March 12, 1963 C. HASSAGE 3,080,592

AUTOMATIC WINDOW WASHER

Filed Jan. 23, 1961 3 Sheets-Sheet 1

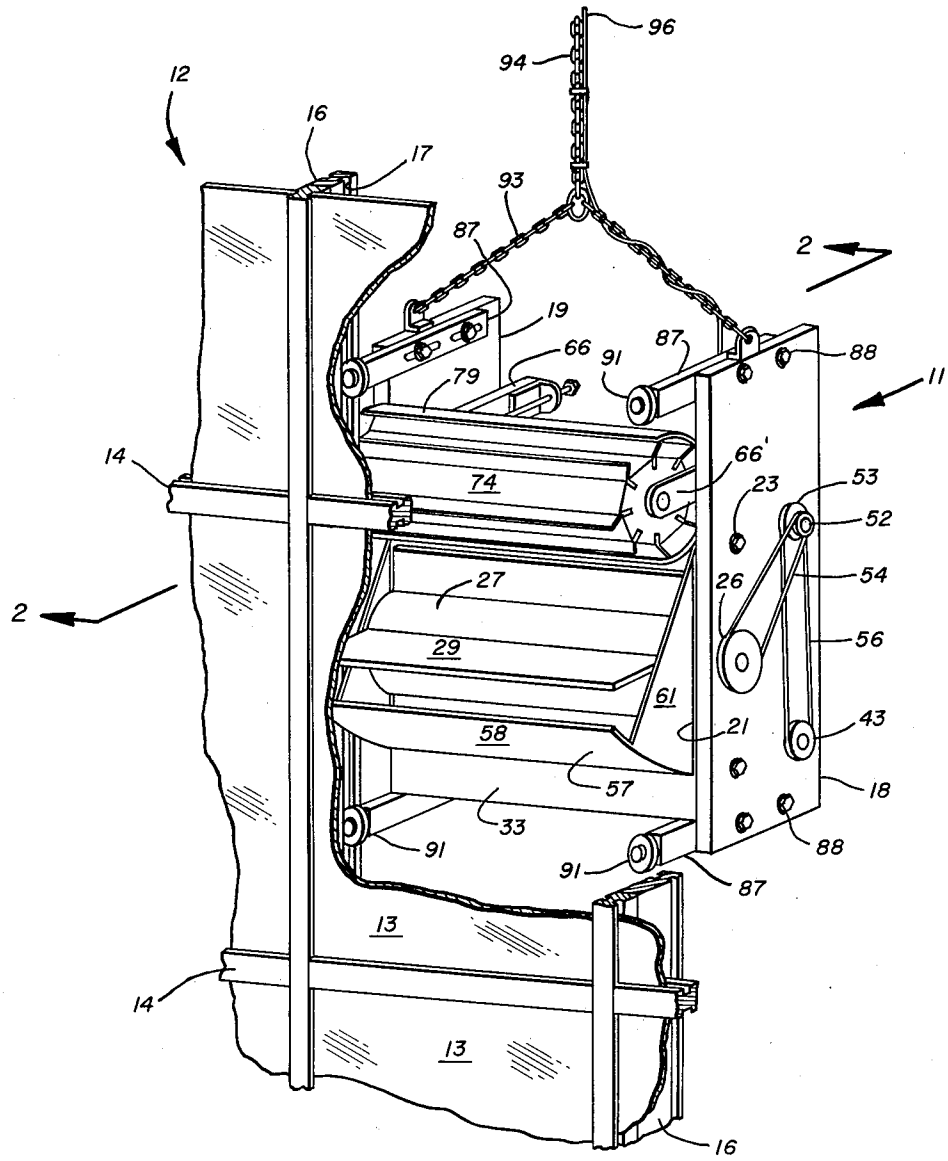

