

March 23 , 1926.

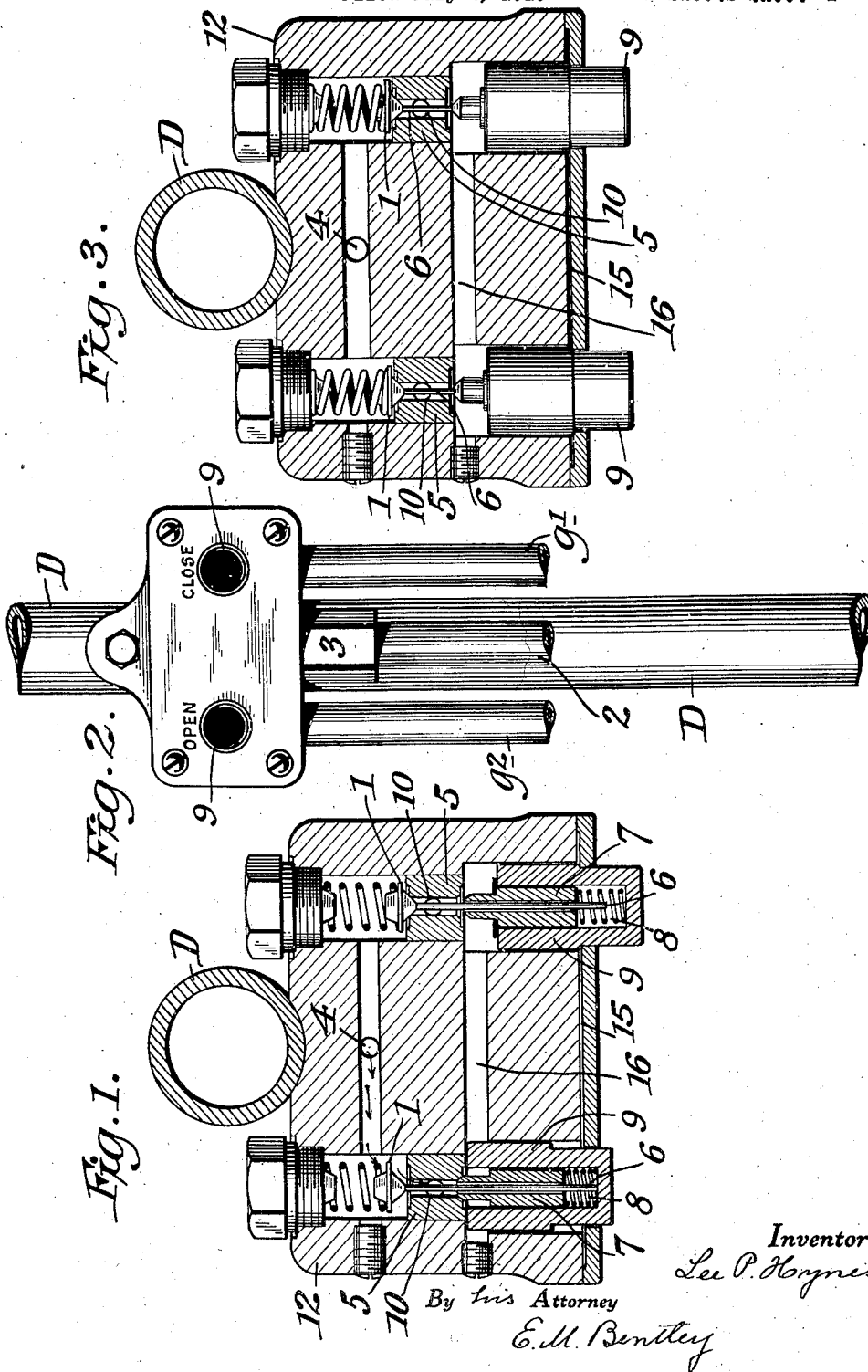
1,577,908

L. P. HYNES

DOOR MOTOR CONTROL

Filed July 2, 1919

2 Sheets-Sheet 1



Inventor
Lee P. Higgins.

Lee P. Hynes.

By his Attorney

E. M. Bentley

March 23 , 1926.

