

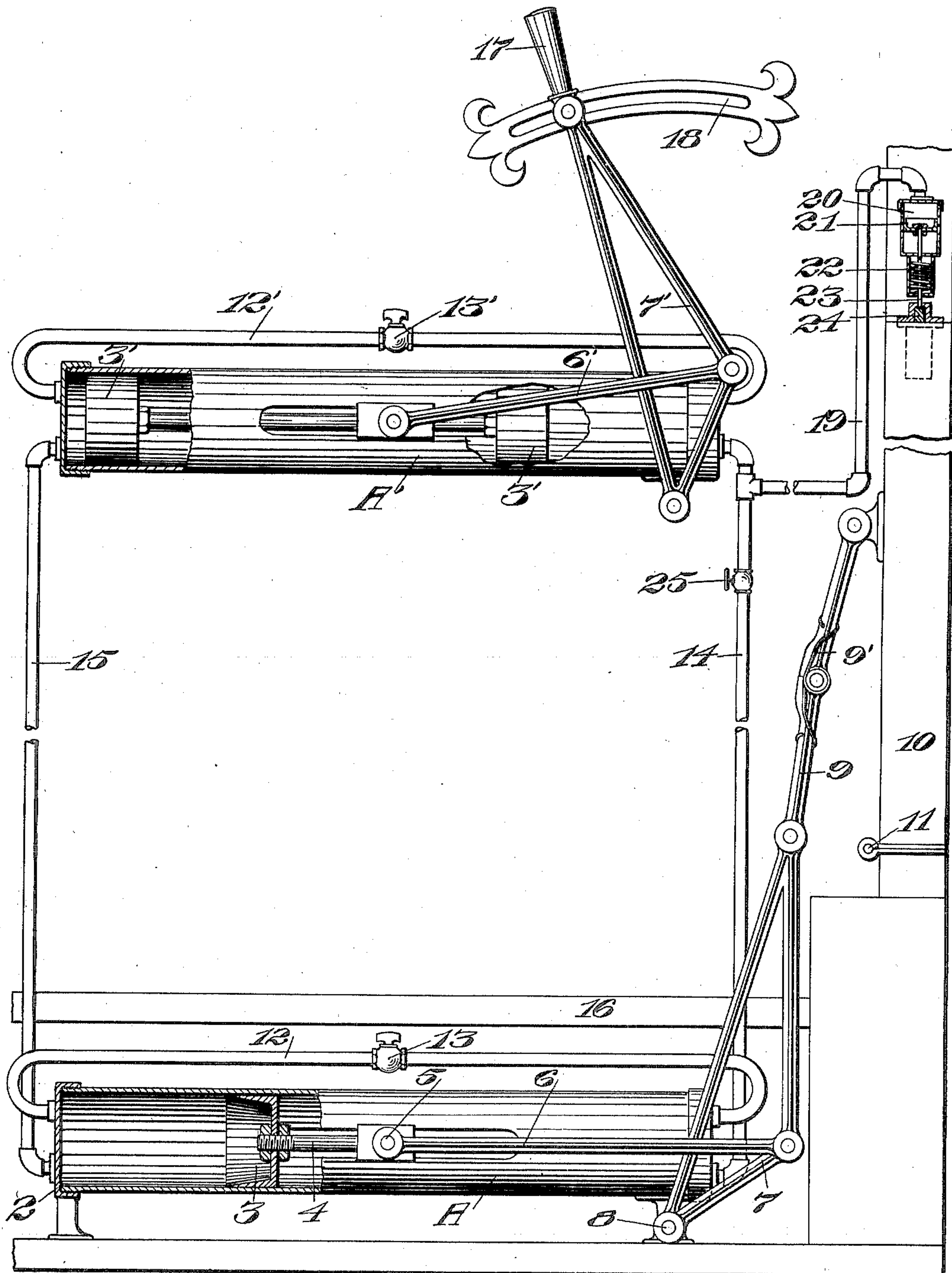
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A. M. SPINK.

FLUID PRESSURE DOOR OPENER AND CLOSER.

APPLICATION FILED OCT. 20, 1905.



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UNITED STATES PATENT OFFICE.

ARTHUR M. SPINK, OF SAN FRANCISCO, CALIFORNIA.

FLUID-PRESSURE DOOR OPENER AND CLOSER.

No. 817,014.

Specification of Letters Patent.

Patented April 3, 1906.

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To all whom it may concern:

Be it known that I, ARTHUR M. SPINK, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Fluid-Pressure Door Openers and Closers, of which the following is a specification.

My invention relates to means for opening and closing doors, and especially for operating doors in flats and the like, where the door is often situated at the bottom of a stairway or at some remote point and it is not desired to have to descend the stairs always to open the door from the inside.

