July 15, 1958 C. E. HANSEN 2,843,314

VACUUM CLEANER SUCTION UNIT

Filed Sept. 27, 1954 3 Sheets-Sheet 1

Fig. 1.

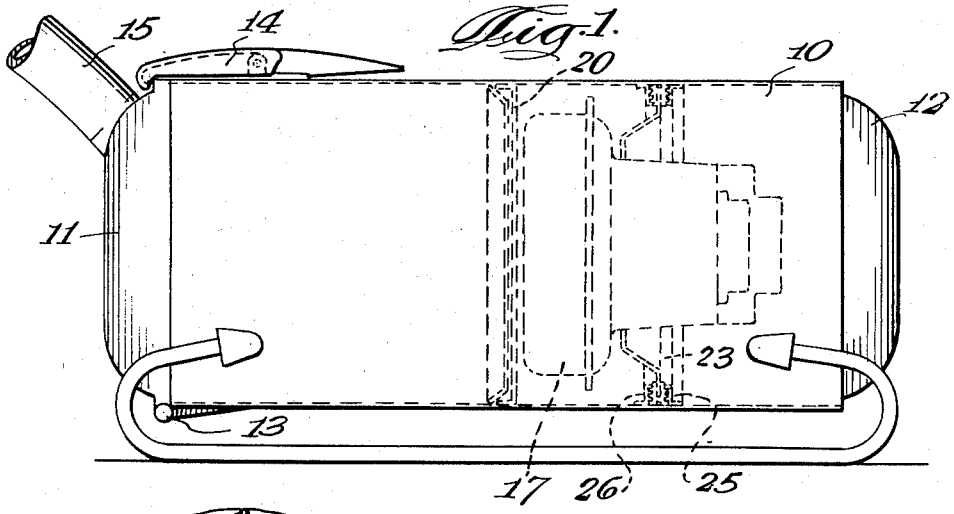


Fig. 4.

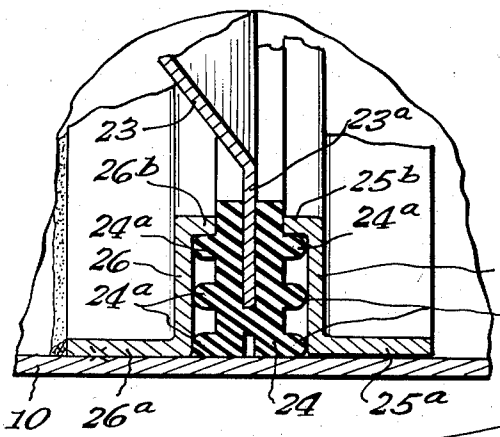
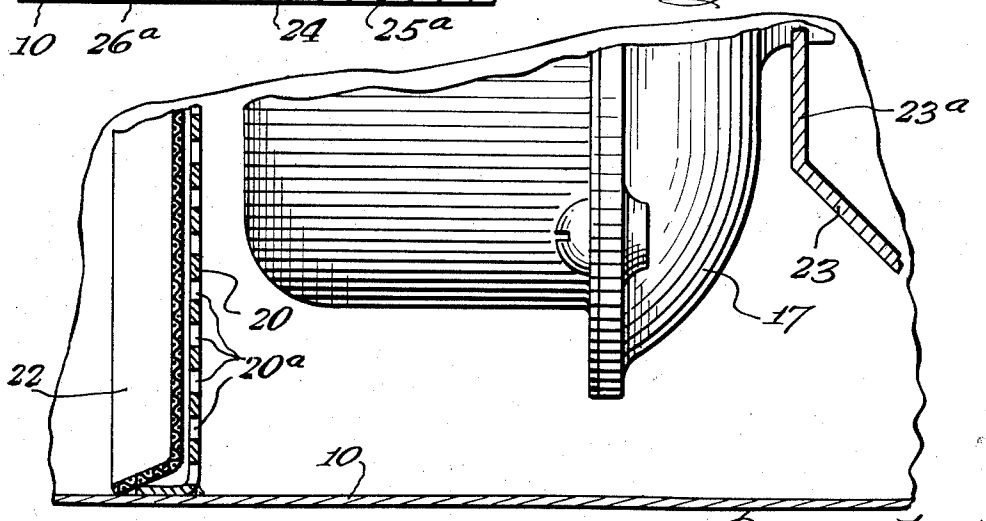


Fig. 5.