FIG. 1

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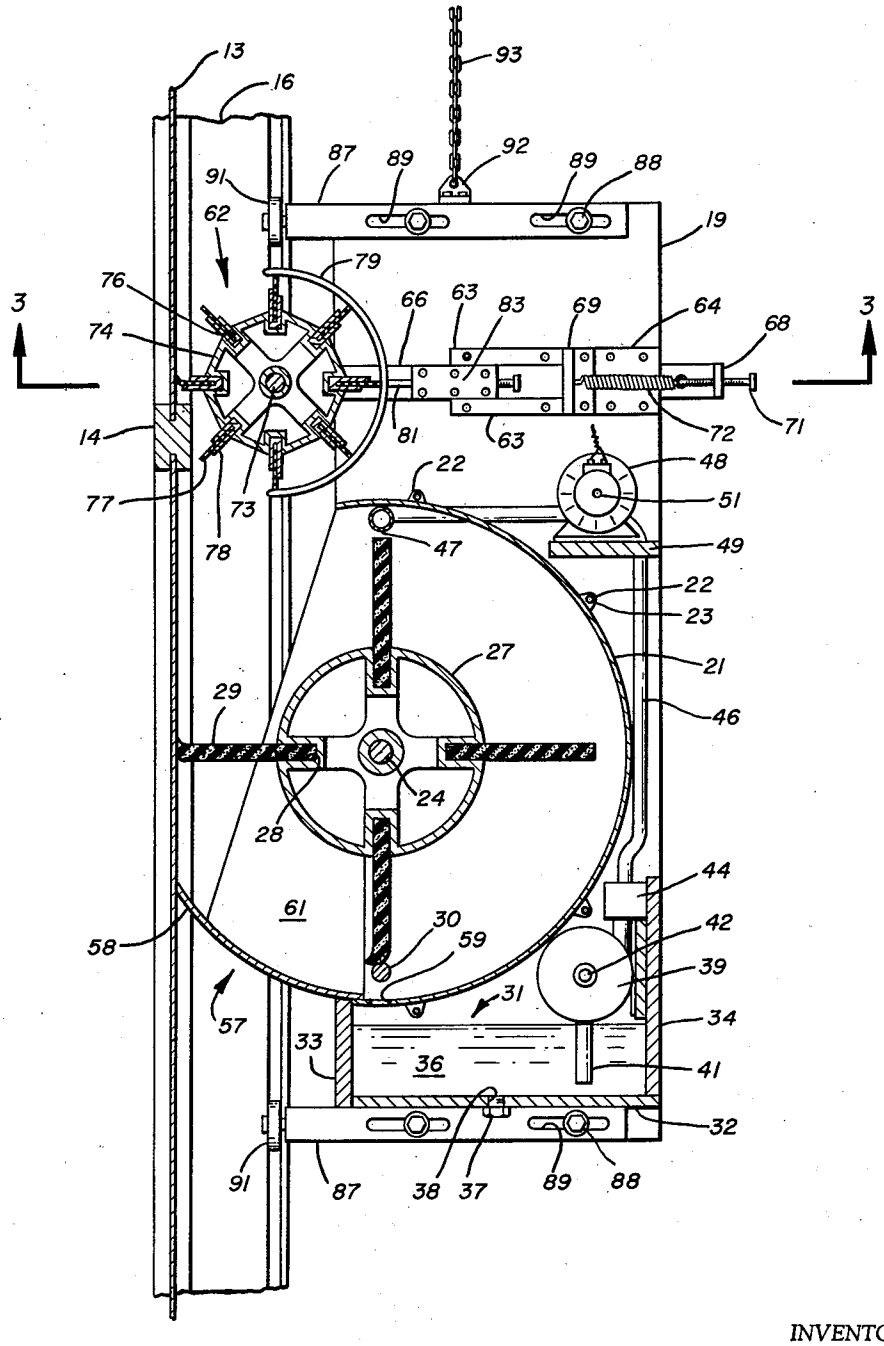

