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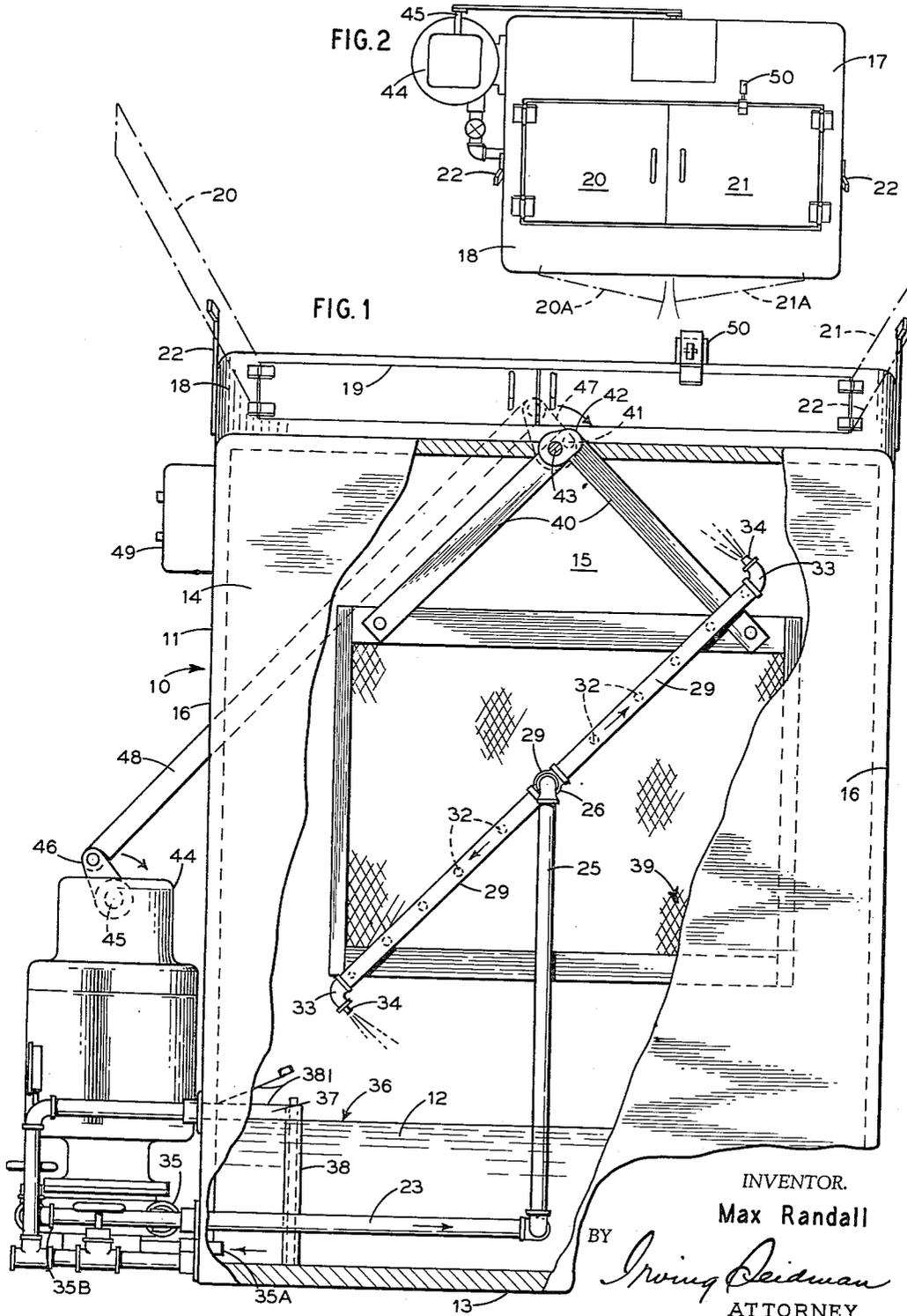
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3,054,411

