April 7, 1959 H. FROHLICH 2,880,449

HOLD OPEN DEVICES FOR DOUBLE ACTING SWINGING DOORS

Filed Sept. 24, 1956

Fig. 1.

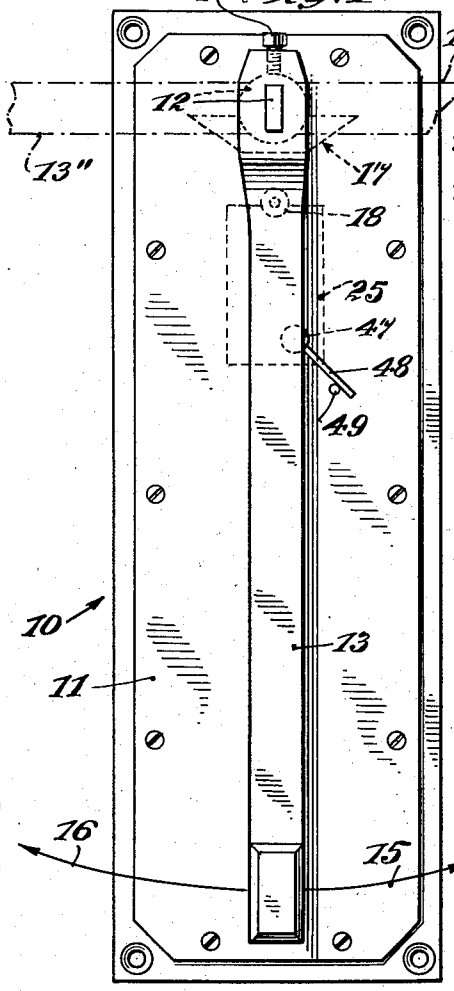


Fig. 2.

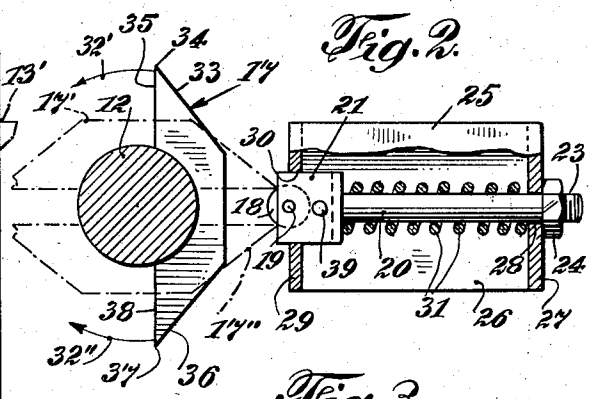


Fig. 3.

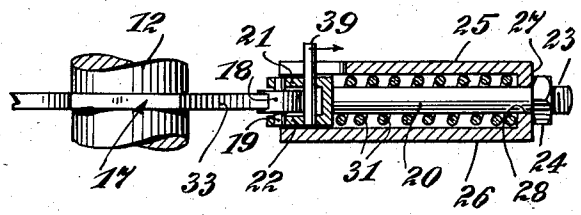


Fig. 4.

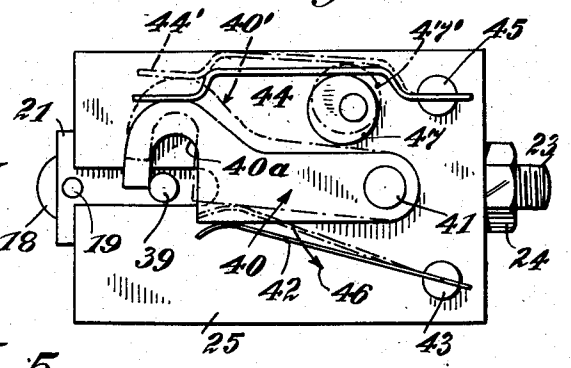
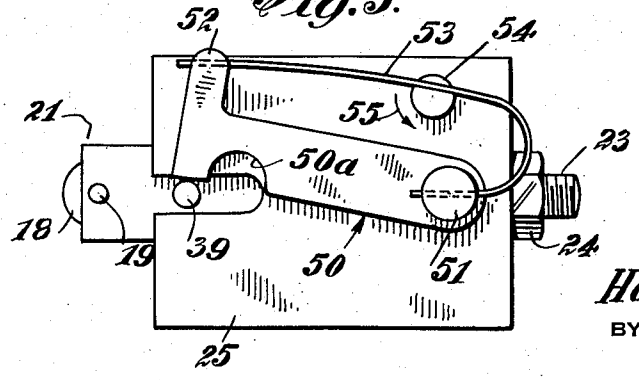


Fig. 5.



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HOLD OPEN DEVICES FOR DOUBLE ACTING SWINGING DOORS

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7 Claims. (Cl. 16—55)

This invention relates to a hold open device for swinging doors, and more particularly to a device of this character combined with checking floor hinges for double acting swinging doors.

