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2,482,166

STATIONARY FILTER TYPE SUCTION CLEANER

Filed July 16, 1947

3 Sheets-Sheet 2

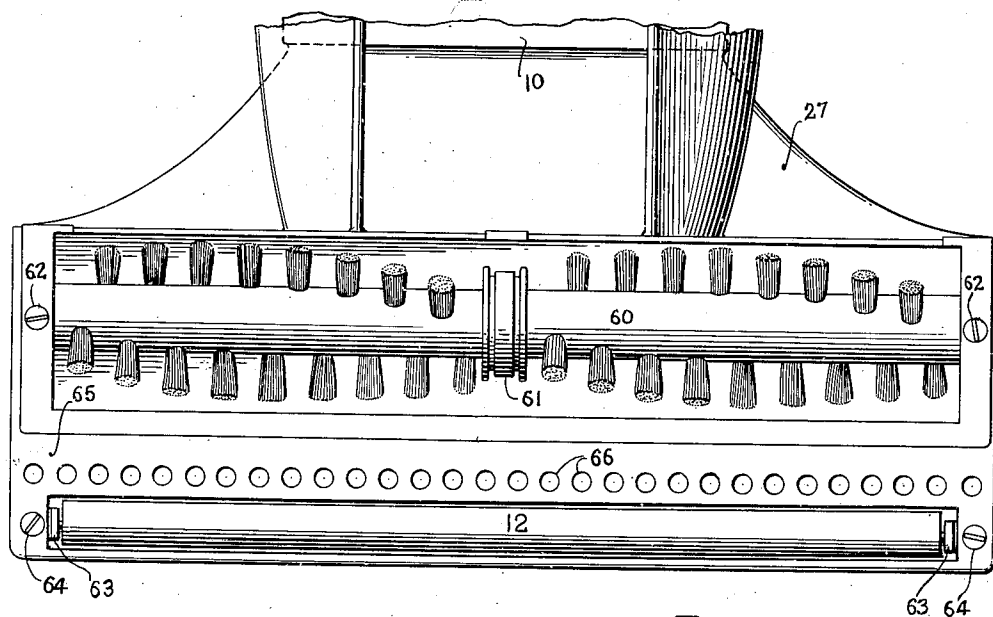


