

July 12, 1960

L. PRESSER

2,944,276

WINDOW CLEANING DEVICE

Filed June 6, 1958

3 Sheets-Sheet 1

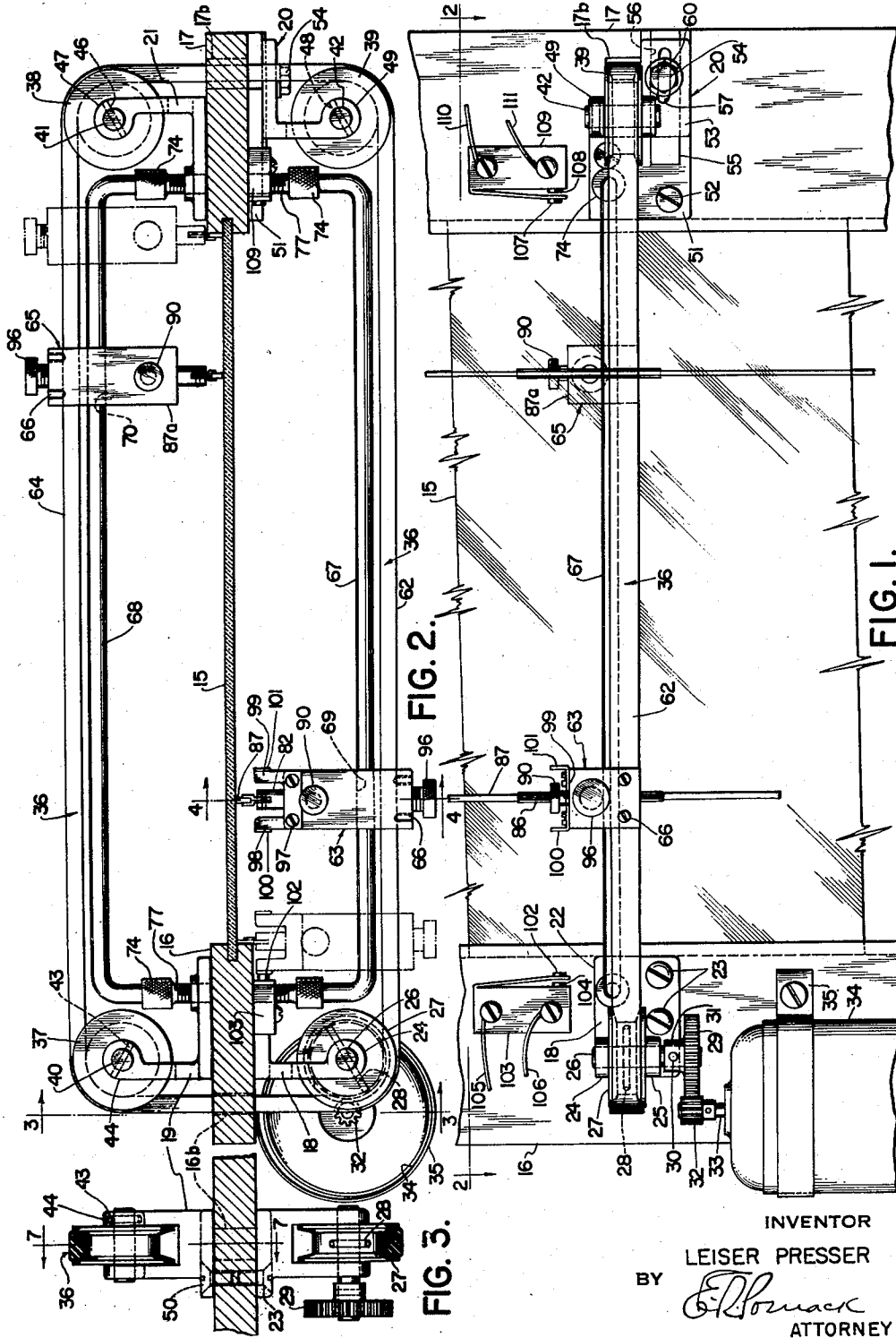


FIG. 1.

