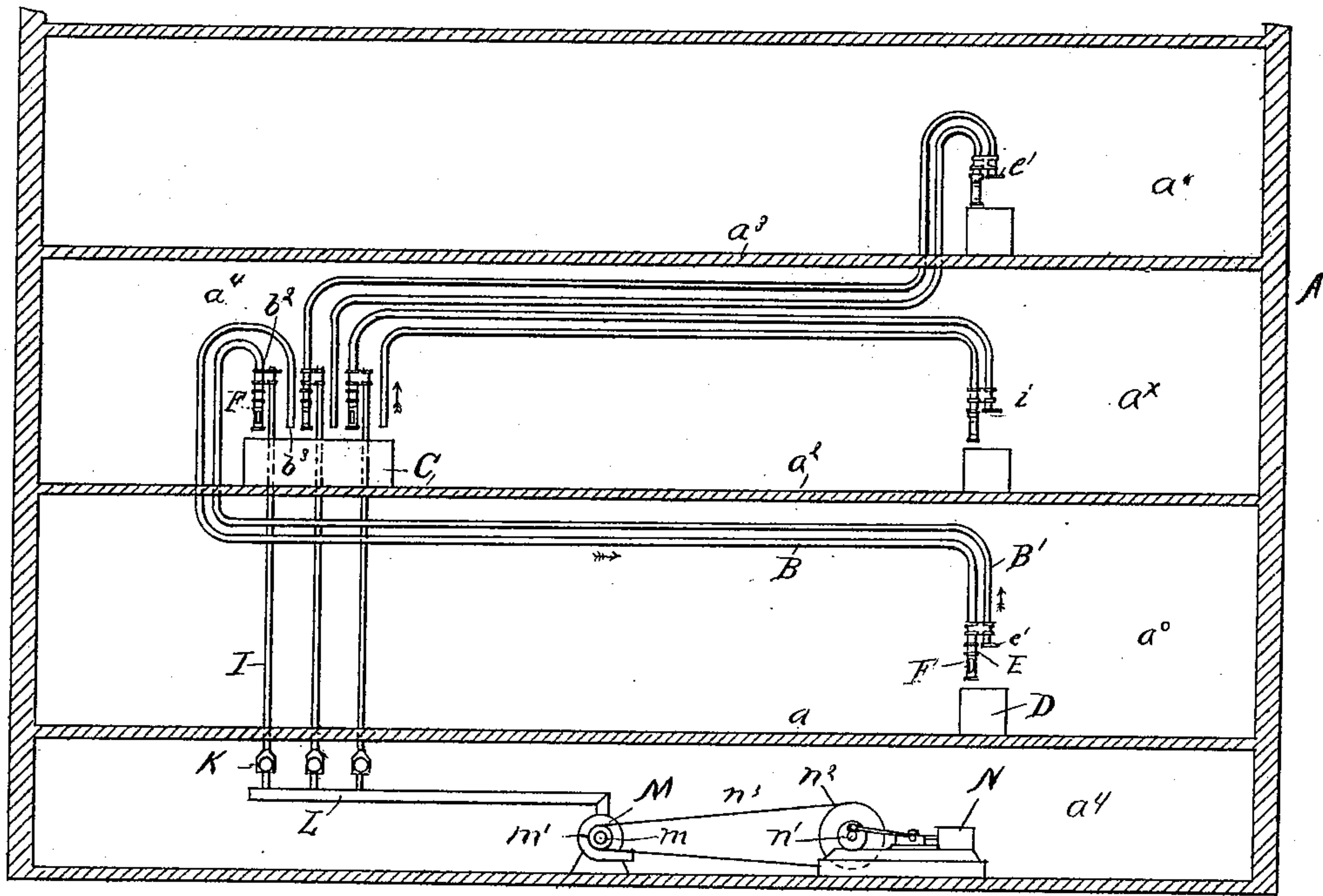
**No. 641,384.**

Patented Jan. 16, 1900.

C. A. GRAY.  
PNEUMATIC DESPATCH TUBE.

(Application filed Apr. 7, 1899.)

(No Model.)



