(No Model.)

W. G. COLLINS.

AUTOMATIC ELECTRO PNEUMATIC TUBE SYSTEM.

No. 460,081. Patented Sept. 22, 1891.

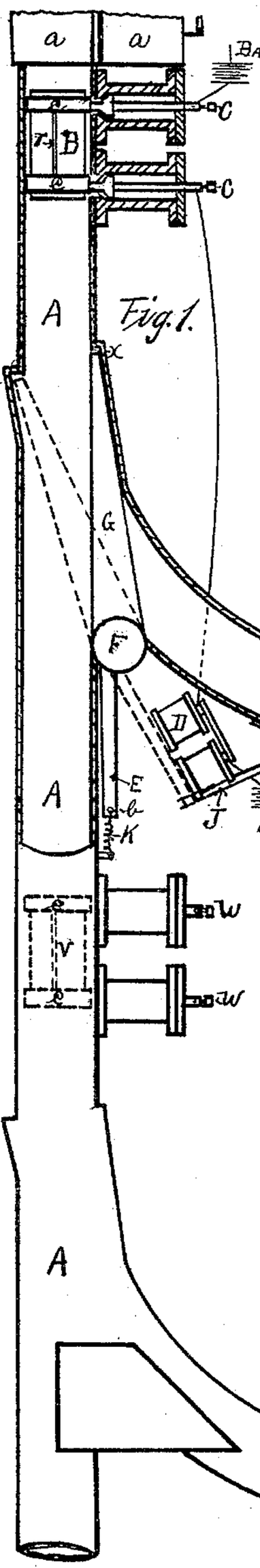


Fig. 2.

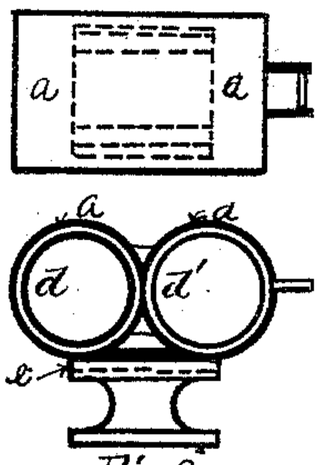


Fig. 3.

Fig. 7.

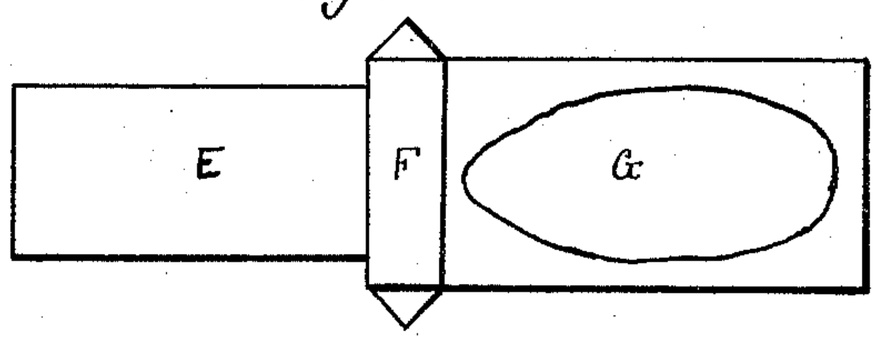


Fig. 8.

Fig. 6.

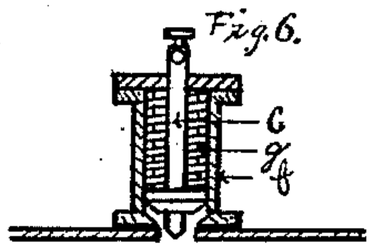


Fig. 5.

Fig. 9.

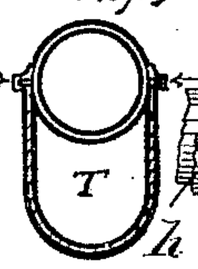


Fig. 9.a

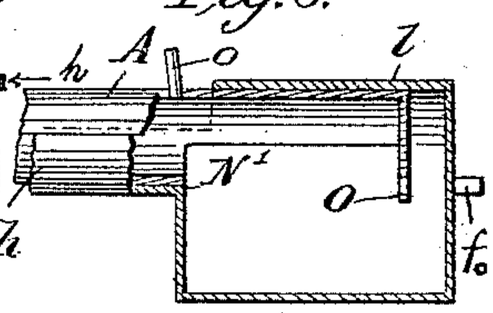


Fig. 10.

