

(No Model.)

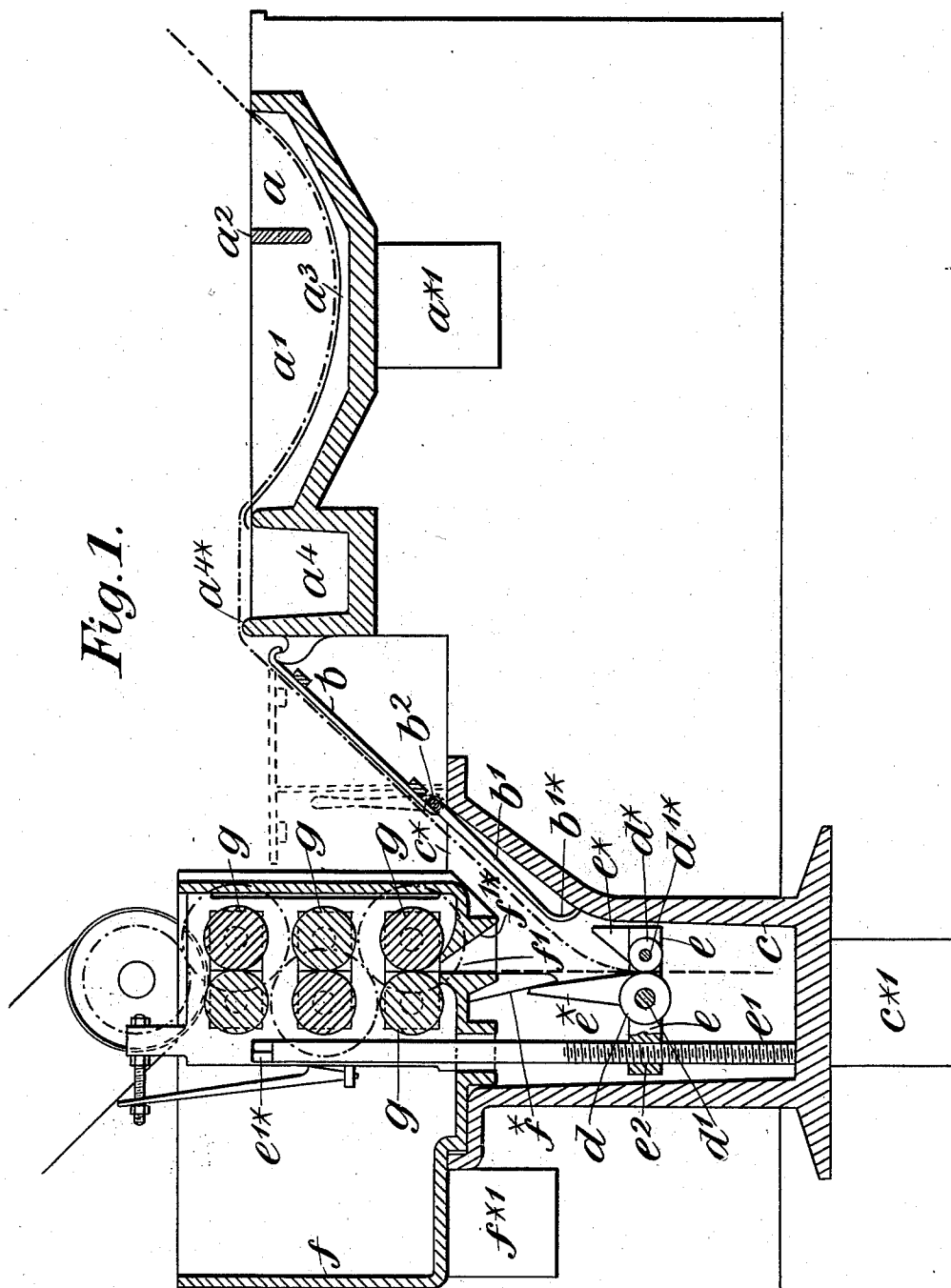
3 Sheets—Sheet 1.

D. JENKINS.

APPARATUS FOR COATING METAL SHEETS.

No. 505,660.

Patented Sept. 26, 1893.



Attest:
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Inventor
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(No Model.)

