

E. MOREWOOD.

APPARATUS FOR COATING METAL-PLATES.

No. 171,685.

Patented Jan. 4, 1876.

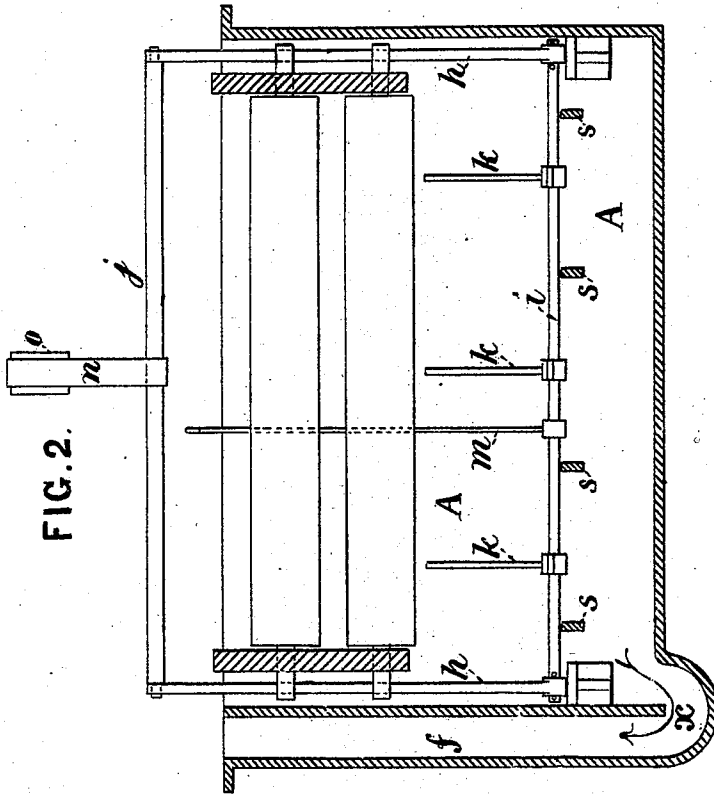


FIG. 2.

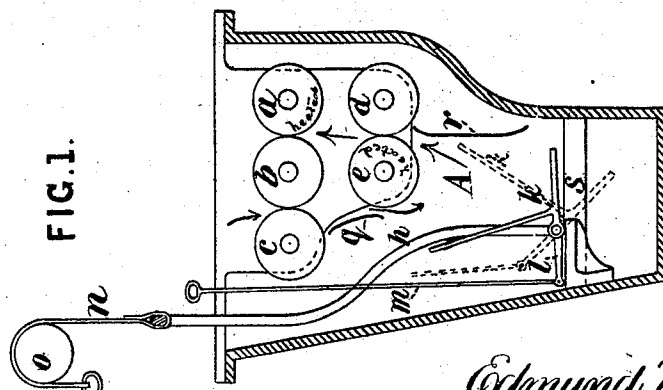


FIG. 1.

Witnesses
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att'y

UNITED STATES PATENT OFFICE.

EDMUND MOREWOOD, OF LLANELLY, GREAT BRITAIN.

IMPROVEMENT IN APPARATUS FOR COATING METAL PLATES.

Specification forming part of Letters Patent No. **171,685**, dated January 4, 1876; application filed November 8, 1875.

CASE A.

To all whom it may concern:

Be it known that I, EDMUND MOREWOOD, of Llanelly, in the county of Carmarthen, Great Britain, formerly of Stratford, in the county of Essex, England, have invented certain Improvements in Coating Metals, and in apparatus to be used therefor, of which the following is a specification:

In the process of coating iron with tin orterne metal, on the withdrawal of the plates from the first tinning or coating pot, and also when they are passed on rapidly through and from the wash or dipping pot, the temperature of the coated plate, especially if it be a thick one, is hotter than is well for finishing through the finishing-rollers if merely dropped into the finishing grease-pot and passed out through one pair of rollers, as is the mode heretofore adopted. Further, in finishing with one pair of rollers in the finishing grease-pot, as heretofore practiced, unless the rolling be repeated a second time the coated surface is not as fine and free from defects as is desirable.

The object of this invention is to remedy these defects, and at the same time to expedite and cheapen the process or manufacture; and in order that this my invention may be fully understood, I will now proceed to describe the same, with reference to the accompanying drawings, of which—

Figure 1 is a vertical cross-section of my improved grease-pot and apparatus connected therewith, and Fig. 2 a vertical longitudinal section of same.

