

Commonwealth of Australia
The Patents Act 1952
DECLARATION IN SUPPORT

In support of the (Convention) Application made by: HEDEROLBA AB

a Swedish Company of Norra Gavlevagen 43, S-810 40 Hedesunda,
SWEDEN

for a patent for an invention entitled:

DEVICE FOR CLEANING BY SUCTION

I (We) Hans Olov Olsson

of and care of the applicant company do solemnly and sincerely declare as follows:

a) I am (We are) the applicant(s) for the patent.
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

or

b) I am (We are) authorised by the applicant(X) for the patent to make this declaration on its behalf.

Delete the following if not a Convention Application.

The basic application(s) as defined by section 141 (142) of the Act was (were) made

in SWEDEN on 26th August 1985

in

on

in

on

by HEDEROLBA AB.

The basic application(s) referred to in this paragraph is (are) the first application(s) made in
a Convention country in respect of the invention the subject of the application.

a) I am (We are) the actual inventor(s) of the invention.
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

or

b) Hans Olov OLSSON
a Swedish Subject, of Villagatan 16, S-810 20 Osterfarnebo
SWEDEN

is (are) the actual inventor(s) of the invention and the facts upon which
HEDEROLBA AB.

is (are) entitled to make the application are as follows:

by virtue of a derivation of right from inventor to
applicant company the applicant is a person who would if a
patent were granted upon an application made by the actual
inventor, be entitled to have the patent assigned to it.

Declared at Hedesunda this 3rd day of March 1988.

Signed  Status Director

Declarant's Name Hans Olsson

F. B. RICE & CO PATENT ATTORNEYS

This form is suitable for any type of Patent Application. No legalisation required.

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(56) Prior Art Documents
FR 1602828

(57) Claim

1. A device for cleaning by suction, comprising means for creating a low pressure, means for spraying liquid on the spot of suction and a tank for separating sucked up dirt and liquid from the suction air, characterised in that said means for creating low pressure is a pump which gives a low pressure of at least 50% vacuum at a suction end of said device.

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PCT

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With amended claims.

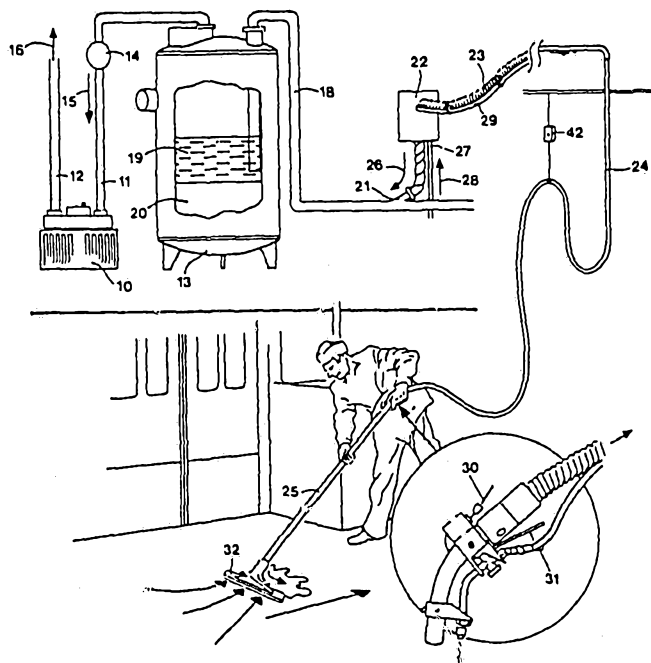
In English translation (filed in Swedish).

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This document contains the amendments made under Section 49 and is correct for printing.

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(54) Title: DEVICE FOR CLEANING BY SUCTION

**(57) Abstract**

The device comprises a vacuum pump (10) or other suction means with ability to create a substantial low pressure, means (30, 31) for sprinkling liquid on the suction spot and a tank (13) for separating sucked up dirt and liquid from the suction air.

