上述したように、集塵部３の連結嵌合部３Ａの外径寸法は、本体部２の連結嵌合部２Ｂの内部に嵌め入れることができる寸法に設定され、さらに、連結嵌合部３Ａの外表面には、突起９が設けられ、連結嵌合部２Ｂには、突起９を受入れるための受入穴１０が設けられている。集塵部３の連結嵌合部３Ａを本体部２の連結嵌合部２Ｂの内部に嵌め入れることにより、突起９が受入穴１０内に嵌り込み、本体部２と集塵部３との連結状態が許容される。

【0024】

同様に、集塵部３と延長管５との連結嵌合部の連結状態を許容する構成について、図１０から図１３を参照して説明する。図１０は、延長管５の吸引口６側に集塵部３を連結させた状態を示す図であり、図２に示す場合に相当する。また、図１１は、図１０の分離状態を示す図である。さらに、図１２は、図１１中ＸＩＩで囲まれた領域の部分拡大図であり、図１３は、図１１中ＸＩＩＩで囲まれた領域の部分拡大図である。

【0025】

集塵部３の連結嵌合部３Ａの外径寸法は、延長管５の連結嵌合部５Ｂの内部に嵌め入れることができる寸法に設定され、さらに、連結嵌合部３Ａの外表面には、突起９が設けられ、連結嵌合部５Ｂには、突起９を受入れるための受入穴１２が設けられている。集塵部３の連結嵌合部３Ａを延長管５の連結嵌合部５Ｂの内部に嵌め入れることにより、突起９が受入穴１２内に嵌り込み、本体部２と延長管５との連結状態が許容されることになる。

【0026】

ここで、把手部４の連結嵌合部４Ｂに集塵部３の連結嵌合部３Ａを嵌め入れようとしても、突起９が邪魔になり、把手部４を直接集塵部３に連結させることはできない。このようにして、集塵部３の連結嵌合部３Ａへの、本体部２の嵌合（図１、図３の状態）と延長管５の勘合（図２の状態）とを許容し、その他は嵌合できないようにすることを可能としている。

【0027】

以上、集塵部３は、本体部２に対して着脱可能であるため、集塵部３から漏れた微細塵が集塵部３に付着した場合にも、集塵部３を単独で分離させて、水洗い等により集塵部３のみを完全に清掃することが可能になる。また、図１に示す把手部４側への荷重の集中、図２に示す把手部４側と吸引口６側とへの荷重の分散、図３に示す吸引口６側への荷重の集中の３態様を容易に選択することが可能になり、操作者の好みに応じて適宜嵌合パターンを選択することを可能としている。

【0028】

また、様々な嵌合パターンを可能としながらも、必然的に、集塵部３が本体部２の吸引口６側に連結される構成を採用していることから、嵌合誤りを確実に防止することを可能としている。

【0029】

（集塵部３の具体的構成）

次に、集塵部３の具体的構成について、図１４および図１５を参照して説明する。なお、図１４は、集塵部３に本体部２が直接連結された状態を示す図であり、図１および図３の嵌合パターンに相当する。また、図１５は、図１４中ＸＶで囲まれた領域の部分拡大断面図である。

【0030】

本実施の形態における集塵部３には、縦長形状の旋回式塵埃分離方式（サイクロン方式）構造が採用され、延長管５からの流入空気（塵埃含む）は、旋回加速部１３および塵埃分離部１４によって、空気中から塵埃が遠心分離され、空気のみが上方の内筒１５に流入して電動送風機１側に流れる。分離された塵埃１６は、カップ１７の底部に蓄えられる。

【0031】

このように、集塵部３に縦長形状の旋回式塵埃分離方式構造を採用することにより、吸込口６と本体部２との間の管状部材の一部を集塵部３として代用することができる。これにより、延長管５を短縮化や、延長管５を用いない構成の採用が可能となり、装置構成の

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簡略化を図ることが可能になる。また、分離された塵埃１６は、カップ１７の底部に蓄えられることから、容易に、塵埃１６の廃棄を行なうことができる。さらに、その構成上から、塵埃１６の量は、空気流れに影響を与えないことから、安定した吸引力を得ることができる。

【0032】

なお、本実施の形態において集塵部３に旋回式塵埃分離方式構造を採用した場合について説明したが、旋回式塵埃分離方式構造に限定されるものでなく、フィルタ型の集塵構造を採用することも可能である。

【0033】

したがって、今回開示した上記実施の形態はすべての点で例示であって、限定的な解釈の根拠となるものではない。したがって、本発明の技術的範囲は、上記した実施の形態のみによって解釈されるのではなく、特許請求の範囲の記載に基づいて画定される。また、特許請求の範囲と均等の意味および範囲内でのすべての変更が含まれる。

【図面の簡単な説明】

【0034】

【図1】本実施の形態における縦型電気掃除機の第１嵌合パターンを示す全体構成側面図である。

【図2】本実施の形態における縦型電気掃除機の第２嵌合パターンを示す全体構成側面図である。

【図3】本実施の形態における縦型電気掃除機の第３嵌合パターンを示す全体構成側面図である。

【図4】図３に示す第３嵌合パターンを一例にした場合の、嵌合領域の連結嵌合部の外径関係を模式的に示す分離図である。

【図5】図４中のＶで囲まれる領域の部分拡大断面図である。

【図6】本実施の形態における縦型電気掃除機の本体部の吸引口側に集塵部を連結させた状態を示す図である。

【図7】図６の分離状態を示す図である。

【図8】図７中ＶＩＩＩで囲まれた領域の部分拡大図である。

【図9】図７中ＩＸで囲まれた領域の部分拡大図である。

【図10】本実施の形態における縦型電気掃除機の延長管の吸引口側に集塵部を連結させた状態を示す図である。

【図11】図１０の分離状態を示す図である。

【図12】図１１中ＸＩＩで囲まれた領域の部分拡大図である。

【図13】図１１中ＸＩＩＩで囲まれた領域の部分拡大図である。

【図14】本実施の形態における縦型電気掃除機の集塵部に本体部が直接連結された状態を示す図である。

【図15】図１４中ＸＶで囲まれた領域の部分拡大断面図である。

【図16】従来の縦型電気掃除機の全体構成を示す第１側面図である。

【図17】従来の縦型電気掃除機の全体構成を示す第２側面図である。

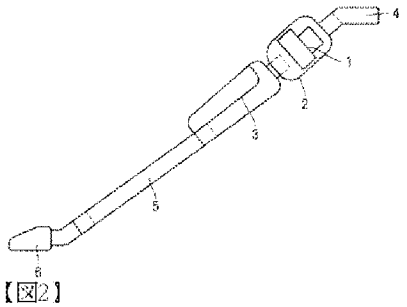
【符号の説明】

【0035】

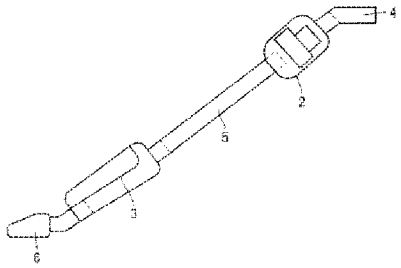
１　電動送風機、２　本体部、２Ａ，２Ｂ，３Ａ，３Ｂ，４Ｂ，５Ａ，５Ｂ，６Ａ　連結嵌合部、３　集塵部、４　把手部、５　延長管、６　吸引口、９　突起、１０，１２　受入穴、１３　旋回加速部、１４　塵埃分離部、１５　内筒、１６　塵埃、１７　カップ。

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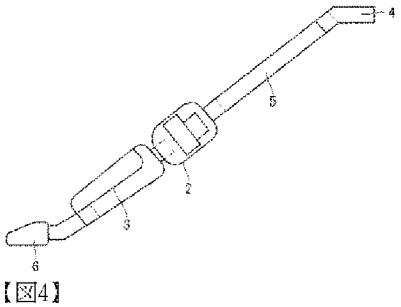
【図1】



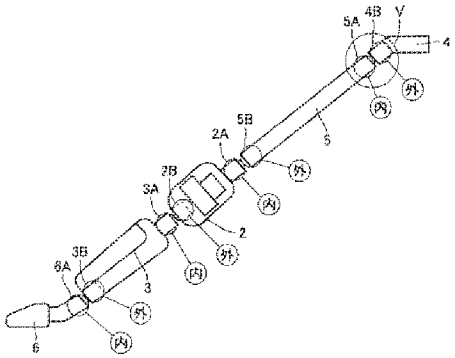
【図2】



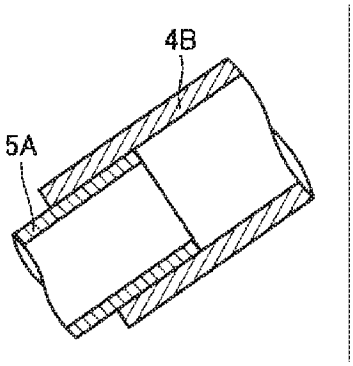
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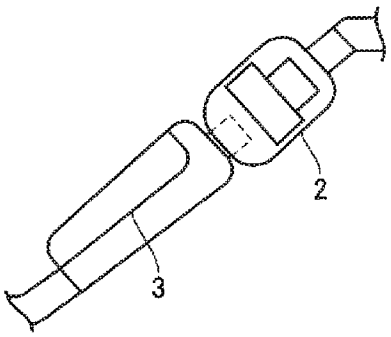
【図4】



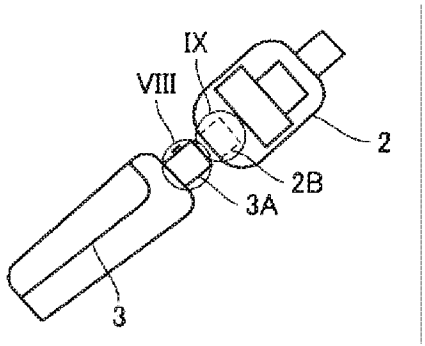
【図5】



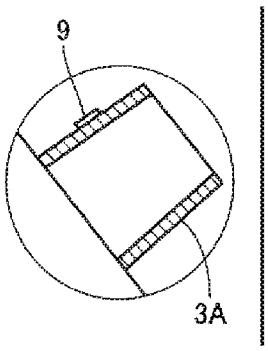
【図6】



【図7】

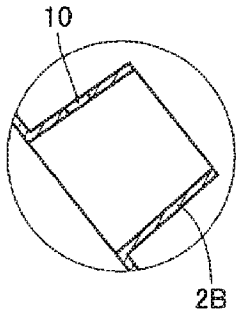


【図8】

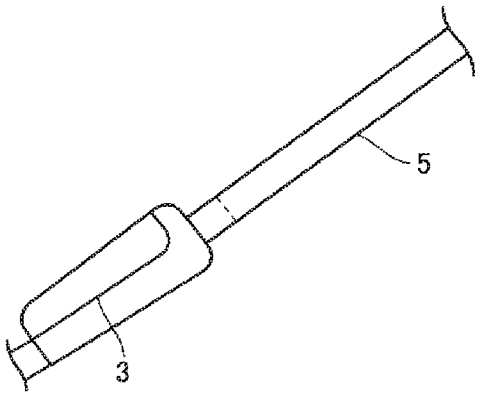


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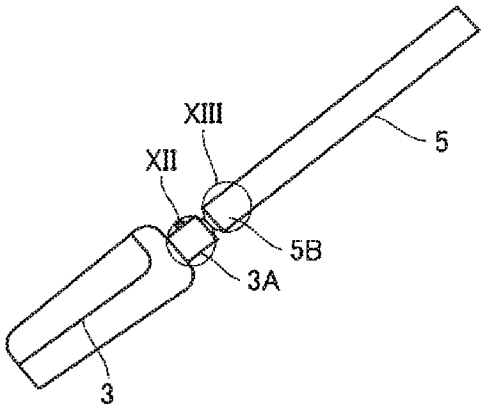
【図9】



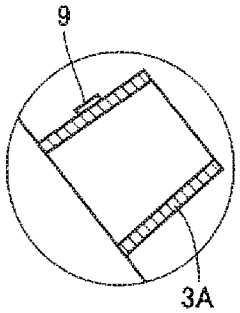
【図10】



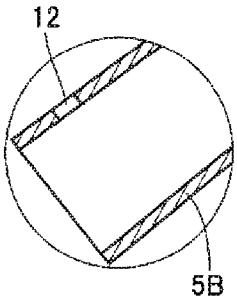
【図11】



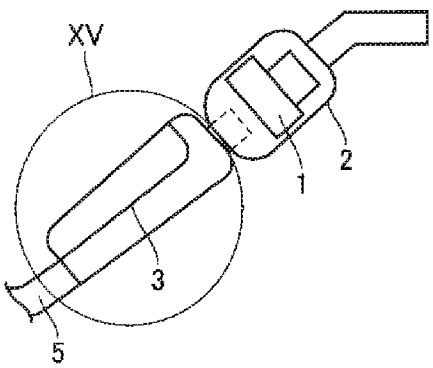
【図12】



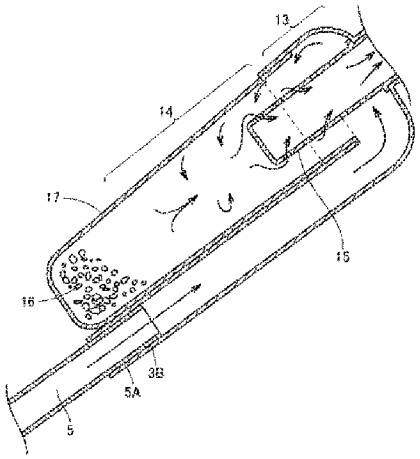
【図13】



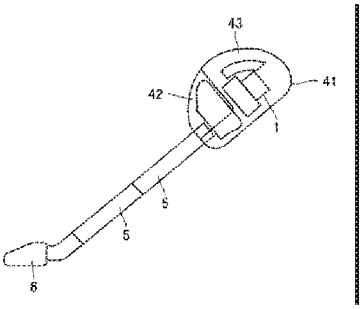
【図14】



【図15】

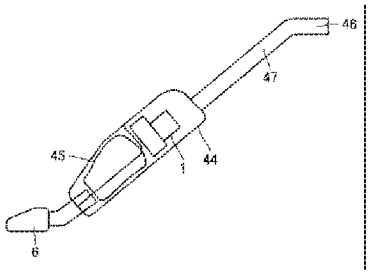


【図16】



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【図17】



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Ｆターム(参考) 3B062 AG01　AH02

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CYCLONE TYPE VACUUM CLEANER

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Inventor(s): YAMADA TAKESHI ±

Applicant(s): TSUIN BADO KOGYO KK ±

Classification: - international: ***A47L9/16; B04C5/04; B04C5/12;*** (IPC1-7): A47L9/16; B04C5/04; B04C5/12

- cooperative:

Application number: JP20020373533 20021225

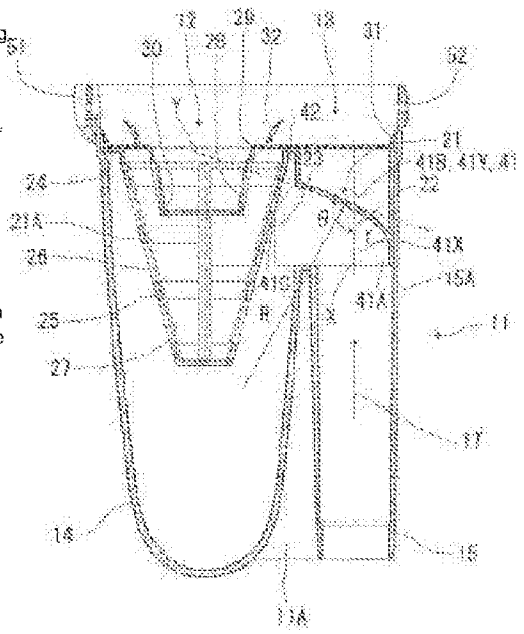
Priority number(s): JP20020373533 20021225

Also published as: JP3876833 (B2)

Abstract of JP2004201875 (A)

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PROBLEM TO BE SOLVED: To provide a cyclone type vacuum cleaner which has a simple and small shape and where dust is less prone to stick to the inner wall of a direction changing part. ;SOLUTION: The direction changing part 41 for changing the direction of an air current is formed between an air intake passage 17 and a whirlpool generating means 21. The direction changing part 41 is formed so that the moving direction of the air current in the channel of the direction changing part 41 can be in the state of a circularly curved line and so that the moving direction of the air current at the terminal of the direction changing part 41 can form an angle being an obtuse angle larger than 90[deg.] with respect to the moving direction of the air current in the intake passage 17.; The direction changing part 41 is formed by continuously connecting a first curved surface part 41X which is provided at a longitudinal port part 41A being an upstream side and which has a smaller radius (r), that is, which has a large curvature with a second curved surface part 41Y which is provided at a horizontal port part 41C being a downstream side and which has a larger radius R, that is, which has a small curvature. The dust included in the air current passing through the direction changing part 41 is never pushed to the inner wall of the direction changing part 41. ;COPYRIGHT: (C)2004,JPO&NCIPI



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DESCRIPTION JP2004201875

The present invention in a simple and compact shape, provide the dust adheres to the inner wall of the direction conversion part difficult to cyclonic vacuum cleaner. A to form a direction changing section 41 to convert the direction of the air flow between the intake passage 17 and the vortex generating means 21. Along with the traveling direction of the air flow in the flow path of the direction changing section 41 is an arc curve shape, angle θ is 90 degrees traveling direction of the air flow at the end of the direction changing section 41 with respect to the traveling direction of the air flow of the intake passage 17 forming the direction changing section 41 in such a way that a larger obtuse angle. The direction changing section 41, having a smaller radius r, which is provided on the upstream side serving vertical mouth 41A, i.e. a large first curved portion 41X of curvature, ne magnitude of the radius R provided on the downstream side serving as lateral opening 41C, that is to form the small second curved portion 41Y of curvature in the continuously connect it. Never dust contained in the air flow through the direction changing portion 41 is pressed against the inner wall of the direction changing section 41. FIELD 5

Cyclonic vacuum cleaner

[0001] [Field of the invention The present invention relates to a cyclone type vacuum cleaner, to a cyclonic vacuum cleaner diverting prior to vortex the particular air flow containing dust is introduced into the cyclone tube. [0002] Background of the Invention Conventionally, this kind of cyclonic vacuum cleaner are mounted centrifugal force dust collection section (the cyclone tube) detachable from the cleaner body to the electric blower is incorporated, the air containing through the intake passage dust by introducing the tangential direction of the inner peripheral surface of the centrifugal force dust collection section, the dust was separated and air by centrifugal force as the vortex air containing introduced dust in the centrifugal force dust collection section, centrifuging the separated dust to accumulate in the bottom of the force dust collection section. And, these cyclonic vacuum cleaner, since the length direction and the axial direction of the centrifugal force dust collection portion of the intake passage is almost parallel, the introduction of air containing dust through the air intake passage to the centrifugal force collecting the dust part to form a direction changing portion for redirecting the airflow to the downstream side of the intake passage. Then, the direction changing section is formed by connecting the straight portions extending horizontally straight portion substantially extending substantially vertically curved portions (for example, see Patent Document 1.). [0003] [Patent Document 1] JP 2001-37687 JP (Fig. 1) [0004] An object of the invention is to provide a However, in these cyclonic vacuum cleaner, for example, when sucked dust such as paper dust certain size, will adhere dust to the inner wall of the direction changing part collide, the air flow through the direction changing portion not only result in inhibition, and to stop the electric blower, dust there is a risk that would fall from the suction of the vacuum cleaner peeled off from the inner wall of the direction conversion unit. This is because the straight portion of the direction changing portion is substantially perpendicular, is believed to be due to dust become pressed against the substantially horizontal inside wall of the direction changing part by substantially vertically elevated air flow. Then, such a phenomenon, the curvature of the curved portion is large (i.e., the air flow is abruptly diverted) is remarkable when. Furthermore, reducing the curvature of the curvilinear portions of the direction changing portion in an attempt to solve such problems when (i.e., airflow gently to turnaround) and, because the curved portion is increased, the whole vacuum cleaner would in size, if it is tried to avoid upsizing has a problem that the shape of the direction changing unit becomes complicated. [0005] The present invention solves the above problems, in a simple and compact configuration, and an object thereof is to provide a dust adheres to the inner wall of the direction changing portion hardly cyclonic vacuum cleaner.

[0006] In order to solve the problem] The cyclonic vacuum cleaner of claim 1 of the present invention, introduced a cleaner body having an electric blower, the a vacuum cleaner cyclone barrel is detachably attached to the main body, the air flow containing the dust into the cyclone cylinder an intake passage, the cyclonic vacuum cleaner having a swirl generator for the vortex airflow introduced into the cyclone cylinder by the intake passage, the direction of the air flow between the intake passage and the downstream generation means forming a direction changing section for converting, with the progress direction of the airflow in the flow path of the direction changing portion is curved, the traveling direction

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of the air flow at the end of the direction changing section to the traveling direction of the air flow of the intake passage the on so that the larger obtuse than 90 degrees is obtained by forming the direction changing section. [0007] By the present invention the configuration described above, when driving the electric blower, after the air flow containing the dust passes through the intake passage is gradually diverted in the curved direction changing section, the cyclone barrel by vortex generating means in becomes vortex, dust is separated by centrifugal force. [0008] Further, cyclonic vacuum cleaner according to claim 2 of the present invention, the air flow containing a cleaner body having an electric blower, and a cyclone tube provided detachably with respect to the cleaner body, a dust cyclone barrel an intake passage for introducing the, in the cyclonic vacuum cleaner having a vortex generating means to swirl the introduced airflow in the cyclone cylinder by the intake passage, of the air flow between the intake passage and the vortex generating means to form the direction conversion section for converting the direction, this cyclone along with the traveling direction of the air flow in the channel in this direction conversion portion is curved, the traveling direction of the airflow at the end of the direction conversion unit at the cyclone cylinder it is obtained by forming the direction changing unit so as to be perpendicular to the axis of the cylinder. [0009] By the present invention the configuration described above, when driving the electric blower, after the air flow containing the dust passes through the intake passage is gradually diverted in the curved direction changing section, the cyclone barrel by vortex generating means in becomes vortex, dust is separated by centrifugal force. [0010] Further, cyclonic vacuum cleaner according to claim 3 of the present invention resides in that in Claim 1 or 2, the direction changing section, and a big first curved portion of curvature provided on the upstream side, disposed downstream and a small second curved portion of curvature which is constituted by successively connecting it. [0011] The present invention by be configured as described above, the path of the air flow is formed so as to reach the small second curved portion of the curvature through the large first curved portion of curvature from the straight intake passage.

[0012] Furthermore, cyclonic vacuum cleaner according to claim 4 of the present invention resides in that in Claim 1 or 3, provided with the direction changing section and the filter to the vortex generating means, between the termination and the filter of the direction changing portion it is obtained by forming the groove. [0013] By the present invention is to be constituted as described above, between the direction conversion portion and a filter, a gap of at least the groove of width for the air flow to pass through is formed. [0014] [Embodiment of the invention] Hereinafter, the first embodiment of the present invention will be described with reference to FIGS. 1-8 Incidentally, in the embodiment of the present invention, based on the orientation of Figures 1-3, to define a longitudinal and vertical [0015] In Figures 1 to 3, 1 is a cleaner body. This vacuum cleaner main body 1, an electric motor 2, has been a fan 3 mounted provided on the rotating shaft of the electric motor 2, these motor 2 and the electric blower 4 in the fan 3 is formed. Further, wherein the lower portion of the cleaner body 1, substantially has the guide portion 5 and the lower end 5A is formed flat in a short cylindrical shape is provided, the guide portion 5, the suction holes 6 downwardly opened form together they are, by the suction holes 6, the lower the electric blower 4 of the guide portion 5 are communicated with each other. Further, the guide portion 5, the protective frame 7 so as to cover the suction holes 6 are formed. Further, on the front side of the guide portion 5 is movable hook 8 is provided. Further, in the rear of the guide portion 5 together with the protrusions 9 which projects downward is formed on the side of the convex portion 9, the fixed hook 10 which protrudes rearward is formed. Thus, the cleaner main body 1 is constructed in a simple structure. [0016] Wherein the lower cleaner body 1, the dust collecting portion 11 made of resin is attached detachably. This dust collecting unit 11 includes a first opening 12 serving opening the guide portion 5 is inserted into one end thereof serving as the upper, second opening 13 in which the convex portion 9 is inserted. Then, the below the first opening 12, substantially cylindrical cyclone tube 14 and a bottomed lower becomes slightly thinner at bottom is provided detachable from the cleaner body 1. Further, the below the second opening 13, axially and and inner surface substantially parallel to the cyclone tube 14 together with the cylindrical inlet portion 15 is formed, a cyclone tube 14 and the inlet section 15 is the same it is integrally formed by a member. Then, the lower end of the inlet portion 15, a suction port body serving nozzle 16 is detachably attached, form an intake passage 17 for introducing the air flow containing the dust into the cyclone barrel 14 through these inlet section 15 and the nozzle 16 to.

[0017] Further, the first opening 12 and second opening 13, swirl generating means serving vortex generating member 21 to vortex is provided a gas flow that is introduced into the cyclone barrel 14 through the intake passage 17. The vortex generating member 21 is composed of a conical part 21A of the downward substantially conical, the direction changing section 41 for converting the direction of airflow to the conical portion 21A and formed inlet wall 22 and below together with . And it is configured so as to open the inlet port 23 in one tangential direction S of the side wall of the cyclone tube 14. That is, the introduction wall 22 is configured to introduce so as to connect substantially linearly with the air flow containing dust from the inlet portion 15 to one of the tangent S direction of the cyclone tube 14. Accordingly, the air flow has been raised inlet section 15 is introduced toward the one tangential direction S of the side wall of the cyclone barrel 14 through the introduction walls 22 and later redirecting portion 41, the air stream which is introduced into the cyclone barrel 14 it is adapted to the vortex. [0018] The vortex generating member 21 is conical portion 21A on the first opening 12, the introduction wall 22 and the direction changing section 41 to the second opening 13 is detachably attached to the dust collecting unit 11 correspondingly. By introducing wall 22 and the direction changing section 41 is mounted between the introduction section 15 side and the second opening 13, together with the upper end of the introduction portion 15 is closed, the upper and upper end of the inlet section 15 of the cyclone tube 14 introducing port 23 to the side wall between the neighborhood is formed. [0019] Further, the conical units 21A, a flange portion 24 for mounting to the stepped portion 14A between the first opening portion 12 and the cyclone tube 14, and the flange portion 24 and conical base portion 25 formed integrally with, the and the air vent 26 provided on a side surface of the base 25, and a filter 27 provided in the vent holes 26. Further, the upper portion of the vortex generating member 21, the filter member 29 is provided with bag-shaped filter 28 is provided. Frame 30

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of the filter member 29 is made of a soft resin or rubber, closely sealing portion 31 formed on the outer periphery of the frame 30 relative to the inner periphery of the first opening 12 and second opening 13 possible are organized. Further, the upper portion of the frame 30 has a lip portion 32 is formed, when attaching the dust collecting unit 11 to vortex generating member 21 and the filter member 29 is attached to the cleaner main body 1, the lip portion 32 it is tightly configured to be capable of the lower end 5A of the guide portion 5 so as to surround the air inlet 6. [0020]

Further, between the intake passage 17 and the vortex generating member 21, to introduce the inlet portion 15 introducing port 23 is bent smoothly in the direction of air flow has been raised to a cyclone barrel 14, a direction to convert the direction of the air flow conversion unit 41 is provided on the reverse L-shaped. The direction changing unit 41 is provided integrally with the vortex generating member 21, inlet that is formed so as to connect substantially straight and the downstream portion 15A of the straight inlet section 15, to one of the tangent S direction of the cyclone tube 14 between the wall 22, communicating with the upper side of the vertical mouth portion 41A and the longitudinally-facing mouth portion 41A which communicates with the downstream portion 15A, through the arc-shaped wall portion 41B to protrude diagonally upward, in the cyclone barrel 14 sideways opening 41C to which are connected communication. Furthermore, arc-shaped wall section 41B, the upstream side, a first curved portion 41X is a curved surface having a radius r which is provided i.e. vertically mouth portion 41A side, disposed downstream, i.e. lateral opening portion 41C side radius and a second curved portion 41Y is a curved surface R is formed continuously connect it. Incidentally, the radius r of the first curved portion 41X is smaller than the radius R of the second curved portion 41Y, thus the first curved portion 41X is formed larger curvature than the second curved portion 41Y. In addition, the axis Y of the end of the second curved portion 41Y in the arc-shaped wall portion 41B, and thus the axis Y of the termination and the coaxial sideways opening 41C, traveling direction X of the air flow of the intake passage 17, and thus the axis of the inlet section 15 the direction is formed so as to intersect, the intersecting angle (inner angle) .theta a large obtuse angle than 90 degrees traveling direction of the air flow at the end of the direction changing part 41 with respect to the traveling direction of the air flow of the intake passage 17 It has become. That is, of the intersection angle between the tangent and the axis X of the end of the second curved portion 41Y is, the angle of the upper side has a larger obtuse than 90 degrees, the traveling direction of the air flow at the end of this result turnaround section 41 There becomes a large obtuse angle than 90 degrees with respect to the traveling direction of the air flow of the intake passage 17. [0021] In addition, the end of the direction changing section 41, and thus and landscape opening 41C side, so that the distance L between the conical portion 21A of the vortex generation member 21 is formed, between the lateral opening 41C and the filter 27 forming a groove 42. [0022] Further, the front side of the first opening 12, with the first receiving portion 51 tc be engaged with the movable hook 8 is formed, on the rear side of the second opening portion 13, the fixed hook 10 the second receiving portion 52 which is engaged is formed. Incidentally, 11A are ribs, in order to increase the rigidity of the particulate collection portion 11 and connects them are integrally formed between the cyclone tube 14 and the inlet section 15.

[0023] Incidentally, 61 is a grip portion which is detachably attached with respect to the cleaner body 1. Further, these cleaner body 1 and the grip portion 61 are respectively hook portion 62 and 63 formed, capable of power cord 64 extending from the cleaner main body 1 between those hook portion 62 and 63 wound it is configured. Furthermore, the switch operation unit 65 is provided on the grip portion 61. [0024] Next, the operation of this embodiment will be described. First, the user attaches the vortex generating member 21 and the filter member 29 to the first opening 12 and second opening 13 of the dust collecting unit 11. At this time, the sealing portion 31 of the filter member 29 are in close contact with the inner wall of the first opening 12 and second opening 13. Then, after the second receiving portion 52 of the dust collecting unit 11 to the fixing hook 10 engaged with, by causing the first receiving portion 51 engaged with the movable hook 8, the dust collecting unit 11 to the cleaner body 1 it is mounted on. At this time, together with the guide portion 5 is inserted into the first opening 12, that the protrusions 9 is inserted into the second opening 13, the dust collecting unit 11 is positioned with respect to the cleaner body 1 . And, the lip portion 32 of the filter member 29, to close the lower end 5A of the guide portion 5 so as to surround the air intake hole 6. Thereby, the path leading from the cyclone tube within 14 to air inlet 6 is sealed. Furthermore, attaching the nozzle 16 to the lower end of the inlet section 15 [0025] Then, unplug the power cord 64 from the hook portions 62, 63, and operates the switch operation unit 65 is inserted into an electrical outlet (not shown), the electric blower 4 is driven. Then, the driving of the electric blower 4, the air flow containing the dust is sucked from the nozzles 16. This airflow is sucked from the nozzle 16 tc increase the introduction section 15, at the upper end of this introduction section 15, along with the leading sideways opening 41C from vertical mouth portion 41A through the arc-shaped wall portion 41B, the arc-shaped wall part 41B is a first curved face portion 41X (small radius r) large curvature provided vertically mouth portion 41A side, the curvature provided in the lateral opening section 41C side small (of radius R large) the second curved face connecting a part 41Y continuously, and direction changing unit 41 which angle θ in the traveling direction of the air flow at the end is a major obtuse than 90 degrees with respect to the traveling direction of the air flow of the intake passage 17 of the direction changing section 41 together veer along the introduction walls 22, it is introduced from the inlet 23 toward the one tangential direction S of the side wall of the cyclone tube 14 to the cyclone barrel 14.

At this time, the air flow containing the dust sucked from the nozzles 16, even if it contains dust such as paper dust certain size, when this dust collides with the arcuate wall portion 41B of the direction changing section 41 , this arcuate wall portion 41B airflow obtuse θ along, i.e., to gradually diverted somewhat upward, it is possible to prevent the dust adheres tc this position is pressed against the direction changing section 41, It is introduced into the cyclone barrel 14 riding on the airflow. [0026] Then, the airflow introduced into the cyclone tube 14 becomes a vortex along an inner circumferential surface of the cyclone tube 14 through the groove 42, it will be lowered spirally. At this time, dust contained in the vortex will be pressed against the inner circumferential surface of the cyclone tube 14 by centrifugal force. Then, the vortex flow and reaches the bottom of the cyclone tube 14, vortex which

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has been lowered at the inner peripheral surface side of the cyclone tube 14 starts to rise in the vicinity of the center of the cyclone tube 14. At this time, as described above, as the dust contained in the vortex because it is pressed against the inner circumferential surface of the cyclone tube 14 by centrifugal force, vortex flows in the vicinity of the center from the inner circumferential surface of the cyclone barrel 14 also, relatively coarse dust will be directly remain in the vicinity of the inner circumferential surface of the cyclone tube 14, it is separated from the vortex. [0027] On the other hand, relatively fine dust, moved to the vicinity of the center of the cyclone barrel 14 and mixed in the vortex, will rise in the cyclone barrel 14 with an increase in the vortex. Then, the increased vortex flow will pass through the vent holes 26 formed in the side surface of the upper vortex generating member 21. At this time, relatively fine dust contained in the vortex, the trapped by the filter 27 which is attached to the vent hole 26, and further passed through the filter 27, finer dust is above the vortex generating member 21 it is collected by the filter 28 of the filter member 29 provided on the. Then, the airflow that has passed through the filter 27 and the filter 28 of the filter member 29 of the vortex generation member 21, reaches from the air inlet 6 to the electric blower 4, further cleaner body 1 exits to the outside. [0028] After the cleaning is finished, after removing the nozzle 16 from the lower end of the inlet section 15, remove the dust collection unit 11 from the cleaner body 1 by operating the moveable hook 8. Then, remove the filter member 29 and the vortex generation member 21 from the first opening 12 and second opening 13, to remove dust adhered to the filter 27. Also, throw away the accumulated dust in the cyclone barrel 14 to the Trash.

At this time, since the cyclone tube 14 and inlet portion 15 to the dust collecting portion 11 is integrally formed, it is possible not only to discard the dust in the cyclone tube 14 easily, with a light collecting unit 11 dust had accumulated in the inlet section 15 can be easily removed. Therefore, it is possible in the middle cleaning will inhale sheet or the like, even if clogged the inlet section 15 and the inlet 23, is easily removed. Further, the dust collection unit 11 because it is integrally made of resin, is washable, thus, it can be a cyclone tube 14 and the inlet section 15 to the more clean state if wash. [0029] In the embodiment as described above, the change of direction 41 for converting the direction of airflow formed between the intake passage 17 and the vortex generating means, the traveling direction of the airflow in the flow path of the direction changing portion 41 is arcuate such as well as a curved, the direction changing section 41 so that the angle θ traveling direction of the air current relative to the traveling direction of the air flow of the intake passage 17 at the end is larger obtuse than 90 degrees of the direction changing section 41 formed, and to drive the electric blower 4, because the air flow containing the dust passing through the intake passage 17 is gradually diverted an arc curved direction changing section 41, dust contained in the airflow passing through the direction changing section 41 There never pressed against the inner wall of the direction changing section 41. Further, an end of the direction changing section 41, i.e. the traveling direction of airflow in the direction of the axis Y of the lateral opening 41C of the arcuate wall portion 41B has, conventionally is 90 degrees with respect to the traveling direction of the air flow of the intake passage 17 compared to the structure of, even dust and the structure not pressed against the direction changing unit, the whole cleaner is never large. [0030] In addition, the direction changing section 41, a small radius r, which is provided on the upstream side serving vertical mouth portion 41A, and a great first curved portion 41X ie curvature, radius was provided on the downstream side serving sideways opening 41C R leading to large, that is a small second curved portion 41Y of the curvature constituted by continuously connecting thing, of curvature from a straight line of the intake passage 17 through a large first curved portion 41X of curvature small second curved portion 41Y of since the path of the air current is formed so as the resistance together with the can be reduced, it can also be reduced in size as compared with the case of forming the direction changing section 41 in the curved section of a single curvature. [0031] In addition, the direction changing section 41 and the filter 27 provided with the vortex generating means 21, the end of the direction changing section 41, that is, the groove 42 is formed between the lateral opening 41C and the filter 27, the direction changing section between the 41 and the filter 27, air flow gaps L of at least the grooves 42 of a width to pass is formed, it will not be clogged dust in between the filter 27 at the end of the direction changing section 41.

[0032] Next, a second embodiment of the present invention will be described with reference to FIG. Note that the first embodiment and the same parts are denoted by the same reference numerals, and detailed description thereof is omitted. [0033] In the second embodiment, the direction changing section 41 for converting the direction of the inverted L-shaped air flow is provided between the intake passage 17 and the vortex generating member 21 is provided integrally with the vortex generating member 21, and a downstream portion 15A of the straight introduction part 15, between one of the introduction wall 22 formed so as to connect substantially linearly in the tangential direction S of the cyclone tube 14, vertical mouth portion communicating with the downstream portion 15A upward of 41 a and the longitudinally-facing mouth 41 a, through the arc-shaped wall portion 41 B to protrude diagonally upward, it is a sideways opening 41 C, which communicates within the cyclone barrel 14 that communicatively connected. Note that the lateral opening 41 C, when fitted with a swirl generating means 21 to the dust collecting unit 11 is configured to lie within the cyclone barrel 14. In addition, the arc-shaped wall portion 41 B is, the upstream side, that is, the first curved portion 41 X is a curved surface of radius r, which is provided in a vertical orientation mouth portion 41 A side, the downstream side, ie sideways opening 41 C side and a second curved portion 41 Y-is a curved surface having a radius R which is provided consists of a continuous connecting it. Incidentally, the radius r of the first curved portion 41 X-is smaller than the radius R of the second curved portion 41 Y-, thus the first curved portion 41 X-is formed larger curvature than the second curved portion 41 Y-. In addition, the second curved portion 41 Y axis Z of the termination in the arc-shaped wall portion 41 B, and thus the termination and the axis Z of the coaxial sideways opening 41 C is, the axis X of this cyclone barrel 14 in the cyclone barrel 14 it is formed so as to be orthogonal to. In other words, the tangent and the axis X and the angle of the end of the second curved portion 41 Y-is a right angle, as a result, the arc-shaped wall portion 41 Bs of the direction changing section 41 has a traveling direction of air flow together with an obtuse angle to the traveling direction of the air flow of the intake passage 17, the

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traveling direction of the air flow at the end of the direction changing section 41, in the cyclone barrel 14, with respect to the traveling direction of the air flow of the intake passage 17 it is 90 degrees on. [0034] When the electric blower is driven, air flow containing dust is sucked from the nozzles 16. This airflow is sucked from the nozzle 16 to increase the introduction section 15, at the upper end of this introduction section 15, change of direction that leads to sideways opening 41 C from vertical mouth portion 41 A through an arc-shaped wall portion 41 B the parts 41 and introduction wall 22 formed toward one tangential direction S of the side wall of the cyclone tube 14, toward the inlet 23 in one tangential direction S of the side wall of the cyclone tube 14, into the cyclone barrel 14 It is.

At this time, the arc-shaped wall portion 41 B of the rate of the song, which is provided to the vertical mouth portion 41 A side large (of radius r small) and the first curved portion 41 X, was of curvature provided sideways opening 41 C side small and (large radius R) second curved portion 41 Y-is formed continuously connects it, in the traveling direction of the airflow in the traveling direction of airflow the intake passage 17 in the circular arc-shaped wall portion 41 Bs since that is the obtuse angle against, as dust such as paper dust certain magnitude is included in the air flow was increased the intake passage 17 is sucked from the nozzle 16, the dust on the arcuate wall portion 41 Bs upon collision, the air flow along the arc-shaped wall portion 41 Bs is obtuse, i.e., in order to gradually diverted somewhat upwards, that the dust adheres to this position is pressed against the direction changing section 41 is prevented, it is introduced into the cyclone tube 14 ride on the air current. Further, the circular arc-shaped wall portion 41 Bs and landscape opening 41 C is formed continuously, the traveling direction of the angle of the airflow at the end of the lateral opening 41 C within the cyclone barrel 14, this since it is configured so as to be orthogonal to the axis X of the cyclone tube 14, the air flow was increased the intake passage 17 is introduced smoothly into the cyclone cylinder 14. [0035] As described above, to form a direction changing section 41 for converting the direction of the airflow, the traveling direction of the airflow in the flow path of the direction changing portion 41 is arcuate curve between the intake passage 17 and the swirl generating means together with a Jo, in which the traveling direction of the air flow at the end of the direction changing portion 41 forms the direction changing section 41 so as to be orthogonal to the axis X of the cyclone tube 14 at the cyclone barrel 14 Yes, and to drive the electric blower, air flow containing the dust passing through the intake passage 17 after the gentle change of direction in the curved direction changing section 41, becomes a vortex within the cyclone barrel 14 by the vortex generating means 21, centrifugal since the dust by the force are separated, never dust contained in the air flow through the direction changing portion 41 is pressed against the inner wall of the direction changing section 41. Further, if the curvature of the direction changing section 41 is the same, as compared with the conventional structure to convert the direction of the air flow outside the cyclone tube 14, the entire vacuum cleaner can be downsized. [0036] The present invention is not limited to the above embodiments, within the scope of the gist of the present invention, and various modifications can be made. [0037]

Effect of the Invention The cyclonic vacuum cleaner of claim 1 of the present invention, introduced a cleaner body having an electric blower, the a vacuum cleaner cyclone barrel is detachably attached to the main body, the air flow containing the dust into the cyclone cylinder an intake passage, the cyclonic vacuum cleaner having a swirl generator for the vortex airflow introduced into the cyclone cylinder by the intake passage, the direction of the air flow between the intake passage and the vortex generating means forming a direction changing section for converting, with the progress direction of the airflow in the flow path of the direction changing portion is curved, the traveling direction of the air flow at the end of the direction changing section to the traveling direction of the air flow of the intake passage on is obtained by forming the direction changing portion such that the larger obtuse than 90 degrees, when driving the electric blower, the air flow containing the dust passes through the intake passage is gradually diverted in the curved direction changing portion because, without the dust contained in the air flow through the direction changing portion is pressed against the inner wall of the direction changing unit, thus dust not only be less likely to adhere to the direction changing section, the curvature of the direction changing portion if There is the same, that the traveling direction of the air flow at the end of the direction changing portion as compared with the conventional structure that is 90 degrees to the direction of movement of the air flow of the intake passage, the size of the entire vacuum cleaner it can. [0038] Further, cyclonic vacuum cleaner according to claim 2 of the present invention, the air flow containing a cleaner body having an electric blower, and a cyclone tube provided detachably with respect to the cleaner body, a dust cyclone barrel an intake passage for introducing the, in the cyclonic vacuum cleaner having a vortex generating means to swirl the introduced airflow in the cyclone cylinder by the intake passage, of the air flow between the intake passage and the vortex generating means to form the direction conversion section for converting the direction, this cyclone along with the traveling direction of the air flow in the channel in this direction conversion portion is curved, the traveling direction of the airflow at the end of the direction conversion unit at the cyclone cylinder is obtained by forming the direction changing unit so as to be perpendicular to the axis of the cylinder, driving the electric blower, after the air flow containing the dust passes through the intake passage is gradually diverted in the curved direction changing section, it becomes vortex within the cyclone barrel by vortex generating means, since the dust is separated by centrifugal force, without dust contained in the air flow through the direction changing portion is pressed against the inner wall of the direction changing unit, thus dust turnaround not only can be unlikely to adhere to the part, if the a direction changing portion the curvature of the same, as compared with the conventional structure to convert the direction of the air flow outside the cyclone tube, the size of the entire vacuum cleaner be able to.

[42]

[0039] Further, cyclonic vacuum cleaner according to claim 3 of the present invention resides in that in Claim 1 or 2, the direction changing section, and a big first curved portion of curvature provided on the upstream side, disposed downstream it is in a small second curved portion of curvature that is

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constituted by continuously connecting thing, the path of the air flow to reach the small second curved portion of curvature through a big first curved portion of curvature from a straight line of the intake passage because There is formed, resistance can be reduced, also can be miniaturized as compared with the case of forming the direction changing section in the curved portion of a single curvature. [0040] Furthermore, cyclonic vacuum cleaner according to claim 4 of the present invention resides in that in Claim 1 or 3, provided with the direction changing section and the filter to the vortex generating means, between the termination and the filter of the direction changing portion It is obtained by forming the groove, between the direction changing section and the filter, because the gap of at least the groove width for the air flow passes is formed, the dust between the filter member at the end of the direction changing portion is prevented is clogged. BRIEF DESCRIPTION OF THE DRAWINGS 1 is a front view of a cyclonic vacuum cleaner showing a first embodiment of the present invention. [Figure 2] id., It is a side view. [Figure 3] Id., Is an enlarged cross-sectional view. [Figure 4] id., Is a side view of the dust collecting part, [Figure 5] id., It is a cross-sectional view of the dust collecting part. [6] id., Is a plan view of the dust collecting part. [7] Id., It is a bottom view of the vortex generating member. [8] id., is a perspective view of a vortex generating member. 9 is a sectional view of a main portion of the cyclonic vacuum cleaner of a second embodiment of the present invention. Description of the code] 1 vacuum cleaner body 4 electric blower 11 Cyclone barrel 21 Vortex generation member (vortex generating means) 27 filter 41, 41 diverting part 41X, 41 X first curved portion 41Y, 41 Y second curved portion 42 Groove portion The traveling direction of the X airflow X axis

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CLAIMS JP2004201875

1.

A cleaner body having an electric blower, and a cyclone tube provided detachably with respect to the cleaner body, an intake passage for introducing the air flow containing dust into the cyclone cylinder, in the cyclone cylinder by the intake passage in the cyclone-type vacuum cleaner having a vortex generating means for the introduced airflow in the vortex, the direction conversion section for converting the direction of the air flow is formed between the intake passage and the vortex generating means, in this direction conversion unit together with the traveling direction of the air flow in the flow path is curved, the direction changing section and the direction changing unit as the traveling direction of the air flow becomes larger obtuse than 90 degrees with respect to the traveling direction of the air flow of the intake passage at the end of the cyclonic vacuum cleaner is characterized in that to form.

2.

A cleaner body having an electric blower, and a cyclone tube provided detachably with respect to the cleaner body, an intake passage for introducing the air flow containing dust into the cyclone cylinder, in the cyclone cylinder by the intake passage in the cyclone-type vacuum cleaner having a vortex generating means for the introduced airflow in the vortex, the direction conversion section for converting the direction of the air flow is formed between the intake passage and the vortex generating means, in this direction conversion unit together with the traveling direction of the air flow in the flow path is curved, the traveling direction of the air flow at the end of the direction changing portion is formed the direction changing unit so as to be perpendicular to the axis of the cyclone tube at the cyclone cylinder cyclonic vacuum cleaner according to claim.

3.

Claims, characterized in that said direction changing section, and a big first curved portion of curvature provided on the upstream side, and constituted by connecting the small second curved portion of curvature is provided on the downstream side continuous claim 1 or 2 cyclonic vacuum cleaner according.

4.

Provided with the direction changing section and the filter to the vortex generating means, cyclonic vacuum cleaner according to claim 1 or 3, wherein the forming the groove portion between the terminal end and the filter of the direction changing section.

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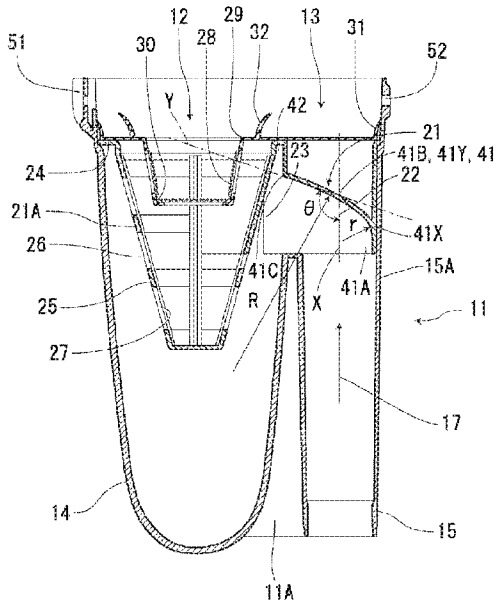
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(54)【発明の名称】サイクロン式電気掃除機

(57)【要約】
【課題】単純且つ小型形状で、方向転換部の内壁に塵が付着しにくいサイクロン式電気掃除機を提供する。
【解決手段】吸気通路17と渦流発生手段21との間に気流の方向を転換する方向転換部41を形成する。方向転換部41の流路における気流の進行方向が円弧な曲線状であると共に、方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して角度θが９０度より大きな鈍角となるように前記方向転換部41を形成する。方向転換部41を、上流側たる縦向き口部41Aに設けられた半径Ｒの小さな、即ち曲率の大きな第一曲面部41Xと、下流側たる横向き口部41Cに設けられた半径Ｒの大きな、即ち曲率の小さな第二曲面部41Ｙとを連続的に繋ぐことで形成する。方向転換部41を通過する気流に含まれる塵　が方向転換部41の内壁に押し付けられることがない。
【選択図】　図５



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【特許請求の範囲】
【請求項１】
電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したことを特徴とするサイクロン式電気掃除機。
【請求項２】
電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前記方向転換部を形成したことを特徴とするサイクロン式電気掃除機。
【請求項３】
前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したことを特徴とする請求項１又は２記載のサイクロン式電気掃除機。
【請求項４】
前記渦流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したことを特徴とする請求項１又は３記載のサイクロン式電気掃除機。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明はサイクロン式の電気掃除機に関するものであり、特に塵　を含んだ気流をサイクロン筒内に導入して渦流とする前に方向転換させるサイクロン式掃除機に関するものである。
【０００２】
【従来の技術】
従来、この種のサイクロン式電気掃除機は、電動送風機が内蔵された掃除機本体に対して遠心力集塵部（サイクロン筒）を着脱自在に取り付け、吸気通路を通った塵　を含む空気を前記遠心力集塵部の内周面の接線方向に導入することで、導入された塵　を含む空気を遠心力集塵部内で渦流として遠心力によって塵　を空気と分離させ、分離された塵　を遠心力集塵部の底部に集積させる。そして、これらのサイクロン式電気掃除機は、吸気通路の長さ方向と遠心力集塵部の軸方向がほぼ平行であるため、吸気通路を通る塵　を含む空気を遠心力集塵部内に導入するために、吸気通路の下流側に気流を方向転換させるための方向転換部を形成している。そして、この方向転換部は、略垂直に延びる直線状の部位と略水平に延びる直線状の部位とを曲線状の部位で繋ぐことで形成されている（例えば、特許文献１参照。）。
【０００３】
【特許文献１】
特開２００１－３７６８７号公報（図１）
【０００４】
【発明が解決しようとする課題】

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しかしながら、これらのサイクロン式掃除機においては、例えば、ある大きさの紙ゴミ等の塵を吸引した場合、方向転換部の内壁に塵が衝突して付着してしまい、方向転換部を通る気流を阻害してしまうばかりでなく、電動送風機を停止させると、塵が方向転換部の内壁から剥がれて掃除機の吸込部から落下してしまうという虞があった。これは、方向転換部の直線状の部位が略直交しているため、略垂直に上昇した気流によって方向転換部の略水平な内壁に塵が押しつけられてしまうためであると思われる。そして、このような現象は、曲線状の部位の曲率が大きい（即ち、気流が急激に方向転換される）場合に顕著である。更に、このような問題を解決しようとして方向転換部の曲線状部位の曲率を小さく（即ち、気流が緩やかに方向転換するように）した場合、曲線部分が大きくなってしまうため、掃除機全体として大型化してしまい、大型化を避けようとした場合には方向転換部の形状が複雑になってしまうという問題があった。

【０００５】

本発明は以上の問題点を解決し、単純且つ小型形状で、方向転換部の内壁に塵が付着しにくいサイクロン式電気掃除機を提供することを目的とする。

【０００６】

【課題を解決するための手段】

本発明の請求項１のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と下流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したものである。

【０００７】

本発明は以上のように構成することにより、電動送風機を駆動すると、吸気通路を通過する塵を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵が分離される。

【０００８】

また、本発明の請求項２のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前記方向転換部を形成したものである。

【０００９】

本発明は以上のように構成することにより、電動送風機を駆動すると、吸気通路を通過する塵を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵が分離される。

【００１０】

また、本発明の請求項３のサイクロン式電気掃除機は、請求項１又は２において、前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したものである。

【００１１】

本発明は以上のように構成することにより、直線状の吸気通路から曲率の大きな第一曲面部を経て曲率の小さな第二曲面部に至るように気流の経路が形成される。

【００１２】

更に、本発明の請求項４のサイクロン式電気掃除機は、請求項１又は３において、前記渦

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流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したものである。

【００１３】

本発明は以上のように構成することにより、前記方向転換部とフィルタとの間に、気流が通過するための少なくとも溝部の幅の間隙が形成される。

【００１４】

【発明の実施形態】

以下、本発明の第一実施形態について、図１～図８に基づいて説明する。なお、本発明の実施形態においては、図１～図３の姿勢を基準として、前後及び上下を規定する。

【００１５】

図１～図３において、１は掃除機本体である。この掃除機本体１内には、電動機２と、この電動機２の回転軸に取り付けられたファン３が設けられており、これら電動機２とファン３で電動送風機４が構成されている。また、前記掃除機本体１の下部には、略短円筒状で且つ下端５Ａが平坦に形成されたガイド部５が設けられており、このガイド部５に、下方が開放した吸気孔６が形成されていると共に、この吸気孔６によって、前記ガイド部５の下方と電動送風機４とが連通している。また、前記ガイド部５には、吸気孔６を覆うように保護枠７が形成されている。また、前記ガイド部５の正面側には可動フック８が設けられている。更に、前記ガイド部５の後方には下方に突出した凸部９が形成されていると共に、この凸部９の側面に、後方に突出した固定フック10が形成されている。このように、掃除機本体１は単純な構造に構成されている。

【００１６】

前記掃除機本体１の下方には、樹脂製の集塵部11が着脱自在に取り付けられている。この集塵部11には、その一端たる上部に前記ガイド部５が挿入される開口部たる第一開口部12と、凸部９が挿入される第二開口部13が形成されている。そして、前記第一開口部12の下方には、有底で且つ下方がやや細くなった有底な略円筒状のサイクロン筒14が掃除機本体１に対して着脱自在に設けられる。さらに、前記第二開口部13の下方には、前記サイクロン筒14の軸方向と略平行で且つ内面が円筒状の導入部15が形成されていると共に、サイクロン筒14と導入部15は同一の部材によって一体に形成されている。そして、前記導入部15の下端には、吸込口体たるノズル16が着脱自在に取り付けられて、これら導入部15とノズル16によりサイクロン筒14内に塵　を含む気流を導入する吸気通路17を形成する。

【００１７】

また、第一開口部12及び第二開口部13には、吸気通路17によって前記サイクロン筒14内に導入された気流を渦流にする渦流発生手段たる渦流発生部材21が設けられている。この渦流発生部材21は、下向きの略円錐形状の円錐部21Ａと、この円錐部21Ａと一体に形成された導入壁22及び後述する気流の方向を転換する方向転換部41とで構成されている。そして、サイクロン筒14の側壁の一方の接線方向Ｓに導入口23を開放するように構成されている。すなわち、導入壁22が、導入部15からの塵　を含む気流をサイクロン筒14の一方の接線Ｓ方向へ略直線的に結ぶように導入するように構成されている。したがって、導入部15を上昇してきた気流は、導入壁22及び後述する方向転換部41によってサイクロン筒14の側壁の一方の接線Ｓ方向へ向かって導入され、サイクロン筒14内に導入された気流を渦流にするようになっている。

【００１８】

前記渦流発生部材21は、第一開口部12に円錐部21Ａ、第二開口部13に導入壁22及び方向転換部41が対応して集塵部11に対し着脱自在に取り付けられている。導入壁22及び方向転換部41が前記導入部15側と第二開口部13の間に取り付けられることで、導入部15の上端が閉塞されると共に、サイクロン筒14の上部と導入部15の上端近傍の間の側壁に導入口23が形成される。

【００１９】

また、円錐部21Ａは、前記第一開口部12とサイクロン筒14の間の段部14Ａに載置するフランジ部24と、このフランジ部24と一体に形成された円錐状の基部25と、前記基部25の側面

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に設けられた通風口26と、この通風口26に設けられたフィルタ27とで構成されている。また、前記渦流発生部材21の上部には、袋状のフィルタ28が設けられたフィルタ部材29が設けられている。このフィルタ部材29の枠30は軟質樹脂又はゴムで形成されており、この枠30の外周に形成されたシール部31が前記第一開口部12及び第二開口部13の内周に対して密接可能に構成されている。また、前記枠30の上部にはリップ部32が形成されており、渦流発生部材21及びフィルタ部材29が取り付けられた集塵部11を掃除機本体1に取り付けた際に、前記リップ部32が前記吸気孔6を囲むようにガイド部5の下端5Aと密接可能に構成されている。

【００２０】

そして、吸気通路17と渦流発生部材21の間には、導入部15を上昇してきた気流の方向をスムーズに曲げて導入口23からサイクロン筒14に導入するために、気流の方向を転換する方向転換部41が逆L字状に設けられる。この方向転換部41は、渦流発生部材21に一体に設けられ、直線状の導入部15の下流部15Aと、サイクロン筒14の一方の接線S方向へ略直線的に結ぶように形成された導入壁22との間に、下流部15Aと連通する縦向き口部41Aと該縦向き口部41Aの上方に、斜め上向きに突設する円弧状壁部41Bを介して、サイクロン筒14内に連通する横向き口部41Cを連通接続したものである。さらに、円弧状壁部41Bは、上流側、すなわち縦向き口部41A側に設けられた半径rの曲面である第一曲面部41Xと、下流側、すなわち横向き口部41C側に設けられた半径Rの曲面である第二曲面部41Yとを連続的に繋ぐことで構成されている。なお、前記第一曲面部41Xの半径rは第二曲面部41Yの半径Rよりも小さく、従って第一曲面部41Xは第二曲面部41Yよりも曲率が大きく形成されている。さらに、円弧状壁部41Bにおける第二曲面部41Yの終端の軸線Y、ひいては該終端と同軸な横向き口部41Cの軸線Yと、吸気通路17の気流の進行方向X、ひいては導入部15の軸線方向とは交差するように形成されており、その交差角度（内角）θは、方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となっている。すなわち、第二曲面部41Yの終端の接線と軸線Xとがなす交差角度のうち、上方側の角度が９０度より大きな鈍角となっており、この結果方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となる。

【００２１】

また、前記方向転換部41の終端、ひいては横向き口部41C側と、渦流発生部材21の円錐部21Aとの間に間隔Lが形成されるように、横向き口部41Cとフィルタ27との間に溝部42を形成している。

【００２２】

更に、前記第一開口部12の前側には、前記可動フック８と係合する第一受部51が形成されていると共に、前記第二開口部13の後側には、前記固定フック10と係合する第二受部52が形成されている。なお、11Aはリブであり、集塵部11の剛性を高めるために、前記サイクロン筒14と導入部15の間に一体形成されてこれらを連結している。

【００２３】

なお、61は掃除機本体１に対して着脱自在に取り付けられた把持部である。また、これら掃除機本体１及び把持部61には、それぞれ引掛部62，63が形成されており、これら引掛部62，63の間に掃除機本体１から延出する電源コード64が巻き付け可能に構成されている。更に、前記把持部61にはスイッチ操作部65が設けられている。

【００２４】

つぎに、本実施形態の作用について説明する。まず、使用者は集塵部11の第一開口部12及び第二開口部13に渦流発生部材21及びフィルタ部材29を取り付ける。このとき、フィルタ部材29のシール部31が第一開口部12及び第二開口部13の内壁に密接する。そして、集塵部11の第二受部52を固定フック10と係合させた後、第一受部51を可動フック８と係合させることで、集塵部11が掃除機本体１に対して取り付けられる。このとき、前記ガイド部5が第一開口部12に挿入されると共に、凸部９が第二開口部13に挿入されることで、集塵部11が掃除機本体１に対して位置決めされる。そして、前記フィルタ部材29のリップ部32が、

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前記吸気孔６を囲むようにガイド部５の下端５Ａと密接する。これによって、サイクロン筒14内から吸気孔６に至る経路がシールされる。更に、前記導入部15の下端にノズル16を取り付ける。

【００２５】

そして、電源コード64を引掛部62，63から外し、図示しないコンセントに差し込んでスイッチ操作部65を操作すると、電動送風機４が駆動される。そして、この電動送風機４の駆動によって、塵　を含んだ気流がノズル16から吸い込まれる。この気流は、ノズル16から吸い込まれて導入部15を上昇し、この導入部15の上端で、縦向き口部41Ａから円弧状壁部41Ｂを介して横向き口部41Ｃに至ると共に、円弧状壁部41Ｂは縦向き口部41Ａ側に設けられた曲率の大きな（半径Ｒの小さな）第一曲面部41Ｘと、横向き口部41Ｃ側に設けられた曲率の小さな（半径Ｒの大きな）第二曲面部41Ｙとを連続的に繋ぎ、かつ方向転換部41の終端における気流の進行方向の角度θが前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となっている方向転換部41に沿って向きを変えると共に、導入壁22によって、サイクロン筒14の側壁の一方の接線方向Ｓに向って導入口23からサイクロン筒14に導入される。このとき、ノズル16から吸い込まれた塵　を含んだ気流に、ある大きさの紙ゴミ等の塵　が含まれていたとしても、この塵　が方向転換部41の円弧状壁部41Ｂに衝突した際に、この円弧状壁部41Ｂに沿って気流が鈍角θ、すなわち、やや上向きに緩やかに方向転換するため、塵　が方向転換部41に押し付けられてこの位置に付着してしまうことが防止され、気流に乗ってサイクロン筒14内に導入される。

【００２６】

そして、サイクロン筒14に導入された気流は、溝部42を通過してサイクロン筒14の内周面に沿って渦流となり、螺旋状に下降することになる。この際、この渦流に含まれる塵　は、遠心力によってサイクロン筒14の内周面に押し付けられることになる。そして、前記渦流がサイクロン筒14の底部に至ると、サイクロン筒14の内周面側で下降していた渦流はサイクロン筒14の中央付近で上昇に転じる。このとき、前述したように、渦流に含まれていた塵　は遠心力によってサイクロン筒14の内周面に押し付けられているので、渦流がサイクロン筒14の内周面側から中央付近に流れたとしても、比較的粗い塵　はそのままサイクロン筒14の内周面付近に留まることになり、渦流から分離される。

【００２７】

一方、比較的細かい塵　は、渦流に混じってサイクロン筒14の中央付近まで移動し、渦流の上昇に伴ってサイクロン筒14内を上昇することになる。そして、この上昇した渦流は、上方の渦流発生部材21の側面に形成されている通風口26を通過することになる。この際、渦流に含まれている比較的細かい塵　は、前記通風口26に取り付けられているフィルタ27によって捕集され、更にこのフィルタ27を通過した、より細かい塵　は、渦流発生部材21の上方に設けられたフィルタ部材29のフィルタ28によって捕集される。そして、渦流発生部材21のフィルタ27及びフィルタ部材29のフィルタ28を通過した気流は、前記吸気孔６から電動送風機４に至り、更に掃除機本体１外に抜ける。

【００２８】

清掃終了後、ノズル16を導入部15の下端から取り外した後、可動フック８を操作して集塵部11を掃除機本体１から取り外す。そして、フィルタ部材29及び渦流発生部材21を第一開口部12及び第二開口部13から取り外し、フィルタ27，28に付着した塵　を除去する。また、サイクロン筒14に溜まった塵　をゴミ箱に捨てる。このとき、集塵部11にはサイクロン筒14と導入部15が一体に形成されているため、サイクロン筒14内の塵　を簡単に捨てることができるばかりでなく、軽い集塵部11を持って導入部15内に溜まってしまった塵　も簡単に除去できる。従って、清掃途中でシート状物等を吸い込んでしまい、導入部15や導入口23に詰まってしまった場合でも、簡単に除去することができる。更に、前記集塵部11は樹脂で一体成形されているため、水洗いが可能であり、従って、水洗いすればサイクロン筒14及び導入部15をより一層清浄な状態にすることができる。

【００２９】

以上のように前記実施形態では、前記吸気通路17と渦流発生手段との間に気流の方向を転

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換する方向転換部41を形成し、この方向転換部41の流路における気流の進行方向が円弧な曲線状であると共に、前記方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して角度θが９０度より大きな鈍角となるように前記方向転換部41を形成し、電動送風機４を駆動すると、吸気通路17を通過する塵　を含んだ気流が円弧曲線状の方向転換部41で緩やかに方向転換するので、方向転換部41を通過する気流に含まれる塵　が方向転換部41の内壁に押し付けられることがない。また、前記方向転換部41の終端、すなわち円弧状壁部41Ｂの横向き口部41Ｃの軸線Ｙの方向における気流の進行方向が、前記吸気通路17の気流の進行方向に対して９０度である従来の構造に比べて、塵　が方向転換部に押し付けられない構造にしたとしても、掃除機全体が大型化することがない。

【００３０】

また、前記方向転換部41を、上流側たる縦向き口部41Ａに設けられた半径ｒの小さな、即ち曲率の大きな第一曲面部41Ｘと、下流側たる横向き口部41Ｃに設けられた半径Ｒの大きな、即ち曲率の小さな第二曲面部41Ｙとを連続的に繋ぐことで構成し、直線状の吸気通路17から曲率の大きな第一曲面部41Ｘを経て曲率の小さな第二曲面部41Ｙに至るように気流の経路が形成されるので、抵抗を少なくできると共に、方向転換部41を一つの曲率の曲線部で形成する場合に比べて小型化もすることができる。

【００３１】

更に、前記渦流発生手段21に前記方向転換部41及びフィルタ27を設けると共に、前記方向転換部41の終端、すなわち横向き口部41Ｃとフィルタ27との間に溝部42を形成し、前記方向転換部41とフィルタ27との間に、気流が通過するための少なくとも溝部42の幅の間隙Ｌが形成され、方向転換部41の終端においてフィルタ27との間で塵　が詰まることはない。

【００３２】

つぎに、本発明の第二実施形態について、図９に基づいて説明する。なお、第一実施形態と同一の部分には、同じ符号を付し、その詳細な説明を省略する。

【００３３】

第二実施形態においては、吸気通路17と渦流発生部材21の間に設けられる逆Ｌ字状の気流の方向を転換するための方向転換部41´は、渦流発生部材21に一体に設けられ、直線状の導入部15の下流部15Ａと、サイクロン筒14の一方の接線Ｓ方向へ略直線的に結ぶように形成された導入壁22との間に、下流部15Ａと連通する縦向き口部41´Ａと該縦向き口部41´Ａの上方に、斜め上向きに突設する円弧状壁部41´Ｂを介して、サイクロン筒14内に連通する横向き口部41´Ｃを連通接続したものである。なお、この横向き口部41´Ｃは、渦流発生手段21を集塵部11に取り付けた際に、サイクロン筒14内に位置するように構成されている。さらに、円弧状壁部41´Ｂは、上流側、すなわち縦向き口部41´Ａ側に設けられた半径ｒの曲面である第一曲面部41´Ｘと、下流側、すなわち横向き口部41´Ｃ側に設けられた半径Ｒの曲面である第二曲面部41´Ｙとを連続的に繋ぐことで構成されている。なお、前記第一曲面部41´Ｘの半径ｒは第二曲面部41´Ｙの半径Ｒよりも小さく、従って第一曲面部41´Ｘは第二曲面部41´Ｙよりも曲率が大きく形成されている。さらに、円弧状壁部41´Ｂにおける第二曲面部41´Ｙの終端の軸線Ｚ、ひいては該終端と同軸な横向き口部41´Ｃの軸線Ｚは、サイクロン筒14内においてこのサイクロン筒14の軸線Ｘ´と直交するように形成されている。すなわち、第二曲面部41´Ｙの終端の接線と軸線Ｘ´とがなす角度は直角となっており、この結果、前記方向転換部41´の円弧状壁部41´Ｂにおいては気流の進行方向が前記吸気通路17の気流の進行方向に対して鈍角となると共に、前記方向転換部41´の終端における気流の進行方向が、前記サイクロン筒14内において、前記吸気通路17の気流の進行方向に対して９０度となる。

【００３４】

そして、電動送風機が駆動されると、塵　を含んだ気流がノズル16から吸い込まれる。この気流は、ノズル16から吸い込まれて導入部15を上昇し、この導入部15の上端で、縦向き口部41´Ａから円弧状壁部41´Ｂを介して横向き口部41´Ｃに至る方向転換部41´及びサイクロン筒14の側壁の一方の接線方向Ｓに向かって形成された導入壁22によって、導入口23からサイクロン筒14の側壁の一方の接線方向Ｓに向かって、サイクロン筒14に導入され

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る。このとき、円弧状壁部41´Bは縦向き口部41´A側に設けられた曲率の大きな（半径Rの小さな）第一曲面部41´Xと、横向き口部41´C側に設けられた曲率の小さな（半径Rの大きな）第二曲面部41´Yとを連続的に繋ぐことで形成されており、この円弧状壁部41´Bにおいては気流の進行方向が前記吸気通路17の気流の進行方向に対して鈍角となっているため、ある大きさの紙ゴミ等の塵がノズル16から吸い込まれて吸気通路17を上昇した気流に含まれていたとしても、この塵が円弧状壁部41´Bに衝突した際に、この円弧状壁部41´Bに沿って気流が鈍角、すなわち、やや上向きに緩やかに方向転換するため、塵が方向転換部41に押し付けられてこの位置に付着してしまうことが防止され、気流に乗ってサイクロン筒14内に導入される。また、前記円弧状壁部41´Bと横向き口部41´Cとが連続的して形成されており、この横向き口部41´Cの終端における気流の進行方向の角度が前記サイクロン筒14内において、このサイクロン筒14の軸線X´と直交するように構成されているため、吸気通路17を上昇した気流はスムーズにサイクロン筒14内に導入される。

【００３５】

以上のように、前記吸気通路17と渦流発生手段との間に気流の方向を転換する方向転換部41´を形成し、この方向転換部41´の流路における気流の進行方向が円弧な曲線状であると共に、前記方向転換部41´の終端における気流の進行方向が前記サイクロン筒14内にてこのサイクロン筒14の軸線X´と直交するように前記方向転換部41´を形成したものであり、電動送風機を駆動すると、吸気通路17を通過する塵を含んだ気流が曲線状の方向転換部41´で緩やかに方向転換した後、渦流発生手段21によってサイクロン筒14内で渦流となり、遠心力によって塵が分離されるので、方向転換部41´を通過する気流に含まれる塵が方向転換部41´の内壁に押し付けられることがない。また、前記方向転換部41´の曲率が同じであるならば、サイクロン筒14外で気流の方向を転換させる従来の構造に比べて、掃除機全体を小型化することができる。

【００３６】

尚、本発明は上記実施形態に限定されるものではなく、本発明の要旨の範囲内において、種々の変形実施が可能である。

【００３７】

【発明の効果】

本発明の請求項１のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したものであり、電動送風機を駆動すると、吸気通路を通過する塵を含んだ気流が曲線状の方向転換部で緩やかに方向転換するので、方向転換部を通過する気流に含まれる塵が方向転換部の内壁に押し付けられることがなく、従って塵が方向転換部に付着しにくくすることができるばかりでなく、前記方向転換部の曲率が同じであるならば、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度である従来の構造に比べて、掃除機全体を小型化することができる。

【００３８】

また、本発明の請求項２のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前

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記方向転換部を形成したものであり、電動送風機を駆動すると、吸気通路を通過する塵を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵が分離されるので、方向転換部を通過する気流に含まれる塵が方向転換部の内壁に押し付けられることがなく、従って塵が方向転換部に付着しにくくすることができるばかりでなく、前記方向転換部の曲率が同じであるならば、サイクロン筒外で気流の方向を転換させる従来の構造に比べて、掃除機全体を小型化することができる。

【００３９】

また、本発明の請求項３のサイクロン式電気掃除機は、請求項１又は２において、前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したものであり、直線状の吸気通路から曲率の大きな第一曲面部を経て曲率の小さな第二曲面部に至るように気流の経路が形成されるので、抵抗を少なくでき、また方向転換部を一つの曲率の曲線部で形成する場合に比べて小型化することができる。

【００４０】

更に、本発明の請求項４のサイクロン式電気掃除機は、請求項１又は３において、前記渦流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したものであり、前記方向転換部とフィルタとの間に、気流が通過するための少なくとも溝部の幅の間隙が形成されるので、方向転換部の終端においてフィルタ部材との間で塵が詰まってしまうことが防止される。

【図面の簡単な説明】

【図１】本発明の第一の実施形態を示すサイクロン式電気掃除機の正面図である。

【図２】同上、側面図である。

【図３】同上、拡大断面図である。

【図４】同上、集塵部の側面図である、

【図５】同上、集塵部の断面図である。

【図６】同上、集塵部の平面図である。

【図７】同上、渦流発生部材の底面図である。

【図８】同上、渦流発生部材の斜視図である。

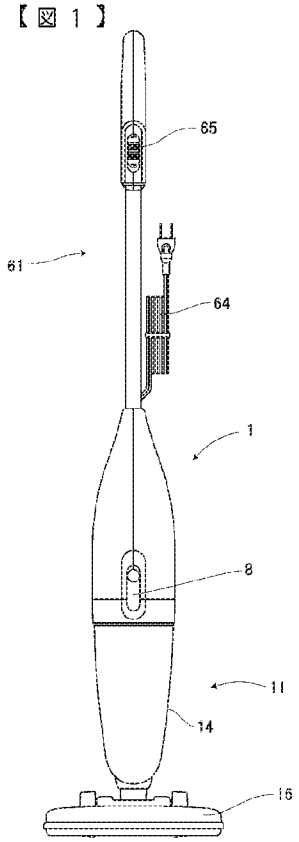
【図９】本発明の第二の実施形態を示すサイクロン式電気掃除機の要部の断面図である。

【符号の説明】

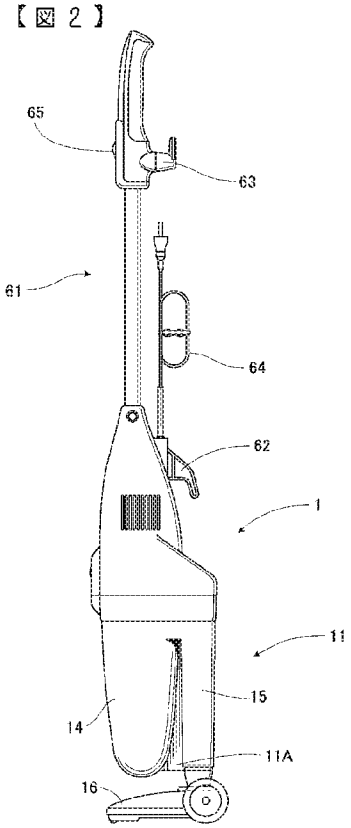
1　掃除機本体
4　電動送風機
11　サイクロン筒
21　渦流発生部材（渦流発生手段）
27　フィルタ
41，41´　方向転換部
41X，41´X　第一曲面部
41Y，41´Y　第二曲面部
42　溝部
X　気流の進行方向
X´　軸線

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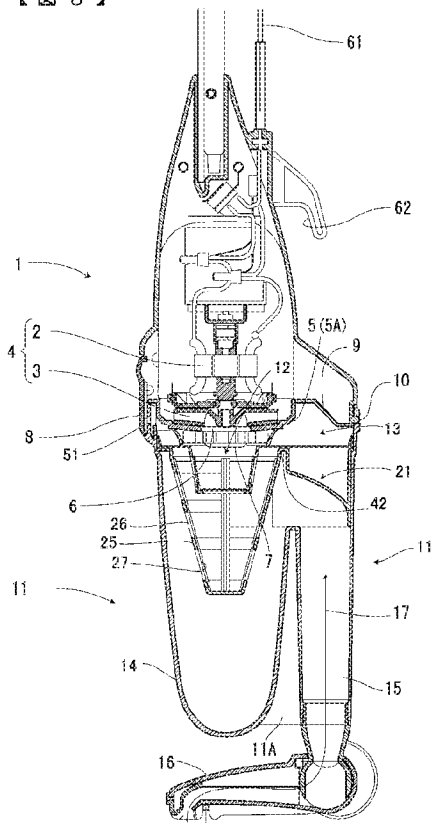
【図１】


65
61
64
1
8
11
14
16

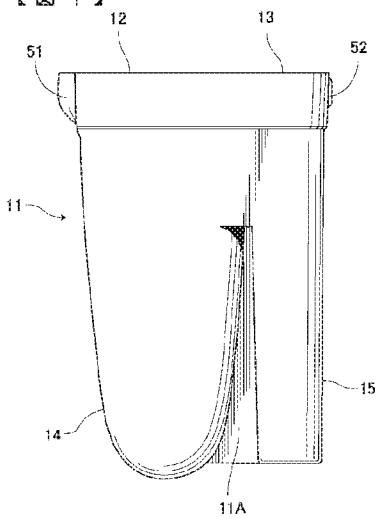
【図２】


65
63
61
64
62
1
11
15
14
11A
16

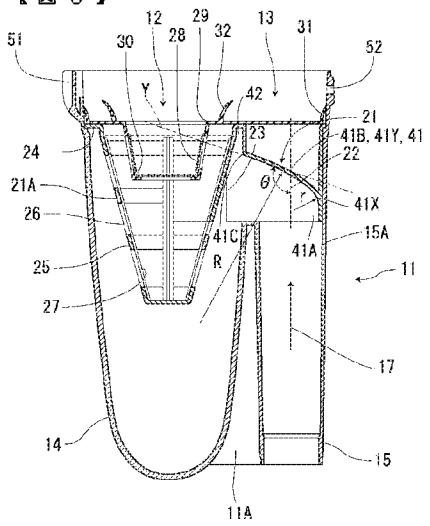
【図３】


61
62
1
2
3
4
5(5A)
9
12
10
8
51
13
21
6
42
26
25
27
7
11
11
17
14
15
11A
16

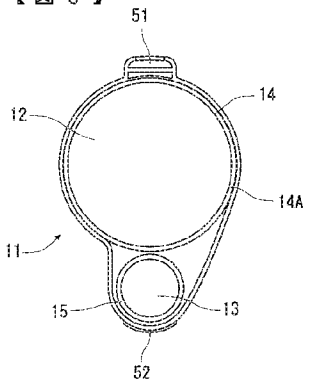
【図４】


12
13
51
52
11
15
14
11A

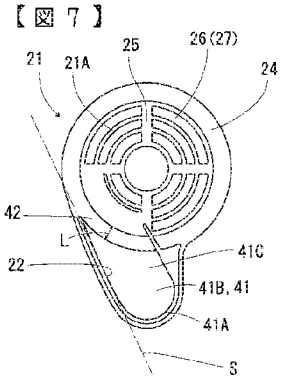
【図５】


51
12
29
32
13
31
52
30
28
Y
42
21
41B, 41Y, 41
23
24
22
θ
21A
41X
26
41C
15A
41A
25
R
11
27
17
14
15
11A

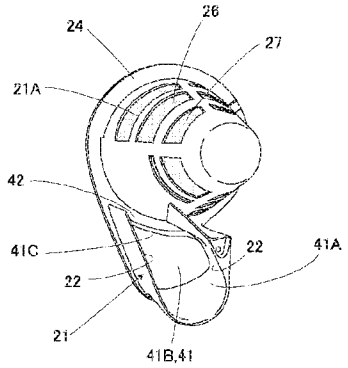
【図６】


51
14
12
14A
11
15
13
52

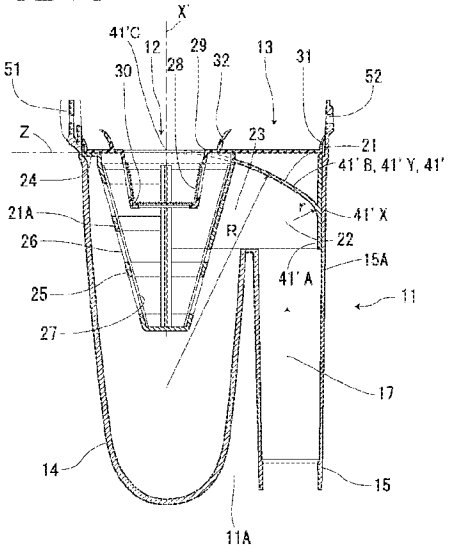
【図７】


21
21A
25
26(27)
24
42
L
41C
22
41B, 41
41A
S

【図８】


24
26
27
21A
42
41C
22
22
41A
21
41B,41

【図９】


X'
41'C
12
29
13
31
51
30
28
32
52
Z
23
21
41'B, 41'Y, 41'
24
21A
41'X
R
22
26
15A
41'A
25
11
27
17
14
15
11A

【手続補正書】
【提出日】平成15年8月1日(2003.8.1)
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】全文
【補正方法】変更
【補正の内容】
【特許請求の範囲】
【請求項１】電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したことを特徴とするサイクロン式電気掃除機。
【請求項２】電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前記方向転換部を形成したことを特徴とするサイクロン式電気掃除機。
【請求項３】前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したことを特徴とする請求項１又は２記載のサイクロン式電気掃除機。
【請求項４】前記渦流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したことを特徴とする請求項１又は３記載のサイクロン式電気掃除機。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明はサイクロン式の電気掃除機に関するものであり、特に塵　を含んだ気流をサイクロン筒内に導入して渦流とする前に方向転換させるサイクロン式掃除機に関するものである。
【０００２】
【従来の技術】
従来、この種のサイクロン式電気掃除機は、電動送風機が内蔵された掃除機本体に対して遠心力集塵部（サイクロン筒）を着脱自在に取り付け、吸気通路を通った塵　を含む空気を前記遠心力集塵部の内周面の接線方向に導入することで、導入された塵　を含む空気を遠心力集塵部内で渦流として遠心力によって塵　を空気と分離させ、分離された塵　を遠心力集塵部の底部に集積させる。そして、これらのサイクロン式電気掃除機は、吸気通路の長さ方向と遠心力集塵部の軸方向がほぼ平行であるため、吸気通路を通る塵　を含む空気を遠心力集塵部内に導入するために、吸気通路の下流側に気流を方向転換させるための方向転換部を形成している。そして、この方向転換部は、略垂直に延びる直線状の部位と略水平に延びる直線状の部位とを曲線状の部位で繋ぐことで形成されている（例えば、特許文献１参照。）。
【０００３】
【特許文献１】

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特開２００１－３７６８７号公報（図１）
【０００４】
【発明が解決しようとする課題】
しかしながら、これらのサイクロン式掃除機においては、例えば、ある大きさの紙ゴミ等の塵　を吸引した場合、方向転換部の内壁に塵　が衝突して付着してしまい、方向転換部を通る気流を阻害してしまうばかりでなく、電動送風機を停止させると、塵　が方向転換部の内壁から剥がれて掃除機の吸込部から落下してしまうという虞があった。これは、方向転換部の直線状の部位が略直交しているため、略垂直に上昇した気流によって方向転換部の略水平な内壁に塵　が押しつけられてしまうためであると思われる。そして、このような現象は、曲線状の部位の曲率が大きい（即ち、気流が急激に方向転換される）場合に顕著である。更に、このような問題を解決しようとして方向転換部の曲線状部位の曲率を小さく（即ち、気流が緩やかに方向転換するように）した場合、曲線部分が大きくなってしまうため、掃除機全体として大型化してしまい、大型化を避けようとした場合には方向転換部の形状が複雑になってしまうという問題があった。
【０００５】
本発明は以上の問題点を解決し、単純且つ小型形状で、方向転換部の内壁に塵　が付着しにくいサイクロン式電気掃除機を提供することを目的とする。
【０００６】
【課題を解決するための手段】
本発明の請求項１のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と下流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したものである。
【０００７】
本発明は以上のように構成することにより、電動送風機を駆動すると、吸気通路を通過する塵　を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵　が分離される。
【０００８】
また、本発明の請求項２のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前記方向転換部を形成したものである。
【０００９】
本発明は以上のように構成することにより、電動送風機を駆動すると、吸気通路を通過する塵　を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵　が分離される。
【００１０】
また、本発明の請求項３のサイクロン式電気掃除機は、請求項１又は２において、前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したものである。
【００１１】
本発明は以上のように構成することにより、直線状の吸気通路から曲率の大きな第一曲面

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部を経て曲率の小さな第二曲面部に至るように気流の経路が形成される。

【００１２】

更に、本発明の請求項４のサイクロン式電気掃除機は、請求項１又は３において、前記渦流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したものである。

【００１３】

本発明は以上のように構成することにより、前記方向転換部とフィルタとの間に、気流が通過するための少なくとも溝部の幅の間隙が形成される。

【００１４】

【発明の実施形態】

以下、本発明の第一実施形態について、図１～図８に基づいて説明する。なお、本発明の実施形態においては、図１～図３の姿勢を基準として、前後及び上下を規定する。

【００１５】

図１～図３において、１は掃除機本体である。この掃除機本体１内には、電動機２と、この電動機２の回転軸に取り付けられたファン３が設けられており、これら電動機２とファン３で電動送風機４が構成されている。また、前記掃除機本体１の下部には、略短円筒状で且つ下端５Ａが平坦に形成されたガイド部５が設けられており、このガイド部５に、下方が開放した吸気孔６が形成されていると共に、この吸気孔６によって、前記ガイド部５の下方と電動送風機４とが連通している。また、前記ガイド部５には、吸気孔６を覆うように保護枠７が形成されている。また、前記ガイド部５の正面側には可動フック８が設けられている。更に、前記ガイド部５の後方には下方に突出した凸部９が形成されていると共に、この凸部９の側面に、後方に突出した固定フック10が形成されている。このように、掃除機本体１は単純な構造に構成されている。

【００１６】

前記掃除機本体１の下方には、樹脂製の集塵部11が着脱自在に取り付けられている。この集塵部11には、その一端たる上部に前記ガイド部５が挿入される開口部たる第一開口部12と、凸部９が挿入される第二開口部13が形成されている。そして、前記第一開口部12の下方には、有底で且つ下方がやや細くなった有底な略円筒状のサイクロン筒14が掃除機本体１に対して着脱自在に設けられる。さらに、前記第二開口部13の下方には、前記サイクロン筒14の軸方向と略平行で且つ内面が円筒状の導入部15が形成されていると共に、サイクロン筒14と導入部15は同一の部材によって一体に形成されている。そして、前記導入部15の下端には、吸込口体たるノズル16が着脱自在に取り付けられて、これら導入部15とノズル16によりサイクロン筒14内に塵　を含む気流を導入する吸気通路17を形成する。

【００１７】

また、第一開口部12及び第二開口部13には、吸気通路17によって前記サイクロン筒14内に導入された気流を渦流にする渦流発生手段たる渦流発生部材21が設けられている。この渦流発生部材21は、下向きの略円錐形状の円錐部21Ａと、この円錐部21Ａと一体に形成された導入壁22及び後述する気流の方向を転換する方向転換部41とで構成されている。そして、サイクロン筒14の側壁の一方の接線方向Ｓに導入口23を開放するように構成されている。すなわち、導入壁22が、導入部15からの塵　を含む気流をサイクロン筒14の一方の接線Ｓ方向へ略直線的に結ぶように導入するように構成されている。したがって、導入部15を上昇してきた気流は、導入壁22及び後述する方向転換部41によってサイクロン筒14の側壁の一方の接線Ｓ方向へ向かって導入され、サイクロン筒14内に導入された気流を渦流にするようになっている。

【００１８】

前記渦流発生部材21は、第一開口部12に円錐部21Ａ、第二開口部13に導入壁22及び方向転換部41が対応して集塵部11に対し着脱自在に取り付けられている。導入壁22及び方向転換部41が前記導入部15側と第二開口部13の間に取り付けられることで、導入部15の上端が閉塞されると共に、サイクロン筒14の上部と導入部15の上端近傍の間の側壁に導入口23が形成される。

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【００１９】
また、円錐部21Ａは、前記第一開口部12とサイクロン筒14の間の段部14Ａに載置するフランジ部24と、このフランジ部24と一体に形成された円錐状の基部25と、前記基部25の側面に設けられた通風口26と、この通風口26に設けられたフィルタ27とで構成されている。また、前記渦流発生部材21の上部には、袋状のフィルタ28が設けられたフィルタ部材29が設けられている。このフィルタ部材29の枠30は軟質樹脂又はゴムで形成されており、この枠30の外周に形成されたシール部31が前記第一開口部12及び第二開口部13の内周に対して密接可能に構成されている。また、前記枠30の上部にはリップ部32が形成されており、渦流発生部材21及びフィルタ部材29が取り付けられた集塵部11を掃除機本体１に取り付けた際に、前記リップ部32が前記吸気孔６を囲むようにガイド部５の下端５Ａと密接可能に構成されている。
【００２０】
そして、吸気通路17と渦流発生部材21の間には、導入部15を上昇してきた気流の方向をスムーズに曲げて導入口23からサイクロン筒14に導入するために、気流の方向を転換する方向転換部41が逆Ｌ字状に設けられる。この方向転換部41は、渦流発生部材21に一体に設けられ、直線状の導入部15の下流部15Ａと、サイクロン筒14の一方の接線Ｓ方向へ略直線的に結ぶように形成された導入壁22との間に、下流部15Ａと連通する縦向き口部41Ａと該縦向き口部41Ａの上方に、斜め上向きに突設する円弧状壁部41Ｂを介して、サイクロン筒14内に連通する横向き口部41Ｃを連通接続したものである。さらに、円弧状壁部41Ｂは、上流側、すなわち縦向き口部41Ａ側に設けられた半径ｒの曲面である第一曲面部41Ｘと、下流側、すなわち横向き口部41Ｃ側に設けられた半径Ｒの曲面である第二曲面部41Ｙとを連続的に繋ぐことで構成されている。なお、前記第一曲面部41Ｘの半径ｒは第二曲面部41Ｙの半径Ｒよりも小さく、従って第一曲面部41Ｘは第二曲面部41Ｙよりも曲率が大きく形成されている。さらに、円弧状壁部41Ｂにおける第二曲面部41Ｙの終端の軸線Ｙ、ひいては該終端と同軸な横向き口部41Ｃの軸線Ｙと、吸気通路17の気流の進行方向Ｘ、ひいては導入部15の軸線方向とは交差するように形成されており、その交差角度（内角）θは、方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となっている。すなわち、第二曲面部41Ｙの終端の接線と軸線Ｘとがなす交差角度のうち、上方側の角度が９０度より大きな鈍角となっており、この結果方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となる。
【００２１】
また、前記方向転換部41の終端、ひいては横向き口部41Ｃ側と、渦流発生部材21の円錐部21Ａとの間に間隔Ｌが形成されるように、横向き口部41Ｃとフィルタ27との間に溝部42を形成している。
【００２２】
更に、前記第一開口部12の前側には、前記可動フック８と係合する第一受部51が形成されているとと共に、前記第二開口部13の後側には、前記固定フック10と係合する第二受部52が形成されている。なお、11Ａはリブであり、集塵部11の剛性を高めるために、前記サイクロン筒14と導入部15の間に一体形成されてこれらを連結している。
【００２３】
なお、61は掃除機本体１に対して着脱自在に取り付けられた把持部である。また、これら掃除機本体１及び把持部61には、それぞれ引掛部62，63が形成されており、これら引掛部62，63の間に掃除機本体１から延出する電源コード64が巻き付け可能に構成されている。更に、前記把持部61にはスイッチ操作部65が設けられている。
【００２４】
つぎに、本実施形態の作用について説明する。まず、使用者は集塵部11の第一開口部12及び第二開口部13に渦流発生部材21及びフィルタ部材29を取り付ける。このとき、フィルタ部材29のシール部31が第一開口部12及び第二開口部13の内壁に密接する。そして、集塵部11の第二受部52を固定フック10と係合させた後、第一受部51を可動フック８と係合させる

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ことで、集塵部11が掃除機本体1に対して取り付けられる。このとき、前記ガイド部5が第一開口部12に挿入されると共に、凸部9が第二開口部13に挿入されることで、集塵部11が掃除機本体1に対して位置決めされる。そして、前記フィルタ部材29のリップ部82が、前記吸気孔6を囲むようにガイド部5の下端5Aと密接する。これによって、サイクロン筒14内から吸気孔6に至る経路がシールされる。更に、前記導入部15の下端にノズル16を取り付ける。

【００２５】

そして、電源コード64を引掛部62，63から外し、図示しないコンセントに差し込んでスイッチ操作部65を操作すると、電動送風機4が駆動される。そして、この電動送風機4の駆動によって、塵　を含んだ気流がノズル16から吸い込まれる。この気流は、ノズル16から吸い込まれて導入部15を上昇し、この導入部15の上端で、縦向き口部41Aから円弧状壁部41Bを介して横向き口部41Cに至ると共に、円弧状壁部41Bは縦向き口部41A側に設けられた曲率の大きな（半径rの小さな）第一曲面部41Xと、横向き口部41C側に設けられた曲率の小さな（半径Rの大きな）第二曲面部41Yとを連続的に繋ぎ、かつ方向転換部41の終端における気流の進行方向の角度θが前記吸気通路17の気流の進行方向に対して９０度より大きな鈍角となっている方向転換部41に沿って向きを変えると共に、導入壁22によって、サイクロン筒14の側壁の一方の接線方向Sに向って導入口23からサイクロン筒14に導入される。このとき、ノズル16から吸い込まれた塵　を含んだ気流に、ある大きさの紙ゴミ等の塵　が含まれていたとしても、この塵　が方向転換部41の円弧状壁部41Bに衝突した際に、この円弧状壁部41Bに沿って気流が鈍角θ、すなわち、やや上向きに緩やかに方向転換するため、塵　が方向転換部41に押し付けられてこの位置に付着してしまうことが防止され、気流に乗ってサイクロン筒14内に導入される。

【００２６】

そして、サイクロン筒14に導入された気流は、溝部42を通過してサイクロン筒14の内周面に沿って渦流となり、螺旋状に下降することになる。この際、この渦流に含まれる塵　は、遠心力によってサイクロン筒14の内周面に押し付けられることになる。そして、前記渦流がサイクロン筒14の底部に至ると、サイクロン筒14の内周面側で下降していた渦流はサイクロン筒14の中央付近で上昇に転じる。このとき、前述したように、渦流に含まれていた塵　は遠心力によってサイクロン筒14の内周面に押し付けられているので、渦流がサイクロン筒14の内周面側から中央付近に流れたとしても、比較的粗い塵　はそのままサイクロン筒14の内周面付近に留まることになり、渦流から分離される。

【００２７】

一方、比較的細かい塵　は、渦流に混じってサイクロン筒14の中央付近まで移動し、渦流の上昇に伴ってサイクロン筒14内を上昇することになる。そして、この上昇した渦流は、上方の渦流発生部材21の側面に形成されている通風口26を通過することになる。この際、渦流に含まれている比較的細かい塵　は、前記通風口26に取り付けられているフィルタ27によって捕集され、更にこのフィルタ27を通過した、より細かい塵　は、渦流発生部材21の上方に設けられたフィルタ部材29のフィルタ28によって捕集される。そして、渦流発生部材21のフィルタ27及びフィルタ部材29のフィルタ28を通過した気流は、前記吸気孔6から電動送風機4に至り、更に掃除機本体1外に抜ける。

【００２８】

清掃終了後、ノズル16を導入部15の下端から取り外した後、可動フック8を操作して集塵部11を掃除機本体1から取り外す。そして、フィルタ部材29及び渦流発生部材21を第一開口部12及び第二開口部13から取り外し、フィルタ27，28に付着した塵　を除去する。また、サイクロン筒14に溜まった塵　をゴミ箱に捨てる。このとき、集塵部11にはサイクロン筒14と導入部15が一体に形成されているため、サイクロン筒14内の塵　を簡単に捨てることができるばかりでなく、軽い集塵部11を持って導入部15内に溜まってしまった塵　も簡単に除去できる。従って、清掃途中でシート状物等を吸い込んでしまい、導入部15や導入口23に詰まってしまった場合でも、簡単に除去することができる。更に、前記集塵部11は樹脂で一体成形されているため、水洗いが可能であり、従って、水洗いすればサイクロン

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筒14及び導入部15をより一層清浄な状態にすることができる。

【００２９】

以上のように前記実施形態では、前記吸気通路17と渦流発生手段との間に気流の方向を転換する方向転換部41を形成し、この方向転換部41の流路における気流の進行方向が円弧な曲線状であると共に、前記方向転換部41の終端における気流の進行方向が前記吸気通路17の気流の進行方向に対して角度θが９０度より大きな鈍角となるように前記方向転換部41を形成し、電動送風機４を駆動すると、吸気通路17を通過する塵　を含んだ気流が円弧曲線状の方向転換部41で緩やかに方向転換するので、方向転換部41を通過する気流に含まれる塵　が方向転換部41の内壁に押し付けられることがない。また、前記方向転換部41の終端、すなわち円弧状壁部41Ｂの横向き口部41Ｃの軸線Ｙの方向における気流の進行方向が、前記吸気通路17の気流の進行方向に対して９０度である従来の構造に比べて、塵　が方向転換部に押し付けられない構造にしたとしても、掃除機全体が大型化することがない。

【００３０】

また、前記方向転換部41を、上流側たる縦向き口部41Ａに設けられた半径ｒの小さな、即ち曲率の大きな第一曲面部41Ｘと、下流側たる横向き口部41Ｃに設けられた半径Ｒの大きな、即ち曲率の小さな第二曲面部41Ｙとを連続的に繋ぐことで構成し、直線状の吸気通路17から曲率の大きな第一曲面部41Ｘを経て曲率の小さな第二曲面部41Ｙに至るように気流の経路が形成されるので、抵抗を少なくできると共に、方向転換部41を一つの曲率の曲線部で形成する場合に比べて小型化もすることができる。

【００３１】

更に、前記渦流発生手段21に前記方向転換部41及びフィルタ27を設けると共に、前記方向転換部41の終端、すなわち横向き口部41Ｃとフィルタ27との間に溝部42を形成し、前記方向転換部41とフィルタ27との間に、気流が通過するための少なくとも溝部42の幅の間隙Ｌが形成され、方向転換部41の終端においてフィルタ27との間で塵　が詰まることはない。

【００３２】

つぎに、本発明の第二実施形態について、図９に基づいて説明する。なお、第一実施形態と同一の部分には、同じ符号を付し、その詳細な説明を省略する。

【００３３】

第二実施形態においては、吸気通路17と渦流発生部材21の間に設けられる逆Ｌ字状の気流の方向を転換するための方向転換部41´は、渦流発生部材21に一体に設けられ、直線状の導入部15の下流部15Ａと、サイクロン筒14の一方の接線Ｓ方向へ略直線的に結ぶように形成された導入壁22との間に、下流部15Ａと連通する縦向き口部41´Ａと該縦向き口部41´Ａの上方に、斜め上向きに突設する円弧状壁部41´Ｂを介して、サイクロン筒14内に連通する横向き口部41´Ｃを連通接続したものである。なお、この横向き口部41´Ｃは、渦流発生手段21を集塵部11に取り付けた際に、サイクロン筒14内に位置するように構成されている。さらに、円弧状壁部41´Ｂは、上流側、すなわち縦向き口部41´Ａ側に設けられた半径ｒの曲面である第一曲面部41´Ｘと、下流側、すなわち横向き口部41´Ｃ側に設けられた半径Ｒの曲面である第二曲面部41´Ｙとを連続的に繋ぐことで構成されている。なお、前記第一曲面部41´Ｘの半径ｒは第二曲面部41´Ｙの半径Ｒよりも小さく、従って第一曲面部41´Ｘは第二曲面部41´Ｙよりも曲率が大きく形成されている。さらに、円弧状壁部41´Ｂにおける第二曲面部41´Ｙの終端の軸線Ｚ、ひいては該終端と同軸な横向き口部41´Ｃの軸線Ｚは、サイクロン筒14内においてこのサイクロン筒14の軸線Ｘ´と直交するように形成されている。すなわち、第二曲面部41´Ｙの終端の接線と軸線Ｘ´とがなす角度は直角となっており、この結果、前記方向転換部41´の円弧状壁部41´Ｂにおいては気流の進行方向が前記吸気通路17の気流の進行方向に対して鈍角となると共に、前記方向転換部41´の終端における気流の進行方向が、前記サイクロン筒14内において、前記吸気通路17の気流の進行方向に対して９０度となる。

【００３４】

そして、電動送風機４が駆動されると、塵　を含んだ気流がノズル16から吸い込まれる。この気流は、ノズル16から吸い込まれて導入部15を上昇し、この導入部15の上端で、縦向

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き口部41´Ａから円弧状壁部41´Ｂを介して横向き口部41´Ｃに至る方向転換部41´及びサイクロン筒14の側壁の一方の接線方向Ｓに向かって形成された導入壁22によって、導入口23からサイクロン筒14の側壁の一方の接線方向Ｓに向かって、サイクロン筒14に導入される。このとき、円弧状壁部41´Ｂは縦向き口部41´Ａ側に設けられた曲率の大きな（半径Ｒの小さな）第一曲面部41´Ｘと、横向き口部41´Ｃ側に設けられた曲率の小さな（半径Ｒの大きな）第二曲面部41´Ｙとを連続的に繋ぐことで形成されており、この円弧状壁部41´Ｂにおいては気流の進行方向が前記吸気通路17の気流の進行方向に対して鈍角となっているため、ある大きさの紙ゴミ等の塵　がノズル16から吸い込まれて吸気通路17を上昇した気流に含まれていたとしても、この塵　が円弧状壁部41´Ｂに衝突した際に、この円弧状壁部41´Ｂに沿って気流が鈍角、すなわち、やや上向きに緩やかに方向転換するため、塵　が方向転換部41に押し付けられてこの位置に付着してしまうことが防止され、気流に乗ってサイクロン筒14内に導入される。また、前記円弧状壁部41´Ｂと横向き口部41´Ｃとが連続的して形成されており、この横向き口部41´Ｃの終端における気流の進行方向の角度が前記サイクロン筒14内において、このサイクロン筒14の軸線Ｘ´と直交するように構成されているため、吸気通路17を上昇した気流はスムーズにサイクロン筒14内に導入される。

【００８５】

以上のように、前記吸気通路17と渦流発生手段との間に気流の方向を転換する方向転換部41´を形成し、この方向転換部41´の流路における気流の進行方向が円弧な曲線状であると共に、前記方向転換部41´の終端における気流の進行方向が前記サイクロン筒14内にてこのサイクロン筒14の軸線Ｘ´と直交するように前記方向転換部41´を形成したものであり、電動送風機を駆動すると、吸気通路17を通過する塵　を含んだ気流が曲線状の方向転換部41´で緩やかに方向転換した後、渦流発生手段21によってサイクロン筒14内で渦流となり、遠心力によって塵　が分離されるので、方向転換部41´を通過する気流に含まれる塵　が方向転換部41´の内壁に押し付けられることがない。また、前記方向転換部41´の曲率が同じであるならば、サイクロン筒14外で気流の方向を転換させる従来の構造に比べて、掃除機全体を小型化することができる。

【００８６】

尚、本発明は上記実施形態に限定されるものではなく、本発明の要旨の範囲内において、種々の変形実施が可能である。

【００８７】

【発明の効果】

本発明の請求項１のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度より大きな鈍角となるように前記方向転換部を形成したものであり、電動送風機を駆動すると、吸気通路を通過する塵　を含んだ気流が曲線状の方向転換部で緩やかに方向転換するので、方向転換部を通過する気流に含まれる塵　が方向転換部の内壁に押し付けられることがなく、従って塵　が方向転換部に付着しにくくすることができるばかりでなく、前記方向転換部の曲率が同じであるならば、前記方向転換部の終端における気流の進行方向が前記吸気通路の気流の進行方向に対して９０度である従来の構造に比べて、掃除機全体を小型化することができる。

【００８８】

また、本発明の請求項２のサイクロン式電気掃除機は、電動送風機を有する掃除機本体と、この掃除機本体に対して着脱自在に設けられるサイクロン筒と、このサイクロン筒内に塵　を含む気流を導入する吸気通路と、この吸気通路によって前記サイクロン筒内に導入された気流を渦流にする渦流発生手段とを有するサイクロン式電気掃除機において、前記

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吸気通路と渦流発生手段との間に気流の方向を転換する方向転換部を形成し、この方向転換部の流路における気流の進行方向が曲線状であると共に、前記方向転換部の終端における気流の進行方向が前記サイクロン筒内にてこのサイクロン筒の軸線と直交するように前記方向転換部を形成したものであり、電動送風機を駆動すると、吸気通路を通過する塵を含んだ気流が曲線状の方向転換部で緩やかに方向転換した後、渦流発生手段によってサイクロン筒内で渦流となり、遠心力によって塵が分離されるので、方向転換部を通過する気流に含まれる塵が方向転換部の内壁に押し付けられることがなく、従って塵が方向転換部に付着しにくくすることができるばかりでなく、前記方向転換部の曲率が同じであるならば、サイクロン筒外で気流の方向を転換させる従来の構造に比べて、掃除機全体を小型化することができる。

【００３９】

また、本発明の請求項３のサイクロン式電気掃除機は、請求項１又は２において、前記方向転換部を、上流側に設けられた曲率の大きな第一曲面部と、下流側に設けられた曲率の小さな第二曲面部とを連続的に繋ぐことで構成したものであり、直線状の吸気通路から曲率の大きな第一曲面部を経て曲率の小さな第二曲面部に至るように気流の経路が形成されるので、抵抗を少なくでき、また方向転換部を一つの曲率の曲線部で形成する場合に比べて小型化することができる。

【００４０】

更に、本発明の請求項４のサイクロン式電気掃除機は、請求項１又は３において、前記渦流発生手段に前記方向転換部及びフィルタを設けると共に、前記方向転換部の終端とフィルタとの間に溝部を形成したものであり、前記方向転換部とフィルタとの間に、気流が通過するための少なくとも溝部の幅の間隙が形成されるので、方向転換部の終端においてフィルタ部材との間で塵が詰まってしまうことが防止される。

【図面の簡単な説明】

【図１】本発明の第一の実施形態を示すサイクロン式電気掃除機の正面図である。

【図２】同上、側面図である。

【図３】同上、拡大断面図である。

【図４】同上、集塵部の側面図である、

【図５】同上、集塵部の断面図である。

【図６】同上、集塵部の平面図である。

【図７】同上、渦流発生部材の底面図である。

【図８】同上、渦流発生部材の斜視図である。

【図９】本発明の第二の実施形態を示すサイクロン式電気掃除機の要部の断面図である。

【符号の説明】

1　掃除機本体
4　電動送風機
11　サイクロン筒
21　渦流発生部材（渦流発生手段）
27　フィルタ
41，41´　方向転換部
41X，41´X　第一曲面部
41Y，41´Y　第二曲面部
42　溝部
X　気流の進行方向
X´　軸線

【手続補正２】

【補正対象書類名】図面

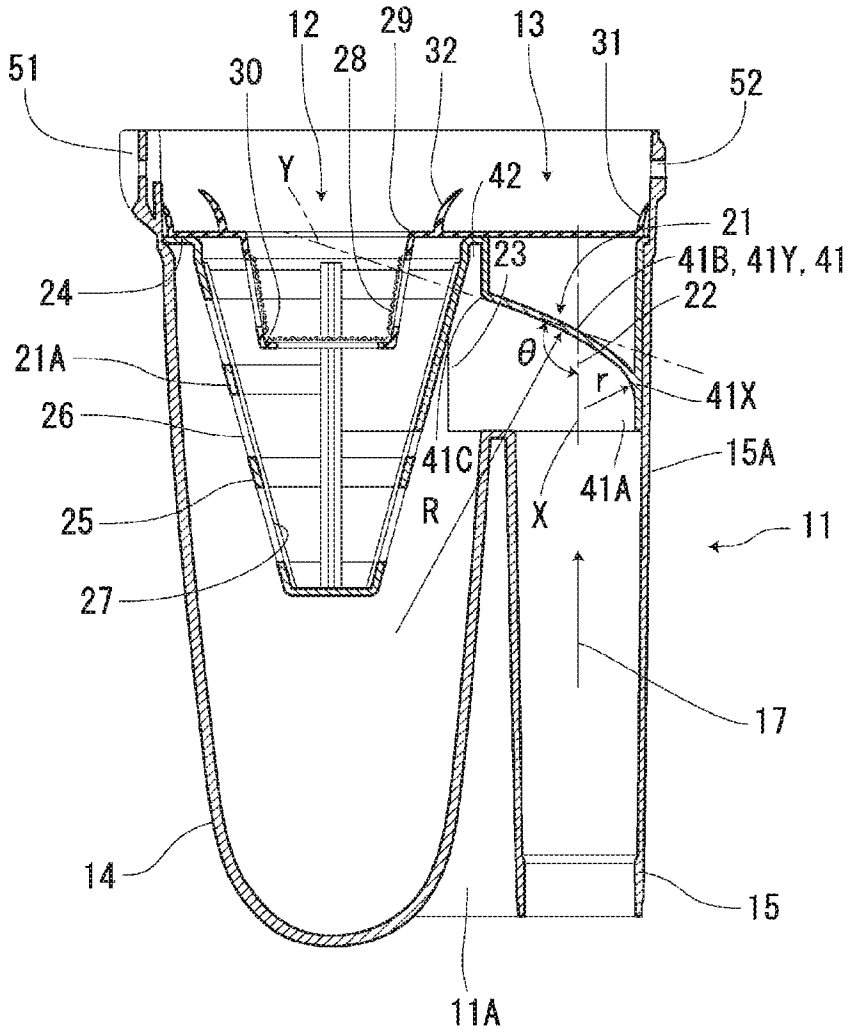
【補正対象項目名】図５

【補正方法】変更

【補正の内容】

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【図５】


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VACUUM CLEANER

Page bookmark JP2003250729 (A) - VACUUM CLEANER

Inventor(s): TAKEMOTO RITSUO; YOKOYAMA HIROSHI ±

Applicant(s): TOSHIBA TEC KK ±

Classification: - international: ***A47L9/10;*** (IPC1-7): A47L9/10

- cooperative:

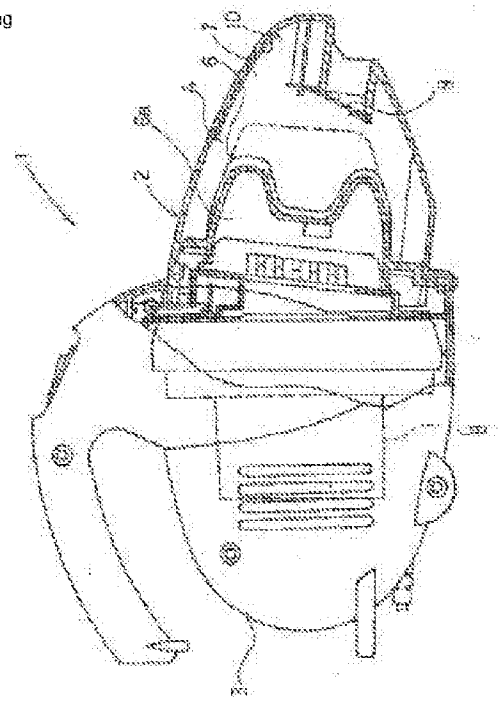
Application number: JP20020053273 20020228

Priority number(s): JP20020053273 20020228

Abstract of JP2003250729 (A)

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PROBLEM TO BE SOLVED: To provide a vacuum cleaner having a dust collecting chamber capable of maintaining good appearance by preventing scratches on a transparent or translucent inner face of the dust collecting chamber for flowing-in and storing of dust. ;SOLUTION: This vacuum cleaner comprises an electric blower (8, 24), and the dust collecting chamber (7, 23) for storing dust sucked by the electric blower, wherein the transparent or translucent part is provided for recognizing stored dust. A hard coat layer (10, 30) is provided on the transparent or translucent part of an inner face of the dust collecting chamber. ;COPYRIGHT: (C)2003,JPO



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DESCRIPTION JP2003250729

[0005]

The present invention relates to relates to an improvement of the electric vacuum cleaner having a transparent or semi-transparent dust chamber. Conventionally, vacuum cleaner, it is known that the dust-collecting chamber is formed in a transparent or semi-transparent so that it looks the amount of accumulated dust in the dust collection chamber. In particular, the cyclonic vacuum cleaner so that the deposition of air allowed to flow as a swirling flow in the dust cup is dropped to the bottom of the dust collecting chamber of the dust cup dust in the air by its own weight or the like, including dust . In such a cyclone type dust cup, because dust is less likely to occur changes in pressure and temperature in the dust cup is also accumulated, the amount of dust accumulated therein because it is difficult to detect the reservoir state of dust on the sensor, etc. the user dust collecting chamber viewable is formed from a transparent or translucent material. The present invention is, however, the dust flowing into the dust collection chamber sand and small metal mass (for example, small screws, etc.) is often contains solids, such solids dust collection it was often that would damage the inner surface of the chamber. in particular, the greater the pain in the dust cup to flow into the dust collection chamber solids while vigorously turning the inside of the dust cup in the cyclone-type vacuum cleaner. Thus, when the inner surface of the dust collecting chamber from being damaged, dirt dust adhering to the wound, the conventional transparent or semi-transparent dust collecting chamber, in order to dirt and scratches are visible from the outside, the dust collection chamber there is a problem that impairs very appearance. 【0004】 To eliminate this poor appearance, by providing a pre-embossed on the inner surface of the transparent or semi-transparent dust collecting chamber (fine irregularities satin finish), the transparent or translucent portion of the dust collecting chamber can be as ground glass it has been attempted. However, even in this case, it can not be avoided that the inner surface of the dust collecting chamber from being damaged by dust containing solids, in particular, fine dust adheres to the wound, as described above, impairs the appearance of the dust collecting chamber. Moreover, cracking the flaw occurs, the dust collection chamber, there is a problem that eventually the life of the dust cup is shortened. 【0005】 Dust collecting together object of the present invention is not to scrape prevented from adhering dirt by dust on the inner surface of the dust collecting chamber for accommodating the dust, and ensure over the appearance of the dust collecting chamber to the long-term and to provide a vacuum cleaner capable of increasing the strength of the chamber. in the present invention SUMMARY OF] To achieve the above object, the dust is accommodated, the inner surface of the dust collecting chamber to the stowed dust having a transparent or translucent portion to be visible from the outside to, to avoid scratching the transparent or translucent portion is one of providing a hard coat layer.

