

May 4, 1937.

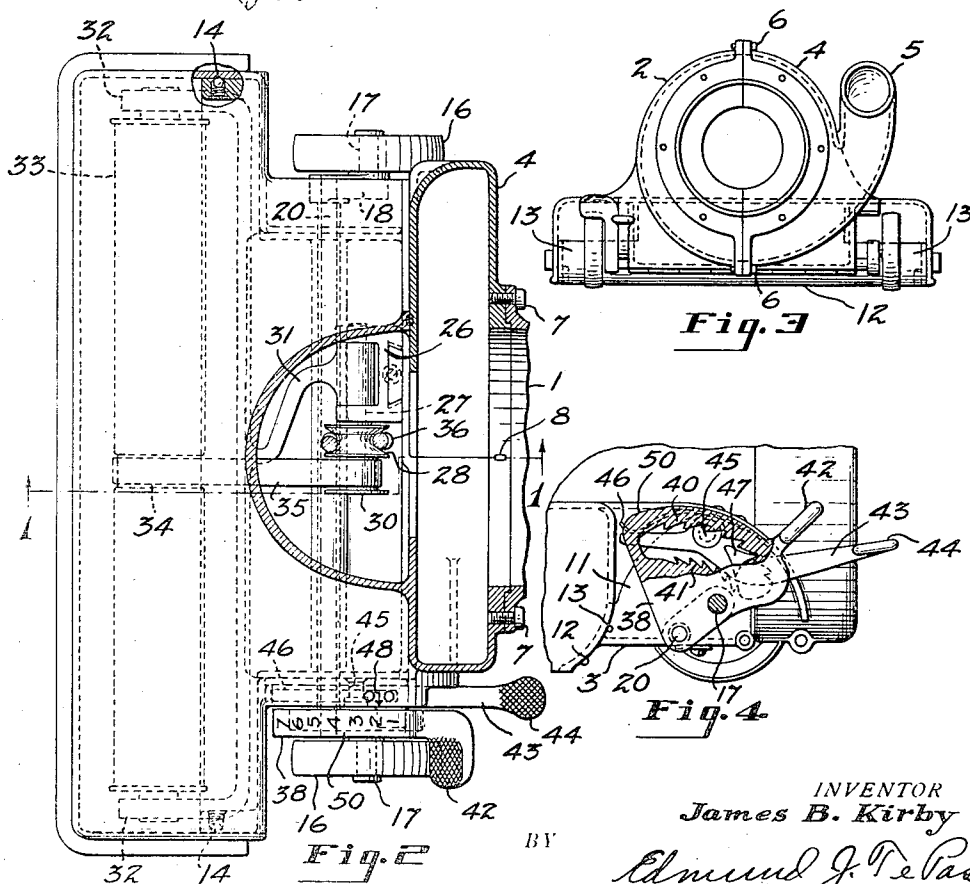
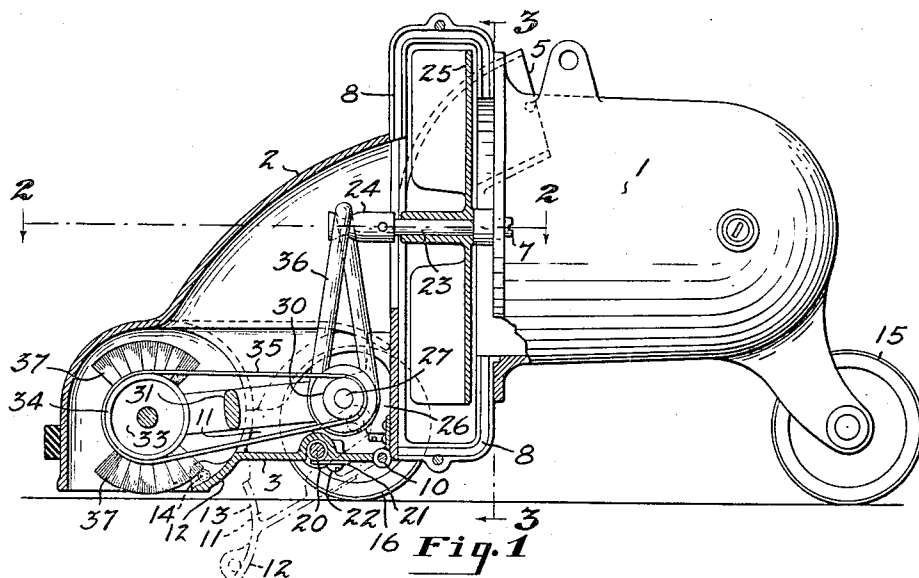
J. B. KIRBY

2,079,293

SUCTION SWEEPER

Filed June 26, 1933

2 Sheets-Sheet 1



INVENTOR
James B. Kirby

Edmund J. DePas
his ATTORNEY

May 4, 1937.

