

July 23, 1963

L. C. CREECH

3,098,250

PORTABLE WASHING APPARATUS FOR LIGHT FIXTURE PANELS AND THE LIKE

Filed May 15, 1961

4 Sheets-Sheet 1

Fig. 1

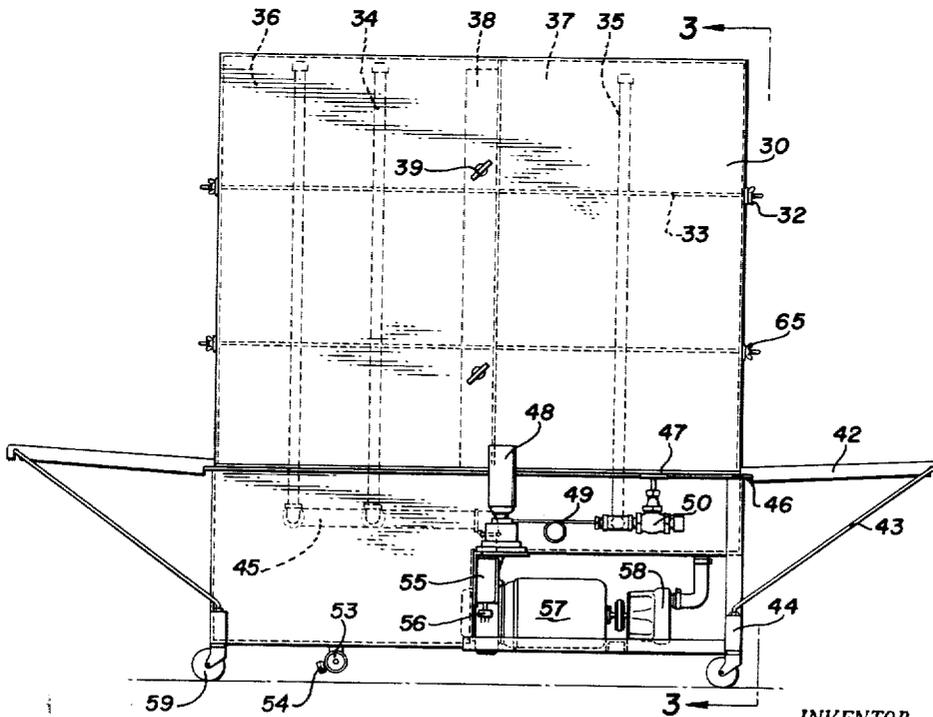
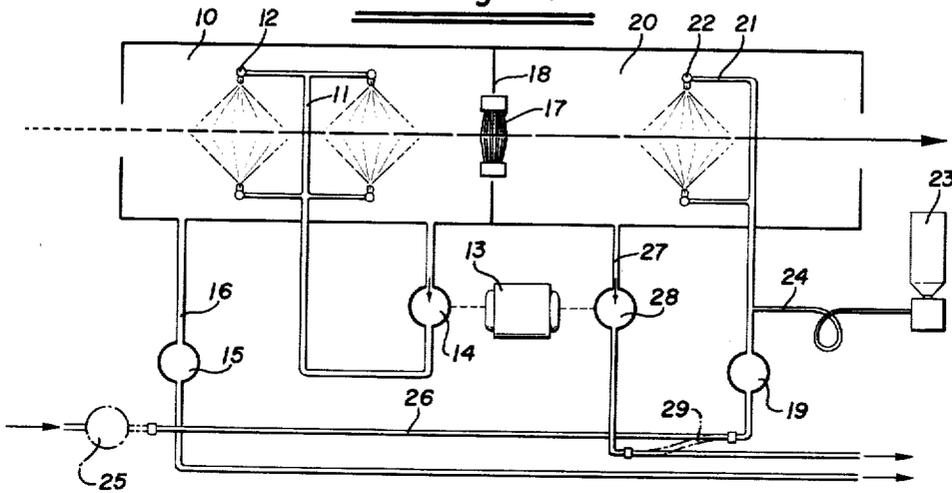


