H. CARR.

STREET CLEANING MACHINE.

APPLICATION FILED JUNE 6, 1912.

1,081,209.

Patented Dec. 9, 1913.

5 SHEETS—SHEET 1.

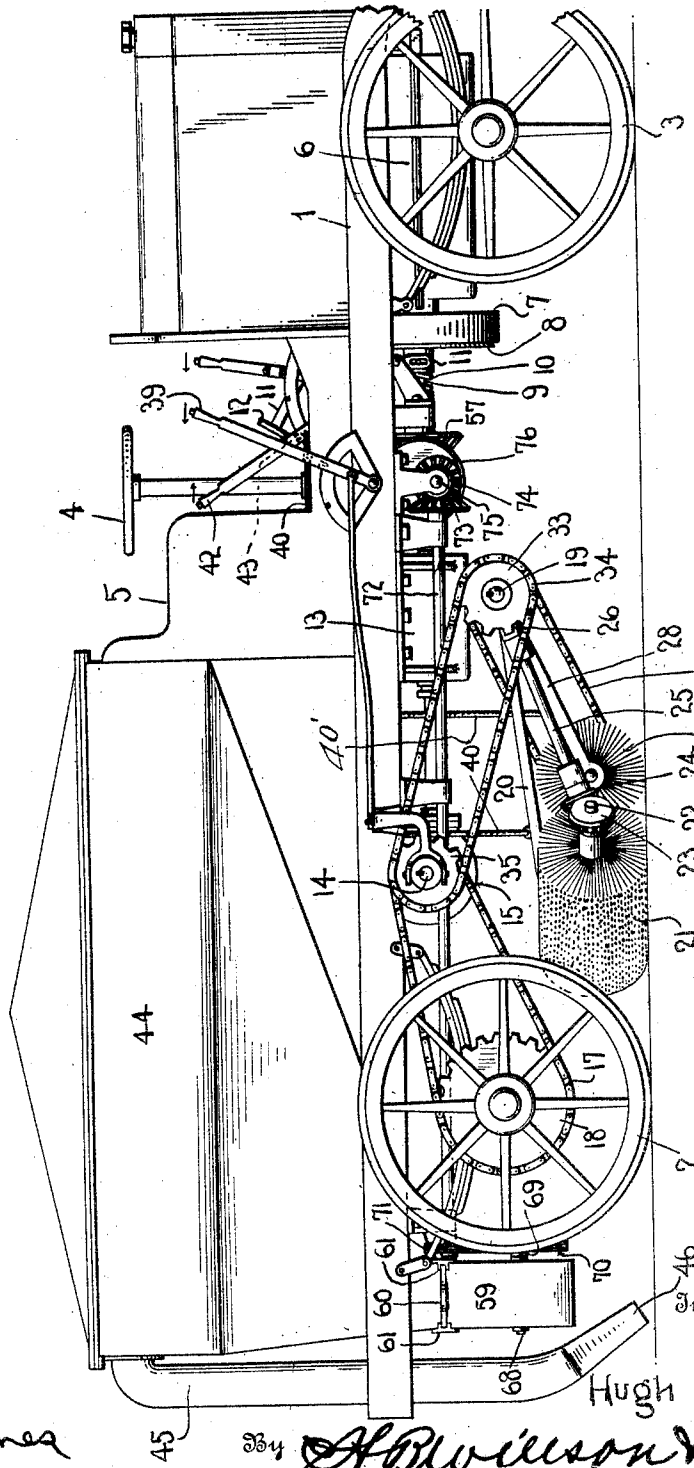


Fig. 1.

