April 20, 1965 S. VOELSTAD 3,178,746

STREET CLEANING EQUIPMENT

Filed Oct. 3, 1962 2 Sheets-Sheet 1

Fig. 1.

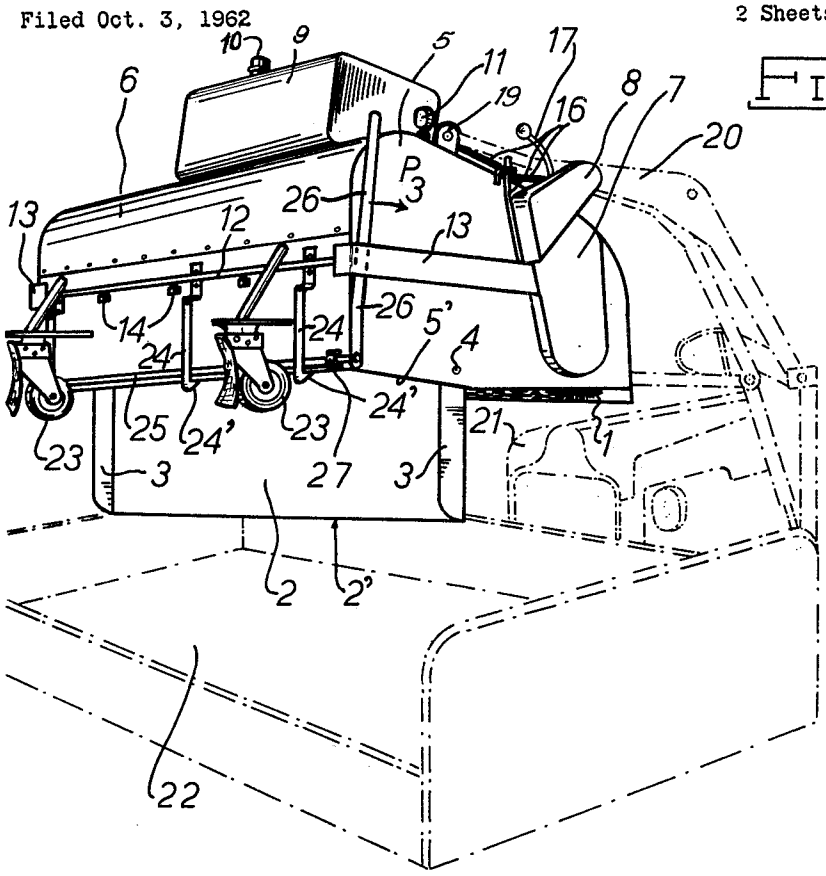
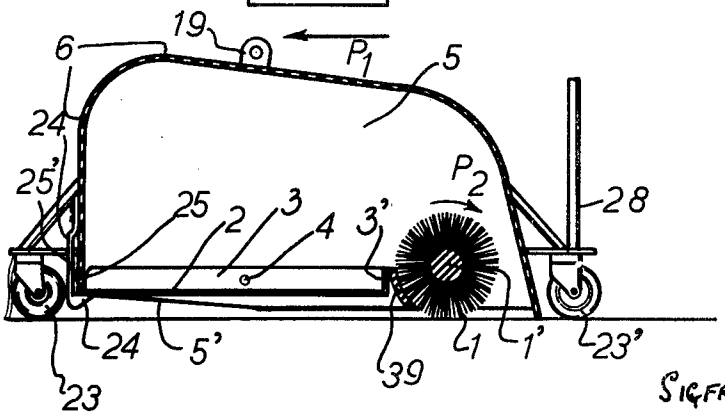



Fig. 2.




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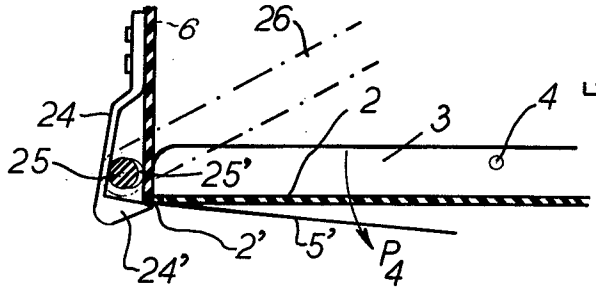
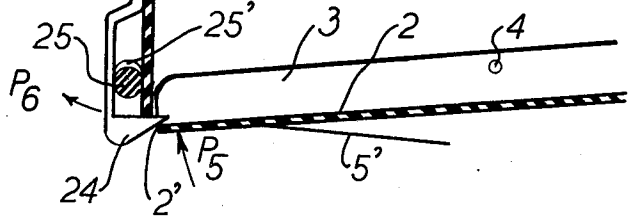



FIG. 3.

FIG. 4.



