

1 576 611

- (21) Application No. 5016/76
- (22) Filed 9 Feb. 1976
- (19)
- (23) Complete Specification filed 6 May 1977
- (44) Complete Specification published 8 Oct. 1980
- (51) INT. CL.<sup>3</sup> A47L 1/08
- (52) Index at acceptance  
A4F 25



(54) APPARATUS PRIMARILY FOR USE IN CLEANING WINDOWS

(71) I, JOHN ARTHUR REED, a British subject, of 50 Burgh Road, Gorleston, Great Yarmouth, Norfolk, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an apparatus primarily for use in cleaning windows.

According to this invention there is provided an apparatus for cleaning windows or similar surfaces comprising an elongated channel member with longitudinal edges provided with flexible strips, the channel member housing a number of discharge nozzles to direct a spray of liquid towards the open face of the channel, a conduit connected through a pump to a liquid supply tank from which liquid is fed to the nozzles, valve means selectively directing the liquid to either the nozzles or to a return conduit leading back to the supply tank, and a suction line communicating with the channel for removal of liquid caught in the channel.

In such an apparatus the flexible strips along the edges of the channel form a squeegee to remove the cleaning liquid, generally water, from the window glass. The liquid is then drawn-off by the suction created inside the channel. The apparatus includes a water supply unit having a pump for supply of water under pressure to the nozzles in the channel member, constructed as a cleaning head, and preferably a suction producing means also connected with the head by a flexible ducting which may also house the water feed conduit. The water is advantageously fed continuously to a manually operated valve associated with the cleaning head which normally allows feed water to return back through a water return conduit to a water tank in the supply unit. Operation of the valve causes water to be fed to the nozzles for cleaning purposes. The suction conduit may be arranged at its water supply unit end to discharge water drawn-off through the channel in the head into a return tank. The return tank can be arranged to replenish the

water tank as and when required through a filter unit thus providing continuous recycling of the water.

Filter means may be provided in the outlet of the liquid supply tank.

The nozzles in the head will preferably be adjustable to produce the required spray patterns.

An embodiment of the invention is shown by way of example in the accompanying drawings also illustrating further preferred features and in which:—

Figure 1 shows schematically a cleaning head and a water supply unit associated therewith,

Figure 2 shows the cleaning head in cross-section with spray nozzle dismantled,

Figure 3 shows the water control valve,

Figure 4 shows the apparatus schematically with an extension unit for cleaning second floor windows,

Figure 5 shows a section of an extension unit,

Figure 6 shows a schematic view of a second water supply unit from one side,

Figure 7 shows the unit of Figure 6 from the other side, and

Figure 8 shows a detail of the end of the flexible hose.

Referring to Figure 1 the apparatus comprises a cleaning head unit 1 and a water supply unit 2 interconnected through a flexible convoluted suction conduit 3 which encloses a water feed conduit 4 and water return conduit 5. The cleaning head 1 has a handle 6 provided with a water control valve 7 which normally connects conduit 4 with conduit 5 whereby water under pressure supplied by a pump 8 from tank 9 is fed back to the tank at 10. This allows the pump to run continuously and the water to circulate. Operation of the valve 7 causes the pressure water to be fed through the pipe 11 to one or a series of nozzles 12 located within a channel 13 and arranged to direct a spray in the direction 14 onto a window 15.

The top and bottom edges of the channel 13 are provided with rubber strips 16 and 17 forming blades. The lower blade 16 serves to prevent water running down the

2 window and the upper blade 17 assists in  
the production of a vacuum within the  
channel and achieved by suction applied to  
the conduit 3 from suitable means provided  
5 in the unit 2. The suction producing  
means is conveniently powered from a  
motor also driving the water pump. Water  
drawn-off from the head 1 is discharged  
from the suction conduit 3 in a separation  
10 chamber 18 and is collected in a return  
water tank 19. The vacuum is applied to  
the tank 19 through an orifice 19a.

The return tank 19 is connected to the  
supply tank 9 through a filtering means  
15 such as a cartridge filter and when the level  
in tank 19 reaches a predetermined level  
set by a float mechanism 20 water is transferred  
to replenish the tank 9. This tank  
includes a valve means such as a ball-cock  
20 9a which closes when the tank is full to  
prevent water being sucked back to tank  
19 as the level therein falls.