Fig. 2

INVENTOR.
Larry C. Creech

July 23, 1963

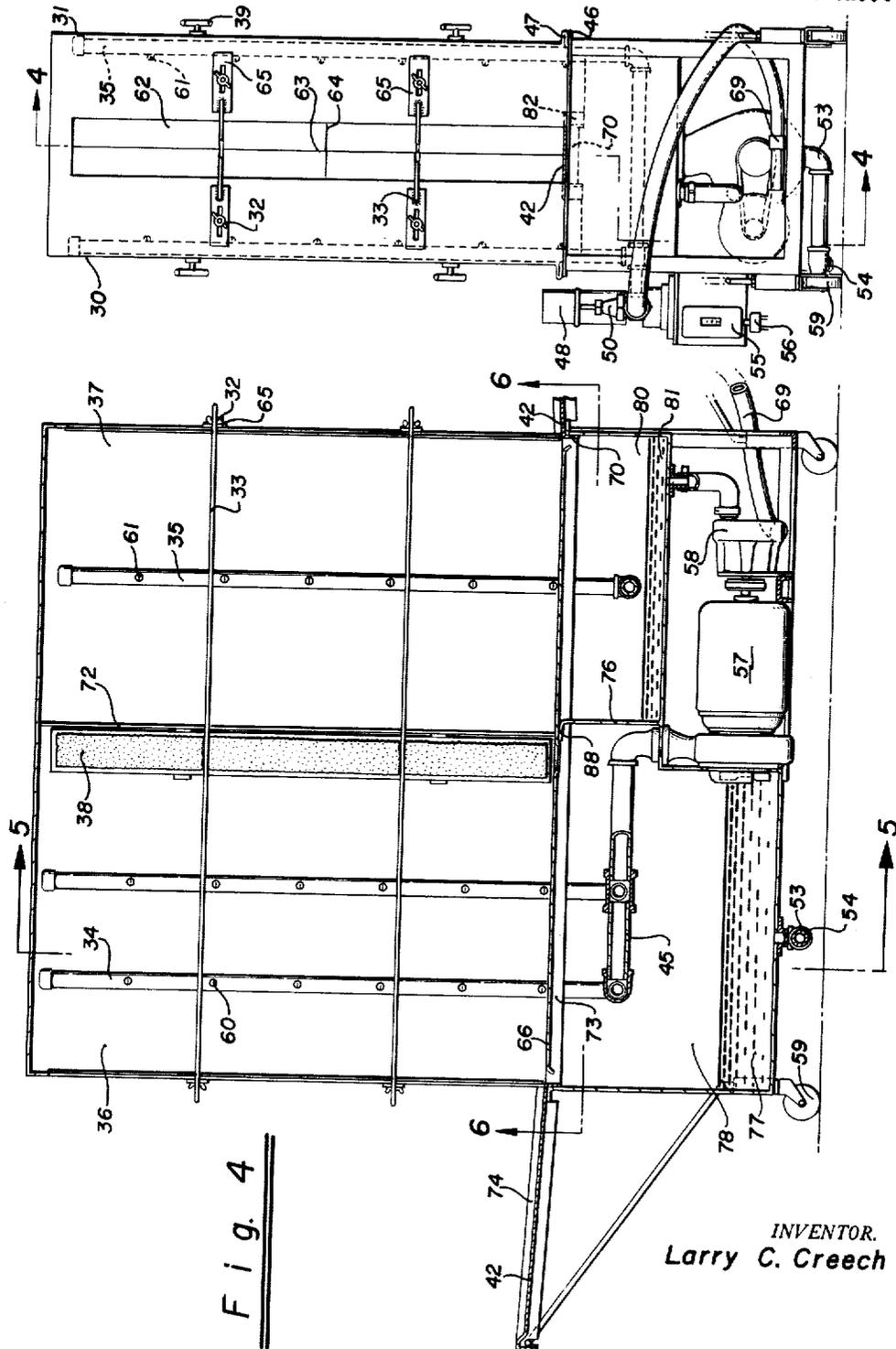
L. C. CREECH

3,098,250

PORTABLE WASHING APPARATUS FOR LIGHT FIXTURE PANELS AND THE LIKE

Filed May 15, 1961

4 Sheets-Sheet 2



INVENTOR.
Larry C. Creech

July 23, 1963

L. C. CREECH

3,098,250

PORTABLE WASHING APPARATUS FOR LIGHT FIXTURE PANELS AND THE LIKE

Filed May 15, 1961

4 Sheets-Sheet 3

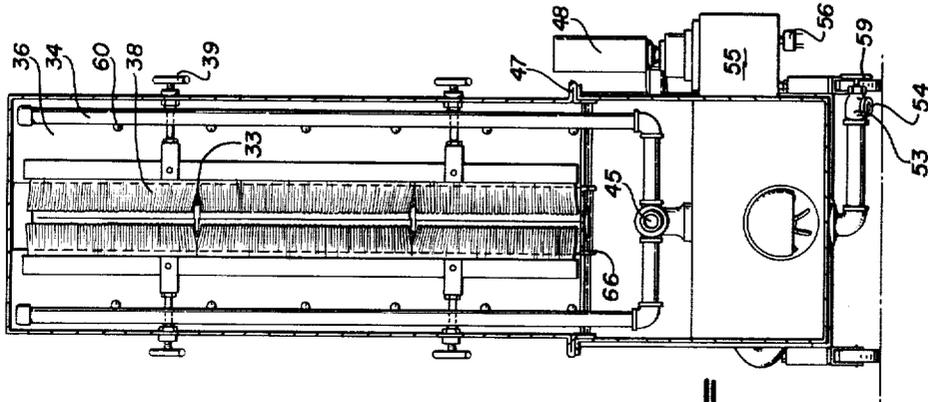


Fig. 5

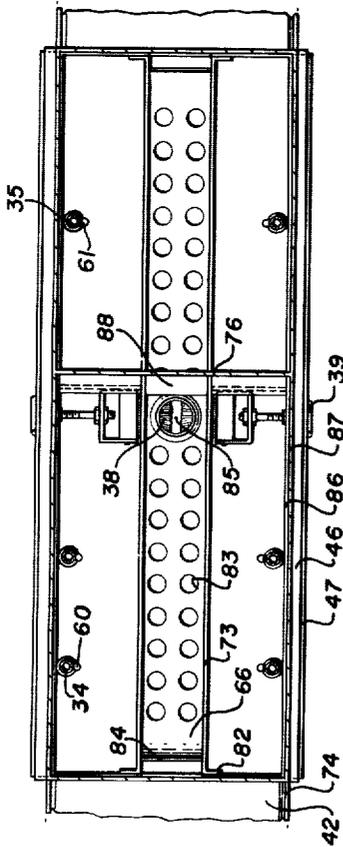


Fig. 6

INVENTOR.
Larry C. Creech

July 23, 1963

L. C. CREECH

3,098,250

PORTABLE WASHING APPARATUS FOR LIGHT FIXTURE PANELS AND THE LIKE

Filed May 15, 1961

4 Sheets-Sheet 4

Fig. 7

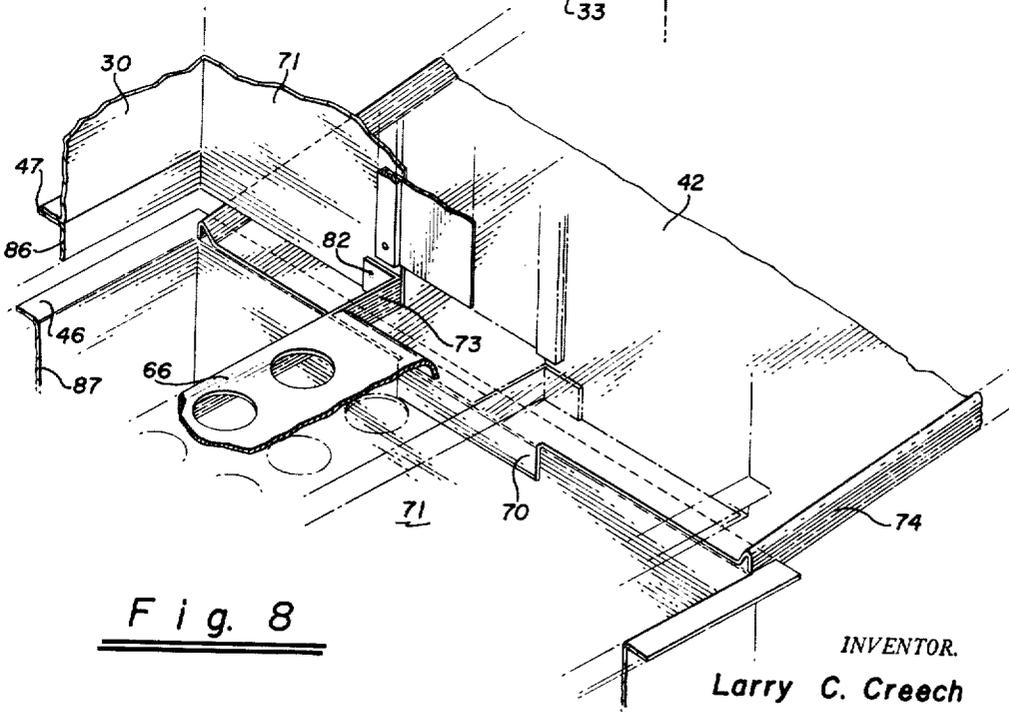
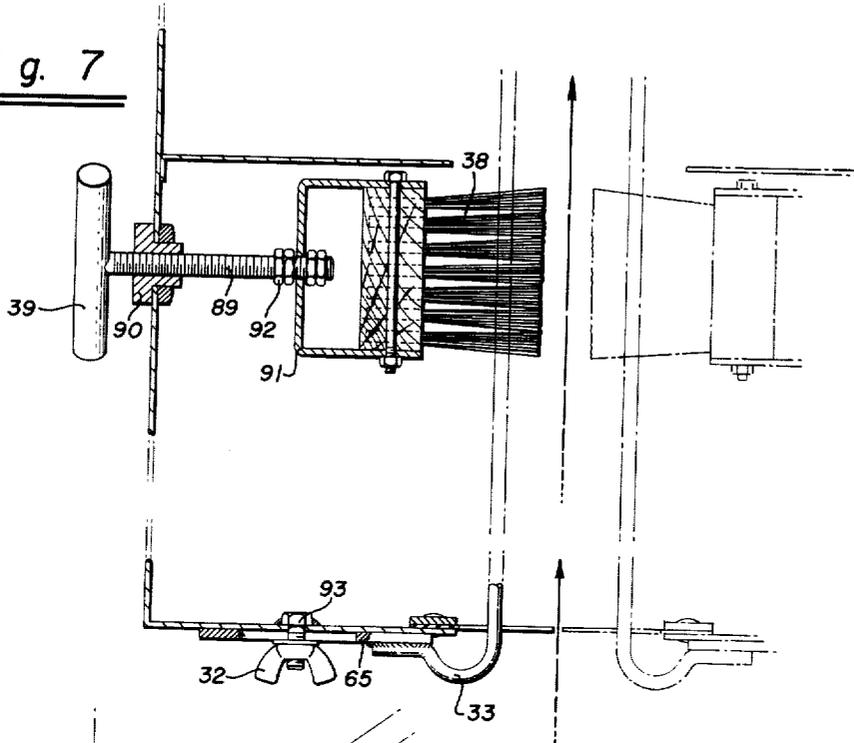


Fig. 8

INVENTOR.
Larry C. Creech

1

3,098,250

**PORTABLE WASHING APPARATUS FOR LIGHT
FIXTURE PANELS AND THE LIKE**

Larry C. Creech, 1523 43rd Ave., San Francisco 22, Calif.

Filed May 15, 1961, Ser. No. 110,084

2 Claims. (Cl. 15-77)

The present invention relates to a simply constructed yet highly efficient self contained apparatus for washing panels featuring a plurality of washing spray units, adjustable scouring brushes and a plurality of rinsing spray units. In the past, light panels such as those commonly employed in commercial translucent fixtures were washed in open tanks or removed from the ceiling and hosed. However, manual washing of panels in open tanks or by hose is clumsy, laborious and inefficient. Moreover, because of the unavoidable splashing during the washing operation and dripping of the washed panels, it has been virtually impossible to maintain the immediate washing area in a satisfactory dry condition. Additionally, and most important, when washing double walled, hollow diffusing panels in the conventional manner, leaks or cracks frequently develop which admit water into the central cavity of the panel. Because of the danger of infiltrating water into double walled, hollow diffusing panels, such panels are customarily carefully washed with running hoses. However, this procedure drastically limits the selection of the washing site and is prohibitively slow.

It is, consequently, the principal object of the present invention to provide an apparatus which permits the washing of all types of panels in a single apparatus in a simple, neat, yet efficient manner.

Another object of the present invention is to provide an apparatus for the thorough but rapid washing of double walled, hollow panels without the infiltration of water into the central cavity of the panel structure.

Yet another object of the present invention is to provide a compact washing apparatus which can be easily moved to any desired location.

Still another object of the present invention is to provide a washing apparatus for panels wherein a housing substantially encases the washing compartments thereby minimizing the splashing resulting from the washing yet permits manual manipulation of the panels through the washing and rinsing compartments.

Another object of the present invention is to provide a washing machine for panels having a substantially rigid yet easily dismantled housing provided with washing and rinsing tanks and adjustable brushes.

