Oct. 31, 1961 P. G. PATCH 3,006,021

POWER DRIVEN STREET SWEEPER

Filed Dec. 30, 1957 5 Sheets-Sheet 1

Fig. 1.

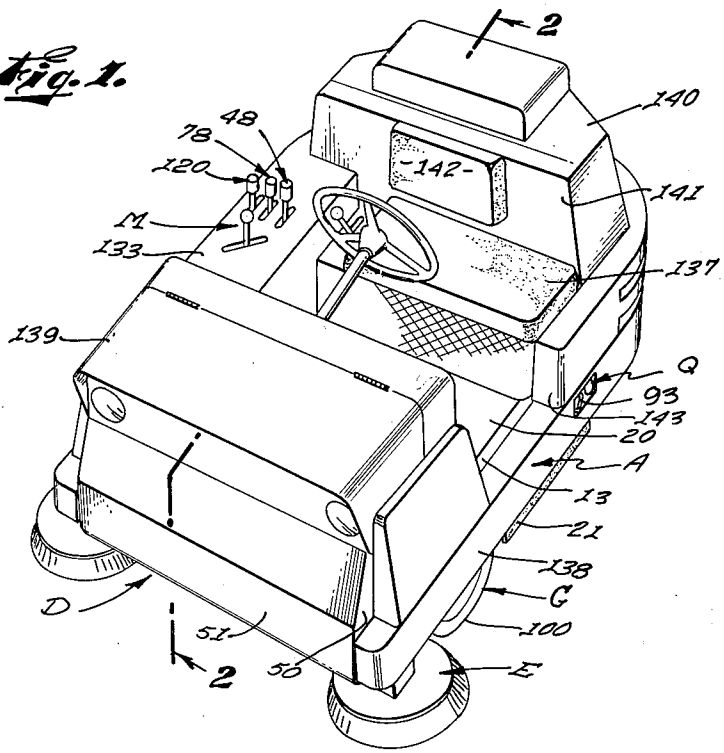
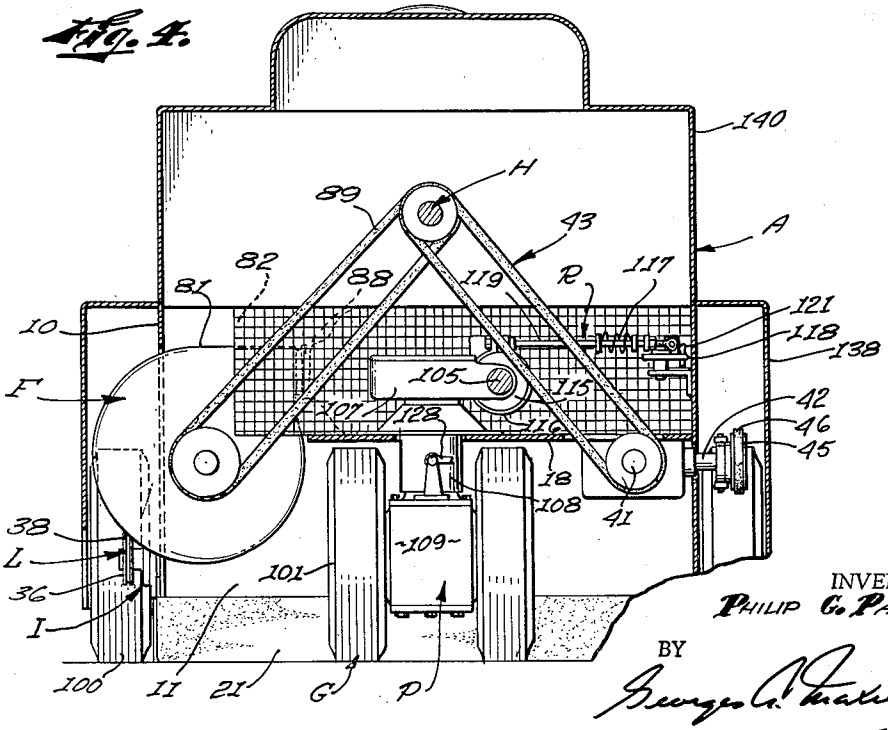


Fig. 4.



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POWER DRIVEN STREET SWEEPER

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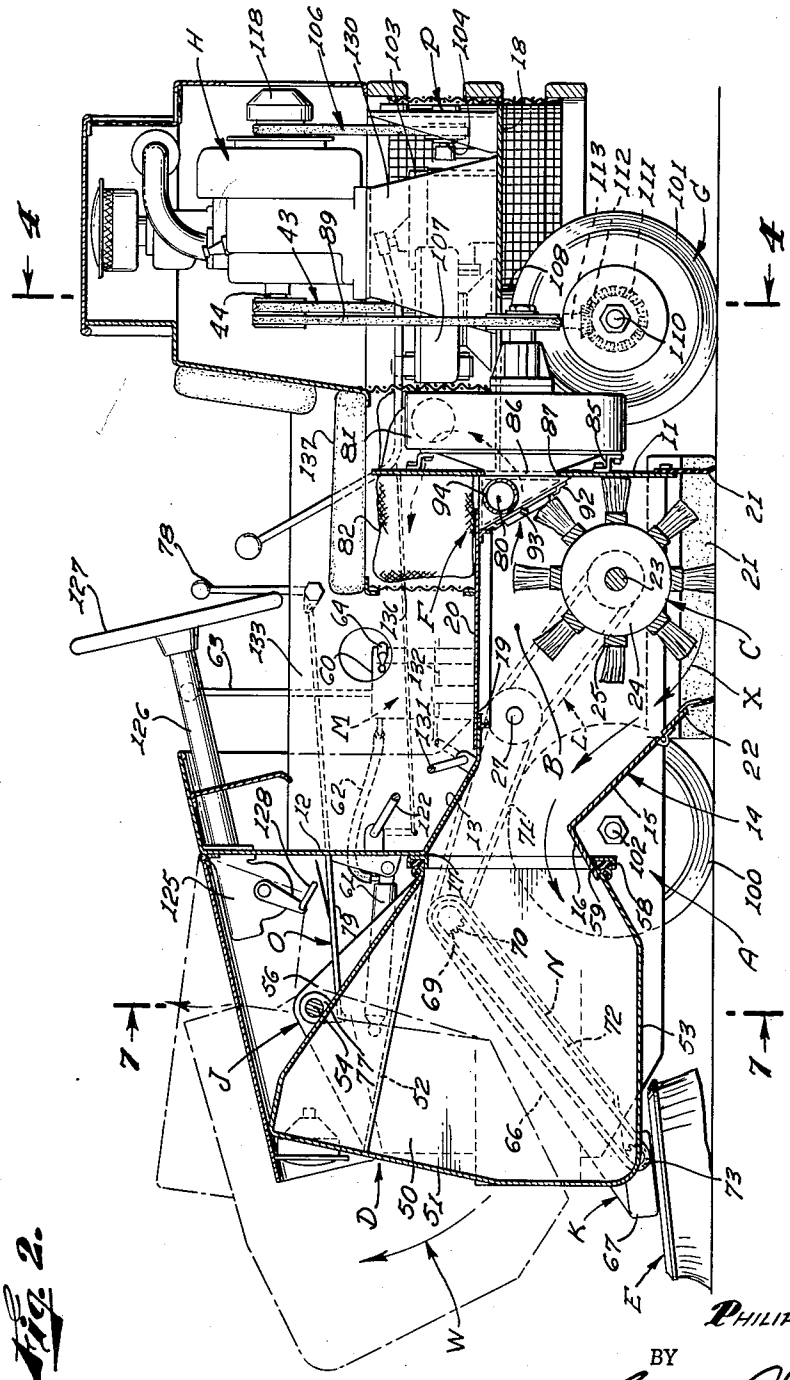


Fig. 2.

