United States Patent

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[31] 21,982/68

[54] **DOOR FURNITURE**
10 Claims, 8 Drawing Figs.

[52] U.S. Cl. ..... 292/353, 287/53 H
[51] Int. Cl. E05b 3/00, F16d 1/06
[50] Field of Search ..... 292/353, 359, 347, 348, 355, 358, 336.3, 349, 352, 336.5, 356; 287/53 H; 74/553, 554

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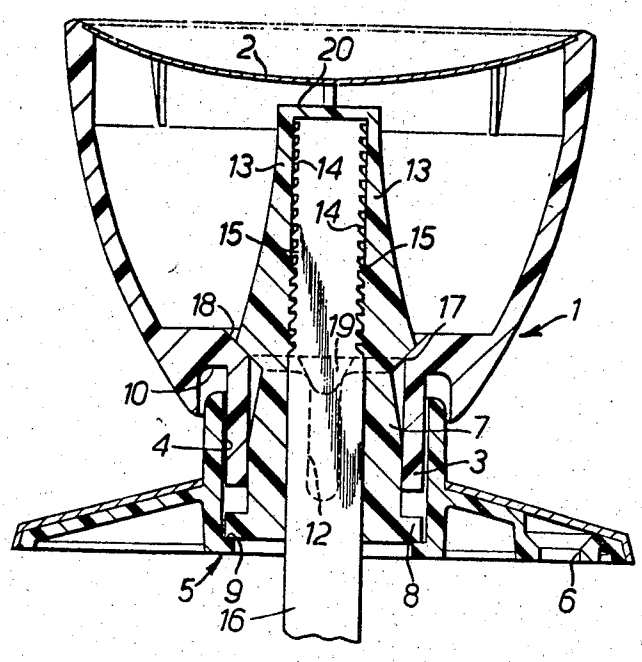
ABSTRACT: A door handle set comprises a spindle and two handles for detachable fixing on the two ends of the spindle. Each handle has ratchet-fixing means whereby it fitted merely by pushing it on to the spindle. When it is desired to remove one of the handles, the ratchet fixing thereof is freed by pushing the handle towards the door. This enables the other handle, complete with the spindle, to be withdrawn from the opposite side of the door.



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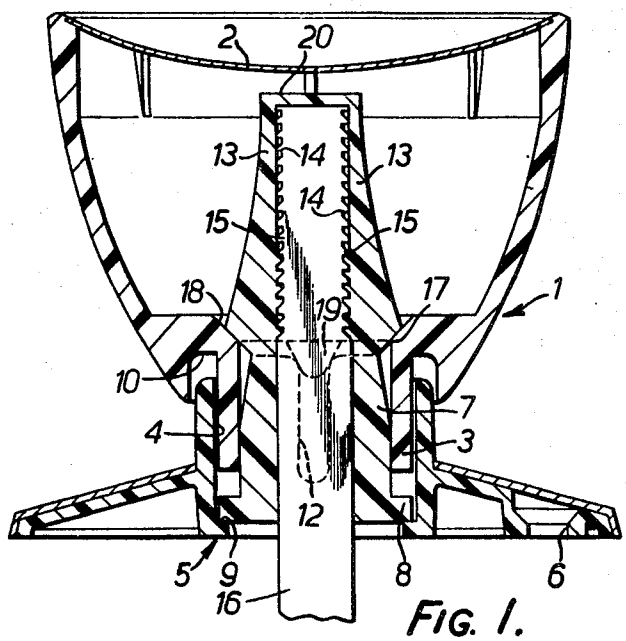

FIG. 1.

