

(No Model.)

2 Sheets—Sheet 1.

R. J. P. GOODWIN.

## PNEUMATIC DISPATCH AND SPEAKING TUBE SYSTEM.

No. 322,178.

Patented July 14, 1885.

Fig. 4.

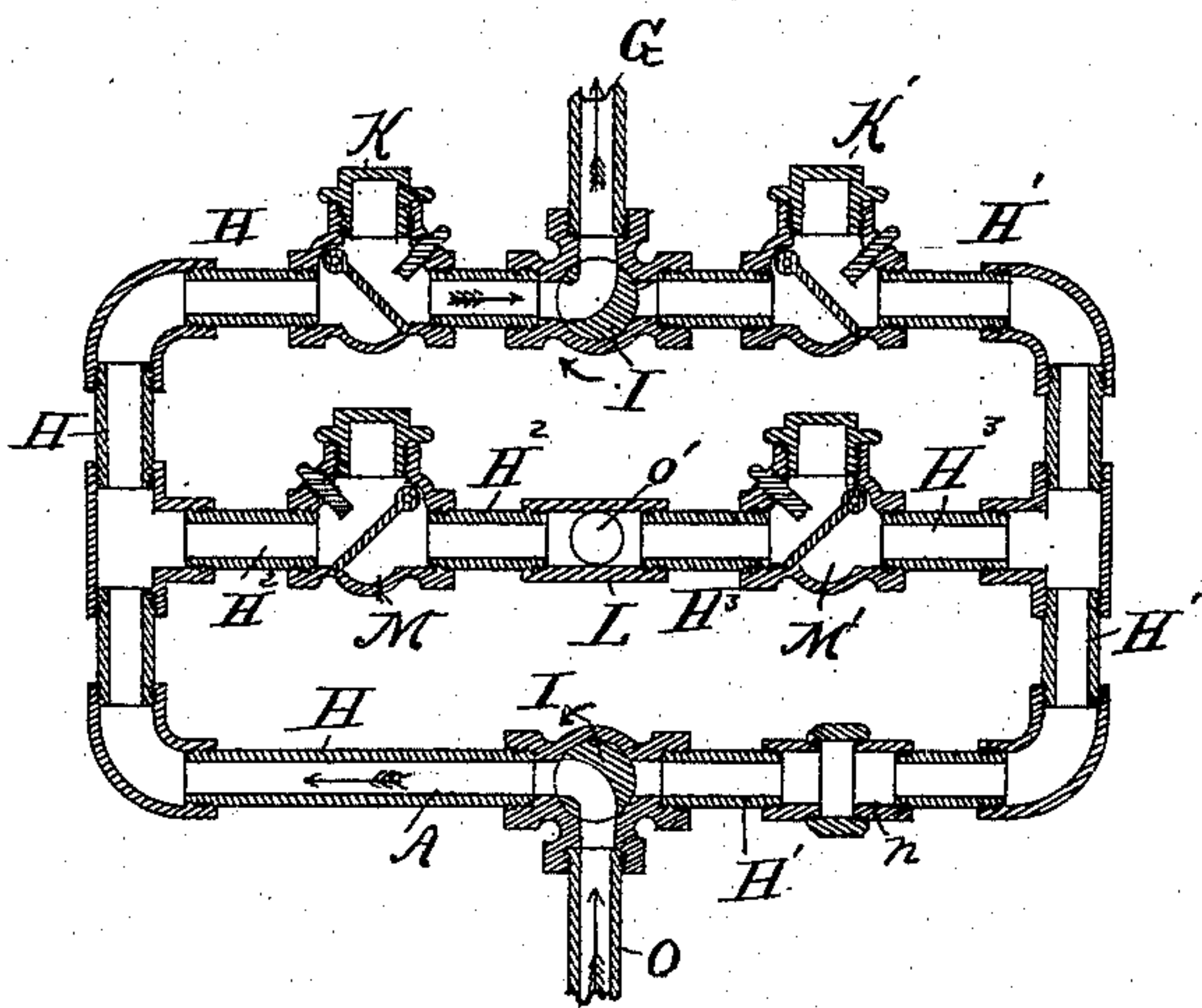
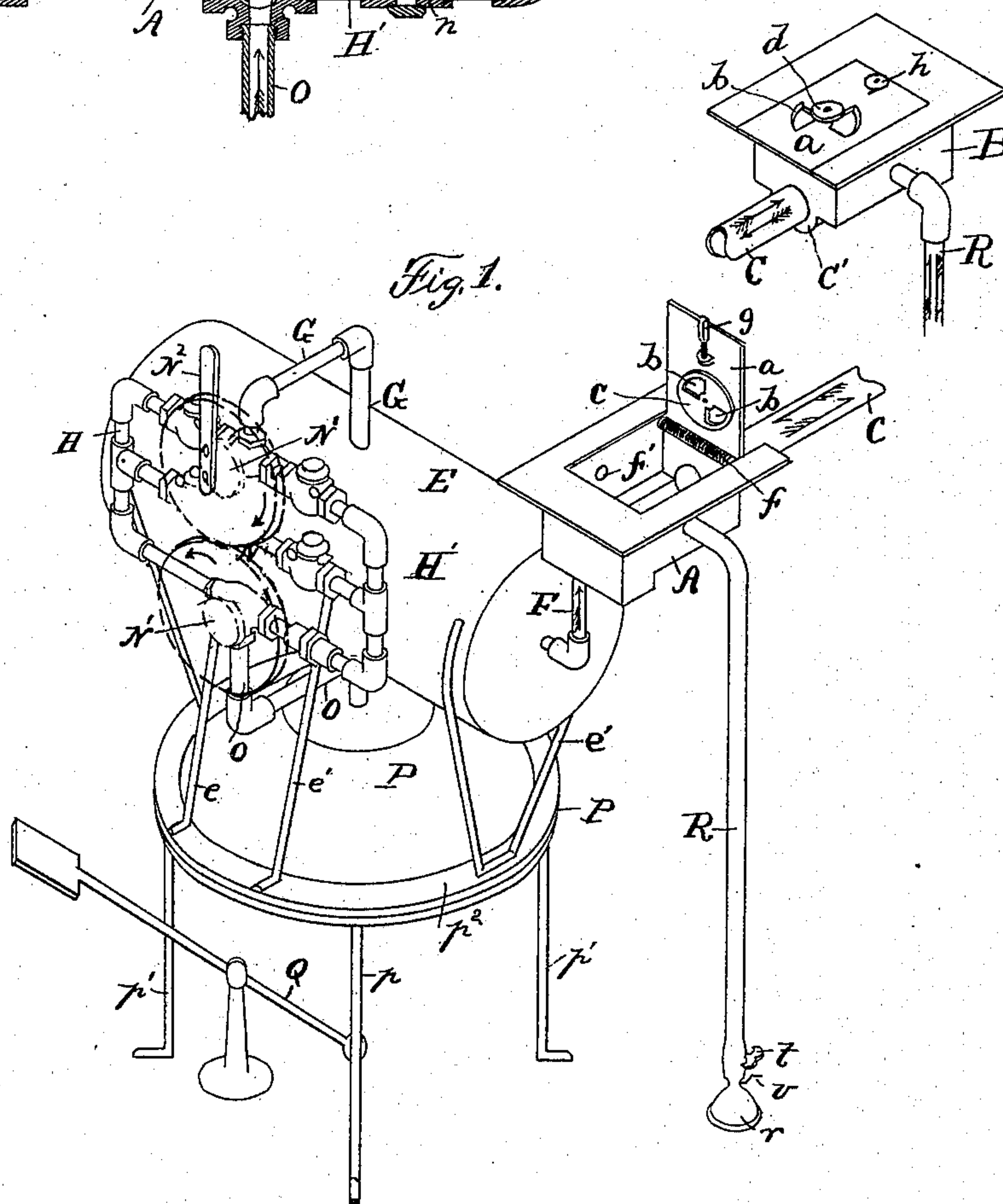


Fig. 1.



