

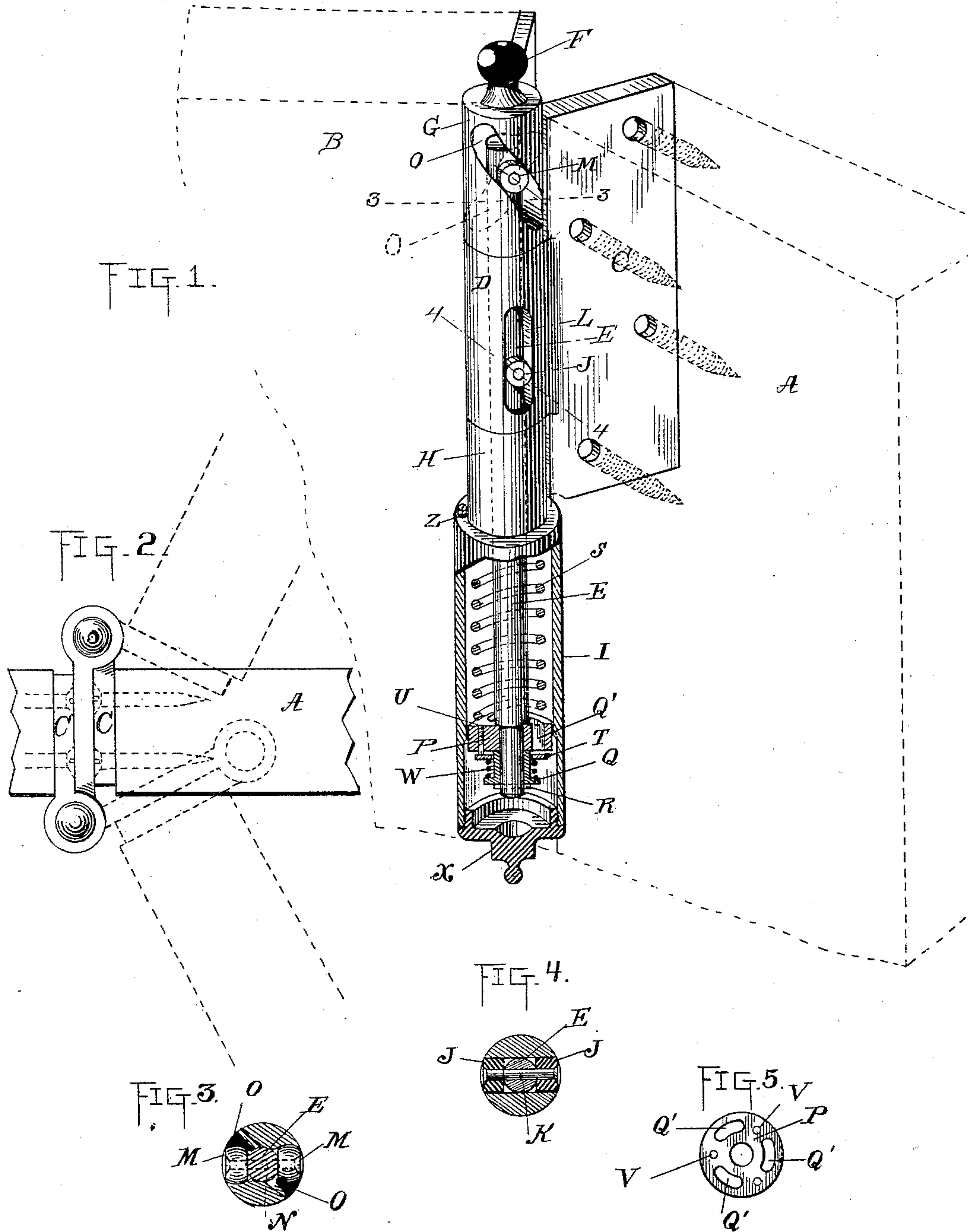
(No Model.)

J. W. MORRIS.

COMBINED SPRING HINGE AND DOOR CHECK.

No. 424,613.

Patented Apr. 1, 1890.



Witnesses

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COMBINED SPRING-HINGE AND DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 424,613, dated April 1, 1890.

Application filed September 9, 1889. Serial No. 323,419. (No model.)

To all whom it may concern:

Be it known that I, JAMES WILLARD MORRIS, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a new and useful Automatic Combined Spring-Hinge and Door-Check, of which the following is a specification.

The main object of my invention is to practically combine a spring-hinge and door-check in the same device, to the end that a compact, efficient, and slightly device may result, of few parts, readily assembled, comparatively inexpensive of construction, and requiring but little, if any, attention to keep in order, and adapted to take the place of an ordinary hinge in the hanging of the door.

The device used to carry out the main object of my invention with but a slight change is adapted to be used either as a spring-hinge or a door-check. When used as a spring-hinge, it is specially adapted for locations where a vertical movement of the door is undesirable, and when used as a door-check the ordinary door-closing springs may be used.