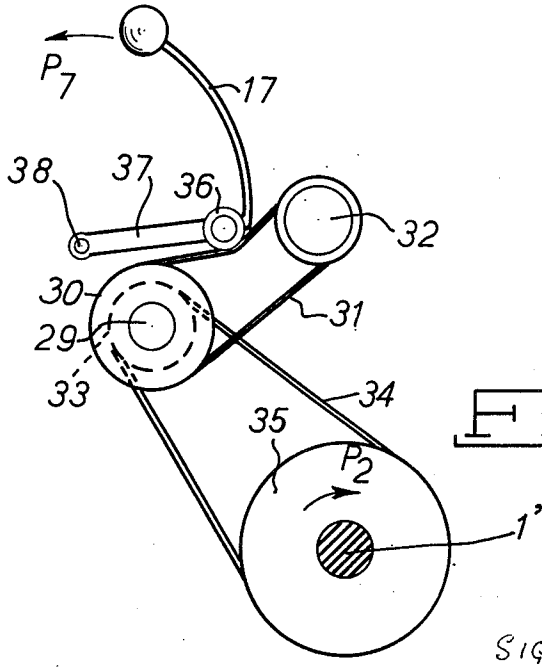




FIG. 5.

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# STREET CLEANING EQUIPMENT

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5 Claims. (Cl. 15—83)

The present invention concerns street cleaning equipment and its primary object is to provide a machine of simple and cheap structure which will sweep up dust, trash and other debris from the street as the machine travels therealong and will deposit the swept up material continuously in a receptacle for periodic dumping as required.

I am, of course, aware that there have been machines for this general purpose but in accordance with my invention I provide a greatly simplified machine, the machine being both simple in structure and easy to handle, as well as the efficiency of the machine being very high. I provide a machine embodying a sweeping brush and receptacle for accumulating the material and mount this assembly upon a vehicle in such a manner that it may be elevated relative to such vehicle and the receptacle tilted over to dump the accumulated material directly into a transport or dump truck.

An important object of my invention is to provide a simple tiltable receptacle which is maintained in its debris receiving position by means of easily releasable locking means, said tiltable receptacle being formed and arranged in such a manner relative to its tilting axle that when released from said locking means it automaticaly tilts over into its dumping position. For this purpose I mount a receptacle of generally rectangular shape comprising a flat bottom and flat upstanding longitudinal side walls and one end wall adjacent the rotary brush on its tilting bolts on the main frame of the machine in such a manner that the part of the receptacle having no end wall is heavier than the other part relative to the tilting axle.

In accordance with my invention I provide locking means maintaining the receptacle in the debris receiving position comprising flexible members attached to the main frame adjacent the dumping edge of the receptacle, said flexible members having free hookshaped ends engaging said receptacle. The receptacle is released from engagement with said hookshaped locking members by forcing the latter away, which is allowed by the flexibility of their material (spring steel), whereby the receptacle automatically tilts over to its overweighted side of the tilting axle and in a generally vertical position with its end wall free edge lowest dumps the accumulated debris.

The above-mentioned and more detailed and specific objects will be disclosed in the course of the following specification reference being had to the accompanying drawings, in which—

FIG. 1 is a perspective view of a street sweeper according to my invention, the sweeper being elevated by means of the conventional lifting arms of an ordinary tractor and being placed over the loading area of a transport truck with the receptacle in its dumping position (the tractor and the loading area being shown with dotted lines); the sweeping machine being provided with a water spraying system comprising a water tank, a pump, spray pipes with nozzles; these parts not being shown in the FIGURES 2, 3 and 4.

FIG. 2 is a longitudinal sectional view of the street sweeper with the receptacle in its debris receiving position.

FIG. 3 and FIG. 4 are enlarged fragmentary longitudinal sectional views partially broken away to better illustrate the construction of the receptacle and its locking members (the locking members in these figures have somewhat shorter length than those shown in FIGS. 1 and 2). FIG. 3 shows the parts in a position just after the receptacle has been released from the locking means, but before the tilting movement of the receptacle has started. FIG. 4 shows the parts in a position with the hookshaped members in their locking position and just before the empty receptacle is forced into its debris receiving position.



FIG. 5 shows diagrammatically the driving motor and transmission means for the rotary brush and the water pump.

Referring now more particularly and by reference characters to the drawings, I have shown my improved street sweeper mounted forwardly on a conventional tractor **21** and further illustrate the tractor as equipped with verticaly movable arms **20**. It is sufficient for purposes of the present disclosure to state that the sweeping machine is provided with fastening ears **19**, to which the outer ends of the lifting arms **20** are releasably mounted.

