A. H. WEHRLE.

MACHINE FOR TINNING SHEET METAL AND WIRE.

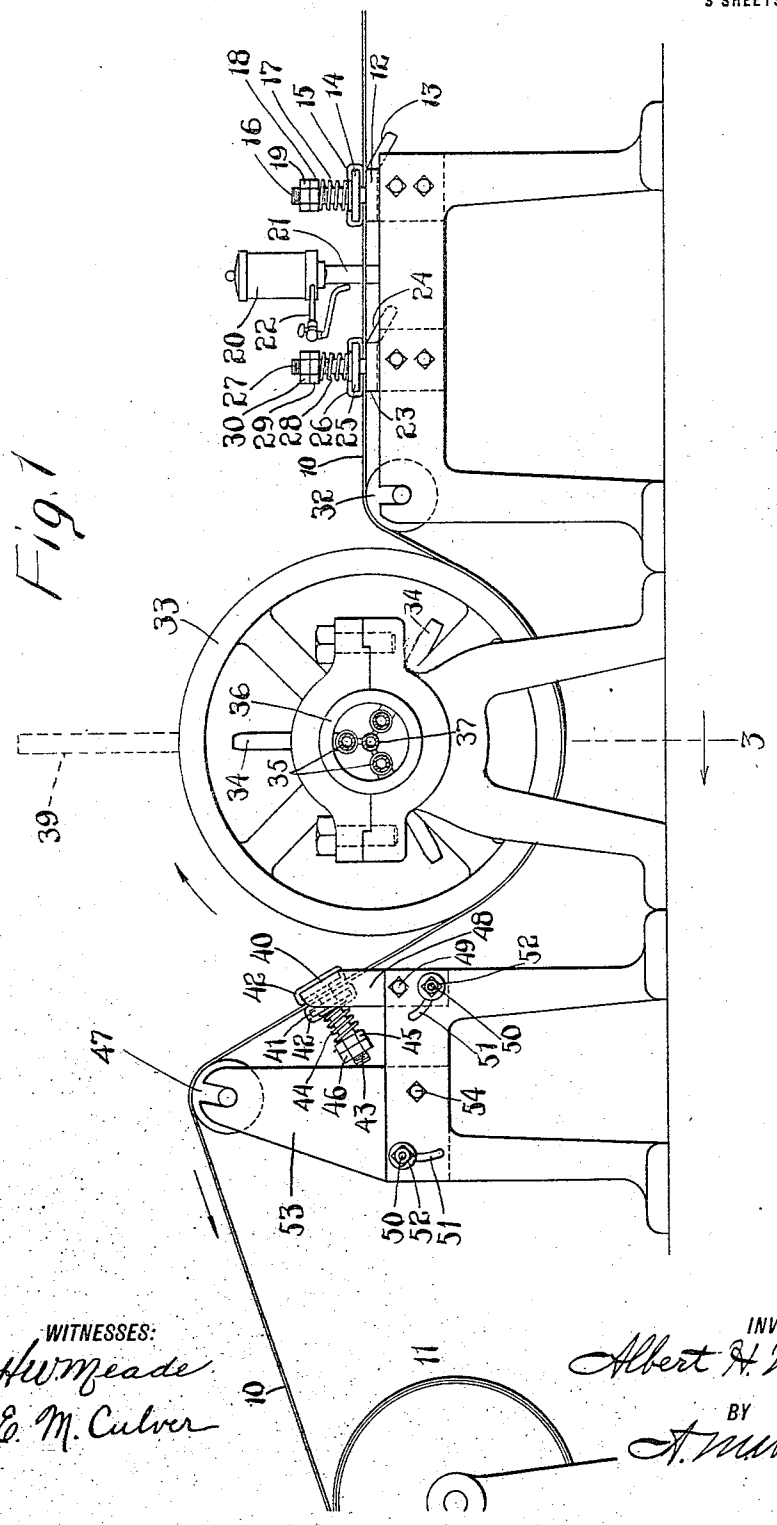
APPLICATION FILED MAR. 17, 1914.

1,244,931.

Patented Oct. 30, 1917.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

H. W. Meade

E. M. Culver

INVENTOR

Albert H. Wehrle

BY

A. M. Wooster

ATTORNEY

A. H. WEHRLE.

MACHINE FOR TINNING SHEET METAL AND WIRE.

