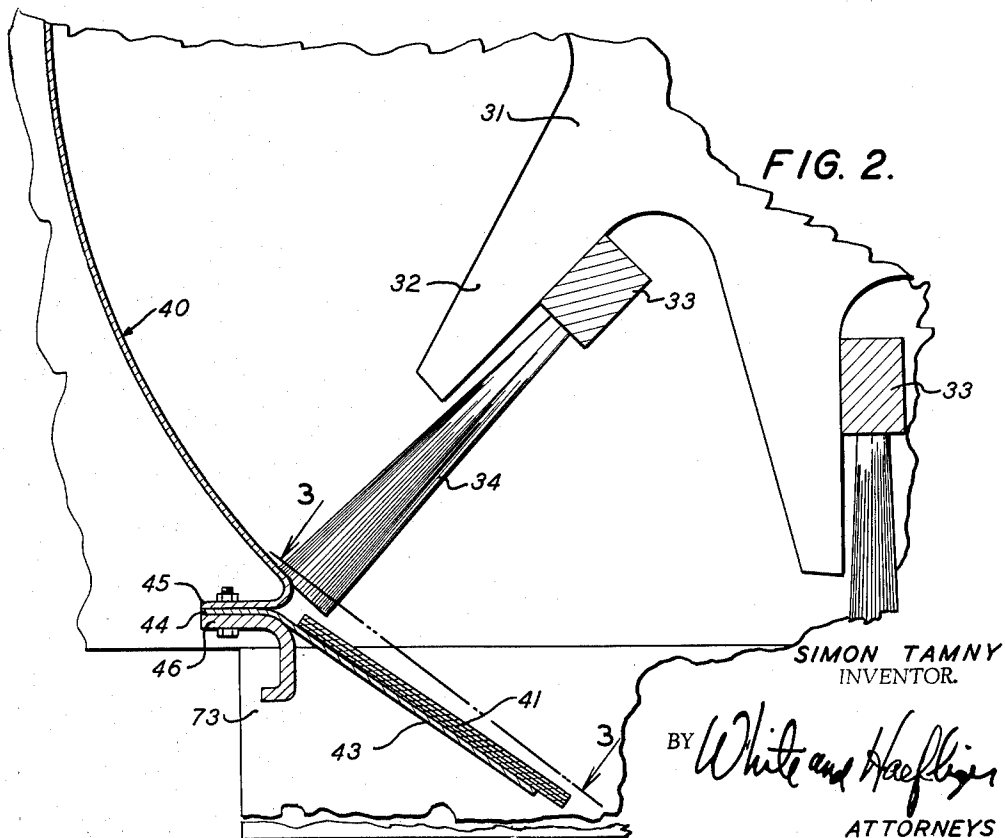


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2 Sheets-Sheet 1



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S. TAMNY

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POWER SWEEPER BROOM CHAMBER

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2 Sheets-Sheet 2

FIG. 4.

