

Dec. 21, 1937.

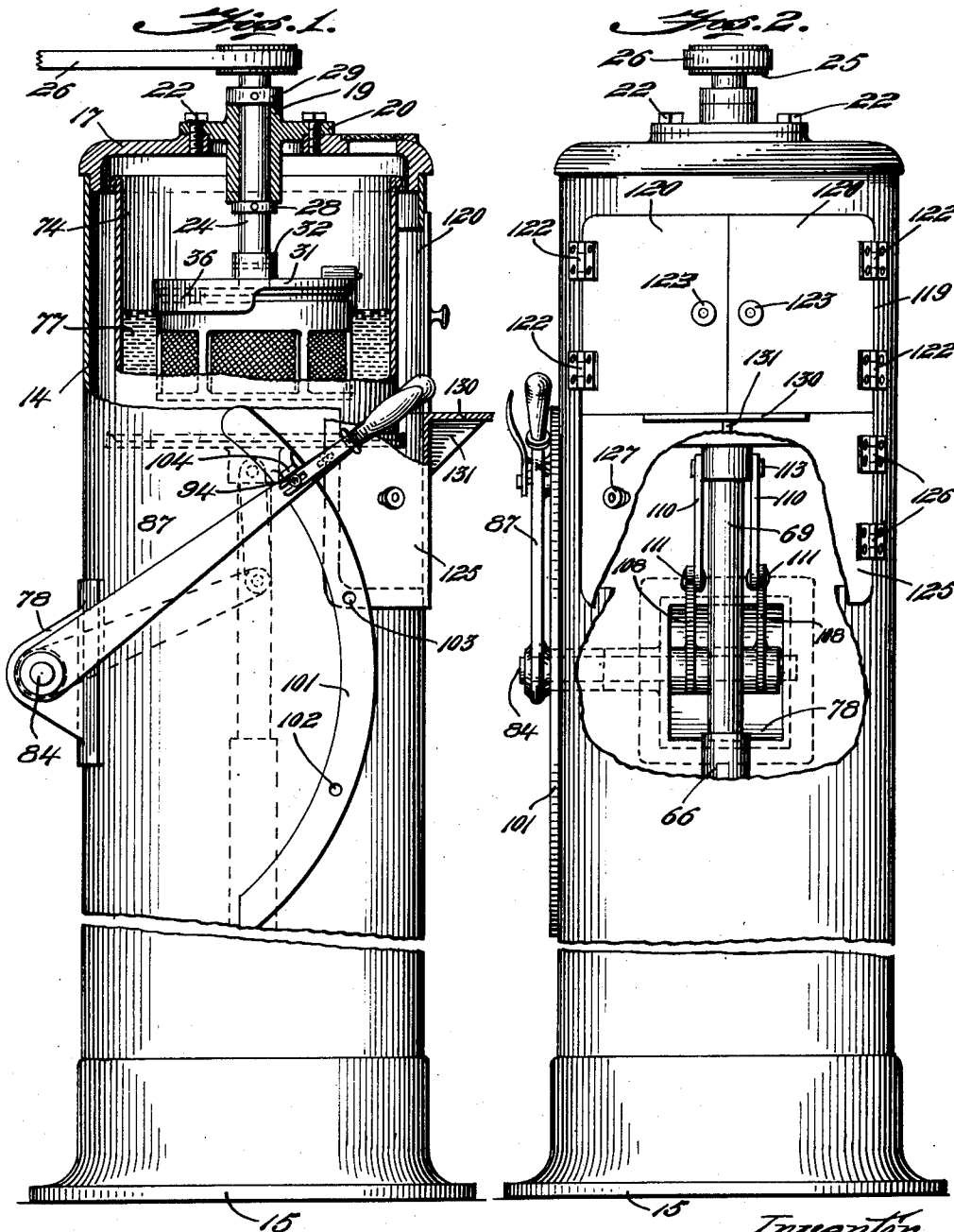
F. M. RONCI

2,102,819

IMMERSING AND DRYING MACHINE

Filed Feb. 23, 1937

4 Sheets-Sheet 1



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