Aug. 14, 1951 L. F. NERHEIM 2,564,339

VACUUM CLEANER

Filed May 6, 1950 2 Sheets-Sheet 1

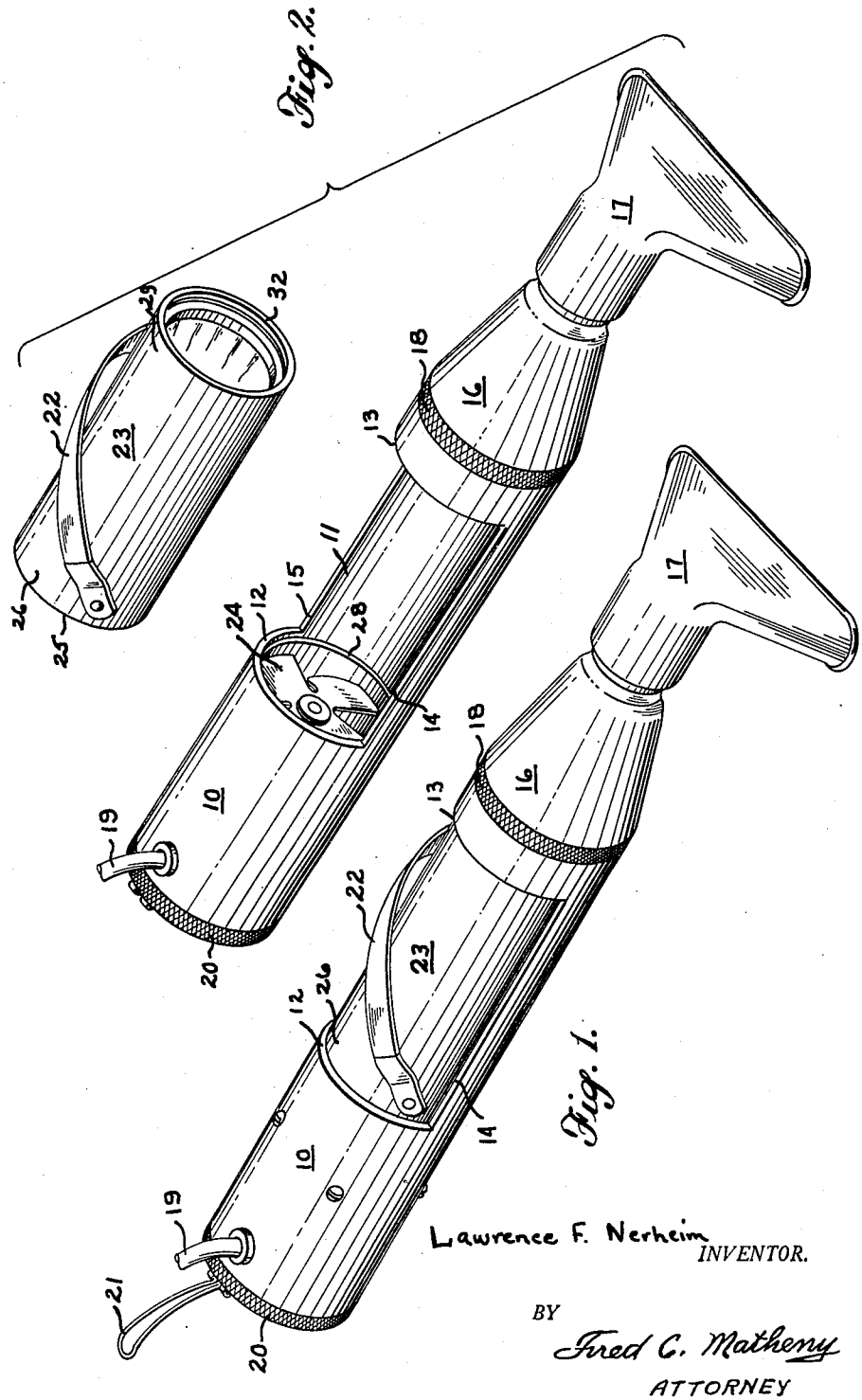

Fig. 1.

