June 14, 1938. L. G. COPEMAN 2,120,461

METHOD OF PROTECTING AND FORMING PREFINISHED METAL

Filed Feb. 28, 1938

Fig. 1

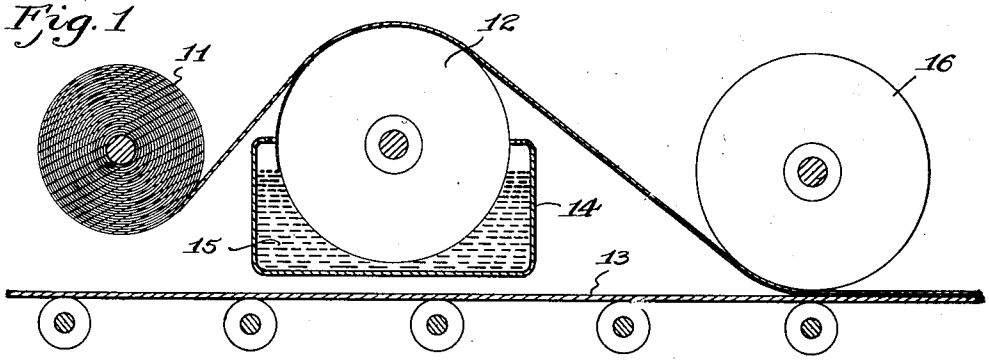


Fig. 2

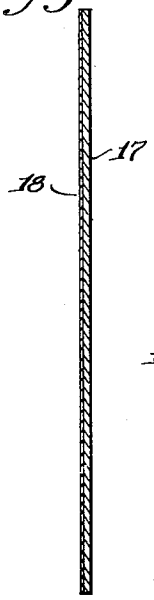


Fig. 3

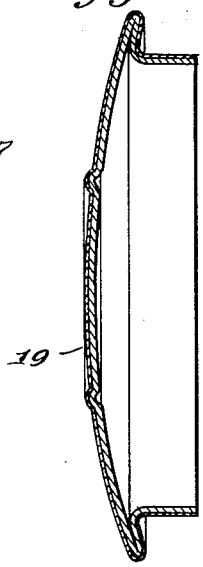


Fig. 4

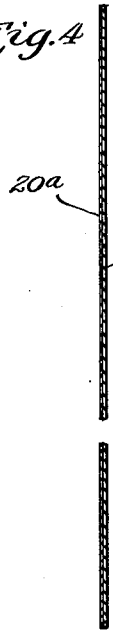


Fig. 5

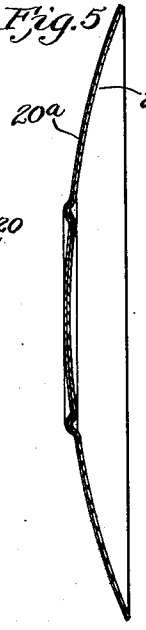


Fig. 6

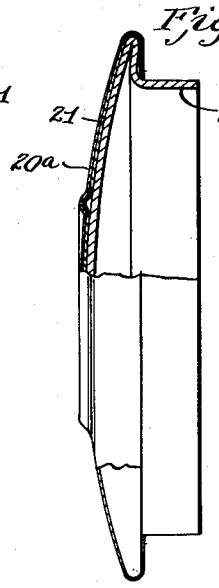


Fig. 7



Fig. 9

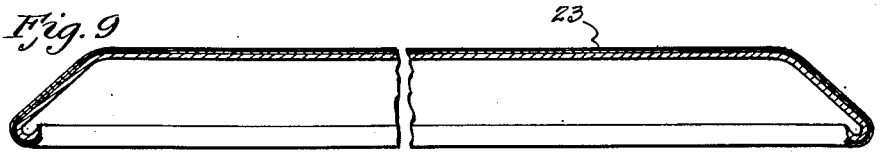


Fig. 10



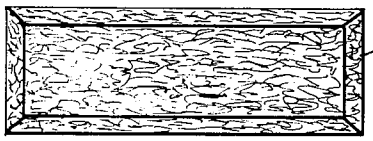


Fig. 8

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METHOD OF PROTECTING AND FORMING PREFINISHED METAL

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Application February 28, 1938, Serial No. 193,001

8 Claims. (Cl. 113—51)

This invention relates to a method of protecting and forming prefinished metals and has particularly to do with the use of a coating material to afford surface protection for prefinished metals during blanking and forming operations.

