Oct. 28, 1930. C. A. GIBLIN 1,779,934

GALVANIZING RACK CENTRIFUGE

Filed Aug. 15, 1928

Fig.4

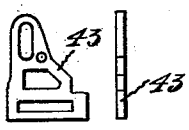


Fig.1

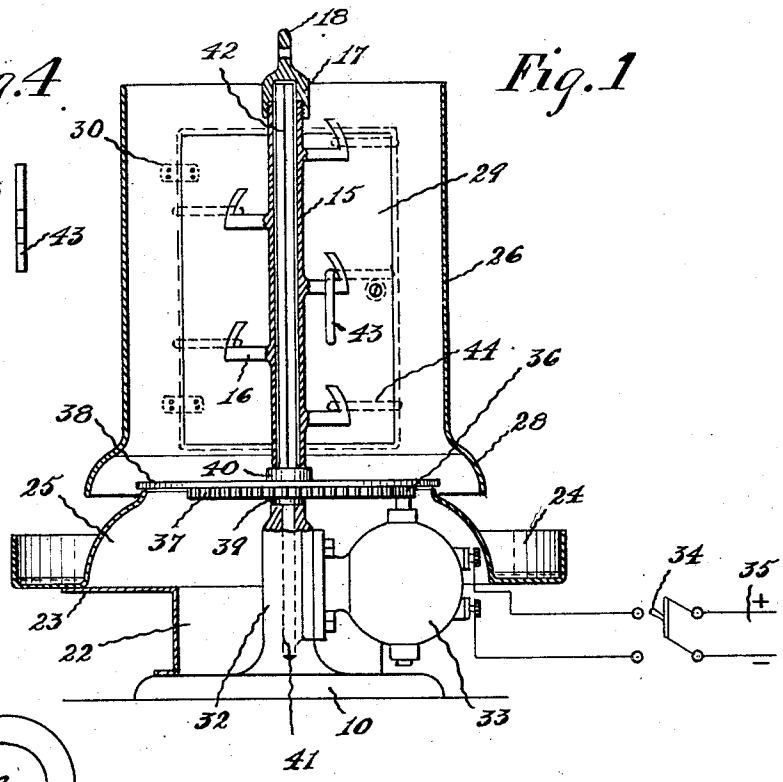


Fig.2

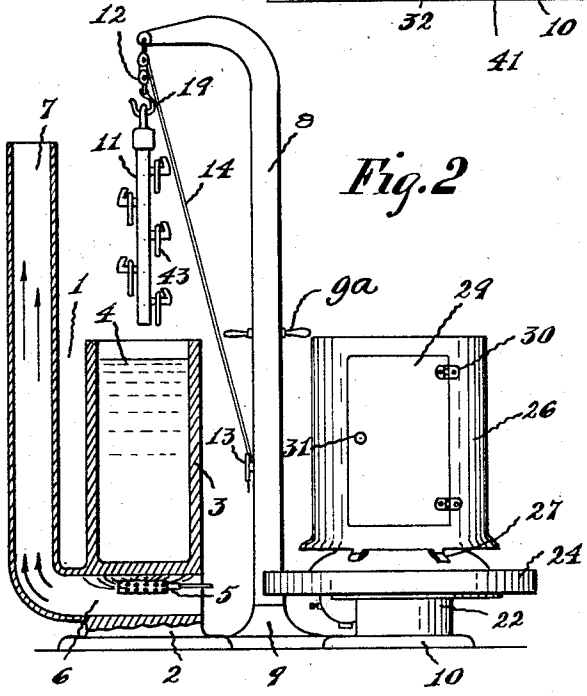


Fig.3

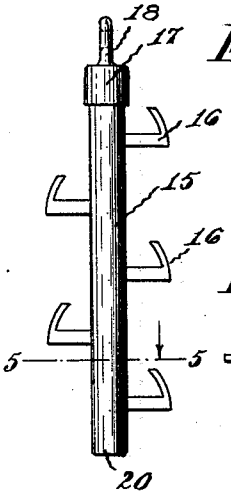


Fig.5

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UNITED STATES PATENT OFFICE

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GALVANIZING-RACK CENTRIFUGE

Application filed August 15, 1928. Serial No. 299,845.

My present invention relates to a method of, and apparatus for, coating and has particular reference to a method of, and apparatus for, galvanizing and centrifuging objects of varied shapes.

It has been customary to galvanize iron articles, en masse, by immersing them into a zinc bath while in contact with one another. After this immersion the articles, such as screws, bolts and the like, are usually subjected to centrifugal action, in a perforated metal basket, in order to remove the excess zinc from them, and thus leave them uniformly coated.

