(Model.)

J. S. STEVENS & C. G. MAJOR.

COMBINED DOOR SPRING AND CHECK.

No. 328,077. Patented Oct. 13, 1885.

Fig 1

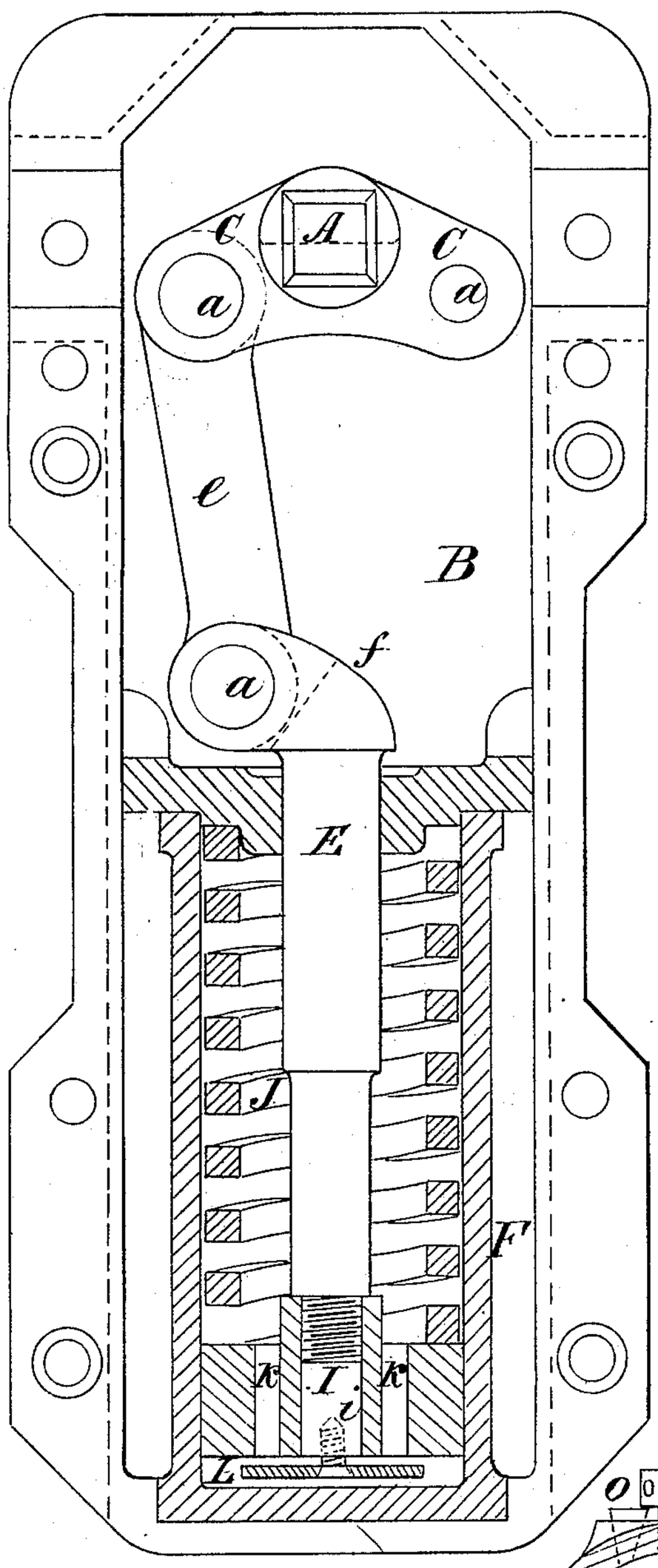


Fig 2

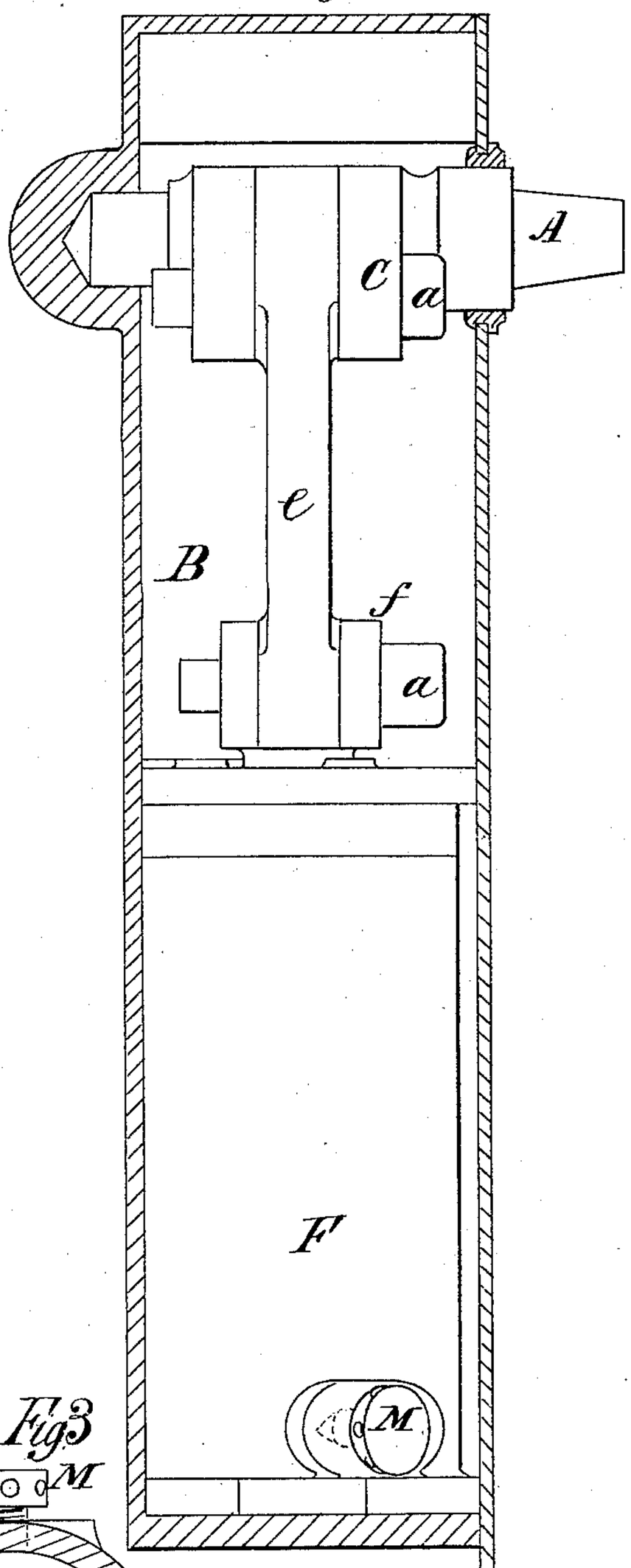
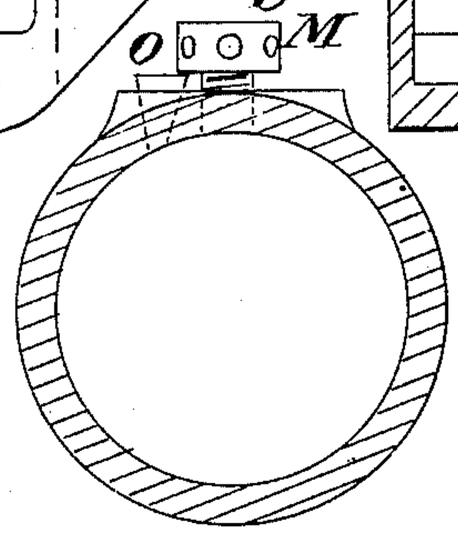


Fig 3



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN SANDERS STEVENS AND CHARLES GEORGE MAJOR, OF BATTERSEA, COUNTY OF SURREY, ENGLAND.

COMBINED DOOR SPRING AND CHECK.

SPECIFICATION forming part of Letters Patent No. 328,077, dated October 13, 1885.

Application filed June 29, 1885. Serial No. 170,076. (Model.)

To all whom it may concern:

Be it known that we, JOHN SANDERS STEVENS and CHARLES GEORGE MAJOR, subjects of the Queen of Great Britain, residing, respectively, at Janus Works, Queen's Road, Battersea, and 34 Fuke Road, Battersea, in the county of Surrey, in that part of Great Britain called England, have invented certain new and useful Improvements on Spring Hinges and Checks for Doors; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of spring-hinges for doors which are fixed in or under the floor.

Spring-hinges for doors opening in one direction only, as heretofore constructed, close the door with violent slamming action, or, on the other hand, are too weak to hold the door closed against the wind. For single-action doors various checks have been devised in the form of an independent and separate apparatus—such as a spring-buffer, an india-rubber cushion, or a pneumatic cylinder.

The object of our invention is to construct a hinge-closing spring and check or buffer applicable to right or left hand single-action doors all in one apparatus contained in a dust and dirt tight box, which is fixed beneath the floor, said apparatus being coupled up to the heel of the door by means of a shoe fitted to it in the usual manner.

