

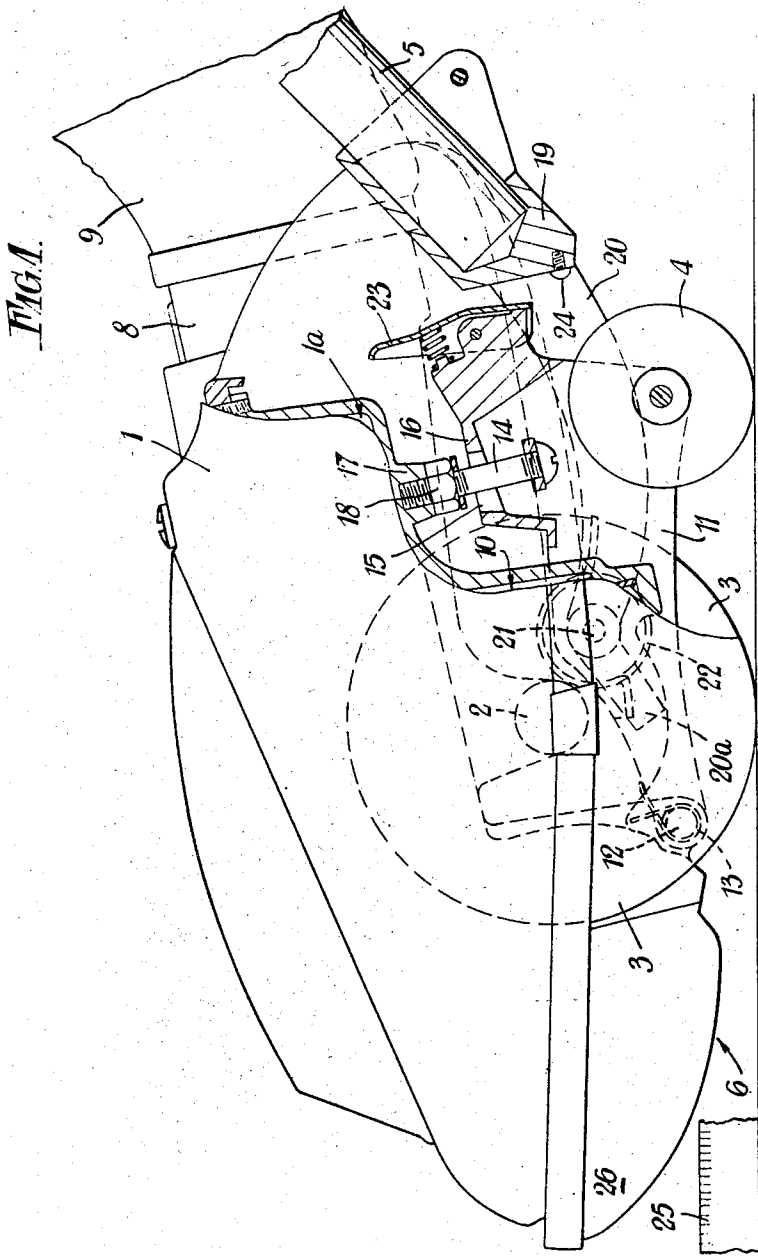
Feb. 24, 1959

A. E. BURRAGE
NON-ELECTRIC VACUUM CLEANERS AND LIKE
CLEANING APPLIANCES

2,874,400

Filed Dec. 5, 1956

2 Sheets-Sheet 1



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FIG. 3.