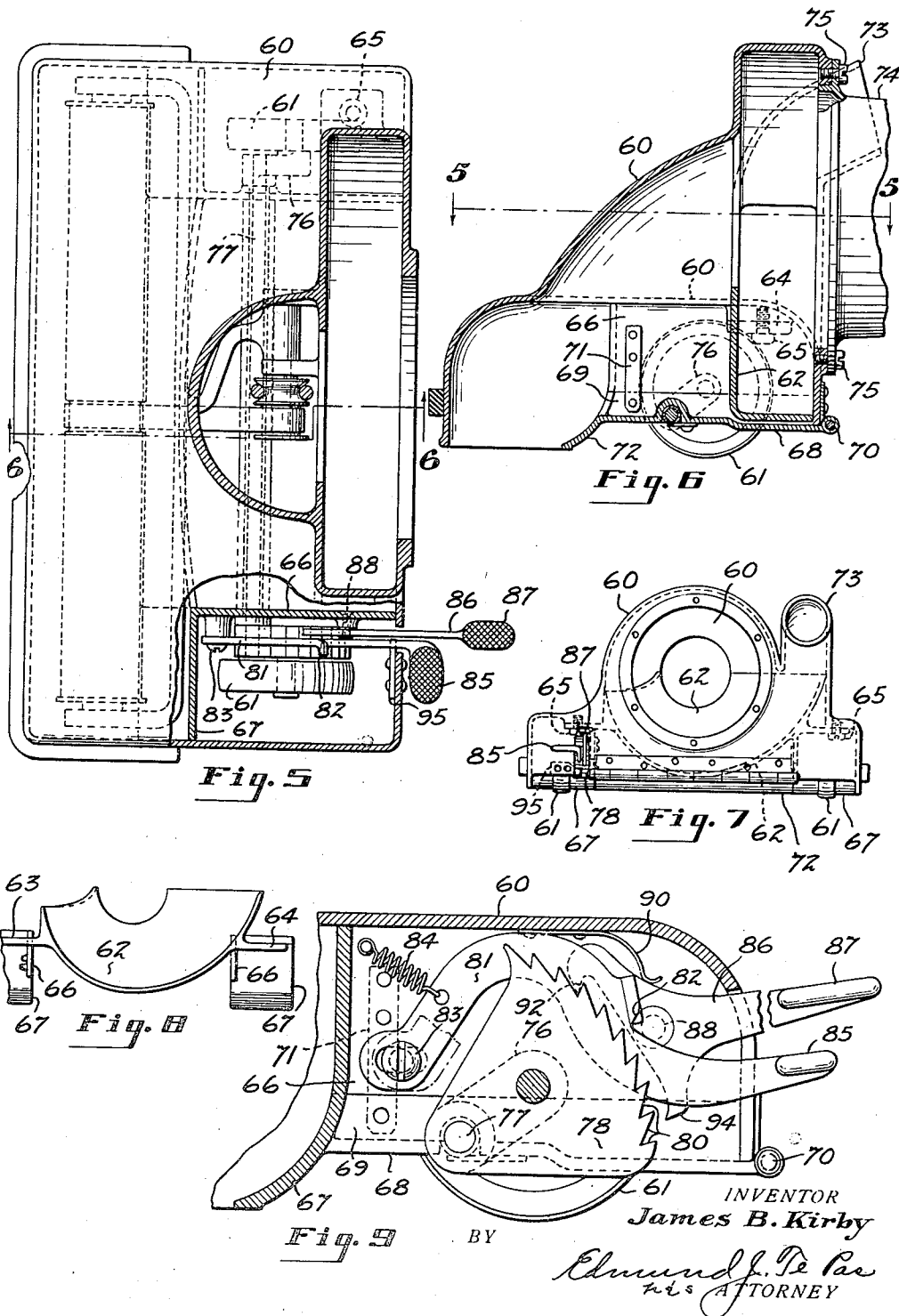
J. B. KIRBY

2,079,293

SUCTION SWEEPER

Filed June 26, 1933

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,079,293

SUCTION SWEEPER

James B. Kirby, West Richfield, Ohio, assignor
to Industrial Improvements Incorporated,
Cleveland, Ohio, a corporation of Ohio

Application June 26, 1933, Serial No. 677,602

7 Claims. (Cl. 280—44)

This invention relates to suction cleaners and in particular suction sweepers employing a rotatably driven litter agitating brush and it constitutes a continuation in part of my copending applications Serial No. 469,140, filed by me July 19, 1930, and Serial No. 509,862, filed by me January 19, 1931.

