

(No Model.)

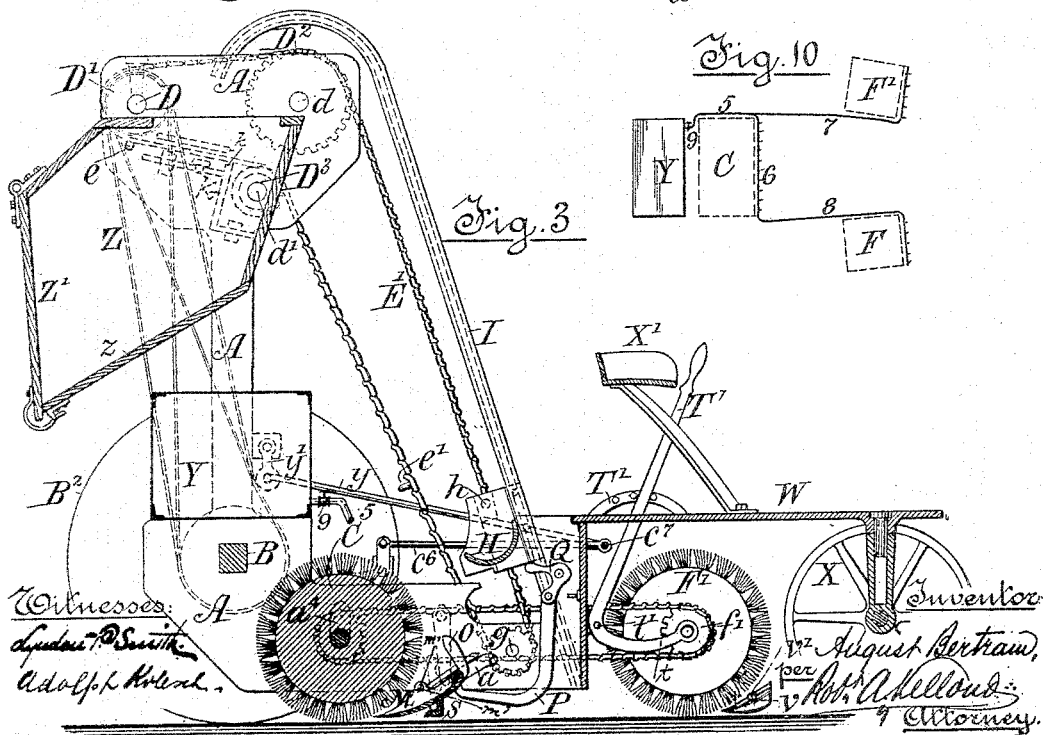
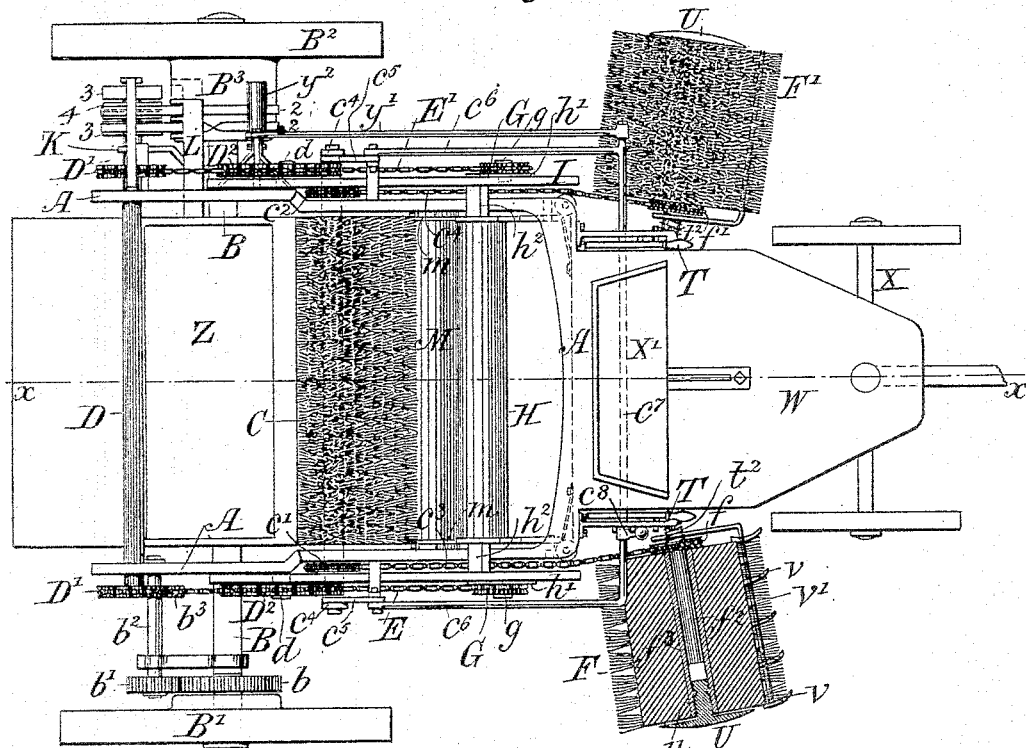
2 Sheets—Sheet 1.

