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(54) Mini sucking battery motorbrush.

(57) The mini sucking battery motor-brush comprises a hollow framework (22), with wheels (11) and steering-drive handle (1), housing an electric duster (7) actuated by a series of batteries (6) and a closed extractable dust container (25).On the outside front of the framework (22) there is a movable block (18) on a supporting pin (19).

Bolts (12) hold two counter-revolving adjustable brushes (9) in horizontal and vertical sense actuated by two motor reducers (8).

An inclined and articulated shoot (26-32) is attached in two parts, the second one (32) being secured by bolts (34) to the first articulated part (26), so that pivoting it continuously skims the floor (24) (or the ground) surface following any depressions, causing the rubbish and dust to be picked and thrown into the closed container (25).

The electric duster (7) is lodged in the framework (22) and is connected to a vertical suction conduit (39) inserted in the framework (22).

At the end of the cleaning operation said container (25) can be extracted from the framework (22) and emptied.

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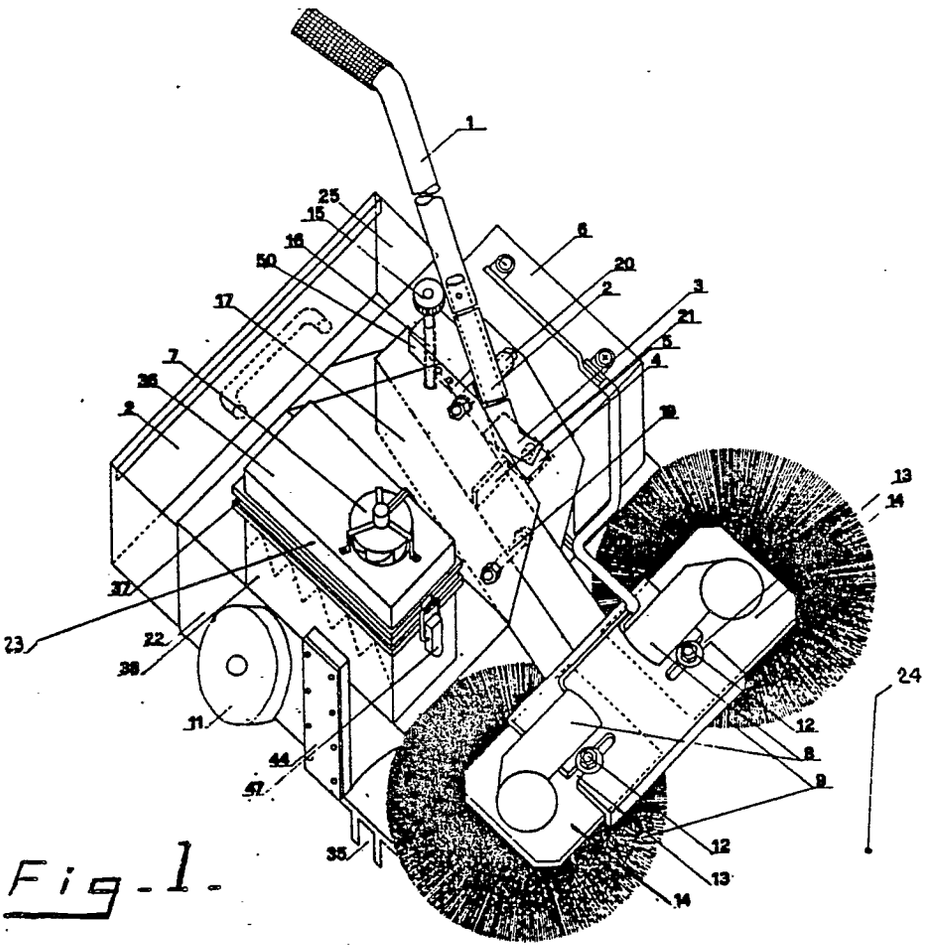
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Fig-1-

A mini sucking battery motors-brush.

The invention relates to a sucking battery motor-brush for cleaning places and simularly acting sweeping machines, comprising a hollow framework with wheels and steering-drive handle, lodging an electric duster actuated by a series of batteries and a closed extractable dust container. Sucking motor-brush machines allow cleaning anywhere without the use of hand brushes, besoms, dust-bins and vacuum cleaners.

