

Nov. 20, 1923.

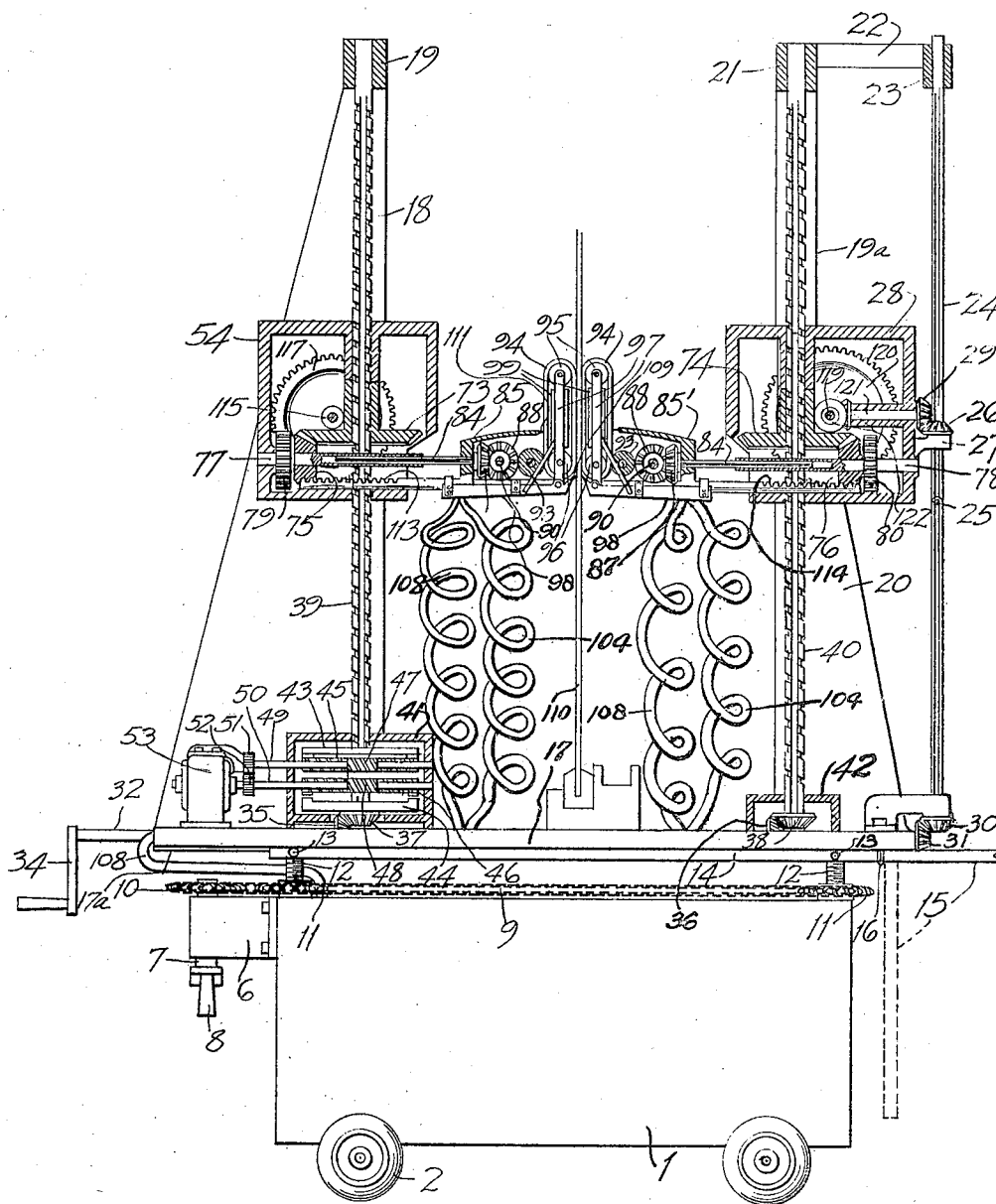
1,474,840

J. MARTIN

WINDOW WASHING AND DRYING MECHANISM

Filed Nov. 3, 1921

5 Sheets-Sheet 1



WITNESS:

C. L. Cogood

INVENTOR.

J. Martin
BY
H. J. Sanders
ATTORNEY.

Nov. 20, 1923.