A. BERTRAM.
STREET SWEEPING MACHINE.

No. 491,278.

Fig. 1

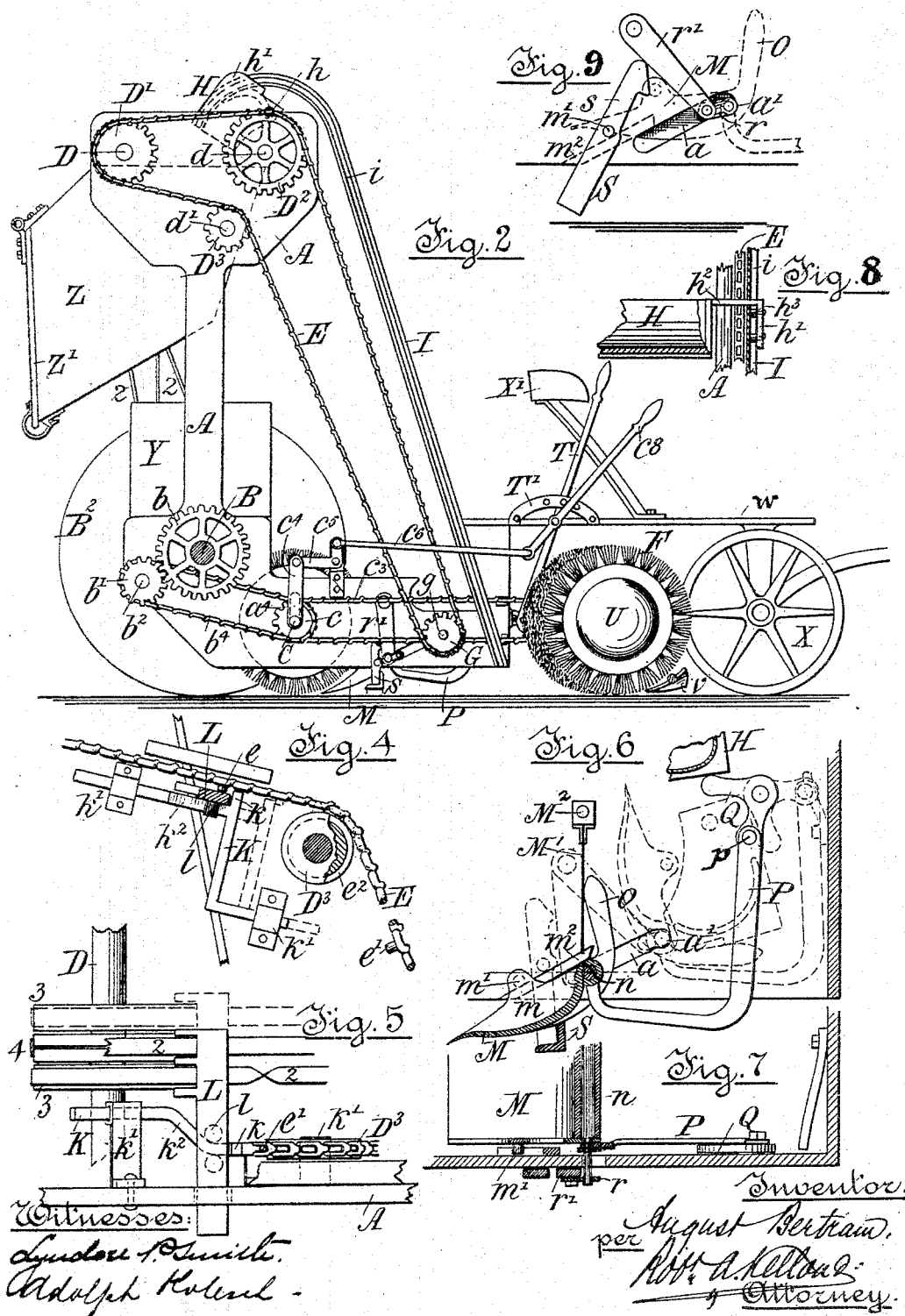
Patented Feb. 7, 1893.



