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2,317,533

ROLL BRUSH

Filed June 23, 1941

2 Sheets-Sheet 1

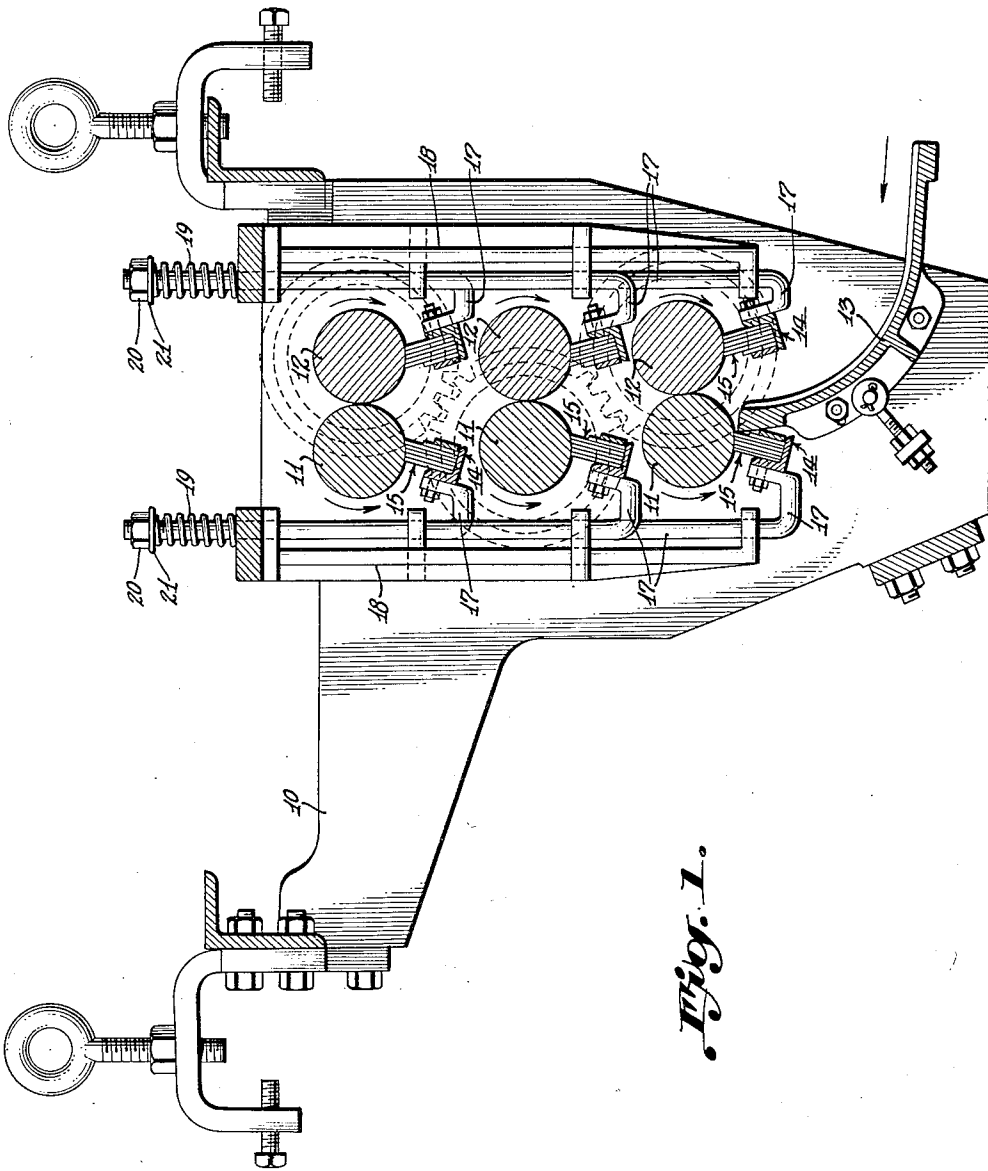


Fig. 1.

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2 Sheets-Sheet 2

Fig. 2.

