No. 802,607. PATENTED OCT. 24, 1905.

L. C. STEELE.

COATING MACHINE.

APPLICATION FILED NOV. 10, 1903.

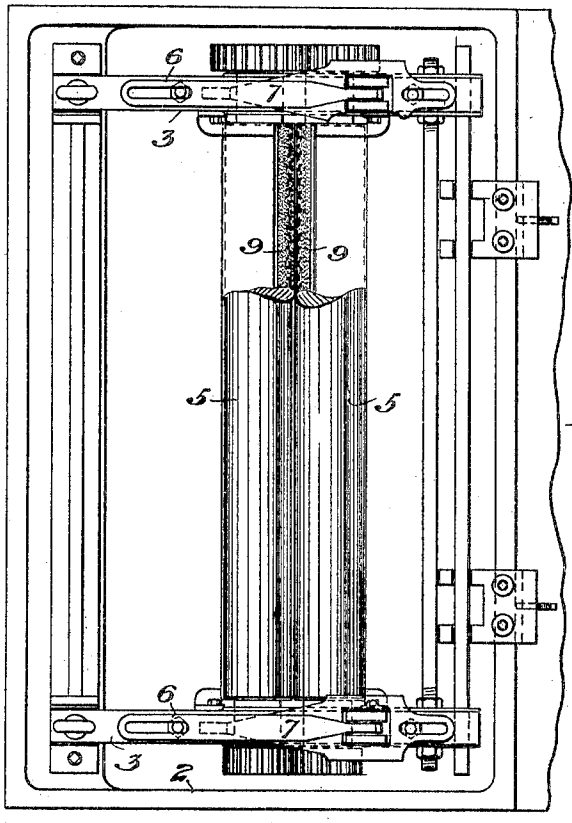


Fig. 1.

Fig. 2.

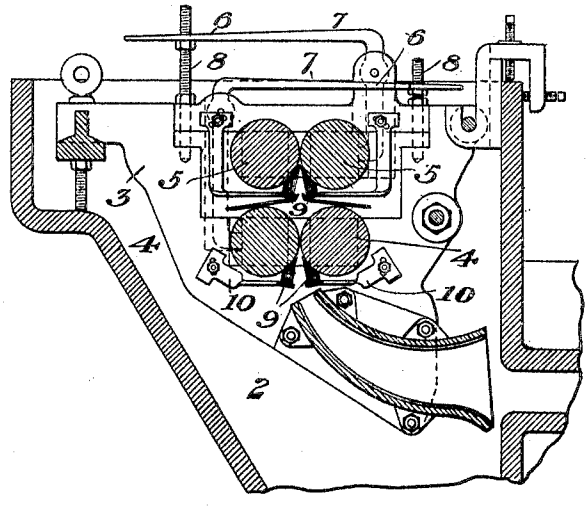


Fig. 3.

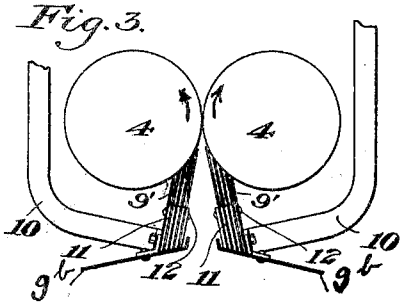


Fig. 4.

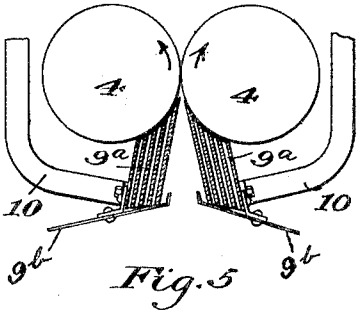
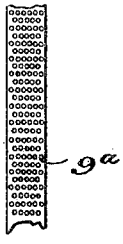


Fig. 5



WITNESSES

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LAWRENCE C. STEELE, OF WHEELING, WEST VIRGINIA, ASSIGNOR TO AMERICAN SHEET & TIN PLATE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

COATING-MACHINE.

