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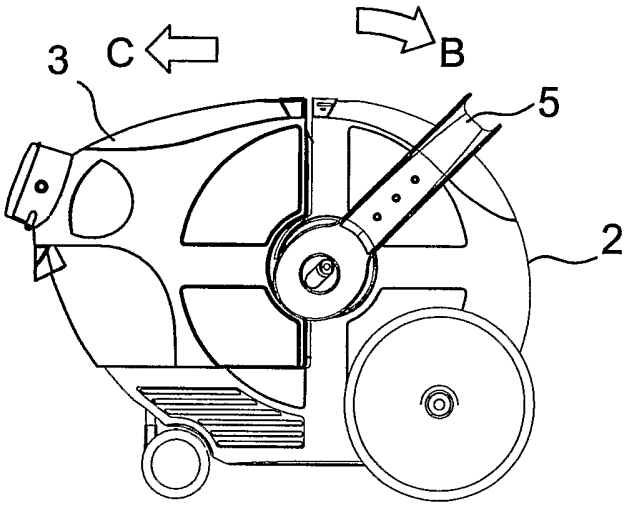
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(54) Title: COUPLING AND DECOUPLING SYSTEM, PARTICULARLY FOR CLEANING MODULAR APPARATUSES



(57) Abstract: The present invention relates to a coupling and decoupling system for cleaning modular apparatuses, particularly to be applied to modular cleaning apparatuses (1), comprising two cam coupling devices (6), and activation means (5) of said two cam coupling devices provided laterally on said apparatus (1), said two cam coupling devices (6) being integrally coupled with a first module (2) of said modular apparatus, and two pins, said two pins (12) being integral with a second module (3) of said modular apparatus, characterised in that, following a rotative motion, said cam devices (6), sliding on said pins (12), allow the coupling and decoupling of said first (2) and second (3) modules, being further provided activation means (5) for the motion of said cam devices (6) with respect to said pins (12).

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COUPLING AND DECOUPLING SYSTEM, PARTICULARLY FOR CLEANING MODULAR APPARATUSES

The present invention relates to a coupling and decoupling system for cleaning modular apparatuses.

More specifically, the invention concerns a system of the above kind, studied and realised particularly for apparatuses for environment cleaning, typically domestic environments, that can be decomposed into two or more modules.

As it is well known, presently many models of modular cleaning apparatuses are available on the market. In fact, most of said models provide inside boilers that can be separated from the other parts of the apparatus, thus making the device easy to be repaired, cleaned and maitainance.

Moreover, apparatuses are available that are divided into modules having different and complementary functions, that must be electrically connected for controlling each other, and that are realised in such a way to be able to work separately, and that thus require a particularly precise and safe coupling.

To make said apparatuses modular, they must be provided with coupling and decoupling systems. Said systems often are inadequate, not making the apparatus properly robust. In fact, it must be taken into consideration that said apparatuses are also subjected to frequent stresses, also in view of the use to which they are destined. It can be easily desumed taking into consideration the fact that within a domestic environment, cleaning apparatuses are subjected to crashes and/or fallings, and that in any case they are not carefully and caution managed, so that even the simple coupling and decoupling operation of the two parts can involve mechanical problems.

Among the various coupling systems available on the market, it can be mentioned the one provided with one or more buttons, pressing which it is possible to actuate a lever, possibly returned by a spring, lifting a hook fixing the parts. This system is not so much robust and it is rather dangerous. In fact, due to an inadvertent pressure, it is possible that modular parts can be separated during the operation of the apparatus. Further, it is a particularly wearable system.

Another problem of the devices presently available on the market concerns the fact that electrical, hydraulic, vapour and similar couplings are realised by outer couplings, while it would be useful to provide them inside.

It is therefore object of the present invention to suggest a coupling and decoupling device for cleaning apparatuses allowing to simplify, and at the same time making more efficient, robust and safe the same apparatus, allowing, among the other things, a simplified maintenance and the possibility of intervention for possible repairs of the inner parts of said cleaning apparatuses.