Witnesses

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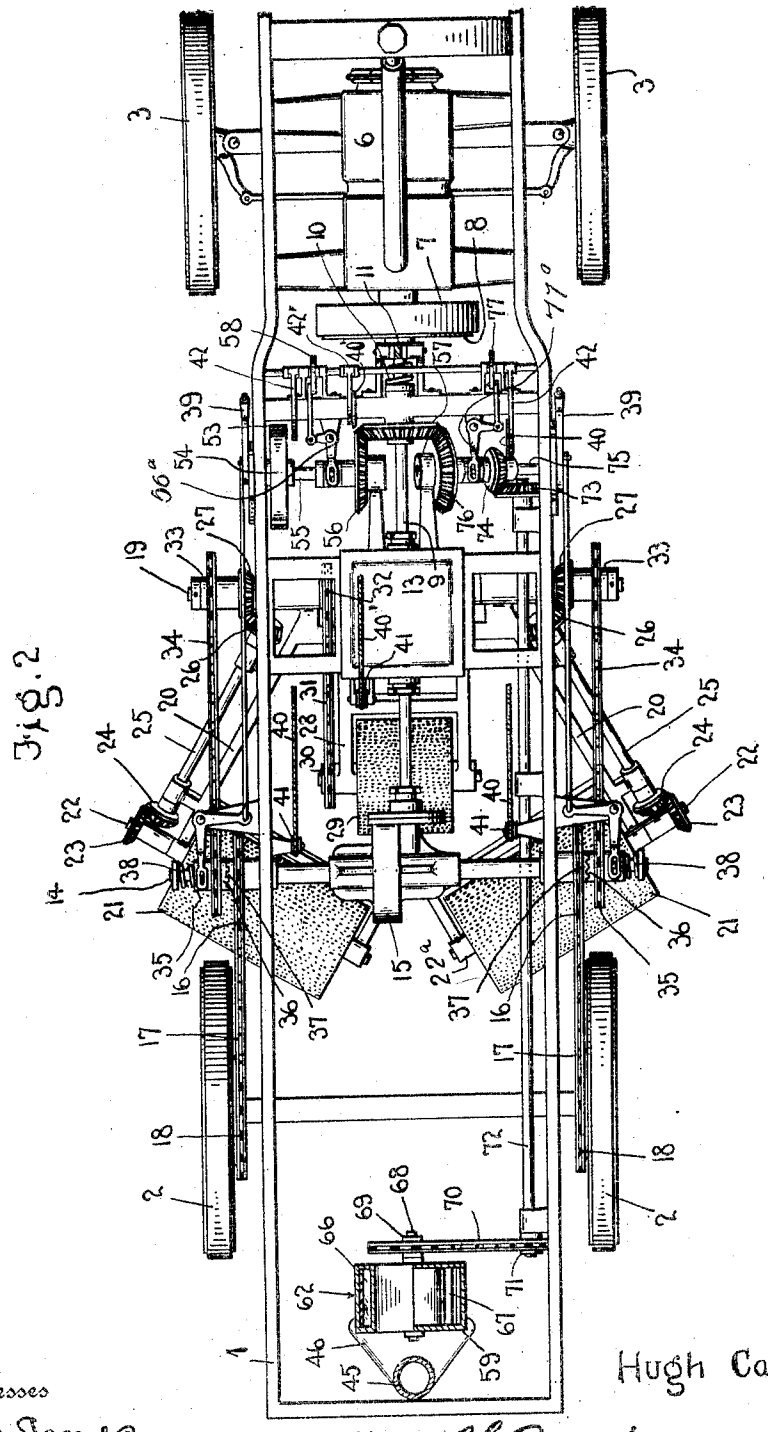
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5 SHEETS—SHEET 2.

Fig. 2.



