

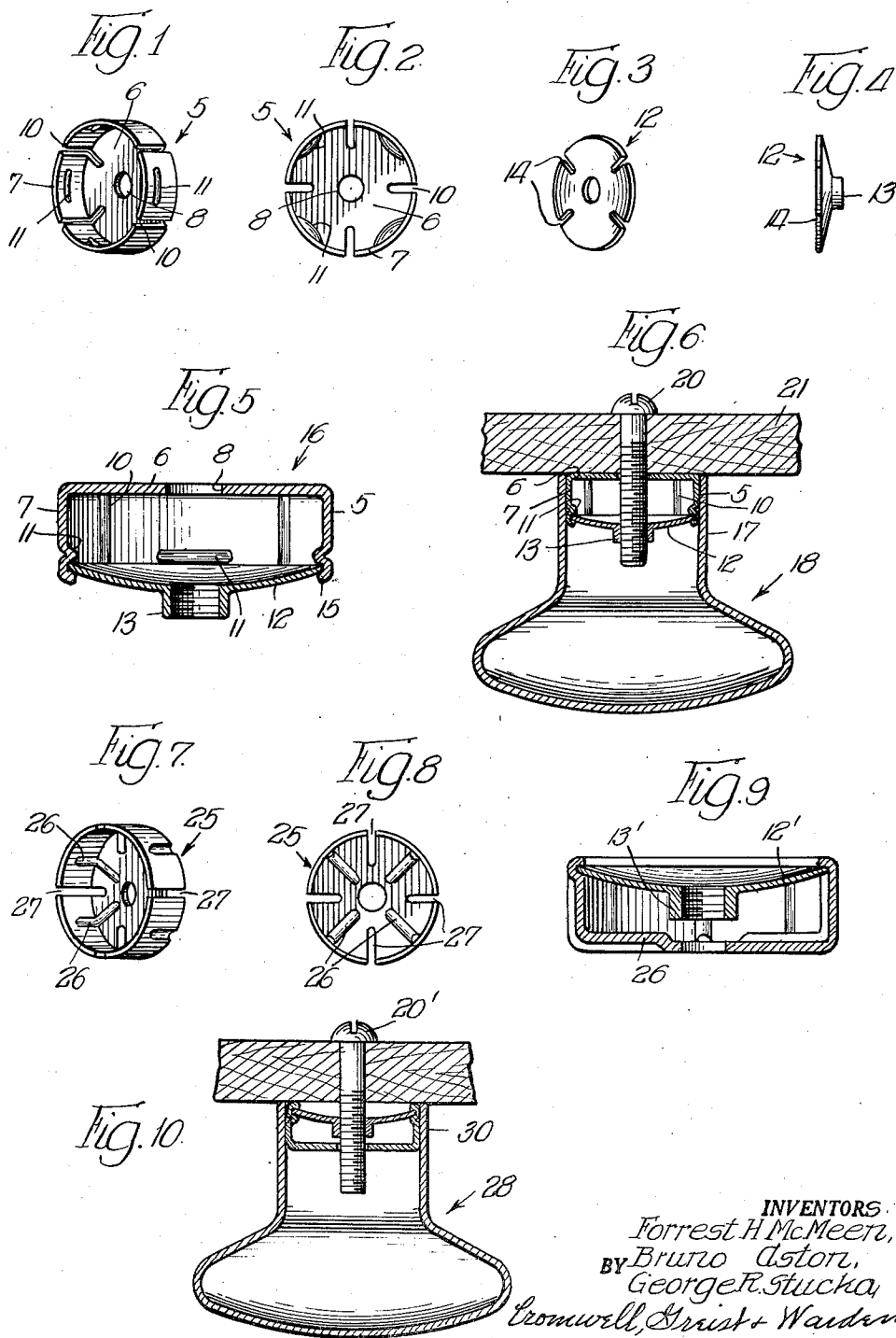
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INSERTS FOR NECKS OF HOLLOW KNOBS AND THE LIKE

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1

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INSERTS FOR NECKS OF HOLLOW KNOBS AND THE LIKE

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This invention relates, generally, to innovations and improvements in hollow button-like inserts which are laterally or radially distensible into frictional engagement with the interior surfaces of sleeve or tubular sections. The invention further relates to door knobs, drawer pulls, handles and the like comprising knob portions having hollow necks with the hollow button-like inserts of this invention frictionally retained therein.

