

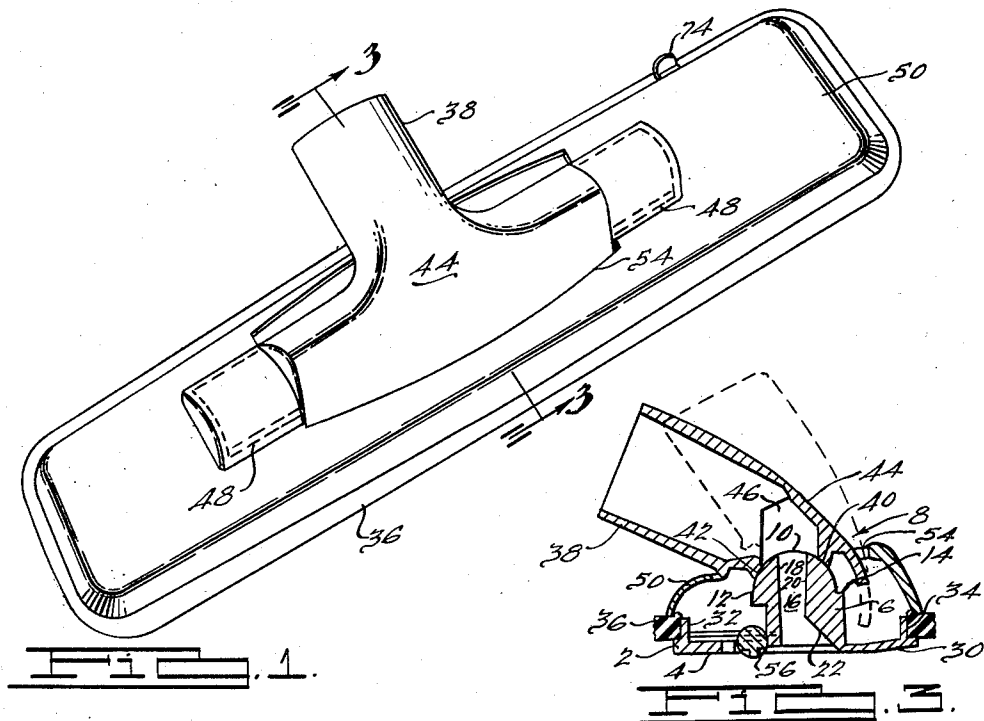
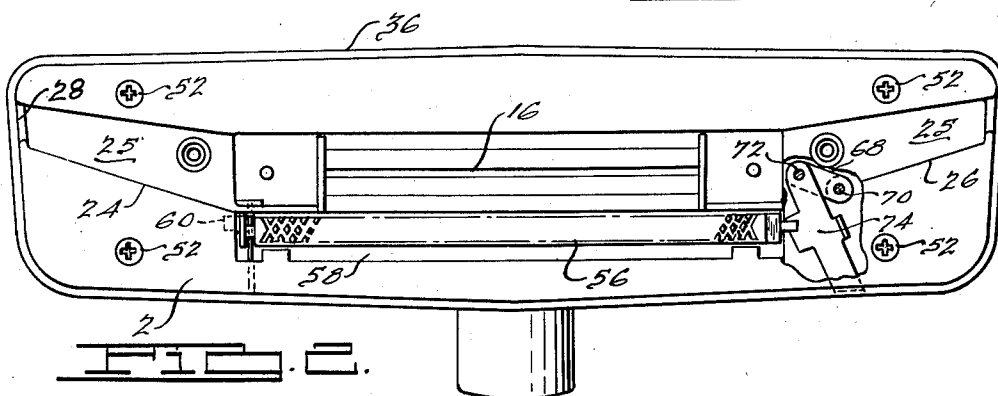
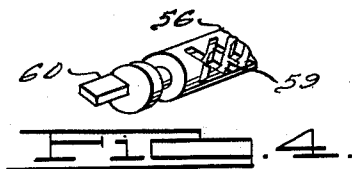
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VACUUM CLEANER NOZZLE

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VACUUM CLEANER NOZZLE

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1 Claim. (Cl. 15—365)

The present invention relates to improvements in vacuum cleaner nozzles and it particularly relates to improvements in vacuum cleaner nozzles that are employed with the "cylinder" or "tank" type of vacuum cleaner. With this type of cleaner the source of suction and container for the dirt are usually mounted as a portable unit and the intake or nozzle is attached to the unit by means of a flexible hose. As the operator need only to support that part of the hose adjacent the nozzle, a light yet powerful vacuum cleaner is produced, all of which is well known in the art.