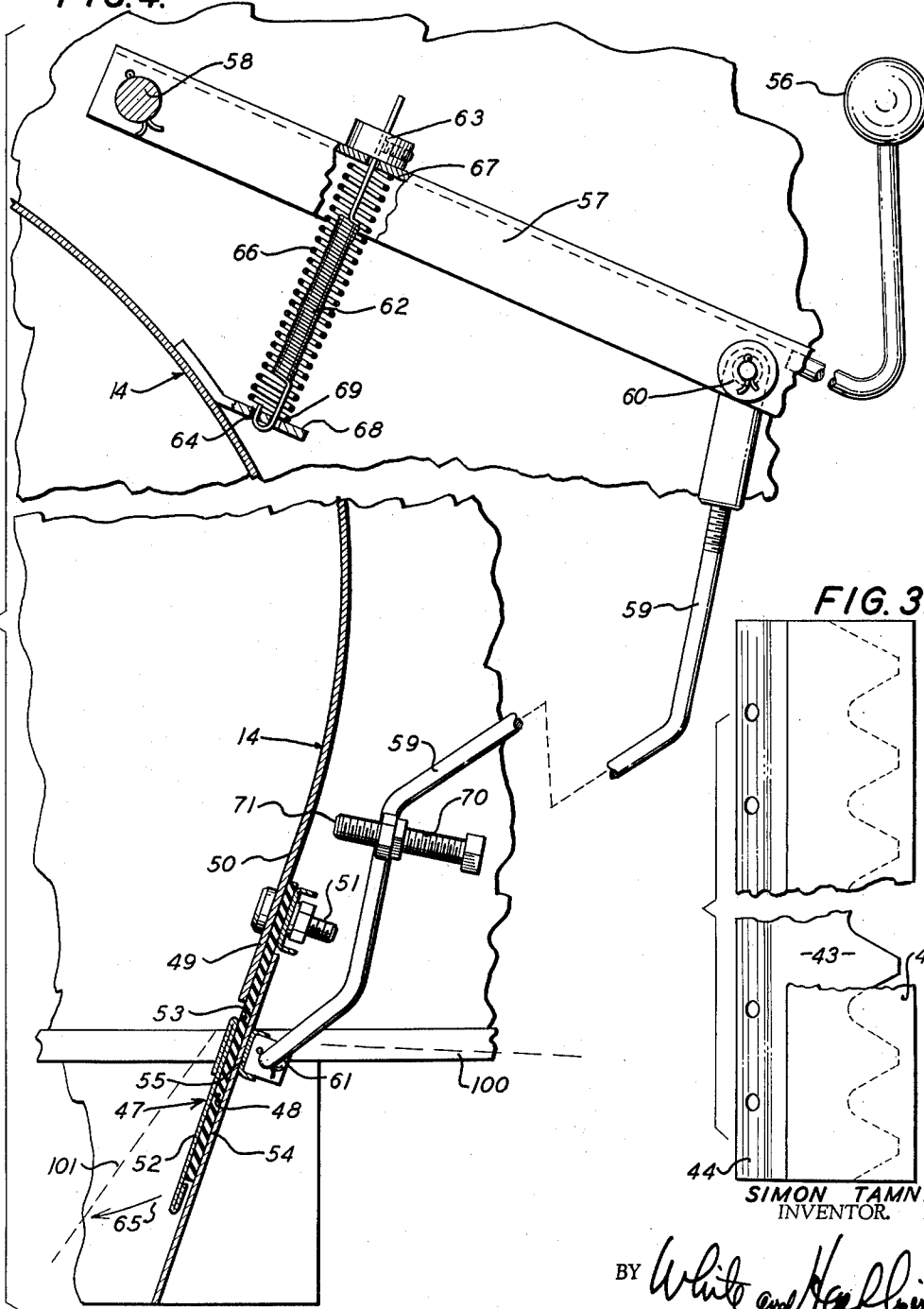
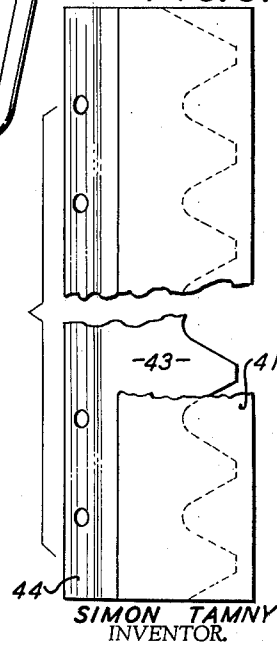


FIG. 3.



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POWER SWEEPER BROOM CHAMBER

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This invention relates generally to power sweeper equipment, and more particularly concerns improvements in the sweeping functions of rotary brooms contained within downwardly opening chambers.

In the past it has been thought desirable to arrange and rotate the broom in such relation to the broom chamber and a hopper zone that articles swept off the ground or floor are transported generally forwardly and upwardly in the forward interior of the chamber for ultimate discharge through a chamber opening into the hopper zone, the latter being located at the front of the broom with respect to the direction of sweeper forward travel. One trouble with this arrangement resides in the limited height or depth requirement imposed on the hopper, since the chamber opening to the interior of the hopper must be in the forward path of swept particle travel.

The present invention comprising an altogether different conceptual approach to the achievement of efficient sweeping operation has been found in practice to overcome or solve not only the problem briefly mentioned above, but also others which will become evident from the description.

