

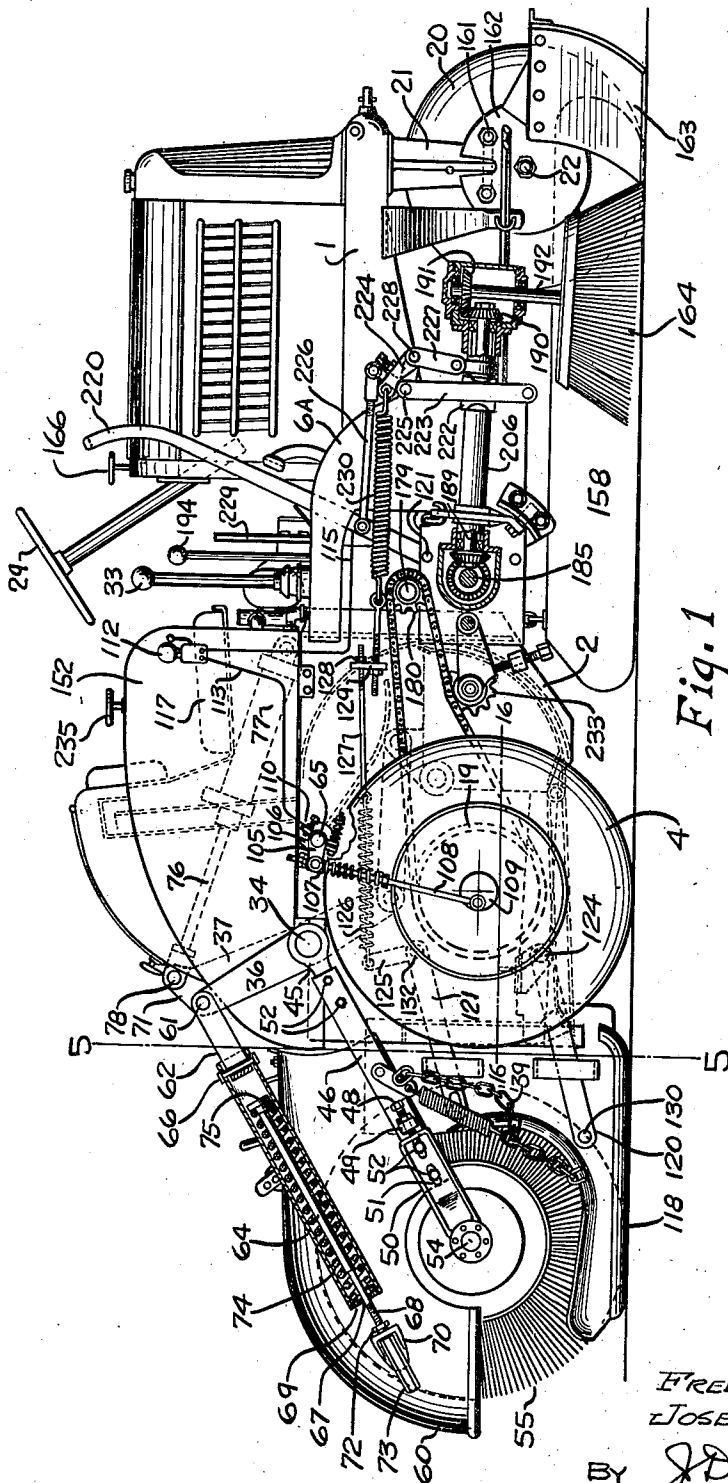
June 16, 1942.

F. D. WILSON ET AL
STREET SWEEPING MACHINE

2,286,245

Filed May 10, 1939

7 Sheets-Sheet 1



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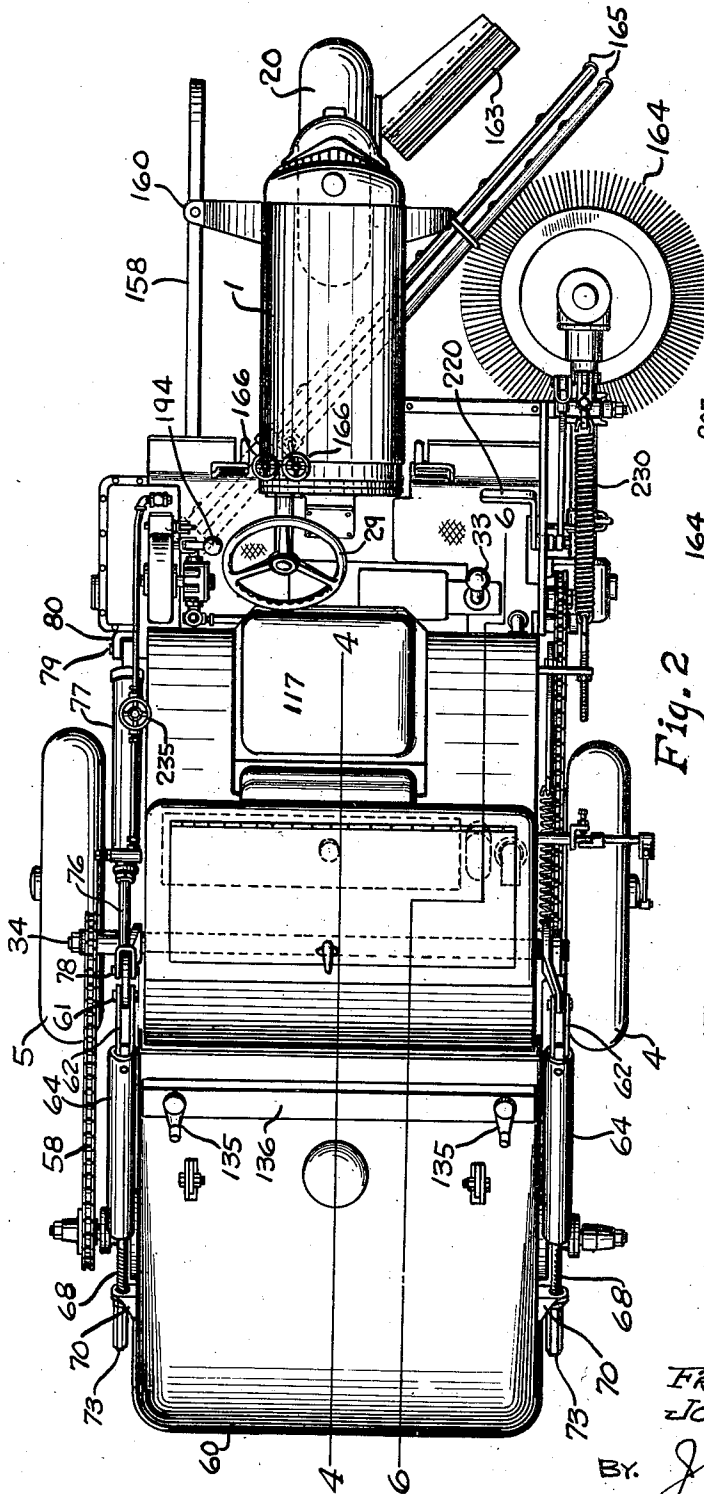


