

April 19, 1966

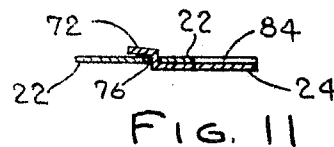
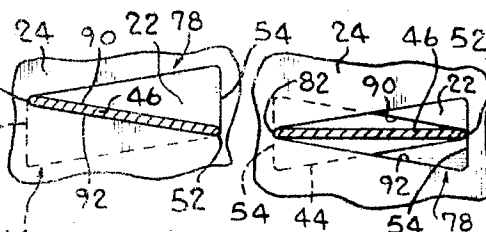
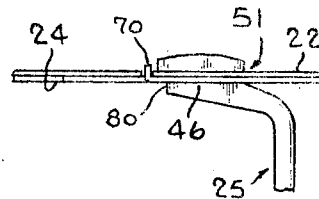
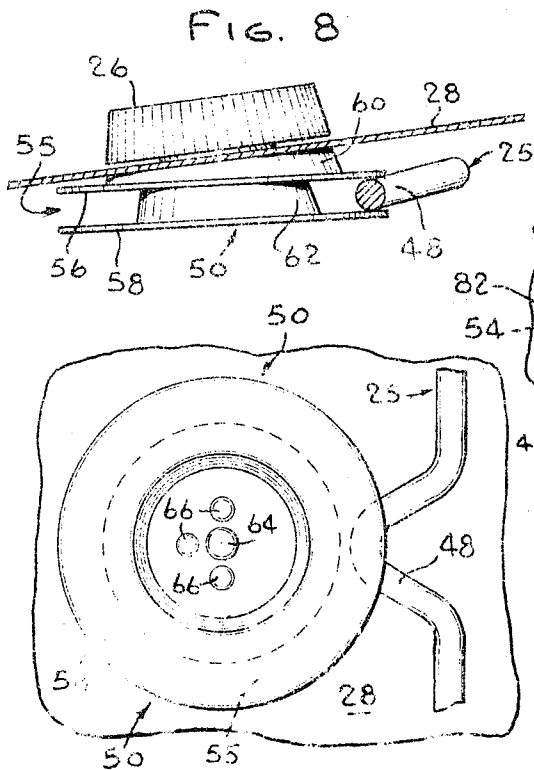
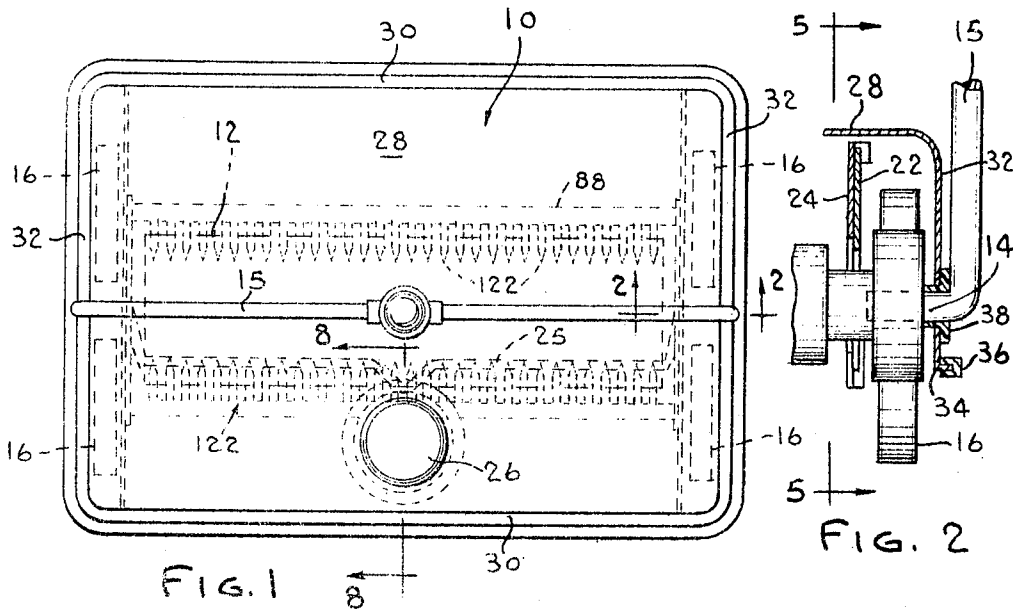
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3,246,353

