

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 1

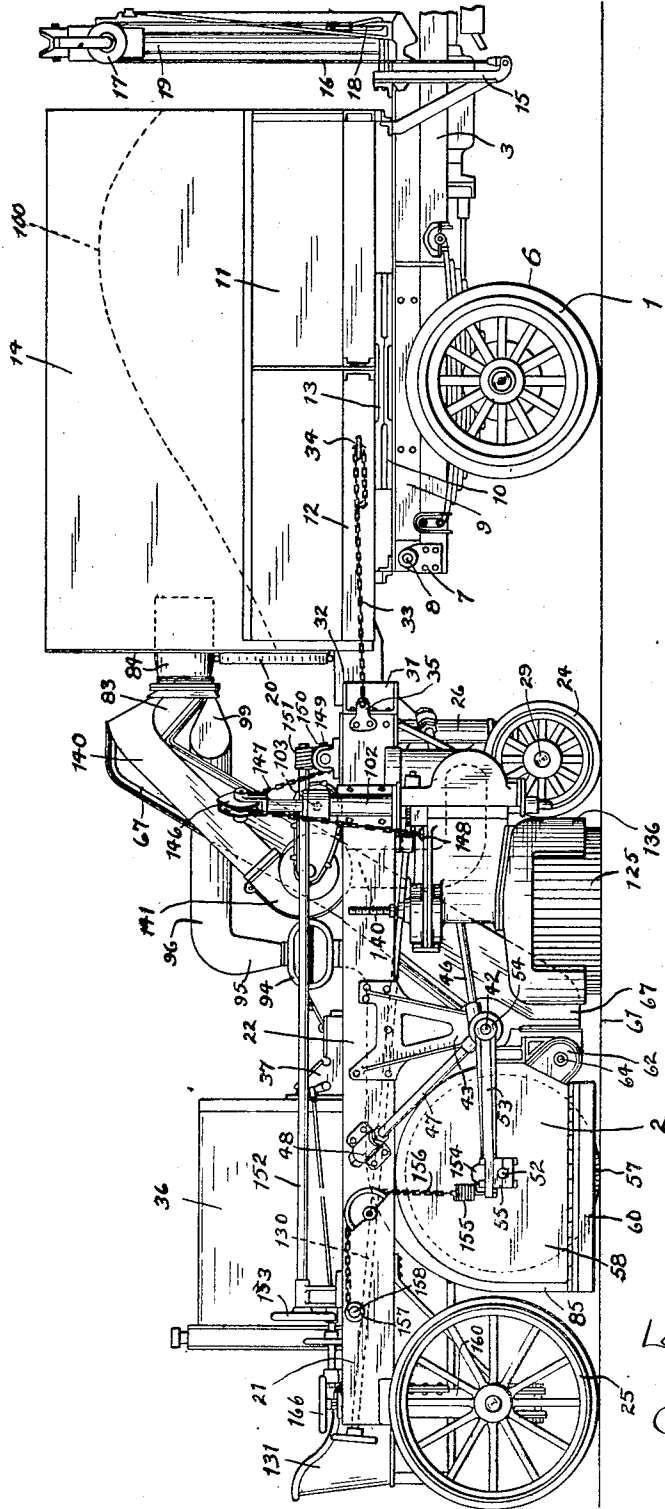


Fig. 1

Inventor
Lee A. Frayer.

C. Shepherd.
Attorney

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 2

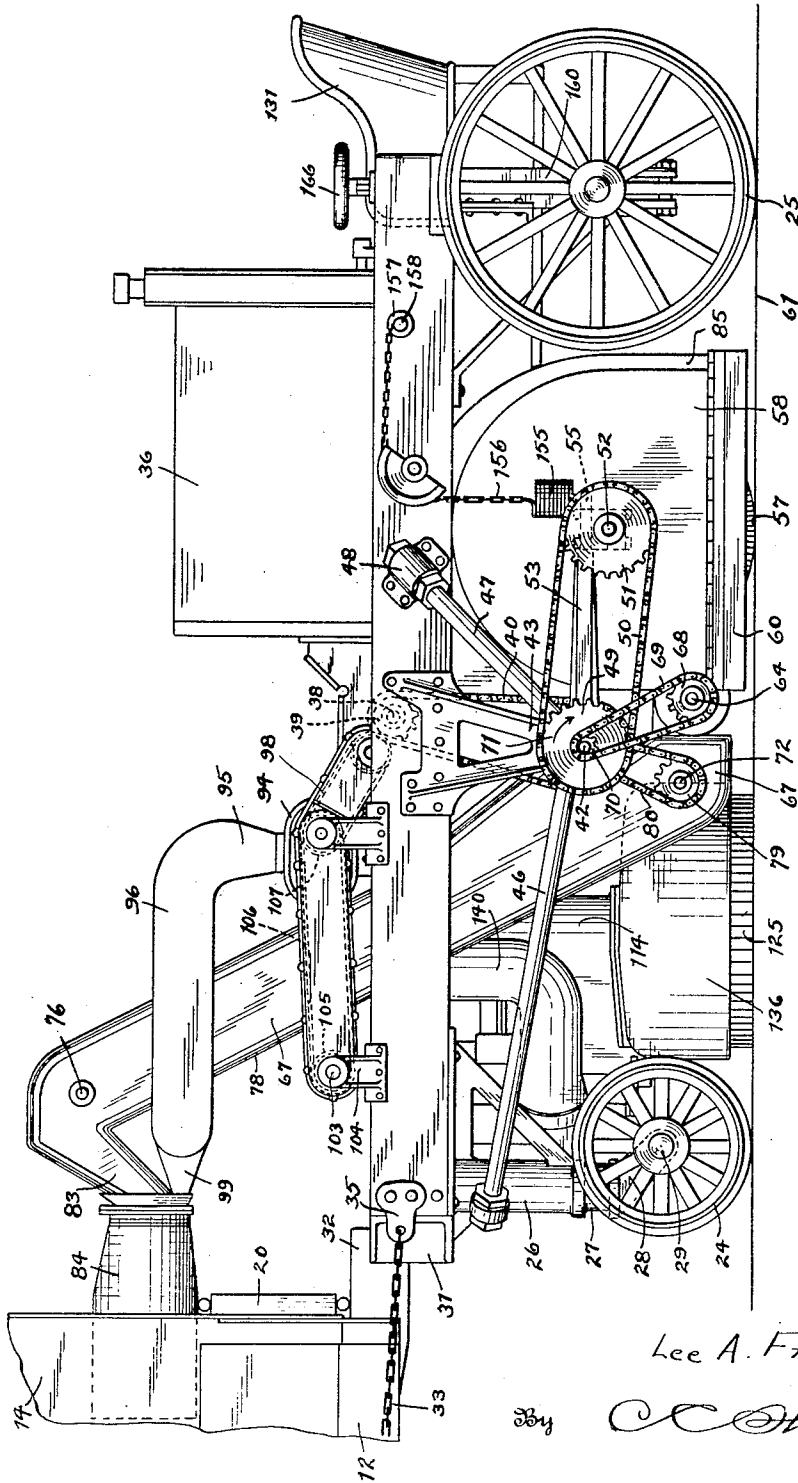


Fig. 2

Inventor

Lee A. Frayer.

