

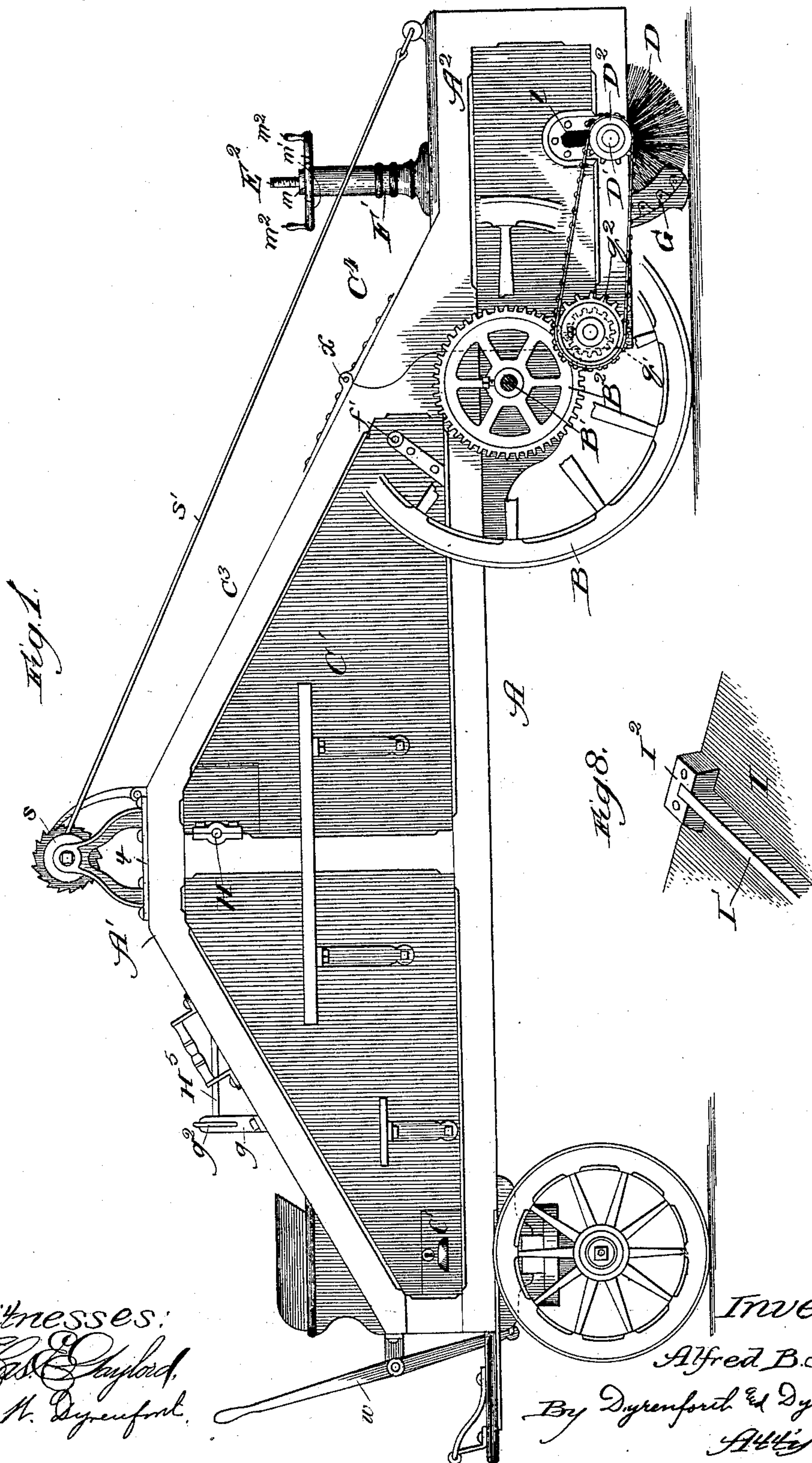
(No Model.)

4 Sheets—Sheet 1.

A. B. SMITH.
STREET SWEEPER.

No. 435,103.

Patented Aug. 26, 1890.



Witnesses:

Chas. Dyrenfort,
J. H. Dyrenfort.

Inventor.

Alfred B. Smith.

By Dyrenfort & Dyrenfort,
Attys.

