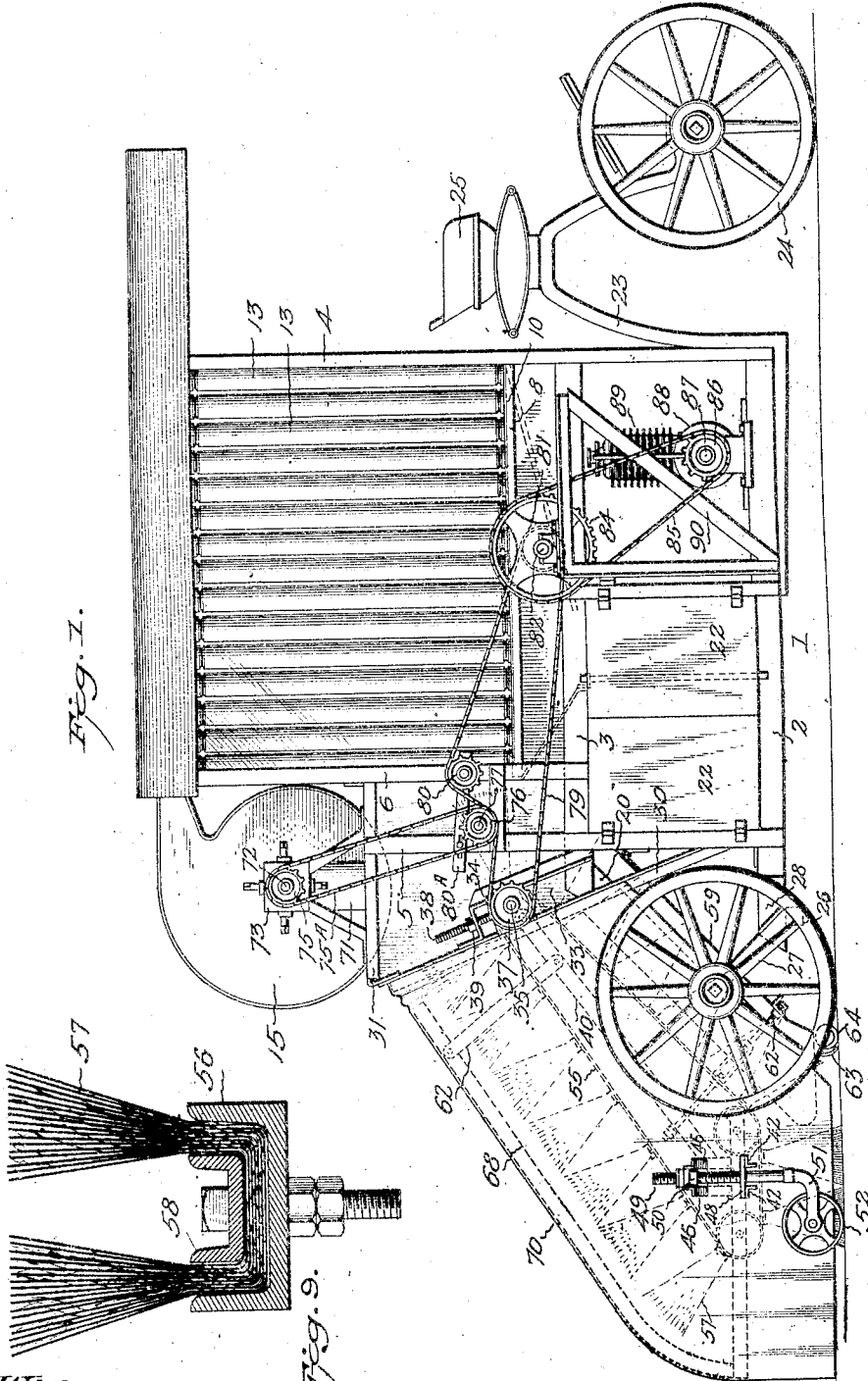


H. R. HARN.  
STREET SWEEPING MACHINE.  
APPLICATION FILED MAY 9, 1908.

Patented Mar. 29, 1910.

