(No Model.) 4 Sheets—Sheet 1.

H. CLAY.

PNEUMATIC DISPATCH TUBE.

No. 307,437. Patented Nov. 4, 1884.

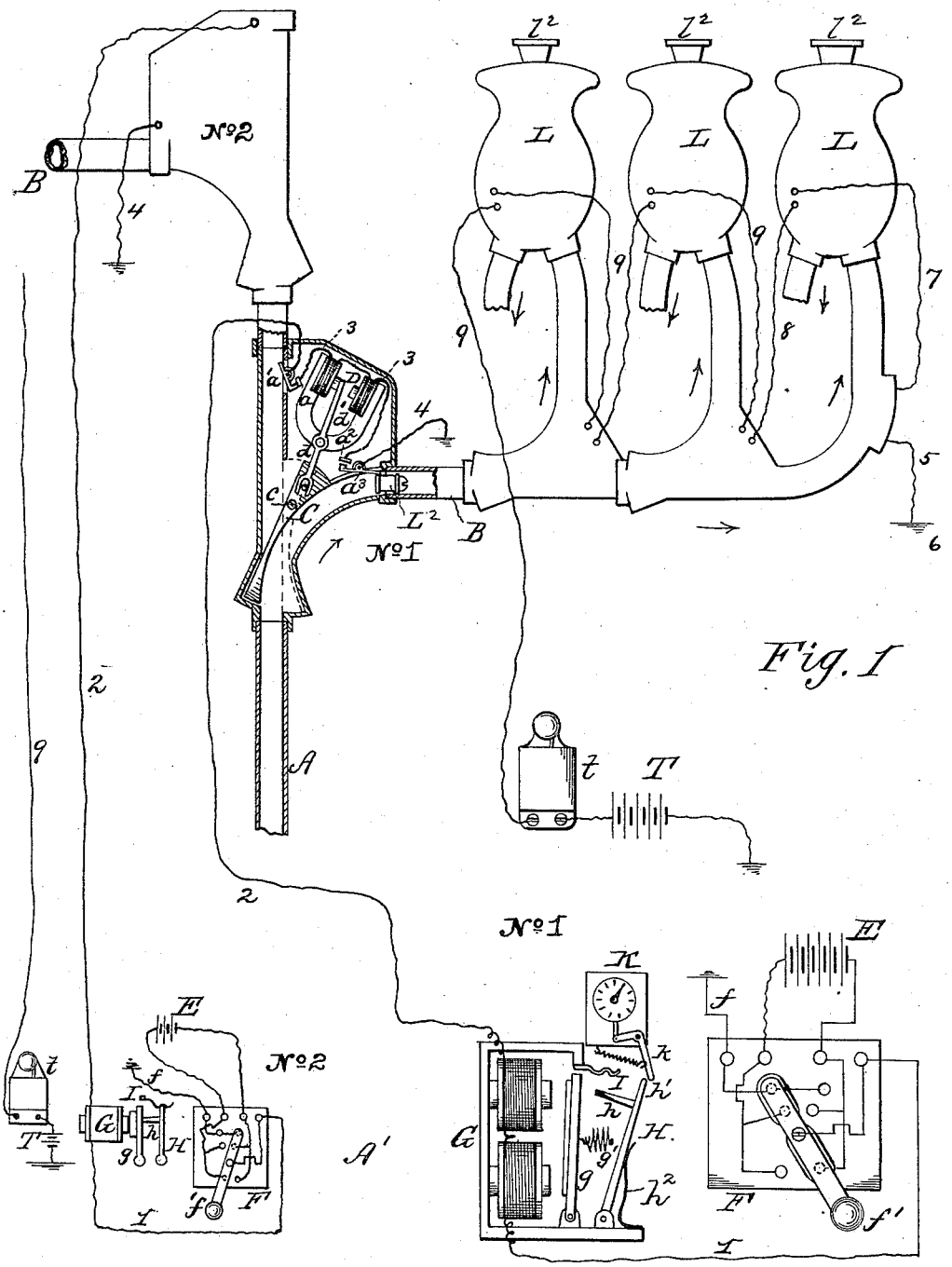

Fig. 1

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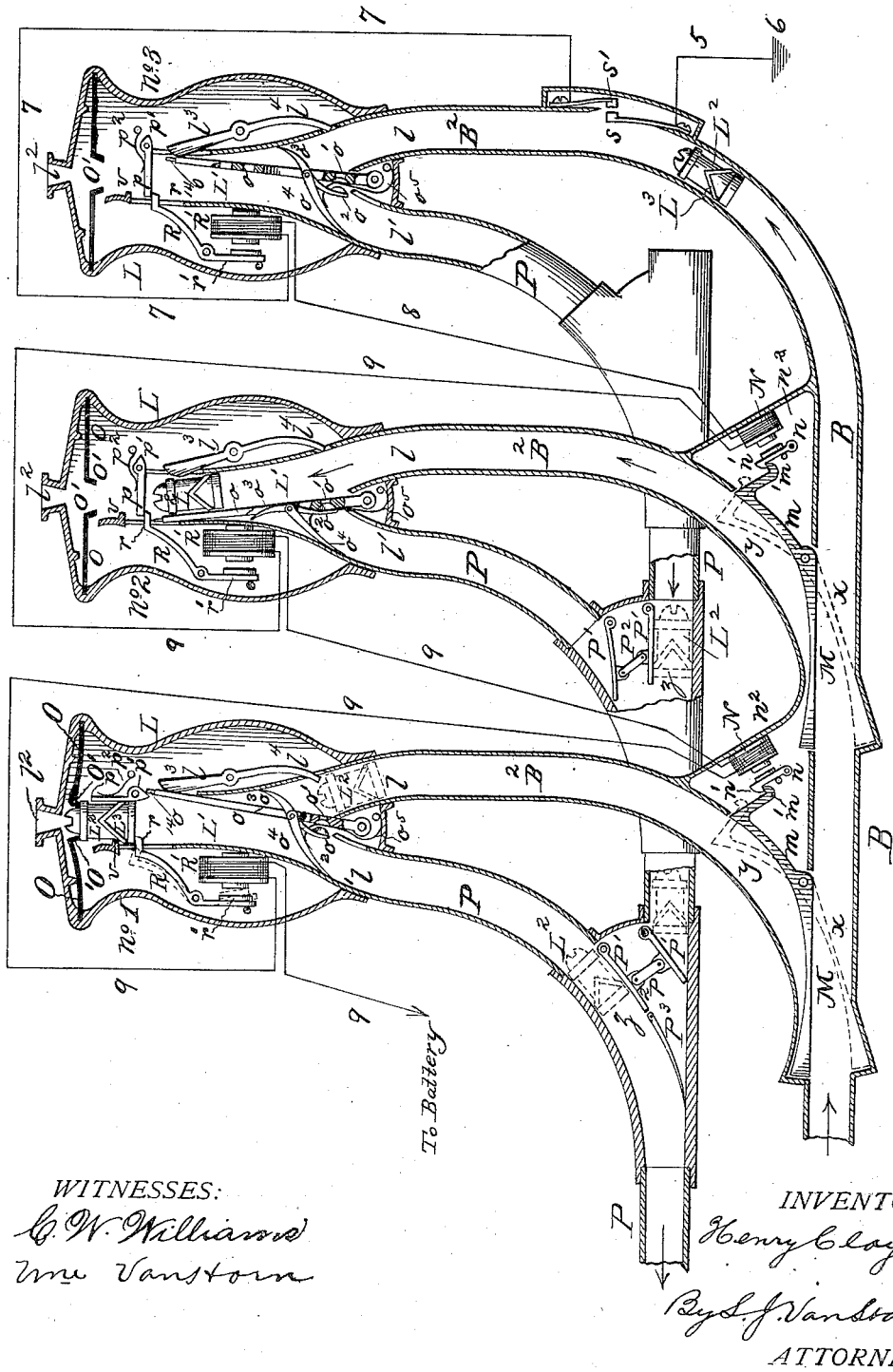

