J. GAZDZICKI.

WINDOW CLEANING APPARATUS.

APPLICATION FILED AUG. 16, 1921.

1,416,280. Patented May 16, 1922.

4 SHEETS—SHEET 1.

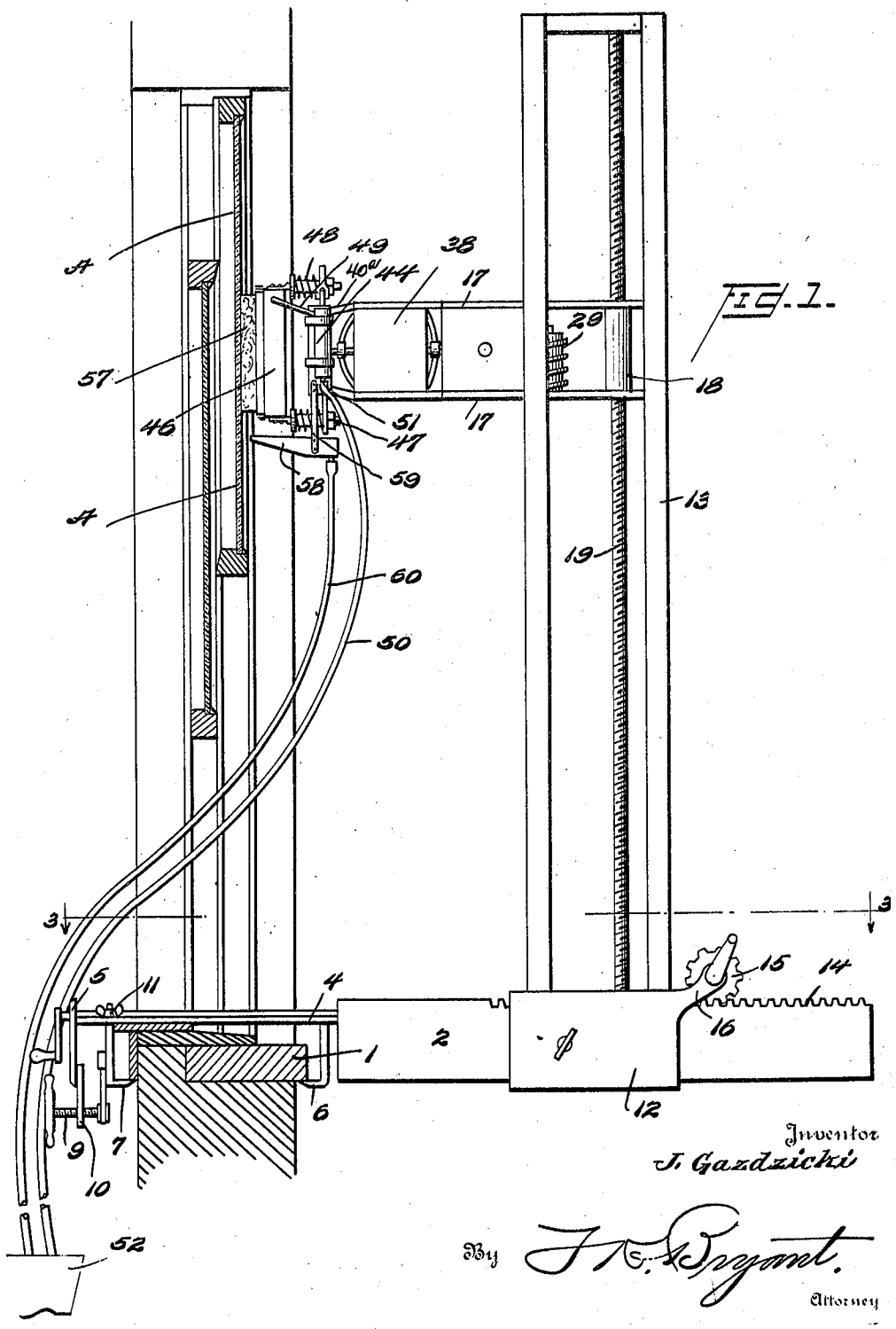


FIG. 1.