The design of the intake or nozzle is of importance as the efficiency of the cleaning action is largely dependent on the nozzle construction. As the nozzle is moved back and forth over the carpet, or other surface to be cleaned, it distributes the suction intake over a desired area of the carpet and forces the air that is drawn into the nozzle to come from both below and across the carpet and through the nap as well as across the nap and thereby pick up dirt, lint, dust and other material from the carpet.

Efficiency of a vacuum cleaner nozzle is affected by the velocity of the air passing through a given area of the carpet, the manner in which the nap of the carpet is opened by the supporting surfaces of the nozzle, the distribution of air over the carpet and the type and degree of carpet agitation produced by the nozzle.

As the angle between the hose and supporting surface of the nozzle is constantly changing as the nozzle is moved toward and away from the operator, suitable pivotal means must be provided between hose and nozzle. This pivotal connection must provide openings for the air to travel through the nozzle to the hose irrespective of the angle of the hose to the floor and yet be freely pivotal to minimize the effort required to translate the nozzle across the carpet.

It is an object of the invention to provide an improved vacuum cleaner nozzle which will produce maximum utilization of the vacuum under various operating conditions.

Another object of the invention is to produce a nozzle which will give a more concentrated suction than has heretofore been produced.

A further object is to produce a nozzle suction chamber with a tapered entrance so as to deflect the carpet over a large area and provide better access to the dirt within the carpet nap.

Another object is to produce a nozzle section chamber which will direct the air from the front of the nozzle to the suction chamber so as to clean close to walls and other immovable objects.

Yet another object lies in the provision of an agitator incorporated in the nozzle to loosen threads, hairs and other material from the carpet that they may be drawn into the suction chamber.

Another object is to produce a vacuum cleaner nozzle agitator which is self cleaning.

A still further object is to provide a nozzle agitator which may be adjusted for optimum results with either soft and fine rugs or coarse and heavy carpets.

Another object is to provide an improved swivel or pivot connection between the hose and nozzle so as to

facilitate cleaning under furniture and objects close to the floor.

These and other objects of my invention will appear from the detailed description of my invention and the appended claim when viewed in the light of the accompanying illustrated drawings wherein,

Fig. 1 is a top perspective view of the vacuum cleaner nozzle,

Fig. 2 is a bottom view of the nozzle,

Fig. 3 is a cross section view along the line 3—3 of Fig. 1,

Fig. 4 is a view of one end of the agitator, and

Fig. 5 is a view of the other end of the agitator.

The nozzle of the present invention may be used with conventional "tank" type vacuum cleaners and as the tank, motor and hose form no part of my invention the same are not disclosed as they may be of conventional construction.

As shown, the nozzle base 2 is formed to be supported upon the surface to be cleaned and consists of a substantially planar lower surface 4 which slides over the area to be vacuumed. Rising from base 2 and formed integrally with the base is portion 6 which forms the lower part of the swivel connection 8. Portion 6 is of an elongated configuration and is located approximately in the center of the nozzle base 2 and extends about one half the length of the nozzle in an axial direction. The upper surface of portion 6 is machined in a semi-cylindrical shape and constitutes a crown 10 of portion 6. Stops 12 and 14 are provided at the lower edges of the crown for purposes later described.

