

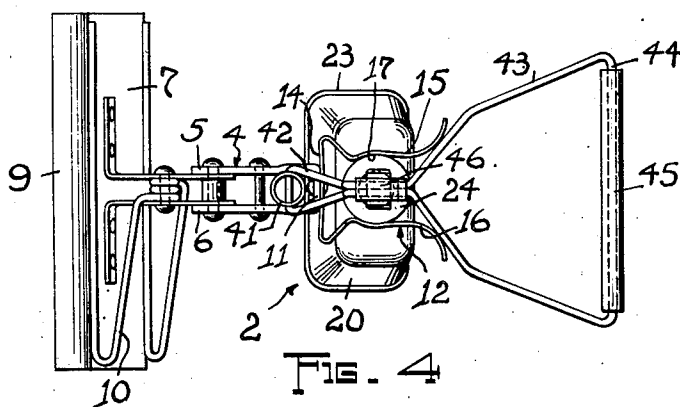
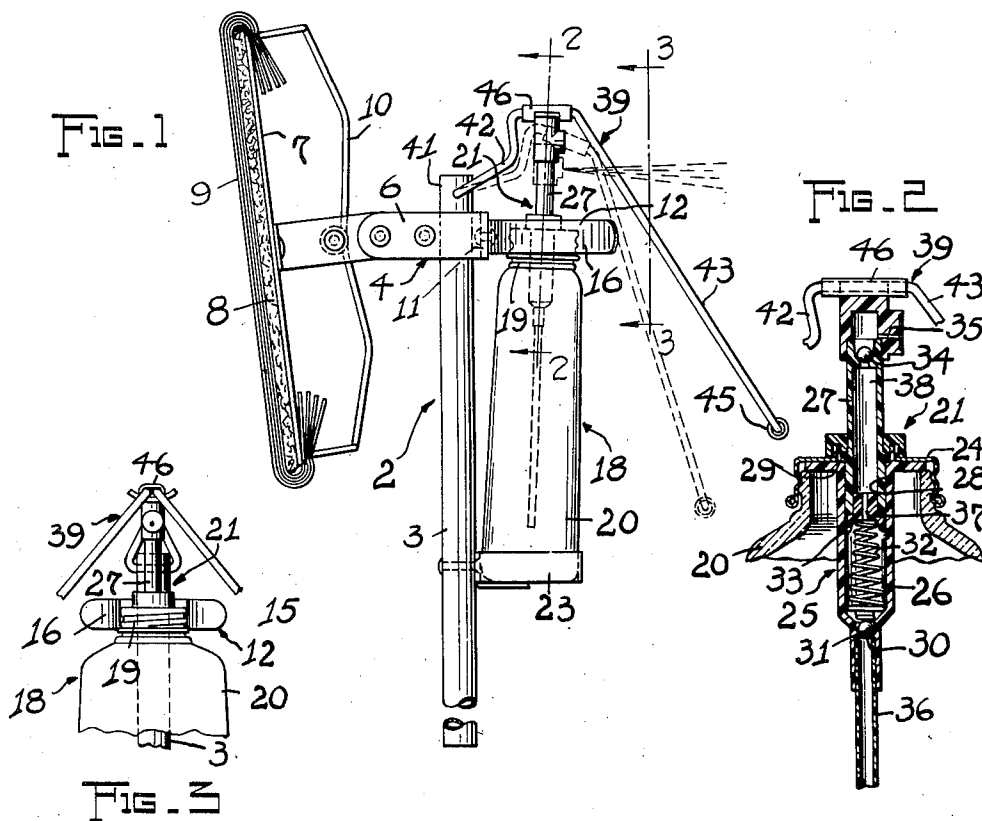
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WINDOW CLEANING DEVICE

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## WINDOW CLEANING DEVICE

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The present invention relates to window cleaning devices with atomizing means for spraying cleaning fluid on window panes.

