United States Patent

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[45] **Jan. 25, 1972**

[54] RUNWAY OR STREET SWEEPER

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[73] Assignee: **Wayne Manufacturing Company,** Pomona, Calif.

[22] Filed: **Nov. 20, 1969**

[21] Appl. No.: **878,325**

[52] **U.S. Cl.**.....**15/340,** 15/83, 15/375, 15/368

[51] **Int. Cl.**.....**E01h 1/08**

[58] **Field of Search**.....15/82, 320, 340, 345, 347, 15/354, 355, 368, 375

[56] **References Cited**

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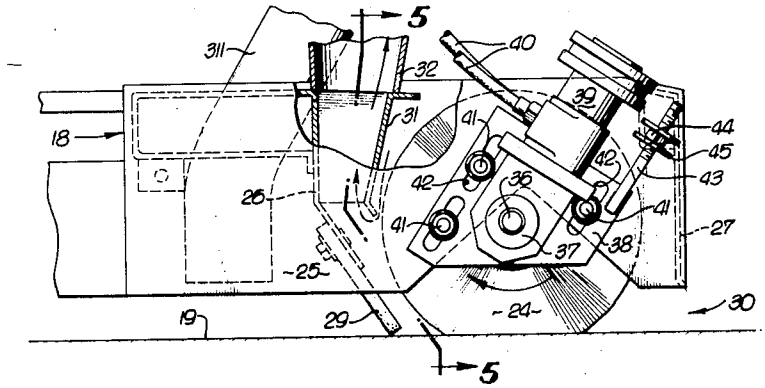
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[57] **ABSTRACT**

In distinction to a conventional powered road sweeper having its pickup broom operating in a chamber under conditions such that the broom tends to create a slipstream carry over of some of the sweepings, this tendency is minimized in the present structure employing an open bottom broom-containing suction hood beneath the sweeper vehicle and having an open top through which airflow is induced into the broom chamber, nullifying the stated slipstream effect and otherwise simplifying the construction and maintenance of the broom chamber and related parts.

7 Claims, 6 Drawing Figures



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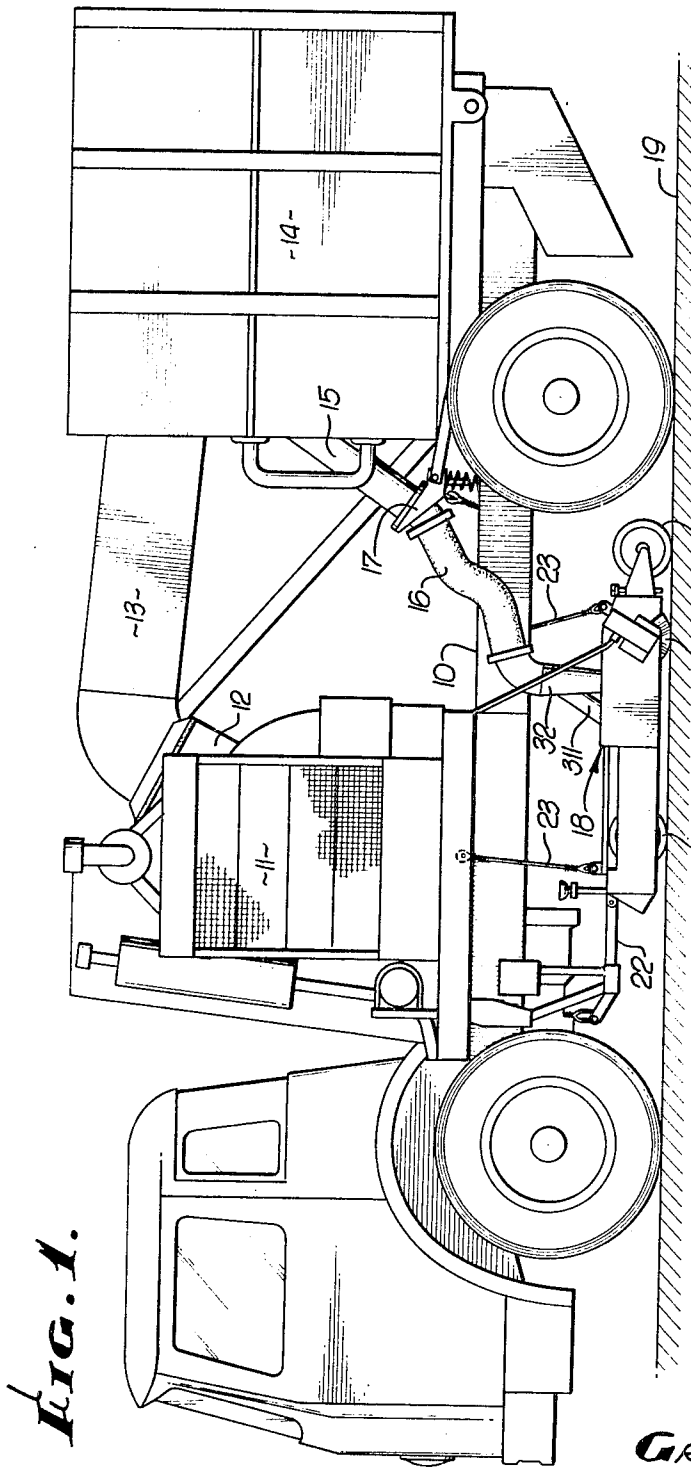