Fig. 2

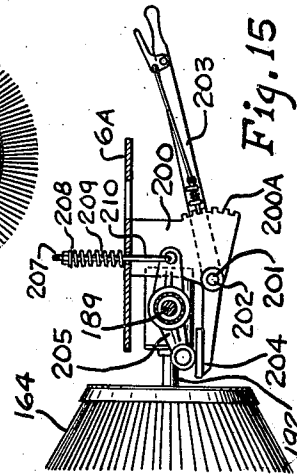


Fig. 15

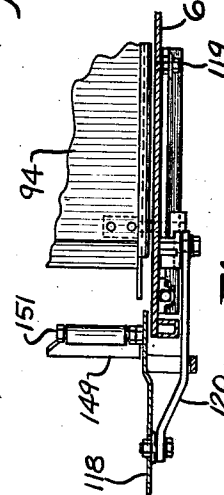


Fig. 16

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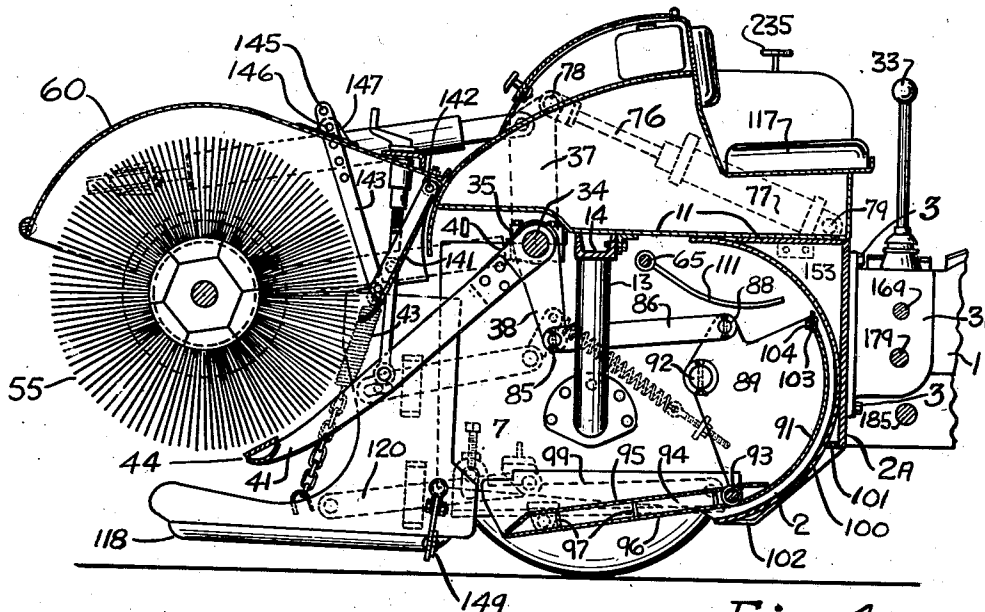
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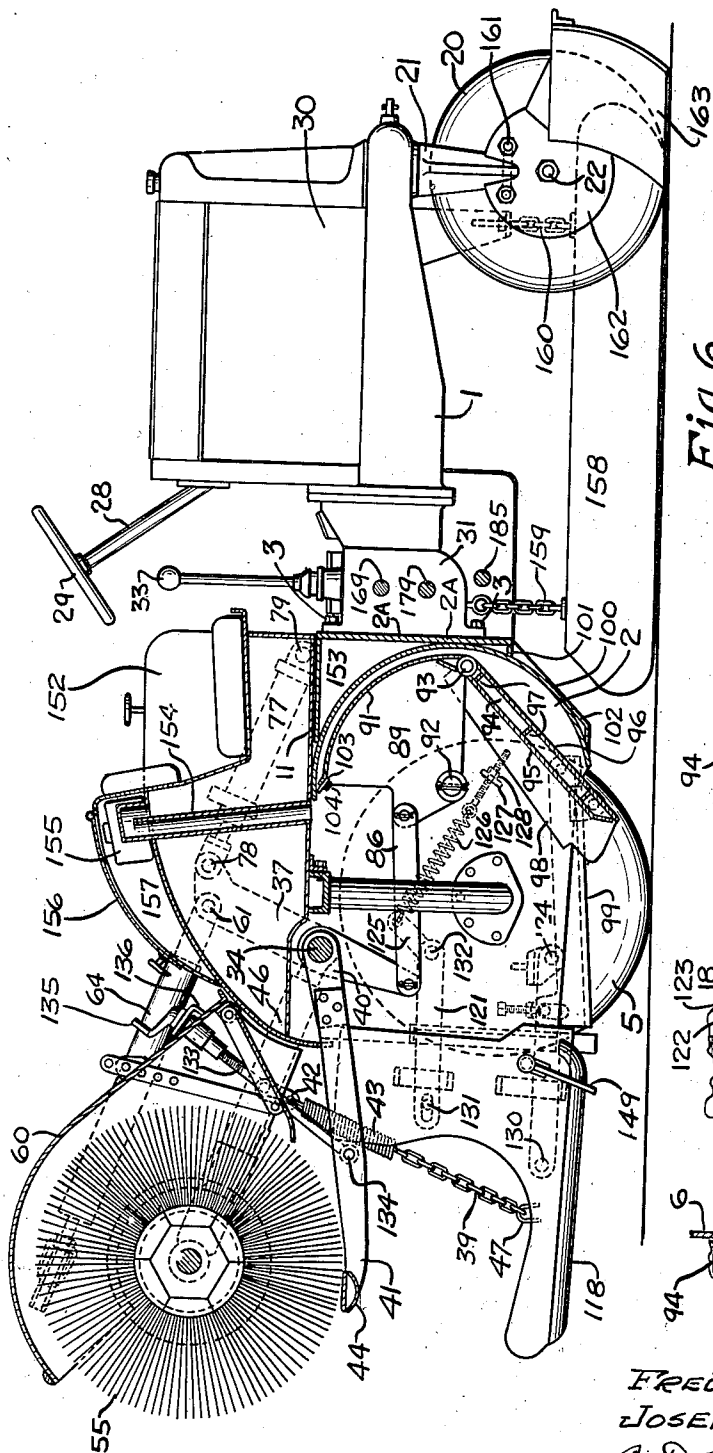