FIG. 2.

FIG. 3.

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3 Sheets-Sheet 2

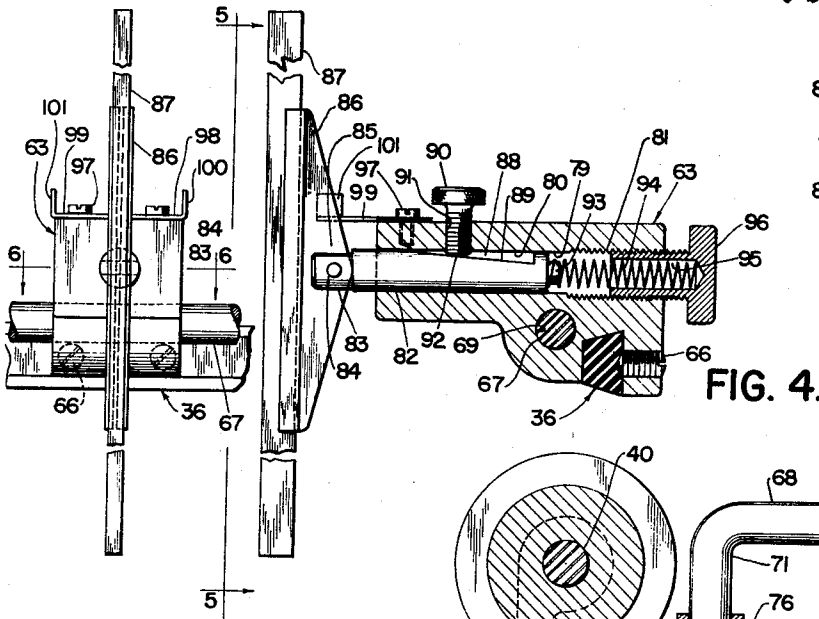


FIG. 5.

FIG. 4.

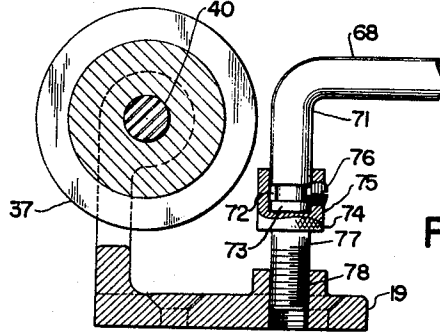


FIG. 7.

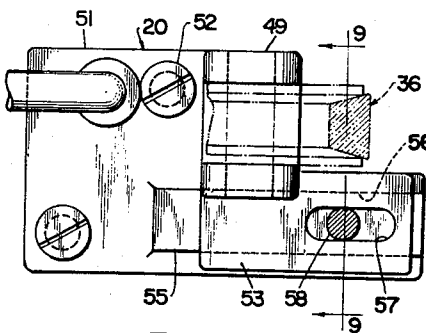


FIG. 8.

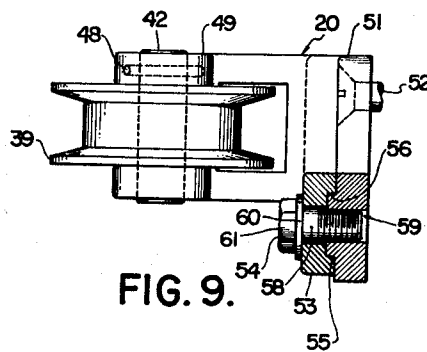


FIG. 9.

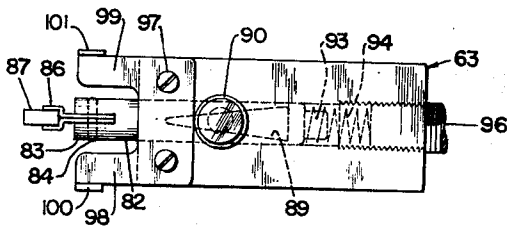


FIG. 4A.