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UNITED STATES PATENT OFFICE.

AUGUST BERTRAM, OF BROOKLYN, NEW YORK.

STREET-SWEEPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 491,278, dated February 7, 1893.

Application filed August 11, 1891. Renewed August 1, 1892. Serial No. 411,876. (No model.)

To all whom it may concern:

Be it known that I, AUGUST BERTRAM, a citizen of the United States, residing in the city of Brooklyn, Kings county, in the State of New York, have invented certain new and useful Improvements in Street-Sweeping Machines, of which the following is a specification.

This invention relates to street sweeping machines, and is designed for the purpose of performing the work in a thorough and expeditious manner, for lessening the number of hands usually employed in gathering and removing the sweepings, and thus economizing in cost of the service.

To this end, my improved machine embodies means for properly sweeping the gutter on either side of the street as well as a considerable portion of the center, the brooms being adjustable so as to adapt them to the curve of the road from gutter to center,—as well as to permit the machine to travel with the brooms clear of the roadway.

The machine also includes a receptacle for the sweepings which are automatically gathered up and deposited therein at proper intervals as the work proceeds,—to be afterward dumped directly into a cart and drawn away. A sprinkling device is also provided for dampening the ground in front of the brooms whenever the nature of the dust may require it.

Certain novel details of construction, combinations and arrangements of parts and specific elements also form important parts of my street sweeper which operate for the most part automatically and under control of only one man who also drives the horses.

All of the above features are thoroughly described in the following detailed description, having reference, however, to the accompanying drawings forming part of this specification.

Similar letters and figures of reference indicate like parts.

In said drawings:—Figure 1 is a plan view of my street sweeping machine. Fig. 2 is a side elevation of same with the near wheel removed. Fig. 3 is a section taken on the line *xx* in Fig. 1. Figs. 4 and 5 are respectively a side and plan view of my belt-shifting device. Figs. 6 and 7 are details show-

ing collecting and elevating troughs in cross-section, tripping devices &c., in different positions. Fig. 8 is a detail showing relations of trough extension and side frame. Fig. 9 is a detail showing action of guard and collector-trough. Fig. 10 is a diagram illustrating sprinkling device.

A represents any suitable three-sided frame extending along the sides and front of the machine, and affording bearings or journals for the main axle B, which carries a pair of wheels B' B², the main brush C, the pulley-shaft D, and certain sprocket-wheels,—and also supporting a dust receptacle Z and other devices, as will be hereinafter fully explained.

The main axle B is stationary and one wheel B' carries the driving gear *b*, which meshes with another gear *b'*, mounted on a short shaft *b*², supported from the frame and axle;—the same shaft also carries a sprocket-wheel *b*³ an endless drive-chain *b*⁴ leading from this to a sprocket-wheel *c*, fixed on the shaft of the main brush C. This latter shaft also carries sprocket-wheels *c'*, *c*², from which are endless chains C³ and C⁴ to engagement with sprocket-wheels *f* and *f'*, these being mounted respectively on inner ends of two side brushes F and F'. The paths of these brushes are forward of and to the right and left, respectively, of the main central brush C, in such manner that they practically extend the path being swept to double the width of that covered by the main brush, one side brush being generally used to sweep the gutter of the street, while the other may or may not be employed at the same time to assist the main brush on the level. For this purpose these side brushes are made adjustable, as will be further described. The running-wheel B² on the other end of the axle and at the opposite end of the machine, carries a drum B³ around which pass belts 2, 2, (one being crossed) to pulleys 3, 3, and 4 (the latter being a loose pulley and preferably made in two sections to insure rapidity of operation, as indicated by dotted lines in Fig. 1, and full lines in Fig. 5,) these pulleys being carried by the pulley-shaft D, near one end, which shaft is journaled in the upper parts of the side frames A, as shown. The shaft D has also fixed thereupon two sprocket-wheels D' D', the same being located preferably just outside of the side

