

Sept. 2 , 1924.

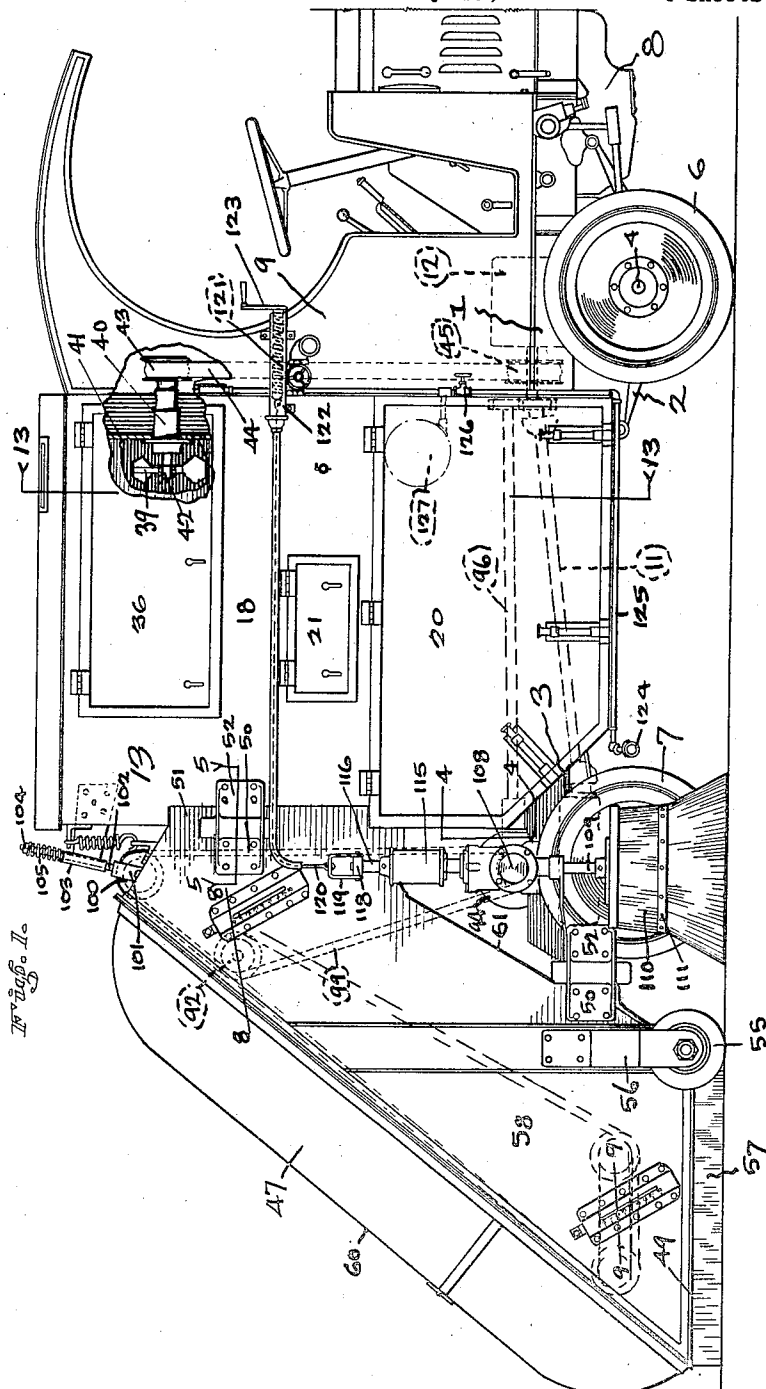
1,507,243

F. H. MEYER

STREET SWEEPER

Filed May 18, 1922

4 Sheets-Sheet 1



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STREET SWEEPER

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4 Sheets-Sheet 2

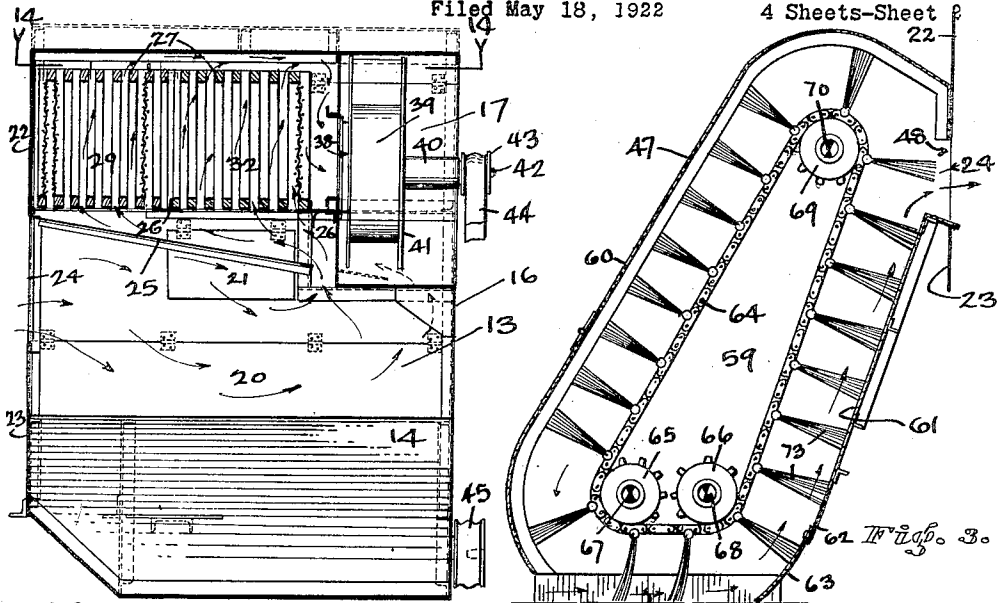


Fig. 2.

Fig. 3.

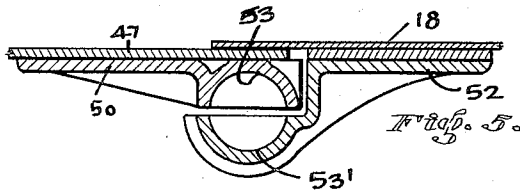


Fig. 5.

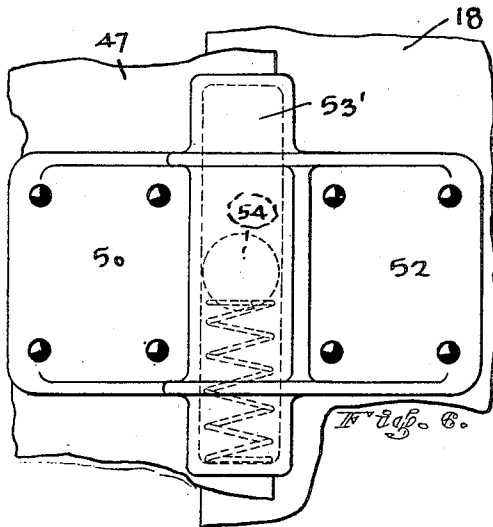


Fig. 6.

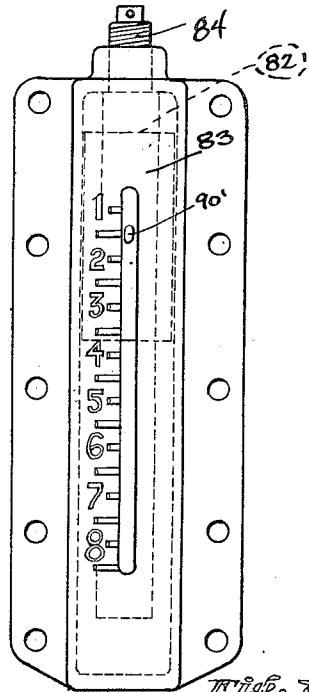


Fig. 7.

