O. G. GILSTRAP.

PNEUMATIC DESPATCH APPARATUS.

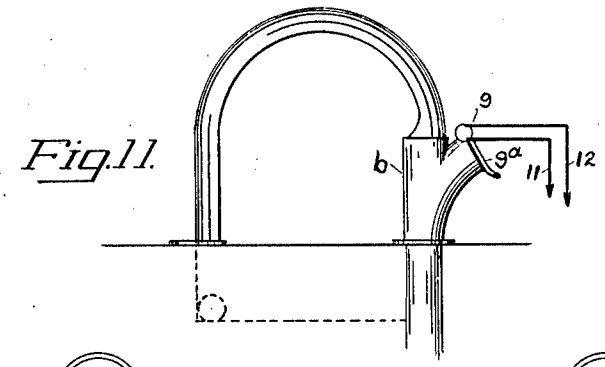
APPLICATION FILED OCT. 18, 1911.

1,066,599.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

Fig. 11.



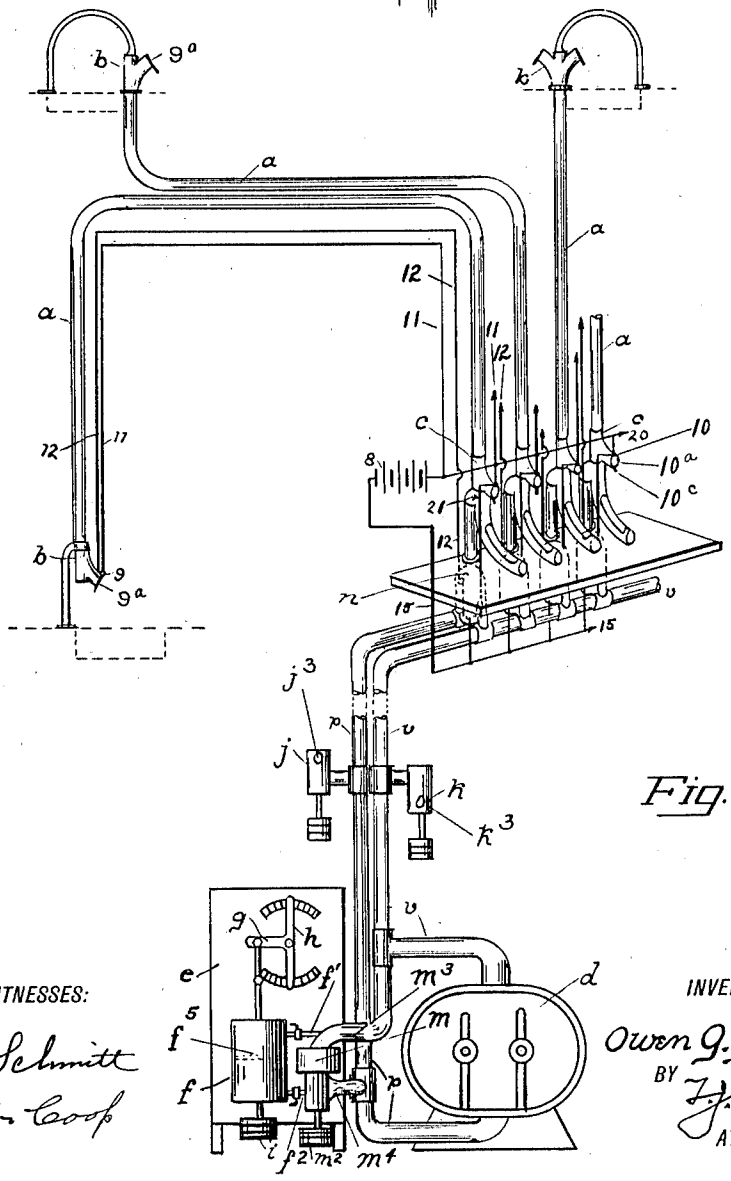


Fig. 1.

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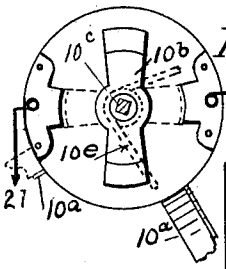


Fig. 5.

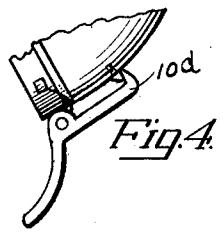


Fig. 4.

