J. F. SKIRROW.

TRANSFER TUBE SYSTEM.

APPLICATION FILED MAY 23, 1905.

1,045,205.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.

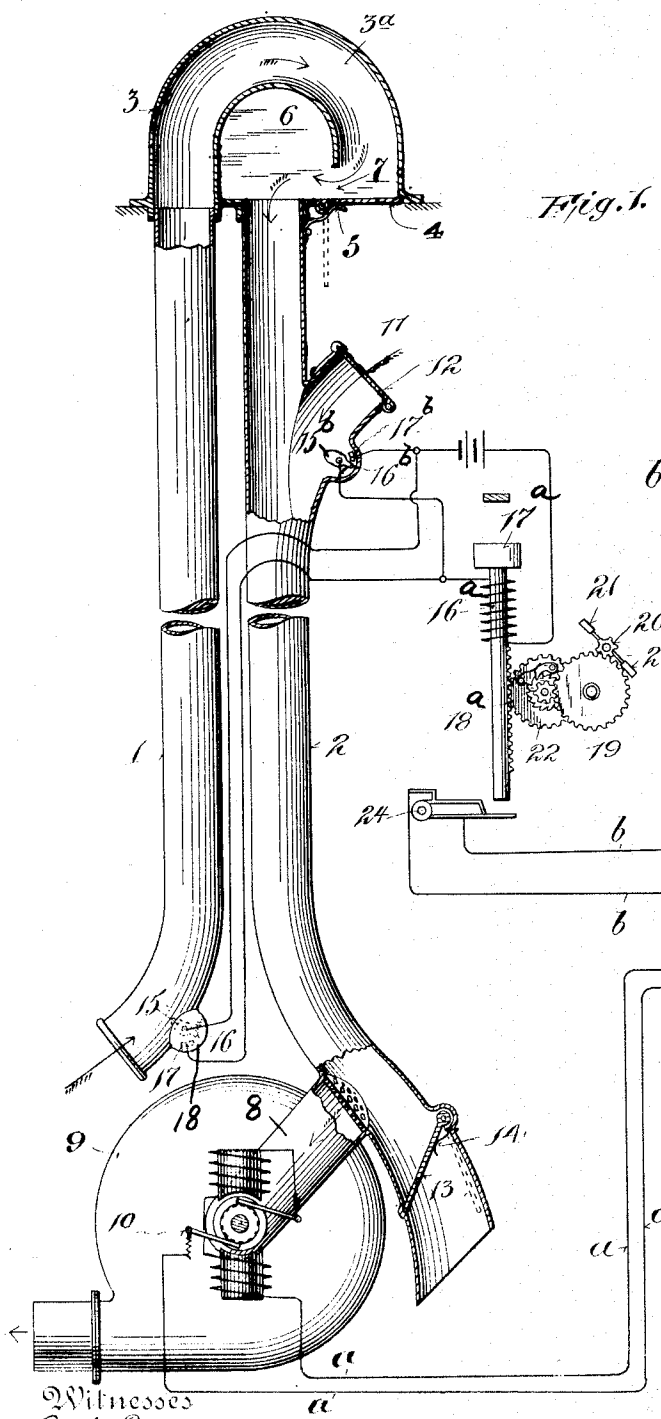


Fig. 1.

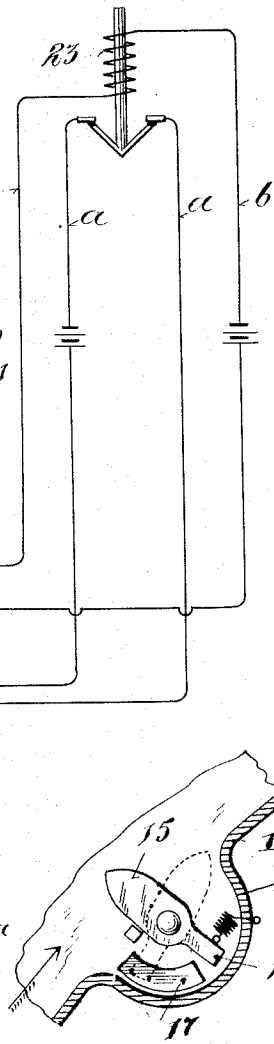


Fig. 4.

Witnesses
C. W. Benjamin
E. I. Caughlan

Inventor
John F. Skirrow
By his Attorneys Davis & Davis

J. F. SKIRROW.

TRANSFER TUBE SYSTEM.