*Fig 1*

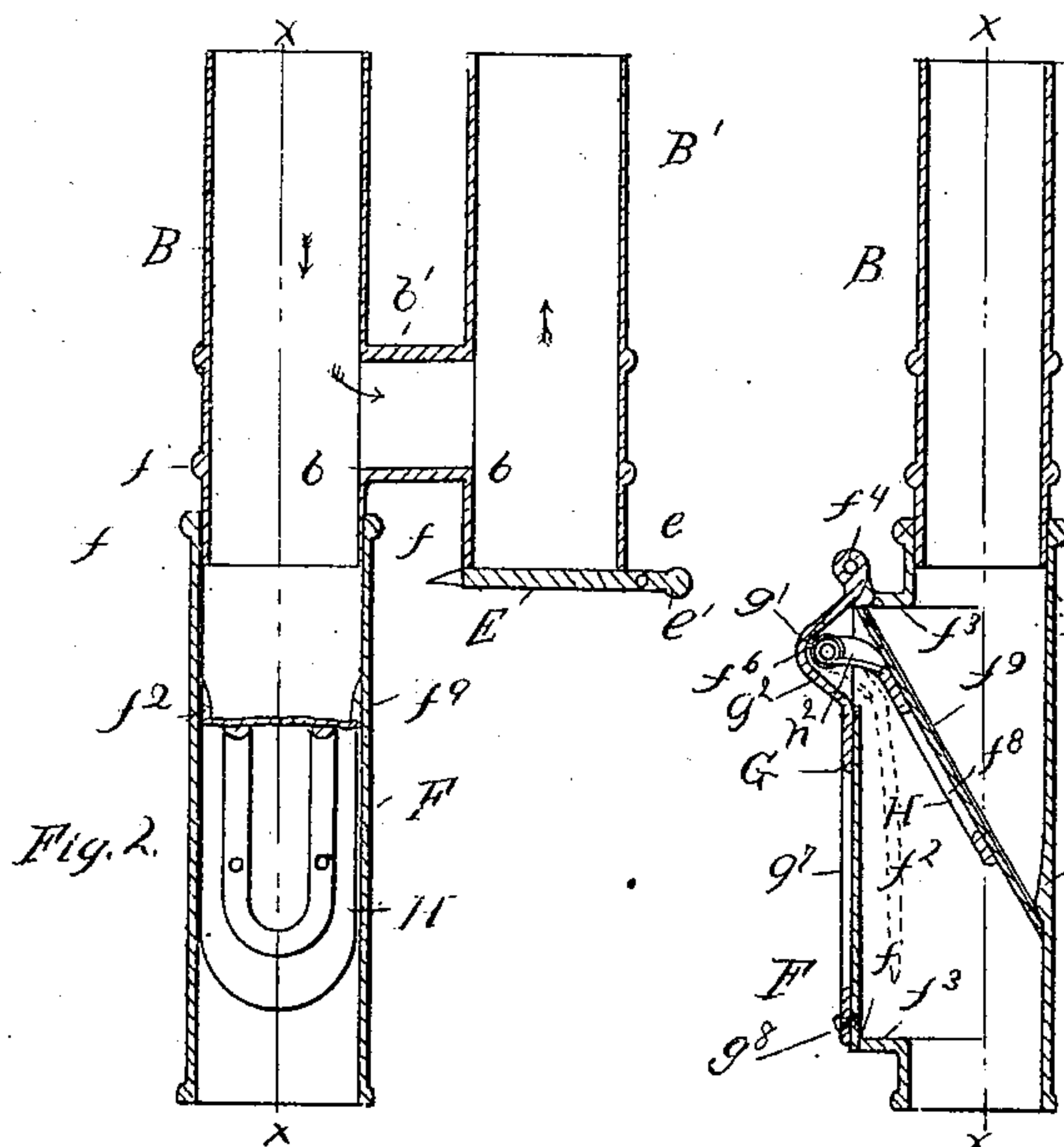
