United States Patent [19]

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[45] **Dec. 4, 1973**

[54] **ROTARY BRUSH**

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[52] **U.S. Cl.** **15/28**

[51] **Int. Cl.** **A46b 13/02**

[58] **Field of Search** ..... 15/4, 28, 29, 49 R, 15/50 R, 93, 97 R, 98, 344; 310/50

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[57] **ABSTRACT**

Portable electromechanical household tool appliance consisting of a box-like casing made of a number of parts of plastics enclosing an electric motor. A driving shaft of the motor emerges from the box-like casing. A plurality of working tools or cleaning members can be removably secured to the device, the cleaning members including a first interchangeable cleaning member provided with brush means and removably mounted on the shaft and a second interchangeable cleaning member provided with a peripheral row of bristles and removably mounted on the casing of the device.

2 Claims, 8 Drawing Figures

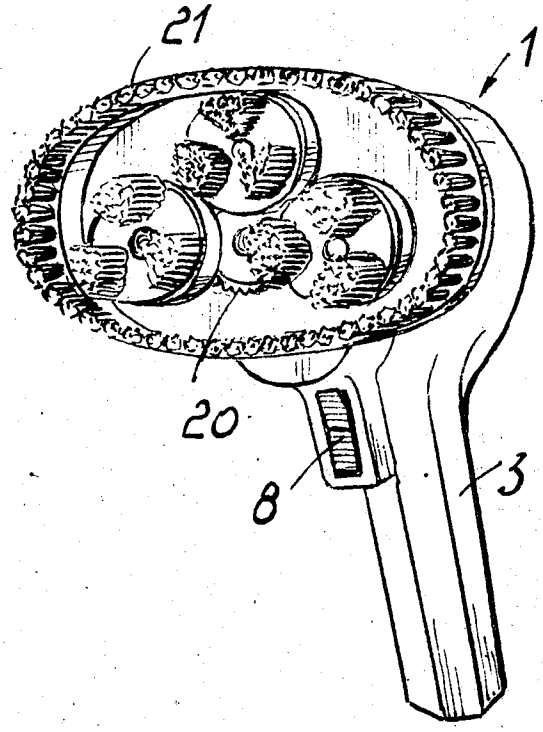


Fig. 1a

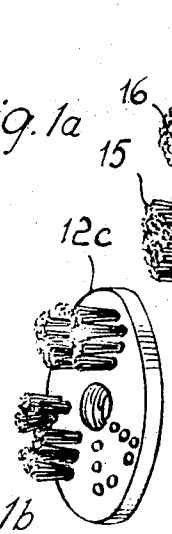


Fig. 1b

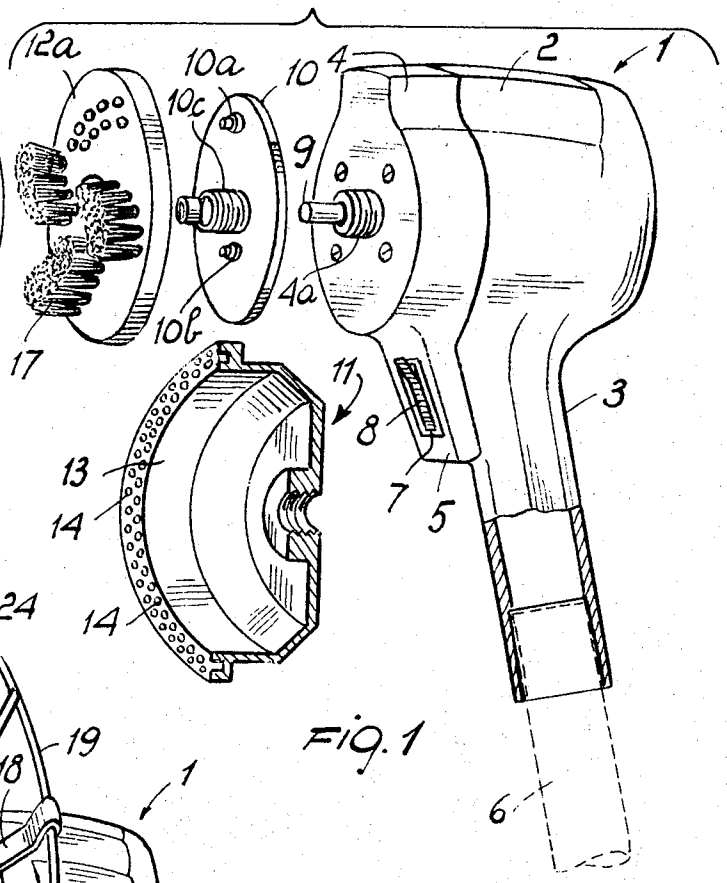


Fig. 1

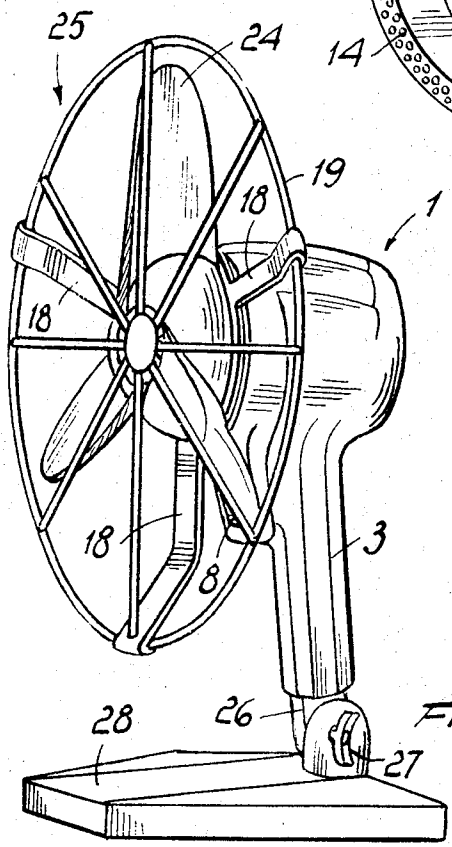


Fig. 6

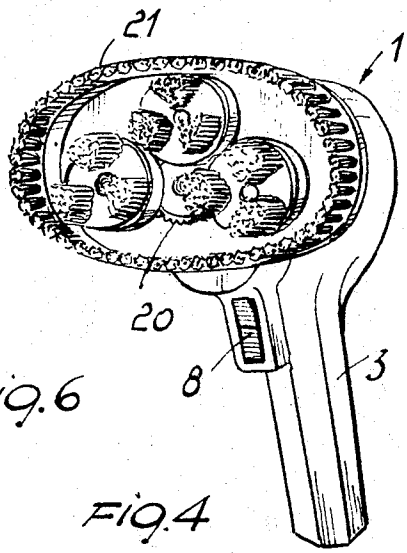


Fig. 4

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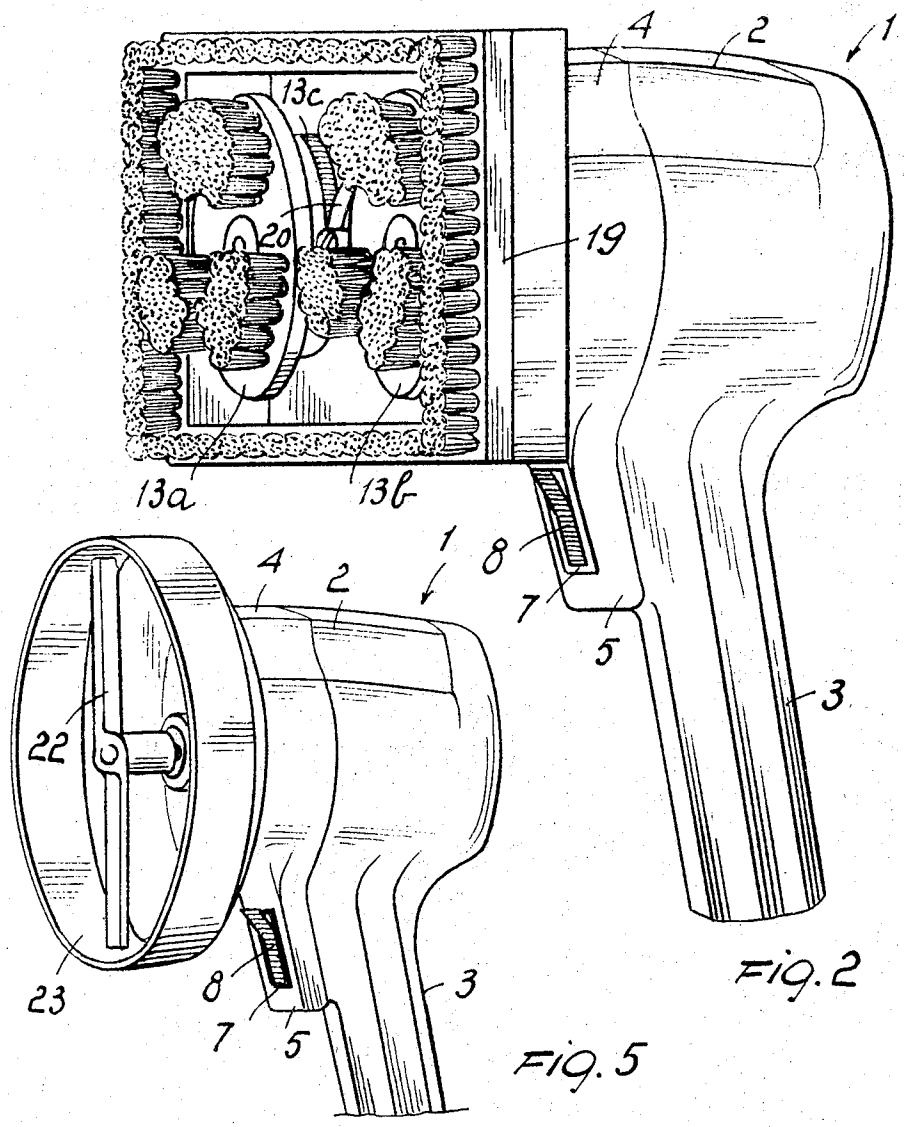


FIG. 2

FIG. 5

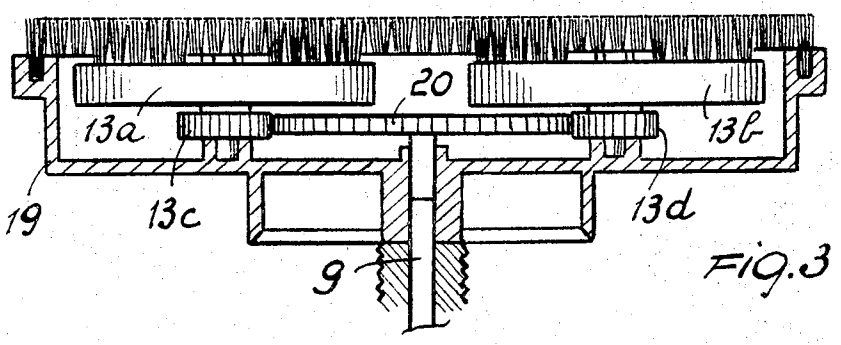


FIG. 3

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ROTARY BRUSH

BACKGROUND OF THE INVENTION

The present invention relates to an electromechanical device particularly useful as a household electrical applicance for cleaning windows, furniture, shutters; shoes and smooth surfaces in general.

In the technical field devices are available with pistol grips comprising essentially an electric motor which can drive a tool such as for example a drill bit, circular saw and the like for carrying out woodwork and metalwork operations.

SUMMARY OF THE INVENTION

The object of the present invention is to effectively resolve the problem of cleaning smooth surfaces such as windows, mirrors, furniture, tiles and the like by providing a household electrical applicance of practical use and reliable operation, and able to reach parts of the object to be cleaned which are not easily accessible.

