Sept. 7, 1954 W. C. HANSEN 2,688,261

ADJUSTABLE HANDLE CONSTRUCTION

Filed June 21, 1951 2 Sheets-Sheet 1

FIG. 1.

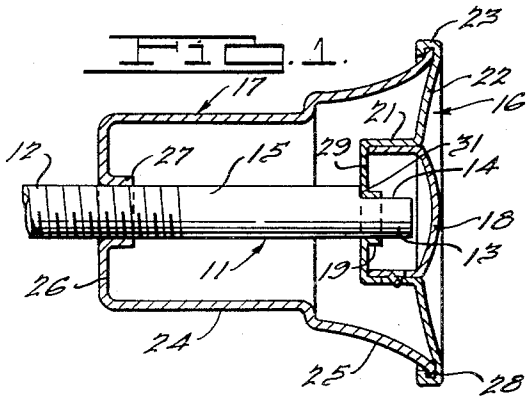


FIG. 2.

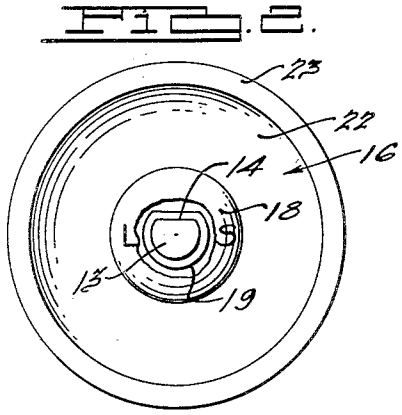


FIG. 3.

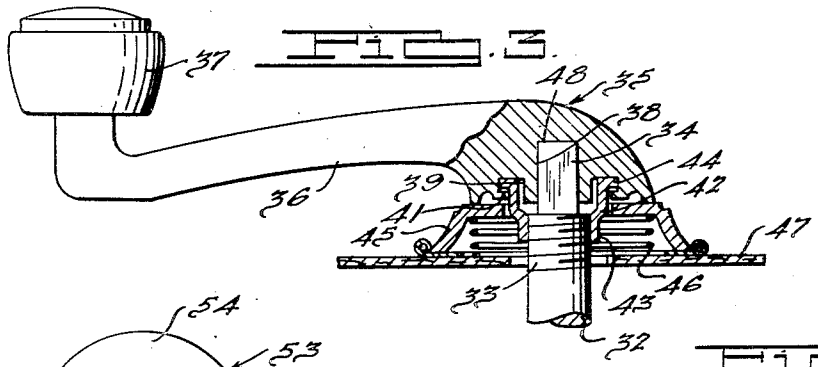
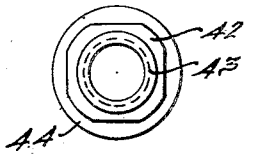


FIG. 4.



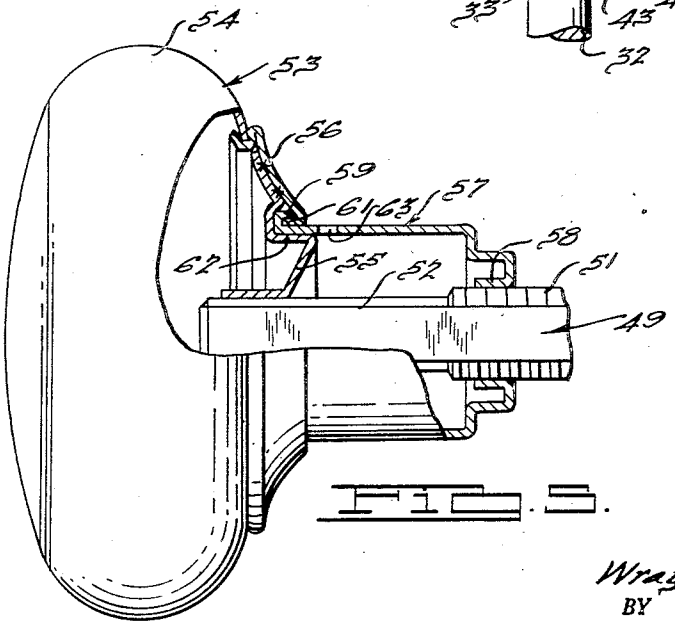


FIG. 5.

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Fig. 6.

