

No. 628,616.

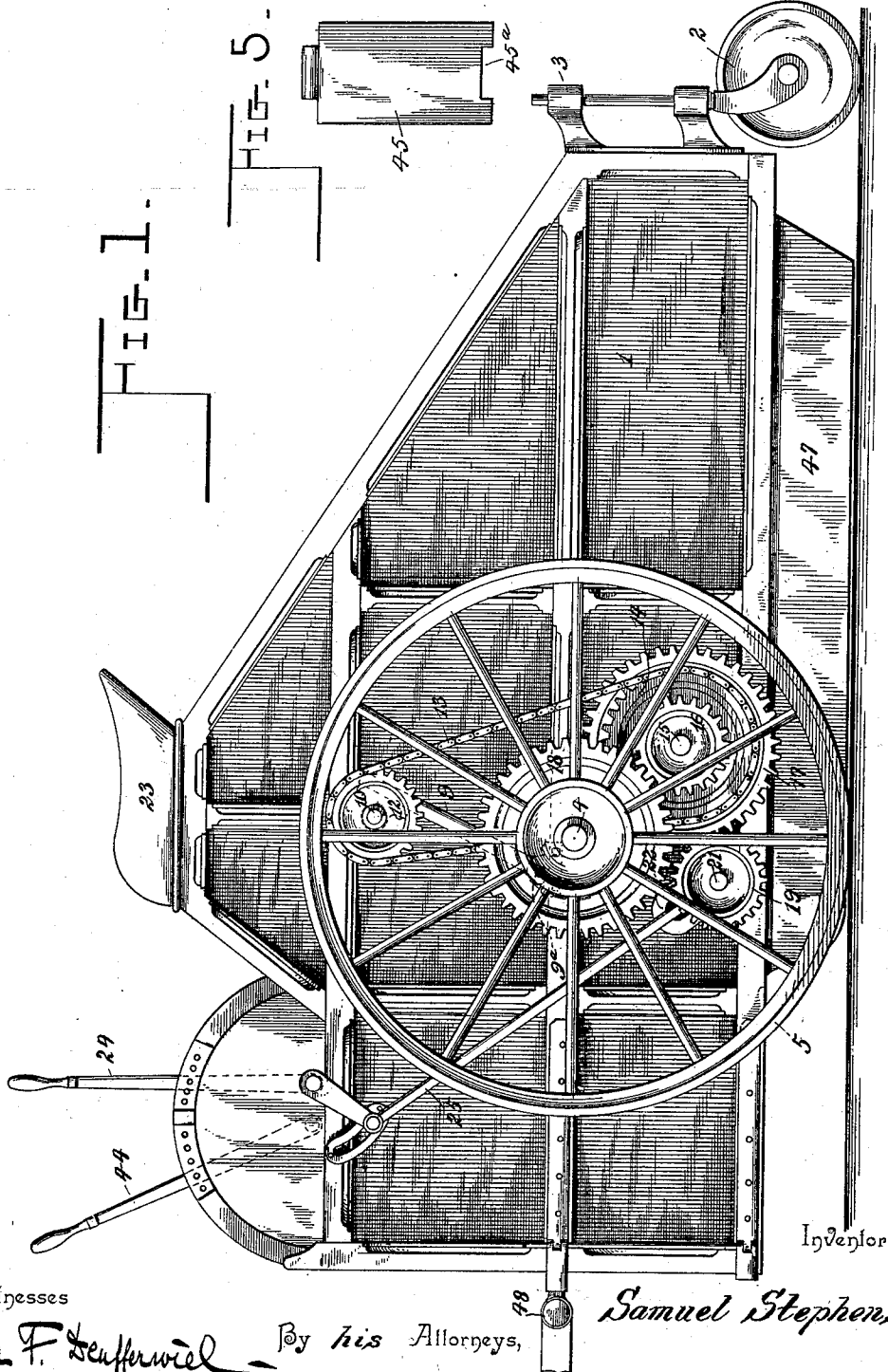
Patented July 11, 1899.

