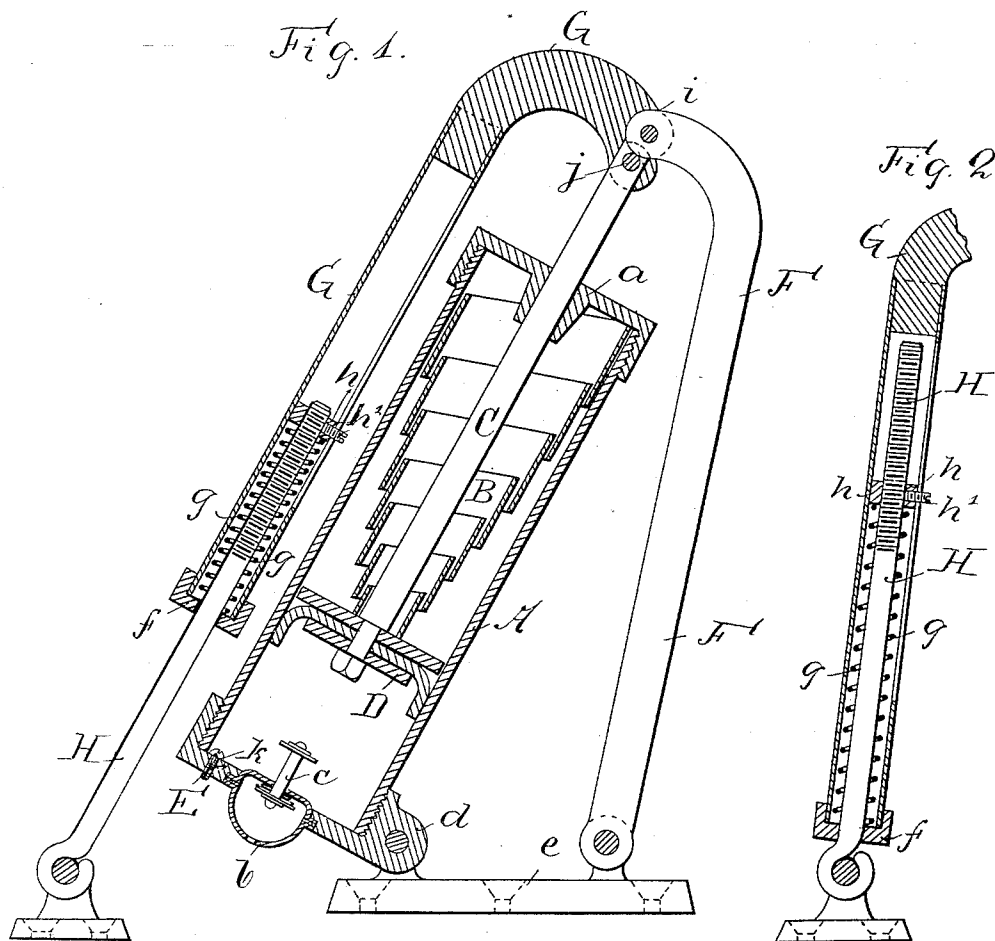


(No Model.)

H. SCHUBERT & R. WERTH.
DOOR CLOSING AND CHECKING APPARATUS.

No. 467,997.

Patented Feb. 2, 1892.



Witnesses:

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UNITED STATES PATENT OFFICE.

HERMANN SCHUBERT AND RUDOLPH WERTH, OF BERLIN, GERMANY.

DOOR CLOSING OR CHECKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 467,997, dated February 2, 1892.

Application filed August 25, 1891. Serial No. 403,702. (No model.) Patented in Germany January 3, 1891, No. 49,615; in Belgium February 6, 1891, No. 93,677, and in England February 9, 1891, No. 2,314.

To all whom it may concern:

Be it known that we, HERMANN SCHUBERT and RUDOLPH WERTH, both subjects of the King of Prussia, German Emperor, and residents of Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Door-Closing and Door-Checking Apparatus, (for which we obtained patents in Germany, No. 49,615, dated January 3, 1891; in Belgium, No. 93,677, dated February 6, 1891, and in England, No. 2,314, dated February 9, 1891,) of which the following is a complete specification.

Our invention relates to an improved device or apparatus for silently closing doors automatically with a view to preventing the noise and vibration that usually occur when said doors are violently pushed or slammed and to guard against the possibility of the same being left ajar to create draft; and it consists of two cylinders arranged to be parallel, or nearly so, when at rest and provided with internal springs, operating-pistons, and rods hinged or fulcrumed with or upon a pivoted lever in such a manner as to permit the door to which said apparatus is attached to be opened to any angle and automatically and silently closed.

In order that our invention and the manner of its operation may be clearly understood, we have appended hereunto a sheet of drawings, in which—

Figure 1 is a part sectional plan view of the complete apparatus when in use. Fig. 2 is a longitudinal section of the smaller cylinder detached from Fig. 1, illustrating the operation of the spiral spring therein.

