

March 20, 1928.

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H. A. HARRIS

WINDOW WASHING MACHINE

Original Filed Aug. 14, 1920

4 Sheets-Sheet 1

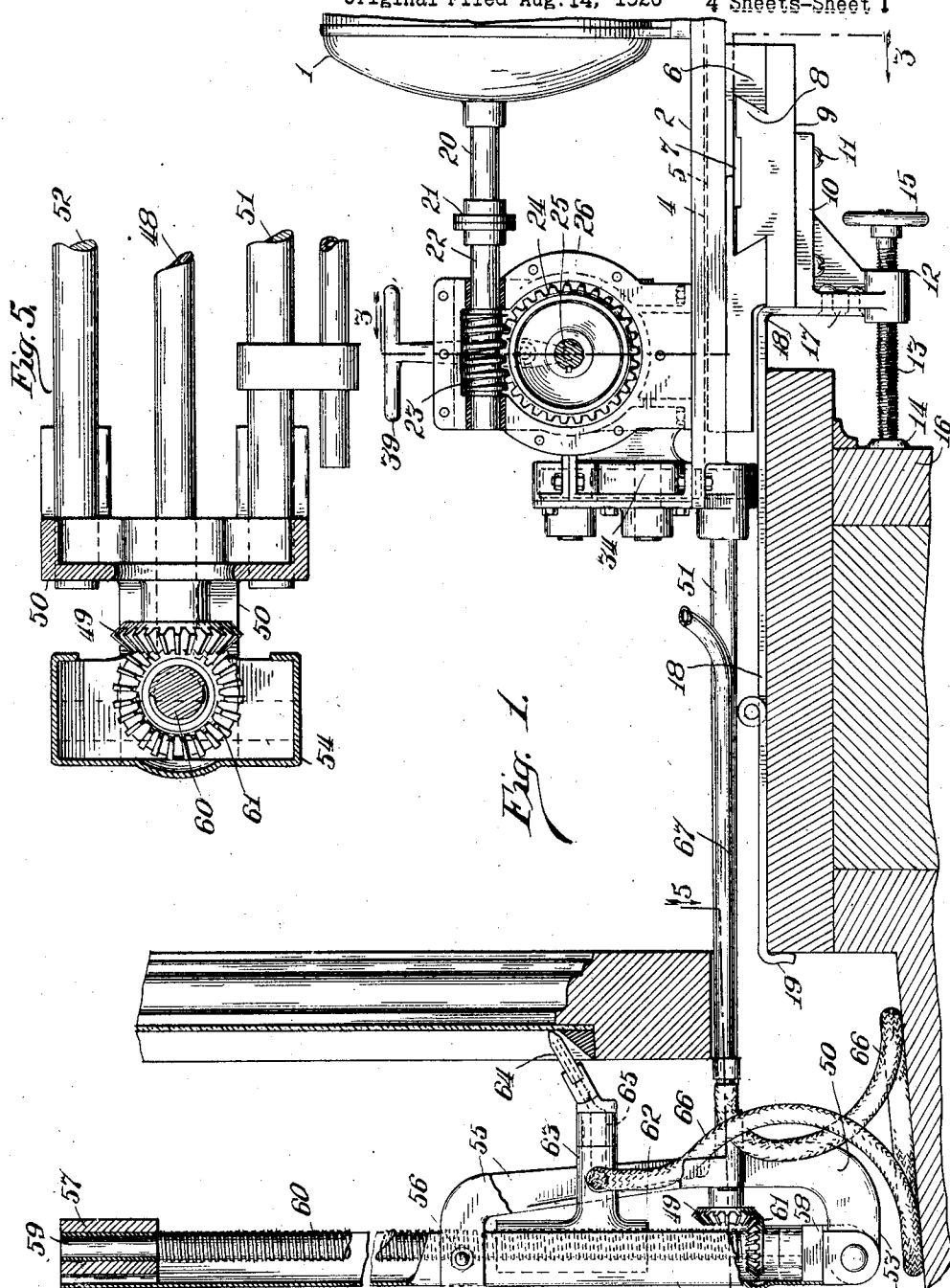


Fig. 1.