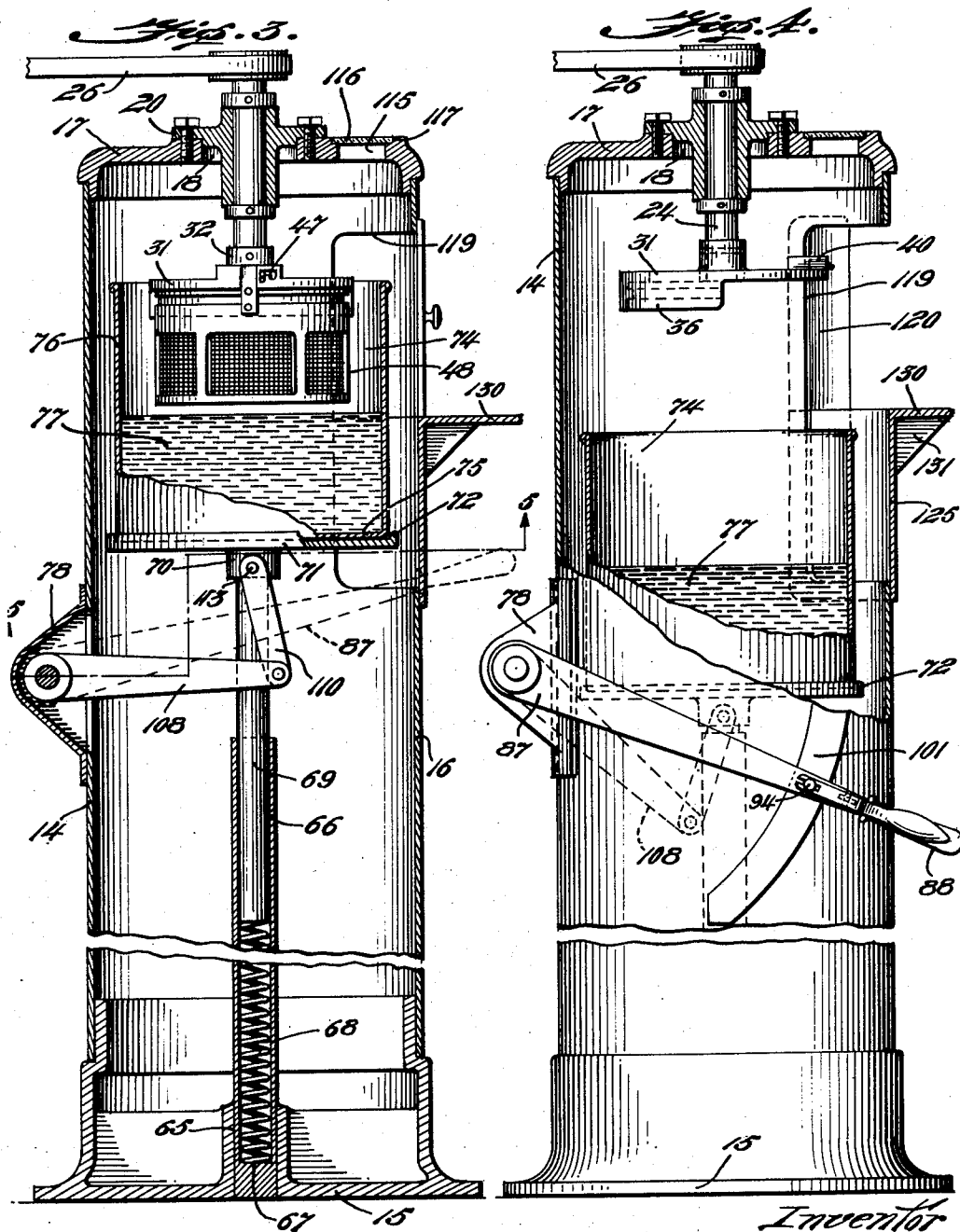
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4 Sheets-Sheet 2



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Fig. 5.