Fig. 6

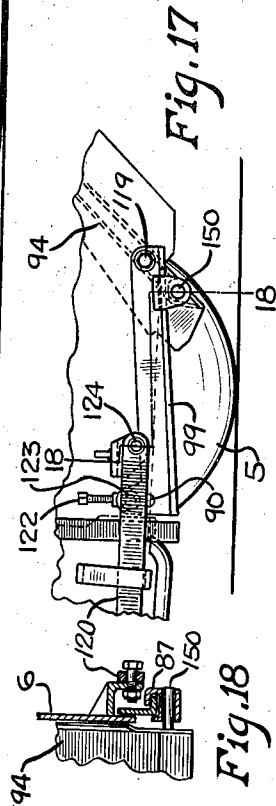


Fig. 17

Fig. 18

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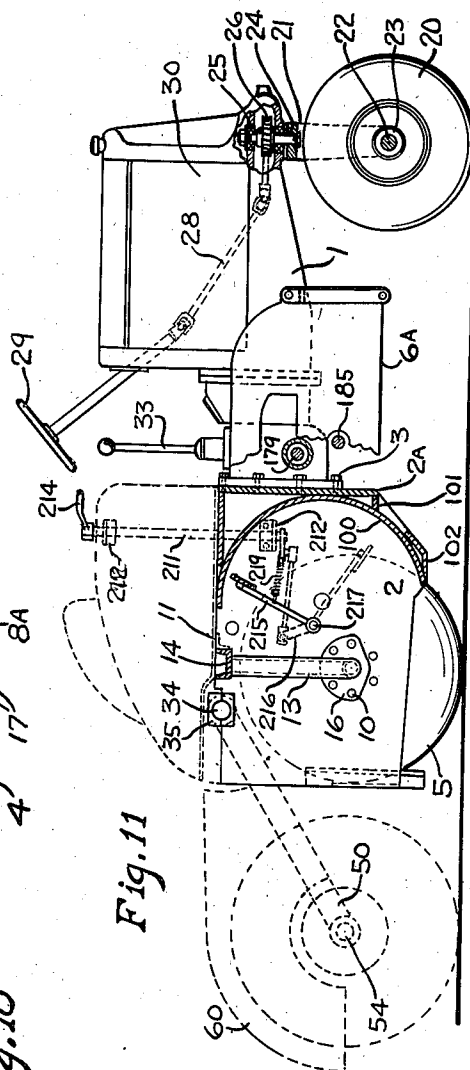
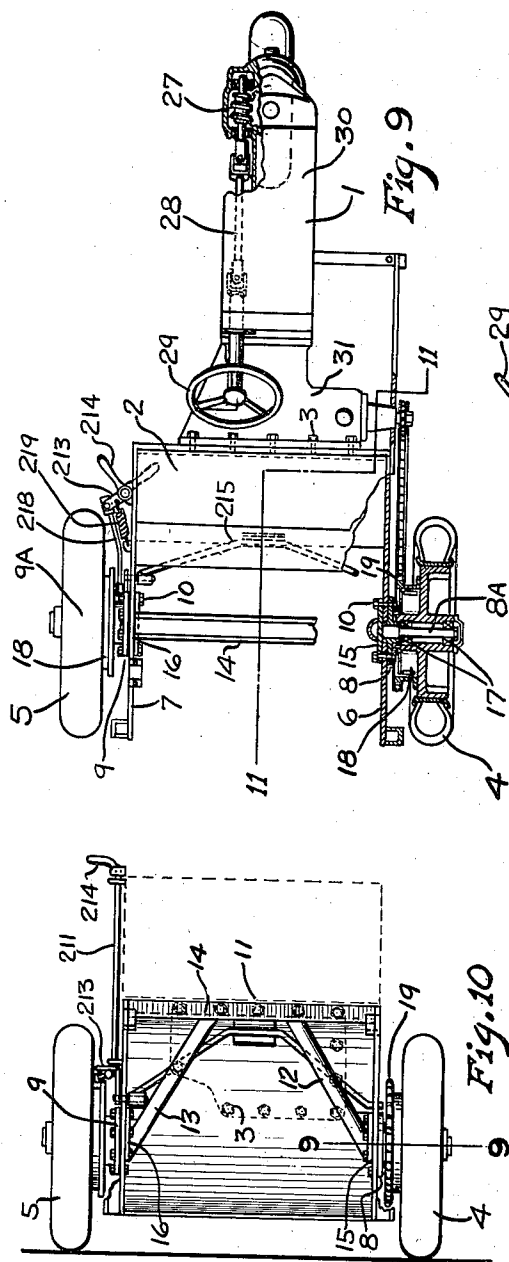
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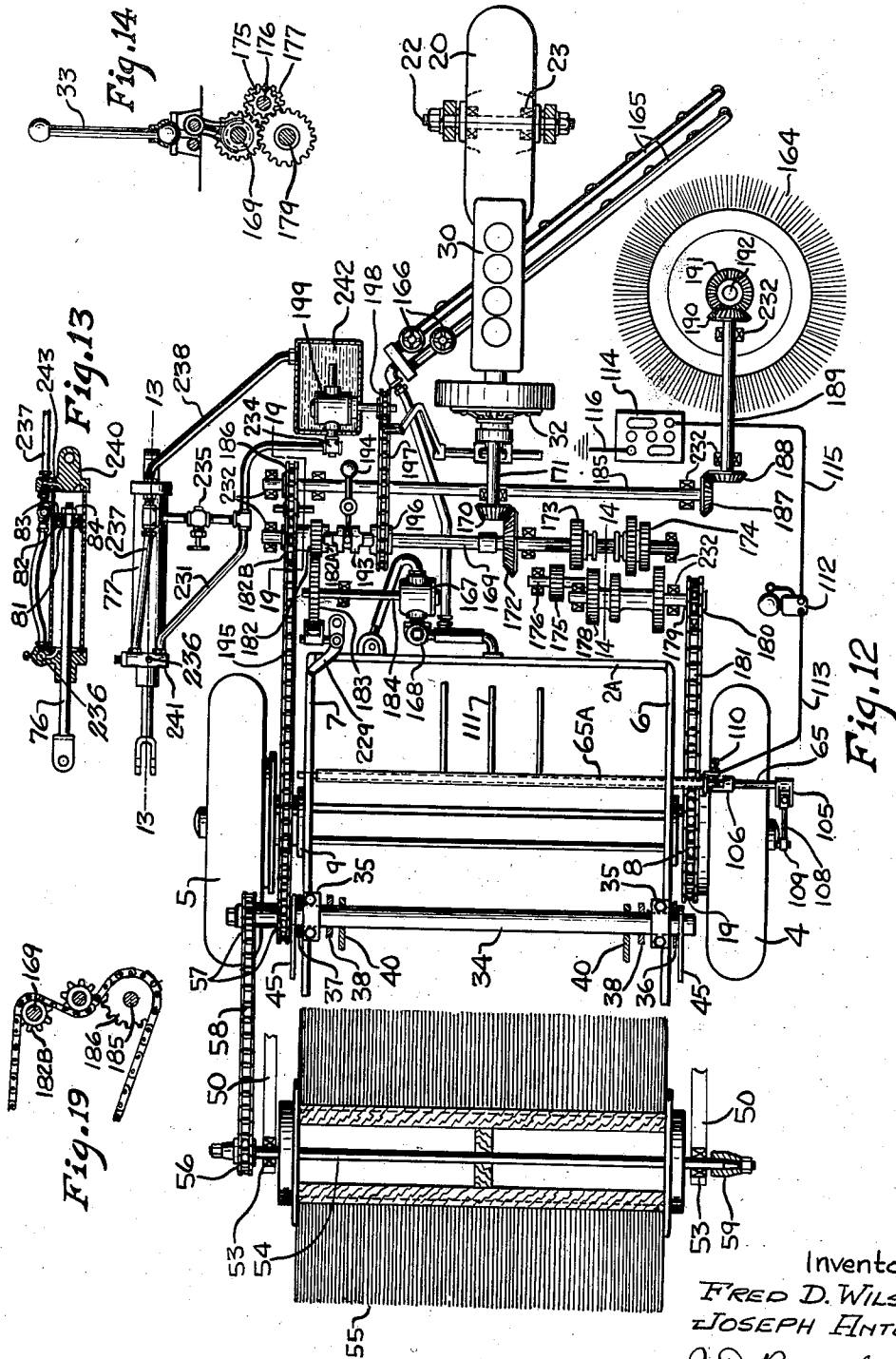
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UNITED STATES PATENT OFFICE

