Jan. 29, 1957 C. A. ELLIS 2,779,184

DOORKNOB AND SPINDLE STRUCTURE

Filed April 28, 1954 2 Sheets-Sheet 1

Fig. 1.

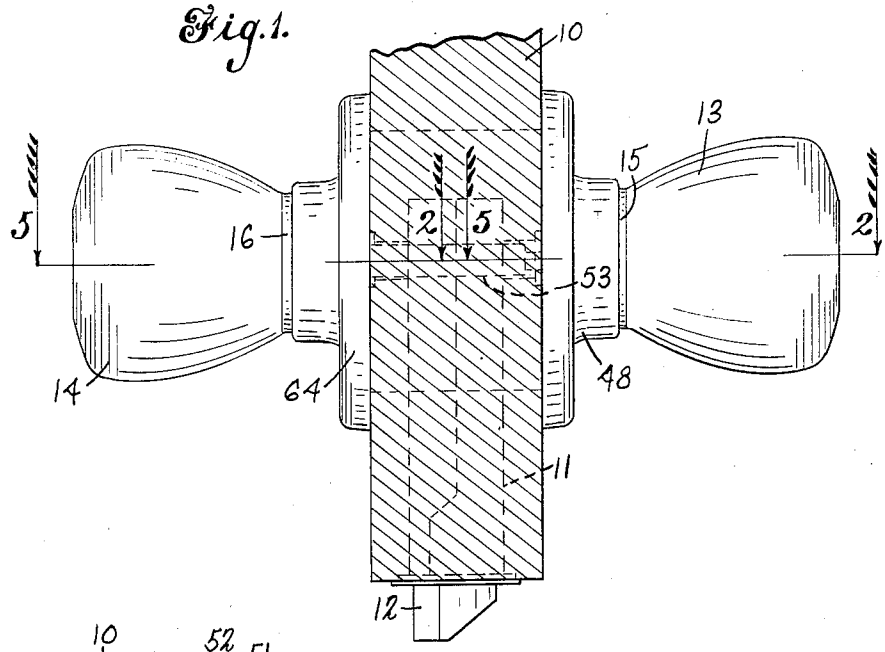
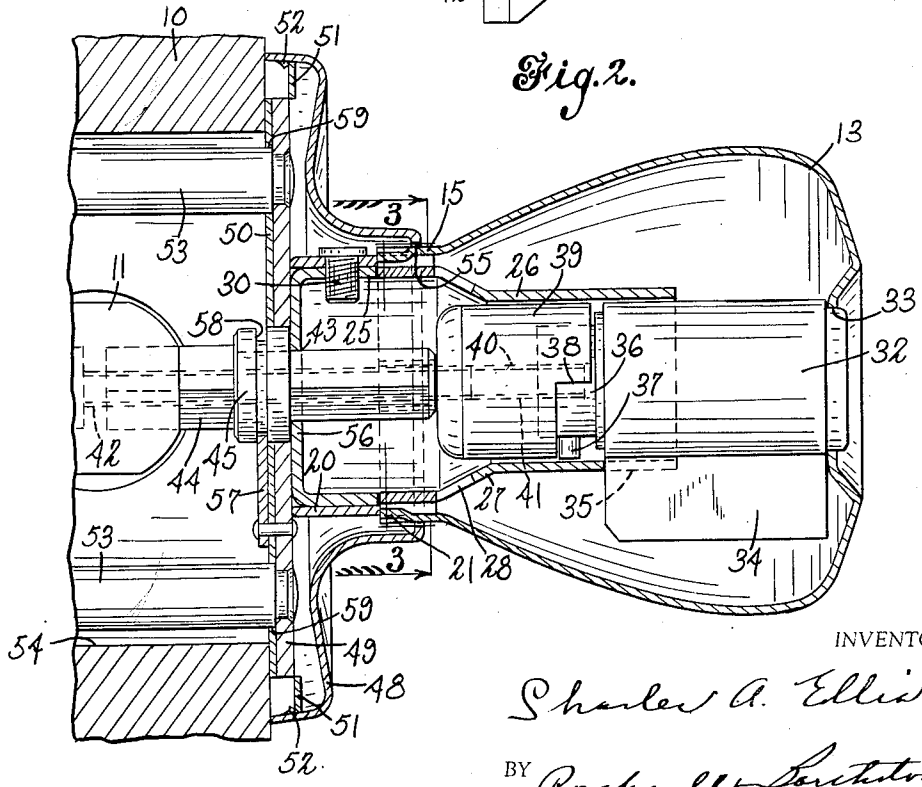


Fig. 2.