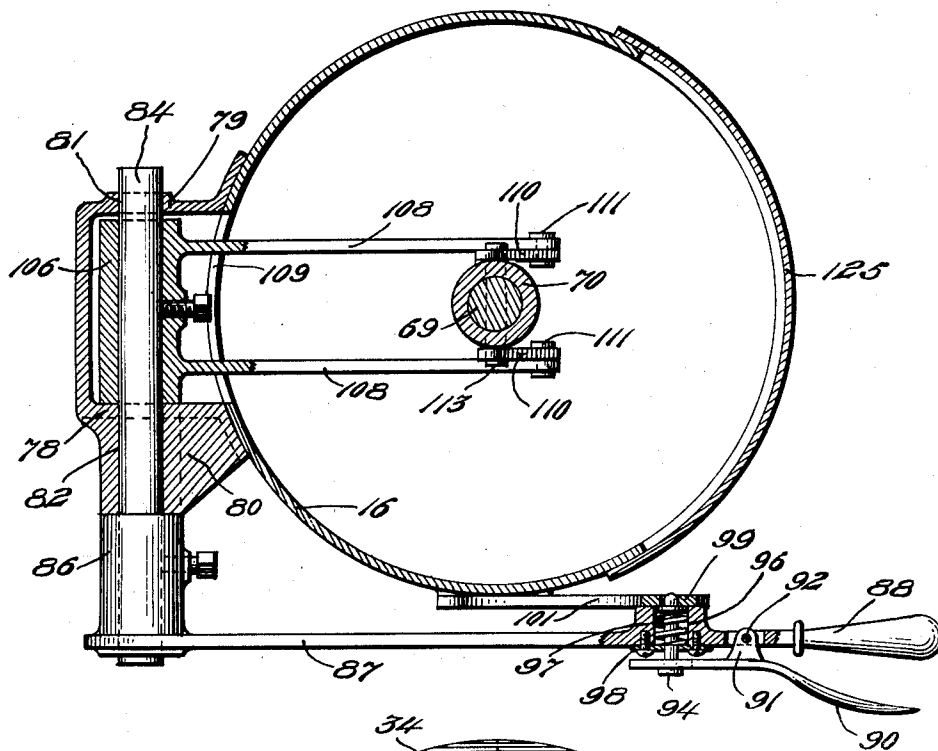
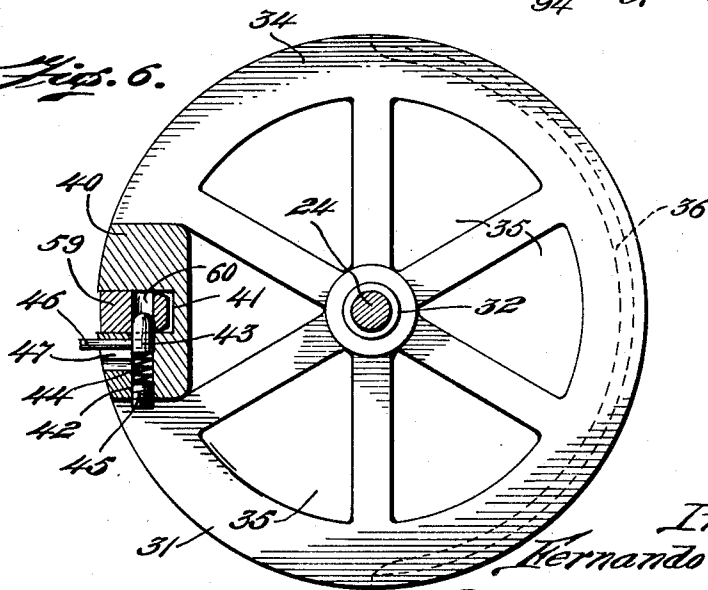


Fig. 6.



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Fig. 7.

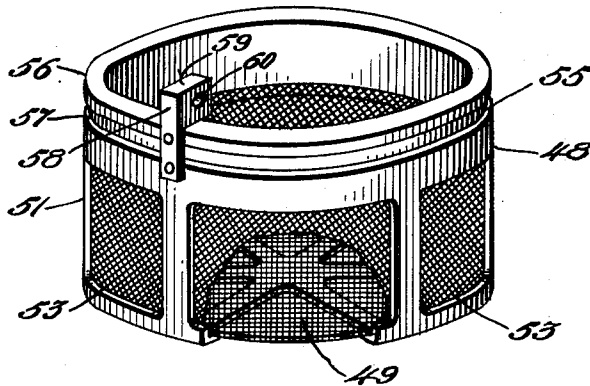


Fig. 8.

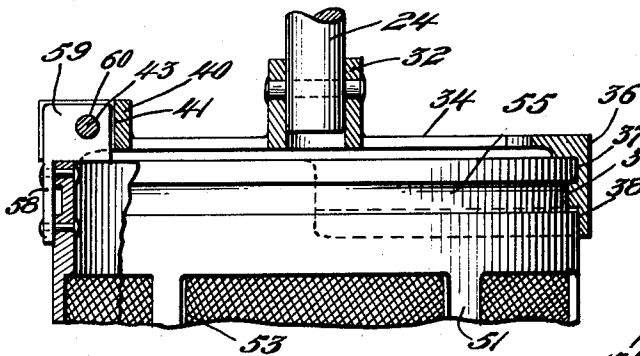


Fig. 10.