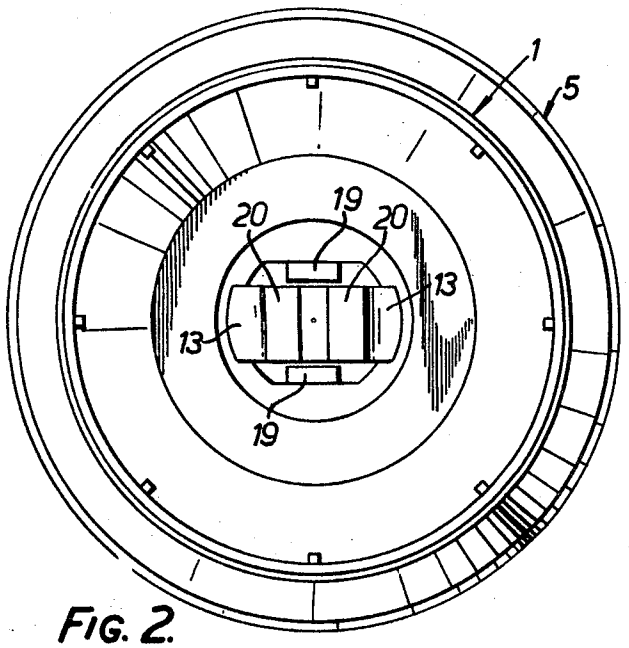

FIG. 2.

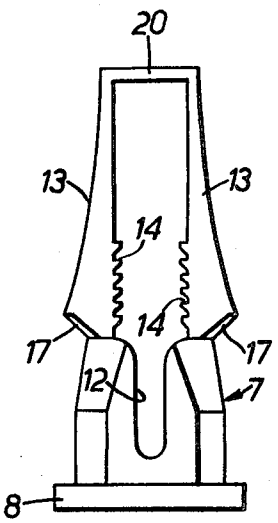

FIG. 3.

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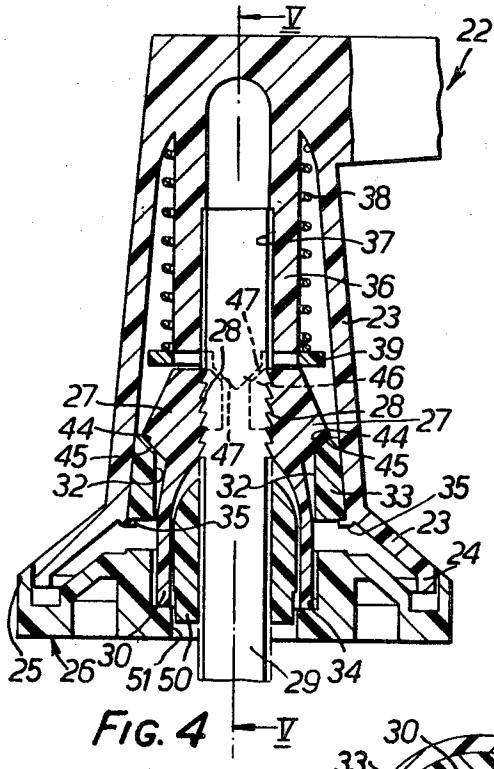

FIG. 4

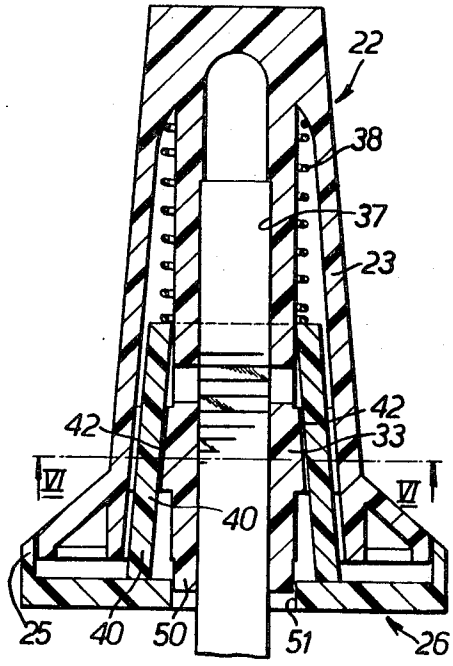

FIG. 5.

