C. G. THOMPSON.

STREET SWEEPER.

APPLICATION FILED JAN. 27, 1916.

1,207,816.

Patented Dec. 12, 1916.

4 SHEETS-SHEET 1.

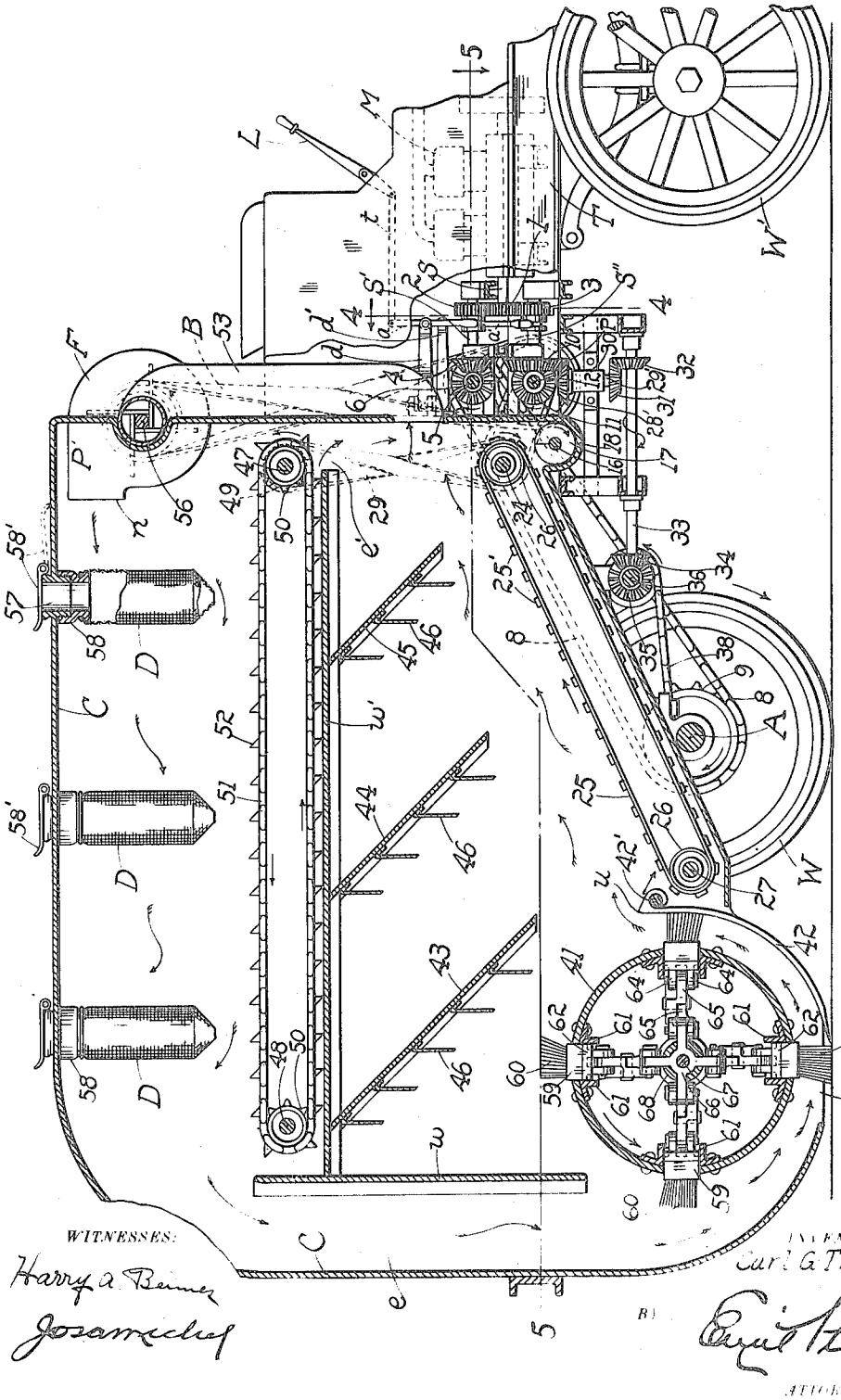


FIG. 1.

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4 SHEETS—SHEET 2.

