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[54] **HOLD OPEN ASSEMBLY FOR CHECKING FLOOR HINGE**

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[51] Int. Cl.E05f 3/20, E05f 3/22

[58] **Field of Search**.....16/49, 55, 61, 62, 71, 78,
16/72, 75, 185 R

[56] **References Cited**

UNITED STATES PATENTS

3,106,743 10/1963 Ellis et al.16/55

2,911,210	11/1959	Ferguson	16/55 X
3,273,196	9/1966	Voster et al.	16/55 X
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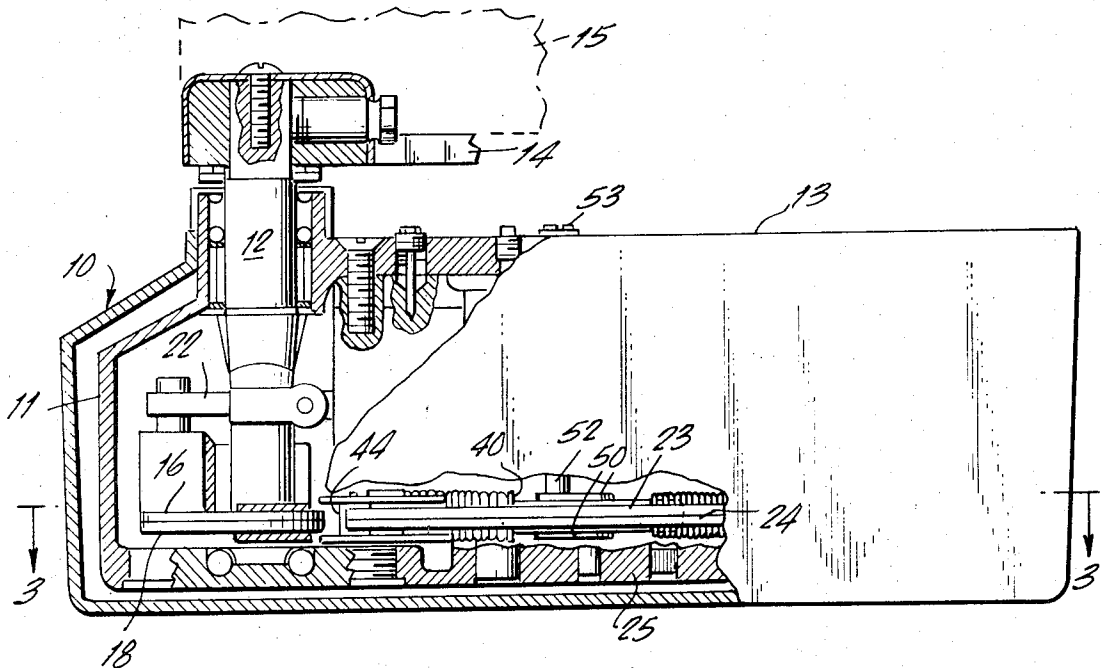
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[57] **ABSTRACT**

A hold open assembly for a checking floor hinge is disclosed in which a cam having a step in the cam face is yieldably engaged by a spring loaded cam follower roller. In the non-hold open position substantially all of the loading is removed from the cam follower. A simplified mechanism is provided to change the assembly from the non-hold open to the hold open condition.

