July 2, 1957 E. D. THORNWALD 2,797,430

VACUUM CLEANER CONSTRUCTION AND CLOSURE THEREFOR

Original Filed June 10, 1949 3 Sheets-Sheet 1

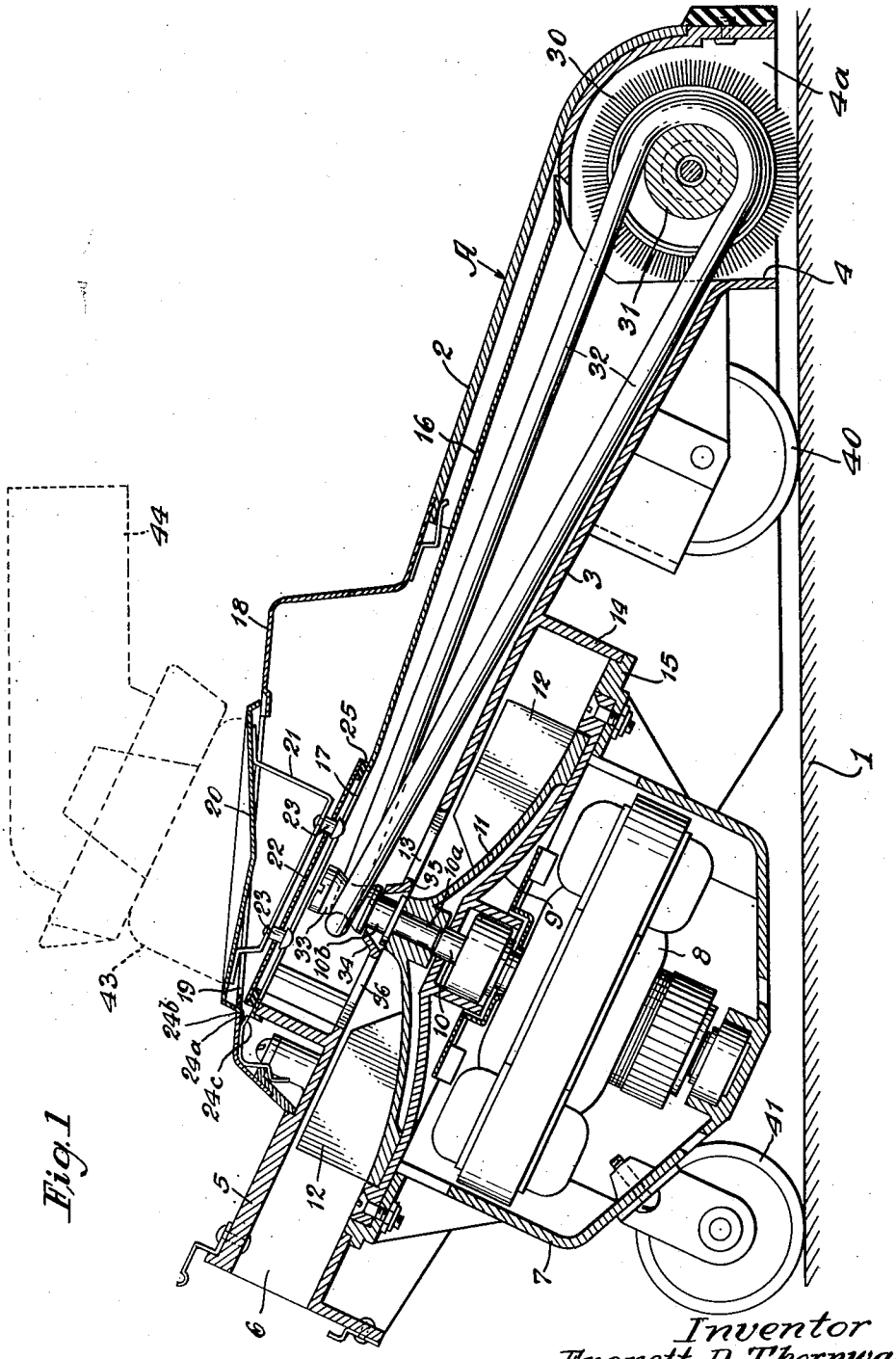


Fig. 1

Inventor
Everett D. Thornwald
by Parker & Carter
Attorneys

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VACUUM CLEANER CONSTRUCTION AND CLOSURE THEREFOR

Original Filed June 10, 1949 3 Sheets-Sheet 2

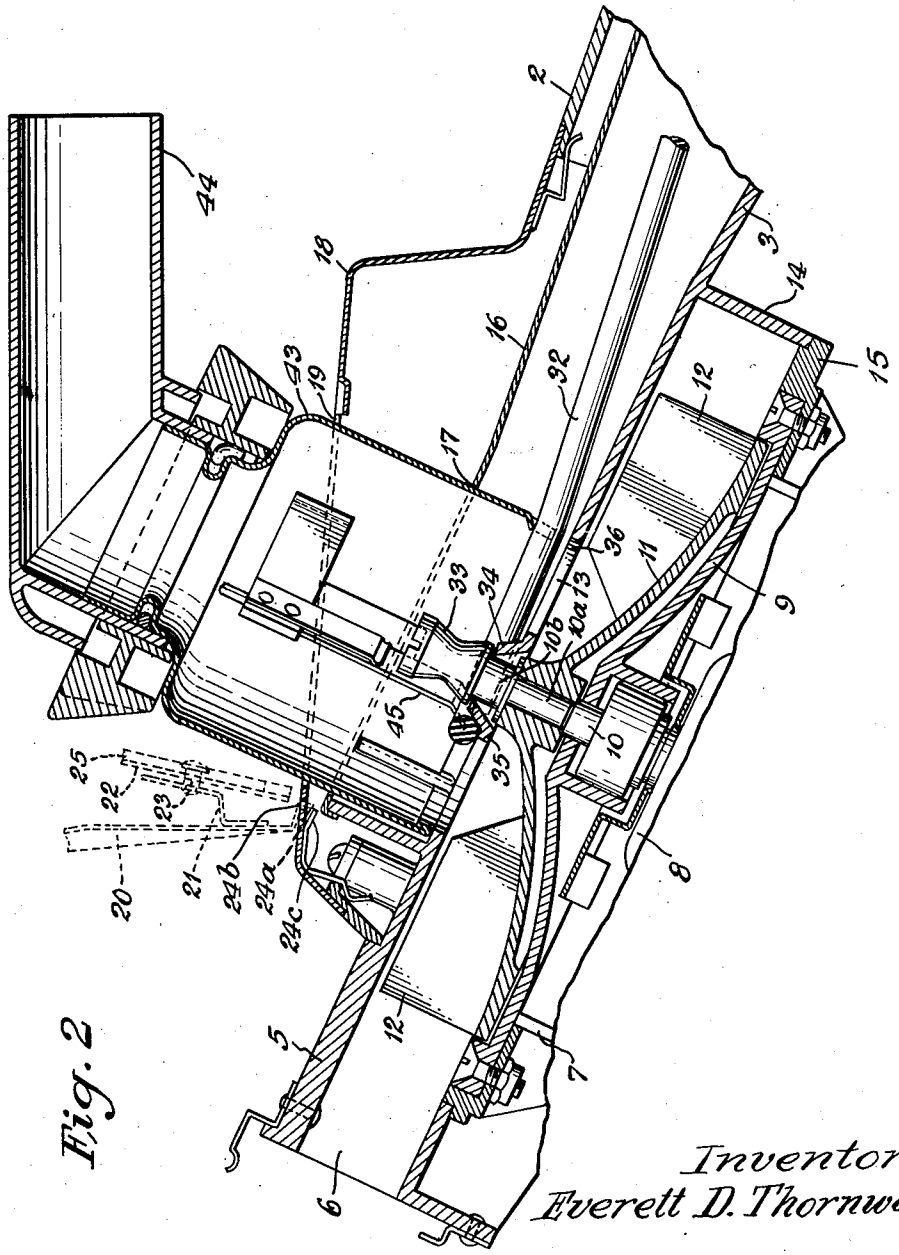


Fig. 2

Inventor
Everett D. Thornwald

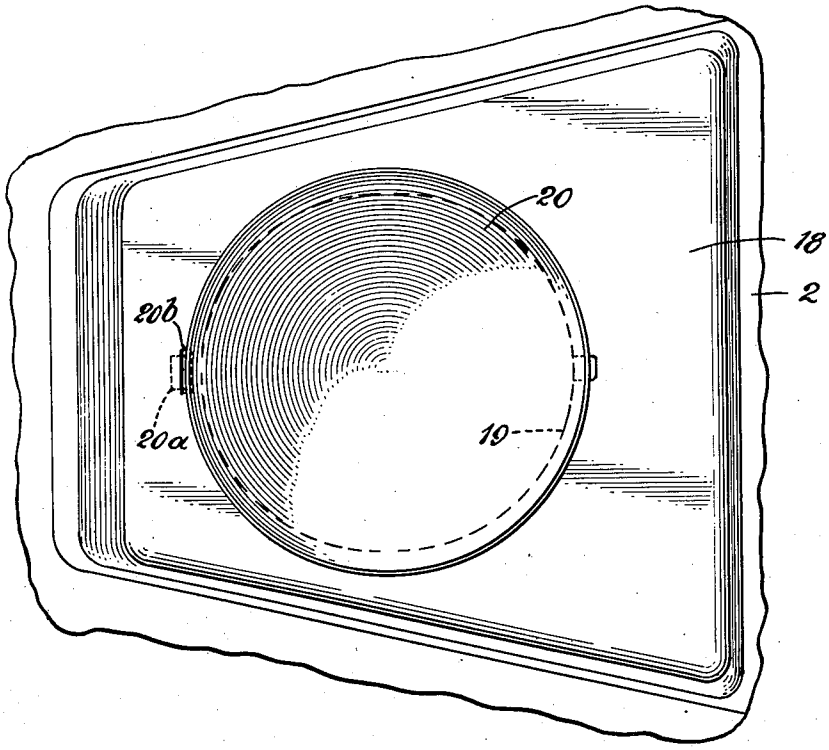
by Parker & Carter
Attorneys

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Fig. 3



Inventor
Everett D. Thornwald
by Parker & Carter
Attorneys

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VACUUM CLEANER CONSTRUCTION AND CLOSURE THEREFOR

Everett D. Thornwald, Glenview, Ill., assignor to Clements Mfg. Co., Chicago, Ill., a corporation of Illinois

Original application June 10, 1949, Serial No. 98,296, now Patent No. 2,708,766, dated May 24, 1955. Divided and this application February 8, 1955, Serial No. 486,821