2,286,245

STREET SWEEPING MACHINE

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Application May 10, 1939, Serial No. 272,858

4 Claims. (Cl. 15—83)

Heretofore most of the self-propelled street sweeping machines were designed to deposit material at the foot of an elevator and elevate the material into a carrying receptacle, which requires a multiplicity of complicated parts to repair and keep in working condition. Furthermore, separate frames were used upon which were mounted the broom, the dirt receptacle, the elevators and power plants supported by steering and propelling wheels and this of necessity made a long street sweeper which was difficult to maneuver in restricted areas.

One of the objects of this invention is to provide deflecting means which contacts the sweeping broom and is adjustable as to the deflecting angle, or its angular relation to the broom, also adjustable means to maintain constant relation between the deflecting means and the sweeping broom as the broom wears.

Another object of this invention is to provide a self-propelling street sweeper which can be built in small sizes as well as large sizes and eliminates the use of elevators and conveyers to deposit the material into the material carrying receptacle, thus permitting the sweeper to be made much shorter and increases its maneuverability in restricted areas.

Another object of this invention is to provide a self-propelled sweeper in which the engine frame and the material carrying receptacle form the main frame of the machine, to which are mounted the supporting, driving and steering wheels and the rotary brooms, thus eliminating the use of a special frame.

Another object of this invention is to provide a self-propelled sweeper having a front steering wheel, one rear driving wheel and one rear supporting wheel, thus eliminating the use of a differential.

Another object of this invention is to provide power means for raising and lowering the sweeping broom, the deflector and the draw wings and also automatically move the movable bottom and curved plate of the material carrying receptacle upward and forward and downward and backward, thus permitting the dirt or trash to be dumped at stated intervals and the broom to clear the dumped pile of dirt or trash.

Another object of this invention is to provide means for driving the broom at a constant rate of speed, irrespective of the speed of the sweeper, and thus assure the operator that the dirt or trash is being picked up and deposited in front of the material carrying receptacle, as it is known that the broom must be driven at a certain pe-

ripheral speed to give the dirt or trash the required momentum.

Another object of this invention is to provide means which will automatically notify the operator when the material carrying receptacle is full, and also manually operated means to move into and out of contact with the material in the material carrying receptacle and thus determine when the material carrying receptacle is ready to be dumped.

Another object of this invention is to provide means whereby the operator can adjust the gutter broom to the angle of the gutter without stopping the sweeper, thus eliminating the necessity of cleaning the gutter by hand labor.

Another object of this invention is to so mount the broom that independent vertical movement of the broom when in operating position can be affected without disturbing the relation of any other parts, thus allowing the broom to drop into depressions or move over humps during the sweeping operation.

Another object of this invention is to mount a deflector on the front steering wheel which will move the turning of the steering wheel and thus prevent, at all times, the material being swept by the gutter broom from being thrown ahead of and in the path of the steering wheel.

Further objects of this invention are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings and, while we have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change without departing from the spirit of the invention.

In the drawings:

Figure 1 is a side elevation of the sweeper showing the broom in the normal working position and a sectional view of the cover adjustments and the gutter broom drive.

Figure 2 is a plan view of the entire sweeper.

Figure 3 is a side elevation and a partial cross section showing the sectional views of the gas tank, water tank or reservoir and the material carrying receptacle, broom and other coordinating parts in the normal working position.

Figure 4 is a side cross sectional view of the rear portion of the sweeper including the entire material carrying receptacle and the water tank

or reservoir, showing the broom, drag wings and dirt deflector in an elevated position for transportation.

Figure 5 is a cross sectional view of the sweeper at 5—5 in Figure 1.

Figure 6 is a side elevation with the rear portion cross sectioned to show the broom in the elevated position and the bottom of the material carrying receptacle elevated for dumping the material collected.

Figures 7 and 8 are side and cross sectional views of another form of means to adjust the deflector to the broom.

Figure 9 is a plan and sectional view showing the frame of the sweeper and also the manually operated means to determine when the material carrying receptacle is full.

Figure 10 is a rear view of Figure 9 with the broom and other parts removed to show the frame construction and also the manually operated means to determine when the material carrying receptacle is full.

Figure 11 is a cross section of the side elevation shown in Figure 9 at 11—11 showing a portion of the frame and the steering axle in section, with the broom and the manually operated means to determine when the material carrying receptacle is full shown in dotted lines.

Figure 12 is a diagrammatic plan view of the sweeper showing the propelling and control mechanism and the sprinkling system.

Figure 13 is a cross section of the hydraulic cylinder shown in Figure 12 at 13—13.

Figure 14 is a side elevation of the transmission gears for speed and directional control shown in Figure 12 at 14—14.

Figure 15 is a view showing the method of adjusting the gutter broom from the operator's seat or station while the sweeper is in motion.

Figure 16 is a partial cross section taken at 16—16 in Figure 1.

Figure 17 is a portion of the side elevation shown in Figure 6 to more clearly show some of the details.

Figure 18 is a cross section of Figure 17 at 18—18.

Figure 19 is a cross section of Figure 12 at 19—19 to show the relation of the transmission shaft and the gutter broom drive shaft to the means for keeping the drive chain in contact with the sprocket.

Figure 20 is an enlarged view and cross section of the lower portion of the deflector showing means for adjusting the angular relation of the deflector to the broom.

Referring to the drawings:

The frame of the sweeper (see Figures 3, 4, 5, 6, 9, 10 and 11) is composed of two main parts, the engine main frame 1 and the material carrying receptacle 2, which are fastened together by bolts 3, forming a single unit upon which the sweeper parts are mounted.

The side plates 6 and 7 and the top plate 11 of the material carrying receptacle 2 are braced and stiffened on the inside by two diagonal braces 12 and 13, which are welded or otherwise secured to a reinforcing top member 14. To the lower end of the diagonal braces 12 and 13 are welded, or otherwise secured, reinforcing plates 15 and 16. Thus it is seen that the top reinforcing member 14 and the diagonal braces 12 and 13, with the reinforcing plates 15 and 16, form one unit and prevent any side racking or twisting of the material carrying receptacle 2.

