H. G. VOIGHT.

DOOR CLOSER AND CHECK.

APPLICATION FILED FEB. 14, 1913.

1,085,070.

Patented Jan. 20, 1914.

Fig. 1.

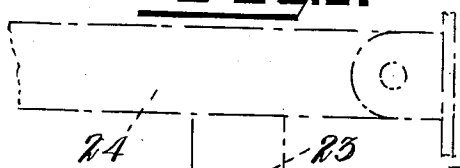


Fig. 3.

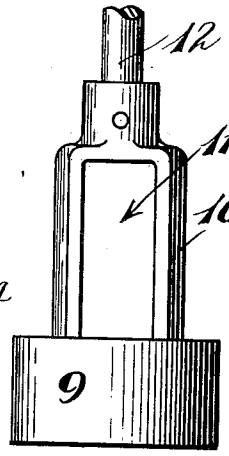


Fig. 2.

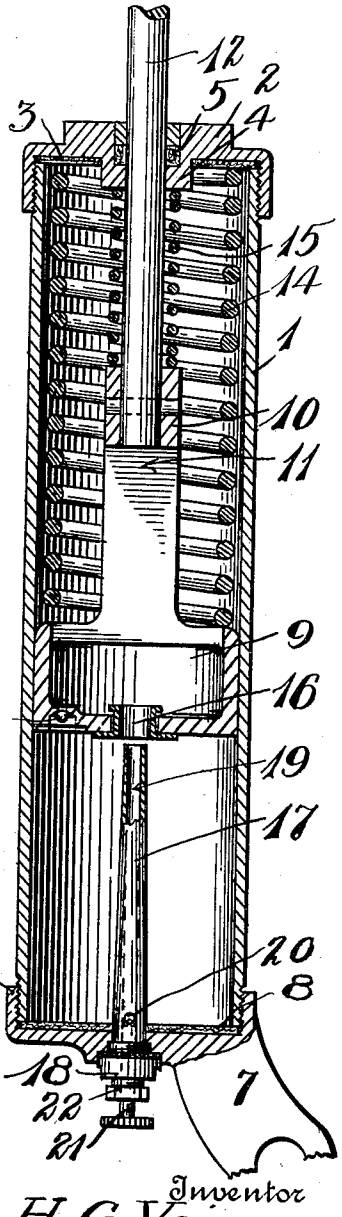
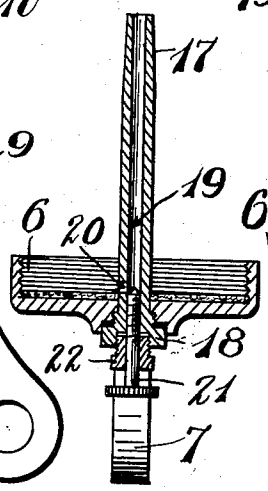
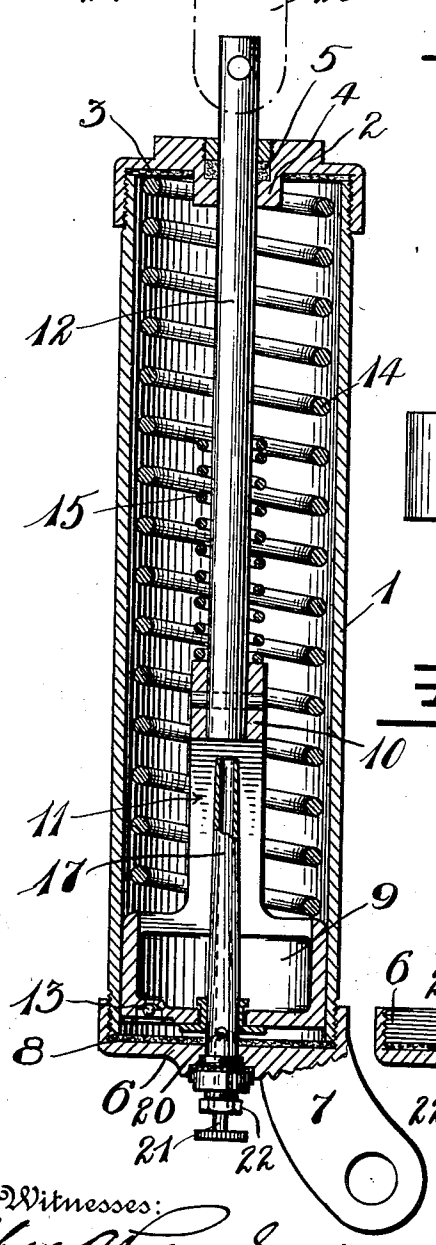


Fig. 4.