The principal object of the invention is to provide a mechanism which holds open a double acting swinging door at about a right angle in either direction.

Another object of the invention is to provide a mechanism of the above character including simple means for releasing an open swinging door so that the latter may be closed automatically by the checking floor hinge when desired.

A further object of the invention is to provide a hold open device for double acting swinging doors which is fully received in the housing of the floor hinge.

The invention resides essentially in the combination and arrangement of various parts including a double acting keeper which rotates with the main spindle of the floor hinge, a roller resiliently mounted in the path of the rotating keeper, and a spring actuated hook member which is adapted to engage the roller and hold it away from the path of the keeper. The hook is controlled by an exterior lever, but all the remaining elements of the hold open device are received in the housing of the floor hinge.

Various other features and attributes of the novel hold open device will become apparent in the course of the following description of two preferred embodiments which are illustrated in the accompanying drawing, and the invention will be finally pointed out in the appended claims.

The the drawing,

Fig. 1 is a top plan view of a checking floor hinge for double acting swinging doors, with certain elements of the hold open device indicated in dotted lines;

Fig. 2 is a top plan view of the hold open device;

Fig. 3 is a partly sectional view in side elevation of the hold open device with the keeper in operative position;

Fig. 4 illustrates one form of control mechanism for inactivating the hold open device, the external control lever being omitted in this view; and

Fig. 5 shows a modification of the mechanism illustrated in Fig. 4.

Referring first to Fig. 1, the checking floor hinge includes a housing **10** having a cover plate **11** through which extends the end of main spindle **12**. The spindle **12** carries an arm **13**, attached thereto by means of a screw **14**. The arm **13** is also connected to the double acting swinging door (not shown) and since it cannot rotate on the spindle, the spring mechanism in the housing **10** normally holds the arm **13** with the swinging door in the position shown in full lines. When the swinging door is pushed to the right or to the left, the arm **13** follows such movement in the direction of arrows **15, 16**, respectively, to assume either of the two extreme positions **13', 13''**, shown in Fig. 1 in dot-dash lines. This structure is known in the art and does not form part of my present invention.

The novel hold open device includes a flat keeper **17** which is rigidly attached to the spindle **12** in the housing **10** to rotate therewith into either of its dot-dash positions **17', 17''**, as is shown in Fig. 2. The keeper **17** remains in its position shown in full lines when the double acting swinging door is held closed by the mechanism in the housing **10**. When the keeper is in the position **17'**, the arm **13** with the swinging door is moved in the direction of arrow **15**, and on pivoting of arm **13** into its position **13''** in the direction of arrow **16**, the keeper will assume the position **17''**.

Spaced from the keeper **17** within the housing **10** is a roller **18**, mounted on a shaft **19** between two flanges **21, 22** of a yoke attached to the end of a short rod **20** whose other end is threaded, as at **23**, to receive a nut **24** or the like. The assembly of roller **18** and rod **20** with flanges **21, 22** is slidably inserted into a frame consisting of an upper plate **25**, a lower plate **26**, a rear end plate **27** having an opening **28** for the passage of rod **20**, and a front end plate **29** with a suitable cutout **30** permitting reciprocal movement of the flanges **21, 22** with roller **18** therebetween. In the frame, there is a coil spring **31** coaxially surrounding the rod **20** between flanges **21, 22** and rear end plate **27** for permanently urging the roller **18** toward the keeper **17** to the extent permitted by nut **24**.

The operation of the hold open device is as follows:

When the spindle **12** rotates in clockwise direction, the keeper **17** pivots in the direction of arrow **32''** and its inclined surface **33** comes into contact with the roller **18**. On continued rotation of the spindle, the roller is pushed into the frame against the resistance of spring **31** so that the apex **34** of the keeper **17** may pass over the roller. If the swinging door which rotates the spindle in the indicated direction is then released, the keeper **17** bears against the roller with its surface **35**, but the force of spring **31** is sufficient to prevent roller **18** from sliding into the frame so that the apex **34** cannot pass thereover and the swinging door remains open. This position of the keeper is shown in Fig. 2 at **17''**.

When the spindle **12** is rotated by the swinging door in the opposing direction, as indicated by arrow **32'**, the inclined surface **36** will come into contact with roller **18** first, and after the apex **37** has passed thereover, the roller retains the keeper **17** in its position **17'** by bearing against the surface **38** which is substantially parallel with the direction of reciprocal movement of the roller.

If it is desired to close the swinging door, it is pushed in either direction opposed to arrows **15, 16** (see Fig. 1), so that the combination force of the hinge mechanism and of the person pushing the swinging door causes spring **31** to yield, whereupon either of apices **34, 37** passes over the roller and the hinge mechanism alone then returns the keeper into its position shown in full lines.