Device for Cleaning by Suction

The present invention relates to a device for cleaning by suction especially suitable for internal cleaning of public transportation vehicles as buses, trains, ships and aeroplanes or of large premises as schools, offices and hotels. It is previously known to use central suction devices for creating a suction effect at a number of working spots for connecting suction tools, but these have not been sufficient in view of the difficult contamination to which public transportation means and public premises are subjected. A special problem has been the removal of dirt which has got stuck by drying or has been tramped into mats and cannot be removed by suction only.

A purpose of the invention is to improve a suction device of this type by a combination of steps for dissolving the dirt and increasing the suction force.

The present invention therefore comprises a device for cleaning by suction, comprising means for creating a low pressure, means for spraying liquid on the spot of suction and a tank for separating sucked up dirt and liquid from the suction air, characterised in that said means for creating low pressure is a pump which gives a low pressure of at least 50% vacuum at a suction end of said device.

A preferred embodiment of the present invention will now be further described with reference to the accompanying drawings in which:

Fig. 1, shows a view of a suction device according to one embodiment of the present invention.

Fig. 2, shows a detailed picture, on a larger scale, of a suction head of an embodiment of the present invention seen from below.

Figs. 3 - 5, show sectional views of the suction head of the embodiment of the present invention as shown in



Fig. 2 and as seen along the arrows 3 - 3, 4 - 4 and 5 - 5 in Fig. 2.

The device shown in Fig. 1 comprises a suction system where the low pressure is generated by a vacuum pump 10, to which an inlet pipe 11 and an outlet pipe 12 are connected. The inlet pipe 11 is connected at its other end to a tank 13 via a separator 14 which prevents water and dirt from following with the air flow from the tank to the vacuum pump. The direction of the air flow is shown by the arrows 15 and 16.



Both the separator 14 and the tank 13 are provided with not illustrated level controls. The supply pipe to the tank extends below the surface of the water 19 present in the tank. At the bottom of the tank dirt 20 gathers which has been brought along by the suction air. The water which also has been conveyed by the suction air mixes with the water in the tank. In this way the water which is added at the suction spot is prevented from reaching the vacuum pump 10. The tank 13 and the separator 14 cooperating therewith thus perform a separating function which is necessary for the use of a vacuum pump.

The pipe 18 is provided with an arbitrary number of connection studs 21, of which one is shown in Fig. 1, each stud leading via a valve device 22 to a joining duct 23 to a connection for a hose 24, which leads to a suction tool 25 having a suction head 32. The arrow 26 shows the direction of the air current.

For the supply of water to the suction spot there is provided a pipe 27 which suitably can be connected to an existing water supply system. It is suitable to use hot water. The water flows along the arrow 28 and continues in the pipe 29 via the valve device 22 parallel with the hose 23, 24 to the suction head 32, where the water is sprinkled out through one or more spray nozzles. There can also be a not illustrated dosing pump for a cleaning agent.

The hoses 24 and 29 are hung in a balance block 42 which holds the hoses weightlessly hung up in a curved loop, so that they can be pulled apart or pushed together, so that the hand tool 25 can be moved. At the upper end of the hand tool there is an operating lever 30 for opening or closing the air flow and another operating lever 31 for controlling the water flow. These levers act via the valve aggregate 22.

Fig. 2 is a view from below of a suction head 32. This consists of a frame 33 with an elongated hole 34 for the suction air connected to the tubular hand tool 25 by a funnel 36 (Figs. 3 - 5). Along each long side of the frame 33 a

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rubber strip 44 and 45 respectively is attached, which is formed with vertical ribs and is held by a clamping iron 46 and 47 respectively which is fastened to the frame 33 with screws 48. In order to prevent the rubber strips 44 and 45 from being compressed by the suction effect there are two sliding pins 52 arranged, which have a rounded lower end surface in order to slide more easily on the floor. The rounded surface lies somewhat higher than the lower edge of the rubber strips 44 and 45. In order to prevent the head from getting stuck by the suction the strips 44 and 45 are separated from each other at their ends by openings 49.