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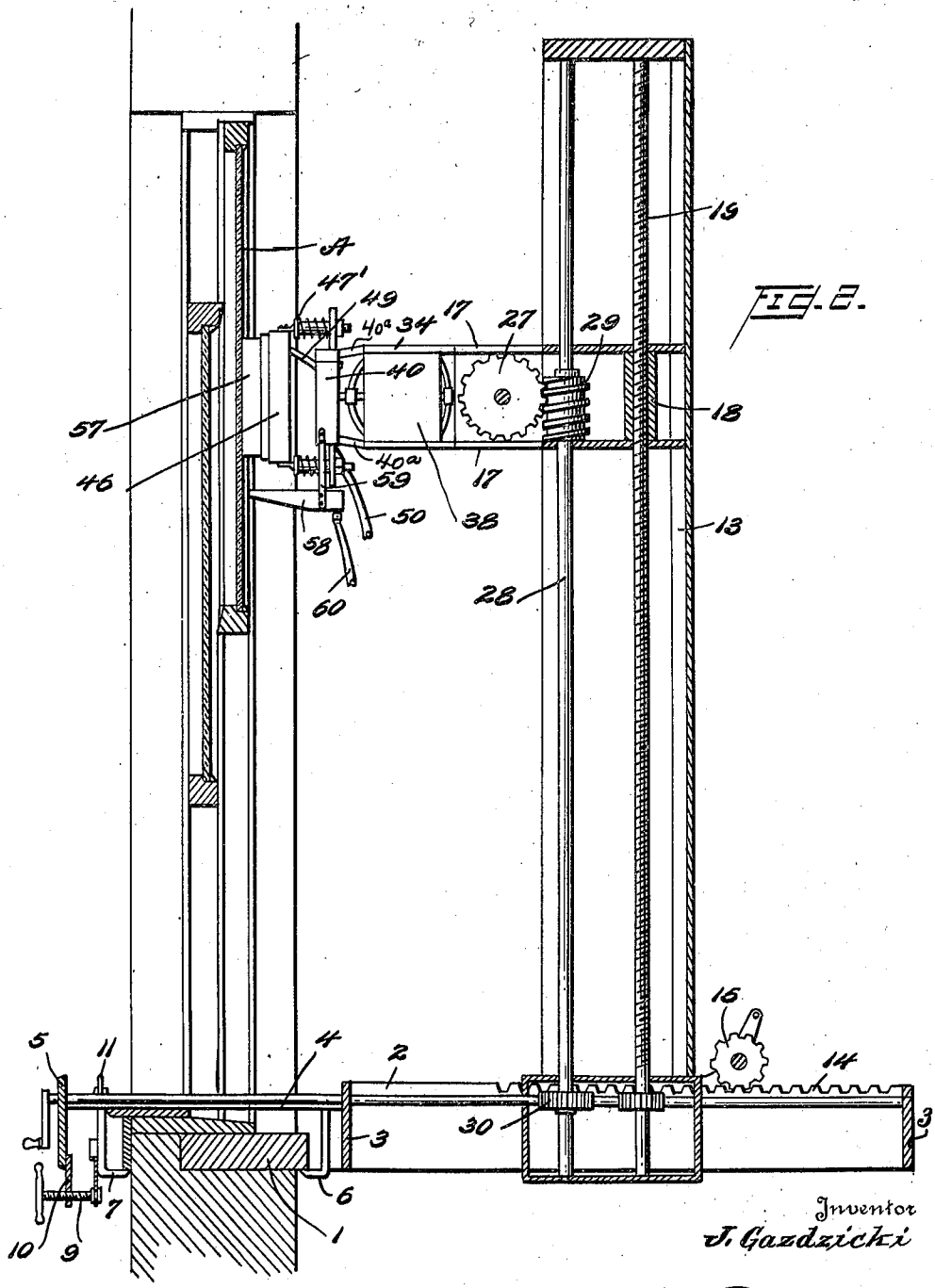
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4 SHEETS—SHEET 3.

