Dec. 22, 1959 H. BURGDORFF 2,917,761

STREET SWEEPER HOPPER AND LIFT MECHANISM

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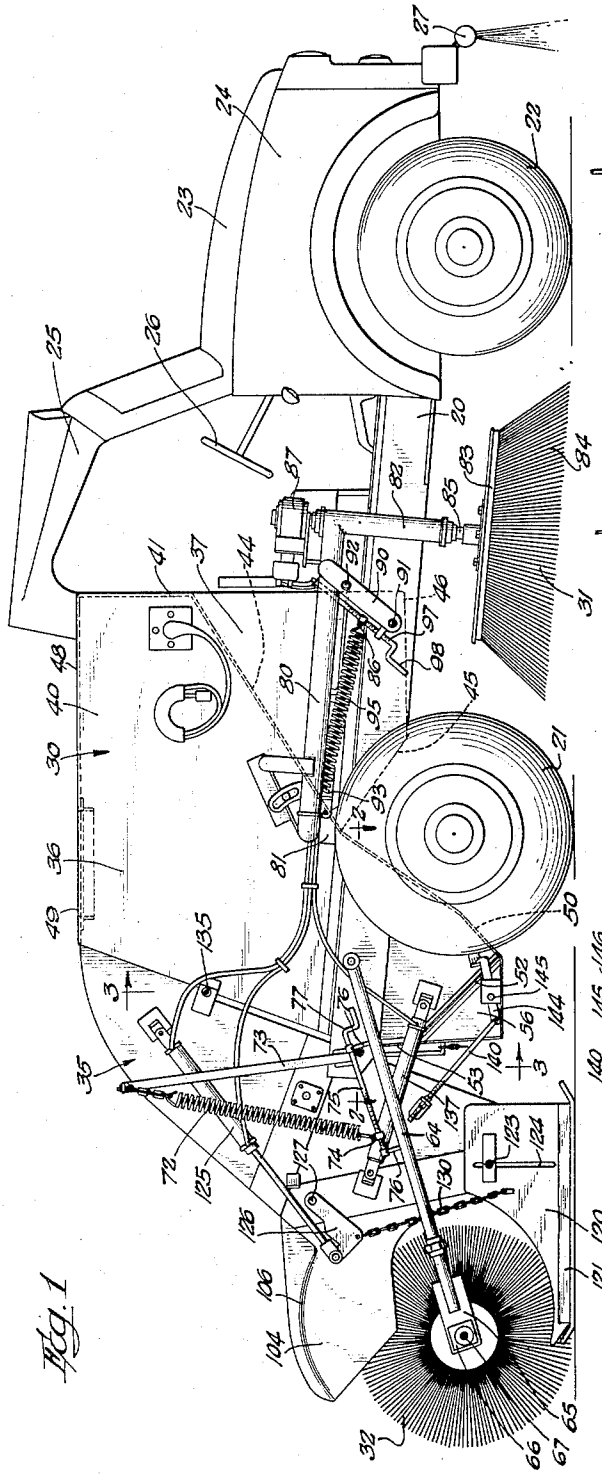