S. STEPHENS.
STREET SWEEPER.

(Application filed Sept. 10, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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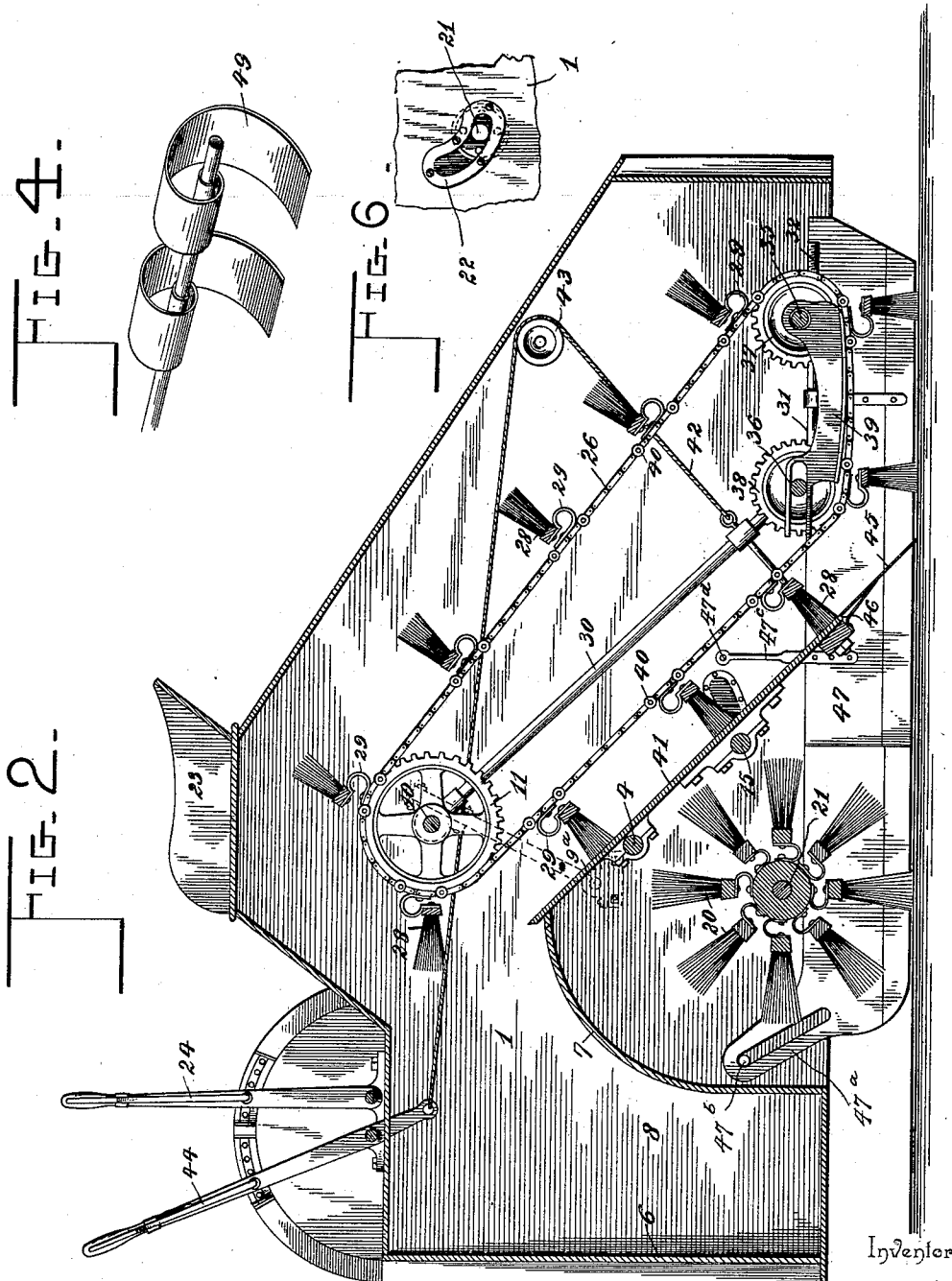
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3 Sheets—Sheet 2.