PARTS CLEANING MACHINE

Filed Feb. 26, 1960

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

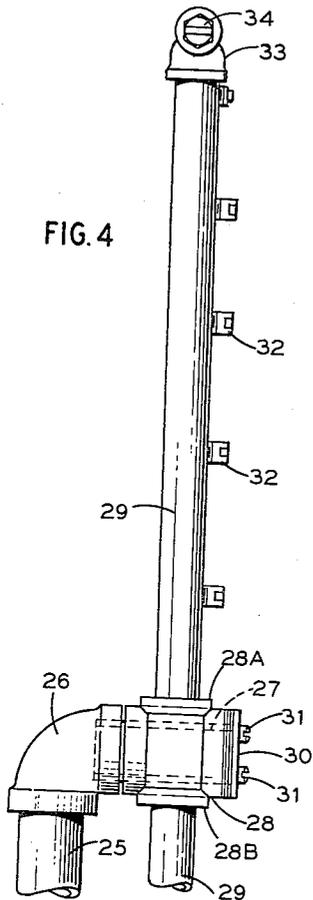


FIG. 4

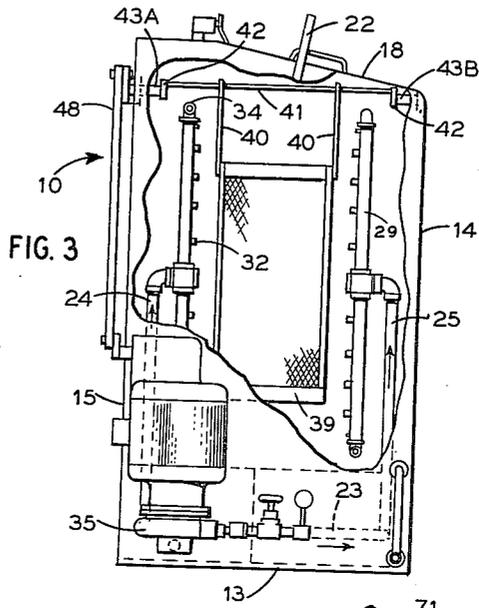


FIG. 3

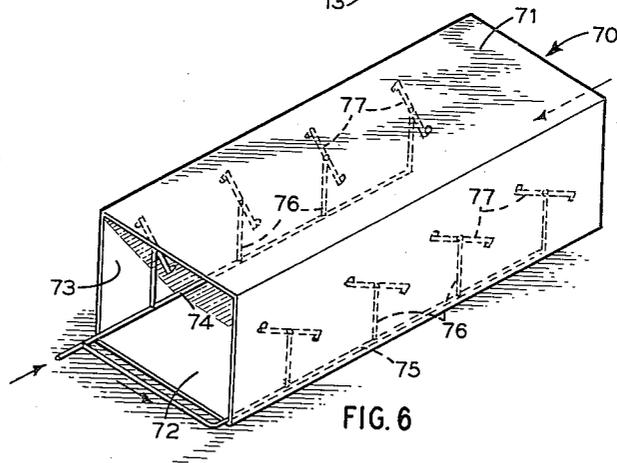


FIG. 6

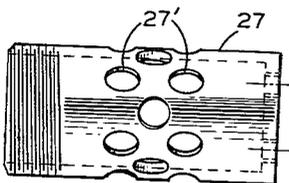


FIG. 5

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1

3,054,411

**PARTS CLEANING MACHINE**

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 3 Claims. (Cl. 134-111)

This invention relates generally to a parts cleaning machine, and more specifically to an improved spray type degreaser.

An object of this invention is to provide an improved degreaser having self-propelled rotating spray arms disposed within the degreaser tank.

Another object is to provide means for oscillating a parts holding means within the tank relative to the rotating spray arms to insure complete washing of an entire part or work piece.

Another object is to provide in a degreaser means for filtering and recirculating the cleaning fluid from the tank to the rotary spray means.

A feature of the invention resides in the provision that the rotation of the spray arms within the tank coupled with the oscillating movement of the parts holding means enables the cleaning fluid spray to reach recessed parts and cover areas not possible with fixed spray headers.

Another feature resides in the provision that the improved degreaser enhances economy in that much less cleaning solution is required to be pumped to clean a given number of parts.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a front elevation view of the degreaser of this invention having parts shown in section.

FIG. 2 is a top plan view of the degreaser.

FIG. 3 is a side elevation view on a reduced scale, and having parts thereof broken away.

FIG. 4 is an enlarged detail of the rotating spray means.

FIG. 5 is an enlarged detail of the distributing nipple of the spray means.

FIG. 6 is a perspective view of a modified form of the invention.