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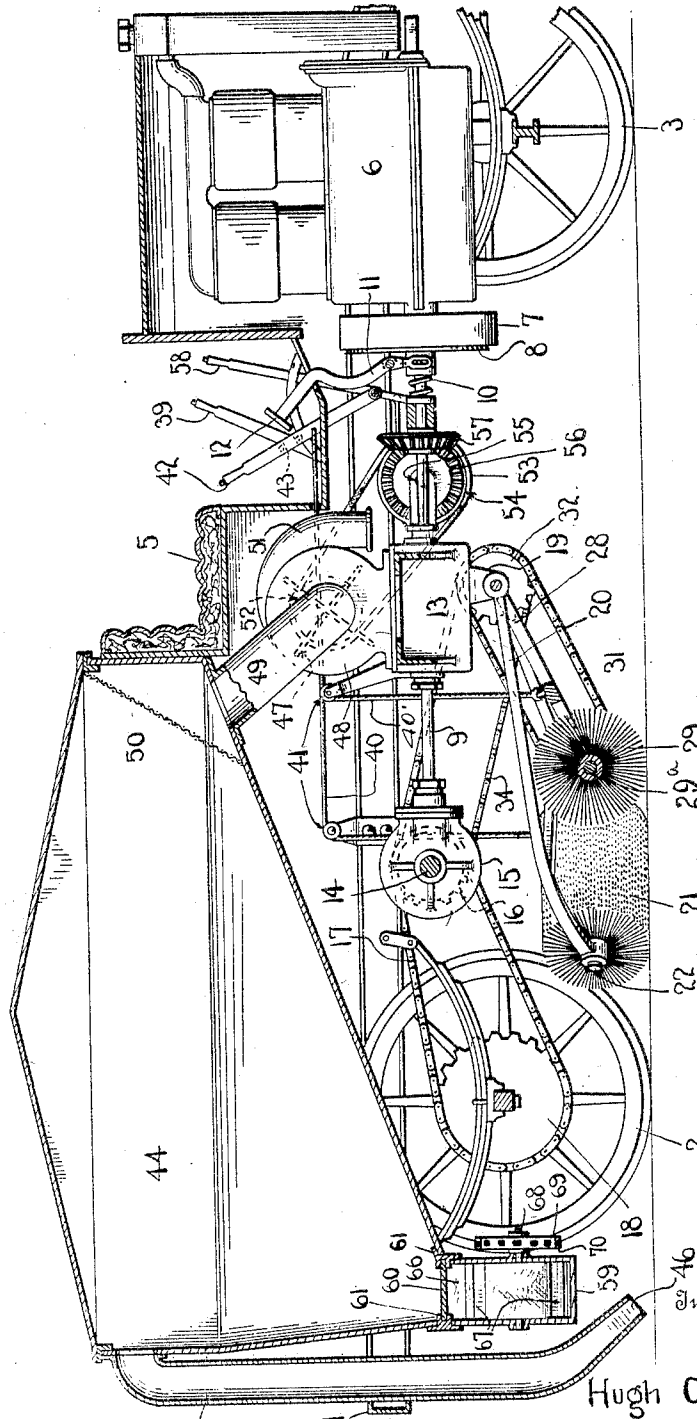
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5 SHEETS-SHEET 3.

Fig. 3.



Witnesses

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5 SHEETS—SHEET 4.

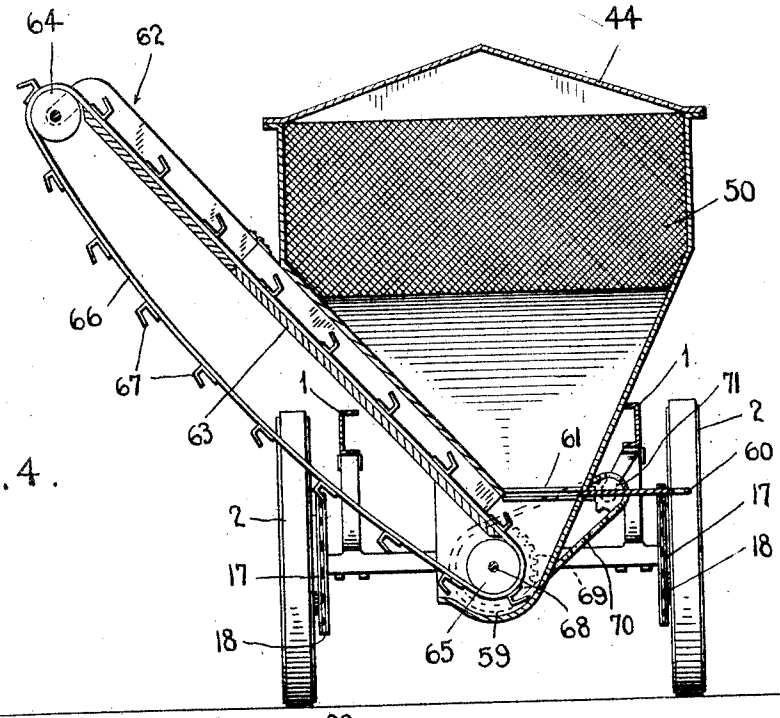


Fig. 4.

