Aug. 24, 1943. A. L. FARRAR 2,327,879

STREET SWEEPER

Filed May 14, 1940 7 Sheets-Sheet 1

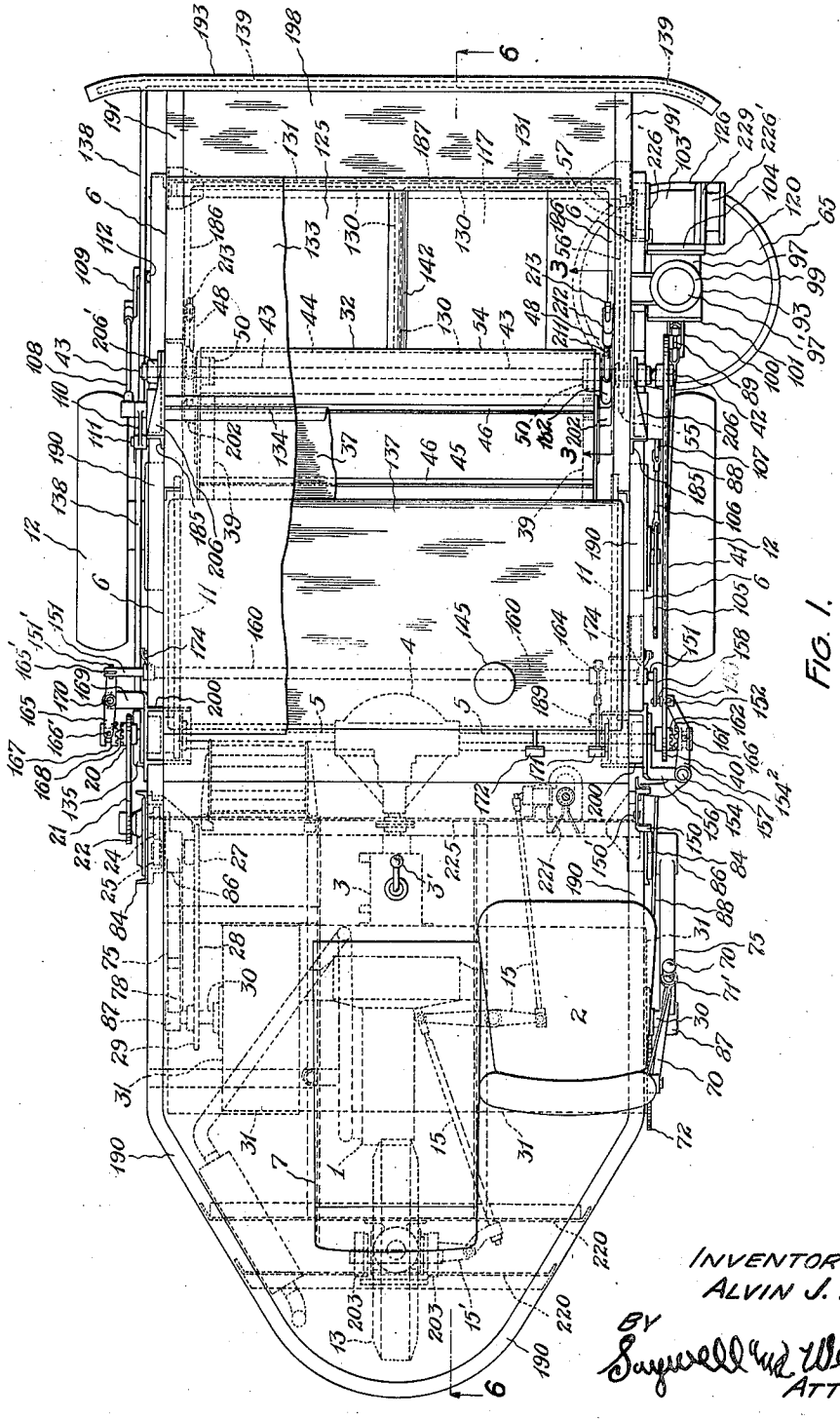


FIG. 1.

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Aug. 24, 1943. A. L. FARRAR 2,327,879

STREET SWEEPER

Filed May 14, 1940 7 Sheets-Sheet 2

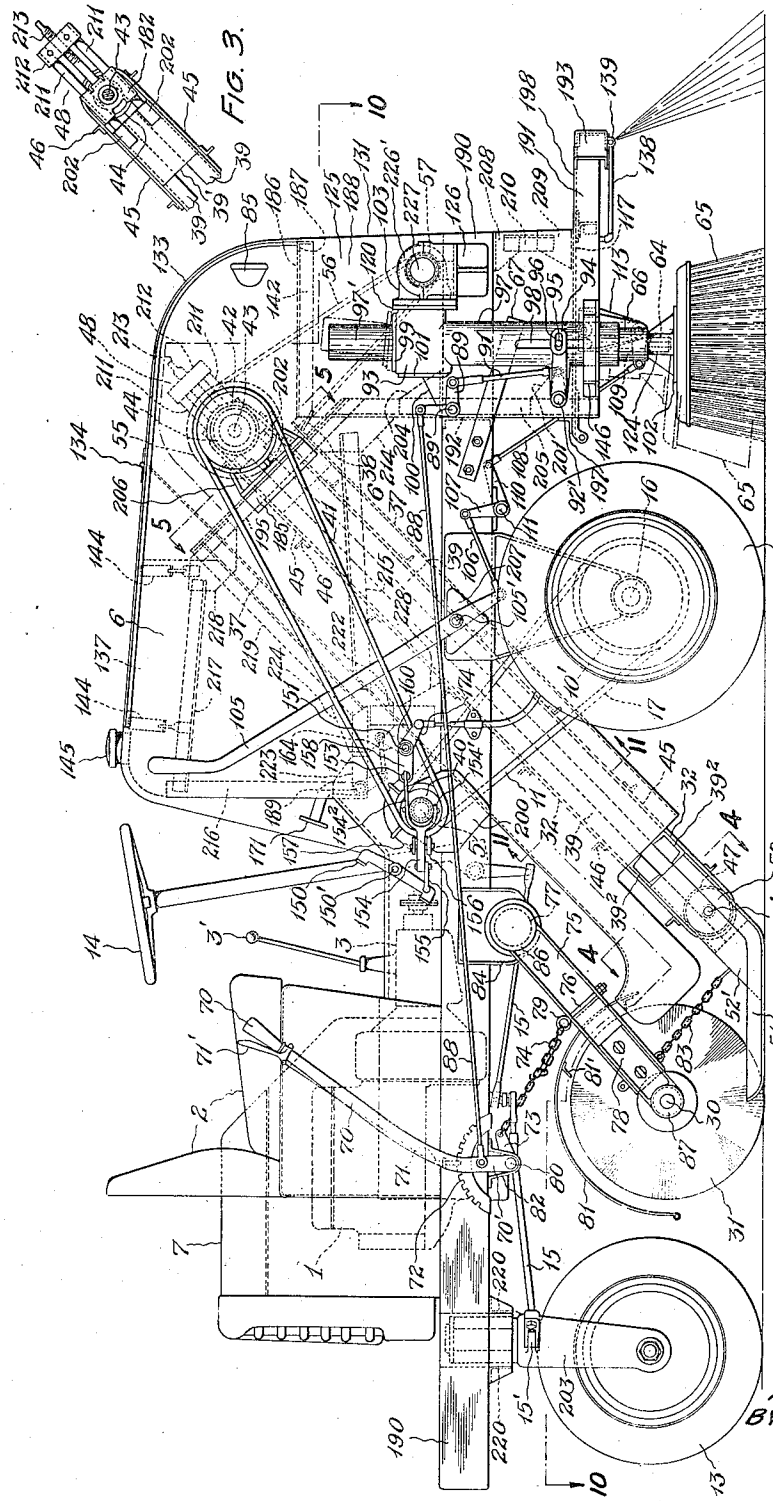


FIG. 2.