Fig. 2.

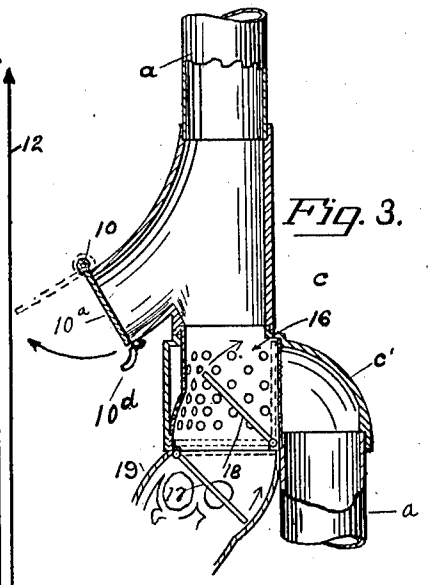


Fig. 3.

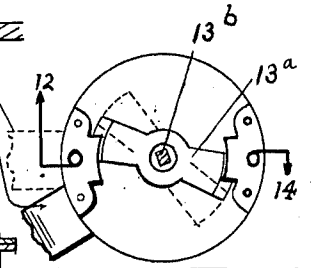


Fig. 6.

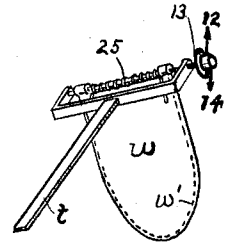


Fig. 7.

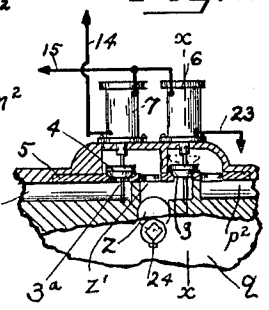


Fig. 8.

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3 SHEETS—SHEET 3.

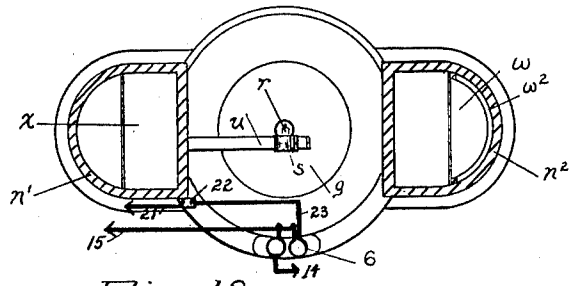


Fig 12

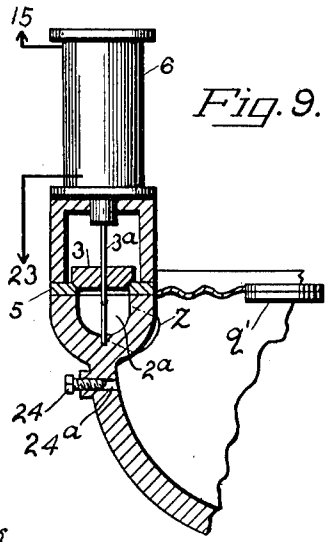
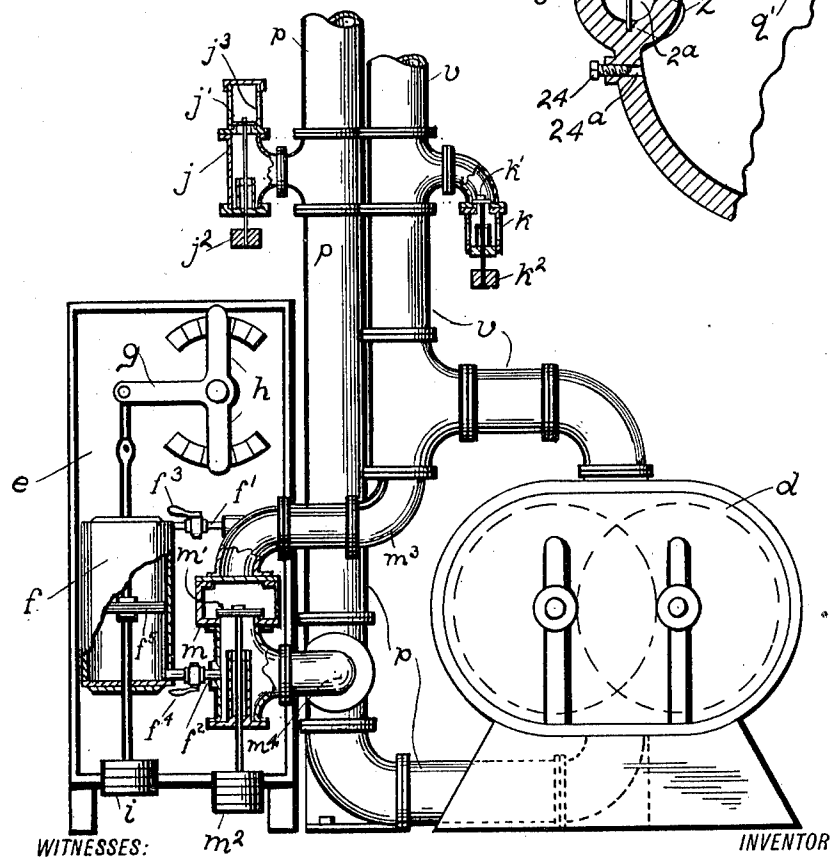