FIG. 2

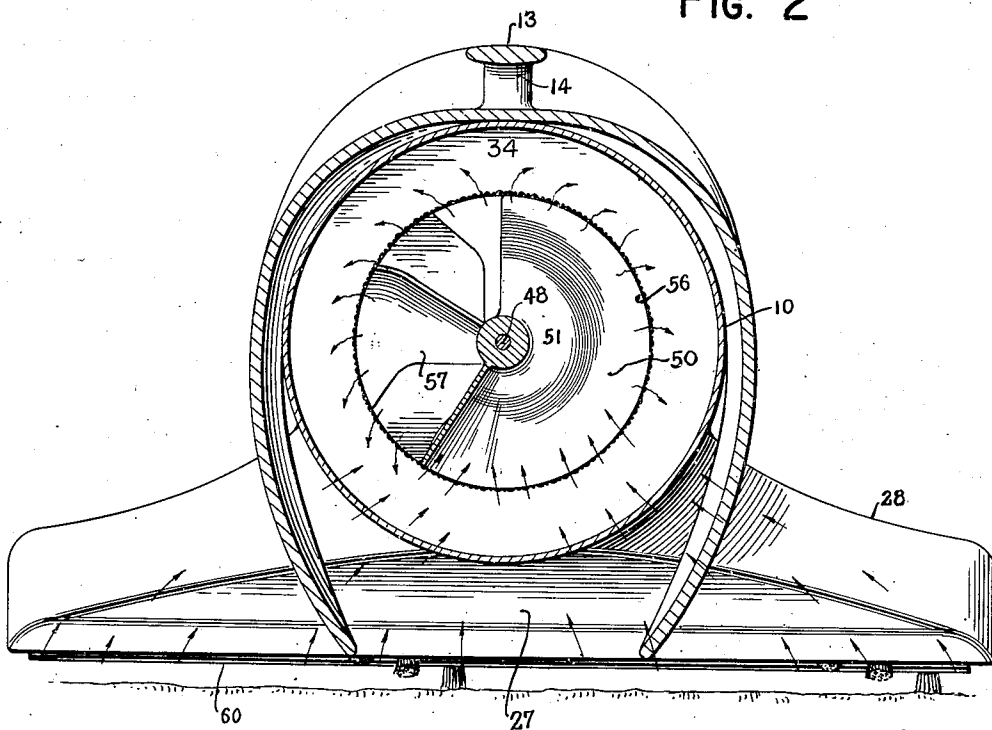


FIG. 3

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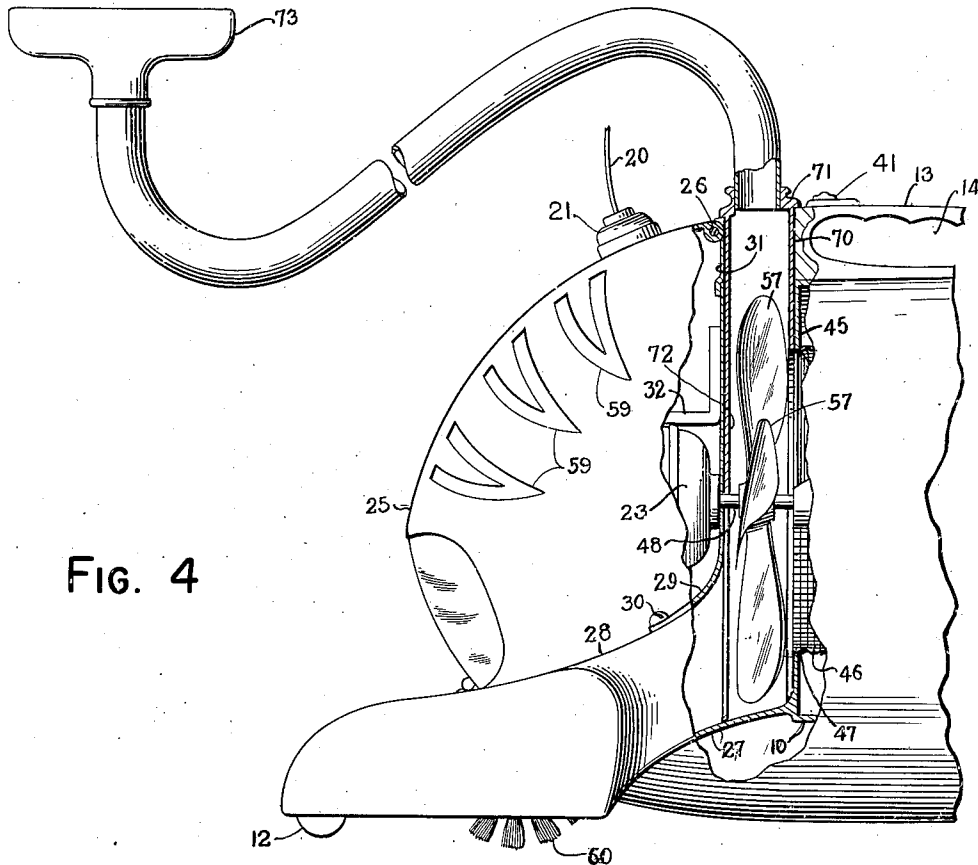