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(No Model.)

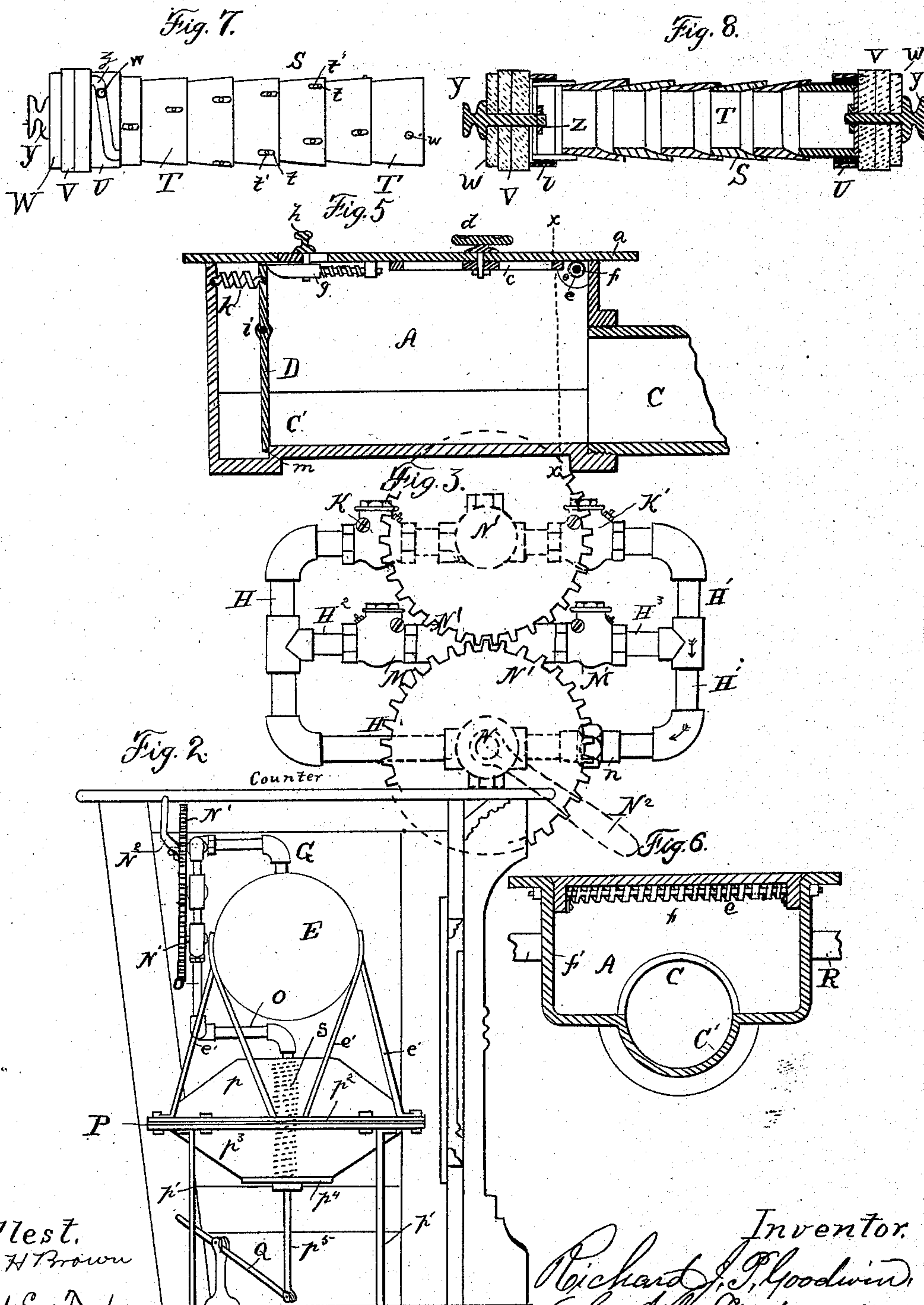
2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

RICHARD J. P. GOODWIN, OF MANCHESTER, NEW HAMPSHIRE.