Wheel axle brackets 8 and 9, with wheel axles

8a and 9a mounted therein, are attached to the side plates 6 and 7 of the material carrying receptacle 2 and to reinforcing plates 15 and 16 by bolts or rivets 10, thus making a rigid axle support and also stiffening the side plates 6 and 7.

The rear propelling wheel 4 and supporting wheel 5 are mounted for rotation on the wheel axles 8a and 9a by ball or roller bearings 17 of the conventional type. The rear propelling wheel 4 and supporting wheel 5 have the conventional type of hydraulic brake equipment 18. On the rear propelling wheel 4 is also mounted drive sprocket 19.

The front steering wheel 20 is mounted in a steering fork 21 on axle 22 by the conventional type of ball or roller bearings 23. The steering fork 21 is attached to the front end of engine main frame 1 by shaft 24, which revolves on the ball or roller bearings 25 mounted in the engine main frame 1. On the shaft 24 is keyed or otherwise fastened a worm gear 26. The steering of the front steering wheel 20 is accomplished by the usual form of worm 27 attached to the steering shaft 28, which engages the worm gear 26 and is controlled by the operator by the use of hand wheel 29. The propelling power or engine 30 is mounted on the engine main frame 1, which frame forms a housing for the usual type of transmission 31, clutch 32 and gear shift lever 33, as shown in Figures 1, 12 and 14.

At the rear (see Figures 3, 4, 5, 6, 7 and 11) and near the top of the material carrying receptacle 2 is shaft 34, mounted in bearings 35 which are bolted or otherwise secured to the side plates 6 and 7. Keyed or otherwise fastened to the shaft 34 on the outside of side plates 6 and 7 are levers 36 and 37, and keyed or otherwise fastened to the shaft 34 on the inside of the side plates 6 and 7 are levers 38. Rotatably mounted on shaft 34 are links 40, to which are bolted arms 41. Rotatably mounted on shaft 34 outside of levers 36 and 37 are links 45 and bolted or otherwise fastened thereto are bars 46, having adjustable screws 48 in the projection 49 to adjust the broom axle bearing brackets 50, which have slotted holes 51 and are bolted to bars 46 by bolts 52.

The broom axle bearing brackets 50 have mounted therein roller or ball bearings 53 in which broom axle 54 rotates. On broom axle 54 is mounted and keyed the broom 55, and one end of the broom axle 54 sprocket 56 is keyed or otherwise fastened. Rotatably mounted on shaft 34 outside of link 46 is a double sprocket 57. Sprocket 56 is driven from double sprocket 57 by sprocket chain 58. The broom axle 54 and broom 55 are reversible and spacer 59 is used on one end of broom axle 54 to permit the reversibility of broom axle 54.

Mounted on bars 46 (see Figures 1, 4 and 6) and rigidly attached thereto is the broom cover 60, so designed that it rotates with the bars 46 and broom 55 concentric with the center of shaft 34 during the raising and lowering of the broom 55.

To prevent refuse, dirt or other material from being thrown thru the space above the broom 55 under the broom cover 60 and thence back to the ground, we have added a plate 141 which is swivelably connected to the broom cover 60 at 142. The lower end of plate 141 has adjustable bars 143 attached at 144. These adjustable bars 143 extend thru the broom cover 60 and have several holes 145 punched therein. As the broom 55 wears, the adjustable bars 143 can be moved

upwardly and thereby the plate 141 is kept in contact with the broom 55. This adjustment is made by inserting a pin 145 thru bracket 147, mounted on the outside of broom cover 60, and into one of the holes 145.

Another means of adjusting this plate 141 is shown in Figure 7 and consists of threaded bars 143a, which are movable up or down by means of threaded cranks 142, which are rotated in the direction desired in order to maintain a constant relation between the plate 141 and the broom 55.

To throw the material picked up by the broom 55 (see Figure 3) into the material carrying receptacle 2, a deflector bar 44 of the same width as the broom 55 is attached by welding or any other means to the lower ends of arms 41.

An adjustable deflector bar may be desired, as some materials are heavier than others and consequently the angular relation of deflector bar 44 to the broom 55 would have to be slightly modified to suit the material to be deposited in the material carrying receptacle 2 by the broom 55. An adjustable deflector bar 44a is shown in Figure 20 and is similar to the deflector bar 44 except that it has levers 44b and round pins or bolts 44c welded to each end. Round pins or bolts 44c are inserted into circular holes 44d of the arms 41. To adjust the angular relation of the adjustable deflector bar 44a to the broom 55, there is provided bolts 44e, which are inserted in the slots 44f of the arms 41. By moving the levers 44b, the desired angularity can be secured, and tightening the bolts 44e at the desired position will maintain the selected angular relation of the adjustable deflector bar 44a to the broom 55.

To maintain a constant relation between the broom 55 and the deflector bar 44 or 44a, we provide adjusting rods 133, the lower ends of which are swivelably attached to the links 40 by pins 134. The upper ends of adjusting rods 133 are threaded to receive the adjusting cranks 135 which are also tapped for the threads of adjusting rods 133. The adjusting cranks 135 are mounted on the broom cover 60 by brackets 136.

Figures 7 and 8 show a single crank 137 which is attached to shaft 138, and mounted thereon are beveled pinions 139. Instead of using adjusting cranks 135, we have substituted beveled gears 140 which are threaded to receive adjusting rods 133. Thus it is readily seen that both adjusting rods 133 can be adjusted by the rotation of the single crank 137.

To prevent the material from flowing around the sides of the broom 55, there are mounted on either side of the broom 55, drag wings 118 (see Figures 1, 3, 4 and 6) which are swingably connected to the side plates 6 and 7 by four links 120 and 121. Links 120 are fastened to the lower part of drag wings 118 by pins 130 and to the lower part of side plates 6 and 7 by pins 124. Links 121 are fastened to the upper part of drag wings 118 by pins 131 and to the side plates 6 and 7 by pins 132. On links 121 are extensions 125, to the upper ends of which are attached springs 126 and adjustable rods 127 and nuts 128. Adjustable rods 127 are inserted thru holes in brackets 129, which are welded to side plates 6 and 7.

Links 42 are swingably mounted to each side of the broom cover 60 and springs 43 are attached thereto. The top links of the chains 39 are attached to the hook-shaped ends of springs 43. The opposite ends of the springs 43 have

U-bolts 47 attached to the drag wings 118 and inserted into the lower links of chains 39. Thus the drag wings 118 are lifted from the pavement when the broom 55 is raised. This design permits adjustment of drag wings 118 as the broom 55 wears.

Swingably mounted on drag wings 118 by bolts or pins 151 are guards 149 which prevent the broom 55 from throwing small stones or other material ahead of the material carrying receptacle 2 and outside of the rear propelling wheel 4 and supporting wheel 5.