FIG. 4

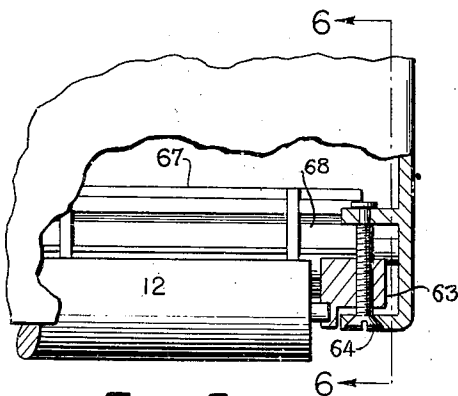


FIG. 5

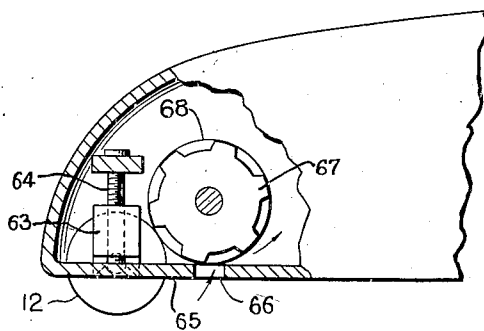


FIG. 6

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STATIONARY FILTER TYPE SUCTION
CLEANER

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4 Claims. (Cl. 183—52)

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The present invention relates to a stationary filter type suction cleaner and has for its object the provision of a self-contained suction cleaner of the bagless type.

The present invention contemplates a completely self-contained suction cleaner in which all of the operating parts of the cleaner and the dust or dirt compartment are enclosed within a unitary housing.

It is a further object of the invention to provide a unitary suction cleaner construction that is light in weight and susceptible of easy portability, particularly when used in combination with the suction attachments therefor.

More specifically, the invention contemplates a suction cleaner embodying a unitary housing embracing a longitudinally extending cylindrical filter and motor operated means for insuring relative movement between the cylindrical filter and a device for maintaining the filter free from dirt.

Further and more detailed objects of the invention will become apparent as the description proceeds, which will be given in connection with the accompanying drawings forming a part hereof and in which:

Figure 1 is a longitudinal sectional view through the cleaner housing disclosing the relationship of parts therein;

Fig. 2 is a fragmentary bottom plan view illustrating the suction nozzle and associated elements;

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary side elevational view of the front end of the suction cleaner disclosing the manner of application of a suction attachment thereto;

Fig. 5 is a detailed sectional view of the adjustable front roller mounting; and

Fig. 6 is a fragmentary cross sectional view on the line 6—6 of Fig. 5.

Referring to Figure 1, the suction cleaner housing is indicated generally at 10 and is provided with rear caster wheels 11 and a vertically adjustable transversely extending front roller 12. The housing 10 has a streamline upward extension 13 provided with hand hold opening 14 and with transverse openings 15 for the attachment of a shoulder strap diagrammatically illustrated at 16—17. The housing 10 is also provided with a suitable detachable elongated handle 18 adapted to be attached to the housing as indicated at 19 for use when the suction cleaner is to be pushed over the floor. A suitable extension cord 20, having a plug 21 and embracing a conventional

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switch 22, supplies current for the motor 23 and for the headlight 24, so positioned as to light up the floor in advance of the suction cleaner. The plug 21 and the headlight 24 are mounted in a curved streamline pivoted front section 25 of the housing 10 which is adapted to be moved into the dotted line position of Figure 1 about the pivot point 26.

The housing 10 terminates at its forward end in a laterally flared portion having the lower wall 27 and the upper wall 28 to provide therebetween a suction nozzle extending transversely of the suction cleaner. The upper wall 28 of the suction nozzle has secured to the rear end thereof a partition member 29 secured to the wall 28 through the medium of appropriate screws such as 30. The partition member 29 extends vertically through the housing and is affixed at its upper end to a rigid flange 31 carried by the housing 10. The arrangement is such that the partition 29 forms a wall separating the motor from the path of dust and dirt laden air moving through the suction cleaner. A motor supporting bracket 32 is affixed to the partition wall 29 and supports the motor 23 through the motor supporting bracket 33.

