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SUCTION CLEANERS

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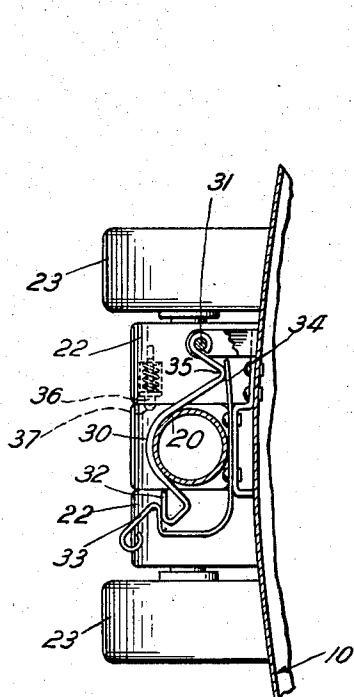


FIG. 3

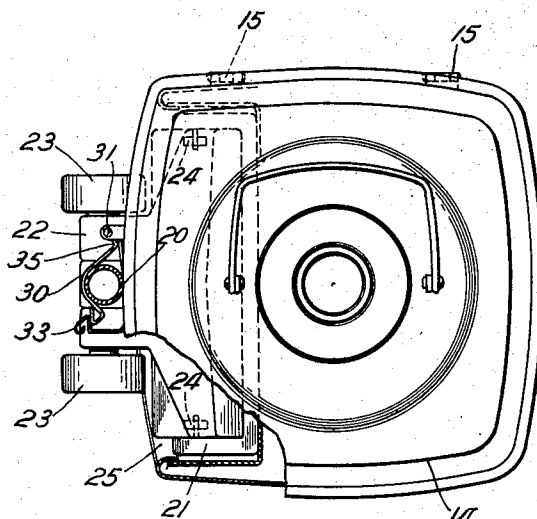


FIG. 2

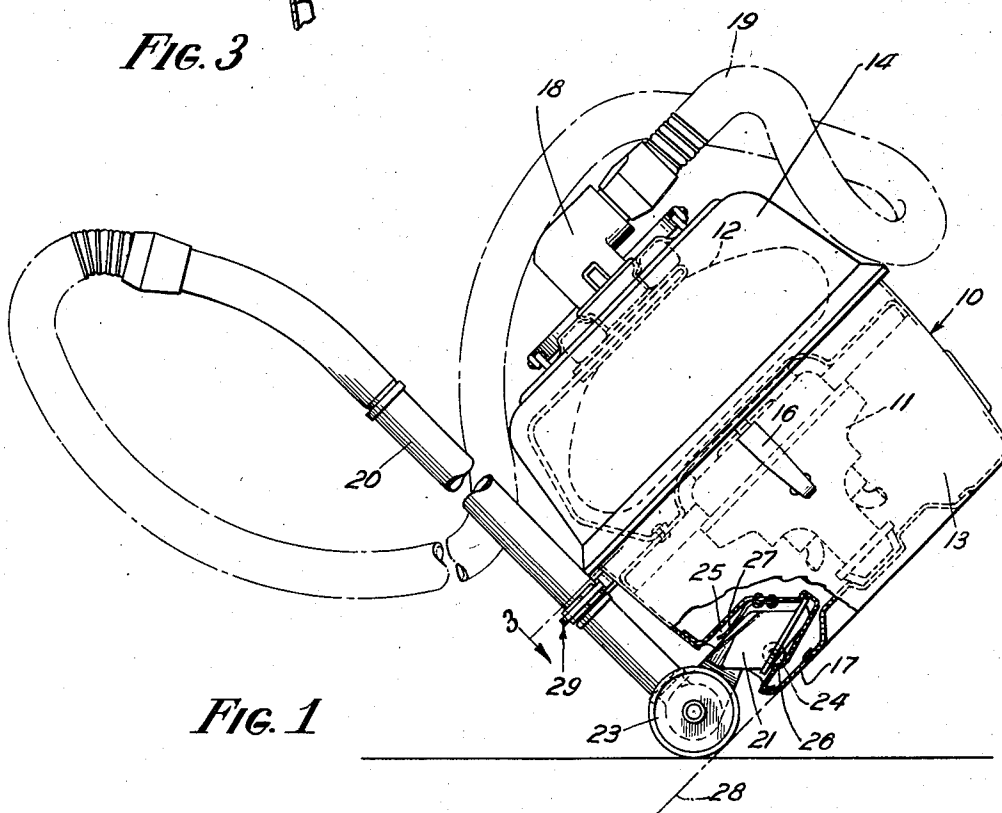


FIG. 1

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SUCTION CLEANERS

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The instant invention relates to suction cleaners and more particularly to a suction cleaner in which the suction tube and cleaning tool may be assembled with the cleaner casing to provide means whereby the suction tube can be utilized as a manipulating handle to transport the cleaner.

In accordance with the instant invention, there is provided a suction cleaner of the canister type, a suction tube with a cleaning tool attached to the end of the suction tube, and means connecting the suction tube to the filter of the cleaner for conducting the dirty air stream thereto, to separate the dust and litter from the air stream. A motor-fan unit in the cleaner casing generates a suction flow of air in the cleaning tool and suction tube for removing the dirt and litter from the surface to be cleaned. The cleaning tool is swivelly mounted at an end of the suction tube and includes a pair of wheels which are rotatable about the swivel axis. During cleaning operations the wheels support the cleaning tool on the surface being traversed. The cleaning tool as thus constructed is of the floating type in which the aforementioned wheels absorb the vertical thrust applied to the suction tube in traversing the cleaning tool over the surface being cleaned, whereby the cleaning tool floats on that surface facilitating movement of the tool thereover and permitting the tool to adjust itself to any irregularities in the surface.

The cleaner casing includes a receptacle for the cleaning tool and means for securing the suction tube to the casing side wall in substantially vertical position relative to a floor on which the cleaner is supported. The suction tube and cleaning tool are assembled with the cleaner casing for purposes of storing the former, and the wheels on the cleaning tool are disposed adjacent to the floor supporting the cleaner. When the suction tube and cleaning tool are thus assembled with the cleaner, the suction tube may be used as a manipulating handle to tilt the cleaner onto the wheels, and the cleaner may then be transported on these wheels using the suction tube to manipulate the same.