One of the objects of this invention is to provide an improved form of brush drive and brush mounting for such sweepers.

Another object of this invention is to provide a foot pedal controlled device for adjusting the elevation of a vacuum cleaner nozzle.

A further object of this invention relates to the provision of an improved form of sectional cleaner casing employing sections which may be readily formed from die-castings and which sections do not necessitate the use of complicated or expensive dies in connection with the die-casting of such casing parts.

With these and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter illustrated and described in some of its embodiments in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevational view, partly in section, of a vacuum cleaner illustrating one form of the invention, the sectional part of the view being taken on broken line 1—1, Figure 2; Figure 2 is a sectional view taken on the line 2—2, Figure 1; Figure 3 is a reduced side elevational view taken on line 3—3, Figure 1, showing the rear part of the cleaner with the motor removed; Figure 4 is a detail view partly in section showing the elements of the supporting wheel or nozzle height adjustment; Figure 5 is a sectional view taken on line 5—5, Figure 6 of another form of cleaner illustrative of the invention; Figure 6 is a sectional view taken on line 6—6, Figure 5 with certain of the operating parts removed from the cleaner casing; Figure 7 is a reduced side elevational view showing the rear of the cleaner illustrated in Figures 5 and 6; Figure 8 is a detail side elevational view of the casing part which forms the lower half of the fan case and a part of the suction nozzle; and Figure 9 is an enlarged detail view partly in section of the casing supporting, wheel elevation adjusting means.

In the drawings the casing of the cleaner illustrated in Figures 1 to 3 comprises a motor housing or motor cap 1 to which is secured a casting 2 which forms part of a suction chamber or nozzle and part of a fan case. A plate 3 cooperates

with the casting 2 to form the bottom part of the suction nozzle and a fourth element 4 forms one-half of the fan case. The section 4 has integrally formed therewith a discharge conduit 5 for the fan case.

The section 4 of the fan case is secured to the other half of the fan case formed in the casting 2, by any suitable means such as screws 6, one of which is provided at the top and bottom of the fan case. The motor cap 1 is secured to the fan case by screws 7. The mating edges of the fan case may be grooved as shown at 8 to receive a strip of packing material to provide for sealing engagement at this joint of the casing. The bottom plate 3 is pivotally connected to the casting 2 by means of a hinge 10. The bottom plate 3 has side walls 11 and a front wall 12 integrally formed therewith. The walls 11 cooperate with the walls of the casting 2 and the bottom plate 3 in forming the suction chamber.

The lower edge of the front wall 12 of the plate 3 forms the rear lip of the working mouth of the suction nozzle, the outer end portions of such wall being extended upwardly as at 13 to form the lower half of the rear wall of the outer end portions of the nozzle. Suitable stops such as the ball and spring arrangement shown at 14 are provided to hold the hinged bottom plate 3 in operative position on the nozzle of the cleaner.

The cleaner casing is carried on a rear supporting wheel 15 and a pair of forward supporting wheels 16. The front wheels are journaled for rotation upon pins 17, one of which is carried by a crank arm 18 and the other of which is carried by a segmental member 38. The crank 18 and member 38 are fixedly secured at the opposite ends of a crank shaft 20. The shaft 20 is held in position in a groove formed in the plate 3 by means of a clip 21 and its securing screw 22. A motor (not shown) is carried in the motor cap or housing 1. The motor has a shaft 23 projecting through the fan case and carrying on its outer extremity a belt pulley 24. A fan 25 is fixed on the shaft 23 and mounted for rotation in the fan case.

A bracket 26 is fixedly secured to a wedge shaped block formed on the lower part of the casting 2 within the suction chamber. A jack-shaft 27 is carried in this bracket. The jack-shaft at one end provides a bearing for a pair of rotatable pulleys 28 and 30 and adjacent to and on the other end of the jack-shaft there is pivotally secured a bracket 31. This bracket terminates in a pair of laterally spaced arms 32 between which a brush 33 is mounted for rotation. The

bracket 31 is arranged to have a limited amount of movement about the axis of the shaft 27 and it provides a floating support for the rotatable brush 33.