C. Shepherd.

Attorney

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 3

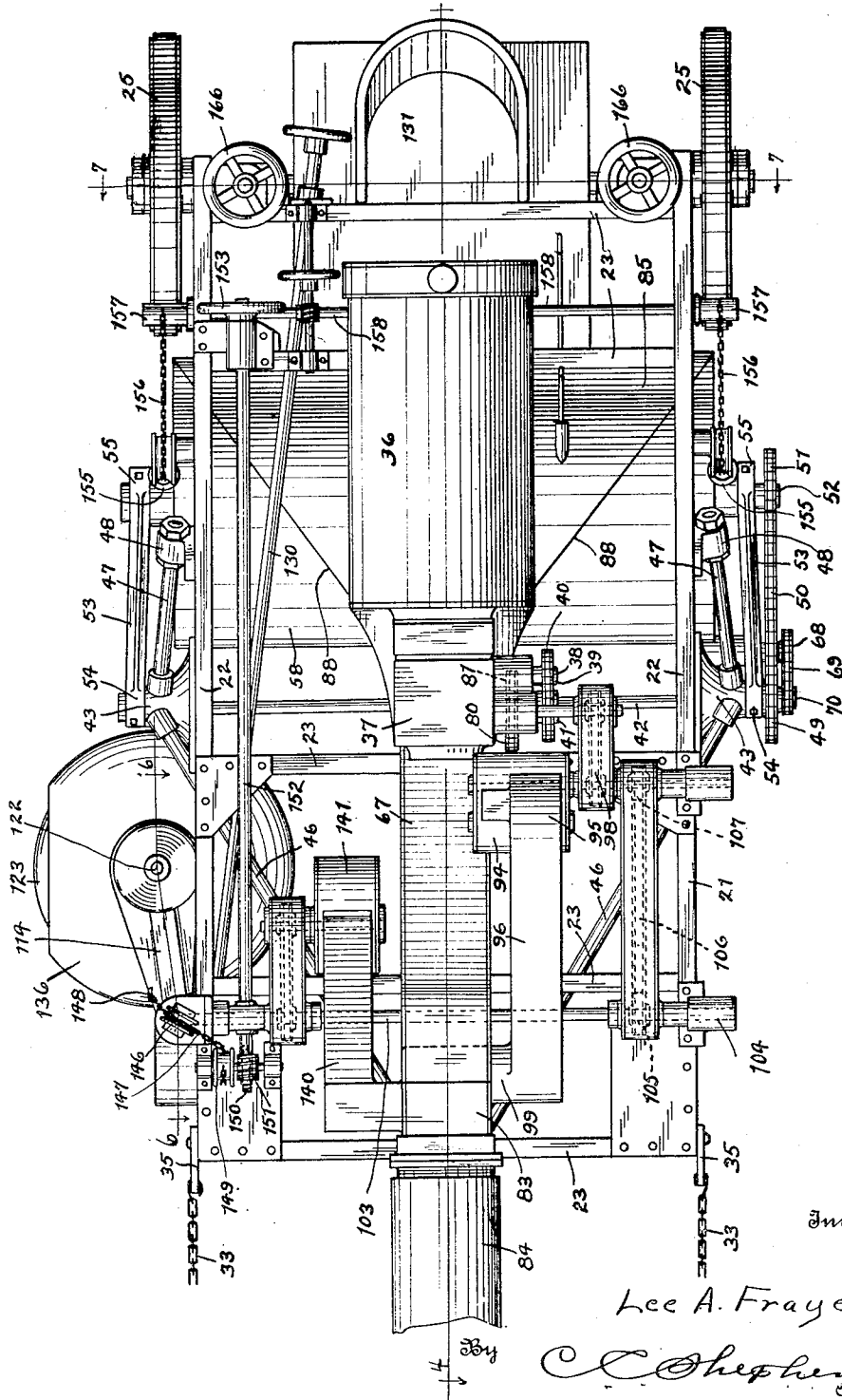


Fig. 3

Inventor

Lee A. Frayer.

