United States Patent [19]

Bisbing

[11] **3,862,773**

[45] **Jan. 28, 1975**

[54] **PUSH-RELEASE FASTENER**

[75] Inventor: **Robert H. Bisbing,** Springfield, Pa.

[73] Assignee: **Southco, Inc.,** Lester, Pa.

[22] Filed: **Aug. 6, 1973**

[21] Appl. No.: **386,197**

[52] **U.S. Cl.** **292/70,** 292/DIG. 4

[51] **Int. Cl.** **E05c 19/02**

[58] **Field of Search** ..... 292/57, 58, 59, 60, 61, 292/62, 70, 4, DIG. 4

[56] **References Cited**

UNITED STATES PATENTS

3,152,822	10/1964	Griffiths	292/61
3,603,631	9/1971	White	292/220

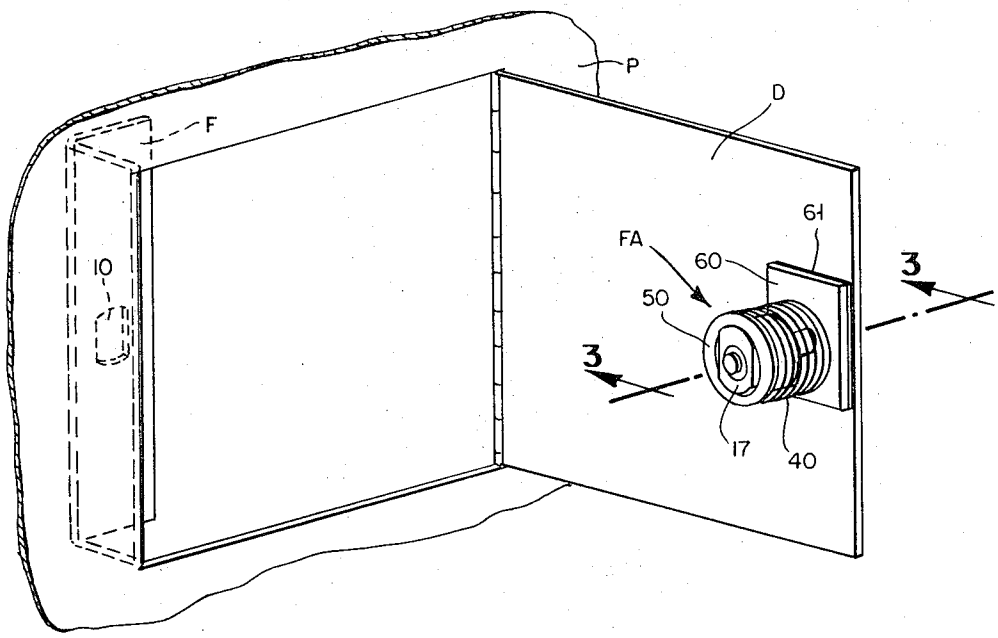
Primary Examiner—Robert L. Wolfe

Attorney, Agent, or Firm—Paul & Paul

[57] **ABSTRACT**

Disclosed is a fastener, for a door or other movable element, which, is response to a manual push on the door toward its frame, positively secures the door to the frame, and which in response to a subsequent manual push in the same direction, releases the door. Thus, no handle is required on the exterior surface of the door. When the fastener is compressed between the door and its frame, by an initial manual push on the exterior portion of the door, a cam member is caused to rotate through an acute angle by cooperation of sets of cam surfaces on two members, one of which is the cam member. Rotation of the cam member changes correspondingly the position of a latch element which is an integral part of the rotatable cam member. The latch element provides engagement with the surface of the door frame surrounding a hole of corresponding shape in the door frame. A succeeding manual push in the same direction causes additional angular rotation of the rotatable cam member in the same direction and places the latch element in an angular position to pass through the hole, thereby allowing release of the door from its frame. In a preferred form, a coil spring is incorporated into the fastener assembly to urge the door partially open when the pawl element is in its door-release angular position.