Yet another object of the present invention is to provide a durable, sturdy apparatus for washing panels which is simple to operate and use and consistently effective in performance.

Other objects, features and advantages of the present invention will be apparent from the following description read in conjunction with the appended drawings and claims.

In the accompanying drawings:

FIG. 1 is a schematic view showing the separate wash and rinse tanks through which the panels are moved, the brushes disposed between these tanks and the pipe and pump system by means of which water is supplied to the tanks and removed therefrom;

FIG. 2 is a side view of the washing apparatus showing the panel guide extensions in their open position, the rinse injector, switch, electrical connection, motor and pump assembly, tank separator and spray pipes, and caster elements by means of which the entire housing unit may be conveniently moved;

FIG. 3 is an end view of the washing apparatus taken along the line 3-3 of FIG. 2 and shows in detail the

2

disposition of the brush and rod adjustment elements, the spray pipes, the pump discharge system and tank drain, and the power assembly;

FIG. 4 is a cross sectional view taken along the lines 4-4 of FIG. 3 and shows in detail the separation of the wash tank and rinse tank, the disposition of the spray pipes and guide rails, the drainage system whereby the excess water in each tank is withdrawn and the construction of the rod adjustment members employed to guide the panels as they pass through the tanks;

FIG. 5 is a cross sectional view taken along the lines 5-5 of FIG. 4 and shows details of the brush structure and spray pipes between which the panels move;

FIG. 6 is a cross sectional view taken along the lines 6-6 of FIG. 4 and shows in detail the track over which the panels to be washed are guided.

FIG. 7 is an enlarged fragmentary view showing the brush and rod adjustment disposed to operatively engage a panel passing along the path shown by the arrows in phantom lines;

FIG. 8 is an enlarged fragmentary view showing details of the panel track and the manner in which the terminal portion of the track is engaged with the removable hood.

Referring now to FIG. 1 in greater detail the panels are moved along the path shown by the phantom line arrow into the interior of the washing apparatus. These panels may be moved manually along a panel guide and may conveniently be placed upon a panel guide extension of the type shown in FIG. 2. In operation after the first panel is placed on the panel track or guide other panels are moved behind it thus forcing the first panel further into the interior of the apparatus. The panel to be washed now passes between spray pipes 11 in a washing tank 10. Closely spaced nozzles 12 spray both sides of the pipe with water containing one or more wetting agents and detergents. The number of spray nozzles 12 may vary considerably. It is also within the scope of the present invention to spray one side of the panel before the other, i.e. spray the sides of the panel passing through wash tank 10 sequentially rather than simultaneously. As a practical matter, however, it is preferred to simultaneously spray both sides of the panel passing through wash tank 10 between spray pipes 11 by means of the spray nozzles 12.

As shown in FIG. 1, pumps such as 13 may be employed to recirculate the water and detergent through pipes 11 into the spray nozzles 12 thus permitting reuse of the water and detergent on subsequently washed panels. The pump effecting the recirculation of the water and detergent into wash tank 10 may be turned on and off by means of valve 14. When it is desired to empty the wash tank 10 of the water containing wetting solution and detergent a valve 15 in drainage pipe 16 is employed. Pipe 16 leads to a convenient outlet for sewage. After the panel has passed through the plurality of spray nozzles 12 it is moved between vertically disposed brushes 17 which dislodge dirt and grime. Brushes 17 are adjusted to prevent scratching or marring of the surface of the treated panel. The vertically disposed brushes 17 are preferably constructed of nylon which exhibits the requisite stiffness yet is sufficiently resilient to prevent deleterious scratching of the treated surface. As shown most clearly in FIG. 1 the brushes employed to dislodge dirt and the like are disposed medially, the separation wall between the chambers being indicated at 18. One pair of vertically disposed brushes is sufficient for the purposes of the present invention. However, it should be understood that just as the number of spray pipes and spray nozzles may vary considerably within the scope of the present invention, so in like manner may the number of pairs of opposing brushes 17.

3

After the panel has passed between brushes 17 it is moved into tank 20 which is provided for the rinsing of the washed panel. In the embodiment of the present invention shown in FIG. 1 rinse tank 20 is provided with one pair of opposed rinse pipes 21, each of which is provided with a rinse spray nozzle 22. The number of rinse pipes 21 and rinse spray nozzles 22 may vary considerably. It has been found preferably, however, to employ two pairs of opposed spray pipes 11 provided with a plurality of spray nozzles 12 and a single pair of rinse pipes 21 provided with a plurality of spray nozzles 22. The rinse spray nozzles 22 subject the panels to a continuous rinsing action. If desired a chemical appropriate for the purposes of the present invention may be injected or bled into the spray system in rinse tank 20. In FIG. 1 the rinse injector 23 is connected to rinse pipe member 21 by means of connecting member 24.

The water from rinse tank 20 is supplied from a convenient source which may be turned on by a house valve such as that shown at 25 in phantom lines. The water supply pipe 26 is preferably provided with a conventional valve 19 so that the volume of water passing into the rinse pipes 21 and thence through the rinse spray nozzles 22 may be accurately controlled. The water conveyed into the rinse tank 20 through water supply pipe 26 may be removed from the tank by means of drainage pipe 27 which, as shown in FIG. 1, can run directly into a convenient sewer outlet. If desired, however, the drainage pipe 27 may be provided with a valve 28 attached to the pump 13 and the pipe 27 connected, as shown by phantom lines at 29, to the water supply pipe 26. Employing this system it is possible to make an endless circuit of water circulating through the rinse tank 20. This system of recirculating the water in the tank may be particularly valuable when the acquisition of water is inconvenient or when only a few panels are being washed and the original volume of water passing through the rinse pipe 21 and rinse spray nozzles 22 would remain sufficiently clean for efficient washing of the remaining panels.

