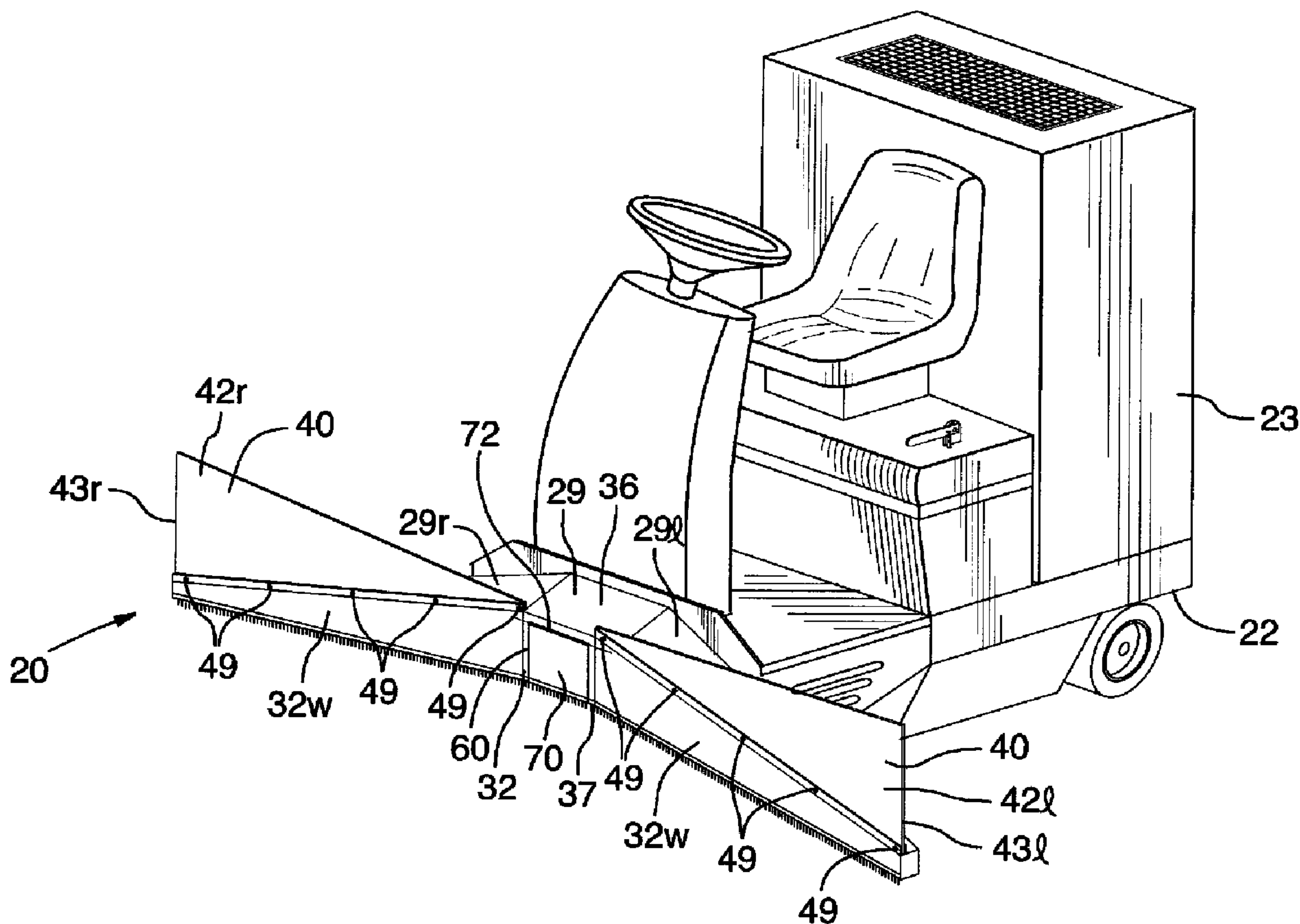




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(54) Titre : TETE DE RAMASSAGE A CHARRUAGE DE DEBRIS POUR BALAYEUSE MOBILE
(54) Title: A DEBRIS-PLOWING PICK-UP HEAD FOR A MOBILE SWEEPER



(57) Abrégé/Abstract:

A debris-plowing pick-up head for a mobile sweeper comprises a housing defining a substantially hollow interior and having a front, a back, a left end and a right end, a top and a bottom, and a suctioning bottom opening for suctioning dust and small debris into

(57) **Abrégé(suite)/Abstract(continued):**

the substantially hollow interior of the housing. A suctioning front opening is disposed in the front of the housing for receiving debris into the substantially hollow interior of the housing. A selectively openable and closable door means operatively mounted on the debris plowing pick-up head for selectively opening and closing the suctioning front opening. There is a dust and debris outlet in the housing for permitting dust and debris to be suctioned from the substantially hollow interior of the housing into a hopper. A barrier is disposed on the top of the housing for substantially precluding the passage of large debris over the housing.