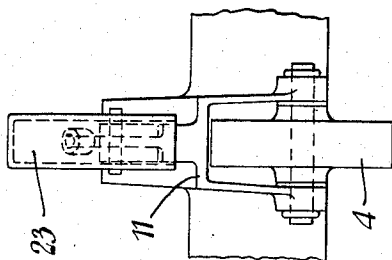
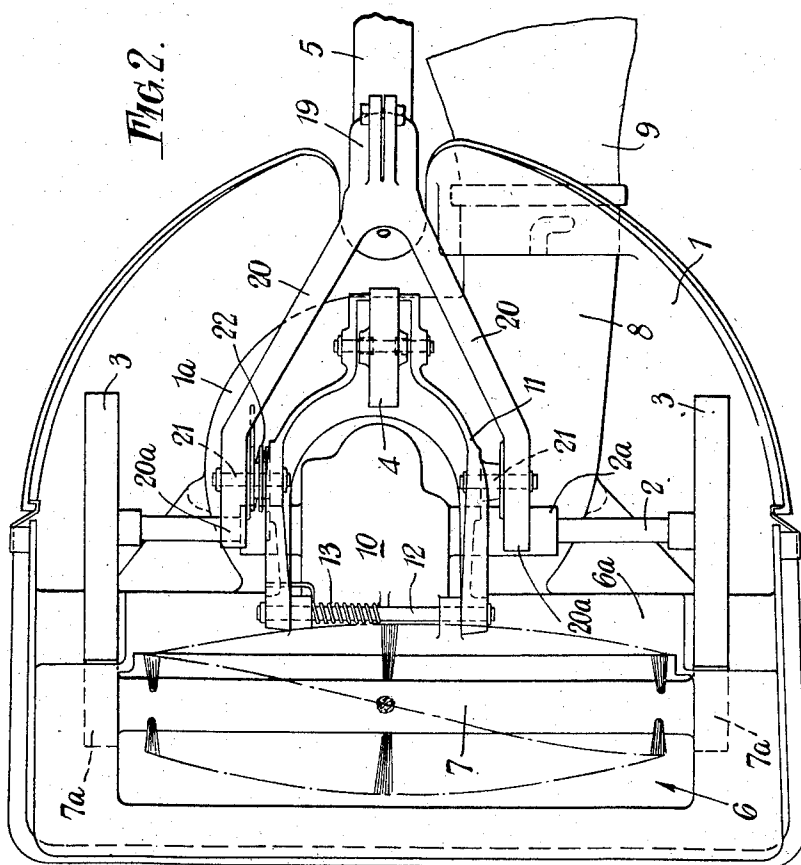


FIG. 2.



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NON-ELECTRIC VACUUM CLEANERS AND LIKE CLEANING APPLIANCES

Albert Edward Burrage, Milton, England, assignor to Burrage & Boyde Limited, Adnitt, England, a British company

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7 Claims. (Cl. 15—359)

This invention relates to non-electric vacuum cleaners, carpet sweepers and like cleaning appliances of the kind in which the body of the appliance is supported by a pair of co-axial intermediate wheels and by a rear adjustable guide wheel or roller, and is arranged to tilt about the intermediate wheel axis to vary the height above floor level of a front brush housing.

A main object of the invention is to facilitate the automatic operation of such appliances irrespective of the thickness of the floor covering or carpet over which the appliance is propelled.

Accordingly the invention provides a non-electric vacuum cleaner or like cleaning appliance of the kind specified, wherein the rear guide wheel or roller is mounted on a wheel carrier which is pivoted to the body of the appliance on a transverse fulcrum located in front of and below the intermediate wheel axis, to permit free relative tilting movement of the appliance body about the intermediate wheel axis between limiting positions in which the front brush housing is respectively depressed close to, and elevated away from, the plane on which the body wheels are supported, and a spring is adapted lightly to urge the appliance body towards said depressed position of the front brush housing, the arrangement being such that the brush housing, on contacting floor coverings having top surfaces at varying heights above the aforesaid plane, will automatically adjust itself, within the permitted limits, to ride lightly over each or any of said surfaces.

In order that the invention may be clearly understood and readily carried into effect, an embodiment thereof will now be described in detail with reference to the accompanying drawings in which:

Figure 1 is a part-sectional side elevation showing the body portion of a non-electric vacuum cleaner constructed in accordance with the invention,

Figure 2 is an underneath plan view, to a reduced scale, of the appliance shown in Figure 1, and

Figure 3 is a fragmentary rear elevation showing a constructional detail.

Referring now to the drawings, the invention as illustrated is applied to a vacuum cleaning machine or appliance of the non-electric type, the appliance including a main body casing 1 mounted to rock or tilt freely about an axle 2 carrying a pair of intermediate co-axial support wheels 3. A centrally disposed rear support wheel 4 and a handle 5 are also attached to the main body casing 1 in a manner which will later be fully described.

