Dec. 12, 1933. C. F. McEWAN 1,939,308

ROTARY CAN WASHING MACHINE

Filed Oct. 10, 1928 5 Sheets-Sheet 1

Fig. 1

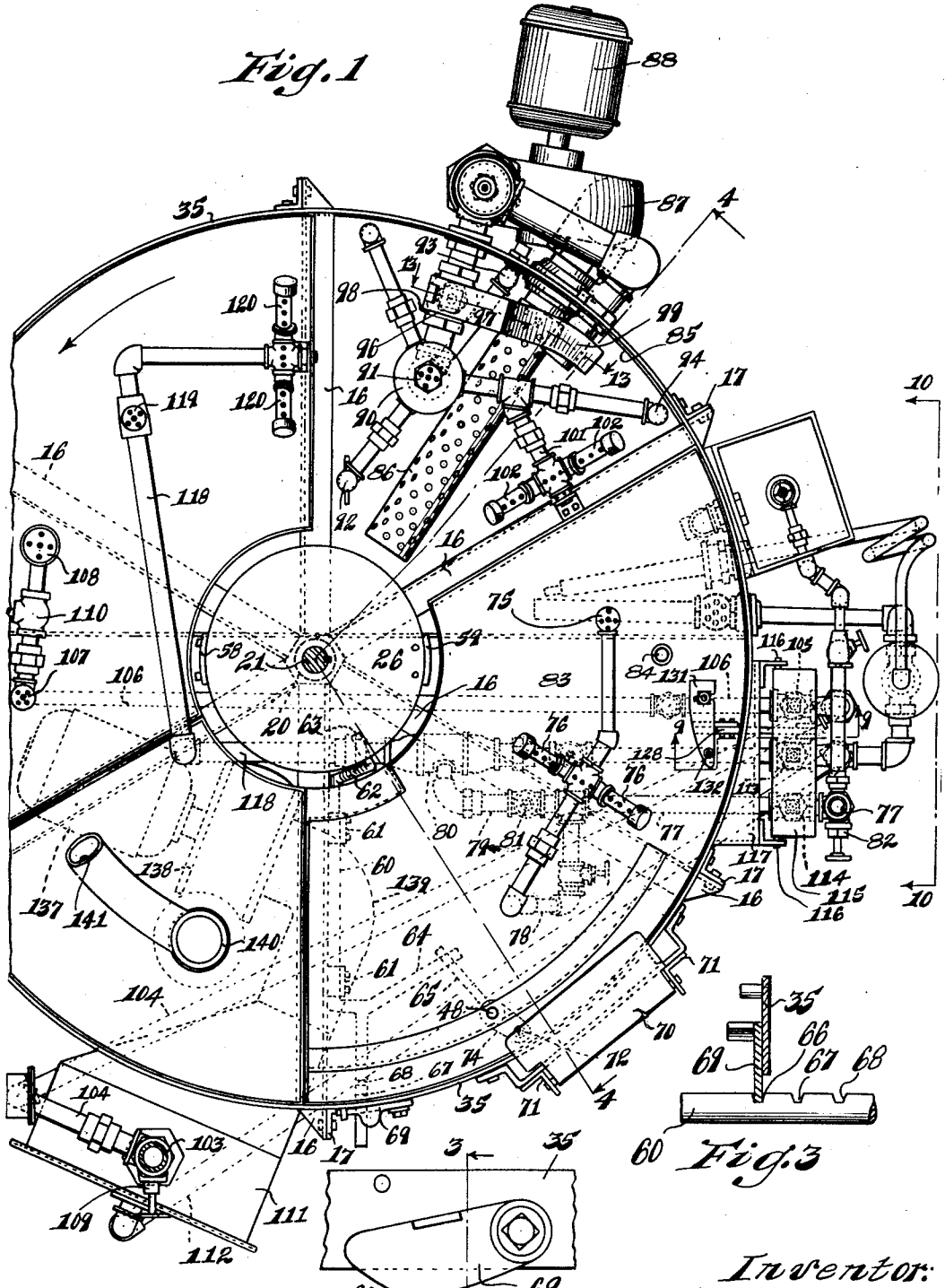


Fig. 2

Fig. 3

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ROTARY CAN WASHING MACHINE

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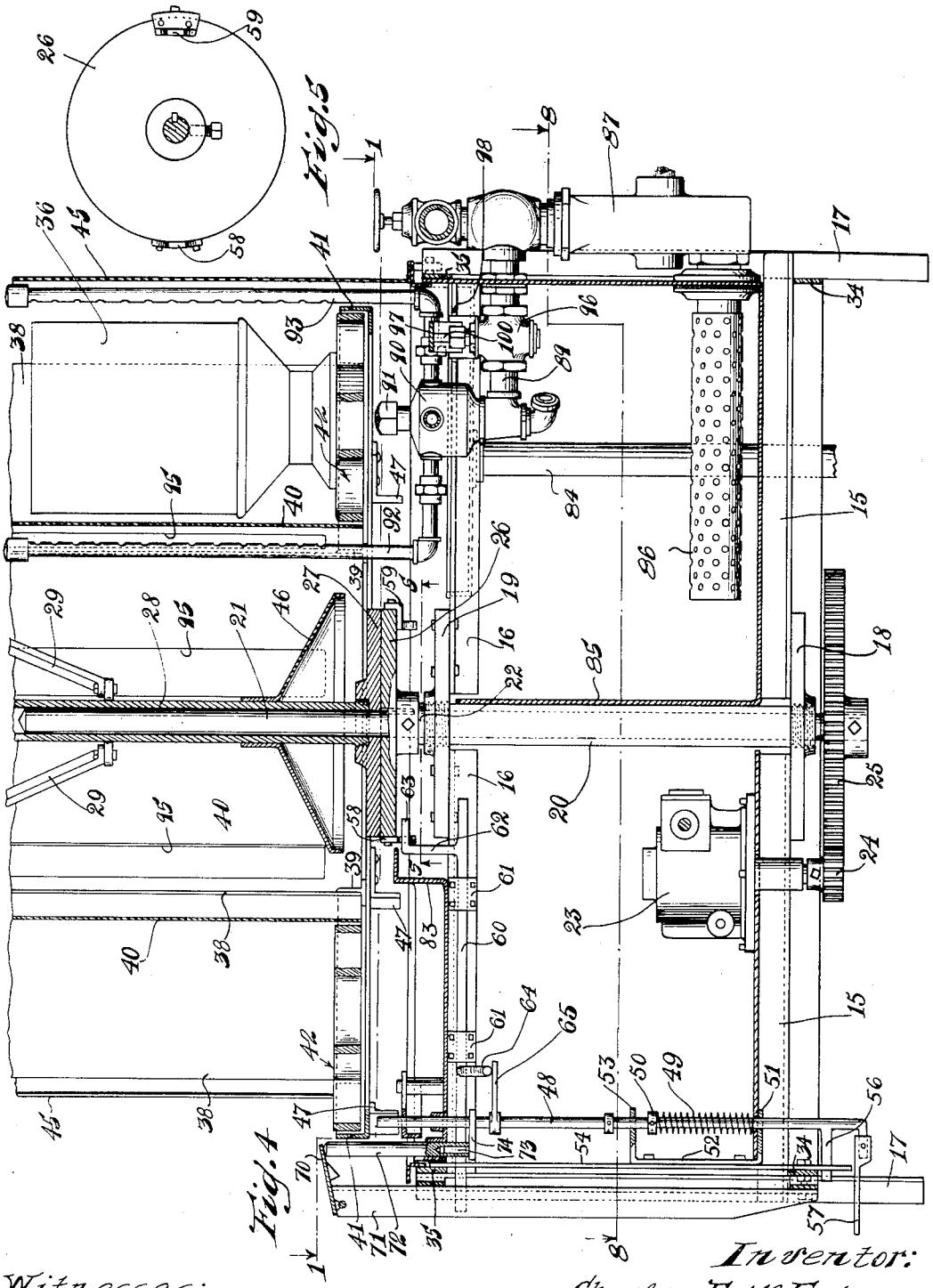