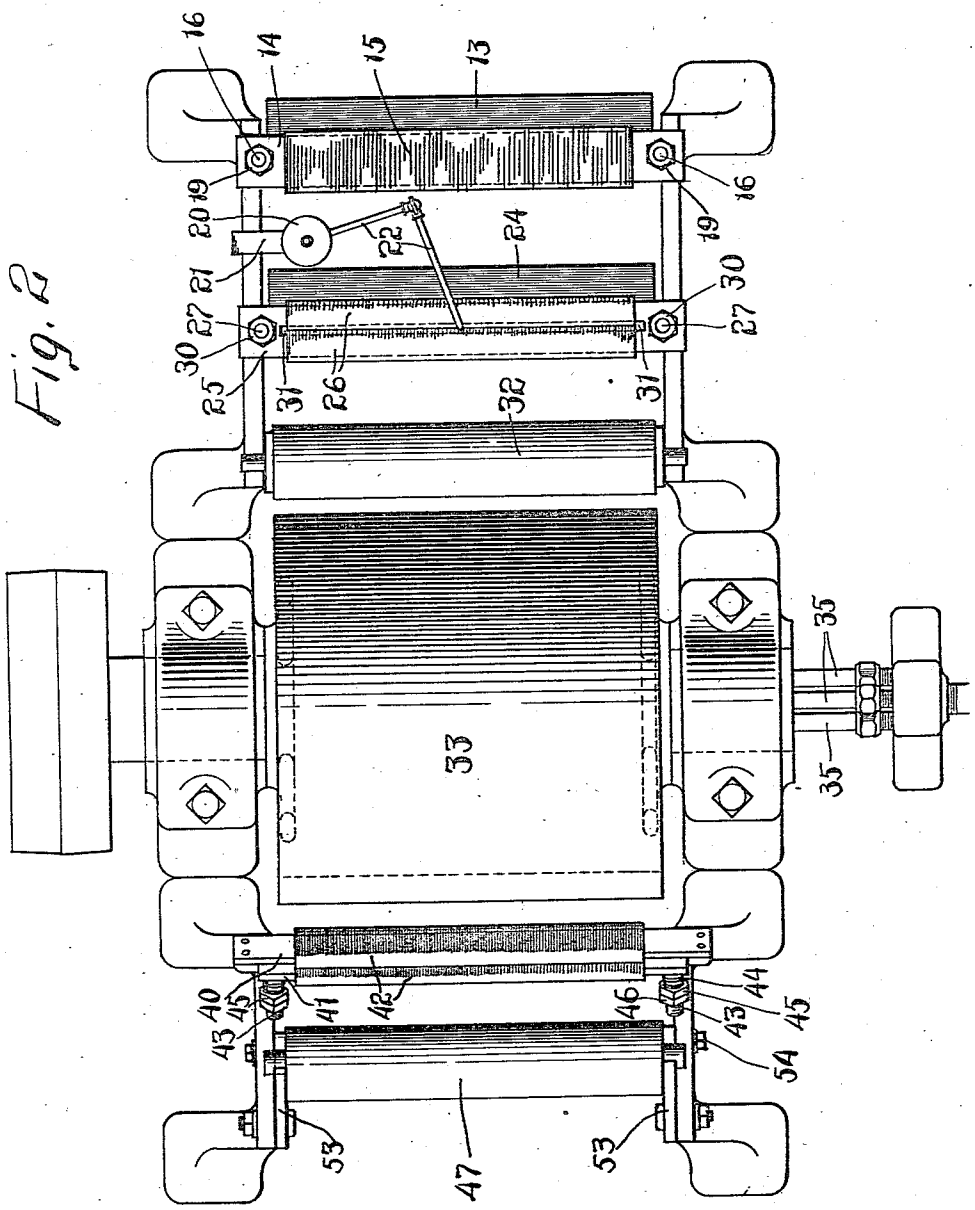
APPLICATION FILED MAR. 17, 1914.

1,244,931.

Patented Oct. 30, 1917.

3 SHEETS—SHEET 2.

Fig. 2



WITNESSES:

H. W. Meade

E. M. Culver

INVENTOR

Albert H. Wehrle

BY

A. M. Wooster

ATTORNEY

A. H. WEHRLE.

MACHINE FOR TINNING SHEET METAL AND WIRE.

APPLICATION FILED MAR. 17, 1914.

1,244,931.

Patented Oct. 30, 1917.