[0012]

[Embodiment of the present invention will be described in detail with reference to the drawings, embodiments of the present invention. Referring to Figure 1, there is shown an embodiment in which the present invention is applied to Handei type electric vacuum cleaner. Vacuum cleaner in this embodiment, comprises a cleaner body 1, the cleaner main body is a body to case - having scan 2. The main body case is composed of a rear casing 3 and detachably attached front case 4 which in this case after. 【0008】 The main body casing 2 is disposed dust-collecting filter 6, the dust collecting chamber 7 partitioned by the dust-collecting filter is formed in the front inner case 4. The rear case 3 is arranged electric blower 8, inhale through the suction opening 9 provided in the case 4 before this electric blower dust (dust) in the dust collecting chamber 7. 【0009】 Operating the electric blower 5, the internal chamber 6a of the dust-collecting filter 6 becomes a negative pressure, whereby the dust collecting chamber 7 becomes negative pressure. By this negative pressure in the dust collecting chamber dust will be sucked into the dust collecting chamber 7 through the suction opening 9, the dust is gradually accumulated in the dust chamber. 【0010】 Here, the dust collected in the dust collecting chamber 7 as seen from the outside, part or all of the front case 4 to form a dust collecting chamber 7 is formed transparent or translucent. Further, the hard coat layer 10 is provided on the inner surface of the front case 4 in the portion of the transparent or translucent. Some of the hard coat layer 10 provided on the inner surface of the dust collecting chamber 7 is shown in FIG. 【0011】 In one embodiment for

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forming the transparent or translucent portion, the front case is formed of a transparent or semi-transparent resin molded product. Apart from this, for example, a portion of the front case 4, for example, to form a window by notching the upper half portion may be attached to a transparent or translucent plate in the window. In this case, it is possible to see the dust collected in the dust collecting chamber from above the vacuum cleaner. 【0012】 The hard coat layer 10, even violently collide hard solid metallic mass or the like contained in the dust is formed from readily wound does not stick layer, UV coating layer or the fluorine coating layer in this embodiment It is made up of. Wherein the hard coat layer 10 is made of the front case 4 to form a dust collecting chamber 7 (for example, ABS or PP) harder it is preferred over. The hard coat layer, if a part of the dust collecting chamber 7 is transparent or semi-transparent, is provided on part of the transparent or translucent. In this case also, it is possible to maintain the transparent or translucent portion scratch-resistant because the visible state, attaching less hard coat layer of the wound can be prevented from adhering from slippery dust.

[0018]

It should be noted, may be provided with a hard coat layer in a portion other than the portion of the transparent or semi-transparent. In this way, it is possible to prevent the occurrence of the dust collecting chamber the entire wound in advance, as a result, it is possible to increase the dust collecting chamber of life without cracks resulting from flaws are generated. 【0013】 Wherein the hard coat layer, when applied to a transparent or translucent portion of the dust collecting chamber 7, as the dust collecting chamber of dust is visible from Incidentally outside, must be formed of a transparent or semi-transparent state it is Incidentally, the hard coat layer, such as described above, without being limited to such as UV coating layer, it is possible to provide a layer of various materials, also be used various methods such as painting or spraying as its application it can. 【0014】 The dust collecting chamber to translucent, as an example, or colored, is formed by or subjected to graining (fine irregularities satin finish as described above). Thus, when the the dust collecting chamber 7 translucent, it is possible to see the dust collecting chamber of the dust in the so-called blur state, it never gives discomfort. In this case, the hard coat layer 10 is provided on the inner surface of the translucent dust chamber. In particular, the provision of the hard coat layer over which has been subjected to texturing, it is not compromising the appearance without the fine dust enters the grooves of the grain. 【0015】 Referring to Figure 2, there is shown an embodiment in which the present invention is applied to a cyclonic vacuum cleaner. The vacuum cleaner is, and will be described in simple since it is known, the body Ke - is equipped with a removably mounted dust collecting container to the nest 20 (dust cup) 21. The dust cup, container 23 for containing the dust which is formed integrally below the cyclone vessel and cyclone container 22 to flow the air and dust sucked as swirl, i.e., and a dust collecting chamber. In the figure, reference numeral 24 denotes an electric blower for sucking dust into the dust cup through the suction inlet 25. 【0016】 The air and dust to fall down in the dust during the turning in the cyclone container this turning its own weight, etc., will be deposited in the dust collecting chamber 23. 【0017】 In such a cyclone type vacuum cleaner, which may dust cup formed from a transparent or translucent material so that the amount of accumulated dust is visible in are provided. In addition, sometimes the dust cup provided with a grain (fine irregularities satin finish) to advance the inner surface accumulated dust because the appearance is bad look from the outside in is used. 【0018】 In the present invention, the hard coat layer 30 is provided over the inner surface or embossed transparent or translucent dust cup has been applied.

[0019]

[0020]

The hard coat layer in the same manner as described above in Example, harder than the material of the dust cup, for example, consists of UV-coating layer or the fluorine coat layer. As a result, the dust without scratching the part of the also transparent or semi-transparent and even violently collision, when until it is also possible to keep the amount of dust in the visible state. Further, if the hard coat layer, since the dust even slippery adhered by static electricity or the like in the cyclone type dust cup can achieve the effect of easily fall by dust its own weight 【0019】 It may be the entire dust cup transparent or semi-transparent in this embodiment, as the amount of accumulated dust is visible from the outside, may be only the least dust collecting chamber 23 to the transparent or translucent. The hard coat layer 30 is provided by any means such as painting or spraying the transparent or translucent portion. Since the hard coat layer 30 is the same as that of the hard coat layer 10 of the above-described embodiments and will not be further described. 【0020】 incidentally, in the above embodiment the present invention is applied to Handei type and cyclone type vacuum cleaner, it is possible to apply the present invention to other types of vacuum cleaner. [Effect of the Invention] As described above, according to the present invention, by providing a hard coat layer on the inner surface of the transparent or translucent part of the dust collecting chamber, even if dust entering the dust collecting chamber is violently collide there is no possibility to get a crack on the inner surface of the dust collecting chamber also. Therefore, forever the amount of dust in the dust collection chamber to visible state can be maintained, there is a practical benefits that there is no thing at all woo the appearance of the dust collection chamber.

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CLAIMS JP2003250729

1.

An electric blower, the dust by the electric blower suction, in an electric vacuum cleaner which housed and the stowed dust at least a portion to be visible from the outside and a dust collecting chamber having a portion of transparent or translucent, vacuum cleaner, characterized in that a hard coat layer on the inner surface of the dust collecting chamber in the transparent or translucent portion of the dust collection chamber. Includes a method according to claim 2] electric blower and a dust cup having a transparent or semi-transparent part so that the dust is sucked by the electric blower, housed and the accommodation has been dust is visible from the outside, the dust cup condensing in the electric vacuum cleaner having a dust chamber, an electric vacuum cleaner, characterized in that it provided a hard coat layer on the inner surface of the dust collecting chamber in the transparent or translucent portion of the dust collection chamber. 3. The method of claim 1] and the electric blower, air inlet and the air becomes a vortex flow dust, including dust sucked from the inlet by the electric blower has a dust collection chamber is accumulated in the dust collection chamber and the in the accumulated electric vacuum cleaner dust and a dust cup made of the dust collecting chamber is transparent or translucent as seen from the outside, characterized in that a hard coat layer on the inner surface of the dust collection chamber vacuum cleaner. Wherein the collecting grain finish on the inner surface of the dust chamber is provided, and claims 1, 2 or 3 vacuum cleaner according is characterized in that the inner surface of the embossed hard coat layer is provided . 5. A vacuum cleaner according to any one of claims 1 to 4 wherein the hard coat layer is composed of a UV coating layer.

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(43)公開日　平成15年９月９日(2003.9.9)

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審査請求　未請求　請求項の数５　ＯＬ　（全　４　頁）

(21)出願番号　特願2002－53273(P2002－53273)

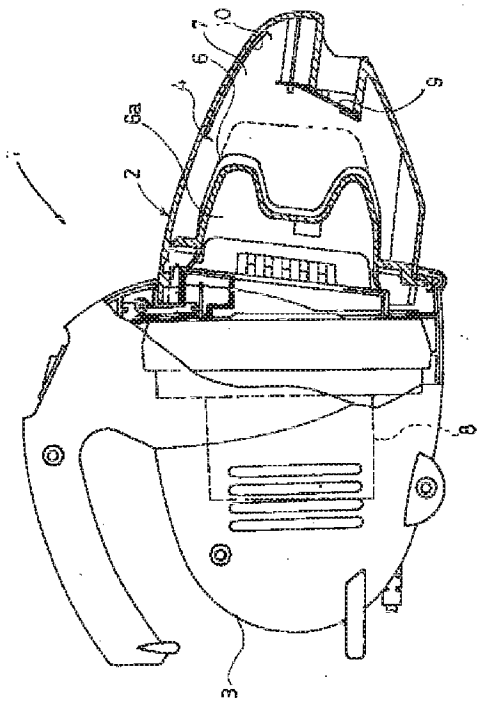
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Ｆターム(参考)　3B062 AA00

(54)【発明の名称】　電気掃除機

(57)【要約】
【課題】ダストが流入して収容される透明又は半透明の集塵室の内面に傷がつくのを未然に防止し、いつまでも見栄えを損うことがない集塵室を備えた電気掃除機を提供すること。
【解決手段】この電気掃除機は、電動送風機（8,24）と、この電動送風機により吸い込まれたダストを収容し、この収容されたダストが外部から見えるように透明又は半透明部分を有する集塵室（7,23）とを備え、この集塵室の透明又は半透明部分における集塵室の内面にハードコート層（10、30）が設けられていることを特徴とする。



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【特許請求の範囲】
【請求項1】電動送風機と、該電動送風機によってダストが吸引、収容され且つ該収容されたダストが外部から見えるように少なくとも一部が透明又は半透明の部分を有する集塵室とを備えた電気掃除機において、前記集塵室の透明又は半透明の部分における集塵室の内面にハードコート層を設けたことを特徴とする電気掃除機。
【請求項2】電動送風機と、該電動送風機によってダストが吸引、収容され且つ該収容されたダストが外部から見えるように透明又は半透明の部分を有するダストカップとを備え、該ダストカップが集塵室を有する電気掃除機において、前記集塵室の透明又は半透明の部分における集塵室の内面にハードコート層を設けたことを特徴とする電気掃除機。
【請求項3】電動送風機と、吸気口および集塵室を有し前記電動送風機によって前記吸気口から吸い込まれたダストを含む空気が渦流となって流れダストが前記集塵室内に蓄積され且つ該蓄積されたダストが外部から見えるように前記集塵室が透明又は半透明から成るダストカップとを備えた電気掃除機において、前記集塵室の内面にハードコート層を設けたことを特徴とする電気掃除機。
【請求項4】前記集塵室の内面にシボ加工が設けられ、且つ該シボ加工の内面にハードコート層が設けられていることを特徴とする請求項１、2又は3記載の電気掃除機。
【請求項5】前記ハードコート層がUVコート層から成る請求項1乃至4のいずれかに記載の電気掃除機。
【発明の詳細な説明】
【0001】
【発明の属する技術分野】本発明は 透明又は半透明の集塵室を有する電気掃除機の改良に関するものである。
【0002】
【従来の技術】従来、電気掃除機は、集塵室の中に溜まったダストの量が見えるように集塵室が透明又は半透明に形成されているものが知られている。特に サイクロン式の電気掃除機ではダストを含む空気をダストカップ内に旋回流として流入させて空気中のダストを自重等でダストカップの下部の集塵室に落下させて堆積するようにしている。このようなサイクロン式のダストカップでは、ダストが溜まってもダストカップ内の圧力や温度の変化が生じにくいので、ダストの溜まり具合をセンサ等で検出するのが難しいため内部に溜まったダストの量を使用者が視認可能に集塵室が透明又は半透明の材料から形成されている。
【0003】
【発明が解決しようとする課題】しかしながら、集塵室内に流入するダストには砂や小さな金属塊（例えば 小さなネジ等）の固形物が含まれることが多く、このような固形物が集塵室の内面を傷つけてしまうことが度々あった。特に、サイクロン式の電気掃除機では固形物がダストカップ内を激しく旋回しつつ集塵室内に流入するためダストカップ内の傷みは一層大きい。このように、集塵室の内面が傷つけられると この傷にダストの汚れが付着し、従来の透明又は半透明の集塵室では、汚れや傷が外部から見えるために、集塵室の見栄えをきわめて損なうという問題があった。
【0004】この見栄えの悪さを無くすために、透明又は半透明の集塵室の内面に予めシボ（梨地模様の細かい凹凸）を設けて 集塵室の透明又は半透明部分をスリガラスの様にすることが試みられている。しかし、この場合でも、集塵室の内面が固形物を含むダストによって傷つけられることは避けられず、特に、細かいダストが傷に付着し、上述の如く、集塵室の見栄えを損なう。しかも、傷によってひび割れが生じ、集塵室、ひいてはダストカップの寿命が短くなるという問題があった。
【0005】本発明の目的は、ダストを収容する集塵室の内面に傷がつかないようにしてダストによる汚れが付着するのを防止し、且つ集塵室の美観を長期に亘って確保すると共に集塵室の強度を増大することができる電気掃除機を提供することにある。
【0006】
【課題を解決するための手段】上述の目的を達成するために本発明では、ダストが収容され、この収容されたダストが外部から見えるように透明又は半透明の部分を有する集塵室の内面に、透明又は半透明部分が傷つかないように、ハードコート層を設けるようにしたものである。
【0007】
【発明の実施の形態】以下 本発明の実施の形態について図面を参照して詳細に説明する。図1を参照すると、本発明をハンディ型の電気掃除機に適用した場合の実施の形態が示してある。この実施形態における電気掃除機は、掃除機本体1を備え、この掃除機本体は本体ケース2を有する。この本体ケースは後ケース3とこの後ケースに着脱可能に取付けられた前ケース4とから構成されている。
【0008】本体ケース2内には集塵フィルタ6が配置され、前ケース4内には集塵フィルタによって区画された集塵室7が形成されている。後ケース3内には電動送風機8が配置され、この電動送風機は前ケース4に設けられた吸込開口9を通してダスト（塵埃）を集塵室7内に吸い込む。
【0009】電動送風機5を作動させると、集塵フィルタ6の内部室6aが負圧になり、これによって集塵室7が負圧になる。この集塵室の負圧によりダストが吸込開口9を通して集塵室7内へ吸引されていき、ダストがこの集塵室に溜まっていく。
【0010】ここで、集塵室7に溜まったダストが外部から見えるように、集塵室7を形成する前ケース4の一部又は全部が透明又は半透明に形成されている。又、この透明

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又は半透明の部分における前ケース4の内面にハードコート層10が設けられている。図1には集塵室7の内面に設けられたハードコート層10の一部が示されている。

【0011】透明又は半透明の部分を形成する一つの実施例では、前ケースが透明又は半透明の樹脂成形品から形成される。これとは別に、例えば、前ケース4の一部、例えば、上半部を切り欠いて窓を形成し、この窓に透明又は半透明の板を取付けるようにしてもよい。この場合には、集塵室に溜まったダストを電気掃除機の上方から見ることができる。

【0012】ハードコート層10は、ダストの中に含まれた金属塊等の硬い固形物が激しく衝突しても容易に傷がつかない層から形成されており、この実施例ではUVコート層又はフッ素コート層から成っている。ここで、このハードコート層10は集塵室7を形成する前ケース4の材質（例えば、ABS又はPP）よりも硬いことが好ましい。このハードコート層は、集塵室7の一部が透明又は半透明である場合には、その透明又は半透明の部分に設けられる。この場合にも、透明又は半透明部分に傷がつきにくいので視認可能な状態を維持することができると共に、傷のつきにくいハードコート層は滑りやすいからダストの付着を防止することができる。尚、ハードコート層を透明又は半透明の部分以外の部分に設けてもよい。このようにすると、集塵室全体の傷の発生を未然に防止することができ、この結果、傷から生ずるひび割れ等が発生することなく集塵室の寿命を長くすることができる。

【0013】ここで、このハードコート層は、集塵室7の透明又は半透明部分に適用されたとき、集塵室内のダストがなお外部から見えるように、透明又は半透明状態で形成されることが必要である。尚、このハードコート層は、上述の如き、UVコート層などに限定されることなく、種々の材料の層を設けることができ、又、その適用として塗装や吹き付けなど種々の方法を用いることができる。

【0014】集塵室を半透明にするには、一例として、色を付けたり、シボ加工（上述の如く梨地模様の細かい凹凸）を施したりすることによって形成される。このように、集塵室7を半透明にすると、集塵室内のダストをいわゆるぼかし状態で見ることができるので、不快さを与えることがない。この場合にも、半透明の集塵室の内面にハードコート層10が設けられる。特に、シボ加工を施した上からこのハードコート層を設けると、細かいダストがシボの溝に進入することがなく見栄えを損うことがない。

【0015】図2を参照すると、本発明をサイクロン式の電気掃除機に適用した場合の実施の形態が示してある。この電気掃除機は、公知であるので簡単に述べると、本体ケース20に着脱自在に載置される集塵容器（ダストカップ）21を備えている。このダストカップは、吸い込んだ空気とダストとを渦流として流すサイクロン容器22とこのサイクロン容器の下方で一体に形成されたダストを収容する収容容器23、即ち、集塵室とを有する。尚、図中、符号24は吸入口25を通してダストをダストカップ内に吸い込むための電動送風機を示す。

【0016】空気とダストとはサイクロン容器内で旋回されこの旋回中にダストが自重等で下方に落下し、集塵室23内に堆積されていく。

【0017】このようなサイクロン式の電気掃除機では、中に溜まったダストの量が見えるように透明又は半透明の材料から形成されたダストカップが設けられることがある。又、中に溜まったダストが外部から見えると見栄えが悪いので予め内面にシボ（梨地模様の細かい凹凸）を設けたダストカップが用いられることもある。

【0018】本発明では、透明又は半透明のダストカップの内面又はシボ加工が施された上からハードコート層30が設けられる。このハードコート層は上述の実施例と同様に、ダストカップの材質より硬い、例えば、UVコート層あるいはフッ素コート層から成っている。これにより、ダストがたとえ激しく衝突しても透明又は半透明の部分に傷がつくことなく、いつまでもダストの量を視認可能な状態に維持することができる。また、ハードコート層であれば、静電気等により付着したダストも滑りやすいのでサイクロン式のダストカップではダストが自重で落下し易いという効果を奏することができる。

【0019】この実施例ではダストカップ全体を透明又は半透明にしてもよいし、溜まったダストの量が外部から見えるように、少なくとも集塵室23のみを透明又は半透明にしてもよい。ハードコート層30はこの透明又は半透明の部分に塗装又は吹き付けなど任意の手段によって設けられる。このハードコート層30は、上述の実施例のハードコート層10と同様であるので、更なる説明を省略する。

【0020】尚、上述の実施の形態では本発明をハンディ型およびサイクロン式の電気掃除機に適用したが、本発明を他の形式の電気掃除機に適用することができる。

【0021】

【発明の効果】上述の如く、本発明によれば、集塵室の透明又は半透明の部分における内面にハードコート層を設けたことによって、たとえ集塵室に流入するダストが激しく衝突しても集塵室の内面に傷がつくことがない。従って、集塵室のダストの量を視認可能な状態にいつまでも維持することができ、集塵室の見栄えを全く損うことがないという実益がある。

【図面の簡単な説明】

【図1】本発明に係る電気掃除機の一実施例を示す一部断面にした側面図である。

【図2】本発明に係る電気掃除機の他の実施例を示す斜視図である。

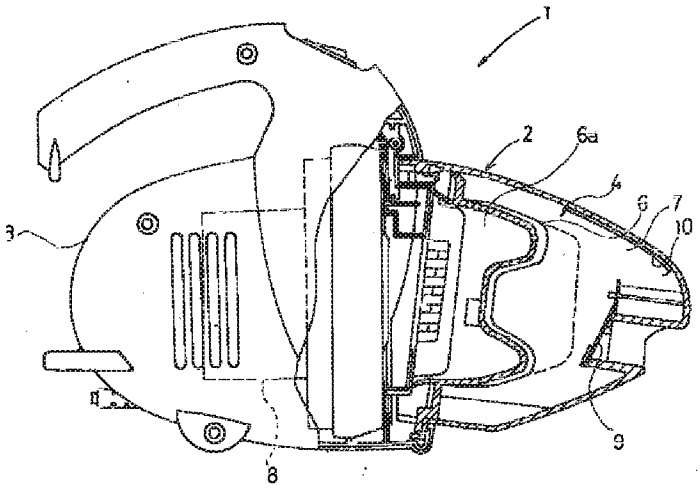
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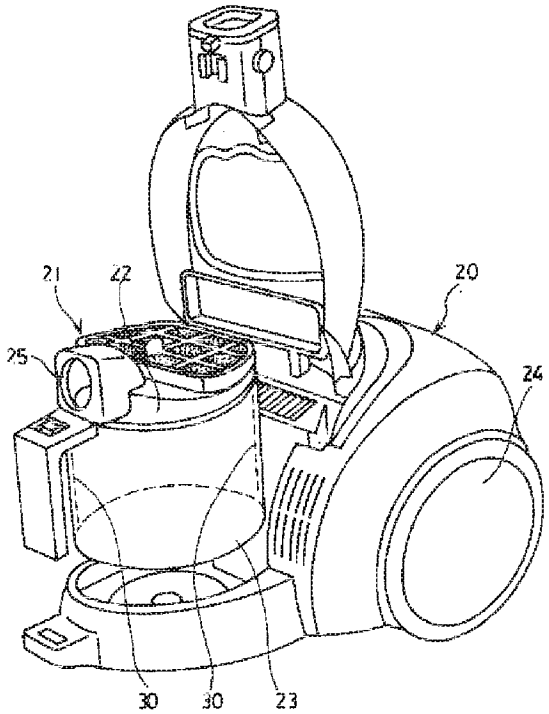
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8、24　電動送風機、
7　集塵室、
10ハードコート層、
21　ダストカップ、
23集塵室（収容容器）
30　ハードコート層、

【図1】



【図2】



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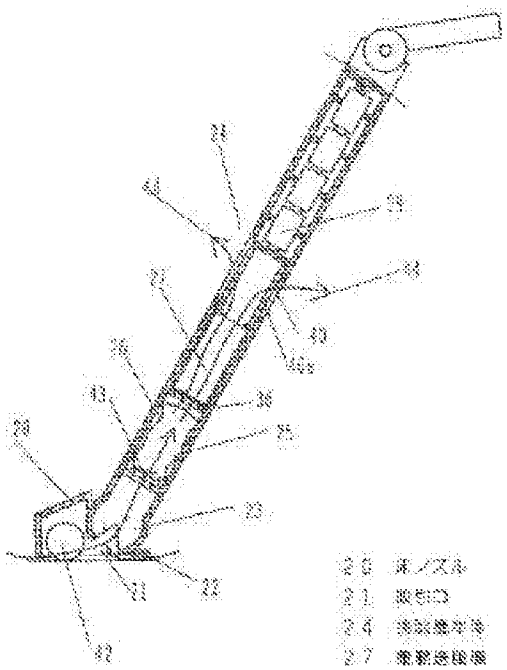
VACUUM CLEANER

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Inventor(s):	HIROSE TORU; HOSOKAWA FUMINOBU; FUKUMOTO MASAMI; NAKAMOTO SHIGEHARU; KIKUKAWA TOMOYUKI; ZAIZEN KATSUNORI; ASADA KAZUHIKO; IWAMOTO KEIKO ±
Applicant(s):	MATSUSHITA ELECTRIC IND CO LTD ±
Classification:	- international: ***A47L9/00; A47L9/16;*** (IPC1-7): A47L9/00; A47L9/16
	- cooperative:
Application number:	JP20020004106 20020111
Priority number(s):	JP20020004106 20020111

Abstract of JP2003204903 (A)

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PROBLEM TO BE SOLVED: To obtain a vacuum cleaner which is compact, user-friendly, and efficient in dust collection. ;SOLUTION: The vacuum cleaner is composed of a floor nozzle 20 with a dust suction opening 21, a dust chamber 25 which communicates with the floor nozzle 20, and an axial electric air blower 27 which is provided at the downstream side of the dust chamber 25. A vacuum cleaner which is compact and user-friendly, and has good dust collection performance is obtained. ;COPYRIGHT: (C)2003,JPO



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DESCRIPTION JP2003204903

[0001]

The present invention relates to relates to a vacuum cleaner for the home.

[0002]

Explaining the structure of a conventional household electric vacuum cleaner using the Prior Art FIG.

[0003]

Figure 17 shows a conventional bed mobile vacuum cleaner. 1 is a floor nozzle having a suction port of the dust hose 5 to the cleaner main body 4 having a built-in electric blower 10 for generating a bag-shaped paper filter 2, and the suction force to separate the dust, the extension pipe 6 communicate with each other through. Figure 18 shows a conventional relatively compact vertical vacuum cleaner. Floor nozzle 1, a paper filter, which is connected directly to the vacuum cleaner main body 4 having a built-in such as an electric fan. Figure 18 shows a conventional electric blower 10 used in these vacuum cleaners. 9 shows the centrifugal impeller, the shroud front 7 is composed of a plurality of blades 11 that are Kyoji the shroud after 8. 9a is the entrance, 9b is shown the exit.

[0004]

By centrifugal force when rotating the impeller 9 at a high speed, a large suction force airflow flows occurs, is performed suction of the dust at high speed as indicated by the arrow 12 from the entrance 9a to the outlet 9b.

[0005]

in such centrifugal conventional electric vacuum cleaner impeller with electric blower 10 having a, it is difficult to reduce the outer diameter dimension of the cleaner main body for housing the electric blower 10, a vertical cleaning shown in FIG. 18 cleaner body 4 becomes larger than that of the floor nozzle 1 is also in the machine, a narrow place cleaning is difficult operability of deteriorates. But if you focus on the operability of the floor nozzle made on the floor moving type vacuum cleaner shown in Figure 17, the hose 5, the assembly of the extension tube 6 is cumbersome, also there is a need to move a large vacuum cleaner body 4 for improvement in operability to many points. in this way, vacuum cleaner using the conventional electric blower 10, it is difficult to realize a good operability body constituting a compact.

[0006]

[SUMMARY OF THE INVENTION However, in the conventional configuration, it is necessary to increase the outer diameter than the diameter of the inlet 6a of the impeller 6, also sometimes airflow flows radially out of the electric blower diameter increases, the cleaner main body 4 which incorporates the electric blower 3 of the floor nozzle 1 height, or outer diameter than the width becomes large. Although the impeller 5 there is a method to reduce the outer diameter of the impeller 5 is driven at high speed, if too small a diameter of the inlet 6a flow stops flowing, dust collection performance is not realistic to deteriorate as a vacuum cleaner.

[0007]

The present invention is intended tc solve the conventional problems above, and an object thereof is to provide an electric vacuum cleaner with excellent dust collecting performance compact.

[0008]

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In order to solve the above conventional problems SUMMARY OF THE INVENTION The vacuum cleaner of the present invention includes: a floor nozzle having a suction port for sucking dust, and a dust collecting chamber communicating with the floor nozzle, it is obtained by a structure comprising an electric blower of axial flow type provided downstream of the dust collecting chamber.

[0009]

Thus, small radial direction, that the thin body can be realized, but compact and operability is good addition that can realize an electric vacuum cleaner with excellent dust collecting performance.

[0010]

DETAILED DESCRIPTION OF THE INVENTION According to one aspect of the present invention, a floor nozzle having a suction port for sucking dust, and a dust collecting chamber communicating with the floor nozzle, provided downstream of the dust collecting chamber with the vacuum cleaner having an axial flow type of the electric blower, a small, a vacuum cleaner excellent in operability, lightweight it can be realized.

[0011]

According to a second aspect of the invention, in particular, by the floor nozzle according to claim 1 wherein is a connected to each downstream of the cleaner body containing therein a dust collecting chamber and the electric blower, excellent operability the vacuum cleaner can be achieved was.

[0012]

Claim 3 The invention described in the present invention, particularly, the outer diameter of the cleaner body according to claim 2, by the floor nozzle and the height smaller configuration, an electric vacuum cleaner excellent in operability can be cleaned even in narrow spaces It can be realized.

[0013]

4. placing of the invention of the present invention, particularly, the outer diameter of the cleaner body according to claim 2, by a width less than the construction of the floor nozzle, the vacuum cleaner excellent in operability can be cleaned even in narrow spaces it can be realized.

[0014]

invention of claim 5, wherein the present invention is particularly, the dust chamber according to claim 1, by utilizing the inertia force acting on the dust and air structure that having a structure of an inertial separation type for separating dust it makes possible to realize a vacuum cleaner excellent in more efficient operability.

[0015]

For embodiments of EXAMPLES Hereinafter the present invention will be described with reference to the drawings.

[0016]

(Example 1) Figure 1 shows a vacuum cleaner according to a first embodiment of the present invention. 20 shows the floor nozzle. 21 is connected to the opposed open the suction port a and the cleaner body 24 via a connecting pipe 23 to the floor surface 22, and communicates with the dust collecting chamber 25 which is built in the cleaner body 24.

[0017]

Some dust collecting chamber 25 bag-like paper filter 26 has an installed in function of storing the separated and dust. 27 shows an electric blower of an axial flow type disposed on the downstream side of the dust collecting chamber 25. Showing the details of the electric blower 27 in FIGS. 2 to 4. Figure 2 is a side sectional view of an electric blower, Fig. 3 is a front view, FIG. 4 shows an external view. 28 is a rotor blade of axial-flow type disposed in a cylindrical casing 34, a plurality of blades 28a, as shown in Figure 4 are fixed has a mounting angle A29 to the hub 28b. 31 is a stationary blade including a plurality of blades 31a, fixed to the casing 34, are installed after the moving blade 28. These wings in this embodiment has a configuration of a two-stage, second rotor blade 32, the second stationary blade 33 is disposed downstream. 35 is a motor for driving the stator 35 b, the rotor 35c, the rotary shaft 35a, a bracket 35d, and a 35e. Electric motor 35 is fixed to the casing 34 by a second stationary blade 33 and the struts 37, moving blade 28, 32 is fixed to the rotary shaft 35a. Arrow 30a arrows 30b the direction of rotation of the bucket represents the flow direction of the wind. That 34a the intake port of the casing 34, 34b shows the exhaust port. 35f shows the bearing.

[0018]

The electric blower 27 damping rubbers 38a is supported on the cleaner body 24 via the rubber vibration isolator 38a, 38b also serves as a seal 38 has a cylindrical form. That is, by attaching via a seal 38 to the communication port 36a which is provided in the electric blower 27 and the intake port

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34a in the partition wall 36 of the dust collecting chamber 25, and is connected dust collecting chamber 25 and the communication. In Figure 1 39 shows a battery as a power source. 40 shows the exhaust hole of the cleaner body 24, an exhaust filter 40a is provided. 42 shows a rotary brush disposed in the floor nozzle 20.

[0019]

A vacuum cleaner shape of the body 24 of the rod-like, the cross-section is almost circular, but its outer diameter 24a is smaller than the height 20a of the floor nozzle 20, and smaller than the longitudinal direction of the width 20b of the floor nozzle 20.

[0020]

Floor nozzle 20 is rotatably connected to the cleaner body 24, the outer dimensions of the cleaner body 24, as when the cleaner main body 24 upright on the floor shown in Fig. 5 (a) Floor nozzle it fits in the longitudinal direction in the width 20b of 20. Further, it fits the cleaner main body 24 in the height 20a of the floor nozzle 20 so that when parallel to the floor surface shown in FIG. 5 (b).

[0021]

The suction force and drives the electric blower 27 is generated, dust on the floor surface 22 is the dust collecting by floor nozzle 20. Sucked dust is separated in the paper filter 26, the dust is stored in a paper filter 26. 43 shows a check valve for preventing outflow of the sucked dust. The clean air of dust are separated as indicated by arrows 44, further fine dust passes through the exhaust filter 40a is exhausted to the outside from the removed exhaust hole 40.

[0022]

Electric blower 27 is an axial-flow blower having an axial-flow rotor blade 28 rotating at high speed, creating an air flow with a suction force by lifting caused by the rotor blades 28 rotates. Axial-flow blower as compared to a centrifugal-type blower shown in the conventional example, relatively and efficient blower to produce a small stream of pressure, also straight manner in the axial direction can flow wind, centrifugal the maximum projected area is small when viewed from the axial direction compared to the type blower. The vacuum cleaner having the configuration shown in the present embodiment, a hose, compared to the floor moving type vacuum cleaner having the extension tube, near the floor nozzle 20 dust collecting chamber 25, can be installed electric blower 27, collecting pressure loss occurring at the time the dust is small, can generate a suction force for a sufficient dust collection at a pressure axial flow type of blower can be operated efficiently. By utilizing a small axial-flow type power transmission blower 27 up to the projected area when viewed from the axial direction, it is possible to reduce the outer diameter 24a of the cleaner body 24, than the width 20b and height 20a of the floor nozzle 20 a small outer diameter 24a cleaner body 24 can be realized, very compact configuration can be achieved when compared to conventional vertical vacuum cleaner. Also, the hose in a conventional bed mobile vacuum cleaner, if the clearance floor nozzle 20 having a thing that was used about the same size falls along with the extension tube, the cleaner body 24 is failure not, as well as the floor moving type vacuum cleaner can maneuverability well cleaning work even in a narrow place. Further hose, floor mobile body without operability is also improved as compared to conventional floor mobile vacuum cleaner.

[0023]

6 is a example where the exhaust filter 40a of the exhaust hole 40 in the housing portion of the battery 39, the cooling effect of the battery 39 is improved, the charge characteristic of the battery 39 is improved.

[0024]

Figure 7 shows a case which is installed immediately after the battery 39 floor nozzle 20, a battery 39 is accommodated in the accommodating cylinder 39a, the air passage 45 is constructed in the outer peripheral portion of the receiving cylinder 39 a. In this configuration, at the same time the cooling effect of the battery 39 is further improved, because that can be placed near the heavy battery 39 floor nozzle 20, which reduces the weight feeling at hand better operability.

[0025]

Figure 8 is established a battery 39 housed in the storage cylinder 39a between the dust collecting chamber 25 and electric blower 27, a configuration example in which the outer peripheral portion has an air passage 45 of the storage cylinder 39a, the battery 39 clean and at the same time as the cooling effect of low temperature air flow is good, it does not clog the large dust in the air passage 45. In this example it is also possible to eliminate the storage cylinder 39a, the effect of cooling the battery 39 That way is further improved.

[0026]

(Embodiment 2) Figure 9 shows a second embodiment of a vacuum cleaner of the present invention in FIG. Example 1 and the same parts will be omitted are denoted by the same reference numerals. 51 shows a dust chamber in this embodiment. Dust collection chamber 51 has an inertia separating type

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of arrangement for separating dust by utilizing the inertia force acting on the dust and the air with a large difference in mass. That has a configuration of the inverting type axial flow cyclone, the inner cylinder on an inner peripheral side of the outer peripheral passage 51b through the tube 51a to between connecting pipe 23 the air flow containing the dust which has passed through the inner cylinder 51a and the outer wall 53 it passes through the axial flow blade 51c which is fixed between the 51a and the communicating pipe 51e flows into the inner cylinder 51a with. Air stream containing the time the dust is vigorously turning by the action of the axial-flow wings 51c to separate the dust by the centrifugal force. The separated air stream is sucked from the communication hole 51d communicating pipe 51e communicating with the suction port 34a of the electric blower 27. Dust 52 separated is accumulated in the bottom of the inner cylinder 51a. Arrow 44 indicates the flow of air.

[0027]

Or more of such inertial separation type of dust collecting chamber, it is also without the pressure loss is increased by the accumulated dust, can be a relatively low pressure loss of the dust-collecting chamber pressure is also small necessary electric blower can be realized, axial-flow type allowing vacuum cleaner arrangement which can sufficiently sucked dust in the electric blower 27.

[0028]

Figure 11 and 12 is an example in which the straight-type axial flow cyclone in the dust collecting chamber 51, the air stream containing the dust that flows through the connecting tube 23 passes through the inner tube 55, the inner tube 55 passing through the axial flow blades 56 fixed to the inner periphery. Space 58 between the time the air stream containing the dust is vigorously swirling the dust is centrifuged by a centrifugal force, the separated dust 52 flows outside wall 53 and the inner tube 55 along the inner circumferential wall 55a of the inner tube 55 it is stored in. Clean air flow dust 52 has been separated is sucked through the communication hole 51d into the electric blower.

[0029]

According to this structure, when the flow pressure loss is straight manner is further reduced can be constructed compact dust collection chamber 51 at the same time

[0030]

Figure 13, 14 and 15 is connected to the floor nozzle 20 and the dust chamber 71 rotatably connected to section 72, the mounting tube 61 of the floor nozzle 20 and the dust collection chamber 71 in the duct 60 of the rich bellows in flexible it shows a configuration in communication. Duct 60 and the floor nozzle 20 is connected tiltably through a nozzle communicating pipe 62. Dust collection chamber 71 is constituted by a tube 71b inside the outer container 71a and the opposite open ends, one end 71f of the inner cylinder 71b communicates with the inlet of the electric blower. Mounting tube 61 is connected to the outer container 71a tangentially, and communicates with the space 71c between the inner cylinder 71b and the outer container 71a

[0031]

Air flow containing dust flows from the street mounting pipe 61 to duct 60 into dust collection chamber 71, with vigorous swirling along the inner wall of the outer container 71a, dust the lower end of the outer container 71a while being separated outward by centrifugal force to section 71d is sucked from the lower end opening 71e of the flow suddenly reversed inner cylinder 71b. Then the dust 52 separated is accumulated in the lower end portion 71d of the outer container 71a. As shown in Figure 14, the cleaner main body 24 is tiltable transversely to the floor, horizontal to the floor by tilting the cleaner body 24 in the longitudinal direction as indicated by Matazu 15, or perpendicular position cleaning of narrow places can tilt is done easily to, also excellent in operability. Furthermore, can be easily be made to flow into the air flow in a tangential direction relative to the outer container 71a of the dust collecting chamber 71, a standard cyclone configuration can be realized, the separation performance of the dust 52 is improved.

[0032]

As described above, according to the present invention, according to the invention of claims 1 to 5, wherein, by using an axial-flow type of electric blower, to reduce the size of the cleaner main body compared to the floor nozzle, very operation it is possible to realize a gender good vacuum cleaner.

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CLAIMS JP2003204903

1.

Vacuum cleaner comprising a floor nozzle having a suction port for sucking dust, and a dust collecting chamber communicating with the floor nozzle, and a axial flow type of the electric blower provided on a downstream side of the dust collecting chamber.

2.

Cleaner main body containing therein a dust collecting chamber and the electric blower is an electric vacuum cleaner according to claim 1, which is connected to the downstream side of the floor nozzle.

3.

The outer diameter of the cleaner body, the vacuum cleaner according to claim 2, characterized in that less than the floor nozzle height.

4.

The outer diameter of the cleaner body, the vacuum cleaner according to claim 2, characterized in that less than the width of the floor nozzle.

5.

Dust collecting chamber, an electric vacuum cleaner according to claim 1 having the structure of an inertial separating type which uses an inertial force to separate dust acting on dust and air.

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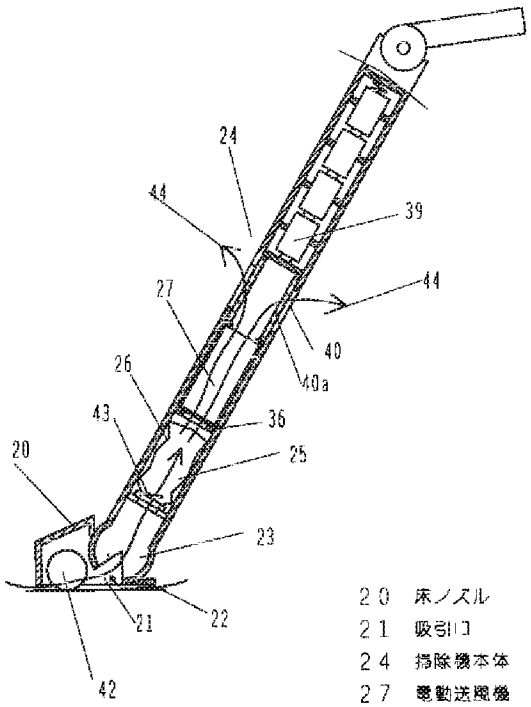
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(54)【発明の名称】　電気掃除機

(57)【要約】
【課題】　小型で操作性が良く、しかも集塵性能に優れた電気掃除機を実現すること。
【解決手段】　塵埃を吸引する吸引口２１を有した床ノズル２０と、床ノズル２０に連通した集塵室２５と、集塵室２５の下流側に設けられた軸流型の電動送風機２７とを備える電気掃除機とした。これにより、小型で操作性が良く、しかも集塵性能に優れた電気掃除機を実現できる。



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【特許請求の範囲】
【請求項１】　塵埃を吸引する吸引口を有した床ノズルと、床ノズルに連通した集塵室と、前記集塵室の下流側に設けられた軸流型の電動送風機とを備えた電気掃除機。
【請求項２】　集塵室と電動送風機とを内包した掃除機本体が、床ノズルの下流側に接続された請求項１記載の電気掃除機。
【請求項３】　掃除機本体の外径が、床ノズルの高さより小さいことを特徴とする請求項２記載の電気掃除機。
【請求項４】　掃除機本体の外径が、床ノズルの幅よりも小さいことを特徴とする請求項２記載の電気掃除機。
【請求項５】　集塵室が、塵埃と空気に働く慣性力を利用して塵埃を分離する慣性分離式の構成を有した請求項１記載の電気掃除機。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、家庭用の電気掃除機に関するものである。
【０００２】
【従来の技術】図を用いて従来の家庭用電気掃除機の構成を説明する。
【０００３】図１７は従来の床移動型掃除機を示す。１は塵埃などの吸引口を有した床ノズルであり、塵埃を分離する袋状の紙フィルタ２、および吸引力を発生する電動送風機１０を内蔵した掃除機本体４にホース５、延長管６を介して連通している。図１８は従来の比較的コンパクトな縦型掃除機を示す。床ノズル１は、紙フィルタ、電動送風機などを内蔵した掃除機本体４に直接連結されている。図１８はこれらの掃除機に使用される従来の電動送風機１０を示す。９は遠心型のインペラを示し、シュラウド前７、シュラウド後８に挟時された複数枚のブレード１１により構成されている。９ａは入り口を、９ｂは出口を示す。
【０００４】インペラ９を高速で回転駆動すると遠心力により、入り口９ａから出口９ｂへ矢印１２で示すように高速で気流が流れ大きな吸引力が生じ、塵埃の吸引を行っている。
【０００５】このような遠心型のインペラを有した電動送風機１０を用いた従来の電気掃除機では、電動送風機１０を収納する掃除機本体の外径寸法を小さくすることが難しく、図１８で示す縦型掃除機でも床ノズル１に比べ掃除機本体４が大きくなり、狭い場所の掃除が難しく操作性が悪くなる。床ノズルの操作性を重視すると図１７で示した床移動型掃除機になるが、ホース５、延長管６の組み立てが煩わしく、又大きな掃除機本体４を移動する必要があり操作性に改良すべき点が多い。このように従来の電動送風機１０を用いた掃除機では、小型で操作性の良い本体構成の実現が難しい。
【０００６】
【発明が解決しようとする課題】しかし、上記従来の構成では、インペラ６の入り口６ａの径より外径を大きくする必要があり、又半径方向に気流が流出することもあり、電動送風機の外径が大きくなり、電動送風機３を内蔵する掃除機本体４は床ノズル１の高さ、あるいは幅に比べその外径が大きくなっている。インペラ５を高速で駆動しインペラ５の外径を小さくする方法もあるが、入り口６ａの径をあまり小さくすると流量が流れなくなり、掃除機としての集塵性能が悪化し現実的では無い。
【０００７】本発明は前記従来の課題を解決するもので、小型で集塵性能に優れた電気掃除機を提供することを目的とする。
【０００８】
【課題を解決するための手段】前記従来の課題を解決するために、本発明の電気掃除機は、塵埃を吸引する吸引口を有した床ノズルと、床ノズルに連通した集塵室と、前記集塵室の下流側に設けられた軸流型の電動送風機とを備える構成としたものである。
【０００９】これによって、径方向に小さい、すなわち細い本体が実現でき、小型で操作性が良くしかも集塵性能に優れた電気掃除機を実現できるものである。
【００１０】
【発明の実施の形態】請求項１に記載の発明は、塵埃を吸引する吸引口を有した床ノズルと、床ノズルに連通した集塵室と、前記集塵室の下流側に設けられた軸流型の電動送風機とを備えた電気掃除機とすることにより、小型、軽量で操作性に優れた電気掃除機を実現できる。
【００１１】請求項２に記載の発明は、特に、請求項１記載の床ノズルが、集塵室と電動送風機とを内包した掃除機本体の下流側に接続された構成とすることにより、操作性に優れた電気掃除機を実現できる。
【００１２】本発明の請求項３記載の発明は、特に、請求項２の掃除機本体の外径が、床ノズルの高さより小さい構成とすることにより、狭い場所でも掃除できる操作性に優れた電気掃除機を実現できる。
【００１３】本発明の請求項４載の発明は、特に、請求項２の掃除機本体の外径が、床ノズルの幅より小さい構成とすることにより、狭い場所でも掃除できる操作性に優れた電気掃除機を実現できる。
【００１４】本発明の請求項５記載の発明は、特に、請求項１に記載の集塵室が、塵埃と空気に働く慣性力を利用して塵埃を分離する慣性分離式の構成を有した構成とすることにより、より効率の良い操作性に優れた電気掃除機を実現できる。
【００１５】
【実施例】以下本発明の実施例について、図面を参照しながら説明する。
【００１６】（実施例１）図１に、本発明の第一の実施例における電気掃除機を示す。２０は床ノズルを示す。２１は床面２２に対向し開口した吸引口であり接続管２

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３を介して掃除機本体２４に接続され、掃除機本体２４に内蔵された集塵室２５に連通している。

【００１７】集塵室２５の中には袋状の紙フィルタ２６が設置され塵埃を分離しかつ蓄える機能を有している。２７は集塵室２５の下流側に設置された軸流型の電動送風機を示す。図２～図４に電動送風機２７の詳細を示す。図２は電動送風機の側断面図を、図３は正面図、図４は外観図を示す。２８は円筒形のケーシング３４内に設置された軸流型の動翼であり、図４で示すように複数枚のブレード２８ａがハブ２８ｂに取り付け角度Ａ２９を有して固着されている。３１は複数枚のブレード３１ａから構成された静翼であり、ケーシング３４に固定され、動翼２８の後に設置されている。本実施例ではこれらの翼は２段の構成を有しており、下流に第２動翼３２、第２静翼３３が設置されている。３５は駆動用の電動機で、固定子３５ｂ、回転子３５ｃ、回転軸３５ａ、ブラケット３５ｄ、３５ｅから構成されている。電動機３５は第２静翼３３及び支柱３７でケーシング３４に固定され、回転軸３５ａに動翼２８、３２が固定されている。矢印３０ａは動翼の回転方向を矢印３０ｂは風の流れ方向を示している。すなわちケーシング３４の３４ａが吸気口、３４ｂが排気口を示す。３５ｆは軸受けを示す。

【００１８】電動送風機２７は防振ゴム３８ａ、３８ｂを介して掃除機本体２４に支持され防振ゴム３８ａは円筒型をしておりシール３８を兼ねている。すなわち電動送風機２７はその吸気口３４ａを集塵室２５の隔壁３６に設けた連通口３６ａにシール３８を介して取り付けることにより、集塵室２５と連通接続されている。図１で３９は電源となるバッテリーを示す。４０は掃除機本体２４の排気孔を示し、排気フィルタ４０ａが設置されている。４２は床ノズル２０内に設置された回転ブラシを示す。

【００１９】掃除機本体２４の形状は棒状で、その断面がほぼ円形であり、その外径２４ａは床ノズル２０の高さ２０ａより小さく、かつ床ノズル２０の前後方向の幅２０ｂよりも小さい。

【００２０】床ノズル２０は掃除機本体２４に回転自在に接続されており、掃除機本体２４を床面に垂直に立てた場合は図５（ａ）で示すように掃除機本体２４の外寸は床ノズル２０の前後方向の幅２０ｂ内に収まる。又、掃除機本体２４を床面に平行にした場合には図５（ｂ）で示すように床ノズル２０の高さ２０ａ内に収まる。

【００２１】電動送風機２７を駆動すると吸引力が発生し、床ノズル２０により床面２２の塵埃が集塵される。吸引された塵埃は紙フィルタ２６で分離され、塵埃は紙フィルタ２６内に蓄積される。４３は吸引された塵埃の流出を防止するための逆止弁を示す。塵埃が分離された清浄な空気は矢印４４で示すように、排気フィルタ４０ａを通過し更に微少な塵埃が取り除かれ排気孔４０から外部に排気される。

【００２２】電動送風機２７は高速で回転する軸流型の動翼２８を有した軸流型送風機であり、動翼２８が回転することによって生じる揚力によって吸引力を伴う空気流を生み出す。軸流型送風機は従来例で示した遠心型の送風機に比べると、比較的圧力の小さい流れを生み出すのに効率の良い送風機であり、又直進的に軸方向に風を流すことができ、遠心型送風機に比べると軸方向から見た最大投影面積は小さくなる。本実施例に示した掃除機の構成では、ホース、延長管を有した床移動型掃除機に比べると、床ノズル２０の近くに集塵室２５、電動送風機２７を設置することができ、集塵時に生じる圧損は小さく、軸流型の送風機が効率良く運転できる圧力で十分な集塵のための吸引力を発生できる。軸方向から見た最大投影面積の小さな軸流型電送送風機２７を利用することにより、掃除機本体２４の外径２４ａを小さくすることが可能になり、床ノズル２０の幅２０ｂと高さ２０ａより小さな外径２４ａの掃除機本体２４が実現でき、従来の縦型掃除機に比べると非常にコンパクトな構成が実現できる。又、従来の床移動型掃除機でホース、延長管と共に使用されていた物とほぼ同じ大きさを有した床ノズル２０が入る隙間であれば、掃除機本体２４が障害になることは無く、床移動型掃除機と同様に狭い場所でも小回り良く掃除作業ができる。又ホース、床移動型本体が無く操作性も従来の床移動型掃除機に比べても改善される。

【００２３】図６は、バッテリ３９の収納部分に排気フィルタ４０ａと排気孔４０を設置した例であり、バッテリ３９の冷却効果が良くなり、バッテリ３９の充電特性が改善される。

【００２４】図７はバッテリ３９が床ノズル２０の直後に設置されている場合であり、バッテリ３９は収納筒３９ａに収納され、空気通路４５は収納筒３９ａの外周部に構成されている。この構成では、バッテリ３９の冷却効果が更に改善されると同時に、重たいバッテリ３９が床ノズル２０近くに配置できるため、手元での重量感が軽減され操作性が良くなる。

【００２５】図８は集塵室２５と電動送風機２７の間に収納筒３９ａに収納されたバッテリ３９を設置し、収納筒３９ａの外周部を空気通路４５とした構成例であり、バッテリ３９には清浄かつ温度の低い空気が流れその冷却効果が良くなると同時に、空気通路４５に大きな塵埃が詰まることも無い。この例では収納筒３９ａをなくすことも可能であり、そうすればバッテリ３９の冷却効果は更に改善される。

【００２６】（実施例２）図９、図１０に本発明の電気掃除機の第２の実施例を示す。実施例１と同一部分は同一符号を付してその説明を省略する。５１は本実施例での集塵室を示す。集塵室５１は質量に大きな違いのある塵埃と空気に働く慣性力を利用して塵埃を分離する慣性

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分離式の構成を有している。すなわち反転型軸流サイクロンの構成を有しており、接続管２３を通過した塵埃を含んだ気流は内筒５１ａと外壁５３の間の外周通路５１ｂを通り内筒５１ａの内周側に内筒５１ａと連通管５１ｅの間に固定された軸流羽５１ｃを通過して内筒５１ａ内部に流入する。この時塵埃を含んだ空気流は軸流羽５１ｃの作用で激しく旋回し塵埃を遠心力で分離する。分離された気流は電動送風機２７の吸気口３４ａに連通した連通管５１ｅの連通口５１ｄから吸引される。分離された塵埃５２は内筒５１ａの底部に蓄積される。矢印４４は空気の流れを示す。

【００２７】以上のような慣性分離式の集塵室は、蓄積された塵埃によって圧損が大きくなることも無く、比較的低圧損な集塵室が実現でき電動送風機が必要な圧力も小さくでき、軸流型の電動送風機２７で十分な吸引集塵ができる掃除機構成が可能になる。

【００２８】図１１，１２は直進型の軸流サイクロンを集塵室５１に構成した例であり、接続管２３を経由して流入した塵埃を含んだ空気流は内側管５５を通過し、内側管５５の内周に固定された軸流羽５６を通過する。このとき塵埃を含んだ空気流は激しく旋回し塵埃が遠心力によって遠心分離される、分離された塵埃５２は内側管５５の内周壁５５ａに沿って流れ外壁５３と内側管５５の間の空間５８に蓄積される。塵埃５２が分離された清浄な空気流は連通口５１ｄを通って電動送風機へ吸引される。

【００２９】この構成によれば、流れが直進的であり圧損が更に軽減されると同時にコンパクトな集塵室５１が構成できる。

【００３０】図１３、１４、１５は床ノズル２０と集塵室７１を回転自在に接続部７２で接続し、床ノズル２０と集塵室７１の取り付け管６１を可撓性に富んだ蛇腹のダクト６０で連通した構成を示す。ダクト６０と床ノズル２０は傾動可能にノズル連通管６２を介して接続されている。集塵室７１は外容器７１ａと両端が開口した内筒７１ｂにより構成され、内筒７１ｂの一端７１ｆは電動送風機の吸気口と連通している。取り付け管６１は外容器７１ａに接線方向に接続され、内筒７１ｂと外容器７１ａの間の空間７１ｃに連通している。

【００３１】塵埃を含んだ気流はダクト６０を通り取り付け管６１から集塵室７１に流入し、外容器７１ａの内側壁に沿って激しく旋回し、塵埃は遠心力によって外側に分離されつつ外容器７１ａの下端部７１ｄへ流れ急反転し内筒７１ｂの下端口７１ｅから吸引される。そして分離された塵埃５２は外容器７１ａの下端部７１ｄに蓄積される。図１４で示すように、掃除機本体２４は床面に対し横方向に傾動可能であり、又図１５で示すように掃除機本体２４を前後方向に傾動させ床面に水平、あるいは直角な位置まで傾動でき狭い場所の掃除が簡単に行なえ、操作性にも優れる。また、集塵室７１の外容器７１ａに対し接線方向に気流を流入させることが容易にでき、標準的なサイクロン構成が実現でき、塵埃５２の分離性能が良くなる。

【００３２】

【発明の効果】以上のように、請求項１～５記載の発明によれば、軸流型の電動送風機を利用し、床ノズルに比べ小型な掃除機本体を実現することにより、非常に操作性の良い電気掃除機を実現することができる。

【図面の簡単な説明】

【図１】本発明の実施例１における電気掃除機の部分断面図

【図２】同、軸流型電動送風機の横断面図

【図３】（ａ）図２に示す軸流型電動送風機をＢ－Ｂから見た動翼部分の正面図

（ｂ）同、軸流型電動送風機をＡ－Ａから見た静翼部分の正面図

【図４】（ａ）本発明の実施例１における軸流型電動送風機の横外観図

（ｂ）同、軸流型電動送風機の斜視図

【図５】（ａ）同、掃除機本体を床面に対して垂直にした場合の部分断面図

（ｂ）同、掃除機本体を床面に対して水平にした場合の部分断面図

【図６】本発明の実施例１における他の電気掃除機の部分断面図

【図７】同、他の電気掃除機の部分断面図

【図８】同、他の電気掃除機の部分断面図

【図９】本発明の実施例２における電気掃除機の部分断面図

【図１０】（ａ）同、集塵室まわりの平面図

（ｂ）同、集塵室まわりの断面図

【図１１】本発明の実施例２における他の電気掃除機の部分断面図

【図１２】同、集塵室部分の断面図

【図１３】（ａ）本発明の実施例２における他の電気掃除機の正面図

（ｂ）同、後面図

【図１４】（ａ）同、電気掃除機の本体を左に傾動した場合の後面図

（ｂ）同、右に傾動した場合の後面図

【図１５】（ａ）同、電気掃除機の本体を垂直にした場合の正面図

（ｂ）同、水平にした場合の正面図

【図１６】（ａ）同、集塵室まわりの平面断面図

（ｂ）同、集塵室まわりの正面断面図

【図１７】従来の床移動型掃除機まわりの要部断面図

【図１８】従来の縦型掃除機の外観図

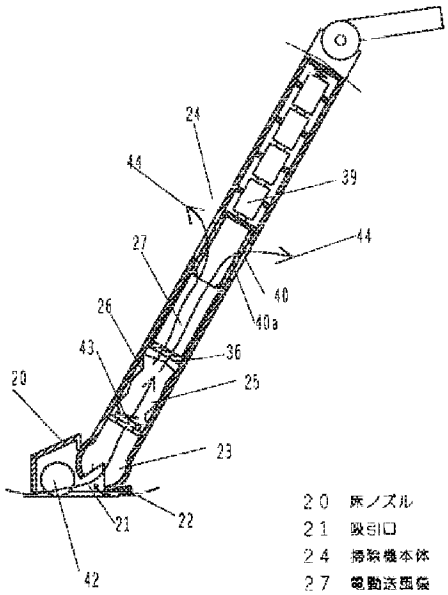
【図１９】（ａ）従来の掃除機に搭載された電動送風機の平面断面図

（ｂ）同、電動送風機の正面断面図

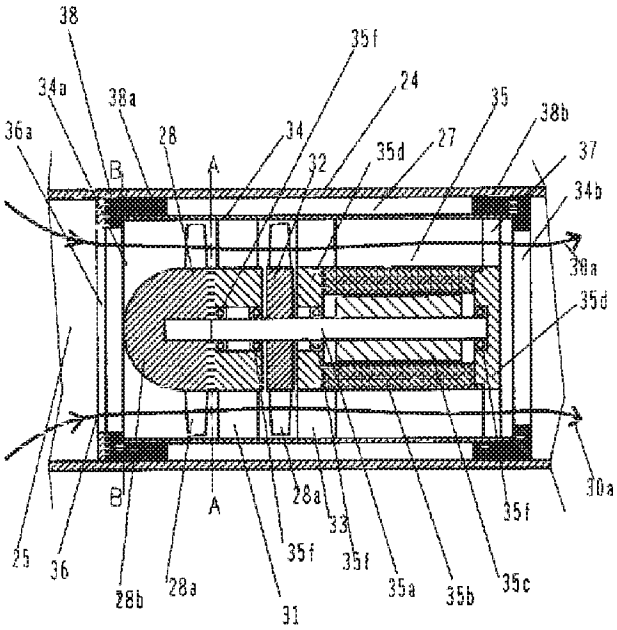
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【符号の説明】
20　床ノズル
21　吸引口
24　掃除機本体
24a　外径
27　電動送風機
20a　高さ
20b　幅
25、51、71　集塵室

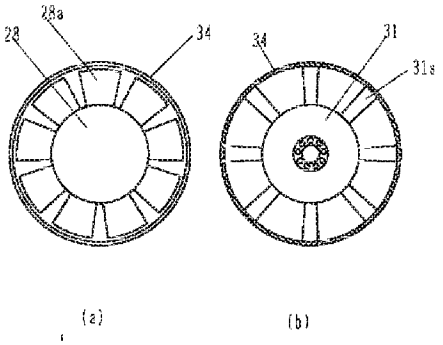
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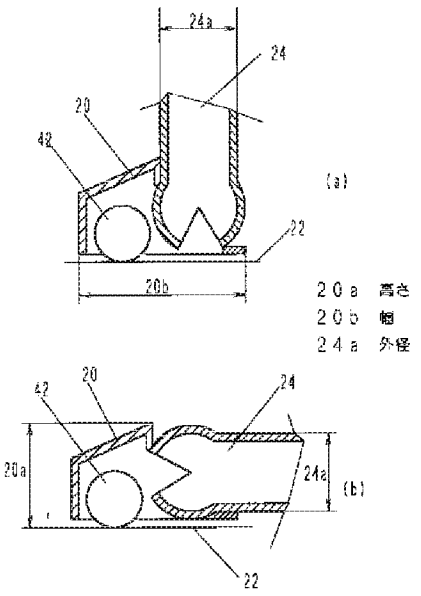
【図2】



【図3】

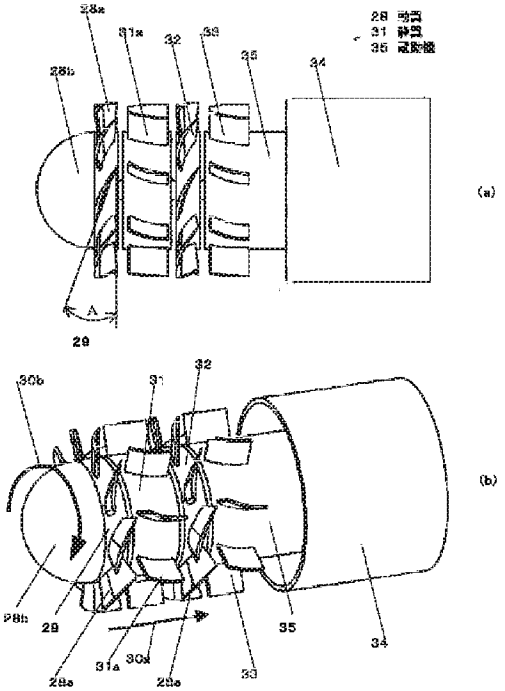


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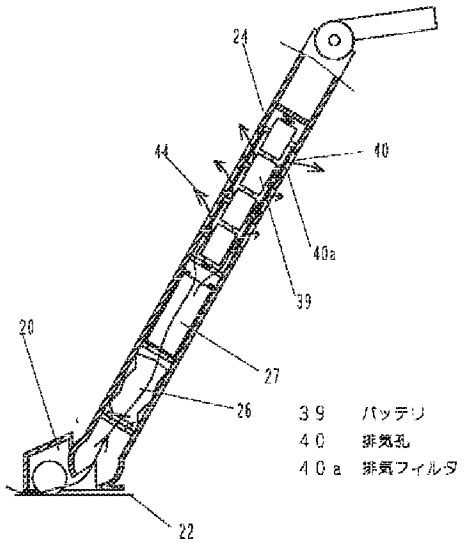


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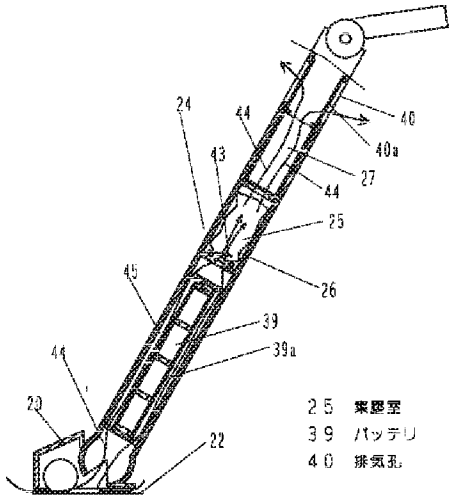
【図4】



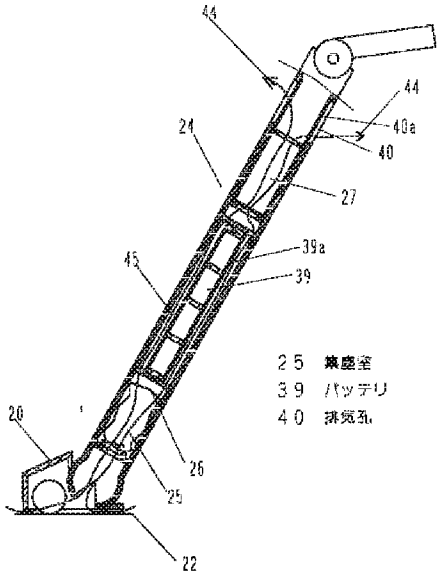
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【図7】

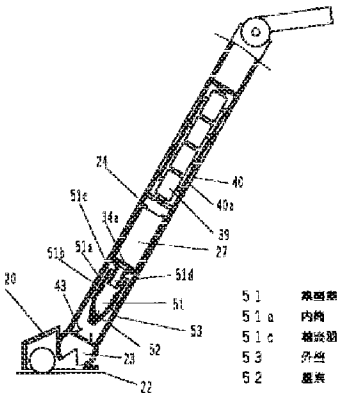


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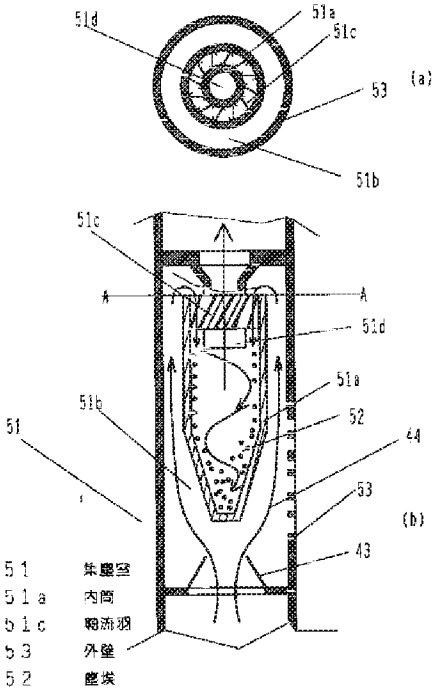


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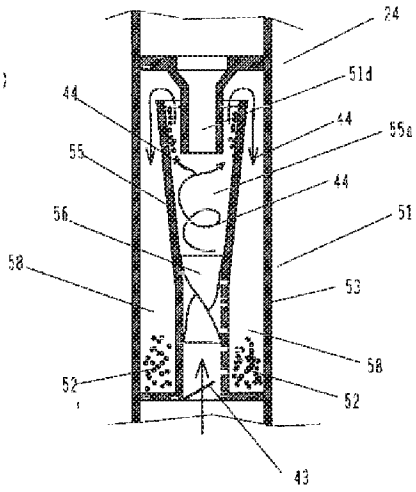
【図９】



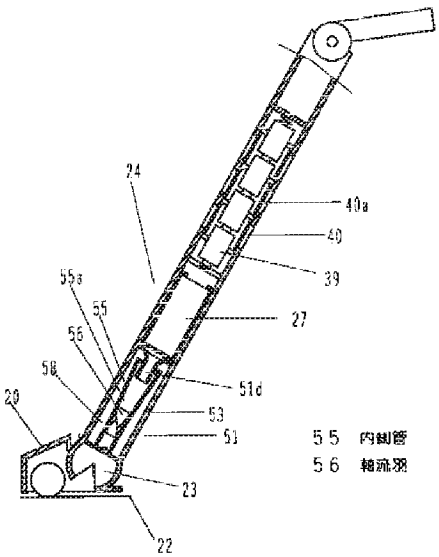
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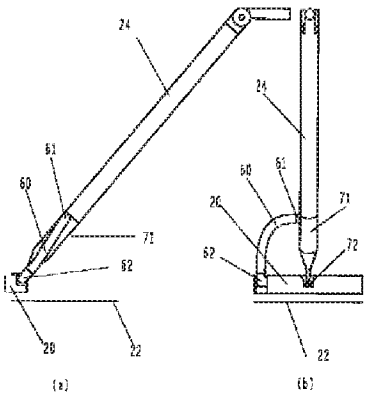
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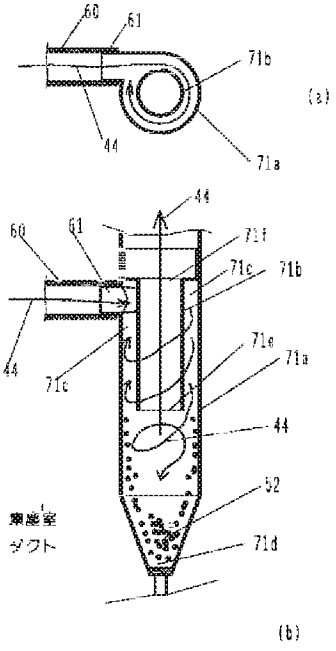
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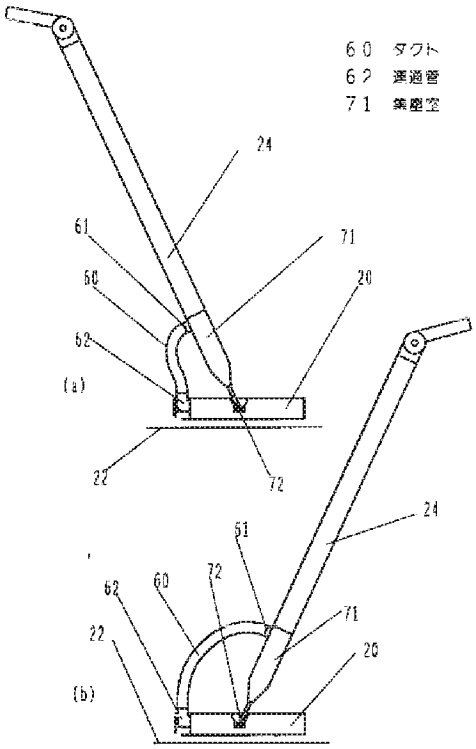
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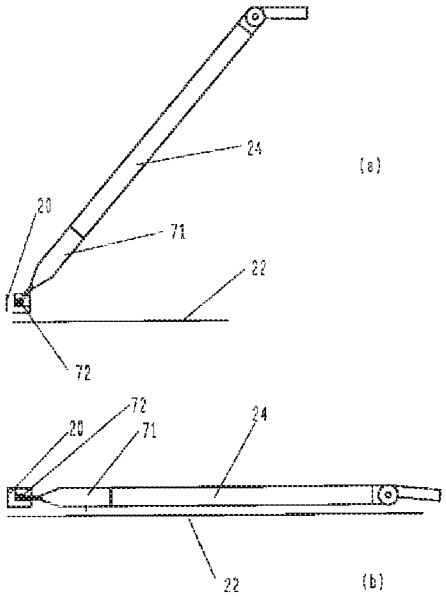
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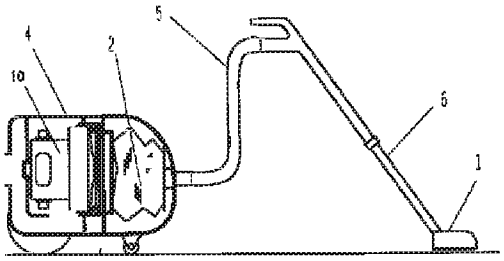
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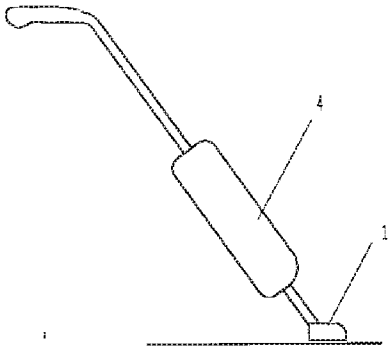
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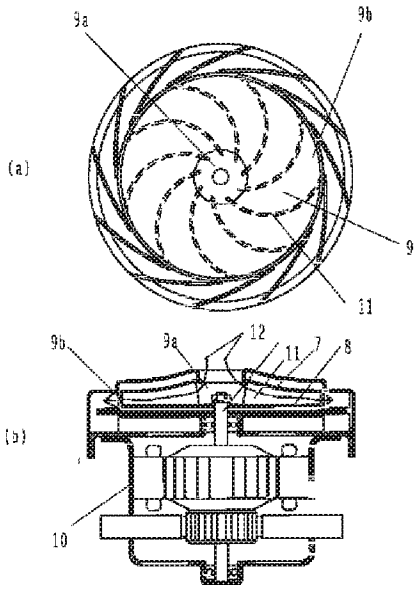
【図17】



【図18】



【図19】



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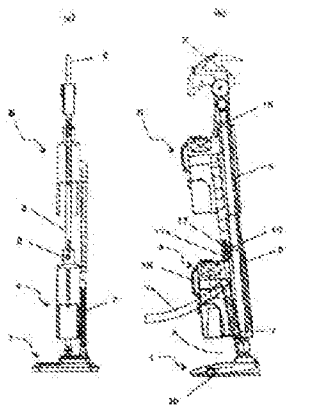
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(71)Applicant	SHARP CORP
(72)Inventor	ONISHI YUJI IKEZAKI KATSUJI



(54)RECHARGEABLE VACUUM CLEANER

(57)Abstract

PROBLEM TO BE SOLVED: To provide a rechargeable vacuum cleaner suitable for cleaning a gap where a vacuum cleaner main body can not pass through, a high place, and the inside of a car, etc.

SOLUTION: A conventional vacuum cleaner has structure in which the main body removes dust by filtering an air stream including dust. Accordingly a blower with large power is required considering the resistance by filtering the air stream by a cloth bag to cause the main body to be a larger size and noise to be a problem. Dust is sucked only through a suction port. To resolve these problems. This rechargeable vacuum cleaner is equipped with a vacuum cleaner with the main body containing an operating rod with the suction port for dust on one end and a handle part on the other end, a rechargeable battery, an electric blower driven by the rechargeable battery, a charger to charade the rechargeable battery, and a cyclone type dust collector to collect dust.

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CLAIMS DETAILED DESCRIPTION

DESCRIPTION OF DRAWINGS DRAWINGS

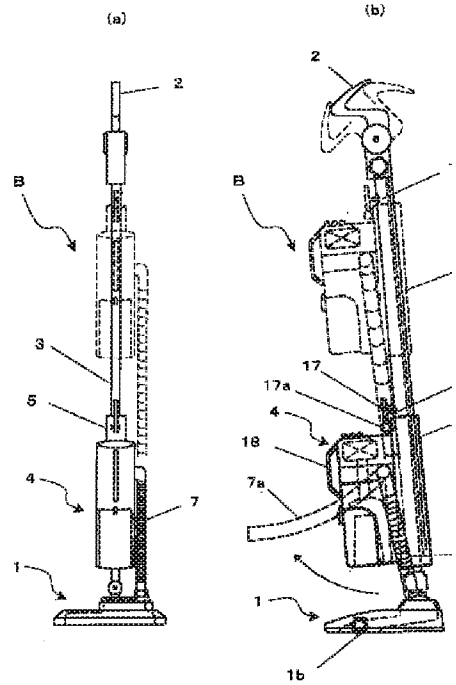
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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]The present invention relates the rechargeable battery mainly used for home use to the rechargeable vacuum cleaner which carries out an inner package, and relates to the rechargeable vacuum cleaner which adopted the cyclone dust collector which is provided to an operation rod slidably [the cleaner body which incorporates especially a dust collector], and which both has a small light weight as a dust collector.
[0002]
[Description of the Prior Art]As a rechargeable vacuum cleaner which carried out the inner package of the rechargeable battery, As shown in Fig.7, a handle part to the lower end of the operation rod 3 which it has An electric blower, The cleaner considered as the composition which provided the suction opening part 1 which connects the cleaner body 4 which carries out the inner package of the rechargeable battery etc., and also absorbs a dust with the suction force of an electric blower ahead of the cleaner body 4, The rechargeable vacuum cleaner provided with the tray 100 which carries out the inner package of the battery charger for charging the aforementioned rechargeable battery which provided the box part which stores a power transformer, and the placing part which adjoins this box part is disclosed in JP,2000-189367,A. Since it is the structure of placing the part except the suction opening part 1 of the above-mentioned cleaner body 4 on the above-mentioned tray 100, and charging it in the above-mentioned rechargeable vacuum cleaner, the top it becomes possible to make area of the placing part of a battery charger small and in which the miniaturization as the whole rechargeable vacuum cleaner is possible -- under cleaning -- a battery charger -- an obstacle -- things -- although -- it can be considered as a rechargeable vacuum cleaner with little high usability.
[0003]
[Problem to be solved by the invention]However, since the cleaner body 4 is the structure of filtering the airstream containing dust with a cloth bag, and removing dust according to the above-mentioned, conventionally publicly known vacuum cleaner, it had the problem that it lacked in usability and convenience that the electric blower of the big output which considered the resistance at the time of filtering airstream with a cloth bag is needed, and the cleaner body 4 becomes large-sized, or noise enlarges etc. Since it was the structure which can perform suction of dust only from the suction opening part 1 to the last, it had the problem were not suitable for cleaning of heights, such as cleaning of the gap along which the suction opening part 1 or the cleaner body 4 does not pass, a desk top, a wall and a ceiling, and cleaning inside an automobile etc. The present invention aims at dissolution of the aforementioned problem which is inherent in the conventional rechargeable vacuum cleaner which was described above.
[0004]
[Means for solving problem]To achieve the above objects, the operation rod with which the present invention placed the handle part at the suction opening part which inhales dust at the one end, and the other end, In the rechargeable vacuum cleaner possessing the vacuum cleaner which has a cleaner body having a rechargeable battery, the electric blower driven with the rechargeable battery, and the dust collector which collects dust for dust, and the charging equipment which charges a rechargeable battery, It is constituted as a rechargeable vacuum cleaner, wherein a dust collector is a cyclone type dust collector. Since it was efficient since the cyclone type dust collector used here separated air and dust with the centrifugal force which arises according to swirling flow, and it was low also about noise, it should be extremely



Representative drawing

Representative drawing | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

excellent in usability and convenience as the rechargeable vacuum cleaner itself used indoors.
[0005]Charging equipment may be the tray which served as the mounting base of a vacuum cleaner. When charging a rechargeable vacuum cleaner by being constituted in this way, the time and effort to which charging equipment and a vacuum cleaner are connected becomes move a vacuum cleaner to charging equipment from a mounting base, or unnecessary, and charge with the stable attitude is attained and the convenience of a rechargeable vacuum cleaner improves.
[0006]A cleaner body may be slidably provided along with an operation rod. By the stable operation by cleaning of a floor line being possible, and fixing a cleaner body to the position near a handle part conversely, if a cleaner body is fixed to the suction opening part side and the center of gravity is carried out the floor side by being constituted in this way, High places, such as a deep gap between back and a curtain, can be cleaned efficiently, and convenience further improves.
[0007]A cleaner body may be slidably provided by the operation rod via the holding stand provided slidably at an operation rod. By being constituted in this way, a cleaner body can be made into a removable structure from a holding stand. Therefore, it becomes possible to separate from an operation rod or a suction opening part, and to use it as a vacuum cleaner of a portable type with a cleaner simple substance, and can clean the inside of a height or a car, etc. efficiently.
[0008]To an operation rod, a rechargeable battery is an opposite side of a cyclone type dust collector, and may be caudad arranged rather than an electric blower. By being constituted in this way, it becomes possible to make small hand load as the whole rechargeable vacuum cleaner, and rotational force especially centering on an operation rod, and to set up the center of gravity low, and the operability at the time of operating a rechargeable vacuum cleaner with an operation rod improves.
[0009]Only when a cleaner body places a vacuum cleaner on a tray in the state where it slid to the lower limit position, it may be constituted so that charge of a rechargeable battery may be performed. By being constituted in this way, it becomes possible to make low the center of gravity of the whole rechargeable vacuum cleaner at the time of charging, and can perform charge with the stable attitude with the low danger of a fall.
[0010]When a vacuum cleaner is placed on a tray, the alarming means which reports that charge of a rechargeable battery is not performed may be provided. In spite of placing the rechargeable vacuum cleaner on the tray for the object of charge by being constituted in this way, it becomes possible to avoid the situation where charge is not performed.
[0011]The energizing means which always energizes a cleaner body in the direction of a handle part may be provided. By being constituted in this way, it becomes possible to slide a cleaner body of the energization force of an energizing means lightly by assistance, and an operator's burden is eased.
[0012]An energizing means may be constituted by the spring which gives the energization force of approximately regulated load to the above-mentioned cleaner body. By being constituted in this way, equipment without change of power when moving a cleaner body along with an operation rod can be provided with simple equipment.
[0013]The energization force by an energizing means may be substantially the same as the load of the sliding body which slides on an operation rod top. By being constituted in this way, the power which the slide of a cleaner body takes can be lost substantially completely, and an operator's burden can be eased remarkably.
[0014]When a vacuum cleaner is placed on a tray, a means by which a cleaner body and a tray are engaged may further be provided. When a vacuum cleaner is placed on a tray for the object of charge by being constituted in this way, it becomes possible to fix the vacuum cleaner itself reliably to a tray, and can perform stable charge with the low danger of a fall.
[0015]
[Mode for carrying out the invention]Referring to an accompanying drawing below, it describes about an embodiment of the invention and an working example, and presents an understanding of the present invention. The following embodiments and working examples are examples which materialized the present invention, and are not a thing of the character which limits technical scope of the present invention. Fig.1 is an outline view ((a) is a front view and (b) is a side view) of the vacuum cleaner B, Fig.2 is drawing of longitudinal section of the rechargeable vacuum cleaner A here, and Fig.3 is a cross sectional view in A-A shown in Fig.2, and an enlarged drawing of the broken line circle part [in / in Fig.4 / Fig.2] C. The working-example figure at the time of drawing of longitudinal section of the rechargeable vacuum cleaner A which has arranged caudad the rechargeable battery whose Fig.5 is other working examples of the present invention, and Fig.6 cleaning the back of a deep gap, and Fig.7 are the outline views of the conventional rechargeable vacuum cleaner.
[0016]It describes about Fig.1 and the outline structure of the rechargeable vacuum cleaner A built over the present invention using 2. As shown in Fig.1, the cleaner body 4 is slidably locked to one end via the holding stand 5 by the operation rod 3 which provides the suction opening part 1 which inhales dust, and the handle part 2 which can rotate freely to the other end. The inlet-port part 1 and the cleaner body 4 are connected with the inlet pipe 7 formed with the bellow hose etc. which are expanded, contracted or bent in connection with the slide of the cleaner body 4. The above-mentioned inlet pipe 7 is expanded and contracted in connection with the slide of the cleaner body 4, and the airstream containing the dust sucked from the inlet-port part 1 is sucked by the cyclone type dust collector 6 through the inlet pipe 7 by making the structure which communicates the suction opening part 1 and the cyclone type dust collector 6. The rotary brush 1b which is built in the suction opening part 1 and which can be rotated produces the effect which rakes out the dust inside hair, such as a carpet, by rotating by an electric motor or airstream. As shown in Fig.2, the inner package of the cyclone type dust collector 6 connected to the aforementioned inlet pipe 7 and the rechargeable battery 8 is carried out to the cleaner body 4, and dust is inhaled via the inlet pipe 7 by driving the electric

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blower M with the rechargeable battery 8 from the suction opening part 1. The cleaner body 4 is controlled by the control device 9 based on the instructions from the operating part 10. The inner package of the battery charger 101 including a charge circuit is carried out to the tray 100 which places the vacuum cleaner 8 for the object of charge.

[0017]Next, it describes about the composition of a cyclone type vacuum cleaner using Fig.2. The airstream sucked in the cyclone type dust collector 6 through the inlet pipe 7 rotates within the dust cup 11, it separates from the inlet-port part 1 with a centrifugal force, and dust is accumulated into the dust cup 11. After the airstream which dust was separated and was purified is sucked by flue connector 12 inside through the exhaust port 13 with the electric blower M, it is discharged from the slit 14 outside. The filter of mesh state is fixed to the exhaust port 13, and the dust which was not able to be separated is captured. Thus, since the cyclone type dust collector 6 removes dust in process of the flow of air and is only generating airstream, There is also little generating of a loss, it is lightweight and can be miniaturized, and there is also little noise, it is excellent in usability and operability, and excellent in usability and operability by the light weight when using it, making it move to especially a hand, and a small feeling. One end of the inlet pipe 7 is removably connected with the inlet-port part 1 with fitting by a taper, or a lock, and the other end is connected with the inlet port not shown provided to the cyclone type dust collector 6, enabling free rotation. Therefore, it becomes possible to move freely the end of the inlet pipe 7 removed from the inlet-port part 1 to Fig.1 in the position which should be cleaned as shown in the dashed line 7a, and can clean the place of four-directions arbitration. Thereby, the gap [in any position], a certain ** curtain, and desk top of a still higher position, etc. can be cleaned easily.

[0018]Next, it describes about the structure which made the cleaner body 4 slidable along with the operation rod 3. At this embodiment, as shown in Fig.1, the cleaner body 4 is engaging with the holding stand 5, and the holding stand 5 is slidably held along with the operation rod 3 at operation rod 3 periphery by slide members, such as the bearing 21, as shown in Fig.3. As a locking means which prevents the slide of the holding stand 5, The lock lever 17 is provided for the lock lever fitting parts 15 and 16 by the holding stand 5 at the predetermined position of the operation rod 3, and when the lock lever 17 fits in the lock lever fitting part 15 or 16, it is the structure which locks the holding stand 5 to the position of the operation rod 3. The lock lever 17 is rotatable to the circumference of the axis of rotation 17a, and is a structure energized in the direction of a lock lever fitting part with a spring not shown. For example, along with the operation rod 3, the cleaner body 4 in the lower limit position shown as the solid line of Fig.1 to the upper limit position shown with the dashed line. When making it slide, first, the energization force of a spring is resisted, the lock lever 17 is rotated, fitting of the lower lock lever fitting part 16 and the lock lever 17 is released, and the cleaner body 4 which is in a lower limit position with the grip part 18 is slid in the direction of a handle part with the holding stand 5. In this way, after sliding the cleaner body 4 to an upper limit position, it becomes possible by carrying out fitting of the upper lock lever fitting part 17 and the lock lever 15 to lock the cleaner body 4 to an upper limit position. In this example, although the lock lever fitting part was considered as two upper and lower sides, the cleaner body 4 can be fixed to a multistage position by extending the lock lever fitting part to an adequate position. This locking means locks the shoe which has frictional force to the holding stand 5, and the structure which binds operation rod 3 periphery tight by this may be sufficient as it. In this case, when moving the cleaner body 4, the above-mentioned shoe is loosened and it is eventually made to move. According to this, the lock lever fitting parts 15 and 16 are not needed, but it becomes possible to fix the cleaner body 4 to the favorite position of a stepless story. By moving the cleaner body 4 to a predetermined position as mentioned above, in the case of cleaning of a floor line, lock the cleaner body 4 to the suction opening part 1 side, and to the floor side, as shown in Fig.6, again the center of gravity. In the case of cleaning of a gap and a deep place, the cleaner body 4 is locked to the handle part 2 side, between the cleaner body 4 and the inlet-port part 1 is lengthened, it can be used efficiently, and usability and convenience improve remarkably. Even if it makes it move to the handle part 2 side by attaching slidably the cleaner body 4 especially provided with the small and lightweight cyclone type dust collector 6, the burden of load is eased, and comfortable usability is obtained.

[0019]Next, it describes about the structure which makes removable the cleaner body 4 and the holding stand 5. In Fig.2, The engaged concave part 5a provided to the lower end of the holding stand 5 is made to carry out engagement of the engagement protruding part 4a projected to the lower end of the cleaner body 4. It is the structure which locks the cleaner body 4 to the holding stand 5 by the upper end of the cleaner body 4 providing enabling free rotation, and meshing the protruding part 5b which always provided and hung down the holding lever 4b which places elastic energization upside down to the upper end of the holding stand 5 to be held. In this way, the cleaner body 4 and the holding stand 5 slide on the operation rod 3 top in one in an axial direction. Release the engagement of the engagement protruding part 4a and the engaged concave part 5a, and engagement with the holding lever 4b and the protruding part 5b to be held, and remove the cleaner body 4 from the holding stand 5, and. The end of the inlet pipe 7 is removed from the suction opening part 1, and it is also possible to use the cleaner body 4 as a vacuum cleaner of the portable type with which it separated from the operation rod 3 or the suction opening part 1, and it can clean the inside of a height or a car, etc. efficiently.

[0020]Next, it describes about Fig.2 and the structure which energizes the cleaner body 4 in the direction of the handle part 2 using 3. As an energizing means which energizes the cleaner body 4 in the direction of the handle part 2, An end is locked to the holding stand 5 and many items are a structure which energizes the cleaner body 4 in the direction of the handle part 2 with the holding stand 5 with the spring 19 which it comes to twist around the rotary wheel part 20 which the end of an operation rod comes to provide, and which can be rotated. Spring 19 self is covered with the spring covering 3a which constitutes the coat of the operation rod 3, the spring 19 is exposed, it loses people's finger touching or damaging, and holding of the fine

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sight is achieved. Here, the spring 19 has fixed energization force with a constant force spring, and the energization force of the spring 19 is set as the value the weight of the body which becomes with the cleaner body 4, the holding stand 5, etc. to be hung, substantially equivalent, or slightly small. Thereby, the aforementioned lock lever 17 is removed and it becomes possible by making the operation rod 3 incline to slide the cleaner body 4 in the direction of the handle part 2 automatically by the energization force of the spring 19. On the contrary, if the operation rod 3 is uprighted vertically, it will become possible to make it slide in the direction of the suction opening part 1 automatically by weight of the above-mentioned body to be hung of the cleaner body 4. That is, the cleaner body 4 will slide on a position automatically in accordance with operation of the operation rod 3, and operability and convenience improve. And since the cleaner body 4 moves by the slight load which only the difference of the load of energization force with the spring 19 and the bodies, such as the cleaner body 4, to be hung fixed, Without the speed which the cleaner body 4 moves according to the inclination degree of the operation rod 3 changing, throughout [diakinesis stage / of the cleaner body 4] is smoothly transported with constant speed, and produces neither a sense of crisis nor sense of incongruity. Since the load of the cleaner body 4 is offset in energization force with the spring 19 also when sliding the cleaner body 4 by hand, there is little power to which the cleaner body 4 is moved, and it ends, and operability improves. In order to fix movement which is along the operation rod 3 of the cleaner body 4, the spring 19 may be held and fixed so that movement of the spring 19 may be prevented. Thereby, since movement of the spring 19 is prevented, it becomes possible to fix the cleaner body 4. The operation rod 3 is good also as double structure of the moving operation pole 31 in the air and the fixing operation rod 32 which fits into the hollow section of this moving operation pole 31 slidably, as shown in Fig.2. Thereby, the operation rod 3 is constituted elastically. Fig.2 is the constitutional diagram which elongated the operation rod 3, and the moving operation pole 31 shown in a dashed line shows the state where the moving operation pole 31 was stored to the inlet-port part 1 side. Fixing operation rod 32 periphery and the moving operation pole 31 are constituted so that it can slide smoothly via the sliding materials 32a and 31a. Fixing with this moving operation pole 31 and the fixing operation rod 32 is good also as a structure which provides a means for locking not shown to a predetermined position, and it locks with prescribed length. Where this used the handle part 2 in the state where it set to the suitable position or an overall length is shortened short, storage storing of the rechargeable vacuum cleaner A can be carried out.

[0021]Next, it describes about the structure which places the vacuum cleaner B on the tray 100, and it charges. In Fig.2, the tray 100 of the abbreviated L shape which places the vacuum cleaner B, The battery charger 101 including a battery-charger circuit etc. and the place detection means 102 which detects coming to place the vacuum cleaner B, The indicator lamp 105c is provided during the charge which indicates that the electric power switch 105a which carries out ON OFF of the electric supply to the battery charger 101, the power indicator lamp 105b which indicates that the light is switched on and it is under electric supply when it is under electric supply, and the current which the vacuum cleaner B comes to charge are detected, and it is under charge, and it is constituted. When the vacuum cleaner B is placed on the tray 100 as shown in the Fig.4 which expanded the broken line circle part C of Fig.2, the structure of charging the vacuum cleaner B is provided by the cleaner body 4, and with a lead not shown. When the charge connecting terminal 104a which it comes to connect with a rechargeable battery, and the charge connecting terminal 104b which are provided by the tray 100 and it comes to connect with the battery charger 101 with a lead not shown connect, it is the structure where the rechargeable battery 8 is charged. By considering it as the structure which the above-mentioned charge connecting terminals 104a and 104b connect, only when the cleaner body 4 is locked to the lower limit position in this embodiment as shown in Fig.2, It becomes possible to make low the center of gravity position of the vacuum cleaner B under charge, and can perform charge with the stable attitude with the low danger of a fall. By forming the male fitting 103b and the fitting concave portion 103a between the tray 100 and the cleaner body 4, respectively as shown in Fig.4, When the vacuum cleaner B is placed on the tray 100 for the object of charge, it becomes possible to fix the vacuum cleaner B itself reliably to the tray 100, and can perform stable charge with the low danger of a fall. It describes about the procedure in the case of performing actual charge to below. First, if the vacuum cleaner B is placed on the tray 100 and ON operation of the electric power switch 105a is carried out, the battery charger 101 including a charge circuit will operate, and the power indicator lamp 105b will light up. Next, if placing of the vacuum cleaner B is detected by the place detection means 102, the battery charger 101 will start electric supply. Here, if the charge connecting terminals 104a and 104b are connected, charging current will flow to the rechargeable battery 8, and the indicator lamp 105c lights up during charge, and the charge to the rechargeable battery 8 begins. On the contrary, if the charge connecting terminals 104a and 104b have not connected, the charging current to the rechargeable battery 8 is zero, and charge to the rechargeable battery 8 is not performed. Therefore, in spite of having carried out ON operation of the above-mentioned electric power switch 105a by monitoring the charging current to the rechargeable battery 8, when it is judged that the charging current to the rechargeable battery 8 is not flowing, it may be made to report that charge of the rechargeable battery 8 cannot be performed. Such procedure is an example of an alarming means. Thereby, in spite of placing the vacuum cleaner B on the tray for the object of charge, it becomes possible to avoid the situation where charge is not performed. If an operator recognizes here that charge is not performed by the above-mentioned information, in order to charge, it will be thought that the cleaner body 4 is slid on the suction opening part 1 side, but. In the rechargeable vacuum cleaner A concerning the present invention, If fitting of the lock lever 17 and the lock lever fitting part 15 is released as above-mentioned, The cleaner body 4 is automatically slid in the suction opening part 1 direction with a fixed sliding speed according to the difference of weight of the cleaner body 4, and energization force with the spring 19, and shifting to a charging state simply is possible, and it excels in operability and convenience.

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[0022]Finally, Fig.5 is used and it describes about the cyclone type vacuum cleaner which has arranged caudad the rechargeable battery used as other working examples of the present invention. Provide the rechargeable battery 8 with large weight so that it may be a lower part and may come to the opposite side of the cyclone dust collector 6 to the operation rod 3 from the electric blower M which comes to carry out an inner package to the cleaner body 4, as shown in Fig.5, and, [things] Since it is possible to make small hand load and rotational force especially centering on the operation rod 3, the usability which ****s the handle part 2 and operates a rechargeable vacuum cleaner improves.
[0023]
[Effect of the Invention]The suction opening part to which the present invention inhales dust at the one end as described above, and the operation rod which placed the handle part at the other end, In the rechargeable vacuum cleaner possessing the vacuum cleaner which has a cleaner body having a rechargeable battery, the electric blower driven with the rechargeable battery, and the dust collector which collects dust for dust, and the charging equipment which charges a rechargeable battery, It is constituted as a rechargeable vacuum cleaner, wherein a dust collector is a cyclone type dust collector. Since it was efficient since the cyclone type dust collector used here separated air and dust with the centrifugal force which arises according to swirling flow, and it was low also about noise, it should be extremely excellent in usability and convenience as the rechargeable vacuum cleaner itself used indoors.
[0024]Charging equipment may be the tray which served as the mounting base of a vacuum cleaner. Since it is constituted in this way, when charging a rechargeable vacuum cleaner, the time and effort to which charging equipment and a vacuum cleaner are connected becomes move a vacuum cleaner to charging equipment from a mounting base, or unnecessary, and charge with the stable attitude is attained and the convenience of a rechargeable vacuum cleaner improves.
[0025]Charging equipment may be the tray which served as the mounting base of a vacuum cleaner. Since it is constituted in this way, when charging a rechargeable vacuum cleaner, the time and effort which moves a vacuum cleaner to charging equipment from a mounting base, or connects charging equipment to a vacuum cleaner becomes unnecessary, and charge with the stable attitude is attained and the convenience of a rechargeable vacuum cleaner improves.
[0026]A cleaner body may be slidably provided by the operation rod via the holding stand provided slidably at an operation rod. Since it is constituted in this way, a cleaner body can be made into a removable structure from a holding stand. Therefore, it becomes possible to separate from an operation rod or a suction opening part, and to use it as a vacuum cleaner of a portable type with a cleaner simple substance, and can clean the inside of a height or a car, etc. efficiently.
[0027]To an operation rod, a rechargeable battery is an opposite side of a cyclone type dust collector, and may be caudad arranged rather than an electric blower. Since it is constituted in this way, it becomes possible to make small hand load as the whole rechargeable vacuum cleaner, and rotational force especially centering on an operation rod, and to set up the center of gravity low, and the operability at the time of operating a rechargeable vacuum cleaner with an operation rod improves.
[0028]Only when a cleaner body places a vacuum cleaner on a tray in the state where it slid to the lower limit position, it may be constituted so that charge of a rechargeable battery may be performed. Since it is constituted in this way, it becomes possible to make low the center of gravity of the whole rechargeable vacuum cleaner at the time of charging, and can perform charge with the stable attitude with the low danger of a fall.
[0029]When a vacuum cleaner is placed on a tray, the alarming means which reports that charge of a rechargeable battery is not performed may be provided. Since it is constituted in this way, in spite of placing the rechargeable vacuum cleaner on the tray for the object of charge, it becomes possible to avoid the situation where charge is not performed.
[0030]The energizing means which always energizes a cleaner body in the direction of a handle part may be provided. Since it is constituted in this way, it becomes possible to slide a cleaner body of the energization force of an energizing means lightly by assistance, and an operator's burden is eased.
[0031]An energizing means may be constituted by the spring which gives the energization force of approximately regulated load to the above-mentioned cleaner body. Since it is constituted in this way, equipment without change of power when moving a cleaner body along with an operation rod can be provided with simple equipment.
[0032]The energization force by an energizing means may be substantially the same as the load of the sliding body which slides on an operation rod top. Since it is constituted in this way, the power which the slide of a cleaner body takes can be lost substantially completely, and an operator's burden can be eased remarkably.
[0033]When a vacuum cleaner is placed on a tray, a means by which a cleaner body and a tray are engaged may further be provided. Since it is constituted in this way, when a vacuum cleaner is placed on a tray for the object of charge, it becomes possible to fix the vacuum cleaner itself reliably to a tray, and can perform stable charge with the low danger of a fall.

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JP,2003-070706,A

PAJ Detail Image

CLAIMS DETAILED DESCRIPTION

DESCRIPTION OF DRAWINGS DRAWINGS

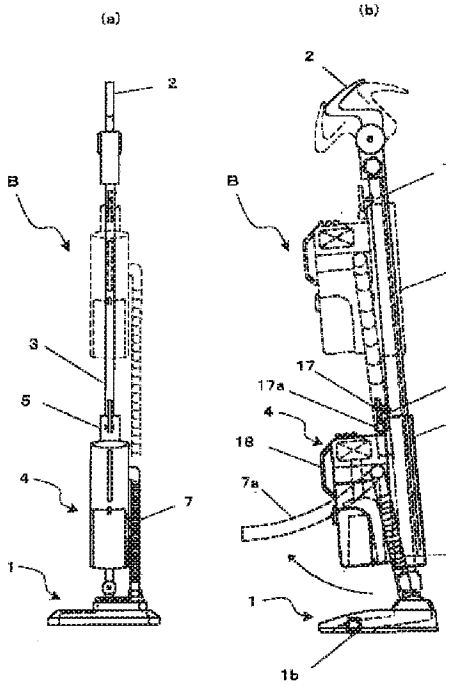
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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]A suction opening part which inhales dust at the one end, and an operation rod which placed a handle part at the other end, In a rechargeable vacuum cleaner possessing a vacuum cleaner which has a cleaner body having a rechargeable battery, an electric blower driven with the rechargeable battery, and a dust collector which collects dust for dust, and charging equipment which charges the above-mentioned rechargeable battery, A rechargeable vacuum cleaner, wherein the above-mentioned dust collector is a cyclone type dust collector.
[Claim 2]The rechargeable vacuum cleaner according to claim 1 which is the tray in which the above-mentioned charging equipment served as a mounting base of the above-mentioned vacuum cleaner.
[Claim 3]Claim 1 which comes to provide the above-mentioned cleaner body slidably along with the above-mentioned operation rod, or a rechargeable vacuum cleaner described in any of 2.
[Claim 4]The rechargeable vacuum cleaner according to claim 3 which the above-mentioned operation rod comes to provide slidably via a holding stand which the above-mentioned cleaner body provided slidably to the above-mentioned operation rod.
[Claim 5]The rechargeable vacuum cleaner according to any one of claims 1 to 4 with which the above-mentioned rechargeable battery is an opposite side of the above-mentioned cyclone type dust collector, and it comes to arrange it rather than the above-mentioned electric blower caudad to the above-mentioned operation rod.
[Claim 6]The rechargeable vacuum cleaner according to any one of claims 3 to 5 constituted so that charge of the above-mentioned rechargeable battery might be performed only when the above-mentioned cleaner body placed the above-mentioned vacuum cleaner on the above-mentioned tray in the state where it slid to a lower limit position.
[Claim 7]The rechargeable vacuum cleaner possessing an alarming means which reports that charge of the above-mentioned rechargeable battery is not performed when the above-mentioned vacuum cleaner is placed on the above-mentioned tray according to any one of claims 2 to 6.
[Claim 8]The rechargeable vacuum cleaner possessing an energizing means which always energizes the above-mentioned cleaner body in the direction of the above-mentioned handle part according to any one of claims 3 to 7.
[Claim 9]The rechargeable vacuum cleaner according to claim 8 with which a spring which gives energization force of approximately regulated load to the above-mentioned cleaner body comes to constitute the above-mentioned energizing means.
[Claim 10]The rechargeable vacuum cleaner according to claim 9 as load of a sliding body which slides on the above-mentioned operation rod top in which energization force by the above-mentioned energizing means is substantially the same [Claim 11]The rechargeable vacuum cleaner according to any one of claims 2 to 10 which further possesses a means by which the above-mentioned cleaner body and the above-mentioned tray are engaged when the above-mentioned vacuum cleaner is placed on the above-mentioned tray.