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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PNEUMATIC DISPATCH TUBE.

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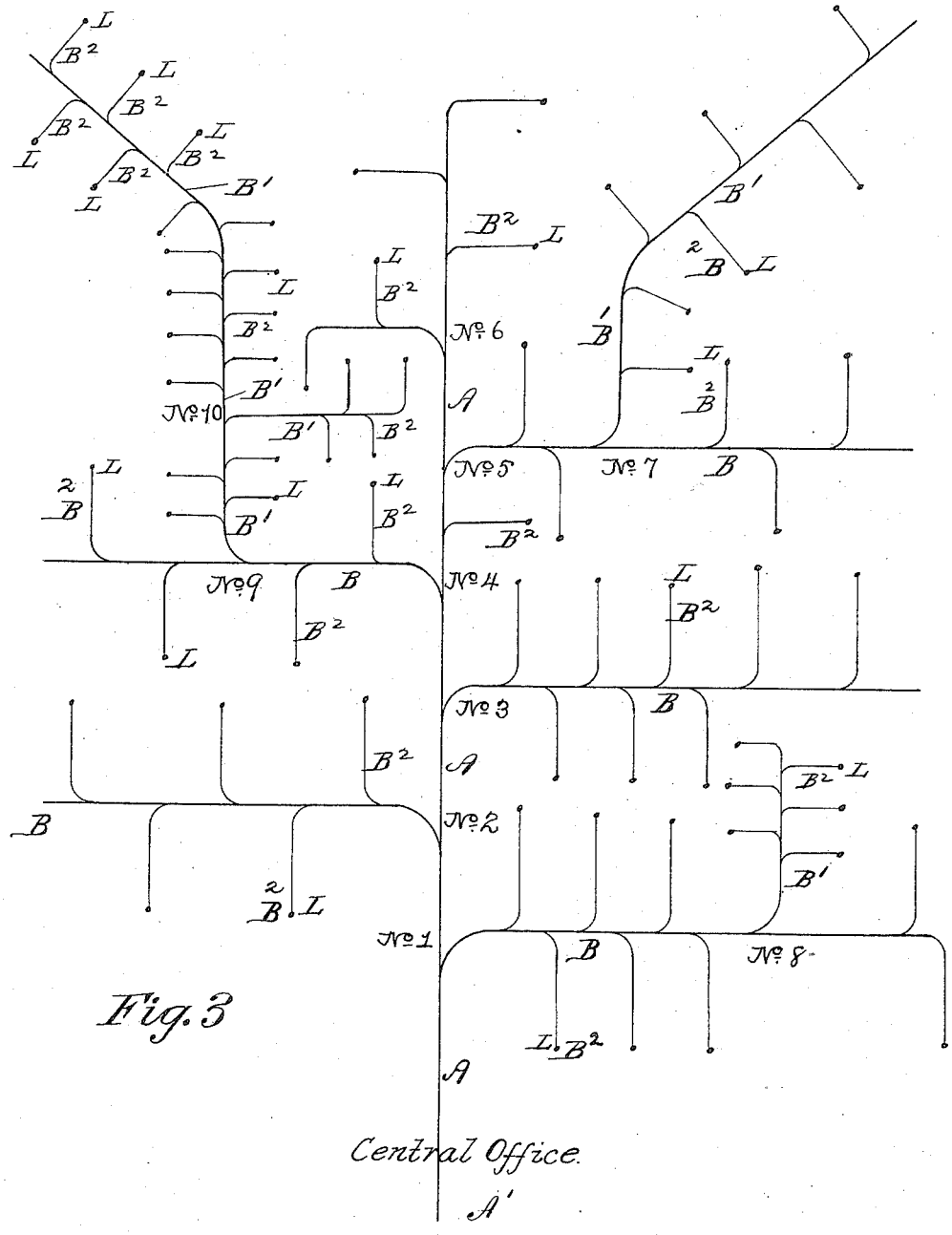

