Nov. 5, 1946. J. M. BOUDREAU 2,410,626

MEANS AND METHOD OF TREATING SURFACES

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Fig. 1.

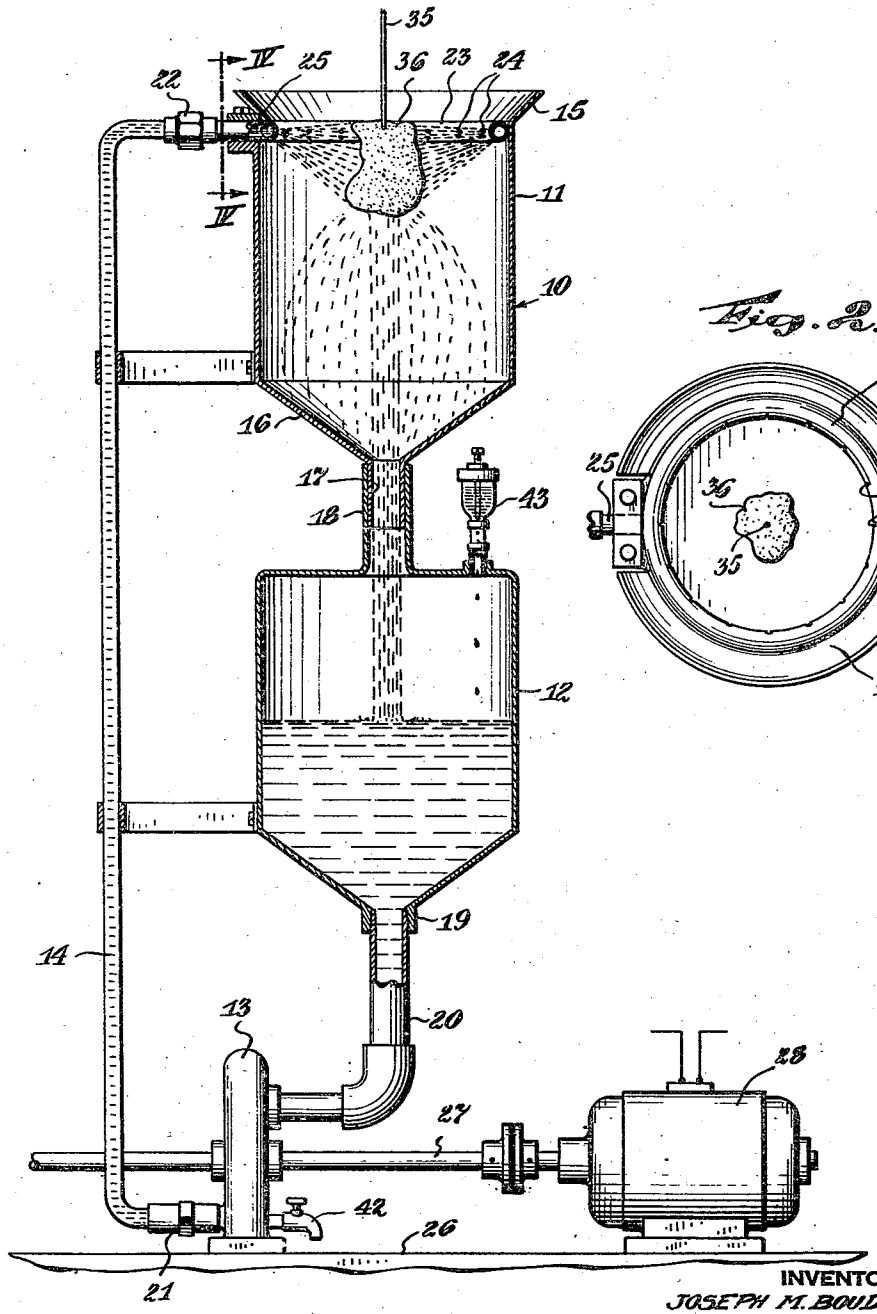


Fig. 2.

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Fig. 3.

