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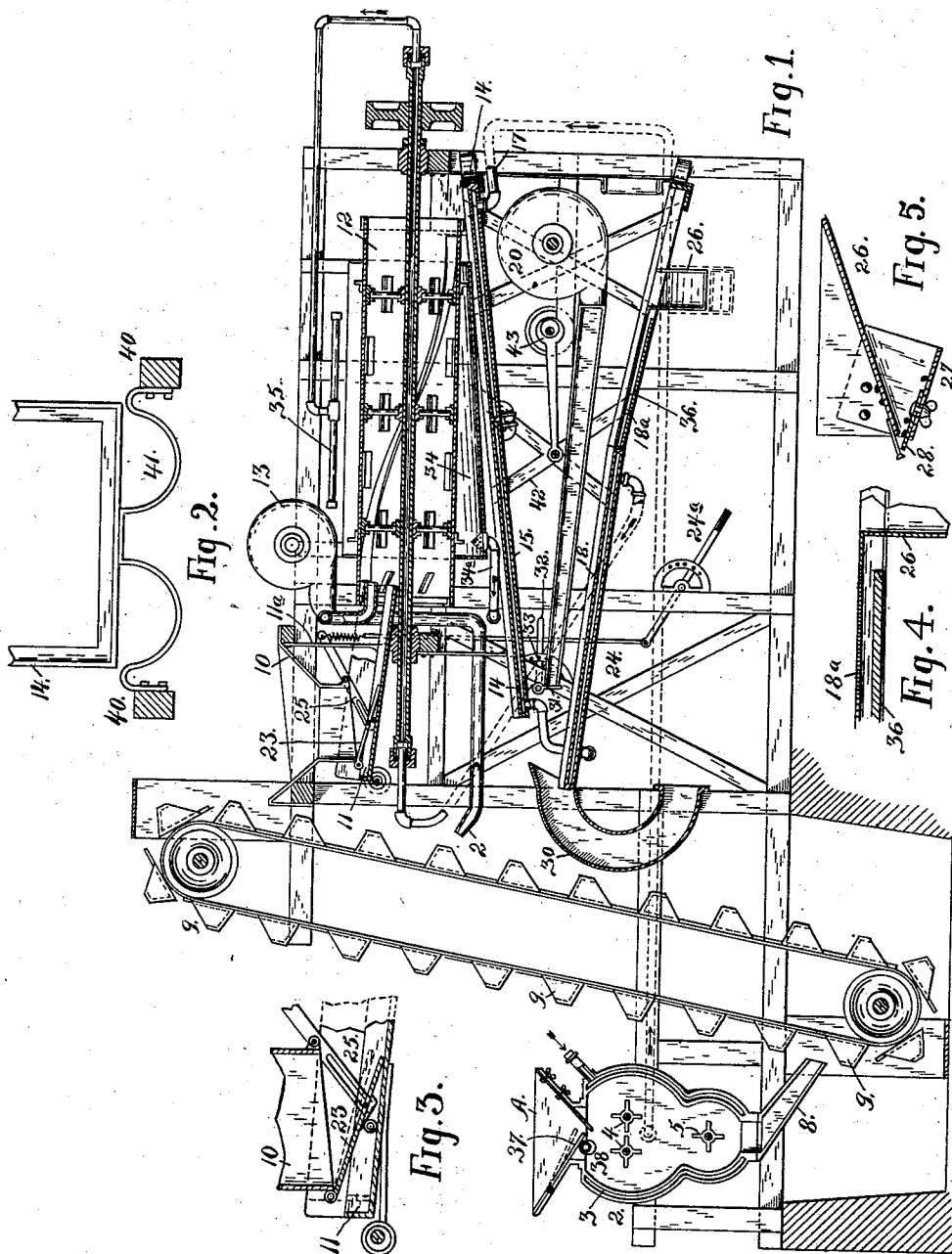
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G. PORTER.

APPARATUS FOR REMOVING SURPLUS METAL FROM COATED ARTICLES.

APPLICATION FILED JAN. 28, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

GEORGE PORTER, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR REMOVING SURPLUS METAL FROM COATED ARTICLES.

SPECIFICATION forming part of Letters Patent No. 720,283, dated February 10, 1903.

Application filed January 28, 1902. Serial No. 91,540. (No model.)