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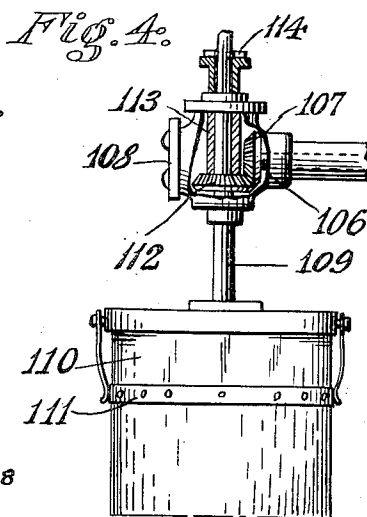
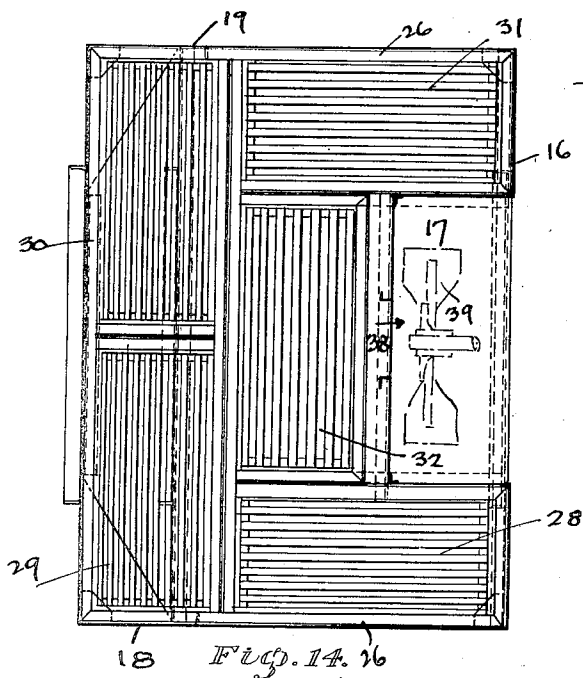
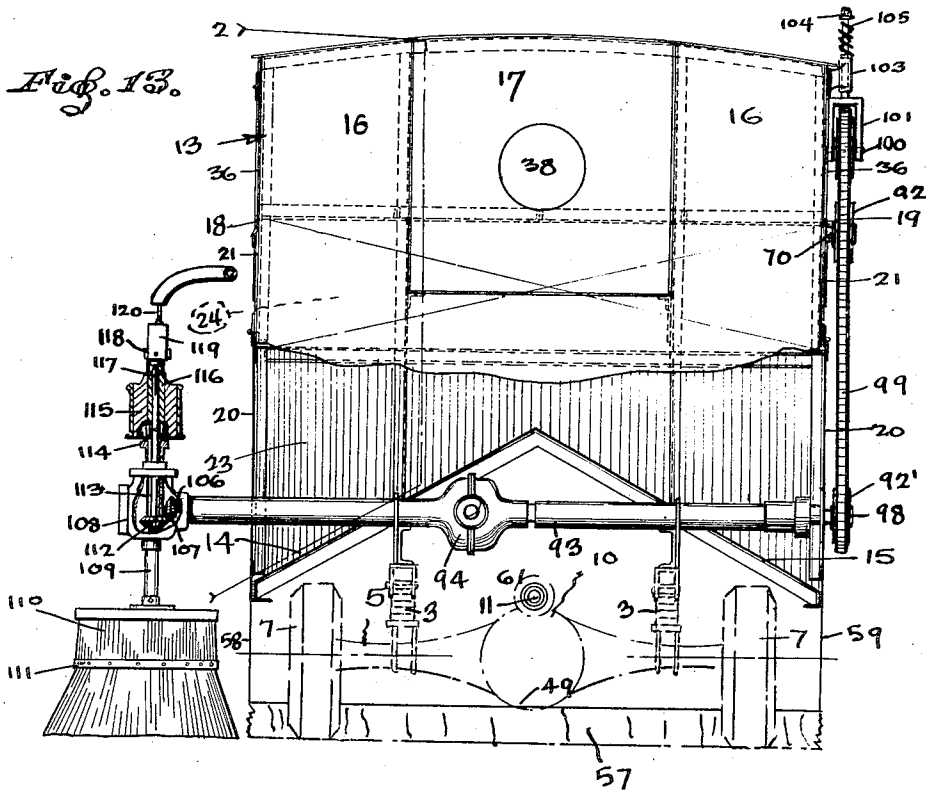
