

(No Model.)

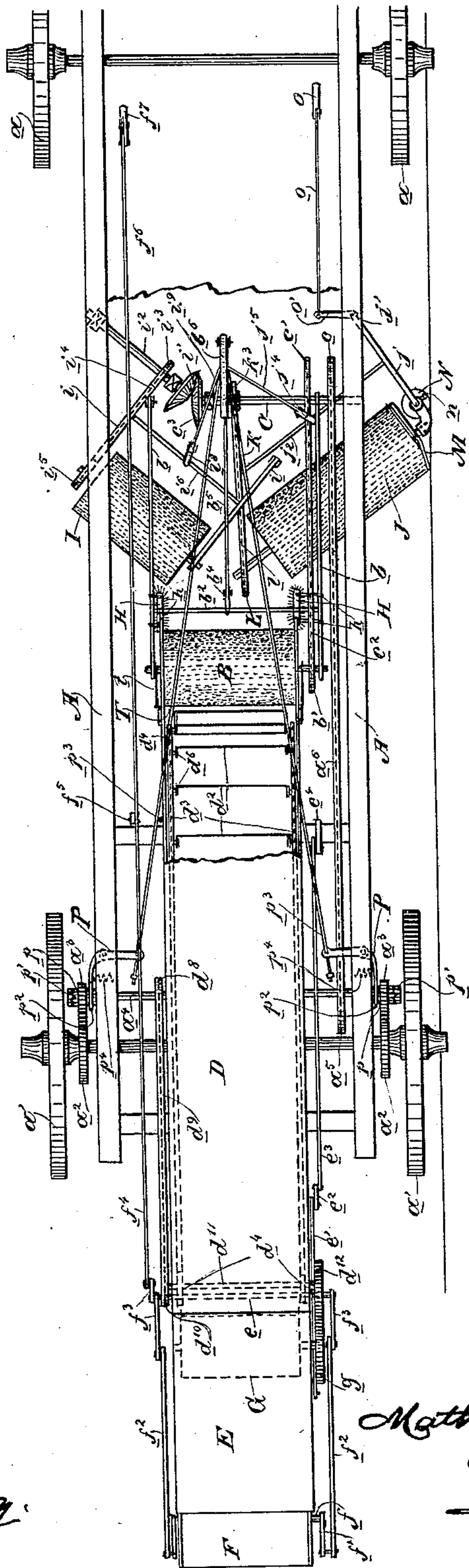
5 Sheets—Sheet 1.

M. C. ROBICHAU.  
STREET SWEEPING MACHINE.

No. 427,795.

Patented May 13, 1890.

Fig. 1.



Witnesses,  
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(No Model.)

5 Sheets—Sheet 2.

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Fig. 4.

