Disclosed is a vacuum cleaner beater bar with an air injector. The vacuum cleaner beater bar with an air injector that injects pressurized air deep into the carpet causing turbulences that allow the dirt that is deep in the carpet to be removed. Also disclosed is a vacuum cleaner with an air injector.
BEATER BAR WITH AIR INJECTOR

TECHNICAL FIELD AND BACKGROUND

[0001] The present invention relates to a vacuum cleaner beater bar with an air injector. More specifically, vacuum cleaner beater bar with an air injector that injects pressurized air deep into the carpet causing turbulences that allow the dirt that is deep in the carpet to be removed.

[0002] One of the main problems with vacuum cleaners today is that most of the air is drawn from between the vacuum cleaner head and the carpet. This allows the dirt on the surface to be removed by the air turbulences, but draws very little air/dirt from below the surface. Therefore, the present invention solves this problem by injecting pressurized air deep into the carpet causing turbulences that allow the dirt that is deep in the carpet to be removed.

[0003] In the present invention, pressurized air created by the vacuum cleaner enters the beater bar-Air Injector and flows into the beater bar and then out the holes/slots, between brushes. This directs the pressurized air as deeply into the carpet as possible. Thus creating air turbulences that go deep into the carpet, which is then vacuumed out, taking the dirt with it.

[0004] In the present invention, an Air Flow director is located inside the beater bar and is stationary. It is designed to direct the pressurized air out the holes/slots only when they are positioned correctly (downward into the carpet). This Air Flow director is optional, but I believe it will cause the pressurized air to be utilized to its maximum efficiency.

[0005] In the present invention, brushes on the rotating beater bar can be positioned on both sides, around the holes/slots, or on either side of the holes/slots to first move the carpet out of the way, opening a gap for the air to be inject deep into the carpet and second, provide a flexible channel to further guide the pressurized air deep into the carpet.

[0006] In the present invention, brushes on the vacuum housing are optional and are used to seal the vacuum chamber and cause more air to be pulled through the carpet fibers and from the beater bar-Air Injector. The pressure for this could be generated by a number of ways: 1) An impeller/compressor driven by the other end of the motor that generates the vacuum. 2) From the output of the vacuum. 3) From a separate motor driving a compressor/impeller. 4) From an outside source other than the vacuum cleaner.

[0007] In the present invention, the pressure could be carried to the beater bar area in a number of ways: 1) by a hose. 2) by channels built into the housing of the vacuum. 3) A partitioned off part of the vacuum hose. The pressure may need to be regulated because, shag carpets will probably require more air volume/pressure than wood floors would.

[0008] The present invention may have slots instead of holes and gives a more detailed blow out of the original design. It also has a non-belt driven idea where the cones direct the pressurized air down into the carpet and in order to stir up the dirt and allow it to be vacuumed up. The ends if slits in a cross shape in order to allow the pressurized air out when the cone end is flat against the surface. The end of the cone in one embodiment would allow it to go deeper into carpet. The cone/bar assembly would roll against the ground or carpet and the air flow director would direct the air to only the cones that are pointed downward towards the carpet or floor.

[0009] In one embodiment of the present invention a better seal that has a more simple design that could be built cheaply, and would be less likely to become bound when the beater bar gets thread or hair wrapped around it. In the present invention shown is a new way the bearings and end caps are designed. In the present invention shown are brushes around the holes, instead of the brushes being in a line.

[0010] In the present invention shown in one embodiment the device injects the pressurized air around a standard beater bar from one end instead of injecting it from the inside out. Another version of this would allow more space around the beater bar to allow more even pressure along the beater bar and close down as tight as possible at the bottom, or make the beater bar hollow and narrow it down at the bottom to direct the pressurized air downward and inward. The pressurized air enters (from one side) the chamber around the beater bar.

[0011] In the present invention, as on one embodiment for vacuums with no beater bars or vacuum attachments, the pressurized air is fed in from a tube in the center of the vacuum hose and directed toward the item being vacuumed. It is positioned so that it is enclosed in a vacuum field so that any dirt that is blown free by the pressurized air will be vacuumed up.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The objects, features, and advantages of the present invention will be apparent from the following detailed description of the preferred embodiment of the invention with references to the following drawings.

[0013] FIG. 1 is a drawing of beater bar with air injector of one embodiment of the present invention.

[0014] FIG. 2 is a drawing of beater bar with air injector of one embodiment of the present invention.

[0015] FIG. 3 is a drawing of beater bar with air injector of one embodiment of the present invention.

[0016] FIG. 4 is a drawing of beater bar with air injector of one embodiment of the present invention.

[0017] FIG. 5 is a drawing of beater bar with air injector of one embodiment of the present invention.

[0018] FIG. 6a is a drawing of beater bar with air injector of one embodiment of the present invention.

[0019] FIG. 6b is a drawing of beater bar with air injector of one embodiment of the present invention.

[0020] FIG. 6c is a drawing of beater bar with air injector of one embodiment of the present invention.

[0021] FIG. 7a is a drawing of beater bar with air injector of one embodiment of the present invention.

[0022] FIG. 7b is a drawing of beater bar with air injector of one embodiment of the present invention.