In either of the uses to which my device may be put it possesses advantages arising from its simplicity of construction and from the fact that it is adapted to be used as a hinge in the hanging of the door.

The main object of my invention is accomplished by causing in any suitable way a part within the hinge-knuckles, preferably the pintle of the hinge, to reciprocate and by its reciprocation operate a check of any desirable form, of which the part or pintle itself may form a part.

In the example of my invention shown in the drawings a portion of the pintle of the hinge reciprocates in the lower knuckle of the hinge, which becomes then a cylinder, the pintle acting as a piston or plunger therein. The upward movement of the plunger is utilized to cause the compression of a spring, which is also located in the cylinder, and the downward movement by suitably arranging the cylinder to permit of a gradual shifting of the fluid contained therein is cushioned to effect the check.

In the accompanying drawings, forming a part of this specification, Figure 1 is an elevation of a combined spring-hinge and door-

check embodying my invention, partially in section, and in the position occupied when the door has been partially opened. Fig. 2 is a plan view of a device embodying my invention applied to a door to permit it to swing both ways. Fig. 3 is a section taken on the plane of the line 3 3 of Fig. 1, the rollers being shown at the bottom of the incline. Fig. 4 is a section taken on the plane of the line 4 4 of Fig. 1, and Fig. 5 is a plan view of the head on the pintle.

In the drawings, A is the door, and B the door-casing. To the door A is attached the leaf C of the hinge, which is provided with a knuckle or socket D to receive the hinge-pintle E. To the casing B is attached the leaf F, which is provided with knuckles or sockets G and H, adapted to receive between them the knuckle or socket D of the leaf C and to match therewith. The socket G is preferably closed at the top to prevent dirt or dust getting into the parts. The socket H is carried downward beyond the hinge-leaves and is formed into a cylinder I, which is designed to inclose the spring necessary to make the hinge a spring-hinge and to act as a dash-pot in the operation of checking. This cylinder I receives a fluid—such as glycerine—which acts as the cushion, and is of greater diameter at its lower portion than at its top, as shown.

The pintle E of the hinge, which, with its head in the example of my invention shown in the drawings, acts as the plunger in the cylinder I, is reciprocated in one direction by the opening of the door, preferably by the following means:

J J are projections from the pintle, (shown as rollers mounted upon an arbor K,) which enter each a vertical slot L, formed on each side of the knuckle or section D, and contact with the side walls of said slots. Other projections M M (shown as rollers on an arbor N) enter reversely-inclined slots O O in the knuckle or socket G. When the door is closed, the projections J J and M M are at the bottom of their respective slots. As the door is opened, the walls of the slots L L, bearing against the projections J J, tend to rotate the pintle, and this rotation is converted into a vertical movement by the projections M M, riding upon the inclined planes which the slots O O afford.

The return movement and the cushioning of the pintle are effected, preferably, in the following manner: The pintle is carried downward into the cylinder I and is reduced in diameter at its lower end, as shown, to form a shoulder, against which a piston-head P is held by the collar Q, slipped onto the pintle below it and secured in place by the cross-key R. This head P is formed with a number of passages Q', which permit the liquid contained in the cylinder to pass to either side of the head, as may be required. Held between the upper surface of the head and the top of the cylinder I is the coiled spring S, which is compressed by the upward movement of the head and serves by its expansion to force the head to the lower end of the cylinder again. Beneath the head P is located on the collar Q a spring-seated valve T, of less diameter than the cylinder, so that the working-fluid may flow by it in either direction. This washer is maintained a fixed distance from the head P, depending upon the rapidity with which the door is to be closed by screws U, passing through tapped holes V in the head, and is held up against said screws by the coiled spring W on the collar Q. The cylinder I is closed at the bottom by a cap X, which is screwed therein, and the removal of which permits the adjustment of the parts within the cylinder, as may be desired, to effect the closing of the door with greater or less rapidity.

The working-fluid is admitted to the cylinder through the opening Z by the screw, as shown.

The operation is as follows: The cylinder I is in operation partially filled with glycerine or other suitable fluid to just above the point where the cylinder is enlarged. Starting with the door closed, when the pintle will be in its lowest position in the cylinder, the movement of opening the door will cause the side walls of the slots L L to rotate the pintle E, and the projections M, working on the reversely-inclined planes, will convert this rotation into a vertical movement. During the vertical movement of the pintle the spring S is compressed and the glycerine above the head P flows, owing to the pressure of air above it, through the passages until all of it is in the lower portion of the cylinder below the head, the atmospheric pressure causing the valve T to move away from the head P, thus enlarging the restricted passage between the head P and valve. When the door is released, the expansion of the spring S forces the head downward, carrying the pintle with it, and through the action of the projections and slots the door is brought to the closed position. On its downward movement, however, the head P meets the glycerine in the cylinder, above the larger diameter thereof, and its downward movement is checked. The glycerine, however, flowing upward through the passages Q', permits the gradual descent of the head and

