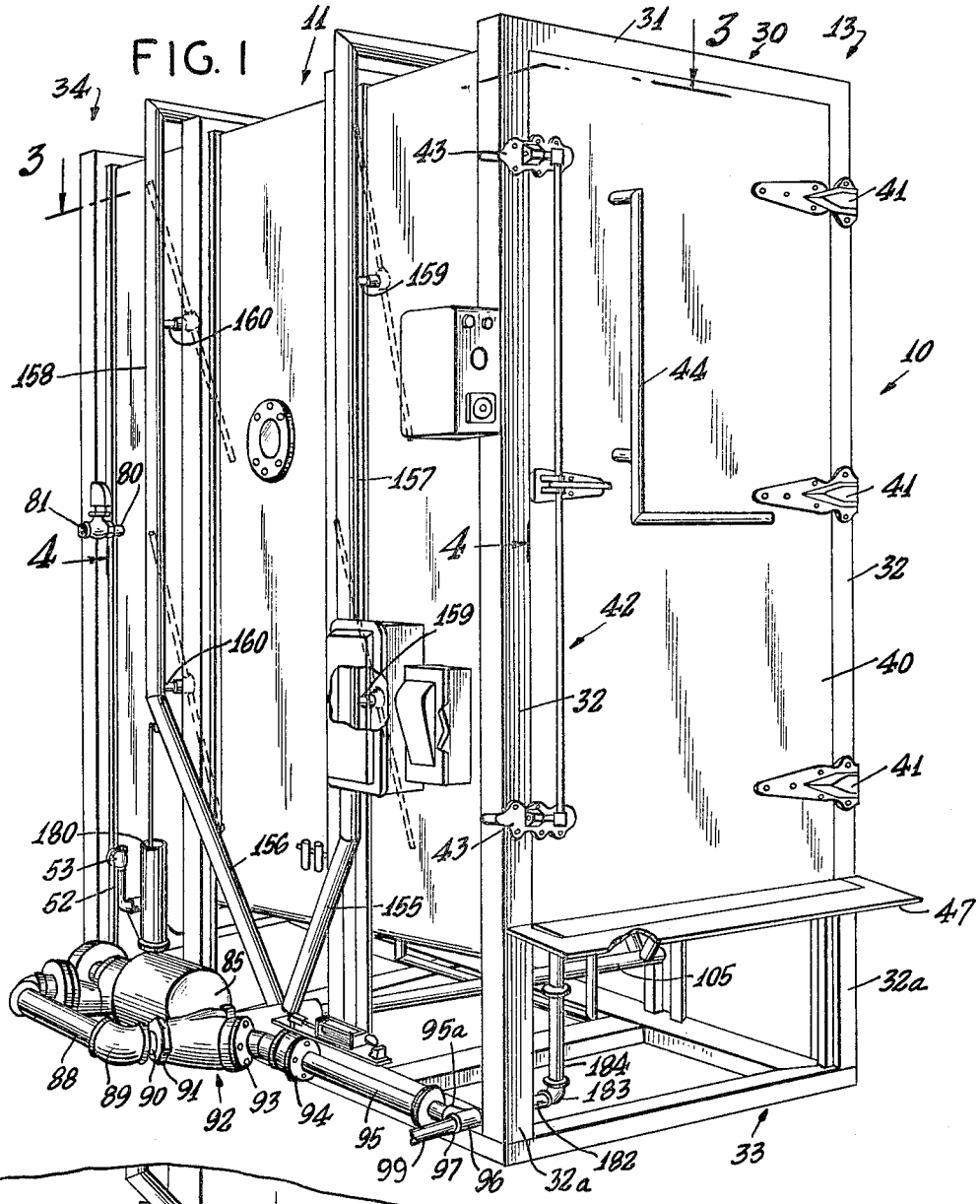
Oct. 11, 1966 D. GOLDMAN 3,277,907

ANIMAL CAGE WASHER

Original Filed April 4, 1960 4 Sheets-Sheet 1

FIG. 1



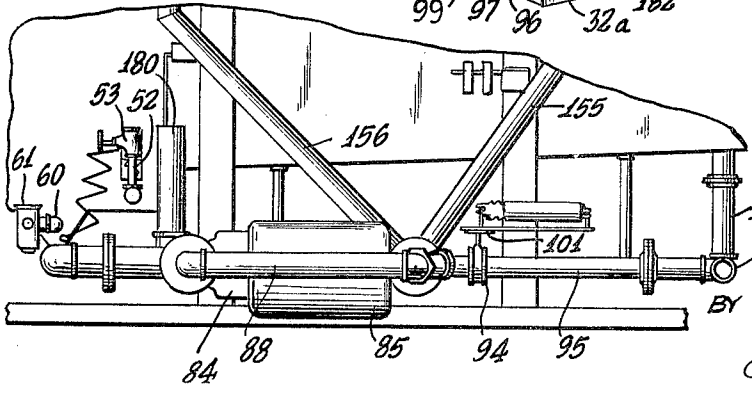


FIG. 1a

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ANIMAL CAGE WASHER

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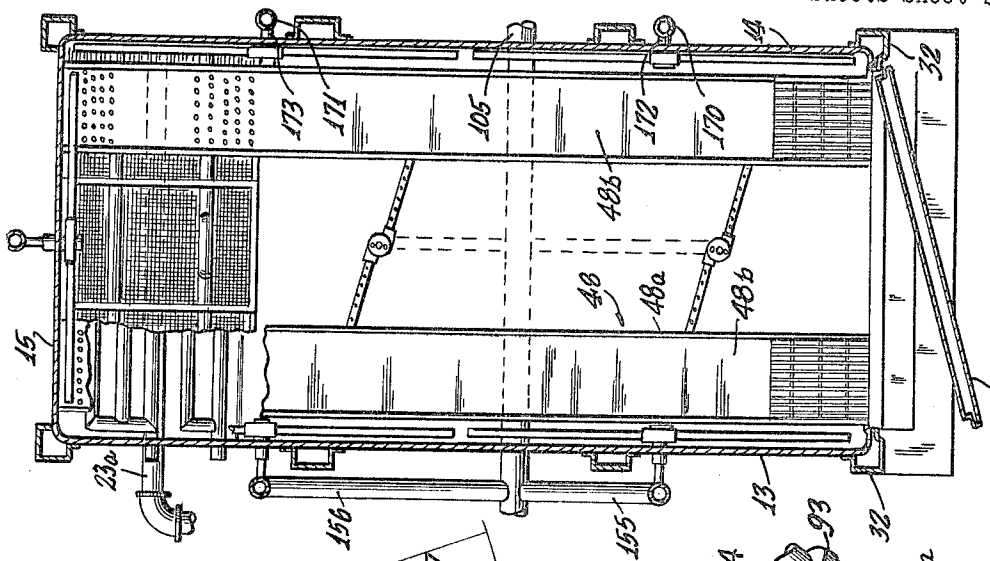


