

Oct. 23, 1945.

F. M. RONCI

2,387,299

IMMERSING AND CENTRIFUGING UNIT

Filed Jan. 7, 1944

5 Sheets-Sheet 1

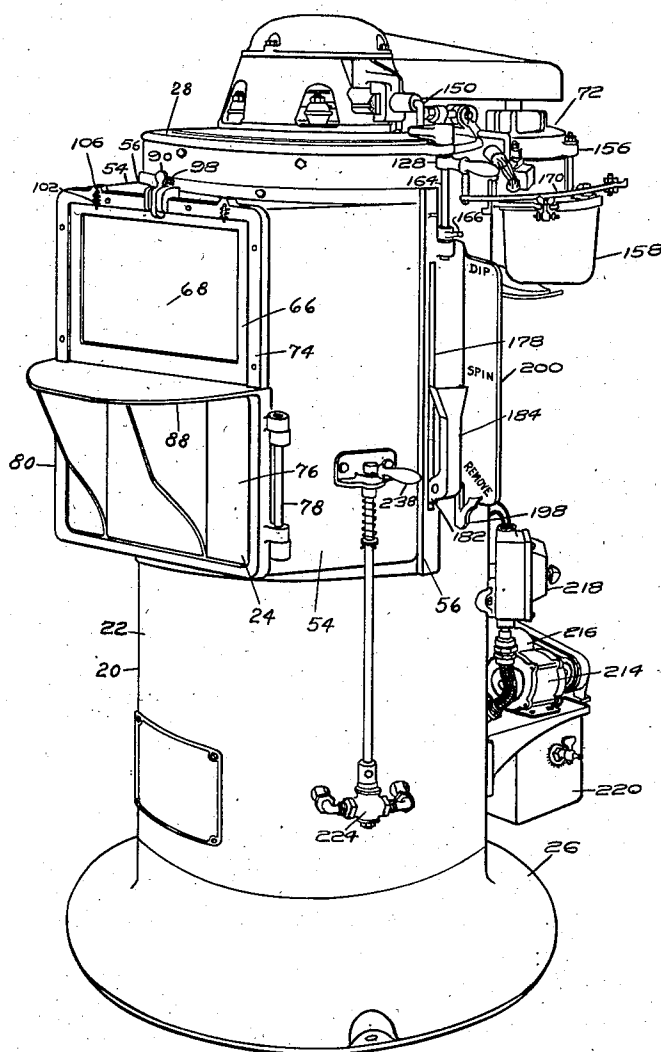


Fig. 1

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5 Sheets-Sheet 2

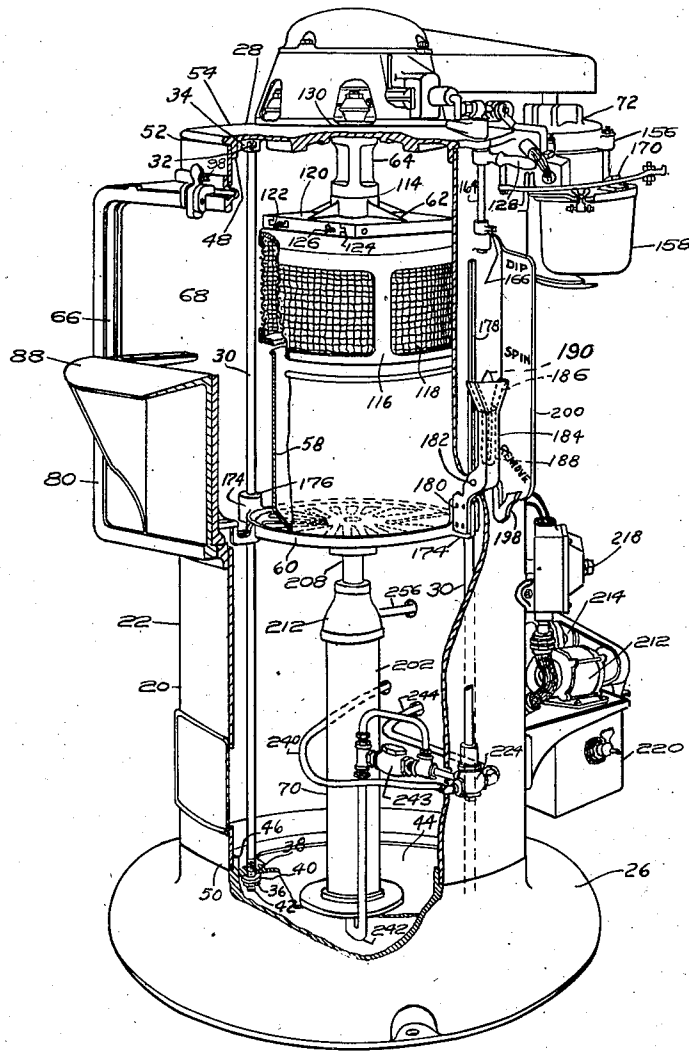


Fig 2

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5 Sheets-Sheet 3

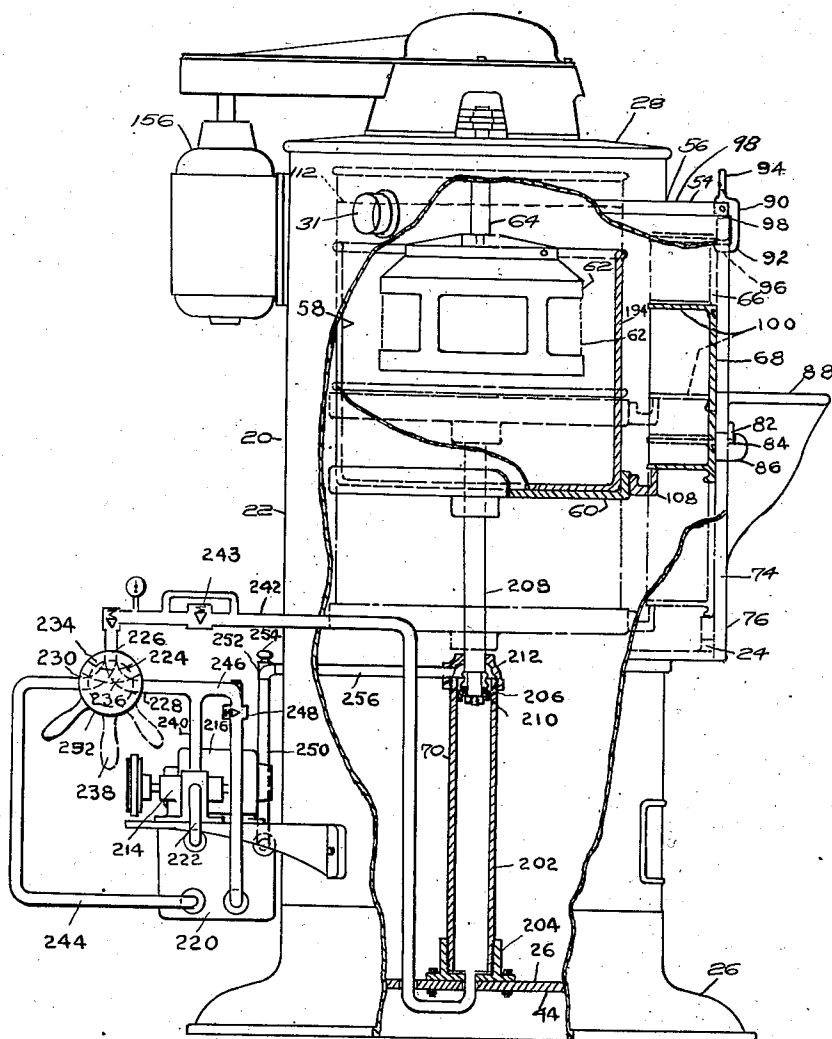


Fig. 3

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5 Sheets-Sheet 4