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POWER DRIVEN STREET SWEEPER

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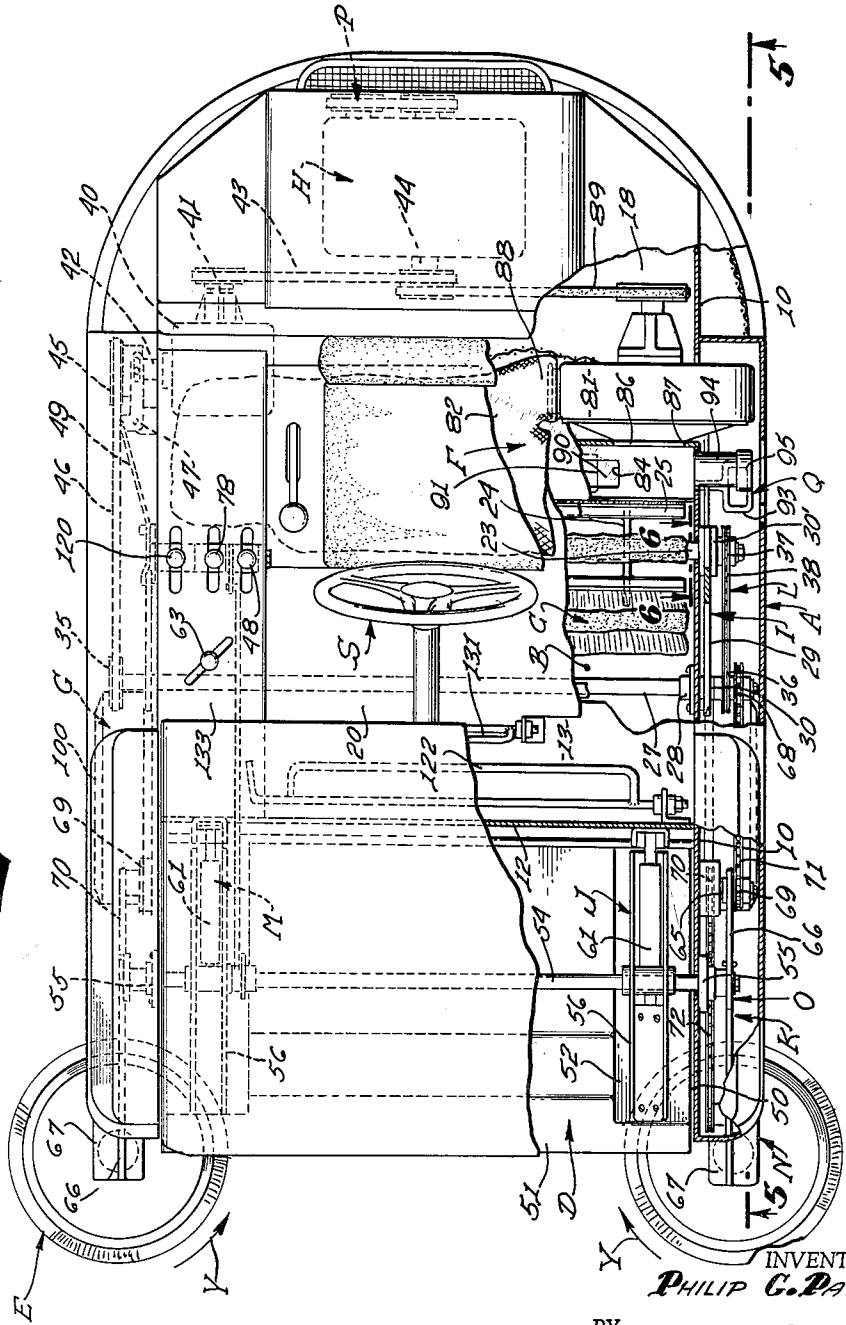


Fig. 3.

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POWER DRIVEN STREET SWEEPER

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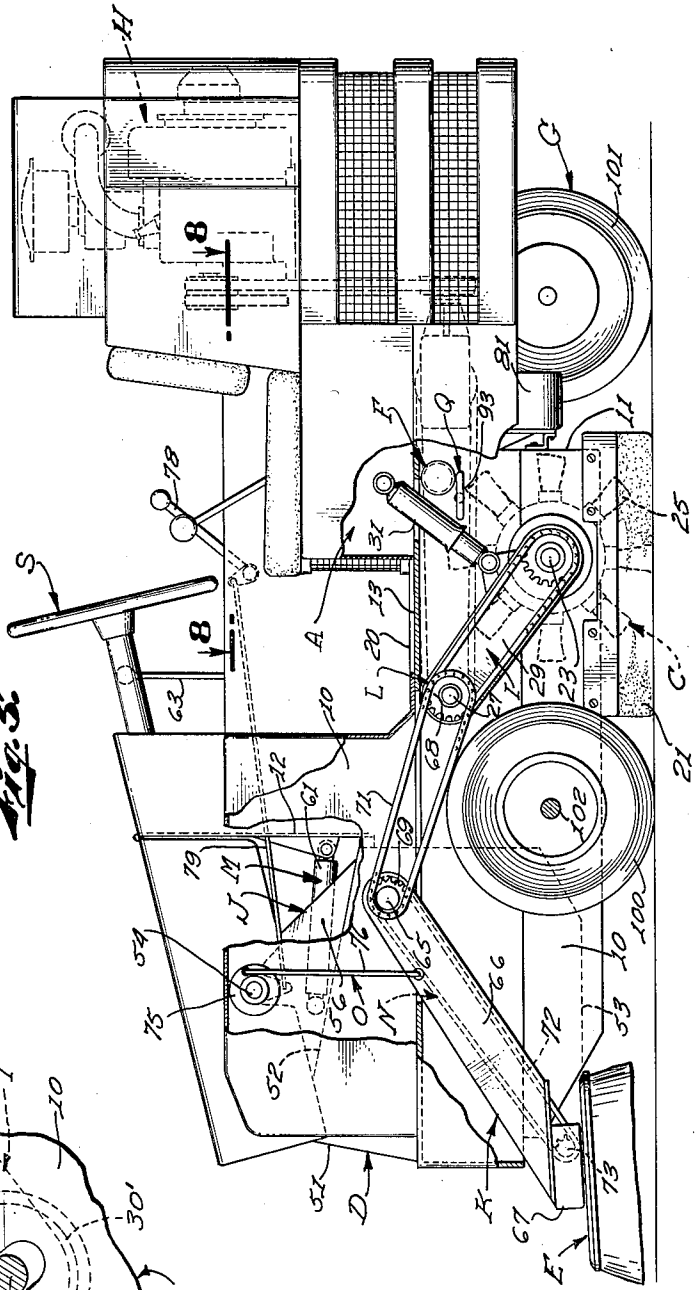


