May 20, 1952 D. P. SMITH 2,597,132

INDUSTRIAL WASHING MACHINE EMBODYING FLUID SPRAYING APPARATUS

Filed Feb. 4, 1946 3 Sheets-Sheet 1

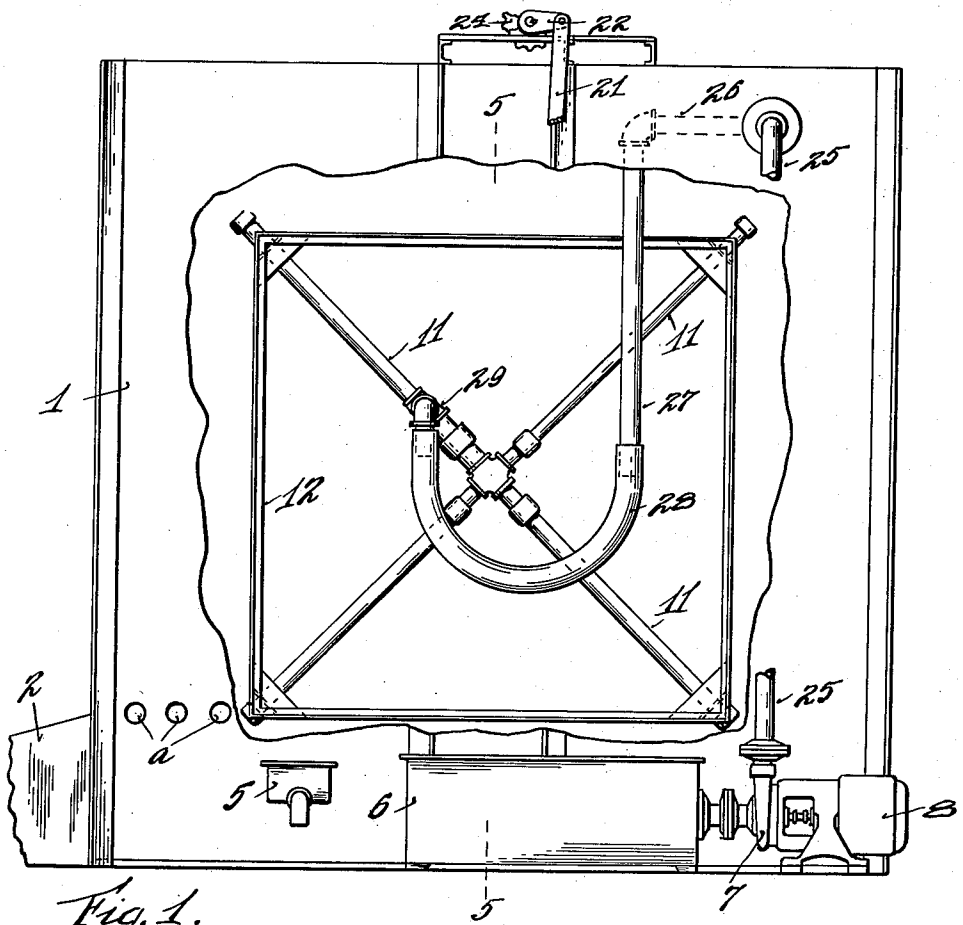


Fig. 1.

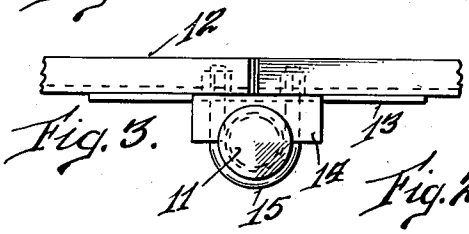


Fig. 3.

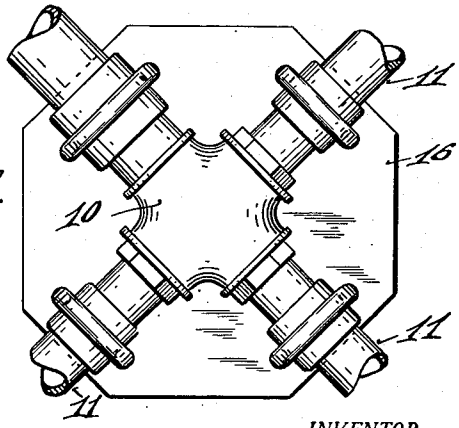


Fig. 2.

