The invention herein disclosed relates to suction cleaners and more particularly to a cleaner operating on the squeegee principle.

Objects of the invention primarily are to provide a squeegee cleaner which will operate with a squeegee effect to wipe clean and to remove the water used in the washing of a floor or other surface.

Special objects of the invention are to provide a suction nozzle having the wiping effect of a squeegee, flexible to accommodate itself to the floor surface and which will continue effective and not be closed up by varying pressure against the floor surface.

A further special object of the invention is to provide a wet pickup suction nozzle having a substantially uniform suction pressure distribution along its entire length, an important advantage for wide sweep suction tools such as required with commercial cleaners.

Accordingly the invention resides in part in the provision of a suction nozzle made up of companion flexible strips supported for contact with a floor surface and spaced to provide between them a suction mouth and at least one of said strips being grooved at the floor engaging edge to prevent closure of the suction inlet by flexure of the strips in engagement with the floor.

A further feature of the invention is the provision of a plenum chamber in the suction head which diminishes in size uniformly from the center to the opposite ends of the nozzle and is in communication with a smaller plenum chamber by way of restricted passages so as to effect substantially uniform distribution of suction pressure and air flow along the entire length of the nozzle mouth.

Other novel features of the invention and further desirable objects accomplished by the invention as set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate present practical embodiments of the invention. Structure however may be modified and changed as regards the immediate illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

FIG. 1 in the drawings is a side elevation of one of the cleaners, showing it with the suction nozzle lowered to the floor engaging level.

FIG. 2 is a front elevation of the machine shown in FIG. 1.

FIG. 3 is a perspective view of the squeegee forming suction nozzle, showing it as detached from the machine and used on a suction wand.

FIG. 4 is an elevation of the front or main body portion of the suction nozzle.

FIG. 5 is an elevation of the companion flexible wiper strip and the bar by which it is secured in place.

FIG. 6 is an elevation of the angle bar to which the wiper blade is attached.

FIGS. 7 and 8 are cross sectional views on an enlarged scale on substantially the planes of lines 7-7 and 8-8 of FIG. 4.

FIG. 9 is a broken detail showing how the brush may be pivotally mounted to adjust itself to varying floor surface.

FIG. 10 is an end elevation of the suction nozzle, and FIG. 11 is a cross sectional view of the same, shown in an upright position to illustrate structural features.

FIGS. 1 and 2 illustrate the invention embodied in a suction cleaner of a standard make and consisting of a drum or container 15 supporting a power head 16 carrying the motor and suction fan and provided with a suction inlet 17 and exhaust outlet 18.

In this particular construction a flexible suction hose 19 is run from the suction inlet in the head of the machine down to the suction nozzle 20 of special construction, supported by a rod 21 sliding through a guide bracket 22, adapted to be raised and lowered in a supporting collar 23, by a turn handle 24 on the upper end of the rod, carrying a cam 25 in engagement with the fixed cam surface 26 on the supporting bracket 23.

A spring 27 is provided for lowering the nozzle supporting rod.

The nozzle is thus free to raise and lower so as to ride over a floor surface, tensioned by the spring in sliding engagement with the floor.

When not in use the handle 24 may be turned to cause the cooperative cams 25 and 26 to lift and support the nozzle clear of the floor.

The nozzle consists of a hollow body or head portion 28 having a suction pipe extension 29, FIG. 4, to which the hose may be connected and carrying at the bottom a front wiper blade 30 cooperable with a companion, back wiper blade 31.

These wiper blades, as shown particularly in FIGS. 10 and 11, are arranged on a downwardly convergent angle with their lower edges close together or practically confronting to provide a narrow slit suction mouth 32.

A special feature of this suction nozzle inlet is that it can never be entirely closed by pressure of the wiper strips upon the floor surface.

This is because one of the wiper blades or strips has a scalloped lower edge, providing a multiplicity of small, closely spaced air passages 33 which communicate with upwardly extending grooves 34 on the inner face of the blade.

FIG. 10 shows how in use, with pressure on the front blade, holding it against the back blade there will still be flow through the scalloped edge and up the grooves in the back of the blade.

Thus, while the blades are more or less building up a body of wash water with a squeegee action, as indicated at 35 in FIG. 10, the up draft will be carrying away this accumulation, to leave the surface wiped clean and relatively dry.