FIG. 2 shows a side view of the washing apparatus with details of the panel guide extensions, pumps, valves and rinse injector. Side wall 30 is an integral element of the detachable hood which can be removed from the base portion of the washing apparatus. Guide rails 33 shown in phantom lines are fixedly secured to the end walls of the detachable hood by appropriate attaching means such as wing nuts 32 and slotted link member 65. The guide rails 33 serve to hold the panels to be washed in proper position as they pass through the washing apparatus. Because of the adjustability of the wing nuts 32, the guide rails 33 may be moved laterally to accommodate panels of different dimensions which are pushed manually through the confines of the wash tank 36 and rinse tank 37.

A plurality of spray pipe members 34 are disposed vertically in the wash tank 36. These spray pipe members are preferably disposed in opposed pairs, as shown most clearly in FIG. 5. The number of opposed pairs of spray pipe members 34 may vary considerably. It has been found satisfactory for the purposes of the present invention, however, to employ two pairs of opposed spray pipe members 34 as shown in FIG. 2.

Rinse tank 37 is provided with a similarly constructed pair of opposed rinse pipe members designated 35 in FIG. 2. The number of rinse pipe members 35 may also vary considerably within the scope of the present invention. However, it has been found preferable to employ a single pair of opposed rinse pipe members. A pair of brush members 38 are disposed medially in the apparatus so that each panel passes between the brushes and is swept clear of loose dirt and the like. The brushes 37 are adjustable to prevent the panels from being scratched or marred by the brush bristles. The adjustment of the brushes is shown most clearly in FIG. 7. In essence, a handled bolt is employed to move the brush in and out of the channel

4

through which the panels are pushed. The handle to the brush screw adjustment is shown at 39 in FIG. 2. It will be understood that other types of adjusting means may be employed to move the brushes into the path of the panels being washed. However, the illustrated key head bolt type element employed to move the brushes into operative connection with the panels being washed resolves the problem in a simple yet highly efficient manner and obviates the danger of marring or scratching the surfaces of the panels being washed. The resolution of this problem is particularly critical in the washing of certain plastic panels employed in luminous light fixtures, since these panels are easily scratched. Moreover, panels used in luminous light fixtures are prone to show scratching and marring on their surface when in use.

The panel guide extension members 42 constitute a particularly advantageous feature of the present invention. Panel guide extension members 42 are disposed so that the panels to be washed may be guided along the desired path into the confines of the detachable hood. These extension members 42 are held in position by brace members 43 which are operatively accommodated by adjustable collar members 44. Because of this arrangement of elements, the extension members 42 may be adjusted angularly to conveniently accommodate panels passed through the confines of the hood. The detachable hood or cover is disposed upon a bottom wall and as shown most clearly in FIGS. 3 and 8 is provided with a flange 47 which makes possible the removal of the detachable hood yet permits its firm operative attachment to the lower portion of the washing apparatus without the employment of bolts or the like.

Container 48 may be employed to bleed a chemical into the rinse pipe members 35 by means of connecting member 49. The chemical container or rinse injector 48 may vary considerably in size and any conventional method of injecting or bleeding the chemical contained therein is clearly within the scope of the present invention. The valve 50 may be employed to control the quantity and duration of rinse water passing through rinse pipe members 35. The wash tank is provided, as shown in FIG. 2, with a drain valve 53 and hose connection 54 to the drain valve so that wash water may be easily removed. One particularly advantageous feature of the present invention is the fact that the drain valve and hose connection are disposed at a point where they may be easily connected by hoses to a sewer outlet. Because of this design it is possible to employ the apparatus in virtually any appropriate room of the building, yet by attachment of hose easily drain the spent water. Moreover, and most important, both the wash water and rinse water may be recirculated in the system which is thus rendered completely portable and self contained.

FIG. 2 also shows the switch 55 and electrical connection 56 disposed laterally to the motor 57. The type of power source employed may, of course, vary considerably. It is preferred, however, to employ a one-half horsepower electric motor for purposes of pumping. The power source 57 is operatively engaged with the pump 58.

The entire unit is mobile because of the employment of casters 59. Because of the relatively small size of the unit, the employment of casters and the fact that the panel guide extension members may be detached or collapsed from the substantially horizontal position shown in FIG. 2, the entire washing unit may be easily moved through elevators, office doors and the like. Hence, it is possible to use the present unit in any convenient spot within the building. Moreover, because of the compactness of the unit and design of the wash tanks and rinse tanks, it is possible to completely service a large number of panels in a neat and highly efficient manner without excessive escape of water from the apparatus. These advantages coupled with recirculation of the wash and rinse waters render the present washing apparatus clearly superior to any heretofore employed in the washing of panels.

In operation, a panel to be washed is placed on panel

5

6

guide extension 42, which is supported by brace member 43 and adjusted into a slightly tilted position so that the panel may be easily disposed thereon. The panel is pushed or otherwise propelled into the interior of wash tank 36. A second and third panel may subsequently be placed behind it and pushed in the same manner into the interior of the container. In wash tank 36 the panels are sprayed through spray pipe member 34. The panels are subsequently pushed between brushes 38 which are adjusted to the width of the panels by means of the handle screw adjustment 39 and thence into the rinse tank 35. In rinse tank 35 the panels are rinsed by means of rinse pipe members 35 which may employ a chemical such as a non-ionic surface active agent which is bled into the system through connecting member 49 of rinse injector 48. The panels are subsequently removed from the apparatus and are ready for replacement in the fixture or stacking. FIG. 3 shows details of the elements secured to the sidewalls 30 and 31 of the detachable hood of the washing apparatus. The pair of opposed rinse pipe members 35, shown in phantom lines, are provided with a plurality of spray nozzles 61. The rinse water passing through these opposed pipes 35 and thence through the spray nozzles 61 thoroughly rinses the panels passing through the washing apparatus. The handles to the screw adjustments for the brushes 38 are shown at 39 and are employed to adjust the brushes to the appropriate width for the panels being washed. Similarly, adjustment of the guide rail members 33 is effected through employment of the wing nut 32, accommodated by the slotted link element 65. A closure member generally designated 62 and preferably constructed of a resilient material such as rubber prevents water from seeping out of the chamber 37 when the washed panels pass through the vertical split 63. When panels of smaller dimension such as skylights are washed, it has been found highly advantageous to employ a horizontal slit 64 in the closure member 62 so that the entire closure element is not opened when the washed panel passes through the vertical slit 63. This horizontal slit in the closure element constitutes a particularly advantageous feature of the present invention.