Fig. 1

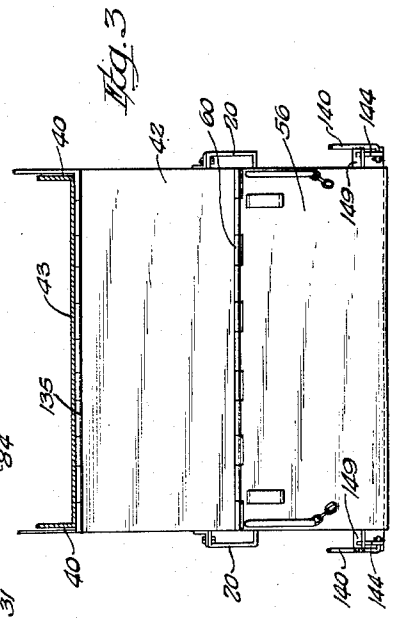


Fig. 3

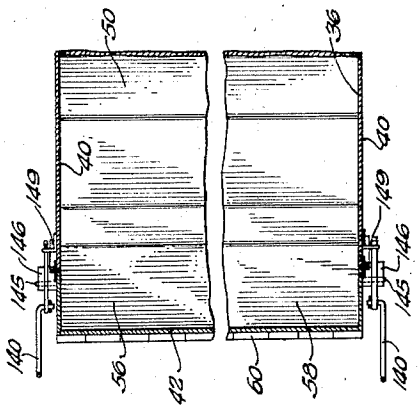


Fig. 2

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Fig. 4

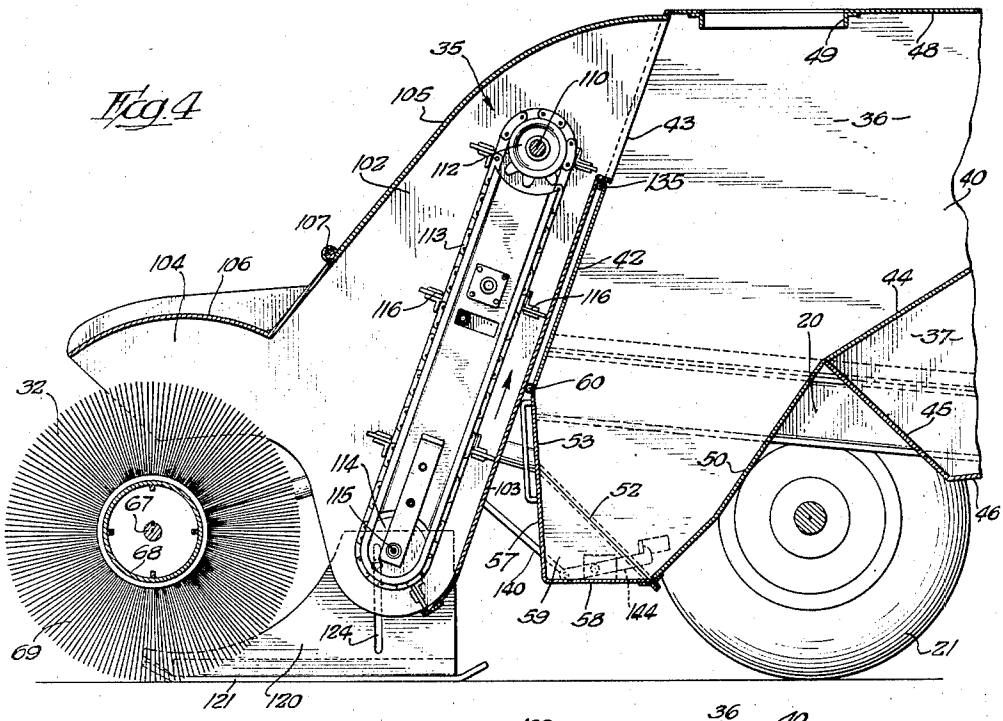
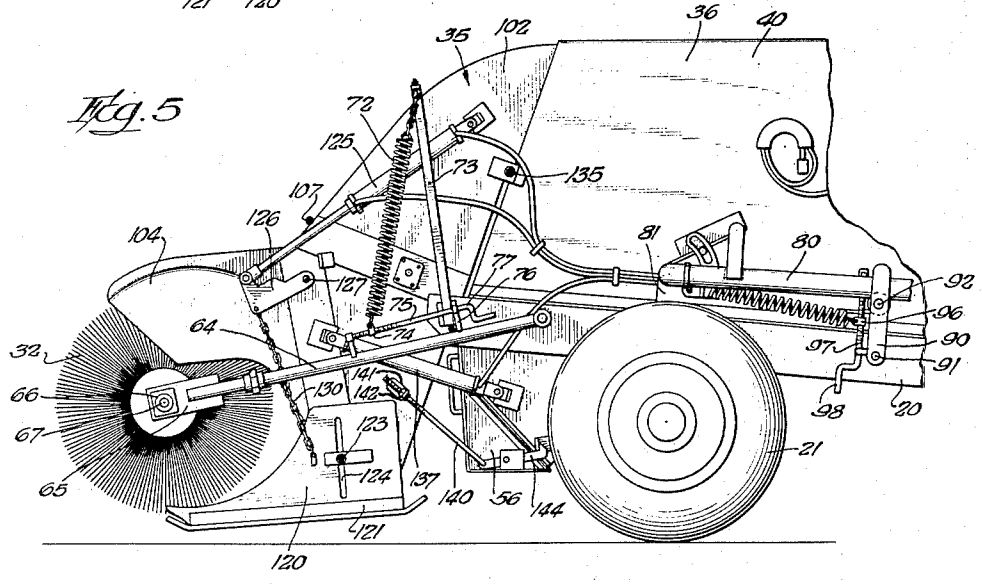


Fig. 5



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STREET SWEEPER HOPPER AND LIFT MECHANISM

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Fig. 6

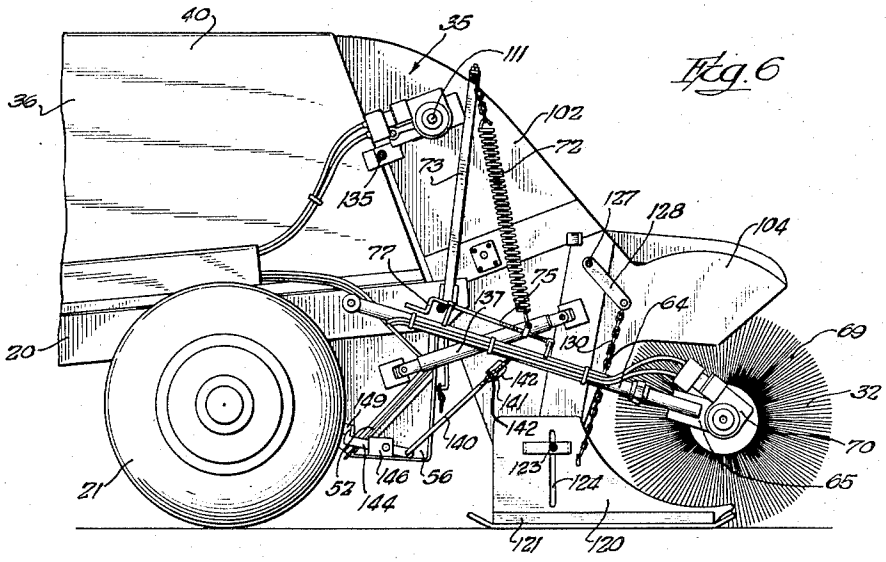


Fig. 7

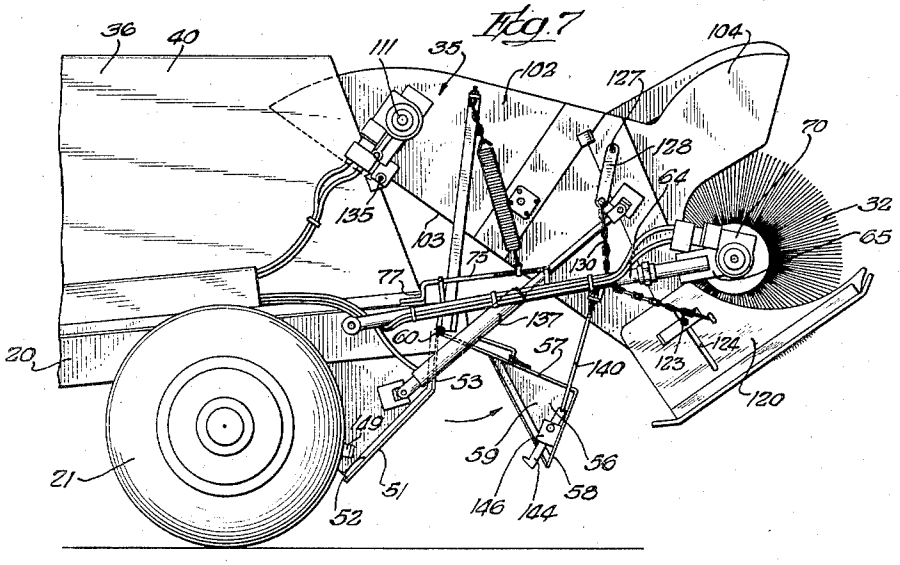
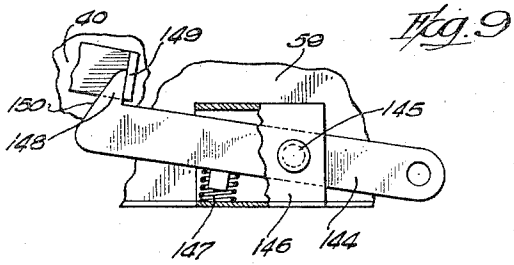