It is therefore specific object of the present invention a coupling and decoupling system for cleaning modular apparatuses, particularly to be applied to modular cleaning apparatuses, comprising two cam coupling devices, said two cam coupling devices being integrally coupled with a first module of said modular apparatus, and two pins, said two pins being integral with a second module of said modular apparatus, characterised in that, following a rotative motion, said cam devices, sliding on said pins, allow the coupling and decoupling of said first and second modules, being further provided activation means for the motion of said cam devices with respect to said pins.

Always according to the invention, said activation means can be comprised of a lever.

Preferably, according to the invention, said lever can be a carrier handle, connecting at the ends said two cam coupling devices.

Still according to the invention, said coupling device provides a substantially circular hole, mainly provided at the centre of the same device.

Furthermore, according to the invention, said coupling device provides a radial profile, not juxtaposed with said longitudinal sliding guide of the same cam coupling device.

Always according to the invention, said cam coupling device can provide a cam having a radial profile not juxtaposed with the cam, said profile being such that, following said rotative motion, also a longitudinal sliding of said second module, with respect to the first module for fixing the coupling.

Further, according to the invention, said cam coupling device can have at least a housing for positioning a spring, parallel with respect to said profile.

Preferably, according to the invention, said cam coupling device provides two housings for the springs.

Always according to the invention, said device can be comprised of steel or plastics.

Further, according to the invention, said rotative motion is a 90° motion.

The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

Figure 1 shows a perspective view of the modular cleaning apparatus provided with coupling and decoupling system;

Figures 2, 3 and 4 show the decoupling steps of the system according to the present invention;

Figure 5 shows the fixed part of the modular cleaning apparatus to which the coupling and decoupling system is applied;

Figure 6 shown the portable part of the modular cleaning apparatus to which the coupling and decoupling system is applied; and

Figures 7 and 8 show two perspective views, respectively a front and a rear view, of the cam device used in the coupling and decoupling system.

Figure 1 shows the domestic cleaning apparatus 1, comprised of two parts, a fixed part , movable on wheels, and a portable part 3, that will be described in the following figures. It is possible to clearly note the sucking/vapour emission bocca4, to which it is possible to apply different means, such as a lance or an iron, not shown in the figures, and the handle 5. the latter, as it will be seen in the following, will act also as a lever to allow coupling and decoupling of the two par 2 and 3 of the apparatus 1. At the ends of the handle, two cam devices 6 are applied, allowing, as it will be described in the following, the fixing of said modules 2 and 3

Apparatus 1 also comprises standard motion means, such as the rear wheels 7, the front wheel 7' and suitable air intake plugs 8.

Finally, it must be added that the apparatus 1 has all the electrical, hydraulic and vapour connections built in.

In figures 2, 3 and 4, they are shown the various steps of the decoupling system of the portable part 2 from the movable part 3. Figure 2 shows the first step of the decoupling between two modules 2 and 3 that still are coupled. Particularly, in the present figure, handle 5 is pushed downward, according to the direction indicated by arrow A, making the cam device 6 sliding downward, ad thus allowing to this device the possibility of rotating. Thus, as from figure 3, handle 5 is rotated of about 90° according to the direction of arrow B, toward the rear part of apparatus. Cam device allows to the portable part 3 to slide for some centimetres according to direction indicated by letter C, thus allowing to the two parts 2 and 3 to begin their separation.

Finally, making reference to figure 4, it is possible to completely separate said two movable 2 and portable 3 parts, respectively according to directions D and E, when the handle 5 has reached its stop.

It must be added that, during the normal use, handle 5 is used as a carrier device. Thus, lifting would occur according to the direction opposite to the one indicated by arrow A of figure 2, thus obtaining an automatic hindrance of the accidental separation of the two parts 2 and 3.

To couple and tighten said two parts 2 and 3, the opposite operation is carried out with respect to the one of figures 2 – 4.

In figure 5 it is shown the fixed part 2 of the cleaning apparatus 1. The latter provides the handle 5 coupled, on both sides of the apparatus, with two coupling and decoupling cam devices 6, fixed part 2 provides inside the electronics for controlling the whole device, and more particularly, provides the vapour generator.