1,577,908

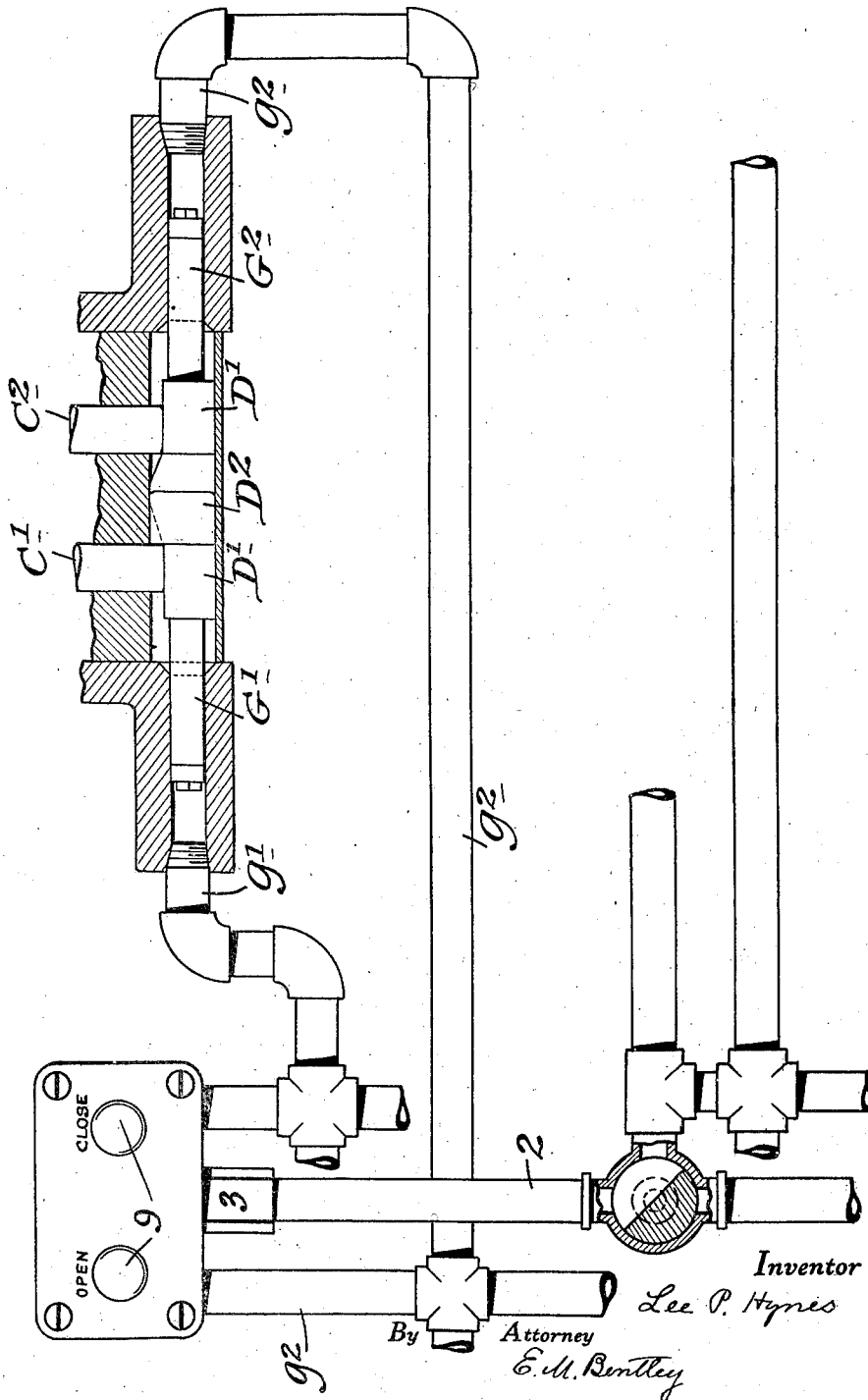
L. P. HYNES

DOOR MOTOR CONTROL

Filed July 2, 1919

2 Sheets-Sheet 2

Fig. 4



UNITED STATES PATENT OFFICE.

LEE P. HYNES, OF ALBANY, NEW YORK, ASSIGNOR TO CONSOLIDATED CAR-HEATING COMPANY, OF ALBANY, NEW YORK, A CORPORATION OF WEST VIRGINIA.

DOOR-MOTOR CONTROL.

Application filed July 2, 1919. Serial No. 308,153.

To all to whom it may concern:

Be it known that I, LEE P. HYNES, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Door-Motor Controls, the following being a full, clear, and exact disclosure of the one form of my invention which I at present deem preferable.

For a detailed description of the present form of my invention, reference may be had to the following specification and to the accompanying drawings forming a part thereof, wherein:—

Fig. 1 is a horizontal section of the pneumatic push-buttons showing one button pushed in;

Fig. 2 is a front elevation of the push-button box;

Fig. 3 is a horizontal section of the push-buttons in normal position;

Fig. 4 is a pipe diagram.

My invention relates to a means for manually controlling doors or similar devices operated by a stroke motor—i. e. a motor which performs its intended work by a single stroke. Such motors have heretofore been controlled by means of pistons acting on the motor valves and the said pistons controlled in turn by means of an electromagnetic valve the circuit of the magnet being extended to electrical push-buttons at the point of ultimate control. It is my purpose in the present invention to provide similar push-buttons which are however not electrical but pneumatic and which operate directly the valves which control the valve-operating pistons aforesaid. By my arrangement, I dispense with all electrical intermediaries and yet secure the same control of the motor without using any greater amount of air.

