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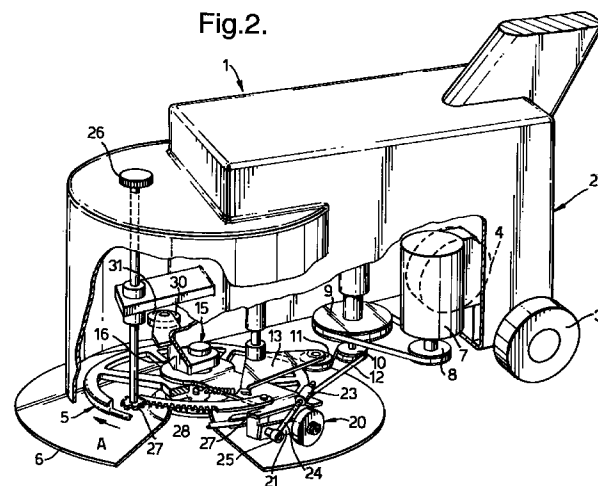
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(54) An apparatus for processing a base with a rotating member

(57) An apparatus (1) for processing a base with the aid of a rotating member (6), such as brushing or rubbing a floor, comprising:

- a frame or chassis (2);
- coupling means (15) disposed on the chassis (2) and for coupling the rotating member to the chassis (2);
- driving means (7-12) displaced in the chassis (2) and for driving the rotating member (6); and
- varying means (20) for varying the magnitude and position of the pressing force of the rotating member (6) relative to the base.



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Description

For scrubbing and for polishing of relatively large floor areas, frequent use is made of apparatus having a rotating member which is provided with a scrubbing or polishing material. Such apparatus exerts an angular momentum to one side on the floor or base, whereby the apparatus tends to deflect sideways from the desired path in a straight ahead direction, because of the reaction forces exerted by the base to the apparatus.

To prevent this, it is possible to dispose the rotating member with a relatively small angle, whereby a forward force to such apparatus also results. This is particularly advantageous if further wheels are not driven and the scrubbing machine has to be pushed by human power. It is also known to suspend the rotating member in a cardanic way and to exercise pressure locally to the rotating member.

The known techniques show a disadvantage, as the operation of the rotating member, e.g. for cleaning purposes, will vary, dependent on the roughness/smoothness of the base. The above solutions are therefore a compromise, especially if the apparatus has to be suited for any scrubbing element as well as for any polishing cloth which show quite a different friction coefficient relative to various bases or floors.

The present invention provides an apparatus for processing a base with the aid of a rotating member, such as for brushing or rubbing the floor, comprising:

- a frame or chassis;
- coupling means disposed on the chassis and for coupling the rotating member to the chassis;
- driving means disposed on the chassis and for driving the rotating member; and
- varying means for varying the magnitude and position

of the pressing force of the rotating member relative to the base.

In a preferred embodiment, the apparatus of the invention comprises varying means for varying only the position of the pressing force relative to the base, whereby the magnitude of the pressing force is kept constant.

The apparatus according to the present invention can be adapted by the varying means to the extent of the roughness of the base and the extent of roughness of the scrubber or polishing element. The user can, as he/she wishes, bias the desired forward force and reduce or increase the angular momentum exerted by the rotating means.

The driving means may use fluid or gaseous medium. In the preferred embodiment, however, the driving means comprise an electric motor and more preferably the apparatus is provided with a rechargeable battery so that wires can be dispensed with while the apparatus is in operation. As discussed above the

apparatus preferably comprises two non-driven rear wheels. The present invention, however, is also of advantage for an apparatus with driven rear wheels, to prevent additional load on the bearings and/or gearing of one or more of the rear wheels.

In a further preferred embodiment the apparatus is provided with a central driven wheel, for reducing the pushing forces.

Further advantages, features and details of the present invention will be clarified by means of the following description of preferred embodiments thereof, with reference to the annexed drawings, in which:

fig. 1 shows a principal diagram of an apparatus according to the present invention;

fig. 2 shows a perspective view partly broken away of the embodiment of fig. 1; and

fig. 3 shows a perspective view of an alternative part

of the embodiment of fig. 2.

An apparatus 1 (fig. 1) comprises a chassis or frame 2, from which two non-driven rear wheels 3, 4 are suspended and a substantially horizontal wheel or disk 5 which is driven in the direction of arrow A. To prevent the disk or wheel 5 damaging a wall W, the apparatus is preferably provided with a frame part 30 projecting beyond the circumference of the disk and on which a freely rotatable wheel 31 is disposed.