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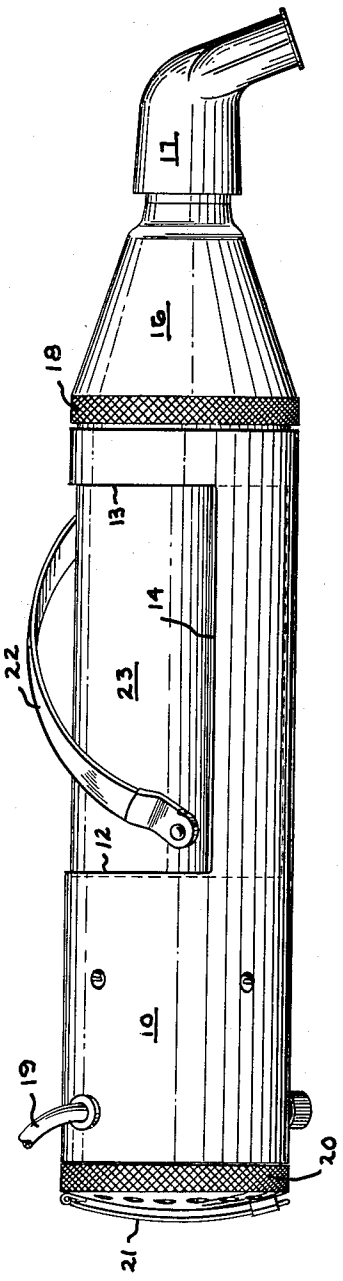

Fig. 3.

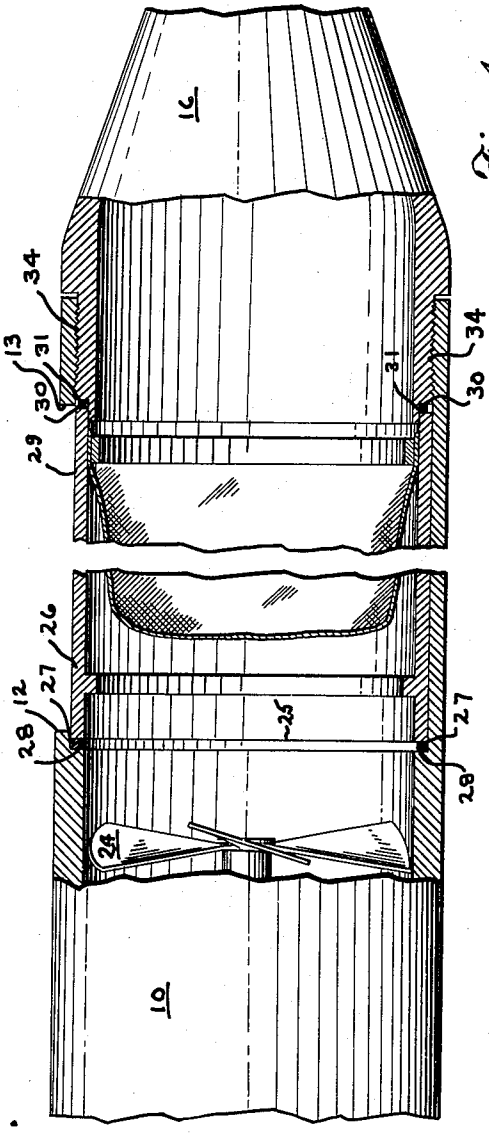

Fig. 4.

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VACUUM CLEANER

Lawrence F. Nerheim, Seattle, Wash.

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5 Claims. (Cl. 183—44)

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My invention relates to vacuum cleaners; more particularly my invention relates to a vacuum cleaner casing and to a vacuum cleaner filter carrier employed in conjunction with and removable from said casing.

A primary object of my invention is to provide a vacuum cleaner from which the collected dust and dirt can be easily and quickly removed.

Another primary object of my invention is to provide a vacuum cleaner from which the collected dust and dirt can be removed indoors without scattering the collected dust and dirt.

Another primary object of my invention is to provide a vacuum cleaner from which the filter carrier unit can be easily and quickly removed thus providing a vacuum cleaner of great compactness without need for large storage space for accumulated cleanings.

I attain these objects by my invention, an embodiment of which is illustrated in the accompanying drawings in which—

Figure 1 illustrates a perspective view of an embodiment of my invention showing the filter carrier in operative position in the vacuum cleaner casing.

Fig. 2 is an exploded perspective view of my invention showing the filter carrier removed from the vacuum cleaner casing.