FIG. 1.

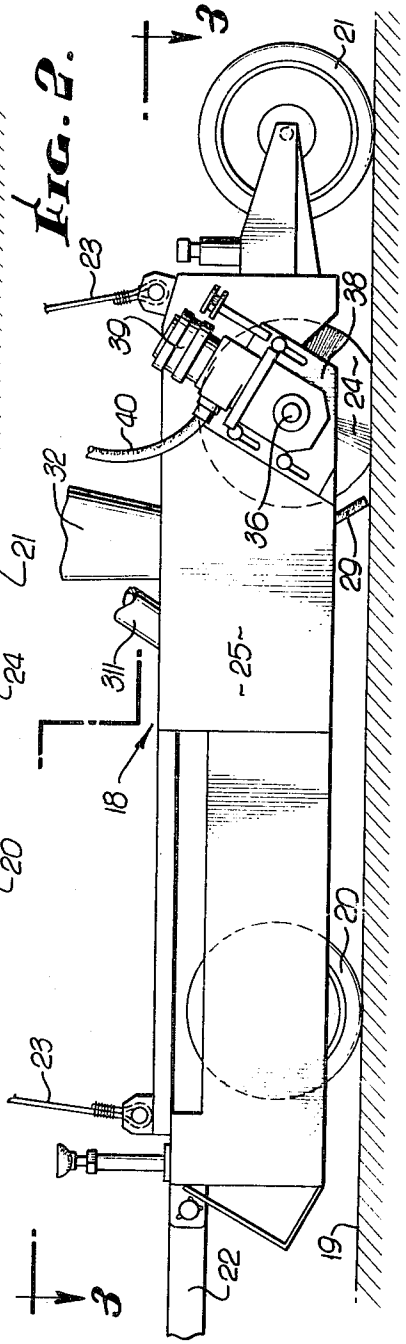
