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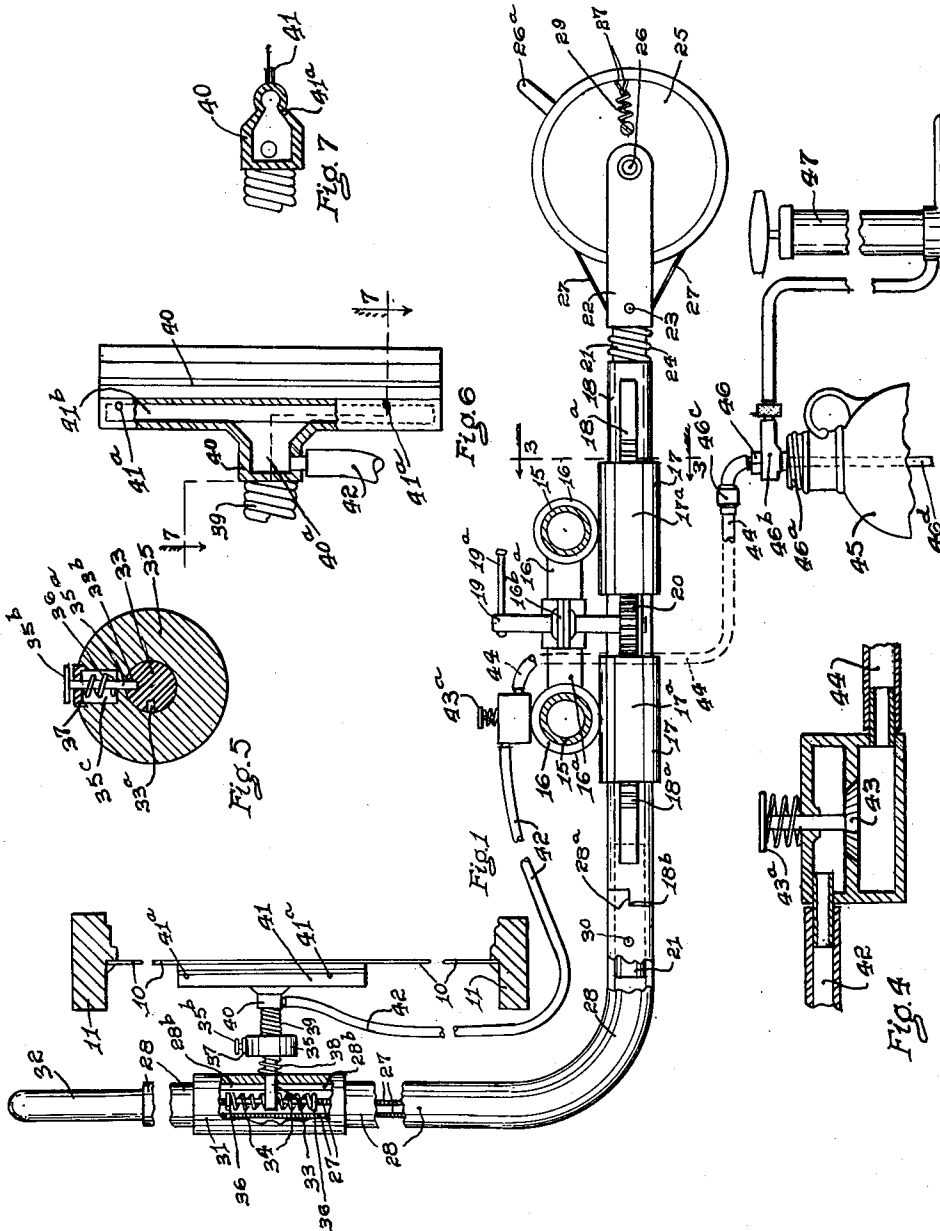
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2,634,448