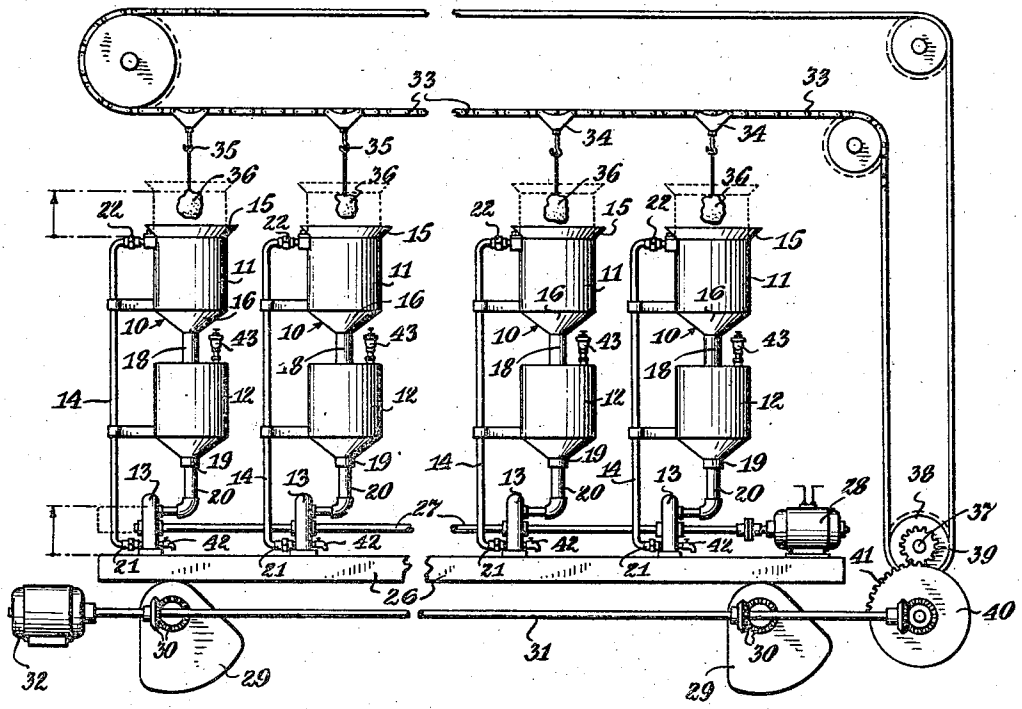


Fig. 5.

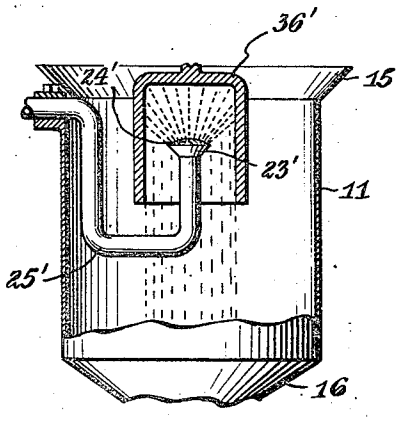
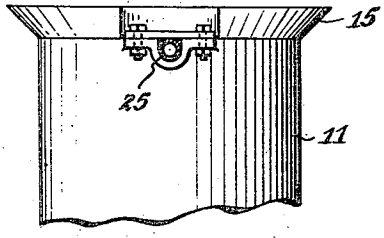


Fig. 4.



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MEANS AND METHOD OF TREATING SURFACES

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7 Claims. (Cl. 117—105)

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This invention relates to means and method of treating surfaces and more particularly in carrying out the metalizing of electrically non conductive surfaces to render the same conductive and adapted thereby to be electro-plated.

The objects of the invention are to provide an improved means for accomplishing the purpose; to provide such a means which will be automatic; to apply a reducing agent intermittently with application of a metalizing solution; to apply each in separate chambers; to obtain an even distribution of reducing agent and of metalizing solution upon the article to be metalized; to apply the reducing agent and metalizing solution both in fluid form; to apply said fluids to the entire surface of the article; to provide for intermittent advance of the article from station to station and introduction into the fluid at each station; to provide for a plurality of fluid applying chambers and means for lifting the same simultaneously to several pieces of work; to improve upon previous methods of metalizing surfaces; to secure simplicity of construction, method and operation; and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings in which like numerals of reference indicate similar parts throughout the several views:

Figure 1 is a sectional view, partly in elevation, of one of the units of my improved means for treating surfaces;

Figure 2 is a plan thereof;

Figure 3 is an assembly illustrating a bank of units and article conveying and operating means employed in carrying out the method of my invention;

Figure 4 is a sectional view on line IV—IV of Figure 1; and

Figure 5 is a sectional view of a modified form of spray-head mounted in place in the spray chamber.

