

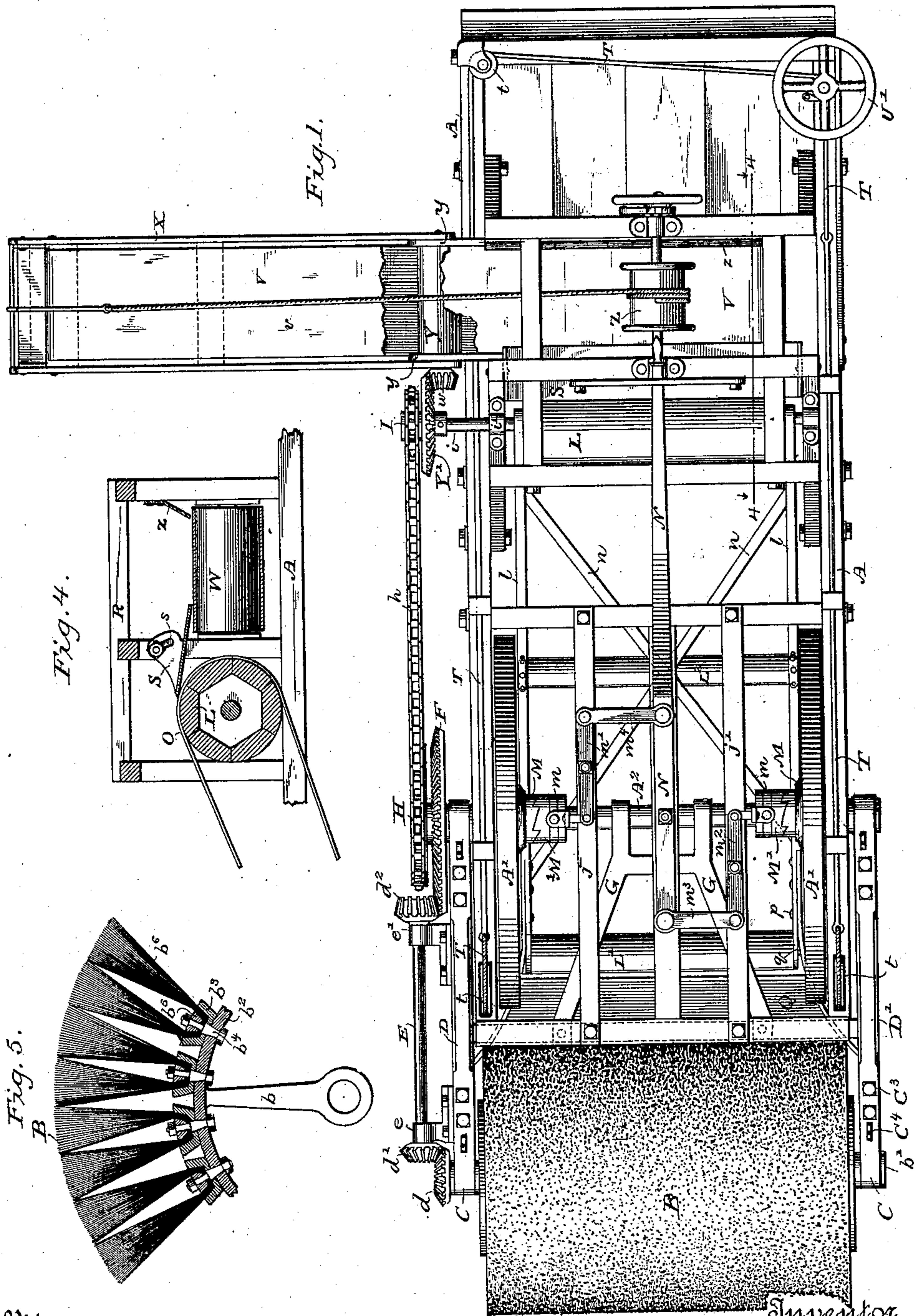
(No Model.)

2 Sheets—Sheet 1.

C. DRILL.
STREET SWEEPING MACHINE.

No. 365,374.

Patented June 28, 1887.



Witnesses
Geo W Young
Henry A. Lamb.

By his Attorneys
James Skinkle.

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Fig. 3.