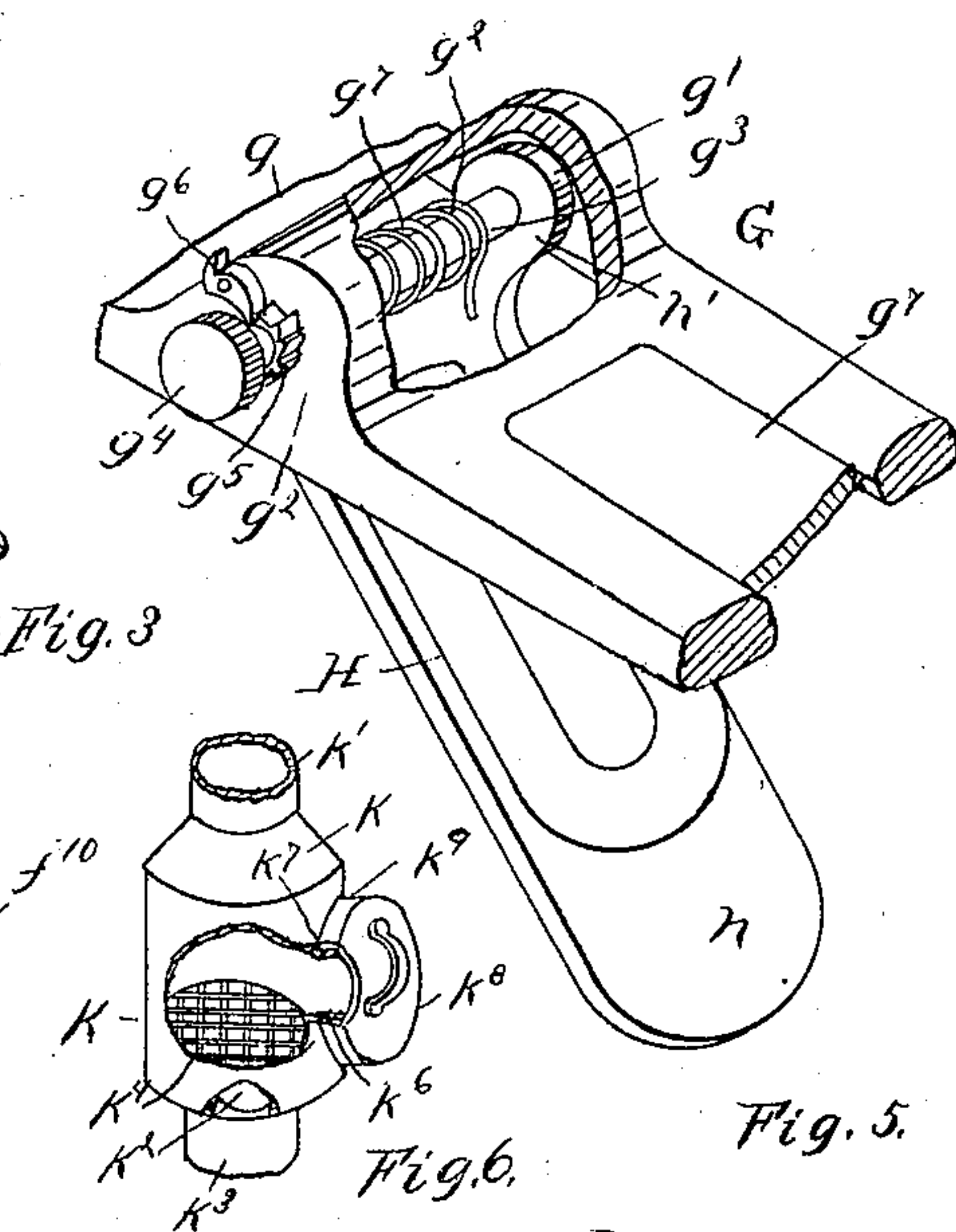