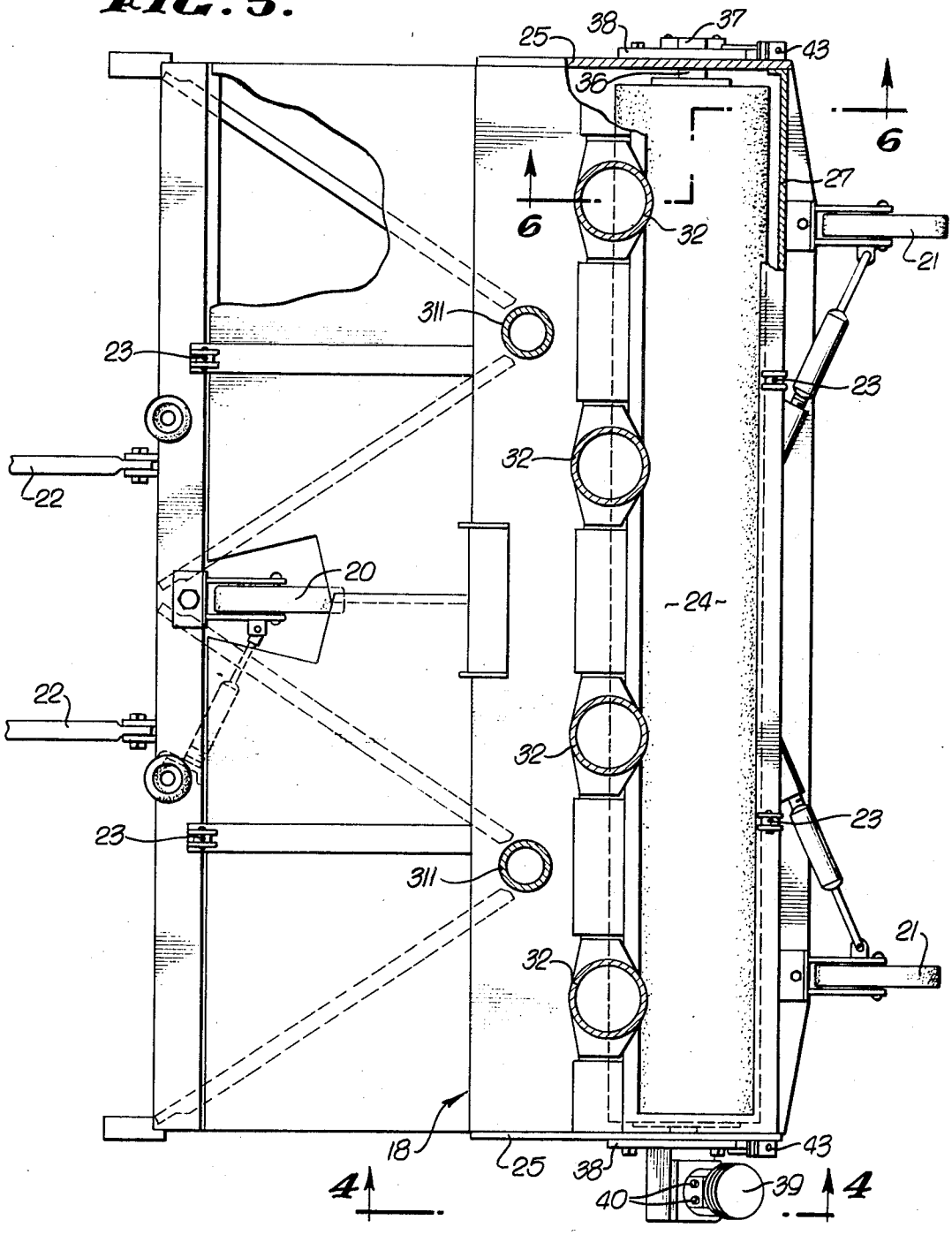