Representative drawing

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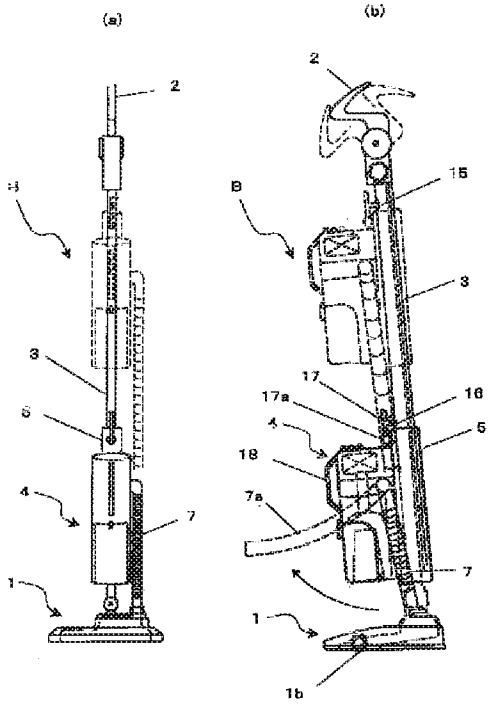
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3B062 AH02

(54)【発明の名称】　充電式電気掃除機

(57)【要約】
【課題】従来の充電式電気掃除機は，掃除機本体が塵埃を含む空気流を布袋で沪過して塵埃を除去する構造であるため，空気流を布袋で沪過する際の抵抗を加味した出力の送風機が必要となり掃除機本体の大型化，或いは騒音が問題となる。また，あくまでも吸引口部からしか塵埃の吸引が出来ない構造であるため，掃除機本体が通らない隙間の掃除や，高所の掃除，自動車の内部等の掃除に適していないという課題を解消すること。
【解決手段】一端に塵埃を吸気する吸引口部，他端にハンドル部を配した操作竿と，２次電池と，該２次電池により駆動される電動送風機と，塵埃を集塵する集塵装置と，を内蔵してなる掃除機本体とを有する電気掃除機と，２次電池を充電する充電装置とを具備してなる充電式電気掃除機において，集塵装置がサイクロン式集塵装置であることを特徴とする充電式電気掃除機。



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【特許請求の範囲】
【請求項１】一端に塵埃を吸気する吸引口部，他端にハンドル部を配した操作竿と，２次電池と，該２次電池により駆動される電動送風機と，塵埃を集塵する集塵装置と，を内蔵してなる掃除機本体と，を有する電気掃除機と，上記２次電池を充電する充電装置と，を具備してなる充電式電気掃除機において，上記集塵装置がサイクロン式集塵装置であることを特徴とする充電式電気掃除機。
【請求項２】上記充電装置が，上記電気掃除機の載置台を兼ねたトレイである請求項１に記載の充電式電気掃除機。
【請求項３】上記掃除機本体が，上記操作竿に沿って摺動自在に設けられてなる請求項１，あるいは２のいずれかに記載の充電式電気掃除機。
【請求項４】上記掃除機本体が，上記操作竿に摺動自在に設けた保持台を介して上記操作竿に摺動自在に設けられてなる請求項３に記載の充電式電気掃除機。
【請求項５】上記２次電池が，上記操作竿に対して上記サイクロン式集塵装置の反対側で，且つ上記電動送風機よりも下方に配置されてなる請求項１～４のいずれかに記載の充電式電気掃除機。
【請求項６】上記掃除機本体が下限位置まで摺動された状態で上記電気掃除機を上記トレイに載置した場合にのみ，上記２次電池の充電が行なわれるように構成された請求項３～５のいずれかに記載の充電式電気掃除機。
【請求項７】上記電気掃除機を上記トレイに載置した際に，上記２次電池の充電が行なわれていないことを報知する報知手段を具備してなる請求項２～６のいずれかに記載の充電式電気掃除機。
【請求項８】上記掃除機本体を上記ハンドル部の方向に常時付勢する付勢手段を具備してなる請求項３～７のいずれかに記載の充電式電気掃除機。
【請求項９】上記付勢手段は，略一定荷重の付勢力を上記掃除機本体に与えるバネにより構成されてなる請求項８に記載の充電式電気掃除機。
【請求項１０】上記付勢手段による付勢力が，上記操作竿上を摺動する摺動体の荷重とほぼ同一である請求項９に記載の充電式電気掃除機
【請求項１１】上記電気掃除機を上記トレイに載置した際に，上記掃除機本体と上記トレイとを係合する手段を更に具備してなる請求項２～１０のいずれかに記載の充電式電気掃除機。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は，主に家庭用に用いられる二次電池を内装してなる充電式電気掃除機に関し，特に集塵装置を内蔵する掃除機本体が操作竿に摺動自在に設けられている共に，集塵装置として小型軽量であるサイクロン集塵装置を採用した充電式電気掃除機に関するものである。
【０００２】
【従来の技術】２次電池を内装した充電式電気掃除機としては，図７に示すようにハンドル部を有する操作竿３の下端に電動送風機と，２次電池等とを内装する掃除機本体４を連結し，更に掃除機本体４の前方に電動送風機の吸引力により埃塵を吸い込む吸引口部１を設けた構成とした掃除機と，電源トランスを収納する箱状部，およびこの箱状部に隣接する載置部を設けた前記２次電池を充電するための充電器を内装するトレイ１００とを備えてなる充電式電気掃除機が特開２０００－１８９３６７号公報において開示されている。上記充電式電気掃除機では，上記トレイ１００に上記掃除機本体４の吸引口部１を除いた一部を載置して充電する構造であるので，充電器の載置部の面積を小さくすることが可能となり，充電式電気掃除機全体としての小型化が可能な上に，掃除中に充電器が邪魔なることもが少ない使用性の高い充電式電気掃除機とすることができる。
【０００３】
【発明が解決しようとする課題】しかしながら，上記の従来公知の電気掃除機によると，掃除機本体４が塵埃を含む空気流を布袋で沪過して塵埃を除去する構造であるため，空気流を布袋で沪過する際の抵抗を加味した大きな出力の電動送風機が必要となり掃除機本体４が大型となり，或いは騒音が大きくなるなど，使用性，利便性に欠けるという課題を有していた。また，あくまでも吸引口部１からしか塵埃の吸引が出来ない構造であるため，吸引口部１あるいは掃除機本体４が通らない隙間の掃除や，机上や壁，天井などの高所の掃除，自動車の内部等の掃除に適していないという課題を有していた。本発明は上記したような，従来の充電式電気掃除機に内在する上記課題の解消を目的とするものである。
【０００４】
【課題を解決するための手段】上記目的を達成するために本発明は，一端に塵埃を吸気する吸引口部，他端にハンドル部を配した操作竿と，２次電池と，該２次電池により駆動される電動送風機と，塵埃を集塵する集塵装置とを内蔵してなる掃除機本体とを有する電気掃除機と，２次電池を充電する充電装置とを具備してなる充電式電気掃除機において，集塵装置がサイクロン式集塵装置であることを特徴とする充電式電気掃除機として構成されている。ここで用いられるサイクロン式集塵装置は，旋回流により生じる遠心力で空気と塵埃を分離するので効率がよく，騒音についても低いので，室内で用いられる充電式電気掃除機自体として極めて使用性，利便性に優れたものとすることが出来る。
【０００５】また，充電装置が，電気掃除機の載置台を兼ねたトレイであっても良い。このように構成されることによって，充電式電気掃除機の充電を行なう際に，電気掃除機を載置台から充電装置へと移動させたり，充電

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装置と電気掃除機とを接続させる手間が不要となると共に，安定した姿勢での充電が可能となり，充電式電気掃除機の利便性が向上する。

【０００６】また，掃除機本体が，操作竿に沿って摺動自在に設けられても良い。このように構成されることによって，掃除機本体を吸引口部側に固定して重心を床側とすれば，床面の掃除での安定した操作が可能であり，逆に掃除機本体をハンドル部に近い位置に固定することで，奥の深い隙間やカーテン等の高い場所の掃除を効率的に行なうことが出来，利便性が更に向上する。

【０００７】また，掃除機本体が，操作竿に摺動自在に設けた保持台を介して操作竿に摺動自在に設けられても良い。このように構成されることによって，掃除機本体を保持台から着脱可能な構造とすることが出来る。そのため，操作竿や吸引口部と分離して掃除機単体で可搬式の電気掃除機として使用することが可能となり，高所あるいは車内等の掃除を効率的に行なうことができる。

【０００８】また，２次電池が，操作竿に対してサイクロン式集塵装置の反対側で，且つ電動送風機よりも下方に配置されても良い。このように構成されることによって，充電式電気掃除機全体としての手元荷重，特に操作竿を中心とした回転力を小さくし，且つ重心を低く設定することが可能となり，操作竿によって充電式電気掃除機を操作する際の操作性が向上する。

【０００９】また，掃除機本体が下限位置まで摺動された状態で電気掃除機をトレイに載置した場合にのみ，２次電池の充電が行なわれるように構成されても良い。このように構成されることによって，充電を行なう際の充電式電気掃除機全体の重心を低くすることが可能となり，転倒の危険性の低い安定した姿勢での充電ができる。

【００１０】また，電気掃除機をトレイに載置した際に，２次電池の充電が行なわれていないことを報知する報知手段を具備しても良い。このように構成されることによって，充電式電気掃除機を充電の目的でトレイに載置しているにもかかわらず，充電が行なわれていないという状況を避けることが可能となる。

【００１１】また，掃除機本体をハンドル部の方向に常時付勢する付勢手段を具備しても良い。このように構成されることによって，付勢手段の付勢力が補助により掃除機本体を軽く摺動させることが可能となり，操作者の負担が軽減される。

【００１２】また，付勢手段は，略一定荷重の付勢力を上記掃除機本体に与えるバネにより構成されても良い。このように構成されることによって，簡素な装置で，掃除機本体を操作竿に沿って移動させるときの力の変動のない装置を提供することができる。

【００１３】また，付勢手段による付勢力が，操作竿上を摺動する摺動体の荷重とほぼ同一であって良い。このように構成されることによって，掃除機本体の摺動に要する力をほぼ完全に無くすことが出来，操作者の負担は著しく軽減できる。

【００１４】また，電気掃除機をトレイに載置した際に，掃除機本体とトレイとを係合する手段を更に具備しても良い。このように構成されることによって，電気掃除機を充電の目的でトレイに載置した際に，電気掃除機自体をトレイに対して確実に固定することが可能となり，転倒の危険性の低い安定した充電ができる。

【００１５】

【発明の実施の形態】以下添付図面を参照しながら，本発明の実施の形態及び実施例について説明し，本発明の理解に供する。尚，以下の実施の形態及び実施例は，本発明を具体化した一例であって，本発明の技術的範囲を限定する性格のものではない。ここに，図１は電気掃除機Ｂの外観図（（ａ）は正面図，（ｂ）は側面図），図２は充電式電気掃除機Ａの縦断面図であり，図３は図２に示すＡ－Ａにおける断面図，図４は図２における破線円部Ｃの拡大図である。また，図５は本発明の他の実施例である２次電池を下方に配置した充電式電気掃除機Ａの縦断面図，図６は奥深い隙間の奥を掃除する際の実施例図，図７は従来の充電式電気掃除機の外観図である。

【００１６】図１，２を用いて本発明に係る充電式電気掃除機Ａの概略構造について説明する。図１に示すように，一端に塵埃を吸気する吸引口部１，他端に回動自在のハンドル部２とを設けてなる操作竿３に，掃除機本体４が保持台５を介して摺動自在に係止されている。吸気口部１と掃除機本体４とは，掃除機本体４の摺動に伴って伸縮あるいは屈曲する蛇腹ホース等によって形成した吸気管７で連結されている。上記吸気管７は，掃除機本体４の摺動に伴って伸縮すると共に，吸引口部１とサイクロン式集塵装置６とを連通する構造をなすことにより，吸気口部１から吸引された塵埃を含む空気流は吸気管７を通ってサイクロン式集塵装置６に吸引される。吸引口部１に内蔵される回動自在な回転ブラシ１ｂは，電動機あるいは空気流等によって回転することによって，絨毯等の毛内部の塵埃を掻き出す効果を奏する。図２に示すように，掃除機本体４には，前記吸気管７に接続されたサイクロン式集塵装置６と，２次電池８とが内装されており，該２次電池８によって電動送風機Ｍを駆動することにより，吸引口部１より吸気管７を介して塵埃を吸気する。また，掃除機本体４は，操作部１０からの指令に基づいて制御装置９によって制御されている。また，充電の目的で電気掃除機Ｂを載置するトレイ１００には充電回路を含む充電器１０１が内装されている。

【００１７】次に，図２を用いて，サイクロン式電気掃除機の構成について説明する。吸気口部１から，吸気管７を通りサイクロン式集塵装置６内に吸引された空気流は，ダストカップ１１内で旋回し，遠心力で分離されて塵埃がダストカップ１１内に集積される。塵埃が分離され浄化された空気流は，電動送風機Ｍによって排気口１

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３を通って排気筒１２内部に吸引された後，スリット１４から外部へ排出される。また，排気口１３にメッシュ状のフィルターが固定されており，分離しきれなかった塵埃を捕獲する。このようにサイクロン式集塵装置６は，空気の流れの過程で塵埃を除去し，単に空気流を発生させているだけであるので，ロスの発生も少なく，軽量で小型化でき，騒音も少なく，使用性，操作性に優れたものであり，特に手元に移動させて使用する時の軽量，小型感により使用性，操作性に優れたものである。また，吸気管７の一端は，テーパによる嵌合，あるいはロックなどにより吸気口部１と着脱可能に連結され，他端はサイクロン式集塵装置６に設けた不図示の吸気口に回動自在に連結される。従って，吸気口部１より外した吸気管７の一端を，図１に破線７ａに示すように掃除すべき位置へ自由に動かすことが可能となり，上下左右任意の場所を掃除することができる。これにより，任意の位置にある隙間，あるはカーテン，更には高い位置の机上などを手軽に掃除することができる。

【００１８】次に，掃除機本体４を操作竿３に沿って摺動可能とした構造について説明する。本実施の形態では，図１に示すように，掃除機本体４は，保持台５に係着されており，該保持台５は，図３に示すように，操作竿３外周にベアリング２１等の摺動部材で操作竿３に沿って摺動自在に保持されている。保持台５の摺動を抑止する係止手段としては，操作竿３の所定位置にロックレバー嵌合部１５，１６が，保持台５にはロックレバー１７が設けられており，ロックレバー１７がロックレバー嵌合部１５，あるいは１６に嵌合することによって，保持台５を操作竿３の所定の位置に係止する構造である。また，ロックレバー１７は回転軸１７ａ回りに回動可能であり，不図示のバネによってロックレバー嵌合部方向に付勢される構造である。例えば，図１の実線で示している下限位置にある掃除機本体４を操作竿３に沿って，破線で示している上限位置まで摺動させる場合，先ず，ロックレバー１７をバネの付勢力に抗して回動させ，下方のロックレバー嵌合部１６とロックレバー１７との嵌合を解除し，把持部１８を持って下限位置にある掃除機本体４を保持台５と共にハンドル部方向に摺動させる。こうして，掃除機本体４を上限位置まで摺動させた後，上方のロックレバー嵌合部１７とロックレバー１５とを嵌合させることによって，掃除機本体４を上限位置に係止することが可能となる。本実施例においては，ロックレバー嵌合部を上下２ヶ所としたが，該ロックレバー嵌合部を適当位置に増設することにより，多段的な位置に掃除機本体４を固定することができる。また，この係止手段は保持台５に摩擦力を有するシューを係止すると共に，これによって操作竿３外周を締め付ける構造でも良い。この場合に掃除機本体４を移動させるときには，上記シューを緩めて移動させることになる。これによるとロックレバー嵌合部１５，１６を必要とせず，無段階の好みの位置に掃除機本体４を固定することが可能となる。以上のように掃除機本体４を所定位置に移動させることにより，床面の掃除の際には掃除機本体４を吸引口部１側に係止して重心を床側に，また，図６に示すように隙間や奥深い場所の掃除の際には掃除機本体４をハンドル部２側に係止して掃除機本体４と吸気口部１間を長くして効率よく使用出来，使用性，利便性が著しく向上する。特に，小型で軽量なサイクロン式集塵装置６を備えてなる掃除機本体４を摺動可能に取り付けることによりハンドル部２側に移動させても荷重の負担が軽減され，快適な使用性が得られる。

【００１９】次に，掃除機本体４と保持台５とを着脱可能とする構造について説明する。図２において，保持台５の下端に設けた被係合凹部５ａに掃除機本体４の下端に突出した係合凸部４ａを係合させ，また，掃除機本体４の上端に回動自在に設けられ，常時下向きに弾性付勢される保持レバー４ｂを保持台５の上端に設けたれた被保持凸部５ｂに噛合させることによって，掃除機本体４を保持台５に係止する構造である。こうして，掃除機本体４と保持台５とは，一体となって操作竿３上を軸方向に摺動する。また，係合凸部４ａと被係合凹部５ａとの係合，および保持レバー４ｂと被保持凸部５ｂとの噛合を解除し，掃除機本体４を保持台５から取り外すと共に，吸気管７の一端を吸引口部１から取り外し，掃除機本体４を操作竿３や吸引口部１から分離された可搬式の電気掃除機として使用することも可能であり，高所あるいは車内等の掃除を効率的に行なうことができる。

【００２０】次に，図２，３を用いて掃除機本体４を，ハンドル部２の方向に付勢する構造について説明する。掃除機本体４をハンドル部２の方向に付勢する付勢手段としては，一端が保持台５に係止され，多端は操作竿の端部に設けられてなる回動自在の回転車輪部２０に巻き付けられてなるバネ１９によって，保持台５と共に掃除機本体４をハンドル部２の方向に付勢する構造である。また，バネ１９自身は操作竿３の外殻を構成するバネカバー３ａでカバーされ，バネ１９が露出し人の指が触れたり，或いは破損することをなくすと共に美観の保持が図られている。ここで，バネ１９は定荷重バネで一定の付勢力を有し，該バネ１９の付勢力は掃除機本体４と保持台５などでなる被懸架体の重量とほぼ同等，あるいは若干小さい値に設定されている。これにより，前記ロックレバー１７を外すと共に，操作竿３を傾斜させることで，掃除機本体４をバネ１９の付勢力で自動的にハンドル部２の方向に摺動させることが可能となる。逆に，操作竿３を垂直に直立させると，掃除機本体４は上記被懸架体の自重で自動的に吸引口部１の方向に摺動させることが可能となる。即ち，操作竿３の操作に合わせて自動的に掃除機本体４が所定の位置に摺動されることになり，操作性，利便性が向上する。しかも，掃除機本体４が，バネ１９による付勢力と掃除機本体４などの被懸架

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体の荷重の差分だけの一定したわずかな荷重で移動するので，操作竿３の傾斜程度により掃除機本体４の移動する速度が変化することなく，掃除機本体４の移動期間中は一定速度でスムーズに移送し，危機感や違和感を生じない。また，掃除機本体４を手で摺動させる場合も，掃除機本体４の荷重がバネ１９による付勢力にて相殺されるので，掃除機本体４を移動させる力が少なくてすみ，操作性が向上する。また，掃除機本体４の操作竿３に沿う移動を固定するには，バネ１９の移動を抑止するようにバネ１９を保持して固定してもよい。これにより，バネ１９の移動が阻止されるので掃除機本体４を固定することが可能となる。また，操作竿３は図２に示すように，中空の移動操作竿３１と，この移動操作竿３１の中空部に摺動自在に嵌合する固定操作竿３２の２重構造としても良い。これにより操作竿３は，伸縮自在に構成される。図２は，操作竿３を伸長した状態図で，破線に示す移動操作竿３１は，該移動操作竿３１を吸気口部１側に収納した状態を示す。固定操作竿３２外周と移動操作竿３１は摺動材３２ａ，３１ａを介して円滑に摺動できるように構成されている。また，この移動操作竿３１と固定操作竿３２との固定は，所定位置に不図示のロック手段を設け所定長さでロックする構造としても良い。これにより，ハンドル部２を適当な位置に設定した状態で使用したり，全長を短く短縮した状態で充電式電気掃除機Ａを収納格納することができる。

【００２１】次に，電気掃除機Ｂをトレイ１００に載置して充電する構造について説明する。図２において，電気掃除機Ｂを載置する略Ｌ字型のトレイ１００は，充電器回路等を含む充電器１０１と，電気掃除機Ｂが載置されてなることを検知する載置検知手段１０２と，充電器１０１への給電を入切する電源スイッチ１０５ａと，給電中の際には点灯し給電中であることを表示する電源表示ランプ１０５ｂと，電気掃除機Ｂに充電されてなる電流を検知して充電中であることを表示する充電中表示ランプ１０５ｃとを具備して構成される。電気掃除機Ｂを充電する構造は，図２の破線円部Ｃを拡大した図４に示す通り，電気掃除機Ｂをトレイ１００に載置した際に，掃除機本体４に設けられ，不図示の導線により２次電池に連結されてなる充電接続端子１０４ａと，トレイ１００に設けられ，不図示の導線により充電器１０１に連結されてなる充電接続端子１０４ｂとが連結することにより二次電池８が充電される構造である。また，本実施形態においては，図２に示す通り，掃除機本体４が下限位置に係止されている場合にのみ，上記充電接続端子１０４ａ，１０４ｂが連結する構造とすることによって，充電中の電気掃除機Ｂの重心位置を低くすることが可能となり，転倒の危険性の低い安定した姿勢での充電ができる。更に，図４に示す通り，トレイ１００と掃除機本体４との間に嵌合凸部１０３ｂと，被嵌合凹部１０３ａとをそれぞれ形成することによって，電気掃除機Ｂを充電の目的でトレイ１００に載置した際に，電気掃除機Ｂ自体をトレイ１００に対して確実に固定することが可能となり，転倒の危険性の低い安定した充電ができる。以下に，実際の充電を行なう場合の手順について説明する。先ず，電気掃除機Ｂをトレイ１００に載置して電源スイッチ１０５ａを入操作すると充電回路を含む充電器１０１が作動し，電源表示ランプ１０５ｂが点灯する。次に，載置検知手段１０２によって電気掃除機Ｂの載置を検知すると，充電器１０１が給電を開始する。ここで，充電接続端子１０４ａと１０４ｂとが連結されていれば，２次電池８に対して充電電流が流れると共に，充電中表示ランプ１０５ｃが点灯し，２次電池８への充電が開始する。逆に，充電接続端子１０４ａと１０４ｂとが連結していなければ，２次電池８への充電電流が零であり，２次電池８への充電が行なわれない。従って，２次電池８への充電電流を監視することにより，上記電源スイッチ１０５ａを入操作したにもかかわらず，２次電池８への充電電流が流れていないと判断された場合には，２次電池８の充電ができないことを報知するようにしても良い。このような処理手順が報知手段の一例である。これにより，電気掃除機Ｂを充電の目的でトレイに載置しているにもかかわらず，充電が行なわれていないという状況を避けることが可能となる。ここで，操作者は上記報知によって充電が行なわれていないことを認識すると，充電を行なうために掃除機本体４を吸引口部１側に摺動させると考えられるが，本発明に係る充電式電気掃除機Ａにおいては，上述の通りロックレバー１７とロックレバー嵌合部１５との嵌合を解除すれば，掃除機本体４を，該掃除機本体４の自重とバネ１９による付勢力との差分に応じた一定摺動速度で吸引口部１方向に自動的に摺動させ，簡単に充電状態に移行することが可能であり，操作性，利便性に優れる。

【００２２】最後に，図５を用いて，本発明の他の実施例となる２次電池を下方に配置したサイクロン式電気掃除機について説明する。図５に示す通り，重量の大きい２次電池８を掃除機本体４に内装されてなる電動送風機Ｍよりも下方であって，且つ操作竿３に対してサイクロン集塵装置６の反対側にくるように設けてなることによって，手元加重，特に操作竿３を中心とした回転力を小さくすることが可能であるため，ハンドル部２を把持して充電式電気掃除機を操作する使用性が向上する。

【００２３】

【発明の効果】以上説明したように，本発明は，一端に塵埃を吸気する吸引口部，他端にハンドル部を配した操作竿と，２次電池と，該２次電池により駆動される電動送風機と，塵埃を集塵する集塵装置とを内蔵してなる掃除機本体とを有する電気掃除機と，２次電池を充電する充電装置とを具備してなる充電式電気掃除機において，集塵装置がサイクロン式集塵装置であることを特徴とする充電式電気掃除機として構成されている。ここで用い

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られるサイクロン式集塵装置は，旋回流により生じる遠心力で空気と塵埃を分離するので効率がよく，騒音についても低いので，室内で用いられる充電式電気掃除機自体として極めて使用性，利便性に優れたものとすることが出来る。

【００２４】また，充電装置が，電気掃除機の載置台を兼ねたトレイであっても良い。このように構成されるので，充電式電気掃除機の充電を行なう際に，電気掃除機を載置台から充電装置へと移動させたり，充電装置と電気掃除機とを接続させる手間が不要となると共に，安定した姿勢での充電が可能となり，充電式電気掃除機の利便性が向上する。

【００２５】また，充電装置が，電気掃除機の載置台を兼ねたトレイであっても良い。このように構成されるので，充電式電気掃除機の充電を行なう際に，電気掃除機を載置台から充電装置へと移動させる，あるいは充電装置を電気掃除機に接続する手間が不要となると共に，安定した姿勢での充電が可能となり，充電式電気掃除機の利便性が向上する。

【００２６】また，掃除機本体が，操作竿に摺動自在に設けた保持台を介して操作竿に摺動自在に設けられても良い。このように構成されるので，掃除機本体を保持台から着脱可能な構造とすることが出来る。そのため，操作竿や吸引口部と分離して掃除機単体で可搬式の電気掃除機として使用することが可能となり，高所あるいは車内等の掃除を効率的に行なうことができる。

【００２７】また，２次電池が，操作竿に対してサイクロン式集塵装置の反対側で，且つ電動送風機よりも下方に配置されても良い。このように構成されるので，充電式電気掃除機全体としての手元荷重，特に操作竿を中心とした回転力を小さくし，且つ重心を低く設定することが可能となり，操作竿によって充電式電気掃除機を操作する際の操作性が向上する。

【００２８】また，掃除機本体が下限位置まで摺動された状態で電気掃除機をトレイに載置した場合にのみ，２次電池の充電が行なわれるように構成されても良い。このように構成されるので，充電を行なう際の充電式電気掃除機全体の重心を低くすることが可能となり，転倒の危険性の低い安定した姿勢での充電ができる。

【００２９】また，電気掃除機をトレイに載置した際に，２次電池の充電が行なわれていないことを報知する報知手段を具備しても良い。このように構成されるので，充電式電気掃除機を充電の目的でトレイに載置しているにもかかわらず，充電が行なわれていないという状況を避けることが可能となる。

【００３０】また，掃除機本体をハンドル部の方向に常時付勢する付勢手段を具備しても良い。このように構成されるので，付勢手段の付勢力が補助により掃除機本体を軽く摺動させることが可能となり，操作者の負担が軽減される。

【００３１】また，付勢手段は，略一定荷重の付勢力を上記掃除機本体に与えるバネにより構成されても良い。このように構成されるので，簡素な装置で，掃除機本体を操作竿に沿って移動させるときの力の変動のない装置を提供することができる。

【００３２】また，付勢手段による付勢力が，操作竿上を摺動する摺動体の荷重とほぼ同一であって良い。このように構成されるので，掃除機本体の摺動に要する力をほぼ完全に無くすことが出来，操作者の負担は著しく軽減できる。

【００３３】また，電気掃除機をトレイに載置した際に，掃除機本体とトレイとを係合する手段を更に具備しても良い。このように構成されるので，電気掃除機を充電の目的でトレイに載置した際に，電気掃除機自体をトレイに対して確実に固定することが可能となり，転倒の危険性の低い安定した充電ができる。

【図面の簡単な説明】

【図１】電気掃除機Ｂの外観図。

【図２】充電式電気掃除機Ａの縦断面図。

【図３】図２に示す充電式電気掃除機ＡのＡ－Ａによる断面図。

【図４】図２に示す充電式電気掃除機Ａの破線円部Ｃの拡大図。

【図５】２次電池を下方に配置した充電式電気掃除機Ａの縦断面図。

【図６】奥深い隙間の奥を掃除する際の実施例図。

【図７】従来の充電式電気掃除機の外観図。

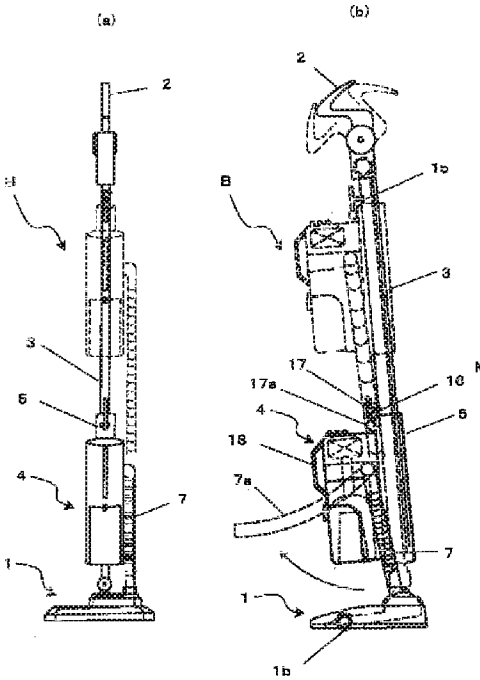
【符号の説明】

Ａ…充電式電気掃除機
Ｂ…電気掃除機
Ｍ…電動送風機
１…吸引口部
１ｂ…回転ブラシ
２…ハンドル部
３…操作竿
３ａ…バネカバー
４…掃除機本体
４ａ…係合凸部
４ｂ…保持レバー
５…保持台
５ａ…被係合凹部
５ｂ…被保持凸部
６…サイクロン式集塵装置
７…吸気管
８…２次電池
９…制御装置
１０…操作部
１１…ダストカップ
１２…排気筒
１３…排気口

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１４…スリット
１５…ロックレバー嵌合部
１６…ロックレバー嵌合部
１７…ロックレバー
１７ａ…回転軸
１８…把持部
１９…バネ
２０…回転車輪部
２１…ベアリング
３１…移動操作竿
３１ａ…摺動材
３２…固定操作竿
３２ａ…摺動材
１００…トレイ
１０１…充電器
１０２…載置検知手段
１０３ａ…嵌合凸部
１０３ｂ…被嵌合凹部
１０４ａ…充電接続端子
１０４ｂ…充電接続端子
１０５ａ…電源スイッチ
１０５ｂ…電源表示ランプ
１０５ｃ…充電中表示ランプ

【図１】



【図２】

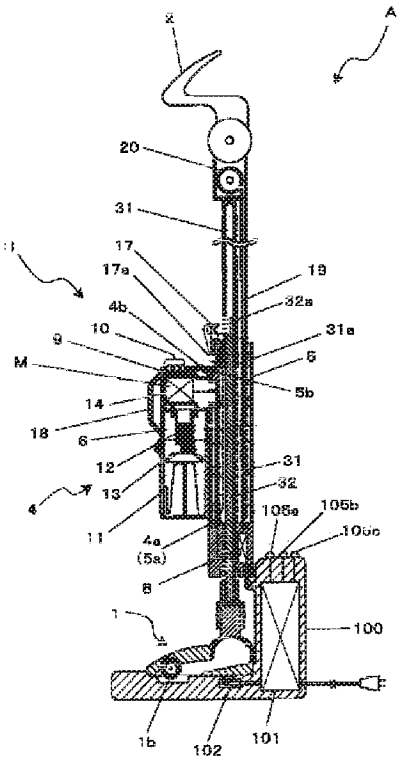
【図３】

【図７】

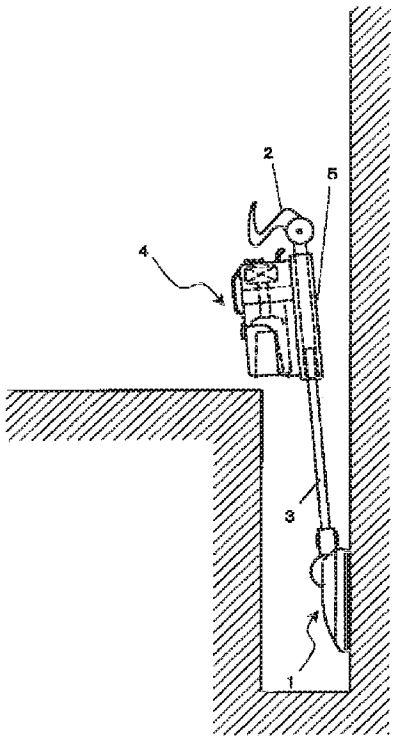
【図４】

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【図5】


A
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105a
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【図6】


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Bibliographic data: CN2529599 (Y) — 2003-01-08

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Cyclone device of small hand-held household duster

Page bookmark CN2529599 (Y) - Cyclone device of small hand-held household duster

Inventor(s): PAN JINGLIANG [CN] ±

Applicant(s): PAN JINGLIANG [CN] ±

Classification: - international: ***A47L9/16;*** (IPC1-7): A47L9/16

- cooperative:

Application number: CN2001272873U 20011214

Priority number(s): CN2001272873U 20011214

Abstract of CN2529599 (Y)

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The utility model discloses a cyclone device of small hand-held household duster, containing a chassis, an air inlet and a dust removing device; wherein the lower of the chassis has a laid clapboard which forms an air inlet channel with the bottom of the chassis; and the laid clapboard has an air channel outlet which has a cover lid and is connected to the laid clapboard by one side. The inlet air of the device can produce cyclone in the chassis, thus reducing the possibility that dust blocks the dust removing device and avoiding the motor of a cleaner be burned because of overloading; and at the same time, the exhausted air of the cleaner is relatively clean, thus avoiding secondary pollution.

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English

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DESCRIPTION CN2529599

The utility model discloses a small hand-held vacuum cleaners cyclone means, including housing, air inlet, dust means, said housing has a lower inner transverse bulkheads, transverse bulkheads with the bottom of the casing is formed into the duct, transverse bulkhead is provided on the outlet duct with cover plate side and transverse bulkhead connection duct outlet; wind energy into the device in the body to produce cyclone, reducing the possibility of dust clogging dust means avoid the vacuum cleaner motor overload and burn out, while allowing relatively cleaner exhaust air clean, to avoid secondary contamination of produce.

Small hand-held vacuum cleaners cyclone device

TECHNICAL FIELD

The utility model relates to a small hand-held vacuum cleaners.

Background technique

With the social and economic development and people's living standards improve, vacuum cleaner are increasingly entering the home Court, and the type of vacuum cleaner has also increased a lot, for example, there are currently on the market for a special pack Desktop, beds, sofas and other small hand-held vacuum cleaners. 1, mainly composed of the vacuum cleaner Chassis, motor and negative pressure inside the apparatus housing the composition of the dust from the air inlet into the vacuum cleaner through the dust loading Post by motor, then from the outlet, the biggest drawback of the vacuum cleaner is a direct hit from the air inlet dust Dust on the device, but the device has a single-layer flat dust filters, so in a very short period of time the dust means Will be blocked, resulting in motor overload, temperature rise quickly, resulting in burned, so that the vacuum cleaner performance and There is a security risk severe punishment there.

SUMMARY

The utility model aims to: provide a small hand-held vacuum cleaners cyclone apparatus Not directly into the wind playing in the dust means, but after the body is rotated by the dust suction device, so Dust clogged with dust is reduced means possible, to avoid the vacuum cleaner motor overload and burn, improved absorption Dust safety and reliability, while allowing the vacuum cleaner exhaust air is clean, avoid two Second generation of pollution.

The utility model is a technical solution: a small hand-held vacuum cleaners cyclone device comprising Housing, air inlet, dust means, said housing has a lower inner transverse bulkheads, the crossbeam and the chassis bottom shape into the inlet duct, it is provided on the crossbeam duct outlet with cover plate on the side of the diaphragm and the outlet duct Board connector.

The utility model is a further technical solution: a small hand-held vacuum cleaners cyclone device, including housing, air inlet, dust means, said housing has a lower inner transverse bulkheads, transverse bulkheads and the housing bottom is formed into the duct, transverse bulkhead outlet duct is provided with a side cover plate on the outlet duct Transverse bulkhead connections; the inlet is located in the front end of the housing, air inlet direction slightly downward, with its axis horizontal

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Surface at an angle.

The utility model has the advantages:

[1]

1. The utility model through the inlet duct into the crossbeam and the bottom of the casing is formed into the housing, Transverse bulkhead is provided on the outlet duct, provided with a side of the crossbeam connector cover on the duct outlet, use wind Blowing open the cover hit the inner wall of the housing to form a cyclone, rather than a direct hit on the dust means, so dust Device is not easy to be blocked to avoid serious accidents caused by motor overload burned.

[2]

2. The utility model cyclone dust formed after the dust filtering means, so the cleaner the air Mouth relatively clean exhaust air, to avoid secondary contamination of produce.

BRIEF DESCRIPTION

Below in conjunction with the accompanying drawings and the embodiments of the present utility model is further described:

Figure 1 is a schematic structural view of the prior art;

Figure 2, Figure 3 is a schematic view of the structure of the utility model.

[7]

Where: 1 cabinet; 2 air inlet; 3 precipitator apparatus; 4 transverse bulkheads; 5 inlet duct; duct outlet 6; 7Cover.

detailed description

Example: Fig. 2 and 3, a small hand-held vacuum cleaners cyclone device package including housing [1], the air inlet [2], Dust apparatus [3], the lower portion of the casing [1] has the crossbeam [4], horizontal Separator [4] and the casing [1] the bottom of the inlet duct is formed [5], the crossbeam with a outlet duct [6] [4], the wind tells Has a mouth [6] on the cover [7], the cover [7] side and transverse bulkheads [4]; said air inlet [2] located Machine The front end of the shell [1], the air inlet [2] direction slightly downwards, which makes an angle with the horizontal axis.

The utility model inlets [2] After the crossbeam [4] and the casing [1] formed in the bottom inlet duct [5] to enter Cabinet [1], the crossbeam [4] provided with duct outlet [6], the outlet duct is provided on one side and the crossbeam [4] [6] Connection cover [7], blown open when using the cover [7] playing in the housing [1] is formed on the inner wall of the cyclone, rather than A direct hit in the dust filter device [3], so dust means [3] is not easy to be blocked, causing the motor to avoid Overload burned a serious accident; the utility model after the cyclone dust formed by the precipitator apparatus [3] conducted Filter, so that the cleaner exhaust outlet air cleaner, to avoid secondary pollution generated.

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CLAIMS CN2529599

[1]

1. A small hand-held vacuum cleaners cyclone apparatus includes a cabinet [1], the air inlet [2], filter Dust means [3], characterized in that: the lower part of the casing [1] has the crossbeam [4], the crossbeam [4] and the chassis Forming a bottom inlet duct [5], the crossbeam [4] provided with duct outlet [6], duct outlet [6] on a cover Plate [7], the cover [7] side and transverse bulkheads [4] connection.

[2]

2. According to claim 1, wherein the small hand-held vacuum cleaners cyclone apparatus, comprising: The air inlet [2] is located in the housing [1] of the front air inlet [2] slightly downward direction, its axis with the horizontal plane An angle.

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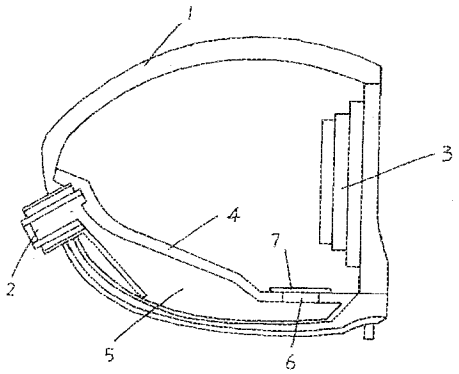
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权利要求书1页 说明书2页 附图2页

[54]实用新型名称 小型手持式家用吸尘器的旋风装置

[57]摘要

本实用新型公开了一种小型手持式家用吸尘器的旋风装置，包括机壳、进风口、滤尘装置，所述机壳内下部设有横隔板，横隔板与机壳底部形成进风道，横隔板上设有风道出口，风道出口上设有盖板，盖板的一侧与横隔板连接；该装置的进风能在机体内产生旋风，减小了灰尘堵塞滤尘装置的可能，避免吸尘器电机因过载而烧坏，同时使得吸尘器排出的空气比较清洁干净，避免了二次污染的产生。



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1．一种小型手持式家用吸尘器的旋风装置，包括机壳[1]、进风口[2]、滤尘装置[3]，其特征在于：所述机壳[1]内下部设有横隔板[4]，横隔板[4]与机壳[1]底部形成进风道[5]，横隔板[4]上设有风道出口[6]，风道出口[6]上设有盖板[7]，盖板[7]的一侧与横隔板[4]连接。

2．根据权利要求 1 所述的小型手持式家用吸尘器的旋风装置，其特征在于：所述进风口[2]位于机壳[1]的前端，进风口[2]方向略向下，其轴线与水平面有一夹角。

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小型手持式家用吸尘器的旋风装置

技术领域

本实用新型涉及一种小型手持式家用吸尘器。

背景技术

随着社会经济的发展和人民生活水平的提高，吸尘器正越来越多地进入家庭，而且吸尘器的类型也增加了很多，例如，目前市场上有一种专门用于收拾桌面、床铺、沙发等的小型手持式家用吸尘器。如图 1 所示，该吸尘器主要由机壳、机壳内的电机和负压装置组成，灰尘由进风口进入吸尘器，通过滤尘装置后经电机，再从出风口排出，该吸尘器的最大缺陷是，灰尘从进风口直接打在滤尘装置上，而滤尘装置又采用单层平面过滤，所以在很短时间内滤尘装置就会堵塞，造成电机超载、温升迅速、最终导致烧毁，所以该吸尘器在性能和安全上存在有严惩隐患。

发明内容

本实用新型目的是：提供一种小型手持式家用吸尘器的旋风装置，该装置的进风不是直接打在滤尘装置上，而是在机体内旋转后由滤尘装置吸入，这样就减小了灰尘堵塞滤尘装置的可能，避免吸尘器电机因过载而烧坏，提高了吸尘器的安全性和可靠性，同时使得吸尘器排出的空气比较清洁干净，避免了二次污染的产生。

本实用新型的技术方案是：一种小型手持式家用吸尘器的旋风装置，包括机壳、进风口、滤尘装置，所述机壳内下部设有横隔板，横隔板与机壳底部形成进风道，横隔板上设有风道出口，风道出口上设有盖板，盖板的一侧与横隔板连接。

本实用新型进一步的技术方案是：一种小型手持式家用吸尘器的旋风装置，包括机壳、进风口、滤尘装置，所述机壳内下部设有横隔板，横隔板与机壳底部形成进风道，横隔板上设有风道出口，风道出口上设有盖板，盖板的一侧与横隔板连接；所述进风口位于机壳的前端，进风口方向略向下，其轴线与水平面有一夹角。

本实用新型的优点是：

1．本实用新型的进风口经过横隔板与机壳底部形成的进风道进入机壳内，

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横隔板上设有风道出口，风道出口上设有一侧与横隔板连接的盖板，使用时风吹开盖板打在机壳内壁上而形成旋风，而不是直接打在滤尘装置上，这样滤尘装置就不容易被堵塞，避免了引起电机过载烧坏的严重事故。

2．本实用新型的灰尘形成旋风后再由滤尘装置进行过滤，使得吸尘器出风口排出的空气比较清洁，避免了二次污染的产生。

附图说明

下面结合附图及实施例对本实用新型作进一步描述：

图 1 为现有技术的结构示意图；

图 2、图 3 为本实用新型的结构示意图。

其中：1 机壳；2 进风口；3 滤尘装置；4 横隔板；5 进风道；6 风道出口；7 盖板。

具体实施方式

实施例：如图 2、图 3 所示，一种小型手持式家用吸尘器的旋风装置，包括机壳[1]、进风口[2]、滤尘装置[3]，所述机壳[1]内下部设有横隔板[4]，横隔板[4]与机壳[1]底部形成进风道[5]，横隔板[4]上设有风道出口[6]，风道出口[6]上设有盖板[7]，盖板[7]的一侧与横隔板[4]连接；所述进风口[2]位于机壳[1]的前端，进风口[2]方向略向下，其轴线与水平面有一夹角。

本实用新型的进风口[2]经过横隔板[4]与机壳[1]底部形成的进风道[5]进入机壳[1]内，横隔板[4]上设有风道出口[6]，风道出口[6]上设有一侧与横隔板[4]连接的盖板[7]，使用时风吹开盖板[7]打在机壳[1]内壁上而形成旋风，而不是直接打在滤尘装置[3]上，这样滤尘装置[3]就不容易被堵塞，避免了引起电机过载烧坏的严重事故；本实用新型的灰尘形成旋风后再由滤尘装置[3]进行过滤，使得吸尘器出风口排出的空气比较清洁，避免了二次污染的产生。

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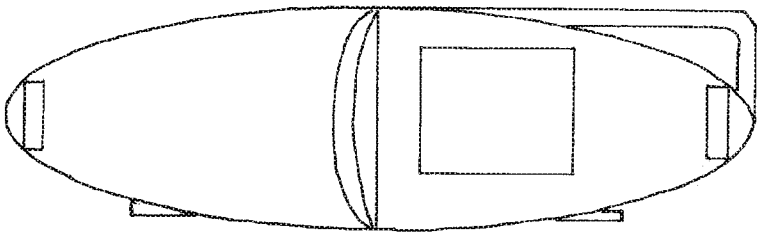


图 1

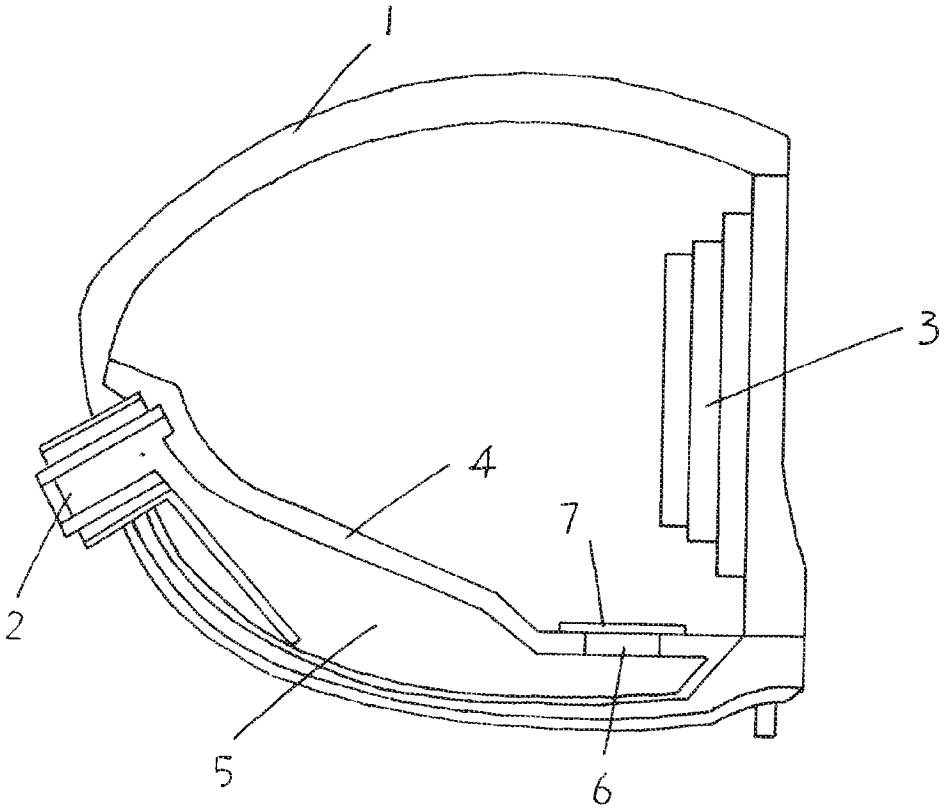


图 2

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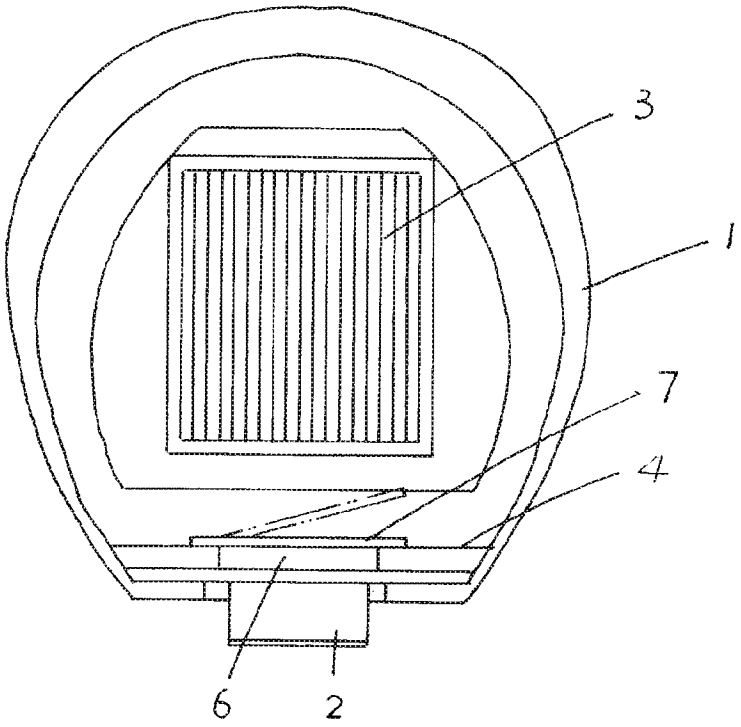


图 3

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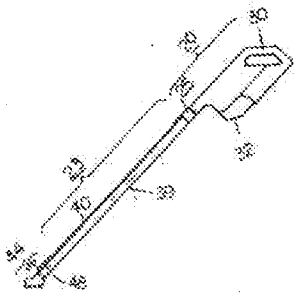
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(22)Date of filing	11.09.2000
(71)Applicant	MATSUSHITA ELECTRIC IND CO LTD
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(54)VACUUM CLEANER

(57)Abstract
PROBLEM TO BE SOLVED: To provide a vacuum cleaner which is high in dust collecting performance, lightweight and excellent in usability for three-dimensional cleaning of a ceiling, a wall surface, a floor, etc., in particular.
SOLUTION: The cleaner consists of a suction port body 44 incorporating an electric brush, a main body 20 incorporating an electric blower, a dust collecting case 32 fitted to the main body 20 and a conductive extension pipe 23 for connecting the body 44 and the main body 20. The total mass of the main body 20 and the case 32 is ≤1 kg and the mass of the body 44 is ≤1/5 of the total mass of the main body 20 and the case 32. Thus, it is possible to clean even the ceiling, the wall surface, etc., by the electric blower 21 of a comparatively small power without deteriorating the dust collecting performance by utilizing the raking-up force of an electric brush 47 without being bothered by the weight of the cleaner.

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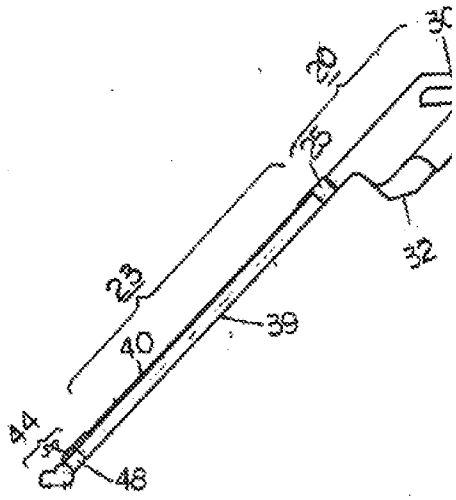
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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]The present invention relates to the vacuum cleaner which equipped the inlet port body with the electric brush.
[0002]
[Description of the Prior Art]Conventionally, the stick type vacuum cleaner of the hand carry type which combined the floor nozzle with the body part provided with the electric blower and the dust collection part by extension wands was constituted as shown in JP,S64-9006,B. Hereinafter, based on Fig.6, it describes about the composition.
[0003]1 builds in the electric blower (not shown) which generates a suction force, and provides the insertion part 3 of the extension wands 2 at a tip, It is the body part which formed the carrying handle 4 in the back end, and provided the switch part 5, and the dust collection part in which 6 built the filter body (not shown), and 7 are floor nozzles combined with the body part 1 via the extension wands 2.
[0004]Dust is collected for the dust of a floor line from the suction opening of the floor nozzle 7 in the dust collection part 6 via the extension wands 2 with the suction force generated by the electric blower.
[0005]
[Problem to be solved by the invention]In such conventional composition, if it is going to improve the dust collecting performance of the floor nozzle 7, in order to compensate the pressure loss of the extension wands 2 and to carry out the drawing in of sufficient air capacity from the suction opening of the floor nozzle 7, the input of the electric blower needed to be enlarged and air capacity and a degree of vacuum needed to be made high. Therefore, the weight of the body part 1 enlarged inevitably and it worsened usability. When also enlarging the floor nozzle 7 and cleaning a wall surface and a ceiling up in three dimensions, since it was too heavy, it needed to be independently used by raising, having changed for the small lightweight attached shelf nozzle.
[0006]The present invention solves the above-mentioned conventional problem, and it aims at providing the vacuum cleaner which reduced weight suitable for solid cleaning.
[0007]
[Means for solving problem]The inlet port body which built in the electric brush in order that the vacuum cleaner of the present invention might solve an aforementioned problem, It shall consist of extension wands which carry out connection combination of the body part which incorporates an electric blower, and the aforementioned inlet port body and a body part, and the total mass of the aforementioned body part shall be 1 kg or less, and it makes the aforementioned inlet port body and the mass ratio of a body part or less into 1/5.
[0008]Since the electric blower should just supply the sink air capacity which conveys the dust through which its hand was run to a dust collecting case if the electric brush of an inlet port body runs its hand and dust collecting performance improves and secures by power by this, Size and weight reduction of a body part can be realized, the weight of the hand at the time of use can be reduced as 1 kg or less, and usability can be improved.
[0009]The vacuum cleaner of the present invention becomes what was suitable when three-dimensional cleaning especially of those other than a floor line was carried out, since he did not get tired even if it cleaned the wall surface and the ceiling up as it is, since mass of the inlet port body was made into [less than / 1/5 or less / of a body part], i.e., 200g.
[0010]



Representative drawing

Representative drawing | 1 | 2 | 3 | 4 | 5 | 6

[Mode for carrying out the invention]The inlet port body in which the invention of the present invention according to claim 1 built the electric brush, It shall have extension wands which carry out connection combination of the body part which has an electric blower and a dust collection part, a dust collecting case, and the aforementioned inlet port body and a body part, and the total mass of the aforementioned body part shall be 1 kg or less, and. By having used 1/5 or less [of total mass with a body part], cleaning of a wall surface or a ceiling is not tiring and the aforementioned inlet port body is made.
[0011]Since the invention of the present invention according to claim 2 formed the handle part in the body part, it can grasp a handle part, and can move a main part, and can move an inlet port body with a handle part for a wall surface or ceiling cleaning.
[0012]Since the invention of the present invention according to claim 3 provided the handle part back from the electric blower and the dust collection part was ahead provided from the electric blower, the center of gravity of the part which has back an electric blower which is a heavy ifft, and a body part will be placed back, and it can bring the center of gravity of a body part close to a handle part. Therefore, in carrying out ceiling cleaning where it grasped the handle part and a body part is raised, the weight from a part with the center of gravity of a body part near a handle part and the body part concerning a grip hand can be eased, and usability improves.
[0013]Since a suction passage and this suction passage constituted extension wands from a divided conductor storage part, the invention of the present invention according to claim 4, Can perform the electric power supply to the electric brush provided to the inlet port body via a conductor, and. Since a conductor is not damaged under the influence of dust etc. since the conductor is divided with the suction passage, and the ventilation resistance of a suction passage is not enlarged with a conductor, either, a lightweight and small electric blower with low suction power is employable.
[0014]Since the invention of the present invention according to claim 5 constituted the dust collection part from a filter body which covers the opening of the dust collecting case and dust collecting case of approximately earthenware mortar form or approximately bottomed cylindrical shape and the inlet port was provided to the peripheral surface of the aforementioned dust collecting case, Since it is what is called a cyclone system that rotates spirally over the peripheral surface of a dust collecting case, and descends to the bottom part side of a dust collecting case, there is little blinding according to adhesion of dust to a filter body, and the dust sucked from the inlet port of a peripheral surface is **. Therefore, even if it adopts a lightweight and small electric blower with low suction power, dust can be absorbed sufficiently.
[0015]Since the invention of the present invention according to claim 6 attached the dust collecting case via the filter body ahead of the electric blower, When carrying out floor cleaning, the filter body of a dust collecting case will be placed up, it is rare for a filter body to cause blinding with dust, and when carrying out ceiling cleaning, the filter body of a dust collecting case turns down, but. Blinding of a filter is made hard for the dust which moves to the filter body side to be able to wind up according to swirling flow, and to carry out, since it is the cyclone system mentioned above.
[0016]
[Working example](Working example 1) Hereafter, about the working example of the present invention, while referring to Drawings, it describes.
[0017]As for drawing of longitudinal section of a body part and an electric conduction extension-wands essential part, and Fig.2, drawing of longitudinal section of an electric conduction extension-wands essential part and an inlet port body and Fig.3 of Fig.1 are appearance side views.
[0018]As shown in Fig.1 - Fig.3, in the cleaner body 20, in support of the electric blower 21 which generates a suction force, it builds by the support rubber 22, and forms the suction part 26 which provided the receiving part 25 which fits in with the insertion part 24 of the electric conduction extension wands 23 ahead at the upper end. The contact plate 29 was provided to the receiving part 25, and this contact plate 29 is connected to a power supply via the switch part 27 and the electric wire 28. The handle part 30 is integrally formed in the back end of the main part 20.
[0019]The dust collecting case 32 which attached the filter body 31 ahead of the electric blower 21 built in the main part 20 engages with the locking part 34 of the main part 20 by the engagement part 33 of one end, and the buckle 35 provided to the other end engages with the concave part 36 of the main part 20, and it has locked it freely attachable/detachable. The inlet port 37 is provided to the peripheral surface of the approximately earthenware mortar-like dust collecting case 32, and this inlet port 37 is formed in the main part 20, the suction part 26 of integral formation, and the position that communicates. Thus, by constituting the dust collecting case 32, the dust sucked from the inlet port 37 of a peripheral surface serves as what is called a cyclone system that rotates spirally over the peripheral surface of the dust collecting case 32, and descends to the bottom part side of the dust collecting case 32, and it can lessen that dust adheres to the filter body 31.
[0020]The electric conduction extension wands 23 consist of the pipe body 39 which provided the insertion part 24 to main part 20 side edge and to which they provided the receiving part 25 of the main part 20, and the isomorphism-like receiving part 38 to the other end, and the cover body 40. And to main part 20 side edge, the same contact plate 42 as the contact plate 29 is arranged for the connecting terminal 41 welded by pressure to the contact plate 29 fixed to the receiving part 25 at the other end, and it is holding and fixing in space of the pipe body 39 and the cover body 40 with the electric wire 43 which connects the connecting terminal 41 and the contact plate 42.
[0021]44 builds in the electric brush 47 rotated with the drive motor 46 via the belt body 45, and is the connection tube 48 and the inlet port body supported pivotally pivotably. The connection tube 48 provides the main part side edge of the electric conduction extension wands

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23, and the isomorphism-like insertion part 49, and it has carried out holding fixing of the connecting terminal 49 by the cover body 50, and it has connected the electric wire 51 to the drive motor 46. The electric brush 47 transplants hair in the synthetic fiber 53 to the axis 52, and the outermost periphery end 54 is arranged so that a floor line may be touched. 55 is a sliding body which consists of raising cloth material which acts as shock absorbing material between floor lines.

[0022]The electric blower 21 is constituted from the fan part 56 and the motor 57 which drives this fan part 56, and since the low input type motor of the motor input 40W and the fan output 20W is used, weight is lightweight with about 250 g. Capacity of the dust collecting case 32 is made small in 3 and about 1/compared with the common domestic vacuum cleaner at about 0.6 L, and further, since outline thickness of the main part 20 is made thin walled with an average of 1.6 mm, the total weight of the main part 20 and the dust collecting case 32 is 1 kg or less.

[0023]the width of the inlet port body 44 shall be 120 mm in the minute of a cleaner [diffused in our country] for home use half [about], depth L is also miniaturized at worst, and since the inner diameter of the pipe body 39 of the electric conduction extension wands 23 is also made small, the insertion part 49 of the connection tube 48 can also be miniaturized, and weight has become 200g or less.

[0024]Operation is described in the above-mentioned composition. Since the electric brush 47 is making the synthetic fiber in which an outer peripheral part has elasticity the composition in which hair was transplanted, even if the floor line of a surface to be cleaned up is always abutted and it rotates the peripheral edge 54, it does not damage a floor line, it runs any of its floor lines through it, and enables dust collecting of the dust by power. [one's] For this reason, the electric blower 21 should have only a suction force carried to the dust collecting case 32 through the electric conduction extension wands 23 in the dust through which its hand was run, and according to the experiment, it is practical by an equivalent for 10W by an air power. For this reason, the electric blower 21 can be made a low input and a miniaturization and a weight saving are made. Although the range which can be cleaned by one operation will spread if the width of the inlet port body 44 is large, there is an inconvenient surface in cleaning narrow places, such as a corner. That is, cleaning a narrow place generally like the house in Japan has many scenes which are actually hard to treat, and the effect by giving priority to a weight saving is larger. Since the suction air capacity per unit width increases by making width small, improvement in the dust collecting performance in a low input is expected more.

[0025]And if it is 200g or less in weight of the inlet port body 44, and 1 kg or less in total mass of the main part 20 and the dust collecting case 32, as shown in Fig.4, even if it cleans a ceiling and a wall surface up as it is, by a service test, it is heavy, does not become pain and can clean up in three dimensions easily. Since the electric brush 47 can run not only a floor line but its ceiling and wall surface and power can be made to act, improvement in usability can be aimed at without making dust collecting performance be deteriorated. It is also possible to, remove and clean the inlet port body 44 from the electric conduction extension wands 23 as well as the former, of course, and as further shown in Fig.5, the electric conduction extension wands 23 can be removed, the inlet port body 44 can be directly attached to the main part 20, and it can also be used for it as what is called a handled type.

[0026]Although width of the inlet port body 44 was made small and the weight saving was carried out in this example, it may be the composition of it being good and in short having the electric brush 44 also by the weight saving of the drive motor 46, or the weight saving of outline material, without making width small.

[0027]Although this example is constituted from the electric blower 21 of alternating current system, what was used as the cordless type which uses a rechargeable battery as a power supply with the electric blower of direct current system, and carried out the weight saving using the NI-H (nickel hydride) cell etc. may be used.

[0028]Furthermore, in this example, although the electric conduction extension wands 23 are constituted from one, 2 splices may be sufficient as them and the thing of composition elastic again may be sufficient as them. And the electric wire 28 may not be built in but may consist of external.

[0029]

[Effect of the Invention]Since a lightweight inlet port body and body part can be obtained as mentioned above according to that of the present invention, without an electric brush's running its hand, utilizing power, and making dust collecting performance be deteriorated, the vacuum cleaner which was excellent in usability carrying out three-dimensional cleaning can be obtained.

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JP,2002-085297,A

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CLAIMS DETAILED DESCRIPTION
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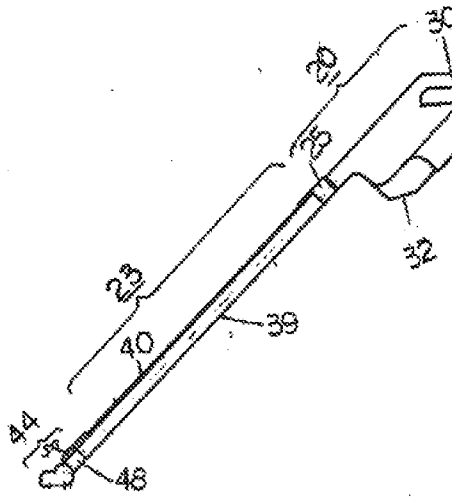
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CLAIMS

[Claim(s)]
[Claim 1]A vacuum cleaner which it had extension wands which carry out connection combination of an inlet port body which built in an electric brush, a body part which has an electric blower and a dust collection part, and the aforementioned inlet port body and the aforementioned body part, and total mass of the aforementioned body part was 1 kg or less, and made the aforementioned inlet port body one or less [of abbreviated 5 minutes of total mass of the aforementioned body part].
[Claim 2]The vacuum cleaner according to claim 1 which formed a handle part in a body part.
[Claim 3]The vacuum cleaner according to claim 2 which provided a handle part back from an electric blower, and a dust collection part provided ahead from an electric blower.
[Claim 4]A vacuum cleaner of a description in any 1 item of Claims 1-3 characterized by comprising the following.
Extension wands are suction passages.
A conductor storage part divided with this suction passage.

[Claim 5]A vacuum cleaner of a description in any 1 item of Claims 1-4 characterized by comprising the following.
About a dust collection part, it is a dust collecting case of approximately earthenware mortar form or approximately bottomed cylindrical shape.
It constitutes from a filter body which covers an opening of the dust collecting case, and is an inlet port to a peripheral surface of the aforementioned dust collecting case.

[Claim 6]The vacuum cleaner according to claim 5 which attached a dust collecting case via a filter body ahead of an electric blower.



Representative drawing

Representative drawing | 1 | 2 | 3 | 4 | 5 | 6

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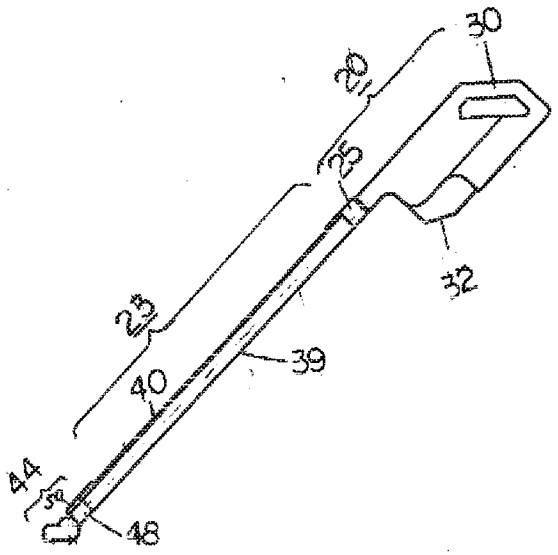
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(54)【発明の名称】　電気掃除機

(57)【要約】
【課題】　集塵性能が高く 軽量で特に天井や壁面、床等の立体掃除の使用性に優れた電気掃除機を提供する。
【解決手段】　電動ブラシを内蔵した吸込口体４４と、電動送風機を内蔵する本体２０と、本体２０に取り付けた集塵ケース３２と、吸込口体４４と本体２０とを連結結合する導電延長管２３とからなり、本体２０と集塵ケース３２の合計質量を１Ｋｇ以下にすると共に、吸込口体４４は本体２０と集塵ケース３２の合計質量の５分の１以下としてある。これにより、重さを苦にすることなく、天井や壁面等も電動ブラシ４７の掻き上げ力を活用して集塵性能を低下させずに比較的小さい出力の電動送風機２１により掃除する事ができる。



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【特許請求の範囲】
【請求項１】　電動ブラシを内蔵した吸込口体と、電動送風機及び集塵部を有する本体部分と、前記吸込口体と前記本体部分とを連結結合する延長管を備え、前記本体部分の合計質量を１Ｋｇ以下にすると共に、前記吸込口体は、前記本体部分の合計質量の略５分の１以下とした電気掃除機。
【請求項２】　本体部分には把手部を形成した請求項１記載の電気掃除機。
【請求項３】　把手部は電動送風機より後方に設け、集塵部は電動送風機より前方に設けた請求項２記載の電気掃除機。
【請求項４】　延長管は、吸気通路と、この吸気通路とは仕切られた導電体収納部から構成した請求項１乃至３のいずれか１項に記載の電気掃除機。
【請求項５】　集塵部を、略すり鉢形状もしくは略有底円筒形状の集塵ケースと、その集塵ケースの開口部を覆うフィルター体から構成し、前記集塵ケースの周面に吸気口を設けた請求項１乃至４のいずれか１項に記載の電気掃除機。
【請求項６】　電動送風機の前方にフィルター体を介して集塵ケースを取り付けた請求項５記載の電気掃除機。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、吸込口体に電動ブラシを備えた電気掃除機に関するものである。
【０００２】
【従来の技術】従来、電動送風機及び集塵部を備えた本体部分に、延長管で床ノズルを結合した手持ち式のスティック型電気掃除機は特公昭６４－９００６号公報に示されているように構成されていた。以下、その構成について図６に基づいて説明する。
【０００３】１は吸引力を発生する電動送風機（図示せず）を内蔵し、先端に延長管２の挿入部３を設け、後端に持ち手部４を形成し、スイッチ部５を設けた本体部分であり、６はフィルター体（図示せず）を内蔵した集塵部、７は延長管２を介して本体部分１と結合される床ノズルである。
【０００４】電動送風機によって発生される吸引力によって床ノズル７の吸込口から延長管２を介して床面の塵埃を集塵部６内に集塵するものである。
【０００５】
【発明が解決しようとする課題】このような従来の構成では、床ノズル７の集塵性能を高めようとすれば、延長管２の圧損を補い、床ノズル７の吸い込み口から十分な風量を引込みするため、電動送風機の入力を大きくし風量と真空度を高くする必要があった。そのため必然的に本体部分１の重さが大きくなり使い勝手を悪くしていた。又、床ノズル７も大きくなり壁面や天井を立体的に掃除をする場合には持上げる必要があり重すぎるので、別に添付の小型軽量の棚ノズルに付け替えて使用する必要があった。
【０００６】本発明は上記従来の課題を解決するもので、立体掃除に適した重さを軽減した電気掃除機を提供することを目的とするものである。
【０００７】
【課題を解決するための手段】本発明の電気掃除機は、上記課題を解決するために、電動ブラシを内蔵した吸込口体と、電動送風機を内蔵する本体部分と、前記吸込口体と本体部分とを連結結合する延長管とからなり、前記本体部分の合計質量を１Ｋｇ以下にすると共に、前記吸込口体と、本体部分の質量比を５分の１以下としたものである。
【０００８】これにより、吸込口体の電動ブラシの掻き上げ力で集塵性能が向上し確保すれば、電動送風機は掻き上げられた塵埃を集塵ケースに搬送するだけの吸込み風量を供給すれば良いので、本体部分の小型、軽量化を実現でき１Ｋｇ以下として使用時の手元の重さを軽減でき、使い勝手を向上することができる。
【０００９】また、本発明の電気掃除機は、吸込口体の質量を本体部分の５分の１以下、すなわち２００ｇ以下にしているので、そのまま壁面や天井を掃除をしても疲れることがないので特に床面以外の立体的な掃除をする場合に適したものとなる。
【００１０】
【発明の実施の形態】本発明の請求項１に記載の発明は、電動ブラシを内蔵した吸込口体と、電動送風機及び集塵部を有する本体部分と、集塵ケースと、前記吸込口体と本体部分とを連結結合する延長管とを備え、前記本体部分の合計質量を１Ｋｇ以下にすると共に、前記吸込口体は、本体部分との合計質量の５分の１以下としたことにより、壁面や天井の掃除が疲れることが無くできる。
【００１１】本発明の請求項２記載の発明は、本体部分には把手部を形成したので、把手部を握り本体を移動させることができ、また、壁面や天井掃除のために把手部を持って吸込口体を移動させることができる。
【００１２】本発明の請求項３記載の発明は、把手部は電動送風機より後方に設け、集塵部は電動送風機より前方に設けたので、重量物である電動送風機が後方にある分、本体部分の重心が後方に位置することとなり、本体部分の重心を把手部に近づけることができる。よって、把手部を握って本体部分を持ち上げた状態で天井掃除する場合には、本体部分の重心が把手部に近い分、握り手に掛かる本体部分からの重量を緩和することができ、使い勝手が向上する。
【００１３】本発明の請求項４記載の発明は、延長管を、吸気通路と、この吸気通路とは仕切られた導電体収納部から構成したので、吸込口体に設けた電動ブラシへの電力供給を導電体を介して行うことができると共に、

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導電体が吸気通路と仕切られているので、塵埃などの影響により導電体が悪影響を受けることがなく、また、吸気通路の通風抵抗も導電体により大きくなることもないので、吸い込み力が低い軽量かつ小型の電動送風機を採用できる。

【００１４】本発明の請求項５記載の発明は、集塵部を、略すり鉢形状もしくは略有底円筒形状の集塵ケースと、その集塵ケースの開口部を覆うフィルター体から構成し、前記集塵ケースの周面に吸気口を設けたので、周面の吸気口から吸引された塵埃は集塵ケースの周面に沿って螺旋状に旋回して集塵ケースの底部側に下降する、いわゆるサイクロン方式であるので、フィルター体へ塵埃の付着による目詰まりが少なくなる。したがって、吸い込み力が低い軽量かつ小型の電動送風機を採用しても充分に塵埃を吸い込むことができる。

【００１５】本発明の請求項６記載の発明は、電動送風機の前方にフィルター体を介して集塵ケースを取り付けたので、床掃除する場合には集塵ケースのフィルター体が上方に位置することとなり、フィルター体が塵埃により目詰まりを起こすことが少なく、また、天井掃除する場合に集塵ケースのフィルター体が下側になるが、上述したサイクロン方式なので、フィルター体側に移動する塵埃が旋回流により巻き上げられ、フィルターの目詰まりをしにくくする。

【００１６】

【実施例】（実施例１）以下、本発明の実施例について、図面を参照しながら説明する。

【００１７】図１は、本体部分及び導電延長管要部の縦断面図、図２は、導電延長管要部及び吸込口体の縦断面図、図３は、外観側面図である。

【００１８】図１～図３に示すように、掃除機本体２０内には、吸引力を発生する電動送風機２１をサポートゴム２２で支持して内蔵し、上部一端に、前方に導電延長管２３の挿入部２４と嵌合する受け部２５を設けた吸い込み部２６を形成している。受け部２５には接点板２９を設け、この接点板２９をスイッチ部２７及び電線２８を介して電源に接続している。また、本体２０の後端には把手部３０を一体に形成している。

【００１９】本体２０に内蔵した電動送風機２１の前方にはフィルター体３１を取付けた集塵ケース３２が、一端の係合部３３で本体２０の係止部３４に係合し、他端に設けた尾錠３５が本体２０の凹部３６に係合し、着脱自在に係止してある。略すり鉢状の集塵ケース３２の周面には吸気口３７を設け、この吸気口３７は本体２０と一体形成の吸い込み部２６と連通する位置に形成している。このように、集塵ケース３２を構成することにより、周面の吸気口３７から吸引された塵埃は集塵ケース３２の周面に沿って螺旋状に旋回して集塵ケース３２の底部側に下降する、いわゆるサイクロン方式となり、フィルター体３１へ塵埃が付着するのを少なくできる。

【００２０】導電延長管２３は、本体２０側端に挿入部２４を、他端に本体２０の受け部２５と同形状の受け部３８を設けたパイプ体３９と、カバー体４０で構成している。そしてパイプ体３９とカバー体４０の空間で、本体２０側端には受け部２５に固定した接点板２９に圧接する接続端子４１を、他端には接点板２９と同一の接点板４２を配設し、接続端子４１と接点板４２をつなぐ電線４３と共に保持、固定している。

【００２１】４４はベルト体４５を介して駆動モータ４６により回転駆動される電動ブラシ４７を内蔵し、接続パイプ４８と揺動自在に軸支した吸込口体である。接続パイプ４８は導電延長管２３の本体側端と同形状の挿入部４９を設けると共に接続端子４９をカバー体５０で保持固定してあり、電線５１は駆動モータ４６に接続してある。また、電動ブラシ４７は軸体５２に合成繊維５３を植毛したものであり、最外周端５４は床面に接するように配設してある。５５は床面との間の緩衝材として作用する起毛布材からなる摺動体である。

【００２２】電動送風機２１は、ファン部５６と、このファン部５６を駆動するモータ５７とで構成し、モータ入力４０Ｗ、ファン出力２０Ｗの低入力型モータを使用しているので重量は約２５０ｇと軽量になっている。また、集塵ケース３２の容量は約０．６Ｌで一般の家庭用掃除機に比べると約１／３と小型にしてあり、さらに本体２０の外郭肉厚は平均１．６ｍｍと薄肉にしているので、本体２０及び集塵ケース３２の合計重量は１ｋｇ以下になっている。

【００２３】また、吸込口体４４の幅を１２０ｍｍと我が国で普及している一般家庭用掃除機の約半分にし、奥行きＬも最小限に小型化すると共に、導電延長管２３のパイプ体３９の内径も小さくしているので接続パイプ４８の挿入部４９も小型化でき重量は２００ｇ以下となっている。

【００２４】上記構成において動作を説明する。電動ブラシ４７は外周部は弾性を有する合成繊維を植毛した構成にしているので、その外周端５４を常時被掃除面の床面に当接して回転させても床面を傷つけることがなく、どのような床面でも掻き揚げ力による塵埃の吸塵を可能にする。このため電動送風機２１は掻き上げられた塵埃を導電延長管２３を通じて集塵ケース３２に運ぶだけの吸引力があれば良く、実験によれば空気動力で１０Ｗ相当で実用性があるものである。このため電動送風機２１を低入力にする事ができ、小型化、軽量化ができる。又吸込口体４４の幅は大きければ1回の操作で掃除できる範囲は広がるものの、隅などの狭い場所を掃除するには都合が悪い面がある。すなわち日本の家屋のように一般的に狭い場所を掃除するにはかえって扱いにくい場面が多く、軽量化を優先させることによる効果がより大きい。また、幅を小さくすることによって単位幅当たりの吸い込み風量は増加するので、より低入力での集塵性能

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の向上が見込まれる。

【００２５】そして、吸込口体４４の重量２００ｇ以下、本体２０と集塵ケース３２の合計質量１ｋｇ以下であれば、図４に示すように天井及び壁面をそのまま掃除をしても実用試験では重くて苦になることがなく、簡単に立体的に掃除をすることができる。また、床面だけでなく天井や壁面でも電動ブラシ４７の掻き上げ力を作用させることができるので、集塵性能を低下させずに使い勝手の向上が図れる。もちろん従来と同じく導電延長管２３から吸込口体４４をはずして掃除することも可能であり、さらに図５に示すように導電延長管２３をはずして本体２０に直接吸込口体４４を取り付けていわゆるハンド型として使用することもできる。

【００２６】本実施例では吸込口体４４の幅を小さくして軽量化したが、幅を小さくすることなく、駆動モータ４６の軽量化もしくは外郭材料の軽量化によってもよく、要は電動ブラシ４４を有する構成であればよい。

【００２７】また、本実施例は交流式の電動送風機２１で構成しているが、直流式の電動送風機で2次電池を電源とするコードレス型にし、ＮＩ－Ｈ（ニッケル－水素）電池などを使用して軽量化したものでもよい。

【００２８】さらに本実施例では導電延長管２３は一体で構成しているが、２本継ぎでもよく又伸縮自在な構成のものでもよい。そして電線２８は内蔵せず外付けで構成してもよい。

【００２９】

【発明の効果】以上のように本発明のによれば、電動ブラシの掻き上げ力を活用し、集塵性能を低下させることなく軽量な吸込口体及び本体部分を得ることができるので、立体的な掃除をするのに使用性に優れた電気掃除機を得る事ができる。

【図面の簡単な説明】

【図１】本発明の第１の実施例を示す電気掃除機の本体部分周辺の縦断面図

【図２】同電気掃除機の導電延長管要部及び吸込口体の縦断面図

【図３】同電気掃除機の外観側面図

【図４】同電気掃除機の使用状態を示す側面図

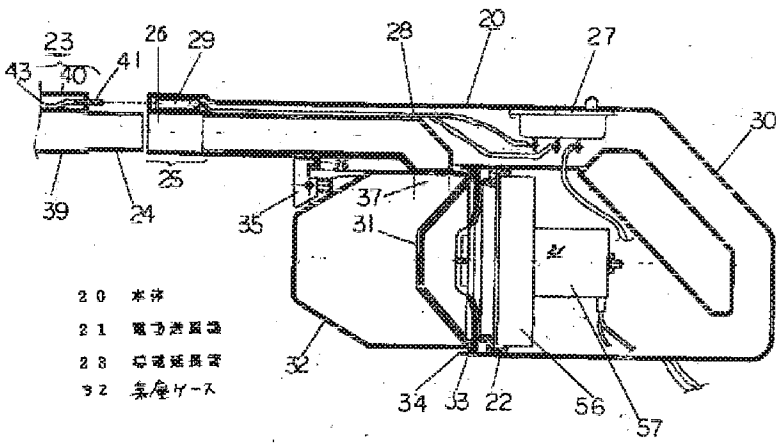
【図５】同電気掃除機の他の使用状態を示す外観側面図

【図６】従来の電気掃除機の外観斜視図

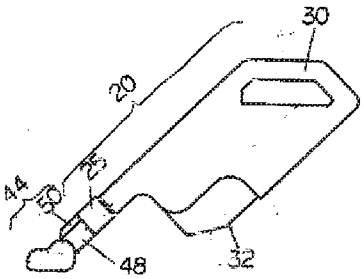
【符号の説明】

２０　本体
２１　電動送風機
２３　導電延長管
３２　集塵ケース
４４　吸込口体
４７　電動ブラシ

【図１】

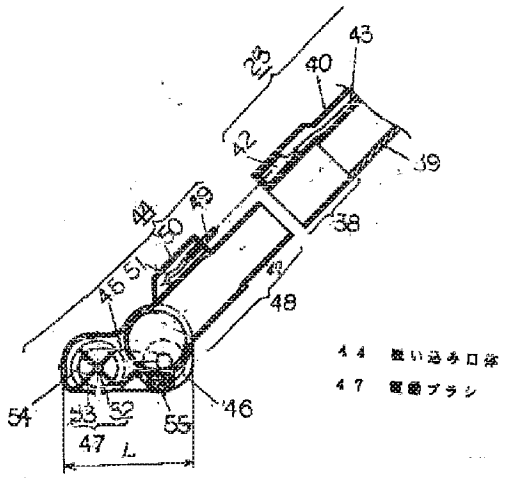


【図５】

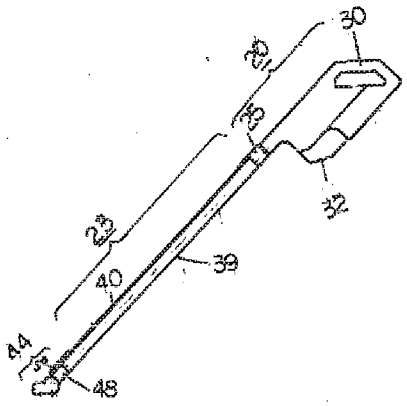


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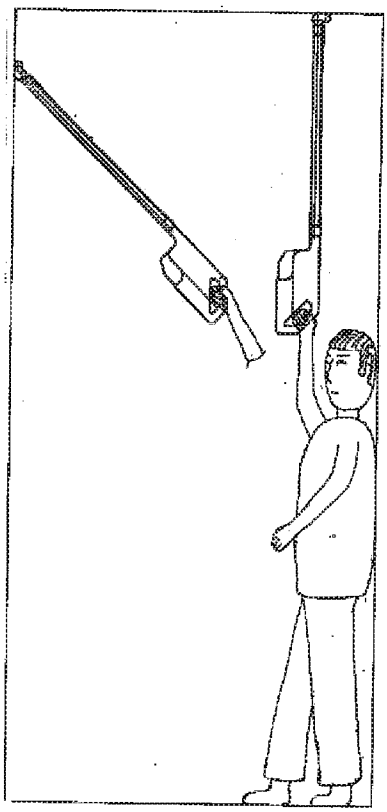
【図2】


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44 吸い込み口体
47 吸込ブラシ

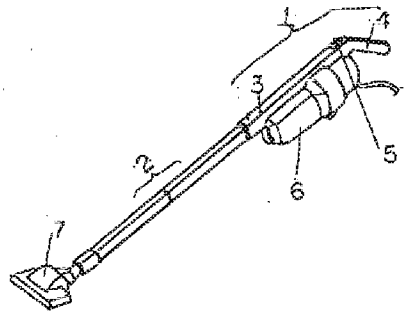
【図3】


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【図4】



【図6】


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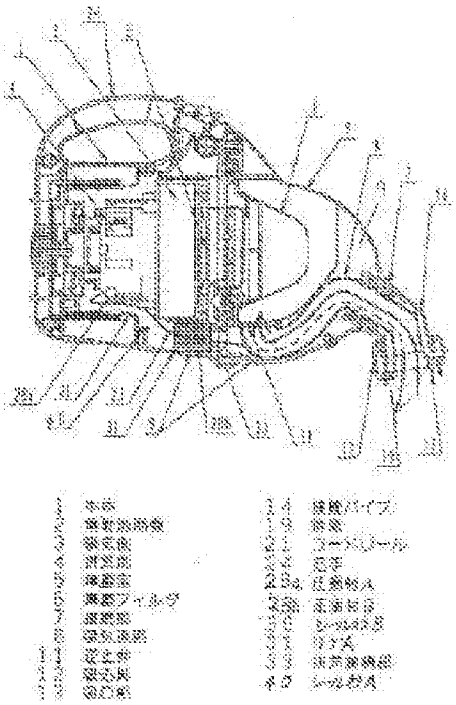
ELECTRIC VACUUM CLEANER

Page bookmark	JP2001353110 (A) - ELECTRIC VACUUM CLEANER
Inventor(s):	KODACHI TORU; KATO KIMINORI; ITO KOICHI ±
Applicant(s):	MATSUSHITA ELECTRIC IND CO LTD ±
Classification:	- international: ***A47L5/14; A47L5/24; A47L9/00; A47L9/06; A47L9/08; A47L9/26;*** (IPC1-7): A47L5/14; A47L5/24; A47L9/00; A47L9/06; A47L9/08; A47L9/26
	- cooperative:
Application number:	JP20000177948 20000614
Priority number(s):	JP20000177948 20000614

Abstract of JP2001353110 (A)

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PROBLEM TO BE SOLVED: To provide an electric vacuum cleaner with high usability for eliminating the blow-off of dust by exhaust air from a rear part in a dead angle to a user. SOLUTION: This electric vacuum cleaner is provided with a motor-driven blower 2, a duct collecting chamber 5 communicated to the intake side of the motor-driven blower 2, a suction tool 12 for sucking the dust on a surface to be cleaned and an intake passage 8 for communicating the dust collecting chamber 5 and the suction tool 12 and a cord reel 21 is mounted to the outer periphery of the motor-driven blower 2. The exhaust 19 of the motor-driven blower 2 is inverted by the cord reel 21. By eliminating the exhaust 19 from the rear part of a main body 1, leading the exhaust 19 to the front part of the main body 1 and discharging the exhaust 19 from the front part of the main body 1, the electric vacuum cleaner with high usability is provided.



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DESCRIPTION JP2001353110

[0001]

TECHNICAL FIELD [0001] The present invention is related to the overall structure of the vacuum cleaner.

[0002]

Background of the Invention of a conventional vacuum cleaner will be described with reference to FIG. 11. Conventionally, the dust collection chamber 5 in front of the electric blower 2, the collector connection 7 for attaching the suction device 12 in front of the dust chamber is provided, the dust on the surface to be cleaned is the suction unit 12 air inlet (not ze not) is from sucked together with outside air flows into the dust collecting chamber 5 through the connection portion 7, it is separated dust and ambient air with a paper bag filter 6 provided inside the dust collecting chamber 5, the outside air into the electric blower 2 rear is blown out becomes exhaust. Around the electric blower 2 and the cord reel 21 is mounted, the exhaust 19 from the electric blower 2 through the cord reel unit 21, an exhaust 19 from the exhaust port 17 is further provided on the rear of the cord reel 21 outside it was not make an arrangement for release to.

[0003]

The present invention is, however, in the conventional configuration, for which the main body 1 rearward from the exhaust 19 that is out of the reach of the eye is blown out at the time of use, exhaust 19 is blown into an unexpected location, it would scatter blow the dust Sometimes. For example, a person with a clean a portable vacuum cleaner is, can happen that such or worse by blowing the exhaust 19 to the face of the person in the rear, resulting in raised dance the ashtray of ash on the table in the exhaust 19 . In recent years, with an increase in the suction force of the vacuum cleaner, air pressure of the exhaust 19 are also becoming stronger, adverse exhaust 19 gives have become no longer negligible.

[0004]

The present invention is intended to solve the conventional problems described above, eliminating the exhaust from the rear of the main body, the exhaust leading to the front of the body, by issuing an exhaust from the front of the body, a high usability vacuum cleaner it is intended to provide.

[0005]

The present invention in order to achieve the above object, according the order to achieve the above, and the electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, comprising an intake passage communicating the suction unit and said dust collecting chamber, in the electric blower vacuum cleaner placing the cord reel to the outer periphery of, which was a configuration to invert the exhaust of the electric blower by the cord reel , eliminating the exhaust from the rear of the body, the exhaust leads to the front of the body, it is possible to provide a high use of vacuum cleaner by issuing the exhaust from the front of the body.

[0006]

The invention of claim 1, wherein of the embodiment of the present invention is an electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, said collection comprising an intake passage communicating the dust chamber and the suction device, in the electric blower vacuum cleaner placing the cord reel to the outer periphery of, which was a configuration to invert the exhaust of the electric

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blower by the cord reel, the body configuration of the vacuum cleaner from the rear does not emit exhaust is facilitated, it is unnecessary to wind up the dust ash or ashtray placed behind as a blind spot for the user in the exhaust. Further, in the structure where the exhaust tc bypass, it is also possible to lower the noise level.

[0007]

invention of claim 2 of the present invention, in the invention described in claim 1, wherein the flexible member is provided in the cord reel, the pressure in the exhaust, which was so as to abut against the inner wall of the body, to the outside air exhaust it is intended to prevent leakage.

[0008]

The invention described in claim 3 of the present invention, an electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, the suction unit and the dust collecting chamber comprising an intake passage communicating, an electric vacuum cleaner of mounting the cord reel to the outer periphery of the electric blower, a cover body for covering the exhaust side of the electric blower between the cord reel and the electric blower, the cover body the present invention was configured to invert the exhaust of the electric blower, the configuration of the electric vacuum cleaner does not emit exhaust from the body rear is facilitated, exhaust dust ash or ashtray placed behind as a blind spot for the user by that wound up in is eliminated. Further, in the structure where the exhaust to bypass, it is also possible to lower the noise level. Furthermore, it is to prevent leakage to the outside air exhaust.

[0009]

The invention described in claim 4 of the present invention is the invention according to any one of claims 1-3, wherein, as it recirculates at least a portion of the exhaust of the electric blower to the suction device, returned to the suction unit the exhaust gas is, thereby improving the dust collection performance by the effect of increasing scraping dust surface to be cleaned.

[0010]

invention of claim 5, wherein the present invention is the invention of the claim 3 or 4, wherein the electric blower, in which the insertion of the member to increase the air resistance between the cover body for covering the exhaust side of the electric blower, velocity of the exhaust gas emitted from the electric blower by a member increasing the air resistance, wind pressure is reduced, wind noise is reduced. Further, the periphery of the electric blower to cover a member increasing air resistance, it is possible to push into even rotation noise generated from the electric blower, it is possible to reduce significantly the noise level of the product itself.

[0011]

Invention of claim 6, wherein the present invention is provided in the invention described in any one of claims 3 to 5, and the cover body for covering the discharge side of the electric blower, a sealing material between the inner wall of the body as hereinbefore, the electric blower than that exhaust backward to the airtight by the sealing member so as not to leak, it is possible to greatly reduce the exhaust leaking from the cord reel outlet, more of flawless vacuum cleaner it is possible to provide the.

[0012]

The invention according to claim 7 of the present invention, an electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, the suction unit and the dust collecting chamber in a vacuum cleaner having an intake passage communicating the interior of the handle which is provided substantially above the electric blower as a passage for exhaust of said electric blower, at least a portion of the exhaust was configured for recirculating to said suction unit intended, for use with internal handle as an exhaust passage, there is no need to provide an exhaust passage around the electric blower, a small vacuum cleaner becomes possible tc provide.

[0013]

8. The invention according to the present invention is the invention according to any one of claims 1 to 7, a universal dust collecting chamber detachably attached to the electric blower unit and the electric blower unit body has an electric blower it consists dust collecting chamber having, wherein from the front of the electric blower unit in which the exhaust of the electric blower is emitted, in a state where the dust collecting chamber is detached from said electric blower unit, of the electric blower side intended to use the exhaust gas that is emitted from the exhaust passage as a blower, a cleaning cleaning is recessed portion and the front door has been difficult up to now becomes easy. In addition, such as dust and pollen Furitsumo' the leaves of foliage plants, it can be carried out without damaging the plant. In addition, it becomes possible to clean the portion that is not out of reach, such as near the ceiling.

[0014]

Invention of claim 9, wherein the present invention is the invention of the eighth aspect, a rib inside the

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exhaust passage of the electric blower unit, plus the pressure loss in the interior of the electric blower unit, exhaust tight construction there it is possible to suppress the exhaust leakage of the entire body by previously adding a pressure loss in a relatively simple and large electric blower of tight effect, thereby the exhaust velocity is suppressed, reducing the body noise value it is possible.

[0015]

Invention of claim 10, wherein the present invention is the invention of the claim 8 or 9, wherein, in which reduced amount of exhaust gas by providing a member to increase the air resistance inside the exhaust passage of the electric blower unit, exhaust tight construction there relatively concise, it is possible to suppress the exhaust leakage of the entire body by previously adding a pressure loss at a large electric blower of tight effect, thereby the exhaust velocity is suppressed, also sound absorbing effect by a pressure loss member since also obtained, it is possible to reduce the body noise value.

[0016]

Invention of claim 11, wherein the present invention is the invention according to any one of claims 1 to 10, in an exhaust passage for guiding the exhaust of the electric blower, a rib extending from the inner wall sides of the exhaust passage plurality, along said air flow direction of the exhaust and staggered position to each other, in which the exhaust is configured to flow in a zigzag, since the exhaust passage is extended, the noise generated from the electric blower contained in the exhaust attenuation and, it is possible to lower the noise level of the product.

[0017]

Invention of claim 12, wherein the present invention is the invention according to any one of claims 1 to 11, the exhaust from the electric blower, is guided to the suction device through an exhaust passage provided in the main body , wherein at least a part of the exhaust as it was configured to release into the ambient air from the exhaust port provided in the suction device, it is easy to configuration of an electric vacuum cleaner does not emit exhaust from the body rear, a blind spot for the user it is unnecessary to wind up the dust of ash like ashtray placed in the rear made of exhaust. Further, since the exhaust passage becomes longer, the noise generated from the electric blower contained in the exhaust is attenuated, it is possible to provide a quieter vacuum cleaner.

[0018]

Invention of claim 13, wherein the present invention is the invention of the claim 12, the provided on the suction device exhaust port, which was a configuration that emits exhaust upwards or obliquely on the front of the suction unit, without having the exhaust gas that is discharged from the suction device top according blown on the face of the user, it is possible to comfortably clean.

[0019]

Invention of claim 14, wherein the present invention is the invention of the claim 12, the provided on the suction device exhaust port, which was a configuration of emitting exhaust into the lateral or oblique upper side of the suction unit , even if inclined angle between the suction device and the surface to be cleaned, without having the angle of the exhaust and the floor too small, there is no blowing off by the exhaust dust on the floor surface.

[0020]

Invention of claim 15, wherein the present invention is the invention of the claim 12, the provided on the suction device exhaust port, which was a configuration that emits exhaust rearward or obliquely upward behind the suction unit, located in suction device forward, there is no risk of blowing by exhausting the dust that is intended to be sucked.

[0021]

16. The invention according to the present invention is the invention according to any one of claims 13 to 15, a plurality provided together with an exhaust port to the suction device, the exhaust amount from the exhaust port of at least one place, which was a quantity different from the other, for example if the user is right-handed, for holding the main body with the right hand, reduces the amount of the exhaust gas blown toward the user by reducing the exhaust from the suction unit left, more clean and comfortable it is possible to Do cleaning.

[0022]

Invention of claim 17, wherein the present invention, the release in the invention described in any one of claims 1 to 16, from the exhaust port provided in the front body, and the exhaust upward or obliquely on the front of the body configuration and the one that, the exhaust gas emitted from the main body forward, without according blown on the face of the user is positioned behind the body, nor to blow off dust on the surface to be cleaned by this exhaust.

[0023]

18. The invention according to the present invention is the invention according to any one of claims 1 to

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16, from the exhaust port provided in the front body, evacuate the lateral or oblique upper side of the front body which was a configuration of emitting a, be used in largely inclined back and forth a body, there is no blowing off by the exhaust dust on the floor surface during use.

[0024]

Invention of claim 19, wherein the present invention, the release in the invention described in any one of claims 1 to 16, from the exhaust port provided in the front body, and the exhaust rearward or obliquely rearward of the front body which was a configuration in which, there is no risk of blowing the dust situated ahead suction device are trying to aspiration therefrom by an exhaust

[0025]

20. The invention according to the present invention is the invention according to any one of claims 17 to 19, a plurality provided together with an exhaust port in the front body, the exhaust amount from the exhaust port of at least one place, which was a quantity different from the other, for example if the user is right-handed, for holding the main body with the right hand, reduces the amount of the exhaust gas blown toward the user by reducing the exhaust gas from the main body left side, more clean and comfortable cleaning becomes possible.

[0026]

Invention of claim 21, wherein the present invention is the invention according to any one of claims 1-20, body and from the exhaust port provided in connection part for connecting a suction device, the connecting portion of the exhaust which was a configuration of emitting upward or obliquely upward and forward, the exhaust gas emitted from the connecting portion, without according blown on the face of the user is positioned behind the body, also on the surface to be cleaned by this exhaust never to blow off the dust.

[0027]

Invention of claim 22, wherein the present invention is the invention according to any one of claims 1-20, body and from the exhaust port provided in connection part for connecting a suction device, the connecting portion of the exhaust which was a configuration of emitting a laterally or obliquely upward direction, be used in largely inclined back and forth a body, there is no blowing off by the exhaust dust on the floor surface during use.

[0028]

Invention of claim 23, wherein the present invention is the invention according to any one of claims 1-20, body and from the exhaust port provided in connection part for connecting a suction device, the connecting portion of the exhaust which was a configuration of emitting rearward or obliquely rearward, there is no risk of blowing the dust situated ahead suction device are trying to aspiration therefrom by an exhaust.

[0029]

Invention of claim 24, wherein the present invention, the invention described in any one of claims 21 to 23, the main body and the connecting portion which connects the suction device provided with a plurality of exhaust ports, at least one position the exhaust emissions from mouth, which was a quantity different from the other, for example if the user is right-handed, for holding the main body with the right hand, the exhaust amount of blown toward the user by reducing the exhaust gas from the main body left side reduced, it becomes possible to more clean and comfortable cleaning.

[0030]

Invention of claim 25, wherein the present invention is the invention according to any one of claims 1 to 24, comprising a suction device, a connecting portion for connecting the suction device and the body, wherein the suction device is It is composed from the connection pipe and the mouth portion, an electric vacuum cleaner in which the mouth portion and the connecting pipe is rotatably mounted, together with the mouthpiece portion is rotated 90 degrees in at least one of the left and right with respect to the connecting pipe , which was provided with a rotation regulating portion for regulating the rotation of the connecting pipe and the mouth portion in 90-degree increments, the suction device width by causing the suction device 90 degrees rotation is reduced, the normal state suction unit which is useful for cleaning the narrow gap than the lateral width. In addition, television when cleaning a low height clearance, such as such as under the base also, the suction device is rotated by 90 degrees, it is possible to clean it possible to submerge into the gap.

[0031]

Invention of claim 26, wherein the present invention is the invention as defined in claim 25 wherein, the rotation restricting portion, which was constituted by a leaf spring or a resin spring, the suction device used in the surface to be cleaned having a large frictional resistance to prevent the suction device would be rotated unexpectedly when are, still the user can check the suction device is facing in the right direction by clicking feeling, time and effort to adjust the rotational position while watching the like fit mark Habukeru.

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[0032]

invention of claim 27, wherein the present invention is the invention according to any one of claims 1 to 26, which was the input power of the electric blower and 200 ± 50 W, even the exhaust circulation type electric on it is possible to suppress heat generation by the blower low, it is possible to obtain a necessary and sufficient suction force. Further, the electric blower makes it possible to compact and can be lightweight.

[0033]

Invention of claim 28, wherein the present invention is the invention according to any one of claims 1 to 27, the exhaust from the electric blower leading to the suction device, the suction unit to the suction device lower surface end portions an exhaust hole for blowing exhaust gas directed towards the intake port is provided, a configuration for circulating a circulating amount of the exhaust gas which was a 20% to 40% of the total emissions from the electric blower, the exhaust gas blowing from the suction unit bottom surface without blowing off dust surface to be cleaned, also the dust collecting performance is good, further temperature rise of the electric blower also becomes possible to suppress moderately, it is possible to provide a high-performance vacuum cleaner with compact and lightweight Become.

[0034]

EXAMPLES (Example 1) Hereinafter, a first embodiment of the present invention will be described with reference to FIGS. 1-7.

[0035]

1 is a sectional view showing the internal configuration of the electric vacuum cleaner. Electric blower 2 for generating a negative pressure inside the main body 1 has been mounted, the intake side 3 of the electric blower 2 is attached dust chamber 5 having a dust-collecting filter 6. Further, dust chamber 5 and the connecting portion 7 are communicated with the intake passage 8, the dust sucked from the suction device 12 which is attached to the connecting unit 7 flows into the dust collecting chamber 5 through the internal suction passage 8. It is separated into the air component and dust component in the dust collection filter 6.

[0036]

Dust chamber 5 and the intake passage 8 is connected at the bottom of the dust collecting chamber 5, the air flow flowing into the dust chamber 5 from the intake passage 8, so that around the outer circumference of the dust collection filter 6, the dust collecting chamber intake passage 8 at substantially along form the inner surface wall shape of 5 is connected to the dust chamber 5. Thus, around the dust filter 6 and turning air including the dust, the dust is because it is pressed into the dust chamber 5 inside wall by centrifugal force, reducing the amount of dust adhering to the dust-collecting filter 6, the dust collecting it is possible to suppress the suction performance deterioration due to clogging of the filter 6.

[0037]

As shown in FIG. 3, the main body 1 and the electric blower 27, and a second portion of the dust collecting chamber portion 26. Buckle 34 to handle 24 near the front base of the electric blower unit 27 is attached, when holding the handle 24, and make it easier to manipulate the buckle 34 with the thumb. By pressing the buckle 34, the electric blower unit 27 and the dust-collecting chamber portion 26 is separated.

[0038]

Therefore, when discarding the dust deposited therein dust chamber 5, with only a removable dust collecting chamber 26 a dust collecting chamber 26 from the main body 1 goes into the trash, it is possible to take out the inside of the dust . in other words, it can be discarded without the need refuse to carry a heavy electric blower unit 27, effort of discarded waste is reduced.

[0039]

The outer periphery of the electric blower 2 and the cord reel 21 is provided, said structure by it becomes possible to effectively utilize the space in the outer periphery of the electric blower 2, it is possible to provide a compact vacuum cleaner there. In Figure 1, an exhaust 19 that is emitted from the electric blower 2, while being diverted by the cord reel 21, the pressure of the exhaust 19, the sealing member A40 is a soft body provided cord reel 21, the main body leakage from the exhaust passage 9 of the exhaust 19 can be prevented by abutting to one inner wall. Since the cord reel 21 is rotated during extraction and the winding of the cord, the drum unit is a code winding portion of the cord reel 21 is required to keep the inner wall and a non-contact state of the main body 1. Therefore, between the drum portion and the inner wall of the body 1 since the gap occurs, it is are you in the sealing material A40 around the drum portion of the cord reel 21.

[0040]

In Figure 2, between the cord reel 21 and the electric blower 2, a cover member 22 covering the

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electric blower 2 is attached, an exhaust 19 that is emitted from the electric blower 2 is diverted by the cover body 22 that. Urethane between the cover body 22 and the electric blower 2, are inserted is a member to increase the air resistance is the pressure loss material A28a, such as felt, the exhaust 19 exiting from the electric blower 2 once to pass this pressure loss material A28a vicinity , reduced wind noise wind speed is lowered, but also for even noise generated from the electric blower 2, this pressure drop material A28a is to serve the soundproofing material, it is possible to greatly reduce the noise level of the main body 1.

[0041]

Exhaust 19 that passes through the vicinity of pressure loss material A28a may give additional pressure loss in the rib A31 extending from the contour of the body 1 is dropped the wind speed, even pressure loss material B28b is a member to increase the air resistance is added. By the constitution, the wind speed of the exhaust 19 is sufficiently suppressed, reducing the noise of the main body 1. Moreover, the electric blower 2 around the electric blower unit 27, is a tight structure by the two parts of the dust collecting chamber 26, and the relatively brief because, in FIG. 2, between the inner wall of the body 1 of the cover body 22 in order to seal member B30 is provided, an exhaust 19 leaking from the tight section be added a large pressure loss is suppressed small. In other words, by advance over a large pressure loss in the electric blower 27, it becomes possible to reduce the pressure of the exhaust 19 in the dust collecting chamber portion 26 as the front passage of the exhaust 19, is complex tight surface construction, the intake passage 8 and the exhaust passage 9 is air leak is suppressed in the easy dust collecting chamber 26 occur air leak in close proximity, it is possible to reduce the loss of suction force.

[0042]

Dust collecting chamber 26, the dust collection chamber 5, the dust collection filter 6, the exhaust passage shell 32a, an exhaust passage shell B 32b, the exhaust connecting portion 33, an intake passage 8 is composed of a connecting portion 7, and the check valve 11 check valve 11 is mounted in a form sandwiching the connection portion of the intake passage 8 and the dust collecting chamber 5. Further, the exhaust connecting portion 33 is composed of a soft material, to connect the exhaust passage 9 of the electric blower 27 and the dust collecting chamber portion 26 is airtight to each other. Opening direction of the valve body of the check valve 11 flows into the dust chamber 5, so as not to interfere with the air flow swirling, and as never sucked dust is caught by the check valve 11, resulting airflow it has a configuration which is open in the direction. In addition, dust is deposited on the inside of the dust collection chamber 5, so that dust does not flow back into the intake passage 8 at the check valve 11 even when a load is applied to the check valve 11 is depressed into the intake passage 8 side, the inverse check valve 11 is open only to the dust chamber 5 side. And the outer intake passage 8, an exhaust passage shell 32a, an exhaust passage shell B 32b, and a space surrounded by the dust chamber 5 has an exhaust passage 9. Although exhaust connection 33 exhaust 19 and than to the exhaust passage 9, which is provided to the electric blower unit 27 flows, has a large pressure loss is added already in the internal electric blower unit 27, of the exhaust wind speed, it has been kept to a wind pressure both Therefore, the leakage of the exhaust 19 from the exhaust connection portion 33 is small. Further, the inside of the exhaust passage 9, by make multiple ribs B25 at positions shifted from each other, since the flow of exhaust 19 in a zigzag, it is possible to take the exhaust passage 9 long, quieter vacuum cleaner it can be made.

[0043]

Figure 3 shows a state of the blower used. Remove the dust collecting chamber portion 26, when using only the electric blower 27, since the exhaust 19 discharged from the exhaust connection portion 33, it is possible to help clean the blower blowing it. More specifically, and if you blow the entrance of sand dust, it is useful for blowing the pollen and dust that accumulated on the leaves of houseplants.

[0044]

Top of the electric blower 27, that is, in the vicinity of the electric blower 2 and a handle 24 is provided, the dust collecting chamber 26, fitted with a suction device 12, while holding the handle 24 by hand, that is, in use, the body 1 is tilted forward and the suction device 12 is adjusted gravity center position such that the surface to be cleaned and the horizontal, it is not necessary to apply a force to tilt the main body 1 during use, can be performed comfortably cleaning operation.

[0045]

The intake passage 8 and the exhaust passage 9, the connection portion 7 are aggregated, this portion has become a double cylindrical pipe, the space inside the pipe separated by the intake passage 8, the inner pipe and outer pipe it has become a exhaust passage 9. Similarly, the connecting pipe 14 of the suction device 12 also has become a double cylindrical pipe, as well inside the connection portion 7 intake passage 8, the outer has become exhaust passage 9.

[0046]

Suction device 12 includes a connection pipe 14, is made from the mouth portion 13. Connection pipe 14 is rotatably attached to mouthpiece portion 13, a normal position shown in FIG. 5, rotated 90 degrees from here to the left and right, it is possible to the state of FIG. Further, the rotation fixing mechanism is provided for fixing the rotation normal state, and left and right 90-degree rotation state

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shown in FIG. The suction device 12 even this by narrow place and where low TV under the base, such as height becomes easy cleaning by rotating 90 degrees.

[0047]

Further, in FIG. 5, the mouthpiece portion 13 the upper surface of the suction unit 12 has an exhaust port 17 is provided, the exhaust passage 9 from the main body 1, a part of the connecting portion 7, the connection exhaust 19 flows into suction port 13 through a pipe 14 but it is discharged to the outside from the exhaust port 17. As a result, it no longer would blow off the dust to be suck unexpectedly from now. In the present embodiment, the exhaust port 17 provided an exhaust 19 in the suction device 12, has been released to the side of the suction unit 12, upward or diagonally upward and forward of the exhaust 19 is suction unit 12 or the suction, an oblique upper side of the tool 12, or may be discharged rearward or obliquely on the rear of the suction unit 12. Further, in the exhaust opening 17 which plurality, emissions from at least one location of the exhaust port 17, by an amount different from the other, for example if the user is right-handed, for holding the main body 1 with the right hand, it reduces the amount of exhaust gas 19 blown toward the user by reducing the exhaust 19 from the left side of the main body 1, thereby enabling a more clean and comfortable cleaning.

[0048]

Further, as shown in FIG. 7, the remaining exhaust 19 which has not been discharged from the exhaust port 17 is blown out toward the suction port 15 from the exhaust hole 29 provided on the back surface end portions of the mouth portion 13. As a result, the blow off towards the dust on the surface to be cleaned to the intake port 15 by the force of the exhaust 19, the force of the exhaust 19 not only suction force also be used, if the compared precipitator performance for collecting dust in the suction only There is improved. However, when the entire exhaust gas 19 will be circulated to the intake port 15, because of the heat generated from the electric blower 2, the temperature of the electric blower 2 is increased, or the service life of the electric blower 2 is shortened, the main body 1 because there is a risk of thermal deformation, it is necessary to release a portion of the exhaust 19 from the exhaust port 17 to the outside together with heat, the circulating amount of exhaust gas 19 to be recycled to the electric blower 2, the total exhaust from the electric blower 2 it is 20 to 40% of the amount. Further, the input power of the electric blower by a 200 ± 50 W, on even the exhaust circulating it is possible to suppress the heat generation by the electric blower 2, it is possible to obtain a necessary and sufficient suction force.

[0049]

Further, transparent to the dust chamber 5, and uses a decorated with material having antistatic finish, since it is possible to visually confirm the volume of dust, waste time of the dust grasped easy, dust adheres to the dust collection filter 6, clogging state, ie it is no longer the suction force can continue to use remain dissatisfied with the suction force in a state of decline. In addition, to look how the dust inside to pivot at the time of the dust suction, are helped to be a fun cleaning by making the generally not fun cleaning work have a game of.

[0050]

In the present embodiment, although an example of a portable vacuum cleaner, without limitation thereto, an invention that is common to the vacuum cleaner in general such floor mobile vacuum cleaner.

[0051]

(Example 2) Hereinafter, a second embodiment of the present invention will be described with reference to FIG. The same components as the above embodiments, the same reference numerals, and a description thereof will be omitted.

[0052]

Exhaust 19 discharged from the electric blower 2, flows into the cord reel 21 rearward through the inside of the cord reel 21, and passes through the handle 24 inside which is provided substantially above the electric blower 2 to the front of the main body 1 flowing. Exhaust 19 that has flowed into the dust collecting chamber portion 26, the process proceeds to the connection portion 7 through the upper dust chamber 5. By substantially above the electric blower 2 is provided in the exhaust passage 9, when discarding the dust accumulated in the dust collecting chamber 5, can be utilized in the exhaust passage 9 as handle when the dust collecting chamber portion 26 carrying Become.

[0053]

(Example 3) Hereinafter, a third embodiment of the present invention will be described with reference to FIG. The same components as the above embodiments, the same reference numerals, and a description thereof will be omitted.

[0054]

The connecting portion 7 of the suction unit 12 has an exhaust port 17 is provided, in this embodiment, by which the exhaust port 17, eliminating that would blow off the dust to be suck suddenly now. Further,

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all of the exhaust 19 and thus is circulated into the intake port 15, because of the heat generated from the electric blower 2, the temperature of the electric blower 2 is increased, or the service life of the electric blower 2 is shortened, the main body 1 there because there is a risk of thermal deformation, it is necessary to release and a portion of the exhaust 19 through the exhaust port 17 to the outside together with heat. In the present embodiment, the exhaust port 17 provided an exhaust 19 in the connecting portion 7, has been released to the side of the connecting portion 7, the exhaust 19 to the upward or diagonally upward and forward of the connecting portion 7, or the connection an oblique upper side of the part 7, or may be discharged rearward or obliquely upward rearward of the connecting portion 7. Further, in the exhaust opening 17 which plurality, emissions from at least one location of the exhaust port 17, by an amount different from the other, for example if the user is right-handed, for holding the main body 1 with the right hand, it reduces the amount of exhaust gas 19 blown toward the user by reducing the exhaust 19 from the left side of the main body 1, thereby enabling a more clean and comfortable cleaning.

[0055]

(Example 4) Hereinafter, a fourth embodiment of the present invention will be described with reference to FIG. The same components as the above embodiments, the same reference numerals, and a description thereof will be omitted.

[0056]

And the formed front of the connecting portion 7 exhaust port 17 in the vicinity of the main body 1, a result, it is no longer that would blow off the dust to be suck unexpectedly from now. Further, all of the exhaust 19 and thus is circulated into the intake port 15, because of the heat generated from the electric blower 2, the temperature of the electric blower 2 is increased, or the service life of the electric blower 2 is shortened, the main body 1 there because there is a risk of thermal deformation, it is necessary to release and a portion of the exhaust 19 through the exhaust port 17 to the outside together with heat. In the present embodiment, the exhaust port 17 provided an exhaust 19 in front of the main body 1, has been released to the side of the main body 1, the exhaust 19 to the upward or diagonally upward and forward of the main body 1 or the main body 1, the diagonal upper direction, or it may be discharged rearward or obliquely upward and rearward of the main body 1. Further, in the exhaust opening 17 which plurality, emissions from at least one location of the exhaust port 17, by an amount different from the other, for example if the user is right-handed, for holding the main body 1 with the right hand, it reduces the amount of exhaust gas 19 blown toward the user by reducing the exhaust 19 from the left side of the main body 1, thereby enabling a more clean and comfortable cleaning.

[0057]

According to the present invention, it is capable of vacuum cleaner that does not emit exhaust from the main body behind, can occur in the body backward to be a blind spot in the vacuum cleaner use, of garbage by the exhaust blow off and ashtray it is possible to prevent a dance up ashes. Further, since the exhaust passage can be relatively long, it is possible to suppress the body noise. Further, a portion of the exhaust to reduce the absolute amount of the exhaust gas by circulating into the inside suction device as well as a clean vacuum cleaner, thereby enabling to improve the dust collecting performance by using the power of the exhaust gas.

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CLAIMS JP2001353110

1.

And the electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, with an intake passage communicating the suction unit and the dust collecting chamber, of the electric blower in vacuum cleaner placing the cord reel to the outer periphery, an electric vacuum cleaner which is configured to invert the exhaust of the electric blower by the cord reel.

2.

The soft body is provided in the cord reel, the pressure in the exhaust, vacuum cleaner according to claim 1 which is adapted to abut against the inner wall of the body.

3.

And the electric blower, and a dust collecting chamber which communicates with the intake side of the electric blower, and a suction device to suck the dust on the surface to be cleaned, with an intake passage communicating the suction unit and the dust collecting chamber, of the electric blower in vacuum cleaner placing the cord reel on the outer periphery, the electric blower cover body for covering the exhaust side of between the said and the electric blower cord reel installed, configured and for reversing the exhaust of the electric blower by the cover body electric vacuum cleaner.

4.

The vacuum cleaner according to any one of claims 1 to 3, wherein the recirculating at least a portion of the exhaust of the electric blower to the suction unit.

5.

An electric blower, electric vacuum cleaner of claim 3 or 4, wherein the insertion of the member to increase the air resistance between the cover body.

6.

And the cover body for covering the discharge side of the electric blower, vacuum cleaner according to any one of claims 3-5 in which a sealing member between the inner wall of the body.

7.

An electric blower, a dust collecting chamber communicating with the intake side of the electric blower, an electric vacuum cleaner having a suction device for sucking the dust on the surface to be cleaned, an intake passage communicating the suction unit and said dust collecting chamber the interior of the handle which is provided substantially above the electric blower as a passage for exhaust of said electric blower, electric vacuum cleaner at least a part of the exhaust was configured for recirculating to said suction unit.

8.

Body is composed of the dust collecting chamber portion having a free dust collecting chamber detachably attached to the electric blower unit and the electric blower unit having an electric blower, according to claim 1 in which the exhaust of the electric blower from the front of the electric blower portion are released the vacuum cleaner according to any one of to 7.

9.

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Ribs inside the exhaust passage of the electric blower unit, electric vacuum cleaner according to claim 8, wherein the addition of the pressure loss in the interior of the electric blower unit

[10]

10. The electrical vacuum cleaner according to claim 8 or 9, wherein providing the member to increase the air resistance inside the exhaust passage of the electric blower unit.

[11]

11.] In an exhaust passage for guiding the exhaust of the electric blower, a plurality of ribs extending from the inner wall sides of the exhaust passage, along the air flow direction of the exhaust and staggered position to each other, configured to exhaust gas flows in a zigzag the vacuum cleaner according to any one of claims 1 to 10 in which the.

[12]

12. The exhaust gas from an electric blower, together with leading to the suction device through an exhaust passage provided in the main body and configured to emit the at least a portion of the exhaust to the outside air from the exhaust port provided in the suction unit according the vacuum cleaner as claimed in any one of items 1-11.

[13]

13.] From the exhaust port provided in the suction device, the electric vacuum cleaner according to claim 12 which is configured to emit exhaust upwards or obliquely on the front of the suction unit.

[14]

14.] From the exhaust port provided in the suction device, the electric vacuum cleaner according to claim 12 which is configured to emit exhaust air from sideways or diagonally upper side of the suction unit.

[15]

15.] From the exhaust port provided in the suction device, the electric vacuum cleaner according to claim 12 which is configured to emit exhaust rearward or obliquely on the rear of the suction unit.

[16]

16. The plurality is provided together with an exhaust port to the suction device, the exhaust amount from the exhaust port of at least one place, the vacuum cleaner according to any one of claims 13 to 15 in which the other different amounts.

[17]

17.] From the exhaust port provided in the main body forward, vacuum cleaner according to any one of claims 1 to 16 exhaust was configured to release upwardly or obliquely on the front of the body.

[18]

18.] From the exhaust port provided in the main body forward, vacuum cleaner according to any one of claims 1 to 16 exhaust was configured to release into the lateral or oblique upper side of the body.

[19]

19.] From the exhaust port provided in the main body forward, vacuum cleaner according to any one of claims 1 to 16 in which the exhaust is configured to be discharged rearward or obliquely rearward of the main body.

[20]

20.] Provided with a plurality of exhaust ports to the body forwardly, the exhaust amount from the exhaust port of at least one place, the vacuum cleaner according to any one of claims 17 to 19 in which the other different amounts.

[21]

21. The body and from the suction device an exhaust port provided in the connecting portion for connecting the vacuum cleaner according to any one of claims 1 to 20 which is configured to emit exhaust upward or obliquely upward and forward of the connecting portion .

[22]

22. The body and from the suction device an exhaust port provided in the connecting portion for

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connecting the, the electric vacuum according to any one of claims 1 to 20 which is configured to be released into the lateral or oblique upper side of the connecting portion of the exhaust machine.

[23]

23. The body and from the suction device an exhaust port provided in the connecting portion for connecting the vacuum cleaner according to any one of claims 1 to 20 which is configured to emit exhaust rearward or obliquely rearward of the connecting portion.

[24]

24. The body and the suction device to the connecting portion for connecting together providing a plurality of exhaust ports, the exhaust amount from the exhaust port of at least one place, electricity according to any one of claims 21 to 23 which is an amount that differs from other Vacuum cleaner.

[25]

25. A] suction device, having a connecting portion for connecting the suction device and the body, wherein the suction device is composed of the connection pipe and the mouth portion, said connection electric vacuum the pipe and the mouth portion is mounted rotatably in the machine, claims the mouthpiece part along with the 90-degree rotation to at least one of the left and right with respect to the connection pipe, provided with a rotation regulating portion for regulating the rotation of the connecting pipe and the mouthpiece part in 90-degree increments the vacuum cleaner according to any one of 1-24.

[26]

26. The rotation restricting portion, the electric vacuum cleaner of claim 25, wherein you have a plate spring or a resin spring.

[27]

27. The electrical vacuum cleaner according to any one of claims 1 to 26 in which the input power of the electric blower and 200 ± 50W.

[28]

28. The exhaust from the electric blower leading to the suction device, the exhaust hole for blowing exhaust gas directed towards the suction port of the suction unit to the suction device lower face both end portions is provided, in a configuration for circulating, the circulating amount of the exhaust motor the vacuum cleaner according to any one of the preceding claims 1 to 27 which is 20 to 40% of the total emissions of the blower.

