Jan. 5, 1960 H. R. VITENSE 2,919,705

APPARATUS FOR TREATING ARTICLES

Filed Feb. 6, 1956 2 Sheets-Sheet 1

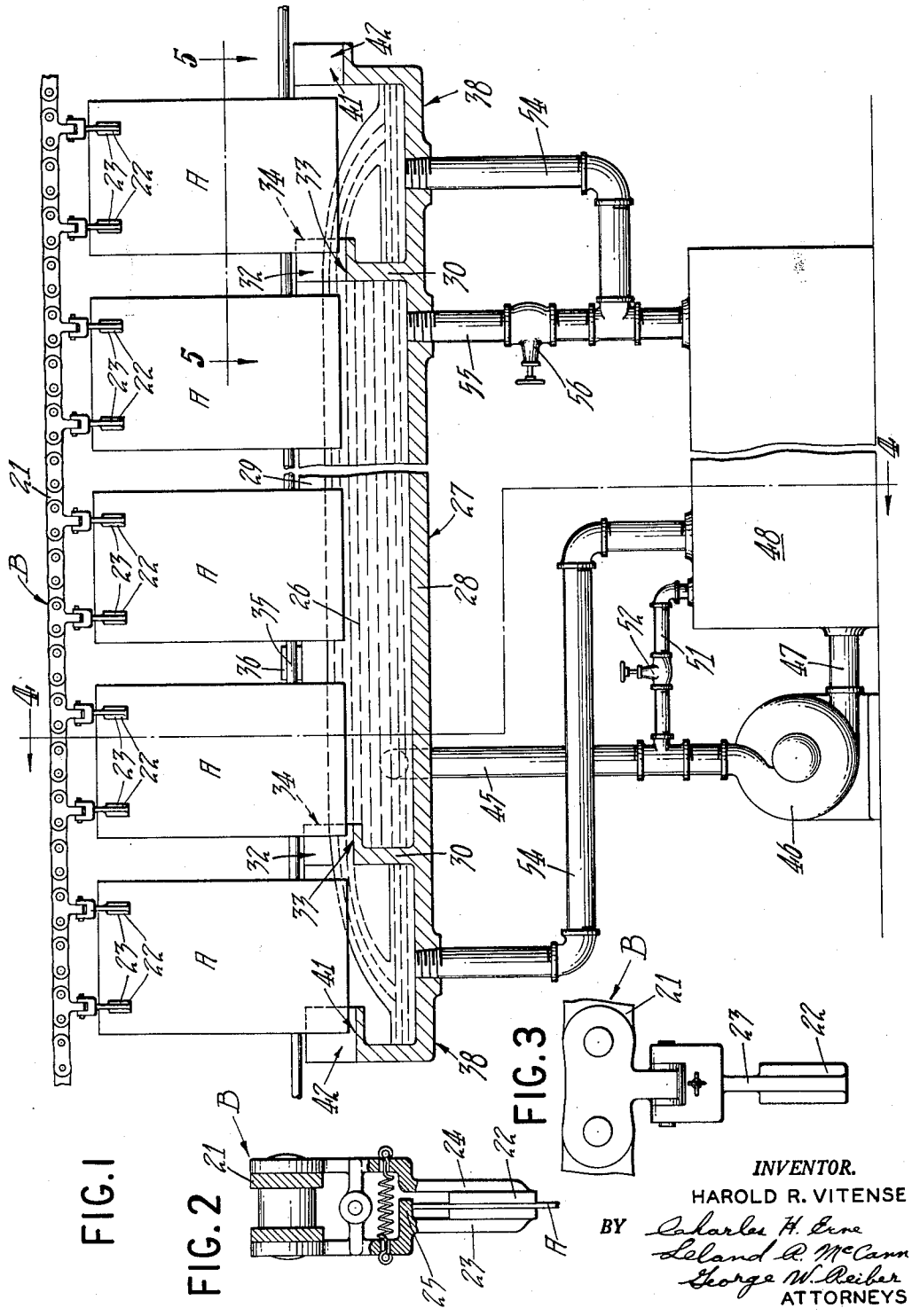


FIG. 1

FIG. 2

FIG. 3

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Filed Feb. 6, 1956 2 Sheets-Sheet 2

