The present invention relates generally to improvements in hinge or pivot assembly for doors or other panel type closures and, more particularly, to a novel arrangement for projecting a hinge pin or spindle outwardly from a swing type door.

The invention has for its principal object the provision of a new and improved pivot assembly adapted to project a door spindle outwardly from the door and into engagement with a spindle receiving bearing in the door frame by easy and convenient manipulation of structure which is accessible from the exterior of the door, thereby hinged to mount the door, which assembly may also be manipulated to retract the spindle in order to remove the door from the frame.

Another object of the invention is to provide a pivot assembly of the character indicated above which the adjusting mechanism is accessible from a side edge of the door, and hence is substantially hidden from view so as not to mar the appearance of the door.

A further object of the invention is the provision of an improved hinge assembly for swing type doors which is extremely simple to install and may be readily adjusted following installation.

Still another object of the invention is to provide a pivot assembly of the character indicated above which is relatively inexpensive to manufacture and is yet rugged and foolproof in operation.

The foregoing and other objects are realized, in accordance with the present invention, by the provision of a pivot assembly including a spindle receiving socket member secured in fixed position on a door and mounting a spindle for movement from a retracted position within the door to an extended position in engagement with a bearing located in the door frame surrounding the opening in which the door is to be installed. A cam member movable along a guide channel in the door engages the spindle in order to move it with respect to the socket member between its retracted and extended positions. For the purpose of moving the cam member, an adjustable member extends from the side edge of the door and threadedly engages the cam member.

Other objects and advantages of the present invention will become apparent from the ensuing description in the course of which reference is had to the accompanying drawings wherein:

Fig. 1 is a fragmentary, front elevational view, partially broken away and in section illustrating a door equipped with the pivot assembly of the present invention and showing the spindle in extended position as employed to mount the door within a door frame;

Fig. 2 is a fragmentary, sectional view taken along a line substantially corresponding to the line 2--2 in Fig. 1 assuming, of course, that the entire door structure had been shown in Fig. 1; and

Fig. 3 is a fragmentary sectional view illustrating the spindle in partially retracted position.

A typical installation of the hinge or pivot assembly of the present invention as illustrated in Fig. 1 wherein this assembly is indicated generally by the reference numeral 10 and is shown installed on a panel type closure in the form of a door 11. The door 11 is mounted for swinging movement in a door frame 12 which includes a floor or bottom portion 12a, a header or top portion 12b and a vertical door jamb 13 not shown. The door includes the usual top and bottom rails 13 and 14 and vertical side rails 15, only one of which is shown in Fig. 1. The rails support one or more center panels 16 which may be made of glass or other panel material and may be mounted upon the rails in any suitable manner.

The lower end of the door is mounted for rotation about a vertical pin or spindle 17 extending between the bottom rail 14 and the floor 12a. The lower pivot assembly is of conventional construction and since it forms no part of the present invention it will not be described in detail.

The assembly 10 as illustrated in Fig. 1 is mounted in the upper corner of the door near the junction between the top rail 13 and the side rail 15. As is best shown in Fig. 2, the upper rail 13 provides a guide channel 26 defined between top and bottom walls 21 and 22 and side walls 23 and 24. The top wall 22 is suitably apertured, as indicated at 22a, in order to receive a spindle guiding socket member 25 which forms a part of the assembly 10. Specifically, the socket member 25 is preferably formed of metal and includes a flat base plate 26 secured to the wall 22 by means of machine screws 27 and further includes a spindle guiding portion 28 extending through the aperture 22a. The spindle guiding portion comprises a hollow cylindrical boss depending downwardly from the base plate 26. The spindle guiding portion 25 is provided with diametrically opposed, axially elongated slots or openings 29 and 30 extending parallel to each other. The portion of the cylindrical boss 28 which lies to the left of the slots 29 and 30 as viewed in Figs. 1 and 3, is somewhat shorter than the portion 25b which lies to the right of these slots for a purpose which will become evident as the description proceeds.

The socket member 25 accommodates a vertical spindle or hinge pin 32 extending into the boss 28 and having a cam follower 33 in the form of a hollow cylindrical roll or pin which is driven fitted within a transverse opening 32a in the spindle. The follower 33 includes opposed end portions 33a and 33b which protrude beyond the cylindrical surface of the spindle 32 and are respectively seated within the openings 29 and 30 in the spindle guiding boss 28.

To mount the door 11 within the frame 12, the spindle 32 is adapted to be extended outwardly and upwardly from the socket member 25 so that its extreme upper end portion is received within a suitable spindle receiving bearing 34 mounted in fixed position in the header 12b of the door frame. To effect the described extension of the spindle, the follower 33 is engaged by a cam member 35 which is mounted for movement longitudinally along a guide channel 26. Cam member 35 includes a flat base portion 36 resting upon the bottom wall 21 of the top rail, a pair of vertically extending parallel side walls 37 and 38 and a vertical front wall 39. The side walls 37 and 38 are provided with elongated camming slots 40 and 41, respectively, which extend parallel to each other and receive the end portions 33a and 33b, respectively, of the cam follower 33. Each of the slots 40 and 41 includes an elongated portion which is inclined with respect to the base 36 and an upper dwell portion extending substantially parallel to the base 36. The dwell portion of the camming slot 40 is indicated at 41a and the dwell portion of the slot 41 is indicated at 41b in Fig. 3.