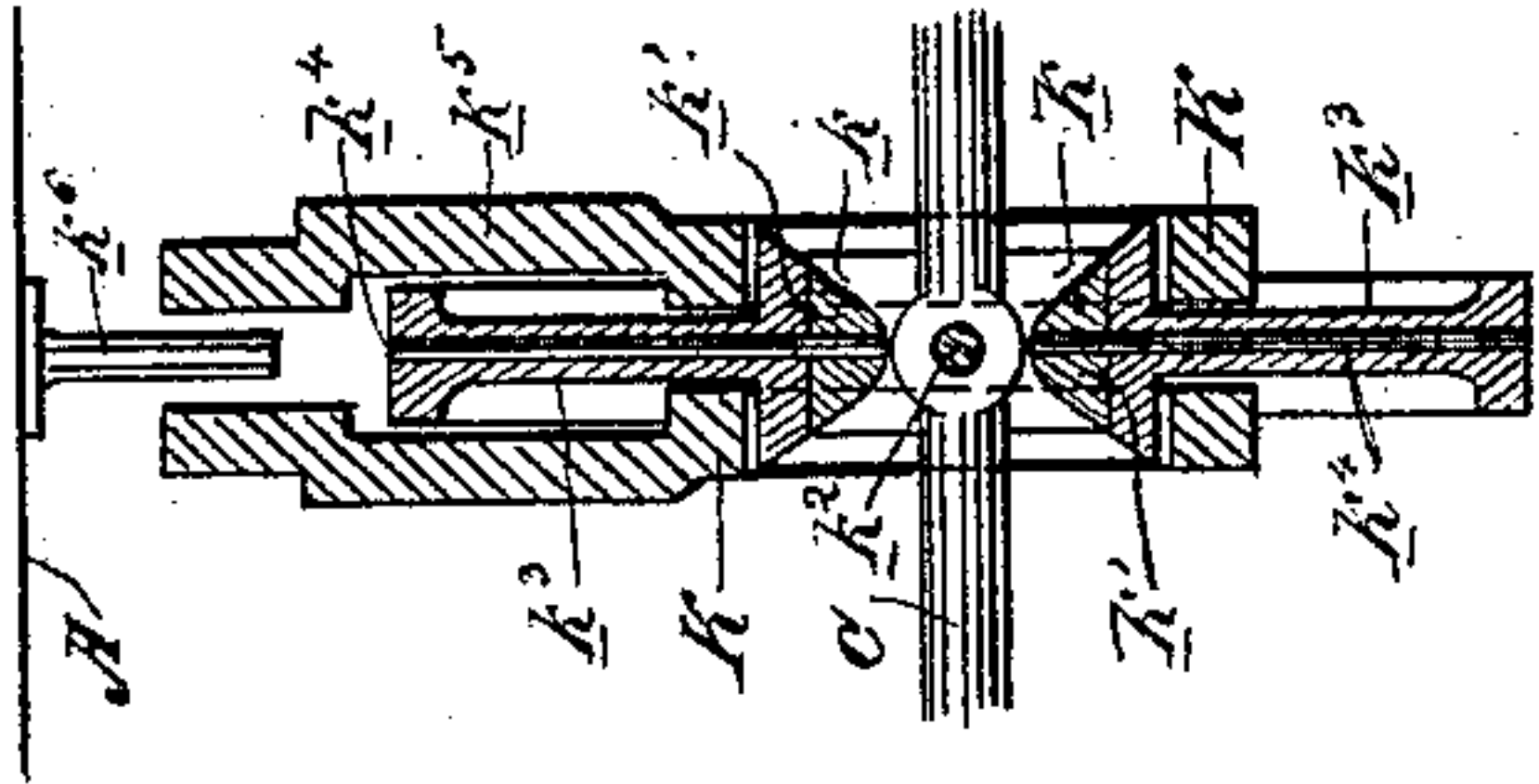


Fig. 3.

