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MOUNTING MEANS FOR A DOOR CLOSER

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FIG. 1

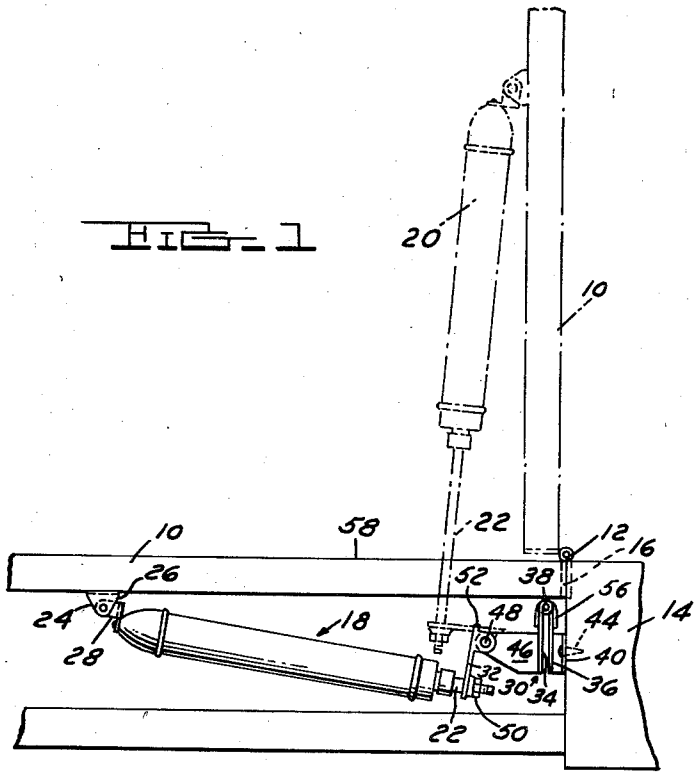


FIG. 3

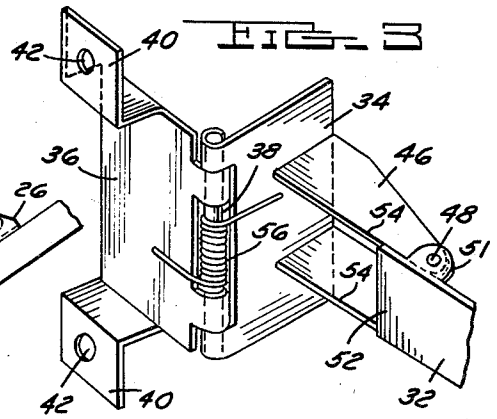
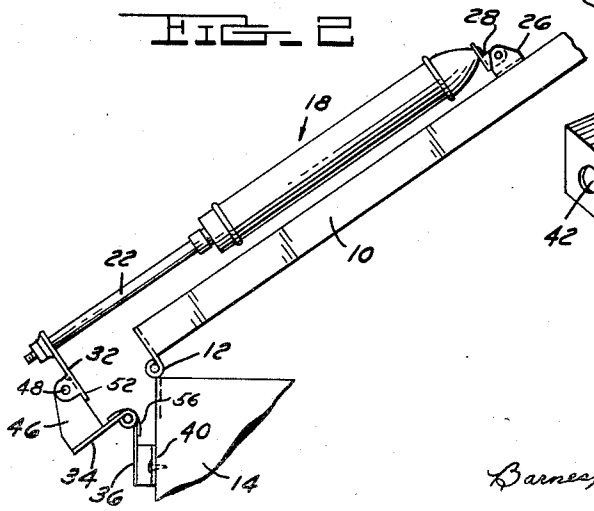


FIG. 2



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MOUNTING MEANS FOR A DOOR CLOSER

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5 Claims. (Cl. 16—163)

This invention relates to a mounting bracket for a hydraulically operated door closer.

Conventional hydraulically or pneumatically operated door closers of the type frequently used for light-weight doors, such as screen and storm doors, usually include a cylinder in which a spring-biased piston is axially movable. The piston connects with an operating rod which projects axially out of one end of the cylinder. The door closer is usually mounted for operation by pivotally connecting the free end of the piston rod with the door jamb at or near the hinged edge of the door and pivotally connecting the opposite end of the cylinder with the door itself at a point spaced from the hinged edge thereof. The present invention has to do with a mounting bracket for a door closer of this general type as distinguished from the heavy-duty type door closer which usually includes a hydraulic mechanism and a pair of pivotally connected links which interconnect the door with the door jamb.

