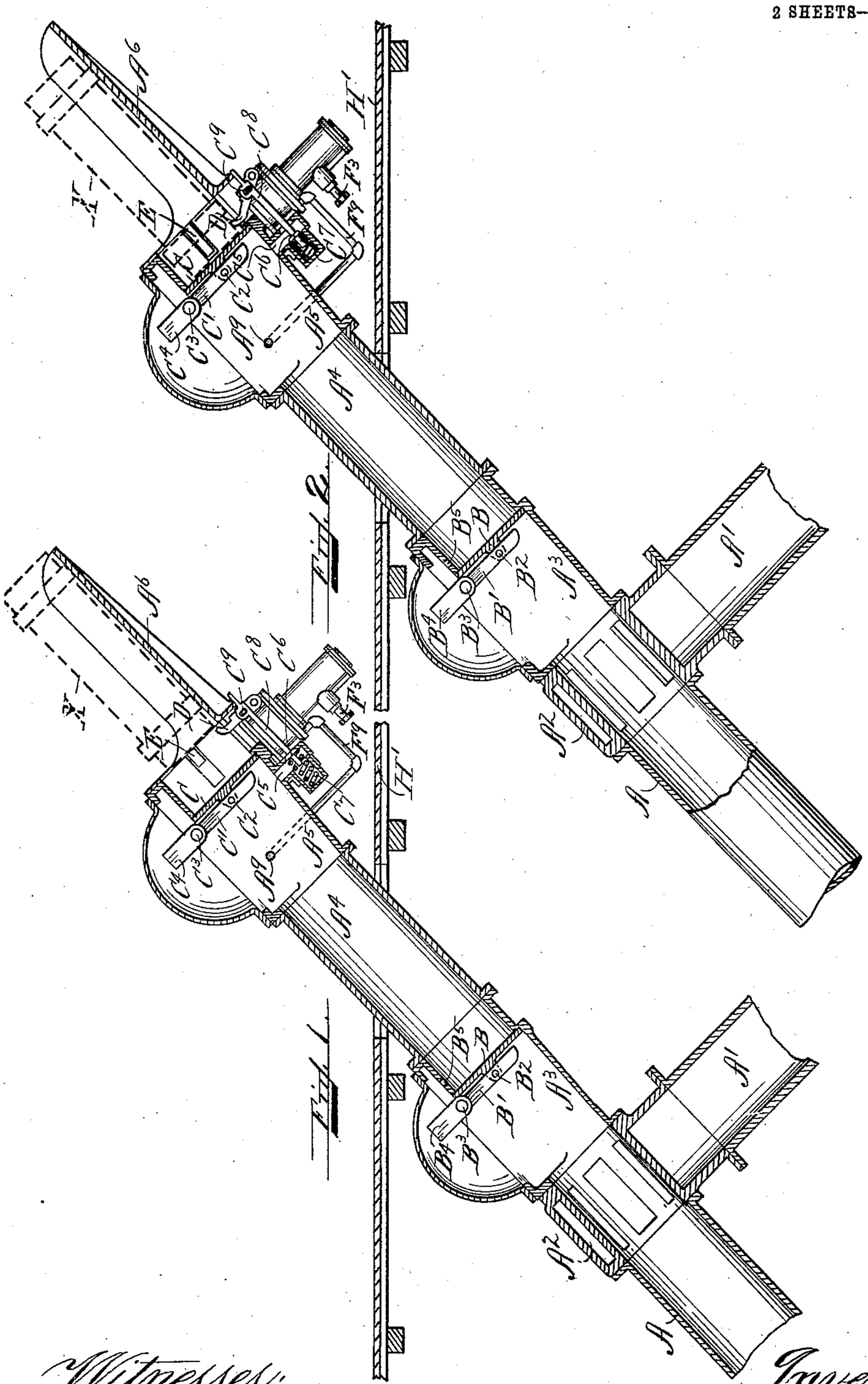
No. 842,353. PATENTED JAN. 29, 1907.

C. F. STODDARD.

PNEUMATIC DESPATCH APPARATUS.

APPLICATION FILED MAY 20, 1904.

