

(No Model.)

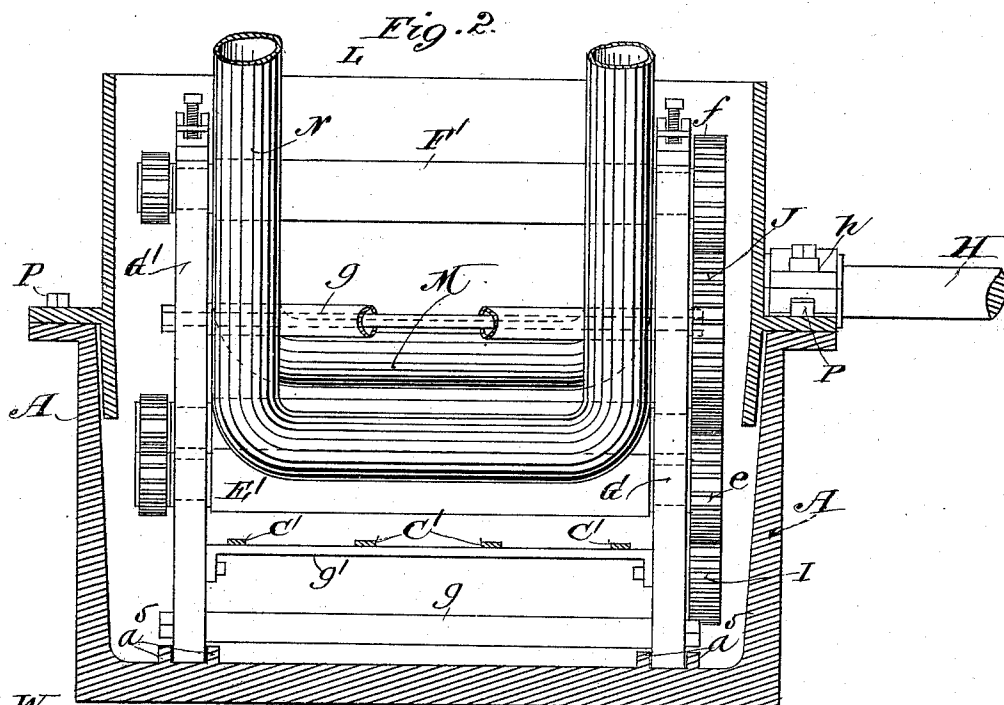
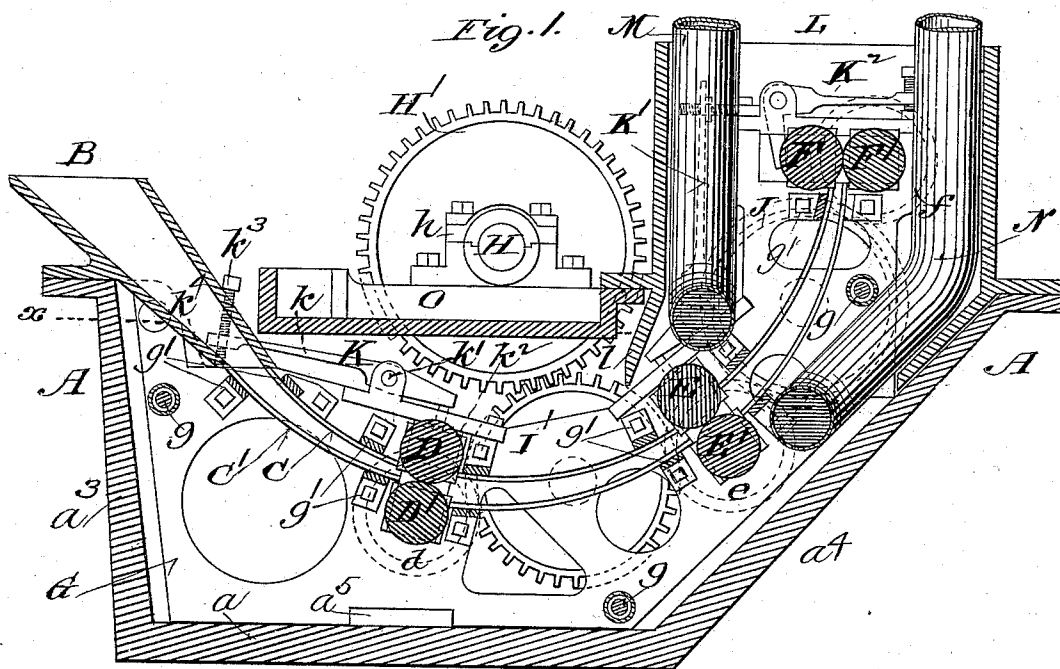
2 Sheets—Sheet 1.

