Sept. 21, 1954 H. NELSON 2,689,545

ROLL-PAINTING APPARATUS

Filed June 30, 1950

2 Sheets-Sheet 1

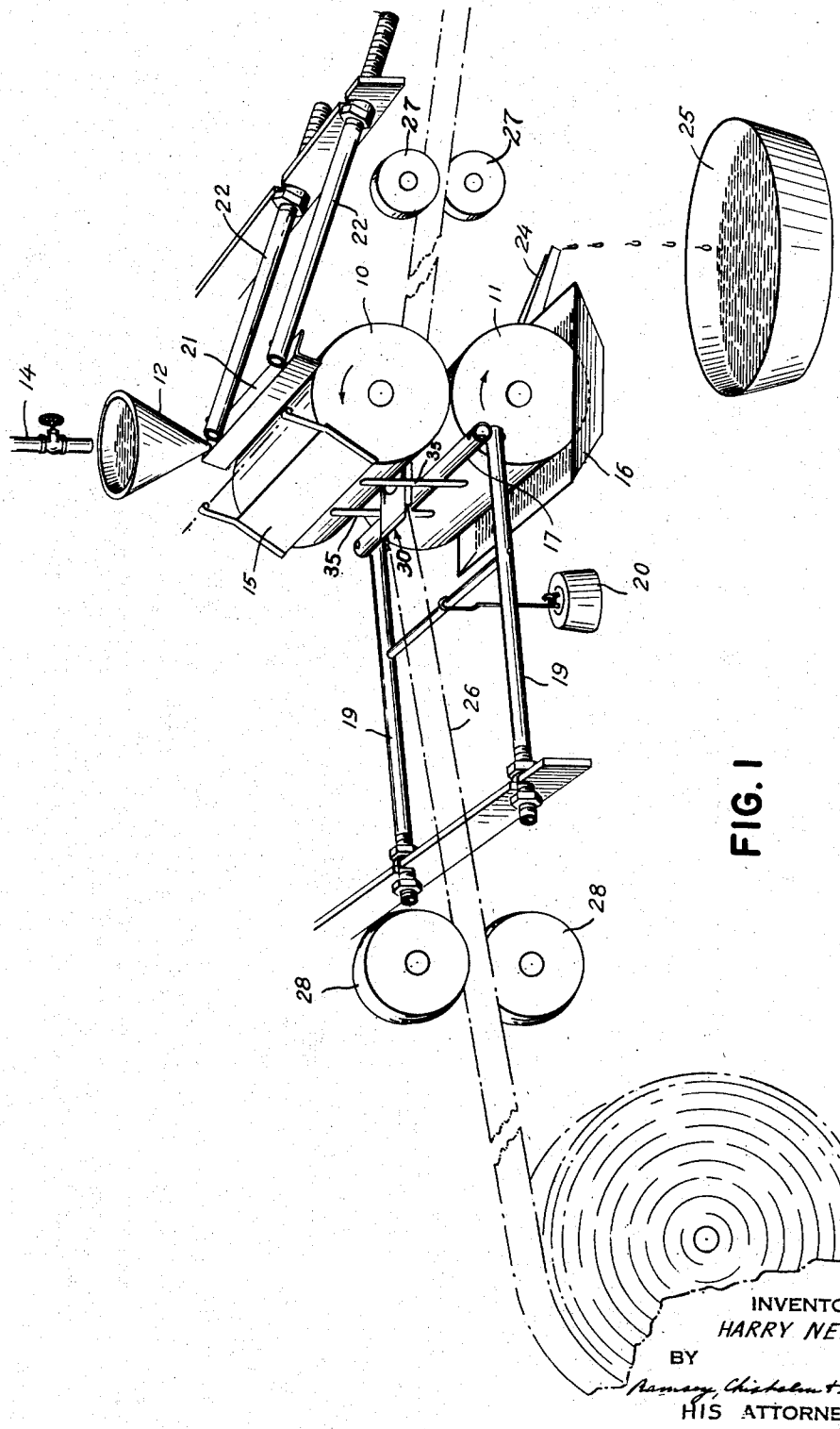


FIG. 1

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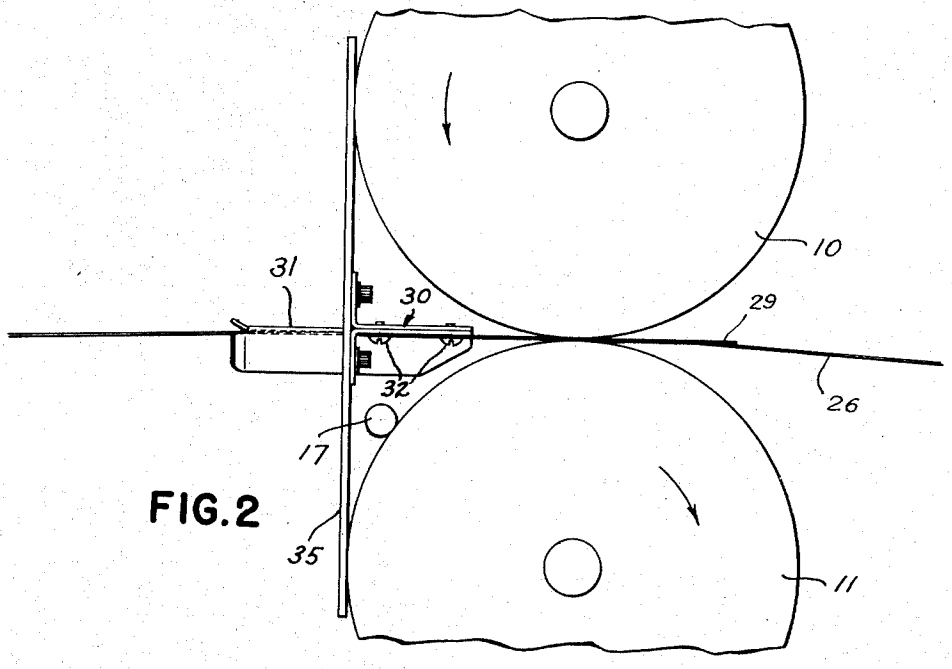


FIG. 2

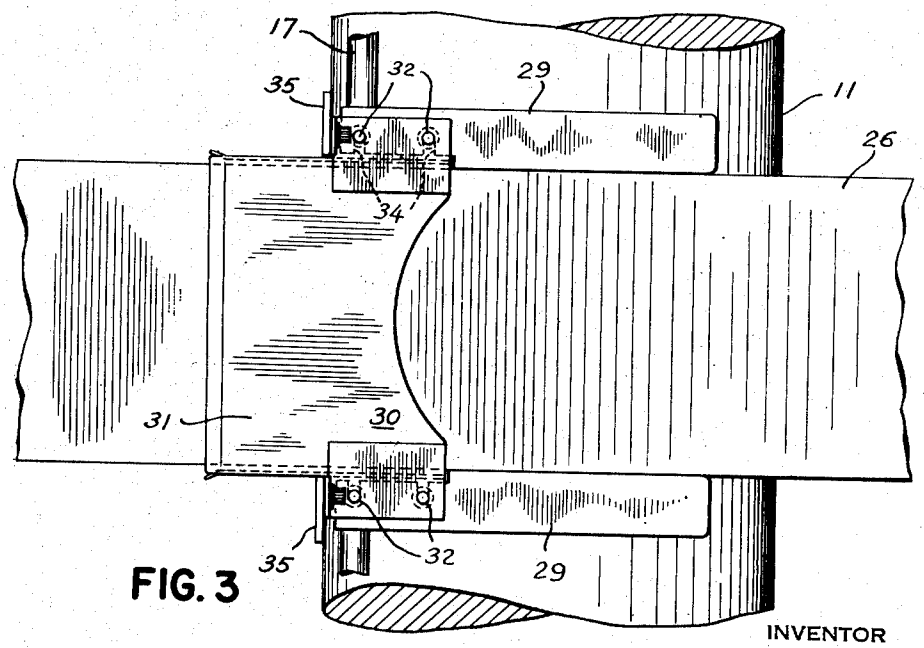


FIG. 3

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ROLL-PAINTING APPARATUS

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10 Claims. (Cl. 118—33)

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This invention relates to a method and apparatus for the roll-painting of thin sheet metal strip.