The already existing sucking motor-brushes in which a single big mechanical central brush is made of flexible material, can clean only the centres of the floor or ground.

Considerable power absorption and strong stress has to be borne by the above mentioned single big central brush which causes it immediate distortion and damage.

Additionally it is difficult to collect the litter and dust in the corners of rooms and to replace the consumed central brush.

A great variety of apparatus and machines for cleaning places and premises (for example bars, restaurants, factories canteens, supermarkets, stores, motorway restaurants-grills, motels, churches, banks, warehouses etc.) have been proposed for mechanically removing and collecting litter and dust and conveying them into a single unremovable box.

Also the traditional sweeping machines with a single central brush and the electric vacuum dusters present many operating difficulties.

The electric dusters, particularly, powered by noisy electrical motors with hindering wires, cannot collect bulky litter such as tins, papers, broken pieces, cigarette-ends and so on.

The invention - as claimed - is intended to remedy these drawbacks and solves the problem of how to engineer and make available a particular solution of a mini sucking battery motor-brush.

The mini sucking motor-brush works anywhere with the following advantages:

1) It is engineered with a new system which has reduced the framework body for cleaning even in very narrow places.

2) It can work under furniture (bookcases etc.) and collects everything, from dust to the bigger litter such as tins, papers etc.

3) It has no electrical wires, because it works with accumulator batteries. Being quite silent and raising no dust it can be used in the presence of people and furthermore it works with low-voltage current.

The building structure and the functional peculiarities of the above invention will be better explained and shown in the following detailed specification which is illustrated in the enclosed drawing sheets, where a particular building solution is shown, this being just an example, without limiting it.

Fig. 1 of the sheet 1 is a perspective view of the invention from the top right with the structure of the motor-brush and the placing of its components.

Fig. 2 of the sheet 2 shows the two bolts-adjusters movable along the slot by means of two supports which hold the two motor-reducers where the brushes are assembled in a position touching themselves.

Fig. 3 of the sheet 2 shows the whole movable brush-holder blok, where two other supports are rivetted.

Fig. 4 of the sheet 3 shows the framework of the motor-brush, the extractable container, the shoot and all the necessary parts for the intake.

The figures show a mini sucking battery motor-brush and similarly acting machines essentially comprising a hollow framework 22, provided with wheels 11 and steering-drive handle 1, housing an electric duster 7 and an extractable closed dust container 25.

The handle 1 turns by means of a ball joint 2 is connected to the lever 3 which going into the slot 4 automatically acts the electric circuit with a switcher 5 passing power from the battery of the accumulators 6 to the electric duster 7 and to the motor reducers 8 which permits the two rotating brushes 9 to work.

These brushes, formed by a plurality of radial flexible filaments, are counter-revolving from the inner to the outside side, stretch out the framework 10 and of the wheels 11 so collecting litter and dust in the centre and in the corners of the room floor 24 (either in the right or in the left) converging it to the centre.

When the brushes 9 are consumed they have to be adjusted by the two bolts 12 setting brushes 9 closer to each other and then putting them down. The two bolt-adjusters 12 must be loosened allowing to run along the slots 13 the two supports 14 which hold the two motor reducers 8 where the brushes 9 are assembled, until they are closer to the centre and touch themselves as is shown in the Fig. 2 of sheet 2.

Then it must put down to the ground the two brushes 9 on the consumed side; it is necessary to turn from left to right the steering wheel 15 which will allow the threaded bar 16 to turn, thus reducing pressure on the rod 17 which is part of the movable block 18.

This block 18 is hinged on the pin 19 and the whole weight of motor-reducers 8 and of supports

16 loads on the brushes 9.

The handle 1 is joined to the pin 20 pressing on the plate 21 and the movable block brush holder 18 is fixed to this plate 21 by a pin 19.

The handle 1 is provided with a lever 3, that taking it place in the slot 4 activates the switcher 5 which stops the electric duster 7 or motor-reducers 8.