APPLICATION FILED MAY 23, 1905.

1,045,205.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 2.

Fig. 2.

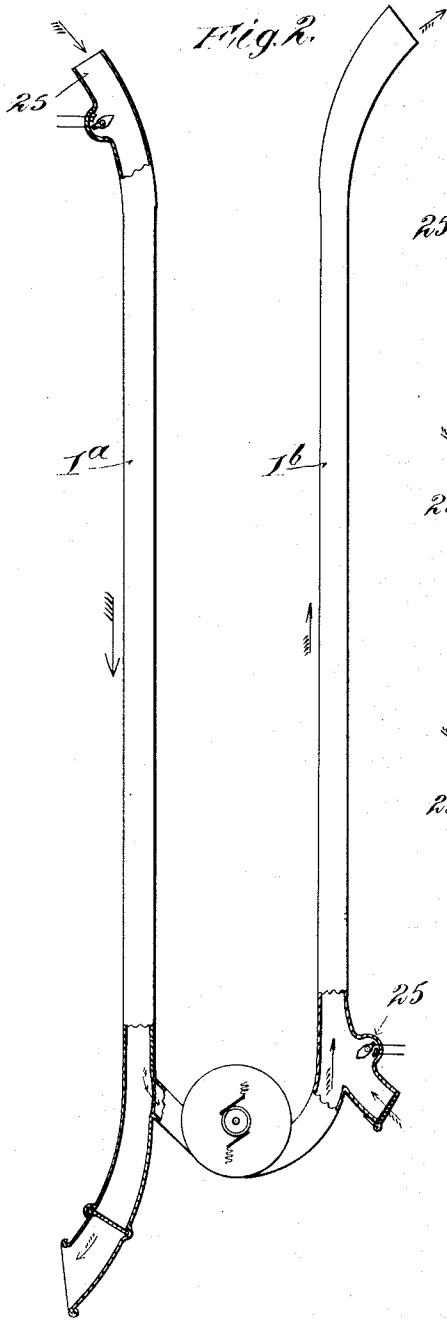
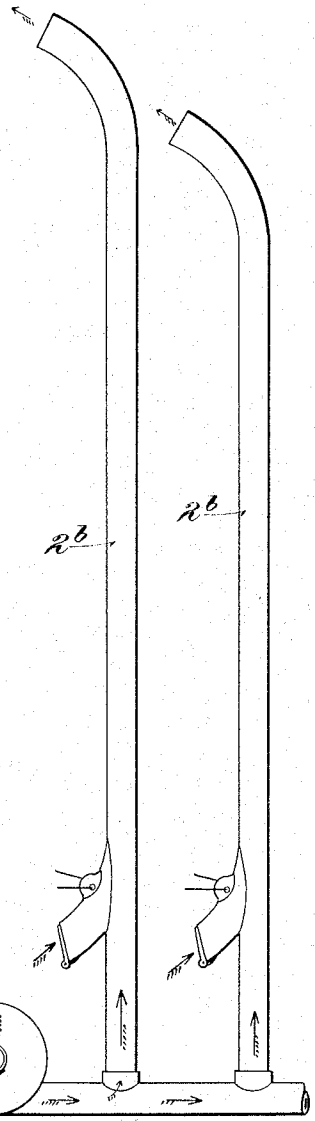


Fig. 3.



Witnesses
C. W. Benjamin
E. J. Caughlan

John F. Skirrow
Inventor
By his Attorneys Davis & Davis

J. F. SKIRROW.

TRANSFER TUBE SYSTEM.