Fig. 2.



*Fig. 5.*

*Inventor*

*Witnesses*

A. B. Jacobus  
Annie L. Greer

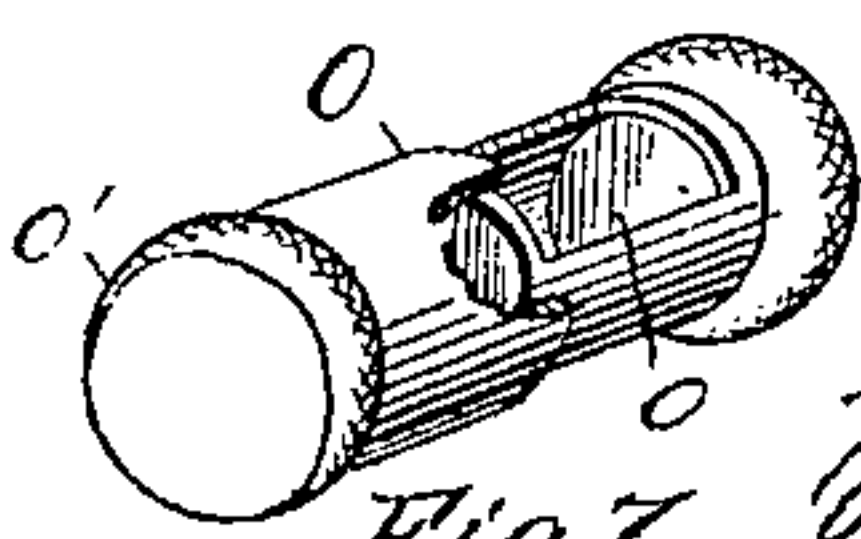
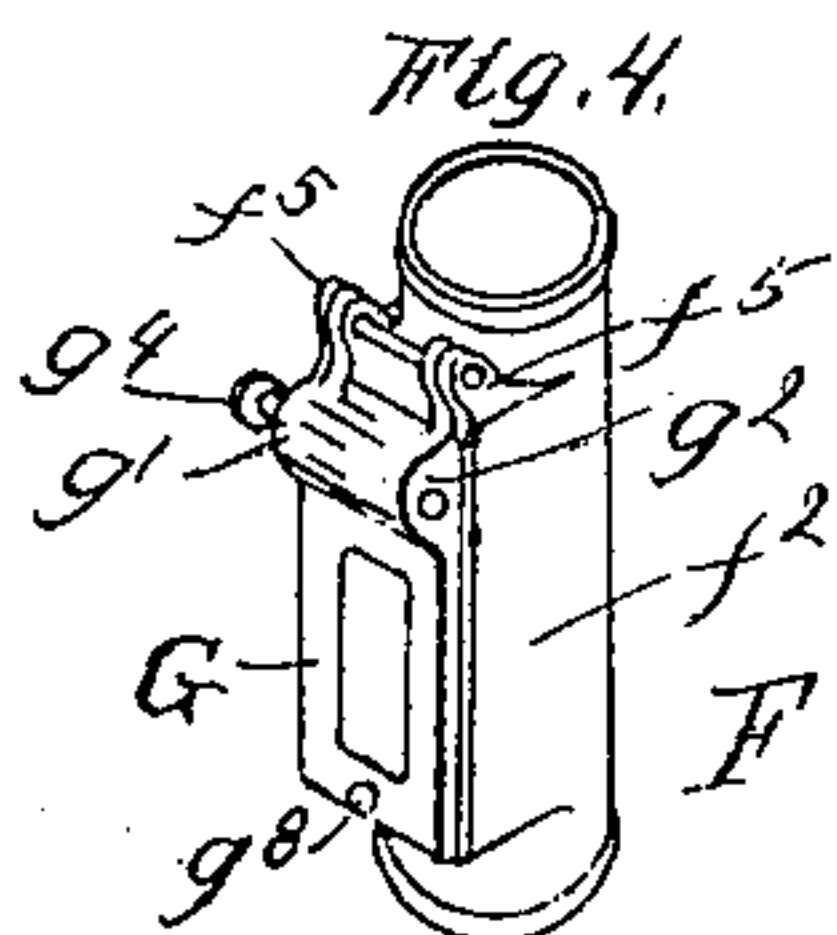



Fig. 7.

 Charles A. Gray  
By  
Rich<sup>d</sup> H. Manning  
Atty



# UNITED STATES PATENT OFFICE.

CHARLES A. GRAY, OF KANSAS CITY, KANSAS, ASSIGNOR OF ONE-HALF TO JOHN LOGAN JONES AND LAURENCE MONROE JONES, OF SAME PLACE.

## PNEUMATIC-DESPATCH TUBE.

SPECIFICATION forming part of Letters Patent No. 641,384, dated January 16, 1900.