FIG. 3.

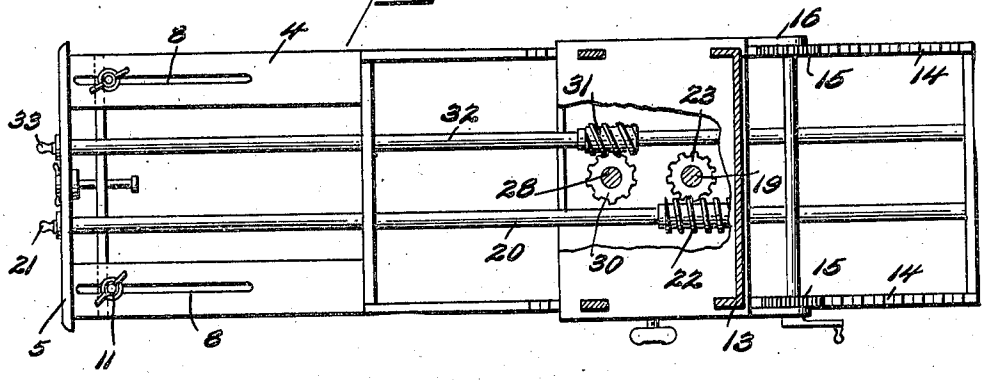


FIG. 4.

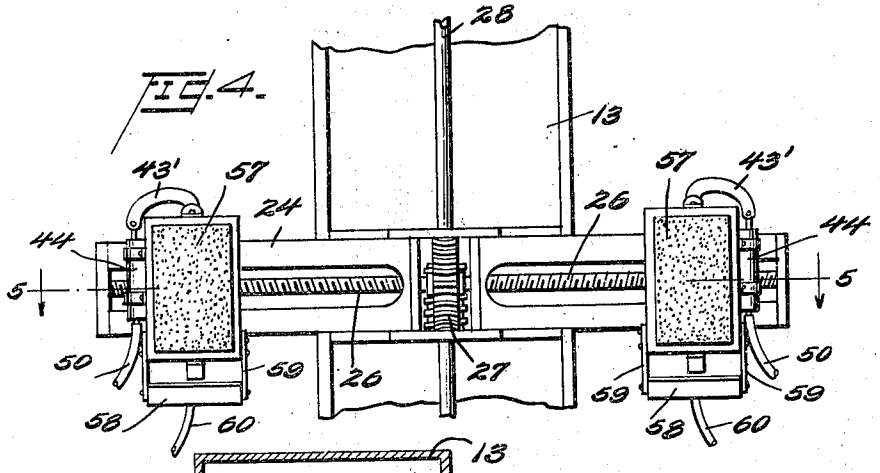
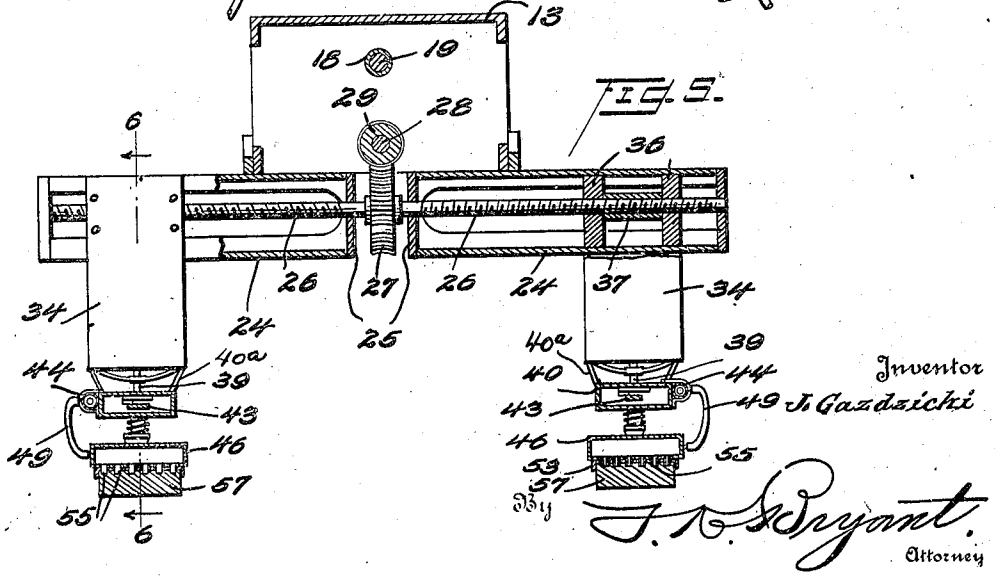