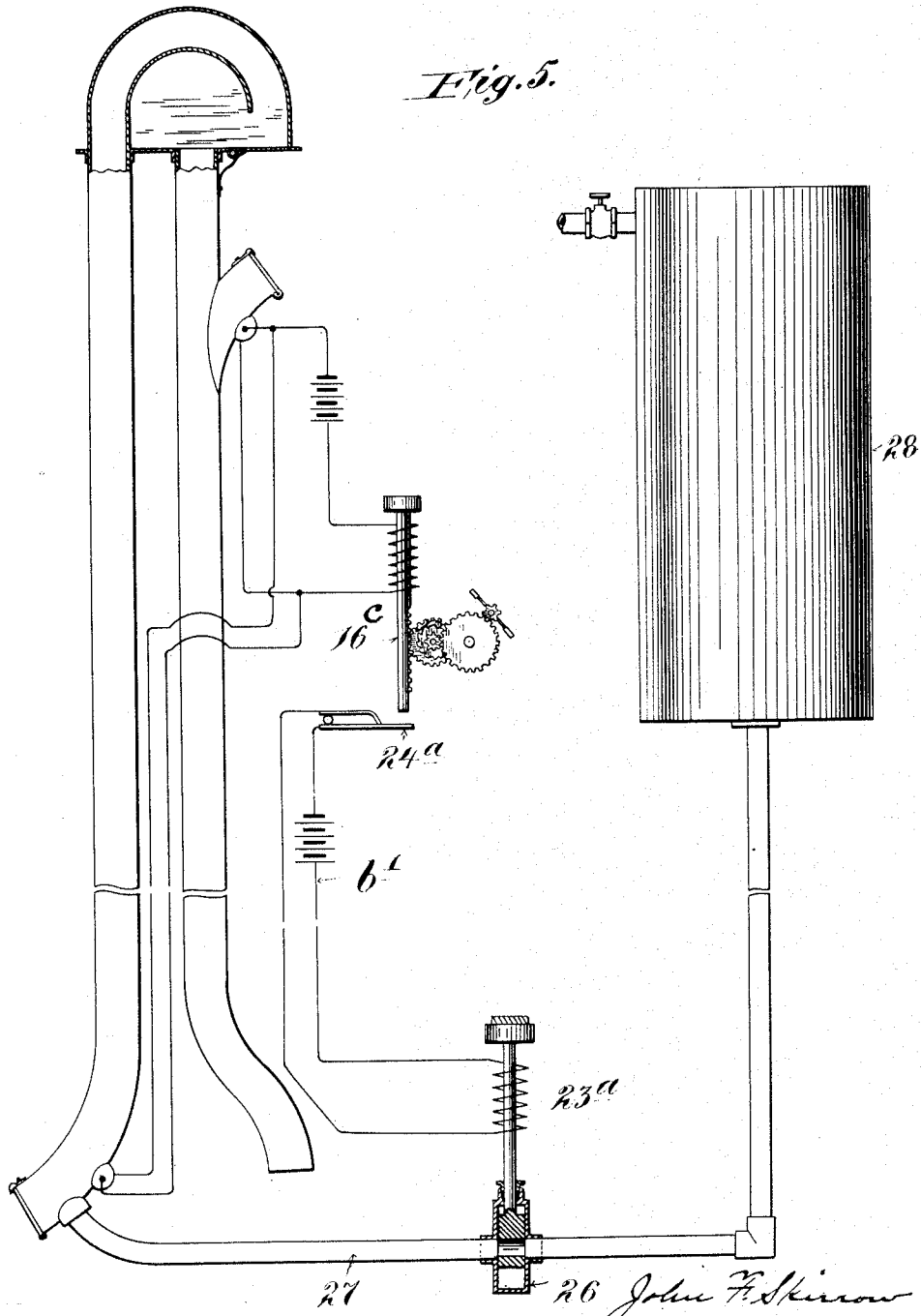
APPLICATION FILED MAY 23, 1905.

1,045,205.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 3.

Fig. 5.



Witnesses
C. W. Benjamin
E. F. Caughlan

John F. Skirrow
Inventor

By his Attorneys Davis & Davis

UNITED STATES PATENT OFFICE.

JOHN F. SKIRROW, OF EAST ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO LAMSON CONSOLIDATED STORE SERVICE COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TRANSFER-TUBE SYSTEM.

1,045,205. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed May 23, 1905. Serial No. 261,912.

To all whom it may concern:

Be it known that I, JOHN F. SKIRROW, a citizen of the United States, residing at East Orange, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Transfer-Tube Systems, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a complete system in which air is exhausted from the transmission tubes to drive the carriers in two directions; Fig. 2 is a view showing an arrangement of apparatus wherein air is exhausted from one tube and driven through one; Fig. 3 a similar view showing an arrangement of apparatus wherein air is exhausted from one tube and driven through a plurality of tubes; Fig. 4 a detail view of the trigger key; and Fig. 5 is a diagrammatic view of a modified form of the apparatus.

One of the many objects of this invention is to improve that class of transfer tube systems, in which air is caused to pass through the transmission tubes by providing means whereby air will be moved through the tubes for a predetermined time and will then be stopped, said time being so determined that the carrier will have ample time to pass through the tube to its destination.