One of the objectionable features of door closers of the type first mentioned above is that usually the closer is mounted such that, after the door is opened to a position substantially less than 180° from the closed position of the door, the cylinder swings with the door about the door hinges as an axis to a position wherein the extended piston rod abuts laterally against either the door jamb or the hinged edge of the door. This engagement between the piston rod and the edge of the door or the jamb prevents the door from being opened further. Under ordinary conditions, this arrangement may perhaps be satisfactory, since engagement of the piston rod with the door edge or the jamb provides a stop for limiting the opening movement of the door. However, under other conditions such as in the case of a heavy wind and the like, it often happens that the force tending to open the door is relatively great, sufficiently strong in many instances to cause bending of the piston rod around the edge of the door or the jamb. Or if the piston rod is sufficiently rigid to resist bending, it often happens that the wind is sufficiently strong to pull the mounting screws of the door closer out of the door or jamb.

It is an object of this invention to provide a mounting bracket for a door closer which is constructed to provide a yieldable stop mechanism for limiting the extent to which the door may be opened under normal conditions but which permits swinging the door to a fully opened position without damaging the door closer when the force tending to open the door exceeds that to which the door is subjected under normal conditions of opening and closing.

More specifically, this invention contemplates an arrangement for attaching a pneumatic or hydraulic door closer to a door and a jamb in the form of a specially constructed bracket comprising an assembly of two hinges one of which is a limited hinge and freely operable and the other of which is biased to a closed position by a relatively heavy spring so that it can be opened only by the application of a substantial force to one of its hinge members. These hinges are arranged such that the freely operable hinge comes into play when the door is

initially opened and the spring-biased hinge comes into play when the door is opened to an extent beyond that permitted by the limit of the freely operable hinge. The bracket is furthermore designed to permit swinging the door open through 180° or at least sufficiently to permit the damaging force of the wind to be expended by sliding off the face of the door without causing any bending action between the door closer and the door jamb.

In the drawing:

Fig. 1 is a more or less diagrammatic view showing the mounting bracket of this invention arranged in conjunction with a door and a door closer and showing the parts in dotted lines when the door is opened to a position substantially 90° from the closed position of the door.

Fig. 2 is a view similar to Fig. 1 and showing the position assumed by the various parts of the mounting bracket when the door is opened to a position substantially beyond that shown by dotted lines in Fig. 1.

Fig. 3 is a fragmentary perspective view of the mounting bracket of this invention.

Referring to the drawing and particularly to Fig. 1, there is illustrated a door **10** which is mounted as by means of hinges **12**, on a door jamb **14** for pivotal movement about the vertical edge **16** of the door. Door **10** is preferably of light-weight construction such as may be employed for a screen door or a storm door. There is associated with door **10** a door closer generally referenced **18** which includes a cylinder **20** in which is operable a piston (not shown) which connects with a piston rod **22**. In the arrangement illustrated cylinder **20** is pivotally connected at the end opposite rod **22** to the door by means of a hinge bracket **24** of conventional construction which includes two pivotally connected hinge members **26** and **28** one of which is fixedly secured to the door and the other of which is secured to the end of the cylinder. The outer end of piston rod **22** is connected with the door jamb **14** by the hinge bracket **30** which will be presently described. As the description proceeds it will be apparent that, if desired, the door closer may be mounted such that the free end of rod **22** is connected to the door by the bracket **24** and the opposite end of the cylinder connected with the door jamb by bracket **30**. That is to say, the closer may be connected with a door and jamb in a position opposite to that illustrated in Fig. 1.

Referring to Fig. 3, it will be observed that the bracket **30** of this invention is comprised essentially of three hingedly connected members **32**, **34** and **36**. Members **34** and **36** are generally in the form of plate members, as in a conventional butt, which are hingedly connected together by a pintle **38**. Member **36** is fashioned with a pair of offset mounting flanges **40** provided with screw holes **42** for securing the member **36** to the door jamb **14** as by screws **44**. Hinge member **34** is provided with a pair of spaced apart legs **46** which project perpendicularly from the plane of member **34**. At their free ends legs **46** are hingedly connected as by a pintle **48** to one end of the hinge member **32**, the other end of the hinge member being apertured for connection with the free end of piston rod **22** as by a nut **50**. Member **32** may be advantageously formed with a pair of aligned ears **51** for reception of the ends of pintle **48**. Pintles **38** and **48** are arranged such that the hinge members pivot on parallel axes.

