(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 986 987 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.03.2000 Bulletin 2000/12

(51) Int. Cl.[7]: **A47L 5/02**, A47L 5/24

(21) Application number: **99117929.2**

(22) Date of filing: **14.09.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **15.09.1998 IT MO980191**

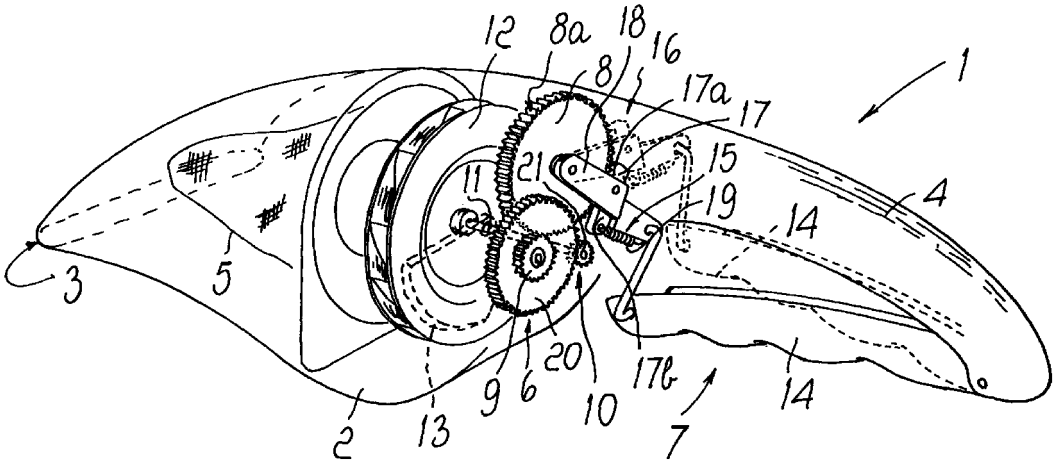
(71) Applicant: **NEXT-AT S.r.l.**
41100 Modena (IT)

(72) Inventor: **Pineschi, Massimiliano**
41100 Modena (IT)

(74) Representative:
Modiano, Guido, Dr.-Ing. et al
Modiano Gardi Patents,
Via Meravigli, 16
20123 Milano (IT)

(54) portable kinetic vacuum cleaner

(57) A portable kinetic vacuum cleaner constituted by an elongated box-like containment body which defines an inlet at one end and an ergonomic handle at the other end; the body accommodates at least a bag for collecting waste and a connected suction motor assembly which can be operated by the user by means of repeated impulses thanks to corresponding manual means.



EP 0 986 987 A2

Description

[0001] The present invention relates to a portable kinetic vacuum cleaner.

[0002] Small portable vacuum cleaners, used to collect equally small waste particles, have long been known.

[0003] This is the case, for example, of vacuum cleaners used to collect crumbs from tables or dust from furniture, armchairs and sofas or from the seats of motor vehicles and the like.

[0004] These conventional vacuum cleaners are constituted by a small electric motor which causes rotation of a shaft on which an impeller is keyed which is adapted to generate a flow of air providing suction towards a collection bag, the entire assembly being arranged conveniently in a variously shaped box-like body which is ergonomic in order to allow to handle it easily.

[0005] This electric motor is preferably driven by the electromotive force of a battery pack of the rechargeable or replaceable type, accommodated in an adapted compartment provided in the box-like body and connected to the motor by way of an adapted cable on which a power switch is located.

[0006] Although these known vacuum cleaners offer a substantially satisfactory performance as to their intended application, they suffer drawbacks.

[0007] A first drawback consists in the manufacturing cost proper, which is substantially high with respect to the target market; the cost is affected by the need to provide a significant number of components, such as an electric motor and a device for supplying power to the motor and controlling it.

[0008] A second drawback relates to the need to replace exhausted batteries after use, placing them in the appropriately provided containers for their disposal.

[0009] A third drawback likewise relates to the need to be able to find a further disposal means when the vacuum cleaner is damaged beyond repair and must therefore be scrapped.

[0010] A fourth drawback is the limited overall life of the batteries due to their well-known memory effect, when used for the operation of known vacuum cleaners, in relation to the frequency and method of use of the vacuum cleaners; moreover, the batteries are highly polluting because they are usually of the nickel-cadmium type.

[0011] The aim of the present invention is to solve the above-mentioned drawbacks of the prior art by providing a portable kinetic vacuum cleaner which is absolutely devoid of problems in disposing both the materials to be used for its operation and those used for its construction, is considerably more durable than known vacuum cleaners and is convenient to manufacture and purchase.

[0012] This aim, this object and others, which will become more apparent hereinafter, are achieved by a portable kinetic vacuum cleaner, characterized in that it is constituted by an elongated box-like containment body which defines an inlet at one end and an ergonomic handle at the other end, the body accommodating at least a bag for collecting waste and a connected suction motor assembly which can be operated by the user by means of repeated impulses thanks to corresponding manual means.