Fig. 3

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(No Model.) 4 Sheets—Sheet 4.

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Fig. 4

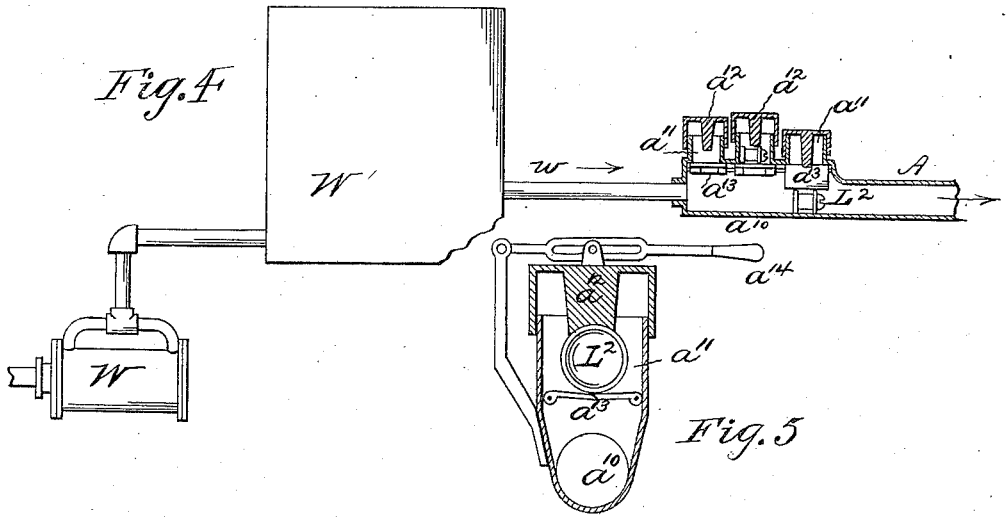


Fig. 5

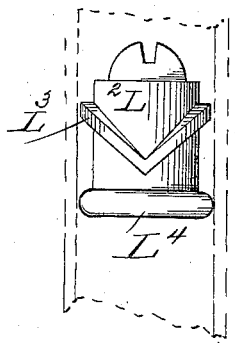
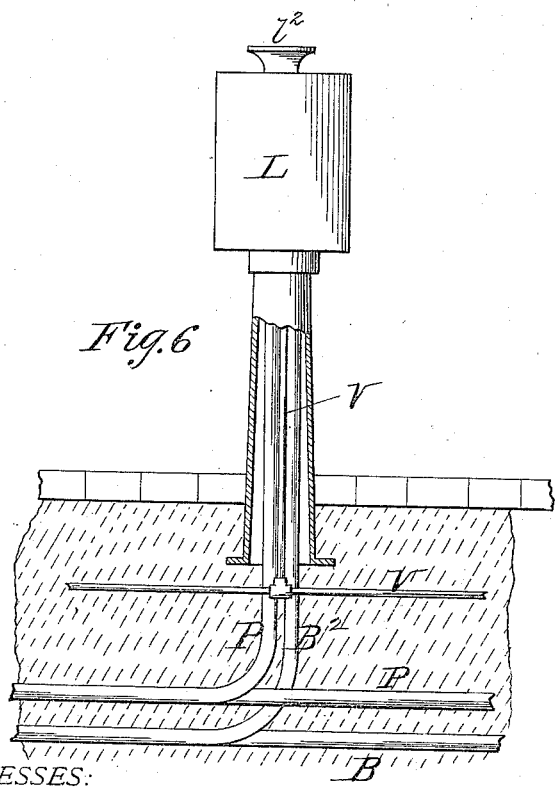


Fig. 7

Fig. 6



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UNITED STATES PATENT OFFICE.

HENRY CLAY, OF PHILADELPHIA, PENNSYLVANIA.

PNEUMATIC DISPATCH-TUBE.

SPECIFICATION forming part of Letters Patent No. 307,437, dated November 4, 1884.

