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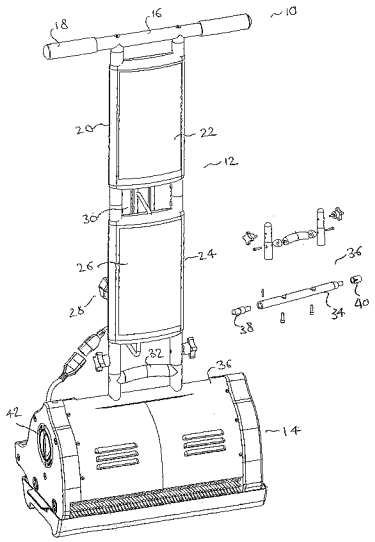
(54) Title: FLOOR CLEANING APPARATUS



(57) Abstract: A carpet cleaning apparatus comprising a handle assembly pivotable about a base unit. The base unit has a motor to drive at least two counter-rotating cylindrical brushes. The motor includes a switch to cut-off power to the motor when the handle assembly is pivoted beyond a pre-determined angle relative to the base unit, and the unit having locking means to lock the handle assembly in a pre-determined position relative to the base unit.

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FLOOR CLEANING APPARATUS

The present invention relates to floor cleaning apparatus and more especially to an industrial carpet cleaning apparatus.

Floor cleaning machines that include two counter-rotating cylindrical brushes are known. Such machines can be used to clean carpets using cleaning products whereby the rotation of the brushes acts to massage the cleaning products into the carpet. The left-over cleaning agent is then vacuumed from the carpet.

The present invention seeks to provide an improved apparatus with a more efficient drive system and a number of safety features.

Accordingly, in one aspect there is provided a cleaning apparatus comprising a handle assembly pivotable about a base unit, the base unit having a motor to drive at least two counter-rotating cylindrical brushes, the motor including a switch to cut-off power to the motor when the handle assembly is pivoted beyond a pre-determined angle relative to the base unit.

According to a second aspect there is provided a cleaning apparatus comprising a handle assembly pivotable about a base unit, the base unit having a motor to drive at least two counter-rotating cylindrical brushes, and locking means to lock the handle assembly in a pre-determined position relative to the base unit.

One embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which :

Figure 1 is a front perspective view of a floor cleaning apparatus constructed in accordance with the present invention;

Figure 2 is an exploded schematic diagram of the lower part of a handle assembly of the apparatus of Figure 1;

Figure 3 is perspective views of the apparatus of Figure 1 with the handle assembly tilted in various positions;

Figure 4 is an exploded schematic drawing of a base unit of the apparatus of Figures 1 to 3; and

Figure 5 is a further exploded schematic drawing of the base unit of Figure 4 taken from a different angle.

Referring to Figure 1, a floor cleaning apparatus 10 comprises a handle assembly 12 which is pivotally connected to a base unit 14.

The handle assembly 12 is constructed primarily of a number of tubular frame sections, as will now be described.

The handle assembly 12 comprises a top cross bar 16, which in use is held by a user to move and direct the apparatus. Hand grips 18 are provided at each end of the cross-bar 16 to aid use of the apparatus.

The top cross bar 16 is connected to an upper frame 20. An upper panel 22 is secured to the upper frame 20 which is capable of carrying a label or other advertising indicia.

The upper frame 20 is connected to a lower frame 24 to which a lower panel 26 is secured, for the same purpose as the upper panel 22.

The lower frame 24 has a cable holder 28 attached thereto to allow a cable 30 to be easily and efficiently held and stored against the back of

the frame 20, 24, possibly during use and while the apparatus is not in use.

The ends of the lower frame 24 are connected to a solid bottom cross bar 34 within a housing 36 of the base unit 14. The bottom cross bar 34 is shown in Figure 2. The bottom cross bar 34 includes a handle 32 for carrying the apparatus 10 to another area.

The bottom cross bar 34 is generally cylindrical and receives, at one end, a locking shaft 38 and, at the other end, a micro switch bush 40.

The locking shaft 38 provides a means to lock the handle assembly 12 in a vertical position during use. This can be seen in Figure 3a. A manual switch 42 is formed within a side wall of the housing 36 which can be turned to lift a locking pin (not shown) into a groove formed in the locking shaft 38 to lock the handle assembly 12 in a vertical position.

When the manual switch 42 is turned to an unlocked position, the handle assembly 12 is able to pivot relative to the bottom cross bar 34 to a generally horizontal position in either direction as can be seen in Figures 3b and 3c.