The cleaning head 1 is shown in section  
25 in Figure 2 and each spray nozzle 12  
(shown dismantled) is connected to a manifold  
12a fed by the pipe 11 from valve 7. Water  
drawn-off by the suction flows in  
direction A down through the handle to  
30 the conduit 3. The nozzles 12 may be adjustable,  
to achieve the required spray pattern.

Figure 3 shows the valve 7 which has a  
manual trigger 7a controlling two poppet  
35 valves 7b and 7c. Valve 7c normally closes  
the feed to pipe 11 and valve 7b allows  
water from feed conduit 4 to pass to return  
conduit 5. When the trigger is pressed the  
state of the valve is reversed and water  
40 from conduit 4 is fed to the pipe 11.

The handle of the cleaning head may be  
adapted so that several sections can be  
coupled together for cleaning windows at  
higher levels and Figure 4 shows an arrangement  
45 wherein two additional sections of handle  
6a and 6b are provided between the cleaning  
head 1 and the valve 7 to increase reach  
to enable second floor windows to be cleaned.  
Figure 5 shows one such section wherein the  
50 tubular extension 50 has an internally threaded  
socket 51 and an externally threaded spigot 52  
whereby a number of such sections may be  
connected together, the socket of one section  
engages the spigot of another. Sealing means  
55 such as O-rings may be included to provide  
a seal for the vacuum. The water conduit  
provided in each section has a tapered  
socket 53 and tapered plug 54 each retained  
by spiders 55 concentrically and connected  
60 by a flexible tube 56. This arrangement  
provides coupling of the conduit when the  
sections are joined together. Any slight  
water leakage at the conduit joint is not  
important.

65 The float mechanism 20 (Figure 1) is ar-

ranged so that the outlet to the filter is  
blocked when tank 19 is empty. The float  
also cuts-off the vacuum when the water  
level rises due to blockage of the filter  
70 preventing water flowing therethrough to  
tank 9.

The apparatus provides an effective  
method of cleaning windows or similar  
surfaces using high pressure water jets  
75 without substantial wastage of water and is  
thus self contained.

Figures 6 and 7 show a generally similar  
apparatus from the used return water tank  
side and feed water tank side respectively.  
The motor unit A, which can be electrically  
80 powered or an internal combustion engine  
drives a water pump B and a suction producing  
unit C. The pump B draws water from an inlet  
D in the base of the feed water tank E and  
passes it to the outlet F (conduit 4) under  
85 pressure. The unused return water (conduit  
5) is discharged back through G into tank E.  
The vacuum hose 3 communicates with a box H  
opening into the used return water tank I  
90 which is subject to a vacuum produced by  
unit C. The tank I has a valve unit J comprising  
a vertical channel with a ball float K and  
arranged to be movable between a high water  
level position K<sup>1</sup> in which the vacuum duct  
95 connection to unit C is blocked, this is to  
prevent water being drawn into said unit  
should the level rise too high due to a  
blocked filter, and a low water position K<sup>2</sup>,  
100 in which the duct to a cartridge filter L  
is closed when the water level falls too low  
whereby the suction is prevented from acting  
on the filter.

The feed water tank is equipped with a  
ball cock M which opens the outlet side of  
105 the filter L when the water level is less  
than a prescribed maximum.

Figure 8 shows in detail the end of the  
convoluted hose 3 with the water valve 7  
110 and connection for either the head or extension  
tubes.

#### WHAT I CLAIM IS:—

1. An apparatus for cleaning windows or  
similar surfaces comprising an elongated  
115 channel member with longitudinal edges  
provided with flexible strips, the channel  
member housing a number of discharge  
nozzles to direct a spray of liquid towards  
the open face of the channel, a conduct  
120 connected through a pump to a liquid  
supply tank from which liquid is fed to the  
nozzles; valve means selectively directing  
the liquid to either the nozzles or to a  
return conduit leading back to the supply  
125 tank, and a suction line communicating  
with the channel for removal of liquid  
caught in the channel.

2. An apparatus according to Claim 1,  
130 wherein the conduit and suction line con-

nect with a liquid supply means and a suction producing means respectively through flexible connecting tubing.

