

F. H. WOLEVER.
PNEUMATIC DESPATCH TUBE SYSTEM.
APPLICATION FILED AUG. 10, 1908.

943,329.

Patented Dec. 14, 1909.

3 SHEETS—SHEET 1.

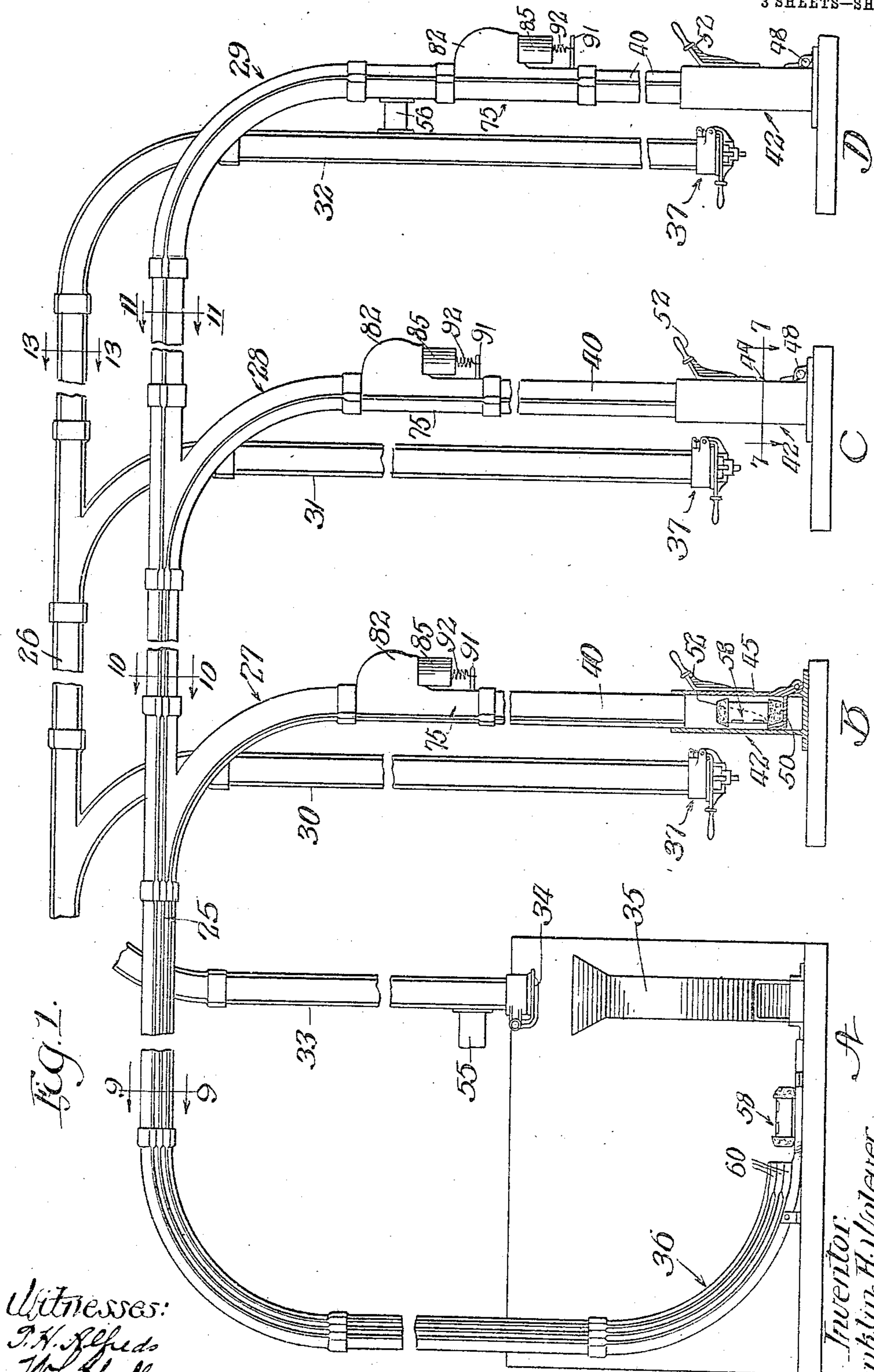


Fig. 1.