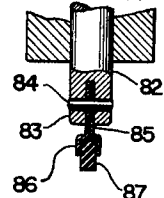


FIG. 6.

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3 Sheets-Sheet 3

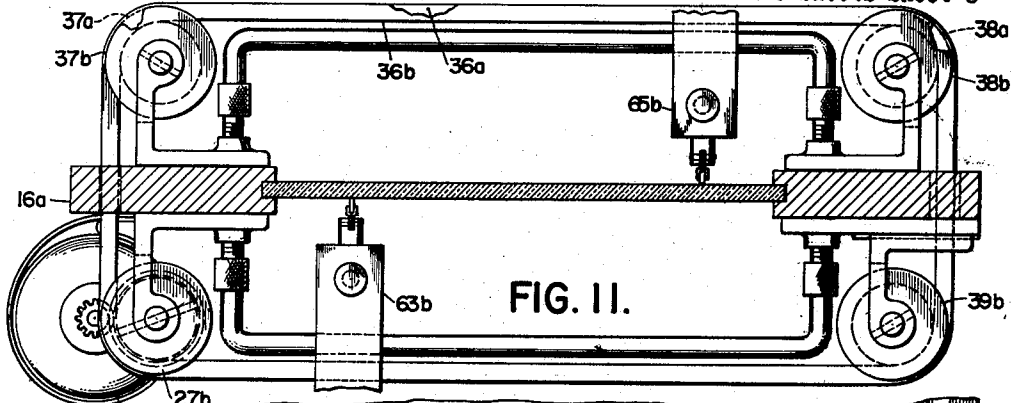


FIG. II.