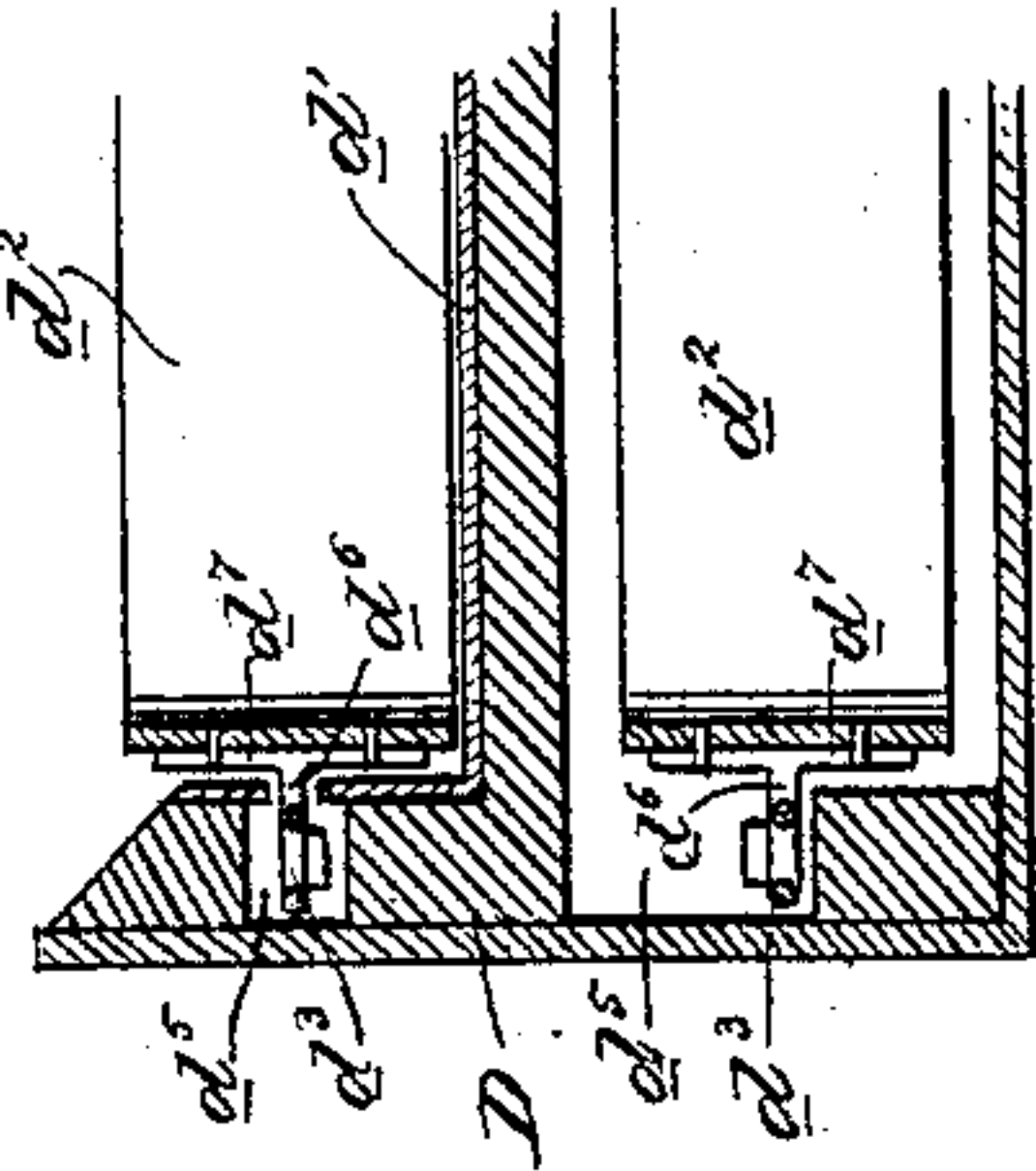
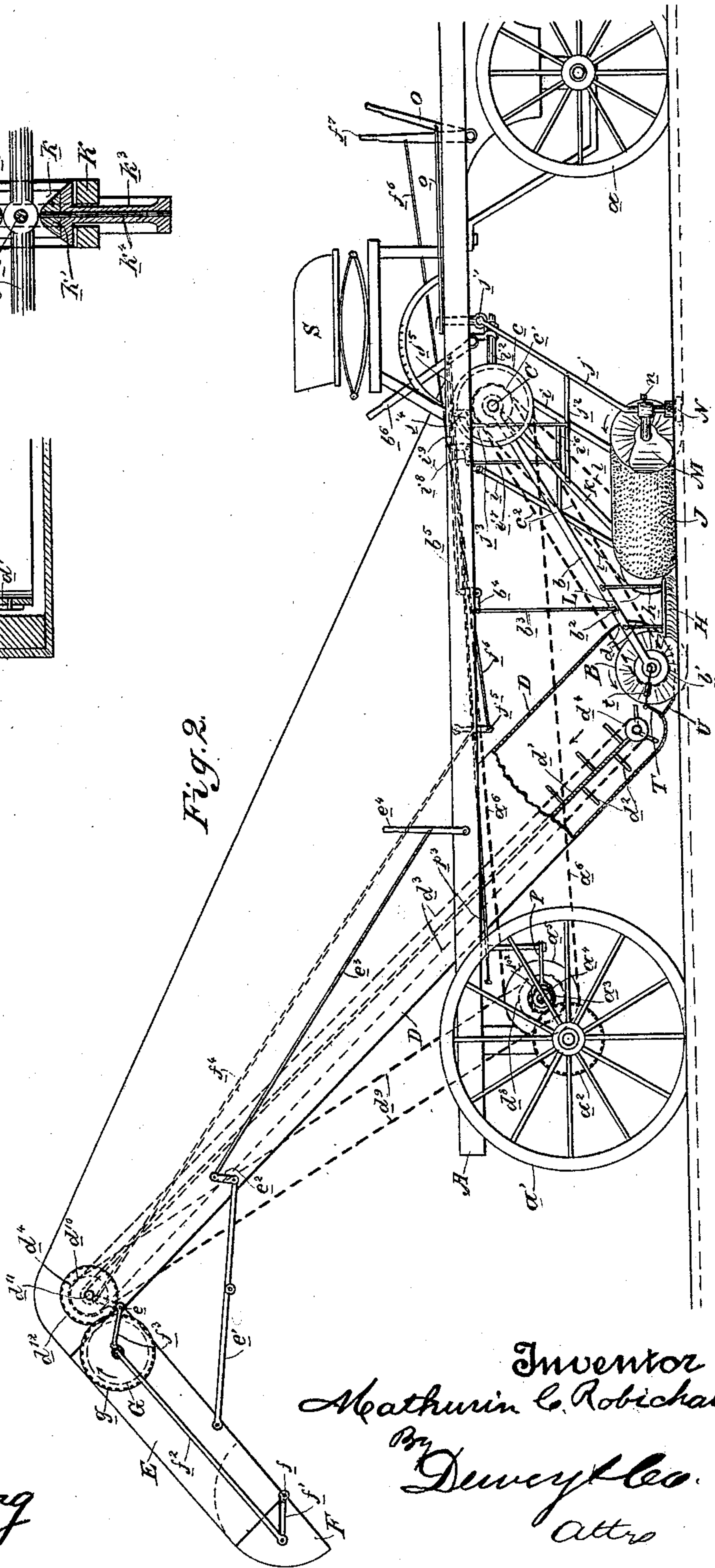


Fig. 2.