Application filed August 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY CLAY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Dispatch-Tubes, of which the following is a specification, reference being had therein to the accompanying drawings, wherein—

Figure 1 is a view, partly sectional, of a portion of main delivery-tube with branches, manual switches, and sub-station boxes, together with central-office electro-magnetic devices for controlling the movements of said switches. Fig. 2 is a section, partly in elevation, of branch delivery and receiving tubes, sub-station boxes, and automatic switch mechanism for said tubes. Fig. 3 is a diagram illustrating a typical plan or arrangement of pneumatic dispatch-tubes in accordance with my invention. Fig. 4 is a sectional elevation of central-station mechanism for introducing the carriers to the pneumatic tubes and of the air-compressing devices. Fig. 5 is an enlarged detail sectional view. Fig. 6 is an elevation, partly sectional, of a typical form of sub-station box when my invention is employed for transmitting or receiving letters or applied to post-office work; and Fig. 7 is an elevation of a preferable form of carrier.

My invention has relation to that class of pneumatic dispatch-tubes wherein each sub-station is connected to the central station by receiving and delivery tubes, and has for its object to dispense with the use of separate delivery and receiving tubes for each sub-station, and substitute therefor a single delivery-tube and a single receiving-tube common to all the sub-stations connected to or in circuit with said tubes, thereby effecting a material reduction in the extent of pipe used and a saving in cost of plant or equipment.

My invention has for its further object to control from the central station the movements of the carriers from the main tube to its branches and subdivisions of the latter, whereby the path of travel of the carriers is so directed that each carrier passes to its destination without interfering with the movement or blocking the path of other or following carriers.

My invention has for its still further object to cause each carrier, as it passes from a main tube or a branch thereof and enters a sub-station delivery-tube, to automatically close the entrance of said sub-station tube by moving a switch located thereat, which, when so moved, is held in a locked position by electro-magnetic devices designed to be operated to release said switch by the closing of an electric circuit by a moving carrier as it passes to the last sub-station box on the main or branch delivery-tube, whereby leading carriers passing through said delivery-tube successively close the sub-station tubes to the following carriers, but open a passage for the movement of the latter through said delivery-tubes.

Again, my invention has for its further object to provide sub-station boxes for receiving and holding the carriers in a locked position in said boxes, which are furnished with mechanism for automatically releasing and forcing the carriers out of said boxes, whereby the carriers are not ejected from the pneumatic tubes when they reach the sub-station boxes, but are held therein until freighted, and are automatically caused to return to the receiving-tubes leading to the central station, thereby avoiding all handling of the carriers by attendant at the sub-stations.

My invention accordingly consists of the novel combination, construction, and arrangement of parts comprising a pneumatic-dispatch-tube system, having reference particularly to the following points: first, of a central station having a delivery and a receiving tube common to all the sub-stations and switches therefor, as hereinafter described and claimed; second, of a central station having a delivery and a receiving tube common to all the sub-stations, manual and automatic switches therefor, electro-magnetic appurtenances at the central station for controlling the movement of said manual switches, and electro-magnetic devices located upon the tubes adjacent to said automatic switches for locking and unlocking them to permit of their return to their normal positions; and, third, of a sub-station box or carrier receptacle provided with locking mechanism for retaining the carrier therein, electro-magnetic appurtenances for releasing said carrier, and devices for giving to the latter an initial return movement to cause it to pass out of the sub-station box into

No. 10, a like switch at the junction of two sub-branches B′ B′, the latter as well as the tubes A and B having branches B^2, which lead to the sub-station boxes L, and their junction is not, therefore, provided with switches C.

By successively closing or opening, as above described, the various manual switches C of a system of pneumatic tubes, the carriers can be sent to all the sub-stations, and such result is obtained, however intricate may be the ramifications of the tubes. Where the system is divided into districts there will be a main tube, A, for each district, and the electro-magnetic appurtenances for the switches C of each district will be grouped or suitably arranged at the central station so that they may readily be operated without confusion.

At each junction of tube A or its branches B B′, and a tube, B^2, leading directly to a sub-station, except as hereinafter noted, is placed a switch, M, automatically controlled in its movements by passing or traveling carriers, such switch being plainly shown in Fig. 2. The gravity of each switch M normally maintains it in the position indicated by the dotted lines *x x* so as to close the passage-way through delivery-tube B and open it through sub-station tube B^2 to boxes L. Each switch M has an arm, *m*, which, when in its normal position, projects into the bore of the sub-station tube B^2, so as to be in the path of the carrier, as indicated by dotted lines *y*.

At the end of arm *m* is a lip, *m′*, which is designed to engage with a catch, *n′*, on an armature-lever, *n*, of magnets N, inclosed in coupling or box n^2 at said junctions. As the carriers pass into the tubes B^2 on their way to the sub-station boxes L they strike the arm *m* of switch M, depress the former and elevate the latter to seal tube B^2, and open the tube B for the passage of a following carrier to the next sub-station, and so on. As the carrier depresses the arm *m*, as above set forth, its lip *m′* engages with the catch *n′* of armature *n* to lock arm *m* and hold the switch M in its elevated position, thereby keeping the tube B open for following carriers. Such position of the switch M is so maintained until its lock is released, as hereinafter set forth.