The rear wall of the housing 10 is provided with a plurality of openings 34 through which the dust free air is expelled from the suction cleaner. The housing 10 is additionally provided with an integral transverse partition member 35 at the rear end thereof, to the lower rearmost portion of which the door 36 of the dust and dirt compartment 37 is pivoted as indicated at 38. The door 36 is adapted to be held in closed position by the retractable latch 39. The transverse partition 35 carries at its forward end a circular plate 40 which is welded or otherwise suitably secured to the transverse partition 35 as indicated at 41. The circular plate 40 is formed with a central depression 42 for receiving the race of the ball bearing 43. The circular plate 40 is flanged around its periphery as indicated at 44. The housing 10 is provided with an inwardly extending annular flange 45. A cylindrically formed filter screen 46 is attached at one end throughout its circumference to the flange 45 as indicated at 47. The opposite end of the screen 46 has its lower portion cut away as indicated at 48 and the remainder thereof secured to the flange 44 of the circular plate 40. The arrangement is such that the cylindrical filter screen 46 is held stationary in the housing 10. The cut away portion of the filter screen 46 is indicated at 48 and communi-

cates with the dirt receiving chamber 37 at the lower rear portion of the housing 10.

The motor shaft 48, it will be observed, extends both forwardly and rearwardly from the motor 23. This motor shaft 48 passes through and is partially supported by the partition wall 29 and extends centrally through the stationary cylindrical filter 46 and has its extreme rear end 49 received in the ball bearing 43 positioned in the central recess 42 of the stationary circular plate 40. The motor shaft 48 rotates freely within the ball bearings 43. A helical conveyor element 50 having the hub 51 is rotatably mounted on the motor shaft 48. The rear end of the helical conveyor member 50 is rigidly secured to the circular plate 52 having the internally toothed flange 53 which provides what may be termed a sun gear integrally carried by the helical conveyor element 50. A small gear 54 is mounted on the motor shaft 48 immediately adjacent the bearing 43 and meshes with an intermediate gear 55, which in turn meshes with the internal or sun gear 53 for driving the helical conveyor 50 from the motor shaft at a substantially lower speed of rotation than that of the motor shaft. This mode of operation is achieved through the reduction gears 54, 55 and 53. The blades of the helical conveyor 50 terminate in close juxtaposition to the stationary cylindrical filter 46, as indicated at 56, so that any dirt collecting on the interior wall of the cylindrical filter 46 is constantly removed therefrom and carried by the helical conveyor 50 to the opening 48 in the lower rear portion of the cylindrical filter 46 and discharged therethrough into the dirt receiving chamber 37.

The suction inducing fan 57 is mounted on the motor shaft 48 intermediate the forward end of the helical conveyor element 50 and the partition member 29. The arrangement is such that the suction inducing fan 57 rotates at the speed of rotation of the motor shaft 48. A small fan 58 is mounted forwardly of the motor 23 on the motor shaft 48 for the purpose of effectively cooling the motor 23. It will be observed by reference to Fig. 4 that the front portion of the housing 10 is vented as indicated at 59 to admit the circulation of cooling air for the motor 23. A rotatable sweeper brush 60 extends transversely of the suction cleaner and is mounted for rotation in the suction nozzle provided between the walls 27 and 28. The rotating sweeper brush 60 is driven by a belt 61 trained over the forward end of the motor shaft 48 between the fan 58 and the end thereof to thus provide a positive drive for the sweeper brush 60. The ends of the sweeper brush 60 are supported in appropriate vertically adjustable bearings, not shown, through the medium of screws 62 (Fig. 2).

The rotatable roller 12 has its ends supported in vertically adjustable bearings 63 mounted on screws 64, as more particularly illustrated in Fig. 5. Slightly to the rear of the front roller 12 and intermediate that roller and the transverse suction slot in which the rotating brush 60 is mounted, the lower wall 65 of the housing 10 (Figs. 2 and 6) is provided with a series of openings 66 arranged transversely of the suction cleaner. Just above the series of openings 66 there is mounted a roller 67 extending transversely of the suction cleaner and provided along its periphery with a longitudinally extending groove 68. The roller 67 is driven by frictional contact with the floor contacting roller 12. The arrangement is such that the groove 68 of the