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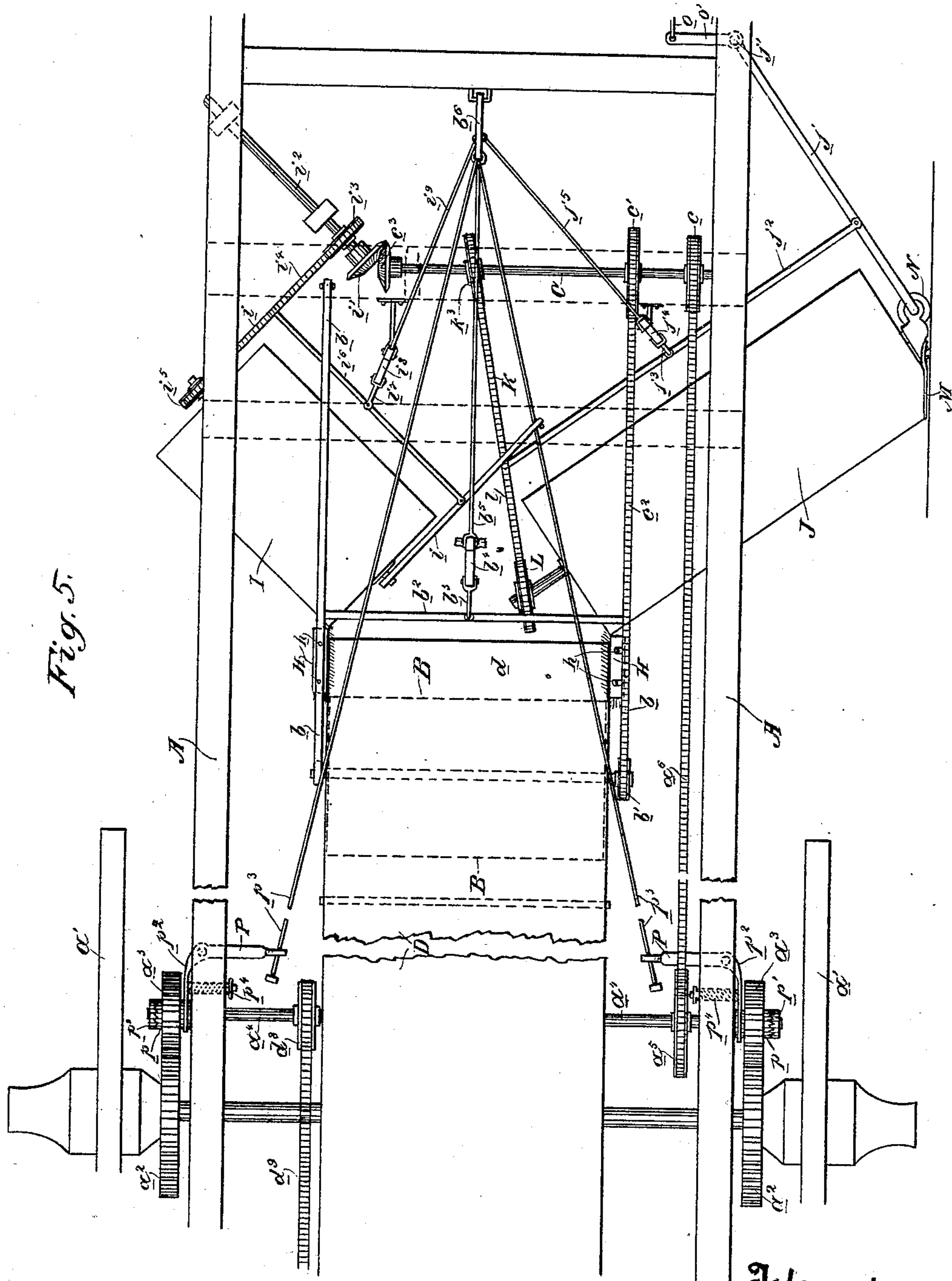
(No Model.)

