United States Patent

Gaysowski

[15] 3,648,326

[45] Mar. 14, 1972

[54] ELECTROMECHANICAL DOOR HOLDER-CLOSER

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[73] Assignee: **Rixson Inc.**, Franklin Park, Ill.

[22] Filed: **Nov. 21, 1969**

[21] Appl. No.: **878,604**

[52] **U.S. Cl.** **16/48.5**, 49/379, 292/273

[51] **Int. Cl.** **E05f 15/20**

[58] **Field of Search** 49/379, 1, 2; 292/273; 16/49, 16/58, 57, 51, 52, 63, 61, 82, 48.5

[56] **References Cited**

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Primary Examiner—James T. McCall
Assistant Examiner—Garry Moore
Attorney—Augustus G. Douvas

[57] **ABSTRACT**

An electromechanical door holder-closer to maintain remote fail-safe holding of a door in an open position, and also to effect closure of the door in response to the application of a manual closing force, the opening of an operating switch, the malfunctioning of condition detection circuitry for fire or smoke, or, alternatively, the detection of an undesired condition.

16 Claims, 13 Drawing Figures

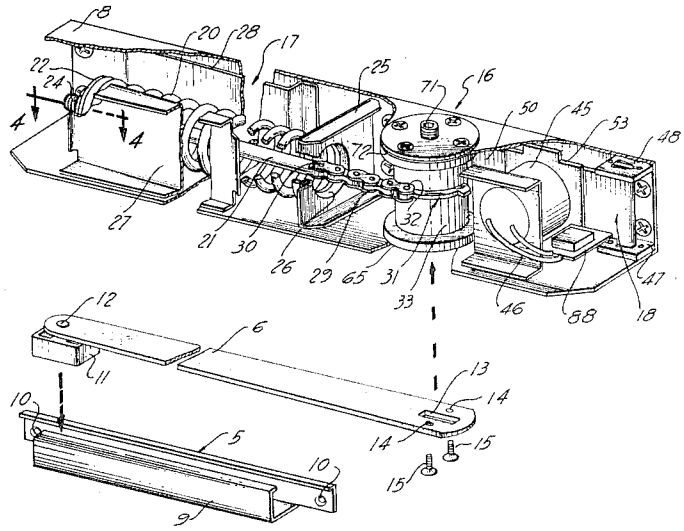


FIG. 1.

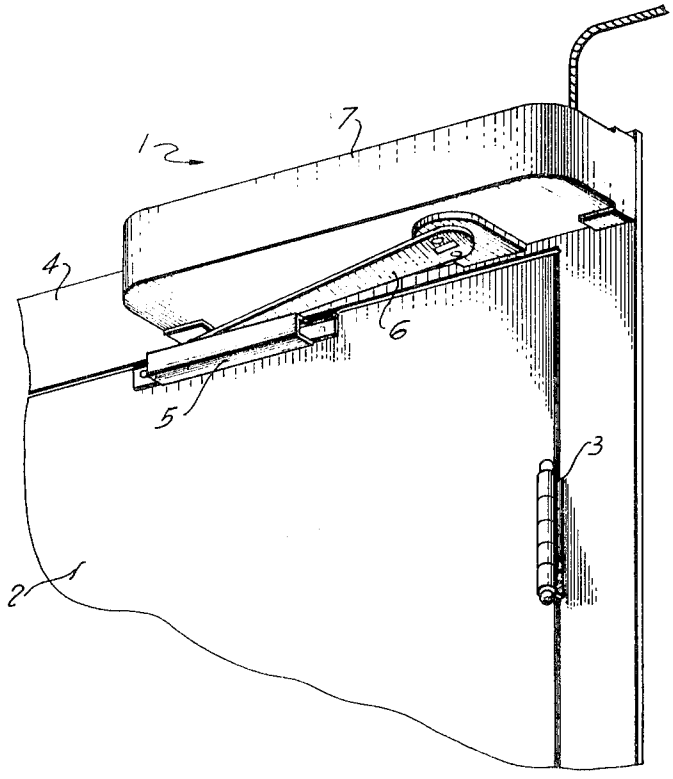


FIG. 2.