C. Shepherd.
Attorney

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 4

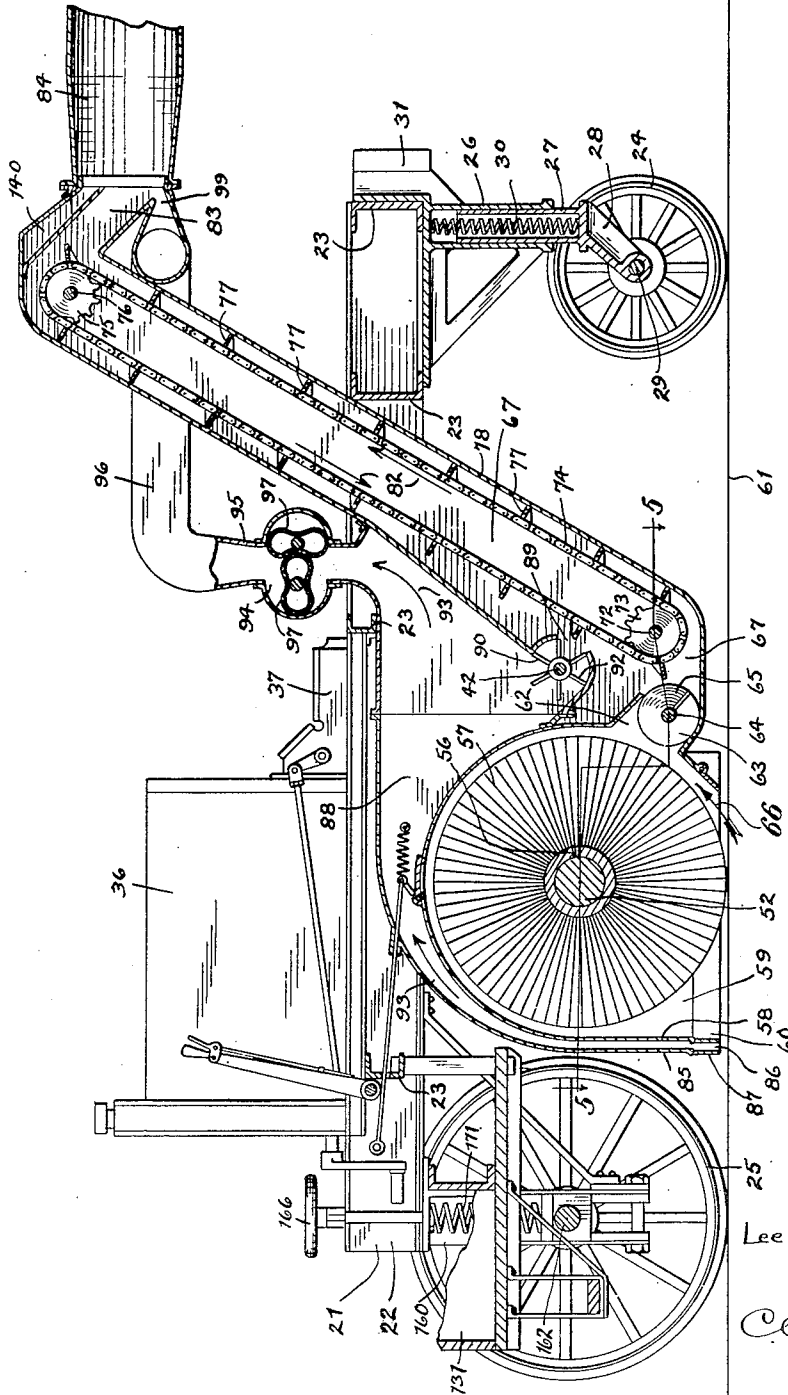


Fig. 4

Inventor
Lee A. Frayer.

C. C. Shepherd.
Attorney

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 5

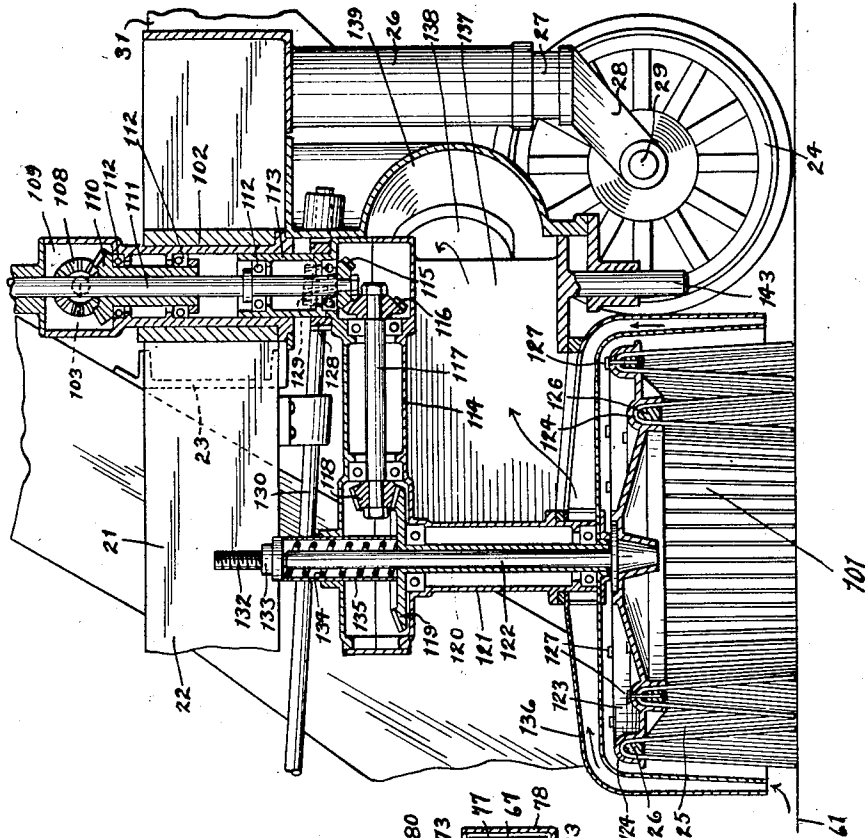


Fig. 6

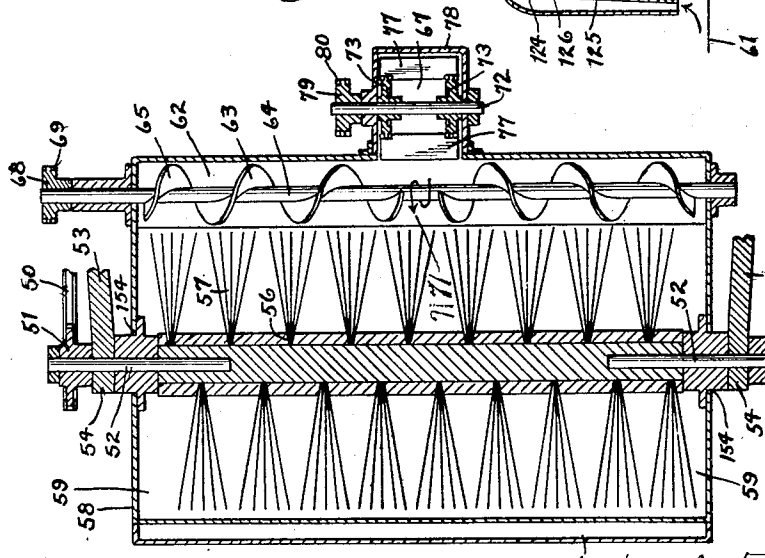


Fig. 5

Inventor

Lee A. Frayer.

C. C. Shepherd
Attorney

July 21, 1925.