Application filed April 7, 1899. Serial No. 712,194. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. GRAY, a citizen of the United States of America, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Pneumatic-Despatch Tubes; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as

will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification. The objects of my invention are, first, in a pneumatic-despatch system, to cut off the projectile force of the air exerted upon the carrier anterior to its exit from the discharging end of the tube; second, to prevent injury to the carrier in its ejection from the tube and lessen the noise, and, third, to intercept articles accidentally drawn within the tubes and locate the place of entry.

My invention consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view of the side walls and floors of a building, showing the pneumatic-despatch tubes on each floor leading to the central station and also to the source of exhaust and my improvements applied to the tubes. Fig. 2 is a vertical sectional view of the separate terminals of the separate tubes in one exhaust connection, showing the by-passage connecting the separate tubes, also showing the self-acting carrier-retarding valve and portions of the valve-seat. Fig. 3 is a vertical sectional view of one of the novel discharge-tube terminals, taken at right angles to and upon the line  $xx$  of Fig. 2. Fig. 4 is a detail view in perspective of the valvular discharge-tube terminal. Fig. 5 is a view in detail of the carrier-retarding valve, showing the door with which the valve is connected broken away at the lower end and also at the pivotal point of connection of the valve to show the spring assisting to close the valve. Fig. 6 is a detail view of the trap in the tubes leading to the exhaust-fan, with the side portion broken away to show the screen. Fig. 7 is a detail view of a carrier in an open position.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents a building in which the pneumatic-despatch system and tubes are installed, and  $a$   $a^2$   $a^3$  the respective floors of the building in ascending series.

B B' are separate parallel delivery and return tubes leading from a position a short distance above the floor  $a$  in the apartment-room  $a^0$  upwardly through the floor  $a^2$  into the apartment-room  $a^3$ , said tubes being bent at an angle, as at  $a^4$ , and extended in parallel planes in a downward direction toward the floor  $a^2$  and terminating the proper height from the floor for convenient access from a table or counter C, which counter occupies a position commonly known as the "central station" and at which point the other tubes leading from the other rooms terminate, as hereinafter described.

Beneath the ends of the tubes B B' in the chamber  $a^0$  and upon the floor  $a$  is a counter or table D, which in business-houses is known as the "inspection-counter." With the end of the tube B' above the counter D is pivotally connected at  $e$  a valve E. From the pivotal portion thereof extends horizontally a weighted arm  $e'$ .

In the sides of each tube B B', opposite in position and a short distance from the ends of said tubes, is an opening  $b$ , and with the sides of which openings are connected the respective ends of a short pipe  $b'$ , which forms a by-passage for the air from tube B to the tube B'.

With the end of the pipe B is connected the novel terminal F, which consists of a tubular extension of the tube B of considerable length to extend nearly to the top of the counter D, the circumference of the inner side of which is slightly in excess of that of the tube B, the upper end of said terminal fitting over the lower end of said tube and being detachably secured thereto. In the side of the terminal F is an opening  $f'$ , extending nearly the length of said terminal and nearly of the same width as between the opposite sides of said tube-terminal, the sides of said opening comprising flanges  $f^2$   $f^2$ , extending outwardly and tangentially to the inner side of said tube a short distance beyond the circumference of



said tube, and the flanges  $f^3 f^3$  extending at right angles to the said tube at the respective upper and lower ends of said opening, the opposite ends of each flange  $f^3$  being connected  
 5 with the respective side flanges  $f^2 f^2$ , thus forming a box-shaped extension, upon the outside of which is a closely-fitted door G, hinged at its upper end to the lugs  $f^5$  on the outer edge of the upper flange  $f^3$ . A short distance below  
 10 the upper end of the door G is an outwardly-curved projection of said door  $g'$ , extending the width of said door and closed by plates  $g^2$ , extending from the outer edge of the door outwardly to said projection. Through the  
 15 plates  $g^2 g^2$  extends a pin  $g^3$ , upon one end of which pin is a milled head  $g^4$ , and between said head and the outer side of the end  $g^2$  of the projection  $g'$  is a ratchet-wheel  $g^5$ , shrunk upon or fixedly secured to said pin, and upon  
 20 the plate  $g^2$  is a pawl  $g^6$ , pivotally connected with said plate and engaging with the ratchet-wheel  $g^5$ .

