(No Model.)

3 Sheets—Sheet 1.

E. C. FISHER.

STREET SWEEPING MACHINE.

No. 436,520. Patented Sept. 16, 1890.

Fig. 1.

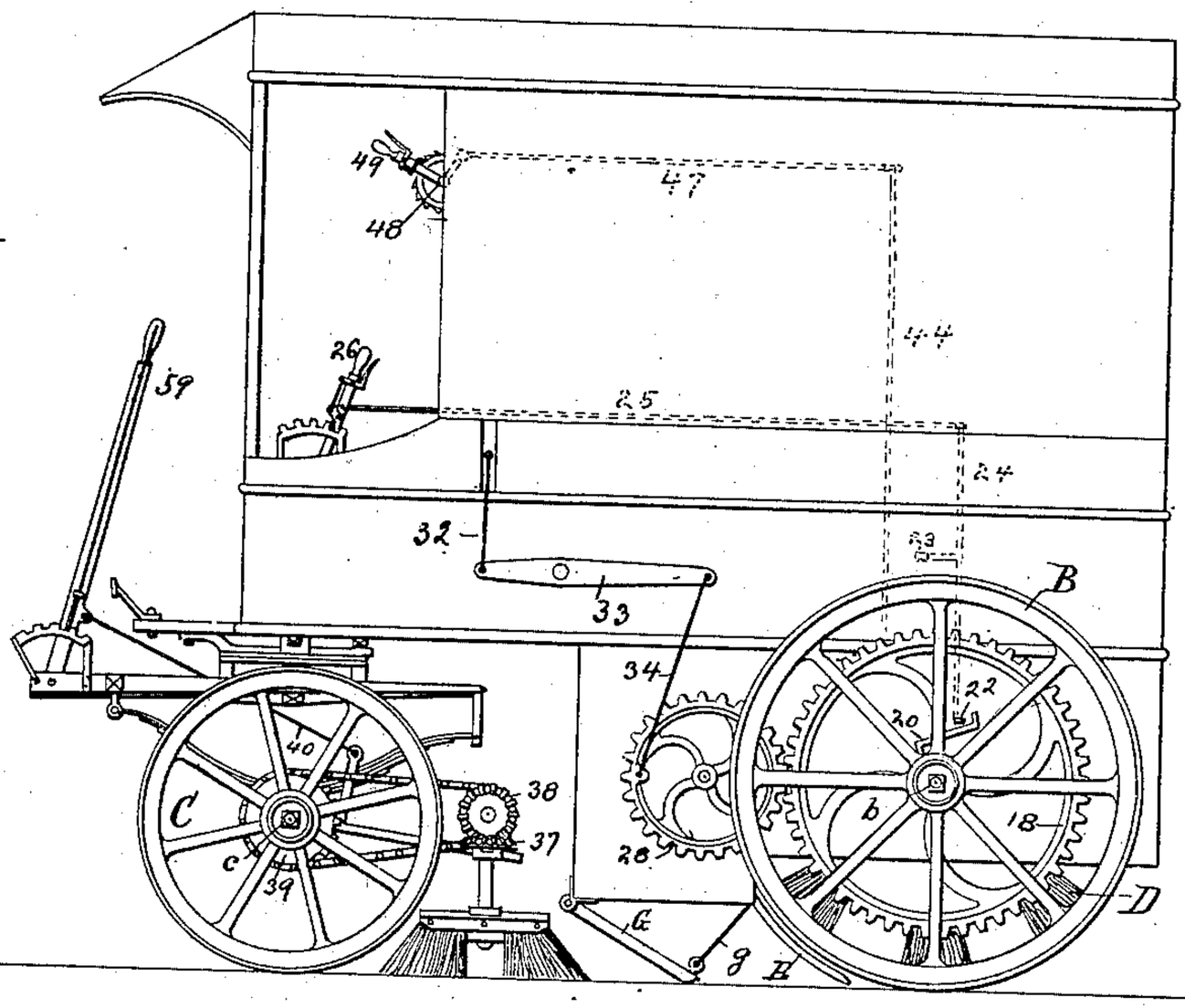
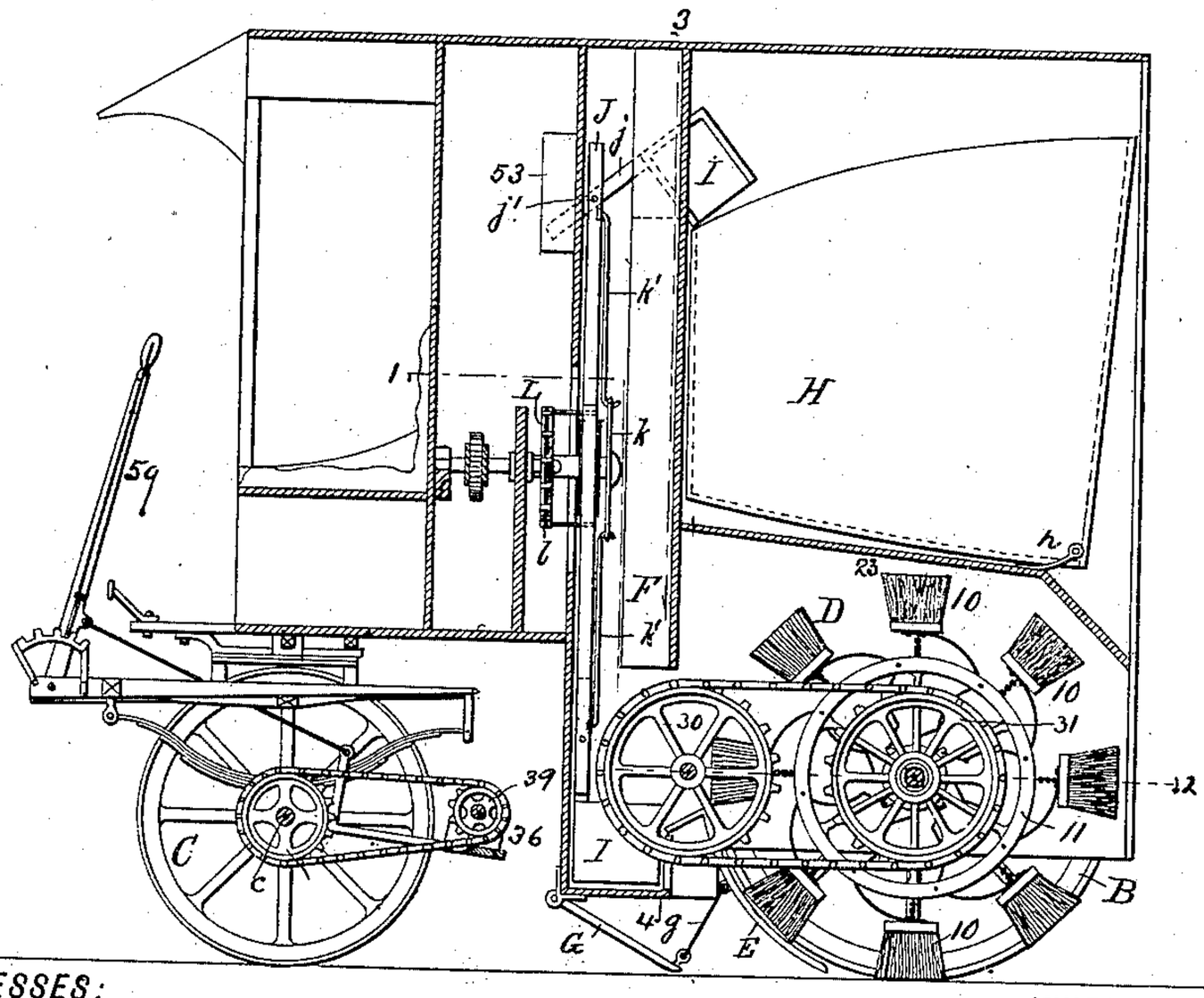


