

Sept. 29, 1953

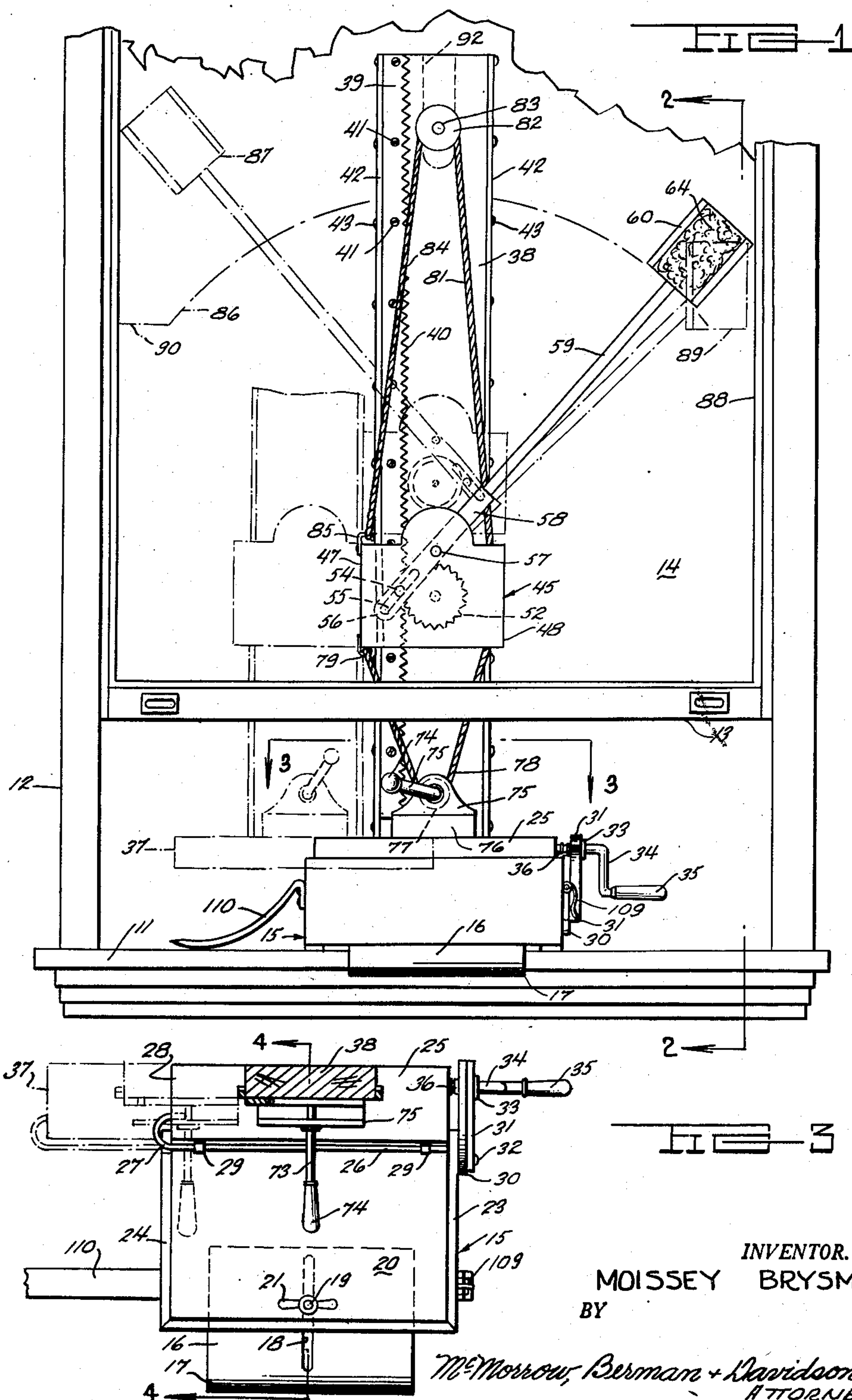
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WINDOW-WASHING MACHINE