FIG. 5.



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4 SHEETS—SHEET 4.

FIG. 6.

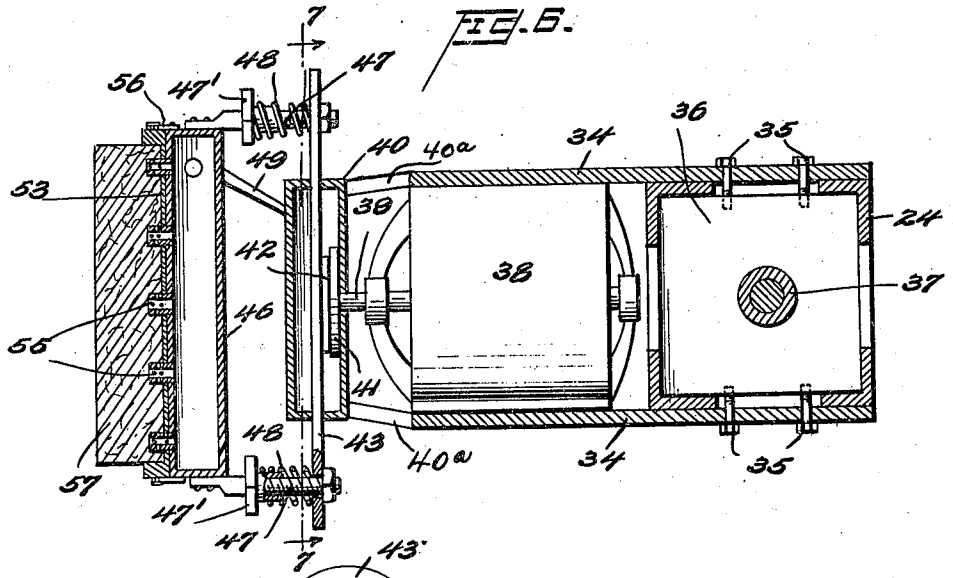


FIG. 7.

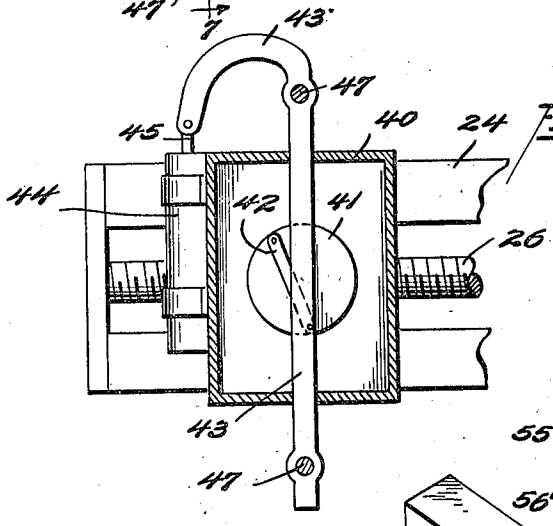
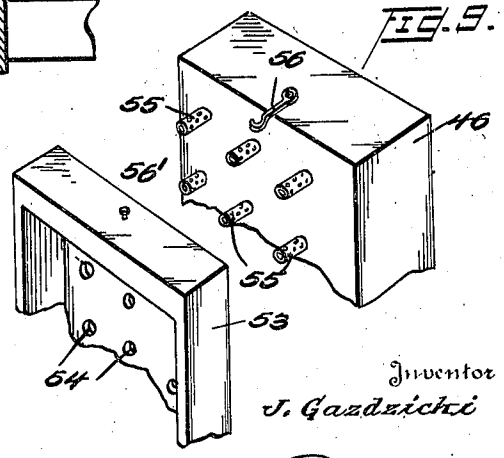


FIG. 8.