The casing is shaped, at the forward end, to provide a downwardly opening transverse brush housing 6, which also acts as a suction nozzle. A cylindrical brush 7, which receives a rotary drive, is mounted in this housing 6 to make light contact, through the open bottom of the housing, with the floor surface over which the machine is to be propelled. To enable a drive to be transmitted to the brush 7, the rear wall 6a of the housing 6 is slotted at each end in known manner to permit

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entry into the housing of peripheral portions of the intermediate support wheels 3. These peripheral wheel portions are arranged to make frictional driving contact with concentric bosses 7a, on the brush stock or spindle.

Within the upper part of the casing 1 there is arranged, in known manner, a fan chamber 1a which communicates through a suction port (not shown) with the open top of housing 6 and, through a blowing port 8, with one end of a dustbag 9. Since, however, the fan chamber and its communicating ports form no part of the present invention and may be of known design, these parts are not shown or described in detail. Between the intermediate wheels 3 below the fan chamber 1a and behind the brush housing 6, the casing 1 is provided with a lower compartment 10 through which the wheel axle 2 extends.

The rear support wheel or roller 4 is rotatably mounted on the free outer end of a carrier in the form of a stirrup shaped bracket 11, the divided arms of which are fulcrumed on a transverse axis 12 located at the bottom of the casing 1 immediately behind the brush housing 6. The carrier bracket 11 extends rearwardly from its fulcrum and is of such length that the rear support wheel or roller 4 is located beneath the rear part of the casing 1. A coil spring 13 mounted on the carrier bracket fulcrum 12 and acting between the bracket 11 and a part of the machine casing 1, is arranged to urge the latter to tilt forwardly about the intermediate wheel axle 2 to depress the front or nozzle end of the casing towards the ground and angularly to separate the rear casing end from the carrier bracket.

The amount of angular separation which is permitted between the rear casing end and the carrier bracket, and thus also the degree of tilt of the casing is limited by stop means. This stop means is conveniently constituted by a headed bolt 14 which is entered loosely, shank uppermost, through an aperture 15 in a top rear bridge part 16 of the carrier bracket and the shank extremity is screwed into a tapped boss 17 provided under the fan housing. To hold the bolt 14 against axial displacement when screwed into the boss 17, a lock nut 18 is preferably provided on the bolt shank and screwed up against the boss surface. With this arrangement, the rear casing is then free to move downwardly towards the bracket bridge 16 until the lock nut 18 contacts the aforesaid bridge and, conversely, is free to move upwardly away from the bridge 16 until the bolt head contacts the under surface of the aforesaid bridge. The degree of movement is thus determined by the amount that the bolt 14 is screwed home into the boss 17, this amount being, of course, adjustable to provide the required initial setting or range of movement. For the purpose of such initial adjustment, the machine is placed with its wheels on a hard surface and the machine body is then tilted down until the under edges of the brush housing are just clear of this surface. The bolt is then screwed up and locked so as to prevent further depression of the nozzle.

To attach the handle 5 there is provided a socket member 19 which can be clamped or otherwise secured to one handle end and which has bifurcated arms 20 positioned one on each side of the carrier bracket 11. These socket arms 20 are pivotally connected with the respective bracket arms by co-axial pins 21 located at a position intermediate the bracket fulcrum 12 and the rear wheel or roller 4. The location of the pivot pins 21 is such that the force that acts through the bracket fulcrum 12 from the handle 5 is insufficient to prevent the machine casing tilting about the intermediate wheel axle 2 but is sufficient to counteract upward turning of the machine around this axle under conditions of rapid forward acceleration.

A coil spring 22 is mounted on one of the fulcrum

pins 21 attaching the handle socket arms 20 to the carrier bracket 11, the function of this spring 22 being to apply a light pressure to the carrier bracket in the downward direction thereby holding the rear support wheel or roller 4 in contact with the floor. It will, however, be appreciated that this latter spring 22 becomes effective when the machine is on a hard surface and the front nozzle 6 has a working clearance from the floor, the spring action then preventing the nozzle bumping and rubbing on the floor when the machine is propelled forwardly.