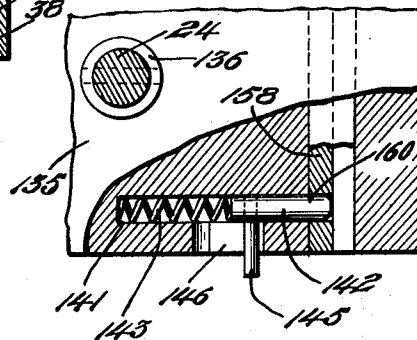
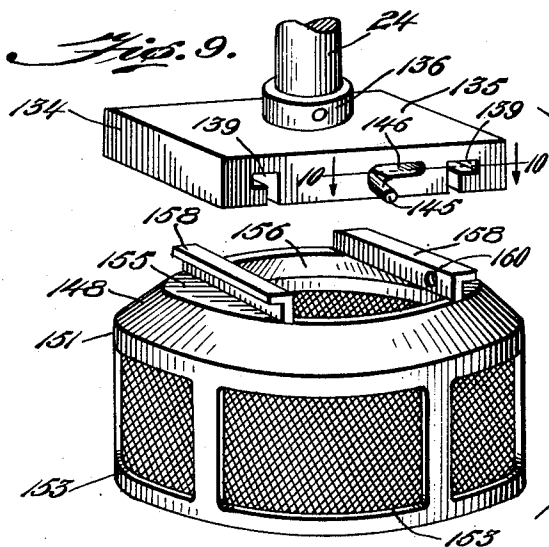


Fig. 9.



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UNITED STATES PATENT OFFICE

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IMMERSING AND DRYING MACHINE

Fernando M. Ronci, Providence, R. I.

Application February 23, 1937, Serial No. 127,328

12 Claims. (Cl. 91—46)

My invention relates to immersing and drying machines, and is particularly adapted for cleaning, staining and coating articles, and is particularly effective when the immersing liquid is impregnated with chemicals.

My invention relates to the construction and operation of immersing and drying machinery in which the articles are placed in cages and the cages are immersed in liquid.

The essential objects of my invention are to make it unnecessary, after one or more immersions of the articles, to mechanically draw off the liquid, when different chemicals or colors are required in successive baths of the same or other articles; to avoid the delays incident to scouring or cleaning a tank permanently housed in the casing; to provide an inexpensive and easily operable means for elevating the liquid receptacle; to facilitate the loading and unloading of the cage; and to permit the change of liquid receptacles or containers.

Other objects and advantages will be herein-after indicated in connection with the description.

To the above ends primarily my invention consists in such parts and combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings which form a part of this specification,

Figure 1 is a side elevation, partly in vertical central section of an immersing and drying machine embodying my invention,

Figure 2, a front elevation of the same, with a portion of the casing broken away,

Figure 3, a vertical central section of the same,

Figure 4, a side elevation of the same, partially in vertical section, with the cage removed,

Figure 5, a section taken on line 5—5 of Figure 3,

Figure 6, a plan view of the basket holder partially in horizontal section,

Figure 7, a perspective view of the cage,

Figure 8, a vertical central section of the cage holder, the adjacent portion of the cage being shown in fragmentary side elevation,

Figure 9, a disassembled perspective view of a modified form of basket holder and basket, and

Figure 10, a fragmentary top plan view of the holder partly in section on a line corresponding to 10—10 of Figure 9 after the holder and cage are locked in interengaged relation.

Similar reference characters indicate similar parts throughout the views.

As herein illustrated my machine includes a casing 14 comprising a base 15, a cylindrical side

wall 16 and a top or cap 17. Centrally of the top is an opening 18 through which extends a vertical bearing 19 intermediate whose length is an annular attaching flange 20, closing the opening and fixed by bolts or screws 22 to the cap. Rotatably mounted in the bearing is a shaft 24 upon whose upper end is a pulley 25 upon which is a belt 26 driven by any suitable power medium. Collars 28 and 29 fixed upon the shaft and slidably contacting the top and bottom of the bearing prevents vertical movement of the shaft 24.