FIG. 9.



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UNITED STATES PATENT OFFICE.

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WINDOW-CLEANING APPARATUS.

1,416,280. Specification of Letters Patent. Patented May 16, 1922.

Application filed August 16, 1921. Serial No. 492,713.

To all whom it may concern:

Be it known that I, JOSEPH GAZDZICKI, a citizen of Poland, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Window-Cleaning Apparatus, of which the following is a specification.

This invention relates to window cleaning apparatus and has particular reference to that type of device that is supported on a window sill with the cleaning brushes or swabs positioned for engagement with the window panes.

The primary object of the invention resides in the provision of a window cleaning device having a frame supported on a window sill with brushes or swabs capable of vertical and horizontal reciprocating movements while engaged with the pane of a window.

A further object of the invention has reference to a window cleaning apparatus wherein brushes or swabs while moving in contact with a window pane are supplied with a cleaning fluid such as water that is pumped to the brushes or swabs with a collection pan or tray for the refuse water to be returned to the source of supply.

A still further object of the invention embodies in a window cleaning apparatus an electric motor for operating a pump to supply cleaning fluid such as water to a brush or swab, mechanical devices being associated with the brushes for reciprocating the same in vertical and horizontal directions.

With the above general objects in view and others that will appear as the nature of the invention is better understood, the same consists of the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings, wherein like reference characters designate corresponding parts throughout the several views.

Figure 1 shows a window frame in vertical section with the present window cleaning apparatus operatively supported on the lower sill of the window and in engagement with one of the window panes, and further showing the electrically operated pump for supplying cleaning fluid to the window scrubbers with the supply and return pipes for the cleaning fluid,

Figure 2 is a view similar to Fig. 1 showing the window cleaning apparatus in vertical section, the screw shaft and its operating mechanism for vertically adjusting the scrubbers being illustrated together with the rack and pinion for shifting the scrubbers toward and away from the window pane,

Figure 3 is a horizontal sectional view taken on line III—III of Fig. 1 showing the two operating shafts for vertically and laterally adjusting the window scrubbers,

Figure 4 is a fragmentary detail front elevational view of the cleaning apparatus showing the positively positioned scrubbers and the supporting screw shafts therefor,

Figure 5 is a detail sectional view taken on line V—V of Fig. 4 showing the laterally shiftable scrubbers and the worm and gear for shifting the same,

Figure 6 is a detail sectional view taken on line VI—VI of Fig. 1 showing one of the window scrubbers and the mounting therefor,

Figure 7 is a detail sectional view taken on line VII—VII of Fig. 1 showing the connections between the armature shaft of the motor and the pump rod,

Figure 8 is a fragmentary perspective view of the socket member for supporting the window brush or swab, and

Figure 9 is a fragmentary perspective view of the fluid receptacle carrying the socket member that is in communication with the pump.

Briefly described, the invention embodies a horizontal frame that is supported on the sill of a window and is disposed at the outer side of the window. A perpendicular frame is adjustably supported on the horizontal frame and has a rack and pinion connection therewith to move the frame inwardly and outwardly of the window. A cross head is carried by the vertical frame and through the intermediary of a perpendicular screw rod the height of the cross head is changed. A screw shaft reversely threaded at its opposite ends and journaled in the cross head has a worm and gear connection with the vertical shaft operated from the horizontal frame, the reversely threaded shaft of the cross head carrying arms provided with window brushes or swabs that are capable of movement toward and from each other. An electric motor carried by each arm operates a pump supported on the arm for supplying water to the hollow backing of the brush or swab while a drip pan supported

on the receptacle receives the overflow and waste water to return the same to a source of supply.

