No. 632,690. Patented Sept. 12, 1899.

B. C. BATCHELLER.

PNEUMATIC DESPATCH SYSTEM.

(Application filed Nov. 1, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

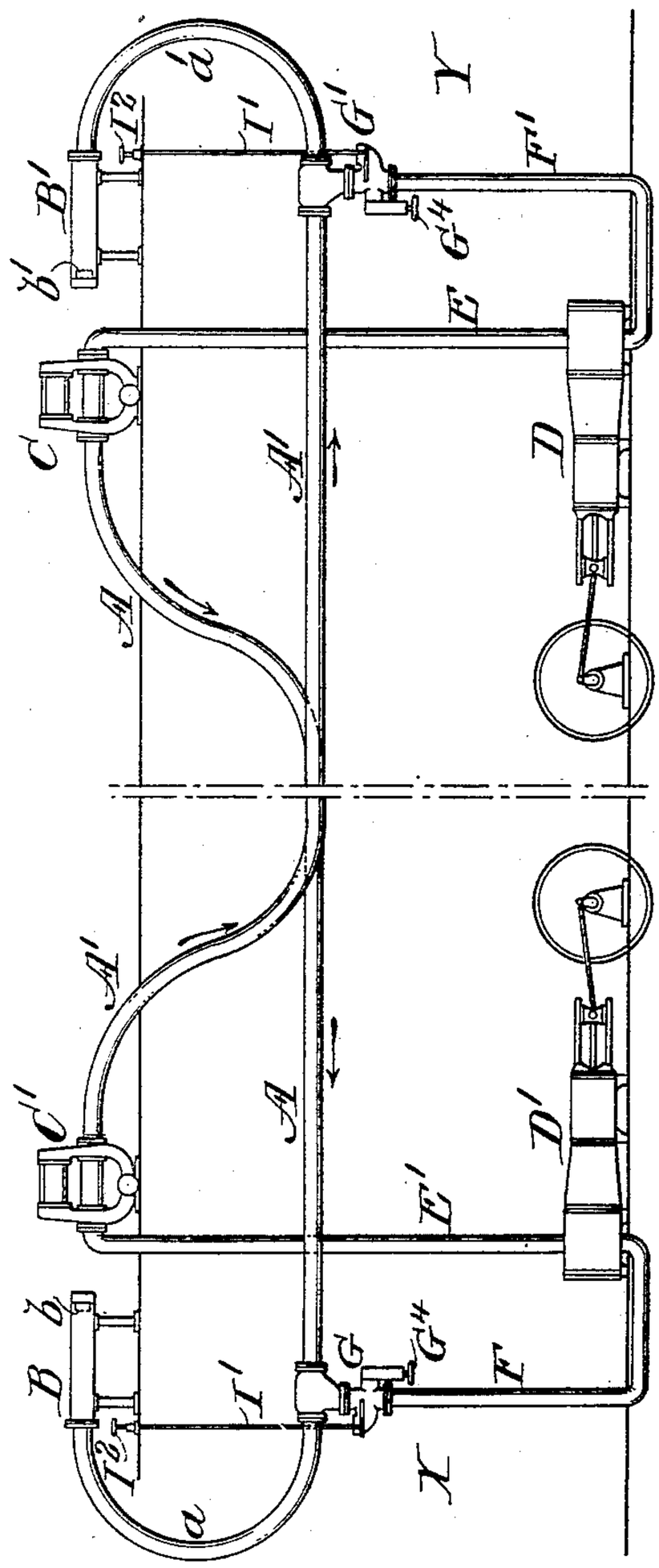
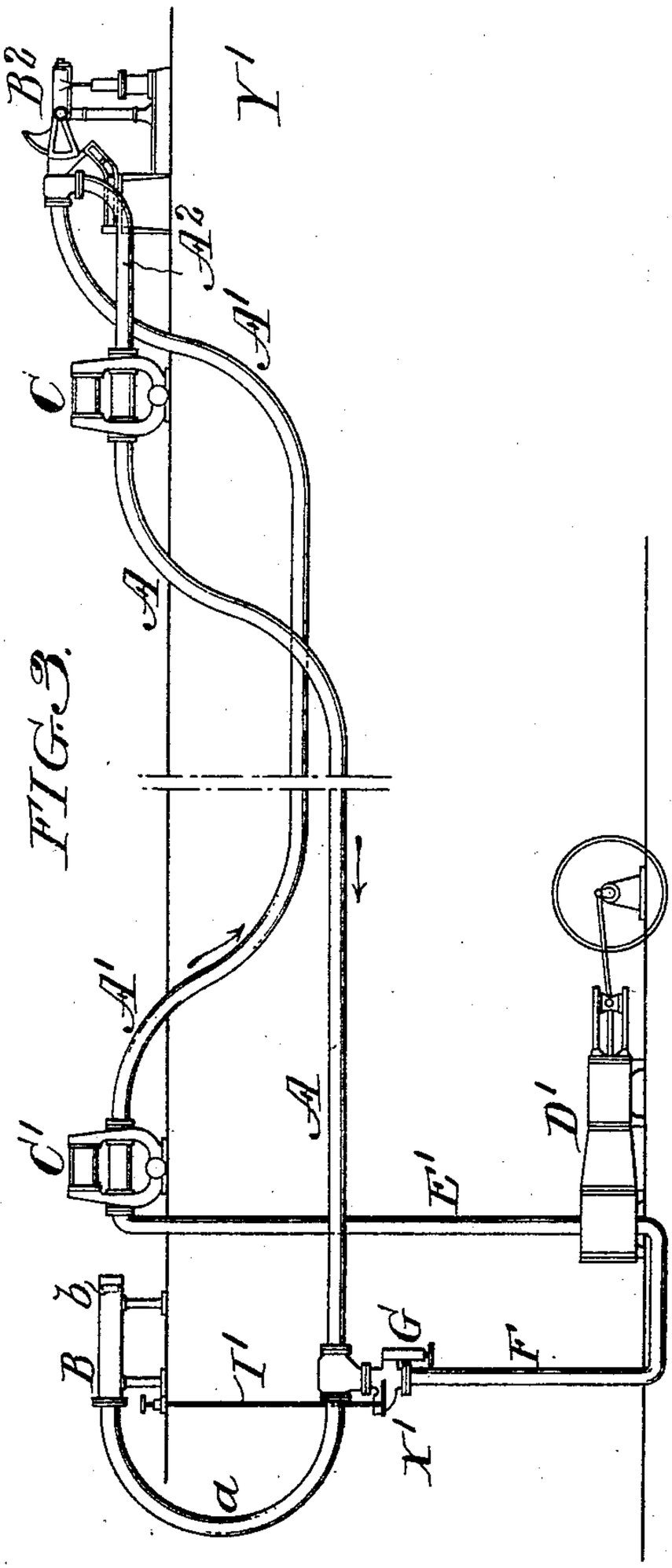