5 3. An apparatus according to Claim 2, wherein the conduit is located inside the suction line.

4. An apparatus according to Claim 3, wherein a part, at least, of the suction line is convoluted hose.

10 5. An apparatus according to any one of Claims 2 to 4, wherein the conduit and suction line connect with a rigid tubular extension, at one end of which the channel member is mounted, the extension being in sections, a number of which may be connected as required to provide a working length, each section incorporating a conduit and suction line with connecting means for coupling adjacent sections.

20 6. An apparatus according to any preceding claim, wherein the suction line has a liquid separating means causing liquid drawn-off through the channel member to be discharged into a return tank, which is subject to vacuum produced by a suction pump, the return tank being connected to

the supply tank through a filter means and including a valve means operable in response to predetermined levels in one or other or both tanks, to cause liquid to flow from the return tank to the supply tank to replenish same. 30

7. An apparatus according to claim 6, wherein filter means are included in the outlet of the liquid supply tank. 35

8. A method of cleaning windows or similar surfaces using an apparatus according to any preceding claim.

9. An apparatus for cleaning windows substantially as herein described with reference to and as shown in Figures 1 to 5 of the accompanying drawings or in Figures 1 to 5 as modified by Figures 6 to 8. 40

KINGS PATENT AGENCY LIMITED

BY

J. B. KING,  
DIRECTOR,

Registered Patent Agent,  
146a Queen Victoria Street,  
London EC4V 5AT.

Agents for the Applicant.

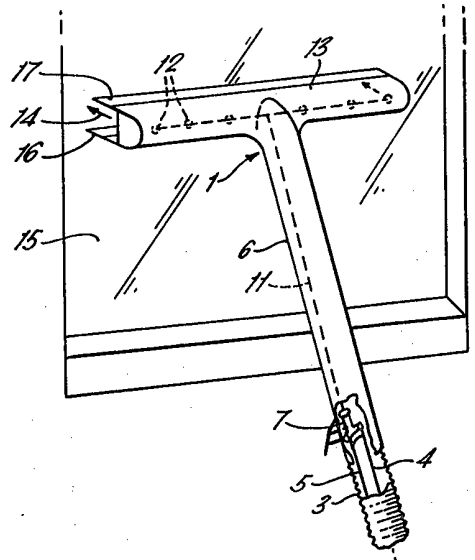
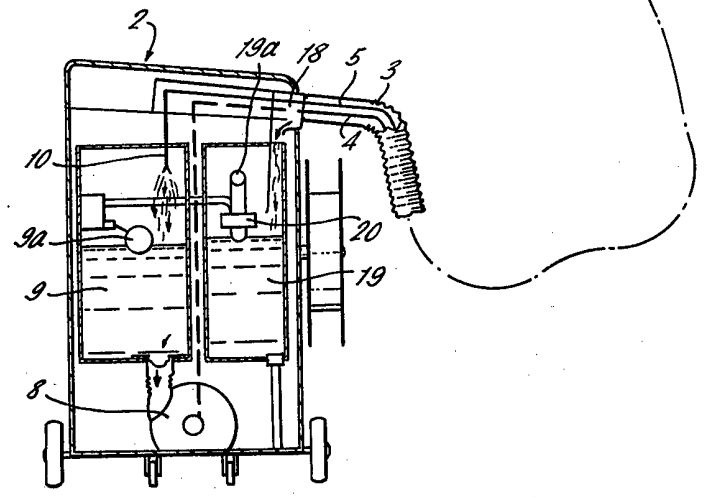


FIG. 1.



