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C. C. MAYHEW
WINDOW CONSTRUCTION

3,355,761

Filed Oct. 21, 1965

3 Sheets-Sheet 1

FIG. 5

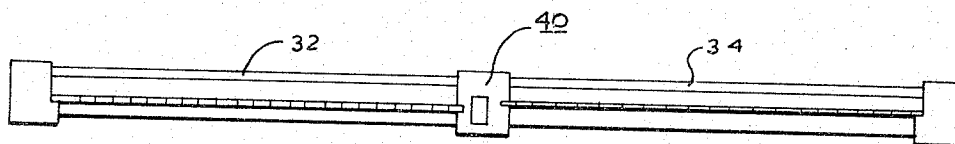
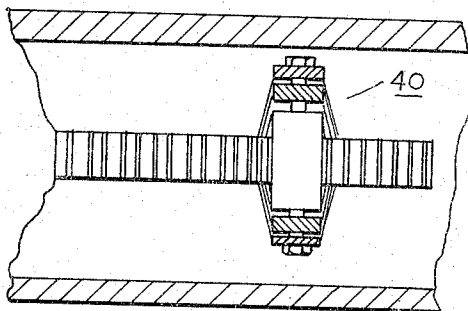


FIG. 2

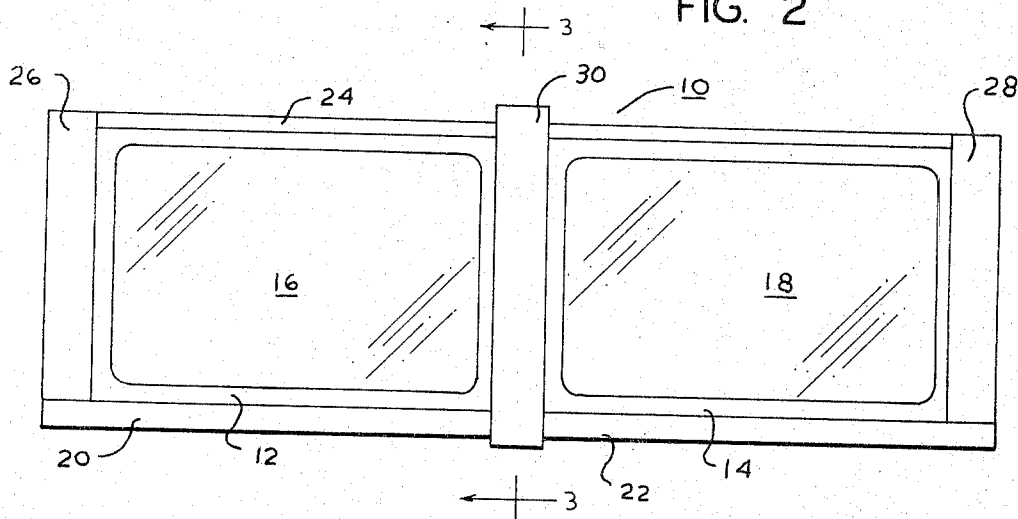


FIG. 1

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3 Sheets-Sheet 2

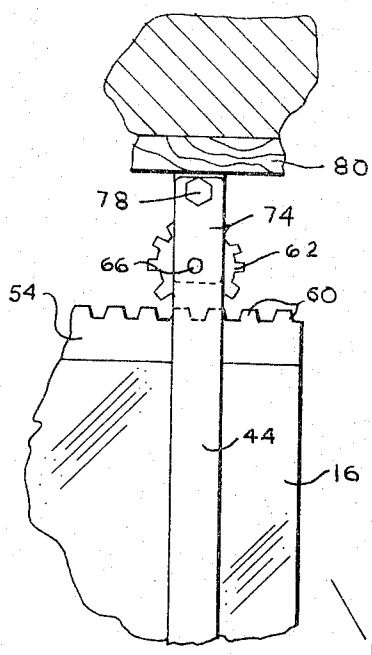
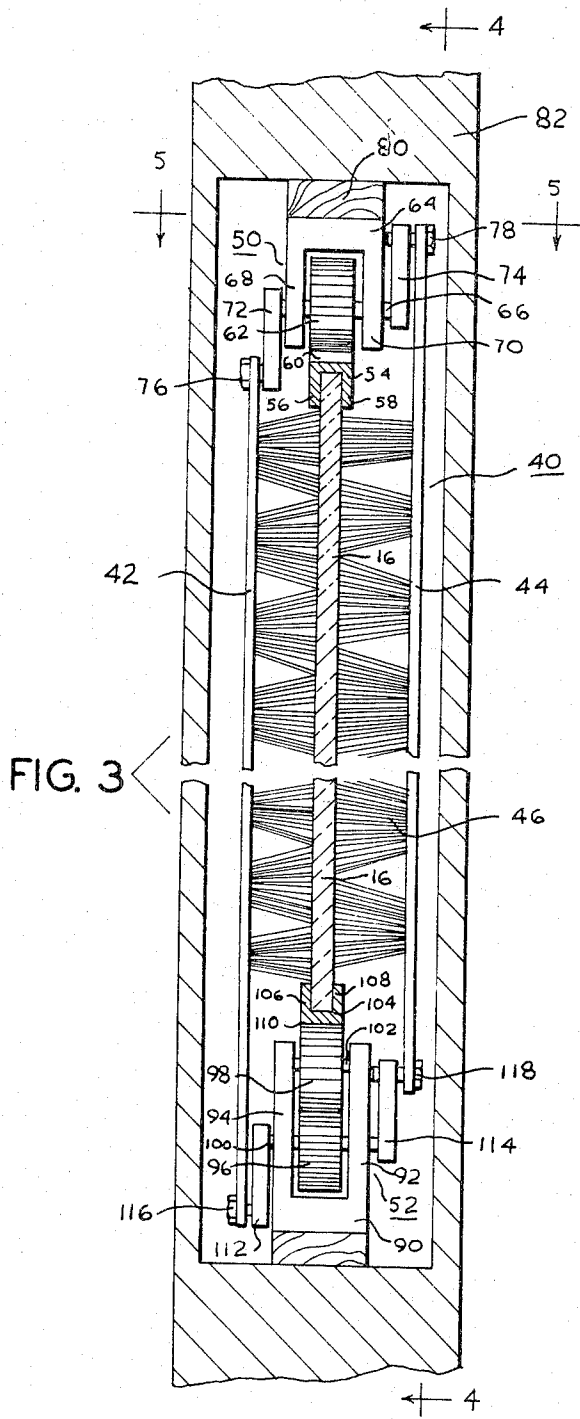
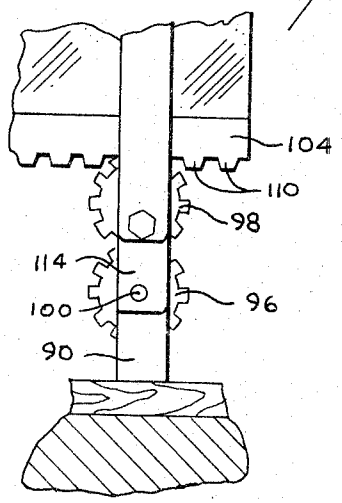