The street sweeper comprises a main frame or casing of plate material having opposite side walls **5** and a curved roof, front and rear wall **6**. A large, circular street sweeping brush **1** with a central axial shaft **1'** is mounted in bearings (not shown) on the inner side of the side walls **5** of the frame. A sweeping tray **39** shaped to make close contact with the circumference of the brush **1** is welded to the innerside of the walls **5** and extends parallel to and in the entire length of the brush. The tray **39** extends upwards to about the half height of the brush **1**. A receptacle of generally rectangular shape comprising a flat bottom **2** with upstanding side walls **3** and one end wall **3'** is mounted in front of the brush **1** and the tray **39** on tilting bolts **4** extending through the side walls **5** of the frame. The height of the receptacle is about the same as that of the tray **39** and it extends with its end wall **3'** close to said tray **39** and with its opposite end **2'** close to the lower edge of the frame front wall **6**. The front part of the receptacle relative to the tilting axle **4** is heavier than the rear part with the end wall **3'**.

The frame or casing **5, 6** is provided with road wheels **23, 23'** and surrounds the brush **1** and the tiltable receptable **2, 3, 3'** from above.

A water tank **9** with a filling opening **10** is placed on and welded to the top of the main frame **6** and spray pipes **12** are arranged around the machine, and these spray pipes **12** on the underside are provided with nozzles **14**. The spray pipes on the longitudinal sides **5** of the machine are housed in casings **13**. The spray pipes **12** are fed with water under pressure from the water tank **9** by means of a pump **32** via pipes **16**.

With reference now to FIG. 5, a rotary motor **29** is arranged on the frame for driving both the brush **1** and the water pump **32** via chains **31, 34** and chain wheels **30, 33, 35**. A jockey pulley **36** on a tiltable arm **37** which is pivotally mounted at **38** and has a handle **17** arranged for assisting the driving of the water pump and to allow stopping the same. These transmission means are housed in casings **7** and **8**.

On the outside of the front wall **6** are mounted three vertical locking members **24**, whose free ends **24'** extend downwards adjacent the lower edge of the front wall **6**, said ends **24'** being hook shaped and intended for engagement with the bottom of the receptacle near its "dumping" edge **2'**. The undersurface of said hook shaped ends **24'** inclines upwards and backwards. The locking members **24** are made of spring steel and in order to provide the required flexibility the shafts of the members **24** are bent outwards and downwards from their fastening point on the main frame.

A shaft **25** rotatable in bearings **27** is mounted between the locking members **24** and the adjacent part of the front wall **6**, this shaft **25** being circular and provided with enlarged portions or cams **25'** in the area of the locking members **24**. The cams **25'** extend over about ¼ of the circumference of the shaft **25**. In the normal position

of the shaft **25**, i.e. when the locking members **24**, **24'** engage the receptacle, these cams **25'** have no contact with the front wall **6** or the members **24**. The circular shaft **25** has a press fit between the inner side of the locking members **24** and the outside of the front wall **6** of the frame.

An upright handle **26** is rigidly attached to one of the outer ends of the shaft **25** for turning the shaft **25** when desired.

My new and improved street sweeper operates as follows:

Being arranged for upwards and downwards movements by attachment to the lifting arms **20** of a tractor **21**, the street sweeper is positioned as shown in FIG. 2 with its road wheels **23**, **23'** and circular brush **1** in contact to the streetway.

The motor **29** rotates the brush in the direction indicated by the arrow $P_2$ as the tractor moves the machine in the direction of the arrow $P_1$, whereby the brush sweeps debris from the street up along the sweep tray **39**, wherefrom the debris arrives in the receptacle **2**, **3**, **3'** where it is accumulated during a period of sweeping. The surrounding frame **5**, **6** will prevent dust from being thrown upwards or sidewise relative to the machine and the water spraying system will also aid to prevent turbulence of dust. Assuming the receptacle to be satisfactorily filled with accumulated debris, the machine is elevated to the position shown in FIG. 1, i.e., just above the loading area **22** of a transport truck (not shown), whereafter the handle **26** is moved in the direction indicated by the arrow $P_3$, whereby the shaft **25** is turned to the position shown in FIG. 3, so that the cams **25'** are brought into contact with the outside of the front wall **6** of the main frame and hence enlarging the distance between the wall **6** and the flexible locking members **24**, thus causing the members **24** to spring forwards ($P_6$) and disengage the receptacle **2**, **3**, **3'** (see FIG. 3). Being thus released, the receptacle tilts in the direction of the arrow $P_4$ and down to vertical dumping position (FIG. 1), whereby the debris slips out of the receptacle and into the loading area **22** of the truck. The tilting movement is caused by the fact that the receptacle is heavier on the front side of the tilting axle **4**.

The handle is thereafter moved forwards, whereby the locking members **24** return to their original position (FIG. 4).

After being emptied, the receptacle is forced in the direction of the arrow $P_5$ whereby the "dumping" edge **2'** of the flat bottom **2** slides over the inclined under surfaces of the hook shaped ends **24'** and thus causing the flexible members **24** to spring forwards ($P_6$) for a short moment until the receptacle has taken its debris receiving position (FIG. 2) once more.