Witnesses:
J. H. Alfred
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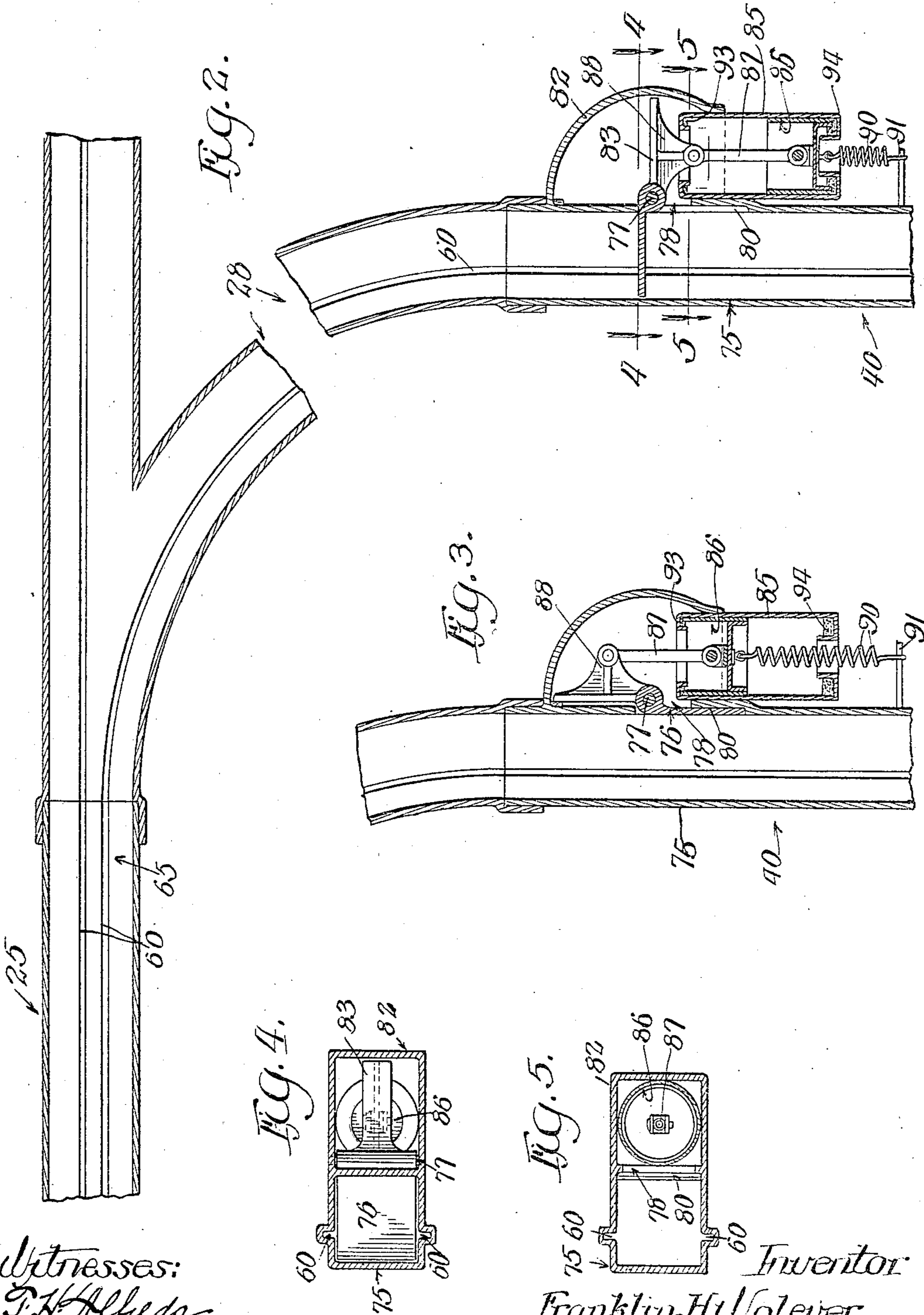
Inventor
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by *Paul Brown* Att'y

