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SLUSHING OIL

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This invention relates to an oily composition for protecting surfaces exposed to high temperatures and has to do specifically with a slushing oil for protecting rolled sheet steel during the annealing operation.

In the manufacture of rolled sheet steel it is customary to cold roll bars of steel into thin strips and then cut the strips into sheets which are subjected to annealing. In the annealing operation the sheets are piled on top of each other and subjected to a temperature of the order of about 1350-1400° F. It is desirable at these temperatures to protect the surfaces of the sheets to prevent them from sticking together and otherwise damaging the surfaces. It has been found that the surfaces can be protected by covering them with a slushing oil containing a non-volatile constituent which will be deposited as a film on the surface of the steel when the oil is vaporized. Difficulty has been experienced heretofore in obtaining a material which is sufficiently soluble in the oil and will provide a satisfactory protective film.

I have found that a satisfactory slushing oil is obtained by dissolving a minor proportion of magnesium naphthenate in a light lubricating oil. This material provides a very satisfactory protective coating consisting of a magnesium compound deposited on the surfaces subjected to high temperatures employed in annealing. The amount of the magnesium naphthenate should be between about 2 and 15% and preferably at least 5%, for example 5-10% or more by volume.

As an oil constituent I prefer to use a lubricating oil which has a fairly high volatility. A light lubricating oil of about 50-100 viscosity at 100° F. is satisfactory and preferably one having a viscosity of about 55-80 at 100° F. The oil should have a flash point of over 200° F. It is desirable to use an oil having a low carbon residue, for example, refined naphthene base lubricating oil. An oil which has been found to be particularly satisfactory is a highly refined naphthene base oil having a Saybolt Universal viscosity of about 80 at 100° F.

A slushing oil is usually applied at a temperature of about 150-180° F. It may be applied by brushing or washing the surfaces with the oil or by spraying or any other suitable means to provide a uniform film of the material over the surface.

As an illustration of the operation of the inven-

tion, the slushing oil was prepared by dissolving about 5% of magnesium naphthenate in a highly refined naphthene base oil of about 80 viscosity at 100° F. The surfaces of rolled sheet steel were covered with a film of the slushing oil and subjected to annealing. The annealed sheets which have been so treated contain only 2% or less of sheets having damaged surfaces whereas without such treatment with the slushing oil the rejected sheets ordinarily run as high as 30%.

The advantage of the present slushing oil is the high solubility of the magnesium naphthenate in the oil and the ability of the solution of the naphthenate in oil to deposit a residue of magnesium compounds in sufficient amount and in proper form to provide a highly successful protective film.

While I prefer to use a magnesium naphthenate as the metal soap ingredient of my slushing oil, it is contemplated that iron naphthenate may also be used.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof, and only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A process for protecting sheets of cold rolled steel during annealing, which comprises applying to the surface of the sheets a light lubricating oil containing about 5-10% of magnesium naphthenate whereby the oil is vaporized during annealing and a protective coat of a magnesium compound is deposited on said surface.

2. A process for protecting steel surfaces during annealing, which comprises applying to the surfaces a light lubricating oil containing about 5-10% of iron naphthenate, whereby the oil is vaporized during annealing and a protective coating containing the iron is deposited on the surfaces.

3. A process for protecting steel surfaces during annealing, which comprises applying to the surface of the steel a light lubricating oil containing a minor proportion of a compound selected from the group consisting of iron naphthenate and magnesium naphthenate, whereby the oil is vaporized during annealing, and a metal compound derived from said naphthenates is deposited on the surface of the steel as a protective coating.

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