Fig. 5

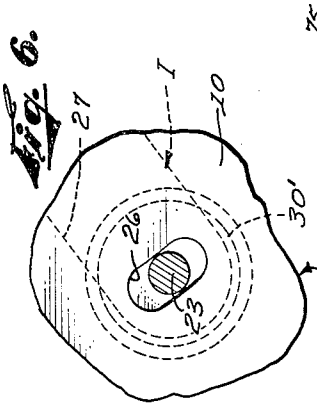


Fig. 6

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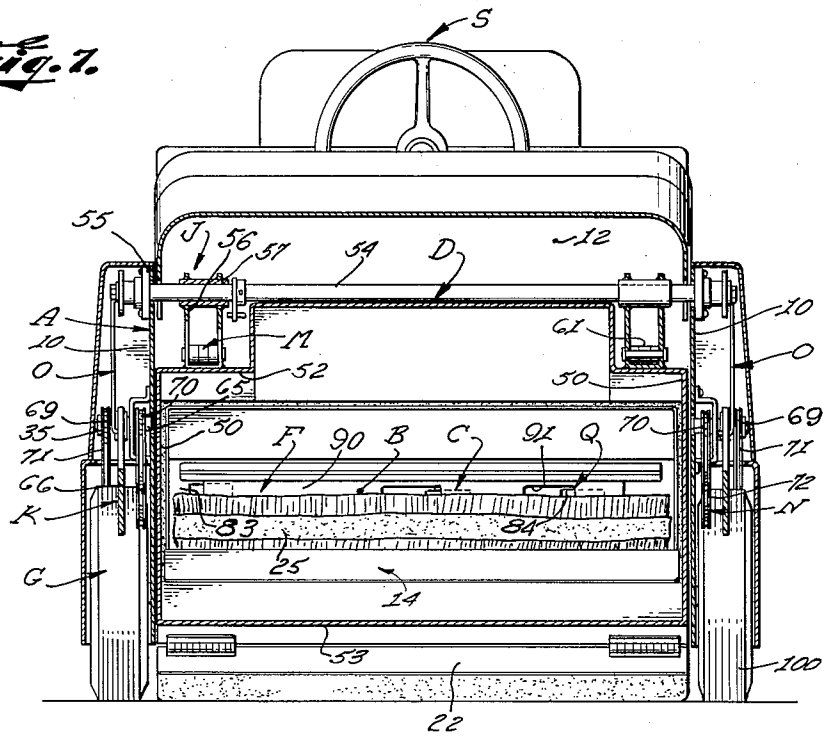
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POWER DRIVEN STREET SWEEPER

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Fig. 7.



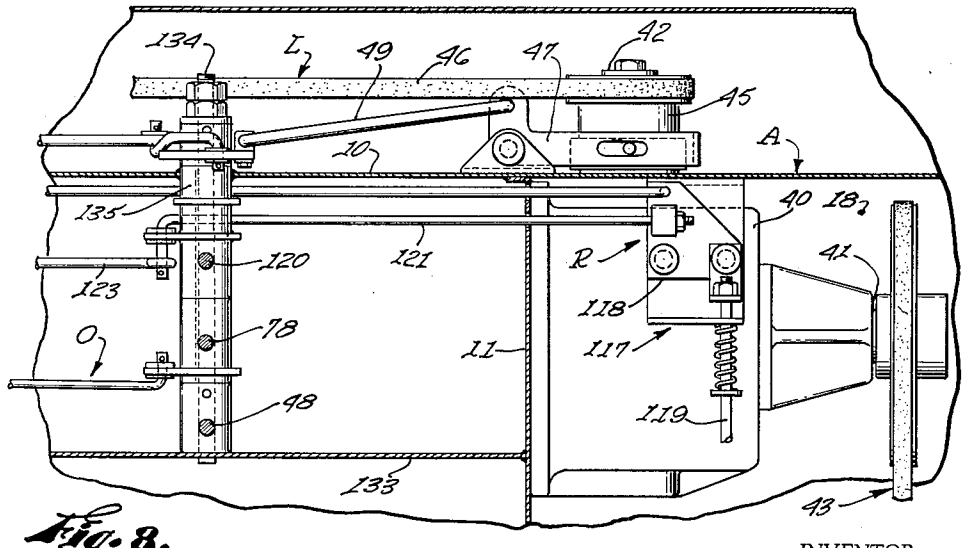


Fig. 8.

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United States Patent Office 3,006,021 Patented Oct. 31, 1961

3,006,021

POWER DRIVEN STREET SWEEPER

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Filed Dec. 30, 1957, Ser. No. 706,163
9 Claims. (Cl. 15—340)

This invention relates to a sweeper and is more particularly concerned with a power operated sweeping vehicle adapted for industrial and commercial use.

Small operated sweeping vehicles adapted for industrial and commercial use, such as for sweeping the floors, sidewalks and driveways of industrial plants, and the like, are becoming widely used. The ordinary sweeping devices of the character referred to, that are presently in use, have evolved or developed in a step-by-step or piece-meal manner from the ordinary manually operated rotary sweeper and, as a result, are rather awkward, poorly designed devices having numerous undesirable features and characteristics.

An object of the present invention is to provide a new power operated sweeping vehicle having a novel relationship of parts and a sweeping vehicle which is well designed and balanced so that it is highly effective in operation and is both easy and economical and convenient to operate.

Another object of the present invention is to provide a sweeping vehicle of the character referred to having an elongate, fabricated frame and a body defining a downwardly opening broom chamber adapted to house a spool-type rotary broom and having a forwardly disposed discharge opening.

Another object of the present invention is to provide a sweeping vehicle of the character referred to having a hopper pivotally carried by the frame at the forward end thereof to normally communicate with the discharge opening of the broom chamber and having means coupled thereto to pivot the hopper in a manner to dump the sweepings collected thereby.

Another object of the present invention is to provide a sweeping vehicle of the character referred to having disc-type rotary curb brooms carried by forwardly projecting, laterally disposed arms pivotally connected to and carried by the frame and having manually operable means connected therewith to elevate and lower the arms in a manner to shift the curb brooms into and out of engagement over the surface on which the construction is operated.

Still another object of the present invention is to provide a novel vacuum means related to the broom chamber and adapted to collect dust and other light particles swept into the broom chamber and past the outlet opening therein.

A further object of the present invention is to provide a sweeping vehicle of the character referred to having a novel wheel supporting means and having a unitary prime mover for driving certain of the supporting wheels and the several brooms and vacuum means of the vehicle.

An object of the present invention is to provide clearance beneath the hopper and the frame to allow bulky objects to enter the chamber and to provide suitable shiftable flap means about the lower open end of the chamber to engage the floor and establish what is, in effect, a seal between the chamber and the floor.

Another object of the present invention is to provide a construction of the character referred to which is both easy and economical of manufacture and which is highly effective and dependable in operation.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my

invention, throughout which description reference is made to the accompanying drawings, in which:

FIG. 1 is a perspective view of the sweeper provided by the present invention.

FIG. 2 is a longitudinal sectional view of the sweeper that I provide and taken as indicated by line 2—2 on FIG. 1.

FIG. 3 is a plan view of my new sweeper construction and having portions thereof broken away to illustrate certain parts of the construction in section.

FIG. 4 is a transverse sectional view taken as indicated by line 4—4 on FIG. 2.

FIG. 5 is a longitudinal sectional view of my new sweeper and taken substantially as indicated by line 5—5 on FIG. 3.

FIG. 6 is an enlarged detailed sectional view of a portion of my new construction and taken as indicated by line 6—6 on FIG. 3.

FIG. 7 is a transverse sectional view taken as indicated by line 7—7 on FIG. 2.

FIG. 8 is an enlarged detailed sectional view of a portion of the construction that I provide and taken as indicated by line 8—8 on FIG. 5.

The sweeper construction provided by the present invention and illustrated throughout the accompanying drawings involves, generally, a frame A defining a primary broom chamber B, an elongate spool-type primary broom C within the chamber B, a hopper D carried by the frame to communicate with the chamber B and adapted to collect material swept up by the broom C, secondary disc-type curb brooms E carried by the frame, vacuum means F related to the chamber B and adapted to remove dust and the like therefrom, wheel supporting means G for the frame and a prime mover H adapted to drive the vehicle, the several brooms related thereto and the vacuum means.

The construction of the present invention further includes mounting means I pivotally supporting the primary broom C in the chamber B, mounting means J pivotally supporting the hopper D on the frame, and mounting means K pivotally supporting the curb brooms E on the frame.

In addition to the foregoing, the construction that I provide further includes drive means L related to the prime mover H and driving or rotating the primary broom C, actuating means M adapted to pivot and dump the hopper D, drive means N related to the prime mover and manually operable actuating means O for the curb brooms E to rotate the brooms and shift the brooms vertically into and out of engagement with the floor or deck over which the vehicle or sweeper operates, and drive means P between the prime mover and the wheel supporting means G and adapted to drive the vehicle. Still further, the construction of the present invention includes a suitable control means Q for the vacuum means F, braking means R related to the drive means P and steering means S related to the wheel supporting means and drive means P and operable to direct the vehicle over the surface upon which it is operated.