Filed June 3, 1949

2 Sheets-Sheet 1



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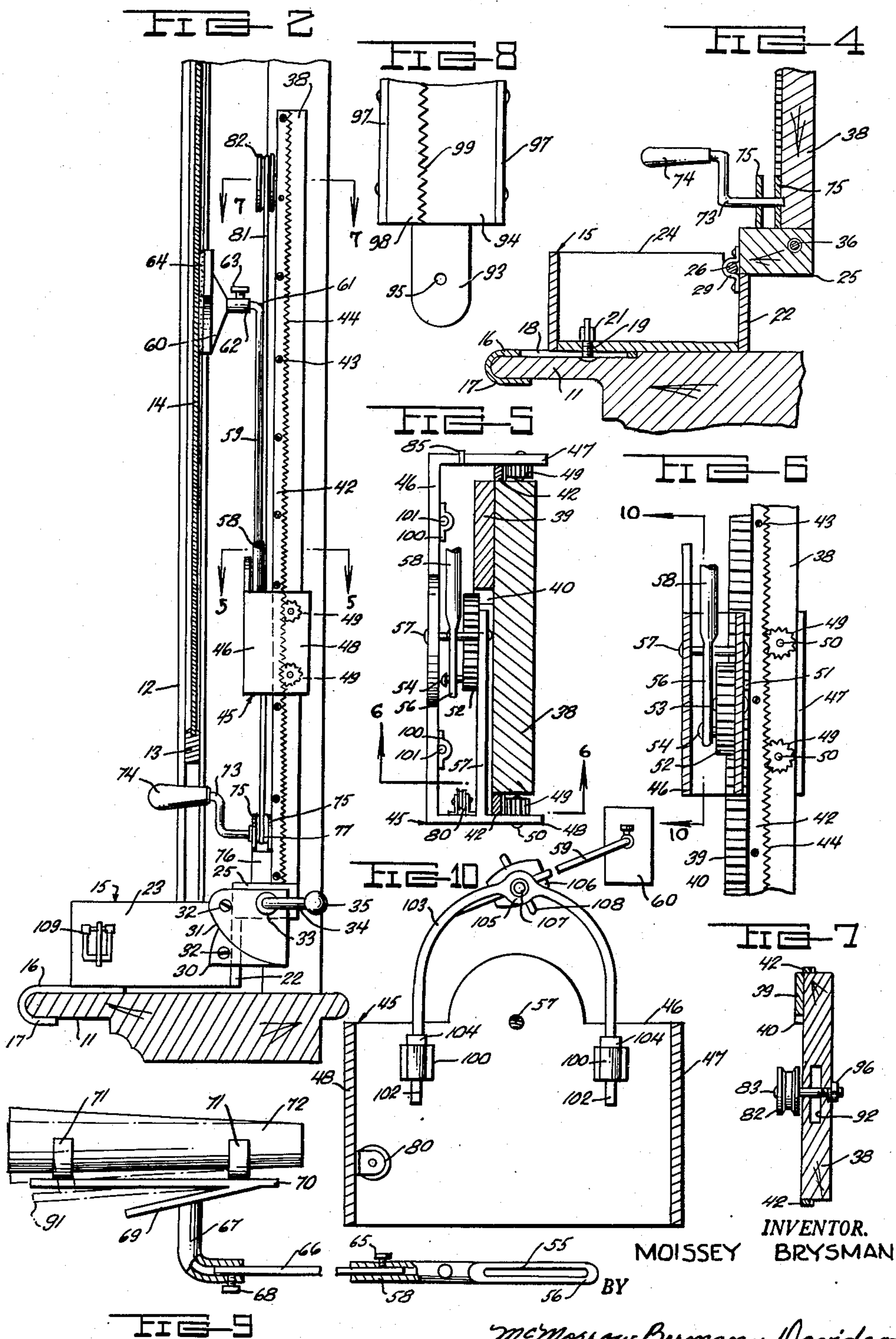
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2 Sheets-Sheet 2



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2,653,333

WINDOW-WASHING MACHINE

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Application June 3, 1949, Serial No. 96,866

3 Claims. (Cl. 15—103)

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My invention relates to manually or power-operated apparatus and devices for washing and wiping windows, and particularly to a window-washing machine.