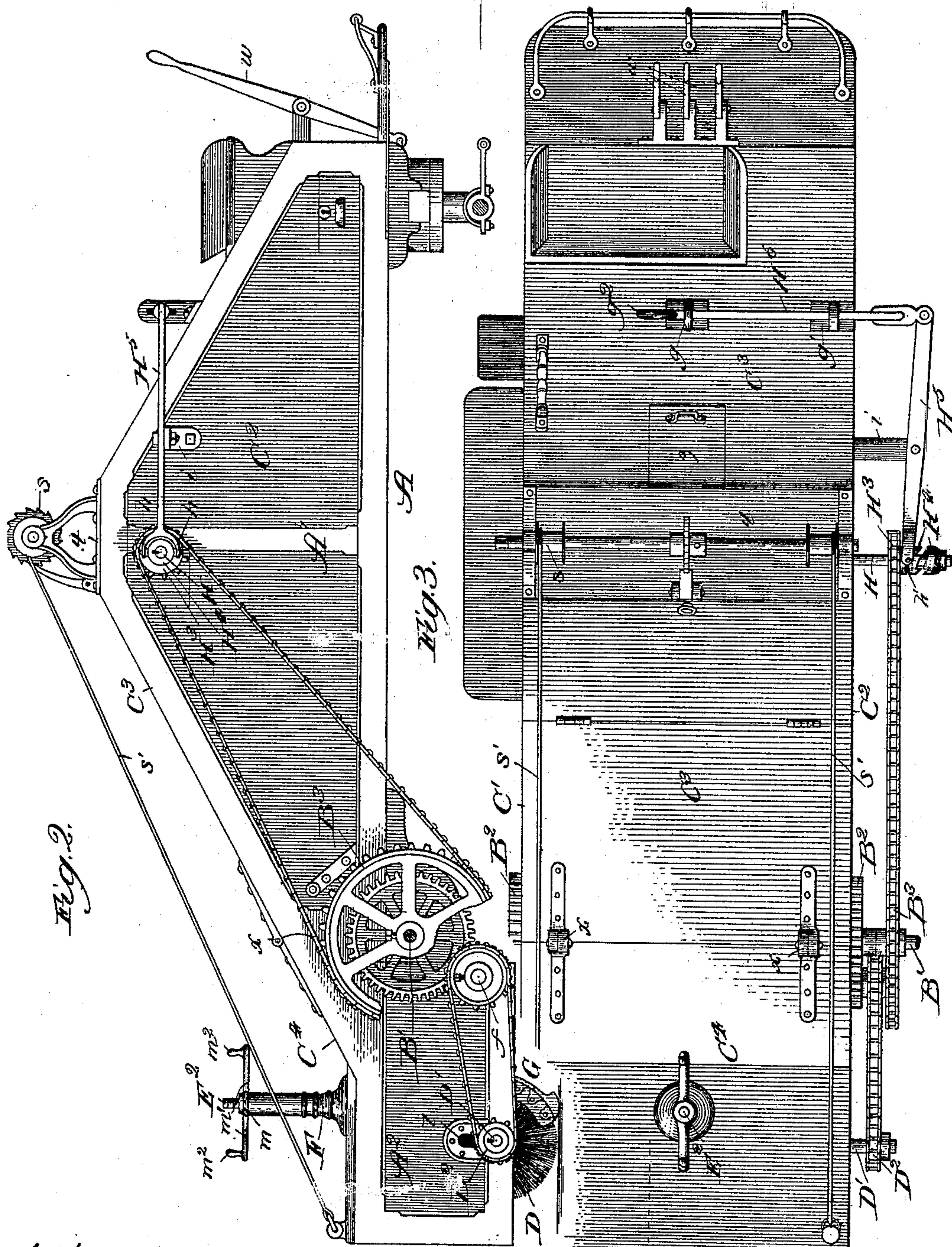
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4 Sheets—Sheet 2.

A. B. SMITH.
STREET SWEEPER.

No. 435,103.

Patented Aug. 26, 1890.



Witnesses:
J. H. Dyrenforth.
J. H. Dyrenforth.

