METHOD OF MANUFACTURE OF LEVER HANDLE

Filed Oct. 15, 1963
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Filed Oct. 15, 1963, Ser. No. 316,300
10 Claims, (Cl. 29—463)

The present invention relates to a method of manufacturing door lock handles.

Therefore, lever or other type handles have been produced by casting of brass or stainless steel by which good quality handles have been produced.

It is an object of this invention to provide a novel method of manufacturing a lever or other type handle for door locks or the like made of at least a pair of light gage stamped elements peripherally or otherwise secured together forming a unit body. An open end portion may be provided within which a counterbored metal insert is mounted and secured. Also, the body may include a high strength filler core cast therein.

It is a further object to provide a novel method of manufacturing handles which permits the use of mass production methods, provides good lines and design definition to the finished product, and cuts down the cost of assembly to no more than the cost of a raw brass casting and to one-half the cost of a raw stainless steel casting, and wherein there is no scrap loss.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which:

FIG. 1 is a side elevational view of the present handle.
FIG. 2 is a fragmentary bottom plan view.
FIG. 3 is a longitudinal section of the handle taken in the direction of arrows 3—3 of FIG. 4.
FIG. 4 is a section taken in the direction of arrows 4—4 of FIG. 3.
FIG. 5 is a section taken in the direction of arrows 5—5 of FIG. 3.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention and the steps taken in the manufacturing process, and that other embodiments or equivalent steps are contemplated within the scope of the claims hereafter set forth.

PROCESS

The present method of manufacturing door handles includes the following steps:

Step 1.—The stamping of at least a pair of symmetrical or asymmetrical metal shells 12 of L-shape or other desired shape which may include the peripheral slightly out-turned marginal portions 13. The shell elements are peripherally closed when assembled but in the initial stamping process normally provide the open end portions 19 which may be slightly enlarged radially, FIG. 3.

These are adapted to receive therebetween the preferably hardened metal insert 17, of steel for illustration, which has been broached, cut or cast to define the bore 15, preferably square in cross-section, corresponding to the shape of the spindlet to which the handle is to be mounted. Said insert includes counterbore 16. Said shells may be constructed of sheet metal, stainless steel, steel, brass, bronze, aluminum, copper or other suitable metal.

A pair of symmetrical shells are shown in the drawing for illustration. It is contemplated that the shell elements may be asymmetrical and consist of more than two parts. This would occur in forming a knob which employs opposed shell elements and a single tubular shank, for example. Though the claims may specify symmetrical shell elements, it is contemplated as equivalent structure that asymmetrical shell elements may be employed so that when assembled, a unit body is produced.

In the illustrative embodiment the shells include out-turned marginal portions 13. It is contemplated that these can be omitted, and the shells brought together in edge to edge relation, or an overlapping relation and secured together.

At this step the metal insert can be omitted. The insert can be assembled later or in its place the shells formed to co-operatively receive an operating spindle.

Step 2.—The symmetrical or asymmetrical shells 12 which form hollow body 11 are now jig or otherwise assembled with their peripheral edges 13 arranged in opposed engaging relation and with the spindle receiving insert 17 interposed between the two shells at their open ends 19. Insert 17 has an enlarged base 18 with an arcuate exterior curvature adapted to snugly register within the similarly shaped open end portions 19 of the respective shells, FIG. 3. End portions 19 need not be enlarged.

Step 3.—A fusible alloy powder in a suitable binder as at 21, FIGS. 3 and 4, is applied along or adjacent the interior or exterior peripheral engaging edges 15 and adjacent surface portions of shells 12, FIG. 3. In the illustrative embodiment of the invention a nickel chrome alloy powder is employed mixed with a suitable binder for easy application. Alternately, a silver solder, a lead solder or copper could be used. Also, a wire alloy or a sheet alloy could be used omitting the binder.

Step 4.—The assembly is then peripherally spot welded at several spaced points 20, FIG. 1, for securing the shells together and for securing the insert to the shells, where an insert is used.