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M. C. ROBICHAU.  
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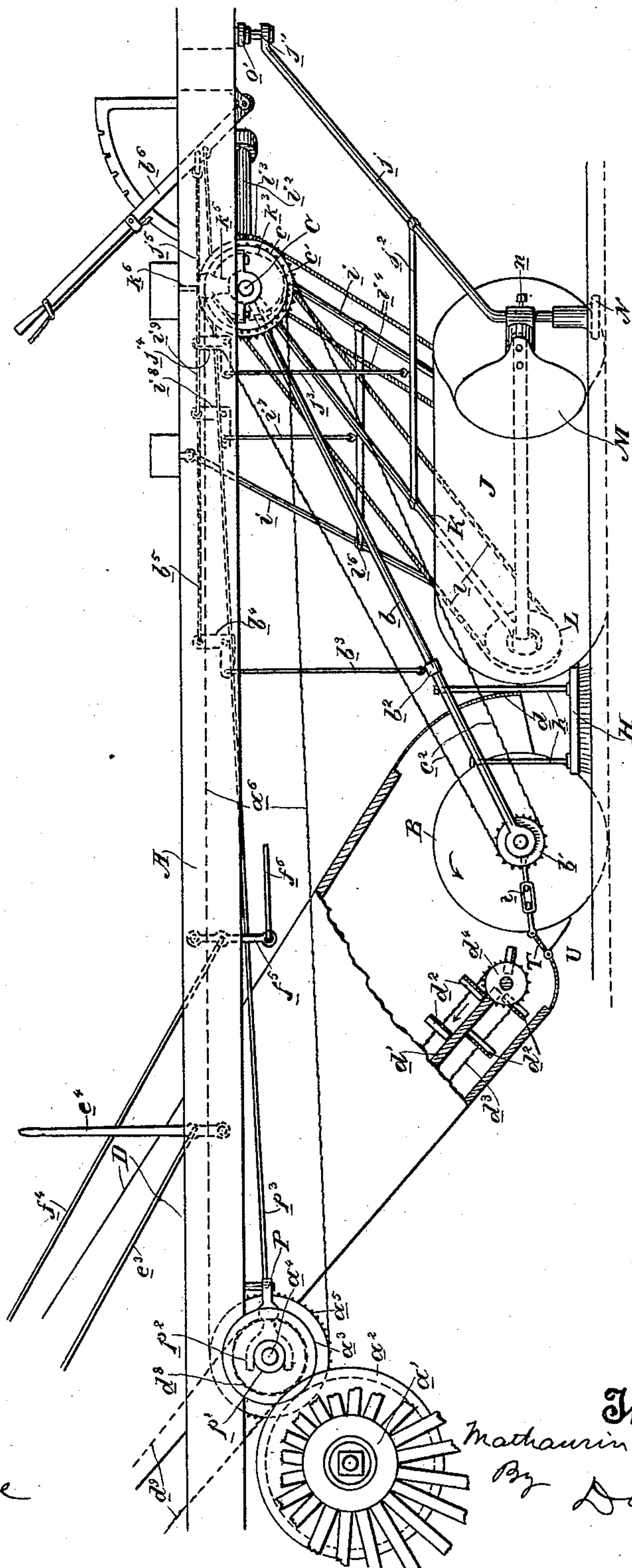
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M. C. ROBICHAU.  
STREET SWEEPING MACHINE.

No. 427,795.

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Fig. 6.



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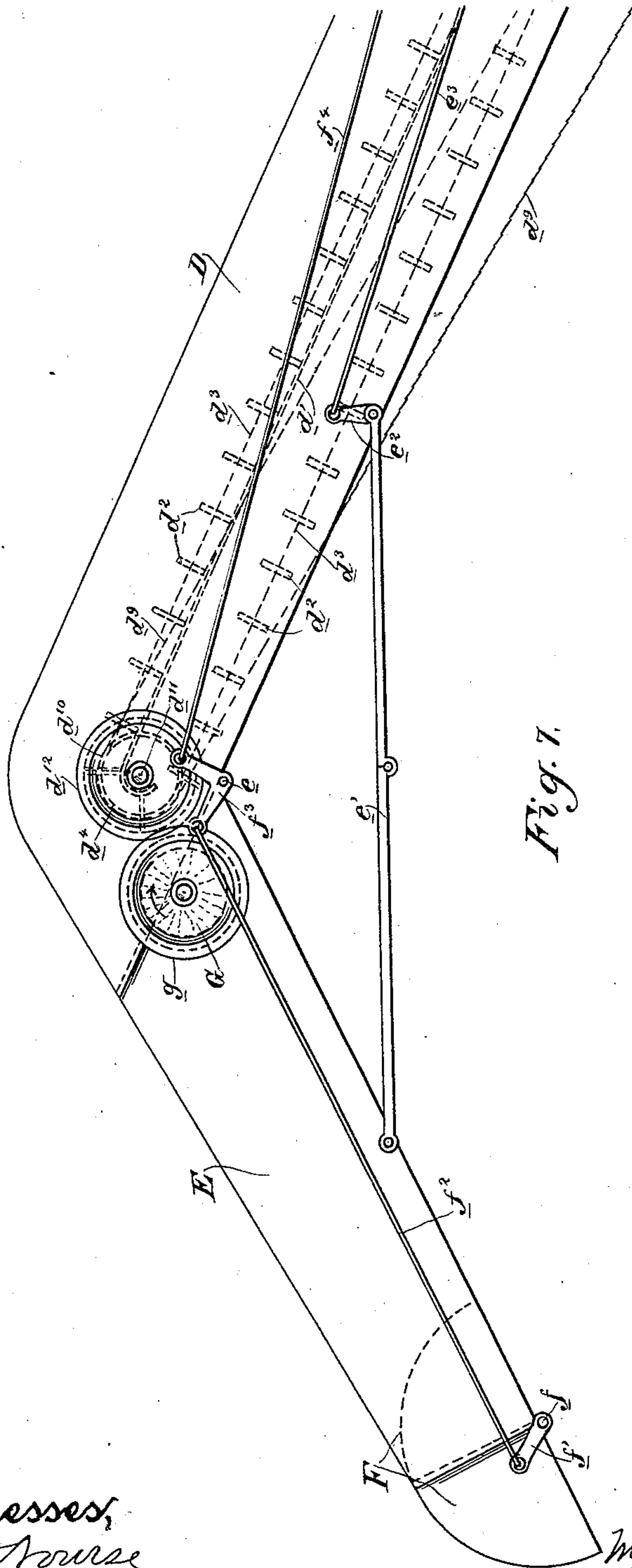
(No Model.)