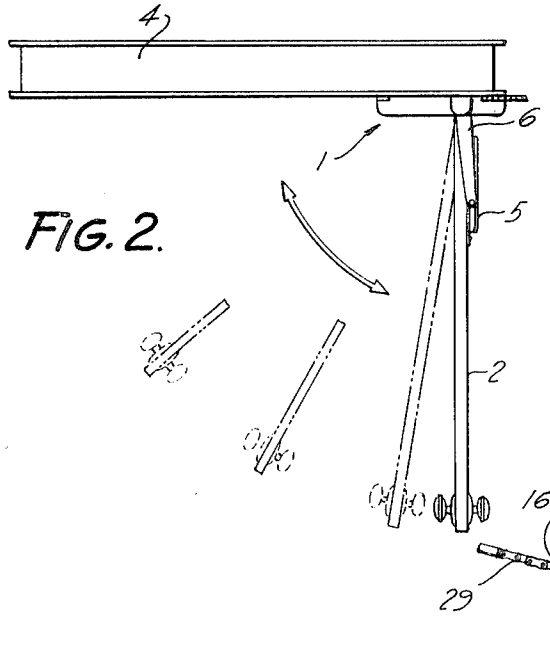
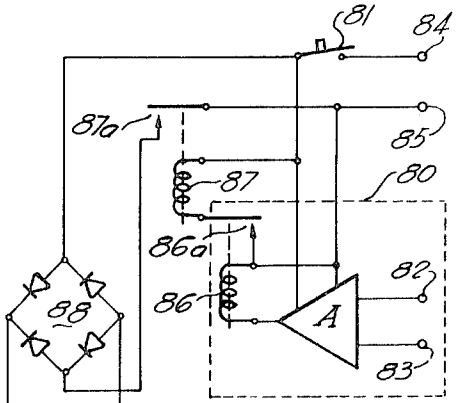


FIG. 12.



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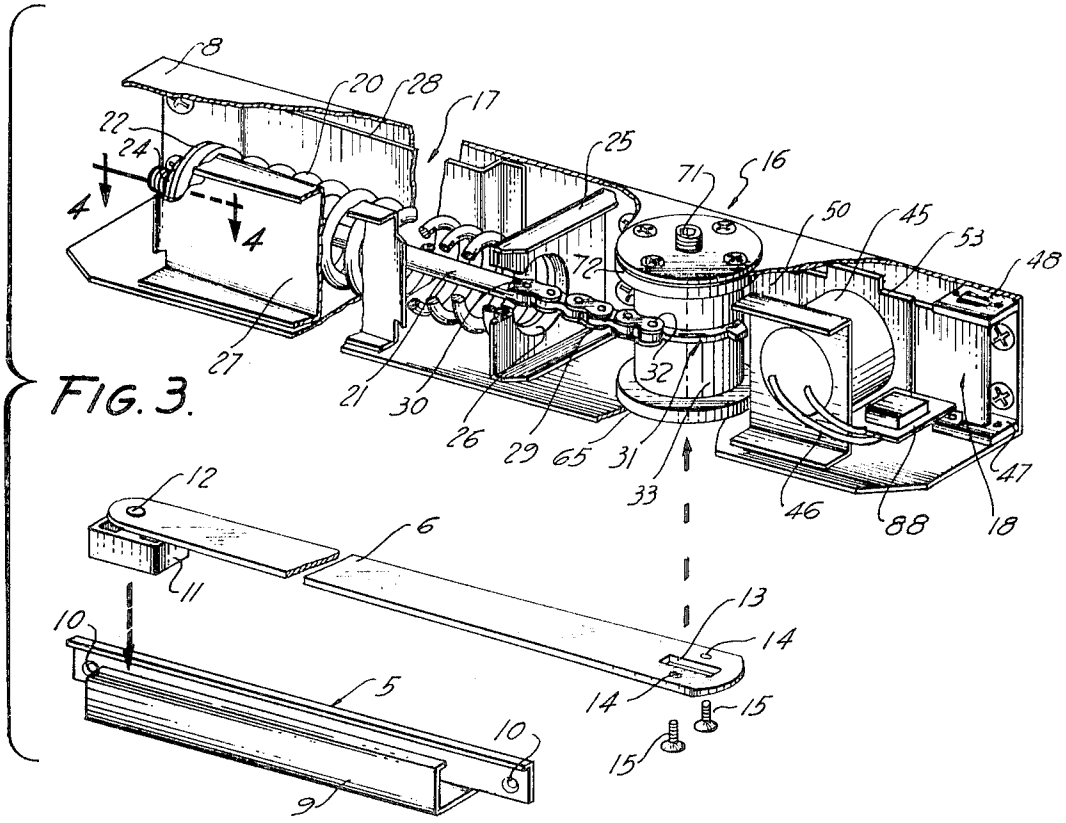


FIG. 3.

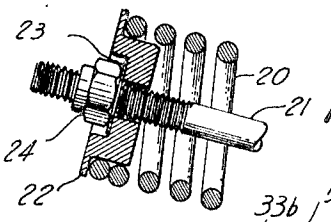


FIG. 4.

FIG. 5.

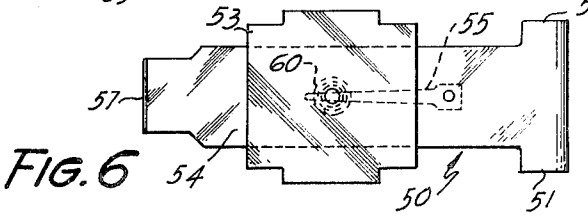


FIG. 6

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FIG. 7.