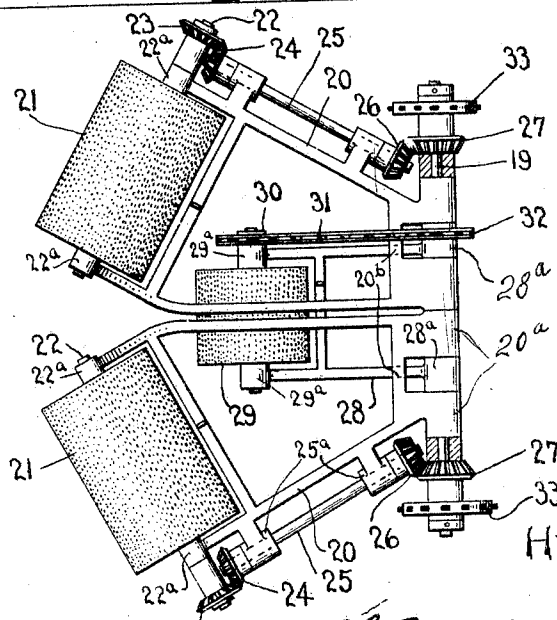


Fig. 5.

Witnesses

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5 SHEETS—SHEET 5.

Fig. 6.

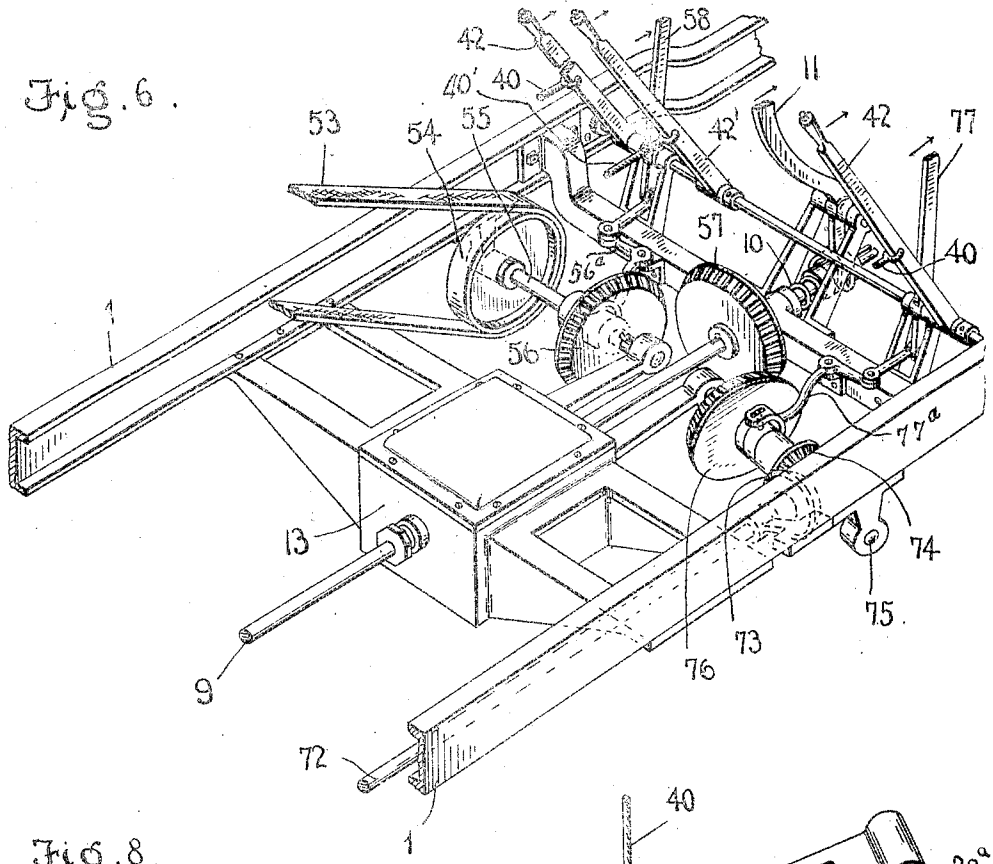
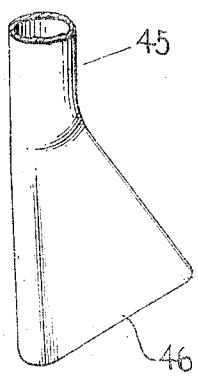


Fig. 8.