FIG. 2

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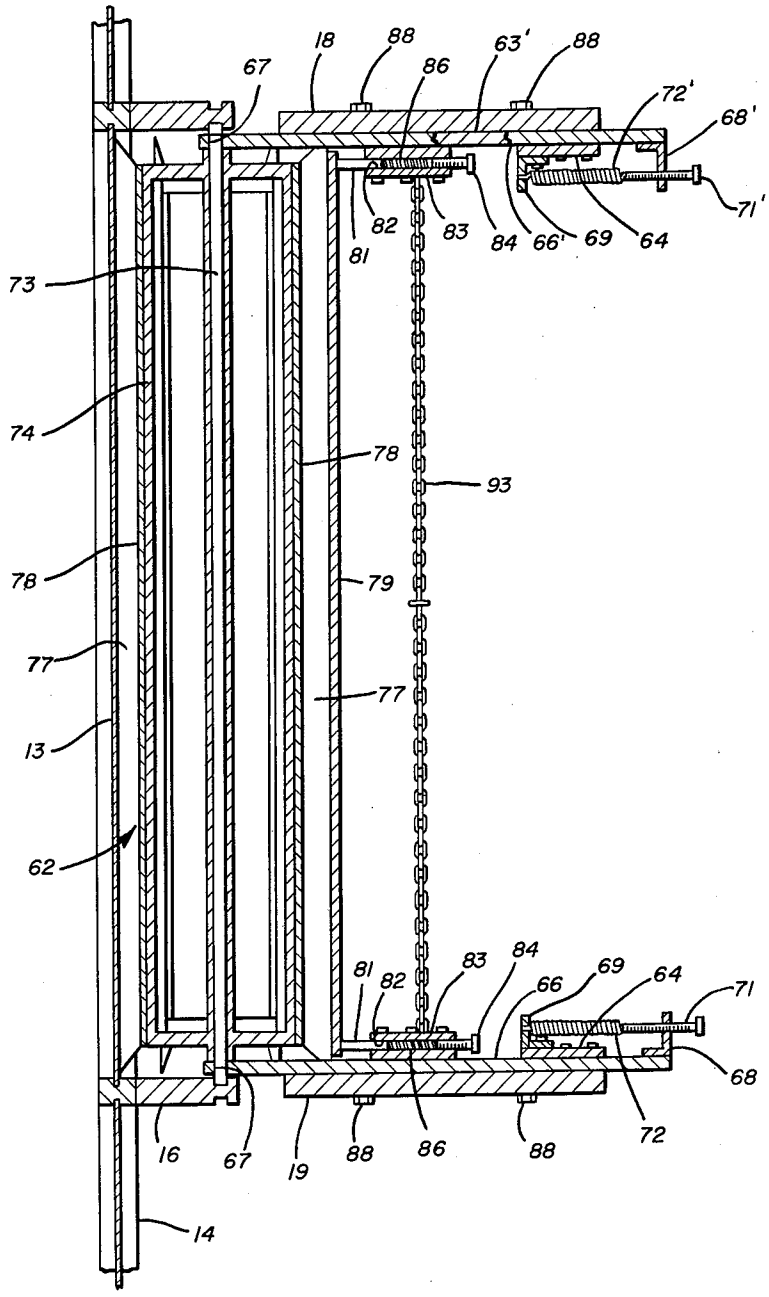

FIG. 3

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3,080,592

AUTOMATIC WINDOW WASHER

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11 Claims. (Cl. 15—50)

The present invention relates to window washing equipment and more particularly to an automatic cleaning apparatus adapted to be continuously moved along a column of windows in a multi-story building.

An important maintenance operation in modern buildings is that of providing for the cleaning of windows. Owing to the increasing use of glass as a surfacing for multi-story structures, the effort and expense which must be devoted to this phase of maintenance has become unduly great. While the interior window surfaces in high buildings can be cleaned by conventional hand methods without difficulty, the cleaning of exterior surfaces in this way is subject to many problems.

Where a workman must support himself at the exterior wall of a building to perform the window washing operation, the actual washing is hindered by other considerations. Such a workman must be primarily concerned with safety and must devote considerable time and effort to his support means. In this situation the workman's freedom of movement is highly restricted and his ability to freely manipulate his tools is impeded. As a consequence of these and other factors, the cleaning of exterior windows by manual methods is slow, inefficient and hazardous.

Thus a need is present for an automatic apparatus for washing the exterior window surfaces of high buildings, which apparatus should be rapid, efficient and which should not require manual operations at the exterior wall of the building. To be fully satisfactory however, a device of this character must overcome several difficult operational problems.

The washing of windows requires a liberal amout of water. To attempt to supply this to the moving washing apparatus by a hose extending to the roof or the base of a high building however is obviously a somewhat unsatisfactory expedient owing to such factors as the weight of the hose, the possibility of fouling and the problem of disposing of the used water.

A second and very prominent difficulty in the design of a mechanized window washer arises from the fact that virtually all multi-story buildings have slightly projacting sashes or other framing members between adjacent window panes. The washing apparatus must therefore be able to pass across such projections without damaging the washing elements of the device and without interfering with the operation thereof.

A further desirable characteristic of an automatic window washer is that it contain both washing and drying elements in one continuously moving unit. If the apparatus can thus clean a column of window panes in one pass therealong, considerable time and effort is saved.

The present invention provides an extremely rapid, efficient and reliable automatic window washing apparatus which meets each of the foregoing requirements. The apparatus is contained within a framework which may be lowered along a vertical column of windows at rates of the order of sixty feet per minte and which cleans the windows in the column with a single pass therealong. Included within the frame is a motor driven rotary sponge assembly with means for continuously wetting the sponges.

The invention carries its own supply of cleaning water which is recovered by sealing means located below the rotary sponges and which is filtered and recirculated so

that the apparatus requires no supply hoses or other external water supply.

A mechanism carrying a squeegee wiper against the window surface is mounted above the rotary sponge assembly so that all the normal functions of window washing are performed by the apparatus.

To enable the invention to over-ride projecting sashes, guide means are provided for holding the frame a small distance outward from the wall surface. The elements of the rotary sponge assembly and the underlying water recovery seals which project toward the windows from the frame are formed of resilient material. Such elements will thus yield when a sash or other projection is encountered and will resume the normal shape and operation when the projection is passed.