The object of the invention is to provide a simple, cheap, practical, and noiseless door opener and closer which is easy of operation, which can be readily gotten at and repaired if anything goes wrong without having to tear out the whole side of the wall, and which will keep the door under perfect control at all times, so that it may be opened more or less, as desired.

The invention consists of the parts and the construction and the combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawing, in which the figure represents in elevation, with parts broken away, a door opening and closing apparatus embodying my invention.

In practicing my invention I employ two apparatuses, each practically the counterpart of the other and disposed one adjacent to the door and the other situated at some point remote from the door, as the top of the landing or wherever the movements of the door are to be controlled from. The former apparatus comprises a cylinder A, having the heads 2, suitably secured to a fixed support. The cylinder contains a double piston 3, the two pistons in the cylinder being connected by a rod 4. The cylinder is slotted between the pistons for an arm 5 to work in, which connects with the rod 4. A pitman 6 connects with the arm 5 and with a trussed lever 7, here shown as of the third class and as pivoted at 8. The free end of the lever connects by a link 9 with the door 10, which is hinged in the ordinary manner, as at 11. The opposite ends of the cylinder are connected through the heads by the small equalizing-pipe 12, in which is a cock 13. Admitting fluid under pressure into one end of the cylinder against the piston and allowing for

discharge of the fluid from the opposite end of the cylinder will operate the piston to close the door. Reversing the operation will open the door. The "upstairs" apparatus or that by which the actual operation of the door is controlled comprises a similar cylinder A', piston 3', pitman 6', and operating-lever 7'. The lever ends of the two cylinders are connected by a pipe 14, and the corresponding opposite ends of the two cylinders are connected by a pipe 15.

Both of the cylinders and the pipes 14 15 are set in the walls of the building, the lever 7 of the "downstairs" apparatus being arranged horizontally and working in a slot in the base-board 16 and the operating-lever 7' of the upstairs apparatus being disposed vertically and connected to a handle 17, which operates in a slot in plate 18, set in or secured to the wall.

When the machine is set up, oil or other suitable liquid is pumped into the lower cylinder and made to circulate through both cylinders and through all the pipes until all the air is expelled and all parts are filled. The equalizing-pipes 12 12' enable the handle 17 to be set properly by getting the necessary quantity of oil in both ends of both cylinders. The valves 13 13' are then closed and remain closed. Thenceforth circulation is between corresponding ends of the two cylinders through the pipe 14 15 and not between the two ends of the same cylinder. While I have shown each cylinder as having an equalizing-pipe and valve, it is only necessary, in fact, for one cylinder to be so provided.

The parts being in position, as shown, with the door closed, the operation of the device is as follows: To open the door, the operating-handle 17 is moved to the right, which causes the oil or other fluid to pass from the right end of the cylinder A' through pipe 14 into the right end of the cylinder A to act to move the piston 3 to the left, expel the oil from the opposite end of cylinder A through pipe 15 into the suction end of cylinder A' and to pull on the door and open it. Prior to the opening of the door the latch must be released from its keeper, and this is done by fluid-pressure means controlled from the cylinders. As shown, the pipe 14, or that pipe which carries the fluid under pressure when the door is opened, has a branch 19, which extends beneath the floor and up through the door-jamb to connect with a small horizontal cylinder 20, which carries a piston 21.

One side of this piston is operated by the fluid-pressure in pipe 19. The other side is acted on by a spring 22. The piston has a stem or rod 23 on the spring side extending
 5 out through the head and in line with and in the path of the latch 24. When the rod 23 is pushed out by fluid-pressure in pipes 14 19, it will carry the end of the latch out flush with or beyond the inside of the jamb, so that
 10 no obstruction is offered to the opening of the door.

While the link 9 might be in one inflexible piece, I prefer to joint it, as shown, so that the door may be opened by turning the knob
 15 without having to work the whole apparatus. If a stiff link were used, it would necessitate the operation of the pistons in each cylinder and the corresponding movement of all the parts of both machines each time the door is
 20 opened. This might prove objectionable. By jointing the link as shown and having the two sections stand slightly out of line when straightened to their fullest extent the door may be opened by hand without affecting
 25 the apparatus. By providing a suitable stiff spring 9', acting normally to straighten the link-sections, it enables, primarily, an articulated link of this character to exert a sufficient push to close the door.

30 To close the door, the handle 17 is turned to the left, forcing the fluid from that end of cylinder A' through pipe 15 back into the corresponding end of cylinder A and drawing the oil from the opposite end of cylinder A and from cylinder 20 up through pipe 14 into
 35 cylinder A'. As soon as pressure is released on the fluid in pipes 14 19 and cylinder 20 the spring 22 operates to retract the stem 23 and allow the latch to engage with its keeper.
 40 The spring 9' acts not only to straighten the link to close the door, but it relieves shock to the apparatus in case the handle 17 is moved very rapidly or faster than corresponds to the closing movement of the door.

