No. 735,861. PATENTED AUG. 11, 1903.

W. G. DAVIS.

PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL. 9 SHEETS—SHEET 1.

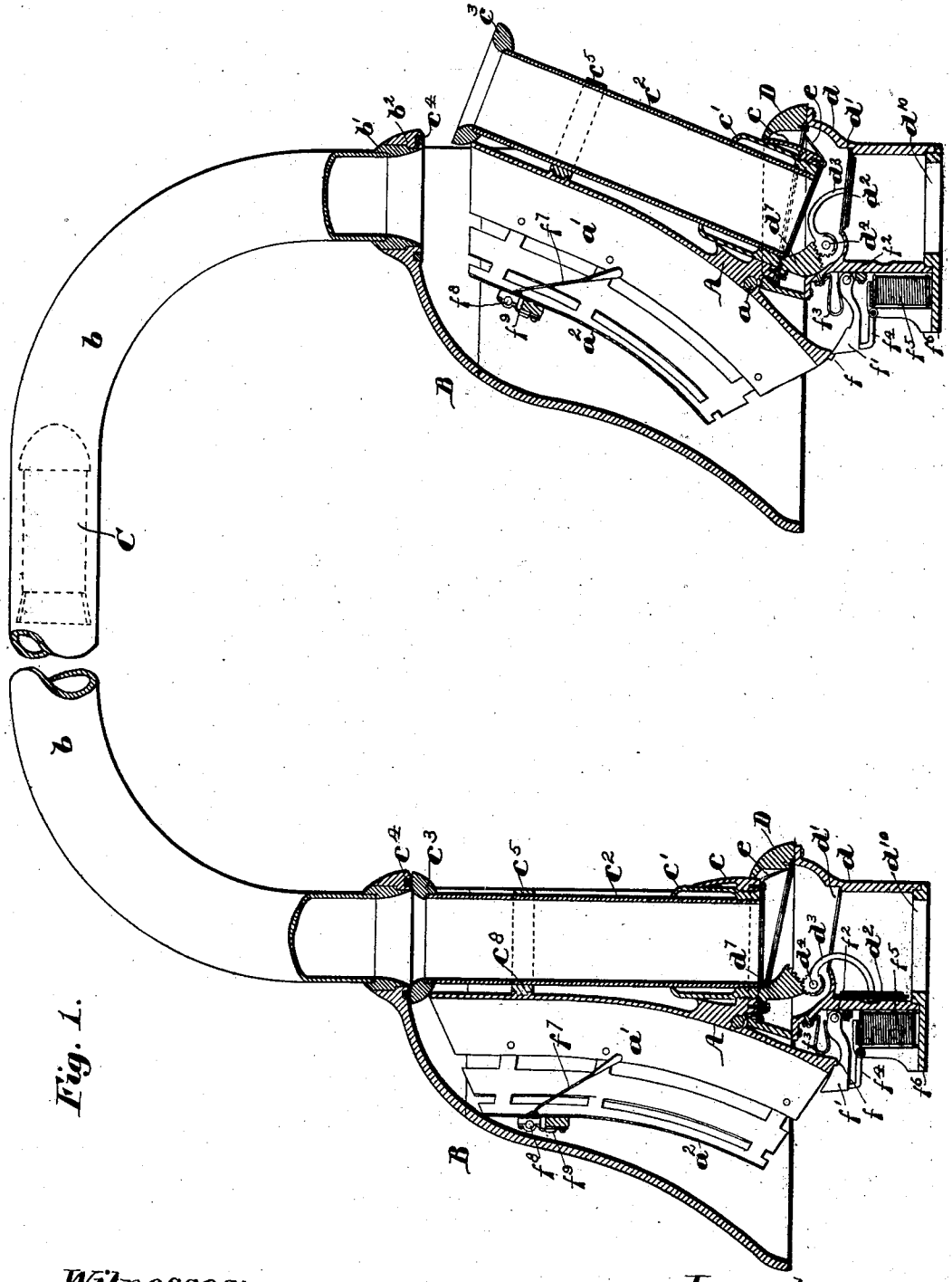


Fig. 1.

Witnesses:
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NO MODEL. 9 SHEETS—SHEET 2.