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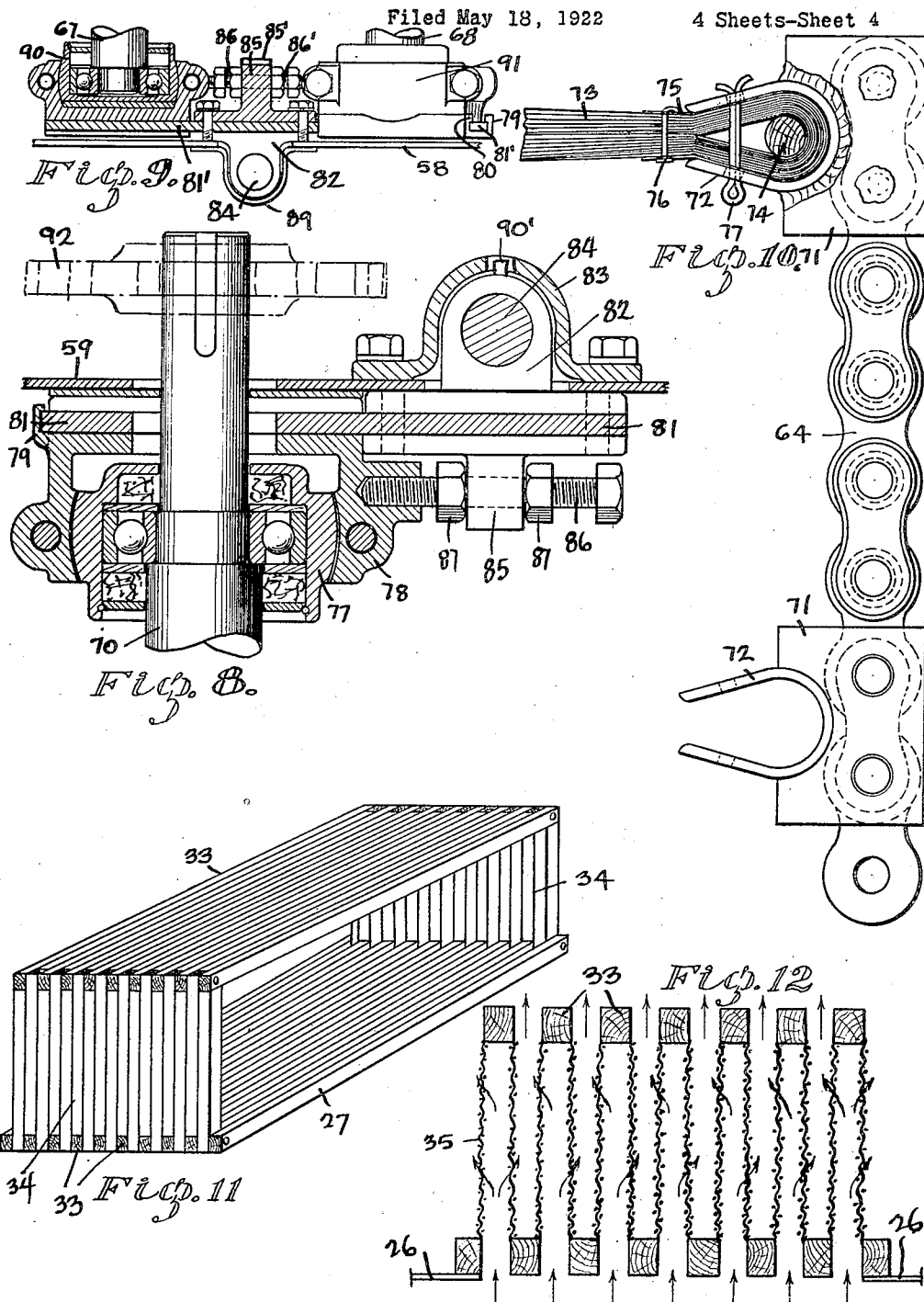
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

