

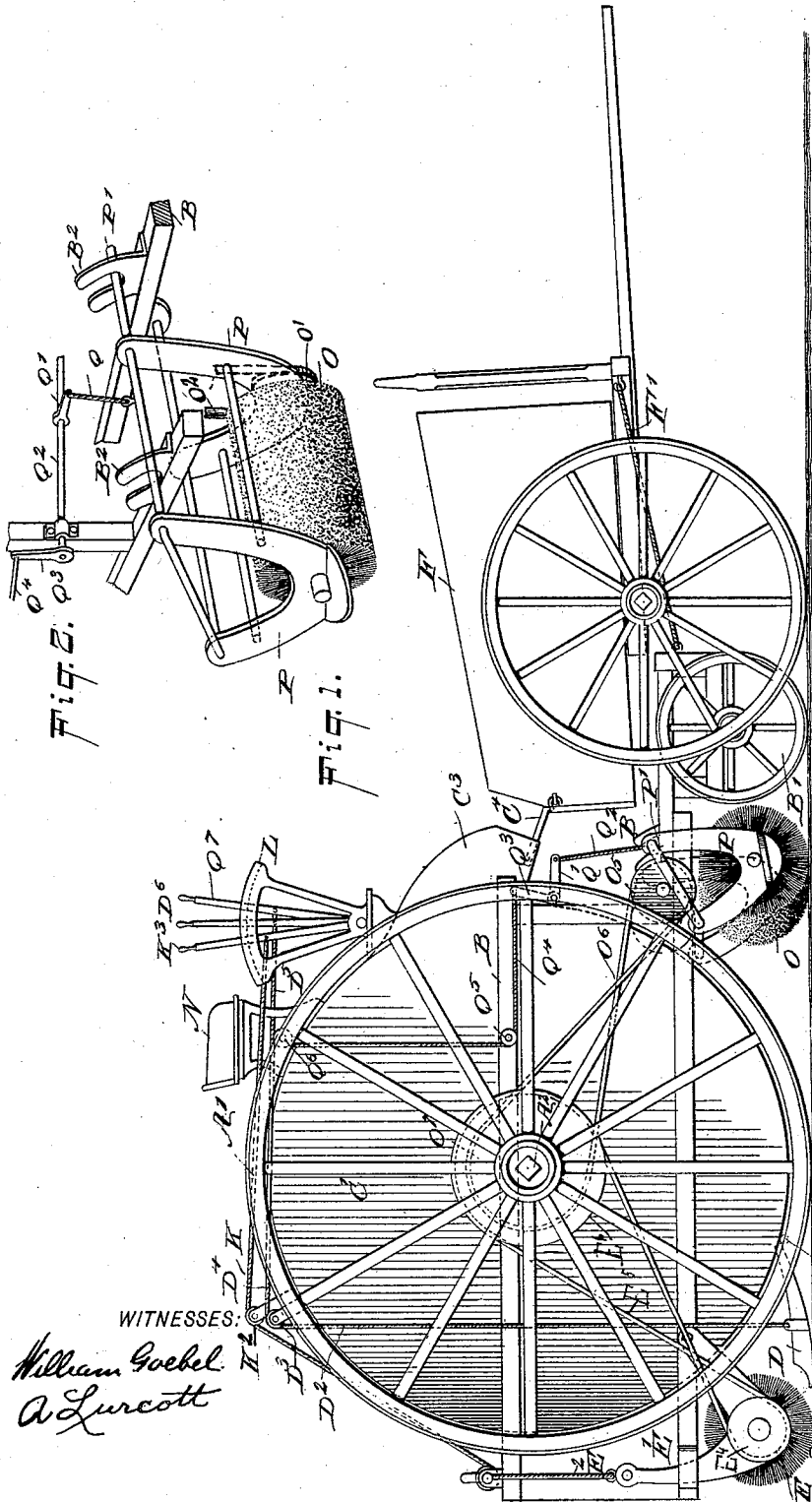
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4 Sheets—Sheet 1.

