

March 6, 1951

M. CARLSON ET AL
DOOR CLOSER MECHANISM

2,544,253

Filed May 11, 1949

Fig. 1

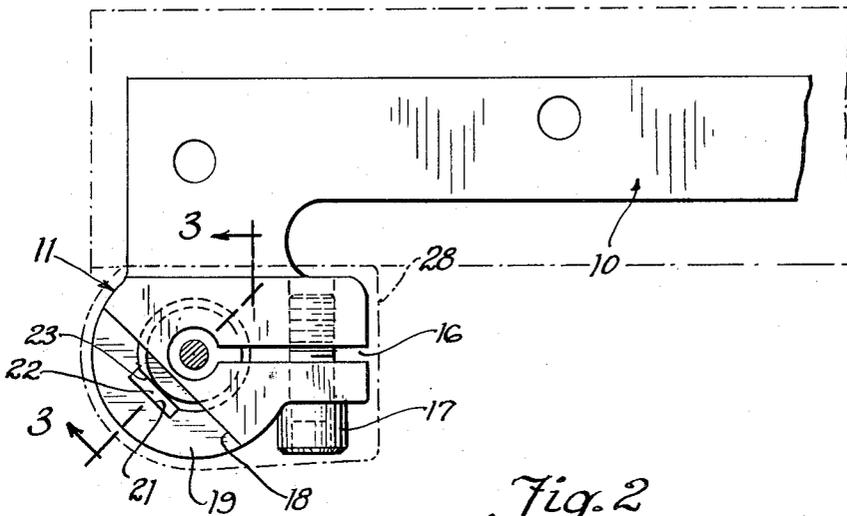


Fig. 2

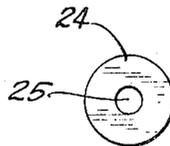
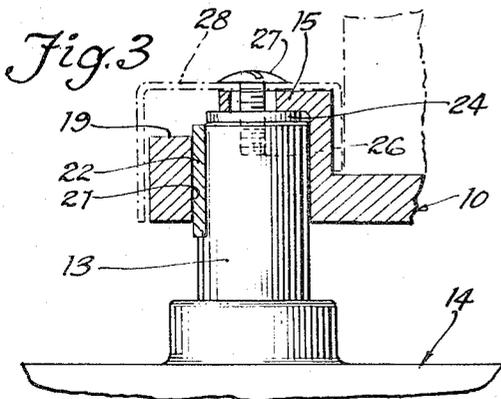
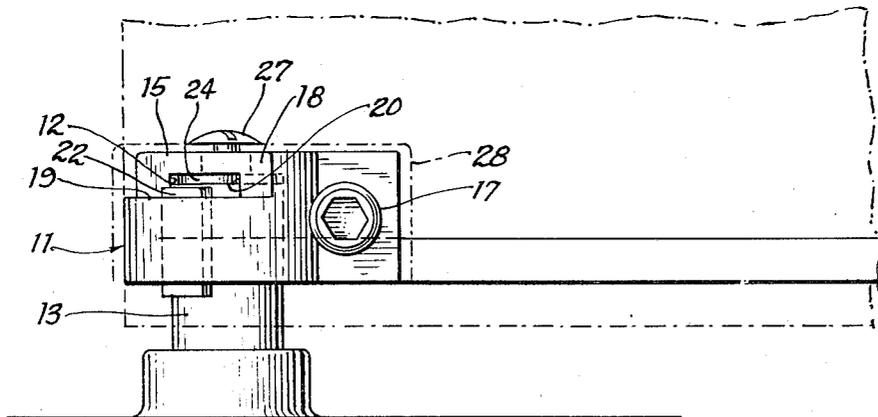


Fig. 4

INVENTORS
Martin Carlson and
Otto D. Michaelson

Sheridan, Davis & Carpill
Attys

UNITED STATES PATENT OFFICE

2,544,253

DOOR CLOSER MECHANISM

Martin Carlson, Brookfield, and Otto D. Michael-
sen, Evergreen Park, Ill., assignors, by mesne
assignments, to George W. Housby, Jr., Chi-
cago, Ill.

Application May 11, 1949; Serial No. 92,576

3 Claims. (Cl. 16-55)

1

This invention relates to improvements in door closer mechanisms. In door closer mechanisms of the type that are mounted in the floor of a building structure, adjacent an edge of the door, an actuating pin or stud generally is provided as a part of the mechanism that projects above the floor level for engagement by an arm secured to the lower edge of the door for supporting the door and for turning the pin as the door is opened. The turning of the pin, generally through cam action stores up energy in a spring structure which effects the return movement of the door to closed position under a cushioning or controlling action of a dash pot, or the like, forming a part of the mechanism.

The arms of the type mentioned, and here under consideration, are provided with heads that are recessed or socketed for receiving the upper portion of the pin. The sockets referred to are formed in the lower side of the arm and do not extend vertically through the head, but are closed at the upper ends, and since substantially the entire weight of the door to which such an arm is secured is transmitted to the upper end of the pin, use of supplementary means for securing the head against downward slipping movement along the pin is eliminated.