4 SHEETS—SHEET 1.

953,201.



Witnesses  
G. Sargent Elliott.  
Adella M. Towle

By  
H. S. Bailey

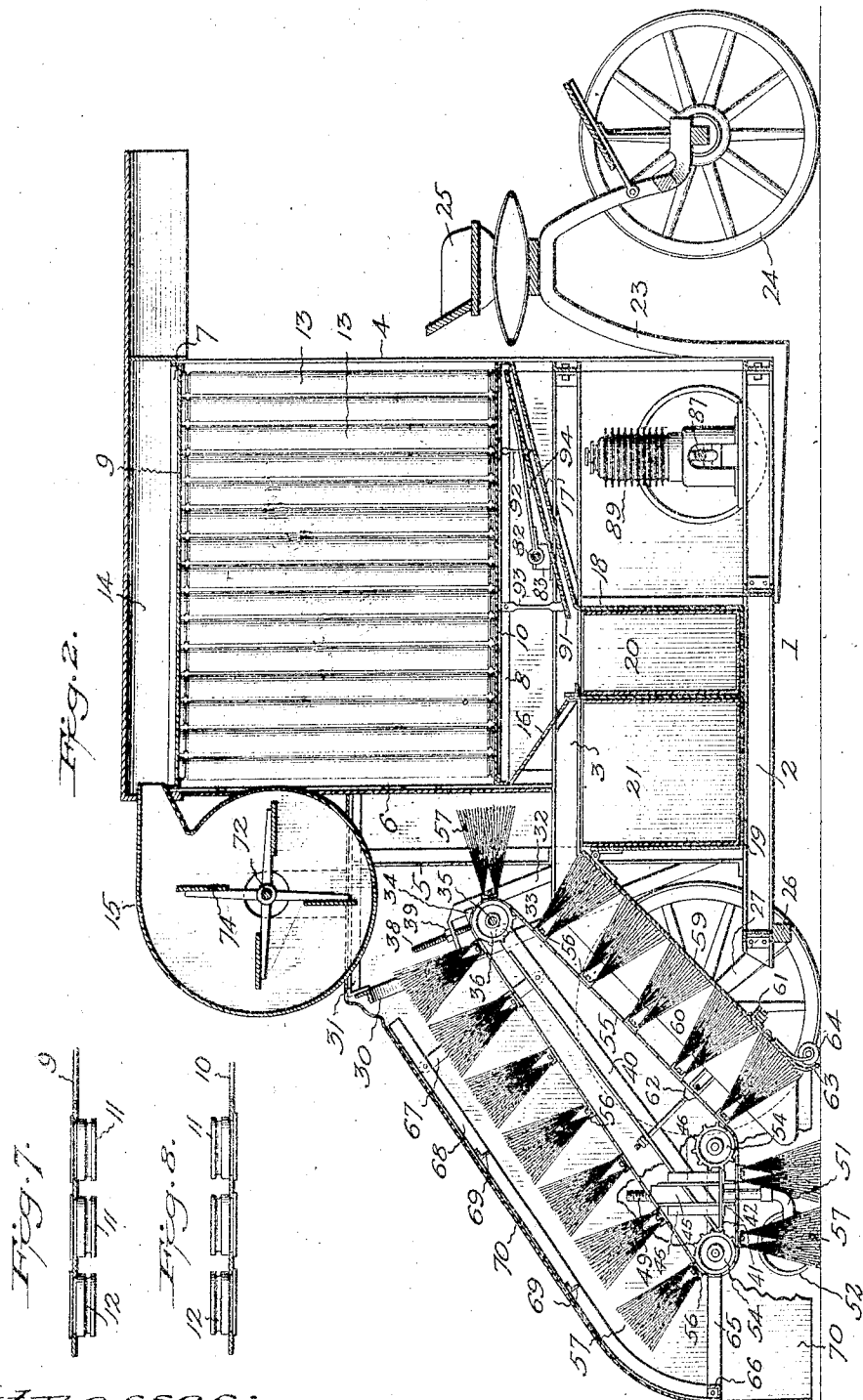
Inventor  
Harry R. Harn.  
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4 SHEETS—SHEET 2.