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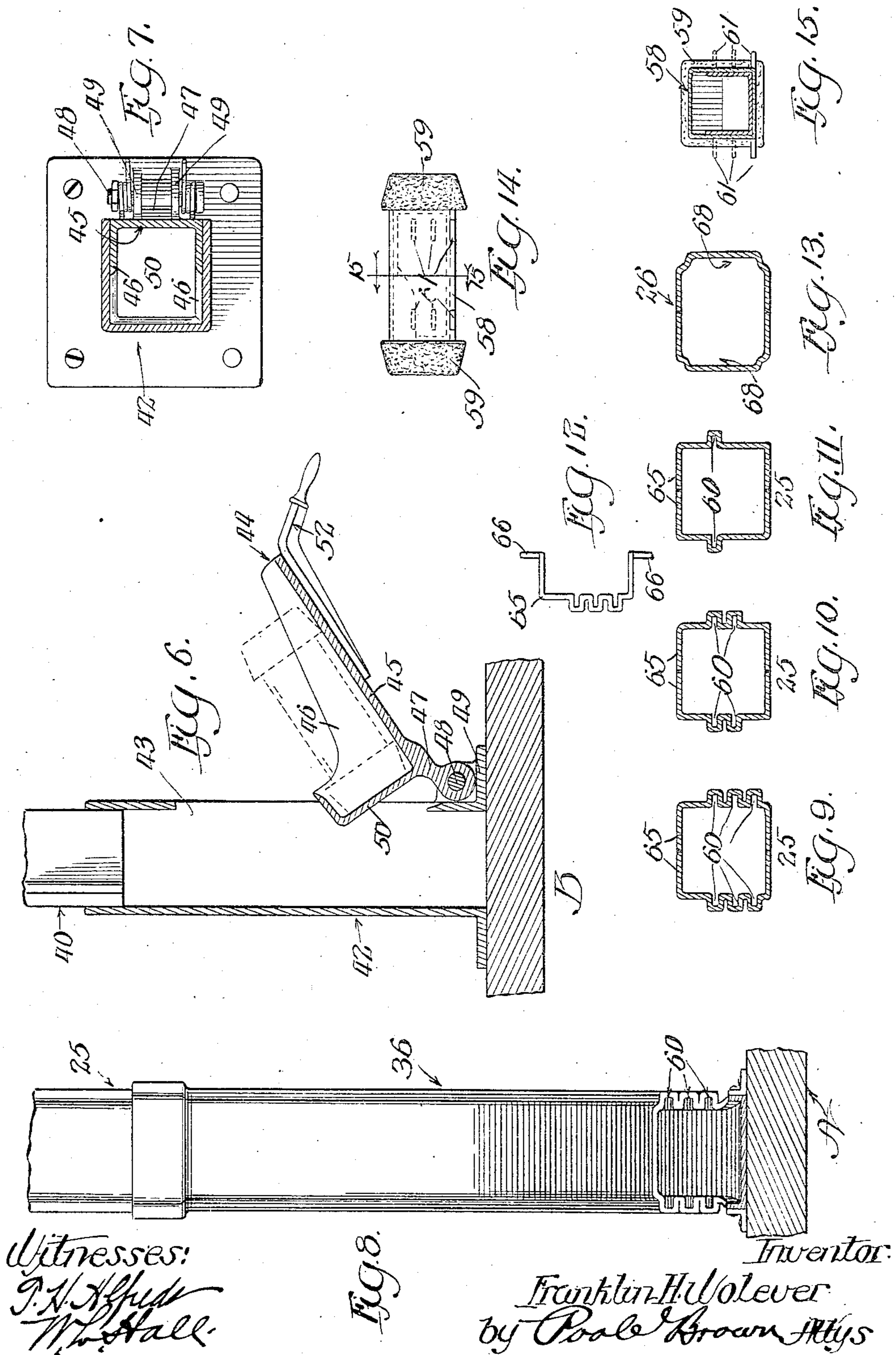
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3 SHEETS—SHEET 3.



Witnesses:
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Fig. 8.

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UNITED STATES PATENT OFFICE.

FRANKLIN H. WOLEVER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO SAMUEL FEIST, OF CHICAGO, ILLINOIS, AND ONE-HALF TO THE ILLINOIS PNEUMATIC TRANSMISSION CO., A CORPORATION OF SOUTH DAKOTA.

PNEUMATIC-DESPATCH-TUBE SYSTEM.

943,329.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed August 10, 1908. Serial No. 447,733.

To all whom it may concern:

Be it known that I, FRANKLIN H. WOLEVER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic-Despatch-Tube Systems; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in pneumatic despatch tube systems, and the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

Certain of the features of my invention relate to improvements in that type of despatch tube systems shown in the prior U. S. patent to Stange, No. 743,109, dated November 3rd, 1903, wherein provisions are made for mechanically guiding cartridges from a central or cashier's station through the cashier's trunk line into one of a plurality of branches leading from said trunk line to the salesmen's stations.