To all whom it may concern:

Be it known that I, GEORGE PORTER, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Apparatus for Removing Surplus Metal from Coated Articles; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus which is designed for the cleansing and preparation of nails which have been previously coated with molten zinc or equivalent protecting metal and which process is technically called "galvanizing."

The object of my invention is to provide a mechanism and apparatus by which the surplus fused metal adhering to the nails, &c., can be cleaned off and the nails left in a smooth and merchantable condition.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section of the apparatus. Fig. 2 is an enlarged plan of one end of chute with spring. Fig. 3 is an enlarged view of bottom of hopper 10 and gate. Fig. 4 is an enlarged section of discharge end of screen 18^a. Fig. 5 is a section of transverse discharge and separating chute.

Nails and similar articles are coated with tin, zinc, or equivalent protecting metal which is less liable to corrosion than the iron of the nails by submerging the articles to be coated in the molten coating metal. It is difficult to afterward clean the nails of the surplus adherent metal so that they are in condition for use, and many times the nails become stuck together in masses when they cool by reason of this surplus metal.

As shown in my present construction, the articles to be cleansed having first been dipped in the molten metal are delivered through a hopper A into a casing 2, which is here shown in the form of two cylindrical segments united together one above the other and having double sides or water-jackets at 3. It will be understood that this case may be made of other shape than the cylindrical segments without materially altering its character or effectiveness. Within the upper and larger portion of the casing are beaters 4, the shafts of which are journaled, so that the beaters lie horizontally

within the casing, and in the lower part are similar beaters 5, these being driven by belts in any well-known manner. The coated articles falling from the hopper are first acted upon by the upper beaters, which, striking them violently, cause the surplus adherent metal, which is still in the molten condition, to be knocked off, and as articles fall to the lower beaters they are again acted upon and a further amount of the loose metal is detached.

The water-jacket serves to keep the casing cool and prevent undue heat of the parts, which would otherwise occur by the constant accession of new hot metal.

At the lower part of the case a chute 8 receives the coated articles and delivers them into the buckets 9 of an elevator, which elevator is also driven from the main shaft, and the buckets carry the coated articles up to the upper end of the elevator, where, passing over, the buckets are inverted and the articles are discharged into a hopper 10, so located as to receive them. From this hopper the articles fall into a chute 11, suitably suspended by elastic arms, as at 11^a, and this chute is given a shaking motion by a cam, eccentric, or other suitable means, so as to gradually advance the material and finally deliver it into the cylinder 12, mounted upon an approximately horizontal shaft journaled upon the frame, as shown. This cylinder is revoluble by means of belts and pulleys, through which motion is communicated from a main driver, and the interior of the cylinder is provided with lifters and agitators so disposed within the cylinder as to constantly lift and drop the articles which have been delivered into the cylinder and to cause them to gradually remove from the receiving to the discharge end. A blast of air from a fan-blower 13 is delivered through a suitable discharge-pipe through the interior of the cylinder to further cool the passing articles and the cylinder. At the discharge end of the cylinder the articles are delivered upon an inclined suspended shaking table or chute 14, having a double bottom, as shown at 15, and this is constantly supplied with water through a pipe, as at 17, having a flexible section within its length, so as to allow the chute to be shaken without interfering with the water connection. The constant

shaking advances the coated articles down this chute, and they are finally delivered at the lower end upon another chute 18, which is inclined in the opposite direction and beneath the first-named chute, the latter being also inclined beneath the cylinder, so that the whole apparatus will take up as little space and length as is consistent with its operation. The second chute 18 is in the same manner provided with a water-jacket bottom and a supply of water through the pipe either by connection with the discharge from the water-bottom of the upper chute or by an independent water-supply, or both, and this insures the cooling of this second chute. Both these chutes are so suspended that the angle may be adjusted to cause the articles to pass through them at any desired rate of speed. I have also shown another fan-blower, as at 20, the spout or mouth of which discharges in line with the chute, so that a blast of air is constantly delivered over it. From one of the blowers a blast of air, as 21, also discharges air against the elevator-buckets to keep them cool.

The feed from the hopper 10 upon the chute which delivers into the cylinder is regulated by a gate, as at 23, hinged to one side of the hopper and having a lever connection 25 and a rod 24, connecting with the hand-lever 24^a, by which the gate may be closed until a sufficient supply has been received within the hopper, then opened to allow the contents to be discharged and to pass through the remaining portion of the apparatus. The gate can also be regulated to discharge continuously, if desired.

