Nov. 11, 1969 H. W. TANSLEY 3,477,176

MAGNETIC DOOR HOLDER

Filed July 15, 1968 2 Sheets-Sheet 1

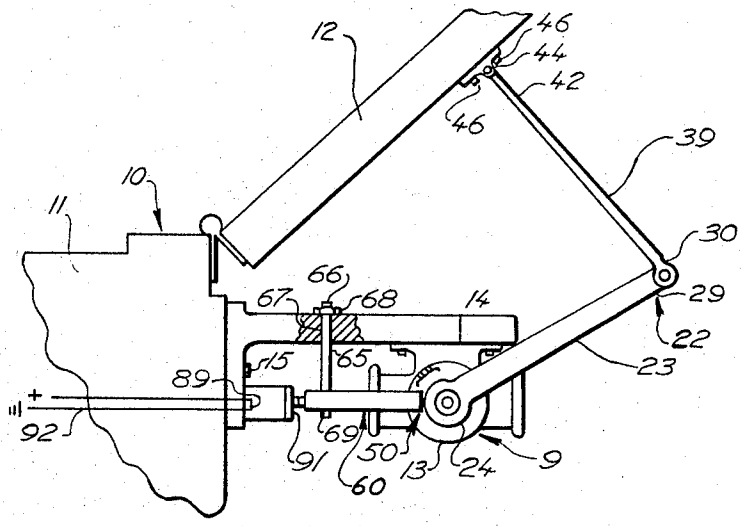


Fig. 1

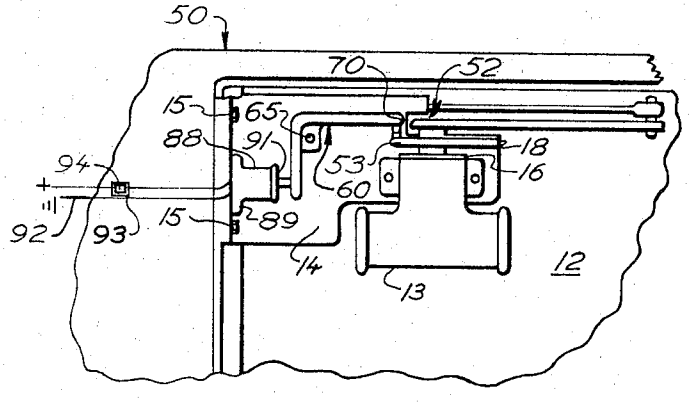


Fig. 2

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MAGNETIC DOOR HOLDER

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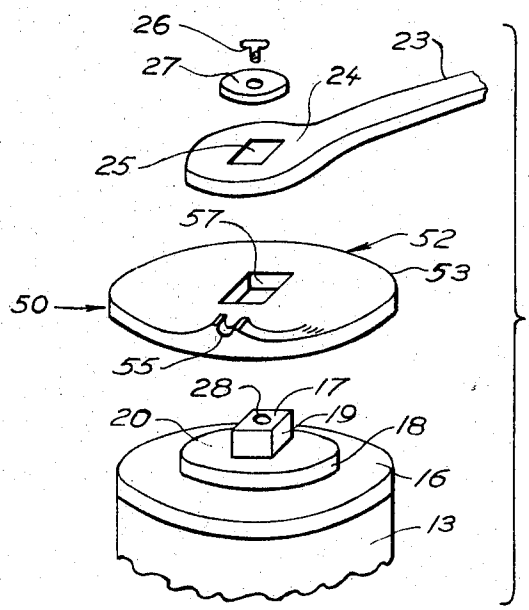