Formed within portion 6 is the suction chamber 16 through which the dirt and debris are drawn by the vacuum suction. Chamber 16 consists of a vertical rear wall 18 and front walls 20 and 22, wall 20 being substantially parallel to rear wall 18 and extending from the crown 10 of portion 6 to a point about midway from the crown to the lower surface of the nozzle base where it intersects wall 22 of the suction chamber. Wall 22 is formed at an angle to wall 20 and extends from the intersection of wall 20 toward the front of the nozzle. Wall 22 is constructed on this angle to more fully open the nap of the carpet to be cleaned and facilitate removal of the dirt that lies in the nap. Such an angle keeps the nap open longer than a vertical wall. As the nozzle is pushed over and compresses the nap, the wall 22 allows the nap to open gradually as the suction chamber 16 passes over, thereby performing an efficient cleaning action.

Also formed within the lower surface 4 of nozzle base 2 are wings 24 and 26 which are extensions of the suction chamber 16 and comprise channels 25 formed in surface 4 extending from the suction chamber 16 to the end 28 of the base. These wings 24 and 26 increase the effective cleaning area and are especially effective in removing the surface dirt. Immediately in front of suction chamber 16 the lower surface of the nozzle is tapered as at 30 to open the nap over a large area and allows the air to have a sweeping action from the front of the nozzle to the chamber 16 and to allow the nozzle to clean close to walls and other immovable objects. Wall 32 is integral with base 2 and has formed therein a shouldered recess 34 which extends about the entire periphery of the nozzle base 2 and supports a bumper 36 of a resilient material such as rubber, plastic, etc.

Forming the upper part 44 of the swivel connection 8 is a tubular element 38 onto which connects the vacuum hose. The end of the hose usually consists of a rigid tube which acts as a handle and this tube slips into element 38 thereby connecting the hose to the nozzle. The upper swivel connection is also formed with surfaces 40 and 42 which coact with crown 10 to form an airtight

connection between the upper and lower elements of the swivel connection.

Adjacent to crown 10 and formed within upper part 44 is a chamber 46 which is open to the inside diameter of tubular element 38. Chamber 46 is also open to suction chamber 16 and the opening of chamber 46 must be large enough to maintain cooperation with chamber 16 between the angular operation limits of the upper portion 44 of the swivel connection.

Stops 12 and 14 cooperate with surfaces 42 and 40 respectively to limit the angular movement of element 44. Chamber 46 extends the entire length of lower portion 6 and permits the maximum flow of air through suction chamber 16 irrespective of the angular position of upper part 44. Upper part 44 is provided with two extensions 48 whose function will be described later.

To the top of nozzle base 2 is fastened a cover 50 held to the base by means of screws 52 which extend up through countersunk holes in the surface 4 of the nozzle base into threaded holes located in the cover 50. The lower edge of cover 50 rests upon bumper 36. An opening 54 is provided in the cover 50 to permit the upper part 44 of the swivel connection to extend through the cover 50 and freely pivot on crown 10 of portion 6. Cover 50 also overlaps the extensions 48 of the part 44, thereby holding part 44 to the crown 10 and maintaining a substantially air tight seal between the upper part 44 and lower portion 6 of the swivel connection.

A cylindrical agitator 56 is mounted in an opening 58 in surface 4 of the nozzle base immediately behind the suction chamber 16 for rotation in the base 2 with the lowermost point of the agitator extending slightly below the surface 4 of the nozzle. The surface of the agitator 56 is preferably roughened as at 59 on substantially 120° of its periphery and along its length while the remainder of the agitator is smooth. At one end of the agitator 56 is provided with a stop 60 which is mounted off-set to the axis of agitator rotation and coacts with the body of base 2, thereby limiting the rotation of the agitator to about 180°.

At the opposite end of the agitator 56 there are provided two flats 62 and 64 formed in the roller for a purpose later to be described. Therefore, it will be apparent that as the nozzle is pushed back and forth across the surface to be cleaned the agitator will rotate in one direction until limited by stop 60 and then slide across the cleaned surface the remainder of the stroke and rotate 180° in the opposite direction on the reverse stroke and then slide the remainder of the reverse movement.