The main object of my invention is to provide means for mechanically washing and wiping windows safely and conveniently, especially on the outside from within a room in order to avoid the inconvenience and danger involved in washing the windows from the outside according to conventional methods.

Another object is to provide a window-washing machine which may be mounted on a window sill with the operating parts extending upwardly exteriorly of the window to be washed, while the means for operating the machine are accessible to the operator upon the window sill from within a room.

A further object is to provide such a window-washing machine which is adjustable from one side to the other on the window sill for wide windows and also vertically adjustable for high windows.

It is also an object to have a machine of the indicated character capable of being operated by a person sitting before the window being washed and operating a crank or controlling a motor operating the machine.

A practical object is to make a machine for the present purpose which is simple in form, easy to operate and sufficiently light and portable to be readily shiftable from window to window as the washing of the latter proceeds.

Other objects and advantages of the invention will appear in further detail as the specification proceeds.

In order to facilitate ready comprehension of this invention for a proper appreciation of the salient features thereof, the invention is illustrated on the accompanying drawings forming part hereof, and in which:

Figure 1 is an elevation of a window-washing machine made according to the invention, and embodying the same in a practical form, the machine being seen in operative position through a window from the inside of the latter;

Figure 2 is a vertical section taken on line 2—2 in Figure 1;

Figure 3 is a transverse section taken on line 3—3 in Figure 1;

Figure 4 is a vertical section taken on line 4—4 in Figure 3;

Figure 5 is a transverse section taken on line 5—5 in Figure 2;

Figure 6 is a vertical section taken on line 6—6 in Figure 5;

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Figure 7 is a transverse section taken on line 7—7 in Figure 2;

Figure 8 is a fragmentary elevation of detail;

Figure 9 is an elevation of the oscillating washing arm alone as modified and provided with means for wiping a window which has just been washed;

Figure 10 is a vertical section taken on line 10—10 in Figure 6.

Throughout the views, the same reference numerals indicate the same or like parts.

The washing of windows is well known as a more or less hazardous undertaking even in private homes, due to the necessity of climbing ladders or sitting on window sills for the purpose of washing the outsides of the windows, and it is equally well known that the method of washing windows on large buildings by professional window washers by being suspended from so-called safety belts many floors above the ground is highly hazardous to such an extent that many people will not even attempt to clean such windows. At best, window washing always includes not only the washing of the windows on the inside from within a room, but also upon the outside surfaces of the window panes, and this is the hazardous feature dreaded by many and relished by none, in view of the unavoidable danger involved.

Upon considering this problem, it has occurred to me that a conveniently-operated mechanical apparatus should be available for placing upon a window sill by which it should be possible to wash the window upon the outside, either by mechanically cranking the apparatus, or driving the same by a motor. As a result, I have succeeded in producing a machine of this character, as will now be more fully explained.

Hence, in the practice of my invention, and referring again to the drawings, upon the sill 11 of a window frame 12 having a window sash 13 provided with a glass pane 14 to be washed is mounted a supporting box 15 having a bracket 16 secured to the bottom thereof forming an anchoring plate extending inwardly over the sill from box 15 and bent to form a U-shaped enveloping hook 17 engaging the front edge and also the bottom of sill 11 in such fashion as to locate supporting box 15 definitely with respect to the window and prevent outward movement of the mentioned box. The anchoring plate 16 is provided with a slot 18 intermediate the side edges thereof, as best seen in Figure 3, with an adjusting bolt 19 extending upwardly through the slot and into the bottom 20 of supporting box 15

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upon which bottom a wing nut 21 on bolt 19 serves to hold plate 16 assembled with the supporting box in an adjustable position, so that it is possible to adjust the box outwardly or inwardly with respect to the window sill. If desired, the plate 16 may be extended beneath the entire bottom 20 instead of merely beneath a portion thereof, as illustrated.

