Jan. 20, 1953 M. DE KADT ET AL 2,625,698

CARPET SWEEPER

Filed Jan. 13, 1947 2 SHEETS—SHEET 1

FIG. 1.

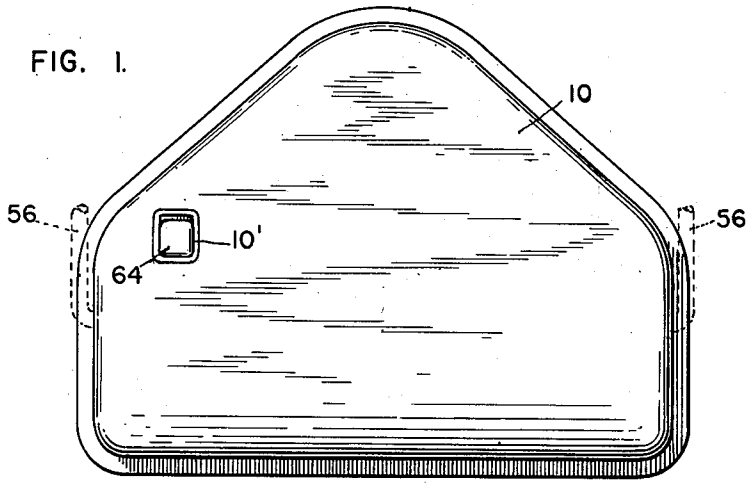


FIG. 3.

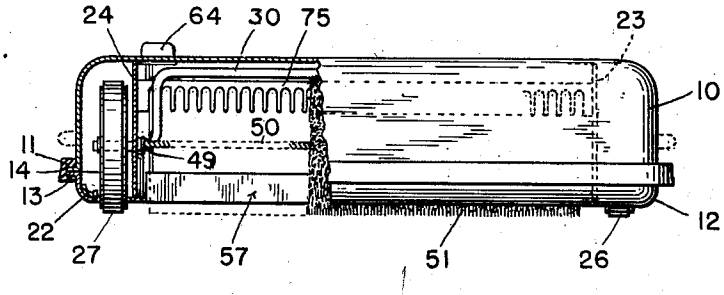
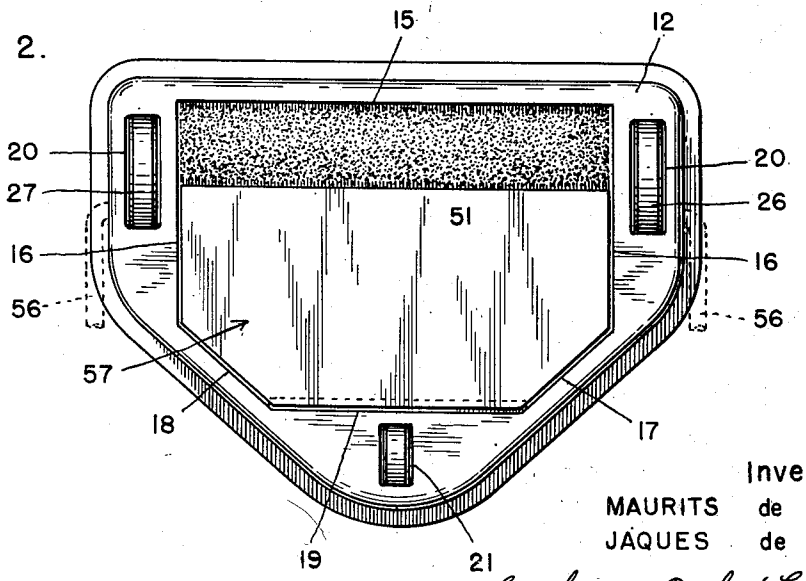


FIG. 2.



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FIG. 5.

