Nov. 22, 1949 A. SCHOEPE ET AL 2,489,160

DOOR KNOB AND METHOD OF MAKING THE SAME

Filed Oct. 20, 1947

FIG. 1.

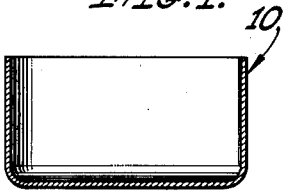


FIG. 2.

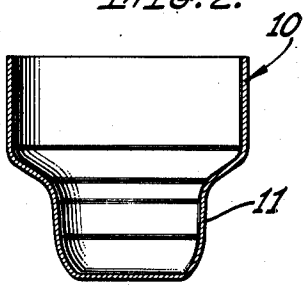


FIG. 3.

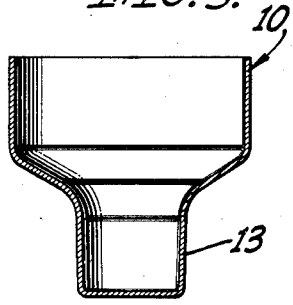


FIG. 4.

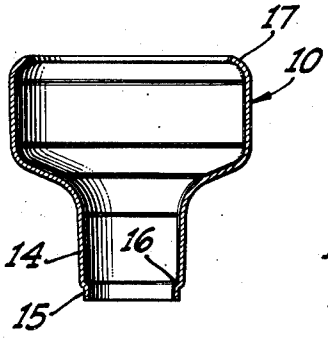


FIG. 5.

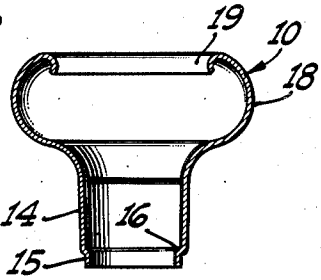


FIG. 6.

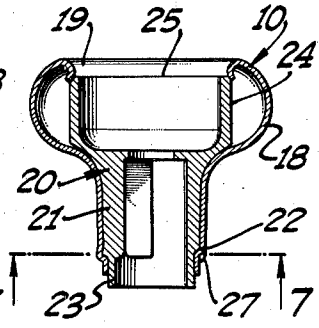


FIG. 7.

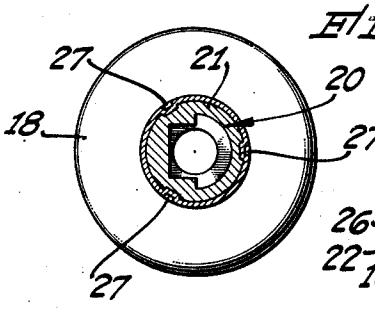


FIG. 8.

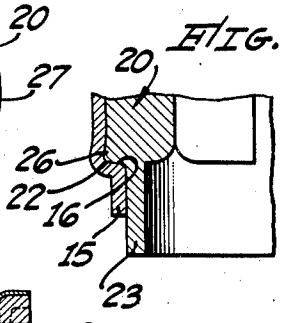


FIG. 9.

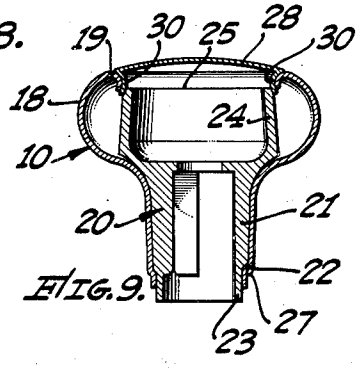
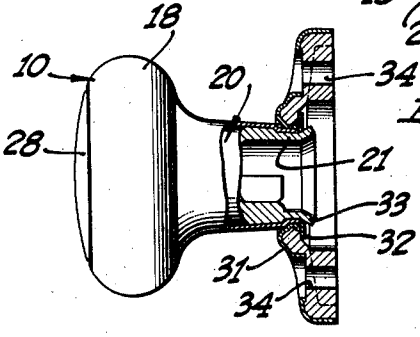


FIG. 10.