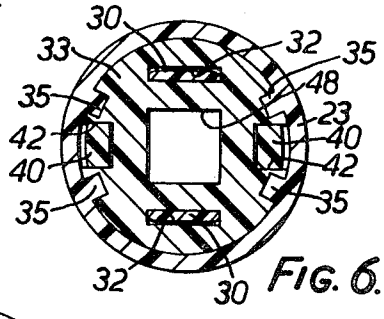

FIG. 6.

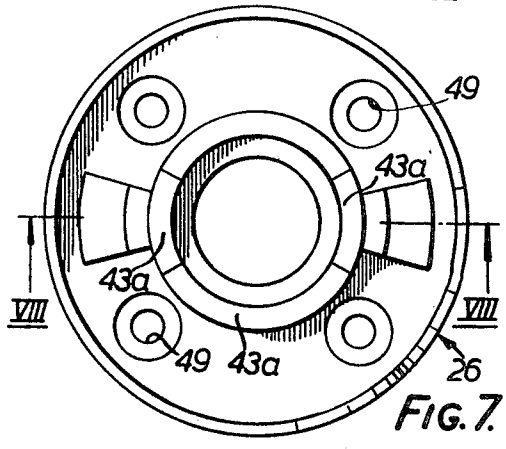

FIG. 7.

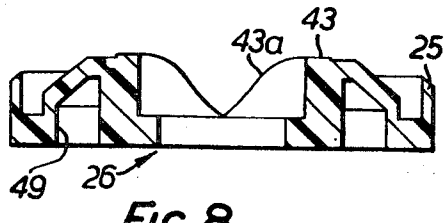

FIG. 8.

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DOOR FURNITURE

This invention relates to door furniture, and in particular to spindle mounted door handles. Such handles are referred to herein as "spindle fixing handles" and are mounted in pairs on the ends of the associated latch-operating spindle, which passes through the door and is normally of square cross section, as an alternative to rotatably mounting the handles on the door itself. The object of the invention is to provide spindle fixing handles which can be fitted and readily detached without the use of tools and in a manner which does not necessitate separate fixing screws and the like which can easily become loose and/or lost.

According to the invention a spindle-fixing handle incorporates a ratchet device adapted to grip the spindle when the handle is pushed thereon, and ratchet release means which when the handle is fitted are operative as a result of pushing the handle against the door to free the ratchet means and allow the opposite side handle complete with the spindle to be withdrawn. Prior forms of spindle-fixing handles have been designed so that the handle can be removed from the spindle leaving the latter in position, whereas the present invention is based on the novel concept of a handle which can be freed from the spindle but is not itself removed therefrom but the spindle rather withdrawn from the handle leaving the latter detached.

The ratchet means include two pawl-like members which may be molded from a plastics material and which respectively grip opposite sides of the spindle. The pawl members and the gripped sides of the spindle may each be formed with a row of inclined barblike teeth, and the pawl members may be mounted separately in the handle or they may be moulded integrally with a split collar which surrounds the spindle.

The handle may be associated with a mounting body or escutcheon which is fixed to the door so that is supports the handle in the rotational sense, and this body and all the main handle components apart from any metal trim and/or metal springs which may be provided for decoration are desirably moulded from plastics material. The ratchet release means preferably comprise a projection or projections within the handle which engages or engage between the pawl members with a wedge or camming action, as the handle is pushed into the mounting body, to urge the pawl members apart and hence free of the spindle.

The grip of the pawls on the spindle may be achieved solely by the resilience of the pawls themselves, but the grip may be spring assisted. To this end wedge or cam surfaces on the handle may engage the pawls under the influence of a spring urging the handle to its normal outward position with respect to the mounting body. The same spring may operate as a handle return spring which tends to centralize the handle or return it to an inoperative position. For this purpose the spring may engage a sleeve mounted in the handle so as to slide axially therein while rotating therewith, this sleeve engaging an appropriate circular cam formation in the mounting body.