The principal object of the invention is the provision of a simple window cleaning device in which an atomizer with spring-pressed reciprocatory piston means co-operates with oscillatory lever means in effecting by the lever means shifting of the reciprocatory piston means against the force of its spring for discharge of atomized liquid from the reciprocatory piston means by the spring force of the reciprocatory piston means and automatic return of piston and lever means to starting positions.

Another object of the invention is the provision of a window cleaning device of the type referred to above with a piston type atomizer, the non-rotatable reciprocatory piston of which is spring-pressed and outwardly extended for slidable contact with hingedly supported oscillatory lever means permitting oscillatory and reciprocatory movement of lever means and piston with respect to each other.

A further object of the invention is the provision of a window cleaning device of the type referred to above, which embodies supporting means, an atomizer supported by the supporting means, and includes a spring-pressed reciprocatory, axially perforated, outwardly extended piston having an outlet and oscillatory lever means hinged to the supporting means and slidably engaged with the piston to permit oscillatory and reciprocatory movement of lever means and piston with respect to each other.

Still other objects of the invention lie in the provision of a window cleaning device of the type referred to above, in which the reciprocatory lever means and the outlet of the piston are extended from the same side of such window cleaning device, in which the reciprocatory lever means include portions arranged in lateral relation with respect to the outlet of the piston to prevent unencumbered discharge of fluid from such outlet of the piston, and in which the reciprocatory lever means include bumper-like means to permit smooth actuation of the lever means when forced against window panes without danger of breaking same.

Additional objects and novel features of construction, combinations and relations of parts by which the objects in view have been attained, will appear and are set forth in detail in the following specification.

The drawing accompanying and forming part of the specification illustrates a certain practical embodiment of the invention, but it will be apparent as the specification proceeds that the structure may be modified and changed in various ways without departure from the true spirit and scope of the invention.

In the drawing:

Fig. 1 is a side view of a window cleaning device embodying the invention. This figure also illustrates, in dotted lines, the operation of the atomizer of the cleaning device.

Fig. 2 is a fragmentary transversal sectional view

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through the window cleaning device shown in Fig. 1, the section being taken on line 2-2 of said figure.

Fig. 3 is a fragmentary front view of the window cleaning device shown in Fig. 1, the view being taken from 3-3 of said figure; and

Fig. 4 is a plan view of the window cleaning device shown in Fig. 1.

Referring now in detail to the exemplified form of the invention shown in the drawing, window cleaning device 2 mounts on the upper portion of its supporting means in the form of an operating handle 3 a U-shaped bracket 4 with parallel flanges 5 and 6 pivotally adjustably supporting a backing member 7 for a felt pad 8 having removably secured thereto wiping fabric or cloth 9 by means of a spring 10.

U-shaped bracket 4 has attached to its web portion 11 a U-shaped spring clamp 12, the central area or web 14 of which is riveted to web portion 11. Spring clamp 12 includes clamping flanges 15 and 16 having recesses 17 to permit removable gripping and holding of atomizer device 18 which is arranged between flanges 15 and 16 and supports on neck portion 19 of fluid receptacle 20 a combined cover and atomizing arrangement 21 seated upon neck portion 19 and threadedly connected therewith. Atomizer device 18 seats its bottom 22 in a recessed base 23 arranged on handle 3 below bracket 4.

The combined cover and atomizing arrangement 21 embodies a cover 24 which is screwed to neck portion 19 and centrally perforated. This cover 24 mounts a piston type pumping device 25, the chambered body 26 of which is extended downwardly from cover member 24 into receptacle 20 and a tubular piston 27 slidably arranged in piston chamber 28 of such chambered body 26, which piston 27 is extended upwardly through perforation 29 of cover 24 outside of receptacle 20. Chambered body 26 includes at its lower portion an intake opening 30 closed by a spring-pressed ball check valve 31 including a compression spring 32 engaged at its other end with lower end 33 of tubular piston 27. The outwardly extended upper end of piston 27 which is slidably and non-rotatably guided in piston chamber 28 includes a gravity ball check valve 34 arranged below a small fluid discharge opening 35.