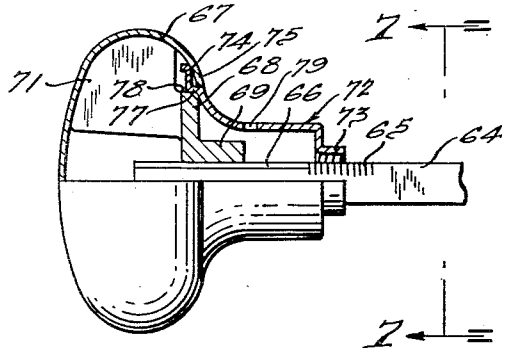


Fig. 7.

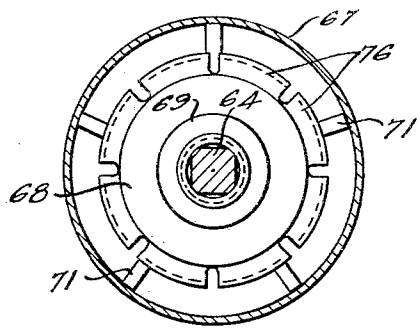


Fig. 5.

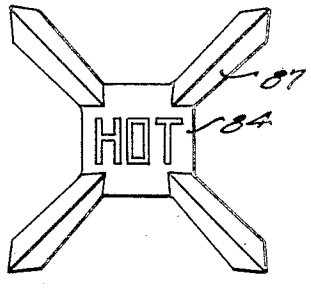
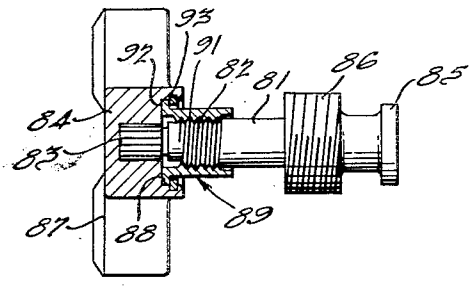


Fig. 8.



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ADJUSTABLE HANDLE CONSTRUCTION

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11 Claims. (Cl. 74—545)

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This invention relates to handle constructions, and more particularly to adjustable handles adapted for use in automobile, radio, and other installations wherein it is desired to axially adjust the handle relative to the shaft.

It is an object of this invention to provide a handle construction which is easily attachable to a shaft and which is thereafter axially adjustable relative to the shaft, and at the same time may be readily gripped to rotate, push or pull the shaft when desired. In this respect, this invention is an improvement over Patent No. 2,507,392, issued May 9, 1950, in the name of Earl J. Williams. In the latter patent, a handle structure is disclosed having means for axial adjustment, but which has the disadvantage that the handle cannot be readily gripped to rotate the shaft, since the normal gripping action will instead rotate the axial adjusting means without moving the shaft.

It is another object to provide an improved handle structure having the above properties, which is especially adapted to be used with shafts which are to be both rotated and moved axially during use, such as shafts which control switches, rheostats and the like.

It is another object, in some forms of my invention, to provide an improved handle structure of the above character, which is further provided with means for abutting the shaft in an axial direction to thereby bind the threads of the shaft and handle.

Other objects, features and advantages of the present invention will become apparent from the subsequent description, taken in conjunction with the accompanying drawings.

In the drawings:

Figure 1 is a cross-sectional view of a preferred embodiment of the improved handle structure which is especially adapted for use with shafts having rotational and axial movement;

Figure 2 is a front elevational view of the handle structure of Figure 1, showing the configuration of the shaft non-circular portion;

Figure 3 is a side view partly in cross section of a second embodiment of the invention, especially adapted for shafts such as are used in window regulators;

Figure 4 is an elevational view of the axial adjusting means in the embodiment of Figure 3;

Figure 5 is a side elevational view, partly in cross section, of a third embodiment of the improved handle construction, especially adapted for door knobs and the like;

Figure 6 is a view, partly in cross section, of a

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fourth embodiment of the improved structure, for use with door knobs of the type having a cast shaft-engaging portion;

Figure 7 is a cross-sectional view taken along the line 7—7 of Figure 6, with parts broken away for clarity, and showing the cooperation of the knob and the axial adjusting means;

Figure 8 is a side elevational view, partly in cross section, of a fifth embodiment adapted for use with a shaft controlling a valve or the like; and

Figure 9 is a front view of the view of the knob of Figure 8, showing the contour of the knob.

The invention comprises, in general, a handle adapted for mounting a shaft having a threaded shank portion, the handle being axially movable relative to the shaft but held against relative rotational movement. The invention further comprises axial adjusting means in the form of an annular member engageable between the shaft and the handle. In the preferred embodiments, this axial adjusting member comprises a threaded portion engageable with the threads on the shaft, and an annular flange portion or projection which extends outwardly and rotatably engages a complementary inwardly extending flange or projection on the handle. Since the flange portion of the handle thus overlaps the flange portion of the axial adjusting member, the latter is in noninterfering relation with the manual gripping portion of the handle and the latter may thus be easily gripped to rotate or otherwise move the shaft.