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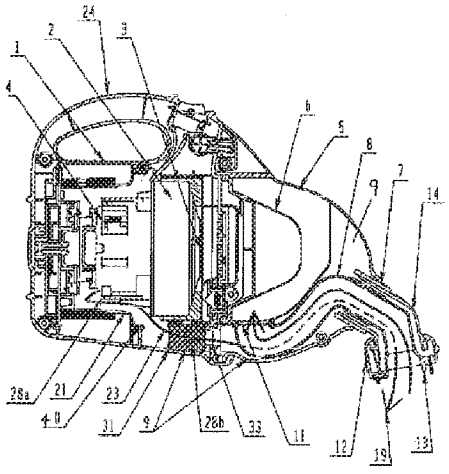
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最終頁に続く

(54)【発明の名称】　電気掃除機

(57)【要約】
【課題】　本発明は、使用者にとって死角となる本体後方から放出される排気によるゴミの吹飛ばしを無くし、使用性の高い電気掃除機を提供することを目的としている。
【解決手段】　電動送風機２と、前記電動送風機２の吸気側に連通する集塵室５と、被清掃面上の塵埃を吸い込む吸込具１２と、前記集塵室５と前記吸込具１２を連通する吸気通路８を備え、前記電動送風機２の外周にコードリール２１を載置した電気掃除機で、前記コードリール２１によって前記電動送風機２の排気１９を反転させる構成としたもので、本体１の後方からの排気１９を無くし、排気１９を本体１の前方へと導き、本体１の前方から排気１９を出すことで使用性の高い電気掃除機を提供できる。



1	本体	14	接続パイプ
2	電動送風機	19	排気
3	吸気側	21	コードリール
4	排気側	24	把手
5	集塵室	28a	圧損材A
6	集塵フィルタ	28b	圧損材B
7	接続部	30	シール材B
8	吸気通路	31	リブA
11	逆止弁	33	排気接続部
12	吸込具	40	シール材A
13	吸口部		

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【特許請求の範囲】

【請求項１】　電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備え、前記電動送風機の外周にコードリールを載置した電気掃除機で、前記コードリールによって前記電動送風機の排気を反転させる構成とした電気掃除機。

【請求項２】　コードリールに軟質体を設け、排気の圧力により、本体の内壁に当接するようにした請求項１記載の電気掃除機。

【請求項３】　電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備え、前記電動送風機の外周にコードリールを載置した電気掃除機で、前記電動送風機と前記コードリールの間に前記電動送風機の排気側を覆うカバー体を設け、前記カバー体によって前記電動送風機の排気を反転させる構成とした電気掃除機。

【請求項４】　電動送風機の排気の少なくとも一部を吸込具へ還流させる請求項１～３記載のいずれか１項に記載の電気掃除機。

【請求項５】　電動送風機と、カバー体の間に空気抵抗を増す部材を挿入した請求項３または４記載の電気掃除機。

【請求項６】　電動送風機の排気側を覆うカバー体と、本体の内壁との間にシール材を設けた請求項３～５のいずれか１項に記載の電気掃除機。

【請求項７】　電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備えた電気掃除機で、前記電動送風機の略上方に設けた把手の内部を前記電動送風機の排気の通路とし、前記排気の少なくとも一部を前記吸込具へ還流させる構成とした電気掃除機。

【請求項８】　本体が電動送風機を有する電動送風機部と前記電動送風機部に着脱自在で集塵室を有する集塵室部から構成され、前記電動送風機部の前方から前記電動送風機の排気が放出される請求項１～７のいずれか１項に記載の電気掃除機。

【請求項９】　電動送風機部の排気通路内部にリブを設け、前記電動送風機部の内部にて圧損を加えた請求項８記載の電気掃除機。

【請求項１０】　電動送風機部の排気通路内部に空気抵抗を増す部材を設けた請求項８または９記載の電気掃除機。

【請求項１１】　電動送風機の排気を導く排気通路内に、前記排気通路の内壁両側面より延びるリブを複数設け、前記排気の気流方向に沿って互いに位置をずらして配置し、排気がジグザグに流れるように構成した請求項１～１０のいずれか１項に記載の電気掃除機。

【請求項１２】　電動送風機からの排気を、本体内部に設けられた排気通路を通じて吸込具へと導くとともに、前記排気の少なくとも一部を前記吸込具に設けられた排気口より外気へと放出する構成とした請求項１～１１のいずれか１項に記載の電気掃除機。

【請求項１３】　吸込具に設けられた排気口より、排気を吸込具の上方または斜め上前方へと放出する構成とした請求項１２記載の電気掃除機。

【請求項１４】　吸込具に設けられた排気口より、排気を吸込具の側方または斜め上側方へと放出する構成とした請求項１２記載の電気掃除機。

【請求項１５】　吸込具に設けられた排気口より、排気を吸込具の後方または斜め上後方へと放出する構成とした請求項１２記載の電気掃除機。

【請求項１６】　吸込具に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量とした請求項１３～１５のいずれか１項に記載の電気掃除機。

【請求項１７】　本体前方に設けられた排気口より、排気を本体の上方または斜め上前方へと放出する構成とした請求項１～１６のいずれか１項に記載の電気掃除機。

【請求項１８】　本体前方に設けられた排気口より、排気を本体の側方または斜め上側方へと放出する構成とした請求項１～１６のいずれか１項に記載の電気掃除機。

【請求項１９】　本体前方に設けられた排気口より、排気を本体の後方または斜め後方へと放出する構成とした請求項１～１６のいずれか１項に記載の電気掃除機。

【請求項２０】　本体前方に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量とした請求項１７～１９のいずれか１項に記載の電気掃除機。

【請求項２１】　本体と吸込具を接続する接続部に設けた排気口より、排気を接続部の上方または斜め上前方へと放出する構成とした請求項１～２０のいずれか１項に記載の電気掃除機。

【請求項２２】　本体と吸込具を接続する接続部に設けた排気口より、排気を接続部の側方または斜め上側方へと放出する構成とした請求項１～２０のいずれか１項に記載の電気掃除機。

【請求項２３】　本体と吸込具を接続する接続部に設けた排気口より、排気を接続部の後方または斜め後方へと放出する構成とした請求項１～２０のいずれか１項に記載の電気掃除機。

【請求項２４】　本体と吸込具を接続する接続部に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量とした請求項２１～２３のいずれか１項に記載の電気掃除機。

【請求項２５】　吸込具と、前記吸込具と本体を接続する接続部を有し、前記吸込具は吸口部と接続パイプから構成され、前記接続パイプと前記吸口部が回動自在に取

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り付けられている電気掃除機で、前記吸口部が前記接続パイプに対して左右の少なくとも一方に９０度回転するとともに、９０度単位で前記吸口部と前記接続パイプの回動を規制する回動規制部を設けた請求項１～２４のいずれか１項に記載の電気掃除機。

【請求項２６】　回動規制部を、板ばねあるいは樹脂ばねで構成した請求項２５記載の電気掃除機。

【請求項２７】　電動送風機の入力電力を２００±５０Ｗとした請求項１～２６のいずれか１項に記載の電気掃除機。

【請求項２８】　電動送風機からの排気を吸込具に導き、前記吸込具下面両端部に前記吸込具の吸気口へと向けて排気を吹き出す排気穴を設け、循環させる構成で、前記排気の循環量を前記電動送風機の総排気量の２０～４０％とした前記請求項１～２７のいずれか１項に記載の電気掃除機。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、電気掃除機の全体構造に関するものである。

【０００２】

【従来の技術】従来の電気掃除機を図１１を用いて説明する。従来は、電動送風機２の前方に集塵室５、前記集塵室の前方に吸込具１２を取付ける接続部７が設けられており、被清掃面上の塵埃は吸込具１２の吸気口（図示ぜず）より外気と共に吸引され、接続部７を通じて集塵室５へと流入し、集塵室５内部に設けられた紙袋フィルタ６で塵埃と外気を分別し、外気は電動送風機２後方へと排気となって吹き出される。電動送風機２周囲にはコードリール２１が載置されており、電動送風機２からの排気１９はコードリール部２１を貫通し、コードリール２１のさらに後方に設けられた排気口１７より排気１９を外部へと放出する構成を成していた。

【０００３】

【発明が解決しようとする課題】しかしながら、上記従来の構成では、使用時に目の届かない本体１後方から排気１９が吹き出すため、予期しない場所へと排気１９が吹き付けられ、塵埃を吹き散らしてしまうことがある。例えば、携帯型掃除機で掃除をしている人が、後方にいる人の顔へと排気１９を吹き付けてしまったり、テーブル上の灰皿の灰を排気１９で舞い上げてしまうといったことが起こりうる。特に近年、掃除機の吸引力の増加に伴い、排気１９の風圧も強くなってきており、排気１９が与える悪影響は無視できなくなってきている。

【０００４】本発明は、上記従来の課題を解決するもので、本体の後方からの排気を無くし、排気を本体の前方へと導き、本体の前方から排気を出すことで、使用性の高い電気掃除機を提供することを目的としている。

【０００５】

【課題を解決するための手段】上記目的を達成するために本発明は、電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備え、前記電動送風機の外周にコードリールを載置した電気掃除機で、前記コードリールによって前記電動送風機の排気を反転させる構成としたもので、本体の後方からの排気を無くし、排気を本体の前方へと導き、本体の前方から排気を出すことで使用性の高い電気掃除機を提供できる。

【０００６】

【発明の実施の形態】本発明の請求項１記載の発明は、電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備え、前記電動送風機の外周にコードリールを載置した電気掃除機で、前記コードリールによって前記電動送風機の排気を反転させる構成としたもので、本体後方から排気を出さない電気掃除機の構成が容易となり、使用者にとって死角となる後方に置かれた灰皿の灰等の塵埃を排気で巻き上げることがなくなる。また、排気が迂回する構成とすることで、騒音値を下げることも可能となる。

【０００７】本発明の請求項２記載の発明は、上記請求項１記載の発明において、コードリールに軟質体を設け、排気の圧力により、本体の内壁に当接するようにしたもので、排気の外気への漏れを防止するものである。

【０００８】本発明の請求項３記載の発明は、電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備え、前記電動送風機の外周にコードリールを載置した電気掃除機で、前記電動送風機と前記コードリールの間に前記電動送風機の排気側を覆うカバー体を設け、前記カバー体によって前記電動送風機の排気を反転させる構成としたもので、本体後方から排気を出さない電気掃除機の構成が容易となり、使用者にとって死角となる後方に置かれた灰皿の灰等の塵埃を排気で巻き上げることがなくなる。また、排気が迂回する構成とすることで、騒音値を下げることも可能となる。さらに、排気の外気への漏れを防止するものである。

【０００９】本発明の請求項４記載の発明は、上記請求項１～３記載のいずれか１項に記載の発明において、電動送風機の排気の少なくとも一部を吸込具へ還流させるもので、吸込具へ還流された排気により、被清掃面の塵埃を掻き上げる効果により集塵性能を向上させるものである。

【００１０】本発明の請求項５記載の発明は、上記請求項３または４記載の発明において、電動送風機と、前記電動送風機の排気側を覆うカバー体の間に空気抵抗を増す部材を挿入したもので、空気抵抗を増す部材によって電動送風機から放出される排気の風速、風圧が減少し、

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風切音が低下する。また、電動送風機の周囲を空気抵抗を増す部材で覆うため、電動送風機から生ずる回転音も押え込むことが可能となり、製品本体の騒音値を大きく下げることが可能となる。

【００１１】本発明の請求項６記載の発明は、上記請求項３～５のいずれか１項に記載の発明において、電動送風機の排気側を覆うカバー体と、本体の内壁との間にシール材を設けたもので、前記電動送風機より後方へ排気がリークしないように前記シール材でエアタイトをすることで、コードリール出口から漏れる排気を大きく低減させることが可能であり、より清潔感のある電気掃除機を提供することが可能となる。

【００１２】本発明の請求項７記載の発明は、電動送風機と、前記電動送風機の吸気側に連通する集塵室と、被清掃面上の塵埃を吸い込む吸込具と、前記集塵室と前記吸込具を連通する吸気通路を備えた電気掃除機で、前記電動送風機の略上方に設けた把手の内部を前記電動送風機の排気の通路とし、前記排気の少なくとも一部を前記吸込具へ還流させる構成としたもので、把手内部を排気通路として使用するため、電動送風機周囲に排気通路を設ける必要がなくなり、小型の掃除機が提供可能となる。

【００１３】本発明の請求項８記載の発明は、上記請求項１～７のいずれか１項に記載の発明において、本体が電動送風機を有する電動送風機部と前記電動送風機部に着脱自在で集塵室を有する集塵室部から構成され、前記電動送風機部の前方から前記電動送風機の排気が放出されるもので、前記集塵室部を前記電動送風機部より取り外した状態で、前記電動送風機部側の排気通路より放出される排気をブロアとして使用するもので、今まで掃除が困難であった奥まった部分や玄関先の掃除が容易となる。また、観葉植物の葉に降り積もった埃や花粉などを、植物を傷めることなく行える。さらに、天井付近などの手の届かない部分の掃除も可能となる。

【００１４】本発明の請求項９記載の発明は、上記請求項８記載の発明において、電動送風機部の排気通路内部にリブを設け、前記電動送風機部の内部にて圧損を加えたもので、排気タイト構成が比較的簡潔でタイト効果の大きい電動送風機部で圧損を加えておくことで本体全体としての排気漏れを小さく抑えることが可能であり、これにより排気速が抑えられ、本体騒音値を小さくすることが可能となる。

【００１５】本発明の請求項１０記載の発明は、上記請求項８または９記載の発明において、電動送風機部の排気通路内部に空気抵抗を増す部材を設けて排気量を減少させたもので、排気タイト構成が比較的簡潔でタイト効果の大きい電動送風機部で圧損を加えておくことで本体全体としての排気漏れを小さく抑えることが可能であり、これにより排気速が抑えられ、また、圧損材により吸音効果も得られるため、本体騒音値を小さくすることが可能となる。

【００１６】本発明の請求項１１記載の発明は、上記請求項１～１０のいずれか１項に記載の発明において、電動送風機の排気を導く排気通路内に、前記排気通路の内壁両側面より延びるリブを複数設け、前記排気の気流方向に沿って互いに位置をずらして配置し、排気がジグザグに流れるように構成したもので、排気通路が延長されるため、排気に含まれる電動送風機から生じる騒音が減衰し、製品の騒音値を低くすることが可能となる。

【００１７】本発明の請求項１２記載の発明は、上記請求項１～１１のいずれか１項に記載の発明において、電動送風機からの排気を、本体内部に設けられた排気通路を通じて吸込具へと導くとともに、前記排気の少なくとも一部を前記吸込具に設けられた排気口より外気へと放出する構成としたもので、本体後方から排気を出さない電気掃除機の構成が容易となり、使用者にとって死角となる後方に置かれた灰皿の灰等の塵埃を排気で巻き上げることがなくなる。また、排気通路が長くなるため、排気に含まれる電動送風機から生じる騒音を減衰させ、より静かな電気掃除機を提供することが可能となる。

【００１８】本発明の請求項１３記載の発明は、上記請求項１２記載の発明において、吸込具に設けられた排気口により、排気を吸込具の上方または斜め上前方へと放出する構成としたもので、吸込具上部より放出される排気が使用者の顔に吹きかかることがなく、快適な掃除が可能となる。

【００１９】本発明の請求項１４記載の発明は、上記請求項１２記載の発明において、吸込具に設けられた排気口により、排気を吸込具の側方または斜め上側方へと放出する構成としたもので、吸込具と被清掃面との角度が傾いても、排気と床面のなす角度が小さくなりすぎることがなく、床面上の塵埃を排気によって吹飛ばすことがない。

【００２０】本発明の請求項１５記載の発明は、上記請求項１２記載の発明において、吸込具に設けられた排気口により、排気を吸込具の後方または斜め上後方へと放出する構成としたもので、吸込具前方に位置し、これから吸引しようとしている塵埃を排気によって吹飛ばす恐れがない。

【００２１】本発明の請求項１６記載の発明は、上記請求項１３～１５のいずれか１項に記載の発明において、吸込具に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量としたもので、例えば使用者が右利きの場合、本体を右手で保持するため、吸込具左側からの排気を減らすことにより使用者側に吹き出る排気量が減り、より清潔で快適な掃除が可能となる。

【００２２】本発明の請求項１７記載の発明は、上記請求項１～１６のいずれか１項に記載の発明において、本体前方に設けられた排気口より、排気を本体の上方また

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は斜め上前方へと放出する構成としたもので、本体前方より放出される排気が、本体の後方に位置する使用者の顔面に吹きかかることがなく、またこの排気によって被清掃面上の塵埃を吹飛ばすこともない。

【００２３】本発明の請求項１８記載の発明は、上記請求項１～１６のいずれか１項に記載の発明において、本体前方に設けられた排気口より、排気を本体前方の側方または斜め上側方へと放出する構成としたもので、本体を前後に大きく傾けて使用しても、使用中に床面上の塵埃を排気によって吹飛ばすことがなくなる。

【００２４】本発明の請求項１９記載の発明は、上記請求項１～１６のいずれか１項に記載の発明において、本体前方に設けられた排気口より、排気を本体前方の後方または斜め後方へと放出する構成としたもので、吸込具前方に位置しこれから吸引しようとしている塵埃を排気によって吹飛ばす恐れがない。

【００２５】本発明の請求項２０記載の発明は、上記請求項１７～１９のいずれか１項に記載の発明において、本体前方に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量としたもので、例えば使用者が右利きの場合、本体を右手で保持するため、本体左側からの排気を減らすことにより使用者側に吹き出る排気量が減り、より清潔で快適な掃除が可能となる。

【００２６】本発明の請求項２１記載の発明は、上記請求項１～２０のいずれか１項に記載の発明において、本体と吸込具を接続する接続部に設けられた排気口より、排気を接続部の上方または斜め上前方へと放出する構成としたもので、接続部より放出される排気が、本体の後方に位置する使用者の顔面に吹きかかることがなく、またこの排気によって被清掃面上の塵埃を吹飛ばすこともない。

【００２７】本発明の請求項２２記載の発明は、上記請求項１～２０のいずれか１項に記載の発明において、本体と吸込具を接続する接続部に設けられた排気口より、排気を接続部の側方または斜め上側方へと放出する構成としたもので、本体を前後に大きく傾けて使用しても、使用中に床面上の塵埃を排気によって吹飛ばすことがなくなる。

【００２８】本発明の請求項２３記載の発明は、上記請求項１～２０のいずれか１項に記載の発明において、本体と吸込具を接続する接続部に設けられた排気口より、排気を接続部の後方または斜め後方へと放出する構成としたもので、吸込具前方に位置しこれから吸引しようとしている塵埃を排気によって吹飛ばす恐れがない。

【００２９】本発明の請求項２４記載の発明は、上記請求項２１～２３のいずれか１項に記載の発明において、本体と吸込具を接続する接続部に排気口を複数設けるとともに、少なくとも１箇所の排気口からの排気量が、他と異なる量としたもので、例えば使用者が右利きの場合、本体を右手で保持するため、本体左側からの排気を減らすことにより使用者側に吹き出る排気量が減り、より清潔で快適な掃除が可能となる。

【００３０】本発明の請求項２５記載の発明は、上記請求項１～２４のいずれか１項に記載の発明において、吸込具と、前記吸込具と本体を接続する接続部を有し、前記吸込具は吸口部と接続パイプから構成され、前記接続パイプと前記吸口部が回動自在に取り付けられている電気掃除機で、前記吸口部が前記接続パイプに対して左右の少なくとも一方に９０度回転するとともに、９０度単位で前記吸口部と前記接続パイプの回動を規制する回動規制部を設けたもので、吸込具を９０度回動させることで吸込具横幅が小さくなり、通常状態の吸込具横幅よりも狭い隙間を掃除する際に便利である。また、テレビ台の下などの様な高さの低い隙間を掃除する際にも、吸込具を９０度回転させ、隙間に潜り込ませることで掃除が可能となる。

【００３１】本発明の請求項２６記載の発明は、上記請求項２５記載の発明において、回動規制部を、板ばねあるいは樹脂ばねで構成したもので、吸込具を摩擦抵抗の大きい被清掃面で使用している時に吸込具が不意に回動してしまうのを防止し、さらに使用者がクリック感によって吸込具が正しい方向を向いているか確認でき、合いマークなどを見ながら回動位置を合せる手間が省ける。

【００３２】本発明の請求項２７記載の発明は、上記請求項１～２６のいずれか１項に記載の発明において、電動送風機の入力電力を２００±５０Ｗとしたもので、排気循環式であっても電動送風機による発熱を低く抑えることが可能である上に、必要充分な吸い込み力を得ることが可能となる。さらに、電動送風機を小型にすることが可能となり、軽量化が可能である。

【００３３】本発明の請求項２８記載の発明は、上記請求項１～２７のいずれか１項に記載の発明において、電動送風機からの排気を吸込具に導き、前記吸込具下面両端部に前記吸込具の吸気口へと向けて排気を吹き出す排気穴を設け、循環させる構成で、前記排気の循環量を前記電動送風機からの総排気量の２０～４０％としたもので、吸込具下面より吹き出す排気によって被清掃面の塵埃を吹飛ばすこともなく、また集塵性能も良く、さらに電動送風機の温度上昇も適度に抑えることが可能となり、小型軽量で高性能な電気掃除機を提供することが可能となる。

【００３４】

【実施例】（実施例１）以下、本発明の第１の実施例について、図１～７を用いて説明する。

【００３５】図１は電気掃除機の内部構成を示す断面図である。本体１の内部に負圧を発生させる電動送風機２が搭載されており、前記電動送風機２の吸気側３には集塵フィルタ６を有する集塵室５が取り付けられている。また、集塵室５と接続部７は吸気通路８にて連通されて

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おり、接続部7に取り付けられる吸込具１２より吸引された塵埃が吸気通路８内部を通じて集塵室５へと流入し、集塵フィルタ６にて空気成分と塵埃成分に分離される。

【００３６】集塵室５と吸気通路８は、集塵室５の下部にて接続され、吸気通路８より集塵室５へと流入する気流が、集塵フィルタ６の外周を周回するよう、集塵室５の内面壁形状にほぼ沿った形で吸気通路８は集塵室５に接続されている。これにより、集塵フィルタ６の回りを塵埃を含んだ空気が旋回し、塵埃は遠心力により集塵室５内壁へと押し付けられるため、集塵フィルタ６へと付着する塵埃量を減らし、集塵フィルタ６の目詰まりによる吸引性能劣化を抑制することが可能となっている。

【００３７】図３にも示すように、本体１は電動送風機部２７と、集塵室部２６の２部分で構成されている。電動送風機部２７の把手２４前方根元付近に尾錠３４が取り付けられており、把手２４を握った時、親指で前記尾錠３４を操作しやすくしている。前記尾錠３４を押すことで、電動送風機部２７と集塵室部２６が分離する。

【００３８】したがって、集塵室５内部に堆積した塵埃を廃棄する際に、本体１から集塵室部２６を取り外し集塵室部２６のみを持ってゴミ箱へ行き、内部の塵埃を取り出すことが可能となる。つまり、重い電動送風機部２７を持ち歩く必要なくゴミ捨てが可能であり、ゴミ捨ての労力が軽減される。

【００３９】電動送風機２の外周にはコードリール２１が設けられており、前記構成により電動送風機２の外周のスペースを有効に利用することが可能となり、コンパクトな電気掃除機を提供することが可能となっている。図１においては、電動送風機２より放出された排気１９は、前記コードリール２１によって方向転換されるとともに、排気１９の圧力により、コードリール２１に設けられた軟質体であるシール材Ａ４０が、本体１の内壁に当接することで排気１９の排気通路９からの漏れを防止できる。コードリール２１はコードの引出及び巻取り時には回転するので、コードリール２１のコード巻取り部分であるドラム部は本体１の内壁と非接触状態としておく必要がある。そのため、ドラム部と本体１の内壁との間には隙間が発生するので、コードリール２１のドラム部の周囲にシール材Ａ４０をはしているのである。

【００４０】図２においては、コードリール２１と電動送風機２との間に、電動送風機２を覆うカバー体２２が取り付けられており、電動送風機２より放出された排気１９は、前記カバー体２２によって方向転換される。カバー体２２と電動送風機２の間にはウレタン、フェルトなどの空気抵抗を増す部材である圧損材Ａ２８ａが挿入されており、電動送風機２から出る排気１９は一度この圧損材Ａ２８ａ近傍を通過するため、風速が下がり風切り音が減少し、また電動送風機２から生じる騒音についても、この圧損材Ａ２８ａが防音材の役割を果たすため、本体１の騒音値を大幅に抑制可能となる。

【００４１】圧損材Ａ２８ａ近傍を通過した排気１９は、本体１の外郭から延びるリブＡ３１にてさらなる圧損を得、加えて空気抵抗を増す部材である圧損材Ｂ２８ｂでも風速を落とされる。前記構成により、排気１９の風速が充分に抑制され、本体１の騒音を低下させる。しかも、電動送風機２周辺は電動送風機部２７と、集塵室部２６の２部品によるタイト構造であり、比較的簡潔なためと、図２においては、本体１の内壁と前記カバー体２２の間にはシール材Ｂ３０が設けられているため、大きな圧損を加えてもタイト部から洩れる排気１９が少なく抑えられる。つまり、電動送風機部２７であらかじめ大きな圧損をかけておくことで、排気１９の前方通路となる集塵室部２６での排気１９の圧力を下げることとなり、タイト面構成が複雑で、吸気通路８と排気通路９が近接しエアリークが起り易い集塵室部２６でのエアリークが抑えられ、吸込力のロスを削減できる。

【００４２】集塵室部２６は、集塵室５、集塵フィルタ６、排気通路外郭Ａ３２ａ、排気通路外郭Ｂ３２ｂ、排気接続部３３、吸気通路8、接続部7、および逆止弁１１で構成されており、吸気通路８と集塵室５の接続部分に挟み込む形態で逆止弁１１が取り付けられている。また、排気接続部３３は軟質体で構成されており、電動送風機部２７と集塵室部２６の排気通路９を互いにエアタイトして接続する。逆止弁１１の弁体の開口方向は、集塵室５へ流入し、旋回する気流を妨げることのないよう、また吸引した塵埃が前記逆止弁１１に引っかかることのないように、生じる気流方向に開口する構成となっている。また、集塵室５の内部に塵埃が堆積し、逆止弁１１に荷重が加わっても前記逆止弁１１が吸気通路８側に落ち込んで塵埃が吸気通路８へと逆流しないよう、前記逆止弁１１は集塵室５側のみに開口する。吸気通路８外周と、排気通路外郭Ａ３２ａ、排気通路外郭Ｂ３２ｂ、および集塵室５で囲まれた空間が排気通路９となっている。電動送風機部２７に設けられた排気接続部３３より排気通路９へと排気１９が流入するが、電動送風機部２７内部で大きな圧損がすでに加えられており、排気の風速、風圧ともに抑えられているため、排気接続部３３からの排気１９の漏れは少ない。また、排気通路９の内部に、互いにずらした位置にリブＢ２５を複数立てることで、排気１９の流れをジグザグにし、排気通路９を長く取ることが可能となるため、より静かな電気掃除機にすることが可能となる。

【００４３】図３はブロア使用の状態を示している。集塵室部２６を取り外し、電動送風機部２７のみを使用した場合、排気接続部３３から排気１９が吹き出すため、これを吹き付けブロアとして掃除に役立てることが可能となる。具体的には玄関の砂ゴミを吹飛ばす場合や、観葉植物の葉に積もった花粉やほこりを吹飛ばすのに便利である。

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【００４４】電動送風機部２７の上部、つまり電動送風機２の付近には把手２４が設けられており、集塵室部２６、吸込具１２を取り付け、把手２４を手で持った状態、すなわち使用状態において、本体１が前傾し吸込具１２が被清掃面と水平になるように重心位置が調整されており、使用時に本体１を傾ける力を加える必要はなく、快適に掃除作業が行なえる。

【００４５】接続部７では吸気通路８と排気通路９が集約されるが、この部分は２重円筒パイプになっており、内側のパイプが吸気通路８、内側のパイプと外側のパイプで区切られた空間が排気通路９となっている。同様に、吸込具１２の接続パイプ１４も２重円筒パイプになっており、接続部７と同じく内側が吸気通路８、外側が排気通路９となっている。

【００４６】吸込具１２は、接続パイプ１４と、吸口部１３から成っている。接続パイプ１４は吸口部１３に回動自在に取り付けられており、図５に示す位置を通常として、ここから左右に９０度回転し、図６の状態にすることが可能となっている。また、通常状態、および図６に示す左右９０度回転状態で回転を固定する回転固定機構が設けられている。これにより狭いところやテレビ台の下など高さの低いところでも吸込具１２を９０度回転させることで掃除が容易となる。

【００４７】また、図５において、吸込具１２の吸口部１３上面に排気口１７を設けており、本体１から排気通路９、接続部７、接続パイプ１４を通じて吸口部１３へと流入した排気１９の一部が、前記排気口１７から外部へと放出される。これにより、不意にこれから吸い込もうとする塵埃を吹飛ばしてしまうことがなくなる。本実施例においては、排気１９が吸込具１２に設けられた排気口１７より、吸込具１２の側方に放出されているが、排気１９は吸込具１２の上方または斜め上前方へ、あるいは吸込具１２の斜め上側方へ、あるいは吸込具１２の後方または斜め上後方へと放出されていてもかまわない。また、複数設けた排気口１７において、少なくとも１箇所の排気口１７からの排気量が、他と異なる量とすることで、例えば使用者が右利きの場合、本体１を右手で保持するため、本体１の左側からの排気１９を減らすことにより使用者側に吹き出る排気１９の量が減り、より清潔で快適な掃除が可能となる。

【００４８】また、図７に示すように、排気口１７から放出されなかった残りの排気１９は、吸口部１３の裏面両端部に設けられた排気穴２９より吸気口１５へ向けて吹き出される。これにより、排気１９の力で被清掃面上の塵埃を吸気口１５に向けて吹飛ばし、吸引力のみでなく排気１９の力も利用することで、吸引のみで集塵する場合と比べ集塵性能が向上する。但し、排気１９の全てを吸気口１５へと循環させてしまうと、電動送風機２から生ずる熱のため、電動送風機２の温度が上昇し、電動送風機２の耐久寿命が短くなったり、本体１が熱変形する恐れがあるため、一部の排気１９を排気口１７から熱と共に外部へと放出する必要があり、電動送風機２へ循環させる排気１９の循環量は、前記電動送風機２からの総排気量の２０～４０％としている。また、電動送風機の入力電力を２００±５０Ｗとすることで、排気循環式であっても電動送風機２による発熱を低く抑えることが可能である上に、必要充分な吸い込み力を得ることができる。

【００４９】また、集塵室５には透明で、かつ帯電防止加工の施された材質を用いており、塵埃の体積量を目視で確認する事が可能となっているため、塵埃の廃棄時期が把握し易く、塵埃が集塵フィルタ６へと付着し、目詰まりした状態、すなわち吸引力が低下した状態で吸引力に不満を抱えたまま使用しつづけることがなくなる。また、塵埃吸引時に内部で塵埃が旋回する様子が見えるため、一般に楽しいものではない掃除作業に遊戯性を持たせることで楽しく掃除をすることに一役買っている。

【００５０】本実施例では、携帯型掃除機の例を挙げているが、これに限定することなく、床移動型掃除機等の掃除機全般に共通する発明である。

【００５１】（実施例２）以下、本発明の第２の実施例について、図８を用いて説明する。なお、上記実施例と同一構成部品については、同一符号を付し、その説明は省略する。

【００５２】電動送風機２から排出された排気１９は、コードリール２１の内部を通過してコードリール２１後方へと流れ、電動送風機２の略上方に設けた把手２４内部を通過して本体１の前方へと流れる。集塵室部２６へと流れ込んだ排気１９は、集塵室５の上側を通じて接続部７へと進む。電動送風機２の略上方に排気通路９を設けることで、集塵室５に蓄積した塵埃を廃棄する際の、集塵室部２６運搬時の持ち手として排気通路９を利用することが可能となる。

【００５３】（実施例３）以下、本発明の第３の実施例について、図９を用いて説明する。なお、上記実施例と同一構成部品については、同一符号を付し、その説明は省略する。

【００５４】吸込具１２の接続部７に排気口１７を設けており、本実施例においては、前記排気口１７をこれにより、不意にこれから吸い込もうとする塵埃を吹飛ばしてしまうことがなくなる。また、排気１９の全てを、吸気口１５へと循環させてしまうと、電動送風機２から生ずる熱のため、電動送風機２の温度が上昇し、電動送風機２の耐久寿命が短くなったり、本体１が熱変形する恐れがあるため、一部の排気１９を排気口１７から熱と共に外部へと放出する必要がある。本実施例においては、排気１９が接続部７に設けられた排気口１７より、接続部７の側方に放出されているが、排気１９は接続部７の上方または斜め上前方へ、あるいは接続部７の斜め上側方へ、あるいは接続部７の後方または斜め上後方へと放

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出されていてもかまわない。また、複数設けた排気口１７において、少なくとも１箇所の排気口１７からの排気量が、他と異なる量とすることで、例えば使用者が右利きの場合、本体１を右手で保持するため、本体１の左側からの排気１９を減らすことにより使用者側に吹き出る排気１９の量が減り、より清潔で快適な掃除が可能となる。

【００５５】（実施例４）以下、本発明の第４の実施例について、図１０を用いて説明する。なお、上記実施例と同一構成部品については、同一符号を付し、その説明は省略する。

【００５６】本体１の前方の接続部７近傍に排気口１７を設けており、これにより、不意にこれから吸い込もうとする塵埃を吹飛ばしてしまうことがなくなる。また、排気１９の全てを、吸気口１５へと循環させてしまうと、電動送風機２から生ずる熱のため、電動送風機２の温度が上昇し、電動送風機２の耐久寿命が短くなったり、本体１が熱変形する恐れがあるため、一部の排気１９を排気口１７から熱と共に外部へと放出する必要がある。本実施例においては、排気１９が本体１の前方に設けられた排気口１７より、本体１の側方に放出されているが、排気１９は本体１の上方または斜め上前方へ、あるいは本体１の斜め上側方へ、あるいは本体１の後方または斜め上後方へと放出されていてもかまわない。また、複数設けた排気口１７において、少なくとも１箇所の排気口１７からの排気量が、他と異なる量とすることで、例えば使用者が右利きの場合、本体１を右手で保持するため、本体１の左側からの排気１９を減らすことにより使用者側に吹き出る排気１９の量が減り、より清潔で快適な掃除が可能となる。

【００５７】

【発明の効果】本発明によれば、本体後方から排気を出さない電気掃除機が可能であり、電気掃除機使用中に盲点となる本体後方で起こり得る、排気によるゴミの吹飛ばしや灰皿の灰の舞い上げなどを防止することが可能である。また、排気通路を相対的に長くできるので、本体騒音を抑えることが可能である。さらに、排気の一部を吸込具内部へと循環することで排気の絶対量を減少させ、清潔な電気掃除機とするとともに、排気の力を利用して集塵性能の向上を可能としている。

【図面の簡単な説明】

【図１】本発明の第１の実施例を示す電気掃除機の全体断面図

【図２】同他の実施例を示す電気掃除機の全体断面図

【図３】同電気掃除機の分解断面図

【図４】同電気掃除機の一部破断下面図

【図５】同電気掃除機の前方部の斜視図

【図６】同電気掃除機の他の前方部の斜視図

【図７】同電気掃除機の吸込具の一部破断斜視図

【図８】本発明の第２の実施例を示す電気掃除機の全体断面図

【図９】本発明の第２の実施例を示す電気掃除機の前方部の斜視図

【図１０】本発明の第３の実施例を示す電気掃除機の前方部の斜視図

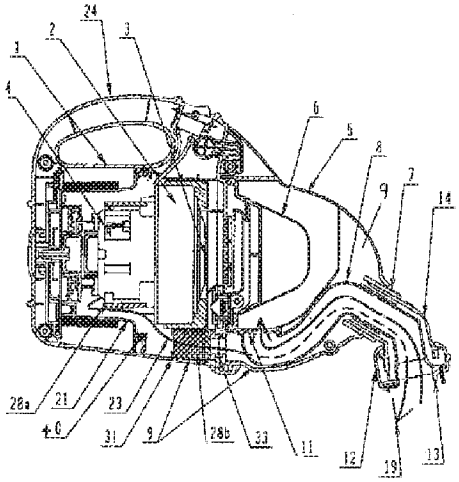
【図１１】従来の電気掃除機の全体断面図

【符号の説明】

１　本体
２　電動送風機
３　吸気側
５　集塵室
７　接続部
８　吸気通路
９　排気通路
１２　吸込具
１３　吸口部
１４　接続パイプ
１５　吸気口
１７　排気口
１９　排気
２１　コードリール
２２　カバー体
２４　把手
２５　リブＢ
２６　集塵室部
２７　電動送風機部
２８ａ　圧損材Ａ
２８ｂ　圧損材Ｂ
２９　排気穴
３０　シール材Ｂ
３１　リブＡ
３３　排気接続部
４０　シール材Ａ

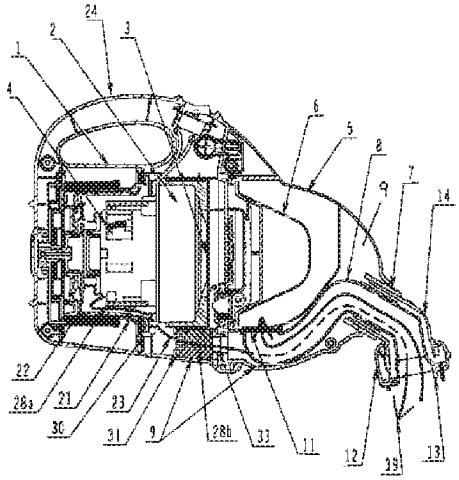
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【図1】



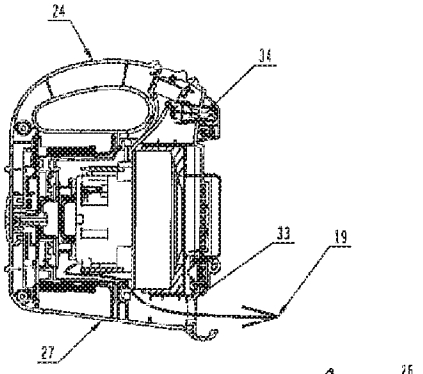
1 本体
2 電動送風機
3 吸気側
4 排気側
5 集塵室
6 集塵フィルタ
7 接続部
8 吸気通路
11 逆止弁
12 吸込具
13 吸口部
14 接続パイプ
19 排気
21 コードリール
24 把手
28a 圧損材A
28b 圧損材B
30 シール材B
31 リブA
33 排気接続部
40 シール材A

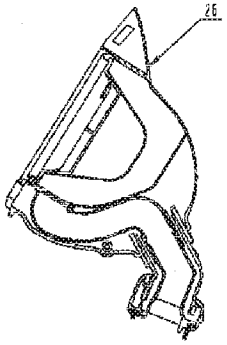
【図2】



1 本体
2 電動送風機
3 吸気側
4 排気側
5 集塵室
6 集塵フィルタ
7 接続部
8 吸気通路
11 逆止弁
12 吸込具
13 吸口部
14 接続パイプ
19 排気
21 コードリール
22 カバー体
24 把手
28a 圧損材A
28b 圧損材B
30 シール材B
31 リブA
33 排気接続部

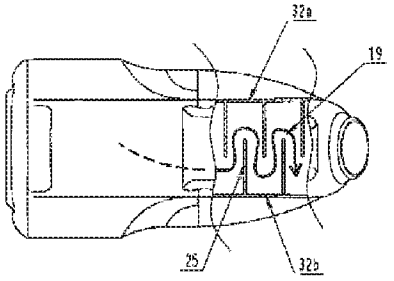
【図3】





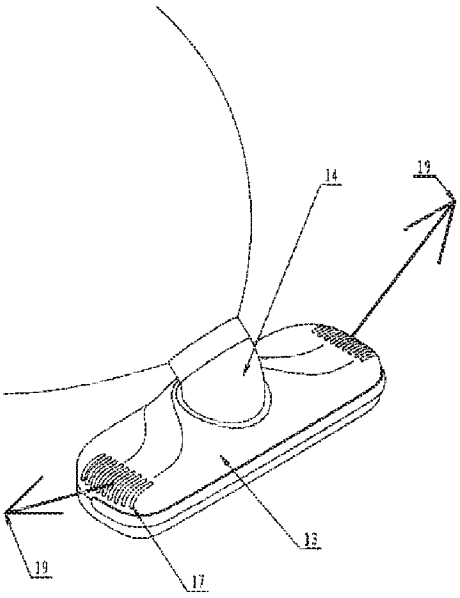
19 排気
24 把手
26 集塵室部
27 電動送風機部
33 排気接続部

【図4】



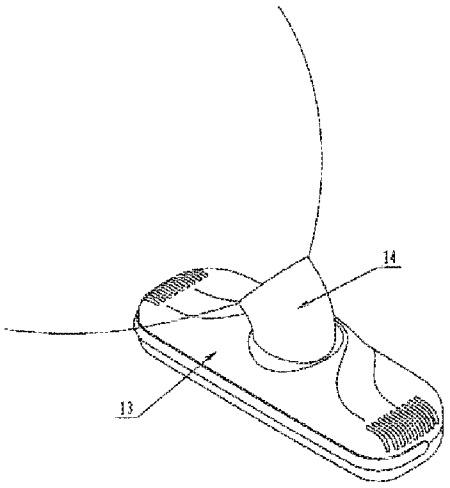
19 排気
25 リブB
32a 排気通路外郭A
32b 排気通路外郭B

【図5】



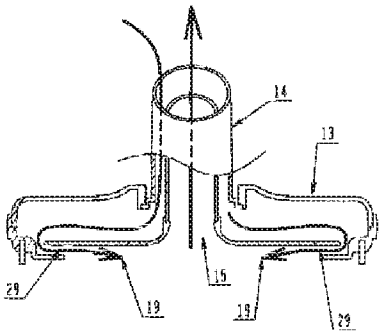
13 吸口部
14 接続パイプ
17 排気口
19 排気

【図6】



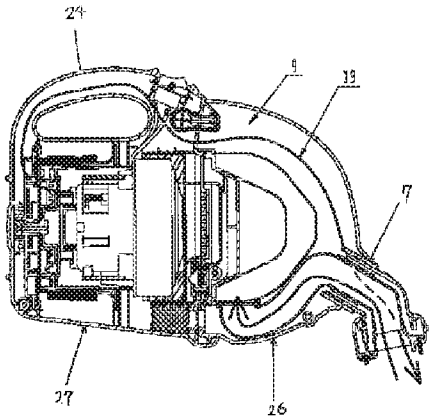
13 吸口部
14 接続パイプ

【図7】



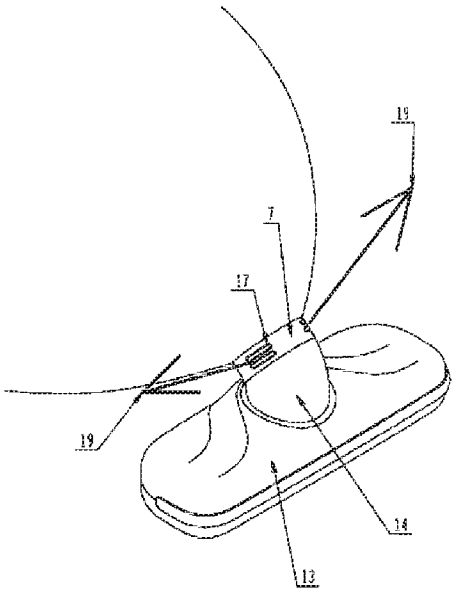
13 吸口部
14 接続パイプ
15 吸気口
19 排気
29 排気穴

【図8】



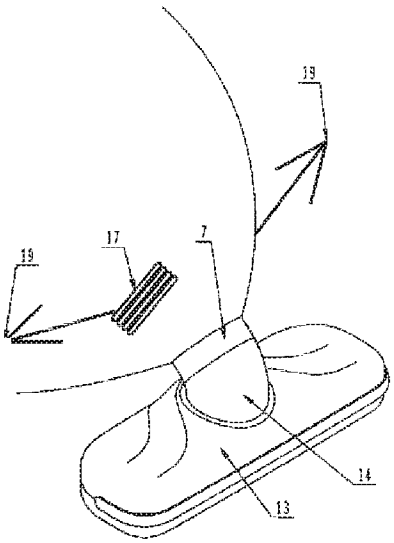
9 排気通路
19 排気

【図9】



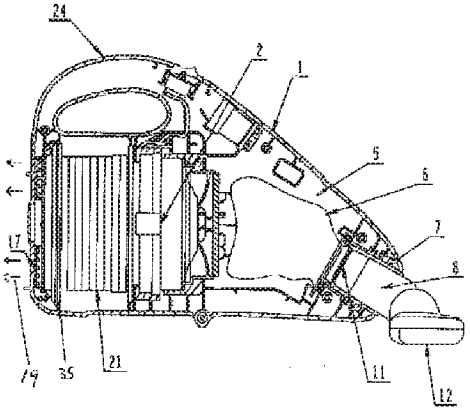
7　接続部
13　吸口部
14　接続パイプ
17　排気口
19　排気

【図10】



7　接続部
13　吸口部
14　接続パイプ
17　排気口
19　排気

【図11】



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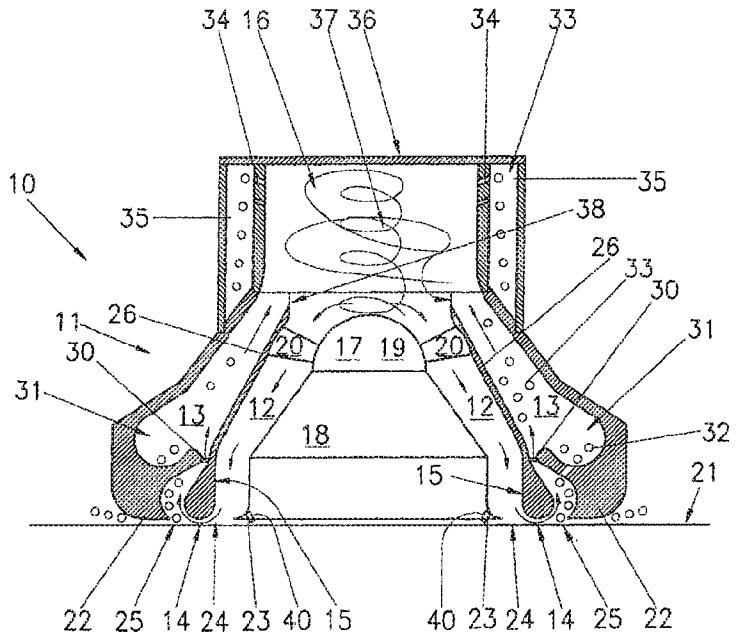
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(74) Agent: CULLEN & CO.; 240 Queen Street, Brisbane, QLD 4000 (AU).

(54) Title: AN APPARATUS FOR PICKING UP AND COLLECTING PARTICULATE MATERIAL



(57) Abstract

An apparatus (10) to separate a particle containing fluid such as dust laden air uses a Coanda blowing slot (14) to entrap particles into a recirculating fluid stream, and strips the particles out of the fluid stream in a separation chamber (31, 16) preferably using a vortex system. The apparatus can be a zero emission apparatus making it suitable in areas where conventional vacuum cleaners are inappropriate.

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AN APPARATUS FOR PICKING UP AND COLLECTING PARTICULATE MATERIAL

FIELD OF THE INVENTION

This invention relates to an apparatus to pick up and collect particulate material and in one form, the invention is directed to a vacuum cleaner such as a floor vacuum cleaner for use on carpets and the like. However, the invention need not be limited to vacuum cleaners, and can extend to devices to remove particles from a liquid, and other apparatus to remove particles from a gas, liquid or gas/liquid mixture. The invention can also extend to a separating system not necessarily limited to use with vacuum cleaners, and which uses a spinning motion to separate particles from a fluid flow. The invention will be described broadly with reference to vacuum cleaners, which can be domestic, industrial or specialised type cleaners.

BACKGROUND ART

Vacuum cleaners develop suction by means of a fan which discharges a powerful stream of air from the rear end of the casing. This sets up a powerful inflowing current of air which carries along any dust particles from the carpet or floor to which a suction nozzle is applied. The fan has a large number of blades set at an angle, the rotation setting up a flow of air in the axial direction. The air stream is passed through a bag in which the dust is precipitated and collected without appreciably obstructing the air flow.

One disadvantage with vacuum cleaners is that the entire volume of air passes into the dust collecting chamber and must pass through the walls of the dust bag. Should the dust bag become too full or clogged, this will reduce the efficiency of the vacuum cleaner and can result in damage to the vacuum cleaner itself.

The efficiency of a vacuum cleaner is dependent upon two factors being the air flow rate and the suction power. The suction performance is the product of two factors. Thus, when the flow rate is maximum, the suction is low and conversely when suction is high, the flow rate is low. For a vacuum cleaner to function efficiently, it is necessary for both the suction and the flow rate to be adequate.

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Another disadvantage with conventional vacuum cleaners is that the air flow speed and volume is relatively low. The air flow speed along the carpet or ground and into the vacuum cleaner head largely determines the efficiency of the vacuum cleaner. Thus a high speed of air and a high volume of air would be desirable.

Other disadvantages of vacuum cleaners are the relatively high power consumption of the motor being typically over 1,000Kw making efficient vacuum cleaners difficult to be battery powered; and the low efficiency of the fan.

Our earlier patent application WO 97/08983 describes a vacuum cleaner having a curved body about which fluid can circulate, the curved body having a lower portion which in use is adapted to be adjacent the area to be vacuumed, the lower portion being dimensioned to provide a lower pressure surface, the curved body also having an upper portion dimensioned to provide a higher pressure surface, fluid acceleration means to accelerate the fluid about the curved body, a fluid stream splitter in the upper portion of the curved body to split the fluid into a recirculated portion which continues to move about the curved body, and a waste portion which passes into a dust collecting chamber and is exhausted therefrom.

The curved body may be in the form of a doughnut or toroid. The curved body need not be symmetrical and may be slightly elliptical in cross-section. The curved body need not be entirely curved, and portions of the curved body may be straight if desired. With this vacuum cleaner, the fluid stream splitter splits the fluid into a recirculating portion and a waste portion. The air passing into the waste portion needed to be exhausted through an upper exhaust duct which could be associated with a filter screen.

A possible disadvantage with this vacuum cleaner is that removal of the particulate matter from the waste stream was done by slowing the air down causing the particulate matter to drop down into a collection basket. For the finer particulate material, separation was not always very efficient. Also, a quantity of air still needed to be exhausted through the top of the vacuum cleaner.

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It is known to separate particles from a fluid flow by causing the fluid to spin, and to remove the particles using centrifugal forces. Industrial cyclones use this principle. However known separators of this type are not very efficient, and especially if the separator needs to be quite small in size, and needs to separate quite fine particles. For this reason such separators have not found great commercial success in many applications such as vacuum cleaners.

Another disadvantage with almost all known vacuum cleaners and with spin type separators is that the cleaned gas or liquid stream is exhausted from the apparatus. This makes the apparatus unsuitable where exhaust emissions need to be minimised or even eliminated. For instance, persons with allergy problems find that any exhaust from a cleaning device can cause an allergic reaction. Hospitals and other clean rooms find that exhausts from a cleaning apparatus still spew contaminants into the air.

OBJECT OF THE INVENTION

The present invention is directed to an apparatus which can separate particles from a fluid flow.

In a specific form, the invention covers an apparatus to pick up and collect particulate material and which can be used as a vacuum cleaner and where the apparatus can separate the particulate matter with improved efficiency.

In a preferred form of the invention, the apparatus is a "zero emission apparatus" which means that there is little or no exhaust air passing from the apparatus. In this form, the apparatus finds particular applications in sterile environments and in environments where hazardous waste is required to be picked up and safely collected.

In another form, the invention is to a separating system which can be used with a vacuum cleaner or with other apparatus, and which utilises a particular spinning motion to separate particles from a fluid flow.

In one form, the invention resides in an apparatus to pick up and collect particulate material, the apparatus having a housing, a recirculating air stream or fluid stream passageway in the housing, the passageway having a

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bottom slot, which can be annular and which is adapted to pass over the particulate material to be picked up, a curved body positioned in the slot and dividing the slot into two parts, the slot and the body being configured such that the air or fluid stream passes through one part of the slot, about a portion of the curved body and into the other part of the slot, and picking up the particulate matter in the process, a separating chamber communicating with or forming part of the passageway and in which the particulate material is separated from the air or fluid stream, and an acceleration means to accelerate the air or fluid stream through the passageway.

In another form, the invention resides in an apparatus for separating particles from a fluid stream, the apparatus comprising a chamber which has one or more outer walls, at least one fluid inlet adjacent an outer wall of the chamber, and at least one fluid outlet which is spaced inwardly from the fluid outlet, the construction and arrangement being that particulate containing fluid enters into the chamber through the at least one inlet and adopting a first larger diameter spinning motion, to spin particulate material towards the outer wall of the chamber, the fluid subsequently adopting a second smaller diameter spinning motion and passing back through the centre of the fluid having the first spinning motion.

In another form, the invention resides in a method of separating particulate material from a particle containing fluid stream comprising causing a first fluid stream to adopt a first larger diameter spinning motion to remove particles from the stream by centrifugal forces, and subsequently causing the fluid stream to adopt a second smaller diameter spinning motion and passing the fluid back through the centre of the first fluid stream.

In another form, the invention resides in a vacuum cleaner having a housing which has an internal recirculating air passageway through which an air stream recirculates, air accelerating means to accelerate the air stream through the passageway, the passageway having a first inner passageway and a second outer passageway, said passageways being joined at the bottom of the housing by an annular slot which is adjacent the area to be vacuumed, an annular curved body positioned in the slot and slightly inwardly

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from the lowermost edge of the slot to divide the slot into an inner part which forms part of the inner passageway, and an outer part which forms part of the outer passageway, the body and slot being configured such that the accelerated air stream passes down the inner annular passageway, through the inner part of the slot, about the curved body and up into the outer part of the slot and into the outer passageway, and in the process picks up particulate matter from the said area, a separating chamber communicating with the outer passageway and in which the air stream adopts a spiral flow to spin out the particulate matter into a collection area, the inner passageway communicating with the separating chamber to allow the departiculated air stream to recirculate through the inner passageway and towards the slot.

The apparatus will be described with reference to its use as a vacuum cleaner but it should be appreciated that the term "vacuum cleaner" should be construed broadly and may include an apparatus which picks up particulate material other than from carpets and floors. For instance, the apparatus could be used to pick up and collect particulate materials in industrial and mining areas.

The separating chamber can separate the particulate material entrained in the air stream in an improved manner by having the air stream adopt a spiral flow in the separating chamber. In this manner, the particulate material can be spun out of the air stream using centrifugal force. This allows a better separation of particulate material from the air stream. The separating chamber can have a surround wall formed with openings through which the particulate material can pass together with a portion of the air stream. The surround wall can communicate with a collection area into which the separated particulate material can be collected. The collection area may include means to slow the speed of the air stream to cause the particulate material to separate therefrom.

In one form of the invention, the vacuum cleaner is configured such that little or no emissions emanate from the vacuum cleaner. This can be achieved by ensuring that as the air stream passes through the slot and about the curved body, no external air is sucked into the air stream from the

surrounding area. To prevent this, a proportion of the air stream can be split off prior to passing through the slot and this split off portion of the air stream can be directed to adjacent the slot such that the split off portion is entrained by the air stream passing through the slot. In this manner, little or no additional air is trapped by the air stream. Consequently, there is no net build up of air volume circulating through the apparatus and thus there is no need for an air outlet which can cause fine particles to be sprayed into the room.

Another advantage in splitting off a portion of the air is that this portion can be directed against the area to be cleaned at fairly high speed to assist in the dirt loosening and cleaning action.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will be described with reference to the following drawings in which

Figure 1 is a section view of a vacuum cleaner according to an embodiment of the invention.

Figure 2 is a bottom view of the vacuum cleaner of Figure 1.

Figure 3 is a section view of a vacuum cleaner according to another embodiment of the invention.

Figure 4A and 4B illustrate a corner attachment to the vacuum cleaner.

Figure 5 illustrates an apparatus for separating particles from a air stream according to another embodiment of the invention.

Figure 6 illustrates a variation to the apparatus of Figure 5.

Figure 7 illustrates a bottom view of a pick up head which is linear.

Figure 8 illustrates a side view of the pick up head of Figure 7.

Figure 9 is a bottom view of a pick up head which is annular.

Figure 10 illustrates a side view of the pick up head of Figure 9.

Figure 11 is a plan view of an apparatus for supplying air to the pick up head of Figure 9.

Figure 12 illustrates a section view of the apparatus of Figure 11.

Figure 13 illustrates the apparatus of Figure 11 connected to an

apparatus for separating particles which is a variation of the apparatus of Figure 5.2

BEST MODE

Referring initially to the section view in Figure 1, there is illustrated a vacuum cleaner 10 the major components of which are an outer housing 11, an internal recirculating air passageway which comprises an inner annular passageway 12, an outer annular passageway 13, an annular bottom slot 14, a curved body 15 positioned within the slot, an upper separating chamber 16, an air accelerating means in the form of a fan 17, and a motor 18 to drive fan 17.

Vacuum cleaner 10 can be formed from metal, plastic, composites or any other suitable material. The vacuum cleaner is fairly small and has a diameter of approximately 40cm and a height of approximately 40cm. Of course, larger or smaller vacuum cleaners are envisaged depending on the required use. The vacuum cleaner has a recirculating air passageway inside outer housing 11 and the arrows illustrated in Figure 1 show generally the direction of flow of the air stream. Fan 17 can be of a design described in International patent application PCT/AU93/00581. Fan 17 has a hub 19 and a number of extending blades 20. Fan 17 rotates at high speed causing air to be pushed at high speed down inner annular passageway 12 and towards slot 14. Slot 14 is between 5 to 20mm wide (although this can vary to suit) and is positioned at the bottom of the vacuum cleaner and adjacent the floor surface 21 which is to be vacuumed. The annular slot 14 is defined by a lower portion 22 of outer housing 11 and a lower portion 23 of the motor housing. Of course, portion 23 need not be part of the motor housing and can be formed separately. Positioned inside annular slot 14 is an annular curved body 15. The annular curved body 15 divides slot 14 into two sub-slots being an inner part 24 (a blowing slot) and an outer part 25. The lowermost curved portion of body 15 is spaced inwardly from the slot such that when the vacuum cleaner is placed on the floor 21, a small gap is provided between the bottom of curved body 15 and floor 21 which enables the air stream to pass around the curved body.

Curved body 15 has an upper annular portion 26 which extends

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up and towards the bottom of separating chamber 16 and which functions to separate the inner annular passageway 12 from the outer annular passageway 13. The portion 26 is configured adjacent the fan blades 20 to allow the fan blades 20 to rotate within portion 26 with a fine contact between the outer edge of blades 20 and the inner wall of portion 26. Thus, this part of portion 26 functions as a shroud about fan 17.

As fan 17 is rotated at high speed, air passes through the fan and passes at high speed through inner part 24 which can be seen as an annular blowing slot. By virtue of the air being blown through the blowing slot, it adheres to curved body 15 and will follow the surface of the body by virtue of the Coanda effect. As air passes at high speed through the blowing slot and about the lowermost portion of curved body 15, it picks up particulate matter such as dust and dirt from floor 21 and carries the particulate matter around curved body 15 and up into outer annular passageway 13.

Outer annular passageway 13 tapers from a wider lower diameter adjacent slot 14 to a narrower upper diameter which communicates with the bottom of separating chamber 16. By virtue of this tapering, the air stream passing along outer annular passageway 13 is caused to spiral through the annular passageway at increased revs per minute. That is, as the particulate entrained air passes up passageway 13, it also spirals through annular passageway 13 at higher and higher revolutions per minute as it progresses towards separating chamber 16. The spiral action can be facilitated by providing a deflecting means 30 in passageway 13 the deflecting means being in the form of angled members such as slots, fins, or vanes which deflect the air stream into a spiral flow.

The lower portion of outer annular passageway 13 of this first embodiment is formed with a bulbous enlargement 31 which forms part of a first collection area. In this collection area, the larger entrained particles 32 separate from the upwardly moving air stream by virtue of their larger mass and fall into collection area 31 for later disposal.

Before enlargement 31, the outer passageway is narrowed to create a pressure drop in the outer passageway. The pressure drop causes the

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air stream to attempt to increase speed. The deflecting means 30 assist in deflecting this air stream into a spiral flow so that it can increase speed.

The smaller particles 33 remain entrained in the upwardly moving and spiraling air stream. The air stream passes into the open bottom of separating chamber 16 and, at this point, the air stream is spiraling at relatively high speed and rpm. Once in separating chamber 16, the smaller particles 33 spin out of the air stream and pass through openings 34 in the surround wall of separating chamber 16. The smaller particles pass through the openings and into a second collection area 35. In this area, the speed of the air stream is slowed and this can be assisted by having baffles (not shown) in the collection area and the slowing of the air stream causes the smaller particles 33 to fall down and stay in the second collection area 35. The departiculated spiraling air stream reaches the top wall 36 of separating chamber 16 and spirals inwardly and downwardly towards the upper part of inner annular passageway 12. Reference number 37 references the downwardly spiraling air stream. Inner annular passageway 12 has an open top end 38 which communicates with the open bottom of separating chamber 16 but is spaced inwardly from outer annular passageway 13.

With this arrangement, air passing into separating chamber 16 through outer annular passageway 13 spins about chamber 16 and is forced to adopt a tight spiral 37 as it passes downwardly into the inner annular passageway 12 and through fan 17. As the air adopts the tighter spiral, it will spin at greater rpm and this will assist in spinning out fine particles which will then become entrained in the remaining air spinning upwardly (note: upwardly depends on one's viewing angle), within separating chamber 16. In this way, dust is kept from returning back through the fan or fluid drive. Only very fine particles pass back through the fan and do not impair its function to a great extent.

To assist in the cleaning action, and also to minimize entrapment of outside air, there are provided openings 40 immediately adjacent slot 14. Openings 40 can be in the form of an array of bores or can be in the form of an annular slot.

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The air stream passing down inner annular passageway 12 will have a portion of the air split off and passed through openings 40 which has the effect of blowing high speed air onto the floor 21 to loosen the particulate material. Also, this split off portion of air will be entrained with the remaining air stream flowing about curved body 15 which means that there will be little or no additional air passing through the slot. Consequently, no vents are required in the collection areas to vent any build up of pressure caused by extra air being trapped in the fluid flow. If some air is trapped in the fluid flow, and vents are required, these vents can be made very small and can be covered by an extremely effective filter which is not possible with conventional vacuum cleaners where a high volume of air must be exhausted.

The fluid passing through bores 40 strikes the carpet, floor, or ground as jets. This loosens particular matter. That air then momentarily stagnates as its speed is substantially arrested. This raises its static pressure momentarily and it rushes towards the low pressure area created by the Coanda jet issuing from slot 24. The high speed jet from slot 24 wants to entrain, as does any jet. In this case, it entrains the fluid from bores 40 instead of any substantial amount of air from outside the device.

Figure 3 illustrates a second embodiment of the invention. In this embodiment, the fan 50 is spaced away from the annular slot 51. Otherwise, the invention works in a similar manner. For instance, with the vacuum cleaner illustrated in Figure 3, fan 50 accelerates an air stream through an inner tubular passageway 52 and towards the annular slot 51. Annular slot 51 is formed by virtue of a tapered cone insert 53 and the wall of outer annular passageway 54. An annular curved body 55 is positioned in slot 51 and again spaced slightly inwardly such that air can blow through a blowing slot 56 about curved body 55 and into outer passageway 54.

Bores 40, as described in Figure 1 can also be placed adjacent slot 56 of Figure 3 but are not illustrated. An underside view of the pick-up head of Figure 3 would look substantially like the view of Figure 2 with bores 40.

The section cut lines 57 illustrate that the annular slot 51 can be

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spaced at any convenient distance away from fan 50. Outer passageway 54 again has a first annular collection area 62 to collect the heavier particles, and a separating chamber 58 which spins out the finer particles in a manner similar to that described with reference to Figure 1. Prior to collection area 62, the passageway is narrowed to create a pressure drop which causes the air stream to speed up. Deflectors can be used to assist in causing the air to spin as it moves along the passageway.

Separating chamber 58 again has openings 59 in the side wall through which the particles can pass and into a second collection chamber 60. In use, air flows through fan 50 where it is accelerated and pushed at high speed through annular blowing slot 56, about curved body 55, up into outer passageway 54, through passageway 54 and into the first collection zone 62 where the heavier particles leave the air stream. The air stream continues to pass through passageway 54 and into separating chamber 58 and in the process passageway 54 tapers inwardly which causes an increase in the rpm of the air stream. The air stream spins within separating chamber 58 and when it reaches outer wall 61, the air spirals in a tighter circle back into the inlet of inner passageway 52 and through fan 50.

Figures 4A and 4B illustrate a corner attachment for the vacuum cleaner. Corner attachment 80 is roughly triangular in shape when viewed in plan (see Figure 4B), and has two straight outer edges 81,82 and a curved inner edge 82A which compliments the outer curve of the vacuum cleaner wall. A pair of air flow tubes 83A,83B, extend through bores 95,96, and the tubes have one end 84,85 projecting into inner passageway 12 the ends being scooped to assist in the passing of a portion of the air stream through the tubes. The other end 86,87 of the tubes have a lower opening 88,89 which is sealed off when the attachment is in the position of Figures 4A and 4B. (Of course, the number and size of the tubes may vary.) The attachment is spring biassed by spring 90 which allows the attachment to be pushed against the outer wall of the vacuum cleaner. When this occurs, tubes 83A,83B, are pushed further into bores 95,96 and the tube openings 88,89 now communicate with a bore 91 which itself communicates with a chamber 92

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which has an array of lower orifices 93.

When attachment 80 is pushed against the vacuum cleaner against the bias of spring 90, high pressure air can pass along tubes 83,84, through bore 91, into chamber 92 and through the orifices 93, and against the ground to collect dust and dirt particles. The dirt passes into a return tube 97 which slides within a bore 98. Return tube 97 communicates with outer passageway 13 but only when the attachment 80 is pushed up against the vacuum cleaner.

It should be noted that the pick-up head need not be annular in plan view, but can be any convenient shape in plan view.

The vacuum cleaner has a number of advantages. By having low or no emissions, the vacuum cleaner finds application in sterile environment such as hospitals. The vacuum cleaner can be used to pick up and collect hazardous particles with a reduced or no likelihood of any particles being vented from the vacuum cleaner. The motor 18 can be cooled by vents (not shown) passing through the vacuum cleaner but air passing through the vents does not mix with any of the recirculating air. After the air stream passes about curved body 15 of Figure 1, the air stream passageway increases in cross-section to slow the rpm of the air to facilitate removal of the larger particles 32. The passageway then tapers to narrow the cross-section and thereby to increase the rpm of the air.

It should be noted that liquids may be suctioned up by this vacuum cleaner and collected in the same way as particulate material and do not impair the system as long as the motor is isolated from them.

The fundamental features of this vacuum cleaner while not limiting it to a vacuum cleaner used only in the home as already aforementioned are: that either a minute amount or zero air or any other fluid is ejected. Some versions can function immersed in any liquid such as water to remove particulate matter from that fluid. That fluid re-circulates substantially within the system and there is no need to draw ambient fluid from the surroundings. Therefore no or little fluid is ejected from the system and is described as a substantially closed circuit system.

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Particulate laden water or any liquid can be processed by certain versions of this device. Whether the Coanda pick-up head is placed at a distance from the motor and fan or other fluid acceleration means or very close by, that enables this closed circuit to function, and the majority of the dirt or other particulate matter can be removed by any means but preferably by a vortex as mentioned in this description. There is no need to remove every last piece of particulate matter during the first circuit, as it recirculates and does not then communicate back to the surroundings.

A version of the invention may be immersed in swimming pools to collect and separate particulate material from the water.

Figure 5 illustrates a vacuum-type cleaner according to a further embodiment of the invention. In this further embodiment, the lower part of the vacuum cleaner is similar to that described with reference to Figure 1 and therefore like numbers have been used to designate like parts. For instance, the vacuum-type cleaner in Figure 5 again describes an outer housing 11, an internal recirculating air passageway which comprises an inner annular passageway 12, and an outer annular passageway 13, an annular bottom slot 14 and an annular curved body 15 positioned within the slot. A fan 17 driven by a motor 18 is provided inside the housing. The annular curved body 15 divides the slot 14 into two sub-slots being an inner blowing slot 24 and an outer slot 25. Fluid such as air is accelerated by fan 17 to flow downwardly through inner slot 12, around curved body 15, and upwardly through outer slot 13. Above fan 17 is a vortex chamber 110 which is U-shaped in configuration. Air containing dust or other particular material passes up through passageway 13 and is adopting a spiral motion for the reasons described with reference to Figure 1. Air passes into vortex chamber 110 via an inlet 111 which is adjacent the wall of the vortex chamber 110. The air forms a vortex 112 in vortex chamber 110 and is in the form of a larger diameter vortex which is adjacent the walls of vortex chamber 110. The vortex follows the curved pathway of vortex chamber 110 and into a collection area 113. The vortex then adopts a second smaller diameter vortex 114 (also called the inner vortex) which runs back up the approximate middle of the outer vortex 112 to return back through

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fan 17. Gravity helps to keep the dirt and particulate matter at the bottom of collection area 113. Collection area 113 can be in the form of a removable chamber or cup which can be fastened via a collar 115 which is disengagable so that collection area 113 can be removed and emptied. Collar 115 can be attached by any convenient method such as by being threaded or having engagable bayonets for securing the two portions together.

In order to have larger particles end up in collection area 113, the bulbous enlargement 31 has a smaller cross-section than the enlargement in Figure 1. This promotes sweeping of the larger heavier particles up through passageway 13 along vortex chamber 110 and into collection area 113. Thus, by having the vortex more intense, this can be achieved more readily. In the embodiment illustrated in Figures 5 and 6, passageway 13 does not need to slope inwardly but may, at any point, and especially at the entry into the upper part of vortex chamber 110, be sloping outwardly or any other configuration to assist with the upward travel of heavy particles spiraling with the vortex.

Vortex chamber 110 need not be exactly U-shaped or curved around 180°. For instance, it may be curved to a lesser or greater angle for whatever convenient, geometric and practical considerations. Any configuration can be achieved as long as the two vortices are formed being the outer vortex, and the inner vortex which travels in the opposite direction to the outer vortex.

Referring to Figure 6, there is illustrated an apparatus similar to that described with reference to Figure 5 but including a tube 116. The tube is positioned such that one end is substantially in the middle of the vortex chamber while the other end is in the collection area 113 and adjacent the end wall of the vortex chamber (the vortex chamber being considered to extend all the way to the bottom of collection area 113. The pressure in the middle of a vortex is slightly lower than the pressure near the periphery of the vortex. In Figure 6, a dirt collection bag 117, for instance a thin translucent bag, is placed in collection area 113. Tube 116 creates a lower pressure immediately inside the wall of collection area 113. In this way, although the pressure within the whole system is lower than atmospheric, tube 116 causes the bag to be sucked

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against the walls of collection area 113 by virtue of the lower pressure. Tube 116 may be unnecessary as there can be found low pressure areas adjacent inner walls where fluid speed is highest. This keeps the bag open such that the vortex can rotate within the bag. Collection area 113 can then be decoupled and the bag removed for disposal or cleaning.

The plastic or other type of bag 117 can be frictionally restrained, say by an o-ring or other like device inside collar 115, and the weight of the dirt causes the rest of the bag inside the chamber, whose walls are represented by 119, to cling especially at the bottom where there may be trenches of any configuration or ribs, then the top of the bag adjacent collar 115 remains relatively stationery while the rest of the lower portion of the bag rotates with the rotatably disengagable collection area.

In this way, an upper portion of the bag plastic or otherwise, is rotated substantially as many times as it requires to rotate and disengage the collection area 113 and so the neck of the dirt collection bag is twisted to enclose the dirt found in the lower part of the bag. In this way, upon complete disengagement of the collection bag can be lifted out of the collection area and tied off to completely seal the dirt from the atmosphere. If the dirt collection bag is biodegradable material, it can then be dumped in a landfill or incinerated.

A further improvement of the invention may be where the air pathway through tube 116, upon rotational disengagement of the collection area, is also disengaged and upon further rotation a hole or passageway through to atmospheric air is opened. In this case, if the vacuum cleaner is allowed to run during disengagement, there will be quite a significant pressure difference between the outside of the bag found within the area 113 and the inside of that dirt collection bag. In this way, the bag will collapse onto the enclosed dirt, compressing it and then upon further disengaging rotation the dirt inside the dirt collection bag will be found in a much more compact form and the same tying off of the upper portion of the removable bag can occur as already described.

Returning to Figure 3, it should be noted that the version depicted in Figure 3 may also possess these latest aforementioned features and that the

collection chamber 62 is eliminated as are the slots 59 and the outside wall of the vortex chamber 58 can be extended to any distance and in any direction. It need not curve around the 180° but may curve around 90° or some other angle to allow it to function in this latest mentioned identical manner, i.e. it may have a collar which is threaded or has bayonets and is rotatably disengagable and may contain a dirt collection bag and may have the assistance of gravity to keep the dirt at the bottom of the collection chamber.

It should also be noted that the embodiment depicted as Figure 3 may have the handle which is shown uppermost of the drawing removed and may be on the floor as a type of canister version of a vacuum cleaner. Passageways 52 and 54 may have flexible walls such as a flexible tube within a flexible tube. Bulbous area 62 may have a reduced cross-sectional area. Collection chamber 60 is eliminated as are slots 59 and because a vortex chamber 110 as in Figures 5 and 6 is facing in a downward direction, that vortex chamber need not have the aforementioned curvature to it. In fact it may remain straight as depicted and yet the same features may apply. In effect, the addition of a threaded or bayoneted collar for rotational disengagement of one section from the other and the addition of a dirt collecting bag placed within and all of the same features exhibited such as tube 116 of Figure 6.

A further embodiment of the invention is where the Coanda pick-up head is not round, annular or some other shape when viewed in plan view from underneath, but may be configured as Figure 7 and Figure 8.

Figures 7 and 8 illustrate a pick-up head having a row of nozzles 120 (or a slot) through which pass a portion of the fluid delivered from the fluid drive. A Coanda blowing slot 121 is provided through which passes another portion of the fluid. A curved Coanda surface is provided. These passageways may be reversed. 123 is the intake slot. 124 is the fluid delivery passageway. 125 is the passageway for return of the fluid to the vortex chamber and then to the fluid drive (not shown). 126 are side fences to isolate the process from the atmosphere at each end.

In Figures 7 and 8, the arrowed lines represent the airflow. The row of nozzles may be in a straight line or follow a curved path, as may the

Coanda blowing slot. The suction head when viewed in plan may be straight or curved.

It should be understood that the nozzles and Coanda slot shown as annular when viewed from beneath may be straight. That would provide a pick-up head that may be rectangular, square, elliptical or any shape as well as substantially circular when viewed from below. The nozzles may be aimed at any angle.

The perimeter of the pick-up head may possess bristles to help it to conform as it passes over irregular surfaces. Other flexible means of conforming to irregular surfaces may be employed.

In one embodiment of the invention, another type of collection chamber may lie substantially parallel to the vortex chamber and the passage through which the dirt is flung may be near the top of the vortex chamber and this passageway or hole may be any size.

A means of disconnecting the air to the nozzles may be employed when repositioning the pick-up head from the floor to ceiling and vice versa. This may be automatic or manually activated.

A further embodiment of the invention is where the sucking or inlet slot may be found more medially than the Coanda blowing slot or nozzles.

In that case, the nozzles, or alternatively to them a slot, may be placed close to the periphery of the pick-up head whether the pick-up head is round, rectangular or any shape when viewed from below.

The Coanda blowing slot may be placed inwardly relative to the nozzles and aiming the jet toward the centre when viewed from below. The nozzles may or may not be deleted.

In this last case, the medial sucking slot may be deleted and a simple substantially centrally located hole substituted to return the air or other fluid to the fluid drive or vortex chamber.

It should be appreciated that in this case the fluid path via a tube may pass through the wall of the passage leading the air to the nozzles or blowing slot.

Otherwise the removal of dirt is accomplished by the already

mentioned means.

Figure 9 illustrates an underside view of a pick up head 130 according to this further embodiment of the invention. Figure 10 illustrates a side view of the pick up head 130. The pick up head is annular in shape with a point 131 for going into the corner of a room. The pick up head 130 has a ring of nozzles 132 spaced about the periphery of the head 130. The Coanda slot 133 is located towards an outer edge of the head 130. The ring of nozzles 132 directs air down into the carpet to loosen dirt as previously described. The air is removed from the carpet surface through a central air inlet 134. The head 130 further includes three rounded spacers 135. These spacers have a smooth surface and allow the head to easily slide over a carpet surface and to otherwise raise it slightly above a smooth floor.

The flow of air about the pick up head is shown by arrows. (The flow of air through nozzles 132 is not shown).

The air supply to the pick up head 130 is provided by a fan 136 as illustrated in Figures 11 and 12. Figure 11 is a plan view of the fan 136 and Figure 12 is a cross sectional view. The fan 136 is mounted within a housing 137 having an air inlet 138 and an air outlet 139.

The air inlet 138 is connected by a rigid or flexible tube to the air inlet 134 of the head 130. The air outlet 139 is connected by flexible or rigid tube to the Coanda slot 133. Whether the connection is by a rigid or flexible tube depends on the type of vacuum cleaner. A flexible tube may be used for a fan which in use sits on the floor. A rigid tube may be used where the fan is mounted directly above the head 130.

It can be seen in Figure 11 that the air inlet 138 feeds the air substantially tangential to the inside wall to assist the air to assume the cyclonic or spiral flow as previously described with reference to Figure 1.

The air inlet 138 feeds an air passageway 140. It can be seen in Figure 12 that the air outlet passageway cuts through the passageway 140 fed by the air inlet 138. This enables the air pathways to cross over to enable the air inlet 134 of the pick up head 130 to be placed substantially centrally.

Figure 13 shows the fan 136 of Figure 12 in communication with

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a vortex chamber 141. This vortex chamber operates in a similar manner to that already described with reference to Figures 5 and 6. However, the means by which the vortex chamber 141 is attached to the apparatus is different to that as described above. The vortex chamber 141 has a collecting bowl 142 and a dirt collecting bag (not shown) within it as previously described. A trapeze 143 is pivotally attached to the apparatus at a point above the bowl 142. The trapeze can swing away from the bowl to disengage the bowl and can swing towards the bowl to engage the bowl. When the bowl is engaged as shown in Figure 13, the bowl is held against a plate like member 143 and is held in place by upward pressure. It can be seen that in this case, there is no need to use the rotating action to engage the bowl 142 as previously described. It can also be seen that by swinging the trapeze away from the bowl 142, the bowl 142 can quickly drop away to be emptied.

The vortex chamber 142 has a small hole or passageway 144 which passes through the bottom of the bowl to the trapeze. The trapeze is hollow such that the passageway allows air flow to communicate between the bowl and the trapeze.

Air passageway 144 transmits the air pressure differential that causes the bag inside bowl 142 to remain inflated while the vortex rotates within that bag. In this way, the passageway 144 functions in a similar manner to tube 116 as described with reference to Figure 6.

As the trapeze is hollow, the air pressure differential is transmitted through the trapeze from where it pivots at its attachment points. In this way, an area of lower cross sectional area, and therefore lower pressure can communicate through the trapeze and back up the inside of the underside of the bowl. That air pressure may not be found immediately at the engagement points of the trapeze but a passageway may lead to these points from a more suitable lower pressure area within the system.

It can be seen that this arrangement represents a very quick and easy way of engagement and disengagement of the dirt collecting bowl 142 including the inflatable bag within it. Another feature of this improved bowl and attachment method is that by simple rotation of the bowl between an insert

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hand, the dirt collecting bag may be rotatably sealed onto the dirt as already described above and disengaged easily for disposal.

This invention offers further advantages over other vacuum devices. It is potentially smaller, lighter and simpler than many other vacuum devices.

Also, the outside casing or shell may be simply held in position by its own internal low pressure enabling ease of emptying, cleaning internal surfaces or for quick access for repairs or maintenance.

There may be quite a number of geometric configurations of the invention without departing from the spirit and scope of the idea.

It should be appreciated that various other changes and modifications can be made to the embodiment described without departing from spirit and scope of the invention.

CLAIMS:

1. An apparatus to pick up and collect particulate material, the apparatus having a housing, a recirculating air stream passageway in the housing, the passageway having a bottom slot which is adapted to pass over the particulate material to be picked up, a curved body positioned in the slot and dividing the slot into two parts, the slot and the body being configured such that the air stream passes through one part of the slot, about a portion of the curved body and into the other part of the slot, and picking up the particulate matter in the process, a separating chamber communicating with or forming part of the passageway and in which the particulate material is separated from the air stream, and an acceleration means to accelerate the air stream through the passageway.

2. The apparatus of claim 1, wherein air passing into the separating chamber adopts a spiral flow to spin out the particulate matter into a collection area, prior to passing back towards the bottom slot.

3. The apparatus of claim 2, wherein the slot is annular.

4. The apparatus of claim 3 in the form of a vacuum cleaner having a housing which has an internal recirculating air passageway through which an air stream recirculates, air accelerating means to accelerate the air stream through the passageway, the passageway having a first inner passageway and a second outer passageway, said passageways being joined at the bottom of the housing by an annular slot which is adjacent the area to be vacuumed, an annular curved body positioned in the slot and slightly inwardly from the lowermost edge of the slot to divide the slot into an inner part which forms part of the inner passageway, and an outer part which forms part of the outer passageway, the body and slot being configured such that the accelerated air stream passes down the inner annular passageway, through the inner part of the slot, about the curved body and up into the outer part of the slot and into the outer passageway, and in the process picks up particulate matter from the said area, a separating chamber communicating with the outer passageway and in which the air stream adopts a spiral flow to spin out the particulate matter into a collection area, the inner passageway communicating with the

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separating chamber to allow the departiculated air stream to recirculate through the inner passageway and towards the slot.

5. The apparatus of claim 4, wherein the separating chamber has a substantially inverted U-shape, and the collection area is at the lower end of one leg of the U-shaped chamber.

6. An apparatus to pick up and collect particulate material from a fluid stream containing particulate material, the apparatus having a housing, a recirculating fluid stream passageway in the housing, the passageway having a bottom slot which is adapted to contact the particulate containing fluid stream, a curved body positioned in the slot and dividing the slot into two parts, the slot and the body being configured such that the fluid stream passes through one part of the slot, about a portion of the curved body and into the other part of the slot, and picking up the particulate matter in the process, a separating chamber communicating with or forming part of the passageway and in which the particulate material is separated from the fluid stream, and an acceleration means to accelerate the fluid stream through the passageway.

7. An apparatus for separating particles from a fluid stream, the apparatus comprising a chamber which has one or more outer walls, at least one fluid inlet adjacent an outer wall of the chamber, and at least one fluid outlet which is spaced inwardly from the fluid outlet, the construction and arrangement being that particulate containing fluid enters into the chamber through the at least one inlet and adopting a first larger diameter spinning motion, to spin particulate material towards the outer wall of the chamber, the fluid subsequently adopting a second smaller diameter spinning motion and passing back through the centre of the fluid having the first spinning motion.

8. A method of separating particulate material from a particle containing fluid stream comprising causing a first fluid stream to adopt a first larger diameter spinning motion to remove particles from the stream by centrifugal forces, and subsequently causing the fluid stream to adopt a second smaller diameter spinning motion and passing the fluid back through the centre of the first fluid stream.

9. An apparatus to pick up and collect particulate material, the

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apparatus having a passage, fluid acceleration means for accelerating fluid flow through the passage, a fluid inlet in communication with the passage and through which particle entrained fluid can pass into the apparatus, wherein the apparatus further includes a particle separation means which comprises a chamber which has one or more outer walls, at least one fluid inlet adjacent an outer wall of the chamber, and at least one fluid outlet which is spaced inwardly from the fluid outlet, the construction and arrangement being that particulate containing fluid enters into the chamber through the at least one inlet and adopting a first larger diameter spinning motion, to spin particulate material towards the outer wall of the chamber, the fluid subsequently adopting a second smaller diameter spinning motion and passing back through the centre of the fluid having the first spinning motion.

10. The apparatus of claim 9, which is in the form of a vacuum cleaner.

11. The apparatus of claim 10 having a housing and the chamber is removably attached to the housing.

12. The apparatus of claim 11, which includes a frame member for holding the chamber, the frame member being pivotably attached to the housing.

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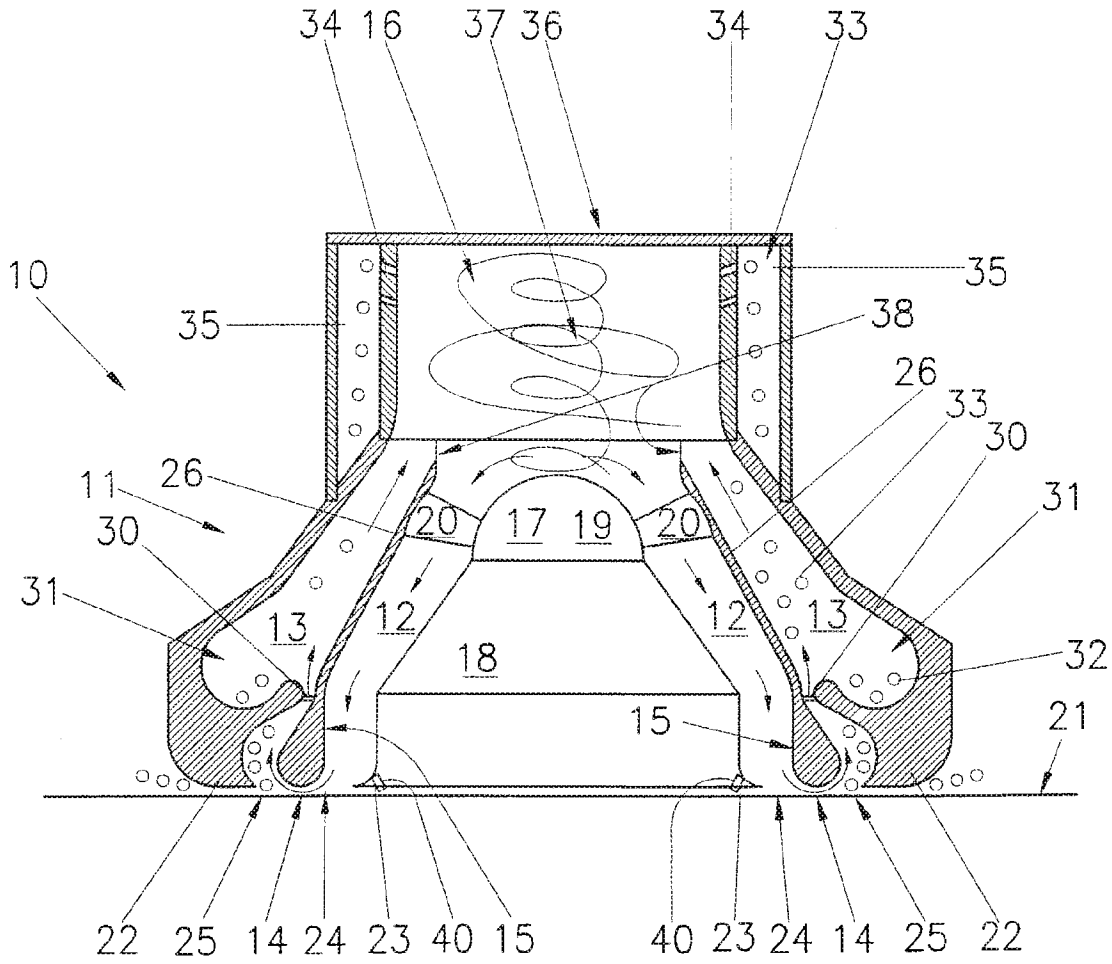


FIG 1.

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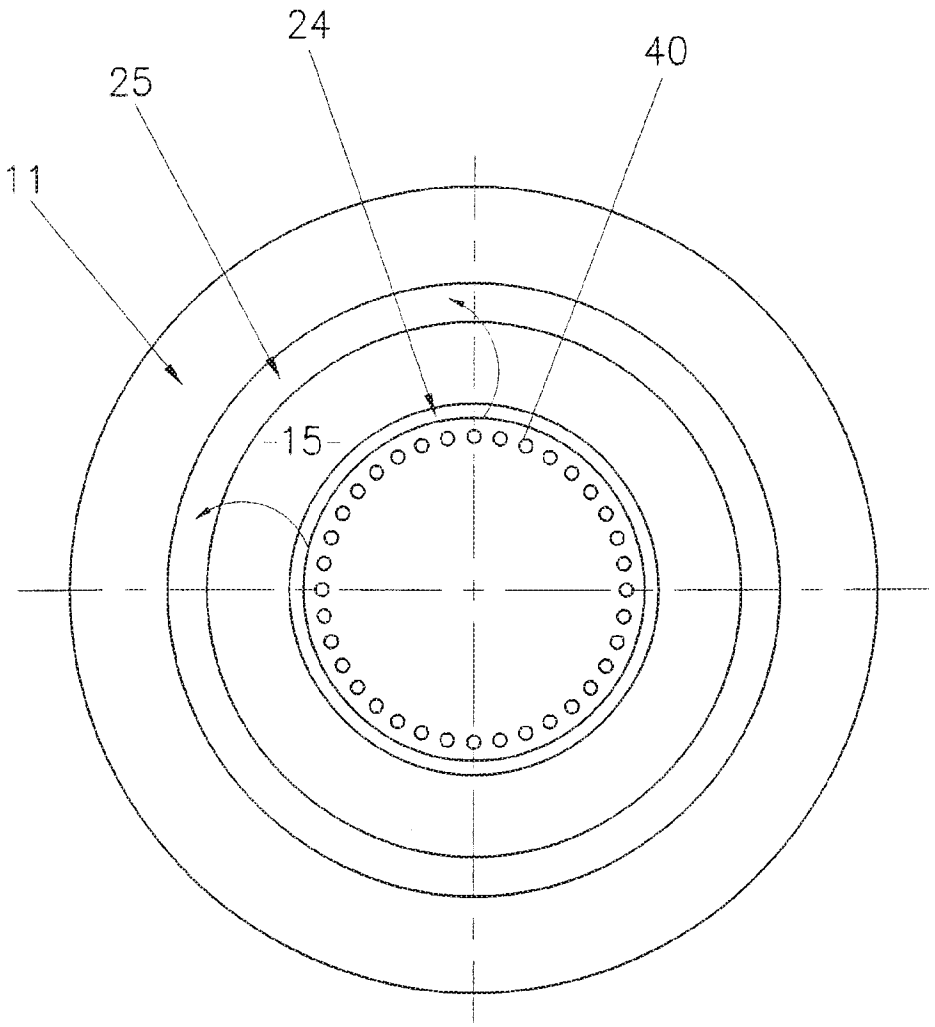


FIG 2.

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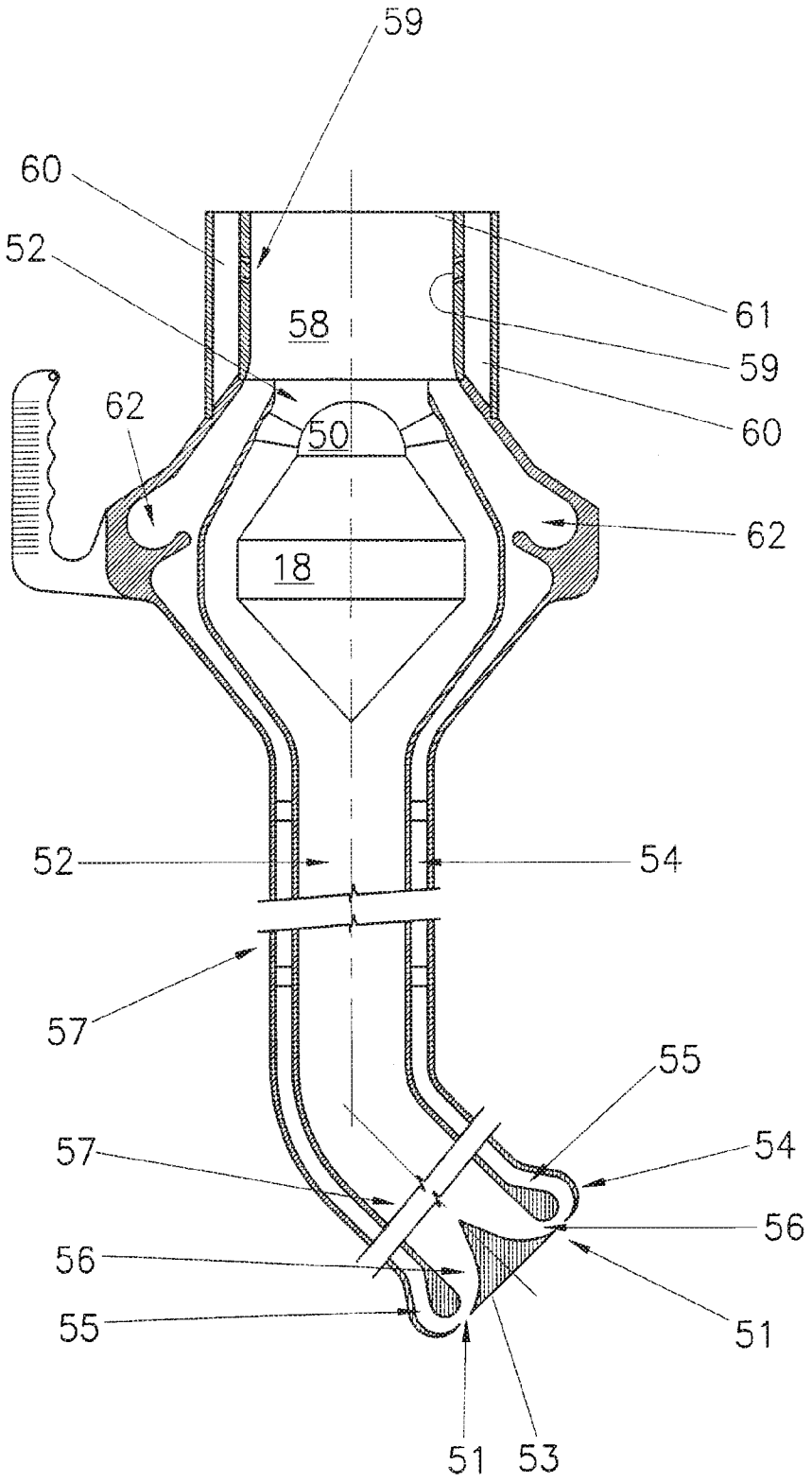


FIG 3.

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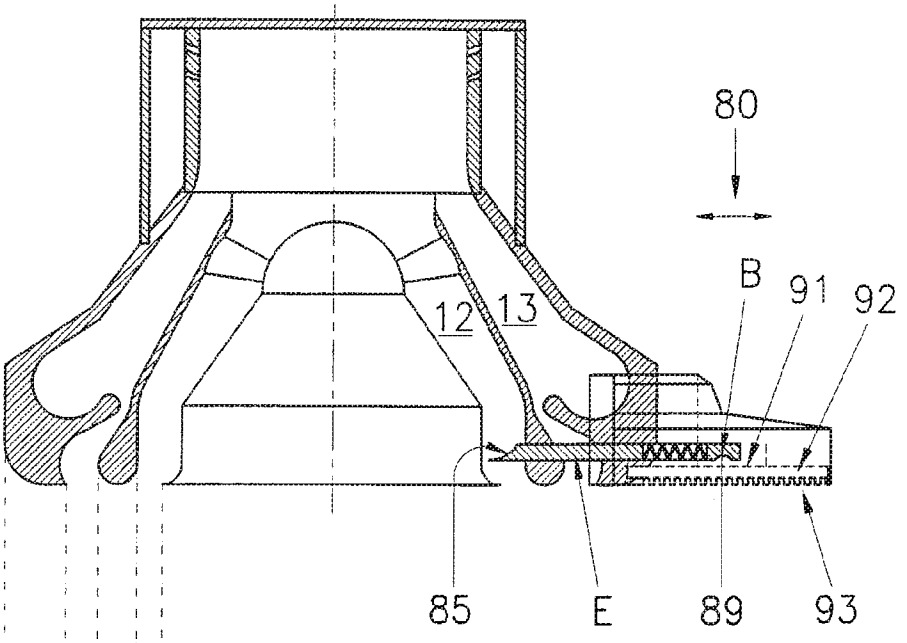


FIG 4A.

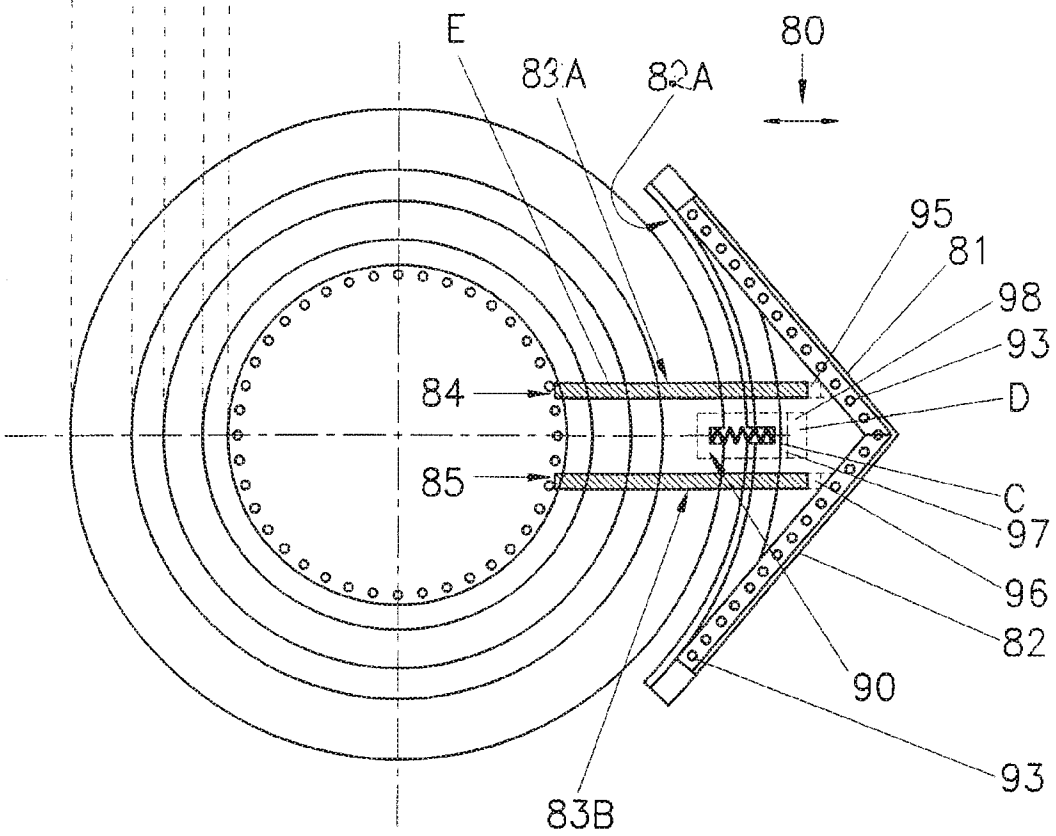


FIG 4B.

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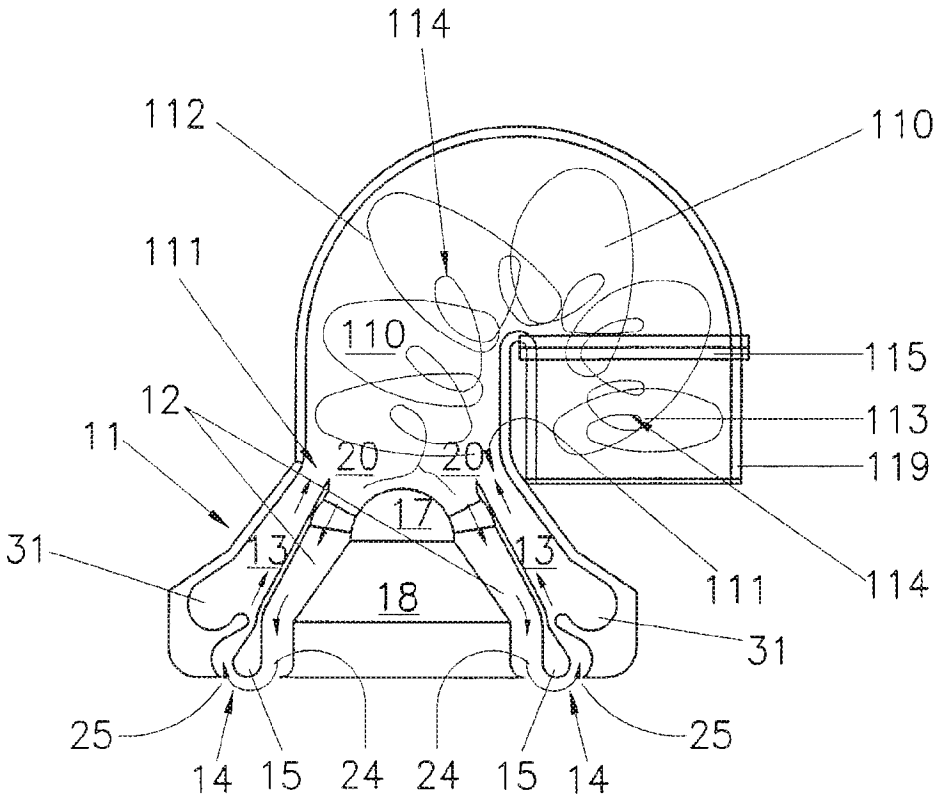


FIG 5.

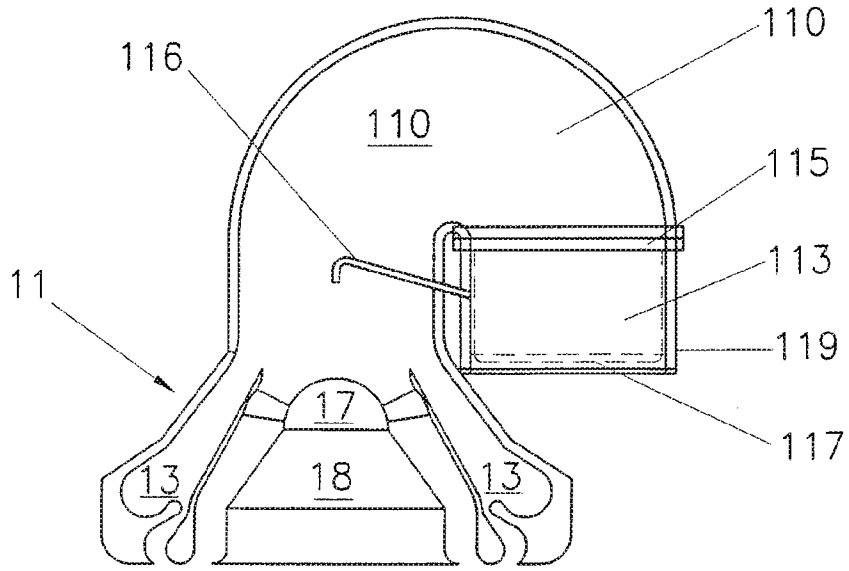


FIG 6.

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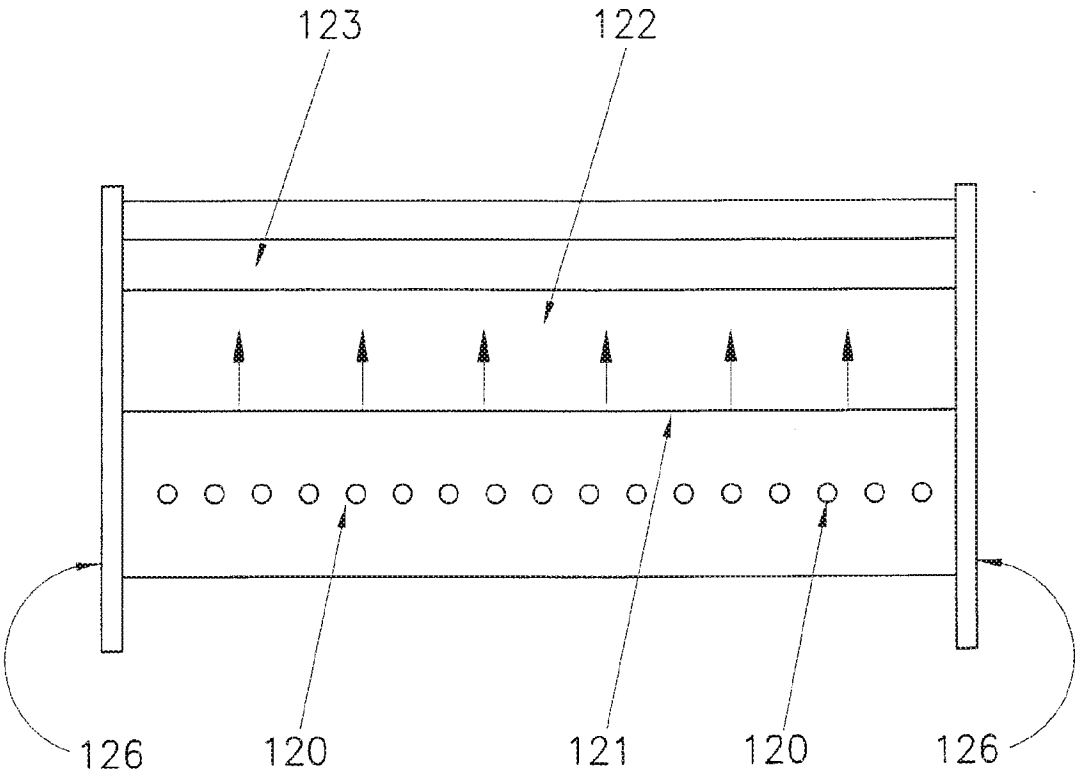


FIG 7.

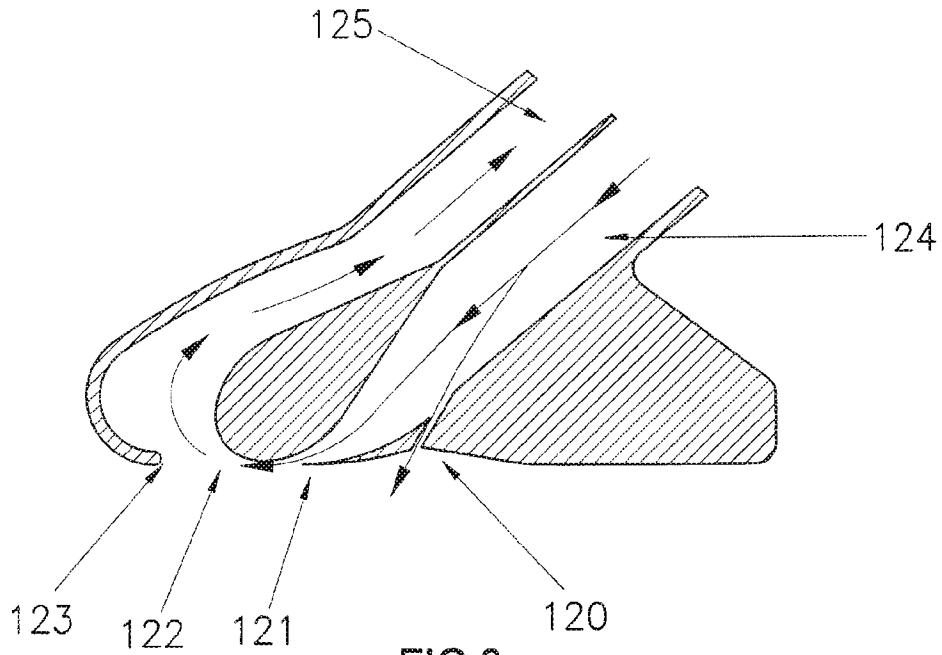


FIG 8.

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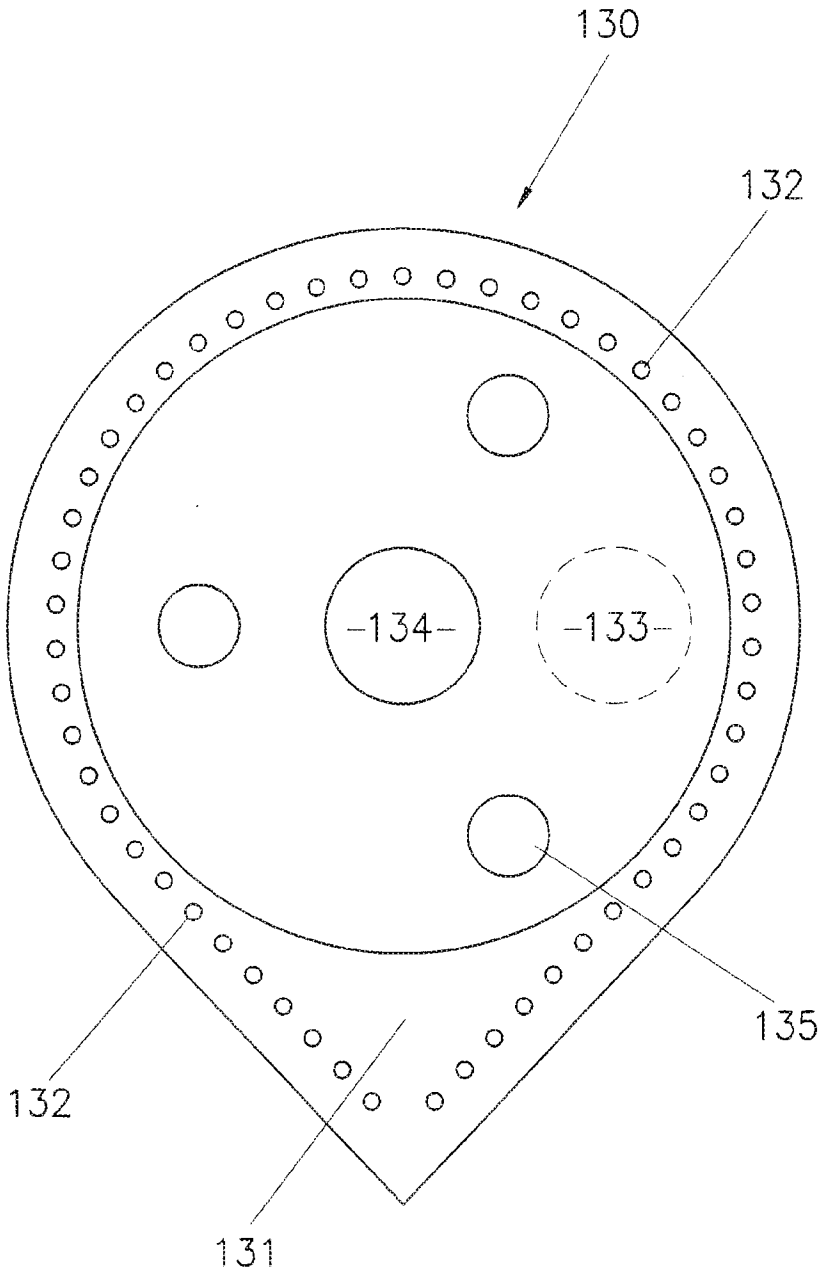


FIG 9.

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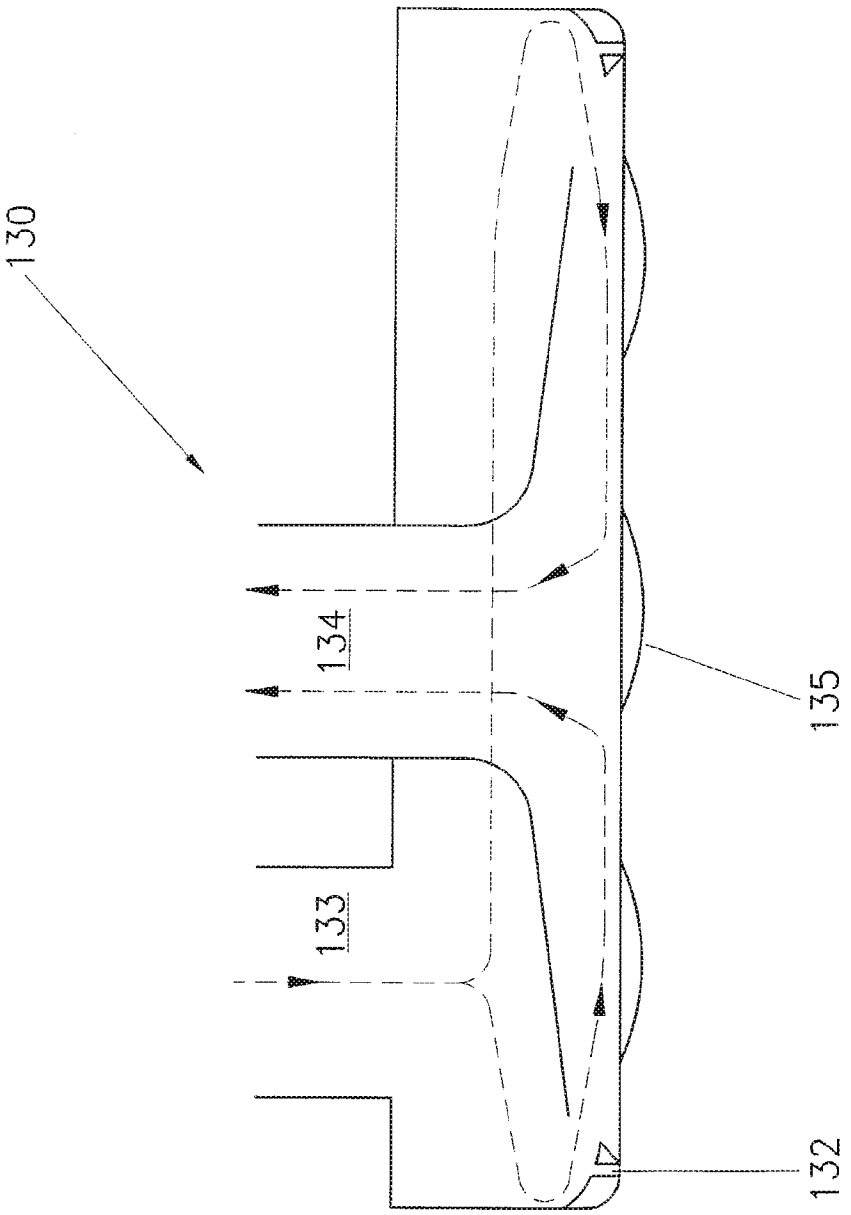


FIG 10.

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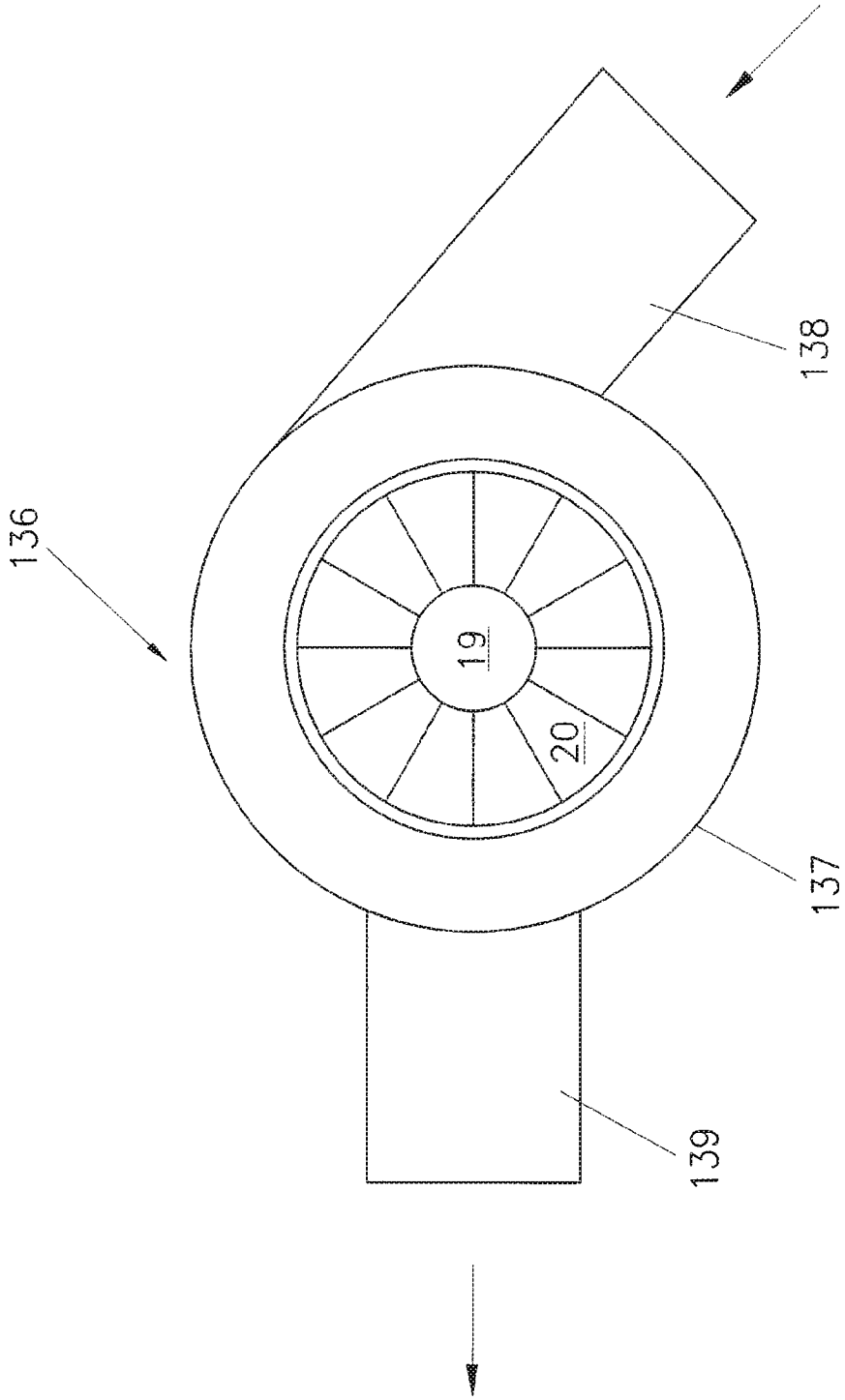


FIG 11.

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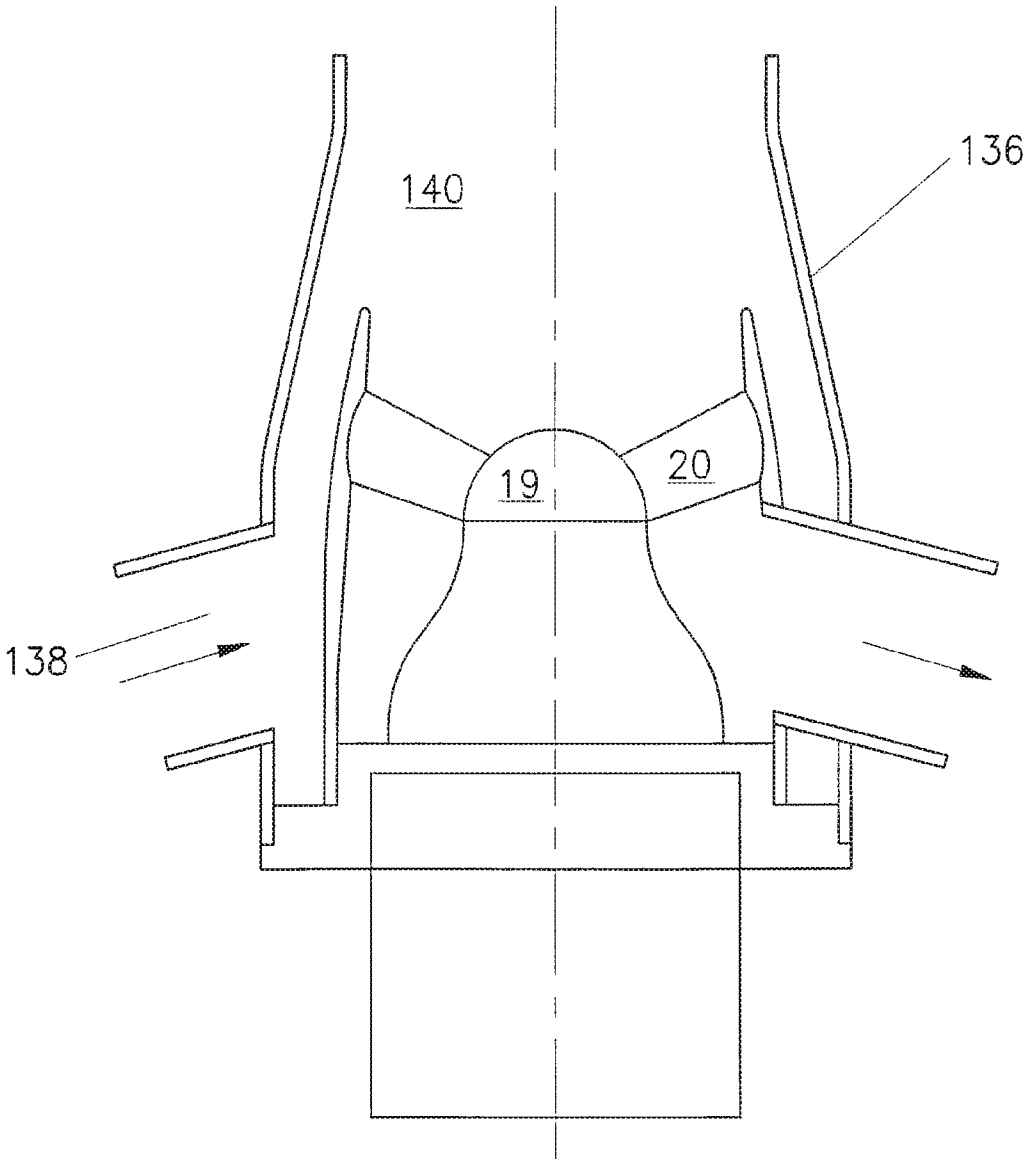


FIG 12.