The supports 14 hold two motor-reducers 8 which permit the brushes 9 to turn to the opposite direction making pressure on the small plate 21 and allowing it turn on the pin 20, of Fig. 1 -sheet 1, through the hole 23, of Fig. 3 - sheet 2, that allows the lowering and rising of the movable brush-holder block 18.

The framework 22 runs on the floor 24 on two wheels 11, of Fig. 1 - sheet 1, which are diametrically opposed to each other; it is positioned into the holes 27, of Fig. 4 - sheet 3, by the roll 28 located between the two supports 29, which turns on the pin 30.

In the framework 22 two holes 31 are visible where there is a pin 19, of Fig. 1 - sheet 1, which supports the whole movable brush-holder block 18. When the two brushes 9, assembled on the movable brush holder block 18, of Fig. 3 - sheet 2, are in working position they collect the rubbish either on the left or the right side of the floor 24, because they turn in opposite directions (counter-revolving) towards the centre and, adhering partially to the floor 24 and to the shoot 26 and 32, of Fig. 4 - sheet 3, they carry the rubbish into the closed container 25.

The shoot 26 and 32, important element of the motor brush, is made up of two parts:the first 26 is supported by two holes 29, by the pin 30 and by two fixed supports 33 of the framework 22; the second 32, which is consumable, is rivetted on the ball joint part 26 by three bolts 34.

The consumable part 32, which adheres to the floor 24, has been built with a wide flat surface, for these reasons:

1) To obtain many hours of work before its replacement;

2) To avoid it getting into holes which may be found on the floor 24 surface;

3) To skim the floor surface making easy to pick-up litter and dust, by means of its inclined flat surface 32, thrawing them into the proper closed container 25.

The shoot 26 - 32 is an inclined and articulated plane which adheres to the floor 24 even in the small depressions and reliefs and allowing the two brushes 9 to collect the rubbish, to lift and throw it into the closed container 25.

The electric duster 7 is connected to the vertical suction conduit 39 through the slot 40.

The conduit 39 is closed by a hermetic cover seal 44 and continues horizontally with the duct 41 which is joined to the conduct 42.

The conduct 42 has an opening 46, a floodgate 45 and is subdivided in two air intakes 35 and 35.

The conduct 42 is a rubber-made part, fixed by screws to the part located under the framework 22 and is connected (like the Fig. 1 - sheet 1 shows) to the vertical suction conduit 39 set on the framework 22.

The conduct 42, made of rubber or other flexible material thus obtaining the two flexible tongues 43, avoids their breakage when skimming the floor 24 surface. The above conduct 42 - which carries the duct 41 with the two intakes 35 and 35 - may be obtained directly on the framework 22, by pressing or fusion systems, creating two tongues 43 with rubber strips fixed by screws to the air intakes 35 and 35. The working of the mini sucking battery motor-brush is briefly specified as follows. To move and operate it is sufficient just to grip the handle 1, turn it by the ball joint 2 a quarter of turn from right to left setting the lever 3 free from the slot 4 which automatically turns on the switcher 5 passing power from the battery accumulators 6 to the electric duster 7 and to the motor reducers 8 which will allow the two brushes 9 to work . These brushes 9 are counter-revolving from the inner to the outside and stretch out the framework 10 provided with wheels 11 they collect litter and dust in the corners of the room floor 24 either to the right or the left converging them to the centre. After some working time the brushes 9 will be consumed and they must be adjusted by setting them closer to each other and secondly by putting them down.

To obtain this first adjustment the two bolt-adjusters 12 must be loosened allowing to run along the slots 13 the two supports 14 which hold the two motor reducers 8 where the brushes 9 are assembled, until are closer to the centre and touch themselves as is shown in the Fig. 2 of sheet 2.

For the second adjustment it must put down to the ground the two brushes 9 on the consumed side; it is necessary to turn from left to right the steering wheel 15 which will allow the threaded bar 16 to turn, thus reducing pressure on the rod 17 which is part of the movable block 18.

This movement is possible for the movable block 18 hinged on a pin 19 and the whole weight of the motor-reducers 8 and supports 14 is on the brushes 9.

