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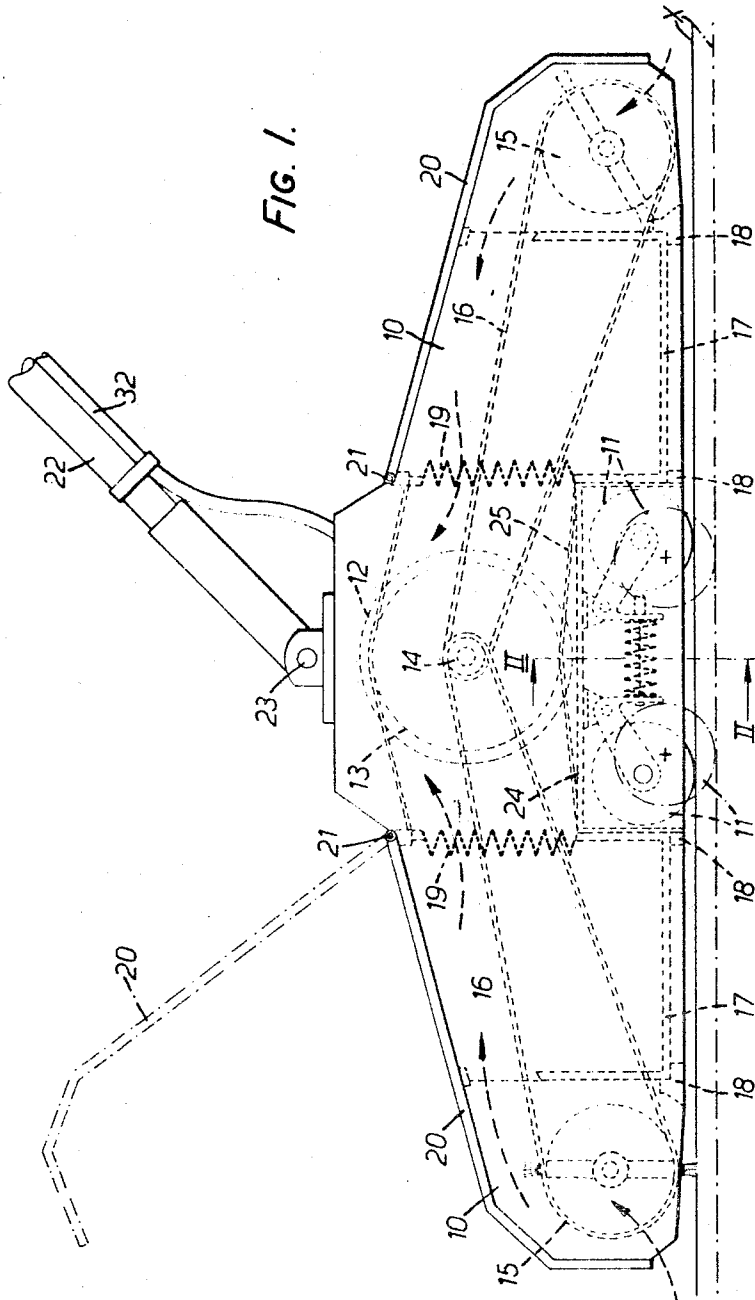
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3,460,187

SUCTION CLEANERS WITH WHEEL ADJUSTMENT

Filed Feb. 14, 1967

3 Sheets-Sheet 1



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3 Sheets-Sheet 3

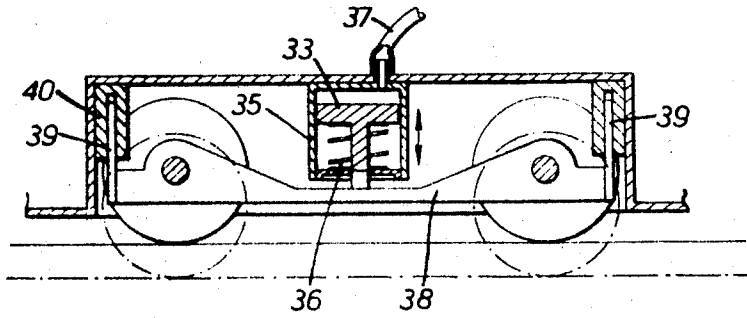


FIG. 5.