Fig. 5.

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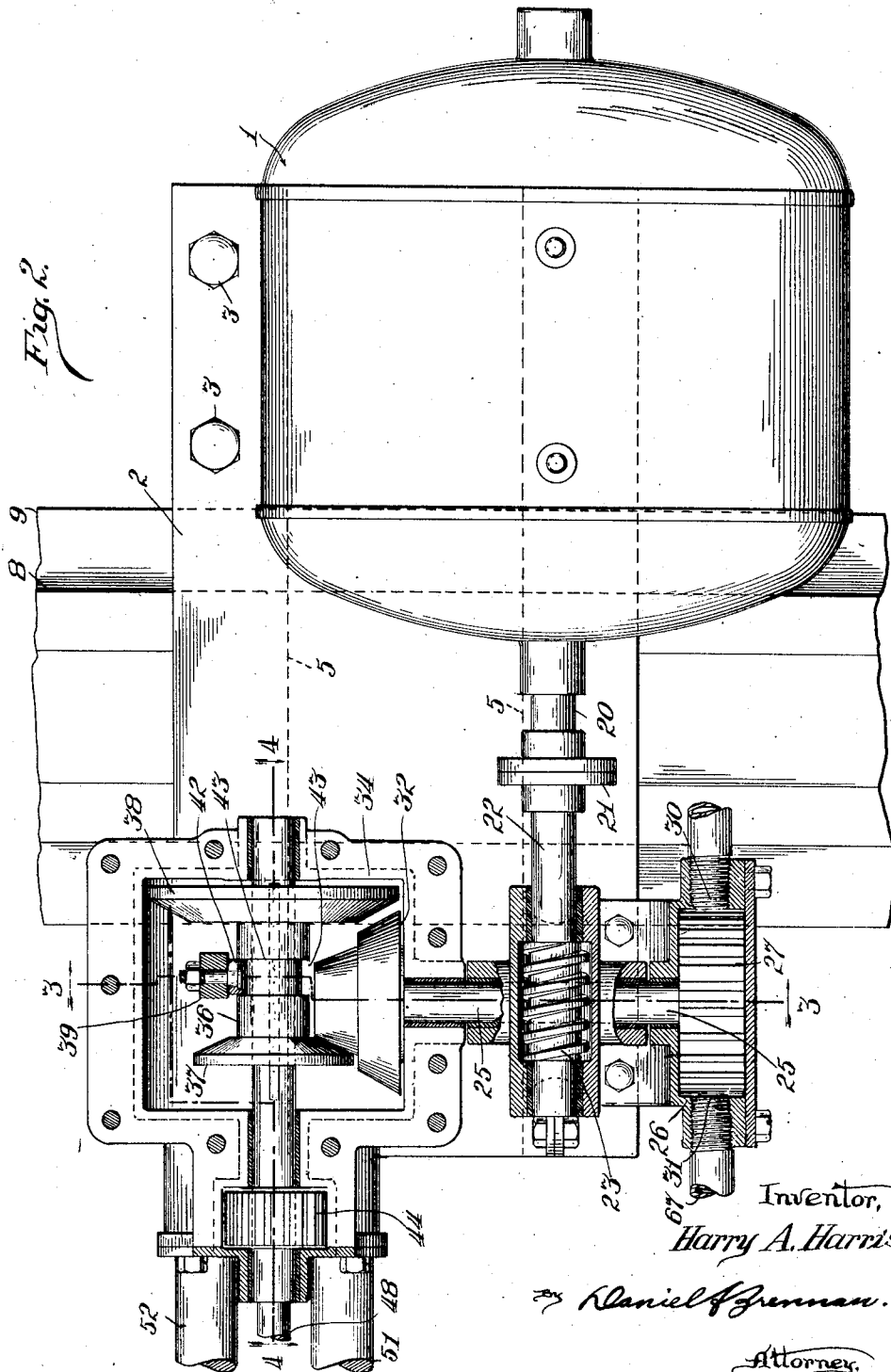
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