

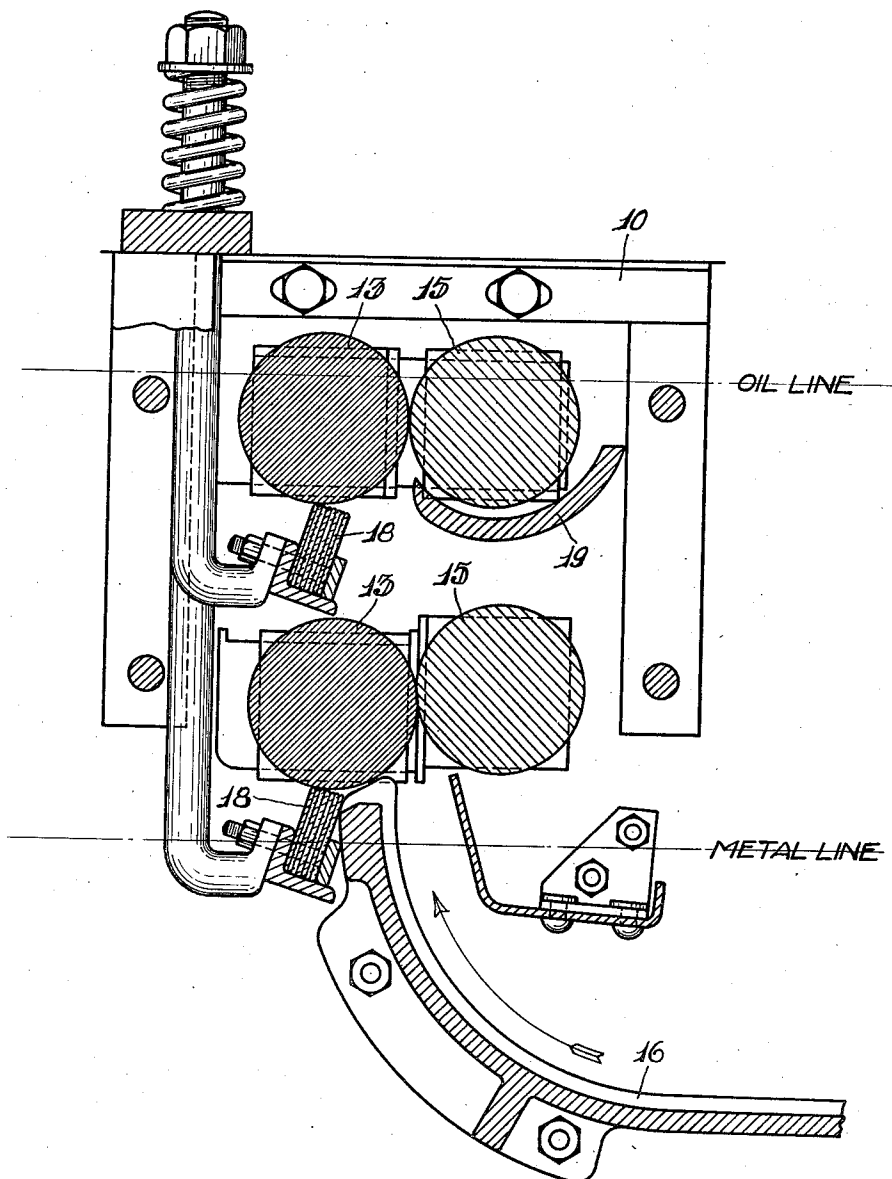
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R. B. McLIN

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MEANS FOR APPLYING VARIABLE COATINGS TO METAL SHEETS

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INVENTOR

Robert B. McLin

By

Arthur J. Maunier

ATTORNEY

UNITED STATES PATENT OFFICE

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MEANS FOR APPLYING VARIABLE COATINGS TO METAL SHEETS

Robert B. McLin, Follansbee, W. Va.

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4 Claims. (Cl. 91—59.2)

This invention relates to means for coating metal sheets with a protective metal coating, and relates more particularly to apparatus whereby one side of a metal sheet will have a thin metal coating while the opposite side of the sheet will have a still thinner metal coating.

The economical value of producing such a variable coated sheet lies in the ability of the apparatus to produce a metal sheet bearing an extremely light coating of the protective metal on the side or surface not exposed to severe service, as, for instance, the outside of a sheet of tinplate to be made into cans, and a standard, or heavier, coating on the opposite side of the sheet where its ultimate use requires an efficient protective coating.

I am aware that others have previously attempted to provide a sheet with coatings of varying thicknesses on its opposite surfaces, but each has resulted in a heavy coating on one side and a heavier coating on the other, as distinguished from my product wherein one side bears a light standard coating and the opposite side bears a coating lighter than the standard coating.

In describing the invention in detail, reference is herein had to the accompanying drawing, in which the figure is a vertical sectional view of a portion of a coating machine used in connection with the application of the metallic coating to the sheets.

Referring to said drawing, the reference numeral 10 designates the frame or housing of a coating machine, which latter is adapted to be removably mounted over and partially submerged in a reservoir or pot (not shown) containing the metallic coating, as molten tin, spelter, terne, or the like, on which floats the usual layer of oxidation preventive oil, used also for smoothing the coating.