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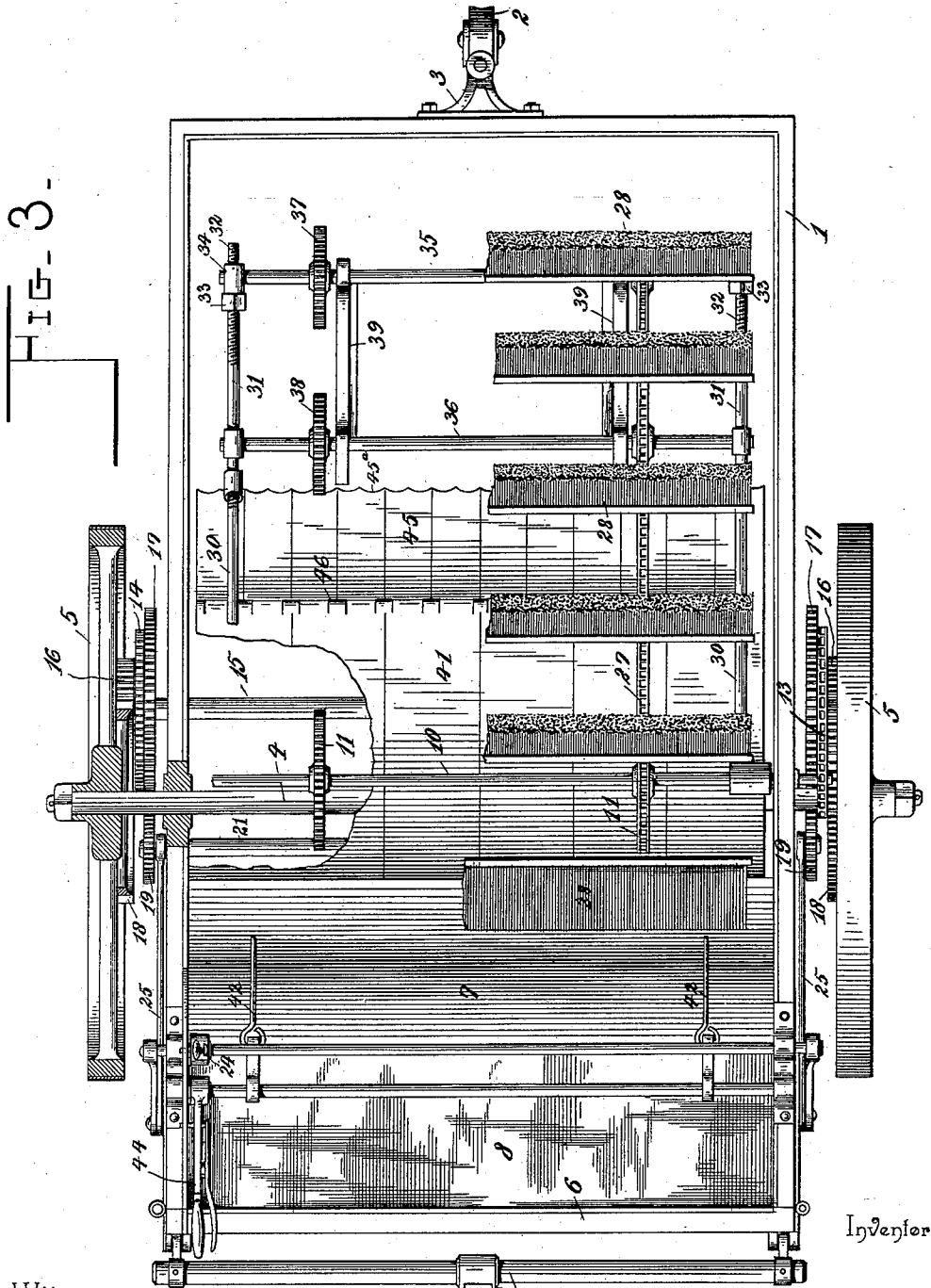
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

SAMUEL STEPHENS, OF HAMILTON, CANADA.