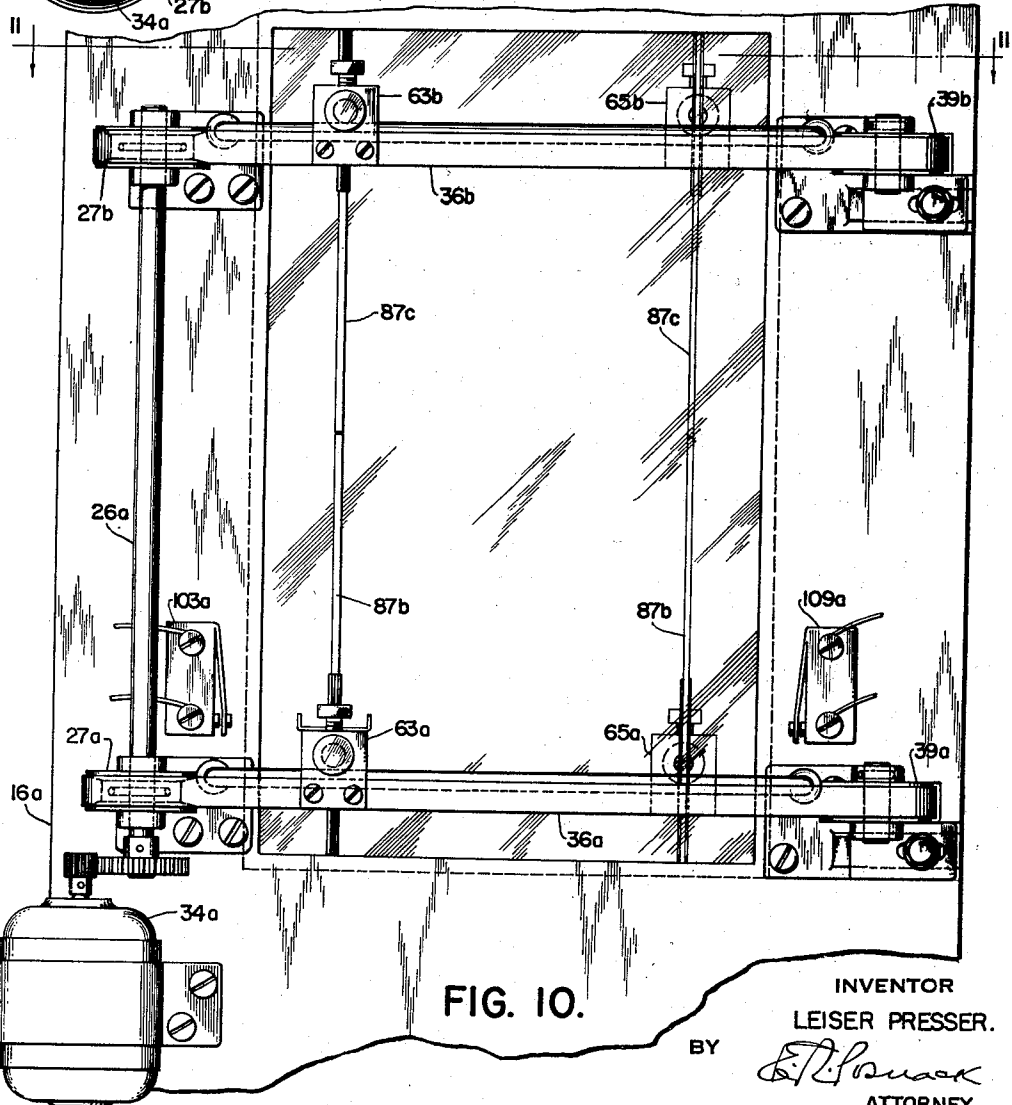


FIG. 10.

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2,944,276

WINDOW CLEANING DEVICE

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5 Claims. (Cl. 15—250.24)

This invention relates to window cleaning apparatus, and is particularly directed to devices of this category permanently mounted on the frame structures of glass windows.

The primary object of my invention is to provide a device for simultaneously cleaning the opposite surfaces of a window. And in this aspect of my invention it is my objective to provide novel connecting means between components of the apparatus on opposite sides of the window, so that when the cleaning or wiping element on one side is operatively actuated the corresponding element on the other side will be simultaneously actuated.

It is further object of my invention, in one form thereof, to provide automatic means for simultaneously actuating both oppositely positioned window-cleaning elements, said means being adapted for mounting upon a window frame for effectuating reciprocating action of said elements across the entire window, or selected portions thereof.

Another object of my invention is to provide guide means for directing the window cleaning elements along predetermined paths across opposite sides of the window. And in this aspect of my invention it is a further object to provide adjusting means for the said guide means, so as to maintain said cleaning elements in proper operative engagement with the window pane along said paths. It is also an object of my invention to provide independent adjusting means, cooperative with said adjustable guide means, whereby said independent means are operable directly upon the cleaning elements for producing a predetermined yieldable pressure of said elements against the glass.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a fragmentary front view of a window structure, showing my apparatus operatively mounted on the frame, the front and rear window cleaning elements being shown in corresponding opposite positions against the window pane.

Figure 2 is a section of Fig. 1 taken substantially along line 2—2, the dot-dash lines indicating the extreme limiting positions of the two wiper carrier members.

Figure 3 is a fragmentary section of Fig. 2 taken along line 3—3.

Figure 4 is an enlarged section of Fig. 2 taken along line 4—4, a portion being shown in elevation.

Figure 4A is a fragmentary plan view of Fig. 4.

Figure 5 is a view of Fig. 4 looking in the direction of arrows 5—5.

Figure 6 is a fragmentary section of Fig. 5 taken along line 6—6, a portion being shown in elevation.

Figure 7 is an enlarged fragmentary section of Fig. 3 taken substantially along line 7—7.

Figure 8 is a somewhat enlarged front view, partly in section, of the adjustable belt-supporting bracket shown at the right side of Fig. 1.

Figure 9 is a section along line 9—9 of Fig. 8.