Inventor:
Alfred B. Smith.
By Dyrenforth & Dyrenforth,
Attorneys

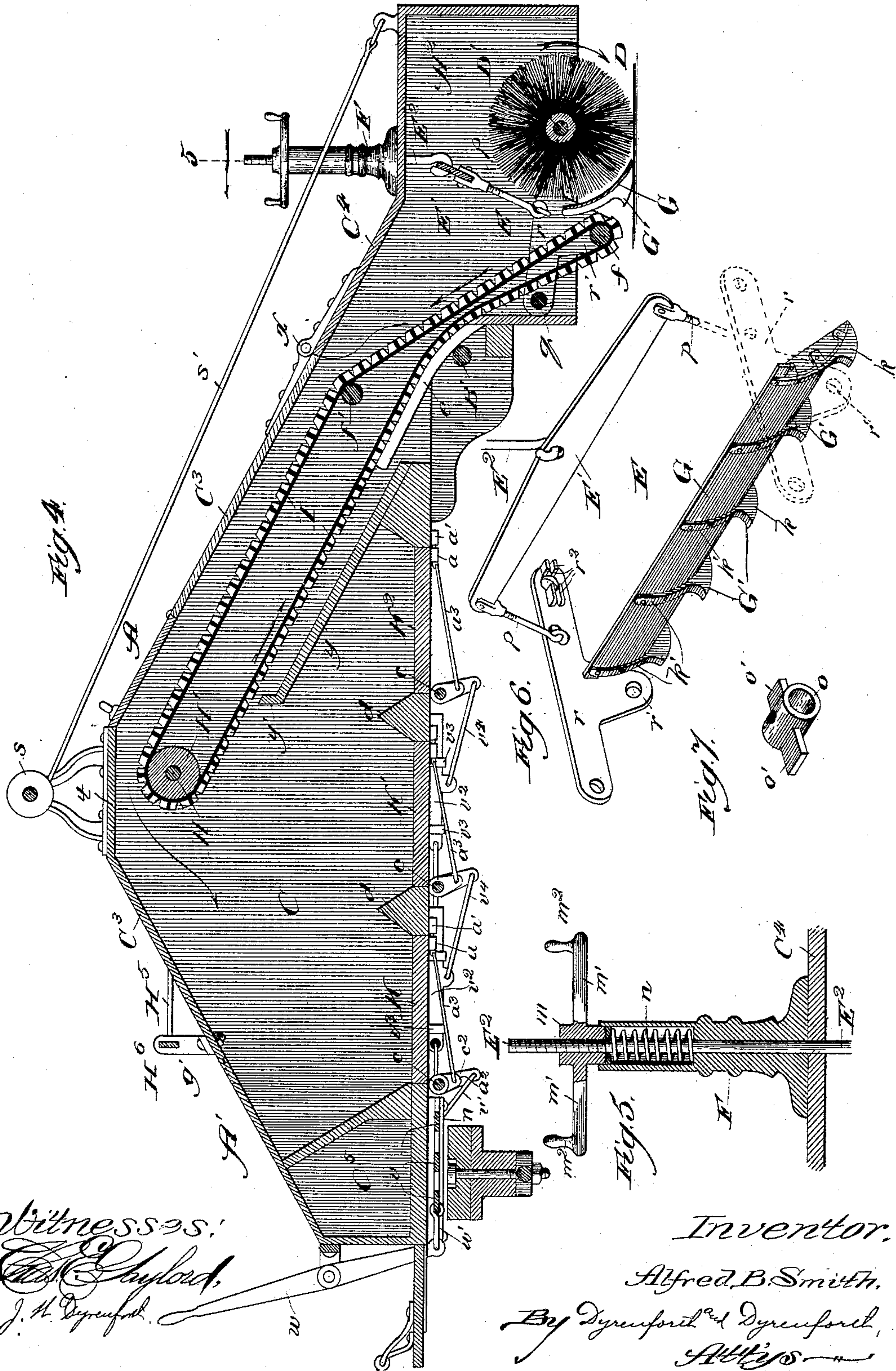
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4 Sheets—Sheet 3.

A. B. SMITH.
STREET SWEEPER.

No. 435,103.

Patented Aug. 26, 1890.



Witnesses:
Chas. Paylor,
J. H. Dyrenforth.

Inventor:
Alfred B. Smith,
By Dyrenforth & Dyrenforth,
Attys.

