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METHOD OF PROTECTING SHEET METAL

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This invention relates to the protection of sheet metal, particularly during shipment from the mill and manufacture into automotive parts and its subsequent preparation to receive a permanent protective coating, such as paint, varnish, enamel or the like.

In the manufacture of automotive parts from sheet metal, such as body panels, fenders and the like, great care has to be exercised to keep the metal free from rust and scale and from becoming damaged during shipment or prior to manufacture. Heretofore sheet metal produced at the mill has been carefully freed of scale and then a protective coating applied. For this purpose mineral oil has ordinarily been used to protect the metal against rust. When the sheet metal has been made up into parts by means of presses and dies, the dies have been lubricated with an oil of the type with which the metal has been coated at the rolling mill.

In order to prepare the metal for enameling or painting after the parts have been shaped in the presses, it has been necessary to remove the protective coating and the lubricant so that the permanent protective coating, such as paint, varnish, enamel or the like, will adhere properly, since they will not adhere properly to surfaces which have even a trace of mineral oil. Various methods have been employed to remove the mineral oil. Commonly, it has been burned off at a temperature of about 800 to 850° F. This temperature tends to produce a slight oxidation of the metal, forming a scale which prevents the proper adhesion of the permanent protective coating. The presence of any residue of the mineral oil film or of any scale causes a weak bond between the paint, enamel or like coating and the metal with the result that the paint or enamel peels off or cracks.

It is an object of the present invention to provide an economical method of protecting metal from rust and other damage during shipment and manufacture and at the same time leave the metal in suitable condition for the application of the final permanent coating.

In accordance with the invention the metal as it comes from the rolls is freed from scale at the mill and is coated with a protective compound which adheres to the metal during shipment or transportation to the place of manufacture and which can be removed easily without formation of scale, and if not completely removed will not affect the proper adhesion of the permanent finish coating, such as paint, enamel or the like. The same or a similar compound is used as a lubricant on the dies. A compound suitable for this purpose which has the capacity to combine with the permanent coating for the metal, and which is also soluble in water, so that it may be readily removed, merely by rinsing, to such an extent that any residue will not affect the adhesion of the permanent coating, is composed in large part of a substance containing a fatty acid, or a saponified vegetable oil.

In general, in the practice of the invention a suitable soluble compound, preferably a soap compound which is soluble in water or a light alkali cleaning solution, is applied to the metal at the mills. The compound, preferably, should be of such nature that, when applied to the metal at a temperature of about 150° F., it will dry out and form a coating which will adhere to the metal during shipment. In working the metal into finished parts, the same or a similar compound is used to lubricate the dies and the metal is pressed to the desired shape. The compound is then removed and the metal cleaned by washing in water, or other cleaning solution, and rinsed in hot water. The metal is then dried and wiped and is ready for the application of a permanent coating of enamel, paint or the like.

A compound which has been found suitable is a soluble soap compound made by adding a mixture of sodium and potassium hydroxide to a mixture of vegetable oils containing six parts cocoanut oil, one part olive oil and one part palm oil, whereby the oils are saponified. Sufficient water is added

to render the mixture soluble and have the following composition:

	Per cent
Anhydrous soap	22 to 23
Free fatty acid	1 to 2
Free alkali	None.

Another compound which has given satisfactory results in the practice of the invention is composed of 10 per cent. of animal wool fat and 90 per cent. of kerosene.

While various compounds may be employed in the practice of the invention and may be applied to the metal by various methods, a soluble soap compound which may be applied to the metal at a temperature of about 150° F. is preferred. It is found that any thin film of such a soap compound which may adhere to the metal does not interfere with the proper adhesion of the enamel to the metal due to the similar basic characteristics of the soap and the enamel or varnish and the like. Any compound may be used in the practice of the invention which will combine with the permanent finish coating in such a manner as not to affect detrimentally its bond with the metal. Water soluble as used in the appended claims means capable of dissolving in water either pure or slightly alkaline.

The invention particularly contemplates the protection of sheet metal during its fabrication into finished automobile parts, such as fenders, aprons, body panels and the like, and their subsequent preparation for the application of a permanent protective coating of paint, enamel or the like, but is not to be construed as so limited, as its scope and application in other fields will be understood by those skilled in the art.

What I claim is:

The improved method which consists in coating sheet steel as it comes from the rolls with a protective coating of a water soluble soap compound, transporting the steel to the place of manufacture while so coated, shaping the steel with dies lubricated with a similar compound, and thereafter removing the compound, cleaning the metal and applying a permanent coating.

In testimony whereof I affix my signature.

RALPH Z. HOPKINS.