In carrying our invention into effect we construct of any suitable metal or alloy of metals a cylinder A, provided internally with a powerful graduated spiral spring B, through which passes a rod C, one end of which within the cylinder A carries a piston D, the opposite end passing through a suitable gland *a* on the end of the cylinder. The opposite end of the cylinder is provided with a cover E, in the center of which is fitted a small chamber *b* for admitting air into said cylinder, regulated by a spring-valve *c*. The cover E is formed with a projecting lug or extension *d*, by means

of which the cover E is pivoted to the frame or other suitable stationary part of the door or adjacent to the door and shown by the letter *e*. Upon the same part *e* or near thereto is pivoted one end of a lever F, the opposite end of which curves toward the free end of rod C. The second or smaller cylinder G we form of any suitable metal, preferably of the same as that of A, provided at one end with a gland *f*, through which passes a rod H, which when within the cylinder G is surrounded by a spiral spring *g*, one end of which abuts against the inner surface of the gland *f*, the opposite end abutting against a piston-head *h*, provided with a central bore threaded, so that it may be screwed upon the end of rod H. The head *h* is provided with a projecting lug *h'*, which fits within a longitudinal slot formed in cylinder G, so that said head *h*, while being free to slide from end to end of the cylinder G, or so much thereof as is cylindrical, cannot turn round therein. The tension of the spring *g* tends to keep rod H within the cylinder G, as shown by Fig. 2, and as the power of *g* may under varying conditions need adjusting we attain this by screwing the rod H more or less into the head *h* and so lessen or extend the expanding limit of spring *g*. The free or exposed end of rod H is pivoted to the door to be operated, preferably at a point below the horizontal level of cylinder A. The opposite end of cylinder G is solid and curves in the direction toward the rods C and F and is connected thereto by separate pivots *i* and *j*.

The tension of the spring B tends to retain rod C within the cylinder A, and the manner of operation is as follows: When the door is closed and in the position of rest, the rod H would be wholly within the cylinder G, as in Fig. 2, and the rod C within cylinder A, with its head D near to the cover E and the spring B expanded, the valve *c* being closed. Upon the opening of the door in the direction of the dotted line, Fig. 1, the rod C would be withdrawn from cylinder A and the spring B compressed and the space between E and D in said cylinder extended, and the power of the spring of the valve *c* being less than that of the external atmospheric pressure permits air

to enter the cylinder A through valve *c*, as shown in Fig. 1. The curved formation of the solid end of cylinder G and of the lever F, fulcrumed together with the rod B, and the method of pivoting lug *d* and lever F at *e* relatively to each other permits the door to be opened to any extent, and should this exceed the limit of compressibility of B the door would then be in a position to act upon the compressibility of spring *g*. When the power exerted in opening the door ceases, the depressed spring B immediately asserts its power to replace rod C within the cylinder A, and this it does at first somewhat rapidly; but as the air between piston D and cover E would thereby be compressed and the valve *c* closed this would form a cushion for said piston against the power of the spring B, and consequently check its progress. In the meantime the momentum given to the door withdraws rod H from cylinder G; but this is again arrested or checked by the spring *g*, and as the air in cylinder A exhausts through suitable apertures *k* and both springs B and *g* settle into a position of rest the door becomes noiselessly closed.

It will sometimes occur through atmospheric disturbances that the door has a tendency to keep ajar, occasioned by the pressure of air being greater upon one side thereof than the other. To accommodate this is the object of the head *h* and the threaded portion of rod H, as by the turning of the rod, which may be provided for in pivoting it upon the door, the lengthening or shortening of the same by screwing it into or out of head *h*, more or less, and the consequent expansion or contraction of spring *g*, the uneven pressure of air upon the door may be compensated at will.

Having thus fully described the nature of

our invention, what we desire to secure by Letters Patent of the United States is—

1. In a door closing or checking apparatus, the combination, with the cylinder A, having a gland *a* and cover E and provided with a chamber *b* and valve *c*, and with lug *d*, fulcrumed upon the frame of the door, the rod C, the piston D, the spring B, and the lever F, pivoted to the frame of the door, of the rod H, pivoted to the door, the spring *g*, the gland *f*, the piston-head *h*, and the cylinder G, the solid end whereof curves toward the free ends of lever F and rod C and is pivoted thereto at *i* and *j*, substantially as and for the purpose described.

2. In a door closing or checking apparatus, the combination, with the cylinder A, having a gland *a* and cover E and provided with a chamber *b* and valve *c*, and with lug *d*, fulcrumed upon the frame of the door, the rod C, the piston D, the spring B, and the lever F, pivoted to the frame of the door, of the rod H, pivoted at one end to the door and provided at its other end with a thread, upon which is adjustably screwed the piston-head *h*, carrying a lug *h'*, which acts as a guide within a longitudinal slot of the cylinder G, which is fitted with gland *f* and with spring *g* and the solid end whereof curves toward the free ends of lever F and rod C and is pivoted thereto at *i* and *j*, substantially as and for the purpose specified.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

HERMANN SCHUBERT.
RUDOLPH WERTH.

Witnesses:

R. HERPICH,
E. SCHULTZE.