14 Claims, 13 Drawing Figures



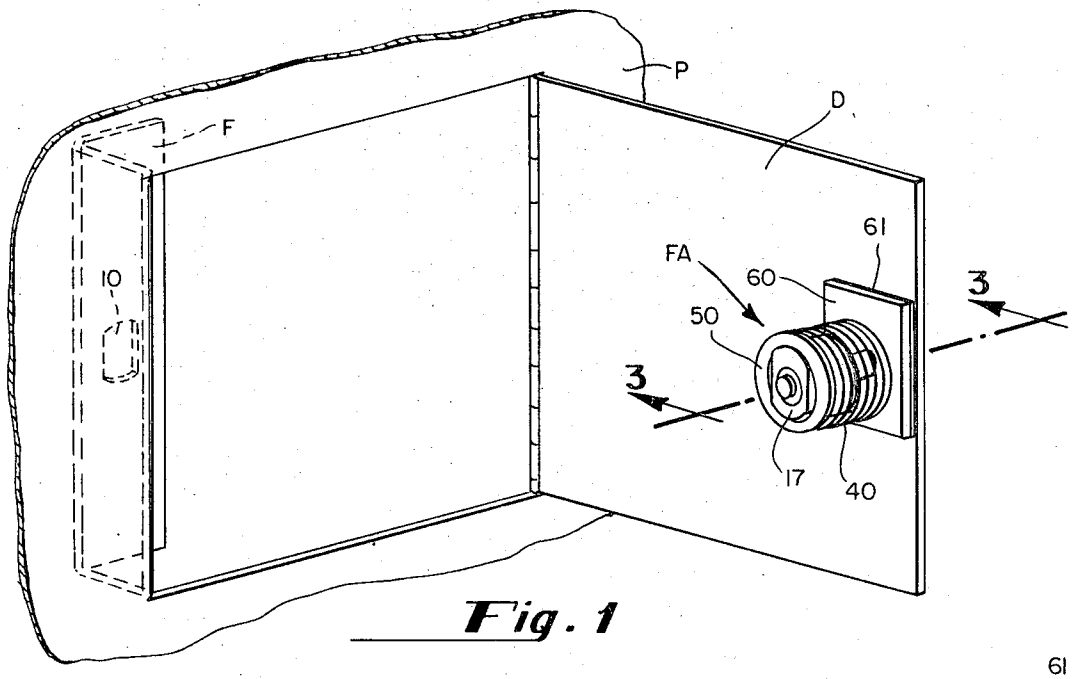


Fig. 1

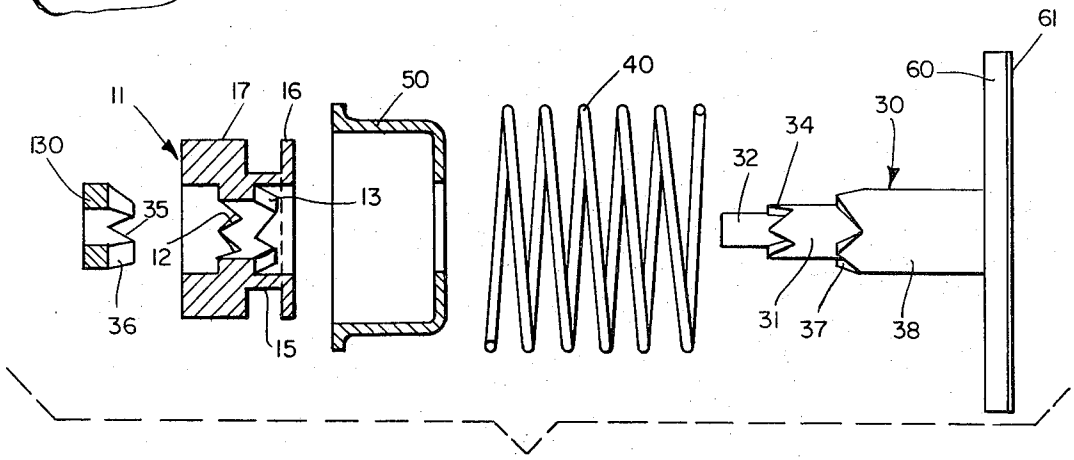


Fig. 2

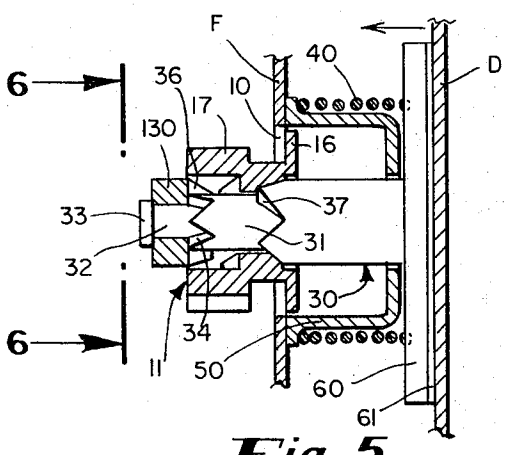


Fig. 5

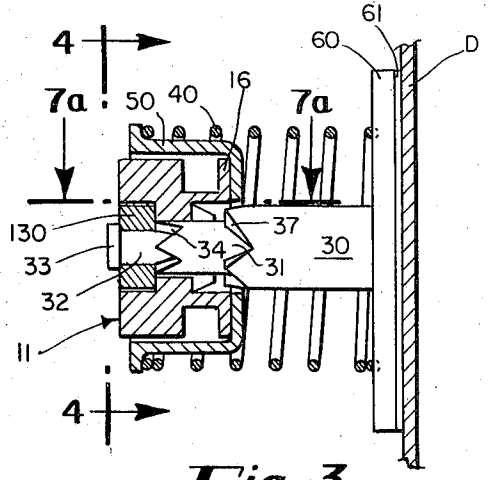


Fig. 3

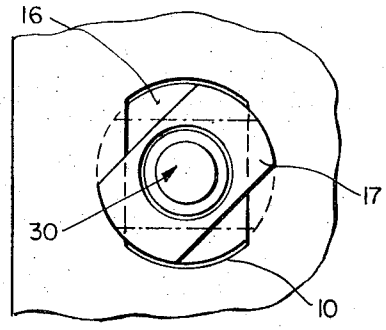


Fig. 6

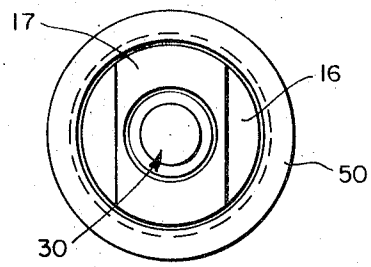


Fig. 4

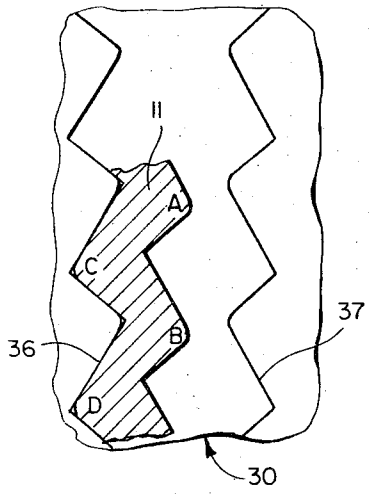


Fig. 7c

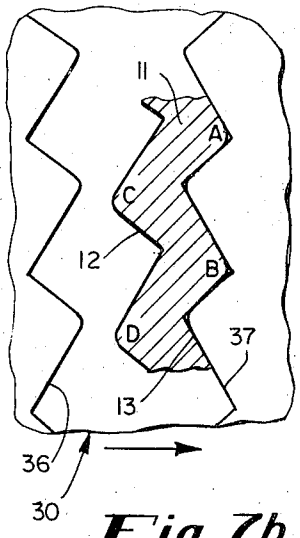


Fig. 7b

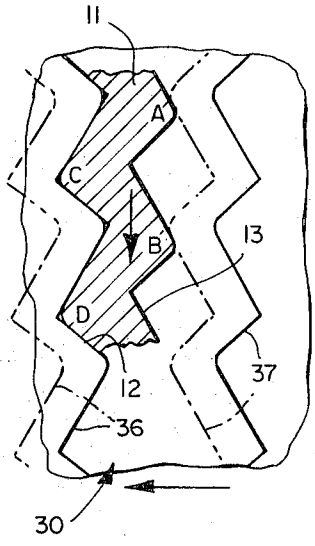


Fig. 7a

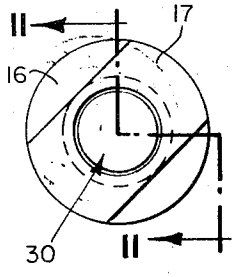


Fig. 10

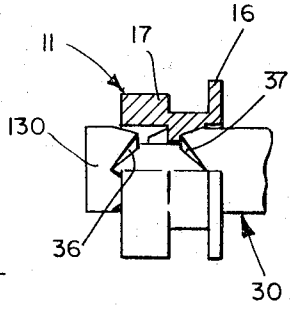


Fig. 11

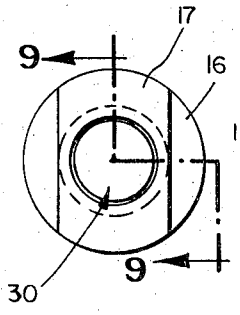


Fig. 8

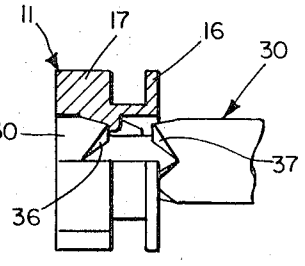


Fig. 9

PUSH-RELEASE FASTENER

BACKGROUND OF THE INVENTION

This invention relates to fasteners for securing together two members, such as a door and its frame. The invention relates particularly to those applications of fasteners whereby the two members, such as the door and its frame, are secured together in such a manner that they may be released by causing relative movement of the two members in the same direction as was required to effect the securing thereof.