It often occurs that articles to be galvanized and centrifuged for the removal of excess coating are too large for such mass treatment, which is satisfactory for small articles, and, therefore, such larger articles must have separate treatment in isolated condition, but in plural quantities to satisfy commercial output requirements, including smooth even coating, rapidity and continuity of process and economy of material and cost.

I have devised a new process and apparatus for coating articles and to accomplish the foregoing objects by removing excess coating from the coated articles, in which the articles at no time contact with a basket or each other during the coating or subsequent treatment steps.

My method, in addition, is applicable to articles of complex shape, such as uniform, or irregularly contoured castings having a plurality of apertures therein, which ordinarily would be exceedingly difficult to treat in the usual dipping and centrifuging processes as heretofore practiced.

Accordingly, one of the main objects of my present invention is to provide a method of, and apparatus for, coating articles in which a plurality of articles of complex or simple shape and bulk may be coated or hot-dipped in a galvanizing bath, and then subjected to centrifugal action to remove excess metal, the coating and centrifuging steps being accomplished speedily and without the articles touching one another, each article of the group being coated or centrifuged apart from the others of said group, thereby producing galvanized articles of the larger bulk with a more uniform coating than has hitherto been done.

Another object of the invention is to provide an apparatus for galvanizing and subsequently removing excess metal by centrifugal force, in which a portable rack is used in the dipping step, as the article-supporting means during the centrifugal treatment, thus insuring efficient and speedy movements between steps, said rack being adapted for rapid cooperative engagement with a centrifugal machine driving spindle immediately after the articles and rack are removed from the zinc pot.

Still another object of the invention is to provide a galvanizing bath or pot and centrifugal apparatus in close proximity to one another, and by the provision of a rack lifting means associated therewith to enable the operator to transfer, with ease, the loaded article-supporting rack, after dipping the loaded rack into and out of the zinc pot to the centrifugal apparatus. Thus, the rack may be quickly mounted upon the centrifuge for centrifugal removal of the excess spelter and thereafter removed from the centrifuge for removal of the finished articles and reloading.

And still another object of the invention is to provide an article-supporting rack which has a dual function, in that it is provided with means to suspend or support the articles being coated in isolated positions and not contacting with one another during the hot-dipping step and successive treatment, and has, further, the provision of means to enable the rack to be positioned in driving position relative to a centrifugal machine stud, whereby when the stud is rotated the articles and rack rotate with it.

Other objects of the invention are to improve generally the simplicity and efficiency of such devices and to provide a device or apparatus of this kind which is economical, durable and reliable in operation, and economical to manufacture.

The inventive features for the accomplishment of these and other objects are shown herein in connection with an improved

method of, and apparatus for, hot-dipping articles in non-contacting position with each other, and then subjecting the articles to centrifugal force to remove excess coating, the articles remaining in non-contacting position during the centrifugal step, which method and apparatus comprise mounting the articles to be coated in suspended non-contacting position with each other on a portable rack, then immersing the rack and suspended articles in a coating bath which is in close proximity to the rack point loading, then removing the rack from the bath and moving it over a centrifugal machine mounted close to the rack, the transfer being effected with the articles and rack in the same relative positions as obtained during the dipping step.

The movement is effected by a lifting device mounted in close proximity to both the bath and centrifugal machine. then lowering the rack into the machine, there being a rotatable rack engaging stud located in the machine, said stud and loaded rack being driven by a source of power. A surrounding protective casing is arranged about the entire apparatus, the lower end of the casing opening into a spelter receiving trough, the upper end being open for the entry of the loaded rack, the casing having a clean-out and inspection door therein, the rack driving stud and rack being provided with interengaging means whereby when the rack is lowered into the machine it is engageable with the driving stud and rotatable therewith, and finally rotating the stud and rack whereby the excess metal is removed from the articles as they rotate, the articles remaining in non-contacting position during such rotation, the removed excess metal impacting against the surrounding casing and dropping into the aforesaid trough.

A plurality of article-supporting racks may be furnished to the apparatus herein disclosed whereby the racks may be loaded in advance of the dipping operation, and after the centrifuging be moved away loaded, to cool, be emptied and again sent through the cycle of treatment.

Many of the features of the invention may be used without employing all of them, as some of those which are not essential may be omitted, without departing from the spirit of the invention, though such omission may affect the quality of the result.

Moreover, the apparatus in this invention is capable of receiving various mechanical expressions without departing from the spirit of the invention itself.