3 SHEETS—SHEET 3.

Fig. 3

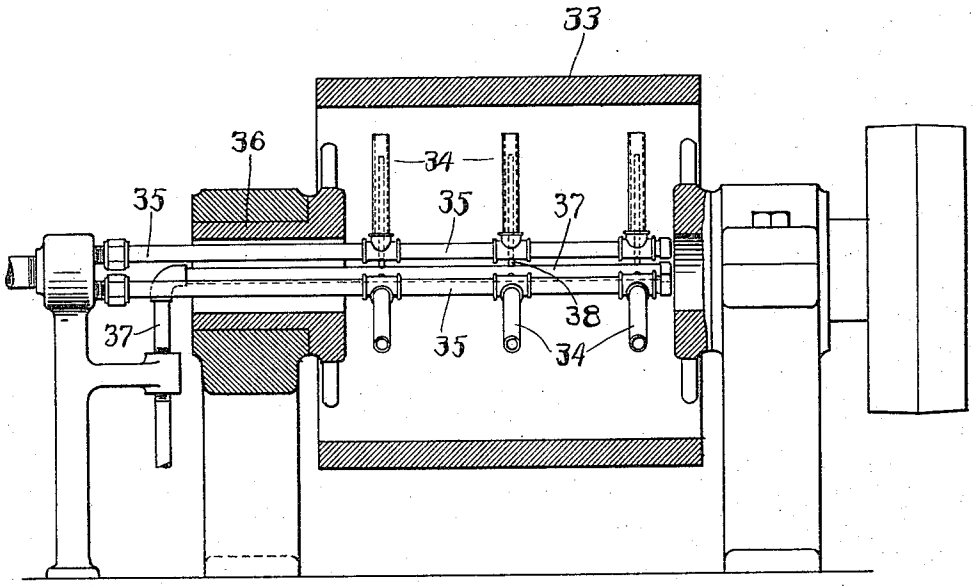


Fig. 4

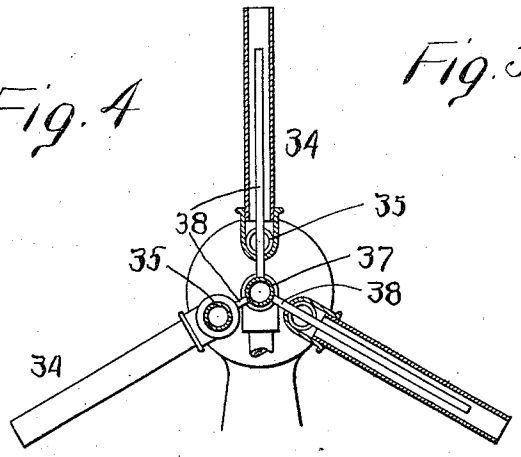
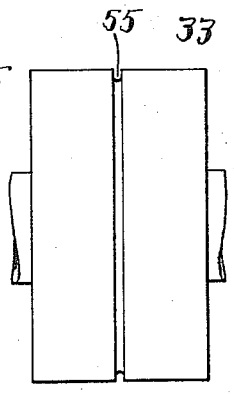


Fig. 5



WITNESSES:

H. W. Meade

E. M. Culver

INVENTOR

Albert H. Wehrle

BY

H. M. Wooster

ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT H. WEHRLE, OF DERBY, CONNECTICUT, ASSIGNOR TO WILLIAM A. COOK, OF NEW YORK, N. Y.

MACHINE FOR TINNING SHEET METAL AND WIRE.

1,244,931. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed March 17, 1914. Serial No. 825,284.

To all whom it may concern:

Be it known that I, ALBERT H. WEHRLE, a citizen of the United States, residing at Derby, county of New Haven, State of Connecticut, have invented an Improvement in Machines for Tinning Sheet Metal and Wire, of which the following is a specification.

This invention is directed to the provision of an improved means for applying a thin metal coating, such, for instance, as a coating of tin, to metallic parts such as strips of sheet metal and wire. The object of the invention is to provide a mechanism for this purpose whereby a material saving is effected in the time required for the operation, in the labor involved, and in the materials used.

In applying a coating of tin to sheet metal wire, it has been the common practice heretofore to reduce solid tin to a molten state by heating it and to effect the transfer of molten tin from the receptacle in which the tin is melted to a roll or other device whereby the tin is applied to the sheet metal. This operation has involved considerable loss in the tin which is relatively expensive as more or less of the tin, when in a molten state, oxidizes and forms what is known as "dross."