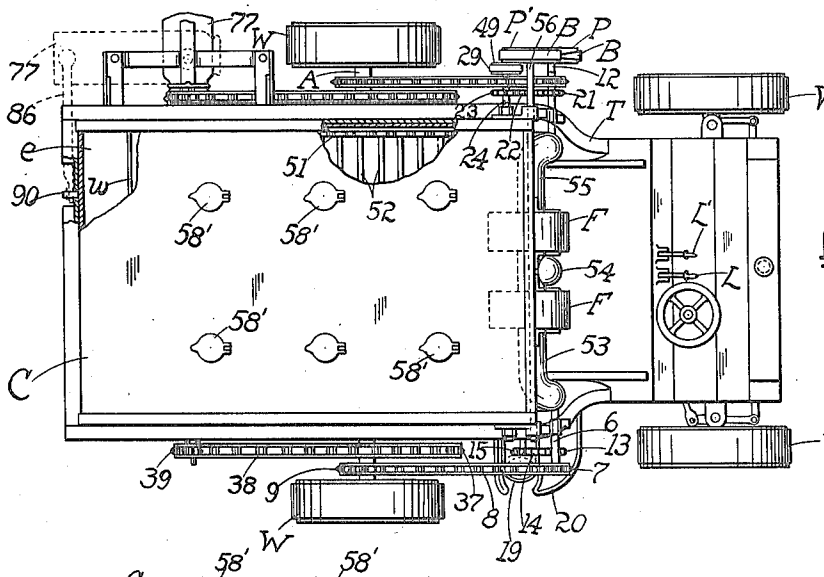


FIG. 2.

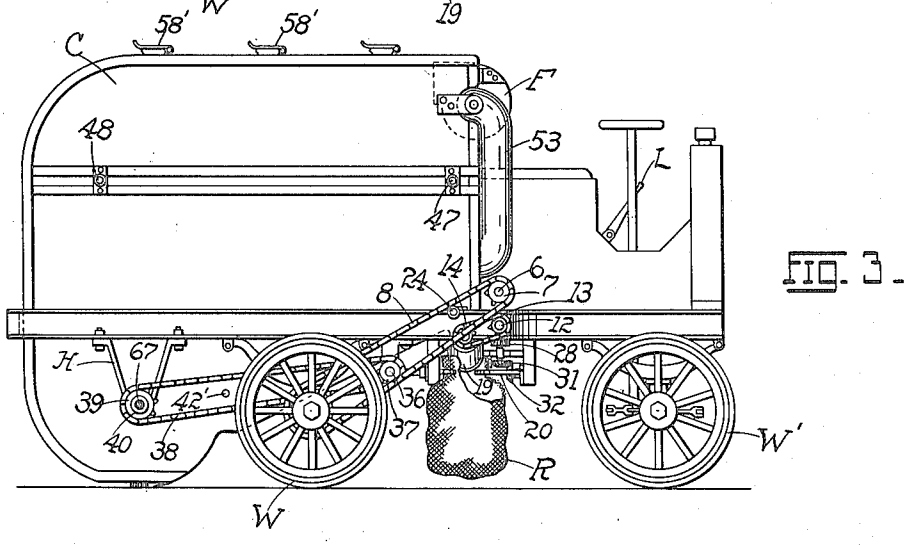


FIG. 3.

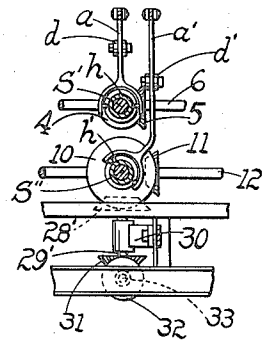


FIG. 4.

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4 SHEETS—SHEET 3.