In order to prevent the machine tilting forward during elevation, a vertical rod **28** is arranged for co-operation with a corresponding cross member extending between the lifting arms **20** of the tractor. When the top of the rod **28** engages said cross member, the rod transfers some of the weight of the sweeping machine to the lifting arms **20** to a point more rearward than the fastening points **19** and thus ensures that the machine maintains a generally horizontal position during the upward and downward movements.

It is to be understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appending claims.

I claim:

1. A street-sweeping machine adapted for mounting on the lift arms of, and propulsion by, an automotive vehicle, comprising, a casing having a top, front, rear and side walls depending from said top, to form a unitary, open-bottom casing having lower edges lying in a normally-horizontal first plane, a rotary brush journaled in said casing, between said side walls and adjacent said rear wall



for rotation about a normally-horizontal first axis, a pan having a bottom mounted in said casing between said side walls, and between said brush and front wall, for pivoting about a second axis parallel with said first axis and adjacent said plane, from a first position in said plane to a second position normal thereto, said pan being urged to second position, latch means carried by said front wall and resiliently urged into position engaging and releasably holding said pan in its said first position, and means carried by said casing and operable positively to move said latch means out of holding engagement with said pan for movement to said second position.

2. The machine of claim 1, said latch means comprising a plurality of latches each having a resilient shank fixed at one end to said front wall, in spaced relation therealong, each said latch having its mid-portion offset from said front wall and terminating at its other end in a hook resiliently and yieldably urged to position releasably engaging beneath the front edge of said pan when the same is in first position, a shaft journaled on said front wall and extending horizontally therealong between said wall and each offset portion of said latch, said shaft including eccentric cam means operable in response to rotation of said shaft to simultaneously force all said hooks free of said pan.

3. The machine of claim 2, each said hook having an upwardly and rearwardly inclined cam edge engageable by said pan as the latter is swung to first position, to thereby simultaneously cam all said hooks forwardly.

4. A street-sweeping machine adapted for mounting upon the lift arms of, and propulsion by, an automotive vehicle, a casing having a top, and front, rear and side walls depending from said top to define an integral unit having an open bottom, to lower edges of said walls being substantially horizontally coplanar, a rotary brush journaled in said casing between said side walls and adjacent said rear wall, for rotation about a normally-horizontal first axis, a pan having a bottom normally in the plane of said edges and mounted between said side walls for pivoting about a second axis parallel with said first axis, adjacent said plane and mid-way between the front and rear edge of said pan, said pan being urged about said second axis, from a first position substantially in said plane, to a second position normal thereto, said pan when in said first position having its rearward edge contiguous and parallel with said brush, and latch means carried by said casing and releasably engageable with and holding said pan in said first position, and spaced lugs fixed to said top wall for connecting said machine with the respective distal ends of lift arms of an automotive vehicle, said lugs being aligned in and along a normally horizontal third axis above said second axis.

5. A street-sweeping machine adapted for mounting upon the lift arms of, and propulsion by, an automotive vehicle, a casing having a top, and front, rear and side walls depending from said top to define an integral unit having an open bottom, the lower edges of said walls being substantially horizontally coplanar, a rotary brush journaled in said casing between said side walls and adjacent said rear wall, for rotation about a normally-horizontal first axis, a pan having a bottom normaly in the plane of said edges and mounted between said side walls for pivoting about a second axis parallel with said first axis, adjacent said plane and mid-way between the front and rear edge of said pan, said pan being urged about said second axis, from a first position substantially in said plane, to a second position normal thereto, said pan when in said first position having its rearward edge contiguous and parallel with said brush, and latch means carried by said casing and releasably engageable with and holding said pan in said first position, said pan including a bottom essentialy coplanar with the pivot axis thereof, and an upstanding rear wall closely adjacent said brush, and an

elongated tray carried by said side walls with its upper edge flush with the upper edge of the rear wall of said pan, said tray being arcuate in cross-section to closely follow the contour of said brush, downwardly and rearwardly.


References Cited by the Examiner

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 797,794 | 8/05 | Currie et al. | 298—26 |
| 1,892,347 | 12/32 | Jerome. | |
| 1,975,380 | 10/34 | Streich | 15—50 X |
| 2,298,054 | 10/42 | Howell | 15—83 |
| 2,697,846 | 12/54 | Wilcox | 15—83 |
| 2,732,572 | 1/56 | Dunham | 15—79 |
| 2,783,487 | 3/57 | Luders | 15—41 |
| 2,986,755 | 6/61 | Sobie et al. | 15—41 X |

FOREIGN PATENTS

| | | |
|---|---|---|
| 508,224 | 6/39 | Great Britain. |




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