1,546,441

L. A. FRAYER

STREET SWEEPING MACHINE

Filed May 25, 1921

6 Sheets-Sheet 6

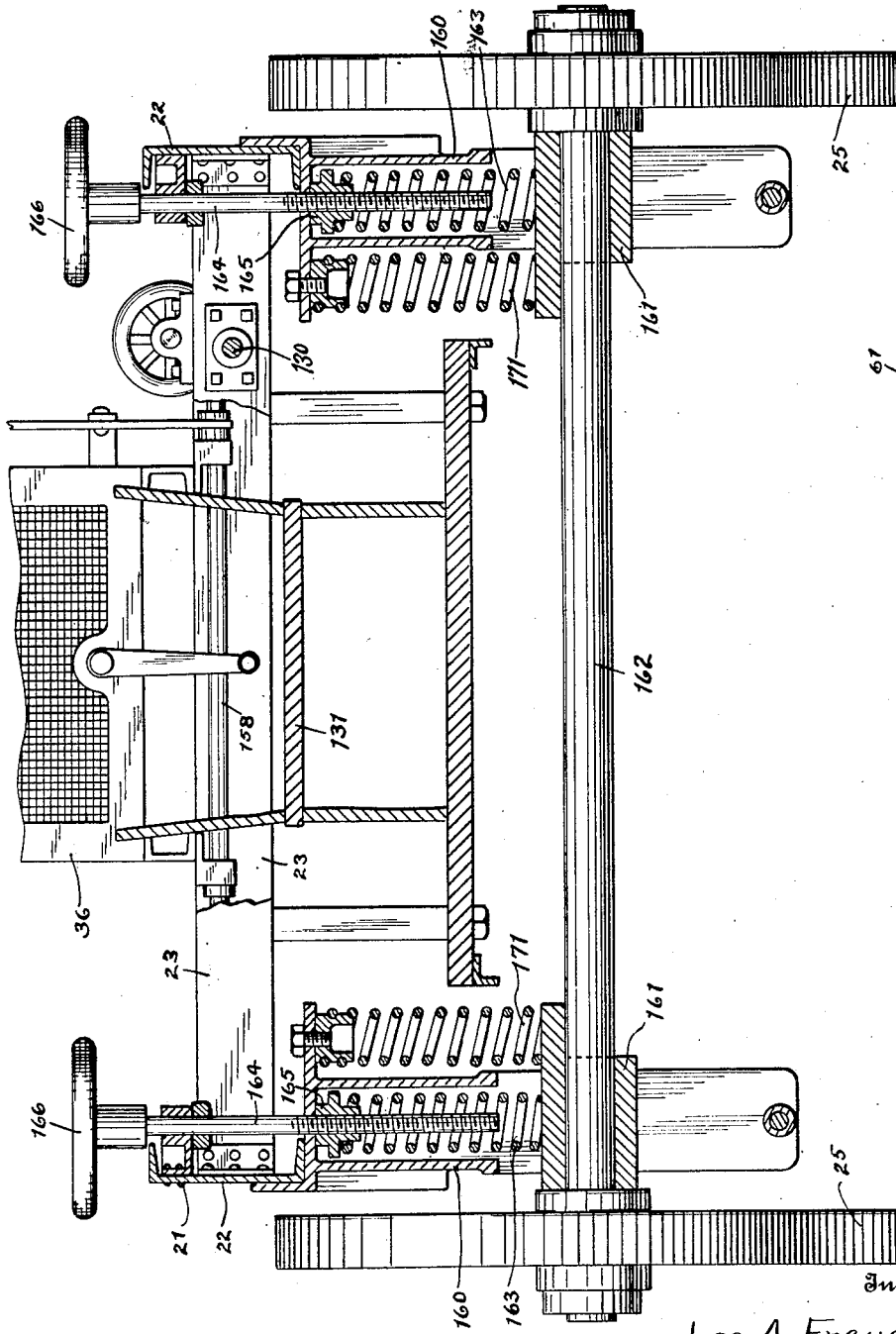


Fig. 7

Inventor

Lee A. Frayer.

C. Shepherd

Attorney

384

Patented July 21, 1925.

1,546,441

UNITED STATES PATENT OFFICE.

LEE A. FRAYER, OF COLUMBUS, OHIO, ASSIGNOR TO H. C. ROGERS, OF COLUMBUS, OHIO.

STREET-SWEEPING MACHINE.

Application filed May 25, 1921. Serial No. 472,525.

To all whom it may concern:

Be it known that LEE A. FRAYER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, has invented certain new and useful Improvements in Street-Sweeping Machines, of which the following is a specification.

This invention relates to an improved power operated street sweeping machine, and has for its primary object to provide a machine of this character which will serve to positively and efficiently remove dirt and débris from streets or other public rights of way in an effective, expeditious and labor saving manner.

Another object of the invention resides in the provision of a street sweeping machine which will include cooperatively united propelling and sweeping units, the said sweeping unit being formed to embody mechanism of a novel and improved character which will be capable of gathering material from the surface of a street and to conduct such material to a point where the same may be discharged into a receiver carried by a rear end of the propelling unit, the said receiver being pivotally mounted upon the frame of the propelling unit and detachably connected with the frame of the sweeping unit, this arrangement of parts being such that the receiver may be maintained in receiving relationship with respect to the discharge end of the sweeping unit irrespective of the relative angular relationship which may exist between the trucks of the said units, the detachable connection between the units serving to permit of the removal of a loaded receiver from cooperative relation with the sweeping unit and of the substitution of an empty receiver in lieu thereof, thus permitting of substantially continuous use on the part of the sweeping unit so that the full efficiency thereof may be obtained at the lowest practical cost of operation.

A further object of the invention resides in the provision of a sweeping unit wherein is provided a portable frame which is formed to carry a casing, the latter being formed to include communicating broom and elevator chambers and a substantially independent suction chamber, the said chambers being formed to upwardly terminate in cooperatively located nozzles, in providing the said broom chamber with a rotatable

broom capable of engaging the street surface over which the unit may operate and in providing elevator mechanism in conjunction with the broom which will serve to collect the sweepings of the broom and to discharge such sweepings through the outlet of the elevator chamber and into the receiver of the propelling truck, the discharge of such sweepings being further facilitated and effected by locating a blower or fan within the suction chamber, which will serve to gather the dust created by the rotation of the broom and to draw such dust upwardly through the suction chamber and to discharge the same through a nozzle located in the upper end of said chamber, the nozzle being situated so as to create induced air currents within the elevator chamber so that the dust and sweepings of the latter will be positively forced into the receiving unit.

A still further object of the invention resides in equipping the sweeping unit with an improved curb broom structure, which is adapted to be pivotally mounted in conjunction with the frame of the sweeping unit in order that the same may be adjusted to assume various lateral positions with respect to the frame of the sweeping unit, the said broom structure serving to enable the machine to remove dirt from the surface of the street immediately adjacent to the curbing thereof and in this respect to eliminate a manual operation heretofore required in sweepers of this character.

Other objects of the invention reside in an improved construction for effecting the operation and mounting of the curb broom structure so that the latter may operate to force the sweepings into the path of the main broom; in the provision of means whereby the positions of operation of the curb broom may be readily maintained and varied; in the provision of mechanism for collecting and removing dust set up by the operation of the curb broom; providing means for discharging the heavier dirt particles from the suction chamber of the casing into the elevator chamber, and in the provision of a structure of a manually operated character whereby the frame of the sweeping unit may be vertically oscillated so that the sweeping elements thereof may be moved to assume active or inactive positions.

With these and other objects in view, as

will appear as the description proceeds, the invention accordingly consists in the novel features of construction, combinations of elements and arrangements of parts, hereinafter to be fully described and pointed out in the claims hereunto appended.

In the accompanying drawings, forming a part of this specification and in which similar characters of reference denote like and corresponding parts throughout the several views thereof:

Figure 1 is a side elevation of the improved street sweeping machine comprising the present invention and disclosing the cooperation between the propelling and sweeping units thereof.