FIG. 2.

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FIG. 3.



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FIG. 4.

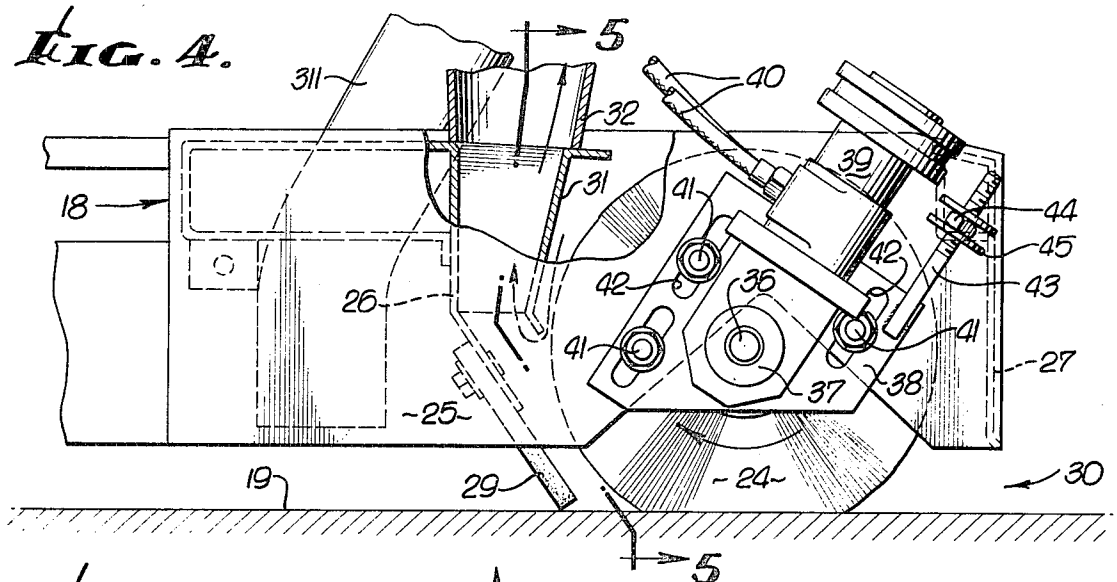
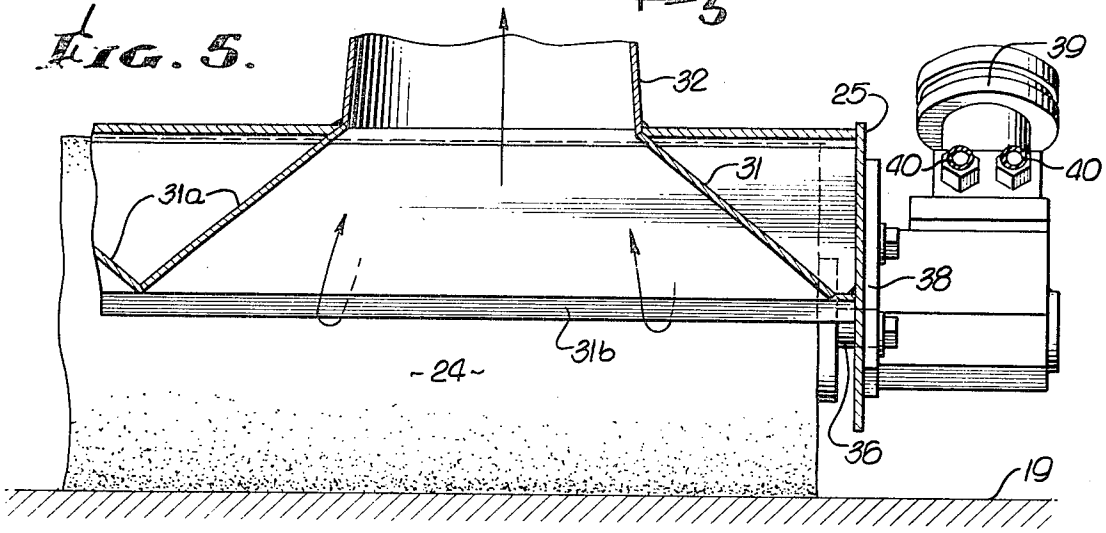


FIG. 5.



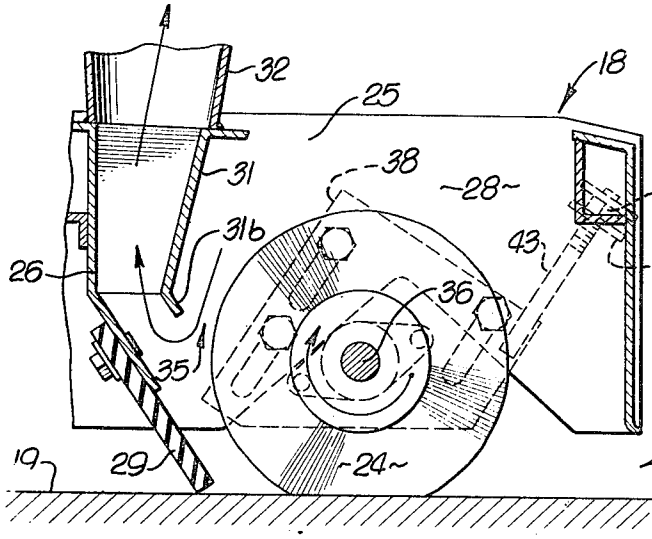


FIG. 6.