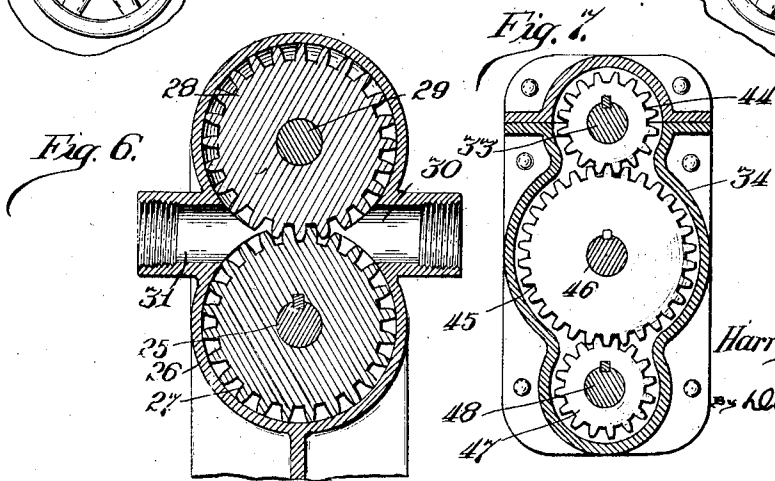
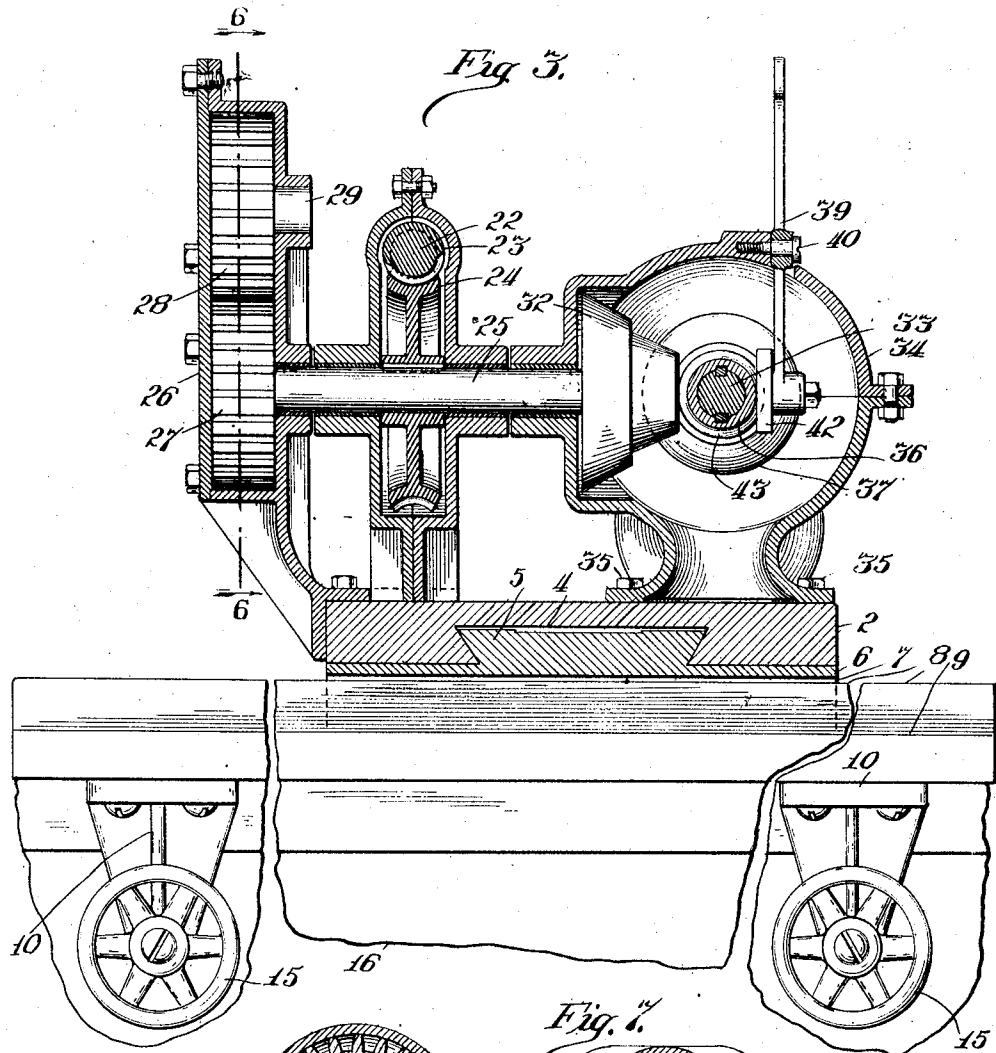
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WINDOW WASHING MACHINE