4 Claims. (Cl. 15—332)

This invention relates to an improvement in vacuum cleaners and has for one purpose to provide an improved cleaner in which the provision is made for receiving a dusting tool adapter.

Another purpose is to provide an improved closure for a dusting tool adapter opening in a vacuum cleaner.

Another purpose of the present invention is the provision of an improved upper wall construction with an adapter closure embodied therein.

Other purposes will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a vertical longitudinal section;

Figure 2 is a partial vertical longitudinal section with a dusting tool in place; and

Figure 3 is a plan view of a portion of the cleaner shown in Figure 1 with the adapter dusting tool removed.

This is a division of my co-pending application Serial No. 98,296 filed on June 10, 1949, now U. S. Patent No. 2,708,766, issued May 24, 1955.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 indicates any suitable supporting surface such as a floor, rug or carpet. A generally indicates the forward portion or housing of a vacuum cleaner. It includes a forwardly and downwardly inclined upper wall 2 and a forwardly and downwardly inclined lower wall 3, the walls being suitably connected at their sides and terminating at the floor nozzle portion 4. The vacuum cleaner housing has a rear portion 5 which defines an outlet passage 6. 7 indicates a motor housing in which is positioned any suitable motor 8, the details of which do not of themselves form part of the present invention. The motor housing is closed at its upper end by a closure plate 9 through which extends a motor shaft 10. Positioned on an upper part 10*a* of the shaft is the fan body generally indicated as 11 and having any suitable fan blades 12. The upward continuation of the housing wall 3 is apertured as at 13 to provide an air inlet to the chamber formed by any suitable downwardly extending circumferential wall 14. 15 is any suitable housing or wall portion to which the plate 9 and the motor housing 7 may suitably be secured.

