G. W. SCHWEINSBERG AND M. I. DOYLE.

APPARATUS FOR CLEANING ARTICLES.

APPLICATION FILED JULY 16, 1919.

1,422,309.

Patented July 11, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

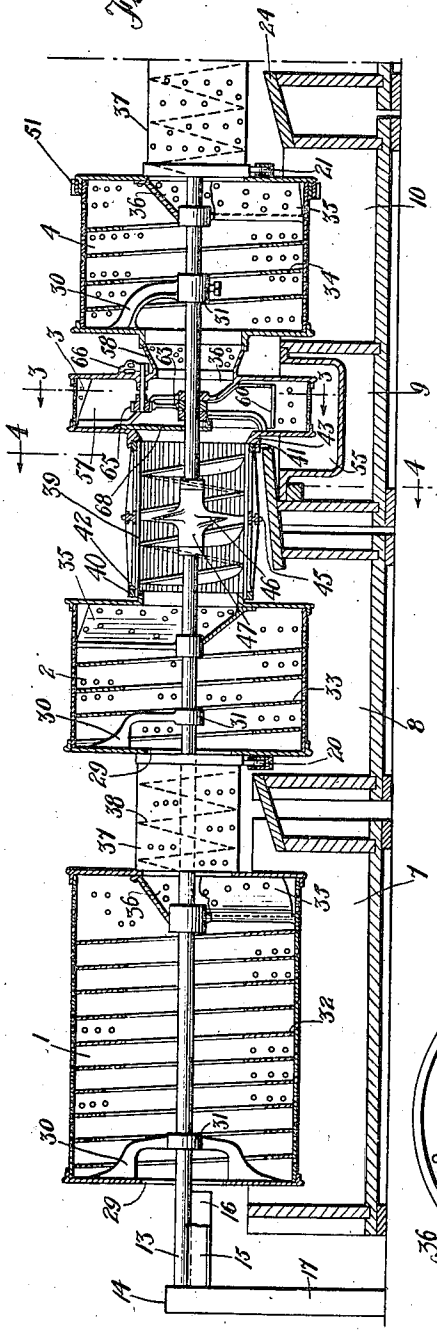


Fig. 4.

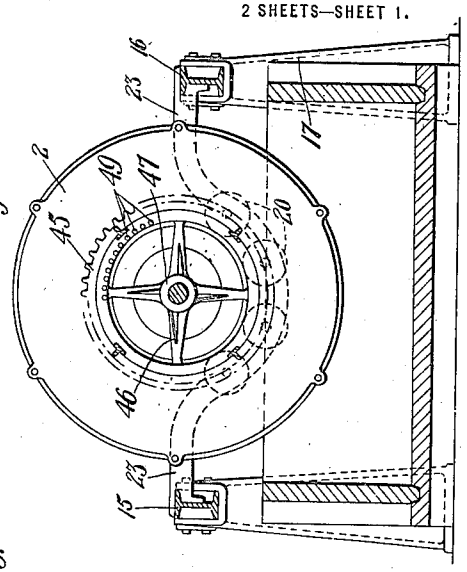


Fig. 3.

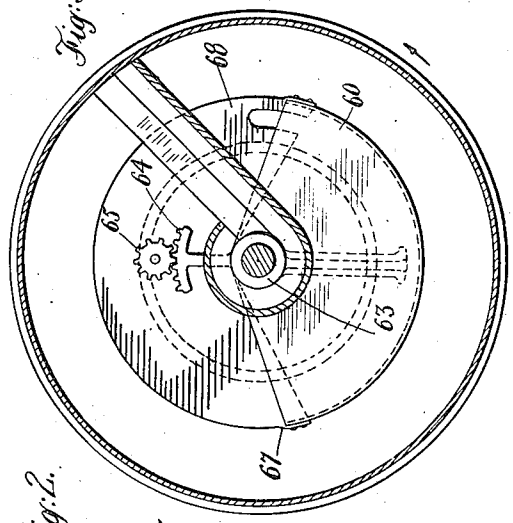
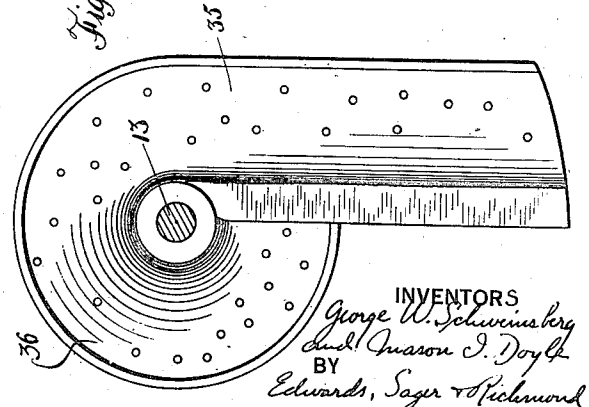