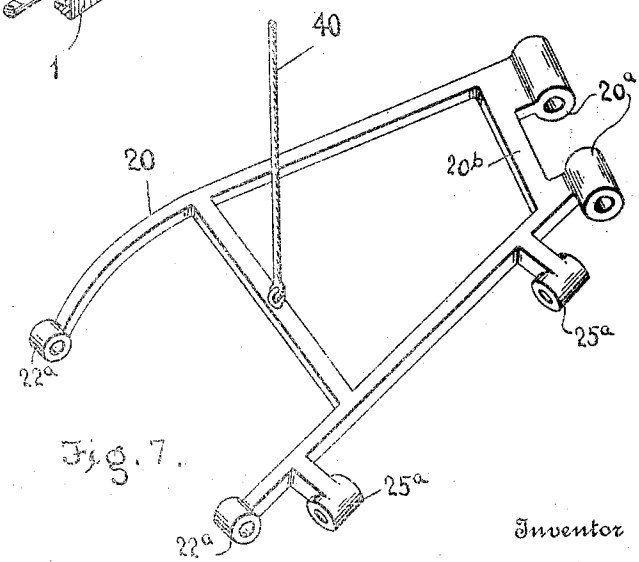


Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

HUGH CARR, OF SMYRNA, MICHIGAN.

STREET-CLEANING MACHINE.

1,081,209. Specification of Letters Patent. Patented Dec. 9, 1913.

Application filed June 6, 1912. Serial No. 702,093.

To all whom it may concern:

Be it known that I, HUGH CARR, a citizen of the United States, residing at Smyrna, in the county of Ionia and State of Michigan, have invented certain new and useful Improvements in Street-Cleaning Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to street cleaning machines.

One object of the invention is to provide a street cleaning machine having an improved construction and arrangement of propelling mechanism which is also employed for operating the dirt sweeping, gathering and discharging devices of the machine.

Another object is to provide a machine of this character having an improved construction and arrangement of sweeping and dirt gathering mechanism and means whereby the gathered dirt is discharged from the machine into a wagon or other receptacle or place of deposit.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings, Figure 1 is a side view of my improved street cleaning machine; Fig. 2 is a plan view of the machine with the dirt receptacle removed, and parts broken away and in section; Fig. 3 is a central vertical longitudinal section of the machine; Fig. 4 is a vertical cross sectional view thereof; Fig. 5 is a plan view of the supporting and operating mechanism for the brushes, removed from the machine; Fig. 6 is a detail perspective view of a portion of the forward end of the supporting frame and the main drive shaft showing more particularly the construction and arrangement of the gears for transmitting motion to the suction fan and elevator of the machine, and the arrangement of the levers for controlling the various clutches for throwing parts of the machine into and out of operation. Fig. 7 is a detail perspective view of the frame for one of the diagonally arranged rotary brushes of the machine: Fig. 8 is a detail perspective view of the lower end of the dirt conducting tube and the flared mouth piece thereof.

In the embodiment of the invention, I provide a supporting frame or chassis 1, which is mounted on rear driving wheels 2 and front steering wheels 3 which are provided with the usual or any suitable form of steering mechanism operated by a hand wheel 4 suitably arranged on the machine in convenient reach of the driver's seat 5. Arranged in the forward end of the frame 1 is a motor 6 which may be of any desired construction and which is provided with a drive shaft having on its inner end one member 7 of a friction clutch the opposite member 8 of which is slidably keyed to a main drive shaft 9 revolubly mounted in suitable bearings in the frame of the machine and which is normally held in operative engagement with the clutch member 5 by a coiled spring 10. The clutch member 8 is disengaged from the member 7 by a suitable shifting lever 11 which projects through the platform adjacent to the dash board of the machine and has a treadle 12 within convenient reach of the foot of the operator as shown.

The main drive shaft 9 extends back through the center of the machine and has arranged at a suitable point therein a change gear transmission 13 and has its rear end connected with a transverse jack shaft 14 by a differential gearing 15. Fixed on the jack shaft 14 adjacent to the opposite sides of the machine are sprocket gears 16 which are connected by sprocket chains 17 to similar gears 18 fixedly connected with the rear drive wheels 2 whereby the latter are driven to propel the machine.