Fig. 2.



WITNESSES:

E. J. Griswold

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INVENTOR

Elmendorf C. Fisher

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his ATTORNEYS

(No Model.)

3 Sheets—Sheet 2.

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Fig. 5.

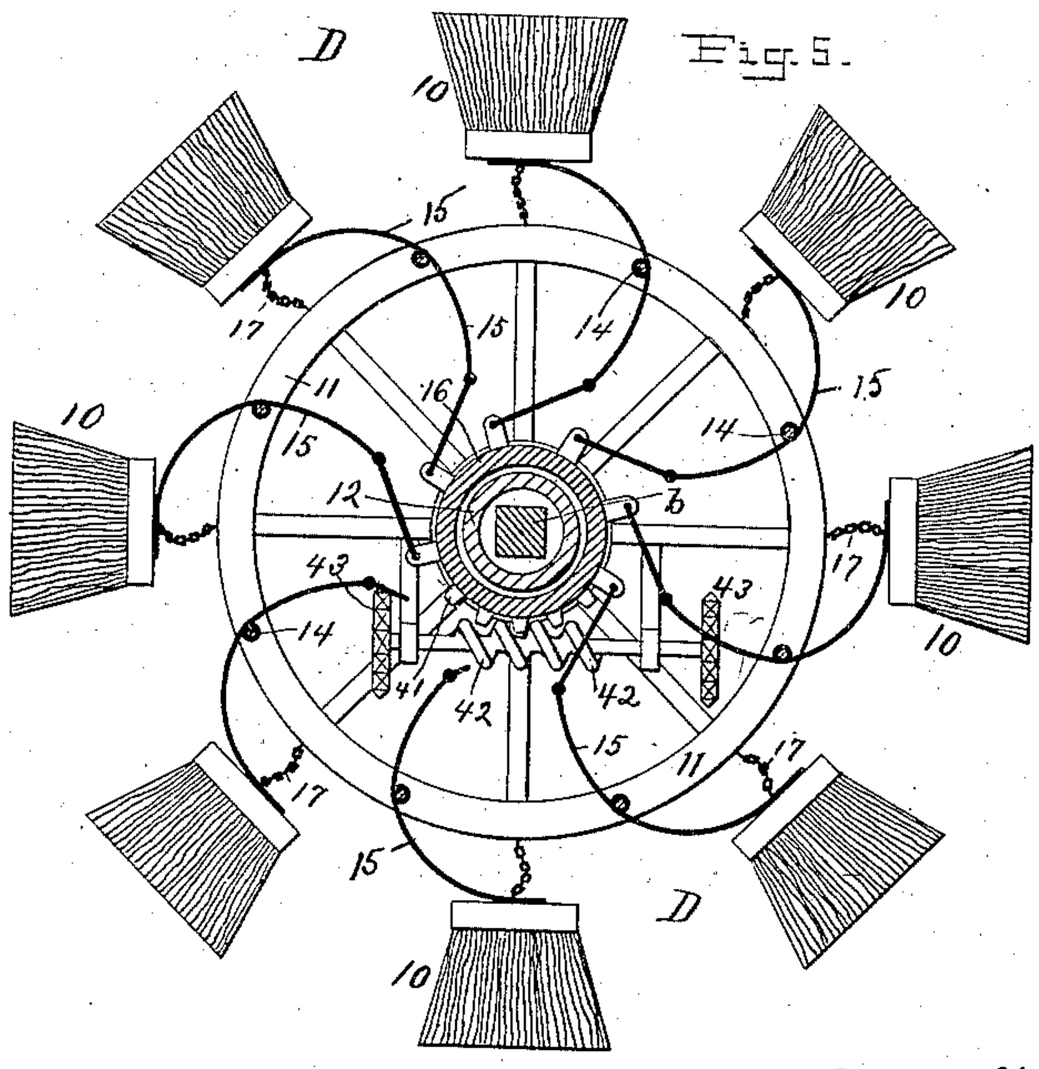

Fig. 11.

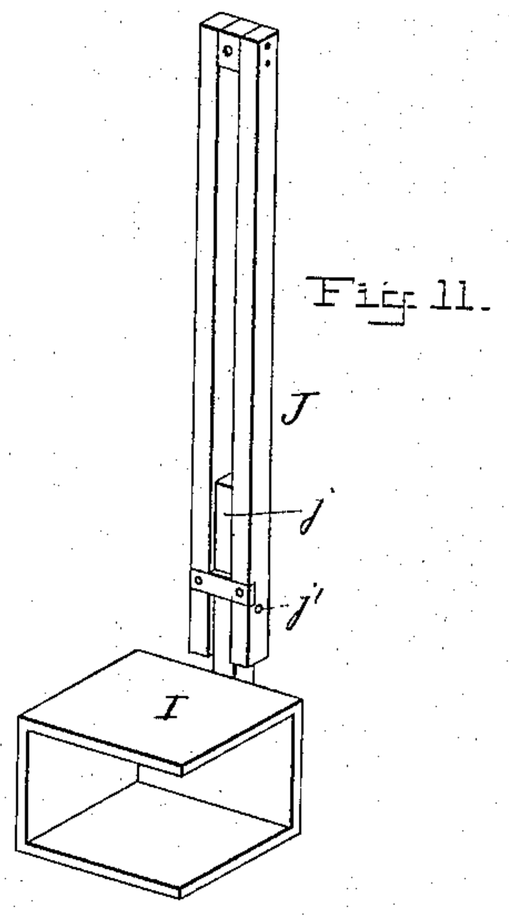

Fig. 3.