ADJUSTABLE CARPET SWEEPER

Filed Nov. 23, 1964

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

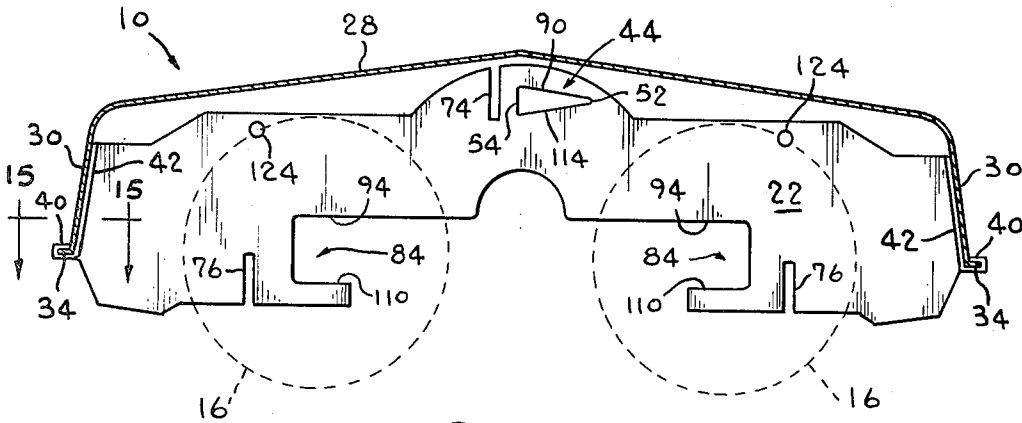


FIG. 3

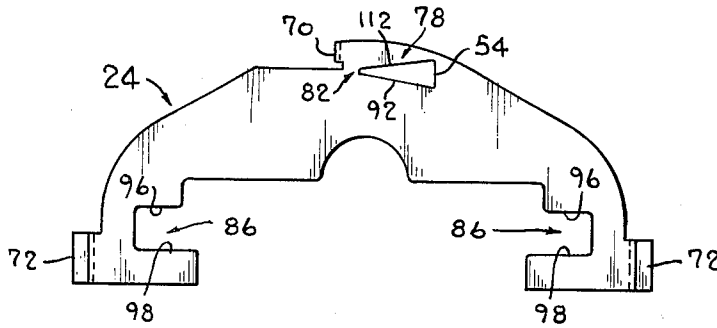


FIG. 4

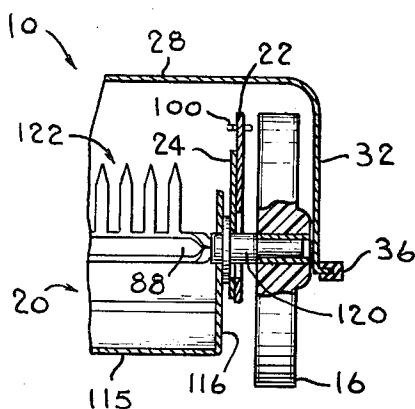


FIG. 12

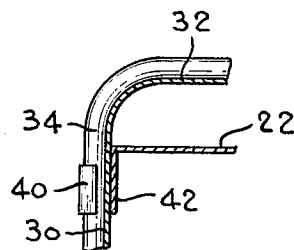


FIG. 15

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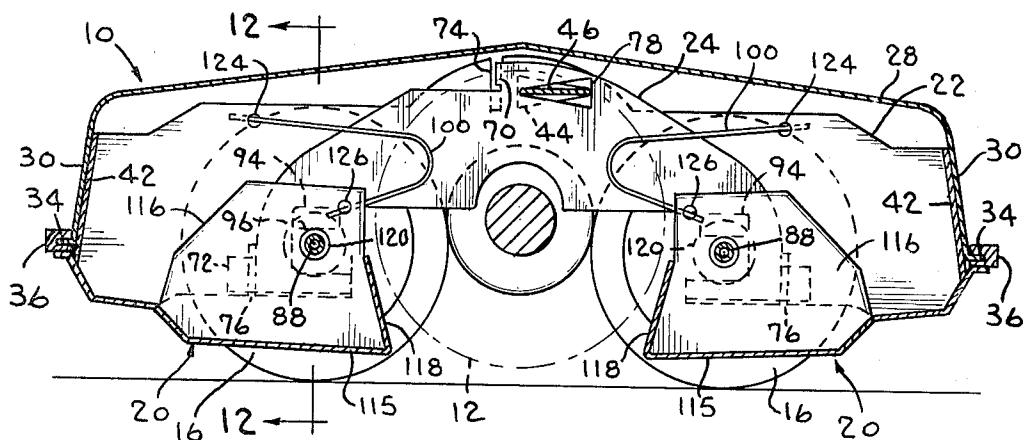