Still more particularly, the invention applies to releasably securing two members, such as a door and its frame, by pushing the door toward the frame to latch the door, and by pushing the door toward the frame to release the door, whereby no knob or handle is required upon the exterior of the door.

Fasteners of the general type here involved are available in the prior art.. They range from simple leaf springs, which provide a mechanical detent, to complicated spring, lever, and cam designs. In the more simple varieties it is common that the door may be pushed beyond its intended latched position to its unwanted release position upon the initial attempt to securely close the door. This, of course, is undesirable. To overcome this deficiency, prior art devices sometimes provide a positive stop to terminate the closing motion. However, such stop means, in at least some of the prior art devices, is of a complicated mechanism that is subject to jamming, is bulky, and presents alignment problems at installation when two cooperating assemblies must be installed, one of which is on the door, and the other on the frame.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a push-release type of fastener which provides positive latching and unlatching with only one assembly to be installed, on either the door closure or on the frame.

Another object is to provide a push-release type of fastener which is much more simple in design than prior art fasteners of this general type.

Another object of the invention is to provide a push-release type of latching mechanism which requires one push to lock and another push to unlock and which cannot be unintentionally pushed beyond the lock position to the unlocked position thereby failing to lock the door closure when locking is desired.

Yet another object is to provide a push-release fastener with integral biasing means to bias the door away from the frame so that no additional biasing device is required.

The foregoing objects of the invention are achieved by providing a single assembly which includes a latch element adapted to cooperate with a hole or notch in the other member. For example, if the assembly is installed on the door closure, then the latch element is adapted to cooperate with a hole or notch in the door frame. The fastener is so designed and constructed that a push toward the door frame provides rotation of the latch in one direction and a succeeding push on the door in the same direction provides further rotation of the latch in the same direction, whereby by successive pushes, the latch may be rotated successively into latching and unlatching positions.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective schematic illustration showing the push-release fastener of the present invention installed on the door of a panel and with a cooperating hole in the panel frame.

FIG. 2 is an exploded view, partly in section, showing the single assembly push-release fastener.

FIG. 3 is a side view, partly in section, showing the push-release fastener mounted on an open door or closure element.

FIG. 4 is an end view looking along the line 4—4 of FIG. 3, showing the pawl in unlatched position.

FIG. 5 is a side view, partly in section, of the push-release fastener showing the component parts in the position which they assume when the door is pushed against the door frame and the biasing spring is compressed.

FIG. 6 is an end view looking along the line 6—6 of FIG. 5, showing the latch rotated through 45° into partial latching position.

FIGS. 7(*a*), 7(*b*) and 7(*c*) are a series of sequential schematic illustrations which will be helpful in describing the action which occurs when the door is pushed toward the door frame, to effect rotation of the latch.

FIG. 8 is an end view showing thet latch in unlatched position.

FIG. 9 is a view, partly in section, looking along the line 9—9 of FIG. 8.

FIG. 10 is a view of the latch in partially latched position.

FIG. 11 is a view, partly in section, looking along the line 11—11 of FIG. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The fastener assembly in preferred form, identified FA, is illustrated in FIG. 1 as secured to the inner surface of a hinged door D of a panel P. Since the fastener engages a slot or hole 10 in the door frame F, there is no requirement for a keeper in the form of a hook or for a protrusion of any kind, as is required by prior art fasteners of this general type. The fastener assembly FA is generally cylindrical in shape which is desirable for safety and for clean neat appearance. Also the fastener assembly FA consists of a single assembly mounted on but one of the two elements comprising the door or other closure element and the frame. In FIG. 1, the fastener assembly is shown mounted on the door.

Referring now to FIG. 2, which is an exploded view showing the component elements of the fastener assembly FA, the pawl element identified 17 is an integral forward part of a generally cylindrical cam 11 having a center bore and having thereabout an internal forward set of circumferentially generated cam surfaces 12 and an internal rearward set of circumferentially generated cam surfaces 13. The cam 11 which is movable axially as well as rotatably on a stud or shaft 30, includes a cylindrical portion 15, an annular rearward flange 16, and a forward flange 17 which is the latch and which may be generally rectangular in cross section. The shape of the forward flange or latch 17 corresponds to that of opening 10 in the door frame F, shown in phantom in FIG. 1. In the illustrative embodiment, latch 17 has the configuration of a center seg-

ment of a circular area, and opening **10** has a correspondingly similar shape.