Fig. 3 is a view in side elevation of my invention showing the filter carrier in operative position in the vacuum cleaner casing.

Fig. 4 is a view in side elevation of my invention partially in cross-section and with parts broken away for purposes of illustration.

Referring now to Fig. 1, the illustrated vacuum cleaner embodying my invention comprises a tubular cylindrical casing 10 providing an opening 11 which opening 11 is bordered by walls 12 and 13 which walls 12 and 13 are parallel to each other and extend at right angles to the longitudinal axis of the casing 10. The opening 11 is also bordered by walls 14 and 15 which walls 14 and 15 are parallel to each other and parallel to the longitudinal axis of the casing 10 and extend at right angles to the walls 12 and 13.

End member 16 carries air-inlet member 17 and is threadedly engageable with the end portion of casing 10 (see Fig. 4). End member 16 is provided with knurled portion 18 to facilitate manual engagement of the end member 16 with the end portion of casing 10.

Only a short section of power cord 19 is illustrated, the remainder being broken away for purposes of illustration.

Knurled butt member 20 is threadedly engaged with the end portion of casing 10 and loop 21 is hingedly connected with the butt member 20 and is designed to be used in facilitating storage of the device by hanging as in clothes closets.

Hand strap 22 is illustrated as connected with

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filter carrier 23 although it could be connected with the casing 10. In connection with filter carrier 23, however, the hand strap 22 serves not only to properly position the hand of the user on the device as well as suspend the device from the back of the hand of the user thus taking the weight from the fingers, but also serves as a handle for the filter carrier 23 facilitating removal of the filter carrier 23 from the casing 10 in the course of removing accumulated cleanings from the machine.

The filter carrier 23 is tubular and cylindrical having a slightly smaller outside diameter than the outside diameter of the portion of casing 10 which carries the filter carrier 23.

The carrier 23 is provided with a suitable filter element, a bag type being illustrated, it being understood, however, that other suitable filter types could as well be employed.

My invention of casing and detachable filter carrier is also adapted to provision of a low cost, disposable filter carrier made up of cardboard, plastic or other suitable material such that the cost would be low enough to permit the user to dispose of the entire unit in ridding the machine of accumulated cleanings and substitute a new disposable filter unit for the unit discarded.

The motor (not shown) is of conventional type as is the fan 24. Although my invention is illustrated in the accompanying drawings as embodied in a small, compact vacuum cleaner designed particularly for one-hand operation, it will be understood that the principle of the invention is equally applicable to so-called tank-type cleaners and that such application in this type of vacuum cleaner is accompanied by all of the advantages herein set forth.

The air-inlet member 17 is frictionally engaged with the end member 16 and can be removed to permit use of all standard accessory cleaning attachments well-known in the art.

Referring now to Fig. 4, the rim 25 of the butt end portion 26 of filter carrier 23 rests on washer 27 when in operative position in the casing 10. The washer 27 is made of rubber or other suitable material and provides an airtight seal between the rim 25 and the casing 10. The washer 27 is lodged on the shoulder 28 which shoulder 28 is provided in the inside bore of casing 10 (see also Fig. 2). The forward end portion 29 of the filter carrier 23 in operative position is in airtight contact with the washer 30 which washer is similar to washer 27. The washer 30 is carried on the shoulder 31 of end member 16. As end member 16 is moved into threaded engagement with the end portion of casing 10, the shoulder 31 of end member 16 carrying washer 30 is moved into airtight contact with the rim 32 of the forward portion of filter carrier 23. The pressure exerted by the shoulder 31 on the rim 32 of filter carrier 23

slidably moves the entire filter carrier 23 in a rearward direction parallel to the longitudinal axis of the filter carrier 23 and the casing 10 moving the other rim 25 of the filter carrier 23 into airtight contact with the washer 27 carried by shoulder 28.

That is, when the end member 16 is screwed onto the end portion of casing 10, the end portion of the end member is forced into airtight engagement with the rim 32 of the filter carrier 23 while the filter carrier itself is simultaneously slid into airtight engagement with the shoulder 26 in the inside of casing 10.

While the shoulder 31 in the end member 16 is not essential to the operation of my invention in that contact between the rim portion 32 of filter carrier 23 and the end portion of end member 16 with a resilient washer interposed would result in an airtight seal between end member 16 and filter carrier 23, nevertheless the provision of a shoulder as shoulder 31 on end member 16 results in a positive interlocking action between the carrier 23 and the end member 16 and is a preferable refinement.