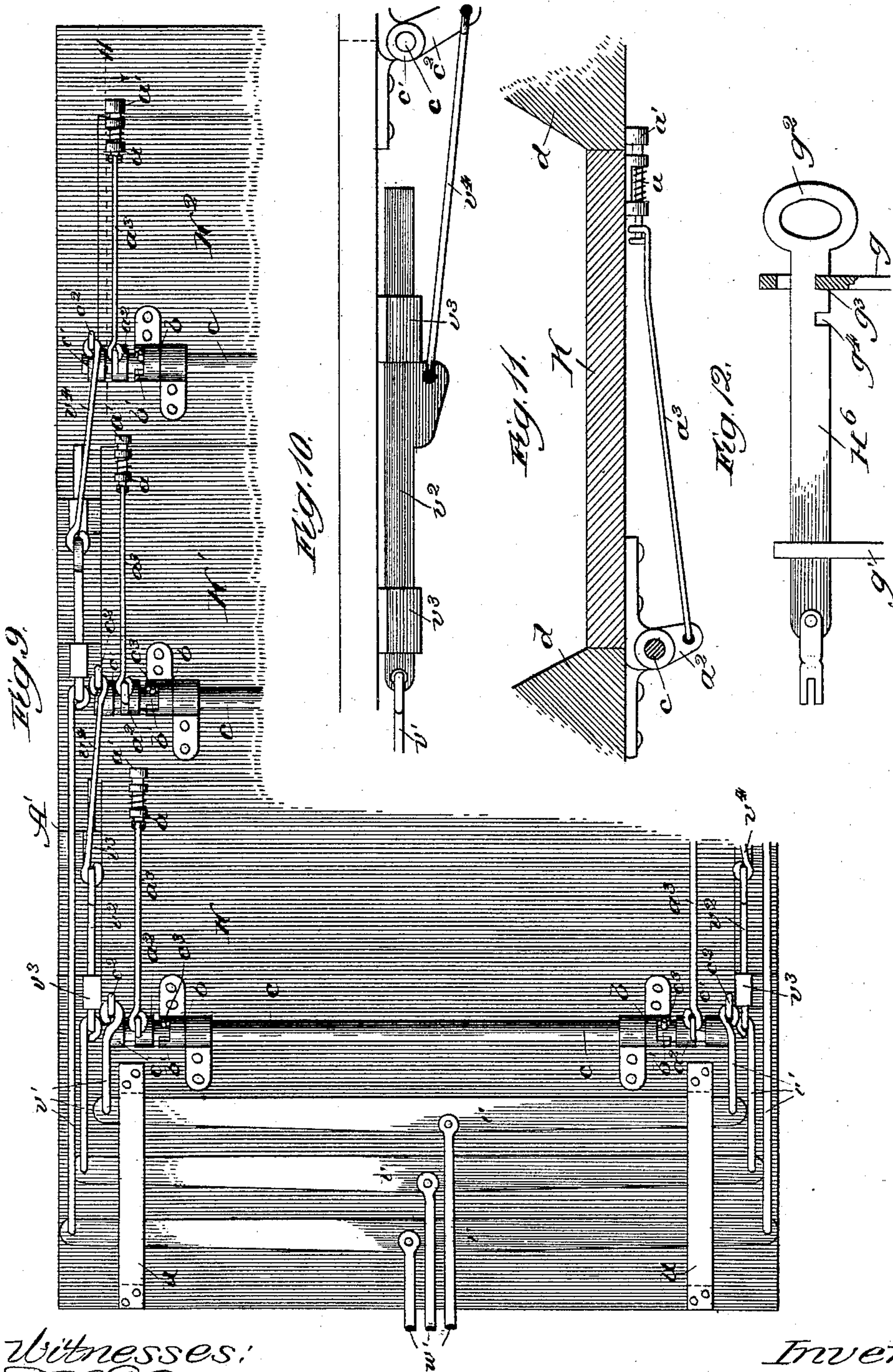
(No Model.)

4 Sheets—Sheet 4.

A. B. SMITH.
STREET SWEEPER.

No. 435,103.

Patented Aug. 26, 1890.



Witnesses:
Ed. C. Gaylord,
J. H. Dyrenforth,

Inventor:
Alfred B. Smith,
By Dyrenforth & Dyrenforth,
Attys

UNITED STATES PATENT OFFICE.

ALFRED B. SMITH, OF CHICAGO, ILLINOIS.

STREET-SWEEPER.