The present invention is characterized by the fact that the tin for coating the metal is in the form of a solid block and this tin is reduced to a molten state as an incident of the operation of applying the tin to the metal and only as fast as the operation of applying the tin to the metal progresses. Preferably a rotatable cylinder is employed provided with means for heating the peripheral surface thereof to a relatively high temperature; a block of solid tin is held in contact with the surface of this cylinder so that the tin is melted by its contact with the cylinder and the cylinder takes up a thin film of molten tin from the block; and, the metal to be coated is carried into close contact with the cylinder at a point on the cylinder displaced by a short distance from the block of solid tin so that the metal takes up the film of molten tin from the surface of the cylinder.

With these and other objects in view I have devised the novel metal coating machine which I will now describe, referring to the accompanying drawings forming a part of this specification and using reference characters to indicate the several parts:

Figure 1 is an elevation of the machine complete with the air and gas pipes in section;

Fig. 2 is a plan view corresponding therewith;

Fig. 3 is a partial vertical section on the line indicated by 3 in Fig. 1, looking in the direction of the arrow and showing the air and gas pipe connections;

Fig. 4 is an enlarged detail view partly in section showing the arrangement of the air and gas pipes and the burners, and

Fig. 5 is an elevation of a grooved drum for tinning wire.

While my novel machine will be found especially valuable for tinning copper, it will be found equally useful for tinning sheets, strips or wire made of iron or steel. When used for tinning sheets or short strips, the sheets may be joined by turning the edges and connecting them together by hooked joints so that they may be more readily handled by passing them through the machine as one continuous strip.

The metal, indicated by 10, which may be either sheet metal or wire, is drawn through the machine by means of a power-driven winding drum indicated by 11. The metal first passes through a tension device comprising a fixed plate 12 which is preferably provided with an inclined guide 13 on the receiving side, and a spring controlled plate 14, which is preferably wound with wicking, indicated by 15. Threaded rods 16 are rigidly secured in and extend upward from the ends of plate 12 and pass through holes in plate 14. Springs 17 surrounding the rods and bearing against plate 14 are set at the required tension by means of a nut 18 and locked there by a set nut 19. The metal then passes through a fluxing device which comprises a can 20 carried by a bracket 21 and provided with a jointed pipe 22 for delivering acid or other suitable fluxing liquid which is deposited upon a spreader constructed similarly to the tension device. 23 denotes the fixed plate of the spreader which is preferably provided with an inclined guide 24, 25 the spring controlled plate, 26 wicking, 27 the threaded rods, 28 the springs, 29 the nut and 30 the set nut, the only difference in construction between the spreader and the tension de-

vice being that the spring controlled plate of the spreader is provided with a longitudinal slot 31, through which the fluxing fluid passes freely so as to completely saturate the wicking and spread the fluxing material evenly upon the surface of the metal to be tinned. The metal then passes over a roller 32 and partly about a heated tinning drum 33 which is driven at substantially the same surface speed as the winding drum. I have shown the drum as heated by means of three sets of burners indicated by 34 which project radially from gas pipes 35 which extend into the drum through a hollow journal 36. 37 denotes an air supply pipe lying between the gas pipes. From pipe 37, air pipes 38 extend into and partly through each burner so that the burners are caused to operate on the Bunsen principle and intensely hot flames are produced which heat the drum to any required temperature. It will be noted that the drum is made relatively heavy so as to retain the heat. A block of tin in the form of the solid metal is held against the peripheral surface of the drum 33 by hand or by any suitable mechanical devices so that as the heated drum is rotated, it melts the portion of the block of tin in contact with the drum and takes up therefrom a thin film of tin in a molten state. This thin film is carried around to the point where the sheet to be coated makes contact with the drum and is there applied to the sheet. I have shown the metal to be tinned as passing over the under-side of the drum and have indicated at 39 a block of tin which may be held against the periphery of the drum by hand or may be pressed against it by any suitable automatic device, not shown. The heat of the drum melts the tin and causes the surface of the drum to be covered evenly with a very thin film of molten tin which is applied to the metal as it passes over the drum, as will be readily understood from Fig. 1.

After leaving the drum, the tinned metal passes through a wiper which is similar in construction to the tension device and the fluxing device and comprises a fixed plate 40, a spring controlled plate 41, both of which plates in the present instance are wound with wicking 42, threaded rods 43 rigidly secured to the fixed plate and passing through holes in the spring controlled plate, springs 44 and a nut 45 and set nut 46 for regulating the tension of the springs. After leaving the wiper the metal passes over a roller 47 and thence to the winding drum. In order that the amount of contact of the metal being coated with the heated drum may be increased or decreased, if required, I pivot the standard 48 by which the wiper is carried, as at 49, provide the standard with a threaded stud 50 which extends through a slot 51 in the frame and lock the wiper at any required adjustment by means of a nut 52 engaging the stud. The standard 53 which carries roller 47 is also pivoted as at 54 and is made adjustable in the same manner as the wiper standard.