Fig. 4

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ROTARY CAN WASHING MACHINE

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Fig. 6

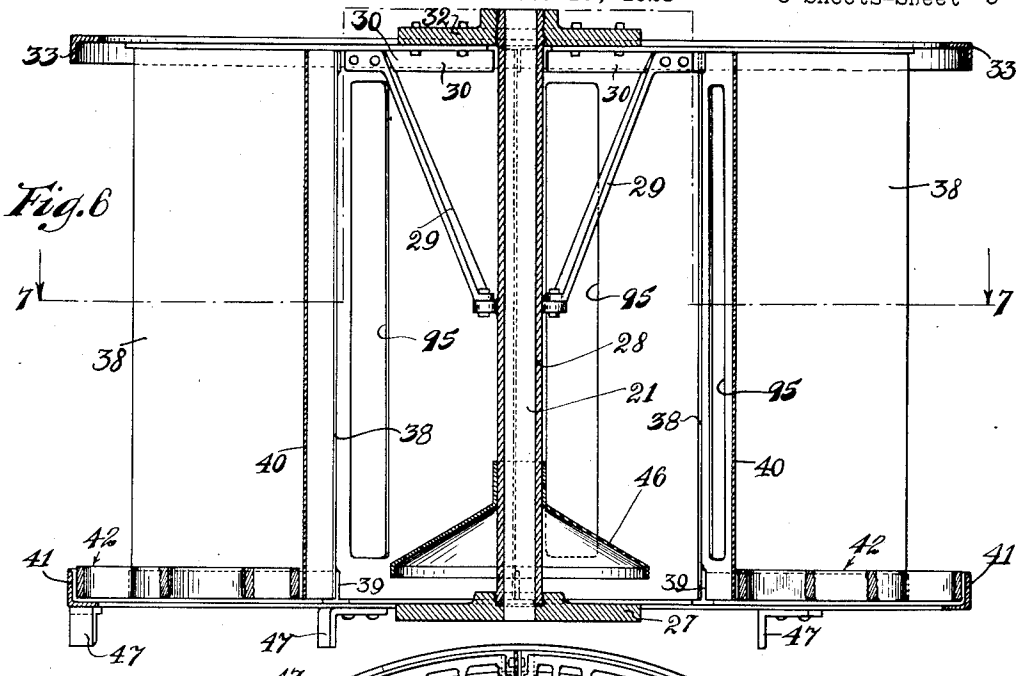
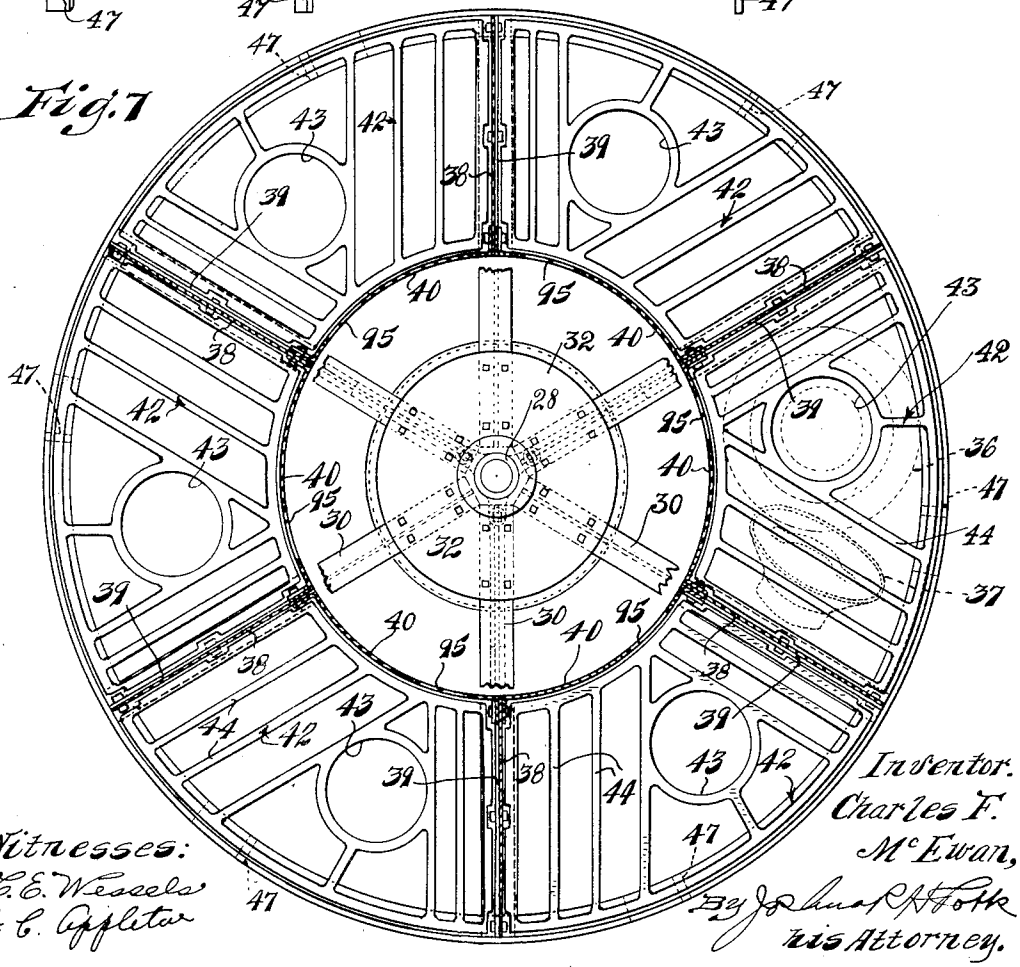