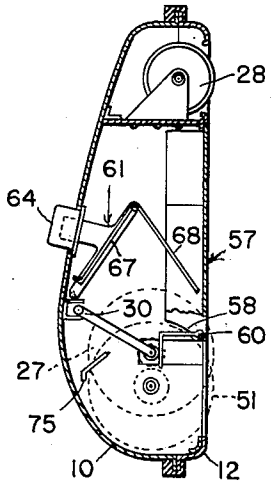
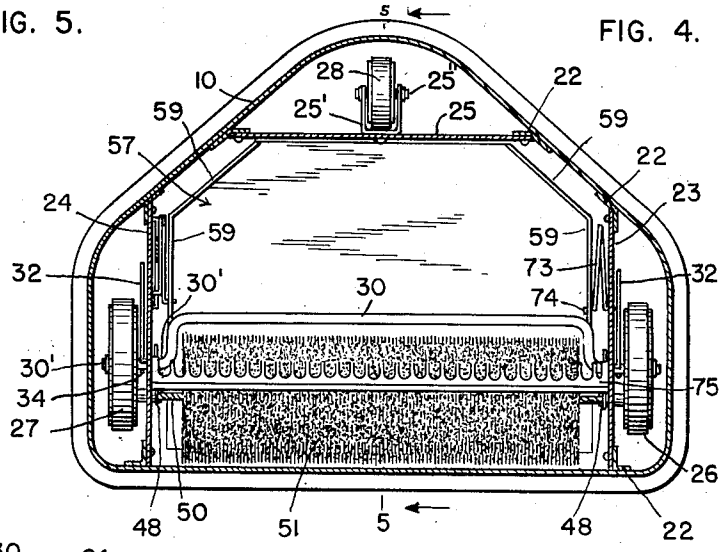


FIG. 4.



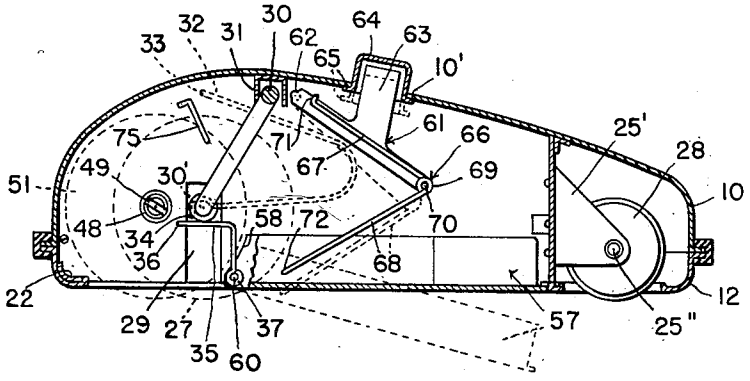


FIG. 6.

FIG. 7.

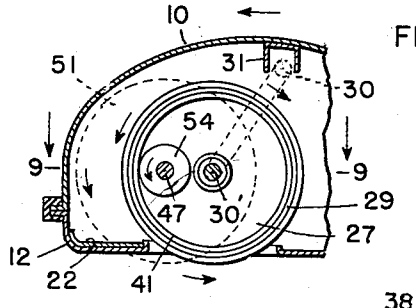


FIG. 8.

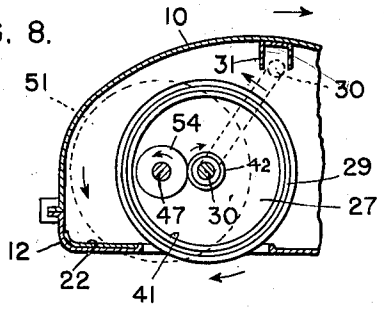
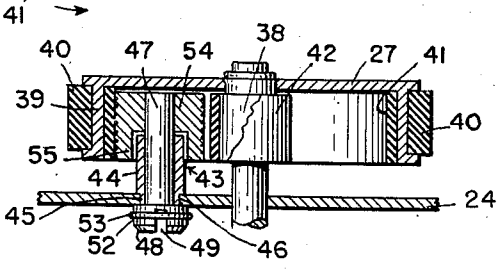


FIG. 9.