FERD H. MEYER, OF OAKLAND, CALIFORNIA.

STREET SWEEPER.

Application filed May 18, 1922. Serial No. 561,835.

To all whom it may concern:

Be it known that I, FERD H. MEYER, a citizen of the United States, and a resident of the city of Oakland, county of Alameda, State of California, have made a new and useful invention, to wit, Improvements in Street Sweepers; and I do hereby declare the following to be a full, clear, concise, and exact description of the same.

This invention relates particularly to an automotive street sweeping apparatus.

An object of this invention is to provide a street sweeping apparatus of such a character that dust and dirt will be removed from the surface to be swept without the usual annoying dust disturbances accompanying such an operation.

A further object of the invention is to provide a street sweeping apparatus wherein the dust and dirt is elevated mechanically and by aid of an air suction, deposited in a suitable dust collecting chamber, from which the collected refuse may be removed and suitably disposed of. A still further object of the invention is to provide a plurality of baffle-plates and air filtering mediums which, acting in co-operative combination with an air current suction, will effectually and efficiently deposit all dust and dirt particles in a dust collection chamber.

Other objects of the invention are to provide, a street sweeping mechanism wherein the sweeping brushes contact over a greater superficial area of surface to be cleaned as contrasted with the conventional type of roller brush cleaner; to provide a curb cleaning brush entirely independent of the main brushes so designed as to snugly engage a street surface contiguous to the curbing without danger of injury or breaking any of the parts thereof, of which the brush member may be adjusted so that the entire length of its fibers may be utilized and which may be placed into and from operative position at will; to provide a dust collection chamber with filtered members therein which may be quickly and easily removed or replaced; and to provide an endless belt having brush fibers thereon removable at will and readily adjustable.

A still further object of the invention is to provide an apparatus that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation and

facility and convenience in use and general efficiency. Other objects and advantages will appear as this description progresses.

In the specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other forms; and it is also to be understood that in and by the claims following this description, it is desired to cover the invention in whatsoever form it may be embodied.

In the accompanying four sheets of drawings,

Fig. 1 is a side elevation of an automotive street sweeper constructed in accordance with my invention.

Fig. 2 is a vertical section taken through Fig. 13 on the line 2—2.

Fig. 3 is a vertical section taken through brush sweeper housing.

Fig. 4 is a front elevation partly in section, taken through Fig. 1 on the line 4—4.

Fig. 5 is an enlarged section taken through Fig. 1 on the line 5—5.

Fig. 6 is a front elevation of Fig. 5.

Fig. 7 is an enlarged front elevation of the shaft adjusting guide brackets shown in Fig. 1.

Fig. 8 is an enlarged section taken through Fig. 1 on the line 8—8.

Fig. 9 is a plan section taken through Fig. 1 on the line 9—9.

Fig. 10 is an enlarged fragmentary detail of the sweeper brush and supporting chain.

Fig. 11 is an isometric view of the air filter frame.