1,474,840

J. MARTIN

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5 Sheets-Sheet 2

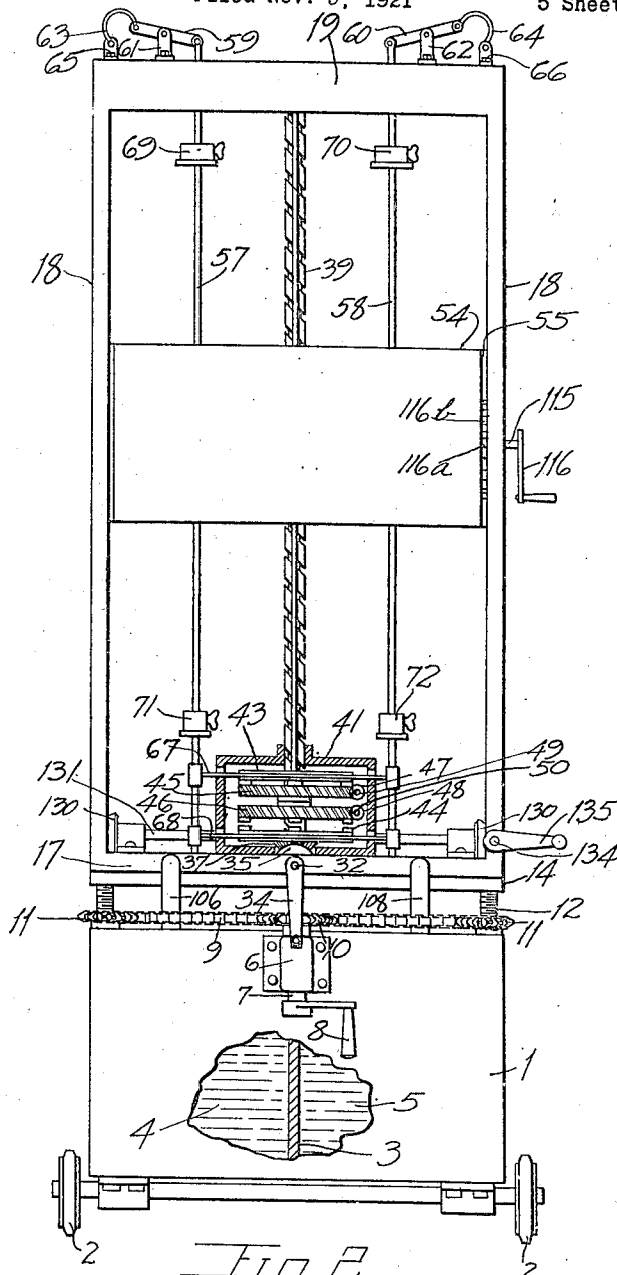


Fig 2

WITNESS:

C. L. Osgood

INVENTOR.

J. Martin
H. J. Sanders
ATTORNEY.

BY

Nov. 20, 1923.

