March 26, 1940. J. C. CONNAL 2,195,202

DRUM WASHING APPARATUS

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FIG. 1

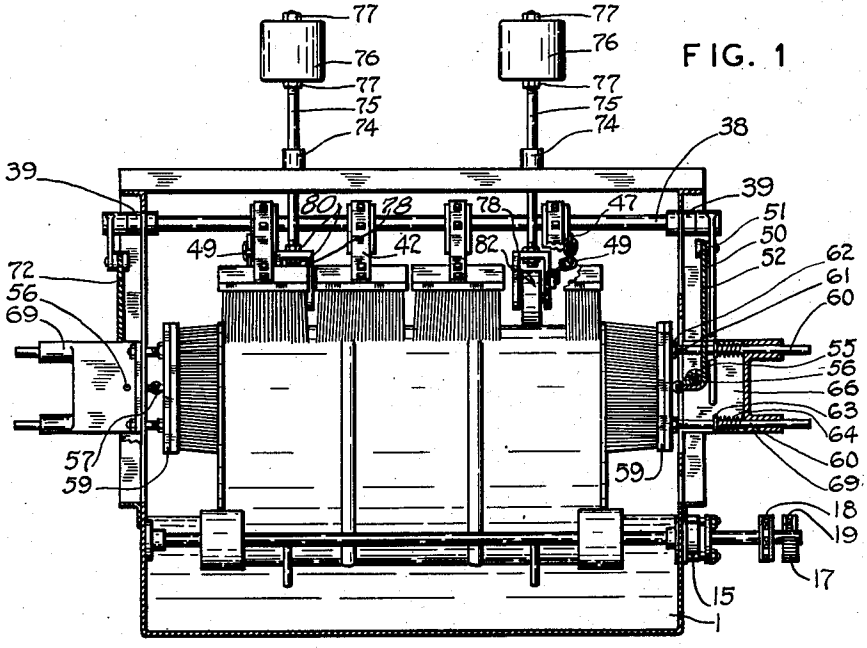


FIG. 2

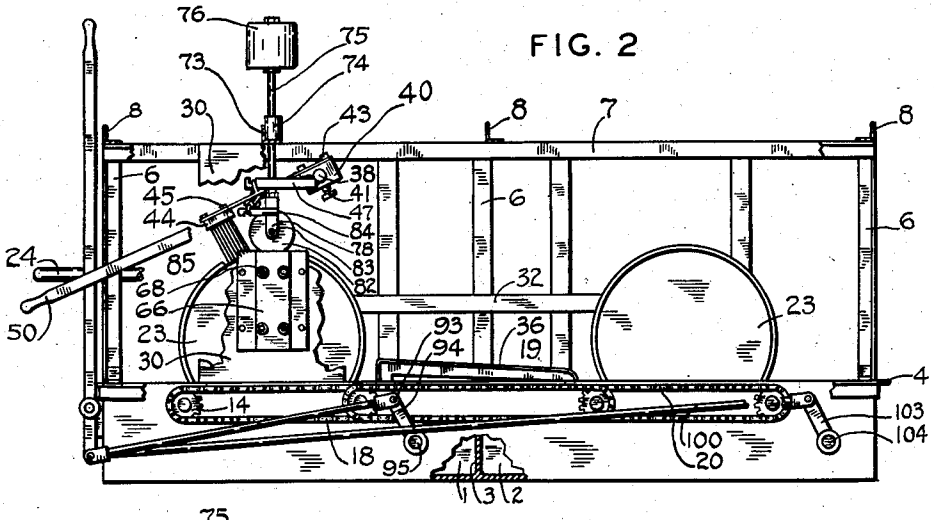
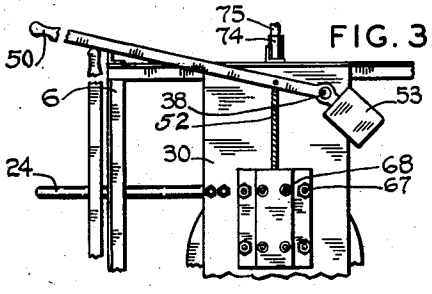