The wheel or disk 5 exerts angular momentum relative to the pair of rear wheels in the direction of arrow A to the base, whereby the base exerts angular momentum in the opposite direction to the apparatus, which results in a tendency of a deflection to one side. This can therefore be undesirable especially in the present embodiment where the rear wheels 3, 4 are not driven. To prevent this undesirable momentum, a pressing member 40 is disposed on frame 2, which obviates or reduces the angular momentum and converts it into a force in the forward direction of arrow B, which force also facilitates pushing the apparatus. As the pressing member 40 is displaceable in the direction of the arrows C and D, according to the preferred embodiment of the apparatus according to the present invention, the position of the pressing force is adjustable relative to the disk, whereas the magnitude of the reaction angular momentum exerted by the base to the apparatus and the magnitude of the propelling force are also adjustable. If on e.g. a rough base or floor the pressing member is displaced in the direction of arrow D, the forward force is decreased, while the tearing to the side of the apparatus is reduced to a sufficient extent. When adjusted in the direction of arrow C, the forward force increases and the angular momentum of the base to the apparatus decreases.

The wheel 5, in this embodiment formed by a spoked wheel and a closed diskshaped plate, is driven by a belt or string 12, which is bound around pulleys 10 and 11 and which is driven through a further belt around

pulleys 8 and 9, one of which is driven by an electric motor 7. Pulley 11 is disposed on a pivotable support part 13, and tension spring 14 maintain the tension in belt 12. Preferably the apparatus is provided with a pre-chargeable battery, so that an electric cable can be dispensed with during the operation.

Wheel 5 and disk 6 are attached to the frame by means of a cardanic suspension 15 which is disposed on a suspension frame part 16, whereby wheel 5 and disk 6 are movable in all directions, at least in the pivot direction imposed by pressing member 40.

Pressing wheel 20 is pivotably disposed on a suspension part 22 via arm 21, which suspension part 22 is secured to the cardanic suspension 15. The pressing force of the pressing wheel 20 can be varied by screwing of a counter weight 23 which is provided on a further arm 24 to pivot axis 25. Pressing wheel 20 is in the present embodiment formed by a wear-resistant wheel of plastic material.

The position of the pressing wheel 20 is adjustable along the circle arc of arrows C and D by means of an adjusting knob 26 which can be arrested e.g. in a depressed rest position, and which will displace a toothed rack 28, according to the circle arc through toothed pinion 27, when it is lifted and turned.

In practice the user will primarily adjust the position of the pressing wheel of the disk dependent on the roughness/smoothness of the surface to be scrubbed or polished and dependent on the type of scrub element or polishing element present under the disc, as this biasing can be executed easily from the exterior. Since biasing the magnitude of the pressing force will have to be done in the interior of the apparatus e.g. by screwing and displacing of the counter weight, this type of adjustment is less preferred in actual practice.

In a non shown way, the apparatus is preferably provided with a central driven wheel for driving the apparatus.

It goes without saying that the present invention is not limited to the above described preferred embodiment thereof. The requested rights are primarily defined by the following claims, within the scope of which various modifications are possible.

A variation which is not limited, relates e.g. to the way in which the force exerted by the pressing wheel to the disc is adjusted. As shown in figure 3, this force can also be adjusted through a screw spring 51 which can be adjusted by turning knob 52.

Claims

1. An apparatus for processing a base with the aid of a rotating member, such as brushing or rubbing a floor, comprising:

- a frame or chassis;
- coupling means disposed on the chassis and for coupling the rotating member to the chassis;

- driving means displaced in the chassis and for driving the rotating member; and
- varying means for varying the magnitude and position of the pressing force of the rotating member relative to the base.

2. An apparatus according to claim 1, provided with two or more non-driven rear wheels.

3. An apparatus according to claim 1 or 2, wherein the coupling means comprise cardanic suspension means.

4. An apparatus according to claim 1, 2 or 3, wherein the varying means comprise a pressing wheel of which the position relative to the rotating member is adjustable by adjusting means.

5. An apparatus according to claims 1-4, whereby the adjusting means comprise a toothed rack and pinion.

6. An apparatus according to any of the preceding claims, in which the driving means comprise an electric motor and one or more transmission belts for transmitting the driving force of the electric motor to the rotating member.

7. An apparatus according to any of the preceding claims, provided with a chargeable battery for supplying power to the motor.

8. An apparatus according to any of the preceding claims, provided with a frame part projecting beyond the rotating member and to which a free running roll or wheel is secured.

9. An apparatus according to any of the preceding claims, provided with one or more driven wheels.

10. A method for processing of a floor area, using an apparatus according to any one of claims 1-8.

Fig.1.