To avoid damage of the brushes 9 pressing on the floor 24 while motor-brush rests it is sufficient to lift up the handle 1 by letting it turn on the pin 20 making pressure on the plate 21; this is fixed to the movable block brush-holder 18 and it will let it turn on the pin 19 and will raise the brushes 9 from the ground 24.

To keep the brushes 9 lifted of the ground 24

the handle 1 must be turned from left to right using the joint 2 and allow the lever 3 to place itself in the slot 4 which is a part of the framework 22. The lever 3, taking place in the slot 4, acts in the meantime the switcher 5 which will stop either the electric duster 7 or the motor-reducers 8.

The whole movable brush-holder block 18 is a movable support where two other supports 14 are rivetted; these ones hold two motor-reducers 8 which permit the brushes 9 to turn in the opposite direction and makes pressure on the small plate 21 and lets it turn on the pin through the hole 23, that allows lowering and raising of the movable brush-holder block 18.

The framework 22 runs on the floor 24 on two wheels 11 which are diametrically opposed to each other; it is positioned into the holes 27 by the roll 28 located between the two supports 29, which turns on the pin 30. The framework 22 is provided with two holes 31 where there is a pin 19 supporting the whole movable brush-holder block 18.

When the two brushes 9, assembled on the movable brush-holder block 18, are in working position, they collect the rubbish either on the left or the right side of the floor 24, because they turn in opposite directions (counter-revolving) towards the centre and by adhering partially to the floor 24 and to the shoot 26-32 they carry the rubbish into the closed container 25.

Where the mini sucking battery motor-brush is working, the consumable part 32 of the shoot 26-32 adheres to the floor 24 by virtue of its wide flat surface.

The inclined and articulated shoot 26-32 skims the surface of the floor 24 even in small depressions and reliefs and allows the two brushes 9 to collect the rubbish, to lift and to throw it into the closed container 25. The brushes 9, when working, carry to the centre of the floor 24 rubbish and dust, but - fails to let them totally pass into the container 25 - leaving in the centre of the floor a thin strip of fine dust and dust in the air, outside the two opposite air intake openings 35 and 35.

The above lower part 38 is connected to the suction conduit 39 through the slot 40.

The electric duster fan 7 creates vacuum in the framework 36 by intaking clean air through the filter 37, depositing the dust in the lower part 38.

The electric duster fan 7 sucks the dust strip left on the floor 24 by brushes 9 after the shoot 26-32 and sucks up the fine dust lifted by the two brushes 9 outside the machine through the two air intake openings 35 and 35.

When the lower part of the filter 38 is full of dust, it is necessary to thraw the floodgate 45. Doing this the dust falls down through the opening 46 into the container 25 together with the rubbish and dust collected by the brushes 9.

After some time of use the filter 37 must be cleaned.

To do this, it is sufficient to release the hooks 47 which are diametrically opposed to each other and lift the box 36 making it possible to take out the filter 37 and shake it.

The slot 4 in the framework 22 lets pass the lever 3 to put the switcher 5 on.

The holes 48 are provided for the three screws which secure the switcher 5.

The four holes 49 are for the screws which fix the small block 50.

To execute the whole sweeping operation in small places obstructed by objects (for example tables, chairs, shelvings, book-shelfs etc.) it is requested to assemble two brushes 9 towards the front of the motor-brush; these brushes 9, due to their position, reach first the corners in front of themselves, on the right and on the left, and their counter revolving rotation sense makes it possible converge the rubbish to the centre of the floor 24.

For most efficient use the brushes 9 must touch themselves at the rubbish to throw it into the closed container 25.

The particular shoot 26-32, planned on the mini sucking battery motor-brush, eliminates the big central brush fitted up all previously known motor-brush machines.

This shoot 26-32 in effect allows to collect dust, small and bulky litters (like papers, cigarette-ends, metal tins, etc.). It reduces the framework 22 size and by consequence the machine needs the minimal power for working.

The shoot 26-32 is a very important and essential element of the invention and may be built in different sizes and applied in many ways without modifying its specified peculiarities.

To obtain a perfect final result and collect the strip of dust left by the shoot 26-32 there is a duct 41 just after the shoot which connects the two air openings 35-35 to the electric duster 7 making it possible to sweep without raising dust. Whatever the invented mini battery motor-brush with all its details built and suited for the job it has to do, it can be assembled on a self-propelled machine with operator.