Referring again to FIG. **2**, the push-release fastener FA includes the previously referred to stud or shaft **30** which includes at its forward end a ring portion **130**. So far as the operation of the fastener assembly is concerned, shaft **30** could be a one-piece component having at its forward end, as an integral part thereof, the ring **130**. However, for assembly reasons, either the shaft **30** of the rotatable cam **11** must be composed of a plurality of separable segments in order to provide for the assembling together of the cam **11** on the reduced-diameter portion **31** of the shaft **30**. In the construction illustrated in the drawings, the shaft **30** is shown as having as its forward end a separate ring component **130** which is mounted on the foremost small-diameter end **32** of the shaft **30** and secured thereto as by peening over the terminal end of shaft **30** to deform the end as at **33** and retain the ring.

The forward annular surface of the reduced-diameter portion **31** of shaft **30** has a saw-tooth configuration, as indicated at **34**, which receives and mates with a corresponding annular saw-tooth surface **35** in the rearward face of the ring element **130**. The purpose of this mating saw-tooth construction is, of course, to prevent relative rotation between shaft **30** and the ring **130**, when the ring has been secured to the shaft by the deformation of the end **33**.

The rearward outer annular face of the ring portion **130** is provided with a set of circumferentially generated cam surfaces **36** and the forward annular surface of the full-diameter portion **38** of shaft **30** is provided with a set of circumferentially generated cam surfaces **37**. These cam surfaces **36** and **37** cooperate respectively with sets of cam surfaces **12** and **13** on the rotatable cam component **11**. For convenience, the sets of cam surfaces **36** and **12** may be referred to as the forward sets of cam surfaces, while the sets of cam surfaces **13** and **37** may be referred to as the rearward sets of cam surfaces.

In addition to the elements already described, the push-release fastener assembly FA of the present invention, in its preferred form, includes a biasing coil spring **40** and a cup washer **50**. The function of spring **40** is to bias the door D away from the frame F. This biasing action by spring **40** also biases the rotatable cam component **11** away from the door D when the latch **17** is in engagement with the frame F, as in FIGS. **5** and **6**. By means of cup washer **50**, the spring **40** also biases the cam component **11** away from door D when the door D and frame F are not in close proximity, as in FIG. **3**.

Stud shaft **30** is integral with an enlarged base plate **60** which is secured to the inner surface of the panel door D. In a preferred form, the base plate **60** is secured to the door D by an adhesive backing **61**. This method of securing the base plate **60** to the door D is very fast and simple. Since the spring **40** acts against the components of the fastener assembly, there is no force at any time acting to separate the fastener from the member to which it is adhesively secured.

FIG. **3** is a side view, in section, showing the push-release fastener FA of the present invention mounted on the panel door D. The various components of the assembly are shown in the positions which they assume when the door is in open position. FIG. **4**, which is an end view looking along the line **4—4** of FIG. **3**, shows that the forward flange or latch **17** is in its vertical position. This is the releasing or unlatched position, since in this position, the latch **17** will pass through the opening **10** in the door frame F.

OPERATION

The positions of the various component parts of the push-release fastener when the door is in the open position are shown in FIG. **3**. In FIG. **3**, the forward set of cam surfaces **12** of the rotatable cam component **11** is adjacent to and substantially mating with the forward set of cam surfaces **36** of the ring portion **130** of the shaft **30**. However, the rearward set of cam surfaces **13** of the rotatable cam component **11** are spaced axially from and are clear of the rearward set of cam surfaces **37** of the shaft **30**. This, of course, is due to the fact that the forward and rearward sets of cam surfaces **36** and **37** on the shaft **30**, which border the reduced-diameter portion of the shaft **30**, are separated axially by a distance which is greater than the axial distance between the forward and rearward sets of cam surfaces **12** and **13** of the rotatable cam component **11**. Thus, the cam component **11** must move axially with respect to shaft **30** in order for the rearward set of cam surfaces **13** of the cam component **11** to contact the cooperating set of cam surfaces **37** of the shaft **30**. The axial distance between the forward and rearward sets of cam surfaces **37** and **36** of the shaft **38** is, however, short enough to allow only limited rotational freedom to the rotatable cam component **11** with respect to the shaft **30**. Full rotational freedom is denied as a result of interference which will occur between the sets of cam surfaces **36** and **37** with the sets of cam surfaces **12** and **13**, respectively.

