

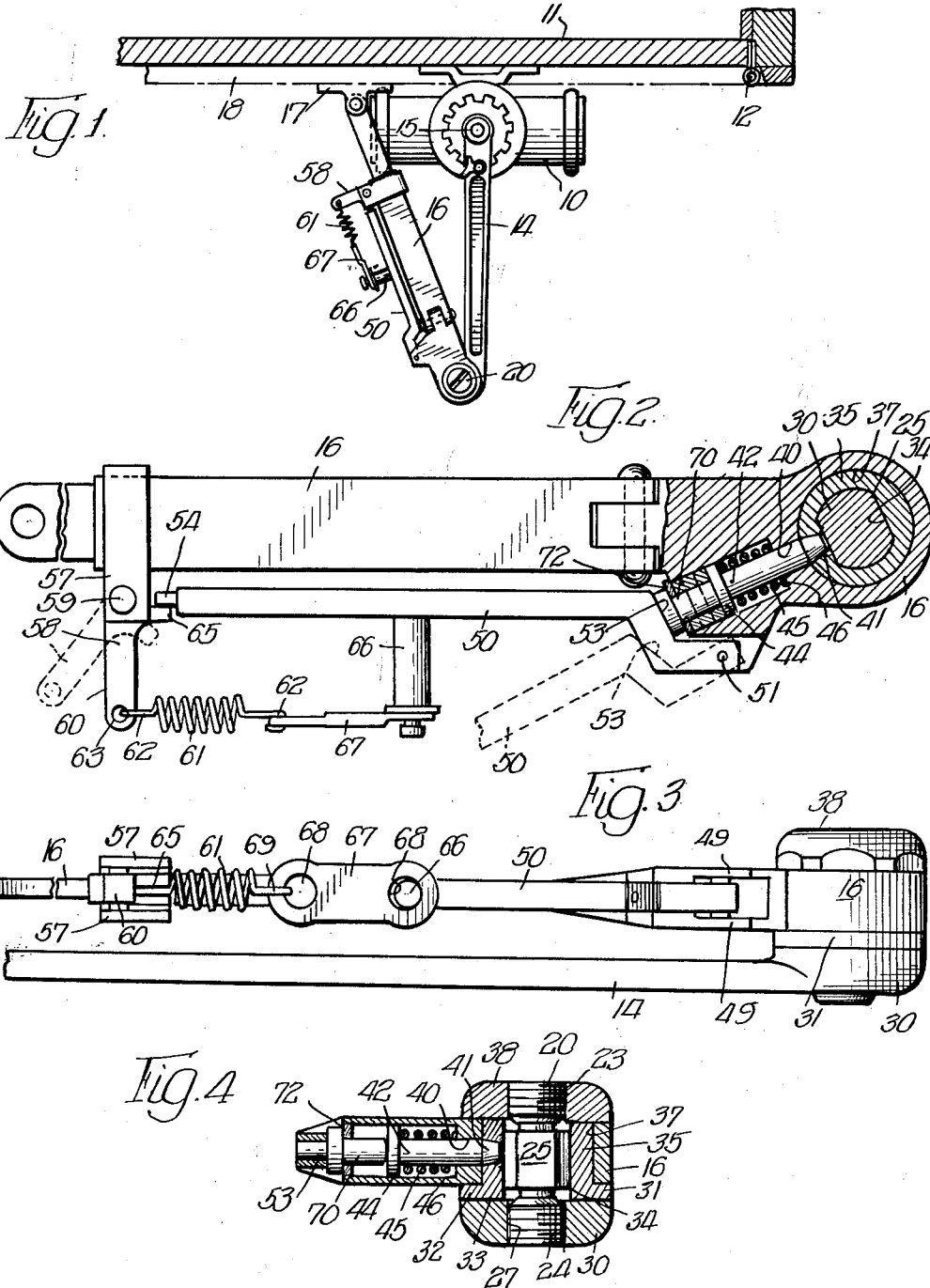
Sept. 8, 1964

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3,147,830

RELEASABLE HOLD OPEN DEVICE

Filed Aug. 26, 1958



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RELEASABLE HOLD OPEN DEVICE

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Filed Aug. 26, 1958, Ser. No. 757,385

2 Claims. (Cl. 189—45)

This invention pertains to a releasable hold open device for doors, and more particularly to a hold open device having a release mechanism that automatically renders it ineffective in the case of fire.

It is often desired to maintain a door in open position for traffic, or ventilation. However, if the door is located in a strategic location, it is necessary that it should be quickly and dependably closed in case of fire.