On the outer ends of levers 36 and 37 and connected thereto by pins 61 are connection yokes 62, which are attached to spring sleeves 64 by bolts 66. The lower ends of spring sleeves 64 have plates 69 welded thereto, with holes 67 in the center thereof thru which the spring rods 68 pass to make connection with the suspension spring anchors 70, which are attached to each side of the broom cover 60 by rivets, bolts or welding, as may be most convenient. The spring rods 68 have check nuts 72 and adjusting nut 73, as shown in Figures 1, 2, 4 and 6. The adjusting nut 73 is used to apply the proper tension on the springs 74 by means of the spring rods 68. The upper ends of spring rods 68 have circular discs 75 welded thereto which are larger than the outside diameter of springs 74 and form a spring seat for the upper ends of springs 74. The springs 74 and a portion of the spring rods 68 are enclosed in the spring sleeves 64 and the tension of the springs 74 is adjustable.

The above arrangement permits the broom 55 to raise or lower a slight amount without disturbing the levers 36 and 37, when passing over bumps or depressions during the sweeping operation.

The upper end 71 of lever 37 has two holes and the piston rod 76 of the hydraulic cylinder 77 is connected to the upper hole by means of pin 78. The opposite end of hydraulic cylinder 77 is attached to side plate 7 by means of fulcrum 80 and pin 79, which permits the hydraulic cylinder 77 to oscillate when raising and lowering the broom 55 and broom cover 60. The piston rod 76 has the usual piston 81, packing cup 82, follower 83 and nuts 84, and is used to apply power in one direction only. A description of its operation will be given later.

In Figures 2, 3, 4, 6 and 11, connected to the lower ends of levers 32 by pins 85 are links 86, which are in turn connected by pins 88 to segments 89. Segments 89 revolve on shaft 92 and are joined together by curved plate 91, which also acts as a movable back for the material carrying receptacle 2. At the lower edge of segments 89 is shaft 93, about which the movable bottom 94 of the material carrying receptacle 2 revolves during the raising and lowering movement.

The front ends of adjustable angle guides 99 are mounted on the outside of the side plates 6 and 7 by bolts 119 and the rear ends have slotted holes 90 for vertical adjustment and are supported on pins 123 which are attached to the side plates 6 and 7. The rear ends of adjustable angle guides 99 are adjustable vertically and are provided with set screws 122 which contact pins 123 to determine the location vertically of the adjustable angle guides 99.

The movable bottom 94 is made up of two plates 95 and 96, which are reinforced and held apart by spacers 97 which also stiffen the movable bottom 94. The top plate 95 is bent downward at the rear end and joined to the bottom plate 96 by welding to form a beveled edge. The forward end

of plates 95 and 96 are formed to make a circular hinge about shaft 93. On each side of the movable bottom 94 are welded side plates 98 which contact the side plates 6 and 7 and move with the movable bottom 94 during the raising and lowering movement.

On each side of the rear end of movable bottom 94 (see Figures 1, 3 and 4) are inserted pins 150 on which is mounted movable bottom guide 87, which slides back and forth on the adjustable angle guides 99 with the movable bottom 94.

The adjustment of adjustable angle guides 99 is to permit the raising and lowering of the rear end of the movable bottom 94, as sometimes light material will pass under the deflector 44 when it is swept up by the broom 55, which would necessitate the lowering of the rear end of the movable bottom 94. Most material, however, can be deposited in the material carrying receptacle 2 and on the movable bottom 94 without making this adjustment.

In addition to front plate 2a of the material carrying receptacle 2, there is another front plate 100, which is formed in a semi-circle and welded to the side plates 6 and 7 and to front plate 2a and top plate 11, and is also reinforced by stiffeners 101 and 102.

On the upper edge of curved plate 91 is an adjustable scraper 103 connected thereto by bolts 104. In the upward movement of the movable bottom 94 and the curved plate 91, the adjustable scraper 103 contacts the semi-circular front plate 100 and thereby removes all trash or dirt tending to stick to the semi-circle front plate 100.

From the foregoing description it is readily seen that the movements of the movable bottom 94 and the curved plate 91 are synchronized with the movements of the broom 55, the deflector 44 and the drag wings 118. The broom 55, the deflector 44 and the drag wings 118 can be raised for transportation while the movable bottom 94 and the curved plate 91 remain in the carrying position (see Figure 4); and by admitting more oil to the hydraulic cylinder 77, thus continuing the upward movement of the broom 55, the deflector 44 and the drag wings 118, the movable bottom 94 and the curved plate 91 will move forward and upward and dump the refuse from the material carrying receptacle 2 and permit the broom 55 to pass over and clear the pile of refuse (see Figure 6).

To notify the operator when the material carrying receptacle 2 is ready to dump there is mounted above the movable bottom 94 and curved plate 91 shaft 65, which is revolvably mounted in side plate 7 within tube or shaft 65a and extends outside of side plate 6 and rear propelling wheel 4. On shaft 65 outside of rear propelling wheel 4 a lever 105 is mounted. At the end of lever 105 is swingable block 107 thru which is inserted a rod 108, which is connected to an eccentric 109 mounted on rear propelling wheel 4. Rigidly mounted on tube or shaft 65a outside of side plate 6 is a contact finger 110 which contacts contact point 106 on shaft 65 when the dirt or trash in the material carrying receptacle 2 has raised feelers 111, which are rigidly mounted on tube or shaft 65a, to the position shown by solid lines in cross section view, Figures 3 and 4. Contact finger 110 has a wire connection 113 to bell 112 and a wire connection 115 from bell 112 to battery 114, which is grounded to the frame by wire 116. Thus, when the feelers 111 are raised by the accumulation of dirt or trash in the material carrying receptacle 2 to the position shown by the solid lines (see Figures 3 and 4), contact

is intermittently made between contact point 106 and contact finger 110, which causes the bell 112 to ring and notify the operator on the operator's seat or station 117 that the material carrying receptacle 2 is full and ready to dump. Bell 112 can be operated intermittently or continuously, depending on the desires of the operator.

We have shown in Figures 9, 10 and 11 a manually operated means for determining when the material carrying receptacle 2 is filled and this is under the control of the operator. On the outside of side plate 7 of the material carrying receptacle 2 is mounted vertical shaft 211 on two brackets 212. At the lower end and rigidly connected to shaft 211 is lever 213. At the upper end of shaft 211 is mounted the control handle 214. On the inside of the material carrying receptacle 2 is feeler 215, preferably made as shown in the drawings. One end of feeler 215 is rotatably mounted on side plate 6 and the opposite end is rigidly connected by a pin 217, or other means, to crank 216, which projects inwardly thru side plate 7. On the outside of side plate 7 is a connecting rod 218, one end of which is attached to the lever 213 and the other end is attached to crank 216. To maintain the feeler 215 in the position shown by the full lines in Figure 11, a spring 219 is provided, one end of which is attached to the side plate 7 and the other end to lever 213.

To determine when the material carrying receptacle 2 is filled, the operator moves control handle 214 clockwise, as indicated by dotted lines in Figure 9, and thereby lowers the feeler 215 to the dotted position shown in Figure 11, or to whatever position the dirt or trash in the material carrying receptacle 2 causes the feeler 215 to be in. The operator can determine by the location of the control handle 214 what amount of dirt or trash is in the material carrying receptacle 2. When the feeler 215 is raised to the position shown by solid lines in Figure 11, the operator knows that it is time to dump the material carrying receptacle 2.