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Figure 10 is a fragmentary front view of a window frame structure showing a modified form of my invention wherein there are upper and lower cleaning elements on each side of the window pane.

Figure 11 is a section of Fig. 10 taken substantially along line 11—11.

The essence of the invention resides in my novel means for effecting a wiping or cleaning action on opposite sides of any window pane, whether it be part of the stationary structure or a movable vehicle. For the purpose of this specification, the embodiments illustrated are those adapted for a stationary window structure.

In the form of my invention illustrated in Figs 1 to 9, a window pane 15 is operatively supported by the laterally opposite window frame members 16 and 17. Secured to front and rear sides of the window frame member 16 are the fixed brackets 18 and 19, respectively; and affixed to front and rear sides of frame member 17 is the adjustable bracket 20 and the fixed bracket 21, respectively. Bracket 18 has a base 22 secured in place by the screws 23, and two bearing members 24 and 25 supporting the shaft 26 upon which is fixedly mounted the pulley 27, the pin 28 extending through shaft 26 and the body of the pulley. The said shaft 26 has fixedly secured thereto the gear 29, the pin 30 extending through the boss 31 of the gear to secure the latter to said shaft, so that upon an operative rotation of gear 29 the said shaft 26 and the pulley 27 will rotate. In operative engagement with gear 29 is the gear 32 affixed to shaft 33 of the reversible motor 34 which is secured by brace 35 to the frame member 16.

The arrangement is hence such that upon an operative rotation of the motor shaft 33 in either direction, the pulley 27 will be operatively rotated, whereby said pulley serves as a drive pulley for the belt 36 operatively mounted thereover. The said belt operatively extends over pulleys 37, 38 and 39, these being rotatably mounted over the respective shafts 40, 41 and 42. Shaft 40 is secured by pin 43 to the bearing 44 of bracket 19, said shaft 40 extending through the pulley 37. In similar manner shaft 41, rotatably supporting pulley 38, is affixed by pin 46 to the bearing 47 of bracket 21; and similarly shaft 42, rotatably supporting pulley 39, is affixed by pin 48 to bearing 49 of bracket 20. The said brackets 19 and 21 are secured to the respective frame members 16 and 17 by suitable screw fasteners 50. The belt 36 extends through apertures 16b and 17b of the respective window frame members 16 and 17.

Bracket 20 comprises two components (see Figs. 1, 8 and 9), the stationary component 51 being secured to frame member 17 by the screw fasteners 52, and the movable component 53 being adjustably secured in place by the stud 54. The stationary component 51 contains an elevated guide rib 55 extending transversely with respect to the window, the movable component 53 having a recessed portion 56 proportioned to slidably fit over the said guide rib 55, so that it could be adjustably moved transversely with respect to the window. The said movable component 53 also contains therein an elongated slot 57, the shank 58 of said stud 54 extending through said slot and being in threaded engagement with the internally threaded hole 59 of the stationary component 51 of the bracket 20. Disposed over the upper surface of the movable component 53 is the washer 60 over which is positioned the head 61 of the stud 54. Integral with the movable bracket component 53 are the two bearing members 49 operatively supporting the said shaft 42. The arrangement is hence such that by adjustably manipulating the movable bracket component 53, the proper tension of belt 36 can be effected, the stud 54 being adapted to secure component 53 in its adjusted position.

Affixed to the front section 62 of belt 36 is the front

wiper carrier member 63; and affixed to the rear section 64 of the belt is the rear wiper carrier member 65. Fastening screws 66 extend into the body of the said wiper carrier members 63 and 65, said screws being partly imbedded into the body of the belt 36 so as to hold it in fixed relation to said carrier members. The arrangement is hence such that upon an operative rotation of the drive pulley 37, the said belt 36 will be correspondingly actuated, thereby causing the said wiper carrier members 63 and 65 to move transversely with respect to the window pane 15, along predetermined paths.