SPECIFICATION forming part of Letters Patent No. 435,103, dated August 26, 1890.

Application filed May 3, 1890. Serial No. 350,500. (No model.)

To all whom it may concern:

Be it known that I, ALFRED B. SMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Street-Sweepers, of which the following is a specification.

My invention relates to an improvement in street-sweeping machines of the general class in which a broom is operated automatically by movement of the wheeled truck upon which it is mounted to sweep in the direction of the movement of the device.

My object is to provide a street-sweeper of improved construction, upon the truck of which is mounted a receptacle for the sweepings, which latter as they are swept by the broom from the street are deposited upon a traveling conveyer, which carries them to the receptacle.

My object is, further, to provide the receptacle with readily-operative means for discharging it of its contents when desired, whereby the sweepings gathered up by the device may be deposited in large heaps at comparatively long intervals.

In the drawings, Figure 1 is a view in side elevation of my improved street-sweeper with parts left out and others broken away to display details, which would otherwise be hidden; Fig. 2, a similar view, on a slightly-reduced scale, of the other side of the same, with parts left out and others broken away for the same reason; Fig. 3, a top plan view of the device with a corner broken away and parts left out for purposes of illustration; Fig. 4, a longitudinal section taken on the line 4 of Fig. 3 and viewed in the direction indicated by the arrow; Fig. 5, a section taken on line 5 of Fig. 4 and viewed in the direction of the arrow; Fig. 6, a broken perspective view of details with parts indicated in dotted lines; Fig. 7, a detail in perspective and enlarged; Fig. 8, an enlarged broken perspective view of details; Fig. 9, an enlarged broken bottom plan view of the receptacle portion of the device; Fig. 10, a broken and still further enlarged view, in side elevation, of details of the construction; Fig. 11, a section taken on line 11 of Fig. 9, viewed in the direction of the arrow and enlarged; and Fig. 12,

an enlarged broken and partly-sectional view illustrating a detail.

A is the frame, including the truck of the device, mounted at its stationary part A' to travel on four wheels, the hind wheels B serving in their rotation to actuate the drive mechanism for the broom and conveyer, as hereinafter described.

Mounted rigidly upon the axle B' of the hind wheels and between the latter and the frame are large gear-wheels B², and toward one end at the side C² of the frame, between the respective gear-wheel B² and wheel B, is a sprocket-wheel B³, also rigidly mounted upon the axle.

The main body portion of the device may be substantially of the form shown to afford a chamber or receptacle C with sides C' C² and top C³, which latter inclines downward toward the front and back from a flat deck portion t. Back of the stationary part A' of the frame A is a movable part A², which affords practically a continuation of the stationary part. It is boxed in by walls, which extend nearly to the ground, and is provided with a top C⁴. The parts A' and A² of the frame are hinged together at the abutting edges of their tops by means of hinges x to permit the part A² to be swung upward from the position shown, and upon the deck t of the part A' is a windlass s, to which ropes s', secured at one end to the rear end of the top of the part A², extend, and may be wound with the aid of a suitable removable crank, (not shown,) whereby the part A² may be swung upward any desired distance, for the purpose hereinafter described.

In my device I prefer to employ a broom D of cylindrical form, and which is mounted upon a shaft D' to rotate with the latter.

E is a frame, comprising two end pieces r r, having the corresponding downward projecting extensions r', and which are loosely mounted at their forward ends on a shaft q, extending diagonally across the part A² of the frame in the position shown. The frame E is suspended toward its free end from an equalizing-beam E', which hangs pivotally at its center upon a rod E², which extends upward through the top C⁴ and passes thence through a stand F upon the latter. The

stand has an opening longitudinally through it for the rod, and at the upper part of the stand the opening is enlarged to afford a recess for a stiff spiral spring n , which surrounds the rod, and above the spring upon the rod, which is screw-threaded along its upper portion, is an internally-threaded hand-wheel m , which rests with its hub upon the spring n . The hand-wheel m may comprise simply two spokes m' , radiating from the hub, and provided at their free ends with upright hand-holds m^2 . The frame E hangs upon pivotal links p , which connect it at the end portions r with the ends of the equalizing-beam.