Fig. 7



Witnesses:
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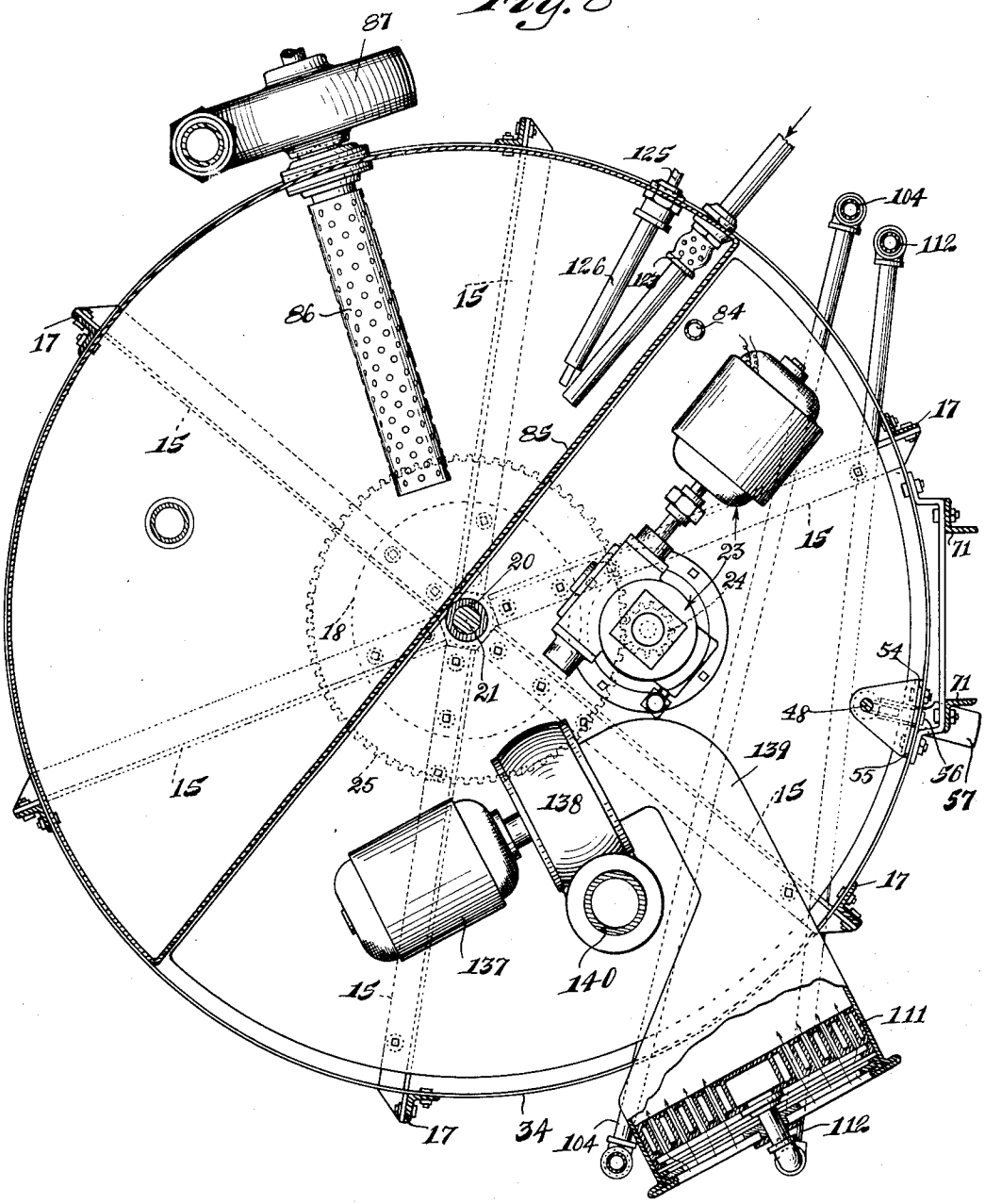
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ROTARY CAN WASHING MACHINE