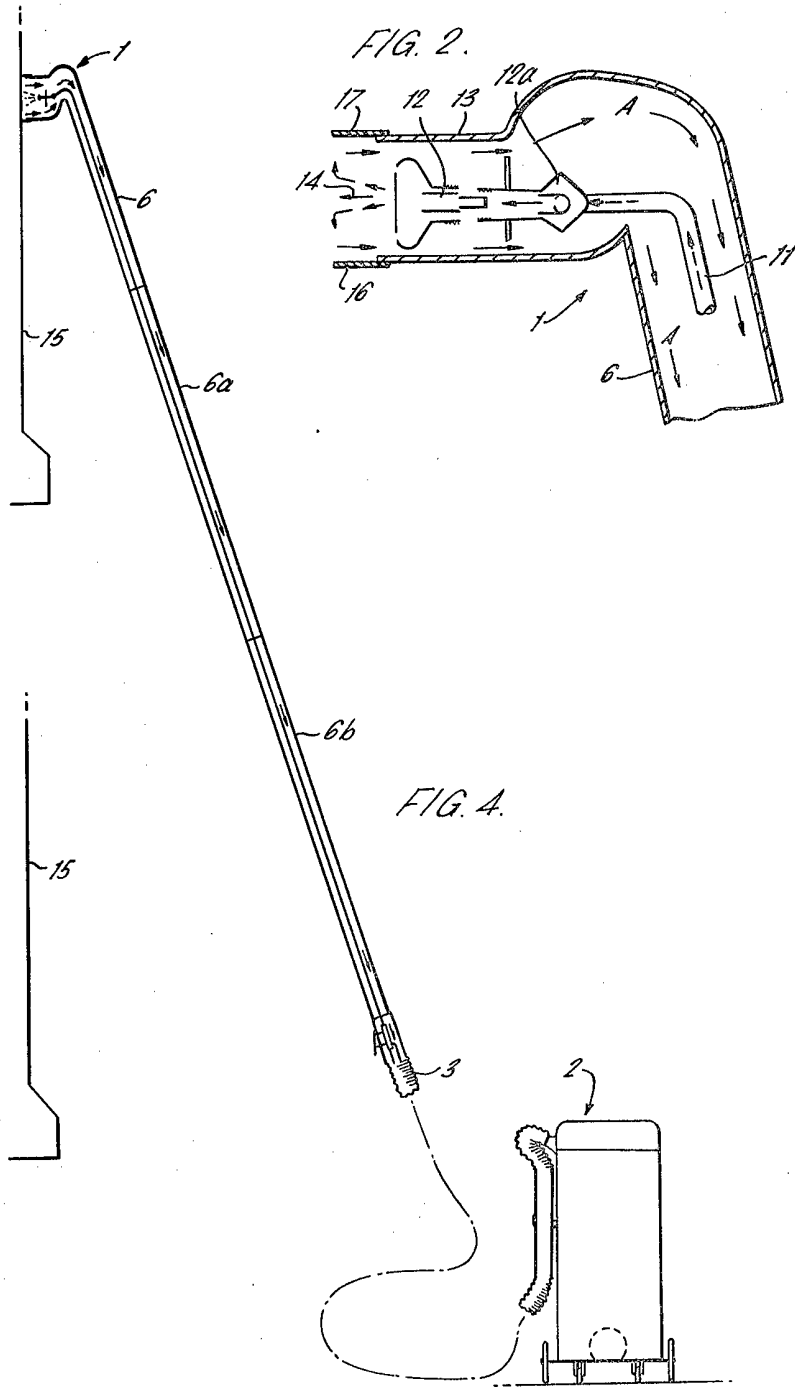


FIG. 3.