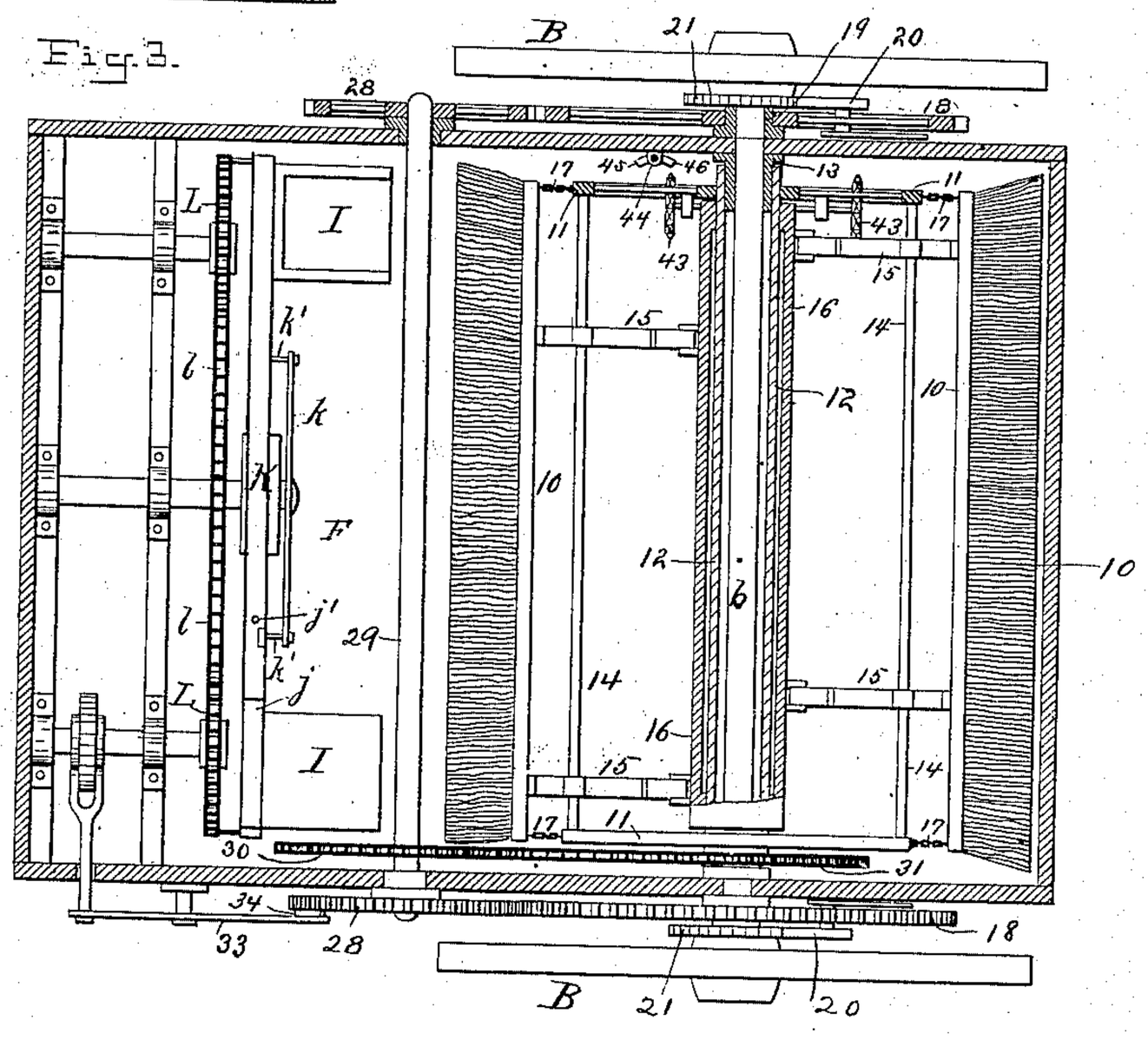

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Fig. 6.

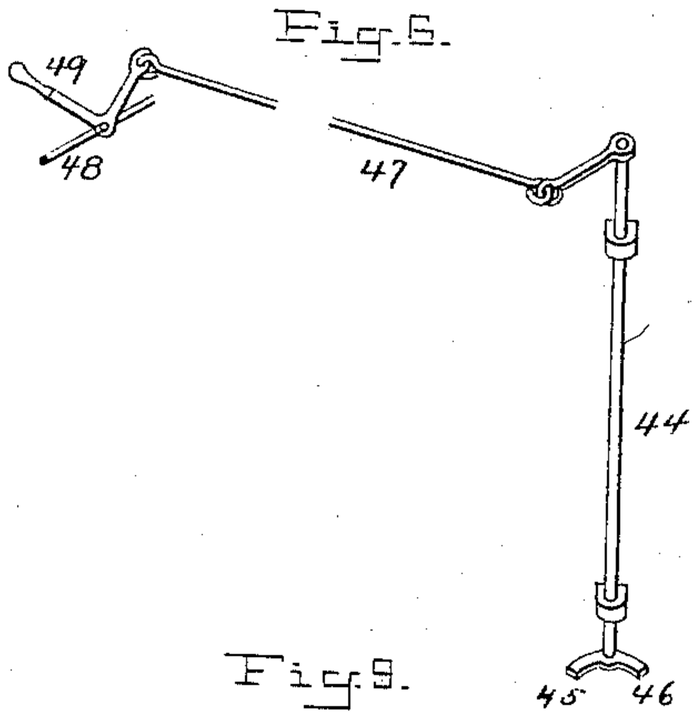


Fig. 2A.

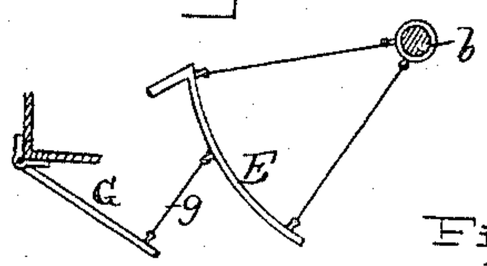


Fig. 7.

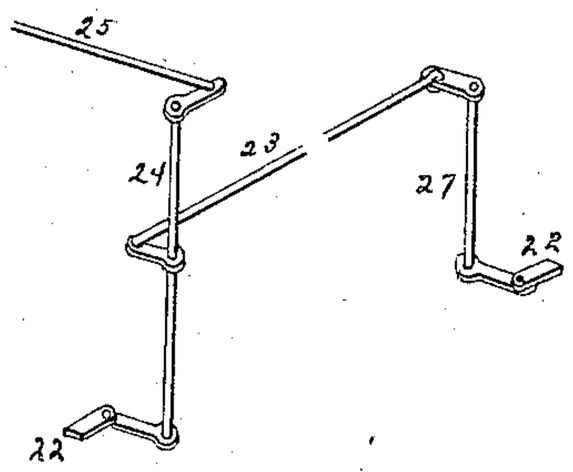


Fig. 9.