FIG. 3

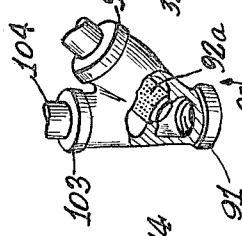


FIG. 12

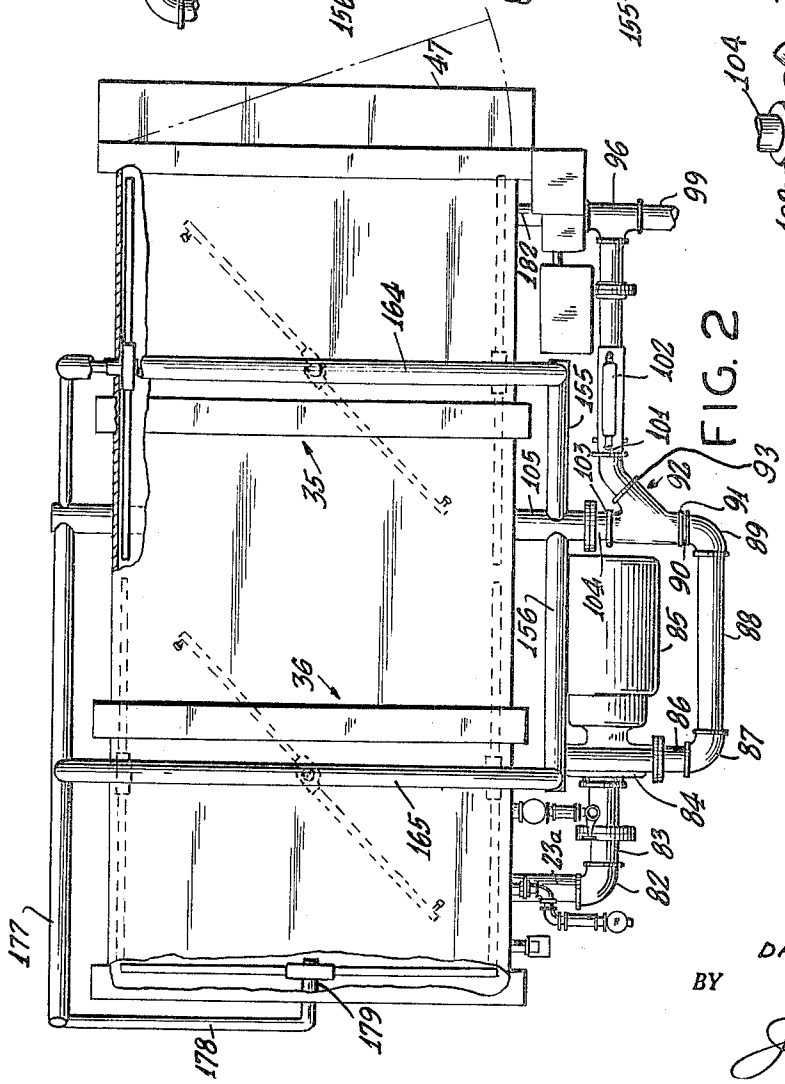


FIG. 2

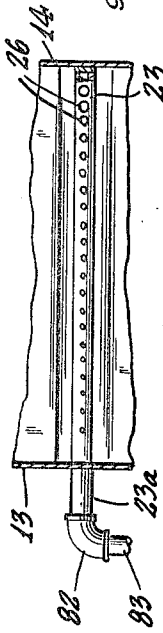


FIG. 6

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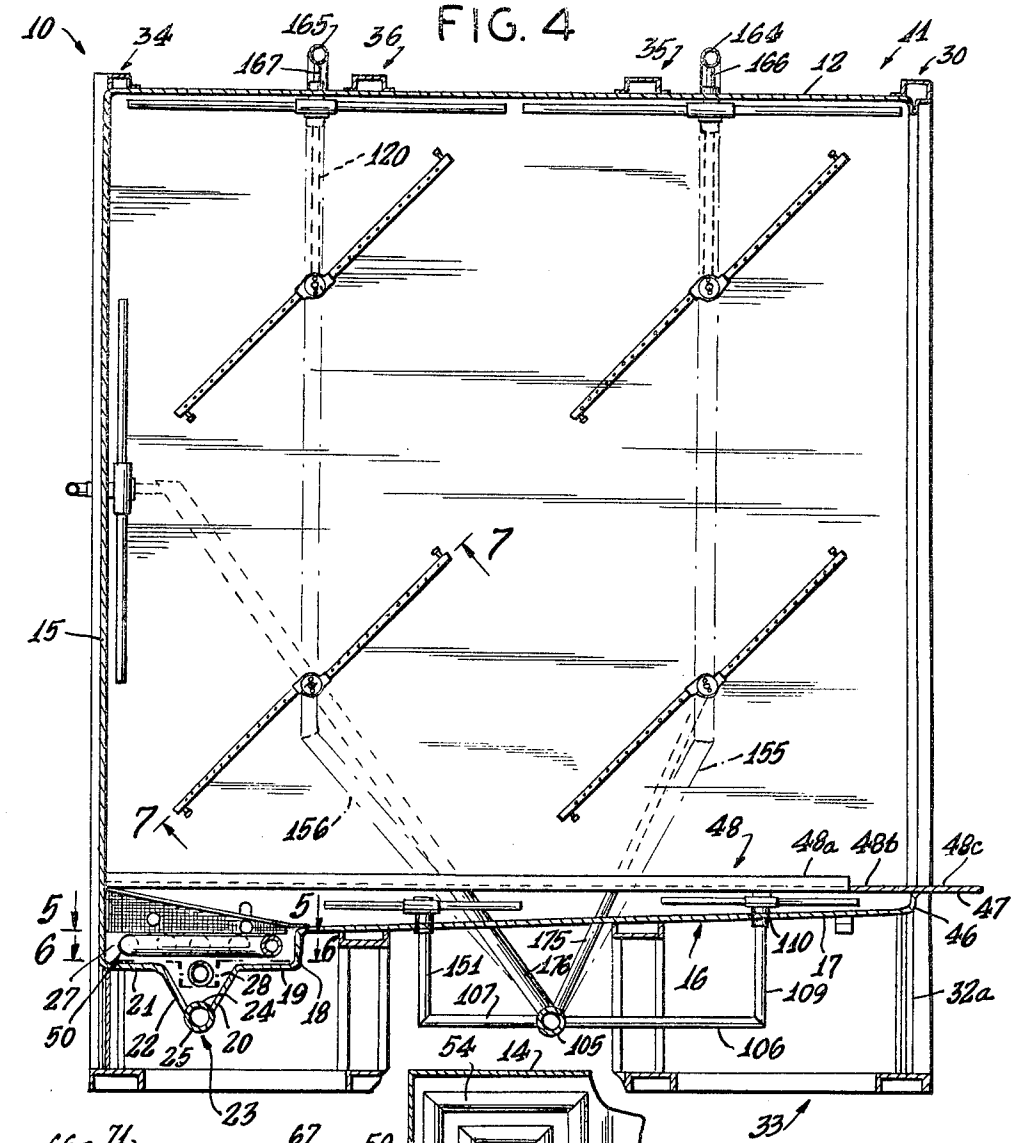
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ANIMAL CAGE WASHER

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FIG. 4



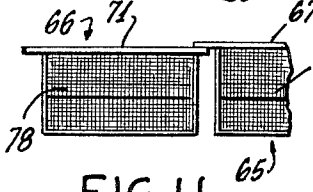