As broadly conceived, the improvement contemplates that the broom rotates about an axis extending generally horizontally and transversely relative to the direction of sweeper forward travel, sweeping articles generally upwardly in the forward interior of a downwardly opening broom chamber and then rearwardly in the upper interior of the chamber for discharge through an elevated chamber opening to the hopper. This arrangement allows for the use of a deeper hopper, i.e. one with considerably higher capacity, but it also introduces the additional problem of carry-over of some articles past the chamber outlet and downwardly to the rear of the broom where they tend to collect on the swept surface without further entrainment in the broom rotating relatively forwardly past them.

This added problem is overcome in accordance with the invention through the provision of a chamber extension proximate the rear of the broom, including the rear underside thereof, and facing the periphery of the broom downward path of rotation for keeping swept articles that have been carried past the chamber outlet opening within the path of broom rotation. In a preferred form the lower portion of the extension is characterized as being maintained in immediate proximity to the broom rear underside so as effectively to keep material entrained in the path of broom rotation. Also, the lower portion of the extension may be free to move generally rearwardly and away from the broom and to return into proximity to the broom rear underside all in response to contact with and travel over obstructions during forward travel of the sweeper. More specifically, in a preferred construction the lower portion of the chamber extension typically having sheet form is capable of sudden deflection rearwardly and away from the broom, and rearwardly yieldable means as for example a flat mounting spring carried by the sweeper acts to urge the sheet form lower portion of the chamber extension generally forwardly for maintenance in proximity to the rear underside of the broom. This condition is maintained by the flat spring in what may be characterized as upper and lower sweeping positions of the broom, bodily displacement of which between such positions being controllable

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by the operator to an extent permitting compensation for various sweeping conditions.

Another object of the invention has to do with the provision of another chamber extension typically comprising flap means, together with manually operable means for raising and lowering the flap means as well as deflecting it toward and away from the broom periphery. As will appear, such an extension typically comprises a forward flap mounted proximate the lower front of the broom for rearward movement as well as upward and downward movement under the control of the operator through manually operable control mechanism, for the purpose of controlling entrance of varied objects into the lower interior of the broom chamber for entrainment by the rotary broom.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following detailed description of the drawings in which:

FIG. 1 is a vertical elevation taken through a mobile power sweeper embodying the invention;

FIG. 2 is an enlarged fragmentary section showing the rearwardly deflectable chamber extension or shroud in position relative to the sweeper broom;

FIG. 3 is a plan view of the deflectable extension of FIG. 2; and

FIG. 4 is an enlarged fragmentary section illustrating a control for another chamber extension proximate the lower front of the broom.

Referring first to FIG. 1, the sweeper vehicle 10 includes a body 11 supported on wheels 12 for forward travel under the control of an operator seated at 13 above the broom chamber 14. Steering gear is shown in part at 14a, and the vehicle engine is outlined at 15, the operator controlling vehicle forward speed by means of a foot treadle comprising a vehicle forward treadle 16 and a vehicle reverse treadle 17.

The main broom chamber is characterized as dust-tight, and effectively sealed to the surface 18 to be swept. Furthermore, the chamber 14 comprises an integral part of the unitized heavy duty frame for the vehicle, other portions of which are shown at 19 and 20. The broom chamber 14 has an outlet opening 20 through which swept particles are discharged rearwardly from the upper interior of chamber 14 as the broom 21 rotates, and such materials 22 then travel into a hopper zone 23 rearward of the broom chamber.

In this connection, it will be realized that the hopper zone 23 has desirably large capacity as result of the location of the opening 20 at a relatively high elevation, which circumstance is made possible by broom rotation carrying swept particles upwardly in the forward interior of the broom chamber 14 and then rearwardly over the broom axis 24 and in the upper interior of the chamber 14.

The hopper zone 23 is formed above a bottom 124 inclined upwardly and forwardly toward the opening 20, and to terminate at a point of juncture 25 with the broom chamber. Discharge of swept particles through the opening 120 and into the hopper zone is aided by partial vacuum conditions created by operation of a blower 26 having an inlet 27 to which air passes through a conduit 28 above the broom chamber 14. In passing to the conduit 28, air is drawn upwardly from the hopper as indicated by the arrows 29, for passage through a filter zone 30 within the upper interior of the hopper chamber, wherein dust particles are separated from the air stream.