The outwardly-directed side 22 of supporting box 15 is lower than the ends 23, 24 thereof, and serves to slidably support a base member 25 which rests horizontally thereon and is provided with a guide rod 26 which at one end is formed into a hook 27 which extends into the end 28 of base member 25. The mentioned guide rod 26 engages slidably in a pair of clips 29, 29 which are secured to the upper inner edge of the outer end or side 22 of supporting box 15, in order to contribute to the proper position of the base member when sliding along the upper edge of the mentioned outer side 22. For the purpose of longitudinally sliding and thereby adjusting the base member 25 upon the outer end of supporting box 15, and thus longitudinally of the window sill 11, a pair of plates 30, 31 are secured to the box by screws 32 or the like. In these plates is fixed a bearing 33 for a manually operated means or hand crank 34 provided with a handle 35, the crank being rigidly connected, and even integral if preferred, with a feed screw 36 screwed into the base 25 in such fashion that rotation of the crank in one direction will adjust the mentioned base 25 horizontally into the position indicated at 37 in broken lines in Figure 1, while supporting box 15 remains stationary on window sill 11, or if rotated in the opposite direction, the base will be adjusted from said indicated position at 37 to that shown in full lines in both Figures 1 and 3.

Upon base member 25 is fixed an upwardly-extending guide bar 38 of substantially rectangular cross-section. Upon the inner side of the upright guide bar 38 is mounted a rack 39 adjacent one edge thereof with the teeth 40 directed toward the opposite edge of the guide bar, the rack being preferably secured by means of screws 41, 41 or the like. Upon the side edges are also secured a pair of narrower racks 42, 42 by means of further screws 43, 43 with the teeth 44 thereof directed outwardly. Upon the inner side of guide bar 38 is also connected a vertically disposed control box 45 for reciprocatory movement therealong, the box consisting of a front plate or wall 46 and a pair of angularly-bent side walls 47, 48 extending past the side edges of guide bar 38 in such fashion as to engage slidably upon the sides of racks 42. Upon the inner sides of side walls 47 and 48 are rotatably mounted two pairs of pinions 49, 49 meshing with the teeth 44 of both racks 42, being secured to the side walls 47 and 48 by means of pivot pins 50, 50. The traveling control box 45 thus resembles a short channel member with the side walls 47 and 48 thereof guided along the rear toothed edges of racks 42 at the sides of guide bar 38 in a vertical direction. Intermediate the front and rear vertical edges of side wall 48 is integrally secured a supporting plate 51 in substantial parallelism with the front plate 46, and upon the inner end of which is rotatably mounted a gear 52 by means of a pivot pin or stud 53. Upon the gear 52, which is so arranged and disposed within the space between front plate 46 and intermediate plate 51 that the gear meshes with the teeth 40 on rack 39, a crank pin 54 is eccentrically fixed