A further object of the present invention is that said apparatus may also be employed for gardening operations such as grass or hedge cutting, or finishing operations on grass lawns along edges and corners which are not easily accessible to other cutting means.

A further object of the present invention is that said electromechanical device may be employed as a fan for environmental aeration and freshening.

A further object of the present invention is that said electromechanical device may be advantageously employed for dusting and washing operations on shutters and the like.

These and further objects which will be better evident hereinafter are attained by the electromechanical device according to the invention comprising a box-like casing in a number of parts, an electric motor disposed within said box-like casing, means for fixing together the pieces forming said box-like casing, a driving shaft rigid with said motor and emerging from said box-like casing, a plurality of working tools of rotary movement which can be alternatively connected to said driving shaft, means for removably fixing each of said plurality of working tools on to said driving shaft, and gripping and/or resting means formed in said box-like casing for supporting and manipulating said electromechanical device.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will be more evident from the detailed description given hereinafter of some preferred but not exclusive embodiments given by way of example with reference to the accompanying drawings in which:

FIG. 1 is a perspective exploded view of the device according to the invention with cleaning members comprising brushes;

FIG. 1*a* and 1*b* show further cleaning members before mounting on the device;

FIG. 2 is a modification of the device according to the invention;

FIG. 3 is a cross-sectional view through the centre line of the brush mounted on the device of FIG. 2;

FIG. 4 is a modification of the device shown in FIG. 2;

FIG. 5 is a device employed as a cutting device; and

FIG. 6 shows the device employed as a fan.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows a box-like casing or housing 1 of pistol form which houses an electric motor, not shown in the figure. The box-like casing 1 is formed in two pieces, i.e., a central drum 2 which extends downwards in the form of a grip or handle 3 and a front cover 4 which extends downwards on to the grip in the form of an appendix 5. The cover 4 is retained against the central portion 2 by means of screws which engage with the motor body. On the appendix 5 of the cover 4 there is an aperture 7 for housing a pushbutton 8 which operates the switch for starting and stopping the motor. The driving shaft 9 emerges by way of the cover 4 through its externally threaded hollow hub 4*a*, for removable engagement with a working tool. Between the tool and driving shaft 9 a tool support plate 10 is provided for fixing to the free end of the driving shaft 9 by bush and nut or screw coupling. On the body of the tool support plate 10 two or more plugs 10*a* and 10*b* may be provided for snap engagement with correspondingly shaped bores (not shown) provided in one of the brushes 12*a*, 12*b*, 12*c*. Between the plate 10 and cover 4 a bristled cap generally indicated at 11 may be mounted provided with a peripheral border 13 carrying a row of peripheral bristles (not shown in FIG. 1) fixed in holes 14 formed along its peripheral border 13. The bristled cap 11 is fixed to the cover 4 by screwing it by means of the central threaded bore on to the hollow hub 4*a* and serves to give good stability to the apparatus as it ensures a large support area and prevents spraying of liquid by the brushes 12*a*, 12*b* and 12*c* when they carry out washing operations. Each brush 12*a*, 12*b* and 12*c* is formed of a number of bristle groups, 15, 16 and 17 which may be disposed in a spiral manner so as to give rise to a suction action in addition to a brushing action. The brush 12*c* is particularly suitable for massage. The brushes 12*a*, 12*b* and 12*c* each define a first cleaning member, while the cap 11 provided with the bristles defines a second cleaning member.

Advantageously the grip 3 of the box-like casing 1 is provided of tubular form for insertion of elongation members 6 so as to be able to move the device 1 to difficulty accessible points.

In FIG. 2 the bristled cap member 11 is replaced by a bristled member of substantially rectangular form 19 in which are mounted two brushes 13*a* and 13*b* entirely similar to those shown in FIG. 1 in the assembled position.

The bristled member 19 has therefore portions converging into right angles, thereby to allow the bristles of said second cleaning member to reach and clean the corners of the window-panels.