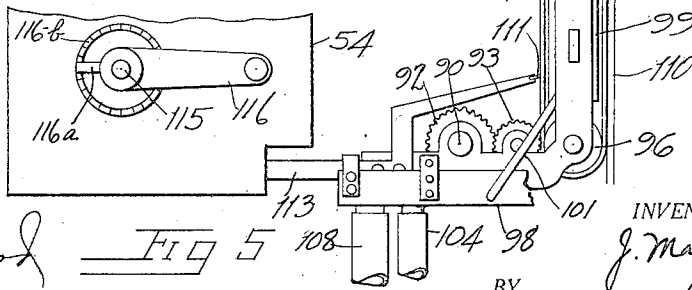
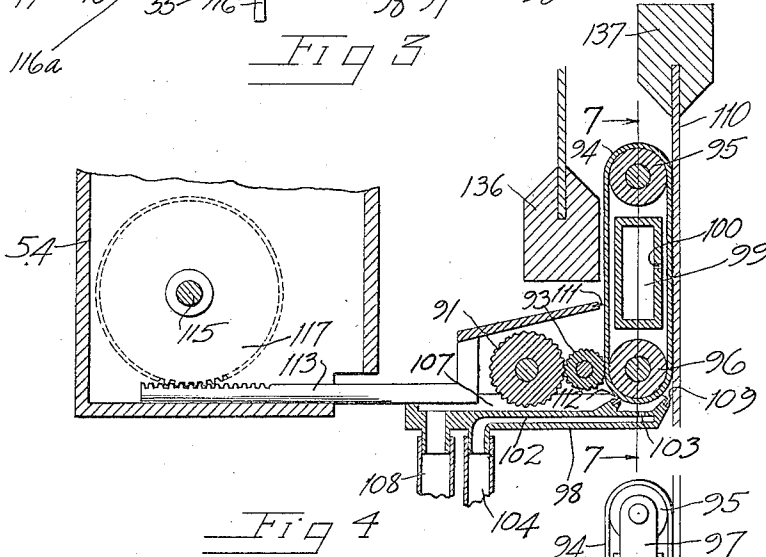
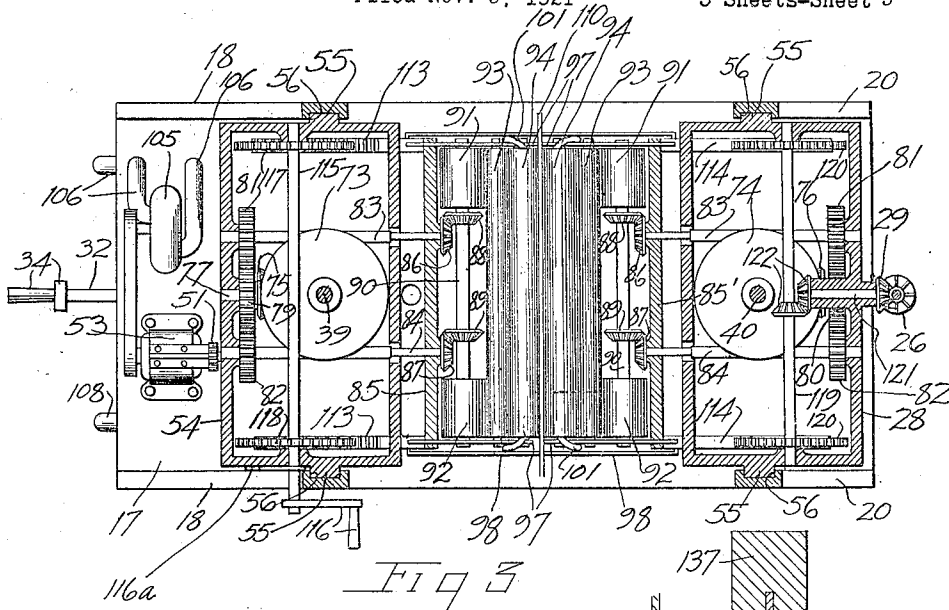
1,474,840

J. MARTIN

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5 Sheets-Sheet 3



WITNESS:

C. L. Good

FIG 5

BY

INVENTOR.

J. Martin

H. J. Sander

ATTORNEY.

Nov. 20, 1923.

J. MARTIN

1,474,840

WINDOW WASHING AND DRYING MECHANISM

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5 Sheets-Sheet 4

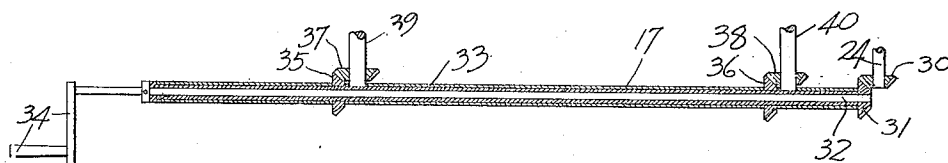


Fig 6

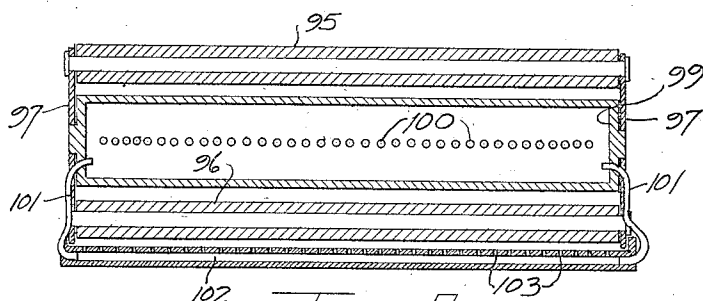


Fig 7

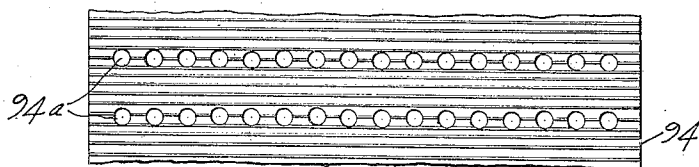


Fig 8

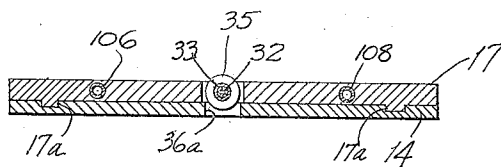


Fig. 15

WITNESS:
C. L. O'Connell

BY

INVENTOR.
J. Martin
H. J. Sanders
ATTORNEY.