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Patented Nov. 22, 1949

2,489,160

UNITED STATES PATENT OFFICE

2,489,160

DOORKNOB AND METHOD OF MAKING THE SAME

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Application October 20, 1947, Serial No. 780,810

6 Claims. (Cl. 292—347)

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This invention relates to improvements in door knobs and methods of making the same. An object of the invention is to provide an improved door knob consisting essentially of an insert applicable to the spindle of a door lock covered by an outer sheet metal shell which is firmly locked to the insert against movement relatively thereto and a cap applicable to the outer end of the shell to complete the closure over the end of the insert.

One of the improvements resides in the manner in which the shell is formed to enable the door knob to be easily, quickly and economically manufactured and assembled with the insert. Another improvement relates to the manner in which the shell is attached to the insert so that it will not loosen thereon but instead will enable high torsional forces to be transmitted from the shell through the insert to the spindle.

Still another improvement resides in the manner in which the cap is applicable to the shell wherein the flange of the cap is spread in the course of application by the insert and bent beneath a curl that is formed on the outer end of the shell causing the cap to be firmly locked in place and the parts to be stressed in the course of assembly in that the inturned curl on the outer end of the cap is stretched and the end of the insert is compressed or contracted. This arrangement assists in maintaining the cap firmly in position. Still another improvement relates to the manner in which the rosette is easily and quickly and permanently attached to the improved knob.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein,

Fig. 1 is a sectional view through a cup-shaped blank from which the shell of the improved door knob is formed;

Figs. 2, 3, 4 and 5 are sectional views of progressive stages of drawing the shell from the blank, shown in Fig. 1, by means of dies that may be employed in a punch press;

Fig. 6 is a sectional view illustrating the insert as having been assembled with the shell;

Fig. 7 is a transverse section taken substantially upon the line 7—7 upon Fig. 6;

Fig. 8 is a partial view in vertical section on an enlarged scale to illustrate somewhat exaggerately the detail of construction;

Fig. 9 is a sectional view illustrating the cap of the door knob as having been applied; and

Fig. 10 is a view in side elevation of the door knob parts being broken away and shown in vertical section and illustrating the rosette as having been applied to the door knob.

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Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, we manufacture the shell from a cup-shaped blank generally indicated at 10 on Fig. 1. This blank is subjected to the treatment of progressive dies mounted in a punch press and first force the bottom downwardly as indicated at 11 (see Fig. 2) and then to deepen the bottom as indicated at 13 (see Fig. 3). The next set of dies serve to punch out the contracted bottom and to form at the end of the neck 14 a contraction 15 presenting an internal shoulder 16. These dies also start the inward turning indicated at 17 of the top edges of the blank. The final dieing operation completes the shell by properly shaping the head 18 and curling the top edges of the shell inwardly as indicated at 19.

An insert is provided indicated at 20 which is preferably in the form of a die casting. This insert has a generally cylindrical portion 21 the interior of which is shaped so as to fit and be applicable to the spindle of a door lock. Adjacent at its end it presents an inwardly facing shoulder 22 on its exterior designed to be engaged by the outwardly facing shoulder 16 on the neck 14 of the shell. Beyond the shoulder 22 there is a short extension 23 which is of such a length as to protrude inwardly a short distance beyond the inner end of the contraction 15.

The outer end of the insert has a generally cylindrically shaped extension 24 that extends across the major portion of the interior of the head 18 so that its outer edge 25 which is externally chamfered is disposed close to the curl 19 on the shell. In assembling the insert 20 with the shell the insert is placed in the shell and is forced downwardly through the curl 19 the extension 24 spreading the curl slightly. The assembly is performed in a die on a punch press which presents a shoulder against which shoulders 22 and 16 are forced. This causes the exterior metal of the neck of the insert to be slightly upset as indicated at 26 (see Fig. 8) and expanded against the interior of the metal of the shell adjacent the shoulder 16. The metal of the shell is normally bulged outwardly a slight distance which although it may be only a matter of a few thousandths of an inch is ordinarily detectable on very close inspection. At the same time that this upsetting operation takes place the die stakes the metal 16 of the shell into the metal of the die cast insert as indicated at the points 27 on Fig. 7. In this manner the staking together with the upsetting at 26 forms a very rigid, tight connection between the inner end of the neck 14 of the shell and the exterior of the insert so that even though high torsional forces are applied to the shell the shell will not twist or turn with re-

lation to the insert. Instead both of these parts will be firmly anchored to each other.