Other features of the invention relate to an improved delivery device for facilitating the delivery of the cartridges from the trunk line to the salesmen's branches.

As shown in the drawings:—Figure 1 is a diagrammatic view, illustrating a typical arrangement of an outgoing and return despatch tube system, showing the application of my invention thereto. Fig. 2 is a fragmentary longitudinal section, with parts broken away, illustrating a portion of the cashier's trunk line, a salesman's delivery branch and terminal. Fig. 3 is a similar view of a portion of a salesman's delivery terminal, with parts thereof shown in changed positions. Figs. 4 and 5 are horizontal sections, taken on lines 4—4 and 5—5, respectively, of Fig. 2. Fig. 6 is a vertical section of the lower end of a salesman's receiving terminal, showing the means for removing the cartridges therefrom. Fig. 7 is an enlarged horizontal section, taken on line 7—7 of Fig. 1. Fig. 8 is a side elevation of the cashier's sending terminal or fit-

ting. Figs. 9, 10 and 11 are cross sections, taken on lines 9—9, 10—10 and 11—11, respectively, of Fig. 1. Fig. 12 is a cross section, illustrating one lateral part or half of a tube section from which the cashier's sending tube is made. Fig. 13 is a cross section taken on line 13—13 of Fig. 1. Fig. 14 is a side elevation of a cartridge adapted for my improved system. Fig. 15 is a cross section taken on line 15—15 of Fig. 14.

As shown in the drawings, reference being made more particularly to Fig. 1, 25 designates the cashier's sending tube or trunk line through which the cartridges are despatched from the cashier's desk A to the several outlying or salesmen's stations B, C and D, and 26 designates the salesman's sending tube or trunk line through which the cartridges are despatched from said salesmen's stations to the cashier's station. The cashier's trunk line is provided with a plurality of branches 27, 28 and 29 leading to the salesmen's stations B, C and D, respectively, and the salesman's trunk line is likewise provided with a plurality of branches 30, 31 and 32 leading from said salesmen's stations B, C and D, respectively, to the salesman's trunk line. The salesman's trunk line terminates at the cashier's desk in a downwardly turned portion 33 which is provided at its lower end with the spring closed door 34 which seals the system at this point. The cartridges are discharged from the salesman's trunk line into a receiving terminal 35 located at the cashier's desk. The cashier's trunk line is provided with a sending terminal or fitting 36, shown in Figs. 1 and 3, through which the cartridges are delivered from the cashier's station to the trunk line. The said sending terminal is open to the atmosphere and is of special construction as will hereinafter more fully appear. The salesman's sending branches 30, 31 and 32 are provided with sending boxes 37, 37 of any preferred form through which cartridges are inserted into the system for passage to the cashier's desk.

The salesman's delivery branches discharge into delivery terminals, designated as a whole by 40. The said terminals are provided at their lower ends with hollow cast

fittings 42, 42 which are joined at their upper ends to the sheet metal branches and are supported at their lower end on the salesmen's desks. The said fittings are provided
 5 with side openings 43 which are adapted to be closed by gates 44, said gates being arranged to seal the system at these points and to provide means for removing the cartridges from the terminals. The said
 10 fittings 42 are of the same cross-section as the trunk lines and branches, they being shown as rectangular to correspond with the rectangular cross-section trunk lines and branches, as will hereinafter more fully ap-
 15 pear. The gates 44, as herein shown, each consists of a flat plate or body 45 and marginal right angle flanges 46, 46 which fit against the inner faces of the side walls of the fitting 42. Each gate is provided at its
 20 lower end outside of the fitting with a lug 47 which is hinged to a pin 48 mounted in a lug 49 integral with and at one side of the lower end of the fitting 42 whereby the gate is hinged to swing toward and from the
 25 fitting. The gate is formed at its lower end to provide an upwardly facing flanged seat portion 50 of a size to receive the lower end of a cartridge delivered to the fitting, as indicated in Fig. 1. When the gate is
 30 used in a delivery terminal the seat portion thereof is solid or imperforate as shown in Fig. 6. The gate is provided with a handle 52 by which it may be opened and closed. When said gate is swung outwardly into the
 35 position shown in Fig. 6, the cartridge is drawn outwardly with it, and may at this time be removed from the system. The location of the hinge with respect to the center of gravity of the gate is such that when the
 40 gate is closed the weight of the gate automatically holds it in its closed position.