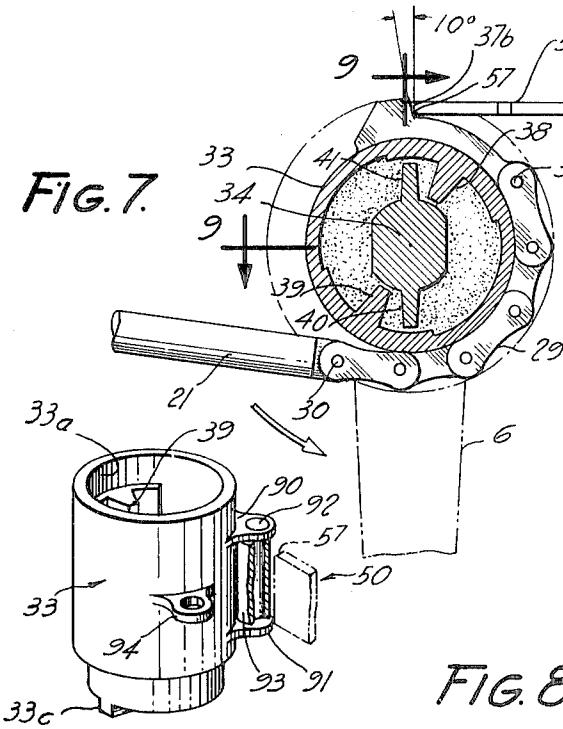


FIG. 8.

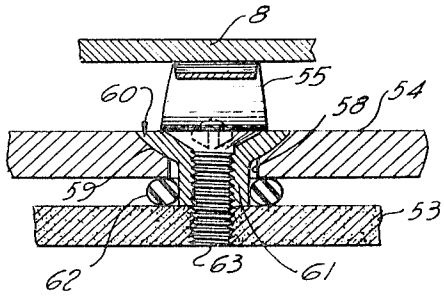


FIG. 13.

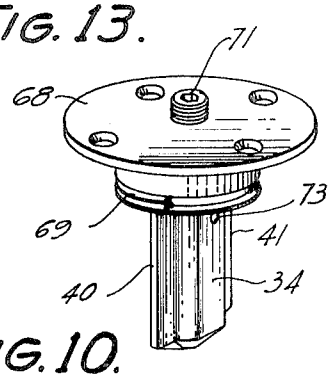


FIG. 10.

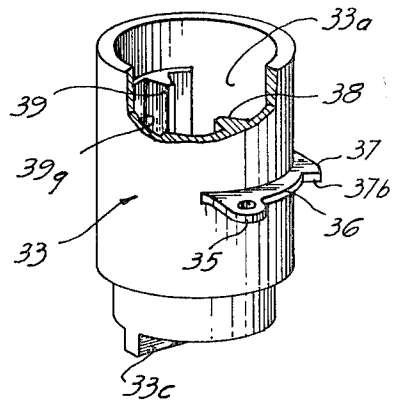


FIG. 11.

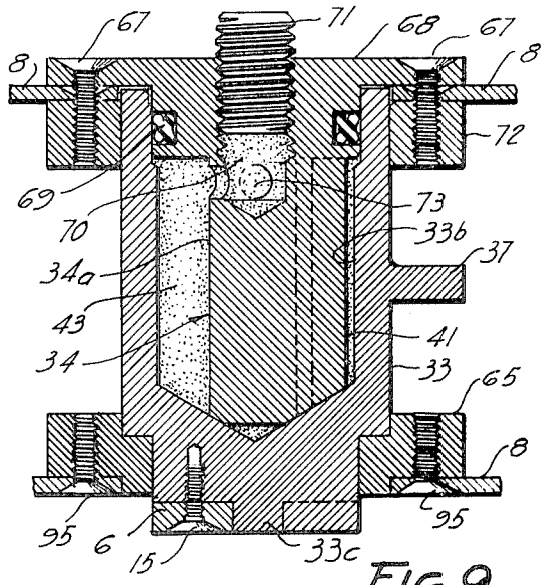


FIG. 9.

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ELECTROMECHANICAL DOOR HOLDER-CLOSER

The door holder-closer features a frame mounted dashpot having a rotor and an internally housed stator preferably containing a viscoelastic medium such as unvulcanized silicone rubber or "bouncing putty." The rotor carries a cam element and a connecting element.

An electromagnet and lever assembly is closely associated with the dashpot on the frame. This assembly includes a magnetic armature coupled to the electromagnet. The armature is supported upon a pivoted lever, a portion of which projects into the rotating path of the cam to engage the cam.

A coil spring also mounted on the frame is coupled to the connecting element supported by the rotor to exert a rotational force on the rotor in the door closing direction.

A door arm and track assembly, including a track fixed to the door and an arm coupled to a track slide, drives the rotor responsively with the movements of the door.

When the door is opened to the door hold position and the electromagnet is energized, the lever engages the cam to maintain the door in this position. When the lever-cam engagement is overcome either by a manual closing force or deenergization of the electromagnet, the door is closed.

BACKGROUND OF THE INVENTION

In recent years an increased emphasis has been placed on the need for improved safety devices to minimize the loss of life and property occurring from the products of combustion. In many buildings, office and otherwise, it is desired to maintain doors in an open position during normal business hours. However, in response to the occurrence of a hazardous condition such as smoke or fire, it is desirable to isolate an unsafe building area by the automatic closure of otherwise open doors.