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and directed toward the front plate. The eccentric crank pin 54 extends through the slot 55 in the lower end of an operating arm 56 pivotally mounted above slot 55 by means of a pivot pin or shaft 57 extending through front and intermediate plates 46 and 51 above gear 52 in such position that when gear 52 is rotated, crank pin 54 traveling in slot 55 in the lower end of operating arm 56 will cause this operating arm to oscillate about the axis of pivot shaft 57. The upper end 58 of the operating arm is tubular and adapted to receive a narrow shank 59 of a sponge pad 60, having the upper end bent at an angle at 61 and extending into a socket 62 upon the rear of the pad 60 and secured in the socket by means of a set screw 63. Sponge pad 60 is provided with attached sponge material 64 adapted to engage directly against the window pane 14 of sash 13, as best seen in Figures 1 and 2. Through the presence of set screw 65 in the upper tubular end 58 of operating arm 56 (Figure 9), the shank 59 may be released from the operating arm and another shank 66 inserted which extends into a bracket 67 to which it is secured by a set screw 68, the bracket being fixed to a resilient rear plate 69 of a felt roll holder 70 provided with clamping fingers 71, 71 between which is clamped a roll of felt or other absorbent material 72 adapted to be brought against the window pane 14 to wipe the same after washing has been performed by means of the sponge material 64 of sponge pad 60.

In order to provide for oscillation of operating arm 56 and progressive feeding of the sponge pad or holder 60 or felt roll 72 upwardly and downwardly along the window pane, a second manually-operated means or crank 73 provided with a handle 74 extends rotatably through a pair of upwardly-projecting bearing plates 75 fixed upon a base block 76 which in turn is secured to the lower end of the front face of upright guide bar 38 and base member 25. Between plates or bearing members 75, 75 is mounted a pulley 77 on crank 73, and beneath this pulley is passed a cable 78, one end of this cable being extended upwardly and secured to the lower end of side wall 47 of traveling control box 45 by means of a depending hook 79 secured to the box, while at the other side the cable is passed upwardly into control box 45 within side wall 48 to engage with a roller 80, best seen in Figure 5, from which roller an upper length 81 of the cable is extended upwardly upon the front working face of guide bar 38 and passed over a groove roller 82 pivotally mounted upon a stud 83 on the guide bar so as to be rotatable thereon. From the upper roller or pulley 82 a downwardly-extending length 84 of the cable is attached at the lower end thereof to a second hook 85 secured to the upper portion of the previously-mentioned side wall 47 of traveling control box 45. The arrangement is primarily such that the cable is under sufficient tension so that substantially no play is present in the cable and the pulley and rollers engaged thereby, and, furthermore, so that rotation of crank 73 in clockwise direction, for example, will cause the upper right length 81 of the cable to travel downwardly about pulley 77 on crank 73, meanwhile shortening the left length 84 and raising control box 45 upwardly along guide bar 38. The immediate result is that during upward travel the gear 52 within control box 45 meshing with rack 39 will rotate and cause eccentric pin 54 thereof to rotate with it and travel through slot 55 in the lower end 56 of the operating arm to oscillate the latter about its pivot mounting 57, the sponge

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pad or holder 60 on shank 59 being swung through successively higher arcs, as indicated in broken lines at 86, from the position shown in full lines in Figure 1 to that shown in broken lines at 87. When the operating arm and its upwardly-extending shank 59 approaches the side 88 of sash 13, the sponge pad will tend to turn upon its upper bent shank portion 61 in socket 62 to become aligned with the mentioned side 88, as indicated in broken lines at 89. When the ensemble is swung to the left, as indicated at 87, a similar action will be produced, as partially indicated at 90. Thus, continuous rotation of crank 73 first in one direction until control box 45 has traveled up to the upper limit possible when the sponge holder 60 will begin to strike the upper inner edge of sash 13, then the crank is reversed and rotated in the opposite direction with the arm 56 and shank 59 with sponge holder 60 describing progressively lower arcs across the window pane, so that if soapsuds, water or any desirable detergent is used, the window will be washed by the sponge material 64 on member 60. When the washing has thus been performed, the shank 59 is removed and the other shank 66 inserted so that the same performance may be followed with the felt roll 72 in order to wipe the window dry.