Another object of the invention is to cause the air to pass through the tubes by means of a suitable blower or pump operated by a motor, and providing means whereby the motor will be operated for a predetermined time and will then be stopped.

A further object of the invention is to provide means whereby the motor and timing device will be electrically operated and electrically controlled by an auxiliary circuit and the timing device will be operated to interrupt this motor controlling circuit at a predetermined time.

Another object of the invention is to provide means whereby a plurality of receiving stations may be connected to a single transmission tube, each receiving station being provided with means for independently actuating the timing mechanism, whereby the motor will be independently controlled from each of said stations.

Referring to the various parts by numerals 1 and 2 designate the transmission tubes, 1 being the outgoing tube and 2 the incoming one.

The outgoing tube is connected at its outer end to a delivery head 3, having a carrier passage 3^a which is upwardly arched. The lower discharge end of this passage is normally closed by a cover 4, said cover being held in position by means of a spring 5. The outer end of the incoming tube opens into an air chamber 6 of the delivery head, said chamber being connected to the discharge passage of the head through an opening 7. The lower end of the incoming tube 2 is connected by a pipe 8 to a blower 9, said blower being directly operated by means of an electric motor 10, as represented in diagram in Fig. 1. This motor is so driven that air will be drawn up through the outgoing tube 1, through the head 3 into the chamber 6 and down through the incoming tube 2 and out, as indicated by the arrows in Fig. 1. The incoming tube 2 is provided with a receiving terminal 11 near its outer end, said terminal being normally closed by means of a cover 12. At the lower end of the incoming tube below the air exhaust pipe 8 is mounted a swinging closure or valve 13, said valve being normally held against its seat to close said tube by means of a very light spring 14 so that when the blower is operated to draw air through the transmission tubes this valve will be held closed by the suction of the blower and by the spring, to prevent air passing into said tube through its lower end.

As thus far described, this apparatus is similar to transfer tube systems now in use wherein the air pump is operated continuously to exhaust air from the transmission tubes, and the important features of this invention lie in the motor controlling devices which will be hereinafter described.

At the entrance of the outgoing transmission tube 1 and extending into the tube so that it lies in the path of the entering carriers is a small trigger or key 15. When this key is swung on its pivot by the entering carrier its contact arm 16 engages a contact 17 located in a small casing 18, secured to the side of the tube, and completes the

motor timing circuit. In this circuit is a solenoid 16^a whose armature is prolonged to form a rack bar 18^a and is provided at its upper end with the weight 17^a. This rack bar engages one of a train of gearing 19, the final shaft 20 of which carries a small fan 21.

The rack 18^a of the solenoid armature meshes with a gear 22 of the timing train, said gear being loose on its shaft but connected thereto in such manner, by means of a pawl and ratchet, that when the solenoid armature descends to its normal position it will rotate said gear and its shaft and actuate the timing train. The trigger or key 15 is provided with means preferably a spring to hold its contacts separate so that the motor timing circuit will normally be open. At the receiving terminal of the incoming tube 2 is mounted a trigger 15^b which is provided with a contact 16^b adapted to engage a stationary contact 17^b, said contacts being in the motor timing circuit and adapted to complete said circuit when they are in engagement. It will, therefore, be seen that when a carrier is inserted at either receiving terminal or station the motor timing circuit will be completed and the solenoid armature lifted to its uppermost position. The timing train and the fan 21 actuated thereby are so arranged and proportioned that it will require a given time for the descent of the solenoid armature after the motor timing circuit has been broken.

The motor circuit *a* is completed through a motor starting solenoid 23, and said motor starting solenoid is arranged in a motor controlling circuit *b*. Directly below the armature of the motor timing solenoid 16^a is arranged a pair of normally closed contacts 24, one of said contacts being adapted to be engaged by the armature of the said solenoid at the lower end of its movement to separate said contacts and thereby break the motor controlling circuit. By thus interrupting this circuit the armature of the motor controlling solenoid will be dropped and the motor circuit interrupted.