The sub-station boxes are constructed as follows:

l represents the inlet-port, and *l′* the outlet-port, leading to the receiving-tube P for conducting the carriers from the sub-stations to the central office. The ports *l l′* merge into a common duct, L′, located within the boxes L. The duct L′ in each box L leads to the top of the latter, in which is an opening, l^2, for the insertion of packages, letters, &c., to carrier L^2 when in position, as shown in sub-station box marked No. 1, Fig. 2.

Between the ports *l l′* is pivoted a flap or valve, *o*, which is moved over to the right of duct L′ or held in its normal position, as shown at station No. 1, Fig. 2, by the spring o^5. Said valve is moved to the opposite side or to the left of duct L′ by the carriers as they pass out of tube B^2. When valve *o* is in the former position, the way through duct L′ is open to tube P, and when in the latter position the way through said duct leads from tube B. Said valve, therefore, guides the carriers into and out of the boxes L. The valve *o* has an opening, *o′*, near its lower end, which is sealed and unsealed by a valve, o^2, pivoted to valve *o*. The valve o^2 is provided with an integral valve, o^3, located on the side of valve *o* opposite that upon which the valve o^2 is arranged, and it bears against the adjacent wall of the duct L′, as shown. The gravity of the valve o^3 is greater than that of the valve o^2, so that when the former falls by gravity against the wall of duct L′ the valve o^2 is moved away from valve *o* and unseals its opening *o′*, as indicated at station No. 1, Fig. 2, to permit the air-pressure in tube B to pass or escape into tube P. The valve o^2 is also provided with a pivoted valve, o^4. The valves o^3 and o^4, which are located above the valve o^2 and are kept up or in impingement with the adjacent wall of the duct L′ by the upper curved end of the spring o^5, are on opposite sides of the valve *o*, and they, together with valve o^3, are moved or operated by their impingement against the walls of duct L′ as the valve *o* is moved to and fro therein, as hereinafter to be explained. The combined action of said valves guides the carriers in and out of the boxes L and cuts off and admits air-pressure to the receiving-tubes P as follows: When the valve *o* is in its normal position, or to the right of the boxes L, as shown at station No. 1, Fig. 2, the valve o^3, falling by gravity against the adjacent wall of the duct L′, closes the upper end of port *l* and opens valve o^2, while the upper curved end of spring o^5 presses the valve o^4 up against the adjacent wall of the duct L′ to close the upper part of the port *l′*, so that blasts or pressure of air passing to port *l* are diverted by valve o^3 to opening *o′* and port *l′* to tubes P, thereby preventing such air passing to the boxes L and escaping through the top openings, l^2. Such air-pressure is then used to return the carriers in tubes P to the central station; but when valve *o* is forced over to the left of boxes L, as shown at station No. 2, by the entrance of a carrier from port *l* or tube B, the carrier in passing the valve o^3 moves it to the left, or within a recess formed in valve *o*. Such movement of the valve o^3 depresses the valve o^2, or the latter is then moved to seal opening *o′* and cut off the air-pressure to tubes P. Consequently the full force of the pressure is exerted upon said carrier to drive it to its proper position in boxes L. As soon as the carrier reaches such position the valve *o* is returned to its normal position by the reaction of spring o^5, its upper curved end keeping the valve o^4 up and the valve o^3, dropping by gravity, opens the valve o^2 to unseal opening *o′* of valve *o* to admit air to tubes P, as above set forth. When valve *o* so returns to its normal position its end o^{14}, which is a yielding or spring-supported end or pin, engages with or passes back of the tail-

piece p' of a pivoted platform, p, and is thereby held firmly or locked in such position, so that it cannot be moved out thereof by the pressure of air in port l or tube B. Said valve o being so locked it is always out of the way of and forms a guide for the carrier in the boxes as it is returned through duct L′ to tubes P. While the valve o is locked by the tail-piece of platform p, yet such engagement does not interfere with the free movement of platform p to its horizontal position when so impelled by its reacting-spring p^2. Such movement of the platform is only made when the carrier is leaving the boxes L, so as to close the top of duct L′. When the platform p is in its normal or horizontal position it rests upon the lip or end r of a pivoted lever, R. To the opposite end of the latter is secured an armature, r', for the electro-magnets R′, suitably affixed to the boxes L, as desired. Below the top of the latter are placed two strong plate-springs, O O, having bent ends O′ O′, which project into the line or path of the carrier. As the latter passes to its position within the boxes L it moves valve o aside, as above set forth, raises the platform p to a vertical position, and is forced against the ends O′ O′ of springs O until its lower edge passes above the end r of lever R. The carrier is thereby held or locked by lever R in such position until the latter is released, and when said lever supports said platform or carrier the armature r' is then not attracted by the magnets R′, but when attracted the end r of lever R is withdrawn from beneath the carrier, which is then free to pass to the receiving-tubes P, its initial movement being produced by the reaction of spring O O.

At the end of the branch B or at the junction between it and the last sub-station, tube B^2, there is no switch M, but in lieu thereof are contact-points s s', which are normally open. From contact s leads a wire, 5, to ground 6, and from contact s' leads a wire, 7, to magnets R′ of box L, station No. 3, and from thence a wire, 8, to magnets N in box n^2, connected with tube B^2 for station No. 2. The remaining magnets R′ N of tube B and its sub-stations are in circuit with each other and with a battery, T, and an alarm or signal, t, Fig. 1, by means of wires 9, such circuit being plainly indicated in Figs. 1 and 2.