This is a continuation-in-part of my co-pending application, Serial No. 110,435, filed November 12, 1936.

It is an object of the present invention to provide a method of handling and forming prefinished metal so that it may be blanked and formed in a die without having to be polished thereafter.

It is a further object of the invention to furnish a protective coating for prefinished metals so that they may be actually drawn in the forming process without danger of scratching and scoring of the polished surface.

Another object of the invention is to provide a method of coating the surface of prefinished metals so that they may be blanked and formed and the coating left on as a wrapping until its removal is desired at which time it may be easily peeled off. This feature will save considerable wrapping costs, the coating serving to protect the polished surface of the metal from dust and abrasion during the storage or transit period.

Other objects and features of the invention having to do with the method of temporarily protecting of the prefinished surface of metals will be further brought out in the following description and claims.

In the drawings:

Fig. 1 is an illustration of one method of applying an aqueous solution of elastic material to form adhesive protective paper.

Figs. 2 and 3 are illustrations of the use of the elastic material in the form of a hub cap.

Figs. 4, 5 and 6 illustrate steps in a modified method of forming a hub cap.

Figs. 7, 8, 9 and 10 illustrate steps in the formation of a beveled top for an ice cream cabinet or the like.

The invention consists briefly of applying a coating of latex or latex and paper to the blank of prefinished metal and of then proceeding with the formation of the metal product by blanking and forming machines and then removing the coating. If paper and latex is used it may be made, as shown in Fig. 1, by passing the paper from a supply roll **11** over a coating roller **12** and on to a moving sheet **13**. The roller **12** is mounted over a tank **14** in such a manner that the lower portion of the roller will run in the tank. The tank will contain an elastic material disseminated in an aqueous solution as, for example, an aqueous dispersion of rubber commonly called latex.

The paper used may be of any thickness or weight desired for the particular work to be coated. It is rolled over the coating roller **12** by a roller **16** which is mounted directly over the moving sheet **13**, and which guides the paper to said sheet. The latex will be carried by the coating roller **12** to the paper and deposited thereon in a continuous even coat. This latex may be allowed to partially or wholly set up, or the coated paper, as it comes off the coating roller **12**, may be directly applied to the prefinished surface of the metal sheet **13**. In either case the protective paper is ultimately applied to blanks of prefinished metal, such as Monel metal, stainless steel, chromium plated metal, or any sheet metal, such as cold rolled, having a polished or finished surface. Cross sections of such metals are shown in Figs. 2, 4 and 7. The paper will be bound thereto by a non-tacky inner coating of the solids of the latex composition.

There are other methods of applying the aqueous dispersion of elastic material. It may be applied to either the paper or the metal and may be painted, sprayed or dipped on. Evaporation of the water for the aqueous dispersion results in a setting up of the elastic compounds into a thin non-tacky coating which adheres firmly to the paper and to the metal.

When paper is used with an aqueous dispersion of rubber, it causes the aqueous dispersion to set up rapidly by reason of the fact that the paper soaks up the water from the solution. Other fibrous materials might be used for this same purpose. The use of paper with the latex coating permits a cheaper coating since, if latex is used alone, it takes longer to set up and, as a rule, when latex is used alone, in order to have a peelable coating, it is necessary to apply more than one coat of the latex.

In Fig. 2 the cross section of the blank **17** is shown with a protective paper **18** firmly adhering thereto. In Fig. 3 the same blank **17** is shown after being subjected to a stamping and drawing process which has formed it into a hub cap **19**. In Fig. 4, a blank **20** is shown with a coating of latex **20a** and Fig. 5 shows the blank **20** after it has been stamped to form a finishing cap **21** for hub cap **22**, as shown in Fig. 6.