The front, scalloped and grooved blade 30 is shown as a molded strip of flexible rubber or equivalent, set in a groove 36 in the front member 28, held there by screws 37 and the back blade 31 is shown as a continuous strip of flexible rubber or the like secured by a clamping plate 38 and holding screws 39 against the upright flange 40 of an angle plate 41 attached to the front member by screws 42 and 43, FIGS. 10 and 11.

The lift rod 21 is indicated as attached to the angle bar 41 at 44, FIG. 10.

FIG. 9 shows how the nozzle lifting and lowering rod 21 may be pivotally connected with the nozzle at 45 so as to enable the nozzle to pivot one way or the other to automatically adjust itself to the floor surface.

To firmly hold the back wiper blade 31 in place the body portion 28 of the nozzle is shown as having a clamping edge 46, FIGS. 10 and 11, opposed to the clamping plate 38 and this clamping edge is shown as vertically grooved to provide a multitude of air passages 47. This enables the back blade to flex one way or another without closing off upward passage of air and liquid.

FIGS. 2, 4 and 5 show how the flexible blades may be extended at opposite ends 48 beyond the clamps holding them in place to serve as elastic cushions or bumpers to prevent injury to walls and furniture.
The squeegee nozzle described may be used with the cleaner machine or be used as a separable hand carried instrument as shown in FIG. 3.

In this view the nozzle is shown detached from the cleaner machine and mounted on the end of a suction wand 49 on the end of a suction hose 50. With hand operation the nozzle may be used with greater freedom to wipe with squeegee effect various corners and other more or less difficult places to reach with the machine.

The hollow suction head 28 is shown in FIGS. 4 and 7 as having a cavity 51 in the inner face of the same tapering uniformly in cross section from the center suction outlet toward opposite ends.

In the assembled relation shown in FIGS. 10 and 11, this cavity is covered over by the wiper blade 31 and its mounting, thus to provide the effect of a plenum chamber diminishing in volume from the center toward opposite ends of the nozzle and which chamber is in communication with the plenum chamber 52 of lesser volume between the wiper blades, through the medium of the multidimensional restrictive passages 47, thus to create substantially uniform distribution of suction pressure and air flow along the entire length of the mouth of the nozzle.

This relation of larger plenum chamber diminishing uniformly in cross section toward the opposite ends and communication by widely distributed restrictive passages with a smaller plenum chamber in the suction mouth and having noncloseable extended communication with the floor surface provides an effective wet pickup for wide swath nozzles such as needed in industrial cleaners.

What is claimed is:

A squeegee suction cleaner comprising in combination, a suction head, front and back flexible wiper blades, means securing said wiper blades on said suction head in downwardly convergent relation terminating at the bottom in a narrow floor engaging suction inlet slot and providing between the upper portions of said blades a lower plenum chamber over and in communication with said suction inlet slot, said means including a fixed clamping edge on the lower end of said suction head in engagement with the back wiper blade and the suction head having a cavity in the face of the same above said clamping edge providing an upper plenum chamber and with said clamping edge separating said upper plenum chamber from said lower plenum chamber, said clamping edge of the suction head having a multitude of small air passages communicating said upper plenum chamber with the lower plenum chamber between the wiper blades, the front wiper blade having a scalloped floor engaging lower edge providing a multiplicity of passages and grooves in the inner face of the same communicating said passages with the lower plenum chamber, and the back wiper blade having a continuous floor engaging lower edge whereby in operation the wiper blades will be effective to mop up a floor even if the blades are flexed into engagement at their lower edges, the suction head having a central suction outlet and said upper plenum chamber being in communication with said suction outlet and tapering in cross section from the suction outlet toward opposite ends to thereby effect substantially uniform distribution of suction pressure and air flow along the length of the suction inlet slot formed by said convergent and possibly engaging flexible wiper blades.

References Cited in the file of this patent

UNITED STATES PATENTS

1,114,592 De Witt .......................... Oct. 20, 1914
1,205,574 Sournian ........................ Nov. 21, 1916
1,497,164 Flinnell ........................ Mar. 15, 1924
2,677,144 Pariy ............................. May 4, 1954
2,822,061 Pettit et al. ..................... Feb. 4, 1958
2,930,053 Fallen et al. ........................ Mar. 29, 1960
3,063,082 Rosenberg ........................ Nov. 13, 1962