FIG. 3.



Witnesses:
Henry Drury
J. Stewart

Inventor:
Benj. C. Batcheller
by his atty.
Francis J. Clemens

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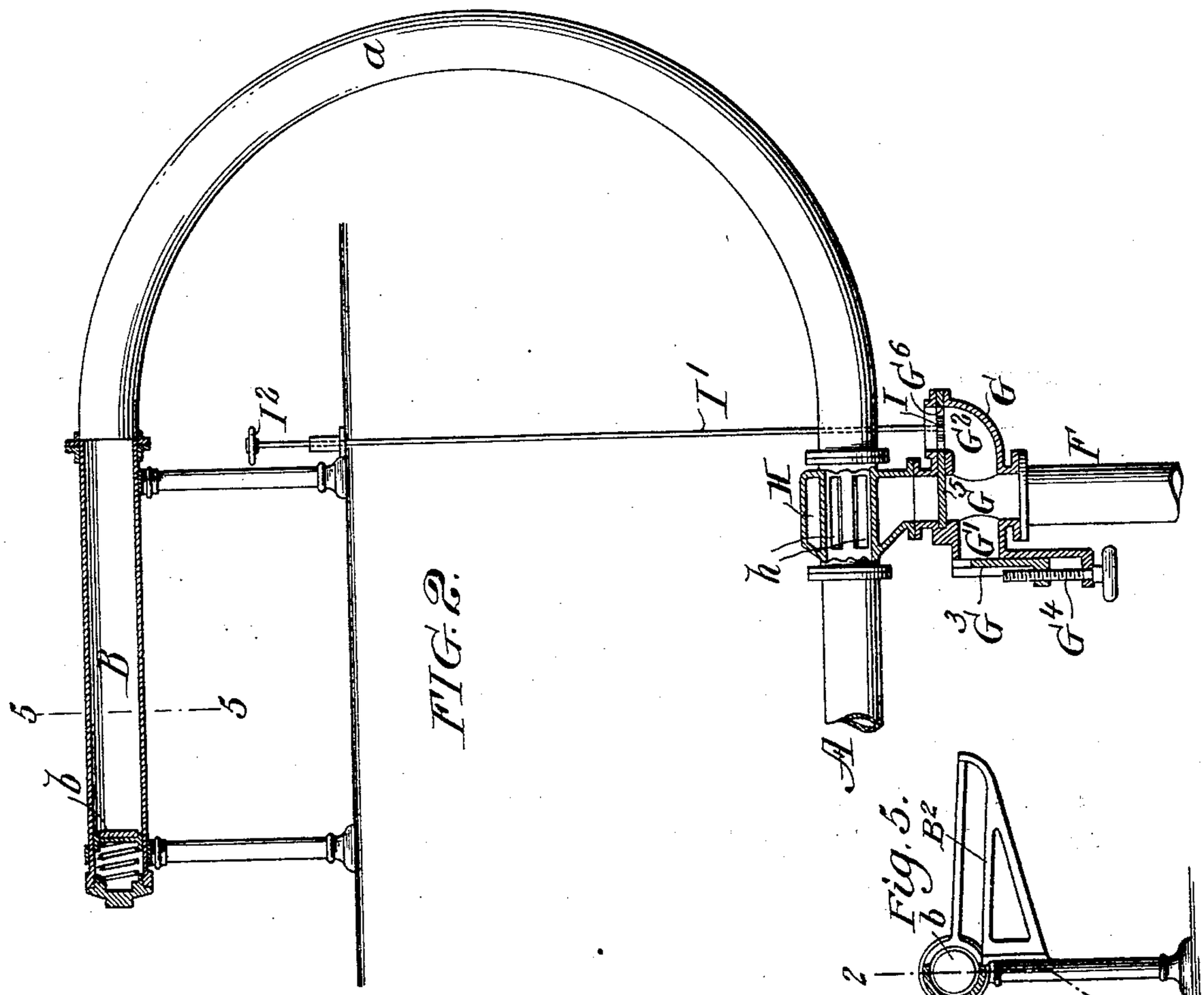

FIG. 2.

Fig. 5.

FIG. 4.

Witnesses:
Henry Drury
D. Stewart

Inventor:
Byron C. Batcheller
by his atty
Francis J. Chambers

UNITED STATES PATENT OFFICE.

BIRNEY C. BATCHELLER, OF PHILADELPHIA, PENNSYLVANIA.

PNEUMATIC-DESPATCH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 632,690, dated September 12, 1899.

Application filed November 1, 1898. Serial No. 695,164. (No model.)