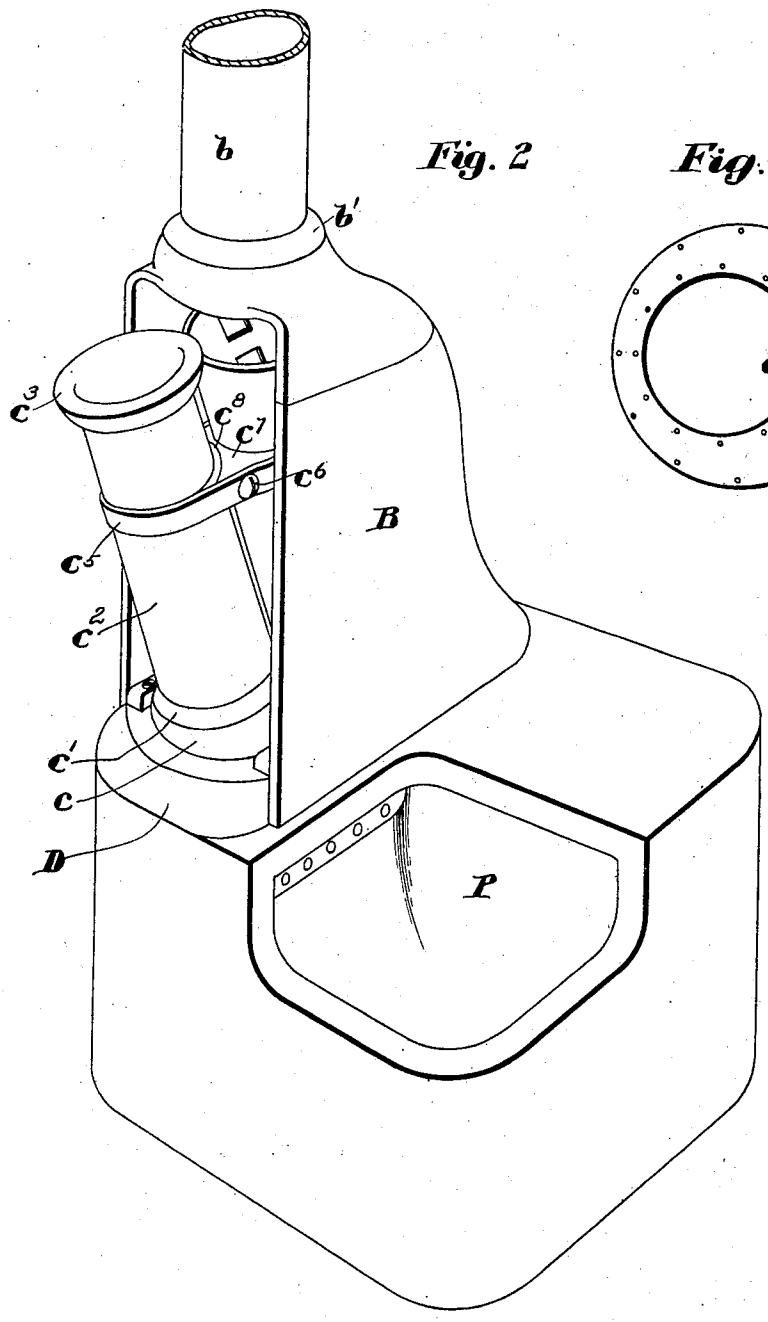


Fig. 2

Fig. 18

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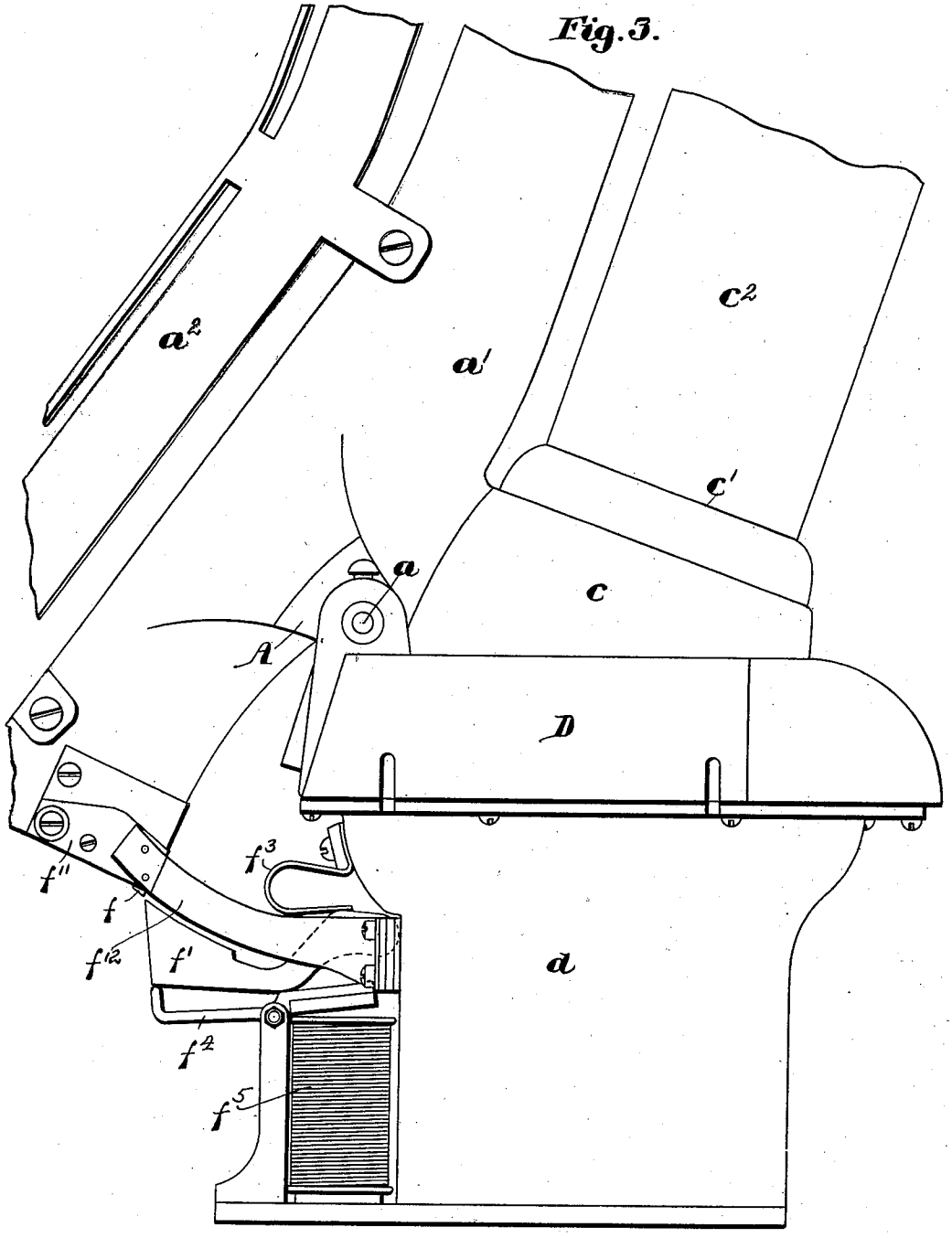
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PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL. 9 SHEETS—SHEET 3.

Fig. 3.



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PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL. 8 SHEETS—SHEET 4.

Fig. 4

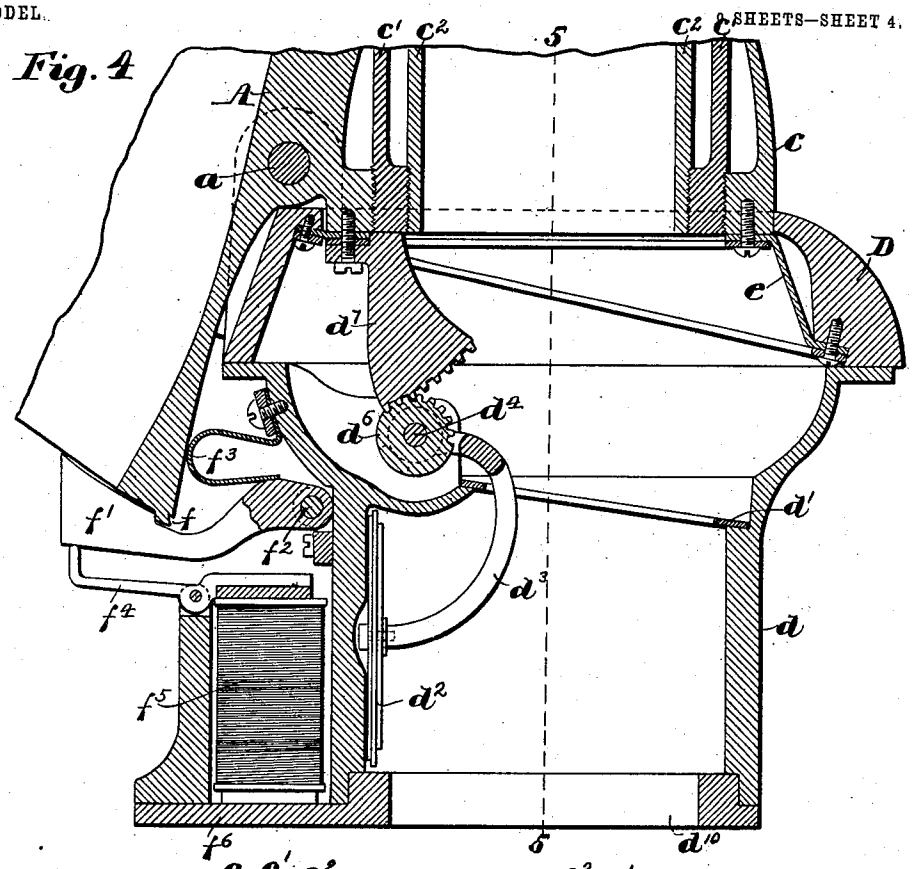
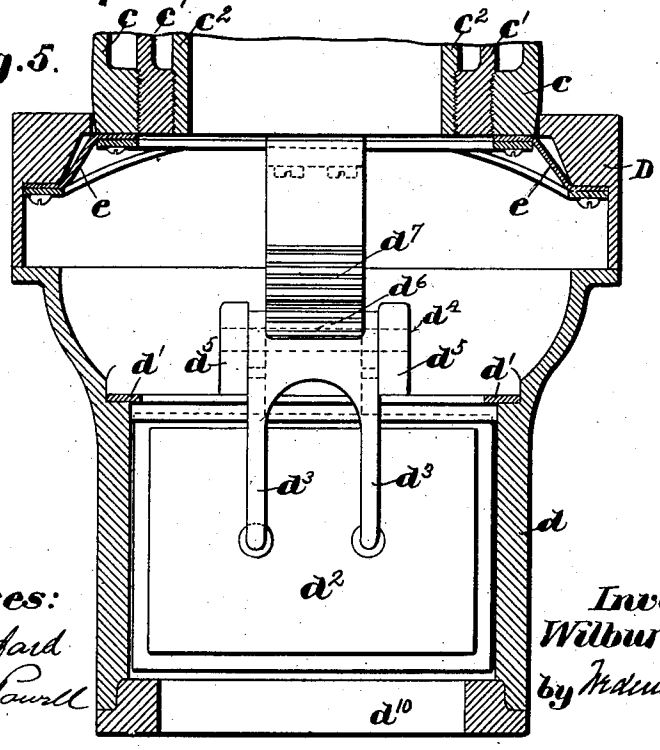


Fig. 5.



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NO MODEL. 9 SHEETS—SHEET 5.

Fig. 6.