These paths are determined by the positions of the front and rear guide rods 67 and 68 respectively, these extending through transverse apertured portions 69 and 70 of the carrier members 63 and 65, respectively, and being in slidable engagement therewith. The said guide rods 67 and 68 are disposed parallel to the window pane 15, and are adjustably positioned, in a manner to be hereinafter described, so as to position said carrier members in proper relation to the said window pane 15.

By referring to Fig. 7, showing the construction of the adjustable connection for the guide rod 68, which corresponds with the adjustable construction at the other end of rod 68 as well as with the opposite ends of rod 67, it will be seen that the guide rod has an inwardly extending arm 71 containing an annular recess 72 near the terminal portion 73 thereof. Mounted over said terminal portion is the adjustable supporting member 74 having an externally knurled hollow body portion 75 into which said terminal portion 73 extends, there being a screw 76 extending through the lateral wall of portion 75 and partially into said annular recess 72, thereby permitting rotary motion of member 74 about the terminal portion 73, but preventing a detachment of said member 74 from the arm 71 of guide rod 68. The said member 74 also contains a threaded shank 77 which is in threaded engagement with the internally threaded boss 78 integral with the base of the bracket 19. By a rotary manipulation of the member 74, the guide rod 68 can be brought closer or farther from the glass pane 15. In this manner, both guide rods 67 and 68 can be adjustably positioned, for determining the path of both window cleaning elements with respect to the entire width of the window. This arrangement, in cooperation with the individual adjustment of the two window cleaning elements, in a manner to be hereinafter described, provides the desired pressure of the cleaning element against the window.

By referring to Fig. 4 it will be noted that the wiper carrier member 63 contains therein a through hole 79, the front portion 80 of said hole being smooth, and the rear portion 81 thereof being threaded. Positioned and slidably movable within said forward smooth portion is the rod 82, the forwardly protruding portion 83 thereof being bifurcated, a pin 84 extending transversely there-through and pivotally supporting the rear portion 85 of the channel 86 frictionally holding the resilient wiper 87. At the upper portion of the rod 82, disposed within the forward portion of hole 79, is the recessed portion 88, this containing a rearwardly and downwardly sloping bottom wall 89. A set screw 90, in engagement with the threaded aperture 91 of the carrier member 63, has its bottom terminal 92 in engagement with said surface 89. The arrangement is hence such that, in the manually adjusted position of set screw 90, a rearward movement of said rod 82 away from the window pane is prevented when said terminal 92 engages said surface 89, said screw thus serving as a stop member to prevent a retraction of the wiper-holding rod 82 beyond a predetermined position. Positioned over the rear extension 93 of said rod 82 is the spring 94, said spring extending into the central apertured portion 95 of the adjusting screw 96, the latter being in threaded engagement with the said rear threaded portion 81 of hole 79. Thus, by adjustably

manipulating the said screw 96, the spring 94 will be compressed a desired amount to yieldably urge the rod 82 and the channel member 86 forwardly, so as to bring the wiper element 87 into frictional engagement with the window pane, with the desired pressure.

From the above it is apparent that the wiping action of both oppositely positioned wiper elements 87 and 87a throughout the entire extent of their respective operative strokes can be regulated by pre-setting the guiding members 67 and 68 as well as their respective adjusting and stop screws 96 and 90.