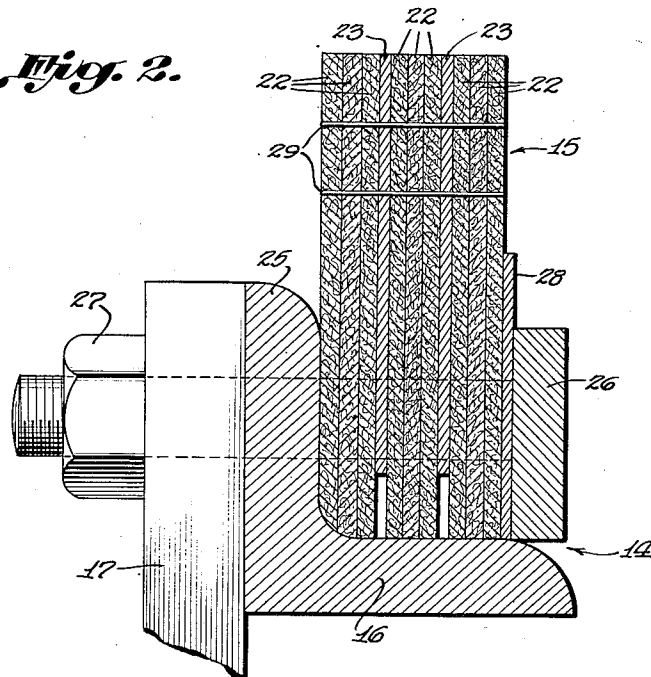
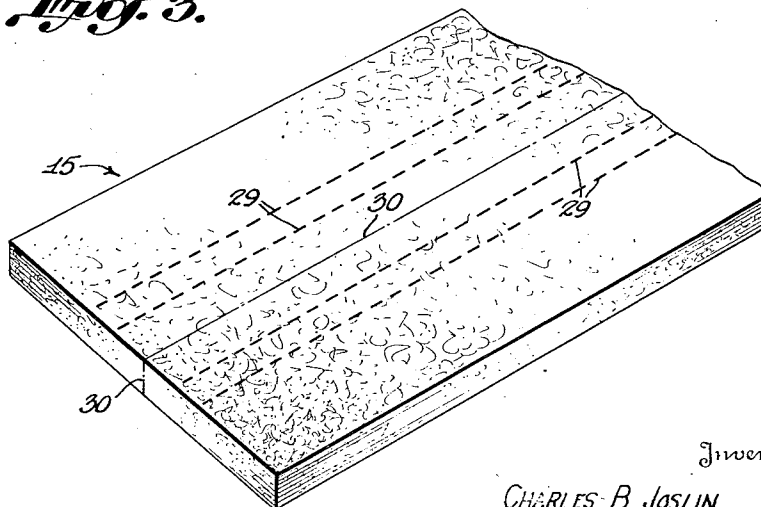


Fig. 3.



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ROLL BRUSH

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Application June 23, 1941, Serial No. 399,345

1 Claim. (Cl. 15—236)

This invention relates to machinery for coating sheet or strip material wherein rolls are used to distribute the coating liquid on the sheet or strip material, the improvement being in the finishing rolls and brush or wiper used to free the rolls of excess coating liquid and spread the residue evenly on the rolls together with the method of making the brush.

In the tinning art as in other coating arts the sheet or strip material to be coated hereinafter called "sheet metal" is passed through a bath of liquid coating material, in the particular instance, molten tin, spelter, terne or similar metal. The sheet metal is then passed between rolls which squeeze the excess tin off the plate and at the same time distribute the tin more or less evenly over the surface of the sheet metal. How well this latter step is accomplished depends in good part on how well the tin is distributed over the roll. The excess tin squeezed off the sheet tends to remain on the roll and to remove this excess tin while retaining enough tin on the roll to give a final proper depth of coating on the sheet is the duty of the roll brush or wiper.