Fig. 12 is a section through an air filter frame, illustrating the path of air there-through.

Fig. 13 is a vertical section through Fig. 1 on the line 13—13.

Fig. 14 is a plan view taken through Fig. 2 on the line 14—14.

In detail, the construction illustrated in the drawings comprises an automotive vehicle consisting of a chassis 1 suspended on and connected through the front and rear springs 2 and 3, respectively, to the axle housing 4 and 5 on the ends of which the front and rear wheels 6 and 7 are rotatably mounted. The front portion of the chassis

has an engine or prime mover 8 mounted therein and provided with the conventional equipment necessary to its operation arranged in close proximity to the operator seat 9 mounted on the said chassis. The axle housing 5 of the rear wheels 7 is provided with a conventional type of driving differential 10, operatively connected through the propeller shaft 11 with a selective transmission 12 secured to the engine structure.

The rear part of the chassis has a dirt collector or dust chamber 13 mounted thereon and which consists of flooring members 14 and 15 slanting from a central point between the respective frames of the chassis 1 to a point below the tops of said frame on the opposite outer sides thereof, forming a bottom having a cross section similar to an inverted V. The front surface 16 of the chamber 13 is sheathed in a substantial manner, a box-like cavity 17 being formed below the plane of the said face, in which an exhaustor suction fan might be mounted.

The side walls 18 and 19 of the said chamber are provided with dump doors 20 adjacent the slanted flooring, said doors being provided with suitable latches for maintaining the same in a closed position. Sight or inspection doors 21 are provided above the bottom doors and through which the interior of the said chamber might be observed.

The rear end of the chamber 13 is entirely closed by the plates 22 and 23 except for an opening 24 extending continuously across the entire width of the rear end of said chamber. Secured within the said chamber and commencing at a point above the rear opening 24, a baffle-plate 25 is mounted which extends downwardly toward the inner front end 16 of said chamber. The baffle-plate 25 extends into close proximity with the inner face of the exhaustor box mounting 17 and on both sides thereof to close proximity with the inner face of the front wall 16, sufficient space being allowed between the end of said baffle-plate and the respective walls 16 and 17 to allow the passing of an air current from the lower portion of the chamber, through the said spaces aforementioned into the upper portion of the said chamber.

Suitable brackets 26 are provided around the interior of the chamber walls 18, 19 and 22, above the baffle-plate, each of said brackets forming a plurality of individual compartments 28, 29, 30, 31 and 32, within which may be supported and securely held one each of a plurality of air filter boxes 27. The air filter boxes 27 comprise a plurality of members 33 maintained in spaced relation on the longer length by means of connecting end bars 34 joined together in a solid non-spaced relation. This construction permits of a filter cloth or fabric 35

being weaved and passed around the upper and lower spaced members 33 so that the respective alternate spaces between the members 33 at top and bottom are separated by the filter cloth, making it necessary for air entering any one of the spaces to pass through the filter cloth before it can pass outwardly through any of the next adjacent spaces. The filter cloth or fabric is fastened securely in position in the supporting frame and the assembled member placed in its respective compartment, formed by the brackets 26. Doors 36 are provided through the sides 18 and 19 of the chamber through which the air screen or filter frames may be individually removed or replaced. The air filter frames are arranged above the baffle-plate 25 in such a manner that any air flowing past the openings provided through the said baffle-plate must pass through the air filter members and thus cleansed or strained prior to escaping out of the suction or exhaustor opening 38 provided in the exhaustor cavity 17.

An exhaustor fan 39 of any suitable design and construction is arranged within the cavity 17 by being supported in a suitable bearing 40 mounted in the plate 41 adapted to cover the open face of the said cavity 17. The exhaustor fan 39 is mounted on the shaft 42, rotatably journaled in the bearing 40, said shaft having the pulley 43 on the end thereof connected by the drive belt 44 with a pulley 45 provided on the propeller shaft 11. The rotative axis of the exhaustor fan is arranged substantially concentric with the opening 38 provided in the exhaustor cavity 17 and the said exhaustor cavity is provided with a suitable discharge outlet. Thus, when the exhaustor fan is operated, a current of air is drawn through the opening 38 supplied with air admitted through the transverse opening 24 in the rear of the chamber 13, the said air passing around the baffle-plate 25 through the filter cloths in the frames 27 and into and through the suction opening 38 as indicated by arrows in Fig. 2.

A housing 47, consisting of a suitably designed casing, is adapted to be secured to the rear portion of the chassis 1 and chamber 13. The housing 47 is provided with a transverse opening 48 in its upper end which registers and communicates with the opening 24 provided across the end of the dust chamber 13. The sides 51 of the said housing at the point of joining to the chamber 13 overlap and lie in contact with the respective side walls 18 and 19 of the said chamber 13. The opposite lower end 49 of the said housing 47 is open approximately across its entire length so as to communicate with a street or other surface to be swept.