Mounted on the front carrier member 63, and secured in place by screws 97, are the forwardly extending contact members 98 and 99 (see Figs. 1, 2, 4, 5), the former having an upstanding contact flange 100 and the latter having an upstanding contact flange 101. When the carrier member 63 is in its extreme left-hand position (see Fig. 2), the contact flange 100 engages the contact arm 102 of the micro-switch 103 to bring said arm into abutment with the contact element 104. This will close the circuit through the conductors 105 and 106 which lead (in a manner not shown) to the reversible motor 34. The arrangement is such that when the contact elements 102 and 104 are brought into engagement, the motor will be reversed to cause a reversal of the operative movement of the belt 36. For example, when the front section 62 of the belt 36 is moving to the left, and the carrier 63 reaches the extreme dot-dash position shown in Fig. 2 and moves the contact 102 into engagement with contact 104, the closing of the circuit will cause a reversal of direction of rotation of the motor 34, thereby causing a reversal of the movement of the belt 36, so that the front section will now move from left to right, the wiper carrier member 63, moving with the belt, causing the wiper element 87 to traverse a corresponding path from left to right. The details of the circuit and construction of the motor are not herein described, as they are well-known to those skilled in the art. It is apparent that as the carrier member 63 moves in one direction, the opposite carrier member 65 moves in the opposite direction, since the front and rear sections 62 and 64 of belt 36 obviously move in opposite directions. It is merely necessary to set the positions of the respective carrier members 63 and 65 in proper positions at the extreme ends of their respective strokes, as indicated by the dot-dash lines in Fig. 2, to bring the two wiper members in proper coactive position. The positioning of said carrier members can be effected, as aforesaid, merely by manipulating the screws 66.

When the front carrier member 63 reaches the extreme right position, the contact flange 101 will engage the contact element 107 to bring it into engagement with contact element 108 of the micro-switch 109, thereby closing the circuit through the conductors 110 and 111 operatively connected to the said motor 34. The circuit is so arranged that when said contacts 107 and 108 are brought into engagement, the motor will again reverse its rotation, thereby again causing a reversal of direction of movement of belt 36. It should be noted that under normal conditions the contact member 102 is yieldably urged out of engagement with respect to contact element 104; and similarly, contact element 107 is yieldably urged out of engagement with contact element 108.

By the method above described, both sides of the window are simultaneously cleaned, the reciprocal and reversing actions taking place repeatedly, in the particular motorized embodiment of my invention illustrated, until the desired cleaning operation is considered completed. It is understood that although a particular motorized construction is illustrated, the invention is not limited solely to such construction, since other actuating mechanisms, either automatic or manual, may be employed within the scope and intent of this invention.

In the embodiment of my invention illustrated in

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Figs. 10 and 11, the basic concept of my invention hereinabove described is employed; but instead of having a single belt extending across the medial portion of the window, two separate belts are employed in spaced relation, one being at the top of the window, and the other at the bottom, leaving substantially the entire window free of obstructions when the device is not in use.

Specifically, a motor 34a is employed connected by gearing to drive shaft 26a, said shaft having fixedly secured thereto the drive pulleys 27a and 27b, the former being at the bottom of the window frame 16a and the latter at the top of said frame. In cooperative relation with drive pulley 27a are idler pulleys 37a, 38a and 39a. Similarly, in cooperative relation with drive pulley 27b are idler pulleys 37b, 38b and 39b. Mounted over pulleys 27a, 37a, 38a and 39a is the bottom belt 36a; and mounted over the pulleys 27b, 37b, 38b and 39b is the upper belt 36b. Affixed to the respective front and rear portions of lower belt 36a are the wiper carrier members 63a and 65a; and affixed to the respective front and rear portions of the upper belt 36b are the wiper carrier members 63b and 65b. The microswitches 103a and 109a, and the circuits connected to the motors, are substantially like the corresponding parts above described.

In the operation of this device, the motor 34a actuates the drive pulleys 27a and 27b, through the drive shaft 26a, thereby causing both belts to move, in the manner aforesaid, whereupon the bottom carrier members 63a and 65a operatively move the wiper elements 87b, and the upper carrier members 63b and 65b operatively move the wiper elements 87c. In this manner both upper and lower portions of the entire window, both front and rear, are simultaneously cleaned. And yet, during the inoperative position of the parts, with the carrier members 63a, 65a, 63b, 65b at their extreme opposite positions, the entire area of the window is substantially unobstructed.

In the above description the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except insofar as such limitations are specified in the appended claims.