Hollow door knobs are presently manufactured on a large scale in this country in accordance with the method and apparatus described in Patent 2,688,297. These door knobs produced are characterized by the fact that the hollow neck portions thereof are accurately finished to dimension, especially the interior neck surfaces. They are of excellent quality in that the metal is dense and has an excellent finish. It has been found that hollow knobs of this type may be readily converted into door or drawer pulls and handles by combining the same with the hollow button-like inserts of the present invention.

The hollow button-like inserts of the present invention may be produced on a quantity production basis at low unit cost by stamping and assembly operations. Therefore, by assembling these inserts into the necks of the hollow knobs, door or drawer pulls and handles of excellent quality can be produced at low unit cost. Furthermore, the outward pressure action of the hollow button-like inserts and the co-action thereof with the hollow necks of the hollow knobs is such that the tighter the pulls or knobs are drawn up or screwed up, the tighter will the inserts engage the interior surfaces of the necks so as to be positively retained therein.

One of the main objects of the invention is the provision of hollow, button-like inserts which may be commercially produced in large quantities at low unit cost and which are particularly useful for insertion into the interiors of sleeve or tubular sections, such as the hollow necks of hollow knobs, to provide means for attaching said hollow knobs or other parts having tubular neck sections to drawers, doors and various objects.

Another object of the invention is the provision of drawer pulls, knobs, handles and the like wherein the hollow neck of each hollow knob contains an insert in the form of an outwardly distensible hollow button-like assembly which accepts a screw and which upon turning in a tightening direction causes the side walls of the insert to distend and engage the interior surface of the hollow neck with increased frictional locking action.

Other objects of the invention will, in part, be obvious and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention, reference may now be had to the following detailed description thereof, taken in connection with the accompanying drawings, wherein:

FIG. 1 is a perspective view looking into the interior of a hollow cup-like member which forms one part of an insert forming one embodiment of this invention;

FIG. 2 is a plan view looking into the cup member of FIG. 1;

FIG. 3 is a perspective view showing the concave side of a concavo-convex cover member for closing the cup-like member shown in FIGS. 1 and 2;

2

FIG. 4 is a side elevational view of the cover member shown in FIG. 3;

FIG. 5 is a vertical sectional view taken through the center of an insert formed by assembling the washer or cover of FIGS. 3 and 4 in the cup-like member of FIGS. 1 and 2, the view being on double scale with respect to FIGS. 1-4;

FIG. 6 is a sectional view through a hollow knob provided with one of the distensible inserts of FIG. 5 in the outer end of the neck portion and showing the manner in which the resulting pull or handle is attachable to a wooden member which may represent a drawer panel, a cupboard door, etc.;

FIG. 7 is a perspective view corresponding to FIG. 1 showing a hollow cup member of somewhat different design;

FIG. 8 is a plan view looking into the cup member of FIG. 7;

FIG. 9 is a view on double scale corresponding to FIG. 5 but showing the cup member of FIGS. 7 and 8 combined with the washer or cover member of FIGS. 3 and 4 in a somewhat different manner; and

FIG. 10 is a sectional view corresponding to FIG. 6 but showing the manner in which the distensible insert of FIG. 9 may be used on the interior of the neck of the hollow knob.

Referring to FIGS. 1 and 2, the cup member 5 is formed of metal, tough plastic, e.g. Teflon, or other yieldable material so as to have a bottom 6 with side wall 7. While the cup 5 is round or cylindrical, it will be understood that it could be formed with multiple sides such as for example being hexagonal in shape.

The bottom 6 is provided with a center aperture 8 and four L-shaped slots 10-10 are cut into or through the side wall 7 so as to extend radially part way in toward the aperture 8. The four slots thus divide the cup 5 into four segments which are bendable or flexible outwardly from the axis of the cup. Four indentations 11-11 are formed in the side wall 7 to serve as supports for the cover or washer 12 shown in FIGS. 3 and 4. The washer 12 is concavo-convex in shape. That is, it is concave on the underside (i.e. left side) as shown in FIG. 3 and is convex on the top or outer side as illustrated in FIG. 4. The washer or cover 12 is formed with a short nipple portion 13 which is tapped or interiorly threaded as shown in FIG. 3. Four radial slots 14-14 extend into the periphery of the washer 12. The cup members 5 and the covers or washer members 12 may be readily stamped from thin metal sheet stock or molded from tough plastics of sufficient strength.