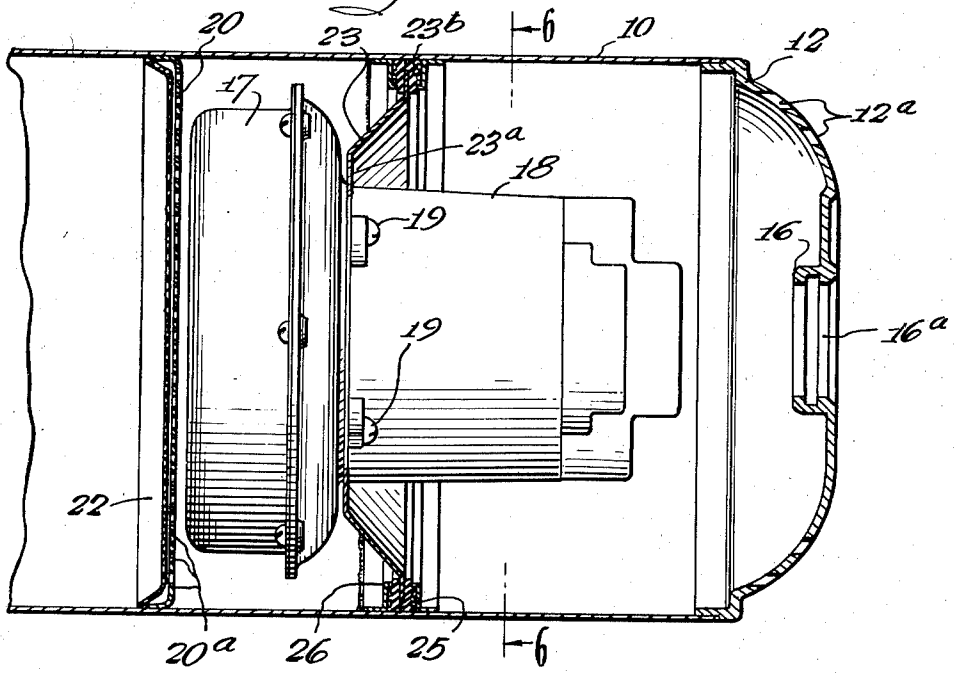
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VACUUM CLEANER SUCTION UNIT

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Fig. 2.



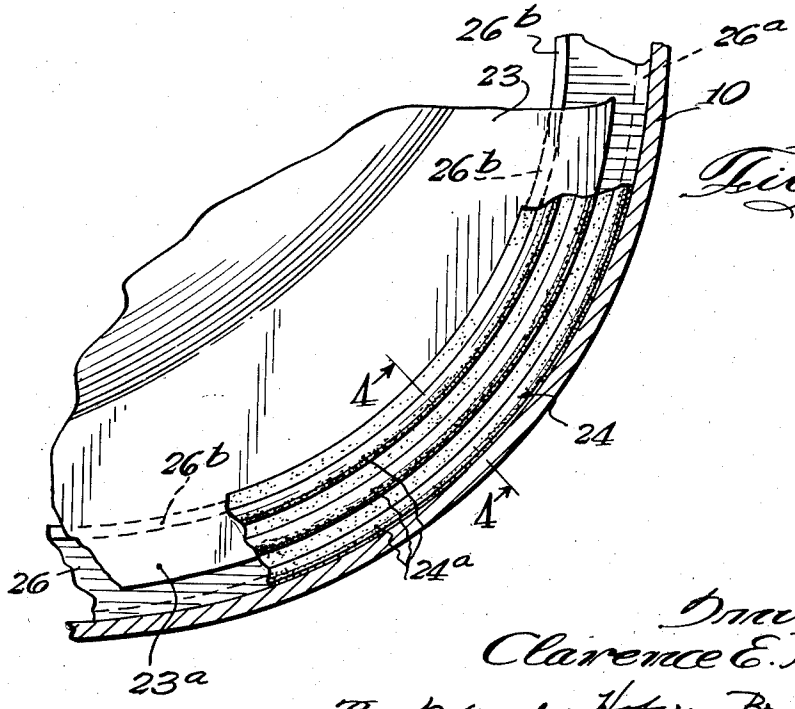


Fig. 3.