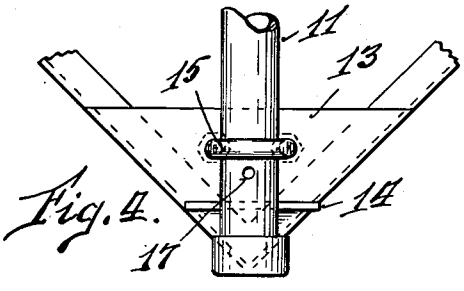


Fig. 4.

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INDUSTRIAL WASHING MACHINE EMBODYING FLUID SPRAYING APPARATUS

Filed Feb. 4, 1946 3 Sheets-Sheet 2

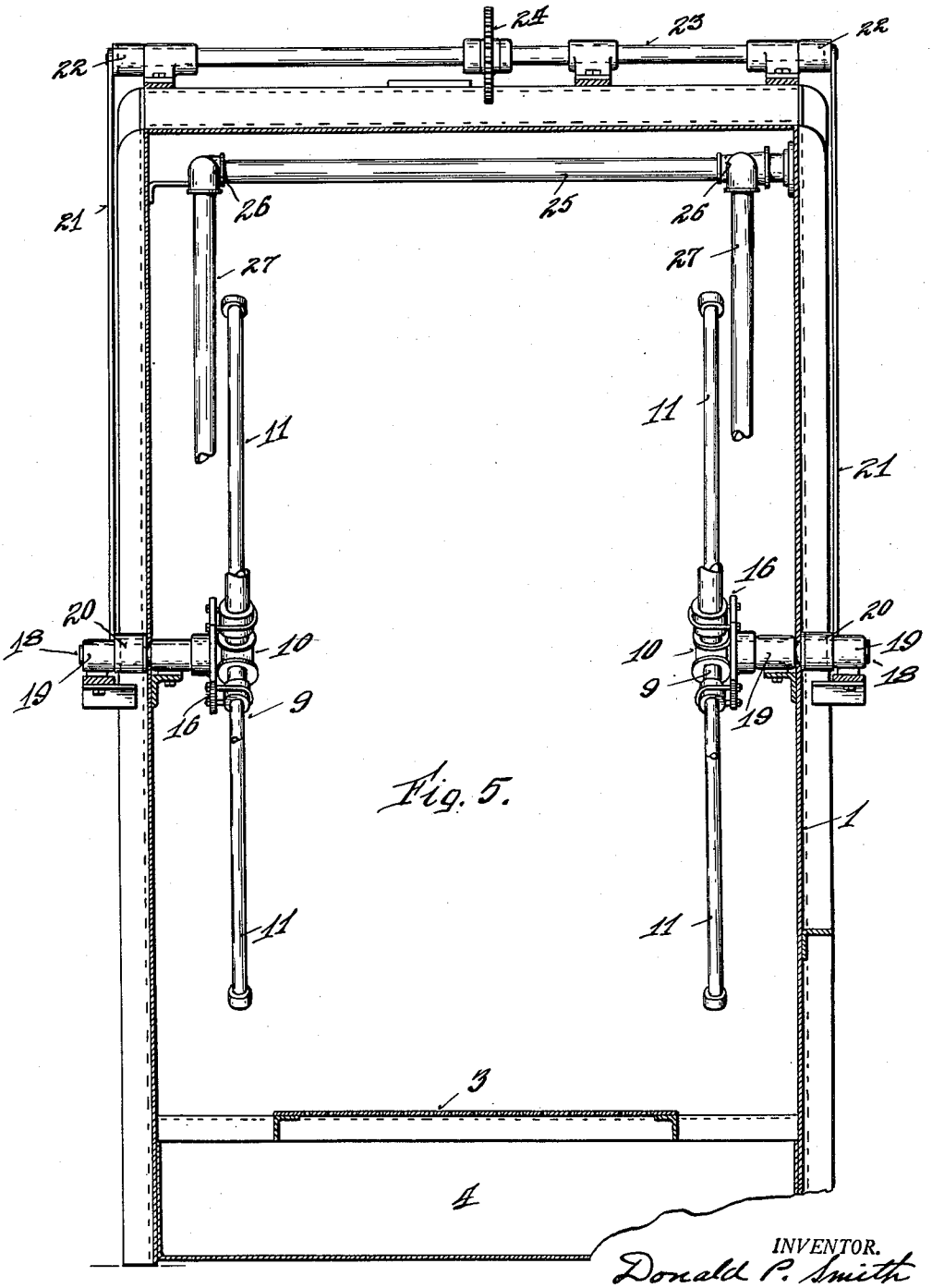


Fig. 5.