frames A,—and upon short spindles $d, d,$ and d', d' , fixed in the side frames are mounted other sprocket wheels or pulleys $D^2, D^2,$ and D^3, D^3 , one pair at each side, and endless drive chains E, E', one at each side of the machine, pass around the wheels D', D^2, D^3 , (one of each) and thence downward around pulleys, or sprocket wheels G G, carried loosely on spindles g, g , fixed on the lower forward part of the frame, one at each side.

Both of the endless chains are fixed by pins h to the end plates h' of extensions h^2, h^2 , of an elevator-trough H, which carries the sweepings to the dust receptacle Z, in such manner that at the proper intervals these chains will alternately raise and lower said trough. This elevator trough lies transversely of the machine, being about the same length as the main brush C, and the extensions h^2 lying beyond the end plates proper of the trough, are forked as shown in the detail, Fig. 8, so as to straddle the side frames A and allow said trough to come well down between and clear of such side frames, into position for receiving the sweepings.

The end plates h' are provided with small rollers h^3 , which extend into grooves i , formed in guide-bars I, I, running upward from the front part of each side frame A, in a rearwardly slanting direction to a junction with the extreme top parts of such frames the upper ends of such guide-bars being curved so as to permit the elevator trough H to turn upside down and empty its contents into the receptacle Z.

Upon the endless chain E', (that nearest the pulleys 3, 3, and 4) I fix, at a proper distance apart, two projecting pins e, e' , adapted to strike alternately on each side as the chain moves in one direction or the other, against a projection k formed on the upper side of a bar K carried by and sliding in guide-sockets k', k' , fixed upon the outer face of the side frame A. This bar K has a double bend near its middle so as to form a short incline k^2 upon which will play two small rollers l, l , pinned to the belt-shifting bar L, which crosses the bar K at right angles, i, e , parallel to the pulley-shaft—and has the usual fingers at its end for embracing the belts 2, 2.

The pulley D^3 over which that part of the chain E', which carries the pins e, e' , travel, is preferably grooved in the center, as shown at e^2 in Fig. 4, so that said projecting pins may not impinge thereupon.

The elevator trough H, is fed or filled by a collector trough M, which lies normally just between the main brush C, and the elevator trough, its edge coming well under the front part of the brush and close to the ground. The end plates m, m , of the collector trough have short projecting pins m' which act as supports for the trough and travel upon inclines m^2 formed on the inner faces of the side frames A.

The collector trough is hung upon a rod n the ends of which play in slots a, a , formed

in the side frames,—these slots being slanted to about the same angle as the inclines m^2 , and each provided with a depression or pocket a' , at its extreme upper end, into which the shaft n will drop and find a bearing upon which the collector trough can turn while emptying its contents into the elevator trough, as shown by the dotted lines in Fig. 6. The end plates m of the collector trough are extended for some distance beyond the shaft n , so as to form tripping-arms o , against which the end-plates proper of the elevator trough H will strike as it assumes its lowest position, and thus turn the collecting trough M over into the position required for emptying the contents of the latter into the former. (See dotted lines, Fig. 6.)

Close to the side frames A at each side of the machine, the rod n carries one end of a curved or two-armed lever P, its other end or arm extending upward and being pivoted at p to one arm of a bell-crank shaped trip-lever Q, which is in turn pivoted to the side-frame, its other arm lying in position to be tripped by the descent of the elevator trough H, and thus have the effect of raising and retiring the lever P, which in turn draws upon the rod n and collector-trough M, until said rod drops into the pockets of the slots a, a , when the farther descent of the elevator-trough effects the turning over of the collecting-trough, as already described.

