UNITED STATES PATENT OFFICE

2,171,721

WINDOW CLEANING MACHINE

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Application May 26, 1936, Serial No. 81,827

5 Claims. (Cl. 15—251)

The principal object of this invention is to provide an improved machine for cleaning the outside surfaces of windows.

A further object is to provide an outside-window-surface cleaning machine which will be very light in construction, capable of being economically manufactured, and capable of being easily handled by persons of less than average strength and yet effectively operated from a point inside the window to rapidly clean the entire outer surface of the window, irrespective of its height, within reasonable limits.

Prior machines of the above nature have been provided with mast arrangements to be projected outside the window, and another object is to provide for more effectively controlling the position of such mast to exert the necessary pressure on the window surface for cleaning or drying the same.

Another object is to provide a power driven outside-window-surface cleaning machine capable of vertically and horizontally traversing the entire window surface to be cleaned.

Still another object is to provide a novel vertical adjustment for the mast portion of an outside-window-surface cleaning machine.

Another object is to provide a cleaning and drying implement for a machine of the class shown, which implement may be interchangeably adjusted, or mounted, properly to effect the desired operation.

Other objects and the various novel characteristics will become apparent from the following description.

Referring briefly to the drawings, Fig. 1 is a central sectional view of the machine in one form. Fig. 2 is a bottom plan view of the base of the machine shown in Fig. 1; Fig. 3 is a sectional view taken through the cleaning head; Fig. 4 is a perspective view, showing another form of machine, which, as illustrated, has a motor driven cleaning and/or drying mechanism thereon; Fig. 5 is a sectional view of a drying pad adapted for attachment to a brush or other cleaning implement on the machine, and Fig. 6 is a perspective view of a modified cleaning implement.

Referring further to the drawings, and first to Figs. 1 to 3, a two-part base is shown at 1, having an inner section 2 and an outer section 3.

The base is shown as supported on the window ledge L and controlled by the operator in a manner to be hereinafter described, so as properly to position the mast, generally indicated at 4 and which rises from the base part 3 outside the window W.

The mast may comprise one or more sections of tubing. As shown, there is a single lower non-circular tubing section 6, on which another section of tubing 7 is adapted to be adjusted up and down and locked in the desired position as by a thumb screw 8. The section 7, in one position, may rest directly against the base part 3, and may be elevated for substantially the height of the inner section 6, for reaching the upper outer surfaces of very high windows.

Sildably mounted on the upper or outer section 7 of the mast is a cleaning head comprising a block 10, preferably made as a metal casting, which block detachably supports a scrubbing and/or cleaning device, one form of which is shown at 12. This cleaning device may be in the form of a hollow body 14, say of rubber, having mounted on its front face a suitable brush or sponge (a sponge-rubber pad being shown at 14). The cell structure of the sponge communicates with the interior of the body so as to be supplied with cleaning fluid. The body 14 has suitable provision for detachably securing it to the block 10, as for example on one of two pairs of guide ways 16 and 18. As shown the body 14 also incorporates a squeegee 19, which in another position of the body (as when it occupies the pair of guide ways 16 and 18), is in proper position to contact with the window surface in a manner to dry it. The hollow body 14 serves as a reservoir for cleaning fluid, and has a suitable filler opening and stopper at 18a.

The cleaning head is arranged to be reciprocated substantially the entire effective length of the mast, or, in the extended position of the mast, the entire length of the extended section. As shown, the block has vertically spaced bearings engaging the non-circular tubing section 7, these bearings having sufficient clearance to prevent sticking of the block as it is moved up and down. The non-circular section of the support prevents rotation of the block into such a position that the cleaning or drying implement is out of proper relation to the window surface.

I propose to reciprocate the cleaning head up and down on its guide by suitable pull cords, the end portions of which extend laterally from the base part 2, so that the user of the machine may work the cleaning head up and down on the outside of the window by alternately pulling the cords from inside the window. In some instances one of these cords may be dispensed with and the weight of the head 10 depended upon to return it to the lower position after it has been raised. As shown, one of the pull cords 20 extends...
into the embrace of a sheave 27 on the base part 1, thence along the base to a roller 22, located in the lower end of the mast section 2, thence upwardly and over a sheave 23 in a suitable guard bracket 24, surmounting the mast section 1, and thence downwardly for attachment to the block 18 as at 28. The same piece of cord may extend from the block 18 downwardly to a guiding roller 22 or sheave 26 thence below the base section 2 and around a sheave 27 and out at the side of the base.

The base section 2, comprises preferably a light metal casting (say aluminum), which may have downwardly extending stiffening flanges about its perimeter, the forward flange forming a limiting abutment for a one-way acting hinge 30 in conjunction with a similar flange 32, on the base part 2. This prevents the mast from swinging downwardly with reference to the base 2, in the horizontal position of the base, but permits the base section 2 to be swung up against the mast to decrease the size of the machine for storage and handling when the machine is not in use.