## PNEUMATIC DISPATCH AND SPEAKING TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 322,178, dated July 14, 1885.

Application filed September 4, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD J. P. GOODWIN, a citizen of the United States, residing at Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Pneumatic Store-Service Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The object of this invention is to furnish a ready and rapid means of communication by speech and conveyance between the cashier and salesmen in dry-goods and other stores where it has heretofore been customary to employ cash-boys or messengers in order to facilitate the transaction of business.

My invention consists in certain peculiarities in the construction and combination of the parts of a pneumatic cash and parcel transmitting apparatus and its accessories, as hereinafter more fully set forth.

In the annexed drawings, illustrating the invention, Figure 1 is a perspective view of my improved apparatus for transmitting parcels and cash-carriers by pneumatic pressure or exhaust, the apparatus being provided with speaking-tube attachments. Fig. 2 is an end elevation of the apparatus in position beneath a store-counter. Fig. 3 is a front view of a quadrilateral system of valved pipes placed between the air-pump and reservoir for controlling the circulation of air. Fig. 4 is a vertical longitudinal section of the same. Fig. 5 is a longitudinal section of one of the receiving and transmitting boxes. Fig. 6 is a transverse section of the same on the line *x x* of Fig. 5. Fig. 7 is a side view of the cash or parcel carrier, and Fig. 8 is a longitudinal section of the same.

Like letters of reference are used to indicate like parts in the several views.

A designates an air-tight receiving and transmitting box that is located at the salesman's station, and B is a similar box located at the cashier's desk. These boxes are connected by a pneumatic tube, C, in which the parcel

or cash carrier is made to travel from one box to the other and back, as desired.

It will be understood that a box, as A, is provided for each salesman employed in operating the system, and that the cashier's desk or station is furnished with a corresponding number of similar boxes. The salesman's box is preferably arranged immediately beneath a rectangular opening cut in the top of the counter, with which the lid of the box may be flush, or the box may project slightly above the counter. The boxes at the cashier's station may be arranged in a similar or other convenient manner, and are preferably disposed in a circle or semicircle around the cashier, so that all will be under his supervision with equal facility and convenience. The boxes A B are each provided with a lid, *a*, in which is formed an opening or openings, *b b*, closed by a rotary valve, *c*, by means of a turn-button, *d*, on the outer side of the lid. This lid is hinged near one end upon a transverse rod, *e*, about which is wound a spiral spring, *f*, one end of which bears against the under side of the lid, so as to cause it to fly open when the lid is unfastened. The lid when closed is secured by a spring bolt or catch, *g*, on its inner side that communicates through a slot with a knob or draw-button, *h*, by which the bolt can be drawn, so as to afford access to the interior of the box.

In one end of each receiving and transmitting box A or B is a vertical metallic buffer-plate or partition, D, that extends across the box and is journaled at or near its upper third on horizontal pivots *i*. The upper part of this partition, on its inner side, is in contact with the end of the spring-bolt *g*, while between its opposite side and the end of the box is interposed a spiral spring, *k*, the contractile force of which serves to hold the lower end of the partition in close contact with a ledge, *m*, that is formed in the bottom of the box at one end of a concave trough or guideway, C', that communicates with the entrance of the pneumatic tube. When the cash or parcel carrier enters the box A or B forcibly from the pneumatic tube, it traverses the trough C' and impinges against the lower end of the pivoted partition D, the upper end of which is thus forced inward against the spring-bolt



g, thereby unfastening the lid *a* and causing it to fly open under the action of its spring-hinge. The arrival of the carrier at its destination is thus announced. As the lid *a* flies open the spring *k* returns the partition *D* to its normal position. The hinged end of the lid *a* may be made to project slightly beyond the box, so as to turn down into a recess or space at the back or one end thereof when opened, the lid being thus braced or held in a vertical position until again closed.