Referring to Fig. 4, G^1 and G^2 are two pistons which act alternately on the stems or plungers C^1 , C^2 of the motor valves. To one end of each of the cylinders in which the respective pistons move, the air is supplied by the pipes g^1 , g^2 both of which lead away from the motor to the point of ultimate control and may be herein referred to as service pipes. At that point the pipes are connected with ducts 10, 10 formed in a

cast iron block 12 that is mounted on a post D or other support. As appears in Figs. 2 and 4 the pipes g^1 , g^2 enter the under side of the block 12, so that from the horizontal sections of that block shown in Figs. 1 and 3, it will be manifest that the ducts 10, 10 lead downward into the respective pipes g^1 , g^2 . The ducts 10, 10 communicate respectively with horizontal axial ducts formed in brass plugs 5, 5, driven into round holes in the block. On one end of each plug 5 is seated a spring-pressed valve 1. The chambers containing the two valves 1 are both supplied with air through a duct 4 that communicates with a pressure supply pipe 2 through a strainer 3. The pipe 2 and strainer 3 are shown in Figs. 2 and 4 as applied to the under side of the aforesaid cast-iron block 12. Hence it will be obvious from the horizontal sections of block 12 in Figs. 1 and 3 that the duct 4 leads downward through the block into the strainer 3 and pipe 2 and conducts the supplied air therefrom upward into the horizontal duct connecting the two valve-chambers. On the opposite side of each plug 5 is a chamber in which slides a hollow button or finger-piece 9. In the center of each finger-piece is an exhaust valve 7 that seats against the plug 5 to close the axial passage therein just as the admission valves 1, 1 aforesaid seat against the opposite ends of the same axial passages in the plug. The exhaust valves 7, 7 are seated at their outer ends against springs 8, 8 in the finger-pieces 9, 9, and are secured in place therein by upset lips a , a , that engage shoulders on the valves. Each admission valve is provided with a stem 6 which passes through the axis of plug 5 and through an axial hole in the exhaust valve 7 to a point near the bottom of the cavity in the push-button. Normally the finger-pieces 9, 9 stand in the position shown in Fig. 3, but either one may be pushed inward as shown at the left of Fig. 1. When a finger-piece is pushed in, its first effect is to compress spring 8 and thereby force the exhaust valve 7 against its seat on plug 5. The second effect, as the finger-piece is pushed in still farther, is to lift the admission valve 1, by engaging its stem 6, from its seat on plug 5. Assuming that the left finger-piece in Fig. 1 is thus

pushed in, the air from supply pipe 2 will enter duct 4 and flow thence, as the arrows indicate, into the axial passage in plug 5 and through duct 10 to the pipe g^2 leading to the back of piston G^2 . The piston G^2 will then act to start the motor in—say, a door-opening direction. This it does by pushing to the left a cam-slide D^1 that first lifts valve-stem C^1 by means of the incline shown in dotted lines on the upper edge of the cam-slide and then pushes under the lifted valve-stem a supporting portion of a block or dog D^2 , contained in a recess in the front side of the cam-slide in front of the two oppositely sloping inclines by which the slide lifts valve-stem C^1 if moved to the left, or valve-stem C^2 if moved to the right in Fig. 4. The block or dog D^2 then maintains the valve in its uplifted position. Thus by a mere momentary pressure on finger-piece 9 the door is started and will continue on its course until, by automatic means not shown, the motor restores the valve maintaining slide D^1 to the neutral position represented in Fig. 4, pushing the maintaining dog D^2 out from under valve-stem C^1 and allowing said stem to operate.

In the above described operation of the push-button several features may be particularly noted. First. The closing of exhaust valve 7 prior to the opening of admission valve 1, not only prevents all leakage of pressure but also insures a very quick and positive action of the piston G^2 which controls the motor. The preliminary closure of the exhaust valve converts the long service pipe extending from the motor to the distant point of control, into a closed chamber. The subsequent opening of the admission valve impresses on said chamber a sudden impulse of high pressure that is transmitted instantly to the cylinder containing one of the pistons G^1, G^2 which form an extension of the said closed chamber. This produces the quick and positive effect aforesaid. Second. It compels the operator to press the button properly or no action at all results. Third. The first effect of releasing the finger-piece after it has been pushed in is merely to allow the springs to react, the admission valve remaining open and the exhaust valve remaining closed. This affords a time element, brief indeed, yet sufficient to insure adequate air pressure reaching the piston G^2 . Fourth. The admission valve 1 seats before the exhaust valve unseats. That also prevents loss of air pressure and aids materially in enabling the press-button valve, located at a distance from the motor, to be used as a manual controller with the same effect as a magnetic valve located close to the motor. Fifth. While the admission valve 1 is moved back to its closed position by the spring, it is retained in that position

by the air pressure since the air is permitted to act on the back side of it as it approaches and reaches its seat on plug 5. It is thereby maintained closed when not being used for motor control.