Where it becomes necessary to elevate a door slightly to clear the floor due to sagging of the door or due to changes in the structure of the building, it has been common to use shims between the upper end of the pin and the closed upper end of the socket of the head. Insertion of shims or spacers heretofore has required removal of the door from the upper hinge member, as well as from the pin, to provide access to the socket or to the upper end of the pin for placing a shim in position.

One object of the present invention is to provide an improved socketed member for receiving an actuating pin of a door closer mechanism, which, when the head is raised slightly with respect to the pin in elevating the door to an adjusted position above the floor, enables a shim or spacer to be inserted in the socket over the end of the pin without removing the socket from the pin or the door from its hinged supports.

Another object of the invention is to provide a socket arm for a door closer mechanism that is so formed as to permit insertion of a shim or shim laterally into the vertical socket and over the upper end of an actuating pin of a door closer mechanism for retaining the arm and the door supported thereby in an elevationally adjusted position with respect to the floor.

2

An additional object of the invention is to provide an improved door supporting arm for a door closer mechanism that is provided with a clamping head so formed as to permit insertion of a suitable key or spline in position for keying the head to the pin of the door closer mechanism after the door has been hung and properly adjusted relative to the door opening, whereby during the making of such adjustments the door is freely movable on its pivotal axis independently of or uninfluenced by the door closer mechanism.

Other objects of the invention relate to various features of construction and arrangement of parts, which will be apparent from a consideration of the following specification and accompanying drawing, wherein:

Figure 1 is a plan view of a door supporting arm and the associated pin of a door closer mechanism of the type mounted in the floor adjacent one side of the door opening;

Fig. 2 is an elevational view of the structure shown in Fig. 1, a door being indicated by the broken lines;

Fig. 3 is a detail sectional view taken on line 3-3 of Fig. 1; and

Fig. 4 is a plan view of a shim or spacer shown in position in the preceding figures.

In the drawing, 10 indicates generally a door supporting arm of a type adapted to be secured by screws, or the like, in a groove or channel provided in the lower edge of a door. The arm 10 is provided with a laterally offset head indicated generally by numeral 11. The head 11 is provided with a recess or socket 12 open at the lower side of the head which enables the head to be slipped downwardly over the upper portion of a pin or stud 13 of a door closer mechanism. The pin projects above the floor line, as is well known, while the mechanism itself, indicated generally by numeral 14, is supported in a cement casing located within the floor structure. Such a door is provided with an upper hinge member, not shown in the drawing, which, together with the pin 13, provide the pivotal axis about which the door swings.

The head 11 is provided with an upper wall 15 which closes the upper end of the socket, and which wall normally seats on the upper end of the pin 13, whereby the weight of the door supported by the arm is transmitted to the pin. The head 11 shown in the drawing is provided with a kerf 16 which extends from one side to the adjacent side of the socket for rendering the head somewhat contractile upon the tightening of a screw 17, whereby the socket can be tightened

upon the pin. Mere frictional contact between the socket walls and the pin is not relied upon to prevent relative movement of the arm with respect to the pin, for the reason that the swinging of the door to open position must turn the pin, which generally, through cam action, results in the storing up of energy in a spring structure forming part of the door closer mechanism for effecting the closing of the door when the same has been released.

For preventing slippage or relative movement of a head with reference to a pin, the sockets and pins of door closers have heretofore sometimes been formed of rectangular form in cross-section or provided with splines or keys. The formation of a socket which is rectangular in cross-section for coaction with a pin of like shape, requires certain manufacturing steps that are avoided by the present construction. By making the socket and the pin cylindrical, the manufacture of the pin and head is facilitated and the keying of the head to the pin can be accomplished by the mechanism shown in the drawing, after the door has been mounted on the arm and the arm placed upon the pin, and adjustments of the door have been made without thereafter removing the head from the pin. For accomplishing this and an additional purpose to be hereinafter described, an upper portion of the head is provided in effect with a cut-out defined by faces 18 and 19, which intersect in an upper portion of the socket, providing a port 20 communicating with the socket. The socket is provided with a keyway 21 for receiving a key which is rectangular in cross-section and indicated by the numeral 22, while the pin is provided merely with a flat surface 23 which may be formed by a grinding operation, as will be seen. The provision of the cut-out described, renders the upper end of the keyway 21 accessible from the exterior of the head, which, as shown in Fig. 1, is located at one side of the plane of the door. Hence, when the keyway 21 and the flat face 23 of the pin are in registration, the key 22 can be inserted in position for preventing relative rotation of the head with reference to the pin. After insertion of the key 22, the screw 17 is rotated in a direction to tighten the head firmly upon the pin for holding the parts against relative movement.