The frame A of the sweeper construction provided by the present invention is an elongate structure fabricated of sheet metal and includes, a pair of laterally spaced, flat, vertically disposed side plates **10** extending longitudinally of the construction, a flat, vertically disposed rear bulk head **11** of limited vertical extent and fixed to and extending between the side plates **10** at a point spaced forward of the rear end of the side plates and adjacent the lower-most or bottom edges thereof, a flat, vertically disposed forward bulk head of limited vertical extent fixed to and extending between the side plates **10** at a point spaced forward of the rear bulk head and adjacent the uppermost or top edges thereof, a deck **13** with a

substantially flat, horizontally disposed deck 13 to rear portion and an upwardly inclined front portion, fixed to and extending between the side plates 10 and the top and bottom edges of the rear and forward bulk heads 11 and 12, and an elongate broom arch 14, V-shaped in cross section, fixed to and extending between the side plates 10 at a point spaced forwardly of the rear bulk head 11 and below the forward bulk head 12. The broom arch 14 (see FIGS. 2 and 7), is substantially V-shaped and has a downwardly and rearwardly inclined rear portion 15 which terminates at the bottom edge of the side plates 10 at a point intermediate the front and rear bulk heads, and a downwardly and forwardly inclined front portion 16 of limited longitudinal extent and which terminates at a point substantially directly below the forward bulk head 12.

With the relationship of parts set forth above, it will be apparent that the side plates 10, bulk heads 11 and 12, deck 13 and broom arch 14 cooperate to establish the broom chamber B, which chamber opens downwardly and is provided with a forwardly disposed discharge opening 17, defined by the forward bulk head 12, broom arch 14 and side plates 10.

In addition to the foregoing, the frame A further includes a flat, horizontally disposed, mounting plate 18, (see FIGS. 2, 3, 4 and 8), which plate is fixed to and extends between the side plates 10 and projects rearwardly from the rear bulk head 11. In the case illustrated, the plate 18 occurs in a plane spaced above the bottom edges of the side plates and slightly below the upper or top edge of the rear bulk head 11.

In practice, the deck 13 of the body A is provided with an access opening 19 to provide access to the interior of the chamber B from the top thereof. The opening 19 is normally closed by a suitable removable cover plate 20 (see FIG. 2).

Depending from the side plates 10 adjacent the lower open end of the chamber B and depending from the bottom edges of the rear bulk head 11 are suitable, flexible shields 21, which shields are adapted to slidably and yieldingly engage the deck or floor over which the sweeper is operated and serve to confine the material swept by the broom C within the confines of the chamber. The shields 21 are suitably mounted on their respective side plates and bulk heads for vertical adjustment. From the above, it will be apparent that the shields 21 form what is, in effect, a depending extension of the chamber B.

Depending from the lowermost rear edge of the broom arch 14 is a deflector shield 22, which deflector shield 22 is pivotally secured to the arch 14 by suitable hinge means and is such that it will readily swing or pivot upwardly when it engages a large object and in such a manner as to allow for free entry of such objects into the confines of the chamber B (see FIG. 2).

The primary broom C is an elongate, substantially cylindrical, spool-type broom and is characterized by an elongate, horizontally disposed axle member 23, two or more axially spaced discs 24 carried by the axle, and a plurality of elongate, circumferentially spaced and longitudinally disposed brushes 25 fixed to and extending between the discs. The broom C is arranged in the chamber B to extend transversely of the body A and so that the brushes at the lower portion thereof project through the lower open end of the chamber and engage the deck or floor over which the structure is operated. The brushes of the broom are slightly less in longitudinal extent than the lateral extent of the chamber B with the result that the broom is freely engageable in the chamber B, while the axle member 23 is substantially longer and projects axially beyond the opposite ends of the said brushes and projects through suitable axially aligned openings 26 provided in the side plates 10 of the frame and to points where it is suitably engaged by the mounting means I and connected with the drive means L as will hereinafter be described (see FIG. 6).

The mounting means I (see FIG. 5) for the primary broom C is shown as including an elongate, horizontally disposed counter-shaft 27 extending transversely of the body at a point spaced forward of and above the broom axle 23 and rotatably supported in suitable axially aligned bearings 28 carried by the side plates 10 of the frame, an elongate support arm 29 rotatably carried at each end of the counter-shaft by means of suitable bearings 30 and projecting downwardly and rearwardly from the counter-shaft to the ends of the axle member 23 related thereto. The lower ends of the arms 29 are provided with suitable bearings 30' through which the ends of the axle member project and which rotatably connect the broom with said arms.

The openings 26 in the side plates 10 of the frame A and through which the ends of the broom axle 23 project are elongated or slotted in a direction substantially tangential with the arch through which the ends of the supporting arms 29 swing (see FIG. 6), thereby allowing for vertical shifting of the broom, as the brushes thereof wear down or as might be caused by the brush engaging a large object or uneven surface. In the case illustrated, the bearings 30 (see FIG. 3) at the lower ends of the supporting arms 29 have radial flanges, which flanges occur adjacent the side plates 10 of the frame A and overlie and close the openings 26 through which the ends of the broom axle 23 project.

In addition to the foregoing, the mounting means I for the broom C, includes a suitable hydraulic shock absorber 31 suitably connected with and extending between each supporting arm 29 and the adjacent side plate 10 of the body. The shock absorbers 31 serve to yieldingly maintain the broom C in proper sweeping position and serve to prevent excessive hopping or jumping of the broom as the construction is operated.

The drive means L (see FIGS. 3 and 5) for the broom C is shown as including a drive pulley 35 fixed to the outer terminal end of the counter-shaft 27, at one side of the frame, a drive sprocket 36 at the other end of the counter-shaft, at the other side of the frame, a drive sprocket 37 at the end of the broom axle 23, adjacent said other side of the frame, and a drive chain 38 engaged with and extending between the sprockets 36 and 37.

The drive means L is adapted to drive the broom C in the direction indicated by the arrow X in FIG. 2 of the drawings.

The counter-shaft 27, which shaft is rotatably carried by the frame, is driven by the primary mover H through a suitable drive means, which means is shown as including a bevel gear box 40 suitably mounted on the frame at a point laterally offset from the prime mover H and having a longitudinally disposed input shaft 41 and a laterally projecting output shaft 42 (see FIG. 8). A belt pulley drive 43 is provided between the drive shaft 44 of the prime mover and the input shaft 41 of the gear box 40 and a suitable drive is provided between the output shaft 42 of the gear box 40 and the drive pulley 35 on the counter-shaft. In the preferred carrying out of the invention, the drive between the output shaft 42 of the gear box and the driven pulley 35 on the counter-shaft 27 includes a manually operable, releasable clutch-type pulley 45 on the output shaft 42 and a drive belt 46 engaged with the said releasable pulley 45 and the said driven pulley 35. The releasable pulley 45 is operated by a suitable bell crank 47 pivotally carried by the frame adjacent the pulley, a hand lever 48 pivotally carried by the frame at a point spaced forward of the pulley and a link 49 fixed to and extending between the bell crank and the lever.

The hopper D (see FIG. 2), carried by the frame A to communicate with the chamber B and to collect the material swept up by the broom C is shown as a substantially square, rearwardly opening, box-shaped struc-

ture having substantially flat, vertically disposed side and front walls 50 and 51 and substantially flat, horizontally disposed top and bottom walls 52 and 53. The rear, vertically and horizontally disposed edges of the side, top and bottom walls of the hopper cooperate to define an inlet opening to the interior of the hopper.

The mounting means J pivotally supporting the hopper D on the frame A is shown as involving an elongate, horizontally disposed shaft 54 rotatably carried by a pair of axially aligned bearings 55 fixed to the side plates 10 of the frame, at a point spaced forward of the forward bulk head 12, a pair of laterally spaced brackets 56 fixed to and projecting upwardly from the top wall 52 of the hopper, and a bushing 57 carried by each bracket and rotatably engaging the shaft 54. With the above relationship of parts, it will be apparent that the hopper D is pivotally supported by the shaft 54 to occur between the side plates 10 and forward of the forward bulk head 12 of the frame. The hopper D is positioned between the sides of the frame so that the inlet opening thereof is in register with the discharge opening 17 of the chamber B and is supported in such a manner that when it is allowed to swing free on the shaft 54 it is urged towards the discharge opening 17 of the chamber B by the force of gravity.