It is therefore an object of the invention to provide a hold open device that is releasable when contacted by super-heated air from a fire. It is a further object of the invention to provide a reliable hold open device which depends for its releasing action upon a fusible link of well known construction which will fuse at a predetermined temperature, so that the hold open device will be released and the door automatically closed to cut off drafts that communicate between rooms. It is yet another object of the invention to provide a releasable holding device having a mechanism for rapidly closing doors in order to deter the spreading of fires. It is still another object of the invention to provide a releasable hold open device which is simple in construction and inexpensively manufactured, and yet which is highly efficient, durable, and dependable in service. Further objects and advantages of this invention will become evident as the description proceeds and from an examination of the accompanying drawing which illustrates one embodiment of the invention and in which similar numerals refer to similar parts throughout the several views.

In the drawing:

FIGURE 1 is a top plan view of a closing device with a hold open device embodying the present invention with the door and door frame shown in section;

FIGURE 2 is an enlarged fragmentary view of the forearm of the device shown in FIGURE 1 with the releasable mechanism shown partly in section;

FIGURE 3 is an enlarged fragmentary side view in elevation of the release mechanism; and

FIGURE 4 is an enlarged view partly in section of the pivot between the forearm and the main arm.

Referring now to the drawing, it will be seen that a door closing device 10 is mounted on a door 11 which is hung on hinges 12. One end of a main arm 14 is secured to the drive shaft or spindle 15 of the door closing device. Pivotaly secured to the other end of the main arm is a forearm 16. The forearm 16 is pivotaly fastened at its other end to a shoe or bracket 17 mounted on a door frame 18.

Between the main arm 14 and the forearm 16, is a primary pivot which is ordinarily used for the normal opening and closing of the door. The primary pivot is in the form of a stud 20 having threaded extremities 23, 24 and a non-circular integral central section 25 which may be flat on two opposite sides. The main arm 14 is provided with internal threads 27 adapted to receive the threaded extremity 24 of the stud 20.

A friction head 30 is formed on the main arm 14. A second friction head 31 is mounted on the stud 20 above the friction head 30. Friction heads 30, 31 have opposing opposite friction faces 33, 32, respectively, as best shown in FIGURE 4. An aperture 34 in the friction head 31 is of a configuration conforming to the outline of the central non-circular section 25 of the stud 20, so that the friction head 31 and stud 20 are non-rotatable

with respect to each other, and move when turned as a single unit. As the main arm 14 and the forearm 16 rotate relative to each other when the door is opened and closed, the stud 20 is screwed into and out of the threaded aperture 27 in the friction head 30 of the main arm 14. As the stud moves in and out of the friction head 30, the friction faces 32, 33 are moved into and out of frictional contact. When the friction faces 32, 33 move into binding frictional engagement with each other they maintain the door in a hold open position.

A cylindrical boss 35 projects upwardly from the friction head 31. An opening 37 in the forearm 16 is journaled for rotation on boss 35. A jam nut 38 is threaded on the upper extremity 23 of stud 20.

Under ordinary circumstances the forearm 16 is locked to the friction head 31 by a releasable mechanism. However, in the event of fire, the releasable mechanism permits the forearm 16 to swivel about aperture 37 on boss 35 of the friction head 31 in order to close the door. An aperture 40 in the forearm 16 is adapted to be aligned with a recess 41 in the boss 35 of friction head 31. A pin 42 normally projects through aperture 40 in the forearm into recess 41 in the friction head 31. A flange 44 is formed on the outer end of the pin 42. A shoulder 46 is formed in the aperture 40 by enlarging the diameter thereof. Between flange 44 and the shoulder 46 is a compressed coiled spring or helical spring 45 which tends to bias the pin 42 out of the recess 41.

Adjacent aperture 40 on the forearm 16 are a pair of ears 49 which loosely embrace the sides of a control lever 50. Control lever 50 is pivotally mounted between the ears 49 by a pin 51 passing therethrough. The control lever is provided with a shoulder 53 which is, under normal circumstances, adjacent the exterior opening of aperture 40. The opposite end of the lever has a latch portion 54.

Forearm 16 has at its inner end a pair of ears 57. Ears 57 pivotally hold the locking pawl 58 by pin 59. Locking pawl 58 has an extension 60 to which is attached a coil spring 61 by a hook 62 passing through opening 63. The locking pawl also has an abutting surface 65 adjacent the pivot 59 for engaging the latch end portion of the control lever 50.