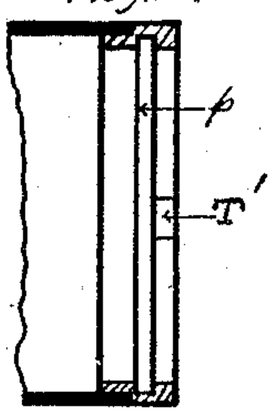


Fig. 4.

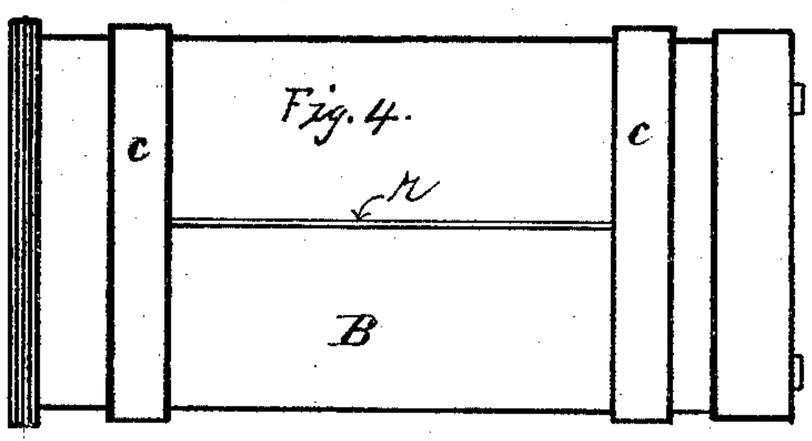


Fig. 11.

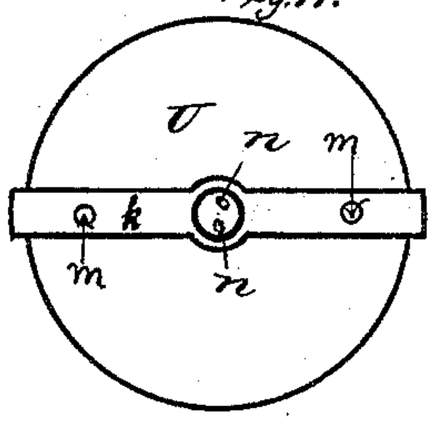
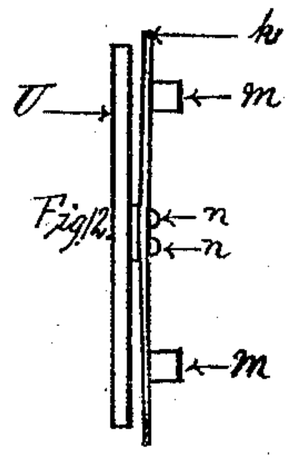


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM GUY COLLINS, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO MAGGIE U. COLLINS AND HUGO J. WEBER, BOTH OF SAME PLACE.

AUTOMATIC ELECTRO-PNEUMATIC-TUBE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 460,081, dated September 22, 1891.

Application filed November 7, 1889. Serial No. 329,592. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GUY COLLINS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electro-Pneumatic-Tube Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to systems in which carriers for parcels, change, &c., are sent through suitable tubes by pneumatic pressure or suction, and in which the carriers are diverted from the main tube to branch tubes by proper switches.

The object of my invention is to provide a system which is largely automatic and which is simple and efficient in construction and operation.

The invention consists in the automatic carrier system, in the carrier, in the circuit-controller, in the switches, and in certain other features hereinafter set forth and claimed.

In the accompanying drawings, which illustrate my invention, Figure 1 is a view, partly in section, of a main tube and two branch tubes with several of my improvements connected therewith. Fig. 2 is a side view of the device which I use in introducing a carrier into the tube. Fig. 3 is a plan view of the same device. Fig. 4 is a side view of my carrier. Fig. 5 shows a detail of my circuit-controller. Fig. 6 is a central section of a part of the circuit-controller. Figs. 7 and 8 are side and top views, respectively, of the switch. Fig. 9 is a section on line *v v* of Fig. 1. Fig. 9ª is a view of the receiver, the section being at right angles to that of Fig. 9. Fig. 10 is a view showing means for securing the cover, which is illustrated in Figs. 11 and 12, on the carrier.