[0023] FIG. 7c is a drawing of beater bar with air injector of one embodiment of the present invention.

[0024] FIG. 8a is a drawing of beater bar with air injector of one embodiment of the present invention.

[0025] FIG. 8b is a drawing of beater bar with air injector of one embodiment of the present invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0026] Various aspects of the illustrative embodiments will be described using terms commonly employed by those skilled in the art to convey the substance of their work to others skilled in the art. However, it will be apparent to those skilled in the art that the present invention may be practiced with only some of the described aspects. For purposes of explanation, specific numbers, materials and configurations are set forth in order to provide a thorough understanding of
the illustrative embodiments. However, it will be apparent to one skilled in the art that the present invention may be practiced without the specific details. In other instances, well-known features are omitted or simplified in order not to obscure the illustrative embodiments.

Various operations will be described as multiple discrete operations, in turn, in a manner that is most helpful in understanding the present invention, however, the order of description should not be construed as to imply that these operations are necessarily order dependent. In particular, these operations need not be performed in the order of presentation.

The phrase “in one embodiment” is used repeatedly. The phrase generally does not refer to the same embodiment, however, it may. The terms “comprising”, “having” and “including” are synonymous, unless the context dictates otherwise.

Referring to FIG. 1, as in one embodiment is a drawing of side view of vacuum housing 10 with a beater bar 12 that may be turning in a clockwise direction and air flow director inside 14. Brushes 20 are attached to the vacuum housing 10. Shown is carpet 22. Many arrows show the air flow 24. Pressure 26 is inside of air flow director 14. FIG. 2, as in one embodiment of the present invention shown is vacuum housing 10. Air flow director 14 is shown with the beater bar 12. Four sealed bearings 30 are shown. Drive belt 34 is in contact with beater bar 12.

In FIG. 2 as in one embodiment air flow 24 enters the flow director 14 and passes through beater bar holes 40. In FIG. 3 as in one embodiment shown is a beater bar with air injector 44. Screws 46 hold the end cap 48 to the air flow director 14. Beater bar 12 fits around air flow director 14 with sealed bearings 30 pressed in to Beater bar 12. A second end cap 48 attaches to air flow director 14 and flow intake 50. The air flow director goes through a sealed bearing 30 and end cap 48 and screws to the air intake 50 using matched pipe threads. Beater bar 12 has beater bar holes 40 with beater bar hole brushes 52. Drive belt 34 is shown in contact with beater bar 12. The end cap 48 attaches to air flow director 14 and remains stationary while the beater bar 12 can rotate around the end cap 48 and air flow director 14.

In FIG. 4 as in one embodiment shown is a cone pattern 60 on a beater bar 62. In FIG. 5 as in one embodiment shown is beater bar with air injector 60 with spiral brushes 82 that will have slots, holes or grooves 84. In FIGS. 6a, 6b and 6c as in one embodiment shown is injector 100, beater bar 110 with air flow 112. FIG. 6c is a top view showing belt 114 with air flow 112 and pressure 116. FIG. 6b is a side view showing belt 114 and injector 100. FIG. 7a is a top view of a no beater bar injector 120 with vacuum 122 and pressure 124. FIG. 7b is an end view of a center tube 130 and vacuum hose 132. FIG. 7c is a side view of no beater bar injector 120 with air flow 134. Shown is the center tube 130 and the vacuum hose 132. FIGS. 8a and 8b is an end view along a-a showing inlet holes 200 at one end of the beater bar to input the pressurized 210 air into the space 212 around the beater bar 214.

While the present invention has been related in terms of the foregoing embodiments, those skilled in the art will recognize that the invention is not limited to the embodiments described. The present invention can be practiced with modification and alteration within the spirit and scope of the appended claims. Thus, the description is to be regarded as illustrative instead of restrictive on the present invention.

What is claimed is:

1. A beater bar with air injector comprising:

- an air flow director that directs pressurized air through beater bar holes, the beater bar holes are on a beater bar,
- the air flow director is stationary while the beater bar fits around the air flow director and rotates around the air flow director, an air flow intake is attached to the air flow director.

2. The beater bar with air injector of claim 1 wherein the beater bar holes have brushes around the beater bar holes to further direct the pressurized air to the area being vacuumed and a drive belt is in contact with the beater bar.

3. The beater bar with air injector of claim 1 wherein the air injector is in a cone pattern with a hole in each cone to further direct the pressurized air to the area being vacuumed, on the beater bar.

4. The beater bar with air injector of claim 1 wherein the beater bar with air injector has spiral brushes with a selected one of slots, holes and grooves which further direct the pressurized air to the area being vacuumed.

5. A vacuum with an air injector comprising:

- a center tube that feeds pressurized air to an item being vacuumed; and
- a vacuum field that is between the center tube and a vacuum hose, the vacuum field picks up the dirt and carries the dirt away, the vacuum hose encloses and surrounds the vacuum field.

6. A beater bar with air injector comprising:

- a space around the beater bar that allows pressurized air to surround the beater bar, the pressurized air enters the space around the beater bar, the air injector closes down as tight as possible at the bottom of the beater bar to direct the pressurized air to the area being vacuumed.

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