A cap is provided which is likewise in the form of a sheet metal stamping and which is indicated at 28 (see Fig. 9). This cap has a flange 30 disposed near its margin which initially is cylindrical or substantially cylindrical in form. When the cap 28 is forced into the outer end of the shell the flange 30 enters between the curl 19 and the chamfered outer edge of the extension 24 with the result that the flange is deformed and is flared outwardly by the extension 24 to be partially curled beneath the curl 19. At the same time, the extension 24 is crowded inwardly or contracted (compare Figs. 6 and 9) so that in the resulting construction the curl 19 on the shell is stretched outwardly while the extension 24 on the insert is compressed or contracted inwardly and the flange 30 between the curl and the extension 24 is not only curled to lock it in place beneath the curl 19 but is effectively clamped by the extension 24 tending to expand and return to its normal position and the curl 19 which having been expanded is tending to contract and return to its normal position. In this manner the cap will be firmly and rigidly locked in position.

The door knob is completed by providing a rosette 31 designed to fit over the contraction 15 on the shell. A thin washer 32 is slipped on to the extension 23 of the insert against the inner end of the contraction 15 on the shell. The extension 23 is then spun outwardly as indicated at 33 (compare Fig. 10 with Figs. 6 and 9) the outward spinning of the extension 23 inwardly of the washer 32 causes the insert to thus lock the washer firmly against the inner end of the shell leaving the rosette freely rotatable relatively to the door knob so that when attaching screws are driven through the apertures 34 in the rosette the door knob may freely turn relatively to the rosette.

From the above described construction it will be appreciated that an improved door knob is provided the parts of which may be very easily and economically manufactured from punch press dies and a die cast insert. In assembling the insert with the shell an extremely firm attachment between these parts is secured by the combined staking at 27 and the upsetting of the shoulder 22 as indicated at 26. When the cap 28 is applied not only is the flange of the cap deformed from its original cylindrical condition to lock itself beneath the curl 19 but the insert and the shell are stressed thereby so that the flange is in effect clamped between these parts. The application of the rosette can be easily and quickly accomplished and enables a permanent attachment of the rosette to the door knob while at the same time permitting relative rotation between these parts.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. The method of making door knobs which includes curling the metal of a door knob shell inwardly adjacent its outer end, positioning an insert within the shell presenting a contractible extension disposed adjacent the curl and driving a flanged cap into the outer end of the shell so that its flange is caused to enter between the curl on the shell and the extension on the insert to be curled beneath the curl of the shell and compressed between the extension on the insert and the curl on the shell.

2. A door knob comprising an insert applicable to a door lock spindle presenting an inwardly facing shoulder, a shell disposed about the spindle having a reduced end presenting an interior shoulder abutting the mentioned shoulder and secured thereto, the metal of the insert at the shoulder extending slightly outwardly into an enlargement of the shell, the outer end of the shell having an inwardly directed flange, the insert presenting an extension adjacent the flange, and a cap having a flange positioned between the extension and the first mentioned flange with a tight fit between the parts.

3. A door knob comprising an insert applicable to a door lock spindle, a shell around the insert, said shell and insert presenting annular portions in close proximity to each other, and a cap closing the outer end of the shell having a flange disposed between said annular portions and having a tight fit therewith.

4. A door knob comprising an insert applicable to a door lock spindle, a shell around the insert, said shell and insert presenting annular portions in close proximity to each other, and a cap closing the outer end of the shell having a flange disposed between said annular portions and having a tight fit therewith, said flange extending outwardly slightly beneath the annular portion on the shell and being held against inward contraction by its engagement with the annular portion on the insert.

5. A door knob comprising an insert applicable to a door lock spindle, a sheet metal shell disposed around the insert, the shell and insert presenting annular portions adjacent their outer ends in close proximity to each other, a cap closing the outer end of the shell, said cap having a flange disposed inwardly of its outermost edge and fitting tightly between the annular portions of the shell and insert.

6. A door knob comprising an insert applicable to a door lock spindle, a sheet metal shell disposed around the insert, the shell and insert presenting annular portions adjacent their outer ends in close proximity to each other, a cap closing the outer end of the shell, said cap having a flange disposed inwardly of its outermost edge and fitting tightly between the annular portions of the shell and insert, the flange extending outwardly beneath the annular portion of the shell and being held against inward contraction by its engagement with the annular portion of the insert.

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