In the preferred carrying out of the invention, and as illustrated in the drawings, a suitable rectangular, forwardly opening, U-shaped frame 58, carrying a suitable seal 59, is fixed to the frame to surround the discharge opening 17 of the chamber B (see FIG. 2). The frame 58 and seal 59 is adapted to receive the seal with the rear edges of the top, bottom and side walls of the hopper D which define the inlet opening thereto. The seal 59 can be formed of any suitable material, as for instance, it can be formed of felt or sponge rubber.

With the above relationship of parts, it will be apparent that when the hopper D is down and in communication with the chamber B, a suitable seal is established therebetween to prevent the loss or escape of sweepings between the hopper and the chamber.

In the particular case illustrated and in order to provide a hopper of maximum capacity, the hopper D is not perfectly square, but is shaped to conform with the space in the frame in which it is located and in a manner to provide working clearance and in a manner to accommodate the various other structural elements of the construction thereabout. In view of the fact that the exact configuration of the hopper can vary without effecting the novelty of the present invention, I will not burden this application with further unnecessary description of the particular configuration of the hopper illustrated throughout the drawings.

The actuating means M related to the hopper D and adapted to pivot the hopper about the shaft 54 and in a manner to dump the material or sweepings collected thereby, involves, generally, a manually operable fluid pump 60 mounted on the deck 13 of the frame A, a pair of laterally spaced, hydraulic jacks 61 pivotally mounted on the forward bulk head 12 of the frame to project forwardly therefrom and pivotally connected to the brackets 56 at a point spaced below the shaft 54, and fluid conducting hoses 62 extending between and connecting the pump and the jacks.

The pump 60 (see FIG. 2) of the means M is shown as involving a simple box-like chest mounted on the deck 13 of the frame and having an elongate operating lever 63 projecting upwardly therefrom and having a manually operable release valve 64 at one side thereof. The jacks 61 are simple cylinder and piston units and are connected with or to the bulk head 12 and the brackets 56 by suitable pivotal connecting means.

With the relationship of parts set forth above and illustrated in the drawings, it will be apparent that when the release valve 64 of the pump 60 is closed and the pump is operated by means of the lever 63, fluid is delivered to the jacks 61, with the result that the jacks urge and pivot the hopper forwardly and upwardly about the shaft 54, in the direction indicated by the arrow W in FIG. 2 of the drawings, and so that the sweepings collected in the hopper are free to drop out through the inlet opening of the hopper and onto the deck or floor in a neat pile, and so that they can be later disposed of in any desired manner.

After the hopper has been dumped in the manner set forth above, it is let down and returned to its unactuated position by simply opening the release valve 64 of the pump 60.

The secondary curb brooms E (see FIGS. 3 and 5) are simple, downwardly facing and substantially horizontally disposed disc brooms rotatably carried by the mounting means K to occur at the forward corners of the frame A and are driven by the drive means N to rotate in the direction indicated by the arrows Y in FIG. 3 of the drawings. It will be apparent from the above, that the brooms C sweep any material engaged thereby laterally inwardly where it can be engaged by the primary broom C and swept forwardly and upwardly into the hopper D.

The mounting means K for the brooms E is shown as involving laterally outwardly projecting trunnions 65 fixed to the side plates 10 of the frame A at points spaced rearwardly and upwardly from the brooms E, elongate arms 66 pivotally connected with the trunnions to project forwardly and downwardly therefrom and gear boxes 67 at the forward ends of the arms and rotatably carrying the brooms. The gear boxes 67 establish parts of the drive means N, as will hereinafter be described.

The driven means N for the curb brooms E is shown as involving the gear boxes 67, referred to above, at the lower ends of the arms 66, which boxes rotatably carry the brooms, drive sprockets 68 at the ends of the countershaft 27 related thereto, a pair of operatively connected idler sprockets 69 and 70 rotatably carried by each trunnion 65, drive chains 71 between the drive sprockets 68 and idler sprockets 69 and drive chains 72 between the idler sprockets 70 and driven sprockets 73 on the gear boxes 67.

The manually operable actuating means O for the curb brooms E (see FIG. 5) is adapted to shift the brooms E vertically out of engagement with the floor or deck over which the sweeper operates and is shown as including a bell crank 75 at each end of the rotatable shaft 54, a link 76 extending from each bell crank and connected with the curb broom supporting arm 66 occurring therebelow, a lever arm 77 fixed to the shaft 54, a hand lever 78 spaced rearwardly of the shaft 54 and a link 79 projecting rearwardly from the arm 77 and operatively coupled with the hand lever 78.

With the above relationship of parts, it will be apparent that upon shifting of the hand lever 78, and resulting rotation of the shaft 54 and the bell cranks 77 carried thereby, the supporting arms 66 for the curb brooms E can be easily and conveniently elevated and so that the brooms are shifted out of engagement with the floor or deck over which the sweeper is operated.

The vacuum means F (see FIGS. 2, 3 and 7), related to the chamber B is adapted to withdraw foreign matter, such, as dust, carried by the air in the chamber B and to deposit it in a suitable dust collecting bag, or the like, carried by the sweeper.

In the case illustrated, the vacuum means is shown as involving an elongate vacuum duct 80 extending transverse the chamber B where the rear bulk head 11 and deck 13 of the frame join, a vacuum pump 81 carried by the rear bulk head 11 and having an inlet opening communicating with the duct, and a dust bag 82 connected with an outlet opening in the pump 81 and occurring at the top side of the deck 13 of the frame. The duct 81 is shown as being established by an elongate, forwardly and upwardly inclined, rectangular plate 83 fixed to and extending between the side plates 10, the front surface

of the rear bulk head 11 and the bottom surface of the horizontally disposed deck 13, as clearly illustrated in FIG. 2 of the drawings. The plate 83 is provided with two or more longitudinally spaced inlet apertures 84 which establish open communication between the chamber B and the duct 80 defined by the plate and the frame.

The pump 81 (see FIGS. 3 to 5) is a typical centrifugal-type vacuum pump and is secured to the rear side of the rear bulk head 11 by suitable mounting means 85. The pump 81 has a central, forwardly projecting neck 86, defining an inlet opening, which neck projects through a suitable opening 87 provided in the bulk head 11 to establish open communication with the duct 80 and an outlet tube 88 projecting laterally and tangentially from the top of the pump and with which the dust bag 82 is connected. The pump 81 is driven by the prime mover H by means of a suitable belt and pulley drive 89, as clearly illustrated throughout the drawings.

The control means Q provided for the vacuum means F is adapted to open and close the inlet apertures 84 in the plate 83 and to further provide for connecting the vacuum system with or to a vacuum hose, or other like vacuum operated auxiliary devices.

The means Q (see FIG. 3) is shown as including an elongate shutter plate 90 slidably engaging the forwardly disposed side of the plate 83 and having apertures 91 therein adapted to be shifted into and out of register with the inlet openings 84 in the plate. The shutter plate 90 is maintained in sliding engagement with the plate 83 by means of a pair of longitudinally disposed, parallel rails 92 fixed to the plate 83 and engaging the opposite side edges of the shutter plate. A suitable handle 93 is secured to one end of the shutter plate 90 to project through the side plate 10 of the frame adjacent thereto and to a point where it can be easily and conveniently engaged at the exterior of the construction to shift the plate as circumstances require.

In addition to the foregoing, the means Q is shown as further including an attachment tube 94 projecting laterally from one of the ducts 80 and to which a suitable vacuum hose, or the like, can be attached. A suitable cap 95 is provided at the outer end of the attachment tube to normally close it.