A squeegee wiper however should preferably have rigid support a very small distance outward from the window surface and does not function effectively if mounted on a high speed rotary mechanism. Accordingly means must be provided to enable the squeegee to cross the projecting sashes without damage or interference which means must also insure that the glass will be wiped immediately above and below the sash. This problem is met in the present invention by providing a plurality of squeegees mounted in radially projecting relationship on a rotatable drum. A spring pressured clutch acts against the squeegee assembly with just sufficient force to keep the drum from rotating while one of the squeegees bears against a window. When the foregoing squeegee encounters the top of a projecting sash however, the clutch restraint is overcome and the drum turns to bring a subsequent squeegee against the underlying window pane.

The invention thus meets each of the requirements hereinbefore discussed in a unit which is self contained, of simple construction, and conveniently operated.

It is accordingly an object of this invention to provide a mechanized window cleaning apparatus adapted for cleaning the exterior windows of multi-story buidings.

It is an object of the invention to provide an automatic apparatus which may be travelled along a column of windows on a building and which will efficiently clean the windows with a single continuous pass therealong.

It is another object of this invention to provide a more rapid means for washing the exterior windows of multi-story buildings.

It is a further object of this invention to provide a safe and efficient means for washing the windows of high buildings.

It is another object of the invention to provide an automatic washing device for the exterior windows of a building which device has a self-contained recirculating water supply.

It is still another object of the invention to provide an automatic window washing mechanism which may be travelled along a column of windows and which may pass across projecting window frame members without hindrance, damage or interference with the washing operation.

It is an object of the invention to provide means for washing the exterior window surfaces of a building without requiring manual operations at the exterior wall of the building.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in conjunction with the accompanying drawing, in which:

FIGURE 1 is a perspective view showing an automatic window washer in the operative position at the exterior wall of a building,

FIGURE 2 is an elevation section view of the window washer showing internal components thereof and taken along line 2—2 of FIGURE 1, and

FIGURE 3 is a section view taken along line 3—3 of FIGURE 2 and further illustrating portions of the structure thereof.

Referring now to the drawing and more particularly to FIGURE 1 thereof, the window washer 11 is shown in the operative position adjacent a portion of the wall 12 of a typical building. The wall 12 in this example is formed by rectangular glass panes 13 mounted in frame members which include horizontal sashes 14 and vertical mullions 16. The mullions 16 in this particular building project a small distance outward from the exterior surface of the wall 12 and a vertical groove 17 is formed along each side of the mullions near the outer edges thereof.

Considering now the structure of the washer 11, and with reference to FIGURE 2 in conjunction with FIGURE 1, two side plates 18 and 19 are provided which plates are parallel and spaced apart a distance equal to the spacing of the mullions 16. The side plates 18 and 19 serve as the principal elements of a frame to which other components of the washer 11 may be attached. A rotor cover 21 is situated between the side plates 18 and 19, the cover having the shape of a half cylinder and being positioned with the open side thereof facing the building wall 12. The cover 21 is formed with four tubular longitudinal guides 22 at spaced apart positions along the convex face and four tie-bolts 23 extend through the guides and through the side plates 18 and 19 to secure the members together.

To mount a rotary sponge assembly within the cover 21, a shaft 24 is disposed along the axis thereof which shaft is journalled in the side plates 18 and 19. A drive pulley 26, preferably of the V-belt variety, is mounted on the end of shaft 24 adjacent the outer surface of side plate 18. A cylindrical drum 27 is secured to shaft 24 in coaxial relationship therewith, the drum being of considerably less diameter than cover 21 and being of substantially similar length. Four longitudinal slots 28 are formed along the outer surface of drum 27, the slots being equi-angularly spaced around the circumference thereof.

Four broad flat rectangular sponges 29 are carried by the drum 27, such sponges being the elements which contact the window panes 13 to perform the washing thereof. Each sponge 29 is of a length substantially equal to that of the cover 21 and has an inner edge retained in one of the slots 28 of the drum 27. The sponges 29 thus project radially from the drum 27 at ninety degree angles therearound.

A horizontal bar 30 extends between the sides of the cover 21 below shaft 24 a distance equal to the spacing of the outer edges of sponges 29 from the shaft. The sponges 29 thus strike bar 30, as the assembly turns, and dirty water is squeezed from the sponges.

To provide for the circulation of washing water, as will hereinafter be described, the relative proportions of cover 21, drum 27, sponges 29 and the spacing of shaft 24 from the surface of window panes 13 should be selected so that the outer edges of the sponges do not contact the cover but are spaced therefrom by a small gap.