Figs. 7, 8, 9 and 10 represent various progressive steps in another stamping process in which a beveled top **23** is formed from a paper and latex protected blank **24**.

Prior to the present invention it has been the practice to protect surfaces of these metals with a coating of oil to provide a lubricant during the stamping and forming process. With the present method of stamping and forming it is unnecessary to provide this oil lubricant since the latex on the blank serves as a lubricant in itself due to the fact that it will give and stretch under the action of the forming tools. When paper and latex are used in combination in the forming and drawing operation it will be recognized that the stretching point of the paper is limited. However, it has been found even after the breaking of the paper, upon further drawing of the metal the rubber coating still remains intact and serves as before, to protect the surface of the metal and to lubricate the drawing action. The rubber coating, whether it is used alone or with paper has been found to provide a much smoother forming operation with less tendency to wrinkle than when paper alone, for example, is used. In this sense, the latex coating serves as a lubricant in the drawing process and this is due to the fact that the rubber will flow at the contact points and still protect the surface of the metal.

When latex alone is used, as in Fig. 4, the coating is usually a little thicker than when applied with paper and hence more expensive than the paper-latex coating. The action, however, is the same as with the paper during the forming and drawing process and when the process is completed the latex may be peeled from the surface of the metal.

After the protected metal has been subjected to the forming process, it is often necessary to store or transport the finished product. In such case the protection paper or latex coating may be left on the piece to afford further surface protection against dust and abrasion. When the piece is finally assembled the protective paper and/or rubber coating may be readily stripped off as a single large piece. It will be understood that the coating substance 15 may be any of the well-known aqueous dispersions of flexible material, artificial, or natural, adapted to set up into a substantially homogeneous flexible bonding coat having a greater affinity for paper than for polished metal.

What I claim is:

1. The method of stamping and forming prefinished metal which comprises applying a protective paper to the finished surface with an inner coating of latex to serve as an adhesive, stamping and forming the metal, and removing the protective paper.

2. The method of temporarily protecting the prefinished surface of metal during a forming step which comprises applying an aqueous dispersion of rubber, which when dried forms a non-tacky deposit, to said prefinished surface, evaporating water from the dispersion to form a readily removable temporary coating on said surface and coldworking said metal while protected with said coating, and subsequently removing said coating.

3. The method of stamping and drawing prefinished metal which comprises applying a protective paper to the finished surface with an inner coating of latex to serve as an adhesive, stamping and drawing the metal, and removing the protective paper.

4. The method of stamping and forming prefinished metal which comprises applying a protective paper to the finished surface, said paper being adhered to said metal by a coating of rubber deposited from an aqueous dispersion of rubber, stamping and forming the metal and protective paper as a composite unit, and removing the protective paper.

5. The method of stamping and drawing prefinished metal which comprises applying a protective paper to the finished surface, said paper being adhered to said metal by an aqueous dispersion of rubber, which when dried forms a non-tacky deposit, stamping and drawing the metal and protective paper as a composite unit, and removing the protective paper.

6. The method of stamping and drawing prefinished metal which comprises applying a protective paper to the finished surface, said paper being adhered to said metal by a substance having a bonding action relative to said paper and prefinished surface, the bonding action between the paper and substance being greater than the bonding action between the substance and metal, stamping and drawing the metal and protective paper as composite unit, and removing the protective paper.

7. The method of forming prefinished sheets of metal which comprises temporarily bonding a protective sheet of fibrous material to the prefinished surface, said fibrous material being temporarily secured to said finished surface by a coating having a bonding action relative to said fibrous material and prefinished surface, the bonding action between the fibrous material and coating being greater than the bonding action between the coating and metal, forming the metal and protective fibrous coating as a composite unit, and then removing the protective sheet of fibrous material and coating.

8. The method of temporarily protecting the prefinished surface of metal during a forming step which comprises applying an aqueous dispersion of rubber, which when dried forms a non-tacky deposit, to said prefinished surface, and cold-working the metal while covered with said rubber deposit, said rubber deposit being adapted to stretch and flow during the forming step to protect the prefinished surface from scratches and the like, and then removing the protecting sheet of rubber.

LLOYD G. COPEMAN.