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ROLLING MAGNESIUM AND MAGNESIUM ALLOYS

Julius Züblin, Glarisegg, near Steckborn,
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It is known that the rolling of bars and pressed rods of magnesium and magnesium alloys into sheets must follow a very different method from that used with, for instance, aluminium. In addition to more frequent intermediate annealings and hot passes, other points must be kept in mind in order to obtain fault-free sheets. In the present state of the art it is not possible to roll magnesium sheets using conventional lubricants because the structure of the material then suffers. Even small traces of water or oil damage the cohesion of the material. As the operator is compelled to work with dry rolls and several hot passes must be effected, it is impossible to avoid the rolls becoming covered with material abraded off the sheets, that is with fine metal spangles. The adhesion is so strong that the rolls have to be cleaned after quite short periods, as otherwise the surfaces of the sheets are badly damaged. Even the use of polishing devices does not permit avoidance of the detachment of fine metal particles from the rolls and their rolling into the sheets. For these reasons, after rolling the sheets must be brushed and ground to obtain a smooth surface. Cleaning of the rolls and grinding of the sheets involves expenditure of considerable time, the expense of the process is increased, and the output of the rolling mill is reduced.

It has now been found that all these disadvantages can be avoided if the surfaces of the material, that is of the bars, rods or sheets to be rolled, are coated with a protective layer which is maintained during the whole rolling process. This protective layer has the great advantage that the oxide skin of the metal is not damaged and does not adhere to the rolls. As no metal particles are rolled into the sheet and the surface thereof remains mirror-smooth, brushing and grinding of the sheets are no longer necessary.

The invention will be further explained by reference to the following example.

The material, that is the bars, rods or sheets to be rolled are rubbed over before or during rolling with an oil-like substance mentioned further below, which has a high boiling point, of at least 200° C., which leaves during rolling a resin-like, firmly adherent, plastic and rollable coating, and which forms a protective layer between the roll and the sheet. For further cold or hot passes the rolls are preferably coated with the same oil-like substance, which becomes transferred to the sheet, so that during further procedure involving intermediate annealing, the protective layer is always renewed. The following substances can be used for example for the formation of the pro-

5 tective layer; tar fat oils, tar-oils, carbolineum, anthracene-oil, heavy oils and the constituents thereof of synthetic origin, for example tricresyl phosphate, that is in general oily substances in liquid, gaseous or vapour form which enable a rollable plastic resin-like layer to be formed on the metal. Advantageously care is taken that the protective coating, which forms this layer during rolling, is one adapted at the same time to hinder oxidation of the metal during annealing and to protect the sheets against atmospheric action during storage.

The aforementioned resin-like coating combines with and integrates the oxide particles on the surface of the magnesium sheet producing a resultant protective layer which is maintained throughout the entire rolling process inasmuch as it is resistant to rolling, bending, etc.

What I claim is:

1. A process for rolling magnesium and alloys thereof which comprises the step of providing the surface of the material to be rolled with a resin-like coating which contains oxide of the said material as a component thereof and which forms a rollable protective layer between roll and material.

2. A process for rolling magnesium and alloys thereof which comprises the steps of providing the surface of the material to be rolled with a resin-like coating which contains oxide of the said material as a component thereof and which forms a rollable protective layer between roll and material and maintaining such layer during substantially the entire course of rolling.

3. A process for rolling magnesium and alloys thereof which comprises the steps of providing the surface of the material to be rolled with a resin-like coating of a substance which combines with the oxide skin of the said material to form a rollable protective layer between roll and material, and providing the rolls themselves with a coating of the said substance whereby said layer is renewed during the rolling process.

4. A process for rolling magnesium and alloys thereof which comprises the step of providing the surface of the material to be rolled with an oil-like coating of a substance which forms, in combination with the oxide skin of the said material, a rollable protective layer between roll and material and also protects the material against oxidation during annealing and the rolled material against atmospheric action during storage.

5. In the rolling of magnesium and alloys thereof, the step which comprises rubbing on

the material an oil-like substance which has a boiling point of at least 200° C., which during rolling leaves, in combination with the oxide skin of the said material, a resin-like, firmly adherent and rollable coating and which forms a protective layer between roll and material.

6. An article for the production by rolling of sheet material of magnesium or magnesium alloy, comprising a billet of the material and a coating thereon of an oil-like substance which forms, in combination with the oxide skin of the said material, a rollable protective layer between roll and material in the rolling operation.

7. An article for the production by rolling of sheet material of magnesium or magnesium al-

loy, comprising a billet of the material and a coating thereon of an oil-like substance which forms, in combination with the oxide skin of the said material, a resin-like firmly adherent and rollable layer between roll and material in the rolling operation.

8. An article for the production by rolling of sheet material of magnesium or magnesium alloy, comprising a billet of the material and a coating thereon of an oil-like substance combined with and integrating the oxide particles on the surface of the material and which forms a resin-like firmly adherent and rollable layer between roll and material in the rolling operation.

JULIUS ZÜBLIN.