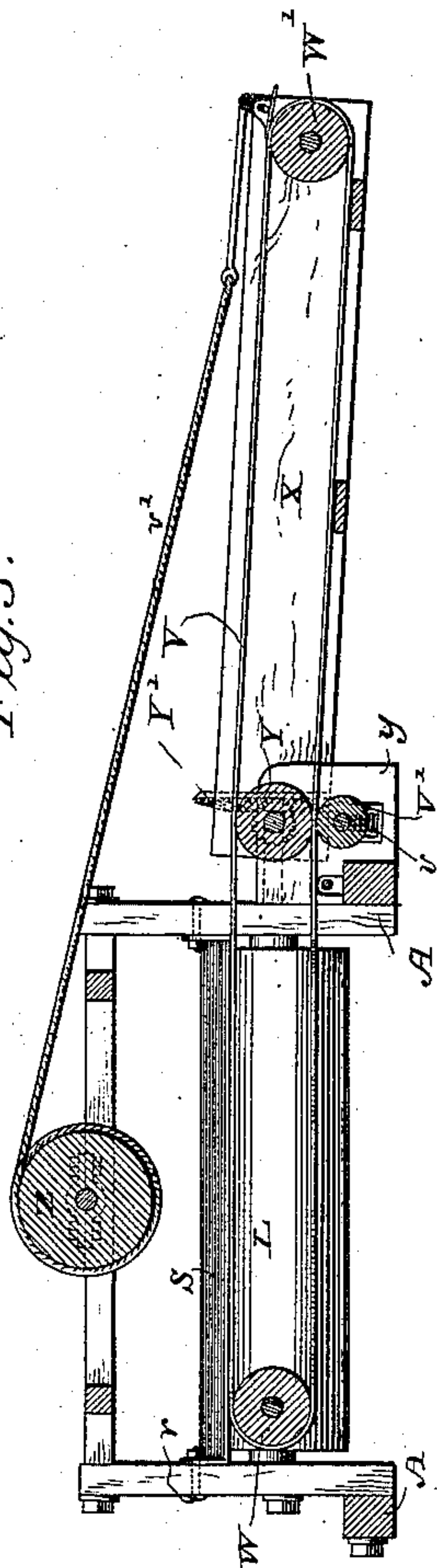
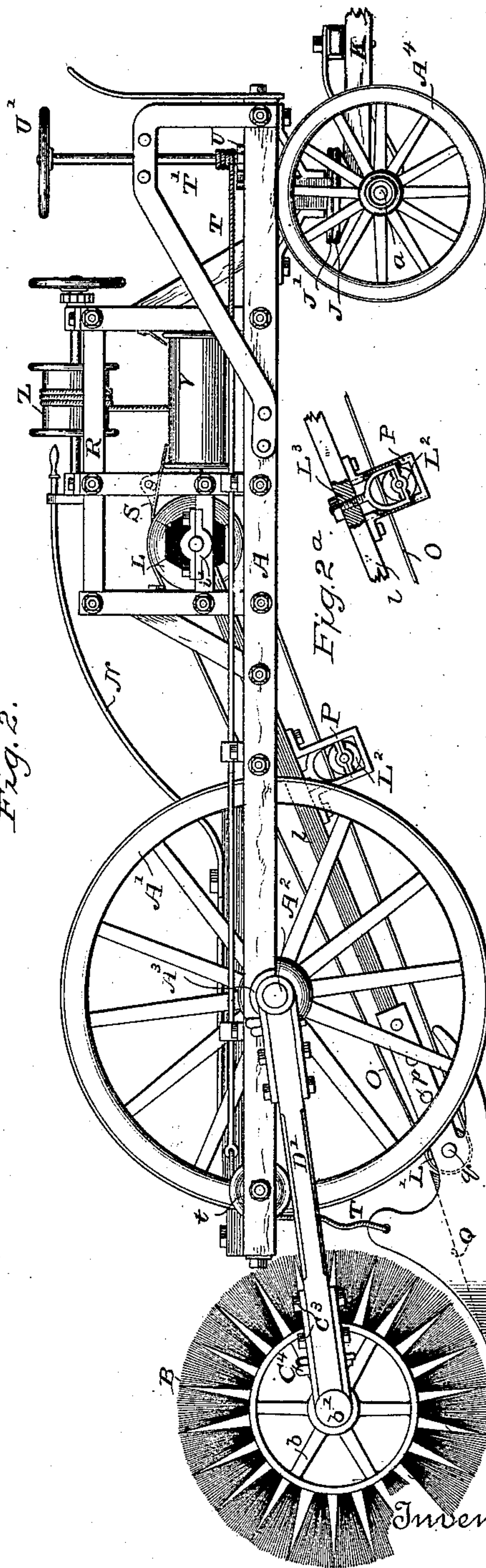


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES DRILL, OF ST. LOUIS, MISSOURI.