The battery T is grounded, as illustrated, and it and the alarm are preferably located at the central office. The normally-open position of contacts s s' makes an open circuit for said battery T, so that the armatures r' and n are not attracted to their respective magnets R′ and N until the circuit of battery T is closed, such result being produced when a carrier passes the contacts s s'.

As the boxes L are made, a carrier, L^2, is inserted in position therein, so that when connected to the tubes B^2 and P of a pneumatic system a carrier is already in place in each box L. Said boxes are also provided with a pivoted lever, l^3, whose upper end is so arranged and is of such weight that it normally tends to move toward and bears against the valve o when it is in its locked position, and to give the latter an initial movement or start it to the left when its lock is released. The valve o, in moving to its locked position, strikes and oscillates the lever l^3, projecting its end l^4 into the port l or in the path of the incoming carrier, and the gravity movement of the valve l^3 starting the valve o to the left withdraws said end l^4 from port l or out of the path of said carrier. When a carrier is in position within a box L, the tail-piece p' of the raised platform p not only locks the valve o in its normal position, but also causes it to maintain the lever end l^4 in its projected position in port l, and a carrier then coming into the latter is stopped or checked in its travel as soon as it impinges against the end l^4 of lever l^3, as indicated by dotted lines, station No. 1, Fig. 2. As soon, however, as the carrier in the box L passes to tube P, the platform p drops, releases the lock on valve o, and the gravity movement of lever l^3 then starts valve o to the left and withdraws end l^4 from port l, thereby leaving the checked carrier free to be driven into box L by the air-pressure in tube B^2. Said sub-station boxes with contained carriers and the pneumatic tubes with switches C and M being arranged as described, the switch or switches C are manipulated to direct the carriers fed into the tube A at the central office to the tube B, Fig. 2. The leading carrier traveling along the same meets the first switch M, and is diverted thereby to the tube B^2 of the sub-station No. 1. As said carrier passes through tube B^2 it depresses arm m of said switch to elevate the latter and lock it in such position, as above set forth, to close the tube B^2 and open tube B for the passage of following carriers. After locking said switch said carrier travels through tube B^2 until it meets and is detained by the end l^4 of lever l^3, as shown. Meanwhile said following carriers have raised and locked the remaining switches M, and passed to the inlet-ports of the remaining boxes connected to tube B, except for the last box, or box No. 3. The last carrier proceeding to the said end box, in passing the contacts s s', causes them to impinge and close the circuit of battery T to magnets N and R′, which then attract their armatures. The switches M are released and return to their normal position, and the ends r of levers R are withdrawn from beneath the carriers L^2 in the boxes L, whereupon the springs O react to give said carriers an initial return movement through duct L′ to the outlet-ports l', and the platforms p are returned to their normal positions by their reacting springs p^2 to unlock valves o. The return-carriers, passing down the duct L′, impinge upon and push down or aside the valves o^4 and o^2. The latter are thereby moved to close the openings o' in valves o to cut off the air-pressure to tubes P. As soon as the lever ends l^4 are withdrawn from the ports l, the detained carriers therein are, by the pressure of air in tubes B^2, driven through said ports, and strike against valves o and o^3 to move

them to the left of ducts L′ to provide a passage-way through them for said carriers, which then pass through said ducts, lift the platforms *p*, and enter into position in boxes L, whereupon they are locked therein by the levers R, and the valves *o* are returned to their normal position by the springs o^5, and the openings *o′* thereof unsealed, as hereinbefore described, to admit air-pressure to tubes P to force the return-carriers therein to the central station. The tubes P follow the line of or are a duplication of tubes A B B′, &c., and at their junctions they are provided with shunt-valves P′ P′, united by a bar, P^2, to cause them to move together and prevent blocking of the carriers at such points. The carrier first reaching the valves P′ moves them aside into the path of the joining-tube to stop or detain the carriers therein until said first-named carrier has passed said valves, as shown at *z*, Fig. 2. If desired, said junctions may also be provided with the movable guide pieces or bars P^3. When the last carrier for tubes B passes the contacts *s s′* and momentarily closes the circuit of battery T, the bell or alarm *t* is rung at the central station, notifying the attendant thereat that said circuit is in order, and that the boxes on said tube are supplied with carriers, whereupon feeding of carriers in a corresponding manner may be proceeded with for other parts of the system.

To feed the carriers into the main tubes A, I preferably employ the mechanism shown in Figs. 4 and 5, wherein W represents a compressing-pump, W′ a reservoir for the storage of compressed air or other motive power, and *w* a pipe-connection leading to tube A. Pipe *w* is provided with a chamber, a^{10}, having a number of outlets, a^{11} a^{11}, depending upon the extent of the system. The outlets a^{11} have pistons a^{12} with flanges for closing said openings, and hinged or flap valves a^{13} at their lower ends. The valves a^{13} are normally closed by the pressure of air in chamber a^{10}, to prevent the escape of air-pressure from pipe *w*. The pistons a^{12} are also provided with suitable operating-levers, a^{14}, which may be manually or otherwise operated, as desired.