FIG. 4

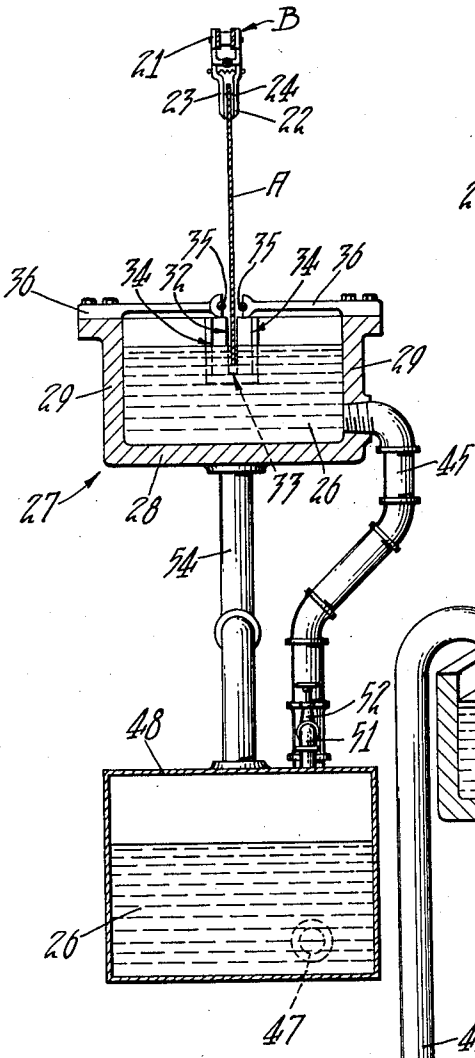


FIG. 5

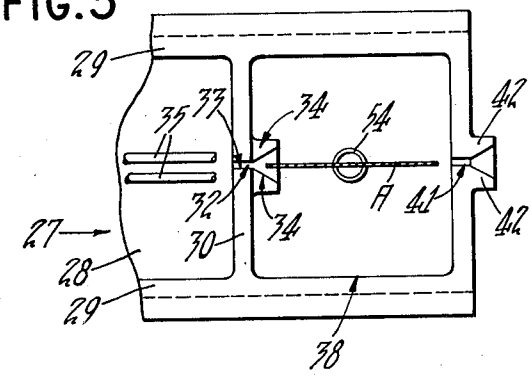
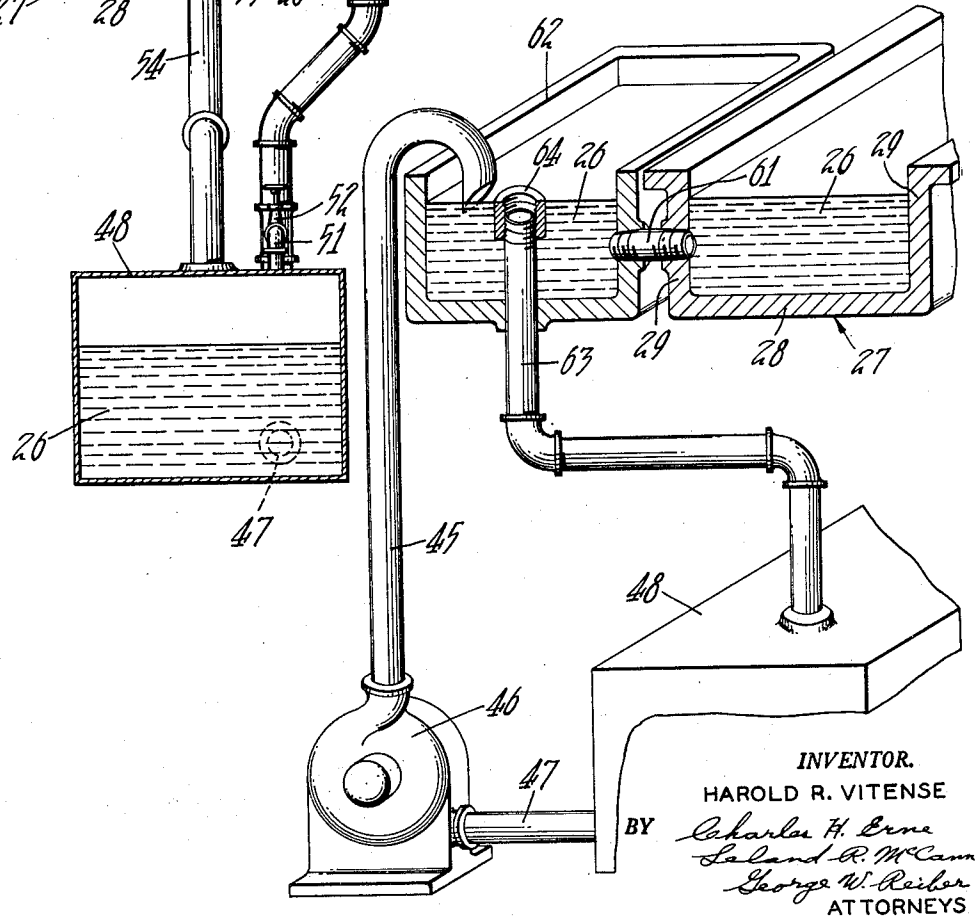