For the purpose of describing the invention, there is illustrated in the accompanying drawing the preferred form of apparatus in which drawings:

Fig. 1 is a rear elevation, partly in longitudinal section, of the centrifugal machine, showing the article supporting rack operatively positioned therein.

Fig. 2 is a front elevation, partly in section of the zinc pot, lifting crane and centrifugal mechanism, showing the article supporting rack in position over the bath.

Fig. 3 is an enlarged view of the article supporting rack.

Fig. 4 is a front and side elevation of an article of complex shape, to be coated.

Fig. 5 is a section of the rack taken on the line 5—5, Fig. 3, looking in the direction of the arrow.

In the practical application of my invention, and referring particularly to Fig. 2, the coating bath is denoted generally by 1. Specifically a base 2 supports thereon a pot 3, which contains therein the coating material 4. This material may be metal, paint or lacquer, depending on what is to be coated and the process employed. The process disclosed herein is particularly adapted for galvanizing objects and therefore it will be understood that the material 4 is molten zinc.

A heating burner 5, disposed in the fire pot 6 serves to maintain the zinc in molten condition. A waste gas stack 7 connected to the fire pot 6 effectively removes the combustion gases.

In close proximity to the bath is a rack lifting crane 8, pivoted on a base 9, and manually rotated by a pair of handles 9^a. The bases 2, 9 and 10 may be a common base, or separate. The base 10, upon which the centrifugal machine is mounted is in close proximity to the bath and crane, thereby rendering the transfer of the rack, denoted by 11, from the bath to the centrifugal machine, a simple task, readily performed by unskilled laborers.

The article supporting rack 11 is raised, lowered and held in fixed suspended position by a block and fall or chain lift mechanism 12, the pulley rope 14 being manually attachable, in Fig. 2, to a cleat 13.

Referring now to Figs. 1, 3 and 5, the rack or spindle 11 comprises a hollow-cylindrical member 15 having positioned therein a series of laterally extending brackets 16, having each the shape of an inverted knee. These brackets may be integral with the rack or they may be secured thereto in any well known manner, such as welding etc. The said brackets 16 are spaced from each other in such a manner that articles may be suspended therefrom out of contact with each other and the rack 15. The said brackets 16 may be arranged in any desired radial positions about the rack spindle 15.

A rack cap 17, having a lifting eye 18 is secured to the rack spindle 15, which is open at its lower end 20. Thus, the hook 19, of the block and tackle 12, supportably engages the rack 11, when the hook is passed through the eye 18 for lifting the rack and load. The bore 21 of the rack spindle 15 is of square cross sec-

tion and runs through the entire length of the rack spindle 15.

The centrifuge or centrifugal machine is mounted on the base 10, and the square driving centrifuge stud 42 receives the rack 11, when the latter is lowered down over it. A circular pedestal casing 22, affixed to the base 10, supports an annular trough 24 upon its flange 23. The inner wall 25 of the trough is bell-shaped and supports at its upper edge a circular surrounding impact casing 26.

The casing 26 has spaced supporting lugs 27 integral therewith. The lugs 27 are bolted to the bell portion 25 and thus space the bottom of the casing free from the spelter receiving trough 24. The bottom of the casing 26 is open and flared, as at 28, thereby facilitating the flow of excess chilled spelter from the casing into the trough 24. A door 29, hinged as at 30 to the casing 26, may be opened by a knob 31, to inspect and clean the interior of the casing, as desired.

A combined vertical motor base and pedestal 32, has bolted thereto a motor 33, which is connected to a current source 35 by a circuit closing switch 34. A spur pinion 36 mounted on the shaft of the motor 33 meshes with a gear 37, which is housed within the bell-shaped portion of the trough 24. The gear 37 is affixed to a shaft 41 rotatably mounted in the bearing 32, with a thrust collar 39 positioned therebetween. The gear 37 also supports on it a turntable 38 which serves as a cover for the bell-shaped portion 25, and thus prevents the thrown-off metal from being spattered over the driving mechanism, disposed below the casing 26. The rack driving spindle 42, which is a continuation of the shaft 41, projects through the gear hub 40, whereby the parts 37, 38, 40, 41 and 42 are in fixed driving assembly.

It will now be seen that when the loaded rack 11 is lowered over the driving spindle 42, the former will easily slide down upon the latter until the end 20 of the member 15 of said rack 11 contacts with the hub 40. The stud or driving spindle 42 is of a square cross section, and therefore will prevent the rack spindle 15 from moving relative to it, since the bore of the rack spindle 15 is of square cross section, as well.