FIG. 3



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DRUM WASHING APPARATUS

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FIG. 4

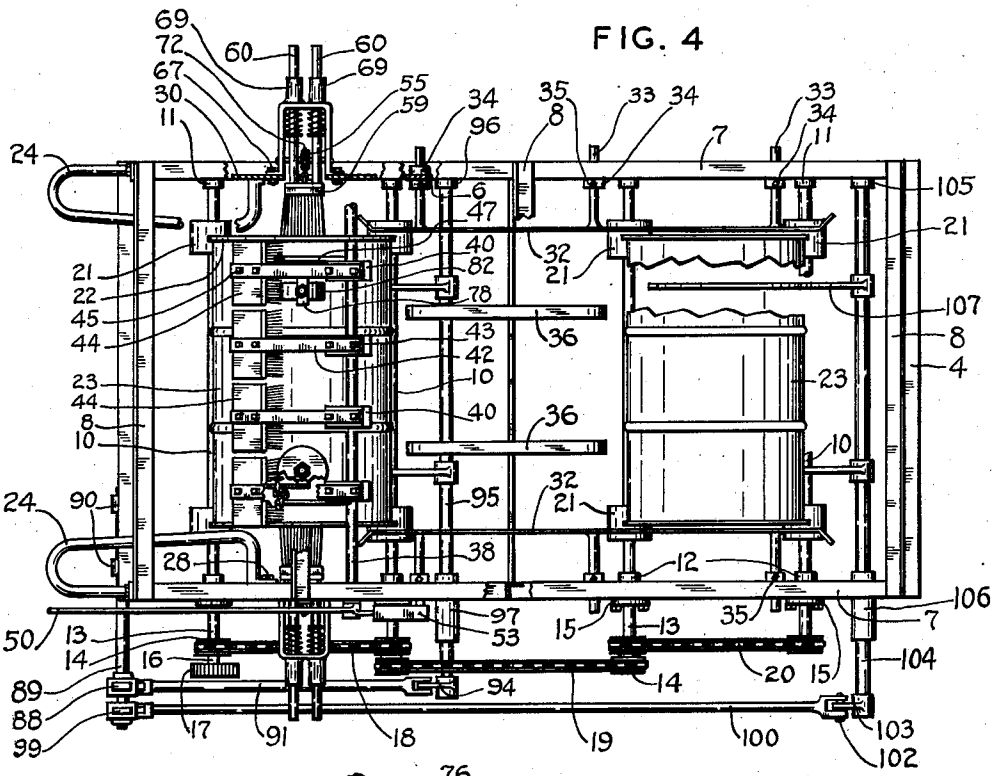
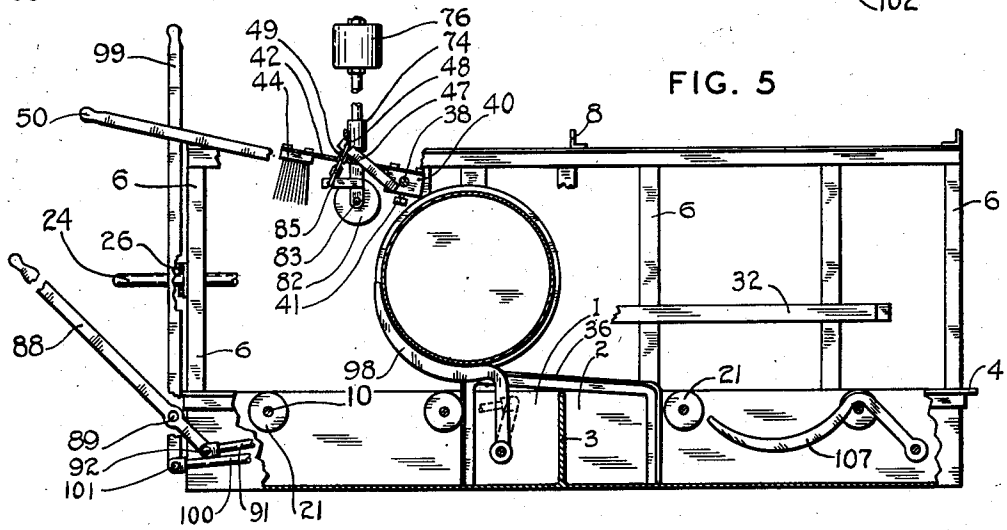