The broom 21 rotatable within the chamber 14 comprises a core 31 with fingers 32 for supporting the broom strips 33. The latter extend transversely within broom chamber in generally parallel relation to the broom axis 24 of rotation. The removable strips 33 carry trans-

versely extending bands of bristles 34 as shown, which are adapted to sweep against the surface 18 to entrain particles between the circularly spaced bristle bands, and for ultimate discharge through the opening 20 to the hopper during broom rotation. Rotary drive is communicated to the broom from the engine 15 through transmission mechanism including the broom shaft 35, the latter being supported by a structure 36 and arm 37 for height adjusting rotation about a pivot 38. Accordingly, the broom height within the shroud or chamber 14 may be adjusted as by means of an elevating rod or other equivalent structure 39 to support the broom in full floating up and down position for sweeping uneven surfaces, in semi-floating partly raised position for many sweeping needs and greater broom life, and fully raised position for traveling. As illustrated in FIG. 1, the broom is in semi-floating or partly raised position within the chamber 14.

The broom chamber 14 includes an extension below chamber panel 40 proximate and facing the periphery of the broom downward path of rotation for keeping swept articles that have been carried past the opening 120 in the path of broom rotation. The lower portion 41 of the extension has flexible extent accommodating sudden deflection of that portion generally rearwardly and away from the broom, as indicated by the broken lines 42, in response to contact with and travel over obstructions during forward travel of the sweep. Under normal conditions, the lower portion 41 of the extension may be characterized as maintained in proximity to the broom rear underside, and preferably in rearwardly yieldable proximity thereto as shown in FIG. 1. For these purposes, the lower portion of the extension typically comprises a flexible sheet, as for example may be constructed of multiple ply elastomeric material for long wear purposes. The sheet is bonded to a flat spring, typically metallic and shown at 43 in FIG. 2 as having cantilevered extent generally underlying the sheet 41. Both the flat spring 43 and the sheet 41 extend transversely across the broom chamber width and the flat spring upper extent 44 is supported between overlapping and underlapping panel layers 45 and 46 in such position that the sheet 41 is urged into proximity to the broom path of rotation at the rear underside of the broom. Accordingly, since the sheet 41 also projects downwardly to terminate quite close to the ground surface 18, articles which are carried past the opening 20 are maintained within the broom path of rotation for forward and upward travel toward the opening 20. Furthermore, the sheet is preferably maintained in position for contact with the outer terminals of the bristles 34 in both the fully floating and semi-floating sweeping positions of the broom as previously described.

The broom chamber also includes what may be characterized as forward flap means generally shown at 47 in FIG. 1, supported for rearward deflection proximate the lower front of the broom for admitting and retaining swept articles in the path of forward and upward broom rotation. The forward flap means is shown in detail in FIG. 4 as typically comprising an elastomer layer 48 the upper extent of which is fastened to the lower terminal 49 of the metallic chamber forward panel 50 as by a row of threaded fasteners 51 or other equivalent structure. A metallic stiffener plate 52 is attached to the layer 48 in such a way as to provide a flexible hinge section 53 of the layer 48 accommodating deflection of the layer extent below the hinge to which a flap 54 is attached at 55. Flap 54 extends downwardly toward the ground 18 and transversely across the width of the broom chamber as illustrated.