Filed Oct. 10, 1928 5 Sheets-Sheet 4

Fig. 8



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ROTARY CAN WASHING MACHINE

Filed Oct. 10, 1928 5 Sheets-Sheet 5

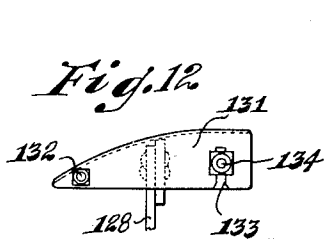


Fig. 12.

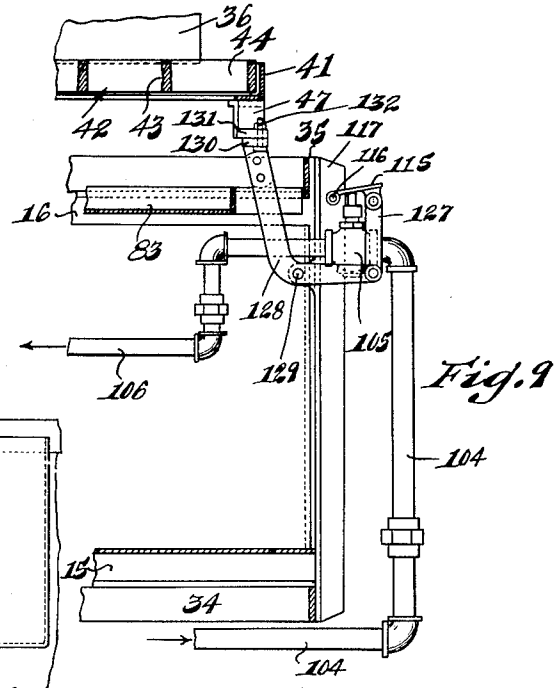


Fig. 9

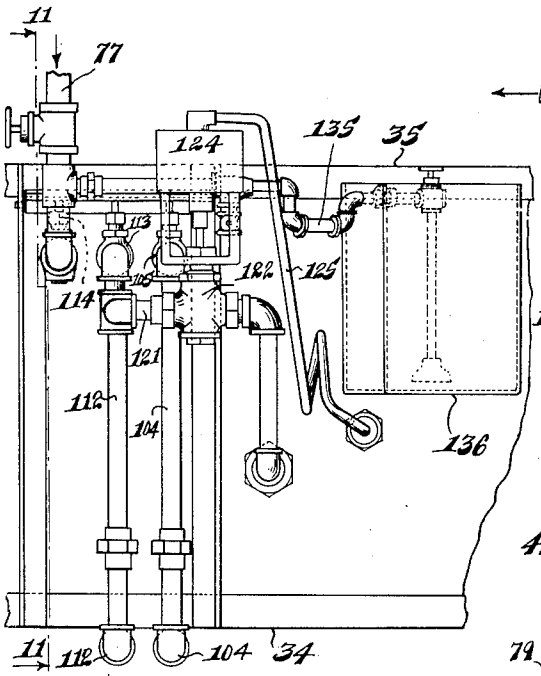


Fig. 10

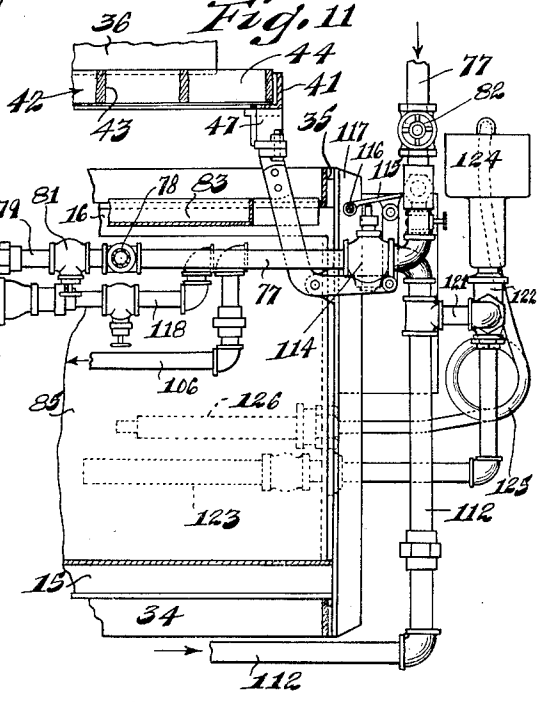


Fig. 11

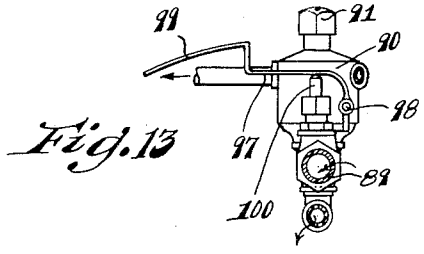


Fig. 13

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Patented Dec. 12, 1933 1,939,308