To limit permitted pivoting movement of the handle 5 about its fulcrum, the socket arms 20 are extended beyond their fulcrum at 20a to contact intermediate wheel axle bearings 2a when the handle is fully depressed. The fully raised position of the handle is maintained by a spring catch 23 which is pivoted on the rear end of the carrier bracket 11 above the rear wheel or roller 4 and is arranged to engage behind a stud 24 provided on the under surface of the socket 19.

In the operation of the cleaning machine as described, assuming that the stop 14 has been appropriately adjusted, the nozzle will be supported just clear of the floor when the machine is located on a hard surface so that the machine can be freely propelled over such a surface. If then the machine is transferred to a pile carpet such as indicated at 25, it will be found that the machine wheels will tend to sink in the carpet down to a support plane which is lower than the top pile surface, while the nozzle 6, meeting the resistance of the pile, will automatically adjust its height to rest lightly on the top pile surface. In this way the nozzle can be automatically maintained at ideal working height without the necessity for any manual adjustment and irrespective of the pile thickness of the floor covering over which the machine is operated, the range of permitted adjustment being amply sufficient to accommodate all normal depths of pile. Likewise the machine will automatically adjust itself whilst being transferred from a hard floor surface to a pile carpet without the necessity for any manual tilting or other manual adjustment.

To ensure that the nozzle 6 will ride easily on to a carpet from a lower level, the front of the machine body is provided with a toe part 26 having an undersurface which inclines upwardly in the forward direction.

It will be appreciated that the invention is not limited to the particular machine construction as described and may be applied to various alternative forms of non-electric vacuum cleaning appliances or to carpet sweeping appliances provided the power for driving the brush is derived from the main intermediate wheels and the machine body is arranged to rock about the axis of these wheels.

I claim:

1. In a vacuum cleaner, the combination of a main body casing, a downwardly directed suction nozzle at the front end of said casing, main casing support wheels having a common transverse axis which is disposed rearwardly of said nozzle and about which said casing is free

to tilt, a rear guide wheel carrier bracket extending rearwardly of said casing from a transverse fulcrum located on the casing in front of and below said main wheel axis, a rear guide wheel mounted on said bracket rearwardly of said fulcrum and of said main wheel axis, light spring means acting between said carrier bracket and said casing to urge said casing nozzle downwardly about said main wheel axis, and propelling handle means pivoted to said guide wheel carrier bracket between the bracket fulcrum and rear guide wheel, the arrangement being such that the nozzle end of said casing, on contacting different floor coverings during propulsion of the cleaner, will automatically adjust itself to ride lightly over the top surface of any such covering.

2. The combination as claimed in claim 1 in which the said carrier bracket fulcrum is positioned across the bottom of the casing immediately behind the casing nozzle, said bracket having divided arms which are pivoted on the fulcrum and being adapted to support the rear guide wheel beneath the rearward end of said casing.

3. The combination as claimed in claim 2 further including adjustable stop means for limiting the permitted tilting movement of said casing in relation to said carrier bracket between limiting positions in which the casing nozzle is respectively depressed close to and elevated away from the plane on which the main wheels are supported.

4. The combination as claimed in claim 3 in which said handle means includes a rearwardly extending handle, a socket in which one end of said handle is releasably received and bifurcated arms on said socket which are coaxially pivoted to the respective arms of said carrier bracket at a location intermediate said bracket fulcrum and said rear guide wheel, the force which acts through the bracket fulcrum from said handle being insufficient to prevent the casing tilting around the main wheel axis but sufficient to counteract upward turning of the front casing end under conditions of rapid forward acceleration.

5. The combination as claimed in claim 4 in which the socket arms are extended beyond their fulcrum and stop means on the casing are arranged to contact said socket arm extensions when the handle is fully depressed.

6. The combination as claimed in claim 5 further including a spring arranged at the handle socket fulcrum to apply a light pressure to the carrier bracket in the downward direction and thereby hold the rear guide wheel on the ground.

7. The combination as claimed in claim 6 further including a spring catch mounted on the upper rearmost end of the carrier bracket and arranged releasably to co-operate with said handle socket to maintain the handle in a fully raised position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,202,980	Becker	June 4, 1940
2,291,250	Nielsen	July 28, 1942