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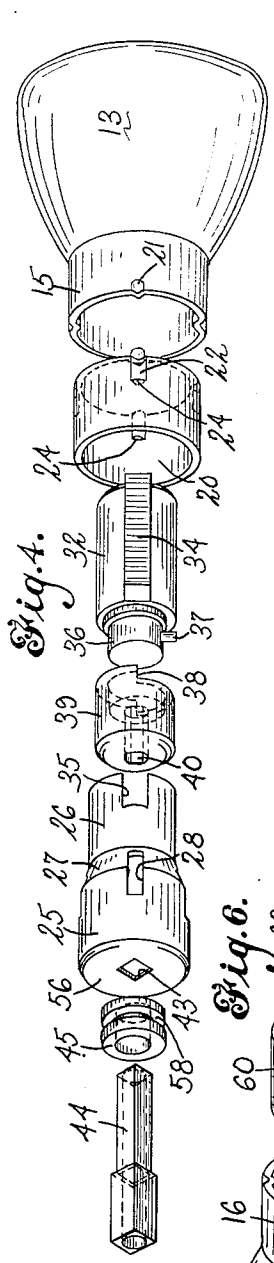


Fig. 4.

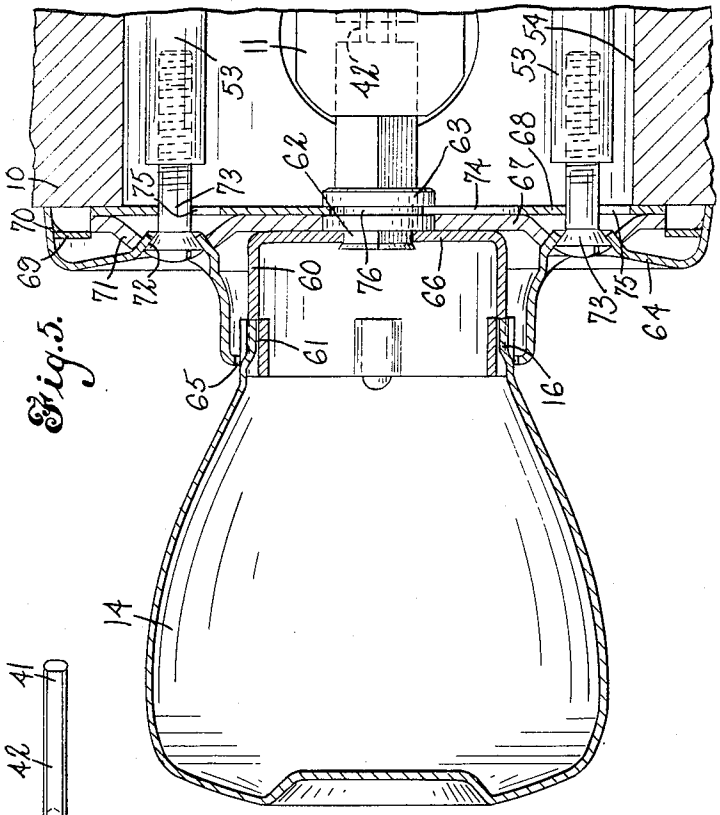


Fig. 5.

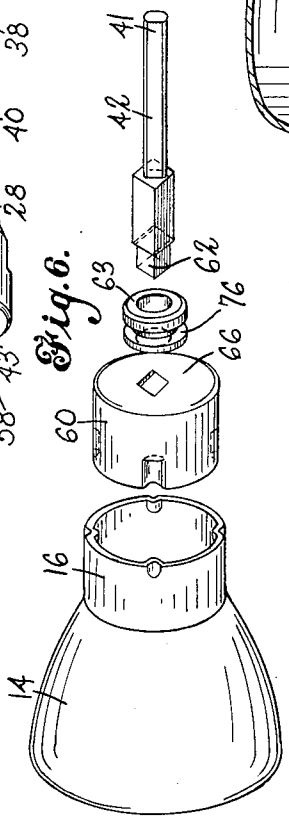


Fig. 6.

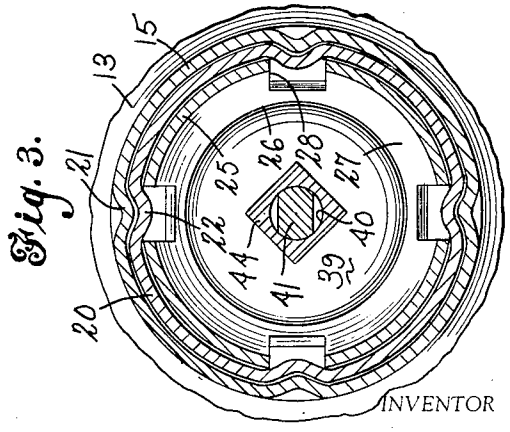


Fig. 3.

