

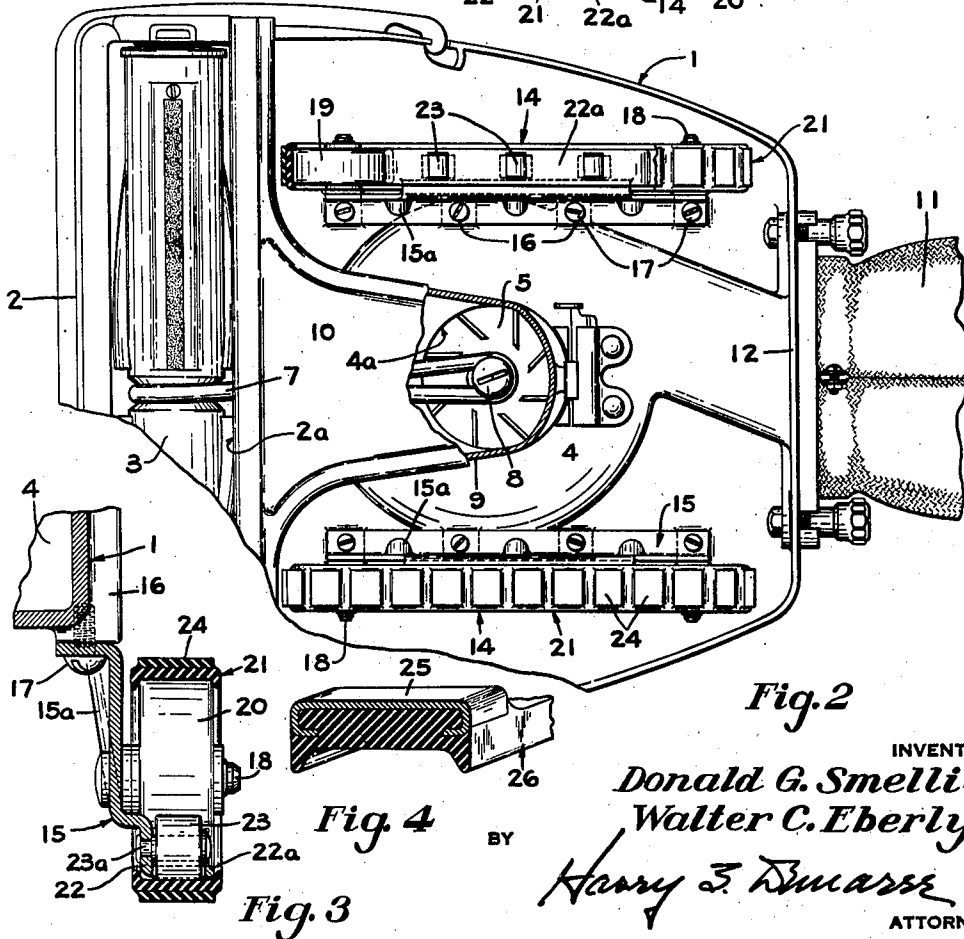
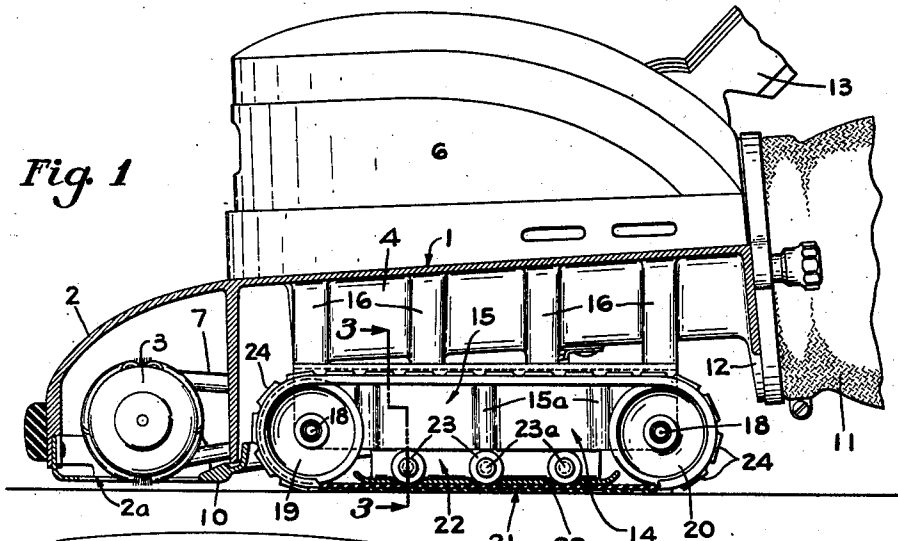
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D. G. SMELLIE ET AL.