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INDUSTRIAL WASHING MACHINE EMBODYING FLUID SPRAYING APPARATUS

Filed Feb. 4, 1946 3 Sheets-Sheet 3

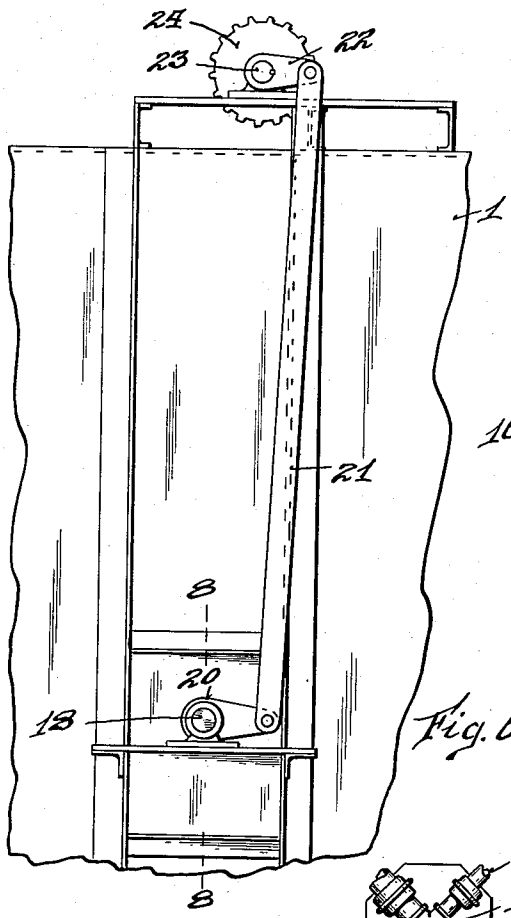


Fig. 6.

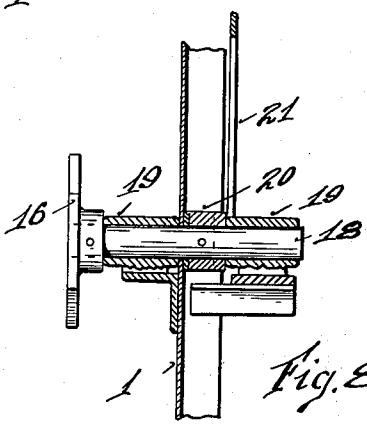


Fig. 8.