Step 5.—The assembled shells and insert are then placed within a suitable furnace or oven wherein a vacuum or inert atmosphere is maintained and the same is raised to a temperature sufficiently high as to fuse the nickel chrome or other alloy to the respective interior mating surface portions 13 of said shells and adjacent areas thereof. This provides for illustration a continuous or discontinuous inner peripheral fillet of the nickel chrome or other alloy now intimately bonded to the adjacent mating edge portions 13 of the shells throughout their contacting edges or surfaces for securing the shell elements together defining body 11; and for fixedly securing the steel insert 17 therein.

The use of the present nickel chrome or other alloy establishes a high joint strength between the peripheral mating and engaging edge or surface portions of the shells and produces after buffing a substantially invisible joint.

The use of the present nickel chrome or other alloy joint thus produces:

1. An inner fillet 21, FIGS. 3 and 4.
2. A joint that can be visually inspected easily.
3. A joint which requires a minimum of grinding and buffing for the completed article.

Alternately, to Steps 3 and 5, the shell elements can be secured together with a suitable glue, a cement or adhesive such as an epoxy resin cement.

There is thus produced by the foregoing steps a finished handle which is very attractive in appearance and completely serviceable under normal conditions but will not stand abuse since it can be crushed or buckled, unless of solid form.

In order to overcome this objection and to provide an improved handle, further steps are published in the manufacturing process.

Step 6.—The inside of the handle body defined by the assembled shells is filled with a low cost, high strength, resilient, and low shrinkage plastic material 22, such as polystyrene for illustration, FIGS. 3 and 4. At the time the liquid plastic is poured into the handle body a suit-
able bar, as indicated in dotted lines at 23, is inserted for the following purposes:
(1) To retain the plastic during the curing and solidification thereof, and
(2) To create a suitable cavity 24 of a cross-sectional shape, preferably square, adapted to snugly and co-operatively receive a lock spindle.
Bar 23 could be omitted in Step 6 with the result that a solid core is produced. Thereafter, as a further step bore 24 can be separately formed as by broaching or machining.
Instead of a plastic core, the shells can be filled with other low melting point material such as lead, zinc, copper or sulfur for illustration.
Solid body elements could be employed to eliminate a hollow central portion and thus eliminate pouring of the core.
Step 7.—Includes the curing and solidifying of the filler and the removal of bar 23 initially introduced to define core aperture 24.
The plastic or other core material and substantially reinforces the body core since it snugly engages the interior surfaces of shells 12. This gives increased mass to the assembly and prevents crushing or buckling of the body.
An additional advantage in the use of the plastic or metallic core is that after the final step of grinding and buffing, even if only a minor amount of the original welds 20 are left, the handle nevertheless retains adequate strength to maintain the assembly of the shells and the securing of the metal insert therein.
Step 8.—Includes the final step of grinding and buffing the exterior peripheral edges of the assembled article to complete a smooth blend between the mating or peripheral edge portions 13, and thus produce a unit appearing body which is finished in all respects and simulates in appearance a fully cast handle.
During the curing process and solidification of the plastic or other core there will be a slight amount of shrinkage. The inherent elasticity of the plastic core produces a tight “feel” after the conventional spindle has been installed and inserted within the insert and corresponding aperture of the body core.
In the pouring of the plastic or other core, as shown in FIG. 3, said core extends outwardly and fills counterbore 16 of the insert as at 25 so as to smoothly merge with bore 15 of said insert to thus facilitate insertion of the mounting spindle thereinto.
A further advantage is that said core operatively and retainingly engages interior portions of the insert for maintaining the same in the assembled relationship shown in FIGS. 3 and 5. Another advantage in this tight “feel” produced by the shrinkage of the plastic or other core 22 is that it permits the use of greater tolerances in the broaching or machining operation in forming insert 17 and in the production of spindles used in the final assembly and eliminates a sloppy or loose fit therebetween. Under some conditions counterbore 16 is omitted. In that case the core extends to the insert.
The plastic preferably employed has sufficient elasticity as to allow easy assembly of the slightly oversized spindle thereinto for a tight fit.
The present invention contemplates the use of two or more light gage stamped elements 12 which form when assembled the present handle or other body.
In FIG. 3 core 22 flows partly into radial bore 26 of insert 17 to form an anchor lug 27. Set screw 28 is threaded through body element 19 and into bore 26 for operative compressive registry with plug 27 transmitting frictional securing forces to mounting spindle 28. The inherent resiliency of plug 27 produces a reactive force tending to anchor set screw 28 against loosening.
Insert 17-18, FIG. 4, may be further secured within shell elements 19 by welding as at 19'.