I place two or more pairs of roller, *a b* and *d e*, one above the other in the finishing grease or oil pot A, so that the coated plate in rising perpendicularly out of the grease passes in succession through these pairs of rollers. The upper rollers are about half immersed in the grease, as is well understood, and I make each pair capable of adjustment, as is well known, so that I may be able to exert such a pressure on the plate as shall lessen or improve its surface-coating. I find in practice that a suitable pressure will also raise the plates through the rollers. The rollers are geared together, and driven in any usual and suitable way. I, by preference, use three rollers abreast, *a b c*,

as here shown, revolving in the finishing-grease, one object being that the plates introduced hot from the coating-metal may furnish a portion of heat to the rollers between which they enter into the grease-pot, and thus enable me to have the temperature of the rollers above the average temperature of the grease; another object being to take off the surplus metal when the plate enters hot from the coating-metal pot through the rollers into the grease, and to finish and improve the coating when the plate passes out after being cooled by its travel through the grease. All the rollers are to be perfectly coated with the coating-metal. I find in practice that the rollers are generally kept coated with metal by the mere action of the plates passing down through them into the grease as the superfluous metal is left on the rollers *b* and *c*, and thence by frictional contact carried to the roller *a*; but when I wish to give a heavier coating than usual, or when I drop the plate into the grease-pot direct, and pass it through the elevating-rollers *d e* and *a b* only, then I feed the upper rollers, by preference *a* and *b*, with melted coating-metal by means of a ladle or otherwise. I may heat one roller of each pair by making it hollow and introducing hot air. I then may make the other roller of each pair movable by causing it to work in connection with a spring, or with such an arrangement as enables it to give or yield readily to the pressure of a thick plate passing between it and the other roller of the pair. If the right-hand roller of the lower pair be movable, I heat that of the left hand, and vice versa as to the upper pair. In passing up from the grease between these rollers one side of a plate first touches the heated roller of the lower pair, and then the other side that of the upper pair; and the plate is acted upon first on one side and then on the other by rollers at a temperature above that of the average of the grease; or I obtain a result in some degree equivalent by introducing a tube with cold water passing through it, or other arrangement, as a means of keeping the grease cooler in most parts than about the rollers. In such case I apply heat to the exterior of the grease-pot, but I aim to keep the

line of travel of the plate through the grease before it reaches the exit-rollers cool—that is, cooler than the plate as it comes from the coating-pot. In regular working the rollers are to some extent kept hot by the passage of the hot plates passing in succession between them from the pot or pots of melted coating-metal. When I work thus the coated plate enters the grease-pot between the roller *c* on the entrance side and the center one *b*, and by their revolution is carried downward and dropped into a rack or apparatus in the grease-pot, and is raised by suitable machinery into the opening between the center roller *b* and the exit-roller *a*; or the one against which the plate did not enter. The entrance-roller *c* and the center roller *b* receives some heat from contact with the hot entering-plate, and the center roller *b* communicates some heat to the exit-roller *a* by revolving against it and touching it; but if I desire to give it more I do so by making the roller hollow and applying hot air to it. With the same object of transferring heat and coating-metal from the plate to the rollers, I may use two pairs of rollers abreast instead of three rollers. In such case one pair carry the plate down, the other pair bring it up. Other arrangements of rollers may be employed than herein shown and described, my object being to reduce the coating when the plate is hot, and to finish and improve the surface when it has been somewhat cooled by the grease, and cooled to a greater extent than heretofore. I may make one part of the bottom of the grease-pot lower than the other, as shown at *x*, so that the coating-metal which drops from the rollers may flow to one side. I apply heat so as to keep such coating-metal fluid, and from the lowest part of the grease-pot a tube, *f*, rises, and through this tube any excess of metal can be removed by means of a can or other appliance with as little disturbance to the grease as may be. I also arrange so that this tube shall be kept at or above the melting point of the metal which has to be withdrawn through it. *h h i j* is the lifting and tilting rack, consisting mainly of one or more bars, *h*, a cross-bar, *i*, at the bottom, and an attach-

ment or connection at the top *j* for raising it by mechanical or other power. It also has tilting guides and rests for the plate in process of finishing, and a tilting appliance therefor. *h h* are here the two sides of the rack, in the bottom eyes of which the cross-bar *i* can turn. This cross-bar has fixed to it guides and rests *k*, on and against which the plate can rest and lean. *l* is a lever also fixed on the cross-bar *i*, and by pulling or depressing the rod *m* connected thereto the plate is tilted over to the position shown in dotted lines, so as to be directly under the center line between the rollers *d* and *e*, the plates then standing on stationary bars *s*, between which the guides and rests *k* can pass; the whole rack or apparatus is then raised by hand-power, or as here shown, where the strap *n*, attached to the cradle-top *j*, passes over a revolving pulley, *o*, and is drawn up by it when the workman pulls the handle *p*. The rack must be suitably guided and steadied in its upward and downward movements. Any other suitable appliance for bringing the plate into the rollers may be used. *q* and *r* are guides for confining the travel of the plate in the desired direction.

I claim—

1. The entrance-rollers *c b*, in combination with two or more pairs of exit-rollers, *b a* and *d e*, the upper pair being over the lower pair, and placed horizontally so as to be adapted to receiving between them a supply of melted coating-metal, substantially as and for the purposes set forth.

2. The grease-pot *A*, constructed with a tube or passage, *f*, communicating with a lower part, *x*, of said grease-pot, substantially as and for the purpose set forth.

3. The rack *h i j*, with plate-rest and tilting appliance *k l m*, in combination with grease-pot and rollers, as set forth, and operating substantially as set forth.

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Witnesses:

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