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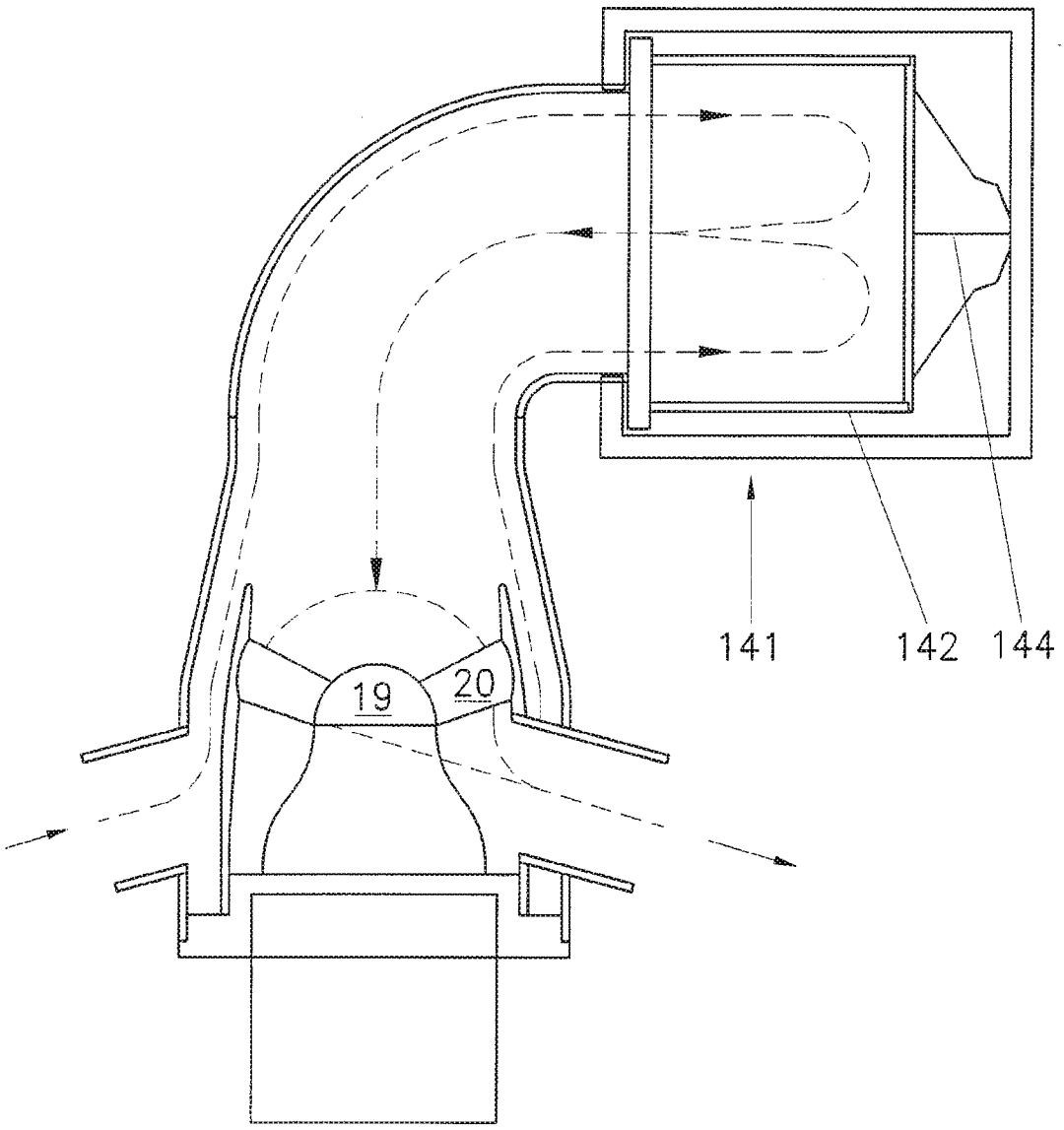


FIG 13.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00861

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: A47L 9/10, 9/16; B01D 45/16; B04C 5/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: AS ABOVE

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Derwent World Patent Index

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 042723 A (ROTORK APPLIANCES LIMITED) 30 December 1981 See figure 1	7-12
X	EP 728435 A (BLACK & DECKER INC) 28 August 1996 See figure 3	7-12
X	GB 2315231 A (NOTETRY LIMITED) 28 January 1998 See figures 1 and 2	7-12

☐ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 December 1999	14 DEC 1999
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **D.R. LUM** Telephone No.: (02) 6283 2544

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INTERNATIONAL SEARCH REPORT

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See attached sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

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INTERNATIONAL SEARCH REPORT

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Box (continuation)

Lack of unity

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claims 1-6 are directed to an apparatus to pick up and collect particulate material. It is considered that the curved body positioned in the slot and dividing the slot into two parts comprises a first "special technical feature".

2. Claims 7 & 8 are directed to an apparatus for separating particles from a fluid stream and claims 9-12 are directed to an apparatus to pick up and collect particulate material It is considered that causing the fluid to adopt a first larger diameter spinning motion and then a second smaller diameter spinning motion and passing the fluid back through the centre of the first fluid stream comprises a second "special technical feature".

These groups are not so linked as to form a single general inventive concept, that is, they do not have any common inventive features, which define a contribution over the prior art. The common concept linking together these groups of claims is a separating chamber in which the particles are separated from the fluid stream. However this concept is not novel in the light of the documents cited in this report. Therefore these claims lack unity a posteriori.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 99/00861

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
EP	42723	AT	14974	CA	1182613	DE	3171910
		DK	2721/81	JP	57066728	JP	61191329
		US	4593429	US	4826515	US	4853011
		US	5160356				
EP	728435	GB	9503334				
GB	2315231	AU	34503/97	CN	1230100	EP	918481
		WO	9802080				
END OF ANNEX							

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⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　平3－65545

⑤Int. Cl.⁵	識別記号	庁内整理番号	㊸公開　平成3年(1991)6月26日
A 47 L 9/16		7618－3B	

審査請求　未請求　請求項の数 1　（全　頁）

㊵考案の名称　着脱式サイクロン型掃除機

㉑実　願　平1－126057
㉒出　願　平1(1989)10月27日

㉓考案者　三好　紀明　大阪府大阪市阿倍野区長池町22番22号　シャープ株式会社内
㉓考案者　井谷　明広　大阪府大阪市阿倍野区長池町22番22号　シャープ株式会社内
㉑出願人　シャープ株式会社　大阪府大阪市阿倍野区長池町22番22号
㉔代理人　弁理士　中村　恒久

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89-5294

明　細　書

1．考案の名称

着脱式サイクロン型掃除機

2．実用新案登録請求の範囲

サイクロン本体と、該サイクロン本体の後部にフイルタ式掃除機本体の吸込口に着脱可能に形成された排気口と、サイクロン本体の前部にフイルタ式掃除機本体の吸込ホースに着脱可能に形成されたサイクロン吸込口と、前記サイクロン本体の内部に形成された砂ごみ等の集塵室とを備えて成る着脱式サイクロン型掃除機。

3．考案の詳細な説明

〈　産　業　上　の　利　用　分　野　〉

本考案は、フイルタ式掃除機に装着して使用する着脱式サイクロン型掃除機に関するものである。

〈　従　来　技　術　〉

従来のフイルタ式掃除機は、第4図の如く、モーター1により駆動されるファンケース2内のファンにより、ホース3を通して、掃除機本体4の吸込口5より塵埃と空気が吸い込まれる。そして、

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実開3－65545

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掃除機本体４内でフイルター６により、塵埃はろ過され、空気のみがファンケース２、およびモータ１を通して掃除機排気口７より排気される。

フイルターパッキン８は本体前部４ａの内周に密着しているため、掃除機吸込口５より入った空気と塵埃は必ずフイルタ６を通ってファンケース２に排気される。このため、フイルタ６の目詰まりが起ってくると、徐々に風速抵抗が増し、風量が落ちてくる。

〈 考案が解決しようとする課題 〉

上記従来技術において、特に砂ごみの多い場所を掃除する場合、従来のフイルター式掃除機では、短時間の内に目詰まりが起り、吸込口が急速に低下する。

しかし、フイルター式掃除機は、微細ごみもろ過するという点で優れているので、家庭用掃除機の主流になっている。

このため、特に砂ごみの多い場所で使用する場合にのみフイルタの短時間の目詰まりを防止する改善策が望まれていた。

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本考案は、上記に鑑み、フイルタ式掃除機本体に装着してその掃除機本体のフイルタの早期目詰まりを改善し得る着脱式サイクロン型掃除機の提供を目的としている。

〈 課題を解決するための手段 〉

本考案による課題解決手段は、第１，２，３図の如く、サイクロン本体１１と、該サイクロン本体１１の後部にフイルタ式掃除機本体４の吸込口５に着脱可能に形成された排気口１２と、サイクロン本体１１の前部にフイルタ式掃除機本体４の吸込ホース３に着脱可能に形成されたサイクロン吸込口１３と、前記サイクロン本体１１の内部に形成された砂ごみ等の集塵室１４とを備えて成るものである。

〈 作 用 〉

上記課題解決手段において、サイクロン排気口１２と掃除機吸込口５を接続すると、サイクロン吸込口１３より、砂ごみの混った空気が入ってくる。この空気はサイクロン本体内で、回転運動が加わり、比重の重い砂ごみは大きい遠心力が働き

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外へ振られる。このため砂ごみはサイクロン本体の内壁に当りその運動エネルギーを失ない、自重により集塵室１４へ落ちる。

軽いごみと空気はサイクロン排気口１２を通じフイルタ式掃除機本体に吸い込まれる。

そのため、フイルタ式掃除機本体のフイルタの早期目詰まりが改善できる。

〈 実 施 例 〉

以下、本考案の一実施例を図面に基づいて説明する。

第１図はフイルタ式掃除機本体に本考案に係る着脱式サイクロン型掃除機を装着した状態を示す斜視図、第２図は同じくその断面図、第３図は着脱式サイクロン型掃除機の要部拡大断面図である。

図示の如く、本考案に係る着脱式サイクロン型掃除機は、軸流サイクロン本体１１と、該サイクロン本体１１の後部にフイルタ式掃除機本体４の吸込口５に着脱可能に形成された排気口１２と、サイクロン本体１１の前部にフイルタ式掃除機本体４の吸込ホース３に着脱可能に形成されたサイ

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クロン吸込口１３と、前記サイクロン本体１１の内部に形成された砂ごみ等の集塵室１４とを備えて成るものである。

前記サイクロン本体１１は、第３図の如く、円筒状サイクロン室１６と、該サイクロン室１６に連続する大径のごみ分離室１７と、該分離室１７の下側に形成された前記集塵室１４とから構成されている。そして、分離室１７の集塵室１４側の周壁には砂ごみ落下孔１８が形成されている。

前記サイクロン室１６には、その中心軸Ａ部に前後端が円錐状に形成された塵埃案内筒２０が形成され、該案内筒２０の外周壁には、空気とごみとに回転運動を与えるための複数枚のガイド羽根２１が形成されている。

前記排気口１２は、分離室１７の中心部Ａ部に固定された円筒２３により構成され、該円筒２３はサイクロン本体１１から後方へ突出して第２図の如くフイルタ式掃除機本体４の吸込口５に内嵌可能とされている。

前記サイクロン吸込口１３は、第３図の如く、

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サイクロン室１６から円錐状に形成された前部に、第２図の如く、フイルタ式掃除機本体４のホース３を外嵌可能な口径に形成されてなる。

なお、第３図中２５は集塵室１４のゴミを排出する排出口である。

また、フイルタ式掃除機本体４は、第４図で示すものと同様の構造をしているため、第２図において、第４図に示すものと同一機能部品は同一符号で示し、その詳細な説明は省略する。

上記構成において、床上を掃除するときは、第４図のように、掃除機吸込口５とホース３を直接接続する。

また、床下とか自動車の中を掃除するときは、まず、軸流サイクロン本体１１を掃除機吸込口５に取り付け、次にホース３をサイクロン吸込口１３の先端に取り付ける。

次に、床下とか自動車の中を掃除する場合の動作手順を説明する。取付け順序は上記に記載した通りである。フイルタ式掃除機本体４のモーター１を駆動すると、フアンケース２内のフアンが回

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転し、ホース３より空気とごみ(比重の重いごみ、軽いごみ)が吸い込まれる。ホース３と接続されたサイクロン吸込口１３に空気とごみが入る。この空気とごみは、ガイド羽根２１により、空気とごみに回転運動が加わる。このため比重の重いごみ(砂ごみ)は大きな遠心力を与えられ、サイクロン排気口１２の吸込力に抗して外へ振れる。軽いごみと空気はサイクロン排気口１２の吸込力に抗しきれずにサイクロン排気口１２に吸い込まれる。

外へ振れた重いごみはサイクロン本体１１の内壁１６aに当り、運動エネルギーを失い、分離室１７でほぼ停止し、自重により落下孔１８を通し、集塵室１４に落ちる。

サイクロン排気口１２と接続された掃除機吸込口５に吸い込まれた軽いごみと空気はフィルタ式掃除機本体４のフィルタ６により、ごみはろ過され、空気のみがファンケース２、モーター１を通し、掃除機排気口７より排気される。

このように、軸流サイクロン自体に砂ごみ(比重が重い)と他のごみとを分離する作用があり、

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また砂ごみは遠心力が与えられた場合、遠心力によりサイクロン室１６の内壁に衝突を繰り返し、運動エネルギーを失い分離室１７に集まり集塵室１４へ落下するので、砂ごみによるフイルタ式掃除機本体４のフイルター６の目詰まりを軽減できる。

なお、本考案は、上記実施例に限定されるものではなく、本考案の範囲内で上記実施例に多くの修正および変更を加え得ることは勿論である。

〈 考 案 の 効 果 〉

以上の説明から明らかな通り、本考案によると、サイクロン本体と、該サイクロン本体の後部にフイルタ式掃除機本体の吸込口に着脱可能に形成された排気口と、サイクロン本体の前部にフイルタ式掃除機本体の吸込ホースに着脱可能に形成されたサイクロン吸込口と、前記サイクロン本体の内部に形成された砂ごみ等の集塵室とを備えており、サイクロン自体に砂ごみ(比重が重い)と他のごみとを分離する作用があり、また砂ごみは遠心力が与えられた場合、遠心力によりサイクロン本体の

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内壁に衝突を繰り返し、運動エネルギーを失い集塵室へ落下するので、砂ごみによるフイルタ式掃除機本体のフイルターの早期目詰まりを改善できるといった優れた効果がある。

4．図面の簡単な説明

第1図はフイルタ式掃除機本体に本考案に係る着脱式サイクロン型掃除機を装着した状態を示す斜視図、第2図は同じくその断面図、第3図は着脱式サイクロン型掃除機の要部拡大断面図、第4図はフイルタ式掃除機本体の断面図である。

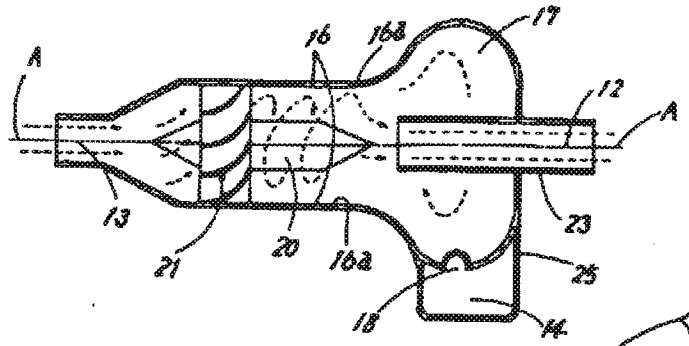
3：吸込ホース、4：フイルタ式掃除機本体、4A：フイルタ式掃除機、5：吸込口、11：サイクロン本体、12：排気口、13：サイクロン吸込口、14：集塵室。

出願人　シャープ株式会社

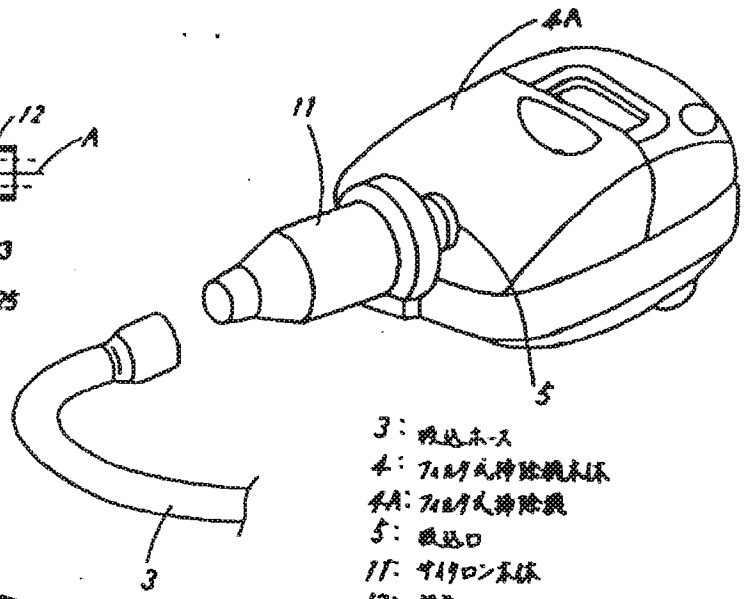
代理人　中村恒久

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第 3 図

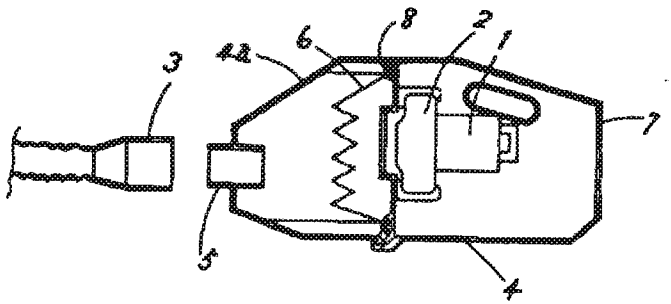


第 1 図

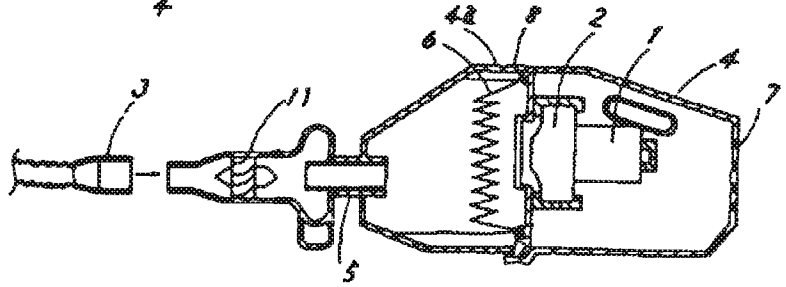


3：吸込ホース
4：フィルター装着掃除機本体
4A：フィルター装着部
5：吸込口
11：サイクロン本体
12：排気口
13：サイクロン吸込口
14：集塵室

第 4 図



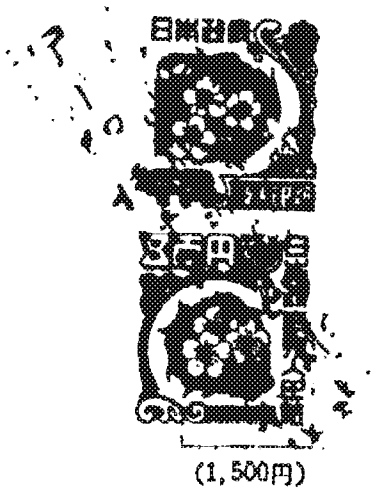
第 2 図



代理人 中村恒久

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JP. 48-54260. U



(1,500円)

実用新案登録願 (2通添付すること)

昭和 46.10.20

特許庁長官 井 土 武 久 殿

1. 考案の名称 電気掃除機

2. 考案者 実用新案登録出願人に同じ

住所
氏名

3. 実用新案登録出願人

住所 東京都世田谷区喜多見1丁目21番17号

氏名 今井 厚

(国籍)

4. 代理人 〒145

住所 東京都大田区南千束2丁目22番15号

氏名 (3459) 弁理士 荒井 進

5. 添付書類の目録

(1) 明細書	1	通
(2) 図面	1	通
(3) 願書副本	1	通
(4) 委任状等	1	通

特許庁

本件は同時提出の実願 号と添付のものを援用

48-54260-01 46-096300 方式

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明　　細　　書

1. 考案の名称　電気掃除機

2. 実用新案登録請求の範囲

前端に吸込具1を取付け得るようにした吸込管2の後方に筒状集塵室3を設け、該室を隔板4によつて前後二室に区分するとともに該隔板の中央に内筒5を保持させ、該内筒の前室内にある部分の筒壁に多数風車状の切窓6と傾斜翼板7とを設け、該集塵室3の後部にフィルター9およびファンモーター10を収容した筒状の吸気室11の前端を嵌合し、該室の前端中央に通気管12を附してその前端を前記内筒後端中央に一定の空隙13を設けて対向させ、該室の後端中央に長管状の排気管14の前端を取付けて成る電気掃除機。

3. 考案の詳細な説明

本案は吸込管の一部に塵埃の遠心分離装置、フィルターおよびファンモーターを装着した電気掃除機に係るものである。

普通の家庭用電気掃除機は吸込管部分とファン

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モータを収容した機体部分とが別体となつていて吸込管を把持しつつ掃除を行うとき機体部分を引摺つて作業するを要し、連結管にコードがからまつたりして煩雑な余分の手間を要するのみならず、機体中に集塵が詰まるとフイルターも充分奏効せず、更に排気が多量の粉塵を撒き散らすため衛生的である等の欠点があつた。

本案は長形の吸込管と排出管の中間に遠心分離装置、フイルター、フアンモータ等を装設し排出管を把手および消音管に兼用させることにより、軽量で吸塵力が強く、しかも騒音の発生および排気中の粉塵が少い携行に至便で衛生的な電気掃除機を得ようとするものである。

本案電気掃除機の構成を図面について説明すると、前端に吸込具1を取付け得るようにした吸込管2の後方にこれと同心状として筒状の集塵室3を設け、該室を隔板4によつて前後二室に区分するとともに該隔板の中央に内筒5を保持させ、該内筒の前室内にある部分の筒壁に多翼風車状の切欠6と傾斜翼板7とを設け、該内筒の後室内にあ

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る部分の筒壁を先細テーパー状8に絞り、集塵室3の後部にフィルター9および7ンモーター10を取着した筒状の吸気室11の前端を嵌合し、該室の前端中央に通気管12を附してその前端を前記内筒後端中央に一定の空隙13を設けて対向させ、該室の後端中央に長管状の排気管14の前端を取付けて成るものである。

なお15は集塵室3に設けた集塵取出口、16は開閉蓋を示し、また排気管14の後端17は図示のように屈曲させておくと取扱にあたつて管端が他物に衝突して傷つけるおそれがなく、つり下げ等にも便利である。

次に本機の作用を説明すると、吸込具より吸込まれた含塵気流はまづ集塵室3の前室より切溝6を通つて内筒5に入り、このとき傾斜翼板7の誘導によつて旋回流となり該筒より出るとき遠心力によつてその中の固形塵体を集塵室3該室の内壁面に向つて放出し、中心部を流れるほぼ除塵された気流のみが吸気室11に入る。

吸気室11に入つた気流はフィルター9によつて

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ろ過されフアンモータ10を通過して排気管14より外部に排出されるものとす。

本案電気掃除機は吸込管2と排気管14との間に集塵用の全機構が取付けられていて携行、使用に至便であり、狭い室内、車内または高所に登つて使用するにも好適するのみならず、吸塵は殆んど集塵室3中に捕集された後フイルター9を通過するので該フイルターは長期間正常に作用し、排気は清浄で極めて衛生的である。

集塵室3中に分離された塵挨は随時開閉蓋16を開いて取出し、また集塵室内の掃除、フイルターの掃除、取替等を行うときは集塵室と吸気室11の嵌合部を取外せばよい。

なお排気管14は把手の作用を行うとともに消音効果をも奏し、また前記のように排気は極めて清浄であるが特に病室、精密作業場その他完全無塵を要求される場所で使用する場合は、管端にバックフイルター等を取付けておけば微粉塵等の排出は全面的に防止される。

4. 図面の簡単な説明

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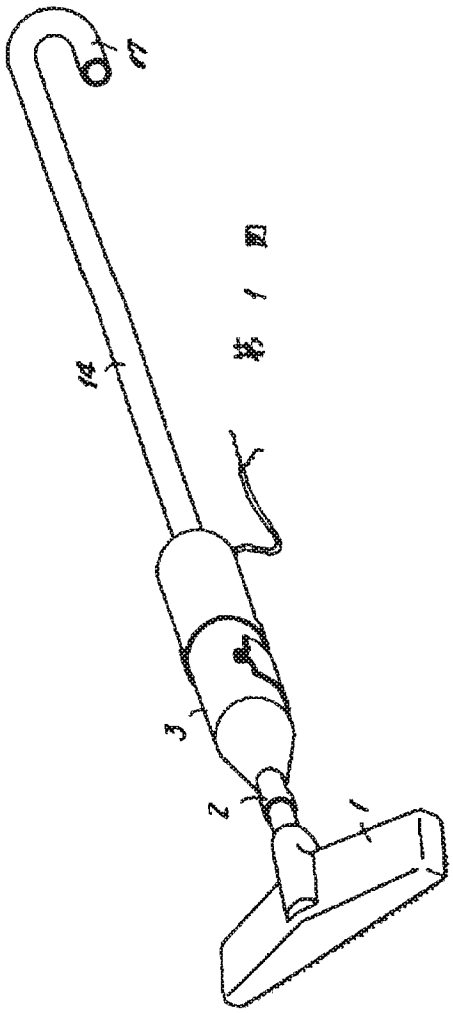
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第１図は本案電気掃除機の斜視図、第２図は要部の中央縦断面図、第３図は前図のＡ－Ａ線断面図で、図中１は吸込具、２は吸込管、３は集塵室、４は隔板、５は内筒、６は切窓、７は傾斜翼板、９はフィルター、１０はファンモータ、１１は吸気室、１２は通気管、１３は空隙、１４は排気管を示す。

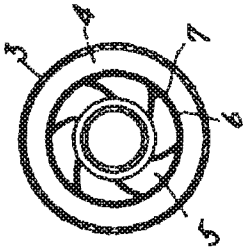
代理人　荒井　邁

48-54260-06

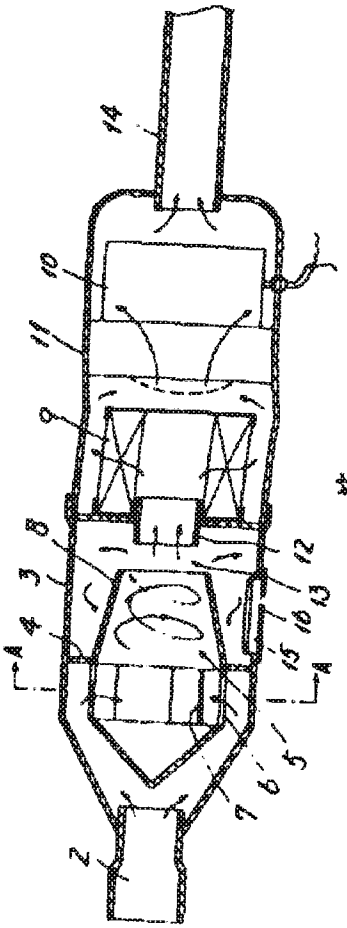
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第1図



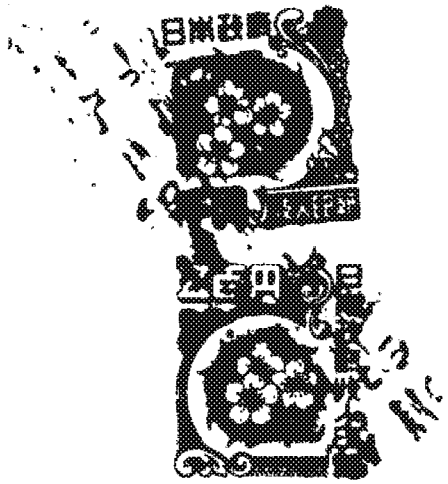
第3図



第2図

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(1,500円)

実用新案登録願 (1)

46.10.20
昭和　年　月　日

特許庁長官　井　土　武　久　殿

1. 考案の名称　電気掃除機用吸込管（デンキソウジキヨウスイコミカン）

2. 考案者　実用新案登録出願人

　住所
　氏名

3. 実用新案登録出願人

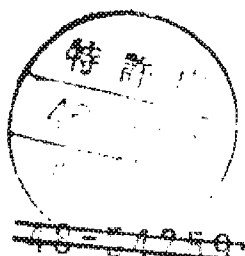
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5. 添付書類の目録

(1)	明細書	1通
(2)	図面	1通
(3)	願書副本	1通
(4)	委任状	1通



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明　細　書

1. 考案の名称　電気掃除機用吸込管

2. 実用新案登録請求の範囲

前端に吸込具1を取付け得るようにした前部吸込管2の後方に集塵室3を連設し、該室を隔板4によつて前後二室に区分するとともに該隔板中央に内筒5を保持させ、該内筒の前室内にある部分の筒壁に多翼風車状の切窓6と傾斜翼板7とを設け、該内筒の後室内にある部分の筒壁を先細テーパー状8に絞るとともにその開口部後方に若干の空隙9を設けて前端を集塵室3の後室に引込んだ後部に吸込管10の口部を対向させて成る電気掃除機用吸込管。

3. 考案の詳細な説明

本案は電気掃除機用吸込管の一部に塵埃の遠心分離装置を設けたものである。

普通の家庭用電気掃除機は吸込管の塵埃が全部機内のフイルターに吸着されるため、該フイルターに簡単なふるい落し装置を設けた程度では除塵

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が完全に行われずに短期間に目詰りするとともに機内に集められる塵は風圧によつて圧搾されて大なる通風抵抗を生じ、使用風力、動力等も大となり、機重も増加して使用者に多くの労力を要求するのみならず、前記の集塵中を高圧を以て浸透して外部に排出される空気は多くの微粉塵を含んでいてこれを室内に撒き散らすため非衛生的である等の欠点があつた。

本案は電気掃除機の吸込管の一部に吸塵の遠心分離装置を設けることにより、吸塵の大部分を該装置に捕集させ、ほぼ清浄となつた空気のみを機内に吸込んでフイルターに充分の機能を発揮させるとともに、機内における集塵量を減少させ、これに伴う通風抵抗の低下、風力、動力の減少によつて排気中の粉塵を可及的に減少させようとするものである。

本案電気掃除機用吸込管の構成を図面について説明すると、前端に吸込具1を取付け得るようにした前部吸込管2の後方にこれと同心として筒状の集塵室3を連設し、該室を隔板4によつて前後

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二室に区分するとともに該隔板の中央に内筒5を保持させ、該内筒の前室内にある部分の筒壁に多翼風車状の切窓6と傾斜翼板7とを設け、該内筒の後室内にある部分の筒壁を先細テーパー状8に絞るとともにその開口部後方に若干の空隙9を設けて前端を集塵室3の後室に引込んだ後部吸込管10の口部を対向させて成り、なお図中11は集塵室の前室前方に設けた縦状導風体、12は集塵室の一側に設けた集塵取出口、13は該取出口に取付けた開閉蓋を示す。

本案吸込管は在来の電気掃除機の本体より吸込管を取外したあとに該管使用するもので、本体を作動させると吸込具1が吸塵し前後部の吸込管2、10を経て本体へ吸気する点は在来の吸込管と同様であるが、本案の場合吸気が集塵室3の前室より切窓6を経て内筒5に入るとき傾斜翼板7の誘導によつて筒内において旋回流となり、該筒外に出るとき遠心力によつてその中の固形塵体を集塵室3後室の内壁面に向つて放出し、中心部を流れるほぼ除塵された空気のみを後部吸込管10より

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本体内に送る。

従つて本体の吸込む気流中の含塵量は僅少であり、本体内のフィルターは長期間に亘つて目詰りせずに完全ろ過作用を行うとともに、本体中の滞塵が少量であり、通気抵抗が小であるため使用動力も少く、同時に排気中の粉塵も少く極めて衛生的である。

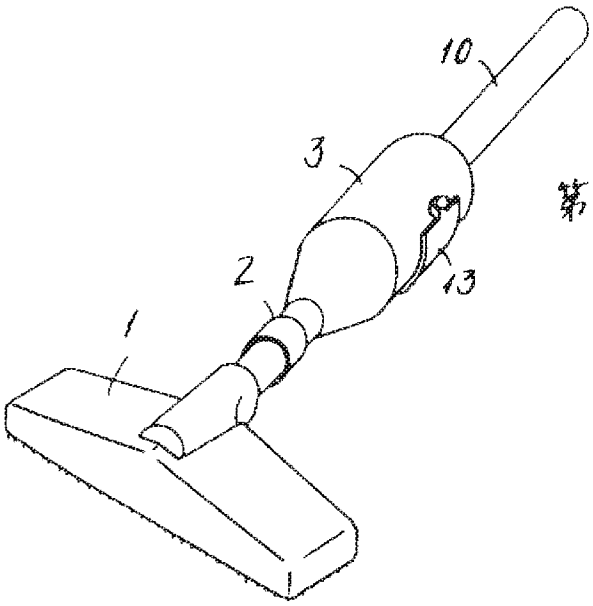
なお集塵室3中に分離された塵埃は随時開閉蓋13を開いて取出せばよく、また集塵室の一部または全面を透明プラスチック材等で構成させておけば外部より集塵量が見知できて好都合である。

4. 図面の簡単な説明

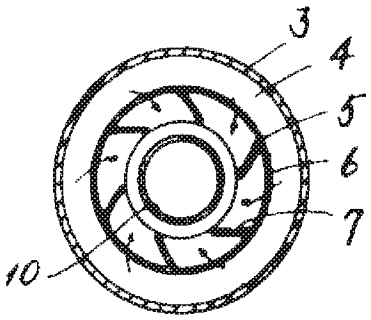
第1図は本案電気掃除機用吸込管の斜視図、第2図は要部の中央縦断面図、第3図は前図のA—A線断面図で、図中1は吸込具、2は前部吸込管、3は集塵室、4は隔板、5は内筒、6は切窓、7は傾斜翼板、8は内筒の後部筒壁テーパー部、9は空隙、10は後部吸込管を示す。

代理人　荒井　進

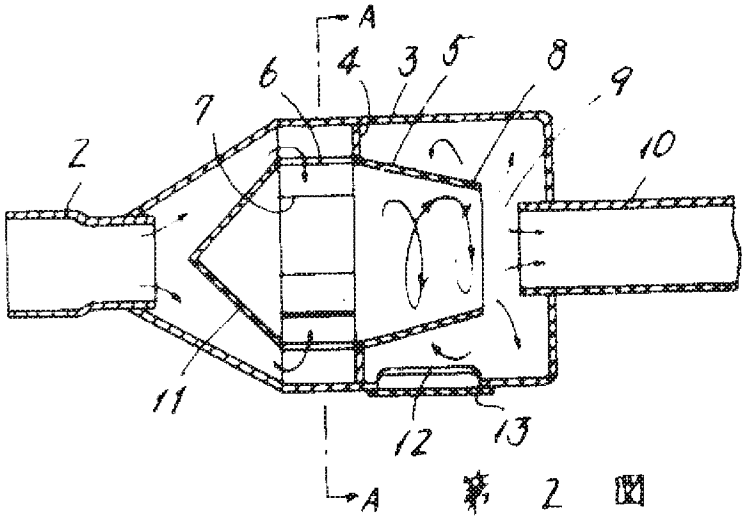
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第 1 図



第 3 図



第 2 図

実用新案登録出願人　今井　尋

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DESCRIPTION DE2153664

Vacuums The invention relates to a vacuum cleaner with a dust collector and a <RTI> Notorgebläseeinheit, </ RTI> which are arranged within a common housing, which is provided with suction and blowing openings for the funded through the vacuum cleaner from the blower unit air from which the coarse dust particles are deposited without using a notch filter by working with centrifugal dynamic separator.

There are already such vacuum cleaners are known in which a part of the dust particles without the use of <RTI> STOPF - </ RTI> or paper filter from the drawn-in air are separated.

The deposition takes place in that the air sucked encounters a centrifugal impeller that angle captures the larger Staubparti- and fugalrad against the inside of the centrifuge surrounding, suitably <RTI> manner 'designed </ RTI> baffle hurls which the radial movement of the particles to the direction of the dust collector <RTI> -umlenkt.- After this </ RTI> coarse filtering the air is a collection space for finer dust particles supplied, where they by means of conventional <RTI> fine filters, </ RTI> usually in the form of cloth or paper bags, will be exempt from further contamination.

Object of the invention is to make the arrangement of a special collection chamber for fine dust in a vacuum cleaner of the type mentioned superfluous. According to the invention this object is achieved in that the working with centrifugal dynamic separator is in two stages, coarse dust particles in a first stage and finer dust particles are separated in a second stage.

The invention is described in more detail below, with reference to a chosen as an example and shown schematically in the drawings vacuum cleaner with a, preferably consisting of plastic housing which is divided into two halves, which are joined by gluing, welding or in some other way to form a unit. Show it. FIG. 1 is a perspective view of a <RTI> Hand dust - </ RTI> uum cleaner, the purifying <RTI> smaller - </ RTI> Surfaces, <RTI> beispi.elsweise-.in </ RTI> <RTI> Automotive, zeu-s - ,, </ RTI> is provided <RTI> Figure </ RTI> 2 is a view of the <RTI> inside fdieses </ RTI> <RTI> dust eye; </ RTI> after removing the one housing half, FIG. 3 is a view of the inside of the removed <RTI> I ,, housing :: shell 1 - </ RTI> Fig. 4 is a perspective view of the first stage differs from the form of a fan impeller, FIG. 5 shows on a larger scale a section along line

[1]

V-V in Fig. 1 Fig. 6 shows a section, along the line <RTI> VI-VI </ RTI> in Fig. 2 by the second separating stage Fig. <RTI> 7 - </ RTI> shows a section through one half of the dust uum cleaner along the line <RTI> VII-VII </ RTI> in Fig. 3.

The cleaner body is throughout denoted by 10. and contains a dust collector 11, a separation space 12 and a space 13 for the motor blower unit 14th In the suction opening 15 a pipe connection 16 is used, which can be provided with a (not shown) cleaning mouthpiece. The dust-laden air from the <RTI> Notorgebläseein - sucked </ RTI> unit by a centrally housed in the dust collector suction tube <RTI> 17 </ RTI> of which one end is connected to the pipe stub 16 and the other end into the separating zone 12 opens before an arranged on the motor shaft 18 centrifugal impeller 19th The suction tube <RTI> 17 </ RTI> is held within the dust collector, and that arranged on the outer wall of the tube by means of two radial elevations 20, which engage in corresponding recesses 21 in collector <RTI> längagehenden </ RTI> walls 22 in the dust.

These walls divide the dust collector in two substantially identical halves 23a, 23b which are partly shielded from the separating chamber by transverse walls 24a, 24b.

As shown in FIG. 4, the centrifugal impeller 19, a number straight radial vanes 25 which extend from a round, arranged transversely in front of the suction pipe 17 disk 26.

In the center of the disk 26 is a circular opening 27 for the motor shaft 18th At the blades 25 opposite side of the disc a cylindrical drum 28 is disposed coaxially with the centrifugal impeller 19th The drum 28, which forms the second stage of the dust separator is attached by means of spokes 19 to a hub 30 which has a central opening 31 for the motor shaft 18th The drum 28, whose outer diameter <RTI> something </ RTI> <RTI> less </ RTI> is <RTI> u </ RTI> the diameter of the impeller, <RTI> 19, </

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RTI> <RTI> is </ RTI> in <RTI> their </ RTI> lateral surface provided with a relatively large number of apertures 32, through which the durchbrochens Elech- material small, in the direction of rotation of the drum considered backward curved blades 33 forms, as shown in FIG. 5 is visible. The rear in the flow direction of the air end of the drum 28 is <RTI> It </ RTI> a flange 34 which engages in a circular recess <RTI> 3 = </ RTI> in a between the separation chamber 12 and <RTI> the </ RTI> chamber 13 arranged wall 36 engages.

The space 13 in which the Motorgebläseein- unit is housed, is through a central opening 37 in the wall 36 with the separating chamber 12.

The inner wall surface of the separating chamber 12 is 33 </ RTI> provided with a cast, trapezoidal in cross-section spiral <RTI> whose slope on the merits of the axial <RTI> height </ RTI> corresponds to the fan impeller 19 and the slope direction of the rotational direction of the wheel 19 and the drum 28 follows. By this arrangement, the pipe socket 16 coming dust-laden air through the intake manifold 17 through to the centrifugal impeller 19, which is made from a mainly axial airflow, the <RTI> by </ RTI>.

In the wheel 19 there is a rapid change in direction of the air flow, and the air is thrown against the spiral 38 is provided with the inside of the separating chamber 12th

This has the consequence that meet due to the relatively high rotational speed of the fan impeller, in this case about 16 000 rpm, all the larger dust particles, the inside of the room with great force, where their tangential moving direction of the spiral 38 on the axial direction is changed, that the particles are fed to the dust collector eleventh

The thus freed of coarser dust particles air is further sucked into the second stage of the trap of the motor fan unit 14 between the periphery of the disc 26 and the inner wall of the space 12 and.

As mentioned, <RTI> is </ RTI> this stage of the <RTI> perforated, </ RTI> zwischen'dem centrifugal impeller and the <RTI> Notorgebläseeinheit </ RTI> arranged drum <RTI> 28th </ RTI> The partially cleaned air between the drum 28 and the inside of the <RTI> bschelde - </ RTI>, space 12 is set by the vanes 33 of the drum in strong rotation, the dust particles after the Grobabscheiden a small mass <RTI> hook </ RTI> are gradually brought into contact with the with <RTI> Spi.ralgåager </ RTI> <RTI> provided </ RTI> inner wall of the space 12 and follow the coarser dust particles into the dust collector 11th The filtered in this way, air flows through the openings of the drum 28 and the central opening 37 for Gebläsemotor to cool these, and escaping finally through the <RTI> blowout - </ RTI> opening 39 to the outside, Patent claims /

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CLAIMS DE2153664

<RTI> Pzatentanspruche t </ RTI> Vacuum cleaner with a dust collector and a <RTI> place for engine </ RTI> <RTI> blower unit, </ RTI> which. Within a common housing reasonable <RTI> i </ RTI>

are arranged, which is provided with suction and blowing openings for the funded through the vacuum cleaner from the blower unit air from which the coarser dust particles. are deposited without using a notch filter by working with centrifugal dynamic separator, d a a u r c h g e k e n n c e i c h n e t that of working with centrifugal dynamic separator is in two stages, coarse dust particles in a first stage and finer dust particles are separated in a second stage.

2.

Vacuum cleaner according to claim 1, d a d u r c h g e k e n n c e i c h n e t, that the first stage of the trap from a provided with radial blades centrifugal impeller (19) and the second stage of a coaxial therewith arranged cylindrical drum (28) are made,

3.

Vacuum cleaner according to claim 2, characterized in that the outer diameter of the drum (28) is somewhat smaller than the diameter of the fan impeller (19) and that the drum in its outer surface a relatively large number of substantially rectangular openings (32) <RTI> identifies, < / RTI be> of, viewed in the direction of rotation of the drum, backward curved vanes (33) partially covers.

4.

Vacuum cleaner according to one of claims 1 to 3, characterized in that on the inner wall of the separating chamber (12) leading to the dust collector guide surface is arranged, through which the radial movement direction of the <RTI> S * aubpartikel </ RTI> in axial direction can be changed is.

5.

Vacuum cleaner according to claim 4, d a d k e n n c e i c h n e t, <RTI> däss </ RTI> the guide surface in the form of a trapezoidal cross-section spiral movement on the merits of the axial height of Zentrifugalrade (19) and the slope direction of the rotational direction of the impeller, follows.

6.

Vacuum cleaner according to one of the preceding claims, <RTI> you </ RTI> rchgekennzeichnet that the drum (28) seen in her in the direction of air flow, the rear end has a radial flange (34) in a recess (35) within a between the separation space (12) and a motor fan unit (14) containing space (13) disposed wall (36) engages.

7.

Vacuum cleaner according to claim 6, dadurchgekenn ze ichnet that the space (13) for the <RTI> Notor - </ RTI> blower unit (14) with the interior of the drum (28) through a central opening (37) in the wall (36) communicates.

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BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

(52) Deutsche Kl.: 34 c, 9/16

(10)
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(33) Land: Schweden
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(54) Bezeichnung: Staubsauger

(61) Zusatz zu: —
(62) Ausscheidung aus: —

(71) Anmelder: Aktiebolaget Electrolux, Stockholm

Vertreter gem. § 16 PatG: Beyer, W., Dipl.-Ing.; Jochem, B., Dipl.-Wirtsch.-Ing.; Patentanwälte, 6000 Frankfurt

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Patentanwälte
Dipl.-Ing. W.Beyer
Dipl.-Wirtsch.-Ing. B.Jochem

2153664

Frankfurt am Main Freiherr-vom-Stein-Str. 18

In Sachen:

Aktiebolaget Electrolux
Stockholm /Schweden
Luxbacken 1

Staubsauger

Die Erfindung betrifft einen Staubsauger mit einem Staubsammler und einer Motorgebläseeinheit, die innerhalb eines gemeinsamen Gehäuses angeordnet sind, welches mit Saug- und Ausblasöffnungen für die durch den Staubsauger von der Gebläseeinheit geförderte Luft versehen ist, aus der die gröberen Staubpartikel ohne Verwendung eines Sperrfilters durch einen mit Zentrifugalkraft arbeitenden dynamischen Abscheider abgeschieden werden.

Es sind bereits solche Staubsauger bekannt, bei denen ein Teil der Staubpartikel ohne Verwendung von Stoff- oder Papierfilter von der eingesaugten Luft abgeschieden werden. Das Abscheiden geschieht dadurch, daß die eingesaugte Luft auf ein Zentrifugalrad trifft, das die größeren Staubpartikel auffängt und sie gegen die Innenseite einer das Zentrifugalrad umgebenden, in geeigneter Weise ausgestalteten Leitfläche schleudert, welche die radiale Bewegung der Partikel zur Richtung zum Staubsammler umlenkt. Nach dieser Grobfilterung wird die Luft einem Sammelraum für feinere Staubpartikel zugeleitet, wo sie mit Hilfe von herkömmlichen

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Feinfiltern, gewöhnlich in der Form von Stoff- oder Papierbeuteln, von weiteren Verunreinigungen befreit wird.

Aufgabe der Erfindung ist es, die Anordnung eines besonderen Sammelraums für Feinstaub in einem Staubsauger der eingangs genannten Art überflüssig zu machen. Erfindungsgemäß wird diese Aufgabe dadurch gelöst, daß der mit Zentrifugalkraft arbeitende dynamische Abscheider zweistufig ist, wobei gröbere Staubpartikel in einer ersten Stufe und feinere Staubpartikel in einer zweiten Stufe abgeschieden werden.

Die Erfindung wird nachstehend näher beschrieben unter Hinweis auf einen als Beispiel gewählten und in den Zeichnungen schematisch dargestellten Staubsauger mit einem vorzugsweise aus Kunststoff bestehenden Gehäuse, das in zwei Hälften aufgeteilt ist, die durch Kleben, Schweißen oder auf andere Weise zu einer Einheit verbunden sind. Es zeigen:

Fig. 1 eine perspektivische Ansicht eines Handstaubsaugers, der zur Reinigung von kleineren Flächen, beispielsweise in Kraftfahrzeugen, vorgesehen ist,

Fig. 2 eine Ansicht des Inneren dieses Staubsaugers nach Entfernen der einen Gehäusehälfte,

Fig. 3 eine Ansicht der Innenseite der abgenommenen Gehäuseschale,

Fig. 4 eine perspektivische Ansicht der ersten Abscheidestufe in der Form eines Zentrifugalrades,

Fig. 5 in größerem Maßstab einen Schnitt nach Linie V-V in Fig. 1

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Fig. 6 einen Schnitt nach der Linie VI-VI in Fig. 2 durch die zweite Abscheidestufe,

Fig. 7 einen Schnitt durch die eine Hälfte des Staubsaugers nach der Linie VII-VII in Fig. 3.

Das Staubsaugergehäuse ist im ganzen mit 10 bezeichnet und enthält einen Staubsammler 11, einen Abscheideraum 12 und einen Raum 13 für die Motorgebläseeinheit 14. In die Saugöffnung 15 ist ein Rohrstutzen 16 eingesetzt, der mit einem (nicht gezeigten) Reinigungsmundstück versehen werden kann. Die staubbeladene Luft wird von der Motorgebläseeinheit durch ein zentral in dem Staubsammler untergebrachtes Saugrohr 17 eingesaugt, dessen eines Ende mit dem Rohrstutzen 16 in Verbindung steht und dessen anderes Ende in den Abscheideraum 12 vor einem auf der Motorwelle 18 angeordneten Zentrifugalrad 19 mündet. Das Saugrohr 17 ist innerhalb des Staubsammlers gehalten, und zwar mittels zweier an der Außenwand des Rohres angeordneter radialer Erhöhungen 20, die in entsprechende Ausnehmungen 21 in längsgehenden Wänden 22 in dem Staubsammler eingreifen. Diese Wände teilen den Staubsammler in zwei im wesentlichen identische Hälften 23a, 23b, die zum Teil von dem Abscheideraum durch Querwände 24a, 24b abgeschirmt sind.

Wie aus Fig. 4 ersichtlich, hat das Zentrifugalrad 19 eine Anzahl gerade radiale Schaufeln 25, die von einer runden, quer vor dem Saugrohr 17 angeordneten Scheibe 26 ausgehen. In der Mitte der Scheibe 26 befindet sich eine kreisförmige Öffnung 27 für die Motorwelle 18. An der den Schaufeln 25 entgegengesetzten Seite der Scheibe ist eine zylindrische Trommel 28 koaxial zu dem Zentrifugalrad 19 angeordnet. Die Trommel 28, die die zweite Stufe des Staubabscheiders bildet, ist mittels Speichen 19 an einer Nabe 30 befestigt, die eine

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zentrale Öffnung 31 für die Motorwelle 18 aufweist. Die Trommel 28, deren Außendurchmesser etwas kleiner ist als der Durchmesser des Zentrifugalrades 19, ist in ihrer Mantelfläche mit einer verhältnismäßig großen Anzahl von Öffnungen 32 versehen, über denen das durchbrochene Blechmaterial kleine, in der Rotationsrichtung der Trommel betrachtet nach rückwärts gebogene Flügel 33 bildet, wie aus Fig. 5 ersichtlich ist. Das in der Strömungsrichtung der Luft hintere Ende der Trommel 28 ist mit einem Flansch 34 versehen, der in eine kreisförmige Aussparung 35 in eine zwischen dem Abscheideraum 12 und dem Raum 13 angeordnete Wand 36 eingreift. Der Raum 13, worin die Motorgebläseeinheit untergebracht ist, steht durch eine zentrale Öffnung 37 in der Wand 36 mit dem Abscheideraum 12 in Verbindung.

Die innere Wandfläche des Abscheideraumes 12 ist mit einer angegossenen, im Querschnitt trapezförmigen Spirale 38 versehen, deren Steigung in der Hauptsache der axialen Höhe des Zentrifugalrades 19 entspricht und deren Steigungsrichtung der Rotationsrichtung des Rades 19 und der Trommel 28 folgt. Durch diese Anordnung wird die durch den Rohrstutzen 16 kommende staubbeladene Luft durch das Saugrohr 17 hindurch zu dem Zentrifugalrad 19 geführt, das von einem hauptsächlich axialen Luftstrom getroffen wird. In dem Rad 19 erfolgt eine schnelle Richtungsänderung des Luftstromes, und die Luft wird an die mit der Spirale 38 versehene Innenseite des Abscheideraumes 12 geschleudert. Dies hat zur Folge, daß auf Grund der verhältnismäßig hohen Rotationsgeschwindigkeit des Zentrifugalrades, im vorliegenden Fall etwa 16 000 UpM, alle größeren Staubpartikel die Innenseite des Raumes mit großer Kraft treffen, wo ihre tangentiale Bewegungsrichtung von der Spirale 38 auf axiale Richtung geändert wird, so daß die Partikel dem Staubsammler 11 zugeführt werden.

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Die auf diese Weise von gröberen Staubpartikeln befreite Luft wird von der Motorgebläseeinheit 14 zwischen die Peripherie des Scheibe 26 und die Innenwand des Raumes 12 und weiter in die zweite Stufe des Abscheiders eingesaugt. Wie erwähnt, besteht diese Stufe aus der durchlöcherten, zwischen dem Zentrifugalrad und der Motorgebläseeinheit angeordneten Trommel 28. Die zum Teil gereinigte Luft zwischen der Trommel 28 und der Innenseite des Abscheideraumes 12 wird von den Flügeln 33 der Trommel in kräftige Rotation gesetzt, wobei die Staubpartikel die nach dem Grobabscheiden eine kleine Masse haben, allmählich in Berührung mit der mit Spiralgängen versehenen Innenwand des Raumes 12 gebracht werden und den gröberen Staubpartikeln in den Staubsammler 11 nachfolgen. Die auf diese Weise filtrierte Luft strömt, durch die Öffnungen der Trommel 28 und die zentrale Öffnung 37 zum Gebläsemotor, um diesen abzukühlen, und entweicht schließlich durch die Ausblasöffnung 39 ins Freie.

Patentansprüche /

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1. Staubsauger mit einem Staubsammler und einer Motorgebläseeinheit, die innerhalb eines gemeinsamen Gehäuses angeordnet sind, welche mit Saug- und Ausblasöffnungen für die durch den Staubsauger von der Gebläseeinheit geförderte Luft versehen ist, aus der die gröberen Staubpartikel ohne Verwendung eines Sperrfilters durch einen mit Zentrifugalkraft arbeitenden dynamischen Abscheider abgeschieden werden, d a d u r c h g e k e n n z e i c h n e t , daß der mit Zentrifugalkraft arbeitende dynamische Abscheider zweistufig ist, wobei gröbere Staubpartikel in einer ersten Stufe und feinere Staubpartikel in einer zweiten Stufe abgeschieden werden.

2. Staubsauger nach Anspruch 1, d a d u r c h g e k e n n z e i c h n e t , daß die erste Stufe des Abscheiders aus einem mit radialen Schaufeln versehenen Zentrifugalrad (19) und die zweite Stufe aus einer koaxial zu diesem angeordneten zylindrischen Trommel (28) bestehen.

3. Staubsauger nach Anspruch 2, d a d u r c h g e k e n n z e i c h n e t , daß der Aussendurchmesser der Trommel (28) etwas kleiner als der Durchmesser des Zentrifugalrades (19) ist und daß die Trommel in ihrer Mantelfläche eine verhältnismäßig große Anzahl im wesentlichen rechteckiger Öffnungen (32) aufweist, die von, in der Rotationsrichtung der Trommel betrachtet, rückwärts gebogenen Flügeln (33) teilweise überdeckt werden.

4. Staubsauger nach einem der Ansprüche 1 bis 3, d a d u r c h g e k e n n z e i c h n e t , daß an der Innenwand des Abscheideraumes (12) eine zu dem Staubsammler führende Leitfläche angeordnet ist, durch welche die radiale Bewegungsrichtung der Staubpartikel in axiale Richtung änderbar ist.

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5. Staubsauger nach Anspruch 4, d a d u r c h g e k e n n z e i c h n e t , daß die Leitfläche die Form einer im Querschnitt trapezförmigen Spirale (38) hat, deren Steigung in der Hauptsache der axialen Höhe des Zentrifugalrades (19) entspricht und deren Steigungsrichtung der Rotationsrichtung des Zentrifugalrades folgt.

6. Staubsauger nach einem der vorhergehenden Ansprüche, d a d u r c h g e k e n n z e i c h n e t , daß die Trommel (28) in ihrem in der Strömungsrichtung der Luft gesehen, hinteren Ende einen radialen Flansch (34) hat, der in eine Aussparung (35) innerhalb einer zwischen dem Abscheideraum (12) und einem die Motorgebläseeinheit (14) enthaltenden Raum (13) angeordneten Wand (36) eingreift.

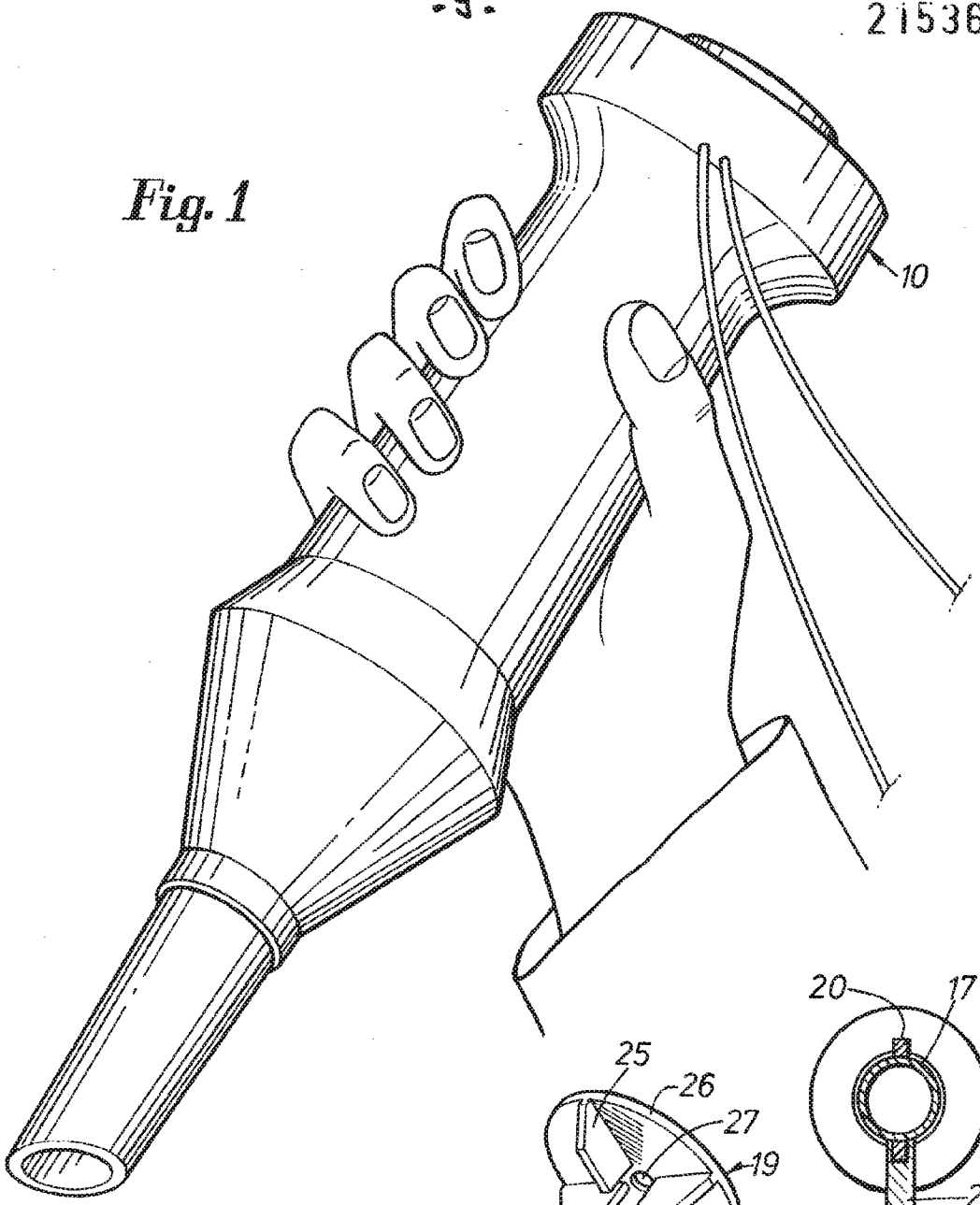
7. Staubsauger nach Anspruch 6, d a d u r c h g e k e n n z e i c h n e t , daß der Raum (13) für die Motorgebläseeinheit (14) mit dem Inneren der Trommel (28) durch eine zentrale Öffnung (37) in der Wand (36) in Verbindung steht.

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Fig. 1



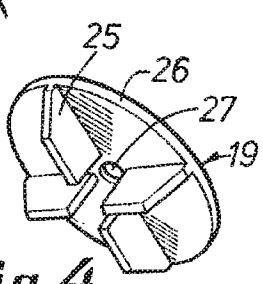


Fig. 4

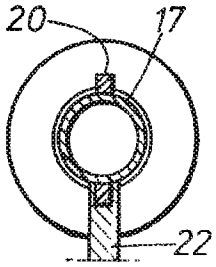


Fig. 6

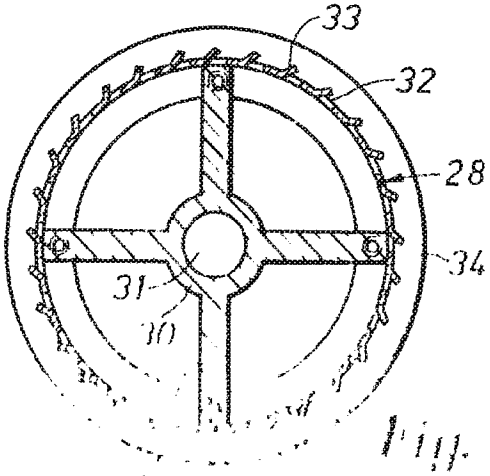


Fig. 5

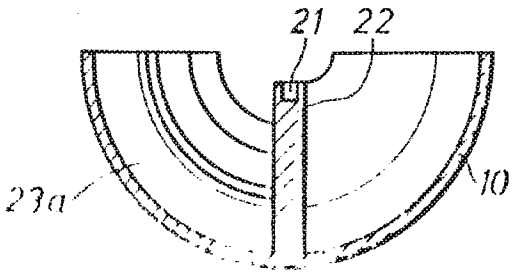


Fig. 7

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Fig. 2

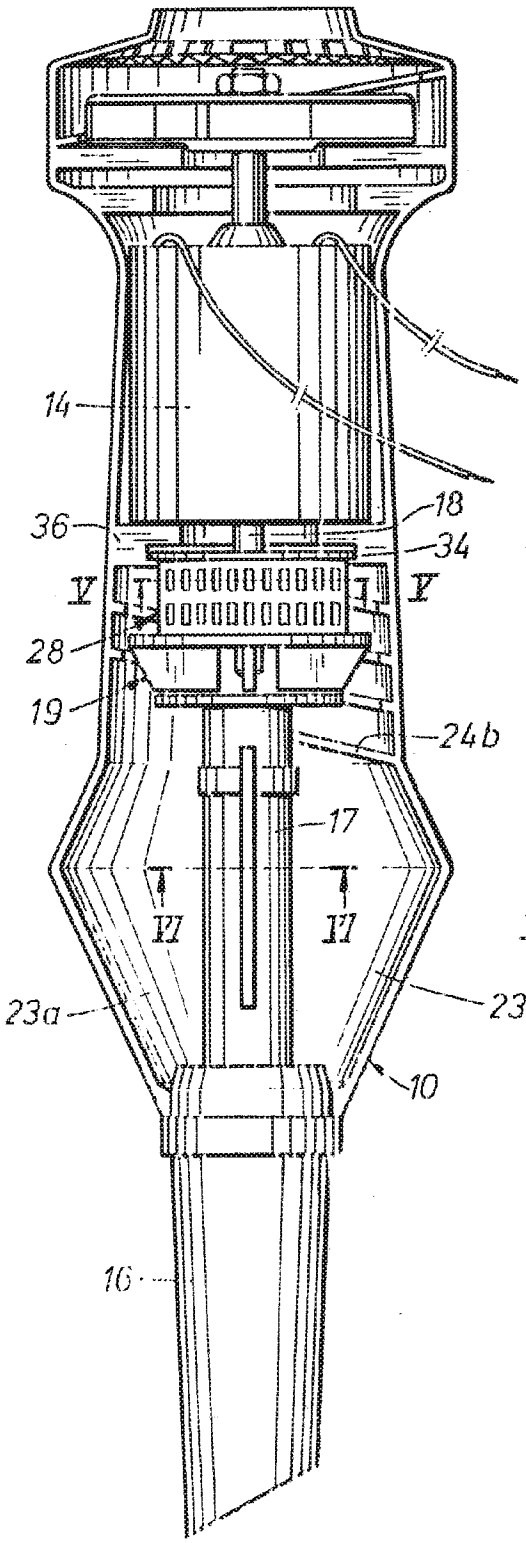
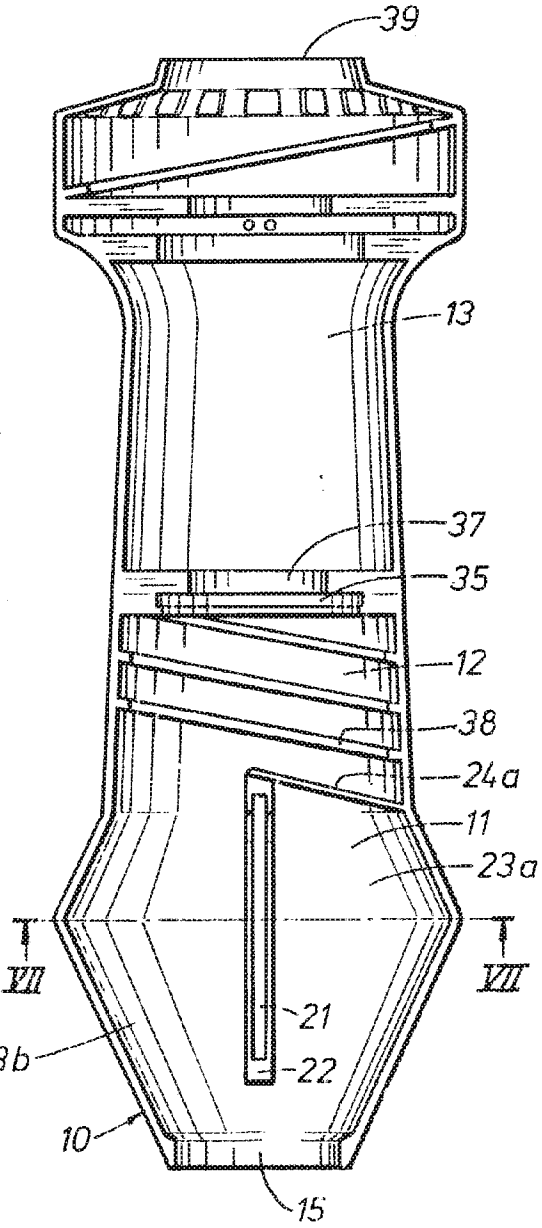


Fig. 3



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DESCRIPTION DE1407995

Means for <RTI> separation </ RTI> solid constituents of more airflow The invention relates to a device for <RTI> separation </ RTI> <RTI> solid - </ RTI> <RTI> components </ RTI> from a air flow, in particular for vacuum cleaners, un ter <RTI> use </ RTI> a cylindrical <RTI> air conduct chamber, _ </ RTI> of the air <RTI> tangentially </ RTI> with directed against the ground <RTI> Strömungsrichtu </ RTI> <RTI> ng </ RTI> <RTI> supplied </ RTI> and is taken centrally deck side via a <RTI> outlet </ RTI>.

It is known that solid particles from an air flow <RTI> charactenzed @ ERS </ RTI> a divorce, that one. A primary air flow with a secondary Air flow <RTI> applied, </ RTI> through the fringes of the primary <RTI> LuftströmL </ RTI> are brought into a rotating movement, in such a way that their BEWE supply of primary air flow runs counter. With such <RTI> Eir _ </ RTI> <RTI> direction </ RTI> can <RTI> z. B. </ RTI> fly ash are removed from Heizabgasen. For this purpose, the exhaust gas stream .by a <RTI> air conduct chamber </ RTI> <RTI> hindurchgeführ </ RTI> and <RTI> tangentially </ RTI> on the walls of <RTI> air conduct chamber </ RTI> is a against the < RTI> the flow direction of the @ </ RTI> flue gas stream directed <RTI> secondary air jet </ RTI> blown one. The deposited solid matter, <RTI> so * of </ RTI> flue dust, be removed on the bottom side at the edge of the <RTI> air conduct chamber </ RTI>.

<RTI> The </ RTI> invention is based on the task; this known device. for small appliances, in particular household appliances, train, so <RTI> that </ RTI> they dust separation </ RTI> can be used for vacuum cleaners to <RTI>. <RTI> inventions - </ RTI> <RTI> tion according </ RTI> this is achieved, that the bottom of the <RTI> Air Flow - </ RTI> <RTI> chamber </ RTI> a closed outwardly <RTI> plenum </ RTI> is under construction, of the <RTI> air conduct chamber </ RTI> at least one, preferably <RTI> slot -, </ RTI> port is connected </ RTI> <RTI> like. To generate the for <RTI> separation </ RTI> necessary primary and secondary air flow, it is advantageous in the <RTI> air conduct chamber </ RTI> by suction at the <RTI> outlet </ RTI> a <RTI> sub to generate </ RTI> <RTI> printing </ RTI> so that the enriched air dust with Se kundärströmung <RTI> tangentially </ RTI> air conduct chamber </ RTI> is inserted into the <RTI>.

Reference to the drawing, an embodiment of the <RTI> invention </ RTI> and the <RTI> action </ RTI> is described. <RTI> The </ RTI> <RTI> Fig.1 </ RTI> shows in elevation and the <RTI> -Fig.2 </ RTI> in plan a <RTI> Air Flow - </ RTI> <RTI> " chamber </ RTI> 1 'and one of these <RTI> chamber </ RTI> under-built plenum. 2 `A Bo the 3 separates the two chambers from one another. At the <RTI> outlet </ RTI> 4 <RTI> air conduct chamber </ RTI> 1, a vacuum is created, so that over the pipe stub 5 <RTI> tangentially </ RTI> to the wall of the <RTI> air conduct chamber </ RTI > I 'and ge gen the bottom 3 directed an air flow <RTI> sucked </ RTI> is: with the pipe clip 5 is a suction hose 6 with corresponding suction nozzles <RTI> or the like. </ RTI> connected. The intake air flow runs with the dust particles in the dashed <RTI> depicted </ RTI> manner to the wall of the <RTI> LLi @ tfiih = </ RTI> <RTI> tion chamber </ RTI> 1 down, then circling on the floor 3 under <RTI> deposit </ RTI> of Stäub in the peripheral zone 7 and then exits via a concentric stationary air flow to <RTI> blow-out </ RTI>. 4

The dust particles off stored in the edge zones 7 fall through a slit-like opening 8 in the <RTI> plenum </ RTI>. 2 In addition, the <RTI> outlet </ RTI> 4 to be completed with a 9 <RTI> inserted </ RTI> coarse filter. To avoid that in a closure of the <RTI> suction nozzles </ RTI> or the, suction aehlauehes 6 in the <RTI> air conduct chamber </ RTI> 1, a vacuum occurs, a conveying of the deposited dust from the filter 9 would result in a <RTI> second </ RTI> is provided nozzles 10, of the nozzle similarly arranged 5 and is closed by a <RTI> vacuum valve </ RTI> 11th When occurring excessive vacuum in the <RTI> luftführungskam - </ RTI> <RTI> mer </ RTI> 1, the valve 11, whereby an air stream </ RTI> 5 passes the airflow over the <RTI> guide sleeve parallel opens, in the <RTI> Luftführungskam - embedded </ RTI> <RTI> mer </ RTI> 1 <RTI> vhrd.

</ RTI> The <RTI> Figure 3 </ RTI> shows a schematic representation of a hand vacuum cleaner in which the <RTI> air conduct chamber </ RTI> 15 as <RTI> midsection </ RTI> a three-part <RTI> Staubeaugergehäuses < / RTI> is formed. <RTI> The </ RTI> portion 16 takes the drive motor with the fan on, by using the <RTI> outlet </ RTI> <RTI> I? </ RTI> is negative pressure created in the chamber 15th <RTI> The </ RTI> about <RTI> nozzle </ RTI> 18 and the suction tube 19 sucked dust is again

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<RTI> tangentially </ RTI> injected into the <RTI> Kammer15 </ RTI> and slot-like through a opening 20 deposited in the collection chamber 21st To avoid that at elevated suction nozzles 18 dust from the collecting space 21 in the <RTI> air conduct chamber </ RTI> 15 drops back, a <RTI> Rückfallblende </ RTI> 22 is arranged so that the <RTI> sdi </ RTI > <RTI> litzartige </ RTI> <RTI> opening </ RTI> <RTI> 20 </ RTI> in the direction of the given through the handle 23 <RTI> motion - </ RTI> <RTI> a </ RTI > <RTI> pivot point </ RTI> for <RTI> vacuum cleaner </ RTI> is shielded.

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CLAIMS DE1407995

[3]

<RTI> Claims </ RTI>. 1 Device <RTI> to </ RTI> <RTI> separation </ RTI> solid components of an air flow, <RTI> particular </ RTI> for vacuum cleaner, using a <RTI> cylindrical </ RTI> <RTI> air conduct chamber ', </ RTI> of the air <RTI> tangentially </ RTI> with directed against the ground <RTI> direction of flow " </ RTI> supplied and <RTI> zentra'1 </ RTI> deck side via a <RTI> outlet </ RTI> is removed, characterized in that the floor a outwards abgeschlos sener plenum <RTI> under construction </ RTI> is that the <RTI> Luftführungskam - </ RTI> <RTI> mer </ RTI> is connected via at least one, preferably slot-like opening. 2, The device of claim 1, characterized in that in the <RTI> air conduct chamber </ RTI> through <RTI> suction </ RTI> at <RTI> outlet </ RTI> a is generated under pressure.

[5]

3, A device according to <RTI> claim-1 </ RTI> and 2, characterized in that d ass the connecting opening is arranged in the bottom in the cylindrical wall of the <RTI> guide chamber </ RTI>. 4, The device of claim 1 to 3, characterized in that <RTI> @im </ RTI> part of the <RTI> air outlet, </ RTI> preferably in the <RTI> outlet </ RTI> of <RTI> guide chamber, </ RTI> a filter, in particular a coarse filter is arranged. 5, A device according to claim 1 to 4, characterized <RTI> in </ RTI> that <RTI> air conduct chamber </ RTI> with a second, sealed by a Unterdruckven til <RTI> inlet opening is </ RTI> equipped, by the ex a predetermined vacuum air at <RTI> tangential </ RTI> and <RTI> against </ RTI> the ground directed <RTI> flow direction </ RTI> <RTI> injected </ RTI> is.

[7]

6, A device according to claim 1 to 5, characterized <RTI> in </ RTI> that the plenum of the <RTI> inlet </ RTI> a <RTI> relapse aperture - </ RTI> has. 7, The device of claim 6, characterized in that the <RTI> relapse aperture </ RTI> is arranged so that the <RTI> inlet </ RTI> device in Richmond on a <RTI> movement fulcrum, </ RTI> <RTI> z , B. </ RTI> is the handle of a vacuum cleaner, shielded.

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B 04 c
A 47 l

BUNDESREPUBLIK DEUTSCHLAND
DEUTSCHES PATENTAMT

(52) Deutsche Kl.: 50 e - 3/10
34 c - 9/16

Behördeneigentum

(10)
(11) # Offenlegungsschrift 1 407 995

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(22) Anmeldetag: 23. Oktober 1964
(43) Offenlegungstag: 20. Februar 1969

Ausstellungspriorität: —

(30) Unionspriorität
(32) Datum: —
(33) Land: —
(31) Aktenzeichen: —

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(54) Bezeichnung: Einrichtung zur Abscheidung fester Bestandteile aus einer Luftströmung

(61) Zusatz zu: —

(62) Ausscheidung aus: —

(71) Anmelder: Siemens-Electrogeräte GmbH, Berlin und München, 8000 München

Vertreter: —

(72) Als Erfinder benannt: Kaiser, Dr. Fritz, 8000 München

Benachrichtigung gemäß Art. 7 § 1 Abs. 2 Nr. 1 d. Ges. v. 4. 9. 1967 (BGBl. I S. 960): 13. 3. 1968

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SIEMENS-ELECTROGERÄTE
Aktiengesellschaft

1407995

München, den
Oskar-von-Miller-Ring 18

PVA 64/5302

Dr. Expl.

Einrichtung zur Abscheidung fester Bestandteile aus einer Luftströmung

Die Erfindung bezieht sich auf eine Einrichtung zur Abscheidung fester Bestandteile aus einer Luftströmung, insbesondere für Staubsauger, unter Verwendung einer zylindrischen Luftführungskammer, der die Luft tangential mit gegen den Boden gerichteter Strömungsrichtung zugeführt und zentral deckseitig über eine Auslaßöffnung entnommen wird.

Es ist bekannt, feste Bestandteile aus einer Luftströmung dadurch abzuscheiden, daß man eine primäre Luftströmung mit einer sekundären Luftströmung beaufschlagt, durch die die Randzonen der primären Luftströmung in eine drehende Bewegung gebracht werden, und zwar so, daß ihre Bewegung der primären Luftströmung entgegenläuft. Mit einer derartigen Einrichtung kann z.B. Flugasche aus Heizabgasen entfernt werden. Zu diesem Zweck wird der Abgasstrom durch eine Luftführungskammer hindurchgeführt und tangential an den Wandungen der Luftführungskammer ein gegen die Strömungsrichtung des Abgasstromes gerichteter Sekundärluftstrahl ein-

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geblasen. Die abgeschiedenen festen Bestandteile, also der Flugstaub, werden bodenseitig am Rand der Luftführungskammer abgenommen.

Der Erfindung liegt die Aufgabe zugrunde, diese bekannte Einrichtung für Kleingeräte, insbesondere Haushaltgeräte, auszubilden, so daß sie zur Staubabscheidung für Staubsauger eingesetzt werden kann. Erfindungsgemäß wird dies dadurch erreicht, daß dem Boden der Luftführungskammer ein nach außen abgeschlossener Sammelraum untergebaut wird, der mit der Luftführungskammer über mindestens eine, vorzugsweise schlitzartige, Öffnung verbunden ist. Zur Erzeugung der für die Abscheidung notwendigen Primär- und Sekundärluftströmung ist es vorteilhaft, in der Luftführungskammer durch Absaugen an der Auslaßöffnung einen Unterdruck zu erzeugen, so daß die mit Staub angereicherte Luft mit der Sekundärströmung tangential in die Luftführungskammer eingeführt wird.

Anhand der Zeichnung sei ein Ausführungsbeispiel der Erfindung und die Wirkungsweise beschrieben.

Die Fig.1 zeigt im Aufriß und die Fig.2 im Grundriß eine Luftführungskammer 1 und einen dieser Kammer untergebauten Sammelraum 2. Ein Boden 3 trennt die beiden Räume voneinander. An der Auslaßöffnung 4 der Luftführungskammer 1 wird ein Unterdruck erzeugt, so daß über den Rohrstutzen 5 tangential zur Wandung der Luftführungskammer 1 und gegen den Boden 3 gerichtet ein Luftstrom angesaugt wird. Mit dem Rohrstutzen 5 ist ein Saugschlauch 6 mit entsprechenden Saugdüsen o.dgl. verbunden. Die angesaugte Luftströmung läuft mit den Staubteilchen in der gestrichelt eingezeichneten Weise an der Wandung der Luftführungskammer 1 nach unten, kreist dann auf dem Boden 3 unter Ablagerung von Staub in der Randzone 7 und verläßt dann über einen zentrisch stehenden Luftstrom den Ausblasstutzen 4. Die in den Randzonen 7 ab-

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gelagerten Staubteile fallen durch eine schlitzartige Öffnung 8 in den Sammelraum 2. Zusätzlich kann die Auslaßöffnung 4 mit einem eingeschobenen Grobfilter 9 abgeschlossen sein.

Um zu vermeiden, daß bei einem Verschluß der Saugdüsen bzw. des Saugschlauches 6 in der Luftführungskammer 1 ein Unterdruck auftritt, der zu einem Fördern der abgelagerten Staubteilchen gegen das Filter 9 führen würde, ist ein zweiter Stutzen 10 vorgesehen, der ähnlich dem Stutzen 5 angeordnet und durch ein Unterdruckventil 11 verschlossen ist. Bei auftretendem überhöhten Unterdruck in der Luftführungskammer 1 öffnet das Ventil 11, wodurch ein Luftstrom, der dem Luftstrom über den Führungsstutzen 5 parallel verläuft, in die Luftführungskammer 1 eingelassen wird.

Die Fig.3 zeigt in schematischer Darstellung einen Handstaubsauger, bei dem die Luftführungskammer 15 als Mittelteil eines dreiteiligen Staubsaugergehäuses ausgebildet ist. Das Teil 16 nimmt den Antriebsmotor mit dem Gebläse auf, durch das über die Auslaßöffnung 17 Unterdruck in der Kammer 15 erzeugt wird. Der über die Düse 18 und das Saugrohr 19 angesaugte Staub wird wiederum tangential in die Kammer 15 eingeblasen und über eine schlitzartige Öffnung 20 im Sammelraum 21 abgelagert. Um zu vermeiden, daß bei angehobenen Saugdüsen 18 Staub aus dem Sammelraum 21 in die Luftführungskammer 15 zurückfällt, ist eine Rückfallblende 22 so angeordnet, daß die schlitzartige Öffnung 20 in Richtung auf den durch den Handgriff 23 gegebenen Bewegungsschwenkpunkt für den Staubsauger abgeschirmt ist.

7 Patentansprüche
3 Figuren

BAD ORIGINAL

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PVA 64/5 1407995

Patentansprüche

Dr. Expl.

1. Einrichtung zur Abscheidung fester Bestandteile aus einer Luftströmung, insbesondere für Staubsauger, unter Verwendung einer zylindrischen Luftführungskammer, der die Luft tangential mit gegen den Boden gerichteter Strömungsrichtung zugeführt und zentral deckseitig über eine Auslaßöffnung entnommen wird, dadurch gekennzeichnet, daß dem Boden ein nach außen abgeschlossener Sammelraum untergebaut ist, der mit der Luftführungskammer über mindestens eine, vorzugsweise schlitzartige Öffnung verbunden ist.

2. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, daß in der Luftführungskammer durch Absaugen an der Auslaßöffnung ein Unterdruck erzeugt wird.

3. Einrichtung nach Anspruch 1 und 2, dadurch gekennzeichnet, daß die Verbindungsöffnung im Boden im Bereich der Zylinderwand der Führungskammer angeordnet ist.

4. Einrichtung nach Anspruch 1 bis 3, dadurch gekennzeichnet, daß im Zuge des Luftauslasses, vorzugsweise vor der Auslaßöffnung der Führungskammer, ein Filter, insbesondere ein Grobfilter, angeordnet ist.

5. Einrichtung nach Anspruch 1 bis 4, dadurch gekennzeichnet, daß die Luftführungskammer mit einer zweiten, durch ein Unterdruckventil verschlossenen Einlaßöffnung ausgestattet ist, durch die ab einem vorgegebenen Unterdruck Luft in tangentialer und gegen den Boden gerichteter Strömungsrichtung eingeblasen wird.

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6. Einrichtung nach Anspruch 1 bis 5, dadurch gekennzeichnet, daß der Sammelraum unter der Einlaßöffnung eine Rückfallblende aufweist.

7. Einrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Rückfallblende so angeordnet ist, daß die Einlaßöffnung in Richtung auf einen Bewegungsschwenkpunkt, z.B. den Handgriff eines Staubsaugers, abgeschirmt ist.

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Fig.1

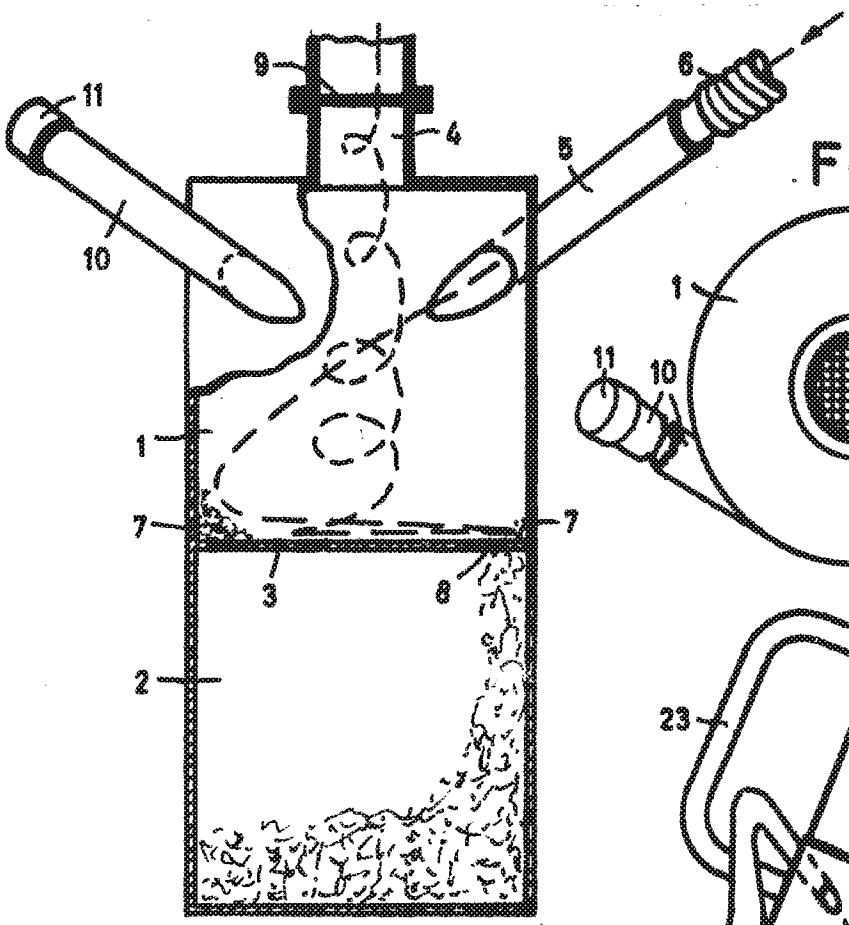


Fig.2

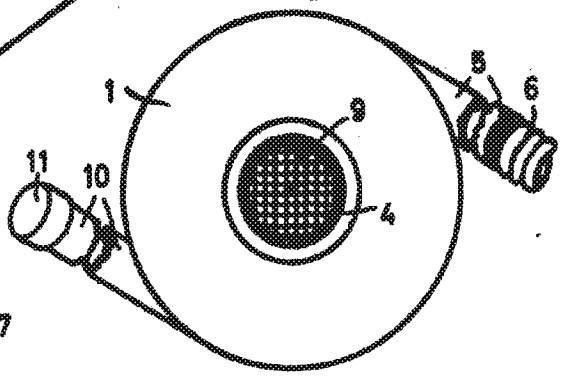
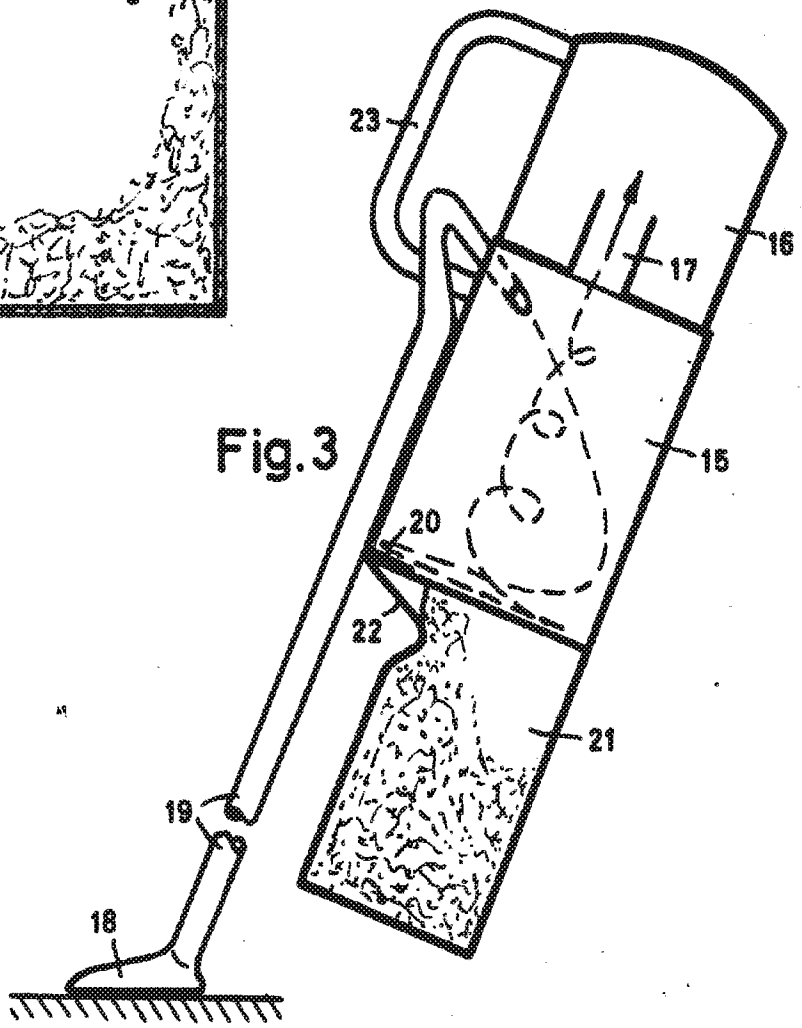


Fig.3



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DESCRIPTION FR1094603

<RTI> Aniélioratioii </ RTI> provided <RTI> to </ RTI> <RTI> vacuum cleaners </ RTI> of dust. In current devices: <RTI> vacuum cleaners </ RTI> of dust, dust removal is usually done by forcing the air drawn to pass through the weft of a fabric, which lets the gas <RTI > go </ RTI> retains dust. This fabric is placed before or after the turbine; clans one or the other case, the pores of the fabric become clogged, material accumulates behind the tissue and slows down or the suction tion air evacuated. The most common, the container is full and there is nothing to realize it, which mau vaise aspiration, yet the <RTI> dump </ RTI> a IESO lice bag is a recognized operation <RTI> difficult. </ RTI>

The invention aims to remedy these incon tages, by 1 Containers smooth and transparent material, replacing the fabric bags; 2 The application of the principle Tourbillon and <RTI> filtering </ RTI> further by a paper sieve.

1.

The vessel, designed to <RTI> receive </ RTI> the dust, glass or plastic, rigid or flexible, is transparent and has the following advantages result of transparency, the user is able to stop, to realize where is the filling of the container; so it can better judge of when to be emptied; it <RTI> small </ RTI> to hear and even see a lost object and drawn through the device and back.

<RTI> As </ RTI> smooth inside, the container is a <RTI> dump </ RTI> .easy, without releasing dust as in the case of a bag; moreover, the container is easily detachable.

He. By applying the principle Tourbillon. device used in the mill and silos, <RTI> is - </ RTI> <RTI> ie </ RTI> arrival of the air drawn tangentially to the inner wall of the transparent container, the ts is my deposited on the bottom of the container, after having separated from the air before it passes through the <RTI> tainis-screener, </ RTI> this arranging the encras ment, where permanent suction .

Filtering sucked dust is completed with <RTI> jin </ RTI> interchangeable strainer b, paper or special material, standing in front of the fabric c; replaced each flush, this screen lets the clean cloth and the set is in mint condition at each departure.

The <RTI> filters </ RTI> are maintained on a single frame or metal frame h.

The attached drawing gives all indications on the circuit imposed jet dust sucked into a vacuum cleaner brush-type model where the camera is held vertically or slightly inclined; <RTI> with - </ RTI> <RTI> 1 </ RTI> <RTI> eatment </ RTI> filtered air can then pass through the turbines <i> ci </ I> and in an engine is cooled <RTI> élier - </ RTI> <RTI> logically, </ RTI> which represents a big interest.

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BREVET D'INVENTION

Gr. 19. — Cl. 6.

N° 1.094.603

Amélioration apportée aux aspirateurs de poussière.

M. FRANÇOIS MARTELLIERE résidant en France (Seine-et-Oise).

Demandé le 16 décembre 1953, à 14h 40m, à Paris.
Délivré le 8 décembre 1954. — Publié le 23 mai 1955.

Dans les appareils courants : aspirateurs de poussière, la récupération de la poussière se fait ordinairement, en obligeant l'air aspiré à passer à travers la trame d'un tissu, qui laisse passer le gaz, mais retient les poussières. Ce tissu se place avant ou après la turbine; dans l'un ou l'autre cas, les pores du tissu se bouchent, la matière s'accumule derrière le tissu et freine l'aspiration ou l'évacuation de l'air. Le plus fréquent, le récipient est plein et rien ne permet de s'en rendre compte, d'où mauvaise aspiration, encore le vidage d'un sac à poussière est une opération reconnue difficile.

L'invention a pour but de remédier à ces inconvénients, par :

1° Les récipients en matière lisse et transparents, remplaçant les sacs en tissu;

2° L'application du principe « Tourbillon » et filtrage complémentaire par un tamis en papier.

I. Le récipient *a*, destiné à recevoir la poussière, en verre ou matière plastique, rigide ou souple, est transparent et présente les avantages suivants :

Par suite de la transparence, l'utilisateur est à même, à l'arrêt, de se rendre compte où en est le remplissage du récipient; il peut donc mieux juger du moment où il doit être vidé; il peut entendre et même voir un objet perdu et aspiré par l'appareil, et le récupérer.

Etant lisse à l'intérieur, le récipient est d'un vidage facile, sans dégager de poussière comme dans le cas d'un sac; de plus, le récipient est très facilement détachable.

II. Par application du principe « Tourbillon », dispositif utilisé dans la meunerie ou les silos, c'est-à-dire, arrivée de l'air aspiré tangentiellement à la paroi intérieure du récipient transparent, les matières se déposent dans le fond du récipient, après s'être séparées de l'air, avant que celui-ci ne passe à travers le tamis-filtreur, ceci ménageant l'encrassement, d'où aspiration stable.

Le filtrage des poussières aspirées est complété par un filtre tamis interchangeable *b*, en papier ou en matière spéciale, se plaçant devant le tissu *c*; remplacé à chaque vidage, ce tamis laisse le tissu propre et l'ensemble est à l'état neuf à chaque départ.

Les filtres sont maintenus sur un bâti ou simple armature métallique *h*.

Le dessin joint donne toutes les indications sur le circuit imposé au jet de poussière aspirée dans un modèle d'aspirateur type-balai, où l'appareil est maintenu verticalement ou légèrement incliné; parfaitement filtré, l'air peut ensuite passer dans les turbines *d* et dans le moteur *e* qui est refroidi énergiquement, ce qui représente un gros intérêt.

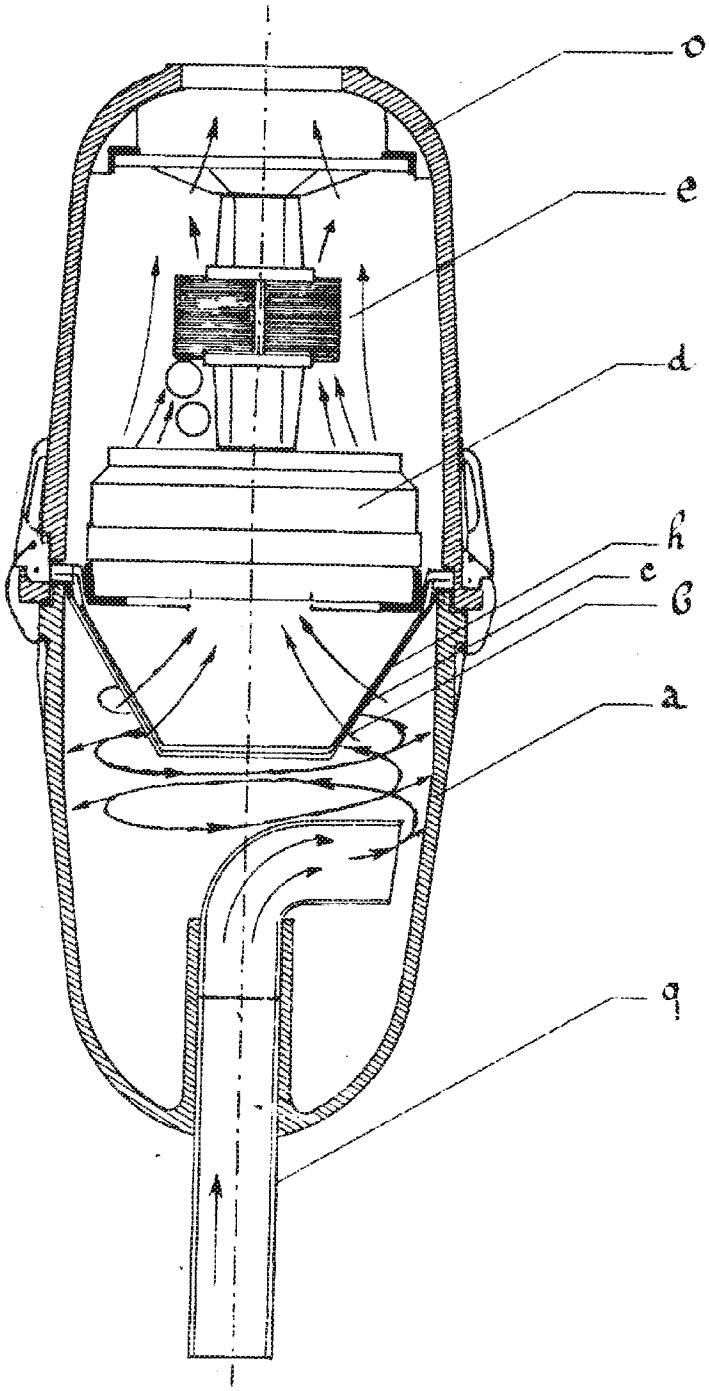
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DESCRIPTION CH203675

Vacuum cleaner. The known <RTI> storage: bsauger </ RTI> have <RTI> @ d: s </ RTI> disadvantage <RTI> d; assl </ RTI> <RTI> they </ RTI> to perform <RTI> the </ RTI> <RTI> ver - </ RTI> <RTI> schiedenen </ RTI> <RTI> cleaning </ RTI>: a behaves tively <RTI> large: ss! g </ RTI> <RTI> number </ RTI> need interchangeable suction pieces, <RTI> which </ RTI> at <RTI> which </ RTI> work not be simultaneously </ RTI> left on the line <RTI> Kings NEN ', <RTI> but </ RTI> lying around or in a Beu tel to <RTI> supply </ RTI> are. This <RTI> fact </ RTI> ver slows rapid <RTI> fJ.bergaag </ RTI> from a cleaning job to another. Des farther are the <RTI> most </ RTI> vacuum cleaner in hand dling as <RTI> whole </ RTI> too rigid, leading to <RTI> inflexible </ RTI> to them always as <RTI> </ RTI> to that;. the suction part <RTI> (nozzle </ RTI> or brush) close enough to the to-clean pad rests .or to the suction part <RTI> 'comfort </ RTI> also lead to bad to reach locations ,

The <RTI> present </ RTI> invention now relates to <RTI> a </ RTI> <RTI>. vacuum cleaner, </ RTI> wherein <RTI>: suction nozzles </ RTI> <RTI> and </ RTI> < RTI> Saughürsten </ RTI> both directly and <RTI> under </ RTI> <RTI> interposition </ RTI> of pipe and <RTI> joint - </ RTI> <RTI> Post </ RTI> <RTI combinable> -drehbar </ RTI> single <RTI> interchangeable </ RTI> and with each other <RTI>: the </ RTI> <RTI> vacuum cleaner - </ RTI> <RTI> enclosure </ RTI> <RTI> CONNECTING! bar </ RTI> are the rotary <RTI> load </ RTI> The <RTI>: Saugstücke </ RTI>: by <RTI>: the </ RTI> <RTI> Ans STATEMENTS - </ RTI> <RTI> thread </ RTI>: same <RTI> allows </ RTI> is.

in the . Drawing is an exampie <RTI> AusführungsTo: rm </ RTI> of <RTI> invention against Stan - </ RTI> <RTI> the </ RTI> illustrates. Shown are: <RTI> Fig. </ RTI> 1 <RTI> a! </ RTI> <RTI> longitudinal section </ RTI> <RTI>: by </ RTI> the <RTI> Dust: saugergehäu: se </ RTI> <RTI> with </ RTI> <RTI> inner parts </ RTI> without outdoor equipment, <RTI> Fig. </ RTI> 2 the vacuum cleaner in Gebrauchsbe readiness for .the cleaning <RTI> the </ RTI> soil <RTI> Fig. </ RTI> 3 in the vacuum cleaner Gebrauchsbe readiness for <RTI> Cleaning </ RTI> of. <RTI> pad - </ RTI> <RTI> furniture, </ RTI> <RTI> Fig. </ RTI> 4 <RTI> a </ RTI> <RTI> in </ RTI>: the vacuum cleaner is in use for standby <RTI> that </ RTI> cleaning hardly accessible areas, such as under and behind furniture; <RTI> Fig.

</ RTI> 5 <RTI> up. </ RTI> 9 are components .of dust uum cleaner and <RTI> Fig. </ RTI> 10 is a. Section on line <RTI> 1-I </ RTI> in <RTI> Fig. </ RTI> 9 of. <RTI> combined </ RTI> and suction nozzles <RTI> -bürstenstückes. </ RTI>

The <RTI> illustrated </ RTI> <RTI> @ S: Taub: au! ger </ RTI> <RTI> has </ RTI> <RTI> a </ RTI> housing, <RTI> the </ RTI>: two <RTI> different </ RTI> large lid 1, <RTI> `? </ RTI> <RTI> and </ RTI> is formed a between <RTI> used </ RTI> coat. 3 4 is the fan, its housing by its flange 5 at <RTI> by means of a support ring 6 using </ RTI> a <RTI> Dielhtungseinlage </ RTI> 7 on the housing cover 1 by means of screws 8 <RTI> be - </ RTI> <RTI> consolidates </ RTI> is. The <RTI> vent </ RTI> of ventila tor includes a in the <RTI> cover </ RTI> 1 to set up, with rubber handle 9 provided draw stub 10th With <RTI> distance </ RTI> of the <RTI> suction port </ RTI> of <RTI> Fan housing </ RTI> is to <RTI> latter </ RTI> the motor 11 <RTI> screwed.

</ RTI> which by a connecting piece 12 the <RTI> Lufteinsa-ugstutzen </ RTI> 13 carries, which the <RTI> Ge - interspersed </ RTI> <RTI> lräusedeckel </ RTI> 2 and a lateral, in the <RTI> housing interior </ RTI> < RTI> which opens </ RTI> <RTI> Off - </ RTI> <RTI> trittsöffnun.g </ RTI having> 14th The through the housing cover 2; outstanding <RTI> end </ RTI> <RTI> .dos </ RTI> <RTI> Lufteinsaugstutzens </ RTI> 13 is a <RTI> An - </ RTI> <RTI> connecting thread </ RTI> provided 15th Likewise, also the end of. <RTI> trigger nozzle </ RTI> 10 with a <RTI> terminal </ RTI> 16 of the same dimension as the Di <RTI> Ansahlussgewinde </ RTI> 15 see thread ver. The dust bag or dust filter is designated by 17 and <RTI> has </ RTI> cone shape. <RTI> His </ RTI> <RTI> lower </ RTI> end at <RTI> Verbindungsstlich </ RTI> 12 moored while in the <RTI> Advanced </ RTI> top of a <RTI> spiral spring ring </ RTI is sewn> 18th

<RTI> The </ RTI> provided with the sewn-in spiral spring 18 the edge of the <RTI>, dust bag </ RTI> is. supported through a grommet 19, which at the circumference <RTI>: of. </ RTI> <RTI> Ventilatorgehäises </ RTI> is applied and between <RTI> this </ RTI> and the edge of <RTI> upper </ RTI> cover 1 <RTI> seals. </ RTI> 20 is the <RTI> power supply cable </ RTI> of the motor 11, which, with a <RTI> intermediate switch </ RTI> is 2-1 see ver. The <RTI> main accessory </ RTI> of <RTI>

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dust - </ RTI> <RTI> ium cleaner </ RTI> forms a tube angle 22 with a <RTI> connection sleeve </ RTI> <B> 23 </ B> on one end and a <RTI> connection: thread </ RTI> 23 'at <RTI> other </ RTI> end. The ser <RTI> tube angle </ RTI> <RTI> 22nd </ RTI> means of its sleeve <RTI> 2.3 </ RTI> to the <RTI> Ans @ STATEMENTS @ ge @ thread </ RTI> 15 of the <RTI> L, uftein - </ RTI> <RTI> suction connection </ RTI> 13 <RTI> connected.

</ RTI> His <RTI> Connection - </ RTI> <RTI> thread </ RTI> 2.3 'is used to <RTI> connecting </ RTI> of <RTI> Suction - </ RTI> <RTI> pieces </ RTI> <RTI> (suction nozzles, </ RTI> suction brushes). As suction piece for purifying <RTI> soil </ RTI> carpets and the like is from <RTI> nozzle </ RTI> and suction brush <RTI> combined, </ RTI> <RTI> segment-</ RTI> <RTI > örmiges </ RTI> piece 24 of wedge-shaped <RTI> cross-section, </ RTI> on its back using <RTI> internal thread </ RTI> <RTI> ver - </ RTI> <RTI> seheneu </ RTI> < RTI> fitting piece </ RTI> 25 is attached, which forms the <RTI> Anschlussöffnung </ RTI>. The <RTI> Keilflächen </ RTI> of <RTI> Saugs @ tüekes </ RTI> are each a Saugöff voltage <RTI> 2,6, </ RTI> 27, which with the <RTI> To: circuit ' - </ RTI> <RTI> opening </ RTI> <RTI> communicate </ RTI> <RTI> and </ RTI> each respectively with a <RTI> arched </ RTI> metal edge 2e <RTI>.

[9]

</ RTI> 29 is provided. <RTI> N </ RTI> at which the metal rim <RTI>? 9</ RTI> with a <RTI> Bor - hr </ RTI> <RTI> stenkra nz </ RTI> 30th At the <RTI> wedge surfaces </ RTI> of <RTI> Saugstückes </ RTI> 2.1 <RTI> formed </ RTI> <RTI> edge </ RTI> sits a rubber strip <RTI> .31, < / RTI> which RTI> the </ RTI> <RTI> edge </ RTI> <RTI> understanding </ RTI> <RTI> metal edges </ RTI> 28, 29 is clamped and to protect the furniture against between about < toast at <RTI> cleaning </ RTI> is used. A close cram <RTI> 32 </ RTI> is used to terminate one or <RTI> other </ RTI> suction port <RTI> 26 </ RTI> <RTI> respectively. </ RTI> 2 7 per <RTI> after </ RTI> is carried out with the suction nozzle or with the suction brush.

For ease of <RTI> handling </ RTI> is cleaning work with the <RTI> vacuum cleaner </ RTI> with floor and carpet to the, <RTI> Connection - </ RTI> <RTI> thread </ RTI> 1.6 the trigger nozzle 10 a <RTI> Ver - </ RTI> <RTI> längerun: gsstange33, </ RTI> which at one end <RTI> a </ RTI> <RTI> Anschlussmuffe </ RTI> 34 <RTI> and </ RTI > at the other end a <RTI> Ans, chlussigewinde </ RTI> 35 has connected. <RTI> This </ RTI> <RTI> extension pole </ RTI> <RTI> 33 is </ RTI> with a clasp or <RTI> Bride </ RTI> <RTI> 3.6 </ RTI> to <RTI> clamping </ RTI> of <RTI> power supply cable </ RTI> 20 for better guidance provided thereof. <RTI> Fig. </ RTI> Figure 3 shows the vacuum cleaner ready for cleaning floors, carpets and .dergleichen.

The <RTI> An - </ RTI> <RTI> sehlussge @ cvinde </ RTI> <RTI> between </ RTI> tube angle <B> '222) </ B> and <RTI> Saugstück </ RTI> <RTI > 2'4 </ RTI> are not completely gen angezo but can still easily turn. <RTI> This </ RTI> is the tube angle <RTI> 2'2 </ RTI> between rule vacuum cleaner housing and <RTI> suction part </ RTI> a <RTI> particular </ RTI> agility achieved which a <RTI > always </ RTI enables location> good concerns Saugränder of <RTI> Saugstückes </ RTI> on .the surface to be cleaned, said <RTI> iVeigung </ RTI> the prolongations approximately rod can be changed ver relative to the ground. This allows a <RTI> good </ RTI> work <RTI> under </ RTI> tables, chairs and the like furniture. Especially <RTI> hard </ RTI> to cessible <RTI> Ask </ RTI> of <RTI> bottom </ RTI> <RTI> or </ RTI> by furniture <RTI> feigned </ RTI> walls <RTI > can </ RTI> also be easily achieved if, as <RTI> Fig.

[3]

</ RTI> 4 <RTI> shows </ RTI> that <RTI> Verlängerunigss @ is </ RTI> <RTI> 3l 3</ RTI> <RTI> between </ RTI> <RTI> vacuum cleaner housing </ RTI> and tube angle is switched into.

For cleaning upholstery and their joints a slim, ge gen the front end in <RTI> diameter </ RTI> all gradually <RTI> serves as <RTI> suction part </ RTI> decreased </ RTI> <RTI> nozzle < / RTI> <B> 3.7 </ B> wooden <RTI> side </ RTI> vacuum slot 38 and <RTI> a </ RTI> on their <RTI> rear end </ RTI> pushed <RTI> connection sleeve </ RTI> 39 from <RTI> rubber. </ RTI> <RTI> This, Saugdüs, e </ RTI> 3.7 <RTI> is </ RTI> just in case <RTI> under </ RTI> <RTI> interposition </ RTI> of Rohrwin cle 22 of <RTI> the </ RTI> <RTI> vacuum cleaner housing </ RTI> <RTI> ans, chiless - </ RTI> <RTI> bar </ RTI> as indicated by <RTI> Fig. </ RTI>. 3 <RTI> illustrated </ RTI> is. <RTI> For, daee </ RTI> <RTI> Polstermöbelreinigung </ RTI> the <RTI> Ver - </ RTI> <RTI> length approximately rod </ RTI> <RTI> 313 </ RTI> are omitted.

By contrast, the <RTI> nozzle </ RTI> <RTI> 37 </ RTI> <RTI> with </ RTI> a <RTI> wreath brush </ RTI> 40 are combined, which, like <RTI> Fig. </ RTI> 8, the <RTI> rubber sleeve </ RTI> 3.9 <RTI> can be pushed </ RTI>. The rim brush 40 can also be <RTI> Only </ RTI> <RTI> used </ RTI> are by the same <RTI> under </ RTI> using the rubber sleeve 39 to <RTI> tube angle </ RTI> 22 <RTI> attached </ RTI> is <RTI> (Fig. </ RTI> 7)

A special <RTI> advantage </ RTI> at <RTI> the </ RTI> <RTI> Reini - described </ RTI> <RTI> tion work </ RTI> with the <RTI> </ RTI> dust sucker <RTI > forms </ RTI> of <RTI> fact </ RTI> <RTI> that </ RTI> blicklich the eyes. not for use entering <RTI> Saugstücke </ RTI> either on the <RTI> Ans: ehlussge - </ RTI> <RTI> thread </ RTI> <RTI> h6, @ the </ RTI> <RTI> trigger nozzle < / RTI> 10 <RTI> or </ RTI> <RTI> at </ RTI> Ver use the <RTI> extension pole </ RTI> <RTI> 3'.3 </ RTI> to <RTI> their </ RTI > <RTI> Anschlussigewinde </ RTI> 35 <RTI> plugged </ RTI> or <RTI> screwed </ RTI> .are and therefore during <RTI> core </ RTI> work <RTI> always </ RTI> at hand are <RTI> so </ RTI> not lying around or <RTI> otherwise </ RTI> supplied who need to.

This enables rapid <RTI> -Change </ RTI> <RTI> d (yr </ RTI> <RTI> Saugstücke </ RTI> at <RTI> transition </ RTI> from a cleaning work on the other.

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CLAIMS CH203675

PATENT CLAIM: vacuum cleaner, thereby <RTI> gekennzeichnet, </ RTI> <RTI> that </ RTI> suction nozzles and suction brushes <RTI> both </ RTI> <RTI> directly </ RTI> and the <RTI> interposition < / RTI> rotation of pipe and joint Beilen, <RTI> single </ RTI> exchange- gels on combinable <RTI> that </ RTI> which <RTI> vacuum cleaner housing </ RTI> <RTI> connectable </ RTI> are, the <RTI> of Saugstücke by the <RTI> connecting thread </ RTI> <RTI> Uemselben </ RTI> allows rotation Barken </ RTI> <RTI> wind. </ RTI> UNDER CLAIMS:. 1 <RTI> vacuum cleaner </ RTI> to <RTI> patent claim, </ RTI> characterized <RTI> in </ RTI> <RTI> dassSaugdüsen </ RTI> <RTI> and </ RTI> suction brush such <RTI > Education </ RTI> <RTI> own, </ RTI> that characterized the possibility <RTI> is </ RTI> the <RTI>.

[3]

Saugstücke </ RTI> while: the work and in their <RTI> non-use </ RTI> <RTI> amStaubsauger - </ RTI> <RTI> enclosur-e </ RTI> to leave. 2. , Vacuum cleaner according to <RTI> claim </ RTI> and <RTI> Un - </ RTI> <RTI> teranspi-Lieh </ RTI> <B> 1 </ B> characterized <RTI> that </ RTI> <RTI> a </ RTI> for purifying <RTI> padding </ RTI> and their <RTI> joint </ RTI> <RTI> .dienende </ RTI> <RTI> nozzle </ RTI> with <RTI> a </ RTI> ring brush <RTI> kombiniarbar </ RTI> <RTI> äst. </ RTI>. 3 Vacuum cleaner according to <RTI> claim </ RTI> and <RTI> Un - </ RTI> <RTI> teranspruch, </ RTI> <B> 1 </ B> characterized. <RTI> in </ RTI> <RTI> that </ RTI> for <RTI> the </ RTI> <RTI> bottom </ RTI> and <RTI> Carpet Cleaning - </ RTI> <RTI> supply </ RTI> serving, to the vacuum cleaner housing <RTI> ansehliessibares </ RTI> <RTI> Sauptück </ RTI> on one side of a suction nozzle and on the other <RTI> page </ RTI> a <RTI> Brush nozzle </ RTI> <RTI> which </ RTI> where the ever Weil's not <RTI> used </ RTI> from the suction opening closable <RTI>.