STREET-SWEEPER.

SPECIFICATION forming part of Letters Patent No. 628,616, dated July 11, 1899.

Application filed September 10, 1897. Serial No. 651,264. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL STEPHENS, a subject of the Queen of Great Britain, residing at Hamilton, in the county of Wentworth, Province of Ontario, Canada, have invented a new and useful Street-Sweeping Machine, of which the following is a specification.

My invention relates to improvements in street-sweeping machines of that class which use horse-power for hauling the machine over the street and are equipped with mechanism for utilizing the motion of the carrying-axle in driving the brush mechanism.

The primary object of the invention is to provide a machine of the character specified in which the brush or broom mechanism is sustained to accommodate itself automatically to the level of the street-surface and in which provision is made for easily and quickly raising or lowering the broom mechanism into and out of service.

A further object of the invention is to provide mechanism by which the brooms are held positively in operative relation to the street-surface to thoroughly remove all refuse therefrom.

A further object of the invention is to provide means along which the refuse is carried by the action of the brooms, said devices arranged to accommodate themselves to inequalities in the ground and at the same time present continuous surfaces for the travel of the refuse as it is swept by the action of the brooms.

A further object of the invention is to provide the machine with means which operate in conjunction with the broom mechanism to break up hard matter in the path of the broom mechanism and to remove from the street-surfaces any refuse which may have a tendency to adhere thereto; and a further object is to so construct and arrange the parts as to provide for the taking up of wear and for the proper adjustment of the parts to compensate for the wear.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand my invention, I have illustrated the preferred embodi-

ment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation of a street-sweeping machine constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view of the same, showing the interior operative mechanisms. Fig. 3 is a view, partly in plan, with parts broken away and shown in section to more clearly illustrate the interior devices. Fig. 4 is a detail view of a scraper which may be used in lieu of the rotary brush shown by Figs. 1 to 3, inclusive. Fig. 5 is a detail view of one of the trailing plates to form a continuation of the inclined floor. Fig. 6 is a detail view illustrating in part the means by which the auxiliary broom may be adjusted.

Like numerals of reference denote corresponding parts in all the figures of the drawings.

1 designates the supporting-frame, which is of the general rectangular form with a sloping rear part and constructed in the form of casing for the operative parts of the machine. This casing or frame 1 is supported at its rear on the caster-wheel 2, the spindle of which is loosely journaled in a bracket 3, fastened to the reduced rear end of the casing or frame, and through the casing or frame, at or near the middle thereof, passes the main carrying-axle 4, which is journaled in suitable bearings in said casing or frame to rotate freely therein. The ends of the main carrying-axle protrude from opposite sides of the casing or frame, and on said protruding ends of the axle are mounted the carrying or traction wheels 5, which ride upon the ground or street and serve to impart motion to the main carrying-axle 4 when the machine is drawn.

The front part of the casing is constructed with a removable front wall 6, which extends across the front of the casing from side to side thereof, and this front wall 6 is held in place by hinges, locking-pins, or other suitable attaching means in order to permit of the removal of the front wall or the opening thereof for the purpose of having easy access to the front interior part of the casing to permit of the removal of the accumulated refuse therein. This front part of the casing 1 is provided with an interior curved or inclined

partition 7, which extends across from side to side of the machine, and this partition, in conjunction with the sides and front of the casing, forms a box or receptacle 8 for the accumulation of the refuse swept therein by the action of the broom mechanism.