FIG. 3.

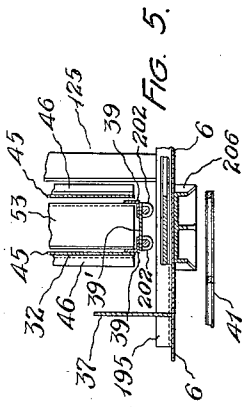


FIG. 5.

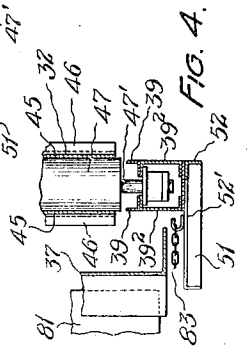


FIG. 4.

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Aug. 24, 1943. A. L. FARRAR 2,327,879

STREET SWEEPER

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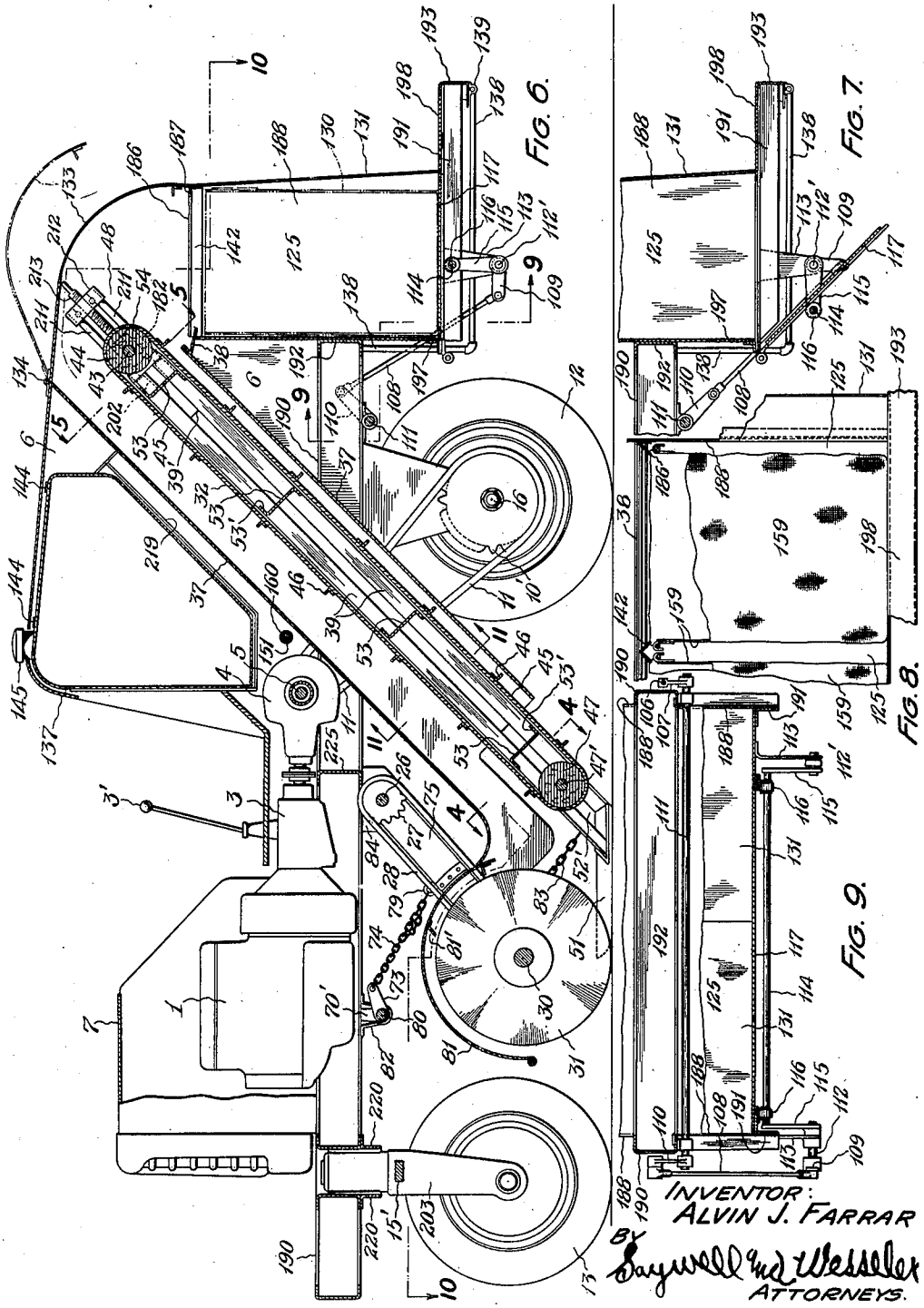


FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

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Aug. 24, 1943. A. L. FARRAR 2,327,879

STREET SWEEPER

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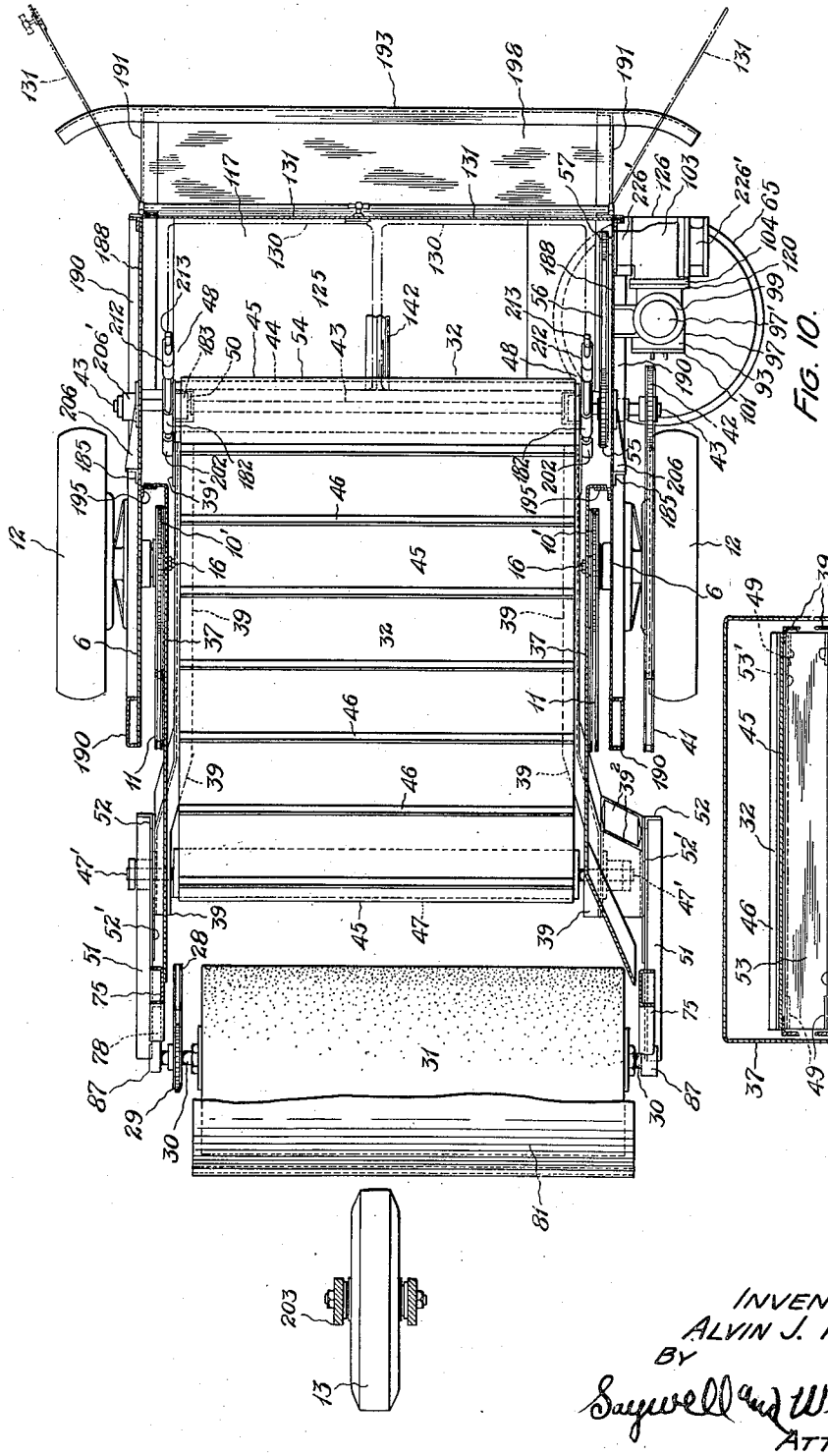


FIG. 10.