Revolubly mounted in suitable bearings in the main frame of the machine substantially midway between its ends is a brush supporting and operating shaft 19 on which are hung eyes or bearings 20^a at the front end of brush carrying frames 20 which project rearwardly and downwardly from the shaft and have revolubly mounted in bearings 22^a at their outer ends diagonally arranged cylindrical brushes 21 the shafts 22 of which project beyond the outer sides of the frames 20 and have fixed thereon bevel gears 23 which are engaged with similar gears 24 on power transmitting shafts 25 revolubly mounted in suitable bearings 25^a on the sides of the frames 20. On the forward end

of the shafts 25 are fixed bevel gears 26 which are engaged with similar gears 27 fixed on the shaft 19 as shown. Also hung on the shaft 19 is the eye or bearing 28[a] of a central H-shaped brush supporting frame 28 which extends rearwardly and downwardly and has revolubly mounted in bearings 29[a] in its outer end a central brush 29 on one end of the shaft of which is fixed a sprocket gear 30 which is connected by a sprocket chain 31 with a similar gear 32 fixed on the shaft 19. By arranging the diagonal brushes 21 and gearing the same to the shaft 19 in the manner described it will be seen that these brushes will be revolved in the proper direction for sweeping the dirt forwardly and in a windrow beneath the center of the machine, while the brush 29 when arranged and geared to the shaft 19 as shown and described will rotate in the opposite direction from the brushes 21, said brush 29 being provided to loosen the dirt in the middle of the street and toss it backward so that it may be readily drawn up or gathered by the suction mechanism hereinafter described.

Fixed on the ends of the shaft 19 are sprocket gears 33 which are connected by sprocket chains 34 to sprocket gears 35 loosely mounted on the jack shaft 14. On the gears 35 are clutch members 36 which are adapted to be engaged with clutch members 37 fixed on the shaft 14 whereby when said clutch members are engaged the movement of the shaft 14 will be transferred to the shaft 19 thereby driving the latter in the proper direction. The gears 35 are shifted inwardly to engage the clutch members thereon with the clutch members 37 on the shaft 14 by coiled springs 38 which also yieldingly hold the clutch members in engagement. The gears 35 are retracted to disengage the clutch members thereon from the clutch members 37 thus throwing the shaft 19 out of gear by suitably arranged clutch shifting levers 39 which are disposed within reach of the operator.

By loosely connecting the forward ends of the brush holding frames 20 and 28 to the shaft 19, said frames together with the brushes carried thereby may be lifted or swung upwardly when desired, and in order to effect the lifting of the brushes, I provide lifting cables 40 and 40′ which are connected at their rear ends to the brush carrying frames and which pass over suitably arranged guide pulleys 41 and are connected at their forward ends to brush lifting levers 42 mounted near the driver's seat 5 and which are provided with locking mechanisms 43 whereby the brushes may be held in an elevated position.

It will be observed from Fig. 5 that at the points 20[b] the side bars of the H-shaped frame 28 carrying the intermediate roller 29 underlie the inner cross bars of the two side frames 20 carrying the diagonal rollers 21. The side frames are independently elevated by the ropes 40 and levers 42 as when for any reason it is not desired to sweep at one side of the street.

Suitably supported on the frame 1 of the machine and in the rear portion thereof is a dirt receptacle 44 the bottom of which preferably inclines from its forward end toward the rear end thereof as shown. Connected with the rear end of the receptacle 44 near the top thereof is a dirt conducting tube 45 which extends downwardly and has its lower end projecting forwardly and terminating a slight distance above the street, said lower end being flared outwardly to form a fan shaped mouth piece 46 which, as the machine is propelled sucks and gathers up the dirt collected or swept together by the brushes. Attention is directed to the fact that while the oblique rollers 21 are connected with the shaft 19 by gearing which causes them to rotate in a reverse direction so that the dust and dirt gathered up by them is brushed obliquely into the windrow above referred to, the intermediate roller is connected with said shaft 19 by belting which causes it to rotate in the opposite direction with the result that the dust and dirt gathered in said windrow is thereby brushed directly backward toward the fan-shaped mouth-piece 46 of the suction pipe 45. If all brushes rotated in a direction the reverse of that traversed by the main wheels, the dirt would be swept forward and then probably swept forward again by a succeeding brush, with the result that the dirt would be in a measure kept out of the way of the mouth-piece; but by reversing the direction of movement of the brush directly forward of said mouth-piece, the advantage described above is gained. The suction through the receptacle 44 and tube 45 is accomplished by a fan 47 arranged in a suitably supported casing 48 beneath and to one side of the forward end of the receptacle, said fan casing being connected by a tube 49 to the forward end of the bottom of the receptacle as shown. Arranged in the forward end of the receptacle above the upper end of the tube 49 is a screen 50 of fabric or other suitable material through which the air is drawn by the fan 47 and by means of which the dirt is separated from the air and prevented from being drawn into the fan casing. The fan casing is provided with a suitable discharge spout 51 which projects downwardly and discharges the air toward the street as shown.