In carrying out the process, it is desirable to first suspend the empty rack 11 from the lifting hook 19. In this position the articles 43 are suspended from the rack hooks 16 in position as shown in Fig. 2. These articles may be pipe fittings, cup shaped castings and articles of irregular and complex shape, as shown by 43, Fig. 4. It should be noted that when positioned on the hooks 16, they are not only in non-contacting position with each other, but they do not touch the member 15 of said rack 11.

The rack is then lowered into the zinc pot 4 by means of the block and tackle. After remaining a desired period in the molten zinc bath, the rack is raised out of the bath. The crane is then swung by handle 9^a to shift the loaded rack over the driving spindle 42.

The rack is then lowered upon the stud or spindle 42 until the end 20 of member 15 rests on the hub 40. The hook is removed and the switch 34 closed. Through the medium of motor 33, gears 36 and 37, the stud 42 is rotated and, with the latter, the articles 43. As the speed of rotation increases, the articles assume a lateral position 44 as shown in Fig. 1, at right angles to their normal suspended position.

Excess removed metal from the surfaces of articles impacts against the interior walls of casing 26, and falls into the receiving trough 24.

After centrifuging the loaded rack is removed. The rack and articles are then placed in the usual quenching medium and the articles removed when cooled.

It will thus be seen that I have devised an efficient and quick method of coating and removing excess coating from comparatively bulky articles of simple or complex shape, in which the article supporting means retains the articles in non-contacting position with one another during the coating and excess removing steps, and which means is adapted for rapid operative connection with a centrifugal machine to effect the whirling of the articles.

The foregoing detailed description has been given for clearness of understanding, hence, no unnecessary limitation should be understood. Further, the appended claims should be construed as broadly as permissible in view of the prior art, since many and various changes may be made without departing from the scope of the invention as defined in the broader claims.

I claim:

1. The method of galvanizing metal articles of irregular shape consisting in first revolvably suspending said articles from a support out of contact with each other and in a way to permit them to be swung or turned on their supports away from the plane of suspension and the axis of revolution thereof, then immersing said articles with their support in a bath of zinc, then removing said articles with their support from said bath and rapidly revolving said support with said articles thereon around said axis, thereby allowing said articles to be swung radially outward by centrifuged force towards the plane of revolution of their points of support during the revolution thereof, whereby a uniform distribution of zinc is effected and surplus zinc is thrown off the articles.

2. In a machine of the character described a rack for suspending therefrom articles to be galvanized, a means for imparting a rapid

rotary motion to said rack, members on said rack for suspending therefrom said articles out of contact with each other and in a way to permit said articles to be swung or turned with relation to said rack away from the plane of suspension and axis of revolution thereof towards the plane of revolution of the points of suspension of said articles, and a means associated with said rack, whereby said rack and the articles suspended therefrom may be dipped into a coating bath.

3. In a machine of the character described a rack, for suspending therefrom articles to be galvanized, a means for imparting a rapid rotary motion to said rack, brackets, having each the shape of an inverted knee, positioned on said rack, for suspending therefrom said articles out of contact with each other and in a way to permit said articles to be swung or turned with relation to said rack away from the plane of suspension and axis of revolution thereof towards the plane of revolution of the points of suspension of said articles, and a means associated with said rack, whereby said rack and the articles suspended therefrom may be dipped into a coating bath.

4. In a machine of the character described a base, a centrally positioned crane revolvably mounted thereon, a coating bath adjacent thereto, a centrifuge adjacent to said crane on the opposite side from said bath, a rack, for suspending therefrom articles to be coated, detachably mounted on said centrifuge and a means on said crane for alternately turning it from said bath to said centrifuge and towards said bath again, whereby said crane may be employed in rapid succession for lowering said rack with said articles thereon into said bath, thereupon to lift said rack from said bath and deposit it for mounting the same on said centrifuge, for removing surplus coating from said articles, thereupon to lift said rack from said centrifuge, for placing the same with said articles thereon in a quenching medium and thereupon to return said rack with other articles thereon to the said bath.

5. In a machine of the character described a vertically positioned and revolvably mounted centrifuge spindle, a means for revolving the same, an annular drip trough encompassing the same, a substantially vertically disposed rack, for suspending therefrom articles to be coated, detachably secured to said spindle for centrifuging said articles thereby, an impact casing for intercepting the excess of coating material removed during the centrifuging process, said casing being positioned over said trough and the lower end of said casing being open, whereby the excess coating intercepted by the interior surface of said casing may be directed by gravity to said trough, and a means for shielding said revolving means from said excess coating and for guiding the same from the interior of said casing into the said trough.

Signed at Westfield, in the county of Union and State of New Jersey, this sixth day of July, A. D. 1928.

CHARLES A. GIBLIN.