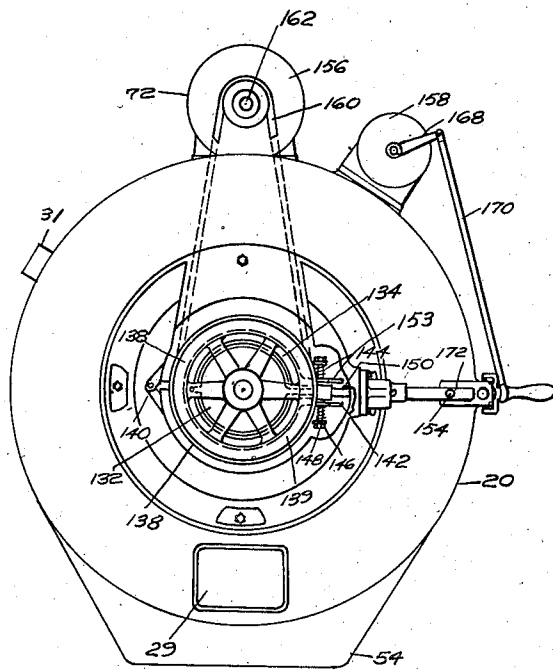


Fig. 4

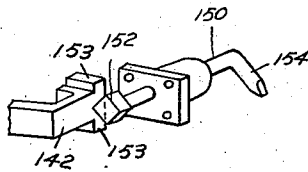


Fig. 7

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5 Sheets-Sheet 5

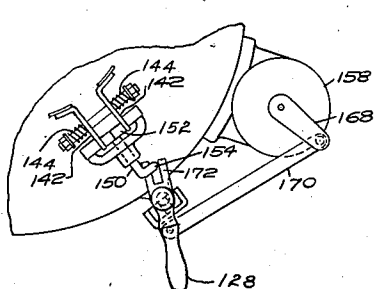


Fig. 5

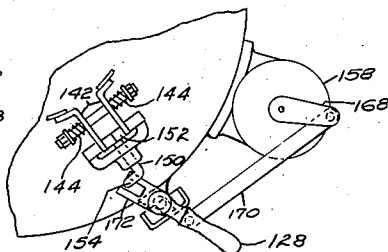


Fig. 6

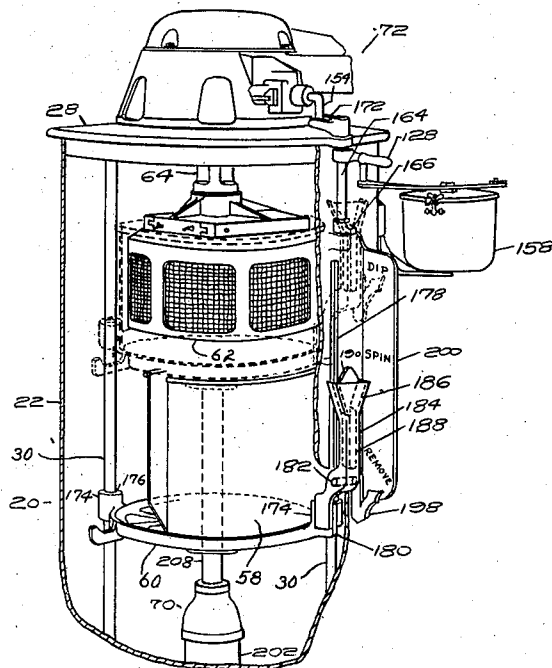


Fig. 8

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UNITED STATES PATENT OFFICE

2,387,299

IMMERSING AND CENTRIFUGING UNIT

Fernando M. Ronci, Providence, R. I.