UNITED STATES PATENT OFFICE

1,939,308

ROTARY CAN WASHING MACHINE

Charles F. McEwan, Chicago, Ill., assignor to Harry D. Lathrop, Chicago, Ill.

Application October 10, 1928. Serial No. 311,538

7 Claims. (Cl. 141—7)

This invention relates to a rotary can washing machine especially adapted for washing, sterilizing and draining milk cans and covers and the like, and the object of the invention is the provision of an improved machine of this character equipped with improved automatic valve operating mechanisms for the successive washing and sterilizing operations.

A further object resides in the provision of an improved construction whereby the duration of the intermittent, successive washing, sterilizing and drying operations may be varied, and whereby the machine will continue to operate automatically upon one adjustment of the period of duration of the successive operations until a second adjustment is made.

A further object is the provision of an improved can washing machine of this type which is durable in construction, highly efficient in use, and which is provided with a novel friction driving means to prevent injury to the driving mechanism in case of accident or emergency.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which:

Fig. 1 is a plan view of the lower stationary portion of the machine, taken substantially on the line 1—1 of Fig. 4;

Fig. 2 is a detailed elevational view of the locking means for maintaining the speed control rod in any adjusted position;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view of the stationary base and superposed rotary can carriage taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is an inverted face view of the rotary driving disk;

Fig. 6 is a vertical sectional view of the rotary can and cover carriage;

Fig. 7 is a plan view, partly in section, of the structure shown in Fig. 6, taken substantially on the line 7—7 of Fig. 6.

Fig. 8 is a plan view of the lower portion of the stationary supporting structure, taken substantially on the line 8—8 of Fig. 4.

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 1 and including a portion of the rotary carriage, showing the relative position of the parts following an automatic operation of the valves;

Fig. 10 is an elevational view taken substantially on the line 10—10 of Fig. 1;

Fig. 11 is a sectional view similar to Fig. 9 taken on the line 11—11 of Fig. 10;

Fig. 12 is a detailed plan view of the valve lever operating shoe; and

Fig. 13 is a detailed elevational view of the soda solution discharge valve mechanism taken substantially on the line 13—13 of Fig. 1.

As illustrated in the drawings, the preferred embodiment of the apparatus comprises a lower stationary frame structure consisting of radially extending angle irons 15, upper radially extending angle irons 16 and vertically extending angle irons 17 which connect corresponding pairs of angle irons 15 and 16, and which preferably extend a sufficient distance beneath irons 15 to form supporting legs for the structure. The lower angle irons 15 are preferably secured to a stationary circular plate 18 by means of bolts or rivets, and similarly the inner ends of the upper angle iron 16 are secured to a circular plate 19. Threaded into the respective plates 18 and 19 is a vertically extending sleeve member 20 within which is rotatably mounted a vertically extending shaft 21. Shaft 21 is preferably arranged to make a fairly close fit within sleeve 20 to insure smoothness of operation, and is maintained in position by a collar 22 adapted to bear against the central portion of plate 19. Power is preferably supplied by means of electric motor and reduction gearing assembly 23 mounted upon the frame of the machine, the shaft of which is provided with a pinion 24 adapted to mesh with gear 25 secured to the lower end of shaft 21. At a suitable location intermediate the length of shaft 21, there is secured thereto a driving disk 26, preferably of steel construction, and provided with an upper flat surface having frictional engagement with the lower surface of the corresponding driven disk 27 into which is threaded a vertically extending upper sleeve 28 (as shown in Fig. 4). Shaft 21 is constructed and arranged to make a fairly close fit with sleeve 28, but still permit of rotation within the sleeve, the purpose of the sleeve 28 being primarily to maintain the upper rotary can and cover carriage in position. Secured to sleeve 28 are diagonally extending brace members 29, the upper ends of which are secured to radially extending T-iron supports 30. The inner ends of the radially extending T-irons 30 are preferably bolted or riveted to circular plate 32, similar to the construction with reference to members 15 and 16, and as shown in

Fig. 6, the upper end of sleeve 28 has threaded engagement with plate 32. The outer ends of radially extending supports 30 are preferably secured to a circular angle iron 33, and the lower stationary portion of the apparatus is preferably reinforced by circular bands 34 and 35.