FIG. 5

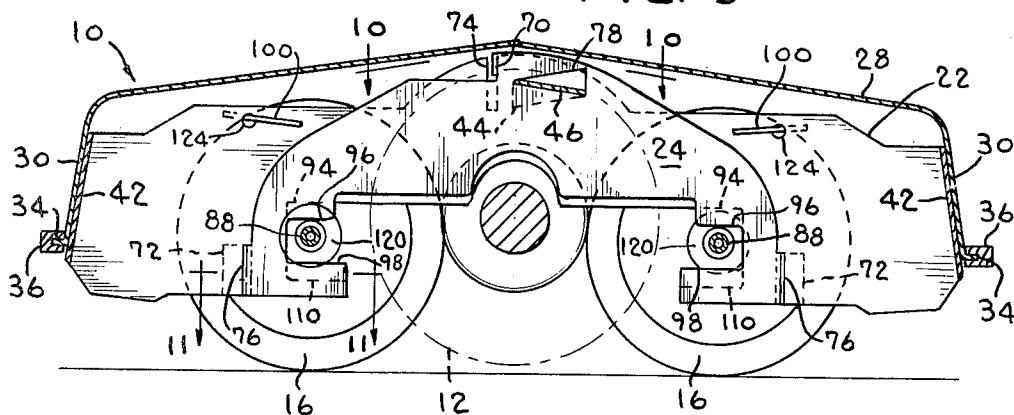


FIG. 6

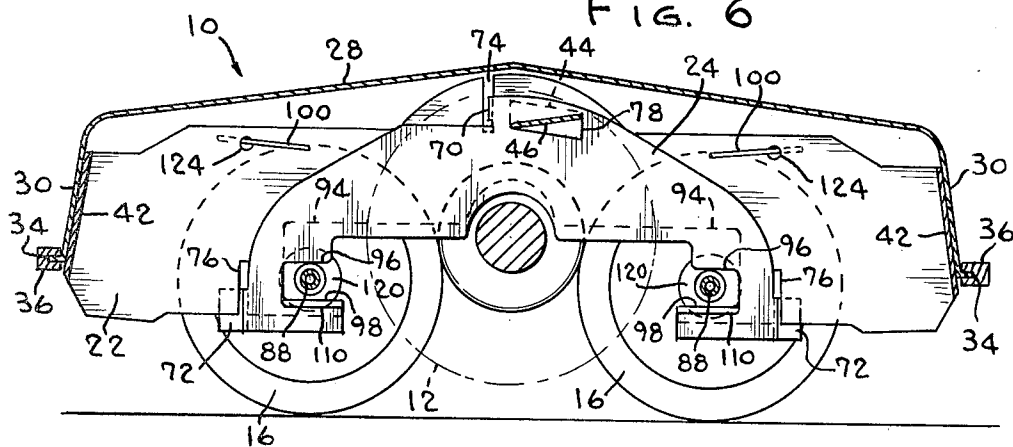


FIG. 7

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ADJUSTABLE CARPET SWEEPER

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4 Claims. (Cl. 15-41)

This invention relates to improvements in carpet sweepers and particularly to improvements in their brush height adjustment mechanisms.