To all whom it may concern:

Be it known that I, BIRNEY C. BATCHELLER, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Pneumatic-Despatch Systems, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to systems of transmitting carriers in pneumatic-despatch tubes, and has for its object to provide an improved system which can be worked to a high point of efficiency at comparatively moderate cost and in which the momentum of the carrier at the point of delivery can be nicely regulated without affecting its speed of movement through the transmission-tube.

The nature of my improvements will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a diagrammatic elevation of a system of transmission-tubes embodying my invention, Fig. 2 being a partly-sectional elevation, on line 2 2 of Fig. 5 and on an enlarged scale, of the delivery end of one of my tubes. Fig. 3 is a diagrammatic elevation of a modification of my invention. Fig. 4 is a diagram graphically illustrating the principles of my system, and Fig. 5 is a section on line 5 5 of Fig. 2.

X and Y, Fig. 1, indicate two stations which are connected by pneumatic-transmission tubes, (indicated at A and A′,) in which the air-current travels in opposite directions, as indicated by arrows.

a and *a′* indicate curved delivery ends on the pipes A and A′.

B and B′ are receivers placed in registry with the delivery ends of the tubes and preferably provided at their outer ends with cushioning devices, as indicated at *b*. (See Fig. 2.) The receivers may be of any convenient type, many of which are well known. As shown, it consists of a substantially semicylindrical body, with a cushioning device *b* at its outer end and a laterally-extending platform B^2, Fig. 5, extending from the bottom of the semicylindrical body.

C and C′ are sending devices, by means of which carriers are injected into the tubes. They are placed in the receiving ends of the transmission-tubes at each station, and, again, they may be of any convenient type and construction.

D and D′ are air-pumps, the delivery-ports of which are connected with the receiving ends of the tubes A and A′, as shown, by means of conduits E and E′.

F and F′ are air-conduits leading from the suction-ports of the air-pumps to points slightly in the rear of the delivery ends of the transmission-tubes. As shown, the connection, which is conveniently made through a head H, (see Fig. 2,) opening through slots *h* into the tube, is just in the rear of the curves *a* and *a′*.

By preference I place in each of the conduits F F′ a head, such as is indicated at G and shown in detail in Fig. 2. This head is provided with an opening G′, leading to the atmosphere and made regulable by means of a valve or gate G^3, adjusted by screw G^4. Preferably the head is also provided with another opening G^2, leading to the atmosphere, and, as shown, with a valve G^5 G^6, the portion G^6 of which indicates an opening adapted to register with the opening G^2. This valve is arranged so that in one position—that indicated in Fig. 2—the valve closes the conduit F and fully opens the passage G^2, while in another position the same valve opens the conduit F and closes the passage G^2. As a convenient device for moving this valve I have indicated a spur-wheel I, turned through a rod I′ by a handle I^2 in operators' room of the station and which may be connected to actuate the valve in any convenient way.

In operation the air-pumps D and D′ or equivalent apparatus acting as a source of air-pressure and an air-sucking device are as nearly as possible of the same capacity and run at the same speed. Each engine is therefore forcing a certain amount of air into one of the tubes and sucking an approximately similar amount of air out of the other tube.

The pressure in each tube is therefore at its maximum in its receiving end, falling gradually and uniformly to atmospheric pressure at the points where the conduits F and F′ are connected, and supposing the pumps to work with absolute uniformity and no leakage to occur the air will be stationary in the delivery ends *a* and *a′* of the tubes. If the suction of the pump exceeds the delivery of air through the transmission-tube, then the deficiency in supply will be made up by a backward flow of air through the delivery end of the tube, and of course if the supply of air reaching the point of attachment of the tubes F and F′ is greater than the suction of the pump then there will be an outward flow of air through the delivery ends of the tubes.

By providing the opening G′ leading into the suction-pipe F and regulating this orifice, as by means of the gate G^3, I am enabled to secure the exact conditions at the delivery end of the pipe which may be thought most desirable, supplying any proportion of the atmospheric air of the pump in accordance with the adjustment of the gate.