Fig. 9.



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Fig. 10.

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UNITED STATES PATENT OFFICE.

OWEN G. GILSTRAP, OF PORTLAND, OREGON, ASSIGNOR OF ONE-FOURTH TO CHARLES E. MEYRING, OF PORTLAND, OREGON.

PNEUMATIC-DESPATCH APPARATUS.

1,066,599. Specification of Letters Patent. Patented July 8, 1913.

Application filed October 18, 1911. Serial No. 655,431.

To all whom it may concern:

Be it known that I, OWEN G. GILSTRAP, a citizen of the United States, and a resident of Portland, county of Multnomah, State of Oregon, have invented a new and useful Improvement in Pneumatic-Despatch Apparatus, of which the following is a specification.

The object of this invention is to obtain an efficient pneumatic tube-despatch system, especially adapted for stores, in which both the suction and pressure side of the fan divide the work of propelling the carrier to and fro in a single tube.

It is well known that systems which rely upon the suction side of the fan only for moving the carrier, by rarefying the air in the tube, are expensive both in installation and operation, because it requires a relatively larger sized fan than that required to do the average work, since provision must be made for the fan to be constantly supplied with an ample volume of air in order to avoid the rarefaction of the air on the suction side of the fan to such degree that atmospheric pressure on its exhaust side will overcome the power of the motor. To illustrate my point, I may state, as well known, that in systems having one hundred stations only about ten per cent. of such stations will be in constant use, and even less stations may be used during dull periods. Nevertheless a fan of sufficient size to simultaneously operate a greater proportion of the stations is required; but since a fan of the size capable of operating such greater number of stations requires a greater volume of air, to prevent abnormal rarefaction, than admitted by the stations normally in use, a certain number of stations must be left open all the time to insure the admission of an ample volume of air. The unavoidable waste of energy under such conditions is obvious. On the other hand, in a system utilizing both the exhaust and pressure sides of the fan to perform the work of moving the carriers, a fan of approximately one-half the size required in the other system may be used to do the work, provided the double-acting half-size fan be driven by a relatively larger motor capable of carrying the load on the pressure side of the fan; or in other words, a motor must be used of approximately the same power as required for operating the larger fan doing the work on its suction side only. And it follows that by providing a practical device in which a smaller sized fan does all the work formerly done by a fan twice its size, a lesser volume of air is moved in the tubes through which the carrier travels, and the system may be so arranged that the stations normally in use supply all the external air required.

The further purpose of my invention is to provide for the automatic relief of excessive rarefaction or pressure in the tubes, also to permit the fan to run constantly and freely regardless of the number of stations in use, or whether all stations are closed for a period, as during a lull in business.

In order to attain these objects of my invention, also to provide an efficient device, also to render the cost of installation, operation and maintenance as low as possible, and also to achieve other incidental advantages, as will appear from the body of this specification, I have devised the system, apparatus and contrivances illustrated in the accompanying drawings, constituting a part of this specification.