The box *A* at each salesman's station or counter communicates with an air-reservoir, *E*, through a pipe or tube, *F*, that enters the side of the box. This air chamber or reservoir is conveniently located beneath the counter, and may be made of metal in a cylindrical or other suitable form to correspond with the space afforded by the situation in which it is placed. At its upper part the reservoir *E* communicates through a pipe, *G*, with a quadrilateral system of valved pipes, *H H'*, in which the circulation of air is controlled both for propelling the carrier forward to the box *B* by compressed air and for withdrawing or returning it to the box *A* by means of an exhaust.

The construction of the quadrilateral circulation and the arrangement of its valves are clearly shown in Fig. 4, in which *I I* indicate the three-way cocks or valves, one of which is placed at the top and the other at the lower part of the system. A check-valve, *K*, is placed on one side of the upper three-way cock *I*, and a check-valve, *K'*, on the other side, the flap of the valve *K* being arranged to open toward the three-way cock, while the flap of the valve *K'* opens away from said cock.

The ends of the quadrilateral *H H'* are connected centrally by a pipe formed of short tubes *H<sup>2</sup> H<sup>3</sup>*, that are united centrally by a union or coupling, *L*, on either side of which is a check-valve, *M* and *M'*, the flaps of which open in a direction opposite to those of the valves *K K'*, beneath which they are placed. It will be seen that this quadrilateral system of pipes is composed of a number of short tubes connected by *T*'s, bends, and valve-casings in a well-known manner, the connection of the parts being completed and facilitated by the employment of a union or right-and-left-hand-screw coupling, *n*, at the lower part of the quadrilateral, on one side.

The three-way cocks or valves *I I* are simultaneously actuated by means of intermeshing gears *N N'*, one of which is provided with a crank-handle, wrench, or lever, *N<sup>2</sup>*, by which the gears and connected cocks can be operated. The pipes *H, H', H<sup>2</sup>, and H<sup>3</sup>*, composing the quadrilateral, communicate with the atmosphere through an opening, *o'*, in the back of the union or box coupling *L*. They also communicate through a bent pipe, *O*, with an air-pump, *P*, which is preferably of the class known as "diaphragm-pumps." This diaphragm air-pump is placed beneath the coun-

ter, as shown in Fig. 2. The upper part of the pump consists of a flanged metallic dome, *p*, that is supported on legs or standards *p' p'*, the flange *p<sup>2</sup>* affording an attachment for the stays *e' e'* by which the air-chamber or reservoir *E* is supported. The lower part of the pump consists of a collapsible diaphragm or bag, *p<sup>3</sup>*, composed of leather, rubber cloth, or other similar material, said diaphragm being connected to the flanges *p<sup>2</sup>*, and provided at the bottom with a metallic disk or plate, *p<sup>4</sup>*, to the under side of which is attached a depending rod, *p<sup>5</sup>*. This rod is hinged or jointed at its lower end to a foot-treadle, *Q*, that is fulcrumed in a suitable stand; or, instead of the treadle, a hand-lever may be provided for operating the pump.

In order to assist the weighted disk *p<sup>4</sup>* in expanding the pump-chamber during the act of suction, a spring, *s*, may be arranged in said chamber between the disk and the top of the dome. This spring may, however, be dispensed with, as the weight of the diaphragm *p<sup>3</sup>* and attached disk *p<sup>4</sup>* is ordinarily sufficient to expand the internal area of the pump-chamber.

Each receiving and transmitting box *A B* is provided with a flexible speaking tube, *R*, in length about twenty-four inches, (more or less,) one end of the tube being made to communicate with the box or receiver at the side opposite to the inlet *f'* of the pipe *F*; that connects with the air-reservoir. The free end of this speaking-tube is provided with a mouth-piece, *r*, a stop-cock, *t*, and a whistle that is controlled by a crank, *v*, in the usual manner. These speaking-tubes are used for conveying verbal messages between the cashier and salesmen, the whistles serving as signals to attract attention, as hereinafter explained.

