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ROTARY AGITATOR FOR SUCTION CLEANERS

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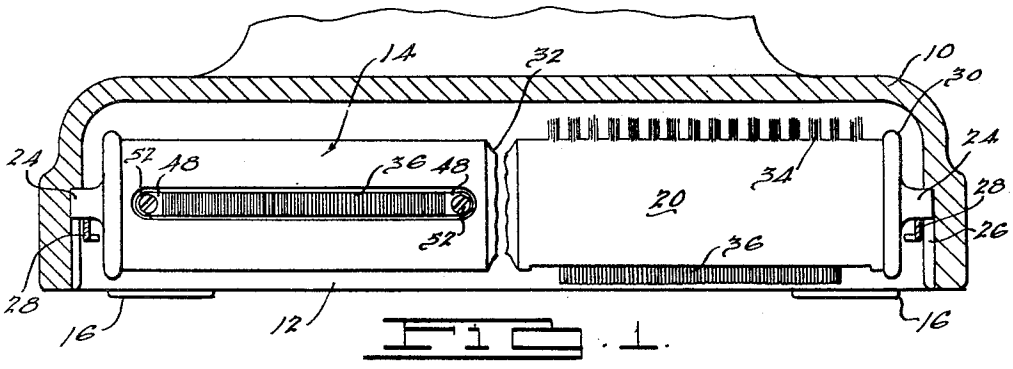


FIG. 1.

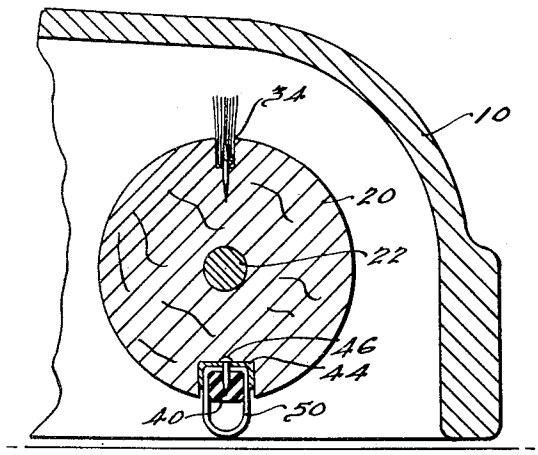


FIG. 2.

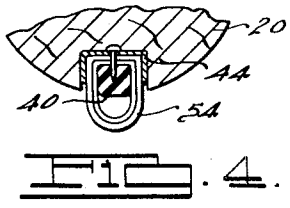


FIG. 4.

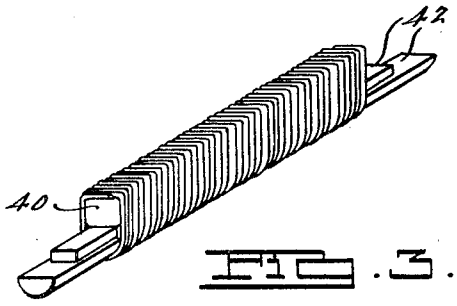


FIG. 3.

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ROTARY AGITATOR FOR SUCTION CLEANERS

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5 Claims. (Cl. 15—141)

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This invention relates to suction cleaners and has particular reference to a novel and efficient agitator therefor.

A principal object of the invention is to provide a new and improved agitator for a suction cleaner.

Other and further objects of the present invention will be apparent from the following description and claims and will be understood by reference to the accompanying drawing of which there is one sheet and which, by way of illustration, shows preferred embodiments and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a vertical sectional view through the nozzle of a cleaner embodying the invention;

Fig. 2 is a transverse sectional view of the nozzle and the agitator on an enlarged scale;

Fig. 3 is a perspective view illustrating an arrangement by means of which the beater of the agitator may be formed; and

Fig. 4 is a fragmentary sectional view of a modification.