2 SHEETS—SHEET 1.



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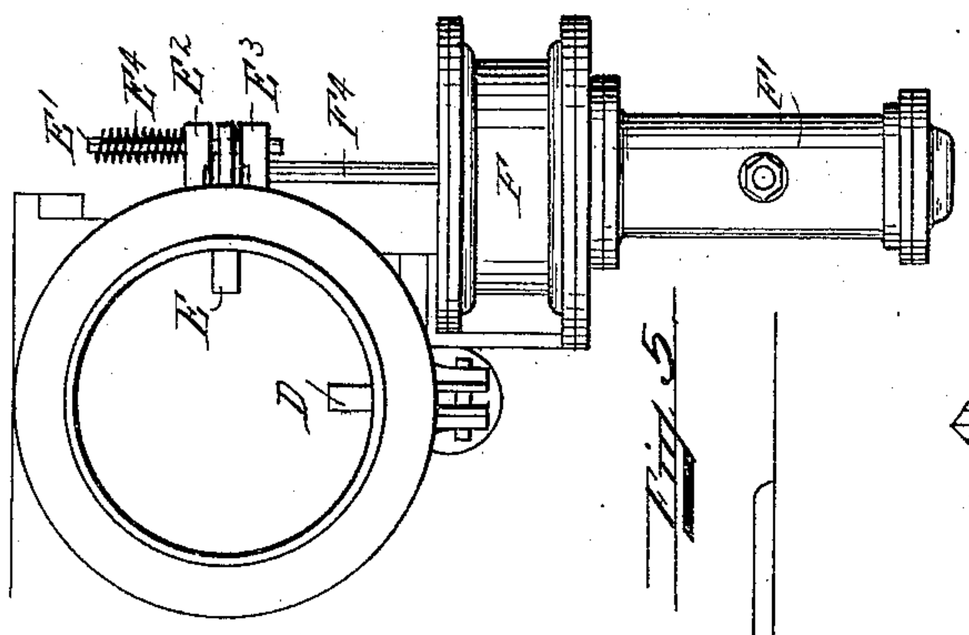

Fig. 5.

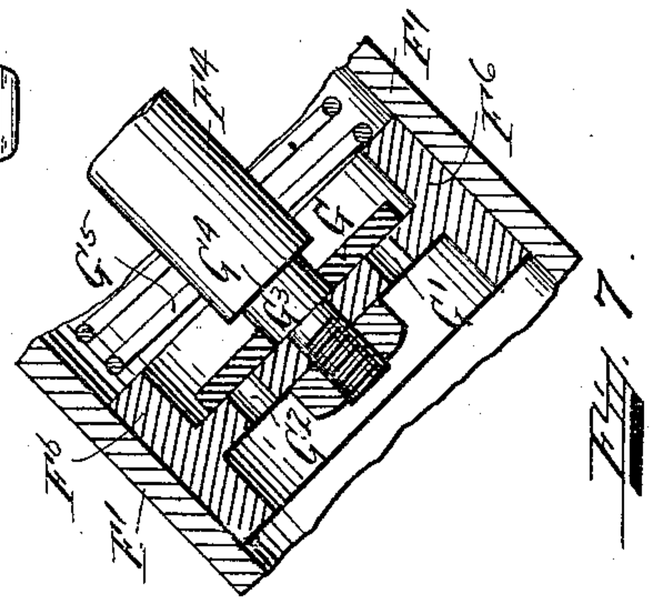

Fig. 7.

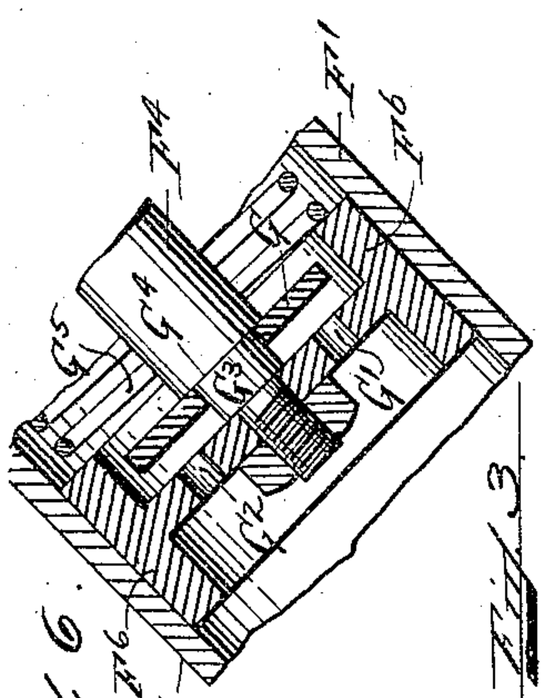

Fig. 6.