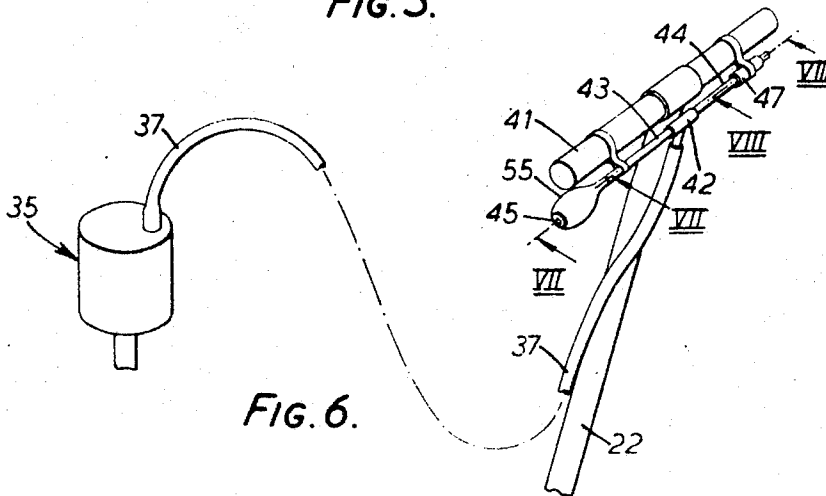


FIG. 6.

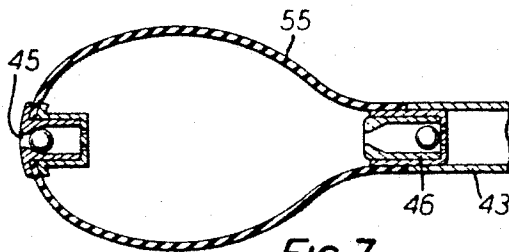


FIG. 7.

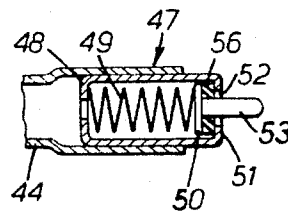


FIG. 8.

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3,460,187 SUCTION CLEANERS WITH WHEEL ADJUSTMENT

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Int. Cl. A47I 5/34

U.S. Cl. 15—361

8 Claims

ABSTRACT OF THE DISCLOSURE

A suction cleaner is mounted on at least three spaced apart wheels which are simultaneously adjusted relatively to the casing of the cleaner so that upon adjustment the cleaner maintains the same disposition with respect to the floor surface.

This invention concerns a suction cleaner for cleaning carpets of the type comprising a casing, an electric motor within the casing, a suction fan driven by the motor, a suction opening in the casing directed downwardly towards the carpet, a dirt receptacle and a duct extending from the dirt receptacle to the suction fan, the suction of the fan creating a stream of air which flows through the suction opening, into the dirt receptacle for collection therein of dirt borne by the airstream.

Carpets are now commonly made having piles of greatly varying depth and the material of the piles also varies considerably so that a hard or a soft pile may be provided. To accommodate for these variations it is customary to provide for height adjustment of the suction nozzle by raising and lowering floor-engaging wheels. When mechanical means is provided for such adjustment, it is at times a strenuous and inaccurate operation. The present invention has for an object to overcome or minimise this disability, in combination with avoiding reduction in the effectiveness of the suction nozzle on such adjustment due to tilting.

It is a common expedient to provide, in a suction cleaner of the type set forth, a rotary carpet beater and/or brush assembly within the suction opening and extending partly through the opening to engage the carpet, the assembly being driven by the motor. For convenience a rotary beater and/or brush assembly is referred to herein simply as a beater assembly. It is a further object of this invention to provide that on height adjustment of the cleaner the effectiveness of the beater assembly is not substantially impaired.

According to this invention a suction cleaner of the type set forth is characterized in that the suction cleaner is mounted on at least three spaced-apart wheels adjustably carried by the casing for raising and lowering the casing relatively to the carpet and there is means for simultaneously adjusting the distance of all of the wheels relatively to the casing, and fluid-pressure means for operating the adjusting means.