On one end of the shaft of the fan is fixed a pulley 52 which is connected by a belt 53 to a fan operating pulley 54 which is fixedly mounted on a short fan operating shaft 55 revolubly mounted in suitable bearings in

the frame of the machine. Slidably keyed to the shaft 55 is a beveled gear 56 which is adapted to be shifted into engagement with a bevel gear 57 fixed on the main drive shaft 9 as shown. The hub of the gear 56 is provided with an annular groove and collar with which is adapted to be engaged the bifurcated end of a gear shifting bell crank lever 56ª which is actuated by a hand lever 58 the upper end of which is disposed within reach of the driver. By thus arranging the fan operating mechanism it will be seen that the same may be readily thrown into and out of operation for driving the fan when desired.

In order to remove the dirt from the receptacle 44, I preferably provide an elevating and discharging mechanism comprising a well or hopper 59 arranged on the bottom of the receptacle and toward which the bottom and sides of the receptacle incline as shown in Fig. 4 of the drawing. The opening between the bottom of the receptacle 44 and the hopper is normally closed by a valve or gate 60 which is slidably engaged with suitable guides 61 and is adapted to be retracted to an open position through one side of the bottom of the receptacle as shown.

Arranged beneath the bottom of the receptacle and having its lower end working in the hopper 59, is an endless conveyer or elevator 62 comprising a supporting bar or chute 63 which is disposed at a suitable angle and secured to one side of the bottom of the receptacle as shown. The bar 63 is preferably formed in two sections hingedly connected together adjacent to one side of the receptacle whereby the outer section of the bar together with the part of the conveyer connected therewith may be swung back against the receptacle and to an out of the way position when not in use. Revolubly mounted in suitable bearings on the outer end of the bar 63 is an outer conveyer pulley 64, while in the hopper 59 at the lower end of the bar is revolubly mounted a conveyer operating pulley 65. Operatively engaged with and driven by the pulleys 64 and 65 is an endless conveyer belt 66 having thereon a series of conveyer buckets 67 which are adapted to be successively brought around through the hopper 59, thus taking up and elevating the dirt discharged therein from the receptacle 44. The dirt when thus elevated may be discharged into a wagon or other receptacle or onto any desired place of deposit.

On the forward end of the shaft 68 of the lower conveyer pulley is a sprocket gear 69 which is connected by a sprocket chain 70 with a sprocket gear 71 fixed on the inner end of a power transmitting shaft 72 journaled in suitable bearings on the frame 1 and extending forwardly for a suitable distance. On the forward end of the shaft 72 is fixed a bevel gear 73 which is engaged with a similar gear 74 fixedly mounted on a short conveyer operating shaft 75 which is revolubly mounted in suitable bearings on the frame of the machine opposite to the fan operating shaft 55. On the shaft 75 is slidably keyed a bevel gear 76 which is adapted to be shifted into engagement with the bevel gear 57 on the main drive shaft 9 with the opposite side of which the fan operating gear 56 is adapted to be engaged. It will thus be seen that the gear 57 serves the double function of driving the fan and the dirt elevating and conveying mechanism. It will be understood however that these parts are not both operated at the same time. The hub of the bevel gear 76 is provided with an annular groove and collar which is adapted to receive the bifurcated end of a gear shifting bell crank lever 77ª which is actuated by a hand-lever 77 the upper end of which is disposed within convenient reach of the driver whereby the gear 76 may be shifted into and out of engagement with the gear 57 for driving the elevating mechanism when desired.