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 5.

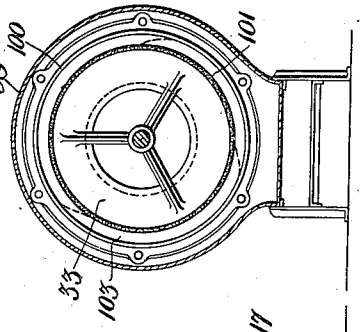


Fig. 1a

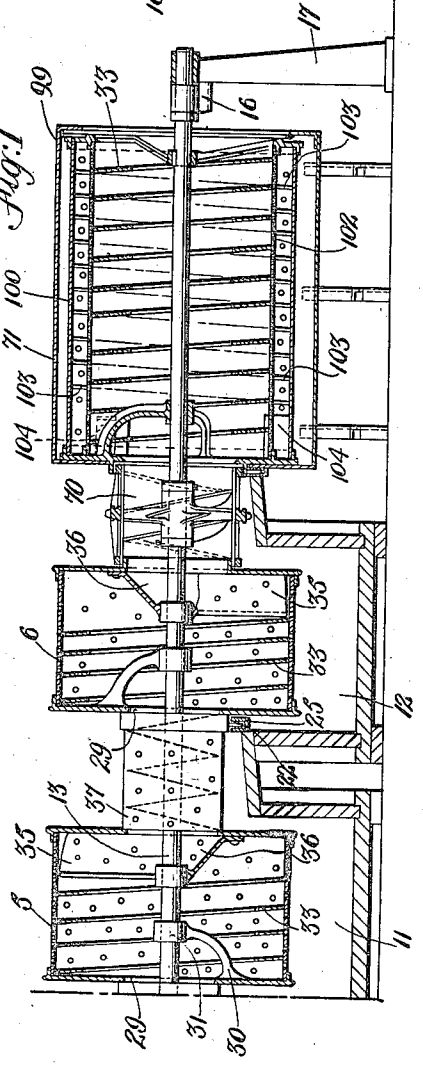


Fig. 7.

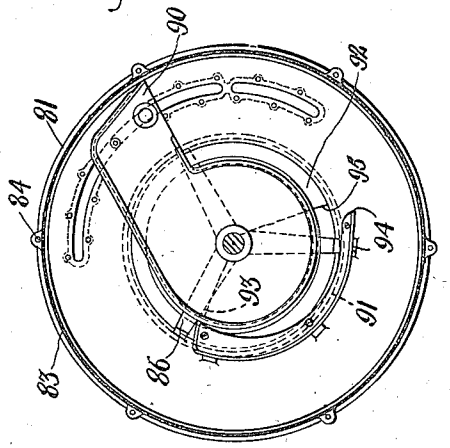
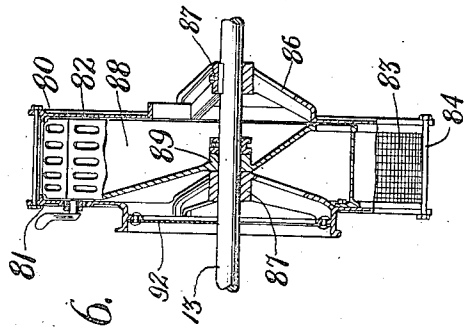


Fig. 6.



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APPARATUS FOR CLEANING ARTICLES.

1,422,309. Specification of Letters Patent. Patented July 11, 1922.

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To all whom it may concern:

Be it known that we, GEORGE W. SCHWEINSBERG and MASON I. DOYLE, citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for Cleaning Articles, of which the following is a specification.