FIG. 5



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DRUM WASHING APPARATUS

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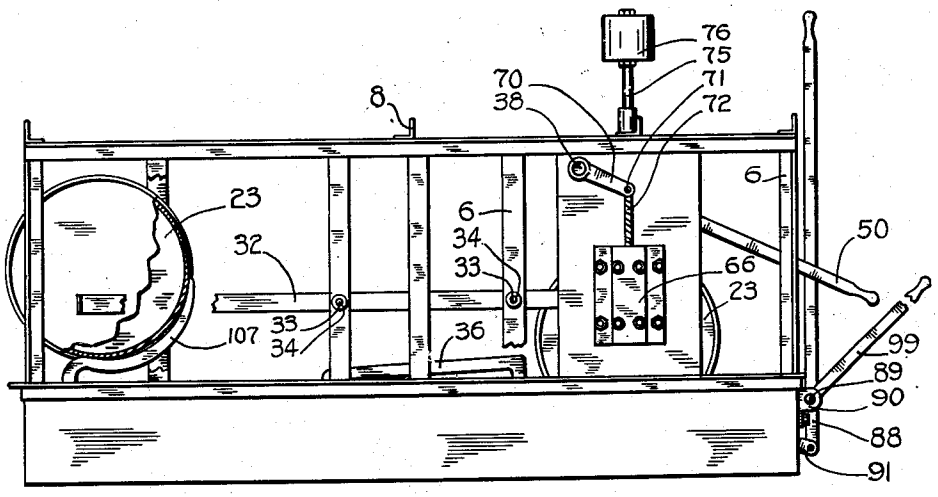


FIG. 6

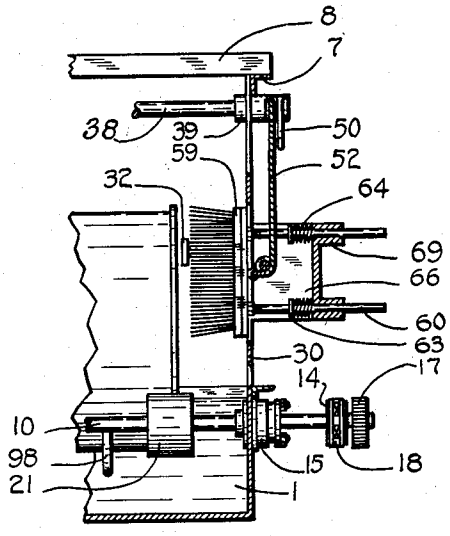


FIG. 7

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UNITED STATES PATENT OFFICE

2,195,202

DRUM WASHING APPARATUS

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Application April 8, 1938, Serial No. 200,884

2 Claims. (Cl. 15—57)

This invention relates to an apparatus for washing drums and is more particularly directed to apparatus for mechanically washing and cleaning oil drums employed for distributing oil to filling stations and the like.

It has been found that color schemes for decorating the exterior surfaces of oil drums have proved to possess great commercial value, as a mark of identification for a particular brand of lubricating oil. Customers at filling stations, and commercial buyers alike, for psychological reasons are attracted to, and are more favorably impressed with clean and freshly painted drums.

When shipments of new drums are received at storage and distributing stations, it has been found necessary to cleanse them thoroughly before applying either superficial preservatives or paints. The initial and subsequent investments in oil drums represent large sums of working capital and in order to protect such an investment, it is necessary to preserve and protect drum equipment from deterioration. As a cooperative expedient customers are oftentimes billed for drums when buying oil with an accompanying option of receiving full credit if returned to the seller. This rebate inducement has proved very effective and the annual returns of drums to the oil distributing branches reach a total of many thousands of drums. The exterior surfaces of such returned drums are usually not clean and therefore generally require washing before being refilled, whether or not they are to be repainted or recoated with a preservative.

It is obvious that the quantity of new drums handled, coupled with those returned from selling agencies, presents a difficult problem when attempting to use common drum-cleaning methods and that a tremendous saving in labor costs can be effected by employing a mechanical washing apparatus.

The principal object of the present invention is to provide an apparatus for mechanically washing and cleaning oil drums in which rollers are adapted to revolve the drum in a bath of cleaning fluid.

Another object of the invention is to provide a washing apparatus in which weighted cleaning brushes are adapted to engage with the exterior surfaces of drums being rotated in a bath of cleaning fluid.

A further object of the invention is to provide a washing machine in which means are adapted for mechanically loading and unloading the drums.