FIG. 11.

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STREET SWEEPER

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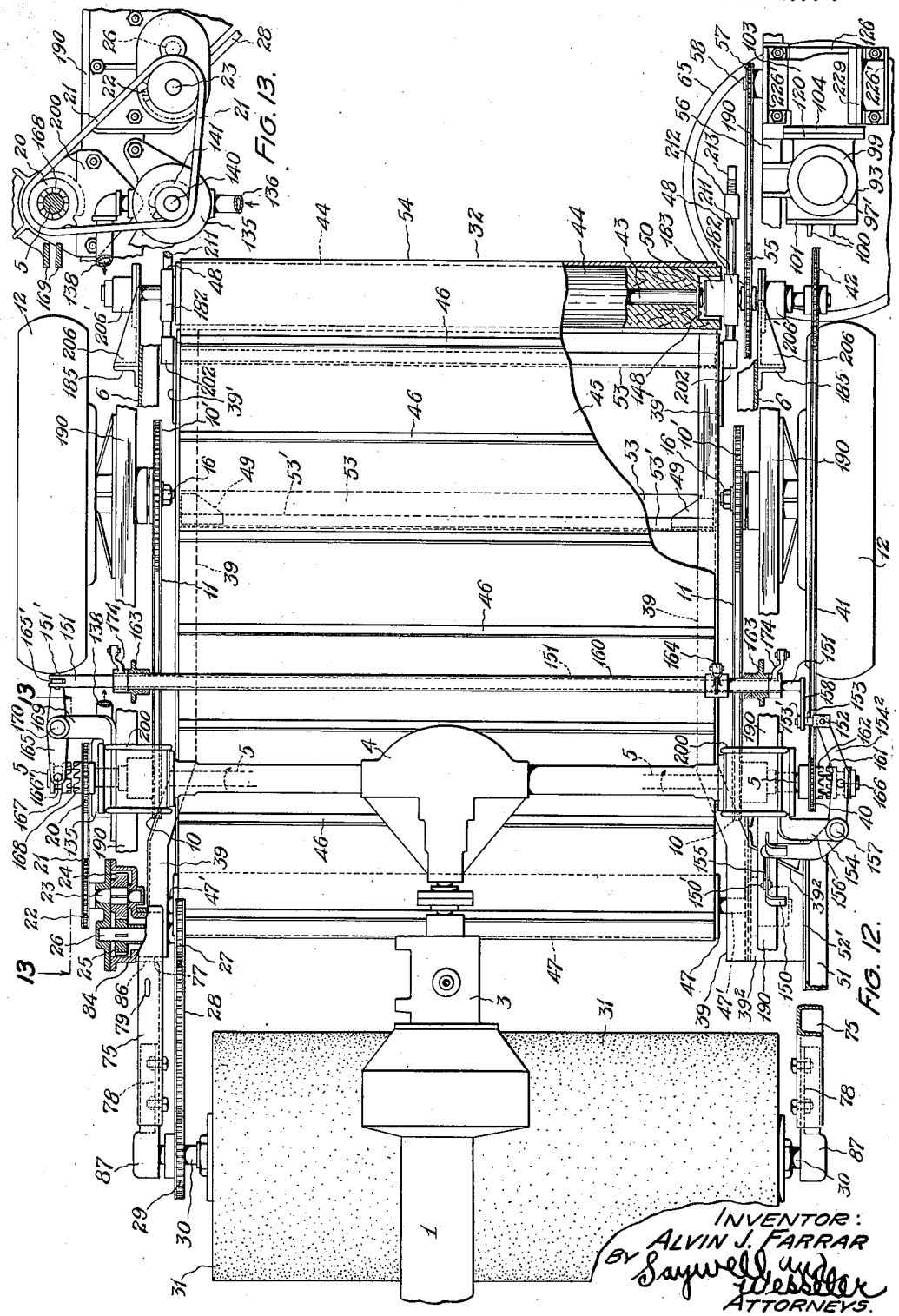


FIG. 13.

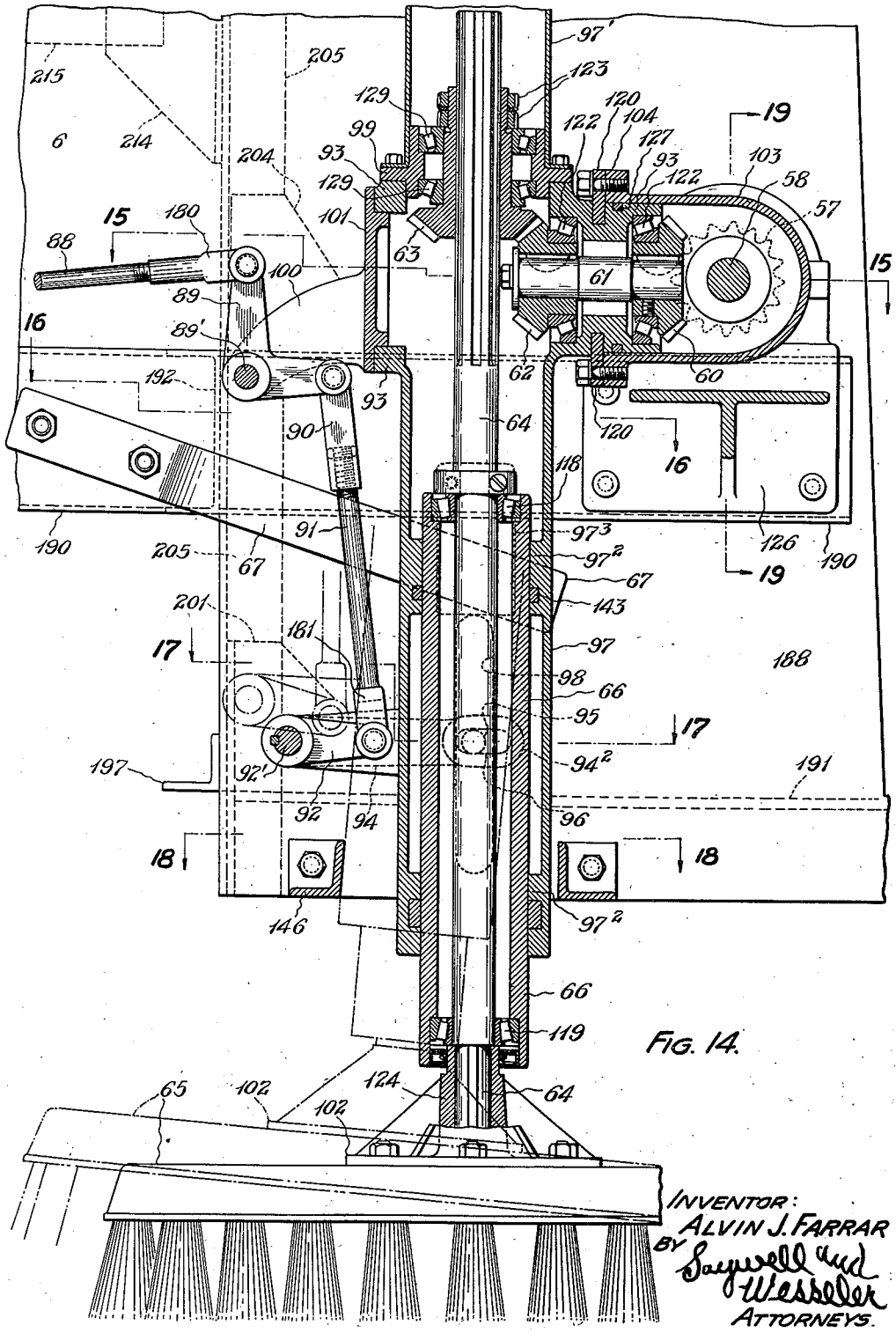
FIG. 12.