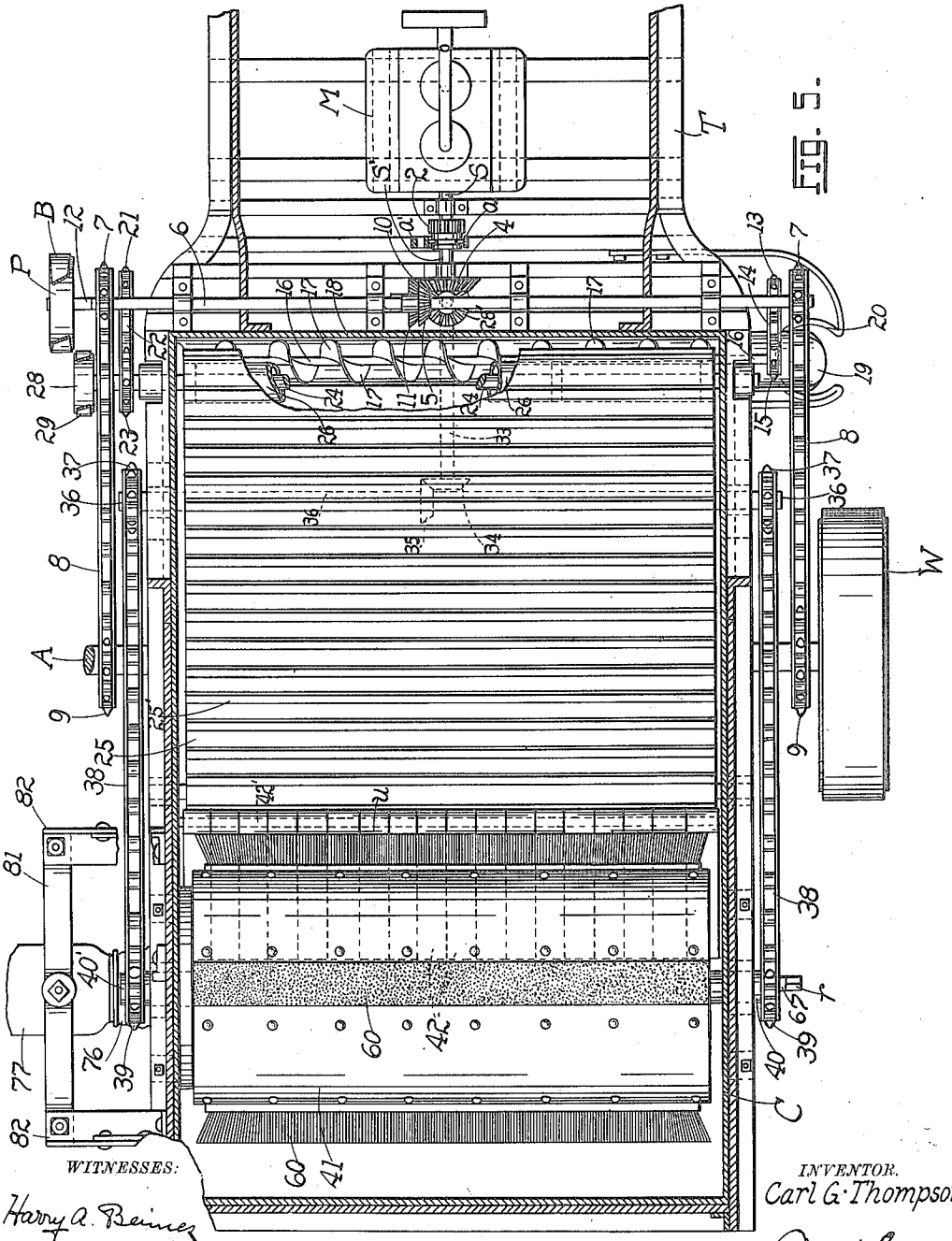


Fig. 5.

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4 SHEETS—SHEET 4.

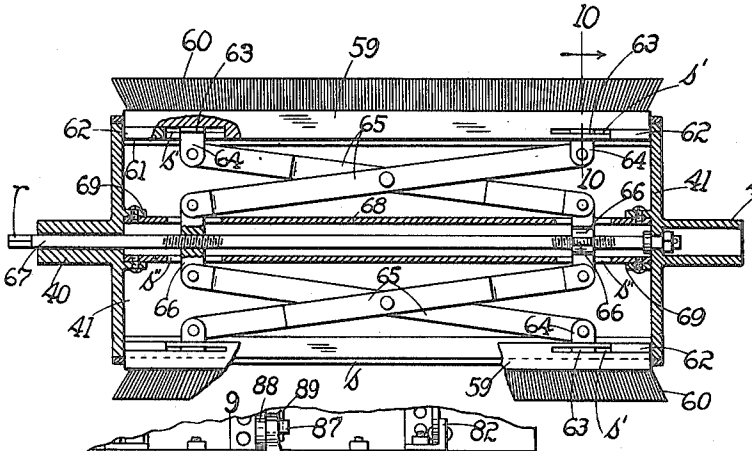


FIG. 6.