It will thus be seen that when a carrier is inserted in either of the receiving terminals the motor timing circuit is completed through the trigger, and the armature of the solenoid 16^a will be raised to its upper position. As soon as the armature of said solenoid is free of the contacts 24 the motor controlling circuit is closed and the armature of the solenoid 23 caused to complete the motor circuit. As soon as the carrier has passed beyond the trigger at the receiving terminal the motor timing circuit will be broken and the armature of the solenoid 16^a will begin its downward movement. This movement may be retarded to any extent desired by means of the timing train and the fan so that the motor will be permitted to run any desired length of time, usually a few seconds, before the lower end of the armature of the said solenoid engages and separates the contacts 24.

It will be observed that the last carrier inserted in either of the transmission tubes resets the timing mechanism so that the motor will run a predetermined time after the last carrier is inserted in the system, whether it be an incoming carrier or an outgoing one. It will, of course, be understood that as many incoming and outgoing transmission tubes may be connected to and operated by one motor and blower as desired, it being only necessary to have the motor and blower of the proper capacity.

In Fig. 2 is shown a slightly different form of the apparatus. In this arrangement the air is exhausted from one transmission tube 1^a and forced out through the other tube 1^b as indicated by the arrows in said figure. The receiving terminals 25 of this form of the apparatus are provided with trigger keys, and the apparatus is in all other respects the same as shown in Fig. 1.

In Fig. 3 another form of the apparatus is shown. In this arrangement the incoming transmission tube 2^a is provided with a plurality of receiving terminals 25^a all of which lead into said transmission tube 2^a. Each of these receiving terminals is provided with a key or trigger so that upon the insertion of a carrier in any one of them the motor timing and controlling circuits will be completed in the same manner as described with respect to Fig. 1. As shown in this view the air is drawn in through the tube 2^a and is forced outward through the outgoing tubes 2^b, two of these outgoing tubes being shown in this figure.

In ordinary store service apparatus, the outgoing tubes are arranged so that each will discharge at or near a separate receiving terminal in the suction tube 2^a, that is to say, one discharge tube will lead to the most distant receiving terminal in tube 2^a; another to the next distant receiving terminal, and so on throughout the series. It will, of course, be understood, however, that to adapt the system for other uses the outgoing tubes need not necessarily lead to a receiving terminal in the suction tube.

In Fig. 5 still another form of the apparatus is shown. In this arrangement the motor and blower are dispensed with and the motor controlling circuit *b'* is arranged to open a valve 26 which is located in an air supply pipe 27, said pipe connecting a tank 28 to the inlet end of the transmission tube. The transmission tubes as shown in this figure are arranged in the same manner as shown in Fig. 1; and the timing device and the trigger arrangements for completing the timing circuits are to be ar-

ranged exactly as shown in Fig. 1. The armature of a solenoid 16^c is adapted to open the valve-controlling circuit b' after a predetermined time and to thereby render inoperative the solenoid 23^a which is arranged to lift the valve 26, said valve being connected to the lower end of the armature of said solenoid. Any suitable means as a weight or a spring may be employed to normally hold the valve 26 in its closed position. The operation of this form of the apparatus is obvious but may be briefly described as follows:—When a carrier is placed in either terminal the timing circuit is completed and the armature of the solenoid 16^c is lifted permitting the contacts 24^a to close the valve-closing circuit b'. The valve will remain lifted and open until the armature on the solenoid 16^c descends and separates the contacts 24^c, whereupon the solenoid 23^a will be rendered inoperative and the valve 26 will return to its closed position. The tank 28 is preferably charged with compressed air; of course, it will be understood, that it may be a vacuum tank, if desired. In this latter case, however, the pipe 27 must be connected to the transmission tube in a manner similar to the exhaust pipe shown in Fig. 1.

It will, of course, be understood that the timing means may be set from the receiving stations or terminals otherwise than by the insertion of a carrier.

Features of invention which are shown and described herein, but not claimed will be made the subject-matter of divisional applications.

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

1. In a pneumatic despatch tube system, the combination with the transit tubing, of an air moving device, a motor for driving it, and motor controlling means responsive to the carrier insertions in said transit tubing for insuring the operation of the motor during a predetermined minimum time interval following each carrier insertion and independent of the actual travel of the inserted carrier.

2. In a pneumatic despatch tube system, the combination with the transit tubing and a plurality of transmitter stations therefor, of an air moving mechanism for causing the inserted carriers to pass through said tubing, and means for controlling said mechanism, comprising a device at each transmitter station adapted to be actuated by each insertion of a carrier at that station, and a timing device set on each actuation of any of said devices for insuring the operation of said air moving mechanism for a predetermined interval of time after a carrier has been inserted in the transit tubing at any of said stations.