45 The door may be stopped and held at any point in its opening or closing movements and is always under perfect control.

By interposing a cock, as 25, in one or the other of the pipes 14 15 it is possible by turn-
 50 ing this cock when the door is closed to prevent its opening or to hold it open at any point.

It is possible that various modifications in my invention may be made without departing from the principle thereof, and I do not
 55 wish to be understood as limiting myself beyond the reasonable construction of my claims.

Having thus described my invention, what
 60 I claim, and desire to secure by Letters Patent, is—

1. In a door closing and opening means, the combination with a hinged door, of a cylinder slotted intermediate of its ends, a double
 65 piston in the cylinder, a pitman operating

in the slot in the cylinder and connected with the piston, a lever connected with said pitman, a link pivotally connecting the door and lever, and means including a second cylinder and pipe connections between the ends
 70 thereof and corresponding ends of the first cylinder, for admitting fluid under pressure alternately into opposite ends of the cylinder to open and close the door.

2. In door closing and opening means, the combination with a hinged door, of a fluid-pressure cylinder, a double-ended piston in said cylinder, a pitman connected with the piston, a lever fulcrumed to a fixed point of support and pivoted to the pitman, a link
 80 connecting the lever and door, and fluid-pressure mechanism connected with opposite ends of said cylinder for operating the piston to open and close the door, said mechanism including a second cylinder and double-
 85 ended piston and pipes connecting the ends of one cylinder with corresponding ends of the other cylinder.

3. In door opening and closing means, the combination with a hinged door, of a fluid-pressure cylinder, a piston operating in each end of the cylinder, a piston-rod connecting the two pistons, said cylinder slotted intermediate of said pistons, a pitman exterior to the piston and connected to the piston-rod through said slot, a lever of the third class connected with the pitman, a link
 95 connecting the door and lever, fluid connections between the opposite ends of the cylinder, and means for operating the piston to open and close the door, said mechanism including a second cylinder and double-ended piston and pipes connecting the ends of one cylinder with corresponding ends of the
 100 other cylinder.

4. In a door opening and closing means, the combination of two fluid-pressure cylinders, a piston operable in each cylinder, means connecting one end of one cylinder with the same end of the other cylinder
 110 whereby the fluid expelled from one end of one cylinder by the piston of that cylinder is delivered into the same end of the other cylinder to move the piston thereof in a direction opposite to the movement of the first-named piston, and means connected with each piston said last-named means including
 115 a pitman, and a lever to which said pitman is connected, and connections between one of the levers and the door.

5. In door opening and closing means, the combination with a hinged door having a latch-bolt, and a keeper for the latter, of two fluid-pressure cylinders, a piston in each cylinder, a pitman connected with each piston,
 125 an operating-lever connected with one piston, connections between the other piston, and the door to open or close the latter on the reciprocation of said piston, fluid connections between the corresponding ends of the two
 130

cylinders, and fluid-pressure means controlled by said operating-lever to release the latch to allow the door to open.

5 6. In door opening and closing means, the combination with a door having a latch-bolt, of two fluid-pressure cylinders, fluid connections between corresponding ends of the two cylinders, valved connections between the opposite ends of one of the cylinders, a piston in each cylinder, an operating-lever connected with one piston, and connections between the other piston and the door to open or close the latter on the oscillation of the operating-lever, and fluid-pressure means controlled by the lever to release the latch-bolt to allow the door to open.

7. In door opening and closing means, the combination with a door, the latch thereof, and a keeper, of two fluid-pressure cylinders, fluid connections between corresponding ends of said cylinders, a piston in each cylinder, an operating-lever connected with one piston, connections between the other piston and the door, and fluid-pressure-actuated mechanism connected with the cylinders to release the latch.

8. In door opening and closing means, the combination with a door, of a cylinder, a piston therein, a lever connected with the piston, and spring-actuated articulated connections between the lever and door, and means for reciprocating the piston.

9. In door opening and closing means, the combination with a door, of a cylinder, a piston therein, a lever, a jointed link connecting the lever and door, means operating on the link to tend to straighten the sections thereof, and means for reciprocating the piston.

10. In door opening and closing means, the combination with a door, of a cylinder, a piston therein, a lever connected with the piston, means for reciprocating the latter, and resilient connections between the lever and door, said connections causing the door to move in unison with the lever on the reciprocation of the piston in one direction and permitting a limited movement of the door independent of the movement of the piston.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR M. SPINK.

Witnesses:

D. B. RICHARDS,
J. E. RAPHAEL.