Considering now means by which washing water is delivered to the sponges 29 and recovered for recirculation, a reservoir 31 is provided between side plates 18 and 19 at the bottom ends thereof. To form the reservoir 31, a baseplate 32 extends between the two side plates 18 and 19 at a level slightly above the lower edges thereof. A flat front cross member 33 extends between side plates 18 and 19 at the edges thereof which are adjacent wall 12, the member having sufficient height to extend between the baseplate 32 and the lower edge of cover 21. A flat rectangular rear cross member 34 extends between the side plates 18 and 19 at the opposite edges thereof,

the member 34 having a lower edge contiguous with the rear edge of the baseplate 32.

The various joints between the cross members 32 and 34 are made fluid tight in order that a supply of washing water 36 may be contained in the reservoir 31. If desired, detergents or other washing compounds may be added to the water 36. To provide for draining of the reservoir 31, for replacing the water 36, a threaded plug 37 is engaged in an opening 38 in baseplate 32.

To deliver water from reservoir 31 to the sponges 29 a pump 39, preferably of the centrifugal class, is mounted on rear cross member 34 immediately above the reservoir. Pump 39 has an intake conduit 41 extending downwardly to a point just above baseplate 32 and the driven shaft 42 of the pump projects through sideplate 18. A V-belt drive pulley 43 is mounted on the end of pump drive shaft 42 at the outer side of sideplate 18.

The outlet of pump 39 connects with a suitable filter and strainer 44 which is mounted immediately above the pump. A conduit 46 extends upwardly from the filter 44 outlet, to the rear of cover 21, and is transpierced through the top portion of the cover adjacent the inside surface of sideplate 19. Within the cover 21, the conduit 46 extends along the inside top surface of the cover directly above and parallel with washer shaft 24. A narrow slit 47 is formed along the underside of the conduit 46 within the cover 21 and thus water is sprayed on the edges of sponges 29 as the shaft 24 rotates.

To drive the rotary sponge assembly, as well as the pump 39, an electric motor 48 is secured to a cross-brace 49 which extends between the sideplates 18 and 19 to the rear of the upper portion of cover 21. A shaft 51 is coupled to the motor 48 and extends through the sideplate 18. A pair of V-groove pulleys 52 and 53 are mounted on the end of shaft 51, adjacent the outer surface of sideplate 18, and are respectively coupled to pulleys 26 and 43 by V-belts 54 and 56. The motor 48 and the above described couplings to the rotary sponge drive shaft 24 are arranged to turn the shaft in a counter-clockwise direction as viewed in FIGURE 2. It should be understood that forms of motor other than an electric one may be employed and that the motor may be variously placed on the window washer.

To recover washing water which is carried by sponges 29 and released thereby in the region of the window pane 13, a resilient sealing element 57 extends from the washer to the window below the level of the sponge assembly drive shaft 24. The sealing element 57, which may be formed of sheet rubber, includes an arcuate lower section 58 having a long edge secured to the lower inside edge of cover 21 and having a similar radius of curvature. Section 58 of the seal thus effectively constitutes an extension of the cover 21 and projects towards the window 13 with an upward curvature. The seal section 58 is made of sufficient extent that the forward edge thereof rides against the window pane 13 along a linear zone which is parallel to the zone of contact of sponges 29 with the window and which is of similar length. The seal section 58 thus forms a water return channel by which washing water from the sponges 29 is returned to reservoir 31 through openings 59 at the bottom of cover 21.

To prevent the loss of water from the sides of seal section 58 or along the mullions 16, sealing element 57 is formed with two flat side sections 61. One side section 61 extends upward from each lateral edge of section 58 to the top inner surface of cover 21, the forward edges of the sections 61 thus being inclined and being positioned to ride against the sides of the adjacent mullions 16. The side sections 61 do not extend to the extreme tip of the bottom section 58 in order to permit the latter portion to deflect as it passes across a projecting sash 14.

For satisfactory window cleaning, the washing must be promptly followed by a squeegee operation to remove the water which would otherwise remain on the window and which would leave a deposit thereon upon evaporat-

ing. In contrast to the washing sponges 29, a squeegee wiper must have rigid support very close to its zone of contact with the window pane. Accordingly, specialized means are needed to enable the rigid squeegee to ride over the projecting sashes 14.

Referring now to FIGURE 3 in conjunction with FIGURE 2, a squeegee mechanism 62, capable of meeting the foregoing requirement, is mounted above the washing mechanism. To support the mechanism 62 at the side thereof adjacent side plate 19, a pair of parallel spaced apart horizontal guides 63 are secured against the inside surface of the side plate. The guides 63 are located a distance above the top of cover 21 and are confined to the central and rearmost portion of the side plate 19. The more rearward portion of the guides 63 is bridged by a cover plate 64.