Fig. 9



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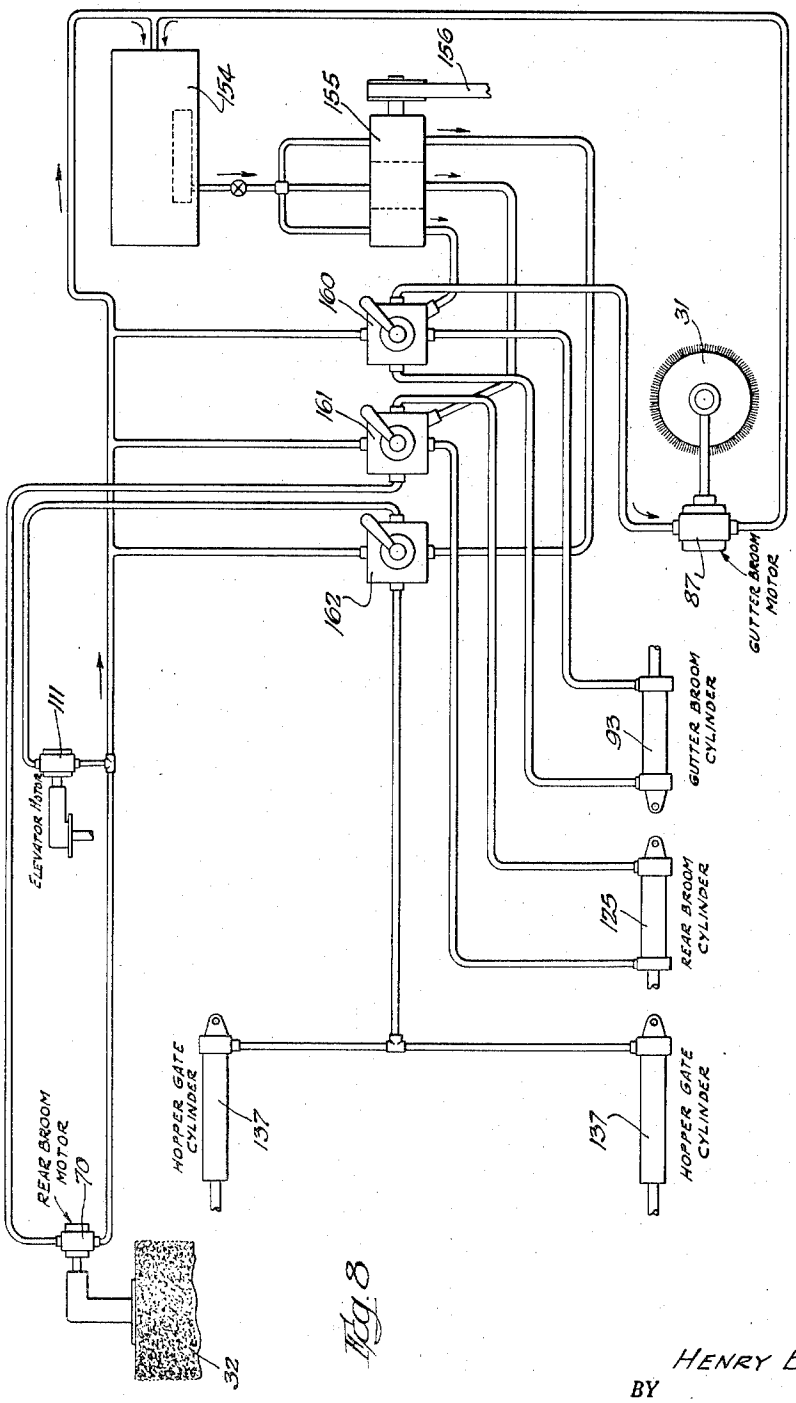


Fig. 8

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United States Patent Office 2,917,761 Patented Dec. 22, 1959

2,917,761

STREET SWEEPER HOPPER AND LIFT MECHANISM

Henry Burgdorff, Long Beach, Calif.

Application March 8, 1956, Serial No. 570,293

9 Claims. (Cl. 15—84)

This invention relates generally to modern motor driven street sweepers and more particularly to an improved sweeper which greatly facilitates dumping of the refuse gathered therein.

In the conventional street sweeper regardless of its arrangement it is customary to provide a pick-up broom which extends across the path of the sweeper and pushes dirt and refuse towards a refuse-receiving hopper wherein it is temporarily stored. Usually a conveyor or elevator is provided for carrying the refuse into the hopper from the pick-up broom. Side gutter brooms for sweeping refuse out of the street curbings and into the path of the pick-up broom are also provided, as may be water spraying nozzles and other accessories.

As can be appreciated, the refuse gathered in the hopper must be periodically and rather frequently emptied out, and ultimately taken to a city dump or other disposal area. It is with this problem that the present invention is principally concerned. In prior devices of this kind, the dirt or refuse-receiving hopper is mounted between the front and rear wheels of the sweeper and is equipped with bottom opening dump gates which normally cover a downwardly directed discharge opening disposed longitudinally between the front and rear wheels. When the dump gates are opened the refuse in the hopper is deposited in a pile beneath the sweeper. After the sweeper has been driven away the pile of refuse is subsequently gathered into a dump truck or other conveyance in which it is taken to the ultimate disposal area.

It is obviously of great advantage if the refuse stored in the sweeper can be discharged or dumped from the end of the sweeper rather than from a middle position between the wheels. By the use of end dumping the sweeper can be driven to the edge of a pit or loading dock and discharged directly therein rather than the requiring subsequent handling, reloading and redumping. However, this has not heretofore been achieved because the position of the pick-up broom and lift elevator relative to the refuse hopper is such as to normally interfere with any attempted end dumping arrangement.

With the foregoing in mind, it is therefore a major object of the invention to provide a modern type street sweeper having means for dumping refuse from the end of the sweeper rather than from a position between the wheels thereof.

An equally important object of the invention is to provide a street sweeper of the character described in which the pick-up broom and lift elevator are moved out of the discharge path of the refuse when the hopper dump gate is opened.

It is another object of the invention to provide a street sweeper having a refuse hopper provided with a lower discharge opening positioned longitudinally outwardly of the wheels and a pivotally movable dump gate mounted thereon.

A further object of the invention is to provide a street sweeper having a pivotally mounted dump gate and means associated with the gate and an adjacent elevator and broom for opening the gate and moving the elevator and broom out of the discharge path of the hopper.

It is also an object of the invention to provide a dump gate having supplemental storage volume therein and arranged to be emptied when said gate is moved to an open position, the release of refuse from said gate also acting to loosen the refuse within said hopper and expedite the dumping thereof.

Still another object of the invention is to provide force-applying and linkage means operable to move said gate, elevator and broom to open and cleared positions and to permit independent lifting of the elevator and broom.

A still further object of the invention is to provide a gate having self-latching means actuated for release by the operation of the opening and lifting means.

Yet another object of the invention is to provide a street sweeper of the character described which is of simple and durable construction for withstanding rugged use.

These and other objects and advantages of the invention will become apparent from the following detailed description of a preferred form thereof, and from an inspection of the accompanying drawings in which:

Figure 1 is a side elevation of a preferred embodiment of the street sweeper in operating position;

Figure 2 is a cross sectional detail taken along the line 2—2 of Figure 1;

Figure 3 is a cross sectional detail taken along the line 3—3 of Figure 1;

Figure 4 is an elevational detatil partially broken away to show the interior elevator and hopper construction;

Figure 5 is an elevational detail showing the elevator and broom lifted for road traveling operation;

Figure 6 is an opposite side elevation detail;

Figure 7 is an elevational detail similar to Figure 6 showing the elevator and broom lifted clear of the refuse discharge path and the hopper gate opened;

Figure 8 is a schematic of the hydraulic control system; and

Figure 9 is a detail of the hopper gate latch mechanism.

Referring now to the drawings and particularly to Figure 1 thereof, the invention is disclosed in conjunction with a motor-driven street sweeper of the four-wheeled type. The sweeper has a longitudinally extending frame designated generally at **20** and is provided with a pair of rear supporting wheels **21** and front steerable wheels **22**. In this instance, the front portion of the sweeper is arranged similar to a conventional motor truck and includes an engine (not shown) which is used to drive the sweeper and operate the various parts of the sweeper assembly. Behind a front hood **23** and fenders **24** is an operator's cab **25** containing a steering wheel **26** and various controls, for operating the sweeper, and driving the vehicle along the street. A water spray pipe **27** is also mounted at the front of hood **23** and sends a spray downwardly in front of the path of the sweeper to prevent the raising of dust by the sweeping operation.

Behind the cab **25** is a large body **30** which is supported on frame **20** above the rear wheels **21** and together with the other relatively stationary parts may be designated as the sweeper body assembly. Mounted at the side of the sweeper between the front and rear wheels is a large circular broom **31** which is driven for rotation about a generally vertical axis and makes sweeping contact with the surface of the street beneath the sweeper and to the side thereof as would be adjacent the curbing of a conventional street. Broom **31** is termed the gutter broom and functions to sweep dirt

out of the curbing gutter and laterally inwardly to a position beneath the sweeper.

Extended transversely across the sweeper at the rear end thereof is a large cylindrical pick-up broom **32** which is supported for rotation about its horizontal axis. As will later be described, pick-up broom **32** is driven for forward and upward rotation so that it sweeps refuse upwardly to clean the pathway of the sweeper. This includes the refuse normally lying within the wheel track of the sweeper as well as the refuse thrown outwardly from the curbing by the gutter broom **31**. Mounted between the body assembly **30** and the pick-up broom **32** is an elevator assembly **35** which is adapted to receive refuse from broom **32** and carry it forward and upwardly into a refuse hopper **36** which is contained within body **30**. Subsequently, when refuse hopper **36** is full it may be dumped to complete the sweeping cycle. While this serves in a general way to describe the operation of the sweeper, the interrelation of the various parts can best be understood by considering the structure in more detail.

The frame **20** comprises two spaced parallel elongated channels which are connected to the framework of the vehicle under cab **25** and extend rearwardly and slightly upwardly to the end of sweeper body **30**. The body assembly **30** is a large box-like housing which includes the refuse hopper **36** and a forward water tank **37** adjacent the bottom of cab **25**. The structure includes vertical side panels or walls **40** which are supported just inside frame channels **20** and extend upwardly a considerable distance. The shape of walls **40** is rectangular along the front and top edges, upwardly and forwardly sloping along the rear edge, and somewhat irregular along the bottom. A front wall **41** joins side walls **40** together and serves as the rear partition of cab **25**. A rear wall **42** extends only partially up the sloped back edge and the top portion thereof is open to define an intake opening **43**, as is best seen in Figure 4, for receiving refuse within the hopper **36**.

The forward bottom portion of the refuse hopper **36** is defined by a transverse sloping partition **44** which extends forwardly and upwardly from a point spaced above rear wheels **21** to approximately the middle of forward wall **41**. Partition **44** also forms the top of water tank **37**, the remainder of the tank being formed by downwardly convergent bottom walls **45** and **46** which join with the top wall and front wall **41**, respectively. The position of water tank **37** is quite desirable since it is supported between the sweeper wheels and also has a low center of gravity for good weight distribution.

As thus far defined it can be seen that refuse hopper **36** has the rear upper intake opening **43** and a rearwardly sloping front portion which is open downwardly from a point above rear wheels **21** to the partial rear wall **42**. A top wall **48** may extend over the entire hopper and be formed with an access hatch **49** therein for cleaning purposes. In order to facilitate dumping of hopper **36** a rear tail or chute portion is extended downwardly therefrom behind rear wheels **21** and, as is best seen in Figure 4, is formed by a steeply angled bottom wall **50** joined with the forward bottom partition **44** and extended downwardly to a rearwardly and downwardly facing discharge opening **51** which lies between the end of wall **50** and rear wall **42**. The sides **40** are extended downwardly to cover this chute portion and have two angularly intersecting edge sections adjacent to discharge opening **51**, a front section **52** extending rearwardly and upwardly from the corner of bottom wall **50**, and a rear section **53** intersecting therewith and extending approximately vertically upwardly therefrom to the lower corner of rear wall **42**. In other words, from the side, the discharge opening **51** has the upper rear corner thereof cut back along the vertical edge section **53**.

Discharge opening **51** is normally closed to permit the accumulation of refuse in hopper **36**, and this is accomplished by means of a dump gate **56** which is formed as a bucket-like cover which itself provides storage volume for refuse. Gate **56** has a rear wall **57** joined to a horizontally extending bottom wall **58** lying some distance below discharge opening **51** but extending forwardly to meet the rear corner of bottom wall **50**. Rear wall **57** extends along the aforementioned vertical edge section **53** of opening **51** to make a tight closure therewith. Triangular side walls **59** are fitted within walls **57** and **58** and shaped to fit tightly with the front edge sections **52** of walls **40** to complete the closure of the discharge opening **51**. As can thus be seen, gate **56** defines a supplemental container extending the storage capacity of hopper **36**.

The entire gate assembly **56** just described is pivotally connected to rear wall **42** by a horizontal hinge **60** extended across the lower edge of the rear wall, as is best seen in Figure 3, and the gate is thus adapted to swing rearwardly from its normal closed position to a position spaced from discharge opening **51** with an action as is best seen in Figures 6 and 7. It will be noted that discharge opening **51** is behind rear wheels **21** and that when gate **56** is opened the refuse within hopper **36** has a straight and clear discharge path. It can also be appreciated that the movement of the dump gate **56** tends to cause a freeing of the refuse within the hopper since part of the refuse moves with the gate and a suddent dislodging action takes place. When opened, gate **56** is in effect upturned, and any refuse riding therein is simultaneously dumped free and clear.

While the action of gate **56** is one of the important features of the invention, its cooperative relationship with the remainder of the sweeper assembly is also important and requires a description of the remaining elements. This is particularly true of the elevator and broom mechanisms which move with the gate in the dumping operation.

As was previously mentioned, the pick-up broom **32** is mounted at the rear of the sweeper. Broom **32** is supported on a pair of arms **64** which are pivotally connected to frame channels **20** at their forward end and extend downwardly and rearwardly for floating or pivotal action in a vertical plane. At the ends of arms **64** are bearing plates **65** containing bearings **66** which rotatably support a broom shaft **67** that forms a part of a broom core **68**, as is best seen in Figure 4. The broom **32** may be, in and of itself conventional, and comprises bristles **69** mounted on core **68** in a cylindrical overall shape.

Mounted at the left hand end of broom **32** is a hydraulic drive motor **70** which is supported on the left arm **64** and is free for pivotal movement with the arm. Motor **70** is suitably connected to broom shaft **67** and serves to rotate broom **32** forwardly and upwardly in a counterclockwise direction as viewed in Figures 1 and 4. The action of bristles **69** is thus to sweep refuse forwardly and upwardly as broom **32** traverses the street. The purpose of having arm **64** pivotally mounted is to permit broom **32** to ride along the surface of the street in conformance to the contour thereof for sweeping contact. It is also to permit the raising of broom **32** off the street for road traveling purposes as will subsequently be described in connection with the operation of the elevator assembly.

In order to adjust the weight or tension with which broom **32** rides on the street adjustable spring supporting means for arms **64** are provided. These spring supporting means take the form of a pair of elongated coil springs **72** which are connected at their upper ends to upstanding standards **73** that are rigidly supported on the ends of both frame channels **20**. The lower ends of springs **72** are connected to adjustment nuts **74** which are threadedly engaged on adjusting screws **75**. The latter are rotatably mounted on arms **64** by brackets **76** and have front

handles 77 by which they may be rotated. As screws 75 are rotated the position of nuts 74 relative thereto is moved to change the effective length of supporting springs 72. For normal usage, springs 72 are adjusted so that they substantially balance the weight of broom 32 and its supporting structure.

The previously mentioned forward gutter broom 31 is supported in a generally similar manner to the rear broom 32. The basic support for broom 31 is provided by an arm 80 which is pivotally supported on the right hand frame 20 by a bracket 81 at a point above the rear wheel 21, and extends forwardly and connects right angularly to a downturned arm 82. Broom 31 has an upper support disc 83 to which are secured downwardly projecting bristles 84. Disc 83 is supported on the end of a rotatable drive shaft 85 which extends upwardly through support arm 82 and is journaled therein. Mounted at the top of arm 82 is a hydraulic drive motor 87 which is suitably connected to shaft 85 to rotate it, and in turn, broom 31.

When the sweeper is traveling to and from sweeping locations it is desirable to lift broom 31 free of the road surface. To this end, a pivotally mounted crank 90 is supported on frame 20 midway of the length of arm 80 by a pivot pin 91 connected near the lower end of the crank. The upper end of crank 90 carries a roller 92 which passes under arm 80 in supporting relationship. A hydraulic ram 93 is connected between crank 90 and a fixed point on bracket 81 and is adapted for extension and retraction in the usual manner. As shown in Figure 1, ram 93 is in the extended position causing crank 90 to be rotated forwardly and downwardly so that broom 31 engages the street surface. When it is desired to lift broom 31, ram 93 is retracted and crank 90 is pivoted upwardly to the position shown in Figure 5.

In order to prevent the full weight of gutter broom 31 from resting on the ground, an adjustable spring-supporting means is connected between crank 90 and body assembly 30 and tends to pull the crank upwardly. One end of a coil spring 95 is connected to bracket 81 and the other end connects to an adjusting nut 96 carried on an adjusting screw 97 which extends parallel to crank 90 and is supported thereon. A handle 98 is provided on the end of screw 97 and by rotating the screw the position of nut 96 may be changed to adjust the tension on spring 95. Again, the usual adjustment of spring 95 is such that it supports substantially all of the weight of broom 31 and the latter exerts only a light sweeping pressure.

The elevator assembly 35 which is positioned between rear broom 32 and refuse hopper 36 is formed with two vertical walls or side plates 102 which extend downwardly from the top of the hopper to a point spaced a short distance above the ground level. The lateral spacing of plates 102 is slightly less than that of body side walls 40 so that the plates lie just inside of the latter. Extended across between the front edge of plates 102 is an elevator bottom wall 103, which, as is best seen in Figure 4, extends parallel to rear hopper wall 42 from its top to a point near the bottom of the elevator. The lower edge portion of wall 103 may be curved rearwardly and upwardly. Above rear wall 42 the side plates 102 project forwardly a short distance and lap the inside of hopper side walls 40 within the previously mentioned hopper intake opening 43.

The rear edges of side plates 102 curve rearwardly from the top front corner and then slope downwardly at a flatter angle to a point above and just to the front of rear broom 32. From this point the rear edges curve upwardly over the broom, angle downwardly and return forwardly to provide rear skirts 104, and then curve downwardly to join the front edges at a rounded bottom portion, as is shown in Figure 4. The external framework of the elevator assembly is completed by a transversely extending fixed top cover 105 secured along the upper rear edges of the side plates, and a lower hinged fender 106 which is secured to the upper cover by a transverse hinge 107. Fender 106 continues rearwardly along the top of skirt portions 104 to cover broom 32, and is pivotally movable upwardly for cleaning and repair of the broom.

Within the elevator assembly 35 are means movable to carry refuse upwardly from broom 32 to refuse hopper 36 in the form of a conveyor having an upper drive shaft 110 extended transversely across between plates 102. Outboard of left hand side plate 102 (Figure 6) is a hydraulic motor 111 suitably connected to rotate shaft 110 in a counterclockwise direction as viewed in Figure 4. Inside of the elevator, shaft 110 carries spaced drive sprockets 112 which engage with conveyor chains 113. The latter extend downwardly parallel to the hopper bottom 103 and are rotatably supported at their lower ends on idler sprockets 114 which are carried on a lower shaft 115. Conveyor chains 113 move counterclockwise around the path established by sprockets 112 and 114, and support transversely extending lift or squeegee bars 116 which are spaced apart on the chains and are of such a size that they slide closely along elevator bottom 103 when on the lower half of their path. As lift bars 116 move upwardly along elevator bottom 103 they lift the refuse upwardly until the hopper intake opening 43 is reached. At this point the refuse falls forwardly into hopper 36, and the bars 116 turn upwardly over upper sprockets 112 and return downwardly to the bottom of the elevator.

In order to confine the refuse against spreading laterally outwardly as it is swept up by broom 32, side drag shoes 120 are mounted at the lower ends of the elevator side plates 102. The drag shoes 120 have lower skids 121 which slide along the surface of the street so that they provide a protective closure along the sides of broom 32 and forwardly up to the bottom elevator wall 103. Shoes 120 are connected to side plates 102 by means of pins 123 extended from the plates and engaged within elongated vertical slots 124 formed in the shoes. This connection permits the shoes 120 to conform to the surface irregularity in the street without disturbing the position of the elevator.

When the sweeper is to be driven to and from sweeping jobs it is desirable to elevate broom 32 and shoes 120 clear of the ground from the normal sweeping position to that shown in Figure 5. For this purpose a hydraulic ram 125 is mounted upon the right hand side plates 102. The upper end of ram 125 is pivotally connected to the side plate 102 and the lower end is connected to a pivotal crank 126 which is mounted on a cross shaft 127 extended between the side plates and rotatably journaled therein. The left hand end of shaft 127 carries a crank arm 128 similar to crank 126, and both are thus adapted to be moved pivotally upon extension or retraction of ram 125.

On both sides of the sweeper the cranks 126 and 128 are connected by flexible chains 130 with the broom supporting arms 64 and the shoes 120. Normally, ram 125 is extended, and cranks 126 and 128 are turned rearwardly and downwardly so that both broom 32 and shoes 120 are free to ride on the street surface. When ram 125 is retracted, as shown in Figure 5, chains 130 act to lift the arms 64 and shoes 120 so that the latter and broom 32 are clear of the street. In this position, and with the forward gutter broom 31 elevated as has been previously described, the street sweeper has normal truck characteristics and can be driven rapidly to and from the sweeping locations. It should also be noted that the chain connections 130 permit complete freedom of movement of broom 32 and shoes 120 when in the sweeping position for conformance with street irregularities.

The complete elevator assembly 35 thus described, is pivotally supported on the rear wall 42 of the refuse

hopper 36. As is best seen in Figure 4, a hinge 135 is extended along the top of wall 42 and is connected to the elevator bottom wall 103. This connection allows elevator assembly 35 to pivot upwardly from its normal position to the position shown in Figure 7. As this occurs, the upper leading edge portions of side plates 102 slide freely forwardly into hopper 36. As elevator assembly 35 moves upwardly the broom 32 and shoes 120 are also lifted through the connection of lifting chains 130 and cranks 126 and 128.

Lifting of elevator assembly 35 is accomplished by means of a pair of hydraulic rams 137 which are connected between body assembly 30 and the elevator assembly. The front ends of rams 137 are pivotally connected to the hopper chute portion of side walls 40 just above hopper gate 56, and the rear ends of the rams are elevated slightly and pivotally connected to elevator side plates 102 at points spaced above shoes 120. Normally, rams 137 are in a retracted position as shown in Figures 1 and 6. When the rams 137 are extended they force the bottom portion of elevator assembly 35 to move rearwardly and upwardly to the position shown in Figure 7. The purpose of lifting elevator assembly 35 is to move it free and clear of the discharge path of the refuse when hopper gate 56 is opened. Also, since the elevator assembly 35 is lifted the sweeper can be more readily backed up to a dumping site.

As will be remembered, in order to dump the refuse from hopper 36 the lower dump gate 56 is opened by pivoting it rearwardly. This is accomplished at the same time that elevator assembly 35 is lifted by means of a connection between assembly 35 and gate 56 in the form of linking levers 140. The upper ends of levers 140 are threaded and adjustably connected to brackets 141 mounted on elevator side plates 102 by nuts 142. Levers 140 angle forwardly and downwardly and the lower ends are connected to latches 144 which are mounted on the side plates 59 of gate 56.

Each latch 144 is pivotally secured to side plate 59 by a pin 145 which extends through a small box-like housing 146 mounted thereon as is best seen in the detail of Figure 9. The upper and lower edges of housing 146 limit the pivotal movement of the lever and a small spring 147 confined therein urges the forward end of the latch upwardly. On the leading end of latch 144 is a hook end 148 which is adapted to engage a fixed keeper plate 149 mounted on hopper side wall 40. Hook 148 has a tapered leading edge 150 and is adapted to be self-latching with keeper plate 149 when gate 56 is closed.

When elevator assembly 35 is lifted upwardly by hydraulic rams 137 the linkage levers 140 act to first pull the rear end of latches 144 upwardly against the urging of springs 147 to release hooks 148 from keeper 149. This frees gate 56, and continued movement of levers 140 pulls the gate rearwardly and upwardly to the open position shown in Figure 7. As can thus be seen, the elevator assembly 35 and hopper gate 56 move simultaneously to an open position to provide a free path for the discharge of refuse. Rear broom 32 is, of course, moved out of the path of the discharging refuse through its connection with elevator assembly 35. When refuse hopper 36 is emptied, the hydraulic pressure on rams 137 is released, and the weight of elevator assembly 35 causes it to pivot downwardly to its normal position. Gate 56 is automatically closed through the action of latches 144 and the sweeper is ready for continued sweeping operation.

Figure 8 shows a schematic diagram of the system for the various hydraulic operating elements which have previously been described. In addition to the described elements, the system includes hydraulic fluid storage tank 154 and a hydraulic system pump 155, the latter being adapted for connection to the sweeper engine by suitable means such as a drive belt 156. From pump 155 the hydraulic fluid under pressure is conducted through suitable lines to a set of control valves which are used to control the operation of the hydraulic rams and drive motors. Three such valves are illustrated, these being a control valve 160 which is used for operating the gutter broom motor 87 and gutter broom ram cylinder 93, a valve 161 for the rear broom motor 70 and rear broom lifting ram cylinder 125, and a valve 162 for the elevator lifting ram cylinder 137 and elevator motor 111. Each of the control valves is of conventional multiple port construction so that the various operating elements can be driven at high or low speeds and in opposite directions. It should be noted that the lines used to connect the control valves with the operating elements are of flexible hose type. Thus, the movement of the various parts previously described in the operation of the sweeper is not hampered in any way by the hydraulic connections.

While I have thus described in considerable detail a preferred embodiment of the invention, it is to be understood that modification of design and construction can be made without departing from the scope of the invention. Therefore, I do not wish to be limited to the foregoing except as defined in the appended claims.

I claim:

1. A street sweeper which includes: a body assembly including a refuse-receiving hopper; a pick-up broom extending across said sweeper and connected to said body assembly for limited vertical movement; an elevator mounted between said broom and said hopper and having means for carrying refuse from said broom to said hopper, said elevator being supported for limited vertical movement relative to said body assembly; means connecting said broom and elevator to limit lifting of said broom independently of said elevator to a transporting position of said broom and adapted to lift said broom in response to lifting of said elevator; a dump gate mounted on said assembly at the bottom of said hopper and movable from a normally closed to an open position; means connecting said gate and elevator adapted to open said gate in response to lifting of said elevator and means connected to said body assembly for moving said broom and said elevator upwardly and clear of the discharge path of said refuse.

2. A street sweeper which includes: a body assembly including a refuse-receiving hopper; a set of supporting wheels mounted on said body assembly; a pick-up broom extending across one end of said sweeper and connected to said body assembly for vertical pivotal movement; an elevator mounted between said hopper and said broom and having means movable to lift refuse upwardly into said hopper, said elevator being pivotally connected to said body assembly for vertical movement; force applying means interconnecting said broom and elevator to move said broom between sweeping and transporting positions thereof when said elevator occupies a lowered position and adapted to lift said broom upwardly beyond transporting position when said elevator is lifted; a dump gate mounted on said assembly at the bottom of said hopper and movable from a normally closed to an open position, said gate being positioned longitudinally outwardly of said wheels adjacent said elevator; means connecting said gate with said elevator; and force-applying means connected to said body assembly and said elevator for pivotally lifting said elevator and said broom out of the discharge path of said refuse and opening said gate.

3. A street sweeper which includes: a body assembly including a refuse-receiving hopper having an upper intake opening and a lower discharge opening; a set of supporting wheels mounted on said body assembly longitudinally inwardly of the discharge opentng on said hopper; a pick-up broom extending across one end of said sweeper and connected to said body assembly for vertical pivotal movement; an elevator mounted between said broom and said hopper and having means movable to lift refuse upwardly into said hopper, said elevator being connected to said body assembly for vertical pivotal

movement; a dump gate mounted on said assembly at the discharge opening of said hopper and pivotally supported for movement from a closed position to an open position spaced from said opening in the direction of said elevator; latch means normally holding said gate closed; means connecting said broom to said elevator for movement with said elevator and allowing said broom to lift between sweeping and transporting positions thereof independently of said elevator; force applying means connected to said broom for moving said broom between sweeping and transporting positions; means operatively associated with said latch means and connecting said gate with said elevator; and force-applying means connected to said body assembly and said elevator for pivotally lifting said elevator and said broom out of the discharge path of said refuse and opening said gate.

4. A street sweeper which includes: a body assembly including a refuse-receiving hopper having an upper intake opening and a lower discharge opening; a set of supporting wheels mounted on said body assembly longitudinally inwardly of the discharge opening on said hopper; a pick-up broom extending across one end of said sweeper and connected to said body assembly for vertical pivotal movement; an elevator mounted between said broom and said hopper and having means movable to lift refuse upwardly into said hopper, said elevator being connected to said body assembly for vertical pivotal movement; a dump gate mounted on said assembly at the discharge opening of said hopper and pivotally supported for movement from a closed position to an open position spaced from said opening in the direction of said elevator; self-latching means holding said gate in said closed position; means connecting said broom to said elevator for vertical movement of said broom with said elevator, and limiting said broom to movement between sweeping and transporting positions thereof independently of movement of said elevator when said elevator is in a lowered position; means connected between said latching means and said elevator for opening said latching means and moving said gate to said open position when said elevator moves upwardly; and force-applying means connected to said body assembly and said elevator for pivotally lifting said elevator and said broom out of the discharge path of said refuse and opening said gate.

5. A street sweeper which includes: a body assembly including a refuse-receiving hopper having an upper intake opening and a lower discharge opening; a set of supporting wheels mounted on said body assembly longitudinally inwardly of the discharge opening on said hopper; a rear pick-up broom extending across said sweeper; a pair of supporting arms attached to said broom and extending forwardly and upwardly, said arms being pivotally connected to said body assembly; means for rotating said broom forwardly and upwardly; an elevator mounted between said broom and said hopper, the lower end of said elevator being positioned to receive refuse from said broom upon rotation of the latter, said elevator having lift means therein movable to lift refuse up to the upper opening of said hopper and said elevator being pivotally connected to said hopper for upward and rearward pivotal movement; means interconnecting said elevator and broom for supporting said broom in a lowered sweeping position and a raised transporting position independently of said elevator, and adapted to lift said broom during upward pivotal movement of said elevator; a dump gate positioned over the discharge opening of said hopper and having an angular bucket shape forming an extension of said hopper, said gate being pivotally mounted to said hopper at the rear end of said opening for rearward pivotal movement, said gate being normally closed and movable rearwardly to an inverted position for the discharge of refuse from said hopper and said gate; self-latching means holding said gate in said closed position; means connected between said latching means and said elevator for opening said latching means and moving said gate to said open position when said elevator moves upwardly; and a fluid-actuated plunger connected to said body assembly and said elevator for lifting said elevator and said broom out of the discharge path of said refuse and opening said gate.

6. In a street sweeper vehicle having a refuse receiving hopper, a dump gate spaced rearwardly of the supporting wheels of said vehicle for closing a discharge opening formed in said hopper, a vertically swingable pick-up broom assembly at the rear end of said vehicle, and an elevator assembly pivotally mounted on said hopper and positioned between said broom and said hopper to conduct refuse from said broom upwardly into said hopper, the improvement comprising the combination of: force applying means interconnecting said broom assembly and said elevator assembly that is operable to move said broom assembly between transporting and sweeping positions when said elevator assembly occupies a lower transporting position, and adapted to carry said broom assembly above transporting position in response to lifting of said elevator assembly from transporting position; force applying means connected to said vehicle and operatively associated with said elevator assembly for lifting said elevator assembly upwardly from said transporting position out of the discharge path of refuse falling from said discharge opening whereby said broom assembly is concurrently lifted upwardly above transporting position and out of said discharge path; latching means for releasably holding said gate in closed position; and means interconnecting said latching means and said elevator assembly to release said latching means in response to lifting of said elevator assembly whereby said discharge path is unobstructed by said elevator assembly and said broom assembly upon opening of said gate.

7. In a street sweeper vehicle having a refuse receiving hopper, a dump gate spaced rearwardly of the supporting wheels of said vehicle for closing a discharge opening formed in said hopper, a vertically swingable pick-up broom assembly at the rear end of said vehicle, and an elevator assembly pivotally mounted on said hopper and positioned between said broom and said hopper to conduct refuse from said broom upwardly into said hopper, the improvement comprising the combination of: means interconnecting said broom assembly and said elevator assembly for limiting independent movement of said broom assembly between a sweeping position and a transporting position of said broom assembly; a fluid actuated plunger adapted to be remotely controlled by the operator of said vehicle and drivingly connected to said first mentioned means to selectively move said broom assembly between sweeping and transporting positions; a fluid actuated plunger adapted to be remotely controlled by the operator of said vehicle and operatively interconnected between said vehicle and said elevator assembly to lift said elevator assembly upwardly from a lowered transporting position and out of the discharge path of refuse falling from said discharge opening whereby said broom assembly is concurrently lifted above transporting position and out of said discharge path; latching means for releasably holding said gate in closed position; and means interconnecting said latching means and said elevator assembly to release said latching means in response to lifting of said elevator assembly whereby said discharge path is unobstructed by said elevator assembly and said broom assembly upon opening of said gate.

8. In a street sweeper vehicle having a refuse receiving hopper, a dump gate spaced rearwardly of the supporting wheels of said vehicle for closing a discharge opening formed in said hopper and openable in a direction away from said hopper, a vertically swingable pick-up broom assembly at the rear end of said vehicle, and an elevator assembly pivotally mounted on said hopper and positioned between said broom and said hopper, the improvement comprising the combination of: force applying means interconnecting said broom assembly and said elevator

assembly that is operable to move said broom assembly between transporting and sweeping positions when said elevator assembly occupies a lowered transporting position and adapted to carry said broom assembly above transporting position in response to lifting of said elevator assembly from transporting position; force applying means connected to said vehicle and operatively associated with said elevator assembly for lifting said elevator assembly upwardly from said transporting position and out of the discharge path of refuse falling from said discharge opening whereby said broom assembly is concurrently lifted upwardly above transporting position and out of said discharge path; self-latching means including cooperating parts mounted on said gate and on said hopper for holding said gate in closed position; and rigid means interconnecting the part of said latching means mounted on said gate and said elevator assembly and adapted to release said latching means in response to lifting of said elevator assembly and to open said gate concurrently with lifting of said elevator assembly whereby refuse is discharged through said discharge opening in a path unobstructed by said elevator assembly and by said broom assembly.

9. In a street sweeper vehicle the combination of: a body assembly including a rigidly mounted substantially enclosed refuse receiving hopper with an upper intake opening and a lower discharge opening formed in the rear end of said body assembly, said discharge opening being spaced rearwardly of the rear supporting wheels of said vehicle; a broom assembly comprising a pair of broom supporting arms pivotally connected at their forward ends to said vehicle and extending rearwardly to support a pick-up broom behind said vehicle; an elevator assembly including a housing that opens at its upper end into communication with said intake opening and receiving said broom in a lower end opening thereof, said housing supporting a means to convey refuse from said broom to said intake opening and being pivotally connected to said hopper for telescoping angular movement into said intake opening; means interconnecting said broom assembly and said elevator assembly for limiting independent movement of said broom assembly between a sweeping position and a transporting position of said broom assembly; a fluid actuated plunger adapted to be remotely controlled by the operator of said vehicle and drivingly connected to said means interconnecting said assemblies to selectively move said broom assembly between sweeping and transporting positions; a fluid actuated plunger adapted to be remotely controlled by the operator of said vehicle and operatively interconnected between said vehicle hopper and said elevator assembly to lift said elevator assembly upwardly from a lowered transporting position and out of the discharge path of refuse falling from said discharge opening whereby said broom assembly is concurrently lifted above transporting position and out of said discharge path; a dump gate on said hopper for said discharge opening and openable in the direction of said elevator housing to release refuse from said hopper; self-latching means for normally holding said gate in closed position; and means interconnecting said latching means and said elevator assembly and adapted to release said latching means in response to lifting of said elevator assembly to open said gate whereby refuse is discharged through said discharge opening in a path unobstructed by said elevator assembly and by said broom assembly.

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