I claim:

1. In a window cleaning device for operative attachment to a window structure, front and rear window cleaning elements positioned on opposite sides of the pane of the window structure and in slidable engagement with the respective front and rear surface of said pane, a carrier member for each of said elements, resilient means mounted on said carrier members for urging said cleaning elements toward the window pane with respect to said carrier members, front and rear rigid guide bars rigidly anchored in spaced parallel relation to the respective front and rear surfaces of said pane, apertured portions extending through said carrier members in directions parallel to the plane of the window pane, a movable belt having front and rear sections supporting said respective carrier members, said belt extending through said window structure, said guide bars extending through and being in slidable engagement with said respective apertured portions in the carrier members, a plurality of pulleys supported by said structure and operatively supporting said belt, and actuating means for said belt, whereby the operative movement of said belt will simultaneously cause operative movements of said carrier members and their said respective cleaning elements.

2. In a window cleaning device for operative attachment to the opposite frame members flanking a window pane, front and rear window cleaning elements positioned on opposite sides of the pane and in slidable engagement with the respective front and rear surfaces thereof, a

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carrier member for each of said elements, open portions in said frame members, a movable belt extending through said open portions and having front and rear sections substantially parallel to said window pane, said carrier members being releasably attached to said respective front and rear sections of the belt, a plurality of pulleys supported by said frames and operatively supporting said belt, said carrier members each having an apertured portion extending therethrough in a direction parallel to said pane, front and rear rigid guide bars in spaced parallel relation to the respective front and rear surfaces of said pane, said guide bars extending through and being in slidable engagement with said respective apertured portions in the carrier members, adjustable guide bar supports attached to said frame members and in supporting engagement with said guide bars adapted to adjust the distance between said rigid guide bars and the window pane, said guide bar supports rigidly anchoring the guide bars at the adjusted positions, and actuating means for said belt, whereby the operative movement of said belt will simultaneously cause operative movements of said carrier members and their said respective cleaning elements.

3. In a window cleaning device for operative attachment to a window structure, front and rear window cleaning elements positioned on opposite sides of the pane of the window structure and in slidable engagement with the respective front and rear surfaces of said pane, a carrier member for each of said elements, each of said carrier members having a passageway extending there-through normal to the plane of the window, a rod disposed within said passageway and extending forwardly therebeyond, said rod supporting the corresponding window cleaning element, resilient means at the rear of said passageway in engagement with said rod and urging it forwardly towards the window pane, adjusting means to vary the tension in said resilient means, front and rear rigid guide bars in spaced parallel relation to the respective front and rear surfaces of said pane, apertured portions extending through said carrier members in directions parallel to the plane of the window pane, a movable belt having front and rear sections supporting said respective carrier members, said belt extending through said window structure, said guide bars extending through and being in slidable engagement with said respective apertured portions in the carrier members, adjustable guide bar supports mounted on said window structure for setting the distance between the guide bars and the window pane, whereby their respective operative settings and the respective operative settings of said first-mentioned adjusting means will enable the window cleaning elements to bear against the pane with predetermined pressure along the entire width of the window, a plurality of pulleys supported by said structure and operatively supporting said belt, and actuating means for said belt, whereby the operative movement of said belt will simultaneously cause operative movements of said carrier members and their said respective cleaning elements.

4. In a window cleaning device, the combination according to claim 3, each of said rods which support a window cleaning element having at the top thereof a rearwardly and downwardly sloping wall, the corresponding carrier member having an adjustable stop member in engagement with said wall to limit the rearward retraction of the rod.

5. In a window cleaning device, the combination according to claim 4, adjustable guide bar supports mounted on said window structure for setting the distance between the guide bars and the window pane, said guide bar supports rigidly anchoring the guide bars at the adjusted positions, whereby the setting of the position of the guide bars and the action of the resilient means will enable the window cleaning elements to bear against the pane with

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predetermined pressure along the entire width of the window.

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