Accordingly, there is substantial demand for a simple and effective door holder-closer which is operative to maintain a door in a desired open position, but additionally which will automatically close the door quickly and reliably in the event of a fire so that the products of combustion may be isolated.

Such a door closer should also be fail-safe in the sense that a power failure, or other circuit malfunctioning of the condition detection system will automatically close the door. Additionally, upon restoration of power or correction of the circuit malfunction, the door holder-closer must be operational without the necessity for a serviceman to obtain access to the device to replace or rearm components.

DESCRIPTION OF THE PRIOR ART

The prior art is prolific in door holder or closer mechanisms which employ chains, coil springs and dashpots. For example, U.S. Pat. Nos. 766,386; 980,342; 1,052,019; 1,447,630; 1,898,609 and 2,741,793 are typical of these devices. However, none of the foregoing art is advantageously associated with electromagnets or other electrical means for providing the operational functions herein set forth. Other art, such as U.S. Pat. Nos. 1,430,192; 1,701,202; 1,829,312; 3,063,086 and 3,415,562 disclose electromagnetic assemblies applied to door controls. None of these latter patent designs offer the simple and effective mode of operation characterized by the door holder-closer of this invention.

SUMMARY OF THE INVENTION

The structure for the preferred embodiment of the door holder-closer is briefly described in the Abstract and is specifically disclosed in the detailed description appearing hereinafter. It is important to note, however, that this device has the following advantages over other types of door holder-closers available commercially:

1. The unit is compact with all components contained within the same case.

2. The unit contains an electric hold open means, an energy storage (spring) mechanism for door closing, a speed damping means to prevent door slamming, and means for adjusting door closing forces and speeds.

3. The door holder-closer operates as a conventional door closer when power is cut off.

4. The complete door holder-closer can be surface mounted to the frame of a door with a minimum of labor.

5. The basic design contains a minimum of parts and is relatively economical to manufacture.

6. No liquid or oil is used in the dashpot portion. Oils can stain or damage woodwork, carpets, walls and floors in case of leakage which inevitably occurs before a unit wears out.

7. The unit employs a single arm sliding in a door track which is less prone to vandalism than door holders with double jointed arms. Also, appearance is improved from an esthetic standpoint.

DETAILED DESCRIPTION OF THE DRAWINGS

In order that all of the structural features for attaining the objects of this invention may be readily understood, reference is herein made to the following drawings, wherein:

FIG. 1 is a view showing the application of the electromechanical door holder-closer of this invention to a flush door which is supported by butt hinges upon a metal door frame;

FIG. 2 is a plan view showing the door of FIG. 1 held in an open position by the door holder-closer;

FIG. 3 is an exploded perspective view of the door holder-closer with the cover removed and parts of the supporting frame broken away to show internal structural details;

FIG. 4 is a section view taken along line 4—4 of FIG. 3 which shows the spring tensioning mechanism;

FIG. 5 is a view which shows the link chain, the dashpot rotor and stator, and the electromagnet and lever assembly in the door closed position;

FIG. 6 is a view of the electromagnet lever assembly;

FIG. 7 is a view which shows the link chain, the dashpot rotor and stator, and the electromagnet and lever assembly in the door open position;

FIG. 8 is a section view along line 8—8 of FIG. 7 which shows the mechanism for enabling the magnetic armature to pivot relative the lever so that the armature can establish firm contact with the electromagnet;

FIG. 9 is a section view taken along line 9—9 of FIG. 7 which shows the internal details of the dashpot in the door open position;

FIG. 10 is a perspective view of the dashpot stator;

FIG. 11 is a perspective view of the dashpot rotor;

FIG. 12 is a fail-safe schematic circuit which shows the connection of the electromagnet of the door holder-closer for manual switch operation or alternative operation by condition detecting means; and

FIG. 13 is an alternative modification employing a roller for the cam of the dashpot rotor.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, the electromechanical door holder-closer 1 of this invention is shown typically applied to a flush door 2 which is supported by a plurality of butt hinges 3 (only one of which is shown) upon a conventional metal door frame 4.

In general, door holder-closer 1 includes a track 5 within which reciprocates a slide block (11 of FIG. 3). The left end of standard arm 6 is coupled to the slide block. The right end of standard arm 6 is coupled to a dashpot which forms a part of an electromechanical combination which includes a coil spring, link chain, the dashpot, and an electromagnetic lever assembly housed within cover 7.

In the usual preferred installation of door holder-closer 1, cover 7 and its contained components are fixedly positioned on the header trim of door frame 4, and track 5 is fixedly positioned immediately below cover 7 adjacent the upper edge of flush door 2, as is shown in FIG. 1.

With the foregoing disposition of components, the opening of door 2 to an approximate 90° opening, as is shown in FIG. 2, translates the door movements into a corresponding movement of the dashpot rotor connected to the right end of arm 6. Arm 6 is also capable of exerting a closing force on door 2 by means of the components contained within cover 7, the details of which components will be described hereinafter.