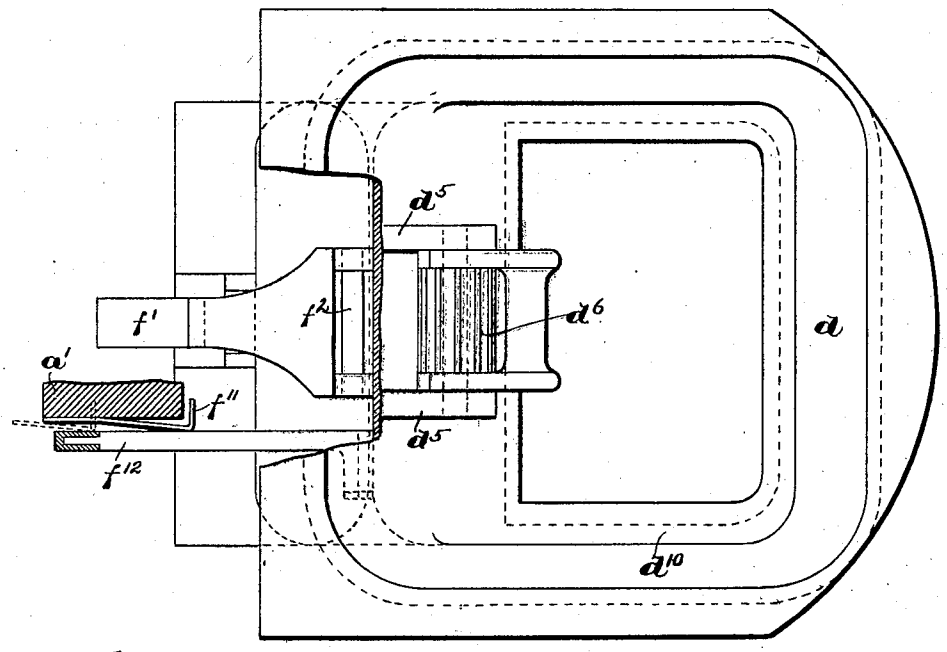


Fig. 9.

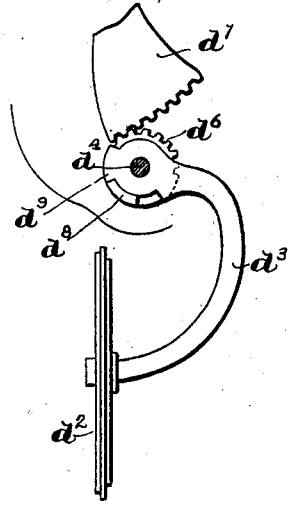


Fig. 10.

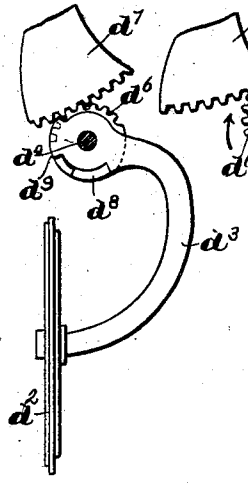
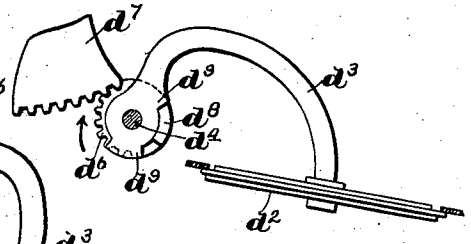


Fig. 11.



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No. 735,861. PATENTED AUG. 11, 1903.

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PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL 9 SHEETS—SHEET 6.

Fig. 7.

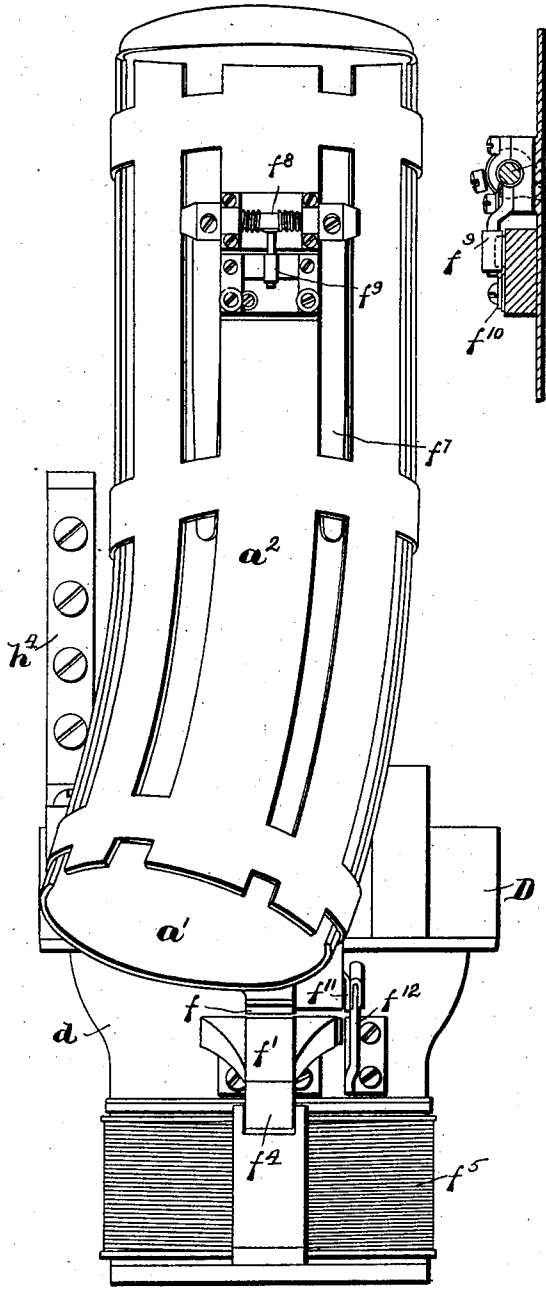
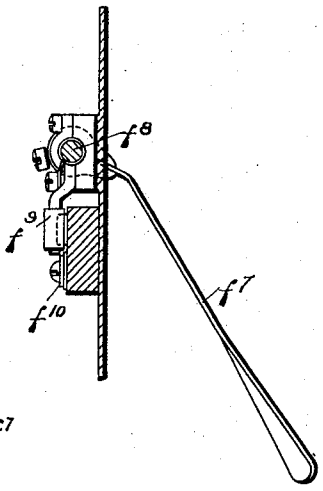


Fig. 8.



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APPLICATION FILED DEC. 1, 1902.

NO MODEL

9 SHEETS—SHEET 7.

Fig. 12.

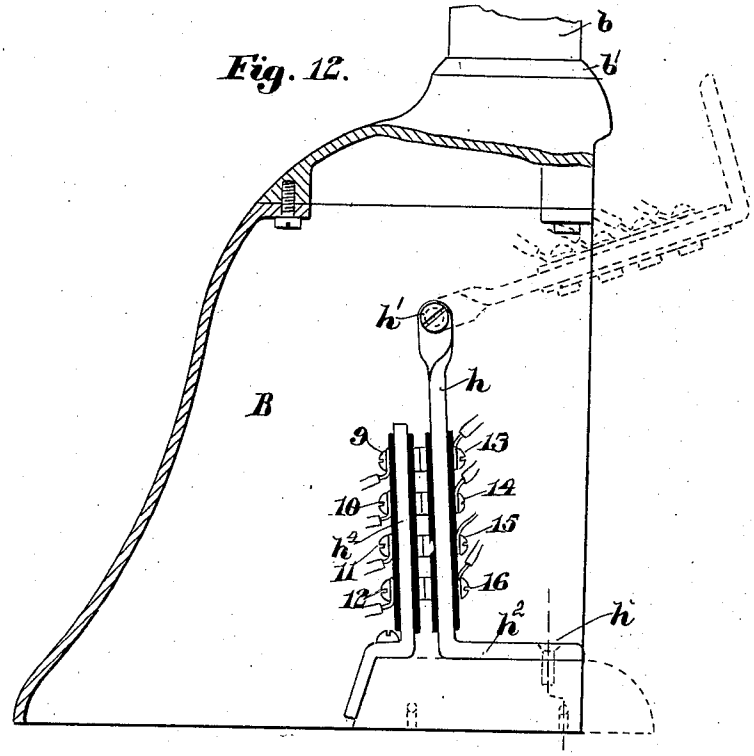


Fig. 13.

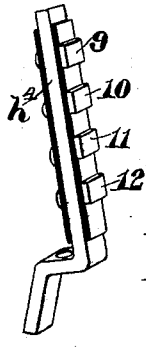


Fig. 14.

