Aug. 14, 1945. C. H. TAYLOR 2,382,348

SUCTION CLEANING APPARATUS

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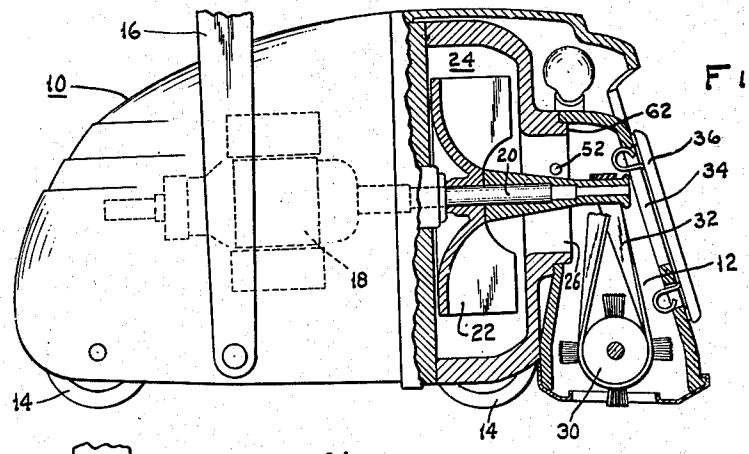


FIG. 1.

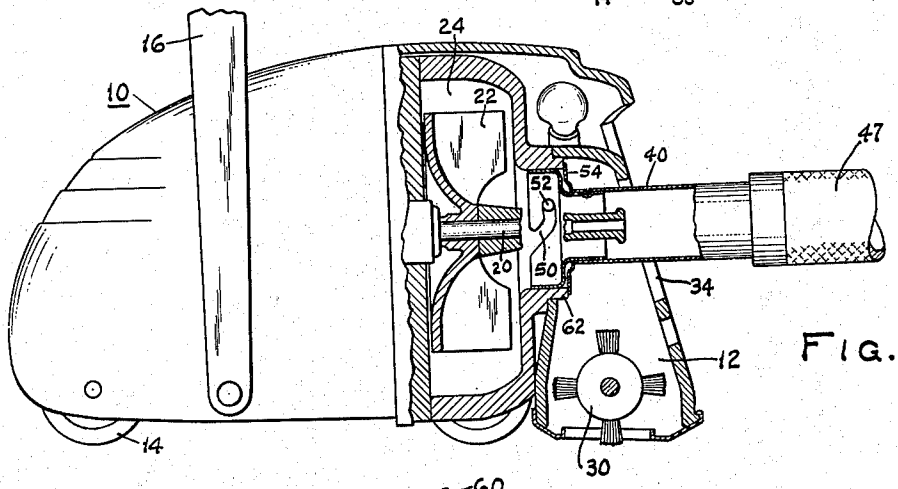


FIG. 2.

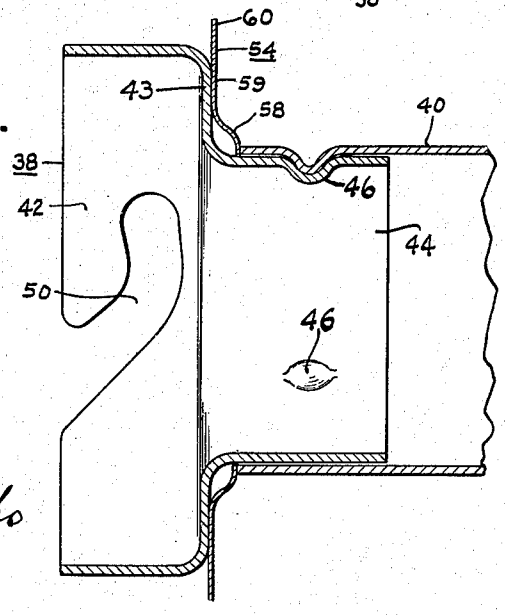


FIG. 3.

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SUCTION CLEANING APPARATUS

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3 Claims. (Cl. 285—183)

My invention relates to a suction cleaner of the type adapted to be converted from floor nozzle cleaning to attachment hose cleaning.