ABSTRACT OF THE DISCLOSURE

A debris-plowing pick-up head for a mobile sweeper comprises a housing defining a substantially hollow interior and having a front, a back, a left end and a right end, a top and a bottom, and a suctioning bottom opening for suctioning dust and small debris into the substantially hollow interior of the housing. A suctioning front opening is disposed in the front of the housing for receiving debris into the substantially hollow interior of the housing. A selectively openable and closable door means operatively mounted on the debris plowing pick-up head for selectively opening and closing the suctioning front opening. There is a dust and debris outlet in the housing for permitting dust and debris to be suctioned from the substantially hollow interior of the housing into a hopper. A barrier is disposed on the top of the housing for substantially precluding the passage of large debris over the housing.

This application is a non-provisional application claiming priority from U.S. Provisional Patent Application Serial No. 60/975,052 filed on September 25, 2007, which is herein incorporated by reference.

FIELD OF THE INVENTION

[0001] The present invention relates to factory and sidewalk sweepers, and more particularly to pick-up heads for factory and sidewalk sweepers.

BACKGROUND OF THE INVENTION

[0002] Sidewalk sweepers and factory floor sweepers of various types are used to sweep debris in many different types of locations. Sidewalk sweepers are typically used to sweep dust, dirt and debris from sidewalks, parking lots, and so on. Often, the dust, dirt and debris has accumulated significantly on a surface that is to be swept, and when swept by a sidewalk sweeper, the dust, dirt and debris can accumulate in front of a pick-up head

or gutter broom high enough that the dust, dirt and debris actually travel over the pickup head or gutter broom. Accordingly, this dust, dirt and debris again end up on the surface being swept, which is completely unacceptable. This situation is especially common during spring cleanup, and especially in climates where large amounts of leaves from deciduous trees remain on the ground until spring time, and also where sand is used on roads during the winter.

[0003] It should be noted that the above described situation of having debris pass over the pick-up head is exacerbated by the fact that the outer ends of some pick-up heads are lower than the central portion. Such lowering of the outer ends of the pick-up head is due to the need to reduce the cross-sectional area of the pick-up head at its outer ends, in order to maintain airflow, and therefore suctioning, towards the outer ends of the pick-up head. Unfortunately, the lower outer ends of the pick-up heads tends to permit debris to readily pass over the outer end portions of the pickup head, which is unacceptable.

[0004] It is an object of the present invention to provide a pick-up head for use with a factory floor sweeper and especially a sidewalk sweeper.

[0005] It is another object of the present invention to provide a pick-up head for use with a factory floor sweeper and especially a sidewalk sweeper, wherein dirt and debris are precluded from passing over the top of a pick-up head or gutter broom.

[0006] It is another object of the present invention to provide a pick-up head for use with a factory floor sweeper and especially a sidewalk sweeper, wherein dirt and debris are precluded from passing over the top of a pick-up head or gutter broom, and airflow, and therefore suctioning, is maintained within the pick-up head towards the outer ends of the pick-up head.

SUMMARY OF THE INVENTION

[0007] In accordance with one aspect of the present invention there is disclosed a novel debris-plowing pick-up head for a mobile sweeper. The debris plowing pick-up head comprises a housing defining a substantially hollow interior and having a front, a back, a left end and a right end, a top and a bottom, and a suctioning bottom opening for suctioning dust and small debris into the substantially hollow interior of the housing. There is a dust and debris outlet in the housing for permitting dust and debris to be suctioned from the substantially hollow interior of the housing

into a hopper. A barrier is disposed on the top of the housing for substantially precluding the passage of large debris over the housing.

[0008] Other advantages, features and characteristics of the present invention, as well as methods of operation and functions of the related elements of the structure, and the combination of parts and economies of manufacture, will become more apparent upon consideration of the following detailed description and the appended claims with reference to the accompanying drawings, the latter of which is briefly described herein below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The novel features which are believed to be characteristic of the debris-plowing pick-up head for a mobile sweeper according to the present invention, as to its structure, organization, use and method of operation, together with further objectives and advantages thereof, will be better understood from the following drawings in which a presently preferred embodiment of the invention will now be illustrated by way of example. It is expressly understood, however, that the drawings are for the purpose of illustration and description only, and are not intended

as a definition of the limits of the invention. In the accompanying drawings:

[00010] **Figure 1** is a perspective view of the first preferred embodiment of the debris-plowing pick-up head according to the present invention, in use on a mobile sweeper vehicle;

[00011] **Figure 2** is a top plan view of the first preferred embodiment debris-plowing pick-up head of Figure 1;

[00012] **Figure 3** is a front elevational view of the first preferred embodiment debris-plowing pick-up head of Figure 1;

[00013] **Figure 4** is a perspective view of a portion of the first preferred embodiment debris-plowing pick-up head of Figure 1;

[00014] **Figure 5** is a partially cut-away side elevational view of the second preferred embodiment debris-plowing pick-up head according to the present invention, in use on a mobile sweeper vehicle; and,

[00015] **Figure 6** is a perspective view of a portion of the second preferred embodiment debris-plowing pick-up head of Figure 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00016] Referring to Figures 1 through 6 of the drawings, it will be noted that Figures 1 through 4 illustrate a first preferred embodiment of the debris-plowing pick-up head of the present invention, and Figures 5 and 6 illustrate a second preferred embodiment of the debris-plowing pick-up head of the present invention.