W. F. NIEDRINGHAUS.

APPARATUS FOR THE MANUFACTURE OF TIN PLATE AND COATING
SHEET METAL.

No. 505,171.

Patented Sept. 19, 1893.



WITNESSES
Edward W. Lunnell
A. Bonville

INVENTOR
William F. Niedringhaus
by C. D. Moody, atty

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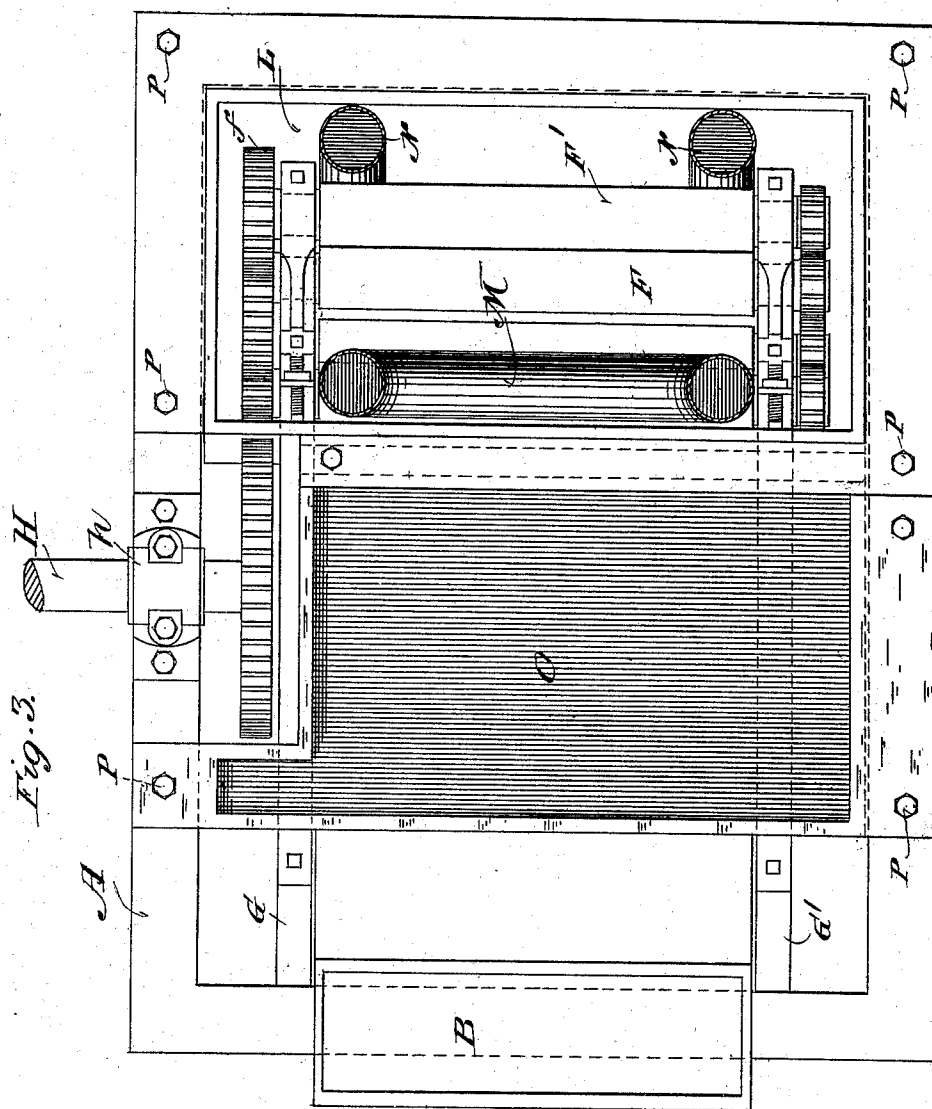
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UNITED STATES PATENT OFFICE.