3 Sheets—Sheet 2.

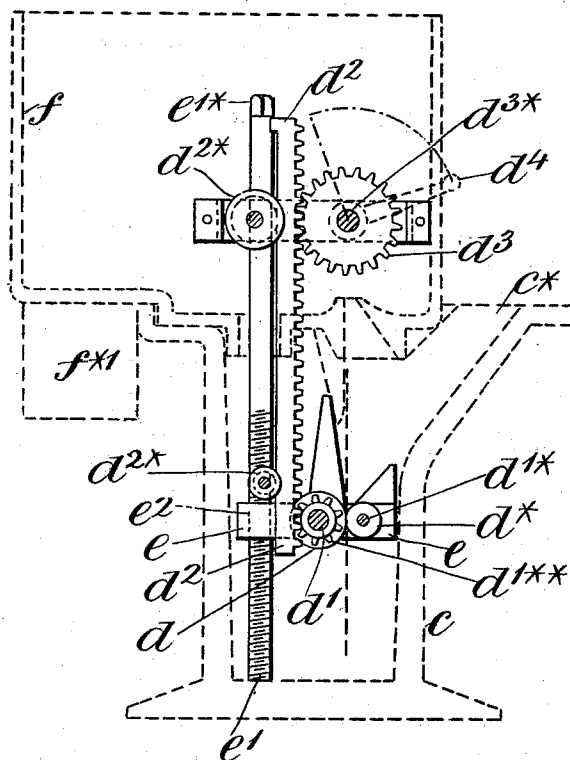
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Fig. 2.



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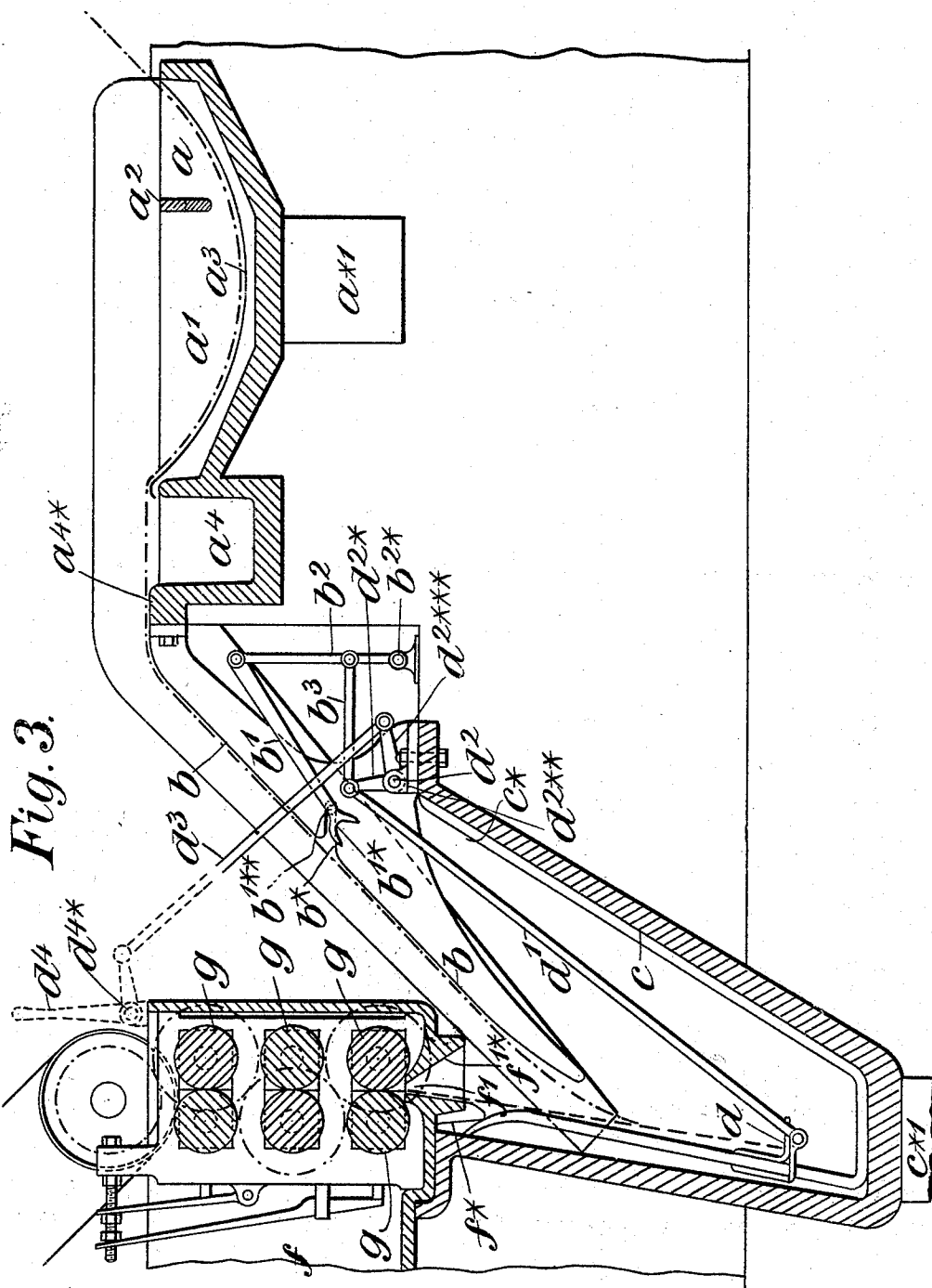
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APPARATUS FOR COATING METAL SHEETS.