Nov. 20, 1923.

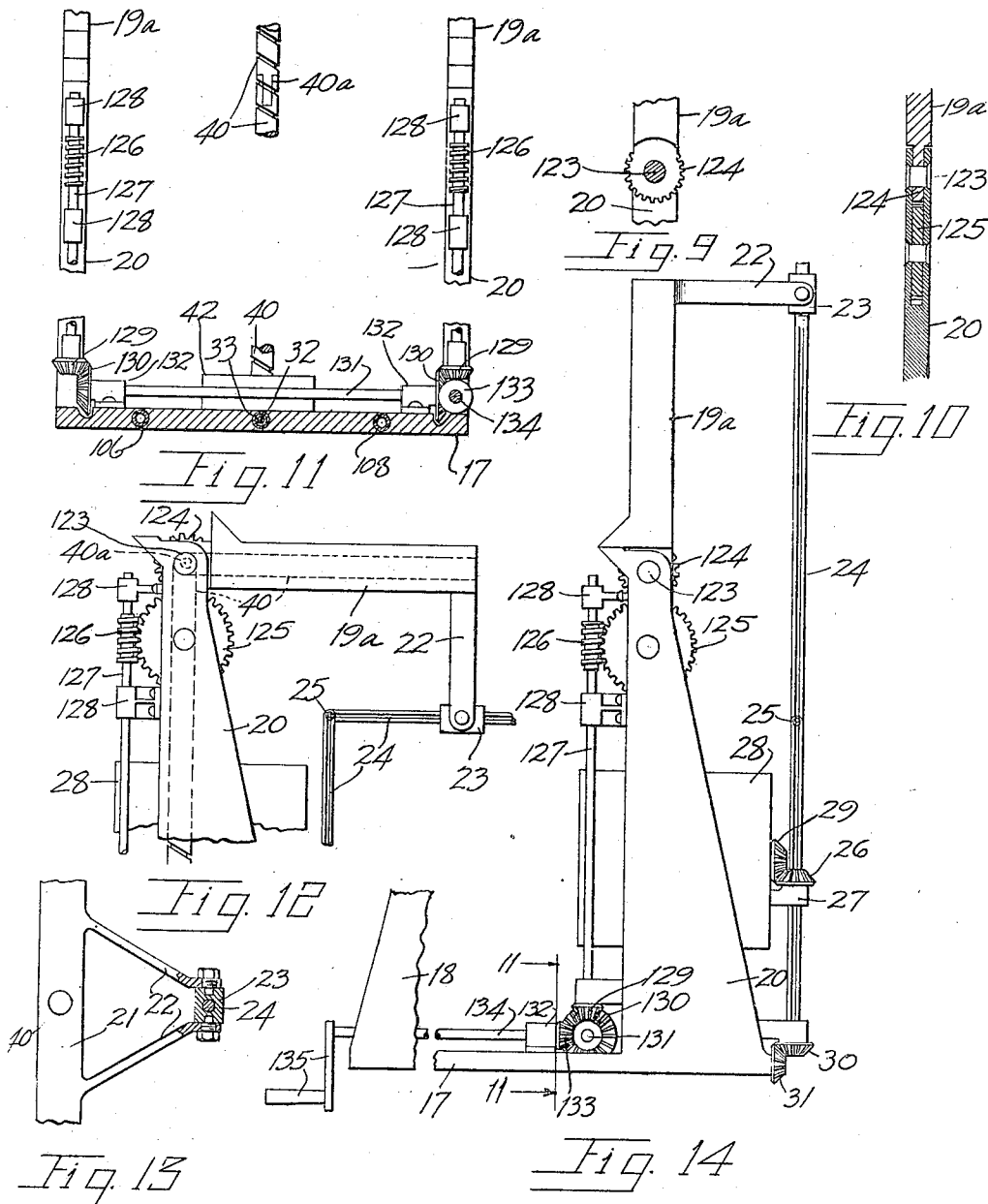
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J. MARTIN

WINDOW WASHING AND DRYING MECHANISM

Filed Nov. 3, 1921

5 Sheets-Sheet 5



WITNESS:

C. L. Osgood

INVENTOR.