5 Sheets—Sheet 5.

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STREET SWEEPING MACHINE.

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# UNITED STATES PATENT OFFICE.

MATHURIN C. ROBICHAU, OF SAN FRANCISCO, CALIFORNIA.

## STREET-SWEEPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 427,795, dated May 13, 1890.

Application filed July 19, 1889. Serial No. 318,078. (No model.)

*To all whom it may concern:*

Be it known that I, MATHURIN C. ROBICHAU, of the city and county of San Francisco, State of California, have invented an Improvement in Street-Sweeping Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of street-sweeping machines; and it consists in the novel construction and arrangements of parts hereinafter described, and specifically pointed out in the claims.

The object of my invention is to provide an effective street-sweeping machine.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a plan of my street-sweeping machine. Fig. 2 is a side elevation of the same. Fig. 3 is a detail cross-section of the elevator. Fig. 4 is a detail of the swiveling mechanism of K. Fig. 5 is an enlarged plan view of Fig. 1, showing a part of the machine broken away. Fig. 6 is an enlarged side elevation. Fig. 7 is a detail showing the top portion of the elevator and connections.

A is the frame of the machine, mounted at its forward end upon wheels  $a$  and at its rear end upon wheels  $a'$ .

B is the main brush of the machine. This is connected with the frame by means of hangers  $b$ , extending upwardly and forwardly from each end of the brush and pivotally connected with the frame at their upper ends by means of the cross-shaft C on which they are mounted, whereby said main brush may travel on the ground and have a freedom of vertical movement to adapt itself to any inequalities. A rotary motion is imparted to this brush by means of the following power-transmitting mechanism: Upon the hubs of the wheels  $a'$  are the gears  $a^2$ , which mesh with the pinions  $a^3$  on the cross-shaft  $a^4$ . This cross-shaft near one end carries a sprocket-pulley  $a^5$ , from which an endless chain  $a^6$  extends to a sprocket-pulley  $c$  on the cross-shaft C. Upon the cross-shaft C is another sprocket-pulley  $c'$ , from which an endless belt or chain  $c^2$  extends to a sprocket-pulley  $b'$  on the end of the axle or shaft of brush B.

When not in use, the brush B may be elevated out of the way by means of a cross-rod  $b^3$ , extending between its hangers  $b$ , and hav-

ing connected with its center a link  $b^3$ , the upper end of which is attached to a pivoted bell-crank lever  $b^4$  on the frame of the machine, from the upper arm of which extends a rod  $b^5$  to a lever  $b^6$ .

D is the elevator frame or casing properly secured to the frame A and extending upwardly and backwardly, as shown in Fig. 2. The lower end  $d$  of this casing extends down over the front of the main brush B, forming a kind of hood therefor. Within the elevator-casing is the scraping-floor  $d'$ , over which travel upwardly the cross-slats  $d^2$  of the elevator. These slats are secured to endless side chains  $d^3$ , which pass around sprocket-pulleys  $d^4$  in the base and in the top of the elevator-frame, and consequently the cross-slats  $d^2$  pass up over the scraping-floor and down under it.

The lower end of the elevator is just back of the brush B, as shown in Fig. 2, and is adapted to receive the dirt which is thrown upwardly and backwardly by said brush, the direction of rotation of which is shown by the arrow, from which it will be seen that said brush rotates in a direction opposite to the direction of rotation of the wheels of the machine.

The manner of mounting the elevator in its frame or casing and of connecting the cross-slats  $d^2$  with the endless chains  $d^3$  is shown in Fig. 3, where, it will be seen, the chains travel in housing-grooves  $d^5$  in the frame sides, and have extending inwardly therefrom the shanks  $d^6$ , carrying plates  $d^7$ , to which the cross-slats are secured. This housing of the endless chains keeps them free from dirt, and thus prevents their clogging.

E is a discharge-spout, the upper end of which is hinged at  $e$  to the upper end of the elevator frame or casing D, so that said spout may be extended for use, as shown in Fig. 2, or may be turned inwardly and downwardly and parallel with the under side of the elevator-frame. This movement is effected by the following connections: A centrally-jointed rod  $e'$  is connected at one end with the under side of the spout and at the other end with an arm or lever  $e^2$ , the other end of which has connected with it the rod  $e^3$ , and which extends forwardly and is connected with the lever  $e^4$  on the frame A. Now, by moving



this lever the jointed rod  $e'$  may be straightened out, thereby extending the discharge-spout E for use, or may be bent upwardly at its joint, thereby drawing down said discharge-spout to a position out of use.