5 The brush 33 has at its center a belt pulley 34. This pulley is connected by means of a belt 35 to the jack-shaft pulley 30. The jack-shaft pulley 28 is fixed to turn with the pulley 30 and it is connected by means of a belt 36 to the motor
10 driven pulley 24. The pulley 24 is of smaller diameter than the pulley 28 and the pulley 30 is of smaller diameter than the brush pulley 34. By reason of this arrangement a two-step speed reduction is provided between the motor and the
15 brush.

The brush 33 has two oppositely disposed rows of bristles 37 so that the carpet is swept twice for each revolution of the brush. This form of brush when used in connection with a speed
20 reducing drive of the type shown allows the brush to be operated at a much lower rate of speed than is ordinarily required in order to perform satisfactory work with a brush having a single row of bristles for in the use of such
25 a brush the carpet is contacted or brushed but once for each revolution of the brush and if such a cleaner is advanced rather rapidly over a carpet it will leave brush marks, particularly if the brush is operated as slowly as it is in the present
30 cleaner. The use of a slow speed brush with two rows of bristles greatly reduces brush wear without sacrificing anything in the way of cleaning efficiency.

A quadrant 38 is fixedly secured to one end
35 of the wheel supporting crank shaft 20. This quadrant is provided with an upper set of ratchet teeth 40 and to a lower set of ratchet teeth 41. A foot operated pad 42 carried by the quadrant 38 is provided for effecting the angular move-
40 ment of the shaft 20 in one direction. A lever 43 having a foot operated pad 44 is pivoted at 45 to the cleaner casing. This lever is provided for adjusting the crank shaft 20 in an angular direction reverse to the direction it is operated
45 by means of the pad 42.

A spring 46 engages one end of the lever 43 for the purpose of holding one of the corners of an offset triangular block 47 in engagement with one of the teeth of the upper ratchet 40. The
50 lower corner of the triangular block is provided for engagement with the lower ratchet teeth 41. The cleaner casing is provided with an indicating arrow 48 which cooperates with the numerals formed on the outer upper face 50 of the quad-
55 rant 38 to indicate the elevation of the cleaner nozzle with respect to the working surface.

In the operation of the wheel adjustment, the depressing of the pedal or pad 42 serves to raise the cleaner nozzle with respect to the supporting
60 surface. The cleaner nozzle is lowered a distance proportional to the space between one of the upper notches each time the pad 44 is depressed. The block 47 in its operation, alternately engages with the lower and upper notches
65 to prevent the nozzle of the cleaner casing from being lowered more than one division of the indicating scale for each time the pad 44 is depressed. The force of gravity is utilized in effecting the downward adjustment of the cleaner
70 nozzle, the block 47 cooperating with the opposite rows of ratchet teeth to effect the lowering thereof in a step-by-step manner.

In the form of the device illustrated in Figures 5 to 9 the cleaner casing is of slightly different
75 form and construction. In this form of the in-

vention the upper half of the fan case and the top wall and front wall of the suction chamber are formed from a single casting 60. The top wall and side walls of this casting extend rear-
wardly of the end portions of the nozzle to form
5 housings or shrouds for the supporting wheels 61 of the cleaner. The lower half of the fan case, exclusive of the rear wall thereof which is integral with the casting 60, is formed from a separate casting 62, provided at its sides with
10 lateral extensions 63 and 64 which are drilled for the reception of screws 65 for securing this section of the casing to the casting 60. The lower half of the fan case is also provided with vertical, forwardly extending side wall portions 66 and
15 end wall portions 67, the wall portions 66 form the lower side walls of the suction chamber of the casing and the end walls 67 form the lower rear end wall portions of the suction mouth of the cleaner.

A bottom plate 68 having vertical side walls 69, is hinged at 70 to the lower rear part of the casting 60. A spring catch 71 is carried by the casting 60 to hold the plate 68 in its operative position. The forward edge of the plate 68 is provided with a wall part 72 which forms the intermediate part of the rear lip of the suction
25 mouth of the cleaner. The wall parts 66 and 67 of the casting 62, abut at their upper edges against the under face of the casting 60 which
30 forms the top half of the fan case and suction chamber.

The discharge outlet 73 of the fan case is integrally formed with the casing casting 60. A motor cap 74 is secured rearwardly of the casting 60 by screws 75. The brush mounting and
35 brush drive are substantially the same as in the form of the invention shown in Figures 1 to 4. The front supporting wheels of the cleaner are carried on a crank arm 76 and a segment 78
40 which are fixed to a shaft 77 in much the same manner as was done in the cleaner shown in Figures 1 to 4.