The shaft D' is provided with journal-pieces o , Fig. 7, which are formed with radial lugs o' , which fit into recesses at the free ends of the parts r , formed by lugs r^2 , projecting from the inner face of the latter, and which operate to hold the journal-pieces against rotating with the broom. The shaft D' extends at both ends beyond the journal-bearings o , through openings in the parts r , and through segmental guide-openings l , Fig. 1, in the part A^2 of the frame. At both ends beyond the sides of the part A^2 the shaft D' is provided with sprocket-wheels D^2 . The shaft q extends through journal-bearings in opposite sides of the part A^2 of the frame, and beyond the part A^2 , toward both ends it is provided with gear-wheels q' , which when the part A^2 is down mesh with the gear-wheels B^2 . At opposite ends beyond the gear-wheels q' the shaft q carries sprocket-wheels q^2 , to which the sprocket-wheels D^2 are geared, as shown.

At the front of and adjacent to the lower part of the broom D and extending parallel with it is a guide-shield G , which has a concave face concentric or approximately concentric with the broom, which in its rotation sweeps upward across the face of the shield. The shield is supported in the frame E , and on its forward or convex side it is provided at intervals with runners or shoes G' . The shoes G' may be formed with curved bases k , which are intended to run upon the ground, and with arms k' , at which they are secured to the shield, and which operate also to stiffen and strengthen the latter.

Toward the top of and center of the chamber C , and journaled in the opposite sides C' C^2 , respectively, of the latter, is a shaft H , carrying a drum H' , extending nearly the full width of the chamber. The shaft H extends beyond the side C^2 , where it carries a loose and sliding sprocket-wheel H^3 and clutch mechanism H^4 , for throwing the shaft and sprocket-wheel into and out of engagement. The sprocket-wheel H^3 is geared to the sprocket-wheel B^3 , as shown. The clutch mechanism comprises a jaw-piece fixed to the outer end of the shaft and a companion jaw-piece fixed to the sprocket-wheel H^3 . Fulcrumed on a bracket i on the side C^2 is a lever H^5 , bifurcated at one end, where it is provided with pins h , which project loosely into opposite

sides of an endless groove h' in the periphery of the part of the clutch which is secured to the sprocket-wheel H^3 , and at its opposite end the lever is pivotally connected to a bar H^6 , extending through guides $g g'$ on the cover C^3 . The bar H^6 is provided with a handle g^2 and on its under edge with notches $g^3 g^4$, to be engaged alternately by the lower edge of the opening in the guide g . When the bar H^6 is in the position shown in Fig. 12, with its notch g^3 engaging the guide g , the clutch mechanism H^4 is out of engagement. By raising the bar to clear the lower edge of the guide g and drawing it through the latter until the notch g^4 engages the guide the lever H^5 slides the sprocket-wheel H^3 outward and produces engagement of the clutch, whereby the shaft H is caused to rotate with the sprocket-wheel. Fulcrumed in the parts r' of the frame E , adjacent to the shield G , is a roller f , and a similar roller f' is fulcrumed in opposite sides of the frame A in the location shown in Fig. 4. Over the drum H' and rollers $f f'$ is stretched an endless carrier I . The carrier I comprises a web of rubber cloth or canvas provided on its outer surface with a series of transversely-extending cleats I' , held in place by blocks I^2 , into which they are inserted at the ends, and which are secured to the web at the lateral edges of the latter, all as shown in Fig. 8. The carrier should be as wide or a trifle wider than the broom and shield G . Extending transversely across the frame A , above the axle B' , is a flat deck e , which operates to guide the carrier over the axle and causes it to clear the shaft q . The carrier receives its motion from the drum H' .

The bottom of the chamber C is constructed with trap-doors, which may be three in number, as K , K' , and K^2 , divided from each other by beams d , which extend to opposite sides of and form a part of the frame A , and have inverted-V-shaped upper edges, which extend above the plane of the trap-doors to guide the sweepings to the latter when the chamber is emptied, as hereinafter described. Each trap-door is hinged upon a transversely-extending rock-shaft c by means of hinges b , having eyes which surround the shaft, and the shaft is journaled along the under side of the frame and extends below the edge of the respective trap-door nearest the forward end of the device. At its swinging edge each trap-door is provided near opposite ends with a spring-catch a to engage a socket-piece a' on the frame, and rigid upon each shaft c are collars a^2 , having short arms, to which rods a^3 , loosely connected at their opposite ends with the bolts of the catches a , are pivotally secured. Each shaft c is provided at its opposite ends with rigid collars c' , having arms c^2 extending radially from their peripheries. Near the front of the device, extending transversely of the latter and upheld by guide-plates $u u$ near opposite sides of the bottom of the frame A , are parallel equalizing-bars v of graduated lengths. The shortest bar v is