Two embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings. In the drawings:

FIG. 1 is an axial sectional view of one of the embodiments which has a knob-type handle,

FIG. 2 is an outer end view with a handle closure trim plate removed to show internal detail,

FIG. 3 is a detail view of the pawl arrangement of this embodiment,

FIG. 4 is a view similar to that of FIG. 1, but of the other embodiment,

FIG. 5 is a sectional view on the line V—V in FIG. 4,

FIG. 6 is a sectional view on the line VI—VI in FIG. 5,

FIG. 7 is an outer face view of a mounting body of this embodiment, and

FIG. 8 is a sectional view on the line VIII—VIII in FIG. 7.

Referring to FIGS. 1 to 3 the handle 1 is in the form of a circular knob with an outer end closed by the snap-in trim plate 2 and which on the inner side, i.e. the side facing the door when fitted, has a cylindrical projecting skirt 3 which fits within a central bore 4 of a mounting body 5 molded with screw fixing holes 6 for attachment to the door (not shown) so that it provides rotational support for the handle. A moulded plastics collar 7 which fits closely within the handle skirt 3 has an inner end radial flange 8 which seats against a step 9 at the inner end of the bore 4 in order to provide axial location for the handle, and this flange is in the normal position axially spaced from the inner end of the skirt 3 as shown in FIG. 1. An annular recess 10 which surrounds the skirt 3 is of approximately the same depth as this spacing and provides clearance for the body 5 to allow the handle 1 to be pressed into the body 5 over the collar 7 when the handle is to be removed.

The collar 7 has two diametrically opposite splits 12 over most of its length but not over an inner end region including the flange 8, and at its outer end it has two tonguelike projections providing ratchet pawls 13 the opposed inner faces of which are moulded with a row of axially outwardly pointing barblike teeth 14. When the handle 1 is fitted these teeth engage, under the natural resiliency of the molding material, complementary teeth 15 formed on the sides of an end portion of the latch-operating spindle 16, only that end of which is shown in FIG. 1, so that the spindle is gripped by the handle through the pawls and cannot be removed by an axial pull. A tapered step 17 on the collar 7 at the inner end of each pawl 13 engages a complementary step 18 within the handle 1 with a camming action which urges the two pawls 13 together and hence into firmer engagement with the spindle 16 in the event of any attempt to pull off the handle 1, the grip of the pawls 13 thus increasing the harder the handle is pulled.

The two handles of a handle set are identical, and if they are to be removed from the door one of them is pushed towards the door and hence into its mounting body 5 until the gap with respect to the collar flange 8 is taken up. This forces two diametrically opposite wedgelike projections 19, which project internally of the handle skirt 3, into the splits 12 in the collar 7 to open out the pawls 13 until they are free of the spindle 16. With the handle kept pressed towards the door the opposite side handle can now be withdrawn complete with the spindle 16. Initial fitting and refitting is a simple process as the handles merely have to be pushed on to the spindle 16, the barbed ratchet teeth 14 and 15 allowing this one-way ratchet movement but preventing movement in the opposite direction. At the outer ends the pawls 13 project beyond the toothed spindle portions and are joined by a bridging portion 20 which provides a spindle stop for engagement by the corresponding end of the spindle 16 to limit the insertion of the latter into either handle.

The lever-type handle 22 of the other embodiment, the lever section of which is incompletely shown in FIG. 4, has a projecting skirt 23 with a cylindrical end portion 24 which engages within an upstanding rim 25 of a mounting body 26. Two pawls 27 with barblike teeth 28 again engage toothed sections spindle the spindle 29 but in this case each pawl is a separate moulding toothed at the outer end and having at the other end a rectangular-section projecting tail 30 which extends through an aperture 32 in the side wall of a sleevelike locating member 33 which surrounds the shaft 29 within the skirt 23. The tail end of each pawl 27 engages the end step of a counterbore 34 in the body 26. The locating member 33 is fixed within the handle skirt 23 and engages four ribs 35 moulded internally in the skirt, so that the member 33 locates angularly with respect to the handle 22.