Reference is now made to FIG. 3, which is an exploded perspective view of the door holder-closer with cover 7 removed and parts of the supporting frame 8 broken away to show internal structural details.

In particular, track 5 comprises a channel section 9, the backwall of which is formed with a plurality of apertured door mounting flanges 10.

Slide block 11 (which may be advantageously fabricated of Delrin) is pivotally supported on the left terminal end of arm 6 by means of slide block pivot pin 12. The right end of arm 6 is formed with an elongated slot 13 which receives a mating rotor stem or spindle (33c in FIG. 9), and two screw holes 14 through which arm screws 15 pass to fix arm 6 on dashpot 16.

Supporting frame 8, which is enclosed within cover 7, houses the following principal components; namely, dashpot 16, spring coil assembly 17, link chain 29, and electromagnet and lever assembly 18.

Referring now to FIGS. 3 and 4, spring assembly 17 includes compression coil spring 20 which envelopes spring rod 21. The left end of spring rod 21 is threaded (FIG. 4) so that the adjacent end of spring 20 is held by spring retainer 22. Retainer 22 is adjustably mounted relative to rod 21 by washer 23 and spring tension adjusting nut 24.

The right end of coil 20 is supported on spring support plate 25 from which is formed a circular flange 26. Flange 26 receives the adjacent contacting compression coil spring. Accordingly, spring 20 is positioned relative to rod 21 by spring retainer 22 and spring support plate 25 so that adjustment of nut 24 can vary the static compression force generated by spring 20.

Lateral movement of spring 20 relative to frame 8 are limited by front spring guide 27 and rear spring guide 28, which guides are both included as part of spring assembly 17.

The right end of spring rod 21 (FIG. 3) is coupled to link chain 29 by connecting pin 30. The right end of link chain 29 (FIG. 3) is coupled to connector and cam flange 31 by connecting pin 32.

Connector and cam flange 31 is an integral part of dashpot rotor 33. FIG. 5 shows a plan view of connector and cam flange 31 and the internal details of dashpot 16 in the door closed position of FIG. 1. In particular, connector and cam flange 31 is fixedly attached to the outer cylindrical surface of rotor 33 which houses centrally disposed stator 34. Connector and cam flange 31 includes an ear 35 (see FIG. 11), which receives pin 32, and lever cam 37. Rib 36 connects ear 35 to lever cam 37 (FIG. 11).

Lever cam 37 includes a leading edge 37a disposed at a large inclined angle and a trailing edge 37b disposed at a sharp angle.

Rotor 33 supports a pair of integral vanes 38 and 39 which rotate with the rotor. Stator 34 is formed with a pair of stator vanes 40 and 41. The stator and its vanes remain fixed at all times relative supporting frame 8.

The interior dashpot cavity existing between rotor 33 and stator 34 contains a viscoelastic plastic solid 43. This material may preferably be either a natural or synthetic unvulcanized rubber, or an elastomericlike material known as "bouncing putty."

With respect to synthetic rubbers, any unvulcanized silicone rubber, either in gum form or, alternatively, a form which includes additive constituents to form the gum into an unvulcanized rubber, may operate in dashpot 16.

The inventor has satisfactorily used General Electric "bouncing putty" SS 91 and General Electric unvulcanized silicone rubber SE-100U as dashpot filling mediums 43.

Plastic solids which do not display viscoelastic properties, such as paste, grease and clay, are generally unsatisfactory because an "elastic type" damping is more satisfactory.

It should be noted that the interior periphery of rotor 33 (excluding those peripheral positions occupied by vanes 38 and 39) has two different radii. Rotor sections 33a, 33b, 33d and 33e have a greater wall thickness than rotor sections 33f and 33g. Correspondingly, stator 34 (with the exception of the vanes 40, 41) is formed by a generally circular central shaft which is modified to include two flat portions 34a and 34b.

Accordingly, as rotor 33 turns in response to the movement of door 2, the gaps between rotor vanes 38, 39 and stator 34 increase as the rotor vanes rotate adjacent stator flats 34a and 34b. Likewise, the gaps between stator vanes 40 and 41 and rotor 33 increases as these stator vanes are adjacent rotor sections 33f and 33g.

These variances in the gaps of the passages or clearances existing between the rotor and stator enable greater dashpot damping action during that portion of the opening and closing of door 2 from approximately 0° to 15° and from approximately 70° to 90°. In the intervening angular positioning of the door, namely from 15° to 70°, a larger passage or clearance exists between the rotor and stator and, therefore, substantially less dashpot resistance is met.

Maximum damping is desired in the extreme door positions at closing or at the nearly fully open position. This damping corresponds to the "back checking" action of a conventional hydraulic oil type door closer. A minimum of "speed checking" is desired when the door is in the intermediate door opening and closing positions.

As is shown in FIGS. 3 and 5, electromagnet and lever assembly 18 is closely associated with dashpot 16. In particular electromagnet 45 is supported on frame 8 by electromagnet support plate 46 (FIG. 3). Frame 8 also supports a bottom lever pivot plate 47 and top lever pivot plate 48. Each pivot plate is formed with a generally tapered slot 49 (FIG. 5) which increases in width from right to left to enable pivoting of lever 50 with respect to the plates.