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Aug. 24, 1943. A. L. FARRAR 2,327,879

STREET SWEEPER

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STREET SWEEPER

Filed May 14, 1940 7 Sheets-Sheet 7

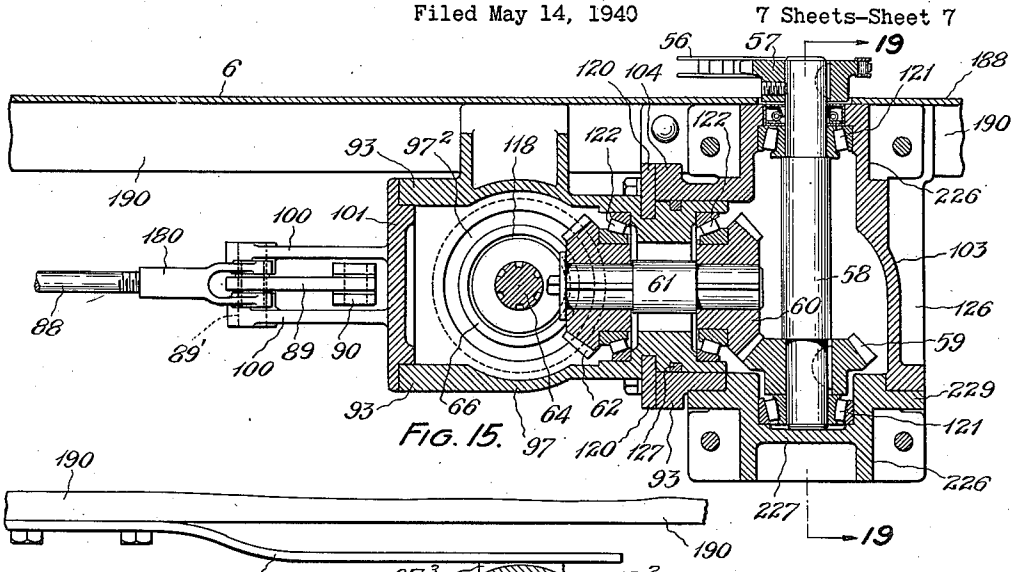


FIG. 15.

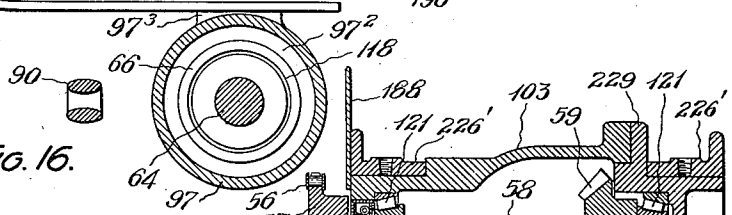


FIG. 16.

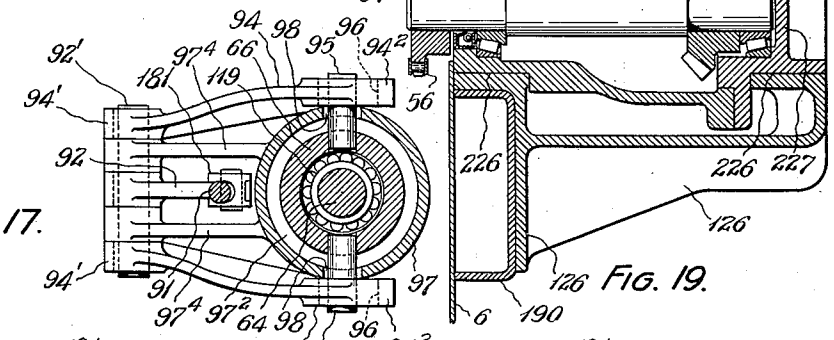


FIG. 17.

FIG. 19.

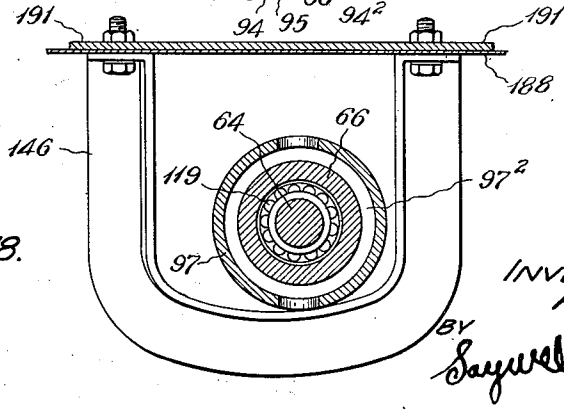


FIG. 18.

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Patented Aug. 24, 1943 2,327,879

UNITED STATES PATENT OFFICE

2,327,879

STREET SWEEPER

Alvin J. Farrar, Cleveland, Ohio, assignor to The Van Dorn Iron Works Company, Cleveland, Ohio, a corporation of Ohio

Application May 14, 1940, Serial No. 335,110

6 Claims. (Cl. 15—87)

The invention relates to street sweepers, and particularly to machines of this character having a chassis of the automobile type including a pair of front driven supporting wheels and a central rear supporting and steering wheel. An engine of standard automobile design, with transmission and differential, drives a power shaft from which are driven the front wheels, a rear transverse rotary main broom, an elevator adapted to receive dirt from the main broom, a front curb-broom rotatable upon a vertical axis and adapted to throw out dirt from the gutter into the pathway of the rear main broom, and a water pump which with suitable pipe connections provides a spray transversely of the roadway and adjacent the front of the machine.

The principal improvements in the machine relate to a new arrangement of driving elements for actuating the several driven functioning members; an improved symmetrical arrangement of the several driven elements laterally and longitudinally relative to the chassis; improved means providing automatic longitudinal and lateral pivotal adjustments of the curb-broom whereby the latter can conform without undue strain to unevenness of the roadway adjacent the curb and irregularities of the curb; improved means for vertically lifting and lowering the main transverse broom, the curb-broom, and the elevator; and an improved elevator and supporting structure therefor, including means for longitudinally adjusting the elevator pulleys relatively to each other to maintain tight the dirt-conveying belt transversing said pulleys.

Other detailed improvements in the machine will fully appear in the following description by reference to the accompanying drawings.

The claims of this application are limited to the improvements in curb-broom attachments.

The annexed drawings and the following description set forth in detail certain mechanisms illustrating the improvements, such illustrations, however, being only a few of the various structural forms in which the principle of the invention may be embodied.