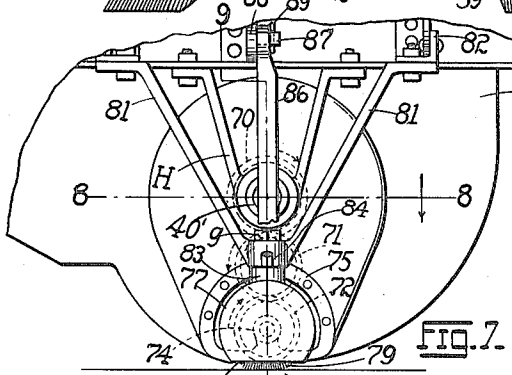


FIG. 7.

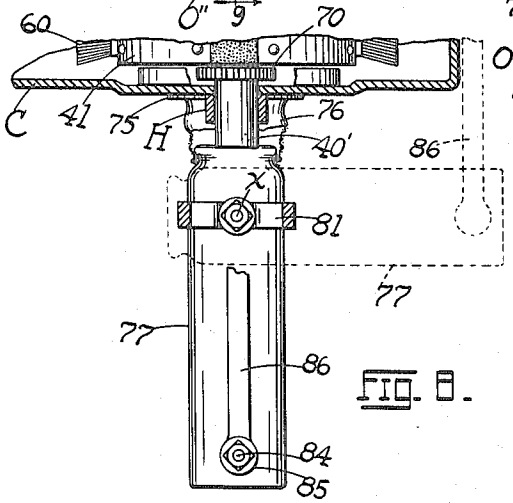


FIG. 8.

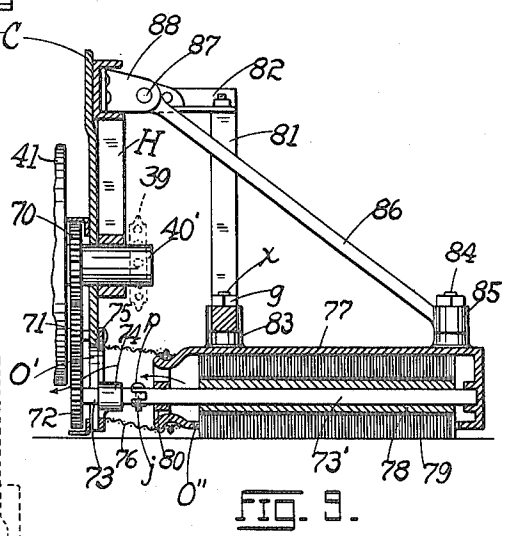


FIG. 9.

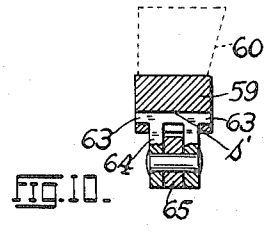


FIG. 10.

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UNITED STATES PATENT OFFICE.

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STREET-SWEEPER.

1,207,816. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed January 27, 1916. Serial No. 74,620.

To all whom it may concern:

Be it known that I, CARL G. THOMPSON, a citizen of the United States, residing at Sullivan, in the county of Sullivan and State of Indiana, have invented certain new and useful Improvements in Street-Sweepers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in street sweepers; and it consists in the novel features of construction more fully set forth in the specification and pointed out in the claims.

The present improvement is directed to motor-operated street-sweepers preferably mounted on some form of self-propelled vehicle or automobile truck, the object of the invention being to sweep the street without previous sprinkling, and at the same time dispose of the dirt and dust in such a way as to prevent any undue scattering of the dust particles into the atmosphere, both the heavy and light particles being collected in a common receptacle or bag mounted on the truck frame. In the present embodiment of my invention the heavy particles are caused to be precipitated from the lighter particles or dust by means of properly circulated air currents operating in conjunction with suitable deflecting plates and baffles, provision being made to regulate the intensity or force of the currents as will more fully hereinafter appear.

A further object is to make suitable provision for effectively sweeping the gutters or corners between the street and curb-stones; to provide means for adjusting the brushes to effect proper contact with the surface swept over; and to provide further and other details of construction better apparent from a detailed description of the invention in connection with the accompanying drawings in which—

Figure 1 represents a side elevation of an automobile truck with my invention applied thereto, parts being in vertical longitudinal section; Fig. 2 is a top plan of the sweeper on a reduced scale, with parts broken away; Fig. 3 is a side elevation; Fig. 4 is a vertical cross-sectional detail on the line 4—4 of Fig. 1; Fig. 5 is a horizontal section on the zig-zag line 5—5 of Fig. 1; Fig. 6 is a longitudinal middle section of the brush cylinder or drum showing the mechanism for imparting radial adjustment to the brushes; Fig. 7 is an end elevation of the gutter broom or brush; Fig. 8 is a horizontal section on the line 8—8 of Fig. 7; Fig. 9 is a vertical section on the line 9—9 of Fig. 7; and Fig. 10 is a sectional detail on the line 10—10 of Fig. 6.