Witnesses:

G. Sargent Elliott  
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Inventor:

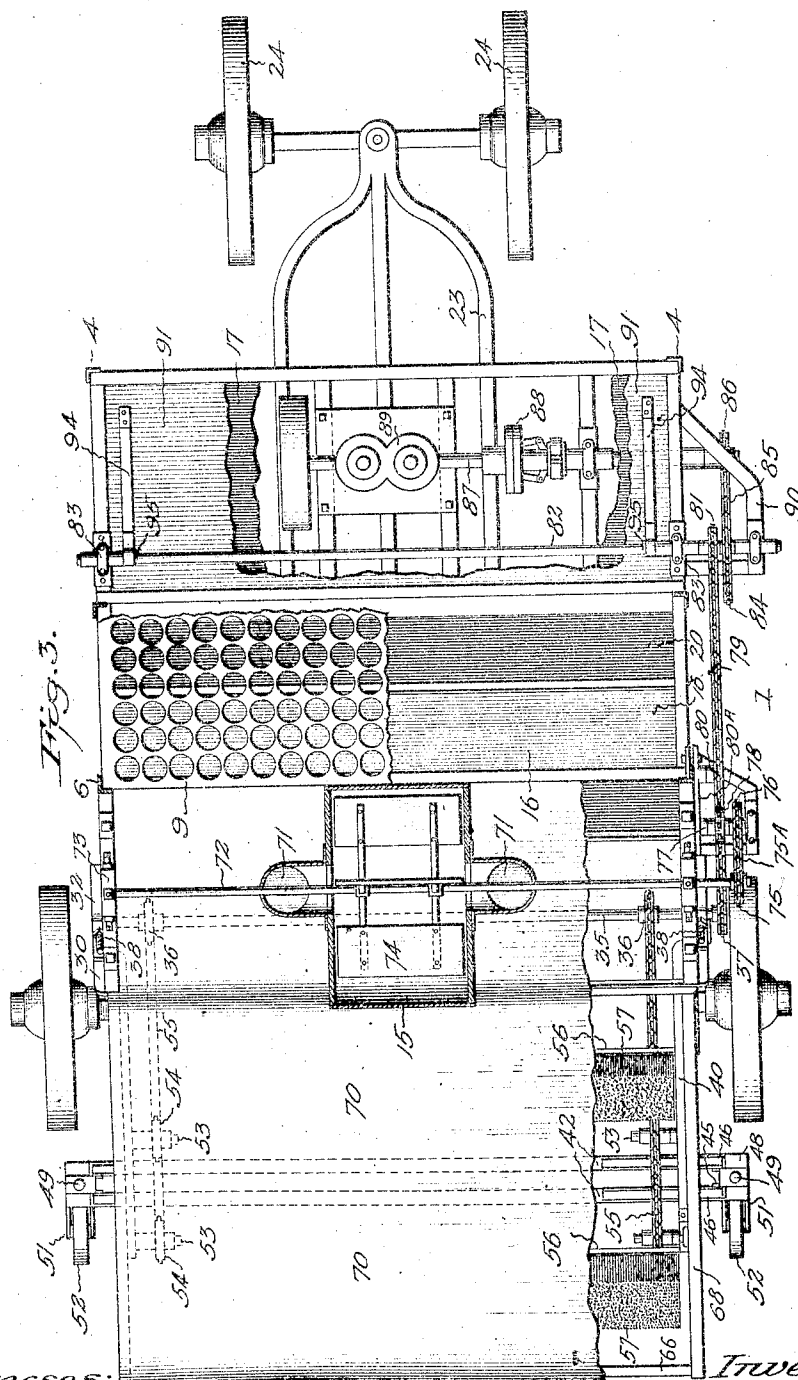
Harry R. Harn.  
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4 SHEETS—SHEET 3.