No. 802,607. Specification of Letters Patent. Patented Oct. 24, 1905.

Application filed November 10, 1903. Serial No. 180,556.

To all whom it may concern:

Be it known that I, LAWRENCE C. STEELE, of Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Coating-Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view, partly broken away, showing a coating-machine with the preferred form of my improvement applied thereto. Fig. 2 is a vertical cross-section of Fig. 1. Fig. 3 is a detailed view showing a modified form of device to remove the surplus metal from the rolls, and Figs. 4 and 5 are detail views of other modifications of the device employed to remove the surplus metal.

My invention relates to the coating of metal sheets with metal, such as tin, which is applied in the molten condition, and more particularly to coating-machines wherein the sheet passes upwardly between rolls arranged to remove the surplus metal adhering to the plate as it emerges from the liquid-bath. Heretofore in tinning or other coating machines of this character if the machine was driven above a certain speed of rotation the metal would not drain from the rolls by gravity, owing to the increased speed, and the adhesion would carry the molten metal up and redeposit it on the plates. It has therefore been necessary to drive such machines at a comparatively low speed, especially where a light coating is desired. My invention overcomes this difficulty and enables such a machine to be driven at high speed and to increase the output without increasing the thickness of the coating; and it consists in providing means for removing the surplus metal from the rolls, and thus preventing it from being carried up and again deposited on the plate.

It also consists in providing brushes which will be wet by the liquid metal, whereby capillary action can be utilized in the removal of the metal. I prefer to use brushes composed of a metal strip or strips or composed of wire and place such brushes closely adjacent to the surface of the rolls and preferably under them and adjacent to the nip of the rolls, so that the metal on the rolls is removed by gravity and capillary action.

In the drawings, 2 represents a tinning-pot in the usual form and containing the ordinary tinning-machine set therein and suspended on end hangers or housings 3 3. In these housings are mounted the lower part of rolls 4 and the two upper rolls 5, the rolls preferably having sliding bearings with the compressing-springs 6, forming a portion of levers 7, adjusted by the screw-bolts 8, these parts being well known in tinning-machines.

Under the lower rolls 4 and between the lower rolls 4 and the upper rolls 5 I secure two series of metal brushes 9, which extend longitudinally of the rolls, with their upper edges cut to a curve of proper radius to fit closely adjacent to the surfaces of the rolls. I preferably hold these brushes by end parts 10 10, adjustably secured to the housings 3. Plates 9^b, secured at the base of the upper brushes, constitute deflectors to prevent the molten metal conducted by the brushes from dropping upon the lower rolls and to direct the surplus metal back to the bath.

Instead of the wire brushes shown in Figs. 1 and 2, I may employ strips 9′, extending lengthwise of the rolls and having spacing-blocks 11 at various points between them and held by through-bolts 12, as in Fig. 3, or I may employ a bar or block 9^a, extending lengthwise of the rolls and having a curved upper face with capillary openings or holes leading down through it, as in Figs. 4 and 5.

In the operation of the machine the pot is filled with molten metal to within a few inches of the two lower rolls, and on this molten bath is poured the oil which covers the lower rolls and partially submerges the upper rolls. When the sheet passes upward between the rolls in emerging from the bath, the rolls squeeze the surplus metal from it. When the machine is operated at a low speed, gravity carries the excess molten metal down the face of the sheet in advance of the rolls, depositing the same in the pot and causes the metal which has adhered to drop into the pot. When the speed of the machine is increased to such extent as to overcome gravity, excess metal would be carried with the rolls and redeposited upon the sheet; but by means of my brushes such

excess metal is removed from the rolls and caused to pass from the brushes into the pot. The brushes are arranged to make contact with the under surfaces of the rollers, whereby they will catch the molten metal which runs down the surface of the rolls from their place of contact with the plate. As shown in Fig. 2, I prefer to arrange the brushes 9 in such proximity to each other that they will be adjacent to the nip or bite of the rolls; and they may not only make contact with the rolls, but will also touch the plate, and thus aid in removing the surplus molten metal therefrom.