6 Claims, 5 Drawing Figures



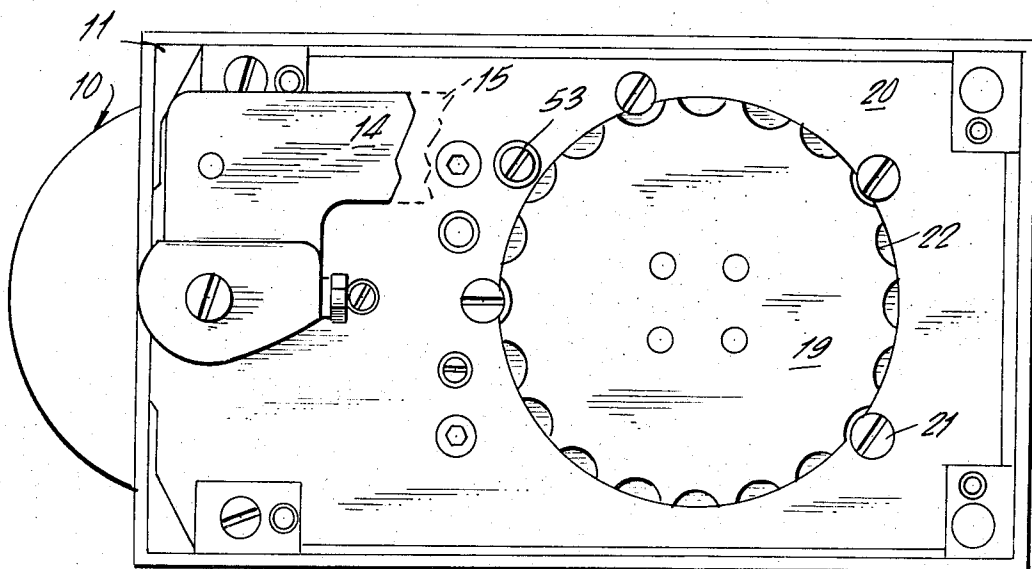


FIG. 1

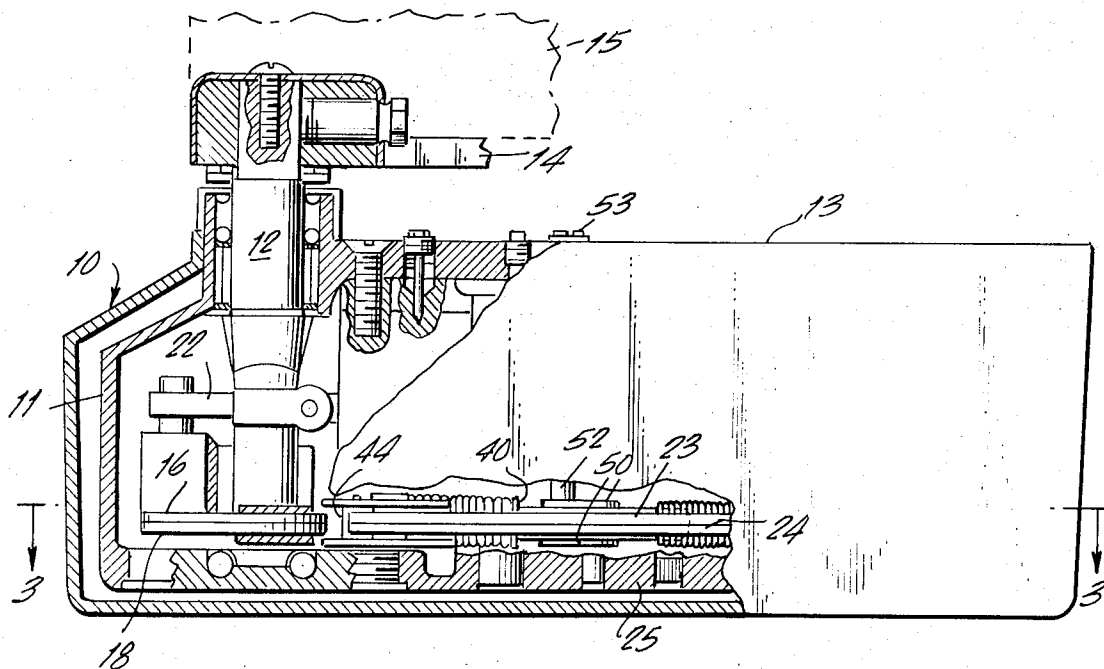