Figure 2 is a side elevation looking toward the opposite side of the sweeping unit,

Figure 3 is a top plan view of the sweeping unit,

Figure 4 is a vertical longitudinal sectional view taken through said sweeping unit on the line 4—4 of Figure 3,

Figure 5 is a transverse sectional view taken on the planes indicated by the line 5—5 of Figure 4, and disclosing more particularly the broom and conveyor mechanisms and the driving elements thereof,

Figure 6 is a transverse sectional view taken along the line 6—6 of Figure 3 and setting forth the curved broom construction, and

Figure 7 is a transverse sectional view taken along the plane indicated by the line 7—7 of Figure 3, and disclosing the mechanism for adjusting the frame of the sweeping unit.

Referring more particularly to the structural details of the improved street sweeping machine, as such details are disclosed in the specific embodiment of the invention set forth, the numeral 1 designates the propelling unit of the machine and the numeral 2 the sweeping or gathering unit, the said units when in cooperative relation being of such nature as to produce a self contained machine which will be capable of successful operation without requiring outside assistance. The propelling unit consists primarily of an ordinary motor driven truck, such as are commonly employed for commercial purposes, and therefore, the truck includes a frame or chassis 3, usual driving wheels 6, all of which parts are of standard construction and operate in the ordinary manner common to vehicles of this character. The rear end of the frame 3, in this instance, is provided with brackets 7, which receive a transversely extending rod 8, which acts as a horizontal pivot for a supplemental frame 9, located in parallelism with and above the frame 3. The supplemental frame 9 carries a fifth wheel construction 10, upon which an enclosed sweeping receiver 11 is positioned. This receiver

includes a metallic bottom structure 12, which is capable of being supported upon anti-friction devices 13 projecting upwardly from the frame 9, and above the bottom 12 the receiver is formed to include an enclosed fabric body or canopy 14, into which the sweepings, delivered from the sweeping unit 2, are delivered. It will also be observed that the forward end of the supplemental frame is provided with a suitably braced, downwardly projecting structure 15, to the lower end of which is connected the free end of a cable 16. This cable passes around a pulley 17, and has its other end fixed or anchored as at 18 upon the frame 3. The pulley 17 is, in turn, connected with a hydraulic or other mechanically operating jack structure 19, which is capable of being raised and lowered for the purpose of effecting the inclination of the supplemental frame 9 and the receiver 11 thereof, in order that the contents of such receiver may be positively and expeditiously discharged. The rear end wall of the receiver includes a pivoted door 20, which is capable of assuming an open position when the receiver is tilted, in order that the contents of such receiver may be readily discharged.

The sweeping unit, which forms the essential part of the present invention, consists of a main frame 21, preferably formed from rigidly connected longitudinally and transversely extending girders 22 and 23 respectively, which are adapted to be riveted or otherwise suitably secured to provide a rigid and substantial frame. The frame 21 is provided with a pair of forwardly located caster wheels 24, and with a pair of rearwardly located road wheels 25. The caster wheels are located longitudinally and centrally of the forward part of the frame 21, and are adapted to be connected with said frame by providing the forward part of the latter with a downwardly extending rigidly mounted sleeve 26, which is capable of telescopically receiving a tubular standard 27, which is integrally formed with a yoke 28. This yoke carries a stud axle 29, upon the ends of which the spaced caster wheels 24 are mounted. To rigidly support the frame 21 in connection with the caster wheels, the standard 27 is adapted to receive a comparatively strong coil spring 30, which is so located within the standard 27 as to resiliently receive the weight of the forward portion of the frame so that the latter may operate with more or less elasticity over street surfaces. It will be understood that the standard 27 is free to rotate within the sleeve 26, and therefore the caster wheels will be properly positioned upon forward movement on the part of the machine, and that by the use of the casters the sweeping unit will be enabled to negotiate turns with all due facility required for machines of this

character. Also, the forward part of the frame 21 is provided with a coupling plate 31, which is adapted to loosely receive a coupling tongue 32, projecting rearwardly from the supplemental frame 9, the tongue being maintained in cooperation with the plate 31 by means of coupling chains 33. These chains are suitably connected with eyes 34, formed with the supplemental frame and are likewise suitably connected in a rigid manner at their inner ends with brackets 35, carried by the frame 21. It will be seen that through the instrumentality of the chains 33, movement on the part of the propelling unit will result in drawing or pulling the sweeping unit in unison therewith. The plate and tongue construction 31 and 32 is provided to preserve proper alignment between the said units, but it should be noted that this construction is such that the frames 3 and 21 may move vertically upon their respective supports without relative interference. Also, by the said tongue plate construction the receiver 25 may be oscillated about the fifth wheel 10 so as to be longitudinally aligned with the frame of the sweeping unit.

Arranged to be suitably mounted contiguous to the rear end of the frame 21 is a driving motor 36 of the sweeping unit. In this instance the motor 36 is of the internal combustion type and includes a suitable transmission structure 37, from which projects a suitably journaled drive shaft 38. This shaft carries at its outer end a sprocket 39, over which is trained an endless chain 40. This chain is, in turn, trained over a sprocket 41, which is fixed to a counter shaft 42, the latter being mounted for rotation within bearings 43 provided upon each side of the frame 21, the shaft 42, which may be formed in one or more sections, and suitably journaled for rotation, being disposed to extend transversely across the width of the frame 21. The shaft 42 has its ends rotatably supported in the bearings 43. The brackets or bearings 43 are adapted to receive, by reason of their function, considerable stress and strain, and the same are therefore braced by means of forwardly converging rods 46, which have their forward ends connected with the sleeve 26. In conjunction with the rods 46, the bearings 43 are further braced by means of upwardly and angularly extending rods 47, which latter have their upper ends connected rigidly as at 48 to the sides of the frame 21.

One of the ends of the countershaft projects slightly beyond the bearings 43, and is equipped with a sprocket 49, over which an endless broom driving chain 50 is designed to pass. The chain 50 also passes around the sprocket 51, which is carried in a fixed manner by the outer end of a broom shaft 52. The shaft 52 is oscillatably supported

from the countershaft 42 by means of pivoted arms 53. These arms have their hubs 54 rotatably positioned upon the sleeve 44 and are confined between the outer ends of the bearings 43 and the sprockets 49. The outer or free ends of the arms 53 are equipped with bearing boxes 55, in which the outer ends of the broom shaft 52 are rotatably received. The shaft 52 is, in itself, formed to include spiral grooves 56, in which the inner portions of the bristles of a broom 57 are positioned and secured. The broom 57 is preferably of such length as to extend substantially across the full width of the frame 21 and is of the usual cylindrical construction common to brooms employed in this class of machines. It will be manifest, therefore, that the broom will be pivotally carried by the countershaft 42 and will be permitted to oscillate from said shaft by reason of the arms 53. Also, through the driving sprockets and chains described power will be positively delivered to said broom to effect its rotation so that the latter may be forced to revolve independently of the movement of the sweeping unit as a whole. Also, by pivotally mounting the broom from the countershaft, the same may rise and fall and to thus adapt itself to irregularities in the surface over which it is operated. By reason of the rods 46 and 47 the bearing brackets 43 will be substantially and rigidly braced so that the stresses exercised thereon by reason of the broom may be readily received and absorbed without injury to the machine.