nearest the shaft c of the trap-door K , and is connected at opposite ends with the arms c^2 on that shaft by pivotal links v' . The next bar v is connected at opposite ends by links v' with longitudinally-sliding bars v^2 , held in guides v^3 below the side beams of the frame A , the sliding bars v^2 being connected by pivotal links v^4 with the arms c^2 on the shaft c of the trap-door K' . The outer and longest bar v is also connected at opposite ends by links v' with longitudinally-sliding bars v^2 in guides v^3 , and the bars v^2 by links v^4 with the arm c^2 on the shaft c of the trap-door K^2 . Each bar v is connected near its center with the end of a separate lever w by means of a link w' . The levers w are fulcrumed at the forward end of the device, and their free ends are shaped for grasping with the hand. Each hinge b is provided at one side with a slot b' , and a pin c^3 upon the shaft c extends into the slot, for the purposes hereinafter described.

In the operation of my improved sweeper, all the parts being in the respective positions shown, (except the clutch H^4 and its operating mechanism, which should be in the condition of causing the parts of the clutch to engage,) forward movement of the device causes the wheels B , through their axle and the gear-wheels on the latter, to rotate the shaft q and sprocket-wheels q^2 in the negative direction, and through the latter the broom D also in the negative direction, as indicated by the arrows, and at a velocity several times greater than that of the wheels B . Through the sprocket-wheel B^3 and its gear-connection with the drum H' the endless carrier I is caused to travel rapidly over its supports. The guide-shield G slides on its shoes or runners G' , with its lower edge close to the ground, and the broom sweeps the dust, &c., from the street onto the shield and over the latter, depositing it on the carrier, by which it is carried up over the drum H' and dropped into the receptacle C . At the back of the receptacle C , and extending close to and parallel with the under side of the carrier, is a shield y , having at its upper forward end an upward-extending part y' , which may operate as a scraper to free the surface of the carrier from such of the sweepings as may from any cause adhere to it after it has turned to its downward course. The shield y also operates to prevent the sweepings, when the receptacle is nearly full, from being carried out by the under side of the conveyer. In the cover C^3 , at the forward side of the device, just back of the driver's seat, is a hinged door z , which the driver may open from time to time to determine when the receptacle is full. When the receptacle is filled with the sweepings and it is desired to empty it, the operator may first disengage the clutch mechanism H^4 by raising and pushing the bar H^6 through the guides until the notch g^3 engages the guide g , which operation, as before described, releases the drum H' , which moves the conveyer from its

operating mechanism. The operator may then turn the hand-wheel m to draw up the rod E^3 and raise the frame E with the broom and shield G , so that the latter will be out of contact with the ground. The device may then be drawn without sweeping to the place where it is desired to unload. The unloading is effected by opening the trap-doors K K' K^2 , and this may be done by the driver by drawing the handles of the levers w successively toward him. When the lever which operates the trap-door K is thus drawn upon, it draws the respective equalizing-bar v and links v' to cause the latter to turn the respective rock-shaft c . As the shaft turns, the bolts of the catches a are withdrawn from the sockets a' and the trap-door swings downward of its own weight and the weight of the sweepings upon it. If from any cause the door should stick and not open when the bolts are withdrawn, the impact of the pins c^3 against the forward ends of the slots b' in the hinges b will serve to start it. The trap-door may be closed again when the sweepings have run out by pushing forward upon the lever w , which rocks the shaft c in the opposite direction and causes its pins c^3 to engage the rear sides of the slots in the hinges b and turn the latter with the door until the catches a spring into the sockets a' and hold the door closed. Each of the other trap-doors is opened and closed by means of its lever in the same manner. When the load is discharged, the part A^2 of the frame, with the frame E and parts carried by it, may be swung upward to clear the pile of sweepings when the device is moved forward by turning the windlass s to wind up the ropes s' , as described. When the frame E is raised by means of the hand-wheel m , the consequent rise of the roller f reduces the distance between it and the drum H to a degree which will enable the part A^2 to be swung upward without interference from the endless conveyer. A strip of canvas or the like may be fastened along the lower edge of the boxing of the part A^2 to hang toward the ground and prevent the escape of dust. Between the chamber C and front of the device is a small chamber C^5 , which is employed as a receptacle for tools, &c.

