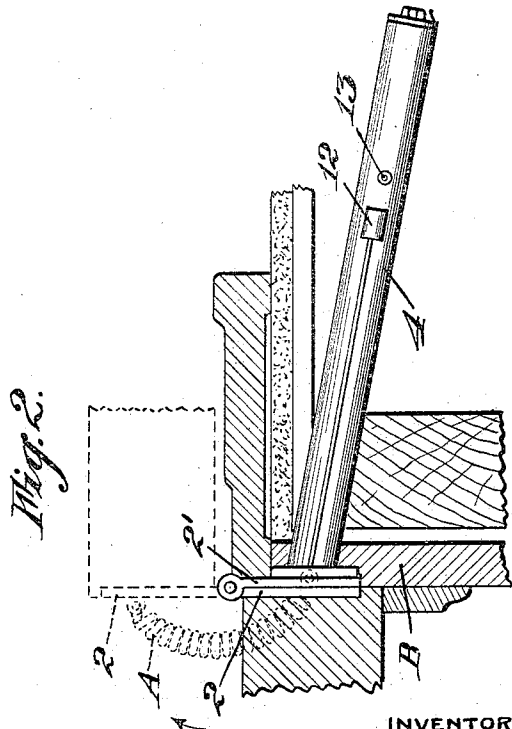
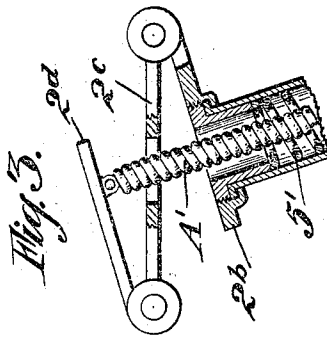
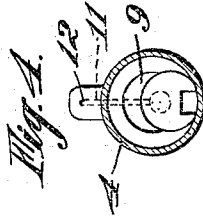
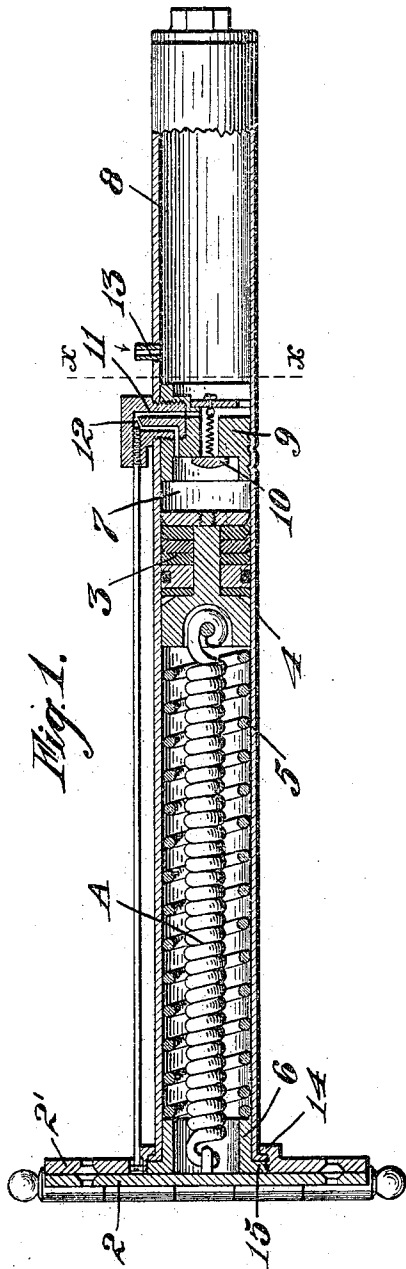


P. J. DECKER.
DOOR CLOSING DEVICE.
APPLICATION FILED SEPT. 13, 1909.

962,198.

Patented June 21, 1910.



WITNESSES;

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PHILLIP JOHN DECKER, OF SAN FRANCISCO, CALIFORNIA.

DOOR-CLOSING DEVICE.

962,198.

Specification of Letters Patent. Patented June 21, 1910.

Application filed September 13, 1909. Serial No. 517,369.

To all whom it may concern:

Be it known that I, PHILLIP JOHN DECKER, 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 Door-Closing Devices, of which the following is a specification.

My invention relates to door or like closing means, and to spring hinges.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the invention. Fig. 2 is a plan view as applied. Fig. 3 is a detail showing the invention as applied to a double-acting hinge. Fig. 4 is a section on the line X—X, Fig. 1.

While I have shown the invention as adapted to a door or other hinged swinging part, it is manifest that it is applicable to a variety of uses and under a variety of conditions.

The present description and illustration are intended to illustrate, rather than to limit the invention.

The invention comprises a flexible resilient connecting member, as the stiff coiled spring A adapted to be suitably connected at one end to the leaf of a hinge 2, or other swinging part, and the other end connected to a piston 3 operating in a cylinder 4. The cylinder 4 is suitably supported in the wall or casing or other fixed part of the structure to which the member 2 is hinged, and houses a spring 5 which is somewhat more resilient than the resilient connecting member A and acts against the piston 3 and against a fixed stop, as 6, within the cylinder to push the piston inwardly and tend to draw the resilient connecting member A into the cylinder.