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Witnesses:

J. Sargent Elliott  
Adella M. Towle

By

Harry R. Harn.

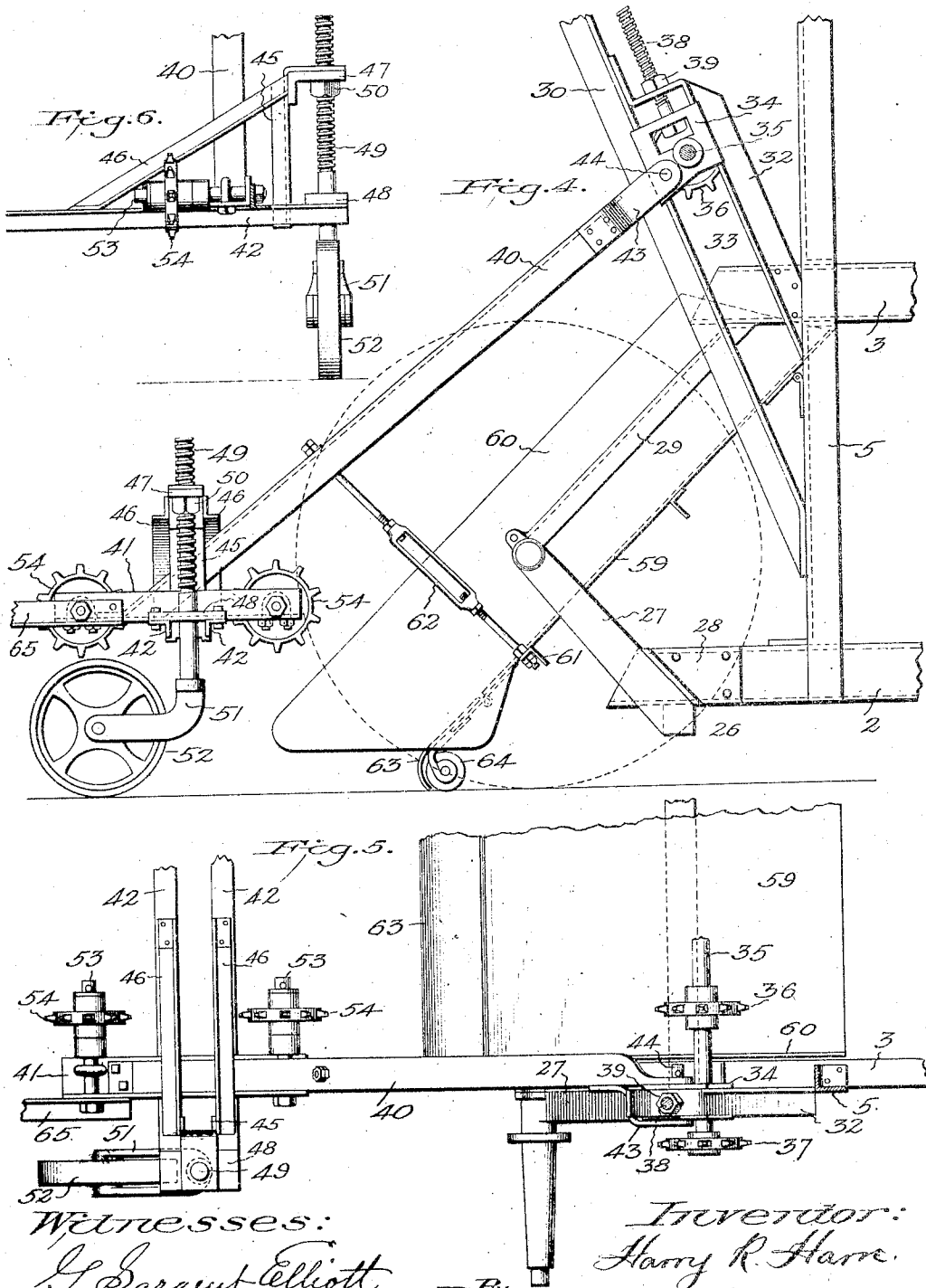
H. S. Bailey. Attorney.