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UNITED STATES PATENT OFFICE

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CARPET SWEEPER

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Application January 13, 1947, Serial No. 721,808

17 Claims. (Cl. 15—45)

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This invention relates to certain new and useful improvements in carpet sweepers.

The primary object of this invention is to provide a carpet sweeper with a rotary brush fixedly journaled and driven always in the same direction of rotation by a pair of resiliently mounted drive wheels, whether or not the sweeper is moved forward or backward.

A further object of the invention is to provide a carpet sweeper of the foregoing character wherein the drive wheels have resilient mounts attached to their wheel axle for normally holding the sweeper body and brush above the floor, said resilient mounts being so pivoted directly above the ends of the wheel axle as not to urge the wheels either forward or backward.

A further object of the invention is to provide a carpet sweeper of the foregoing character that will be silent in operation by making the driving wheels friction-drive surfaces of a rubber or fiber material.

Another object of the invention is to provide a single rear wheel at the apex of the sweeper which not only affords ease of operation but also permits equal transmission of power when the sweeper is operated forward or backward in a straight direction, or on any size or arc.

A still further object of the invention is to provide a carpet sweeper with a totally enclosed casing having an upper part and a lower part, the lower part of the casing totally enclosing the bottom except for the portions occupied by the wheels and a dust pan.

With the above and other objects in view that will be apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claims.

In the drawings:

Figure 1 is a top plan view of the improved carpet sweeper.

Figure 2 is a bottom plan view of the carpet sweeper.

Figure 3 is a front view with the left-hand side of the casing broken away.

Figure 4 is a top plan view with the upper portion of the casing broken away.

Figure 5 is a cross sectional view taken on the section line 5—5 of Figure 4.

Figure 6 is an enlarged view of Figure 5 showing the operation of the dust pan.

Figure 7 is a detail view of the left hand drive wheel of Figure 3 and brush showing the rotation of the drive wheel and brush when the carpet sweeper is moved forward.

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Figure 8 is a detail view similar to Figure 7 but showing the rotation of a drive wheel and brush when the carpet sweeper is moved backward.

Figure 9 is a cross sectional view taken on the section line 9—9 of Figure 7.

Referring more in detail to the accompanying drawings, there is illustrated a carpet sweeper comprising a casing, preferably of a somewhat triangular form in plan view with a general oval contour extending from the front to the back. Referring to Figure 3, the casing is made up of two pieces of sheet metal, an upper one piece casing 10 stamped into the form indicated with a flanged portion 11, and a lower one piece casing 12 having a flanged portion 13. The two flanged portions 12 and 13 fit tightly together and are held in place by suitable screws. Positioned over the flanged coupling is a buffer element 14 of rubber which extends around the entire sweeper.

The upper one piece casing 10 has in its upper surface, as shown in Figure 1, a square-shaped opening as indicated at 10' through which moves a dust pan operating member, to be described later.

The lower one piece casing 12, as shown in Figure 2, is formed with a stamped-out or cut-out opening having six sides, comprising a forward edge 15 parallel to the forward edge of the casing, two parallel sides 16—16, two inwardly inclined edges 17 and 18 and a rear edge 19 parallel to the forward edge 15. Within this center cut-out opening there extends a rotary brush and a dust pan, both to be described later. The lower one piece casing 12 also is formed with two rectangular cut-out openings 20—20 through which extend the two drive-wheels, to be described later. At the rear or apex portion of the case 12 there is another rectangular cut-out or stamped-out opening 21 through which extends a third or tail wheel, to be described later. Referring to Figures 3 and 7, there is best shown a reinforcing plate 22 shaped and secured to the inside forward portion of the one piece bottom casing 12.