55 designates a suction pipe which connects the discharge end of the salesmen's trunk lines with a suitably located vacuum
 45 pump, not herein shown.

56 designates a by-pass which connects the terminal branch 29 of the cashier's trunk line with the terminal receiving branch 32 at the outermost salesmen's station B. The
 50 cashier's sending terminal 36 remains always open, this being the only part in the system, as herein arranged, through which air is continuously admitted to the system under the action of the vacuum pump connected with
 55 the pipe 55. With this arrangement the connection of the single vacuum pipe 55 with the system at the terminal of the salesmen's trunk line establishes and maintains a vacuum in all parts of the system, and in
 60 the proper direction to carry the cartridges to their intended destinations.

My improvements relate in part to the shape and construction of the trunk lines 25

and 26 and their branches and the guiding connections between the cartridges and the
 65 cashier's trunk line, whereby the cartridges are guided through said trunk line and are diverted through the several branches leading therefrom to the several salesmen's sta-
 70 tions.

In accordance with one phase of my invention, the trunk lines 25 and 26, as well as the branches and terminals thereof, are made of rectangular cross-section, and the
 75 cartridges 58 are likewise of rectangular cross section, at least at the cushioned ends 59 thereof. The said cashier's trunk line is provided in two opposite walls, the vertical walls as herein shown, with guide grooves
 80 60, 60 to receive guide projections or lugs 61, 61 extending laterally and in opposite directions from the cartridges; the said grooves being arranged in oppositely located
 85 pairs. As shown, each cartridge is provided with four of said guide lugs 61, two at the front and two at the rear end thereof, thus affording four points of contact for each
 90 cartridge to insure that each cartridge shall be properly delivered or paid out to its appropriate delivery branch without liability of tangential force to place undue stress on
 95 said guide lugs at the moment of delivery from the main tube to the branches, such as would tend to twist or distort the lugs. Two oppositely extending guide lugs, one at each
 end of the cartridge, would, perhaps, in a lesser measure answer the purpose.

The sending terminal 36 of the cashier's trunk line terminates in a generally horizontal mouth or opening located above the
 100 cashier's desk. As herein shown, the trunk line is provided with three pairs of guide grooves 60 to accommodate three delivery branches. A greater number of guide grooves may be provided to accommodate
 105 the system to a larger number of salesmen's stations. With the guide grooves arranged on opposite sides of the cashier's sending tube and originating and opening at the mouth of the tube in oppositely located pairs
 110 and extending continuously therefrom to the branches or delivery terminals; I am enabled to arrange the guide grooves so that the guide lugs on the cartridges intended for a different salesman's station will auto-
 115 matically find their proper grooves when the cartridges are presented endwise to the mouth of the cashier's sending terminal. In practice, the cartridges will be designated by suitable numbers or other characters to
 120 correspond with the salesmen's stations to which they are to be delivered. Thus when a cartridge is to be sent to a certain station the cartridge will be turned the proper side
 125 upwardly (the upper side thereof may bear its designating character) and the relative

locations of the guide lugs and grooves will insure that the cartridge will enter the tube to be delivered or paid out therefrom through its own proper branch and no other.

5 A set of the cartridges for one of the stations will be provided with guide lugs located adjacent to the top of the cartridge, another with guide lugs located near the center thereof, and another with guide lugs
10 located adjacent to the bottom of the cartridge, as indicated in full and dotted lines in Figs. 14 and 15.

The said trunk lines are made of sheet metal and may preferably be made of two
15 lateral parts or halves 65, 65. Each of the parts of the cashier's trunk line is formed to provide one of the walls containing one set of the guide grooves 60 and a portion of the two adjacent walls, as shown in Fig. 12.
20 Such lateral parts of the tube may be brazed or otherwise permanently secured together; or the adjacent margins thereof may be formed with flanges 66 by which the two parts of the tube may be bolted or riveted
25 together, suitable packing being interposed between the flanges to afford an air tight joint between the lateral halves or parts of the tube. However, where convenient, the tube may be made of a single part provided
30 with the oppositely arranged sets of guide grooves. The guide grooves 60 are continued directly from the trunk line or main sending tube through the branches and occupy the same relative positions in the walls
35 of the branches 27, 28 and 29 as they occupy in the trunk line, whereby each oppositely located pair of guide grooves are directed by a simple curve from the trunk line to the branch. Thus the lowermost pair of grooves
40 of the trunk line is directed into the branch nearest adjacent to the cashier's station, the second or next upper pair of grooves into the second branch and the last pair or uppermost pair of grooves is directed into the
45 farthestmost branch 29. The open ends of said guide grooves are flared or widened, as shown in Fig. 8, to facilitate the entrance of the guides thereinto.