FIG. 11

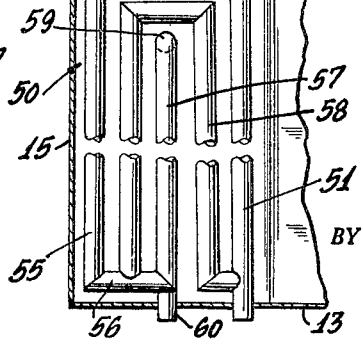


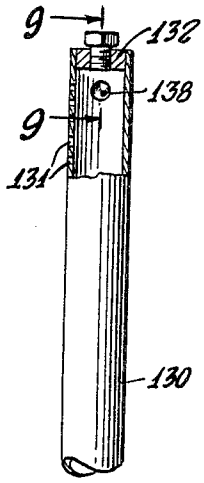
FIG. 5

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ANIMAL CAGE WASHER

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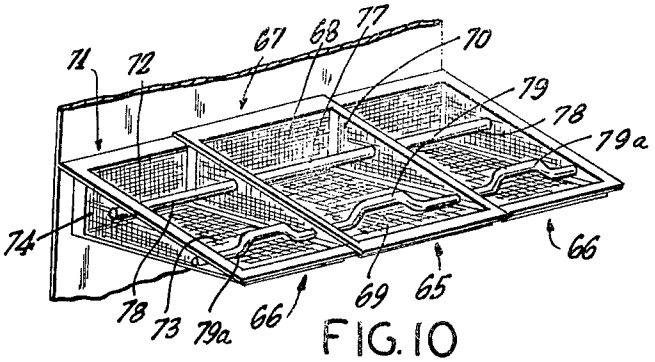


FIG. 10

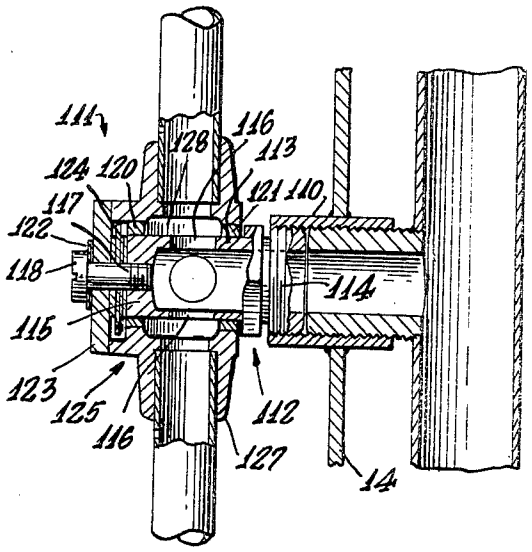


FIG. 7

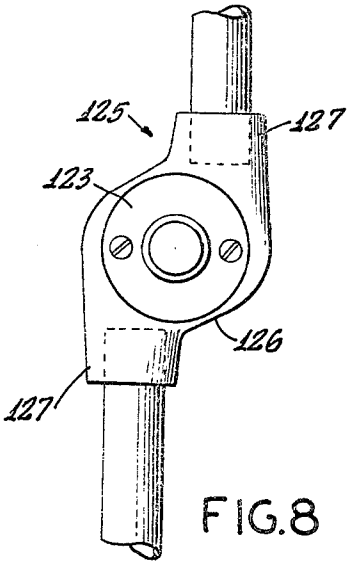
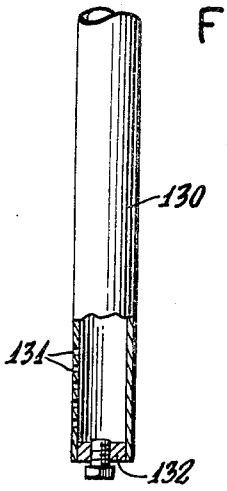