W. H. WALKER & T. H. BOYCE.
STREET SWEEPER.

No. 531,079.

Patented Dec. 18, 1894.



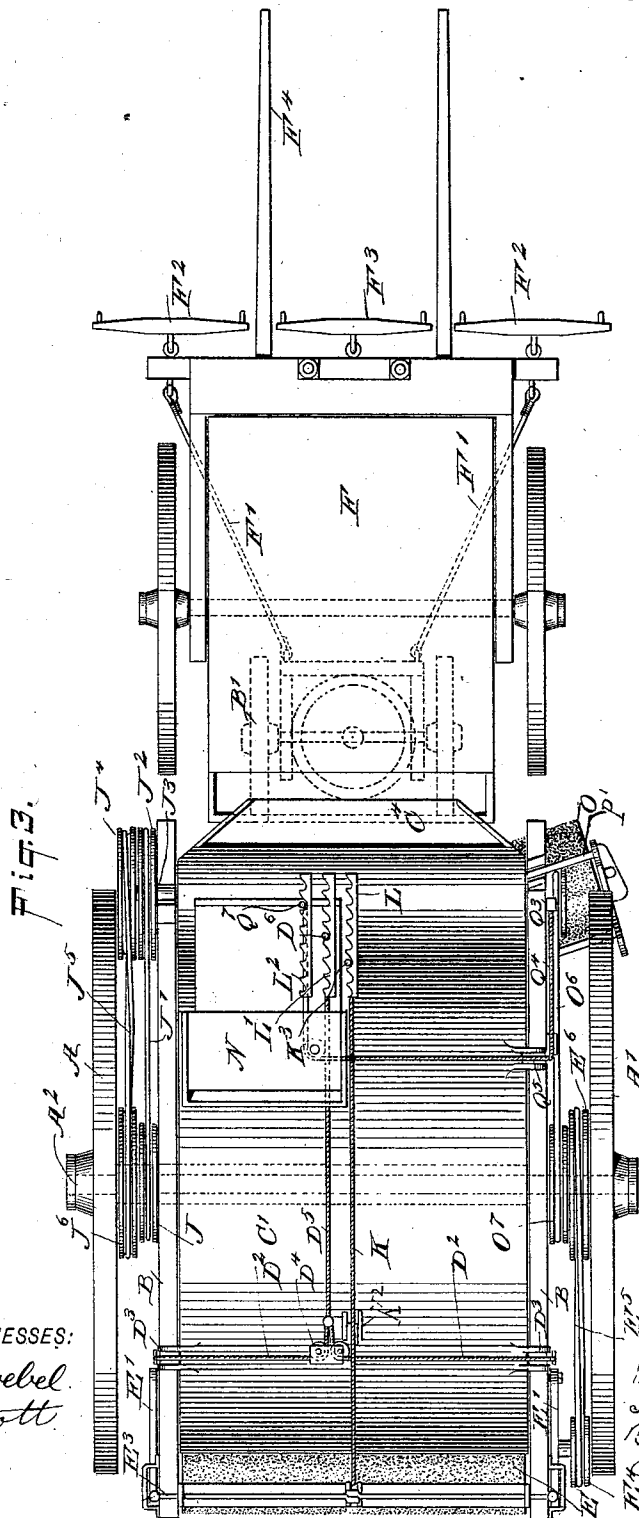