Application January 7, 1944, Serial No. 517,459

12 Claims. (Cl. 91—42)

My invention relates to a combination of an immersing and centrifuging unit or machine in which work held in a rotatable basket is immersed in a liquid and then centrifuged, the work being readily replaced in the unit and the immersion liquid also being readily replaced in the unit as desired. In general my invention specifically covers improvements on the "Immersing and drying machine" shown and claimed in my Patent 2,102,819, issued December 21, 1937.

The improvements in the present machine are to provide a self-contained self-operable unit fool-proof in its operation and in which the parts are so designed as to assist the functioning of other parts and comprises a complete, strong, light, self-contained, semi-automatic, high speed unit. Any type of work may be treated in any type of immersion liquid whether it be cleaning, staining, coating, lacquering, enameling, hot waxing, chemical, or other immersion liquid. My improved high speed machine is also particularly adapted for lacquering small articles whether they are made of wood, metal, paper, composition, or otherwise in such a manner as to permit the treatment of a great number of said small articles in a suitable immersion liquid and the drying thereof within as short a period of time as possible, all operations in the treatment of small articles taking place in the minimum amount of time, such as coating three thousand shoe buckles in thirty seconds as well as removing immersion liquid therefrom.

An object of my invention is to provide a device in which the basket containing the work may be quickly attached and detached therefrom and in which a different immersion liquid may be readily substituted for the one previously used in a minimum amount of time.

A further object of my invention is to provide a device which is essentially fool-proof in its action in the matter of inhibiting the splashing of any immersion liquid, the basket rotating means being positively inhibited from functioning when the parts are relatively moved to bring the basket into immersing position within the immersion liquid; the splashing of immersion liquid during centrifuging being substantially eliminated by the relative positions of the work holding basket and the immersion liquid container during centrifuging; and a door panel being provided which is positively closed the immersion and centrifuging operations but which may be opened for loading or unloading the work basket and immersion liquid container.

A further object of my invention is to design the

parts so that the rods for joining the parts of the container together supplementally function to guide and support the table bearing the immersion liquid container as it is raised and lowered to and from lower loading and upper immersing and intermediate centrifuging positions.

A further feature of these parts retaining guide rods is that they so evenly balance and support the table that the hydraulic raising and lowering system preferably employed may be constructed of simple small parts and with a piston of less area than its supporting cylinder. The table carries projections having guideways adapted to cooperate with the guide rods for keeping the table in alignment and positively supporting it during its up and down movement, a projection for automatically closing the door when the table is raised to immersing position and a bracket projecting therefrom adapted to positively lock and inhibit the use of the basket rotating means when the table is raised to bring the basket into immersing position.

A further feature of my invention relates to improvements in the specific door employed.

A further feature of my invention relates to improvements in the specific basket rotating means employed and the means just described to function to positively inhibit its actuation when the immersion liquid container is raised to immersing position.

A further feature of my invention resides in the hydraulic system employed as well as detailed structural features thereof and particularly in the manner in which the table is supported by the guide rods so that the hydraulic system may be constructed of light effective materials and of a simple design.

A further object of my invention is to provide a construction in which the various parts of the casing may be readily assembled together by rods which also function in the manner explained as table supporting and guide rods.

A further object of my invention is to provide a device in which the fumes generated by the immersion treatment of the articles may be quickly removed from the shop.

These and such other objects of my invention as may hereinafter appear will be best understood from a description of the accompanying drawings, which illustrate an embodiment thereof.

In the drawings,

Fig. 1 is a perspective view of the exterior of an immersing and centrifuging unit constructed in accordance with my invention.

Fig. 2 is a perspective view similar to Fig. 1 with parts of the casing broken away to illustrate the details of construction of the parts of my invention contained in the interior of the casing, specifically the basket, the guide rods, the table and its hydraulic raising and lowering system.

Fig. 3 is a side elevation of my improved machine, partially broken away to show the door construction and how the slidable panel thereof is closed by the immersion liquid carrying table, the parts of the hydraulic system employed being diagrammatically shown, showing the table, the immersion liquid container and the door panel in centrifuging position in full lines, in immersing position in dash lines and in loading position in dash dot lines.

Fig. 4 is a plan view thereof, illustrating the basket rotating means in neutral position and with the brakes applied.

Figs. 5 and 6 are respectively fragmentary plan views of a portion of the parts shown in Fig. 4 in which the operating handle for the motor is moved to operating position releasing the brakes, in the position shown in Fig. 5 to cause forward rotation of the basket and in the position shown in Fig. 6 to cause reverse rotation of the basket.

Fig. 7 is a diagrammatic perspective view of the brake actuating means.

Fig. 8 is a diagrammatic perspective view of the upper portion of the casing similar to Fig. 2 showing the immersion liquid container being raised from a full line loading position to a dotted line immersion position positively inhibiting the action of the basket rotating means while the basket is immersed in the immersion liquid.

In the drawings, wherein like characters of reference, generally indicate like parts throughout, 20 generally indicates an immersing and centrifuging unit constructed in accordance with my invention. Said unit comprises a vertically extending casing comprising a tubular member 22 making up the side wall of said casing preferably having an opening 24 in the wall thereof extending a substantial distance downwardly from adjacent the top thereof, a base 26 for said casing and a top 28 for said casing. These parts are normally connected together and are preferably so constructed that the lower end of the tubular member 22 may be mounted on said base 26, the top 28 mounted on the upper end of said tubular member 22 and the top 28 and base 26 clamped to the respective ends of said vertically extending tubular member 22 by guide rods 30 preferably diametrically spaced from each other adjacent opposite portions of said tubular member 22 having the ends thereof secured respectively in any suitable manner to said base and top for holding the parts of the casing together. In the embodiment shown, the upper ends of said rods preferably externally threaded as at 32 are threaded within internally threaded sockets 34 projecting downwardly from said base and the lower ends 36 of said guide rods 30 project downwardly through suitable holes 38 in said base 26 and are externally threaded as at 40 to receive the lock nuts 42 on the ends thereof projecting through the centrally raised portion 44 of said base 26. To prevent leakage the base 26 and top 28 are provided with respective inwardly projecting flanges 46 and 48 interior of the respective lines of jointure 50 and 52 of said tubular portion 22 with said base 26 and top 28 respectively.