The base unit 14 construction will now be described with reference to Figures 4 and 5. The housing 36 comprises a number of panel sections 44 which interconnect to fit around the main workings of the apparatus. Within the base unit 14 are two elongate cylindrical brushes 46 that rotate around hexagonal shafts 48 (see Figure 5) that extend across the housing 36.

In use, the brushes 46 are counter-rotating to "massage" cleaning products (not shown) into a carpet to which the apparatus is applied. One end of each shaft 48 receives a locking spring 50.

The brushes 46 can be removed horizontally from the housing 36 in order to replace or clean the brushes 46.

For storage, the base unit 14 can be pivoted to such an extent that the brushes 46 face upwardly and the weight of the apparatus 10 is supported by rear wheels. In such a position, the weight of the base unit 14 is not borne by the brushes 46 but rather by the rear wheels.

A motor 52 is located within the housing 36 directly above the brushes 46 to drive the brush shafts 48. A plastic moulded shield 54 is located between the brushes 46 and the motor 52 to shield the motor from cleaning agent residue that is drawn upwards by the brushes 46 during use.

A tray 56 is provided directly underneath the brushes 46 to collect cleaning agent residue.

As can be seen best in Figure 4, the drive system of the apparatus comprises a series of helical gears 58 which provide rotation of the brushes 46 at variable speed.

The motor 52 has a micro switch 60 linked thereto which acts with the micro switch bush 40 on the bottom cross bar 34 to cut-off power to the motor 52 when the handle assembly 12 is tilted beyond a pre-determined angle in either direction.

For example, the power to the motor 52 would be cut-off when as the handle assembly 12 is tilted towards a horizontal position as shown in Figures 3b and 3c.

A printed circuit board 62 controlling all drive electrics of the apparatus is mounted against the motor 52.

The above described embodiments are given by way of example only, and the skilled reader will naturally appreciate that many variations could be made thereto without departing from the scope of the present invention.

CLAIMS

1. Cleaning apparatus comprising a handle assembly pivotable about a base unit, the base unit having a motor to drive at least two counter-rotating cylindrical brushes, the motor including a switch to cut-off power to the motor when the handle assembly is pivoted beyond a pre-determined angle relative to the base unit.

2. Cleaning apparatus comprising a handle assembly pivotable about a base unit, the base unit having a motor to drive at least two counter-rotating cylindrical brushes, and locking means to lock the handle assembly in a pre-determined position relative to the base unit.

3. Cleaning apparatus according to claim 1 or claim 2, wherein the handle assembly is constructed primarily of a number of tubular frame sections.

4. Cleaning apparatus according to claim 3, wherein the handle assembly comprises upper and lower frames and wherein ends of the lower frame are connected to a solid cross bar within a housing of the base unit.

5. Cleaning apparatus according to claim 4, wherein the cross bar receives, at one end, a locking shaft and at the other end, a micro switch bush.

6. Cleaning apparatus according to claim 5, further comprising a manual switch, formed within a side wall of the housing, which can be turned to lift a locking pin into a groove formed in the locking shaft to lock the handle assembly in a vertical position.

7. Cleaning apparatus according to any preceding claim, further comprising a drive system comprising a series of helical gears which provide rotation of the brushes at variable speed.

8. Cleaning apparatus according to one of claims 5 to 7, wherein the motor includes a micro switch linked thereto which acts in conjunction with the micro switch bush on the cross bar to cut-off power to the motor when the handle assembly is tilted beyond a pre-determined angle with respect to the base unit, in either direction.

9. Cleaning apparatus according to any preceding claim, wherein a printed circuit board controlling all drive electrics of the apparatus is mounted against the motor.

10. Cleaning apparatus according to any preceding claim, wherein each cylindrical brush rotates around a hexagonal shaft that extends across the housing.

11. Cleaning apparatus according to claim 10, wherein one end of each shaft receives a locking spring to allow horizontal removal of either or both brushes.

12. Cleaning apparatus according to any preceding claim, wherein the base unit can be pivoted to such an extent that the brushes face upwardly and the weight of the apparatus is supported by rear wheels.

13. Cleaning apparatus according to any preceding claim, further comprising a collection tray located directly beneath the brushes.