Original Filed Aug. 14, 1920

4 Sheets-Sheet 3



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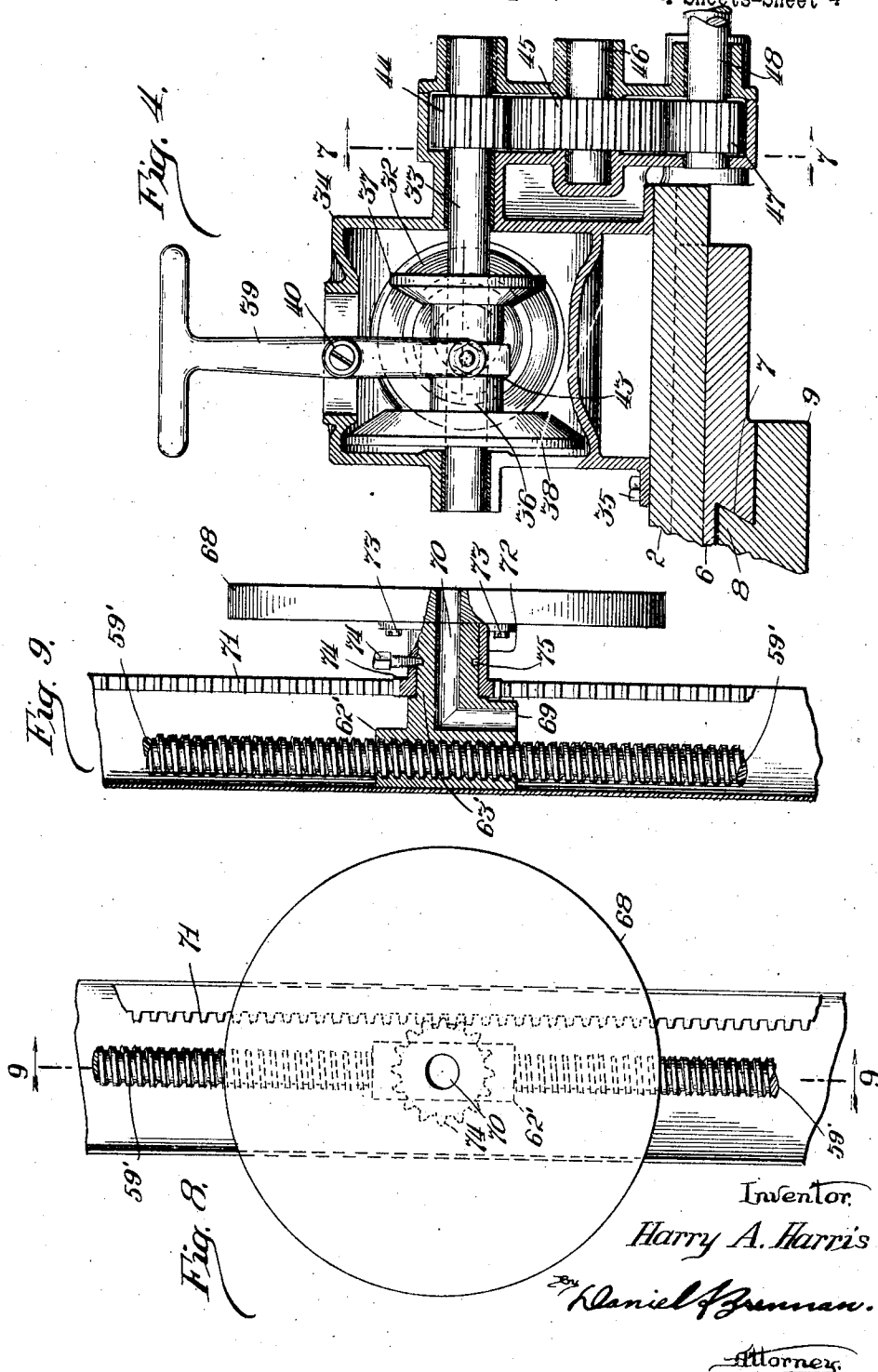
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WINDOW WASHING MACHINE