[00017] Reference will now be made to Figures 1 through 4, which show a first preferred embodiment of the debris plowing pick-up head for a mobile sweeper 22 according to the present invention, as indicated by general reference numeral 20. The pick-up head 20 for a mobile sweeper 22 comprises a housing 30 defining a substantially hollow interior 31 and having a front 32, a back 33, a left end 34 and a right end 35, a top 36 and a bottom 37. There is also a suctioning bottom opening 38 for suctioning dust and small debris, such as dirt and small stones, and the like, into the substantially hollow interior 31 of the housing 30. A dust and debris outlet 39 in the housing 30 permits dust and debris to be suctioned from the substantially hollow interior 31 of the housing 30 into a hopper 23 that is mounted at the back of the mobile sweeper 22, via a duct 26. The dust and debris outlet 39 is preferably disposed in the back 33 of the housing 30, so as to take advantage of the relative

travel of debris with respect to the pick-up head 20 as the mobile sweeper 22 travels forwardly.

[00018] As can readily be seen in the figures, the housing 30 is tapered from a higher central portion 29 to a lower outer left portion 29l and a lower outer right portion 29r. Tapering the housing 30 in this manner permits sufficient air flow at the left and right ends 34,35 respectively, of the housing 30 to be sufficient enough to suction dust and debris from the left and right ends 34,35 of the housing 30.

[00019] The pick-up head of the present invention also comprises a barrier 40 disposed on the top of the housing 30. The barrier 40 preferably comprises at least one substantially vertically disposed plate, and even more preferably, left and right substantially vertically disposed plates 42l, 42r. Each plate elongate, and tapers from its widest at its outer ends 43l,43r, corresponding to the left and right outer ends 34,35 of the housing 30, to the central portion 29. Preferably, the barrier 40 comprises a pliable material to thereby permit some physical flexibility of the barrier 40. Accordingly, in the event that the barrier 40 impacts against solid object, the barrier 40 will bend somewhat, thus minimizing the chance of breakage or other damage.

[00020] Also, the barrier 40 is removably and replaceably mounted on the housing 30 within a slot 72 defined by two rails 70 by means of threaded fasteners 49 extending through co-operating apertures in the left and right substantially vertically disposed plates 42l,42r, and in the rails 70. Use of such threaded fasteners permits the barrier 40 to be readily replaced if it is broken or if a specific type of barrier 40 is desired to be used.

[00021] Alternatively, the barrier could comprise one continuous barrier that spans across the entire housing 30.

[00022] The barrier 40 is for substantially precluding the passage of large debris over the housing, so that large debris, such as leaves, bottles, cans, and so on do not end up behind the pick-up head 20 as the mobile sweeper 22 travels forwardly.

[00023] The pick-up head 20 further comprises a suctioning front opening 60 disposed in the front of the housing 30 for receiving debris into the substantially hollow interior 31 of the housing 30, and in debris receiving relation with respect to a surface being cleaned. Preferably, the suctioning front opening 60 is disposed generally centrally in the front of the housing 30. It will also be noted that the dust and debris outlet 39 is generally centrally disposed in the back of the housing 30, so as to be generally

laterally aligned with the suctioning front opening 60. The suctioning front opening 60 needs to be large enough to accept large debris, such as most sizes of cans and bottles therethrough.

[00024] A selectively openable and closable door means 70 is operatively mounted on the pick-up head 20, at the suctioning front opening 60, for selectively opening and closing the suctioning front opening 60. The openable and closeable door means 70 comprises at least one door member mounted in hinged relation on the housing 30. In the first preferred embodiment, as illustrated, the openable and closeable door means 70 comprises a single door 70 mounted by means of a horizontally oriented top hinge 72. Preferably, the at least one door member 70 is mounted so as to open inwardly into the substantially hollow interior 31 of the housing 30. In this manner, the door member 70 opens in the same direction as the relative travel of debris with respect to the pick-up head 20 as the mobile sweeper 22 travels forwardly.

[00025] The pick-up head 20 further comprises means for urging large debris towards the suctioning front opening 60. In the first preferred embodiment, as illustrated, the means for urging debris towards the suctioning front opening 60 comprises a "V"-shaped front wall portion 32w of the housing 30. The suctioning front opening 60 is disposed at the vertex of the "V"-shaped front wall

portion 32w, so as to receive large debris that is pushed along the left and right front walls of the housing 30, as the mobile sweeper 22 travels forwardly.