3. In a pneumatic despatch tube system, the combination with the transit tubing, of an air moving device, an electric motor for driving it, an automatic controller for starting and stopping the motor, and actuating means therefor comprising a timing device, and means for setting it each time a carrier is inserted in said tubing, said timing device actuating said controller to start the motor if stopped when a carrier is inserted, to maintain it in operation after that carrier insertion, or any subsequent carrier insertion, until the interval of time following any carrier insertion, without a following carrier insertion exceeds a predetermined period, and to stop the motor when said interval exceeds said period.

4. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air for driving the carriers, a motor adapted to drive said blower or pump, timing means for said motor arranged to be set to stop the carrier driving operation of the motor independently of the travel of the carriers, and means at each despatching station for starting the motor and setting the timing means for the transmission of carriers.

5. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air for driving the carriers, a motor adapted to drive said blower or pump, timing means for said motor arranged to be set to stop the carrier driving operation of the motor independently of the travel of the carriers, and means for resetting said timing means independently of the position of the timing means under the previous setting.

6. A transfer tube system comprising a transmission tube normally dead, a receiving terminal and a discharge terminal, electrically operated means for moving air through said tube, means at the receiving terminal and adapted to be operated by the insertion of a carrier in the transmission tube to complete a timing circuit, a timing device in said circuit and adapted to be operated thereby, and means whereby the timing device will control the air moving means.

7. A transfer tube system comprising a transmission tube, a receiving terminal and a discharge terminal, an air pump connected to said transmission tube, an electric motor for operating said pump, electrical means controlled from the receiving terminal for operating said motor, and including means for stopping said motor after a predetermined time.

8. A transfer tube system comprising a transmission tube, a receiving terminal and

a discharge termin an air pump connected to said transmission tube, an electric motor for operating said pump, a timing means to control the motor independently of the motor and of the moving air, and means at the receiving terminal for starting the motor.

9. A transfer tube system comprising a transmission tube, a receiving terminal and a discharge terminal, an air pump connected to said transmission tube, an electric motor for operating said pump, a timing means to control the motor independently of the motor and of the moving air, and electric means controlled from the receiving terminal for setting in operation the motor.

10. A transfer tube system comprising a transmission tube, a receiving terminal, an air pump connected to said transmission tube, an electric motor for operating said pump, a gear-train timing means to stop said motor after a predetermined time, and a circuit controlled from the receiving terminal for setting in operation said gear-train timing means and starting the motor.

11. A transfer tube system comprising a transmission tube, a pump connected thereto, an electric motor for operating said pump, a motor starting device for completing the motor circuit, a motor controlling circuit for operating the starting device, a timing circuit, and a timing device operated by said circuit for closing the motor controlling circuit.

12. A transfer tube system comprising a transmission tube having a plurality of receiving terminals, an air pump connected to said tube, an electric motor for operating said pump, means arranged to be operated from each receiving terminal for controlling said motor and permitting it to operate a predetermined time, said means operating to stop the motor independently of the carrier in the transmission tube.

13. A transfer tube system comprising a transmission tube, a pump connected thereto to exhaust air from said tube, a plurality of receiving terminals connected to said tube, an electric motor for driving said pump, a gear-train timing means for controlling said motor, electrical means at each receiving terminal for starting said gear-train timing means and the motor.

14. A transfer tube system comprising a transmission tube, a receiving terminal, an air pump connected to said tube, an electric motor for operating said pump, a timing means for stopping the motor after a predetermined time, said timing means operating independently of the motor and of the moving air, and uncontrolled by the said motor or the said moving air, and means for starting the motor and the timing means.

15. A transfer tube system comprising a transmission tube, a receiving terminal and a discharge terminal therefor, an electrically operated timing device, electrically operated means for controlling the movement of air through said tube, said means being controlled by the timing device.

16. A transfer tube system comprising a transmission tube, a receiving terminal therefor, electrically operated means for governing the movement of air therethrough, an electrically operated timing means for controlling the air governing means, and means at the receiving terminal adapted to be operated by a carrier to complete the circuit of the timing means.

17. A transfer tube system comprising a normally dead transmission tube, a pump connected thereto, a motor for operating said pump, a motor controlling circuit adapted to be completed by the insertion of a carrier in the transmission tube, and means in said controlling circuit for permitting the motor to operate for a predetermined time.