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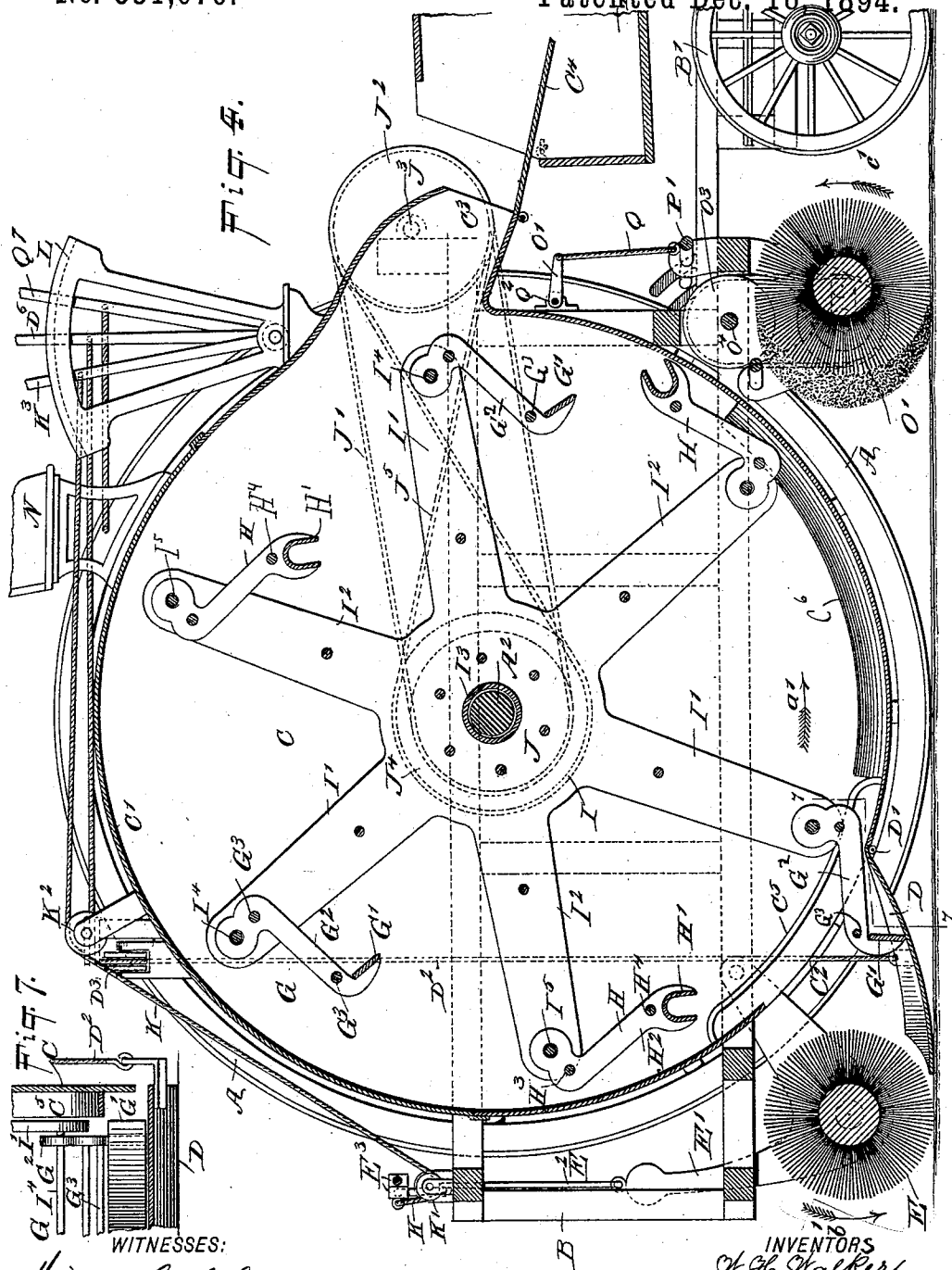
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