The carriers *S*, which are used for the conveyance of money or small parcels, have a cylindrical form corresponding with that of the pneumatic tubes *C* through which they are passed, and are preferably made flexible, so as to facilitate their passage around curves or bends in said tubes.

Figs. 7 and 8 represent a flexible carrier composed of a number of tapering rings, *T T*, constructed of thin sheet metal. Near the edge of each ring, at its larger end or side, are cut three slots, *t t*, equidistant from each other, and the smaller or tapering end of each ring is provided with three headed pins or studs *t' t'*, that correspond in position with the slots of its fellow ring, to which it is by this means adjustably connected in such a manner as to impart the requisite flexibility to the tube by permitting a slight rotation of the rings upon each other. The end rings of the tube are made of somewhat thicker stock and have a screw-thread cut on their outer surface, to which the internally-threaded cap or cover *U* is fitted, as shown in Fig. 8; or, instead of a screw-thread, the parts may be connected by a boss, *w*, on the collar or end ring, as shown in Fig. 7, for engaging an inclined



slot, *z*, in the cap. The metallic caps or covers U U are provided with washers V, of felt, leather, or other soft material. These washers are cut with a diameter slightly larger than that of the cap, so as to completely fill the pneumatic tube and serve as a packing to prevent the passage of air past the carrier during its passage through the tube. The washers V are secured to the outer side or head of the cap U by means of a metallic disk, W, and a knob-screw, Y, the shank of the knob-screw passing through the disk, washers, and cap, and being secured on the inner side of the cap by a nut, Z, as shown in Fig. 8. It will thus be seen that should the washers at any time become worn they can be readily removed and new ones substituted. The washers being made of a soft yielding substance and larger in diameter than the body of the carrier, causes the latter to be suspended, as it were, in the pneumatic tube, and thus obviates a large amount of friction that would otherwise be encountered. The carrier, being flexible, is enabled to turn readily in the curves of the pneumatic tube. These carriers may be of any convenient length, from three or four inches upward, according to the bulk of the intended contents. In diameter they are preferably about one and three-fourths of an inch.

It will be observed that the solidity of the knob Y at each end of the carrier enables it to strike forcibly against the buffer-plate in the receiving-box, and so renders the action of the plate against the spring-bolt certain and effective. As each end of the carrier is provided with a detachable cap having such knob, it is immaterial which end is propelled foremost. In case the carrier should accidentally stick in the pneumatic tube, it may be readily released by means of a wire carrying a clutch for engaging the knob.

The pneumatic tubes for conveying the carriers are preferably what are known as "seamless" brass tubes, and have a diameter of about two inches. These pneumatic tubes may be concealed beneath the counters or the flooring in any convenient manner, so as to avoid using space that is more available for other purposes.

The cashier's desk, to which the various pneumatic tubes extend, may be located in any part of the store or building; but the receiving and transmitting boxes located thereon are preferably arranged in such a manner that each one will be within easy reach at all times, one receiving and transmitting box being required at the cashier's desk for each and every salesman who acts as an operator of this system.

Whenever a salesman desires to make change, he opens his receiving and transmitting box A by drawing back the knob *h* of the bolt *g*. He then removes the carrier S, which is lying at rest in the box, unfastens the cap U, places the money in the carrier, closes it, and on returning it to the box A pushes it (the carrier) forward into the pneu-