FIG. 6



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APPARATUS FOR TREATING ARTICLES

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Application February 6, 1956, Serial No. 563,578

4 Claims. (Cl. 134—122)

The present invention relates to an apparatus for treating articles, preferably sheet metal can body blanks and the like and has particular reference to a novel form of treating reservoir for containing a liquid-form treating substance and through which the articles are passed for treatment.

This application is a companion to the following applications filed in the United States Patent Office, Serial Number 563,621, filed February 6, 1956, in the names of Karl Bofinger and Ronald E. J. Nordquist on Apparatus for Treating Articles, and application Serial Number 563,626, filed February 6, 1956, in the names of Karl Bofinger and Bert A. Deisch on Apparatus for Treating Articles, and application Serial Number 563,576, filed February 6, 1956, in the names of Harold R. Vitense and Walter F. Pillnik on Apparatus for Treating Edge Portions of Can Body Blanks, and application Serial Number 563,577, filed February 6, 1956, in the name of Harold R. Vitense on Method of Treating Edge Portions of Blanks. These applications are assigned to the assignee of the instant invention.

An object of the instant invention is the provision of a reservoir through which articles may be passed for treatment while propelling the articles along a path of travel and while maintaining the articles at a predetermined constant level, so as to obviate vertical movement of the articles or any portion thereof for insertion into and removal from the reservoir for treatment.

Another object is the provision of such a treating reservoir through which sheet material articles may be readily passed in any position ranging from vertical to substantially horizontal.

Another object is the provision of such a single treating reservoir or a pair of opposed treating reservoirs adapted respectively to separately treat the single marginal edge portions of blanks or to simultaneously treat both marginal edge portions of blanks.

Another object is the provision of such a treating reservoir in which a liquid-form treating substance may be maintained at a predetermined constant level without splashing or spilling the substance beyond the marginal edge portions of blanks or onto adjacent parts of the apparatus.

Still another object is the provision of such an apparatus in which the liquid-form treating substance may be recirculated continuously for re-use and in which a predetermined level or hydrostatic head of the substance may be readily maintained above an overflow edge of a reservoir for the passage of articles therethrough.

Another object is the provision of such an apparatus which is particularly adapted for use in high speed machines so that treating time may be reduced to a minimum with a resultant saving in machine construction, maintenance, and floor space occupied.

Another object is the provision of such an apparatus which is particularly adapted to cleaning and deoxidizing sheet metal articles and to coating and electroplating such articles efficiently at high speeds.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which taken in connection with

the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a sectional view of an apparatus embodying the instant invention;

Figs. 2 and 3 are enlarged end and side views respectively of parts of a conveyor used in the apparatus, portions of Fig. 2 being broken away and shown in section;

Fig. 4 is a sectional view taken substantially along the broken line 4—4 in Fig. 1;

Fig. 5 is a plan view taken substantially along the line 5—5 in Fig. 1, with a sheet metal blank shown in section; and

Fig. 6 is a sectional perspective view showing a modified form of a portion of the apparatus shown in Fig. 1.