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DOORKNOB AND SPINDLE STRUCTURE

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Application April 28, 1954, Serial No. 426,231

11 Claims. (Cl. 70—216)

This invention relates to a door knob structure and more particularly to the construction of a door knob, the parts of which may be economically made and assembled and at the same time present an ornamental appearance.

As illustrated the door knob structure is of the type employed with a tubular lock or latch structure wherein the lock or latch mechanism is embodied in a tubular case inserted into a bore made through the edge of the door. It will be understood, however, that the construction is not limited to this particular application but is capable of use in connection with door locks and latches of other types.

In the embodiments of the invention illustrated there is shown a knob structure for use at the inside of the door and one for use upon the outside of the door, the latter being provided with a key-operated cylindrical lock mechanism so that the door may be opened from the outside by the use of a key when the latch bolt is dogged or is otherwise held against retraction. While the two structures differ in some respects, they also employ common novel principles.

As illustrated, each of the knobs is mounted upon a rose or escutcheon for rotating movement with respect thereto, and the escutcheons are adapted to be secured together upon opposite sides of the door in proper alignment with the tubular lock case. Spindles are nonrotatably connected to the knobs which spindles extend into the lock casing to engage with rollbacks or other bolt-retracting mechanism, not shown. According to the present arrangement the spindle of the inner knob extends through the spindle of the outer knob and is engaged and actuated by the cylindrical lock mounted in the outer knob, as will be hereinafter explained.

The present construction provides a simple and economical arrangement for securing the knob spindle nonrotatably to the knob by means of a cup-shaped member or spindle shank which may readily be secured to the hollow barrel of the knob and nonrotatably engaged with the spindle. Also, in the construction for the outer knob means are employed for securing the lock cylinder in place in the knob in a novel way and providing novel means of connection between the cylinder and the spindle of the inner knob.

One object of the invention is to provide new and improved knob structure to be employed at the inside of the door.

A further object of the invention is to provide a new and improved knob structure having a key-operated lock therein to be employed at the outside of the door.

A further object of the invention is to provide a new and improved knob and knob spindle construction which may be economically manufactured and which at the same time will be of durable construction and of pleasing appearance.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a horizontal sectional view of a portion of a door having my improved knob structure applied thereto;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is an exploded view of the arrangements embodied in the knob construction shown in Fig. 2;

Fig. 5 is a sectional view on line 5—5 of Fig. 1; and

Fig. 6 is an exploded view of the elements employed in the knob construction shown in Fig. 5.

To illustrate a preferred embodiment of my invention, I have shown the novel knob constructions as applied to a door 10 in which is mounted a tubular lock case 11, the case being provided with a latch bolt 12 of the usual form. Knob members 13 and 14 are secured at the outer and inner sides of the dor respectively, these knobs being of ornamental form and sheet metal construction, as shown in Figs. 2 and 5. These knob blanks may be formed by cupping and drawing operations, a plug being placed in the knob during the drawing operation and then withdrawn to provide the cylindrical open end portions 15 and 16, shown particularly in Figs. 4 and 5.

As shown more especially in Figs. 2 and 4, a sleeve member 20 open at both ends is inserted within the portion 15 of the outer knob 13. For this purpose the barrel or cylindrical portion 15 of the knob is provided with a number of depressions or inwardly displaced axially extending areas 21, and similar inwardly displaced portions 22 are provided about the sleeve 20 to register with the depressions 21 and to receive the latter therein, as shown in Figs. 2 and 3. At the bottom of the depressions 22 the metal is cut through, as shown at 24, so as to provide effective stops against which the edge of the cylindrical portion 15 of the knob may abut to limit the insertion of the sleeve member in the knob.

The sleeve is then cemented or otherwise secured to the knob. Within the sleeve 20 is received a spindle shank provided with a relatively large inner portion 25, this shank having a forwardly reduced cylindrical portion 26 which joins the larger inner portion 25 on a taper 27 wherein are provided a plurality of slots 28. These slots 28 are provided to receive the depressed areas 22 of the sleeve 20 so that the portion 25 of the spindle shank will fit snugly against the sleeve. The parts 20 and 25 may be secured together by means of a fastening element such as the screw 30.