Inventor:

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4 SHEETS—SHEET 4.

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Inventor:  
Harry R. Harn.

By H. S. Bailey, Attorney.

# UNITED STATES PATENT OFFICE.

BEST AVAILABLE COPY

HARRY R. HARN, OF DENVER, COLORADO.

STREET-SWEEPING MACHINE.

953,201.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed May 9, 1903. Serial No. 431,951.

To all whom it may concern:

Be it known that I, HARRY R. HARN, a citizen of the United States of America, residing at the city and county of Denver and State of Colorado, have invented a new and useful Street-Sweeping Machine, of which the following is a specification.

This invention relates to improvements in street sweeping machines.

10 The object of the invention is to provide a machine of this character, which is adapted for dry sweeping, or for the sweeping of streets which have not been previously sprinkled, and to this end, the invention  
15 consists in a machine comprising a wheeled vehicle, to the rear of which is adjustably secured a frame upon which is mounted power-driven endless chains, to which are secured transverse rows of brushes, recep-  
20 tacles being provided to receive the coarse or heavy sweepings, and also the fine or dust element, which latter is drawn up through a suitable fan and discharged through a plurality of fabric tubes to the  
25 dust receiving receptacle, the brushes and other parts of the machine being so inclosed as not only to prevent the escape of dust, but also to permit of the passage of air up through the brushes to the fan, when the  
30 same is in operation.

The invention further consists in the improved manner of supporting and adjusting the brush carrying frame, and in securing the brushes to the endless chains; all of which is fully hereinafter set forth, and illustrated in the accompanying drawings, in which:

Figure 1, is a side elevation of the improved street sweeping machine. Fig. 2, is a vertical, longitudinal, sectional view thereof. Fig. 3, is a horizontal, sectional view through the upper part of the machine on the line of fan shaft, parts being broken away to give a clearer understanding of the construction of the said machine. Fig. 4,  
45 is a side elevation, showing a portion of the rear end of the vehicle with the brush supporting frame adjustably secured thereto, also the inclined sweepings apron, the upper end of which is hinged to the vehicle, while the lower end is adjustably secured to the brush supporting frame. Fig. 5,  
50 is a plan view of the portion of the machine shown in Fig. 4. Fig. 6, is an end elevation of the same. Figs. 7 and 8, are sectional

views showing portions of upper and lower plates in which are secured thimbles to which the upper and lower ends of fabric tubes are secured, through which the dust from the sweepings discharges to the receptacles. And Fig. 9, is a transverse sectional view showing the manner of clamping the brushes to their supporting bars.

Referring to the accompanying drawings, the numeral 1, indicates a suitable car or vehicle, which is preferably constructed of metal angle bars and channel beams, so as to form a light, rigid and durable structure. In this construction of the vehicle I employ lower longitudinal beams 2, and upper longitudinal beams 3, which are connected at their forward ends by vertical angle bars 4, which extend above the beams 3, to a point corresponding to the height of the vehicle, and at their rear ends by similar bars 5, which extend above the beams 3, but not so high as the bars 4. Vertical bars 6, are secured to the beams 3, a short distance forward of the bars 5, and these bars extend as high as the bars 4, and are connected to each other and to the bars 4 at their upper ends by angle bars, which are in the form of a rectangular frame 7, the horizontal flanges of the angle bars being at the lower edge of the frame, and projecting inward, for a purpose to be presently specified. The vertical bars 4 and 6, are also connected a short distance above the beams 3, by an angle bar frame 8, similar to the frame 7, but having its inwardly projecting flange at the top edge thereof, and the frames 7 and 8, support apertured metal plates 9 and 10 respectively, the plate 9 setting down into the frame 7 and resting upon its flange, as clearly shown in Fig. 2. The apertures in one plate are diametrically opposite those in the other plate, and are numerous, as will appear by reference to Fig. 3, and in each aperture a short thimble 11, is secured, those in the upper plate projecting downward, while those in the lower plate project upward. The thimbles have circumferential grooves 12, and fabric tubes 13, are secured at their ends to the oppositely arranged thimbles, and are secured thereto by securing a cord around the tube in such manner as to embed the cord and tube in the grooves 12.