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VACUUM CLEANER SUCTION UNIT

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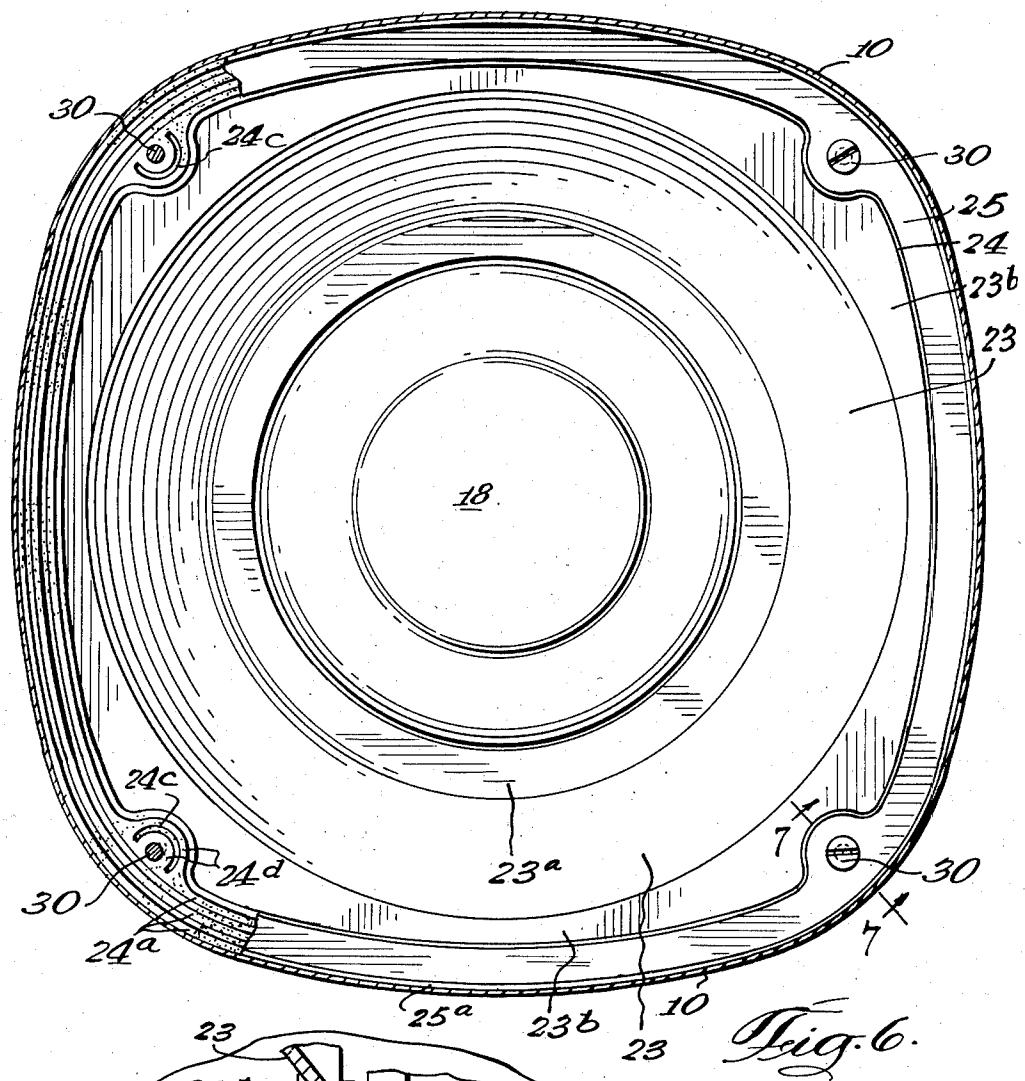


Fig. 6.