This invention relates to the treatment of material in successive fluids and particularly to apparatus for moving masses of material such as small metal articles through a series of liquids to clean or otherwise treat them. The object of the invention is to provide apparatus wherein the movement of the material through the tanks is accomplished automatically so that it is only necessary to feed the material in at one end and receive it at the other completely treated.

A further object of the invention is to provide draining means for the material to drain it thoroughly from the liquid of one treatment before it reaches the next succeeding tank.

A further object of the invention is to provide means for varying the relative durations of the dipping and draining actions so that the apparatus may be readily accommodated to different sizes and kinds of articles.

A further object of the invention is to provide treating means which will dip the material into a tank for a definite length of time and then certainly remove it so that, as is particularly desirable with a "bright" or nitric acid dip, the duration of the action of the liquid is surely restricted within safe limits.

A further object of the invention is to provide a final drying means which mixes the articles with dry saw-dust in a continuous and automatic manner.

In the accompanying drawings showing an embodiment of the invention,

Fig. 1 is a partial longitudinal side view with parts in section of an apparatus constructed in accordance with this invention;

Fig. 1ª is a continuation to the right of Fig. 1;

Fig. 2 is a view of a detail;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a sectional view on line 4—4 of Fig. 1;

Fig. 5 is a section on line 5—5 of Fig. 1ª;

Figs. 6 and 7 are longitudinal and transverse sections respectively of a modified detail.

In the embodiment of the invention shown in the drawings, a series of drums 1, 2, 3, 4, 5 and 6 are rotatably supported in position to dip into successive tanks 7, 8, 9, 10, 11 and 12 which, for purposes of illustration, may be considered to contain successively an alkali solution for cleaning the articles, water for washing off the alkali, nitric acid or bright dip for brightening the articles, and water for washing off the nitric acid, an alkali for neutralizing the acid and a final water wash, after which the material is drained in cylinder 70 and dried in the dryer 71. The drum containers are spaced successively along a central horizontal shaft 13 rotatably supported in end bearings and carried on cross members 14 between side beams 15 and 16 supported by legs 17 from the floor.

The heads of the drum containers are connected to this shaft and are also supported from the side members 15 and 16 by cradle bearings 20, 21 and 22 under flange projections from the heads of barrels 2, 4 and 6, respectively, the cradle bearings being carried by cross members 23, 24 and 25 between the side members. The forward head of each drum has a central opening 29 and is attached to the shaft 13 by spokes 30 and hub 31 offset, as indicated, from the central entrance opening of the head to permit free access of the articles to the drums. Within the drums the articles are supported in the liquid in the tanks and in the drums the articles are progressed therethrough by spiral ribs or projections 32 and 33, the spiral 32 being narrower at the entrance end of drum 1, as shown, to accommodate the intermittent feeding of large masses of articles at the entrance to the apparatus. The feeding of the material from this mass of articles by the lower spiral is substantially uniform providing a continuous feed to the subse-

quent thicker or deeper portions of the spiral 32.

Between the drums are the connecting draining and conveying means comprising means for lifting the material out of the liquid in each prior tank and draining it and transferring it to the next succeeding drum or out of the machine. In each of the drums this draining and discharge means comprises a guideway or fin 35 extending from the periphery of the drum and receiving the material therefrom and guiding and discharging it onto the inclined surfaces of the central conical member 36 which discharges into the connecting passageway in the form of a cylinder 37, 39 or 70 leading to the next drum or discharging from the machine. The guideway or fin 35 has its plane at an angle to the axis of longitudinal shaft 10 so that as it lifts the material from the liquid it tends to feed it backward and discharge it from the drum before the guideway 35 passes beyond the uppermost vertical position. The fin, the central member, and the cylinder are preferably made of permeable material to drain off the liquid from the articles. The guideway 35 and the conical member 36 are formed integral and fastened to the rear head of the drum. The connecting passageways or cylinders 37, 39, 70 rotate in the same direction as the drums and are provided with spiral fins or webs 38 positively feeding the work from one drum into the next or out of the machine.