[00026] In use, as the mobile sweeper 22 travels forwardly, dust and debris on the surface being cleaned are encountered by the pick-up head 20. Dust and small debris near or against a generally vertically disposed surface, such as a curb, are encountered by a gutter broom (not shown). The dust and debris encountered by the gutter broom are swept inwardly away from the left end 34 of the housing 30. Most of the debris, except very small debris, is encountered by the left and right front walls 32w of housing 30, and is moved to the suctioning front opening 60, due to slope of the "V"-shaped front wall portion 32w of the housing 30. The debris that tries to pass over the housing 30 is precluded from doing so by the barrier 40.

[00027] As can readily be seen, with the pick-up head 20 according to the present invention, dust and very small debris that pass under the pick-up head 20 enter the substantially hollow interior 31 of the pick-up head 20 through the suctioning bottom opening 38. In essence, the pickup head 20 according to the present invention separates the dust and very small debris from the larger debris, and causes them to take their separate routes in

order to ultimately be suctioned up. This particular structure and function allows the pick-up head 20 to maintain proper and sufficient suctioning across the width of the housing 30.

[00028] It should also be noted that the pick-up head 20 for a mobile sweeper 22 according to the present invention can be used as part of a vacuum type system on a sidewalk sweeper or a factory floor sweeper, or as part of a re-circulating type system on a sidewalk sweeper or a factory floor sweeper, as will now be discussed.

[00029] Reference will now be made to Figures 5 and 6, which show a second preferred embodiment of the debris-plowing pick-up head according to the present invention, as indicated by reference numeral 220. The second preferred embodiment debris-plowing pick-up head 220 is similar to the first preferred embodiment debris-plowing pick-up head 20, except that it is used in a re-circulating type system on a sidewalk sweeper or a factory floor sweeper. The right substantially vertically disposed plate 242r and the left substantially vertically disposed plate are the same as those described in the first preferred embodiment. In addition to the elements and features described in the first preferred embodiment, the second preferred embodiment debris-plowing pick-up head comprises a top covering 280 of the hopper 223 has a built in panel

filter 282 at the back, and unfiltered direct opening 284 to the ambient surroundings adjacent the panel filter 282. A recirculating air hose 286 has its inlet 287 at the top covering 280 of the hopper 223 and its outlet 288 in the pickup head to form a "closed loop" system with the fan 224. The fan 224 blows unfiltered air into the inlet 287 of the recirculating air hose 286, as indicated by arrow "A". This air is introduced into the pick-up head 220, as indicated by arrow "B", in order to help capture dust and debris within the pick-up head 220. The recirculating air, including the dust and debris, circulate through the duct 226, as indicated by arrow "C", and returned to the hopper 223, as indicated by arrow "D", as drawn in by the fan 224.

[00030] A portion of the air from the fan 224 is bled off to the atmosphere, as controlled by flap valve 290, either through the panel filter 282, as is shown in Figure 5, or through the direct opening 284, as is shown in Figure 6. A large gate valve 292 is mounted in hinged relation at the junction between the panel filter 282 and a direct opening 284 for movement between a first position, as shown in Figure 5, whereat all of the air flow that is bled off is directed through the panel filter 282. The large gate valve 292 seals against the slanted wall 294 in order to preclude air from escaping through the direct opening 284. This mode is used during dry sweeping in order to preclude dust from escaping to the

atmosphere. There were circulation of a substantial portion of the airflow significantly reduces the volume of air that must be filtered per unit time, which is a significant problem with vacuum type sweepers.

[00031] In the event that sweeping must be performed in wet or damp conditions, there is no actual dust generated that needs to be controlled and captured; however, there is a wet airborne particulate that must be dealt with. It is well known that this wet airborne particulate can readily clog a panel filter 282. Accordingly, the large gate valve 292 can be moved to the position as shown in Figure 6, whereat the panel filter 282 is covered, and there is a direct path for the flow of air that is bled off to the direct opening 284 to the ambient surroundings, thus precluding the panel filter 282 from becoming clogged.

[00032] As can be understood from the above description and from the accompanying drawings, the present invention provides a pick-up head for use with a factory floor sweeper and especially a sidewalk sweeper, wherein dust, dirt and debris is precluded from passing over the top of a pick-up head or gutter broom, and airflow, and therefore suctioning, is maintained within the pick-up head towards the outer ends of the pick-up head, all of which features are unknown in the prior art.

[00033] Other variations of the above principles will be apparent to those who are knowledgeable in the field of the invention, and such variations are considered to be within the scope of the present invention. Further, other modifications and alterations may be used in the design and manufacture of the debris plowing pick-up head for a mobile sweeper of the present invention without departing from the spirit and scope of the accompanying claims.