It is, accordingly, the prime object of the instant invention to provide a novel suction cleaner with which a suction tube and cleaning tool may be assembled, including wheels on the suction tube and cleaning tool, the suction tube serving as a manipulating handle to permit the cleaner to be tilted onto the wheels for transport of the cleaner.

It is a further object of the instant invention to provide novel suction cleaner, suction tube and cleaning tool assembly, in which the cleaner casing includes a receptacle for the cleaning tool, permitting storage thereof and the suction tube, the assembly including wheels on which the cleaner may be transported utilizing the suction tube as a manipulating handle.

Further objects and advantages of the instant invention will be apparent to those skilled in the art upon consideration of the following detailed description of a pre-

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ferred embodiment of the invention, reference being had to the drawings in which:

Figure 1 is an elevational view of the suction cleaner with the suction tube and cleaning tool secured thereto, the suction cleaner being shown in transport position,

Figure 2 is a top plan view of the novel suction cleaner with the cleaning tool and suction tube attached thereto, and

Figure 3 is a detailed view of the means for securing the suction tube to the cleaner casing taken on the line 3 in Fig. 1.

Referring to the drawings, the suction cleaner of the instant invention is formed with a casing 10 enclosing a motor-fan unit 11 and a filter 12, of the usual form. The casing 10 comprises a lower casing section 13 within which the motor-fan unit 11 is supported and an upper casing section 14 enclosing the filter 12. The upper casing section 14 is swingably mounted on the lower casing section 13 by a pair of hinges 15, permitting the casing sections to be separated and giving access to the filter 12 for removal thereof. A latch 16 normally secures the two casing sections together with an airtight seal at the junction thereof.

The casing 10 is formed with a substantially flat undersurface 17 on which the suction cleaner is normally supported on a floor. The substantially flat undersurface 17 permits the cleaner to be skidded from one position to another during use of the cleaner.