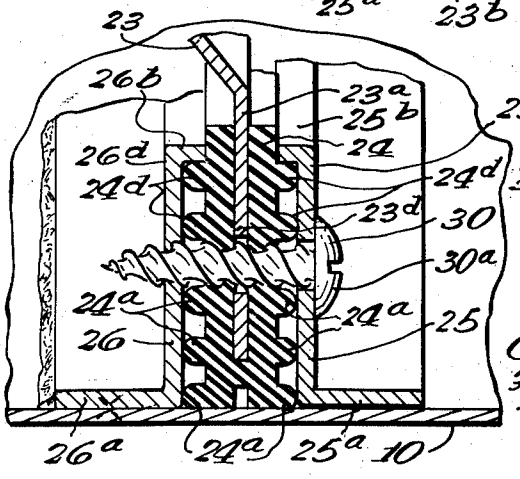


Fig. 7.

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United States Patent Office 2,843,314
Patented July 15, 1958

2,843,314

VACUUM CLEANER SUCTION UNIT

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Application September 27, 1954, Serial No. 458,597

2 Claims. (Cl. 230—232)

This invention relates to a vacuum cleaner suction unit.

Many vacuum cleaners employ a motor-fan unit comprising a fan structure including a multi-stage fan and a motor structure attached thereto in alignment so that the assembly can be handled, installed and removed as a unit from the vacuum cleaner.

When such a unit is installed in a vacuum cleaner, there are serious problems involved not only of mounting the unit for effective operation, but also in reducing the vibration and noise caused by the operation of the motor and fan unit. The present invention is concerned with an improved supporting apparatus for such a unit by means of which the unit is securely supported and vibration and thus resulting noise effectively reduced.

The invention will be described as related to the embodiment shown in the accompanying drawings. Of the drawings:

Fig. 1 is a side elevational view of the cleaner embodying the invention.

Fig. 2 is a fragmentary vertical sectional elevation, taken through the rear portion of the cleaner of Fig. 1.

Fig. 3 is a fragmentary elevational view, partially broken away for clarity of illustration, showing the support means adjacent to the shell of the cleaner.

Fig. 4 is a sectional elevational view, taken substantially along line 4—4 of Fig. 3.

Fig. 5 is an enlarged fragmentary detailed view, illustrating the support for the suction fan end of the motor-fan unit.

Fig. 6 is a detailed cross sectional view of the vacuum cleaner, taken substantially along line 6—6 of Fig. 2 but omitting the motor.

Fig. 7 is an enlarged sectional elevational view, taken substantially along line 7—7 of Fig. 6.

In the embodiment shown in the drawings, the vacuum cleaner includes a shell **10**, a front end cap **11** closing this end of the shell and a rear end cap **12** closing the rear end of the cleaner. The front cap **11** is hinged to the shell **10** as by means of the hinge **13** and this end cap is releasably locked closed by means of a toggle catch **14**. This front end cap **11** is provided with an inlet opening in which an air intake conduit such as an ordinary hose **15** may be attached. The rear end cap **12** is provided with air outlet openings **12***a* and a central air outlet **16***a* defined by an inwardly extending tubular member **16**.

Positioned within the interior of the vacuum cleaner shell **10** is a motor-fan unit comprising a multi-stage fan structure **17** and a motor structure **18** attached together in longitudinal alignment. Both the fan structure and the motor structure are conventional and are widely used in vacuum cleaners of this type. As can be seen, the motor and fan structures may be bolted together by means of a plurality of bolts **19**.

Extending across the interior of the shell **10** is a foraminous sheet metal member **20** provided with a plurality of holes **20***a*. This foraminous member **20** extends all the way across the shell **10**. The member **20** may be provided with a fibrous filter **22**. This filter acts as a secondary filter to remove any particles of dirt or dust that may be left in the airstream before it enters the motor and fan unit. As is customary in vacuum cleaners of this type, the primary filtering function is performed by a bag filter (not shown) either of cloth, paper or similar material positioned in the front of the cleaner and in communication with the inlet hose **15**.

The supporting apparatus for the motor and fan unit includes a bracket attached to the unit intermediate its ends and extending rearwardly of and toward the vacuum cleaner casing. In the embodiment shown, this bracket **23** is annular and has the shape of a truncated cone. The bracket is provided with substantially parallel opposite side flanges **23***a* and **23***b*. The bracket **23** extends rearwardly of the unit and to a point adjacent to the inner surface of the shell **10**. The bracket is attached in place by bolting the inner flange **23***a* between the fan structure **17** and the motor structure **18**. The bolts **19** serve to provide this connection.