No. 505,660.

Patented Sept. 26, 1893.



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UNITED STATES PATENT OFFICE.

DANIEL JENKINS, OF MORRISTON, ENGLAND.

APPARATUS FOR COATING METAL SHEETS.

SPECIFICATION forming part of Letters Patent No. 505,660, dated September 26, 1893.

Application filed June 28, 1892. Serial No. 438,296. (No model.) Patented in England November 19, 1890, No. 18,718.

To all whom it may concern:

Be it known that I, DANIEL JENKINS, engineer, a subject of the Queen of Great Britain, residing at Morriston, in the county of Glamorgan, situate in that part of Great Britain called Wales, have invented certain Improvements in Machinery or Apparatus to be Employed in Coating Metal Sheets or Plates with Tin or other Metal or Alloy, (for which I have obtained a patent in Great Britain, No. 18,718, bearing date November 19, 1890,) of which the following is a specification.

My invention relates to improvements in machinery or apparatus to be employed in coating metal sheets or plates with tin or other metal or alloy, and the object of my invention is to obtain a simple form of machine by the aid of which I reduce the labor incident to the operation, and at the same time economize the material employed therein. For this purpose I separate the flux box from the tinning pot by means of a partition, and I pass the metal plate by hand down through the flux box under the partition through the metal and up and over the wall of the tinning pot, and at the point where the metal plate leaves the tinning pot I pass it over another division of the tinning pot forming a drainage pot, and in contact with the outer wall thereof so that some of the superfluous tin will be removed and caught by the drainage pot. I conduct the metal plate from the tinning pot into the mouth of the dipping pot filled with molten tin by means of inclined ways which are continued into such mouth and down which the metal plate slides by gravity, and I mount the lower continuations of these inclined ways upon a shaft or axis of motion fitted with an external lever and I curve them at their lower ends so as to form fingers for the purpose hereinafter explained.

Within the dipping pot and mounted upon axes of motion carried by a vertically adjustable frame are several pairs of disks which receive the metal plates from the inclined ways, and these disks receive rotary motion by means of a rack and pinion or an equivalent device such for example as an endless chain and chain wheels operated by the attendant from above by means of a crank handle and toothed or chain wheels first to carry the metal plate downward completely into the dipping pot

and then by reversing the motion to carry the metal plate upward into the grease pot which is located above and covers the dipping pot and is provided with an opening formed with an extended flaring lip in its bottom through which the metal plate passes, and in order to bring the metal plate into alignment with such opening the operator while still lifting the plate turns the lower inclined ways or fingers upon their axis of motion thereby moving them forward and tilting the metal plate into a vertical position, and the plate is thus tilted and lifted into the grip of the first pair of finishing rolls at one operation. The rotary motion of the disks is discontinued when the metal plate comes within the grip of the first pair of finishing rolls, and the plate is then carried through the grease pot by successive pairs of rolls in the ordinary manner. By the employment of disks fixed upon spindles of small diameter in lieu of rolls for manipulating the plates, the metal will not be disturbed to the same extent as heretofore, and consequently less dross will be created and the metal will therefore be kept purer.