In said annexed drawings:

Figure 1 is a plan view of the improved street sweeper, the top cover being partly broken away;

Figure 2 is an elevation of the curb side of the machine, an automatically adjusted position of the curb-broom being also indicated by broken lines;

Figure 3 is a fragmentary vertical longitudinal section, taken in the plane indicated by the line 3—3, Figure 1, of the upper part of the elevator, the figure particularly disclosing one of a pair of adjustable conveying-belt tightening devices;

Figures 4 and 5 are transverse sections, taken in the respective planes indicated by the lines 4—4, and 5—5, Figures 2 and 6;

Figure 6 is a vertical longitudinal section, taken in the place indicated by the line 6—6, Figure 1, certain parts of the machine being shown in elevation;

Figure 7 is a view of the lower right hand end of the machine, as shown in Figure 6, the view particularly disclosing a bottom dump door for the dirt reservoir in open position, whereas this dump door is shown in Figure 6 in closed position;

Figure 8 is a fragmentary elevation of the front of the machine, partially broken away, and particularly showing the use of fabric dirt-receiving bags in the dirt hopper;

Figure 9 is a vertical transverse section, taken in the planes indicated by the line 9—9, Figure 6;

Figure 10 is a longitudinal plan section, taken in the planes indicated by the line 10—10, Figures 2 and 6;

Figure 11 is a transverse section through the dirt elevator and its housing, taken in the plane indicated by the line 11—11, Figures 2 and 6;

Figure 12 is a fragmentary top plan, upon an enlarged scale, partly broken away, and with some parts in section, and particularly showing the arrangement of the various drive mechanisms actuated from the main power shaft;

Figure 13 is a side elevation, particularly showing the drive for the water pump, the view being taken from the plane indicated by the line 13—13, Figure 12;

Figure 14 is a fragmentary vertical longitudinal section, upon an enlarged scale, showing the curb-broom and its shaft, and the drive and mounting for the shaft, an automatically adjusted position of the curb-broom and some related elements being shown in broken lines;

Figures 15, 16, 17, and 18 are longitudinal plan sections taken, respectively, in the planes indicated by the lines 15—15, 16—16, 17—17, and 18—18, Figure 14; and

Figure 19 is a transverse vertical section, taken in the plane indicated by the line 19—19, Figures 14 and 15.

Referring to the annexed drawings in which the same parts are indicated by the same respective numbers in the several views, the improved street sweeper includes an engine 1 having hood 7, with a transmission 3, differential 4, and main power shaft 5, all of standard construction and operating in a manner well known in automobile operation. A suitable chassis including main frame channels 190 and other related frame structure, some of which will be hereinafter referred to in detail, supports the aforementioned elements upon a pair of front driven supporting wheels 12 and a central rear supporting and steering wheel 13. The machine is driven and operated from a driver's seat 2, a gear shift lever 3', steering wheel 14, brake pedal 171, and clutch pedal 172, being provided.

The machine has a main outside casing 6 provided with a forward rearwardly-opening cover 133 hinged at 134 and forming a hood over a dirt receiving hopper 125.

A main cross frame channel 225, Figures 1 and 6, assists in strengthening and in tying together the two sides of the chassis, and forms an important support for various parts of the machine and has fastened to it a strap 221 for securing the post of the steering wheel 14.

The rear steering wheel 13 is mounted in a depending forked hanger 203, Figure 2, which depends from and is rotatably mounted at its upper end in transverse angles 220, Figure 1, secured to the main frame member 190, the steering arm 15' being fixed to the hanger 203 and being actuated by a standard assemblage of linkage 15 from the steering wheel 14. Lamps for the machine are indicated by 85, transverse straps for steadying a water tank 137 by 144, and a tank-filling opening by 145.

Attention will now be directed in a general manner to certain frame elements which serve to support and strengthen the several parts of the improved sweeper in a manner hereinafter more specifically referred to when said parts and their operation are described in detail. A cross channel 192 is secured at its ends to the main channel members 190 adjacently the rear side of the dirt hopper 125, Figure 6, which also is secured to the channel 192 and the main frame channels 190, Figure 9. The bottom of the hopper 125 is secured to a supporting framework consisting of longitudinal angles 191 secured together at their rear ends by a cross angle 197, Figure 6, the forward ends of the angles 191 forming a support for a front bumper 193 and a front working platform 198, Figures 1 and 8. By gussets 201 the rear ends of the angles 191 are secured to the bottom ends of vertical angles 205, Figures 2 and 14, which angles 205 are secured by gussets 214, Figure 2, to one end of angles 195. The latter are extended diagonally across the top of the machine under the upper elevator pulley 44 and laterally of the upper end of the elevator 32, the other end of the angles 195 being secured by gussets 218 to one end of rearwardly and downwardly extending angles 219. The latter are secured at their other ends to gussets 224 in turn secured to the top ends of vertical angles 222 whose lower ends are secured by gussets 228 to the main frame channels 190. Angles 223 are also extended rearwardly from the gussets 224 and form supports for a shaft 189 upon which the brake pedal 171 is pivoted. The intermediate parts of the vertical angles 205 are secured by gussets 204 to the main frame channels 190 and to the dirt reservoir 125.

The gussets 224, Figure 2, are secured to the elevator housing 37 and also to the rear ends of horizontal longitudinal angles 215 whose front ends are secured to the gussets 214 and which also are secured to and reinforce the housing 37. Also secured to the gussets 214 are horizontal longitudinal angles 186, Figure 6, which with a front transverse angle 187 reinforces the side walls 188 of the dirt hopper 125. Also secured to the gussets 218, Figure 2, are the forward ends of horizontal angles 217 whose rear ends are secured to the tops of vertical angles 216 to whose lower ends the rear ends of angles 223 are secured and in which the brake pedal shaft 189 is mounted. The ends of the tank-steadying straps 144 are adjustably secured to the angles 217.

Hand levers and pedal devices, and their respectively associated elements, under control of the operator and designed particularly for controlling the operation of the improved functioning elements of the sweeper, as distinguished from the more or less standard propulsive elements, will be hereinafter referred to and described in detail.

Briefly, the structure and assembly of the various parts of the improved sweeper contemplate that a drive for an elevating dirt conveyor shall function with a drive for a curb-broom 65, upon one side, the curb side of the machine, and that a drive for a rear main transverse broom 31, together with a drive for a water pump 135, shall function upon the other side of the machine. The drive for the pair of front main supporting wheels 12 functions, as is usual, upon both sides of the machine; in other words, the main power shaft 5 acts through sprockets and chains directly upon both of the main wheels 12, as hereinafter described.

Furthermore, the structure and assembly of the several machine parts contemplate that the putting into operation of the elevator 32, the main broom 31, the curb-broom 65, and the water pump 135, shall be effected from a single actuating member, a foot pedal 150, and that the detailed structural arrangement of the elements controlling such operation shall be such that, upon the proper actuation of the foot pedal 150, the elevator 32 and the curb-broom 65 shall be connected for operation slightly off the commencement of operation of the main broom 31 and the water pump 135; specifically, as assembled, the main broom 31 and the water pump 135 are put into operation slightly ahead of the elevator 32 and curb-broom 65. The structure and assembly of the elements further contemplate devices for lifting and lowering the main broom 31, the elevator 32, and the curb-broom 65 as a unit by the actuation of a hand lever 70.

Other features of the machine contemplate automatic transverse and longitudinal adjustments of the curb-broom 65 to accommodate irregularities in the curb and the roadway adjacent the curb, respectively; also, the control from a hand lever 105 of the dumping of gathered dirt from the dirt hopper 125 through a bottom dump door 117.

The improved sweeper also contemplates a plurality of methods of removing the gathered dirt dumped into the dirt hopper 125 from the elevator discharge plane 54. In addition to the dumping of the gathered dirt through the bottom door 117, it may be discharged from the top of the elevator 32 into suitable boxes 130, Figures 1 and 6, positioned in the dirt reservoir 125 upon opposite sides of a dust shed 142, Figure 1, which boxes 130 may be removed through side opening front doors 131, Figures 6 and 8; or, if temporary storage for the gathered dirt, outside of the machine, is desired, it may be discharged from the elevator 32 into fabric bags 159, Figure 8, positioned in the dirt reservoir 125, and the filled bags removed through the doors 131 and parked for convenient later removal or for conveyance of the same to a suitable discharge area therefor. In other words, the use of the boxes 130, preferably of metal or other solid structure, contemplates immediate dumping of the same as they are filled; whereas, the use of the fabric receptacles 159 contemplates the loading of the same into a truck when filled, or the leaving of the same at the curb for later picking up, for con-

veyance to and emptying thereof in a suitable dirt-receiving area.