I prefer to use the curved delivery ends, as shown in the drawings, so as to avail myself of the frictional resistance developed by the carrier in passing around the curve in checking the momentum of the carrier before it is delivered from the tube. It will be readily understood that by having a slight flow of air through the delivery end the momentum of the carrier can be reduced to any desired amount.

In the diagram Fig. 4 I have represented the tubes A and A′ as forming a circle, the outer line J′ indicating atmospheric pressure and the center of the circle J zero pressure or vacuum. The lines J^2 J^2 indicate the pressure in the tube, being highest at the receiving end, as indicated at J^3, and gradually approaching atmospheric pressure until at the points F and F′ it is equal to the atmosphere, crossing the line J′ at these points, as shown at J^4, and then falling slightly below atmospheric pressure, as indicated at J^5 J^5.

In Fig. 3 I have indicated the application of my system to a pair of tubes connected for the flow of air as one tube, the stations connected being indicated at *x′* and *y′* and the air-pump D′ connecting with the tubes A and A′, as at the station X. At the station Y, however, a receiver (indicated at B^2) is provided, and the pressure of air at this point will be approximately half the initial pressure.

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

1. A pneumatic-transmission tube having a delivery end open to the atmosphere and its other or sending end connected to a source of air under pressure in combination with an air-conduit connected to the transmission-tube a short distance behind its open delivery end and an air-pump connected to draw air through said conduit from the transmission-tube.

2. A pneumatic-transmission tube having a delivery end open to the atmosphere and its other or sending end connected to a source of air under pressure in combination with an air-conduit connected to the transmission-tube a short distance behind its open delivery end, an opening through said air-conduit to the atmosphere other than the delivery end of the transmission-tube and means for regulating the same and an air-pump connected to draw air through said conduit from the transmission-tube and the outer atmosphere in proportion to the adjustment of the device regulating the opening in the air-conduit aforesaid.

3. A pneumatic-transmission tube having a curved delivery end open to the atmosphere and its other or sending end connected to a source of air under pressure in combination with an air-conduit connected to the transmission-tube a short distance behind its curved open delivery end and an air-pump connected to draw air through said conduit from the transmission-tube.

4. A pneumatic-transmission tube having a curved delivery end open to the atmosphere and its other or sending end connected to a source of air under pressure in combination with an air-conduit connected to the transmission-tube a short distance behind its curved open delivery end, an opening through said air-conduit to the atmosphere other than the open delivery end of the transmission-tube and means for regulating said opening, and an air-pump connected to draw air through said air-conduit from the transmission-tube and the opening in the conduit in proportion to the adjustment of the device regulating the said opening in the air-conduit.

5. In combination with two stations of a pneumatic-transmission system, two transmission-tubes connecting said stations respectively adapted to use in opposite directions and each having its delivery end open to the atmosphere, and air-pumps at each station each having its delivery-port connected to the charging end of the tube leading from the station and its suction-ports connected to the delivery end of the tube leading to said station a short distance in the rear of the opening into the atmosphere.

6. In combination with two stations of a pneumatic-transmission system, two transmission-tubes connecting said stations respectively adapted to use in opposite directions and each having its delivery end open to the atmosphere, air-pumps at each station each having its delivery-port connected to the charging end of the tube leading from the station and its suction-ports connected to the delivery end of the tube leading to said station a short distance in the rear of the opening

into the atmosphere and regulable air-admission ports connected with the suction-port of each engine and whereby air can be admitted otherwise than from the tube.

7. In combination with an open-ended transmission-tube and an air-pump a conduit F leading from a point in the transmission-tube slightly in the rear of its open end to the suction-port of the pump, a connection G in said conduit having openings G′ and G^2, a valve G^3 for regulating opening G′ and a valve G^5 G^6 for alternatively opening and closing conduit F and opening G^2.

BIRNEY C. BATCHELLER.

Witnesses:
HAROLD A. LEWIS,
G. W. TORREY.