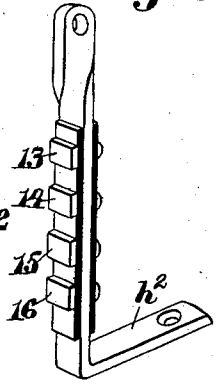
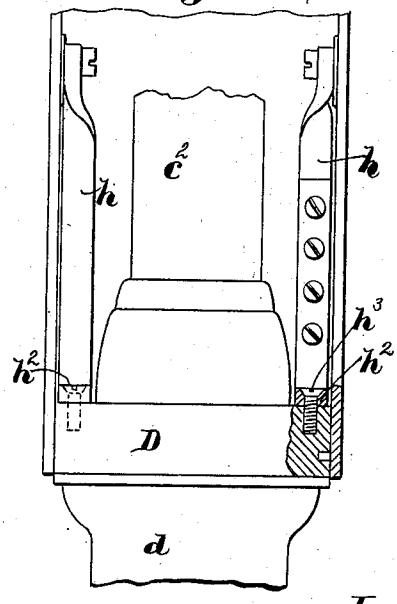


Fig. 15.



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No. 735,861. PATENTED AUG. 11, 1903.

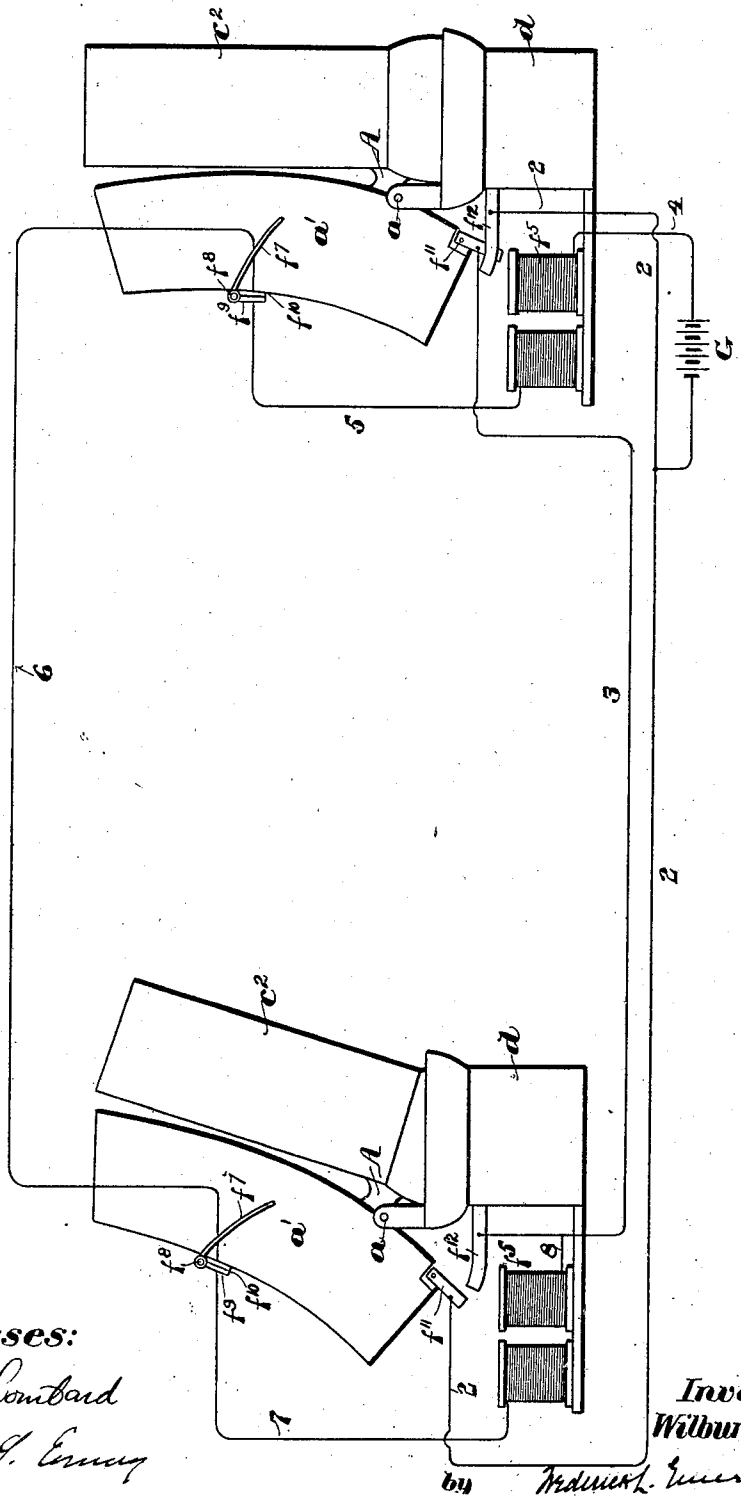
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PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL. 9 SHEETS—SHEET 8.

Fig. 16.



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No. 735,861 PATENTED AUG. 11, 1903.

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PNEUMATIC TUBE SYSTEM.

APPLICATION FILED DEC. 1, 1902.

NO MODEL. 9 SHEETS—SHEET 9.

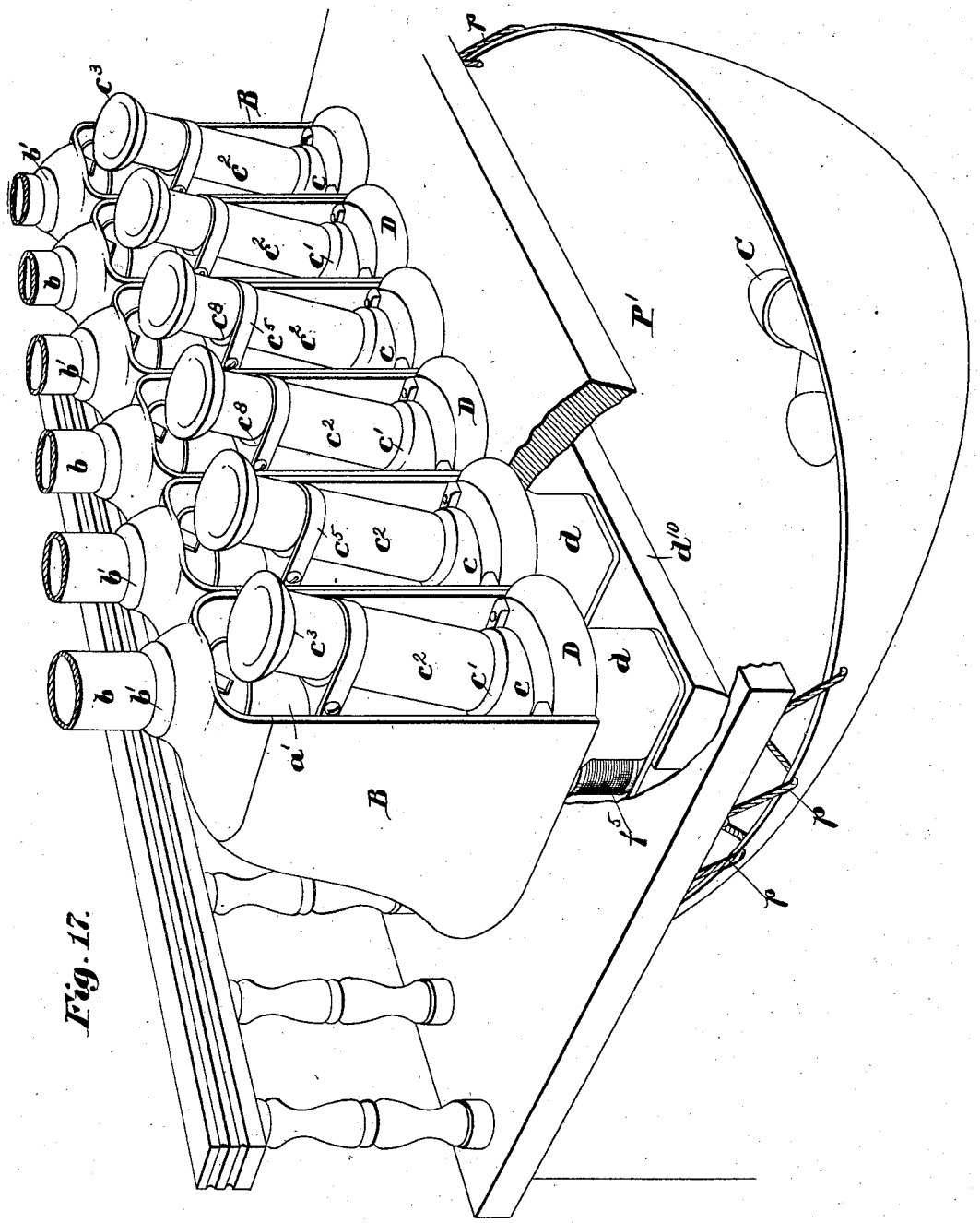


Fig. 17.