Manually operable means is shown in FIG. 4 for lifting or bending the front flap means 47 about hinge 53 to elevated broken line position 100 in order to allow large objects to enter the rotating broom as the vehicle

travels forwardly. As illustrated, a handle 56 is provided on a lever 57 pivoted at 58 to swing upwardly and thereby tending to lift the link 59 which is connected to the lever 57 at 60, and which is also connected to the flap means at 55 through the connector 61. Such lifting motion is resisted by a tension spring 62 one end portion of which is effectively attached to the lever 57 at 63 and the other end of which is effectively attached or anchored at 64 to the broom chamber 14. The handle 56 may also be depressed manually to urge the flap means 47 generally rearwardly in the direction of the arrow 65 to broken line position 101 in order to push large objects into the rotating broom. Such downward and forward actuation is resisted by the compression spring 66 the lower terminal of which bears against the bracket 68 at 69, the bracket being joined to the broom chamber. Accordingly, the link 59 establishes a neutral position of the flap means as shown in full lines in FIG. 4. In addition, the rearward travel limit of the flap means may be adjusted by the set screw 70 carried by the link 59, and having its forward terminal 71 engageable with the broom chamber 14 to determine limiting position 101 of the flap means.

From the foregoing it will be understood that the front flap means 47 and the flexible lower portion 41 of the broom chamber extension 40 define the forward and rearward boundaries of the chamber inlet generally shown at 72 in FIG. 1. The transverse opposite sides of the inlet 72 are bounded by vertical flexible flaps 73 hanging downwardly from the vehicle body at opposite sides thereof, and cooperating with the flap means 47 and a conventional rear dust flap, not shown, to form a semi-sealed chamber inlet.

I claim:

1. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower inlet, and an outlet through which swept articles discharge to a hopper, the improvement which comprises an extension carried by the chamber and maintained in underlying particle retaining proximity to the downward travel path of the broom periphery at one side of said inlet under the broom for keeping articles in the path of broom rotation, the lower portion of said extension being flexible and accommodating sudden deflection of said portion away from the broom in response to contact with and travel over obstructions during sweeper travel.

2. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower inlet, and an outlet through which swept articles discharge to a hopper, the improvement which comprises an extension carried by the chamber and maintained in underlying particle retaining proximity to the downward travel path of the broom periphery at one side of said inlet under the broom for keeping articles in the path of broom rotation, the lower portion of said extension being flexible and accommodating sudden deflection of said portion away from the broom in response to contact with and travel over obstructions during sweeper travel, and downwardly projecting chamber flap means at the opposite side of said inlet to confine swept articles in said chamber.

3. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower inlet, and an outlet, the broom rotating about said axis to transport swept articles generally upwardly in the forward interior of said chamber and then rearwardly in the upper interior of said chamber for discharge through said outlet and into a hopper zone located generally rearwardly of the broom, the improvement which comprises a chamber extension

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proximate the rear of the broom and facing the periphery of the broom downward path of rotation for keeping swept articles that have been carried past said outlet in said path of broom rotation, a lower portion of said extension being characterized as structurally maintained in particle retaining proximity to the broom rear underside and to be free to move generally rearwardly and away from the broom and to return into particle retaining proximity to the broom's rear underside all in response to contact with, and travel over obstructions during forward travel of the sweeper.

4. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper forward travel, the chamber having a lower inlet, and an outlet, the broom rotating about said axis to transport swept articles generally upwardly in the forward interior of said chamber and then rearwardly in the upper interior of said chamber for discharge through said outlet and into a hopper zone located generally rearwardly of the broom, and means for displacing the broom between upper and lower sweeping positions in said chamber, the improvement which comprises a chamber extension proximate the lower rear of the broom and facing the periphery of the broom's downward path of rotation for keeping swept articles that have been carried past said outlet in said path of broom rotation, the lower portion of said extension being flexible and accommodating sudden deflection of said portion generally rearwardly and away from the broom in response to contact with, and travel over obstructions during forward travel of the sweeper, and rearwardly yieldable means acting to urge said extension lower portion generally forwardly for maintenance in particle retaining proximity to the rear underside of the broom in both said upper and lower sweeping positions thereof.

5. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper forward travel, the chamber having a lower inlet, and an outlet, the broom rotating about said axis to transport swept articles generally upwardly in the forward interior of said chamber and then rearwardly in the upper interior of said chamber for discharge through said outlet and into a hopper zone located generally rearwardly of the broom, and means for displacing the broom between upper and lower sweeping positions in said chamber, the improvement which comprises a chamber extension proximate and facing the periphery of the broom's downward path of rotation for keeping swept articles that have been carried past said outlet in said path of broom rotation, the lower portion of said extension being flexible and accommodating sudden deflection of said portion generally rearwardly and away from the broom in response to contact with, and travel over obstructions during forward travel of the sweeper, and rearwardly yieldable means acting to urge said extension lower portion generally forwardly for maintenance in particle retaining proximity to the rear underside of the broom in both said upper and lower sweeping positions thereof, and another chamber flexible extension proximate the lower front of the broom for retaining swept articles in the path of forward and upward broom rotation.