In order to facilitate horizontal traverse of the window, so as to clean all parts of it, a set of rollers 33 is generally mounted on the underside of the base section 2 (or the base section 3 if desired), the rollers being arranged to ride and run on the window ledge or window sill, whichever the rollers engage. Only one set of rollers is shown and the manner in which these rides and run on the window sill is shown in Fig. 1. The rollers may be rubber, to avoid marring the window sill surface.

An important feature of the invention is the stirrup arrangement shown on Fig. 1, this being attached to the inner end of the base section 3, and is pivotally mounted on the underside of the base section 2 (or the base section 3 if desired), the stirrup being adjustable up and down, as by a conventional buckle 36, to permit lengthening and shortening of the stirrup in accordance with the height of the window ledge from the floor.

Another feature is the provision of arms at 40, for embracing the sides of the body of the user, so as to hold the base in its proper position, with respect to the window, leaving both hands free to work the pull cords for reciprocating the cleaning head. The arms 40 have slots 46a extended therethrough, to enable hanging a cross bar 41 beneath the base section 2, and are adjustable to outward and inward positions, as shown respectively in full and broken lines on Fig. 2. In their outward position, portions of the arms 40 pivot in suitable openings in the forward depending flange of the base section 2, the inner ends of the arms being forced outwardly by a suitable compression spring 42 on the bar 41 which yieldingly maintains the outer end portions of the arms against the user’s body, say against the upper leg portions or the hips. Referring now to Fig. 4, this arrangement incorporates a modified mast including, as shown, spaced bars 56, which can be made of a single piece of light metal rod bent into substantially U shape, having a horizontal cross portion 51 at the bottom. The base of the machine 52, may likewise be formed of a metal rod bent into the shape shown, and having I formations 55 in its ends embracing the cross portion 51 of the mast as a hinge, to permit folding of the base up against the mast for storage of the machine. The inner end of the base is bent as at 52a for lateral bracing against the user’s body and the stirrup 37—38 may be attached as shown.

The base 32 carries a U shaped bracket 55, pivotally secured to the base 32 on ears 56, the bracket having I formations 57 at its free ends adapted to detachably engage the ends of a cross bar 88 on the mast, to lock the mast in up-right position. It will be seen that when the ends of the bracket 55 are sprung out and detached from the bar 88, the entire base may be folded upwardly against the mast. As illustrated in broken lines (Fig. 4) it will also be seen that the base 32 may be swung about its pivotal connection 53 approximately 180 degrees, so that it lies on the opposite side of the mast from the position shown in Fig. 4. The base may be locked in such outwardly swung position by means of the bracket arms 55 engaging the ends of the bar 88. This merely requires swinging the arms 55 past the side members of the base. Thus, the machine may be used to support the mast in washing the inside surfaces of high windows without having to reverse the position of the cleaning head on the mast. The necessity for a step ladder in order to reach high inside window surfaces may, thereby, be obviated.

Rollers are preferably provided as at 35c on the arms of the base 32 for engagement with the window ledge for vertical adjustment.

For vertical adjustment of the mast the upper portion of this comprises a U shaped tube 88, the arms of which telescopingly fit the bar ends 88 and are adapted to be locked in position by suitable set screws 89. This mast extension has a cross portion at the top carrying a sheave 92 and guard 93 for the operating cord or cable 95. At the bottom the extension is braced by a cross piece 96c which serves as a handle in lifting and lowering the extension.

The cleaning head comprises a block 18c having two pairs of spaced bearings rideable on the vertical arms of the adjustable part 88 of the mast. The block is reciprocated up and down by the cord 96 which may be essentially as described in connection with Figs. 1 to 3. The cord extends under a sheave 96 on the cross bar 91, thence upwardly through an opening 97 in the block 18c, thence over the sheave 82 and thence down to a suitable fastening at 98 on the block 18c. The weight of the cleaning head may be depended upon as the sole means to return the head towards the base of the window, after being pulled up by the cord.

In lieu of a simple brush or pipe and cleaning squeegee on the block 18c, an electric motor 78 may be mounted in the block having a driving head 71 thereon to which may be detachably secured a circular cleaning brush 72, having a base 73 and bristles 74. The electric conductor, comprising the usual flexible cable 76, may be lead in the block by means of a sheave 78 on the cross bar 91, the cord extending upwardly to the block 18c and being electrically connected to the motor. This electric conductor may, if desired, be embodied with suitable strengthening material so that it may be used as a pull cord in returning the cleaning head to a lower position after it is raised by the cord 96.