A further object of the invention is to provide an apparatus for washing drums in which means may be used advantageously to compensate for variations in drum sizes and simultaneously compensate for shortening of the bristles in the cleaning brushes.

A further object of the invention is to provide an apparatus for washing oil drums in which a plurality of compartments are used for successive cleaning and rinsing operations.

Another object of the invention is to provide an apparatus for washing oil drums in which multiple compartments are provided with mechanical means for ejecting drums therefrom.

Another object of the invention is to provide an apparatus for washing drums in which track and guide means are provided for maintaining alignment of the drums while being rotated therein.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts, substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The apparatus of the present invention comprises a frame mounted on a multiple compartment tank in which a plurality of power driven rollers embrace and rotate drums in a bath of cleaning fluid, and against which drums, cleaning brushes are forcibly engaged. The apparatus further has lever means and rocker arms connected to arcuately formed ejector arms disposed below the rotating drums for shifting said drums to an adjacent compartment after which ejector arms are adapted to eject the drums from the apparatus.

In the accompanying drawings I illustrate one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

Figure 1 shows a vertical cross sectional view of the machine with a drum in position. Fig. 2 is drawn in a reduced scale and is a side elevation with fragments broken away and illustrates the invention with two drums in position therein. Fig. 3 is a fragmentary view illustrating the upper extreme position of the brush lever. Fig. 4 is a plan view of the machine. Fig. 5 is a diagrammatic view illustrating the lever mechanism and shows one of the ejector arms in an elevated position and supporting a drum. Fig. 6 is a side elevation, the opposite of that shown in

Fig. 2, and illustrates a drum being ejected from the machine. Fig. 7 is an enlarged fragmentary view showing one of the end brushes disengaged from the drum and moved outwardly therefrom.

In carrying out my invention I provide adjacently arranged fluid tanks 1 and 2 respectively which may have a partition 3, preferably welded in place to form leak proof joints. An outwardly projecting angle iron or reinforcing flange 4 may be provided and extended around the upper portion of the tanks 1 and 2 and preferably welded in place.

Mounted on the tanks 1 and 2, and partly supported on the flange 4, a framed structure may be provided, the component parts including a plurality of perpendicularly disposed standards 6—6, horizontally disposed frame members 7—7 secured to the upper extremities of the standards 6—6, and tie bars 8—8 secured to and supported on frame members 7—7, the respective frame parts being preferably welded to each other and to the tanks 1 and 2.

A plurality of rotatably mounted shafts 10—10 disposed transversely of the length of machine may be provided and arranged in pairs, one end of each shaft being journaled preferably in bearing brackets 11—11, mounted in the tanks 1 and 2 respectively. The opposite end portion of the said shafts may be journaled in bearing brackets 12—12 and have provided thereon protruding ends 13—13 onto which chain sprockets 14—14 may be secured for rotation thereof. I provide conventional stuffing boxes 15—15, for the shafts 10—10 which are secured to the outer walls of the tanks 1 and 2. An extension 16 is provided on one of the shafts 10 to which a main driving pinion 17 is secured as a means for any convenient driving unit to be engaged with such as an electric motor. Link chains 18, 19, and 20, respectively, are provided and mesh with chain sprockets 14—14 for simultaneously rotating the shafts 10, in response to rotation of the pinion 17.

A pair of spaced roller members 21—21, are passed over and secured to each of the shafts 10, their spacing being adapted to coincide with spaced flanges 22, provided usually on oil drums 23 now in common use, the said rollers being of a diameter sufficiently small and spaced outwardly from the drum so as to embrace the said drum flanges tightly due to the wedging action produced, thereby imparting a rotating movement thereto.

To facilitate entering drums into the apparatus, guide rods 24—24 are advantageously positioned, and may be secured at an intermediate point to the standards 6—6, by means of screws 26, and at their inner ends by screws 28 that thread into vertically disposed supporting plates 30—30, interposed between and securely welded to the horizontal frame members 7—7 at their upper end portions and to tank 1 at their lower ends.

Arranged parallel to the longitudinal axis of the machine, and extending over shafts 10—10 in tank 2 and preferably over a shaft in tank 1, are provided drum guide bars 32—32, which are supported by means of a plurality of horizontally disposed rods 33 slidably mounted in brackets 34, provided in the uprights or standards 6—6. The said bars are secured into any desirable lateral position, determined by the size of the drum being washed, by means of set screws 35—35 threaded into brackets 34.