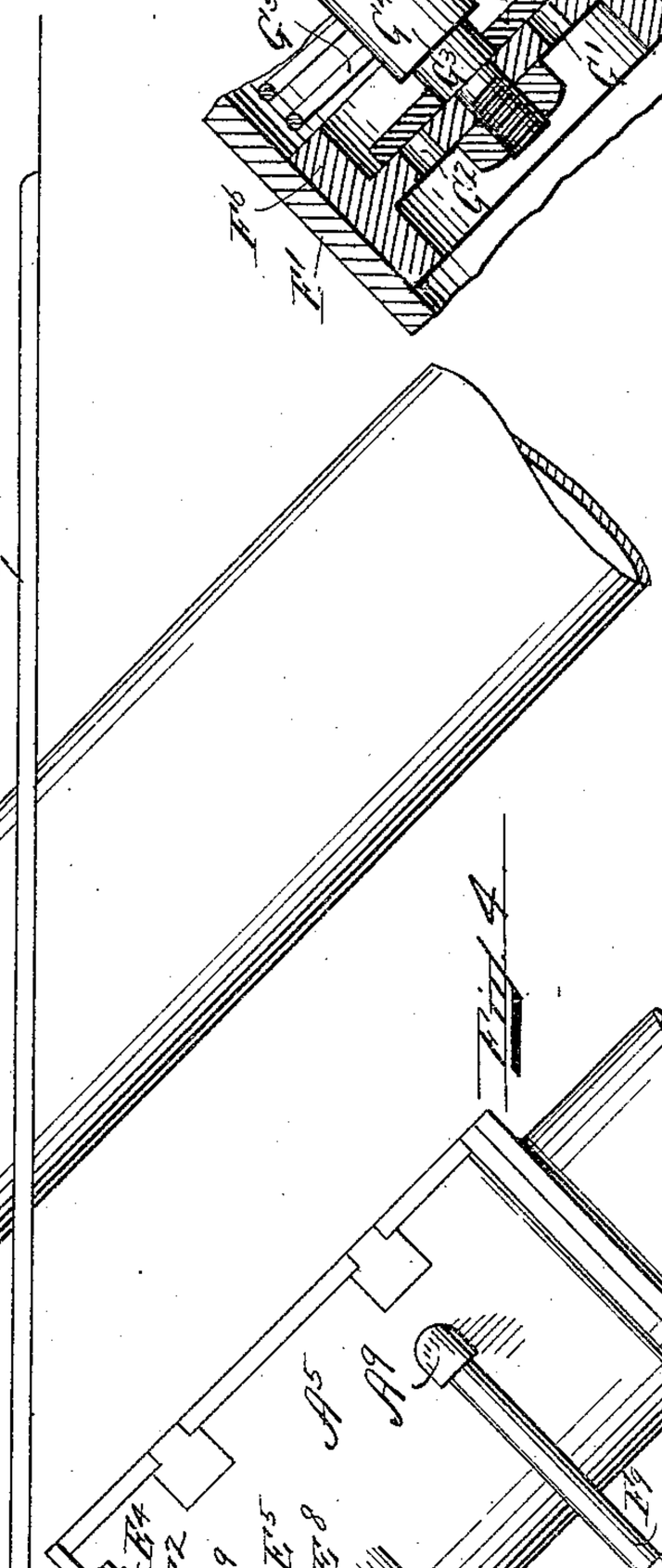

Fig. 4.