</ RTI> <RTI> -1. </ RTI> <RTI> vacuum cleaner </ RTI> to <RTI> claim </ RTI> and Un teranspruch <B> 1 </ B> by <RTI> in </ RTI> <RTI> that </ RTI > the <RTI> rotation </ RTI> <RTI> between. Vacuums - </ RTI> <RTI> enclosure </ RTI> and <RTI> a </ RTI> for <RTI> ground, - </ RTI> and carpet cleaning serving <RTI>, suction part </ RTI> by a < RTI> interposed, </ RTI> with <RTI> Anschluagewinde </ RTI> <RTI> provided </ RTI> <RTI> tube angle </ RTI> is allowed, the, the. Tube angle with the suction part <RTI> linking </ RTI> threaded a <RTI> rotation </ RTI> this <RTI> Share </ RTI> <RTI> against - </ RTI> <RTI> each </ RTI> < RTI> gestarttet. </ RTI>

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PATENTSCHRIFT

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EIDG. PATENTBUREAU ZÜRICH

HAUPTPATENT

Peter JÖRG, Chur (Graubünden, Schweiz).

Staubsauger.

Die bekannten Staubsauger haben den Nachteil, daß sie zur Ausführung der verschiedenen Reinigungsarbeiten eine verhältnismäßig große Anzahl auswechselbarer Saugstücke benötigen, welche bei der Arbeit nicht gleichzeitig am Apparat belassen werden können, sondern herumliegen oder in einem Beutel zu versorgen sind. Dieser Umstand verlangsamt einen raschen Übergang von einer Reinigungsarbeit zur andern. Des weitern sind die meisten Staubsauger in der Handhabung als Ganzes zu starr, zu ungelenkig um sie stets so führen zu können, daß das Saugstück (Düse oder Bürste) dicht genug an die zu reinigende Unterlage anliegt oder um das Saugstück bequem auch an schlecht zugängliche Stellen zu führen.

Die vorliegende Erfindung betrifft nun einen Staubsauger, bei welchem Saugdüsen und Saugbürsten sowohl direkt als auch unter Zwischenschaltung von Rohr- und Gelenkteilen drehbar einzeln auswechselbar und miteinander kombinierbar an das Staubsaugergehäuse anschließbar sind, wobei die Drehbarkeit der Saugstücke durch die Anschlußgewinde derselben ermöglicht wird.

In der Zeichnung ist eine beispielsweise Ausführungsform des Erfindungsgegenstandes veranschaulicht. Es zeigen:

Fig. 1 einen Längsschnitt durch das Staubsaugergehäuse mit Innenteilen ohne äußeres Zubehör,

Fig. 2 den Staubsauger in Gebrauchsbereitschaft für die Reinigung des Bodens,

Fig. 3 den Staubsauger in Gebrauchsbereitschaft für die Reinigung von Polstermöbeln,

Fig. 4 eine Ansicht des Staubsaugers in Gebrauchsbereitschaft für die Reinigung schlecht zugänglicher Stellen, zum Beispiel unter und hinter Möbeln;

Fig. 5 bis 9 sind Zubehörteile des Staubsaugers und

Fig. 10 ist ein Schnitt nach Linie I—I in Fig. 9 des kombinierten Saugdüsen und -bürstenstückes.

Der dargestellte Staubsauger weist ein Gehäuse auf, das durch zwei verschieden

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große Deckel 1, 2 und einen zwischen diesen eingesetzten Mantel 3 gebildet wird. 4 ist der Ventilator, dessen Gehäuse durch seinen Flansch 5 mittels eines Tragringes 6 unter Verwendung einer Dichtungseinlage 7 am Gehäusedeckel 1 mittels der Schrauben 8 befestigt ist. Die Abzugsöffnung des Ventilators schließt an einen in den Gehäusedeckel 1 eingesetzten, mit Gummigriff 9 versehenen Abzugsstutzen 10 an. Mit Abstand von der Einsaugöffnung des Ventilatorgehäuses ist an letzterem der Motor 11 festgeschraubt, welcher durch ein Verbindungsstück 12 den Lufteinsaugstutzen 13 trägt, welcher den Gehäusedeckel 2 durchsetzt und eine seitliche, in den Gehäuseinnenraum mündende Austrittsöffnung 14 aufweist. Das durch den Gehäusedeckel 2 herausragende Ende des Lufteinsaugstutzens 13 ist mit einem Anschlußgewinde 15 versehen. Desgleichen ist auch das Ende des Abzugsstutzens 10 mit einem Anschlußgewinde 16 von gleicher Dimension wie das Anschlußgewinde 15 versehen. Der Staubsack oder Staubfilter ist mit 17 bezeichnet und besitzt Kegelform. Sein unteres Ende ist am Verbindungsstück 12 festgemacht, während in das erweiterte obere Ende ein Spiralfederring 18 eingenäht ist. Der mit der eingenähten Spiralfeder 18 versehene Rand des Staubsackes ist über einem Gummidichtungsring 19 gehaltert, welcher am Umfang des Ventilatorgehäuses aufgebracht ist und zwischen diesem und dem Rand des obern Deckels 1 abdichtet. 20 ist das Stromzuführungskabel des Motors 11, welches mit einem Zwischenschalter 21 versehen ist. Der Hauptzubehörteil des Staubsaugers bildet ein Rohrwinkel 22 mit einer Anschlußmuffe 23 am einen Ende und einem Anschlußgewinde 23′ am andern Ende. Dieser Rohrwinkel 22 ist mittels seiner Muffe 23 an das Anschlußgewinde 15 des Lufteinsaugstutzens 13 anschließbar. Sein Anschlußgewinde 23′ dient zum Anschließen der Saugstücke (Saugdüsen, Saugbürsten). Als Saugstück zur Reinigung von Böden, Teppichen und dergleichen dient ein aus Saugdüse und Saugbürste kombiniertes, segmentförmiges Stück 24 von keilförmigem Querschnitt, auf dessen Rücken ein mit Innengewinde versehenes Armaturstück 25 befestigt ist, das die Anschlußöffnung bildet. Die Keilflächen des Saugstückes sind je mit einer Saugöffnung 26, 27, welche mit der Anschlußöffnung kommunizieren, sowie je mit einem bombierten Metallrand 28 bezw. 29 versehen, von denen der Metallrand 29 mit einem Borstenkranz 30 besetzt ist. An der durch die Keilflächen des Saugstückes 24 gebildeten Kante sitzt ein Gummistreifen 31, welcher zwischen den über die Kante vorstehenden Metallrändern 28, 29 festgeklemmt ist und zum Schutze der Möbel gegen Anstoßen bei Reinigungsarbeiten dient. Ein Abschlußstopfen 32 dient zum Abschluß der einen oder andern Saugöffnung 26 bezw. 27 je nachdem mit der Saugdüse oder mit der Saugbürste gearbeitet wird. Zur leichteren Hantierung mit dem Staubsauger bei Boden- und Teppichreinigungsarbeiten wird an das Anschlußgewinde 16 des Abzugsstutzens 10 eine Verlängerungsstange 33, die am einen Ende eine Anschlußmuffe 34 und am andern Ende ein Anschlußgewinde 35 besitzt, angeschlossen. Diese Verlängerungsstange 33 ist mit einer Spange oder Bride 36 zum Anklemmen des Stromzuführungskabels 20 zwecks besserer Führung desselben versehen. Fig. 3 zeigt den Staubsauger bereit für die Reinigung von Böden, Teppichen und dergleichen. Die Anschlußgewinde zwischen Rohrwinkel 22 und Saugstück 24 sind nicht vollständig angezogen, sondern können sich noch leicht drehen. Dadurch wird durch den Rohrwinkel 22 zwischen Staubsaugergehäuse und Saugstück eine besondere Gelenkigkeit erzielt, welche ein stets gutes Anliegen der Saugränder des Saugstückes auf der zu reinigenden Unterlage ermöglicht, wobei die Neigung der Verlängerungsstange gegenüber dem Boden verändert werden kann. Dies ermöglicht ein gutes Arbeiten unter Tischen, Stühlen und dergleichen Möbeln. Besonders schwer zugängliche Stellen des Bodens oder der durch Möbel verstellten Wände können ebenfalls mühelos erreicht werden, wenn, wie Fig. 4

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zeigt, die Verlängerungsstange 33 zwischen Staubsaugergehäuse und Rohrwinkel eingeschaltet wird.

Für die Reinigung von Polstern und deren Fugen dient als Saugstück eine schlanke, gegen das Vorderende hin im Durchmesser allmählich verringerte Düse 37 aus Holz mit seitlichem Saugschlitz 38 und einer über ihr Hinterende aufgeschobenen Anschlußmuffe 39 aus Gummi. Diese Saugdüse 37 ist ebenfalls unter Zwischenschaltung des Rohrwinkels 22 an das Staubsaugergehäuse anschließbar, wie dies durch Fig. 3 veranschaulicht ist. Für die Polstermöbelreinigung kann die Verlängerungsstange 33 weggelassen werden. Dagegen kann die Saugdüse 37 mit einer Kranzbürste 40 kombiniert werden, welche, wie Fig. 8 zeigt, auf die Gummimuffe 39 aufschiebbar ist. Die Kranzbürste 40 kann auch für sich allein verwendet werden, indem dieselbe unter Verwendung der Gummimuffe 39 auf den Rohrwinkel 22 aufgesteckt wird (Fig. 7).

Einen besonderen Vorteil bei den Reinigungsarbeiten mit dem beschriebenen Staubsauger bildet der Umstand, daß die augenblicklich nicht zur Verwendung gelangenden Saugstücke entweder auf das Anschlußgewinde 16 des Abzugsstutzens 10 oder bei Verwendung der Verlängerungsstange 33 auf deren Anschlußgewinde 35 aufsteckbar oder aufschraubbar sind und somit während der Arbeit stets bei der Hand sind, also nicht herumliegen oder anderweitig versorgt werden müssen. Dies ermöglicht einen raschen Wechsel der Saugstücke beim Übergang von einer Reinigungsarbeit auf die andere.

PATENTANSPRUCH:

Staubsauger, dadurch gekennzeichnet, daß Saugdüsen und Saugbürsten sowohl direkt als auch unter Zwischenschaltung von Rohr- und Gelenkteilen drehbar, einzeln auswechselbar und miteinander kombinierbar an das Staubsaugergehäuse anschließbar sind, wobei die Drehbarkeit der Saugstücke durch die Anschlußgewinde derselben ermöglicht wird.

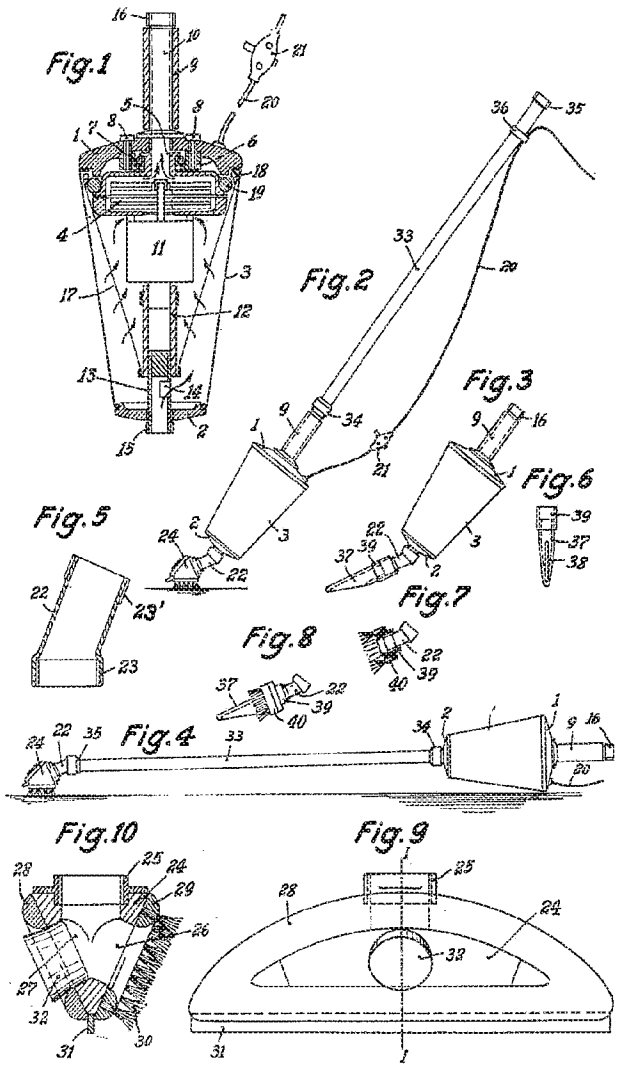
UNTERANSPRÜCHE:

1. Staubsauger nach Patentanspruch, dadurch gekennzeichnet, daß Saugdüsen und Saugbürsten eine derartige Ausbildung besitzen, daß dadurch die Möglichkeit gegeben ist, die Saugstücke während der Arbeit auch bei deren Nichtbenutzung am Staubsaugergehäuse zu belassen.
2. Staubsauger nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß eine zum Reinigen von Polstern und deren Fugen dienende Düse mit einer Kranzbürste kombinierbar ist.
3. Staubsauger nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß ein für die Boden- und Teppichreinigung dienendes, an das Staubsaugergehäuse anschließbares Saugstück auf einer Seite eine Saugdüse und auf der andern Seite eine Saugbürste aufweist, wobei die jeweils nicht benutzte Saugöffnung abschließbar ist.
4. Staubsauger nach Patentanspruch und Unteranspruch 1, dadurch gekennzeichnet, daß die Drehbarkeit zwischen Staubsaugergehäuse und einem für die Boden- und Teppichreinigung dienenden Saugstück durch einen dazwischengeschalteten, mit Anschlußgewinde versehenen Rohrwinkel ermöglicht wird, wobei das den Rohrwinkel mit dem Saugstück verbindende Gewinde eine Drehung dieser Teile gegeneinander gestattet.

Peter JÖRG.

Vertreter: REBMANN, KUPFER & Co., Zürich.

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DESCRIPTION DE661573

Vacuum cleaners for blowing and. Saugluftbetrieb The invention relates to a portable, mobile or stationary vacuum cleaners, both for daily use as well as for connection to dust-generating machinery and equipment, the dust, not only as an annoying byproduct, but also as a product occurs such. B. at mills, namely @es These are vacuum cleaners for blowing and Saugluftbetrieb; especially with a trained for blowing and Saugluftbetrieb dust removal device, wherein the blowing and suction air is generated by a common Arnen centrifugal blower and a Staubabscheidevorrichtung disposed with any axis position.

Such vacuum cleaners have become known in various designs. Generally sucks or presses a centrifugal blasting: by lein suction pipe, which may be provided with nozzles of various designs, sucked dust air through a wove @ efilter which retains the dust, while the clean air is passed directly or through a tube into the open. Here are the centrifugal fan and the Abschei, devorrichtung, in these cases, the fabric filter, not at a local dependency relationships to each other. There are especially famous vacuum cleaner, di> ee, a trained for blowing and Saügluftbetriebi dust removal device are provided, in which the air flowing through the fabric filter clean air from the filter or Abscheidevorrichtu; surrounding ng non-permeable enclosure is surrounded, from which the purified air is supplied through lines as blowing air of standing under suction dust collection apparatus again, so that a guided air circuit is produced.

Mash these known vacuum cleaners are positioned for both the centrifugal fan and for the dust collecting special rooms, so that the Gesamtraummaß is large, which is disadvantageous with respect to the handling and ease of use possibility. In addition, the Staubab, failed: devorrichtungen even used as Staubsiamimelvorrichtungren what when using filter materials as separator, which is generally quite changeable: walls with the result. Since, these vacuum cleaners are not provided with mechanical cleaning devices for the filter bag, but be cleaned at certain time interval by hand, so is seeking the filter bag increasingly, whereby the suction effect decreases slowly. Although there are already Hiebelvorrichtungen provided for this cleaning by hand, which make cleaning easy. Cleaning is always only dependent on the good will of the operator, in this type, and forms for the operation of the vacuum cleaner a certain load.

in, here in particular. Candidate known cases the filter bag as a bag formed of a very large measure of space and due to its double wall of very difficult cleanability.

Unlike zudiesen known devices puzzled at the vacuum cleaner according to the invention, the blowing and suction air generating centrifugal blower; located wholly or partly within the dust collecting device.

With the adjustment of the centrifugal blower various advantages are achieved with respect to the use value of the vacuum cleaner; in accordance with the invention of advanced significance. The whole or acts and thereby the Abscheidevorrichtu n, g orbiting, the wind power generating centrifugal blowers produced at the dust collecting always a irrespective of the Durchströmbewegung of wind through .the dust separating itself sufficient altitude air movement, thereby cleaning the dust collecting device by the wind itself and automatically causes and .This Absi cheidevorrichtung with virtually the same flow resistance works.

The per se by the pooling of the rooms of the centrifugal fan and the Staubabschei, devorrichtung already scored in a volume reduction of the entire area of Staubabschelders is thereby additionally increased that the -Filterfläche or the area of dust collecting in from the free-keeping clear of the filter or Staubabscheidevorüchtung general can be reduced according to experience. The dust collection occurs in the vacuum cleaner g nder, the invention in a known manner in a lower dust collection, space to include either itself removed, depending on the arrangement in a known manner or else in. an expedient manner is emptied.

in particular the white dust collecting device is in the vacuum cleaner, according to the invention arranged in a ring, with the wings of the centrifugal blower or its blades or. wind generating ring are formed so that they protrude into the R, iggra tn, so that: the ß entering the centrifugal blasting dust-laden air stream as circling ring current over the whole surface of the separator is led away. Thus, the flow resistance at the Staubabscheidevorrichteng at any point of its surface in an equal proportion to

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their cleaning is brought and the highest level of suction: achieved and keeping clean.

As a separator can in a vacuum cleaner according to the invention not only fabric or mesh fabric, that is fabric filters, are used; but also leerraumbil. dividend Düngitter that in the execution of perforated sheets, coarser sieves, slotted: grids, scroll bars o..dgl. have become known for other agencies. Explanatory be noted in this connection that in the purified air filter fabrics: the fabric flows through at Düngittern, however, the cleaning is performed on the inside of the grating, so that .the dust, in a on the outer side of the D üngitbers; located. Space, or is spun into several and there reaches the settling, while the cleaned air is discharged from the inner annular space.

are generally those vacuum cleaners that then particular, work with one for blowing and Saugluftbetrieb, formed dust collection device designed with a lower wind pressure Where higher wind pressure is required, however, as such. B. may be in the suction grist of mills the case can also be designed zwewdruckstufig at the vacuum cleaner according to the invention, the centrifugal fan, so that the dust collecting between the two pressure levels is.

The object of the invention is illustrated on the drawing in Fig. 3 in R to an embodiment.

In Fig :. r is in a right bottom provided with a dust collection chamber, e housing a one driven by a motor; the wind power generating centrifugal blower b apgeordnet within a primarily ring-shaped permeable separator c and a game room d. 'The centrifugal blower b sucks serving dust-laden air flow from a trained for blowing and Saugluftbetrieb i Staubaufnahmevorrichtung k through a suction pipe g and ebnen romp room / pass toward the middle of. hurls it against the permeable, mainly annular Stauba' PRETTY Ädevorrichtungc and leads him as circling the ring current over its entire surface away. The Staubabscheidevörrichtung stops here back to dust, which is, however, immediately i or peeled off from the circular ring current, the centrifugal blower w and sold in Stauhsammelxaum e while in the dead space e, which is to take only schematically here, already larger foreign parts from the dust airflow to settle.

In this operation, the centrifugal fan blows the LuA-stream, it purifying, through the Staubabscher: devorrichtung through k across the gap d and the blowpipe i after Staubaufnabmevorrichtung back. If the dust collecting c however a D üngitber, the gap d is a space which is not blown by the wind; in which, rather than in a quiet zone by centrifugal blasting the dust. hi. neingle-spin is, from where it drops to Staubsammelraum while Blaswind from inside the Abscheidevorrichtu: ng c a blowpipe! is passed.

Fig. 2 shows its section through the waste separation works and the collection chamber are on the line II-II, showing how the collected dust through its slot m pass is thrown from the ring current of spin-bicwer in the dust collecting chamber e.

It is further to the blow pipe or the blow pipe i of the dust pickup device g, i, k i, an opening is provided, can be derived by any portion of the blown air to the outside. To this derived part! the blown air flows in k into a corresponding amount of fresh air into the inner circle of the Wind vacuum cleaner, which may be partially naturally also conducted for example by the motor as a cooling stream in a known manner. it is thus given an opportunity to renew the air mass and the same time a means for controlling the suction at the receiving device k eating again Opening i can of course be arranged with known means in a known white changeable, so that the degree of bleed-off into the open air can be adjusted during operation.

There the opening I with a permeable movable or movable layer is further ccvered. This may for example consist of a felt layer, also of limited through screens cavities which sand, z. B. Aluminium sand, are filled. It can also fine fabrics that put up with dust and be flooded by blowing stream and held is cleaner, be arranged. This is the outside bleed-off partial flow which undergoes a second cleaning with simple means in itself, capable of being diverted from a blast, the total dust Trinity has not. It is advantageous in some cases, not completely clean the blow-back to the dust removal device, is: it is that:. The effort is too high, that this dusty blowing stream, similar to the effect of a sand blasting machine, for cleaning surfaces, such was B. Hart dust sites is at roof trusses and walls, hand. In such cases it is more advantageous to the dust from the Sect: ei4evorrichtung to drive only to a certain Gradre and to work with an on diesle thus artificially increased dust content of the inner Ringsfaublwftstromes.

For such cases, the ccvering of the opening I ensures nevertheless a ccmpietely dusted bicwing out the air tc the outside.

The arrangement: a zweidr uckstufigen centrifugal blower in which the Staub.-ab'scheidevorrichtung located between the two pressure levels is not particularly described, since such an arrangement is generally understood and in many embodiments. It is thus achieved that the Durchströmdruck can be kept small by the required dust separation even when other causes necessary high velocity pressure of the air stream.

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CLAIMS DE661573

[3]

CLAIMS: i. Vacuum cleaners for blowing and Saugluftbetrieb :, especially with one for blowing and Saugluftbetrieb' trained dust Shoo @ evornichtung, wherein the blowing and suction air is generated from a common centrifugal fan, and a dust @ -abscheidevorrichtung, characterized in that: the centrifugal fan (b) is disposed wholly or partly within the dust separating apparatus (c). 2. Vacuum cleaner according to claim i, characterized in that the Staubab'scheidevorrichtung (c) ring-shaped and the vanes of the centrifugal fan (b) are formed such that they protrude into the annular space of the Stauhabscheidevorrichtung so that the in the centrifugal blower: entering dust-laden air flow: as circling ring current over the whole surface of the separator is led away. 3. Vacuum cleaner. according to claim i, characterized gekzeichnet that on the blowpipe (i) the Staubaufnahmevorrichtu, ng (g, i, k) has an opening (L) is provided through which part of the blow air is be derived to the outside. q ..

[5]

Vacuum cleaner according to claim 3, characterized in that the opening (L) by a permeable, movable or movable layer, z. B. Felt, Sand o. Like., Is covered. 5. Vacuum cleaner according to claim i, characterized "in that the centrifugal fan äst (b) zweidruckstufig formed so that the dust separating apparatus (c) lies between the two pressure stages.

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DEUTSCHES REICH

AUSGEGEBEN AM
22. JUNI 1938

REICHSPATENTAMT

PATENTSCHRIFT

№ 661573

KLASSE 34c GRUPPE 560

B 173617 X/34c

Tag der Bekanntmachung über die Erteilung des Patents: 25. Mai 1938

Friedrich Büttner in Lübeck

Staubsauger für Blas- und Saugluftbetrieb

Patentiert im Deutschen Reiche vom 2. April 1936 ab

Die Erfindung bezieht sich auf einen tragbaren, fahrbaren oder ortsfesten Staubsauger, sowohl für den Handgebrauch als auch für den Anschluß an stauberzeugende Maschinen und Anlagen, wobei der Staub nicht nur als lästige Nebenerscheinung, sondern auch als Erzeugnis auftritt, wie z. B. bei Mühlen, und zwar handelt es sich hierbei um Staubsauger für Blas- und Saugluftbetrieb, insbesondere mit einer für Blas- und Saugluftbetrieb ausgebildeten Staubaufnahmevorrichtung, wobei die Blas- und Saugluft von einem gemeinsamen Schleudergebläse erzeugt wird und eine Staubabscheidevorrichtung angeordnet ist mit beliebiger Achsenlage.

Solche Staubsauger sind in verschiedenen Ausführungen bekanntgeworden. Im allgemeinen saugt oder drückt ein Schleudergebläse die durch ein Saugrohr, welches mit Düsen von verschiedener Bauart versehen sein kann, angesaugte Staubluft durch ein Gewebefilter, welches den Staub zurückhält, während die Reinluft unmittelbar oder durch ein Rohr ins Freie geleitet wird. Dabei stehen das Schleudergebläse und die Abscheidevorrichtung, in diesen Fällen das Gewebefilter, nicht in einem örtlichen Abhängigkeitsverhältnisse zueinander. Es sind insbesondere auch Staubsauger bekanntgeworden, die mit einer für Blas- und Saugluftbetrieb ausgebildeten Staubaufnahmevorrichtung versehen sind, bei denen die durch das Gewebefilter strömende Reinluft von einem das Filter oder die Abscheidevorrichtung umgebenden nicht durchlässigen Gehäuse umgeben ist, aus welchem die gereinigte Luft durch Leitungen als Blasluft der auch unter Saugwirkung stehenden Staubaufnahmevorrichtung wieder zugeführt wird, so daß ein geführter Luftkreislauf entsteht.

Bei diesen bekannten Staubsaugern sind sowohl für das Schleudergebläse als auch für die Staubabscheidevorrichtung besondere Räume angeordnet, so daß das Gesamtraummaß groß ist, was mit Bezug auf die Handlichkeit und leichte Anwendungsmöglichkeit nachteilig ist. Außerdem werden die Staubabscheidevorrichtungen selbst als Staubsammelvorrichtungen benutzt, was bei Verwendung von Filterstoffen als Abscheidevorrichtung, und das ist allgemein, ganz wechselnde Saugwiderstände zur Folge hat. Da diese Staubsauger nicht mit mechanischen Reinigungseinrichtungen für die Filterbeutel versehen sind, sondern in gewissen Zeitabschnitten von Hand gereinigt werden, so setzt sich der Filterbeutel zunehmend zu, wodurch die Saugwirkung langsam absinkt. Es sind zwar für dieses Reinigen von Hand bereits Hebelvorrichtungen vorgesehen, welche das Reinigen bequem gestalten. Das Reinigen ist aber bei dieser Art immer nur von dem guten Willen des Bedienenden abhängig und bildet für den Betrieb des Staubsaugers eine gewisse Belastung. In hier insbesondere in Frage kommenden bekannten Fällen sind die Filterbeutel als Druckbeutel ausgebildet von sehr großem Raummaß und infolge ihrer

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Doppelwandigkeit von sehr schwieriger Reinigungsmöglichkeit.

Im Gegensatz zu diesen bekannten Einrichtungen wird bei dem Staubsauger gemäß der Erfindung das die Blas- und Saugluft erzeugende Schleudergebläse ganz oder zum Teil innerhalb der Staubabscheidevorrichtung angeordnet.

Durch die neue Anordnung des Schleudergebläses werden verschiedene Vorteile erzielt, die mit Bezug auf den Gebrauchswert des Staubsaugers gemäß der Erfindung von fortschrittlicher Bedeutung sind. Das ganz oder wirkt wird und dadurch die Abscheidevorrichtung umlaufende, den Windstrom erzeugende Schleudergebläse erzeugt an der Staubabscheidevorrichtung stets eine unabhängig von der Durchströmbewegung des Windes durch die Staubabscheidevorrichtung selbst ausreichend hohe Luftbewegung, so daß dadurch das Reinigen der Staubabscheidevorrichtung vom Winde selbst und selbsttätig bewirkt wird und dadurch die Abscheidevorrichtung mit praktisch gleichem Strömungswiderstand arbeitet.

Die an sich durch das Zusammenlegen der Räume des Schleudergebläses und der Staubabscheidevorrichtung in einen Raum bereits erzielte Verkleinerung des Gesamtraumes des Staubabscheiders wird dadurch noch zusätzlich erhöht, daß durch das selbsttätige Reinhalten des Filters oder der Staubabscheidevorrichtung die Filterfläche oder die Fläche der Staubabscheidevorrichtung im allgemeinen erfahrungsgemäß verkleinert werden kann. Die Staubsammlung geschieht bei dem Staubsauger gemäß der Erfindung in bekannter Weise in einem unteren Staubsammelraum, der je nach der Anordnung in bekannter Weise entweder selbst abgenommen oder sonst in einer zweckmäßigen Weise entleert wird.

In besonderer Weise ist bei dem Staubsauger gemäß der Erfindung die Staubabscheidevorrichtung ringförmig angeordnet, wobei die Flügel des Schleudergebläses oder seine Schaufeln oder sein winderzeugender Kranz so ausgebildet sind, daß sie in den Ringraum hineinragen, so daß der in das Schleudergebläse eintretende staubbeladene Luftstrom als kreisender Ringstrom über die ganze Fläche der Abscheidevorrichtung hinweggeführt wird. Dadurch wird der Strömungswiderstand an der Staubabscheidevorrichtung an jeder Stelle ihrer Fläche in ein gleiches Verhältnis zu ihrer Reinigung gebracht und ein Höchstmaß von Saugen und Reinhalten erzielt.

Als Abscheidevorrichtung können bei dem Staubsauger gemäß der Erfindung nicht nur Stoff- oder Siebgewebe, also Filtergewebe, verwendet werden, sondern auch leerraumbildende Düngitter, die in der Ausführung von gelochten Blechen, gröberen Sieben, Schlitzgittern, Spiralgittern o. dgl. bei anderen Einrichtungen bekanntgeworden sind. Erklärend sei hierzu bemerkt, daß bei Filtergeweben die gereinigte Luft das Gewebe durchströmt, bei Düngittern dagegen das Reinigen auf der Innenseite des Gitters erfolgt, so daß der Staub in einen an der Außenseite des Düngitters gelegenen Leerraum oder in mehrere geschleudert wird und dort zum Absetzen gelangt, während die gereinigte Luft aus dem Innenringraum abgeleitet wird.

Im allgemeinen arbeiten solche Staubsauger, die dann insbesondere mit einer für Blas- und Saugluftbetrieb ausgebildeten Staubaufnahmevorrichtung ausgebildet sind, mit geringerem Winddruck. Wo indessen höherer Winddruck erforderlich ist, wie es z. B. bei dem Absaugen des Mahlgutes aus Mühlen der Fall sein kann, kann bei dem Staubsauger nach der Erfindung das Schleudergebläse auch zweidruckstufig ausgebildet sein, so daß die Staubabscheidevorrichtung zwischen den beiden Druckstufen liegt.

Der Gegenstand der Erfindung ist auf der Zeichnung in Abb. 1 bis 3 in einem Ausführungsbeispiel dargestellt.

In Abb. 1 ist in einem rechts unten mit einem Staubsammelraum *e* versehenen Gehäuse *a* ein von einem Motor angetriebenes, den Windstrom erzeugendes Schleudergebläse *b* innerhalb einer vornehmlich ringförmig ausgebildeten durchlässigen Abscheidevorrichtung *c* und eines Spielraumes *d* angeordnet. Das Schleudergebläse *b* saugt den staubbeladenen Luftstrom aus einer für Blas- und Saugluftbetrieb ausgebildeten Staubaufnahmevorrichtung *k* durch ein Saugrohr *g* und einen toten Raum *f* hindurch nach der Mitte zu an, schleudert ihn gegen die durchlässige, vornehmlich ringförmige Staubabscheidevorrichtung *c* und führt ihn als kreisenden Ringstrom über ihre ganze Fläche hinweg. Die Staubabscheidevorrichtung hält hier den Staub zurück, der von dem kreisenden Ringstrom des Schleudergebläses jedoch sofort wieder abgeschält und im Staubsammelraum *e* abgesetzt wird, während in dem toten Raum *e*, der hier nur schematisch zu nehmen ist, sich bereits gröbere Fremdteile aus dem Staubluftstrom absetzen können. Bei diesem Vorgang bläst das Schleudergebläse den Luftstrom, ihn reinigend, durch die Staubabscheidevorrichtung hindurch über den Zwischenraum *d* und das Blasrohr *i* nach der Staubaufnahmevorrichtung *k* zurück. Ist die Staubabscheidevorrichtung *c* indessen ein Düngitter, so ist der Zwischenraum *d* ein Leerraum, der vom Wind nicht durchblasen wird,

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in welchen vielmehr als in eine ruhige Zone vom Schleudergebläse der Staub hineingeschleudert wird, von wo er zum Staubsammelraum absinkt, während der Blaswind aus dem Innenraum der Abscheidevorrichtung *c* zu einem Blasrohr *i* geleitet wird.

Abb. 2 stellt einen Schnitt durch den Abscheide- und den Sammelraum nach der Linie II-II dar und zeigt, wie der abgeschiedene Staub durch einen Schlitz *m* hindurch vom Ringstrom des Schleudergebläses in den Staubsammelraum *e* geschleudert wird.

Es ist ferner an dem Blasrohr oder der Blasleitung *i* der Staubaufnahmevorrichtung *g*, *i*, *k* eine Öffnung *l* vorgesehen, durch die ein beliebiger Teil der Blasluft ins Freie abgeleitet werden kann. Um diesen abgeleiteten Teil der Blasluft strömt bei *k* eine entsprechende Menge Frischluft in den inneren Windkreis des Staubsaugers hinein, der teilweise natürlich auch beispielsweise durch den Motor als Kühlstrom in bekannter Weise geleitet sein kann. Es wird damit Gelegenheit zum Erneuern der Luftmasse gegeben und gleichzeitig ein Mittel zum Regeln der Saugwirkung an der Aufnahmevorrichtung *k*, das neu ist. Die Öffnung *l* kann selbstverständlich auch mit bekannten Mitteln in bekannter Weise veränderbar angeordnet sein, so daß das Maß der ins Freie abblasenden Luft im Betrieb geregelt werden kann.

Es wird ferner die Öffnung *l* mit einer durchlässigen bewegbaren oder beweglichen Schicht abgedeckt. Diese kann beispielsweise aus einer Filzlage bestehen, ferner aus durch Siebe begrenzten Hohlräumen, welche mit Sand, z. B. Aluminiumsand, angefüllt sind. Es können auch feine Gewebe, die sich mit Staub versetzen und vom Blasstrom überspült und sauber gehalten werden, angeordnet sein. Dadurch wird der ins Freie abblasende Teilstrom, der an sich ein zweites Reinigen mit einfachen Mitteln erfährt, befähigt, aus einem Blasstrom abgezweigt zu werden, der völlige Staubfreiheit nicht hat. Es ist in manchen Fällen vorteilhaft, den Rückblasstrom zur Staubaufnahmevorrichtung nicht völlig zu reinigen, sei es, daß der Kraftaufwand zu hoch ist, sei es, daß dieser staubhaltige Blasstrom, ähnlich der Wirkung eines Sandstrahlgebläses, zum Reinigen von Flächen, z. B. Hartstaubstellen bei Dachbindern und Wänden, gebraucht wird. In solchen Fällen ist es vorteilhafter, das Entstauben der Abscheidevorrichtung nur bis zu einem gewissen Grade zu treiben und mit einem auf diese Weise künstlich gesteigerten Staubgehalt des inneren Ringstaubluftstromes zu arbeiten. Für solche Fälle gewährleistet das Abdecken der Öffnung *l* trotzdem ein völlig entstaubtes Ausblasen der Luft ins Freie.

Die Anordnung eines zweidruckstufigen Schleudergebläses, bei dem die Staubabscheidevorrichtung zwischen den beiden Druckstufen liegt, wird nicht besonders beschrieben, da eine solche Anordnung auch in vielerlei Ausführung allgemein verständlich ist. Es wird damit erreicht, daß der Durchströmdruck durch die Staubabscheidevorrichtung auch bei aus anderen Ursachen notwendig hohem Geschwindigkeitsdruck des Luftstromes erforderlich klein gehalten werden kann.

Patentansprüche:

1. Staubsauger für Blas- und Saugluftbetrieb, insbesondere mit einer für Blas- und Saugluftbetrieb ausgebildeten Staubaufnahmevorrichtung, wobei die Blas- und Saugluft von einem gemeinsamen Schleudergebläse erzeugt wird, und einer Staubabscheidevorrichtung, dadurch gekennzeichnet, daß das Schleudergebläse (*b*) ganz oder zum Teil innerhalb der Staubabscheidevorrichtung (*c*) angeordnet ist.

2. Staubsauger nach Anspruch 1, dadurch gekennzeichnet, daß die Staubabscheidevorrichtung (*c*) ringförmig und die Flügel des Schleudergebläses (*b*) derart ausgebildet sind, daß sie in den Ringraum der Staubabscheidevorrichtung hineinragen, so daß der in das Schleudergebläse eintretende staubbeladene Luftstrom als kreisender Ringstrom über die ganze Fläche der Abscheidevorrichtung hinweggeführt wird.

3. Staubsauger nach Anspruch 1, dadurch gekennzeichnet, daß an dem Blasrohr (*i*) der Staubaufnahmevorrichtung (*g*, *i*, *k*) eine Öffnung (*l*) vorgesehen ist, durch die ein Teil der Blasluft ins Freie abgeleitet wird.

4. Staubsauger nach Anspruch 3, dadurch gekennzeichnet, daß die Öffnung (*l*) durch eine durchlässige, bewegbare oder bewegliche Schicht, z. B. aus Filz, Sand o. dgl., abgedeckt ist.

5. Staubsauger nach Anspruch 1, dadurch gekennzeichnet, daß das Schleudergebläse (*b*) zweidruckstufig ausgebildet ist, so daß die Staubabscheidevorrichtung (*c*) zwischen den beiden Druckstufen liegt.

Hierzu 1 Blatt Zeichnungen

BERLIN. GEDRUCKT IN DER REICHSDRUCKEREI.

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Zu der Patentschrift 661 573
Kl. 34c Gr. 560

Abb. 2

Abb. 1

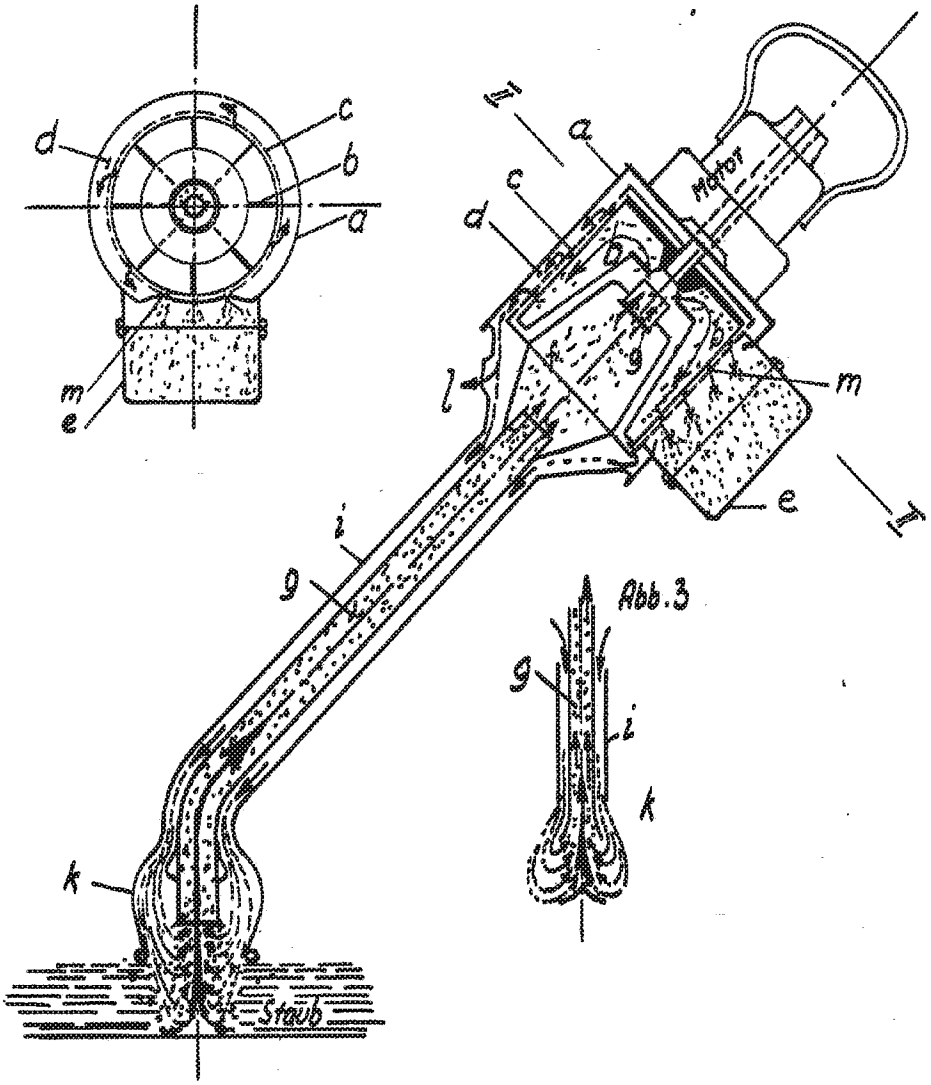


Abb. 3

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DESCRIPTION FR553202

dust separator by centrifugal force. The present invention relates <B> at </ B> of the apparatus which are intended <B> at </ B> separating by solid particles or other air or other fluids and more particularly <B> at < / B> apparatus in which separation is performed by an action purely <RTI> mechanical # </ RTI> An object <B> d - </ B> e the invention is <B> by </ B> perform a simple mechanical device that efficiently separates dust and other foreign matter from air, gas or other fluids through the device and whose construction are <B> - L </ B> combined sc <B> by </ B> that it fits on various types of machines or apparatus for lend <B> by </ B> very different uses.

Another object of -l'invention This is to establish this <RTI> unit Senre which </ RTI> may be applied mostly on constructions -from cleaners, vacuum and give it a constructive form with some other new and useful ca ractéristiques. <B> - </ B> The invention is <B> by </ B> mount a perforated piece (the way it is installed on the path traveled by the fluid stream to loosen particles of matter; this perforated piece receives tion rota motion is imparted to it by driving force <B> by </ B> a speed proportional <B> by </ B> that of particles party which is responsible the fluid, so <B> to </ B> that these particles will be intercepted by impinging upgraded parts between the perforations in this room <RTI> and-se </ RTI> find diverted and driven from the current through these perforations.

Next: the invention there is provided a simple mechanical con struction <B> by </ B> -help which the device can lend <B> by </ B> other jobs in, adapting on machinery -and different devices, and providing the means for the app quer especially on scanning constructions by the <RTI> empty .. </ RTI> <RTI> the invention </ RTI> finally includes certain other provisions and applications, as well as a will <RTI> the indi # luer </ RTI> now <RTI> is-reference </ RTI> to the accompanying drawing, which contains the <B> if </ B> is a longitudinal section made by a cleaner <B> by </ B> empty established according to the invention and shows a manual of improved device in question <B> here. </ B>

Figure -2 is a cross section taken in principle along the line <RTI> 11-II </ RTI> of Figure <B> 1. </ B>

Figure <B> 3 </ B> is also a cutting trans versale-, made in principle along the line <RTI> III-111 </ RTI> of Figure I.

Figure Ai is a detail view showing -in perspective and <B> -to </ B> by a separator body. Figure <B> 5 </ B> is a side elevation represen tative <B> by </ B> smaller scale the <RTI> cleaner à_vide </ RTI> shown in Figure <RTI> I. </ RTI>

Although the device for <B> by </ B> separate airborne dust particles is shown in the accompanying drawing in his fashion d7applica- <RTI> tion </ RTI> on a cleaner <B> to < / B> empty, it remains tense in the present invention is capable <B> by </ B> <RTI> e? pply </ RTI> <RTI> PPUR </ RTI> LA- get dust separation and <RTI> d atres% </ RTI> foreign matter from air, gas or other fluids on other machines or devices. Needless to say also that this improved device may <RTI> to em </ RTI> -ployer separately and use <B> by </ B> alone <RTI> of separator </ RTI> full.

The shape and construction <B> of </ B> separator by <RTI> be the subject </ RTI> of <RTI> rinvention </ RTI> make nature operative part available this <B> by </ B> serve mainly <U > with </ U> of net fcyeurs <B> to </ B> empty, as shown in the drawing; it replaces, in fact, the <RTI> colicteur </ RTI> customary to <RTI> poussiéFes </ RTI> in which dust-laden Pair is. chased <B> by </ B> force by the fan motor controlled. In the cleaner construction <B> by </ B> empty embodying the present invention. <RTI> ITAR </ RTI> in charge of dust is subject <B> by </ B> Call <RTI> Euro- < / RTI> <RTI> son </ RTI> with the usual fan <RTI> suction, - </ RTI> <RTI> but </ RTI> the dust is separated from Pair before -that it comes to fan and escapes <B> by </ B> <RTI> fair </ RTI> free.

<B> - </ B> <RTI> Çomme_ # n </ RTI> see <RTI> su </ RTI> <B> - </ B> <RTI> r </ RTI> drawing <B> 1 </ B> is a wrapper <RTI> lubuisiré </ RTI> which forms a chamber appropriate g <B> where </ B> are received dusts; this envelope is <RTI> formée </ RTI> <B> to </ B> his <RTI> Çxtrémité </ RTI> <RTI> iii - </ RTI> <RTI> ferieure </ RTI> <U> by < / U> <RTI> UPP </ RTI> <RTI> Late </ RTI> remcvable <B> 3 </ B> which is provided <RTI> to </ RTI> <RTI> the </ RTI> <RTI > nozzle </ RTI> <RTI> usually </ RTI> <RTI> of aspi </ RTI> <RTI> r </ RTI> <RTI> do </ RTI> <RTI> u </ RTI> <RTI > the </ RTI> <RTI> Tine </ RTI> <RTI> -C </ RTI> <B> to </ B> <B> </ B> <RTI> be </ RTI> engaged with the Surface <B> by </ B> clean or <B> by </ B> <RTI> th </ RTI> <RTI> 't </ RTI> <RTI> -re </

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LPC-ç </ RTI> of, sort <RTI> that </ RTI> <B> 1 </ B> it forms a pocket <B> and </ B> appropriate room in <B> f </ B > end <RTI> low </ RTI> of <RTI> lenve - </ RTI> <RTI> envelope </ RTI> i around this <RTI> çxtrémité </ RTI> inwardly extended <B> 5 </ B > the <RTI> culvert </ RTI> h to receive dust and particles <B> -which </ B> have <B> de - </ B> Pair stained.

A tubular casing <B> 6 </ B> of the separator is continuation of <RTI> wrapper. </ RTI> <RTI> iL </ RTI> <B> a </ B> which it is fixed in axial alignment with the <U> in - </ U> dune develops I removably and in any suitable manner to form a seal. To this end, we laid out by <RTI> exam - </ RTI> <RTI> -pl - e </ RTI> flanges <B> 7 </ B> <RTI> _who </ RTI> protrude outwards on <RTI> los </ RTI> adjacent ends of two <RTI> elive, </ RTI> <RTI> lopes </ RTI> <B> 1. </ B> and <B> 6 </ B> and is interposed an appropriate packing ring, <B> 6 </ B> between the two flanges <B> 7 </ B> <RTI> that </ RTI> we retain tight <RTI> Pune </ RTI> against <RTI> of the </ RTI> <B> 1 </ B> hearth <RTI> Un-side </ RTI> with a hook <B > 9 </ B> and, on the other side, by a bracket <B> by </ B> spring <RTI> io </ RTI> in this way, we hold these flanges and firmly holds one meeting two envelopes <B> i to 6 </ B> on <RTI> rextrémité </ RTI> higher. of <RTI> wrapper </ RTI> <B> 6 </ B> of the separator and in the axial extension of the casing, mounting a <RTI> rhanibre </ RTI> <B> i </ B> i for <RTI> fan.

</ RTI> A housing <B> 1. </ B> <RTI> L) </ RTI> formed integrally with the upper end of the. chamber <B> 1 </ B> 1 -Fan tion is installed in the axial extension of the <RTI> -chaiibre </ RTI> i i and two enveicpes <RTI> t </ RTI> <B> 6. </ B> In this case <RTI> 12, </ RTI> is <B> houses </ B> a specified engine 1 <B> 3 </ B> and provided on its axis of axes by ray <RTI > 14 </ RTI> on which a fixed Fun <RTI fan> Suction </ RTI> 1 <B> 5. </ B> is <RTI> peut'donner </ RTI> <B> to </ B> ventila tor any constructive form that we judge useful; However, <RTI> * it is </ RTI> preferred to be <B> d </ B> u like <B> by </ B> admission axially with peripheral discharge, so <B> to < / B> that is called in the par- fan in the longi tudinal direction on its axis and discharged <RTI> radially </ RTI> by <B> lé </ B> game of its fins.

On the periphery or <B> here </ B> circularly chamber wall <B> i I; on </ B> practice <RTI> a </ RTI> series <RTI> d # openings </ RTI> <B> 16 </ B> where <RTI> appe </ RTI> <RTI> Vai </ RTI > who-is driven by the <RTI> ventila - </ RTI> <RTI> th </ RTI> <B> <i> 'eh </ i> - </ B> <RTI> _r </ RTI> < RTI> tor </ RTI> <RTI> poue </ RTI> get those <RTI> ouyertures, </ RTI> it is better to prune <B> in </ B> the direction of the length of this I room <RTI > i </ RTI> of <RTI> slot & </ RTI> shaped notches <RTI> redourbant </ RTI> outside the metal on a <RTI> edge </ RTI> <RTI> Figure </ RTI > <RTI> -of </ RTI> <RTI> 3; -o </ RTI> <RTI> each </ RTI> <RTI> ewénage </ RTI> <RTI> slot </ RTI> <RTI> as </ RTI> <RTI> and </ RTI> <RTI> a </ RTI> <RTI> said </ RTI> <RTI> series </ RTI> <RTI> in </ RTI> <RTI> where - </ RTI> <RTI> 17, </ RTI> <RTI> vertures </ RTI> <RTI> ohignguç - </ RTI> <RTI>; t6 </ RTI> 'a' curved parts or <RTI> - --who </ RTI> <RTI> s # 'Lendent </ RTI> forming tan <RTI> çqis </ RTI> 18th <RTI> gentielle - </ RTI> <RTI> ing </ RTI> <B> to </ B> <RTI> IQ-room </ RTI> ti on its outskirts in the direction that turns the <RTI> venWateur </ RTI> <RTI> j </ RTI> <B> 5.

</ B>

THE <RTI> sk </ RTI> of <RTI> -yeptiiateur </ RTI> 1 <B> 5 percent </ B> <RTI> résente </ RTI> a <RTI> pro - </ RTI> <RTI> longeinent </ RTI> <RTI> tubylgire </ RTI> <RTI> ig </ RTI> which some - s'étend- <RTI> pe </ RTI> <RTI> in </ RTI> a <B> < / B> <RTI> rint </ RTI> <RTI> st </ RTI> <B> </ B> <RTI> ICUR </ RTI> <RTI> dice </ RTI> <RTI> envelope < / RTI> <B> 6 </ B> <RTI> and </ RTI> <RTI> on </ RTI> <RTI> which </ RTI> is <RTI> Piante </ RTI> by <RTI> warp < / RTI> of <RTI> #es </ RTI> ends a sepa tor <RTI> roinef </ RTI> of dust indicated by <RTI> go </ RTI> in its <RTI> ense </ RTI> <RTI> com. </ RTI> This go neck separator <B> - I </ B> <RTI> a - </ RTI> <RTI> gate </ RTI> <B> </ B> one end, a <RTI> e </ RTI> <B> and </ B> coin <RTI> __ </ RTI> <B> - </ B> th <RTI> -l'te </ RTI> <RTI> annalair-e < / RTI> <B> to </ B> flange <B> 9 </ B> 1 to fit <RTI> close - </ RTI> <RTI> mejqt </ RTI> on the prole <RTI> ment < / RTI> you <B> P </ B> <RTI> -bulaire </ RTI> 1 <B> 9 </ B> of <U> wheel </ U> of <RTI> veiftiRteur-which </ RTI > and supports <B> by </ B> a <RTI> xLremt </ RTI> and was <RTI> -qi </ RTI> in an <RTI> its rotation.

</ RTI> On e <B> </ B> <RTI> 'Lê </ RTI> <RTI> r </ RTI> in <RTI> rextremité </ RTI> <RTI> oppo5ée </ RTI> separator go, gets a head <RTI> gg </ RTI> <B> to </ B> journal <B>I 3 </ B> to engage <U> -a </ U> through <RTI> 2 hours </ RTI> which has a housing for <B> by </ B> <RTI> C'O </ RTI> pin and extends <B> by </ B> <RTI> $ trayer </ RTI> <RTI> one. </ RTI> <RTI> envelope </ RTI> <RTI> This </ RTI> <RTI> through </ RTI> <B> 6 </ B> <RTI> rextrémité </ RTI> 2 April < RTI> is </ RTI> <RTI> fixed </ RTI> <RTI> lower </ RTI> <B> to </ B> <RTI> pin </ RTI> <RTI> of </ RTI> <RTI> in </ RTI> <RTI> that </ RTI> <RTI> n </ RTI> <RTI> # </ RTI> <B> - </ B> a. next to <RTI> wrapper </ RTI> <B> 6 </ B> <RTI> parfpile </ RTI> of <U> his </ U> ends at the other end, <RTI> it </ RTI> is holding a removably <RTI> on </ RTI> the other side of this envelope with <RTI> d'in </ RTI> suitable spring stirrup <RTI> G6A </ RTI> by releasing this bracket < RTI> fm </ RTI> <B> 6 </ B> on <RTI> p </ RTI> <B> </ B> was turning the cross <B> 9 </ B> <i> h </ i> ii po r <B> the </ B> release of the journal <B> 23 </ B> 'Kind then we can do <RTI> slide </ RTI> separator <RTI> no </ RTI> by end clearing the <B> </ B> la Fri tilateur wheel and remove it from <RTI> renveloppé </ RTI> when <RTI> -on </ RTI> wind <B> the </ B> clean or repair.

Both heads <RTI> f# </ RTI> <B> 1 </ B> and <RTI> fà.2 </ RTI> of the separator are connected by a series <B> </ B> small metal son <B > 7 -9 </ B>, the two ends are Attached <B> by </ B> remains in any appropriate manner 'of the OPEN -pratiquées tures on these two heads. These son <RTI> s "extend </ RTI> <RTI> in </ RTI> spiral of <RTI> theta </ RTI> <B> to </ B> other. As the <RTI> teie </

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RTI> <B> q </ B> has a much smaller diameter than the <RTI> Tae </ RTI> <b >> </ B> i, these are by their various son assembling a shaped wall <RTI> cone </ RTI> truncated and they are separated from each other by very short distances, so that Pair sucked into the nozzle h by the fan 1 <B> 5 </ B> can freely cross the gaps between the son 2 <B> 7 </ B> that make up this wall that <B> - </ B> lunch.

The spiral profile of this series of metal son extending from the small end or bottom end of the cone to achieve <B> at </ B> the large end thereof emerges, preferably in the direction opposite to that of rotation of the cone.

Experience has shown that a cone-shaped separator consisting of a large number of small metal son which extend spirally along the length of the cone and which are separated only very slightly between them is very effective for separating the the air <RTI> dust </ RTI> and other particles. However, it is well stretched 'that the invention also involved- use <RTI> of autreg </ RTI> forms of rotary separators whose perforations let through the fluid and the speed of rotation is such that all entraides particles by the stream are intercepted by undergoing, as a result of the centrifugal drilled or deviated tion action resulting from the rotation <B> of </ B> separator, a powerful force that rejects violently or <RTI > FLU </ RTI> deviate laterally-and <RTI> qu'ainisi </ RTI> these particles separate <B> of </ B> draft.

A conical separator made of a metallic multi son tude extending lon gitudinal direction and spirally thereon constitutes a <RTI> surfoice </ RTI> perforated spacious than air Francesco <RTI> Chit </ RTI> freely and present -it du <RTI> same </ RTI> <B> kick </ B> -a <RTI> serfiace '</ RTI> extent to which <RTI> vien </ RTI> <RTI> NEET, </ RTI> recounted in the 'oh when the dust particles has, through this piece: the rapid rotation of the conical separator 2 <B> o </ B> provides <RTI> the-contact </ RTI> of <B> son </ B> with each <RTI> par - </ RTI> with the <RTI> is </ RTI> have charged <RTI> r - </ RTI> <RTI> before </ RTI > particle that can pass between <I> the </ I> son; when these particles come into <RTI> con, </ RTI> contact with <B> wire - </ B> <RTI> elleis </ RTI> are deflected or <RTI> entered - </ RTI> <RTI> born </ RTI> in a movement rapid turnover and are either rejected laterally immediately by centrifugal force or <RTI> CISP </ RTI> deviation, <B> and </ B> well <RTI> entrained </ RTI> <B> to </ B > follow <RTI> over * </ RTI> to come to the end <RTI> or </ RTI> <RTI> Tae </ RTI> greater expan die <B of> 9 1 </ B> <U > where </ U> to them by the latter and then driven laterally <RTI> Parforce </ RTI> centri fuge.

The <B> </ B> spirals son favors the passage of dust plots <B> these </ B> son to <B> the </ B> <RTI> g ANDE # </ RTI > end <B> of </ B> cone where the centrifugal force is <RTI> Fies </ RTI> high

<B>. </ B> For the device can handle is conveniently as a cleaner, an extension <B> is set to </ B> handle 2 <B> 8 </ B> the end <B> of </ B> cartel , in the engine and the <RTI> common-son </ RTI> which lead to the motor are installed in this handle in the usual way.

<B> It </ B> is obvious that the arrangement can be combined so <B> by </ B> that pair or other fluid can be sent <B> by </ B> by force is blow flerie clans the separator at location <B> of y </ B> be aspirated as in the construction shown. the particular form and special provision of the envelope is also bound to vary, as well as the separator control mode to suit the <B> by </ B> the installation in which the device is used in each case of species. On- can also make minor changes <B> by </ B> the form, <B> by </ B> the construction and <RTI> By - </ RTI> <RTI> storage </ RTI> of perforated rotating separator without departing nothing for it <B> </ B> in the spirit of the invention is not limited, of course, <B> by </ B> construction < B> by </ B> arrangement or <B> by </ B> the combination of various organs that repre feel the drawing.

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CLAIMS FR553202

. <B> RE </ B> <RTI> Sume </ RTI> The invention po <B> - </ B> <RTI> core </ RTI> <RTI> obie't </ RTI> a separator dust, wherein these are separated from the air by centrifugal force and a workpiece, ac lected by driving force, installed on the path <B> of </ B> air flow and provided with openings to deliver passing <B> by </ B> <RTI> fair </ RTI> is set in rotation <RTI> tion </ RTI> <B> to </ B> speed <RTI> proportionnelle, </ RTI> that of walking <B> - </ B> dust particles <RTI> entered - </ RTI> <RTI> Rees </ RTI> per pair, so parts of this piece formed between these openings stop these particles collide with the centrifugal force and deflect laterally to the <RTI> détachor </ RTI> <B> of </ B> airstream when he crosses the room divider.

<B> - </ B> It is particularly intended séparateur- <B> at </ B> be used in cleaners <B> at </ B> vacuum, as well as a structural part separating, so < B> by </ B> that <RTI> ITAR </ RTI> can <B> y </ B> spend free ment, while all dust and other matter, this air is responsible are arrested 'and compelled by force centrifugal hitting this room and follow <RTI> UP tO </ RTI> its periphery where they are discharged laterally outside the path <B> de </ B> Pair. This piece separating own -ing -dite <RTI> préseûte </ RTI> a conical shape with a perforated wall, <U> the </ U> lying parts <B> - </ B> between -these are continuous perforations of one end <B> by </ B> <B> f </ B> other extending to <B> - </ B> reference in <RTI> spi - </ RTI> <RTI> p </ RTI> lines, and is placed in such a position <RTI> qu7elle </ RTI> has cut -the current <RTI> d7air, </ RTI> eh having its axis <RTI> rotation-ready </ RTI> in the <RTI> lon - </ RTI> <RTI> gitudinal </ RTI> of this current and the small end diameter directed toward reentry Pair.

In EC-separator is an established forming the envelope provided with a. driving Admission <RTI> iPair </ RTI> including a tubular extension enters <RTI> d% only </ RTI> certain amplitude <B> by </ B> <RTI> Pintérieur </ RTI> of that forming the envelope where s' installs <RTI> the cutter </ RTI> separation <RTI> own # </ RTI> tion said that is placed <RTI> in-dessusde </ RTI> <RTI> fextré - </ RTI> <RTI> mittee < / RTI> Release of the pipe and which has a perforated wall located opposite, but <B> at </ B> a distance of <RTI> Pextrémité </ RTI> open said intake pipe and <RTI > of the means </ RTI> are provided Per- create a flow <RTI> dair </ RTI> in that envelope and in that room divider and, turning it <B> by </ B> a proportional vi Countess <B> to - </ B> <RTI> Palture </ RTI> printed to particles <RTI> qu7entraine, </ RTI> power <RTI> dair.

</ RTI>

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BREVET D'INVENTION.

XIV. — Arts chimiques.

6. — Distillation. — Filtration. — Épuration des liquides et des gaz.

N° 553.202

Séparateur de poussières par force centrifuge.

M. John Wesley NEWCOMBE résidant aux États-Unis d'Amérique.

Demandé le 23 juin 1922, à 16h 13m, à Paris.
Délivré le 6 février 1923. — Publié le 15 mai 1923.

La présente invention est relative à des appareils qui sont destinés à séparer des particules solides ou autres de l'air ou d'autres fluides et plus particulièrement à des appareils dans lesquels une séparation est effectuée par une action purement mécanique.

Un objet de l'invention consiste à réaliser un dispositif mécanique simple qui sépare efficacement les poussières et autres matières étrangères de l'air, des gaz ou d'autres fluides traversant ce dispositif et dont la construction est combinée de manière à ce qu'il s'adapte sur des machines ou appareils de types divers pour se prêter à des usages très différents.

Un autre but de l'invention c'est d'établir un appareil de ce genre qui est susceptible de s'appliquer surtout sur des constructions de nettoyeurs par le vide et de lui donner une forme constructive ayant certaines autres caractéristiques nouvelles et utiles.

L'invention consiste à monter une pièce perforée de façon qu'elle soit installée sur le trajet parcouru par le courant du fluide pour en détacher des particules de matière; cette pièce perforée reçoit un mouvement de rotation qui lui est imprimé par force motrice à une vitesse proportionnelle à celle des particules dont est chargé le fluide, de manière à ce que ces particules seront interceptées en venant heurter les parties aménagées entre les perforations de cette pièce et se trouveront détournées et chassées du courant qui traverse ces perforations.

Suivant l'invention, on prévoit une construction mécanique simple à l'aide de laquelle le dispositif peut se prêter à divers emplois, en s'adaptant sur des machines et appareils différents, et qui procure le moyen de l'appliquer particulièrement sur des constructions de balayage par le vide.

L'invention comprend enfin certaines autres dispositions et applications, ainsi qu'on va l'indiquer maintenant en se référant au dessin ci-annexé, dans lequel :

La figure 1 est une coupe longitudinale faite par un nettoyeur à vide établi suivant l'invention et montre un mode d'emploi du dispositif perfectionné dont il s'agit ici.

La figure 2 est une coupe transversale, faite en principe suivant la ligne II-II de la figure 1.

La figure 3 est également une coupe transversale, faite en principe suivant la ligne III-III de la figure 1.

La figure 4 est une vue de détail, montrant en perspective et à part un organe séparateur.

La figure 5 est une élévation de côté représentant à plus petite échelle le nettoyeur à vide indiqué figure 1.

Bien que le dispositif destiné à séparer des particules de poussières de l'air soit représenté au dessin ci-annexé dans son mode d'applica-

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tion sur un nettoyeur à vide, il reste bien entendu que la présente invention est de nature à s'appliquer pour obtenir la séparation des poussières et d'autres matières étrangères de l'air, des gaz ou d'autres fluides sur d'autres machines ou appareils. Il va sans dire aussi que ce dispositif perfectionné peut s'employer séparément et servir à lui seul de séparateur complet.

La forme et la construction du séparateur faisant l'objet de l'invention rendent ce dispositif de nature à servir surtout avec des nettoyeurs à vide, ainsi que le montre le dessin; il remplace, en effet, le collecteur usuel de poussières dans lequel l'air chargé de poussières est chassé à force par le ventilateur commandé par moteur. Dans la construction de nettoyeur à vide réalisant la présente invention, l'air chargé de poussières est soumis à l'appel engendré par le ventilateur usuel d'aspiration, mais les poussières sont séparées de l'air avant que celui-ci arrive au ventilateur et s'échappe à l'air libre.

Comme on le voit sur le dessin, 1 représente une enveloppe tubulaire appropriée qui forme une chambre 2 où sont reçues les poussières; cette enveloppe est fermée à son extrémité inférieure par une tête amovible 3 qui est munie de la buse ordinaire d'aspiration 4 destinée à être engagée avec la surface à nettoyer ou à être déplacée au-dessus de celle-ci. Cette buse comporte une partie extrême interne 5 qui s'étend à l'intérieur de la chambre à poussières 2 sur une assez grande distance, de sorte qu'il se forme une poche ou chambre convenable dans l'extrémité du bas de l'enveloppe 1 autour de cette extrémité prolongée intérieurement 5 de la buse 4 pour recevoir les poussières et les particules qui se sont détachées de l'air.

Une enveloppe tubulaire 6 du séparateur fait prolongement de l'enveloppe 1 à laquelle elle se fixe en alignement axial avec cette enveloppe 1 d'une façon amovible et de toute manière appropriée pour constituer un joint étanche. Dans ce but, on aménage, par exemple, des brides 7 qui font saillie vers le dehors sur les extrémités adjacentes des deux enveloppes 1 et 6 et on intercale une bague de garniture appropriée 8 entre les deux brides 7 que l'on retient serrées l'une contre l'autre, d'un côté, par un crochet 9 et, de l'autre côté, par un étrier à ressort 10; de cette façon, on cale ces brides et on maintient fermement la réunion des deux enveloppes 1 à 6.

Sur l'extrémité supérieure de l'enveloppe 6 du séparateur et dans le prolongement axial de cette enveloppe, on monte une chambre 11 pour le ventilateur. Un carter 12 faisant corps avec l'extrémité supérieure de la chambre 11 du ventilateur est installé dans le prolongement axial de cette chambre 11 et des deux enveloppes 1 à 6. Dans ce carter 12, se loge un moteur indiqué en 13 et muni sur son axe d'un arbre 14 sur lequel se fixe un ventilateur d'aspiration 15. On peut donner à ce ventilateur toute forme constructive que l'on juge utile; cependant, il est préférable qu'il soit du type à admission en sens axial avec décharge périphérique, de manière à ce que l'air soit appelé dans le ventilateur dans le sens longitudinal sur son axe et déchargé radialement par le jeu de ses ailettes. Sur la périphérie ou sur la paroi circulaire de la chambre 11, on pratique une série d'ouvertures 16 par où s'échappe l'air qui est chassé par le ventilateur; pour obtenir ces ouvertures, il vaut mieux tailler dans le sens de la longueur de cette chambre 11 des fentes en forme de crans en recourbant extérieurement le métal sur un bord de chaque fente, comme indiqué en 17, figure 3; on aménage ainsi une série d'ouvertures oblongues 16 à parties courbes ou formant cols 18 qui s'étendent tangentiellement à la chambre 11 sur sa périphérie dans la direction où tourne le ventilateur 15.

La roue du ventilateur 15 présente un prolongement tubulaire 19 qui s'étend quelque peu à l'intérieur de l'enveloppe 6 et sur lequel est monté par l'une de ses extrémités un séparateur rotatif de poussières indiqué en 20 dans son ensemble. Ce séparateur 20 comporte, à une extrémité, une tête ou pièce annulaire à bride 21 pour s'adapter étroitement sur le prolongement tubulaire 19 de la roue du ventilateur qui le supporte ainsi à une extrémité et l'entraîne dans sa rotation. Sur l'extrémité opposée du séparateur 20, se met une tête 22 à tourillon 23 pour s'engager sur une traverse 24 qui présente un logement destiné à ce tourillon et qui s'étend à travers l'enveloppe 6 à l'extrémité inférieure de celle-ci. Cette traverse 24 est fixée à pivot en 25 sur un côté de l'enveloppe 6 par l'une de ses

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extrémités et, par son autre extrémité, elle est retenue d'une manière amovible sur l'autre côté de cette enveloppe au moyen d'un étrier à ressort approprié 26. En faisant lâcher cet étrier 26, on peut tourner la traverse 24 pour la dégager du tourillon 23, de sorte qu'on peut faire alors glisser le séparateur 20 par bout en le dégageant ainsi de la roue du ventilateur et le retirer de l'enveloppe quand on veut le nettoyer ou le réparer.

Les deux têtes 21 et 22 du séparateur sont reliées par une série de petits fils métalliques 27 dont les deux bouts sont fixés à demeure de toute manière appropriée dans des ouvertures pratiquées sur ces deux têtes. Ces fils s'étendent en spirales d'une tête à l'autre. Comme la tête 22 a un diamètre bien plus petit que la tête 21, ces divers fils constituent par leur assemblage une paroi en forme de cône tronqué et ils ne sont séparés entre eux que par de très faibles distances, de sorte que l'air aspiré dans la buse 4 par le ventilateur 15 peut franchir librement les interstices existant entre les fils 27 qui forment cette paroi conique. Le profil en spirale de cette série de fils métalliques partant de la petite extrémité ou extrémité inférieure du cône pour aboutir à la grande extrémité de celui-ci se dessine, de préférence, dans la direction opposée au sens de rotation du cône.

L'expérience a démontré qu'un séparateur de forme conique constitué par un grand nombre de petits fils métalliques qui s'étendent en spirales sur la longueur du cône et qui ne sont séparés que très faiblement entre eux est très efficace pour séparer de l'air les poussières et autres particules. Toutefois, il est bien entendu que l'invention vise aussi l'emploi d'autres formes de séparateurs rotatifs dont les perforations laissent passer le fluide et dont la vitesse de rotation est telle que toutes les particules entraînées par le courant se trouvent interceptées en subissant, par suite de la force centrifuge ou de l'action de déviation résultant de la rotation du séparateur, un effort puissant qui les rejette violemment ou les fait dévier latéralement, et qu'ainsi toutes ces particules se séparent du courant d'air.

Un séparateur conique formé d'une multitude de fils métalliques s'étendant en sens longitudinal et en spirales sur celui-ci constitue une surface perforée spacieuse que l'air franchit librement et il présente du même coup une serface étendue avec laquelle viennent en contact les particules de poussières au moment où l'air traverse cette pièce. La rotation rapide du séparateur conique 20 assure le contact des fils avec chaque particule dont est chargé l'air avant que cette particule puisse passer entre ces fils; quand ces particules viennent en contact avec un fil, elles sont déviées ou entraînées dans un mouvement de rotation rapide et elles sont ou bien rejetées latéralement tout de suite par force centrifuge ou par déviation, ou bien entraînées à suivre le fil pour venir jusqu'à l'extrémité ou tête supérieure agrandie 21 où elles sont saisies par celle-ci et chassées ensuite latéralement par force centrifuge. La direction en spirales des fils favorise le passage des parcelles de poussières sur ces fils jusqu'à la grande extrémité du cône où la force centrifuge est très grande.

Pour que le dispositif puisse se manier commodément comme nettoyeur, on fixe un prolongement à poignée 28 sur l'extrémité du carter 12 du moteur et les fils ordinaires qui aboutissent au moteur sont installés dans cette poignée de la manière usuelle.

Il est évident que l'arrangement peut être combiné de manière à ce que l'air ou autre fluide puisse être envoyé à force ou par soufflerie dans le séparateur, au lieu d'y être aspiré comme dans la construction représentée. On peut aussi faire varier la forme particulière et la disposition spéciale de l'enveloppe, ainsi que le mode de commande du séparateur pour les adapter à l'installation dans laquelle on utilise ce dispositif dans chaque cas d'espèce. On peut aussi apporter des modifications de détail à la forme, à la construction et à l'arrangement du séparateur rotatif perforé, sans s'écarter en rien pour cela de l'esprit de l'invention qui n'est pas limitée, bien entendu, à la construction, à l'arrangement ou à la combinaison des diverses organes que représente le dessin.

RÉSUMÉ.

L'invention a pour objet un séparateur de poussières, dans lequel celles-ci sont séparées de l'air par force centrifuge et une pièce, actionnée par force motrice, installée sur le trajet du courant d'air et munie d'ouvertures pour livrer passage à l'air, est mise en rota-

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tion à une vitesse proportionnelle à celle de la marche des particules de poussières entraînées par l'air, de telle sorte les parties de cette pièce formées entre ces ouvertures arrêtent ces particules qui viennent les heurter et que la force centrifuge fait dévier latéralement pour les détacher du courant d'air au moment où il traverse cette pièce séparatrice.

Ce séparateur est particulièrement destiné à s'employer dans des nettoyeurs à vide, ainsi que sur une construction de pièce séparatrice, de manière à ce que l'air puisse y passer librement, tandis que toutes les poussières et autres matières dont cet air est chargé sont arrêtées et obligées par force centrifuge de heurter cette pièce et de la suivre jusqu'à sa périphérie où elles sont rejetées latéralement en dehors du trajet de l'air.

Cette pièce séparatrice proprement dite présente une forme conique avec une paroi perforée dont les parties situées entre ces perforations sont continues d'une extrémité à l'autre en s'étendant, de préférence, en spirales, et elle est placée dans une position telle qu'elle intercepte le courant d'air, en ayant son axe de rotation disposé dans le sens longitudinal de ce courant et son extrémité la plus petite en diamètre dirigée vers l'entrée de l'air.

Dans ce séparateur, est établie une enveloppe munie d'une conduite d'admission d'air dont un prolongement tubulaire pénètre d'une certaine amplitude à l'intérieur de cette enveloppe où s'installe la pièce séparatrice proprement dite qui est placée au-dessus de l'extrémité de sortie de cette conduite et qui comporte une paroi perforée située en face, mais à une certaine distance de l'extrémité ouverte de la dite conduite d'admission et des moyens sont prévus pour créer une circulation d'air dans cette enveloppe et dans cette pièce séparatrice et pour faire tourner cette dernière à une vitesse proportionnelle à l'allure imprimée aux particules qu'entraîne le courant d'air.

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N° 553.202 M. Newcombe Pl. unique

Fig. 1.

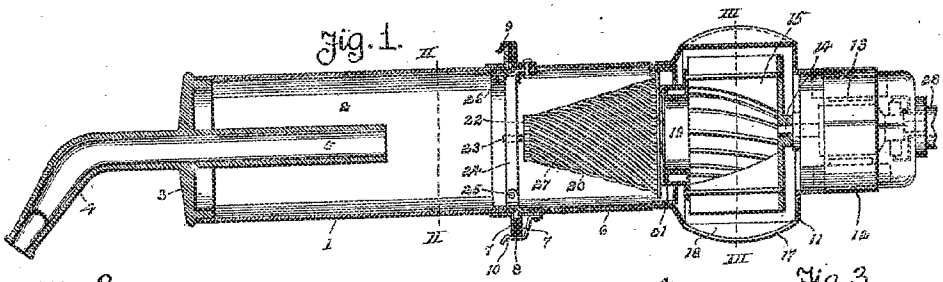


Fig. 2.

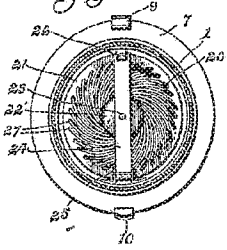


Fig. 5.

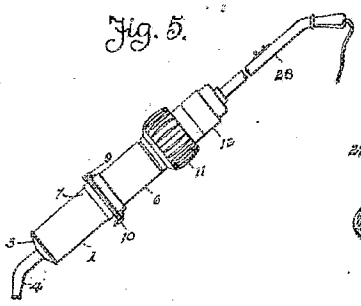


Fig. 4.

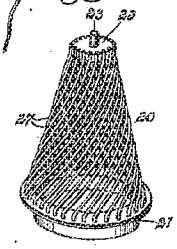
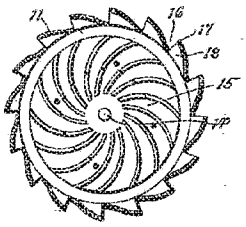


Fig. 3.



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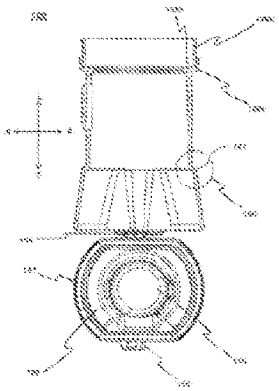
权利要求书1页 说明书16页 附图29页

(54)实用新型名称

电动吸尘器

(57)摘要

本实用新型提供一种电动吸尘器，其既能够作为推杆型又能够作为手持型使用，具备抑制返回、小型轻量且能够维持吸引力的气旋式集尘装置。电动吸尘器具有吸尘器主体和集尘装置，该吸尘器主体具备吸入包含尘埃的空气的主体吸气口和产生吸引力的电动鼓风机，该集尘装置在上述吸气口与上述电动鼓风机之间装卸自如，该集尘装置具有形成外壳的大致圆筒状的外筒和在该外筒内以同心状设置的内筒，该电动吸尘器中，在上述外筒内壁具备在相对于该外筒中心轴大致垂直的方向上形成的尘埃返回防止面。



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1.一种电动吸尘器，具有吸尘器主体和集尘装置，该吸尘器主体具备吸入包含尘埃的空气的主体吸气口和产生吸引力的电动鼓风机，该集尘装置在上述主体吸气口与上述电动鼓风机之间装卸自如，

该集尘装置具有形成外壳的大致圆筒状的外筒和在该外筒内以同心状设置的内筒，

上述电动吸尘器的特征在于，

在上述外筒的内壁具备在相对于该外筒的中心轴大致垂直的方向上形成的尘埃返回防止面。

2.一种电动吸尘器，具有吸尘器主体和集尘装置，该吸尘器主体具备吸入包含尘埃的空气的主体吸气口和产生吸引力的电动鼓风机，该集尘装置在上述主体吸气口与上述电动鼓风机之间装卸自如，

该集尘装置具有形成外壳的大致圆筒状的外筒和在该外筒内以同心状设置的内筒，

上述电动吸尘器的特征在于，

在上述外筒的内壁具备相对于该外筒的中心轴形成于外侧的尘埃返回防止面，

上述外筒为从上述尘埃返回防止面起下方扩大成大致圆锥状的形状。

3.根据权利要求2所述的电动吸尘器，其特征在于，

上述尘埃返回防止面在相对于上述外筒的中心轴大致垂直的方向上形成。

4.根据权利要求1至3中任一项所述的电动吸尘器，其特征在于，

在上述尘埃返回防止面具备向下方突出的大致圆环状的肋。

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电动吸尘器

技术领域

[0001] 本实用新型涉及电动吸尘器。

背景技术

[0002] 近年来，电动吸尘器的形态多样化，除了现有的地面移动型吸尘器、立式吸尘器，还有机器人吸尘器、被褥清扫专用的吸尘器、立式(推杆型)/手持型可两用吸尘器等。其中，上述的推杆型/手持型可两用吸尘器一般被称作DC推杆吸尘器，多数产品搭载有镍/氢电池、锂离子电池等蓄电池，良好的使用便利性得到好评，需求有很大增长。

[0003] 这样的DC推杆吸尘器为如下结构，利用蓄电池驱动电动鼓风机，将从吸口体吸入的含尘埃空气导向吸尘器主体，通过吸尘器主体内的集尘装置集尘，将清洁后的空气排到吸尘器主体外。DC推杆吸尘器要求小型轻量，集尘装置也有必要小型化。因此，在集尘装置采用气旋式时，存在如下问题：捕集的尘埃多时，吸入力降低。针对该课题，日本特开2013-31598号公开了一种在集尘装置内压缩垃圾从而抑制了垃圾返回的气旋集尘装置和具备该气旋集尘装置的电动吸尘器。气旋集尘装置在筒状的垃圾箱主体内以同心状配置圆筒状的一次过滤器，在其下部设置伞状的伸出部，在伞状伸出部内侧形成有比伞状伸出部的下端部突出更长的圆筒状壁。

[0004] 现有技术文献

[0005] 专利文献

[0006] 专利文献1：日本特开2013-31598号公报

[0007] 专利文献1那样的气旋集尘装置通过形成在伞状伸出部内侧的圆筒状壁防止了尘埃再次返回一次过滤器侧，但是有可能尘埃再次沿着垃圾箱主体的内壁返回，吸入力的持续性产生问题。

实用新型内容

[0008] 于是，本实用新型的目的在于提供一种电动吸尘器，既能作为推杆型又能作为手持型使用，具备抑制返回、小型轻量且能维持吸引力的气旋式集尘装置。

[0009] 为了解决上述课题，本实用新型的方案1是一种电动吸尘器，具有吸尘器主体和集尘装置，该吸尘器主体具备吸入包含尘埃的空气的主体吸气口和产生吸引力的电动鼓风机，该集尘装置在上述主体吸气口与上述电动鼓风机之间装卸自如，

[0010] 该集尘装置具有形成外壳的大致圆筒状的外筒和在该外筒内以同心状设置的内筒，

[0011] 上述电动吸尘器的特征在于，

[0012] 在上述外筒的内壁具备在相对于该外筒的中心轴大致垂直的方向上形成的尘埃返回防止面。

[0013] 方案2是一种电动吸尘器，具有吸尘器主体和集尘装置，该吸尘器主体具备吸入包含尘埃的空气的主体吸气口和产生吸引力的电动鼓风机，该集尘装置在上述主体吸气口与

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上述电动鼓风机之间装卸自如，

[0014] 该集尘装置具有形成外壳的大致圆筒状的外筒和在该外筒内以同心状设置的内筒，

[0015] 上述电动吸尘器的特征在于，

[0016] 在上述外筒的内壁具备相对于该外筒的中心轴形成于外侧的尘埃返回防止面，

[0017] 上述外筒为从上述尘埃返回防止面起下方扩大成大致圆锥状的形状。

[0018] 方案3根据方案2所述的电动吸尘器，其特征在于，

[0019] 上述尘埃返回防止面在相对于上述外筒的中心轴大致垂直的方向上形成。

[0020] 方案4根据方案1至3中任一项所述的电动吸尘器，其特征在于，

[0021] 在上述尘埃返回防止面具备向下方突出的大致圆环状的肋。

[0022] 本实用新型的效果如下。

[0023] 根据本实用新型，能够提供具备抑制返回、小型轻量且能够维持吸引力的气旋式集尘装置的电动吸尘器。

附图说明

[0024] 图1是表示本实用新型实施方式的电动吸尘器收纳时整体的外观立体图。

[0025] 图2是表示本实用新型实施方式的吸尘器主体作为推杆型使用时整体的外观立体图。

[0026] 图3是本实用新型实施方式的吸尘器主体的手柄折叠状态的外观立体图。

[0027] 图4是本实用新型实施方式的充电台的外观立体图。

[0028] 图5是本实用新型的实施方式的吸尘器主体的吸口体拆除后的外观立体图。

[0029] 图6是本实用新型实施方式作为手持型使用时的吸尘器主体的右侧视图。

[0030] 图7是本实用新型实施方式的图6所示的吸尘器主体的中央剖视图。

[0031] 图8是本实用新型实施方式作为手持主体使用时采用前端刷的情况的外观立体图。

[0032] 图9是本实用新型实施方式的集尘装置的外观主视图。

[0033] 图10是本实用新型实施方式的集尘装置的分解图。

[0034] 图11是本实用新型实施方式的图9所示集尘装置的A-A剖视图。

[0035] 图12是本实用新型实施方式的内筒的主视图。

[0036] 图13是本实用新型实施方式的内筒的分解图。

[0037] 图14是本实用新型实施方式的图12所示内筒的B-B剖视图。

[0038] 图15是本实用新型实施方式的外筒中底盖打开后的主视图。

[0039] 图16是本实用新型实施方式的外筒中底盖打开后的右侧视图。

[0040] 图17是本实用新型实施方式的图16所示外筒的C-C剖视图。

[0041] 图18是本实用新型实施方式的图16所示外筒的D-D剖视图。

[0042] 图19是表示本实用新型实施方式的尘埃返回防止面的其他形状的剖视图。

[0043] 图20是表示本实用新型实施方式的尘埃返回防止面的其他形状的剖视图。

[0044] 图21是本实用新型实施方式的图11所示集尘装置的E-E剖视图。

[0045] 图22是表示图21中扔垃圾时动作的剖视图。

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[0046] 图23是仅表示本实用新型实施方式中吸尘器主体的集尘装置和导入管的立体图。

[0047] 图24是表示本实用新型实施方式中集尘装置和导入管的主视图。

[0048] 图25是本实用新型实施方式中图24所示F-F剖视图。

[0049] 图26是表示本实用新型实施方式中集尘装置和导入管的仰视图。

[0050] 图27是本实用新型实施方式中图6所示G-G剖视图。

[0051] 图28是本实用新型实施方式中吸尘器主体内部的空气的流动。

[0052] 图29是本实用新型实施方式中拉长伸缩管且不转动手柄状态的电动吸尘器的主视图。

[0053] 图30是本实用新型实施方式中缩短伸缩管且转动手柄状态的电动吸尘器的主视图。

[0054] 图中：

[0055] 1—吸尘器主体，2—手柄，3—吸口体，4—管壳，5—伸缩管，6—充电台，7—马达壳，8—蓄电池壳，9—主体端子部，10—伸缩按钮，11a、11b—操作按钮，12—集尘装置，13—吸口体装卸按钮，14—导入管壳部，15—吸入口，17—电动鼓风机，18—蓄电池，20—前端刷，24—手柄支撑轴，25—充电台基座部，26—充电台架部，28—充电台端子部，30—应用吸口体，32—应用吸口体固定突起，50—壳主体，101—手柄固定卡夹，106—排气口，108—手柄卡夹弹簧，109—固定壳，110—主体基板，111—主体LED，112—气密面，113—吸入部，115—保护罩，116—防振气密橡胶，117—集尘装置固定突起，118—集尘装置固定孔，119—D锁定按钮，120—D锁定按钮弹簧，128—外筒，128a—过滤器壳承受部，128b、131b—凸缘部，129—内筒，129a—上部圆筒，129b—下部圆筒，129c—吸气部，129d—止动件承受部，129e—底面，130—捕尘过滤器，130a—凸边部，130b、137、148、157、162—密封件，131—过滤器壳，131a—开口部，132—上盖，132a—气密面，133—底盖，134—尘埃分离部，135—尘埃容纳部，136—网眼部件，138—空间，139—伞部，139a—空间，139b—肋，139c—上表面，140—筒体，140a—底面，141—弹簧壳，141a—弹簧座，141b—弹簧轴，141c—切口部，142—活塞部，143—止动件，144—螺钉，145—弹簧，146—凸边部，147—过滤器部件，149—流入口，149a—流入口外壁面，150—盖锁定机构，151—尘埃返回防止面，152—圆环肋，153—盖锁定罩，154—按钮，155—爪部，156—勾挂部，158—铰链部，158a—旋转轴，159—凹部，170—凹部，160—导入管，160a、160b—直线配管，160c—斜置配管，161—导入管出口，170—尘埃，180—惯性力，200、201、202、203、204、205—流动。

具体实施方式

[0056] 以下，针对本实用新型的代表性实施方式例，适当参照附图来详细说明。但是，本实用新型不限于以下的实施方式例。以下，如图1等所示，将电动吸尘器100作为推杆型使用时手柄2所位于的方向作为上方，将吸入口15所位于的方向作为下方。就吸尘器主体1而言，将马达壳部7、蓄电池壳部8所在的方向作为上方，将吸入口15所在的方向作为下方。另外，如图1等所示，将电动吸尘器100的伸缩管5(管壳部4)所处一侧作为前方，将集尘装置12所位于的方向作为后方。另外，在电动吸尘器100中，以前方作为正面，以此为基准来规定右方、左方，在图1的纸面上，将左侧作为右方，将右侧作为左方。而且，如图5等所示，在从电动吸尘器100拆除吸口体3作为手持型使用时的说明中，也是将吸尘器主体1的吸入口15所处

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的一侧作为下方，将褶皱过滤器130所处一侧作为上方，将管壳部4所处一侧作为前方，将集尘装置12所处一侧作为后方，将纸面左侧作为右方，将右侧作为左方来进行说明。另外，图4等所示充电台6、图9等所示集尘装置12的上下左右前后与图1的上下左右前后相同。

[0057] 首先，说明本实用新型实施方式例的电动吸尘器100的整体结构。

[0058] 本实施方式中的电动吸尘器100能够主要以两种状态使用，即，如图1、图2、图5所示以手柄2相对于伸缩管5未转动的状态使用，以及，如图3、图6～图8所示在使手柄2相对于伸缩管5转动的状态下使用。

[0059] 图1是表示本实用新型实施方式例中收纳时及充电时的电动吸尘器100的外观立体图。图2是本实用新型实施方式中电动吸尘器100作为推杆型使用时的外观立体图图。图3是本实用新型实施方式中手柄折叠状态的电动吸尘器100的外观立体图。

[0060] <电动吸尘器100>

[0061] 图1中所示的符号100是电动吸尘器，符号6是充电台。电动吸尘器100具有吸尘器主体1、吸口体3和集尘装置12。吸口体3能够装卸地设在吸尘器主体1的下部前端。集尘装置12能够装卸地设在吸尘器主体1的后部。

[0062] 而且，本实施方式例的电动吸尘器100是利用充电台6对蓄电池18充电来作为电源使用的充电式吸尘器，也可以在吸尘器主体1具备电源线，作为商业用途所使用的AC式的电动吸尘器来使用。

[0063] <吸尘器主体1>

[0064] 接着，说明本实施方式例中吸尘器主体1的结构。

[0065] 吸尘器主体1具备壳主体50和手柄2，该壳主体50具有马达壳部7、蓄电池壳部8、管壳部4和导入管壳部14。

[0066] 马达壳部7是大致圆筒形状部分。蓄电池壳部8是大致箱形状部分。管壳部4是大致筒形部分。马达壳部7内置有电动鼓风机17(参照图7)。在蓄电池壳部8内置有蓄电池18(参照图7)。在管壳部4能够内置伸缩管5。在导入管壳部14内置有导入管160。

[0067] 吸尘器主体1中各部分的配置如下。

[0068] 如图1、2、5所示那样不转动手柄2的状态下，手柄2位于吸尘器主体1的上部，吸入口15位于下部，管壳部4位于吸入口15与手柄2之间。马达壳部7位于管壳部4的后方上部。蓄电池壳部8位于管壳部4的后方上部且比马达壳部7靠后方。导入管壳部14位于管壳部4的右方。

[0069] 另外，在吸尘器主体1(管壳部4)的下部具有吸口体装卸按钮13。通过压下吸口体装卸按钮13，能够从吸尘器主体1拆除吸口体3。

[0070] 手柄2具有操作按钮11a及11b，在手柄2的下部设有相对于上下方向伸缩自如地设置的伸缩管5。另外，手柄2具备相对于伸缩管5转动自如的机构(手柄支撑轴24)。通过缩短伸缩管5，使手柄2相对于伸缩管5转动，能够将吸口体3从吸尘器主体1拆除，使得吸尘器主体1的上下方向紧凑，能够作为手持型使用。而且，也可以安装吸口体3，使手柄2相对于伸缩管5转动，以紧凑的状态(图3所示状态)使用。

[0071] 另外，也可以除吸口体3之外，附带应用吸口体30。应用吸口体30安装在吸入口15上使用，为了能够清扫吸口体3进入不了的狭窄场所，应用吸口体30的前端优选为比吸口体3的前端小的形状。另外，为了清扫手持型时高不可及场所，优选为能够伸缩的构造。

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[0072] 接着，说明本实用新型的实施方式例的手柄2及伸缩管5的结构。如上文所述，在手柄2具有操作按钮11a及11b，由于具有操作按钮11b，在如图3所示那样将手柄2转动大致180° 并固定在前侧(管壳部4)来作为手持型使用时，由于操作按钮11b在吸尘器的表面露出，所以也能容易通断电源。

[0073] 手柄2的表面优选由热塑性树脂等软的原材料构成，从而使用者容易手持。另外，为了在使用者正清扫时吸尘器主体1不打滑，优选设置手柄防滑形状等。

[0074] 图5表示伸缩管5缩至伸缩管部4内并收纳、拆除了吸口体3状态的吸尘器1的立体图，图6表示手柄2相对于伸缩管5转动并固定在管壳部4状态的吸尘器主体1从右侧看到的侧视图。

[0075] 手柄2由设于伸缩管5一端的手柄支撑轴24转动自如地支撑。电动吸尘器100在作为推杆型使用时，竖起手柄2(不使其转动)并拉长伸缩管5来进行地面清扫。手柄支撑轴24内部的固定构造、旋转机构的细节省略，通过将手柄支撑轴24压下，旋转机构的锁定被解除，手柄2以手柄支撑轴24为中心转动到前侧(管壳部4侧)。

[0076] 伸缩管5在设于吸尘器主体1的管壳部4内伸缩自如地被支撑。伸缩管5的伸缩及锁定机构的细节省略，通过将伸缩按钮10压下，伸缩管5在上下方向伸缩。另外，在使用者使用吸尘器主体1时，具备锁定机构使得伸缩管5不收缩。而且，伸缩管5的伸缩长度能够多阶段调节也可以。

[0077] 这样，在通过伸缩管5的伸缩机构、手柄2的转动机构将电动吸尘器100作为手持型使用时，使用者能任意地缩短伸缩管5，将手柄2折叠，变更形态。另外，通过作为手持型，在收纳时能够收纳在高度低的场所。

[0078] 接着，说明本实用新型的实施方式例的吸尘器主体1作为手持型使用时的状态。

[0079] 在设于吸尘器主体1前侧的管壳部4，具备由手柄卡夹弹簧108向上侧加力的手柄固定卡夹101。手柄固定卡夹101与设在手柄2的端部的突起部(未图示)嵌合，能够将手柄2固定在管壳部4。若使手柄固定卡夹101向下滑动，则手柄固定卡夹101脱离突起部，能够使手柄2向从吸尘器主体1远离方向转动。

[0080] <前端刷20>

[0081] 在吸尘器主体1的前端部(下侧)，具备相对于前端部能转动的前端刷20。前端刷20在三个方向具有刷毛部。另外在吸尘器主体1的前端部的后侧具有刷毛部。在如图5所示那样为了收纳前端刷20而进行转动的情况下，成为前端刷20的刷毛部朝向上方、吸尘器主体1的前端部的刷毛部朝向前方的状态。在如图8所示那样为了使用前端刷20而进行转动的情况下，成为前端刷20的刷毛部和吸尘器主体1的前端部的刷毛部都朝向前方的状态，两刷毛部设置为一同包围在吸入口15的周围。为了使用前端刷20而进行转动从而使两刷毛部为清扫面侧，从而减少与清扫面之间的间隙，提高吸入性能，另外能够不损伤清扫面地进行清扫。

[0082] <充电台6>

[0083] 说明本实施方式例中充电台6的结构。图4表示充电台6的外观立体图。

[0084] 充电台6由基座部25和架部26构成，架部26相对于基座部25装卸自如。此外，基座部25和架部26可以不是装卸自如，但是为了提高收纳性/包装性，优选为装卸自如。

[0085] 基座部25为大致箱形状。基座部25在后方具备电源线，在内部具有充电基板(未图

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示)。在基座部25的内部,具备配重(未图示)。在基座部25的后方,具备向上方突出的大致圆筒形状的应用吸口体固定突起32。能够将应用吸口体30插入应用吸口体固定突起32并保管。基座部25是载置吸口体3的部分。因此,基座部25的上表面的面积优选大于吸口体3的面积。

[0086] 架部26具有大致箱形状部分和位于箱形状部分上的大致半圆筒形状部分。架部26的上表面(架部26的大致半圆筒形状部分的上表面)具有突起形状的充电台端子部28。

[0087] 基座部25中的电源线和充电基板与架部26的充电台端子部28通过配线(未图示)导通。配线收放在基座部25及架部26的内部。

[0088] 突起形状的充电台端子部28能够与下文所述吸尘器主体1的凹陷形状的主体端子部9嵌合。此时,充电台端子部28与主体端子部9为导通状态下的嵌合固定。在充电台6的电源线与商用电源的插座连接的状态下,通过使充电台端子部28与主体端子部9嵌合,能够向蓄电池18充电。而且,在不将电源线与插座连接的状态下,充电台6能够作为将吸尘器主体1固定并收纳时的收纳架使用。通过基座部25内部的配重,取得在固定吸尘器主体1时难以倾倒的效果。

[0089] <马达壳部7、蓄电池壳部8>

[0090] 接着,使用图7说明本实用新型的实施方式例的马达壳部7及蓄电池壳部8的结构。图7是图6所示的手持型的形态的中央剖视图。在马达壳部7的中央,配置有电动鼓风机17。在将手柄2固定在管壳部4的手持型的形态中,马达壳部7、蓄电池壳部8配置在手柄2的后方。另外,在马达壳部7的下方安装下文所述的集尘装置12。安装了集尘装置12后的吸尘器主体1整体的重心接近固定在管壳部4的手柄2,即便是手持型的形态也为易于携带的配置。而且,在本实施方式中,将蓄电池壳部8配置在了马达壳部7的后方,但是不限于此,蓄电池18也可以配置为包围在电动鼓风机17的周围,也可以配置在电动鼓风机17周围的左右两方。另外,在蓄电池壳部8的下方,具备用于对蓄电池18充电的主体端子部9,通过与上文所述的充电台6的充电台端子部28嵌合并导通,能够对蓄电池18充电。

[0091] 在电动鼓风机17周围,具有用于固定电动鼓风机17的固定壳109,控制吸尘器主体1的主体基板110固定在固定壳109的上部,以将它们覆盖的方式形成有马达壳部7。此外,根据蓄电池18的配置不同,也可以在固定壳109的前方或侧方、下方设置主体基板110。

[0092] 在马达壳部7的上方具备主体LED111。主体LED111能够以红和绿两种颜色点亮,能够显示吸尘器主体1的运转状态、蓄电池18的充电状态。主体LED111的颜色数可以为单色或两色以上,通过与点亮、点灭的组合,显示蓄电池18的充电完成状态,显示电动吸尘器100的运转错误状态,也可以作为外观设计点亮或者点灭。

[0093] 另外,如图6所示,在马达壳部7的侧面(本实施方式例中的右侧面)具备排气口106,在内部具备排气过滤器(未图示)。在本实施方式例中,设定使用者为右手比左手灵,因此通过将排气口106设在吸尘器主体1的右侧,防止了排气直接接触使用者。而且,也可以在左侧设置排气口106,来应对使用者为左撇子的情况,也可以不是设在单侧而是设在左右两侧来分散排气的风量,来抑制排气直接接触使用者的量。排气口106优选为与吸尘器主体1的长度方向大致平行的格子形状。在使用者作为手持型使用时,取得电动鼓风机17的排气不直接接触使用者的效果。另外,在作为手持型使用的情况下,也有时将吸尘器主体1暂时放置在地面等处,即使在误将水等液体从吸尘器主体1的前方洒落的情况下,也能防止液体

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侵入马达壳部7内部，能够防止电动鼓风机17、蓄电池18的故障。

[0094] 在马达壳部7的下方，设有将电动鼓风机17与集尘装置12连通的吸入部113，端面具有用于保持马达壳部7与集尘装置12的气密的气密面112。在吸入部113的通气流路内具备保护罩115，在保护罩115的上游侧设置保护过滤器(未图示)。在将集尘装置12拆除状态下误运转时等情况下，保护过滤器防止尘埃向电动鼓风机17的内部侵入。另外，保护过滤器优选拆装自如、由能够水洗的原材料构成，从而在污浊时能够清扫。在保护过滤器的局部设有切口，通过使切口贯通设在保护罩115的突起部(未图示)来固定保护过滤器。保护罩115优选为以手指等不能进入大小的孔构成的格子状，使得使用者的手指不会碰到电动鼓风机。

[0095] 在电动鼓风机17的上游侧，具备由橡胶等弹性体密封部件构成的防振气密橡胶116，防振气密橡胶116通过与保护罩115外周的平坦面密合，能够确保气密。另外，防振气密橡胶116由于在固定壳109内与电动鼓风机17一起固定，因此也起到吸收由电动鼓风机17的驱动产生的旋转振动的作用。

[0096] <集尘装置装卸机构>

[0097] 接着，说明本实用新型的实施方式的集尘装置装卸机构(D锁定按钮119)的结构。

[0098] 在管壳部4具备用于固定集尘装置12的集尘装置固定突起117，在马达壳部7具备固定集尘装置12的集尘装置固定孔118。在集尘装置12具备由D锁定按钮弹簧120加力的D锁定按钮119。将集尘装置固定突起117插入集尘装置12底面的凹部159，使其以集尘装置固定突起117为起点转动到前方(管壳部4侧)，通过将D锁定按钮119勾挂在集尘装置固定孔118，集尘装置12被安装到吸尘器主体1。

[0099] 在拆去集尘装置12时，通过使D锁定按钮119向下方滑动，从集尘装置固定孔118脱离，通过使其向与安装集尘装置12时相反的方向转动，能够从集尘装置固定突起117脱离。

[0100] 接着，说明本实用新型的实施方式的集尘装置12的结构。

[0101] <集尘装置12>

[0102] 集尘装置12具有将从吸口体3或者吸入口15吸入的包含尘埃的空气分离成尘埃和空气并收集尘埃的功能。

[0103] 图9表示从吸尘器主体1(管壳部4)前方看到的集尘装置12的主视图，图10表示图11所示的集尘装置12的分解图，图11表示图9所示的集尘装置12的A-A剖视图。

[0104] 集尘装置12大概由外筒128、内筒129、捕尘过滤器130、收纳捕尘过滤器130的过滤器壳131、上盖132及底盖133形成。内筒129与过滤器壳131为一体化的结构，在内筒129上部具备过滤器壳131。外筒128为上下开口的筒体，在外筒128下部具备底盖133，从外筒128上部的开口部插入与内筒129一体化的过滤器壳131。而且，在过滤器壳131中收纳捕尘过滤器130，将上盖132与外筒129上部紧固而一体化，从而形成集尘装置12。此时，内筒129被安装成与外筒128大致同心圆状。若将内筒129安装在外筒128，则在外筒128与内筒129之间具有用于尘埃的分离/容纳的空间。在由外筒128与内筒129形成的空间中，上部为尘埃分离部134，下部为尘埃容纳部135。尘埃分离部134是从运送尘埃的空气分离尘埃的空间，尘埃容纳部135是收集尘埃并容纳的空间。

[0105] <内筒129>

[0106] 使用图12、图13及图14说明内筒129。图12是内筒129的主视图，图13是内筒129的

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分解图，图14是图12中B-B剖视图。

[0107] 内筒129的上侧由具备吸气部129c的上部圆筒129a构成，下侧由直径大于上部圆筒129a的下部圆筒129b构成。在上部圆筒的129a侧面具备吸气部129c，由格子状的框体(支骨)形成。在本实施方式例中是上下方向的框体(支骨)，但也可以是格子状的。在吸气部129c的外周面架设有网眼部件136，网眼部件136通过被覆或者镶嵌成型等被保持于框体(支骨)。通过在吸气部129c设置网眼部件136，从而上部圆筒129a具有过滤器功能，抑制微细尘埃流向内筒129内部。在本实施方式例中，网眼部件136使用的是聚酯，但也可以是金属(例如不锈钢)，也可以不是框体(支骨)而是设有多个小直径贯通孔(由模具能够成型的φ2mm程度的孔)的吸气部129c。不同于在框体(支骨)架设网眼部件136的情况，贯通孔对于强度、网眼部件136的破损是有效的，具有不需二次成形的优点。但是，贯通孔的直径大于网眼部件136的孔径，因此为了防止微细尘埃流向内筒129的内部，优选在考虑成型机的同时尽量使其为微小孔。

[0108] 在上部圆筒129a的上侧，如上文所述具备过滤器壳131。过滤器壳131为大致圆筒状，设为与上部圆筒129a同心圆状。过滤器壳131上部开口，下部在大致中心部具备与上部圆筒129a的内部空间连通的开口部131a。在本实施方式例中，上部圆筒129a与过滤器壳131形成为一体，也可以为能装卸的构造。另外，在过滤器壳131下部设有密封件137，以将过滤器壳131收纳在下文所述外筒128的过滤器壳承受部128a时保持外筒128与过滤器壳131气密的状态接触。在本实施方式例中，过滤器壳131所具备的密封件137为将环状的橡胶部件安装在过滤器壳131下部的凹部的构造(能拆除的构造)，但是也考虑到清洗集尘装置12时将密封件137拆除的情况，为了防止忘记安装密封件137，也可以将过滤器壳131与密封件137成形(二次成形)为一体。

[0109] 内筒129的下部圆筒129b与上部圆筒129a以同心圆状设置，为大致圆筒状，上表面闭塞。换言之，是底面开口的具有空间138的形状。而且，在下部圆筒129b的空间138以内置的方式设置与下部圆筒129b的形状偏置的伞部139，在伞部139内部的空间139a，设有从上表面向下方凸出那样的筒体140。筒体140与伞部139以同心圆状设置，底面140a闭塞，为大致半球状，是朝向底面140a而前端变得尖细的大致圆锥形状。通过使筒体140为前端变得尖细那样的大致圆锥形状，成为与下文所述外筒128下部的前端粗的大致圆锥部组合并扩大的容器形状，因此在扔垃圾时垃圾容易落下。该筒体140为了扩大集尘容积也可以减小大致圆锥部的直径。

[0110] 如上所述，伞部139内置于下部圆筒129b中，通过设置在上下方向滑动的滑动机构，在扔垃圾时容易排出尘埃。伞部139在吸引时等扔垃圾时以外收纳于下部圆筒129b内，在扔垃圾时向下方滑动，从而将集尘装置12内的尘埃推出。

[0111] 滑动机构如下。在伞部139内的大致中央设置有底圆筒状的弹簧壳141，在弹簧壳141具备弹簧座141a及弹簧轴141b。因此，是弹簧壳141的外周由筒体140覆盖的构造。而且，在下部圆筒129b，在弹簧壳141具备嵌套状的活塞部142。是以在弹簧轴141b能够固定止动件143的方式利用螺钉144紧固的构造，从上方将弹簧145插入弹簧壳141，安装与下部圆筒129b成为一体的嵌套状的活塞部142后，利用螺钉144等将止动件143紧固在弹簧轴141b。根据这样的构造，构成伞部139的滑动机构。止动件143滑动至下部圆筒129b的上表面所具备的止动件承受部129d。因此，如上所述滑动距离为不足下部圆筒129b的空间138的高度，止

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动件143的高度与滑动距离大致相同。在本实施方式例中，弹簧壳141由非一体部件形成，伞部139能够拆除。伞部139与弹簧壳141的固定通过双方所具备的锁定机构(未图示)进行，通过使伞部139旋转来进行装卸。另外，在弹簧壳141的侧面设有切口部141c，设在活塞部142的突出部(未图示)与切口部141c嵌合，装卸伞部139时止转。通过设置这样的伞部139装卸构造，即使在尘埃进入到下部圆筒129b内的情况下，也能通过拆除伞部139将尘埃除去。另外，在清洗内筒129时，也能通过分解容易地将水分除去，清理容易。在本实施方式例中，伞部139和弹簧壳141为非一体部件，伞部139和弹簧壳141一体成形也可以。那时，通过使筒体140为非一体部件，能够通过模具来成形。

[0112] 在这样的滑动机构中，弹簧145接近自然长的状态为伞部139最大量弹出状态。伞部139的上下滑动距离如上文所述小于下部圆筒129b的空间138的高度。换言之，伞部139的上表面139c不超过下部圆筒129b的底面129e。这是为了，通过尽可能减小扔垃圾时下部圆筒129b的底面129e与伞部139的上表面139c之间的间隙，来抑制尘埃夹在底面129e与上表面139c之间。另外，伞部139设有在下部圆筒129b内的空间138能够容易地滑动的所需最小限的间隔。另外，伞部139位于尘埃容纳部135内，因此如果伞部139外周与下部圆筒129b的间隔(间隙)过小，则也可以考虑到尘埃进入间隙从而难以滑动。在本实施方式例中，设置考虑到尘埃进入的间隔，通过在伞部139的外周设置多个肋139b，来降低由于增大间隔导致的滑动时的晃动。进而，伞部139设有台阶部139d，在台阶部139d与下部圆筒129b的底面129e组合的状态(伞部139收纳于下部圆筒129b的空间138的状态)下，下部圆筒129b与伞部139之间的间隙消失。由此，抑制了吸引尘埃时尘埃进入下部圆筒129b与伞部139内之间的间隙。另外，在伞部139的底部设有凸边部146，通过该凸边部146抑制了尘埃从尘埃容纳部135返回尘埃分离部134。另外，由于尘埃堆积到凸边部146以下，因此可以将尘埃超出凸边部146之前作为尘埃排出的时机。

[0113] <上盖132>

[0114] 如上文所述，内筒129收纳在外筒128内，通过将外筒129与内筒128固定，而成为一体化的集尘装置12。外筒128与内筒129的固定通过上盖132进行。如图10及图11所示，上盖132为上下开口的大致筒体，比过滤器壳承受部128a的外径大一圈，以便覆盖后述外筒128的上部所具备的过滤器壳承受部128a。具备通过从在过滤器壳承受部128a覆盖上盖132的状态进行旋转从而将上盖132与过滤器壳承受部128a固定的构造。以在过滤器壳承受部128a仅在预定位置覆盖上盖132的方式，在上盖132内面具备切口部，在过滤器壳承受部128a具备突起部(未图示)。在切口部与突起部组合的状态下若将上盖132向外筒128侧推压，使上盖132旋转，则突起部进入切口部空间，能够将上盖132和外筒128固定。

[0115] 另外，在上盖132具备上述的D锁定按钮119，进行与吸尘器主体1的固定。

[0116] <捕尘过滤器130>

[0117] 如图10及图11所示，捕尘过滤器130由框体和在框体内折成褶皱状的过滤器部件147形成。捕尘过滤器130的过滤器面优选为大致水平方向。这是因为，重力作用方向的力作用于附着在过滤器部件147的细尘，从而容易使尘埃脱落。另外，通过将过滤器部件147折成褶皱状，过滤器面积增大，因此能够降低过滤器部件147带来的压力损失。过滤器部147的材料例如是高密度的HEPA过滤器(High Efficiency Particulate Air Filter)。HEPA过滤器是指，以额定风量相对于粒径为0.3μm的粒子具有99.97%以上的粒子捕集率、且具有初期

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压力损失为245Pa以下的性能的气体过滤器。捕尘过滤器130优选使用者能够水洗。另外，也可以在捕尘过滤器130的前部设置海绵过滤器(未图示)。海绵过滤器优选在捕尘过滤器130的框体的前侧延长并嵌入框体。另外，海绵过滤器优选使用者能够水洗。由此，捕尘过滤器130难以被尘埃直接污染，清理性提高。

[0118] 捕尘过滤器130收纳于内筒129上部所具备的过滤器壳131。因此，捕尘过滤器130位于上述的上盖132与过滤器壳131之间。为了使在内筒129的网眼部件136通过的空气全部在捕尘过滤器130通过，有必要在上盖132与过滤器壳131之间压接捕尘过滤器130。因此，在捕尘过滤器130的外周具备用于保持上盖132与过滤器壳131的气密的密封件148。密封件148在设于捕尘过滤器130的外周的凸边状的凸边部130a的上下表面由橡胶部件等成形。若在过滤器壳131安装捕尘过滤器130，则密封件148的下表面侧与过滤器壳131上部的凸缘部131a接触。在上盖132的上部设有气密面132a，若如上所述将上盖132从捕尘过滤器130上方覆盖，则密封件148的上表面侧与气密面132b相接，通过固定上盖132的动作，在上盖132与过滤器壳131之间压接捕尘过滤器130。此时，如上文所述，以设在过滤器壳131下部的密封件137与外筒128之间也能够保持气密的方式压接。

[0119] 并且在捕尘过滤器130的上表面也具备用于保持气密的密封件130b。该密封件130b设置为相比上盖132的顶面向上方露出。在将集尘装置12安装在吸尘器主体1时，由该密封件130b保持吸尘器主体1与集尘装置12的气密。

[0120] <外筒128>

[0121] 使用图15至图18说明外筒128。图15是外筒128的底盖133打开状态的主视图，图16是外筒128的底盖133打开状态的右侧视图，图17是图16中C-C剖视图，图21是图19中D-D剖视图。

[0122] 外筒128是上下开口的大致筒体，在上部以内置过滤器壳131的方式设有比过滤器壳131的外径大一圈的过滤器壳承受部128a。在过滤器壳承受部128a具备突出到外侧和内侧的凸缘部128b。凸缘部128b的外侧与上文所述的上盖132的底面相接，凸缘部128b的外径为与上盖132的外径大致相等。另外，在过滤器承受部128a设有一处切口部，切口大小为避开设在过滤器壳132的外周的突起部，细节省略。因此，通过组合该切口部与过滤器壳132的突起部的位置来进行插入外筒128的内筒129的定位。过滤器承受部128a的高度高于上文所述的内筒129的滑动距离。这是在后述的底盖133关闭状态下安装内筒129时(以伞部139突出的状态)，过滤器壳131收纳于过滤器壳承受部128a内的高度，如果过滤器壳131超出该高度，则内筒129不稳定，难以安装。凸缘部128b的内径小于过滤器壳131下部所具备的密封件137的外径，在固定过滤器壳131时，密封件137压接到凸缘部128b的上部，保持气密。

[0123] 在过滤器壳承受部128a的相对侧(外筒128下部)的开口，设有能够开闭的底盖133。关于底盖133形状的详细，将于后文叙述。

[0124] 在外筒128的侧面，具备流入口149及盖锁定机构150。流入口149如图18的D-D剖视图所示设在与中心线(H)平行的面(I)，流入口外壁面149a相比外筒128的外径位于外侧，形成为与外筒128以大致切线相连。流入口149的开口为大致四边形状。因此，流入口外壁面149a不与中心线(J)平行。换言之，流入口149相比外筒128的外径露出到外面。这是为了使与外筒128配备在同心轴上的内筒129和流入口149从流入口149的面观察不重叠。在内筒129与流入口149的面相面对的情况下，流入的包含尘埃的空气与内筒129碰撞，尘埃的分离