Witnesses:

Chas. A. Peard

Ida M. Munziker.

Inventor

H. G. VOIGHT

By his Attorneys

Baxter Burnes Middleton

UNITED STATES PATENT OFFICE.

HENRY G. VOIGHT, OF NEW BRITAIN, CONNECTICUT.

DOOR CLOSER AND CHECK.

1,085,070. Specification of Letters Patent. Patented Jan. 20, 1914.

Application filed February 14, 1913. Serial No. 748,351.

To all whom it may concern:

Be it known that I, HENRY G. VOIGHT, a citizen of the United States, residing at New Britain, Hartford county, State of Connecticut, have invented certain new and useful Improvements in Door Closers and Checks, of which the following is a full, clear, and exact description.

This invention relates to closer and check devices and more especially to an improved form of combined closer and checking cylinder particularly useful in connection with sliding doors, and of the general type shown in my prior U. S. Patent No. 1,028,833, dated June 4, 1912.

The present invention is described in detail in the following specification, taken in connection with the accompanying drawings forming part thereof and illustrating a preferable embodiment of my invention.

In the drawings: Figure 1 is a longitudinal vertical section through the power cylinder with the piston at the end of its power stroke. Fig. 2 is a similar view with the piston retracted. Fig. 3 is a detail view in elevation of the piston head. Fig. 4 is a detail vertical sectional view of the piston head and checking tube, detached.

Referring to the drawings by numerals, 1 indicates a closed cylinder adapted to contain fluid, such as air or oil, this cylinder having at one end a head 2 in threaded engagement with the cylinder end and provided with a suitable packing 3, this head also preferably having a boss 4 centrally apertured to receive the piston rod and provided with a packing 5. The opposite end of the cylinder is provided with a second head 6 likewise in threaded engagement with the cylinder end and having an interposed packing 8, this head 6 having preferably cast or otherwise formed integrally therewith an attaching arm 7 by means of which the cylinder may be mounted upon a suitable bracket or other supporting device.

Mounted within the cylinder 1 and reciprocating longitudinally therein is a hollow cupped piston 9 having an integral bifurcated head 10 extending upwardly therefrom providing openings or slots 11 between its arms, this head 10 being suitably connected to the lower end of a piston rod 12 which extends therefrom through the head 2 of the cylinder. The lower end of the piston body 9 is provided with an aperture forming a fluid escape passage, which aperture is controlled by a check valve 13 of suitable form. A coiled spring 14 of desirable strength is seated within the cylinder, one end resting against the head 2 thereof and the other end engaging the piston 9 and normally tending to force the same downwardly toward the head 6 of the cylinder. A supplemental coiled spring 15, preferably of smaller size, is mounted upon the piston rod 12 over the head 10 of the piston and is normally inactive, but when the piston is moved upwardly against the force of the spring 14, the spring 15 is brought against the head 2 of the cylinder and is compressed, serving to check extreme compression of the main spring 14 and acting to supplement the force tending to return the piston to the opposite end of the cylinder and in effect forming a sort of "kick-off" spring.