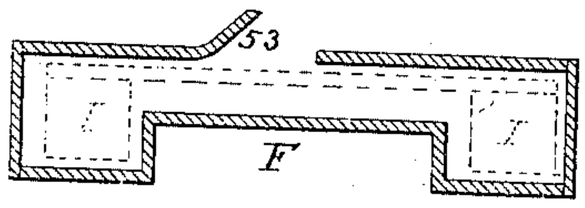


Fig. 8A.

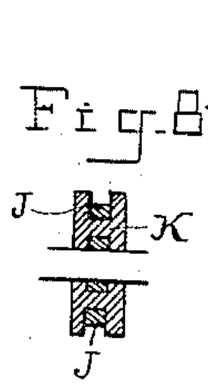


Fig. 10.

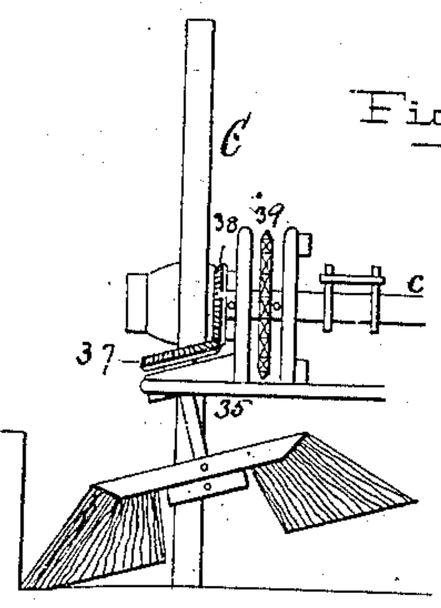


Fig. 8.

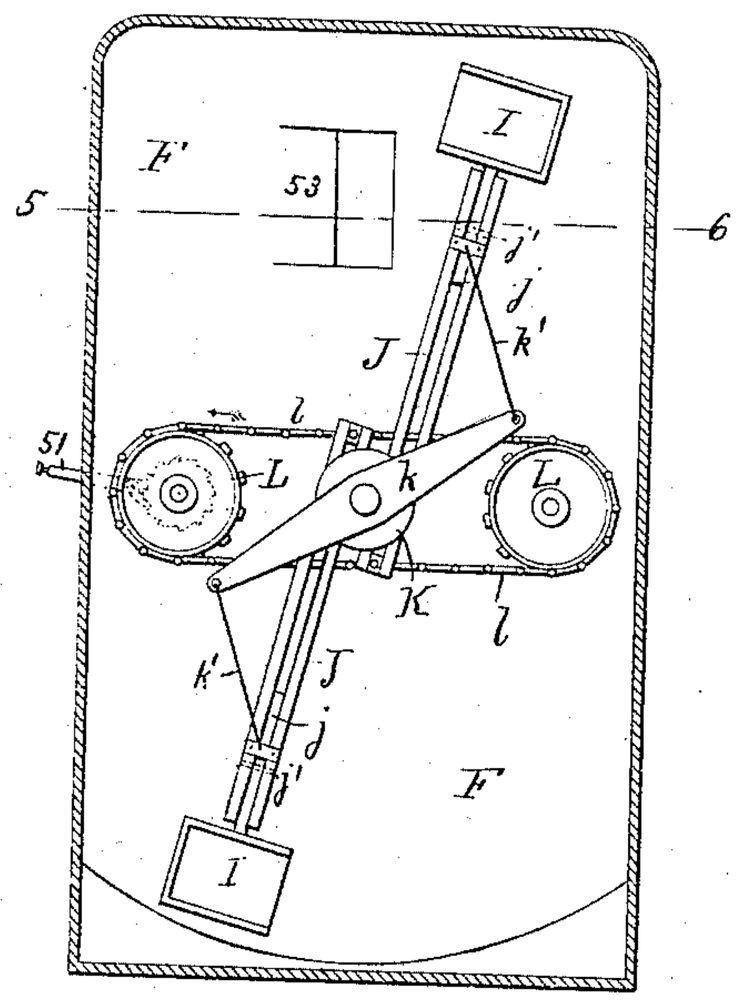
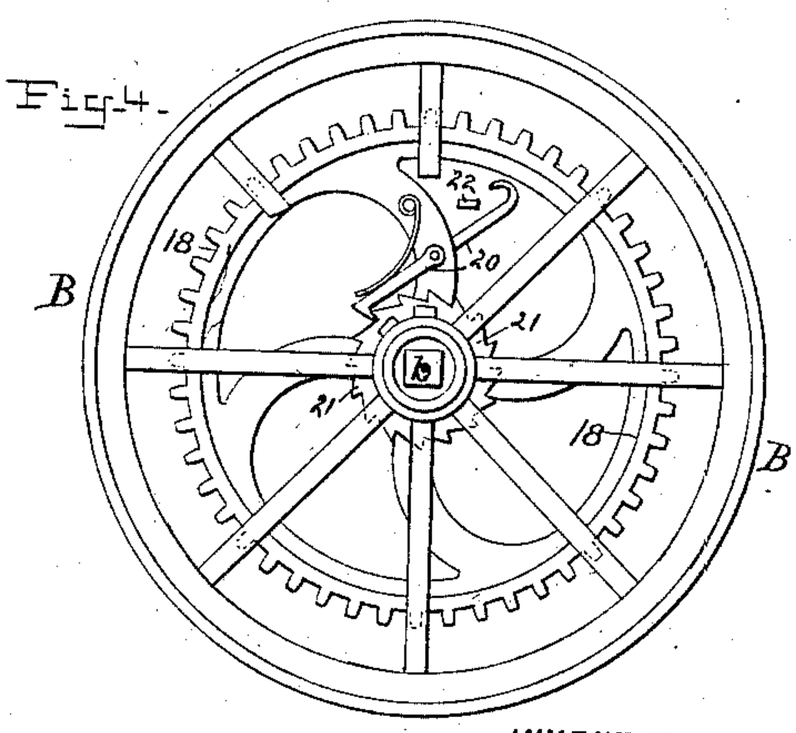