The cylinders or draining chambers 37 of drums 1 and 4 are rigidly fastened to the drum heads to rotate therewith, but the chambers 39 and 70 following the drums 2 and 6 are independently rotatable and provided with separate driving means so that their speeds may be the same as, or greater or less than, that of drums 2 and 3. This independent rotation of the draining chamber permits the duration of the draining action to be varied independently of the speed of rotation of the main dipping drums so that for different materials different draining periods may be allowed. For instance, solid, round objects, such as balls, requires much less time to drain than elongated hollow articles, such as cartridges.

The draining chamber 39 between drums 2 and 3 is formed by end rings 40 and 41 rotatably mounted on flanges 42 and 43 of drums 2 and 3, respectively, and carries centrally gears 45 by which it is driven. This gear may be connected as shown by spokes 46 with the hub 47 rotatable on the shaft 10. Between the rings 40 and 41 extend the grid rods 49 forming a permeable periphery for the chamber to drain and discharge the liquid. The gear 45 is driven by a pinion or chain in turn driven by a variable speed mechanism at a velocity independent of the rotation of the main driving means for the dipping drums which comprises a gear 51 formed on the head of drum 4 and driven from a pinion in brackets on the supporting frame members. Similarly the draining cylinder 70 is independently driven by gear 75. It is obvious that the separate drives of gears 45 and 75 may be omitted and their drum cylinders fastened to the main member to rotate therewith.

The drum 3 and tank 9 are shown adapted to provide for an accurately timed dipping of the material into the liquid of the tank and a positive removal of all the material after each dipping. Such action is particularly adapted for use in connection with nitric acid or "bright dips" used to impart a brilliant appearance to brass articles particularly after they have been cleaned as by an alkali solution in tank 7 and washed by water as in tank 8. The tank 9 is provided with a separate container 55 adapted to resist the action of nitric acid and the drum 3 is provided with a broad guideway or fin member 57 extending completely across the periphery of the drum so that at each rotation it removes all of the material and discharges it directly into the central conical member 36 and out through the discharge ring 58 directly into the wash drum 4. Further draining is omitted because it would leave the metal in contact with the full strength of the acid solution, the irregular and spotted action of which would injure the articles.

In order to submit all of the articles in this acid drum to an equally timed dip, the timing pocket 60 is provided to receive all the material from the preceding drain cylinder 37 for a given length of time and then dump the collected material in a mass into the drum 3 where it remains for a short period until the rotation of the guideway or fin 57 lifts it out of the liquid. The timing pocket 60 is in the form of a substantially semi-circular basket hung from the hub 63 rotatable on shaft 13 and provided with a gear segment 64 engaged by the pinion 65 turned by an adjusting handle 66 so that the position of the discharging edge 67 of the pocket may be varied with respect to the guideway or fin 57. In this way the duration of the dip of the material in the liquid is adjustable, for longer periods the edge 67 being moved away from the guideway 57, and for shorter periods being moved closer thereto. To confine all the material to a path through the basket a baffle plate 68 is provided to partly cover the opening from the cylinder 37 and retain the material therein until the basket is in proper position to receive it. The baffle plate 68 is segmental in form fitting snugly over the end of cylinder 37 and is fastened to the basket with its radial edges coinciding substantially with the front and rear edges of the basket. At its

corners 69 it is attached to the pocket and is provided with a slot 70 to clear spoke 30 in extreme adjustment. As the drum 3 rotates all material discharged from the chamber 37 will be received and retained by the pocket 60 until its discharge edge reaches the lower portion of its circular movement and all of the material will be dropped into the liquid at substantially the same instant. The guide way or fin 57 following the edge 67 at the definite time interval then lifts all the material out of the liquid, drains it and discharges it onto the wash drum 4. The material is, therefore, all dipped and removed within substantially the same time interval and is surely protected against excessive action of the acid and against irregular action thereof such as would take place were a longer period of draining used before the material is discharged into the washing fluid.

In Figs. 6 and 7 a modified form of dipping drum is shown at 80 comprising two heads 81, 82, a peripheral band of meshing 83 and tie rods 84. The heads 81, 82 are connected by spokes 86 with hubs 87 secured to shaft 13. Journaled on shaft 13 is the hub 89 supporting the pick-up scoop 88 so that the latter can have its edge 90 adjusted to different positions to vary the time the articles remain immersed in the fluid of the dip. The articles are dumped into the fluid from the pocket or basket 91 fastened to the head 81 and a plate 92 having an opening with edges 93 and 95 retain the articles from discharging from the preceding transfer cylinder except when the pocket 91 is in position to receive them. The articles are dropped all together from the edge 94 of the pocket 91 into the fluid or "bright dip" and are picked up by the edge 90 of the adjustable scoop 88.