As is best shown in FIG. 6, lever 50 includes a pair of pivot extensions 51 and 52 which are received within the pivot slots of pivot plates 47 and 48, respectively. A magnetic armature 53 is pivotally supported relative the central body portion 54 of lever 50 by pivot structure which will be described hereinafter in detail with regard to FIG. 8. Generally speaking, this pivot structure enables relative pivoting between magnetic armature 53 and lever 50 so that the armature can make firm contact with the magnetic core of electromagnet 45 when this electromagnet is energized. Thus, the movements of lever 50 do not introduce misalignment airgaps between armature 53 and electromagnet 45.

Body 54 of lever 50 also carries lever spring 55, the right end of which is fixed to lever 50 by rivet 56 and the left end of which is curved so that it may slide relative the upper surface of lever 50 (FIG. 5). Lever spring 55 is sandwiched between lever 50 and supporting frame 8, as shown in FIG. 5, so that this spring always exerts a relatively small downwardly directed force on lever 50. This force causes the lever to drive armature 53 into contact with the upper surface of electromagnet 45. The left end of lever 50 is beveled to form a lever cam surface 57 (FIG. 6) which is inclined at about 10° relative a vertical line, as shown in FIG. 7.

As door 2 is manually opened to and beyond the hold position shown in FIG. 2, arm 6 moves to and beyond the counterclockwise position shown in FIG. 7, thereby rotating rotor 33 in the counterclockwise direction. This rotation of rotor 33 causes a compression of coil spring 20 inasmuch as spring rod 21 is carried to the right by link chain 29 which moves responsively with rotor 33.

As rotor 33 rotates in a counterclockwise direction, the leading edge 37a of lever cam 37 elevates lever 50 by camming action.

Thereafter, if the manual opening force is removed from door 2, spring 20 will drive rotor 33 in a clockwise direction so

that the trailing edge 37*b* of cam 37 will engage and lock lever cam surface 57.

If electromagnet 45 is energized, magnetic armature 53 will exert sufficient holding force on lever 50 so that cam engagement between surfaces 37*b* and 57 will be maintained. Thus, door 2 will be held in the hold position of FIG. 2 so long as electromagnet 45 is energized.

The holding force of armature plate 53 may be overridden, however, by the application of a manual closing force on door 2. In this event, notwithstanding the energization of electromagnet 45, lever 50 will be disengaged from cam 37 and accordingly spring 20 will cause rotor 33 to rotate until door 2 is closed relative its frame 4.

FIG. 8 shows the mechanism for enabling magnetic armature 53 to pivot relative lever 50 so that the armature can establish firm contact with electromagnet 45. This firm contact is necessary in order to eliminate any airgaps which might otherwise exist between armature 53 and the core of electromagnet 45. These airgaps would attenuate the holding force of the electromagnet.

In particular, body section 54 of lever 50 is formed with an enlarged countersunk central hole 58 having a spherical surface 59. Lever pivot 60 is inserted within hole 58; and this pivot is formed with a spherical surface which mates with the countersunk spherical surface 59 of lever body 54. Due to the fact that shank 61 of lever pivot 60 has a relatively smaller diameter than the adjacent sections of hole 58, lever pivot 60 is capable of movement relative body 54. Rubber O-ring 62 is sandwiched between lever body 54 and magnetic armature 53; and pivot screw 63 couples lever pivot 60 and magnetic armature 53 to one another.

Accordingly, the foregoing arrangement enables magnetic armature 53 to pivot relative lever 50; thus, the various camming positions of lever 50 do not disrupt the aligned positioning of armature 53 with respect to electromagnet 45.

FIGS. 9 through 11 show various structural details for dashpot 16. In particular, rotor 33 (FIG. 9) is supported relative frame 8 by lower bearing 65. Lower bearing 65 is fixed to frame 8 by a plurality of machine screws 95. Stator 34 is supported relative frame 8 by a plurality of screws 67 which engage upper circular flange plate 68 of the stator and also upper bearing 72.

Viscoelastic material 43 is sealed within the cavity of rotor 33 by a quad ring seal 69 which prevents leakage of the material between the sliding rotor and stator surfaces. Stator flange plate 68 is also formed with a threaded bore 70 which receives threaded adjusting screw 71. The lower end of bore 70 communicates with a through hole 73 which leads to the cavity which contains viscoelastic material 43.

In view of the fact that adjusting screw 71 is received within threaded bore 70, the cavity volume available for viscoelastic material 43 may be varied by this screw. Accordingly, screw 70 adjustably varies the damping action of dashpot 16.

The schematic circuit of FIG. 12 shows the electrical connection of electromagnet 45 to effect holding and closing of door 2 in a fail-safe manner of operation. Additionally, the schematic circuitry incorporates a condition responsive detector and amplifier unit 80 which is fail-safe in operation. In particular, if all of the components of the detector and amplifier unit 80 are properly operative, door 2 will remain held in the open position of FIG. 2 in the event of manual closure of control switch 81. If, however, detector and amplifier unit 80 is not properly operative or, alternatively, this unit senses a condition such as flame or smoke, door 2 will be released from the hold position shown in FIG. 2 and closed in response to the closing force exerted by coil spring 20.