J. Martin

BY

H. J. Sanders
ATTORNEY.

UNITED STATES PATENT OFFICE.

JULIUS MARTIN, OF CHICAGO, ILLINOIS.

WINDOW WASHING AND DRYING MECHANISM.

Application filed November 3, 1921. Serial No. 512,456.

To all whom it may concern:

Be it known that I, JULIUS MARTIN, a citizen of Hungary, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Window Washing and Drying Mechanism, of which the following is a specification.

This invention relates to window cleaners and more particularly to an automatic window washing and drying machine. The prime object of the invention is to provide a machine that may be applied to a window pane. Another object is to so adjust water conveying and applying mechanism relative to the water reservoir that the window pane may be washed longitudinally, and that windows at varying distances from the ground line may be readily reached and washed. A still further object is to provide mechanism whereby both sides of a pane may be washed simultaneously and dried in the same manner.

More specifically the invention provides a machine having a compartmental reservoir on which is carried a frame having window washing elements capable, when set in operation, of travelling back and forth in a vertical plane automatically, said elements including water applying and drying mechanism adapted for application to opposite sides of the window pane, said last named elements being individually adjustable toward and away from each other to facilitate their application to the pane, said elements being fed by flexible water-conveying mechanism connecting the same and the water reservoir, said flexible elements communicating with both compartments of the reservoir to receive clean water from one compartment and to convey used or dirty water to the opposite compartment.

A full and clear description of a preferred embodiment of my invention will be set forth in this specification, more specifically pointed out in the appended claims and illustrated in the accompanying drawings which form a part of this application and in which—

Fig. 1 is a view of the machine in side elevation and partly in section.

Fig. 2 is a front view.

Fig. 3 is a plan view partly in section.

Fig. 4 is an enlarged fragmentary sectional view detailing one pane-washing and

drying element and the means for adjusting the same at right angles to the pane.

Fig. 5 is a side view of Fig. 4.

Fig. 6 is a fragmentary sectional view illustrating the rotary shafts for raising and lowering the cleaning mechanism.

Fig. 7 is a sectional detail of one water applying element employed.

Fig. 8 is a detail view of an endless belt employed.

Figs. 9 and 10 are fragmentary views of Fig. 14.

Fig. 11 is a section on line 11—11 of Fig. 14.

Fig. 12 is a fragmentary view of Fig. 14 with the adjustable parts in an altered position.

Fig. 13 is a fragmentary plan view of Fig. 14.

Fig. 14 is a view in side elevation of the hinged portion of the frame and the actuating means therefor.

Fig. 15 is a cross section through the bed plate and platform.

Like reference characters denote corresponding parts throughout the several views.

The machine comprises a water tank 1 supported upon wheels 2 and provided interiorly with a longitudinally extending partition 3 that divides the tank into a clean water reservoir 4 and a dirty water reservoir 5. Secured to the front end of the tank is a casting 6 in which is journaled a rotary shaft 7 provided at one end with the handle 8, said shaft at its opposite end being provided with a sprocket 10 in mesh with the sprocket chain 9 which chain also passes about sprockets 11 the hubs of which are threaded and receive the threaded posts 12 arranged to telescope into cavities in the four corners of the tank, each shaft being engaged by a pin 13 that extends into the platform 14 carried upon said shafts, said platform being provided with a leaf 15 secured thereto by a hinge 16, said leaf in raised position, shown in full lines in Fig. 1, being supported by the sill of the window being washed.

Upon the platform 14 is a sliding bed plate 17 provided with tongues 17^a that slide in grooves formed in the platform, said bed plate forming the base for the uprights 18 at the front end of the machine which are connected by the cross beam 19; and for the hinged uprights 19^a, 20 at the rear end of

the machine connected by the cross beam 21, which is provided with a pair of converging brace arms 22 between the spaced ends of which a shoe 23 is pivotally supported 5 that slidably engages a sectional rotary rod 24, the sections thereof being connected by a hinge 25, said rod 24 having slidably keyed thereto a bevel gear 26, carried by a casting 27 carried by a gear casing 28, in mesh 10 with a bevel gear 29; and terminally said rod 24 carries a bevel gear 30 in mesh with a bevel gear 31 fast to one end of a shaft 32 extending longitudinally within a sleeve 33 disposed within the base plate 17, said shaft 15 at its forward end being provided with a crank 34.