The space in the cylinder on the opposite side of the piston from spring 5 is divided into two chambers 7 and 8 by a diaphragm 9 having a check-valve 10. When the piston is drawn out, as occurs in opening the door, air or other fluid is drawn into chamber 7 from chamber 8 on the opening of the check-valve 10, the size of the port controlled by check-valve 10 being such that practically no resistance is offered to the movement of the piston 3 by suction. However, when the door is allowed to close on the action of the spring 5, the air or other fluid is forced out

from chamber 7 slowly through a by-pass 11 into chamber 8, the size of this by-pass opening 11 being controlled by suitable means, as the needle valve 12. Under some circumstances I may use oil as a cushioning fluid, the oil flowing back and forth between the chambers 7 and 8 in a manner readily understood. The outer end of the chamber 8 is capped or otherwise closed, and the top of this chamber has a suitable air-vent 13.

I preferably arrange this device in combination with a hinge, the member 2 being one leaf of the hinge, and the member 2' being the other leaf; the cylinder being passed through a hole in the member 2' and seating against a flange 14 on the rear side thereof, and held in place by the threaded flange 15 of the annular stop 6.

This device is applicable either for doors swinging in one direction only, or doors which swing to open in both directions. For instance, in Fig. 3, I have shown the device combined with a double-acting hinge, in which the resilient connecting member A' passes through both the fixed leaf 2^b and the intermediate connecting leaf 2^c and connects with the outer swinging leaf 2^a; a single spring 5' acting in the manner before described to hold the leaves of the hinge in normally closed position.

When the cylinder and its spring and resilient connecting member are connected to the hinge in the manner here shown, it is seen that I produce a spring hinge of novel construction.

In the application of the device to doors and the like, I usually arrange the cylinder at an angle to the fixed hinge-plate 2' or 2^b, as shown in Fig. 2, secure this fixed hinge-plate to the door-frame B, bore a hole in the frame and pass the cylinder 4 therethrough and allow it to project into the wall space. In this way it does not interfere with the outside plastering, and gives a straighter draw on the resilient connecting member A.

The parts are connected together as shown in Fig. 2; the resilient connecting member A will be drawn out and bent, as shown, when the door is opening, thereby compressing the spring 5 or 5'; it being understood that the spring 5 or 5' is more flexible and resilient than the flexible connecting member A. This opening of the door also pulls out the plunger 3 and causes the chamber 7 to fill with fluid from the chamber 8. Releasing the door allows the spring 5 to act, gradually

closing the door as the air in chamber 7 is forced out through the by-pass 11. This resilient connecting member is preferably in the form of a stiff steel spring which naturally tends to straighten itself and so coöperates with the inside spring 5 to close the door.

The use of the fluid cylinder in conjunction with the piston and connecting rod A gives a slow cushioned closing movement to the door, so that in this device I combine both a spring hinge and a door check.

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

1. In a spring hinge, the combination of a cylinder carried by one leaf of the hinge, said cylinder having a diaphragm dividing it into two chambers and said diaphragm having a valve controlled passage directly connecting the chambers and adapted to admit fluid from one chamber to the other, a piston operable in one of said chambers, a resilient member connecting the piston with the other leaf of the hinge, and means including a compression spring acting on the piston to draw the resilient member into the casing, said diaphragm having a valve controlled by-pass for slowly returning the fluid from one chamber to the other and thereby permitting the slow closing of the door.

2. The combination of a cylinder having a diaphragm dividing it into two chambers, said diaphragm having a valve controlled passage connecting said chambers, a piston operable in one of the chambers, a resilient connecting member secured to the piston and having means at its outer end for connection with a movable part to be closed, means including a compression spring acting on the piston to draw said connecting member into the cylinder, and means for producing a slow cushioning return movement of said rod into the cylinder; said last-named means comprising a by-pass connecting one chamber of the cylinder with the other, and a valve for controlling the passage of fluid through the by-pass.

3. The combination of a cylinder having a diaphragm dividing it into two chambers, said diaphragm having a valve controlled passage connecting the chambers and adapt-

ed to admit fluid from one of said chambers to the other, a piston operable in one of the chambers of the cylinder, a resilient connecting member secured to the piston and having means at its outer end for connection with a movable part to be closed, means including a spring connecting with the piston to draw said connected member into the cylinder, and said diaphragm having a valve controlled by-pass connecting with said chambers and returning the fluid from one chamber to the other and permitting the slow closing of the part to be closed.

4. The combination of a cylinder, a piston therein, a spring for actuating the piston, said cylinder having a diaphragm dividing it into two chambers, said diaphragm having a passage connecting the chambers, a check valve mounted on the diaphragm and controlling said passage, said check valve adapted to open when the piston moves outward, and said diaphragm having a by-pass leading from one chamber of the cylinder to the other and provided with a valve, said by-pass producing a slow-cushion movement of the piston when the latter moves inwardly.

5. A spring hinge comprising two leaf members hingedly connected by a diagonal connecting plate whereby a door may open in either direction when the hinge is applied to it, a cylinder secured to one of said hinge members, a piston in the cylinder, means acting normally to press the piston inwardly within the cylinder and away from the hinge member to which the cylinder is connected, said cylinder having a diaphragm dividing it into two chambers and said diaphragm having a valve controlled passage connecting the chambers and also having a by-pass with controlling valve for producing a slow return movement of the door, and a resilient connecting member connected to the piston and passed through said diagonal connecting plate and secured to the other hinge member.

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

PHILLIP JOHN DECKER.

Witnesses:

GEO. J. BUSH,
THOMAS TIPPETT.