A pair of brackets 50 are mounted on the

side plates of the housing 47 adjacent the upper end, each of said brackets having a semi-circular or other equivalent guideway 53 positioned substantially vertically thereon. Complementary brackets 52 are secured to the side plates 18 and 19 of the chamber 13, said brackets having semi-circular or other equivalent guideways 53' thereon which register with the guideways 53 on the opposite bracket member. It should be noted that the side plates 18 and 19 of the dust chamber and guideway 53' of the brackets are spaced apart to receive the overlapping side plate 51 of the housing together with its guideway 53. A ball 54 or other equivalent common engaging means is adapted to rest in the closure provided by the complementary semi-circular guideways 53 and 53', thereby preventing lateral disarrangement of the bracket guideways relative to each other, but allowing a limited vertical movement of the respective bracket members relative to each other. Similar brackets 50 and guideways 53 are provided on the lower end of the housing 47 and joined by common engaging means 54 to brackets 52 and guideways 53' secured to the end of the chassis. The method of joining the housing 47 to the automotive vehicle at two points on each of the opposite sides thereof thus securely holds the respective parts in the desired relation, permitting a limited vertical movement of the housing 47 relative to the automotive vehicle to compensate for irregularities in road surfaces and otherwise make it automatically adjustable to fit any and all varying road conditions.

The lower end 49 of the housing 47 is adapted to be spaced away from the surface to be swept and is thus maintained by supporting wheels 55 secured in frame bearings 56 mounted on the lower end of said housing. The space between the lower end 45 of the housing and the surface to be swept is entirely closed by a screen or fabric member 57, which hangs therefrom so that the lower edge thereof will approximately contact with the said surface to be swept.

The housing 47 is substantially rectangular in cross section, being comprised of the side walls 58 and 59, upper cover 60 and inclined lower wall 61. The inclined wall 61, as previously described, is cut away as at 48 to provide an opening which will communicate with the opening 24 provided in the dust collector chamber 13. The lower edge 62 of the wall 61 is curved on a substantial radius conformable to the radial swing of cleaning brushes mounted within the said housing 47 to be hereinafter described in detail. A flexible apron 63 is secured to and arranged across the lower edge of the inclined wall 62, said element being formed of leather, rubber, canvas or

equivalent composition having an appreciable flexibility, but with sufficient inherent rigidity capable of accomplishing the same results obtainable by the use of an equivalent pivoted and rigid apron. The member 63 is of such length that its lower edge will lie in contact with the surface to be swept, thus placing a slight curvature on the said element forming a substantial continuation of the curved end of the wall 62. The element 63 is positioned so as to be spaced away from and out of the path of movement of the end of the brush bristles moving within the said housing.

The brush sweeper member comprises a pair of endless articulated chains 64 passing around the respective pairs of sprockets 65 and 66 securely mounted in spaced relation on the respective driven shafts 67 and 68, arranged in the lower end of the housing and around the sprockets 69 mounted in spaced relation on the drive shaft 70 arranged in the upper end of the housing 47. The brush chain belts are a conventional type of roller chain and to which at predetermined intervals throughout the entire lengths, side plates or brackets 71 are welded or otherwise fixedly secured. Two endless belts are arranged within the housing adjacent the opposite side walls 58 and 59 thereof and the brackets on the respective belts adapted to be maintained in alignment. A brush trough 72, consisting of a U-shaped sheath is adapted to have its opposite ends confined in and fixedly secured to aligned brackets 71 on each of the spaced belts 64. Brushes 73, consisting of a length of fibers or bristles, are bended intermediate their ends, back upon themselves, around a dowel pin 74 and maintained in the bent position by a retainer clamp 75 passing around the bended ends of the fibers and having a rivet or other equivalent securing means 76 passing through and joining the said ends of the said retainer. In the assembled position, the brush fibers and retainer would be mounted within the trough 72 and there securely held against lateral dislodgement by the removable cotter pins 77. The brush trough and fibers are substantially of the same length as the interior of the housing 47. The shafts 67, 68 and 70 are arranged within the housing so that the sprockets 65, 66 and 69 supporting the brush sweeper belt will allow the ends of the brushes to travel in a path that will bring them into frictional contact with a surface to be cleaned and also in contact with the inclined walls 62 of the housing 47. By referring to Fig. 3, it should be noted that two sets of brush fibers are in contact with a street or other surface from which dirt or dust is moved upwardly over the flexible apron 63 onto the inclined wall 62 and mechanically expelled off said inclined wall through the

opening 24 into the dust collector chamber 13.