The salesmen's trunk line 26 and the
50 branches thereof need not be provided with the guide grooves 60, inasmuch as the cartridges of all the salesmen's stations are returned therethrough to the cashier's station. When the guide lugs 61 of the cartridges are
55 made rigid with the side walls of the cartridges as herein shown the salesmen's trunk line and branches may be formed at the sides thereof with lateral spaces 68, which correspond to the grooved sides of the cashier's
60 trunk line, to accommodate or receive the oppositely extending guide lugs 61 of the cartridges which pass therethrough. By reason of said lateral passage 68 of the sales-

men's trunk line and branches, and because of the fact that the said salesmen's trunk
65 line is located closer to the vacuum pump and its connecting pipe 55 than the cashier's trunk line, the slight additional loss of pressure in the salesmen's trunk line, due to the presence of the lateral passages relatively to
70 the loss of pressure in the cashier's trunk line, has the effect to substantially equalize the velocity of the cartridges in the two lines and to avoid a too high delivery velocity at the discharge terminal 33 of the salesmen's
75 trunk line.

The provision of the seats 50 at the lower ends of the gates 44 of the salesmen's delivery terminals 40 has the effect to prevent the free inrush of air into said terminals at
80 the lower ends thereof when the gate is first swung outwardly to expose a cartridge which has been delivered thereto, and thus prevent a rush of air upwardly from beneath the gate such as would tend to lift the cartridge
85 from its seat. On the other hand, the first passage of air into the terminal, as the gate is being opened, is over the upper end of the gate, which has the effect, not only to prevent the cartridge from rising, but to hold
90 the cartridge to its seat on the gate. A further advantage of the flanged seat to which the cartridge is delivered is that the cartridge is thereby swung outwardly with the gate out of line with the terminal when the
95 latter is opened, thus bringing into position to be readily removed.

The salesmen's delivery terminals 40 are constructed and arranged to permit the free and unobstructed delivery of cartridges from
100 the branches therethrough to the gates 44, and are provided with means for cutting off the entrance of air to the system through the terminals at a time when the gates are opened to remove the cartridges therefrom.
105 This construction is shown in Figs. 1, 2, 3, 4 and 5 and is made as follows: Each of said terminals 40 is composed in part of a tubular cast metal fitting 75, the lower gate fitting 42 and a connecting sheet metal portion. 76 designates a swinging leaf valve located in said fitting which is adapted to close the passage in the fitting and cut off the entrance of air to the system through a
110 terminal when so closed. The valve is pivoted at one side of the fitting to a pivot pin 77, the said fitting being formed with an opening 78 through which the pivoted end of the valve is adapted to extend for engagement with its pivot. The fitting is formed
115 on the inner side of its wall adjacent to and below the pivot pin with a recess 80 to receive the lower end of the valve when the latter is in its open position, whereby the inner face of the valve at this time lies flush
120 with the wall of the fitting and presents no

obstruction to the free passage of a cartridge therethrough. 82 designates a casing which is formed integral with the fitting 75 and incloses a chamber in which the valve pivot 5 is located. Said chamber communicates with the passage of the terminal through the opening 78 in the side wall thereof. Located within said chamber is a valve operating arm 83 which is made integral with said 10 valve 76 and to which is connected the mechanism for operating the valve.