With the above relationship of parts, it will be apparent that by shifting the shutter plate 90 longitudinally relative to the plate 83 and so that the apertures 84 and 91 therein are shifted into and out of engagement with each other, the action of the vacuum means can be varied as circumstances require. Still further, it will be apparent that when desired, the apertures 84 in the plate 83 can be completely shut off by the shutter plate 90 and a suitable vacuum hose, or the like, can be coupled to the attachment tube 94, with the result that the entire drawing effect created by the pump 81 is directed through the tube 94 and the hose connected therewith.

The wheel supporting means G (see FIGS. 2 and 4), is adapted to rotatably support the sweeper and is shown as including a front wheel 100 rotatably carried by each side plate 10 of the frame to occur adjacent the outer sides thereof and a pair of rear drive wheels 101 rotatably and pivotally carried by the mounting plate 18 at the rear end of the frame by the drive means P, as will hereinafter be described.

The front wheels 100 are rotatably supported on simple, trunnion-like mountings 102 secured to the side plates 10 of the frame. In the case illustrated, the trunnions 102 are spaced rearward of the forward end of the frame to occur rearward of the hopper D and below the broom arch 16 of the frame. With this relationship of parts, the wheels 100 are out of the way of the hopper D, so that when the hopper is dumped, the wheels will not interfere with and scatter the dumped sweepings. Still further, by placing the front wheels rearward as far as possible, the wheel base of the vehicle is shortened and affords greater mobility of the sweeper construction.

The drive means P (see FIGS. 2 to 4) rotatably and pivotally supporting the rear drive wheels 101 of the sweeper construction and operatively coupled with the prime mover H is shown as including, a variable speed transmission 103 secured to the mounting plate 18 of the frame A and having horizontally disposed input and output shafts 104 and 105, a pulley drive 106 between the input shaft 104 of the transmission and the drive shaft 44 of the prime mover H, a centrally positioned worm gear transmission 107 secured to the mounting plate 18 adjacent the variable speed transmission 103 and driven by the output shaft 105 of the transmission 103, a cylindrical sleeve 108 projecting downwardly from the transmission 107 through the mounting plate 18, and a bevel gear housing 109 rotatably carried by the sleeve at the lower end thereof. The bevel gear housing 109 rotatably carries an elongate axle 110 which projects from the opposite sides thereof and on which the drive wheels 101 are suitably secured. A bevel gear 111 is secured to the axle to occur within the housing 109 and is driven by a suitable pinion gear 112 at the lower end of a vertically disposed output shaft 113 of the worm gear transmission 107, which shaft projects downwardly through the sleeve 108.

As illustrated in FIG. 4 of the drawings, the bevel gear housing 109 is of limited lateral extent and the drive wheels 101 occur in close proximity to the opposite sides of the housing and with the results that the drive wheels are closely coupled and occur in close proximity to the central longitudinal axis of the sweeper.

With the above relationship of parts, it will be apparent that the rear wheels 101 are suitably driven by the prime mover H in a manner to drive the sweeper and are suitably pivotally related to the frame A so as to allow for convenient steering or directing of the sweeper construction.

Due to the fact that the particular means P, described above, can vary widely in details of construction, without effecting the novelty of the present invention, I will not burden this application with further detailed description thereof.

The braking means R (see FIG. 4), related to the drive means P, is adapted to stop the sweeper when energized and is shown as including a brake drum 115 on the output shaft 105 of the transmission 103 where it projects through the worm gear transmission 107, a brake band 116 engageable about the drum 115, and manually operable actuating means 117 adapted to shift the band into and out of engagement with the drum. In addition to the above, the means R further includes a centrifugal clutch 118 on the drive shaft of the prime mover H and related to the pulley drive 106 between the prime mover and the input shaft of the variable speed transmission 103, which clutch is adapted to release when the brake is actuated to stop rotation of the output 105 of the transmission 103.

The actuating means 117 for the brake band 116 is shown as including, a bell crank 118 pivotally carried by the frame at a point spaced laterally to one side of the brake drum, a link 119 extending between and connecting the brake band and said bell crank, and a hand lever 120 pivotally carried by the frame at a point spaced forward of the bell crank and a link 121 fixed to and extending between the lever 120 and the said bell crank.

In addition to the foregoing, the actuating means 117 for the brake band 116 is shown as including, a suitable brake pedal 122 (see FIG. 2), pivotally secured to the forward bulk head 12 of the frame A, adjacent the deck 31, and a link 123 extending between and connecting the pedal and the hand lever 120. With the above relationship of parts, it will be apparent that upon actuation of the brake band 116 by means of either the hand lever 120 or the brake pedal 122, the sweeper can be advantageously stopped as circumstances require.

It is to be understood that in practice any suitable braking means can be provided and that the particular means illustrated and briefly described above, is only typi-

cal of one preferred form of braking means that can be employed.

The steering means S (see FIG. 2), related to the means G and P and operable to direct the vehicle or sweeper, is shown as including a conventional steering gear transmission 125 mounted on the forward bulk head 12 of the frame A at a point intermediate the sides thereof, a steering column 126 projecting rearwardly from the transmission 125, steering wheel 127 on the rear end of the column 126, and suitable linkage 128 extending between the transmission 125 and the bevel gear housing 109 of the means P and adapted, upon rotation of the steering wheel 127, to rotate the bevel gear housing 109, and the drive wheels 101 related thereto, relative to the sleeve 108 of the worm gear transmission 107 and the frame A of the sweeper.

Due to the fact that the steering means S can vary widely in form and construction, without in any way effecting the novelty of the present invention, I will not burden this application with further description of the particular means that is illustrated in the drawings.

In the form of the invention illustrated (See FIG. 2), the prime mover H is a typical internal combustion engine and is shown as being secured to the mounting plate 18 of the frame A by a suitable U-shaped support 130, which support bridges and overlies the variable speed transmission 103 of the drive means P. A suitable throttle 131 is provided for the prime mover H, which pedal is pivotally mounted on the forward portion of the deck 13 of the frame and is connected with the engine by means of a suitable cable 132.

In the preferred carrying out of the invention, the fluid pump 60 of the means M and the operating or hand levers 48, 70 and 120 for the releasable clutch 45, the operating means O and the braking means R, occur at one side of the sweeper, above the deck 13 of the frame. A suitable housing 133 is provided on the side of the frame at which the pump and hand levers occur to enclose the pump and the various linkages connected with the hand levers and from which the said levers project. The levers project from the housing 133 in a manner so that they can be conveniently engaged by the operator of the vehicle.

In the form of invention under consideration and as clearly illustrated in FIG. 8 of the drawings, the several hand levers 48, 78 and 120, referred to above, are rotatably carried by a single shaft 134, which shaft is rotatably carried by a bearing 135 suitably fixed to the adjacent side plate 10 of the frame.

A suitable upwardly opening cage 136 (See FIG. 2), formed of apertured sheet metal or expanded metal lath is provided at the rear portion of the deck 13 to enclose the dust bag 82 of the vacuum means F, which bag rests on the top of the deck. The cage 136 supports and is suitably closed by a seat 137 upon which the operator of the sweeper can sit.

The seat 137 is removable from engagement on the cage 136 to provide access to the dust bag 82, and the cage 136 is removable from engagement on the deck 13 to allow for removal of the cover plate 120, which closes the access opening 19 in the deck 13 of the frame.

In addition to the foregoing, a suitable shell-like frame cover 138 is provided about the exterior of the frame A to enclose and obscure the various working parts of the construction occurring at the outer sides of the frame. The frame cover 138 is fabricated of sheet metal and, in practice, is fixed to the frame in such a manner as to reinforce the frame and add rigidity to the overall construction.

Due to the fact that the frame cover 138 can vary widely in form and construction without in any way effecting the novelty of the present invention, I will not burden this application with further detailed description of the particular frame cover construction illustrated throughout the drawings.

In the form of the invention illustrated in the drawings and to obscure the hopper D which occurs between the forwardly projecting portions of the side plates 10 of the frame and to obscure the prime mover H, which projects upwardly from within the confines of the frame and frame cover 138, I provide a suitable hopper cover 139 to overlie the hopper D and a suitable engine hood 140 to overlie and house the upper portion of the prime mover H.