14. Cleaning apparatus substantially as hereinbefore described and referred to in the accompanying Figures.

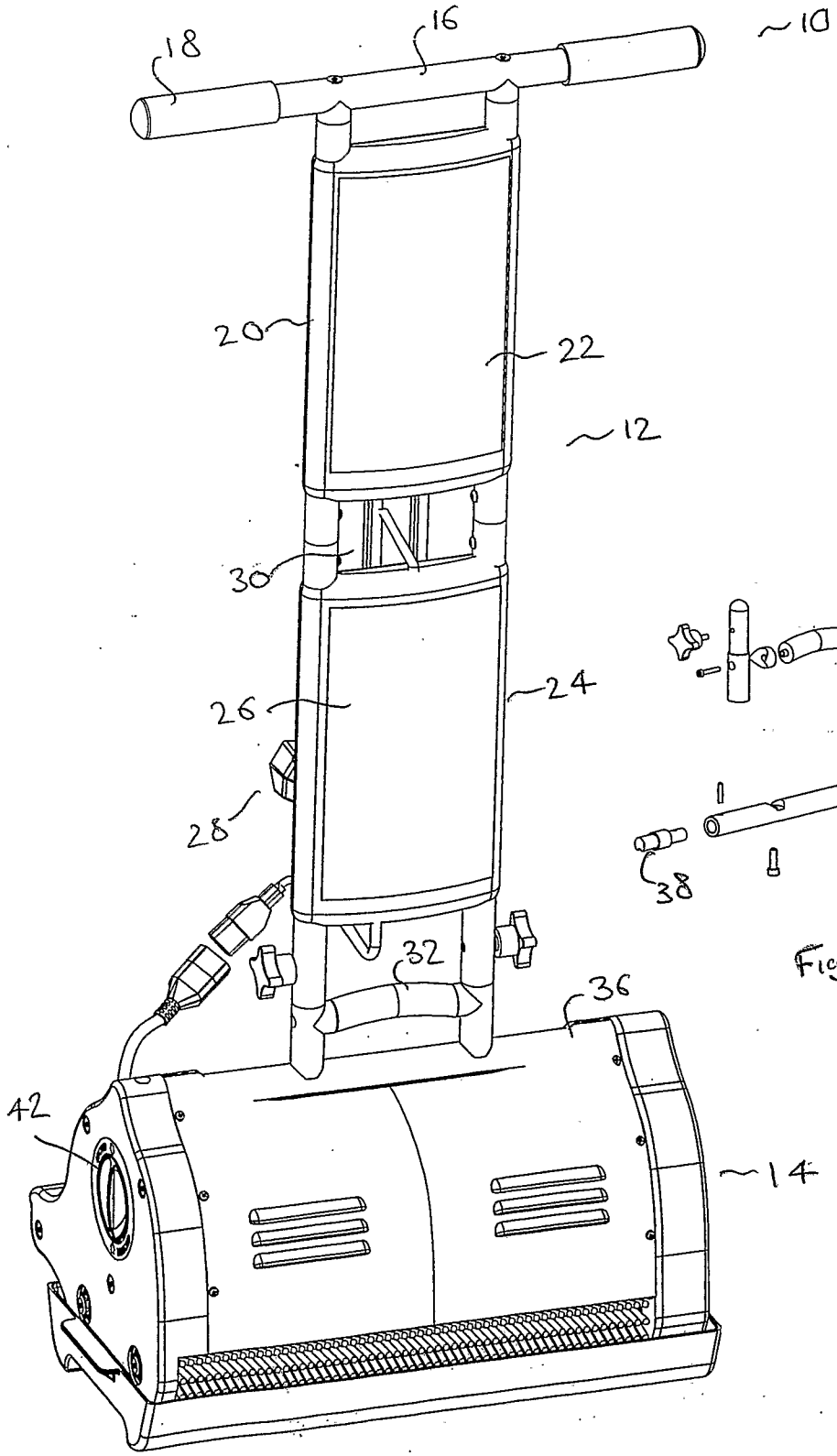

Fig. 1.

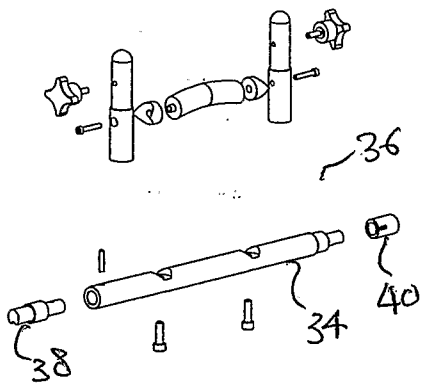

Fig. 2.