As a preferred or exemplary embodiment of the instant invention the drawings illustrate an apparatus for treating marginal edge portions of sheet metal can body blanks A to prepare them for incorporation in a side seam of a finished can body. The blanks A preferably are black iron blanks and the treatment preferably is a cleaning or deoxidizing operation effected by passing the marginal edge portions of the blanks through an acid bath and a washing bath and then electroplating the cleaned areas to provide for efficient soldering of these areas after formation into a usual can body side seam.

Treatment of these edge portions of the blanks A preferably is effected while the blanks are disposed in a vertical position suspended from the conveyor B and arranged in spaced and edgewise relation and moving in a substantially continuous processional order along a straight line path of travel. However the invention is equally well adapted to similarly propelled blanks and other articles disposed at any angle ranging to a substantially horizontal position. For this purpose, the conveyor B preferably is an endless chain 21 (Figs. 1, 2, 3 and 4), driven continuously in any suitable manner along a straight preferably horizontal path of travel, and provided with spaced depending gripper members 22 having cooperating pairs of spring held clamping fingers 23, 24 for gripping and carrying between them edgewise the upper marginal edge portions of the blanks A. A stop 25 on the finger 23 is provided to locate the upper edge of the blanks.

Treatment of the suspended blanks A as hereinabove mentioned, preferably is effected on the lower marginal edge portions of the blanks while the blanks A are moving edgewise along a straight line path of travel. This treatment is effected without moving the blanks vertically so as to immerse them but by merely continuing their advancement along their path of travel while maintaining them at a constant level from entry to discharge. For this purpose there is provided a treating reservoir 27 (Figs. 1, 4 and 5) disposed adjacent and preferably under the path of travel of the conveyor B and containing a liquid-form treating substance 26 such as an acid cleaning liquid, an electroplating solution, a washing fluid or other substance.

The treating reservoir 27 preferably is an elongated shallow, generally rectangular trough having a bottom 28, upright opposed side walls 29, upright opposed end walls 30 and an open top. The end walls 30 are formed with narrow vertical openings, slots or slits 32 which have bottom edges 33 constituting an overflow edge of the reservoir. These openings extend entirely through the walls 30. These openings 32 are aligned longitudinally with each other and vertically with the path of travel of the conveyor B for edgewise passage of the lower ends of the blanks A through the openings 32 and the interior of the reservoir 27 between them.

The overflow edges 33 of the openings 32 are clear of the lower edges of the blanks and are disposed a suffi-

cient distance down from the top edge of the reservoir to permit a predetermined area of the advancing blanks to horizontally pass through the upper portion of the reservoir below its top edge. On the entrance side of the reservoir end walls 30, i.e. at the right as viewed in Fig. 1 outwardly flared projections 34 (Fig. 5) are provided adjacent the openings 32 to guide the blanks A into and through the openings. Horizontal guide rails 35 disposed in spaced and parallel relation are also provided to guide the blanks A. These rails extend the full length of the reservoir 27 and are secured to arms 36 fastened to the top edges of the reservoir side walls 29 (Fig. 4).

The liquid-form treating substance 26 in the reservoir 27 is maintained at a constant predetermined level or hydrostatic head above the overflow edges 33 of the openings 32 in the reservoir end walls 30 so as to treat a predetermined area of the lower marginal edge portion of the blanks A as they advance through the reservoir. This area to be treated may be varied in height or width if desired by adjustment of the hydrostatic head of the substance through lowering or raising the overflow edge or the level of the substance in the reservoir. Maintenance of this substance level or head above the edges 33 of the openings 32 permits the substance to flow out of the reservoir through the openings. This outflowing substance is caught in catch basins 38 which are provided at each end of the reservoir and which are continuations of the reservoir and constitute separate auxiliary compartments of the reservoir.

The end walls of these catch basins 38 are formed with openings, slots or slits 41 which are similar to and longitudinally aligned with the openings 32 in the reservoir. The openings 41 like the openings 32 are provided with flared projections 42 to guide the blanks through the openings 41. The guide rails 35 also extend over these catch basins.