On the outside of the casing 1, above the main carrying-axle, is arranged a pair of links or hangers 9. These hangers are arranged in inclined positions and on opposite sides of the casing, and the lower ends of the hangers are mounted on the casing in a suitable way, preferably by pivotally connecting them to brackets 9^a on said casing, as indicated by dotted lines in Figs. 1 and 2. The upper ends of the links or hangers carry suitable journal-bearings in which is journaled a broom-driving shaft 10, which extends transversely across the casing 1 near the upper part thereof. On this shaft 10 within the casing is mounted a pair or series of chain-wheels 11 to actuate the endless broom mechanism, and on the protruding ends of this broom-driving shaft are mounted the sprocket-wheels 12, around which pass the sprocket-chains 13, that also pass around the driving-sprockets 14 on a counter-shaft 15. This counter-shaft is journaled in suitable bearings in the frame or casing 1, and it extends transversely across the frame or casing. It is arranged in a plane parallel to and slightly below and to the rear of the main carrying-axle 4, and this counter-shaft is designed to be driven by intermediate gear connections with the main driving-axle 4, and it transmits the power for operating the primary broom mechanism and the auxiliary rotary broom when the latter is used. As described, the sprockets 14 are mounted on the counter-shaft to actuate the sprocket-chains 13, that drive the broom-shaft 10, and said counter-shaft 15 is also provided with a gear-pinion 16 and with another larger gear 17, the gears 16 17 being duplicated on the opposite sides of the casing 1. The gears 16 of the counter-shaft mesh directly with the driving-gears 18, mounted on the carrying-axle 4 of the machine, whereby the counter-shaft is driven by the carrying-axle 4. The large gears 17 on the counter-shaft are arranged to mesh with gear-pinions 19, fastened to the protruding ends of the axle or shaft of the auxiliary rotary broom 20; and this rotary broom consists of a series of individual broom-heads carried by flexion springs attached to the axle or shaft 21, as clearly shown by Fig. 2. This axle or shaft 21 of the auxiliary broom 20 is mounted in suitable bearings carried by slotted hangers 22, which accommodate slidable bearings for the shaft of the auxiliary broom in a manner to raise or lower the auxiliary broom 20 into and out of operative position below and above the edge of the casing 1, and this adjustment of the auxiliary broom may be effected by the driver occupying the seat 23 on the machine through the medium of a hand-lever 24, which is ful-

crumed within convenient reach of the driver, said lever 24 being fulcrumed on the casing 1 and connected by links, one of which is indicated at 25, with the hangers or supports for the auxiliary broom 20. This broom 20 is sustained by its hangers or supports to travel in a direction which when the broom is lowered into operative position will bring the pinions 19 of its shaft or axle into mesh with the gears 17 on the counter-shaft, thus throwing the broom into operative engagement with the counter-shaft, to be rotated thereby when the broom is lowered; but when the broom is raised the gear-pinions 19 are moved out of engagement with the gears 17, thus allowing the auxiliary broom to remain at rest when the same is raised, as shown by Fig. 6.

The main or primary broom mechanism of my improved sweeper is housed within the casing 1 to occupy normally an inclined position therein, as shown by Fig. 2, and this primary broom mechanism is arranged substantially in rear of the refuse-receptacle 8, with its upper end overhanging the same. The auxiliary broom 20 is situated in rear of the refuse-receptacle and the partition 7 thereof, and thus the auxiliary broom is situated below the upper overhanging end of the primary broom mechanism. The function of the auxiliary broom mechanism is to break up any lumps in the path of the primary broom mechanism and to remove any refuse which may have a tendency to adhere to the street-surface, and this auxiliary broom is arranged to be driven by its gearing in a direction to throw the refuse rearwardly into the path of the primary broom mechanism, the latter serving to sweep or elevate the refuse into the receptacle 8.