18. A transfer tube system comprising a transmission tube, means for moving air therethrough and adapted to be operated by the completion of an electric circuit, and automatic timing means to permit the air moving means to operate for a predetermined time, said means being independent of the moving air, and uncontrolled by the air moving means, and means to start the air moving means and the timing device.

19. A transfer tube system comprising a transmission tube having a plurality of receiving terminals, an air pump connected to said tube, an electric motor for operating said pump, a timing means to permit said motor to operate a predetermined time, and means at each receiving terminal for independently setting the timing means.

20. A transfer tube system comprising a transmission tube, a plurality of receiving terminals connected to said tube, an air pump connected to said tube, an electric motor for operating said pump, an independent power-driven timing means to stop the pump after a predetermined time, and means at each receiving terminal for independently setting the timing means, whereby the carriers may be despatched through said tube from said terminals, and the motor will be stopped a predetermined time after the last carrier is inserted in the tube.

21. A transfer tube system comprising a transmission tube, a plurality of receiving terminals connected thereto, means for causing air to move through said tube, an independent power-driven timing means to stop the means for moving air through the tube after a predetermined time, and electrical means at each of the receiving terminals for starting the timing means and means for causing air to move through the tube.

22. A transfer tube system comprising a transmission tube, a receiving terminal, an

air pump connected to said tube, an electric motor for operating said pump, an independent power-driven timing means to stop the pump after a predetermined time, and means at the receiving terminal for starting the motor and the timing means.

23. A transfer tube system comprising a transmission tube, a receiving terminal and a discharge terminal, an air pump connected to said tube to move air therethrough, an electric motor connected to said pump, a timing means to control the motor circuit, and electric means at the receiving terminal for setting in motion the timing means and closing the motor circuit, whereby the motor circuit will be closed when the timing means is set in operation and the said circuit will be opened when the timing means has operated for a predetermined time.

24. A transfer tube system comprising a transmission tube, a receiving terminal, an air moving means connected to said tube, an electric motor for operating said air moving means, an independently operating timing means for stopping the electric motor, and means for starting the motor and the timing means whereby the air moving means will be operated for a predetermined time and then stopped.

25. A transfer tube system comprising a transmission tube, a receiving terminal and a discharge terminal, an air pump connected to said transmission tube, an electric motor for operating said pump, electrical means controlled from the receiving terminal for starting said motor, and including means operating independently of the carrier in the transmission tube for stopping said motor after a predetermined time.

26. A transfer tube system comprising a transmission tube having a plurality of receiving terminals, an air pump connected to said tube, an electric motor for operating said pump, means adapted to be independently operated from each receiving terminal for controlling said motor, and including means to permit said motor to operate a predetermined time independently of the carrier in the transmission tube.

27. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air in said tube for driving carriers, a motor adapted to drive said blower or pump, means for cutting said motor and blower into operation for the transmission of carriers, and timing means for maintaining said motor and blower in such operation for the transmission of said carriers and automatically cutting out of such operation said motor and blower a predetermined interval after the insertion of the last carrier.

28. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air in said tube for driving carriers, a motor adapted to drive said blower or pump, means for cutting said motor and blower into operation for the transmission of carriers, and timing means adapted to maintain said motor and blower in such operation for the transmission of said carriers and to automatically cut out of such operation said motor and blower independently of the travel of the carriers.

29. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air in said tube for driving carriers, a motor adapted to drive said blower or pump, means for cutting said motor and blower into operation for the transmission of carriers, and timing means adapted to automatically cut out of such operation said motor and blower after a predetermined interval.

30. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air in said tube for driving carriers, a motor adapted to drive said blower or pump, means for cutting said motor and blower into operation for the transmission of carriers, and timing means acting to allow the blower and motor to thus operate for an interval determined by the timing means and then to automatically cut out of such operation said motor and blower.

31. In a pneumatic despatch tube apparatus, a tube for the transmission of carriers, a blower or pump connected with said tube and adapted to be operated to create a current of air in said tube for driving carriers, a motor adapted to drive said blower or pump, means for cutting said motor or blower into operation for the transmission of carriers, and timing means for allowing the blower and motor to thus operate and subsequently to automatically cut out of such operation said motor and blower independently of the travel of the carriers.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 10th day of May 1905.

JOHN F. SKIRROW.

Witnesses:
WM. R. DAVIS,
E. I. CAUGHLAN.