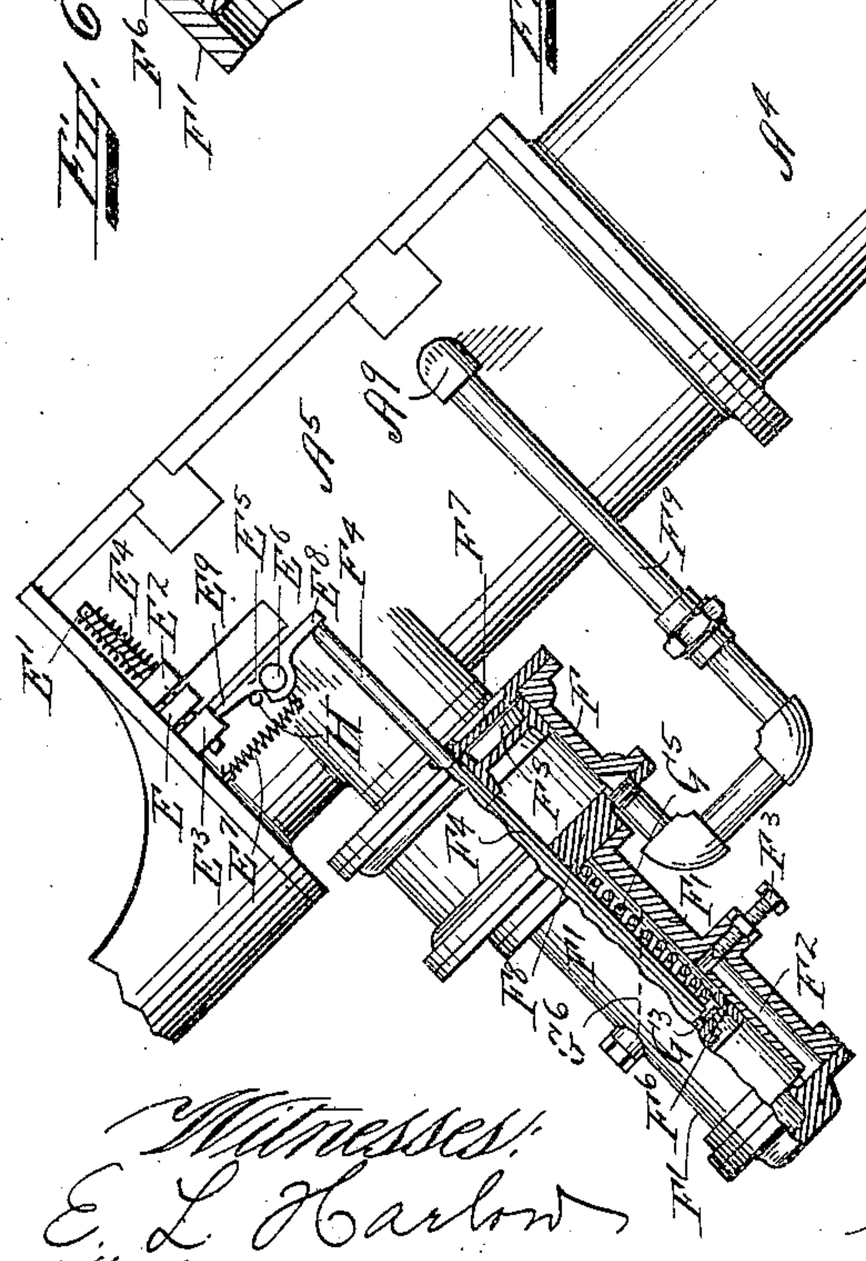

Fig. 3.