Hence as the blanks A, suspended from the conveyor B, advance along a straight line, edgewise, and at a constant level, their lower marginal edge portions enter and pass through the openings 32, 41 in the reservoir 27 and catch basins 38 and through the liquid-form treating substance 26 to a predetermined depth, in the reservoir 27 and flowing out into the catch basins 38, to treat the marginal edge portions of the blanks to a predetermined height, without in any manner moving the blanks vertically to enter and leave the reservoir.

This maintenance of the treating substance 26 at a predetermined level or head in the reservoir 27 to overcome the continual loss of the substance through the openings 32, is effected by a controlled flow of the substance into the reservoir. For this purpose the reservoir 27 is connected by a feed pipe 45 (Figs. 1 and 4) to a pump 46 which in turn is connected by a pipe 47 to a source of supply of the substance such as a storage tank 48.

Between the reservoir 27 and the pump 46, the feed pipe 45 is connected to a by-pass pipe 51 which leads to the storage tank 48 and which includes a regulator valve 52. The valve 52 is maintained in a partially open condition to by-pass from the feed pipe 45 just sufficient of the substance flowing therethrough to provide a flow into the reservoir substantially equal to the flow of the substance out of the reservoir through the openings 32 plus the amount which clings to the blanks during treatment. The substance 26 as it flows from the reservoir 27 into the catch basins 38 is returned to the storage tank 48 by way of drain pipes 54 which are connected to the bottoms of the catch basins 38 and the top of the storage tank 48. A drain 55 having a shut off valve 56 is also provided in the bottom of the reservoir 27 to return the substance 26 to the storage tank 48 before cleaning the reservoir when required.

In a modified form of the invention as disclosed in Fig. 6, the level of the substance 26 in the reservoir 27 is maintained in a different manner. In this modified form the reservoir 27 is disposed adjacent and is connected by

a pipe 61 to a leveling receptacle 62. The treating substance 26 from the storage tank 48 is pumped through the feed pipe 45 into the leveling receptacle at a rate greater than its withdrawal therefrom. The leveling receptacle 62 contains an overflow pipe 63 which leads to the storage tank 48. The upper end of the overflow pipe 63 is provided with a vertically adjustable collar 64.

The substance 26 flowing into the leveling receptacle 62 overflows into the overflow pipe 63 over the top of the collar 64 and returns to the storage tank 48 for recirculation. Hence by regulating the level of the top of the collar 64, the level of the substance in the leveling receptacle 62 and in the reservoir 27 connected thereto may be readily controlled.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. An apparatus for treating articles with a liquid-form treating substance, comprising in combination a reservoir for retaining a quantity of said liquid-form treating substance, said reservoir having a lateral wall formed with a slit disposed therein and through which said treating substance flows from the reservoir, a pump having an inlet connection with a storage tank and having a delivery connection with said reservoir for pumping the treating substance from said tank into said reservoir to replenish said substance therein, a by-pass pipe connected to said storage tank and to said delivery connection between the pump and reservoir, a control valve in said by-pass pipe to divert controlled quantities of said substance from said delivery connection to control the amount of treating substance delivered to said reservoir for maintaining said substance at a predetermined hydrostatic head therein, and conveyor means for propelling said articles through said liquid-form substance in the reservoir and slit for treating said articles with said substance

2. An apparatus of the character defined in claim 1 wherein lateral walls at opposite sides of the reservoir are each formed with a slit therein, and said conveyor is maintained at a predetermined height above and substantially parallel to said constant level of the treating substance in the reservoir for propelling the articles in a straight line through said treating substance and through said slits.

3. An apparatus of the character defined in claim 2 wherein catch basins are provided outside said reservoir and under each of said slits for receiving excess treating substance flowing therefrom, and wherein each of said basins is connected with said storage tank for conducting said excess treating substance to said tank.

4. An apparatus of the character defined in claim 2 wherein said articles are substantially flat sheets and said conveyor is provided with gripping means for gripping the upper edge of each sheet to suspend the sheet and propel it edgewise with a lower portion of the sheet immersed in said treating substance.

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