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(54) Rotatable connection between a vacuum cleaner hose and a handle part

(57) A rotatable connection between a vacuum cleaner hose (12) and a handle part (14), wherein the hose is connectable to a vacuum source (11) arranged in a vacuum cleaner housing (10). The rotatable connection permits limited turning motion of the handle part (14) relative to the hose (12), which is greater than 360°. The rotatable connection is provided by an internally threaded nut on the handle part which cooperates with an externally threaded screw on the hose. The number of threads on the nut is greater than the number of threads on the screw.

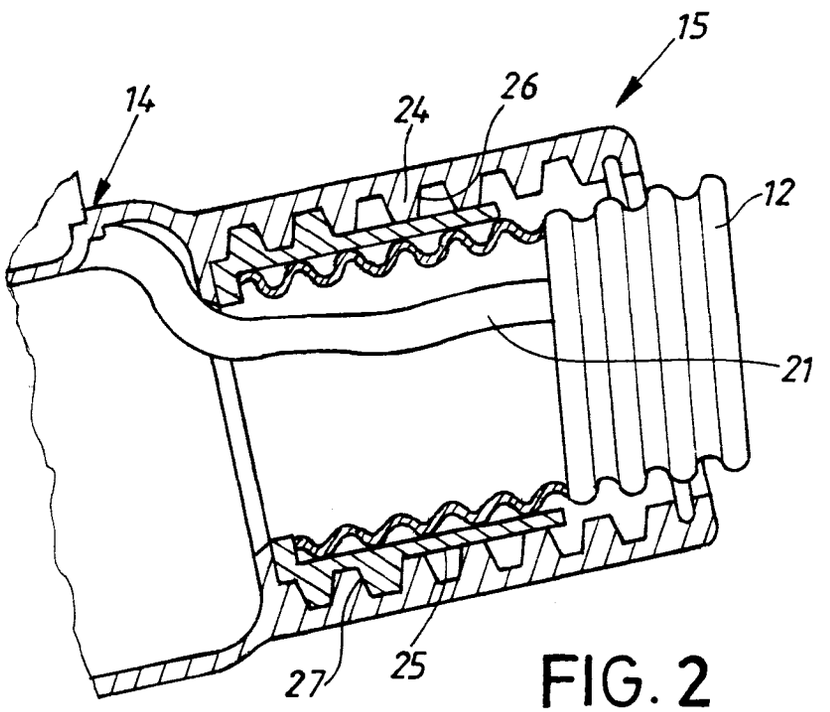


FIG. 2

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Description

The present invention relates to a rotatable connection between a vacuum cleaner hose and a handle part, wherein the hose is connectable to a vacuum source arranged in a vacuum cleaner housing.

Connections of the foregoing type are known in the art. Such connections are usually designed such that the handle part can be turned an indefinite number of revolutions in each direction.

For certain types of vacuum cleaners it is desirable to have the electric control and indication means and electric connections, if any, for brush nozzles or the like easily accessible on the handle part. This means that current is supplied to these control and indication means via conductors arranged in a cable placed outside the hose or within the shell of the hose, the conductors being connected to the electric circuit in the vacuum cleaner housing. However, if one end of the cable is fixed to the vacuum cleaner housing while the other end is fixed to the handle part there is a risk that the cable, when having a conventional rotatable connection between the hose and handle part, will be twisted and, hence, be shortened in length. This means that the cable can be damaged and eventually worn out or torn off from its fastening points. In order to prevent the conductors from being turned too much the connection is designed such that the handle part can only be turned or rotated a limited angular amount in each direction from an intermediate position, with the complete turning motion being less than 360°. The last-mentioned turning motion is limited by means of shoulders arranged on the handle part and on the hose.

Another known type of rotatable connection between the handle part and the hose is described in WO 96/25083. This device is provided with slip rings and contact means engaging the slip rings in order to transmit electrical energy from the hose to the handle part which, in this case, is designed as a tube handle. Unfortunately, these arrangements are rather complicated and expensive and, therefore, economically undesirable in vacuum cleaners.