matic tube. He then shuts down the lid of the box A and sees that the valve *c* is also closed, so that the box will be air-tight. He then examines the position of the wrench or lever N<sup>2</sup>, which indicates whether the three-way cocks I I are so turned as to permit the passage of compressed air from the pump to the transmitting-box. If the wrench or lever N<sup>2</sup> is in a vertical or other predetermined position indicating a clear passage-way through the pipes H, the salesman may operate the pump at once. If not already so placed, he turns the lever N<sup>2</sup> vertically, thereby simultaneously actuating the gears N' N' and bringing the three-way cocks I I into the position shown in Fig. 4 for the passage of compressed air. He then proceeds to operate the air-pump P by means of the foot-treadle Q or a hand-lever, as the case may be. Compressed air is thus driven through the pipes O H, past the check-valve K, and through the pipe G into the reservoir or accumulator E, whence it passes through the pipe F into the air-tight box A, and, impinging against the end of the carrier S, drives it forward through the pneumatic connecting or transmitting tube C and into the receiving-box B at the cashier's desk. The carrier enters this box rapidly and with considerable force, its under side traversing the groove or trough C' till its forward end strikes against the lower end of the pivoted buffer-plate or partition D, and causes the upper end thereof to force back the spring-bolt *g*, thereby enabling the spring *f* to act upon and automatically open the lid of the box B, and so attract the attention of the cashier. It will be understood that during this operation the valve *c* remains open in the lid of the cashier's box B, so that the air normally contained in the tube C can escape in advance of the carrier. After the cashier has removed the carrier and replaced it in the box B with the proper change inclosed he shuts down the lid *a* and signals to the salesman that his change is ready. This signal may be made by any convenient means or in any well-known or suitable manner; but I prefer to use the flexible tubes R, that are connected with the receiving and transmitting boxes, as before described. By blowing through his tube the cashier will be enabled to operate the whistle in the corresponding tube at the station of the salesman, and so attract his attention. This signal being understood by the salesman, he immediately reverses the position of the three-way cocks I I, so as to open communication through the exhaust side H' of the quadrilateral circulation in which said valves are placed. He then proceeds to operate the air-pump P as before, which now rapidly exhausts the air contained within the pneumatic tubes, box A, and reservoir E, and so draws the carrier back from the box B to box A at the salesman's counter, the forcible entry of the carrier into this box automatically raising its lid, as before described. Having removed the change and handed it to the customer, the carrier is



replaced in the box A, which is then closed till its use is again required.

It will be seen that when a volume of compressed air is forced from the pump it passes upward through the pipe O, and the three-way cocks being properly turned, as shown in Fig. 4, its course is directed to the left and upward through the pipe H to the check-valve K, which opens outward toward the pipe G, and so permits the current of compressed air to pass into the reservoir E, and thence into the box A and the pneumatic tube beyond, as already described. As soon as the diaphragm of the pump descends under the action of the treadle or hand-lever, assisted by the springs and weighted disk  $p^1$ , the check-valve M opens under the pressure of atmospheric air, which enters through the union L and passes on to the pump for the purpose of filling it again. When the three-way cocks I I are reversed, the action of the pump in its expansion exhausts the air in the boxes A B, reservoir E, and connecting-tubes. The current of exhaust-air passes from the reservoir E through the pipes G and H', the flap of the valve K' rising to permit its passage. When the treadle or hand-lever throws the diaphragm  $p^3$  upward, the air contained in the pump and in the right-hand side, H', of the quadrilateral is forced past the check-valve M', and makes its exit through the union L into the atmosphere. By the action of the pump P the air-contents of the reservoir E, boxes A B, and pneumatic tubes can thus be compressed or exhausted with facility according to the direction in which the three-way cocks are turned. The cash or parcel carrier is thus propelled at pleasure, either by compressed air or by producing a vacuum in its path.

Should the cashier at any time desire to converse with a salesman, or vice versa, he closes the valve  $c$  in the cover of the receiving and transmitting box, so as to render it airtight. He then blows through the mouth-piece of his speaking-tube, and thereby operates the whistle of the speaking-tube connected with the box at the other end of that circuit. The attention of the salesman or the cashier, as the case may be, being thus arrested, the parties proceed to converse through their respective speaking-tubes, placing the same alternately to the mouth and the ear, as required. If necessary, a code of signals might be adopted, by which the cashier would readily comprehend which of the several salesmen was soliciting his attention.