WILLIAM F. NIEDRINGHAUS, OF ST. LOUIS, MISSOURI.

APPARATUS FOR THE MANUFACTURE OF TIN-PLATE AND COATING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 505,171, dated September 19, 1893.

Application filed February 20, 1892. Serial No. 422,273. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. NIEDRINGHAUS, of St. Louis, Missouri, have made a new and useful Improvement in Apparatus for Manufacturing Tin-Plate and Coating Sheet Metal, of which the following is a full, clear, and exact description.

The improvement relates mainly but not exclusively to that class of apparatuses which are adapted for producing tin or terne plate at a single operation; that is, by means of a continuous passage through the apparatus uninterrupted by manipulation, and it consists in the novel construction of the apparatus in its several parts and in their combination each with the other, all substantially as is hereinafter set forth and claimed, aided by the annexed drawings, making part of this specification, and in which—

Figure 1 is a vertical longitudinal section of the improved apparatus; Fig. 2 a vertical cross section thereof; and Fig. 3 a plan.

The same letters of reference denote the same parts.

A pot, A, in which the tin or other coating-metal is contained, has its interior undivided. The mechanism for working the plate through the pot, including the frame work thereof, rests, detachably, therein. The pot as shown, has a substantially-square, flat, bottom a , and its sides a' , a^2 , and its end, a^3 , are carried up nearly, if not quite, perpendicularly, and the end, a^4 , is inclined substantially as shown, and both sides and ends extend upward to the same level.

B represents the chute or flux box through which the plates to be coated are introduced into the pot. The guides for directing the movement of the plates are shown at C, C'; and D, D', E, E', and F, F', are the rollers which serve to carry the plates through the apparatus in substantially the customary manner. The frame work for supporting said guides and rollers, consists substantially of the uprights, G, G', and the various spacing rods and their tubular casings, g , and bars, g' , which serve to suitably unite the uprights in a lateral direction, and to suitably stiffen the same.

H represents the driving shaft. It is journaled at h , and it is provided with the gear wheel, H', whose motion is communicated

preferably as follows: The wheel H', engages with a gear wheel, I, which in turn, at one side, engages with a gear wheel, d , secured to the shaft of the roller, D', and at the other side, with a gear wheel, e , secured to the shaft of the roller E', and said last mentioned gear wheel in turn transmits its motion to a gear wheel, J, and through it to a gear wheel, f , secured to the shaft of the roller F'. As such systems of gear wheels are quite well understood the details are not shown.

A suitable tension is obtained on the plates by means of the devices K, K', K². Each of said devices consists substantially of the lever, k , pivoted at k' , and at one end connected with the box, k^2 , of the upper one of the pair of rollers to which the device belongs, and at its other end having a screw, k^3 , which works through the lever-arm and is adapted to bear upon any suitable part, k^4 , of the frame work, substantially as shown; by advancing the screw through the lever arm the roller is closed toward its opposing roller.

L represents the grease-pot at the delivery-end of the apparatus. It is supported upon and connects with the pot A above the inclined end a^4 , substantially as shown. It extends upward to a proper height for the work under consideration, and it contains the rollers F, F', and that portion of the guides and frame work which is more immediately therewith connected, and it serves to hold the grease so that it can be applied to the plates as they emerge from the metal-bath in the customary manner, and it is not only properly connected with the pot A, to retain its contents but it is also provided with, or extended to form, a partition, l , whose lower edge extends below the surface of the metal bath.