Above the material carrying receptacle 2 is mounted the water tank or reservoir 152 which is recessed as shown in Figure 3 for the operator's seat or station 117. Additional capacity is secured by having a connection between the water tank or reservoir 152 and a space 153 above the semi-circle front plate 100, front plate 2a and the side plates 6 and 7 of the material carrying receptacle 2. An overflow 154 is provided to permit the excess water to flow downward into the material carrying receptacle 2 and onto the movable bottom 94, which assists in keeping it clean.

Directly above the water tank or reservoir 152 is an additional space 157 in which the fuel tank 155 is mounted. A door 156 which acts as a cover is provided to permit the filling of the water tank or reservoir 152 and the fuel tank 155. There is also room in the space 157 to keep tools and hose connections.

On the left hand side of the sweeper a drag or deflector board 158 is suspended from the engine main frame 1 by means of adjustable chains 159 and 160.

Attached by a U-bolt 161 to the front steering fork 21 is a plate 162 which forms a support for the front wheel deflector 163. Said front wheel deflector 163 is to reduce the amount of material thrown by the gutter broom 164 and is made of flexible material such as leather or rubber, and turns with the steering wheel 20.

Referring to Figure 12, diagonally across underneath the engine main frame 1 and in front of the gutter broom 164 are suspended two sprinkler pipes 165 which are connected to the water pump 167. This water pump 167 is of the usual type, having relief valve 168 and connections to the water tank or reservoir 152. The amount of water desired in the sprinkler pipes 165 is controlled by the valves 166. If necessary, the valves 166 can be closed when transporting the sweeper from place to place.

The propelling power or engine 30 is mounted on the engine main frame 1 at the front end of the sweeper. The main drive shaft 171 of propelling power or engine 30 extends rearwardly from the clutch 32 and has bevel pinion 170 keyed or otherwise mounted thereon. The transmission 31 is mounted at right angles to the main drive shaft 171 instead of parallel, as transmissions usually are assembled, and has three speeds forward and one reverse. The transmission 31 has three shafts, the main transmission shaft 169, the auxiliary shaft 179 and the intermediate shaft 176, as indicated in Figure 12, which are mounted for rotation on bearings 232, which may be of any standard design. The intermediate shaft 176 has mounted thereon gears 175 and 177 and is used for reversing the direction of travel of the sweeper.

To propel the main transmission shaft 169, the bevel gear 172 is mounted thereon by keys or other means and contacts bevel pinion 170. On the right hand side of the main transmission shaft 169 are mounted shifting gear 173 and dual shifting gear 174. By the use of gear shift lever 33, the desired speeds and direction of travel of the sweeper can be obtained.

The relative positions and mountings of the shafts 169, 179 and 176 are shown in Figure 14. On the auxiliary shaft 179 intermediate of the bearings 232 is mounted triple gear 173 and on the right hand end sprocket 180. On sprocket 180 is sprocket chain 181, which contacts and drives the drive sprocket 19 mounted on propelling wheel 4. Swingably mounted on the side plate 6 is adjustable idler 233, which contacts sprocket chain 181 to adjust and take up the wear of sprocket chain 181.

Thus it is seen that the desired speeds and direction of travel of the sweeper are easily controlled by the operator by the use of gear shift lever 33.

On the left hand end of the main transmission shaft 169 is rotatably mounted a combined gear 182 and sprocket 182b, having projections on the right side thereof forming a jaw clutch 182a to engage gear 183 which is slidably mounted on the water pump shaft 184. Gear 183 can be thrown out of engagement by shifting the gear 183 towards the water pump 167, by means of shifting lever 229. Jaw clutch 193 is slidably mounted on the main transmission shaft 169 and has shifting lever 194 attached thereto.

Under the main transmission shaft 169 (see Fig. 19) on bearings 232 is mounted the gutter broom drive shaft 185, which has keyed thereto at the left hand end drive sprocket 186. On the opposite, or right hand end of gutter broom drive shaft 185 (see Figure 12) is keyed bevel gear 187, which contacts and drives bevel gear 188 mounted on the auxiliary gutter broom drive shaft 189, which is mounted at right angles to gutter broom drive shaft 185. At the forward end of the auxiliary gutter broom drive shaft 189 is keyed bevel gear 199, which contacts bevel gear 191 mounted

and keyed to the upper end of gutter broom vertical shaft 192. Gutter broom 164 is mounted and keyed on the lower end of gutter broom vertical shaft 192.

To rotate the gutter broom 164 and broom 55, the shifting lever 194 is shifted toward the center of the sweeper. The clutch 193 will then engage the jaw clutch 182a of the combined gear 182 and sprocket 182b, rotating sprocket 182b and sprocket chain 195, which engages and contacts drive sprocket 186 and double sprocket 57. Thus it is seen that the speed of the gutter broom 164 and the broom 55 is independent of the speed of the sweeper or propelling wheel 4. This is desirable and important, as it is necessary to maintain a certain constant peripheral speed of the broom 55 to deposit the dirt or refuse in the forward portion of the dirt receptacle.

To the right of the jaw clutch 193 is rotatably mounted on main transmission shaft 169, sprocket 196 which drives sprocket 198 of the hydraulic pump 199 by means of sprocket chain 197. The hydraulic pump 199 is only required to supply power to the cylinder 77 to raise and lower the broom 55 and at such times it is not necessary to rotate the broom 55 or the gutter broom 164. Therefore, jaw clutch 193 engages either the jaw clutch 182a or the sprocket 196, as desired.

In Figures 1 and 15, to control the raising and lowering of the gutter broom 164, the lower end of hand lever 220 is mounted on the outside of the forward extended side plate 6a at 221 and is within easy reach of the operator. The shaft housing 206 has guides 222 which determine the vertical position of the auxiliary gutter broom drive shaft 189 and shaft housing 206, as it is guided in its up and down movement by plate 6a and guide bar 223. Bell crank 224 is mounted for rotation on the upper end of guide bar 223 at 225. Adjustable connecting rod 226 is attached to the hand lever 220 and bell crank 224, and shaft housing 206 is attached to the lower end of bell crank 224 by link 227 and pin 228.

Pulling the hand lever 220 toward the operator moves the bell crank 224 in a counter-clockwise direction and thereby raises the gutter broom 164. When the gutter broom 164 and the shaft housing 206 are raised, the tension of the spring 230 pulling on the pin 228 and the bell crank 224 will hold the gutter broom 164 and the shaft housing 206 in a raised position until the hand lever 220 is pushed in the opposite direction, or away from the operator.

The general construction of the gutter broom and the shafts and the raising and lowering devices are similar to that shown and described by the Wilson Patent No. 1,750,839.