Instead of wheels sliders, rollers or the like may be used and throughout the specification and claims the term wheels is to be understood as including sliders, rollers or the like.

Preferably the wheels are disposed substantially in a central region of the suction cleaner.

Practical applications of this invention will now be described, by way of example only, with reference to the accompanying drawings whereof:

FIG. 1 is a diagrammatic side view of a non-elected form of suction cleaner of the type set forth,

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FIG. 2 is a section on the line II—II of FIG. 1 and to a larger size,

FIG. 3 is a section on the line III—III of FIG. 2,

FIG. 4 is a view corresponding to FIG. 3 showing an arrangement of height adjusting mechanism according to this invention,

FIG. 5 is a view corresponding to FIG. 3 showing yet another arrangement of height adjusting mechanism according to the present invention,

FIG. 6 is a schematic view of a pneumatic control for the height adjusting mechanism of FIG. 4 or FIG. 5, and

FIGS. 7 and 8 are sectional views to a larger size on the lines VII—VII and VIII—VIII respectively of FIG. 6.

Referring to FIG. 1: the suction cleaning apparatus comprises a casing 10 mounted upon two pairs of axially-spaced wheels 11 for to and fro movement across a carpet to be cleaned. An electric motor 12 drives a fan unit 13 and a pulley 14. A horizontal brush and/or beater member 15 at each end of the casing is driven by pulley 14 through belts 16. A dust receiving receptacle 17 is between each brush member 15 and motor 12. Each receptacle 17 is supported on a frame 18 carried by casing 10. The rear wall of each receptacle 17 incorporates a filter element 19 and the top edge of the front wall of the receptacle is spaced from a door 20, hinged at 21 to casing 10. Door 20 gives access to the interior of casing 10 for removal and replacement of receptacle 17. The door also gives ready access to brush member 15 for removal and replacement of the brush member. This arrangement is more fully described in the specification of Ser. No. 615,956 of Gordon T. Fillery filed Feb. 14, 1967. A handle 22 is pivoted at 23 to casing 10, the cleaner apparatus being moved to and fro by the handle.

The wheels 11 are within a housing 24 forming part of casing 10.

The brush members 15 are rotatably driven in opposite directions by motor 12.

The wheels 11 are vertically adjustable from the dotted to the chain dotted position shown in FIG. 3 and vice versa thereby to vary the height of the cleaner which during adjustment maintains the same disposition of the cleaner with respect to the carpet surface X to accommodate for different depths of carpet pile.

The suction of fan unit 13 is applied to each receptacle 17 through filter element 19 by a duct 25 and as a consequence a stream of air is drawn past each brush member 15, and dust-laden air passing into the receptacle in which the dirt collects. The discharge side of the fan unit 13 is in a side wall of the casing 10.

A non-elected mechanism for adjusting wheels 11 is shown in FIGS. 2 and 3.

Each pair of wheels 11 is carried on an axle 26. Each axle 26 is supported by a pair of axially-spaced arms 27 pivotally mounted upon a rod 28 the ends of which are received by brackets 29 depending from the roof of wheel housing 24. Integral with each of the arms 27 is a lever 30 disposed generally vertical. The levers 30 (see FIG. 3) are spaced apart to receive therebetween a spring 31 which acts to urge the levers apart with consequential movement of the two pairs of wheels into the housing i.e. to retract the wheels. A Bowden cable 32 is connected to levers 30 for simultaneous movement of the levers towards each other with compression of spring 31. The Bowden cable is actuated in well known manner by a hand lever (not shown) carried on the handle 22 convenient to the user of the cleaner.

Since the two pairs of wheels 11 are similarly adjusted at the same time the casing 10 will rise and fall and be maintained in the same disposition (e.g. horizontal) throughout the range of adjustment and thus the effective-

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ness of suction and beating are not reduced by tilting of the casing 10.