Referring in sequence to the detailed structure of the various machine parts designed to cooperate and function in the manner hereinbefore generally described, and first referring to the driving of the pair of main front supporting wheels 12, this is accomplished in a standard manner by means of a pair of sprockets 10, Figure 12, secured adjacently interiorly of the main frame member 190 to the power shaft 5, over which sprockets 10 play a pair of drive chains 11 which also respectively engage a pair of sprockets 10' secured to stub shafts 16 to which the main wheels 12 are also respectively secured.

Referring now to the drives for the functioning elements of the improved sweeper:

Elevator drive

Another sprocket 40, Figures 1, 2, and 12, is secured to the power shaft 5 adjacent its curb end, over which sprocket plays a drive chain 41 which also engages a sprocket 42 secured to an upper transverse shaft 43 to which is secured the upper pulley 44 over which traverses an endless conveying belt 45 of the elevator 32. This belt 45 is the lifting means for the dirt swept thereonto by the rear main broom 31 for gathering in the dirt reservoir 125, the endless belt 45 also traversing a lower pulley 47 secured to a cross shaft 47'. The belt conveyor 45 is a composite rubber-fabric structure and is provided with a plurality of spaced transverse lifting angular rubber blades 46 secured to the exposed faces of the belt conveyor 45 on its upper and lower runs.

Curb-broom drive

Also secured to the pulley shaft 43 upon the curb side of the machine is a sprocket 55 over which plays a chain 56 which also engages a sprocket 57 secured to a transverse shaft 58 mounted at one end upon tapered roller bearings 121 in a swiveling frame member 103, from which shaft 58, by detailed structure hereinafter fully described, a vertical shaft 64, to which the curb-broom 65 is secured, is rotated. Hence, it will be understood that the elevator 32 and the curb-broom 65 are both driven from the curb side of the machine and are controlled concurrently.

Main broom and water pump drives

Also, concurrently controlled with the elevator 32 and curb-broom 65, but driven from the opposite side of the machine, Figures 12 and 13, are the main broom 31 and the water pump 135. Although the main broom 31 and water pump 135 are controlled concurrently with the elevator 32 and the curb-broom 65, they are not put into operation simultaneously therewith, but actually go into operation slightly ahead of the elevator 32 and the curb-broom 65, due to the structure and cooperative relation of certain elements hereinafter fully described.

The driving of the main broom 31 and the water pump 135 is effected through a sprocket 20 secured to the power shaft 5 on the far side of the machine, Figures 1 and 12. A chain 21 plays over said sprocket 20, and also over a sprocket 22 secured to a shaft 23 and a sprocket 141 secured to a shaft 140, Figure 13. Secured to the shaft 23 is a spur gear 24, Figure 12, engaging a spur gear 25 secured to a transverse shaft 26. Secured to the shaft 26 is a sprocket 27 over which plays a longitudinal chain 28 which is a drive for the main broom 31, inasmuch as the chain 28 also plays over a sprocket 29 secured to a shaft 30 running transversely across the rear of the machine and to which the main broom 31 is secured.

The shaft 140 is the shaft which actuates the pump 135, the arrangement being that this pump feeds water from the water tank 137, the pump receiving the water through the inlet 136, Figure 13, and discharging it through pipe 138, Figure 1, by which it is conveyed to a transverse front spray pipe 139 secured to the under surface of the front bumper 193.

Drive control for the brooms, elevator, and water pump

The elements by which the drive chains for the two brooms, the elevator, and the water pump are operatively connected to or disconnected from the power shaft 5, and by means of which the main broom and water pump are put into operation slightly ahead of the elevator and curb-broom, are controlled by the foot pedal 150 and are as follows:

The exterior faces of the hub members of the sprockets 40 and 20, Figures 1 and 12, are clutch formations 162 and 168 and lie in opposed relation to respectively cooperating exterior clutch formations 161 and 167, the power shaft 5 intersecting all these clutch formations. The hubs upon which the clutch formations 162 and 168 are formed are rotatably mounted upon the power shaft 5, and the hubs of the clutch formations 161 and 167 are splined to the power shaft 5. When it is desired to actuate the sprockets 40 and 20 and, hence, the drive chains 41 and 21, the respectively cooperating clutch parts are brought into engaged position. This is effected as follows:

The pedal 150 is pivotally mounted intermediate its ends upon a pin 150', Figure 12, and pivotally secured to and adjacent the bottom end of the pedal 150 is the rear end of a link 155 to whose forward end is pivoted the end of an angular arm 154 pivoted intermediate its ends upon a vertical pin 157 mounted in a bracket 156 supported by a bracket member 200 upwardly-extended from the main frame member 190. The forward end of the arm 154 beyond the pin 157 is a yoke formation with members 154' and 154^2 straddling the power shaft 5 adjacent the hub member having the clutch face formation 161. Extended into a peripheral groove of said hub member are pins 166 secured to the yoke members 154' and 154^2 so that movement inward or outward of the arm 154 will engage or disengage the clutch faces 161 and 162, and the hub member with the clutch face 162 can rotate with the power shaft 5 with the groove of the hub member of the clutch face 161 passing the pins 166. The upper member 154^2 of the yoke, Figure 2, is pivotally secured by a pin 152 to a bolt 153 having a head or nut 153' to which one end of an arm 158 is welded, the other end of the arm 158 being secured to a freely transversely movable shifter-shaft 151 running across the machine somewhat to the rear of the power shaft 5. The shifter-shaft 151 is housed in a transverse rotatable tube 160 having collars engaging members 163 in which it is journaled, the members 163 being secured to the inner face of the main frame 190, so that the tube 160 is transversely fixed.

The far end of the shifter-shaft 151, Figure 12, is of yoke formation and is fastened by a pin 151' to upstanding angular end portions 165' of an

arm 165 which is pivoted intermediate its ends upon a vertical pin 170 mounted in a bracket 169 secured to an upstanding bracket member 200 mounted upon the main frame member 190. The rear end of the arm 165 is also of yoke formation, similar to the forward end of the arm 154 on the curb side, and has pins 166' which act upon, and have a similar relation to, the clutch face 167, as the pins 166 on the curb side have with relation to the clutch face 161.

The clutch member 167 on the far side of the machine is engaged with the clutch member 168 slightly in advance of the engagement of the clutch member 161 on the curb side with the clutch member 162 because the member 167 is actuated by the shifter-shaft 151 which, being actuated by the pin 152, moves laterally twice as fast as the member 161 which is actuated by the pins 166. Therefore, when the pedal 150 is actuated to bring the respective clutch parts into engagement, the operations of the main broom 31 and the water pump 135 commence slightly in advance of the operations of the elevator 32 and the curb-broom 65, obviating the throwing on of all these loads simultaneously.

Curb-broom assembly

The shaft 64 for the curb-broom 65 is rotatably mounted upon bearings 118 and 119, Figure 14, in a sleeve 66 vertically slideable in a housing 97 upon the faces of inwardly-extended bosses 97^2 with which the housing 97 is formed. The front end of the curb-broom assembly is supported upon a bracket 126 secured to the main frame member 190. The front of the frame member 190 is connected by gussets 208 and 209 and vertical angle 210, Figure 2, to the underlying horizontal angle 191. The bracket 126 has spaced semi-cylindrical lower bearing portions 226, Figures 15 and 19, cooperating with upper semi-cylindrical bearing caps 226' whereby housing member 103 for the shaft 58 is pivotally mounted upon said shaft and thus provides means, in a manner and through elements hereinafter fully described, whereby the curb-broom 65 can automatically adjust itself longitudinally of the roadway in order to conform to irregularities in the roadway adjacent the curb. The curb side of the shaft 58 is closed by a cover 227 secured to the member 103 by means of the flange 229 and said shaft 58 is mounted upon one set of tapered roller bearings 121 in the cover 227 and upon a second set of tapered roller bearings 121 in the pivotal housing 103.