When all tin plate was rolled from hot pack rolled sheets no great problem existed as to applying the tin to the sheets. Such sheets had a surface of a comparatively rough porous nature, and the tin was readily applied thereto. However, with the advent of cold rolled sheets into the tin plate industry, difficulty was experienced in applying an even coating to the sheets due to the highly polished surface. Also, in recent years tremendous effort has been exerted to get a more uniform and even coating than ever before while using little more or even less tin. As a result of these factors much interest has been directed to the tin mill roll and brush.

The temperature of the tin pot and the liquid tin necessitates the use of some material in the brush which is not deleteriously affected by high temperature. Two common materials are laminated asbestos fabric and soapstone. The asbestos fabric in the past has been strengthened with bronze wire. When this was insufficient the soapstone brushes were used, or even a combination of the soapstone and asbestos. The soapstone is objectionable, however, due to its relatively extreme hardness and the resulting roll-wearing characteristics of the wipers incorporating it. Metallic scrapers have been tried, but they lack the required wiping action.

Attempts have been made to stiffen the laminated asbestos brushes by placing heavier bronze filaments in the material. When the brushes achieved the requisite amount of stiffness by this expedient it was found that the roll was marred by scratches.

The present invention solves all the above described problems by presenting a brush which is

stiff enough to withstand a satisfactory pressure against the roll and yet all the component parts are much softer than any material heretofore used, so that marring of the roll is avoided. The advantages flowing from the change in the present brush over the prior art are numerous. "Mushrooming" of the brush by separation of the laminations is prevented. This gives immeasurably longer life to the element besides eliminating "brush streaking" caused by coating metal collecting in the crevices between the spread laminations. The fact that the iron strips actually engage the roll prevents build-up of the coating on the roll in those portions not engaging the tin plate. Such build-up is always present with the old form of roll brush and prevents processing of wide sheets after narrower sheets have been passed through the machine. Besides preventing build-up of the coating on the roll the brush of the present invention keeps the roll clean and free from scruff.

A further advantage of the present invention is that the combination of the iron strip and the asbestos laminations gives a more uniform coating depth because the iron strip acts to remove hard and tough deposits from the roll while acting as reinforcing or backing for the soft but efficient wiping material, the latter giving the efficient spreading action to the coating on the roll. Along this line it is to be noted that the brush of the present invention is much more easily set in accurate relationship to the roll by the brushman. This individual watches the tin plate issuing from the machine and if the coating is heavier adjacent one side edge than the other he adjusts the pressure of the brush against the roll so as to more evenly distribute the tin. The old form of brush was "squashy" and until it mushroomed out so that the brushholder was being forced against the roll, had no appreciable resistance or body. The brush of the present invention, on the other hand, is stiff and presents a firm resistance to pressure forcing it against the roll. The brushman can, therefore, readily determine by feel or "body-response" of the brush just about what pressure it is exerting on the roll.

It will be obvious that manufacture of a laminated asbestos strip with a plurality of iron strips interleaved in the laminations would be easier and less costly than incorporating bronze wires in each individual sheet of asbestos in a similar laminated strip in place of the iron strips.

An important object of the present invention is the provision of an improved roll brush or wiper for coating machines.

A further important object of the present invention is the provision of a roll brush or wiper having a longer life than those now used.

A still further important object of the present

invention is the provision of an improved roll brush or wiper having many operating advantages over those now in use.

A still further important object of the present invention is the provision of a roll brush or wiper which is cheaper to construct than those now in use.

A still further important object of the present invention is the provision of an economical method of making the roll brush or wiper of the present invention.

Other objects and advantages of this invention will become apparent from the following detailed description thereof, reference being had to the accompanying drawings which constitute a part of this specification, and wherein;

Figure 1 is a view in sectional elevation of a coating machine incorporating the present invention,

Figure 2 is an enlarged detail view in section of the improved roll brush, and

Figure 3 is a view in perspective of an intermediate product in the improved method of the present invention.