A mechanism according to the invention is shown in FIG. 4 wherein the same reference numerals refer to like parts. However, in the arrangement of FIG. 4 the levers 30 are connected respectively to the piston 33 and to the cylinder 34 of a pneumatic piston-cylinder unit generally indicated by the reference numeral 35. A spring 36 may be provided within cylinder 34 which acts to move levers 30 towards each other i.e. to retract wheels 11 into housing 24. However, such wheel retraction may be adequately achieved by the weight of the apparatus supported by the wheels, the spring 36 being dispensed with. Air under pressure is supplied to cylinder 34 (as later fully explained) by a flexible pipe 37 which extends up the handle 22 whereby the levers 30 are moved apart to advance the pairs of wheels from housing 24.

In FIG. 5 a pneumatic piston-cylinder unit 35 depends from the roof of housing 24. The piston 33 is connected to a platform member 38 having at each end a vertical slider 39 which is mounted for vertical movement in a guide member 40 secured to housing 24. Again the weight of the apparatus acts to retract wheels 11 into housing 24 and this is assisted by spring 36. The unit 35 is connected to a source of air under pressure by a flexible pipe 37.

Referring now to FIG. 6 and in relation to each of the mechanisms of FIGS. 4 and 5: the pipe 37 extends up handle 22 to a cross member 41 where it is connected by a T-piece 42 to branch pipes 43, 44. Pipe 43 is connected to an air bulb 55 comprising a pair of ball valves 45, 46 which ensure that when the bulb is pressed air is forced under pressure into unit 35 to advance wheels 11 from housing 24. When the bulb is released air enters the bulb from atmosphere. Air delivered to unit 35 can not return to the bulb, this being ensured by valve 46. Pipe 44 terminates in a button valve 47 comprising a housing 48 within which is a spring 49 urging a valve member 50 against a seat 51 to close hole 52 through which a button 53 loosely extends. Member 50 is faced with a resilient material 56 to ensure an air tight seal. When button 53 is pressed inwardly air from unit 35 is permitted to escape to atmosphere so that wheels 11 are retracted into housing 24.

It is obvious that the arrangement of FIG. 4 or FIG. 5 may be readily adapted for hydraulic operation.

Instead of piston-cylinder unit 35 an expansible bellows may be used.

I claim:

1. A suction cleaner of the type set forth mounted on at least three spaced-apart wheels adjustably carried by the casing for raising and lowering the casing relatively to the carpet and comprising means for simultaneously adjusting the distance of all of the wheels relatively to the casing; a handle to move the cleaner to and fro over the

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carpet; and a pneumatic fluid pressure means for operating the adjusting means, the pneumatic fluid pressure means including manually operable means for actuating said pneumatic fluid pressure means, the manually operable means being secured to the handle.

2. A suction cleaner according to claim 1 wherein the wheels are disposed substantially in a central region of the suction cleaner.

3. A suction cleaner as claimed in claim 1 wherein two pairs of axially spaced wheels are provided in a wheel housing constituting a part of the casing, each pair of wheels being pivotally mounted on the casing for movement into and out of the housing.

4. A suction cleaner according to claim 1 wherein two pairs of axially spaced wheels are carried by a platform which is slidably mounted in a wheel housing constituting a part of the casing for vertical adjustment relatively to the casing.

5. A suction cleaner of the type set forth mounted on at least three spaced-apart wheels adjustably carried by the casing for raising and lowering the casing relatively to the carpet and comprising means for simultaneously adjusting the distance of all of the wheels relatively to the casing; a handle to move the cleaner to and fro over the carpet; and a hydraulic fluid pressure means for operating the adjusting means, the hydraulic fluid pressure means including manually operable means for actuating said hydraulic fluid pressure means, the manually operable means being secured to the handle.

6. A suction cleaner according to claim 5 wherein the wheels are disposed substantially in a central region of the suction cleaner.

7. A suction cleaner as claimed in claim 5 wherein two pairs of axially spaced wheels are provided in a wheel housing constituting a part of the casing, each pair of wheels being pivotally mounted on the casing for movement into and out of the housing.

8. A suction cleaner according to claim 5 wherein two pairs of axially spaced wheels are carried by a platform which is slidably mounted in a wheel housing constituting a part of the casing for vertical adjustment relatively to the casing.

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