Secured to the curb side end of the shaft 58, Figures 14, 15, and 19, is a beveled gear 59 which meshes with a beveled gear 60 secured to one end of a shaft 61 to the other end of which is secured a second beveled gear 62 meshing with a beveled gear 63 splined to the curb-broom shaft 64. As stated, tapered roller bearings 121 are provided for the shaft 58 carrying the gear 59 and similar bearings 122 and 129 are provided, respectively, for the hubs of the gears 60 and 62, and for an elongated hub of the gear 63. The curb-broom shaft 64 extends upwardly through and beyond the elongated hub of the gear 63 and is housed in a cover member 97'. A cover member 99 upon which the housing member 97' is mounted accommodates the exterior parts of the bearings 129 and the upper end of the elongated hub of the gear 63 is locked against the upper face of the upper bearing 129 by lock-nuts 123. By this and other means hereinafter fully described, provision is made for lifting the curb-broom 65 off the ground. A peripheral packing ring 143 is mounted in the upper boss 97^2 of the housing 97 against the outer surface of the sleeve 66. The lower end of the curb-broom shaft 64 is secured to and within the hub 124 of an annular broom bracket plate 102 superposed upon and bolted to a circular plate (not shown) secured in the body of the curb-broom 65.

The upper end of the curb-broom shaft housing 97 is formed with an enlarged portion 93 extended toward the shaft 58 and providing a chamber for the gears 62 and 63 and the shaft 61, the bearings 122 having engagement with this housing portion 93. The housing portion 93 is secured to the pivotal housing member 103 by a split annular plate 120 which is bolted to a flange 104 of the swiveling member 103 and is seated in a peripheral groove in the housing member 93. The outer surface of the member 93 can slide upon the inner surface of the member 103 and can slide on the side surfaces of the plate 120, and its curb end surface upon the flange 229 of the cover member 227; hence, the curb-broom shaft assembly can move upon the axis of the shaft 61 inwardly and outwardly of the curb. This action takes place automatically according to the irregularities of curb surface encountered by the curb-broom 65. A peripheral packing ring 127 is seated in the housing member 93 against the inner surface of the swiveling member 103. The rear open end of the housing member 93 is closed by a cover plate 101 upon which are formed brackets 100 supporting at their rear ends a pin 89' which will be hereinafter more fully referred to.

The automatic pivotal swinging of the whole curb-broom assembly about the shaft 58, longitudinally of the curb, is occasioned, as before mentioned, by irregularities in the roadway adjacent the curb. Thus, the curb-broom 65, by having automatic adjustments in two relatively right angular planes, passes over roadway irregularities and conforms to curb irregularities without undue strain. However, the curb-broom 65 tends closely to hug the curb by reason of the pressure of a spring plate 67 fastened at one end to the main frame member 190 and bearing adjacent its other end against a boss 97^3 formed on the housing 97 of the curb-broom shaft 64. Hence, the automatic adjustment of the curb-broom 65 is effected against the tension of the spring plate 67.

Secured to a longitudinal angle 191 is a U-shaped angle 146, Figures 14 and 18, which longitudinal angle and U-shaped angle surround the curb-broom housing 97 and limit the longitudinal and transverse automatic adjustments thereof, provision being made for ample rearward and off-curb movements, as clearly shown by the position of the housing 97 in the angle 146, Figures 14 and 18.

Lifting and lowering of the brooms and elevator

By means hereinafter fully described, the curb-broom 65, in common with the elevator 32 and the main broom 31, can be vertically lifted so as to be carried by the machine clear of the ground when the machine is simply traveling and it is not desired to gather dirt. Insofar as the curb-broom 65 is concerned, these lifting means consist of an elongated tie-rod 88, Figure 14, actuated as hereinafter described, by the hand lever 70, the forward end of which tie-rod 88 is secured to a clevis 180 pivotally secured to one part of a rock arm 89 pivoted upon the pin 89' and the

other part of which rock arm 89 is pivotally secured to a clevis 90 secured to a rod 91 secured to a clevis 181, Figure 17, pivotally secured to one end of an arm 92. The other end of the arm 92 is secured to a pin 92' supported in arms 97^4 formed on the housing 97 and is splined to the hubs 94' of opposed arms 94 straddling the housing 97 of the curb-broom shaft 64 and having enlarged end portions 94^2 formed with elongated slots 96 intersected by a pair of inwardly-extending opposed pins 95 seated in the curb-broom shaft sleeve 66. The pins 95 pass through vertically-elongated slots 98 in the housing 97. It is evident, therefore, that a rearward pull upon the tie-rod 88 will lift the forward end of the arm 92 and hence the arms 94 which will effect the lifting of the curb-broom shaft sleeve 66 and hence the curb-broom shaft 64 and the curb-room 65, the sleeve 66 sliding upwardly in the housing 97 over the surfaces of the bosses 97^2, the elongated slots 98 in the housing 97 permitting the upward movement of the pins 95, and the elongated slots 96 permitting the necessary rearward movement of the arms 94.

The actuation of the hand lever 70 is effected over the face of a toothed segment 72, Figure 2, the teeth of which segment are engaged by a spring-actuated dog 71 whose disengagement is effected through the medium of a retractile rod having a finger-actuated upper end portion 71'. An angular lower end portion 70' of the hand lever 70 is secured to a shaft 80 mounted in a hanger 82 depending from the main frame member 190, and to this lower end portion 70' of the hand lever 70 is pivoted the rear end of the tie-rod 88. The actuation of the hand lever 70 to lift the curb-broom 65 also serves to lift the rear main broom 31 and the elevator 32 by means which will now be described.

Mounted upon hub members 87 at the ends of the main broom shaft 30 are extensions 78 which are bolted to the lower ends of downwardly and rearwardly extending channels 75 whose upper ends are secured to hub members 86 pivoted upon a trunnion 77 mounted in a hanger 84 depending from the main frame member 190. Around the channels 75 and intermediate their ends and adjacently above the main broom 31 are secured bolts 76 having eyes 79 to which are secured one end of chains 74 whose other ends are secured to one end of levers 73 whose other ends are secured to the shaft 80. Also secured to the under surface of the broom-lifting channels 75 and adjacent the lower ends thereof are one end of chains 83 whose other ends are secured to the elevator 32. Therefore, it is evident, the actuation of the hand lever 70 to lift the curb-broom 65 will also effect the lifting of the main broom 31 and the elevator 32.

Elevator

The elevator 32 is enclosed by an open-ended housing 37, Figures 2, 4, 5, 10, and 11, secured by the main framework of the machine, and the lower end of the upper wall of which is flared upwardly and bears resiliently upon a guard 81 for the upper side of the main broom 31, Figure 2. This broom guard 81 is reinforced by angles 81' and is supported by the broom-lifting channels 75. The upper end of the upper wall of the elevator housing 37 is secured to the under surface of the top wall of the machine casing 6. The lower wall of the housing 37 is fastened at its upper end by means of a lip 38 to the top of the rear wall of the dirt reservoir 125. The lower end of the lower wall of the housing 37, as also the lower parts of its two side walls, do not extend to the bottom of the elevator 32 but are cut away somewhat above the lower pulley 47 to allow for the passing therethrough of the flared lower ends of elevator structure hereinafter fully described.