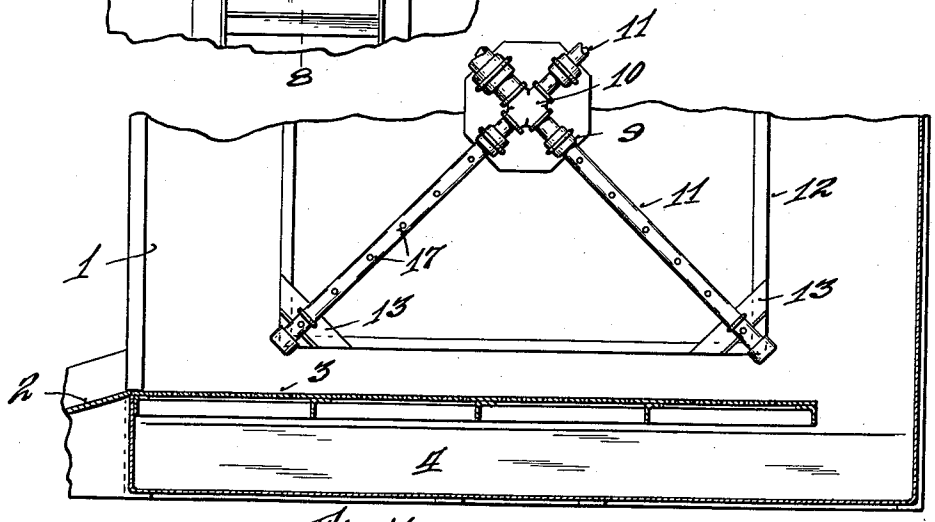


Fig. 7.

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UNITED STATES PATENT OFFICE

2,597,132

INDUSTRIAL WASHING MACHINE EMBODYING FLUID SPRAYING APPARATUS

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Application February 4, 1946, Serial No. 645,367

1 Claim. (Cl. 134—181)

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The invention relates to an industrial washing machine, particularly adaptable for cleansing bakery rack trucks, which are unitarily wheeled into the cabinet of the washer and the rack thereof thoroughly cleansed with no dismantling or removal of any of the fixed components of the rack.

The washing and cleansing of the rack is performed by a multiplicity of high volume and pressure jet or nozzle liquid spray discharges directed against the rack and from opposite sides thereof and under a moving or reciprocatory motion, productive of a turbulent and powerful stripping action reaching all surfaces of the rack for a removal of the sediment therefrom, which generally is of a sticky or pasty character, and without resorting to any manual labor for sediment removal from any part thereof. The rack is completely bodily cleansed, requiring only to be wheeled into and out of the washer cabinet.

A thorough cleansing requires but a brief period of time, which can be accomplished during a waiting period in its rounds from the place of unloading the bakery goods for packaging, back to the point of loading, as at an oven. This results in quite a reduction in number of racks from that ordinarily required, therefore a conservation of floor space for rack storage, held up for manual cleansing, and by frequent cleansing there is no opportunity for excessive hardening of the collected sediment upon the rack surfaces, aside from maintaining a higher standard of sanitation.

Therefore an object of the invention is to provide an industrial washing and drying machine for speedily and efficiently bodily cleaning a rack truck and particularly the commodity sustaining and contacting surface of the rack, for example, as employed in bakeries, the machine providing a cabinet enclosure into which the rack truck is wheeled and stationed between sprayer means disposed at opposite sides of the rack for a removal of the sediment therefrom and thereafter, ready to be again placed into service, the entire operation requiring but a brief period of time and eliminates any manual cleansing performance for any part thereof.

Another object is to provide an apparatus for bodily washing and cleansing appliances of the character as rack trucks, embodying a cabinet enclosure with its base portion providing a reservoir for holding a wash water or treated liquid solution supply and the collection thereof after its spray delivers upon the appliance being washed for re-use, the cabinet equipped with a

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platform immediately above the reservoir for stationing the appliance to be washed thereon and interpose the same between sprayer units, each respectively supported and journaled upon a relative side wall of the cabinet, each unit having a plurality of radial sprayer tubes in a common plane in parallelism with the side wall and of extended reach to spray encompass the appliance to be washed, the sprayer units journalled for rotative or oscillatory motion actuated by transmission means carried exteriorly upon the cabinet.

Another object is to provide a sprayer unit, composed of conventional pipe fittings and tubing, having a plurality of sprayer tubes of a lengthy reach extending radially from a central fitting, the fitting axially having a shaft extending laterally from one side thereof for mounting and rotatively journaling the unit and the outer ends of the sprayer tubes clamped to a frame disposed at one side thereof to rigidly unite the same.

Other objects and features of advantage will be more fully set forth in the following description of the accompanying drawings, forming a part hereof and depicting a preferred embodiment, in which:

Figure 1 is a side elevation of the improved rack washer, having a portion of a side wall of the cabinet broken away to illustrate one of the oscillating liquid sprayers of a pair, opposingly disposed and each respectively adjacent the inner side of a side wall of the cabinet.