A is a main tube through which a current of air is passed by any suitable means. Since this means does not constitute a part of the present invention, it is not illustrated in the drawings. It may be stated, however, that I prefer to propel the carrier by partially exhausting the air in advance of the carrier and at the same time blowing air into the tube behind the carrier. At any desired points in the length of the main tube branch tubes H are connected. At the angles formed by the junction of the main and branch tubes switches G are pivoted. The switch preferably employed consists of a plate having in it an elliptical opening, as indicated in Fig. 7, a pivot F, and an extension E, which serves as an armature for the magnet D. At the point *b* on this extension a spring K is secured, which spring normally holds the switch in its full-line position, the upper end resting in a recess. The surface of the switch toward the left in the arrangement illustrated is straight, forming a continuation of the wall of the main tube, so that in the normal position of the switch a carrier may pass directly through the main tube. The opposite side of the switch is preferably inclined, as shown in Figs. 1 and 8. In order to provide space for the carrier to pass from the main to a branch tube, the elliptical opening before referred to is provided. As a carrier B approaches a switch occupying its dotted position, Fig. 1, in which position it rests in a recess *y*, it strikes the inclined side of said switch, and the rounded end of the carrier strikes the edge of the elliptical opening and is gradually turned from the main to the branch tube. The end of the carrier in turning first projects slightly through the elliptical opening and then is withdrawn therefrom, owing to the shape of the carrier and opening, as will be evident. The minor axis of the opening should be less than the diameter of the carrier to prevent the latter passing through the opening. The construction of the switch just described also allows free circulation of air through both the main and branch pipes without regard to the position of the switch. The carrier consists of a cylindrical box B, having around it metal bands *c c*, which are connected together by a conductor *r*. Each carrier is provided with such bands; but the distance between said bands on any carrier differs from the distance between the bands on any other carrier.

In the head of the carrier is a groove *p*. T′ is a groove at right angles to groove *p* and of equal depth therewith. U is a cover for

the carrier. On the cover is a cross-spring *k*, the length of which is nearly equal to the diameter of the groove *p*. This spring is secured at the center by screws or rivets *n n* and has two knobs *m m*. To put the cover in place, the spring *k* is brought into line with the groove T′, the cover is forced into place, the ends of spring *k* are brought into line with the groove *p* by pressure on the knobs *m*, and the cover is then turned, whereby it is locked in place.

The magnets D, of which there are as many as there are switches, are in normally-open electric circuits. One such circuit is shown in Fig. 1, and two batteries are shown connected to said circuit, although it will be evident that one would answer every purpose. When two batteries are used, they should be placed with their poles in the same direction, so that when the circuit is closed they will not oppose each other. The circuit is connected to two terminals C C, which project slightly into the main tube between the point where the carrier is inserted and the branch into which the carrier is to be diverted. Around the rod or terminal C is a spring *g*, pressing on the head of the rod within the sleeve *f*. The distance between the rods C C differs from the distance between the corresponding rods *w w* of any other switch for a purpose hereinafter described.

a a is a device which I call a "sender," and is for the purpose of introducing the carrier into the main tube without allowing escape of air. This sender consists of a body having two chambers *d d′* of proper size and shape to receive the carrier. One of said chambers is normally in line with the main tube to preserve its continuity and the other is out of line with the tube. This body is mounted in a suitable support. (Shown in Fig. 3.) Said support has a groove *e*, into which a corresponding tongue or projection on the body *a* fits, and in which it can slide.

In one side of each branch tube adjacent to the switch-magnet is placed a spring I, which is connected with a pivoted pawl J. This pawl is provided at its outer end with a hook adapted to engage the armature E when the latter is in its dotted position. L is a similar spring in one side of the tube connected by means of a rod P to a valve-rod M of valve N in pipe *o*, one end of which pipe is connected to the branch tube at the left of the spring and the other end of which is connected to the carrier-receiver T. At the end of the branch tube a portion is cut away on the lower side, as shown in Fig. 9ª, and a plate O is placed over the end of the branch tube. The receiver, which is preferably of the form shown in Figs. 9 and 9ª, is supported by a tongue-and-groove device *h*, so that it can slide on the branch H. *f* is a handle for moving the receiver, and *l* is an extension at the top of the receiver, extending a short distance over the tube H.

The operation of the system may briefly be set forth as follows: A carrier is inserted into the chamber of the sender which is out of line with the main tube A. The sender is then slid along until the carrier is brought in line with the tube, when it is forced along through the tube and in its passage will reach a point where its two bands *c c* will simultaneously make contact with two terminals of one of the switch-circuits, as illustrated in Fig. 1. This closes the circuit of a switch-magnet and draws the switch into the position shown in dotted lines, in which position the switch is held by the pawl J until the carrier in its passage strikes spring I, moving it and the pawl with which it is connected, thus disengaging the detent. As the carrier passes still farther it strikes spring L, opening the valve in pipe *o* and allowing air to pass from the rear of the carrier to the receiver in advance of the carrier, thereby forming an air-cushion. The carrier falls through the opening in the bottom of the tube H into the receiver. The receiver is then moved longitudinally until the shoulder N′ strikes the end plate O. This closes the opening and prevents the escape of air. The carrier is then removed from the receiver. The dotted lines *i′ j′* in Fig. 1 indicate the distance through which the receiver is moved in order to take out the carrier.