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELMENDORF C. FISHER, OF PORT RICHMOND, NEW YORK.

STREET-SWEEPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 436,520, dated September 16, 1890.

Application filed April 28, 1890. Serial No. 349,760 (No model.)

To all whom it may concern:

Be it known that I, ELMENDORF C. FISHER, a citizen of the United States, and a resident of Port Richmond, Richmond county, New York, have invented Improvements in Street-Sweeping Machines, of which the following is a specification.

The main features of my invention relate more particularly to that class of automatic sweeping-machines in which there is combined with the sweeping-brush carried by the vehicle a receiving-box, also carried by the vehicle, and a conveying or elevating device to carry the dust and dirt up into the receiving-box.

My invention consists of certain improvements in the construction of the machine and its parts, as more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of my improved street-sweeping machine. Fig. 2 is a vertical longitudinal section. Fig. 2ª is a detached view of a part. Fig. 3 is a sectional plan view on about the line 1 2, Fig. 2. Fig. 4 is an enlarged side view of one of the vehicle-wheels and the driving-wheel with some of the spokes of the vehicle-wheel broken off. Fig. 5 is a vertical section of the rotating brush-wheel. Figs. 6 and 7 are perspective views of parts. Fig. 8 is a vertical section on the line 3 4, Fig. 2. Fig. 8ª is a view illustrating how the shovel-arms are mounted in the rotary disk. Fig. 9 is a sectional plan on the line 5 6, Fig. 8. Fig. 10 is a view to illustrate the construction and operation of the side sweeping-brush, and Fig. 11 is a perspective view of one of the shovels.

In the drawings I have shown the vehicle part of my improved machine as constructed after the pattern of an ordinary top business-wagon, to be drawn, as usual, by one or a pair of horses, as the work may require. The vehicle is mounted upon four wheels, the two large rear wheels B being mounted to turn loosely on the ordinary axle *b*, fixed to or in the frame-work of the vehicle. The two front and smaller wheels C turn on the axle *c*, which may have the usual springs, frame, and fifth-wheel between it and the under front part of the body of the vehicle. Over the front wheel is the usual seat for the driver of the wagon, and within easy reach are a number of levers, hereinafter referred to, by which the parts are controlled.

The rotary brush-wheel D is mounted concentrically with the rear axle of the vehicle, in order that as the vehicle traverses over the ground the sweeping-edge of the brush shall be coincident with the bearing-edges of the rear wheel, and shall come down into depressions in the ground and pass over rises in the ground coincidently with the rear wheels. By this means the streets will be much more effectually swept than where the brushes are mounted so as not to coincide with the wheels. In the present instance I have shown the rotary brush-wheel as consisting of a series of transverse brushes 10, carried by end wheels 11 on a hollow shaft 12, which is mounted on bearings 13, carried by the opposite side frames. (See Fig. 3.) The transverse brushes 10 are carried by these end wheels through the medium of spring or elastic arms 15, pivoted to cross-bars 14, which are carried by the end wheels 11. The opposite ends of the spring-arms 15 are connected to lugs upon a sleeve 16, which can be adjusted in a rotary direction upon the hollow shaft 12, by means of devices hereinafter described, in order to so act upon the spring-arms 15 as to draw the brushes 10 inward toward their carrying-shaft, or outward from the shaft, or, in other words, to contract or expand the diameter of the brush-wheel. The extent of the outward or expanding movement of the brushes is limited by short chains 17.

Rotary movement is imparted to the brush-wheel thus constructed from the rear wheels in the manner which I will now describe. Between the body of the vehicle and each rear wheel is mounted a gear-wheel 18 upon fixed bearings 19, secured to the body of the vehicle about the fixed axle *b*. Each of these wheels 18 may be thrown into and out of gear with the adjacent vehicle-wheel B by any suitable means, so that when the two are in gear with each other the traversing of the vehicle along the street will then cause the wheels 18 to move and impart rotary motion to the brush, as hereinafter described.

As a convenient device for engaging and disengaging the wheels B and gear-wheels 18, I may use spring-actuated pawls 20, carried by the gear-wheels, to engage with correspond-

ing ratchet-wheels 21 on the hubs of the wheels B. On throwing them out of engagement the traversing of the vehicle will cease to cause the gear-wheels, and consequently the sweeping brush-wheel, to rotate.