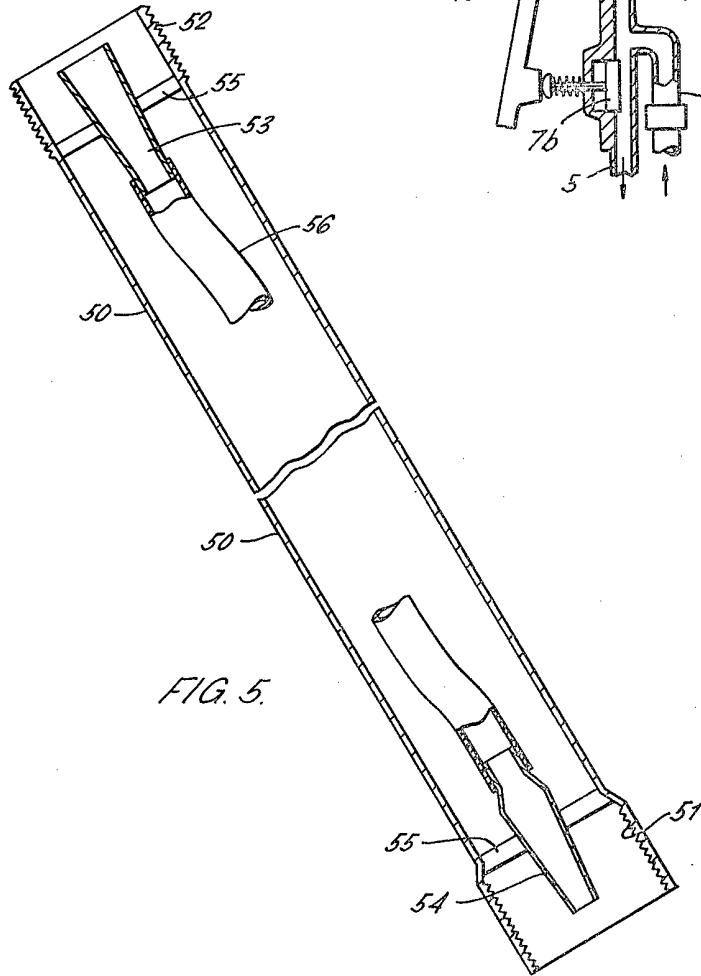
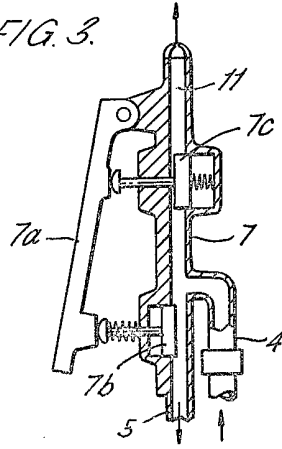


FIG. 5.

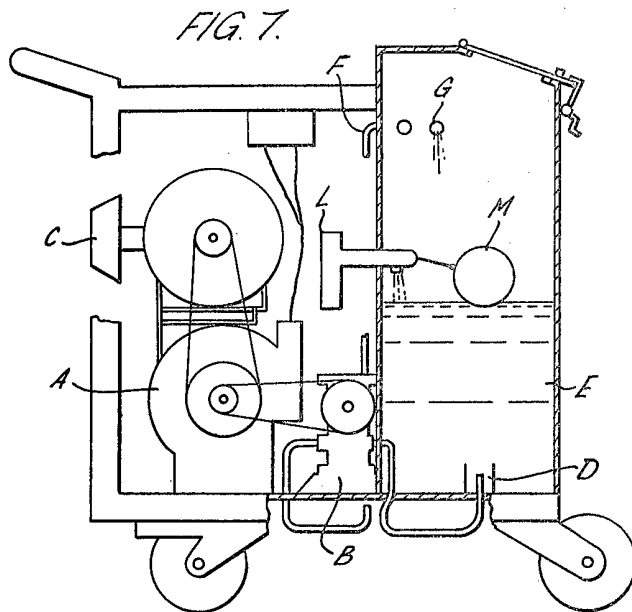
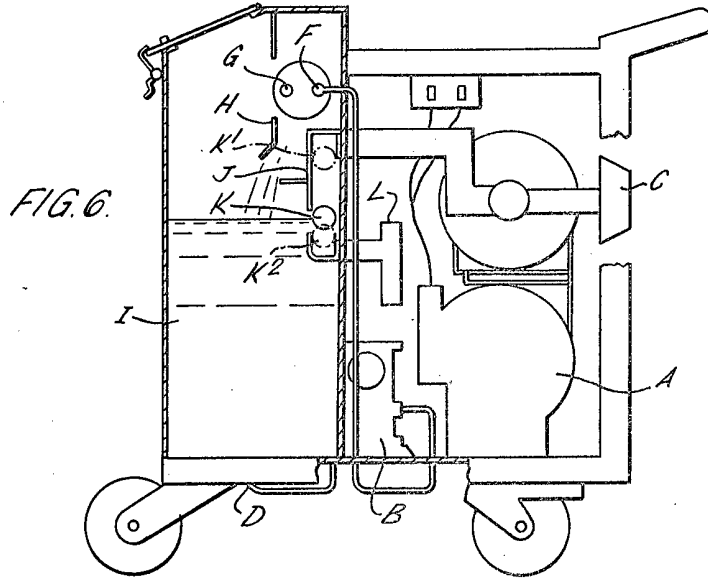


FIG. 8.