The entire upper unit is covered with a detachable hood which is fixedly engaged to the lower tank housing of the washing apparatus by means of flanges 47, as shown most clearly in FIG. 8. The guide rail 66 is downwardly curved, as shown in FIGS. 3 and 4, thus causing the water in the wash tank 36 and rinse tank 37 to run into the lower tank reservoirs. The panel guide extension member 42 is secured to the lower tank wall as shown best in FIG. 8, by flange 70. The lateral flanges 82 of track member 66 serve to fixedly secure the track member to the end wall 71. Because of this unique disposition of elements, it is possible to detach the entire upper hood from the lower tank in a simple yet highly efficient manner without employing screws, bolts, or the like. FIG. 3 also shows the disposition of the drain valve 53 and hose connection 54 to the drain valve as well as the switch 55, electrical connection 56, and rinse injector 43, all of these components being disposed for ease of servicing and use. In the embodiment of the invention shown in FIG. 3, the pump discharge 69 is adjusted to permit recirculation of the wash water. Because both the wash water passing through wash tank 36 and the rinse water passing through rinse tank 37 may be recirculated, the apparatus can be self-contained and completely portable. It should be noted, however, that in the preferred embodiment of the present invention, the wash water is recirculated, whereas the rinse water in rinse tank 37 is not recirculated.

FIG. 4 which is a cross sectional view of the washing apparatus taken along the lines 4—4 of FIG. 3 shows in detail the four separate tank units which together constitute the washing apparatus. Wash tank 36 is provided with spray type members 34 having a plurality of spray nozzles 60. As shown best in FIG. 8, the entire upper portion of the apparatus, including the hood over the wash

tank 36 and rinse tank 37, may be removed. Wash tank 36 and rinse tank 37 are separated by a wall 72. It is essential in all embodiments of the present invention that the wash tank and rinse tank are separated. The rinse tank 37 is provided with at least one pair of opposed rinse pipe members 35 having a plurality of spray nozzles 61 so that the panel to be washed is completely and efficiently sprayed with water when it passes into tank 37. The guide rails 33 extend the length of the washing apparatus and are adjusted by means of wing nut 32 and slotted link member 64. By the adjustment of these guide rail members 33, it is possible to effectively wash panels of varying widths.

As shown most clearly in FIG. 4, the opposed brush members 38 are disposed on the wash tank side of the separating wall 72. It should be noted that a closure member or protective curtain constructed of neoprene or rubber of the type shown at 62 in FIG. 3 may be disposed at the opening between tanks 36 and 37. The disposition of brush members 38 is necessary to direct the water from the brushes into the tank disposed below wash tank 36 rather than into the tank disposed below rinse tank 37. The guide rail member 66, shown in detail in FIG. 6, is supported by angle element 73. As shown most clearly in FIG. 4, the panel guide extension members 42 are preferably slightly tilted to aid in the movement of the panels into the interior of the washing apparatus. The panel extension members 42 are provided with flanges 47 shown most clearly in FIG. 8. The terminal portions of the guide rail 66 are curved downwardly to cause water to run into the tank disposed below. Track member 66 is provided with a plurality of apertures 83, thus permitting the water to run into the lower tanks 78 and 80 and preventing water in wash tank 36 from running into rinse tank 37.

A particularly unique feature of the present invention is the offset baffle shown at 76, which makes possible the retention and recycling of the wash water and is so disposed that water from the brushes 38 collects in residue wash water tank 78 with wash water 77. As shown in FIG. 4, wash water tank 78 is disposed below wash tank 36. Wash water passing through the feed pipe 45 into the spray pipe member 34 and thence through the nozzles 60 passes through the apertures 83 in the track member 66 into the reservoir tank 78 where, accumulating at 77, it is withdrawn by means of the drain valve 53 and hose connection 54. A separate residue rinse water tank 80 serves to collect the water passing through the portion of track member 66 disposed within rinse tank 37. The water passing through rinse pipe member 35 in the rinse tank 37 is collected at 81. For purposes of the present invention, it has been found highly desirable to recirculate the wash water accumulating at 77 in wash tank 78. Generally speaking, however, the rinse water shown at 81 in residue rinse water tank 80 is not reused. As shown in FIG. 4 the motor 57 and pump 58 can be connected by any commonly used drive. If desired, the pump discharge 69 may be employed to recycle the rinse water or, alternatively, as shown in schematic FIG. 1, the pump may be employed to simply discharge the rinse water into a sewer. Generally speaking, 3" casters 59 have been employed in the preferred embodiment of the present invention, though casters of other dimensions and types may be used. In operation, water pumped through feed pipes 45 passes through the spray pipe members 34 into the wash tank 36, where it contacts the subject panels. The water then passes through apertures in the track member 66 and over the curved terminal portion of track member 66 into residue wash water tank 78 where it accumulates at 77. By means of the drain valve 53 and hose connection 54, this water may be removed from the system or, alternatively, recycled and re-used on subsequently washed panels. After being washed in chamber 36, the panels are moved into rinse tank 37 where rinse water is forced by pump 58 powered by motor

7

57 through rinse pipe members 35. The rinse water passing into chamber 37 runs through the apertures in guide rail member 66 and over the curved terminal portion thereof into residue rinse water tank 80 where it collects at 81. By means of the motor-powered pump 58, this water may be removed through pump discharge 63, or alternatively recycled.