Piston type pumping device 25 draws by spring-induced upward movement of tubular piston 27 fluid from receptacle 20 through inlet pipe 36 and check valve 31 into piston chamber 28 and discharges such fluid from said chamber through bores 37 and 38, check valve 34 and fluid discharge opening 35 when tubular piston 27 is shifted downwardly against the force of compression spring 32. Such downward shifting of piston 27 is effected by oscillatory lever 39 hingedly connected at one end with the upper end 41 of operating handle 3. Oscillatory lever 39 embodies two end loops of somewhat triangular shape, a small loop 42 hinged to handle 3 and a large loop 43 supporting on its base 44 a tube-like bumper element 45. Loops 42 and 43 extend in planes angularly related to each other and are connected with each other by a substantially straight middle portion 46 which intersects the axis of tubular piston 27 to effect co-operation of oscillatory lever 39 with the tubular piston 27.

In operation, atomizer device 18 of window cleaning device 2 is actuated by engaging its bumper element 45 on oscillatory lever 39 with a window pane and then the operator reciprocates the window cleaning device to effect spraying of the desired amount of atomized liquid on the window pane by the piston type pumping device 25. After spraying the window cleaning device is rotated to engage the window pane with the fabric-padded backing member 7 for final cleaning and drying operation.

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Having thus described my invention, what I claim is:

1. In a portable window cleaning device, portable supporting means, an atomizing fluid dispensing device supported by said portable supporting means, said dispensing device including reciprocatory piston means, and oscillatory lever means hinged to said supporting means, said oscillatory lever means including two angularly related end portions and a straight middle portion axially intersecting and slidably engaging the reciprocatory piston means of said dispensing device.

2. A portable window cleaning device as described in claim 1, including spring means coupled with the reciprocatory piston means adapted to automatically shift the piston means in one direction, said reciprocatory piston means including a tubular portion non-rotatably extended from the dispensing device outside thereof and a lateral outlet passage in the tubular portion of the piston means, said tubular portion slidably engaged with the oscillatory lever means.

3. A portable window cleaning device as described in claim 2, wherein the non-rotatably extended tubular portion of the reciprocatory piston means has the outlet passage extended in a direction away from the hinge connection between the oscillatory lever means and the supporting means to automatically effect actuation of the oscillatory lever means and discharge of atomized fluid on a window pane by reciprocating the window cleaning device when the oscillatory lever means thereof engage the window pane.

4. In a portable window cleaning device, supporting means, an atomizing fluid dispensing device supported by said supporting means, said dispensing device including spring-pressed reciprocatory piston means extended with a tubular portion out of said device, and oscillatory lever means hinged to said supporting means, said lever means including spaced angularly related end portions and a middle portion connecting the end portions with each

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other, said middle portion intersecting the axis of the tubular portion of said piston means and being slidably engaged with said tubular portion.

5. A portable window cleaning device as described in claim 4, wherein said supporting means includes means releasably attaching the fluid dispensing device to said supporting means.

6. A portable window cleaning device as described in claim 4, wherein one of the end portions of the oscillatory lever means is hinged to said supporting means, wherein the middle portion of the oscillatory means extends substantially rectangular to the axis of the tubular portion of the piston means, and wherein the other end portion of the oscillatory lever means extends downwardly from the middle portion thereof.

7. A portable window cleaning device as described in claim 4, wherein the oscillatory lever means embodies as one end portion a small loop hingedly engaged with the supporting means and as the other end portion a large loop of substantially triangular shape with two symmetrically arranged diverging side members and a base member connecting the side members with each other.

8. A portable window cleaning device as described in claim 4, wherein the oscillatory lever means embodies as one end portion a small loop hingedly engaged with the supporting means and as the other end portion a large loop of substantially triangular shape with two symmetrically arranged diverging side members and a base member connecting the side members with each other, and a bumper member supported by the base member of the said other end portion of the oscillatory lever means.

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