The quality carpet sweepers of today are equipped with adjustment mechanisms for varying the distance between the brush and the brush driving wheels of the sweeper to permit the user to select the particular brush height setting which is best suited for the nap of the surface to be cleaned. The maximum brush-wheel distance is desirable for heavy nap carpets and the minimum distance is proper for light nap carpets or for bare floors.

The general object of this invention is to provide a carpet sweeper having a relatively simple and easily manufacturable brush height adjustment mechanism without sacrificing any of the desirable features of carpet sweepers of this type.

In a broad sense this object is attained by the provision of fixed and movable end members which cooperate to define vertically extending axle receiving apertures which connect the brush or wheel axles for limited vertical motion within the carpet sweeper housing, and by the provision of adjustment means for selectively changing the relative position of the movable end members in respect to the fixed end members to thereby change the axle receiving apertures. As will be appreciated from the more detailed description of the illustrated embodiment of the present invention, this structure employs fairly inexpensive components to provide the relative movement between the brush and wheels of the carpet sweeper during its use and to change the position or limits of such relative movement in accordance with the setting of the adjustment mechanism.

The preferred adjustment mechanism has a crankshaft which has a central crankshaft section and lifter tabs extending transversely thereto at each of its ends. The lifter tabs pivotally engage apexes of suitable apertures in the fixed and movable end members and are pivoted in respect to both members upon movement of the main crankshaft section. This motion changes the vertical position of the movable end members in respect to the fixed end members. The central crankshaft section is engaged by a track of a cam mechanism which is connected to a manually rotatable adjustment knob. The track is oblique to the axis of rotation of the knob and therefore moves the crankshaft upon rotation of the knob. As will be seen from the further description in this specification, the construction of this adjustment mechanism is relatively simple and inexpensive to manufacture, yet is not deficient in its function.

The simplicity of the brush height adjustment mechanism is particularly attained by mounting the brush for rotation around a fixed axis in respect to the carpet sweeper housing, by mounting the axles of the brush driving wheels for limited vertical movement in cut-out sections of fixed end members, and by providing movable end members which have cut-out sections overlying the cut-out sections of the fixed members to define therewith adjustable axle receiving apertures. By varying the vertical position of the movable end member in respect to the housing (i.e. fixed end members) the axle receiving apertures will be changed to render the sweeper applicable for cleaning a particular surface.

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In view of the above, another object of the present invention is to provide effective yet simple means for varying the driving wheel position in respect to the carpet sweeper housing.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the single embodiment shown in the drawings, in which:

FIG. 1 is a top plan view of the carpet sweeper embodying the present invention;

FIG. 2 is an enlarged fragmentary cross-sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is a plan side view of the fixed end member;

FIG. 4 is a plan side view of the movable end member;

FIG. 5 is a cross-sectional view taken on line 5-5 of FIG. 2 showing the carpet sweeper at an intermediate brush height setting;

FIG. 6 is a cross-sectional view similar to that shown in FIG. 5, but showing the carpet sweeper at its low brush height setting and deleting the dust pan structure for the sake of simplicity;

FIG. 7 is a view similar to that of FIG. 6 showing a carpet sweeper at its high brush height setting;

FIG. 8 is an enlarged cross-sectional side view taken on line 8-8 of FIG. 1;

FIG. 9 is a plan bottom view of the structure shown in FIG. 8;

FIG. 10 is a top plan view of the connection between the crankshaft and the fixed and movable end members taken along line 10-10 of FIG. 6;