Said fixed part 2 provides a hollow, housing the portable part 3. Connectors 9 are provided on said hollow for electric control and/or vapour connection. Furthermore, optical signals 10 are provided on the surface, indicating the apparatus operation mode. Further, fixed part 2 has the wheels 9, 9' and the air plugs 10.

Portable part 3 I shown in figure 6 and has a shape suitable to be coupled with the fixed part 2. Said portable part 3 provides the sucking/vapour emission mouth 4 and the electric taps 11, that, due

to the coupling with the fixed part 2, will be coupled with the sockets 9.

Inside, said portable part 3 provides, besides the electronics for controlling the apparatus, also vapour filters.

Finally, it is observed a pin 12 provided on the side of said portable part 12 (on both sides), that is made sliding, during the coupling and decoupling steps, within the cam device 6, while the handle 5 is rotated.

In figures 7 and 8 it is specifically shown, by two opposed perspective views, the cam device 6 allowing to obtain the coupling and decoupling system.

Said device 6, having a circular shape, provides a guide 13 (in figure 8 it is shown the rear part of said guide 13), allowing the passage and the sliding of the pin 12 when the lever 5 is lowered (raised) to allow the decoupling (coupling) of the two parts 2, 3.

Device 6 also provides a central hole 14, for fixing the same to the structure of the apparatus. It is further provided the profile 15, according to a radial direction, allowing the sliding, by the translation of device 6, particularly during the blocking (releasing) step, when the pressure on the handle 5 is applied according to the direction indicated by arrow A, as shown in figure 2. Finally, device 6 provides two pins 16 and 16', provided for housing springs in order to make it easier the longitudinal sliding of the same device.

On the basis of the above specification, it can be noted that the basic feature of the described device is that of making it possible the blocking of two parts in a safe way, and to allow a wide use versatility, in such a way that said device can be applied also to other white goods or other object that are subjected to vibrations.

An advantage of the present system is that the cam – lever assembly is less subjected to accidental activations, thus contributing to improve the whole safety of the apparatuses providing the same.

Finally, materials by which the cam device can be comprised, for implementing the system according to the present invention, can be different, among which steel, titanium, plastics. The choice is dictated by the mechanical stresses to which the cam device must be mainly subjected.

The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

CLAIMS

1. Coupling and decoupling system for cleaning modular apparatuses, particularly to be applied to modular cleaning apparatuses, comprising two cam coupling devices, said two cam coupling devices being integrally coupled with a first module of said modular apparatus, and two pins, said two pins being integral with a second module of said modular apparatus, characterised in that, following a rotative motion, said cam devices, sliding on said pins, allow the coupling and decoupling of said first and second modules, being further provided activation means for the motion of said cam devices with respect to said pins.

2. Coupling and decoupling system according to claim 1, characterised in that said activation means are comprised of a lever.

3. Coupling and decoupling system according to claim 2, characterised in that said lever is a carrier handle, connecting at the ends said two cam coupling devices.

4. Coupling and decoupling system according to one of the preceding claims, characterised in that said coupling device provides a substantially circular hole, mainly provided at the centre of the same device.

5. Coupling and decoupling system according to one of the preceding claims, characterised in that said coupling device provides a radial profile, not juxtaposed with said longitudinal sliding guide of the same cam coupling device.

6. Coupling and decoupling system according to one of the preceding claims, characterised in that said cam coupling device provides a cam having a radial profile not juxtaposed with the cam, said profile being such that, following said rotative motion, also a longitudinal sliding of said second module, with respect to the first module for fixing the coupling.

7. Coupling and decoupling system according to one of the preceding claims, characterised in that said cam coupling device can have at least a housing for positioning a spring, parallel with respect to said profile.

8. Coupling and decoupling system according to claim 7, characterised in that said cam coupling device provides two housings for the springs.

9. Coupling and decoupling system according to one of the preceding claims, characterised in that said device is comprised of steel.

10. Coupling and decoupling system according to one of the preceding claims 1 - 6, characterised in that said device is comprised of plastics.

11. Coupling and decoupling system according to one of the preceding claims, characterised in that said rotative motion is a 90° motion.