In the specific embodiment of the invention illustrated in said drawings, the reference numeral 10 designates a fluid-applying unit, which, for certain conveniences of use, is shown herein as comprising two chambers, one of which, 11, is above the other, 12, with the upper one draining into the lower one. The lower one in turn drains into a fluid pump 13, outlet pipe 14 of which conveys the fluid back to the upper chamber 11. The fluid is accordingly in continuous circulation in the unit.

While subject to change as desired, the several parts comprising the unit as shown may have the following detail structure. The upper chamber 11 is of generally cylindrical shape with an upper flaring peripheral splash collar or apron 15 and a bottom funnel-like outlet 16, terminating in an outlet nipple 17. The lower chamber 12 is shown with an upwardly directed entry socket 18 receiving said outlet nipple 17 of the upper chamber 11. This lower chamber 12 is likewise

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preferably funnel-shape at its bottom leading to a nipple 19 threaded or otherwise applied to the intake pipe 20 of the pump 13. That pump is of the usual centrifugal type. The outlet pipe 14 is preferably of glass and attached to the pump by a union 21. The upper end of said pipe 14 has another union 22 hereon detachably connecting with a spray head in the upper chamber 11.

Spray head 23 shown in Figures 1 and 2 preferably comprises a body in the form of a ring of pipe, the outer diameter of the ring being substantially the inside dimension of the chamber so the ring may be situated within the chamber horizontally next the upper part thereof. The ring of pipe constituting the body of said spray head is provided with suitable perforations 24 directed inwardly and slightly downward to obtain a cross spray of fluid in the chamber, such that an article introduced into the chamber from above through the ring will be thoroughly sprayed over its entire outer surface. A lateral pipe 25 from the ring connects with said union 22 enabling the spray head to be removed readily and another substituted.

An alternative spray-head 23' is shown in Figure 5, the same comprising a nozzle-like body in this instance having the connecting pipe 25' applied at the bottom of the nozzle and extending to the side of the chamber and then upwardly to and laterally at the top of the chamber for connecting with said union 22. Perforations 24' in the upper part of the nozzle of which some are directed outwardly-upward, enable the fluid to spray as a fountain so that insides of articles may be sprayed thereby.

There are preferably a plurality of units 10 arranged successively upon a platform 26, and, as a matter of convenience and economy, the several pumps are mounted upon and driven by a common shaft 27 in turn driven by a single motor 28 on said platform. The platform is arranged to be raised and lowered, the operating means being here illustrated as cams 29 driven through bevel gears 30 from a shaft 31 in turn driven by a motor 32. This same motor and shaft are geared to synchronously advance a work-feeding conveyor 33. Said conveyor is shown as a continuous sprocket chain on which may be removably hung brackets 34 from which depend hooks 35 as shown to which the pieces of work 36 are hung. The brackets and hooks are applied at intervals corresponding to the spacing of the units so that when one is suspended over a unit, others will be also over corresponding units. Advancement of the conveyor is with a step by step motion during the interval when the platform is lowered, so that while the conveyor is stationary with the brackets, hooks and work alined with the units, the platform is raised and lowered thereby introducing the several pieces of work to the sprays of the corresponding units.

The step by step motion of the conveyor may

be accomplished in any suitable manner, and for purposes of illustration gearing somewhat similar to a Geneva movement is shown. Accordingly on a stub shaft 37 carrying driving sprocket 38 for the conveyor chain, is a pinion 39. A rotatable member 40 in a common plane with said pinion has a segmental peripheral portion thereof provided with teeth 41 adapted to mesh periodically with the teeth of the pinion at which time the chain is advanced. When the toothed segment passes the pinion, the remaining part of said member having no teeth rotates without driving the pinion for a predetermined period. This represents the period of rest for the conveyor. Said member is continuously rotated, as by bevel gear connection with the cam-driving shaft 31 thereby synchronizing operation of the platform and advancement of the conveyor.