Figure 2 is an enlarged plan view of the face sides of the central portion of a sprayer.

Figure 3 is an enlarged end view of a corner of the sprayer head or unit.

Figure 4 is a plan view of the corner of the sprayer head shown in Figure 3.

Figure 5 is an enlarged section on line 5—5, Figure 1, with the filter tank omitted.

Figure 6 is an elevation of the central and upper portion of one side of the washer cabinet, illustrating the power transmitting means for oscillating one of the sprayers.

Figure 7 is a central vertical section through the lower portion of the washer.

Figure 8 is an enlarged section taken on line 8—8, Figure 6.

The washer being particularly adaptable for cleansing metallic rack trucks as employed in bakeries, the description will be principally directed to such use, although not necessarily limited thereto.

Bakery floor trucks generally have a wheel and

caster carrying chassis and a rack superstructure fixedly embodying wire mesh shelving for directly sustaining baked products before packaging. This results in a soil adherence to the mesh fabric of the shelves or trays requiring frequent cleansing to maintain the same in a sanitary condition. The racks being of extended capacity considerable difficulty, time and expense is necessitated in manually individually cleansing the shelving or trays to an efficient degree nor is satisfactory performance thereof offered without dismantling the rack.

With the present improvement the rack truck, as a unit, is wheeled into the cabinet of the washer and stationed upon a platform therein, directly intermediate of a pair of opposing and relatively corresponding oscillating perpendicularly positioned sprayer heads or units, each embodying a plurality of jet sprays against the rack of the truck. The oscillatory motion of the sprayer continuously shifts and diversifies the elevation of the jets, so that all surfaces of the shelves and trays are acted upon and exposed to the liquid spray pressure, readily removing all sediment therefrom, whereupon cutting off the liquid spray discharge supply, the rack truck is removed from the cabinet in a completely cleansed condition ready to be again put into immediate service. This materially reduces the volume of rack trucks generally required, as the time consumed for cleansing is negligible, resulting in a reduction of equipment and floor space requirements.

Referring to the drawings, 1 indicates a sheet metal cabinet of structural steel and sheet metal construction, of a dimension to permit a maximum height of rack truck to be bodily wheeled therein and stationed upon an elevated foraminous platform, ready for cleansing. The cabinet walls are shown as sustained by vertical angle iron studding at the exterior side of the cabinet.

The cabinet or casing construction may consist chiefly of structural steel and sheet metal parts to provide the enclosure and supports for the various parts and mechanism employed. The cabinet fabrication may follow conventional practice so that specific description thereof, in detail, need not be made herein, except as may be essential for a clear understanding and necessary to the functioning of the apparatus.

The front end of the cabinet is provided with an entrance opening, sealed by hinged closure doors, not shown. An inclined ramp 2 extends from the front or entrance end of the cabinet for leading a rack truck onto an elevated foraminous platform 3, mounted within the cabinet, so that the cabinet beneath the platform provides a water storage and collecting reservoir 4, for the liquid spray supply. The platform is suspended centrally of the cabinet, and clear of and spaced from the opposite side and rear end walls thereof and preferably is provided with a guard rail thereabout to insure properly locating the rack struck within the cabinet for a uniformity of spray administered from opposite sides thereof.

One side of the cabinet has several aligned apertures, *a*, therethrough for entry of pipe conductors, as for a steam coil connection within the tank, a second for a steam injection into the cabinet, it being desirable to heat the reservoir liquid supply interior of the cabinet and a third for the necessary reservoir water supply.

The cabinet at one outer side is equipped with an overflow box 5, in communication with the reservoir and a screen or filter tank 6, to which a water pressure delivery pump 7, is connected, the

pump being operated by an electric motor 8, in direct connection therewith.

