

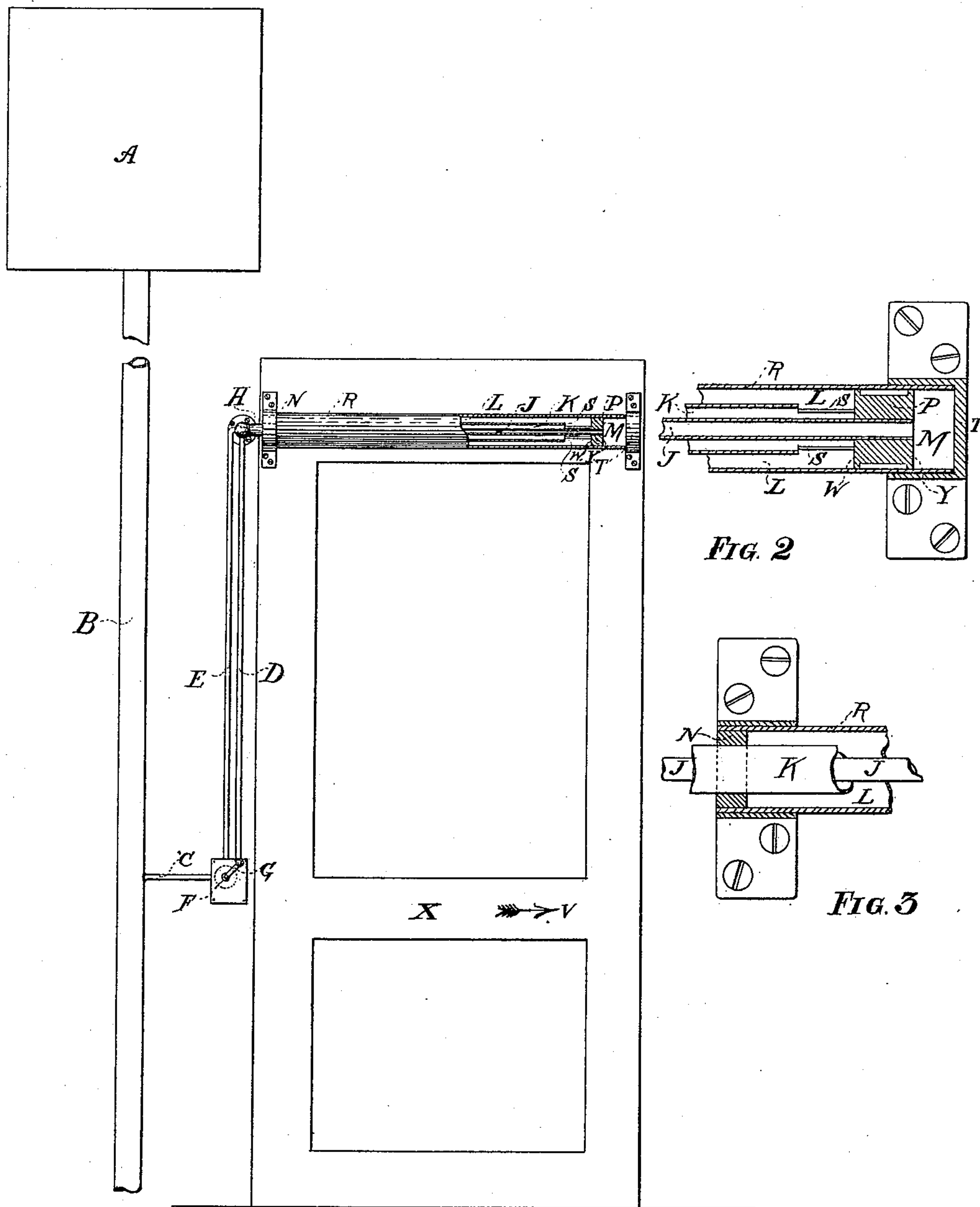
(No Model.)

A. L. WEBSTER.

MACHINE FOR OPENING AND CLOSING BARRIERS CONTROLLING OPENINGS.

No. 464,597.

Patented Dec. 8, 1891.



WITNESSES:

C. Littlefield.
Mortimer Foster.

FIG. 1

INVENTOR

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MACHINE FOR OPENING AND CLOSING BARRIERS CONTROLLING OPENINGS.

SPECIFICATION forming part of Letters Patent No. 464,597, dated December 8, 1891.

Application filed July 12, 1890. Serial No. 358,519. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. WEBSTER, a citizen of the United States, residing in the village of New Brighton, in the county of Richmond and State of New York, have invented a new and useful Machine for Opening and Closing Barriers Controlling Openings, of which the following is a specification.