FIG. 8



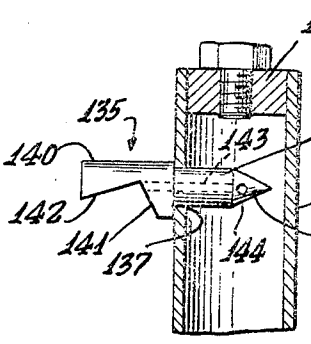


FIG. 9

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United States Patent Office 3,277,907 Patented Oct. 11, 1966

3,277,907

ANIMAL CAGE WASHER

David Goldman, New York, N.Y., assignor, by mesne assignments, to Howard D. Taylor as trustee under an indenture of trust

Continuation of application Ser. No. 24,711, Apr. 4, 1960. This application Mar. 8, 1963, Ser. No. 265,006
12 Claims. (Cl. 134—108)

This application is a continuation of my application Serial No. 24,711 filed April 4, 1960 now abandoned.

This invention relates to washers for animal cages, racks or other large devices, equipment or articles wholly movable into the washer.

An object of this invention is to provide a washer of the character described in which a relatively small amount of water may be heated quickly, recirculated quickly, and drained quickly, whereby less water need be used to obtain maximum wash with; use of less heat and less detergent, thereby greatly reducing cost of the washing operation.

Another object of this invention is to provide a machine of the character described in which the dirty water is discharged directly to the sewer and the same pump powers the rinse, wash and drain operations.

Still another object of this invention is to provide in a washing machine of the character described, a horizontal suction pipe through which water is removed from the washer tank, said pipe being formed with a row of spaced openings or holes of gradually decreasing size toward the outlet end of the pipe, with the combined area of the holes greater than the internal cross-sectional area of the pipe, whereby to ensure quick removal of the water from the tank without vortex or swirling of the water in the tank.

Yet another object of this invention is to provide in a machine of the character described, a tank in the bottom of the machine provided with a rearwardly and downwardly sloping bottom wall, and with a transverse depressed well at the rear end of the tank with steam pipes in the well, said well having a V-shaped lower end in which the outlet branch of the steam pipe is located whereby a great amount of heat is transferred to the water in the tank quickly.

A further object of this invention is to provide a washing machine of the chacter described, in which the suction pipe is at the bottom of the V-shaped lower end of the well, whereby the amount of water at the suction pipe is reduced.

A still further object of this invention is to provide in a machine of the character described, removable fine mesh or perforated baskets mounted over the well in the tank to catch debris.

Yet a further object of this invention is to provide in a machine of the character described, having a walk-in door and track at the level of the lower end of the door on which the cages, racks or other articles to be washed may be rolled into the machine.

The instant machine provides for thorough power rinsing of all detergent traces from animal cage equipment and is of great importance, since licking of detergent from cages by animals is a prime cause of dysentary in animal colonies. By discharging the detergent solution to the sewer following each washing, furthermore, as is done with this machine, a big source of maintenance difficulty is minimized, such difficulty being the build-up of sawdust and other solids in the detergent solution, and which if constantly recirculated as in present animal cage washing machines results in blocking and plugging of the washing heads or nozzles. With the present machine, a hot detergent wash may be given, with the temperature

of the detergent solution maintained by the steam coils in the tank and the period of wash may also be controlled. After use, this detergent solution can be discharged to the sewer, carrying with it all contamination from the cage or other equipment.

Fresh hot water is then introduced into the tank, and the temperature can be raised and maintained by the steam coils. This fresh hot tap water can then be power circulated under high pump pressure for effective rinsing at a fast rate. The first rinse water can then be discharged to the sewer and the tank again refilled with fresh hot tap water, which again is power recirculated for a final effective rinsing.

A third rinse may also be made if desired. To effect economy in the use of fresh hot tap water, this final rinse water may be retained in the tank for the detergent wash on the next cycle.

Another object of this invention is to provide a washer of the character described in which there are a plurality of self rotating spray heads at each of the bottom, the sides, the rear and the top of the machine, thereby ensuring a thorough wash and rinse for the equipment or articles in the machine.

A still further object of this invention is to provide a strong, rugged and durable washer of the character described which shall be relatively inexpensive to manufacture, sure and positive in operation, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

In the accompanying drawings in which is shown an illustrative embodiment of this invention,

FIG. 1 is a perspective view of a washing machine embodying the invention;

FIG. 1*a* is a side view of the lower end of said machine;

FIG. 2 is a top plan view of the machine;

FIG. 3 is a cross-sectional view taken on line **3—3** of FIG. 1;

FIG. 4 is a cross-sectional view taken on line **4—4** of FIG. 1;

FIG. 5 is a cross-sectional view taken on line **5—5** of FIG. 4;

FIG. 6 is a cross-sectional view taken on line **6—6** of FIG. 4;

FIG. 7 is a cross-sectional view taken on line **7—7** of FIG. 4;

FIG. 8 is a partial top view of the center portion of the spray device shown in FIG. 7;

FIG. 9 is a cross-sectional view taken on line **9—9** of FIG. 7;

FIG. 10 is a perspective view of the baskets;

FIG. 11 is a partial rear view of the baskets; and

FIG. 12 is a perspective view of the Y type strainer fitting with parts broken away and in cross-section.