The detailed operation of the circuitry of FIG. 12 is as follows:

Assuming detector and amplifier unit 80 is in proper operating condition and that the detector (not shown) input applied to terminals 82 and 83 indicates an absence of a flame or smoke condition, door 2 will be held in the open position of FIG. 2 in response to the manual closure of switch 81. That is, closure of switch 81 applies line voltage from terminals 84 and 85 to amplifier A of unit 80. The application of line voltage to amplifier A energizes amplifier output relay 86, thereby closing normally open contact 86*a*.

The closure of contact 86*a* applies line voltage to the coil of power relay 87. With this occurrence, normally open contact 87*a* is closed, thereby applying line voltage to fullwave bridge rectifier 88 to energize electromagnet 45 with a pulsating direct-current voltage. (The physical position of a module containing bridge 88 is shown in FIG. 3.)

The energization of electromagnet 45 causes magnetic armature 53 to pivot lever 50 downwardly and into locking engagement with the rear edge 37*b* and cam 37 (assuming door 2 is in the hold open position shown in FIG. 2 whereat arm 6 has rotated rotor 33 of dashpot 16 to the positioning of components shown in FIG. 7).

Accordingly, lever 50 holds rotor 33 with sufficient force to overcome the otherwise door closing force exerted by coil spring 20. Thus, so long as electromagnet 45 is energized, door 2 will be held in the open position of FIG. 2.

In the event, however, (1) a slight manual closing force is applied to door 2, (2) switch 81 is opened, (3) unit 80 malfunctions or, alternatively, (4) an undesired condition such as smoke or heat is detected at input terminals 82 or 83, lever 50 will be pivoted from engagement with cam 37 and spring 20 will close the door to the position shown in FIG. 1.

In the situation of (1) above, the manual closing force overcomes the magnetic attraction of armature 53 by electromagnet 45 to disengage lever 50.

In situations (2), (3) and (4) above, electromagnet 45 is deenergized, thereby enabling the camming action of rear edge 37*b* to disengage lever 50 to enable the door to close.

The cam lever combination 37, 50 shown in the previously described figures (particularly FIGS. 5, 7) could possibly become contaminated with grease or oil. With this condition, the coefficient of friction between engaging surfaces 37*b* and 57 could change thus effecting variable disengagement. This would result in a change in the hold open force necessary to release the door.

FIG. 13 shows an alternative roller arrangement which, although it has a coefficient of friction, establishes a more constant force to effect door release. It also wears less with useage.

In FIG. 13, rotor 33 is formed with a pair of separated ears 90 and 91. These ears form a yoke to which pin 92 is fixed. Cylindrical roller 93 is loosely carried on pin 92 to engage surface 57 of lever 50. Thus, holding action in this embodiment is effected between roller 93 and surface 57. Chain 29 (FIGS. 1 and 7) is connected to ear 94.

It should be understood that the structure shown in the drawings is merely typical, and that modifications can be made without departing from the scope of the invention.

What is claimed is:

1. An electromechanical door holder-closer comprising a dashpot having a generally tubular rotor and an internally housed stator with a damping medium disposed between the dashpot rotor and stator, a cam element carried by the dashpot rotor, an electromagnet including a magnetically coupled armature, a pivoted lever mechanically coupled to the armature for movement therewith and with a portion of the lever projecting into the rotating path of the cam for engagement therewith, a spring coupled to the dashpot rotor exerting a rotational force on the rotor in a first direction tending to close a door, and a door arm assembly adapted for attachment to a door and including an arm coupled to the dashpot rotor so that door opening movements tend to rotate the rotor in a direction opposite to the first direction in opposition to the spring force exerted on the rotor and into latched lever-cam engagement when the electromagnet is energized and door closing is effected by the spring force exerted on the rotor when the electromagnet is deenergized with the dashpot rotor then driving the arm to close the door.

2. The combination of claim 1 in which the spring is coupled to the rotor by a link chain which is directly wound on the exterior cylindrical wall of the rotor and in which the winding and unwinding of the chain vary the spring generated forces.

3. The combination of claim 2 including an elongated support frame and in which the spring is positioned at one end of the frame for varying compression by the chain, the dashpot is positioned at an intermediate portion of the frame with the stator fixed to the frame and with the dashpot rotor rotatable relative the frame, the lever and its associated electromagnet and armature being positioned at the other end of the frame, and the rotor having a drive connecting element projecting from the support frame and adapted for connection to the arm of the door arm assembly.

4. The combination of claim 3 in which the damping medium is a viscoelastic plastic solid whereby sudden door exerted or spring exerted forces are initially substantially opposed by the viscoelasticity of the plastic solid.