It is sometimes desirable to control the angularity of the gutter broom 164 in relation to the pavement to be swept and, to do so during the forward motion of the machine, we have shown on Figure 15 a device whereby this can be done without the operator leaving the operator's seat or station 117. Mounted on the forward extended side plate 6a is a plate 200 having a hole 201 on the lower portion thereof for the reception of the pin 202, to which is mounted ratchet lever 203 to engage ratchet teeth 200a. The lower portion of ratchet lever 203 has a flat plate 204 which engages a lever 205, which is attached to and forms a part of the shaft housing 206 of the auxiliary gutter broom drive shaft 189.

At the upper end of the lever 205 is connected an eye-bolt 210, which projects inwardly thru the forward extended plate 6a and has a spring

209 mounted on one end and is threaded to receive a nut 207 and a washer 208 on the other end. The spring 209 is so adjusted as to cause the lower end of gutter broom 164 to move outwardly from the vertical position and, by moving ratchet lever 203 outwardly, the lower end of the gutter broom 164 will contact and engage lever 205 and move the gutter broom 164 inwardly to any desired angular position. Thus it is seen that the operator can readily adjust the gutter broom 164 to the angle of the gutter and thereby sweep it clean while the sweeper is in motion.

The operator, when seated at the operator's seat or station 117, has full control of all the movements of the sweeper and also the speed of the sweeper and it will be noted that a constant speed relation between the engine 30 and the broom 55 and gutter broom 164 is maintained irrespective of the speed of the sweeper. This is an important factor in sweeping streets or pavements, as it is necessary to maintain a definite peripheral broom speed to deposit the material into the material carrying receptacle 2.

It is also to be noted that after the operator has been notified, by the ringing of the bell 112 (see Figures 1 and 12) or by adjusting the manually operated feeler 215 (see Figures 12 and 13), that the material carrying receptacle 2 is full, he then disengages clutch 32 and moves gear shift lever 33 to neutral position and thus stops the sweeper. Then he moves shifting lever 194 to disengage jaw clutch 193 from jaw clutch 182a and engage sprocket 196, which drives the hydraulic pump 199 and closes valve 235. Releasing clutch 32, the engine 30 will rotate main transmission shaft 169 and start the hydraulic pump 199 and force oil thru check valve 234 and pipe or tube 231 to the front of the piston 81 of the hydraulic cylinder 77 and move said piston 81 to its farthest position, thus rotating shaft 34 and levers 36 and 37 and raising the broom 55, broom cover 60, plate 141, deflector 44 and drag wings 118, and at the same time rotating shaft 92 and moving the curved plate 91 and movable bottom 94 to the dumped position; thus dumping the load of refuse from the material carrying receptacle 2.

The upper cylinder head 241 has a relief valve 236 which prevents the fluid from flowing back into the oil tank 242, which is set at a desired pressure, which in most cases is approximately 600 pounds. In the lower cylinder head 240 there is a by-pass 243 from the lower part of the hydraulic cylinder 77 to the pipe lines 237 and 238 to permit the fluid which may have been stored in the lower part of the hydraulic cylinder 77 to flow back into the oil tank 242. Any excess pressure, over the pressure at which the relief valve 236 operates, will cause the fluid to flow thru pipe lines 237 and 238 into the oil tank 242. The relief valve 236 is also for the purpose of permitting the hydraulic pump 199 to continue operating and the excess pressure to flow thru relief valve 236 as above described.

Check valve 234 prevents the fluid from flowing backward into the hydraulic pump 199 should the hydraulic pump 199 be stopped, and thus the pressure is maintained in the hydraulic cylinder 77 during transportation of the sweeper or until it is desired to lower the broom 55 to contact with the pavement.

After depositing the refuse on the pavement, the operator will then disengage clutch 32 and move gear shift lever 33 to first speed position and thus move the sweeper forward over the pile of refuse which has just been deposited. He then

moves shifting lever 194 to engage jaw clutch 193 with jaw clutch 182a and disengage sprocket 196. When it is desired to return the broom 55, broom cover 60, plate 141, deflector 44 and drag wings 118 to the normal operating position, he opens valve 235, which will permit the fluid to flow thru pipe 231, thru valve 235, into pipe lines 237 and 238 and back to the oil tank 242.

From the forgoing description it can be readily seen that our invention is intended to include other forms of street sweepers which might be attached to and become a part of or be drawn by tractors or other power propelled vehicles where the power from said vehicles can be utilized for rotating the brooms, raising and lowering the rear broom, deflector, movable bottom and end and dumping the load.

Having now described and illustrated one form of our invention, it is readily seen that other combinations may be made without departing from the spirit of the invention.

We claim:

1. In a street sweeper, in combination, a frame supported for movement, a material receptacle having a movable bottom and end rotatably mounted on the sides thereof mounted on said frame, a rotatable shaft projecting thru and mounted on the sides of said material receptacle, arms having their forward ends rigidly mounted on said shaft and the rear ends provided with bearings, a rotatable broom mounted in said bearings, a broom cover attached to said arms, a second pair of arms having one end rotatably mounted on said shaft and a material deflector mounted on the opposite end, means connecting said broom cover and said second pair of arms to maintain a constant relation between said material deflector and said broom, means mounted on said frame and material receptacle to raise and lower said broom, broom cover and deflector and move said movable bottom and end as one unit, an operator's station on said frame, control means at said operator's station to control the raising and lowering of the said broom, broom cover and deflector and the moving of said movable bottom and end.

2. In a street sweeper, in combination, a frame supported for movement, a material receptacle having a movable bottom and end mounted on said frame, a rotatable broom and a material deflector in constant relation with and adjustable to said broom swingably mounted on said frame, means to rotate said broom to deliver material into said material receptacle, power means mounted on said frame and material receptacle, control means to control said power means to synchronize the raising of the said broom and said deflector and the moving of said movable bottom and end to permit the material to be dumped from the said receptacle and the said broom to clear the dumped material during the movement of the sweeper.

3. In a street sweeper, in combination, a frame supported for movement, a material receptacle having a movable bottom and end mounted on said frame, a rotatable broom and a material deflector in constant relation with and adjustable to said broom swingably mounted on said frame, means to rotate said broom to deliver material into said material receptacle, hydraulic means mounted on said frame and material receptacle, control means to control said hydraulic means to synchronize the raising of the said broom and said deflector and the moving of said movable bottom and end to permit the material to be

dumped from the said receptacle and the said broom to clear the dumped material during the movement of the sweeper.

4. In a street sweeper, in combination, a frame supported for movement, a material receptacle having a movable bottom and end mounted on said frame, a rotatable shaft projecting thru and mounted on the sides of the said material receptacle, arms having their forward ends rigidly mounted on said shaft and the rear ends provided with bearings, a rotatable broom mounted in said bearings, a broom cover attached to said arms, a second pair of arms having one end rotatably mounted on said shaft and a material

deflector mounted on the opposite end, means connecting said second pair of arms to said broom cover to maintain constant relation between said deflector and the said broom, levers 5 rigidly mounted on said shaft having connection to said movable bottom and end, a second set of levers rigidly connected to said shaft having power means connected thereto to rotate said shaft and raise said broom and material deflec- 10 tor and move said movable bottom and end to dump the material collected in said material receptacle.

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