The roof of the vehicle is arranged to form an air tight chamber 14, above the upper plate 9, which is formed with an opening at

its rear end to admit the nozzle of a blast fan casing 15, which will be more particularly described hereinafter.

The sides of the vehicle between the lower plate 10 and the side beams 3, are inclosed, and inclined bottom plates 16 and 17 extend from below the plate 10 to a compartment 18, supported upon the beam 2, which is separated by a partition from a similar, though larger compartment 19. The compartment 18 receives a removable dust receptacle 20, while the compartment 19 receives a sweepings receptacle 21. The compartments 18 and 19 are normally closed by doors 22, which are opened to allow the receptacles to be withdrawn for the purpose of emptying. An arched bracket 23, is secured to the forward end of the vehicle frame, to which the forward axle, carrying supporting wheels 24, is pivotally secured, and this bracket also supports the driver's seat 25. A substantially yoke-shaped axle 26, is secured to the under side of the rear ends of the beams 2. This axle comprises a horizontal member, and upright arms 27, upon the upper ends of which the spindles are formed. These arms incline rearward, and are braced by angle plates 28, which are secured to the beams 2, and by angle bars 29, which extend from the ends of the arms 27 to the beams 3. An angle bar 30, bent to form a yoke of the width of the vehicle frame, is secured at its ends to the upright angle bars 5, and extends up at an angle to the bars 5. The horizontal member of the yoke 30, is connected to the uprights 5 and 6, by bars 31, which securely hold the yoke in its rearwardly-inclined position. Angle bars 32, running parallel with the inclined arms of the yoke 30, are secured at their lower ends to the beams 3, and their upper ends are bent at an angle and are secured to the inclined arms of the said yoke. The arms 32, and the yoke arms, form slideways 33, in which are placed flanged bearing blocks 34, which support a shaft 35, upon which is rigidly mounted a pair of sprocket wheels 36. One end of the shaft 35, extends beyond the adjacent bearing block 34, and upon it is rigidly secured a sprocket wheel 37. To the blocks 34, are secured threaded rods 38, which extend through apertures in the tops of the slideways. Nuts 39 on these rods, bear upon the top or end members of the slideways, and by turning these nuts, the block 34 and shaft 35 are raised or lowered, as the case may be. Angle bars 40, are pivotally secured at their upper ends to the bearing blocks 34, and extend down at an angle of substantially forty-five degrees, and are secured at their lower ends to angle bars 41, which are secured upon parallel bars 42, which connect the bars 41 and extend beyond them. The upper ends of the bars 40, have short arms 43 secured to them,

which are parallel with the bars, and with them form yokes which straddle the blocks 34, and are secured to them by bolts or pins 44, as clearly shown in Figs. 4 and 5. Upright bars 45, are secured between the parallel bars 42, near the ends of the said bars, and are held in an upright position by braces 46, which are secured to the uprights and to the bars 42. The upper ends of the uprights 45, are bent outward at right angles, and angle irons 47, are secured to the under side of these bent ends, and to the uprights. Blocks 48, are secured to the extended ends of the bars 42, in line with the angle irons 47. The angle irons and bent ends of the uprights 45, are provided with threaded apertures, and the blocks 48, are provided with smooth apertures in line with the apertures in the angle irons, and in these apertures are mounted threaded rods 49, which are held at any desired vertical adjustment by nuts 50. Upon the lower ends of the rods 49, are pivotally secured yokes 51, in which are mounted caster wheels 52. Stub axles 53, are suitably secured upon the ends of the bars 41, and upon the axles are mounted sprocket wheels 54, which are in line with the sprocket wheels 36, on the shaft 35. An endless chain 55, connects each of the wheels 36, and the two wheels 54 on the same side of the machine, and the two chains are connected at intervals by channel bars 56, to which brushes 57 are secured, the material composing the brushes being first bent in the form of the letter U, and placed with their looped ends in the channel bar, and then clamped therein by a second and smaller channel bar 58, which is bolted to the first bar in the manner illustrated in Fig. 9.