Referring now in detail to the drawing, **10** designates a washing machine embodying the invention. Said machine **10** comprises a walk-in casing or housing **11** having a horizontal top wall **12** (FIG. 4), parallel, vertical side walls **13** and **14**, a vertical rear wall **15** and a bottom wall **16**. Said bottom wall **16** has a front rearwardly and downwardly inclined portion **19** extending the major distance from front to rear. Extending from the rear end of portion **17** is a downwardly extending wall portion **18** from which extends rearwardly a horizontal wall portion **19**. Extending from the rear end of wall portion **19**, is a sharply downwardly and rearwardly in-

clined wall portion **20**. Extending forwardly from the lower end of rear wall **15** is a wall portion **21** in the plane of wall portion **19**, and extending from said wall portion **21** is a downwardly and forwardly sharply inclined wall portion **22**, symmetrical to wall portion **20**. The lower ends of walls **20**, **22** are welded to a spaced portion of a transverse horizontal suction pipe **23** having an upper portion **24** facing the interior of the housing, and a lower portion **25** disposed below said housing.

Said portion **24** is formed with an elongated row of openings **26** (FIG. 6) decreasing in size from wall **14** to wall **13** for the purpose hereinafter appearing. Pipe **23** is closed at wall **14** and projects through wall **13** as at **23***a*. Thus, the casing is formed with a depressed well **27** from which extends down a constricted well portion **28** of V-shape.

The housing **11** is supported and reinforced by a front tubular frame **30** having a top portion **31** at the front end of the top of the housing, and side portions **32** at the front ends of the side walls of the housing and extending down below the housing as at **32***a*, and resting on and attached to the front corners of a rectangular base **33** on the floor or in a pit. Said housing is also supported by a rear tubular frame **34** attached to the rear end of the housing and extending down therebelow and resting on and attached to the rear end of frame **33**. Also, a pair of intermediate tubular vertical frames **35**, **36** are attached to intermediate portion of the top and side walls of the housing and extend therebelow and rest on and are attached to said bottom frame **33**.

A front door **40** is hinged as by hinges **41** to one frame portion **32** of front frame **30**, and carries a latching assembly **42** to engage keepers or strikers **43** on the other portion **32** of said front frame. Also, a handle **44** may be attached to the outside of the door, as shown in FIG. 1.

The forward end of bottom wall **16** has a short upwardly extending portion **46** from which extends forwardly a sill or ledge **47** at the lower end of the door.

Mounted within the housing are a pair of horizontal spaced metal tracks **48** having upwardly extending flanges **48***a* within the housing, and bottom walls **48***b* which may extend into ledge or sill **47**, as at **48***c*.

The animal cages, racks or other equipment or articles to be washed may be rolled into the housing on said tracks **48**. The tracks **48** may be supported in the housing in any suitable manner.

Means is provided to heat water in the bottom of the housing, which constitutes a tank. To this end there is provided a steam assembly **50** within well **27** and above walls **19**, **21**. Assembly **50** comprises an inlet transverse, horizontal pipe **51**, passing into the housing through wall **13** above wall **19**, and connected, outside the housing, to a short vertical pipe **52**, attached to a valve **53** which is connected, by means not shown, to a suitable steam supply. Pipe **51** is connected, adjacent wall **14**, to a short horizontal pipe **54** which is connected to a pipe **55** parallel to pipe **51** and overlying wall **21**. Pipe **55** is connected adjacent wall **13** to a short length of pipe **56** which is connected to a pipe **57** parallel to and between pipes **51**, **55** and above suction pipe **23**. Pipes **51** and **56** are interconnected by a pipe **58** which extends around pipe **57** and in the horizontal plane thereof. From the rear end of pipe **57** extends downwardly a pipe **59**, from which extends forwardly pipe **60** disposed below pipe **57** and located in depressed and constricted well portion **28** and above suction pipe **23**. Pipe **60** projects through wall **13** and is connected to a condensate collector **61**.

Mounted on the steam assembly **50** and below the tracks **48** is a central basket **65** and a pair of side baskets **66**. The central basket **65** has a top downwardly and forwardly inclined rectangular frame **67**, a rear perforated wall **68**, a bottom perforated wall **69**, and side triangular walls **70**. The upper end of rear wall **68**, the upper ends of side walls **70** and the front end of bottom wall **69** are attached to the frame **67**.

The side cages **66** are similar. Each has a top rectangular frame **71**, a rear perforated wall **72**, a bottom perforated wall **73**, and side triangular walls **74**. The sides of frame **67** of cage **65** may rest on the inner sides of frames **71** of cages **66**.

The upper ends of rear walls **72** and side walls **74** and the front end of bottom wall **73** are attached to said frames **71**.

Side walls **70** of cage **65** are interconnected by a rear transverse reinforcing cross-bar **77**, and also by a front transverse cross-bar **78** having an upwardly offset central handle portion **79**. The side walls of cages **66** are provided with similar transverse bars **79***a*.

The central cage **65** is located between the two tracks **48** and may be lifted up. When it is so lifted out of place, the side cages **66** may be slidably moved sideways one at a time, to a position between the tracks, and then lifted up for cleaning. In use, cages **66** are beneath the tracks **48**. Said cages act as a screen to catch debris which may be cleaned out.

Tap water may be fed to the inside of the machine through an inlet pipe **80** passing through side wall **13**, near rear wall **15** and about half-way up the housing **11**. A valve **81** may control flow of water into the machine from any suitable supply.