Within the end of the discharge-spout E is a gate or valve F, consisting of a plate which is hinged at  $f$  in the bottom of the discharge-spout, and is adapted to be turned from a position in line with said bottom to a position at right angles therewith, thereby temporarily closing the end of the spout when it is necessary to confine the dirt during change of dump-wagons. This movement of the gate or valve is effected by a lever  $f'$ , having a rod  $f^2$ , which extends to a pivoted bell-crank  $f^3$ , from which a rod  $f^4$  extends downwardly and forwardly to a lever  $f^5$ , from which another rod  $f^6$  extends forward to the lever  $f^7$ . Motion is imparted to the elevator by the following connections: Upon the cross-shaft  $a^4$  is a sprocket-wheel  $d^8$ , from which an endless chain  $d^9$  extends to a sprocket-pulley  $d^{10}$  on the upper shaft  $d^{11}$ , which carries the sprocket-pulleys  $d^4$  of the endless chains of the elevator.

G is a brush mounted within the discharge-spout and rotated by means of a gear  $g$  on its shaft, meshing with a gear  $d^{12}$  on the shaft  $d^{11}$ . The direction of rotation of this brush is shown by the arrow in Fig. 2, and its object is to prevent the dirt discharged by the elevator into the spout from passing down back to the bottom of the elevator-frame.

H are brushes hung by rods  $h$  from the hangers  $b$  of the main brush, and having a position at each end of the brush just forward of it and in the line of travel of the machine. The object of these brushes is to keep the dirt well confined and guided to the main brush.

I is the outer side brush, which is supported by pivotally-connected hangers  $i$ , whereby it may conform itself to inequalities of the ground. A rotary motion is imparted to this brush by means of a beveled pinion  $c^3$  on the end of the shaft C, which engages with the beveled pinion  $i'$  on the end of the counter-shaft  $i^2$ , which carries the sprocket-pulley  $i^3$  from which the endless chain  $i^4$  extends to a sprocket-pulley  $i^5$  on the end of the shaft or axis of the brush I. The motion of this brush is inwardly and upwardly, so as to sweep the dirt to the center and into the path of the main brush B. This brush may be elevated completely out of the way, when desired, by means of a cross-rod  $i^6$ , extending between its hangers, and having an upwardly-extending rod  $i^7$ , which is connected with a bell-crank lever  $i^8$ , from which a rod  $i^9$  extends to the lever  $b^6$ , which is the same lever used for elevating the main brush.

J is the combined inner directing and gutter brush. This brush is connected at its outer end with a hanger  $j$ , the upper end of which, at a point  $j'$ , is connected by a swivel-joint with the frame A, so as to allow said

brush to move vertically and in and out. At its inner end it is connected with the shaft C by means of the bar K. The connection of this bar is shown in Fig. 4, and is as follows: Upon the shaft C is fitted, by means of an elongated slot  $k$ , a bearing-block  $k'$ , which is pivoted to the shaft by means of horizontal pins  $k^2$ , so that said block may have a movement on the shaft about its pins  $k^2$  in the direction of the length of the shaft while still turning with it. Upon this block  $k'$  is seated a sprocket-pulley  $k^3$ , which is pivoted to it by means of vertically-arranged pins  $k^4$ , so that said pulley may have a vibratory movement on said pins in addition to the movement which it has by reason of the pivotal movement of the bearing-block, the object of this connection being to give the sprocket-pulley  $k^3$  a swiveling movement to conform to all the necessities of position of the brush J. Upon the hub of this pulley, upon each side, is the pivoted forked forward end of the bar K, which supports the inner end of the brush. Bearing-plates  $k^5$ , rising from said forward end, fit on each side of a fixed pin  $k^6$ , projecting downwardly from frame A, whereby the whole device is held substantially upright, though allowed to have the necessary swiveling motion. The other end of the bar K is fitted upon the shaft or axle of the brush J in a similar manner, and at that point there is provided a similarly swiveling sprocket-pulley L, between which and the sprocket-wheel  $k^3$  extends an endless chain  $l$ , by which power is transmitted from the shaft C to the brush J. It will be seen that the said brush being mounted by a swiveling connection at each end may rise and fall to conform to the inequalities of the ground, and may move in and out to conform to the variations of the curb, against which its outer end travels, said end moving in the gutter. The brush I and the brush J are arranged, as shown in Fig. 1, in front of the main brush B, and are set in diverging planes, so as to sweep the dirt to the center and into the path of the main brush. The brush J is elevated out of the way by means of a cross-rod  $j^2$  extending between its supports, and having an upwardly-extending rod  $j^3$ , which is connected with a bell-crank  $j^4$ , from which a rod  $j^5$  extends to the lever  $b^6$ , which operates to elevate the other brushes.