In combination with the broom 57, there is employed a hood or casing 58, which is preferably formed from sheet metal and includes a chamber 59 in which the broom is rotatably received. This chamber 59 has its top curved to conform with the curvature of the broom 57, while the bottom of the chamber is left open so that the broom may freely engage with the road surface. The lower open edges of the chamber 59 are equipped with flexible strips 60, which enable the chamber 59 to terminate close to the road surface 61, and to thereby enable flying dust particles to be confined within said casing. Also, by means of the strips 60 this object is accomplished without liability of damage on the part of said casing. The chamber 59 terminates forwardly in a relatively reduced transversely extending conveyor chamber 62, in which is mounted a transversely extending conveyor structure 63. This conveyor structure includes a shaft 64 which carries reversely arranged spiral blades 65. These blades extend substantially the full width of the chamber 62, and the broom 57 and by reason of their construction the same will serve to engage and receive sweepings discharged from the chamber 59 by the revolving broom, which

rotates in the direction indicated by the arrow 66. The sweepings engaged by the blades 65 are conveyed toward the central part of the chamber 62, and are thence discharged from said conveyor chamber into an elevator chamber 67, also forming a part of the general casing 58. The ends of the conveyor shaft 64 project beyond the side walls of the casing 58, and are provided at one end with a sprocket 68, over which an endless chain 69 passes, the said chain being trained over a sprocket 70 carried by the countershaft 42. It will be manifest that by the rotation of this shaft power will be imparted to the conveyor structure 63 so as to effect the rotation of the latter in the direction indicated by the arrow 71, which results in causing the material in engagement with the conveyor to be delivered to the central portion of the chamber 62 and thence discharged into the elevator chamber 67.

The elevator chamber forms a forwardly extending upwardly and angularly directed extension of the casing 58, and has its lower end provided with a shaft 72, which is suitably journaled so as to extend adjacent to and in parallelism with the shaft 64. The shaft 72 carries, however, sprockets 73, around which spaced longitudinally extending chains 74 are adapted to pass, the said chains being also trained over sprockets 75, mounted on a transversely extending shaft 76 situated at the upper end of the chamber 67. These chains carry at intervals transversely disposed arms or flights 77, which are so disposed that the lower run thereof will travel immediately adjacent to the lower or inner wall 78 of the elevator chamber. The shaft 72 is rotatably supported within the lower portion of the chamber 67 and has at least one of its outer ends equipped with a sprocket 79, which carries an endless chain 80, the latter being suitably trained over a sprocket 81 carried by one of the sections of the countershaft 42. Manifestly, upon the rotation of the countershaft, motion will be imparted to the shaft 72, which will result in the movement of the elevator in the direction indicated by the arrow 82. Thus, sweepings discharged from the conveyor structure 63 will be caught by the flights or arms of the elevator and thence conveyed upwardly of the chamber 67, in order that such sweepings may be discharged by way of the downwardly inclined discharge opening 83 of the elevator. The discharge opening 83 is in communication with the receiver 11 by means of a flexible conduit 84, and therefore material discharged from the elevator will be capable of being directly delivered into the receiver of the propelling unit. The discharge of the sweepings, however, takes place in a more effective manner than

by simply relying upon gravity, and this mechanism will now be described.

The casing 58 includes a suction conduit 85, which is formed so as to substantially surround and yet to be selectively independent of the chamber 59. The suction conduit 85 is provided with a relatively restricted entrance 86, which extends substantially the full width of the rear wall of the chamber 59, and the lower edge of the entrance 86 is provided with a flexible strip 87, which cooperates with the strip 60 so that the entrance 86 will be located as close to the surface 61 as is desired, without liability of injury to the metallic parts of the casing. It will be manifest that by this construction, a suction created within the conduit 85 will serve to remove dirt particles not acted upon by the broom, and also to limit flying dust, created by the operation of the broom, to the confines of the casing, permitting of the collection of such flying dust and subsequent delivery of the same to the receiver 11.

Between the broom and elevator chambers 59 and 67 respectively, the conduit 85 is relatively enlarged and includes downwardly converging walls 88 which terminate in an opening 89, establishing communication between the conduit 85 and the elevator chamber 67. This opening is normally closed, however, by means of a revolving separator 90, which includes the transversely extending shaft 42 and radially projecting blades 92. It will be apparent that upon the rotation of the countershaft, the blades 92 will be revolved, thus permitting the heavier particles of dirt or other matter passing through the conduit 85 to be collected in the pockets formed between the blades 92 and thence delivered into the elevator chamber proper, in order that such heavier particles may be handled by the elevator structure. By reason of the number of the blades 92, the opening 89 will be closed at all times, thus maintaining the independent relationship between the suction conduit and the elevator chamber.

To create forced air currents, traveling in the directions indicated by the arrows 93 within the conduit 85, use is made of a blower 94. This blower is situated in the vertical leg 95 of the angular discharge portion 96 of said conduit, and the blower may be of any desired construction, but in the present instance includes a pair of intermeshing rotors 97, which are designed to closely engage one another and the inner walls of the casing of the blower so as to create a strong, positive and forced draft with the conduit 85. By reason of the separator 90, it will be apparent that the heavier particles of the dust gathered by the suction conduit will be discharged into the elevator structure, hence it is possible to use the type of blower disclosed, since light dust

particles only will be handled thereby. The rotor 97 is preferably operated by means of a chain and sprocket structure 98 driven from the transmission 37. It will be observed that the horizontal leg of the discharge portion 96 of the conduit 85 terminates in a nozzle 99, which is situated so that the restricted portion thereof will communicate directly with the discharge conduit 84 of the elevator chamber. Thus, it will be apparent that by reason of the forced discharge of air through the nozzle 99, induced air currents will be set up within the elevator casing, causing a removal of all dust from the broom and elevator chambers and also causing a certain degree of velocity to be imparted to the sweepings discharged from the elevator proper. The velocity imparted to the sweepings, by reason of the air currents, will be sufficient to positively and forcibly eject the sweepings from the discharge end of the sweeping unit and to deposit such sweepings within the receiver 11. The strength of the air currents thus created is sufficient to deposit the sweepings within the receiver in the moundlike manner indicated by the dotted line 100, from an observation of the curvature of which it will be noted that the sweepings will be delivered into the receiver with such force that the same will be piled up in the forward part of the receiver before the rear portion thereof is filled. This structure serves to insure a complete filling of the receiver before the same may be disconnected with the sweeping unit.