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RUNWAY OR STREET SWEEPER

BACKGROUND OF THE INVENTION

In conventional road sweepers of the present type a generally cylindrical pickup broom is power driven for rotation within a chamber, the top and rear sides of which are defined by a shroud or arch spaced about the broom, the broom chamber having an air seal in the form of a road-engaging flap forwardly of the broom, and the rear of the chamber being partially sealed by a broom-engaging adjustable deflector strip mounted for clearance above the road surface. Suction is communicated to the chamber forwardly of the broom to entrain and carry its sweepings to a debris receptacle.

In this environment, rotation of the broom causes it to have a pumping action so that while most of the swept debris is induced into the suction airstream, some of the sweepings follow the slip stream of the broom. The quantity of debris that otherwise would be carried by the slip stream is limited by effect of the deflector strip at the rear of the broom to reduce the slip stream velocity and its particle-carrying capacity. Such limitation however is incomplete, and residual debris carried by the slip stream deposits on the deflector strip and is then carried between the broom bristles and introduced into the in-flowing airstream which reaches the broom through the road clearance at the rear.

This conventional system presents a number of problems in maintenance of vacuum in the broom chamber. Being in contact with the extremities of the broom bristles, the deflector strip undesirably increases the broom wear rate. Also the width of the gap between the broom and its housing arch increases as the broom wears, and as a result, reduction of the slip stream velocity by the deflector strip becomes less effective and the broom tends to carry over or recycle more debris which again must be handled by the broom.

SUMMARY OF THE INVENTION

The present invention has for its general object to obviate such limitations in the conventional broom accommodation by assuring high sweeping efficiency throughout the life of the broom, reduction of service costs by elimination of most wearing rubber parts, extended broom life by dispensing with the deflector strip, assured sweeping efficiency less sensitive to adjustment, and overall lighter construction and lower production costs.

Structurally the invention departs from the conventional broom chamber configuration by elimination of the broom arch and opening the top of the broom chamber for air entry, the effect of which is to nullify the pumping action of the broom and its slip stream so that no consequential debris is carried over the top of the broom.

In accordance with a preferred embodiment of the invention the broom is contained within an open bottom suction hood supported over the road surface and having suction connections with a debris receptacle. By opening the top of the hood, suction induces airflow downwardly and forwardly of the broom into a suction duct arrangement through which entrained broom sweepings are carried to the debris receptacle. In addition to dispensing with the conventional broom chamber arch, the present top vented hood and chamber configuration renders unnecessary the use of the deflector strip with consequent reduction of broom wear.

These features as well as additional objects and advantages of the invention will appear more fully from the following detailed description of the illustrative embodiment shown in the accompanying drawings;

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view showing the sweeper vehicle in side elevation;

FIG. 2 is an enlarged fragmentary side elevation of the underlying suction hood assembly;

FIG. 3 is a sectional plan of the hood assembly taken on line 3—3 of FIG. 2;

FIG. 4 is an end elevation of the suction hood with its broom mounting as viewed from line 4—4 of FIG. 3;

FIG. 5 is a section taken on line 5—5 of FIG. 4; and

FIG. 6 is a view similar to FIG. 4 showing downward angular adjustment of the broom to compensate for wear.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In reference first to FIG. 1, the vehicle as generally illustrated is a road sweeper on the frame **10** of which is mounted an engine generally indicated at **11** which powers the vehicle together with a suction blower having connection **12** with duct **13** leading to the rear dump debris receptacle **14**. The latter has rigid suction connections **15** with corresponding flexible conduits or hoses **16** by way of joints **17** which are openable to allow for rearward dump tilting of the receptacle **14**. The details of the connections at **17** are more particularly dealt with in my copending application Ser. No. 878,326 entitled ROAD SWEEPER SUCTION AND DIRT CHAMBER CONNECTION, having common assignee with the present application.

An open bottom suction hood generally indicated at **18** is positioned beneath the frame **10** to travel the road surface **19**, the hood being carried by forward wheel **20** and rear wheels **21** and having with the vehicle frame **10** a compensating draft connection generally indicated at **22**, the details of which are the subject matter of my copending application Ser. No. 876,440 entitled ROAD SWEEPER SUCTION HOOD DRAFT CONNECTION, also having common assignee with the present application. When not in sweeping service the hood **18** may be elevated relative to the frame **10** by cable connections **23** with suitable hoist mechanism, not shown.