An inclined apron 59 is hinged at its upper end to the rear end of the vehicle, preferably to the uprights 5. This apron is provided with side flaps 60, and the upper end of the apron is flush with the top of the compartment 19, and in position to discharge into the receptacle 21, which is held in the said compartment. An angle bar 61, extends transversely across the bottom of the apron near its lower end, and projects a slight distance beyond each side of the same, and turn buckles 62, connect the extended ends of the bar 61 with the two bars 40. A supplemental apron 63, is hinged to the lower end of the main apron, and its free end is curved downward and extends nearly to the ground. This curved end is supported upon rollers 64, and whatever the adjustment of the main apron may be, the hinge connection of the supplemental apron will always permit its rollers to rest upon the ground so that the supplemental apron will be in position to catch the sweepings, which are then carried up the main apron and deposited in the receptacle 21.

Bars 65, are secured to the rear ends of

the bars 41, and these extend rearward a suitable distance and are connected by a transverse bar 66. Uprights 67 extend from near the upper ends of the bars 40, and to the free ends of these uprights, are secured strips 68, which extend down parallel with the surface of the brushes, and a slight distance beyond them, and their lower ends curve down and are secured to the bars 65. The strips 68 are connected at intervals by strips 69, and the strips 68 and 69 together form a supporting frame upon which is secured a canvas or other suitable covering 70, which completely incloses the brushes, extending nearly to the ground on each side and at the rear. The covering extends up over the top of the yoke 30 and bars 31, so as to cover that part of the frame of the vehicle on each side of the fan casing, though boards may be used instead, if desired, and the side portions of the frame bounded by the yoke 30, bars 31, uprights 6, and beams 3, are also inclosed in any suitable way.

Air pipes 71, project from each side of the axial center of the fan casing, and communicate with the brush chamber through the top of the cover, and a shaft 72, extends through the fan casing and air pipes, and is journaled in bearings 73 mounted on the bars 31. The shaft carries a fan 74, and upon one end of the shaft is a sprocket wheel 75, connected by a chain 75<sup>A</sup>, with a sprocket wheel 76, on a stub shaft 77, which carries a second sprocket 78. A chain 79, extends from the sprocket wheel 37 on the shaft 35, under the sprocket wheel 78, over an idle sprocket wheel 80, to and around a sprocket wheel 81, on a shaft 82, which extends across the machine, above the inclined bottom 17, and is journaled in bearings 83, on the side beams 3. A second sprocket wheel 84, is also secured to the shaft 82, adjacent to the wheel 81, and this wheel is connected by a chain 85 with a sprocket wheel 86, on a motor-driven shaft 87, which is provided with a suitable clutch 88, by which the driving mechanism may be disconnected from the motor when desired. The motor 89, may be of any desired type. The outer end of the shaft 82, is supported in a bearing on a bracket 90, which is firmly secured to the frame of the vehicle. An inclined platform 91, is situated a short distance above the inclined bottom 17, and this platform is suspended adjacent to one end upon hooks or links 92, which permit the platform to reciprocate, while the other end is attached to depending resilient supports 93. An arm or rod 94, is secured adjacent to each end of the platform 91, and the opposite ends of these rods are formed into bands, which fit upon eccentrics 95, on the shaft 82, whereby, when the shaft revolves, the platform is reciprocated, and the dust discharging upon the platform from the

fabric tubes above the same, is conveyed into the dust receptacle 20.