WINDOW WASHING MACHINE

Filed July 9, 1948

2 SHEETS—SHEET 1



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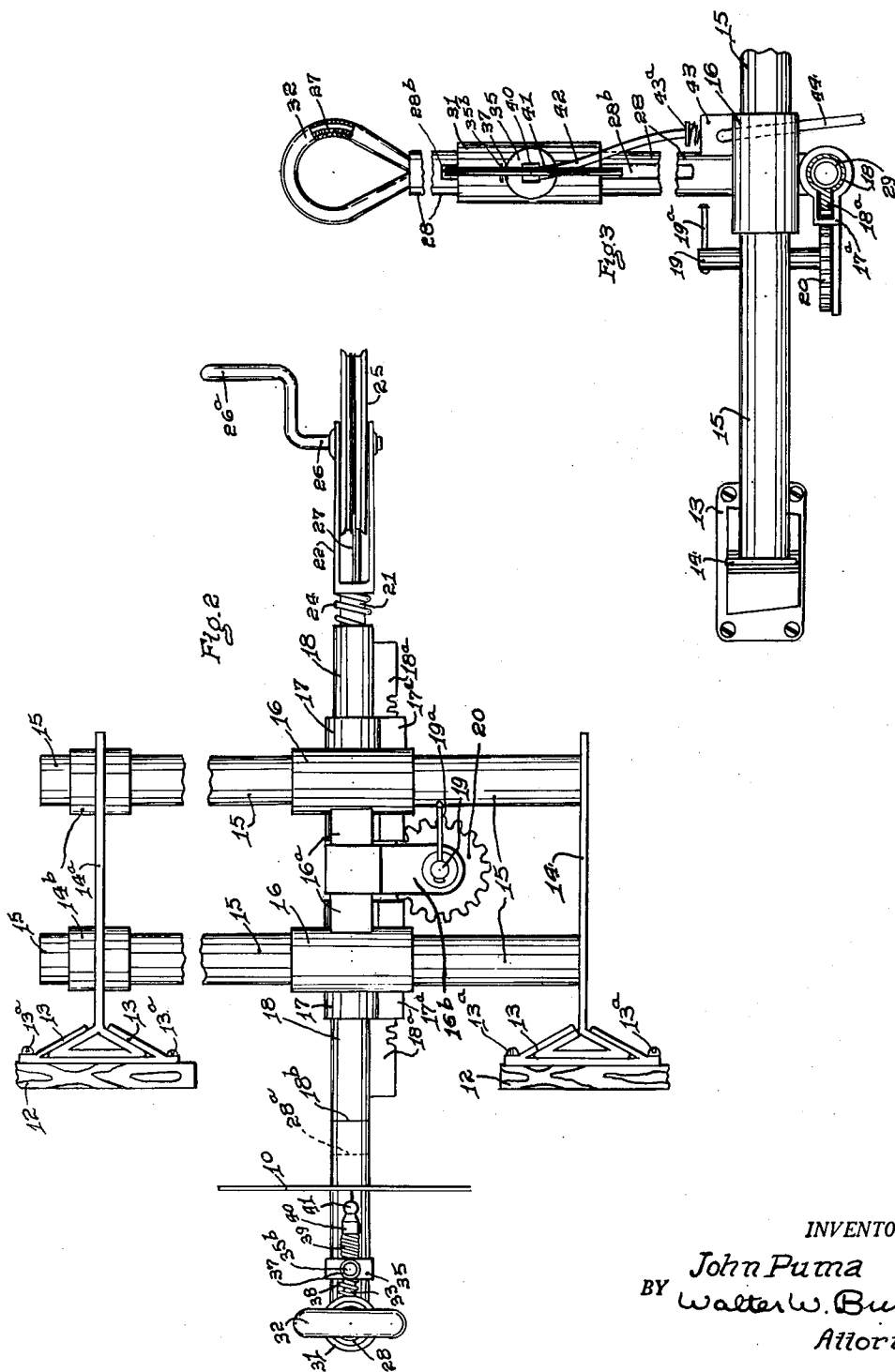
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WINDOW WASHING MACHINE

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2 SHEETS—SHEET 2



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WINDOW WASHING MACHINE

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2 Claims. (Cl. 15—250.4)

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This invention relates to window cleaning machines and has particular relation to that type of machine wherein the window may be cleaned on the outside surface while the operative manipulates the machine entirely from within the building.