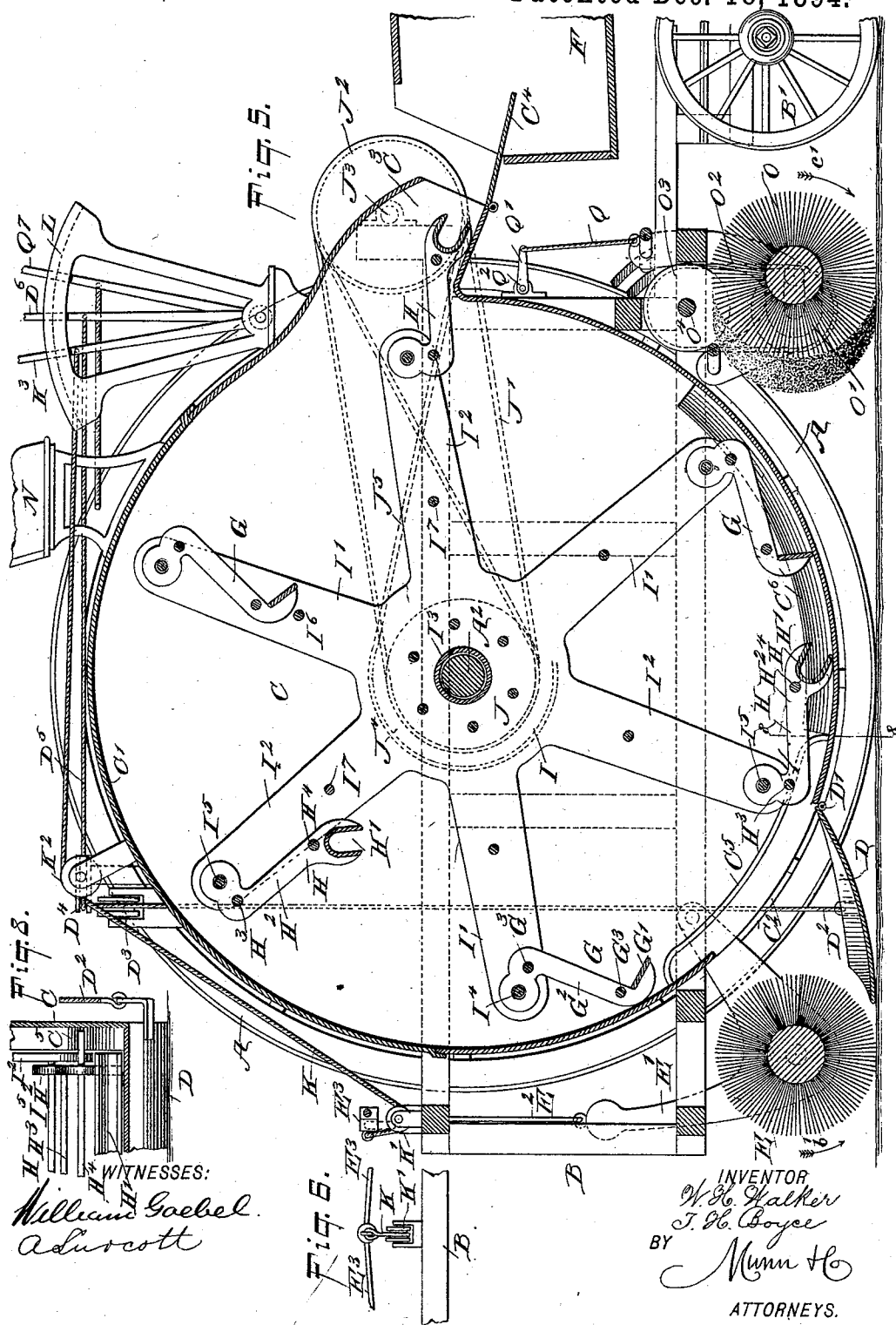
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UNITED STATES PATENT OFFICE.