The water is sprayed by a pipe 50 which is coupled to the hose 29 which is attached along the suction tool 25. The pipe 50 is mounted on the suction head along one long side thereof and is provided with two spray nozzles 51, which sprinkle the water on the floor for instance in the form of a thin fan-shaped curtain from each nozzle.

The pump 10 shall be of a type which gives a substantial low pressure, for instance a vacuum pump which gives 80 % vacuum. A prerequisite for the use of such a pump is that the suction air is cleaned both from dirt and from water, and this is achieved by means of the sludge tank 13 which is supported by the separator 14. Also other pumps giving a substantial low pressure are possible, for instance a turbine which gives about 60 % vacuum. The low pressure (vacuum) delivered by the pump should preferably be of the size 50 % vacuum or more.

The sprinkling of water does not only serve the purpose of dissolving the dirt, so that the dirt easier follows with the suction air. The water sprinkling in connection with the sludge tank has the advantage that burning cigarette stubs are effectively extinguished and can be sucked into the system without danger of fire. This is not possible with dry suction systems where the risk of fire has been found so serious that the ash trays have to be emptied separately. Moreover the water serves to bind the dust.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A device for cleaning by suction, comprising means for creating a low pressure, means for spraying liquid on the spot of suction and a tank for separating sucked up dirt and liquid from the suction air, characterised in that said means for creating low pressure is a pump which gives a low pressure of at least 50% vacuum at a suction end of said device.
2. A device as claimed in claim 1, further comprising a tank wherein said tank is formed as a liquid filter having an inlet pipe which terminates below the surface of a liquid contained in said tank, said liquid being present in the tank during operation.
3. A device as claimed in claim 1 or 2, wherein said low pressure is at least 60% vacuum.
4. A device as claimed in claim 3, wherein said low pressure is at least 80% vacuum.
5. A device as claimed in any one of claims 1 to 4, further comprising a suction heads having a flexible curtain-shaped ridge and at least one supporting abutment which prevents said ridge from being compressed by said low pressure.
6. A device as claimed in any one of the preceding claims, wherein said suction head is provided with at least one opening for supply of air.
7. A device as claimed in any one of the preceding claims wherein said liquid is water.
8. A device substantially as hereinbefore described with reference to any one of the accompanying Figures.

DATED this 21 day of January 1991

HEDEROLBA AB

Patent Attorneys for the
Applicant:

F.B. RICE & CO.