While the four slots 10 in the cup 5 and four slots 14 in the cover 12 have been found to be very satisfactory and provide adequate flexibility while retaining ample strength, it will be understood that satisfactory inserts may be obtained with say three slots each, or with more slots, e.g. 5 or 6.

One of the covers 12 is assembled into the outer or open end of each one of the cups 5 as shown in FIG. 5. It will be seen that each cover 12 rests upon four indentations 11 so that it cannot move inwardly, i.e. coaxially, with respect to the cup 5. The cover or washer 12 is retained in place by crimping over the rim or edges of the segments of the cup 5 as indicated at 15 in FIG. 5. Thus, an insert in the form of a hollow button-like member is obtained which is indicated at 16 in FIG. 5. The assembly may be accomplished by hand or machine.

It will be noted that the diameter of the smooth hole in the bottom 6 is somewhat larger than the inner diameter of the threaded nipple portion 12 and this permits a screw to pass through the opening 8 without en-

3

gaging the sides thereof and project into threaded engagement on the nipple 13 as shown in FIG. 6.

In use, the insert 16 is pushed or lightly pressed into the neck 17 of a hollow knob 18 as shown in FIG. 6. Hollow knobs 18 may be formed as mentioned above in accordance with the disclosure of Patent 2,688,297. As previously mentioned, if the knob 18 is so formed, the inner surface of the neck 17 will be accurately dimensioned and finished so that there will be an accurate fit between each insert 16 and the neck 17 of each of the hollow knobs 18. It will be seen that the insert 16 is pushed into the neck 17 until the bottom end 6 of the insert is flush with the rim or edge of the neck 17. When the insert 16 is so assembled in the neck 17 of the hollow knob 18, a finished drawer pull, drawer handle or the like is obtained. Such pulls or handles may be readily attached to the panel of a drawer, to a door, a cabinet, or any other object which needs a pull type handle or knob. In the installation shown in FIG. 6, a screw 20 passes through a hole provided therefor in the wood panel indicated at 21. The screw 20 passes with clearance through the opening 8 and then screws into the nipple 13. It will be seen that when the knob 18 is turned relative to the screw 20 the screw 20 will tend to move coaxially into the knob 18. However, the head 20 of the screw will engage the adjacent surface of the panel 21 and prevent movement of the screw 20. Similarly, the end of the neck 17 as well as the bottom 6 of the insert 16 will engage the panel 21 on the opposite side and prevent inner movement of the handle or knob 18. When this condition is reached in the installation, some additional turning of the knob is permitted and it will be seen that it tends to draw in the washer or cover member 12. This pull exerted on the washer 12 at the nipple 13 tends to flatten it out. However, any flattening of the cover of washer 12 causes it to spread out at the margin or periphery. This spreading action is impressed on the upper ends of the flexible sections of the cup portion 5 with the result that the whole side wall of the cup 5 tends to be distended, i.e. expanded. However, it can be seen from FIG. 6 that expansion or distention of the insert 16 is resisted due to engagement and confinement by the interior surface of the neck 17. The net result is that the more the knob 18 is tightened the tighter will the insert 16 frictionally engage the inner surface of the neck 17.

A modified form of the invention is shown in FIGS. 7-10. Referring to FIGS. 7 and 8, a cup member 25 is shown which corresponds to the cup member 5 in FIGS. 1 and 2 except that in place of having the arcuate detents 11, the cup member 25 is provided with four L-shaped detents 26-26 intermediate the L-shaped slots 27-27. One leg of each indentation 26 is in the side wall of the cup-like member while the other leg is in the bottom of the cup portion.

The cover or washer for the cup 25 can be the same as that in FIGS. 3 and 4. However, in this instance the cover is assembled in an inverted position as shown in FIGS. 9 and 10. It rests on the outer ends of the indentations 26 and is secured in place by crimping. When the knob 28 is tightened, the cover or washer 12 is pulled upwardly towards the head of the screw 20' as viewed in FIG. 10. In this way the flexible cover or washer 12' is flexed or urged toward a more flattened condition thereby distending or pressing out the sides of the cup portion 25 into engagement with the interior of the neck 30.

It will be appreciated that the hollow knobs 18 and 28 may have various other shapes and sizes as desired. In fact, pulls having approximately one-half the size shown in FIGS. 6 and 10 are a popular size for drawer pulls, cabinet doors, etc.