Referring more in detail to the accompanying drawings and particularly to Figs. 1 and 2 there is illustrated a window cleaning apparatus embodying a horizontally disposed frame supported on a window sill 1, the frame including a rectangular body embodying side walls 2 and end walls 3 carried by bracket arms 4 that have an end face plate 5 position inwardly of the window opening as illustrated, the frame carrying rigid clamps 6 engaging the outer side of the window sill and an adjustable transversely disposed clamp 7 extending between the bracket arms and shiftably mounted in slotted openings 8 in the bracket arms 4, the adjustable clamps 7 engaging the inner face of the window frame and so maintained by the screw 9 swiveled at one end in a hanger rigidly carried by the clamp 7, the screw carrying a plate 10 adapted for engagement with the cross head 5 of the bracket arms. The clamp 7 is further maintained rigidly positioned with respect to the bracket arms by the thumb screws 11 associated with upwardly projecting stud screws carried by the clamp.

A perpendicular frame is adjustably supported on the horizontal frame embodying a rectangular base housing 12 enclosing the horizontal frame and a rectangular perpendicular frame portion 13. The adjustable connection between the horizontal and perpendicular frame embodies the provision of rack teeth 14 provided on the upper edges of the side walls 2 of the horizontal frame while a pinion 15 journaled in positively disposed arms 16 of the base section of the perpendicular frame is in engagement with the rack bars for shifting the perpendicular frame longitudinally of the horizontal frame to move the same toward and away from the window opening.

A cross head supporting the window-cleaning brushes is vertically adjustable in the perpendicular frame, the cross head embodying upper and lower plates 17 suitably secured together and having the inner ends thereof extending into the perpendicular frame and spaced by the collar 18, a vertically disposed screw rod 19 in the perpendicular frame freely passing through said collar and threaded into openings in the upper and lower plates of the cross head. The mechanism for operating the screw rod to shift the cross head in vertical directions embodies a shaft 20 journaled in the horizontal frame and extending outwardly of the face plate 5 with a crank handle 21 upon the free end thereof, a worm 22 secured to the shaft 20 within the base section to the perpendicular housing being in mesh with the pinion 23 secured to the lower end of the screw rod 19. It will therefore be seen that by rotating the shaft 20 in the desired direction the screw rod 13 is rotated to effect the raising and lowering of the cross head.

The cross head embodying the plates 17 has laterally extending rectangular skeleton frames 24 positioned forwardly of the perpendicular housing 13, the adjacent ends 25 of the lateral extensions being spaced as shown in Fig. 5 with a screw rod having reversely threaded end portions 26 journaled in the lateral extensions while that portion of the screw rod intermediate the adjacent ends of the lateral extensions has secured thereto a gear 27. To operate the gear 27, a vertical shaft 28 is journaled in the perpendicular frame and has a worm 29 secured thereto between the upper and lower plates 17 of the cross head, the lower end of the shaft 28 carrying a pinion 30 in engagement with a worm 31 upon the shaft 32 journaled in the horizontal frame and extending forwardly of the face plate 5 with a crank handle 23 secured to the forwardly projecting end thereof.

A window scrubber and water supply device are associated with each lateral extension 24, the detail construction thereof being more clearly shown in Figs. 4 to 9, each window scrubbing device including upper and lower plates 34 enclosing the upper and lower sides of the lateral extension 24 and secured as at 35 to rectangular blocks 36 through which the adjacent end 26 of the screw is threaded with a spacing collar 37 interposed between adjacent blocks as shown in Figs. 5 and 6. An electric motor 38 supported between the outer ends of the plates 34 has the armature shaft 39 thereof extending into a housing 40, a disk 41 secured to the end of the armature shaft within the housing having an eccentric link connection 42 with a shaft 43 vertically reciprocable in the housing 40. A fluid pump 44 secured to the side wall of the housing has the piston rod 45 connected to the downwardly curved extension 43′ of the shaft 43, reciprocations of the shaft being communicated to the piston rod 45 in the pump.