Upon each of the extreme ends of the rod n , and outside of the frames A, A, is mounted a short link r , which is also pivoted to the lower end of another link or pin r' which, normally, hangs vertically and is in turn pivoted to the side frame. In close proximity to the arm r' , I pivot to the side frames, one at each side, short levers s which serve as end pieces for a swinging guard S, which extends across the machine immediately in front of the collector-trough M, so that its cross-bar (the guard proper) will closely approach the ground and encounter any obstacle, such as a stone, lying in the path of the collector-trough and main brush C, and by means of the upper ends of the short levers s , impinging upon the links or arms r' , whenever the obstacle is struck by the guard S, said collector-trough is raised and retired out of the way until the obstacle is passed. The operation is such as to cause the journals of the shaft or rod n to move upward in the slots a, a , and again move down when the guard S assumes its normal position. The above is clearly shown in the detail Fig. 9.

In order to prevent the sweepings from the main brush being projected beyond the collector-trough M, I hang a curtain M' of tarpaulin or other suitable flexible material, upon a rod M^2 extending between the side frames about in the same vertical line as the shaft of the trough,—such curtain serving to deflect the flying sweepings downward into the trough.

The side brushes F and F' are preferably

set slightly diagonal, as shown in Figs. 1 and 2, so as to direct their sweepings toward the center or into the path of the main brush C. They each revolve upon an axle f^2 extending into a suitable internal sleeve f^3 for the greater portion of its length, and this axle forms rigid connection with an arm t of a hand-lever T pivoted at t' to the front part of the frame A of the machine, the pivot point or fulcrum being so situated to the rear of the brush as to insure the lifting of the brush in a vertical line, when it is desired to put the brush out of operation. The brush axles may have springs t^2 on their inner ends with such play that the normal position of the brushes may be immediately regained after they have met with any obstacle such as a projecting curb-stone, and I preferably provide each side brush with a wearing plate or disk U, capable of revolving when the outer end of the brush may be rubbing against the curb-stone in sweeping a gutter; this wearing plate has a short spindle u entering the sleeve or bore out by any suitable means such as a collar and groove as shown in the sectional part of Fig. 1. The side brushes are also provided at the front with deflectors v, v' of suitable curve to assist in directing the sweepings toward the center. These are preferably of metal with lower extensions of sheet rubber so that they may easily ride over stones and the like,—and are carried by a rod v' fixed to the axle f^2 , so that they may move with the brush as the same is raised and lowered by the hand-lever T. This hand-lever is locked upon a suitable rack T', mounted upon a front platform W, extending forward from the frame A. X is a suitable forward truck with two wheels, properly connected with said platform, and X' is the driver's seat mounted thereupon. The main brush C is also adjustable vertically, its axle playing in vertical slots a^4 in the side frames A,—such axle having links c^4 , connected to each end which again join bell-cranks c^5 pivoted to the side frames, and the opposite arms of such bell-cranks are connected with rods c^6 which join a cross-bar or rod c^7 extending across the front of the machine. A suitable hand-lever c^8 is fixed to this cross bar within reach of the driver, by pulling upon which he can raise the main brush clear of the ground. By means of a suitable rack not shown said lever may be locked. Upon the end of the same cross-bar c^7 I mount a rod y which extends along the side of the machine toward the rear where it joins a short arm y' pivoted to the frame and carrying a roller y^2 adapted to impinge against and tighten up the belts 2, 2, when the machine is sweeping, and to be thrown off when the brush is raised and the machine put out of work. The one movement of the hand lever c^8 thus effects the two purposes.

The dust receptacle Z is braced between the

framing of the machine in any suitable manner, not shown,—and is provided with a slanting bottom z , and a hinged door Z' having any suitable fastening device—the height of said receptacle being preferably such as will allow a cart to be conveniently backed underneath.

At any convenient height and in any suitable position within the framing A, I may locate a water tank Y, from which pipes and branches 5, 6, 7, 8 lead to the fronts of the main and side brushes, and provide the same with a suitable cock 9, in control of the driver, as seen in Fig. 10. The sprinkling device thus provided is specially intended for use whenever the dust of the road is exceptionally dry and liable to be blown about,—but water may always be turned on at the discretion of the driver.