I CLAIM:

1. A debris-plowing pick-up head for a mobile sweeper, said debris plowing pick-up head comprising:

5 a housing defining a substantially hollow interior and having a front, a back, a left end and a right end, a top and a bottom, and a suctioning bottom opening for suctioning dust and small debris into said substantially hollow interior of said housing;

10 a dust and debris outlet in said housing for permitting dust and debris to be suctioned from said substantially hollow interior of said housing into a hopper; and,

a barrier disposed on the top of said housing for substantially precluding the passage of large debris over said housing.

2. The debris plowing pick-up head of claim 1, wherein said barrier comprises at least one substantially vertically disposed plate.

3. The debris plowing pick-up head of claim 2, wherein said at least one substantially vertically disposed plate comprises a left substantially vertically disposed plate and a right substantially vertically disposed plate.

4. The debris plowing pick-up head of claim 1, wherein said barrier is elongate.

5. The debris plowing pick-up head of claim 1, wherein said barrier comprises a pliable material to thereby permit physical flexibility of said barrier.

6. The debris plowing pick-up head of claim 1, wherein said barrier is removably and replaceably mounted on said housing.

7. The debris plowing pick-up head of claim 1, wherein said housing is tapered from a higher central portion to a lower outer left portion and a lower outer right portion.

8. The debris plowing pick-up head of claim 1, further comprising a suctioning front opening disposed in the front of said housing for receiving debris into said substantially hollow interior of said housing, in debris receiving relation with respect to a surface being cleaned.

9. The debris plowing pick-up head of claim 1, further comprising a selectively openable and closable door means operatively mounted on said debris plowing pick-up head for selectively opening and closing said suctioning front opening.

10. The debris plowing pick-up head of claim 1, further comprising means for urging large debris towards said suctioning front opening.

11. The debris plowing pick-up head of claim 10, wherein said means for urging large debris towards said suctioning front opening comprises a front wall comprising left and right sloped portions that are each sloped rearwardly and inwardly, and wherein said debris inlet is disposed at said front portion between said left and right sloped portions, in debris receiving relation with respect to a surface being cleaned.

12. The debris plowing pick-up head of claim 11, wherein said left and right sloped portions comprise a "V"-shaped front wall portion of said housing, wherein said suctioning front opening is disposed at the vertex of said "V"-shaped front wall portion.

13. The debris plowing pick-up head of claim 1, wherein said suctioning front opening is disposed generally centrally in the front of said housing.

14. The debris plowing pick-up head of claim 1, wherein said dust and debris outlet is disposed in the back of said housing.

15. The debris plowing pick-up head of claim 1, wherein said dust and debris outlet is generally centrally disposed in said back of said housing.

16. The debris plowing pick-up head of claim 1, wherein said openable and closeable door means comprises at least one door member mounted in hinged relation on said housing.

17. The debris plowing pick-up head of claim 1, wherein said at least one door member is mounted so as to open inwardly into the substantially hollow interior of said housing.