Fig. 3

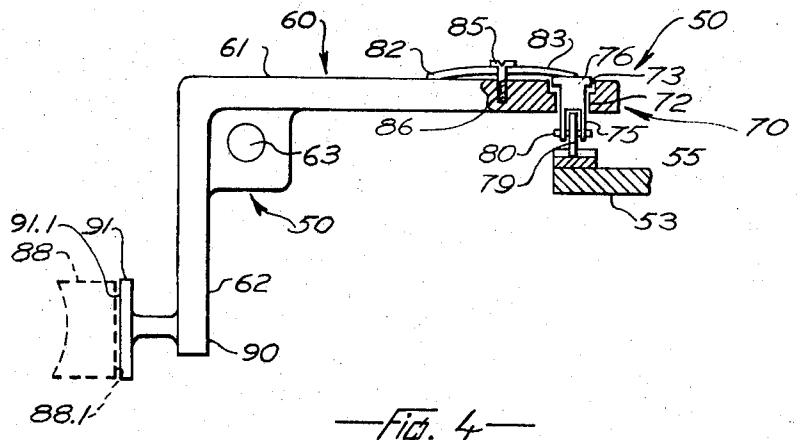


Fig. 4

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MAGNETIC DOOR HOLDER

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U.S. Cl. 49—7 11 Claims

ABSTRACT OF THE DISCLOSURE

A door holding and releasing device wherein latching means carried by an armature is moved, through the mediacy of a normally energized electromagnet, into locking engagement with a locking member having a nonrotatable connection with the closer arm of a door closer so as to prevent closure of the door when the latter is in an open position. The latching means and locking member are disengaged to permit the door closer to return the door to a closed position when the electromagnet is de-energized by the circuit opening operation of a fire sensing device connected in circuit with the electromagnet.

BACKGROUND OF THE INVENTION

This invention relates to door closing holding and releasing devices and in particular to devices which normally hold doors open but which automatically close the latter when conditions of fire or smoke prevail. The invention is, furthermore, more specifically related to an attachment for conventional door closers to convert the latter into devices which will normally hold the door open and which will automatically close the latter in emergency conditions involving fire and smoke.

It is appreciated that door holding and releasing devices have heretofore been devised for the above purposes; however, such devices of prior design have not, in the main, proven entirely satisfactory as their installation has required the addition of holding brackets and the like which in some cases are difficult to install and which unnecessarily clutter up an otherwise clean doorway.

SUMMARY OF THE INVENTION

The present invention overcomes the objectionable features of the aforementioned devices of prior design by providing a door holding and release device which may be connected directly to a conventional door closer so as to become an integral part thereof which results in a doorway having a clean, uncluttered appearance. The device of the present invention, furthermore, will hold a door open, once it is opened, against the closing action of the closer and which will allow the door to be closed manually or permit the closer to automatically close the door when atmosphere conditions, caused by fire, prevail.

The invention includes means for sensing the presence of smoke or fire which will automatically cause the device to release the door and permit the door closer to automatically close the latter.

The door holding and releasing device of the present invention is connectable to a door closer of the type connected between a door member and wall member having a casing mounted on one of the members, a shaft rotatably mounted in the casing having an end portion extending therefrom, resilient means yieldably resisting rotation of the shaft in one direction, and a closer arm mounted on the end portion of the shaft and connected to the door member for rotating the shaft against the action of the resilient means as the door is swung to an open position. The device includes a locking member nonrotatably connectable to the closer arm for rotation therewith as the door member is swung between open and closed positions, an armature mounted on the casing adjacent to the locking member for movement towards and away from the latter, latching means mounted on the armature in a position in which said means extend into the path of the locking member so as to lockably engage the latter when the door member is moved to an open position, and means in circuit with the electromagnetic means activated by atmospheric conditions caused by a fire to de-energize the electromagnetic means and thereby disengage the latching means and locking member so as to permit the door closer to return the door member to a closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a plan view of the device mounted on a conventional door closer.

FIGURE 2 is a side view of the device and door closer illustrated in FIGURE 1.

FIGURE 3 is an enlarged isometric exploded view of a portion of the device illustrating its connection to a conventional door closer.

FIGURE 4 is an enlarged side view of the armature with portions thereof removed for clarity of illustration.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings the numeral **9** designates, in general, a conventional door closer which is rigidly connected to a door frame **10**, the latter forming part of a wall **11**, and being referred to in the claims as a wall member, said door closer also being operatively connected to a door **12**, referred to in the claims as a door member, the latter being shown, in FIGURES 1 and 2, in a partially open position.

The door closer includes a casing **13** rigidly mounted on or formed as an integral part of a mounting bracket **14**. This bracket is formed so as to fit in the inside corner of the door frame **10** and is fastened to the latter by means of bolts or screws **15**. Casing **13** is provided with a removable cover plate **16** through which an upper end portion **17** of a vertical shaft **18** extend. This upper end portion **17** (see FIGURE 3) is formed so as to terminate in a square boss **19** extending from a lower shoulder **20**. Shaft **18** is rotatably mounted in casing **13**, the latter also housing resiliently actuated shaft operating mechanism, not shown, which yieldably resists rotation of the shaft in one direction.

The door closer **9** also includes a closer arm **22** having a main arm section **23** in one end **24** of which a square aperture **25** is formed for fittedly receiving boss **19**. The closer arm **22** is held in place on the shaft **18** by means of machine screw **26** and washer **27**, said screw **26** being threadedly engaged in a suitably tapped hole **28** formed in the boss **19**.