The suction pipe extension **23***a* is connected, outside of side wall **13** to an elbow **82** connected by pipe **83** to the inlet end of a pump **84** powered by an electric motor **85**. The outlet end of the pump **84** is connected through pipe **86** to elbow **87** which is connected through horizontal, longitudinal pipe **88** to elbow **89**. Said elbow **89** is connected by a short nipple **90** to one branch **91** of a Y type strainer fitting **92** which has a cylindrical tubular open ended strainer screen **92***a* contained therein. Said fitting **91** has an offset branch **93** connected to a valve casing **94** connected by pipe **95** to one branch **95***a* of a T-fitting **96**. One branch **97** of T-fitting **96** is connected to an outlet drain pipe **99** which may lead to the sewer.

In valve casing **94** is a normally closed valve **101** controlled by an electromagnetically operated valve control **102** which when energized opens the valve.

The other branch **103** of Y fitting **92** extends transversely below the housing **11** toward its underside. Connected thereto is a pipe **104** fixed to a horizontal, transverse pipe **105** which extends beneath the bottom wall of the housing.

Connected to pipe **105**, about at the transverse midsection of the housing, are horizontal longitudinal pipes **106** and **107**, one extending forwardly and one rearwardly. The forward end of pipe **106** is connected to an upwardly extending pipe **109**. The upper end of pipe **109** is screwed into a coupling **110** passing through an opening in bottom wall portion **17** and welded thereto. Mounted on the upper end of coupling **110** is a spray header **111**.

There are thirteen spray headers **111** used in this machine. They are all similar. One of them is shown in detail in FIGS. 7 and 8 and will be described. Each spray header **111** comprises a fitting **112** comprising a sleeve **113** having an externally threaded portion **114** screwed into coupling **110**. Sleeve **113** has an end wall **115** and is formed adjacent said end wall with four openings **116** spaced 90° apart. Screwed to the end wall **115** is an axial screw stem **117** having a head **118** at its outer end. Force fitted on sleeve **113** are a pair of rings **120**, **121** located on opposite sides of openings **116**. Beneath head **118** of stem **117** is a washer **122**. Contacting washer **122** is an end cap **123**, through which stem **117** passes. On said stem are washers **124** interposed between end cap **123** and end wall **115**. Rotatably mounted on sleeve **113** is a casting **123** having a central circular portion and a pair of parallel offset tubular wings **127** extending in opposite directions. Central portion **126** has an annular

chamber 128 communicating with tubular wings 127 and with openings 116 in sleeve 113. Force fitted into wings 127 are pipe 130 formed with longitudinal rows of spray openings 131 on the sides thereof opposed to the coupling 110. The ends of pipes 130 may be plugged as by plugs 132.

The spray heads 111 are self or hydraulically rotating. To this end there is mounted at the outer end of each of the pipes 130 a nozzle member 135. Each nozzle 135 has a stem 136 projecting through a hole 137 in pipe 130. The hole 137 is 90° apart from openings 131 and located on the side of pipe 130 opposite to the direction in which said pipe is to rotate. Stem 136 has a conical inner end 138. Extending from stem 136 is an enlarged, part cylindrical, axial head 140 having a surface 141 inclined toward pipe 130 and toward casting 125. Extending from said surface 141 is a surface 142 inclined toward pipe 130 and away from casting 125.

Stem 136 has an axial hole 143 extending to surface 141 at one end. The other end of opening 143 terminates short of the joint of conical portion 138 and communicates with a transverse through opening 144 in the cone. Water passing through pipe 130 will pass through openings 144, 143 and strike surface 142, thereby forcing pipe 130 in a direction away from the direction in which head 140 projects.

Spray header 111 just described, while shown in FIG. 7 as located at another part of the machine, is the same as the spray header receiving water from pipe 109.

Pipe 107 is connected to a vertical pipe 151 screwed into another coupling 110 passing through portion 17 of bottom wall 16, but closer to well 27. On said coupling 110 is another spray header 111 similar to the one just described.

Pipe 105 is also connected to a pair of diverging pipes 155, 156 extending upwardly in opposite directions at the outside of side wall 13. Extending up from the upper ends of pipes 155, 156 are vertical pipes 157, 158, respectively.

Attached to each of pipes 157, 158 are a pair of spaced horizontal nipples 159, 160 screwed to couplings 110 passing through side wall 13 to the inside of the housing. On each of the four couplings 110 is a spray header 111.

Extending from the upper ends of vertical pipes 157, 158 are horizontal pipes 164, 165, respectively, extending transversely across and spaced above top wall 12. Connected to said top pipes 164, 165 are nipples 166, 167, respectively, screwed to couplings 110 passing down through the top wall 12. Said couplings 110 lie on the longitudinal midsection of the casing and also carry spray headers 111 disposed beneath and close to the top wall 12.

Connected to the far ends of pipes 164, 165 are downwardly extending pipes 170, 171, respectively. Connected to the lower ends of pipes 170, 171 are horizontal nipples 172, 173, respectively, screwed to couplings 110 passing through side wall 14 and carrying rotating spray headers 111 disposed adjacent wall 14 and aligned with the upper two spray headers in wall 13.

At the far end of pipe 105 are also a pair of upwardly and outwardly diverging pipes 175, 176 (FIG. 4) extending close to the outer side of side wall 14. At the upper end of pipe 175 is a nipple which is screwed also to a coupling 110 passing through side wall 14 and carrying a spray header 111 located at the inside of said side wall, and in alignment with the lower spray header fed by pipe 157.

The other pipe 176 inclines toward the rear wall 15. It carries a nipple screwed to a coupling 110 passing through side wall 14 and carrying a spray header 111 located at the inside of said sidewall and aligned with the lower spray header fed by pipe 158.

Connected to the upper end of pipe 176 is a pipe 177 extending rearwardly beyond rear wall 15. Connected to the rear end of pipe 177 is a horizontal pipe 178 extending forwardly and horizontally behind the rear wall 15, to a midpoint thereof. Connected to said pipe 178 is a nipple 179 screwed to a coupling 110 passing horizontally forwardly through said rear wall 15 and carrying also a spray header 111 at the inner side of said rear wall.