The mechanism herein shown for operating the valve is made as follows: 85 designates a vertical cylinder located at one side 15 of the fitting and which fits closely in an opening in the lower end of the casing 82. Said cylinder is open at its ends and is in communication at its upper end with the interior of the casing. Reciprocating in 20 said cylinder is an elongated piston 86 which is connected by a link 87 with the operating arm 83 of the valve, said arm being provided with a lug 88 with which the link is pivotally connected. 90 designates a spiral 25 contractile spring which is attached at its upper end to the lower side of the piston and extends through the lower open end of the cylinder and is attached at its lower end to a pin 91 fixed to and extending laterally 30 from said fitting. The cylinder is formed at its upper and lower ends to provide annular spaces to receive packing rings 93, 94, respectively, adapted for engagement with the piston when at the upper and lower 35 limits of its movement to prevent the leakage of air past said piston to the system when the piston occupies either of its extreme positions. The operation of this feature of my apparatus is as follows: The lower side 40 of the piston 86 is continuously subjected to atmospheric pressure, and normally the upper side of the piston 86 is subjected to the lower working pressure of the system. Thus, under normal conditions, said piston 45 is held in its upper position, as shown in Fig. 3, against the tension of the spring 90 by the superior atmospheric pressure below, and when in this position operates to hold the valve 76 in its open position, or in a 50 position which will permit a cartridge to pass freely through the fitting. When, however, the delivery gate is opened to deliver a cartridge, air at atmospheric pressure is admitted to the delivery terminal and 55 to the casing 82, whereby the pressure on the opposite sides of the piston 86 is equalized. Upon the equalization of the pressure on opposite sides of the piston, the spring 90 operates to move the piston to its lowermost 60 position and acts, together with atmospheric pressure on the lower side of the valve to swing the valve to its closed position, as indicated in Fig. 2. In this position of the

valve it will be observed that the free passage of air into the system through the 65 branch with which said terminal is connected is cut off so long as the delivery gate 44 is open, thus avoiding the loss of pressure which would occur if such valve were not present. As soon as the gate 44 is closed, 70 however, the lower or working pressure of the system is reestablished on the upper side of the piston, and said piston is raised by the superior pressure on the under side thereof into a position to open the valve, as shown 75 in Fig. 3. It will be observed that when the valve is in its open position, as shown in said Fig. 3, there is presented an unobstructed thoroughfare for the passage of the 80 cartridge through the terminal, thus effecting a noiseless delivery of the cartridge to the delivery end of the terminal, and avoiding impact of the cartridge against a back pressure or automatically closing valve such as have been employed at this point. 85

While I have described the several features of my invention embodied in the complete system herein illustrated with considerable particularity, it is to be understood that the invention in its several phases is 90 not limited to this construction or embodiment, except as hereinafter specifically claimed. The system as a whole constitutes a complete working system so far as is necessary to disclose the subject matter of the invention herein claimed, but it will be understood that the various features of the invention are susceptible of use in other relations 95 so long as the essential laws of their structure and operation are observed. 100

I claim as my invention:

1. In a pneumatic despatch tube system, a despatch tube and its branches, the tube being provided with a sending terminal and provided at its sides with longitudinal, internal guides, arranged in pairs, with the 105 guides of each pair located at opposite sides of the tube, said guides originating at the sending terminal, and each pair of guides extending continuously from said sending terminal into one of said branches. 110

2. In a pneumatic despatch tube system, a despatch tube and its branches, the tube being provided with a sending terminal and provided at its sides with longitudinal, internal guides, arranged in pairs, with the 115 guides of each pair located at opposite sides of the tube, said guides originating at the sending terminal, and each pair of guides extending continuously from said sending terminal into one of said branches, said guides being directed from the tube to the branches in a simple curve and occupying the walls in the branches corresponding to the walls occupied thereby in the tube. 120 125

3. In a pneumatic despatch tube system,

the combination with a despatch tube provided with a sending terminal and with delivery terminals, and provided at its opposite side with longitudinal, internal guides originating at said sending terminal and extending continuously therefrom to the delivery terminals, said guides being arranged in pairs with the ends of each pair arranged vertically one over the other at said sending terminal, of a carrier provided at its opposite sides with lateral guides adapted for guiding engagement with the guides in the tube.

4. In a pneumatic despatch tube system, the combination with a despatch tube provided with a sending terminal and with delivery terminals, and provided in two opposite walls with internal guide grooves originating at said sending terminal and extending continuously therefrom to the delivery terminals, said grooves being arranged in pairs with the grooves of each pair located in opposite walls of the tube and the open ends of the grooves of said terminal bearing the same relation to each other as they do in the body of the tube.

5. In a pneumatic despatch tube system, a despatch tube and its branches made of rectangular cross section and provided with a sending terminal, the tube being provided in its vertical walls with a plurality of internal, vertically separated guide grooves, the grooves of the two opposing walls being arranged in pairs, said grooves originating at said sending terminals and extending continuously therefrom to the branches, and each pair of grooves extending into one of said branches and occupying the side walls thereof.

6. In a pneumatic despatch tube system, a despatch tube and its branches made of rectangular cross section and provided with a sending terminal, said tube being provided in opposite walls with a plurality of longitudinal internal guide grooves arranged in pairs, one pair of which guide grooves extend into each branch, and each pair of grooves extending continuously from its branch to the sending terminal, said tube being made of longitudinal parts jointed at their margins.