To the other end **29** of main arm section **23** one end **30** of a forearm section **39** is swingably connected. On the other end **42** of said forearm section **39** is pivotally mounted a fastening bracket **44** which is secured to the door or door member **12** by means of screws or bolts **46**. The shaft operating mechanism is arranged so as to urge the shaft, and with it the closer arm **22**, to rotate in a direction opposite to the opening direction of the door so that the door will automatically swing from an open to a closed position when released.

The holding and release device herein generally identified by the reference numeral **50** includes a locking member **52** (shown in detail in FIGURE 3) which takes the form of a thin, preferably metallic disc **53** which has an upwardly opening semi-circular seat element **55** adjacent its peripheral edge. The disc is provided with a square central opening **57** the dimensions of which are substantially the same as those of the aperture **25** in the end **24** of main arm section **23**. This disc is designed to fit over the boss **19** between the shoulder **20** and the end **24** of

the main arm section 23 and is installed by simply removing machine screw 26 and main arm section 23, fitting the disc over boss 19 and then replacing main arm section 23 and screw 26. It will be seen that this construction results in mutual rotation of the disc and closer arm as shaft 18 rotates.

Device 50 also includes an armature 60. Armature 60, which is shown in detail in FIGURE 4, is L-shaped having a latching arm 61 and a lever arm 62.

At the juncture of the arms 61 and 62 the armature 60 is provided with a transverse bore 63.

Rigidly mounted on the mounting bracket 14 is a pivot pin 65. This pin 65 can be secured to bracket 14 in any suitable manner; however, as illustrated in FIGURE 1, it is formed so as to have a reduced threaded end portion 66 which extends through an aperture 67 formed in the bracket 14 and over which a nut 68 is threaded, and tightened against the bracket 14. At its other end 69 pin 65 is also reduced in diameter to rotatably fit the bore 63, in armature 60. The pin 65 is positioned so that the latching arm 61 of the armature 60 extends substantially horizontally with a free end 70 of the arm positioned over the disc 53.

End 70 of the latching arm 61 is provided with a vertically extending transverse bore 72 which is counter-bored at its upper end 73 (see FIGURE 4). This bore 72 slidably receives a plunger 75 having a button 76 at its upper end for fitting the counterbored upper end 73 of said bore 72 and having its lower end 77 bifurcated to receive a roller 79 which is rotatably mounted on a transverse shaft 80. The plunger 75 is normally urged to an extended position relative to the latching arm 61 against the disc 53 through the mediacy of an elongated leaf spring 82. This leaf spring extends longitudinally of the latching arm with one end 83 of the spring engaging the button 76. The leaf spring is secured to the latching arm by means of a machine screw 85 extending into a suitably located tapped hole 86 in the latching arm. The plunger 75 and roller 79 together with leaf spring 82 constitute latching means.

Operation of armature 60 is effected by the energizing of an electromagnet 88 having a contact face 88.1 secured by means of bolts 89 to the mounting bracket 14 adjacent to one end 90 of the lever arm 62. This magnet which is a conventional type is connected by leads 92 to a suitable source of power. Although the armature can be arranged so that the lever arm will come into direct contact with the electromagnet, in order to provide an exact and flush contact with the face 88.1 of the latter a contact button 91 made of a paramagnetic material and having a contact face 91.1 is pivotally mounted on the lever arm in a position in which the faces 88.1 and 91.1 will come into direct contact with each other when the magnet 88 is energized. A conventional sensing signalling device 93 (shown diagrammatically) including a normally closed switch mechanism 94 is set up in the circuit formed by the leads 92 and magnet 88 to maintain the magnet 88 in a normally energized condition. Device 93 is arranged so that, when emergency conditions caused by fire or smoke prevail, it will open the circuit and thereby de-energize the magnet.

In assembly and use of the device 50, disc 53 is secured to the shaft 18, as previously described, with the seat element 55 positioned to lie directly beneath the plunger 75 when the door is swung to a fully open position. The magnet, in an energized condition will pivot the armature 60 about that pivot pin 65 so as to urge the roller 79 into rolling engagement with the disc so that the roller will engage and seat itself in the seat element when the door is fully opened. The leaf spring 82 chosen is such that the pressure it exerts on the plunger is sufficient to maintain the roller in the seat element under the normal pressure exerted upon the door by the door closer so that the door will not, of its own accord, swing to a closed position. This leaf spring, however, will give sufficiently to permit retraction of the plunger when pressure is applied, manually, to the door to close the same.