Sheet metal strip of indeterminate length and uniform width is sometimes passed between a pair of soft rubber rolls continuously coated with paint in order to paint the sides and edges of the strip, after which the strip may be baked or otherwise dried and then recoiled. Among the types of paint which may be applied in this manner are the urea alkyd and vinyl types of synthetic enamels.

In the roll-painting of sheet metal strip stock, it is possible to apply a very even coating of paint to the sides or faces of the strip by a pair of opposed rollers, one located above and one located below the strip and both pressing very lightly on the strip. The paint on the rollers comes around and completely coats the edges of the strip, particularly in the case of a relatively thin strip having a thickness up to .040 to .050 of an inch. In fact, the problem in painting such a strip is not one of applying paint to the edges of the strip but in preventing beads or zones of greatly increased thickness along the edges. Such paint beads are particularly detrimental when the strip is subsequently to be roll-formed into finished shapes; e. g., channel sections used for Venetian blind head bars, bottom bars, and metal fascia boards, since the thickened paint is more likely to scale off so as to leave the bare metal exposed.

The present invention contemplates the introduction of a thin metal blade close to each side of the metal strip during its passage between the paint rolls in order to prevent the formation of a heavy layer of paint along each edge of the strip. In the form shown of the present invention, these blades are incorporated in a fitting supported by the strip and riding on the portion of the strip in advance of the paint rolls.

It is sometimes desirable that a strip that is subsequently to be roll-formed be given a full, opaque coat of paint on one side and a somewhat thinner, translucent coat of paint on the other side in order to facilitate the rolling of the strip and prevent galling of the forming rolls by small metal particles from the strip. In the form shown of the present invention, this is accomplished in part by feeding the strip upwardly to and downwardly from the painting rolls so as to produce a greater pressure of the lower painting roll on the strip since the strip is under tension, and therefore produce a thinner coat of paint on the lower side of the strip. In addition, a scraper may also be provided to remove some of the paint from the lower roll before it contacts the strip and further reduce the amount of paint applied to the strip.

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It is an object of the present invention to provide an improved method and apparatus for applying a smooth, uniform, opaque coat of paint to one side and the edges of thin, flat, sheet metal strip and a thinner, translucent coat of paint to the other side of the strip.

Another object is to generally improve apparatus and methods for the roll-painting of thin sheet metal strip.

Further objects and objects relating to details and economies of construction and use will more definitely appear in the detailed description to follow.

My invention is clearly defined in the appended claims. In the claims, as well as in the description, parts are at times identified by specific names for clarity and convenience, but such nomenclature is to be understood as having the broadest meaning consistent with the context and with the concept of my invention as distinguished from the pertinent prior art. The best form in which I have contemplated applying my invention is illustrated in the accompanying drawing forming part of this specification, in which:

Fig. 1 is a diagrammatic, perspective view of the machine of the present invention, showing in broken lines a strip of metal being passed through the machine for painting.

Fig. 2 is an enlarged side elevation of the fitting for preventing the formation of paint beads on the strip during painting, the strip and paint rolls being shown diagrammatically.

Fig. 3 is a top plan view of the fitting shown in Fig. 2, the strip and bottom paint roll being shown diagrammatically.

Venetian blind head bars and bottom bars are often formed of painted metal channels. These channels may be formed from a thin strip of sheet metal of uniform width and thickness and indeterminate length, which is passed through a roll-forming machine to form the desired contour, after which the channel is severed to form sections of predetermined length.