The hinge assembly provided by the members **34** and **32** and the pintle **48** is in the nature of a limited hinge. Any suitable limited hinge construction may be employed for interconnecting these members. For the purpose of illustration, this limited hinge construction is shown in the form of an extension **52** on member **32** which, when the member **32** is pivoted to a position aligned substantially perpendicular to the plane of member **34**, abuts

against the edges 54 of legs 46 to prevent further pivotal movement of member 32. It will be obvious, of course, that other constructions may be employed for providing a positive stop between the members 32 and 34 which limit the extent of relative pivotal movement of these members. The members 32 and 34 are freely pivotable relative to each other within the range of movement permitted by the stop member 52. Members 34 and 36, however, are biased to a closed or juxtaposed position by a relatively heavy torsion spring 56 which surrounds pintle 38 and which has one end acting against plate 34 and the other end acting against plate 36. Spring 56 normally biases members 34 and 36 to the closed position shown in full lines in Fig. 1.

Bracket 30 is mounted on the jamb 14 with the pintles 38 and 48 extending vertically. The bracket is furthermore mounted such that pintle 38 is disposed adjacent the inner face of door 10. Hinge members 32, 34 and 36 are proportioned in size and the bracket is mounted on the door jamb such that the distance between the mounting screws 44 and the piston rod 22 is greater than the distance between the mounting screws 44 and the inner face 58 of the door when the door is swung substantially 180° from the closed position shown in full lines in Fig. 1.

When the door closer 18 and hinge bracket 30 are connected together and mounted on the door 10 and jamb 14, respectively, as described above, it will be observed that the door may be swung open to the dotted line position in Fig. 1 with substantially little effort. As the door is swung open, member 32 pivots outwardly about pintle 48 and the piston within cylinder 20 moves in a direction outwardly of the cylinder in a manner controlled by the fluid and the by-pass valve within the piston, the cylinder being permitted to pivot relative to the door by the hinge bracket 24. When the door is opened to an extent such that it occupies the position shown by dotted lines in Fig. 1, that is, the position removed substantially 90° from the closed position of the door, hinge member 32 is pivoted freely to a position wherein extension 52 abuts against the edges 54 of legs 46. Until this point in the movement of the door is reached, it will be observed that no force is applied to member 34 which would tend to operate the hinge provided by members 34 and 36. However, when the position illustrated by dotted lines in Fig. 1 is reached, member 32 is prevented from pivoting further relative to member 34 and further pivotal movement of the door in an opening direction causes members 32 and 34 to behave as a rigid link and the force exerted by piston rod 22 on the member 32 in a clockwise direction (as viewed in Fig. 1) is applied to the members 34 and 36 at the pintle 38. This further opening movement is yieldably resisted by spring 56.

Under ordinary conditions of opening, the door 10 will open more or less freely to the position shown by dotted lines in Fig. 1; and since the spring 56 is a relatively heavy one, there will be at least a momentary halt to the opening movement of the door when it reaches this position. Therefore, under ordinary conditions of use, the door will be permitted to open freely to a position removed substantially 90° from the closed position. If for some reason the door should become unlatched and swung open by a light wind, the door might perhaps swing open to the position illustrated by dotted lines in Fig. 1. On the other hand, if the door should become subject to a relatively heavy wind, a wind sufficiently strong to overcome the resistance of spring 56, then the member 34 will be caused to pivot relative to the fixed member 36 and the door would be permitted to swing to the position shown in Fig. 2 or even further to a position removed substantially 180° from the closed position of the door shown in Fig. 1.

It will be observed that, when the door is swung open to the full position the piston rod 22 and cylinder 20 swing clear of the door jamb 14 and the door 10 and

therefore there will be no tendency for the piston rod to bend around the door or the jamb or to bind within the cylinder. When the force tending to hold the door open is released, the spring that is conventionally provided within cylinder 20 urges the piston within the cylinder to the inner end of the cylinder thereby retracting rod 22 and causing the door to swing to the closed position illustrated in Fig. 1.