In the washing of the outside surfaces of windows, the great problem is to provide safety for the operative while insuring the proper cleansing and drying of the window surface.

The primary object of this invention is the provision of an improved window washing machine.

Another object of the invention is the provision of an improved window washing machine wherein means are provided for giving a window cleaning element on the outside of a window, either lateral or vertical movement or both, over the surface of the window glass, while the operative remains inside the window.

Still another object of the invention is the provision of an improved window washing machine wherein a horizontal movement to a window cleaning element may be given by sliding a carriage which carries the element, in a horizontal direction.

A further object of the invention is the provision of an improved window washing machine wherein a window cleaning element can be moved by the operative from inside the window by the turning of a wheel or crank.

A still further object of the invention is the provision of an improved window washing machine wherein a window cleaning element is operated from inside the window by a continuous cable moved by a crank or wheel.

Another and still further object of the invention is the provision of an improved window washing machine wherein with the cleaning element in contact with the window, a spray of cleaning liquid may be applied to the surface to be cleaned while the cleaning element is moved horizontally, vertically, or in any direction in the plane of the surface to be cleaned, all of which is controlled by the operative from within the building.

Another and still further object of the invention is the provision of an improved window washing machine wherein mechanism is provided for moving the cleaning element in a direction normal to the window surface and under control of the operative entirely from within the building.

Another and still further object of the invention is the provision of a window washing ma-

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chine wherein from a place entirely within the building, the cleaning element of the machine may be moved from side to side or from top to bottom and to and away from the surface to be cleaned at the will of the operative.

Other and further objects of the invention will be apparent to those skilled in the art from a reading of the complete specification.

Referring to the drawing wherein is illustrated an embodiment of the invention,

Fig. 1 is a side view of the invention showing the sash of the window being cleaned.

Fig. 2 is a top plan view, but with the spraying device removed.

Fig. 3 is a front view—looking toward the window cleaning element—from the control devices on line 3—3 of Fig. 1.

Fig. 4 is a sectional view of the cleaning liquid control valve.

Fig. 5 is a sectional view of the wiper-positioning locking hub.

Fig. 6 is an enlarged view of the cleaning device shown partly in section.

Fig. 7 is a cross section on the line 7—7 of Fig. 6.

Similar reference characters refer to the same or similar parts throughout the specification and drawing.

Referring particularly to Figs. 1 and 2, the reference character 10 designates the glass of the window to be cleaned and 11 its sash which can be raised and lowered to open or close the window in the well known manner. The sash slides in the frame 12, a portion of the sides of which are indicated in Fig. 2.

Secured to the sides of the window frame 12 are a pair of brackets 13, which are held in place on the frame by the screws 13a. In the form of bracket shown, a slot of triangular cross section is provided to receive the detachable supporting arms 14, 14a. The brackets 13 are attached to the window frame at the same height so that the supporting arms 14, 14a will extend inwardly at the same height.

Secured to one of the two supporting arms, as 14, is a pair of rails 15. These rails are supported in a horizontal plane and are individually in parallel vertical planes which are parallel to the surface to be cleaned. The other arm 14a is provided with a pair of short tubular members 14b which slidably receive the ends of the rails 15.

Slidable on the rails 15 is a carriage which carries the active portion of the cleaning machine, which will now be described.

The rails 15 in the illustrated embodiment are cylindrical in form. A pair of sliding sleeve members 16 are provided as the supporting members of the carriage and have interior cross sections slightly larger than the exterior cross sections of the rails 15. The sliding sleeve members 16 surround the rails 15 and may be moved to any place along the length of the rails in accordance with the position it is desired that the cleaning devices shall occupy. It is to be understood that the carriage may be moved freely horizontally along the rails 15 and that there is no securing means necessary or desirable to hold it in any adjusted position.

Welded or otherwise secured to the sliding members 16 is a connecting portion 16a. Welded to the cylindrical members 16, respectively, are two axially aligned tubular members 17. These tubular members 17 carry an adjustable tubular member 18 which supports the cleaner element as will be later described. On the side of the tubular member 18 and secured along its length is a rack member 18a. To the sides of the tubular members 17 are secured members 17a of substantially rectangular cross section, which are provided with slots which open into the interior space within the tubular members 17 and provide for the reception and sliding of the tubular member 18 and its rack 18a, already described.