The completed inserts 16 (FIG. 5), and the modified form of insert shown in FIG. 9, may have a range of outside diameters and still fall within acceptable tolerances which can easily be maintained. Thus, it is not neces-

4

sary to adhere strictly to close tolerances as long as the outside diameters of the completed inserts are slightly greater than the inside diameters of the knob or pull necks 17. The necks of the latter when produced in accordance with the method disclosed in Patent 2,688,297, will be accurately dimensioned and shaped so that there will be negligible variation in dimensions. When the inserts are assembled into the pull or knob neck 17, these inserts will be contracted sufficiently to permit insertion and entry. If desired, the inserts may be pushed sufficiently far into the necks so that they will not be flush with the neck ends as shown in FIGS. 6 and 10. The contraction of the inserts is permitted by reason of the inherent distendability and contractability of the inserts. This feature is very important since it means that the inserts can be mass-produced with comfortable tolerances without in any way impairing the performance or ease of assembly of the completed units.

After a completed pull such as 18 in FIG. 6 or 28 in FIG. 10 has been assembled on a drawer, door, etc., and a tension is applied to the bolt or screw 20 or 20' so as to impart an expanding action to the insert, there will occur a slight bulging of the neck itself in the area surrounding the insert. This bulging or distention takes place around the entire circumference of the neck. While it is infinitesimal in size and not observable by the naked eye, nevertheless, it can be detected by suitable instruments and is therefore definitely present. Even though it is ever so slight, the distention is sufficient so that the assembly is very durable and the force required to move or dislodge the inserts from the necks is many hundreds of pounds greater than the tensile strength of the screws 20 or 20'.

It will also be appreciated that the inserts may be used for insertion into the necks or sleeves of various articles, e.g. tubular table legs, and that their use is not limited to the necks of hollow knobs or handles.

Since certain further changes may be made in addition to those referred to, without departing from the spirit and scope of the invention, the embodiments of the invention described above in connection with the drawings are intended to be interpreted as illustrative and not in a limiting sense.

We claim:

1. A hollow button-like insert of the class described for retained locking engagement within the interior surface of a tubular section comprising, a cylindrical cup-shaped member providing snug telescopic frictional engagement within said tubular section and having a central opening in its bottom portion and a plurality of L-shaped slots each of which completely severs the side-wall portion of said cup-shaped member and extends radially part way into the bottom portion thereof so as to divide said member into a plurality of flexible segments integrally interconnected in said bottom portion, the combined widths of said slots being small in comparison with the outer circumference of said cup-shaped member, a separate flexible concavo-convex member locked within the rim of said cup-shaped member so as to be retained in spaced relation with said bottom portion and having an internally threaded nipple co-axial with said central bottom opening whereby upon applying a force on said nipple in the co-axial direction tending to flatten said concavo-convex member the latter tends to distend said flexible side wall segments into tighter locking engagement within said tubular section, said central bottom opening being large enough to permit a screw having threaded engagement within said nipple to slide through said opening.

2. The insert of claim 1 wherein said cylindrical cup-shaped member has a plurality of indentations on the interior of said side wall adjacent the rim thereof against which the margin of said concavo-convex member engages and which limit the inward movement of said concavo-convex member into said cup-shaped member,

5

with at least portions of said rim being crimped over said margin to lock said concavo-convex member in place.

3. The insert of claim 2 wherein said indentations are generally arcuate and lie in a plane approximately perpendicular to the principal axis of said cup-shaped member.

4. The insert of claim 2 wherein said indentations are L-shaped and lying in transverse planes including the principal axis, each indentation having one leg in the side wall of said cup-shaped member and a second leg in the bottom wall thereof.

5. A knob comprising a hollow neck in the form of a tubular section and a hollow button-like insert retained within said tubular section, said hollow button-like insert comprising, a cylindrical cup-shaped member providing snug telescopic frictional engagement within said tubular section and having a central opening in its bottom portion and a plurality of L-shaped slots each of which completely severs the sidewall portion of said cup-shaped member and extends radially part way into the bottom portion thereof so as to divide said member into a plurality of flexible segments integrally interconnected in said bottom portion, the combined widths of

6

said slots being small in comparison with the outer circumference of said cup-shaped member, a separate flexible concavo-convex member locked within the rim of said cup-shaped member so as to be retained in spaced relation with said bottom portion and having an internally threaded nipple co-axial with said central bottom opening whereby upon applying a force on said nipple in the co-axial direction tending to flatten said concavo-convex member the latter tends to distend said flexible side wall segments into tighter locking engagement within said tubular section, said central bottom opening being large enough to permit a screw having threaded engagement within said nipple to slide through said opening.

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