Referring more particularly to the figures, Figures 1 and 2 illustrate a preferred embodiment adapted for use with shafts which are to be rotated as well as moved axially. The shaft 11 has a threaded shank portion 12 and a noncircular portion 13 having a flat 14 thereon at its outer end. The threaded portion 12 is axially spaced from the flat 14 by a nonthreaded shaft portion 15. The handle comprises a knoblike gripping member, generally indicated at 16, and an axial adjusting member 17. In the illustrated embodiment, the gripping portion 16 is further provided with an insert 18, carrying suitable indicia, although this member in itself does not form part of the invention.

As is best seen in Figure 1, the gripping member 16, which is preferably a metal stamping, comprises a central apertured portion 19, of shape corresponding to shaft flat portion 13 and slidably mounted thereon, and a circular recessed portion 21 outwardly of the shaft-engaging portion 19 for the reception of insert 18. The member 16 further has a radially extend-

ing face portion 22 which may be of slightly concave shape, and around the periphery of this face portion an inturned finger-gripping flange 23 is provided.

The axial adjusting member 17 is of annular shape and in particular may have an inner cylindrical portion 24 and an outer flared portion 25. The inner end of the cylindrical portion is provided with a radial shaft-gripping portion 26 having threaded portion 27 engageable with the threads 12 on shaft 11. The outer end of flared portion 25 is provided with an outwardly extending radial flange 28, and this flange is disposed within the inturned flange 23 on member 16.

In operation, with the knob and shaft assembled as shown in Figures 1 and 2, the shaft will normally be rotated by manually gripping flange 23 and twisting member 16. This twisting movement will be transmitted through shaft-gripping portion 19 of member 16 to the flat portion 13 of shaft 11. The shaft may likewise be moved axially by axial movement of flange 23, this axial force being transmitted through flange 28 of member 17 to threads 12 on the shaft. When it is desired to adjust the knob axially relative to the shaft, the outer surface of member 17 is manually gripped and rotated. When this action occurs, flange 28 will rotate within flange 23, and threads 27 will move axially on threads 12. The member 17 will thus carry with it the member 16, so as to move the knob axially relative to the shaft.

The knob is also provided with means for bottoming the shaft and thereby binding threads 12 and 27. This means preferably comprises the radial surface 29 on recessed portion 21 of the knob, this radial surface being engageable with shoulder 31 at the inner end of flat 14. It will be observed that, upon continued rotation of member 17 to feed the knob inwardly on the shaft, surfaces 29 and 31 will come into abutting relation, thereby preventing member 17 from further axial movement. The threads 12 and 27 will thus bind to lock the knob firmly to the shaft.

Figure 3 illustrates a second embodiment of the invention for use with shafts such as are used to control window regulators and the like. In this embodiment, the shaft 32 is provided with a threaded shank portion 33 and a noncircular portion 34. The handle 35 for rotating the shaft is of the conventional type having a radial extension 36 and a finger knob 37. The inner end of handle 35 is provided with an aperture 38 for the sliding reception of portion 34. The handle is further provided with a recess 39 of annular shape, this recess having an inturned flange 41. The axial adjusting member 42 has a threaded portion 43 engageable with threads 33 on the shaft, and an outturned flange 44 disposed within recess 39 and engageable with inturned flange 41 thereof. It will therefore be seen that rotation of member 42 will axially move handle 35 relative to shaft 32, but that this adjusting means in no way interferes with the manual actuation of handle 35 to rotate the shaft. The conventional escutcheon 45 having spring means 46 therein may be provided between the handle 35 and the upholstery 47 of the door. It will be observed that, as in the previous embodiment, a bottoming action of the shaft relative to the handle is possible, since the end surface 48 of the shaft may engage the bottom of recess 38, to thus bind the threads 33 and 43.