Fast upon the sleeve 33, that runs loose upon the shaft 32, are the bevel gears 35, 36, said gears protruding through perforations 20 in the bed plate into longitudinal grooves 36^a in the platform 14 and being in mesh, respectively, with the bevel gears 37, 38 of the screw shafts 39, 40 which extend from the bed plate through gear casings 41, 42 25 respectively and are journaled in bearings formed in the cross beams 19, 21, the screw shaft 40 being provided with a hinge 40^a. Within the gear casing 41 and slidably keyed to the screw shaft 39 are the clutches 30 43, 44 adapted for engagement with the worm gears 45, 46 which gears are continuously in mesh, respectively, with the worms 47, 48 of the worm shafts 49, 50 which shafts are connected by the meshing pinions 51, 52; 35 the shaft 50 being driven by the motor 53. With the clutch 43 engaging the worm shaft 45 the screw shaft 39 is driven in one direction, the clutch 44 then being idle. With 40 the clutch 44 in engagement with the worm shaft 46 the screw shaft 39 is driven in the opposite direction and the clutch 43 is idle. The screw shaft 39 through the medium of the bevel gears 37, 35, 36, 38 and the sleeve 33 drives the screw shaft 40.

45 The gear casing 28 aforesaid is operatively arranged upon the rotary screw shaft 40 and a similar gear casing 54 is operatively arranged upon the screw shaft 39. As said screw shafts are rotated in one direction or 50 another the said gear casings are raised or lowered over said shafts, said gear casings being formed laterally with shoes 55 that slide in grooved bearings 56 formed in the front and rear uprights 18—18 and 19^a—20. 55 Arranged at the front end of the machine are the vertical shift rods 57, 58 that extend from the bed plate through the gear casing 54, cross beam 19 and are connected to levers 59, 60 fulcrumed, respectively, in castings 60 61, 62 arranged upon the said cross beam, said levers being connected to snap springs 63, 64 terminally pivoted to angle pieces 65, 66 also carried by said cross beam 19. The shift rods are connected by a clutch rod 67 65 that operates the clutch 43, and by a clutch

rod 68 that operates the clutch 44. When the gear casing 54 is raised by the screw shaft 39 until it contacts with the set collars 69, 70 it causes them to raise the shift rods to such a point that the snap springs will 70 operate to continue the movement and so cause the clutch 43 to be disengaged from the worm gear 45 and rendered inoperative and the clutch 44 to be moved into engagement 75 with the worm gear 46 and so rendered operative thus reversing the movement of the screw shaft and causing the shaft 40 likewise to reverse and the gear casings 54, 28 to descend. When the casing 54 engages the set collars 71, 72 the clutches 80 43, 44 are again adjusted and the movement of the shafts and gear casings again automatically reversed.

Upon the screw shafts 39 and 40 and driven thereby are the large bevel gears 73, 74 which are in mesh, respectively, with the small bevel gears 75, 76 the respective shafts 77, 78 of which are journaled in the casings 54, 28 and are provided with gears 79, 80. 85 The gear 79 or 80 is in mesh with the similar gears 81, 82 fast upon the adjustable telescoping shafts 83, 84 journaled in the casings 54 or 28 and extending through perforations in a housing 85 or 85' and there- 90 within provided terminally with the bevel gears 86, 87 in mesh with the bevel gears 88, 89 of a shaft 90 journaled in braces of the housing 85 or 85' and provided terminally 95 with the friction rollers 91, 92 that drive a wringer roller 93, having its shaft journaled in the housing, said wringer roller being in contact with and driving the endless wash- 100 ing and drying belt 94, formed with perforations 94^a that runs over the spaced rollers 95, 96 the shafts of which are supported in the standards 97 secured to the 105 base 98 of the housing.