When the sensing and signalling device 93 senses the presence of fire or smoke, the circuit established by the magnet 88 and leads 92 will be broken thereby resulting in the de-energizing of the magnet and consequently permitting the armature 60 to swing away from the disc 53. The engagement of the roller 79 and seat element 55 will thus be broken thereby permitting the door closer 10 to swing the door to a closed position.

Although, in the foregoing specification, reference has been made to an armature of L-shaped configuration it will be appreciated that the armature may have any suitable configuration to suit the type of door closer with which the device 50 is to be associated. It will also be appreciated the invention can be used in the operation of closers other than conventional door closers.

Furthermore it will be appreciated that although device 50 has been described and illustrated in association with a wall mounted door closer, it may also be employed with door mounted door closers.

What I claim is:

1. Door holding and releasing attachment for a door closer of the type connected between a door member and wall member and having a casing mounted on one of the members, a shaft rotatably mounted in the casing having an end portion extending therefrom, resilient means yieldably resisting rotation of the shaft in one direction, a closer arm mounted on the end portion of the shaft and connected to the door member for rotating the shaft against the action of the resilient means as the door is swung to an open position, said attachment including a locking member nonrotatably connectable to the closer arm for rotation therewith as the door member is swung between open and closed positions, an armature mounted on the casing adjacent to the locking member for movement towards and away from the latter, a latching means mounted on the armature, normally energized electromagnetic means being adapted when energized to move the armature to the position in which the latching means extend into the path of the locking member so as to lockably engage the latter when the door member is moved to an open position, and means in circuit with the electromagnetic means activated by atmospheric condition caused by a fire to de-energize the electromagnetic means and thereby disengage the latching means and the locking member so as to permit the door closer to return the door member to a closed position.

2. An attachment as claimed in claim 1 wherein the armature includes an arm having the latch means mounted at one end thereof and having a paramagnetic body at the other end and including a pivot pin connectable to the casing upon which the arm is pivotally mounted.

3. An attachment as claimed in claim 1 wherein the locking member includes a disc having a central aperture for nonrotatable fitting the extending end portion of the shaft, said disc having a seat element engageable by the latching means when the door member is swung to an open position.

4. An attachment as claimed in claim 3 in which the latching means includes a plunger movable between extended and retracted positions relative to the disc and spring means on the armature for releasably maintaining the plunger in the seat element against the closing action of the door closer when the door member is in an open position.

5. An attachment as claimed in claim 1 wherein the casing is mounted on the door member and the electromagnetic means is mounted on the wall member in a position so as to operably confront the armature when the door is moved to an open position.

6. In combination with a door closer of the type connectable between a door member and wall member and having a casing mountable on one of the members, a shaft rotatably mounted in the casing having an end por-

tion extending therefrom, resilient means yieldably resisting rotation of the shaft in one direction, a closer arm mounted on the end portion of the shaft and connected to the door member for rotating the shaft against the action of the resilient means as the door member is swung to an open position; a holding and releasing device including a locking member nonrotatably mounted on the shaft for rotation with the closer arm as the door member is swung between open and closed positions, an armature mounted on the casing adjacent to the locking member for movement towards and away from the latter, latching means mounted on the armature, normally energized electromagnetic means being adapted when energized to move the armature to a position in which the latching means extend into the path of the locking member so as to lockably engage the latter when the door member is moved to an open position, and means in circuit with the electromagnetic means activated by atmospheric conditions caused by a fire to de-energize the electromagnetic means and thereby disengage the latching means and locking member so as to permit the door closer to return the dor member to a closed position.

7. Structure as defined in claim **6** wherein the armature includes an arm having the latching means mounted at one end thereof and having a paramagnetic body at the other end and including a pivot pin connectable to the casing upon which the arm is pivotally mounted.

8. Structure as defined in claim **6** wherein the locking member includes a disc having a central aperture for nonrotatably fitting the extending end portion of the shaft, said disc having a seat element engageable by the latching means when the door member is swung to an open position.

9. Structure as defined in claim **8** in which the latching means includes a plunger movable betwen extended and retracted positions relative to the disc and spring means on the armature for releasably maintaining the plunger in the seat element against the closing action of the door closer when the door member is in an open position.

10. Structure as defined in claim **8** in which the plunger has rolling contact with the disc.

11. Structure as defined in claim **6** wherein the casing is mounted on the door member and the electromagnetic means is mounted on the wall member in a position so as to operably confront the armature when the door is moved to an open position.

References Cited

UNITED STATES PATENTS

1,544,396	6/1925	Henry	49—8 X
1,987,330	1/1935	Fischer	49—2
1,993,222	3/1935	Moore	49—7
2,887,194	5/1959	Noltin et al.	49—7
3,207,273	9/1965	Jurin	49—7

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