On the outer surface of the control lever 50 is a post 66 for holding one end of the fusible link 67. Fusible link 67 has eyes 68 for engaging the post and the spring. The post passes through one eye and the hook 62 on the spring 61 passes through the other eye. The fusible link 67 and spring 61 hold the abutting surface 65 of the locking pawl 58 in engagement with the latch end 54 of the control lever 50 under the tension of spring 61. The various parts are so constructed that when the abutting surface 65 of the locking pawl 58 is in contact with the latch end 54 of the control lever, the inner surface of the control lever 50 is in close parallel relationship with the outer face of forearm 16 and the shoulder 53 on the control lever 50 is adjacent to and overlies the exterior opening of aperture 40.

Between the shoulder 53 on the control lever 50 and the flanged end 44 of pin 42 is a prong 70 that projects into aperture 40 and forces the pin 42 at its inner end into the recess 41 of the friction head 31. Consequently, when the parts are in the assembled position, as shown in FIGURE 2, the forearm 16 is rigidly held relative to the friction head 31 whereby, in effect, these parts are a single rigid member. The prong 70 may be a separate element or rigidly secured to shoulder 53.

A retaining element 72 may be mounted at the exterior lip of the aperture 40 in order to prevent ejection of the pin 42 by spring 45 when it is released.

In operation, the holding device is mounted in the customary manner, with the parts arranged as shown in the

drawing, so that the forearm 16 and the friction head 31 will be rigidly held, in effect, together in a manner to cause these parts to act as a unitary arm. In this case, the friction head 31 moves on forearm 16 relative to friction head 30 on the main arm for frictional engagement and disengagement between the respective faces 32, 33, as the forearm and then main arm are rotated. When the friction faces 32, 33 of the friction heads are in binding frictional engagement the door will be held in an open position.

In the event of fire, the link 67 will be fused and separated, breaking the tension in the spring 61; thus, permitting the locking pawl 58 free to disengage the control lever 50, as shown in dotted lines in FIGURE 2. The pin 42, in such a circumstance, is forced outwardly by spring 45 to push the shoulder 53 of control lever 59 away from the outer opening of the aperture 40, as shown by the dotted lines, so as to remove the inner end of the pin 42 from the recess 41 of the friction head 31. In this manner, even though the friction faces 32, 33 are firmly bound together in a manner to hold the door open, the independent pivot, provided by opening 37 in the forearm 16 being journaled on the cylindrical boss 35 of the friction head 31, acts as a secondary pivot to permit the forearm and main arm to swivel relative to each other in order to close the door.

The inner end of the pin 42 may be tapered as shown, in order to facilitate insertion into recess 41. Also, recess 41 may have a conical outline conforming to the end of the pin.

The hold open device of the present invention need not be used in connection with the door closing mechanism. However, if it is employed in conjunction with the door closing mechanism, the latter will close the door when the link is fused and the forearm swivels on the secondary pivot. It is obvious that the invention has application on various sorts of closures, such as doors, windows and the like; and, accordingly, the invention is to be construed broadly and as covering all such installations. However, for the purposes of clarity, applicant has defined the device as connected between a door and a door frame.

In the drawing and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, these are used in a generic and descriptive sense only, and not for purposes of limitation. Changes in form and the proportion of parts, as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. A door holder comprising a first arm, a first friction

head at one end of said first arm, a second friction head opposed to said first friction head, a screw member for moving said first and second friction heads relatively toward and away from each other for frictional engagement and disengagement, a second arm rotatably mounted on said second friction head, said second arm having an aperture communicating with said second friction head, said second friction head having a recess adapted to be aligned with said aperture, a pin member in said aperture normally projecting into said second friction head recess for preventing said second arm from rotating on said second friction head while said first and second arms are moved relative to each other, a spring member biased against said second arm and said pin member for ejecting said pin member out of said second friction head recess, and means including a fusible link for holding said pin member in said friction head recess in order to maintain normally a non-rotatable relation between said second arm and said second friction head and to release said pin to permit the second arm to swivel on said second friction head when said fusible link is melted.

2. In a door holder the combination comprising a first arm, a first friction head at one end of said first arm, a second friction head opposed to said first friction head, a screw member for moving said first and second friction heads relatively toward and away from each other for frictional engagement and disengagement, a second arm rotatably mounted on said second friction head, said second arm having an aperture communicating with said second friction head, said second friction head having a recess adapted to be aligned with said aperture, a pin member in said aperture normally projecting into said second friction head recess for locking said second arm to said second friction head while said first and second arms are moved relative to each other, a spring member biased against said second arm and said pin member for ejecting the latter out of said second friction head recess, and means including a fusible link for holding said pin member in said friction head recess in order to maintain normally a locking engagement with said second arm and said second friction head and to release said pin to permit the second arm to swivel on said second friction head when said fusible link is melted.

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