The primary broom mechanism consists in its simplest form of a series (two or more) of sprocket-chains 26 27 (see Fig. 3) and a series of individual broom-heads 28, each flexibly attached by carrying-springs 29 to the endless chains 26 27 in order to give to the broom-heads a flexion movement or play and to enable the same to press by yielding contact upon the street-surface. This primary broom mechanism is carried by a broom-frame 30, which occupies a position within the endless chains and the broom-heads of the primary broom mechanism, and the upper ends of the rails or bars of this broom-carrying frame are loosely or pivotally mounted on the broom-driving shaft 10. The lower ends of the bars or rails of this broom-carrying frame, which is arranged in a vertically-inclined position within the casing, are provided with the horizontal extensions 31, and these extensions have their rear ends threaded at 32 to receive the adjustable nuts 33, that operate in connection with the adjustable bearings 34 of the rear shaft 35. On this broom-carrying frame, at the juncture of the inclined rails or bars and the horizontal extensions 31 thereof, is journaled another shaft 36. The shafts 35

36 are carried by the adjustable broom-frame 30, and they are spaced apart a suitable distance from each other, and they are arranged in parallel relation to each other. These shafts 35 36 are idler-shafts, and they carry the idler-sprockets 37 38, respectively, around which pass the endless chains of the primary broom mechanism, and said shafts are thus arranged to give to the endless chains and to the broom-heads of the primary broom mechanism a position where the broom-heads are properly presented to the street-surface to clean the refuse therefrom. The idler-shafts serve to deflect the broom-heads from pursuing a vertically-inclined path, and they give to the broom-heads a travel in a horizontal direction for a limited distance parallel to the plane of the street-surface, whereby the efficiency of the broom-heads is promoted when the machine is in service. To better attain this deflection of the broom-heads when the machine is in service, I have provided the bearing-shoes 39, which are suitably supported on the broom-frame or on the idler-shafts 35 36 thereof, and I prefer to mount each bearing-shoe pivotally on the shaft 35, while the other end of the bearing-shoe is slotted and slidably connected with the other idler-shaft 36 to provide for the adjustment of the shaft 35 away from the shaft 36 by the manipulation of the adjusting-nuts when it is desired to take up the slack in the endless chains of the primary broom mechanism, which slack may be due to the wear on the working parts of the machine. The bearing-shoes 39 are arranged in horizontal positions below idler-shafts 35 36, and each broom-head is provided with two or more antifric-tion-rollers 40, which when the broom-head is brought opposite to the bearing-shoes are adapted to ride upon or against the bearing-shoes in order to reduce the friction between the broom-head and the shoes.

Below the primary inclined broom mechanism and in parallel relation to the same is the inclined floor 41, which extends from the upper edge of the partition 7 over the auxiliary broom 20 and terminates near the lower edge of the machine-casing 1. This floor is arranged contiguous to the bristles of the broom-heads 28 of the primary broom mechanism, so that the broom-heads are adapted to sweep or travel over and upon the inclined floor, the latter extending from side to side of the machine-casing 1. This inclined floor is loosely or pivotally mounted in any suitable way upon the main or carrying axle 4 of the machine, as shown by Fig. 2, and the broom-frame and its inclined floor 41 are designed to be suspended by the flexible cables, ropes, or other devices indicated at 42 as being connected to the broom-carrying frame and the inclined floor. These cables 42 are suitably attached to the broom-frame 30 and the inclined floor 41, and said cables pass over guide-sheaves 43, journaled in the machine-casing, and thence extend to an op-