In order to vertically adjust the disk frame and thus regulate the position of the disks according to the size of the plates to be treated, I employ a vertical screw which works in a nut fixed to the frame, and is capable of being rotated from above by any suitable means.

In order that the said invention may be more clearly understood and readily carried into effect, I will proceed aided by the accompanying drawings more fully to describe the same.

In the drawings Figure 1 is a longitudinal section of an apparatus constructed according to my invention. Fig. 2 is a similar view of part of Fig. 1, showing more particularly the means for giving motion to the disks for manipulating the metal plates, and Fig. 3 is a similar view to Fig. 1, representing a slightly modified form of apparatus.

In the several figures like parts are indicated by similar letters of reference.

Referring to Figs. 1 and 2 a represents the flux box which is separated from the tinning pot a' by a hanging partition a^2 , and a^3 represents guides or ways for the metal plate.

The metal plate is passed by hand down through the flux box a under the partition a^2 through the metal and up and over the wall of the tinning pot a' and at the point where the metal plate leaves the tinning pot I pass it over another division of the tinning pot forming a drainage pot a^4 and in contact with the outer wall a^{4*} thereof so that some of the superfluous tin will be removed and caught by the drainage pot a^4 . I conduct the metal plate from the tinning pot a' into the mouth c^* of the dipping pot c by means of inclined ways b which are continued into such mouth and down which the metal plate slides by gravity meeting on its way and being directed by guides e^* projecting from the frame e hereinafter more fully referred to, and I mount the lower continuations b' of these inclined ways upon a shaft or axis of motion b^2 fitted with an external lever b^3 and I curve these lower continuations at their lower ends b'^* so as to form fingers for the purpose hereinafter explained. The incline b is hung upon a projection on the side of the draining pot, and when it is desired to dry the plate some before again entering the second tin bath, the lower end of the incline is raised to bring it into horizontal position and form a shelf for supporting the plate. After the plate has dried sufficiently, the incline is lowered and the plate thereby precipitated into the dipping pot, (which as stated above is filled with molten tin) and thus subjecting the plate to another coating of tin before entering the finishing or grease pot f .

Within the dipping pot c and fixed upon shafts or axes of motion d' d'^* carried by a vertically adjustable frame e are several pairs of disks d d^* which receive the metal plates from the inclined ways b b' and these disks d d^* receive rotary motion by means of a pinion d^{**} fixed upon the shaft d' with which engages the lower end of a rack d^2 which is held up to its work by guide rollers d^{2*} and at its upper end engages a toothed wheel d^3 fixed upon a shaft d^{3*} located in the grease pot f and passing through to the exterior thereof where it is provided with a crank handle d^4 or in lieu of the rack d^2 and toothed wheels, I might employ an equivalent device, such for example as an endless chain and chain wheels operated by the attendant from above. By means of the crank handle d^4 the attendant is enabled to rotate the disks d d^* which are driven by frictional contact first to carry the metal plate downward completely into the dipping pot c , and then by reversing the motion to carry the metal plate upward into the grease pot f which is located above and covers the dipping pot c and is provided with an opening f' formed with an extended flaring lip f'^* in its bottom through which the metal plate passes on its way to the finishing rolls g .

In order to bring the metal plate into alignment with the opening f' , the operator while lifting or carrying upward the metal plate

turns the lower inclined ways or fingers upon their axis of motion by means of the lever b^3 thereby moving them forward and tilting the metal plate into a vertical position against a guide f^* projecting from the grease pot f , and the plate is thus tilted and lifted into the grip of the first pair of finishing rolls at one operation. The rotary motion of the disks d d^* is discontinued when the metal plate comes within the grip of the first pair of finishing rolls g and the plate is then carried through the grease pot f by successive pairs of rolls in the ordinary manner. By the employment of disks d d^* fixed upon spindles d' d'^* of small diameter in lieu of rolls of the size of the disks for manipulating the plates, the metal will not be disturbed to the same extent as heretofore and consequently less dross will be created, and the metal will therefore be kept purer.