The spaced apart guides 63 thus form a channel in which a sliding arm 66 is carried. Arm 66 is of sufficient length to extend a distance forwardly and rearwardly from the side plate 19 and is transpierced by a bore 67 at the end most adjacent the window 13. To urge the arm 66 in the direction of window 13, for the purpose of exerting squeegee pressure thereon, an angle bracket 68 is secured to the rearward end of the arm and a second angle bracket 69 is secured to the forward end of cover plate 64. A bolt 71 is threadably engaged in a bore in the laterally projecting arm of bracket 68 and a tension spring 72 is coupled between the forward end of the bolt and bracket 69. The spring 72 thus exerts a pull on arm 66 in the direction of the window 13 which force may be adjusted by turning the bolt 71.

A similar sliding arm 66' is mounted on the inside surface of side plate 18 by guides 63', cover plate 64', brackets 68' and 69', bolt 71' and spring 72', the elements each being similar to the corresponding elements on side plate 19 as described above.

The squeegee assembly is carried on a rotatable shaft 73 which extends between the forward ends of arms 66 and 66' and which is journalled in the bores 67 and 67' thereof. A drum 74, of octagonal cross-section, is coaxially mounted on the shaft 73 and is formed with a longitudinal slot 76 along each apex of the octagon.

A squeegee wiper is carried in each of the slots 76, each such wiper comprising a resilient rubber slat 77 mounted in a rigid metal base 78 of U-shaped cross-section. To provide an efficient squeegee action, the base 78 does not extend to the extreme outer edge of the slat 77. To provide for the over-riding of projecting sashes 14, as will hereinafter be discussed in more detail, the base 78 of each squeegee extends further towards the edge of the slat 77 on the side thereof which contacts the top of the sashes.

To prevent the drum 74 from turning except when a sash 14 is encountered, a spring pressured clutch mechanism is employed. The clutch is comprised of an arcuate plate 79 having a C-shaped cross-section of a diameter equal to the distance between the outer edges of opposing pairs of the squeegee slats 77. The plate 79 is disposed on the rearward side of drum 74 in parallel relationship therewith so that the squeegee slats 77 on the rearward and top and bottom sides of the drum ride against the inside surface of the clutch plate.

To apply sufficient pressure on the clutch plate 79 to hold drum 74 stationary while allowing the drum to turn when the squeegees encounter the top of a projecting sash 14, the plate is supported at each end by a rod 81 which extends rearwardly into a bore 82 in a block 83 mounted on the inner surface of each of the arms 66 and 66'. The rearward end of each of the bores 82 is threaded and bolts 84 are engaged therein. A compression spring 86 is disposed in each of the bores 82, between the ends of rod 81 and bolt 84 and thus by adjustment of the bolts, the clutch plate 79 may be caused to exert a selected degree of pressure against the squeegee assembly.

The proportions of the drum 74 as well as the number and radial extent of the squeegees carried thereon are selected to match the size of the sashes 14 on the building with which the washer is to be used in order that the drum will turn, when a squeegee base 78 contacts the top of a sash 14, a sufficient amount to bring the subjacent squeegee into contact with the next lower window pane 13 at a level immediately below the sash. Similarly, the degrees of pressure exerted by the springs 72 and 86 must be adjusted, by turning bolts 71 and 84 respectively, so that drum 74 remains stationary while passing along a glass window surface 13 but may turn when a sash 14 is encountered.

In order to hold the washer 11 in position against the wall of the building, various means may be employed as determined by the particular structural features of the building. On the building wall shown in the drawing, for purposes of example, the grooves 17 on the projecting mullions 16 may be utilized. Thus an arm 87 may be secured at the top and bottom of the inside surfaces of each of the side plates 18 and 19, which arms are horizontal and project towards the mullions 16. Preferably the arms 87 are adjustably secured to the side plates 18 and 19 by bolts 88 extending through longitudinal slots 89 on the arms. A roller wheel 91 is mounted on the forward end of each arm 87, at right angles to the long dimension thereof, which wheels ride in the mullion grooves 17 and hold the washer 11 in the operative position against the wall.

It should be noted that suitable guide means may readily be installed on a building which does not already have structural features, such as projecting mullions 16, adaptable to guiding the washer 11.

To provide for the lowering of the washer 11 along a column of windows, an angle bracket 92 is secured to the top edge of each of the side plates 18 and 19 and a length of chain 93 is connected between the two brackets. A cable 94 from a winch on the top of the building may be connected with the center of chain 93. The providing of suitable winches, lifts, hoists or other mechanism for lowering the washer 11 is well within the skill of the art and such means are in fact present on many existing buildings. Where, as in the present instance, an electric motor is used to drive the washer a power cable 96 may be provided along the winch cable 94.