A cage holder 31 mounted upon the driving shaft includes a sleeve 32 fixed to the latter and integral with the center of a top 34 provided with sector shaped openings 35, as indicated in Figure 6. A semi-circular peripheral attaching flange 36, as shown in Figure 8, depends from the top and is provided with parallel internal arcuate grooves 37 and 38 forming a resultant arcuate shoulder 39. A vertical boss or elevation 40 upon the margin of the top 34 equidistant from the ends of the flange 36 is provided with a radial recess 41 and with a cavity 42 communicating with the recess at right angles thereto. In the cavity is a bolt 43 pressed by a spring 44 abutting against a plug 45. The bolt is operated by a pin 46 in a U slot 47.

A cage 48 is detachably mounted in the described holder and, as shown in Figure 7, has a reticulated or screened floor 49, and a substantially cylindrical side 51 provided with a circular series of wire screened apertures 53. Above the latter the upper margin of the side 51 is provided with an external annular groove 55 forming resultant annular shoulders 56 and 57. A finger 58 fixed to the shoulders has an offset head portion 59 provided with a transverse hole 60.

In mounting the cage 48 in the holder 31 the former is manually moved in a horizontal plane to enter the flange 36 with the shoulder 39 of the holder registering in the groove 55 of the cage, and the shoulders of the cage slidably entering the grooves of the holder. The described movement introduces the head portion 59 of the finger 58 into the recess 41 of the boss 40 where the bolt 43, after manual release of its pin 46, enters the hole 60 under the influence of the spring 44. The removal of the cage from its holder is accomplished by a reversal of the described movements.

Centrally of the base 15 of the casing 14 is a socket 65 in which is fixed a tubular post 66 in the lower portion of which, as at 67, is seated a helical spring 68 supporting a solid post 69 slidable in the first post and fast to a collar 70

integral with a circular table 71 provided with a peripheral internally beveled shoulder 72. Resting loosely upon the table is a metal container 74 comprising a bottom 75 and cylindrical side 76 of greater diameter than that of the cage, and adapted to contain the liquid 77 for the immersion of the cage 48.

Mechanism, cooperating with the spring 68, for raising and lowering the table includes, as shown in Figure 5, a substantially U-shaped bracket 78 brazed or otherwise fixed to the rear portion of the casing wall 16. The bracket includes interspaced bearing portions 79 and 80 in whose bores 81 and 82 respectively is mounted a rock shaft 84 upon one end of which is fixed a collar 86 integral with an operating lever arm 87 and adjacent whose handle 88 is a grip lever 90 carrying an intermediate lug 91 pivoted as at 92 to the shaft adjacent the handle. The lever 90 carries at its inner end a lock pin 94 movable through a transverse opening 96 wherein a spring 97 is seated with one end abutting against a retaining plate 98, and its other end against collar 99 fixed to the pin so as to normally press the end of the pin into projecting position.

The lever arm 87 slidably engages the face of a vertically disposed arcuate or quadrant plate 101 secured to the casing concentrically to the shaft 84, and provided with lower and higher lock cavities 102 and 103 respectively, and a stop shoulder 104, spaced from the higher cavity. The cavities are in the path of the locking pin 94 and are adapted to receive the latter under the impulse of the spring 97. The stop shoulder 104 is in the path of the lever arm 87 when, as occasionally, the latter is moved to its highest limit. To the rock shaft 84 is fixed a sleeve 106 integral with which are spaced levers 108 entering the casing through an opening 109. Links 110 are connected at their lower ends to the free ends of the levers by pivot pins 111. The upper ends of the links are pivotally connected to the ends of a pin 113 extending through the post 69 and the table collar 70.

For the purpose of inspecting the contents of the cage 48 and container 74 an observation device is provided in the cap portion 17 of the casing consisting of an orifice 115 closed by a transparent plate 116 resting in a peripheral recess 117 at the top of the orifice.

In the front portion of the casing is an opening 119, the upper portion of which is normally closed by doors 120 arranged side by side, and each provided with lateral hinges 122 and a knob 123. The lower portion of the opening 119 is closed by a horizontal door 125 secured at one end to the casing by hinges 126 and carrying a knob 127 upon its opposite margin. Integral with the upper portion of the door 125 is a shelf 130 lying in the horizontal plane of its upper edge and supported by a brace 131.