Should the window be wider than the arc of movement of sponge member 60 and felt roll 72, the machine is first placed in position so that at the right side washing will be performed up to the vertical inner edge 88 of sash 13, and when the washing has been performed both upwardly and downwardly again, adjusting crank 34, with its handle 35, is rotated to shift base member 25 with its superposed guide bar 38 into the position indicated in broken lines at 37 already referred to, when a new area at the left of that already washed will be similarly washed progressively upward and then progressively downward with arcuate strokes, after which the drying may be performed in similar manner by mounting the roll holder 70 with the felt roll 72 engaging against the pane 14. As may be noted in Figure 9, the mounting of the felt roll 72 is such that pressure exerted thereby against the window pane will cause the roll, which is preferably formed as a truncated cone, to be resiliently retracted into the position generally indicated with the broken lines 91.

The apparatus thus far described will serve to wash the outside of a window, while the operator sits in the room within the window and simply operates crank 73. When necessary, also, crank 34 is adjusted.

To further features of the machine should be mentioned at this point, first, the possibility of reaching the upper corners and also washing small windows which would scarcely allow the arcuate singing movement to be performed thereon by the oscillation of arm 56 and either sponge pad 60 or felt roll 72, and also facilities for washing higher windows than those which would be reached by operating the apparatus as described, within the limitation of the guide bar 38. The latter feature will be dealt with first, and in connection therewith, as best seen in Figure 7, the upwardly-projecting guide bar 38 is provided with a central slot 92 opening upwardly to the upper end of the guide bar in such fashion that a depending tongue 93 upon an upward extension 94 of the guide bar may be inserted into the slot after temporarily removing the pivot pin 83 which may conveniently be a bolt, and when tongue 93

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is fully inserted into slot 92, the bolt with pulley 82 mounted thereon may be re-inserted and also inserted through the hole 95 in tongue 93 and the nut 96 replaced, when the extension member 94 will form an upward extension of guide bar 38 which in all respects resembles the same for the purpose of causing control box 45 to travel up along the same. Thus, extension member 94 has a pair of side racks 97, 97 forming upward continuations of racks 42 on guide bar 38 and a main front rack 98 forming the upward continuation of previously-described front rack 39, so that gear 52 will engage with the teeth 99 thereof after leaving the upper end of rack 39, while the gears or pinions 49 of control box 45 will engage upon the rear toothed edges of racks 97. With respect to this extension, it may be noted that the upper end thereof may be provided with a roller or pulley similar to pulley 82, or the latter may be shifted to the upper portion thereof and then a longer cable than previously-described cable 78 may be used, the ends being connected to hooks 79 and 85 on side wall 47 of control box 45.

In connection with the other feature of the invention, it may not be necessary to have a further roller or pulley 82 upon the upward extension, and the same may be considered in connection with the first-described form of the invention without the extension equally well with the extended form having the extension member 94 mounted thereon, as it refers to the possibility of reaching the corners of the window involved and also washing small windows.

For the mentioned purpose, a pair of cleats virtually forming sockets 100, as best seen in Figures 5 and 10, are attached by screws, by brazing or welding, or in any other known manner, to the inner side of front plate 46 of traveling control box 45 with vertical apertures 101 receiving the lower ends 102 of a U-shaped supporting bracket 103 provided with a pair of stops 104 determining a proper position of support member 103 with respect to cleats 100, and also control box 45. As particularly shown in Figure 10, the bracket has an upper central widened portion 105 provided with a clamping fixture 106 of more or less well known construction secured thereto by means of a screw or bolt 107 controlled on the far side thereof by means of a wing nut 108. The clamping fixture 106 is adapted to receive shank 59 of sponge holder 60 in any angular position of shank 59 desired, one such position being indicated in Figure 10, making it obvious that if operating crank 73 is rotated first in one direction, control box 45 will simply rise along guide bar 38 with operating arm 56 oscillating idly, while sponge pad or holder 60 simply rises vertically along the window pane up to the farthest corner thereof, and when the crank is then rotated in the opposite direction, it will again descend along the same path. If adjusting crank 34 is then rotated just sufficiently to bring sponge holder 60 slightly to one side of the first-mentioned position and the operating crank 73 then again operated first in one direction and then in the other, a further narrow strip of the window will be cleaned adjacent to the corner. Of course, if the angle of shank 59 is changed by momentarily releasing wing nut 108 after each vertical stroke of the sponge member, successive strips will be washed without adjustment of crank 34.