In operation, the reservoir 31 is filled with water, the motor 48 is energized and the washer 11 is lowered along the wall 12 of the building as discussed above. The water charged sponges 29 scour all portions of the window panes 13 as the washer 11 progresses down the wall. Owing to the resiliency of the sponges 29 such elements deflect when crossing a sash 14 and immediately straighten to continue the washing action on the subjacent pane 13. Following the washing of a given portion of a window 13 by the sponges 29, water is removed from the window by the squeegee mechanism 62 which may also cross the projecting sashes 14 in the manner hereinbefore described.

Throughout the above operation, the washing water is continually recovered by the seal 57 and returned to reservoir 31 for recirculation by pump 39.

Considerable variation in the structure of the washer 11 is possible within the spirit and scope of the invention. The placement of such elements as motor 48 and pump 39 may be varied and differing forms of motor and pump may be employed. More than one washing rotor may be employed and such additional elements as an air dryer may be used if desired. It will be apparent that the invention may be modified for movement along a horizontal row of windows.

Thus while the invention has been disclosed with respect to a single exemplary embodiment, it will be apparent to those skilled in the art that numerous variations and modifications may be made within the scope of the invention and therefore it is not intended to limit the invention except as defined in the following claims.

What is claimed is:

1. In an automatic apparatus for washing a column of windows upon being travelled therealong, the combination comprising a frame having a liquid storage reservoir at a lower portion thereof, a rotary shaft mounted in said frame in parallel relationship to said windows, at least one resilient cleaning element attached to said shaft and projecting therefrom to contact said windows upon rotation of said shaft, a drive motor coupled to said shaft, a broad sealing element carried by said frame subjacent said shaft and projecting from said frame to contact said windows along a zone at least equal to the zone of contact of said cleaning element therewith, said sealing element forming a liquid flow channel leading to said reservoir, a pump operated by said drive motor and having an intake connected with said reservoir, a conduit receiving the discharge of said pump and having an outlet positioned to direct liquid towards said cleaning element, and filter means for cleaning liquid in passage between said reservoir and said conduit outlet.

2. An automatic apparatus for washing a column of windows upon being passed therealong comprising, in combination, a frame having a liquid reservoir formed at a lower portion thereof, a rotary shaft mounted in said frame above said reservoir and in parallel relationship with said windows, a plurality of resilient cleaning elements disposed along said shaft and projecting radially therefrom to contact said window upon rotation of said shaft, a cover enclosing said shaft and cleaning elements on the side thereof away from said window, a broad sealing element having an edge secured to said cover and projecting therefrom to contact said windows below said cleaning elements, said sealing element being resilient and forming a flexible extension of said cover to contain liquid released by said cleaning elements and forming a channel to return said released liquid to said reservoir, a pump delivering liquid from said reservoir to said cleaning elements, a drive means coupled to said rotary shaft and to said pump, and a squeegee attached to said frame and projecting therefrom above said cleaning elements to contact said windows along a zone at least equal to the zone of contact of said cleaning elements therewith.

3. In an automatic window washing apparatus adapted to be travelled along a column of windows, the combination comprising a frame having a liquid reservoir carried therein, a broad cleaning element mounted on said frame and projecting therefrom to contact said windows, a seal secured to said frame and projecting therefrom beneath said cleaning element to contact said windows, said seal forming a channel for returning liquid to said reservoir, means carried on said frame for delivering liquid from said reservoir to said cleaning element, a rotary shaft mounted on said frame above said cleaning element, a plurality of linear squeegee wipers secured to said shaft and projecting radially therefrom, and a friction clutch, means restraining rotation of said shaft upon the application of a torque thereto of less than a given value.

4. A window washing apparatus adapted to be moved along a column of windows comprising, in combination, a frame carrying a liquid reservoir therein, a broad washing element attached to said frame and projecting therefrom to contact said windows, a broad seal projecting from said frame beneath said washing element to contact said windows and forming a liquid channel leading to said reservoir, means for delivering liquid from said reservoir to said washing element, a rotary drum mounted on said frame above said washing element in parallel relationship to said windows, a plurality of linear squeegee wipers secured along said drum at equi-angular intervals thereabout, and a spring-pressured clutch plate restraining rotation of said drum whereby said drum remains stationary except when one of said squeegee wipers contacts a projection along said column of windows.

5. A window washing apparatus as described in claim 4 wherein said drum is movable in a direction perpendicular to the plane of said windows and comprising the further combination of adjustable spring means urging said drum in the direction of said windows.