The hopper cover 139 is a simple, inverted U-shaped member formed of sheet metal and is pivotally secured to the forward bulk head 12 of the frame A to project forwardly therefrom and overlie the hopper D. The hopper cover 139 is so related to the hopper D and to the bulk head 12 that when the hopper D is elevated to dump the sweepings collected thereby, the cover 139 is pivoted upwardly therewith, as clearly illustrated in phantom lines in FIG. 2 of the drawings.

The engine hood 140 is a simple, box-like unit fabricated of sheet metal and is suitably mounted or secured to the construction to house the upper portion of the prime mover H, which projects upwardly from the frame and the frame cover 138.

In the case illustrated, the engine hood 140 has a flat, forwardly facing, substantially vertically disposed front wall 141 which projects upwardly from the rear edge of the seat 137 which closes the top of the bag cage 136 and which provides a suitable back rest for the operator of the sweeper. If desired, a suitable pad 142 can be provided on the wall 141 of the hood and against which the operator can rest his back.

In the preferred carrying out of the present invention and as illustrated in the drawings, the side plate 10 and the frame cover 138 at one side of the construction are relieved as at 143 and so that the operator of the sweeper can move into and out of driving position in the vehicle or sweeper, as circumstances require.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any modifications or variations that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A sweeper construction of the character referred to including, an elongate frame having laterally spaced, vertically disposed sides, longitudinally spaced, vertically disposed front and rear bulkheads extending between the sides, a deck extending between the sides and the bulkheads and spaced from the bottom of the frame and a broom arch extending between the sides and spaced below the forward bulkhead, said frame defining a downwardly opening broom chamber with a forwardly disposed discharge opening intermediate its ends, wheeled supporting means for the frame, a prime mover carried by the frame and operatively coupled with the supporting means, an elongate spool-type broom positioned within the chamber to extend transversely thereof and engageable on the surface over which the sweeper is operated, mounting means pivotally supporting the broom from the frame, a rearwardly opening hopper pivotally carried by the frame at the forward end thereof to normally occur in open communication with the chamber and to collect material swept through the discharge opening of the chamber by the broom, and drive means for the broom and connected with the prime mover, said broom having an elongate axle member projecting from the opposite ends thereof and through openings in the sides of the frame, said mounting means including, an elongate, downwardly and rearwardly inclined arm at each side of the frame, the upper forward end of each arm being pivotally mounted on the frame, the lower rear end of each arm rotatably supporting the end of the broom axle related thereto, and a double acting shock absorber fixed to and extending between each arm and the adjacent side of the frame, said drive means including a counter-shaft carried by the frame spaced forward and above the axis of the broom and in

axial alignment with the pivotal axes of the arms, a manually releasable belt and pulley drive between the prime mover and the counter-shaft and a chain and sprocket drive between said counter-shaft and the broom axle.

2. A sweeper construction of the character referred to including, an elongate frame having a downwardly opening broom chamber with a forwardly disposed discharge opening intermediate its ends, wheeled supporting means for the frame, a prime mover carried by the frame and coupled with the supporting means, manually operable steering means connected with said supporting means, an elongate spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame, mounting means pivotally supporting the broom, drive means between the broom and the prime mover, a rearwardly opening hopper, means pivotally supporting the hopper to the frame to normally occur in open communication with the chamber and actuating means adapted to dump the hopper, said mounting means including an elongate counter-shaft extending transversely of and rotatably carried by the frame at a point spaced forward of and above the broom, and a pair of elongate arms, each having one end pivotally carried by one end of the counter-shaft and its other end rotatably supporting one end of the broom axle, and a shock absorbing means connected with and extending between each arm and the frame to buffer vertical shifting of the broom, said drive means including a manually releasable belt and pulley drive between the prime mover and the counter-shaft and a chain and sprocket drive between the counter-shaft and the broom axle, said drive means pivotally supporting the hopper including a shaft extending transversely of the frame at a point spaced forward and above the open end of the hopper, a pair of upwardly projecting brackets on said hopper and rotatably engaging the shaft, said actuating means related to the hopper including a hydraulic pump carried by the frame, a hydraulic jack carried by the frame rearward of the shaft and engaging one of the brackets at a point spaced below the shaft, said jack adapted to receive fluid from the pump and urge said hopper forwardly and upwardly about said shaft.

3. A sweeper construction of the character referred to including, an elongate frame having laterally spaced, vertically disposed sides, longitudinally spaced, vertically disposed front and rear bulkheads extending between the sides, a deck extending between the sides and the bulkheads and spaced from the bottom of the frame, and a broom arch extending between the sides and spaced below the forward bulkhead, said frame defining a downwardly opening broom chamber with a forwardly disposed discharge opening intermediate its ends, wheeled supporting means for the frame, a prime mover carried by the frame, and coupled with the wheeled supporting means, manually operable steering means connected with said wheeled supporting means, an elongate primary spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame, the ends of the axle projecting through openings in the sides of the frame, means pivotally mounting said primary broom to the frame, means driving said primary broom, a pair of laterally spaced, disc-type curb brooms, means pivotally mounting said curb brooms to the frame, means driving said curb brooms and actuating means adapted to shift said curb brooms vertically relative to the frame, a rearwardly opening hopper, means pivotally supporting the hopper to the frame to normally occur in open communication with the discharge opening of the chamber, actuating means for the hopper to pivot the hopper relative to the frame and dump it, and vacuum means related to the chamber and adapted to remove dust and the like therefrom, said mounting means for the primary broom including an elongate counter-shaft extending transversely of and rotatably carried by the frame at a point spaced forward of the primary broom and a pair of elongate arms, each having one end pivotally carried by one end of the counter-shaft and its other end rotatably supporting one end of the broom axle, and a shock absorber connected with and extending between each arm and the frame, said drive means for the primary broom including a manually releasable belt and a pulley drive between the primary mover and the counter-shaft and a chain and sprocket drive between the counter-shaft and the broom axle, said curb brooms occurring forward of the broom chamber and at opposite sides of the frame, said mounting means for each curb brooms including, an elongate rearwardly and upwardly inclined arm having its rear end pivotally mounted to the frame, a gear box having an input and an output shaft at the forward end of the frame, said output shaft carrying the broom, said drive means for each curb broom including, a drive sprocket on the counter-shaft, a driven sprocket rotatably carried by the frame on the same pivotal axis as the supporting arm for the curb broom, a driven sprocket coupled with and on the same axis as the driven sprocket, a driven sprocket on the input shaft of the gear box and drive chains engaged between said drive and driven sprockets.

4. A sweeper construction of the character referred to having, an elongate frame having flat, vertically disposed and laterally spaced side plates, a forward bulk head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening, wheeled supporting means for the frame including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the mounting plate and operatively coupled with the rear wheels of the supporting means, an elongate spool-type broom with a central axle positioned within the chamber to extend transversely thereof and engageable on the surface over which the sweeper is operated, said axle having ends projecting through arcuate openings in the side of the frame, mounting means pivotally supporting the broom from the frame, a rearwardly opening hopper pivotally carried by the side plates of the frame at the forward end thereof to normally occur in open communication with the chamber and to collect material swept through the discharge opening of the chamber by the broom, and drive means for the broom and connected with the prime mover, said mounting means including, an elongate, downwardly and rearwardly inclined arm at the exterior of each side of the frame, the upper forward end of each arm being pivotally mounted on the adjacent side plate of the frame, the lower rear end of each arm rotatably supporting the end of the broom axle related thereto, and a shock absorber fixed to and extending between each arm and the adjacent side of the frame, said drive means including a counter-shaft extending between and rotatably carried by the side plate of the frame at a point spaced forward and above the axis of the broom and in axial alignment with the pivotal axes of the arms, a manually releasable belt and pulley drive adjacent one side of the frame and extending between the prime mover and the counter-shaft, and a chain and sprocket drive between said counter-shaft and the broom axle.