The way and manner in which we carry out our invention will be readily understood by reference to the accompanying drawings, in which Figure 1 is a plan, the cylinder being shown in section in order that the spring within it may be clearly seen. Fig. 2 is a sectional elevation; Fig. 3, an end section showing the set-screw and conical plug by which the outflow of liquid or air from the cylinder, and consequently the rate of closing the door, is regulated.

Similar letters refer to similar parts throughout the various views.

To the heel of the door we secure a shoe, and to the shoe a short vertical spindle, A, Figs. 1 and 2, is attached. This forms the pivot of the door. The point of the pivot takes a bearing in the base of the containing-box B, which is fixed beneath the floor-line and contains all the apparatus, except the shoe, before referred to. The pivot or spindle A has two arms, C C, which are forked to receive a connecting-rod, *e*, the object of the two arms being that the connecting-rod *e* may be shifted either to one side or to the other to suit a right or left hand door. The connecting-rod *e* is secured to the required side of arms C C and to the forked cross-head or lug *f* of piston-rod E by pins *a a*, which are made of sufficient length to just clear the lid of the box, so that they cannot come out. The piston-rod E is fitted with a piston, I, which slides in cylinder F. This piston has several holes or ports, K K, drilled or cored in it, and is fitted at its base with a valve, L, covering the ports K K. This valve may be made of metal, india-rubber, leather, or any suitable substance, and we prefer to secure it to the piston by two small screws, *i*.

Inside the cylinder F, and pressing against the piston I, is a spiral spring, J. The box B is filled with oil, glycerine, spirits, solution of soft soap, or any other viscous liquid, or air alone can be used, and sufficient space is left round the piston-rod E to permit the liquid or air to have free entrance from containing-box B into the cylinder F in front of the piston I; or small holes may be drilled in the cylinder-cover for this purpose. At the bottom end of cylinder farthest from the door-pin (see Figs. 2 and 3) is bored a small conical hole, which is fitted with a valve or plug of conical shape, O, the play of which is regulated by a set-screw, M, the cheese-head of which covers said valve O, so that it cannot come out.

The action of the apparatus is as follows: If the door be pushed open, the arms C C, fastened to pivot A, make a quarter-turn, and by means of connecting-rod *e* and piston-rod E the piston I is pulled forward, compressing spring J against fore end of cylinder E and piston I, displacing the liquid in that part of the cylinder F, which passes through the ports K K in piston I, forcing back valve L, and occupying the space behind piston I. As the door closes under the action of the spring J, the valve L closes the ports K K in piston I, and the en-

trapped liquid can only escape by forcing out the small valve or plug O, its rate of escape, and consequently the rapidity with which the door can be closed, being regulated by the amount of liquid or air escaping by valve O. A small amount of leakage takes place round the piston; but with a liquid possessing any degree of viscosity this is unimportant and may be neglected.

The action described is identical irrespective of the side of the arm C to which the connecting-rod *e* is coupled. If the liquid be replaced by air, the piston is then made a good working fit and packed with leather or other suitable substance; but beyond this the general construction and the action is similar. The peculiar form given to the arms C C is such that as the door moves from the closed position the piston exerts a continually-decreasing pull upon them, thus nearly equalizing the pull upon the door for all positions, but permitting the spring to exert its maximum power upon the arms when the door is closed, so preventing it from swinging by the action of wind. It will also be seen that by removing spring J our invention can be used as a check only in cases where a door is closed by an independent spring.

We claim as follows:

1. The combination of a single-action spring-hinge and liquid or air check with door-pin A, arms C C, connecting-rod *e*, piston-rod E, and piston I, having ports K K and valve L, the spring J, cylinder F, conical outlet-valve O, and regulating-screw M, the check and apparatus being contained in box B, fixed beneath the floor, substantially as set forth.

2. The combination of a cylinder and piston moving therein with a spindle or door-pin actuated by the turning of the door, an arm carried by said spindle, and a connecting-rod extending from said arm to the rod of said piston, substantially as set forth.

3. The combination of door-pin A, arms C C, connecting-rod *e*, piston-rod E, and piston I, having ports K K and valve L, with spring J, cylinder F, and an outlet-valve, all substantially as set forth.

4. In a liquid door-check, the taper plug or valve O, in combination with a regulating-screw, M, the head of said screw overlapping said valve and preventing it from being dislodged.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN SANDERS STEVENS.
CHARLES GEORGE MAJOR.

Witnesses to the signature of the said John Sanders Stevens:

R. JAMES,
W. BIBBY,
Clerks to Messrs. Grain & Sons, Notaries, 7 Popes Head Alley, London.

Witnesses to the signature of the said Charles George Major:

W. BIBBY,
C. I. PITT,
7 Popes Head Alley, London, Clerks to Grain & Sons, Notaries, of same place.