WILLIAM H. WALKER AND THOMAS H. BOYCE, OF NEW YORK, N. Y.

STREET-SWEEPER.

SPECIFICATION forming part of Letters Patent No. 531,079, dated December 18, 1894.

Application filed January 19, 1894. Serial No. 497,411. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM HENRY WALKER and THOMAS HANFORD BOYCE, of the city, county, and State of New York, have
5 invented a new and Improved Street-Sweeping Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved street sweeping machine,
10 which is comparatively simple and durable in construction, very effective in operation, and arranged in such a manner as to thoroughly sweep up the dirt from the street, discharge it into carts successively connected
15 with the machine and which when filled are detached and driven to the place of dumping, so as to insure a continuous sweeping, removing and dumping.

The invention consists of an elevator having a casing provided with an inlet and an outlet, and alternately arranged scrapers and buckets, of which the latter receive the sweepings from the scrapers.

The invention also consists of certain parts
25 and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification,
30 in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a perspective view of the gutter brush. Fig. 3 is a plan view of the
35 improvement. Fig. 4 is an enlarged sectional side elevation of the improvement. Fig. 5 is a similar view of the same with parts in a different position. Fig. 6 is a rear elevation of the pulley support for raising and lowering the main brush. Fig. 7 is a transverse
40 section of the elevator scraper; and Fig. 8 is a similar view of the bucket.

The improved street sweeping machine is provided with a vehicle having the two large
45 wheels A and A', mounted to rotate loosely on an axle A², supporting the main frame B, provided at its front end with a truck B', adapted to travel with its wheels on the ground. The frame B supports between the
50 wheels A and A', the circular casing C', forming part of an elevator C, adapted to take the sweepings from a pan D, pivoted at D' on the

said casing at the lower end thereof and slightly in the rear below an opening C², formed in the said circular casing C'. The sweepings pass onto the pan D from the revolving brush E, arranged transversely in the rear of the casing C' and rotating in an opposite direction to the motion of the wheels A and A', so that the brush on coming in contact with the street, sweeps the dirt upward and forward onto the pan D.

The elevator C takes hold of the dirt or sweepings on the pan D, carries it upward and discharges it through a chute C³, onto a hinged plate C⁴, extending into a cart F, or other similar vehicle adapted to be driven by one or more animals, the said cart being temporarily connected by ropes F', or other means with the truck B', so that the cart serves as the propelling medium for the machine. The latter dumps its sweepings into the cart F and when the latter is filled with sweepings, the ropes F' are disconnected from the cart F and an empty cart is substituted in its place, to be filled and to serve as a medium for drawing the sweeper forward along the street.

By reference to Fig. 3, it will be seen that the cart is provided with additional singletrees F², besides the center singletree F³ and shafts F⁴, occupied by the animal drawing the cart from and to the place of dumping. The additional singletrees F² are necessary for two or more animals, to assist in drawing the machine along at the time the cart F is attached to the truck B' by the ropes F'.

The elevator C is constructed as follows: Alternately arranged scrapers G and buckets H are hung on the outer ends of sets of spokes I' and I², respectively, forming part of a wheel I, mounted to turn within the casing C'. This wheel I is provided with a hub I³, through which extends the axle A², as plainly shown in Figs. 4 and 5, and this hub I³ extends at one side through the frame B to carry at its outer end a pulley J, over which passes a belt J', also passing over a pulley J², secured on a short shaft J³, journaled on one side of the frame B near the front thereof, as plainly illustrated in the drawings. See Figs. 3, 4 and 5. On this short shaft J³ is also secured a second pulley J⁴, over which passes the crossed belt J⁵, also passing over a pulley J⁶, attached to the inside of the large side wheel A. Now,

when the machine is drawn forward, then the rotary motion of the wheel A causes a rotary motion of the pulley J⁴ and shaft J³ in an inverse direction, owing to the crossed belt J⁵ connecting the pulley J⁶ with the pulley J⁴. The rotary motion of the pulley J² on the said shaft J³ is transmitted by the belt J' to the pulley J, and consequently the wheel I carrying the scrapers G and buckets H is rotated in the direction of the arrow a', that is, the inverse direction in which the wheels A and A' are rotated, during the forward movement of the machine. Each of the scrapers G is provided with a transversely-extending scraper bar G', attached to two arms G², preferably made Z-shaped and hung loosely on a transversely-extending rod I⁴, connecting two opposite spokes of the set of spokes I' of the wheel I with each other. The two arms G² are rigidly connected with each other by transverse stay rods G³, as plainly indicated in Figs. 4, 5 and 7.

The arms G² on account of being hung loosely on the rod I⁴ readily pass into the opening C² in the casing C' at the time the corresponding set of spokes I' pass downward, so that the scraper bar G' passes onto the outermost end of the pan D to engage the accumulated sweepings thereon and to drag them inwardly into the casing C' on the further rotation of the wheel I in the direction of the arrow a'. The scraper bar G' then carries the sweepings along the inner circular surface of the casing C' until finally the arms G², by their weight, swing into a vertical position, see Fig. 4, thus moving the scraper bar G' away from the rim of the casing C' to permit the sweepings to pass into the bucket H next following this particular scraper.