The outer edge of the bracket **23** is resiliently supported by the shell **10**. In order to provide this resilient support, this outer edge is held in a gasket **24** which in turn is held by a channel member **26** having a flange **26***a* attached as by welding to the inner surface of the shell and a second flange **26***b* extending toward the bracket **23** and in engagement with an inner rib **24***a* of the gasket **24**. The sides of the gasket **24** are provided with a plurality of these spaced ribs **24***a*, as is shown most clearly in Fig. 4.

The side of the resilient gasket **24** opposite to the channel member **26** is grasped by a second channel member **25** similar in shape but smaller in outer diameter than the channel member **26**. This second channel member also has an outer flange **25***a* but this flange is adjacent to but spaced inwardly of the casing **10** and is unattached thereto. The second channel member **25** also has an inner flange **25***b* extending toward the similar flange **26***b* of the other channel member and also bearing against the inner surface of an inner rib **24***a*. This second channel member is unattached to the casing **10**.

Each channel member **25** and **26** is provided with four inwardly extending arcuate portions **25***d* and **26***d* as illustrated at Figure 7. Each pair of arcuate portions **25***d* and **26***d* is located opposite to each other and at an inner corner of the vacuum cleaner. The resilient gasket **24** is similarly provided with inwardly extending arcuate portions **24***c* located between the arcuate portions **25***d* and **26***d*. Each pair of channel member arcuate portions **25***d* and **26***d* with the gasket arcuate portion **24***c* is provided with a clamping screw **30**. Each clamping screw **30** has its head **30***a* bearing against the outer surface of the movable channel member **25** and its threaded body extending through the resilient gasket **24**, through an opening **23***d* in the bracket **23** and into threaded engagement with the fixed channel member **26**. The opening **23***d* in the bracket is considerably larger than the cross sectional diameter of the screw so that the screw is out of contact with the bracket.

The screws **30** hold the gasket **24** clamped between the channel members **25** and **26**. This provides a resilient support for the bracket **23** and thus for the motor and fan unit. This resilient support is substantially free floating because the gasket itself is resilient and because the channel members **25** and **26** bear against the outer surfaces of the flexible ribs **24***a*. These ribs, together with the remainder of the gasket, serve to support the bracket and motor and fan unit and also to efficiently absorb vibration.

With the above construction, the resilient mounting of the motor and fan unit serves to decrease vibration and

noise during the operation of the cleaner. As the annular bracket **23** is substantially rigid, the vibration caused by the motor structure **18** is conducted to the gasket **24** where it is largely absorbed.

Because of the dish shape of the bracket **23**, this bracket can be made of relatively thin steel without danger of being too weak. Thus, the dish shape actually contributes to the strength of the bracket and its ability to resist bending. The particular shape of the bracket also permits it to be attached at the juncture of the motor and fan structures where the fastening means for these structures, such as the bolts **19**, may be utilized and also permits the bracket to extend rearwardly so that the supporting gasket **24** can be located approximately opposite to the center of gravity or balance of the relatively heavy motor structure **18**. The bracket **23** being air impervious also prevents air escaping around the motor and fan unit but directs all of the air into the inlet **17***a* of the fan and from there through the motor structure **18** where it serves the cleaner cooling function.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. In a vacuum cleaner including a horizontal casing, an electric motor structure therein, a fan structure and means attaching the motor and fan structures in alignment to form a horizontal motor-fan unit within the casing, supporting apparatus, comprising: an annular air impervious nonplanar bracket arranged generally vertically attached to and extending around said unit and having its outer peripheral edge portion adjacent to said casing; a resilient gasket embracing said peripheral edge portion; an annular support member attached to said casing and enclosing a portion of said gasket but out of engagement with said bracket; and clamping means spaced from said casing clamping said gasket against said support member and also out of engagement with said bracket so that the bracket and thus the motor-fan unit is supported substantially entirely by said gasket.

2. The vacuum cleaner of claim 1 wherein the gasket has two opposing sides and a pair of spaced inner surfaces, and said support member comprises a clamping member on one side of the gasket having an inner rim portion embracing one of said inner surfaces of said gasket, and said clamping means comprises a second clamping member on the opposite side of the gasket having an outer edge portion located inwardly of and out of contact with said casing and an inner rim portion embracing the other inner surface of said gasket.

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