The drive shaft 70 is supported at its opposite ends, on the side walls 58 and 59 of the housing 47, in anti-friction bearings 77. Each of the bearings 77 are mounted in supporting frames 78, having upper and lower shouldered edges 79 and 80, overhanging and supported on the edges of the supporting plates 81, adjustably positioned in the side walls 58 and 59 of the housing 47. The front face of the supporting plates 81 have threaded sliding nuts or sockets 82 mounted thereon and which project through openings provided in the walls 58 and 59 into alignment and registry with guide brackets 83 mounted on the exterior of each said side wall. Adjusting screws 84 are rotatably journaled in the guide brackets 83 and pass in threaded engagement through the sliding nuts or sockets 82. Thus, by rotating the screws 84, the socket 82 may be adjusted vertically relative to the guide brackets 83 to impart a similar change of position through the supporting plates 81 to the drive shaft 70. The rear face of each of the supporting plates 81 is provided with projections 85 thereon, within which threaded adjusting screws 86 are mounted. The threaded end of each screw is screwed into engagement with a threaded opening provided therefor in the bearing frames 78 whereby rotation of the screws 86 will slide the bearing frames 78 relative to the supporting plates 81. Suitable lock nuts 87 are provided on the screws 86 to lock the same against change of position.

The lower shafts 67 and 68 are mounted in adjustable slide bearings 90 and 91, each of which are provided with slide flanges 79 and 80 thereon, slidably supported on the elongated double-width supporting frames 81'. The bearing supporting frames 81' are secured to a sliding nut or socket 82 adjustable within the guide brackets 89 provided on the lower portions of the side walls 58 and 59, the adjusting screws 84 being utilized for adjusting the position of the sliding sockets and driven shafts, supporting the frames 81', relative to the guide brackets 89. The rear face of each of the shaft bearing, supporting frames 81' is provided with two projections 85 and 85' thereon, each of which supports the adjusting screws 86 and 86', the adjusting screw 86 being screwed into engagement with the bearing frame 90 on the shaft 67 for adjusting said bearing relative to the frame 81' and the remaining adjusting screw 86' engaging the bearing frame 91 supporting the shaft 68 for adjusting said bearing relative to the supporting member 81'. The conventional lock nuts are placed into engagement with the screws 86 and 86' to prevent self-relocation of the same. By and through the adjust-

ments described, the shafts 67, 68 and 70 supporting the brush sweeper belt may be adjusted or rearranged within the housing 47 by movement of the brush adjusting screw 84, of the upper guide bracket 83, directly connected to the drive shaft 70 or similarly, the lower driven shafts 67 and 68 may be moved by rotation of the brush adjusting screw 84 relative to the lower guide bracket 89. The exteriors of the brackets 83 and 89 are graduated in order that an embossment or point 90' provided on the sliding nuts or screws 82 may register a proportionate movement of the shafts in the upper and lower bearings. Slack or play would be imparted to or removed from the belts 64 by movement of the bearing frames 78, 90 and 91, imparted through the respective adjusting screws 86 and 86'.

The end of the shaft 70 projects through and beyond the side wall 59 of the housing 47 and on which a sprocket gear 92 is securely fixed. A shaft housing 93 is arranged transversely of the rear of the chassis 1. A casing 94 is provided in the shaft housing 93, enclosing a bevel gear differential rotated by a propeller shaft 56, directly connected at the end thereof to the prime mover 8 so that the shaft 96 will always rotate in direct relation to engine speed. A shaft 98 is provided in the shaft housing 93, connected at its inner end to the bevel differential and having on its opposite end a gear sprocket 92' adapted to be connected to the sprocket 92 on the shaft 70 and to drive it through the articulated chain belt 99. It will be noticed that the sweeper belt is driven at a speed directly in proportion to the speed of the engine, thus making it possible to move the sweeper belt at a proportionate speed of the engine while the vehicle is in a stationary position, thus promoting a greater efficiency than where the speed of the sweeper brushes is the same as the speed of the automotive vehicle. An intermediate sprocket wheel 100 is provided between the drive sprockets 92 and 92', and about which the drive belt 99 passes. The intermediate sprocket 100 is rotatably mounted in a bearing 101 carried by a shaft 102, slidably retained in a supporting bearing 103 secured to the dust chamber 13. A cross pin or nut 104 is provided on the end of the bearing supporting shaft 102 and an expansion spring 105 interposed between the under side of the pin 104 and the upper face of the support 103. The expanding action of the spring thus tends to draw the shaft 102 and bearing 101 upwardly, thus moving the sprocket 100 to remove slack or looseness from the drive chain 99.