[0013] Further characteristics and advantages will become apparent from the following description of a preferred embodiment of a portable kinetic vacuum cleaner, illustrated only by way of non-limitative example in the accompanying drawings, wherein the only figure shows the invention in phantom lines.

[0014] With particular reference to the above figures, the reference numeral 1 generally designates a portable kinetic vacuum cleaner which is constituted by a substantially elongated box-like body 2 inside which the operating components are arranged.

[0015] The body 2 defines an inlet 3 at one end and an ergonomic handle 4 at the opposite end.

[0016] The body 2 internally accommodates at least a waste collection bag 5 and a connected suction motor assembly 6 which can be operated by the user by means of repeated impulses thanks to corresponding manual means 7.

[0017] The motor assembly 6 is composed of at least one coupling, according to a preset gearing-down ratio, between two gears, specifically a first driving gear 8 and a second driven gear 9; the first driving gear 8 can be rotatably actuated by the manual means 7 and the second driven gear 9 is connected, by interposing transmission means 10, to a user shaft 11 on which at least a rotary suction impeller 12 is keyed.

[0018] Furthermore the motor assembly 6 can optionally be fitted with flywheel means 13 associated with the second driven gear 9.

[0019] The manual means 7 are constituted by a lever 14 articulated to the handle 4 so as to oscillate in contrast with elastic return means 15 and whose free end is provided with means 16 for causing, by means of repeated impulses, the rotation of the driving gear 8.

[0020] These means are constituted by at least one rocker 17 which is articulated to a supporting bridge 18 with which the driving gear 8 is also associated; the active end of the rocker 17 is provided with a tooth 17a for engaging the set of teeth 8a of the driving gear 8 and the opposite end 17b is rigidly coupled to the lever 14 and to the elastic return means 15, which are substantially constituted by at least a helical traction spring 19 which is inserted between the end 17b of the rocker 17 and the box-like body 2.

[0021] The transmission means 10 are constituted by a third gear 20 coaxially associated with the second duct 9 and engages a pinion 21 which is keyed to the user shaft 11.

[0022] The operation of the invention is as follows: by repeatedly squeezing the lever 14, which is returned by

the helical spring 19 each time, the rocker 17 is caused to rotate together with the bridge 18.

[0023] Since it is engaged in the set of teeth 8a of the driving gear 8, the rocker 17 transmits to the gear the successive impulses supplied manually by the user every time he squeezes the lever 14.

[0024] While the user releases the lever 14, the rocker 17 disengages the set of teeth 8a and both the driving gear 8 and the driven gear 9, and accordingly both the third gear 20 and the user shaft 11, rotate freely, continuing the motion by inertia for a few seconds.

[0025] This is sufficient to allow the impeller 12 to generate a suction air stream which allows to collect impurities through the inlet 3, depositing them in the bag 5.

[0026] In order to increase the action of the force of inertia, it is possible to fit known flywheel means 13, for example keyed to the same rotation axis as the second driven gear 9: this allows to significantly extend the interval for repeating the impulses supplied manually by the user by means of the lever 14.

[0027] It is observed that the entire vacuum cleaner 1 can be made of absolutely environment-friendly materials and that if it is provided with adapted extensions and accessories, which are of a known type, it can be converted into a so-called upright vacuum cleaner.

[0028] The motor assembly 6 structured as described also requires no power supply of any kind except human strength.

[0029] To conclude, the production cost of the invention is industrially very low in contrast with its theoretically unlimited durability.

[0030] However, even in case of malfunctions, all the components entail no scrapping and repair problems because they are preferably made of recyclable materials.

[0031] It has thus been observed that the above-described invention achieves the intended aim.

[0032] The invention thus conceived is susceptible of modifications and variations, all of which are within the scope of the inventive concept.

[0033] All the details may also be replaced with other technically equivalent elements.

[0034] In practice, the materials employed, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0035] The disclosures in Italian Patent Application No. MO98A000191 from which this application claims priority are incorporated herein by reference.

[0036] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A portable kinetic vacuum cleaner, characterized in that it is constituted by an elongated box-like containment body which defines an inlet at one end and an ergonomic handle at the other end, the body accommodating at least a bag for collecting waste and a connected suction motor assembly which can be operated by the user by means of repeated impulses thanks to corresponding manual means.

2. The portable kinetic vacuum cleaner according to claim 1, characterized in that the motor assembly is composed of at least one coupling with a preset gearing-down ratio between two gears, a first driving gear and a second driven gear, the first driving gear being rotatably actuatable by the manual means and the second driven gear being connected, with interposed transmission means, to a user shaft on which at least one rotary suction impeller is keyed, optional flywheel means being provided which can be associated with the second driven gear.

3. The portable kinetic vacuum cleaner according to the preceding claims, characterized in that the manual means are constituted by an articulated lever which oscillates, in contrast with elastic return means, with respect to the handle and whose free end is provided with means for actuating the rotation of the driving gear by means of repeated impulses.