For the purpose of moving the cam member 35 within the guide channel 26, there is provided an adjusting means 42 in the form of a lead screw having a threaded end...
3 portion 42a threadedly engaging a tapped opening 39a in the front wall 39 of the cam member. The adjusting screw 42 may be turned by means of a screw driver to move the cam member to the left as viewed in both Figs. 1 and 3. The described movement of the cam member causes the ends 33a and 33b of the follower to ride within the slots 40 and 41 thereby projecting the spindle 32 outwardly and into engagement with the bearing 34. The length of portion 28b of the boss is such that the front wall 39 of the cam may pass thereunder in order to permit the described movement of the cam member. The length of portion 28b of the boss is such that no time does the bottom 36 of the cam member engage the portion 28b of the boss and, accordingly, the spindle is moved solely as a result of the coaction between the follower pin 33 and the slots 40 and 41. When the spindle is reached in its fully extended position, as shown in Fig. 1, the front wall 39 of the cam member engages the side rail 15, thus preventing further movement of the cam member. At this time the follower elements 33a and 33b are respectively seated within the dwell portions 40a and 41a of the camming slots 40 and 41 and, the spindle 32 is, therefore, locked in its extended position. To retract the spindle 32 within the socket member for the purpose of removing the door from the frame, the adjusting screw 42 is rotated in the opposite direction in order to move the cam member 35 toward the right as viewed in Figs. 1 and 3.

In view of the foregoing description it will be recognized that the pivot assembly of the present invention permits a swing type door to be initially installed in place or, alternatively, to be removed from its frame. Thus, in order to install the door, the spindle 17 at the lower end of the door is first placed in proper position. The upper end of the door is then manipulated until the retracted spindle 32 is approximately aligned with the bearing 34 and, with the door swung slightly so that the adjusting screw 42 is accessible, the spindle 32 is projected outwardly in the manner-described above until it is properly seated in the bearing 34. Subsequently, to remove the door from its frame, the above described procedure is one reversed, that is, the spindle 32 is retracted by turning the adjusting screw 42 and the door is then removed from the frame. Thus, it will be observed from the foregoing description that the present invention provides a pivot assembly which is both efficient and foolproof in operation and yet is relatively simple in construction. In addition, the upper spindle is locked in its fully extended position to prevent its inadvertent retraction.

While the present invention has been shown and described in conjunction with an illustrative embodiment thereof, many modifications will occur to those skilled in this art, and it is therefore contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

What is claimed is new and desired to be secured by Letters Patent of the United States is:

1. A pivot assembly adapted to be mounted on a panel type closure, said assembly comprising a spindle movable between a retracted position and an extended position; a socket member including a flat plate secured to the closure, a hollow cylindrical spindle guiding portion extending transversely of the plate for accommodating said spindle; follower elements defining openings in said spindle guiding portion; follower elements secured to and extending transversely of the spindle and respectively accommodated within said openings; a cam member comprising a flat base portion lying in a plane extending normal to the spindle, a wall portion interconnecting said side walls extending transversely of the base portion, a wall portion interconnecting said side walls and having a tapped opening therein, and said side walls being provided with elongated cam slots for respectively receiving said follower elements, said slots being inclined with respect to said base portion and including a dwell portion for retaining said cam slot, a guide channel in said closure extending transversely of the axis of said spindle and receiving said cam member for movement therealong; and an adjusting screw mounted on the closure engaging said tapped opening in said spindle for turning in a direction opposite to said first direction, to move the cam member along the guide channel in a direction opposite to said first direction, thereby to retract the spindle within the socket member.

2. A pivot assembly adapted to be mounted on a panel type closure, said assembly comprising a spindle movably between a retracted position and an extended position; a socket member including a flat plate secured to the closure, a hollow cylindrical spindle guiding portion extending transversely of the plate for accommodating said spindle; follower elements secured to and extending transversely of the axis of said spindle and receiving said cam follower means for movement therealong; an adjusting screw mounted on the closure engaging said tapped opening in said spindle for turning in a direction opposite to said first direction, to move the cam member along the guide channel in a direction opposite to said first direction, thereby to retract the spindle within the socket member.
posite to said one direction, thereby to retract the spindle within the socket member.

4. A pivot assembly adapted to be mounted on a panel type closure, said assembly comprising a spindle; a spindle guide, cam follower means carried by the spindle; a cam member comprising a flat base portion lying in a plane extending normal to the axis of the spindle, at least one side wall extending transversely of the base portion, and at least said one side wall being provided with an elongated cam slot for receiving said follower means, a first portion of said slot being inclined with respect to said base portion and a second portion of said slot defining a dwelling portion; a guide channel in said closure extending transversely of the axis of said spindle and receiving said cam member for movement therealong; an adjusting screw mounted on the closure and in threaded engagement with said cam member, whereby when the screw is turned in the first direction the cam member is moved along said guide channel in one direction so that the follower means ride within the cam slot in order to extend the spindle from the spindle guide, said screw being effective, when turned in a direction opposite to said first direction, to move the cam member along the guide channel in a direction opposite to said one direction, thereby to retract the spindle within the spindle guide.

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