5. A sweeper construction of the character referred to including, an elongate frame having flat, vertically

disposed and laterally spaced side plates, a forward bulk head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and plates at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening, wheeled supporting means for the frame including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the mounting plate and coupled with the rear wheels, manually operable steering means connected with said rear wheels of the supporting means, an elongated spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame and so that the ends of the axle project through axially aligned arcuate openings in the side plates of the frame, mounting means at the exterior of the frame pivotally supporting the broom, drive means between the broom and the prime mover, a rearwardly opening hopper, means pivotally supporting the hopper to the side plates of the frame to normally occur in open communication with the chamber, and actuating means adapted to dump the hopper, said mounting means including, an elongate counter-shaft extending transversely of the frame and rotatably carried by the side plates of the frame at a point spaced forward of and above the broom, and a pair of elongate arms, each having one end pivotally carried by one end of the counter-shaft and its other end rotatably supporting one end of the broom axle, and a shock absorber connected with and extending between each arm and the frame, said drive means including a manually releasable belt and pulley drive between the prime mover and the counter-shaft and a chain and sprocket drive between the counter-shaft and the broom axle.

6. A sweeper construction of the character referred to including, an elongate frame having flat, vertically disposed and laterally spaced side plates, a forward bulk head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and plates at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch having upwardly convergent front and rear surfaces extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening, wheeled supporting means for the frame including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the frame and coupled with the rear wheels, manually operable steering means connected with said rear wheels of the supporting means, an elongate spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame and with the ends of the axle projecting through axially aligned slotted openings in the side plates, mounting means pivotally supporting the broom, drive means between the broom and the prime mover, a rearwardly opening hopper, means pivotally supporting the hopper to the frame to occur between the side plates of the frame and in open communication with the chamber, and actuating means adapted to dump the hopper, said means pivotally supporting the hopper including a shaft extending between and rotatably carried by the side plates of the frame at a point spaced forward and above the open rear end of the hopper, a pair of upwardly projecting brackets on said hopper and rotatably engaging the shaft, said actuating means related to the hopper including a hydraulic pump carried by the frame, a hydraulic jack carried by the forward bulk head of the frame rearward of the shaft and engaging one of the brackets at a point spaced below the shaft, said jack adapted to receive fluid from the pump and urge said hopper forwardly and upwardly about said shaft and out of communication with the chamber.

7. A sweeper construction of the character referred to including, an elongate frame having flat, vertically disposed and laterally spaced side plates, a forward bulk head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and plates at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch having upwardly convergent front and rear surfaces extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening, wheeled supporting means for the frame including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the mounting plate and coupled with the rear wheels, manually operable steering means connected with said rear wheels of the supporting means, an elongate spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame the axle member projecting through openings in the sides of the frame, mounting means at the exterior of the frame pivotally supporting the broom, drive means between the broom and the prime mover, a rearwardly opening hopper, means pivotally supporting the hopper to the frame to normally occur in open communication with the chamber and actuating means adapted to dump the hopper, said mounting means including an elongate counter-shaft extending transversely of the frame and rotatably carried by the side plates at a point spaced forward of and above the broom, and a pair of elongate arms, each having one end pivotally carried by one end of the counter-shaft and its other end rotatably supporting one end of the broom axle, and a shock absorber connected with and extending between each arm and the frame, said drive means including a manually releasable belt and pulley drive between the prime mover and the counter-shaft and a chain and sprocket drive between the counter-shaft and the broom axle, said means pivotally supporting the hopper including a shaft extending between and rotatably carried by the side plates of the frame at a point spaced forward and above the open rear end of the hopper, a pair of upwardly projecting brackets on said hopper and rotatably engaging the shaft, said actuating means related to the hopper including a hydraulic pump carried by the frame, a hydraulic jack carried by the frame rearward of the shaft and engaging one of the brackets at a point spaced below the shaft, said jack adapted to receive fluid from the pump and urge said hopper forwardly and upwardly about said shaft.

8. A sweeper construction of the character referred to including, an elongate frame having flat, vertically disposed and laterally spaced side plates, a forward bulk

head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and plates at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch having a forwardly and upwardly inclined surface extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening intermediate its ends, sealing means about the discharge opening, wheeled supporting means for the frame, including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the mounting plate, and coupled with the rear wheels of the wheeled supporting means, manually operable steering means connected with said rear wheels of the wheeled supporting means, an elongate primary spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame and so that the ends of the axle project through openings in the side plates of the frame, means pivotally mounting said primary broom to the frame, means driving said primary broom, a pair of laterally spaced, disc-type curb brooms, means pivotally mounting said curb brooms to the frame, means driving said curb brooms and actuating means adapted to shift said curb brooms vertically relative to the frame, a hopper having a rearwardly disposed opening to normally register with the discharge opening of the broom chamber and engaging said sealing means, means pivotally supporting the hopper between the side plates of the frame to normally occur in open communication with the discharge opening of the chamber, actuating means for the hopper to pivot the hopper relative to the frame and dump it, and vacuum means related to the chamber and adapted to remove dust and the like therefrom.

9. A sweeper construction of the character referred to including, an elongate frame having flat, vertically disposed and laterally spaced side plates, a forward bulk head of limited vertical extent extending between the side plates at a point spaced from the forward ends thereof and at the upper portion thereof, a rear bulk head of limited vertical extent extending between the side plates at a point spaced rearward of the front bulk head and at the lower portion thereof, a deck extending between the front and rear bulk heads and spaced above the bottom of the frame, a broom arch having a forwardly and upwardly inclined surface extending between the side plates at a point spaced below the forward bulk head and a horizontally disposed mounting plate projecting rearwardly from the rear bulk head, said bulk heads, deck and broom arch defining a downwardly opening broom chamber with a forwardly disposed discharge opening intermediate its ends, wheeled supporting means for the frame including front wheels rotatably mounted on the side plates and rear wheels pivotally and rotatably mounted below the mounting plate, a prime mover carried by the mounting plate, and coupled with the rear wheels of the wheeled supporting means, manually operable steering means connected with said rear wheels of the wheeled supporting means, an elongate primary spool-type broom having an elongate axle positioned within the chamber to extend transversely of the frame, and so that the ends of the axle project through aligned openings in the side plates of the frame, means pivotally mounting said primary broom to the frame, means driving said primary broom, a pair of laterally spaced, disc-type curb brooms, means pivotally mounting said curb brooms to the side plates of the frame, means driving said curb brooms and actuating means adapted to shift said curb brooms vertically relative to the frame, a rearwardly opening hopper, means pivotally supporting the hopper between the side plates of the frame to normally occur in open communication with the discharge opening of the chamber, actuating means for the hopper to pivot the hopper relative to the frame and dump it, and vacuum means related to the chamber and adapted to remove dust and the like therefrom, said mounting means for the primary broom including an elongate counter-shaft extending between and rotatably carried by the side plates of the frame at a point spaced forward of the primary broom and a pair of elongate arms, each having one end pivotally carried by one end of the counter-shaft and its other end rotatably supporting one end of the broom axle, and a shock absorber connected with and extending between each arm and the frame, said drive means for the primary broom including a manually releasable belt and pulley drive between the primary mover and the counter-shaft and a chain and sprocket drive between the counter-shaft and the broom axle, said curb brooms occurring forward of the broom chamber and at opposite sides of the frame, said mounting means for each curb broom including, an elongate rearwardly and upwardly inclined arm having its rear end pivotally mounted to the adjacent side plates of the frame, a gear box having an input and an output shaft at the forward end of the arm, said output shaft carrying the broom, said drive means for each curb broom including, a drive sprocket on the counter-shaft, a driven sprocket rotatably carried by the frame on the same pivotal axis as the supporting arm for the curb broom, a drive sprocket coupled with and on the same axis as the driven sprocket, a driven sprocket on the input shaft of the gear box and drive chains engaged between said drive and driven sprockets.

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