erating hand-lever 44, which is fulcrumed on the casing or frame 1, within convenient reach of the driver. This lever furnishes a means whereby the primary broom mechanism carried by the frame 30 may be raised or lowered, together with the inclined floor 41, and thus the primary broom mechanism and its inclined floor may be adjusted into and out of operative positions, while at the same time the inclined floor occupies its parallel relation to the primary broom mechanism. The inclined floor is arranged to terminate, preferably, at or below the lower edge of the open side of the casing 1, and to this lower edge of the floor is attached a series of independently-movable plates 45, which extend continuously across the floor and the machine-casing. These plates are hung or pivoted loosely on the inclined floor, as at 46, and they are adapted to trail on the street-surface, or they may be sustained by suitable devices, such as springs, (represented by Fig. 2 of the drawings,) to present a continuous surface for the travel of the broom-heads 28 across the plates. These independent plates are adapted to yield or give rearwardly when the machine is drawn forward in order to permit the refuse to pass beneath them, and at the same time said plates form surfaces across which the primary broom mechanism may sweep the refuse up to and along the inclined floor 41.

It will be understood that each lever 24 44 is provided with a suitable locking device for holding the lever in fixed position to maintain the broom controlled thereby in the position to which it may be adjusted by the lever.

At the sides of the machine-casing and at the lower open bottom part thereof I provide the shields 47, which are attached to the sides of the casing. The frontends of these plates have inclined slotted arms 47^a, which are connected by bolts 47^b to the casing, and said side plates are also furnished with the hangers 47^c, having pivotal connection at 47^d to the casing, as shown by Fig. 2. This means for attaching each side plate to the casing permits the plate to swing downward to compensate for the wear on the plate, and said plates at the sides of the casing are adapted to drag on the ground when the machine is in service to the end that the plates effectually prevent the sweepings from escaping at the sides of the machine.

In lieu of the auxiliary broom mechanism 20 I may employ the scraper 49. (Indicated by Fig. 4 of the drawings.) This scraper may consist of a series of springs, each having the curved form shown by Fig. 4, and these scraper-springs are attached to the axle or shaft which is journaled in the adjustable bearings or hangers controlled from the lever 24, whereby the scraper may be adjusted into and out of operative relation to the street-surface. The scraper may be used when it is desired to clean streets to which the refuse may adhere so closely that it cannot be removed advantageously by the rotary auxiliary

broom 20; but I prefer to employ this auxiliary broom because it tends to initially sweep the street-surface and to throw the refuse broken thereby or dislodged by the same from the street-surface rearwardly toward the primary broom mechanism.

The links or hangers 9, which support the carrying-frame for the primary broom mechanism, are set on such angles that when the brooms require lowering to compensate for the wear thereon due to the service of the brooms, the said bars or hangers enable the brooms to be adjusted in a manner to rest uniformly or squarely upon the inclined floor 41.

It is thought that the operation and the advantages of my invention will be readily understood from the foregoing description taken in connection with the drawings.

I am aware that changes in the form and proportion of parts and in the details of construction of the devices herein shown and described as the preferred embodiment of my invention may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention. I therefore reserve the right to make such modifications and alterations as fairly fall within the scope of the invention.

While I have shown and described my machine as adapted to be moved or propelled by horse-power, I do not strictly limit myself to the provision of means of any particular kind for propelling the machine.

In Figs. 3 and 5 of the drawings I have shown the trailing plates as provided with notches or cut-away portions 45^a in their lower free edges for the passage of dirt below said plates. By providing these notches in the lower edge of the plates they are adapted to ride or travel on the street-surfaces and will allow the dirt to pass from the rotary broom mechanism to the primary broom mechanism when by any unevenness in the street or pressure of brooms it is held firmly down upon the street-surface.

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

1. In a street-sweeping machine, the combination with a casing and an inclined floor, of a broom-driving shaft, a broom-frame mounted at one end on said shaft and having at its lower free end the horizontally-extended arms, shaft-bearings adjustably supported on said arms of the broom-frame, an idler-shaft on the broom-frame, another idler-shaft journaled in said bearings and adjustable therewith toward or from the first-named idler-shaft, and an endless broom mechanism fitted to the driving and idler shafts to be driven and guided thereby, said adjustable idler-shaft serving to take up the slack in the endless broom mechanism, substantially as described.