A lock cylinder 32 is mounted within the knob, the ends of the cylinder being supported in an opening 33 at the front of the knob and in the reduced portion 26 of the knob shank. The cylinder is provided with an extension 34 received in a recess or notch 35 in the spindle shank 26 to prevent rotation of the cylinder. Within the cylinder is mounted the usual key barrel 36 provided with a crank pin 37, Fig. 4, which engages a shoulder 38 on a cup-shaped member 39 which surrounds the key barrel so that this latter member is rotated upon rotation of the key barrel 36. It will be understood that as is usual this provides for lost motion between the key barrel and the cup-shaped actuating member 39.

The cup-shaped member 39 is provided with a polygonal opening 40 which nonrotatably receives the outer polygonal end 41 of the inside knob spindle 42, as will be hereinafter more fully explained.

The portion 25 of the spindle shank is provided with a polygonal opening 43 which receives a similarly shaped outside knob spindle 44 to nonrotatably connect these parts together, and upon the spindle 44 is secured a bearing collar 45 by brazing or other suitable means. When the spindle 44 is inserted into the spindle shank, as shown in Fig. 2, it is secured to this shank member by brazing or the like, and the outer end of the spindle engages the cup-shaped member 39 to hold it in position against the

lock cylinder 32. Thus the knob assembly consisting of the knob itself, the sleeve 20, the spindle shank consisting of the parts 25 and 26, the lock cylinder with its associated parts, the spindle 44 and bearing collar 45, is complete with these parts all secured together.

A rose assembly which will now be described is secured to the knob assembly described above. This rose assembly comprises a rose 48 within the hollow base of which is disposed a plate 49, this plate being held in place by a second plate 50 provided with outwardly displaced lugs 51 at its ends, these lugs being adapted to be covered by beads 52 on the interior face of the rose so that they will be secured in place. To the plate 49 are secured sleeves 53 which extend into the bore 54 in the door to receive screws passing through the rose of the inside knob to be described hereinafter.

The rose is provided with an opening 55 through which is received the cylindrical portion 15 of the knob body so that the closed end 56 of the spindle shank bottoms on the plate 49. The rose assembly may then be secured to the knob assembly by a retaining plate 57 secured to the plate 49 and having its edge portion extending into an annular recess 58 in the bearing collar 45. It will be recalled that this bearing collar is secured to the spindle 44 which is in turn secured to the spindle shank of the knob. The plate 50 is provided with openings 59 through which the sleeves 53 extend and is also provided with a central opening as is the plate 49 to receive the bearing collar 45 and provide a bearing for the latter in its rotating movement.

The inside knob assembly comprises the knob 14 and a cup-shaped shank member 60 secured to the knob body 16 at 61 in the same manner as that in which the sleeve 20 is secured to the knob 13 so that these parts are nonrotatably secured together. To the member 60 is secured a squared portion 62 of the inner knob spindle 42, and upon this portion 62 is secured a bearing collar 63.

The inside rose assembly comprises the rose 64 provided with an opening 65 to receive the inner end of the knob assembly so that the bottom 66 of the cup-shaped member 60 rests upon a plate 67 disposed within the rose. The plate 67 is held in place by a retaining plate 68 which is provided at its ends with outwardly displaced portions 69 engaged by beads 70 upon the interior of the rose. The plate 67 has struck out portions 71 to engage the interior of the rose, these struck out portions and the rose itself being provided with openings 72 to receive screws 73 to engage internal threads upon the sleeves 53 to secure the inside rose assembly to the outside rose assembly.

The plate 68 is provided with a keyhole slot 74 to receive therethrough the spindle 62 and elongated or keyhole slots 75 to receive the screws 73. The provision of slots of this shape permits the plate to be slipped over the spindle 62 and then moved laterally into place so that the edge of the keyhole slot 74 enters an annular recess 76 in the bearing collar 63 so as to secure the rose assembly to the knob assembly.

With this construction it will be seen that each of the knob and rose assemblies may be applied to the door as a unit and secured thereto by engagement of the screws 73 in the retaining sleeves 53, thus holding the inside and outside knobs and roses securely in place. The spindles are aligned with the usual openings in the latch case 11, and the portion 42 of the inside spindle is telescopically received in the spindle of the outside knob so that the inside spindle may extend into the cup-shaped member 39 and be rotated thereby through the operation of the key barrel mounted in the lock cylinder in the outside knob.

It will be noted that in connection with both inside and outside, the inner end of the knob body is received within the escutcheon so that there is no exposed shank such as is usual in structures of this kind. Moreover, the knob tapers gradually from its largest diameter adjacent its outer end to the smaller inner end which is

received in the escutcheon so that there has been no heavy reduction to form a shank. The diameter of the inner necked-down portion of the knob structure is not less than one half the largest diameter adjacent the outer end, while the entire length of the knob is approximately equal to the major knob diameter adjacent the outer end.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. A knob structure comprising a knob body having an open substantially cylindrical portion at one end, a cylindrical member telescopically received within said portion, a spindle fixed to said member to rotate therewith, said knob portion and said member having interengaging inwardly displaced areas in their overlapping portions to prevent relative rotation therebetween, said member being secured to the knob against longitudinal displacement and a plate member extending across the open end of the knob and having a bearing for said spindle.