When it is required to tin wire, the heated drum is provided with one or a plurality of grooves 55. A single drum may be provided with as many grooves as may be required, or a plurality of smaller drums may be used each provided with one or more grooves. The molten tin is made to coat the walls of the grooves and effectually tins the wire in the same manner as when sheet metal is passed over a drum with a plane surface.

Having thus described my invention I claim:

1. A machine for applying a metallic coating to sheet metal, wire and the like, comprising a rotatable drum, means for heating the peripheral wall of the drum so that the latter will reduce the metal of a solid block of metal held in contact with the drum and take up a film of molten metal from the block, and means for carrying the parts to be coated into engagement with the peripheral wall of the drum.

2. A machine for tinning metal comprising a rotating drum adapted to receive tin from a block held in contact therewith, means within said drum for heating the same to melt the tin, means for drawing the metal about the drum by which the molten tin is applied to the surface of the metal and means for regulating the amount of contact of the metal with the drum.

3. A machine for applying a coating to wire comprising a rotatable drum provided with a circumferential groove, means for heating the portion of the wall of the drum in which the groove is formed so that the drum will reduce the metal of a solid block held in contact with the drum and take up a thin film of molten metal therefrom and means for guiding a length of wire into the groove in the wall of the drum.

4. A machine of the character described, comprising means for drawing the metal through, a heated drum partly about which the metal is passed, a tension device, a fluxing device and a wiper comprising fixed and spring controlled plates wound with wicking between which the metal is passed, a pivoted standard by which the wiper is carried and means for locking said standard and wiper at any required adjustment relatively to the drum.

5. In a machine of the character described, a drum, means to guide metal to be coated in engagement with the drum, means arranged within the drum to heat the same above the melting point of the tin to be applied to the metal, and a wiper adjustably mounted near the drum to be moved toward and away from the same.

6. A machine for tinning metal comprising a rotating drum adapted to receive tin from a block held in contact therewith, means within said drum for heating the same to melt the tin, a tension device, a fluxing device and means for drawing the metal about the drum, whereby molten tin is pressed between the drum and the metal being treated.

7. A machine for applying a coating of metal to sheets, wire and the like, comprising a drum mounted for rotation in suitable bearings and provided with a heavy cylindrical wall, means extending within the drum for heating the cylindrical wall of the drum, said drum being adapted to have a block of the solid metal to be used for the coating held in contact with the drum so that the drum will reduce the metal and take up a thin film of molten metal therefrom, and means for guiding the parts to be coated into engagement with the cylindrical wall of the drum so that they will take up the film of the molten metal from the drum.

8. A machine for coating metallic parts consisting of a drum mounted for rotation, gas and air pipes extending within the drum, burners within the drum supplied by said pipes and adapted to heat the peripheral wall of the drum, said drum being adapted to have a block of solid metal held in contact therewith so that the heated wall of the drum reduces the metal of the block and takes up a thin film of the metal therefrom, and means for guiding the parts to be coated into engagement with the peripheral wall of the drum.

9. In a machine for plating sheet metal on one side a rotary depositing cylinder provided with a heater and arranged to receive the plating material, and mechanism for advancing the sheet under said cylinder.

10. A machine for tinning metal comprising a rotating drum adapted to receive tin from a block held in contact therewith, means within said drum for heating the same to melt the tin, a fluxing device, means for drawing the metal about the drum whereby molten tin is pressed between the drum and the metal being treated, and a wiping device.

11. A machine for applying a metallic coating to sheet metal, wire and the like, comprising a rotatable drum, means for heating the peripheral wall of the drum, means for supplying the metal for the coating in solid form to the heated peripheral wall of the drum whereby the metal is reduced to form a film of molten metal upon the drum, and means for carrying the parts to be coated into engagement with the peripheral wall of the drum.

12. A machine for applying a metallic coating to sheet metal, wire and the like, comprising a rotatable drum, means for heating the peripheral wall thereof, means for supplying metal in solid form to the heated peripheral wall of the drum at one point thereon, which metal when reduced forms a film of molten metal upon the drum, and means for carrying the parts to be coated into engagement with the drum at a point thereon removed from the point of supply of the solid material for the coating to the drum.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT H. WEHRLE.

Witnesses:
CHAS. E. REMER,
FREDERICK M. DREW, Jr.