In the drawings: Figure 1 is a diagrammatic elevation, partly in perspective, of a complete pneumatic despatch system, embodying my invention, of the type employed in the stores for sending the cash-carrier to and fro in a single tube between the sales counter and cashier's desk; Fig. 2 is a side elevation, partly in section, of the mechanism embodied in the cashier's terminal of said system; this view also showing, in dotted outline, the electromagnets which operate the valves located in the passageways connecting both the pressure and vacuum mains with the single carrier tube, and controlling the flow of air from the pressure and vacuum mains into the single carrier tube; the electric connections are also diagrammatically represented in this figure; Fig. 3 is a longitudinal sectional-detail of the cashier's terminal of the system; Fig. 4 shows a detail of a gravity catch for locking the covers normally closing the openings of the carrier tube at the terminals; Fig. 5 is a diagrammatic detail of the electric switches provided at the clerk's and cashier's terminals for interrupting and establishing the circuit of the electromagnets of my device, by the opening and closing of

the covers normally closing the openings of the carrier tube at its terminals; Fig. 6 is a diagrammatic detail of the auxiliary electric switches related to and operated by the opening and closing of the valves controlling the connection of the pressure and vacuum mains with the single carrier tube; such auxiliary switches serving to prevent the inadvertent simultaneous connection of the carrier tube with both sides of the fan; Fig. 7 is a detail, in perspective, more or less diagrammatic, of one of said valves located in and controlling the passage-way connecting the single tube with the vacuum and pressure mains; Fig. 8 is a longitudinal sectional detail of the valves controlling the air inlet and outlet of the bellows of my system, and operated by electromagnetic means; Fig. 9 is a section on a line *x*—*x* of Fig. 8 looking to the left; Fig. 10 is a larger-scale view, with parts broken away, of the automatic means included in my invention for providing constantly ample air, and preventing the stalling of the motor of the fan, by reason of an insufficient number of, or no, stations being open in the system for a time; Fig. 11 is a larger-scale elevation of the clerk's terminal and one of the carrier tubes of my system, also showing, by dotted outline, a receptacle for receiving the carrier when ejected from the carrier tube; and Fig. 12 is a diagrammatic section on line *y*—*y* of Fig. 2.

The carrier is propelled through a carrier tube, *a*, for example, from the clerk's terminal, *b*, to the cashier's terminal, *c*, by the suction of a rotary fan *d*, rarefying the air in the carrier tube in front of the carrier; and the latter is propelled on its return trip, back to the clerk's terminal, by the action of the fan compressing the air in the carrier tube behind the carrier. The fan is merely represented diagrammatically and is understood to be driven by any convenient type of electric motor (not shown) and such motor is automatically controlled by suitable devices hereinafter described.

The mains leading from the suction and pressure sides of the fan, and hereinafter termed vacuum main, *v*, and pressure main, *p*, are both connected to the single carrier tube, *a*, by the connecting passage-way *v p*. The vacuum main, *v*, is also connected to the upper port, and the pressure main, *p*, to the lower port, of the cylinder, *f*, by valve-controlled ducts f', f^2, as illustrated in Figs. 1 and 10. In the cylinder, *f*, is a piston f^5, from which is suspended a weight, *i*, for resisting the pressure, or vacuum, or both, on the piston; and the latter is connected with a commutator *h*, constituting a part of any convenient means adapted to regulate the power of the electric motor operating the fan. Thus should there be abnormal increase either in the pressure or vacuum, or both, in the cylinder *f*, by reason of like conditions existing in the mains, *p*, *v*, sufficient to overcome the weight, *i*, and raise the piston, the latter would act through the medium of the commutator, to control the motor and relieve the abnormal conditions. The valves, f^3, f^4, of the ducts f', f^2 are adjusted by the engineer to regulate the volume of air admitted through such ducts into the cylinder *f*, and thus serve to regulate the speed with which the piston f^5 is moved.

In the vacuum main, *v*, is provided a "pop" valve *k*, for relieving abnormal rarefaction of the air, and a similar valve, *j*, is provided in the pressure main, *p*, for relieving abnormal compression of the air. The valve, *k*, has an orifice at k^3 and comprises a valve disk k', restrained by a pendent weight k^2, by which it is normally closed. When the vacuum above the valve disk k' becomes greater than normal, the atmospheric pressure under the valve disk raises it and allows air to enter from the exterior, and so relieves the abnormal condition. The valve *j* has an orifice at j^3 and is adapted to operate to relieve abnormal pressure in the pressure main *p* by the lifting of the valve disk j' against the resistance of the weight j^2, normally holding it shut. A by-pass, *m*, controlled by a valve m' governed by a weight m^2, connects the pressure (*p*) and vacuum (*v*) mains, through conduits m^3, m^4; and thus when the valve m' is lifted both sides of the fan are connected by a passage.