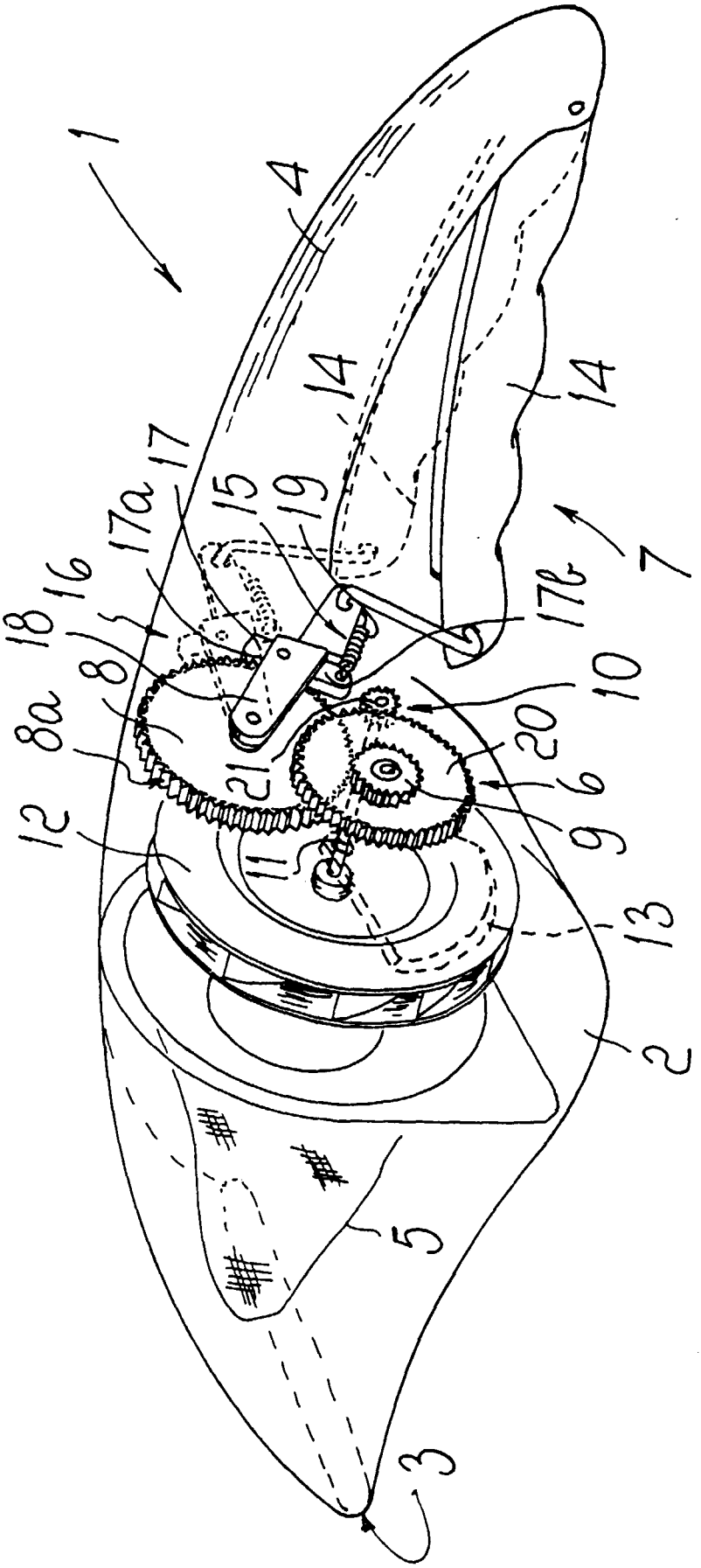
4. The portable kinetic vacuum cleaner according to claims 1 and 3, characterized in that the means for actuating the rotation of the driving gear by means of repeated impulses are constituted by at least one rocker articulated to a supporting bridge with which the driving gear is also associated, the active end of the rocker being provided with a tooth for engaging the set of teeth of the driving gear and the opposite end being rigidly coupled to the lever and to the elastic return means.

5. The portable kinetic vacuum cleaner according to claims 1, 3 and 4, characterized in that the elastic return means are constituted by at least one helical traction spring which is inserted between the end of the rocker and the box-like containment body.

6. The portable kinetic vacuum cleaner according to claim 2, characterized in that the transmission means are constituted by a third gear which is coaxially associated with the second driven gear and engages a pinion which is keyed to the user shaft.

7. The portable kinetic vacuum cleaner according to

claim 2, characterized in that the flywheel means are constituted by at least one plate-like mass which can be keyed eccentrically on the rotation axis of the second driven gear.


1
4
14
14
17
17a
15
19
16
18
8
8a
12
21
11
17b
7
10
20
6
9
13
2
5
3