When the finger-piece 9 has been entirely released and the exhaust valve is finally open, the exhaust pressure acts through port 10 and is distributed and dispersed through several channels. Thus it goes into the annular space around the finger-piece 9 and thence into a narrow space 15 between the front face of the block and the name-plate thereon, this space being open to the atmosphere. There is also a cross-duct 16 formed in the block through which the exhaust pressure can pass into a similar annular space around the other finger-piece 9. By this cross duct the exhaust pressure aforesaid can also pass into the other duct 10 and thence through the other service pipe to the other piston but it becomes so attenuated as to exert no material influence thereon. The effect of this dispersing of the exhaust pressure is to muffle completely the sound of the exhaust. The apparent action of this pneumatic push-button is exactly that of the ordinary electrical push button; even the operator himself can not tell the difference although the entire organization is materially different.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a valve-operating cylinder and piston of a service pipe leading therefrom to a distant point of control, a push-button and pressure supply pipe at said point, and also at said point exhaust and supply valves for said service pipe, both operated by said push-button in the same stroke but separately and in sequence.

2. The combination with a valve-operating cylinder and piston, of a service pipe leading therefrom to a distant point of control, a push-button and pressure-supply pipe at said point of control, and also at said point exhaust and supply valves for said service pipe, the exhaust valve closing in advance of the opening of the supply valve by the same stroke of the push-button.

3. The combination with a valve-operating cylinder and piston of means for maintaining the valve in its operated position until released by the completed movement of the piston, a service pipe leading from said cylinder to a distant point of control, and at said point of control a supply pipe and push-button together with supply and exhaust valves for said service pipe both operated by a single stroke of said button.

4. The combination with a valve-operating cylinder and piston, of a service pipe leading therefrom to a distant point of control, and at said point of control a supply pipe, a push-button, a spring-actuated sup-

ply valve, an exhaust valve and a spring between said exhaust valve and the push-button.

5. The combination with a valve-operating cylinder and piston, of a service pipe leading therefrom to a distant point of control, and at said point of control a supply pipe, a push button, aligned supply and exhaust valves for said service pipe, a valve stem from the supply valve extending through the exhaust valve to the push-button and a spring between said push-button and the exhaust valve.

6. The combination with a valve-operating cylinder and piston, of a service pipe leading therefrom to a distant point of control, and at said point of control a supply pipe, a push-button, a spring operated supply valve for said service pipe, an oppositely acting exhaust valve therefor enclosed in the push-button, a valve stem between said supply valve and a spring between said exhaust valve and the push button.

7. The combination with a valve-operating cylinder and piston, of a service pipe leading therefrom to a distant point of control, and at said point of control a supply pipe, supply and exhaust valves for said service pipe, a push button acting directly on one valve and indirectly on the other valve, and an enclosing structure for said valves provided with means for muffling the exhaust pressure.

8. The combination with two valve-operating cylinders and pistons of service pipes leading to a distant point of control, and at said point a push-button, two normally-open exhaust valves in communicating chambers, and means for separately operating said valves whereby the exhaust from one valve may flow back through the other open valve.

9. The combination with a cylinder and a valve operating piston therein, of a service pipe for said cylinder, an admission valve between said service pipe and said cylinder, a finger-piece for operating said

admission valve, and an exhaust valve having a portion movably mounted within said finger-piece.

10. The combination with a valve-operating cylinder and piston, of a service pipe, a push-button, an admission valve, a spring therefor, an operating finger-piece, an exhaust valve in said finger-piece, and a spring between said finger-piece and the exhaust valve.

11. The combination with a valve-operating cylinder and piston, of a service pipe, a push-button, an admission valve, a spring therefor, an exhaust valve, and an operating finger-piece for said valves operating by a yielding connection the exhaust valve and by an unyielding connection the admission valve.

12. The combination with two separate valve stems, of fluid pressure cylinders, one for each valve stem, a valve stem retaining device positioned to engage said valve stems and having pistons extending into the respective cylinders, a control station, service pipes leading from said control station to the respective cylinders, a supply pipe at said control station, separate pairs of admission and exhaust valves for each service pipe, and separate manual devices for operating each pair of said valves.

13. The combination with two separate valve stems, of fluid pressure cylinders, one for each valve stem, a valve stem retaining device positioned to engage said valve stems and having pistons extending into the respective cylinders, a control station, service pipes leading from said control station to the respective cylinders, a supply pipe at said control station, separate pairs of admission and exhaust valves for each service pipe, and independent push buttons for respectively operating each pair of said valves.

Signed at Albany, county of Albany and State of New York, this 27th day of June, 1919.

LEE P. HYNES.