Vacuum cleaners having a dust container arranged in a handle part are also previously known, as shown in GB 1443494. The handle part is, via a hose, connected to a vacuum cleaner housing which encloses a fan unit. Using this arrangement means that the dust laden air is not drawn through the hose and therefore makes it possible to use the hose as a protecting shell for a cable which is freely mounted within the hose and which transmits current from the vacuum cleaner housing to control and operating means. Such control and operating means may include switches for the fan unit and a motor-driven brush nozzle which is arranged on the handle part. For this type of vacuum cleaner it would, however, be desirable to have a rotatable connection between the hose and the handle part in order to achieve sufficient flexibility and maneuverability. Such a rotatable connection would allow the electrical energy to be transmitted in a simple way from the vacuum cleaner housing to the handle part.

Therefore, there exists a need in the art for an improved rotatable connection between a vacuum cleaner hose and handle part. There also exists a need in the art for such an improved rotatable connection which facilitates transmission of electrical energy through the connection.

The present invention is directed toward a rotatable connection which eliminates or minimizes the above-mentioned disadvantages in the prior art. The present invention is further directed toward a simple, cheap and, hence, a preferable alternative to a conventional slip ring coupling for supplying electrical energy to the handle part or to a motor-driven nozzle connected to the handle part.

In accordance with the present invention, a connection for rotatably securing a vacuum cleaner hose to a handle part permits a range of rotation between the hose and handle part which is greater than 360°. The connection is provided by a first threaded part and a second threaded part which cooperate with one another. The handle part supports one of the threaded parts and the hose supports the other of the threaded parts.

These and further features of the present invention will be apparent with reference to the following description and drawings, wherein:

FIG. 1 is a schematic, partly broken, side view of a vacuum cleaner equipped with a connection according to the present invention; and,
FIG. 2 is a vertical section through the connection according to the present invention.

With reference to FIG. 1, a vacuum cleaner according to the present invention includes a vacuum cleaner housing 10 enclosing a motor fan unit 11 whose inlet side is connected to one end of a hose 12 by means of a removable coupling 13. The other end of the hose 12 is rotatably secured to a handle part 14 by means of a connection 15. The handle part 14 is removably secured to a tube shaft 16 which, in a conventional way, is connected to a nozzle 17. The handle part 14 is provided with a handle 18 supporting control means 19 such as switches for connecting and disconnecting the fan unit and a motor-driven brush nozzle (if any). The handle 18 also supports a dust container 20 in which dust, which is taken up by the nozzle 17, is separated before the cleaned air continues through the hose 12 to the motor fan unit 11.

The hose 12 receives a free cable 21 having conductors which transmit current from the vacuum cleaner housing 10 to the handle part 14. The conductors of the cable 21 are, at one end, secured to the electric components which are positioned in the handle part 14 and, at the other end, are connected to a plug 22 arranged on the hose 12. The plug 22 is electrically connected to

a socket 23 on the vacuum cleaner housing.

With reference to FIG. 2, the connection 15 comprises a screw-nut arrangement designed as an outer sleeve 24 and an inner sleeve 25. The outer sleeve 24 is fixed to the handle part 14 and has an inner thread 26. The inner sleeve 25 is fixed to the hose 12 and has an outer thread 27. The outer thread 27 has a smaller number of thread turns than does the inner thread 26, which means that the inner sleeve 25 can be turned with respect to the outer sleeve 24. However, the turning motion is limited by the axial length of the inner thread 26.

In the preferred and illustrated embodiment, the outer thread 27 of the inner sleeve 25 has two turns while the inner thread 26 of the outer sleeve 24 has six turns. Accordingly, from an initial starting or intermediate position, the handle part 14 can be rotated two turns in each direction to a suitable end position. One of the end positions is shown in FIG. 2. Preferably, rotation is limited to less than three turns in each direction from the center or intermediate position.

Thus, the illustrated arrangement allows a turning motion between the handle part 14 and the hose 12 which is greater than 360° but limits range of movement with simple means to thereby preventing damage to the cable.