In the embodiment of the invention illustrated, six compartments are provided in the rotary carriage, each of which is adapted to receive an inverted can 36 and a cover 37. These compartments are formed by a plurality of radially extending plates 38, the upper ends of which are riveted or otherwise suitably secured to the corresponding T-irons 30 and the lower ends secured to radially extending T-irons 39; also the inner walls of the respective compartments are formed by a plurality of curved plates 40 having lateral flanges for attachment to the inner edges of plates 38. The outer ends of the respective radially extending T-irons 39 are preferably secured to a circular angle iron 41, and thus the horizontally extending flanges of members 39 and 41 in each compartment provide a ledge for the support of a removable grating 42 having a circular opening 43 adapted to register with the top of an inverted can and provided with bars 44 for the support of the can cover. The entire rotary carriage is preferably enclosed within a stationary hood as shown in section at 45 in Fig. 4, provided, however, with an opening for depositing and withdrawing cans and covers, as hereinafter explained, and a small hood 46 is preferably secured to sleeve 28 for the purpose of shedding fluid from the friction drive mechanism. Thus it will be seen that in the construction shown, the structure forming the respective can and cover compartments is suspended from the upper supports 30, which provides a circular space between the hood 46 and the inner curved walls 40 of the compartments.

Further, in the construction and arrangement shown, the driving disk 26 rotates at a uniform speed, but the rotary can and cover carriage is intermittently stopped by means of the following mechanism. Disposed upon the periphery of the circular angle iron 41 and extending downwardly are a plurality of lugs 47 equal in number to the number of can and cover compartments, and in the arrangement illustrated a lug 47 is provided for each compartment in the relative position shown in Fig. 7. Disposed at one side of the machine adjacent the loading plate hereinafter described, is a vertically movable stop rod 48 normally held upwardly in the position shown in Fig. 4 by a compression spring 49 interposed between collar 50 and arm 51 of bracket 52, the upper arm 53 of which is provided with an opening to serve as a guide for rod 48. Bracket 52 is secured to two vertically extending bars 54 and 55 which project downwardly as shown in Fig. 4 to pass upon each side of arm 56 secured to rod 48, whereby the latter is maintained in alignment and prevented from rotating. When one of the lugs 47 contacts with the upper end of stop rod 48 as shown in Fig. 4, the rotary carriage is maintained stationary, and the surfaces of disks 26 and 27 slide upon each other. The carriage is released by the depression of rod 48 and the disengagement thereof with the contacting lug 47, and this may be accomplished by the manual depression of foot pedal 57 removably secured to rod 48 in one adjustment of the machine. Preferably, the depression of rod 48 is performed automatically by means of downwardly extending shoe members 58 and 59, mounted upon the periphery of disk 26 and preferably disposed diametrically opposite thereon as shown in Fig. 5. A rocking member 60 is slidably mounted upon the member 16 adjacent rod 48 as shown in Fig. 4, by means of strap members 61. Member 60 is provided with an upwardly extending L-shaped arm 62 having a horizontally extending leg 63. Rocking member 60 is further provided with a laterally extending arm 64 adapted to engage arm 65 secured to stop rod 48. As shown in Fig. 5, shoe 58 is spaced a greater distance from the center of disk 26 than is shoe 59, and in the position shown in Fig. 4, both of these shoes engage leg 63 of member 62 during one complete rotation of disk 26, and each such engagement causes member 60 to be rocked, and the consequent depression of rod 48 and disengagement thereof with the contacting lug 47, by means of arm 64 engaging and forcing arm 65 downwardly. The outer end of member 60 is preferably provided with notches 66, 67 and 68 for the purpose of locking member 60 in any adjusted position by means of a plate 69 pivotally mounted upon the frame member 35, as shown in Figs. 2 and 3. In the second adjustment, member 60 is withdrawn to the position where plate 69 engages notch 67, and in this position leg 63 is engaged by shoe 58, but not by shoe 59, inasmuch as the latter passes the end of leg 63 by reason of being spaced inwardly from the periphery of disk 26. It will thus be seen that in this second adjustment, the rotary carriage is released once during each complete rotation of disk 26. In the third adjustment whereby plate 69 engages notch 68 of member 60, leg 63 is withdrawn entirely from the path of either shoe 58 or shoe 59, and in this position the disengagement of stop rod 48 with the contacting lug 47 is accomplished either by the manual depression of foot pedal 57 or by means of mechanism connected with the loading plate as presently explained. A loading plate 70 is pivotally mounted upon bracket 71 whereby the inner edge of the loading plate may swing vertically, and may be arranged to rest upon the upper end of pin 72, the lower end of which is recessed to fit upon projection 73 of arm 74 secured to stop rod 48. The enclosing hood 45 preferably surrounds the entire rotary carriage, but is provided with an opening adjacent loading plate 70 whereby the cans and covers may be deposited upon and removed from the carriage. As a can is placed upon plate 70, pin 72 is depressed, causing release of the carriage as above explained, and the can and cover are then slid upon the rack of the adjacent compartment. It will be understood that pin 72 is employed only when member 60 is in the adjustment where neither of the shoes 58 nor 59 contacts with the leg 63, and in either of the two adjustments where such contact is made, pin 72 is ordinarily removed, inasmuch as the periodical release of the carriage is accomplished automatically. After each disengagement of rod 48 with a lug 47, rod 48 is restored to lug engaging position by means of compression spring 49.