In particular reference to FIGS. **4** and **6** the sweeper pickup broom **24**, power driven to rotate as indicated, is adjustably mounted to the sidewalls **25** of the hood structure **18** between forward and rear walls **26** and **27** which define the open top broom chamber **28**. Flexible flap **29** mounted to the lower extremity of wall **26** travels near the road surface **19** to throttle the entry of air to the broom chamber. The broom chamber **28** however has open access at **30** to permit unobstructed passage of air to the rotating broom. Suction is communicated to the broom chamber through ducts **31** (typically four in number) having connections **32** with the flexible conduits **16** and positioned in such forward proximity to the broom as to receive its sweepings being deflected upwardly by the seal strip **29**. As illustrated in FIG. **5** the ducts **31** are flared at **31*a*** transversely of the hood for exposure to contiguous lengths of the broom **24**. Forwardly of ducts **31** the hood may contain supplemental open bottom ducts **311** for suction pickup of debris.

The top of the hood and broom chamber is essentially open to allow for induced atmospheric airflow as indicated by the arrows, into the suction ducts **31**. As previously indicated, such open chamber configuration minimizes debris carryover by the broom in that the usually experienced slip stream and air-pumping action of the broom are nullified by this chamber-venting feature. The induced airflow path is through the gap at **35** between the broom and ducts **31**, and then in reversal, upwardly through the ducts and their suction connections.

Referring again to FIGS. **4** and **6**, the broom axle **36** is journaled within bearings **37** carried by adjustable plates **38**, one of which also mounts an hydraulic broom drive motor **39** having hose connections **40** with a source of pressurized hydraulic fluid. The mounts **38** are releasably held to the sides of the hood by bolts **41** the nuts of which when loosened permit shifting of the bolts within slots **42** to angularly adjust the broom position relative to the duct flange **31*b*** to compensate for broom wear, a condition depicted in FIG. **6**. Such adjustment is shown to include a rod or bolt **43** carrying nut **44** bearing against stationary support **45** and adjustable to bodily shift the mount **38** and broom.

The forward inclination of the broom adjustment has particular relation to the broom clearance from the duct flange **31*b*** in that the adjustment angularity contributes toward

avoidance of excessive opening of the gap at 35 and reduction of air velocity therethrough as successive broom wear compensating adjustments are made.

I claim:

1. In a road sweeper vehicle, a cylindrical broom power driven for rotation of its road-contacting sweeping surface about a horizontal axis and in the direction of the sweeper travel, walls forwardly and rearwardly of the broom forming a broom chamber, and suction means communicating with the front of the broom to receive and remove air-entrained debris being swept upwardly by the broom and to induce ambient airflow downwardly closely adjacent the upwardly rotating upper surface of the broom for mixing with said debris, the top of said chamber being open to atmosphere so that said suction means induces air inflow to the broom chamber through its open top, said suction means including ducting having an inlet at the front of the broom and forming therewith a downwardly progressively narrowing airgap to pass said downward ambient airflow, air entry to the broom chamber at the front thereof being restricted by a flap extending downwardly and rearwardly below the level of said gap, and means to adjust the broom position downwardly and forwardly to compensate for broom wear, said means located to maintain said gap progressive downward narrowing during said downward and forward adjustment.

2. A sweeper vehicle according to claim 1, in which said rear wall has unobstructed clearance from the road surface.

3. A sweeper vehicle according to claim 1, in which said broom and chamber are within an open bottom suction hood transported below the vehicle frame and having a suction connection with a debris chamber carried by said frame.

4. A sweeper vehicle according to claim 3, in which the hood has a plurality of aligned suction connections within said chamber forwardly of the broom.

5. A sweeper vehicle according to claim 4, in which said suction connections include ducts having inlets directly in front of the broom.

6. A sweeper vehicle according to claim 5, in which said hood is wheel supported on the road and is mounted for elevation relative to the vehicle frame.

7. A sweeper vehicle according to claim 6, in which said rear wall of the broom chamber has unobstructed clearance from the road surface.

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