An obvious advantage resulting from the combination of a speaking-tube and pneumatic transmitting apparatus resides in the fact that by this means direct communication can be had in large establishments between the cashier or superintendent and the various employés, as well as indirectly between the latter. In a dry-goods store, for instance, a lady while purchasing at one department may desire to obtain some article embraced in a dif-

ferent and perhaps distant department of the establishment. Without undergoing the fatigue of ascending several flights of stairs or walking the length of the store-room she may communicate her wishes to the attending salesman, who then notifies the cashier or superintendent through the medium of the speaking-tubes R R, as already described. The cashier communicates in the same manner with the proper department, and has the desired article, if not of too great bulk, sent to him through the pneumatic tubes, and he in turn transmits it in the same way to the salesman, thus speedily accommodating the customer and retaining trade that otherwise might have gone elsewhere.

By making the pneumatic tubes and the carriers of sufficient length and diameter it is obvious that small parcels as well as cash can thus be readily transported about the building with great dispatch and without the many vexations, annoyances, and delays that frequently result from the employment of messengers.

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

1. In a pneumatic store-service apparatus, a quadrilateral system of pipes communicating with the atmosphere and provided with check-valves and three-way cocks, whereby it is adapted to control the circulation between a pneumatic tube and an air-pump, substantially as described.

2. In a pneumatic store-service apparatus, a receiving and transmitting box communicating with a pneumatic tube and provided with a pivoted partition or buffer-plate, and a lid having a spring-hinge and a spring bolt or fastening, said bolt being arranged on the inner side of the lid in position to be unfastened by the impact of a cash or parcel carrier against the pivoted partition or buffer-plate, substantially as described.

3. In a pneumatic store-service apparatus, a receiving and transmitting box, as A or B, having a lid provided with valve  $c$ , substantially as described.

4. In a pneumatic store-service apparatus, the receiving and transmitting box A or B, provided at the bottom with a groove or trough, C', that is continuous with a pneumatic tube, a partition or buffer-plate, D, pivoted in the end of the box opposite to its connection with the pneumatic tube and at the end of said trough, and a lid,  $a$ , having a spring-hinge and a spring bolt or fastening on its inner side in contact with the buffer-plate, substantially as described.

5. In a pneumatic store-service apparatus, a receiving and transmitting box having an outward-opening spring-hinged lid, in combination with devices for automatically opening said lid by the entrance into the box of a carrier, and means for holding said lid in an erect position till closed by the operator, substantially as described.

6. In a pneumatic store-service apparatus,



the combination, with air-tight receiving and transmitting boxes located at the cashier's desk and salesman's station, respectively, and a pneumatic tube for connecting said boxes, 5 of a speaking-tube attached to each box and provided with a mouth-piece, a cock, and a whistle, substantially as described.

7. In a pneumatic store-service apparatus, the combination, with receiving and transmitting boxes located at the cashier's desk and salesman's station, respectively, and connected by a pneumatic tube, of an air-reservoir, an air-pump, and means, as specified, for controlling a circulation of air, whereby a cash 10 or parcel carrier may be propelled in one direction by a current of compressed air and returned in the opposite direction by means of an exhaust, substantially as described.

8. In a pneumatic store-service apparatus, 20 the reservoir or accumulator E, connected to a transmitting-box by means of a pipe, F, in combination with an air-pump and a system of valved pipes for inducing and controlling a current of compressed or exhaust air, as required, substantially as described.

9. In a pneumatic store-service apparatus, a quadrilateral system of pipes, H H' H<sup>2</sup> H<sup>3</sup>, connected by T's and bends and provided with a box-coupling, L, that communicates with the atmosphere, three-way cocks I I, and 30 check-valves K K' M M', substantially as and for the purpose described.

10. In a pneumatic store-service apparatus, the combination of the boxes A B, pneumatic tube C, pipe F, reservoir E, quadrilateral 35 valved circulation H H', pipes G O, and diaphragm-pump P, substantially as and for the purpose described.

11. In a pneumatic store-service apparatus, a cash or parcel carrier composed of tapering 40 rings T T, having a flexible connection, said carrier being provided at each end with a detachable cap, U, having washers V, substantially as and for the purpose described.

In testimony whereof I affix my signature in 45 presence of two witnesses.

RICHARD J. P. GOODWIN.

Witnesses:

ALBERT O. BROWN,  
EDWIN F. JONES.