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No. 735,861. Patented August 11, 1903.

UNITED STATES PATENT OFFICE.

WILBUR GROVE DAVIS, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE SINGLE TUBE TRANSMISSION COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

PNEUMATIC-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 735,861, dated August 11, 1903.

Application filed December 1, 1902. Serial No. 133,351. (No model.)

To all whom it may concern:

Be it known that I, WILBUR GROVE DAVIS, a citizen of the United States, residing at Newton, in the county of Middlesex and Commonwealth of Massachusetts, have invented an Improvement in Pneumatic-Tube Systems, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention relates to pneumatic-carrier systems, particularly to systems wherein a single tube only is employed both for the outgoing and the return carriers.

The various features of my invention will be best understood from a description of one embodiment thereof, illustrated in the accompanying drawings.

Referring to said drawings, Figure 1 shows in vertical section two of the combined transmitting receiving heads connected by a single transmission-tube, the latter being broken out to economize in space, one of the said heads showing the parts in position for transmitting a carrier, the other of said heads showing the parts in position for receiving the carrier. Fig. 2 is a perspective view of one of the combined transmitting receiving heads with one form of pocket for receiving a carrier transmitted to said head; Fig. 3, a full-size detail of a portion of one of the combined transmitting receiving heads; Fig. 4, a vertical sectional detail of a portion of Fig. 3; Fig. 5, a cross-sectional detail on the dotted line 5 5, Fig. 4; Fig. 6, a view, partially broken away, looking at the bottom of Fig. 3; Fig. 7, a detail looking from the left, Fig. 3, showing the self-contained arrangement of working parts whereby they may be removed as a unit from the inclosing case or structure; Fig. 8, a detail showing the releasing-switch; Figs. 9, 10, and 11, details illustrating the various positions and movements of the controlling-valve; Fig. 12, a detail showing the arrangement of circuit-connecting devices for closing or establishing simultaneously a plurality of circuits; Figs. 13 and 14, perspective details of parts of Fig. 12; Fig. 15, a view illustrating the positions of the circuit-connecting device in the head; Fig. 16, a diagram illustrating the various circuits; Fig. 17, a perspective view illustrating one grouping of a plurality of the combined transmitting receiving heads—for instance, at the cashier's station—and Fig. 18 a detail showing the diaphragm *e* detached.

In the particular embodiment of my invention selected for illustration and shown in the drawings, referring first to Fig. 1, the transmission-tube *b*, of suitable material, construction, and diameter, is of suitable length to extend from one to the other of the points between which it is desired to transmit a cash or other carrier—for instance, from the salesman's counter to the distant cashier's desk—either upon the same or a different floor. This tube *b* terminates at its ends at two heads, (indicated generally by the letters B B,) which may be similar in construction and operation and which in accordance with my invention constitute combined transmitting and receiving heads—that is, heads which serve both as means for transmitting a carrier to a remote point, also for receiving a carrier transmitted from a remote point, contradistinguished in this respect from the prevailing constructions wherein separate transmitting and receiving heads are employed for each station. Since the heads, as shown, are identical, I will describe in detail one only thereof, it being understood that the other is similar in all respects, corresponding parts being identified by similar reference characters.

Referring particularly to the head at the right, Fig. 1 and also to Fig. 2, the said head is hood-shaped to inclose the working parts, it being adapted at its upper end to receive the adjacent end of the transmission-tube *b*. In order that the same head may suffice for tubes of various diameters to accommodate carriers of various capacity, the end of the tube is seated in a bushing *b'*, which in turn is seated upon a shoulder b^2 in the head-casting B. By providing bushings of uniform outside diameters and varying inside diameters tubes of varying diameters may be conveniently connected to one and the same head-casting, thus economizing in structural cost. Near

the lower end of the casting B there is pivoted at a a yoke-casting A, fitted at one side, as at a', to form part of a receiver or receiving volute, which is completed by a preferably sheet-metal outer portion a^2, riveted or otherwise secured thereto and made more or less open or basket-like in construction to gain lightness. At its opposite or front side the said yoke A is provided with a ring-like arm c, threaded to receive the bushing c', which latter in turn is interiorly threaded to receive the lower end of the removable transmitter c^2. By providing a series of bushings c' of uniform outside diameters and varying inside diameters transmitters c^2 of varying diameters (corresponding in each case to the diameters of the particular transmitting-tube used) may be used in connection with the same swinging yoke A. The receiver may usually be made of one size or diameter sufficient for the largest carrier to be used, since closeness of fit between it and the carrier is not essential. Near their upper ends the transmitter c is supported by a strap c^5, partially inclosing the same and secured at its ends, as by screws c^6, to a saddle c^7 on the receiver a'. A spline or filler c^8 is interposed between the said saddle and said transmitter, which may be replaced by one of different thickness when a transmitter of different diameter is to be used. The strap of course is readily adaptable to any diameter of transmitter. The location of the yoke-pivot a is such, herein at one side of the removable transmitter c^2, that the said yoke may be tipped outwardly or, as shown at the right in Fig. 1, to bring the upper end of the receiver into line with the lower end of the transmission-tube to receive a carrier from the latter and direct it into the pocket P, Fig. 2, or the said yoke may be tipped inwardly into its position, as shown at the left, Fig. 1, to cause the transmitter c^2 to be brought into position in line with and forming a continuation of the transmission-tube. This location of the said pivot a also causes the transmitter when tipped inwardly, as shown at the left, Fig. 1, to be raised bodily, so that its upper end, which is preferably fitted with a lip or top c^3, is lifted directly against and to make firm contact with a packing-ring c^4 on the head-casting B and surrounding the end of the transmission-tube, thus making a tight joint between adjacent ends of the said tube and transmitter to insure efficient transmission of a carrier from one to the other. In tipping the yoke outwardly again, as at the right, Fig. 1, the location of the pivot a causes the said transmitter c^2 to drop directly away from the packed end of the transmission-tube, thus insuring free and quick movement without unnecessary or ruinous frictional contact or wear.

Positioned between the side walls of the head-casting B is a base-plate D, from which depends a housing d, which contains a suitable valve-seat d', Fig. 4, conveniently ring-like in form and riveted or otherwise suitably and preferably removably secured upon a shoulder formed within said housing. Cooperating with the under side of this valve-seat is a controlling-valve d^2, having a suitably-packed upper face and mounted upon a bifurcated carrier d^3, loosely mounted upon a pivot-pin d^4, which (see Fig. 6) is supported at its ends in two ears d^5, depending from the base-plate D. The pivot end also of this valve-carrying arm d^3 is bifurcated to receive the pinion d^6, Fig. 6, which is also mounted upon the said pivot d^4 and is engaged by a segment-gear d^7, depending from and screwed to the bottom of the yoke A. The ends of the pinion d^6 are provided, respectively, with lugs d^8, Figs. 9 to 11, which stand between coöperating contact-surfaces d^9 on the adjacent faces of the bifurcated valve-carrying arm, the said stop-surfaces d^9 being separated by a greater distance than the lengths of the pinion-lugs d^8 to provide between the said lugs and the said stop-surfaces a lost motion to permit a certain movement of the said pinion before it commences to move the valve-carrying arm and its valve.

Referring to Fig. 1, the depending housing d at its lower end is adapted to be connected at d^{10} in suitable manner, as by a tube, with any desired pressure-supply device, preferably one which will furnish stored or accumulated pressure always at hand to be drawn upon when needed, but which may, if desired, be a foot or other power pressure creating or furnishing device, according to the requirements of any particular installation.