consequent gradual closing of the door. The enlargement of the cylinder at a point below where the checking has occurred permits the force of the spring S to easily latch the door, as it permits the glycerine to be displaced around the periphery of the head quickly and with the exertion of but a small force, thus permitting the spring to exert its maximum force on the door at the last moment—i. e., the moment of latching. The regulation of the rapidity of closing may be effected by altering the position of the washer T relatively to the head P by means of the adjusting-screws U, as the amount of fluid permitted to flow through the passages Q' in an upward direction depends upon the relationship of said washer and head.

In Fig. 2 of the drawings I have shown my device applied to a door to permit it to swing in two directions. Its construction is substantially the same as the device of Fig. 1, the difference consisting merely in the arrangement of a pair of the combined spring and checking devices, so that when the door swings in one direction its fulcrum will be on one of the spring and checking devices, and when it swings in the other direction its fulcrum will be on the opposite spring and checking device.

It is obvious that if the working-fluid be omitted from the cylinder I the device will operate as a spring-hinge. The cylinder itself may also be omitted, together with the devices for permitting the shifting of the working-fluid in the cylinder, producing a simple form of spring-hinge.

What I claim is—

1. The combination, with the stationary and moving leaves of a hinge, of hollow knuckles, a part adapted to move vertically within said knuckles, and a cushion formed within one of said knuckles for said part, substantially as set forth.

2. The combination, with the stationary and moving leaves of a hinge, of hollow knuckles, a part moved vertically within said knuckles by the opening of the door, a spring compressed by such part, and a cushion formed within one of said knuckles, substantially as set forth.

3. The combination, with the stationary and moving leaves of a hinge, of hollow knuckles, a pintle within said knuckles, a head on said pintle, means for reciprocating said pintle, and a cushion for said head, substantially as set forth.

4. The combination, with the stationary and moving leaves of a hinge, of hollow knuckles, a pintle within said knuckles, a head on said pintle, means for lifting said pintle, a spring within said knuckles, put under tension by the raising of the pintle, and a cushion, substantially as set forth.

5. In a combined spring-hinge and door-check, the combination, with a pintle and means for reciprocating it, of a dash-pot of

which the pintle forms the plunger, substantially as set forth.

6. The combination, in a combined spring-hinge and check, of a pintle, means for reciprocating said pintle, a head on the pintle, a cylinder within which said head reciprocates, and means for permitting the shifting of the working-fluid in the cylinder, substantially as set forth.

7. The combination, in a combined spring-hinge and door-check, of a pintle, means for moving said pintle in one direction during the opening of the door, a spring compressed by said movement, a head on the pintle forced by said spring in the return direction, and a cylinder within which said head moves, and means for permitting the displacement of the working-fluid therein, substantially as set forth.

8. The combination, in a combined spring-hinge and door-check, with a pintle rotated by the opening of the door, of coacting projections and inclines, whereby the rotation of said pintle is converted into a vertical movement, a spring compressed by the vertical movement of the pintle and acting to produce a return movement of the pintle, a head on said pintle, a cylinder within which said head reciprocates, and means for permitting the shifting of the working-fluid in the cylinder, substantially as set forth.

9. In a spring-hinge, the combination of a pintle, means for vertically moving said pintle relatively to both hinge-leaves by the opening of the door, and a spring compressed by the vertical movement of the pintle and acting to force the pintle in the other direction, whereby the door is closed, substantially as set forth.

10. In a spring-hinge, the combination, with a pintle, of inclines and slots on the hinge-knuckles and projections on the pintle, said inclines and slots and said projections being located in such relation as to engage, respectively, the vertical slot and incline in said knuckles, substantially as set forth.

11. In a spring-hinge, the combination of a pintle, means for moving said pintle in a vertical direction relatively to both hinge-leaves by the opening of the door, a head carried by said pintle, and a spring compressed between said head and another part of the hinge by the vertical movement of the pintle and acting to force the pintle in a downward direction, whereby the door is closed, substantially as set forth.

12. In a door-check, the combination, with a cylinder of uniform bore for a portion of its length and of greater bore in the lower portion thereof near the close of the stroke of the piston, of a plunger fitting the lesser bore snugly, substantially as set forth.

13. The combination, with the one leaf of a hinge having reversely-formed inclines and the other leaf having a vertical slot, of a pintle having projections engaging, respectively, with said inclines and slot and extending into a cylinder, said cylinder and a head on said pintle, a spring located between said head and one end of the cylinder, and passages in said head to permit the shifting of the working-fluid, substantially as set forth.

This specification signed and witnessed this 30th day of August, 1889.

JAMES WILLARD MORRIS.

Witnesses:

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