18^a is a screen-bottom chute which receives the articles and whatever detached metal has passed through the apparatus to this point. This screen may be a separate device, into which the chute 18 discharges, or it may be, as here shown, a continuation of 18 and have a slightly-greater inclination. This screen allows a part of the detached metal to pass through and be delivered below, and the larger and heavier pieces or buttons will pass over the screen and, together with the cleaned articles, will be delivered upon an inclined chute 26, which has a sufficient angle to cause the nails or other articles and the remaining particles of separated metal to slide down by gravitation. Beneath the chute 26 is another chute 27, having an adjustable slide 28, which may be moved to project a little beyond the end of the chute 26, as shown. The momentum of the nails and their position lengthwise of the chute will cause them to pass over the projecting lip of the lower chute; but the irregular detached particles of metal will drop upon this lip and will be conducted away by the lower chute.

In the method of separation above described there is, in addition to the two grades of metal which are separated by the screen and at the final discharge, a quantity of light particles and scales of metal, which are disposed of in one of the inclined chutes. By means of the

blast of air from the fan 20 most of the lighter material will be blown over the upper end of the chute and may be conducted below by a curved or other carrier 30. When light nails or articles are coated and passed through this apparatus, it will be necessary to regulate the air-blast so that the articles will not be carried away with the waste, and this is effected in one way by opening the air-discharge valve 31 when the heavier articles are passing and partially closing it when the light ones are passing. This adjustment may be made by a lever 32, and the air-controlling valve may be held at any desired point by a rack or other suitable device, as at 33. The shaft of the cylinder may be hollow and water-pipes connected therewith by suitable stuffing-boxes, so that a circulation of water may take place through this part to keep it cool. A perforated pipe 35 extends above the cylinder, and water is discharged therefrom over the surface of the cylinder, the object in all cases being to prevent excessive heat within the apparatus. The water flowing over the cylinder is collected in a hopper 34 below and conducted away for further use by a screened pipe, as at 34^a. The beater-shafts may be hollow and open-ended to allow air to circulate through them.

Beneath the screen 18^a is a tight bottom 36. The space between the two is sufficient to allow the particles of metal to pass through the screen upon this bottom, which directs the metal to the discharge; but the distance between the screen and this bottom is so small that the nails will be prevented from standing on end and sticking in the holes of the screen as they pass over it.

The hopper through which the coated articles are delivered to the first part of the separating apparatus has an inclined movable bottom 37, over which the articles pass, and by means of cams 38, mounted upon a hollow shaft with air or water circulating through it, this bottom is so agitated as to continuously deliver the articles into the casing 2, where they are first acted on by the beaters. The ends of the chutes 14 and 18 may be connected with stationary timbers 40 of the frame by springs 41, curved as in Fig. 2, with the ends secured to the frame and the center to the chute. The elasticity of the spring allows a sufficient movement of the chute and serves as a cushion therefor. The chutes 14 and 18 may be connected by intermediate bars, as at 42, and these are connected with an eccentric or equivalent shaking device, as at 43.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for removing hot surplus metal from previously-coated articles, a water-jacketed chamber having beaters mounted upon horizontally-disposed journal-shafts extending through the case, and means including a hopper having a vibrating bot-

tom, and means for operating the same, for delivering the coated articles into the case.

2. In an apparatus for removing hot surplus metal from previously-coated articles, a water-jacketed chamber or casing means including a hopper having a vibrating bottom for supplying the coated articles into the upper part of the casing, beaters revoluble within the casing, acting to separate the surplus metal from the coated articles, a chute at the lower end and a bucket elevator into which the articles are delivered from the chute.

3. The combination in an apparatus for removing hot surplus metal from previously-coated articles of a water-jacketed casing, said casing consisting of superposed cylindrical segments united together, beaters revoluble within the casing, a means for supplying material into the upper part of the casing and a discharge-chute into which the articles and separated metal are received from a contracted discharge at the lower end of the casing.

4. The combination in an apparatus for separating hot surplus metal from previously-coated articles, of a preliminary separator, an elevator into which the articles are delivered therefrom, a revoluble cylinder and a chute discharging into the receiving end of the cylinder and a feed device for the chute into which the articles are delivered from the elevator.