2. A knob structure as in claim 1 wherein said spindle is nonrotatably secured to a cup-shaped member, and the said cup-shaped member is received within the knob and within said cylindrical member and secured to the latter.

3. A door knob and rose assembly comprising a hollow knob body open at its inner end and a cup-shaped member secured to said body and having a knob spindle secured thereto, a bearing collar fixed to said spindle, a rose having a flaring base and an opening to receive said knob and member, a plate within the base and secured thereto, said plate having an opening to receive the bearing collar and spindle, and means engaged with the plate and said collar to hold the rose structure in assembled relation with the knob structure.

4. A door knob and rose assembly comprising a hollow knob body open at its inner end and a cup-shaped member secured to said body and having a knob spindle secured thereto, a bearing collar fixed to said spindle, a rose having a flaring base and an opening to receive said knob and member, a plate within the base and secured thereto, said plate having an opening to receive the bearing collar and spindle, means holding said plate against the inner end of said cup-shaped member to hold the rose structure in assembled relation with the knob structure, said holding means comprising an annular recess in the bearing collar, and a member secured to the plate and engaged in said recess.

5. A knob structure comprising a knob body having an open substantially cylindrical portion at one end, a cylindrical member telescopically received within said portion, said cylindrical knob portion having spaced longitudinal recesses in the wall thereof extending to its open end, said cylindrical member having corresponding depressed areas in its wall received in said recesses, the metal of said member being cut through at the inner ends of said depressed areas to form a stop for the end of the knob, and means for securing said member to the knob.

6. A door knob and rose assembly comprising a hollow knob body open at its inner end and a cup-shaped member secured to said body and having a knob spindle secured thereto, a bearing collar fixed to said spindle, a rose having a flaring base and an opening to receive said knob and member, a plate within the base and secured thereto, said plate having an opening to receive the bearing collar and spindle, and means engaged with the plate and said collar to hold the rose structure in assembled relation with the knob structure, the opening in said plate snugly receiving said collar to form a bearing for the same.

7. A lock structure comprising a hollow knob body open at its inner end, a cup-shaped member received within the knob with the closed end thereof adjacent the open

end of the knob, means securing said member to the knob, a lock body within the knob supported at one end by the front wall of the knob structure and received at its other end in the open end of said cup-shaped member, said lock body having a lateral extension, and said cup-shaped member having a slot to receive said extension to hold the lock body against rotation in the knob, a hollow spindle rigidly and nonrotatably secured to the bottom portion of said cup-shaped member and extending on both sides thereof, said lock body comprising a rotatable key barrel, a second spindle rotatably received within the first and operatively connected to the key barrel, and a second knob rigidly secured to said second spindle.

8. A knob and rose assembly comprising a hollow knob body having a knob spindle secured thereto, a rose having an opening to receive the inner portion of the knob, means rotatably connecting said knob to the rose, a bearing collar on said spindle, and means carried by the rose to provide a bearing for said collar.

9. A self-containing knob and rose assembly comprising a knob having an open end, a cup-shaped member having an open end, said cup-shaped member being partially received in the knob with the open end of the knob facing the closed end of the cup-shaped member, a knob spindle nonrotatably secured to the cup-shaped member, a rose having an opening within which the cup-shaped member is received, a collar on said spindle, means within said rose to provide a bearing for said collar, and means for rotatably securing the spindle in said bearing means.

10. A door knob structure comprising an integral hollow thin-walled body having an inner open end reduced in cross sectional size with respect to that of the outer end, a spindle-carrying member received telescopically within said open end and nonrotatably secured to the knob body, a spindle carried by said member, a rose having a part extending outwardly toward the knob and being provided with an opening to receive the adjacent end of the knob body, a plate secured to the rose and having a bearing opening for said spindle, and means rotatably securing said spindle to said plate.

11. A door knob structure comprising an integral hollow thin-walled body having an inner open end reduced in cross sectional size with respect to that of the outer end, a spindle-carrying member received telescopically within said open end and nonrotatably secured to the knob body, a spindle carried by said member, a rose member adapted to be secured to a door, said rose having an outwardly projecting part provided with an opening to receive the inner open end of the knob body, and a plate secured to the rose and having a bearing opening for said spindle.

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