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SUCTION CLEANER

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SUCTION CLEANER

Donald G. Smellie, Canton, and Walter C. Eberly,
North Canton, Ohio, assignors to The Hoover
Company, North Canton, Ohio, a corporation
of Ohio

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This invention relates to improvements in suction cleaners and more particularly to a suction cleaner of the portable, handle-maneuvered type equipped with novel supporting units calculated to maintain its nozzle at a substantially uniform height above the carpet surface irrespective of the nature and character of the carpet being cleaned.

It is the usual practice to equip suction cleaners with suitable adjusting devices whereby the height of the nozzle can be regulated to the particular kind of carpet to be cleaned and more particularly to carpets with varying thickness and texture of pile, this adjustment being regarded as quite essential to efficient and effective cleaning and especially as a means of compensating for the penetration of the wheels into the pile.

The object of the present invention is to eliminate the necessity of using nozzle adjusting devices by designing the cleaner so that the nozzle is maintained substantially the same height above the surface of the carpet pile under operating conditions, that is to say, the height is always within the range of effective cleaning performance.

A preferred embodiment of the invention is disclosed in the accompanying drawing, in which:

Figure 1 is a general view in side elevation of a suction cleaner designed to operate at a substantially uniform nozzle height;

Figure 2 is a bottom plan view of the cleaner;

Figure 3 is an enlarged detail view in vertical section as taken on line 3—3 of Figure 1 and showing the structural details of the so-called caterpillar tread mounting; and

Figure 4 is a detail view in cross-section of a modified type of endless track member in which metal plates form the tread elements.

The suction cleaner herein disclosed is for the most part of standard design and comprises generally a casing 1 having a nozzle portion 2 at its forward end with its downwardly facing suction mouth 2a which normally lies in a horizontal plane parallel with and spaced a short distance above the surface of the carpet to be cleaned, although it is to be understood that when the cleaner is in operation the carpet is lifted from the floor and held in sealing contact with the suction mouth.

Above the suction mouth is a nozzle chamber, preferably housing a rotary agitator 3 consisting generally of a cylindric shell provided with a carpet contacting brush element and beater bars, but inasmuch as agitators of this type are in

common use, further details thereof will be omitted.

Located rearwardly of the nozzle chamber and formed integral with the underside of the casing 1 is a generally circular fan chamber 4 housing a motor-driven suction fan 5 rotative about a vertical axis. The motor (not shown) is housed within a removable cover or dome-like shell 6 supported upon the casing 1. The motor also drives the agitator 3 through a belt 7 and pulley 8 forming an axial extension of the hub of the fan 5.

Immediately below the fan chamber is an air passageway leading forwardly to the fan chamber and formed by shallow side walls 9 and a removable bottom plate 10. This passageway connects the nozzle chamber with the fan chamber 4 through a centrally disposed inlet opening 4a at the bottom wall of the fan chamber, and also provides a housing for the agitator drive belt 7.