Should an insufficient number of stations be in operation in my despatch system, the vacuum and pressure would both increase to the point of over-balancing the weight m^2 of the valve m' of the by-pass *m*, raising the former and allowing air to pass freely from the pressure to the vacuum side of the fan, and thus prevent any further increase of either pressure or vacuum, and incidentally the over-loading of the driving motor. This is a valuable feature, since it takes care of the condition existing during the period of time when less than the average amount of business is being transacted. For at such times an insufficient number of stations would be in use to supply the fan with an ample volume of air, unless special provisions are devised for that purpose. In my improved system, under the condition referred to, the air may pass from the pressure main, *p*, through conduit m^4, by-pass *m*, thence through conduit m^3 into vacuum main *v*, and thus continually circulate while the fan is running idle, regardless of whether any stations are open in the system. As soon as business begins, and a clerk sends a carrier to the cashier's terminal the vacuum will fall and the weight m^2 will

overcome the resistance of the pressure and close the valve m'. The abnormal pressure then existing for the moment will cause the valve j of the pressure main, p, to open until the cashier relieves such abnormal pressure by sending back the carrier from his terminal to the clerk. The valve m' of the by-pass is not operated by either abnormal vacuum or pressure independently, but only when both the vacuum and the pressure are abnormal. The valves j and k are set to have greater resistance than the by-pass valve m'. Consequently, during the slack periods of the day, though neither the pressure nor the vacuum be sufficient to open either of the valves j or k, nevertheless the accumulated forces of both pressure and vacuum would open the by-pass valve m' and in so doing relieve any excessive stress of the fan, until the despatch system is put in its normal condition by use.

Beneath the table at the cashier's terminal (compare Figs. 1 and 2) the pressure and vacuum mains, p, v, are connected by a chamber, n, with the single carrier tube a. The connection of either the vacuum or pressure side of the fan with the carrier tube is controlled by bellows q, made with a yielding diaphragm q', on which is rigidly affixed a rod r provided with a laterally projecting pin, on which is journaled a roller s. On the latter bear the two lever-arms, t, u, rigid members of the controller valves, w, x, installed in the pressure and vacuum mains respectively, and normally held shut by a coil-spring, represented by 25 in the detail Fig. 7. Upon the bellows being operated the up or down movement of the rod r opens one of said controller valves, x, w. See Fig. 2. Thus while the bellows q is neutral, that is, the diaphram q' thereof being operated neither by a condition of pressure or vacuum, both of the valves, w, x, would be closed by their governing springs. The means used for operating the bellows are illustrated in Figs. 2, 8 and 9.

The air ports, v^2, p^2, of the bellows connect with the vacuum and pressure mains, v, p, respectively, and are controlled by valves, 3, 4, operated by electromagnetic means. The valves, 3, 4, are seated in the head 5 of the bellows and when opened establish communication between the interior of the bellows q and either the vacuum and pressure mains v, p. The valves, 3, 4, are guided so as to become properly seated, when closed, by guide rods 3^a.

The valves, 3, 4, are opened by electromagnets, 6, 7, connected by wires, 11, 12, through the medium of switch 9 at the clerk's terminal, and by wires, 20, 21, through the medium of switch 10 at the cashier's terminal, with the battery 8. The switches 9 and 10 are normally opened, as illustrated by the diagram Fig. 5, which, while lettered in correspondence with switch 10, represents the action of switch 9 also.

The movable member 10^b of the switches 9 and 10 is understood to be fastened on the pintle 10^c of the hinge of the cover 9^a or 10^a, normally closing the inlet opening of the terminals of the carrier tube. The act of lifting such cover closes the switches. The covers are provided with a gravity latch 10^d adapted, as illustrated in Fig. 4, to hold the cover normally shut, and so that by seizing the latch handle the cover may be lifted.