Rails 36—36 are interposed between guide bars 32 and arranged parallel therewith and are secured to the bottom of the tanks 1 and 2, usually being welded therein. The upper faces of the said rails are inclined downwardly toward the tank 2 to enable the drums to gravitate to a point between the rollers 21—21 in the tank 2.

A shaft 38 is journaled in brackets 39—39 provided on the upper portion of the plates 30 and has passed over its central portion blocks 40—40, anchored to the shaft 38 by means of set screws 41. Outwardly extending flexible arms 42, preferably of spring steel, may be secured to the blocks 40 by means of screws 43 and to the outer end of said springs I provide downwardly disposed brushes 44—44 preferably of wire construction, which are attached by means of screws 45.

Supplementary arms 47—47 are provided and disposed outwardly from the blocks 40 to which they are usually secured by welding and have notches 48 formed therein to which the upper links of chains 49—49 are attached. A hand lever 50 may be securely attached to one extremity of the pivotally mounted shaft 38 and has provided in its intermediate portion a flanged pin 51 to which the upper end of a perpendicularly disposed cable 52 is anchored. To facilitate operating the hand lever 50 I provide a counterweight 53 at one end thereof. The lower portion of the said cable is usually wrapped around a grooved pulley 55, rotatably mounted on a spindle 56, after which it is disposed substantially horizontally and then looped through an eye bolt 57. The said eye bolt is usually threaded into the outer face of an inwardly disposed brush 59 which engages with the end face of the drum 23.

To provide lateral movement of the said brush toward and away from the drum, a plurality of guide pins 60—60 are provided and one end may be secured to the brush 59 by means of threads in one end of the said pins, as at 61, and locked in position with a lock nut 62. The central portion of the guide pins 60 have formed thereupon flanges 63, against which compression springs 64 are shouldered at one end, the opposite end of said springs being shouldered against a U shaped supporting bracket 66. Screws 67 are employed to attach the said supporting bracket to the vertical side plates 30. Apertures 68—68 are formed in the central portion of bearings or bosses 69—69 and provide sliding supports for the guide pins 60 to be moved inwardly and outwardly from the drum.

To one end of the shaft 38 I secure a rocker arm 70, on the outer end of which is provided a flanged pin 71, to which a cable 72 is looped about. The said cable is adapted to actuate a horizontally disposed brush assembly which corresponds to and is disposed directly opposite brush 59, and for purpose of convenience similar reference characters are employed to identify the said brush and component parts, inasmuch as the parts are identical and the operation of both brushes is adapted to be actuated simultaneously and by the hand lever 50, the mode of operation being described hereinafter.

A cross brace 73 is secured at its outer ends to the frame members 7—7 and has provided in its intermediate portion bearings 74—74 through which are passed vertically disposed slide rods 75—75. To the upper ends of the said rods weights 76—76 are attached, and are preferably of a cylindrical formation and secured in position by means of lock nuts 77—77. The lower ends of the slide rods 75 have threaded thereon adjustable yokes 78—78 which are secured in position by nuts 80, the said yokes being adapted to re-

ceive rollers 82 which are, in the present instance, rotatably mounted in the said yoke, by means of spindles 83.

An outwardly disposed arm 84 is welded to the yoke 78 and has formed in its outer portion a notch 85 into which the lower link of chain 49 is engaged.

A vertically disposed hand lever 88 is fulcrumed on the horizontally disposed shaft 89 which is passed through brackets 90—90 secured to the end portion of the tank 1. The lower end of the lever 88 is pivotally attached to one end of a connecting rod 91 by means of a clevis pin 92. The opposite end of the rod 91 is pivotally attached, by means of a clevis pin 93, to a rocker arm 94. The said rocker arm is secured tightly to a rocker shaft 95 which is disposed parallel with the respect to the roller shafts 10, and is journaled at one extremity by means of a bearing bracket 96, which is preferably secured to the side wall of the tank 1. A relatively long bearing bracket 97 provides a journal and support for the opposite end of the rocker shaft 95, a portion of which protrudes to receive the rocker arm 94.

Arcuately formed ejector arms 98—98 are passed over the shaft 95 and nonrotatably secured thereto, the outer ends of which are spaced from the drum 23 in tank 1 and partially encircle the lower face of the said drum.