STREET-SWEEPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,374, dated June 28, 1887.

Application filed November 11, 1885. Serial No. 192,408. (No model.)

To all whom it may concern:

Be it known that I, CHARLES DRILL, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have
5 invented a new and useful Improvement in Street-Sweeping Machines, in addition to those already allowed to me by the Patent Office on my applications made for Letters Patent and numbered as follows: Serial No. 149,579, filed
10 December 5, 1884, and Serial No. 156,848, filed February 24, 1885, for improvements in street-sweeping machines.

The following is a specification of my present improvement, the object of which is to
15 simplify the construction and reduce the numbers of parts in street-sweeping machines to the lowest figure possible for effective usefulness. I attain this by the mechanism illustrated in the accompanying drawings, in which
20 similar letters refer to similar parts throughout the several views.

Figure 1 is plan view of the machine, the main carrier-belt being omitted and a portion of the delivery-belt being broken away to
25 more clearly show the construction. Fig. 2 is a side elevation. Fig. 2^a is a detail view of the belt-tightener. Fig. 3 is a section on a line, 3 3, Fig. 1. Fig. 4 is a section on the line 4 4, Fig. 1. Fig. 5 is a detail section of
30 the brush, showing the manner of holding the brush-wires or their equivalents in place.

The frame A may be made of iron, wood, or any suitable material, and it is supported
35 mainly upon the wheels A', mounted upon the axle A², which is attached to the frame by suitable boxes, A³. The front portion of the frame is also carried by a pair of smaller wheels, A⁴, upon the axle a, a bed-plate and fifth-wheel, J J', and pole K being provided
40 and attached thereto in the usual manner for moving the structure by animal-power.

B represents a brush or broom, which extends at each end outside of the path of the driving-wheel in front of it, and is of such
45 length and diameter as may be found best.

Fig. 5 shows the construction of the broom in detail. A spider, b, the arms of which are connected by a rim or cylinder, b², which may be integral therewith or not, as found most
50 desirable, is centrally bored for the shaft b',

and the periphery of the cylinder b² is divided into as many parts as may be desired for lags b³, to extend around the circumference of the cylinder b². The lags b³ are preferably made
55 long enough for the whole length of the broom, but may be made in shorter pieces if more convenient. On the inner side they conform in shape to the circumference of the cylinder or rim b², to which they are bolted by the taper bolts b⁴, which fit into perforations in the
60 said flanges, which are tapered to correspond to the bolts upon their upper sides. The lags are recessed their entire length. This recess is sufficiently larger in cross-section than the male part b⁵, fitting thereinto, to admit the
65 brush material b⁶ to be put into it, as shown, after which the male parts b⁵ are placed in position and forced home by the nuts upon the bolts b⁴.

Two end spiders, with one or more intermediate ones, are bored and placed upon a shaft, b', Figs. 1 and 2, to which they are attached
70 by set-screws or otherwise. The spiders are duplicates of each other when fitted. So, also, are the male and female parts of the lags,
75 for convenience in manufacturing, repairs, or interchanges. The shaft b' extends out at each end beyond the lags sufficiently to form the bearings, which rotate in suitable boxes contained within straps C C, which are attached,
80 by bolts C³ and gibs and keys C⁴, or in any other well-known manner, to the outer ends of the connecting-rods D D'. The shaft b is recessed at each end, to prevent the strap from
85 slipping off.

Upon one end of the broom-shaft b' is attached a bevel-gear, d, which meshes with the gear d' upon the shaft E, which latter is journaled in boxes e e' at each of its ends, both of
90 which boxes are secured to and carried by the connecting-rod or swing-bar D. A gear-wheel, d², at the other end of the shaft E meshes with the gear-wheel F, carried upon the end of the main axle A², and serves to communicate motion therefrom to the shaft E and thence to the
95 broom.