An arm 68 is attached to the upper surface of nozzle base 2 by means of screw 70. Arm 68 supports a pivot pin 72 on which lever 74 pivots. Lever 74 extends through a suitable opening in cover 50 and may be moved as desired by the operator.

Lever 74 is situated near the end of the agitator on which flats 62 and 64 are formed and by moving the lever in its horizontal plane the lever will coact with either flat thereby preventing rotation of the agitator. The flats are positioned such that one flat will lock the smooth portion of the agitator downwardly so the smooth portion will always contact the surface to be cleaned or similarly the rough surface may be locked in the downwardly position. When the lever 74 is moved away from the agitator, the agitator is free to oscillate as described above.

The operation is as follows:

For normal operation of the nozzle, the lever 74 will be moved away from the flats 62 and 64 thereby permitting the agitator to oscillate or rotate 180° during the vacuuming operation. The roughened portion 59 is located in such a position relative to stop 60 that as the nozzle is moved forward or away from the operator the rough portion will be in contact with the carpet or other surface to be cleaned and upon the return stroke of the

nozzle the smooth portion of the agitator will contact the carpet. The purpose of the roughened part of the agitator is to massage the carpet or rug and break loose foreign matter such as dirt, lint, hair or thread which tends to work its way into the nap and is difficult to remove. However, the agitator will often become clogged with hair, lint, etc. and therefore by revolving the agitator past the suction chamber 16 on the reverse stroke the roughened part will be automatically cleaned of foreign matter. As stated above the agitator is mounted adjacent the suction chamber 16 and as the rear wall 18 stops short of surface 4 air will flow past the agitator and will clean the agitator as the roughened portion rolls adjacent the suction chamber on the return stroke.

If it is desired to clean usually dirty or heavy surfaces the roughened portion of the agitator may be locked downwardly by means of lever 74 to allow maximum manipulation of the carpet or if fine or soft rugs are to be cleaned the use of the roughened portion may not be necessary and the smooth side of the agitator may be locked downwardly.

It is therefore apparent that the agitator may be used in any one of three positions, e. g. oscillating or self-cleaning position, roughened portion operating continually or the smooth portion operating continually. The agitator may be adjusted for the maximum efficiency, depending on the type of surface being cleaned, with the minimum amount of effort.

It is fully appreciated that various means may be used for limiting the agitator rotation and locking the agitator in position. Thus numerous other arrangements for accomplishing the above results will readily suggest themselves to those skilled in the art.

It is for this reason that I do not wish to be limited to the illustrated embodiments of my invention but wish to include as part of my invention all equivalent structure coming within the scope of annexed claim.

A vacuum cleaner nozzle having a lower surface adapted to slide on the surface to be cleaned, a suction chamber formed in said base within a suction chamber housing, a swivel connection attached to the top of the suction chamber housing, said suction chamber comprising front and rear walls, said front wall being inclined downwardly toward the front side of said base and intersecting said lower surface a sufficient length to retard the return of the nap of the carpet to the normal position after being compressed by the lower surface, the lower surface of said base between said suction chamber and said front side being inclined downwardly from said front side toward said suction chamber, an agitator positioned adjacent said suction chamber, a portion of said agitator extending below said lower surface and contacting the surface to be vacuumed, said agitator mounted for limited rotation in said base whereby a first portion of said agitator will be in contact with the surface of the area to be cleaned during the forward movement of said nozzle and a second portion of said agitator will be in contact during the return motion of the nozzle, a pivotally supported lever mounted on said nozzle adapted to engage positioning means carried by said agitator whereby said agitator may be locked such that said first and second portions selectively engage the surface of the area to be cleaned during both forward and return motions of the nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

2,275,357	Gaines	Mar. 3, 1942
2,278,382	Ross	Mar. 31, 1942
2,511,238	Beede	June 13, 1950
2,516,205	Hallock	July 25, 1950
2,622,263	Allen	Dec. 23, 1952
2,641,015	Lovick	June 9, 1953
2,659,098	Meyerhoefer	Nov. 17, 1953