A modified form of cage holder 134 shown in Figures 9 and 10 includes a rectangular block or plate 135 having a ring or socket 136 for the reception of the driving shaft 24. Extending from its front to its rear faces are two parallel transversely rectangular or reversed L-shaped grooves 139. Within the block, disposed at right angles to the grooves, is a cylindrical recess 141 extending to one of the grooves and in which is slidably mounted a bolt 142 pressed by a helical spring 143. A push pin 145 in the bolt projects loosely and forwardly through a transversely L-shaped recess 146.

The modified form of cage 148 shown in Fig-

ure 9, is adapted for detachable engagement with the holder 134, and includes a reticulated floor, similar to that shown in Figure 7, a substantially cylindrical side 151 provided with screened apertures 153, and a top 155 provided with a central opening 156. Two parallel transversely rectangular or reversed L shaped shoulders 158 are integral with the top, one of which is provided with a perforation 160. The cage is attachable to the holder by sliding the shoulders 158 endwise into the grooves 139 of the holder until the bolt 142 registers in the perforation. The cage is withdrawable after manually retracting the bolt by the push pin 145.

Preparatory to operating the machine the doors 120 are opened, and the cage 48, resting upon the shelf 130 or elsewhere, receives through its open top the materials to be treated which, in the present instance, are metal parts or articles intended for successive external chemical treatment or processing incident to cleaning and the application of successive layers of coating, or otherwise finally surfacing or coloring the articles. After the cage is thus loaded it is slidably inserted and detachably locked into the holder 31 as heretofore described. During the mounting of the cage the container 74 is either exterior of the casing, or, if in the casing, rests upon the table 71 with the latter in its lower position, as shown in Figure 4, wherein the locking pin 94 of the operating lever 87 registers in the lower cavity 102 of the arcuate plate 101.

A plurality of containers 74 are employed according to the number of different successive chemical baths required to treat the contents of the cage. To facilitate the insertion or removal of any one of the containers the door 125 is opened in addition to doors 120. The container is held in contact with the table by gravity while the shoulder 72 is purposed merely to prevent lateral escape of the container by sliding, and also to center the container relatively to the cage. The vertical dimension of the container exceeds that of the cage, so as to permit a sufficient depth of liquid 77 to substantially immerse the cage when the operating lever is in the elevation position adjacent the stop shoulder 104 shown in Figure 1, and of sufficient vertical dimension to completely surround the basket when the latter is in spinning or drying position clear of the liquid, as shown in Figure 3. When the container is in this position relatively to the cage the operating lever is in intermediate position with its locking pin 94 in registration with the upper cavity 103 of the arcuate plate 101, and the driving shaft 24 is in action rotating the cage.

When the cage is in immersed position, as shown in Figure 1, the driving shaft 24 is inactive.

In elevating the container through the levers 87, 108, and links 110 the operator is assisted in the initial upward lift of the operating lever 87 by the upward pressure of the spring 68 in the tubular post 66. The closed top 17 of the casing wall 16 forms a resultant chamber above and around the cage and container that prevents the premature escape of the chemical vapors emanating from the liquid 77.

The provision of a cage holder, and the readily attachable and detachable character of the cage relatively thereto, and the temporary interlocking of these two elements, facilitates unloading, and inspection, saves time, and insures against accidental detachment of the parts.

The employment of a table and a portable container makes possible the use of a plurality of previously charged containers adapted for successive substitution according to the number of different baths required to completely process the articles enclosed in a single cage, which reduces the speed of processing to an unprecedented minimum. This construction of table and container also enables speedy cleaning of receptacles that have been once used, particularly when the last contents of the container was a coloring liquid.

Although I have described and illustrated a specific structural embodiment of an apparatus for carrying out my invention, and have described and illustrated specific cages and containers adapted to be used, and particularly for cleaning, staining or coating articles, my invention may be applied to different types of articles and different materials, and for performing different operations on such articles and different materials, and the apparatus and the method followed may be changed to conform to and be suited for such different articles and materials and the different treatments required therefor, within the limits of the invention as defined in the appended claims.

I claim:—

1. In an immersing and drying machine, a casing having a side provided with an opening therein, a driving shaft rotatably mounted in the casing, a cage supported by the shaft, a container within the casing removable through the side opening and providing a lower liquid containing portion and an upper centrifuging portion, and means for effecting relative vertical movement between the container and the cage.

2. In an immersing and drying machine, a casing having a top and a side, said side being provided with an opening, a closure for said opening, a driving shaft rotatably mounted in the casing, a cage supported by the shaft, a container within the casing below the cage and removable through the side opening and providing a lower liquid containing portion and an upper centrifuging portion, and means for effecting relative vertical movement between the container and the cage.