The operation of my improved street-sweeping machine is as follows:—The different hand-levers having been released, allowing the brushes to rest upon the ground, and the belt-tightener thrown into contact with the belts 2, 2, the horses are started and the wheels B', B², commence to revolve and communicate motion to the main brush C, through the gears b and b' , sprocket wheels b^3 and c , and endless chain b^4 , and said main brush driving the side brushes F, F, by the chains and sprocket wheels described. Simultaneously motion is communicated to the pulleys 3, 3, by the belts 2, 2, from the drum B³, and the pulley shaft D revolves and through its sprocket wheels D', D', causes the chains E, E', to travel. The elevator trough H being properly at the top end of the ways I when the machine was stopped, and the belts having been left on the pulleys in the position which brought such elevator to that point, the projection e on the chain E' will soon strike against the stop k on the sliding bar K and by causing the inclined portion k^2 to travel between the rollers l, l , on the belt-shifter L, so moves the latter as to immediately transfer the belts to the reverse pulleys, and the chains will travel until the elevator trough is brought down to position in front of the collector trough, and through the tripping mechanism described receives the sweepings meanwhile swept into such trough M by the main brush. When this is accomplished the chain E' will have traveled far enough for the other projection e' to strike the stop k on the opposite side and move the bar K, and belt shifter L in the other direction to reverse the position of the belts with relation to the pulleys, that is to say, effects the transfer of the crossed belt from the loose pulley to a fast pulley, and the straight belt from the latter to the former, or vice versa, and thus reverses the motion of the pulley shaft, its sprocket wheels, and the chains E, E', and these latter pull the elevators up to the top of the guides I. It there empties its contents into the receptacle Z, and the brushes keep on sweeping until the belts

are again reversed and the elevator trough again arrives at the bottom of its travel to receive another load from the collector.

While the devices and arrangements above described in detail go to make up an operative machine of simple construction, I wish it to be understood that I do not limit myself to the precise construction or arrangement set forth,—as I may considerably vary the details and substitute equivalent elements and combinations of working parts without departing from the principles or sacrificing the advantages of my invention.

What I claim is as follows:

1. In a street sweeping machine, the combination with a pair of wheels and a suitable frame, of a revolving brush or broom, a collecting trough arranged in front of said brush or broom adapted to receive the sweepings directly therefrom, an elevating-trough adjacent to said collecting-trough and fed by same, and a receptacle into which said elevating trough dumps its load, all arranged substantially in the manner specified.

2. The combination with the collecting trough, of a yielding guard located in front of same, and connections between said guard and trough, whereby the trough is automatically raised clear of any obstruction met with by the guard, substantially as described.

3. The combination with the side brush F having internal sleeve f^3 and axle f^2 , of the hand lever T, pivoted to the frame and in rigid connection with said axle, substantially as and for the purpose set forth.

4. The combination with the side brush and its axle, of the bar or rod v' and deflector v , v , for the purpose described.

5. The combination with the wheel B², having drum B³ and frames A, A, of the pulley shaft D, pulleys 3, 3, and 4, and sprocket wheels D', D', mounted thereon, belts 2, 2, between said drum and pulleys, chains E and E', and suitable guiding pulleys therefor, pulleys or sprocket wheels g , g , elevating trough

H, ways or guides I, and connections between said trough and the chains, all combined and arranged so that said elevating trough may be automatically raised and lowered in said ways or guides at proper intervals, substantially as and for the purpose specified.

6. The combination with the side frames A, having slots a , formed as described, and inclines m^2 , of the rod n , collecting trough M, having projecting pins m' and tripping arms O, pivoted lever P, bell-crank trip lever Q, and the elevating trough H, all combined and arranged so that at each descent of the elevating trough the collecting trough will be raised and its contents emptied into such elevating trough, substantially in the manner described.

7. The combination with the belts 2, 2, of the tightening device consisting of roller y^2 , rod y' , cross-bar c^7 , and hand lever c^8 , said cross-bar and hand lever being also used for adjusting the main brush, as described.

8. The combination with the pulleys on the pulley shaft and with the belts and the chain E', having projecting pins e and e' , of the belt-shifting device consisting of sliding bar K, having incline k^2 and projection h' and bar L, engaging the belts and having rollers l , l , impinging upon said incline, substantially in the manner set forth.

9. The combination with the side or gutter brush having internal sleeve f^3 of the wearing plate or disk U, having spindle u entering said sleeve, and means for retaining same loosely, arranged so that said wearing plate 80 may revolve, and act as a fender for the gutter brush, substantially as set forth.

10. The combination with the said frames A, A, main brush C, and the collector-trough M, of the curtain M' and its rod M², for the purpose described.

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Witnesses:

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