The passage-ways, n', n^2 of the U-shaped chamber, n, connecting both sides of the fan and the carrier tube, are D-shaped in cross section. Said passage-ways are formed with valve seats, as shown at w^2 in Fig. 2, and the rims of the valves, w, x, are provided with packing, as shown at w' in Fig. 7. The valves, w, x, are so arranged that when opened to their full extent, as they are when the diaphram q' of the bellows w is actuated, they will extend longitudinally with the current of air rushing by, and offer little resistance; when, however, these valves have started to close they soon become positioned cross-wise to the current of air, and offer sufficient surface to cause such air current to assist the springs of the valves in closing with a snap.

In the operation of my system, when the cover 9^a at the clerk's terminal is opened to insert a carrier, the movable member 9^b of the switch 9 is positioned to close the circuit of the electromagnet 7, with which the switch is connected by wires, 12, 14, on one side, and, 15, 11, on the other side. The circuit of the electromagnet 7 being closed attracts and lifts the valve 4, and establishes communication between the interior of the bellows q through the ports z, z' and passage v^2 with the vacuum main v. The action of the fan then rarefies the air in the chamber q and allows external atmospheric pressure to drive in the diaphragm q' causing the downward movement of the rod r to depress the arm u of the valve x, and opening communication between the suction side of the fan through the vacuum main v with the carrier tube a. The carrier being inserted at the clerk's terminal will therefore be moved from the latter to the cashier's terminal c. At the cashier's terminal the air passes through a screen 16 (see Fig. 3) the external opening of which is controlled by a pair of check valves 17, 18, both adapted to be actuated by suction, and the valve 18 also operates by pressure, existing in the carrier tube. Thus when the carrier tube, a, is operatively connected with the vacuum or suction side of the fan, the valve 18 will be lifted up against one side of the screen 16, the air passing through such screen, as usual; and the valve 17 will be held shut

by external atmospheric pressure. The check valve 18 being lifted up out of the way, as mentioned, when the carrier arrives at the cashier's terminal it falls on and opens by impact the valve 17, and then drops into the receiving chute 19. It is understood that the parts are properly constructed to guide the carrier to the opening of the terminal.

The action of my device in sending the carrier from the cashier's terminal to the clerk's terminal is as follows: Upon the cashier lifting the cover 10^a the movable switch 10^b, (see Fig. 5) rigidly mounted on the pintle of said cover, is positioned to close the circuit of the electromagnet 6, which, being energized, attracts and lifts the valve 3 of the bellows, establishing communication between the interior of the bellows q and the pressure main p through passage p^2 and port z, driving up the diaphragm q' causing the upward movement of the rod r to open the valve w, in so doing connecting the carrier tube, a, with the pressure side of the fan, and propelling the carrier from the cashier's to the clerk's terminal. During this period the check-valve 18 is forced down, closing the exit of the terminal c. A catch of any convenient form, as illustrated by 10^d in Fig. 4, is provided to latch the cover 10^a shut to prevent the escape of the air while under pressure in the carrier-tube. A coil-spring, 10^e, illustrated in Fig. 5, is also provided on the pintle 10^c of the cover 10^a to insure the closing of said cover.

In order to prevent the reversing of the flow of air in the carrier-tube, a, during the period it is in use for sending a carrier between the terminals of the cashier and clerk, or vice versa, I provide switches, at 13 and 22, operated by the movement of the valves, w, x, being normally closed and adapted to break the electrical continuity of the wires 12, 14 or 23, 21, when either of the controller valves, w, x, is operated, through the medium of the bellows, to open communication between the carrier-tube and the suction side or pressure side of the fan, as described.

Fig. 6 shows a diagram of the operation of the switch located at 13. The movable switch member 13^a is rigidly mounted on the pintle or axis of the valve w, and is adapted to be placed in open position by the opening of said valve w. The action of the switch 22 is like that of the switch 13. Thus, since the switch 22 is opened by the opening of the controller valve x of the vacuum main v, and the switch 13 is opened by the opening of the controller valve w of the pressure main p, the electric circuit of wires 21 and 23 is broken at 22 during the period the carrier is propelled by suction from the clerk's terminal, and the electric circuit of wires 11 and 12 is broken at switch, 13, during the period the carrier is propelled by pressure from the cashier's end.