FIG. 2

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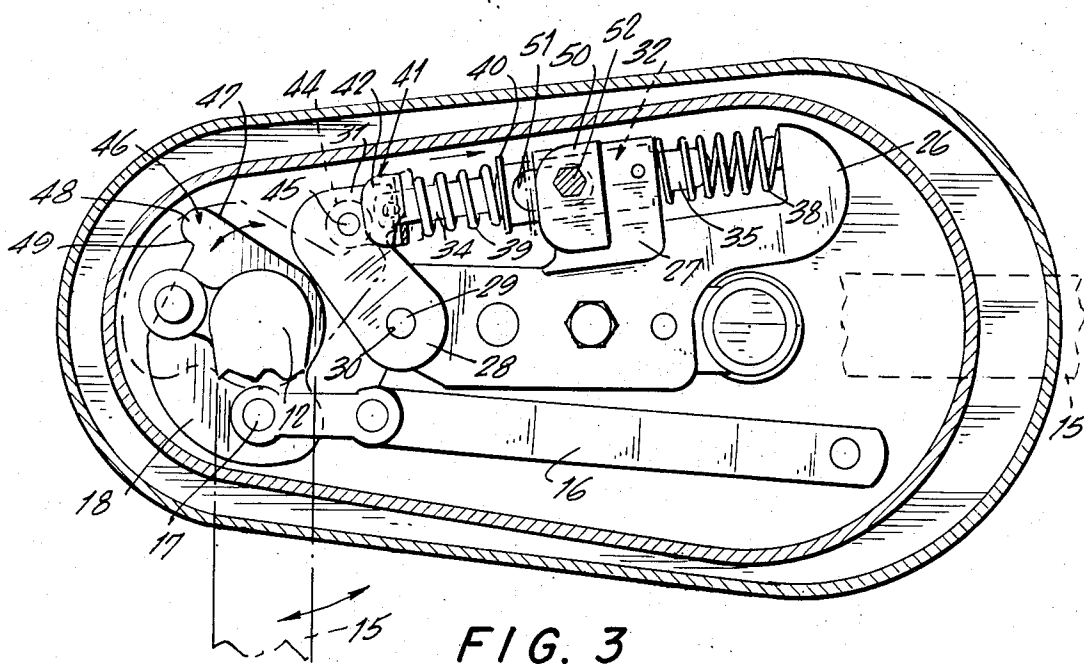