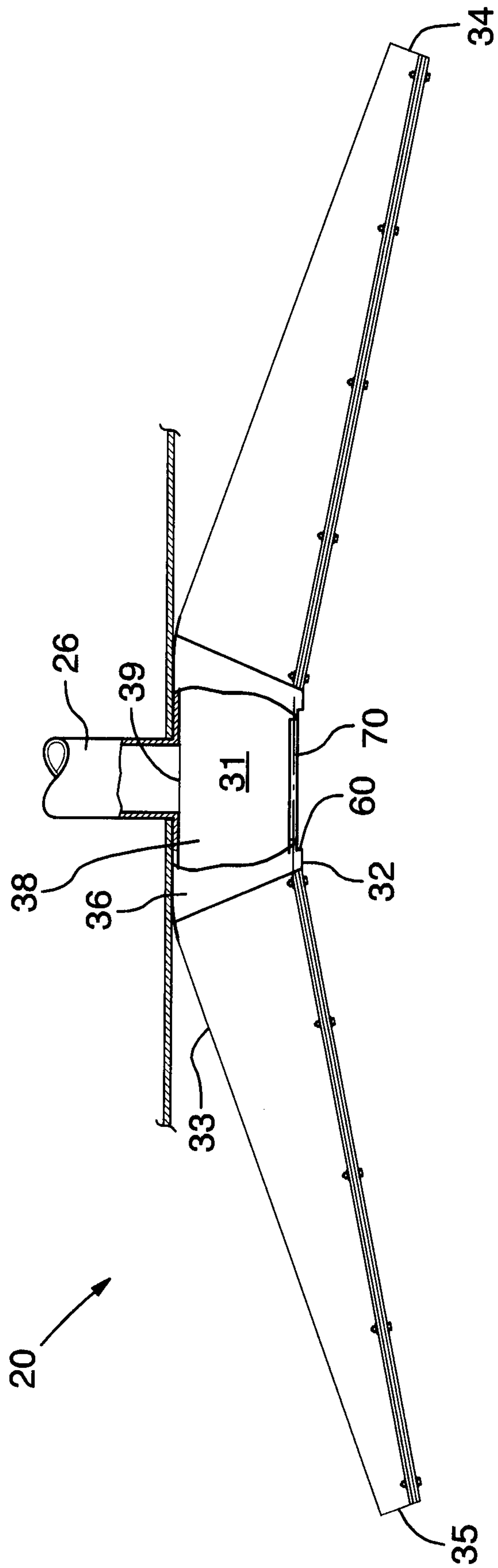


FIG.2

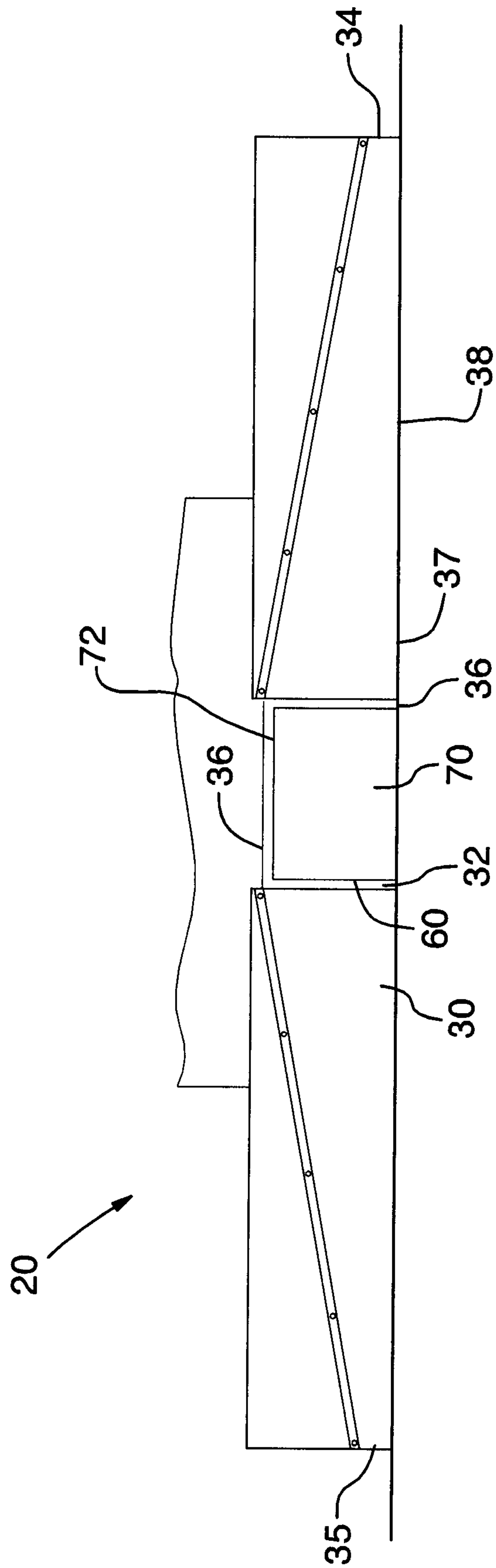