When the door D is pushed from the open position illustrated in FIG. **1** to the closed position, since the latch **17** is in its vertical position, as seen in FIG. **4**, the latch **17** will pass through the correspondingly-shaped opening **10** in the frame member F. However, the cup washer **50** is unable to pass through the opening **10** and, as a consequence, comes to a stop when its forward annular edge abuts against the frame F. Continued push on the door in the closing direction compresses the spring **40**. When, as illustrated in FIG. **5**, the annular rearward flange **16** of the cam component **11** reaches the abuts against the frame F, the forward movement of the cam component **11** stops but forward motion of the stud shaft **30** continues. When this happens, the latch **17** is rotated from the vertical position indicated in FIG. **4**, through an acute angle, preferably 45°, to the position indicated in FIG. **6**.

An explanation of how latch **17** is caused to rotate through 45° will now be given with the help of a series of schematic illustrations presented in FIGS. **7**(*a*), **7**(*b*) and **7**(*c*). These figures are schematic illustrations of fragmentary portions of the sets of cam surfaces **36** and **37** of the shaft **30** and of the sets of cam surfaces **12** and **13** of the rotatable cam component **11**.

FIG. **7**(*a*) shows the relative positions of the cam surfaces **12, 13, 36** and **37** when the door D is in the open position, as is illustrated in FIGS. **1** and **3**. In this position, the forward sets of cam surfaces **36, 12** are in mating engagement but the rearward sets **13, 37** are spaced axially apart. When the door D is pressed toward the closed position, after the vertically-oriented latch **17** has passed through the hole **10** in the frame F, and after the cup washer **50** has abutted against frame F and

spring 40 has been compressed, and after the continued forward movement of the cam component 11 stops because its rearward flange 16 has abutted against surface of the frame F, continued forward movement of shaft 30 causes the sets of cam surfaces 36, 37 of the shaft 30 to move from the solid line to the phantom positions in FIG. 7(*a*), while the cam element 11 remains stationary both axially and rotationally. When the set of cam surfaces 37 reaches the set of cam surfaces 13 of the cam element 11, the high points of the set of cam surfaces 37 of the shaft 30 occupy the positions shown in FIG. 7(*a*) relative to the high points A and B of the sets of cam surfaces 13 of the cam element 11. Further continued forward movement of the shaft 30 causes the rotatable cam component 11 to move rotationally in the direction of the arrow indicated in FIG. 7(*a*). This moves the high points A and B of the cam element 11 from the positions shown in FIG. 7(*a*) to the positions shown in FIG. 7(*b*).

FIG. 7(*b*) illustrates the axial and rotational positions of the cam element 11 at the completion of the forward stroke. When the manual forward push on the door D is released, the door D and stud shaft 30 are moved in the rearward direction, i.e., away from the frame F, by the action of the spring 40 which was compressed between the frame F and the base of the stud shaft 30. The sets of cam surfaces 36 and 37 move axially in the direction of the arrow in FIG. 7(*b*) from the positions shown in FIG. 7(*b*) to the positions shown in FIG. 7(*c*). During the first part of this axial movement the cam element 11 remains stationary, both axially and rotationally but when the set of cam surfaces 36 reaches and engages the set of forward cam surfaces 12 of the cam component 11, the cam component 11 is driven axially rearwardly and also rotationally through a fraction of one revolution, preferably through a further acute angle of 45° in the same direction in which it had been driven during the forward push movement of the door. Thus, the cam high points, A, B, C and D are moved from the positions shown in FIG. 7(*b*) to the positions shown in FIG. 7(*c*), and latch 17 is moved axially from the position shown in FIG. 5 to a position in which it is abutting against the frame F. Thus, FIG. 7(*c*) illustrates the axial and rotational positions of the cam component 11 at the completion of the spring-actuated return stroke. This completes one cycle of operation, during which the cam element 11, and hence also the latch 17, are moved through two fractions of one revolution, each preferably 45°, to achieve a total rotation of 90°, for one cycle of operation.

SUMMARY OF OPERATION

It has been explained that as a result of a first push motion in the direction of door closing, the cam component 11 has moved rotationally in the direction of the arrow from the position shown in FIG. 7(*a*) to the position shown in FIG. 7(*b*), and that when the forward push is released the action of the compression spring 40 effects an axial movement rearwardly and, a further rotational movement of the cam component 11 in the same direction causing the cam component to move from the position shown in FIG. 7(*b*) to the position shown in FIG. 7(*c*).

In a preferred embodiment, the extent of the rotational movement of the cam element resulting from a forward push is through an angle of 45°, thereby moving the latch 17 from the vertical position shown in FIG. 4 to the angular position shown in FIG. 6. When the force of the forward push is relieved, the spring 40 effects a further rotational movement of the cam component 11 through an additional 45°, thereby moving the latch 17 from the angular position shown in solid lines in FIG. 6 to the horizontal position shown in dot-and-dash lines. This horizontal position corresponds to the full locking or latching position.