The frame E being suspended from the equalizing-beam E' , the shield G and broom may conform to slight inclines or hollows in the street, and as the frame is upheld by the spring n the latter acts as a cushion to prevent undue jarring of the parts when they or the wheels B have to override unusually large obstacles in the street.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a street-sweeper, the combination, with the broom and operating mechanism therefor, of the main frame A , comprising a stationary part A' and vertically-swinging part A^2 , a receptacle C , and means for raising the part A^2 on the part A' , a frame E , in which the broom is mounted, pivotally sup-

ported in the part A^2 , a guide-shield G , mounted on the frame E adjacent to the broom, an endless carrier extending from the shield to the receptacle, and means upon the
5 part A^2 for raising and lowering the frame E on its pivot, substantially as and for the purpose set forth.

2. In a street-sweeper, the combination, with the main frame, broom, and operating
10 mechanism therefor, of a receptacle on the main frame for the sweepings, a frame E , in which the broom is mounted, pivotally supported on the main frame at one end and suspended toward its opposite end from an equal-
15 izing-beam E' , a vertical rod E^2 , upon which the equalizing-beam hangs, screw-threaded at its upper end, a stand F upon the main frame, through which the rod E^2 extends, a supporting-spring n on the stand about
20 the rod, a hand-wheel m upon the rod above the spring, operated by turning to raise or lower the rod and swing the frame E on its pivot, a guide-shield G , mounted on the frame E adjacent to the broom to co-operate there-
25 with, and an endless carrier extending from the shield to the receptacle, substantially as and for the purpose set forth.

3. In a street-sweeper, the combination, with the running-gear, of a frame A thereon,
30 comprising the stationary part A' and vertically-swinging part A^2 , a receptacle C on the part A' , means, as the windlass s and rope s' , upon the part A' for raising the part A^2 , a shaft q , journaled in the part A^2 and in gear
35 with wheels of the running-gear when the part A^2 is down and out of gear when the part A^2 is raised, a frame E , pivotally supported at one end on the shaft q , a broom D on a broom-shaft D' , mounted in the frame
40 E and geared to the shaft q , a guide-shield G on the frame E adjacent to the broom, means upon the part A^2 for raising and lowering the frame E on its pivot, and an endless carrier extending from the shield to the
45 receptacle, substantially as and for the purpose set forth.

4. In a street-sweeper, the combination, with the running-gear, broom, and operating mechanism therefor, of a frame A , comprising the stationary part A' and vertically-
50 swinging part A^2 , a receptacle C on the part A' , means, as the windlass s and ropes s' , upon the part A' for raising the part A^2 , a frame E , in which the broom is mounted, pivotally supported in the part A^2 at one end and sus-
55 pended toward its opposite end from an equalizing-beam E' , means upon the part A^2 for raising and lowering the equalizing-beam and the frame on its pivot, a guide-shield G and a roller f , mounted in the frame E ,
60 and an endless carrier extending from the roller f to the receptacle, substantially as and for the purpose set forth.

5. In a street-sweeper, substantially as described, the combination, with the frame A ,
65 of a receptacle C in the frame for sweepings, a trap-door in the bottom of the receptacle, a rock-shaft c , mounted on the frame below the edge of the trap-door, hinges b , connecting the trap-door with the shaft, having sockets
70 b' , pins c^3 on the shaft, extending into the sockets, arms c^2 at opposite ends of the shaft, arms a^2 on the shaft, fasteners $a a'$ toward opposite ends of the swinging edge of the trap-door for holding the latter closed, links a^3 ,
75 connecting the arms a^2 with the fasteners, an operating-lever for the trap-door fulcrumed on the forward end of the frame, and a movable horizontal bar v , extending in guides across the under side of the frame and connected
80 toward its center with the lever and at its ends with the arms c^2 , whereby movement of the lever in one direction will disengage the fasteners and cause the trap-doors to drop and movement of the levers in the contrary
85 direction will close the trap-doors, substantially as described.

ALFRED B. SMITH.

In presence of—

J. W. DYRENFORTH,
M. J. FROST.