FIG. 4



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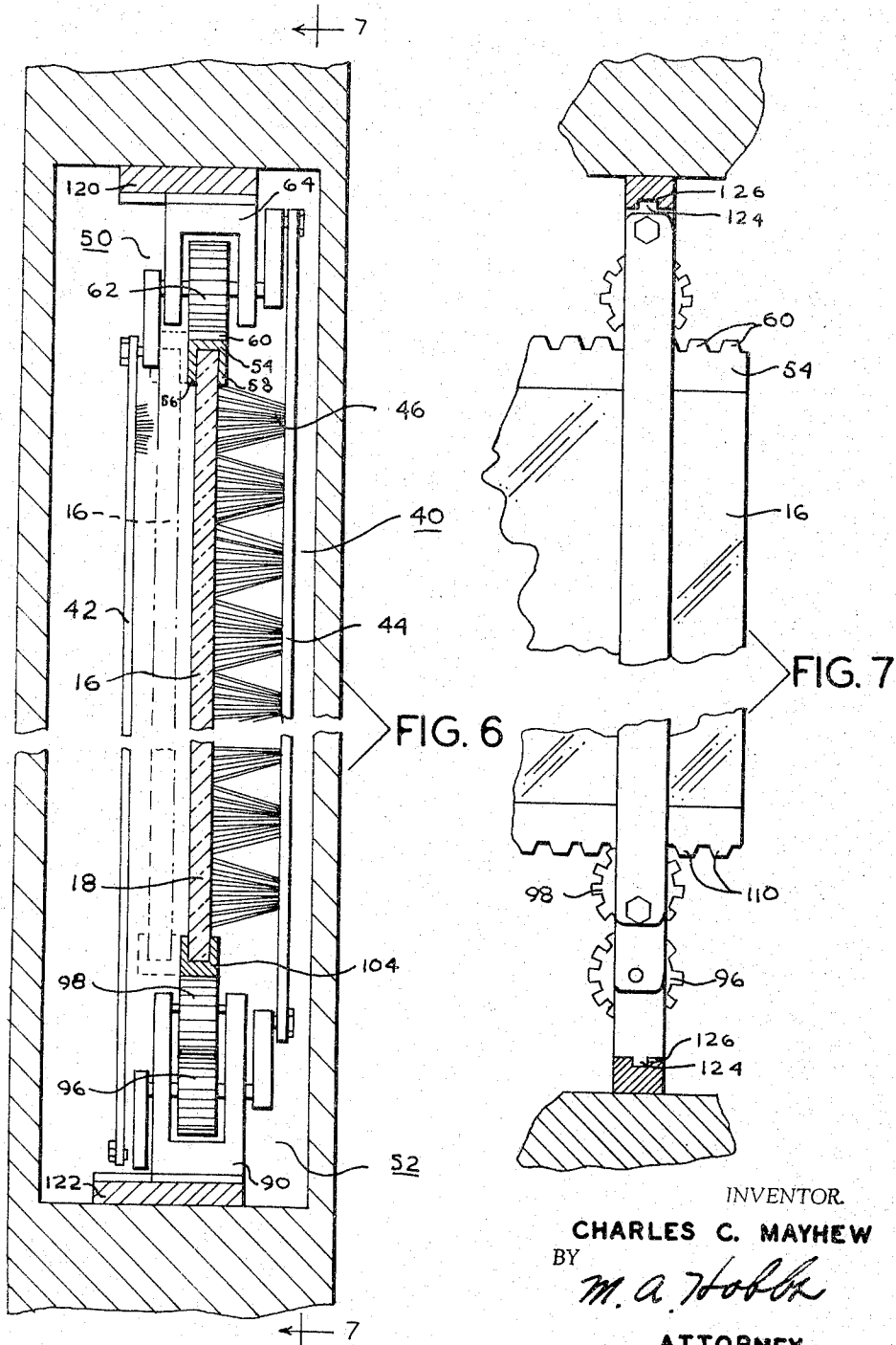
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WINDOW CONSTRUCTION

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3 Sheets-Sheet 3



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3,355,761
WINDOW CONSTRUCTION
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 7 Claims. (Cl. 15-250.1)

The present invention relates to a window structure, and more particularly to a window construction having embodied therein a window pane cleaning mechanism.

The conventional window having sliding frames for the panes is often enclosed by screens or storm windows which must be removed in order to clean the outside surface of the panes. This is often not only difficult but dangerous, and consequently, the cleaning operation is not performed as frequently as required nor sufficiently thoroughly to remove all of the firmly adhering film on the outside surface. This difficulty is greatly increased in multiple story office and apartment buildings having sliding windows which can only be completely cleaned by the window washer standing on the outside window sill or on a ladder or scaffold, thus increasing the hazard and inconvenience to the washer. The foregoing difficulties and dangers are present in washing windows having either dual sliding, overlapping sashes or single sashes sliding into a pocket in the wall, either above or at one side of the sash. It is therefore one of the principal objects of the present invention to provide a window construction of either the single or multiple sliding sash type in which a mechanism is included for automatically cleaning both sides of one pane when the respective sash is merely opened and closed, and which can be thoroughly cleaned without removing or shifting any screen or storm window installed on the outer side of the window.

Another object of the present invention is to provide a window cleaning apparatus which can be installed on most slide sash type windows, and which, in scrubbing the window pane, executes a rotary or circular motion on the pane surface similar to the effective motion performed by the manual cleaning operation.