FIG.3

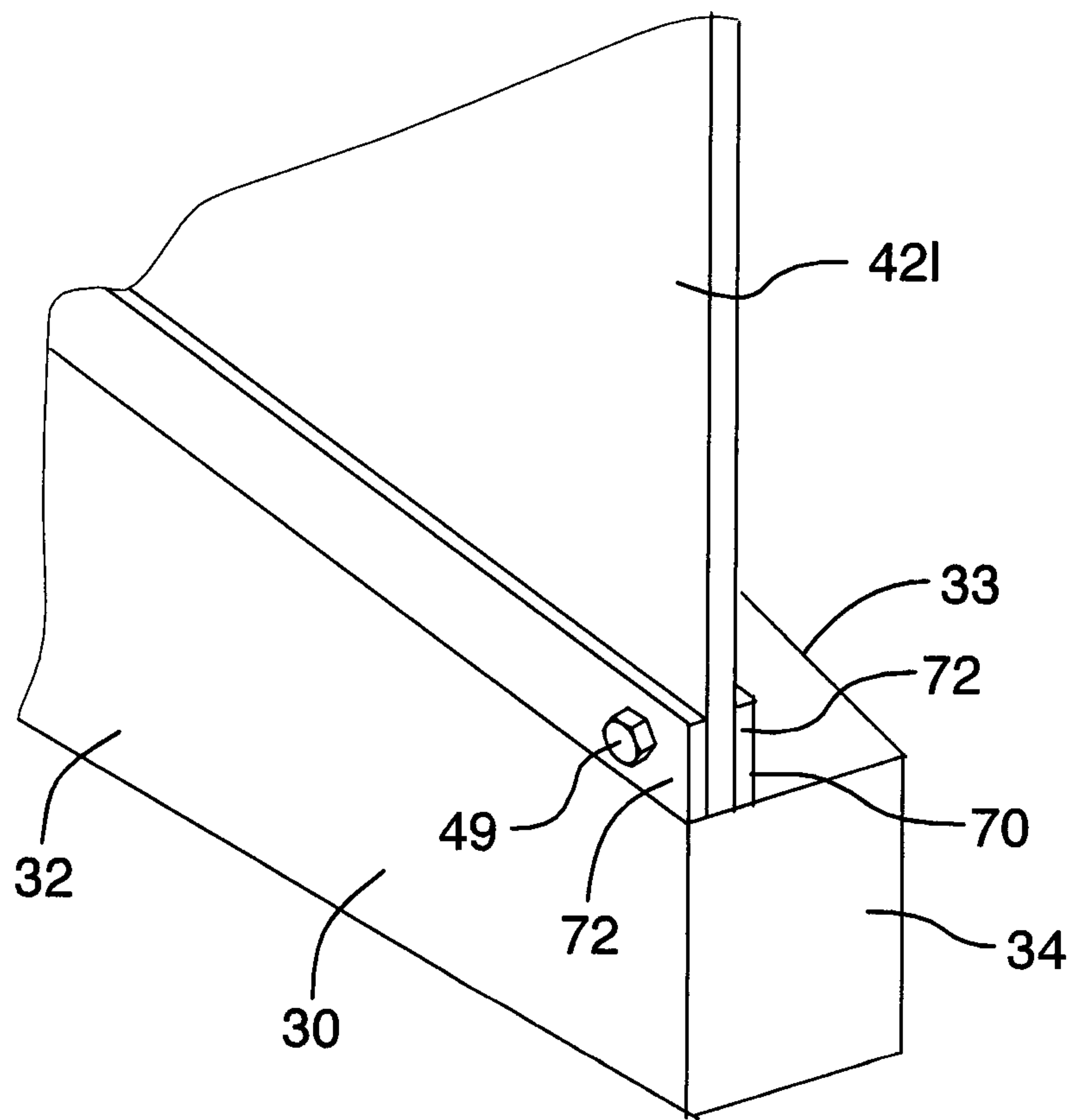


FIG.4