Referring to Figure 4, there is shown secured to the inside surface of the case 10, suitable mounting clips 22 to which are attached two side mounting plates 23 and 24 and a rear mounting plate 25. The two side mounting plates 23 and 24 are so positioned that they form spaces with the adjacent inside surface of the casing 10 for mounting the two drive-wheels 26 and 27. The rear mounting plate 25 is so positioned that it forms a space with the ad-

jacent inside surface of the casing 10 for mounting a U-shaped bracket 25'. The bracket 25' is apertured to receive an axle 25'' which supports a rubber tired rear or tail wheel 28.

Referring to Figure 6, each of the side mounting plates 23 and 24 are formed with a cut-out portion or slot 29 of rectangular shape extending from the lower edge vertically upward to about the middle of the plates. Within these slots 29 there are freely positioned the end portions 30' (see Figure 4), of a drive wheel axle 30 which is so shaped that its middle portion is co-extensive with a rotary brush, to be described later, while the end portions are bent into the form of crank arms. The middle portion of the wheel axle 30 is freely guided for both up and down as well as pivoted movement by a depending U-shaped guide member 31 attached to the inner surface of the upper casing 10.

Referring to Figures 4 and 6, there are shown two U-shaped spring members 32, positioned along the outer surfaces of plates 23 and 24 having their upper ends bent at a right angle and pivoted in apertures indicated at 33 vertically above the slots 29 in the side plates 23 and 24 while their lower ends 34 are so shaped that they bear against a portion of the upper surface of the end portions 30' of the drive wheel axle 30. Retaining elements 35, in the form of a wire bent at a right angle have their upper ends bent and inserted into apertures 36 in the side mounting plates 23 and 24, while their lower ends are formed with eyes 37 through which pass dust pan pivot mountings, to be described later. These retaining elements 35 serve as barriers against which the wheel mounting ends 30' of the axle 30 ride when urged downwardly by the spring members 32. The spring members 32 although pivoting about their mounting ends at 33 are used solely to maintain the relation between the rug or floor surface and the drive wheels 26 and 27, mounted on the end portions 30' of the wheel axle.

The drive wheels 26 and 27 are of cylindrical cup-shape having a center hub portion 38 and a peripheral rim portion 39, as shown in Figure 9. The outside of the rim 39 is covered with a rubber tire 40, while the inner peripheral surface of the rim is lined with a rubber surface 41 which is designated as the outer friction driving surface. The outer peripheral surface of the hub 38 is covered with a rubber surface 42 which is designated as the inner frictional driving surface.

In Figure 9 there is also shown the mounting of one of the brush bearings generally indicated at 43 having a cylindrical collar portion 44 and a reduced cylindrical portion 45 which is press fitted into an aperture 46 in the side mounting plate 24. The aperture 46 is at a point intermediate the inner and outer friction driving surfaces of the drive wheels and substantially on a level with the axis of the drive wheels when they are in their extreme downward position (see Figure 6).

Within the bearings 43 there rotate brush holders 47 each having formed head portions 48 which have slots in their faces as shown at 49 in Figure 6. These slotted portions 49 serve as receptacles and drives for each end of a brush shaft 50 of a rotary brush 51 as shown in Figure 4. The formed head portions 48 have a peripheral slot as shown at 52 in Figure 9 in which rides an open ended circular brush retaining element 53 as shown in Figure 4. Each outer end of the brush holders 47 have press fitted thereto drive bushings 54, preferably of brass, with inwardly extending flange portions 55 whose inner peripheral surface is in spaced relationship with the adjacent outer peripheral surface of the collar portion 44 on the brush bearings 43. The outer peripheral surface of the drive bushings 54 is knurled.

In Figure 9, the drive wheel 27 is shown with its outer frictional driving surface 41 in friction contact with the knurled surface of the brush drive bushing 54. Such a position is obtained where the sweeper is moved forward by pressure being applied to the sweeper handle 56 attached to either side of the upper casing 10 toward the forward portion of the sweeper as shown in Figure 1.