If the carrier V, instead of B, had been put into the tube, it would not have closed the circuit of the first branch, but would have passed to the second circuit-controller and would have there closed a circuit leading to the second switch-magnet, since the distance between *c c* on this carrier is equal to the distance between the rods *w w*.

From what has been described it will be seen that when any carrier is placed in the tube it automatically selects and passes into the proper branch tube, owing t the fact that each carrier has what may be termed an "individual-circuit controller"—that is, a controller adapted to close or change the circuit which operates the switch of its own branch tube, but no other.

Having thus described the invention, what I claim is—

1. The combination, in an electro-pneumatic tube or carrier system, of a main and branch tubes, carriers adapted to pass through said tubes, and magnets in circuits automatically controlled by the carriers to divert each carrier to its own branch tube, substantially as described.

2. The combination, in an electro-pneumatic tube system, of a main and branch tubes, switches controlling the passages between the main and branch tubes, magnets for operating the switches, electric circuits, including the magnets, and individual-circuit controllers for the several circuits, each operated by its own carrier passing through the tube and by no other carrier, substantially as described.

3. The combination, in an electro-pneumatic-tube system, of main and branch tubes,

switches controlling the passages between said tubes, magnets in normally-open circuits for controlling the switches, circuit-terminals in the circuit of each magnet, the terminal of each circuit being differently arranged from those of the other circuits, and carriers adapted to pass through the tubes, each carrier having an individual-circuit controller co-operating with the circuit-terminals, substantially as described.

4. The combination of a carrier for electro-pneumatic-tube systems, bands on the carrier, and a conductor connecting said bands, substantially as described.

5. The combination, in an electro-pneumatic tube system, of a tube, rods, or similar devices extending into the tube at a predetermined distance apart, and a carrier adapted to move in the tube and to simultaneously touch said rods to control a circuit, substantially as described.

6. The combination, in an electro-pneumatic-tube system, of a main and branch tubes, rods or similar devices extending into the main tube at a predetermined distance apart, a carrier adapted to move in the tubes and to simultaneously touch said rods to control a circuit, and a switch-magnet in said circuit, substantially as described.

7. The combination, in an electro-pneumatic-tube system, of two spring-pressed rods extending into the tube, a carrier adapted to move in the tube, and bands or projections on said carrier at a distance apart equal to the distance between the rods and adapted to make contact simultaneously with said rods, substantially as described.

8. The combination, in an electro-pneumatic-tube system, of a main and branch tubes and a switch having an opening through it pivoted at the angle between said tubes, substantially as described.

9. The combination, in an electro-pneumatic-tube system, of a main and branch tubes, a switch having an opening of an elliptical shape through it and controlling the passage between said tubes, substantially as described.

10. A switch for controlling passage between a main and branch tubes, consisting of a pivoted plate having a rounded or elliptical opening, substantially as described.

11. A switch controlling the passage between a main and branch tubes, consisting of a pivoted plate having a rounded or elliptical opening, and an extension forming an armature, substantially as described.

12. A switch for controlling the passage between a main and branch tubes, consisting of a pivoted plate having a rounded or elliptical opening, and a spring for holding the switch in its normal position, substantially as described.

13. The combination of a main and branch tubes, a switch normally closing one of said tubes, a magnet for moving said switch, a circuit for the magnet rendered operative by a circuit-controller on a carrier moving through said tube, and a pawl for holding the switch in its attracted position, substantially as described.

14. The combination of a main and branch tubes, a switch normally closing one of said tubes, a magnet for moving said switch, a circuit for the magnet automatically controlled by a carrier, a pawl for holding the switch in its attracted position, and means operated by the carrier for releasing the switch, substantially as described.

15. The combination, in a pneumatic-tube system in which carriers are passed through suitable tubes, of a tube having a segment cut away from its lower side to allow a carrier to drop out of the tube, and a sliding receiver over the end of the tube, into which the carrier falls, substantially as described.

16. The combination, in a pneumatic-tube system in which carriers are passed through suitable tubes, of a tube having a segment cut away from its lower side to allow a carrier to drop out of the tube, an end plate for the tube, and a sliding receiver over the end of the tube, into which the carrier falls, said receiver having a shoulder adapted to bear against the end plate to close the tube, substantially as described.

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