Each bucket H is provided with a U-shaped bucket proper, H', secured in two oppositely-arranged arms H², hung loosely on a transversely-extending rod I⁵ secured on two oppositely-arranged spokes of a set of spokes I², as will be readily understood by reference to Figs. 4 and 5. The two arms H² are rigidly connected with each other by stay rods H³ and H⁴, of which the stay rod H⁴ is located near the bottom of the U-shaped bucket H' and projects beyond the outer faces of the said arms H², so as to move in contact with segmental cams C⁵, extending over the opening C² near the sides thereof, next to the heads of the casing C'. See Fig. 8. Thus, the buckets H in descending in the rear part of the casing C' engage with the projecting ends of the rod H⁴, and the cams C⁵, so as to hold the buckets H' in alignment with the inner surface of the casing, to prevent the said buckets from passing through the opening C² onto the pan D. At the same time, the buckets H' are held in a forward position, as plainly illustrated in Fig. 5, with the lower edge of the bucket H' resting on the inner surface of the casing C'. Now, as this bucket H' is moved forwardly and upwardly it travels directly be-

hind the next forward scraper G, so that the latter, on swinging away from the rim in assuming the vertical position, as above described, causes the sweepings to fall into this bucket H'. Guards C⁶ located in advance of the cams C⁵, serve to prevent a lateral escape of the sweepings carried up by the scrapers.

It is understood that while the scraper G moves upward with the sweepings from the opening C² toward the chute C³, the arms G² of the said scraper extend rearwardly from their spokes I', while the following bucket H' is held in front of its spokes I² by the arms H², to readily gather the sweepings dropped from the scraper plate H'. Now, as the wheel I rotates in the direction of the arrow a', the scrapers G are held farthest from the chute C³, while the upwardly moving and filled buckets H pass readily into the chute C³, as indicated in Fig. 5, so as to discharge the contents of the buckets proper H', through the chute C³ over the plate C⁴ into the vehicle F. On the further upward movement of the corresponding set of spokes I², the arms H² of the bucket just having discharged its contents in the chute C³, readily swing out of the latter by their own weight.

In order to prevent the scrapers G and buckets H from swinging too far during the time they pass through the upper half of the casing C', we provide the corresponding spokes of a set of spokes I' with transversely-extending stop rods I⁶, for the scrapers G and the corresponding spokes of a set of spokes I² with similar stop rods I⁷, for the buckets H. Thus, it will be seen that one scraper removes the sweepings from the pan D, drags it into the casing C' and carries it along part of the rim thereof, to finally drop it to permit the sweepings to pass into the following bucket H', which delivers the sweepings to the chute C³ and plate C⁴, over which they readily slide down into the vehicle F.

The brush E is journaled in suitable bearings in L-shaped arms E', pivoted to the frame B and connected by upwardly-extending ropes E², with transversely-extending levers E³, pivotally-connected with each other at or near the center of the machine, as plainly shown in Fig. 3. The connected ends of the levers E³ are connected with a rope K, extending first downwardly under a pulley K', journaled on a transverse beam of the frame B, as plainly illustrated in Figs. 3, 4, 5 and 6. The rope K then extends upward and passes over a pulley K², journaled in a suitable bearing attached to the casing C' near the top thereof. The rope K then extends forwardly and is connected with a lever K³, journaled on a segment L having notches for locking the said lever in position. The upper end of the lever K³ is under the control of the operator seated in the seat N attached to the casing C' at the front. Now, by the operator manipulating the lever K³ he can raise and lower the brush E so as to move the brush

either entirely out of contact with the street or in contact, to sweep the street and carry the sweepings onto the pan D.

