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H. A. KALVONJIAN

3,533,921

METHOD OF FINISHING THE SURFACE OF METAL ARTICLES

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Fig. 1.

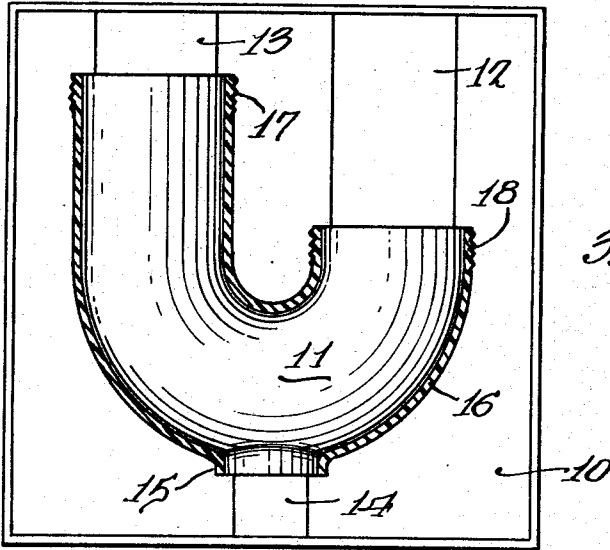


Fig. 2.

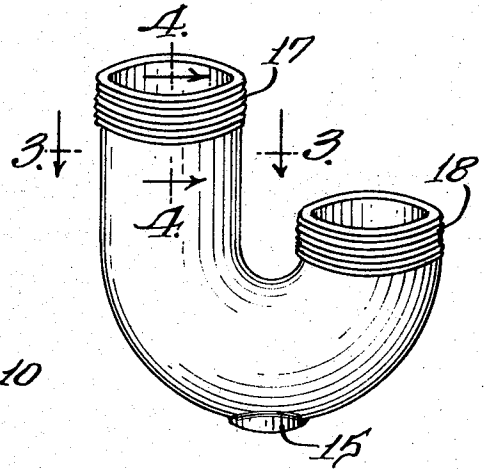


Fig. 3.

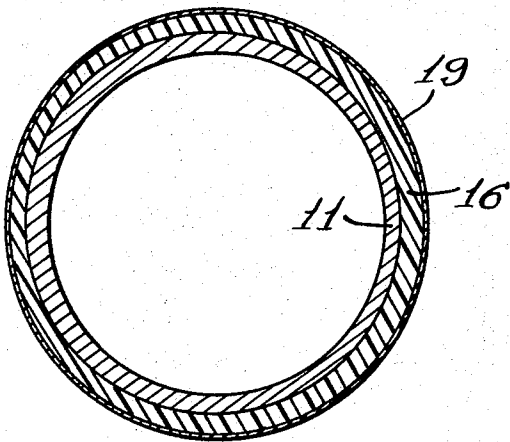
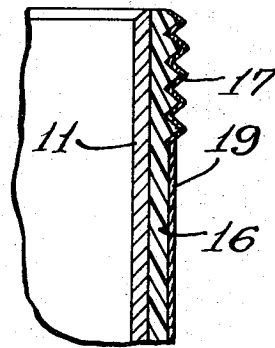


Fig. 4.



Inventor
Harry A. Kalvonjian
By Gary Parker,
Juettnet, Pigott & Cullinan
Attys

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METHOD OF FINISHING THE SURFACE OF METAL ARTICLES

Harry A. Kalvonjian, Kenosha, Wis., assignor to Frost Co., Kenosha, Wis., a corporation of Wisconsin
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2 Claims

ABSTRACT OF THE DISCLOSURE

Production of smooth level electroplated metal coatings on the irregular rough surface of a sand molded metal casting or other rough surfaced metal parts by first molding about the metal casting a layer of plastic providing a smooth uniform base which is then electroplated.

This invention relates to the finishing of rough surfaced metal parts such as metal forging or sand molded metal, and particularly brass castings especially shaped ones such as plumbing traps for sinks which are generally exposed and are chrome plated for esthetic appearance.

Hitherto such sand molded brass castings, which have rough irregular surfaces, were electroplated with a succession of layers such as copper, nickel and finally chromium. However, before electroplating it was necessary to smooth and level out irregularities in the coating surface such as by grinding, buffing and finish polishing. At times there are left some depressions which cannot be removed in this manner. At other times this grinding and buffing brings to light cavities which must be welded to close them up.

In many instances portions of the casting became out-of-round due to generation of gases when the metal is poured about the core of the shape, i.e. trap being cast, and this also affects the external threads at the opposed ends of the unit which are integrally cast or cut into thickened cast end portions. In all, some of such castings are so defective that they must be entirely discarded. As a whole there was about 50% scrap in the prior process.

In accordance with the present invention, where I employ the casting substantially, as removed from the mold, with only minor tumbling to remove sand and flashings and subsequently mold thereover a plastic coat of smooth outer surface, the brass casting can be thinner than was heretofore necessary, while retaining required standard mold thickness, to the extent that one can save approximately one-third brass base stock. Further savings are in grinding, welding, and rejects. Out-of-round parts can be brought up to full roundness by means of the plastic layer, and the necessary external threads can be molded of the same plastic at the time the plastic coating is molded about the casting.