To supply the brush with water or other cleaning fluid, a tank 98 is preferably mounted on top of the mast, as on a bracket 91 and suitable means provided to convey fluid therefrom into operative association with the brush. As shown, the tank has a valve 82 in a discharge pipe 83 which valve is controlled by the user of the machine (from inside the window). This control may comprise a valve operating arm 94 and pull

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cord 85 passing under a sheave 86 adjacent the base and thence to the operator.

The fluid from the tank 80 may be discharged directly onto the window, above the brush, by a short flexible tube 87 projecting inwardly from the pipe 83, or the fluid may be lead directly to the brush by lengthening the flexible tube.

A feature of the invention, see Fig. 5, is the drying device 90 comprising, as shown, a pad formed of a suitable number of laminations of cloth, provided with a thin flexible waterproof inner cover 91 and an elastic band inserted in a gathered tunnel edge 92 of the pad. To mount the pad the elastic edge of the pad is spread over the base portion 73 of the brush for operation by the motor. The waterproof material prevents the drying material of the pad from absorbing any moisture which may remain on the brush. The pad obviously may be adapted for use on the non-rotary cleaner of the modification shown in Figs. 1 to 3 or on the brush shown in Fig. 5 which will now be described.

Referring to Fig. 6, a suitable block 100 forms the base for conventional parallel brush tufts 101. This block may be detachably mounted on the cleaning head in any suitable fashion; for example, as shown, in connection with Figs. 1 and 3, or otherwise (mounting not shown). Cleaning fluid from a tank such as 80 is conducted to a point centrally of the block 100 and into a liquid receiving space 102 formed by a recess on the top face of the block. An extension 87a of the flexible tube 87 may have its lower end fastened as at 103 to a cover plate 105 surmounting the block 100. Grooves 106 radiate from the space 102 to various positions along the top of the block which, in conjunction with the cover plate, form conveying ducts for the fluid. These grooves (preferably more numerous than as shown) communicate with the bristle body of the brush by intersecting bores 107, each having a horizontal portion leading to the face of the block from which the bristles project.

In order to lead the fluid from the bores 107 well into the bristle body, short sections of rubber hose 108 may be secured in place in each horizontal bore portion. The hose sections discharge the fluid onto the tufts and do not interfere with the flexibility of the latter.

The block 100 may, in keeping herewith, be provided with a wiper and squeegee at one end and be adjustable secured to the head (say in the manner suggested by Figs. 1 and 3 in connection with the cleaner 12) so as to render the wiper and brush interchangeably active.

It is to be understood that the base portion of the machine as shown in Fig. 4 may incorporate all the features shown in Figs. 1 and 2, these features being omitted to avoid duplication.

In other words the base may have additional guides for the pull cords, and may have more elaborate means to clasp the body of the user.

It will be seen that, with either general arrangement described, the user will have no difficulty in mounting the machine on the window and effectively cleaning the entire outside surface without having to lean out of the window. Thus this ordinarily unsafe operation is rendered entirely safe and easy.

I claim:

1. A window cleaning machine comprising a mast adapted to be positioned substantially vertically outside a window to be cleaned, a base for the mast extending inwardly substantially at right angles therefrom and adapted to rest on the window ledge or sill, means arranged to traverse the mast to perform a cleaning or drying operation on such window and spaced arm members on the base adapted to extend into contact with opposite sides of a portion of the body of the user, more effectively to control the position of the mast.

2. A window cleaning machine, comprising a mast adapted to extend outside a window to be cleaned, parallel therewith, and having a cleaning head vertically reciprocable thereon, a base for supporting the mast in said position, said base being adapted to rest on a window ledge or sill, means operable by a person adjacent the base for reciprocating said cleaning head on the mast, and extensible and retractable arm members on the base adapted to clasp a portion of the body of the user, to assist in guiding the mast.

3. A window cleaning machine having a mast with a cleaning device reciprocable thereon, and a base for holding the mast in upright position outside the window, said base comprising a pair of spaced parallel arms, pivotally connected to the mast, said arms each having a roller axially supported thereon, for engagement with a window ledge or sill as a fulcrum for the machine.

4. A window cleaning machine of the class described, a mast having a cleaning head vertically reciprocable thereon, means to reciprocate the head, a supporting base pivotally attached to the mast at its lower end, said base being swingable to positions on opposite sides of the mast, and means for holding the base substantially at right angles to the mast in either swung position, whereby inside and outside window surface cleaning may be effected from inside the window, without having to reverse the position of the cleaning head on the mast.

5. A window cleaning machine of the class described, comprising a base frame constructed of metal and having a pair of spaced arms, a mast formed of a pair of spaced upright metal arms and having a cross portion at the bottom hinged to the extremities of the base arms, a cleaning device adapted to vertically traverse the mast, and a bracket pivotally secured to one pair of arms and adapted to be sprung into locking relationship with projections on the other pair of arms to hold the base and mast in rigid angular relationship, while permitting the base to be folded against the mast.

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