There are thus provided thirteen spray headers, two at the bottom, two at the top, four at each of the side walls and one at the rear of the housing.

A float switch assembly 180 is connected to the lower end of the housing, at wall 13 and it comprises usual switch means controlled by the water reaching an upper level in the housing to cut out the electric controls, and by the water reaching a lower level to cut in the electric controls.

A pipe 182 is connected to one branch of T fitting 96, and in turn is connected to an elbow 183 connected to a vertical pipe 184 which passes up through an opening in bottom wall 16 and acts as a safety overflow pipe, to prevent water from spilling out of the door.

The sequence of operation of the machine will now be described:

It may be assumed that heat is passing through the steam pipes 50. Water is in the bottom of the housing from a previous final rinse. The motor 85 is de-energized, the door 40 is closed and valve 101 in the sewer drain pipe is closed. With this condition, the door 40 is opened and previously cleaned cages, racks or other equipment are rolled out, and other cages or equipment to be cleaned are rolled into the machine. Detergent is then added to the water in the housing. The door is then closed and latched securely. Any suitable known microswitch means may be provided which must be actuated by the door to permit actuation of electric motor, electric controls and drain valve. This is an electric safety "cut-out" to prevent operation of the controls, etc., unless the door is securely latched.

A start button is then pressed to close an electric circuit which has means to automatically do the following: The electric motor which operates the pump is energized by the circuit when the door is closed and the push button is pressed, and water from the tank is drawn out through the suction pipe 23 and is pumped by pump 84 through pipe 105 and hence through the spray headers 111 which are hydraulically self-rotating. This water is heated by the steam pipes 50. An adjustable timer in said circuit determines the period of this wash operation. during which the devices in the housing are being thoroughly washed with hot water. The water in well 27 is quickly heated. Water moves along inclined bottom wall 16 to the well. At the end of the wash period, the drain valve 101 is automatically opened and the water is power drained to the sewer by the pump. This forced drainage automatically cleans the strainer screen 92*a* contained within the Y strainer fitting 92 carrying the collected debris to the sewer. This draining operation can be set to a definite regulated period, or can depend on drop of water level in the float control 180, or can be terminated a designated period after drop to a predetermined level. The float valve 180 is used in this regulation. The timer may also be used.

At the end of the drain cycle, the drain valve 101 is again closed and the motor 85 is automatically de-energized. When the float valve is down to a predetermined level, the time switch is closed and the timer stops operating.

The filling valve 81 is then opened and fills the tank (lower end of housing below the door sill). When water in the float valve reaches a predetermined level, a switch is actuated which starts the pump motor and starts a main program timer. The water is pumped to the spray heads 111 for a first rinse operation which continues for a predetermined period controlled by the program timer. After the designated period of first rinse, the drain valve is again opened and the motor continues operating, and the first rinse water is pumped out to the sewer. At end of this drain period, the drain valve closes. The motor

is again de-energized and the filling valve is again opened to supply water to the tank to a predetermined level. During this refill period, the program timer has been stopped because the float switch dropped. As the water fills up the tank, the float rises and when it reaches an upper level, it closes the timer switch and energizes the motor which starts to again pump water to the spray headers. This is the second rinse operation. The timer is set to stop the motor at the end of the second rinse operation.

A third rinse operation may also be provided for.

The last rinse water remains in the tank and is heated up by the steam pipes while the door is opened and the washed and rinsed articles are removed. The last rinse water is treated with detergent and is used for the next wash operation.

The openings of various sizes in pipe **23** prevent vortex. The tank is shallow, a small quantity of water is rapidly heated in the small well and drains rapidly directly downwardly to the pipe **23** without vortex.

It will thus be seen that there is provided an apparatus in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A washing machine, comprising a housing having a front wall provided with a front door, a rear wall, a pair of side walls, and a bottom wall below said door, said bottom wall having a portion sloping downwardly and rearwardly from the front door, and a depressed well located at the lower rear end of said sloping wall and extending therebeyond and located near said rear wall and extending transversely substantially from one side wall to the other side wall, heating means in the upper part of said well and extending transversely, substantially coextensively with said well, said well having a lower part comprising downwardly converging wall portions, and a suction pipe interconnecting the lower ends of said converging wall portions, said pipe having an upper side, and a row of drain openings in said upper side in fluid flow communication with said well and decreasing in size toward the outlet end of said suction pipe.

2. A washing machine, comprising a housing having a front wall provided with a front door, a rear wall, a pair of side walls, and a bottom wall below said door, said bottom wall having a portion sloping downwardly and rearwardly from the front door, and a depressed well located at the lower rear end of said sloping wall and extending therebeyond and located near said rear wall, and extending transversely substantially from one side wall to the other side wall, heating means in the upper part of said well and extending transversely, substantially coextensively with said well, and a fixed suction pipe in the lower part of the well and below said heating means and longitudinally of the well and having an outlet at one end thereof, and said pipe being formed with communication means between the inside of the pipe and the well longitudinally of said pipe and distributed substantially along the entire length of the pipe, a pair of fixed longitudinal horizontally spaced tracks wholly within the casing over said sloping bottom wall at the level of the lower end of said door, and extending longitudinally from said front wall to said rear wall, and screen means removably supported on said heating means, over said well and beneath said tracks and located at the rear end of the casing near said rear wall and over the well, said screen means comprising a central perforated basket of less width than the space between the tracks, removably mounted between said tracks, and a pair of perforated side baskets beneath said tracks with a major portion of said baskets covered by said tracks, and said side baskets being slidable to positions between said tracks, one at a time, upon removing said central basket, each of said pair of baskets being of less width than the space between the tracks.