The window scrubber embodies a casing 46 carrying mounting screws 47 connected to the shaft 43 as shown in Figs. 6 and 7 with springs 48 interposed between the shaft and the shoulders 47′ of the bracket screws to effect a resilient mounting for the casing 46. The casing 46 is of hollow construction and has a pipe connection 49 with the pump 44, the pump being supplied with fluid through the hose 50 connected to the inlet end 51 thereof and having its other end communicating with a source of supply 52. A socket member 53 having openings 54 in the bottom wall thereof has the perforated nozzles 55 of the casing 46 received

therein, the socket member and casing being connected by the hook and eye 56 and 56'. A window cleaning device 57 such as a brush or swab is supported in the socket member 53 with the perforated nozzles 55 extending thereinto as shown in Fig. 6.

The overflow of waste water from the brush 57 is received in a pan 58 supported by hangers 59 on the casing 40, the pan having a hose connection 60 with the receptacle 52 whereby the same water or cleaning fluid may be again employed. In the operation of the device, the motor 38 being operated from a suitable source of electric supply the armature shaft 39 thereof is rotated for reciprocating the shaft 43 and the casing 46 and brush 57 supported on the shaft 43. The cleaning fluid in the receptacle 52 is supplied to the brush through the medium of the pump 44 operated by the connection between the armature shaft 39 and the shaft 43. The height of the cross head is varied by the operating shaft 20 in communication with the screw rod 19 while lateral adjustments of the brushes 57 is accomplished by the rod 32 rotating the shaft 28 and having the worm and pinion connection 29—27 with the reversely threaded screw shaft 26.

With this device, the window panes A may be thoroughly cleaned upon the outer faces thereof without the necessity of a person standing upon the outer edge of a window sill while the several adjustments of the device will permit the brush 57 to engage the entire outer surface of the window pane A.

While there is herein shown and described the preferred embodiment of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope thereof as claimed.

What is claimed as new is:—

1. Window cleaning apparatus comprising a horizontal frame adapted to be mounted upon a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames, a cross head vertically adjustable on the perpendicular frame, and scrubbing brushes laterally adjustable of the cross head.

2. Window cleaning apparatus comprising a horizontal frame adapted to be mounted upon a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames, a cross head vertically adjustable on the perpendicular frame, scrubbing brushes laterally adjustable of the cross head, and cleaning fluid supply means associated with each scrubbing brush.

3. Window cleaning apparatus comprising a horizontal frame adapted to be mounted upon a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames, a cross head vertically adjustable on the perpendicular frame, scrubbing brushes laterally adjustable of the cross head, an electric motor adjustably supported adjacent each end of the cross head, and connections between said motor and brush for reciprocating the same.

4. Window cleaning apparatus comprising a horizontal frame adapted to be mounted upon a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames, a cross head vertically adjustable on the perpendicular frame, scrubbing brushes laterally adjustable of the cross head, an electric motor adjustably supported adjacent each end of the cross head, connections between said motor and brush for reciprocating the same, a cleaning fluid supply pump associated with each scrubbing brush, and connections between the motors and pumps for supplying fluid to the brushes.

5. Window cleaning apparatus comprising a horizontal frame adapted to be mounted upon a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames, a cross head vertically adjustable on the perpendicular frame, scrubbing brushes laterally adjustable of the cross head, an electric motor adjustably supported adjacent each end of the cross head, connections between said motor and brush for reciprocating the same, a cleaning fluid supply pump associated with each scrubbing brush, connections between the motors and pumps for supplying cleaning fluid to the brushes, and a waste receptacle associated with each brush.

6. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames for shifting the perpendicular frame on the horizontal frame, a vertical screw rod journaled in the perpendicular frame, a cross head threaded on said rod, an operating shaft journaled in the horizontal frame, connections between the operating shaft and the screw rod, a shaft reversely threaded at each end journaled in the cross head, a gear fixed to said shaft, a rod journaled in the perpendicular frame, a worm fixed to said rod in mesh with said gear, a second operating shaft journaled in the horizontal frame, worm and gear connections between the second operating shaft and the vertical rod, and scrubbing brushes associated with the reversely threaded shaft.