Between the rollers 95, 96 within the belt 94 is a water reservoir 99 formed with spray 110 perforations 100, the water being supplied by pipes 101 communicating with the reservoir 102 formed by the hollow base 98, said base being provided also with spray perforations 103 through which water is forced 115 upon the belt and window panes in the same manner that it is forced upon the belt through the spray perforations 100. The water is forced, under pressure, into the reservoir base 98 through the flexible pipes 104 by means of the pump 105, arranged 120 upon the bed plate 17, said pump being belt-connected to and driven by the motor 53, said pump drawing the water from the tank section 4 through pipe 106; the dirty water from the belt is received again in a drain 125 portion 107 of the reservoir base and passes out through the flexible pipes 108 to the tank section 5.

The reservoir 98 is provided with a flexible lip 109 adapted to bear against the window 130

pane 110 as the belt 94 operates, and a similar tongue 111 carried by the housing 85 bears upon the belt 94 to carry off water to the drain portion of the reservoir 98; a scraper 112 carried by a partition of said reservoir likewise bearing against said belt for a similar purpose. A housing 85' similar in all respects to the housing 85 is provided with all of the mechanism of the latter which is numbered correspondingly, a description thereof being therefore unnecessary. The housing 85' is disposed opposite the housing 85 and operates upon the opposite side of the pane 110. The housing 85 is formed with an extension terminating within the casing 54 in racks 113 and the housing 85' with a similar extension terminating within the casing 28 in racks 114. Within the casing 54 is a shaft 115 provided with a hand crank 116 having a spring finger 116^a working over a circular rack 116^b, outside the casing, said shaft having large gears 117 and 118 fast thereon which work over the racks 113 whereby the housing 85 is moved toward and away from the casing 54 to permit the belt 94 to approach and contact with the window pane 110.

Within the casing 28 a shaft 119 is provided with the large gears 120 that work over the racks 114 to move the housing 85' and connections toward and away from the window pane. A stub shaft 121 journaled in the casing 28 is connected to the said shaft 119 by means of the bevel gears 122, said stub shaft being driven from the rod 24 to which it is connected by the aforesaid bevel gears 29, 26.

Referring again to the hinged uprights 19^a, 20, the sections thereof are connected by the pivot 123, the sections 19^a terminating in the segmental racks 124 in mesh with the gears 125 carried by the sections 20, said gears being in mesh with worms 126 of the vertical shafts 127 journaled in bearings 128 carried by the upright sections 20, said shafts 127 at their lower ends being connected by bevel gears 129 with bevel gears 130 terminally carried by the connecting shaft 131, journaled in bearings 132 secured to the bed plate 17, a bevel pinion 133 in mesh with one of the bevel gears 130 is carried terminally by a drive shaft 134 provided with the hand crank 135.

Operation: The machine is moved from place to place upon its wheels 2 by hand. With the tank compartment 4 partly or entirely filled with water it is moved into position before the window to be washed, the leaf 15 is raised and rested upon the window sill. The sliding bed plate is now pushed manually over the platform until its longitudinal central point is disposed approximately beneath the window pane 110. Should the window pane, in raised or open position, not be high enough

above the window sill to permit the passage therebeneath of the rear end of the frame of the machine the hinged standards are moved into the position shown in Fig. 12. This is done by rotation of the hand crank 135 which causes rotation of the shafts 127 and gears 125 which move the segments 124; this operation also moves the upper section of the rod 24 upon its hinge 25, the shoe 23 sliding over said rod portion meanwhile. The bent end of the frame may now be readily moved into position beneath the open window pane and it is then again moved into erect position to permit the window-washing and drying operation.

With the open pane 110 now lowered, as shown in Fig. 1, it is in position between the ends of the frame of the machine. The housings 85, 85' are now individually adjusted in position with the opposed belts 94 both against the window pane. The pump 105 is now started which draws water from the section 4 of the tank and forces it through the pipes 106, 104 into the reservoir 98 and from the same through perforations 103 upon the belt 94, and pane, the belt being operated by the motor 53. The water also passes from the reservoir 98 through the pipes 101 into the reservoir 99 and out through the spray perforations 100 upon the belt. The belt is now running in a direction to draw the water up over the pane, the water passing out through the belt perforations 94^a upon the pane. The water will pass over the belt and, being removed by the scrapers 111 and 112 will pass into the drain portion of the reservoir 98 and out through the pipes 108 into the compartment 5 of the tank.