When a carrier is to be introduced into tube A, the piston a^{12} of an outlet, a^{11}, is raised and the carrier placed therein resting upon the valves a^{13}, as shown in Figs. 5 and 4. The piston is then forced down upon the carrier, which depresses or opens the valves a^{13} to permit the carrier to fall into chamber a^{10}, and thence to tube A. The flanges of the pistons prevent the escape of air-pressure from outlets a^{11} when the valves a^{13} are opened.

If desired, the boxes L may be configured and arranged, as illustrated in Fig. 6, and be provided with pipes or conduits V for the electrical or other wires, 2, 5, 7, or 9, used in connection with the system.

To cause the opening in the top of the carriers to align with the openings l^2 of the boxes L as the carriers reach their position therein, they are provided with a helical cam, L^3, which impinges with a stud or guide, *v*, secured to boxes L, as shown in Fig. 2.

To avoid friction between the tubes and the carrier and to permit the latter to pass through sharp or quick curves, it is made smaller in diameter than the bore of the tubes, and provided with a paper or other suitable bead or collar, L^4, of the size of the diameter of the tubes, as indicated in Fig. 7.

While, as stated, I have shown my invention being especially adapted for post-office work, I do not limit myself thereto, as it is obvious that it may be used for other desired purposes by changing the form of the carriers and of the sub-station boxes L. So, too, if desired, each of the boxes L herein shown and described may be connected with the central office by a separate receiving and a delivery tube. Again, the circuits for the batteries E and T may be opened or closed circuits, as desired. In either case the electro-magnetic appurtenances both at the central and local stations will be arranged to produce the results above described.

The outlet of receiving-tube P at central station may be open or unprovided with valves; or, if desired, any suitable form of the latter may be applied thereto. The course of the tubes P follows that of the various delivery-tubes A, B, B′, and B^2, preferably parallel therewith; but it may be arranged in any desired or suitable manner.

Any terminal devices or valves may be secured to the ends of the tubes P at the central office; but as they form no part of my invention they need no further description.

What I claim is—

1. In a pneumatic-dispatch-tube system, a delivery and a receiving tube having branches and sub-branches common to all the stations or local termini connected to or in circuit therewith, and means for changing the course of the carriers through said tubes, substantially as shown and described.

2. In a pneumatic-dispatch-tube system, the combination of a central office, a series of sub or local stations, a delivery and a receiving tube common to all of said sub-stations, and means for changing the course of the carriers through said tubes, substantially as shown and described.

3. In a pneumatic-dispatch-tube system, the combination of a central office, sub-stations connecting delivery-tubes with branches, switches located at the junction of said tubes and branches, polarized magnets and armature-levers for said switches, and an electric circuit leading from said magnets to electro-magnetic appurtenances located at the central station, substantially as shown and described.

4. In a pneumatic-dispatch-tube system, the combination of central and sub stations, a connecting delivery-tube with branches, having at their junctions a switch with polarized magnet and armature lever, circuit-connections

from said magnet to a pole-changing switch located at the central office, substantially as shown and described.

5. The combination, with the tubes A and B, of a switch, C, polarized magnets D, armature-lever *d*, pole-changing switch F, and an electric circuit for the latter and said magnets, substantially as shown and described.

6. The combination, with tubes A and B, of a switch C, polarized magnets D, armature-lever *d*, contact-points *a a' a² a³*, pole-changing switch F, electro-magnets G, with indicator or register, and an electric circuit for said electro-magnetic devices, substantially as shown and described.

7. The combination, with tubes A and B, of a switch, C, polarized magnets D, armature-lever *d*, contact-points *a a' a² a³*, pole-changing switch F, electro-magnets G, lever H, locking mechanism I, register or indicator K, and an electric circuit for said electro-magnetic devices, substantially as shown and described.

8. The combination, with tubes A and B, of a switch, C, polarized magnets D, armature-lever *d*, contact-points *a a' a² a³*, pole-changing switch F, electro-magnets G, lever H, locking mechanism I, register or indicator K, battery E, and circuit-connections, substantially as shown and described.

9. The combination of tubes A and B, switch C, electro-magnetic operating devices therefor, and a register or indicator, substantially as shown and described.

10. The combination of tubes A and B, switch C, electro-magnetic operating devices, and circuit-connections therefor, and a register or indicator, substantially as shown and described.

11. In a pneumatic-tube system, the combination of delivery-tubes A B, &c., and the receiving-tubes P, having valves P' P', substantially as shown and described.

12. In a pneumatic-tube system, the combination of a central office, sub-stations, and interposed receiving-tubes joining one to another between said central office and sub-stations, having shunts or valves at each junction therein, substantially as shown and described.

13. The combination, with sub-station boxes L, having delivery-tube B, of the branched or joining pipes P, having valves P' at their junctions, as and for the purpose set forth.

14. In a pneumatic-dispatch-tube system, a sub-station box having a delivery and a receiving tube terminating in a common duct or tube within said box, a valve located within said duct for guiding the carrier into and out of the box, a lock for holding the carrier in the latter, and means for effecting its release, substantially as shown and described.

15. A pneumatic dispatch-tube, sub-station box provided with inlet and outlet ports merging into a common duct within said box, valve mechanism for guiding the carrier into and out of said duct, a lock for the carrier, means for releasing said lock, and mechanism for imparting to the carrier an initial return movement, substantially as shown and described.