FIG. 5, which is a cross sectional view taken along the lines 5—5 of FIG. 4, shows details of the brush structure and spray pipe members in wash tank 36. The wash tank 36 is provided with a plurality of spray pipe members 34, each of which possesses spray nozzles such as those shown at 60. The panel being washed is forced between opposing spray pipe members 34 and opposing brushes 38. The brushes 38 are adjusted to the desired width by means of screw adjustment member 39 so that each panel passing between the opposing brushes is thoroughly brushed clean of dirt and debris, but is not scratched or deleteriously marred. The panels passing between the opposing brushes 38 and spray pipe members 34 are maintained in position by guide rail members 33, the panels passing along the face of track member 66. The hood or cover is easily detached from the lower portion of the washing apparatus with which it is securely engaged by flanges 47. FIG. 5 also shows most clearly the highly advantageous disposition of the rinse injector 48, switch 55, electrical connection 56, and drain valve 53.

FIG. 6 is a cross sectional view taken along the lines 6—6 of FIG. 4, and shows in detail the structure of track member 66, which is a critical element of the present invention. The track member 66 is provided with a plurality of apertures 83 through which the water in wash tank 36 and rinse tank 37 passes. Additionally, the track member 66 is characterized by a downwardly curved terminal portion designated 84 in FIG. 6 which serves to direct water falling upon the track member 66 into the residue wash water tank 78 or residue rinse water tank 80. The supporting angle bars of track member 66 designated at 73 in FIG. 6 and FIG. 8 are particularly adapted to fixedly secure the track member 66 to end wall 71 of the detachable hood. A larger brush aperture 85 is provided in the track member 66 below the brushes 38 so that excess water, dirt and grime loosened by the brushes 38 are directed into residue wash water tank 78. As shown most clearly in FIG. 6, the brush aperture 85 and opposed brushes 38, which are adjusted by means of screw adjustments 39, are disposed on the wash tank side of the apparatus and drain into residue wash water tank 78. This residue wash water tank is separated from the residue rinse water tank 80 by offset baffle 76 which is provided with an angled terminal portion designated 88 in FIG. 6 and shown most clearly in FIG. 4. Because of the unique construction of the track member 66 and offset baffle 76, tanks 36 and 37 are completely separated as are the lower reservoir tanks 78 and 80.

The manner in which the hood which comprises side walls 30 and 31 and end walls 71 is detached from the bottom portion of the washable apparatus is shown most clearly in FIGS. 6 and 8. The attaching flange element 86 of the detachable hood abuts wall 87 of the lower tank. The support flange 46 of wall 87 abuts the detachable hood flange 47. Because of this simple yet highly efficient disposition of elements, the hood may be removed from the housing of tanks 78 and 80 with ease. The detachability of the covering hood of the wash apparatus from the housing of residue water tank 78 and 80 constitutes one most unique feature of the present invention making possible easy maintenance and repair of the internal portions of wash tanks 36 and 37.

FIG. 7 shows in detail the manner in which the brush 38 and the guide rails 33 are adjusted to provide for panels of varying width. The screw shank 89 with attached handle 39 is screwed through collar member 90

8

and fixedly secured by nuts 92 or other appropriate means to the brush handle 91. By simply rotating the handle 39, the brush is moved in and out of the path of the panels shown by arrows in FIG. 7. In this simple but unique manner, it is possible to adjust the brushes to virtually any panel width easily and quickly. The brush shown in FIG. 7 may also be pivoted horizontally thus diminishing wear and tear on the brushes. In addition to removing dirt spots the brushes also serve as a barrier between the wash tank 36 and rinse tank 37. It should be noted that a closure element or protective curtain such as 62 in FIG. 3 preferably constructed of rubber or neoprene may also be disposed at the opening between tanks 36 and 37 to prevent water seepage. The guide rails 33 are similarly adjusted through the employment of a wing nut 32 which is attached at 93 to a slotted link member 65. Because of the simple yet highly efficient adjusting means for the brush 38 and guide rails 33, the present invention may be employed to wash panels of greatly varying width. This feature of the present invention constitutes one most significant advantage in the employment of the claimed washing apparatus.

As shown in FIG. 8, the hood of the wash tank 36 and rinse tank 37 may be easily yet efficiently removed from the lower housing. Lower tank wall 87 is provided with an upwardly extending support flange 46. The detachable hood comprising the end wall 71 and side walls 30 and 31 are provided with an upwardly extending flange 47 and a downwardly extending attaching flange element 86. Flange 47 abuts flange 46 of lower tank wall 87, and flange 86 of the detachable hood abuts wall 87. In this simple but unique manner, the hood covering wash tanks 36 and 37 may be fixedly secured to the lower tanks 78 and 80. The track member 66 is provided with a supporting angle member 73 having laterally extending flanges 82 which are fixedly secured to the end wall 71 of the detachable hood. Flange 70 of panel guide extension 42 is provided to secure the extension member to the terminal portions of the washing apparatus. Panel guide extension 42 is also provided with border flanges 74.

In operation the novel washing apparatus of the present invention accepts dirty lighting panels and delivers them thoroughly washed and ready for reinstallation after a short, efficient, continuous operation which obviates the slow, inefficient and laborious methods of washing panels heretofore employed. The water preferably has a temperature not in excess of 135° F. and contains detergent or wetting agents which prevent the formation of drops. For example a wetting agent which can be employed in the rinse may contain approximately 80 percent by weight non-ionic surfactant and 20 percent alcohol. In spite of its efficiency, the apparatus may be constructed in highly convenient compact form. Thus an overall height of approximately five feet, width of 16 inches and length when the panel guide extensions are lowered of approximately four feet, serves effectively in the cleaning of the great majority of ceiling and door panels. Because of its compactness the apparatus can easily be moved through normal doorways and elevator entrances. Moreover because of the unique, simple and efficient construction of the apparatus, relatively long hose connections and power cables may be effectively attached thus permitting washing operations at virtually any appropriate location. The apparatus may be employed to wash virtually any panel construction of metal, plastic, glass or the like.