Original Filed Aug. 14, 1920 4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE.

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WINDOW-WASHING MACHINE.

Application filed August 14, 1920, Serial No. 403,448. Renewed January 15, 1926.

The invention relates to window washing machines, and the principal object is to provide a machine of the character specified by means of which a window may be cleaned from the outside without requiring a person to go outside of the room such as is necessary when the windows are washed manually.

The cleaning of windows in large buildings, and especially in high buildings, is always fraught with grave danger that the person acting as cleaner, although fastened by means of a strap to hooks projecting from the building wall adjacent the window, may not properly secure the strap or in moving from one window to the other may lose his balance or become dizzy and fall to the ground.

The present invention aims, therefore, to preclude entirely the necessity of the cleaner occupying a position outside of the room or the building, but permitting the arrangement of a cleaning device from within and having means for cleaning the outside of windows.

It is also an object of the invention to provide a power-driven device which may be driven from any suitable source of power, and thus may be easily started and stopped whenever required.

It is a further object of the invention to provide a window cleaning machine, which is equipped with a squeegee or a rotary brush capable of traveling in contact with the outside of the window panes, and thereby by effect the cleaning operation.

It is a further object of the invention to provide a device, in which the cleaning medium will reciprocate vertically, the downward movement being effected at comparatively low speed, and the upward movement being effected at comparatively high speed.

It is a further object of the invention to provide suitable water supply to the cleaning medium to effect a thorough cleansing of windows.

It is also an object of the invention to provide a device which may be conveniently adjusted so as to insure the cleansing of all parts of the windows.

With these and other objects in view which will hereinafter appear, the invention comprises the means hereinafter described, and particularly pointed out in the claims and illustrated in the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a portion of a building wall and a window to which the improved device has been applied;

Fig. 2 is a plan view of the device with parts in section and the cover of the friction drive casing removed;

Fig. 3 is a section on the line 3—3 of Fig. 1 or 2;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a section on the line 6—6 of Fig. 3;

Fig. 7 is a section on the line 7—7 of Fig. 4;

Fig. 8 is a fragmentary view of the modification; and,

Fig. 9 is a section on the line 9—9 of Fig. 8.

Referring to the several views of the drawing, 1 designates a motor of any suitable type which is secured to a bed plate 2 by a plurality of screws 3. The bed plate 2 is formed in longitudinal direction with a dove-tail groove 4 to receive a correspondingly formed tenon 5 of a plate 6. The latter again is formed with a transverse dove-tail groove 7 into which extends a correspondingly shaped tenon 8 of a fixed transverse member or base plate 9 to the under side of which are secured a plurality of brackets 10 by screws 11. The brackets 10 terminate at the lower ends in hub portions 12, the bore of which is tapped for the passage of spindles 13 formed at their inner ends with abutment blocks 14 and at their outer end with a hand wheel 15. The abutment blocks 14 engage the inner side of the building wall, generally designated by 16. To the brackets 10 the depending arm 17 of a hinged bracket 18 is secured, such as by riveting or any other preferred or approved manner and at the outer end the bracket 18 is formed with a depending flange or lip 19 which engages the outer side of the building wall 16.

From the foregoing it follows that the plates 2, 6, and 9 are supported from the building wall by the engagement of the bracket 19 with the outer side of the wall and the clamping engagement between the spindles 13 and the inner side of the building wall. It is also evident that the bed plate 2 may be shifted in transverse direc-

tion with relation to the window sill on the tenon 5 and that the plates 2 and 6 may be shifted in transverse longitudinal direction on the tenon 8, for the purpose of enabling the device to reach any part of the outside of the window, as will hereinafter further appear.