While the opening 24 may be provided in the upper portion of the tubular member 22, it is preferably provided in the outer end of the rectangular extension 54 projecting outwardly from 75

the hole 56 in the upper end adjacent the top of said tubular member 22. The opening 24 is of such a height that the immersion liquid container 58 mounted on the table 60 for vertical up and down movement in a manner to be explained may be readily removed and replaced through said opening 24 and the work holding basket 62 may be also readily removed and replaced through said opening 24. As in practice it is often desirable to give different types or lots of work immersion in the same type or color of immersion liquid, I have provided a secondary opening 66 in said opening 24 which may be readily opened and closed by the panel 68 for the more ready removal and insertion of the work holding basket 62 on its respective rotating shaft 64. The table 60 is raised and lowered by any suitable means 70, such as the hydraulic means shown and the basket 62 is rotated by any suitable means, such as the rotating means 72 shown.

In my preferred embodiment, the opening 24 is preferably provided with a composite door 74 having an open upper portion 66 and a closed lower portion 76 hingedly mounted on said tubular member 22 in any suitable manner, such as by the hinge pin 78 mounted in suitable ears on said door 74 and tubular member 22 with the free end 80 thereof detachably secured to said tubular member 22 on the opposite side of said opening 24 in any suitable manner such as by the pivotally mounted gravity actuated latch 82 movable into a suitable vertical slot 84 in a locking lug 86 projecting forwardly from said tubular member 22 immediately adjacent the edge of said opening 24. If desired, a shelf 88 may be provided projecting outwardly from the upper end of said closed lower end 76 of said door 74 to carry the basket 62 thereon for ease of insertion of the basket 62 through the opening 66. As stated, I preferably provide a vertically slidable panel 68 for closing the upper portion 66 of said door and suitable means for automatically locking said panel 68 in closed position, such as the locking lever 90 pivotally mounted on said tubular member preferably centrally of the upper edge of said opening 24 having a handle 94 projecting upwardly as the power arm therefrom and the locking lug 92 projecting inwardly from a downwardly projecting work arm therefrom adapted to fit into a suitable indent 96 in the upper end of said door 68, when the door is raised to its position closing said upper portion 66, by the spring 98 normally urging said lug 92 inwardly into position engaging said indent 96.

It is thus apparent that when the door 68 is raised to a position closing said opening 66 that the spring 98 will urge the locking lug 92 into the indent 96 to lock the door in closed position and that the door panel 68 will be retained in closed position until the handle 94 is pushed inwards against the pressure of the spring 98 to withdraw the locking lug 92 from the indent 96 to permit the door 68 to drop by gravity to its open position. Spaced brackets 100 are provided projecting inwardly at spaced intervals from the upper edge of said door 68 so that when said door 68 is dropped to its lowermost position said brackets 100 will be in alignment with the shelf 88 so as to permit the insertion or the removal of the basket 62 through the then open upper portion 66 of said door 74. I may also provide means to lock the panel door 68 against vibration comprising the spring plungers 102 mounted in the lower ends of sockets 104 and urged downwardly limited amounts by the springs 106 to abut the upper

edge of the panel door 68 to prevent its vibration when in closed position. The table 60 is provided with a lifting lug 108 projecting forwardly therefrom adapted to abut one of said brackets 100 or other portion of said door 68 to raise the panel door 68 to a raised closed position to permit automatic locking of the lever 90 after the means 70 has functioned to raise the table carrying the immersion liquid container 58 initially to a position immersing the attached basket 62 within the immersion liquid 112 in the container 58.

I provide a suitable drive shaft 64 projecting downwardly from the casing top 28 having means 114 at the lower end thereof for detachably securing the work holding basket 62 thereto. Any suitable type of a work holding basket may be employed and any suitable means 114 may be provided for detachably securing it to the lower end of the drive shaft 64, but I preferably employ my specially constructed work holding basket 62 and the specific type of means 114 for detachably securing and locking the work holding basket 62 to the lower end of the drive shaft 64 both shown, described and claimed in my copending application for patent for Means for mounting work in a casing for dipping and centrifuging, Ser. No. 517,736, filed January 10, 1944. As shown in said application I preferably employ a work holding basket having a cylindrical skeleton cage 116 preferably constructed of light metal and a resilient wire mesh lining 118 for said cage capable of movement independently of said cage, loosely mounted within said cage as claimed in said application, and as means to detachably secure said work holding basket 62 to the lower end of the drive shaft, I preferably employ the supporting plate 120 permanently mounted on the lower end of the drive shaft 64 having splines 122 projecting centrally from each side thereof, adapted to project within spaced facing U-shaped runways 124 mounted on the top of the cage 116 of said basket 62 and latched thereto by the latching means 126 more specifically shown, described and claimed in said patent application.