The parts cleaning machine or degreaser, of the type to be herein described, has wide application in industry for removing oils, compounds, waxes, grease tars, metal chip and other dirt and grime from various parts manufactured by machining, stamping, drawing, quenching or buffing operations prior to painting, plating, pickling or phosphating such manufactured parts. Referring to the drawings, the degreaser 10 comprises a tank 11 designed to contain a body of cleaning fluid 12. For cleaning operations which require highly caustic acid or alkaline cleaning solutions, the tank 11 is formed of a corrosive resistance material, such as stainless steel. As shown in FIGS. 1 to 5, the tank 11 is formed with a bottom wall 13 and oppositely connected front, rear and side walls 14, 15 and 16, respectively. The upper end of the tank 11 is provided with a top 17 and an inclined surface 18 having a relatively large opening 19 therein to provide access to the interior of the tank. Door sections 20 and 21, hinged at their outer ends to the top 17 of the tank, form the closure for the opening 19. If desired, upright rests 22 are secured to the sides 16 of the tank for supporting each door section 20 and 21 in the open position. If

2

desired, front loading door 20A, 21A may be provided instead.

According to this invention the rotating spray means are disposed within the tank 11 for directing moving streams of cleaning solution in a dense pattern against the manufactured parts to be cleaned. As shown, the spray means include a supply pipe 23 extending along the bottom of the tank. The supply pipe 23 extends inwardly from a side wall 16 to a point intermediate the front wall 14. In the illustrated form the supply pipe 23 connects to a pair of upwardly extending branches 24, 25 positioned closely adjacent oppositely disposed walls, e.g. the front and rear walls 14, 15, respectively, of the tank. Connected to the upper end of each branch 24, 25 is an elbow 26 for receiving a threaded nipple 27 having a plurality of openings 28 in the wall thereof. Rotatably mounted on the nipple 27 is a hub 28 that is provided with opposed threaded or tapped openings 28A, 28B for receiving radially extending sprayer arms 29. A flange 30 connected to the end of the nipple 27 by fasteners 31 for rotatably securing the hub 28 thereto.

Longitudinally spaced along each sprayer arm 29 at predetermined intervals are a plurality of spray nozzles 32 for directing streams of cleaning fluid inwardly toward the center of the tank 11.

Connected to the outer end of each sprayer arm 29 is an elbow 33 adapted to receive a reaction nozzle 34. As shown, each reaction nozzle 34 has its respective discharge orifice oppositely disposed so that the reaction to fluid discharging therefrom effects rotation of the sprayer arms 29.

Means for pumping fluid to the supply pipe 23 and to the connected spray arms 29 include a pump 35 positioned adjacent a wall 14 of the tank. The pump 35 is motor driven and is provided with a suction inlet 35A which connects with the bottom of the tank below the liquid or fluid level, the outlet 35B of the pump connects with the supply pipe 23. Thus it will be noted that in operation the tank 11 is filled to a suitable level as indicated at 36 and the fluid is continuously recirculated from the tank 11 to the spray means through the interaction of the pump 35 and connecting piping.

The dirt, sludge, grime and other waste which is deposited on the bottom of the tank during cleaning is prevented from entering the pump 35 by filtering means. Referring to FIG. 1, the filtering means comprises a liquid compartment 37 defined by suitable partition members adjacent the inlet end 35A of the pump 35. The compartment 37 is closed by an imperforate cover 381 at the upper end thereof to prevent any of the liquid washing off the parts being cleaned from entering into compartment 37. One side of the compartment 37 is open to the main liquid or fluid supply of the tank. This side is provided with a removable filter screen 38. The screen 38 prohibits dirt and sludge and grime collecting in the bottom of the tank from entraining in the fluid passing from the main supply to the intake side 35A of the pump 35.

Means for supporting the workpieces or parts during a cleaning or spraying operation include a carrier or wire basket 39 supported between the opposed rotating sprayer arms 29. In accordance with this invention the basket 39 is provided with hangers 40 for supporting the same from a cross-bar 41 eccentrically connected by links 42 to journals 43A, 43B which are rotatably supported in suitable bearings in the front and rear wall, as shown in FIG. 3.

In accordance with this invention means are provided for oscillating the basket 39 and the workpieces supported therein to enhance the cleaning operation. In the illustrated embodiment, gearmotor 44 is provided with a rotat-

ing spindle 45 to which there is connected an arm link 46 for rotation therewith. A similar link 47 is connected to the journal 43A to which the cross-bar 41 supporting the work basket 39 is connected. Interconnecting the two links 46, 47 is a connecting rod 48. Thus it will be noted that rotation of the motor spindle 45 is translated to the journal 43A through the connecting bar 43 and the cross-bar eccentrically mounted by links 42 to the journals 43A, 43B in turn is rotated to effect an oscillating motion to the work basket 39. With the relative movement between the moving spray arms and connected nozzles and the oscillation of the workpieces, it has been discovered the cleaning action is enhanced in that stubborn dirt and grime can be more effectively removed. In addition, the cleaning fluid is able to reach portions of the workpieces otherwise rendered inaccessible. Also the arrangement described has been found to be more economical in that the cleaning cycle time can be reduced, while at the same time requiring much less cleaning solution to be pumped to clean any given number of parts.