H represents the yielding valve in the terminal F, which consists of a flat plate of considerable length and nearly of the same width  
 25 as the opening  $f'$ , the lower end describing an arc of a circle  $h$  to fit the curved inner side portion of the terminal F. At the upper end of the valve H are lugs  $h^2 h^2$ , which extend  
 30 from the rear side portion of the valve and are perforated to receive the pin  $g^3$  and turn freely upon said pin. Around the pin  $g^3$  extends a spiral spring  $g^7$ , one end of which spring is secured fixedly to the said pin and  
 35 the other end bears upon the rear side of the valve H. The forward side of the valve is provided with a non-metallic covering  $f^8$ , such as leather. Paper or rubber may also be employed. The normal position of the valve is  
 40 at an oblique angle to the door G, and upon the inner side of the flange  $f^2$  are obliquely-inclined flanges  $f^9$ , extending from the upper flange  $f^3$  downwardly to the rear inner side of the terminal F and also in a curved line at  
 45 the lower end of said flanges, as at  $f^{10}$ , forming with the flanges  $f^9$  a valve-seat for valve H. In the door G is a transparent panel  $g^7$ . The lower end of the door G is secured by a screw  $g^8$  to the lower flange  $f^3$ .

50 With the end of the tube B' terminating in the apartment or room  $a^x$  and above the counter at the central station C is a terminal which is the same as tube-terminal F. The end of tube B above the counter C is left  
 55 open. At one side of the tube B' and the terminal F is an air-exhaust pipe I, the upper end portion of which pipe is closed. The side portions of the pipe I and the pipe B' are connected with a tube-joint or a by-passage  $b^2$ ,  
 60 which is the same as the tube-joint  $b'$ . The lower end of the pipe I extends downwardly through the floor  $a^2$ , through the apartment  $a^0$ , and through the floor  $a$  into the basement  $a^4$  of the building, and upon said end of pipe  
 65 I is a trap K, which consists of a cylindrical vessel larger in circumference than the pipe I, the top  $k$  of which vessel is inclined upwardly

from the sides and is connected with a collar  $k'$ , which collar receives the lower end of the pipe I. In the bottom of the receptacle K is  
 70 an opening  $k^2$ , from the sides of which opening extends downwardly a short length of pipe  $k^3$ . Within the receptacle K and covering the opening  $k^2$  in the bottom of said receptacle is a circular screen  $k^4$ . In one side  
 75 of the receptacle is an opening  $k^6$ , around which is a flange  $k^7$ . A cover  $k^8$ , provided with a flange  $k^9$ , is fitted to the flange  $k^7$ . The lower end portion of the pipe  $k^3$  is connected  
 80 with the side portion of a horizontal pipe L, which pipe is closed at one end and the other end connected with a suction-fan case M of well-known construction in the basement of the building.  $m$  is the fan-shaft, and  $m'$  the band-pulley upon said shaft.  
 85

N is an engine, upon the driving-shaft  $n'$  of which is a pulley  $n^2$ , over which pulley extends one end of a belt  $n^3$ , the other end of which belt is extended over the pulley  $m'$  on the driving-shaft in the fan-case M.  
 90

In the chamber  $a^x$  are despatch-tubes which run direct to the station C on the floor  $a^2$ , and in the chamber  $a^*$  are despatch-tubes which lead from a counter in the same manner as described above the counter D in the  
 95 apartment  $a^0$  and which extend through the floor  $a^3$  and to the central station C, all of which are constructed and arranged in position and provided with the terminal F, as described of the despatch-tubes B B' in the  
 100 apartment  $a^0$  and with which pipes are connected pipes similar to the pipe I, each of which is provided with a trap K and connected with the main exhaust-pipe L in like manner as described of said trap mentioned.  
 105

O in Fig. 7 represents the carrier for use in the despatch-tubes and which is of the ordinary construction and consists of a cylindrical metallic box, in the side of which is an opening  $o$  for the introduction of the articles to  
 110 be sent through the despatch-tubes, and at each end of the box is a felt or other elastic substance  $o'$ , which forms a close frictional contact with the inner side of the despatch-tubes. The carrier O also is made of separate cylinders, one telescoping within another,  
 115 and one cylinder having an opening  $o$ , and by a partial withdrawal of the separate cylinders the opening is brought in view.