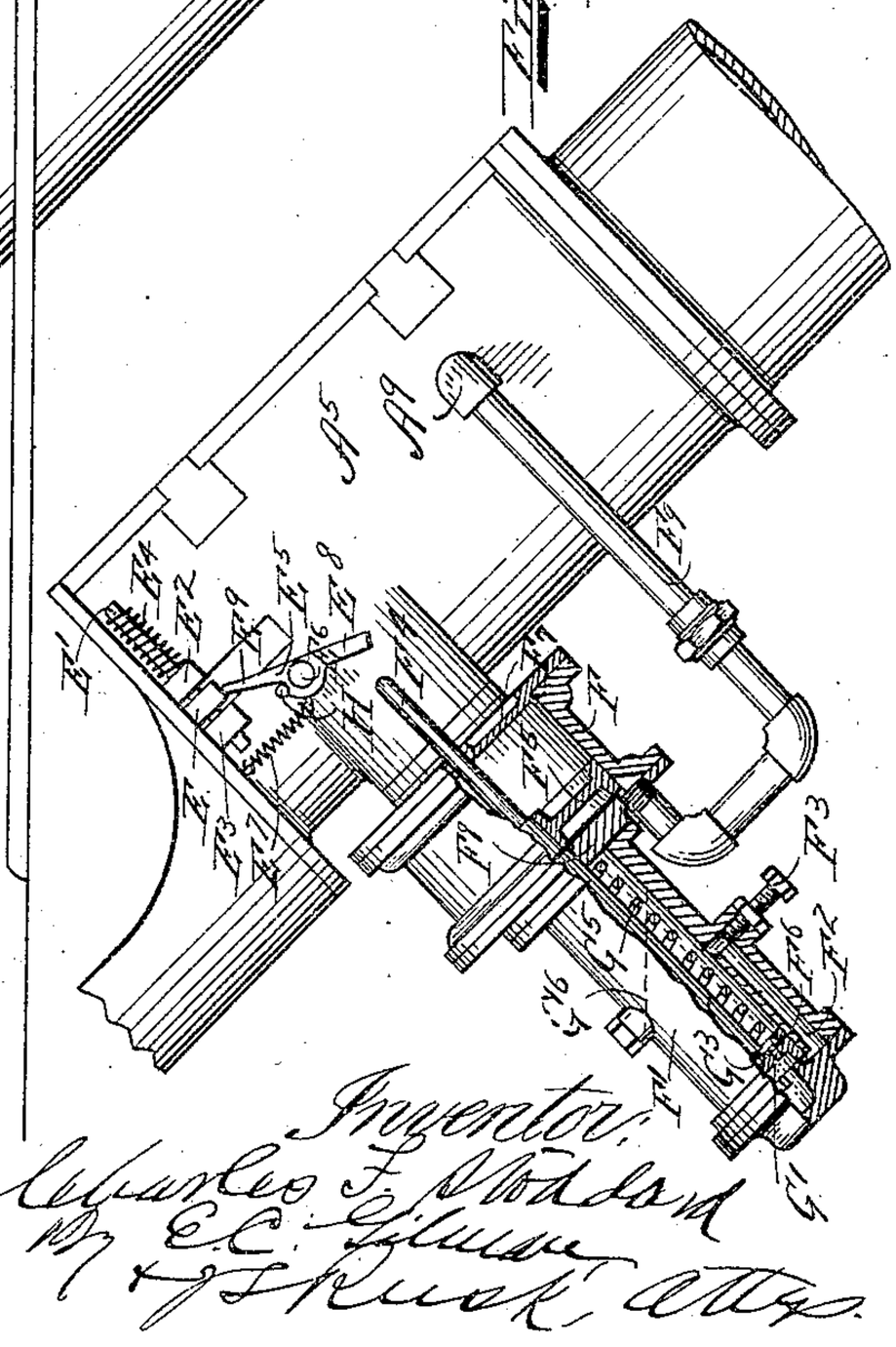

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES F. STODDARD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO AMERICAN PNEUMATIC SERVICE COMPANY, OF DOVER, DELAWARE, A CORPORATION OF DELAWARE.

PNEUMATIC-DESPATCH APPARATUS.

No. 842,353. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed May 20, 1904. Serial No. 208,811.

To all whom it may concern:

Be it known that I, CHARLES F. STODDARD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic-Despatch Apparatus, of which the following is a specification.

My invention relates to new and useful improvements in timing devices for pneumatic-despatch apparatus, and especially to such apparatus wherein large carriers are used for the transmission of mail-matter, merchandise, and the like.