Referring to Figure 7, there is shown the operation of the drive wheels and rotary brush when the sweeper is given a forward movement to the left. In this view the left hand wheel of Figure 3 is shown. However, the action applies the same to both drive wheels. The drive wheel 27 rotates in a counter-clockwise direction, due to its frictional engagement with the surface of the rug or floor. The outer frictional driving surface 41, of the drive wheel 27, is in contact with the knurled surface of the brush drive bushing 54 and rotates the brush 51 in a counter-clockwise direction. Pressure applied to the handle 56 attached to the casing 10, moves the sweeper forward and the drive wheel axle 30 tends to pivot counterclockwise in its guide member 31, thereby forcing the outer frictional driving surface 41, on the drive wheel 27, into frictional contact with the knurled surface of the brush drive bushing 54. It will be noted that element 30 thus acts as a carrier for the drive wheels.

In Figure 8 there is shown the operation of the drive wheel and the rotary brush when the sweeper is pulled backward by its handle to the right. The drive wheel 27 rotates in a clockwise direction, due to its frictional engagement with the surface of the rug or floor. The inner frictional driving surface 42, of the drive wheel 27, is in contact with the knurled surface of the brush drive bushing 54 and rotates the brush 51 still in a counter-clockwise direction. The pull applied to the handle 56 attached to the casing 10 pulls the sweeper backward and the drive wheel axle 30 tends to pivot clockwise in its guide member 31, thereby forcing the inner frictional driving surface 42, on the drive wheel 27, into frictional contact with the knurled surface of the brush drive bushing 54.

In either of the actions just described and illustrated in Figures 7 and 8, downward pressure is applied through the handle 56 so as to force the casing 10 and its attached mountings downward against the spring pressure of springs 32, attached to the drive wheel axle, thereby permitting the brush 51 to contact the rug or floor surface so as to pick up particles to be deposited in the dust pan to be described hereinafter.

As the brush 51 always rotates in the same direction, namely, counter-clockwise, as viewed in Figures 7 and 8, the particles picked up by the brush from the surface of the rug or floor are carried by the brush and deposited in a dust pan generally indicated at 57.

The dust pan generally indicated at 57 in Figure 2 is shaped with six sides so as to fit into the rear portion of the center cut-out opening in the lower one piece casing 12. Referring to Figure 6, the dust pan 57 is shown with an upturned

forward edge 58 which is of a circular contour to correspond with the circular surface of the brush 51. The remaining edges of the dust pan are shown upturned as at 59 so as to form suitable shoulders for retaining the collected particles within the pan. The dust pan is pivotally mounted at its forward outer corners by means of suitable pins 60 extending into the eyelets 37 of the elements 35.

The dust pan 57, as viewed in Figures 4, 5 and 6, is dumped by a dumping lever generally indicated at 61. The dumping lever 61 has a reduced portion at its upper end 62 which is bent at a right angle to the lever and pivots in a suitable aperture in the adjacent side mounting plate 24. The lever 61 is also formed with an upwardly projecting arm 63 which extends through the opening 10' in the top of the upper casing 10. Also movably inserted in this opening 10' is a cup-shaped cap 64 having a flanged retaining portion 65. The cap 64 fits over the end of the arm 63 of the lever 61. A spring generally indicated at 66, of one piece, is formed with an upper arm 67, a lower arm 68, and a spirally bent portion at 69 intermediate the arms which pivotally fits over a pivot post projection 70 on the lever 61. The upper end of the arm 67 has a bent portion 71 which fits over an adjacent portion of the lever 61 while the lower end 72 of the arm 68 is bent at a right angle and forms a pivoted connection in a side 59 of the dust pan.

In Figure 4 there is shown a spring 73 positioned at the right hand side of the dust pan, having one end bent and pivoted in an aperture in the adjacent dust pan wall 59, while the other end is pivoted in the adjacent side mounting plate 23.

Both of the springs 66 and 73 serve to urge the dust pan 57 into closed position. To open the dust pan, pressure is applied on the cap 64 which urges the lever 61 downward, as shown in broken lines in Figure 6, carrying along with it the spring 66 whose lower arm 68 serves to pivot the dust pan downwardly about the pivots 69, thereby permitting the collected particles within the dust pan to slide out the rear open end of the dust pan.