In operation, alternate units are supplied with different fluid. In the first unit may be used an appropriate fluid for preparing the surface. It may function in part to wash the surface and to wet it, and preferably is also a reducing agent applied so as to give complete surface coverage thereof on the article. The second unit is intended for spraying of a metalizing fluid of a character, such as a silver compound that will be reduced in place on the work to a metallic status by the action of the reducing agent. An excess of this metalizing fluid adheres to the work and on the next or third step, the spray again consists of reducing agent in part acting on the metalizing material and adhering in excess of that then needed to reduce more of the metalizing material again sprayed on the work on the fourth step. Adequate numbers of units may be provided for thus, alternately covering the work to be sprayed by the reducing agent and metalizing fluid as often as desired. After desired thickness of metalizing material has been applied, the work may be removed or otherwise taken to the plating operations performed in usual manner for plating on metal surfaces.

It is to be particularly noted that the work to be metalized by my improved process may be and preferably is of an electrically non-conductive character. Prior to introduction to the apparatus here disclosed, said work should be suitably prepared to be receptive of the metalizing treatment. Such preparation, in part governed by the constituency of the work, may be by sand-blasting, chemical cleansing, buffing or otherwise. Smooth or shiny surfaces are dulled and preferably minutely pitted so as to not only be readily wetted by the treating fluids, but to be adherent to the metalizing material.

In order to make the apparatus continuously operative and avoid necessity of draining the fluid periodically, as can be done if desired from drain valves at the bottom of the pump, means is provided to apply fresh concentrate directly to the fluid in use. As shown in Figure 1, an adjustable drip cup is shown on each unit, preferably situated at the top of the lower chamber 12. Concentrate of the particular fluid for the unit is fed by the drip cup at a rate adjusted to computed consumption by the particular work being treated. The drops of the concentrate become thoroughly mixed with the bulk of the fluid in the chamber and pump before being sprayed from the spray head.

Obviously detail changes and modifications may be made in the method of operation, as well as in the apparatus, and I do not wish to be understood as limiting myself as set forth in the following claims, when construed in the light of the prior art.

Having described the invention, I claim:

1. An apparatus for metalizing surfaces comprising an elevating platform, a unit situated on said platform, means for suspending work over said unit, means to elevate the platform and unit and thereby introduce the work into the unit, and means for spraying the work while situated in said unit.

2. An apparatus for metalizing surfaces comprising an elevating platform, a plurality of units on said platform, means for suspending work over each of said units and periodically advance the work from one position over one unit to a successive position over another unit, means to elevate the platform and units and thereby introduce the several pieces of work in the several units, and means for spraying the work while situated in said units.

3. A method of metalizing surfaces consisting in suspending a plurality of pieces of work and moving them in unison with a step-by-step motion, simultaneously including the several pieces of work each within a spray unit individual to the piece of work between the step-by-step motion thereof, and spraying said pieces of work successively in each unit.

4. An apparatus for metalizing surfaces comprising a unit having a chamber having a bottom outlet, means for pumping fluid from the bottom outlet and spraying said fluid within the upper part of said chamber onto work suspended therein, and drop-by-drop means having entry to the course of travel of the fluid between said bottom outlet and pumping means at a part in said course of travel where the fluid pressure is less than the force of gravity for replenishing by added concentrate the consumed fluid, whereby the concentrate is mixed with the fluid in transition to and before reaching the spray head.

5. An apparatus for metalizing surfaces comprising a unit having an upper chamber having a bottom outlet, a spray head mounted within said chamber in proximity to the top thereof, said unit having a lower chamber the inlet for which is the outlet of the upper chamber, a pump connected for returning fluid from the bottom of said lower chamber to said spray head and as a spray into the upper part of the upper chamber, and drop-by-drop means having entry to the course of travel of the fluid between discharge from the spray and said pump at a part in said course of travel where the fluid pressure is less than the force of gravity for replenishing by added concentrate the consumed fluid, whereby the concentrate is mixed with the fluid in transition to and before reaching the spray head.

6. A method of metalizing surfaces consisting in continuously circulating different spraying fluids, intermittently and successively subjecting the surfaces to the continuous sprays of said fluids, and continuously adding concentrate to the spray fluid as said fluid circulates, and reusing the fluid.

7. A method of metalizing surfaces consisting in continuously circulating a fluid through a spray head and back to source, introducing a surface in the spray from said spray head, and replenishing fluid used by drop-by-drop continuous addition of concentrate into the continuously circulating fluid.

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