There are certain advantages inherent in painting such a strip before it is given its channel form. A coating of paint of more uniform thickness can be obtained by painting the flat strip rather than the completed channel and, in addition, there is a saving in equipment and labor. Fig. 1 shows diagrammatically the paint-

ing a flat strip by passing it between two opposed paint rolls which are continuously coated with paint and transfer the paint to the strip.

Referring more specifically to the drawings, the machine of the present invention comprises a pair of opposed paint rolls 10 and 11, these rolls usually being formed of soft rubber rotated on horizontal axes. The painting apparatus shown includes a paint supply cone 12 which is located above the top roll 10 and feeds paint by gravity at a predetermined rate to the top surface of the roll 10. The cone 12 is fed by a supply pipe 14.

Paint falling onto the paint roll 10 is distributed more or less evenly along the surface of the roll 10 by a distributing blade or strip 15 which may be mounted on a horizontal support and bears lightly against the upper portion of the roll 10 in advance of contact of the roll with the strip.

The lower roll 11 is rotated with its lower portion immersed within paint contained within a paint trough 16, which accumulates surplus paint fed through the supply cone 12 and onto the upper roll 10, and drips down into the trough. If desired, a round scraper 17 may be located to bear against the surface of the roll 11 in advance of its contact with the strip in order to remove most of the paint from the lower roll and place only a relatively thin coating of paint on the underside of the strip. The scraper 17 is preferably mounted on a pair of radial arms 19, 19, which are supported on the frame of the machine. The thickness of paint on the underside of the strip may be controlled to some extent by varying a weight 20 suspended from the radial arms 19 so as to vary the pressure at which the scraper 17 bears against the lower roll.

In order to supply a more uniform coating of paint to the lower roll 11, an overflow 24 is provided in the trough 16 so as to maintain a uniform depth of paint within the trough. The paint flowing through the overflow may be collected in a receptacle 25 and then recirculated by a suitable pump, not shown, to the supply pipe 14 and the supply cone 12. A scraper 21 bears against the surface of the top roll 10 after it has contacted the strip to be painted and in advance of the paint supply cone 12 to remove any dirt, scale, or other foreign matter from the surface of the roll and prepare the roll for receiving additional paint supply. This scraper may be formed of an angle section and is carried by a pair of radial arms 22, 22, supported from the frame of the machine.

The paint rolls 10 and 11, are of very soft rubber. These rolls contact the upper and lower surface of the strip to be painted with a very light pressure and are driven by sprockets, not shown, at a peripheral speed exactly equal to the speed of the strip being painted. In Fig. 1 a strip 26 to be painted is indicated in broken lines and is usually supplied from a coil mounted to rotate on a horizontal axis. The strip 26 is progressed through the painting machine by a pulling unit, comprising a pair of opposed drive rolls 27, 27 to uniformly progress the strip and a braking unit having opposed braking rolls 28, 28 in advance of the paint unit to maintain a slight tension of the strip in its passage through the painting and paint-drying operation. The drive rolls 27, 27 following the paint rolls 10 and 11 are located a sufficient distance from the paint rolls to allow time for the paint to be dried.

The above-outlined method of painting is suitable for thin sheet metal strips of a thickness up

to .050 to .075 of an inch. A film of paint on the rolls 10 and 11 tends to collect along the line of contact between the rolls, particularly outside of the strip-contacting portion of the rolls, and to flow around to coat the edges as well as the top and bottom surface of the strip. In fact, a film of paint of increased thickness tends to form in a continuous line along both edges of the strip, extending a short distance inwardly on the top and bottom sides thereof. This excess paint is probably pulled onto the strip from the paint supply on the rolls out beyond the edges of the strip by surface tension of the paint as the strip leaves the rolls.