Fig.1

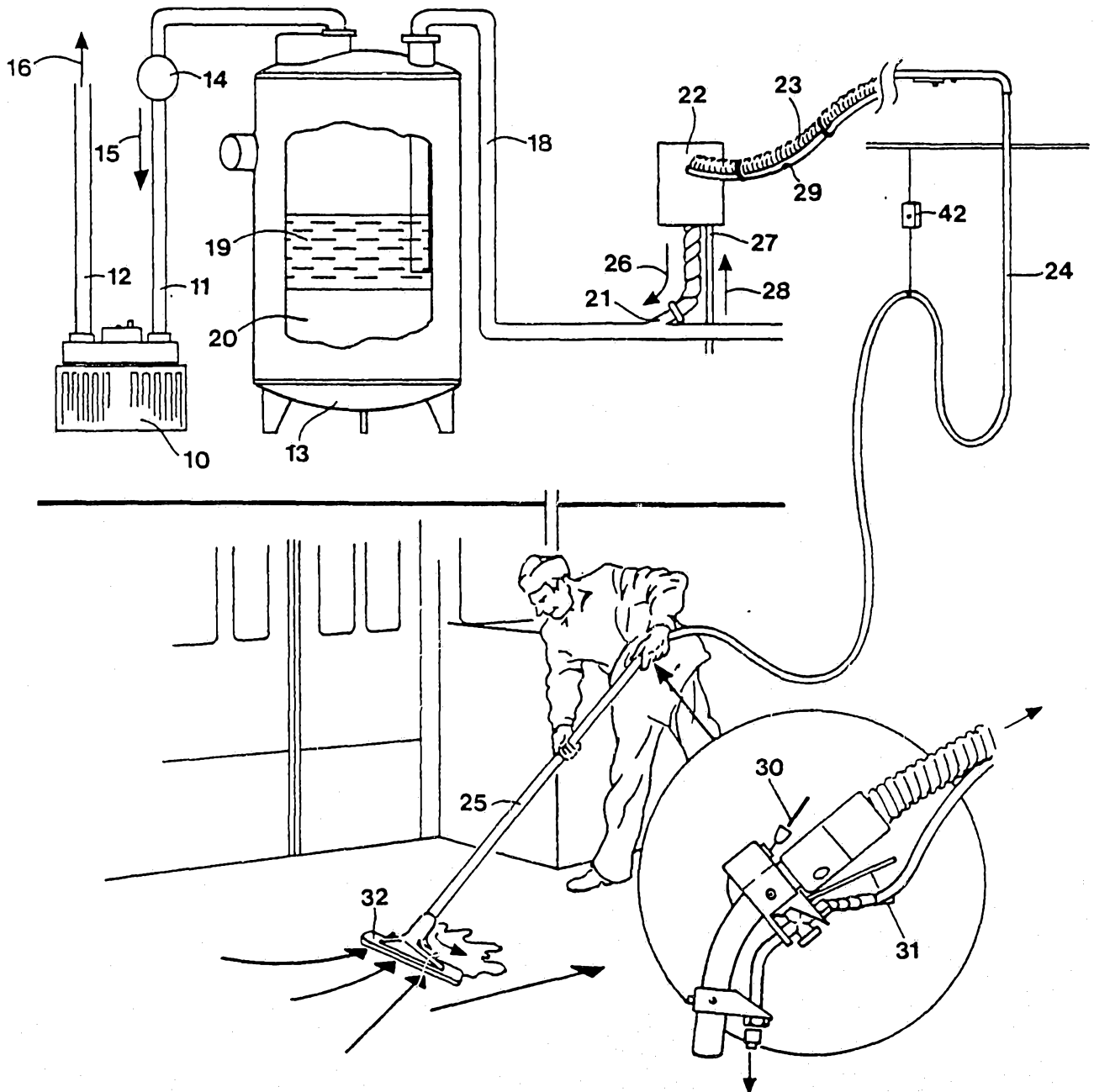


Fig.2

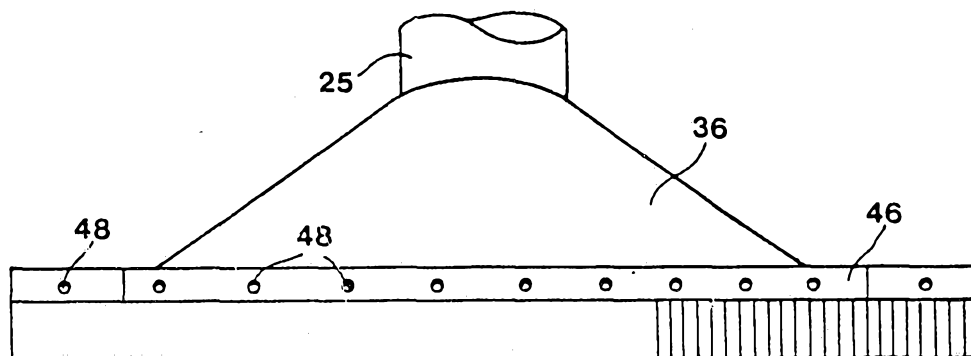
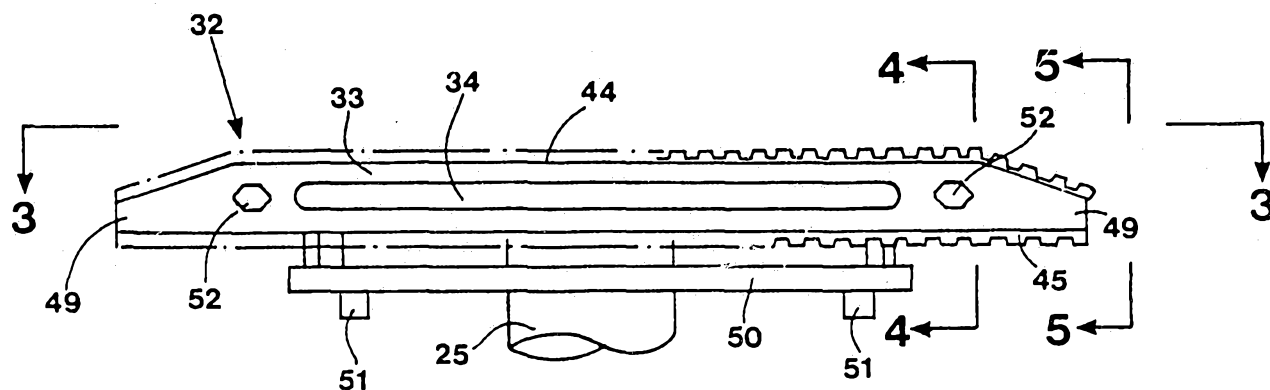


Fig.3

Fig.4

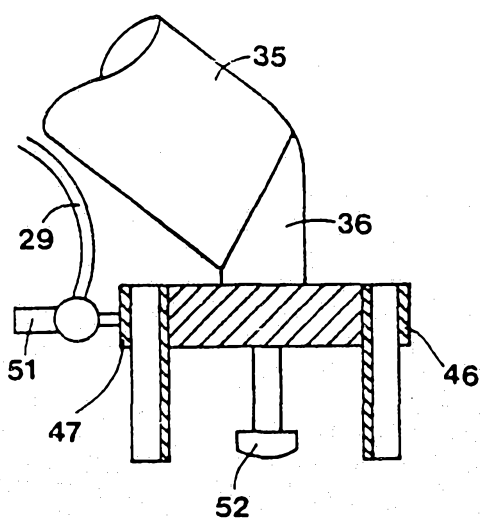
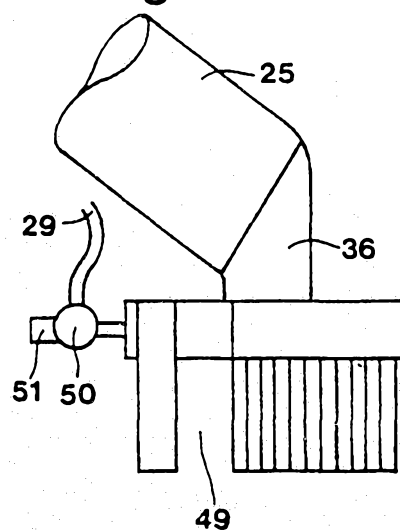
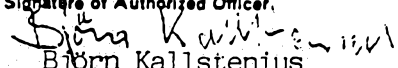


Fig.5



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE86/00377

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC 4		
A 47 L 11/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC 4	A 47 L 5/36, /38, 7/00, 11/00, /20, /29, /30, /38	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁸		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, A, 1 454 381 (J M STEPP) 8 May 1923	1,2
Y	US, A, 993 694 (F D LARSON) 30 May 1911	3
Y	FR, A, 1 602 828 (HOOVER LIMITED) 1 February 1971 & US, 3520012 GB, 1262357	3
* Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "A" document member of the same patent family		
IV. CERTIFICATION		
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International Searching Authority	Signature of Authorized Officer.	
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