Thus, the advantages of the present invention are lighter weight of original brass casting; elimination of costly surface preparation; elimination of the possibility of porosity showing up during polishing operations; elimination of scrap during finishing operations because of poor surface conditions; production of a more uniform and impervious wall on the end product; perfectly rounded outer contour of the finished pieces; material increase in eye value; reduction in cost; and supplying of the trade with a superior product at a reduction in cost.

The plastic molding can be conducted by employing a conventional screw injection machine (not shown) which will deliver stock of substantially uniform temperature from beginning to end of the shot.

The plastic can be either ABS (acrylonitrile butadiene styrene copolymer) or such plastics as polypropylene, polysulfone or other hardenable resin. The plastic coating

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on the brass casting takes the form and polish of the plastic mold such that for example an out-of-round brass casting which has become wholly or partially so due to generation of gases in molding can be produced in a piece of perfectly round cross section and all voids and surface irregularities leveled off and smoothed out so as to provide a smooth base for the subsequent metal plating without the former requirement of grinding, brushing and polishing.

The layer of plastic coating applied to the brass casting is generally from .030 to about .050 inch in thickness, being adequate to completely coat the rough outside surface of the brass casting and correct any out-of-round that may be found therein, thus eliminating surface finishing prior to plating.

The plastic coating is plated with a chrome finish in known manner such as by first subjecting the part to conventional treatment such as cleaning, acid treatment, sensitization by immersion in a solution of tin, titanium, or other readily oxidized metallic salt. Adsorption of the sensitized material on the surfaces of the plastic prepares it for the activating procedure. In the activating step, the plastic surface is made catalytic so that a firm adherent metal coating will be deposited in the subsequent electrodeless plating step. The catalysts for this purpose are generally precious metals such as gold, silver and palladium, this step of catalyst application being generally called seeding or treating the plastic surface with a solution containing a salt of the catalytic material. Oxidation of the tin or other sensitizer reduces the catalytic precious metal salt to nuclei of the corresponding metal which nuclei clings to the surface of the plastic. Thereafter, the catalyst plastic surface is immersed in an electrodeless copper or nickel plating bath, the catalytic action of the precious metal nuclei reducing the plating metal out of solution so that it deposits on the plastic surface. This electrodeless plating step provides the plastic with a surface that can then be electroplated by standard procedures of the electroplating industry and in this case desirably with added nickel plating and a final chrome plating.

Other objects and advantages of the present invention relate to details of construction, arrangement of parts and the economies thereof as will be apparent from a consideration of the following specification and accompanying drawings wherein:

FIG. 1 diagrammatically illustrates a mold and a sink trap disposed therein and with a plastic layer molded thereabout.

FIG. 2 is a perspective view of a sink trap formed in accordance with the present invention.

FIG. 3 is a section on the line 3—3 of FIG. 2.

FIG. 4 is a section on the line 4—4 of FIG. 2.

Referring to the drawings, the reference numeral 10 indicates a mold half wherein a sink trap 11 which was previously cast in a sand mold in conventional manner is disposed and retained in position by means of the circular plug-like mold portions 12 and 13 which extend into the opposed ends of the trap and by means of the plug member 14 which extends into the drain opening 15 of the trap. The members 12, 13 and 14 serve to close up the openings of the brass casting and in addition position it within the cavity of the mold so that even though the brass casting may originally be out of round as shown in FIG. 3, the layer of plastic 16 molded thereabout, as also shown in FIG. 3, will be round and compensate for the out-of-roundness of the brass casting 11. It will be noted that the plastic layer 16 is molded with integral threads wherever necessary such as 17 and 18. The cavity of the mold 10 is smooth so as to provide the injection mold layer 16 with a smooth outer contour. After preparation thereof as previously described it is electroplated with one or more layers of metal, jointly indicated as 19,

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in the previously described manner which is now conventional for the electroplating of plastics.

Although for the purpose of illustration I have shown a brass sink trap, castings of other metals and of other shapes are amenable to the process of the present invention as will be readily understood by those skilled in the art.

I claim:

1. The method of finishing the surface of a metal product, which comprises molding a plastic coating in a die completely about and to said metal product to form a continuous plastic coating, integrally molding threads in the plastic coating, and then electroplating with at least one layer of bright metal.

2. An article comprising a rough irregular surfaced metal product, an outer surface layer of plastic molded completely about and bonded to said metal product, ex-

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ternal threads molded in said plastic, and electroplated metal covering and bonded to said plastic layer.

References Cited

UNITED STATES PATENTS

3,406,105	10/1968	Letendre	204—16
3,317,411	5/1967	Letendre	204—29
2,554,453	4/1949	Bryan	18—36
799,218	10/1905	Blacklidge	204—30

HOWARD S. WILLIAMS, Primary Examiner

R. L. ANDREWS, Assistant Examiner

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