One object of my invention is to produce an improved suction cleaner of the type set forth.

A further object of my invention is to produce an improved conversion adapter whereby the coupling of an attachment hose to and the uncoupling of said hose from the cleaner is facilitated.

A still further object of my invention is to produce an improved conversion adapter by means of which the attachment hose may be connected to the source of suction in an airtight manner without the use of accurate machining or exact alignment of the coacting parts.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a view, partly in vertical section and partly in side elevation, of a suction cleaner adapted to be converted from floor nozzle to attachment hose cleaning;

Fig. 2 is a view similar to Fig. 1, showing the suction cleaner after it is converted from floor nozzle to attachment hose cleaning by the application thereto of a conversion adapter embodying my invention; and

Fig. 3 is an enlarged fragmentary sectional view of the conversion adapter referred to.

Referring to the drawing, I show a suction cleaner 10 having a floor nozzle 12 and supported by front and rear wheels 14. When used for floor nozzle cleaning, the cleaner is porpelled by a conventional pivoted handle 16. The cleaner 10 includes a motor 18 which actuates a shaft 20 for driving a suction fan 22 disposed in a fan chamber 24. The fan chamber 24 has an air inlet 26 which communicates with the nozzle 12. A brush roll or agitator 30 is rotatably mounted in the nozzle 12 and is driven by a belt 32 engaging the shaft 20. The front wall of the cleaner 10 is provided with an opening 34 through which the conversion adapter may be inserted to divert suction from the nozzle 12 to an attachment hose. The opening 34 is normally closed by a detachably mounted cover 36.

The conversion adapter embodying my invention includes a coupling member 38 and a conduit member 40. The coupling member 38 includes an enlarged cylindrical portion 42 and a reduced cylindrical portion 44 which are connected by a flat annular member 43. The annular member 43 may be integral with the cylindrical portions 42 and 44, as shown, or it may be a separate member interposed between and secured to the cylindrical portions 42 and 44 in a suitable manner. The reduced portion 44 of the coupling member is inserted into the juxtaposed end of the conduit member 40 and the nested portions of the coupling and conduit members are staked, peened or otherwise secured together at one or more points 46. To the other end of the conduit member 40 is secured a flexible hose 47 which carries a conventional cleaning tool (not shown). The coupling member 38 is provided with bayonet slots 50 formed in the cylindrical wall of the enlarged portion 42 and adapted to engage pins 52 projecting inwardly from the wall of the inlet 26.

In order to facilitate insertion of the adapter, to prevent binding when the adapter is to be withdrawn, and to reduce the cost of manufacture by eliminating the necessity of working to close tolerances, the cylindrical portion 42 of the coupling member is made slightly smaller than, and fits loosely within, the opening 26. This loose fit permits suction to leak between the portion 42 of the adapter and the inlet 26, thus lowering the efficiency of the cleaner.

To overcome this condition, I use a resilient annular member 54 which is made of thin spring sheet metal such as .094 stainless steel or the like, and which is carried by the outer reduced portion 44 of the coupling member 38. The annular member 54 includes an inner dished portion 58 which abuts against the inner end of the conduit member 40, and an outer flat portion 59 which abuts against the connecting wall 43. The inner end of the conduit member 40 and the wall 43 thus coact to position and retain the annular member 54. The annular member 54 has a greater diameter than the enlarged inner cylindrical portion 42 of the coupling member, so that an outer marginal portion 60 of the annular member 54 extends beyond the periphery of the portion 42.

In assembling the adapter, the outer portion 44 of the coupling member 38 is first inserted through the annular member 54. The outer portion 44 is then inserted into the conduit member 40 until the end of the conduit 40 is pressed tightly against the inner marginal portion of the dished portion 58 of the annular member 54. The nested portions of the conduit and coupling members are then peened or staked together, as at 46. The pressure of the end of the conduit 40 against the dished portion 58 causes the central portion

59 of the annular member 54 to abut tightly and yieldably against the connecting wall 43.