The connecting-rods or swing-bars D D' extend rearwardly from the axle A², upon which they are removably attached in any suitable
100 manner, and serve to connect the main axle

with the broom-shaft. By this means the broom is left free to rise and fall without altering its relation to its driving mechanism, and so to adjust itself automatically to any surface over which it is passing.

For the purpose of bracing the connections $D D'$ against side strains, braces G are provided, which, as shown, consist of a triangular frame extending between the said connecting-rods and removably secured to the main axle A^2 in any convenient manner.

The various parts of the broom or brush are preferably of iron; but any other suitable material may be used. The main axle extends out beyond the outside of the frame A sufficiently to form a journal and collar for the proper attachment of the upper end of the connecting-rods or swing-bars $D D'$ thereon, and also to carry the gear F and sprocket-wheel H , both of which latter are rigidly set-screwed or keyed thereto. The gear F meshes with the smaller bevel gear, d^2 , as stated, and the sprocket-wheel H is connected by means of the endless-chain belt h to a second sprocket-wheel, I , mounted upon the extremity of the shaft i of the drum L . The wheels A turn on the main axle A^2 independent of each other forward or backward. There are collars (not shown) on the axle inside of the hubs, against which the inner ends of the hubs press and are held in position thereby.

M represents one part of a common clutch, which is rigidly secured upon the inner end of each hub of the wheels A' in a proper manner. The projections on this part of the clutch revolve with the wheels on the axle, except when it is clutched into by the sliding part M' , which slides laterally upon the axle and revolves with it, being held movably by a feather-key on the axle, (not shown,) which key plays in a slot corresponding to it in the sliding part M' of the clutch. The projections on this part are formed to fit into their counters upon the wheel-hubs. This sliding part of the clutch is grooved out, and has therein the shifting band m , in which it may be revolved. For the purpose of shifting it out or into clutch, use is made of any suitable levers, m' m^2 , and links m^3 m^4 , which are pivotally mounted upon the cross-bars $j j'$ of the frame and operated by power, the hand of the operator applied to the extremity of the lever N , to which they are connected. The cross-bars form supports for the fulcrum-pins in the levers and also support and strengthen the frame A .

O represents an endless inclined carrier or apron, of heavy duck-cloth or other suitable material, about equal in width to the length of the brush B . It extends over the driving-drum L , down to and over the roller L' , returning to drum L . The frame of this apron extending between the drum L and roller L' consists of two side pieces, l , having substantial cross-braces n between them to hold it stiffly and prevent its twisting.

An additional roller, L^2 , is supported within

the brackets P , depending from the side pieces, l , where it is held against the lower side of the apron O , which it prevents from sagging, and also tightens when too slack by means of a nut on the upper end of each of the screw-threaded stems L^3 , which are attached to the bearings of the roller L^2 and pass upward through the pieces l . The side arms at their upper ends are hinged upon the shaft i of the drum L , and are secured thereto by boxes around the shaft or in any suitable way, and, extending rearwardly nearly back to the broom B , have removably attached upon their lower ends the drag or shoe Q , which is secured to them by nuts and bolts p , and extends across to prevent the apron or roller L' from striking the ground or the inner sides of the driving-wheels. The shaft q of the roller L' is journaled in these arms and projections of the shoe and extends entirely across the frame at this point from where the shoe widens to the full length of the broom. The shaft i of the drum L is suitably journaled in boxes z , attached to the sides of the elevator part of the frame A , as shown in Fig. 2, the object being to obtain sufficient elevation at this end of the apron O for discharging the sweepings raised thereby from the surface of the street to this elevation over into the discharge-carrier, which is arranged at right angles to its upper portion, as will be fully set forth.

For the purpose of raising and lowering the shoe Q , and with it the broom and apron, to enable them to pass obstructions, or when not in use ropes or chains T are secured at the upper portion of each end of the shoe Q , and, passing over suitable sheaves, t , in the frame A , extend forward to a vertical windlass, T' , around the stem of which the ropes or chains T are wound or unwound, raising or lowering both ends of the shoe evenly. A pawl and ratchet, U , is provided to hold the parts in the desired positions, and a hand-wheel, U' , for communicating motion thereto. A raised auxiliary frame, R , is built upon the forward part of the main frame A , and carries the delivery apparatus.