I also provide means 72 having a handle 128 effective at the will of the operator to rotate said drive shaft 64 preferably in forward or reverse directions and preferably also to stop the rotation thereof with a braking action. While any suitable type of means may be employed for this purpose, I preferably construct my improved driving means as follows. The drive shaft 64 projects through a suitable hole 130 in the casing top 28 and has suitable driving means, such as the drive pulley 132 and a braking pulley 134 mounted thereon. The actual braking means includes a pair of semi-circular brake shoes 138 surrounding said brake pulley, each pivotally joined together at one end thereof as by the pivot pin 140 and having lugs 142 projecting outwardly therefrom from the opposite ends thereof, normally urged together into braking relationship around the pulley 134 by means of suitable springs 144, in the embodiment shown comprising expansion springs mounted on suitable bolts 146 projecting outwardly from said lugs with the ends thereof interposed between the bolt heads 148 and the side walls of said lugs 142.

I also provide a rotatable brake arm 150 shown in Fig. 7 having a brake cam 152 of square shape thereon to be interposed between the free ends of said brake shoe lugs 142 and a pin 154 projecting at right angles from the outer end thereof. The brake cam 152 has flat side walls so that

when the cam 152 is moved into a position with the flat side walls 153 thereof abutting said lugs 142, the springs 144 apply the brake shoes 138 to said brake pulley 134 and when said brake arm 150 is rotated 45° the corners between said flat side walls of said brake cam abut said lugs 142 to separate the brake shoes against the pressure of said springs 144 to release the brakes. (See Figs. 5 and 6.)

I also employ a reversible electric motor 156 suitably actuated in either direction by the preferably explosion proof switch 158. Suitable means are provided for the operation of said motor 156 to rotate said drive shaft 64, in the embodiment shown comprising a belt 160 operated by a pulley on the motor drive shaft 162 to rotate the pulley 132.

I also employ a pivot rod 164 vertically mounted on said tubular member 22 having a pin 166 projecting radially outwardly therefrom and the handle 128 projecting radially outwardly from said pivot rod 164 above said pin 166. The motor switch 158 is provided with an operating handle 168 which is joined to the handle 128 operating the brake controlling pivot rod 164 by the connecting rod 170. The handle 128 has a yoke 172 projecting inwardly of said tubular member 22 and surrounding said brake arm pin 154. When the handle 128 therefor is in a position radial to said casing, the motor 156 is shut off and the brake cam 152 is moved into a flat position permitting actuation of said brake by the springs 144 closing the brake arms 138 around the brake pulley 134. If, however, the handle 128 is moved into the position shown in Fig. 5, the motor switch 158 is moved to actuate the motor 156 in forward direction and the yoke 172 tilts the pin 154 to a position moving the brake cams 152 to a position releasing the brake as shown in Fig. 5. If the handle is moved to the opposite position shown in Fig. 6, the brake cam will also be tilted to spread the brake arms 138 to release the brake and the motor switch 168 will be moved to actuate the motor 156 in the reverse direction as it is often desirable after centrifuging the work to temporarily rotate the basket in the opposite direction to remove the last traces of liquid therefrom.

The table 60 is provided with diametrically opposite projections 174 having vertical guideways 176 therein adapted to receive the guide rods 30 within them so that the said guide rods may support the table 60, immersion liquid container 58 and guide it in its vertical up and down movement.

Said table 60 may also be provided with means projecting therefrom adapted to remove and retain the drive shaft rotating means in neutral position. While any suitable means may be provided for this purpose, in my preferred embodiment the tubular member 22 is provided with a vertical slot 178 therein below said pivot rod 164. For this purpose, I also provide the bracket 180 projecting upwardly from said table 60 having a narrow portion 182 projecting through said vertical casing slot 178 and a portion 184 projecting vertically exterior of said casing wall having an enlarged upper portion 186 having a narrow channel 188 in the inner wall thereof terminating in an outwardly tapered upper end 190 in said enlarged upper portion 186 for engaging the pivot rod pin 166, if in a non-radial position with one wall of the enlarged channel 190 in the upper end 186 of said bracket and moved to a true radial position on upward movement of said table 60

as the inwardly tapered wall 190 of said channel abuts it and moves it until it is moved to a true radial position in the narrow channel 188 at the lower end of the outer portion 184 of said bracket. This will move the brake cam 152 to a neutral position permitting the springs 144 to contact the brake shoes 138 to apply the brakes and also through the medium of the connecting rod 170 will move the switch handle 168 to a neutral position stopping actuating of the motor 156 from rotating the drive shaft 64 in either direction so as said table 60 is raised to immersing position the pin 166 will be moved and be positively held in a neutral position positively inhibiting any rotation of the basket 62 when the table 60 and the immersion liquid container 58 are moved to their uppermost immersion or dipping position. It is thus apparent that the operation of the table 60 controls the operation of the basket rotating means.

I also provide, as stated, means 70 effective at the will of the operator to relatively raise and lower said table 60 carrying said immersion liquid container 58 from a lower loading position substantially opposite the lower portion 76 of said opening to an immersion position substantially opposite said door panel opening 66 and an intermediate centrifuging position with the basket 62 opposite the upper portion 194 of the wall 196 of the immersion liquid container 58. If desired as shown the outer portion 184 of the bracket 180 may carry a pointer 198 adapted to move relatively to a marker 200 provided with suitable insignia thereon, such as "dip," "spin," "remove," indicative of the respective immersing, centrifuging, and loading positions of the apparatus.