In operation, the caster wheels 52, are adjusted to suit the length of the brushes, and the apron 59 is correspondingly adjusted, by manipulating the turn buckle 62, while the screw rods 38 are turned to raise or lower the bearing slide blocks 34, to bring the under sides of the brush carrying chains and the surface of the brushes parallel with the apron 59. The motor is started, and power from the shaft 87 is communicated to shaft 82 by chain 85, connecting power-driven sprocket 86 and sprocket 84. Sprocket wheel 81, on shaft 82, drives wheel 87 on the shaft 35, through chain 79, and the brush carrying chains 55 are thereby operated, carrying the brushes with them. The chain 79 engages the sprocket wheel 78 on the stub shaft 77, and the sprocket wheel 76, on the same shaft, is also turned, communicating power to the sprocket wheel 75, on the fan shaft 72, through the chain 75<sup>A</sup>. The tension of the chain 79 is regulated by the sprocket wheel 80, which is mounted on an adjustable arm 80<sup>A</sup>. As the machine advances, the sweepings are carried by the brushes, against the supplemental apron 68, and thence up the main apron 59, whence they are discharged into the sweepings receptacle 21. The dust from the sweepings is drawn up through the air pipes 71, by the action of the fan 74, and carried out through the fan casing into the chamber 14, at the top of the machine, whence it descends through the numerous fabric tubes 13, into the dust receptacle 20, being directed into the said receptacle by the inclined bottom 16, and the reciprocating platform 91. The air from the fan escapes through the meshes of the fabric tubes, but the dust is prevented from escaping, thus obviating objectionable and unsanitary conditions during the operation of the machine.

By employing a pair of sprocket wheels 54, on each side of the brush supporting frame, instead of a single wheel on each side, the brushes, after contacting with the street, travel parallel with it a short distance, which results in a more thorough and effective removal of the sweepings than can be accomplished by a rotary contact of the brushes with the street, as instanced by machines operating in this manner in present use.

The machine is easily and quickly adjusted, and meets all the requirements of a sanitary sweeper.

Having described the invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a street sweeping machine, the combination of a wheeled vehicle; slideways on the rear end of the vehicle; slide bearing blocks adjustably mounted in the slideways;

4  
 5 a shaft supported in said blocks, and sprocket  
 wheels adjacent the ends of the shaft;  
 a frame pivotally secured to said blocks;  
 adjustable casters for supporting the oppo-  
 10 site end of the frame; sprocket wheels on  
 the frame in line with the sprocket wheels  
 on the shaft; endless chains connecting the  
 aligned sprocket wheels and brushes secured  
 to the chains; an inclined apron in contact  
 15 with the upwardly moving brushes, and  
 hinged at its upper end to the vehicle frame;  
 adjusting means connecting the lower end of  
 the apron and the brush carrying frame; a  
 housing for the brushes; a receptacle for re-  
 20 ceiving the heavy sweepings from the apron;  
 air induction means for conveying the dust  
 from the sweepings; a receptacle for receiv-  
 ing the dust, and means for operating the  
 brushes and air induction means.

20 2. In a street sweeping machine, the com-  
 bination of a wheeled vehicle, having a  
 sweepings receiver and a dust receiver; slide-

ways on the end of the vehicle; a frame  
 mounted at its upper end on blocks adjust-  
 able in the slideways and having adjustable 25  
 supporting casters at its lower end; an end-  
 less series of brushes mounted on the frame  
 and arranged to travel parallel with the  
 street for a predetermined distance; an in-  
 30 clined apron hinged at its upper end to the  
 vehicle, upon which the upwardly moving  
 brushes travel; a supplemental apron hinged  
 to the lower end of the first apron having  
 rollers which rest upon the street; a housing  
 for the brushes; a rotary fan communicat- 35  
 ing with the housing and with the dust re-  
 ceiver; and means for operating the brushes  
 and fan.

In testimony whereof I affix my signature  
 in presence of two witnesses.

HARRY R. HARN.

Witnesses:

C. R. GARY,  
 J. T. BOLAM.