Here are pointed out briefly the advantages and innovations of the invention for cleaning by motorized brushes in the above mentioned places. It is considered of no aid to show all the possible additions to the invention because they do not modify the system and the essential peculiarities of the new battery powered motor-brush machine.

Claims

1. A mini sucking battery motor-brush, com-

prising a hollow framework (22), with wheels (11) and steering-drive handle (1), housing an electric duster (7) actuated by a series of batteries (6) and a closed extractable dust container (25), on the outside front of the framework (22) being located a movable block (18) on a supporting pin (19), to said block (18) being fixed by bolts (12) two counter-revolving adjustable brushes (9) in horizontal and vertical sense actuated by two motor reducers (8), characterised in that an inclined and articulated shoot (26-32) continuously skims the floor or ground (24) surface following its reliefs allowing rubbish and dust to rise on the shoot (32) and enter into the closed extractable container (25), and in that said electric duster (7) is lodged in the framework (22) and connected to a vertical suction conduit (39) inserted in the framework (22).

2. The mini sucking battery motor-brush, as claimed in 1, characterised in that the inclined and articulated shoot (26-32) is settled in two parts, the first one (26) being articulated and borne by two bored supports (29) by the pin (30) and by two fixed supports (33) of said framework (22), the second one (32) being secured by bolts (34) to the articulated part (26) to pivot so as to skim and follow continuously the floor-ground (24) making it easy for rubbish and dust to rise and enter into the closed extractable dust container (25).

3. The mini sucking battery motor-brush, as claimed in 1, characterised in that the electric duster (7) with filter (37) is lodged in the framework (22) creating vacuum inside and sucking the outside dusty air from the air intake openings (35-35) and in the meantime the rubbish left down in the outside side (38) under the filter (37) converging all litter into the rigid vertical suction conduit (39), then in the connected horizontal flexible ducts (41-42) and into the closed extractable dust container (25).

4. The mini sucking battery motor-brush, as claimed in 1, characterised in that the two brushes (9) are formed by a plurality of radial flexible filaments and are borne by the movable block (18) and fixed by means of two bolts (12) to the supports (14) into the holes (13) for the adjustment of the brushes (9) putting them near or removing them in the horizontal sense and by that a rod (17) part of the block (18) is in close contact with the threaded har (16) provided with turnable steering wheel (15) solidly fitted up the bar (16) for the adjustment of the brushes (9) hightening or lowering them in vertical sense.

5. The mini sucking battery motor-brush, as claimed in 1, characterised in that the steering-drive handle (1) is settled by a bar with turnable handle (1) throughout the ball joint (2), working on a lever (3) releasing or grafting it into the slot (4) that automatically acts the switcher (5) leaving free pass or breaking off the low-voltage current of the batteries (6) to the electric duster (7) and to the motor-reducers (8) driving the counter-revolving brushes (9) from the inner to the external side.

6. The mini sucking battery motor-brush, as claimed in 1, characterised in that the rigid vertical suction conduit (39) is lodged in the framework (22) or opportunately drawing from the framework (22) surface by means of a deep closed conduct (42) by an hermatic cover seal (44), such conduct (42) being provided with opening (46), floodgate (45) and the suction conduit (39) continuing horizontally with the duct (41) connected to the conduct (42) divided in two air intake openings (35-35), such conduct (42) being made of flexible material fixed by screws to the part located under the framework (22) and connected to the vertical suction conduit (39) set on said framework (22), and in that the conduct (42) is made of rubber or other flexible material forming two pliant tongues (43).