Journalled in appropriate bearings provided in the housing 10 are a series of metal rolls 13 and 15, which govern the weight or thickness of the protective coating. As shown in the drawing, the rolls 13 and 15 are disposed in pairs, each of the rolls 13 being disposed opposite one of the rolls 15. Each of the rolls 13 is in vertical alignment with the other, and both of the rolls 15 are also vertically aligned. As will be manifest, the roll arrangement may be of two, four, or six roll design and construction.

The rolls 15 are made of metal having a low carbon content, as, for instance, .45% to .50% carbon, and about 30 scleroscope, so that their entire surfaces consist of minute pits or pores as is characteristic of open grain metal having

a low carbon content. On the other hand, the rolls 13 consist of metal having a high carbon content of, for instance, from 1.05% and up, and about 50 scleroscopic hardness. As a consequence, the rolls 13 have dense, hard and smooth surfaces devoid of the small pits and pores and capable of taking a very high polish, as is typical of this character of dense grain metal.

In practice, the sheet to be coated is, after previous preparation and pickling, passed through the flux box and metal pot where a quantity of the metal coating is deposited on and adheres to all its exposed surfaces. As the sheet passes through the coating bath, it contacts a guide 16 whereby the course of travel of the sheet is directed upwardly between the series of pairs of rolls 13 and 15.

The rolls 13 and 15, as they contact the sheets, function to remove excess quantities of the metal coating and insure a uniform thickness of such coating. Inasmuch as the surfaces of the rolls 13 are smooth, hard and dense, and devoid of surface indentations, porosity, and irregularities, the greater portion of the coating on the side of the sheet contacted by said rolls is removed, leaving but an extremely thin film of coating on this surface. On the other hand, the minute pits or pores present in the surfaces of the rolls 15 permit more of the coating to adhere to the side of the sheet contacted by the rolls 15 and, as a consequence, this side of the sheet receives a heavier coating than the opposite side, although neither of the surfaces is heavily coated.

Frictionally contacting the underside of one or each of the rolls 13 throughout the longitudinal extent thereof is an adjustable brush 18, preferably made of laminated asbestos and metal fabric or soapstone, such brushes functioning to wipe the metal coating from the roll with which it is associated and to maintain said roll free from either undesirable or excess coating metal, scruff, or objectionable impurities.

Suspended beneath the topmost roll 15, or, if desired, both rolls 15, is a trough 19 designed to contain a quantity of the coating metal. Obviously, the provision of this trough or troughs, and the additional quantity of the coating metal through which the rolls 15 operate, increases the coating on that side of the sheet contacting the rolls 15. The trough is maintained filled with the metallic coating to the proper level by ladling or pumping the same from the tin pot, and the metal in the trough is prevented from oxidizing by reason of being located beneath the oil level.

While the rolls 15 have herein been described as being made of high carbon steel, it is also contemplated that these rolls may be made of any of several alloy metals such as chromium, nickel, tungsten, or any other material affording the desired smoothness, hardness, and density to the roll surfaces.

What is claimed is:

1. In apparatus for use in applying a protective coating to metal sheets wherein one side of the sheet is to bear an extremely thin film of said coating and the opposite side of the sheet is to bear a coating heavier than that borne by the first mentioned side of the sheet, said apparatus comprising a frame, a series of rolls journaled in said frame and disposed in opposing pairs, one of said rolls of said pair being made of a metal having hard, dense grain characteristics so as to present a surface devoid of surface irregularities, and the other differing metallurgically and being made of a metal having open grain characteristics so as to present a roll having surface indentations.
2. In apparatus for use in applying a protective coating to metal sheets wherein one side of the sheet is to bear an extremely thin film of said coating and the opposite side of the sheet is to bear a coating heavier than that borne by the first mentioned side of the sheet, said apparatus comprising a frame, a series of rolls journaled in said frame and disposed in opposing

pairs, one of said rolls of each pair being made of a metal low in carbon content so as to afford a roll surface having minute indentations, and the other of said rolls being made of a metal high in carbon content so as to afford a smooth roll surface substantially free of irregularity.

3. In apparatus for applying different thicknesses of protective metallic coating to the opposite sides of a metal sheet comprising a frame, a series of rolls journaled in the frame and disposed in opposing pairs, one of said rolls of each pair having a surface devoid of surface irregularities and the other roll of said pair having minute irregularities in its surface.

4. In apparatus for use in applying a protective coating to metal sheets wherein one side of the sheet is to bear a thin film of said coating and the opposite side of the sheet is to bear a coating heavier than that borne by the first mentioned side of the sheet, said apparatus comprising a frame, a series of rolls journaled in said frame and disposed in opposing pairs, one of said rolls of said pair being made of a metal having dense grain characteristics so as to present a surface substantially devoid of surface irregularities, and the other roll differing metallurgically and being made of a metal having open grain characteristics so as to present a roll having minute indentations.

ROBERT B. McLIN.

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