Referring to the drawings, T represents a conventional automobile truck, M the motor, and W, W′, the rear and front running wheels as well understood in the art. The shaft S of the motor terminates in a spur gear wheel 1 which meshes with the diametrically opposite gears 2 and 3 on the superposed parallel shafts S′, S″, (Fig. 1), suitably mounted on the truck frame. The gears 2 and 3 are slidably feathered to their respective shafts S′, S″, and may be moved into and out of engagement with the motor gear 1 by the shifting levers *a*, *a′*, pivoted respectively to brackets *d*, *d′*, which levers in turn are actuated by levers L, L′, through suitable link connections *t* as fully understood in the art (only one link *t* appearing in the drawing) the forked terminals of the levers *a*, *a′*, engaging the hub portions *h*, *h′*, of the respective gears 2, 3. The inner end of the upper shaft S′ terminates in a bevel gear 4 which meshes with a similar gear 5 on a transverse or counter-shaft 6 on the truck frame, said shaft projecting beyond the sides of the truck where it is provided with suitable sprocket wheels 7 from which lead sprocket chains 8, 8, over similar but larger sprocket wheels 9, 9, on the axle A carrying the wheels W, W. The connections last described constitute the automobile drive, for it is obvious that upon rotation in proper direction being imparted to the motor shaft S, the shaft 6 will be turned in proper direction to cause the sprocket chains 8, 8, to impel the vehicle forward.

The inner end of the lower shaft S″ terminates in a bevel gear wheel 10 which meshes with a bevel pinion 11 on a transverse or counter-shaft 12 mounted parallel to and below the shaft 6, one end of the shaft 12 terminating in a belt pulley P over which operates the cross belt B. The shaft 12 is provided at one end with a sprocket wheel 13, over which passes a sprocket chain 14, the latter in turn passing over the sprocket wheel 15 at the adjacent terminal of the shaft 16 of a screw-conveyer 17 operating in the transverse trough 18 as shown, the dis-

charge end of the trough terminating in a chute 19 which discharges into a bag or receptacle R suspended in any convenient manner from the open ring or bracket 20 carried by the truck frame. At the opposite end the shaft 12 carries a sprocket wheel 21 driving a sprocket chain 22 which in turn passes over a sprocket 23 mounted on the adjacent end of a transverse shaft 24 actuating a belt conveyer 25 provided with cross-slats 25′, the said shaft being provided with a roller 26 for the support of the upper end of the belt, the lower end of the conveyer passing over a similar roller 26 on a parallel shaft 27 mounted on the truck frame. The end of the shaft 24 opposite the discharge end of the screw conveyer 17 is provided with a pulley 28 over which operates a cross-belt 29 for a purpose presently to be explained. The bevel gear 10 likewise engages a bevel pinion 28′ at the upper end of a short vertical shaft 29′ mounted in the bracket 30, the lower end of said shaft terminating in a bevel pinion 31 which in turn meshes with a bevel pinion 32 on a shaft 33 disposed parallel to the shafts S, S′, S″, that is to say disposed longitudinally of the vehicle and mounted in any suitable manner on the truck frame, the inner end of said shaft terminating in a bevel pinion 34 which meshes with a corresponding pinion 35 on a transverse shaft 36. The opposite ends of the shaft 36 are provided with sprocket wheels 37 each of which actuates a sprocket chain 38 extending rearwardly and passing over a sprocket wheel 39 carried by the hollow trunnions 40, 40′, projecting from the heads of the brush-cylinder or sweeper broom 41.

It may be convenient at this point to state that inasmuch as the gears 2, 3, are disposed on opposite sides of the motor gear 1, they, and their shafts S′, S″, will rotate in the same direction; and assuming that the motor shaft S is rotating counter-clockwise, the shafts S′, S″, will rotate clockwise and the truck wheels W will be correspondingly rotated, the vehicle moving forward. By following the several gear connections described it will be found that the brush cylinder will rotate counter-clockwise which should be the case in order to sweep the dirt before it; and the belt 25 and screw-conveyer 17 will rotate as indicated by the arrows.