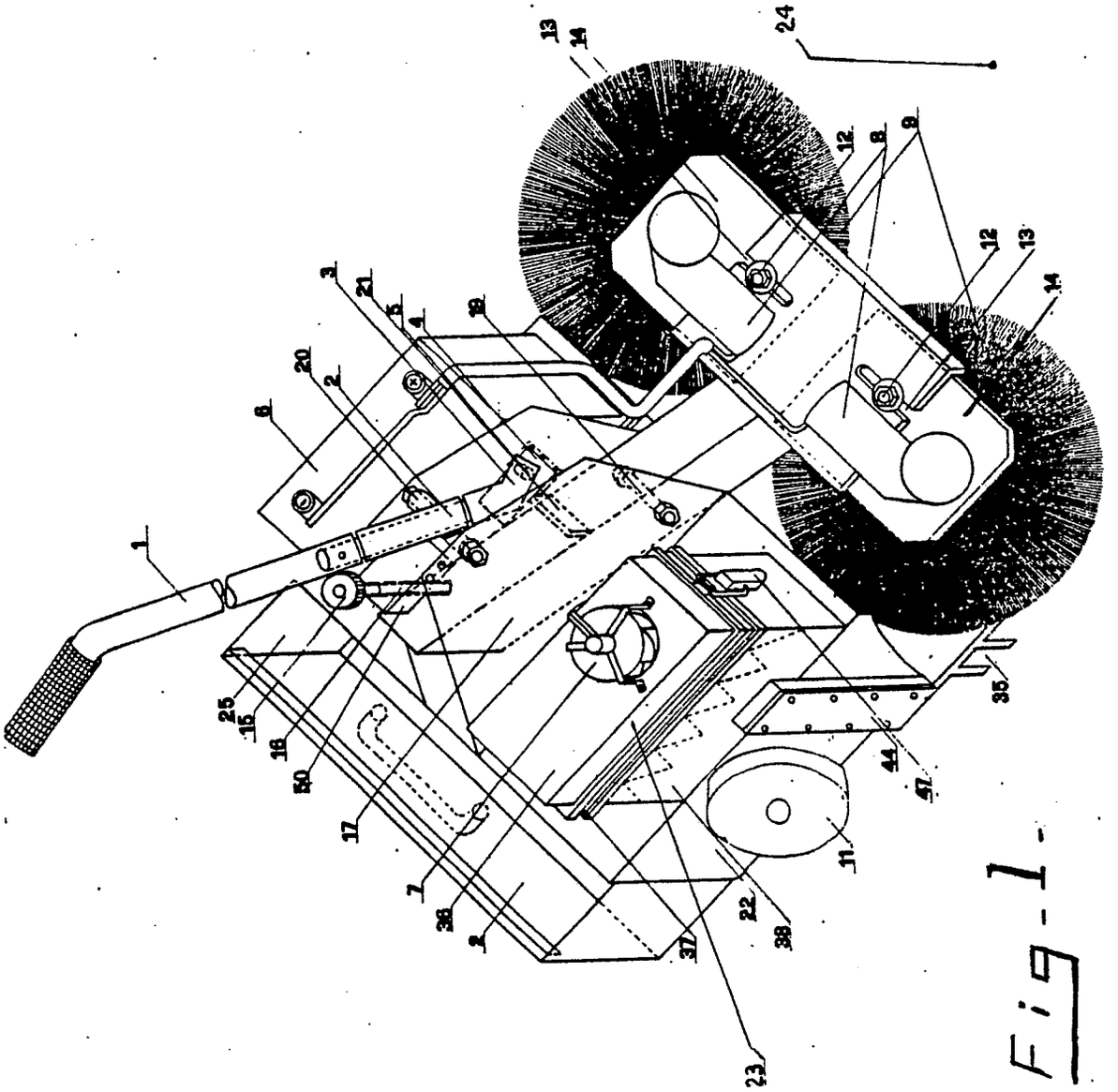
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Fig - 1 -