With the saddle A and its receiver and transmitter tipped outward, as shown at the right, Fig. 1, the position of the segmental gear d^7 is such that the valve d^2 is held in elevated position in contact with its valve-seat d', cutting off thereat the supply of operating-pressure to that end of the tube b. The parts then, as stated, are in position to receive a carrier transmitted from a distant station. When, however, it is desired to transmit a carrier from the station at the right, Fig. 1, the said carrier, which may be of any desired type, shape, or construction—such, for instance, as indicated in dotted lines at the top of Fig. 1—is inserted with its pointed end upward in the forwardly-tipped transmitter c^2, and the latter is tipped inwardly into its vertical position, as shown at the left, Fig. 1, to cause it to register with the adjacent end of the transmission-tube. This inward-tipping movement of the transmitter operates through the depending segmental gear d^7 to turn the pinion d^6 in the direction of the arrow, Fig. 11, such movement of said pinion taking place without opening the valve until the pinion-lugs d^8 meet the bottom stop-surfaces d^9 on the valve-carrier, when further movement of the said gear by rotating the pinion with it will cause the valve d^2 to be turned downwardly from its position, Fig. 11, into its position,

Fig. 9, thus opening communication between the pressure-supply through the transmitter c^2 into the transmission-tube to impel the carrier from the said transmitter into and along the said tube to the distant station, where it is directed by the receiver a' thereat into the pocket P.

The lost motion between the transmitter c^2 and valve d^2 enforces movement of the said transmitter a considerable distance toward its vertical or transmitting position before the valve is opened to admit pressure which will or may move the carrier, thus preventing incomplete movement of the transmitter from opening the valve and causing the carrier to be expelled before the upper end of the transmitter has been brought into register with the end of the tube. The lost motion, as herein shown, is such as to bring the end of the transmitter sufficiently under the adjacent end of the tube to prevent the carrier being expelled into the air rather than into the tube, thus guarding against accidental expelling of the carrier by a salesman idly or tardily moving the transmitter c^2 toward but not fully into its vertical position.

Upon return of the tipping transmitter c^2 to its outermost position, as at the right, Fig. 1, the lost motion between the pinion d^6 and the valve-carrying arm d^3 is again first taken up, as before, and thereafter and as the said transmitter approaches its full outermost position the said valve is lifted into its closed position again to cut off the supply of pressure to that end of the tube.

To provide an air-tight joint between the base-plate D and the tipping transmitter c^2, which at the same time shall not impair the free movement of the said transmitter, I have provided a flexible diaphragm *e*, Figs. 4 and 18. This diaphragm is secured at its periphery to the base-plate surrounding the air-passage therein, while the inner edge of said diaphragm is suitably secured to the under side of the tipping transmitter c^2 herein by attaching said diaphragm to the bottom of the transmitter-carrying arm *c*.

Since the tipping movement of the transmitter at a point nearest pivot *a* is less than the corresponding movement thereof at the point farthest from the said pivot, I have provided more material in the said diaphragm near its outer portion than at its inner portion, this being conveniently done, as shown in Fig. 18, by arranging the opening in the said diaphragm eccentrically with reference to the periphery thereof. Thus there is provided the necessary material for the maximum movement of the diaphragm at the outer portion thereof without any excess of material at the inner portion thereof, where the movement is slight. In order also that there may be no tendency of the diaphragm when in either of its extreme positions to move the transmitter c^2 away from its extreme position, I prefer to mold the diaphragm *e* or otherwise fit it so that it will tend to buckle or pull always in one or the other direction, and thus tend naturally to assume either of the extreme positions into which it is moved by the transmitter. Should there be any slight tendency of the diaphragm to pull in either direction, it should be so arranged as to exert that pull in an effort to throw the transmitter-section c^2 outward rather than inward, thus to aid gravity in quickly restoring the parts to their normal positions at the completion of the flight of a carrier therefrom.

Having described the mechanical operation of the parts necessary for transmitting and receiving carriers, I will now describe the means which I have provided for locking the transmitters at opposite ends of the tube in their respective positions and otherwise controlling the movements thereof to guard against the possible simultaneous introduction into the same transmission-tube of carriers traveling in opposite directions.

Referring to Figs. 1, 3, and 4, the lower end of the pivoted yoke A is provided with a locking-lug f, adapted to coöperate with a locking-lever f', pivoted at f^2 to and upon the housing *d*. This locking-lever is normally depressed by a spring f^3 and is supported from beneath by the upturned end of an armature-lever f^4, controlled by an electromagnet f^5, also mounted upon the housing or upon a plate f^6, secured thereto. When the magnet f^5 is energized, it will attract its armature, and thereby lift the locking-lever f' into its elevated locking position, where it will lock the said yoke in one or the other of its extreme positions.

Referring to Figs. 1, 7, and 8, there projects into the receiver a' a releasing-switch f^7, pivoted at f^8 and having an arm f^9 adapted to make and break contact with the fixed member f^{10} on said receiver.

The yoke A, Fig. 3, at its lower end and upon one side thereof has a contact-plate f^{11}, adapted to coöperate with a fixed contact-arm f^{12}, fast on the housing *d*. When the saddle is tipped into its innermost position to bring the transmitter c^2 into vertical operative position, the contact-plate f^{11} makes contact with the arm f^{12}, and the contact so made is of course broken when the said saddle is tipped to carry the said transmitter again into its outermost position.

Referring now to the diagram of circuits, Fig. 16, the battery G or other generator is shown as having one of its poles connected by a wire 1 with a wire 2, which latter is joined at one of its ends to the movable contact-plate f^{11} of the receiver at one station—for instance, at the left—the other end of said wire 2 being joined to the fixed contact-arm f^{12} of the housing *d* of the receiver at the opposite end. The fixed contact f^{12} of the receiver at the left, Fig. 16, is connected by a wire 3 with the movable contact f^{11} of the receiver at the right, Fig. 16. The opposite pole of the battery or generator G is connect-

ed by a wire 4 with the magnet f^5 at the right, Fig. 16, thence by wire 5 with the short arm f^9 of the releasing-switch f^7, the fixed contact f^{10} thereof being connected by a wire 6 with the fixed contact f^{10} of the receiver at the opposite station. The short arm f^9 of the releasing-switch f^7 of the latter station is connected by a wire 7 with the magnet f^5 at said station, thence by a short connection 8 with the wire 3, previously referred to as connecting the contact members $f^{12}f^{11}$ of the two stations.

When the transmitters c^2 at both stations are in their forward or inclined positions, all the circuits from the battery or generator G are broken by separation of the fixed and movable contacts f^{12} f^{11} at the two stations. Hence the magnets at the said stations are deënergized, and the transmitter at each station is free to be tipped inwardly preparatory to transmission of a carrier through the tube. If now a carrier be inserted in one of the transmitters c^2—for instance, that at the right, Fig. 16—and the latter tipped inwardly into its vertical position preparatory to transmitting its carrier through the tube, this inward tipping movement will cause its movable contact f^{11} to be turned into engagement with cooperating fixed contact f^{12}, thereby completing a circuit, which may be traced as follows: from the battery or generator G by the wires 1 and 2 to the right and through the engaging contacts f^{11} f^{12}, thence by the wire 3 to the distant magnet f^5, thence by the wire 7 to the contacts f^9 f^{10} of the distant receiver, returning by wire 6 to the contacts f^9 f^{10} of the first receiver, thence by wire 5 through the magnet f^5 of the first receiver and by wire 4 back to the generator. The current thus energizes the magnets at both stations and causes the armatures thereof to be attracted, thereby to lift their respective locking-levers f' into elevated locking positions, the elevation of the locking-lever at the transmitting-station causing it to assume a position behind the locking-lug f on its receiver, thereby to lock said transmitter in its inward or vertical transmitting position, and simultaneously at the opposite station the elevation of the locking-lever thereat will cause it to assume a position in front of the locking-lug f of the distant receiver, thus locking the latter in position to receive the transmitted carrier. The parts remain thus locked until the carrier has completed its flight, when as it passes through the distant receiver a' it will deflect the releasing-switch f^7 and momentarily break the circuit thereat, thus deënergizing the locking-magnets at both stations and permitting the transmitter from which the carrier was transmitted to gravitate forward into its original or normal position. In similar manner the insertion of a carrier in the transmitter at the distant station, at the left, Fig. 16, and tipping of the same into vertical position will cause the circuit to be established through its contacts $f^{11}f^{12}$, thereby to lock it in transmitting position and simultaneously lock the near receiver—that at the right—in its operative position, the circuit being then traced as follows, viz: from the generator G through the wires 1 and 2 to the said distant receiver, thence through the contacts $f^{11}f^{12}$, wire 8, magnet f^5 thereat, wire 7, contacts f^9f^{10}, wire 6, to the near receiver at the right, contacts $f^{10}f^9$, wire 5, magnet f^5, and wire 4, back to the generator. Thus it is impossible to push either transmitter into transmitting position during the period of flight of a carrier toward it from the opposite station, and also it is impossible after having tipped a transmitter inwardly for the transmission of a carrier to withdraw the same again to its normal or inoperative position or to move any part at either station until that carrier has completed its flight. Thus conflicting carriers cannot be in the transmission-tube at the same time, and a single tube may be safely used to transmit carriers in both directions, and since the period of time required for the flight of a carrier, even between widely distant or separated points, is relatively very short one tube may by my invention be employed substantially with the same capacity for transmission of carriers in both directions as two tubes, one for transmitting and one for receiving.