In the operation of the invention the power  
 120 being communicated from the engine N through the shaft  $n'$  to the pulley  $n^2$  and belt  $n^3$  is also transmitted to the shaft  $m'$  in the exhaust-fan case M, and a suction of the air in the pipe I is constantly maintained. This  
 125 suction tends to keep the valve E at the terminal of the tube B' and the valve H in the tube-terminal F closely seated and interrupted only by the opening of the valves H in the terminal F when the carriers are passed  
 130 through. The money or other articles to be delivered to the central station C in the apartment  $a^x$  is placed in a carrier O. The valve E at the end of the delivery-tube B' is then



opened by the hand and the carrier inserted within the open end of the said tube, and upon the removal of the hand from the valve-arm  $e'$  the valve instantly closes, being assisted in closing by the weight of the arm, the carrier passing through the tube  $B'$  to the terminal  $F$  at the station or counter  $C$  in room  $a^x$ , and in passing the passage  $b^2$ , leading to the tube  $B$ , the force exerted against the carrier from behind the carrier is cut off and the carrier falls upon the valve  $H$ , which immediately opens under the momentum of the carrier and receiving the shock of the carrier incident to its weight permits the carrier to drop upon the counter without shock and also without the noise incident to breaking the vacuum in tubes  $B B'$ . It will thus be observed that the discharge of the carrier under the force of the air, as in the old systems, is obviated and the collapsing of the sides of the carriers as they pass from the tubes is prevented and the usefulness of the carriers (the cost of which is an item of considerable expense) maintained for a greater length of time. The resistance of the valve  $H$  to the shock of the falling carrier is readily graduated and made greater by the turning of the pin  $g^3$ , so as to cause the spring  $g^7$  to bear with greater force upon the valve  $H$ , the pawl  $g^6$  securing the pin when the proper force of the spring is applied. The carrier, which is then deposited upon the counter  $C$ , is then opened and the proper articles inserted for return to the counter  $D$  and the carrier inserted in the open end of the tube  $B$ , and the carrier falls with slight noise upon the counter  $D$  in the apartment  $a^0$ .

During the frequent passage of the carriers through the tubes money especially, and frequently paper, will be drawn within the tubes and which lodges in some cases in the tubes and in other cases is drawn within the exhaust-fan. In my invention, however, all of the lost money is collected within the trap  $K$  and upon the screen  $K^4$ , thereby enabling the money or other valuables which are accidentally lost in transmission through the tubes from any one designated point of despatch in the different rooms to be caught in a trap corresponding in number therewith and also in

pipe connection with the fan-case  $M$ . The removal of the cover  $k^8$  from the opening in the trap enables the introduction of the hand and the recovery of the missing article.

In my improved system, with the exhaust in the pipes  $I$  and the end of the tubes  $B B'$  at station  $C$  open, an air-circuit is permitted through the tubes  $B B'$ , which air follows the insertion of the carrier  $O$  within the appropriate tube. The door  $G$  may be dispensed with and the terminal  $F$  made in one piece and considerably shorter in length, if preferred.

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

1. In a pneumatic-despatch system the combination with the pneumatic delivery and return tubes of a tube connection, connecting said tubes near the ends thereof, an exhaust-tube and a tube connection connecting said exhaust-tube with the return-tube, means substantially as described for creating a suction in said tubes, a valve pivotally connected with and closing the end of the despatch-tube in which the carrier is inserted and a self-closing inclined valve-plate in the end of the return-tube and an inclined valve-seat in said tube, lugs upon the upper end of said valve-plate a pin extending through the side of said return-tube and said lugs, a spring having one end connected with said pin and the other end bearing upon the under side of said valve-plate and an adjustable tension device connected with said spring.

2. In a pneumatic-despatch apparatus the combination with a pneumatic-despatch tube having an opening in one side thereof of a valve lugs upon the upper end of said valve a pin extending through the sides of said despatch-tube and said lugs, a spiral spring upon said pin having one end connected therewith and the other end bearing upon the under side of said valve, a ratchet-wheel on said pin on the outside of said tube and a pawl pivotally connected with said tube and engaging with the said ratchet-wheel.

CHARLES A. GRAY.

Witnesses:

JOHN T. MARSHALL,  
T. A. ALEXANDER.