A modified form of wheel adjustment is provided, however, in the present form of cleaner. This adjustment comprises a segment 78 having
45 a single row of ratchet teeth 80. An operating lever 81 having an offset ratchet tooth engaging member 82 is pivotally and slidably secured to a pin 83 carried by one of the elements of the
50 cleaner casing. The operating member 81 is held in its upper and forward position by means of a return spring 84. The lever 81 has a foot pad 85 by means of which it is operated by the foot of the user of the cleaner. This part of
55 the device is provided for lowering the wheels 61 with respect to the cleaner casing which serves to effect the raising of the cleaner nozzle with respect to the working surface.

A second lever 86 having a pad 87 is pivoted at
60 88 to the cleaner casing. A spring 90 serves to hold the ratchet tooth engaging part 92 into engagement with one of the teeth 80 of the quadrant or sector 78. A second tooth engaging part 94 is provided on the lever 86 at the other side
65 of the pivot 84 to engage with the teeth of the quadrant to limit the movement thereof to steps of one tooth at a time. A stop 95 is supported by the cleaner casing beneath the lever 81 to limit its movement to a distance equivalent to one of
70 the ratchet teeth 80.

By reason of the arrangement just described when the pad 87 is depressed the cleaner nozzle will be lowered a distance equivalent the space of one of the teeth of the quadrant 78. In a sim-

ilar manner when the pedal 85 is depressed the cleaner will be raised a distance equivalent to the spacing between one of the teeth of the quadrant 78. The wheel adjusting means shown in

5 both forms of the invention provide a convenient and ready means for effecting in a step-by-step manner the up and down adjustment of the cleaner nozzle with respect to the working surface.

10 Furthermore it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth are presented for purposes of explanation and that various modifications of said apparatus and

15 procedure can be made without departure from this invention as described in the appended claims.

Having thus described my invention what I claim is:

20 1. In a portable device of the class described, supporting wheels for the device, eccentric mounting means for rotatably supporting said wheels whereby the device may be raised or lowered, and a pair of foot operated pedals associated with said eccentric mounting means, one

25 for raising and the other for lowering the device to its various adjusted operating positions.

2. In a portable device of the class described, supporting wheels for the device, means for rotatably and movably supporting said wheels,

30 ratchet means for adjusting the position of said wheels with respect to the device whereby the device may be raised or lowered, said means comprising a pair of foot operated pedals associated with said ratchet means, one for raising

35 and the other for lowering the device to various operating positions in a step-by-step manner.

3. In a portable device of the class described, supporting wheels for the device, means for adjustably and rotatably supporting said wheels,

40 whereby the device may be raised or lowered with respect to the working surface, and a pair of foot operated pedals, one for raising and the other for lowering the device in a step-by-step

45 manner to its various adjusted operating positions.

4. In a portable device of the class described,

supporting wheels for the device, and means for mounting said wheels for rotatable and bodily movements with respect to said device, said means including a rack and a pair of downwardly movable foot-operated members associated therewith for effecting bodily adjustment

5 of the position of said wheels, one of said foot-operated members being fixed for movement with said rack and the other of said foot-operated members cooperating with said rack to provide a

10 stop therefor.

5. In a portable device of the class described, supporting wheels for the device, and means for mounting said wheels for rotatable and bodily movements with respect to said device, said

15 means including a rack and a pair of downwardly movable foot-operated members associated therewith for effecting bodily adjustment of the position of said wheels, one of said foot-operated members being fixed for movement with

20 said rack and the other of said foot-operated members cooperating with said rack to provide a releasable stop therefor for controlling bodily movement of said wheels in one direction.

6. In a portable device of the class described, supporting wheels for the device, and means for adjustably and rotatably supporting said wheels,

25 whereby the device may be raised or lowered with respect to the working surface, said means including downwardly movable foot-operated elements, one for raising and the other for lowering

30 the device in a step-by-step manner to its various adjusted operating positions.

7. In a portable device of the class described, a supporting wheel at each side of the device,

35 both located forwardly of the center of gravity and rearwardly of the front end of the device, mechanism for mounting said wheels on the device for simultaneous and bodily adjustable movement relative thereto, and means for effecting the

40 operation of said mechanism, said means including downwardly movable, foot-operated elements, one for raising and the other for lowering the front end of the device in a step-by-step manner

45 to its various adjusted operating positions.

JAMES B. KIRBY.