6. In a power sweeper including a broom having a generally cylindrical locus of rotation within a generally barrel shaped chamber and about an axis extending generally horizontally and transversely relative to the direction of sweeper forward travel, the chamber having an inlet at a lower elevation below the broom axis and a rearwardly facing outlet above the rear upper side of the broom, the broom rotating about said axis to transport swept articles generally upwardly in the forward interior of said chamber and then rearwardly in the upper interior of said chamber for discharge through said outlet and into a hopper zone located generally rearwardly of the

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broom, the improvement which comprises a chamber extension proximate the rear of the broom and facing the periphery of the broom's downward and forward path of rotation below the level of said axis for keeping swept articles that have been carried past said outlet in said path of broom rotation, the lower portion of said extension including a flexible sheet terminating at said inlet, and rearwardly yieldable flat spring means carried by the sweeper and acting to urge said sheet generally forwardly for maintenance in proximity to the rear underside of the broom, said flat spring means mounting said sheet for sudden deflection generally rearwardly and away from the broom in response to contact with, and travel over obstructions during forward travel of the sweeper.

7. The invention as defined in claim 6 in which said sheet is yieldably urged by said flat spring means into contact with the broom during broom rotation.

8. The invention as defined in claim 7 including means for displacing the broom between upper and lower sweeping positions in said chamber, said sheet being urged into contact with the broom in both said positions.

9. The invention as defined in claim 7 including forward flap means carried for rearward deflection proximate the lower front of the broom for retaining swept articles in the path of forward and upward broom rotation.

10. The invention as defined in claim 9 in which said chamber includes transversely spaced side walls having flexible lower extents at transversely opposite sides of said inlet, said flexible sheet and forward flap means being confined between said side walls.

11. The invention as defined in claim 9 including manually operable means for lifting said front flap means in order to allow large objects to enter the rotating broom and for deflecting said front flap means rearwardly.

12. The invention as defined in claim 11 including an adjustable stop for determining the rearward extent of said front flap rearward deflection.

13. The invention as defined in claim 11 including yieldable means acting on said manually operable means to resist lifting and rearward deflection of said front flap means.

14. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower inlet, and an outlet through which swept particles discharge to a hopper, the improvement which comprises flap means carried at one side of said chamber inlet for deflection proximate the underside of the curved peripheral travel path of the broom for entraining swept particles in the path of broom rotation, and including manually operable means for raising said flap means away from the broom to pass relatively large objects on the surface over which the broom travels and for deflecting said flap means toward the broom periphery.

15. In a power sweeper including a broom rotatable in a chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower inlet, and an outlet through which swept particles discharge to a hopper, the improvement which comprises front flap means carried at the front side of said chamber for rearward deflection proximate the lower front of the broom for entraining swept articles in the path of forward and upward broom rotation, and including manually operable means for raising said flap means forwardly in order to allow relatively large objects on the surface over which the broom travels to enter the rotating broom and for deflecting said flap means rearwardly.

16. The invention as defined in claim 15 including an adjustable stop for determining the rearward extent of said front flap rearward deflection.

17. In a power sweeper including a broom rotatable in a downwardly opening chamber about an axis extending generally horizontally and transversely relative to the direction of sweeper travel, the chamber having a lower

inlet, and an outlet through which swept particles discharge to a hopper, the improvement which comprises front flap means carried at the front side of said chamber for rearward deflection proximate the lower front of the broom for entraining swept articles in the path of forward and upward broom rotation, manually operable means for raising said flap means in order to allow relatively large objects on the surface over which the broom travels to enter the rotating broom and for deflecting said flap means rearwardly, and yieldable means acting on said manually operable means to resist lifting and rearward deflection of said front flap means.

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