FIG. 3

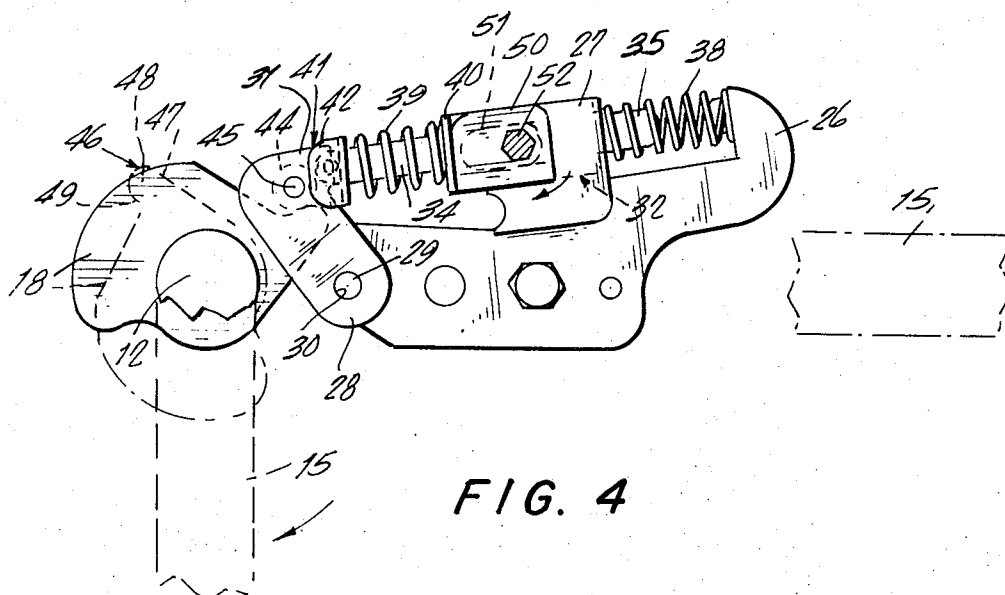


FIG. 4

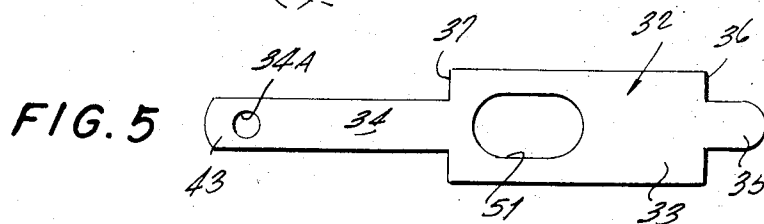


FIG. 5

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HOLD OPEN ASSEMBLY FOR CHECKING FLOOR HINGE

BACKGROUND OF THE INVENTION

Hold open assemblies for checking floor hinges are well known and have been described in patents such as U.S. Pat. No. 3,106,743 issued Oct. 15, 1963 and others. Such prior art devices, however, have required complicated mechanisms for changing from the non-holding to the holding mode and vice versa. In addition, known devices of this type have relied upon heavy spring loaded latches urged against cams at all times resulting in excessive wear on the cams and latches and the need for substantial pressure in swinging the door open and shut.

Accordingly it is an object of the present invention to provide a hold open assembly for checking floor hinges which is free of the shortcomings of prior art devices.

Another object of the present invention is to provide a hold open assembly which will not add substantially to the pressure required to open floor hinge equipped doors.

A further object of the present invention is to provide a hold open assembly which will have a greatly extended useful life due to a reduction of wear on its moving parts.

Still another object of the present invention is to provide a door hold open assembly of simplified structure which is easy to operate, and assemble.

SUMMARY OF THE DISCLOSURE

In the preferred embodiment of the present invention a hold open assembly for checking floor hinges serves to selectively hold a door in an open position or permit it to close by the operation of a retracting mechanism. The door is swingably supported upon an arm which extends outwardly from an upstanding shaft journaled within the floor hinge. A cam member is secured to the shaft and rotates with it as the door is swung. The cam is part of the hold open assembly which also includes a spring loaded guide plate having a cam follower roller thereon in contact with the cam surface. The roller is yieldably held against the cam at all times by light pressure from a first and second coil spring carried upon the guide plate. As the door is swung open in normal use, the second spring which is a relatively light spring is compressed, and thereby keeps the cam roller in contact with the cam without substantially increasing the force required to open the door.

When it is desired to hold the door in an open position two simple rectangular plates rotatably carried by the hold open assembly are shifted to restrict the longitudinal movement of the first coil spring thereby adding to the spring loading of the cam follower roller. A step in the cam face further contributes to the door holding capacity of the hold open assembly.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings forming part of the present disclosure similar parts have been given identical reference numerals in which drawings:

FIG. 1 is a top plan view of a checking floor hinge made in accordance with the present invention,

FIG. 2 is a view in side elevation of the checking floor hinge shown in FIG. 1 partially broken away to show the construction thereof,

FIG. 3 is a sectional view showing the hold open assembly of the checking floor hinge taken on line 3—3 in FIG. 2, in the non-hold open position,

FIG. 4 is a fragmentary view similar to FIG. 3 in the hold open position,

FIG. 5 is a plan view, somewhat enlarged of a spring guide member in accordance with the present invention.

GENERAL DESCRIPTION

Referring to the drawings and particularly to FIGS. 1 and 2; 10 indicates a checking floor hinge built within a rigid housing 11. The housing 11 is sealed and may be filled with fluid in the well-known manner.

A main upstanding spindle 12 is journaled within the housing 11 and extends outwardly thereof as shown in FIG. 2. Secured to the main spindle 12 and above the top 13 of the casing 11 is a door support arm 14. The door support arm 14 underlies the door 15 and is secured thereto.