It has been found by practical experience that the broom 57 or its equivalent in machines of this character, can not sweep immediately adjacent to the curbing of a street, and as a result, it has been the common practice to collect the matter not handled by the sweeper by means of manual operations. This operation is comparatively slow and expensive, and therefore the present invention provides the sweeping unit with an improved curb broom structure, designated in its entirety by the numeral 101, the function of this structure being to sweep a street right up to the vertical wall of its curbing, and in the present instance the said curb broom operates to force the dirt away from the curbing and into the path of the main broom, whence it may be collected in the manner heretofore set forth. To effect the mounting of the structure 101, the frame 21 is provided at one side of the forward portion thereof with a fixed tubular bearing 102, in the upper end of which is rotatably mounted a transversely extending shaft 103. This shaft projects across the frame 21 beneath the elevator casing, and has its other end suitably supported for rotation within a bracket 104, also carried by the frame 21. The shaft

103 carries a sprocket 105, around which a chain 106 is passed, the latter being also passed around a second cooperating sprocket 107 mounted in connection with the chain and sprocket construction 98, the arrangement being such that power from the motor 36 may be employed to effect the rotation of the shaft 103. The end of the latter shaft, which terminates within the upper part of the bracket 102, carries a fixed bevel gear 108. This gear meshes with a similar gear 110, which is adapted to be carried by and suitably fitted to the upper end of a vertically disposed shaft 111. This shaft is suitably supported in anti-friction bearings 112 provided within the main tubular bearing 102, and the lower end of the shaft 111 is designed to pass through the vertical tubular extension 113 provided upon a hollow radially movable casing 114, the said casing by reason of the extension 113 being capable of oscillating about the vertical pivot provided by the bearing 102. The extension 113 is also provided with anti-friction bearings capable of rotatably receiving and supporting the lower end of the shaft 111, and the latter is, in turn, provided at its extreme lower end with a gear 115 capable of meshing with a similar gear 116 provided upon the inner end of a horizontally journaled shaft 117 that is situated for rotation within the horizontal portion of the casing 114. The outer end of the shaft 117 is provided with a pinion 118, which is disposed to mesh with a gear 119 provided upon the upper end of a sleeve 120. This sleeve is suitably mounted for rotation within the tubular vertically extending portion 121 of the casing 114, and the said sleeve is suitably keyed to a vertically disposed shaft 122, which is situated to extend axially and vertically to the portion 121 and also the sleeve 120, whereby upon the rotation of the shafts 111 and 117 rotation will be imparted to the vertical shaft 122. The lower end of the shaft 122 is provided with a head 123, which is fixed to rotate in unison therewith, and this head is provided with a plurality of annular grooves 124, and disposed concentrically of the shaft 122. These grooves are arranged to receive the intermediate portions of the vertically extending bristles of a curb broom 125, which is adapted to rotate about the vertical axis provided by the shaft 122. The bristles of the broom 125 fall outwardly and downwardly, in order that the base of the same may be rotated so as to engage substantially the vertical wall of a contiguous curbing. The grooves 124 are provided with filler blocks 126, which are capable of being wedged into said grooves by means of a screw and nut construction 127, in order to frictionally grip the intermediate portions of the broom bristles and to re-

tain such bristles in engagement with the head 123. The casing 114 in this instance has its extension 113 equipped with a fixed gear 128, which is capable of meshing with a worm 129, the latter being connected to the forward end of a shaft 130, which extends rearwardly to the operator's seat 131 provided upon the rear end of the frame 21. It will be apparent that by operating the shaft 130, the casing 114 may be swung to various angular positions with respect to the frame 21, in order that the sweeper may be accommodated to stress of varying width. By the use of the worm construction the said casing 114 will be locked in any of its adjusted positions. From the description given it will be apparent that by reason of the construction of the curb broom, the latter will be enabled to operate closely and contiguously to an adjacent curbing, in order that dirt or dust engaged thereby may be removed and placed in such positions as to be subsequently engaged by the following main broom. It has been found that by enabling the curb broom to operate from a vertical axis, the bristles are enabled to follow a curb more closely than if the broom were positioned to operate upon a horizontal axis. In order to compensate for the effects of wear upon the bristles of the broom 125, the upper end of the vertical shaft 122 is provided with threads 132, which threads are adapted to receive an adjusting nut 133, and a coil spring 134 is situated between the gear 119 and the lower surface of the nut, and normally tends to maintain the shaft 122 vertically elevated. However, by adjusting the nut 133, it will be apparent that the shaft 122 and the broom construction carried thereby may be vertically adjusted. The spring 134 may be enclosed by a sleeve 135, which guards the spring and permits the same to rotate in unison with the gear 119 and the shaft 122. As shown in Figure 6, the shaft 122, is slightly inclined with respect to the vertical, for the purpose of enabling the bristles thereof to convey sweepings more effectively into the path of the main broom than if the said shaft were vertically arranged.

In order to remove dust from the surface of the street, that is set up by the rotation of the curved broom, the casing 114 has the lower portion 121 thereof equipped with a hood 136, which is formed to include a structure capable of surrounding the broom 125. The said hood is formed to include a double wall structure which is provided with a restricted opened lower end normally disposed immediately above the street surface, and a suction is adapted to be created within the head so as to draw dust or other flying particles upwardly into the hood. The said hood terminates in a discharge chamber 137, which in turn is in

open communication with a chamber 138 provided in a fixed casting 139 carried by the under side of the frame 21. This casting is connected with an upwardly extending pipe 140, which leads to a suction blower 141, the latter being operated by means of drive mechanism capable of receiving its motion from the transverse shaft 103. Above the blower the pipe 140 is continued and terminates immediately above the discharge conduit 84 of the elevator mechanism, and acts in conjunction with the nozzle 99 of the blower 94, for the purpose of creating a forced draft so as to positively discharge the sweepings, derived from the several sources, into the receiver 11. The wall of the chamber 137 is provided with a vertical trunnion 143, situated in alignment with the shaft 111, the said trunnion being received within a bearing provided in the casting 139, and in this respect serves to provide a support for permitting of bodily pivotal movement on the part of the casing and the curb broom.

In order that the curb broom may be adjusted to assume active or inactive positions, that is, raised or lowered, the bearing 102 is provided with a pulley 146, over which a chain 147 is passed, the free end of said chain being connected as is adapted to be wound about a drum 149 carried upon the forward end of the frame 21. The drum 149 is provided with a gear 150, capable of meshing with the worm 151, provided upon the forward end of a manually operated shaft 152. This shaft is provided with a hand wheel 153 at its rear end, whereby the drum 149 may be rotated so as to effect the raising and lowering of the curb broom structure, the worm gear construction permitting of the locking of the structure 101 in either of its raised or lowered positions.