The brush cylinder 41, belt 25, and other parts presently to be described are confined in an air chamber or casing C whose rear lower portion is suitably contoured to conform to the cylindrical shape of the brush cylinder, the brushes of the cylinder operating through a transverse slot or opening O whose forward edge is bounded by the lower ends of a series of juxtaposed pendent wipers 42 having their upper ends secured to or looped about a transverse rod 42′ extending across the chamber of the casing C, the upper ends of the wipers forming a common ridge u, and being disposed above the lower end of the belt 25 and discharging the dirt thereonto. The wipers collectively form a wall or apron along which the dirt is swept by the brushes, the inner surface of the wipers conforming in general to the cylindrical surface described by the ends of the brushes, and engaging the brushes during the rotation of the brush cylinder. The purpose of a multiplicity of wipers is to allow for obstructions in the path of the length of the brush cylinder as the machine is driven along the ground, the wipers forming the front yielding wall of the brush-cylinder housing proper. Disposed in the casing C in front of the rear vertical wall thereof and at a suitable distance therefrom is a vertical partition wall w forming with the rear casing-wall a downtake or passage e for the traverse of the air currents as presently to be described, a horizontal partition w' leading forward from a point below the upper end of the partition w, and terminating a short distance from the front vertical wall of the casing so as to leave a discharge opening e'. From the wall w' lead downwardly and forwardly a series of deflecting plates 43, 44, 45, diminishing progressively in length and inclined at an agle of substantially forty-five degrees, each plate being provided with a series of vertical baffles 46 on the rear face, or that facing the brush cylinder as shown (Fig. 1). Disposed above the wall w' at each end thereof are transverse parallel shafts 47, 48, respectively, the former terminating at one end in a pulley 49 over which passes the cross-belt 29 leading from the pulley 28 on the shaft 24. The opposite ends of the shafts 47, 48, are provided with suitable sprocket wheels 50 for operating the chains 51 forming the side members of a suitable endless scraper, the chains being connected by the transverse scraper bars 52 which are wedge-shaped in cross-section, the sharp edges of the bars scraping along the upper surface of the plate w' which serves as a collecting platform for the particles precipitated thereonto from the upper portions of the casing C as hereinafter more fully described. The cross-belt 29 will obviously impart motion in the proper direction to the scraper belt composed of the chains 51 and cross-bars 52.

Tapping, and leading from, the casing C at a point above the upper end of the slotted conveyer 25 (which by the way discharges into the trough 18) are a series of uptakes or conduits 53, 54, 55, which discharge into the fan casings F, F, the central conduit 54 discharging into both casings, and the conduits 53, 55, discharging each into its corresponding casing (Fig. 2). The fans of the fan casings are provided with a common shaft 56 with a pulley P′ and are jointly

driven by the cross belt B leading from the pulley P on the shaft 12 over the pulley P′, the crossing of the belt being necessary so as to drive the fan blades in proper direction to draw the air into the fan casings from the uptakes 53, 54, 55, and expel it from the eduction legs *n* of the fan casings into the housing or casing C, the fans discharging into the upper front end of the casing C and driving the currents rearwardly over the platform *w′*. The roof of the casing or housing C is provided with a series of nozzles 57 projecting above and below the roof, the lower portions thereof being screw-threaded and having secured thereto the rings 58 carrying filter bags or screens D, the upper ends of the nozzles being normally closed by hinged lids or valves 58′. The bottoms of the bags terminate a suitable distance above the scraper belt (51, 52).