Secured to the connecting portion 16a is a bracket 16b in which is vertically pivoted a shaft 19 having a handle member 19a. At the lower end of the shaft 19 is a pinion 20 which is in mesh with the rack member 18a. It will be observed that since the shaft member 19 is rotatable in the carriage bracket member 16b, any rotation of the shaft 19 will cause a movement of the tube 18 outwardly or inwardly, depending upon which way the shaft 19 is rotated. The purpose of this movement will later become apparent. It will thus be clear that the carriage which comprises the parts 16, 16a, 16b, 17, and 17a, with the parts which it carries, may be moved across the front of the window by sliding the carriage as a whole along the rails 15 and by means of the handle 19a and its coacting parts, the tube 18 may be moved in a direction at a right angle to the rails 15.

As already stated, the operator of this window cleaning machine operates the machine entirely from the inside, the actual cleaning device being on the outside of the window. The tube 18 has a sliding tube 21 therein which is secured at its inner end within the end of an operating wheel yoke 22 by a rivet pin 23. Surrounding the tube 21 and in position to exert an end thrust on the adjacent ends of the tube 18 and the yoke 22 is a spring 24. This spring normally tends to hold the yoke 22 in a rearward position for a purpose to be later made clear.

Pivotally mounted between the arms of the yoke member 22 is an operating wheel 25. The operating wheel 25 is fixedly mounted on a crank axle 26 which is pivoted on the arms of the yoke member 22. At one end of the crank axle 26 is a crank 26a which is used by the operative to rotate the wheel 25. Passing around the wheel 25 in a peripheral groove is an operating cable 27. This cable is secured to the wheel 25 by means of the spring 29 in such a manner that when the wheel is turned, the cable will be under greater tension on one fall and less tension on the other. The purpose of the operating cable will be later made clear. The two falls of the cable pass through suitable openings in the yoke

22 and through the tube 21 which extends throughout the length of the tube 18.

The outer end of the tube 18, which is the end which leads to the outside of the window, is provided with a registry joint cut 18b. A curved tubular member 28 of a cross section which is the same as the tube 18 is provided with a similar but complementary joint cut 28a. Secured to the adjacent end of the tubular member 28 and within its interior is the outer end of the smaller tubular member 21 already described. This outer end of the smaller tubular member 21 may be secured within the end of the curved tubular member 28 by a suitable means as the rivet 30. It is thus clear that the tubular member 21 will slide within the tubular member 18 for a distance sufficient to allow for the compression of the spring 24. With the spring 24 so compressed, the registry cuts 28a and 18b will permit one to be turned relative to the other and the tubular member 28 can be moved to a plane parallel with the tubular members 15, for storing away. It will thus be observed that when the tubular members 18 and 28 are in the relative positions illustrated in Fig. 1, the tubes 18 and 28 are prevented from relative rotative movement by the joint formed by the ends 18b and 28a. The yoke member 22, during the compression of the spring 24, maintains its position relative to the tubular member 28 since both are rigid with the tube 21.

The outer end of the curved tubular member 28 extends upwardly on the outside of the window when in operative position and is provided with a slot 28b—preferably on its inner side toward the window. Slidably mounted on and surrounding the outside of the slotted portion of the tubular member 28 is a relatively short tubular carrying sleeve 31 which carries the cleaning element which will now be described.

The cable 27 which has already been mentioned, passes through the tubular members 21 and 28, passing through a looped tube 32 which is located at the top of the curved tubular member 28. The length of the cable is such that when all of the parts are in place, there will be a continuous tension in the cable 27, due to the spring 29, and due to the tension of the spring 24; the joint formed by the ends 18b and 28a will be tight, these ends being held together by the tension in the spring 24 which normally tends to force the adjacent ends of the yoke 22 and the tubular member 18 apart.