FIG. 11 is an enlarged cross-sectional view taken on line 11-11 of FIG. 6;

FIG. 12 is a fragmentary cross-sectional view taken along line 12-12 of FIG. 5;

FIG. 13 is an enlarged fragmentary side plan view of the lifter tab connection to the fixed and movable end members at the low brush setting;

FIG. 14 is an enlarged fragmentary view similar to FIG. 13, but showing the parts at the medium brush setting; and

FIG. 15 is a view taken on line 15-15 of FIG. 3;

The basic components of the carpet sweeper are shown in FIGS. 1 and 2 and may be considered as a housing 10, a brush 12 carried on inwardly extending ends 14 of the bail 15, brush driving wheels 16 fixed to dust pans 20, fixed and movable end members 22 and 24 which retain the dust pans and wheels in the housing, and a crankshaft 25 which cooperates with the end members to control the wheel position in respect to the brush in accordance with the setting of an adjustment knob 26.

The housing 10 is comprised of a top member 28 and dependent side and end walls 30 and 32 respectively. In this specification the walls transverse to the normal direction of travel of the sweeper are defined as side walls and those parallel to the direction of travel are defined as end walls. The lower edge of the walls is bent outwardly to form a flange 34 which carries a rubber bumper 36. Since the assembly of the carpet sweeper does not require separate end walls construction, as is the case with many sweepers of the prior art, the housing may be formed from a single piece of sheet metal into a unitary final form.

The brush 12 and bail 15 are secured to the housing by the inwardly turned bail ends 14 which extend through antifriction bushings 38 provided in each end wall 32. The end portions are received in appropriate apertures at each end of the brush to rotatably support the same within the housing. The brush and bail are independently rotatable in respect to the housing, yet their axis of rotation is fixed in respect thereto.

Each of the fixed end members 22 is a metal stamping of an irregular contour as best seen in FIG. 3. The members are mounted parallel to and spaced inwardly of the end walls 32 (FIG. 2). They are fixed to the side walls 30 by tabs 40 which are crimped around the flange 34 and by inwardly extending flanges 42 which rest against the inner faces of the side walls and provide lateral stability to the members (FIG. 15). A triangular slot 44 is provided in each end member 22 and receives a flat and outwardly extending lifter tab 46 which is formed at each end of the crankshaft 25.

The crankshaft has a section 48 located intermediate its ends and spaced laterally from the tabs 46. This section is engaged by a cam mechanism 50 which is operable upon actuation of the knob 26 to cause the lifter tabs 46 to pivot at their inner ends 51 (FIG. 10) around the apex 52 of the triangular slots. The degree of pivotal motion of course is limited by the length of the base 54 of the slots. As shown in FIGS. 8 and 9, the crankshaft section 48 is received in a track 55 defined by the opposing parallel flanges 56 and 58 of cam elements 60 and 62 respectively. The two elements are fixed to each other and to the knob 26 by a pin 64 and three nibs 66 which project from the knob. This construction permits the cams and knob to be rotated as a unit around the axis of pin 64. The flanges 56 and 58 are oblique to the axis of rotation of the knob and therefore cause the crankshaft section 48 to be moved towards or away from wall 28 upon rotation of the knob. This motion of the crankshaft portion is transferred to the lifter tabs 46 and causes them to pivot in slots 44.

Each movable end member 24 is a metal stamping of an irregular contour as best seen in FIG. 4, and is secured for limited vertical lineal sliding movement to the inside face of a corresponding fixed end member 22. The members are connected by an upstanding tab 70 and two laterally extending tabs 72 of the movable end member 24. Tab 70 projects through a slot 74 and the tabs 72 are slightly off-set from the plane of the member 24 and project through slots 76 of the end member 22 to engage their outside surfaces (FIG. 11).