It should be mentioned that in order to achieve the limited turning motion according to the invention it is possible to use other means. For instance, a string or a strap of suitable length fastened with one end at the handle part and the other end at the hose. An equivalent solution is an element in the form of a clock-work type spring placed in a limited space between the hose and the handle part and having one end connected to the handle part and the other end connected to the hose.

While the preferred embodiment of the present invention is shown and described herein, it is to be understood that the same is not so limited but shall cover and include any and all modifications thereof which fall within the purview of the invention.

Claims

1. A connection for rotatably securing a vacuum cleaner hose (12) to a handle part, said hose being adapted for connection to a vacuum source (11) arranged in a vacuum cleaner housing (10), **characterized in** that the connection is provided with means (24,25) permitting a limited range of rotation of the handle part (14) relative to said hose (12), said range of rotation being greater than 360°.

2. A connection according to claim 1, **characterized in** that the hose is provided with at least one electrical conductor, said conductor having a first end connected to electrical means (19) in the handle part and a second end connected to an electrical circuit disposed in the vacuum cleaner housing (10).

3. A connection according to claim 2, c**haracterized in** that the handle part (14) includes a dust container (20), said hose (12) being placed downstream of the dust container as seen in a direction of air flow.

4. A connection according to claim 3, **characterized in** that said at least one electrical conductor is at least partially disposed within the hose (12).

5. A connection according to any of the preceding claims, **characterized in** that said means comprises a first threaded part (24) and a second threaded part (25) which cooperate with one another, said handle part (14) supporting one of said first and second threaded parts, said hose (12) supporting the other of said first and second threaded parts.

6. A connection according to claim 5, **characterized in** that said one of said first and second threaded parts has a first number of threads and said other of said first and second threaded parts has a second number of threads, said first number of threads being greater than said second number of threads.

7. A connection according to claim 5 or 6, **characterized in** that said one of said first and second threaded parts (24,25) is designed as a nut and said other of said first and second threaded parts is designed as a screw.

8. A connection according to claim 7, **characterized in** that a number of thread turns of the nut is greater than a number of thread turns of the screw.

9. A connection according to claim 7 or 8, **characterized in** that the screw part (25) is a sleeve to which the hose is fixed.