In operation the panels to be washed are first moved into the wash tank in which they are contacted with water containing a wetting agent and detergent. The application of water containing wetting agent and detergent is preferably conducted simultaneously through a series of closely spaced spray nozzles. The treated panels are then urged between vertically disposed brushes which serve to dislodge dirt, grime and the like. These brushes are preferably constructed of nylon because of the durability

and effectiveness of nylon brushes in removing dirt and grime without marring or otherwise disfiguring the surfaces of the subject panel which are frequently constructed of plastic. The treated panels are now passed into a second tank provided with spray nozzles which are designed to subject the panels to a continuous and effective rinsing action. If desired, the panels may now be treated with a destaticizer and/or non-ionic surface active agent. The panels are now removed from the apparatus. In this condition the washed panels are immediately ready for stacking, or if desired replacement in the supporting grid of the lighting system.

The guide elements and other components contacting the panels during the washing operation are constructed of material such as stainless steel which precludes staining. The width of the guide slots can be easily regulated to accommodate thin sheets, corrugating rolls or even double wall hollow panels. It should be noted that as the panel guides are adjusted in width to accommodate lighting fixtures of varying dimensions, the protective curtains or closure elements which are preferably made of rubber or neoprene located at both ends of the unit and also disposed at the unit's midsection behind the vertical brushes are similarly adjusted to provide for the thin sheets, corrugated walls or double wall hollow panels which are being washed. These adjustments prevent internal spray from wetting surrounding areas so that the premises may be maintained relatively neat and dry during the entire operation. Moreover these adjustments prevent the internal spray from splashing outside the enclosure and prevent detergent from spraying past the brushes into the rinsing compartment.

During the cleaning cycle, both the detergent and the rinse water are sprayed or otherwise projected onto the treated panels under pressure. It will be understood the pressure under which the detergent and rinse water are contacted with the treated panels may vary quite considerably within the scope of the present invention. However, broadly considered, pumps rated at approximately 80 gallons per minute have been found satisfactory for the purposes of the present invention.

The spray drips from the sides of the panels which are being cleaned into a sump. From the sump the water may be directed to the pump intake for recirculation and reuse. Because of the recirculation system encompassed by the present invention significant savings are afforded through the employment of the present apparatus. As the supply of detergent is diminished through the normal process of use and reuse of partial carryover into the rinse compartment, the supply of detergent is replenished from a convenient reservoir. The quantity of detergent present may be conveniently checked by any conventional means. For example the level of detergent may be checked by gauge, while admission of the detergent is regulated by a manual or automatic valve. These modifications of the present invention will be apparent to those versed in the art. The rate of application of detergent, wetting agent and destaticizer is preferably adjusted in accordance with the temperature of the water and may vary somewhat with the condition and size of the treated panel. A broad spectrum of detergents, wetting agents and destaticizers may be employed for the described apparatus. It has, however, been found that detergents, wetting agents and destaticizers formulated for specific use with plastics are most desirable. These formulations will be apparent to those well versed in the art.

As distinguished from the detergent wash water, the rinse water is generally not recirculated though it may be if desired. It has been found preferable to employ supply and exhaust hoses which are connected to the pump and sump respectively so that the water is supplied and removed in a continuous operation. Because of the constant replenishment of fresh rinse water, the apparatus is

particularly effective in cleaning of panels in a simple, rapid, neat yet highly efficient manner heretofore considered impossible.

I claim:

1. Portable apparatus for washing panels comprising in combination;
 - a housing member including a pair of opposing, upstanding, spaced apart side wall members;
 - a guide means disposed between said side wall members on which panels are placed when they are passed between said wall members;
 - a pair of brushes disposed in opposing facing relationship between said wall members and extending in a generally vertical direction from said guide means, said brushes disposed approximately midway between the vertical edges of said wall members;
 - first fluid spray means disposed between said wall members and on one side of said brushes, said spray means disposed above said guide means so as to direct fluid onto panels passed between said walls on said guide means;
 - second fluid spray means disposed between said wall members and on the other side of said brushes; said second fluid spray means disposed above said guide means so as to direct fluid onto panels passed between said wall members on said guide means;
 - a first compartment disposed below said first fluid spray means, said compartment providing means for reclaiming fluid passed through said first fluid spray means;
 - a second compartment disposed below said second fluid spray means, said compartment providing means for reclaiming fluid passed through said second spray means;
 - means for recycling fluid in said first and second compartments through said first and second fluid spray means respectively;
 - a pair of guide rails disposed between said wall members at a distance above said guide means, each of said guide rails spaced from a vertical plane passing through said guide means wherein each of said rails is on an opposite side of said plane, said rails adjustable in a horizontal direction to accommodate panels of varying sizes;
 - means adjustably securing said brushes in position, the distance between said brushes being variable by said adjustable securing means such that the distance between said brushes and the amount of said distance which extend between said guide rails can be selected to meet the requirements of various panel shapes and sizes; and
 - low friction support means on which said washing apparatus is mounted.
2. The apparatus of claim 1 further comprising;
 - a pair of end wall members between the vertical edges of said side wall members, said end walls being made of a resilient material and having a central vertical slit through which panels can be inserted, said end walls thereby preventing fluid from escaping from between said side wall members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,199,747	Long et al.	May 7, 1940
2,282,628	Whann et al.	May 12, 1942
2,293,858	Schafer	Aug. 25, 1942
2,824,320	Teel	Feb. 25, 1958
2,852,790	Bowman	Sept. 23, 1958
2,962,741	Petrillo	Dec. 6, 1960
2,993,492	Mains	July 25, 1961
3,018,200	Huddle	Jan. 23, 1962