Having thus described my invention, what I claim is:

1. In a street sweeping machine, the combination with a framework, a dirt receptacle thereon, and a suction tube depending from said receptacle at the rear end of the machine and having a mouth-piece at its lower extremity; of a plurality of brushes carried by said framework, one disposed directly forward of said mouth-piece and the others standing oblique to the first and disposed also forward of the mouth-piece but rearward and to the sides of the first-mentioned brush, and means for rotating said first-mentioned brush in a direction to sweep the dust toward the mouth-piece and the other brushes in the opposite direction.

2. In a street sweeping machine, the combination with a framework, a dirt receptacle thereon, and a suction tube depending from said receptacle at the rear end of the machine and having a mouth-piece at its lower extremity; of a plurality of brushes carried by said framework, one disposed directly forward of said mouth-piece and the others to the sides of and rearward of the first-mentioned brush with their axes oblique and converging toward each other to the rear of the machine, and means for rotating said first-mentioned brush in a direction to sweep the dust toward the mouth-piece and the other brushes in the opposite direction.

3. In a street sweeping machine, the combination with a framework, a dirt receptacle thereon, and a suction tube depending from said receptacle at the rear end of the machine and having a mouth-piece at its lower extremity; of a plurality of brushes, one dis-

posed directly forward of said mouth-piece and others at opposite sides of the first-mentioned brush with their axes oblique and converging toward each other to the rear of the machine, a frame supporting each brush and movably connected with said framework, the frames of the side brushes partly overlying the frame of the other brush, means for lifting the rear ends of the side frames independently, means for lifting the intermediate frame, and means for rotating said first-mentioned brush in a direction to sweep the dust toward the mouth-piece and the other brushes in the opposite direction.

4. In a street sweeping machine, the combination with a main framework, a shaft journaled across the same, an intermediate brush, and two side brushes; of an H-shaped intermediate frame whose front end is journaled on said shaft and whose rear end carries said intermediate brush, two side frames each of which has its front end journaled on said shaft, its body overlying a portion of said H-shaped frame, and its rear end carrying one of the side brushes, means for elevating either side frame, and independent means for elevating the H-shaped frame.

5. In a street sweeping machine, the combination with a main framework, a shaft journaled across the same, an intermediate brush, and two side brushes; of an H-shaped intermediate frame whose front end is journaled on said shaft and whose rear end carries said intermediate brush, two side frames each of which has its front end journaled on said shaft, its body overlying a portion of said H-shaped frame, and its rear end carrying one of the side brushes, connections between the shaft and the intermediate brush for rotating the latter in one direction, connections between the shaft and the side brushes for rotating the latter in the other direction, means for elevating the side frames independently, and means for elevating the intermediate frame.

6. In a street sweeping machine, the combination with a main framework, a transverse shaft beneath the same, and drive wheels on said shaft; of an H-shaped frame having bearings at its upper end loosely mounted on said shaft and other bearings at its lower end, a brush whose shaft is journaled in the last-named bearings, a pair of other brush-frames each having spaced bearings at its upper end mounted loosely on said shaft astride one of the bearings on the first-named frame and an element overlying the H-shaped frame, each side frame also having bearings in its lower end, a brush whose shaft is mounted therein, connections between the shafts of said brushes and the respective drive wheels on the first-named shaft; means for raising either side frame independently of any other frame, and means for raising the intermediate frame, for the purpose set forth.

7. In a street sweeping machine, the combination with a main framework, a transverse shaft beneath the same, and three drive wheels fast on said shaft; of a frame having two bearings at its upper end loosely mounted on said shaft, a brush whose shaft is journaled in this frame, a pair of other brush-frames each having two spaced bearings at its upper end mounted loosely on said shaft astride one of the bearings on the first-named frame and partly overlying a side bar of the first-named frame, brushes whose shafts are journaled in the last-named frames, connections between the shafts of all brushes and the respective drive wheels, lever mechanism for raising either side frame independently of any other frame, and lever mechanism for raising the intermediate frame, for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HUGH CARR.

Witnesses:
R. K. HENRY,
M. A. WILKINSON.