While any suitable type of means may be provided for this purpose, I preferably provide the hydraulic means 70 now to be described. I preferably mount a suitable hydraulic cylinder 202 so that it projects centrally of the indented portion 44 of said base in any suitable manner, such as by the socket 204 bolted to said base portion 44. I also provide a piston 206 of less diameter than said cylinder 202 having its lower end forcible by hydraulic pressure substantially to the upper end of the cylinder 202 and having a piston rod 208 projecting therefrom to said table 60. The lower end 206 of said piston may have the resilient expansion piston cup washer 210 attached thereto. The cylinder 202 is provided with a cap 212 of decreasing diameter threaded onto the upper end of said cylinder 202 and having a central hole for the piston rod 208; the upper end of said piston being inwardly tapered to fit within the cap 212. It is apparent that this construction permits the piston to be raised to the extreme upper end of the cylinder 202 and as the piston 206 is of less diameter than the cylinder 202 it would tend to tilt thereon were it not for the fact that the guideways 176 in the lugs 174 projecting diametrically from said table 60 about the guide rods 30 holding the portions of the casing 20 together to support and prevent tilting of the table 60 and its attached immersion liquid container 58.

I also provide a hydraulic pump 214 suitably driven by a suitable motor 216. In operation the pump 214 may be continuously driven or if desired a suitable switch 218 may be provided for turning on the motor to drive the pump 214 at the will of the operator.

I also provide a hydraulic storage reservoir

220, a line 222 connecting said reservoir 220 to said hydraulic pump 214 and a three way valve 224 having an outlet vent 226, an inlet vent 228 and a discharge vent 230 in the valve seat 232 thereof. The valve 234 itself contains an arcuate channel 236 movable by the handle 238 to positions (a) shutting off communication between said vents; (b) to a position joining said inlet vent 228 and outlet vent 226; and (c) a position joining said outlet vent 226 and discharge vent 230. I also provide an inlet line 240 connecting said pump 214 and the inlet vent 228 of said three-way valve. I also provide an inlet and exhaust line 242 connecting said lower end of said cylinder 202 to the outlet vent 226 of said valve casing 224, said line 242 having a regulatable return-flow valve 243 therein. I also provide a discharge line 244 connecting the discharge vent 230 of said three-way valve 224 to said reservoir 220 and a return line 246 connecting said inlet line 240 to said reservoir 220 in front of said inlet duct 228 beyond said pump 214 having a pressure relief valve 248 therein. I also may provide a feed line 250 for said reservoir having a feeding orifice 252 therein, having a removable plug 254 and an overflow line 256 connecting the upper end of said cylinder with said feed line 250.

With this construction it is apparent that when the valve 224 is moved to an operating position with the duct 236 thereof in line with the inlet vent 228 and the outlet vent 226 thereof, that the pump 212 will force liquid through said inlet line 240, valve 224, and inlet and exhaust line 242 to the lower end of said cylinder 202 to raise said piston 206 and connected table 60 to the uppermost immersing or "dip" position shown in Fig. 3 in broken lines and that any excess of fluid from the cylinder 202 will flow through the return line 256 to the reservoir 220. It is also apparent that when the valve 224 is moved to a neutral position that liquid will not flow through said valve but on an excessive amount of pressure being built up in said inlet line 214 from said pump, liquid will operate the relief valve 248 in said return line 246 to flow through said line 246 back to said reservoir 220 and that while said liquid so continues to flow, if the valve 224 be moved to its discharge position bringing the duct 236 therein in line with the outlet vent 226 and discharge vent 230, the inlet port 228 still remains closed, and liquid will continue to flow through said return line to said reservoir. When the valve 224 is brought to such a discharge position, however, the weight of the liquid, the liquid container 58 and table 60 will force the piston 206 downwards within the cylinder 202 at a speed regulated by the valve 243 through said inlet and exhaust line 242 through said three-way valve 224 and discharge line 244 to said reservoir 220. It is thus obvious that the three-way valve 224 may be moved to an operating position permitting raising of the table 60 to neutral positions retaining the table in raised position or lowered position and to a discharge position permitting lowering of the table. Any suitable type of pressure relief valve 248 capable of being set may be employed. The regulated return valve 243 is usually only initially adjusted once to set as rapid a speed as practicable for lowering the table.

The top 28 may be provided with an air inlet hole 29 and the casing 22 may be provided with a discharge vent 31 for connecting a suitable suction device thereto for removing fumes from the casing.

In use, the container 58 is suitably filled with immersion liquid, and the table 60 moved by the

hydraulic system to its lower loading or "remove" position, the door 76 opened and the container 58 suitably placed on the table 60. The loaded basket 62 may then be inserted through the then open panel opening 66 and secured to the shaft 64. By operation of the hydraulic system, the table 60 and container 58 are moved upwards to immerse the basket 62 and its contained work in the immersion liquid, the lug 108 positively closing the panel door 68 which is automatically locked in closed position by the latch 90, and the bracket 180 positively turning off the basket rotating means and applying the brake in the manner previously explained. When the work has been immersed for a sufficient period of time, the table is lowered by manipulation of the hydraulic table controlling system to "spin" or centrifuging position, the door panel remaining locked and the basket rotating means being released for actuation. The basket rotating means may then be turned on to centrifuge or dry the work. The hydraulic table controlling system is then actuated to lower the table and container to its lowermost "remove" or loading position, the latch 90 actuated to permit the door panel to drop to open position when the basket may be readily removed, the treated work removed and new work inserted. The above cycle may be repeated any number of times and if it be decided to replace or replenish the immersion liquid at the end of any work treating cycle, it is obvious that the door 74 may be readily opened for this purpose.

It is apparent, therefore, that I have provided many novel features in an immersing and centrifuging unit, all of which, however, cooperate with each other in their respective functions to produce a more desirable unitary machine with the advantages explained above.