It will be understood that in response to rotation of the rotor of the motor 8, the motor shaft 10, 10*a* is rotated and thus the fan 11, 12. The result is an inflow of air through the aperture 4*a* of the floor nozzle 4, air flowing upwardly and rearwardly to the air inlet or suction inlet 13 of the fan chamber. The air is exhausted or discharged from the fan chamber or scroll through the outlet duct 6. It will be understood that any suitable receiving means, bag or duct may be employed to receive the dirty air delivered through the outlet passage 6. Since such a bag or container passage does

not of itself form part of the present invention, it is not illustrated herein. The actual air passage between the floor nozzle inlet 4*a* and the fan suction inlet 13 may be formed in part by an inner top plate 16 which is spaced from the upper wall 2. This plate is shown as having a normally closed air inlet 17. A preferably removable outer plate 18 overlies the rear portion of the cover plate 16 and is provided with a normally closed air inlet aperture 19. It will be understood that in the normal use of the device, a hinged and removable closure plate 20 is employed which carries an inner bracket 21 to which is movably secured the inner closure plate 22 mounted for limited movement upon the positioning and guiding elements 23. The plate 20 may be hinged as at 24, for ready removal. It will be understood that when the parts are in the position in which they are shown in Figure 1, the plate 20 somewhat loosely closes the inlet 19, whereas the plate 22 very snugly closes the air inlet 17. To prevent any substantial leakage, it may have a yielding packing ring or gasket 25. It will be understood that when the fan 11, 12 is rotating, the suction is effective to draw the plate 22 downwardly along the limiting guides 23 as far as the gasket 25 will permit. The result is a simple structure which efficiently prevents any damaging degree of air leakage through the aperture 17.

The hinge 24 may include a lug 24*a* insertable through an aperture 24*b* in the plate 18 adjacent to the air inlet aperture 19 as will be seen in Figure 3. A retaining member 24*c* may be joined to the upper plate 18 and spaced from the undersurface thereof as seen in Figure 2 so that when the closure moves from the open position shown in Figure 2, to the closed position shown in Figure 1, the lug 24*a* is received between the member 24 and the undersurface of the plate 18 adjacent thereto.

Suitably journalled or mounted in the nozzle 4 is a brush generally indicated as 30. The brush structure is not shown in detail, as it does not of itself form part of the present invention. It preferably includes a driven pulley 31 about which passes a belt 32 of suitable material, the belt 32 passing about and driving pulley 33, which may be contoured, as shown in Figure 1 to resemble two inwardly converging truncated cones. The pulley 33 may be mounted on any suitable extension 10*b* of the motor shaft 10. Surrounding extension 10*b* is a fixed conic abutment 34 which may be conveniently contoured as a continuing extension of the lower cone of the pulley 33. It includes also outwardly extending bottom limiting portions 35 and may be supported in fixed position by cross pieces 36 which extend to and may form part of the cleaner wall 3.

It will be understood that the cleaner housing may be supported by any suitable means, but front supporting rollers 40 and rear supporting rollers 41 are indicated.

In the normal use of the device, when the operator is merely moving the cleaner over a floor surface, the closures 20 and 22 remain in the full line position in which they are shown in Figure 1. The belt 32 passes about the pulleys 31 and 33. The rotation of the motor simultaneously operates the fan 11, 12 and the brush 30. Thus, the brush brushes the surface undergoing cleaning and the dust particles are drawn with the inflowing air upwardly through the nozzle aperture 4*a* upwardly and rearwardly between the walls 3 and 16 and downwardly through the fan chamber inlet 13 for escape through the exhaust duct 6.

An adapter tool 43 having an air intake duct 44 is adapted to be inserted through the aperture 19 and disrupt the driving connection between the pulley 33 and belt 32 as by means of a belt contacting member 45 which is carried by the adapter 43. The adapter tool

shown herein is the same form of adapter tool shown and described in my co-pending original application, Serial Number 98,296 filed on June 10, 1949, now U. S. Patent No. 2,708,766, issued May 24, 1955.