In accordance with well known checking floor hinges, such as are shown in U.S. Pat. No. 3,106,743, the door is returned to its closed position by means of a heavy torsion spring (not shown) connected to the spindle by a linkage generally indicated at 16 in FIG. 2. The linkage 16 is coupled at one end to the torsion spring and at its opposite end 17 to a flat cam plate 18 secured to the main spindle 12. A torsion spring access cover 19 is provided in the top 13 of the housing 11 as best shown in FIG. 1. The cover 19 is coupled to one end of the torsion spring and may be rotated to impart the desired loading to this member. Screws 21 carried by the housing 11 and extending into recesses 22 in the cover 19 hold the cover in place following the said loading step.

Door opening back-check and door closing stroke and latch control mechanisms usually incorporated into checking floor hinges form no part of the present invention, are well known in the art and will therefore not be described further herein. The linkage connecting such mechanisms to the main spindle 12 is indicated at 22 in FIG. 2.

Referring to FIGS. 2-4 it will be seen that the hold open mechanism of the present invention is carried by two substantially identically shaped plates 23, 24, which are horizontally disposed within and secured to the bottom 25 of the housing 11. The plates 23, 24, are somewhat J shaped having a curved portion 26 at one end thereof. Each of the plates 23, 24, is formed with an outwardly extending tab 27 laterally offset from the plane of the plate. The tabs 27 are offset in opposite directions to provide an opening therebetween and are located intermediate the ends of the plates 23, 24. In addition, the tabs 27 extend in the direction of the curved portion 26 of said plates and are coextensive with the curved portion.

An arm 28 is pivotally secured on each side of the plates 23, 24, by means of a short pin 29. The pin 29 extends through the plates 23, 24, in a bore 30 spaced from the end of the plates opposite the curved portion 26. The arms 28 are parallel to, but spaced from each other a distance equal to the combined thickness of the plates 23, 24. The free ends 31 of the arms 28 are disposed in the same direction as the curved portions 26 of the plates 23, 24.

A spring guide member 32 (best shown in FIG. 5) is slidably carried between the tabs 27 of the plates 23, 24. The guide member 32 has a generally rectangular portion 33, a first elongated spring receiving extension 34 disposed in the direction of the arms 28 and a second elongated, but shorter spring receiving extension 35 lying in the direction of the curved portion 26 of the plates 23, 24.

The spring guide member is formed with a sharp step 36, 37, between the spring receiving extensions 34, 35. A coil spring 38 made of relatively thin spring steel is slipped over the shorter guide extension 35 and is supported at its ends by the curved portion 26 of the plates 23, 24, and the step 36 of the guide member 32.

A heavier coil spring 39 is slipped over the first spring receiving extension 34 and positioned between a flat thrust plate 40 disposed against the step 37 and a channel shaped retainer 41. The retainer 41 is provided with an axial slot (not shown) through which the extension 34 is slipped. The upstanding portions 42 of the retainer 41 embrace the free ends 31 of the arms 28 and prevent them from spreading under load. The arm 28, in turn, engage the end 43 of the extension 34 by means of inwardly directed detents (not shown) which are received within a bore 34a in the extension 34.

A roller 44, hereinafter the cam follower, is freely journaled upon a pin 45 held at each end by the arms 28 at the free ends 31 thereof. The cam follower, 44 is disposed adjacent the end 43 of the extension 34 so that pressure on the cam follower 44 is translated into axial movement of the extension 34 and consequently into movement of the entire spring guide member 32.

As best shown in FIGS. 3 and 4, the plate 18 secured to the main spindle 12 is provided with a cam 46. The cam follower 44 lies in the path of the cam face 47 and is engaged thereby as the main spindle rotates with the swing of the door. The cam 46 has a single lobe 48 and a recessed portion 49 on one side thereof.

With only slight compression, the lighter coil spring 38 holds the cam follower 44 against the cam face 47 at all times during the non-hold open operation of the door hinge. As a result, no greater effort is required in opening and closing the door than if the hold open assembly were not present. Since there is very little pressure against the cam face there is little wear of the cam and cam follower over prolonged use of the hold open assembly.