It is understood that my invention is not limited to the specific embodiment shown and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What I claim is:

1. An immersing and centrifuging unit, comprising a vertically extending casing having an opening of substantial height in the wall thereof extending a substantial distance downwardly from adjacent the top thereof, a composite door for said opening having an open upper portion and a closed lower portion hingedly mounted on said casing with the free end thereof detachably securable to said casing, a vertically slidable panel for closing said upper portion, means for automatically locking said panel closed and against vibration when raised to a closed position, a base for said casing, a top for said casing, a drive shaft projecting downwardly from said casing top adjacent the upper portion of said opening, means having a handle effective at the will of the operator to rotate said drive shaft in either direction and to immediately stop the rotation thereof with a braking action, a work holding basket detachably securable to the lower end of said drive shaft through the open upper portion of said door, a table vertically reciprocable within said casing having a projection adapted to abut and raise the slidable door panel to a closed locked position and diametrically opposed guide projections having vertical open guideways, and means projecting therefrom adapted to move and to retain the operating handle of said drive shaft rotating means in neutral position, a liquid container insertable to position and removable from position on said table through said opening and means

effective at the will of the operator to relatively raise and lower said table carrying said container from a lower loading position substantially opposite the lower portion of said opening to an immersing position with said means moving said handle to neutral position and retaining it in neutral position to prevent rotation of the basket when in said immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together.

2. An immersing and centrifuging unit, comprising a vertically extending casing, a base for said casing, a top for said casing, a drive shaft projecting vertically within said casing, means effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said drive shaft, a table vertically reciprocable within said casing having diametrically opposed guide projections having vertical open guideways, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together.

3. An immersing and centrifuging unit, comprising a vertically extending casing, a base for said casing, a top for said casing, a drive shaft projecting vertically within said casing, means having a handle effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said drive shaft, a table vertically reciprocable within said casing having diametrically opposed guide projections having vertical open guideways, and means projecting therefrom adapted to move and to retain the operating handle of said drive shaft rotating means in neutral position, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position with said means moving said handle to neutral position and retaining it in neutral position to prevent rotation of the basket when in said immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together.

4. An immersing and centrifuging unit, comprising a vertically extending casing, a drive shaft projecting vertically within said casing, means having a handle effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said drive shaft, a table vertically reciprocable within said casing having means projecting therefrom adapted to move and to retain the operating handle of said drive shaft rotating means in neutral position, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower

position to an immersing position with said means moving said handle to neutral position and retaining it in neutral position to prevent rotation of the basket when in said immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container.

5. An immersing and centrifuging unit, comprising a vertically extending casing, a base for said casing, a top for said casing, a drive shaft projecting downwardly from said casing top, and extending through said casing top and having driving means and a braking pulley mounted thereon, a pair of semi-circular contraction brake shoes surrounding said brake pulley normally spring urged to a braking position, a rotatable brake arm having a brake cam interposed between the free ends of said brake shoes and a pin at the outer end thereof, a reversible electric motor, means operative on rotation of said motor in either direction to rotate said drive shaft, a switch for operating said motor, a motor control pivot rod vertically mounted on said casing having a pin projecting radially outwardly therefrom and having a yoke surrounding said brake arm pin, a handle mounted on said pivot rod projecting outwardly from said casing movable from a neutral position to positions actuating said motor in forward or reverse directions, and means joining said switch and handle whereby when said handle is in radial alignment with said shaft the motor is in neutral position and the brake cam is moved to a position permitting actuation of said brake shoes and as said handle is tilted horizontally in opposite directions the motor switch is moved to operate the motor shaft in forward or reverse rotation and the brake cam is rotated to release the brake shoes, said casing having a vertical slot projecting downwardly therein below said handle, a work holding basket mounted on said power drive shaft end, a table vertically reciprocable within said casing having diametrically opposed guide projections having vertical open guideways, and a bracket projecting upwardly from said table having a narrow portion projecting outwardly through said vertical casing slot and a portion projecting vertically exterior of the casing wall having a channel on the inner wall thereof terminating in an outwardly tapered upper end for engaging said pivot rod pin to rotate said motor control pivot rod to neutral position and apply said brakes and inhibit rotation of the basket when the container is raised to immersing position, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position with said table bracket moving said motor control pivot rod to neutral position and retaining it in neutral position to prevent rotation of the basket when in said immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together.

6. An immersing and centrifuging unit, comprising a vertically extending casing, a drive shaft projecting downwardly within said casing, and extending above the casing top and having driving means and a braking pulley mounted thereon, a pair of semi-circular contraction brake shoes

surrounding said brake pulley normally spring urged to a braking position, a rotatable brake arm having a brake cam interposed between the free ends of said brake shoes and a pin at the outer end thereof, a reversible electric motor, means operative on rotation of said motor in either direction to rotate said drive shaft, a switch for operating said motor, a motor control pivot rod vertically mounted on said casing having a pin projecting radially outwardly therefrom and having a yoke surrounding said brake arm pin, a handle mounted on said pivot rod projecting outwardly from said casing movable from a neutral position to positions actuating said motor in forward or reverse directions, and means joining said switch and handle whereby when said handle is in radial alignment with said shaft the motor is in neutral position and the brake cam is moved to a position permitting actuation of said brake shoes and as said handle is tilted horizontally in opposite directions the motor switch is moved to operate the motor shaft in forward or reverse rotation and the brake cam is rotated to release the brake shoes, said casing having a vertical slot projecting downwardly therein below said handle, a work holding basket mounted on said power drive shaft end, a table vertically reciprocable within said casing having a bracket projecting upwardly from said table having a narrow portion projecting outwardly through said vertical casing slot and a portion projecting vertically exterior of the casing wall having a channel on the inner wall thereof terminating in an outwardly tapered upper end for engaging said pivot rod pin to rotate said motor control pivot rod to neutral position and apply said brakes and inhibit rotation of the basket when the container is raised to immersing position, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position with said table bracket moving said motor control pivot rod to neutral position and retaining it in neutral position to prevent rotation of the basket when in said immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container.