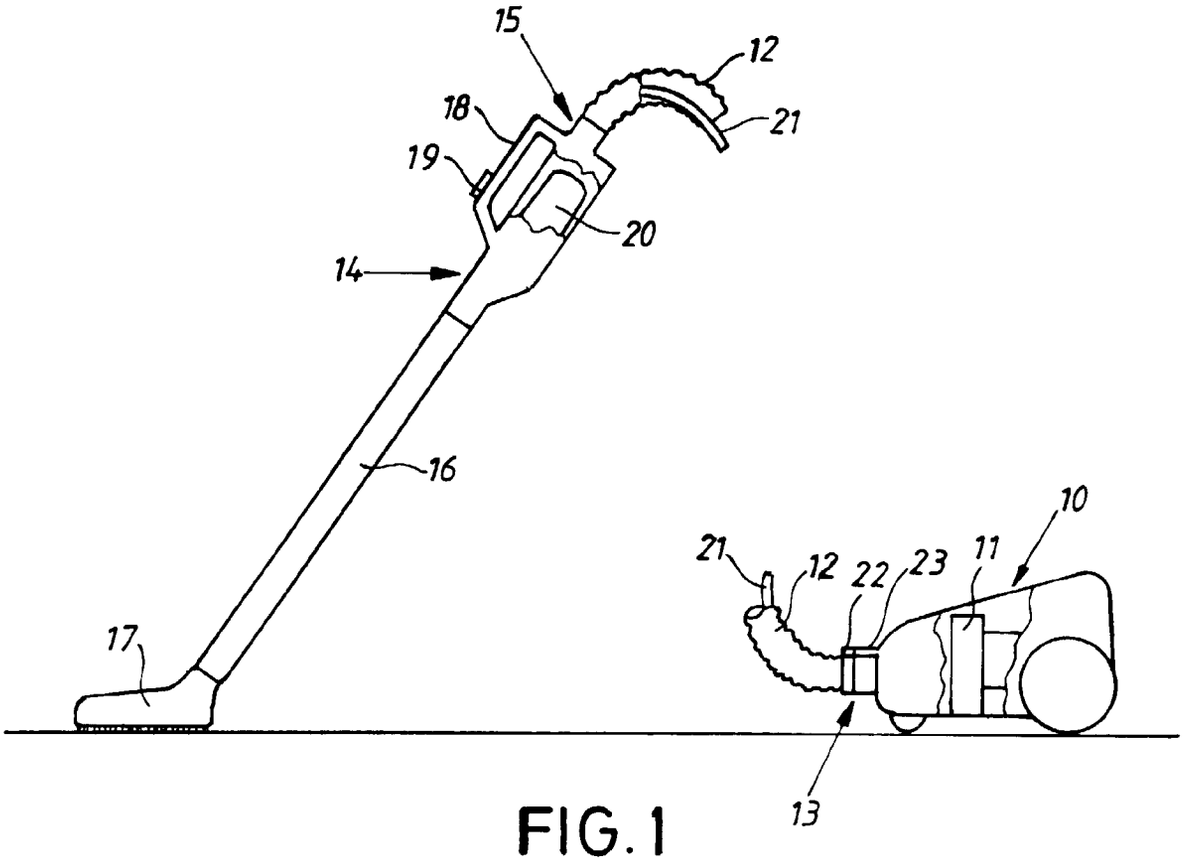


FIG. 1

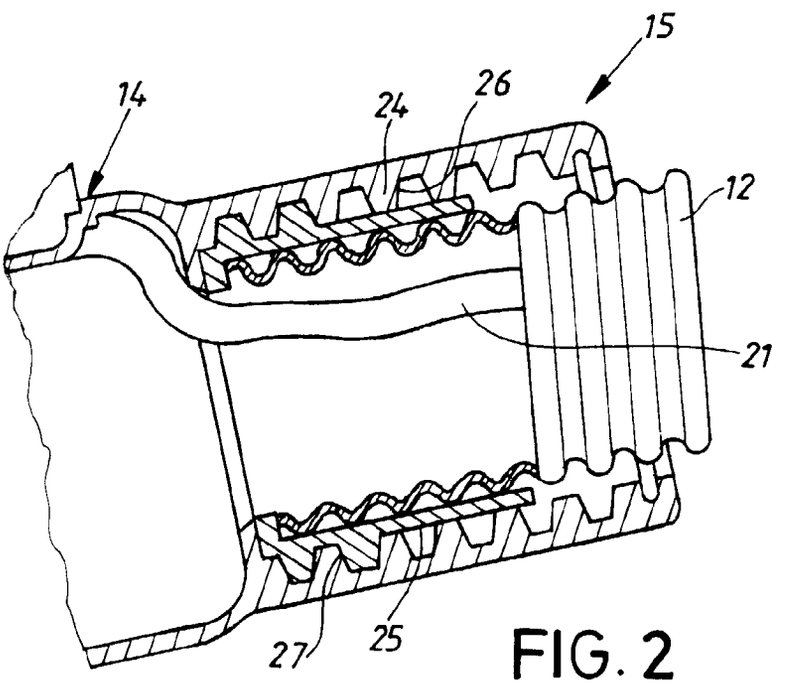


FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 98 85 0075

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)
A	US 4 550 957 A (KEANE JAMES W) 5 November 1985 * column 2, line 8-43 * * column 3, line 52 - column 4, line 3-7; figures 3-7 *	1,2,4,9	A47L9/24
A	DE 40 20 378 A (LICENTIA GMBH) 2 January 1992 * column 1, line 31-56 * * column 1, line 63 - column 2, line 37; figure 1 *	1	
A	EP 0 727 173 A (AEG HAUSGERAETE GMBH) 21 August 1996 * column 2, line 36 - column 4, line 4; figure 1 *	1	
A,D	GB 1 443 494 A (ELECTROLUX LTD) 21 July 1976 * page 1, line 83 - page 2, column 52; figure 2 *	3	
			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
MUNICH	6 August 1998	Laue, F

CATEGORY OF CITED DOCUMENTS

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