In Fig. 1 there is illustrated part of a floor type suction cleaner which includes a nozzle 10, a suction creating means (not shown) having its inlet communicating with the floor nozzle 10 for inducing a flow of air into the cleaner through the rectangular shaped mouth 12 of the nozzle, an electric motor (not shown) for driving the suction creating means, a rotary agitator 14 suitably journaled in the nozzle 10 and a belt and pulley driving connection (not shown) between the motor shaft and the agitator 14 for rotating the latter during the operation of the motor and of the suction creating means of the cleaner. The cleaner further includes the usual dirt collecting bag and handle and wheels, which are arranged so as to support the mouth 12 of the nozzle in proper operative relation with respect to the floor covering to be cleaned.

The wheels of the cleaner, of which the front wheels 16 are shown, are adapted to support the mouth of the nozzle 10 above the surface covering to be cleaned so that during operation of the suction creating means the flow of air into the nozzle of the cleaner through the mouth 12 thereof will lift the surface covering to be cleaned up to the mouth of the nozzle where it may be swept and agitated or beaten by the agitator construction herein disclosed. Or if desired a rug guard may be associated with the mouth 12 of the nozzle for limiting the penetration of the rug into the mouth of the nozzle during the operation of the cleaner.

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The agitator 14 comprises a rotary body or roll member 20 of wood or other suitable material having a shaft 22 extending therethrough along the axis of rotation thereof. The ends of the shaft 22 project beyond the ends of the roll 20 and form trunnions which are journaled in bearings arranged within end caps 24, the hubs of which are arranged in vertical slots on the inside end walls of the nozzle 10 and are retained therein by suitable releasable latches 28. The end caps 24 include portions 30 which receive the ends of the roll 20 and form a thread guard therefore as is well known in the art. The latches 28 are spring biased and hold the endcaps 24 in position so that the agitator 14 is rotatable in the nozzle 10 above the mouth thereof. The central portion of the agitator 14 may be formed as a pulley 32 for driving relationship with the belt which is driven by the motor. In Fig. 1 the agitator has been broken away at the pulley 32 so as to make it possible in this view to show in plan and in side elevation the construction of the agitator. Actually the beater on one-half of the agitator is spaced circumferentially 180° from the beater on the other side of the agitator.

The agitator 14 is provided with at least two different types of tufts or brushes, indicated generally at 34 and 36. Each half of the agitator includes a brush or row of bristles 34 and a beater or row of bristles 36 the bristles or brush 34 forming a sweeping brush while the bristles or brush 36 form a beater or agitator. The agitator or beating brush 36 on one half of the agitator is spaced preferably 180° from that on the other side. While the bristles of each of the brushes 34 and 36 are shown as arranged in a straight row, I contemplate that they may be spirally arranged or arranged in any other suitable manner so long as the sweeping brush 34 does not interfere with the action of the beating brush 36. The bristles of the beaters or agitators preferably are thick and stiff as compared with the bristles or tufts of the brush 34 which form the sweepers.

The beater or agitator 36 have the bristles arranged in the form of a U so that the rounded end therefore is presented toward the carpet or surface covering to be cleaned. The bristles of the beater 36 may comprise a series of individual bristles suitably arranged as illustrated or a continuous bristle which is spirally wound so that one bristle lays contiguous to a bristle on each side thereof. In this way the bristles of the beater are arranged to provide a substantially continuous surface which is formed by a series of flexible bristles. While the bristle material of which the beater 36 is built is flexible, it is considerably more stiff than that of the bristle

material used for the brush 34. This may be achieved by using a stiffer or heavier bristle or one of greater diameter or one which is mounted in such a way that it is stiffer.

The bristle material of which the beater 36 is formed may be wound upon a back 40 and mandrels 42 as illustrated in Fig. 3. Suitable cement may be employed to secure the bristle material to the back 40. After the mandrels 42 are removed the curved and/or looped end of the bristle projects beyond the back 40 and is free to flex relative thereto. Obviously the amount that the looped ends of the bristle project from the back 40 will be a factor in connection with the flexibility or stiffness of the individual bristle as well as of the entire row of bristles which forms a beater. The back 40 with the bristle material arranged thereon is arranged in a channel-shaped member 44 of such size so as to closely fit the back 40 with the bristles thereon so that the same are in a fact clamped in the channel-shaped member 44, which is provided with securing tabs 48 at each end thereof.