In the fully latched position, the compression spring 40 is extended to an extent which is limited only by the spacing between the rearward surface of the latch 17 and the door D. To release the latch, a manual force is applied to the outer surface of the door to move the door toward the frame F. When this happens, the set of rearward cam surfaces 37 of the shaft 30 moves toward the set of rearward cam surfaces 13 of the cam component 11, and the set of forward cam surfaces 36 moves forwardly away from the set of cam surfaces 12 of the cam element. When the set of cam surfaces 37 reaches the position indicated in phantom in FIG. 7(*a*), further forward movement of shaft 30 causes the cam component 11 to move axially forwardly and also rotationally in the directions indicated by the arrows in FIG. 7(*a*). This forward axial movement of the cam element 11 causes the set of rearward cam surfaces 13 to move toward the set of rearward cam surfaces 37 of the shaft 30. At the conclusion of the forward stroke, the cam element 11 has moved axially forwardly through a distance equal to the spacing between the rearward surface of the latch 17 and the flange 16. Cam element 11 has also moved rotationally in the direction of the arrow, thereby moving the cam high points A, B, C and D from the positions indicated in FIG. 7(*a*) to the positions indicated in FIG. 7(*b*). This movement has the effect, in the preferred embodiment, of moving the latch 17 from the horizontal position (FIG. 4) through an angle of 45° to the angular position shown in FIG. 6. When the forward force on the door is released, the compressed spring 40 expands, thereby moving the door D and the shaft 30 rearwardly. This moves the set of cam surfaces 37 rearwardly away from the set of cam surfaces 13 and brings the set of cam surfaces 36 into engagement with the set of cam surfaces 12. When the cam surface 36 engages cam surface 12, the cam component 11 is moved axially rearwardly and also rotationally, thereby moving the high cam points A, B, C and D from the position shown in FIG. 7(*b*) to the position shown in FIG. 7(*c*). Thus, in the preferred embodiment, latch 17 is moved through an additional 45°, thereby moving the latch to the vertical position in which it is able to pass through the opening 10 in the frame F. The spring 40 is now able to expand further, thereby opening the door D to a small extent.

It is to be noted that cup washer 50 and spring 40 may be omitted. However, if these components be omitted, unless the door D operates in such position as to be returned outwardly by gravity or other force, it would be necessary to put some sort of handle on the outer surface of the door so that it could be pulled outwardly to open the door, and to perform the return-stroke part of the cyclic action which is achieved by the spring 40 in the preferred embodiment. The spring 40 by biasing the stud shaft 30 outwardly, also biases the rotating cam component 11 away from base plate 60, thereby preventing the fastener from operating inadvertently. By the use of the cup washer 50, the spring 40 biases the rotating cam component 11 away from

door D when the door D and frame F are not in close proximity (FIG. 3) as well as when they are in close proximity (FIG. 5).

An alternate embodiment of the present invention would use a stud shaft having a portion of enlarged diameter bounded by sets of cam surfaces to cooperate with a rotating cam member having a central portion of enlarged inside diameter bounded by sets of cam surfaces so that, when assembled together, the two members (the stud and the cam) would cooperate in the same manner described hereinafter for the preferred embodiment.

Included among the advantages of the push-release fastener assembly of the present invention are the following: (1) It consists of a single assembly; (2) It provides integral biasing toward the open position so that no additional biasing is required; (3) It provides positive holding in the latched position. The door cannot be pulled open when latched; (4) It is latched by a single push,, and a succeeding single push in the same direction unlatches the fastener. It cannot be pushed past the latched position to the unlocked position by a single push; (5) Installation is much more simple; (6) It is clean and safe, since no hooks or sharp projections are involved.

What is claimed is:

1. A fastener assembly for releasably securing together two members such as a movable closure member and a fixed frame member in fixed spacial relationship to one another, said assembly comprising:

a. A non-rotatable drive member;

b. Means securing said drive member to one of said closure or frame members;

c. A rotatable member on said drive member, said rotatable member having limited axial freedom of movement relative to said drive member;

d. Opposing sets of annular cam surfaces on said non-rotatable drive member and also on said rotatable member;

e. Said opposing sets of annular cam surfaces being spaced axially and, having high points so positioned relative to the high points of the other opposing set that successive opposite axial displacements of said non-rotatable drive member relative to said rotatable member cause successive cumulation rotational displacements of said rotatable member with respect to said drive member;

f. The other of said closure or frame members being adapted to engage with said rotatable member when said rotatable member is in certain angular positions and not to engage when said rotatable member is in certain other angular positions.