6. An automatic apparatus for washing a column of windows upon being travelled therealong comprising, in combination, a frame having a liquid reservoir therein, a resilient washing element attached to said frame and projecting therefrom to bear against said windows, a resilient sealing element extending to said windows from said frame beneath said washing element and forming a liquid channel leading to said reservoir, means for delivering liquid from said reservoir to said washing element, a slidable member carried by said frame which member is movable in a direction normal to the plane of said windows, a first spring means urging said slidable member in the direction of said windows, a drum attached to said slidable member above said washing element, said drum being rotatable and having the axis thereof parallel to the plane of said windows, a plurality of squeegee wipers disposed along said drum at equi-angular intervals therearound, a clutch plate carried by said slidable member and being movable towards said drum, and a second spring means urging said clutch plate towards said drum whereby said plate restrains rotation of said drum in the absence of a large torque force thereon.

7. An automatic apparatus for washing a column of windows as described in claim 6 and comprising the further combination of a means for adjusting the pressure exerted on said slidable member by said first spring means, and a means for adjusting the pressure exerted on said clutch plate by said second spring means.

8. An automatic window washing apparatus movable along a column of windows comprising, in combination, a frame having a liquid reservoir therein, a rotary washing element carried by said frame and projecting therefrom to contact said windows, a broad seal projecting from said frame beneath said washing element to contact said windows and forming a flow channel leading to said reservoir, means delivering liquid from said reservoir to said washing element, a rotary drum carried by said frame above said washing element, said drum being parallel to the plane of said window and being movable in a direction normal to said plane, a first spring urging said drum in the direction of said windows, a plurality of linear squeegee wipers mounted along said drum at equi-angular intervals therearound, a clutch plate of semi-circular cross section slidably mounted on the side of said drum away from said windows, said plate having a radius substantially equal to the maximum radial extent of said squeegee wipers from the axis of said drum, said plate having the concave side thereof facing said drum and being slidable in a direction towards said drum, and a second spring urging said clutch plate in the direction of said drum whereby said clutch plate bears against the edges of said squeegee wipers and prevents rotation of said drum in the absence of a high torque thereon.

9. An automatic window washing apparatus adapted to be lowered along a column of windows comprising, in combination, a frame having a water storage reservoir at the lower portion thereof, a first rotary drum mounted in said frame above said reservoir in parallel relationship with said windows, a plurality of resilient water absorbent cleaning elements mounted on said first drum at equi-angular intervals therearound and projecting therefrom to contact said windows as said first drum is rotated, a cover enclosing said first drum and said cleaning elements on the side thereof opposite said windows, a broad resilient seal projecting from said frame towards said windows beneath said first drum, said seal being continuous with said cover and forming a water channel leading to said reservoir, a pump delivering water from said reservoir to said cleaning elements, a drive motor carried by said frame and being connected to rotate said first drum and operate said pump, a second rotary drum mounted on said frame above said first drum, said second drum being parallel to said windows

and being movable in a direction normal thereto, a first spring means urging said second drum in the direction of said windows, a plurality of squeegee wipers attached along said drum at equi-angular intervals therearound, a slidable clutch plate carried by said frame, said clutch plate being parallel with said second drum and being movable in a direction towards said second drum, and a second spring means urging said clutch plate in the direction of said second drum.

10. A squeegee mechanism for use with an automatic window washer which washer is travelled along a column of windows on a building having projecting frame members separating said windows, said mechanism comprising a rotatable drum mounted on said washer in parallel relationship to said windows, a plurality of squeegee wipers disposed along said drum and projecting therefrom in a radial direction, said squeegee wipers being equi-angularly spaced around said drum with the operative edges of said wipers spaced apart a distance substantially equal to the thickness of said projecting frame members, and a friction clutch restraining rotation of said drum in the absence of a high torque thereon whereby a squeegee wiper is held in contact with a window until a projecting frame member of said window is encountered whereupon said drum turns to bring the following one of said wipers into contact with the following window.

11. In a squeegee mechanism for use on an automatic window washer which is moved along a column of windows separated by projecting frame members, the combination comprising a rotatable drum carried on said washer, said drum being parallel to the plane of said windows and being movable in a direction normal to said plane, a first spring urging said drum in the direction of said windows, a plurality of squeegee wipers mounted along said drum and spaced equi-angularly therearound, the operative edges of said squeegee wipers being spaced apart a distance substantially equal to the thickness of said projecting frame members, a clutch plate of semi-circular cross-section slidably mounted on said washer at the side of said drum away from said windows, said plate having a radius equal to the radial extent of said squeegee wipers from the axis of said drum, said plate having the concave side thereof facing said drum and being slidable in a direction towards said drum, and a second spring urging said clutch plate in the direction of said drum whereby said plate is abutted against the edges of a portion of said squeegee wipers and prevents rotation of said drum in the absence of a high torque thereon.

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