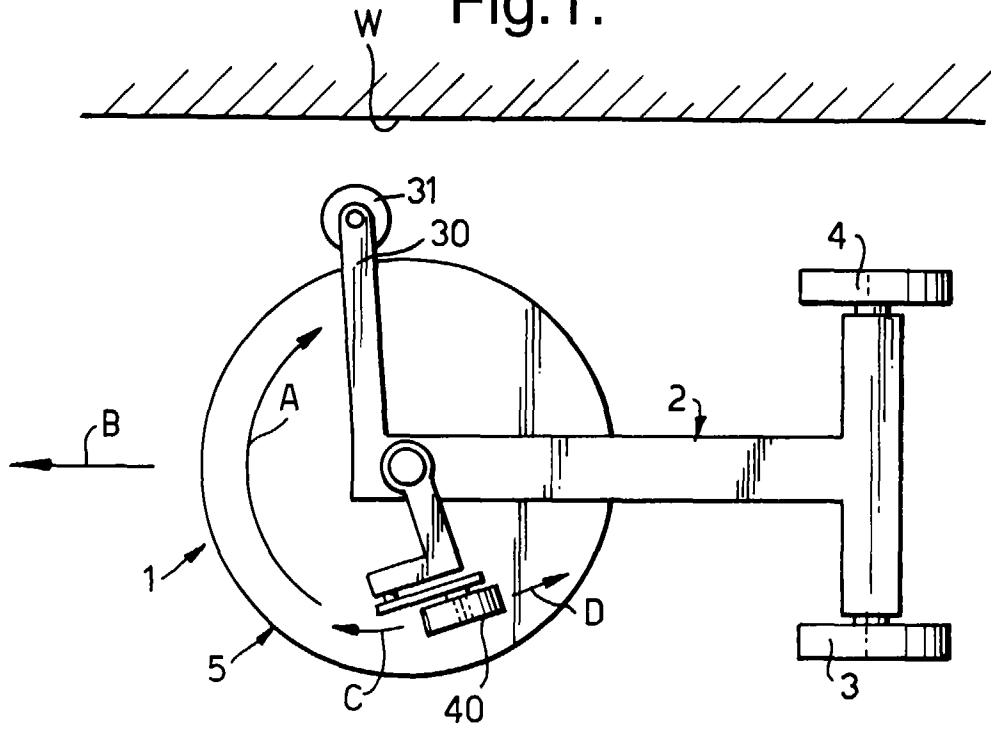
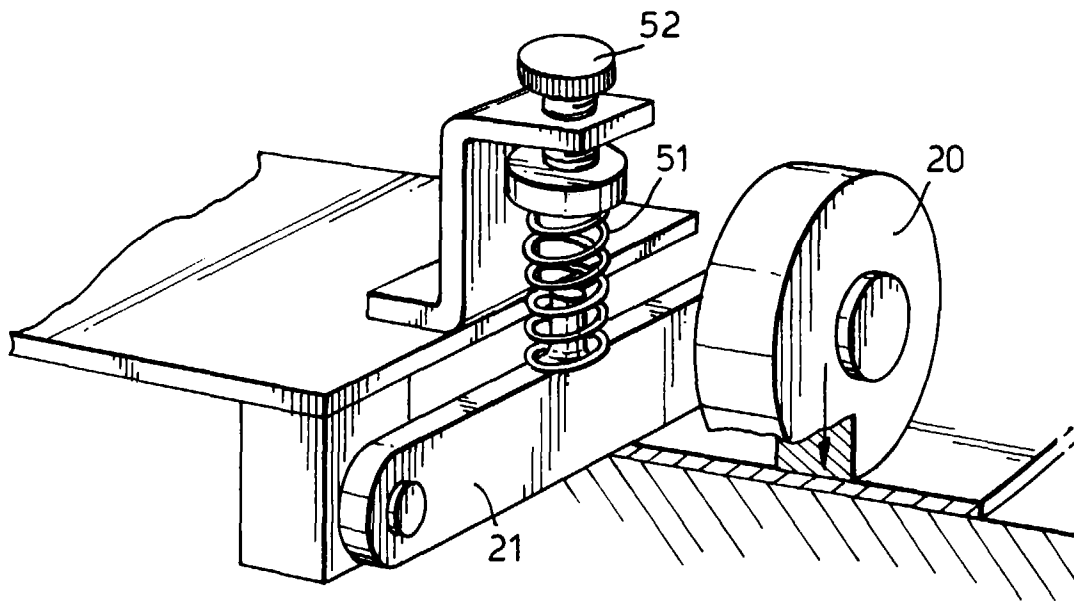
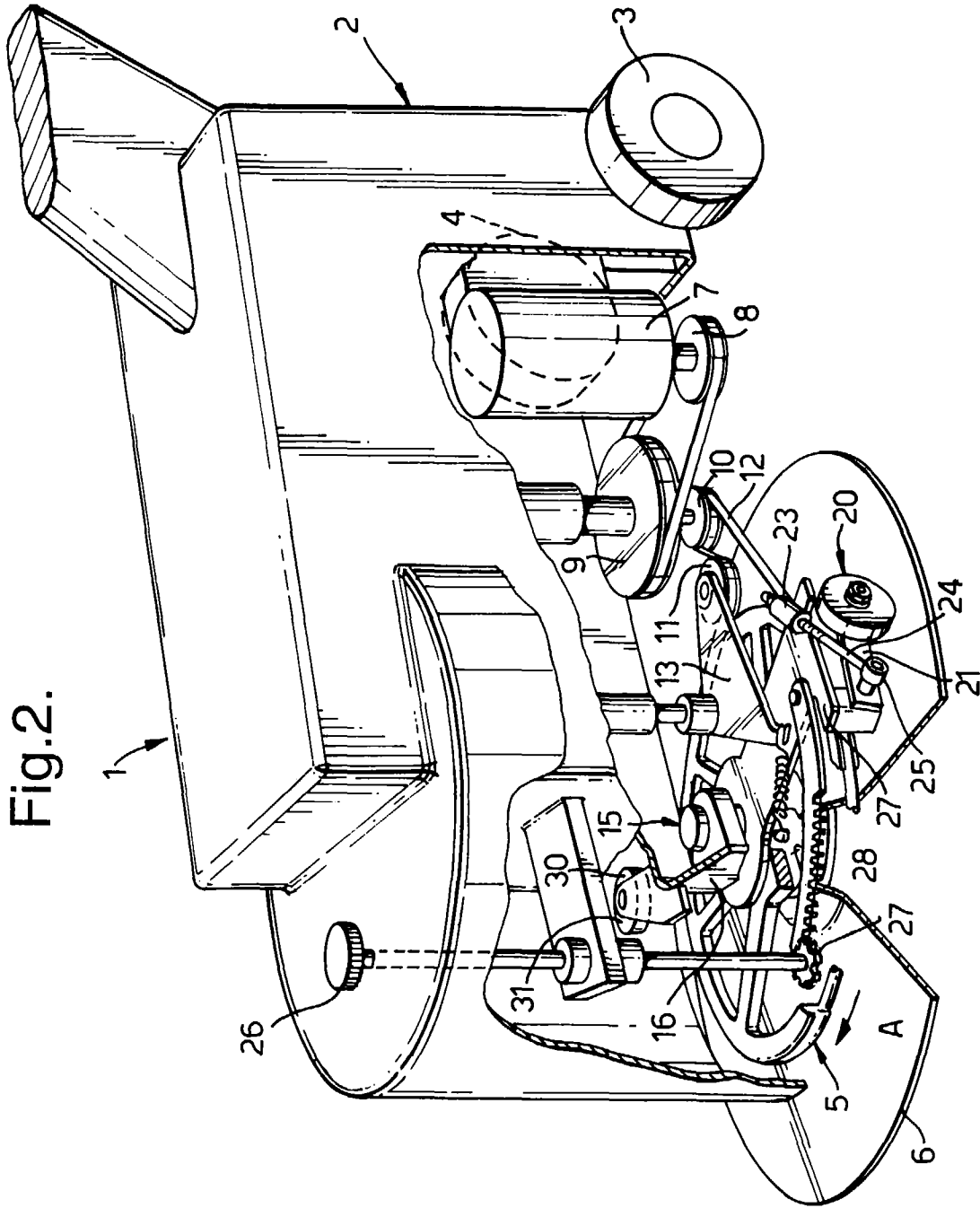


Fig.3.







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EUROPEAN SEARCH REPORT

Application Number
EP 96 20 3638

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.6)
X	DE 44 13 795 A (DIETHELM & CO. AG) * column 4, line 42 - column 7, line 1; figures 3-6,8-10 * ---	1-6	A47L11/162 A47L11/40
X	EP 0 073 725 A (M. PLAZANET) * page 5, line 5 - line 15; figure 4 * ---	1-6	
A	EP 0 640 314 A (UNILEVER PLC) * abstract * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		20 May 1997	Bourseau, A-M
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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