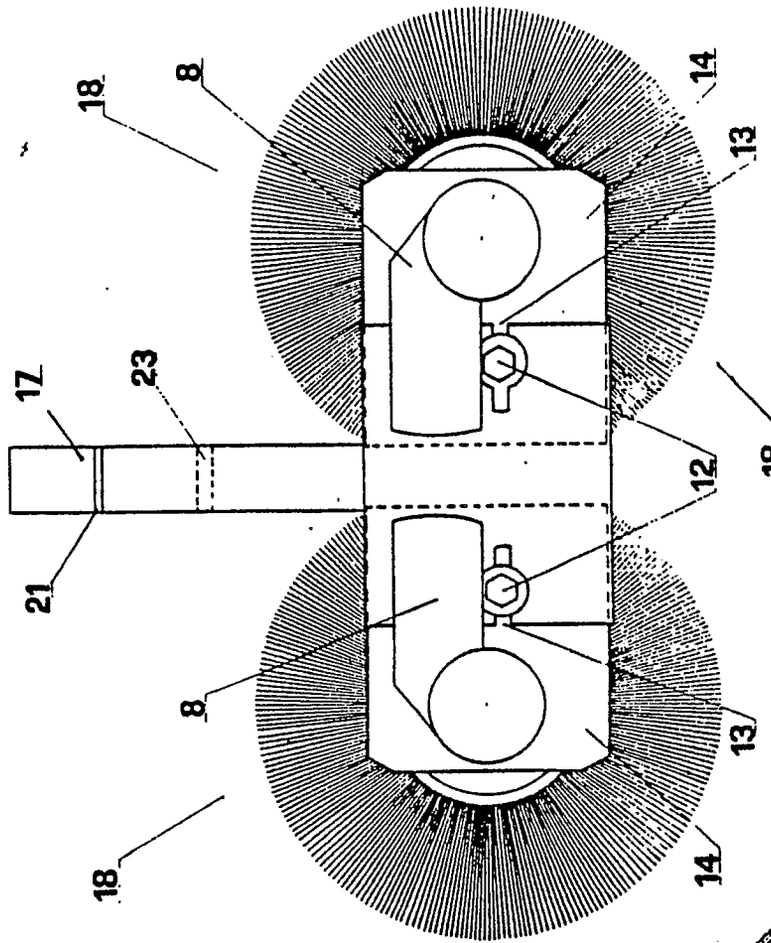

Fig-3-

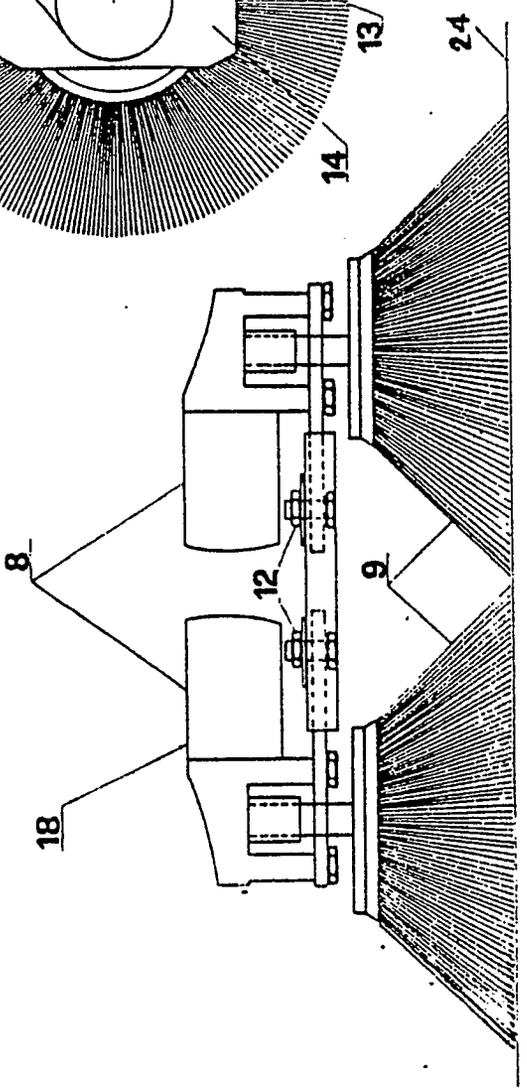

Fig-2-

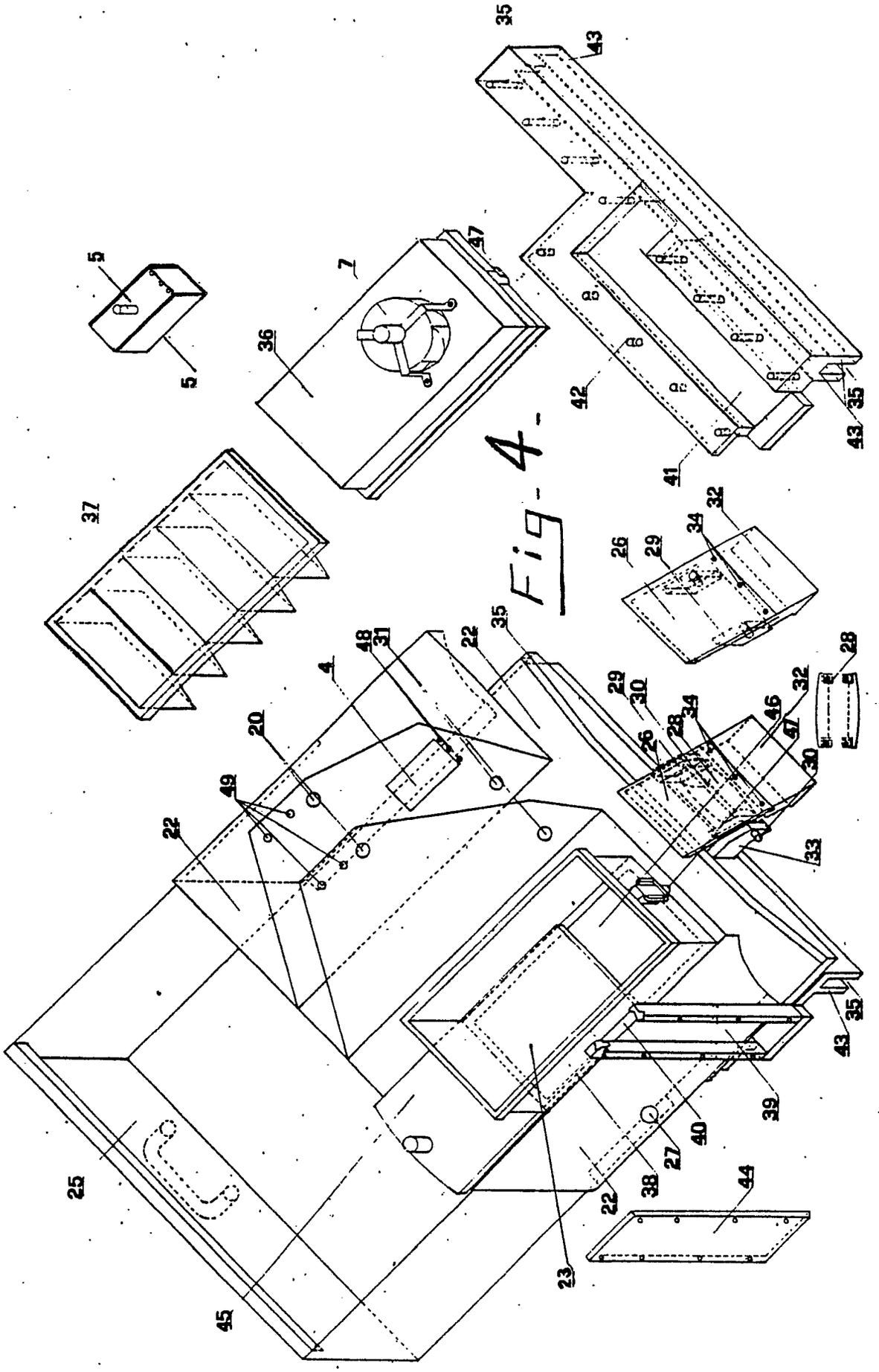

Fig. 4

European Patent Office .

EUROPEAN SEARCH REPORT

Application Number

EP 89 83 0470

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-3 436 788 (S. TAMNY) * Whole document *	1-4	A 47 L 11/24 E 01 H 1/08
A	GB-A-1 097 670 (OKUMARA MFG. CO. LTD) * Whole document *	1,2	
A	GB-A-1 104 300 (OKUMARA MFG CO. LTD) * Whole document *	1,4	
A	GB-A-1 421 076 (H. HAAGA) * Whole document *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 47 L
E 01 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09-02-1990	VANMOL M.A.J.G.

CATEGORY OF CITED DOCUMENTS

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