A slight movement only of a transmitter is required to close the circuit and lock the distant transmitter and receiver against movement, thus practically eliminating danger of the two transmitters at opposite ends of the tube being operated at the same time. To cause conflict, they must be pushed in identically at the same instant, which is highly improbable. If one is started the slightest in advance of the other, it will close the circuit and lock the said other before it is moved. The base-plate D, upon which the pivoted yoke A is mounted and to which the depending housing d is attached, is removable as a unit from the housing B, thus to permit the ready removal of all the working parts of the head without disturbing their inoperative relationship and without disturbing the end of the transmitter-tube or the housing which supports the same. This removable base-plate D may be secured within the housing in any suitable manner. I have found it convenient to employ the means shown in Figs. 12 to 15, inclusive, which consists of two retaining-levers h h, pivotally attached at h' to the opposite inner faces of the housing B and having their lower free ends turned approximately at right angles to form feet h^2, adapted to rest upon and be secured, as by screws h^3, to the said base-plate. When it is desired to remove the said base-plate and its connected parts, the screws h^3 are removed and the retaining-levers turned upward, as into their dotted positions, Fig. 12, thus permitting the base-plate and its connected parts to be withdrawn through the open front of the housing B.

As a convenient means of forming ready electrical connection between the various parts which are removable with the base-plate D and the parts of the wiring which must remain fixed with the transmitter-tube I have arranged upon the said removable base-plate in the rear of one of the said retaining-levers a vertical support h^4, provided with a series of contacts 9, 10, 11, and 12, to which are respectively eclectrically connected the releasing-lever f^7, movable contact f^{11}, fixed contact f^{12}, and electromagnet f^5. Upon the adjacent retaining-lever h are arranged other contacts 13, 14, 15, and 16, to which are respectively electrically connected the ends of the wires 6, 3, 2, and 4 or the corresponding wires at the opposite end of the line. When, therefore, the said base-plate D is placed in position and the retaining-levers h are turned downwardly into and secured in their permanent full-line positions, Fig. 12, the electrical engagement of the contacts 9, 10, 11, and 12 with the contacts 13, 14, 15, and 16 automatically makes the necessary electrical connections at that station. Thus the act of removing the base-plate D of itself breaks the electrical connections without disturbing the relationship thereof, and the act of restoring the said base-plate and locking of the same in position automatically reëstablishes the circuits without possible derangement thereof.

Referring to Fig. 17, I have shown a series of the combined transmitting receiving-heads arranged side by side, as at a cashier's desk, so as to require as little desk or table space as possible, and as a common receptacle for the carriers from all said heads I have suspended or otherwise secured below the table or desk top a receptacle P′, which may conveniently be of canvas, molded leather, or leather-board of proper dimensions and having an inclined bottom adapted to direct the carriers falling thereinto toward the front, which front is permitted to project somewhat beyond the front edge of the desk or table top and at the same time is dropped somewhat below the under side thereof, so that the carriers may conveniently be reached by a single operator. In fact, the tendency of the carriers is to gravitate into position directly in front of the operator. This receiver or receptacle may conveniently be slung from the under side of the table by a lacing p, which is convenient both because of its simplicity and because of the possibilities of ready adjustment which it presents. In this arrangement the said depending housing d may be connected with a common supply trough or conduit d^{10}, which is extended beneath the desk or table top, as shown in the drawings. The apparatus here described is at once highly efficient and positive in its operation and at the same time is simple in construction and readily adaptable to systems employing tubes and carriers of different diameters.

Obviously the carriers and tubes with their associated parts may be made of such capacity, materials, shape, &c., as to adapt the system for the transmission of cash, papers, parcels, or any other articles which it is desired to transmit by a system operating upon the principle here disclosed.

My invention is not restricted to the particular embodiment thereof herein shown by way of illustration, for obviously the same may be varied without departing from the spirit and scope of the invention appearing from the foregoing description and drawings.

My invention in transmitter-receiver construction herein disclosed is adapted for use in the system described and claimed broadly in my copending application, Serial No. 84,297, filed December 2, 1901. The power required for propelling the carriers through the transmission-tube may be stored as described and claimed in my said application or may be otherwise produced, as by a foot-power or other pressure-creating device—such, for instance, as illustrated in my copending application, Serial No. 85,144, filed December 9, 1901.

I claim—

1. In a pneumatic-carrier system, a movable, combined transmitter-receiver and a pressure-controlling valve for said transmitter operated by the latter.

2. In a pneumatic-carrier system a normally dead transmission-tube, a movable transmitter therefor, a source of stored pressure normally ineffective for propulsion through said tube, and means automatically to admit said pressure to said tube upon movement of said transmitter into operative position, removal of said transmitter from said position automatically cutting off said propelling-pressure.

3. In a pneumatic-carrier system, a normally dead transmission-tube, movable transmitters therefor located respectively at opposite ends of said tube and adapted respectively to be moved into operative position relative to said tube for delivering a carrier to the latter, a source of stored pressure normally inoperative for propulsion through said tube and means operated by movement of either transmitter-section into operative position to admit said stored propelling-pressure at the adjacent end of said tube for impelling a carrier through the latter.

4. In a pneumatic-carrier system, a transmitting-tube and an operating device at each end thereof comprising a transmitter and a receiver connected to be moved one by the other, the movement of one into operative position causing movement of the other out of operative position.

5. For a pneumatic-carrier system a combined movable transmitter-receiver and automatic locking devices for the same.

6. In a pneumatic-carrier system a transmission-tube, a transmitter-receiver at each end, and automatic interdependent locking devices for the same.

7. In a pneumatic-carrier system, the combination with a transmission-tube of a movable combined transmitter-receiver at each end of said tube.

8. In a pneumatic-carrier system a normally dead transmission-tube, a source of stored pressure normally ineffective for propulsion through said tube, means at each end of said tube to admit said propelling-pressure thereat and carrier-holding means comprising a movable tube-section at the ends of said tube but between the same and said pressure-admitting means for presenting carriers for transmission through the said tube.

9. In a pneumatic-carrier system, a transmission-tube, means at each end of said tube to admit propelling-pressure thereat, and means at the ends of said tube but between the same and said pressure-admitting means for presenting carriers for transmission through and for receiving carriers from the said tube.

10. In a pneumatic-carrier system, a transmission-tube, means at opposite ends thereof to supply propelling-pressure thereat, valves adjacent the ends of said tube to control the admission of such propelling-pressure, and carrier transmitting and receiving devices for said tube and between the said valves.

11. In a pneumatic-carrier system a transmission-tube, a movable transmitter-receiver, and means for automatically establishing a propelling movement of air in said tube for the flight of a carrier therethrough on movement of said transmitter-receiver.

12. For a pneumatic-carrier system, a movable combined transmitter-receiver, and a pressure-controlling valve for said transmitter, connected with the latter and operated thereby.

13. For a pneumatic-carrier system a movable transmitter, a pressure-controlling valve therefor, and means to cause operation of said valve by movement of said transmitter asynchronously therewith.

14. For a pneumatic-carrier system a movable transmitter, a pressure-controlling valve therefor, and means to cause delayed movement of said valve by movement of said transmitter.

15. In a pneumatic-carrier system, a transmission-tube, and a transmitter adapted to abut against the same, the abutting end of the latter having a longitudinal body movement toward and from the end of said tube to bring the abutting ends into closer relation.