The channel-shaped member 44 is fitted within a slot or groove in the periphery of the agitator 14 and of such depth so that the looped ends 50 which form the beater 36 project outwardly from the peripheral surface of the agitator 20. The tabs 48 are adapted to lay against the surface of the agitator 14 and are provided with holes therein through which screws 57 extend for securing the channel-shaped element 44 with the brush back 40 and the looped bristles 50 thereto to the roll 20. In Fig. 4 there is illustrated a modification in which the beater comprises a double row of bristles 54, one wound over the other so as to obtain a stiffer beater.

The agitator 14 is positioned in the nozzle so that the ends of the beater 36 do not project below the plane of the nozzle mouth during the rotation of the agitator while the sweeping brushes 34 may be of such length that they will project slightly, say, for example, $\frac{1}{8}$ of an inch below the plane of the mouth of the nozzle.

The agitator is adapted to be rotated sufficiently rapidly (say 3,000 R. P. M.) so that the beater 36 will beat and agitate and the sweeping brushes 34 will sweep the surface covering which is lifted up against the mouth of the nozzle by the suction of the cleaner thereof, while the air flow into the mouth of the nozzle will carry with it the dirt separated from the carpet by the action of the beating and sweeping elements 36 and 34 respectively.

The tufts of the sweeping brushes 34 preferably should be sufficient flexible so as to be bent by the contact with the surface covering and preferably should not be so stiff that they will move the surface brush away from the nozzle. The beater 36, while having a certain amount of flexibility is sufficiently stiff so as to move such surface covering away from the nozzle in order to agitate or vibrate the same during rotation of the agitator. As previously indicated the mouth of the nozzle of the suction of the cleaner is supported above the surface covering so that the surface covering will be drawn up to and sufficiently into the nozzle so as to be acted upon by the beaters. While the sweeper brush 34 is not illustrated in the left hand side of the agitator 14, one is provided therein, coextensive in length with the beater 36 and spaced circumferentially 180° therefrom.

The bristle of the tufts of the sweeping brush 34 may be formed of hog or hair bristle or from

a synthetic bristle material such, for example, as nylon which is commercially available in filaments of various thicknesses. For the bristle material for the beater 36 I contemplate that a nylon filament of the desired stiffness would be preferable although other synthetic material such as Vinylite, etc., or natural bristle may be employed. For the beater, I consider it important that the looped ends 50 of the bristle material be arranged in a plane substantially normal to the axis of rotation so that a curved bristle or bristle end will be presented to the surface covering.

While I have illustrated and described a preferred embodiment of my invention it is understood that this is capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations which fall within the purview of the following claims.

I claim:

1. A rotary agitator for a suction cleaner comprising a rotary cylindrical body having contiguous, non-metallic, hollow, flexible filament loops of rounded contour projecting radially outwardly from the cylindrical surface thereof and arranged in a row extending axially of said body and presenting a substantially continuous, yieldable ridge upon the cylindrical surface of said body capable of imparting a beating action upon a surface covering upon rotation of said body about its axis.

2. A rotary agitator for a suction cleaner comprising a rotary cylindrical body having contiguous, hollow, flexible filament loops projecting radially outwardly from the cylindrical surface thereof and arranged lengthwise axially of said body, said loops presenting a substantially continuous, yieldable ridge upon the cylindrical surface of said body and being sufficiently stiff so as to beat and agitate a surface covering suspended against the nozzle of said cleaner upon rotation of said body about its axis.

3. A rotary agitator according to claim 2 wherein each of said loops lies in a plane substantially normal to the axis of rotation of said agitator body.

4. A rotary agitator for a suction cleaner according to claim 2 in which the area enclosed by the loops at the loop end thereof is unobstructed so as to permit flexing of the loops.

5. A rotary agitator for a suction cleaner according to claim 2 in which the extent of projection of the loops from the surface of the body is a distance less than the diameter of said body.

KEMPER M. HAMMELL.

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