I provide any suitable devices for freeing the pawls from the ratchet-wheels, and in this case I have illustrated sliding pins 22 passing through the sides of the vehicle and controlled from the drivers'seat. One stop-pin 22 is controlled through the medium of the hand-lever 26, rod 25, and vertical shaft 24, with its crank-arms, Fig. 7. The stop-pin 22 on the other side of the vehicle is carried by a crank-arm on a vertical shaft 27, which is operated simultaneously with the shaft 24 through the medium of the connecting-rod 23, as illustrated in the perspective diagram, Fig. 7. By moving the hand-lever 26 forward the stop-pins 22 on the opposite sides of the vehicle will be thrown out into the paths of the rear arms of the pawls 20, Fig. 4, and the latter will be thereby disengaged from the ratchet-wheels on the hubs of the wheels B, and accordingly the gear-wheels 18 will be stopped. Motion is transmitted from these gear-wheels 18 to the rotary brush-wheel D by the gearing of the wheels 18 into pinions 28 on a transverse shaft 29, which also carries a chain-wheel 30. Over the latter passes a chain onto a wheel 31, carried by the hollow shaft 12 of the rotary brush-wheel. Through the medium of this or like gearing rotary motion is imparted to the brush in a direction the opposite of that in which the wheels B of the vehicle turn as the vehicle is traversed over the street.

Immediately in front of the brush-wheel D is a movable shield E, whose upper end leads to the bottom of the elevator-chute F, Fig. 2. To the under side of this elevator-chute is pivoted a front guard-board G, connected by a rod or rods *g* to the shield E, so that as the vehicle is traversed over the street if this front guard-board should strike an obstruction the shield E, which is hung by arms *e* from the rear axle of the vehicle, as shown in Fig. 2ª, will be raised up out of the way before the obstruction can strike it, and thus avoid any damage.

The dust and dirt are swept up over the shield E into the bottom of the conveyer or elevator-chute F, and the elevating device thence carries the dirt up into the chute and discharges it into the receiving-box H, as shown in Fig. 2. This receiving-box H occupies the space over the rotary brush-wheel, and may be pivoted at its rear at *h*, so that when the rear doors of the vehicle are opened the receiving-box may be swung on its pivots to dump the dirt out wherever desired.

The elevating or conveying device usually employed in street-sweeping machines consists of endless bands with buckets; but an objection to such devices is that the dirt and dust get into the bearings of the bottom wheel over which the band or chain passes and soon get out of order, and if sticks or barrel-hoops or such devices are swept up into the conveyer they are apt to stop it. I have therefore constructed my conveyer of two or more shovels or buckets carried at the outer ends of traveling arms, so that the operating wheels for these buckets shall not be at the lower end of the chute. I have shown the conveyer in Figs. 2 and 8 as provided with a pair of these shovels I, carried by arms J, and as the width of the chute is not equal to its height I provide means for imparting to these shovels and arms a motion in the direction of their length as well as their rotary traveling motion. For this purpose the arms J are mounted to slide in grooves in a central wheel or disk K, Fig. 8ª, and the inner ends of the arms are pivoted to an endless traveling belt *l*, passing over wheels L mounted in bearings in the vehicles, Figs. 2, 3, and 8. Rotary motion may be imparted to each of these wheels and thence to the buckets by any suitable means. In the present instance I have shown means for imparting intermittent motion to one of the wheels L through the medium of a pawl-lever 51, engaging with a ratchet-wheel on the axis of the wheel L, Figs. 2, 3, and 8, this pawl-lever being connected, as shown in Fig. 1, by a rod 32 to a walking-beam 33, pivoted to the vehicle, while the opposite end of this walking-beam is connected by a rod 34 to a crank-pin on the wheel 28.

The better to balance the opposite shovels I, I prefer to fix to the axis of the wheel K a lever *k*, having its opposite ends connected by rods *k'* to the arms J of the shovels, as shown in Fig. 8. It will thus be seen that as the chain or belt *l* travels in the direction of its arrow, Fig. 8, the buckets will have a rotary motion imparted to them in an elliptical path, owing to the advancing and receding motion of their carrying-arms, in order to accommodate themselves to the width of the vehicle. Each shovel I has a tail-piece *j*, by which it is pivoted to its arm J at J'. As illustrated in Fig. 2, this pivoting point of each shovel is such that the shovel, which has two sides open, as shown in the perspective view, Fig. 11, and which is normally kept from tilting on its pivot by being confined within the chute F, will, when it reaches the top of its movement and comes opposite the opening in the back of the chute, fall or tilt over at right angles to the plane of movement of the elevator-arms, as shown in the upper part of Fig. 2, and dump the contents of the shovel into the receiving-box H. As the shovels continue their rotary movement, however, an incline 53 will so act on the tail *j'* of the shovel as to bring it back into its normal position on its carrying-arm, whence it passes down the chute again to gather up another charge of dust and dirt from the bottom of the chute and carry it up on the other side to discharge at the top into the receiving-box.