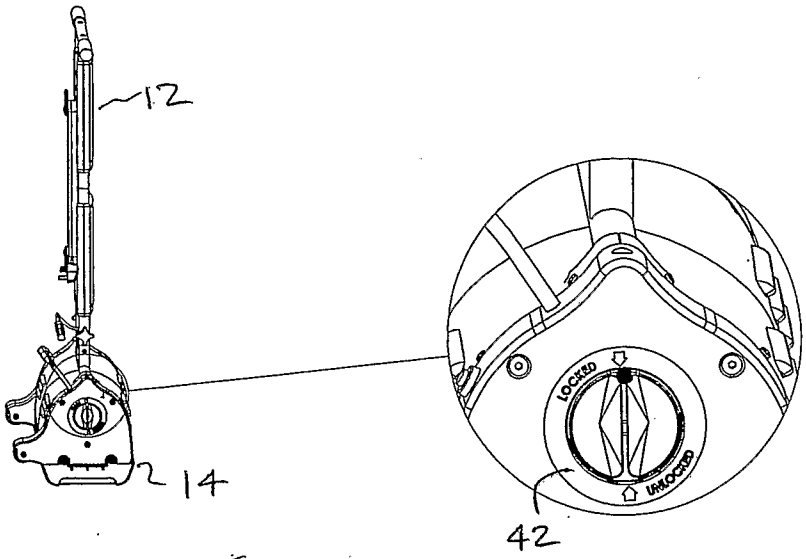

Fig. 3a.

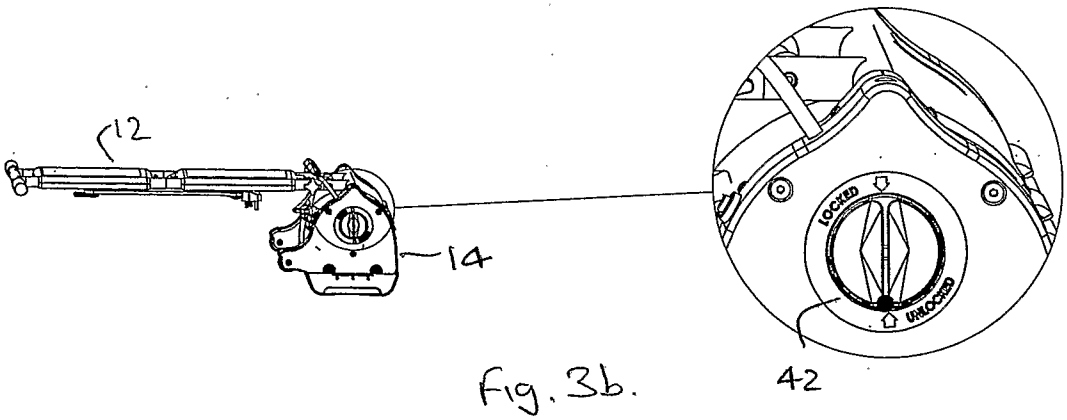

Fig. 3b.