A central tubular section 36 of the handle projects into the skirt 23 and has a square-section bore 37 which receives the spindle 29 and rotatably couples the latter to the handle. A return spring 38 which surrounds the section 36 engages the handle at its outer end and at its inner end engages a sleeve 39, which can slide over the section 36 and which is cut away so that it provides two parallel projecting tongues 40 (see par-

ticularly FIGS. 5 and 6). These tongues are slidable in peripheral guide slots 42 in the locating member 33, and at there inner ends they engage a cam profile 43 on the mounting body. The section illustrated in FIG. 8 shows one of the two troughs 43*a* in the profile 43, which troughs are respectively engaged by the tongues 40 when the handle is in the centralized resting position.

In addition to urging the sleeve 39 into engagement with the cam profile 43 the spring 38 urges the handle 22 away from the mounting body 26. The resultant engagement of inclined surfaces 44 on the locating member 33 with complementary surfaces 45 on the pawls 27 urges the latter firmly into engagement with the spindle 29. Thus the spring 38 performs a dual function. The located body 33 also has a square-section bore 48 which fits the spindle 29, and also couples the latter to the handle 22 through the ribs 35.

This handle is removed and fitted in exactly the same manner as described in connection with the first embodiment, the handle 22 being pushed into the mounting body 26 towards the door to free the pawls 27. In this case the pawls are flexed outwardly away from the spindle 29 by two wedge-shaped projections 46 which are molded at the inner end of the tubular section 36 and which engage between inclined surfaces 47 on the outer ends of the pawls 27. It will be appreciated that as the projections 46 enter between the pawls 27 the locating member 33 moves away from the surfaces 45, with the handle 22, and thus does not prevent the movement of the pawls away from the spindle 29. Also, any outward pull on the handle 22 again increases the grip of the pawls, due to the engagement of the latter by the locating member 33. The mounting body 26 has screw fixing holes 49 so that it can be fixed to the door, and the locating member 33 has an inner end portion which takes a bearing in a bore 51 in the body 26.

I claim:

1. A door handle assembly comprising a spindle adapted to be fitted through a door and having an end portion formed with ratchet teeth, and a door handle removably mounted on said end portion of the spindle and detachable therefrom said handle incorporating ratchet means including two pawllike members respectively adapted to grip the ratchet teeth on the spindle on opposite sides of the latter and ratchet release means which when the assembly is fitted to the door are operative to free the ratchet means, as a result of pushing the handle towards the door, to allow the spindle to be withdrawn from the door.

2. A door handle assembly 1 according to claim 1, wherein the pawl members are formed with a row of inclined barblike teeth for engagement with similarly barbed sides of the spindle.

3. A door handle assembly according to claim 1, wherein the pawl members are mounted separately in the handle.

4. A door handle assembly according to claim 1, wherein the pawl members are moulded integrally with a collar mounted within the handle.

5. A door handle assembly according to claim 1, wherein the ratchet release means comprise a projection or projections within the handle for engagement between the pawl members with a wedge or camming action, whereby to urge the pawl members apart.

6. A handle according to claim 1, wherein the grip of the pawls when the handle is fitted is achieved solely by the resilience of the pawls themselves.

7. A handle according to claim 1, wherein spring means act to urge the pawls to a spindle-gripping position.

8. A door handle assembly according to claim 1, including a mounting body adapted to be fixed to the door in order to support the handle in a rotational sense, the handle being movable axially of the spindle and into the mounting body with resultant corresponding movement of the release means relatively to the ratchet means which acts to free the ratchet means, the assembly also including spring means which urge the pawl member to a spindle-gripping position and also urge the handle to its normal outward position with respect to the mounting body so that the handle has to be moved against the spring means to operated the ratchet release means, the handle having wedge surfaces which engage the pawl members under the influence of the spring means.

9. A door handle assembly according to claim 8, wherein said spring means also operate as a handle return spring which tends to centralize the handle or return it to an inoperative position.

10. A door handle assembly according to claim 9, wherein the spring means engage a sleeve member mounted in the handle so as to slide axially therein while rotating therewith, which member engages an appropriate camlike formation in the mounting body.