This hold open position is used when supplies are continuously moved through the doors. When it is advantageous to close the door permanently, for example, if the door is not often used through a certain period of time, the hold open device can be put out of action. For this purpose, the upper flange **21** carries a short pin **39** which may be engaged by the hook **40**. The latter is pivotally attached at **41** to the upper plate **25** of the roller frame, as is shown in Fig. 4. The position of the hook **40** is controlled by a relatively weak spring **42** which is fastened to the plate **25** at **43** and bears against that portion of the hook which is adjacent its recess **40*a***; and by a relatively strong spring **44** which is fastened to plate **25** at **45** and bears against the curved portion of the hook surrounding the recess **40*a***. As the spring **44** is stronger than the opposing resilient element **42**, the hook will normally tend to pivot in the direction

of arrows 46 and will engage the pin 39 to hold the roller 18 in retracted position away from the pivoting apices 34 and 37 of the keeper 17. The swinging door is then free to close immediately upon release by the action of the mechanism in hinge housing 10.

To render the spring 44 inactive and to thus permit roller 18 to return into operative position, an eccentrically mounted cam 47 is provided between the hook 40 and the spring 44, which extends through the cover plate 11 of the hinge housing 10 (see Fig. 1) and is controlled by an external lever 48 which may rotate the cam 47 to the extent permitted by a limit pin 49. By moving the lever 48 into its extreme position shown in Fig. 1, the cam 47 is moved into the dot-dash position 47' to retract the spring 44 into the position 44'. The hook 40 is then acted upon only by the weaker spring 42 and consequently moves into the position 40' away from the pin 39 to release the roller 18.

A modification of the system of Fig. 4 is shown in Fig. 5. The hook 50 which is pivotally attached to the plate 25 by a pin 51, has a projection 52. Pin 51 rotates with the hook 50. A J-shaped spring 53 has the free end of its longer leg inserted into a bore in the projection 52, and the free end of its shorter leg inserted into the pivot pin 51. The spring also passes through a rotatable member 54 which extends from the housing 10 of the hinge through the upper plate 11 and is controlled by an external lever (not shown) in a manner analogous to that shown in Fig. 1. In the position shown in Fig. 5, the hook 50 is held away from the pin 39, and the roller is free to reciprocate toward and away from the keeper 17, as is shown in Fig. 2. However, if the member 54 is turned for 90° in the direction of arrow 55, the spring 53 bears against the projection 52 of the hook and pushes it toward the pin 39. When the roller 18 is pushed back by the moving keeper, the pin 39 moves toward right and the hook 50 comes down under the influence of spring 53 to receive the pin 39 in its recess 50*a* and thus inactivate the hold open device.

What I claim and desire to protect by Letters Patent is:

1. A checking floor hinge for double acting swinging doors having a housing and a spindle rotatably mounted in said housing, a hold open device comprising, in combination, a trapeziform keeper rigidly attached to said spindle and located within said housing, said keeper having a pair of apices, a roller in said housing opposite and spaced from a portion of said keeper intermediate said apices, means for yieldably urging said roller in a radial direction toward said spindle, and means for limiting the movement of said roller in said direction, said roller being in the path of said apices of said keeper and engaging same when said spindle is rotated for approximately 90 degrees in either direction by the swinging door.

2. The hold open device according to claim 1, further including an elongated rod-like member, a yoke at one end of said rod-like member for rotatably receiving said roller, and a frame for slidably receiving said rod-like member with said yoke extending in a direction radially of said spindle, said means for limiting the movement of said roller in said radial direction being a retaining member attached to the other end of said rod-like membed exteriorly of said frame, and said means for yieldably urging said roller in said radial direction being a resilient element in said frame bearing against said yoke.

3. The hold open device according to claim 2, further including a pin attached to said yoke, a hook pivotally attached to said frame for engaging said pin when pivoted in one direction, a first relatively strong spring supported on said frame for urging said hook into engagement with said pin, a second relatively weak spring attached to said frame for urging said hook away from engagement with said pin, and rotatable cam means supported by said frame adjacent said first spring for moving same away from said hook in one position, and for permitting engagement of said first spring with said hook in the other position thereof.

4. The hold open device according to claim 3, wherein a portion of said cam means extends from said housing, and a lever is attached to said portion for rotating same.

5. The hold open device according to claim 2, further including a pin attached to said yoke, a hook, a pivot pin rotatable with said hook and being rotatably attached to said frame, said hook being adapted to engage said pin when pivoted in one direction, a spring having a first extremity anchored in said hook at a point distant from said pivot pin, and a control member rotatably attached to said frame, said spring being attached to said control member at a point distant from said first extremity thereof, whereby said hook is pivoted into engagement with or away from said pin by said spring when said control member is rotated.

6. The hold open device according to claim 5, wherein said spring is of J-shape and the second extremity of said pin is anchored in said pivot pin.

7. The hold open device according to claim 5, wherein said control member extends from said housing, and a lever is attached thereto for rotating same.

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