Whereas I have shown and described an operative form of my invention, I wish it to be understood that this is to be taken in a diagrammatic or illustrative sense only. There are other physical embodiments of my invention which will be apparent to those skilled in the art. The scope of the invention, therefore, should be limited only by the scope of the hereinafter appended claims.

The use and operation of my invention are as follows:

I illustrate a vacuum cleaner with a dusting tool attachment which is insertable through the upper wall of the cleaner. The user of the cleaner, by the simple downward movement of the adapter along an axis aligned with the axis of the pulley **33**, disrupts the driving connection to the floor nozzle and establishes communication between the fan and the air intake conduit **44**.

I find it particularly advantageous to use the double wall construction shown and described herein for the upper wall of the cleaner. It is particularly efficient in terms of the air drawn through the floor nozzle **4** and through the nozzle **44**.

I find it advantageous to provide a closure construction which closes both the aperture **19** and the aperture **17**. When the closure elements **20** and **22** are moved from the open position illustrated in Figure 2 to the closed position shown in Figure 1, the normal suction developed by the fan **12** pulls the closure **25** into tight sealing engagement with the upper portion of the wall **16** surrounding the aperture **17**. When it is desired to use the adapter tool **43**, however, the user of the cleaner will normally shut off the fan which breaks the suction force inserted against the closure plate **25** and the user by simply exerting a small upward pressure against the end of the closure opposite to the hinge **24** may flip the closure to the open position and then insert the adapter **43**. It should be noted that the member **24***c* is spaced from the undersurface of the wall **18** in such a way that the lower end of the lug **24***a* is disposed adjacent to the end of the element **24***c*.

No latching elements for the closure are necessary and when the cleaner is not in use, the closure will be held in place by the combined action of gravity, the lug **24***a* and member **24***c*.

I claim:

1. In a vacuum cleaner having a motor, a fan driven thereby, a fan housing, and a floor nozzle, said fan housing having a suction inlet in communication through an air passage with said floor nozzle, a double wall for said vacuum cleaner including inner and outer walls, each spaced from said suction inlet, the inner wall assisting in defining said air passage between the floor nozzle and the suction inlet, the two walls being spaced apart and having apertures in line with the suction inlet, and unitary closure means for said apertures including an outer closure hinged to the outer wall of the double wall and an inner closure movably mounted on the outer closure, whereby when the fan is driven by the motor, the inner closure is adapted to be suctionally held in sealing closing relation to the aperture of the inner wall.

2. The structure of claim 1 wherein said inner closure is mounted on spaced lugs carried by said outer closure, and said lugs are adapted to extend generally parallel with the axis of said aperture of the inner wall when said closure is in the closed position.

3. The structure of claim 1 characterized by and including a lug on said outer closure and insertable through an aperture in said outer wall, and a retaining member carried by said outer wall and spaced therefrom adjacent said aperture, said lug, when inserted through said aperture, and during rotation of said closure being adapted for movement into the space between said retaining member and said outer wall, said lug and said retaining member forming cooperating hinge elements for said closure.

4. A vacuum cleaner including a cleaner body adapted for movement over a supporting floor, said body having a fan chamber and a fan therein, an air intake duct extending from above said fan chamber to a point adjacent the supporting floor and in communication with said fan chamber, a floor nozzle carried by said air intake duct, the upper portion of said air intake duct being defined by an outer exposed wall and an inner wall spaced therefrom, said inner and outer walls having aligned apertures for the insertion of an adapter therethrough, said apertures being generally aligned with the axis of said fan, an outer closure hingedly mounted on said outer wall and movable between a closed position overlying the aperture in said outer wall and an open position allowing passage of an adapter through said aperture, an inner closure mounted on said outer closure for limited movement with respect thereto, said inner closure being mounted for movement along an axis extending generally parallel to the axis of said fan when said outer closure is moved to its closed position, the normal suction of said fan being effective to pull the inner closure into tight sealing engagement with the aperture in said inner wall, the portion of the outer wall surrounding the aperture therein being substantially horizontal so that said outer closure rests by gravity on said outer wall when said fan is idle.

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