A shaft 106 projects from the opposite end of the shaft housing 93 and has a bevel gear 107 thereon. An auxiliary bearing 108 is provided on the chassis 1 for supporting

the end of the shaft 106 and enclosing the bevel gear 107. A shaft 109 is arranged vertically within the bearing 108, the lower end of said shaft 109 projecting beyond the under side of the bearing, and has the circular curb sweeper brush 110 securely fixed thereon. The brush 110 consists of a plurality of bristles mounted in a circular backing secured on the shaft 109, the said bristles being of a length substantially greater than the height of a normal street curbing. A retaining band 111 is provided circumferentially around the bristles in order that the outward sweep or flare of the same may be regulated and restricted.

A bevel gear 112 is arranged within the bearing 108 and loosely mounted about the shaft 109, said gear 112 having a hollow shaft 113 secured thereon around the shaft 109, the upper end of said hollow shaft being provided with a jaw clutch member 114 thereon. A clutch engaging member 115 is slidably retained on the shaft 109 and movable into and from contact with the jaw clutch member 114. The clutch engaging member 115 is provided with a reduced end 116 thereon having an interiorly splined facing to engage the splines 117, provided on the upper end of the shaft 109. A loose collar 118 is provided around the reduced end 116 of the clutch engaging member 115, said collar being secured through a suitable yoke 119 to a cable 120. The opposite end of the cable 120 is joined to a threaded shaft 121 retained in a housing 122, said threaded member 121 having a handle 123 thereon which may be rotated to move the threaded shaft 121 to transmit through the cable 120 a vertical movement to the clutch engaging member 115, either lifting or dropping said member into or from engagement with the jaw clutch member 114 to start or stop relative movement of the shaft 109 and brush 110. By the mechanical arrangement thus provided, it is possible to operate the curb sweeper brush in unison with the main sweeper brushes or independently thereof. A spray nozzle 124 is provided contiguous to the curb brush 110 so as to spray fluid onto the adjacent surface to be swept by said curb sweeper and prevent the raising of dust. The spray nozzle is connected through a suitable conduit 125 and control valve 126 with a reservoir 127 mounted within the dust collector chamber 13.

The complete apparatus operates as follows. Operation of the automotive vehicle transmits a rotative movement from the propeller shaft 11 through the auxiliary jack shaft 96, through the sprocket 92' and drive belt 99 to the drive sprocket 92 on the shaft 70, to drive the brush sweeper belts 64 within the housing 47. Movement of the belt 64 places the brushes thereon into

continuous intermittent contact with a surface to be cleaned, moving dirt or other particles upwardly over the apron 63 onto the inclined surface 62, mechanically moving the same thereon in a position to be ejected into the interior of the lower portion of the dust collector chamber 13. Synchronously with the movement of the brush belts 64, the exhauster fan 39 would be placed in operation through the drive belt 44, connecting the fan pulley 43 with the pulley 45 on the propeller shaft 11. The exhauster fan sucks or draws air from the interior of the dust collector chamber, thus aiding the mechanical injection of the dust from the sweeper brushes into the dust collector chamber 13. Obviously, the air drawn in from the sweeper brushes is laden with dust particles, some of which precipitate and settle on the flooring 14 and 15 of the dust collector chamber 13. Particles that remain suspended in the air pass by and through the openings provided in the baffle-plate 25 and thence move into contact with the fabric portions of the filter frames 27. The density and porosity of the filter cloth is of such mesh that the dust particles in the air cannot pass there-through, but remain on and are collected by the fabric filters. The rarefied or strained air passing through the filters enters the suction opening 38 of the exhauster cavity, from whence it is discharged. The dust particles collected on the air filter fabrics will be mechanically dislodged by the vibratory and other jarring reactions caused by movement of the automotive vehicle in its sweeping operations, so that the said collected particles drop from the air filter fabrics down onto the baffle-plate 25. The volume of dust particles which settle upon the upper face of the baffle-plate 25 through continued agitation work downwardly off of the slanted face thereof and are dropped onto the flooring of the dust collector chamber 13. The refuse and other matter collected within the dust chamber is removed when the quantity thereon contained within the said chamber prevents an efficient functioning of the apparatus.

Having thus described this invention, what I claim and desire to secure by Letters Patent is:

1. In combination with a vehicle having a prime mover thereon, of a dust chamber on said vehicle; a brush sweeper housing communicating with said vehicle chamber; means connecting said vehicle chamber and sweeper housing, comprising a pair of bracket members secured respectively to said vehicle chamber and sweeper housing; complementary guideways in each of said brackets; and a common means adapted to be mounted between said complementary guideways to permit a vertical movement

of said sweeper housing relative to said vehicle chamber.

2. In a device of the character described, means for securing a sweeper housing to an automotive vehicle, comprising brackets on said sweeper housing and vehicle body; complementary guideways formed on each of said respective brackets; and a common means engaging the complementary guide-

ways to permit a vertical movement of each of said guideways relative to the other.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 9th day of May, 1922.

FERD H. MEYER.

In presence of—

LINCOLN V. JOHNSON.