roller 67 are successively brought into register with the series of openings 66 with a result that a mild pulsation or vibration of the rug or carpet being cleaned is effected immediately in advance of the rotating brush 60. This pulsating action, effected through the medium of the grooved roller 67 and the openings 66, acts to loosen the dirt in the carpet and to raise the nap so that the sweeper brush 60, acting in co-operation with the suction induced through the medium of the fan 57, effectively frees the rug or carpet of the dirt which follows the path of the arrows shown in Figure 1. Specifically, the dust laden air moves past the fan 57 and into the helical path around the blades of the helical conveyor 50. The dust and dirt are collected on the inner wall of the stationary cylindrical filter 46 and the dust free air passes out through this filter into the annular space surrounding the same and thence past the circular plate 40 above the transverse partition 55 and is expelled through the openings 34 in the rear of the housing.

In this operation the motor 21 drives the motor cooling fan 58 and the suction inducing fan 57. It likewise drives the helical conveyor 50 through the reducing gears 54, 55 and 53. The speed of rotation of the helical conveyor 50 is determined by the ratio of said reducing gears. Likewise, the motor 23 drives the rotating sweeper brush 60 through the medium of the belt 61. The blades of the helical conveyor 50 substantially contact the cylindrical filter 46 and keep the same free from any accumulation of dust and dirt, the latter being advanced by the helical conveyor and discharged into the dust receiving compartment 37 from which it may be removed at will by opening the door 35 thereof.

Normally, when the suction cleaner is being employed for the cleaning of carpets, rugs and the like, the closure plug 69 is positioned in the openings 70 immediately above the suction fan 57. When, however, the portable suction cleaner is to be employed with a suction attachment for cleaning upholstered furniture, walls and the like, the closure plug 69 is removed from the opening 70 and an attachment coupling 71 (Fig. 4) is inserted in the opening 70 in place of the plug 69. The attachment coupling 71 is provided with a bifurcated extension 72 that is adapted to pass down around the motor shaft 48 and substantially close off the passageway between the walls 27 and 28 of the suction nozzle to thereby cause the suction inducing fan 57 to impose its primary suction on the attachment 73.

Inasmuch as the suction cleaner is extremely compact and light in structure it can be carried on the shoulder of the operator through the medium of the attaching strap 16-17 and this facilitates its use in association with various attachments conventionally employed in the suction cleaner art.

Having thus described my invention, what I claim is:

1. A suction cleaner of the bagless type comprising a housing, a motor mounted in the housing, a motor shaft extending longitudinally of the housing, a stationary cylindrical filter surrounding the motor shaft, a rotatable helical filter cleaning blade mounted on the motor shaft interiorly of said stationary filter, and means for driving said filter cleaning blade from said motor shaft.

2. A suction cleaner of the bagless type comprising a housing, a motor mounted in the hous-

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ing, a motor shaft extending longitudinally of the housing, a stationary cylindrical filter surrounding the motor shaft, a rotatable helical filter cleaning blade mounted on the motor shaft interiorly of said stationary filter, and means for driving said filter cleaning blade from said motor shaft, including planetary gear reducing means.

3. A suction cleaner of the bagless type comprising a housing, a vertically extending partition member in the housing providing a motor section thereof separate from the dust laden air receiving portion thereof, a transverse partition at the opposite end of said housing for segregating a portion thereof as a dust and dirt collecting chamber, a motor shaft bearing carried by said transverse partition, a motor shaft having one end thereof mounted in said bearing and projecting through said vertical partition, a motor for driving said motor shaft, a stationary cylindrical filter in said housing, a suction fan carried by said motor shaft, a helical filter cleaning blade carried by said motor shaft, and means for driving said filter cleaning blade at a lower rate of speed than the speed of said suction inducing fan.

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4. A suction cleaner comprising a housing, an elongated cylindrical filter member stationarily mounted in said housing, a filter cleaning instrumentality rotatably mounted within said stationary cylindrical filter member, a suction inducing fan in said housing, a motor for driving said suction inducing fan and said rotating filter cleaning instrumentality, and planetary gearing disposed beyond one end of said filter for driving said filter cleaning instrumentality at a different rate of speed than the suction inducing fan.

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