A brush comb 75, as shown in Figures 3, 4 and 5, is positioned intermediate the side mounting plates 23 and 24 and above the brush 51 in such a manner that the teeth of the comb project into the bristles of the brush to remove any adhering particles. The particles collected by the comb tend to drop downwardly into the dust pan.

The single rear wheel 28 mounted at the apex of the sweeper which is to the rear of and intermediate the drive wheels 26 and 27 serves two particular functions. It provides a rolling support for the rear of the sweeper and also permits equal transmission of power to the brush drive bushings 54—54 and the brush 51 driven thereby, when the sweeper is pushed forward or pulled backward in a straight direction, or on any size of arc.

Various uses and modifications of the invention will be apparent to those skilled in the art.

We claim:

1. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said drive wheels being recessed to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels pivotally mounted in said casing; said drive wheels being responsive to movements of said casings to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

2. A carpet sweeper having upper and lower casing members; a brush rotatably mounted in the upper casing member; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing of cup-shape to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels pivotally mounted in said casing; said drive wheels being responsive to movements of said casing to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

3. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being cup-shaped to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings, an axle for said drive wheels resiliently mounted in said casing and movable both horizontally and vertically in said casing; said drive wheels being responsive to movements of said casing to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

4. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being recessed to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels resiliently mounted in said casing and movable both horizontally and vertically in said casing and means responsive to movements of said casing for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

5. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels having concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels resiliently mounted in said casing and movable both horizontally and vertically in said casing means for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with the brush drive bushings, said means including a handle attached to the sweeper casing.

6. A carpet sweeper having upper and lower casing members; a brush rotatably mounted in the upper casing member; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing said wheels being of a recessed shape to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels resiliently mounted in said upper casing member and movable both horizontally and vertically in said casing members; means for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings, said lower casing member enclosing the bottom of said upper casing.

7. A carpet sweeper having a casing; a brush

rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being cup-shaped to provide concentrically spaced frictional drive surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels mounted in said casing and movable both horizontally and vertically in said casing; resilient means pivoted at one of their ends in said casing vertically above the axis of said wheels and pivoted at their other ends on said axle adjacent said wheels, whereby downward pressure on said casing moves said casing downward with respect to said drive wheels and their axle, thereby providing adjustment between said brush and the surface being cleaned, and means responsive to movements of said casing for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

8. A carpet sweeper having upper and lower casing members, said lower casing member enclosing the bottom of said upper casing; a brush rotatably mounted in the upper casing member; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being recessed between the rim and hub thereof to provide inner and outer frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels mounted in said upper casing member and movable both horizontally and vertically in said casing members; resilient means pivoted at one of their ends in said upper casing member vertically above the axis of said wheels and pivoted at their other ends on said axle adjacent said drive wheels, whereby downward pressure on said upper casing member moves said casing members downward with respect to said drive wheels and their axle thereby providing adjustment between said brush and the surface being cleaned, and means responsive to movements of said upper casing member for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

9. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being recessed to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels resiliently mounted in said casing and movable both horizontally and vertically in said casing; a rear wheel in said casing positioned to the rear of and intermediate said drive wheels, whereby equal transmission of power is applied to said brush drive bushings when the sweeper is moved on the surface being cleaned, and means responsive to movements of said casing for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

10. A carpet sweeper having a casing; a brush rotatably mounted in the casing; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said drive wheels being recessed to provide concentrically spaced frictional drive surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels mounted in said casing and movable both horizontally and vertically in said casing; resilient means pivoted at one of their ends in said casing vertically above the axis of said wheels and pivoted at their other ends on said axle adjacent said drive wheels, whereby downward pressure on said casing moves said casing downward with respect to said drive wheels and their axle thereby providing adjustment between said brush and the surface being cleaned; a rear wheel in said casing positioned to the rear of and intermediate said drive wheels, whereby equal transmission of power is applied to said brush drive bushings when the sweeper is moved on the surface being cleaned, and means responsive to movements of said casing for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings.