99 designates a hand lever fulcrumed at an intermediate point on the shaft 89 and pivotally connected to one end of a connecting rod 100 by means of clevis pin 101. The opposite end of the said rod is pivotally attached by means of a clevis pin 102 to a rocker arm 103 which is nonrotatably secured to one end of a rocker shaft 104. Bearing brackets 105 and 106, respectively, are secured to the side walls of tank 2 to provide journals for the rocker shaft 104. As a means for ejecting the drum from the rollers 21 of tank 2, I provide ejector arms 107—107 which are nonrotatably mounted on the rocker shaft 104 and are operated similarly to arms 98—98.

In operation the drums 23 are usually rolled into position intermediate the rollers 21—21 in tank 1 through the flared opening provided between the guide rods 24—24, an approach to them usually being a conventional type of ramp. The said rollers are spaced apart an adequate distance, proportional to the diameter of said drum, to create a wedging action of an intensity that is conducive to a rotating action of the drum in response to rotation of said rollers.

A fluid level in the tank is adapted to partly submerge the drum in either water or a cleaning solution. During rotation of the said drum when positioned in tank 1, the lever 50 is pulled downwardly which pivotally engages the downwardly disposed brushes 44 with the cylindrical surface of the drum, which lever movement simultaneously loosens the cable 52—52, releasing the pressure on the compression springs 64—64 on each side of the machine. When released, the said springs are adapted to force the inwardly disposed brushes 59—59 against each end face of the drum, as will best be observed in Figs. 1 and 2 of the drawings. When pressure is applied to the said brushes, the drum is prevented from being pushed outwardly by means of the weights 76—76 which exert a downward pressure on the drum through the medium of the rollers 82 which are moved upwardly and downwardly with the lever arm 50.

After the brush cleaning operation is completed the lever 50 is raised, which movement exerts a pull on the cables 52—52 imparting an outward movement to the inwardly disposed brushes 59—59, as best illustrated in Fig. 7. The same upward movement of the lever 50 lifts the brushes 44—44 and simultaneously lifts the rollers 82 which provides overhead clearance for the drum to be removed.

Lever 88 is pulled outwardly when the drum is ready for the rinsing operation, which pulling movement pushes the rocker arm 94 to impart a responsive upward movement to the arcuately formed ejector arms 98. The said movement of the lever 50 is made with adequate speed to cause the drum to be rolled in the direction of tank 2, the guide bars 32—32 serving to guide the path of travel, and its rolling engagement on the declining rails 36 permits it to gravitate into position intermediate the rollers 21 in tank 2. Afterwards the arm 98 is lowered into its normal position and another drum is rolled into the tank 1 for its first cleaning operation.

After the drum in tank 2 is rotated a few revolutions for the rinsing operation the lever 99 is pulled, which raises the arcuately configured arm 107 in tank 2, thereby ejecting the drum from the rinsing tank.

It is obvious that the spring steel of which the brush arm 42 is made may be varied to provide the desired pressure for the best cleaning results. The weights 76—76 may be increased or decreased to provide a downwardly exerted pressure on the revolving drum.

Although I have shown and described one embodiment of my invention, it is to be understood that the same is susceptible of various changes, and I reserve the right to employ such changes as may come within the scope of the appended claims.

I claim as my invention:

1. In a drum washing machine which includes a fluid tank and a plurality of parallel rollers adapted to embrace and rotate a horizontally disposed drum partially submerged in fluid in said tank: brushes adapted to engage exterior surfaces of said drum; means for engaging and disengaging said brushes with respect to said drum; and retainer means, adapted to contact said drum with minimized resistance to rotation thereof, for exerting downward pressure on said drum when being rotated in said tank, said retainer means being connected to said engaging and disengaging means and adapted to be actuated thereby but being capable of a limited degree of independent motion with relation to said brushes while in contact with said drum.

2. A drum-washing machine comprising: a plurality of parallel rollers adapted to support and to rotate a drum; a shaft mounted parallel to said rollers; a plurality of spring arms fixedly attached to said shaft; a plurality of brushes adapted to engage the surface of said drum, one of said brushes being attached to each of said arms; and means for applying a rotational force to said shaft in the direction suitable for pressing said brushes against said drum.

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