The fluid contents of the apparatus, namely the coating-metal and the grease, and their respective relative positions, are not shown. The manner in which the grease floats upon the metal bath beneath, and the depression of the surface of the metal-bath immediately beneath the grease, are well understood. The means, however, herewith shown, whereby the temperature of the contents of the grease pot, and of that portion of the metal bath in the vicinity of the grease-pot, is readily, efficiently, and accurately controlled, are considered novel, and are as follows: M

represents a flue which extends upward and downward in the grease pot at one side of the guides through which the plates are passed, extending, at the lower end thereof, nearly or quite to the level at which the grease floats upon the metal. N represents another flue extending upward and downward in the grease-pot at the opposite side of the guides, and extending, at the lower end thereof, beneath the surface of the metal bath. The lower portions of said flues respectively are also, and substantially as shown, arranged in proximity to that portion of the guides which is immediately beyond the rollers E, E'. Both flues are preferably in the form of pipes and arranged so that the fluid contents can pass entirely around them, and the flues are not made integral with the wall of the grease pot or of the main pot. This not only enables a larger amount of cooling surface to be provided, but also the flues to be detachable for any desired purpose. Both flues are preferably U-shaped as shown, and the flues are preferably independent of each other in order, if desired, different temperatures to be maintained in the flues. The flues are adapted for the circulation of air or other fluid, and of any preferred temperature, whereby the contents of the grease pot and the adjacent portion of the metal pot can be more or less cooled or otherwise regulated.

An additional feature of the construction is the cover O, for shielding the metal in the pot A from the atmosphere. It is of suitable dimensions and shape to occupy the space between the chute, B, and the grease-pot, and it is depressed, substantially as shown, or otherwise contrived, to come in contact with the surface of the metal bath, and perhaps extend slightly beneath said surface; that is, the surface of the metal bath in that part of the apparatus may be represented by the broken lines *x*. The oxidation of the metal—something quite undesirable in carrying on a process such as is under consideration—is thus practically prevented. The various parts of the apparatus are assembled by placing the frame work, and the parts thereby supported, within the pot A, and then attaching the chute and the cover, and then the grease pot, substantially as indicated by the drawings, and after the various parts are properly located they can be secured by suitable bolts or other fastenings, such for instance as shown at P. That portion of the pot in which the wheel H', is contained can be separately screened when desired. The framework is conveniently steadied within the pot A by means of the lugs *a*⁵, *a*⁵, at each side of the pot, and with which respectively the uprights, G, G' engage as shown.

In the operation of the apparatus the pot A, is suitably adapted, as by setting it above

a fire place, to be heated sufficiently to melt and heat the coating-metal within the pot, and the flues M N, are connected with whatever is needful for supplying a cooling or other fluid to them, and with the tin or other metal properly melted and heated in the pot A, and with the grease-pot charged properly, and with the chute, if necessary, containing any desired flux, the plates to be coated are introduced into the chute, whence they slide downward into the first pair of rolls D, D', and are thence worked along through the next pair of rollers, E, E', and thence upward through the finishing rollers F, F', and are discharged at the top of the grease-pot. The metal attaches itself in the usual manner to the plates, and more immediately in that part of the pot A that is between the rollers D, D', and the rollers E, E', and, owing to the proximity of the lower portions of the flues M, N, or either thereof to the guides beyond the rollers E, E', the operation proceeds quite favorably at the delivery-end of the pot A, and the application of the grease to the coated plates is advantageously effected by means of the extension of the flues M, N, or either thereof, upward through the grease pot as described. Although good results can be obtained when only one of said flues is used I prefer to employ the two flues in combination as shown, as thereby the temperature of the fluid contents of the apparatus can be better controlled and better adapted to the end in view, and if for any cause it is desirable to have the temperature at one side of the guides different from that at the opposite side of the guides it can, to some extent at least, be accomplished by means of two independent flues having their own separate cooling circulating fluids as described, or in any equivalent manner by which a greater cooling influence can be exerted upon one side of the guides than at the other side thereof.

I claim—

1. An apparatus for coating sheet metal having cooling flues extending upward and downward in the grease pot at opposite sides respectively of the guides through which the plates to be coated are worked, substantially as described.

2. The combination of the pot A, the vertically extended grease pot, the guides through which the plates to be coated are worked, and the cooling flue extending upward and downward within said grease pot and at its lower end arranged in the vicinity of the guides.

Witness my hand this 15th day of February, 1892.

WILLIAM F. NIEDRINGHAUS.

Witnesses:

C. D. MOODY,
A. BONVILLE.