To complete the general cleaner assembly, a dirt bag 11 is detachably connected at the rear end of the cleaner casing and more definitely to the flanged outlet connection 12 at the end of rearwardly opening exhaust passage from the fan chamber 4. And finally, a handle 13 has pivotal connection with the cleaner casing near its rear end and, extending upwardly, is adapted to swing forwardly and rearwardly in a vertical plane.

Referring now to the supporting members which carry the cleaner in its movement over the carpet surface, the same comprise a pair of so-called "caterpillar" track units 14, 14 mounted beneath the cleaner body rearwardly of the nozzle chamber and inwardly from the sides of the casing 1.

These supporting units 14, 14 embody a typical caterpillar tread construction which has been extensively adopted in other tractor forms of automotive equipment, namely, endless flexible tracks supported upon pairs of spaced wheels.

It may simplify the disclosure somewhat to state at this point that no novelty is claimed for the general design of the caterpillar track per se, except in its practical adaptation to a suction cleaner, wherein the main frame member 15 of each unit consists of a vertical plate transversely ribbed at intervals throughout its length as at 15a for strength and flanged along its upper edge to abut against the lower ends of a series of four vertical posts 16 integral with the casing 1 and extending longitudinally along either side of the fan casing 4 and fastened thereto by means of screws 17. At opposite ends of the frame 15

are mounted axles 18, 18 for the front and rear wheels 19 and 20 which carry the endless belt or track member 21.

Intermediate the supporting wheels is an integral L-shaped portion 22 of the frame member 15 extending along its lower edge and forming a bearing flange 22a for the bottom lead of the track member 21 to maintain the same in a straight line contact with the carpet or floor surface. This lengthwise extending bearing flange 22a is slotted at intervals throughout its length and within these slots is accommodated a set of rollers 23 journaled on bearing pins 23a carried upon the vertical web portion of the L-shaped flange portion 22 of the frame 15. These rollers 23 contact the inner face of the track member and serve to decrease the friction between the track and its supporting flange 22a.

Referring now to the track members 21, the same are primarily endless belts generally flat in contour but preferably channelled on their inner faces in order to fit snugly onto the wheels and embrace the tread portions thereof, as clearly shown in Figure 3. These track members may be made of any suitable material lending itself to flexible belt construction, as for instance, molded rubber, a woven fabric or a composition of fabric and rubber. But irrespective of the general construction of the track members, the important feature is the outer tread construction consisting of a multiplicity of spaced blocks or tread elements 24, which differ essentially from the main body of the belt in that they are relatively hard and inflexible and present smooth contact surfaces. For example, assuming that the main body of the belt is composed of a molded rubber composition, it would have molded integral therewith, an outer band of hard rubber composition which subsequently would be cut at intervals to form the spaces that would give the necessary flexibility to the track. Moreover, as shown in Figure 4, the tread surfaces may be formed by incorporating metal cleats 25 in the surface of a molded rubber or composition belt 26 with the side edges of the cleats bent in U-shape and embedded in the belt material in the manner shown.

In any case, the formation of shallow blocks or cleats on the outer surface of the endless track members is quite desirable if not necessary, in the adaptation of the caterpillar track to a suction cleaner in order to obtain a sufficient degree of freedom in maneuvering the cleaner over the carpet surface.

As is well known, a suction cleaner is ordinarily operated by moving it forwardly and backwardly over the carpet, the direction of progress being generally transverse to the back and forward movement under the influence of a slight turning of the handle exerted by the operator at the completion of each stroke. Obviously, to allow the cleaner to be maneuvered freely over the carpet surface being cleaned, it is quite essential that the track surface be such that it can slide quite readily and not grip the carpet surface with such tenacity as to cause the cleaner to adhere to a straight line movement. It is for this reason therefore, that the tread members are equipped with the hard surface cleats with smooth contact faces. These cleats however, being spaced apart do not lessen the tractive effort to such a degree as to convert the track members into runners which slide over the carpet, but they do lessen the adhesion of the track surface just enough to permit that degree of

sliding movement to give the cleaner the same maneuverability that is present when a cleaner is supported upon a set of independently mounted wheels.