The apparatus therefore provides a storage tank or reservoir for the full inside area of the cabinet and at the base thereof. Thus a storage of treated supply of spray solution, following the general practice for industrial washing machines is maintained within the apparatus and from which it is pumped to supply the sprayer mechanism and collected for reuse. This aside from effecting an appropriate demand supply and economy, permits the use of detergent treated and heated sprayer solution, volume and pressure delivery ordinarily not available directly from water service supply mains.

A pair of oscillating sprayer heads of units 9, 9, respectively opposing one another, each adjacent a relative side wall of the cabinet, are supported and journalled thereupon, centrally, thus locating the sprayer unit at opposite sides of the platform for delivering jetted liquid spray onto and over the entire rack truck stationed therebetween upon the platform, so that the rack is cleansed in its entirety in a single operation.

The sprayer heads or units are of duplicate construction, each consisting of a central pipe cross fitting 10, from which a plurality of sprayer tubes 11, radially extend in a plane parallel with the side wall of the cabinet or plane perpendicular to the platform. The number of tubes is selective, it however, having been experienced that four tubes arranged in aligned pairs, and those of an aligned set at right angles to those of a second set, is ample for certain needs, as a bakery rack truck. Such particular arrangements permit its assembly with standard commercial fittings, and also facilitate in rigidly tying the outer or terminal ends of the sprayer tubes to the corners of a rectangular frame 12, to give stability to the unit, which is a factor as the unit is subjected to the delivery of a comparatively large volume of liquid at extremely high pressure, as well as being a power driven moving element.

The rails of the rectangular frame 12 are preferably formed from angle iron bar material, and at the corners of the frame connected together by a plate 13, extending crosswise thereof, welded or otherwise fixed to the rails. Each of the corner plates is of angle form iron in cross-section, thereby providing a laterally extended limb 14, which is notched centrally to socket a sprayer tube therein toward its outer terminal and bound to the plate by a U-bolt 15, extending laterally from the plate and about the sprayer tube, the frame being upon the rear side of the sprayer tube. Likewise, the sprayer tube, at its inner end connecting with the cross fitting 10, is bound by a U-bolt to the outer face side of a hub plate 16, coaxially with and at the rear side of the cross fitting.

Each sprayer tube 11, lengthwise thereof, is provided with a row of apertures 17, at determined spacing apart, which may each be equipped with a suitable jet or nozzle for an appropriate liquid dispersion, and for which many different types are commercially available, therefore in detail need not be specifically exemplified herein. The nozzles however, may be of a type for the delivery of a fan-shape spray and relatively arranged upon each tube for directional control.

The hub plate 16, is fixed upon an end of a shaft 18, journaled in a pair of bearings 19, 19, mounted upon brackets fixed to a side wall of the cabinet, and respectively on opposite sides thereof, the shaft extending through an aperture in the

side wall of the cabinet, for making a power connection for oscillating the sprayer unit exterior of the cabinet. The shaft 18, at the exterior side of the side wall of the cabinet and between the bearings 19, 19, carries crank 20, fixed thereto.

The arm of the crank 20, at its outer end, pivotally connects to an end of a connecting link 21, which pivotally connects to the end of an arm of a crank 22, fixed upon a end of a shaft 23, extending crosswise of the exterior of the top of the cabinet and journaled in suitable bearings mounted on a frame work on the top of the cabinet.

The shaft 23, intermediate thereof carries a sprocket wheel of gear 24, for a transmission with an electric motor, not shown, stationed on said framework supporting the said bearings for the cross shaft 23. As both sprayer units are similarly transmittingly connected to the shaft 23, they operate in unison in an oscillatory motion.

The mounting of the transmission, connecting with the links 21, on the top of the cabinet, is merely selective and of advantage should it be desired to provide the cabinet with double openings, one for each of the opposite ends thereof for through transportation facility. When the cabinet has but a single opening, the transmission and its supporting framework may preferably be mounted upon and exterior of the rear end of the unit instead of on the top thereof as illustrated, which in some instances may be necessary to reduce the total heighth of the unit, so that the location of the transmission is optional.