If the traveling control box is raised to its uppermost position with respect to the window and the sponge holder engages along the upper edge thereof, it is also possible to shift the same

horizontally along the window pane by operating the adjusting crank 34 to move the upper portion of the apparatus mounted on base member 25 toward the left, it being thus possible to wipe and wash the upper edge of the window pane in a straightline operation, although this is not as speedy as the vertical operation of the sponge holder or the felt roll. In any event, due to the fact that shank 59 may be adjusted upon support bracket 103 without oscillation of the mentioned shank, but merely involving vertical travel thereof, it is readily seen that even small windows may be cleaned and also the more or less inaccessible upper corners of the window panes may readily be reached and washed.

When the support member 103 is removed by lifting it from cleats 100, the shank 59 may be restored to the oscillating operating arm 56 by inserting it into the upper tubular end 53 thereof and fixing it in position by means of set screw 65, when the machine will again be restored to its original operating condition.

Naturally, the machine may be made of any suitable material, such as partially or completely of metal, with some parts of wood or plastic, and any materials will serve that are capable of holding their shape and providing a reliable operating structure.

The main desideratum involved with respect to the materials used for constructing the machine is, of course, lightness aside from practicability, so that it will be possible to shift the washing machine from one window to another without any serious trouble or inconvenience. In order to facilitate such shifting, the end walls or sides 23 and 24 of the supporting box 15 are provided with a buckle 109 and 110, respectively, strap 110 being of sufficient length to go over the shoulders of an operator and be connected to the buckle in order to carry the machine to the window to be washed when the supporting box with its plate 16 may be deposited on the window sill involved, and the curved or hooked portion 17 is pushed into engagement with the edge of the window sill after having opened the sash 13, for example, sufficiently to first extend the guide member or bar 38 outwardly and then upwardly outside the window, when the strap may be released from buckle 109 and allowed to drop aside idly, after which the sash 13 is closed down toward base member 25. For such operation the sponge portion 64 of sponge holder 60 is, of course, attended to prior to placing the apparatus into position, or at least prior to lowering the sash for washing the outside of the pane thereof. When the entire procedure has been followed through and the window is washed and dried, plate 16 with its hooked portion 17 is disengaged from the window sill, sash 13 being raised to its highest position, when the apparatus is again supported by strap 110 being looped over the shoulders and brought down into connection with buckle 109 and the machine then carried to the next window, or when all the windows have been washed, to a storage closet.

Although members 42 on the guide bar 38 have been described as racks and traction members 43 riding along the same are described as pinions, the racks could be simple rails and the pinions be rollers, and these terms are to be considered interchangeable for the present purpose.

Manifestly, variations may be resorted to and parts and features may be modified or used without others within the scope of the appended claims.

Having now fully described my invention, I claim:

1. A window-washing apparatus comprising a supporting member adapted to be secured to the sill of a window to be washed, a horizontally disposed base member superimposed longitudinally of and connected to said supporting member for sliding longitudinal movement, an upstanding guide bar fixed on said base member, a vertically disposed control box including a front wall and a pair of side walls secured to the front wall arranged so that the front wall is parallel to and spaced from said guide bar with the side walls extending beyond said guide bar, means connecting said control box to said guide bar for reciprocatory movement therealong, said means comprising a toothed rack extending longitudinally along and secured to the face of said guide bar adjacent said front wall, another toothed rack extending longitudinally along each end edge of said guide bar and having one side edge secured to said guide bar and having the other side edge slidably engaged by the adjacent side wall, rotatable pinions carried by the portions of said side walls inwardly of the face of said guide bar remote from said front wall and in meshing engagement with said other racks, and a rotatable gear intermediate said front wall and the face of said guide bar adjacent thereto and supported from one of said side walls and in meshing engagement with said toothed rack, an upstanding cleaning element operatively connected to said control box, a manually operated means operatively connected to said base member for effecting the sliding movement of the latter, and a second manually operated means operatively connected to the said control box for effecting the reciprocatory movement of the latter.