The motor 1 is equipped with a shaft 20, which is secured by a coupling 21 to a stub shaft 22, forming therewith a drive shaft, and carrying a worm 23 in engagement with a worm wheel 24 keyed to a shaft 25. The latter enters at its left end, as viewed in Fig. 3 into a gear casing 26 and has keyed thereto a gear 27 which meshes with a gear 28 arranged in superposed relation in the casing 26 and carried by a stub shaft 29 journaled in a bearing formed integral with the casing 26.

An indicated in Fig. 6, the casing is formed with an inlet 30 and an outlet 31 for a purpose hereinafter further referred to. The other end of the shaft 25 carries a friction drive cone 32 which is of stepped formation to provide for two speeds. In alignment with the intermediate shaft 25, but extending at right angles thereto and parallel to the shaft 22 a shaft 33 is journaled in a casing 34 secured to the bed plate 2 by a plurality of screws 35. The shaft 33 has splined thereon a sleeve 36 which has secured at its ends friction wheels 37 and 38, respectively, the former adapted to contact with the smaller portion of the drive cone 32, whereas the latter is adapted to contact with the larger portion of the drive cone 32. In order to obtain selective engagement of the wheels 37 and 38 with the cone drive, a lever 39 is pivotally secured to the casing 34 as at 40 and its lower end carries a roller 42 which enters a circumferential groove 43 in the sleeve 36 (Fig. 4). The outer end of the shaft 33 carries a pinion 44 in mesh with a gear 45 arranged adjacent thereto on a shaft 46 and the gear 45 is in turn meshing with a pinion 47 keyed to a shaft 48. Driven shaft 48 extends to the outside of the building and carries at its extreme outer end a beveled gear 49. The shaft is journaled at the inner end in the gear casing 34 and at the outer end in a bracket 50 which is supported in position by a pair of supporting rods 51, 52 (Fig. 2) which extend outwardly and horizontally from the gear casing 34. The bracket 50 is formed with a lower curved portion 53 directed outwardly and has pivoted thereto a vertical frame 54 which intermediate its ends is braced by an arm 55 integral with the bracket 50 and secured to the frame 52 by cap screws 56. The vertical frame 54 is provided at its upper and lower ends with bearings 57 and 58 to receive therein a vertical shaft 59 formed with square threads 60. The beveled gear 49 of the shaft 48 meshes

with a similar gear 61 keyed on the shaft 59, whereby the latter is continuously driven. An elongated nut 62 surrounds the shaft 59 and is formed with a horizontal extension 63, to which is secured at its extremity a squeegee 64 adapted to bear on the outer side of a window pane. The extension 63 is formed with a port 65 which terminates at the operative end of the squeegee to supply the necessary water while cleaning the window. The extension 63 is formed with an aperture for the entry of a flexible hose 66 which leads to a pipe 67 connected to the water outlet 31.

The operation of the device is as follows:

With the parts in the position as shown in Fig. 1, upon rotation of the motor, rotation is imparted to the shaft 25 and by the engagement of the members of the friction drive the shaft 48 is rotated which through the bevel gears 49 and 61 imparts rotation to the vertical shaft 59. The elongated nut 62, due to the rotation of the shaft 59, is then forced to ascend, thus bringing the squeegee 64 from the lowermost position to the uppermost position on the window, while in contact therewith. At the same time water is discharged onto the window, whereby a thorough cleansing is obtained. In order to force the return of the squeegee to the lowermost position, it is merely necessary to actuate the clutch lever 39 to bring the other wheel in engagement with the cone 32, and due to the reversal of rotation of the shaft 59 the elongated nut moves downwardly, bringing the squeegee into starting or original position. In view of the different sizes of the friction wheels, the speeds of the shaft 48 in both directions vary, whereby the downward movement of the squeegee is slower than the upward movement. When a certain selected vertical portion of the window has been cleaned and the adjacent portion thereof is to be washed, the bed plates 2 and 6 are shifted in transverse direction on the tenon 8 of the plate 9 to the desired extent, whereupon again reciprocal movement is imparted to the elongated nut 62 and squeegee 64 and the same operation is repeated as described before.