I prefer to combine with the street-sweeping device constructed as described a pair of

rotating gutter-brushes to sweep the dirt from the gutters under the vehicle into the line of movement of the main brush-wheel described. For this purpose I pivot to the front axle a frame or frames 36, carrying at opposite sides immediately behind the front wheels vertical shafts with brushes at their lower ends. These shafts are set at such an angle that each part of the brushes will, as shown in Fig. 10, sweep into the gutters during the outer half of each revolution and throw the dirt under the vehicle into the path of the main brush-wheel. Rotary motion may be imparted to the shafts of these brushes by any suitable means, and in the present instance I have shown at the upper end of each shaft a bevel-wheel 37, gearing into a corresponding bevel-wheel 38, whose shaft also carries a chain-wheel 39. Rotary motion is imparted to this chain-wheel from the corresponding front wheel through a chain passing either over the hub of the wheel or over a chain-wheel, which may be driven by the front wheel C and be engaged with or disengaged from it, as desired. The frame 35, which carries these front gutter-brushes, is preferably so mounted and controlled by a hand-lever 59 and connecting-rod 40 that when desired the driver may readily raise the brushes into and out of the gutter.

In order to cause the main brush-wheel to expand or contract to a certain extent—that is to say, to adjust the transverse brushes farther from or nearer to the hollow axle of the wheel—I provide the following or equivalent device: As I have before described, the inner ends of the spring-arms 15, which carry the several transverse brushes 10, are connected to the sleeve 16. On this sleeve is secured a segmental rack 41, into which gears a worm 42, mounted in bearings on one of the end wheels 11 of the brush-wheel. The opposite ends of this worm carry star-wheels 43, located at different distances from the axis of the brush-wheel. A vertical shaft 44, Fig. 6, mounted in bearings in the inner frame of the vehicle, carries at its lower end two fingers 45 and 46. When this shaft 44 is turned so as to throw the finger 45 inward, the latter will come into the path of one of the star-wheels 43 and turn the worm 42 at each revolution of the brush-wheel, and consequently turn the sleeve 16, so as to adjust the brushes outward from the axis of the brush-wheel. When the vertical shaft 44 is turned in the opposite direction, so as to throw the finger 46 inward, the latter will find itself in the path of the other star-wheel 43, which at each revolution of the brush-wheel will be so turned as to move the sleeve 16 in a direction to adjust the brushes 10 nearer to the axis of the wheel and thus collapse or contract the brush-wheel. The shaft 44 can, however, be moved to such a position that neither finger 45 or 46 will be in the way of either star-wheel as the brush-wheel rotates. This shaft 44 may be controlled from a point convenient to the driver by means of a lever 49, controlling the transverse shaft 48, with a crank-arm connected by a rod 47 to an arm on the upper end of the vertical shaft 44.

I claim as my invention—

1. A sweeping-machine having a vehicle-body mounted on wheels, a fixed axle for the rear wheels, with a rotary brush having a tubular shaft turning about the said fixed axle, gearing for imparting motion from the said rear wheels to the brush, and engaging and disengaging devices between the wheels and brush, all substantially as described.

2. A sweeping-machine having a rotary brush-wheel with a series of brushes adapted to be moved toward or from the axis of the wheel, the sweeping-edge of the brush being on a line with the bearing-edges of the vehicle-wheels, in combination with a lever under the control of the driver, and devices, substantially as described, controlled by the lever, to expand or contract the brush while the vehicle is in motion, substantially as described.

3. A sweeping-machine having a rotary brush-wheel with transverse brushes carried by arms pivoted to the wheel, and means for adjusting the arms on their pivots to expand or contract the rotary brush, substantially as described.

4. A sweeping-machine having a rotary brush-wheel with transverse brushes, spring-arms carrying the brushes and pivoted to the wheel, and means for adjusting the said spring-arms on their pivots to expand or contract the rotary brush, substantially as described.

5. A sweeping-machine having a rotary brush-wheel consisting of a shaft with end wheels and rods, spring-arms carrying transverse brushes and pivoted on the said rods with a sleeve to which the inner ends of the spring-arms are connected, and means for adjusting the said sleeve in relation to the axis of the wheel, as and for the purpose specified.

6. A sweeping-machine having a rotary brush-wheel mounted to turn on the rear axle of the vehicle with an intermediate shaft, gearing for imparting motion from the vehicle-wheels to the intermediate shaft and thence to the shaft of the brush-wheel, and engaging and disengaging devices between the vehicle-wheels and brush-wheel.

7. The combination of a receiving-box and elevating-chute of a sweeping-machine with a brush and movable shield over which the brush sweeps the dirt into the chute, and a front guard-board connected with the movable shield, as and for the purpose set forth.

8. The combination of the brush and receiving-box of a sweeping-machine with an elevating-chute and a rotating shaft carrying arms with pivoted shovels at the outer ends, substantially as described.

9. The combination of the brush and receiving-box of a sweeping-machine with an elevator-chute and rotating shaft carrying

arms with pivoted shovels, an endless belt connected to the ends of the shovel-arms, wheels over which the chain passes, and means for traversing the said belt or chain to impart a rotary motion to the shovel-arms, and also a sliding motion longitudinally of the said arms, as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELMENDORF C. FISHER.

Witnesses:

EDITH J. GRISWOLD,

JOHN REVELL.