In order to drive the brush E, we provide one outer end of its shaft with a pulley E⁴, connected by a crossed belt E⁵, with a pulley E⁶, secured on the inner face of the wheel A', as plainly shown in Figs. 1 and 3. Thus, when the machine is drawn forward and the wheel A' revolves in the inverse direction of the arrow a', then the pulley E⁶, by the crossed belt E⁵ and pulley E⁴ causes the brush E to revolve in the direction of the arrow b', that is, in the inverse direction in which the wheel A' is moving.

In order to raise and lower the pan D, we connect the sides of the said pan with upwardly-extending ropes D², passing over pulleys D³, secured on the rim of the casing near the upper end thereof, as plainly shown in Figs. 3, 4 and 5. The ropes D² then extend transversely to pass over pulleys D⁴, secured on the rim of the casing C', the ends of the said ropes then extending forwardly to connect with a common rope D⁵, extending longitudinally and connected with a lever D⁶, likewise fulcrumed in a notched segment L', and likewise under the control of the operator seated on the seat N. By the operator moving the lever D⁶ forward or backward, the pan D can be conveniently raised or lowered, so as to move the pan out of contact with obstructions in the street whenever necessary, or in contact to receive the sweepings.

In order to clean gutters along the street, we provide one side of the machine with a gutter brush O, preferably arranged obliquely to the longitudinal center line of the machine, as indicated in Figs. 1 and 3. This brush O (see Fig. 2) is journaled in a frame P, provided with a rod P', mounted to turn and to slide transversely in forked bearings B², forming a part of the main frame B. The rod P' is adapted to be raised and lowered so as to raise and lower the brush O according to requirements, and for this purpose the said rod P' is connected by a short rope or chain Q, with an arm Q', attached on a transversely-extending shaft Q², journaled in suitable bearings on the frame B. The outer end of the shaft Q² is provided with an arm Q³, connected with a rearwardly-extending rope Q⁴, passing under a pulley Q⁵, journaled in one side of the casing C'. The rope then extends upward and passes over a second pulley Q⁶, to then extend forward to connect with a lever Q⁷, similar to the levers K³ and D⁶, and likewise adapted to be engaged in a notched segment L², as shown in Fig. 3, to hold the said lever in a locked position. This lever Q⁷ is likewise under the control of the operator seated on the seat N to enable the operator to raise and lower the brush whenever deemed necessary. As the supporting rod P' of the frame P carrying the brush O is free to slide transversely in its bearings, any obstruction

striking the frame from the gutter side of the street, causes the frame and consequently the brush, to slide or swing transversely until the obstruction is passed. In order to drive this brush O, we provide the inner end of its shaft with a pulley O', connected by a belt O², with a pulley O³, secured on a transversely-extending shaft O⁴, journaled in suitable bearings in the frame B. The forward end of this shaft O⁴ is provided with a pulley O⁵, over which passes the crossed belt O⁶, also passing over a pulley O⁷, secured on the pulley E⁶, so that the rotary motion of the wheel A' causes a rotary motion of the brush O' in the direction of the arrow c' to throw the sweepings rearward and somewhat transversely into the path of the brush E following in the rear of the machine.

The operation is as follows: When the vehicle F is connected with the truck B' and the animals are attached to the vehicle F at the singletrees F² and F³, then the machine can be drawn forward through the street, so that the several parts are set in motion from the driving wheels A and A', as previously described. The brush E is driven from the wheel A' so as to cause the dirt to be swept onto the pan D, from which the sweepings are removed by the scrapers G into the casing C', from which the sweepings are finally discharged into the buckets H, which carry the sweepings into the chute C³ and discharge the same therein. The sweepings pass down the inclined chute C³ and plate C⁴ into the vehicle F, in which the sweepings accumulate until the said vehicle is filled. When this has been done, this vehicle is detached from the truck B' and an empty and similar one is attached in place, and at the same time the animals attached to the single-trees F² are disconnected from the vehicle F and the single animal hitched to the single-tree F³ in the shafts F⁴, draws the filled cart to the place of dumping, to dump the contents and return with the empty cart to the machine. It will be seen that by this arrangement a continuous sweeping, revolving and dumping of dirt can be accomplished, and only a few vehicles F going from and to the dumping place, to and from the section of street in which the machine operates, are necessary.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. A street sweeping machine provided with an elevator having a casing, provided with an inlet and an outlet and alternately arranged scrapers and buckets, adapted to travel along the casing from the inlet thereof to the outlet, the scrapers being constructed to bring the dirt within the casing, and the buckets to discharge the dirt from the casing, substantially as shown and described.