Operation

When it is desired to convert the cleaner from floor nozzle to attachment hose cleaning, the cover 36 is removed and the belt 32 is disengaged from the shaft 26. Coupling member 38 is then inserted through the opening 34 into the inlet 26 with the pins 52 in alignment with the mouths of the bayonet slots 50. The adapter is then turned by the rigidly connected conduit member 40 until the pins 52 fully engage the bayonet slots 50. This serves to draw the portion 42 of the coupling member 38 into the inlet 26, or to the left, as shown in Fig. 2. In this position, the marginal portion 60 of the annular member 54 yieldingly abuts against the rim 62 of the inlet 26. The annular member 54 being made sufficiently thin and flexible, the marginal portion 60 thereof will abut tightly against the rim 62 to provide a satisfactory seal between the fan chamber 24 and the nozzle 12, regardless of inaccurate or inexact machining or aligning of the pins 52, bayonet slots 50, conduit 40, coupling member 38, inlet 26 or rim 62. Moreover, the suction of the fan 22 tends to draw the marginal portion 60 of the annular member 54 in the direction of or against the shoulder 62 and thus assists in the formation of the seal referred to.

Also, since the load imposed on the annular member 54 by the suction of the fan 22 is in the direction of the seating of the marginal portion 60 thereof against the rim 62 of the inlet 26, the annular member 54 may be made of very thin metal without risk of breakage.

While I have shown and described the conversion adapter of my invention as applied to a vacuum cleaner for the purpose of diverting suction from the floor nozzle to an attachment hose or the like, it is to be understood that the adapter shown may be used to connect one conduit to another, or to connect a conduit or hose to an opening other than the inlet of a fan in a suction cleaner.

It will thus be seen that my adapter is made of parts which can be easily and inexpensively produced and assembled. Also, since the annular member 54 is retained in position by engagement with the end of the conduit member 40 and the connecting wall 43, the cost of welding or other fastening means is saved.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. The combination with a wall structure defining an opening, of means for connecting a conduit to said opening, comprising a first cylindrical portion adapted to be inserted into and to fit loosely within said opening, a second cylindrical portion rigidly secured to one end of said conduit, a wall interconnecting said first and second portions, a separate flexible annular member disposed between and retained in position by the end of said conduit and said wall, the outer marginal portion of said annular member extending beyond the periphery of said first portion and said opening and being so disposed that, when said first portion is inserted into said opening, the marginal portion of said annular member abuts tightly against the rim of said opening to form a seal, and means detachably securing said conduit to said opening.

2. An adapter for connecting a conduit in fluid flow relation to a member having an opening, said adapter comprising a first cylindrical portion adapted to be inserted into, and to fit loosely within, said opening, a second cylindrical portion rigidly secured to one end of said conduit, a wall interconnecting said first and second portions, a separate, resilient member having a central aperture through which said second portion extends, the inner portion of said member abutting against the edge of said conduit with the body of said member abutting against said wall, whereby said member is secured in position by the end of said conduit and said wall, the outer marginal portion of said annular member extending beyond the periphery of said first portion and said opening and being so disposed that, when said first portion is inserted into said opening, the marginal portion of said annular member abuts tightly against the rim of said opening to form a seal, and means detachably securing said conduit to said opening.

3. An adapter for connecting a conduit in fluid flow relation to a member having an opening, said adapter comprising a first cylindrical portion adapted to be inserted into, and to fit loosely within, said opening, a second cylindrical portion rigidly secured to one end of said conduit, a wall interconnecting said first and second portion, a separate, flexible member having a central aperture through which said second portion extends, the inner portion of said member being dished outwardly towards, and abutting against, the edge of said conduit with the body of said member abutting against said wall, whereby said member is secured in position by the end of said conduit and said wall, the outer marginal portion of said annular member extending beyond the periphery of said first portion and said opening and being so disposed that, when said first portion is inserted into said opening, the marginal portion of said annular member abuts tightly against the rim of said opening to form a seal, and means detachably securing said conduit to said opening.

CHARLES H. TAYLOR.