In this respect it should be observed that the main broom 57 may be raised or lowered at the will of the operator to assume active or inactive position. Thus, the ends of the shaft 52 are disposed to operate within arcuate slots 154 provided in the end walls of the chamber 59, which slots allow for the rise and fall of the broom independently of the casing 58. The outer ends of the arms 53 are connected with springs 155, which have their upper ends connected with chains 156. These chains pass around suitable guides, and have their ends connected with drums 157 formed on a shaft 158. This shaft is adapted to be rotated by means of suitable hand wheel operated from the drivers seat 131. This construction permits of the convenient raising and lowering of the main broom so that the latter may be used or inactively supported whenever desired. The springs 155 are employed for relieving tensile stress upon the chains 156.

Outside of these independent adjustments for the brooms 57 and 125, the present invention embodies an adjustment whereby the sweeping mechanism may be bodily moved to assume active or inactive positions. To this end a construction is provided whereby the frame 21 may be vertically oscillated about the axle 29 of the caster construction, in order that by the elevation of the frame 21 both of said brooms may be bodily lifted out of sweeping cooperation with the street surface. To permit of a vertical adjustment on the part of the frame 21, the latter is provided at its rear end with a pair of downwardly projecting pedestals 160, which have their lower ends bifurcated to slidably receive vertically adjustable blocks 161. These blocks act as bearings for the ends of the rear axle 162 utilized in effecting the support of the road wheels 25, and the positions of such blocks within the pedestals 160 is capable of being governed by means of springs 163. These springs are arranged vertically within sockets provided therefor in the pedestals 160, and the lower ends of said springs are arranged to engage with the upper surfaces of the blocks, while the upper ends of said springs engage with vertically adjustable nuts 165. These nuts are carried upon the lower threaded ends of shafts 164, which project vertically and axially through the said pedestals and are also connected with the longitudinal girders 22 of the main frame 21. The upper ends of the shafts 164 are provided with hand wheels 166. By rotating the hand wheels, rotary movement will be imparted to the shafts 164, and since the latter are threaded, it will be manifest that the nuts 163 thereon may be raised or lowered, thus controlling the tension upon the springs 163. Manifestly, when the nuts are forced downwardly upon the shafts 164 the frame 21 will be permitted to drop thus causing the mechanism carried thereby to drop into engagement more or less with the road surface, however, when the nuts 163 occupy their highest positions upon the shafts 164, the frame 21 will be forced upwardly, so that the brooms may be, if desired maintained out of engagement with said road surfaces. Ancillary springs 171 may be positioned between the pedestals 160 and the blocks 161 for the purpose of relieving strain and excessive pressures upon the springs 163.

In view of the foregoing description, taken in conjunction with the accompanying drawings, it will be manifest that the present invention provides a sweeper capable of being effectively employed in its stated capacity for the purpose of cleaning street surfaces in an efficient, expeditious and labor saving manner. The machine embodies pri-

marily but one operator, whose position is defined by the seat 131. The construction of the machine is such that but one sweeping unit need be employed to a plurality of propelling units, the arrangement between said units being such that when the receiver of a guide propelling unit has become filled with the sweepings, the connection between the two units is broken so that a propelling unit having an empty receiver may be substituted in place of the initial propelling unit. This feature serves to secure maximum efficiency from the machine and to eliminate investment charges. It will be observed in this connection that the propelling unit consists of an ordinary commercial truck upon which the receiver 11 has been mounted. It will of course be appreciated that the mounting of the receiver may be of such nature that the truck may be employed for other purposes when not engaged in connection with the sweeping unit. The construction of the sweeping unit is simple, compact and practical, and all of the various parts thereof are under the instant and ready control of the operator. In view of the above it is believed that the operation and construction of the invention will be apparent to those versed in the art, and therefore a more extended explanation has been accordingly omitted.

What is claimed is:—

1. In a street sweeping machine, a portable frame having a casing carried thereby including an open bottom brush chamber, an elevating chamber connecting therewith, an outlet structure situated at the upper end of said elevating chamber, means positioned within said chamber for delivering street sweepings into said outlet structure, a suction conduit substantially surrounding the brush chamber and having the entrance thereof disposed at the bottom of the brush chamber, a refuse separating device positioned between the suction conduit and elevating chamber, and a suction creating device disposed within said conduit to effect the discharge of sweepings therefrom.
2. In a street sweeping machine, a portable frame, a casing carried by said frame and including an open bottomed broom chamber and a communicating elevator chamber, an outlet structure situated at the upper end of said elevator chamber, means cooperatively positioned within said chambers for delivering street sweepings into said outlet structure, a suction conduit having the entrance thereof situated immediately to one side of the broom chamber, a suction creating device disposed within said conduit, a nozzle disposed at the discharge end of said conduit and communicating with said outlet structure to effect a forced discharge of the sweepings therefrom and a separating device including a plurality of

pockets located between the suction conduit and elevator chamber, as and for the purpose set forth.

3. In a street sweeping machine, a portable frame, a casing carried by said frame, a broom movably mounted in a chamber provided in said casing, an elevator positioned within a communicating chamber provided in said casing and capable of receiving and elevating the sweepings delivered from said broom, an outlet structure situated at the upper end of said casing and into which the sweepings conveyed upwardly by said elevator are discharged, a conduit positioned above said casing and having a relatively restricted entrance disposed to one side of said broom, a suction device positioned within said conduit, a discharge nozzle situated at the discharge end of said conduit and communicating with said outlet structure, and a separating device positioned within said conduit and located between the inlet thereof and said suction creating device, said separating device having radial blades cooperative with the conduit to provide independent pockets which serve to discharge the heavier dirt particles from said conduit into cooperation with said elevator.
4. In a street sweeping machine, a portable frame, a casing carried by said frame and including communicating broom and

elevator chambers, a broom movably mounted within said broom chamber, an elevator positioned within said elevator chamber and capable of receiving sweepings delivered from said broom and to convey such sweepings upwardly of said casing, an outlet structure formed at the upper end of said casing and into which the sweepings carried by said elevator are adapted to be delivered, a suction conduit surrounding said broom chamber and including a relatively restricted entrance portion formed to extend to one side substantially across the full width of the broom chamber, said conduit being formed to include a relatively deep pocket situated between the upper walls of the broom chamber and the elevator chamber, a blower positioned within said conduit at a position above said pocket, a pipe leading from said blower and having its other end terminated in a nozzle disposed in communication with said outlet structure, and a rotary separator positioned in the bottom of the pocket of said conduit and including a plurality of radial blades cooperative with the pocket of the conduit to collect heavier dust particles passing through the conduit and discharging the same into said elevator chamber.

In testimony whereof I affix my signature.

LEE A. FRAYER.