Figure 5 illustrates a third embodiment of a knob construction espectially adapted for use with the shafts of door latches and the like. The shaft 49 in this embodiment is provided with the conventional discontinuous threads 51 and the noncircular portion 52 outwardly thereof. The knob 53 comprises a hand-gripping portion 54 and a slidable shaft-engaging portion 55, these portions being connected by an intermediate element 56 which may be welded or otherwise secured to the other two elements. The axial adjusting member, generally indicated at 57, is of generally cylindrical shape and comprises a threaded portion 58 engageable with threads 51 of the shaft, and an outturned flange 59. The latter flange is preferably engageable with an inturned flange 61 on locking element 56 of the knob, the member 57 being frictionally supported by an annular surface 62 on the shaft-engaging portion 55 of the knob. This frictional support serves to prevent unwanted rotation between the handle 54 and member 57 when the latter is frictionally pressed against a door escutcheon (not shown) during use. It will be observed that, as in the previous embodiments, manual rotation of knob 53 will normally be permitted, and that axial adjustment of the knob relative to shaft 49 is accomplished merely by rotating member 57. An aperture 63 may be provided in the axial adjusting element 57 for receiving a rotating tool.

Figures 6 and 7 illustrate a fourth embodiment of the invention which is generally similar to the embodiment of Figure 5 but which utilizes a door knob of the type having a cast internal member engageable with the shaft. In this embodiment, the shaft 64 is provided with a threaded portion 65 and a noncircular portion 66 as in the previous embodiment. The knob comprises a rounded annular hand-gripping portion 67 and an internal member 68 such as a casting having a slidable shaft engaging portion 69 and a plurality of circumferentially spaced ribs 71 extending outwardly of the shaft-engaging portion and adapted to support the hand-gripping element 67 which is preferably clamped thereover. The axial adjusting member 72 comprises the threaded portion 73 and an outturned flange 74 engageable under the inturned edge 75 of the hand-gripping portion 67. In particular, the flange portion 74 may comprise a plurality of resilient fingers 76 as seen in Figure 7, these fingers being urged against the internal surface of the hand-gripping element. The base 77 of these fingers is adapted to rotatably engage the annular surface 78 on the casting 68, so that the member 72 is rotatably supported by the knob. As in the previous embodiment, a tool-receiving aperture 79 may be provided on member 72. In operation, the resilient fingers 76 will frictionally engage the inturned edge 75 of the hand-gripping element, the latter being firmly secured to the casting by means of ribs 71.

Figures 8 and 9 illustrate a fifth embodiment of the invention which is especially adapted for use with shafts controlling valve elements. In this embodiment, the shaft 81 is provided with a threaded portion 82 and a fluted extension 83 for engagement with the knob 84. The inner end of the shaft may also have a valve element 85 and the conventional lead threads 86. The knob is a conventional type having a plurality of radial gripping elements 87, and is also provided with a recess 88 at its inner end. The axial adjusting member 89 has a threaded portion 91 engageable with threads 82 of the shaft, and an outturned flange 92 disposed within recess 88

The flange 92 is preferably retained in the recess by a snap ring, washer, or similar element 93, so that the member 89 is rotatably disposed within recess 88. It will be noted that in this embodiment, as in those of Figures 1 to 4, the end of shaft 81 may be bottomed by continued rotation of the member 89.

It will thus be seen that a handle construction has been provided which is especially adapted for attachment to shatfs which are to be manually rotated and axially moved, and that the construction provides a means by which the handle may be axially adjusted with respect to the shaft, this means being in noninterfering relation with the manual gripping portion of the handle, so that the latter may be easily gripped to rotate the shaft. The construction further provides means whereby, by continued rotation of the axial adjusting means, the handle may be firmly secured to the shaft to prevent relative movement between these parts.

While it will be apparent that the preferred embodiments of the invention herein disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In combination, a rotatable shaft having a threaded portion thereon, a handle having an outer hand-gripping portion and a shaft-engaging portion mounted on said shaft for relative axial movement thereon but held against relative rotational movement, said shaft being rotatable by manual rotation of said hand-gripping portion, and axial adjusting means for moving said handle relative to said shaft, said means comprising a threaded member threadably engageable with said shaft threaded portion, said threaded member being relatively rotatably engageable with a portion of said handle, whereby said member is in noninterfering relation with said hand-gripping portion of the handle, said handle being axially movable during rotation of said threaded member on said shaft.

2. In combination, a rotatable shaft having a threaded portion thereon, a handle having an outer hand-gripping portion and a shaft-engaging portion mounted on said shaft for relative axial movement thereon but held against relative rotational movement, said shaft being rotatable by manual rotation of said hand-gripping portion, and axial adjusting means for moving said handle relative to said shaft, said means comprising a threaded member threadably engageable with said shaft threaded portion, an outwardly projecting portion on said threaded member, and an inwardly projecting portion on said handle and relatively rotatably engageable with said outwardly projecting portion, said mutually engaging portions being in non-interfering relation with the manual gripping portion of said handle.