The back and forth movement of the casings 28 and 54 and their connections has been previously described. As the mechanism moves upward with the casings 28, 54 travelling in an upward direction over the shafts 39, 40 the belts 94 are so driven that that portion pressing against the window pane is moving in an upward direction and washing the pane. When the travelling mechanism is reversed and begins to descend the direction of movement of the belts 94 is reversed so that the belt portions pressing against the window pane are now travelling downward. The belts are now drying the pane. Although, with the pump in operation, water is being applied to the pane through the belt perforations the belt as it passes over the upper roller 95 and against the pane is dry, the scrapers 112 and 111 as well as the wringer 93 having removed the water therefrom. It is obvious, therefore, that the upward movement of the travelling mechanism causes the belts to wash the pane only, while the downward movement of that mechanism causes the belts to give the pane a final application of water and to follow this application by dry-

belt application thereby drying the window. One complete movement up and down of the travelling mechanism is ordinarily enough to wash the pane surface operated upon although further applications may be given if desired. If preferred the pump may be provided with an ordinary clutch which may be used to manually shut it off while the travelling mechanism is descending so that the descent may be a pane-drying movement only. The diameter of a roller 95 or 96 is less than one-half inch so that the rollers and connecting belt 94 may be disposed between the upper and lower window panes. In Fig. 4 this position is clearly illustrated. The numeral 136 denotes the lower sash of the upper window pane and the numeral 137 denotes the upper sash of the lower window pane. The rollers and belt can be readily projected between the two window panes and there operated. The two window panes will be manually adjusted to permit and facilitate operation of the machine.

What is claimed is:—

1. In window washing and drying mechanism, a reservoir, a sliding bed plate, a support for said bed plate, reciprocating mechanism operatively supported upon said bed plate in engagement with a window pane, means for conveying water from said reservoir to said reciprocating mechanism and applying the same simultaneously to both sides of the window pane in one direction of movement of said mechanism and for drying both sides of the window pane during movement in the opposite direction, said mechanism comprising travelling gear casings associated with housings individually adjustable toward and away from the window pane.

2. In window washing and drying mechanism, a reservoir, an adjustable bed plate, a support for said bed plate, reciprocating mechanism operatively supported upon said bed plate and travelling simultaneously over both sides of a window pane, means for conveying water from said reservoir to said reciprocating mechanism and applying the same to both sides of the window pane as said mechanism moves in one direction and for drying the pane as said mechanism moves in the opposite direction, said mechanism comprising travelling gear casings associated with housings individually adjustable toward and away from the window pane.

3. In window washing and drying mechanism, a reservoir, an adjustable platform, a sliding bed plate arranged upon said platform, screw shafts arranged upon said bed

plate, travelling casings operatively supported upon said screw shafts, means carried by said casings for moving contact with the lateral faces of a window pane, said means including oppositely disposed rotary pane-engaging belts, said belts being adjustable horizontally individually, means for supplying water to said belts for distribution over the window pane, and a common source of power for actuating said water supplying means and said screw shafts.

4. In window washing and drying mechanism, a water reservoir, an adjustable platform carried thereby, a sliding bed plate arranged upon said platform, screw shafts arranged upon said bed plate, one of said screw shafts being formed of hinged sections, connection between said screw shafts, travelling casings operatively carried by said screw shafts, housings carried by said casings and adjustable relatively to each other, oppositely disposed perforated window pane-engaging belts carried by said housings, water reservoirs carried by said housings, water conveying means connecting all of said reservoirs whereby water may be supplied to said belts to be distributed over the window pane, and a common power source for said water supply means and said screw shafts.

5. In window washing and drying mechanism, a water reservoir, an adjustable platform carried thereby, a sliding bed plate arranged upon said platform, a leaf hinged to said platform, screw shafts arranged upon said bed plate, connection between said screw shafts, one of said screw shafts being formed of hinged sections, travelling casings carried upon said screw shafts, means for automatically reversing the direction of movement of said screw shafts as said travelling casings approach their ends, housings carried by said casings, said housings being relatively adjustable, rotary oppositely disposed belts carried by said housings for engagement with opposite sides of a window pane, means for applying water to said belts to be distributed over the window pane, scrapers for said rotary belts, wringers engaging said belts, and means for driving said screw shafts and actuating said water supply means.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two subscribing witnesses.

JULIUS MARTIN.

Witnesses:

ALBERT SKEVEZ,
WALTER BECKER.