Still another object of the invention is to provide an apparatus of the aforesaid type which can be shifted between the panes of multiple sash windows to clean both sides of each sash, and which is fully concealed in the window frame or other enclosures where it may be permanently installed in each window and where it performs its complete cleaning operation each time the window sash is fully opened and closed, whether for the purpose of cleaning the window or otherwise.

A further object is to provide a relatively simple, easily operated apparatus for cleaning sliding sash windows, which positively scrubs the surfaces of the window panes when the sashes are opened and closed, and which can be adapted either to the permanently installed construction or to a portable type, which can readily and conveniently be moved from one window to another.

Additional objects and advantages of the invention will become apparent from the following description and accompanying drawings, wherein:

FIGURE 1 is an elevational view of a double window construction having the present window cleaning apparatus incorporated therein;

FIGURE 2 is a top plan view of the window construction shown in FIGURE 1;

FIGURE 3 is a vertical cross sectional view through the window construction shown in the preceding figures, the section being taken on line 3-3 of FIGURE 1, and showing an enlarged view of the present window cleaning apparatus;

FIGURE 4 is a vertical cross sectional view of the window construction shown in the preceding figures, the

section being taken on line 4-4 of FIGURE 3, and showing an elevational view of the present window cleaning apparatus;

FIGURE 5 is a horizontal cross sectional view of the present window construction, the section being taken on line 5-5 of FIGURE 3;

FIGURE 6 is a vertical cross sectional view of the window construction similar to that shown in FIGURE 3, but showing a modification thereof; and

FIGURE 7 is a vertical cross sectional view through the window construction shown in FIGURE 6, the section being taken on line 7-7 and showing the window cleaning apparatus in elevation.

Referring more specifically to the drawings, numeral 10 designates generally the present window construction embodying the present invention, the construction shown consisting of two side-by-side sashes 12 and 14 having panes 16 and 18, respectively, and being mounted in a frame 20 having a sill 22 and header 24 extending the full length of the window, and two side frame members 25 and 28, and intermediate frame member 30. The sill 22 and header 24 are provided with longitudinal grooves for receiving sashes 12 and 14 which are adapted to move laterally in the frame from the position shown in the drawings into the opposite window space, i.e., sash 12 as shown in the drawings being moved completely through the intermediate member 30 to the position of sash 14, and sash 14 being likewise moved to the position shown for sash 12. The particular construction or type of window employed is not important with respect to the present invention so long as the sashes or panes are slidable in the window structure. The present invention is equally applicable to the other types of windows, particularly the type having multiple sashes slidable vertically in the frame. The window structure shown in FIGURE 1 may have screens or storm windows 32 and 34 on the external side of the windows. Further, the present invention can be used in conjunction with a single sash or pane slidable into a pocket in the wall beside, above or below the window opening, as will become readily apparent from the following description.

In the drawings, the window cleaning apparatus 40 is mounted in and enclosed by the housing of intermediate member 30, and consists of a pair of arms 42 and 44 having a plurality of scrubbers 46 secured to the inner side of each arm. The scrubbers 46 are shown consisting of brushes or other bristle-like construction; however, they may be of any suitable effective cleaning construction. The two arms are parallel to the surface of the window and are moved in a rotary action to create a scrubbing action on the surface of the pane of glass by operating mechanism 50 at the top of the sash and mechanism 52 at the bottom of the sash.

Operating mechanism 50 consists of a rack 54 secured to the upper edge of pane 16 by downwardly extending flanges 56 and 58 and contains gear teeth 60 extending throughout substantially the full length of the rack and pane. A pinion 62 rigidly supported by bracket 64 contains teeth meshing with the teeth on rack 54 and is rotated by movement of the sash in either direction through intermediate member 30. The pinion is supported by a shaft 66 which is journaled in arms 68 and 70 of bracket 64 and rotates with pinion 62. Arms 72 and 74 are secured to the outer ends of shaft 66 and revolve with shaft 66, and the outer ends of arms 72 and 74 are connected to the upper ends of arms 42 and 44, respectively, and move the arms and scrubbers 46 upwardly, downwardly and sideways to produce a rotary or circular motion of the scrubbers on the surface of the pane of glass, the two arms being pivoted on bolts 76 and 78, respectively, in arms 72 and 74. Bracket 64 is mounted rigidly on boss 80, which in turn is secured to the upper end 82 of member 30.