3. A handle adapted for mounting on a rotatable shaft, said handle comprising an outer hand-gripping portion, a shaft-engaging portion adapted to interfit with said shaft to allow relative axial movement thereon but prevent relative rotational movement, said shaft being rotatable by manual rotation of said hand-gripping portion, and axial adjusting means comprising a threaded member adapted to threadably engage said shaft, said threaded member being relatively rotatably connected to said hand-gripping portion, said connection being in noninterfering relation with said hand-gripping portion, said handle being axially movable during rotation of said threaded member on said shaft.

4. A handle adapted for mounting on a rotatable shaft, said handle comprising an outer hand-gripping portion, a shaft-engaging portion adapted to interfit with said shaft to allow relative axial movement thereon but prevent relative rotational movement, said shaft being rotatable by manual rotation of said hand-gripping portion, axial adjusting means comprising a threaded member adapted to threadably engage said shaft, an outwardly projecting portion on said threaded member, an inwardly projecting portion on said handle and relatively rotatably engageable with said outwardly projecting portion, said mutually engaging portions being in noninterfering relation with the manual gripping portion of said handle, and a radial surface on said handle adapted to engage said shaft, whereby the relative axial movement of said handle and shaft is limited.

5. In combination with a shaft of the rotatable type, a knob having a central portion adapted to be mounted on said shaft for relative axial movement but held against relative rotational movement, a web portion on said knob, an inturned flange on the outer edge of said web portion and adapted to be manually gripped for rotating the knob, an axial adjusting member comprising a threaded member adapted to threadably engage said shaft, and an outturned flange on said axial adjusting member and interfitting with said intured flange, whereby said axial adjusting member is relatively rotatably connected to said knob.

6. The combination according to claim 5, further provided with a substantially radial surface on said knob and adapted to engage said shaft, whereby continued rotation of said axial adjusting means will bind its threaded portion with the threaded portion of said shaft.

7. In combination, a rotatable shaft having a threaded portion, a knob having a central aperture interfitting with said shaft to permit relative axial movement but prevent relative rotational movement therebetween, a recessed portion surrounding said aperture and adapted to receive an indicia insert, an inturned peripheral flange on said knob and adapted to be manually gripped to rotate the shaft, axial adjusting means comprising a threaded member threadably engageable with the threaded portion of said shaft, an outturned flange on said threaded member and interfitting with said inturned flange, and mutually engageable radial surfaces on said knob and shaft for limiting the relative axial movement between said parts.

8. In combination, a rotatable shaft having a threaded portion, a handle having a shaft-engaging portion adapted to slidably but non-rotatably interfit with said shaft, an arm extending radially from said shaft-engaging portion, and a recess at the inner end of said shaft-engaging portion; axial adjusting means comprising a threaded member engageable with the threads on said shaft, an outturned flange on said threaded member and disposed within said recess, and means for preventing substantial axial movement of said flange within said recess, whereby said threaded member and handle are relatively rotatably connected.

9. In combination, a rotatable shaft having a threaded portion, a knob having a shaft-engaging portion interfitting with the shaft to allow relative axial movement but prevent relative rota-

tional movement therebetween, a hand-gripping shell connected to said shaft-engaging portion, an axial adjusting member having a threaded portion threadably engageable with the threaded portion of said shaft, an outturned flange on said axial adjusting member, and an inturned flange on said knob, said flanges being operatively engageable to permit relative rotation between said knob and said axial adjusting means.

10. In combination, a rotatable shaft having a threaded portion and a noncircular portion, a knob having a hand-gripping shell, a shaft-engaging member slidably but non-rotatably supported by said non-circular shaft portion and having a plurality of circumferentially spaced ribs for supporting said shell, axial adjusting means having a threaded portion threadably engaged with the threaded portion of said shaft, an inturned edge on said handgripping shell, and a plurality of outwardly extending resilient fingers frictionally engageable with said inturned edge, whereby rotation of said axial adjusting means will cause axial movement of said knob.

11. In combination, a rotatable shaft having a threaded portion, a knob having a shaft-engaging portion adapted to slidably but non-rotatably interfit with said shaft and an annular recess at the inner end of said shaft-engaging portion, axial adjusting means comprising a threaded member engageable with the threaded portion of said shaft, an outturned flange on said threaded member and disposed within said recess, and means within said recess for preventing substantial axial movement of said outturned flange relative to said knob, whereby rotation of said threaded member will cause relative axial movement of said knob and shaft.

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