Each movable end member is provided with a triangular slot 78 which is of equal size to and overlies the triangular slot 44 of the corresponding fixed end member and which also receives the lifter tab 46. However, the slots 78 are inverted so that their apex 82 lies at the base 54 of slots 44. The outer ends 80 of the tabs 46 pivotally engage the movable end members 24 at the apex 82 of each slot. As the knob 26 is actuated the tabs 46 pivot at their inner ends 51 in respect to the fixed end member and at their outer ends 80 and pivot in respect to the movable end members. This action causes the movable end member to move in a vertical and linear path in respect to the fixed end member.

Each fixed end member 22 has a pair of vertically extending cut-out portions 84 (FIG. 3) and each of the movable end member has a pair of cut-out portions 86 (FIG. 4) which overlie the former portions and define therewith vertically extending apertures which receive axles 88 of the brush driving wheels. The relative position between the end members defines the size and location of the axle receiving apertures and thereby the relative position of the brush 12 in respect to the brush driving wheels 16.

The brush height can be adjusted to three positions; a low setting at which the permissible distance between the brush and wheels is at its minimum, an intermediate setting, and a high setting at which the brush wheel distance is at its maximum. If desired, the brush height can be set at positions between the three positions mentioned above.

At the low setting the knob 26 is in a position at which the crankshaft section 48 is in its lowermost position and thereby the lifter tabs 46 are pivoted around apex 52 to an upwardly inclined position (FIG. 6). In this posi-

tion the upper face of each lifter tab rests against the upper side 90 of triangular slot 44 in the corresponding fixed end member and the lower face of each lifter tab rests against the lower side 92 of the triangular slots 78 of the movable end members. At this setting the upper limits of the axle receiving apertures are formed by stop surfaces 94 of the cut-out portions 84. The lower limits of the axle receiving apertures are formed by stop surfaces 98 of the cut-out portions 86. The position of the axles 88 within the apertures may vary during the use of the carpet sweeper, however, normally the axles are biased to an intermediate position between the stop surfaces by springs 100 (FIG. 7).

When changing the brush height from the low setting to the intermediate setting, the knob 26 is turned to raise the crankshaft section 48 until the lifter tabs 46 are pivoted to the horizontal position as shown in FIG. 5. At this setting the movable end members have been moved downwardly in respect to the fixed end members and the upper limits of the axle receiving apertures are defined by stop surfaces 96 and the lower limits by stop surfaces 98 and 110. The vertical position of the lower stop surfaces 98 and 110 corresponds.

When changing the brush height from the intermediate to the high setting, knob 26 is turned to move crankshaft section 48 to its uppermost position at which lifter tabs are downwardly inclined as shown in FIG. 7. In this position the upper face of each lifted tab rests against the upper side 112 of each triangular slot 78 and the lower face against the lower side 114 of each triangular slot 44. At this setting the upper limits of the axle receiving apertures are formed by stop surfaces 96 and the lower limits by stop surfaces 110.

Each dust pan has a floor 115, two end walls 116 and a front wall 118. The wheels 16 are rotatably carried on opposite ends of the axle 88 which is fixed to and extends through opposite end walls of the pan. The wheels are spaced from the pan end walls by bushings 120. The central portion of each axle is shaped to provide teeth 122 which are adapted to engage the brush 12 and cause dirt to be moved from the brush and to be collected in the dust pan.

A downward and inward bias is exerted on the axles by the springs 100 which are received in appropriate apertures 124 and 126 provided in the fixed end members and the dust pan end walls respectively. The springs permit biased vertical movement of the axles within the particular axle receiving apertures which are of course determined by the particular knob setting.

The dust pans may be emptied by merely pivoting their axles within the axle receiving apertures (downwardly and inwardly in FIG. 5) in a direction opposite to the normal bias of springs 100. After a limited pivotal opening movement in this direction the aperture 126 will move past the line between the axle and aperture 124 and therefore spring 100 will shift and exert a bias in aid of the opening motion. When the pan is closed the bias of spring 100 will similarly shift back to aid the closing motion of the pan.