5. An electromechanical door holder-closer comprising a dashpot having a generally tubular rotor and containing an internally housed stator with a damping medium disposed between the dashpot rotor and stator, a latching element carried by the rotor, an electromagnet, an actuating lever movable in response to the energization and deenergization of the electromagnet and with a portion of the lever projecting into the rotating path of the latching element for engagement therewith, a spring coupled to the rotor exerting a rotational force on the rotor in a first direction, a rotatable stem fixed to the dashpot rotor for rotation therewith on the axis of rotation of the dashpot rotor, and a door arm assembly adapted for attachment to a door and including an arm extending from the door arm assembly directly to the rotor stem so that door opening movements tend to rotate the stem and the rotor in a direction opposite to the first direction and into latching element-lever engagement when the electromagnet is energized to thus hold the door open and door closing is effected by the spring force exerted on the rotor when the electromagnet is deenergized with the dashpot rotor then driving the arm to close the door.

6. The combination of claim 5, in which the spring is coupled to the rotor by a chain which is wound directly on the rotor.

7. The combination of claim 5 in which the damping medium is a viscoelastic plastic solid whereby sudden door exerted or spring exerted forces are initially substantially opposed by the viscoelasticity of the plastic solid.

8. The combination of claim 5 in which the dashpot resistance to rotor movement varies between initial and final angular ranges of relative rotor and stator rotation by increased or decreased clearances between the adjacent rotor and stator surfaces during its intermediate range of angular rotation.

9. The combination of claim 5 in which a magnetizable armature is pivotally coupled relative to the lever with the armature magnetically coupled to the electromagnet to enable the armature to establish close contact with the attracting surfaces of the electromagnet.

10. The combination of claim 9 in which a biasing element drives the lever and armature toward the electromagnet.

11. An electromechanical door holder-closer contained within a housing comprising a dashpot having a tubular, generally cup-shaped rotor and an internally housed stator containing a damping medium inserted within the rotor, the stator including a control shaft fixed to the housing with one or more vanes projecting from the shaft to close positioning with the inside wall of the rotor, a cam element integral with and carried by the rotor, an electromagnet including a magnetically coupled armature, a pivoted lever mechanically coupled to the armature for movement therewith and with a portion of the lever projecting into the rotating path of the cam for engagement therewith, a coil spring, a rod and a link chain coupling the spring to the rotor for exerting a rotational force on the rotor in a first direction, and the rotor including stem means projecting from the housing and adapted for coupling to a door so that door opening movements tend to rotate the rotor in a direction opposite to the first direction and into latched lever-cam engagement when the electromagnet is energized.

12. The combination of claim 11 in which the magnetic holding force is amplified by an arrangement in which the end of the lever is pulled into a wedging position against the cam with the electromagnetic force being applied to the lever at about a right angle to the releasing force applied to the end of the lever.

13. The combination of claim 11 in which the cam element is a roller rotatively supported relative to and on the rotor.

14. A stationary and fixed door closer for use with a closure adapted for relative movement with respect to a closure frame, comprising a housing fixed adjacent the closure, a coil spring located within the housing, a cylindrical dashpot located within the housing including an internal stator fixed to the housing enveloped by a movable rotor having a stem accessible from outside the housing, the stem rotating on the same axis as the dashpot rotor, means coupling the spring to the rotor so that the rotor is responsive to the spring generated forces in a direction tending to close the door, arm means supported by the closure and coupled to the rotor stem whereby the rotor position is also responsive to the position of the closure relative the frame, and means for locking the dashpot rotor relative the dashpot stator to hold the door at a desired open position in opposition to a spring closing force.

15. A stationary and fixed electromechanical door holder-closer for use with a closure adapted for relative movement with respect to a closure frame, comprising a housing containing the door holder-closer and fixedly mounted adjacent the closure, a spring located within the housing for exerting a closing force on the closure, dashpot damping means located within the housing coupled to the spring for controlling the spring exerted closing speed of the door, a drive spindle coupled to the spring-damping means subcombination with the drive spindle being rotatable on a fixed axis and also accessible through an opening in the housing, apparatus located within the housing and being electromagnetically energized to disable the spring-damping means subcombination from closing an otherwise open closure relative the frame by yieldingly locking the drive spindle from rotation on its axis and the apparatus also being electromagnetically deenergized to enable the spring-damping means subcombination to close the closure relative the frame by unlocking the drive spindle, arm means carried by and fixed to the closure and connected to the door holder-closer drive spindle to rotate with the drive spindle in response to closure movement whereby the closure is held open if the apparatus is electromagnetically energized and with the closure being closed if the electromagnetic apparatus is deenergized or if the yielding lock of the energized electromagnetic apparatus is manually overcome by a force applied to the closure, the electromagnetically energized apparatus locking the drive spindle to hold the door open by a relatively short latching torque arm whose length is confined entirely within the inside dimensions of the holder-closer housing, and in which the latching torque is manually overcome by a relatively longer torque arm whose length includes components external to the housing and coupled to the closure.

16. The combination of claim 15 in which the latching torque arm does not exceed the maximum external dimension of the dashpot, and in which the relatively longer torque arm includes the arm means carried by and fixed to the closure and connected to the drive spindle.

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