The object of my invention is to produce a timing device which will be simple in construction and perform its function accurately and surely.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 is a longitudinal section through a sending-terminal with the timing device shown attached, the machine being in its normal position. Fig. 2 is a similar view showing the position of the relief-valve as a carrier is being despatched. Fig. 3 is an elevation of the sending-terminal from the opposite side to that shown in Fig. 1 and with the timing device shown in section, parts being in their normal positions. Fig. 4 is a similar view showing the timing device in the locking position. Fig. 5 is an end view of the terminal machine looking directly into it and showing the positions of the fingers. Fig. 6 is an enlarged detail of the check-valve in the piston of the oil-cylinder, showing the disk in its open position. Fig. 7 is a similar view showing the disk in its closed and normal position.

Like letters of reference refer to like parts throughout the several views.

The sending-terminal to which this timing device is shown attached is similar to that shown, described, and claimed in United States Letters Patent No. 742,513, issued to the American Pneumatic Service Company, of Dover, Delaware, as my assignee, October 27, 1903.

In the terminal, A is the transmission-tube, which is supplied with compressed air through the slotted casing A^2 from the supply-pipe A'. Above this slotted casing A^2 is placed a valve-casing A^3, and directly above this casing is a receiving-chamber A^4, which is surmounted by a second valve-casing A^5, to the top of which is attached the chute A^6, upon which the carriers are laid in despatching. The valve B swings on the arm B' at B^2, the arm B' swinging in the valve-casing A^3 at B^3. B^4 is a counterweight on the arm B', which tends to hold the valve B closed, its normal position. The valve C swings on the arm C' at C^2, the arm C' swinging in the valve-casing A^5 at C^3.

C^4 is a counterweight on the arm C', which holds the valve C closed, its normal position.

B^5 is a small by-pass, which allows the pressure in the transmission-tube A to pass around the valve B into the receiving-chamber A^4, the valve C normally keeping this pressure from escaping into the atmosphere. This leaves the valve B normally balanced.

C^5 is a port in the valve-casing A^5, which is normally closed to the atmosphere by the valve C^6, held in its closed position by the spring C^7. To this valve C^6 is attached the rod C^8, which is pivotally connected to the finger D at C^9, so that when the finger D is thrown into the position shown in Fig. 2 the valve C^6, will be opened, thereby allowing the pressure in the receiving-chamber A^4 to dissipate into the atmosphere through the port C^5. The size of this port is such that it will spill the pressure in the receiving-chamber A^4 faster than the port G^5 can supply it. When a carrier X is laid on the scoop A^6, it rests against the finger D and also against the locking-finger E. When the timing device is in such a position as to leave the locking-finger E free to move, the carrier drops down against the valve C, at the same time throwing the finger D into the position shown in Fig. 2, thereby opening the valve C^6 and allowing the pressure in the receiving-chamber A^4 to dissipate into the atmosphere through the port C^5, as before explained, which takes the pressure off the back of the valve C and allows the carrier to open it by its own weight and pass into the receiving-chamber A^4, dropping against the gate B, which is held closed by

the pressure behind it. After the carrier has passed into the receiving-chamber A^4 far enough to allow the gate C to close said gate C swings back to its normal position. The carrier by passing into the compression-chamber A^4 releases the finger D and allows the spring C^7 to throw the valve C^6 into its closed position. (Shown in Fig. 1.) The pressure from the transmission-tube A passing through the port B^5 fills the receiving-chamber A^4 until the valve B is balanced. The carrier then by its own weight opens the gate-valve B and drops through the slotted casing A^2 into the transmission-tube A. After the carrier has passed out from under the valve B the counterweight B^4 swings the valve B back into its normal closed position, and leaving the timing device out of consideration the machine is ready to receive another carrier.