Thus, having made proper provision for ease of maneuvering the cleaner, the adaptation of the caterpillar type of tread to a suction cleaner becomes quite practical and advantageous from the standpoint of nozzle height adjustment and for the obvious reason that the endless track affords a comparatively large supporting surface in contact with the carpet, and therefore has a correspondingly less tendency to sink into and penetrate the carpet pile. In other words, the extensive track surfaces tend to ride upon the top of the carpet nap rather than to penetrate or sink into the carpet, and while there undoubtedly would be some penetration, the depth is comparatively nominal compared to the penetrating tendency of separate wheels. And what is more important, the penetration of the endless track surfaces is practically the same regardless of variations in texture and depth of the carpet pile on which the cleaner is resting, and this being the case, it follows that regardless of the particular grade of carpet or rug being cleaned, the height of the nozzle is maintained at a substantially constant level and one that is best suited for the effective cleaning of that particular carpet.

Having set forth a preferred embodiment of our invention, we claim:

1. In a suction cleaner, the combination with a downwardly facing nozzle, of means for maintaining said nozzle at a substantially uniform height above the surface of the floor covering to be cleaned, comprising endless track members extending longitudinally of the cleaner and supported for endless travel in the movement of said cleaner, the lower leads of said track defining supporting surfaces substantially parallel with the plane of the nozzle mouth and spaced a predetermined distance therefrom.

2. In a suction cleaner, the combination with a transversely extending nozzle at its forward end, of means for supporting said nozzle at a predetermined substantially uniform height above the floor covering to be cleaned, comprising endless flexible track members mounted on the underside of said cleaner for endless travel about points spaced apart longitudinally and with their floor contacting tread portions defining a plane substantially parallel with the plane of the mouth of said nozzle.

3. In a suction cleaner, the combination with a nozzle extending transversely of its forward end, of means for supporting said cleaner with the mouth of said nozzle spaced a predetermined and substantially uniform height above the floor covering to be cleaned, comprising endless flexible track members extending longitudinally beneath said cleaner body and carried upon wheels for endless travel in the movement of the cleaner and with their lower leads defining supporting surfaces adapted to maintain said nozzle at a predetermined height above the surface of the floor covering.

4. In a suction cleaner, the combination with a nozzle extending transversely of the forward end of said cleaner, of means for supporting said nozzle at a predetermined substantially uniform height above the carpet to be cleaned, comprising endless flexible track members having a multiplicity of spaced floor contacting elements and carried upon wheels for endless travel in the for-

ward and rearward movement of said cleaner over the carpet surface, the lower leads of said track members forming carpet contacting surfaces spaced a predetermined distance below the plane of the mouth of said nozzle.

5 5. In a suction cleaner, the combination with a nozzle extending transversely across the front end of said cleaner, of means for supporting said cleaner upon the carpet being cleaned with said
10 nozzle at a substantially uniform height above the same regardless of its character, comprising endless flexible belts extending longitudinally beneath the cleaner body and including a multi-
15 plicity of hard-surfaced floor contacting elements, said flexible belt being carried upon wheels journaled on said cleaner whereby the lower leads of said belt form continuous tread surfaces spaced a predetermined distance below the plane of the mouth of said nozzle.

6. In a suction cleaner, the combination of a nozzle extending transversely of the front end of said cleaner and having a downwardly facing mouth, of means for supporting the cleaner with its nozzle at a substantially uniform height
5 above the carpet surface regardless of its texture or quality, comprising endless track members extending longitudinally of the cleaner and each consisting of a belt of flexible material
10 having a multiplicity of spaced metallic cleats forming the tread surface thereof, said track members being supported upon rollers with their lower leads defining a horizontal plane substantially parallel with the plane of the nozzle mouth
15 and spaced a predetermined distance therebelow.

DONALD G. SMELLIE.
WALTER C. EBERLY.