The elevator 32 comprises opposed pairs of longitudinally-extending angles 39, Figures 6, 10, and 11, secured by gussets 49 to oppositely-directed flange ends 53' of longitudinally spaced transverse plates 53, the conveying belt 45 running over the horizontal legs of the angles 39 and traversing the pulleys 44 and 47. Secured to the lower ends of the angles 39 are the upwardly-extended portions 52 of angular sleds having horizontal ground-engaging portions 51 which extend rearwardly, and laterally exteriorly of the main broom 31, Figures 2, 6, 10, and 12. These sleds have rearwardly-extending web portions 52' to which the lifting chains 83 are secured. The angles 39 flare outwardly at their lower ends so as to position the sleds exteriorly of the broom 31 and, in addition, on the curb side, a pair of channel spacers 39^2 are added to the outwardly flared portions of the angles 39 to bring the sled on the curb side out farther than the sled on the opposite side of the machine since the transverse median plane of the broom 31 does not coincide with the longitudinal median plane of the machine, the broom 31 being off-center somewhat toward the curb and thus effecting a sweeping action near the curb.

Secured to the top of the elevator rails 39 on each side of the elevator 32 by plates 39' are blocks 202 to each of which are secured one end of a pair of spaced upwardly-extended bars 211 of a belt-tightening device 48, the other ends of the bars 211 being secured in a cross-head 212. A screw 213 has threaded engagement with the cross-head 212 and is swiveled upon bearings 182 supported on the upper pulley shaft 43, the other end of the screw 213 extending outwardly and upwardly from the cross-head 212 and being formed for engagement by a wrench. It is evident that, inasmuch as the pulley 44 is fixed upon the shaft 43, actuation of the screw 213 will cause the cross-head 212, and, hence, the rods 211, to be adjusted longitudinally of the elevator 32 and, since these rods 211 are connected to the elevator framework, the lower pulley 47 will be moved up or down and thus provision is made for an adjustment of the spacing of the pulleys 44 and 47 to permit proper tightening of the conveying belt 45 which runs upon the side angles 39.

Secured to the diagonal frame angles 195, Figure 12, by angles 185 are bearing brackets 206 having upwardly and forwardly extended ribs formed at their upper ends into hub members 206' supporting the upper pulley shaft 43. The bearings 182 supporting the belt-tightening devices 48, are formed with inwardly-extended block portions 183 positioned in end recesses 50 formed in the upper pulley 44. Resilient annular dust sealing plates 148 are positioned in the recesses 50 around the shaft 43 and between the inner faces of the block portions 183 and the adjacent inner walls of the recesses 50.

Control for the dump door

Provision is made for manual actuation of the bottom dump door 117 of the dirt storage reservoir 125 through the lever 105, Figure 2, which is pivoted adjacent its lower end upon a pin 105' mounted in a bracket 207 secured to the

main frame member 100. The lever 105 is pivotally secured at its extreme lower end to a rod 106 which in turn is pivotally connected to one end of an arm 107 whose other end is secured to one end of a cross-shaft 111, Figures 2, 6, 7, and 9, to whose other end at the far side of the machine, as the machine is seen in Figure 1, is secured an arm 110. The arm 110 is pivotally connected to the upper end of a downwardly and forwardly extending rod 108 pivotally secured at its bottom end to one end of an arm 109 secured at its opposite end to a stub shaft 112. Secured at its bottom end to the stub shaft 112 is an arm 115 secured at its top end to one end of a cross-shaft 114 extending transversely of the machine under the dirt reservoir 125 and having a pair of rollers 116 bearing against the under face of the dump door 117. Also secured to the opposite end of the cross-shaft 114 is the upper end of a second arm 115 mounted upon a stub shaft 112'. The stub shafts 112 and 112' are mounted in a pair of depending hangers 113 secured to the bottom of the dirt reservoir support. The actuation of the dump door 117 will be readily understood from the aforegoing description of its control elements, the closed condition of the door being shown in Figure 6, and an open condition in Figure 7.

The tube 160 surrounding the shifter-shaft 151, Figures 1 and 12, also serves as an element in the wheel braking mechanism of the sweeper for which purpose a lever 164 is fixed to the tube 160 intermediate its ends, this lever 164 being connected by suitable linkage to the brake pedal 171. Adjacent each end of the tube 160 a lever 174 is fixedly mounted, these levers 174 having connected thereto the usual mechanism for transmitting the braking effort to the usual brake drums on the front supporting wheels 12.

What I claim is:

1. In a street sweeper, a curb-broom attachment comprising a downwardly-extended shaft, means for rotating the shaft, a broom secured to the lower end of the shaft, a sleeve axially fixed to the shaft and in which the latter rotates, and means for lifting and lowering the broom comprising a rotatable support, arms secured to said support and having free ends which enclose the sleeve, outwardly-extended pins secured to said sleeve, the free ends of the arms being formed with elongated slots intersected by said pins, and actuating means for the support.

2. In a street sweeper, a curb-broom attachment comprising a downwardly-extended shaft, means for rotating the shaft, a broom secured to the lower end of the shaft, a housing-mounting in which the shaft is rotatably mounted, a support for the housing-mounting permitting automatic lateral and longitudinal adjustments, respectively, thereof to conform to irregularities in the curb and roadway encountered by the broom, a spring secured adjacent one end to said support and engaging the housing-mounting and tending to hold the latter in that position in which the shaft is in its normal depending position, and a U-shaped angle whose legs are secured to the support encircling the housing-mounting and limiting the automatic lateral and longitudinal adjustments thereof.

3. In a street sweeper, a curb-broom attachment comprising a downwardly-extended shaft, means for rotating the shaft, a broom secured to the lower end of the shaft, and a housing-mounting in which the shaft is journalled and which has means at its upper end, near the upper end of said shaft and substantially directly above the broom to permit movements of the housing-mounting in lateral and longitudinal directions relative to the direction of movement of the sweeper and automatically in conformity with surface irregularities in the curb and roadway, the shaft-rotating means including gear-connected shafts around which the housing-mounting automatically adjusts itself.

4. In a street sweeper, a curb-broom attachment comprising a downwardly-extended shaft, means for rotating the shaft, a broom secured to the lower end of the shaft, and a housing-mounting in which the shaft is journalled and which has at its upper end and substantially directly above the broom means enabling movements of the lower end of the housing-mounting in lateral and rearward directions relative to the direction of movement of the sweeper and automatically in conformity with projecting surface irregularities in the curb and roadway encountered by the broom.

5. In a street sweeper, a curb-broom attachment comprising a housing having relatively rotatable parts, said housing being located at the forward end portion of the sweeper, gear-connected shafts in the housing, a downwardly-extended shaft mounted in one of the housing parts, a broom secured to the lower end of the downwardly-extended shaft, one of the first-mentioned shafts being forwardly of the downwardly-extended shaft with respect to the direction of movement of the sweeper and the axis of said one shaft being substantially horizontal and transverse to the direction of movement of the sweeper, and means for driving the downwardly-extended shaft from the first-mentioned shafts, the housing being automatically rotatable about said axis in conformity with surface irregularities encountered on the roadway by the broom and said one housing part being automatically rotatable about the axis of another of the first-mentioned shafts in conformity with surface irregularities encountered on the curb by the broom.

6. In a street sweeper, a curb-broom attachment comprising a substantially horizontal shaft mounted transversely to the direction of movement of the sweeper, a second shaft mounted longitudinally with respect to the direction of movement of the sweeper, means for driving the second shaft from the first-mentioned shaft, a housing, one part of the housing being mounted for rotation about the first-mentioned shaft and a second part of the housing being rotatably secured to said one housing part for rotation therewith about the first-mentioned shaft and also for rotation independently thereof about the second shaft, a downwardly-extended shaft rotatably mounted in the second housing part rearwardly of the first-mentioned shaft with respect to the direction of movement of the sweeper, means for driving the downwardly-extended shaft from the second shaft, and a broom secured to the lower end of the downwardly-extended shaft, the second shaft being shorter than the downwardly-extended shaft.

ALVIN J. FARRAR.