After the bright or acid dip the articles are again washed in water in tank 40 in alkali in tank 11 and again in water in tank 12. The articles are then drained in the independently rotatable cylinder 70 and dried in the dryer 71. This dryer comprises an outside casing 99 provided with heating means such as gas burners in its lower part. Within this casing is the drum 100 comprising end heads fastened to the shaft 13, an outside peripheral cylinder 101 and an inner cylinder 102. This inner cylinder is made permeable to sawdust so that the latter will filter through it into the outer cylinder. In the space between the cylinders is the helical partition 103 which by the rotation of the drum feeds the sawdust to the forward end of the cylinder 101 where it is picked up by pockets 104 and discharged in dried condition back into the inner cylinder 102 where it again mixes with the stream of articles passing through the machine.

The operation of the machine from start to finish is continuous and at the same time the articles are accurately dipped in the acid bath for a relatively brief period. Both before this acid dip and before the final drying the draining means is adjustable in its action so that it can be varied to different kinds of articles. Throughout the machine the feeding is positive and the material is not lifted to unnecessary height nor dropped great distances so as to be damaged. It is obvious that variations of the specific mechanism may be resorted to and that the principle of the invention is not confined to the apparatus shown.

We claim:—

1. In a machine for treating material by liquids in successive tanks, the combination with a unitary rotary member comprising a plurality of containers adapted to tumble and advance the material in contact with the liquids in the tanks in succession, of rotatable draining mechanism intermediate between and connecting said containers and having means for tumbling and advancing the material from one container into the next and draining the liquid back into each preceding tank from the articles.

2. In a machine for treating material by liquids in successive tanks, the combination with a unitary rotary member comprising a plurality of containers adapted to tumble and advance the material in contact with the liquids in the tanks in succession, of rotatable draining mechanism intermediate between and connecting said containers and having means for tumbling and continuously advacing the material from one container into the next and draining the liquid back into each preceding tank from the articles.

3. In a machine for treating material by liquids in successive tanks, the combination with a unitary rotary member dipping into the liquid in said tanks and adapted to tumble and advance the material through said tanks in succession, of rotatable draining mechanism intermediate between and connecting said containers and having means for lifting the material from the liquids and tumbling and advancing it from one container into the next and draining the liquid back into each preceding tank from the articles.

4. In a machine for treating material by liquids in successive tanks, the combination with a rotatable container adapted to tumble and advance the material in contact with the liquid, of an independently rotatable draining means receiving the material from said container and tumbling it and draining the material therefrom.

5. In a machine for treating material by liquids in successive tanks, the combination with a rotatable container adapted to tumble and advance the material in contact with the liquid, of an independently rotatable drain-

ing means receiving the material from said container and tumbling it and draining the material therefrom, and means for varying the relative speed of rotation of the container and draining means.

6. In a machine for treating material by liquid, the combination with a container rotating at constant velocity, of means for intermittently feeding material into said container, and means for discharging material from said container in timed relation to said feed so that the material only remains in said container a certain length of time.

7. In a machine for treating material by liquid, the combination with a container rotating at constant velocity, of means for intermittently feeding material into said container comprising means for uniformly feeding the material, an intermittently operating pocket for collecting the material and discharging it into the container, and means for discharging material from said container in timed relation to said feed so that the material only remains in said container a certain length of time.

8. In a machine for treating material by liquid, the combination with a container rotating at constant velocity, of means for intermittently feeding material into said container comprising means for uniformly feeding the material, an adjustably operating pocket for collecting the material and discharging it into the container, and means for discharging material from said container in timed relation to said feed so that the material only remains in said container a certain length of time.

9. In a machine for treating material by liquid, the combination with a container rotating at constant velocity, of means for intermittently feeding material into said container comprising means for uniformly feeding the material, an adjustable discharge edge for collecting the material and discharging it into the container, and means for discharging material from said container in timed relation to said feed so that the material only remains in said container a certain length of time.

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