3. In an immersing and drying machine, a casing including a side and top, the side being provided with an opening, a closure for the opening, a driving shaft rotatably mounted in the top, a cage detachably supported by the shaft in the horizontal plane of the opening, a container within the casing providing a lower liquid containing portion and an upper centrifuging portion and removable through said opening, and means for raising and lowering the container to move the top of the container above and below the plane of the lower extremity of the cage.

4. In an immersing and drying machine, a casing including a top and a side provided with an opening, a driving shaft rotatably mounted in the top, a cage holder rigid with the shaft and provided with a groove, a cage in the casing, a shoulder upon the cage slidably engageable with the holder in the groove, manually operable means carried by the holder and accessible through the opening for interlocking the holder and cage against relative movement, a container providing a lower liquid containing portion and an upper centrifuging portion, and means for raising and lowering the container to move the top of the container above and below the plane of the lower extremity of the cage.

5. In an immersing and drying machine, a

casing including a top and a side provided with an opening, a vertically stationary driving shaft rotatably mounted in the top, a closure for the upper portion of the opening supported by the side, a horizontal door supported by the side for closing the lower portion of the opening, an outwardly extending shelf upon the door, a cage holder fast to the shaft, a cage detachably mounted upon the holder and positioned in the horizontal plane of the upper portion of the opening for removal therethrough, a container providing a lower liquid containing portion and an upper centrifuging portion and removable through said opening, and means for raising and lowering the container to move the top of the container above and below the plane of the lower extremity of the cage.

6. In an immersing and drying machine, a casing including a base, a side provided with an opening, and a top, a driving shaft rotatably mounted in the top, a cage carried by the shaft, a post in the base, a second post slidably engaging the first post, a table upon the second post, a container for liquid detachably secured upon the table and removable through the opening in the casing and normally surrounding the cage, and means for reciprocating the second post.

7. In an immersing and drying machine, a casing including a base, a side provided with an opening, and a top, a driving shaft rotatably mounted in the top, a detachable cage in the casing supported by the shaft, a post in the base, a second post slidably mounted upon the first post, a table upon the second post, a container within the casing for liquid removable resting upon and detachably secured to the table adjacent the opening for removal therethrough and vertically movable to surround the cage when elevated and to be positioned below the cage when lowered, and means for reciprocating the second post.

8. In an immersing and drying machine, a casing including a base, a side provided with an opening, and a top, a driving shaft rotatably mounted in the top, a cage carried by the shaft, a post in the base, a second post slidably engaging the first post, a table upon the second post, a peripheral shoulder upon the table, a container within the casing for liquid resting upon the table within the shoulder adjacent the opening for removal therethrough and movable to surround the cage when elevated and to be positioned below the cage when lowered, and means for reciprocating the second post.

9. In an immersing and drying machine, a casing including a base, a side provided with an opening, and a top, a driving shaft rotatably mounted in the top, a cage carried by the shaft, a post in the base, a second post slidably engaging the first post, a table upon the second post, a container within the casing for liquid carried by the table in the plane of the opening for removal therethrough and movable to surround the cage when elevated and to be positioned below the cage when lowered, and lever operable means for reciprocating the second post.

10. In an immersing and drying machine, a casing having a side provided with an opening, a driving shaft rotatably mounted in the casing, a cage holder rigid with the shaft and provided with a groove, a cage in the casing, a shoulder upon the cage slidably engageable with the groove in the holder, manually operable means accessible through the opening for interlocking the holder and cage against relative movement, a container providing a lower liquid container portion and an

upper centrifuging portion, and means for effecting relative vertical movement between the container and the cage.

11. In an immersing and drying machine, a casing having a side opening, a shaft rotatably mounted in the casing, a cage holder connected with the shaft, a cage having detachable connection with the cage holder, said detachable connection being so constructed and arranged as to provide for removal of the cage laterally through the side opening, a container for liquid, and means for effecting relative vertical movement between the container and the cage.

12. In an immersing and drying machine, a

casing having a side opening, a shaft rotatably mounted in the casing, a cage holder connected with the shaft, a cage having detachable connection with the cage holder, said detachable connection being so constructed and arranged as to provide for removal of the cage laterally through the side opening, a support within said casing, a container for liquid detachably carried by said support and removable laterally therefrom through a side of the casing, and means for effecting relative vertical movement between the container and the cage.

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