It is obvious that the shoulder 31 could be incorporated into the end portion of filter carrier 23 rather than in end member 16 and the same positive airtight interlocking action obtain. From the standpoint of manufacture, however, I believe the illustrated location of the shoulder 31, that is incorporated into the end portion of filter carrier 23 rather than in end member 16 to be preferable. The threads 34 must be machined, cast, moulded or otherwise suitably incorporated into the end portion of end member 16; the shoulder 31 may be provided in the end portion in a combined operation.

The mode of operation of my invention is as follows:

In order to remove the filter carrier 23 from the casing 10, the user simply grasps the knurled portion 18 of end member 16 and rotates the end member 16 thus tending to threadedly disengage the end member 16 from the casing 10. The pressure exerted by the shoulder 31 on the rim 32 of filter carrier 23 is thereby relieved as a result of the movement of the shoulder 31 away from the rim 32. The filter carrier 23 is thus only loosely disposed in the casing 10 and can be removed by means of the handle 22.

The accumulated cleanings may then be disposed of and the filter carrier 23 replaced in the casing 10. A manual tightening of the end member 16 results in contact of the shoulder 31 with the rim of the filter carrier 23 and in contact of the rim 25 of the carrier 23 with the shoulder 28.

I claim:

1. In a vacuum cleaner, a tubular cylindrical casing providing an opening intermediate the ends thereof; the inner wall of said casing providing an annular shoulder adjacent said opening; a tubular cylindrical filter carrier of lesser outside diameter than the outside diameter of said casing, disposable in said casing through said opening, one end rim portion of said filter carrier being slidingly moveable into air-tight contact with said annular shoulder; and an end member threadedly engageable with an end portion of said casing and moveable into airtight contact with the other end rim portion of said filter carrier.

2. In a vacuum cleaner, a tubular cylindrical casing providing an opening intermediate the ends thereof; the inner wall of said casing providing an annular shoulder adjacent said opening; a tubular cylindrical filter carrier of lesser outside diameter than the outside diameter of said casing, disposable in said casing through said opening, one end portion of said filter carrier being slidingly moveable into air-tight contact with said casing, the inner portion of the rim of the other end portion being provided with an annular recess; and an end member, one end portion of which is threadedly engageable with an end portion of said casing and moveable into said annular recess and air-tight contact with the end rim portion of said filter carrier.

3. In a vacuum cleaner, a tubular cylindrical casing providing an opening intermediate the ends thereof; the inner wall of said casing providing an annular shoulder adjacent said opening; a tubular cylindrical filter carrier of lesser diameter than said tubular cylindrical casing, disposable in said casing through said opening, one end portion of said filter carrier being slidingly moveable into air-tight contact with said casing, the outer portion of the rim of the other end portion being provided with an annular recess; and an end member, one end portion of which is threadedly engageable with an end portion of said casing and moveable into said annular recess and air-tight contact with the end rim portion of said filter carrier.

4. In a vacuum cleaner, a tubular cylindrical casing providing an opening intermediate the ends thereof, the inner wall of said casing providing an annular shoulder adjacent said opening; a tubular cylindrical filter carrier of lesser outside diameter than said tubular cylindrical casing, disposable in said casing through said opening, one end rim portion of said filter carrier being slidingly moveable into airtight contact with said annular shoulder, the rim of the other end portion of said filter carrier being provided with an annular recess; and an end member threadedly engageable with an end portion of said casing and moveable into said annular recess and air-tight contact with the rim of the end portion of said filter carrier.

5. In a vacuum cleaner, a tubular cylindrical casing providing an opening intermediate the ends thereof; the inner wall of said casing providing an annular shoulder adjacent said opening; a tubular cylindrical filter carrier of lesser outside diameter than the outside diameter of said casing, disposable in said casing through said opening, one end portion of said filter carrier being slidingly moveable into airtight contact with said casing; an end member engageable with an end portion of said casing and moveable into air-tight contact with the other end portion of said filter carrier; and handle means connected with said filter carrier, the longitudinal axis of said handle means extending diagonally of the longitudinal axis of said filter carrier.

LAWRENCE F. NERHEIM.

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