A scraper, S , extends across the machine, parallel with the roller L , and is supported in the frame R on screw-threaded pins r , passing through curved slots s in each of its upturned ends, upon which pins the scraper is adjusted to bring its edge in position to clean the sweepings off the apron O , where it is then secured by suitable nuts on the extremities of the pins r . The delivery apparatus consists in an apron, upon which the material raised by the apron O is dumped, and by which said material is carried off and emptied into carts or other receptacles at the side of the machine. The apron V is narrower than the elevator-apron O , and is mounted upon rollers $W W'$, the roller W being suitably journaled at the side of the machine in the frame R . The roller W' is located at the outer extremity of a hinged frame, X , a third roller, Y , being provided at

an intermediate point between the rollers W W', and mounted in extensions *y*, secured to the frame R.

The axis of the roller Y forms the pivot for the inner end of the folding frame X, and at the same time is provided with the gear *w*, which meshes with a larger gear-wheel upon the axis of the roller L, from which it receives the necessary motion. The three rollers just mentioned are all contained within the apron V, and an auxiliary roller, V', is mounted directly beneath the power-roller Y, and is upwardly spring-pressed by suitable springs, *v*, contained in slots or boxes formed in the extension *y*, and by means whereof the said apron is held tightly against the power-roller at its under side, so that the desired motion will be communicated thereto, its upper surface remaining entirely free and unobstructed. For the purpose of raising and lowering the folding section of the delivery apron, a windlass, Z, is mounted in the upper portion of the frame R, a rope, *v'*, extending therefrom to the extremity of the frame X, by means whereof the said hinged frame may be raised or lowered to any desired extent without any change in the positions or connections of the parts. A shield or guard, *z*, is secured to the front portion of the frame R, directly opposite to the scraper S, for the purpose of keeping the sweepings centrally upon the apron V.

From the foregoing it will be understood that the several parts of the apparatus are all under the control of a single operator standing above the small wheels A⁴, the broom, shoe, and apron being raised or lowered by means of the windlass T', and thrown out of or into gear with the driving-wheels through the lever N, and the height of the delivery-apron adjusted by the windlass Z.

It will be obvious that various modifications and changes may be made in the mechanical details without in any way departing from the spirit of the invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with driving and carrying wheels, the frame, the broom, the vertically-moving connecting-rods connected to the axles of the driving-wheels and to the axis of said broom; gear-wheels on the main axle and on the axle of the broom, of an intermediate driving-shaft supported upon one of said connecting-rods and provided with pinions meshing with the gear on the driving-axle and with the axis of the broom, and the clutch mechanism, substantially as shown and

described, whereby the main axle can be caused to rotate to actuate the broom, as set forth.

2. In a street-sweeping machine, the combination, with the main frame A, elevator-frame R, the elevator-apron, and means, substantially as described, for actuating the same, of the transverse discharge-carrier having a hinged outer portion and a single apron extending over both the fixed and movable portions, and a windlass located upon said elevator-frame and connected to the free end of the outer portion, whereby said outer portion of the discharge-carrier and apron may be raised or lowered, as desired.

3. In a street-sweeping machine, the combination, with the main elevator, of a transverse discharge-carrier consisting of a fixed portion located in proximity to the upper end of the elevator-apron, and provided with the roller W, over which the apron passes, a folding frame pivoted upon the axis of the driving-roller Y, and a supplemental roller, *y*, located beneath the driving-roller and arranged to be spring-pressed thereagainst, substantially as shown and described.

4. In a street-sweeping machine, the combination, with the elevator-apron, its driving and supporting drum L, having gear-wheels Y', of the discharge-carrier having a hinged outer portion, carrier-rollers W W' at the outer ends of said carrier, and an apron, V, extending thereover, and a central roller, Y, suitably mounted and provided with a pinion, *w*, meshing with the gear Y', and an auxiliary roller located below the driving-roller Y and normally pressing the lower portion of the apron against said driving-roller, whereby motion is communicated thereto and the entire upper surface thereof left unobstructed, substantially as shown and described.

5. In a street-sweeping machine, the combination, with driving and carrying wheels and a suitable frame therefor, of the broom, vertically-moving connecting-rods extending between the driving-axle and the axis of said broom, an elevator-apron for removing the sweepings, provided with a shoe extending under the broom, a windlass, T', and ropes or chains extending therefrom and secured to the shoe for raising the same, the elevator-apron, and broom, substantially as shown and described.

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Witnesses:

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H. M. THOMPSON.