FIG. 3 shows a cross-section through the device of FIG. 2. It can be seen that by way of the bristled member 19, the shaft 9 drives a pinion 20 which meshes with the gears 13*c* and 13*d* rigid with their respective brushes. Consequently during operation the brushes 13*a* and 13*b* are driven in rotation directions and a good cleaning effect is obtained. Because of the presence of the bristles along the periphery of the member 19, as in the case of the member 11 of FIG. 1, a good finish and stability are also obtained.

FIG. 4 is similar to FIGS. 1 and 2 with the exception that the protection member 21 is of elliptical configura-

tion and three rotating brushes are provided within it instead of two. This multiple tool with three brushes is particularly suitable for cleaning large dimensional surfaces.

FIG. **5** shows that the device described may be adapted for being used as a mower-cutter device, comprising a blade **22** mounted directly on the driving shaft and a protective member **23** fixed directly on to said box-like casing **1** and of substantially truncated conical form.

Finally FIG. **6** shows the device adapted for being used as a fan **24** with a protective mask **25** consisting of support members **18** fixed to the box-like casing **1** and snap connected to the peripheral member **19.** The lower end of the grip **3** is connected to a knuckle **27** rigid with a base **28** by way of a dovetail **26.**

Operation of the device according to the invention is as follows. Tools suitable for the type of operation to be carried out are mounted together with their accessories.

The second cleaning member **11** or **19** is mounted first by screwing it on to the hub **4***a*. The first cleaning member is then directly fixed on to the free end of the driving shaft **9** emerging from the threaded hub **4**a. The grip may be fixed to a base, held in the hand or provided with an extension according to requirements.

The working motion starts after pushing the switch **8,** having previously connected the motor electrically to the mains by means of a normal plug.

As it appears from the foregoing description, the hub **4***a* is rigid with the cover member **4.**

Advantageously these members, as well as the drum member of the casing **1** and the discs **10, 12***a*, **12***b*, **12***c* and the cap **11** are made of plastics material. In the preferred embodiment the tool support plate **10** has an externally threaded hollow hub member **10***c* in the cavity of which a conical-longitudinally partially split clamping bush of known type is arranged to cooperate with a tightening screw for clamping therethrough the plate or disc **10** on the shaft **9.** In the preferred embodiment the supporting discs of the brushes **12***a,b,c* have a central internally threaded hole, which, when the brush is mounted, is screwed on the hub **10***c* of the disc **10** and safely fixed thereon without the need of the plugs **10***a* and **10***b* which are omitted.

Advantageously the right hand or left hand screw threads are selected depending on the direction of rotation of the shaft **9** in order to obtain a tightening of the screw engagements during operation.

The invention so conceived is susceptible to numerous modifications all falling within the scope of the inventive idea.

Various other types of rotating tools may be mounted on the driving shaft **9** without leaving the scope of the present invention.

I claim:

1. A cleaning device in form of a brush, particularly for cleaning window-panes, comprising

a housing having a handle extending therefrom;

a motor mounted within said housing and having a shaft extending out of said housing;

at least a first cleaning member including a disc member and brush means mounted thereon and extending substantially perpendicular thereto;

a second cleaning member having a peripheral border provided with a row of bristles arranged substantially surrounding said first cleaning member; and

means for removably mounting said first cleaning member on said shaft for rotation therewith and said second cleaning member on said housing for being rigid therewith, said means including

an externally threaded hub rigid with said housing and surrounding said shaft for a portion of its length, thereby to have the end portion of said shaft emerging from said externally threaded hub;

a central threaded bore in said second cleaning member for screwing said second cleaning member on said externally threaded hub;

and means for removably securing said first cleaning member on said end of said shaft emerging from said externally threaded hub.

2. A cleaning device as claimed in claim **1,** wherein said peripheral border of said second cleaning member provided with said row of bristles has portions converging into substantially right angles, thereby to allow the bristles of said second cleaning member to reach and clean the corners of the window-panes.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,775,800 Dated December 4, 1973

Inventor(s) Marco Antonio VENEZIANI

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the title page, after the line identifying the application number, insert the following:

/30/ Foreign Application Priority Data
December 24, 1970 Italy.....33532A/70

Signed and sealed this 24th day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents