(No Model.) 4 Sheets—Sheet 1.

F. C. WILLIAMS.

STREET SWEEPER.

No. 557,297. Patented Mar. 31, 1896.

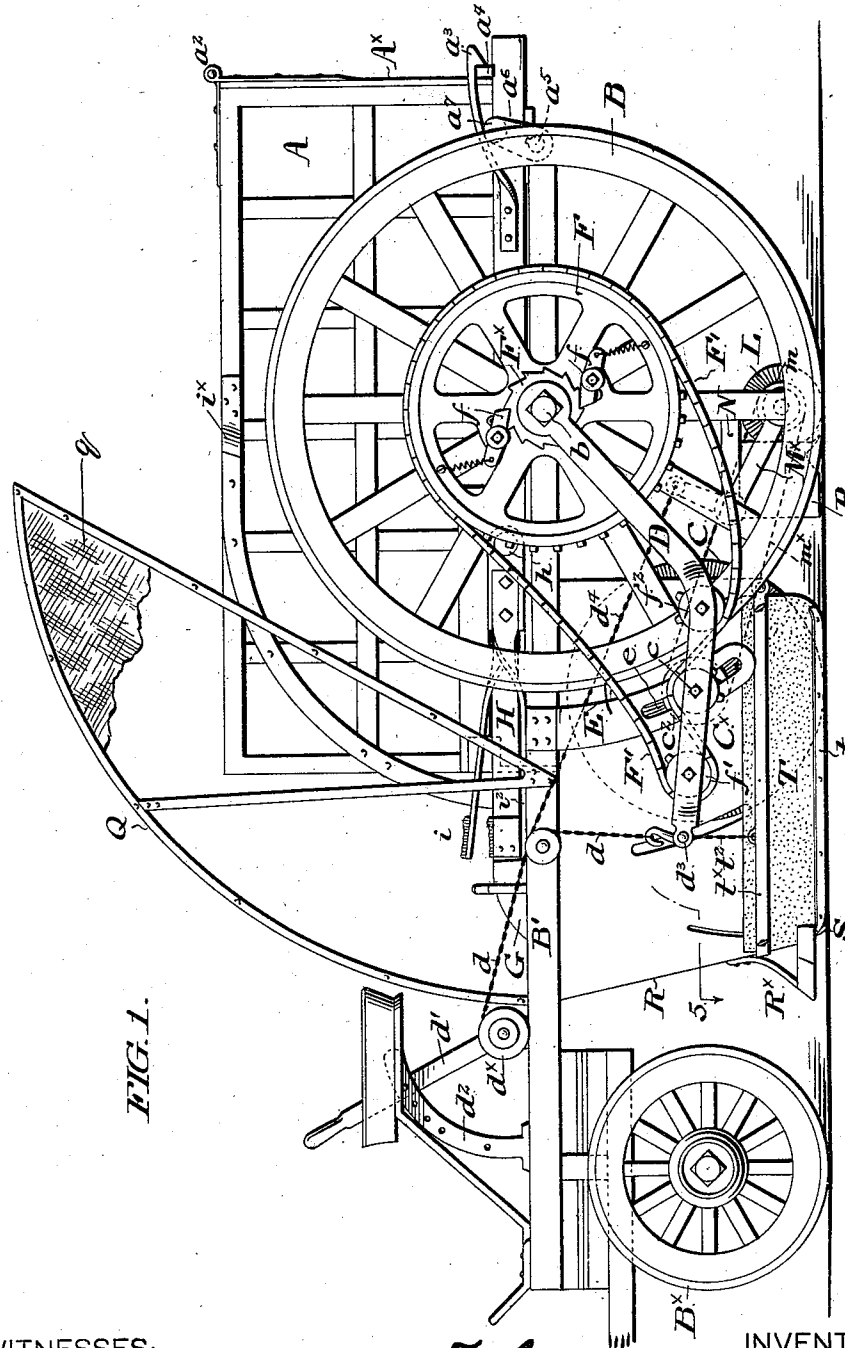

FIG. 1.

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(No Model.) 4 Sheets—Sheet 2.

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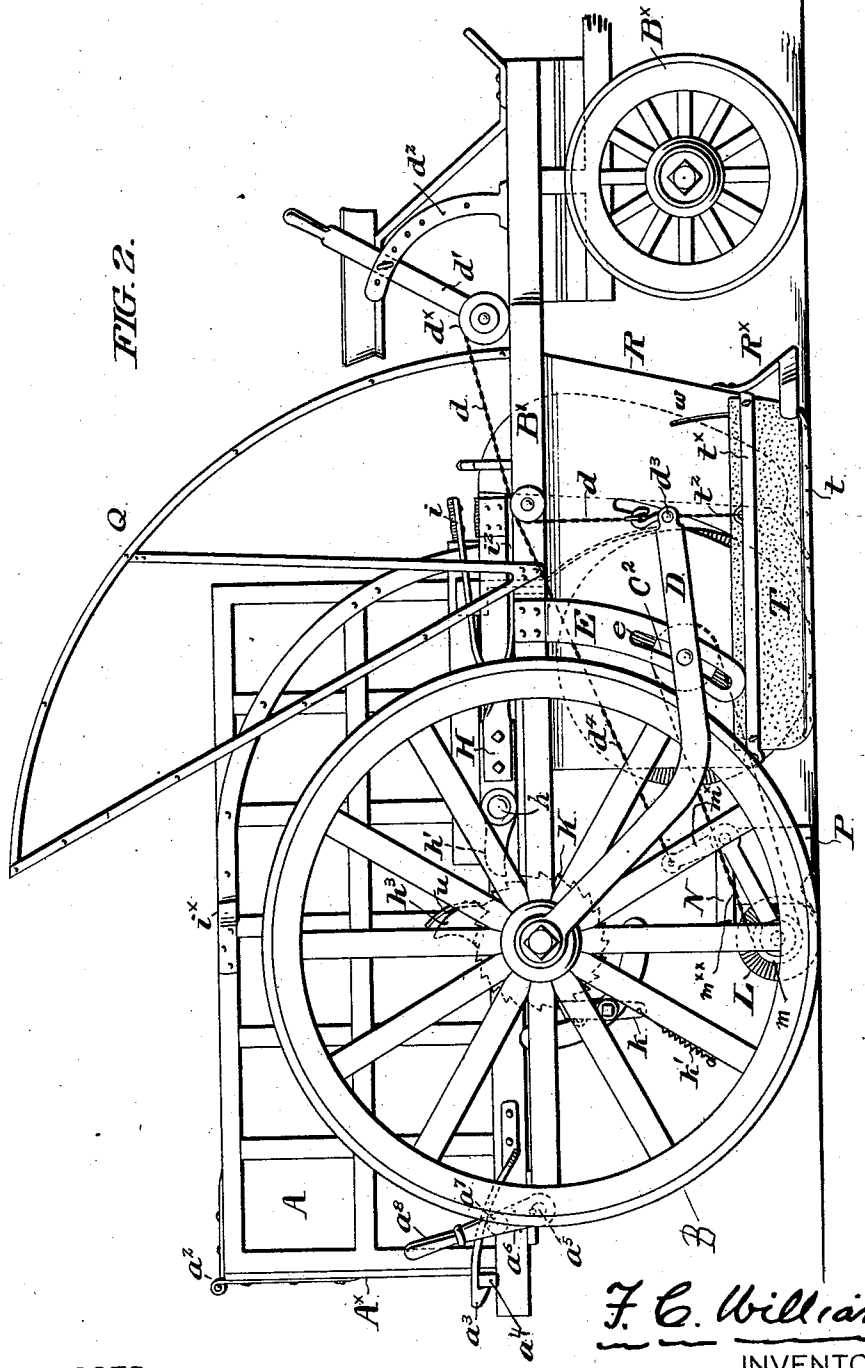
FIG. 2.



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(No Model.) 4 Sheets—Sheet 3.

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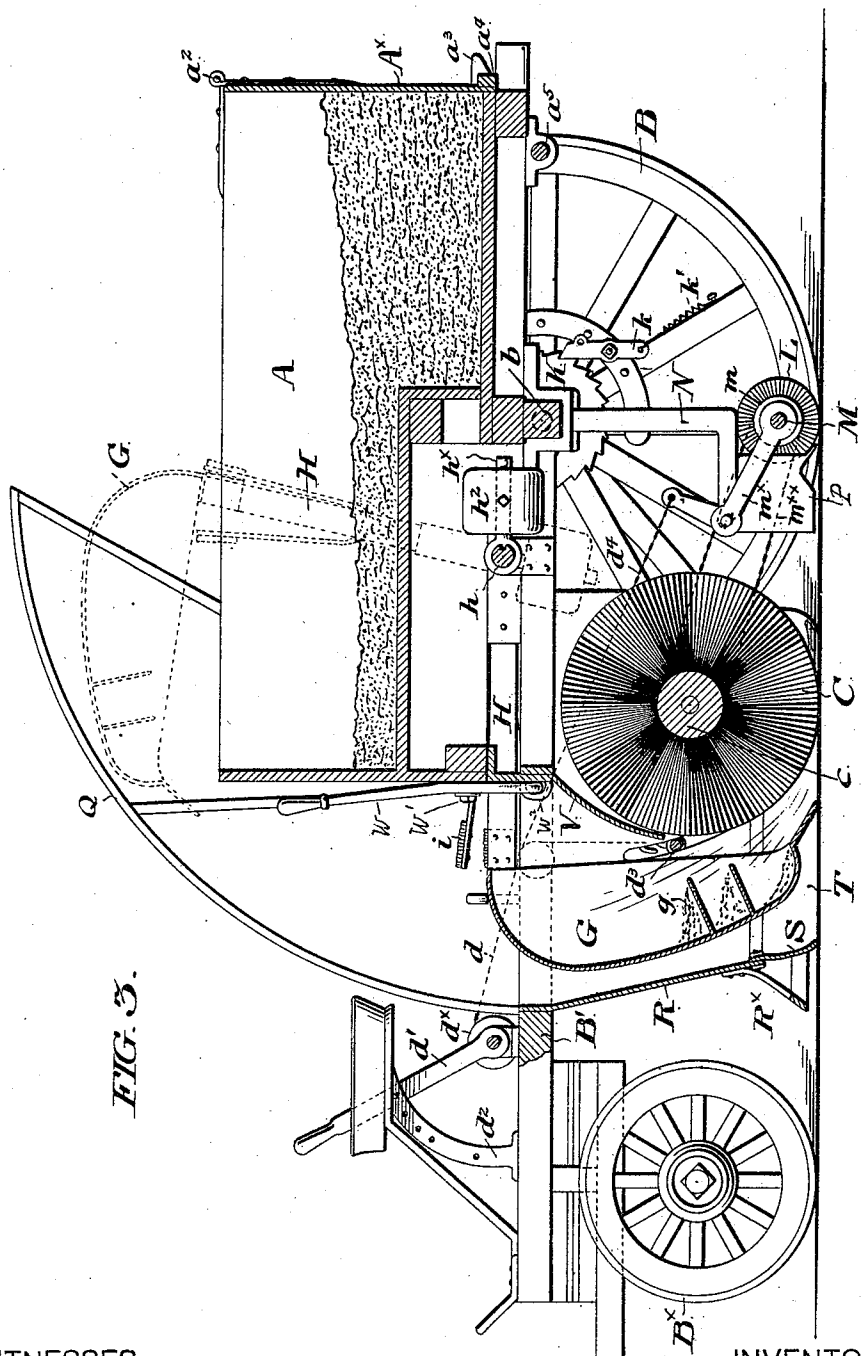

FIG. 3.

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FIG. 5.

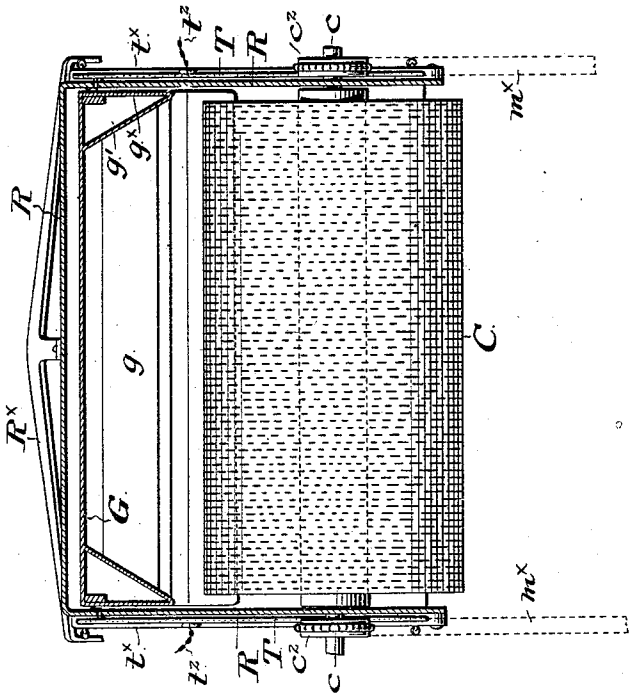
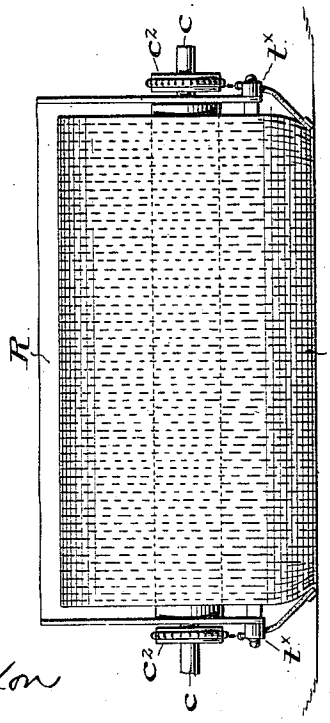


FIG. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS C. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA.

STREET-SWEEPER.

SPECIFICATION forming part of Letters Patent No. 557,297, dated March 31, 1896.

Application filed December 24, 1894. Serial No. 532,783. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS C. WILLIAMS, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Street-Sweeping Machines, of which the following is a specification.

My invention relates to the class of street-sweeping machines which are adapted, in connection with their function of sweeping the surfaces of the streets over which they travel, to elevate the refuse and sweepings encountered or operated upon into a containing-receptacle and transport them to a place of ultimate deposit, and comprehends improvements upon a form of street-sweeper heretofore invented by me and patented to me in and by United States Letters Patent No. 492,489, dated February 28, 1893, to which Letters Patent reference is to be made for the better understanding of my present improvements.

In the accompanying drawings I show and herein I describe a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings, Figure 1 is a view in side elevation of an apparatus embodying my invention, sight being taken toward its left-hand side. Fig. 2 is a similar view of the apparatus, sight being taken toward its right-hand side. Fig. 3 is a central vertical longitudinal sectional elevation of the apparatus. Fig. 4 is an elevational view of the main brush. Fig. 5 is a sectional plan of the carrier and adjacent parts of the apparatus.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings, A indicates the body of the machine, the same being a containing-receptacle composite of the floor, the front and side walls fashioned and connected in any usual manner, and the movable rear wall $A^{\times}$, the whole mounted upon a traveling support consisting, in the form shown, of the driving-wheels B, the front wheels $B^{\times}$, and the floor-frame members B′.

The body A of the machine which constitutes the containing-receptacle is so mounted upon the axle b of the driving-wheels B as to be capable, for the purpose of discharging its load, of being tilted.

The axle b, which is as to its body of square cross-section and upon which the containing-receptacle is rigidly secured, is as to its extremities, which are entered in the hubs of the wheels, of circular cross-section, as indicated in dotted lines in Fig. 3, with the result that in the tilting movement of the receptacle the receptacle and axle turn together as one structure upon the bearing formed by the bores of the wheel-hubs for the cylindrical ends of said axle.

The upper portions of the side walls of the body of the machine are slightly flared outward or away from each other to allow of the entrance between them of the carrier when in its elevated position, whereof hereinafter.

The rear wall $A^{\times}$ of the containing-body A is connected at its top by hinges a^2 to the tops of the side walls and is maintained normally closed by a pair of latches a^3 applied to the respective sides of the body A, and the noses of which engage with suitable projections a^4 applied to the lower edge of the said rear wall $A^{\times}$.

In order to enable a single operative to expeditiously release both of the latches a^3 when the containing body is to be tilted and the load discharged, I mount in suitable bearings beneath the rear end of the containing body a rock-shaft a^5, and provide a crank-arm a^6 at each of the ends of said shaft, each crank-arm being provided with a pin or projection a^7 adapted to encounter its adjacent latch, and also preferably provide one of said crank-arms with an operating-handle a^8, Fig. 2. When the handle a^8 is grasped and elevated, the rock-shaft a^5, as will be understood, is rotated, and the pins or projections a^7 make contact with and occasion the elevation of the latches a^3, and therefore effect the release of the rear wall $A^{\times}$ of the containing body.

C is what I term the "main brush," the same being a cylindrical brush of the configuration usual in street-sweeping machines, supported by being journaled as to its axle c in bearings formed in the front extremities of a pair of brush-arms D, disposed respectively upon opposite sides of the machine, the rear ex-

tremities of which are mounted for support upon the protruding ends of the axle b of the driving-wheels, and the front extremities of which are supported by a pair of flexible connections d, the upper extremities of which are connected to a windlass $d^{\times}$ controlled by a lever-handle d' in the vicinity of the driver's seat. By the forward throw of the handle d' traction may be exerted upon the connections d, and the brush-arms D and the brush C be together elevated until the latter is out of contact with the ground.

d^2 is a segmental arm located beside the lever-handle d' and embodying a series of apertures, by the engagement in a selected one of which apertures of a pin mounted in said lever-handle said handle, and of course also the brush C, may be maintained in any desired position of adjustment.

The front extremities of the two brush-arms D are preferably connected by a transversely-extending tie-bar d^3, as shown.

E are a pair of fixed guide-plates depending, respectively, from opposite sides of the machine and each embodying a curved slot e concentric with the main axle b of the machine, through which slots the respective extremities of the axle c of the brush C extend, and by the sides of which slot said brush is guided and steadied.

Motion may be communicated from the driving-wheels of the machine to the brush C by any desired mechanism. I show in Fig. 1 of the drawings as composing a suitable mechanism for the purpose the following devices:

F, Fig. 1, is a sprocket-wheel mounted loosely upon the driving or main axle b of the machine, but normally locked to said axle by pawls f, pivotally mounted on said wheel F and engaged in a ratchet-wheel $F^{\times}$ keyed upon said axle, with the result that when said pawls are engaged in said ratchet-wheel the motion of the axle will be communicated to the sprocket-wheel.

$C^{\times}$ is a sprocket-wheel mounted upon the extremity of the axle c of the brush C.

F' is a sprocket-chain mounted upon the sprocket-wheels F and $C^{\times}$ and communicating motion from the former to the latter.

f' f^2 are a pair of idler guide-wheels mounted upon the adjacent brush-arm D and over which the sprocket-chain runs.

Referring now to the mechanism for elevating the refuse into the receptacle, G is a carrier, normally disposed in position to receive the refuse driven forward and upward by the action of the brush C and adapted to be automatically elevated at predetermined intervals into a position in which its contents are discharged, conveniently by gravity merely, into the containing-receptacle of the machine. In the preferred form of apparatus illustrated in the drawings the carrier extends across almost the full breadth of the machine and is from its lower edge, which extends to a point immediately in front of the point of contact of the brush with the ground, as shown in Fig. 3, curved forwardly and upwardly to any desired height, and is conveniently provided with a series of pockets formed by upwardly-extending shelf-like projections g existing within the hollow of the carrier and extending from side to side thereof. The sides of the carrier are provided with forwardly-extending flanges $g^{\times}$, Fig. 5, which increase its containing capacity, and webs or diaphragms g' extend from the front edges of the flanges back diagonally to the floor or back plate of the carrier, shutting off the sharp corners which would otherwise exist just within the flanges $g^{\times}$, and rendering the interior of the carrier, from its upper end to its lower, "gutter-shaped," so to speak, with the result that the mass of material charged into the carrier tends to collect in its central portion and is in the elevation of the carrier therefore deposited within the central portion of the containing-receptacle A.

The means to which I prefer to resort for supporting and operating the carrier are as follows:

H H are a pair of carrier-supporting arms disposed upon opposite sides of the machine and pivotally connected at their rear extremities to the framework of the apparatus by being keyed upon a common rock-shaft h extending transversely of the machine and connected as to their front extremities to the respective ends of the carrier G.

To counterbalance the carrier, I prefer to key upon the rock-shaft h a rearwardly-extending arm $h^{\times}$, Fig. 3, and to mount such weights h^2 upon said arm $h^{\times}$ as may be necessary to accomplish the desired object.

h', Fig. 2, is a curved projection rearwardly extending from one of the arms H. h^3 is a correspondingly oppositely-curved operating projection normally rotating with the driving-wheel B and adapted, in each revolution of the driving-wheel, to encounter the projection h' and tilt the carrier G upon the rock-shaft h into the position shown in dotted lines in Fig. 3, the arrangement and balancing of the parts being such that when in the further rotation of the driving-wheel the operating projection h^3 passes away from the projection h' the carrier, its load having been discharged into the containing-body, will descend by gravity into its normal position, being that shown in full lines in Fig. 3.

In order to ease the movement of the carrier and cushion the jar incident to its rise and fall, I provide each of the carrier-supporting arms H with a spring i upon its upper face, adapted, when the carrier reaches the limit of its upward movement, to encounter the stops $i^{\times}$, which project, respectively, from the opposite sides of the wagon-body and are designed to prevent the carrier from going too far rearwardly and cushion the encounter of the carrier with said stops and provide each of said arms H with a spring i^2 upon its lower face, adapted, when the car-

rier drops from its elevated position to the position shown in full lines in Fig. 3, to make cushioning contact with the main frame. These springs I prefer to form as flat springs, each secured as to one end to its carrier-arm H and as to its other end left free, flaring outwardly away from said carrier-arm. I prefer to provide the free end of each of the springs with a facing of rubber or other yielding material.

To prevent too great concussion in the encounter of the operating projection h^3 with the projection h', I provide the projection h^3, as to its curved or working face, with a spring-tongue u, as shown in Fig. 2.

In order that the carrier may not be in constant operation when the collection of a load of refuse has been completed and the vehicle is on its way to the place of deposit, I provide means to interrupt the movement of the carrier-operating mechanism, as follows: The projection h^3, which ordinarily revolves with the main driving-wheel B, projects from and may be formed as a part of a ratchet-wheel K, Figs. 2 and 3, mounted loosely upon the main axle of the machine, and ordinarily compelled to rotate with the driving-wheel by a pawl k pivotally mounted upon the said driving-wheel and engaged in said ratchet-wheel, being maintained in engagement with said ratchet-wheel by a spiral pull-spring k', one extremity of which is connected to the outer end of the pawl and the other to an adjacent portion of the driving-wheel. When, however, in the travel of the machine it is desired to throw the carrier out of operation, the spring k' is disconnected from the outer end of the pawl k and connected to its inner end, and thereupon said spring acts to retain the pawl out of engagement with the ratchet-wheel K, which being free upon the axle will no longer rotate, and its operating projection h^3 no longer control the projection h' of the carrier-arm H.

Inasmuch as a small quantity of refuse is sometimes left upon the ground at points beyond the respective extremities of the brush C, I prefer to provide auxiliary brushes, located one behind each end of the main brush and adapted to sweep up into auxiliary carriers such small quantity as may be so left.

L L are the auxiliary brushes referred to, preferably mounted upon a common axle M, journaled in bearings formed in bell-crank levers $m^\times$, pivotally supported upon an auxiliary rigid supporting-framework N, depending from the main framework. A driving-belt or driving-chain $m^{\times\times}$, mounted on a driving-wheel C^2 on the axle of the brush C and on a wheel m on the shaft M, communicates motion from the main brush to the auxiliary brushes.

To the free arms of the bell-crank levers $m^\times$ are connected branches d^4 of the flexible connections d, which connect the brush-supporting arms D with the windlass $d^\times$, with the result that when the windlass is operated to elevate the main brush out of contact with the ground the branches d^4 tilt the bell-crank levers $m^\times$ and similarly elevate the auxiliary brushes from the ground.

Connected with the supporting-frame N, I show a pair of auxiliary receiving-boxes P, disposed immediately in front of the auxiliary brushes in position to receive the refuse encountered and swept up by said auxiliary brushes.

Q is a permanent framework erected upon the front of the machine to the rear of the driver's seat and overhanging the area occupied by the carrier in the movements of the latter, upon which framework sheets of canvas or other suitable material q (indicated in Fig. 1 of the drawings) are mounted to form an inclosing covering, which operates to confine the dust raised by the brushes and prevent its escape.

R is a depending apron, preferably U-shaped in plan, secured as to its upper edge to and depending from the frame members B′ and preferably so disposed as to constitute, in effect, a continuation of the inclosing covering q. The sides of the apron embody curved slots for the axle of the brush C and the tie-bar d^3.

$R^\times$ is a fender, which I mount upon the lower portion of the front of the apron R for the protection of the latter.

S is a curtain, of canvas or thin rubber, permanently secured to and extending along the bottom of the front edge of the apron.

T, Fig. 2, are curtains, of rubber, provided with shoes t, of steel or other metal, to prevent wear, movably secured to the lower edges of the respective sides of the apron. I prefer to secure these curtains by mounting each one of them in a holder $t^\times$ composed of a pair of clamp-plates, which plates are as to one extremity hingedly or pivotally connected to the apron and as to their respective intermediate portions engaged by chains t^2, Fig. 2, the upper extremities of which are connected to the brush-arms D, with the result that when the brush is elevated from the ground the curtains will also be elevated.

The rear ends of the apron R and of the curtains T converge, so as to be disposed inside the ends of the main brush, with the result that as said rubber curtains make close contact with the ground they tend to throw or sweep the refuse encountered by them in front of the main brush.

V is an apron attached to the front portion of the machine and overhanging the upper portion of the main brush.

w is a slot in the side of the apron R, in which a stud or projection of the holder $t^\times$ may be entered to guide the movement of the curtain and prevent the latter from swinging away from the apron.

When the machine has received a load of sweepings and been transported to the place where the sweepings are to be deposited, the machine is unloaded by releasing the latches

a^3 in the manner hereinafter described and tilting the machine upon its axle, whereupon the load descends by gravity to the ground in the manner usual in the operation of dumping-carts. When the load has been discharged, the body is elevated to its normal position and secured in said normal position by engaging the hook w, pivotally secured by the pivot w' upon the front of the containing-receptacle in a staple w^2 affixed to an adjacent part of the frame of the vehicle.

Having thus described my invention, I claim—

1. In combination, a traveling support, a containing-receptacle, a brush, a carrier, pivotally-mounted carrier-arms upon which said carrier is mounted, a projection connected with one of said carrier-arms, a device adapted when connected with one of the wheels of the apparatus to rotate with said wheel and make contact with said projection to occasion the elevation of the carrier, and means for at will connecting said device to and disconnecting it from said wheel, substantially as set forth.

2. In combination, a traveling support, a containing-receptacle, a brush, means for operating said brush, a pair of pivotally-supported arms, a carrier mounted upon the front extremities of said arms, a projection formed upon the rear extremity of one of said arms, a ratchet-wheel provided with an operating projection adapted to encounter the first-named projection to occasion the elevation of the carrier, a pawl mounted upon a wheel of the apparatus, and adapted to engage with said ratchet-wheel, and means for maintaining said pawl either in or out of engagement with said ratchet-wheel, substantially as set forth.

3. In combination, a traveling support, a main brush, means for operating said brush, pivotally-supported arms which carry said main brush, a pair of auxiliary brushes mounted behind the respective extremities of said main brush, driving-chains which transmit motion from the main brush to the auxiliary brushes, pivotal supporting-arms on which said auxiliary brushes are mounted, a windlass-frame, means for operating said windlass-frame, and a flexible connection leading from said windlass-frame to the pivotal supporting-arms in which the auxiliary brushes are mounted, substantially as set forth.

4. In combination, a traveling support, a main brush, means for operating said brush, pivotally-supported arms which carry said main brush, a pair of auxiliary brushes mounted behind the respective extremities of said main brush, means for transmitting motion from the main brush to the auxiliary brushes, pivotal supporting-arms on which said auxiliary brushes are mounted, a windlass-frame, means for operating said windlass-frame, and a flexible connection leading from said windlass-frame to said pivotal supporting-arms, and a pair of receiving-boxes supported respectively in front of said auxiliary brushes, substantially as set forth.

5. In combination, a traveling support, a containing-receptacle, a brush, means for operating said brush, means for elevating the refuse swept up by the brush and depositing it within the receptacle, a pair of curtains supported respectively at the respective sides of the brush, normally in contact with the ground, and means for elevating said curtains out of contact with the ground, substantially as set forth.

6. In combination, a traveling support, a containing-receptacle, a brush, means for operating said brush, means for elevating refuse swept up by the brush and depositing it within the receptacle, a pair of rubber curtains provided at their lower edges with a metal facing, supported at the respective sides of the brush, with said lower edges normally in contact with the ground, and means for elevating said curtains out of contact with the ground, substantially as set forth.

7. In combination, a traveling support, a containing-receptacle, a brush, means for operating the brush, means for elevating refuse into the containing-receptacle, a hood of metal, substantially **U**-shaped in plan, supported in front of the brush with its rounded end to the front, a pair of holders pivotally secured to the faces of the respective sides of the hood, a pair of curtains mounted in said holders with their lower edges normally in contact with the ground, and means for tilting said holders upon their pivots to elevate said curtains from the ground, substantially as set forth.

8. In combination, a traveling support, a containing-receptacle, a brush, means for operating the brush, means for elevating refuse into the containing-receptacle, a hood of metal substantially **U**-shaped in plan supported in front of the brush with its rounded end to the front, a pair of holders pivotally secured to the faces of the respective sides of the hood, a pair of curtains formed of rubber, and provided with metal facings at their lower edges, mounted on said holders with their lower edges normally in contact with the ground, a windlass-frame, flexible connections through which said holders are connected with and operated by said windlass-frame, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 22d day of December, A. D. 1894.

FRANCIS C. WILLIAMS.

In presence of—

F. NORMAN DIXON,

THOS. K. LANCASTER.