My invention relates to a device for opening and closing all kinds of barriers covering or controlling all kinds of openings; and the objects are to provide means for applying force, first, to move the barrier; second, to return it to its original position, and, third, for controlling the application of the force so that the barrier may be moved and returned at the will of the person operating it or by any automatic operating device. These objects are accomplished by the application of the pressure of any desired liquids or gases or other fluid medium or through a vacuum or a combination of any or all, acting in a vessel, tube, cylinder, or other closed chamber attached to the barrier, containing in its interior a piston attached to one or more hollow piston-rods passing through either or both extremities of the closed chamber and attached to the stationary surface or wall upon which the barrier moves, and connected with pipes or tubes, which serve alternately as supply and exhaust pipes for the ingress and egress of the impelling medium, the control of the impelling medium used being effected by means of a valve or other device so constructed and arranged with reference to the ingress and egress pipes that a single movement of the former by the operator or by any automatic operating device will permit the ingress and egress of the impelling medium to and from the closed chamber, and a consequent movement of the barrier.

The invention will be best understood with reference to the accompanying sheet of drawings, which show the device applied to a sliding door, in which—

Figure 1 is a general elevation of the entire device, showing a part of the closed chamber in section, with its inclosed piston and hollow piston-rods. Fig. 2 is an enlarged section of one end of the closed chamber, and Fig. 3 is an enlarged section of the other end of same.

Similar letters refer to similar parts throughout the several views.

In the drawings, X represents a barrier controlling any form of opening in a wall or other flat surface.

R represents the closed chamber made, preferably, in the form of a cylinder or tube, which is securely attached to the barrier X at any convenient point and in any convenient manner, but preferably by means of the lug provided with screw-openings placed over each end, as shown in the views. One end T of the chamber R is completely closed, while the other end N is closed with a plate or plug containing an opening, through which a piston-rod K passes, or both ends may contain perforated plugs, through each of which a hollow piston-rod passes. The rod K terminates at the end within the receptacle R in a piston P, which is of such dimensions with reference to the receptacle R that the latter can slide freely upon it. The piston-rod K is made with one or more separate lateral passages in its interior for the passage of the impelling medium to and from the interior of the closed chamber, but in practice it will be found most convenient to construct it out of two hollow tubes J and K, the former and smaller of which J passes through the interior of the larger K and is arranged so as to be parallel thereto. One hollow piston-rod J communicates at its inner end through the piston P with the space M between the face of the piston P and the end T of the cylinder R, as shown in the views. The other hollow piston-rod K communicates at the end through the openings or ports S S, with the space L between the opposite face of the piston P and the other end N of the closed chamber R. The rods as they pass out through the end N of the chamber R are made of such length as will enable the chamber R, and with it the barrier X, to slide upon the piston P the entire length of the chamber, the length being in each case equal to the width of the opening which the barrier is designed to close, or such part of the width of the opening as may be desired to be controlled by the barrier. The outer ends of the hollow piston-rods J and K are securely fastened to the wall or surface bounding the opening covered by the

barrier, and from this point on are arranged with particular reference to the control and direction of the impelling medium passing through them by means of the devices hereinafter described. In practice they will preferably be extended from the point H, where they are attached to the wall by the pipes D and E, so as to connect with a combination-valve F, fixed on the wall or surface in the line of the supply-pipe C, which communicates through the pipe B with a reservoir A or other suitable receptacle, which contains the impelling medium in desired quantities; or if the device is acting as a vacuum-machine the reservoir A should be in an exhaust condition of whole or partial vacuum, according to the conditions that may exist.

The combination-valve F is a valve arranged to operate in one position, so as to alternately connect one piston-pipe D or the other pipe E with the supply-pipe C, and at the same time to alternately connect the pipes D and E with the outside air. The details of the valve are not shown, as they may vary from time to time, any form of valve that will accomplish the same result being equally applicable. The combination-valve when moved to the opposite position reverses the connections of the piston-pipes E and D with the pipes C and the air-ports in the valve. In general it must in its first position serve to connect one piston-pipe with the pipe or duct C, while the other piston-pipe is held in communication with a port or opening leading directly or indirectly to the outer air, and in its second position it must serve to connect the other piston-pipe with the pipe or duct C, and at the same time connect the second piston-pipe with the outer air.

The valve is provided with a handle G or other device, whereby it may be moved at will or automatically, if desired, from its first position to its second position and back.

Any convenient fluid-impelling medium may be used, such as gas, steam, water, compressed-air, or it may be operated as a vacuum-machine, &c.; but in practice compressed air or a vacuum will be found preferable.

The operation of the device when applied to a sliding barrier is substantially as follows: The device may, as above indicated, be operated by the pressure of air, gas, liquid, vapor or vapors operating through the pipe C or any other impelling medium; or it may be operated in a reverse manner through the creation of a vacuum partial or complete in the tube C or in a vessel or reservoir with which the tube C communicates.