If desired, submerged heaters, not shown, may be provided to heat the cleaning solution. When such heaters are employed in the arrangement described, further economy is realized in that the B.t.u.'s of heat other wise required with fixed spray degreasers can be materially reduced since much less solution is required. Also a shorter cycle is attained.

Suitable control means including a start, stop switch 49 is connected in an electrical circuit to control the operation of the pump 35 and motor means 44. Included in the circuit is a micro-switch 50 actuated by the doors 20, 21 whereby the circuit is broken when the doors are open. This insures that the spray action is stopped when the doors are open.

If desired, an overflow or stand pipe is provided to insure that the level of the cleaning solution be maintained substantially uniform.

A modified embodiment is illustrated in FIG. 6. This form is directed to the tunnel type cabinet 70. As shown the tunnel cabinet 70 is defined by top, bottom and connected side walls 71, 72 and 73, respectively, to define a cabinet which is open at either end. As shown, pipes 74 and 75 having a common supply 76 extend along the length of the tunnel cabinet adjacent the side walls 73 at the bottom thereof. Each pipe 74, 75 has a plurality of spaced upright branch pipes 76 which have connected to the upper ends thereof rotating spray arms 77, similar in all respects to those hereinbefore described. In the embodiment of FIG. 6, a suitable conveyor (not shown) is provided for moving the workpiece supporting baskets between the opposed rows of rotating spray arms 77. It will be understood that tunnel type degreasers are well known and therefore only that portion which the applicant considers to be his improvement is illustrated. Therefore the fluid pumping means and collecting means are not illustrated as any suitable known means may be provided therefor.

While in accordance with the provisions of the statutes there is illustrated and described herein the best form and mode of operation of the invention now known to the inventor, those skilled in the art will understand that changes may be made in the form of the apparatus disclosed without departing from the spirit of the invention covered by the claims, and that certain features of the

invention may sometimes be used to advantage without a corresponding use of other features.

What is claimed is:

1. A parts cleaning machine having opposed front, rear, side, top and bottom walls to define a tank adapted to contain a cleaning fluid, spray means disposed adjacent a pair of opposed walls of said tank, means for rotating said spray means for directing a stream of fluid inwardly of said tank, a parts holding basket disposed between said rotating spray means, means for oscillating said basket, said oscillating means including a cross-bar for supporting said basket, said cross-bar being eccentrically journaled to opposed walls of said tank, a motor having a rotating spindle, an eccentric arm fixed to said spindle and said cross-bar to rotate therewith, and a connecting rod connected to said eccentric arms whereby the rotating motion of said spindle is translated through said connecting rod to said cross-bar to oscillate said basket.

2. A parts cleaning machine having opposed front, rear, side, top and bottom walls to define a tank adapted to contain an amount of cleaning fluid, spray means disposed adjacent the opposed walls of said tank, a suction pump for circulating a cleaning fluid from said tank to said spray means, filtering means disposed in said tank on the intake side of said pump to filter the abrasive particles out of the fluid to be sprayed, said spray means including a main supply pipe, an upright branch pipe connected to said main supply pipe, a distributing hub rotatably connected to the end of the upright branch pipe, a plurality of radially extending cross arms connected to said hub for receiving the fluid therefrom, a plurality of spray nozzles longitudinally spaced along each of said cross arms, said nozzles directing a stream of fluid inwardly of said tank, a reaction nozzle connected to the end of each cross arm to effect rotation of said cross arm upon discharge of fluid from said reaction nozzles, a parts holding means including a basket disposed between said spray means, means for oscillating said basket, said oscillating means including a cross-bar for supporting said basket, said cross-bar being eccentrically journaled and rotatably mounted on opposed walls of said tank to support said cross-bar, a motor having a rotating spindle, an eccentric arm connected to said spindle and one of said cross-bars journaled to rotate therewith, and a connecting rod having its end connected to said eccentric arms whereby the rotary motion of said spindle and connected eccentric arm is translated through said connecting rod to one of said journals to oscillate said basket.

3. The invention as defined in claim 2, wherein said filtering means includes a means defining a compartment adjacent the intake side of said pump, and a removable filter screen separating said compartment from said main fluid reservoir portion of the tank.

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