A hose connector 18 is rotatably secured in the top of the cleaner casing and communicates with the filter 12 to discharge the dirty air stream to the latter. The hose connector 18 is swivelly mounted in the top of the cleaner casing 10 so that the suction hose 19 may be extended in any direction from the suction cleaner. A suitable length of suction hose 19 extends from the hose connector 18 and connects to one end of a rigid suction tube 20.

The opposite end of the suction tube 20 has secured thereto a cleaning tool 21 formed with a nozzle body and nozzle of a known form. The cleaning tool 21 is pivotally mounted on the end of the suction tube 20, permitting relative movement therebetween in a vertical plane which is parallel to the direction of movement of the cleaning tool over a surface to be cleaned. The rear end of the cleaning tool 21 is bifurcated forming legs 22 between which there is disposed the end of the suction tube 20, the swivel joint between the suction tube 20 and the cleaning tool 21 being formed at this point. A pair of wheels 23 are rotatably mounted on the legs 22 of the cleaning tool 21, the wheels 23 being rotatable about the swivel axis of the cleaning tool 21 on the suction tube 20.

In use of the suction tube 20 and the cleaning tool 21 during cleaning operations, the suction tube 20 is disposed at an obtuse angle with respect to the cleaning tool 21. The propelling force applied to the suction tube 20 in traversing the cleaning tool 21 over the surface to be cleaned is applied in a line extending through the center of the suction tube, intersecting the axis of the wheels 23. The vertical component of the propelling force is applied to the surface through the wheels 23, and none of the vertical force component is transmitted to the cleaning tool 21. Only the horizontal force component, which imparts translatory movement to the cleaning tool 21, is transmitted to the cleaning tool. It is thus seen that the wheels 23 support the cleaning tool 21 on the surface and permit the same to float during cleaning operations, pivoting about the swivel axis between the suction tube 20 and the cleaning tool 21.

Accordingly, the resistance to propulsion of the cleaning tool, which would be developed by bearing down on the cleaning tool 21, is alleviated, facilitating the move-

ment of the cleaning tool 21 on the surface being cleaned. As a further result of the floating cleaning tool arrangement, the cleaning tool 21 is permitted to adjust itself vertically with respect to any irregularities that may be present in the surface being traversed. The body of the cleaning tool 21 further includes a pair of small wheels 24, one at either end of the nozzle for properly locating the nozzle vertically with respect to the surface to be cleaned and assuring proper air flow at all times for most efficient cleaning of the surface.

One side wall of the cleaner casing 10 is formed with a receptacle 25 for the reception of the cleaning tool 21 to store the same. The receptacle 25 is offset inwardly from the perimeter of the cleaner casing side wall. The shape of the receptacle 25 is complementary to that of the cleaning tool 21, so that the two may be mated as illustrated in Fig. 1. The bottom of the receptacle 25 includes a shallow ridge 26 behind which the nozzle wheels 24 seat when the cleaning tool 21 is mated with the receptacle 25. The top of the receptacle 25 has secured thereto, as by riveting, a light leaf spring 27 bearing against the top of the cleaning tool 21 and holding it in place within the receptacle 25 with the nozzle wheels 24 seated behind the ridge 26.

With the cleaning tool 21 seated in the receptacle 25, the rear end of the cleaning tool 21 projects laterally from the cleaner casing 10 disposing the wheels 23 on the floor which normally supports the cleaner. In Fig. 1 the line 28 is the floor line in the normal position of the cleaner, indicating the relative positions of the wheels 23 and the cleaning casing 10 when the latter is supported in its normal upright position.