3. A washing machine, comprising a housing having a front wall provided with a front door, a rear wall, a pair of side walls, and a bottom wall below said door, said bottom wall having a portion sloping downwardly and rearwardly from the front door, and a depressed well located at the lower rear end of said sloping wall and extending therebeyond and located near said rear wall, and extending transversely substantially from one side wall to the other side wall, heating means in the upper part of said well and extending transversely, substantially coextensively with said well, and a fixed suction pipe in the lower part of the well and below said heating means and substantially coextensive with and longitudinally of the well and having an outlet at one end thereof, and said pipe being formed with communication means between the inside of the pipe and the well longitudinally of said pipe and distributed substantially along the entire length of the pipe, said communication means comprising a row of spaced openings formed in the pipe and in communication with the well and said openings decreasing in size toward the outlet end of said pipe.

4. A washing machine, comprising a housing having a bottom wall, a rear wall, laterally spaced side walls, a top wall, and a front door positioned in said front wall, said bottom wall having a rearwardly and downwardly sloping front portion and a depressed transverse well at its rear end adjacent said rear wall and extending across said housing, a suction pipe positioned at the lower end of said well coextensively therewith, and having an outlet at one end, a series of steam pipes in the upper part of said well extending substantially coextensively with said well, a motor operated pump having an inlet end connected to said outlet and of said suction pipe and said pump having an outlet end, a series of spray headers positioned above said pump in said housing, an outlet drain below said headers, means connecting said outlet end of the pump to said outlet drain, and valve means positioned in said means connecting the outlet end of the pump to said outlet drain to control flow from said pump to said outlet drain and said headers, respectively, said well having a pair of downwardly converging side walls, and said suction pipe being positioned at the apex of said downwardly converging side walls and fixed to said walls.

5. The washing machine of claim **4**, said transverse pipe having a series of suction openings in fluid flow communication with said well and decreasing in size toward the outlet end of said pipe.

6. A washing machine, comprising a housing having a rear wall, a pair of side walls, a front wall provided with a door, a bottom wall sloping down rearwardly from its front end, a depressed transverse well at the rear end of the bottom wall and adjacent the rear wall, and extending substantially from one side wall to the other side wall, said well having an upper wider depressed portion and a lower narrower further depressed constricted portion disposed longitudinally of the well and formed with downwardly converging transverse walls and substantially coextensive of the well, a suction pipe at the lower end of the lower constricted portion and having an outlet end, a steam pipe assembly in the upper wider portion of the well and extending forwardly and rearwardly beyond said lower portion of the well, and a motor operated pump having its inlet connected to said outlet end of the suction pipe.

7. The combination of claim **6**, said suction pipe being fixed and formed with a row of openings, communicating with said lower constricted portion of the well and of gradually decreasing sizes toward the outlet end of the

suction pipe, and having a combined area greater than the cross-sectional area of said suction pipe.

8. The combination of claim 7, a pair of spaced horizontal tracks over the bottom wall, and extending from the front wall to the rear wall, and screen means removably mounted on the heating means and covering the well and disposed below said tracks.

9. The combination of claim 7, a sewer drain connected to the outlet of the pump, spray header means in said housing and connected to the outlet end of said pump and extending upwardly therefrom, and a valve in the sewer drain to close and open said sewer drain without closing the connection from the outlet of the pump to the headers.

10. In combination, a casing having a front wall formed with a door opening, a front door for said opening, side walls, a rear wall, and a bottom wall extending from the front wall, below the door opening, and sloping rearwardly downwardly toward the rear wall, a transverse well at the rear end of the bottom wall, near the rear wall and projecting downwardly therefrom, a transverse, fixed, elongated suction pipe at the bottom of the well having an outlet at one end, said suction pipe having a plurality of longitudinally spaced openings communicating with said well, and a heater in the upper portion of the well and extending transversely of the casing and above said suction pipe, a pump, a motor for said pump, said pump having an inlet end connected to the outlet end of said suction pipe, spray means in the casing and extending above said bottom wall, drain means extending below the outlet of the pump, means to connect the outlet of the pump of said spray means and drain means, and valve means to control flow of water from said pump to said spray means and drain means, said suction pipe extending horizontally, and said openings being distributed substantially throughout the length of the pipe from one end to the other, said well and suction pipe extending substantially across the casing between the side walls thereof, and said openings increasing in area from the outlet end of the suction pipe to the opposite end thereof.

11. In combination, a casing having a bottom wall formed with a depressed well, a suction pipe at the lower end of said well, said suction pipe having an outlet end, a pump having an inlet end connected to said outlet end of said suction pipe, spray means in the casing, drain means, means to connect the outlet end of said pump to said spray means and drain means, said connecting means comprising a first branch connected to said outlet of said pump, a second branch connected to said spray means and a third branch connected to the drain means, a filter sleeve in said third branch having one end communicating with said first branch, and an opposite end communicating with said third branch so that water may flow from the pump to the drain means through the interior of said filter sleeve, and a wall of said filter sleeve interposed between said first and second branches of said fitting whereby soil in water flowing from said pump through said wall to said second branch, will collect at said wall, and water flowing from the pump to the third branch and through the sleeve to the drain means will wash soil collected at said wall to said drain means to clean said filter.

12. In combination, a casing having a bottom wall formed with a depressed well, a suction pipe at the lower end of said well, said suction pipe having an outlet end, a pump having an inlet end connected to said outlet end of said suction pipe, spray means in the casing, drain means, means to connect the outlet end of said pump to said spray means and drain means, said connecting means comprising a first pipe means connecting said outlet of the pump to said spray means and a second pipe means connecting said first pipe means to drain means, and a filter crossing the first pipe means and located at said second pipe means without crossing said second pipe means so that water passing from the pump through said first pipe means to the spray means must go through said filter to filter out and collect soil from water flowing therethrough, and water flowing from the pump through the second pipe means to the drain means will wash the soil collected at the filter to flush the same to the drain means.

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