7. An immersing and centrifuging unit, comprising a closed vertically extending casing having an opening of substantial height in the wall thereof extending a substantial distance downwardly from adjacent the top thereof, a composite door for said opening having an open upper portion and a closed lower portion hingedly mounted on said casing with the free end thereof detachably securable to said casing, a vertically slidable panel for closing said upper portion, means for automatically locking said panel closed when raised to a closed position, a drive shaft projecting downwardly from the top of said casing to adjacent the upper portion of said opening, means effective at the will of the operator to rotate said drive shaft, a work holding basket detachably securable to said lower drive shaft end, through the open upper portion of said door, a table vertically reciprocable within said casing having a projection adapted to abut and raise the slidable door panel to a closed locked position, a liquid container insertable to position on said table through said opening and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower loading position substantially opposite the lower portion of said opening to an immersing

position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container.

8. An immersing and centrifuging unit, comprising a closed vertically extending casing having an opening of substantial height in the wall thereof extending a substantial distance downwardly from adjacent the top thereof, a composite door for said opening having an open upper portion and a closed lower portion hingedly mounted on said casing with the free end thereof detachably securable to said casing, having a shelf projecting outwardly from the upper edge of the closed lower end, a vertically slidable panel for closing said upper portion, having spaced brackets projecting inwardly from the upper edge thereof, means for automatically locking said panel closed and against vibration when raised to a closed position, a drive shaft projecting downwardly from the top of said casing to adjacent the upper portion of said opening, means effective at the will of the operator to rotate said drive shaft, a work holding basket detachably securable to said lower drive shaft end, through the open upper portion of said door, a table vertically reciprocable within said casing having a projection adapted to abut and raise the slidable door panel to a closed locked position, a liquid container insertable to position on said table through said opening and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower loading position substantially opposite the lower portion of said opening to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container.

9. An immersing and centrifuging unit, comprising a vertically extending casing, a base for said casing, a top for said casing, a drive shaft projecting downwardly from said casing top, means effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said lower drive shaft end, a table vertically reciprocable within said casing having diametrically opposed guide projections having vertical open guideways, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container comprising a hydraulic cylinder projecting upwardly from said base, a piston of less diameter than said cylinder forcible by hydraulic pressure substantially to the upper end of the cylinder, a hydraulic pump, a hydraulic storage reservoir, means for actuating said hydraulic pump, a line connecting said reservoir to said pump, a three way valve, an inlet line connecting said pump and three way valve, an inlet and exhaust line connecting said three way valve and the lower end of said cylinder, a discharge line connecting said three way valve and reservoir, a return line connecting said inlet line to said reservoir beyond said pump having a pressure relief valve therein, whereby when said valve is moved to an operating position liquid will flow through said inlet line, open valve and inlet and exhaust line to the bottom of said cylinder to raise said piston and table; when said valve is moved to neutral position, liquid will not flow through said valve but on an excessive amount of pressure from said pump liquid will operate said pressure

relief valve to flow through said return line to said reservoir; and when said valve is moved to an exhaust position, the weight of the table, container and piston will force liquid through said inlet and exhaust line, through said three way valve, and discharge line to said reservoir, and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together, and for preventing the piston, table and container from tilting out of alignment with the hydraulic cylinder.

10. An immersing and centrifuging unit, comprising a vertically extending casing, a base for said casing, a top for said casing, a drive shaft projecting downwardly from said casing top, means effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said lower drive shaft end, a table vertically reciprocable within said casing having diametrically opposed guide projections having vertical open guideways, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container, comprising a hydraulic cylinder projecting upwardly from said base, a piston of less diameter than said cylinder forcible by hydraulic pressure substantially to the upper end of the cylinder, hydraulic means to raise and lower said piston at the will of the operator, and guide rods projecting vertically through the vertical guideways in the diametric table projections having the ends thereof secured respectively to said base and top for holding the parts of the casing together, and for preventing the piston, table and container from tilting out of alignment with the hydraulic cylinder.

11. An immersing and centrifuging unit, comprising a vertically extending casing, a drive shaft projecting downwardly within said casing, means effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said lower drive shaft end, a table vertically reciprocable within said casing, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container comprising a hydraulic cylinder projecting upwardly from said base, a piston of less diameter than said cylinder forcible by hydraulic pressure substantially to the upper end of the cylinder, a hydraulic pump, a hydraulic storage reservoir, means for actuating said hydraulic pump, a line connecting said reservoir to said pump, a three way valve, an inlet line connecting said pump and three way valve, an inlet and exhaust line connecting said three way valve and the lower end of said cylinder, a discharge line connecting said three way valve and reservoir, a return line connecting said inlet line to said reservoir beyond said pump having a pressure relief valve therein, whereby when said valve is moved to an operating position liquid will flow through said inlet line, open valve and inlet and exhaust line to the bottom of said cylinder to raise said piston and table; when said valve is moved to neutral position, liquid will not flow through said valve

but on an excessive amount of pressure from said pump liquid will operate said pressure relief valve to flow through said return line to said reservoir; and when said valve is moved to an exhaust position, the weight of the table, container and piston will force liquid through said inlet and exhaust line, through said three way valve, and discharge line to said reservoir.

12. An immersing and centrifuging unit, comprising a vertically extending casing having an air inlet vent and a fume discharge vent connectible to a fume discharge duct, a drive shaft

projecting vertically within said casing, means effective at the will of the operator to rotate said drive shaft, a work holding basket mounted on said drive shaft, a table vertically reciprocable within said casing, a liquid container on said table and means effective at the will of the operator to relatively raise and lower said table carrying said container from a lower position to an immersing position and an intermediate centrifuging position with the basket opposite the upper portion of the wall of the container.

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