Although but a single embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A carpet sweeper, comprising:

a housing;

a brush mounted in said housing for rotation around an axis fixed in respect to said housing;

two pairs of brush driving wheels, each pair having axle means which supports said wheels in said housing for rotational and limited vertical movement in said housing, said housing having a fixed end member at each of its ends, said end members receiving

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said axle means in vertically extending cut-out portions of said end members;

two movable end members, each mounted for limited vertical movement in respect to one of said fixed end members and each having vertically extending cut-out portions receiving said axle means and overlying said cut-out portions of said fixed end members, said cut-out portions of said fixed and movable end members defining axle means receiving apertures which limit said vertical movement of said brush driving means;

adjustment means to change the position of said movable end members in respect to said fixed end members to thereby change said axle means receiving apertures;

said adjustment means comprising crankshaft means connected to said movable end members and crankshaft actuating means connected to said housing to cause vertical movement of said movable end members upon actuation of said actuating means; and

said crankshaft means having a lifter tab at each of its ends, each of the lifter tabs being engaged at one of its ends with an apex of an aperture in one of said fixed end members and being engaged at its other end with an apex of an aperture in one of said movable end members, said lifter tabs pivoting at said apexes upon actuation of said crankshaft and thereby causing relative movement between said fixed and movable end members.

2. A carpet sweeper, comprising:

a housing;

a brush having brush axle means connecting said brush for rotation in respect to said housing;

brush driving wheels having wheel axle means for connecting said wheels for rotation to said housing;

said housing having fixed end members at each of its ends, said end members receiving one of said axle means in vertically extending cut-out portions of said end members;

two movable end members, each mounted for limited vertical sliding movement in respect to one of said fixed end members and each having vertically extending cut-out portions receiving said one of said axle means and overlying said cut-out portions of said fixed end members, said cut-out portions of said fixed and movable end members defining vertically extending receiving apertures for said one of said axle means, said receiving apertures permitting relative vertical motion of said one of said axle means in respect to said housing;

adjustment means to change the position of said movable end members in respect to said fixed end members thereby changing said receiving apertures; and

said adjustment means comprising a crankshaft having a central section extending between said fixed end members and having lifter tabs at each of its ends extending generally transversely to said central

section; each of said lifter tabs being engaged at one of its ends with an apex of an aperture in one of said fixed end members and being engaged at its other end with an apex of an aperture in one of said movable end members, said central section being connected for movement with a manual adjustment member to cause said lifter tabs to pivot at said apexes and change the relative position of said movable end members in respect to said fixed end members upon actuation of said manual adjustment member.

3. A carpet sweeper according to claim 2 wherein said adjustment member is fixed for rotatable adjustment movement to said housing and said crankshaft section is connected to said adjustment member by cam means, said cam means comprising: a member connected for rotation with said adjustment member and having opposing parallel flanges forming a track which is engaged by said crankshaft section, said track being oblique to the axis of rotation of said adjustment member thereby causing movement of said crankshaft section upon rotation of said adjustment member.

4. A carpet sweeper, comprising:

a housing;

a brush rotatably mounted in said housing;

brush driving wheels rotatably carried in said housing and vertically movable relative to said brush, spring means for biasing said relative vertical movement;

a first stop member fixed to said housing;

a second stop member movable in respect to said housing and cooperating with said first stop member to limit said relative vertical movement between said brush and brush driving wheels in accordance with the relative position of said first stop member in respect to said second stop member;

adjustment means to change the relative position between said first and second stop members, said adjustment means comprising of a rotatable member carried by said housing and actuating means for rotating said member, said rotatable member having lifter tab means extending generally transversely to its axis of rotation, said lifter tab means being pivotally engaged at one of its ends with an apex of an aperture in said first stop member and at the other of its ends with the apex of an aperture in said second stop member, said lifter tab means pivoting at said apexes upon rotation of said rotatable member to thereby change the relative position between said two stop members.

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CHARLES A. WILLMUTH, *Primary Examiner.*