2. In a street-sweeping machine, the combination with a casing and an inclined floor, a broom-driving shaft, and a broom-carrying

frame, of idler-shafts journaled on the frame and one of said shafts mounted for adjustment toward or from the broom-driving shaft, bearing-shoes fitted to the idler-shafts to compensate for the movement of said adjustable idler-shaft, and an endless broom mechanism fitted to the driving idler-shafts and engaging with the bearing-shoes, substantially as described.

3. In a street-sweeping machine, the combination with a casing, of an inclined broom-carrying frame provided at its lower end with the horizontal extensions, the idler-shafts, 36, 37, arranged parallel to each other and journaled in said inclined frame and the extensions thereof, bearing-shoes supported on said idler-shafts and spanning the space between the same, guide-wheels on the idler-shafts, and an endless broom mechanism arranged to engage with the guide-wheels and passing around suitable driving-wheels on a shaft forming the pivot of the broom-carrying frame, substantially as described.

4. In a street-sweeper, the combination with a broom-carrying frame and an endless broom mechanism, of the idler-shaft, 36, journaled in said broom-frame, another idler-shaft, 35, carried by adjustable devices which are attached to said broom-frame and maintain the shaft, 35, parallel to the shaft, 36, the bearing-shoes supported on said idler-shafts to compensate for the adjustment of the shaft, 35, with relation to the shaft, 36, and mechanism for driving the broom mechanism, substantially as described.

5. In a street-sweeping machine, the combination of an inclined broom-carrying frame having the horizontal arms at its lower end, an idler-shaft, 36, journaled on said frame, adjustable bearings mounted on the arms of the broom-frame, another idler-shaft, 35, journaled in the said adjustable bearings, the guide-shoes arranged to span the space between the idler-shafts and each having one end pivotally fitted on one shaft and its other slotted end adjustably connected to the other idler-shaft, and an endless broom mechanism, substantially as and for the purposes described.

6. In a street-sweeping machine, the combination with a casing and a carrying-axle therefor, of the inclined hangers or links mounted on said casing, a broom-carrying frame pivoted by a transverse shaft on said hangers or links, an endless broom mechanism carried by said frame, an inclined floor arranged parallel to the broom mechanism, and means substantially as described for suspending the broom-carrying frame and the floor to maintain the parts in operative relation and permit, through the links or hangers, an adjustment of the broom-frame and broom mechanism to compensate for wear on the brushes of the broom-heads, substantially as and for the purposes described.

7. In a street-sweeper, the combination with a casing, of an inclined floor pivotally

supported therein, links or hangers, 9, pivoted to the casing contiguous to the pivotal support for said floor, a broom-driving shaft journaled in said links or hangers, an endless broom mechanism mounted on the shaft, 10, to be driven thereby and adjustable with the same toward said floor, and means for adjusting the broom mechanism and floor simultaneously, substantially as described.

10 8. In a street-sweeping machine the combination with a casing, a carrying-axle, and an inclined endless broom mechanism, of a driving-shaft for said endless broom mechanism, a counter-shaft driven from the axle

15 and having gear connections with the driving-shaft of the endless broom mechanism, an inclined floor below the endless broom mechanism, an auxiliary rotary broom situated below and in advance of the inclined floor

20 and having its shaft mounted in slidable bearings, direct gear connections between the shaft of the auxiliary broom and the

counter-shaft, an adjusting-lever, and connections between said lever and the bearings of the auxiliary broom to retract the gear on the auxiliary-broom shaft from engagement with the counter-shaft, substantially as described.

9. In a street-sweeping machine, the combination with a casing an inclined floor, and an endless broom mechanism, of a series of trailing plates each pivoted to the lower edge of the floor, the free edge of each trailing plate being provided with a notch or passage which permits the sweepings to pass there- through when the edge of the plate rests on the ground, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL STEPHENS.

Witnesses:

T. L. STEPHENS,
F. POTTER.