It will thus be seen that we have provided a simply constructed mounting bracket for a pneumatic or hydraulic door closer which yieldably limits the opening movement of the door to a position which renders the door opening readily accessible but which, at the same time, is constructed such as to permit the door to open the full extent permitted by the hinges on which the door is mounted when a force is applied to the door substantially greater than that to which the door is subjected under normal conditions of operation. With the bracket of this invention the possibility of the piston rod being bent or the door closer being pulled off its mounting as by a heavy wind is therefore eliminated.

We claim:

1. Means for mounting a door closer of the telescoping type on a door and a door jamb comprising a base plate adapted to be secured to a door jamb, a hinge member adapted to be fixedly connected with the door closer and extending transversely of the axis of the door closer, an intermediate link pivotally connected with said base plate and hinge member along parallel axes, means pivotally biasing said link to a position overlying said base plate, the pivotal connection between said hinge member and link being offset from the axis of the door closer and permitting free pivotal movement of said hinge member relative to said link, and cooperating abutment means on said hinge member and said link for limiting the pivotal movement of the hinge member in one direction on said link to a position wherein the plane of the hinge member is substantially perpendicular to the plane of said base plate when said link is in a position overlying said base plate.

2. The combination set forth in claim 1 wherein said cooperating abutment means serve to limit the pivotal movement of said hinge member in a direction opposite to the direction in which said link is pivotally biased on said base plate.

3. In a mounting wherein a door closer of the type comprising two telescopically arranged members is mounted with one of said members connected with the door and the other with the door jamb adjacent the hinged edge of the door, means for connecting said other member with the door jamb comprising a base plate fixedly mounted on the door jamb adjacent the hinged edge of the door, a hinge member fixedly mounted on said other member of said door closer, said hinge member extending generally transversely of the axis of said telescoping members, a link having a pivotal connection with said base plate along an edge of said base plate adjacent and parallel to the hinged edge of the door, said link also having a pivotal connection with said hinge member along a line offset from the axis of said telescoping members, the axes of said pivotal connections being generally parallel, means pivotally biasing said link to a position overlying said base plate, the pivotal connection between said hinge member and said link permitting free pivotal movement of said hinge member relative to said link, and abutment means acting between said link and said hinge member for limiting the pivotal movement of said hinge member in a direction corresponding to the opening movement of the door to a position wherein the axis of said telescoping members is disposed generally perpendicular to the plane of the door opening defined by said jamb.

4. In a mounting wherein a door closer of the type comprising two telescopically arranged members is mounted with one of said members connected with the door and the other with the door jamb adjacent the

hinged edge of the door, means for connecting said other member with the door jamb comprising a base plate fixedly mounted on the door jamb adjacent the hinged edge of the door, a hinge member fixedly mounted on said other member of said door closer, said hinge member extending generally transversely of the axis of said telescoping members, a link having a pivotal connection with said base plate along an edge of said base plate adjacent and parallel to the hinged edge of the door, said link also having a pivotal connection with said hinge member along a line offset from the axis of said telescoping members, the axes of said pivotal connections being generally parallel, means pivotally biasing said link to a position overlying said base plate, the pivotal connection between said hinge member and said link permitting free pivotal movement of said hinge member relative to said link, and a pair of cooperating stops on said link and hinge member for limiting the pivotal movement of said hinge member relative to said link upon opening of the door to a position wherein the door is pivoted through at least 90° and less than 180° from the closed position, whereby when said door reaches said partially opened position, further opening of the door requires the application of force on the door sufficient to overcome the tendency of said biasing means to hold said link in a position overlying said base plate.

5. Means for mounting a door closer on a door and a door jamb comprising a base plate adapted to be secured

to a door jamb, a hinge member adapted to be fixedly connected with the door closer, an intermediate link pivotally connected with said base plate and hinge member along parallel axes, means pivotally biasing said link to a position overlying said base plate, the pivotal connection between said hinge member and link permitting free pivotal movement of said hinge member relative to said link, and cooperating abutment means on said hinge member and said link for limiting the pivotal movement of the hinge member in one direction on said link to a position wherein the plane of the hinge member is substantially perpendicular to the plane of said base plate when said link is in a position overlying said base plate, said link comprising two perpendicularly related portions, said pivotal connections being disposed at the remote ends of said perpendicularly related portions.

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