11. A carpet sweeper having upper and lower casing members; a brush rotatably mounted in the upper casing member; drive bushings on the ends of the brush; drive wheels at opposite sides of the casing, said wheels being provided with an annular groove to provide inner and outer frictional driving surfaces to provide alternate frictional contact with said bushings; an axle for said drive wheels resiliently mounted in said upper casing member and movable both horizontally and vertically in said casing members; means for moving said drive wheels to bring their inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushings, said lower casing member enclosing the bottom of said upper casing and having a reinforcing member secured to its inside forward portion.

12. A drive for a brush of a carpet sweeper comprising a support, a brush rotatably mounted in said support having a brush drive bushing at its end, an axle movably mounted in said support, a drive wheel rotatably mounted on said axle, said wheel having an extending hub to constitute an inner driving surface and having an overhanging rim the inner surface of which constitutes an outer driving surface, said drive wheel being responsive to movements of said support to bring the said inner and outer frictional driving surfaces alternately into frictional contact with said brush drive bushing.

13. In a carpet sweeper, a casing, a brush driving shaft rotatably mounted in the casing, a floor-engageable drive wheel, the wheel being recessed to provide concentrically spaced frictional driving surfaces respectively positioned adjacent portions of a driving surface on said shaft which are substantially diametrically opposite to each other, and a carrier for said drive wheel mounted in said casing, said carrier mounting being arranged to permit movement of the wheel lengthwise of said casing by movement of the casing upon a floor to thereby bring one or the other of said driving surfaces into contact with said shaft according to the direction of movement of said carrier relative to said casing.

14. In a carpet sweeper, a casing, a brush driving shaft rotatably mounted in the casing, a floor-engageable drive wheel, the wheel being recessed to provide concentrically spaced frictional driving surfaces respectively positioned adjacent portions of a driving surface on said shaft which are substantially diametrically opposite to each other, and a carrier for said drive wheel mounted in said casing, said carrier mounting being arranged to permit movement of the wheel lengthwise of said casing by movement of the casing upon a floor to thereby bring one or the other of said driving surfaces into contact with said

shaft according to the direction of movement of said carrier relative to said casing.

15. In a carpet sweeper, a casing, a brush driving shaft rotatably mounted in the casing, a floor-engageable drive wheel, the wheel being recessed to provide concentrically spaced frictional driving surfaces respectively positioned adjacent portions of a driving surface on said shaft which are substantially diametrically opposite to each other, and a carrier for said drive wheel mounted on said casing for swinging movement lengthwise of the casing by movement of the latter upon a floor to thereby bring one or the other of said driving surfaces into contact with said shaft according to the direction of swinging movement of said carrier relative to said casing.

16. In a carpet sweeper, a casing, a brush driving shaft element rotatably mounted in the casing, a floor-engaging wheel element, one of said elements being recessed to provide concentrically spaced frictional driving surfaces respectively positioned adjacent peripheral portions of a driving surface on the other element which are substantially diametrically opposite to each other, and a carrier for one of said elements movably mounted in the casing and arranged to provide for movement of the said element lengthwise of said casing by movement of the latter upon a floor to thereby bring one or the other of said peripheral surfaces into contact with the other element according to the direction of movement of said carrier relative to said casing.

17. A carpet sweeper including a casing, a shaft rotatably mounted in the casing, a brush rotatable with said shaft, drive wheels at opposite sides of the casing, said drive wheels being recessed to provide concentrically spaced frictional driving surfaces to provide alternate frictional contact with driving surfaces on said shaft, a carrier for said drive wheels mounted for swinging movement in said casing to bring the inner and outer frictional driving surfaces of said drive wheels alternately into frictional contact with said shaft.

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