Fixedly secured to the carrying sleeve 31, intermediate its length, and attached to the cable 27 and having a portion passing through the slot 28b, is a supporting member 33, which while free to have a limited movement along the cable 27 is resiliently held in place by the springs 34. These springs 34 are held in place at their opposite outer ends, by collar stop members 36. The supporting member 33 extends through the slot 28b and carries a hub 35 which is rotatively adjustable on the outer cylindrical surface of the supporting member 33. The supporting member 33 is provided with two slots 33a, 33b, which provide for the adjustment. Mounted in the hub 35 is the detent member 35a, the inner end of which is small enough to enter either one of the slots 33a, 33b to hold the hub 35 and supporting member 33 from having relative rotatory movement when in either one of the adjusted positions. A spring 36 has a tendency to force the detent member 35a into registry with the slot 33a or 33b to prevent accidental displacement.

The outer end of the detent member 35a is provided with a head member 35b. A closure plug 37, through which the outer end of the detent member passes, is soldered or otherwise secured in the end of the opening 35c which encloses the spring 36. It will thus be clear by grasping the head 35b that the detent member 35a can be lifted from the slot 33b or 33a and shifted to the other slot and also that when the finger of the operative releases the head 35b, the spring 36 will force the detent 35a into the slot 33a, or 33b. By this means the hub can be adjusted at either of two positions, the purpose of which will be presently made clear.

A spring 38 is interposed between the sides of the carrying member 31 and the hub 35 and surrounds the supporting member 33. This spring normally tends to force the hub outwardly. Secured to the hub 35 is a supporting spring 39 which is rigidly connected to the hub 35 in order that the wiper head 40 which it carries at its other end can have a resilient mounting. Carried by the wiper head 40 is the window wiper 41 which acts to clean the window glass 10.

The wiper head 40 is provided with a chamber 40a which is connected to the interior 41b of the hollow bar of the wiper 41. Near the top of the bar of the wiper and also near but somewhat above the bottom are two spray openings 41a. These spray openings deliver spray to the window glass surface as at 10.

Connected to the interior at the head 40 is the tube 42 which is, in turn, connected to the hand-controlled valve 43. This hand controlled valve 43 receives its spray supply from a tube 44 which is connected to the source of supply which will now be described.

The fluid supply which may be water or other cleaning fluid, may be from any suitable closed tank or container. In the present embodiment, there is shown a standard gallon container 45 which may have a head 46 having a screw cap 46a and an air supply connection 46b attached thereto. The air supply connection opens through the cap 46a to apply a pressure to the top of the fluid within the standard gallon container 45.

The head 46 is provided with a connector 46c at its top, and at its bottom the head is connected to a pipe or conduit 46d which extends to the bottom of the gallon container 45. The tube or conduit 44, already described is connected to the connector 46c for transmission of the spray liquid to the wiper arm 41 as already described.

To provide air pressure at the top of the liquid, any suitable means, as the hand air pump 47, is connected to the air supply connection 46b. Such hand pumps are in general use for inflating the tires of automobiles and bicycles.

The operation of the whole construction will now be described. As the window cleaning machine is stored, the horizontal rails 15 are in substantially the same plane as the tubular member 28 and the wheel 25. This is made possible by the non-registration of the ends 18b and 28a, forming the joint between the tubular members 18 and 28. As the rail members 15 are swung to a horizontal position with the tubular member 28 in a vertical position, the joint ends 18b and 28a will reach a point where the two complementary registry cut ends will register. When this takes place, the spring 21 forces the tubular member 18 and the yoke member 22

apart, thus holding the members of the registry joint in place.

With the parts in this relation, the supporting members 14, 14a are placed in position in the brackets 13 when the tubular member 28 is outside of the partially raised window sash. In using the window cleaning machine on windows of different widths, it will be clear that the different distances between brackets 13 of different windows will be taken care of by the sliding feature of the bracket 14a along the rails 15 already described.