The advantages of my invention result from removing the surplus metal from the squeezing-rolls, thereby preventing them from carrying it up and redepositing it upon the plate. The speed of rotation may be increased without increasing the thickness of the coating 7, thereby lessening the waste by oxidation, permitting a more uniform distribution with a less consumption of the coating metal and greatly increasing the output of coated plates.

The brushes, strips, or bars and the rolls may be arranged in different ways, and other means may be provided for removing the surplus metal from the rolls without departing from my invention.

I do not claim the use of asbestos brushes or wipers located on the outside of the rolls or bearing on the lower portions thereof; but

What I claim is—

1. A coating-machine arranged to contain a molten-metal bath and having rolls arranged to remove the surplus metal from a sheet or plate and means adapted to be wet by the coating metal for removing the surplus metal from the rolls; substantially as described.

2. A coating-machine arranged to contain a molten metallic bath and having rolls arranged to remove the surplus metal from a sheet or plate, and a metallic body adapted to be wet by the coating metal and arranged to withdraw the metal from the rolls; substantially as described.

3. A coating-machine arranged to contain a molten bath, and having rolls arranged to remove the surplus metal from a sheet or plate, and brushes adapted to be wet by the coating metal arranged adjacent to the surface of the rolls and adapted to remove the surplus metal therefrom; substantially as described.

4. A coating-machine having rolls arranged to remove surplus molten metal from a sheet or plate, and a metallic body having capillary openings therethrough arranged to remove the surplus metal from the rolls; substantially as described.

5. A device for removing surplus molten metal from the rolls of a metal-coating machine, consisting of brushes which are adapted to be wet by the coating metal; substantially as described.

6. A device for removing surplus molten metal from the rolls of a metal-coating machine, consisting of a metallic body having capillary openings therethrough; substantially as described.

7. A device for removing surplus coating metal from the rolls of a metal-coating machine, consisting of a plurality of elongated metallic bodies arranged in a holder and separated by capillary spaces only; substantially as described.

8. A coating-machine arranged to contain a molten metallic bath and having rolls arranged to remove the surplus metal from a sheet or plate, and a metallic body adapted to be wet by the coating metal and adjacent to the nip of the rolls to withdraw the metal therefrom; substantially as described.

9. A coating-machine arranged to contain a molten bath, and having rollers and brushes arranged adjacent to the surface of the rollers and adapted to remove the surplus metal therefrom, said brushes being arranged also to make contact with the plate; substantially as described

10. A coating-machine arranged to contain a molten bath and having rollers to remove surplus metal from a sheet or plate, and means adapted to make contact both with the under surface of the rollers and with the plate for removing the surplus metal; substantially as described.

11. A coating-machine arranged to contain a molten bath and having rolls arranged to remove the surplus metal from a sheet or plate, and means for removing the surplus metal from the nip of the rolls; substantially as described.

12. A metal-coating machine having rolls arranged to remove surplus molten metal from a sheet or plate, and means for removing the surplus metal from the nip of the rolls; substantially as described.

13. A device for removing surplus molten metal from the rolls of a metal-coating machine, consisting of brushes which are adapted to be wet by the coating metal, and means for adjusting the pressure of the brushes on the rolls; substantially as described.

14. A device for removing surplus molten metal from the rolls of a metal-coating machine, consisting of brushes which are adapted to be wet by the coating metal, and means for adjusting the brushes toward and from the rolls; substantially as described.

In testimony whereof I have hereunto set my hand November 9, 1903.

L. C. STEELE.

Witnesses:

THOMAS W. BAKEWELL,

H. M. CORWIN.