Figures 8 and 9 disclose a slight modification, permitting the employment of a rotary brush for the cleaning of a window in lieu of a squeegee. The elongated nut 62' surrounds the vertical shaft 59' and the extension 63' of the nut has secured thereto a brush holder 68 by a sleeve 72, which is fastened to the brush holder 68 by screws 73 extending through a flange of the sleeve 72. The sleeve is maintained in position on the extension 63' by a set screw 74 entering a peripheral groove 75 in the extension so that the sleeve and the brush holder can rotate on the extension. The extension 63' is formed with a vertical port 69 to receive the end of

the flexible hose 66 and the port 69 terminates in a horizontal bore 70, for the supply of water to the rotary brush. The sleeve 72 is formed integral with a pinion 74 which is in mesh with the vertical rack 71 formed integral with or, if preferred, formed separate and secured to the vertical frame 54. It is obvious that upon rotation of the shaft 59' the elongated nut 62' will again reciprocate in vertical direction, but this movement will cause rotation of the pinion 74 and of the brush holder 68.

The drawings disclose an embodiment of the invention by way of example. Various changes and alterations can be made without departing from the spirit of the invention. I, therefore, do not confine myself to the details of construction and arrangement of parts, as shown, but claim my invention as broadly as the state of the art permits.

I claim:

1. In a device of the character described, a fixed member, an elongated bed plate mounted on said fixed member and overhanging the same, means permitting sliding of said bed plate relative to said fixed member in longitudinal and transverse directions, a cleaning member mounted for vertical reciprocation on the end of said overhanging bed plate, means for actuating said cleaning member and manually controlled means interposed between said actuating means and said cleaning member for imparting different speeds to said cleaning member.

2. In a window cleaning device, a fixed member adapted to be clamped to a window sill, a bed plate mounted on said fixed member and projecting beyond the sill, a cleaning member mounted for reciprocation on the end of said projecting bed plate, means for actuating said cleaning member and manually controlled means interposed between said actuating means and said cleaning member for causing said member to move with greater speed while actuated in one direction than while actuated in the reverse direction.

3. In a window cleaning device, a bed

plate adapted to be mounted on a window sill and protruding beyond the sill, a cleaning member mounted for vertical reciprocation on the protruding bed plate end and contacting with the window pane, a rotatable shaft geared to said cleaning member, a drive shaft mounted on said bed plate, a driven shaft operatively connected to said rotatable shaft, an intermediate shaft between said drive shaft and said driven shaft and adapted to impart rotation from said drive shaft to said driven shaft, means to drive said drive shaft, and means to supply a cleaning fluid to said cleaning member upon rotation of said intermediate shaft.

4. In a window cleaning device, a bed plate adapted to be mounted on a window sill and protruding beyond the sill, a cleaning member mounted for vertical reciprocation on the protruding bed plate end and contacting with the window pane, a rotatable shaft geared to said cleaning member, a drive shaft, a driven shaft operatively connected to said rotatable shaft, an intermediate shaft having a friction clutch thereon operatively related to said driven shaft and adapted to impart rotation thereto from the said drive shaft, and means to drive said drive shaft.

5. In a window cleaning device, a bed plate adapted to be mounted on a window sill and protruding beyond the sill, a cleaning member mounted for vertical reciprocation on the protruding bed plate end and contacting with the window pane, a rotatable shaft geared to said cleaning member, a drive shaft, a driven shaft operatively connected to said rotatable shaft, an intermediate shaft having a friction clutch thereon operatively related to said driven shaft and adapted to impart rotation thereto from the said drive shaft, means to drive said drive shaft, and means operative thru said clutch to cause said cleaning member to move with a greater speed when actuated in one direction than when actuated in the reverse direction.

In testimony whereof I affix my signature.

HARRY A. HARRIS.