The periphery of the brush cylinder 41 is provided with a series of parallel longitudinal slots or ways *s* spaced ninety degrees apart, through which are free to radially operate the brush-backs or bars 59 to which the bristles 60 are secured. The sides of the slots *s* are bounded by suitable strips or angle bars 61 riveted to the inside of the cylinder shell, said angles 61 serving as guides for the brush backs 59 aforesaid. The ends of the members 59 are formed with open ended T-slots *s′* (which are subsequently closed by plugs 62), said slots being traversed by the flanges 63 of the forked or bifurcated slides or blocks 64, between whose ears or fork members are pivotally secured the outer terminals of the toggle levers 65 which cross each other and are pivotally coupled to one another inside the cylinder 41, the inner ends of the series of toggles being pivotally coupled to the radial arms of the adjusting nuts or spiders 66 operating on the screw-threaded portions of the axial rotatable rod 67 traversing the trunnions 40, 40′, the end of the rod projecting from the trunnion 40 terminating in a square or polygonal head *r* for the application of a suitable wrench or socket. The rod 67 traverses a tube or sleeve 68 secured within the cylinder between the bosses 69 on the cylinder heads, the walls of the sleeve being provided with slots *s″* for guiding the arms of the spider-nuts 66 and constraining the latter to move longitudinally (without rotation) along the rod 67 when rotation is imparted to the latter, the rod at opposite ends being threaded respectively right and left so as to cause the members 66 to move along the rod simultaneously in opposite directions. It will be seen from the connections described that a turn of the rod 67 in one direction will cause the adjusting members 66 to approach one another, thereby closing the toggles and forcing the brush holders 59 radially outward, a turn of the rod 67 in the opposite direction forcing the members 66 apart and thereby opening the toggles and drawing the brush holders radially inward. Thus the brushes may be carefully adjusted against the surface of the ground passed over; and as the brushes wear away they can always be maintained at the proper distance beyond the periphery of the brush-cylinder. In these adjustments of course, the blocks or slides 64 must be free to reciprocate in their slotted bearings *s′*, otherwise the toggles 65 would bind and the adjustment would be impossible. In other words, the blocks 64 must move longitudinally with a corresponding movement of the nuts 66, to allow the toggles to close and open. This is obvious from an inspection of Fig. 6.

To sweep or wipe out the gutters, the following provision is made: The trunnions of the brush cylinder are mounted in brackets or hangers H. Secured to the trunnion 40′ on the inside of the casing C is a gear wheel 70 (Fig. 9) which engages an idler 71, the latter in turn meshing with a gear wheel 72 at the inner end of the inner section 73 of the gutter broom shaft, the outer section 73′ of which is coupled to the inner section by a pin *p* forming a swing-joint *j*, the two sections rotating as a single shaft or unit when swung into axial alinement. The shaft section 73 is supported in a bearing 74 formed with a ring 75 secured about an opening O′ in the casing wall, said ring serving to secure one end of a flexible hose or neck of fabric 76 whose opposite end is passed over and secured to, the adjacent end of the cylindrical gutter-brush carrier or cylinder 77, the inner sleeve 78 of the brush to which the bristles 79 are attached, being secured to the shaft section 73′ which has its bearings respectively in the outer head of the cylinder (77) and an inner terminal spider 80 which is freely traversable by air currents drawn into the casing C through the open bottom or slot O″ of the cylinder 77, through the spider, the hose connection 76 and opening O′. When the cylinder 77 is swung outwardly to bring the shaft sections 73, 73′, into alinement, it is secured rigidly in said outwardly swung position by a V-shaped brace or bracket 81 secured to angle-brackets 82, the base of the brace bearing against a boss or stud 83 formed on the wall of the cylinder, the outer end of the cylinder being provided with a bolt 84 adapted to be passed through the lower terminal head 85 of a strut 86 whose upper end is secured by a pin 87 to a lug 88, a locking or cotter pin 89 being passed through the pin 87 (Fig. 7). The stud 83 is provided with a screw-bolt or stem *x* which is passed through the base of the brace 81, a nut *g* securing the brace firmly

to the stud 83. By removing the pin *p*, detaching the neck of fabric 76 from the cylinder 77, and uncoupling the upper end of the strut 86, whose lower end by the way is freely rotatable about the bolt 84, it is apparent that the gutter-broom cylinder 77 (and its broom) when not in service may be swung out of the way against the side of the machine about the bolt *x* as a pivot or spindle, the removal of the pin *p* allowing the shaft-section 73′ to swing freely with the cylinder or housing 77. The free end of the strut or link 86 can then be passed over a pin 90 as shown in Fig. 2.