After the arm has been secured to the door and the latter mounted in position with the head on the pin, a small tool constituting a temporary key, such as a screw driver bit, or the like, can be inserted in the keyway 21 when the door is closed, notwithstanding that the flat surface 23 will not then be in perfect registration with the keyway. The reason for the lack of registration just mentioned, is that the flat face 23 is provided on the pin at such position that the closer mechanism will tend to swing the arm beyond a position parallel with the plane of the door when closed, and thereby exert sufficient force for retaining the door fully closed against the jamb against gusts of wind, etc. After insertion of the temporary key, the door is swung to an open position, which will effect rotation of the pin in a direction for storing up energy in the closer mechanism. The temporary key, such as the screw driver mentioned, is then withdrawn from the keyway and as the pin is rotated by the door closer mechanism, the door is manually rotated toward closed position at a rate to effect registration of the keyway 19 with the flat face 23, at which time, the key 22 is pressed into position for keying the parts together. It will be under-

stood that the movement of the pin by the mechanism is relatively slow, and that a workman can readily swing the door at the proper rate to effect registration of the keyway 21 with the flat face 23 to enable the key to be inserted. In the event the door closer mechanism is of the type which will releasably hold the door in an open position, a temporary key, such as a screw driver bit, can be utilized for temporarily keying the head to the pin for swinging the pin to the hold-open position referred to, after which the screw driver is removed and the door adjusted relatively to the pin to effect registration of the keyway and the flat surface 23, and the key 22 then inserted. The final keying of the head to the key, as described above, is a distinct advantage not only from the standpoint of manufacture of the parts, but for the reason that after the arm 10 has been secured to the door and the head has been mounted upon the pin, the head can be freely rotated on the pin during adjustment of the door to proper position with respect to the door opening. Hence, with the improved structure, the door can be properly adjusted by means not shown, for shifting the position of the pin 13 or the pintle of the upper hinge member, before keying the head to the pin.

The cut-out section, above referred to, is of advantage in another respect. Sometimes, due to wear of the parts of the hinge structure, or due to sagging of the door, or to changes in the condition of the floor, it becomes necessary to elevate the door slightly with reference to the floor. With the mechanism shown in the drawing, the door can be raised with reference to the pin after loosening the clamp screw 17, to enable the insertion of a shim or spacer 24 of proper thickness between the upper end of the pin and the upper closed end of the socket, thus holding the door in the elevated position to provide the clearance necessary. The spacer 24 is shown in the form of a washer having a central recess 25 which is aligned axially with a threaded recess 26 provided in the pin 13. The recess 26 is designed to receive a screw 27 for holding an ornamental cover plate 28 in position on the head, the cover plate being indicated by broken lines in Figures 1 to 3 inclusive. The screw, however, is removed when a shim 24 is to be inserted, and upon replacement of the screw, the diameter of which is less than the diameter of the recess 25, the screw retains the shim in position against dislodgment through the port 20 formed by the cut-out portion of the head above referred to. It will be understood that in forming the cut-out, the portion need not actually be cut away, but that the head may be forged in the form illustrated. The cut-out provides access to the socket for the insertion of a key, as described above, after a door has been hung and properly adjusted, and also permits insertion of a shim for adjusting the door elevationally without removal of the head 11 from the pin.

The arm herein described is shown but not claimed in the prior application of Martin Carlson, one of the joint applicants of the present application, said prior application having been filed April 29, 1949, Serial No. 90,530 for Door Closers.

While we have shown and described a structure that is illustrative of the invention, variations thereof may be utilized without departure from the spirit of the invention defined by the appended claims.

5

6

We claim:

1. A door supporting arm for a floor mounted door closer mechanism comprising a rotatable vertical actuating pin, said arm being provided with a head having a vertical socket open at the lower surface of the head and having a top closure wall adapted to rest on the upper end of the pin when the head is in position on the pin, said head being provided with a lateral recess communicating with the upper portion of the socket through which a shim can be inserted between the upper end of the pin and said wall for supporting the head and arm in an elevationally adjusted position with respect to the pin, and means for retaining the shim in position on the end of the pin.

2. A door supporting arm for a door closer mechanism comprising a rotatable vertical actuating pin, said arm being provided with a head having a vertical socket open at the lower surface of the head and having a top closure wall adapted to rest on the upper end of the pin when the head is in position on the pin, said head being provided with a lateral recess communicating with the upper portion of the socket through which a perforated disc-shaped shim can be inserted between the upper end of the pin and said wall for supporting the head and arm in elevationally adjusted position with respect to the pin, said wall and pin being provided with registering

openings, and a screw extending through the opening in the wall into the opening in said pin and adapted to pass through the perforation in the shim for retaining the latter in position on the end of the pin.

3. A door supporting arm for a door closer mechanism comprising a rotatable vertical actuating pin, said arm being provided with a head having a vertical socket open at the lower surface of the head and having a top closure wall adapted to rest on the upper end of the pin when the head is positioned on the pin, said head being provided with exterior walls intersecting in a chordal line of the socket to provide a recess communicating with the upper portion of the socket providing access to the latter for accommodating insertion of a shim horizontally into the socket between the upper end of the pin and the top wall of the socket, and means for retaining a shim in position in the socket.

MARTIN CARLSON.
OTTO MICHAELSEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,064,255	Rixson	June 10, 1913