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性能降低。另外，由于内筒129的侧面为架设有网眼部件136的过滤器构造，因此发生尘埃附着在网眼部件136等不良情况，也有可能吸引力降低。另外，本实施方式例那样的流入口149的配置对于压力损失、噪音的降低也是有效的。与本实施方式例相同开口面积的流入口149收纳于外筒128的外径内时，由于内筒129与流入口149相面对，因此发生上述的不良情况。因此，需要减小流入口149的宽度方向大小，流速增加导致压力损失、噪音增加。为了不增加压力损失、噪音，可考虑改变流入口149的纵横尺寸比，形成上下方向较长的流入口149来确保开口面积，但是如果使流入口149的开口在上下方向较长，则外筒128的上下方向增长，因此集尘装置12变大。本实施方式例是推杆型/手持型两用的吸尘器，期待紧凑的吸尘器主体1，集尘装置12也有必要小型化。因此，通过本实施方式例的集尘装置12，能够提供吸尘器主体1小型化的电动吸尘器100。

[0125] 另外，如上文所述那样，流入口149在与图18的D-D剖视图所示中心线(H)平行的面(I面)设有开口。并且，具有流入口149的开口的面(I面)相比外筒128的外径位于内侧(中心线(H)侧)。由于外筒128与后述的导入管160流体性连接，因此通过使流入口149的面(I面)为小于外筒128的最大外径的面(I面)，能够使包含导入管160的吸尘器主体1的前后高度减小。换言之，通过将导入管160不设在外筒128的中心轴(J)的同一线上而是错开，从而能够提供将吸尘器主体1小型化的电动吸尘器100。

[0126] 另外，在本实施方式例中，流入口149设在了右侧，但也可以设在左侧，流入的空气的回旋方向成为相反方向，但是没有必要考虑对尘埃的分离性能等的影响。

[0127] 本实施方式例的外筒128如图17的C-C剖面所示那样上方为圆筒状形状。另外，如图中的虚线190所围成的那样，从大致中央部起相对于集尘装置12的中心轴在大致垂直方向外侧大致水平地设有尘埃返回防止面151，是从尘埃返回防止面151起下方扩大成大致圆锥状的形状。尘埃返回防止面151从外筒128上部圆筒状的内周面向外径侧扩大大约2.5mm。在外筒128安装有内筒129的状态下，内筒129的伞部139的下表面位于外筒128上方的圆筒内，尘埃堆积在内筒129的伞部139的下表面(凸边部146以下)。因此，通过尘埃返回防止面151，防止堆积在下方的尘埃容纳部135的尘埃、从尘埃容纳部135返回的空气所含的尘埃沿着外筒128内表面返回。由此，能够抑制尘埃附着在内筒128侧面的网眼部件136，或者微细尘埃从网眼部件136吹出，因此能够提供具有抑制了吸引力降低的集尘装置12的电动吸尘器100。

[0128] 另外，设置尘埃返回防止面151，从尘埃返回防止面151起使下方为大致圆锥状从而扩大外筒128的容积，能够堆积更多尘埃。在本实施方式例中，在以集尘装置12的中心轴为垂直方向的状态下倾斜大约8度。

[0129] 另外，图17的虚线190所围成的部分，也可以如图19所示剖视图那样，在尘埃返回防止面151的下方大致垂直方向设置圆环状肋152。该圆环状肋152在上方的圆筒部中延伸并向大致圆锥状的内侧突出，能够进一步防止尘埃沿着外筒128内壁返回。

[0130] 并且，图17的虚线190所围成的部分，也可以是以下形状，如图20所示剖视图那样，上方为圆筒状的形状，从大致中央部起设置相比垂直于集尘装置12的中心轴的方向向上方倾斜的尘埃返回防止面151，从尘埃返回防止面151起下方扩大为大致圆锥状。通过设置这样的倾斜的尘埃返回防止面151，能够抑制尘埃附着在内筒129侧面的网眼部件136，或者微细尘埃从网眼部件136吹出，因此能够提供具有抑制了吸引力降低的集尘装置12的电动吸

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尘器100。

[0131] 另外，本实施方式例的电动吸尘器100为推杆型/手持型两用的构造，在手持型的状态下，吸尘器主体1的姿势各种各样，有时集尘装置12的上部(捕尘过滤器130侧)向下。那时，通过设置上述那样的尘埃返回防止面151，能够有效抑制尘埃从尘埃容纳部135返回尘埃分离部134。

[0132] 在本实施方式例中，叙述了推杆型/手持型两用的电动吸尘器100的集尘装置12，关于地面移动型的气旋吸尘器，通过设置上述那样的尘埃返回防止面151，也能抑制尘埃从尘埃容纳部135返回尘埃分离部134，因此对于微细尘埃的吹出、尘埃的压缩有效。

[0133] <盖锁定机构150>

[0134] 外筒128侧面所具备的盖锁定机构150由盖锁定罩153、按钮154、弹簧(未图示)构成。虽然省略了详细内容，但按钮154由弹簧加力，通过按压按钮154，与按钮154成为一体的爪部155转动，按钮154的爪部155从设在底盖133的勾挂部156脱离，底盖133打开。在爪部155及勾挂部156分别形成有斜面(未图示)，通过关闭底盖133的动作，斜面彼此接触，进一步向上推底盖133，按钮154得到旋转力，弹簧收缩，爪部155跃过勾挂部156，底盖133再次被关闭。

[0135] <底盖133>

[0136] 底盖133是具有深度的盘子状，在上表面的外周具备密封件157，在关闭底盖133时，能够保持与外筒128底部的气密。通过使底盖133为盘子状，增加了强度。另外，在外周的一部分具备将上文所述的外筒128和底盖133卡定的勾挂部156，在对面具备具有旋转轴158a的铰链部158。

[0137] 在底盖133的底面(背面)，在吸尘器主体1的管壳部4侧具备凹部159，是吸尘器主体1的集尘装置固定突起117与底盖133底面的凹部159嵌合的形状。如上文所述，在向吸尘器主体1安装集尘装置12时，使底盖133底面的凹部159与吸尘器主体1的集尘装置固定突起117嵌合，以突起部为起点将集尘装置12向吸尘器主体1侧推压。然后，通过上文所述的上盖132上部的D锁定按钮119，集尘装置12与吸尘器主体1成为一体。因此，将集尘装置12安装到吸尘器主体1后，盖锁定机构150隐藏于吸尘器主体1侧。这是因为，在将盖锁定机构150设在相反侧(外侧)的情况下，在清扫时有可能解除盖锁定机构150，从而防止误动作。例如，在推杆型的状态下清扫沙发、床下时等情况下，有时将吸尘器主体1相对于地面接近水平，此时，在将盖锁定机构150设于后方的情况下，有可能与地面接触从而导致盖锁定机构150被解除。盖锁定机构150和铰链部158的位置不限于此，也可以相对于吸尘器主体1设在左右。通过设在左右，能够防止上文所述的误动作，并且由于铰链部158不突出，能够减小吸尘器主体1的前后方向的高度，能够小型化。

[0138] 另外，盘子状的底盖133的中央突出，在中央具备从突出部分凹陷的凹部170。另外，使凹部170大于上述筒体140的底面140a的球形状的球半径，使凹部170的深度为在底盖133打开状态(相对于外筒128的底面为垂直状态)下在凹部170不能形成水平面。另外，凹部170尽量浅，使得在排出垃圾时尘埃不残留在凹部170。

[0139] 在本实施方式例中，凹部170非一体形成，为了降低关闭底盖133时与筒体140的摩擦导致的部件磨耗而采用的是POM(聚甲醛)等材料，也可以一体成形。

[0140] 在以上那样的外筒128及内筒129的构造中，通过在外筒128安装内筒129，设于内

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筒129的滑动机构通过设于外筒128下部的底盖133的开闭来进行。打开底盖133状态时，伞部139向下方突出，关闭底盖133时，弹簧145收缩，伞部139收纳于下部圆筒129b内。因此，扔垃圾时解除底盖133的盖锁定机构150，则伞部139向下弹出，将尘埃推出。

[0141] <扔垃圾时的动作>

[0142] 在以上那样的外筒128、内筒129、垃圾排出的滑动机构中，使用图21及图22对扔垃圾时的动作进行说明。图21是底盖133关闭状态的图11所示E-E剖视图，图22表示图21中排出垃圾后(底盖133打开状态)。

[0143] 底盖133通过按压设在集尘装置12侧面的盖锁定机构150的按钮154来解除。底盖133在盖锁定机构150的相反侧具备铰链部158，以铰链部158的旋转轴158a为轴旋转，底盖133成为大致垂直(底盖133的上表面垂直)的状态。

[0144] 在底盖133打开的同时，利用弹簧145使伞部139及筒体140向下弹出。由此，关于伞部139，相比底盖133关闭状态，在底盖133打开状态下成为靠外筒128的下表面的开口的位置。通过该伞部139的滑动，将捕集的尘埃向下方推出。

[0145] 在扔垃圾后，关闭底盖133时，向下方弹出的筒体140的底面140a与设在底盖133的中央的凹部170接触，伞部139及筒体140被向上方推压。由于筒体140的底面140a与凹部170以球状相接，因此即使通过关闭底盖133的动作使得底盖133的角度改变，也能将筒体140的底面140a与凹部170的接触面积保持恒定，另外，由于通过使曲面彼此接触导致总是在垂直方向上作用力，因此伞部139顺畅地收纳于下部圆筒129b内。在底盖133不设置凹部170而是以平面接触的情况下，力的施加方向相对于平面垂直，因此伞部139难以返回为垂直，底盖133难以关闭。然后，将底盖133关闭至大致水平状态，则勾挂部156与爪部155接触，在通过设在底盖133的密封件157保持气密的状态下被锁定。

[0146] 另外，如上所述具备从集尘装置12的下方排出尘埃的机构，对于在本实施方式例那样的集尘装置12上方具备主体端子部9的电动吸尘器100(充电式电动吸尘器)是有效的，由于能够抑制尘埃附着在集尘装置12上方(上盖132侧)，因此能够防止尘埃附着在主体端子部9，是安全的。

[0147] 接着，说明集尘装置12的上游侧的、向集尘装置12引导包含尘埃的空气的导入管160的形状及构造、空气的流动。

[0148] <导入管160>

[0149] 本实施方式例的推杆型/手持型两用的电动吸尘器100具备作为从吸尘器主体1的前端部的吸入口15达到集尘装置12(外筒128)的流入口149的流路的导入管160。图23是从图5所示在吸尘器主体1安装有集尘装置12的状态省去各部件而仅表示导入管160和集尘装置12的图。图24是图23的主视图，图25是图24所示的F-F剖视图。

[0150] 导入管160上下开口，在下方具备上述的吸入口15，在上方具备与集尘装置12(外筒128)的流入口149流体性相连的导入管出口161。在下方的吸入口15连接吸口体3等。

[0151] 另外，导入管160设在集尘装置12的侧面。图24所示的集尘装置12的中心轴(K)从上方观察与吸尘器主体1的中心轴(未图示)在同一线上(大致平行)。另外，如上文所述，集尘装置12安装在吸尘器主体1的后方。导入管160的直线部(直线配管160a)的中心轴(M)与集尘装置12的中心轴(K)大致平行。导入管160的直线配管160a的长度为从外筒128的流入口149到外筒128的底部为止，为了避开底盖133，在朝向底盖133的中央的方向上弯曲之后，

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设有进一步向下方延伸的直线配管160b。直线配管160b的中心轴(L)从上方观察与集尘装置12的中心轴(K)位于同一线上。换言之，导入管160是直线配管160a的中心轴与吸入口102所在直线配管160b的中心轴(L轴)大致平行、将两直线配管向斜下方连接成的配管形状。两直线配管向斜下方连接的斜置配管160c的倾斜角度根据吸入口15的位置而不同，吸入口15的位置(范围)为位于集尘装置12底面内(底盖133外径内)那样的形状。另外，导入管160收纳在吸尘器主体1的导入管壳部14内，导入管壳部14为从前方观察向管壳部4的左侧鼓出的形状(图1所示右侧)。

[0152] 在与集尘装置12的流入口149连接的导入管出口161具备密封件162，将集尘装置12安装到吸尘器主体1后，密封件162与流入口149被压接，保持气密。密封件162使用橡胶制的部件、不具通气性的海绵状的部件、弹性体材料等，通过与导入管出口161成为一体的成形(二次成形)、以夹入导入管出口161与导入管壳部14之间的方式进行固定等方式，成为保持导入管出口161与密封件162的气密的构造。另外，密封件162也可以不设在导入管出口161，而是设在集尘装置12的流入口149，在集尘装置12能够水洗时，在密封件162为非一体部件的情况下有可能发生忘记安装密封件162等情况，因此优选如上所述那样设在导入管出口161。

[0153] 图24、图25及图26示出本实施方式例那样导入管160弯曲引起的包含尘埃的空气的流动。图中所示170表示尘埃，空气的流动由箭头A表示。从吸入口15吸入的空气沿着导入管160的形状如箭头A那样流动。此时，密度大于空气的重量大的尘埃170由于斜置配管160c由惯性力180被推向直线配管160a的内壁面右侧，沿着内壁面右侧被运送至集尘装置12。直线配管160a的内壁面右侧与设在外筒128的流入口149的内壁面右侧相连，因此与外筒128的内壁面在大致切线方向相连。因此，沿着直线配管160a的内壁面右侧运送的尘埃170在距离尘埃分离部134的外径侧的内筒129的外周最远的外筒128内壁面附近回旋，因此离心分离性能提升。另外，根据从图25或者图26所示吸入口15侧(下方)看到的图，直线配管160a相比具有吸入口15的直线配管160b位于前方，因此与上文所述流动相同，尘埃170由惯性力180被运送至直线配管160a的内壁面前侧，因此尘埃170从外筒128所具备的流入口149的上方被运送。由此，能够有效使用流入口149的高度方向，因此能够有效使用尘埃分离部134的高度。尘埃分离部134越高(上下方向越长)则尘埃的离心分离性能越高。因此，通过为本实施方式例那样的弯曲的导入管160，从而能够提供具有在抑制尘埃分离部134高度的同时(在小型化的同时)确保了离心分离性能的集尘装置12的电动吸尘器100。

[0154] 另外，在导入管160设置弯曲部，关系到吸尘器主体1的小型化。例如，在推杆型的形态清扫沙发、床下时，使吸尘器主体1接近地面，进行将吸口体3放入上下狭窄间隙那样的动作。此时，例如在日本特开2002-85297号公报那样导入管160笔直延伸的形状时，由于集尘装置12接触地面，因此不拉长导入管160就不能使吸尘器主体1接近地面。因此，通过使导入管160如本实施方式例那样弯曲能够缩短吸尘器主体1的前后长度，能提供紧凑的电动吸尘器100。作为缩短吸尘器主体1的前后长度的方法，通过减小集尘装置12的直径能够使导入管160不过长地接近地面，但是如果减小集尘装置12的直径，则有可能导致尘埃的分离性能、集尘量的降低，甚至压力损失恶化。通过如本实施方式例那样使导入管160弯曲，从而提高尘埃的分离性能，能够形成集尘量多、而且压力损失低的集尘装置12，并且能够提供小型的电动吸尘器100。

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[0155] 另外，即使是导入管160笔直延伸的形状，通过不同于本实施方式例的电动吸尘器100，将集尘装置12配备在吸尘器主体1的前方(管壳部4的后方前方)，能够进行上文所述的使吸尘器主体1接近地面、使吸口3进入狭窄间隙那样的动作(参照日本特开2004-24887号公报)。但是，如果将集尘装置12配备在吸尘器主体1的前方，由于集尘装置12的流入口149朝向后方，因此在使吸尘器主体1接近地面进行清扫，或者在手持型的状态下吸尘器主体1的姿势为集尘装置12的上部(捕尘过滤器130侧)向下进行清扫中，在停止运转时，有可能尘埃残留在导入管160内。为了解决这个问题，也可考虑在流入口149设置止回阀，但是有止回阀导致压力损失增加、尘埃夹在止回阀等的可能。因此，如本实施方式例那样将集尘装置12设在吸尘器主体1的后方，使导入管160弯曲，从而在各种清扫姿势下尘埃也难以残留在流入口149侧，因此能提供抑制了设置止回阀等所导致的压力损失的增加、尘埃夹在止回阀等的情况、并且小型的电动吸尘器100。

[0156] 另外，如上文所述，对吸尘器主体1从前方观察时，导入管壳部14为向管壳部4的左侧鼓出的形状(图1等中为管壳部的右侧)。图27中表示图6所示吸尘器主体1的G-G剖视图。如图所示，集尘装置12和吸尘器主体1的中心轴处于大致平行(同一线上)，但是导入管160的直线配管160a的轴没有在两轴的同一线上。这样，通过将导入管160从吸尘器主体1(集尘装置12)在左右方向错开而形成左右非对称(asymmetry)的配置，能够使吸尘器主体1难以接触使用者的身体。图29、图30表示对电动吸尘器100从前方看到的图。图29是拉长伸缩管5且不转动手柄2状态的电动吸尘器100。图30是缩短伸缩管5且转动手柄2状态的电动吸尘器100。另外，通过使壳主体50中导入管壳部14为沿着导入管160形状的形状，实现壳主体50的轻量化带来的吸尘器主体1的轻量化。由此与左右对称的吸尘器相比，能够使吸尘器主体1的外观变小。换言之，对吸尘器主体1从前方观察时，壳主体50以导入管壳部14的量向左侧鼓出，壳主体50为左右非对称(asymmetry)的形状。即，电动吸尘器100整体也为左右非对称(asymmetry)的形状。

[0157] 并且，在本实施方式例那样从前方观察将导入管160配置在左侧的情况下，由于吸尘器主体1的左侧的突出量少，所以右撇子使用者使用方便，在将导入管160配置于右侧的情况下，左撇子使用者使用方便。右侧与左侧的切换只要交换外筒128和导入管160和导入管壳部14即可，因此能够提供以少量部件交换实现通用设计的电动吸尘器100。

[0158] <垃圾吸引时空气的流动>

[0159] 使用图28说明以上那样由外筒128、内筒129、捕尘过滤器130、上盖132和底盖133组合成的集尘装置12安装于吸尘器主体1状态下空气的流动。图28表示在手持型状态下空气的流动，但是由于在推杆型状态下也相同，所以省略推杆型时的空气流动。

[0160] 使用者利用设在手柄2的操作按钮11b开始运转后，电动鼓风机17进行驱动，吸入空气。吸入的空气从导入管160的吸入口15经由导入管出口161，从流入口149流入集尘装置12内(流动200)。此时，由于导入管160的弯曲部，尘埃在被推向导入管160的内壁面左侧的同时，从外筒128的大致切线方向被运送至集尘装置12内。流入的包含尘埃的空气成为回旋流，离心力作用于尘埃，尘埃和空气分离(流动201)。也就是，通过尘埃分离部134，尘埃和空气分离。分离后的空气的大部分从设在上部圆筒129a的吸气口129c流入内筒129的内部(流动202)。然后，空气在捕尘过滤器130中通过，经由上盖132的上部开口，通向电动鼓风机17(流动203)。此时，在吸气口129c的网眼部件136通过的微细尘埃被捕尘过滤器130捕集。

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[0161] 另一方面，由离心力分离后的尘埃由于重力和一部分空气流而在外筒128和下部圆筒129b之间通过，被运送至尘埃容纳部135内。此时，由于离心力作用于尘埃，因此在尘埃容纳部135内回旋(流动204)。并且，若继续使用吸尘器，则尘埃逐渐堆积，在尘埃容纳部135已满的状态下，成为扔垃圾的时机。流入尘埃容纳部135内的空气沿着筒体140、伞部139的空间139a形状，从下部圆筒129b的外周附近向上部圆筒129a侧流动(流动205)。为了抑制该空气的流动引起的尘埃向上部圆筒129a侧返回，需要伞部139有深度。在本实施方式例中，由于设有向下部圆筒129b推出尘埃的滑动机构，因此伞部139设有充分的深度。另外，通过设在外筒128的锥形部上端的尘埃返回防止面151，进一步抑制了尘埃向上部圆筒129a侧返回。

[0162] 尘埃容纳部135中尘埃已满则进行扔垃圾操作，垃圾排出机构为如上所述，即使在吸引的尘埃的量少的情况下，也能够通过伞部139的滑动机构及外筒128的大致圆锥形状排出尘埃。

[0163] 根据在以上本实施方式例所示那样既能作为推杆型也能作为手持型使用、具备能够维持吸引力的气旋式集尘装置的电动吸尘器，能够提供兼顾小型轻量和吸引力强度的使用方便的电动吸尘器。

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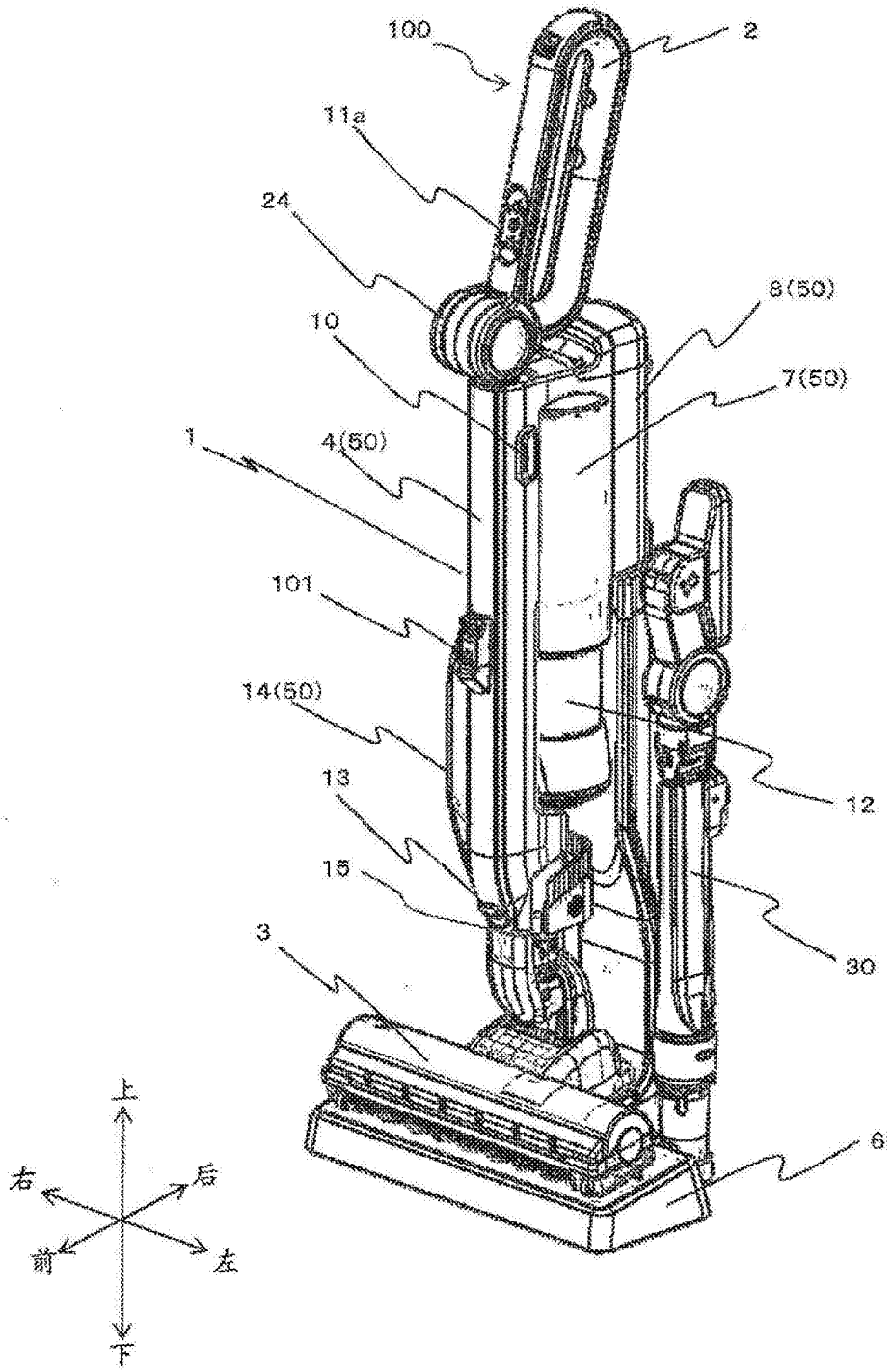


图1

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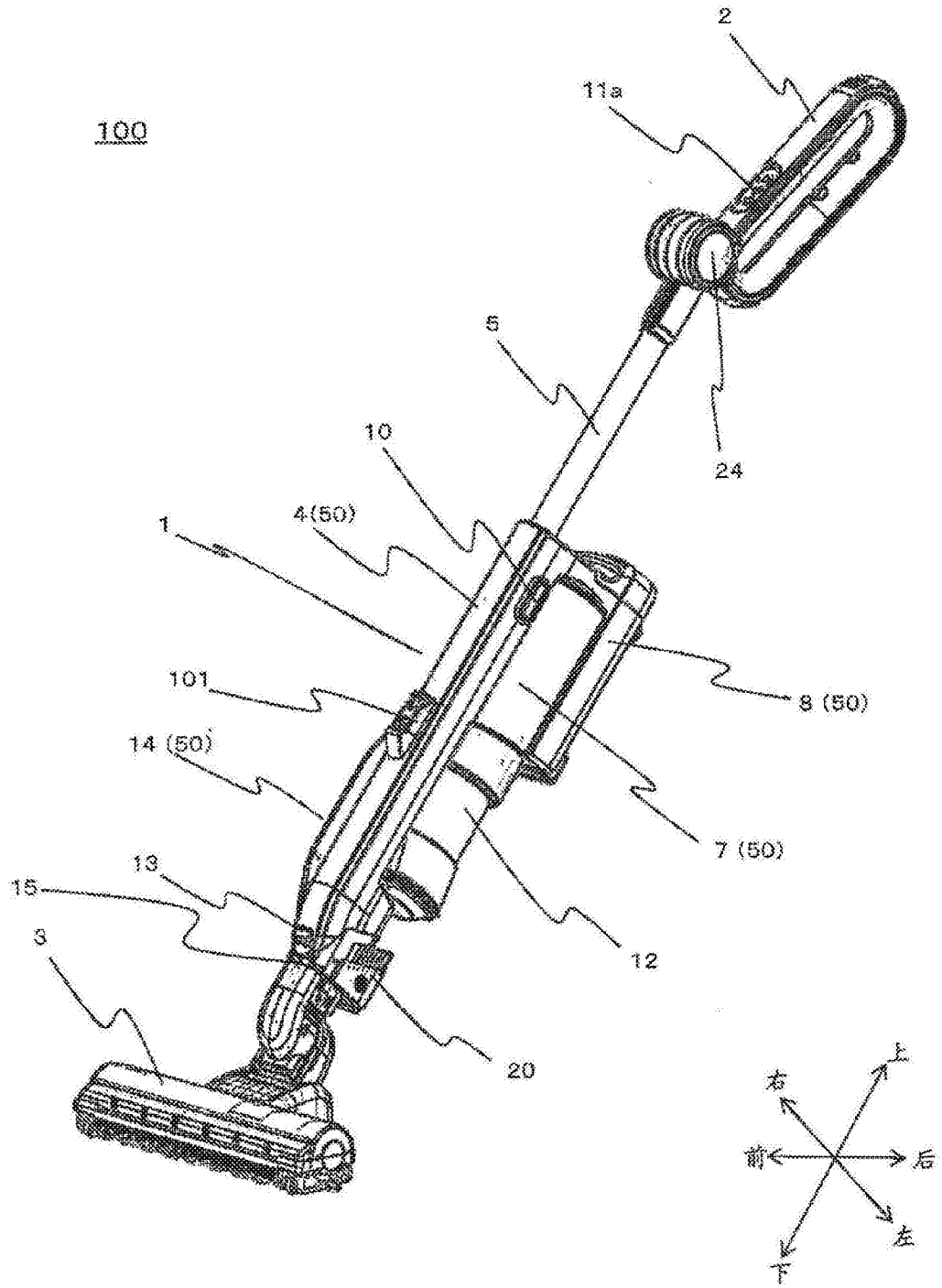


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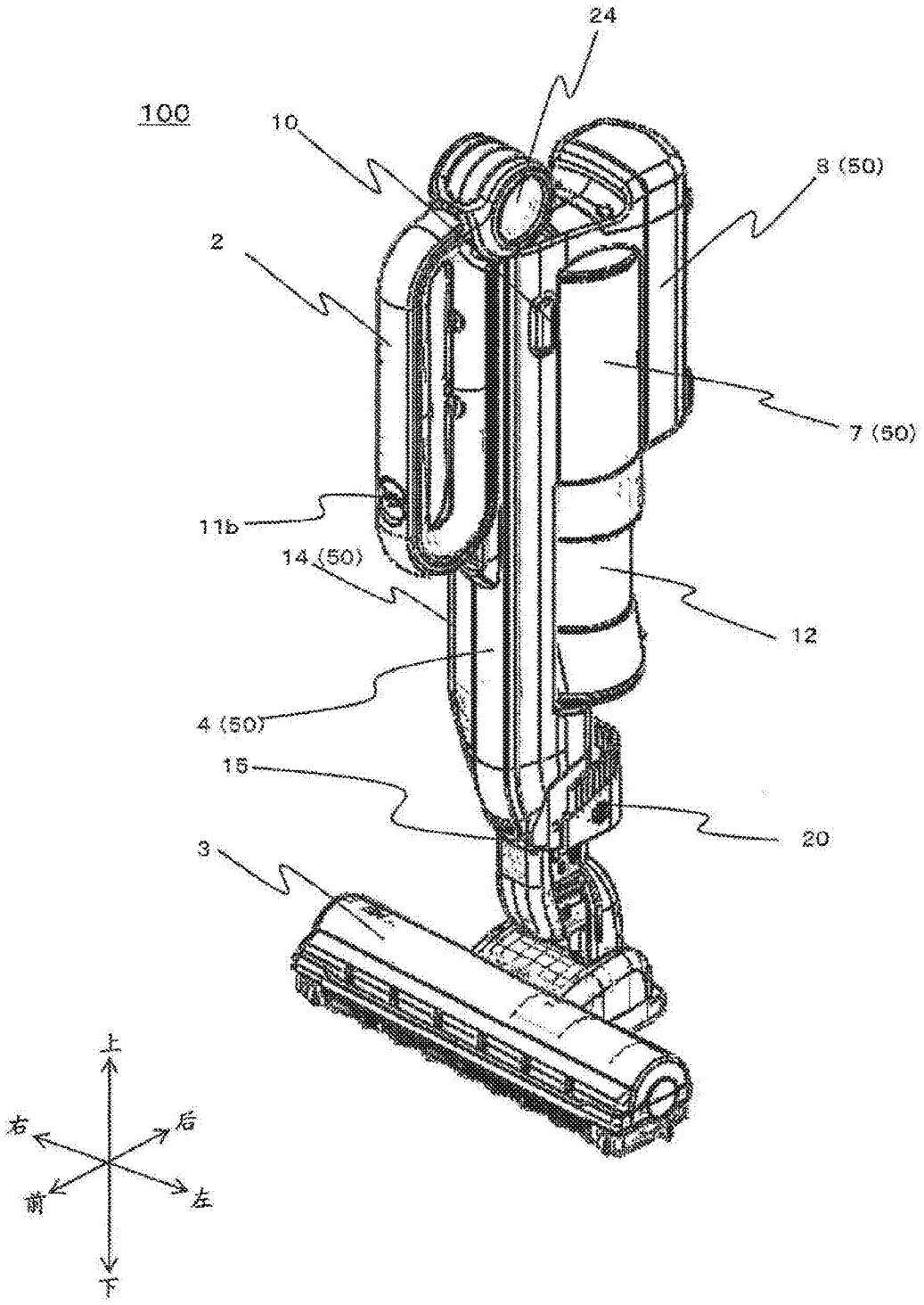


图3

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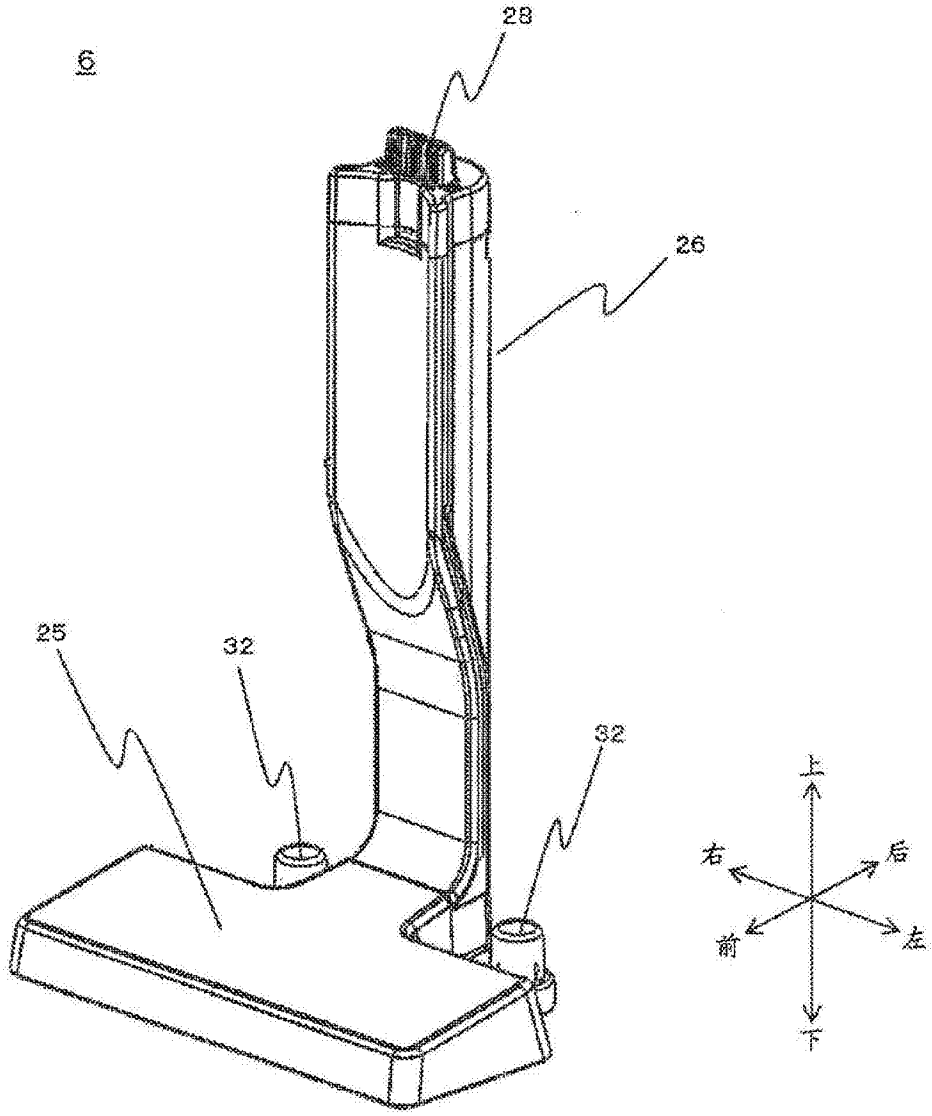


图4

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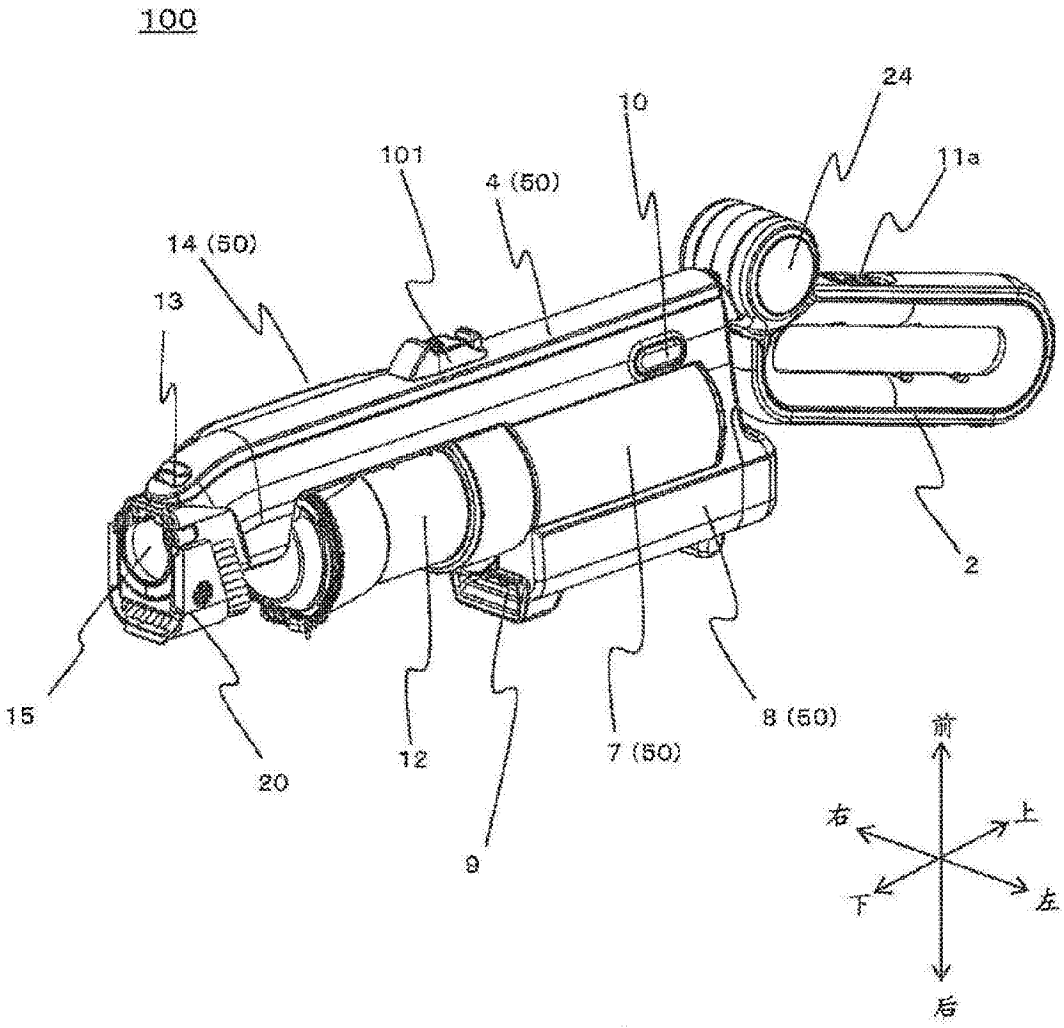


图5

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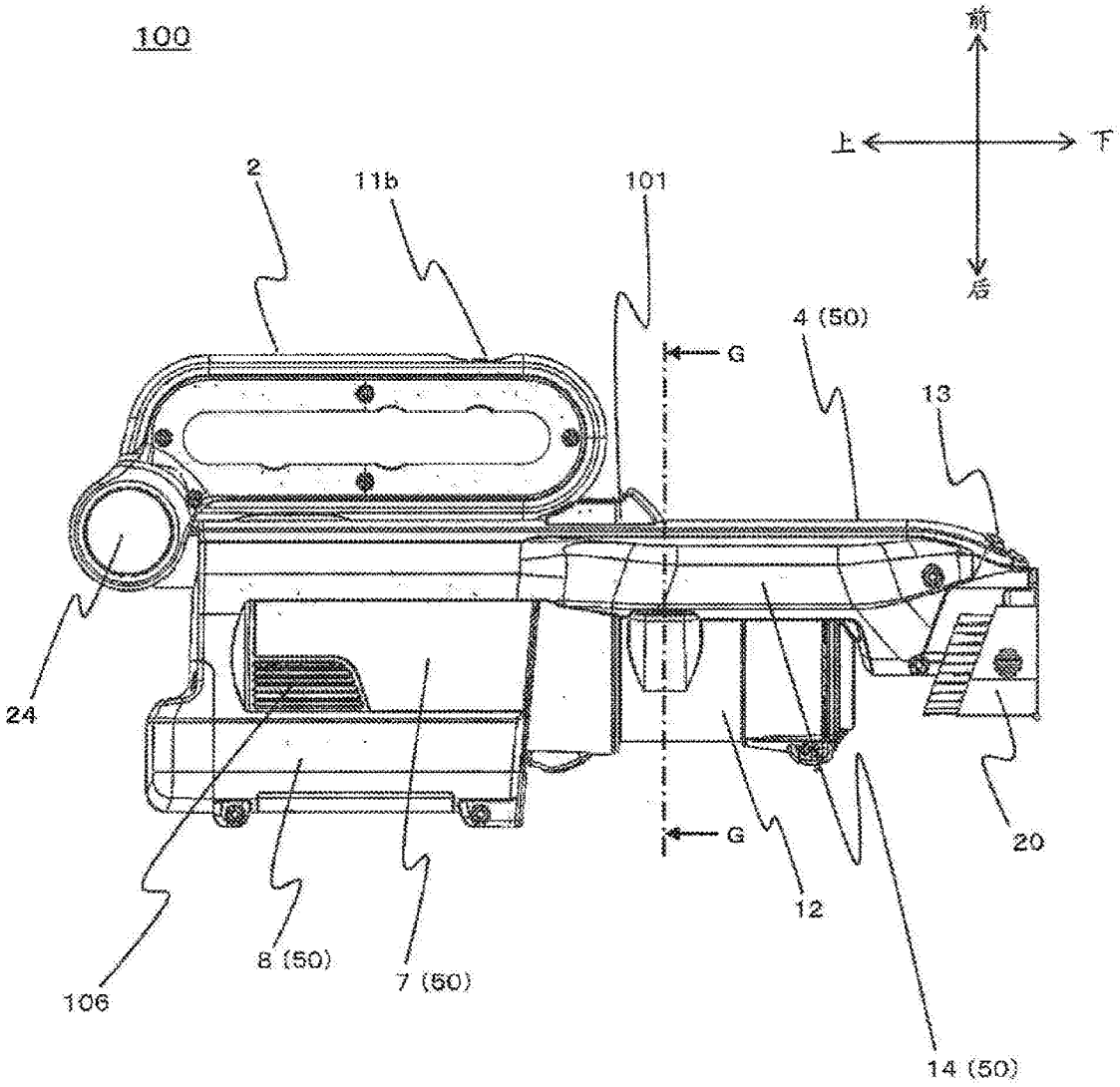


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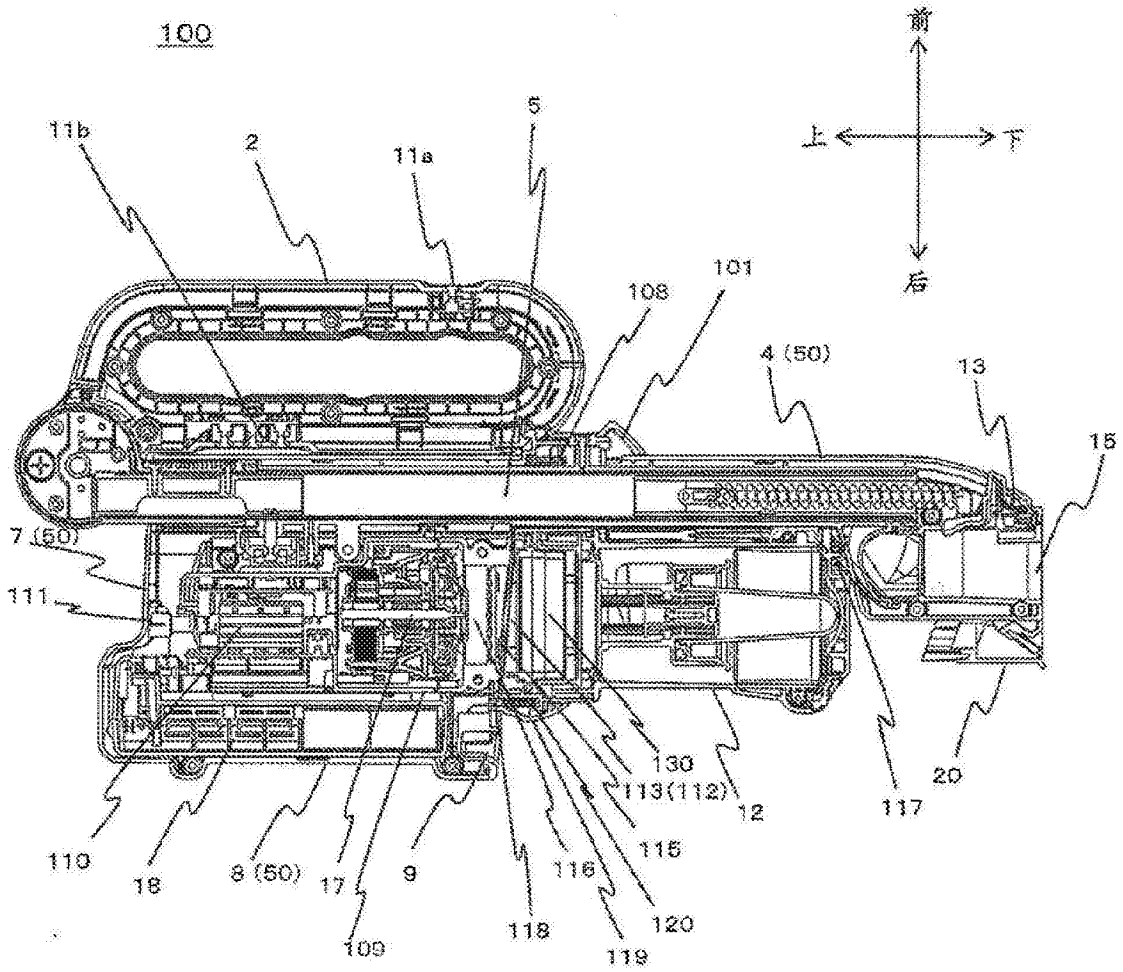


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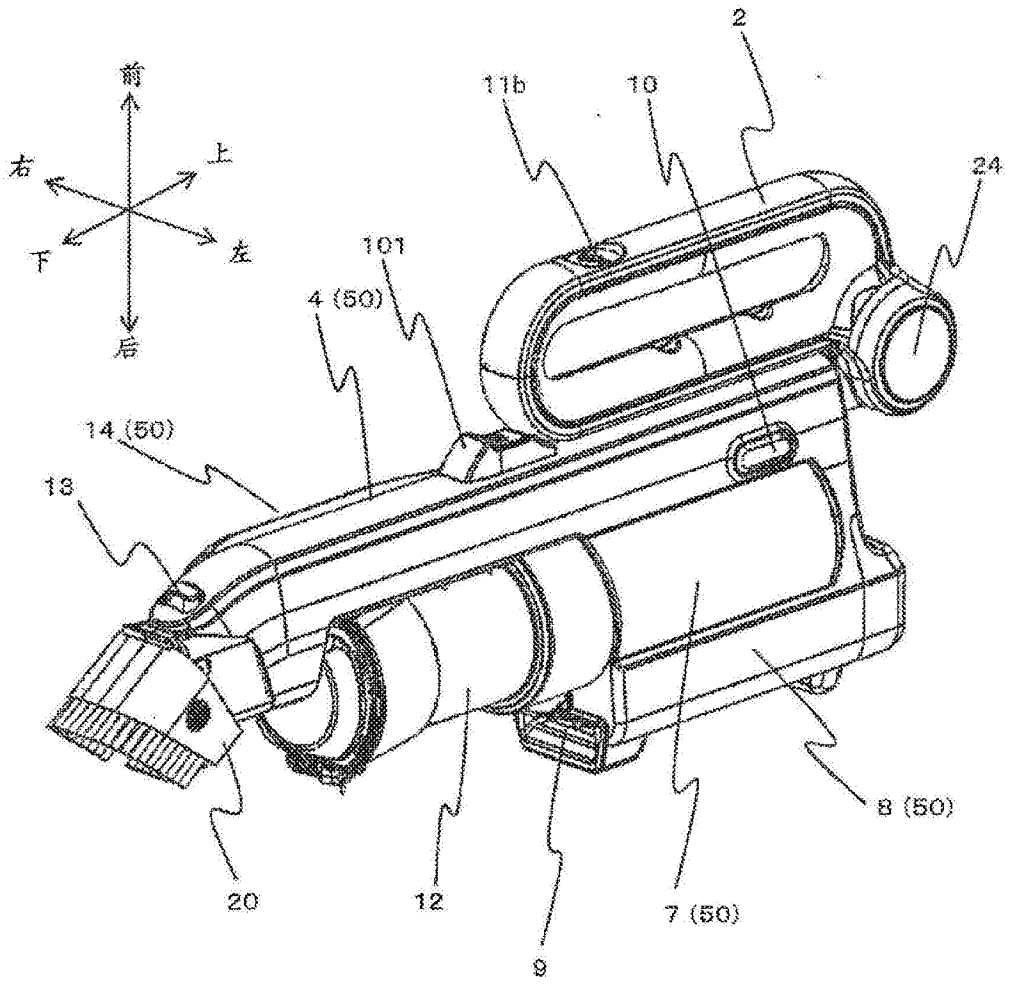


图8

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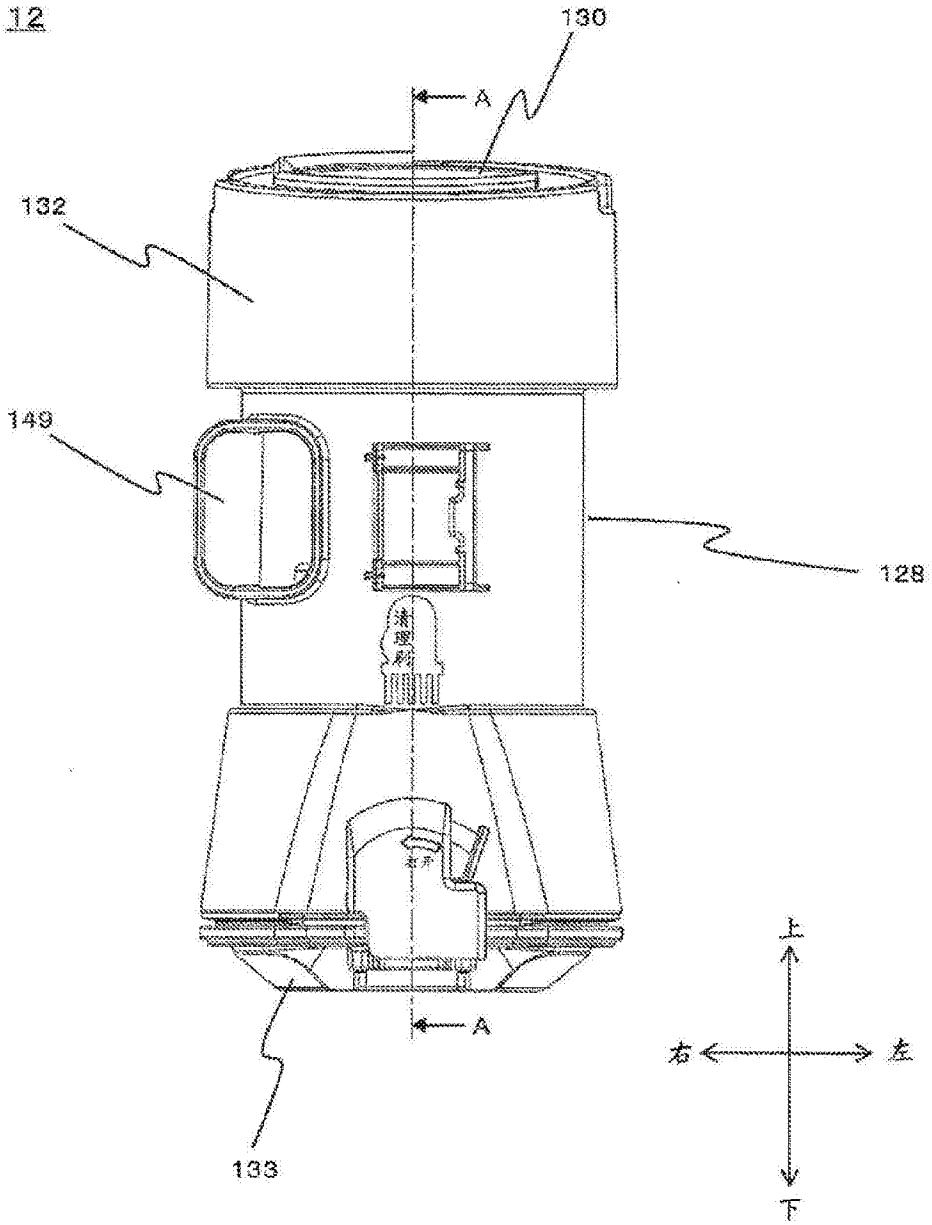


图9

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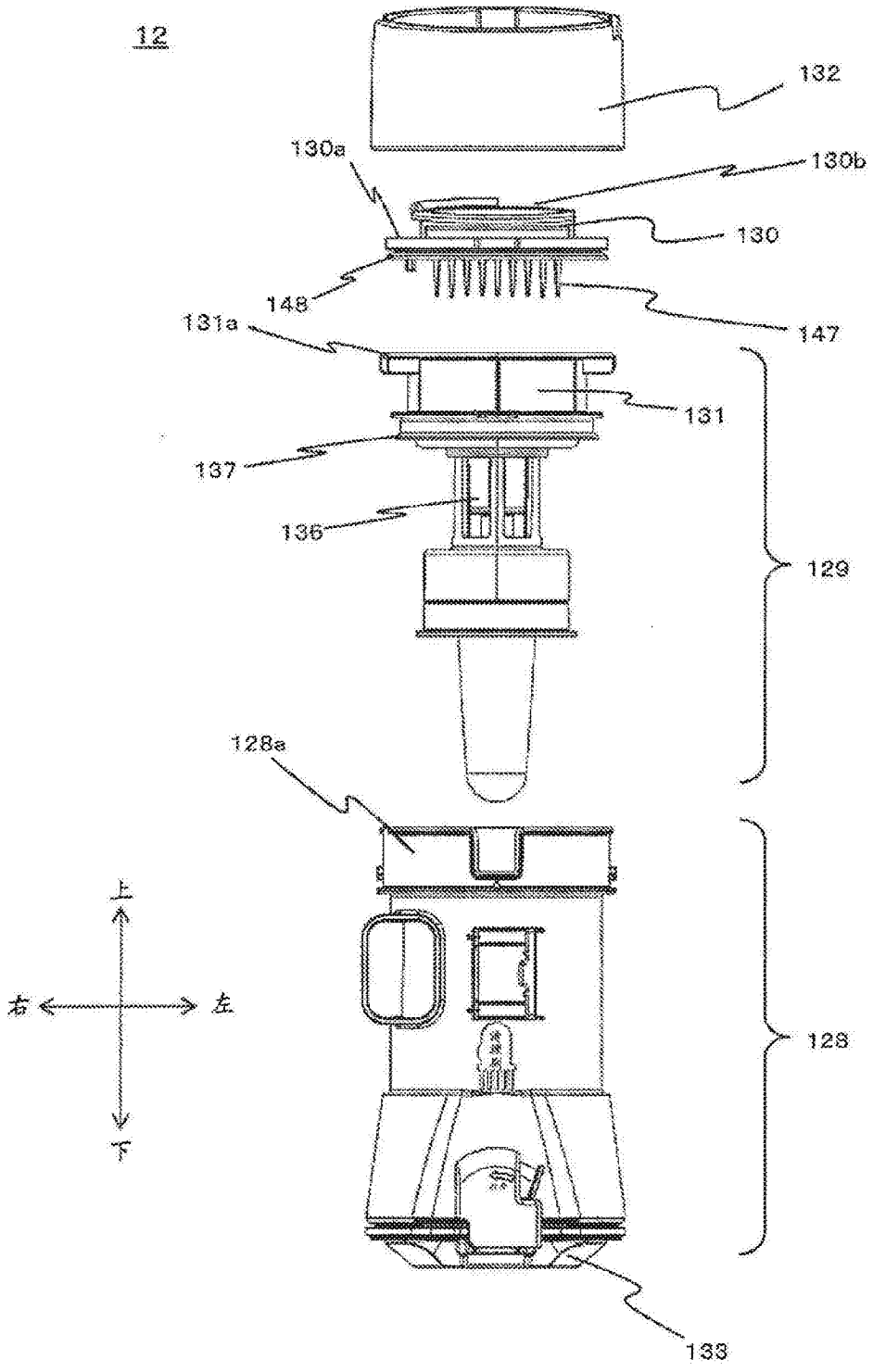


图10

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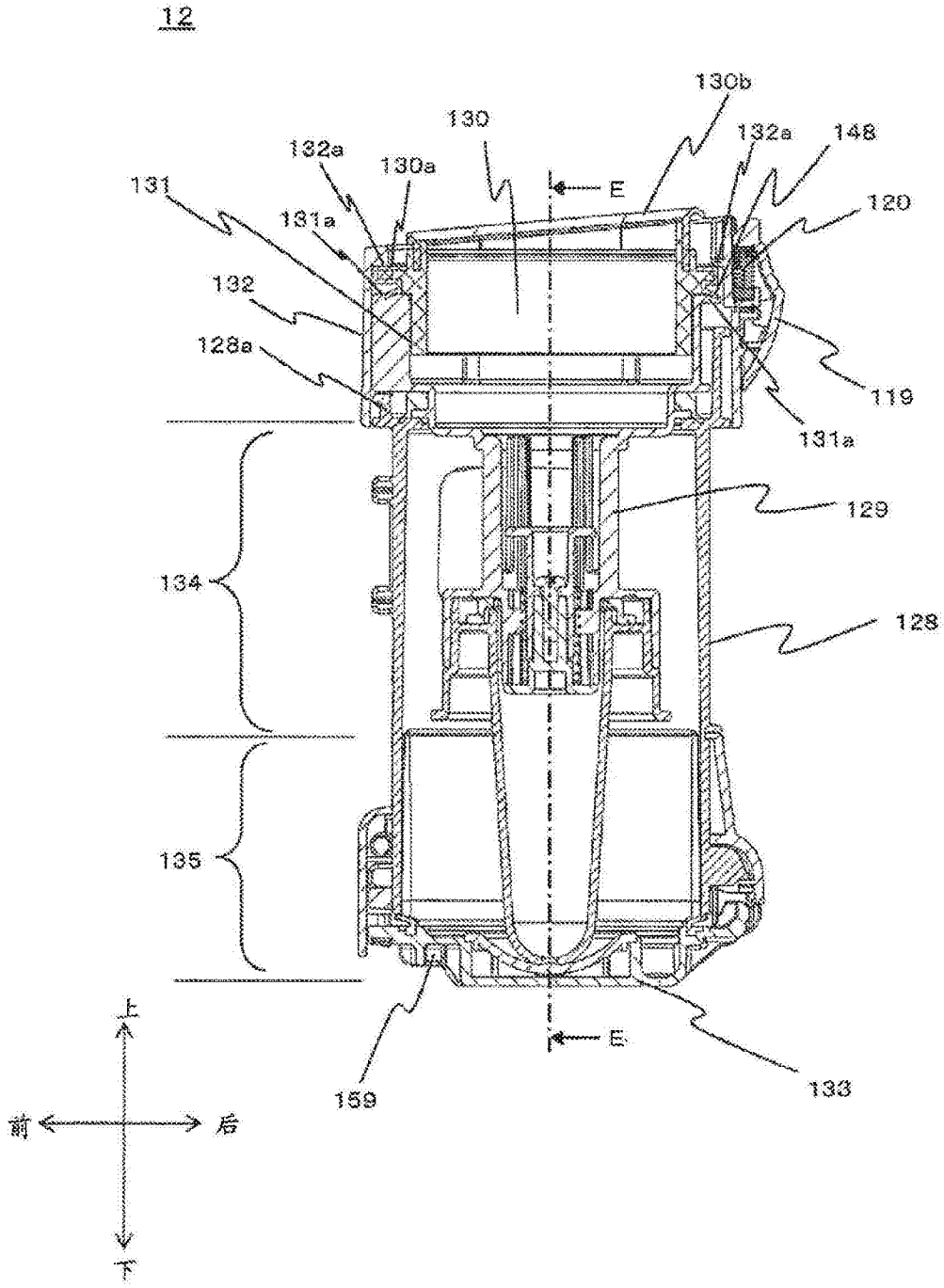


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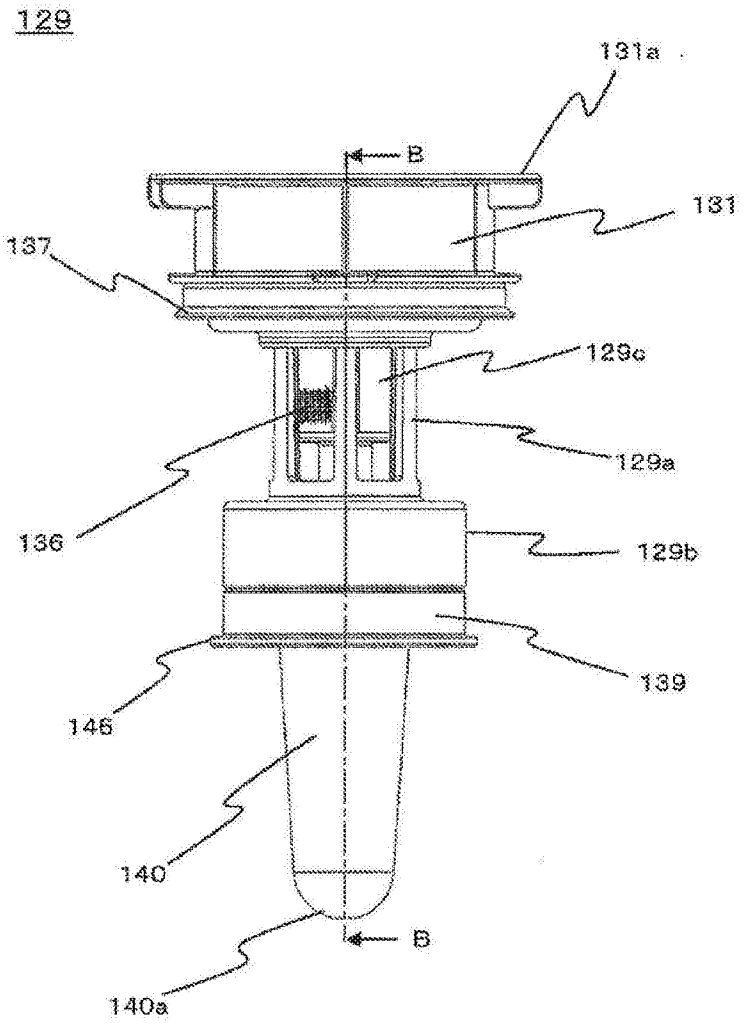


图12

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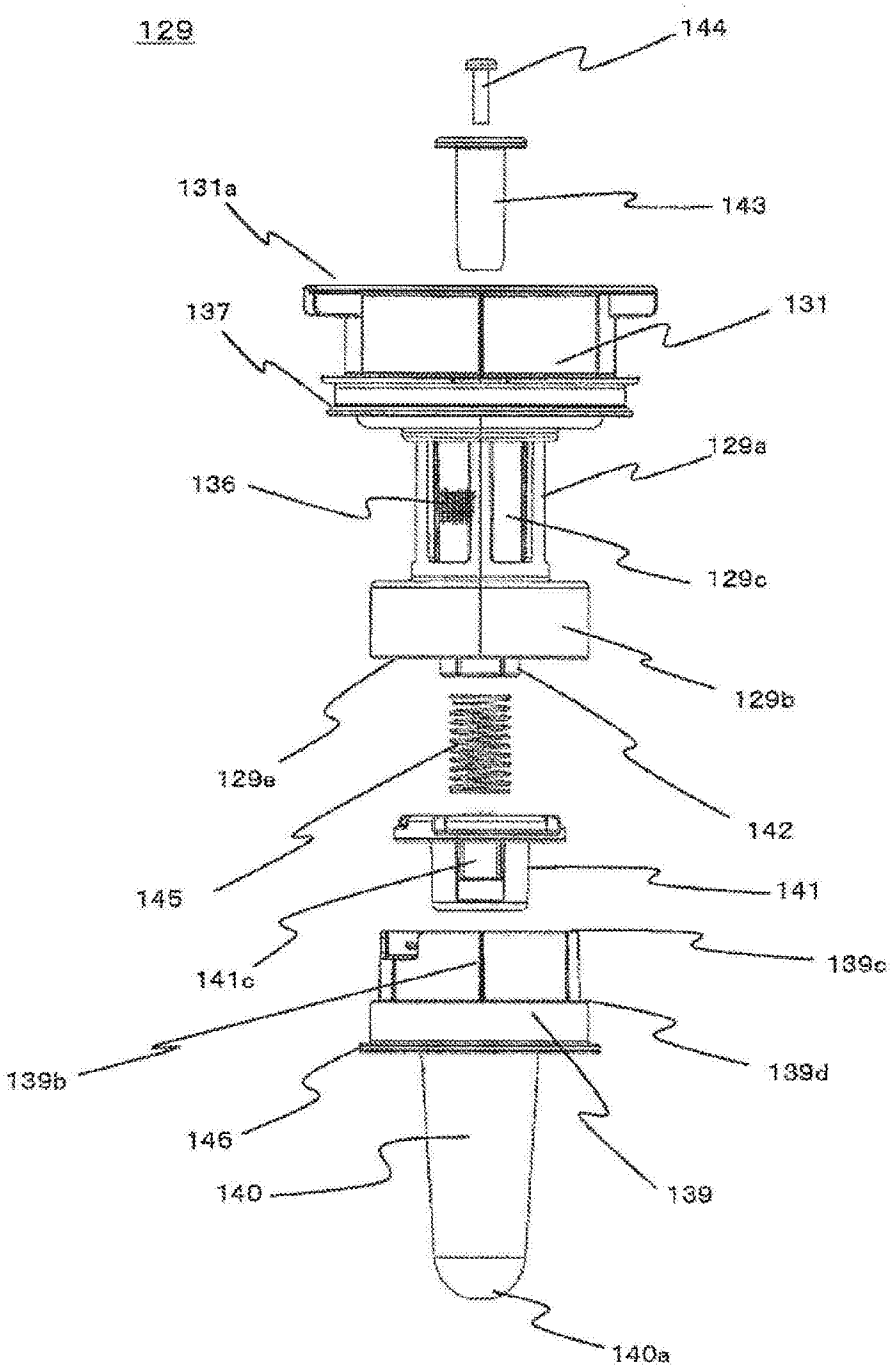


图13

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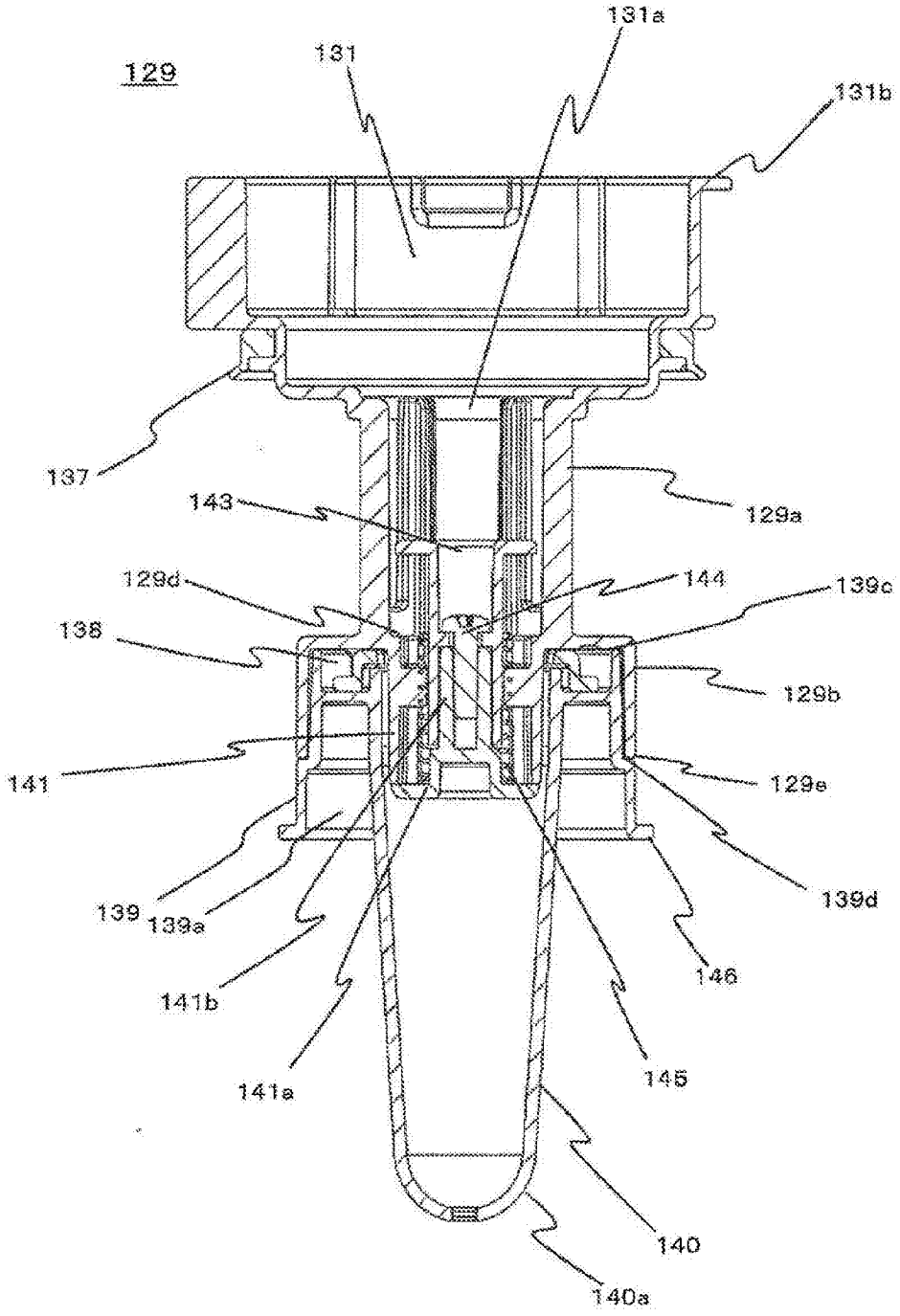


图14

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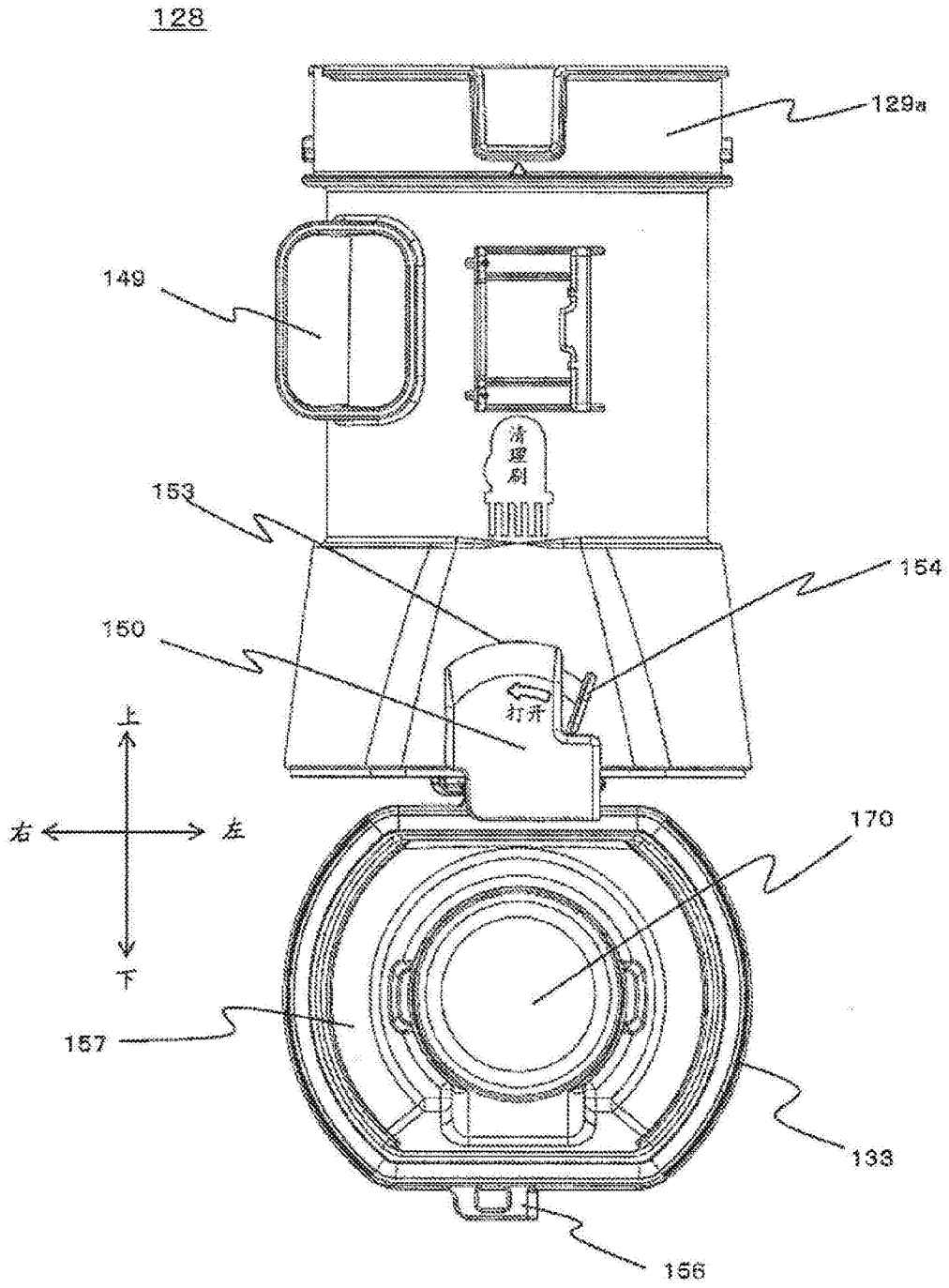


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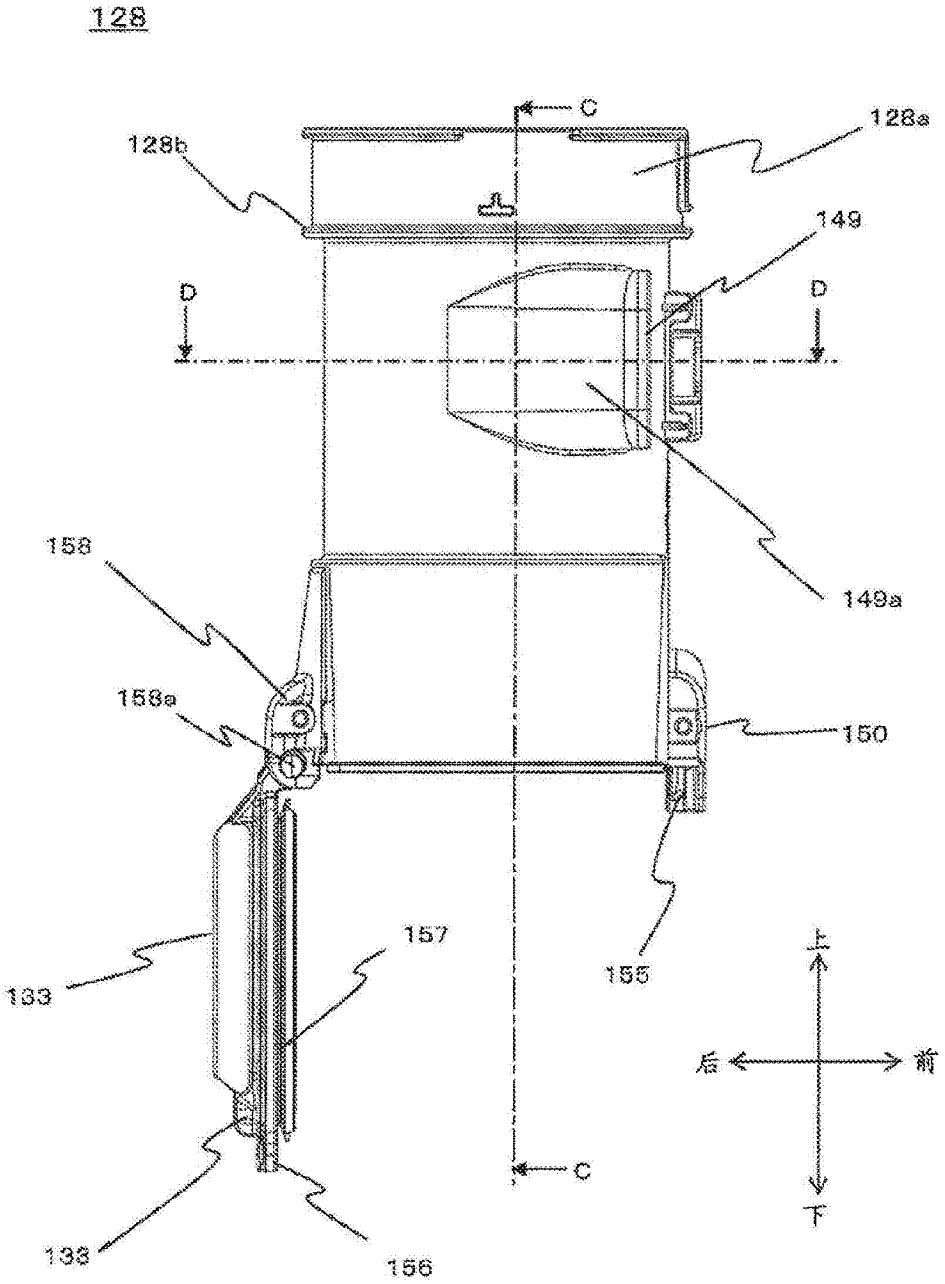


图16

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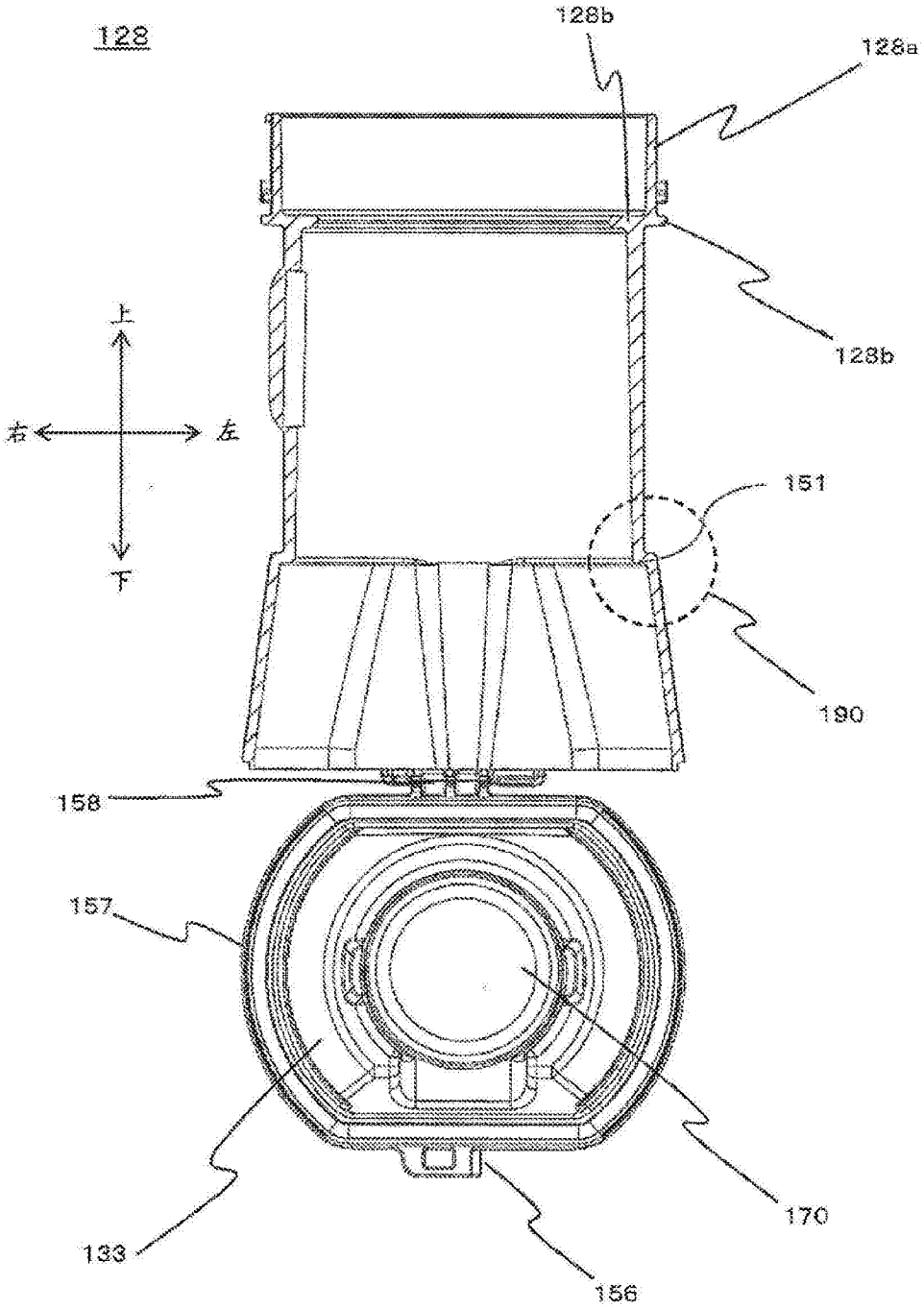


图17

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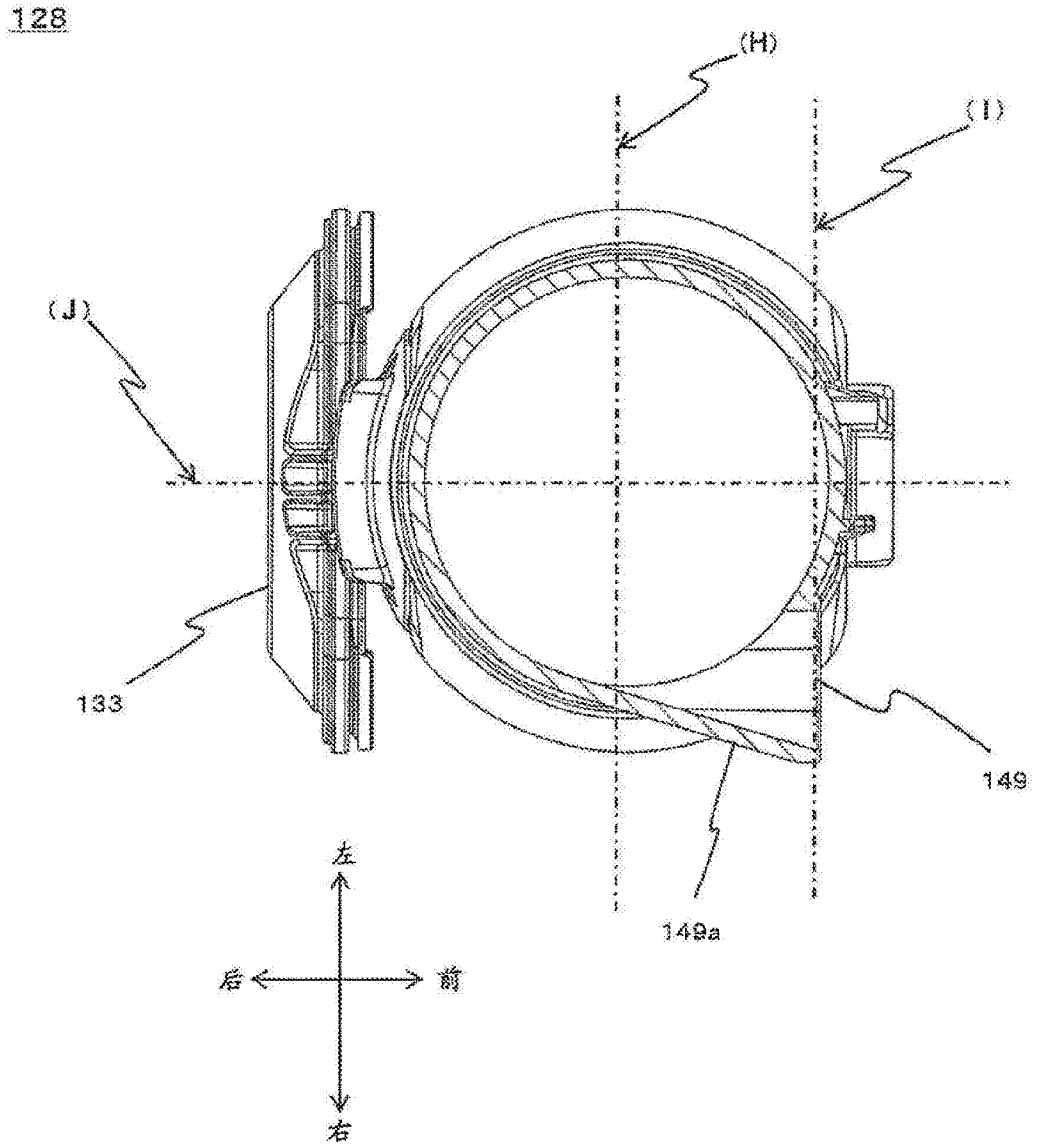


图18

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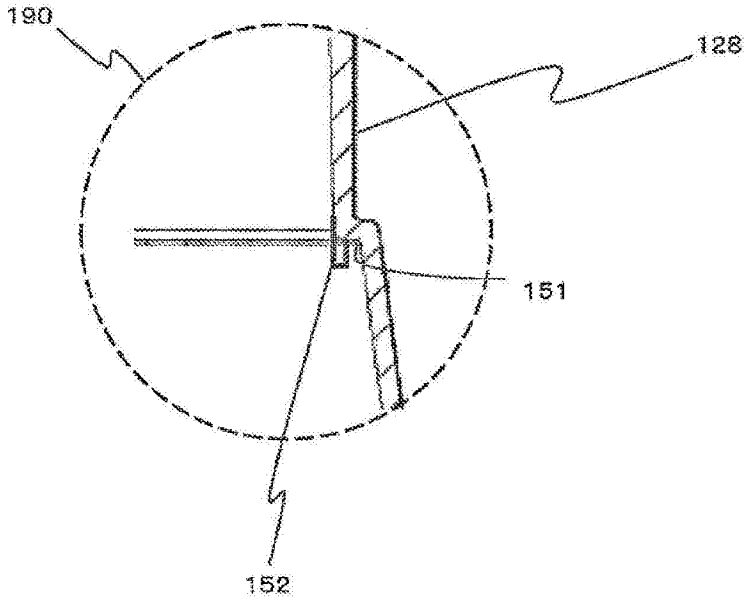


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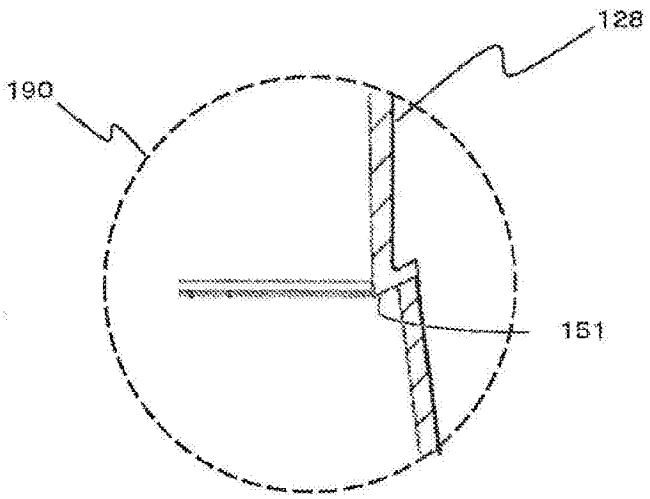


图20

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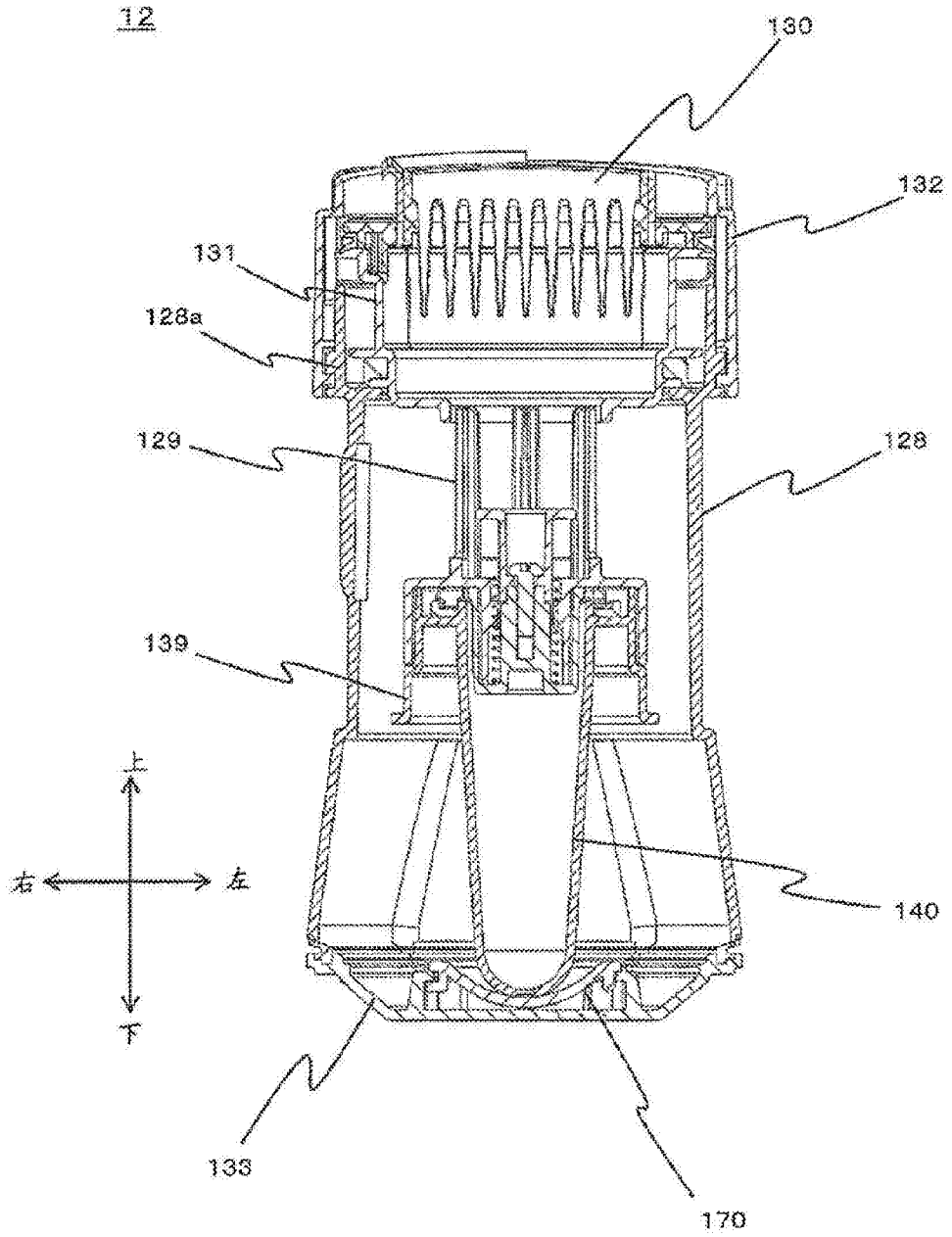


图21

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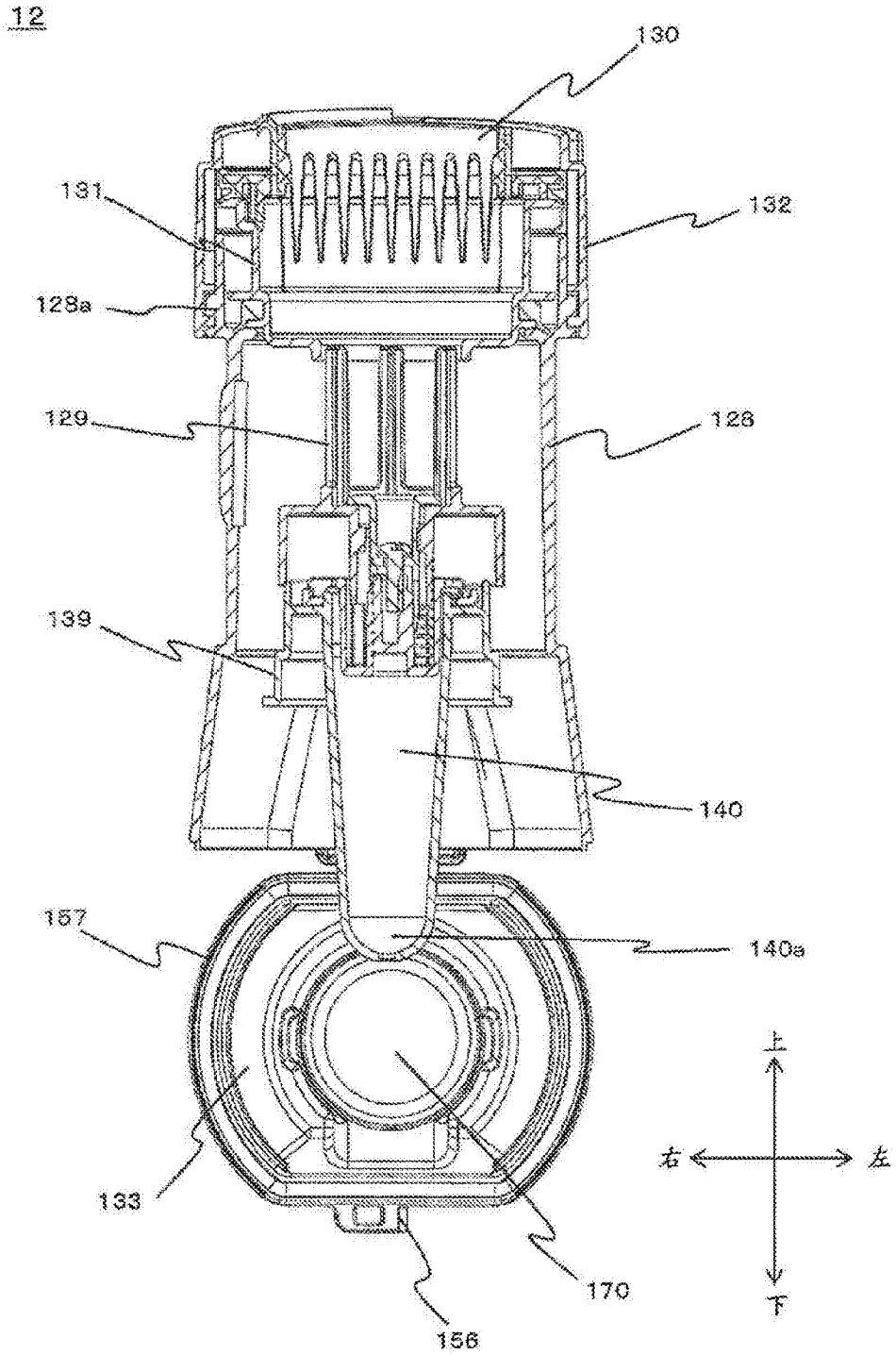


图22

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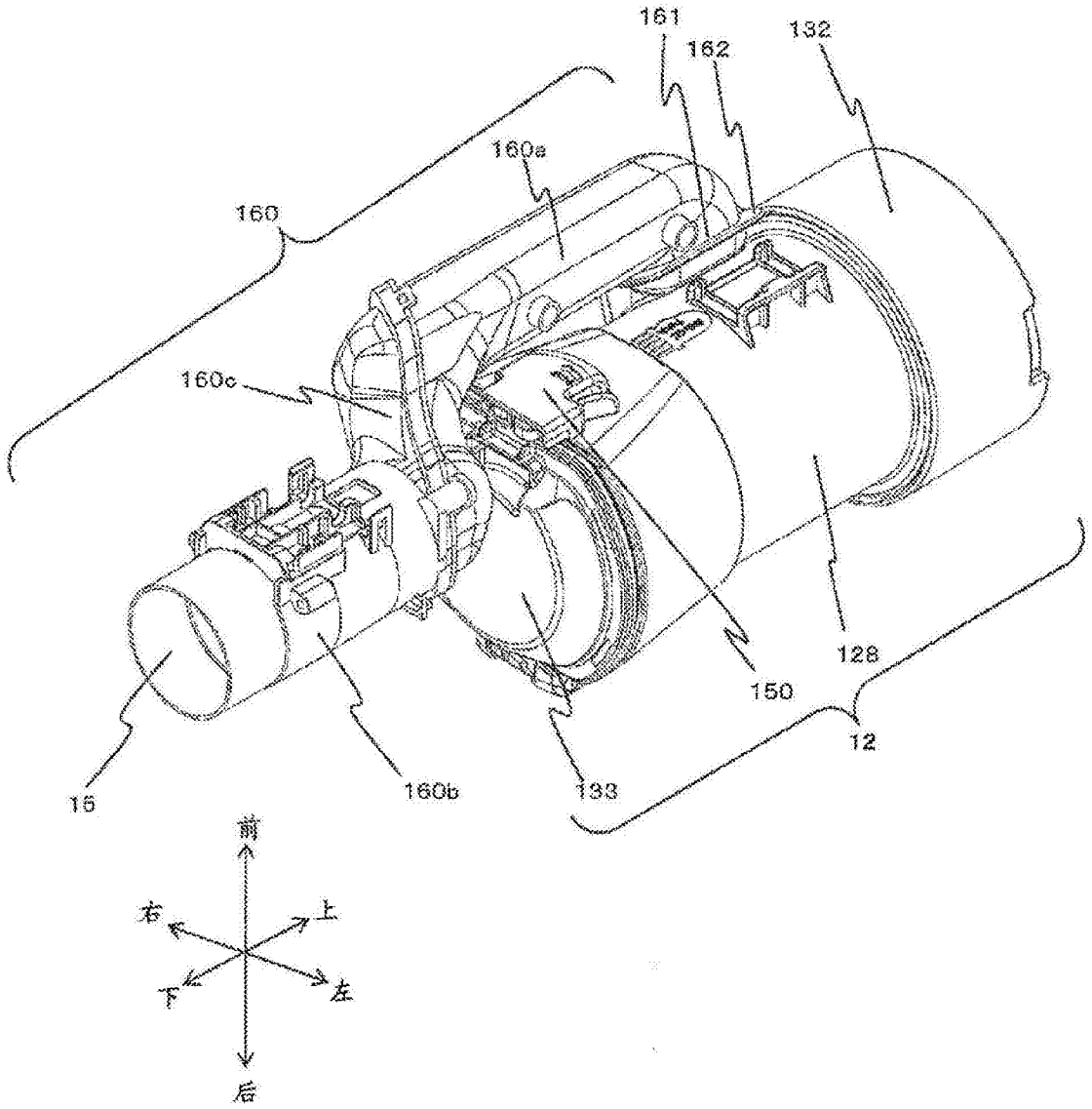


图23

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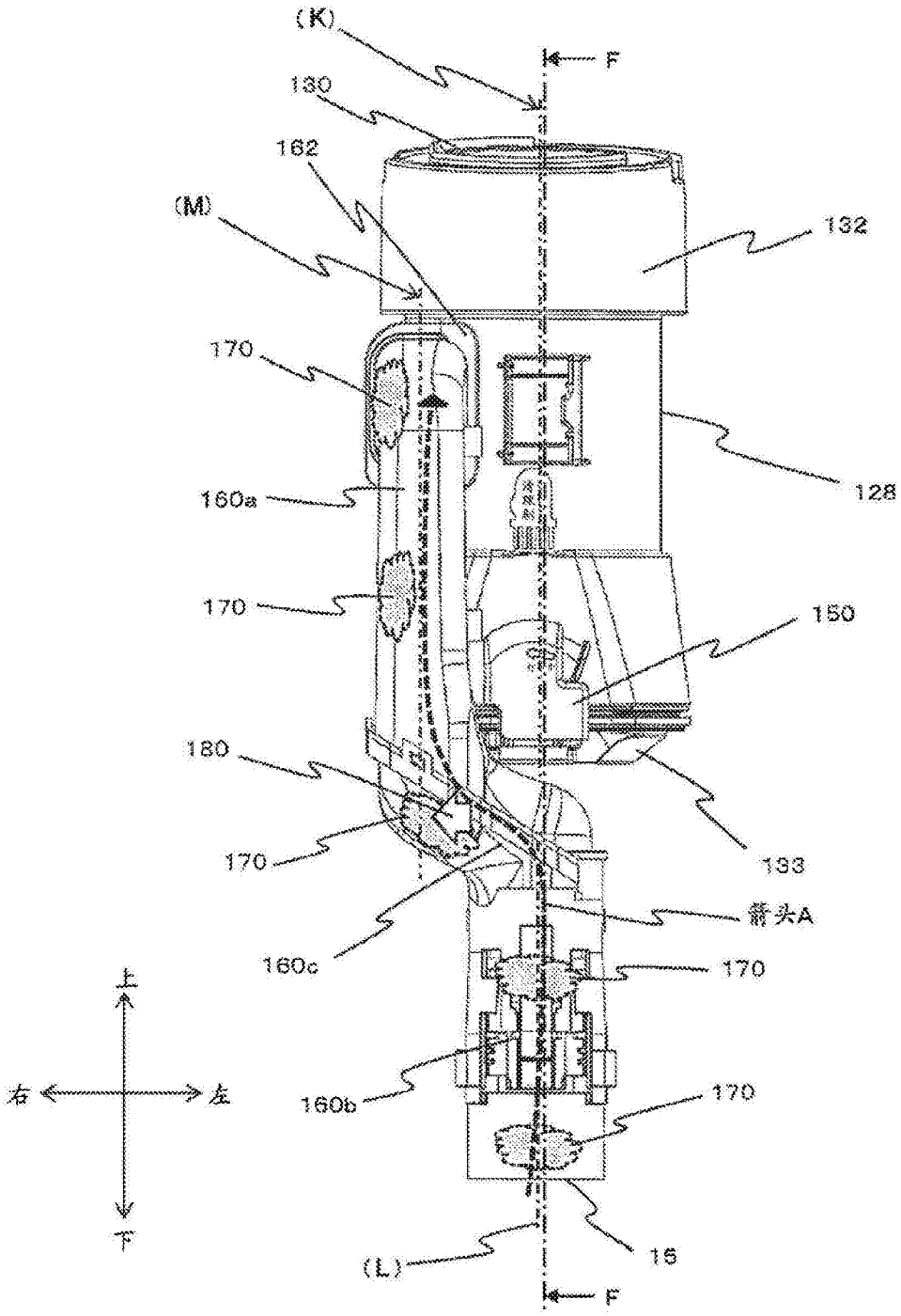


图24

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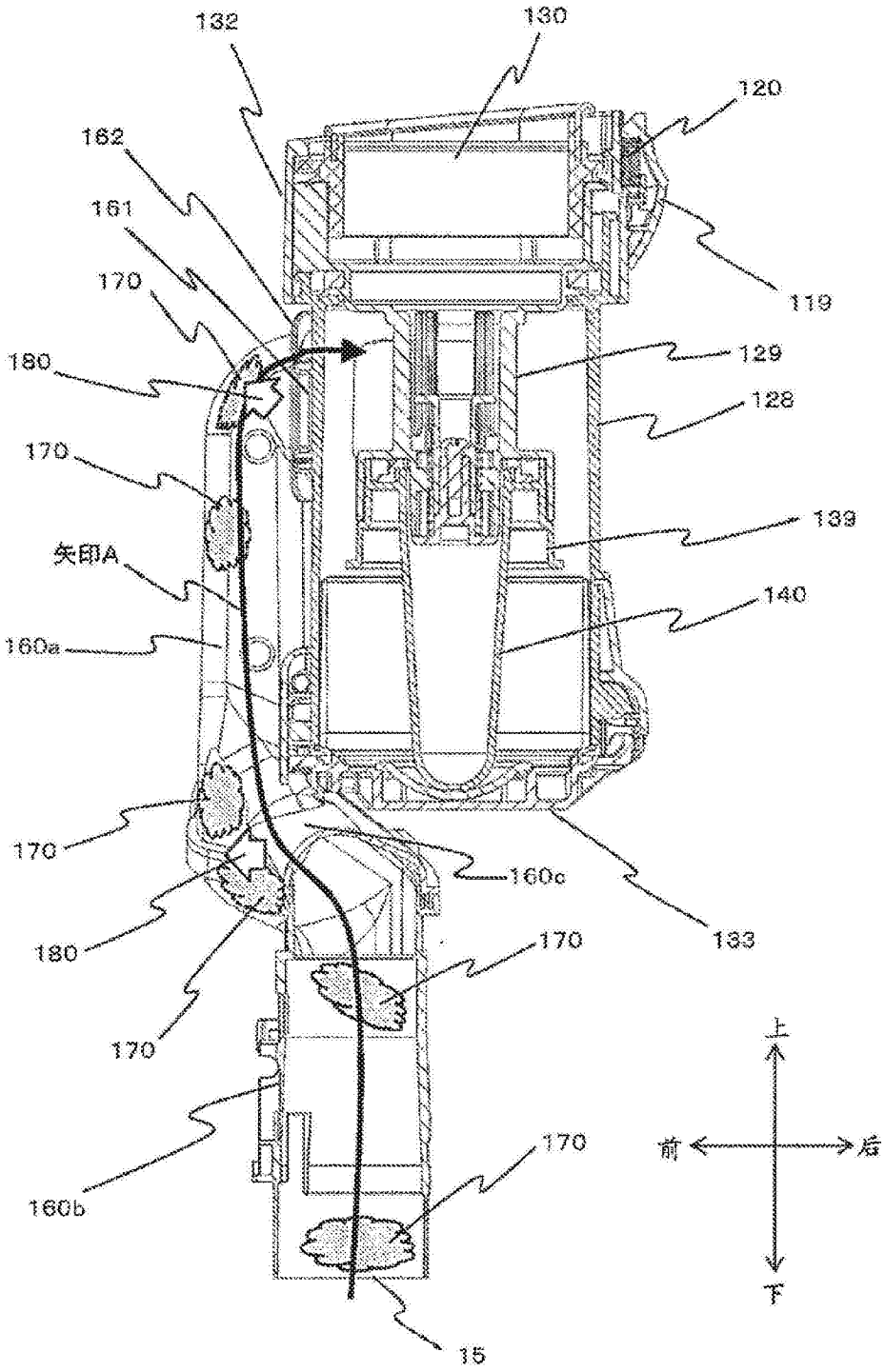


图25

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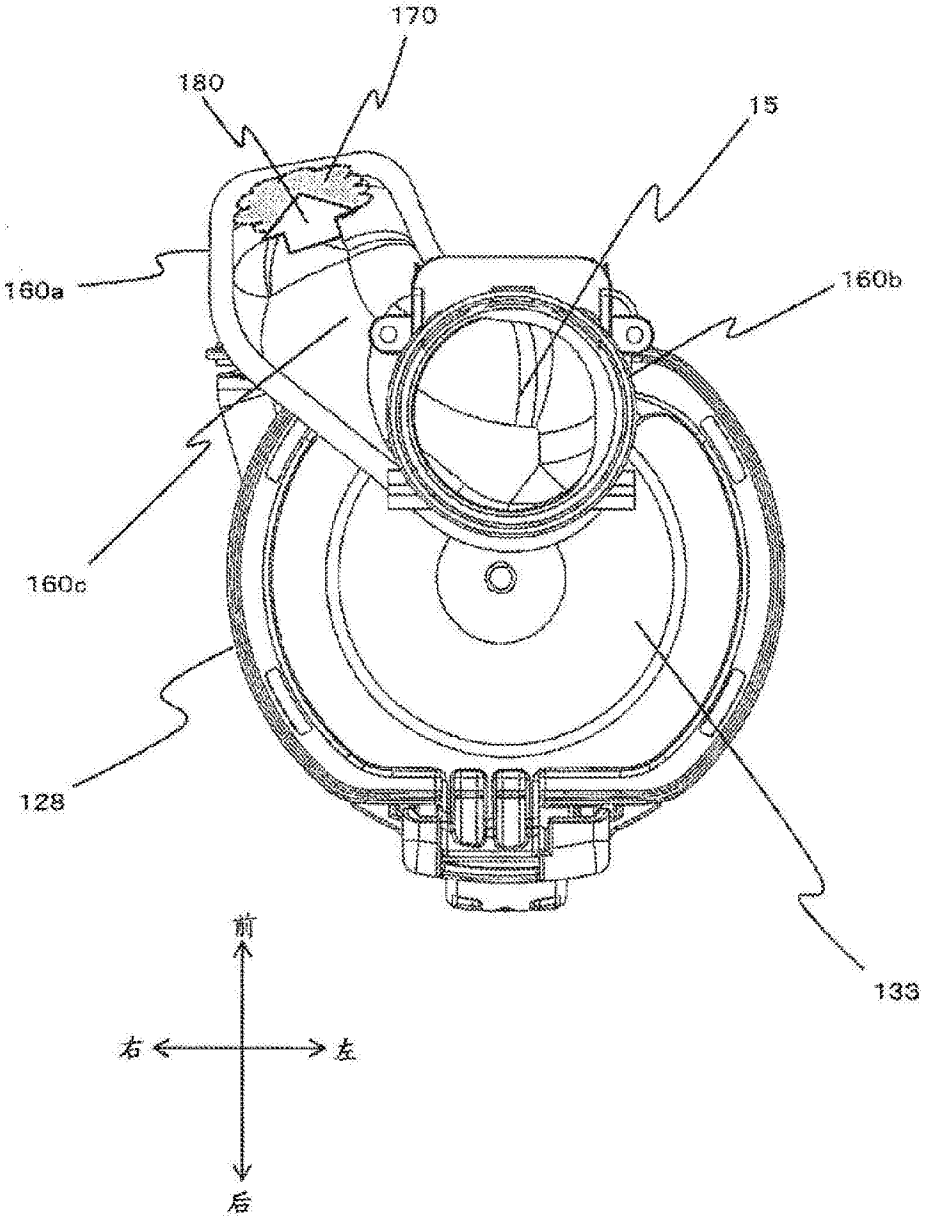


图26

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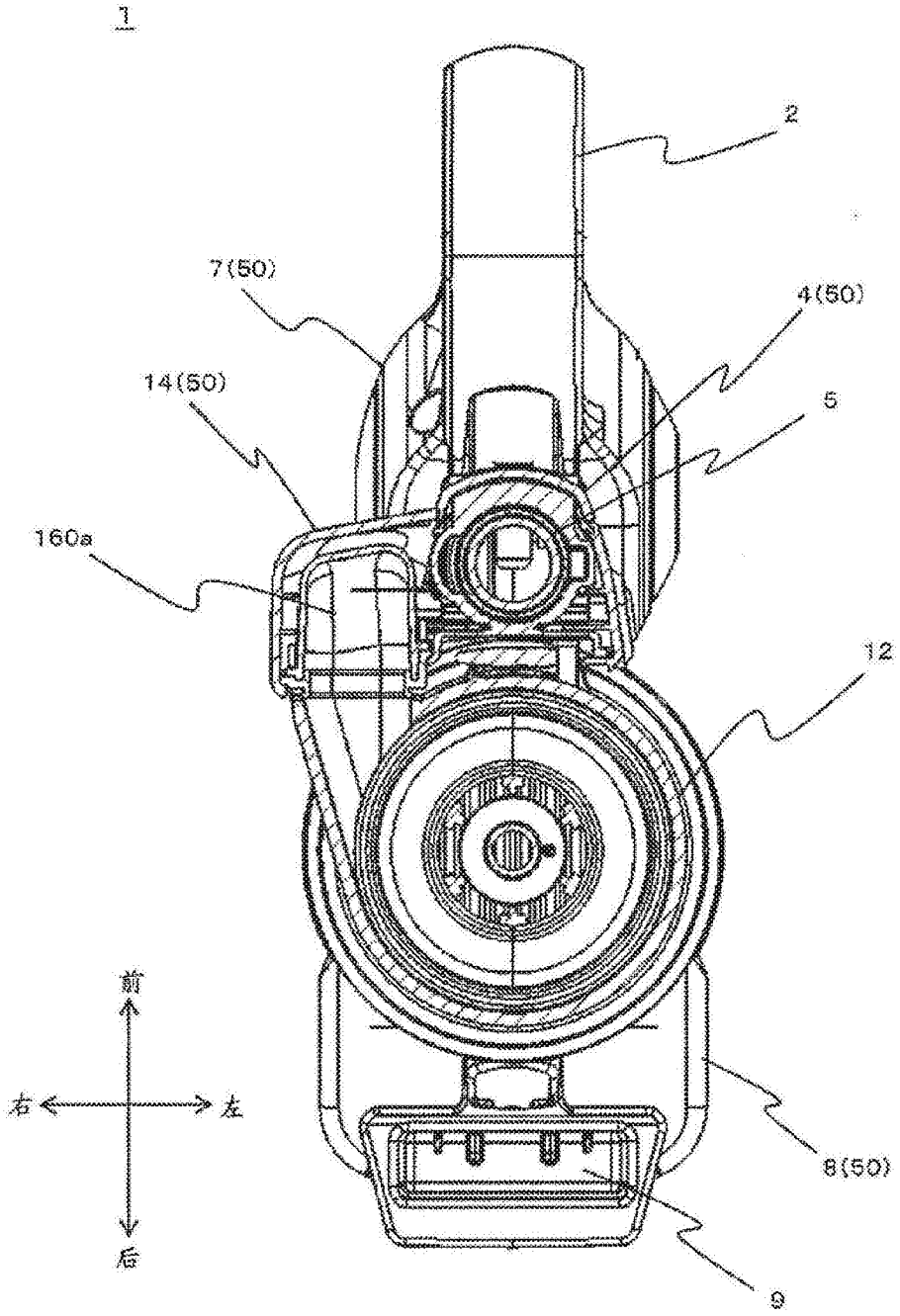