In order to vertically adjust the disk frame e and thus regulate the position of the disks d d^* according to the size of the plate to be treated I employ a vertical screw e' which works in a nut e^2 formed in the frame e and at its lower end descends to the bottom of the pot c while at its upper end it is formed with a square e'^* to receive a key by means of which it may be rotated.

Beneath the several pots are arranged furnaces a^{**} , c^{**} and f^{**} in order to keep the contents thereof fluid as is well understood.

In the modification represented at Fig. 3, the frame e , disks d d^* and connected or co-acting parts are dispensed with, and in lieu thereof I employ a cradle d onto which the plate is conducted by guides b and in order to assist the plate in its descent from the tinning pot a' onto the cradle d I employ fingers b' formed with forked ends b'^* , and connected by bars or rods b^{**} which normally are received and held in open ended slots b^* formed in the guides b , and these fingers b' are at their inner ends pin jointed to the upper ends of vertical arms b^2 whose lower ends are mounted upon centers of motion b^{3*} .

The vertical arms b^2 are by links b^3 connected with levers or offsets d^{2*} from a shaft d^2 which traverses the width of the machine and at each end is mounted in bearings d^{2**} and to the offsets d^{2*} are also pin jointed to the upper ends of rods d' the lower ends of which are pin jointed to the cradle d , while upon the end of the shaft d^2 is fixed a lever or offset d^{2***} which is by a link d^3 connected with a lever or crank handle d^4 mounted upon an axis of motion d^{4*} . By this arrangement of parts upon moving the lever d^4 in one direction the cradle d will be lowered into the required position to receive the plate and at the same time the fingers b' will be carried forward until by reason of the slots b^* the forked ends b'^* will be carried forward and will engage the plate and push it down onto the cradle d , while upon moving the lever d^4 in the other direction the cradle d will be raised until the plate is in the grip of the

finishing rolls *g* and the fingers will be retracted in readiness for the next operation. By these means I so reduce the labor of passing a plate through the apparatus that I am enabled to dispense with one operative and by reason of such a small area of the surface of the metal being exposed to the atmosphere I lessen the usual evaporation and oxidation thereof.

10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

15 1. In machines for coating metal sheets or plates, a tinning pot formed with a partition at one end, in combination with a drainage pot at the point where the plate leaves the tinning pot, having its sides of the same height so that the sheet will be supported in horizontal position while draining off the surplus metal, substantially as described.

20 2. In machines for coating metal sheets or plates, the combination of a tinning pot divided by a partition, a draining pot, a dipping pot, and inclined guides extending from said draining pot to the dipping pot, said guides being so constructed that they can be raised into a horizontal position to form a shelf when it is desired to dry the plates before they are carried into the dipping pot, substantially as described.

30 3. In machinery for coating metal plates, the combination of a separate tinning pot, a separate dipping pot, inclined guides leading from the tinning pot and dipping pot and adapted to conduct the plates by gravity from the former to the latter, fingers supported adjacent to said guides and provided with means

to assist the descent of the plates, a device located within the dipping pot adapted to receive the plates from the guides and raise them into position to be gripped by the finishing rolls, suitable finishing rolls, and means for operating the fingers and lifting devices, substantially as set forth.

45 4. In machinery for coating metal plates, the combination of a separate tinning pot, a separate dipping pot, inclined guides adapted to conduct the plates by gravity from the tinning pot to the dipping pot, a frame suitably mounted in the dipping pot, co-operating rotating disks mounted in said frame and adapted to receive between them the plates from the inclined guides and drop them in the dipping pot and raise them into the position to be gripped by the finishing rolls, suitable finishing rolls, and mechanism for operating said parts in the proper relation to each other, substantially as set forth.

50 5. In machinery for coating metal plates the combination of a separate tinning pot, a separate dipping pot, inclined guides to conduct the plates by gravity from the tinning pot to the dipping pot, fingers adjacent to the guides operated by a lever or crank handle for manipulating the plates, a frame located within the dipping pot, two parallel shafts carried by such frame, several disks fixed upon the shafts, means for rotating the disks in order to lower and raise the plates, and means for adjusting the position of the frame substantially as herein shown and described.

DANIEL JENKINS.

Witnesses:

THOS. MADGE,
E. A. MADGE.