The water or liquid cleansing solution is delivered to each sprayer unit by a vertical supply pipe 25, exterior of the cabinet and at one end connects with the pump 7, and at its upper end traverses the cabinet wall and in lateral lead extends horizontally crosswise within the upper portion of the cabinet. A pair of lateral branches 26, 26, connect with the lateral lead of the supply pipe 25, one respectively for each of the sprayer units. From each of the horizontal branch lines 26, a pipe section 27, depends and its lower end carries a flexible tube section 28, which in turn connects with a pipe L-fitting 29, tapping into one of the connections for a sprayer tube 11, as shown in Figure 1, for supplying all of the sprayer tubes of the unit.

The pipe connection between the L-fitting 29, and the cross fitting 10, are of a capacity for furnishing an adequate supply for all of the sprayer tubes connecting with the cross fitting 10. The tube section 28, as an intermediate flexible or yielding connection between the service pipe 27, and sprayer unit accommodates itself to the degree of oscillatory motion of the sprayer unit and being on the rear side thereof can be located to loop either above or below the axis of the sprayer unit and in connection therewith toward the axis of the unit. Its compensatory movement is comparatively slight and non-straining thereto, nor retarding to the motion of the unit. In an oscillatory stroke each sprayer tube moves in an arc of approximately 90°, so that with four radial sprayer tubes, each having an extended reach, the effective spray area of the unit is of considerable dimension and provides the necessary coverage for the maximum size of rack for which the apparatus was contemplated to accommodate, so that the rack in its entirety can be cleansed in a single operation.

In an oscillatory motion of the sprayer units, the liquid supply connection can be made eccentric from the axis of the unit, so that in its construction conventional pipe and fittings may be

employed, facilitating its manufacture. No packing of joints is required as would be necessary for a full rotative cycle with the supply connection made coaxially of the unit, which however, would be within the concept of the structure disclosed. The oscillatory motion for the four prong or tube series serves admirably and is preferred for bakery rack washing, as the spray jets or nozzles can be definitely set for obtaining the most efficient directional effects, within the arc travel of each sprayer tube.

For a rack cleansing operation the rack is wheeled into the cabinet and thereby stationed upon the platform between the opposing sprayer units, whereupon the electric motor is set into action, rotating the pump which withdraws the water or liquid solution from the cabinet reservoir for delivery at the desired pressure to the sprayer units. The reservoir occupying the entire area of the base of the cabinet collects the liquid discharge and drainage for reuse. Simultaneous with the starting of the pump or subsequently the power means for oscillating the sprayer units can be put into action. The sprayer units initially may be held stationary to sufficiently spray the rack for a soaking period and subsequently oscillated with the water pressure increased for a sediment removing or washing period, after which the spray is cut off.

The liquid can be cut off, at the end of a determined washing period by means of an automatic timer, or manually operated as after a signal light indicates that the washing period has terminated and the other means of treatment and control may be included, which however, forming no part of the present invention are not disclosed or made a part hereof.

Having described my invention, I claim:

An industrial washing machine of the nature disclosed, comprising a cabinet, the lower portion thereof providing a reservoir, a platform mounted within the cabinet horizontally over the reservoir and of less width than the cabinet for the delivery and sustaining thereon an appliance to be spray washed by sprayer units at opposite sides of the platform, a pair of liquid sprayer units within the cabinet, each unit respectively adjacent a side of and mounted upon a cabinet side wall at a relative side of the platform and embodying a plurality of sprayer tubes fixed to and extending from a common conduit fitting and arranged in several pairs, each pair in alignment and relatively extending from opposite sides of the conduit fitting in a plane parallel with the cabinet side wall, each tube having a closed head end and a row of apertures longitudinally thereof to liquid spray an appliance stationed on said platform, a frame joined to the outer end of the tubes of a sprayer unit to bond the same together, each conduit fitting having an axle extending axially therefrom, supported and journaled within a bearing as an element of the side wall and extending through said bearing for making a transmission connection therewith exterior of the cabinet, a liquid supply conduit in connection with the cabinet reservoir having branches each in connection with a sprayer unit and transmission means mounted upon and exterior of the cabinet in connection with the axle of each sprayer unit to oscillate the same.

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