Referring to the figures wherein like numerals denote like elements throughout, reference numeral 10 indicates a coating machine frame of the conventional tin machine type, which is adapted to be suspended in the usual tin pot having a molten metal coating therein covered by the usual oxidation preventing oil. Journalled in frame 10 are three pairs of finishing rolls 11, and 12, acting against each other with an adjustable pressure, and adapted to be located above the coating material but in the oil. A guide 13 is carried by frame 10 with its lower end in such a position that it will be submerged in the coating material. This guide 13 directs the metal sheets being treated up to the first rolls 11 and 12, which, in turn, move the sheet on upwardly to the next rolls 11 and 12, etc. Arranged along each roll is a roll brush indicated generally at 14 including a brush element 15 pressed against the roll, all the brush elements being of identical construction. Each roll brush element is held by a brushholder 16, which, in turn, is suspended on a hanger 17. Brackets 18 hold the hangers against lateral movement. Hangers 17 are suspended from frame 10 through the medium of springs 19 and adjustment nuts 20 threaded on the upper ends of the hangers and acting through washers 21.

The brush element 15 of each brush is formed of laminations or sheets 22 of heat resistant fibrous material such as asbestos superposed one on another to form a thick sheet as best shown in Figures 2 and 3. Interleaved between some of the laminations are thin metal strips 23, two being shown specifically, but one or more may be used depending upon the stiffness required of the wiper element and the hardness of the metal strip. The laminations of fibrous material and strip metal are firmly fastened together in any suitable manner, sewing with a metallic thread 29, being the specific fastening means in the modification disclosed. The edge of the wiper element adapted to contact the roll is made substantially square, with the edges of the fibrous material laminations and the metal strips coinciding. With pressure and wearing, the brush element soon fits the surface of the roll in the manner shown in the drawings.

In the preferred embodiment, the laminations

are formed of woven asbestos about one-tenth of an inch thick, although these laminations could be thicker or thinner sheets without departing from the invention. The metal strip laminations in the preferred embodiment are formed from a soft commercial iron such as that referred to in the trade as Armco iron. A thickness of .0015 of an inch has been found to be satisfactory where two strips of metal were used, although obviously a thicker strip could be used with fewer laminations of metal or thinner strips with a greater number of laminations of metal.

It will be noted that all the brushes 14 are located below the level of the oxidation preventing oil in the conventional tin pot. The pressure adjustment of these brushes against the rolls must, therefore, be made blindly through nuts 20. As wear occurs on a brush, the brushman takes up on nuts 19 sufficiently to achieve the desired pressure and thus the proper depth of coating on the sheets passing between the associated rolls. This pressure should be controlled very precisely from one end of the roll to the other to obtain good results. The brushes of the present invention, due to their stiffness, present a good body response during adjustment to facilitate this operation.

Referring to Figure 2 specifically, the brush elements 15 are shown positioned in brushholders 16. Each brushholder is made up of an angle iron 25 and a bar 26, clamped to the brush element by bolt and nut 27, the latter serving to attach the brushholder to hanger 17. A reinforcing member 28 aids in directing the trailing edge of the brush element against the roll but makes no contact with the roll.

In manufacturing the brush elements of the present invention, sheets of fibrous material having sheets of strip metal between them are stitched together in rows of double stitching 29 as shown on Figure 3. Obviously, any desirable fastening means could be used in place of stitching so long as the effect of spaced rows is achieved. The rows of fastening stitches are spaced apart a sufficient distance so that when the resultant article is cut along a line 30 intermediate the rows of stitching, a plurality of brush elements will result, two in the form shown on Figure 3. Metal strips 23 in the intermediate product of Figure 3 need not be as wide as the fibrous material sheets, thereby saving the more expensive material. When the cut is made between the fastening rows, a square edge is presented having the fibrous material and metal coinciding. The strip metal need only extend towards the other side of the resulting brush element far enough to be engaged between the parts of the brushholder.

I claim:

A laminated brush adapted to serve as a wiper for a roll of a metal coating machine, said brush comprising lengthwise extending layers of heat resistant fabric and interleaved, soft, unabradable, thin sheet metal, of continuously uniform texture from end to end, the various layers being firmly secured together in relative positions such that the adjacently exposed marginal portions thereof are so related as to serve as parts of an even, smooth, wiping face, having its portions of soft metal and heat resistant fabric disposed therein in alternation.

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