16. In a pneumatic-carrier system a transmission-tube, a movable tubular transmitter adapted to abut against the same, the abutting end of the latter having a longitudinal movement to and from said transmission-tube to bring the abutting ends into closer relation and packing means for insuring a tight joint between said tube and transmitter when moved into operative relation one to the other.

17. In a pneumatic-carrier system, a transmission-tube, a movable transmitter adapted to be moved into alinement therewith and removed therefrom, means to admit propelling-pressure through said transmitter, and diaphragm-packing means for said movable transmitter.

18. In a pneumatic-carrier system, a transmission-tube, a tipping transmitter, means to admit propelling-pressure thereto, and diaphragm-packing means therefor.

19. In a pneumatic-carrier system, a transmission-tube, an end support therefor, and a removable size bushing between the end of said tube and its said support.

20. In a pneumatic-carrier system, a transmission-tube, a fixed end support therefor, a movable transmitter adapted to be alined with said transmission-tube, and pressure-controlling means connected with said transmitter, and with the latter bodily removable from said support without disturbing the latter.

21. In a pneumatic-carrier system a transmission-tube, an end support therefor, a movable transmitter-receiver, and pressure-admission means adjacent thereto and operated by movement thereof, the said transmitter-receiver and pressure-admission means being removable from said end support without disturbing the latter.

22. In a pneumatic-carrier system, a transmission-tube, an end support therefor, and a removable base with a transmitter-receiver, and a pressure-controlling valve carried thereby.

23. In a pneumatic-carrier system, a transmission-tube, an end support therefor, a removable base, a transmitter-receiver, a pressure-controlling valve and automatic locking devices, all carried by said removable base.

24. In a pneumatic-carrier system, a transmission-tube, an open-front hood to which it is connected, and a movable transmitter arranged in said hood and having a movement in and out the open front thereof.

25. In a pneumatic-carrier system, a transmission-tube, a movable transmitter, and a valve connected with and moved by said transmitter, the latter and valve having movements respectively in opposite directions.

26. In a pneumatic-carrier system, a transmission-tube, a movable transmitter-holder and means to arrange therein transmitters of different diameters.

27. In a pneumatic-carrier system, a transmission-tube and mechanism at the end thereof for controlling the transmission and receipt of a carrier through said tube and pressure supplying means and controlling devices therefor, located at that side of said transmitting and receiving means which is opposite to the said tube.

28. In a pneumatic-carrier system, a movable transmitter, a distant locking device, and means for operating said distant locking device on movement of said transmitter.

29. In a pneumatic-carrier system a movable transmitter-receiver, a distant locking

device, and means for operating said distant locking device on movement of said transmitter-receiver.

30. In a pneumatic-carrier system, a transmission-tube, transmitting and receiving devices at the ends thereof, and means to enforce simultaneous operative position of the transmitting device at one end of said tube and the receiving device at the opposite end thereof.

31. In a pneumatic-carrier system, a transmission-tube, transmitting and receiving means at the ends thereof, and locking means to enforce simultaneous relative position of the transmitting device at one end of said tube and the receiving device at the opposite end thereof.

32. In a pneumatic-carrier system, a transmission-tube, movable, combined transmitting and receiving devices at opposite ends of said tube and interlocking devices for enforcing predetermined position of the combined devices at one end of said tube upon predetermined position of the combined devices at the opposite end of said tube.

33. In a pneumatic-carrier system, a transmission-tube and tipping, combined transmitting and receiving devices at opposite ends of said tube, and locking means for locking the said tipping combined devices in predetermined position one relative to the other during flight of a carrier through said tube.

34. In a pneumatic-carrier system, a transmission-tube, transmitting and receiving devices at opposite ends of said tube, and locking means therefor whereby movement of a transmission device at one end of said tube into operative position thereby locks the transmission device at the opposite end of said tube in inoperative position, and vice versa.

35. In a pneumatic-carrier system, a transmission-tube, transmitting and receiving devices at opposite ends of said tube, and locking means therefor whereby movement of a transmitting device at one end of said tube into operative position locks the receiving device at the opposite end of said tube also in operative position.

36. In a pneumatic-carrier system, a transmission-tube, and a movable transmitter therefor pivoted at one side the axis of said tube to swing into and out of a position angularly inclined thereto.

37. In a pneumatic-carrier system, a transmission-tube, a movable transmitter therefor, and means to force the abutting ends of said tube and transmitter together, as the latter is moved into its transmitting position.

38. In a pneumatic-carrier system, a movable transmitter and a pressure-admission valve geared to said transmitter.

39. In a pneumatic-carrier system, a transmission-tube, a source of propelling-pressure therefor, a movable transmitter adapted in one position to receive a carrier preparatory to despatching it through said transmission-tube when in another position, and pressure-admission means operated by the movement of said transmitter for the expulsion of said carrier only after said transmitter has left its receiving position.

40. In a pneumatic-carrier system, a transmission-tube having a movable transmitter, and diaphragm-packing means for said movable section.

41. In a pneumatic-carrier system, a movable transmitter, a locking device to lock said transmitter in any one of a plurality of positions, and normally maintained out of locking engagement with said transmitter and an electromagnet for throwing said locking device into locking engagement with said transmitter.

42. In a pneumatic-carrier system, a normally dead transmission-tube adapted for the transmission of a carrier in either direction, means for establishing a propelling movement of air at either end thereof, a movable controlling device at each end to control said means, and means for locking the controlling device at the distant or receiving end in its inoperative or receiving position on the initial movement of the controlling device at the sending end toward its operative or transmitting position.

43. In a pneumatic-carrier system, a movable transmitter, a locking device, and means for locking said locking device on the initial movement of said transmitter.

44. In a pneumatic-carrier system a movable transmitter-receiver connected to be moved one by the other and an automatic locking device for the same.

45. In a pneumatic-carrier system, a movable transmitter-receiver, and a hood for the same.

46. In a pneumatic-carrier system, the combination of a transmission-tube, a movable carrier-holding transmitter at each end thereof adapted to be moved into and out of its transmitting position, and means to enforce an inoperative position of the transmitter at one end when the transmitter at the other end is moved into its transmitting position.

47. In a pneumatic-carrier system the combination of a transmission-tube, a movable carrier-holding transmitter at each end thereof adapted to be moved into and out of its transmitting position, and means to establish a propelling movement of air in the sending direction through movement of one of said transmitters to its transmitting position and to maintain the same during the flight of a carrier.

48. In a pneumatic-carrier system, a transmission-tube, a movable transmitter therefor adapted to receive a carrier for delivery to said tube and having a movement into and out of its transmitting position relatively to the end of said tube and a receiver to receive a carrier from said tube when said transmitter is out of its transmitting position.

49. In a pneumatic-carrier system, a movable transmitter, a pressure-controlling valve

therefor and operated thereby, and an automatic locking device therefor.

50. In a pneumatic-carrier system, a transmission-tube, a movable transmitter having a movement into and out of its transmitting position to transmit a carrier in one direction, and receiving means coöperating therewith to receive a carrier from the opposite direction and adapted to divert the same toward the operator.

51. In a pneumatic-carrier system a transmission-tube, a movable transmitter adapted to be moved into and out of operative position relatively thereto, and means for locking the same in either position.

52. In a pneumatic-carrier system, a transmission-tube, a movable operating device, a stationary support therefor, electric controlling-circuits for said operating device and leading from contacts thereon, corresponding contacts on said support and means for removably securing said operating device to said support, and for simultaneously bringing said support and operating device contacts together.

53. In a pneumatic-carrier system, a transmission-tube adapted for the transmission of a carrier in either direction, a pipe or conduit for connection to the end of the same, to admit pressure thereto, pressure-controlling means therefor, a movable transmitter adapted to be moved into a transmitting position, to connect said pressure-pipe with the end of said transmission-tube and to operate said pressure-controlling means thereby, and a receiver to receive a carrier from said transmission-tube end when said transmitter is out of transmitting position.

54. In a pneumatic-carrier system, a transmitting-tube, a movable transmitter-receiver therefor, and means automatically to admit propelling-pressure to said tube upon movement of said transmitter-receiver into transmitting position, removal of said transmitter-receiver from said position automatically cutting off said propelling-pressure.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILBUR GROVE DAVIS.

Witnesses:
ALICE RICHMOND BROWN,
SUSAN ETHEL HAYNES.