In the present construction, the rotary carriage is adapted to travel in a counter-clockwise direction, looking downward upon the apparatus, or in the direction of the arrow shown in Fig. 1, and the first step in the cleansing operation is a cold water rinse by means of a perforated nozzle 75 which registers with the opening of the can and perforated pipes 76, which spray water upon the covers. The cold water is supplied from a main supply pipe 77, one branch 78 of which

leads to the nozzles 75 and 76, and another branch 79 leads to a mixing chamber 80. A valve 81 is preferably disposed in pipe 79 for regulating the amount of cold water supplied to the mixing chamber 80, and the valve 82 may be placed in pipe 77 to control the main cold water supply. Pipe 78 extends through the bottom of a pan 83 which is adapted to receive the water after the rinsing operation and permit its discharge through a drain pipe 84. The second washing operation is performed when the carriage revolves one step from the position above described, and consists of a soda solution spray upon the inside and outside of the can and upon the cover. The soda solution is contained in a large tank 85 which occupies approximately one half of the lower portion of the frame of the machine. The soda solution is conserved for reuse by permitting the discharged solution to drop into the tank 85 and the solution is withdrawn from the tank through a strainer 86 by means of a pump 87 operated by motor 88. The soda solution is then forced through pipe 89 into a distributing chamber 90 provided with a perforated nozzle 91 adapted to spray the interior of the cans. Connected to chamber 90 are three upright perforated spray pipes 92, 93 and 94, two of which are shown in Fig. 4, and these pipes are adapted to spray soda solution upon the exterior of the cans. It will be noted that pipe 92 is disposed inwardly of wall 40 and therefore the partition 40 of each compartment is provided with a vertical slot 95 of sufficient width and heighth to permit the spray to pass therethrough. Interposed in pipe 89 is a valve 96 which is normally maintained closed by a spring engaging the stem, and this valve is caused to open by depression of plate 97 best shown in Fig. 13, which is pivoted at 98 and provided with an inclined surface 99 which is adapted to be successively engaged by lugs 47 on the rotary carriage causing stem 100 to be depressed and the soda solution ejected. A branch pipe 101 is provided with laterally extending pipes 102 for the purpose of spraying soda solution upon the can covers.

A steam supply is conducted through pipe 103 having one branch 104 which extends beneath the frame of the machine and thence upwardly as shown in Fig. 9. A spring valve 105, similar to valve 96, is introduced in the steam line, and thence the steam is conducted through pipe 106 to a can spraying nozzle 107 and cover nozzle 108. It will be noted that hand valve 110 is provided to regulate the supply of steam to the cover jet. A second branch from steam supply pipe 103 is connected to radiator 111, and after passing therethrough, the stream is conducted through pipe 112 which is likewise provided with a spring valve 113 similar in construction to valves 96 and 105. An additional spring valve 114 is positioned in pipe 77, and thus it will be seen that valves 105, 113 and 114 are arranged in alignment with their spring pressed stems extending upwardly, and these stems are adapted to be depressed simultaneously by a plate 115 pivotally mounted upon pintles 116 upon bracket 117. Continuing beyond valve 113, the second steam supply passes through pipe 118 into mixing chamber 80, where the cold water supplied through pipe 79 is heated by means of the steam, and the hot water passes through pipe 118 for discharge by nozzle 119 into the interior of the can, and through perforated pipes 120, which spray the covers. To maintain the soda solution at the desired temperature, steam is conducted through pipe 121 leading from pipe 112 into tank 85, and is provided with a valve 122 and a steam exhaust pipe 123 upon the interior of the tank 85. Valve 122 is normally maintained in closed position by means of a spring engaging the stem, and is caused to open when the temperature of the soda solution goes below a predetermined temperature by means of a thermostat control 124 having a pipe 125 which enters tank 85, and is provided with a manifold 126 which contains a suitable medium such as ether or the like to respond to temperature changes, and cause operation and opening of valve 122 by contraction of the medium.

Adjacent the free edge of plate 115 is connected one end of link 127, the other end of which is connected to L-shaped lever 128 pivotally mounted at 129 to the frame of the machine. The opposite end of lever 128 is provided with a support 130 to which is pivotally connected a shoe member 131 by means of bolt 132. Member 131 is adjustable by means of slot 133 and bolt 134. The soda solution in the soda tank 85 is automatically replenished by means of a cold water supply pipe 135 which leads from pipe 77 and is adjusted to permit a small amount of water to pass therethrough. Pipe 135 leads into a soda mixing chamber 136 which contains soda, and as the soda is dissolved in the supply of water, the overflow from chamber 136 passes into tank 85. The final drying operation on the cans and covers is performed by means of a motor 137 which operates suction fan 138, drawing the air heated by means of radiator 111 through duct 139, and the heated air is then expelled through opening 140 which registers with the opening of a can upon each periodical stopping of the carriage, and opening 141 through which the heated air passes to dry the covers.

In operation, each compartment of the carriage receives an inverted can 36 and a can cover. As explained, the number of lugs 47 is equal to the number of compartments on the carriage, and the carriage is driven by the frictional engagement between disks 26 and 27 until one of the lugs 47 contacts with stop rod 48. At this point, the lug 47 next in advance of the lug engaging rod 48, is in contact with the cam surface of shoe 131, which causes plate 115 to be depressed, and valves 105, 113 and 114 held open. While these valves are held in open position, the preliminary cold water rinse, the hot water rinse and the steam sterilization are in operation and the respective ejecting nozzles are so positioned in the lower frame of the apparatus as to register with cans and covers in the respective compartments. In this same position, the second lug 47 in advance of the lug in engagement with stop bar 48 is in contact with inclined surface 99 of plate 97, thus maintaining stem 100 depressed, and valve 96 in open position, whereby the can and cover in the compartment of the carriage above the soda solution spray are subjected to a washing operation. It will be understood that the hot air supply for drying purposes operates continuously. When stop rod 48 is disengaged from a contacting lug 47, the carriage rotates through the frictional drive until the next following lug 47 contacts with the upper end of stop rod 48, whereupon the operation is repeated. As soon as the respective lugs pass beyond contact with shoe 131 and plate 97, the valves automatically close, shutting off the steam and fluid supply to the spraying nozzles. In the adjustment shown in Fig. 4, leg 63 is adapted to be engaged by both shoes 58 and