2. A fastener assembly according to claim **1** wherein the axial spacing between the opposing sets of cam surfaces on said non-rotatable drive member is greater than the axial spacing between the opposing sets of cam surfaces on said rotatable member.

3. A fastener assembly according to claim **2** wherein biasing means are provided for axially biasing the rotatable member toward its position furthermost from the closure member to which said support member is secured.

4. A fastener assembly according to claim **3** wherein said non-rotatable drive member is secured to said movable closure member.

5. A fastener assembly according to claim **4** wherein said non-rotatable drive member is a cam shaft.

6. A fastener assembly according to claim **5** wherein said biasing means includes a coil spring biasing said cam shaft away from frame member and biasing said rotatable member away from said movable closure member.

7. A fastener assembly according to claim **6** wherein said biasing means includes a cup washer supported on said cam shaft, and wherein said cup washer supports said coil spring between an inward end of said cup washer and said movable closure member.

8. A fastener assembly according to claim **3** wherein said rotatable member includes a latch element having a non-uniform cross-sectional configuration, and said frame member has therein an aperture having a configuration permitting said latch element to pass through when said latch element is in certain angular positions and preventing passage of said latch element through said aperture when said latch element is in other angular positions.

9. A fastener assembly according to claim **8** wherein latch element has a generally rectangular configuration.

10. A fastener assembly according to claim **9** wherein said successive opposite axial displacements of said cam shaft cause successive cumulative rotational displacements of said rotatable member in discrete steps of 45° each.

11. A push-release fastener for releasably fastening two members such as a door or other closure element to a fixed frame element, said fastener comprising:

a. A non-rotatable shaft element having at its rearward end an enlarged base for securing to said closure element,

b. Said shaft having a reduced-diameter portion located intermediate its forward and rearward ends,

c. Forward and rearward sets of opposing cam surfaces at the forward and rearward ends of said reduced-diameter portion of said shaft,

d. An annular cam element mounted for rotation on said reduced-diameter portion of said shaft,

e. Said cam element having sets of forward and rearward opposing cam surfaces,

f. Said forward and rearward sets of cam surfaces on said shaft being spaced apart axially by a distance greater than the axial distance between the forward and rearward sets of cam surfaces on said cam element,

g. A latch element at the forward end of said cam element,

h. Said latch element having a generally rectangular or other cross-sectional configuration which is non-uniform relative to the center axis of said cam element,

i. An aperture in said frame member so corresponding in cross-sectional configuration to said latch element as to allow passage of said latch element through said aperture only when said latch element is in certain angular positions,

j. A flange at the rearward end of said cam element and spaced axially from said latch element, said flange having a cross-sectional configuration preventing its passage through said frame aperture,

k. Said sets of cam surfaces on said shaft and on said cam element having high points so related to each other that when said closure element is pushed towards said frame element to cause said latch element to pass through said aperture in said frame

element until said flange on said cam element abuts against said frame element and prevents further closing movement of said cam element, continued pushing thereafter causes said rearward set of cam surfaces on said shaft to approach and to engage said rearward set of cam surfaces on said cam element and to cause said cam element and said latch element to move rotationally through a fraction of one revolution, and thereafter upon termination of said forward push and initiation of rearward movement of said shaft, said forward set of cam surfaces on said shaft approaches and then engages said forward set of cam surfaces on said cam element to move said cam element and latch element axially and also rotationally in the same direction of rotation through an additional fraction of one revolution, thereby to complete one-half cycle of motion in which said latch element is moved angularly from releasing position to latching position, and whereby a succeeding discrete push on said latched closure element in the closing direction causes said rearward set of cam surfaces on said shaft to approach and engage said rearward set of cam surfaces on said cam element to move said cam element and latch element axially forwardly and also rotationally in the same direction of rotation through an additional fraction of one revolution, and thereafter upon terminatin of said succeeding push on said closure element and initiation of rearward movement of said shaft, said forward set of cam surfaces on said shaft approaches and then engages said forward set of cam surfaces on said cam element to move said cam element and latch element axially rearwardly and also rotationally in the same direction of rotation through an additional fraction of one revolution, thereby to complete the second one-half cycle of motion in which the latch element is moved angularly from latching to releasing position.

12. A push-release fastener according to claim **11** wherein spring biasing means are provided for effecting said return movement of said shaft.

13. A push-release fastener according to claim **12** wherein said spring biasing means is a coil spring, wherein a cup washer is supported on said shaft, and wherein said coil spring is supported between the forward rim of said cup washer and said base of said shaft.

14. A push-release fastener according to claim **13** wherein said fraction of one revolution is 45°.

* * * * *