The chamber of the bellows q is further provided with an adjustable "leak" valve 24 consisting of a set screw adapted to regulate the opening 24^a, see Fig. 9, leading to the exterior for permitting air to enter or escape from the bellows chamber, after having been connected, as described, with either the vacuum or pressure side of the fan, and the adjustment of the valve controlling the interval of time the diaphragm q' of the bellows will be held up or down and the controller valves w or x correspondingly operated.

I claim:

1. In a pneumatic despatch apparatus, the combination of a fan element and a motor therefor; a carrier tube and passageways connecting both sides of the fan therewith; a cylinder and a weighted piston reciprocating therein; ducts connecting the opposite ends of said cylinder with said passageways; a governing element for the motor of the fan; and connections between said piston and said governing element.

2. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passageways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passageways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; an adjustable valve in said pneumatic device providing a limited inlet and outlet to and from the outer air, whereby is controlled the interval of time during which the operated controlling valve is held open; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers.

3. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a bellows connected with and adapted to operate said controller valves of the passage-ways; said bellows connected by ducts with said passage-ways; an adjustable valve in said bellows providing a limited inlet and outlet to and from the outer air, whereby is controlled the interval of time during which the operated controlling valve is held open; and valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and

switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers.

4. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a bellows connected with and adapted to operate said controller valves of the passage-ways; said bellows connected by ducts with said passage-ways; an adjustable valve in said bellows providing a limited inlet and outlet to and from the outer air, whereby is controlled the interval of time during which the operated controlling valve is held open; valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; and a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves.

5. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passageways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a bellows connected with and adapted to operate said controller valves of the passage-ways; said bellows connected by ducts with said passage-ways; and valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers.

6. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a bellows connected with and adapted to operate said controller valves of the passage-ways; said bellows connected by ducts with said passage-ways; valves controlling said ducts, such valves normally closed; electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; and a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves.

7. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; and a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system.

8. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system; a cylinder and a weighted piston reciprocating therein, ducts connecting the opposite ends of said cylinder with said by-pass above and below the valve therein, and valves controlling said ducts; a governing element for the motor of the fan, and connections between said piston and said governing element.

9. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; regulating valves in the vacuum and pressure passage-ways from the fan to the delivery-tube whereby abnormal vacuum or pressure is independently relieved; and a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system.

10. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; regulating valves in the vacuum and pressure passage-ways from the fan to the delivery-tube whereby abnormal vacuum or pressure is independently relieved; a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system; a cylinder and a weighted piston reciprocating therein, ducts connecting the opposite ends of said cylinder with said by-pass above and below the valve therein, and valves controlling said ducts; a governing element for the motor of the fan, and connections between said piston and said governing element.

11. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passageways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers.

12. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passageways; a pneumatic device connected with and adapted to be operated when either vacuum or pressure is caused in said passage-ways of the fan, and operating said controller valves; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; and a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves.

13. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; an adjustable valve in said pneumatic device, providing a limited inlet and outlet to and from the outer air, whereby is controlled the interval of time during which the operated controlling valve is held open; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; and a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves.

14. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves; and a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system.

15. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves; a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system, a cylinder and a weighted piston reciprocating therein, ducts connecting the opposite end of said chamber with said by-pass above and below the piston therein, and valves controlling said

ducts; and a governing element for the motor of the fan, and connections between the last mentioned piston and said governing element.

16. In a pneumatic despatch apparatus, the combination of a fan and a motor therefor; a carrier-tube and passage-ways connecting both sides of the fan therewith; a controller valve, normally, automatically closed, in each of such passage-ways; a pneumatic device connected with and adapted to operate said controller valves of the passage-ways; regulating valves in the vacuum and pressure passage-ways from the fan to the delivery-tube whereby abnormal vacuum or pressure is independently relieved; said pneumatic device connected by ducts with said passage-ways, valves controlling said ducts, such valves normally closed, electromagnets adapted for opening the last mentioned valves, covers on the terminals of said carrier-tube, and switches operated thereby, in the electric circuit of said electromagnets, said switches being normally open and being closed by the lifting of one of said covers; a second switch in the electric circuit of each electromagnet, such switches being operated by said controller valves, being normally closed and opened by the opening of said controller valves; and a by-pass connecting said vacuum and pressure passage-ways of the fan, and a weighted valve in said by-pass adapted to be automatically operated when abnormal vacuum and pressure exist simultaneously in the system.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."