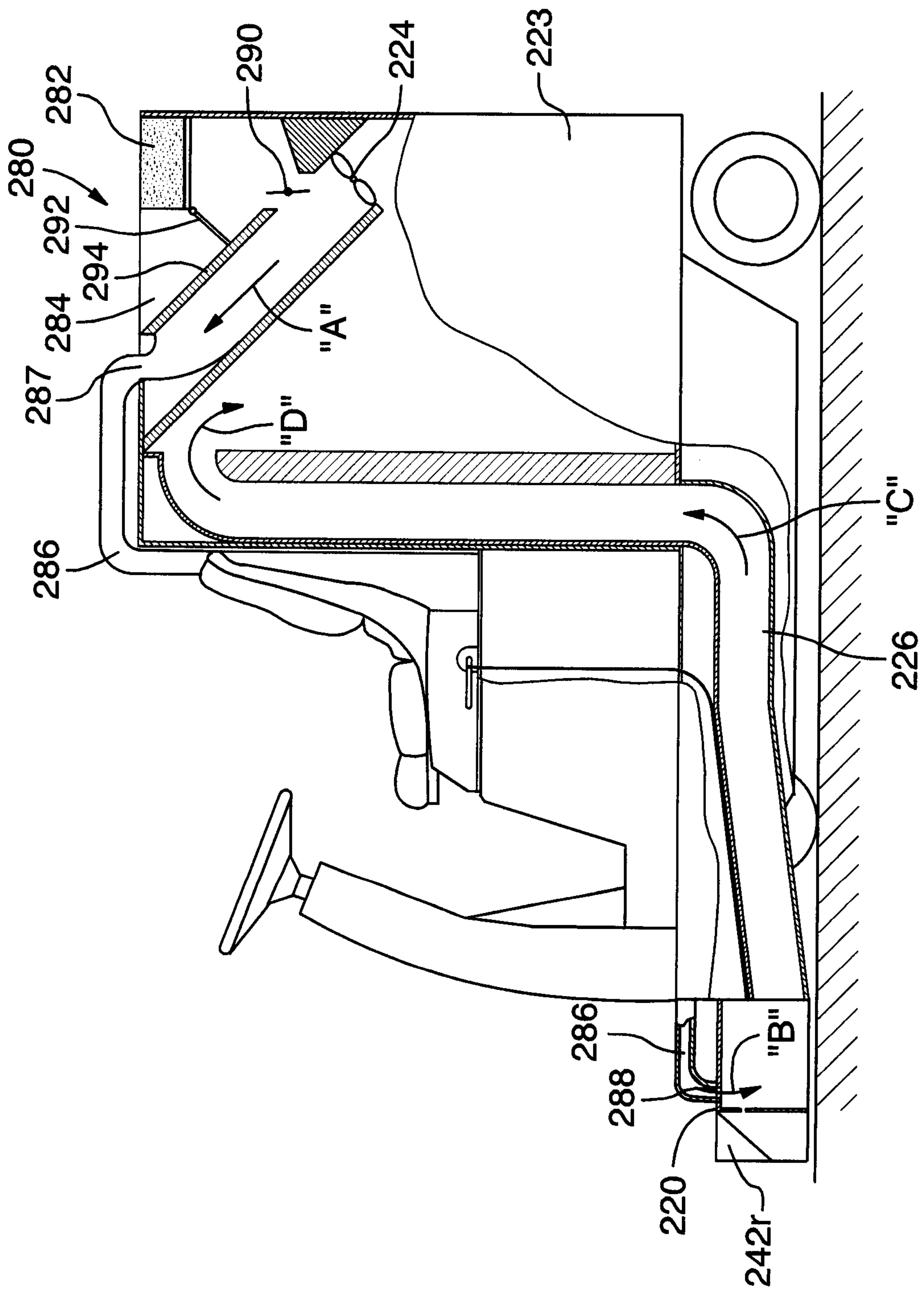


FIG.5

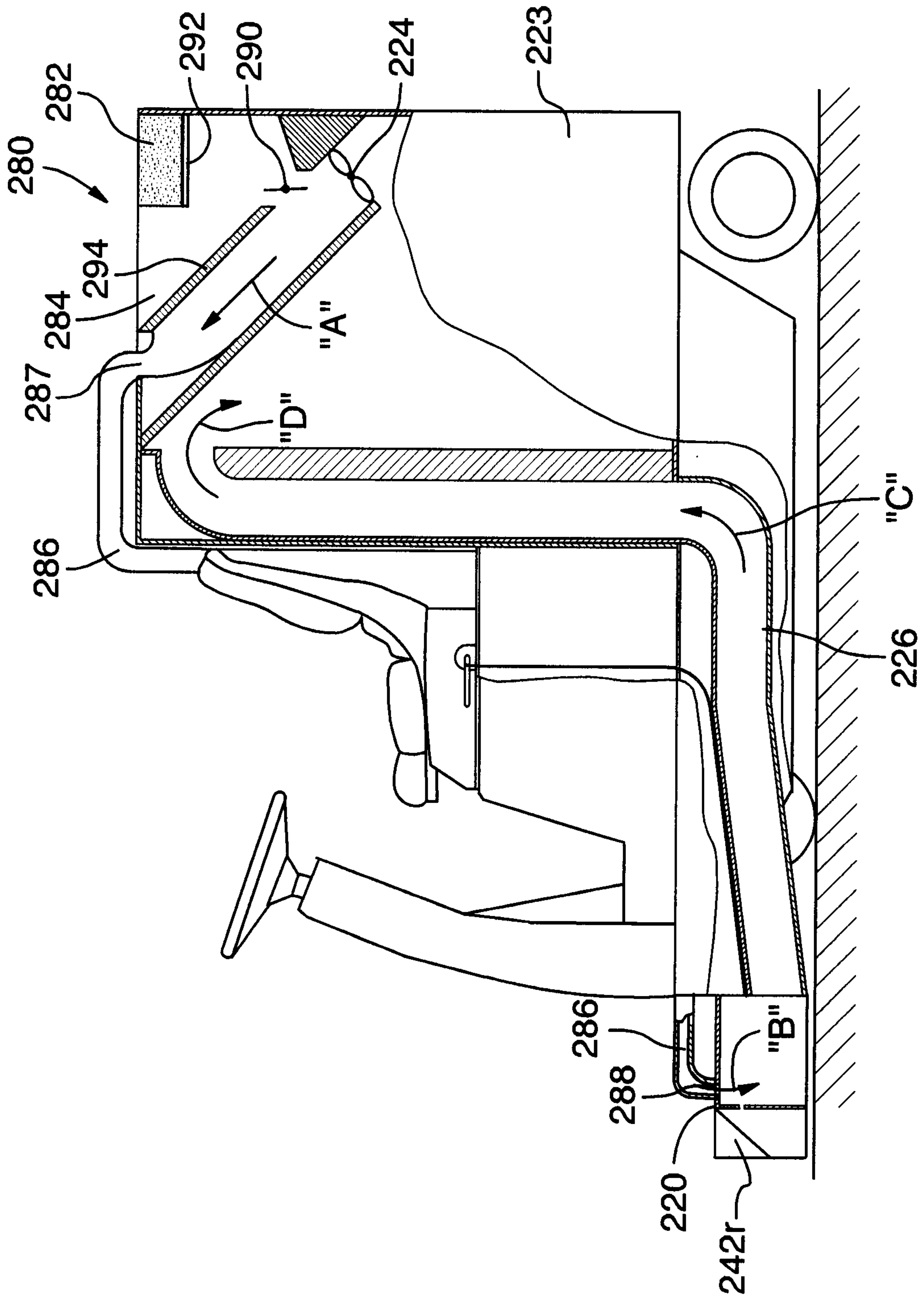


FIG.6