The locking-finger E swings on a pivot E′, (shown in Fig. 3,) which is rigidly connected to the locking-finger E and swings in the bearing-blocks E^2 E^3, which are rigidly connected to the valve-casing A^5. The torsion-spring E^4 tends to hold the locking-finger E in its normal position, Fig. 1. The latch E^5 is pivotally connected to the valve-casing A^5 at E^6, the spring E^7 tending to pull it into the position shown in Fig. 4. F is an air-cylinder rigidly attached to the valve-casing A^5. To the lower side of this air-cylinder F is attached an oil-cylinder F′, which is provided with a restricted passage F^2, connecting the upper and lower ends of same. The size of this restricted passage is controlled or regulated by the screw F^3. The piston-rod F^4 passes through the air-cylinder F and into the oil-cylinder F′, and to it is rigidly connected the piston F^5 of the air-cylinder F and the piston F^6 of the oil-cylinder F′. The holes in the cylinder-heads F^7 F^8, through which the piston-rod F^4 passes, are large enough to allow the free passage of air between the piston-rod F^4 and the cylinder-heads F^7 F^8. The lower end of the air-cylinder F is in communication with the inside of the valve-casing A^5, by means of the pipe F^9, which enters the valve-casing A^5 at A^9. (Shown in Fig. 1.) The piston F^6, which is shown in detail in Figs. 6 and 7, is provided with a check-valve G which moves up and down on the contracted portion G^3 of the piston-rod F^4, its upward movement being controlled by the shoulder G^4. The purpose of the check-valve G is to open and close the ports G′ and G^2 in the piston F^6. The spring G^5 tends to throw the piston F^6 to the lower end of the cylinder F′, as shown in Fig. 4.

Fig. 3 shows the position of the parts of the timing device when the sending-terminal is ready to despatch a carrier. The carrier being laid on the scoop A^6 drops down against the valve C, thereby throwing the fingers E and D both into the position in which the finger D is shown in Fig. 2. This motion of the finger D opens the valve C^6 and dissipates the pressure in the receiving-chamber A^4 into the atmosphere through the port C^5. The lower end of the cylinder F in Fig. 3 being in communication with the valve-casing A^5, the pressure in said cylinder F under the piston F^5 is therefore the same as the pressure in the valve-casing A^5 and the receiving-chamber A^4, so that if the pressure in the receiving-chamber A^4 is the same as that in the transmission-tube A the pressure in the lower end of the cylinder F will also be the same as in the transmission-tube A. When the valve C^6 is opened and the pressure in the receiving-chamber A^4 falls to atmospheric, the pressure in the lower end of the cylinder F does likewise, and the opposing force is removed from the spring G^5, which then pushes the piston F^6 to the lower end of the cylinder F′, as shown in Fig. 4. The cylinder F′ contains oil to the level of the line G^6, and as the piston passes downward the pressure of the oil on the under side of the check-valve G raises it to the position shown in Fig. 6, thereby giving an unrestricted passage to the oil from the lower end of the cylinder F′ to the upper side of the piston F^6, so that the spring G^5 is able to force the piston F^6 to the lower end of the cylinder F′ without encountering practically any oil resistance.

After the carrier has entered the receiving-chamber A^4 and the pressure in said receiving-chamber has risen, as before explained, to that of the transmission-tube this pressure is communicated to the under side of the piston F^5 in the cylinder F and raises it to the position shown in Fig. 3, but not without encountering the resistance of the oil passing through the restricted passage F^2 in the cylinder F′, the check-valve G being closed now on account of the downward pressure of the oil. The time required in raising the piston F^5 from the lower end of the cylinder F to the upper end by the pressure is determined by the amount of restriction in the passage F^2, which is adjusted by the screw F^3. The latch E^5 in Fig. 3 is shown pressed back out of the way of the locking-finger E, so that said finger is free to be moved by a carrier entering the sending-terminal; but as soon as one carrier enters the receiving-chamber A^4, exhausting the pressure therein, the parts of the timing device assume the positions shown in Fig. 4, the forward end E^9 of the latch E^5 protruding in front of the locking-finger E, so that the locking-finger is not free to move when a carrier rests against it, and the carrier is held from going into the machine until the pressure in the receiving-chamber A^4 rises to normal and forces the piston F^5 into the position shown in Fig. 3, which takes a predetermined time. When the piston F^4 has nearly reached the upward limit of its stroke, it engages the rear end E^8 of the latch

E⁵ and turns the latch E⁵ against the spring E⁷ into the position shown in Fig. 3, thereby unlocking the finger E and making it possible for another carrier to be despatched. The stop H is for the purpose of regulating the amount of swing of the latch E⁵. H′ is the floor-line. The piston F⁶ is enough smaller than the piston F⁵ so that the downward pressure coming from the cylinder F through the hole in the head F⁸, through which the piston-rod F⁴ passes, will be so small relatively as not to be detrimental to the working of the device.