16. A pneumatic dispatch-tube, sub-station box provided with inlet and outlet ports merging into a common duct within said box, and valve mechanism for guiding the carrier into and out of the box, and for cutting off or admitting air-pressure from the inlet to the outlet port, substantially as shown and described.

17. In combination with a main or branch delivery-tube, B, of a pneumatic-dispatch-tube system, a series of sub-station delivery tubes and boxes, switches located at the junction of the main and sub-station tubes, electro-magnetic locking mechanism for said switches, and circuit-connection for said electro-magnetic devices, which is made or broken by a moving carrier to release said switches, substantially as shown and described.

18. In combination with the tubes B and B², a series of switches, M, having arms *m*, projecting into the bore of the tubes B², electro-magnetic appurtenances for locking and unlocking said switches, and circuit-connections for said appurtenances having contact-points *s s'*, substantially as shown and described.

19. The combination of tubes B B², switch M, with locking end *m*, lever-armature and electro-magnet N, an electric circuit therefor, and contacts *s s'*, substantially as shown and described.

20. The combination of tubes B B², switch M, with locking end *m*, armature-lever and electro-magnet N, contacts *s s'*, an electric circuit and alarm mechanism included therein, substantially as shown and described.

21. In combination with the tube A, chamber a^{10}, having outlets a^{11}, valves a^{13}, and flanged pistons, with operating mechanism, substantially as shown and described.

22. A carrier for pneumatic-dispatch-tube system, having a slotted end and the cam L^3, combined with a stationary lug to engage said cam to rotate and align properly the carrier.

23. A carrier for pneumatic dispatch-tubes of less diameter than the bore of the latter, and having an anti-friction bead, L^4, and cam L^3, substantially as and for the purpose set forth.

24. A pneumatic-tube sub-station box, L, constructed substantially as shown and described, and provided with a stud or guide, *v*, in combination with a carrier provided with inclines, as and for the purpose set forth.

25. The sub-station box L, having inlet-port and outlet-port, and a pivoted lever or catch, the end of which projects into the bore of the inlet-port, substantially as shown and described.

26. The sub-station box L, having inlet and outlet ports, a valve, *o*, carrying valves o^2, o^3, and o^4, opening *o'*, and reacting-spring o^5, substantially as shown and described.

27. The sub-station box L, having inlet and outlet ports, with valve mechanism, a movable

platform, *p*, a movable rest or locking mechanism therefor, and springs O O, substantially as shown and described.

28. The sub-station box L, having springs O O for giving an initial return movement to the carriers in said box, substantially as shown and described.

29. In combination with box L, electro-magnet R′, armature lever R, having catch *r*, and an electric circuit for said magnet, substantially as shown and described.

30. The combination of boxes L, having connecting-tubes B^2 and P, the former being provided with switch M and electro-magnetic appurtenances, and the latter with valves P′, substantially as shown and described.

31. In combination with pneumatic tubes A P and their branches and sub-branches, of switches C and M, lever R, electro-magnet appurtances for said switches and lever, electric circuits therefor, and conduits or pipes V for the latter, substantially as shown and described.

32. A pneumatic-dispatch-tube system having electric switches for changing the course of the carriers through the tubes, electrical conductors or wires between said switches and the central office, and a pipe or conduit, V, for said wires, substantially as shown and described.

33. In combination with a pneumatic dispatch system, the chamber a^{10}, having inlets a^{11}, gates or valves a^{13}, flanged pistons a^{12}, operating mechanism, compressing devices, and reservoir, substantially as shown and for the purpose set forth.

34. In a pneumatic-dispatch-tube system, the combination of a central station, a series of sub-stations, a single delivery-tube common to all the sub-stations, and means, substantially as shown and described, for directing the course of the carriers to the sub-stations, mechanism for locking the carriers in the boxes of the sub-stations, and devices attached to said boxes for imparting to the carriers an initial return movement, as set forth.

35. In a pneumatic-dispatch-tube system, a delivery-tube having a series of sub-station tubes connected therewith, switches located at the junction of said tubes, which are moved by a passing carrier, electro-magnetic locking devices and contact-points in circuit therewith, which are moved by a traveling carrier to cause said devices to operate to release said switches, substantially as shown and described.

36. In a pneumatic-dispatch-tube system, the delivery-pipe A, having branches and sub-station boxes, the switches C and M, the former being operated from the central station and the latter automatically moved by traveling carriers, substantially as shown and described.

37. In combination with tubes P, the shunts or valves P′ and guide P^3, substantially as shown and described.

38. A sub-station box for pneumatic tubes, having valve mechanism for guiding the carrier into and out of the box, and also for cutting off and admitting air-pressure to the outlet-tube of the box, substantially as shown and described.

39. In a pneumatic-dispatch-tube system, a single delivery-tube having branches, sub-branches, and sub-station boxes, and switches located at the junction of the main and branch tubes and at the junction of the latter and sub-branches, and the latter being arranged to change automatically the course of the carriers to the sub-station boxes, substantially as shown and described.

40. In combination with sub-station box L, having opening l^2, the movable platform *p*, with retracting-spring p^2, substantially as shown and described.

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

HENRY CLAY.

Witnesses:
S. J. VAN STAVOREN,
CHAS. F. VAN HORN.