12. Coupling and decoupling system according to each one of the preceding claims, substantially as illustrated and described.

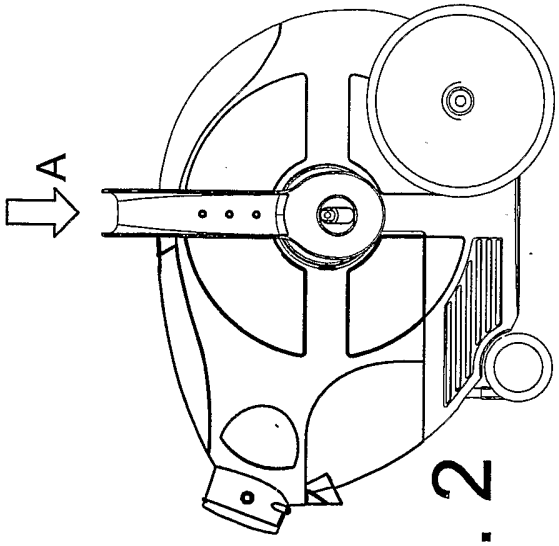


Fig. 2

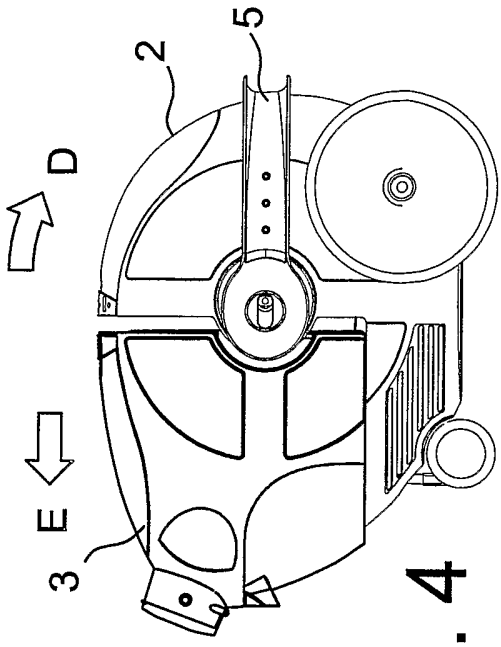


Fig. 4

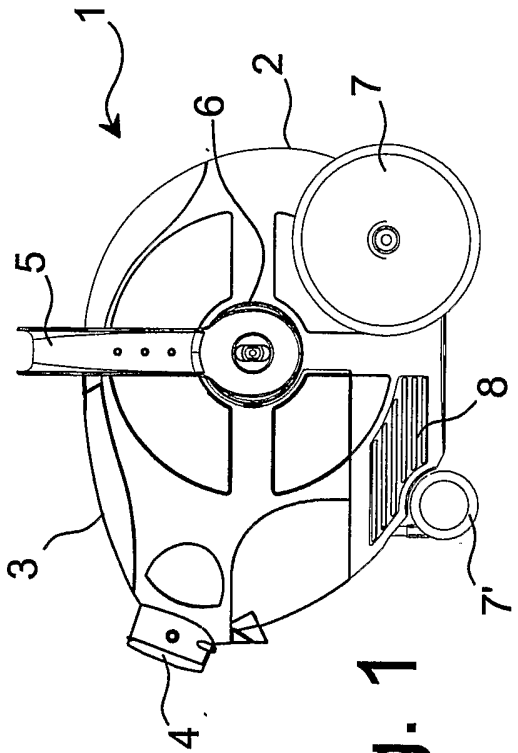


Fig. 1

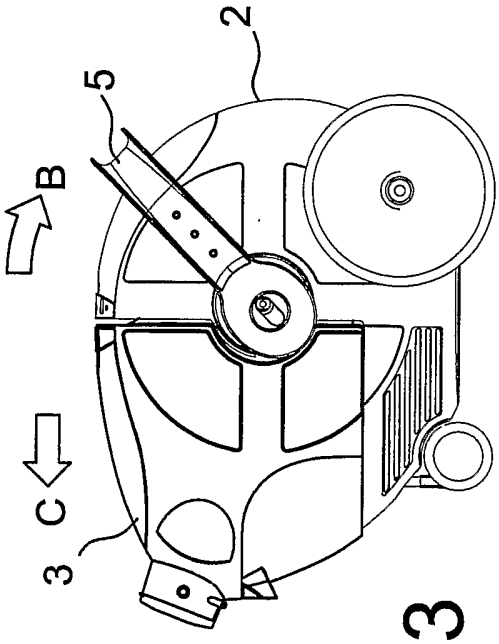


Fig. 3

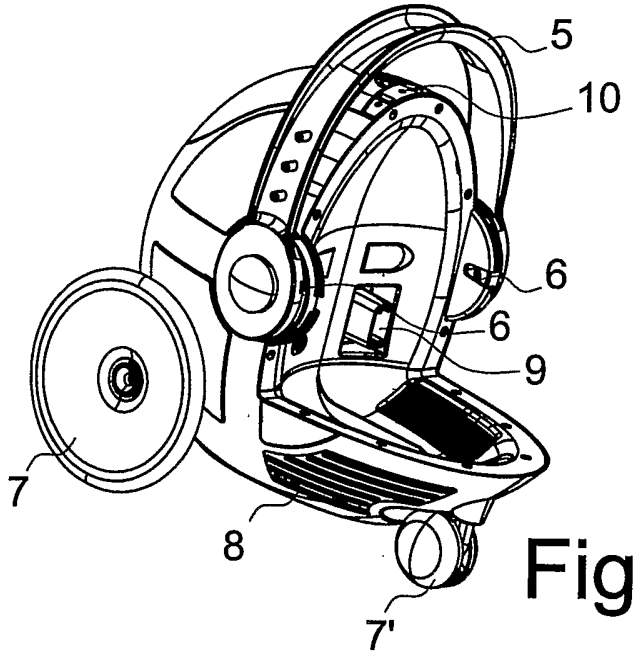


Fig. 5

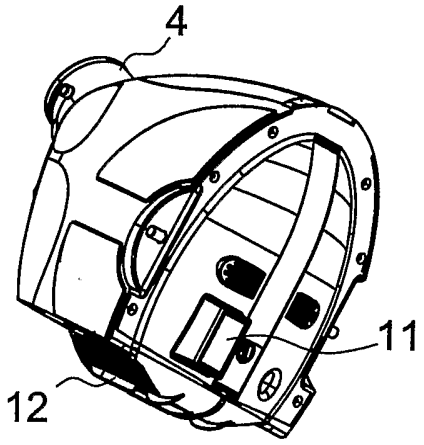


Fig. 6

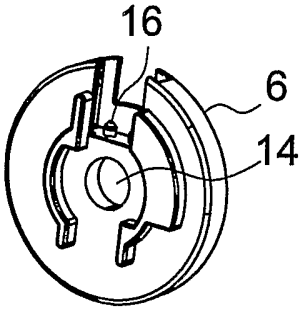


Fig. 7

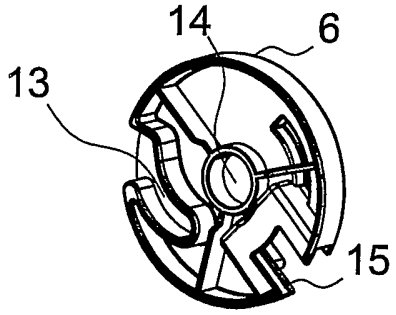


Fig. 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 03/00840

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47L9/32 A47L5/36 A47L9/00 A47L11/40 A47L11/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 323 675 A (NORTH AMERICAN PHILIPS COMPANY, INC.) 6 June 1967 (1967-06-06) the whole document	1-12
A	US 5 301 386 A (MOULINEX S.A.) 12 April 1994 (1994-04-12)	
A	US 5 901 408 A (THE HOOVER COMPANY) 11 May 1999 (1999-05-11)	
A	GB N12516A (ENTWISLE AND KENYON LIMITED) 29 May 1913 (1913-05-29)	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
19 May 2004	26/05/2004

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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