The base of the piston 9 is provided with a second aperture therein forming a second fluid escape passage, a sleeve 16 being preferably inserted through this aperture and being secured to the wall of the piston. A valve tube 17 is rigidly carried by the head 6 of the cylinder, being screwed through said head in line with the opening through the sleeve 16 of the piston. This tube tapers from its upper end downwardly, the cross-sectional area of the upper end being less than that of the sleeve opening 16, and at its lower end substantially corresponding to the area of said sleeve opening. This tube is provided with a threaded lower end 18 having a threaded engagement with the cylinder head 6, and having a fluid escape passage 19 therethrough terminating in a transverse by-pass 20 which communicates with the interior of the cylinder adjacent its head 6. The lower end of this valve tube 17 is interiorly threaded and receives the threaded shank of a pin 21 whose upper end is adapted to be positioned adjacent the by-pass 20 and to vary the size of the passage from said by-pass to the fluid escape passage 19 of the valve tube, this pin 21 forming with said by-pass a needle valve. In order to limit the degree to which the by-pass 20 may be closed, a stop nut 22 is provided, this nut having a threaded engagement with the lower end of the head 18 of the valve tube.

The upper end of the piston rod 12 is appropriately connected to suitable means through which the piston may be moved

upwardly in the cylinder against the force of the power spring 14, which means may be in the form of a transverse arm 23 pivotally secured to the upper end of the piston rod and connected to a pivoted lever member 24, which lever member may form part of the operating mechanism of a sliding door, as in my prior patent hereinbefore referred to.

From the foregoing description it will be evident that the device operates as follows: Assuming that the arm 7 at the lower head of the cylinder and the piston rod 12 are appropriately connected, the one to a suitable abutment and the other to an operating mechanism such as described, this operating mechanism is actuated to move the piston rod and piston upwardly from the position shown in Fig. 1 to that shown in Fig. 2, compressing the coiled spring 14, and adjacent the end of the compressing movement, likewise compressing the auxiliary spring 15 and placing it under tension also. On the upward movement of the piston, the check valve 13 opens, permitting the air, oil or other fluid within the cylinder, to pass freely from the upper side of the piston to its lower side, this being facilitated by the large escape area afforded by the openings 11 and the cupped piston. When the operating mechanism is released, the tension of the coiled springs 14—15 moves the piston 9 in the opposite direction or toward the head 6 of the cylinder. On this downward movement of the piston, the check valve 13 closes and the valve tube 17 guides through the cylinder 16 of the piston, the tapering form of this tube progressively decreasing the size of the fluid escape passage through said sleeve. All the while that the piston is descending, the fluid is escaping through the by-pass 20, thence upwardly through the passage 19 and through the piston to the opposite end of the cylinder. The greater amount of fluid, however, upon the initial descending movement of the piston, escapes through the sleeve passage 16, but as the piston continues to descend, the area of this sleeve passage is progressively decreased because of the tapering form of the tube 17 so that as the piston nears the lower end of its stroke, the total area of fluid escape openings becomes progressively restricted, the minimum opening being that through the by-pass 20 and tube passage 19 which forms the ultimate escape passage at the extreme end of the downward stroke of the piston. It will be seen that by reason of the progressive decrease in the size of the escape passage 16 coupled with the valve-controlled by-pass and outlet passage 20—19, the return of the piston is gradually checked, this checking being accomplished in a very smooth manner. Furthermore, by means of the needle valve 21, the rate of the return movement of the piston may be regulated to a nicety.

While I have herein described a specific embodiment of my invention, it should be understood that the same may be altered in detail and relative arrangement of parts within the spirit of the invention and the scope of the appended claim.

What I claim, therefore, and desire to secure by Letters Patent is:

In a device of the character described, in combination, a cylinder adapted to contain fluid, a cupped piston in said cylinder having integral bifurcated arms extending therefrom, a piston rod operatively connected to said arms, said piston having a fluid escape passage in its base closed by a valve in one direction of movement of the piston and having a second fluid escape passage therein, a stationary tapering tube at one end of said cylinder in line with the second fluid passage of said piston, said tube being hollow with its upper end open and its lower end closed and having a by-pass at its lower closed end communicating with the interior of the cylinder, and a coiled spring within said cylinder acting against said piston and normally tending to move the same in a direction to guide on said tube whereby said tube progressively decreases the size of said second escape passage with the movement of said piston toward said tube and progressively enlarges the size of said escape passage upon reverse movement of said piston and a valve controlled from the exterior of the cylinder and arranged to vary the effective area of said by-pass.

HENRY G. VOIGHT.

Witnesses:
GWENDOLINE A. JACKSON,
CHARLES E. RUSSELL.