Operating mechanism 52 consists of a bracket 90 having arms 92 and 94 and supporting pinions 96 and 98 on pins 100 and 102, respectively. A rack 104 is secured to the lower edges of the pane 16 by flanges 106 and 108 and contains teeth 110 which mesh with the gears on pinion 98 and cause the pinion to rotate as the window is moved from right to left, as viewed in FIGURE 1. In order to have the ends of the arms 42 and 44 move in the same direction, the lower ends of the two arms are driven by pinion 96 through arms 112 and 114, respectively, the two arms being rigidly secured to shaft 100, which in turn is rigidly secured to pinion 96 and rotates in bearings in arms 92 and 94 of bracket 90. The arms 42 and 44 are rotatably secured to arms 112 and 114, respectively, by bolts 116 and 118, thus providing an effective positive drive connection from rack 104 through pinions 98 and 96, shaft 100 and arms 112 and 114 to arms 42 and 44 at the lower ends of the arms and completing the desired circular motion of the scrubbers 46.

It is seen from the foregoing description that when pane 16 is moved to the right, as viewed in FIGURE 1, the racks 54 and 104 rotate pinion 62, and through pinion 98, rotate pinion 96, which in turn causes arms 72 and 74 at the top and arms 112 and 114 at the bottom to revolve, thereby moving arms 42 and 44 and the respective brushes 46 in a circular motion on the surface of the pane. As this operation is performed, a cleaning solution may be added to the surface of the glass if desired, although since the glass is cleaned frequently by the mechanism as the window is opened and closed, it often is not necessary to have the assistance of a cleaning material.

In the embodiment just described, one mechanism is required for each of the two windows; however, the mechanism may be disassembled from member 30 and moved to another window having provisions for receiving the mechanism, so that one mechanism may be used to clean a multiplicity of windows. A permanently installed mechanism of modified form for cleaning windows is illustrated in FIGURES 6 and 7, in which like parts are given like numbers, and in which the mechanism is similar in most respects to the one previously described herein, and consequently, will not be described in detail. In the embodiment illustrated in FIGURES 6 and 7, brackets 64 and 90 are mounted on tracks 120 and 122, respectively, and keyed thereto by tongue and groove 124 and 126 for longitudinal sliding movement thereon. With this arrangement, the cleaning mechanism may be shifted from one slidable pane, indicated by numeral 16, to the other slidable pane, indicated by numeral 18, thus permitting the

same mechanism to clean either window pane by merely shifting the mechanism outwardly and inwardly to the position in alignment with the pane to be cleaned when both panes are closed. The movement of the pane causes the racks 54 and 104 to engage the respective pinions and rotate the arms in the manner described to clean the panes, both internally and externally at the same time.

While only two embodiments of the present window cleaning apparatus have been described in detail herein, various changes and modification may be made without departing from the scope of the invention.

I claim:

1. A mechanism for cleaning windows of the type having one or more sliding panes mounted in a frame, said mechanism comprising racks secured to opposite edges of the pane, a pinion engaging each of said racks to be rotated as said pane is slid from one position to another, a second pinion engaging one of said first mentioned pinions, a shaft connected to said other first mentioned pinion, a shaft connected to said second mentioned pinion, brackets supporting said pinions in fixed position in the frame, arms connected to one end of each of said shafts on the same side of said pane for revolving in the same direction, a member interconnecting the outer ends of said arms, and scrubbing means mounted on said member and adapted to engage the surface of the pane for circular movement thereon when the pane is slid in the frame.

2. The mechanism defined in claim 1, wherein there are arms connected to the opposite ends of each of said shafts, a member interconnecting the outer ends of said arms, and scrubbing means mounted on said member are mounted on the opposite side of said pane, whereby both sides of the pane are cleaned simultaneously.

3. The mechanism of claim 2, in which the brackets are slidable transverse to said racks.

4. The mechanism defined in claim 1, wherein said racks and pinions contain teeth for engaging the respective pinions and racks for positive drive therebetween.

5. The mechanism of claim 1, in which said brackets are slidable in the direction transverse to said racks.

6. The mechanism defined in claim 1, in which the scrubbing means consists of a plurality of members mounted longitudinally on said interconnecting member.

7. The mechanism according to claim 6, in which the scrubbing means consists of a plurality of bristle-like brushes for engaging the surface of the glass.

No references cited.

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