2. The combination, with the elevator casing, having an inlet and an outlet, and the adjustable pan arranged at the inlet of the

casing, of a wheel mounted to revolve within the casing, and alternately arranged scrapers and buckets held loosely on the wheel, the scrapers being constructed to bring the dirt from the pan within the casing, and the buckets to discharge the dirt through the outlet of the casing, substantially as described.

3. A street sweeping machine comprising driving wheels, an axle carrying the said wheels, a frame supported on the said axle, an elevator supported on the said frame and provided with a casing having an inlet and an outlet, and a revolving wheel carrying alternately arranged scrapers and buckets, the scrapers being adapted to bring the dirt within the casing, and the buckets to discharge it therefrom a pan hinged on the rim of the said casing at the inlet opening of the latter, and a brush mounted to turn, to sweep the dirt onto the said pan, the said brush being driven from one of the said drive wheels, substantially as shown and described.

4. A street sweeping machine comprising driving wheels, an axle carrying the said wheels, a frame supported on the said axle, an elevator supported on the said frame and provided with a casing having an inlet and an outlet, a revolving wheel carrying alternately arranged scrapers and buckets, the scrapers being adapted to bring the dirt within the casing, and the buckets to discharge it therefrom a pan hinged on the rim of the said casing at the inlet opening of the latter, a brush mounted to turn, to sweep the dirt onto the said pan, the said brush being driven from one of the said drive wheels, and means, substantially as described, for raising and lowering the said brush and the said pan, substantially as shown and described.

5. A street sweeping machine comprising driving wheels, an axle carrying the said wheels, a frame supported on the said axle, an elevator supported on the said frame and provided with a casing having an inlet and an outlet, a revolving wheel carrying alternately arranged scrapers and buckets, the scrapers being adapted to bring the dirt within the casing, and the buckets to discharge it therefrom a pan hinged on the rim of the said casing at the inlet opening of the latter, a brush mounted to turn, to sweep the dirt onto the said pan, the said brush being driven

from one of the said drive wheels, and a vehicle adapted to be connected with the front of the said frame, and adapted to be connected with the discharge chute of the said casing, substantially as shown and described.

6. A street sweeping machine provided with an elevator comprising a fixed circular casing having an inlet opening in its rim, and a discharge spout likewise in the rim, a wheel mounted to turn within the said casing, scrapers and buckets held loosely on spokes of the said wheel, the scrapers being adapted to bring the dirt within the casing, and the buckets to discharge it therefrom, and cams arranged in the said casing and adapted to be engaged by projecting ends of the said buckets to hold the latter in a forward position, substantially as shown and described.

7. A street sweeping machine provided with an elevator comprising a fixed circular casing having an inlet opening in its rim, and a discharge spout likewise in the rim, a wheel mounted to turn within the said casing, scrapers and buckets held loosely on spokes of the said wheel, the buckets being adapted to discharge the dirt from the casing, and cams arranged in the said casing and adapted to be engaged by projecting ends of the said buckets to hold the latter in a forward position, and a pan hinged to the said casing at the rim thereof, and at the lower end of the inlet opening, the said scrapers being adapted to pass through the inlet opening onto the pan to engage the sweepings and move the same inwardly into the casing, substantially as shown and described.

8. A street sweeper provided with a circular casing having an inlet and a discharge spout, a wheel mounted to revolve in the casing, and a series of buckets each having a loose pivotal connection with the wheel so as to be able to make a complete rotation relatively to the wheel while the same turns in the casing, the buckets being adapted to pass into the discharge spout to discharge the sweepings into it, substantially as shown and described.

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