When it is desired to hold the door open at 90° to its original closed position, it is merely necessary to rotate the hold open cam plates 50 from the position shown in FIG. 3 to that shown in FIG. 4. In the hold open position the hold open cam plates 50, which are somewhat rectangular in shape with rounded corners, bear against the thrust plate 40 thereby limiting the travel of the end of the spring 39 adjacent the said thrust plate. The heavy spring 39 thereupon holds the cam follower 44 against the cam face 47 with substantial loading.

As shown in FIGS. 3 and 4, the cam face 47 is provided with a recessed portion 49. As the cam lobe 48 is swung past the cam follower, as the door is opened 90°, the cam follower 44 will slip behind the recessed portion 49 and yieldably secure the door in the open position without the need for the excessive spring loading of prior art devices. If the door is forced to the closed position while the mechanism is in the hold open mode,

the lobe 48 will urge the cam follower 44 in the direction of the heavy spring 39. The spring 39 will become compressed and the guide member 36 slid back toward the curved portion 26 of the plates 23, 24. The guide member 34 is provided with an elongated slot 51 to enable it to slide past a hexagonal shaft 52 upon which the cam plates are carried. The hexagonal shaft 52 extends upwardly through the top 13 of the housing 11 and terminates in a slotted adjusting head 53 (see FIGS. 1 and 2). In order to change the hold open assembly from the hold open to the non-hold open mode, it is merely necessary to rotate the hold open cam plates 50, 90° by means of the adjusting head 53.

While the foregoing description has been written in connection with hold open assemblies for 90° operation, it is within the purview of the present invention to employ the same structure for 85° and also 105° hold open operation. Such angles can be achieved merely by shifting the relative position of the flat plate 18 and thus the cam 46 upon the main spindle 12.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patents of the United States is:

1. A hold open assembly for a checking floor door hinge having a hollow housing consisting of a top, a bottom, and side walls, an upstanding main spindle rotatably carried in said housing and extending upwardly through the top of said housing, said spindle having an outwardly extending door support arm secured to the upwardly extending portion thereof, comprising a cam plate carried by the main spindle, a cam lobe on the cam plate, a cam face on said cam lobe, a recess in the periphery of the cam plate adjacent the cam lobe, a pair of flat, somewhat J shaped plates horizontally disposed within the housing with their straight ends lying adjacent to, but spaced from, the cam plate, a tab on each of the J shaped plates intermediate the ends thereof, laterally spaced from each other and extending in the direction of the curved portion of the J shaped plates, a pair of arms swingably secured at one end to the straight end of the J shaped plates, an elongated guide member slidably carried between the tabs and coupled to the free end of the arms at one end, a first coil spring carried by the guide member between the said guide member and the arms, a second coil spring of relatively lighter strength than the first coil spring carried by the guide member between the said guide member and the curved portion of the J shaped plates, at least one hold open plate, swingably mounted adjacent the J shaped plates for selective lateral movement restricting engagement with the first coil spring at its end opposite the swingable arms and a cam follower roller carried between the free end of the arms in contact with the cam face and periphery of the cam plate.

2. A hold open assembly according to claim 1 in which the guide member comprises a generally rectangular body portion having an elongated slot therein and a first and second spring receiving extension integral therewith, a thrust plate is carried upon the first spring receiving extension and between the said thrust plate and the first spring to combine with the hold open plate to restrict the axial movement of the adjacent end of the first spring.

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3. A hold open assembly according to claim 2 in which the first spring is unloaded at all times except when the hold open plate is in contact with the thrust plate and the door is in the open position.

4. A hold open assembly according to claim 1 in which the first and second springs are substantially unloaded when the door is in the closed position.

5. A hold open assembly according to claim 2 in

which the hold open plate is secured to a vertically disposed rod, journaled in the top of the housing and freely received within the elongated slot of the guide member.

6. A hold open assembly according to claim 1 in which the cam plate is adjustably secured to the main spindle to adjust the hold open angle of the assembly.

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