According to the present invention, a thin metal blade 29 of about the same thickness as the strip is introduced between the rolls 10 and 11 on each side of the strip 26 to prevent formation of excess paint on the edges of the strip. The blades 29 extend between the rolls 10 and 11 for substantial distances forwardly and rearwardly of the nip of the rolls, that is, the zone at which the rolls approach each other most closely. The blades 29, 29 are mounted to lie in the plane of the pass between the rolls 10 and 11, with their edges very close to the sides of the strip and preferably have only sufficient clearance to permit free running of the strip. This clearance may be as little as about .001 of an inch on each side. The blades 29, 29 are preferably straight and incorporated in a fitting 30 which has a channel-shaped central guide 31 adapted to ride along the strip 26 immediately in advance of the paint rolls. The blades 29, 29 may be mounted one on each side of the guide 31 by screws 32. If desired, these screws can be received in transverse slots 34 within the blades 29 to permit a limited lateral adjustment of the blades for minor variations in width of strip. If desired, the end of the central guide 31 may be flared slightly to facilitate smooth passage of the strip through the guide.

A pair of vertical strips 35, 35 are secured one on each side of the channel-shaped guide 31 and are of sufficient length to extend above the axis of the paint roll 10 and below the axis of the paint roll 11. Accordingly, as the strip 26 passes through the paint rolls, the fitting 30 assumes the position indicated in Figs. 2 and 3, with the blades 29 of the fitting extending between the rolls beside the metal strip 26 and the strips 35, 35 bearing lightly against the front or entrance side of the paint rolls to prevent passage of the fitting through the rolls.

The blades 29 of the fitting 30 occupy the space between the rolls immediately beside the strip 26 and effectively prevent the formation of a thickened layer of paint along the edges of the strip. It is probable that this result is obtained due to the fact that the blades 29, 29 occupy a space between the rolls which would otherwise largely be filled by paint and, by displacing the paint, there is no excess available to be drawn onto the strip as it leaves the rolls.

The paint rolls 10 and 11 customarily used for applying paint are of very soft rubber and bear lightly against the strip in its passage through the rolls. In order to assure a smooth, unbroken coating of paint on the upper surface of the strip 26 and produce a somewhat lighter coating of paint on the lower surface of the strip, it is desirable to bring the strip upward somewhat as it approaches the rolls and downward as it leaves the rolls. Since there is a slight tensioning of the strip by the drive rolls 27, 27 and braking rolls 28, 28, this causes the strip to bear with

greater pressure against the lower roll, and decreases the pressure between the strip and the upper roll **10**. Thus, the thickness of paint on the underside of the strip **26** may be controlled not only by the amount of paint on the lower roll **11** at the point of contact with the strip but also by the angle at which the strip is fed through the rolls. Whenever the angle at one side of the strip made by the strip entering and leaving the rolls is less than 180°, the strip will bear heavier on the roll on that side and produce a thinner coat of paint.

The above-described machine serves to coat the strip **26** with a coating of paint of substantially uniform thickness and avoids producing a thicker film of paint along the edges of the strip. This machine is particularly effective when used with synthetic enamels of the urea alkyd and vinyl types.

I claim:

1. Apparatus for roll-painting thin sheet metal strip of uniform width to produce a uniform coat of paint on one side and the edges and a thinner coat of paint on the other side, said apparatus comprising: a pair of opposed, soft, closely spaced, paint-applying rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, means for supplying paint to the surface of the rolls, means for tensioning the strip in its passage through the rolls and directing the strip so that the angle made by the strip entering and leaving the rolls is less than 180° on one side of the strip, means to scrape most of the paint from the paint-applying roll on that side of the strip, and a pair of thin, blade-like members extending through and beyond the nip of the rolls, one member being located closely beside each edge of the strip.

2. Apparatus for roll-painting thin sheet metal strip of uniform width to produce a uniform coat of paint on one side and the edges and a thinner coat of paint on the other side, said apparatus comprising: a pair of opposed, soft, closely-spaced, paint-applying rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, means for supplying paint to the surface of the rolls, means for tensioning the strip in its passage through the rolls and directing the strip so that the angle made by the strip entering and leaving the rolls is less than 180° on one side of the strip, and a pair of thin, blade-like members extending through and beyond the nip of the rolls, one member being located closely beside each edge of the strip.