7. In a pneumatic despatch tube system the combination with a cashier's trunk line provided with a sending terminal and with a plurality of normally sealed delivery terminals, a salesman's trunk line provided with normally sealed sending terminals adjacent to the delivery terminals of the cashier's trunk line and with a delivery terminal adjacent to the sending terminal of the cashier's trunk line, the salesman's trunk line being connected by a passage at one end of the system with the cashier's trunk line and

communicating at the other end of the system with a vacuum pipe, said cashier's trunk line being provided with guide grooves which originate at and extend continuously from the sending terminal thereof to the delivery terminals of said sending line, and arranged to receive cartridge guide lugs to guide the cartridges through said trunk line to the several receiving terminals thereof, and the salesman's trunk line being enlarged at its sides to provide longitudinal lateral passages of a width to receive all of said guide lugs of the cartridges.

8. In a despatch tube system, a vertically arranged despatch tube having an opening at one side thereof to permit a cartridge to pass therethrough and a vertically swinging gate hinged at one end thereof laterally at the side of the tube for closing said opening and provided at its lower end with a laterally directed portion which, when the gate is closed, extends into the tube and substantially fills the same, said lateral portion being arranged to form a seat for a cartridge.

9. In a pneumatic despatch tube system, the combination with a despatch tube and its vertically arranged delivery terminal, the latter being provided with a lateral opening, through which cartridges are removed therefrom, of a vertically swinging gate for closing said opening provided at its lower end with an inwardly and laterally directed imperforate portion substantially filling the terminal when the gate is closed and arranged to constitute a seat to receive a cartridge.

10. In a pneumatic despatch tube system, the combination with a despatch tube and its delivery terminal provided with a lateral opening, of a hinged delivery gate arranged to close said opening, said gate being provided at its hinged end with a part extending across the bore of the terminal when the gate is closed in position to receive a cartridge said part being arranged to prevent the inrush of air to the terminal about the cartridge when the gate is first opened.

11. In a pneumatic despatch tube system, the combination with a despatch tube and its delivery terminal having a vertical lower end of rectangular cross section and provided on one of its vertical walls with an opening, of a gate hinged outside said opening, comprising a part which extends across and closes the opening and side flanges which extend into said opening and engage the inner faces of the side walls of the terminal, said gate being provided at its lower end with an upwardly facing cartridge receiving seat substantially filling the lower end of the terminal.

12. In a pneumatic despatch tube system, the combination with a despatch tube and

its branch through which cartridges are delivered therefrom, of a delivery terminal having a normally open thoroughfare and provided with an opening closed by a gate, and a pneumatically operated valve between said tube and gate controlled by the opening and closing of said gate arranged to close said tube when the gate is open to deliver a cartridge and to open the tube when the gate is closed.

13. In a pneumatic despatch tube system, the combination with a despatch tube and its branch through which cartridges are delivered therefrom, of a terminal constituting a continuation of said branch and provided with an opening closed by a gate, a valve located between said gate and tube for closing said terminal, a cylinder and a pneumatically operated piston in the cylinder arranged to close said valve when said gate is opened and to permit the valve to be opened when the gate is closed.

14. In a pneumatic despatch tube system, the combination with a despatch tube and its branch through which cartridges are delivered therefrom, of a delivery terminal provided at its end with an opening closed by a gate, a hinged valve located between the gate and tube for closing said terminal when the gate is opened, a chamber at one

side of said terminal in open communication with the interior thereof, a cylinder open at its lower end to the atmosphere and open at its upper end to the interior of said chamber, and a piston in said cylinder operatively connected with said valve.

15. In a pneumatic despatch tube system, the combination with a despatch tube and its branch through which cartridges are delivered therefrom, of a delivery terminal provided at its end with an opening closed by a gate, a hinged valve located between the gate and tube for closing said terminal when the gate is opened, a chamber at one side of said terminal in open communication with the interior thereof, a cylinder open at its lower end to the atmosphere and open at its upper end to the interior of said chamber, a piston in said cylinder operatively connected with said valve, and a spring applied to said piston and acting thereon to close said valve.

In testimony that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 25th day of July A. D. 1908.

FRANKLIN H. WOLEVER.

Witnesses:

W. L. HALL,

T. H. ALFREDS.