I do not limit myself to the arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

Having thus described the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port and operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, means for closing said exhaust-valve after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube, and mechanism operated by a reduction of pressure in said terminal for preventing the carrier from operating the outer gate to open the same until a predetermined time after said pressure becomes normal.

2. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, means for closing said exhaust-valve after the entrance of the carrier to permit the pressure in the sending-terminal and transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold said outer gate closed so that the pressure in the transmission-tube will not escape into the atmosphere while the inner gate is open, and mechanism operated by a reduction of pressure in said terminal for preventing the carrier from operating the outer gate to open the same until a predetermined time after said pressure becomes normal.

3. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, a counterweight on said exhaust-valve for closing the same after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold the said outer gate closed so that the pressure in the transmission-tube will not escape into the atmosphere while the inner gate is open, and mechanism operated by a reduction of pressure in said terminal for preventing the insertion of a carrier into the sending-terminal and to allow the insertion of a carrier into said sending-terminal in a predetermined time after said pressure becomes normal.

4. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates closing said sending-terminal, a by-pass for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, a counterweight on said exhaust-valve for closing the same after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold the said outer gate closed so that the pressure in

the transmission-tube will not escape while the inner gate is open, and mechanism operated by a reduction of pressure in said terminal for preventing the insertion of a carrier into the sending-terminal and to allow the insertion of a carrier into said sending-terminal in a predetermined time after said pressure becomes normal.

5. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port and operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of the carrier into the sending-terminal, means for closing said exhaust-valve after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube, a finger above said outer gate, means for locking said finger against movement for a predetermined time after the insertion of a carrier to prevent the insertion of other carriers into the sending-terminal, and mechanism operated by the pressure in the terminal for releasing said locking means to allow the insertion of another carrier.

6. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, means for closing said exhaust-valve after the entrance of a carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold said outer gate closed so that the pressure in the transmission-tube will not escape into the atmosphere while the inner gate is open, a finger above said outer gate, means for locking said finger against movement for a predetermined time after the insertion of the carrier to prevent the insertion of other carriers into the sending-terminal, and mechanism operated by the pressure in the terminal for releasing said locking means to allow the insertion of another carrier.

7. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, means for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling the said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, a counterweight on said exhaust-valve for closing the same after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold the said outer gate closed so that the pressure in the transmission-tube will not escape into the atmosphere while the inner gate is open, a finger above said outer gate, means for locking said finger against movement for a predetermined time after the insertion of the carrier to prevent the insertion of other carriers into the sending-terminal, and mechanism operated by the pressure in the terminal for releasing said locking means to allow the insertion of another carrier.

8. In a pneumatic-despatch-tube apparatus, a transmission-tube, a sending-terminal connected to said transmission-tube, inner and outer gates normally closing said sending-terminal, a by-pass for normally producing equalization of pressure in the transmission-tube and the sending-terminal, an exhaust-port from said sending-terminal to the atmosphere normally closed, an exhaust-valve controlling said port operated by the carrier to allow the pressure to exhaust from the sending-terminal for releasing the transmission-tube pressure on the outer gate to permit the entrance of a carrier into the sending-terminal, a counterweight on said exhaust-valve for closing the same after the entrance of the carrier to permit the pressure in the sending-terminal and the transmission-tube to substantially equalize on the inner gate whereby the weight of the carrier will open said inner gate and enter the transmission-tube and to hold the outer gate closed so that the pressure in the transmission-tube will not escape while the inner gate is open, a finger above said outer gate, means for locking said finger against movement for a

predetermined time after the insertion of the carrier to prevent the insertion of other carriers into the sending-terminal, and mechanism operated by the pressure in the terminal for releasing said locking means to allow the insertion of another carrier.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of May, A. D. 1904.

CHARLES F. STODDARD.

Witnesses:

A. L. MESSER,

A. R. LARRABEE.