5. The combination in an apparatus for removing hot surplus metal from previously-coated articles, of a preliminary separator, an elevator to which the articles are delivered therefrom, a revoluble cylinder having interior lifters and agitators, and means by which the articles are delivered from the elevator in said cylinder, an inclined shaking-chute into which the articles are delivered from the discharge end of the cylinder, said chute having a double bottom and a water-circulating supply therefor.

6. The combination in an apparatus of the character described of a revoluble agitating-cylinder, means for supplying the coated article thereto, a plurality of inclined chutes having double bottoms and water-circulating supply therefor, into the uppermost of which chutes the articles are delivered from the discharge end of the cylinder and means for separating the articles from the surplus metal at the discharge end of the lower chute.

7. In an apparatus of the character described, a revoluble agitating-cylinder, means for supplying the articles thereto, a plurality of inclined water-jacketed sluices into the uppermost of which the articles are delivered from the cylinder and from the discharge end of the lowermost of which the articles are delivered and separated from the surplus metal, and fan-blowers with adjustable discharges adapted to deliver blasts of air upon the cylinder and upon the chutes.

8. In an apparatus of the character de-

scribed, a revoluble agitating-cylinder, a chute and hopper from which the articles are delivered to the cylinder, and a gate by which the discharge from the hopper is regulated and controlled.

9. In an apparatus of the character described, means for separating the hot surplus metal from previously-coated articles, comprising a revoluble agitating-cylinder and a plurality of inclined chutes over which the materials pass from the cylinder, a transversely-located chute at the discharge end of the lowermost chute, and an inclined spout located beneath said transverse chute and having an adjustable lip projecting beyond the end of the chute and adapted to receive the surplus metal and allow the coated articles to pass over and beyond it.

10. In an apparatus for separating surplus metal from previously-coated articles, a separating mechanism, a plurality of superposed, oppositely-inclined shaking-chutes through which the articles and separated metal are caused to pass and an air-blast apparatus discharging into the chute and means for conducting away the separated metal.

11. The combination in an apparatus for removing surplus metal from previously-coated articles of a preliminary separator, a plurality of chutes into which the separated articles and metal are delivered and through which they are caused to pass, an air-blast apparatus discharging into the chute and adapted to remove the lighter surplus metal, and means for adjusting the blast-gate with relation to the chute.

12. The combination in an apparatus for removing surplus metal from previously-coated articles of a preliminary separator, superposed, oppositely-inclined agitating-chutes, an air-blast by which the lighter surplus is removed from the chutes, and a screen extension of the lowermost chute through which another portion of the metal is removed.

13. The combination in an apparatus for removing surplus metal from previously-coated articles of a preliminary separator, inclined shaking-chutes through which the articles and metal are caused to pass, a regulated air-blast discharging into the chute to remove the lighter metal, a screen-bottom succeeding thereto to remove the intermediate-weight metal and a final separator consisting of an inclined chute with a transverse channel through which the remaining surplus metal passes while the coated articles are carried over said opening by their momentum.

14. In a device for separating previously-coated articles from hot surplus metal, a chamber through which the articles are caused to pass, beaters revoluble within said chamber, said beaters having tubular open-ended shafts, whereby air is circulated through the shafts.

15. In an apparatus for separating hot surplus metal from previously-coated articles, a preliminary separator, an approximately hori-

zontal revoluble cylinder with interior agitating devices having a tubular shaft, connections for supplying water to pass through the shaft, a water-spray pipe discharging upon the exterior of the cylinder and a collector for
5 the water below the cylinder.

16. In an apparatus for separating surplus metal from previously-coated articles, a preliminary separating mechanism, a plurality
10 of superposed, oppositely-inclined shaking-chutes through which the articles and separated metal pass, and a supplemental separating-screen, with a tight bottom located below and forming a passage for the metal which
15 passes through the screen, said bottom also

preventing the nails from entering and sticking in the screen.

17. A device for separating hot surplus metal from previously-coated articles including a casing with beaters revoluble therein, a
20 hopper through which the articles pass to the beaters, and an inclined movable bottom to said hopper, with cams by which it is agitated.

In witness whereof I have hereunto set my
25 hand.

GEORGE PORTER.

Witnesses:

S. H. NOURSE,
H. F. ASCHECK.