With the cable 27 held taut by the spring 29 as just described, any turning of the wheel 25 by the handle 26a will place a greater tension in one fall of the cable 27 and lessen the tension in the other. Since the continuous cable 27 is resiliently attached to the supporting member 33 and since the latter extends through the slot 28b, it follows that any turning of the wheel 25 will result in a raising or lowering of the supporting member 33 and the wiper 41. If slackness tends to occur in the cable 27, this slackness will be at once taken up by the spring 29.

If the wiper is in a vertical position and it is desired to have it in a horizontal position, it is only necessary to turn the wheel 25 to lower the wiper 41 and by means of the head 35b, release the hub 35 and turn the wiper to the desired position. When the head is released, the end of the detent 35a will engage the slot 33a or 33b and the wiper 41 will be held in the new position.

Since, as already pointed out, the whole carriage and the active parts carried thereby may be moved along the rails 15, it follows that any desired lateral or horizontal movement may be given by moving the whole carriage along the rails 15. And since any desired vertical movement may be given by turning the wheel 25, it follows that any combination of the two movements may be given by sliding the carriage and turning the wheel 25 at the same time.

During the movement of the wiper 41 over the surface of the glass 10, the springs 34, 38 and 39 take up any irregularities in the movement. Movement of the cleaning element toward or from the window is accomplished by turning the shaft 19 by its handle 19a.

When everything is ready for the cleaning operation, and the connections to the fluid supply are made as already described, the operative operates the pump 47 a few strokes to place the cleaning fluid under pressure and the spray is released, at the will of the operative, by pressing on the finger piece 43a to send the spray fluid to the openings 41a. By operating the spray mechanism and moving the carriage and the wheel 25, the whole surface of the window glass 10 may be covered with the cleaning fluid. By working the wiper 41 over the wet surface, the dirt may be loosened and then the fluid supply may be shut off. After this is done, the carriage and wheel 25 may be moved to cover the surface with wiper 41 paths which will clear the surface of the moisture and leave the surface clean and dry. The wiper 41 may be removed from contact with the window at the end of a path by turning of the shaft 19.

In storing the window cleaning machine, it is necessary only to compress the spring 21 and simultaneously swing the tubular member 28 relatively to the rails 15 until they are in substantially the same plane. The compression of the spring 21 is necessary to separate the adjacent ends 18b, 28a of the tubular members 18

and 28 until the parts of the joint do not interfere with each other in the relative turning.

In the claims the term tubular member is used to designate the tubular members 18, 21, 28 and 32 or such number of them as may be applicable as used.

While an embodiment of the invention has been shown and described in detail, it is to be understood that the disclosure is merely illustrative and that modifications and changes may be made without departing from the spirit of the invention and within its scope as claimed.

Having described my invention, what is claimed is:

1. A window washing machine comprising supporting means entirely inside the window, means for attaching the supporting means to the inside of a building, horizontal guide means carried by the supporting means and extending across the inside of the window, a carriage means movably mounted on the horizontal means, a window cleaning device in position to be outside the window to be cleaned and including a wiper head, a sectionally foldable tubular means connecting the cleaning device with the carriage, a cable means within the tubular means and connected to the cleaning device to move the same vertically, a wheel for operating the cable and in position to be operated from inside the window, a rack and pinion connection between the carriage and the tubular means for moving the cleaning device in a direction normal to the window and a sliding connection between the carriage means and the horizontal means.

2. A carrying means for a window washing device comprising supporting means entirely inside the window, means for detachably attaching the

supporting means to a building, horizontal means connected to the supporting means and extending across the window space, a carriage slidably mounted on the horizontal means, a tubular member supported by and extending from the carriage, a second tubular member having a long right angular bend and an upright portion extending outside the window, the first-named tubular member having a registry joint between one of its ends and a coacting part of the second tubular member so that when the window washing machine is removed from the window for storage, the upright portion may be first swung to a position substantially in a plane with the horizontal means, a cable means in the second-named tubular member and having a means at the upper end of the second-named tubular member for holding a loop of the cable, a cable wheel and holding member at the other end of the second-named tubular member, the second-named tubular member having a sliding connection with the first-named tubular member and a spring tending to hold the coacting parts of the joint together to prevent relative turning of the two tubular members during operation of the window washing machine.

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