3. Apparatus for roll-painting thin sheet metal strip of uniform width, said apparatus comprising: a pair of opposed, soft, closely spaced, paint-applying rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, means for supplying paint to the surface of the rolls, and a pair of thin, blade-like members or substantially the same gauge as the strip extending through and beyond the nip of the rolls, one member beside and close to each edge of the strip.

4. Apparatus for roll-painting thin sheet metal strip of uniform width, said apparatus comprising: a pair of opposed, soft, closely spaced, paint-applying rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, means for supplying paint to the surface of the rolls, and a pair of thin, blade-like members extending through and beyond the nip of the rolls and for appreciable distances forwardly and rearwardly of said nip, one member beside and having a straight edge closely paralleling each edge of the strip.

5. In a machine for roll-painting thin sheet metal strip of uniform width, a pair of opposed, cylindrical, closely spaced, painting rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, and a fitting for preventing the formation of beads of paint along the side edges of the strip during the passage of the strip between the rolls, said fitting comprising a pair of thin blades connected by a central guide section riding upon the strip in advance of the painting rolls with the blades extending through and beyond the nip of the rolls, one of said blades being positioned beside and close to each side edge of the strip.

6. In a machine for roll-painting thin sheet metal strip of uniform width, a pair of opposed, cylindrical, closely spaced, painting rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, and a fitting for preventing the formation of beads of paint along the side edges of the strip during the passage of the strip between the rolls, said fitting comprising a pair of thin blades connected by a central guide section riding upon the strip in advance of the painting rolls with the blades extending through and beyond the nip of the rolls, one of said blades being positioned beside and close to each side edge of the strip, the fitting having means for preventing the guide section thereof from being carried into the rolls.

7. In a machine for roll-painting thin sheet metal strip of uniform width, a pair of opposed, cylindrical, closely spaced, painting rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, and a fitting for preventing the formation of beads of paint along the side edges of the strip during the passage of the strip between the rolls, said fitting comprising a pair of thin blades extending through and beyond the nip of the rolls beside the strip and supported with one blade slightly spaced from each edge of the strip.

8. In a machine for roll-painting thin sheet metal strip of uniform width, a pair of opposed painting rolls between which the strip is adapted to be passed, the rolls being mounted for rotation on parallel axes, and a fitting for preventing formation of beads of paint along the side edges of the strip during the passage of the strip between the rolls, said fitting comprising a pair of blades of approximately the thickness of the metal strip and supported with one blade slightly spaced from each edge of the strip and extending between the nip of the rolls beside the strip.

9. A fitting for preventing the formation of beads of paint along the side edges of thin sheet metal strip during the roll-painting of the strip by passage between a pair of opposed painting rolls, said fitting comprising: a pair of blades having substantially straight confronting edges positioned in parallel spaced relation within a common plane, the distance between said edges of the blades being only slightly greater than the width of the strip to be painted, and an inverted channel-shaped member adapted to ride along the strip to be painted and having bottom and side walls for closely overlying the top and side edges of the strip, the blades being supported by the channel-shaped member in substantially the plane of the inner bottom surface of the member.

10. A fitting for preventing the formation of edge beads of paint along the side edges of thin

sheet metal strip during the roll-painting of the strip by passage between a pair of opposed painting rolls, said fitting comprising: a pair of blades having substantially straight confronting edges positioned in parallel spaced relation within a common plane, the distance between said edges of the blades being only slightly greater than the width of the strip to be painted, and an inverted channel-shaped member adapted to ride along the strip to be painted and having bottom and side walls for closely overlying the top surface and side edges of the strip, the blades being supported by the channel-shaped member in substantially the plane of the inner bottom surface of the member, and a member extending perpendicularly of the plane of the blades for preventing passage of the channel-shaped member between the rolls.

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