7. Window cleaning apparatus comprising a horizontal frame adapted to be secured

to a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames for shifting the perpendicular frame on the horizontal frame, a vertical screw rod journaled in the perpendicular frame, a cross head threaded on said rod, an operating shaft journaled in the horizontal frame, connections between the operating shaft and the screw rod, a shaft reversely threaded at each end journaled in the cross head, a gear fixed to said shaft, a rod journaled in the perpendicular frame, a worm fixed to said rod in mesh with said gear, a second operating shaft journaled in the horizontal frame, worm and gear connections between the second operating shaft and the vertical rod, lateral extensions carried by the cross head, a brush supporting member associated with each lateral extension and in engagement with the adjacent end of the screw rod, and a brush carried by the brush supporting member.

8. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames for shifting the perpendicular frame on the horizontal frame, a vertical screw rod journaled in the perpendicular frame, a cross head threaded on said rod, an operating shaft journaled in the horizontal frame, connections between the operating shaft and the screw rod, a shaft reversely threaded at each end journaled in the cross head, a gear fixed to said shaft, a rod journaled in the perpendicular frame, a worm fixed to said rod in mesh with said gear, a second operating shaft journaled in the horizontal frame, worm and gear connections between the second operating shaft and the vertical rod, lateral extensions carried by the cross head, a brush supporting member associated with each lateral extension and in engagement with the adjacent end of the screw rod, an electric motor carried by each brush supporting member, a shaft operated by the armature shaft of the motor, and a brush head connected to the last named brush.

9. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame supported on the horizontal frame, rack and pinion connections between the two frames for shifting the perpendicular frame on the horizontal frame, a vertical screw rod journaled in the perpendicular frame, a cross head threaded on said rod, an operating shaft journaled in the horizontal frame, connections between the operating shaft and the screw rod, a shaft reversely threaded at each end journaled in the cross head, a gear fixed to said shaft, a rod journaled in the perpendicular frame, a worm fixed to said rod in mesh with said gear, a second operating shaft journaled in the horizontal frame, worm and gear connections between the second operating shaft and the vertical rod, lateral extensions carried by the cross head, a brush supporting member associated with each lateral extension and in engagement with the adjacent end of the screw rod, an electric motor carried by each brush supporting member, a shaft operated by the armature shaft of the motor, a brush head connected to the last named brush, a fluid supply pump carried by the brush head, and connections between said pump and the last named shaft.

10. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame shiftably supported on the horizontal frame, a cross head vertically adjustable on the perpendicular frame, lateral extensions carried by the cross head, brush supporting members associated with the lateral extensions, an electric motor carried by each brush supporting member, brushes carried by the supporting members, and connections between said motors and brushes for reciprocating the brushes.

11. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame shiftably supported on the horizontal frame, a cross head vertically adjustable on the perpendicular frame, lateral extensions carried by the cross head, brush supporting members associated with the lateral extensions, an electric motor carried by each brush supporting member, brushes carried by the supporting members, connections between said motors and brushes for reciprocating the brushes, a cleaning fluid pump carried by the brush supporting member, and connections between the electric motors and pumps for supplying cleaning fluid to the brushes.

12. Window cleaning apparatus comprising a horizontal frame adapted to be secured to a window sill, a perpendicular frame shiftably supported on the horizontal frame, a cross head vertically adjustable on the perpendicular frame, lateral extensions carried by the cross head, brush supporting members associated with the lateral extensions, an electric motor carried by each brush supporting member, brushes carried by the supporting members, connections between said motors and brushes for reciprocating the brushes, a cleaning fluid pump carried by the brush supporting member, connections between the electric motors and pumps for supplying cleaning fluid to the brushes, and a drip pan associated with each brush.

In testimony whereof I affix my signature.

JOSEPH GAZDZICKI.