The brush J is made of flexible bristles of any suitable character, and it has connected with the outer end of its shaft a fixed shield M, which is situated in a plane parallel with the line of the curb, and as the bristles of the brush come around backwardly they come in contact with the said shield, and are by it forced to conform to the line of the curb, thereby sweeping the dirt from the angle of the curb and gutter very effectually.

N is a small roller, mounted and adapted to rotate in a horizontal plane and bearing against the curb, acting as a guide for the brush J. This roller is mounted on the lower end of the hanger  $j$ , said end passing through



a tubular socket on the end of the brush-shaft, which is provided with a set-screw *n*, whereby the position of said shaft on the hanger is regulated and adjusted. The brush  
 5 J may be moved in and out positively by means of the lever O, from which a rod *o* extends to an arm *o'*, extending from the swivel-connection *j'* of the hanger *j*. In order to  
 10 throw all the power-transmitting devices out of gear and to stop the movement of the several parts when desired, I have the pinions *a*<sup>3</sup> mounted loosely upon the shaft *a*<sup>4</sup>, and provided with clutch-hubs *p*, which are adapted to  
 15 engage clutches *p'* on the ends of the shaft *a*<sup>4</sup>. The inner hubs of the pinions are engaged by clutch-rods *p*<sup>2</sup>, operated by bell-crank levers P, which are themselves operated by  
 20 rods *p*<sup>3</sup>, adjustably connected with them, and extending forward to the lever *b*<sup>6</sup>, which is the same lever that raises all the brushes  
 25 from the ground. The connection of the rods *p*<sup>3</sup> with the bell-cranks P is a sliding one, as shown in Fig. 1, so that the lever *b*<sup>6</sup> will first raise the brushes before their power-transmit-  
 30 ting devices are thrown out of gear, and thus the elevator may continue its operation to raise all the dirt in it before stopping. Springs *p*<sup>4</sup> act against the bell-cranks P to cause them to hold the pinions to their engagement with  
 35 the clutches *p'*.

S is the driver's seat.

T is a guard-plate hinged to the lower end of the elevator-frame and connected with the shaft of brush B by an adjustable rod *t*. Its  
 35 edge bears on the periphery of the brush, and is kept to place as the brush wears by adjusting the rod *t*. Its purpose is to prevent any dirt from being carried down by the brush.

U is a plate secured to the elevator-frame  
 40 under the plate T and adapted to direct what dirt may pass down into the brush.

The general operation of the machine is as follows: As it advances, the side brushes I and J sweep the dirt to the center (the latter brush  
 45 taking it also from the gutter) into the path of the main brush B, and this brush, revolving in the direction heretofore described, throws the dirt upwardly and backwardly into the elevator, by which it is carried up to the  
 50 discharge-spout.

I am aware that in sweeping-machines an elevator has been used and a brush for sweeping the dirt into it; but as far as I am aware the elevator has always been located in front

of the brush and a slow movement given to said brush; but with my brush a high speed  
 55 can be given to it by reason of its separate power-transmitting connections without having to impart any such speed to the other  
 60 brushes, which, if such speed were given them, would result in throwing the dirt backwardly over their tops instead of sweeping it into the path of the main brush. Therefore I can  
 65 run them slowly and yet run the main brush rapidly and throw the dirt backwardly over its top into the elevator.

I do not claim herein a roller at the outer end of the gutter-brush, which, by bearing on the curb, serves to guide said brush, for such  
 70 is not my invention.

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

1. In a street-sweeping machine, the inner side and gutter brush J, in combination with  
 75 the swiveled hanger *j*, supporting its outer end, the pivotally-mounted hanger K, supporting its inner end, the power-shaft C, the swiveled sprocket-pulleys on said shaft and axle of the brush, and the intervening end-  
 80 less chain *f*, substantially as described.

2. In a street-sweeping machine, the inner side and gutter brush J, mounted at an angle as described, in combination with the fixed  
 85 shield on its outer end for bending the bristles of said brush into line with the curb, substantially as described.

3. In a street-sweeping machine, the combination of a traveling elevator, the rotary main brush in front of the base of said ele-  
 90 vator, the fixed straight side brushes at the ends of the main brush, and the rotary inclined side brushes in front, substantially as described.

4. In a street-sweeping machine, the dis-  
 95 charge-spout E, in combination with the swinging gate or valve F at its lower end, and the connections for operating said valve, consisting of the arm *f'*, the rod *f*<sup>2</sup>, the bell-crank  
 100 *f*<sup>3</sup>, the lever *f*<sup>7</sup>, and intervening connections with said bell-crank, substantially as described.

In witness whereof I have hereunto set my hand.

MATHURIN C. ROBICHAU.

Witnesses:

S. H. NOURSE,

H. C. LEE.