2. A window-washing apparatus comprising a supporting member adapted to be secured to the sill of a window to be washed, a horizontally disposed base member superimposed longitudinally of and connected to said supporting member for sliding longitudinal movement, an upstanding guide bar fixed on said base member, a vertically disposed control box including a front wall and a pair of side walls secured to the front wall arranged so that the front wall is parallel to and spaced from said guide bar with the side walls extending beyond said guide bar, means connecting said control box to said guide bar for reciprocatory movement therealong, said means comprising a toothed rack extending longitudinally along and secured to the face of said guide bar adjacent said front wall, another toothed rack extending longitudinally along each end edge of said guide bar and having one side edge secured to said guide bar and having the other side edge slidably engaged by the adjacent side wall, rotatable pinions carried by the portions of said side walls inwardly of the face of said guide bar remote from said front wall and in meshing engagement with said other racks, and a rotatable gear intermediate said front wall and the face of said guide bar adjacent thereto and supported from one of said side walls and in meshing engagement with said toothed rack, an upstanding arm, means connecting the lower end of said arm to said gear for oscillatory movement responsive to the reciprocatory movement of said control box, said last named means comprising a crank pin eccentrically disposed with respect to the face of said gear adjacent said front wall and secured to the latter face of said gear, said arm being pivotally connected adjacent the lower end

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to said front wall, there being a longitudinal slot in said arm intermediate its pivotal connection with said front wall and the lower end thereof slidably receiving said crank pin, an upstanding cleaning element operatively connected to the upper end of said arm, manually operated means operatively connected to said base member for effecting the sliding movement of the latter, and a second manually operated means operatively connected to said control box for effecting the reciprocatory movement of the latter.

3. A window-washing apparatus comprising a supporting member adapted to be secured to the sill of a window to be washed, a horizontally disposed base member superimposed longitudinally of and connected to said supporting member for sliding longitudinal movement, an upstanding guide bar having the lower end fixed on said base member, an extension member projecting from and carried by the upper end of said guide bar, a vertically disposed control box including a front wall and a pair of side walls secured to the front wall arranged so that the front wall is parallel to and spaced from said guide bar with the side walls extending beyond said guide bar, means connecting said control box to said guide bar and extension member for reciprocatory movement therealong, said means comprising a toothed rack extending longitudinally along and secured to the face of said guide bar adjacent said front wall, another toothed rack extending longitudinally along each end edge of said guide bar and having one side edge secured to said guide bar and having the other side edge slidably engaged by the adjacent side wall, rotatable pinions carried by the portions of said side walls inwardly of the face of said guide bar remote from said front wall and in meshing engagement with said

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other racks, and a rotatable gear intermediate said front wall and the face of said guide bar adjacent thereto and supported from one of said side walls and in meshing engagement with said toothed rack, an upstanding arm, means connecting the lower end of said arm to said gear for oscillatory movement responsive to the reciprocatory movement of said control box, said last named means comprising a crank pin eccentrically disposed with respect to the face of said gear adjacent said front wall and secured to the latter face of said gear, said arm being pivotally connected adjacent the lower end to said front wall, there being a longitudinal slot in said arm intermediate its pivotal connection with said front wall and the lower end thereof slidably receiving said crank pin, an upstanding cleaning element operatively connected to the upper end of said arm, manually operated means operatively connected to said base member for effecting the sliding movement of the latter, and a second manually operated means operatively connected to said control box for effecting the reciprocatory movement of the latter.

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