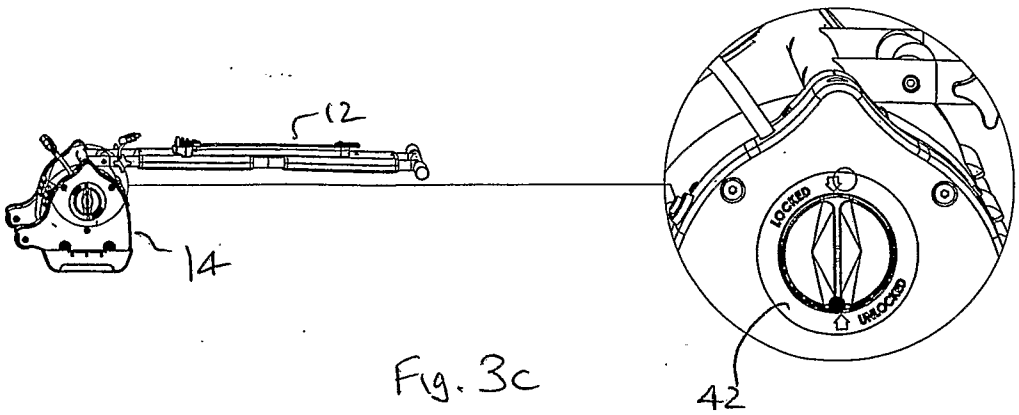

Fig. 3c

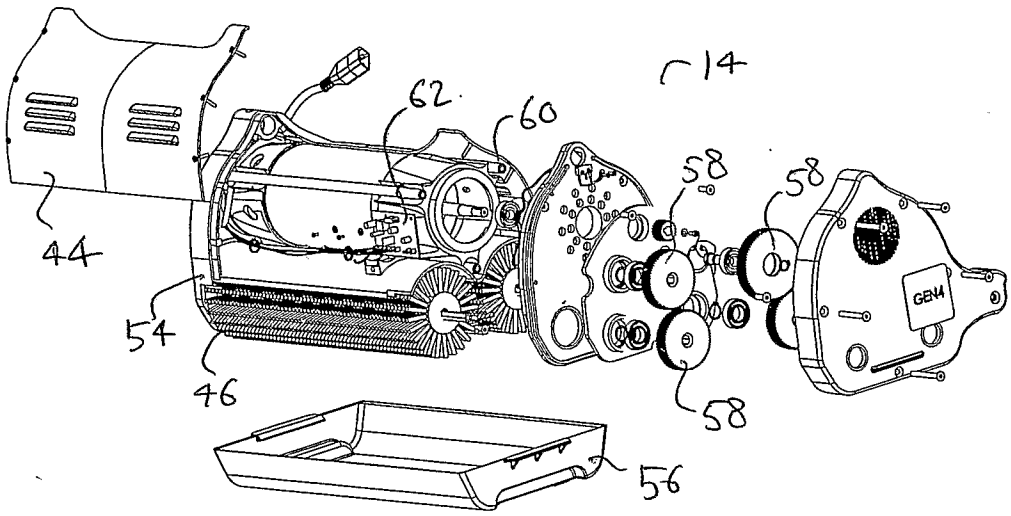

Fig. 4.

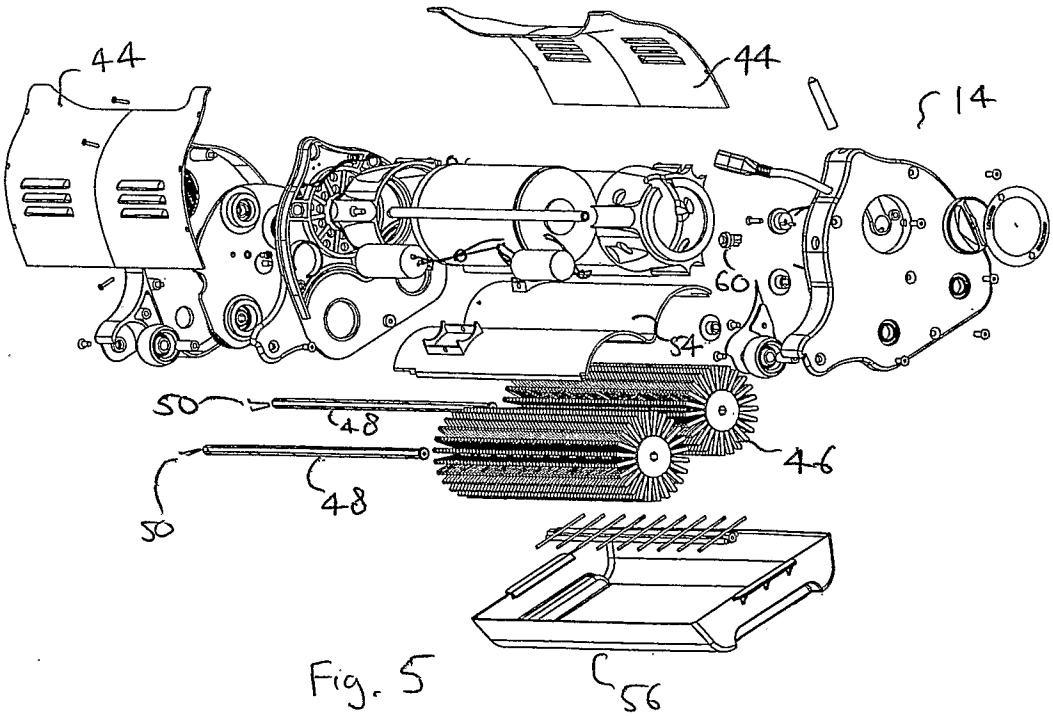

Fig. 5