Immediately above the receptacle 25, there is provided latching means 29 on the side wall of the casing 10 for securing the suction tube 20 to the cleaner casing, with the suction tube 20 disposed in substantially vertical position relative to the floor 28. The latching means 29 comprises a strap 30 pivoted relative to the cleaner casing 10 at 31. The strap 30 embraces the suction tube 20 and holds it in place against the cleaner casing 10. The strap 30 terminates in an arm 32 which is engaged by the latch hook 33 to secure the strap 30 against the suction tube 20. The latch hook 33 is formed of spring metal and is integral with a spring arm 34 which abuts an offset 35 in the strap 30. The spring arm 34 is biased in a direction away from the cleaner casing 10. Thus, when the operator flexes the latch hook 33 away from the arm 32, the spring arm 34 engaging the offset 35 snaps the strap 30 in a direction away from the cleaner casing 10, thereby releasing the suction tube 20.

In order to secure the suction tube 20 to the cleaner casing 10, the suction tube 20 is placed in position along side the cleaner casing 10, and the strap 30 pushed towards the cleaner casing. The arm 32 engages the inclined surface on the latch hook 33 and cams it out of the path of the arm 32, which finally seats behind the latch hook 33, the latter snapping back into place in engagement with the arm 32 and securing the strap 30 behind the suction tube 20.

When assembling the suction tube 20 and the cleaner tool 21 with the cleaner casing as above described, it is desirable that the suction tube 20 and the cleaning tool 21 be placed at substantially right angles with respect to each other. For this purpose, one of the legs 22 of the bifurcation on the cleaning tool 21 includes a spring biased detent 36 which bridges the junction between the leg 22 and the bottom of the suction tube 20. The suction tube 20 includes a seat 37 for the spring pressed detent 36, which seat 37 is so positioned that when the detent 36 engages in the detent seat 37, the cleaning tool 21 and the suction tube 20 are positioned relatively to

each other as illustrated in Fig. 1. Then by manipulation of the suction tube 20, the cleaning tool 21 can be slid into the receptacle 25 until it seats therein. The latching means 29 is then operated as previously described, engaging the latch arm 32 with the latch hook 33 to secure the suction tube 20 to the cleaner casing 10. In this manner, the suction tube 20 and the cleaning tool 21 are stored with the cleaner, the wheels 23 being so disposed as to bear on the floor 28 which normally supports the cleaner casing 10 in upright position. When it is desired to transport the cleaner, as for example when it is taken to a closet for storage, the operator uses the suction tube 20 as a manipulating handle to tilt the cleaner onto the wheels 23 in the manner illustrated in Fig. 1, and the cleaner is wheeled to the closet on the wheels 23. When the cleaner has been placed in the closet, it is again set down on the undersurface 17 of the cleaner casing 10.

While the cleaning tool 21 has not been illustrated as being removable from the end of the suction tube 20, it will be understood by those skilled in the art that it is within the purview of the invention concept that the cleaning tool 21 be removable from the end of the suction tube 20 in order that other cleaning tools be substituted therefore in the usual manner known to the art.

The instant invention in a suction cleaner has been illustrated and described herein as embodied in a preferred form. It will be apparent to those skilled in the art that the preferred embodiment of the invention is subject to modifications falling within the spirit of the invention, and accordingly, it is not intended that the scope of the invention be limited except as set forth in the claims which follow.

I claim:

1. A suction cleaner having a casing enclosing a motor-fan unit and a filter, said casing having a substantially flat undersurface normally supported on a floor to permit the cleaner to be skidded on the floor and also maintain said casing in an upright position, a suction tube with a cleaning tool attached thereto for traversing a surface to be cleaned, means connecting the suction tube to the filter, said motor-fan unit generating a suction flow of air through the suction tube and cleaning tool, the suction tube conducting the dirty air stream to the filter for removal of the dirt from the dirty air stream, said suction tube and cleaning tool including wheels for supporting the tool on the surface, means for securing the suction tube and cleaning tool to said cleaner casing in storage position when the latter is in said upright position, said securing means arranged on said casing with respect to said wheels to position said wheels to bear on the supporting floor and said suction tube disposed in substantially vertical position relative to the floor, the suction tube serving as a manipulating handle to tilt the cleaner casing about the axis of said cleaning tool wheels to raise the cleaner casing off the floor for transporting the cleaner on said wheels.

2. A suction cleaner as described in claim 1, and a receptacle in said casing for the reception of said cleaning tool.

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