Having described my invention, reference should now be had to the following claims.
1 claim:
1. The method of making door handles comprising the following steps:
(1) stamping at least a pair of substantially symmetrical shells of the desired form;
(2) assembling the shells with their peripheral edges in opposed engaging relation with an insert receiving recess therebetween;
(3) applying a fusible alloy along and adjacent the peripheral engaging edges or surfaces of the shells;
(4) welding the shells at a series of peripheral spaced points for securing the shells together;
(5) fusing the alloy to and along the peripheral meeting shell edge surfaces; and
(6) positioning and securing a lock spindle receiving insert within said recess.
2. The method of claim 1, and the further steps:
(7) grinding and buffing the exterior peripheral edges of the assembled handle.
3. The method of claim 1, and the further steps:
(7) pouring a plastic in liquid form into the shells; and
(8) curing and solidifying the plastic to provide a reinforcing core substantially filling the shells.
4. The method of claim 1, and the further steps:
(7) pouring a core in liquid form into the shells, the core selected from the group consisting of plastic, lead, zinc, copper and sulfur; and
(8) curing and solidifying the core to provide a reinforcing filler for the shells.
5. The method of claim 1, and the further steps:
(7) pouring a plastic in liquid form into the shells leaving an elongated substantially axial cavity adapted for the reception of a lock spindle; and
(8) curing and solidifying the plastic to provide a reinforcing core substantially filling the shells.
6. The method of claim 1, and the further steps:
(7) pouring a plastic in liquid form into the shells; and
(8) curing and solidifying the plastic to provide a reinforcing core substantially filling the shells, and
(9) machining an elongated bore into the core adapted for the reception of a lock spindle.
7. The method of making door handles comprising the following steps:
(1) stamping at least a pair of substantially symmetrical shells of the desired form;
(2) jig assembling the shells with their peripheral edges in opposed engaging relation with and with an apertured lock spindle receiving insert interposed and retained therebetween;
(3) applying a fusible alloy powder in a binder along and adjacent the peripheral engaging surfaces of the shells;
(4) spot welding the shells at a series of peripheral spaced points for securing the shells together and the insert to the shells;
(5) fusing the alloy to and along the peripheral meeting edge surfaces;
(6) partly filling the shells with a high strength low shrinkage plastic in liquid form leaving an axial cavity adjacent said insert adapted for the reception of a lock spindle; and
(7) curing and solidifying the plastic filler.
8. In the method of making door handles of claim 1, said alloy of step 3 being selected from the group consisting of nickel chrome, silver solder, lead solder and copper.
9. In the method of making door handles of claim 1, fusing of said alloy being in a vacuum or inert atmosphere furnace raised to a temperature to fuse the alloy to the contacting edge surfaces; and
(7) grinding and buffing the exterior peripheral edges
of the assembled article producing a smooth merging joint and a unitary appearing handle.

10. The method of making door handles comprising the following steps:

(1) stamping at least a pair of substantially symmetrical shells of the desired form;

(2) jig assembling the shells with their peripheral edges in opposed engaging relation and with an apertured lock spindle receiving insert interposed and retained therebetween;

(3) applying a fusible alloy powder in a binder along and adjacent the peripheral engaging surfaces of the shells;

(4) fusing the alloy to and along the peripheral meeting edge surfaces;

(5) partly filling the shells with a high strength low shrinkage plastic in liquid form leaving an axial cav-

ity adjacent said insert adapted for the reception of a lock spindle; and

(6) curing and solidifying the plastic filler.

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