59 upon disk 26 causing depression of rod 48 and consequent release of the carriage twice during each complete revolution of disk 26, and this is termed the high speed adjustment. When member 60 is adjusted so that leg 63 is engaged only by shoe 58 upon disk 26, the release of the carriage occurs only once during each complete revolution of disk 26, and thus it will be seen that in this latter adjustment, the cans and covers in the respective compartments are subjected to washing operations of twice the duration in length of time than in the high speed adjustment. When member 60 is placed in the third adjustment in which leg 63 is not engaged by either shoe 58 or 59, the washing and drying operations continue until rod 48 is manually depressed or depressed by means of pin 72 upon placing a can upon the loading platform 70. The entire apparatus although involving a large number of operations, is almost entirely automatic. The frictional drive construction permits of the intermittent stoppage of the rotary carriage during continuous operation of the driving motor 23, and consequently driving shaft 21, and at the same time permits of extreme smoothness in operation. A satisfactory speed of operation has been found to be three and one-half revolutions per minute for the driving disk 26, and this speed provides thorough rinsing, washing and drying operations upon seven cans per minute in the high speed adjustment, and three and one-half cans per minute in the low speed adjustment.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine of the character described, comprising, in combination, a traveling carriage provided with a plurality of article receiving compartments for conveying articles adapted to be successively subjected to cleansing operations, continuously operating driving means for said carriage, power means connected to said driving means, a plurality of cleansing fluid discharge nozzles along the path of the articles on said carriage, a plurality of valves for controlling the flow of cleansing fluid to said nozzles, a plurality of depending lugs upon said carriage, a stop rod adapted to be successively engaged by said lugs for intermittently arresting travel of said carriage, and cam members mounted upon said driving means for intermittently disengaging said stop rod, and valve operating means in the path of said lugs adapted to be engaged thereby to cause opening of said valves during each arresting period.

2. In a can washing machine, a supporting frame and driving mechanism thereon, a driving clutch member rotatable about a vertical axis and being operably connected with said driving mechanism, a driven clutch member supported on said driving clutch member and being rotatable therewith about the same vertical axis, a spindle member supported by and rotatable with said driven clutch member, an annular carrier frame comprising a central open-ended hollow cylindrical member in spaced relation to said spindle member and supported thereby, said cylindrical carrier member having slotted wall portions, can supports on said annular carrier frame in cooperative relation to said openings therein, upstanding nozzle pipes between said cylindrical spindle and said cylindrical member of the carrier frame, upstanding nozzle pipes external to the peripheral portion of said carrier frame, and means for intermittently arresting said carrier frame with the cans thereon in cooperative range of said nozzle pipes and simultaneously opening communication between said nozzle pipes and their respective sources of supply.

3. In a can washing machine, a rotary can carrier, said carrier comprising an annular supporting frame depending from a radial support at the upper end of a supporting spindle and in concentric spaced relation thereto, a driven clutch disc at the lower end of said supporting spindle and affording a support for the latter, a driving clutch disc on which said driven disc is supported in axial relation thereto whereby said driven disc is normally rotatable with said driving disc and said driving disc is rotatable independently when resistance is brought to bear upon said driven disc, upstanding discharge nozzles disposed between said supporting spindle and said annular carrier frame, and also disposed externally of the circumference of said carrier frame, other treating nozzles disposed below said annular carrier frame, power means for actuating said driving clutch disc, means for intermittently arresting said carrier frame against rotation, and means controlled by the movement of said carrier for making active the respective can treating nozzles and devices during the periods of rest of said carrier.

4. In a can washing machine of the character described, the combination of a traveling carriage, washing means in cooperative relation to said carriage, depending lugs on said carriage, means for successively engaging the lugs to intermittently stop the carriage, and valves for controlling the supply of fluid to said washing means and having operating means in the path of said lugs to be engaged thereby during each rest period of said carriage to open said valves.

5. A machine of the character described comprising, in combination, a traveling carriage for conveying articles adapted to be successively subjected to cleansing operations, depending lugs on said carriage, cleansing fluid nozzles along the path of the articles on said carriage, means for successively engaging the lugs to intermittently arrest the travel of said carriage, and valves for controlling the flow of cleansing fluid to said nozzles, said valves being provided with operating means in the path of said lugs to be engaged thereby during each rest period of said carriage to open said valves.

6. In a can washing machine, a supporting frame, a spindle member, means carried by said frame for supporting and rotating said spindle member, an annular carrier frame comprising a central open-ended hollow cylindrical member in spaced relation to said spindle member and supported thereby, said cylindrical carrier member having slotted wall portions, can supports on said annular carrier frame in cooperative relation to said openings therein, upstanding nozzle pipes between said cylindrical spindle and said cylindrical member of the carrier frame, upstanding nozzle pipes external to the peripheral portion of said carrier frame, and means for intermittently arresting said carrier frame with the cans thereon in cooperative range of said nozzle pipes and simultane-

ously opening communication between said nozzle pipes and their respective sources of supply.

7. In a can washing machine of the character described, can washing means including a plurality of spraying devices adapted to spray washing fluids, a carriage adapted to convey cans past said spraying devices, lugs carried by said carriage, means for successively engaging the lugs to intermittently stop the carriage, valves for controlling the supply of fluid to said spraying devices, and valve operating means in the path of said lugs to be engaged thereby during each rest period of said carriage to open said valves.

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