The operation will be readily understood from the foregoing description, but briefly may be described as follows: Assuming the gears 2 and 3 to be both in mesh with the gear 1 and the motor M running. From the connections described, the sweeper broom or cylinder will rotate as indicated by the arrows, the machine will be propelled forward, and the scraper belt 51, 52, the conveyer belt 25, screw-conveyer 17 and the fan blades in the fan casings F will all be set in motion as above pointed out. As the machine advances, the heavy dirt will be swept along the apron formed by the wipers 42, over the ridge *u* onto the conveyer belt 25, the slats 25′ of which will assist in carrying the material discharged onto the conveyer, over the upper roller 26, the material dropping into the trough 18 whence it is conveyed by the screw conveyer into the chute 19 from which it drops into the bag or receptacle R. The air currents circulating as fully indicated by the arrows in Fig. 1, will cause a constant flow of air rearward from the fans (or from the casings F) above the platform *w′*, then downward through the passage-way *e*, then under the sweeper broom, then upward above the belt 25 toward the intakes of the flues 53, 54, 55. The air currents thus circulating will induce a current to flow from the gutter-broom cylinder 77 through the hose section 76, opening O′, into the casing C (or more properly the immediate housing of the main sweeper broom 41) the dirt and dust from said gutter-broom being thus drawn into the main casing C where it is disposed of in conjunction with the sweepings of the large broom 41. The lighter particles drawn by the air currents are caused to impinge more or less against the deflecting plates 43, 44, 45, and their baffles 46, and are in a measure precipitated onto the conveyer 25 by which they are conveyed to the trough 18 as already described. The still lighter particles or dust are drawn into the region of the casing C above the platform W′ where after impinging against the filters or screens D, they precipitate onto the platform *w′* from which they are scraped by the scraper rods 52 of the scraper conveyer 51, and allowed to drop into the trough 18 from which they are conducted with the rest of the material into the bag R. Should it be desired to reduce the pressure of air in the region about the platform *w′*, one or more of the gates or valves 58′ may be thrown open in which event a part of the air in the casing C would percolate through the bags D and nozzles 57 into the atmosphere, any fine dust accompanying the air being intercepted by the bags before the air discharges into the atmosphere. By opening a gate or valve 58′ communication is at once established between the interior of the casing C and the atmosphere through the meshes of the screens D, whereby the pressure of the air in the upper regions of the casing may be varied and the circulation through the casing nicely regulated.

Practically no dust is discharged into the atmosphere under the arrangement above described, and wetting or flushing of the streets is unnecessary. Should it be desired to propel the machine without operating the broom and the other moving parts of the sweeper, the operator simply disconnects the gear 3 from the gear 1 by a proper manipulation of the lever L′. Features shown but not alluded to are well known in the art and require no description in the present connection.

I may of course depart from the details here shown without in any wise affecting the nature or spirit of my invention.

Having described my invention what I claim is:

1. In a street sweeper, a suitable vehicle, a casing mounted thereon, a rotary brush at the bottom of the casing operating to sweep the surface traveled over by the vehicle, a suitable receptacle on the vehicle, a conveyer interposed between the receptacle and brush for supplying material to said receptacle, means for circulating currents of air in the casing past the brush for carrying over the lighter particles, means for causing a partial precipitation of said lighter particles onto the conveyer, a collecting platform for receiving the balance of the lighter particles, and means for removing the accumulations on said platform.

2. In a street sweeper, a suitable vehicle, a casing mounted thereon, a rotary brush at the bottom of the casing operating to sweep the surface traveled over by the vehicle, a suitable receptacle on the vehicle, a conveyer interposed between the receptacle and brush for supplying material to said receptacle, means for circulating currents of air in the casing past the brush for carrying over the lighter particles, means for causing a partial precipitation of said lighter particles onto the conveyer, a gutter broom operated in conjunction with the sweeper brush aforesaid, and means for causing the

material swept by the gutter-broom to be drawn into the casing in response to the air currents circulating therein.

3. In a street sweeper of the character described, a casing, a brush at the bottom thereof for sweeping the surface passed over by the sweeper, a receptacle, means for conducting the sweepings to the receptacle, means for causing currents of air to circulate through the casing around and under the brush for assisting the sweepings toward the receptacle, a series of deflecting plates and baffles for causing a partial precipitation of the lighter particles onto the conducting means aforesaid, a platform superposed above the deflecting plates for collecting the remainder of the light particles, a traveling member for scraping the accumulations on the platform toward the receptacle, and means for regulating the air pressure in the casing in the region above the platform.

4. In a street sweeper of the character described, a casing, a vertical partition wall removed from the rear wall of the casing and terminating a suitable distance from the top and bottom of the casing, a horizontal platform leading from the partition toward the opposite wall of the casing and terminating a suitable distance therefrom, a sweeper broom at the bottom of the casing below the partition wall aforesaid, a fan at the end of the casing opposite the partition discharging air into the space above the platform, air conduits leading from the space in the casing below the platform aforesaid to the fan, suitable deflecting plates leading downwardly from the platform toward the conduits leading to the fan, baffles leading from the deflecting plates on the sides facing the sweeper broom, a trough, and a conveyer conducting the discharges from the sweeper broom and the finer particles precipitated thereon by the baffles and deflecting plates, into the trough.

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

CARL G. THOMPSON.

Witnesses:
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H. G. BEHLER.