The operation of the machine in the case where pressure is employed in the pipe C is as follows, (it being assumed that the barrier X is to be first moved in the direction of the arrow V, Fig. 1, by the operation of the machine, and afterward returned to its original position, as shown in the figure:) Before the movement begins the valve F is set by the handle or device G on the face of the same, so

that the tube C under pressure is in communication with the piston-pipe D, while the piston-pipe E is in communication with the outside air through a port or opening in the valve F. The pressure in the tube C is transmitted through the combination-valve F and piston-pipe D to the hollow piston-rod K, and through the hollow piston-rod K to the space L between the face W of the piston P, and the end N, of cylinder R. The pressure in the pipe C is thus transmitted to the face N of the cylinder R, and to the face W of the piston P. The pressure thus exerted, acting against the face N of the cylinder R, tends to press the cylinder R and the barrier X, to which the cylinder R is attached, in a direction the reverse of that shown by the arrow V, Fig. 1, thereby holding the barrier X against a stop, jam, or other permanent surface attached to the surface or wall forming the boundary of the opening controlled by the barrier X and limiting the movement of the same in the direction the reverse of that shown by the arrow V, Fig. 1. To move the barrier from the position described in the direction shown by the arrow V, Fig. 1, the handle or device G of the combination-valve F, is moved so as to bring the pipe C into communication with the piston-pipe E, while at the same time the piston-pipe D is brought into communication with the outside air through a port or opening in the combination-valve F, and the pressure of the impelling medium in the space L of the cylinder R is thus relieved through the hollow piston-rod K, the pipe D, and a part of the combination-valve F, and communicated to the outer air. At the same time the space M of the cylinder R is brought under pressure through the pipe C, the combination-valve F, the piston-pipe E, and the hollow piston-rod J, opening through the piston P into the space M. The pressure in M tends to drive the cylinder R and the barrier X, to which it is attached, in the direction of the arrow V, Fig. 1, and to hold the cylinder R and barrier X in a position removed from its first position, until the handle or device G of the valve F is returned to its first position, when the pressure in the space M of the cylinder R is relieved and the pressure in the space L of the cylinder R is restored, the cylinder R and the barrier X, to which it is attached, being thereby moved in the reverse direction to that shown by the arrow V, Fig. 1, thus completing the circle of the operation of the machine. If a vacuum be established in the pipe C, a reverse operation takes place to that obtaining where the pipe C is under pressure. In this case the pressure operating the machine is atmospheric pressure acting through the opening or port in the combination-valve F, as this opening or port is brought into communication with the piston-pipes E or D, through the movement of the handle or device G by the person operating the device by automatic movement of the valve F; or the machine may be operated by both pressure and vacuum.

The invention is not necessarily limited to the application to a sliding barrier, as above set forth, for the reason that by making the closed chamber R and the piston-rods G and K curved and attaching the latter to the surface or wall in which the opening is placed a swinging barrier may be closed in substantially the same manner.

I claim as my invention—

1. In a device for opening and closing a barrier controlling an opening, the combination, substantially as hereinbefore set forth, of a closed chamber attached to the barrier, a piston in said chamber upon which the same can slide, a piston-rod connecting the piston with the wall or surface surrounding the opening, passages in said piston-rod, whereby a fluid-impelling medium may be admitted to and be discharged from the space within the chamber at either side of the piston, and means, substantially as described, for allowing the impelling medium to be alternately admitted to or discharged from the space within the chamber at either end of the piston.

2. In a device for opening and closing a barrier controlling an opening, the combination, substantially as hereinbefore set forth, of a closed chamber attached to the barrier, a piston within the chamber upon which the same can slide, a hollow piston-rod containing two concentric passages connecting the piston

with the wall or surface surrounding the opening, one of which passages opens at its inner end into the space within said chamber at one side of the piston, while the other opens into the space at the other side of the piston, and a valve connected with the outer ends of said passages and with the source of supply of the impelling medium, so constructed and arranged that the medium may be alternately admitted to one passage and discharged through the other.

3. In a device for opening and closing a barrier controlling an opening, the combination, substantially as hereinbefore set forth, of a closed chamber attached to the barrier, a piston in said chamber upon which the same can slide, a piston-rod connecting the piston with the stationary wall or surface containing the opening containing passages for the ingress and egress of a fluid-impelling medium to either side of the piston, a pipe connecting said passages with a suitable source of supply, and a rotary valve containing passages, substantially as described, whereby either of the passages in the piston-rod may be connected with the supply-pipe, while the other is connected with the outside air.

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Witnesses:

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