图27

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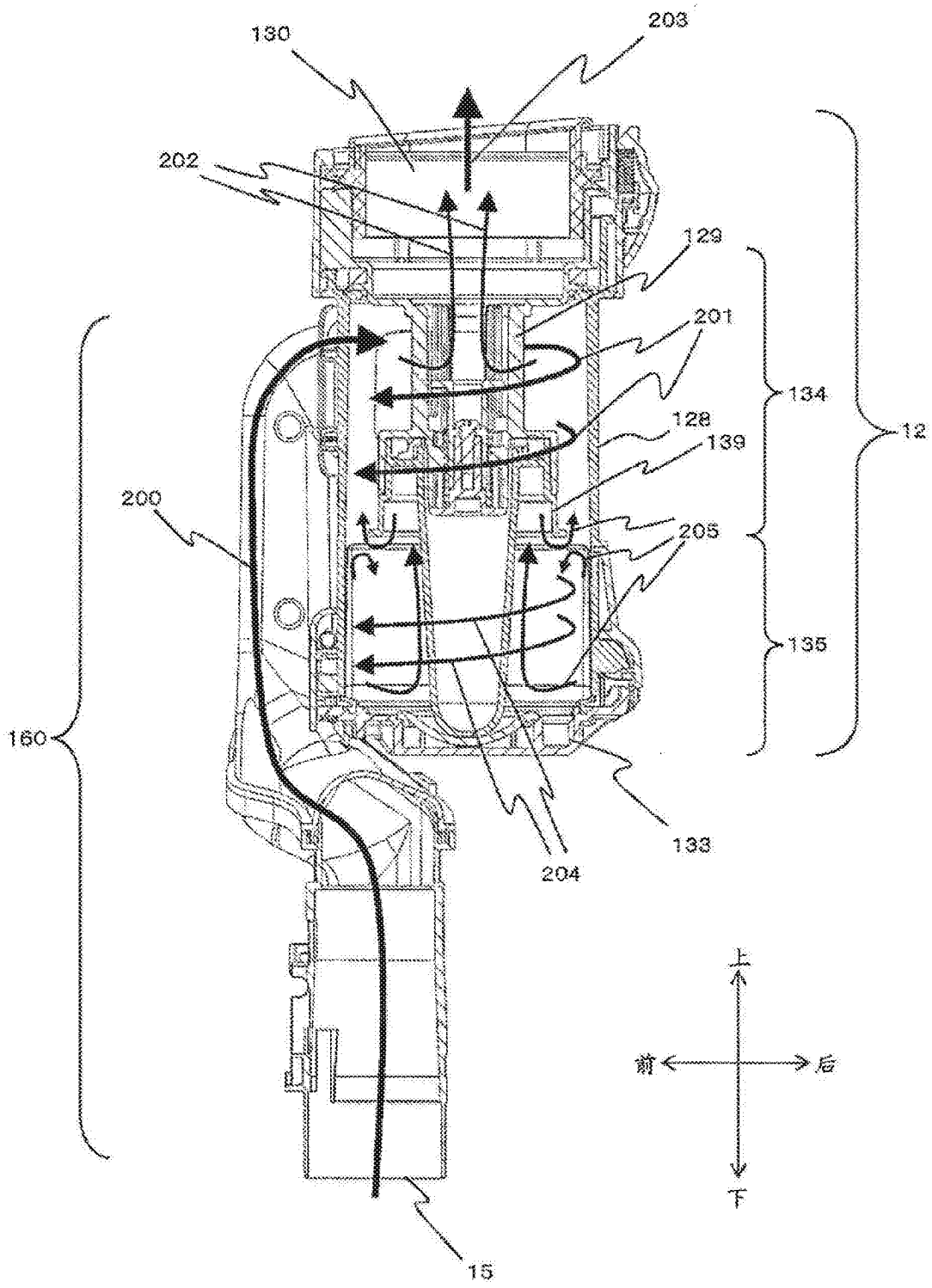


图28

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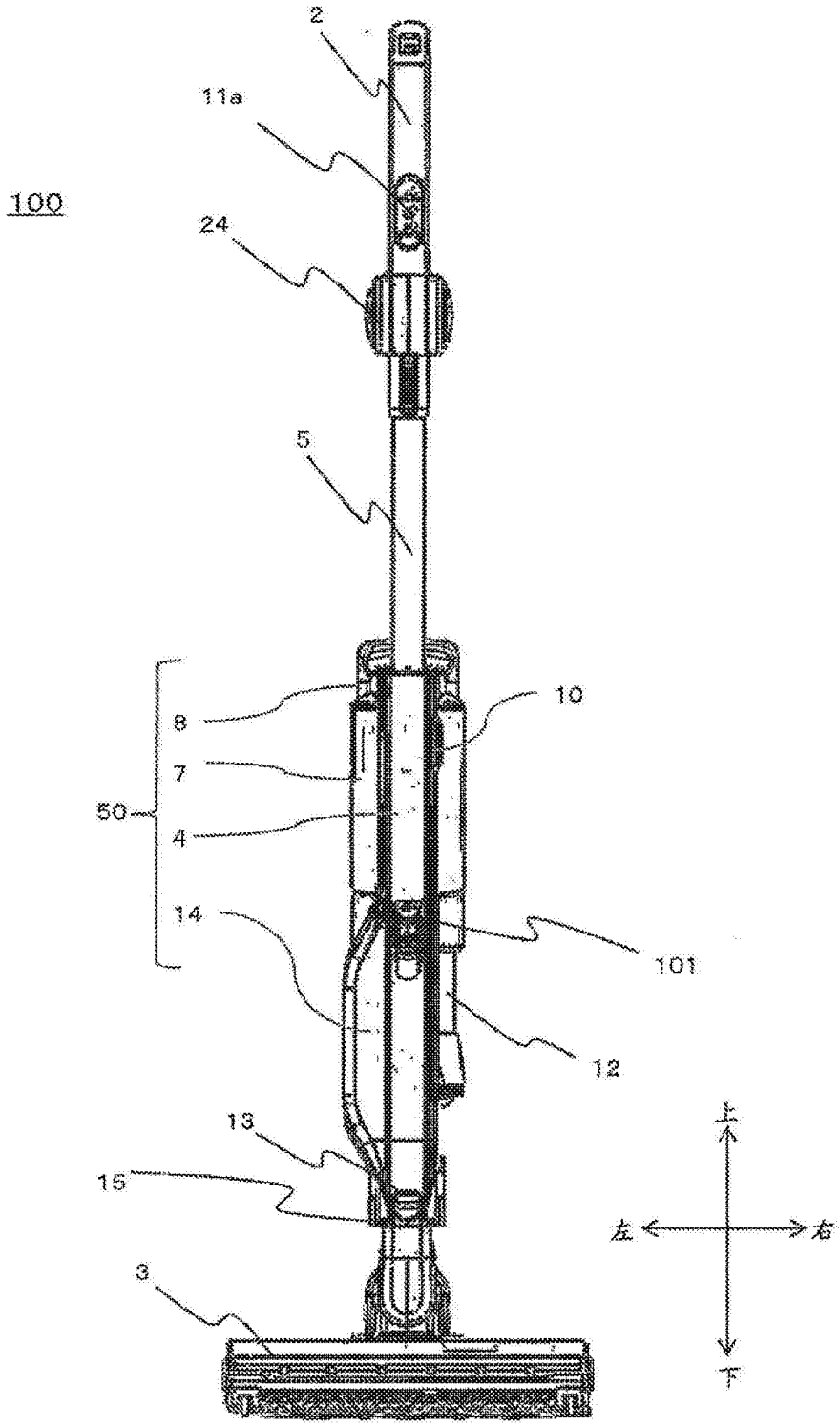


图29

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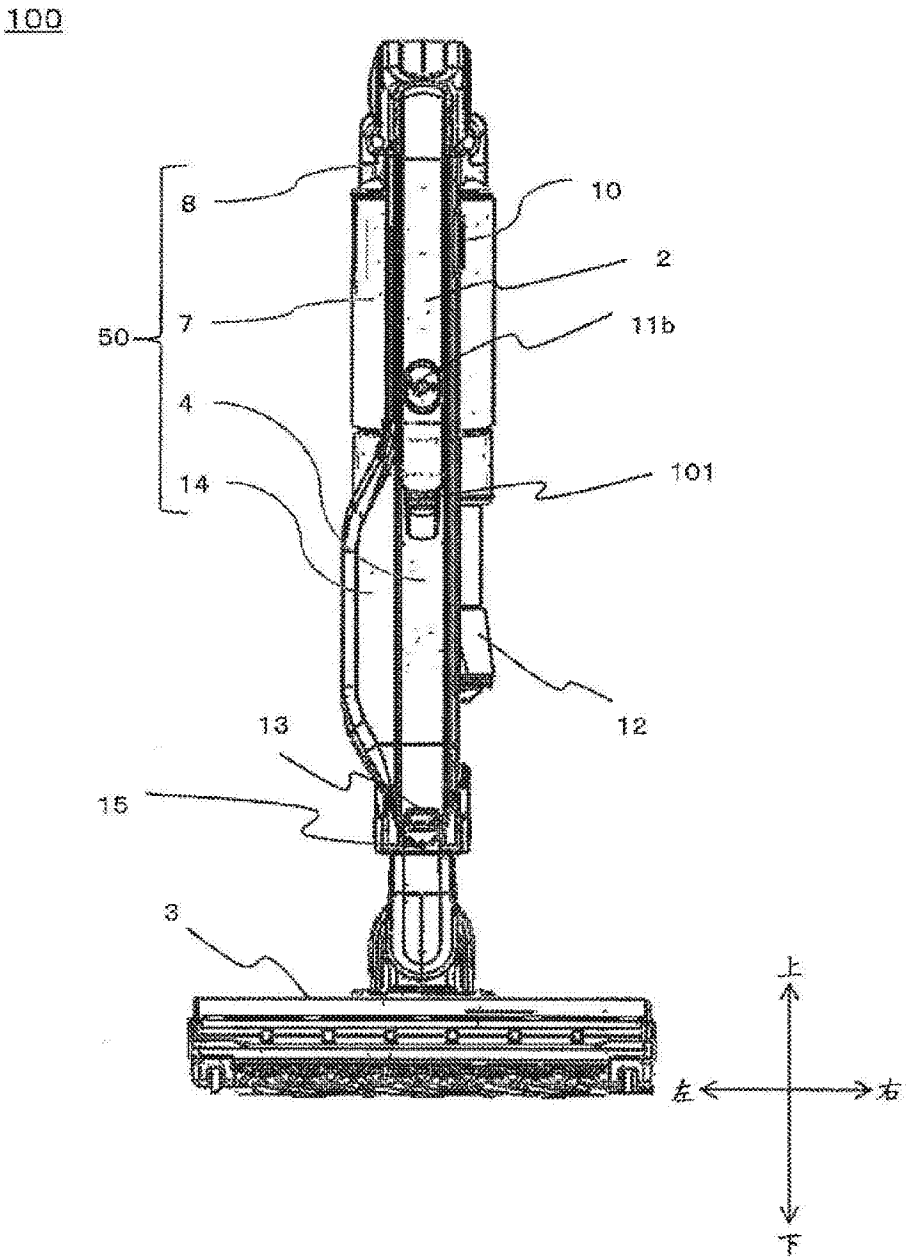


图30

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(19)中华人民共和国国家知识产权局

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A47L 9/00(2006.01)
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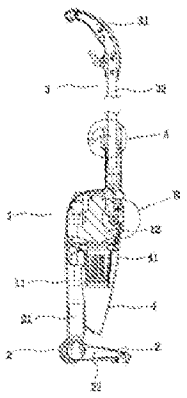
权利要求书1页 说明书4页 附图8页

(54)发明名称

一种手提旋风吸尘器

(57)摘要

本发明公开了一种手提旋风吸尘器，包括主机身、吸尘地拖，主机身上设有手柄、尘杯、机身进风管、吸风电机，吸尘地拖包括地拖基体、插接管，插接管下端与地拖内风道连通，插接管上端与机身进风管卡接且连通，尘杯内设有过滤网筒，尘杯上设有切向进风口、上端排风口，过滤网筒上设有多个过滤孔，切向进风口与机身进风管连通，上端排风口与吸风电机的进风端连通，吸风电机的出风端与设在主机身上的外排风口连通。本发明的有益效果是：能手持操作，清理过程快速省力；风道结构合理，能有效完成灰尘的分离和收集；吸尘能力强，过滤效果良好，可保障排风的清洁度。



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1.一种手提旋风吸尘器，包括主机身、吸尘地拖，其特征是，所述主机身上设有手柄、尘杯、机身进风管，主机身内设有吸风电机，吸尘地拖包括地拖基体、设于地拖基体上的插接管，地拖基体上设有地拖内风道，插接管下端与地拖内风道连通，插接管上端与机身进风管卡接且连通，尘杯内设有过滤网筒，尘杯上设有切向进风口、上端排风口，过滤网筒将切向进风口与上端排风口隔开，过滤网筒上设有多个过滤孔，切向进风口与机身进风管连通，上端排风口与吸风电机的进风端连通，吸风电机的出风端与设在主机身上的外排风口连通。

2.根据权利要求1所述的一种手提旋风吸尘器，其特征是，所述手柄包括握持柄、握持管，握持管上端连接握持柄，主机身上设有插管连接件，握持管下端插入插管连接件中，握持管与主机身之间通过柄体卡扣固定。

3.根据权利要求1所述的一种手提旋风吸尘器，其特征是，所述切向进风口通过杯体进风道与机身进风管连通，杯体进风道的进风方向为尘杯体的一个切向。

4.根据权利要求1或2或3所述的一种手提旋风吸尘器，其特征是，所述过滤网筒内设有尘袋架，尘袋架上设有过滤尘袋，过滤尘袋将过滤网筒与上端排风口隔开。

5.根据权利要求1所述的一种手提旋风吸尘器，其特征是，所述尘杯与主机身卡接，主机身上设有用于固定尘杯的竖按扣，主机身上设有扣轴、用于向外顶压竖按扣的弹簧，竖按扣与扣轴转动连接，竖按扣上端内侧与弹簧一端连接，弹簧另一端顶住主机身，竖按扣下端内侧压住尘杯，扣轴处在竖按扣上端与竖按扣下端之间。

6.根据权利要求1或2或3所述的一种手提旋风吸尘器，其特征是，所述上端排风口处设有过滤架体，过滤架体上设有进风海绵。

7.根据权利要求1所述的一种手提旋风吸尘器，其特征是，所述地拖基体上设有若干后地轮、至少一个前地轮，地拖基体底部设有直接吸入口，直接吸入口的进风方向向上，地拖内风道与直接吸入口连通，地拖基体上设有用于刷地的毛刷条，毛刷条处在直接吸入口前方。

8.根据权利要求7所述的一种手提旋风吸尘器，其特征是，所述地拖基体上设有若干减震调节缸，减震调节缸包括减震缸体、与减震缸体滑动配合的调节活塞，调节活塞上设有外活塞杆，外活塞杆内端连接调节活塞，外活塞杆外端朝向移动轮的前进方向，减震缸体内充有液压油，外活塞杆外端设有弹性接触球头，减震缸体内设有复位弹簧，复位弹簧一端连接调节活塞，复位弹簧另一端连接减震缸体，调节活塞处在复位弹簧与外活塞杆之间。

9.根据权利要求7所述的一种手提旋风吸尘器，其特征是，所述地拖基体包括地拖后基、地拖前罩，地拖前罩后端顶部与地拖后基铰接，前地轮、毛刷条均处在地拖前罩内，地拖前罩内设有毛刷架，毛刷条包括刷条基、刷地条，刷条基与毛刷架滑动连接，滑动方向为上下方向，毛刷架上设有用于防止毛刷条脱离毛刷架的刷条限位板，刷条基顶部设有配重块，地拖后基上设有滑轮立杆，滑轮立杆上设有与滑轮立杆转动连接的外辅助滑轮，还包括一拉动索，拉动索穿过地拖后基的顶壁，拉动索与外辅助滑轮配合接触，还包括一液压拉动缸，液压拉动缸包括拉动缸体、与拉动缸体滑动配合的带动活塞，带动活塞上设有拉动活塞杆，拉动缸体与减震缸体之间通过油管连通，拉动活塞杆内端与带动活塞相连，拉动活塞杆外端与拉动索的一端连接，拉动索的另一端与地拖前罩的顶壁连接，油管为一软管。

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一种手提旋风吸尘器

技术领域

[0001] 本发明属于吸尘器技术领域，尤其涉及一种手提旋风吸尘器。

背景技术

[0002] 随着时代的发展和生活水平的提高，吸尘设备尤其是家用的吸尘器已经得到了较为广泛的应用。吸尘器是一种利用电动机(吸风电机)，在密封的壳体内产生空气负压，吸入尘屑或垃圾的电器。目前的吸尘器，主要功能就是对家中地板、地毯等处的灰尘、垃圾进行回收清理。但是目前的吸尘器，在使用时的操作便捷性，以及在内部风道设置的合理性、灰尘与空气的分离能力等方面，仍有所欠缺。

发明内容

[0003] 本发明是为了克服现有技术中的不足，提供了一种结构合理，可以手持操作，清理过程方便省力，能有效完成分吸尘、分离、排风等功能，吸尘和分离能力强，具有良好过滤效果的吸尘器。

[0004] 为了实现上述目的，本发明采用以下技术方案：

[0005] 一种手提旋风吸尘器，包括主机身、吸尘地拖，所述主机身上设有手柄、尘杯、机身进风管，主机身内设有吸风电机，吸尘地拖包括地拖基体、设于地拖基体上的插接管，地拖基体上设有地拖内风道，插接管下端与地拖内风道连通，插接管上端与机身进风管卡接且连通，尘杯内设有过滤网筒，尘杯上设有切向进风口、上端排风口，过滤网筒将切向进风口与上端排风口隔开，过滤网筒上设有多个过滤孔，切向进风口与机身进风管连通，上端排风口与吸风电机的进风端连通，吸风电机的出风端与设在主机身上的外排风口连通。

[0006] 作为优选，所述手柄包括握持柄、握持管，握持管上端连接握持柄，主机身上设有插管连接件，握持管下端插入插管连接件中，握持管与主机身之间通过柄体卡扣固定。

[0007] 作为优选，所述切向进风口通过杯体进风道与机身进风管连通，杯体进风道的进风方向为尘杯体的一个切向。

[0008] 作为优选，所述过滤网筒内设有尘袋架，尘袋架上设有过滤尘袋，过滤尘袋将过滤网筒与上端排风口隔开。

[0009] 作为优选，所述尘杯与主机身卡接，主机身上设有用于固定尘杯的竖按扣，主机身上设有扣轴、用于向外顶压竖按扣的弹簧，竖按扣与扣轴转动连接，竖按扣上端内侧与弹簧一端连接，弹簧另一端顶住主机身，竖按扣下端内侧压住尘杯，扣轴处在竖按扣上端与竖按扣下端之间。

[0010] 作为优选，所述上端排风口处设有过滤架体，过滤架体上设有进风海绵。

[0011] 作为优选，所述地拖基体上设有若干后地轮、至少一个前地轮，地拖基体底部设有直接吸入口，直接吸入口的进风方向向上，地拖内风道与直接吸入口连通，地拖基体上设有用于刷地的毛刷条，毛刷条处在直接吸入口前方。

[0012] 作为优选，所述地拖基体上设有若干减震调节缸，减震调节缸包括减震缸体、与减

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震缸体滑动配合的调节活塞，调节活塞上设有外活塞杆，外活塞杆内端连接调节活塞，外活塞杆外端朝向移动轮的前进方向，减震缸体内充有液压油，外活塞杆外端设有弹性接触球头，减震缸体内设有复位弹簧，复位弹簧一端连接调节活塞，复位弹簧另一端连接减震缸体，调节活塞处在复位弹簧与外活塞杆之间。

[0013] 作为优选，所述地拖基体包括地拖后基、地拖前罩，地拖前罩后端顶部与地拖后基铰接，前地轮、毛刷条均处在地拖前罩内，地拖前罩内设有毛刷架，毛刷条包括刷条基、刷地条，刷条基与毛刷架滑动连接，滑动方向为上下方向，毛刷架上设有用于防止毛刷条脱离毛刷架的刷条限位板，刷条基顶部设有配重块，地拖后基上设有滑轮立杆，滑轮立杆上设有与滑轮立杆转动连接的外辅助滑轮，还包括一拉动索，拉动索穿过地拖后基的顶壁，拉动索与外辅助滑轮配合接触，还包括一液压拉动缸，液压拉动缸包括拉动缸体、与拉动缸体滑动配合的带动活塞，带动活塞上设有拉动活塞杆，拉动缸体与减震缸体之间通过油管连通，拉动活塞杆内端与带动活塞相连，拉动活塞杆外端与拉动索的一端连接，拉动索的另一端与地拖前罩的顶壁连接，油管为一软管。

[0014] 本发明的有益效果是：能手持操作，清理过程快速省力；风道结构合理，能有效完成灰尘的分离和收集；吸尘能力强，过滤效果良好，可保障排风的清洁度；具有地拖防撞保护功能，还具备对于墙根等死角的高效清洁能力，功能全面；整体稳定性好，噪音小。

附图说明

[0015] 图1是本发明的结构示意图；

[0016] 图2是图1中A处的放大图；

[0017] 图3是图1中B处的放大图；

[0018] 图4是本发明尘杯处的爆炸示意图；

[0019] 图5是本发明实施例2中吸尘地拖的结构示意图；

[0020] 图6是本发明实施例2中吸尘地拖一个工作状态下的结构示意图；

[0021] 图7是本发明实施例2中减震缸体、拉动缸体处的油路及结构示意图；

[0022] 图8是本发明实施例2中毛刷架处的结构示意图。

[0023] 图中：主机身1、机身进风管11、吸风电机12、竖按扣13、扣轴131、弹簧132、吸尘地拖2、插接管21、地拖内风道22、后地轮23、前地轮24、直接吸入口25、毛刷条261、刷条基2611、刷地条2612、毛刷架262、刷条限位板263、配重块264、减震调节缸27、减震缸体271、外活塞杆272、弹性接触球头273、滑轮立杆28、外辅助滑轮281、液压拉动缸29、拉动缸体291、拉动活塞杆292、地拖后基2a、地拖前罩2b、拉动索2c、油管2d、内辅助滑轮2e、手柄3、握持柄31、握持管32、插管连接件33、柄体卡扣34、尘杯4、过滤网筒41、尘袋架42。

具体实施方式

[0024] 下面结合附图和具体实施方式对本发明做进一步的描述。

[0025] 实施例1：如图1至图4所示的实施例中，一种手提旋风吸尘器，包括主机身1、吸尘地拖2，所述主机身上设有手柄3、尘杯4、机身进风管11，主机身内设有吸风电机12，吸尘地拖包括地拖基体、设于地拖基体上的插接管21，地拖基体上设有地拖内风道22，插接管下端与地拖内风道连通，插接管上端与机身进风管卡接且连通，尘杯内设有过滤网筒41，尘杯上

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设有切向进风口、上端排风口，过滤网筒将切向进风口与上端排风口隔开，过滤网筒上设有多个过滤孔，切向进风口与机身进风管连通，上端排风口与吸风电机的进风端连通，吸风电机的出风端与设在主机身上的外排风口连通。所述手柄包括握持柄31、握持管32，握持管上端连接握持柄，主机身上设有插管连接件33，握持管下端插入插管连接件中，握持管与主机身之间通过柄体卡扣34固定。所述切向进风口通过杯体进风道与机身进风管连通，杯体进风道的进风方向为尘杯体的一个切向。所述过滤网筒内设有尘袋架42，尘袋架上设有过滤尘袋，过滤尘袋将过滤网筒与上端排风口隔开。

[0026] 空气(带有灰尘杂质)从地拖吸入后，从切向进风口以切向或近似切向的方向进入尘杯内，并在尘杯内形成旋流，相对较重的灰尘杂质贴壁，随后由于重力逐渐落下，空气气流则通过各过滤孔进入尘杯内随后透过尘袋架上的过滤尘袋(相当于精滤)，进一步得到分离和净化，随后可进入吸风电机、最终排出到外界。在此过程中，先经过旋风分离和过滤网筒的过滤，又经过滤尘袋的过滤，先粗后精，灰尘杂质的过滤效果明显。握持柄、握持管都可以握持，方便使用者直接提着本整机进行吸尘操作，极大提高了操作便捷性和工作效率。其中握持管与与主机身之间通过柄体卡扣固定，便于拆装、维修、更换。

[0027] 所述尘杯与主机身卡接，主机身上设有用于固定尘杯的竖按扣13，主机身上设有扣轴131、用于向外顶压竖按扣的弹簧132，竖按扣与扣轴转动连接，竖按扣上端内侧与弹簧一端连接，弹簧另一端顶住主机身，竖按扣下端内侧压住尘杯，扣轴处在竖按扣上端与竖按扣下端之间。尘杯与主机身可拆卸，需要卸下尘杯时，按住竖按扣上端，使弹簧收缩，竖按扣下端离开尘杯，即可卸下尘杯进行杯内垃圾(灰尘杂质等)的倾倒、清理。装回尘杯时，按住竖按扣上端，使弹簧收缩，让尘杯落位，然后放开竖按扣上端，在弹簧作用下，竖按扣下端压住尘杯，完成固定。

[0028] 所述上端排风口处设有过滤架体，过滤架体上设有进风海绵。可以设置过滤架体和进风海绵，让空气在进入吸风电机之前再被过滤一次，同时还能吸收掉潮湿空气中的水分，进一步保障最终排风的清洁程度，且能保护吸风电机。

[0029] 实施例2：本实施例的基本结构与实施方式同实施例1，其不同之处在于，如图5至图8中所示，所述地拖基体上设有若干后地轮23、至少一个前地轮24，地拖基体底部设有直接吸入口25，直接吸入口的进风方向向上，地拖内风道与直接吸入口连通，地拖基体上设有用于刷地的毛刷条261，毛刷条处在直接吸入口前方。后地轮、前地轮方便地拖在清理表面(地板、地毯等)上移动，直接吸入口就是最初吸尘的位置。毛刷条则可以刷起清理表面上的杂质，提高对清理表面(地板、地面、地毯等)的清理效果。

[0030] 所述地拖基体上设有若干减震调节缸27，减震调节缸包括减震缸体271、与减震缸体滑动配合的调节活塞，调节活塞上设有外活塞杆272，外活塞杆内端连接调节活塞，外活塞杆外端朝向移动轮的前进方向，减震缸体内充有液压油，外活塞杆外端设有弹性接触球头273，减震缸体内设有复位弹簧，复位弹簧一端连接调节活塞，复位弹簧另一端连接减震缸体，调节活塞处在复位弹簧与外活塞杆之间。使用者握着手柄，推动吸尘地拖对地面(或其它清理表面)进行清理时，当清理到墙边或靠近柜子等处时，若不小心推动距离过大，就会导致吸尘地拖撞到墙面、柜子等处，引起墙面、柜子或是吸尘地拖本身的损伤。而在本实施例中，在吸尘地拖前进、将要撞击到墙面前，弹性接触球头会预先接触到墙面，且外活塞杆受力内缩，起到减震、防撞损的效果。虽然没有复位弹簧，调节活塞也会自动复位(调节活

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塞移动时，液压油不能压缩，但缸内空气会压缩或膨胀，在外力消除后，空气受压处具有向外的推力，空气膨胀处具有负压吸力，皆能带动结构复位），但有了复位弹簧，可以在弹性接触球头离开接触的物体后帮助调节活塞复位，提升复位效果。

[0031] 所述地拖基体包括地拖后基2a、地拖前罩2b，地拖前罩后端顶部与地拖后基铰接，前地轮、毛刷条均处在地拖前罩内，地拖前罩内设有毛刷架262，毛刷条包括刷条基2611、刷地条2612，刷条基与毛刷架滑动连接，滑动方向为上下方向，毛刷架上设有用于防止毛刷条脱离毛刷架的刷条限位板263，刷条基顶部设有配重块264，地拖后基上设有滑轮立杆28，滑轮立杆上设有与滑轮立杆转动连接的外辅助滑轮281，还包括一拉动索2c，拉动索穿过地拖后基的顶壁，拉动索与外辅助滑轮配合接触，还包括一液压拉动缸29，液压拉动缸包括拉动缸体291、与拉动缸体滑动配合的带动活塞，带动活塞上设有拉动活塞杆292，拉动缸体与减震缸体之间通过油管2d连通，拉动活塞杆内端与带动活塞相连，拉动活塞杆外端与拉动索的一端连接，拉动索的另一端与地拖前罩的顶壁连接，油管为一软管。油管可以是金属波纹管、塑胶管等可以弯曲变形的软管。墙体和地面之间，属于吸尘地拖较难清理的“死角”，因为吸尘地拖首先要利用毛刷条进行清刷，然后再利用负压进行吸尘、吸杂，但是由于毛刷条的存在，影响了直接吸入口与墙根之间的距离，容易导致对墙边角处的吸力不足。并且，前端外部壳体结构（在本实施例中为地拖前罩）的存在，也会加大直接吸入口与墙根之间的距离，这些都不利于吸尘地拖对墙体和地面之间的角落进行吸尘。而在本实施例中，当吸尘地拖靠近墙体后，弹性接触球头接触墙体，在推力的作用下，外活塞杆受压，液压油从减震缸体流到拉动缸体，从而拉动活塞杆被向外推动、开始伸出，拉动活塞杆带着拉动索移动，拉动索拉动地拖前罩（拉动索的另一端与地拖前罩的顶壁连接）向上翻起（图6为地拖前罩上翻后的示意图），地拖前罩沿着铰接点开始转动。吸尘地拖越靠近墙体，则地拖前罩上翻越多（此外，为了方便拉动索的设置，可以在主机壳再多设几个内辅助滑轮2e，让拉动索也绕过内辅助滑轮，即与内辅助滑轮配合接触，以避免拉动索与其它结构干涉）。并且，地拖前罩无需设计成始终需要拉动索来带动上翻，只要地拖前罩上翻到一定角度后，墙体其实就会接触前地轮，此时若吸尘地拖继续靠近墙体，则在墙体的“推动”下地拖前罩也能继续上翻了，这样一来，既保证了平时地拖前罩的正常使用，也使得当需要对墙根处进行吸尘时，地拖前罩能够翻起、避让，让直接吸入口极度靠近需吸尘的位置（墙根），充分提高了对墙根等死角的清理效果。再者，地拖前罩在上翻过程中，在配重块和毛刷条自身重力的作用下，毛刷条会向下滑动伸出，从而可以补偿地拖前罩翻起时毛刷条的离地间隙，保障进一步提升对近墙根处、墙根处的清理效果。而吸尘地拖离开墙根、墙脚处时，由于重力，地拖前罩可以自动复位，使用者也可以快速后拉一下吸尘地拖，在惯性作用下，地拖前罩也能顺利复位。此外，也可以利用弹簧或者人工进行复位。

SharkNinja Ex. 1002
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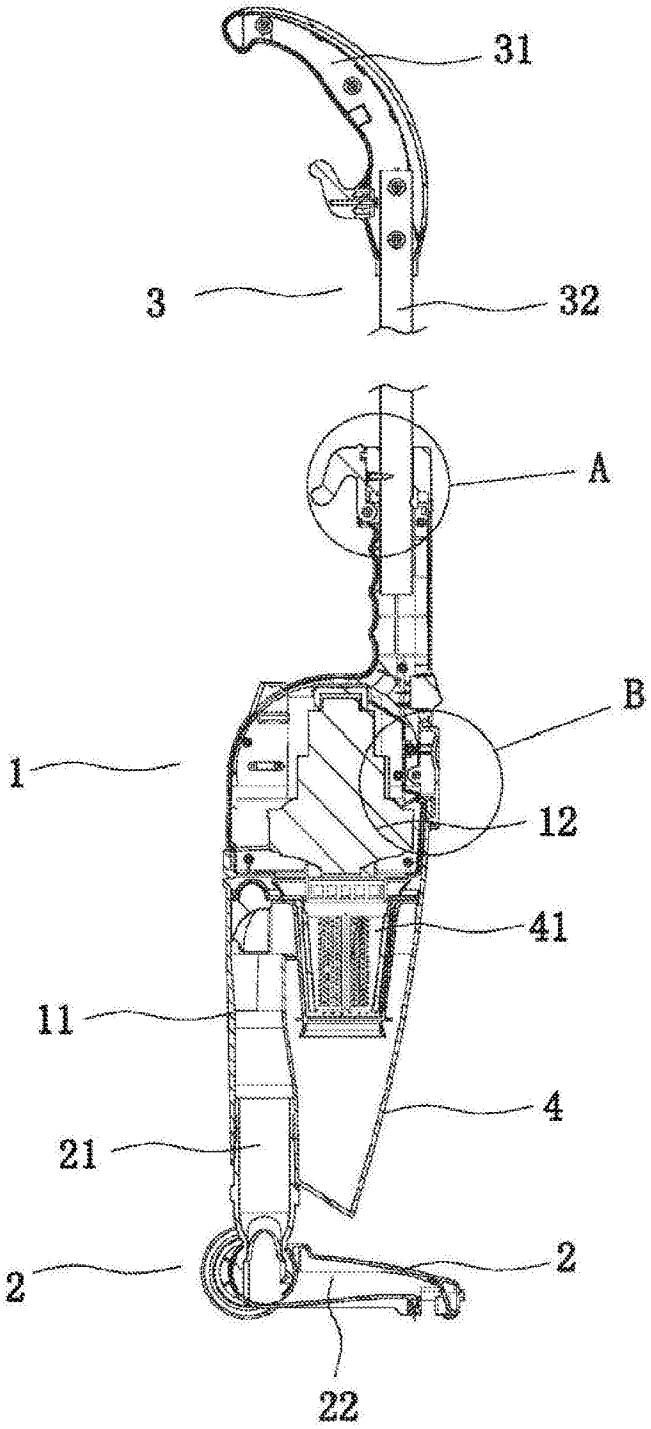


图1

SharkNinja Ex. 1002
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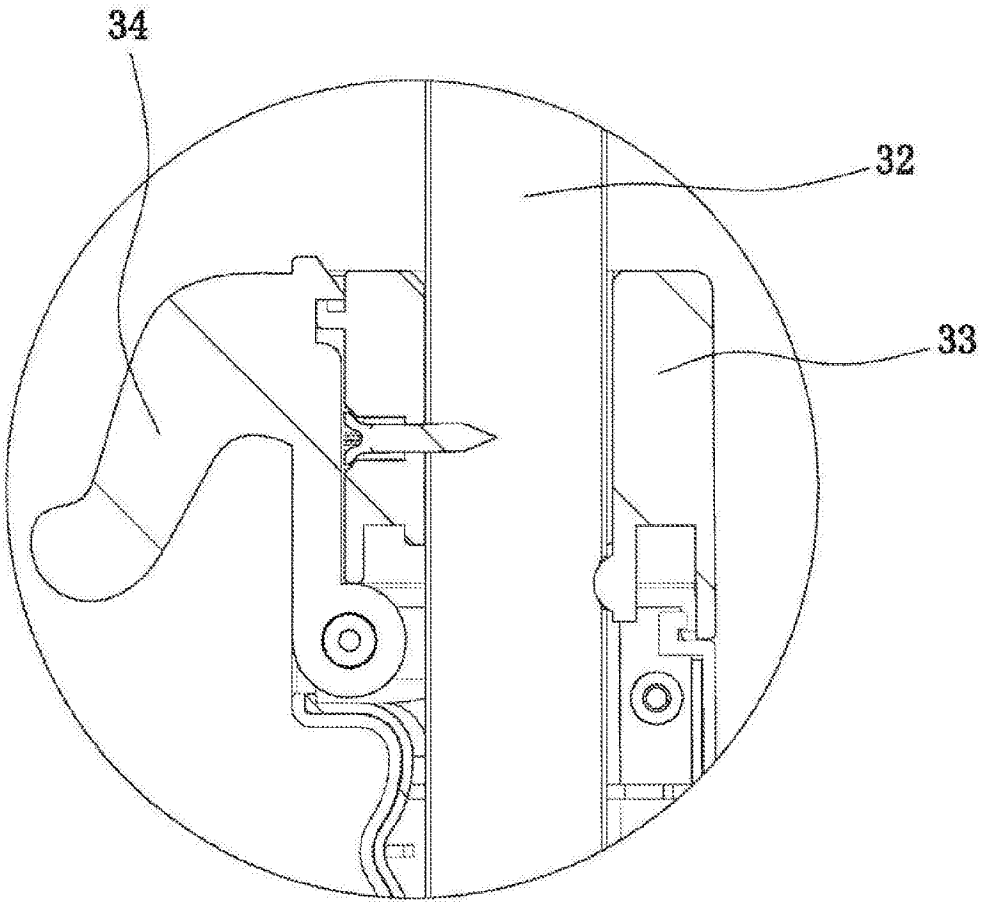


图2

SharkNinja Ex. 1002
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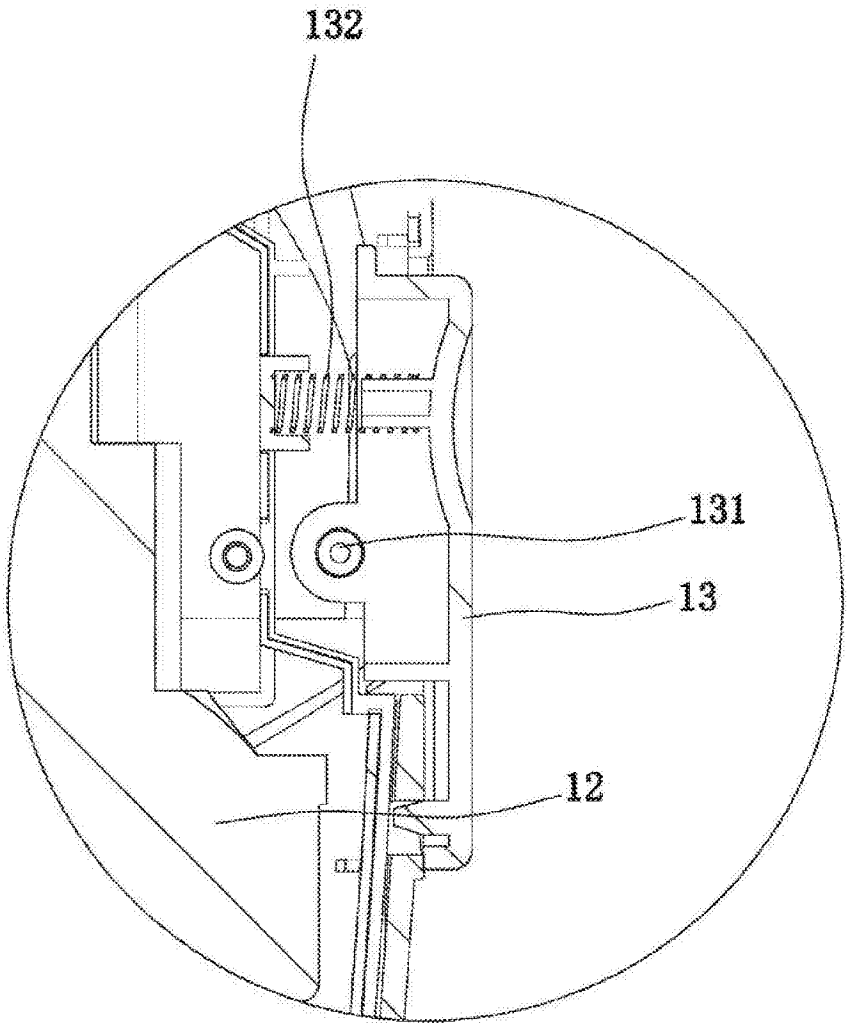


图3

SharkNinja Ex. 1002
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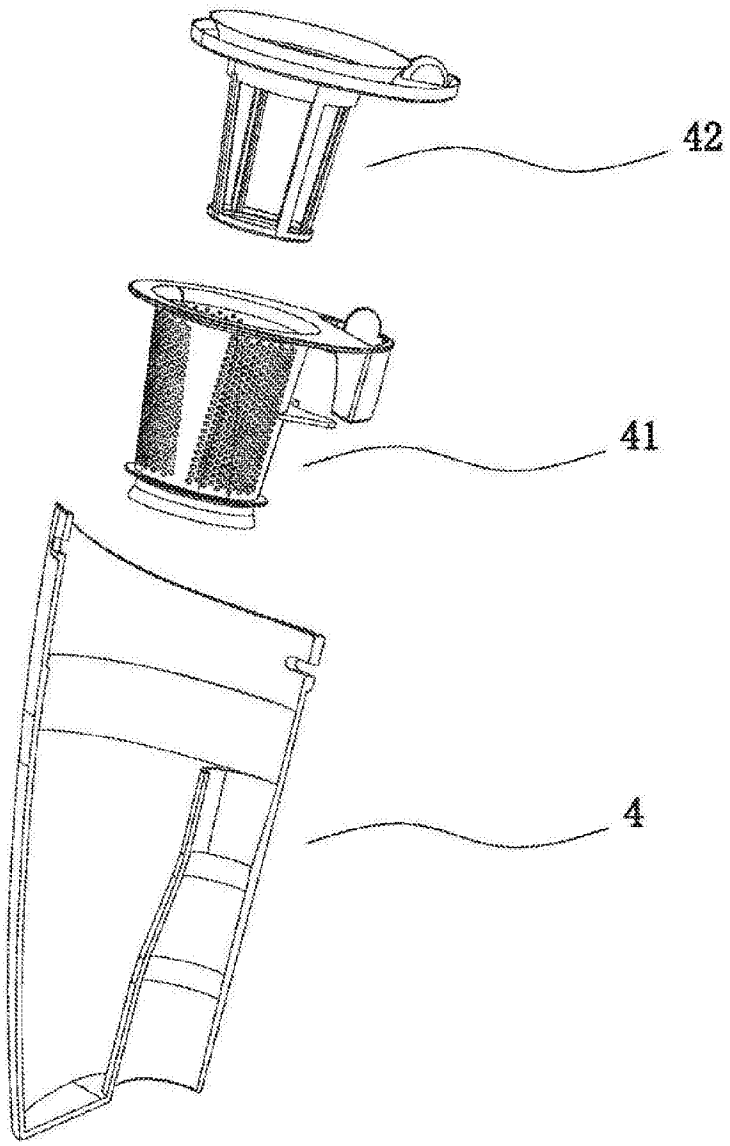


图4

SharkNinja Ex. 1002
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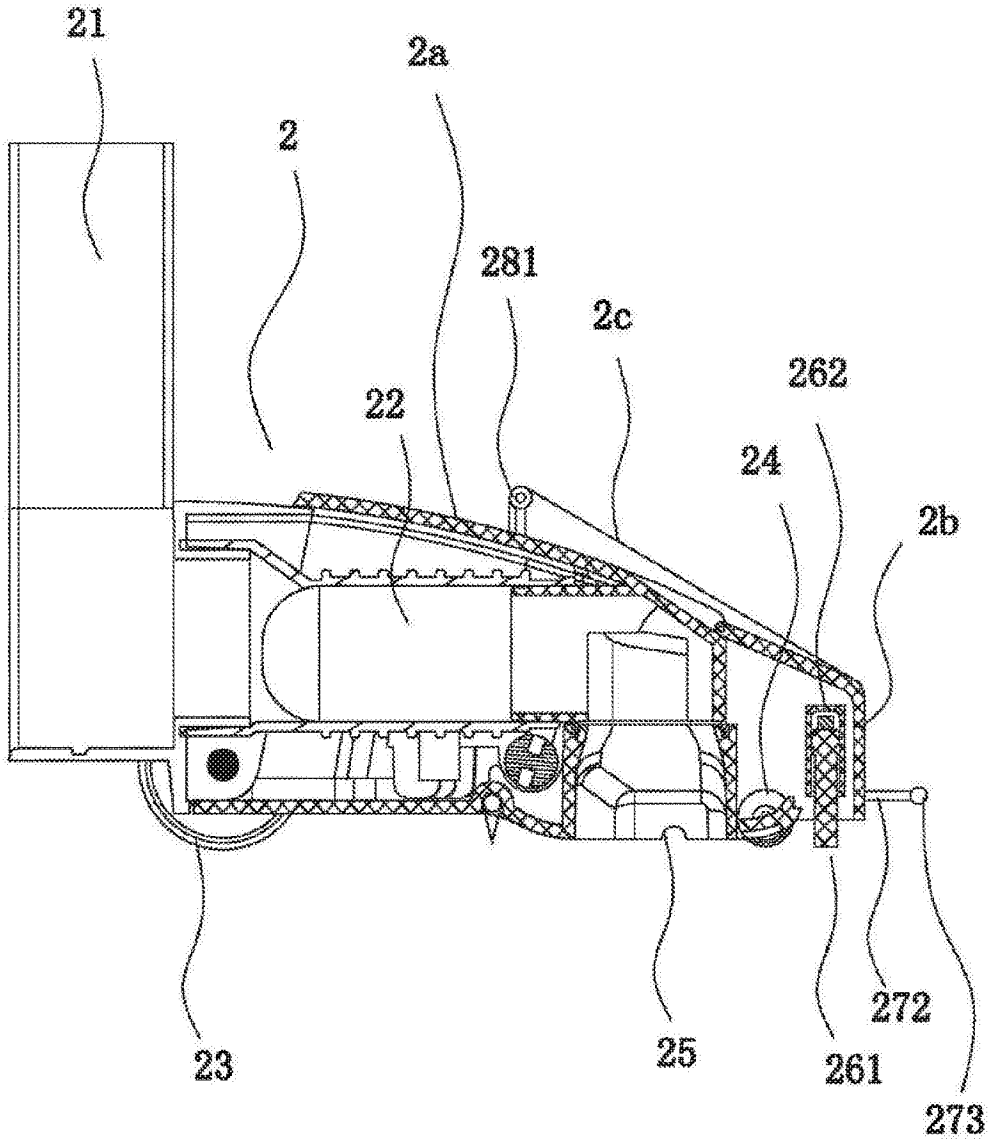


图5

SharkNinja Ex. 1002
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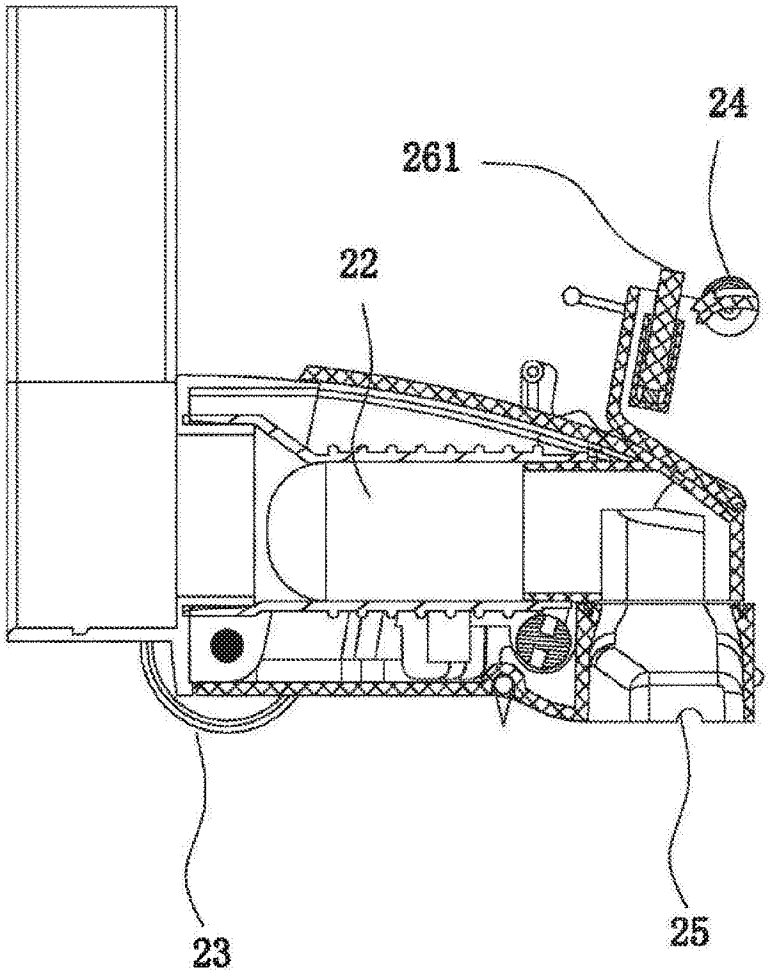


图6

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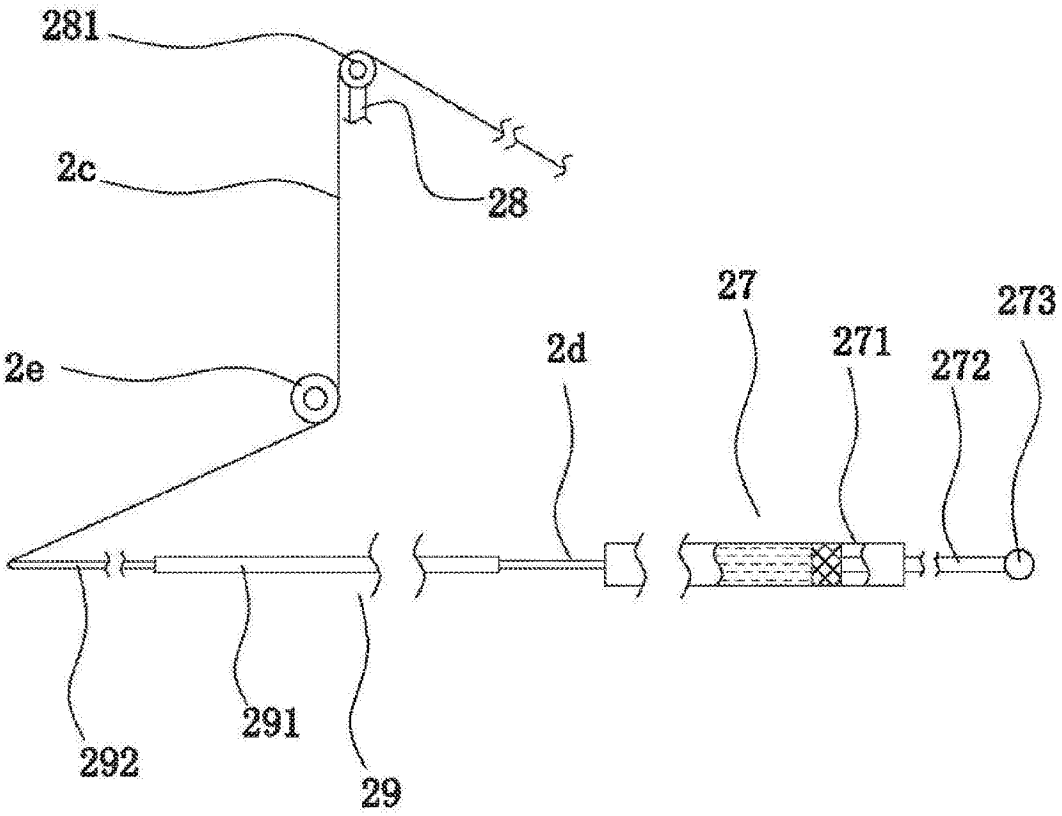


图7

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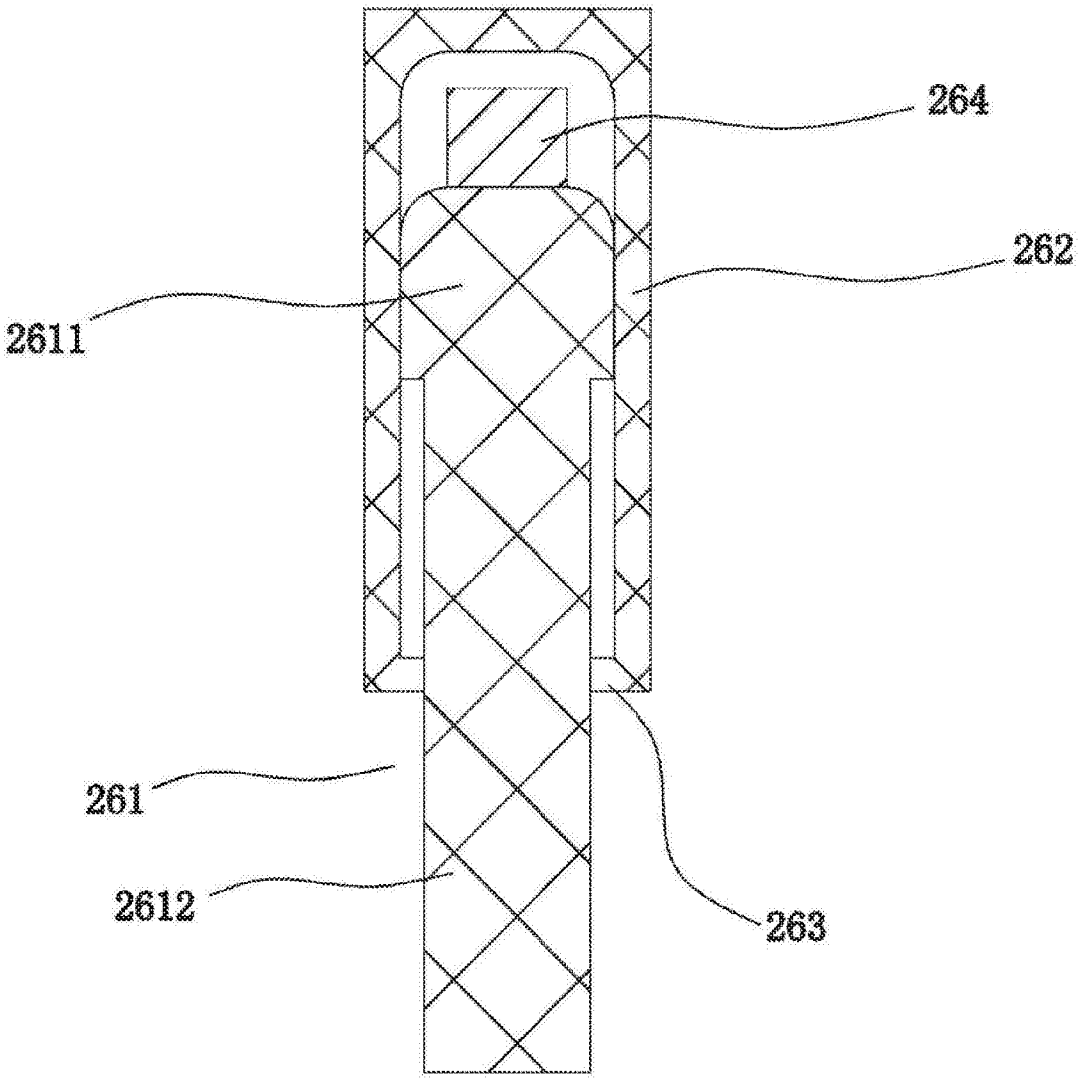


图8

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Agent.	SELIM INTELLECTUAL PROPERTY LAW FIRM
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Applicant	SAMSUNG ELECTRONICS CO., LTD.

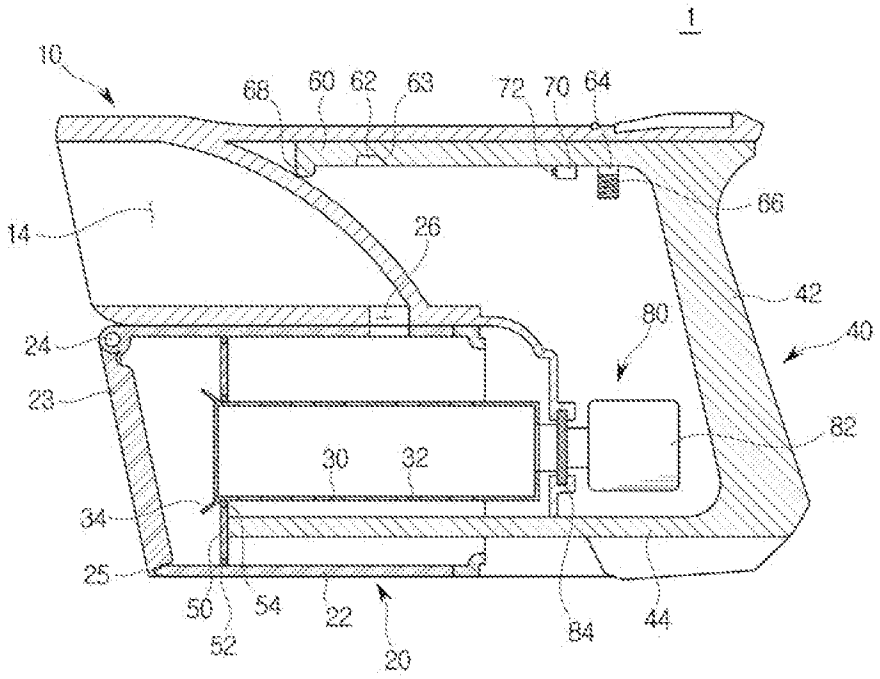
Title of Invention

Cleaner.

Abstract

The invention relates to the cleaner comprising the handle and compressing plate. The cleaner includes the mobile unit including the main body, the power unit, which supplies the drive power it is installed at the main body the dust collection unit which it takes away it separates dust from the air inhaled to the main body, and the compressing plate arranged inside the dust collection unit, and the guide portion which is installed in order to contact the power unit. The handle and compressing plate are integrated ; and it is simple and the compression of dust is possible with the efficient structure.

대표도면(Representative drawing)



Scope of Claims

Claim 1:

The cleaner including the mobile unit :

contacting with the compressing plate arranged inside the dust collection unit :

dust collection unit which separates dust from the air inhaled to the power unit :

main body installed in the main body :

main body and which takes away and includes the guide portion which is installed in order to contact with the power unit.

Claim 1:

The cleaner including the mobile unit :

contacting with the compressing plate arranged inside the dust collection unit :

dust collection unit which separates dust from the air inhaled to the power unit :

main body installed in the main body :

main body and which takes away and includes the guide portion which is installed in order to contact with the power unit.

Claim 2:

The cleaner of claim 1, wherein

mobile unit comprises the handle which is installed in the main body in order to be movabl e.

Claim 2:

The cleaner of claim 1, wherein

mobile unit comprises the handle which is installed in the main body in order to be movabl e.

Claim 3:

As for claim 2, the cleaner in which the compressing plate and guide portion move accordi ng to the movement of

handle.

Claim 3:

As for claim 2, the cleaner in which the compressing plate and guide portion move accordi ng to the movement of

handle.

Claim 4:

As for claim 2, the cleaner in which

handle, and the compressing plate and guide portion are integrally formed.

Claim 4:

As for claim 2, the cleaner in which

handle, and the compressing plate and guide portion are integrally formed.

Claim 5:

As for claim 1, the cleaner which comprises the dustbin wherein

dust collection unit stores dust that is separated from the cyclone which divides dust from the inhaled air.

Claim 5:

As for claim 1, the cleaner which comprises the dustbin wherein

dust collection unit stores dust that is separated from the cyclone which divides dust from the inhaled air.

Claim 6:

As for claim 5, the cleaner in which it compresses the dust received within

dustbin ; and the compressing plate is installed within the dustbin in order to be movable.

Claim 6:

As for claim 5, the cleaner in which it compresses the dust received within

dustbin ; and the compressing plate is installed within the dustbin in order to be movable.

Claim 7:

As for claim 5, the cleaner in which

compressing plate is installed according to the cyclone in order to be movable.

Claim 7:

As for claim 5, the cleaner in which

compressing plate is installed according to the cyclone in order to be movable.

Claim 8:

As for claim 1, the cleaner in which

mobile unit is installed at the main body in order to be movable.

Claim 8:

As for claim 1, the cleaner in which

mobile unit is installed at the main body in order to be movable.

Claim 9:

As for claim 1, the cleaner which turns on and off the power unit while contacting with

guide portion silver power unit.

Claim 9:

As for claim 1, the cleaner which turns on and off the power unit while contacting with

guide portion silver power unit.

Claim 10:

The cleaner which compresses the dust received within the handle :

dustbin which is installed at the dustbin :

main body arranged in the main body :

main body in order to be movable ; and it is connected to the handle and includes the com pressing plate :

which is installed in order to be movable.

Claim 10:

The cleaner which compresses the dust received within the handle :

dustbin which is installed at the dustbin :

main body arranged in the main body :

main body in order to be movable ; and it is connected to the handle and includes the com pressing plate :

which is installed in order to be movable.

Claim 11:

As for claim 10, the cleaner in which

handle and compressing plate are integrally formed.

Claim 11:

As for claim 10, the cleaner in which

handle and compressing plate are integrally formed.

Claim 12:

As for claim 10, the cleaner in which

compressing plate is movably arranged inside the dustbin.

Claim 12:

As for claim 10, the cleaner in which

compressing plate is movably arranged inside the dustbin.

Claim 13:

As for claim 10, the cleaner in which the power source of the main body is turned on/off ac cording to the movement of

handle.

Claim 13:

As for claim 10, the cleaner in which the power source of the main body is turned on/off ac cording to the movement of

handle.

Technical Field

The invention relates to the cleaner, and more specifically, to the cleaner including the han dle and compressing plate.

Background Art

Generally, dust is inhaled with the attracting force in which the cleaner is generated in the fan rotating with the motor with air and it is the instrument in which it collects after it sepa rates the inhaled dust included in the air from air and cleaning is performed.

The main body, including the fan motor in which such cleaner generates the suction force and the inlet port department which is arranged in the front side of the main body and inh ales dust from the bottom surface with air, and the user may include the configuration incl uding the handle etc. moves the sieve caught.

The cleaner can separate the air inhaled using the centrifugal force through the inlet port b etween dust. It says to be this the cyclone cleaner. While air rotates through the cyclone p repared inside the dustbin air can be separated from dust. Separated dusts remain in the dustbin and the user separates this and the user can remove.

At this time, in order that dusts received inside the dustbin are compressed and the dust o f many amounts is accommodated the cleaner may include the separate compressor appar atus. There is a problem that the cleaner including such separate compressor apparatus re quires the individual case power of the compressor apparatus and the part has many and t he size of the cleaner itself is enlarged.

Moreover, there is a problem that the volume of the main body is fostered and the mounte d handle of the main body gives the difficulty to the receipt.

Summary of Invention

Problem to be solved

In accordance with one aspect of the present invention, the cleaner which is connected to the compressing plate and includes the handle which is installed in order to be movable are provided.

Moreover, according to the movement of the handle, the cleaner in which the power source is turned on/off is provided.

Means to solve the problem

The cleaner according to thought of the present invention comprises the main body, the power unit it is installed at the main body and the mobile unit including the guide portion which is installed in order to contact.

The handle in which the mobile unit is installed in the main body in order to be movable is include might.

According to the movement of the handle, the compressing plate and guide portion can move.

The handle, and the compressing plate and guide portion can be integrally formed.

The dustbin storing the dust separated from the cyclone separating dust from the air in which the dust collection unit is inhaled is include might.

In order that the dust received within the dustbin is compressed the compressing plate can be installed within the dustbin in order to be movable.

The compressing plate can be installed according to the cyclone in order to be movable.

The mobile unit can be installed at the main body in order to be movable.

The power unit can be on and off turned while contacting with the guide portion silver power unit.

Moreover, the cleaner according to thought of the present invention comprises the main body, the handle the dustbin, arranged in the main body the handle which is movable, and the dust received within the dustbin are compressed and the compressing plate which connected is installed in order to be movable.

The handle and compressing plate can be integrally formed.

The movably the compressing plate can be the dustbin inside arranged.

According to the movement of the handle, the power source of the main body can be turned on/off.

Effects of the Invention

The handle and compressing plate are integrated and it is simple and the compression of dust is possible with the efficient structure.

Moreover, according to the movement of the handle, the compressing plate compresses dust and the power source is turned on/off and it can use.

Description of Embodiments

Hereinafter, the embodiment according to the present invention is illustrated by referring t o attached drawing.

Figure 1 is a drawing showing the cleaner (1) according to a preferred embodiment of the present invention. Figure 2 is a drawing showing the side cross section of the cleaner (1) a ccording to a preferred embodiment of the present invention.

The cleaner (1) may include the inlet port (12) prepared in one side of the main body (1 0), and main body (10). Moreover, the main body (10) may include the dust collection unit (20), and the mobile unit (40) which is installed at the main body (10) in order to be mova ble.

It can be prepared so that the main body (10) forms the outer tube of the cleaner (1). It c an be arranged so that the inlet port (12) inhales air to the main body (10) inside. In the u ser is the direct bottom surface through the inlet port (12), air is inhaled or all kinds of the extension spray lances (not illustrated) is set up in the inlet port (12) and air can be inhale

d. The air entering through the inlet port (12) can move to the dust collection unit (20) ac cording to the inducing path (14).

It can be installed in order to separate dust from the air in which the dust collection unit (2 0) is inhaled to the main body (10) and take away. The dustbin (22) storing the dust separ ated from the cyclone (30) separating dust from the air in which the dust collection unit (2 0) is inhaled is include might. Moreover, the dust collection unit (20) comprises the inducin g path (14) and the connector (26) in which connected air is flowed in.

The dustbin (22) comprises the cyclone (30) in the inside the outer tube of the dust collect ion unit (20) is formed and the space in which dust can be adopted. As shown in FIG. 1, th e dustbin (22) can be prepared with ***. It can be prepared with the transparent material so that the dustbin (22) grasps amount of the dust in which the user is accommodated.

In one side of the dustbin (22), the cover (23) opening and can close the dustbin (22) can be prepared. The turning member (24) is include might so that the cover (23) is rotatably fixed to one side of the dustbin (22). Moreover, the fixing member (25) which is prepared so that the cover (23) is fixed to the dustbin (22) is include might. The fixing member (25) can be prepared with the dustbin (22) and corresponding various types including the hook etc.

The cyclone (30) is arranged inside the dustbin (22) and it can be installed at regular inter vals the inner wall and predetermined of the dustbin (22). It can be prepared with *** in which the cyclone (30) includes multiple connecting holes (32). One side of the cyclone (3 0) is opened and it can be prepared so that the other one side is closed.

In closed one side of the cyclone (30), the fire-wall (34) extended to the diametric directio n can be prepared. It can be extended so that the fire-wall (34) does not contact the inner wall of the dustbin (22). It is extended to the oblique direction as shown in 2 and the fire-wall (34) can be installed.

The drive unit (80) providing the driving force inhaling air to the main body (10) inside ma y be installed in opened one side of the cyclone (30). The filter (84) filtering the minute for eign substance of air can be prepared between the cyclone (30) and drive unit (80). The fil ter (84) can be prepared with the various types having the mesh of the plurality including sponge, the mesh net etc. The drive unit (80) may include the motor (82) and it can be co nnected to the battery (the not illustrated) or the external power source (the not illustrate d) in which the motor (82) provides the power.

If fig. 2 is referred to and it illustrates for the operation of the cleaner (1) , air is inhaled a ccording to the operation of the motor (80) to the inlet port (12). The air flowing according to the inducing path (14) is flowed in into the dustbin (22) inside according to the connect or (26) and the air rotates around the cyclone (30). Air enters the inside of the cyclone (3 0) through multiple connecting holes (32) and dust falls down outside the cyclone (30). Th at is, dust can be piled up inside the dustbin (22). Then, air any more can not go ahead wi th the fire-wall (34) and air enter the cyclone (30) inside. The air entering the cyclone (3 0) inside is gone to the drive unit (80) and the air can be ejected to outlet (16, and fig. 3) prepared in one side of the main body (10) to the outside.

The power unit (70) which is installed at the main body (10) and in which the cleaner (1) s upplies the drive power to the drive unit (80) is include might. The switch (72) in which th e power unit (70) comes the drive unit (80) with the pressurization (on) made with the off (off) is include might. That is, the power unit (70) can turn on and off the power source of the main body (10) with the pressurization.

The mobile unit (40) comprises the power unit (70) it contacts with the compressing plate (50) arranged inside the dust collection unit (20) and the guide portion (60) which is instal led in order to contact. Moreover, the handle (42) in which the mobile unit (40) is installed at the main body (10) in order to be movable is include might.

According to the movement of the handle (42), the compressing plate (50) and guide porti on (60) can move. That is, in order to the handle (42), the compressing plate (50) and gui de portion (60) operate with and it is movable it can be installed. Moreover, the handle (4 2), and the compressing plate (50) and guide portion (60) can be integrally formed.

The handle (42) can form the outer tube so that the user grips. The handle (42) one side i s connected to the guide portion (60) and the connection part (44) in which the other one side is connected to the compressing plate (50) can be prepared. In order to be located in (10) in which the user grips the handle (42) it can move.

The compressing plate (50) can be installed within the dustbin (22) in order to be movabl e. The dust which is received within the dustbin (22) while the compressing plate (50) mo ves the dustbin (22) inside can be compressed. The compressing plate (50) can reciprocat e the dustbin (22) inside with the handle (42) to the one-way direction.

The compressing plate (50) can be prepared with the same form as the cross section of th e dustbin (22). The opening (not illustrated) is include might in order to be movable while the compressing plate (50) passes the cyclone (30). The compressing plate (50) comprises the inner wall of the dustbin (22) and the second packing member (54) contacting with th e first packing member (52) contacting and contacts with the cyclone (30). The first packi ng member (52) and the second packing member (54) can be prepared for by the external force with the modifiable elastomer.

According to the movement of the handle (42), the compressing plate (50) can move acco rding to the cyclone (30). The fire-wall (34) can prevent the compressing plate (50) from c oming off from the cyclone (30). Therefore, it can reciprocate to the state where the comp ressing plate (50) is inserted in the cyclone (30) within the dustbin (22).

Moreover, according to the movement of the handle (42), it can become the power source of the main body (10) with the on/off lice. That is, according to the movement of the handl e (42), the guide portion (60) moves and the power unit (70) can be on and off turned whi le the guide portion (60) contacts with the power unit (70). The guide portion (60) include s the protrusion part (68) in one end and one end can be arranged so that the protrusion part (68) pressurizes the switch (72).

Moreover, the Five Blessings part (62) is include might so that the guide portion (60) fixes the mobile unit (40) on the predetermined position. In the main body (10), the recess (6 2) and corresponding stopper (64) are provided. The stopper (64) is prepared with the ela stic member (66) and the stopper (64) can contact the guide portion (60) to the state whe re the elastic member (66) is compacted.

According to move the mobile unit (40) to the outside while the case where the recess (6 2) and stopper (64) contact, and the elastic member (66) expand the stopper (64) can be inserted into the recess (62). Accordingly, the mobile unit (40) any more can not move to the outside and it can stop. The stopper (64) the elastic member (66) is again the mobile unit (40) compacted to the main body (10) inside in case the insertion in the recess (62) while being gone. At this time, the inclined surface (63) is prepared for in one side of the r ecess (62) and it helps so that the stopper (64) is gone.

In the main body (10) the guide portion (60) moves to the predetermined direction, the ra il (not illustrated) is provided. It can be prepared with the various types in which the rail (t he not illustrated) can fix the moving direction of the guide portion (60).

The figures 3 through 6 show the side of the cleaner (1). And the process of separating du st from air and processing was shown.

Figure 3 is a drawing showing the first state of the cleaner (1) according to a preferred em bodiment of the present invention. The situation in which the first state the cleaner (1) do es not operate is meant. The mobile unit (40) is inserted to the main body (10) inside and it can be positioned so that the compressing plate (50) be adjacent to the fire-wall (34). It can be prepared so that the part of the handle (42) exposes to the outside and the user gr ips.

Figure 4 is a drawing showing the second state of the cleaner (1) according to a preferred embodiment of the present invention. The situation that draws in air while the cleaner (1) the second state operates is meant. The mobile unit (40) can move if the external force is added through the outside direction of (10) in which the user grips the handle (42). As the stopper (64) is inserted into the recess (62) the mobile unit (40) can move to the predeter mined position.

The protrusion part (68) pressurizes the switch (72) while the guide portion (60) moves an d the power unit (70) operates the drive unit (80). Air can be flowed in with the drive unit (80) through the inlet port (12) into the inside of the main body (10). Then, the compressi ng plate (50) can move with the handle (42) so that air is flowed in through the connector (26) into the dust collection unit (20) inside. The air flowed in into the dust collection unit (20) is separated from dust by the cyclone (30) and the main body (10) can be come off t hrough the outlet (16). The dust separated from air is received inside the dustbin (22).

Figure 5 is a drawing showing the third state of the cleaner (1) according to the other emb odiment of the invention. The third state means the situation where the compressing plate (50) compresses dust while the cleaner (1) stops the operation. The case , and the user to finish the cleaning of the side to be cleaned give the external force and the handle (42) is i nserted on the main body (10). At this time, while the pressure applied to the switch (72) i s removed the power unit (70) stops the operation of the drive unit (80).

At the same time with that, dust is compressed while the compressing plate (50) moves th e dustbin (22) inside according to the cyclone (30). The dust adopted to the dustbin (22) whole can be compacted by the compressing plate (50) in one side of the dustbin (22).

Figure 6 is a drawing showing the fourth state of the cleaner (1) according to the dissimila r embodiment of the invention. The fourth state means the situation where the user remov es the dust of the cleaner (1) inside. It can be positioned so that dusts compacted by the c ompressing plate (50) be adjacent to the cover (23). The user circulates the cover (23) an d dusts received inside the dustbin (22) can be removed.

It illustrated around the specific geometry in illustrating. But it has to be possible with defo rmation and the change and various with it is included in deformation and such change silv er scope of protection of the present invention this has to be interpreted by the person skil led in the art.

Brief explanation of the drawing

Figure 1 is a drawing showing the cleaner according to a preferred embodiment of the pres ent invention.

Figure 2 is a drawing showing the side cross section of the cleaner according to a preferred embodiment of the present invention.

Figure 3 is a drawing showing the first state of the cleaner according to a preferred embodi ment of the present invention.

Figure 4 is a drawing showing the second state of the cleaner according to a preferred em bodiment of the present invention.

Figure 5 is a drawing showing the third state of the cleaner according to the dissimilar emb odiment of the invention.

Figure 6 is a drawing showing the fourth state of the cleaner according to the dissimilar e mbodiment of the invention.

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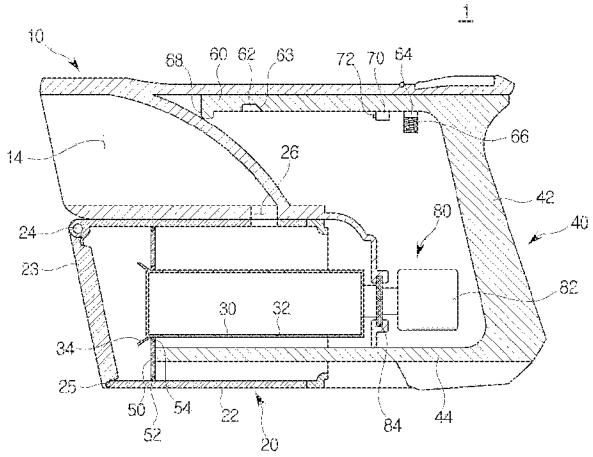
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(54) 발명의 명칭 **청소기**

(57) 요 약

본 발명은 손잡이와 압축판을 포함하는 청소기에 관한 것이다. 청소기는 본체, 본체에 설치되고 구동 전원을 공급하는 전원유닛, 본체로 흡입된 공기로부터 먼지를 분리하여 수거하는 집진유닛, 집진유닛 내부에 배치되는 압축판과 전원유닛과 접촉하도록 설치되는 가이드부를 포함하는 이동유닛을 포함한다. 손잡이와 압축판을 일체화하여, 단순하고 효율적인 구조로 먼지의 압축이 가능하다.

대 표 도 - 도2



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명 세 서

청구범위

청구항 1

본체;

상기 본체에 설치되는 전원유닛;

상기 본체로 흡입된 공기로부터 먼지를 분리하여 수거하는 집진유닛;

상기 집진유닛 내부에 배치되는 압축판과, 상기 전원유닛과 접촉하도록 설치되는 가이드부를 포함하는 이동유닛;

을 포함하는 청소기.

청구항 2

제 1항에 있어서,

상기 이동유닛은 상기 본체에 이동가능하도록 설치된 손잡이를 포함하는 것을 특징으로 하는 청소기.

청구항 3

제 2항에 있어서,

상기 손잡이의 이동에 따라 상기 압축판 및 상기 가이드부가 이동하는 것을 특징으로 하는 청소기.

청구항 4

제 2항에 있어서,

상기 손잡이, 상기 압축판 및 상기 가이드부는 일체로 형성되는 것을 특징으로 하는 청소기.

청구항 5

제 1항에 있어서,

상기 집진유닛은 흡입된 공기로부터 먼지를 분리하는 사이클론과, 분리된 먼지를 저장하는 먼지통을 포함하는 것을 특징으로 하는 청소기.

청구항 6

제 5항에 있어서,

상기 먼지통 내에 수용된 먼지를 압축하기 위해, 상기 압축판은 상기 먼지통 내에 이동가능하도록 설치되는 것을 특징으로 하는 청소기.

청구항 7

제 5항에 있어서,

상기 압축판은 상기 사이클론을 따라 이동가능하도록 설치되는 것을 특징으로 하는 청소기.

청구항 8

제 1항에 있어서,

상기 이동유닛은 상기 본체에 이동가능하도록 설치되는 것을 특징으로 하는 청소기.

청구항 9

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제 1항에 있어서,

상기 가이드부은 상기 전원유닛과 접촉하며 상기 전원유닛을 온/오프시키는 것을 특징으로 하는 청소기.

청구항 10

본체;

상기 본체에 배치되는 먼지통;

상기 본체에 이동가능하도록 설치되는 손잡이;

상기 먼지통 내에 수용된 먼지를 압축하고, 상기 손잡이와 연동되어 이동가능하도록 설치되는 압축판;

을 포함하는 청소기.

청구항 11

제 10항에 있어서,

상기 손잡이와 상기 압축판은 일체로 형성되는 것을 특징으로 하는 청소기.

청구항 12

제 10항에 있어서,

상기 압축판은 상기 먼지통 내부에 이동가능하게 배치되는 것을 특징으로 하는 청소기.

청구항 13

제 10항에 있어서,

상기 손잡이의 이동에 따라 상기 본체의 전원이 온/오프되는 것을 특징으로 하는 청소기.

발명의 설명

기 술 분 야

[0001] 본 발명은 청소기에 관한 것으로서, 보다 상세하게는 손잡이와 압축판을 포함하는 청소기에 관한 것이다.

배 경 기 술

[0002] 일반적으로 청소기는 모터에 의해 회전하는 팬에서 발생하는 흡인력에 의해 공기와 함께 먼지를 흡입하고, 흡입된 공기 중에 포함된 먼지를 공기로부터 분리한 후 집진하여 청소가 수행되도록 하는 기기이다.

[0003] 이러한 청소기는 흡입력을 발생시키는 팬모터를 포함한 본체와, 본체의 전방측에 배치되어 바닥면으로부터 공기와 함께 먼지를 흡입하는 유입구과, 사용자가 잡아 본체를 이동시킬 수 있도록 하는 손잡이 등의 구성을 포함할 수 있다.

[0004] 청소기는 원심력을 사용하여 유입구를 통해 흡입된 공기를 먼지와 분리시킬 수 있다. 이를 사이클론 청소기라 하는데, 먼지통 내부에 마련된 사이클론을 통해 공기가 회전하며 먼지와 분리될 수 있다. 분리된 먼지들은 먼지통에 남고, 사용자는 이를 분리하여 제거할 수 있다.

[0005] 이때, 먼지통 내부에 수용된 먼지들을 압축시켜 많은 양의 먼지를 수용할 수 있도록, 청소기는 별도의 압축장치를 포함할 수 있다. 이러한 별도의 압축장치를 포함하는 청소기는 압축장치의 개별 동력을 필요로 하고, 부품이 많아지고 청소기 자체의 크기가 커지는 문제점이 있다.

[0006] 또한, 본체의 장착되는 손잡이는 본체의 부피를 키우고 수납에 어려움을 주는 문제점이 있다.

발명의 내용

해결하려는 과제

[0007] 본 발명의 일 측면은 압축판과 연동되어 이동가능하도록 설치된 손잡이를 포함하는 청소기를 제공한다.

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[0008] 또한 손잡이의 이동에 따라 전원이 온/오프되는 청소기를 제공한다.

과제의 해결 수단

[0009] 본 발명의 사상에 따른 청소기는 본체, 상기 본체에 설치되고, 구동 전원을 공급하는 전원유닛, 상기 본체로 흡입된 공기로부터 먼지를 분리하여 수거하는 집진유닛, 상기 집진유닛 내부에 배치되는 압축판과, 상기 전원유닛과 접촉하도록 설치되는 가이드부를 포함하는 이동유닛을 포함한다.

[0010] 상기 이동유닛은 상기 본체에 이동가능하도록 설치된 손잡이를 포함할 수 있다.

[0011] 상기 손잡이의 이동에 따라 상기 압축판 및 상기 가이드부가 이동할 수 있다.

[0012] 상기 손잡이, 상기 압축판 및 상기 가이드부는 일체로 형성될 수 있다.

[0013] 상기 집진유닛은 흡입된 공기로부터 먼지를 분리하는 사이클론과, 분리된 먼지를 저장하는 먼지통을 포함할 수 있다.

[0014] 상기 먼지통 내에 수용된 먼지를 압축하기 위해, 상기 압축판은 상기 먼지통 내에 이동가능하도록 설치될 수 있다.

[0015] 상기 압축판은 상기 사이클론을 따라 이동가능하도록 설치될 수 있다.

[0016] 상기 이동유닛은 상기 본체에 이동가능하도록 설치될 수 있다.

[0017] 상기 가이드부은 상기 전원유닛과 접촉하며 상기 전원유닛을 온/오프시킬 수 있다.

[0018] 또한, 본 발명의 사상에 따른 청소기는 본체, 상기 본체에 배치되는 먼지통, 상기 본체에 이동가능하도록 설치되는 손잡이, 상기 먼지통 내에 수용된 먼지를 압축하고, 상기 손잡이와 연동되어 이동가능하도록 설치되는 압축판을 포함한다.

[0019] 상기 손잡이와 상기 압축판은 일체로 형성될 수 있다.

[0020] 상기 압축판은 상기 먼지통 내부를 이동가능하게 배치될 수 있다.

[0021] 상기 손잡이의 이동에 따라 상기 본체의 전원이 온/오프될 수 있다.

발명의 효과

[0022] 손잡이와 압축판을 일체화하여, 단순하고 효율적인 구조로 먼지의 압축이 가능하다.

[0023] 또한, 손잡이의 이동에 따라 압축판이 먼지를 압축하고, 전원이 온/오프되어 편리하게 사용할 수 있다.

도면의 간단한 설명

[0024] 도 1은 본 발명의 일 실시 예에 따른 청소기를 도시한 도면이다.

도 2는 본 발명의 일 실시 예에 따른 청소기의 측단면을 도시한 도면이다.

도 3은 본 발명의 일 실시 예에 따른 청소기의 제 1상태를 도시한 도면이다.

도 4는 본 발명의 일 실시 예에 따른 청소기의 제 2상태를 도시한 도면이다.

도 5는 본 발명의 다른 일 실시 예에 따른 청소기의 제 3상태를 도시한 도면이다.

도 6은 본 발명의 다른 일 실시 예에 따른 청소기의 제 4상태를 도시한 도면이다.

발명을 실시하기 위한 구체적인 내용

[0025] 이하에서는 본 발명에 따른 실시 예를 첨부된 도면을 참조하여 상세히 설명한다.

[0026] 도 1은 본 발명의 일 실시 예에 따른 청소기(1)를 도시한 도면이고, 도 2는 본 발명의 일 실시 예에 따른 청소기(1)의 측단면을 도시한 도면이다.

[0027] 청소기(1)는 본체(10)와, 본체(10)의 일 측에 마련되는 유입구(12)를 포함할 수 있다. 또한, 본체(10)는 집진유닛(20)과, 본체(10)에 이동가능하도록 설치된 이동유닛(40)을 포함할 수 있다.

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[0028] 본체(10)는 청소기(1)의 외관을 형성하도록 마련될 수 있다. 유입구(12)는 본체(10) 내부로 공기를 흡입할 수 있도록 배치될 수 있다. 사용자는 유입구(12)를 통해 직접 바닥면에서 공기를 흡입하거나, 유입구(12)에 각종 연장관(미도시)을 설치하여 공기를 흡입할 수 있다. 유입구(12)를 통해 들어온 공기는 유입로(14)를 따라 집진유닛(20)으로 이동할 수 있다.

[0029] 집진유닛(20)은 본체(10)로 흡입된 공기로부터 먼지를 분리하여 수거할 수 있도록 설치될 수 있다. 집진유닛(20)은 흡입된 공기로부터 먼지를 분리하는 사이클론(30)과, 분리된 먼지를 저장하는 먼지통(22)을 포함할 수 있다. 또한, 집진유닛(20)은 유입로(14)와 연결되어 공기가 유입되는 연결구(26)를 포함할 수 있다.

[0030] 먼지통(22)은 집진유닛(20)의 외관을 형성하고, 내부에 사이클론(30)과 먼지가 수용될 수 있는 공간을 포함할 수 있다. 도 1에 도시된 바와 같이, 먼지통(22)은 원통형으로 마련될 수 있다. 먼지통(22)은 사용자가 수용된 먼지의 양을 파악할 수 있도록 투명한 재질로 마련될 수 있다.

[0031] 먼지통(22)의 일 측에는 먼지통(22)을 개폐할 수 있는 덮개(23)가 마련될 수 있다. 덮개(23)는 먼지통(22)의 일 측에 회동가능하게 고정될 수 있도록 회동부재(24)를 포함할 수 있다. 또한, 덮개(23)는 먼지통(22)에 고정될 수 있도록 마련된 고정부재(25)를 포함할 수 있다. 고정부재(25)는 먼지통(22)과 대응하는 후크 등 다양한 형태로 마련될 수 있다.

[0032] 사이클론(30)은 먼지통(22)의 내부에 배치되고, 먼지통(22)의 내벽과 소정의 간격으로 이격되어 설치될 수 있다. 사이클론(30)은 복수의 연통공(32)을 포함하는 원통형으로 마련될 수 있다. 사이클론(30)의 일 측은 개방되고, 다른 일 측은 폐쇄되도록 마련될 수 있다.

[0033] 사이클론(30)의 폐쇄된 일 측에는 직경방향으로 연장된 차단벽(34)이 마련될 수 있다. 차단벽(34)은 먼지통(22)의 내벽과 접촉하지 않도록 연장될 수 있다. 차단벽(34)은 도 2에 도시된 바와 같이 사선방향으로 연장되어 설치될 수 있다.

[0034] 사이클론(30)의 개방된 일 측에는 본체(10) 내부로 공기를 흡입하는 구동력을 제공하는 구동유닛(80)이 설치될 수 있다. 사이클론(30)과 구동유닛(80) 사이에는 공기의 미세한 이물질을 거르는 필터(84)가 마련될 수 있다. 필터(84)는 스펀지, 매시망 등 복수의 매서를 갖는 다양한 형태로 마련될 수 있다. 구동유닛(80)은 모터(82)를 포함할 수 있고, 모터(82)는 동력을 제공하는 베터리(미도시)나 외부 동력원(미도시)과 연결될 수 있다.

[0035] 도 2를 참고하여 청소기(1)의 작동에 대해 설명하면, 모터(80)의 작동에 따라 유입구(12)로 공기가 흡입된다. 유입로(14)를 따라 흐르는 공기는 연결구(26)를 따라 먼지통(22) 내부로 유입되고, 사이클론(30)을 중심으로 회전한다. 복수의 연통공(32)을 통해 공기는 사이클론(30)의 내부로 들어가고, 먼지는 사이클론(30) 외부에 떨어지게 된다. 즉, 먼지는 먼지통(22)의 내부에 쌓일 수 있다. 이때, 차단벽(34)에 의해 공기는 더이상 전진하지 않고 사이클론(30) 내부로 들어갈 수 있다. 사이클론(30) 내부로 들어간 공기는 구동유닛(80)을 향해 빠져나가고, 본체(10)의 일 측에 마련된 토출구(16, 도3)로 외부로 배출될 수 있다.

[0036] 청소기(1)는 본체(10)에 설치되고 구동유닛(80)에 구동 전원을 공급하는 전원유닛(70)을 포함할 수 있다. 전원유닛(70)은 가압에 의해 구동유닛(80)을 온(on)/오프(off)시키는 스위치(72)를 포함할 수 있다. 즉, 전원유닛(70)은 가압에 의해 본체(10)의 전원을 온/오프시킬 수 있다.

[0037] 이동유닛(40)은 집진유닛(20) 내부에 배치되는 압축판(50)과, 전원유닛(70)과 접촉하도록 설치되는 가이드부(60)를 포함할 수 있다. 또한, 이동유닛(40)은 본체(10)에 이동가능하도록 설치된 손잡이(42)를 포함할 수 있다.

[0038] 손잡이(42)의 이동에 따라 압축판(50) 및 가이드부(60)가 이동할 수 있다. 즉, 손잡이(42)와 압축판(50) 및 가이드부(60)는 서로 연동하여 이동가능하도록 설치될 수 있다. 또한, 손잡이(42), 압축판(50) 및 가이드부(60)는 일체로 형성될 수 있다.

[0039] 손잡이(42)는 사용자가 파지할 수 있도록 외관을 형성할 수 있다. 손잡이(42) 일 측은 가이드부(60)와 연결되고, 다른 일 측은 압축판(50)과 연결되는 연결부(44)가 마련될 수 있다. 사용자는 손잡이(42)를 파지하여 본체(10)에서 이격되도록 이동시킬 수 있다.

[0040] 압축판(50)은 먼지통(22) 내에 이동가능하도록 설치될 수 있다. 압축판(50)은 먼지통(22) 내부를 이동하며 먼지통(22) 내에 수용된 먼지를 압축할 수 있다. 압축판(50)은 손잡이(42)에 의해 먼지통(22) 내부를 일 방향으로 왕복운동할 수 있다.

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[0041] 압축판(50)은 먼지통(22)의 단면과 동일한 형태로 마련될 수 있다. 압축판(50)은 사이클론(30)을 통과하며 이동 가능하도록 개구(미도시)를 포함할 수 있다. 압축판(50)은 먼지통(22)의 내벽과 접촉하는 제 1패킹부재(52)와, 사이클론(30)과 접촉하는 제 2패킹부재(54)를 포함할 수 있다. 제 1패킹부재(52)와 제 2패킹부재(54)는 외력에 의해 변형가능한 탄성체로 마련될 수 있다.

[0042] 손잡이(42)의 이동에 따라 압축판(50)은 사이클론(30)을 따라 이동할 수 있다. 차단벽(34)은 압축판(50)이 사이클론(30)에서 빠지는 것을 방지할 수 있다. 따라서 압축판(50)은 사이클론(30)에 끼워진 상태로 먼지통(22) 내부에서 왕복운동할 수 있다.

[0043] 또한, 손잡이(42)의 이동에 따라 본체(10)의 전원이 온/오프이 될 수 있다. 즉, 손잡이(42)의 이동에 따라 가이드부(60)가 이동하고, 가이드부(60)가 전원유닛(70)과 접촉하며 전원유닛(70)을 온/오프시킬 수 있다. 가이드부(60)는 일 단에 돌출부(68)를 포함하고, 돌출부(68)는 스위치(72)를 가압할 수 있도록 배치될 수 있다.

[0044] 또한, 가이드부(60)는 이동유닛(40)을 소정의 위치에 고정할 수 있도록 오목부(62)를 포함할 수 있다. 본체(10)의 내부에는 오목부(62)와 대응하는 스토퍼(64)가 마련될 수 있다. 스토퍼(64)는 탄성부재(66)와 함께 마련되고, 탄성부재(66)가 압축된 상태로 스토퍼(64)는 가이드부(60)에 접촉할 수 있다.

[0045] 이동유닛(40)을 외부로 이동시킴에 따라 오목부(62)와 스토퍼(64)가 접하는 경우, 탄성부재(66)가 팽창하며 스토퍼(64)가 오목부(62)에 삽입될 수 있다. 이에 따라 이동유닛(40)이 더 이상 외부로 이동하지 않고 정지할 수 있다. 이동유닛(40)을 다시 본체(10) 내부로 삽입하는 경우, 스토퍼(64)는 오목부(62)에서 빠져나가며 탄성부재(66)는 압축된다. 이때, 오목부(62)의 일 측에 경사면(63)을 마련하여 스토퍼(64)가 빠져나갈 수 있도록 돕는다.

[0046] 가이드부(60)가 소정의 방향으로 이동할 수 있도록, 본체(10)의 내부에는 레일(미도시)이 마련될 수 있다. 레일(미도시)은 가이드부(60)의 이동방향을 고정할 수 있는 다양한 형태로 마련될 수 있다.

[0047] 도 3 내지 도 6은 청소기(1)의 측면을 도시한 것으로, 공기로부터 먼지를 분리하여 처리하는 과정을 각각 도시하였다.

[0048] 도 3은 본 발명의 일 실시 예에 따른 청소기(1)의 제 1상태를 도시한 도면이다. 제 1상태는 청소기(1)가 동작하지 않는 상태를 뜻한다. 이동유닛(40)는 본체(10) 내부로 삽입되어 있고, 압축판(50)은 차단벽(34)과 인접하게 위치할 수 있다. 손잡이(42)의 일부는 외부로 노출되어 사용자가 파지할 수 있도록 마련될 수 있다.

[0049] 도 4는 본 발명의 일 실시 예에 따른 청소기(1)의 제 2상태를 도시한 도면이다. 제 2상태는 청소기(1)가 작동하며 공기를 빨아들이는 상태를 뜻한다. 사용자가 손잡이(42)를 파지하여 본체(10)의 외부방향으로 외력을 가하면 이동유닛(40)이 이동할 수 있다. 스토퍼(64)가 오목부(62)에 삽입됨에 따라, 이동유닛(40)은 소정의 위치까지 이동할 수 있다.

[0050] 가이드부(60)가 이동하며 돌출부(68)가 스위치(72)를 가압하고, 전원유닛(70)이 구동유닛(80)을 작동시킨다. 구동유닛(80)에 의해 공기가 유입구(12)를 통해 본체(10)의 내부로 유입될 수 있다. 이때, 연결구(26)를 통해 공기가 집진유닛(20) 내부로 유입될 수 있도록 압축판(50)은 손잡이(42)와 함께 이동할 수 있다. 집진유닛(20)으로 유입된 공기는 사이클론(30)에 의해 먼지와 분리되어 도출구(16)를 통해 본체(10)를 빠져나갈 수 있다. 공기와 분리된 먼지는 먼지통(22) 내부에 수용된다.

[0051] 도 5는 본 발명의 다른 일 실시 예에 따른 청소기(1)의 제 3상태를 도시한 도면이다. 제 3상태는 청소기(1)가 동작을 멈추며 압축판(50)이 먼지를 압축하는 상태를 뜻한다. 피청소면의 청소를 끝내고자 하는 경우, 사용자는 외력을 가하여 손잡이(42)를 본체(10)에 삽입시킨다. 이때, 스위치(72)에 가해지는 압력이 제거되며 전원유닛(70)이 구동유닛(80)의 작동을 멈춘다.

[0052] 그와 동시에 압축판(50)이 사이클론(30)을 따라 먼지통(22) 내부를 이동하며 먼지를 압축시킨다. 먼지통(22) 전체에 수용된 먼지는 압축판(50)에 의해 먼지통(22)의 일 측에 압축될 수 있다.

[0053] 도 6은 본 발명의 다른 일 실시 예에 따른 청소기(1)의 제 4상태를 도시한 도면이다. 제 4상태는 사용자가 청소기(1) 내부의 먼지를 제거하는 상태를 뜻한다. 압축판(50)에 의해 압축된 먼지들은 덮개(23)와 인접하게 위치할 수 있다. 사용자는 덮개(23)를 회동시켜 먼지통(22) 내부에 수용된 먼지들을 제거할 수 있다.

[0054] 설명함에 있어 특정 형상을 위주로 설명하였으나, 이는 당업자에 의하여 다양한 변형 및 변경이 가능하고 이러한 변형 및 변경은 본 발명의 권리범위에 포함되는 것으로 해석되어야 한다.

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부호의 설명

[0055] 1 : 청소기 10 : 본체

20 : 집진장치 22 : 먼지통

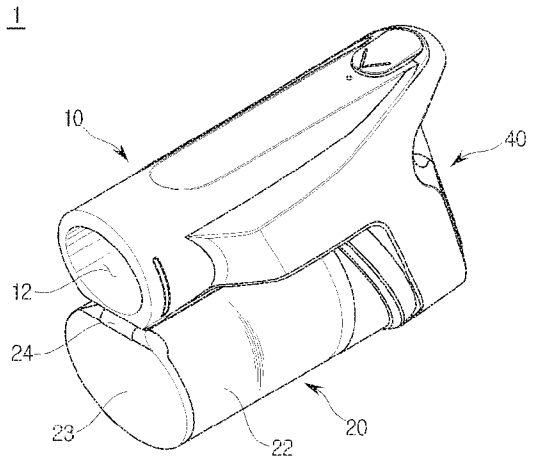
30 : 사이클론 40 : 이동장치

42 : 손잡이 44 : 연결부

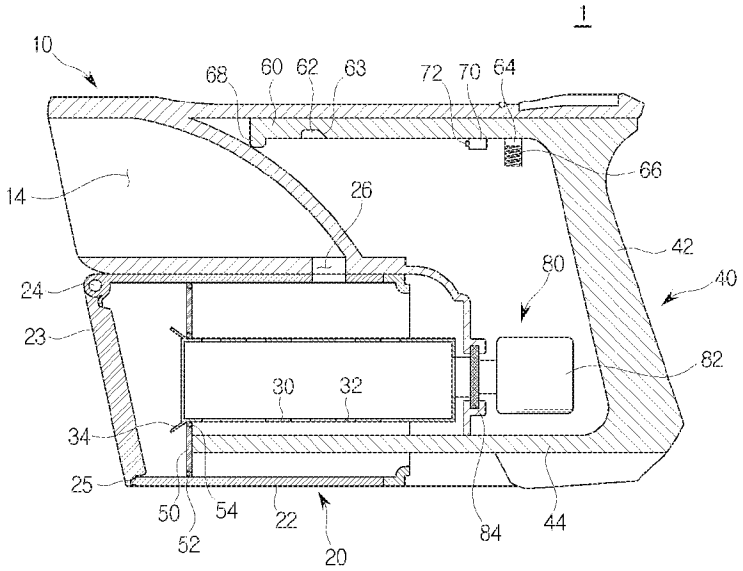
50 : 압축판 60 : 가이드부

도면

도면1

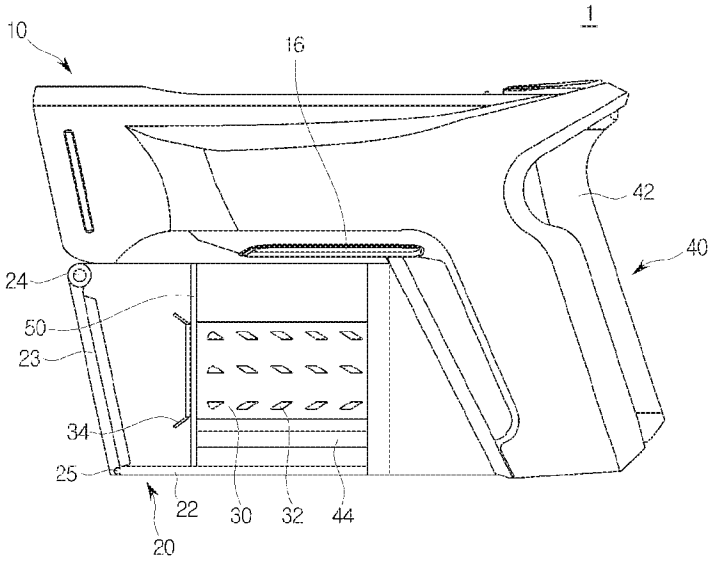


도면2

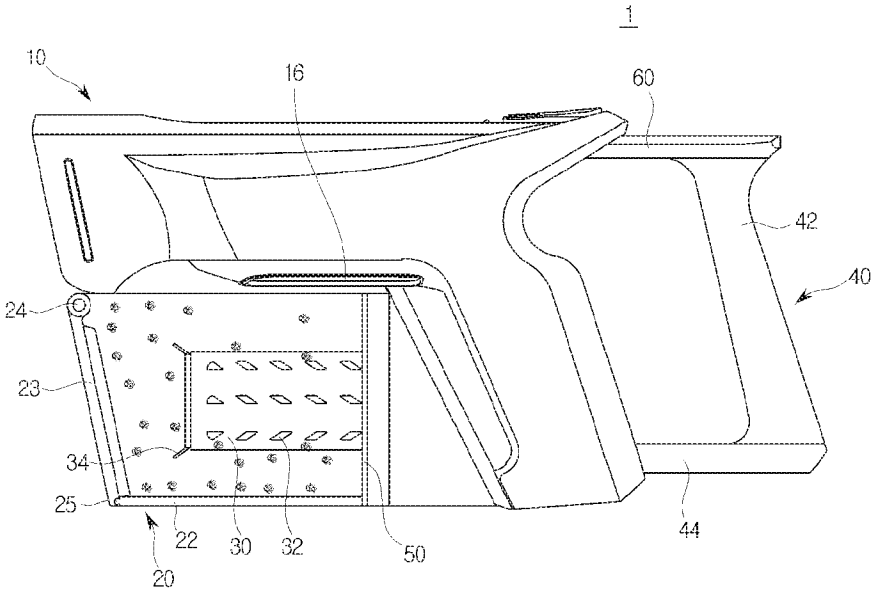


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도면3

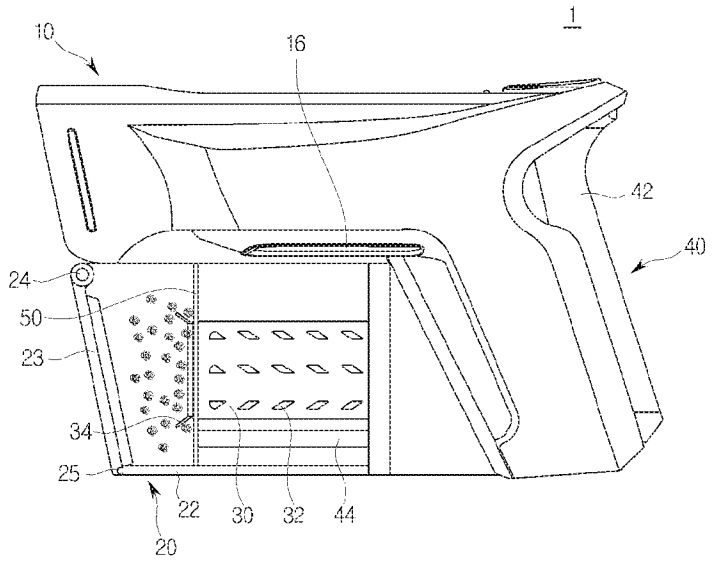


도면4

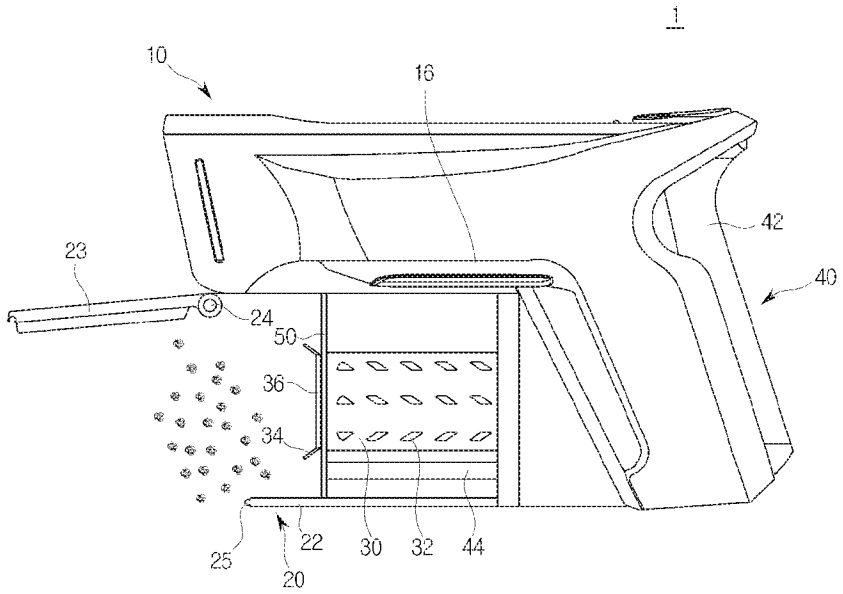


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도면5



도면6



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Filed: September 19, 2016 | Art Unit: 3723

For: VACUUM CLEANER | Examiner: Not Yet Assigned

CLAIM FOR PRIORITY AND SUBMISSION OF DOCUMENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants hereby claim priority under 35 U.S.C. § 119 based on the following prior foreign application filed in the following foreign country on the date indicated:

Country	Application No.	Date
United Kingdom	1516499.9	September 17, 2015

In support of this claim, a certified copy of the said original foreign application is filed herewith.

Dated: January 11, 2017

Respectfully submitted,

By: _____
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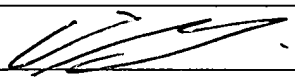
USED IN LIEU OF PTO/SB/21 (07-09)

TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application Number	15/269,430
		Filing Date	September 19, 2016
		First Named Inventor	Stephen Robert DIMBYLOW
		Art Unit	3723
		Examiner Name	Not Yet Assigned
Total Number of Pages in This Submission	2	Attorney Docket Number	424662105900

ENCLOSURES (*Check all that apply*)

☐ Fee Transmittal Form	☐ Drawing(s)	☐ After Allowance Communication to TC
☐ Fee Attached	☐ Licensing-related Papers	☐ Appeal Communication to Board of Appeals and Interferences
☐ Amendment/Reply	☐ Petition	☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
☐ After Final	☐ Petition to Convert to a Provisional Application	☐ Proprietary Information
☐ Affidavits/declaration(s)	☐ Power of Attorney, Revocation Change of Correspondence Address	☐ Status Letter
☐ Extension of Time Request	☐ Terminal Disclaimer	☒ Other Enclosure(s) (please Identify below):
☐ Express Abandonment Request	☐ Request for Refund	Claim for Priority and Submission of Documents Return Receipt Postcard
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☒ Certified Copy of Priority Document(s)	☐ Landscape Table on CD	
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☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	MORRISON & FOERSTER LLP		
Signature			
Printed name	Christopher Gloria		
Date	January 11, 2017	Reg. No.	71,907

Intellectual Property Office

Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

Certified Office Copy

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Dated 25 July 2016

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Intellectual Property Office

Patents Form 1
Patents Act 1977 *(Rule 12)*

Request for grant of a patent

Concept House
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South Wales
NP10 8QQ

Application number GB 1516499.9

1.	Your reference	**SXB_GBP1549A**
2.	Full name, address and postcode of the applicant or of each applicant	**DYSON TECHNOLOGY LIMITED** **Tetbury Hill** **Malmesbury SN16 0RP** **Wiltshire** **United Kingdom**
	Patents ADP number *(if you know it)*	08940744001
3.	Title of the invention	**VACUUM CLEANER**
4.	Name of your agent *(if you have one)*	**BLOOR, Sam**
	"Address for service" to which all correspondence should be sent. This may be in the European Economic area or Channel Islands (see warning note below) *(including the postcode)*	**BLOOR, Sam** **Dyson Technology Limited** **Intellectual Property Department** **Tetbury Hill** **Malmesbury SN16 0RP** **Wiltshire** **United Kingdom**
	Patents ADP number *(if you know it)*	08940744002

5. Priority declaration: Are you claiming priority from one or more earlier-filed patent applications? If so, please give details of the application(s)

Country	Application number	Date of filing	PDAS Access Code

6.	Divisionals etc: Is this application a divisional application, or being made following resolution of an entitlement dispute about an earlier application. If so, please give the application number and filing date of the earlier application	Number of earlier UK application	Date of filing *(day / month / year)*
7.	Inventorship: (Inventors must be individuals not companies) Are all the applicants named above also inventors?	**No**	
8.	Are you paying the application fee with this form?	**Yes**	

Patents Form 1

9. Accompanying documents: please enter the number of pages of each item accompanying this form.

Continuation sheets of this form

Description: **10**

Claim(s): **2**

Abstract: **1**

Drawing(s): **8**

If you are not filing a description, please give details of the previous application you are going to rely upon

Country	Application number	Date of filing	PDAS Access Code

10. If you are also filing any of the following, state how many against each item.

Priority documents: **0**

Statement of inventorship and right to grant of a patent (Patents Form 7): **0**

Request for search (Patents Form 9A): **1**

Request for a substantive examination (Patents Form 10): **1**

Any other documents (please specify):

11. I/We request the grant of a patent on the basis of this application.

Signature: **Subject: Sam Bloor 32558; Issuer: European Patent Office, European Patent Office CA G2**

Date: **17 Sep 2015**

12. Name, e-mail address, telephone, fax and/or mobile number, if any, of a contact point for the applicant

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VACUUM CLEANER

FIELD OF THE INVENTION

This invention relates to a handheld vacuum cleaner comprising a cyclonic separating unit.

BACKGROUND OF THE INVENTION

GB2440111B discloses a handheld vacuum cleaner comprising a main body having a handle and cyclonic separator arranged such that it extends alongside the handle. The cyclonic separator comprises a collector for collecting dirt separated by the cyclonic separator. The collector has a base that is pivotally mounted to an outer wall of the collector and held in a closed position by a catch. Release of the catch allows the base to swing open so that the collector can be emptied.

In order to empty the collector, a user positions the base over a waste bin and then releases the catch. The base swings open and dirt which has been collected falls from the collector into the waste bin. Although the arrangement provides a simple way in which to empty the collector, it is slightly awkward because the user typically has to twist his or her hand to one side or upwardly in order to direct the dirt away from themselves into the waste bin. An improved arrangement is therefore desirable.

SUMMARY OF THE INVENTION

According to the invention there is provided a handheld vacuum cleaner comprising a handle by which the vacuum cleaner is supported during normal use, a cyclonic separating unit having a longitudinal axis and a dirt collector at one end of the cyclonic separating unit, the cyclonic separating unit comprising an end portion having a closed configuration in which dirt is retained within the dirt collector by the end portion and an open configuration for the removal of dirt from the dirt collector, wherein the handle

has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

A handheld vacuum cleaner in accordance with the invention can be emptied by pointing the cyclonic separating unit away from the user and opening the end portion while maintaining a natural grip on the handle. The process of emptying the dirt collector is therefore both ergonomic and intuitive. Furthermore, there is a low risk of the user coming into contact with the dirt as it is emptied because the dirt collector opens away from user.

The handle may be inclined with respect to the cyclonic separating unit to form an angle of not less than 100 degrees and not greater than 125 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

The end portion may comprise an end wall of the cyclonic separating unit. The end portion may be arranged to pivot between the closed configuration and the open configuration.

The cyclonic separating unit may comprise a dirty air inlet through the end portion. The handheld vacuum cleaner may further comprise a connector and a cleaning tool connectable to the connector, wherein the cleaning tool is configured such that when the end portion is in the closed configuration and the cleaning tool is connected to the connector movement of the end portion from the closed configuration into the open configuration is prevented.

The cleaning tool may comprise a collar which abuts the end portion in order to hold the end portion in the closed configuration. The dirt collector may be disposed forward of the handle.

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The longitudinal axis of the cyclonic separating unit may extend in a plane which is located above the handle.

The cyclonic separating unit may comprise a cyclonic separation chamber having an axis that defines the longitudinal axis of the cyclonic separating unit.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to better understand the present invention, and to show more clearly how the invention may be put into effect, the invention will now be described, by way of example, with reference to the following drawings:

Figure 1 is a profile view of a handheld vacuum cleaner;

Figure 2 is a profile sectional view of the handheld vacuum cleaner shown in **Figure 1**;

Figure 3 is a front view of the handheld vacuum cleaner shown in **Figure 1**;

Figure 4 shows the handheld vacuum cleaner shown in **Figure 1**, in use;

Figures 5a, 5b and 5c are representations of the handheld vacuum cleaner shown in **Figure 1** in different orientations;

Figure 6 is a perspective view of a stick vacuum cleaner comprising the handheld vacuum cleaner shown in **Figure 1**;

Figures 7a, 7b and 7c are show different orientations of the vacuum cleaner shown in **Figure 6**; and

Figure 8 shows the vacuum cleaner shown in **Figure 1** being emptied.

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DETAILED DESCRIPTION OF THE INVENTION

Figures 1 and 2 show a handheld vacuum cleaner 2 comprising a main body 4 having an elongate handle 6, a cyclonic separating unit 8 having a longitudinal axis X and a cleaning tool 10, in the form of a nozzle, which is secured to the cyclonic separating unit 8. The cyclonic separating unit 8 extends away from the handle 6 such that the cleaning tool 10 is at the end of the cyclonic separating unit 8 which is furthest from the handle 6. The cleaning tool 10 extends away from the cyclonic separating unit 8 along the longitudinal axis X of the cyclonic separating unit 8.

The main body 4 further comprises a suction generator 11 comprising a motor 12 and impeller 13 which are located above and towards the rear of the handle 6, and a battery 14 located directly below the handle 6. An actuator in the form of a finger-operated trigger 16 is provided at an upper portion of the handle 6. A trigger guard 17 extends forwardly from the handle below the trigger 16. The handle 6 is arranged at an angle θ_1 with respect to the longitudinal axis X of the cyclonic separating unit 8 such that the handle 6 is in a pistol grip configuration. In the embodiment shown, a handle axis H is arranged at 110 degrees with respect to the longitudinal axis X of the cyclonic separating unit 8. The angle θ_1 is the included angle between the longitudinal axis X extending forward of the handle 6 and the portion of the handle axis H extending through the handle 6.

The cyclonic separating unit 8 comprises a primary cyclonic separator 18 and a plurality of secondary cyclonic separators 20 positioned downstream of the primary cyclonic separator 18. The primary cyclonic separator 18 is adjacent a first end of the cyclonic separating unit 8 and the secondary cyclonic separators 20 are adjacent a second end of the cyclonic separating unit 8 which is opposite the first end. The secondary cyclonic separators 20 are arranged in a circular array which extend about the longitudinal axis X of the cyclonic separating unit 8.

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The primary cyclonic separator 18 comprises a separator body 22 in the form of a bin having a cylindrical outer wall 24 and an end wall 26. The cylindrical outer wall 24 defines a cyclonic separation chamber 28. In the embodiment shown, it is the axis of the cyclonic separation chamber 28 which defines the longitudinal axis X of the cyclonic separating unit 8. A central duct 30 extends from the end wall 26 to an inlet 32 of the cyclonic separation chamber 28.

The cleaning tool 10 comprises a connector portion 33 and a nozzle portion 34 which define a duct 36 along the cleaning tool 10. The connector portion 33 has an outer diameter which is smaller than the inner diameter of the portion of the central duct 30 adjacent the end wall 26 such that the connector portion 33 can be inserted into the central duct 30 (as illustrated) thereby ensuring a rigid connection between the cleaning tool 10 and the cyclonic separating unit 8.

The central duct 30 and the duct 36 through the cleaning tool 10 together define an inlet duct 30, 36 which extends coaxially with the longitudinal axis X and through the end of the cyclonic separating unit 8 which is furthest from the handle 6. The inlet 32 of the cyclonic separation chamber 28 is spaced away from the end wall 26 and is located towards the end of the primary cyclonic separator 18 which is opposite the end of the cyclonic separating unit 8 to which the cleaning tool 10 is connected. The cyclonic separation chamber 28 therefore surrounds the portion of the inlet duct formed by the central duct 30. A first portion of the central duct 30 leading from the end wall 26 extends along the axis X of the cyclonic separation chamber 28. A second portion of the central duct 30 extends from the first portion to the inlet 32 of the cyclonic separation chamber 28. The second portion extends in a direction which has both radial and circumferential components with respect to the cyclonic separation chamber 28 so as to promote rotational flow within the cyclonic separation chamber 28 during use.

The end wall 26 and the portion of the cylindrical outer wall 24 adjacent the end wall 26 define a dirt collector 38, which is in the form of a dirt collecting bin, in which dirt separated from the incoming flow by the primary cyclonic separator 18 is collected.

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The end wall 26 is connected to the cylindrical outer wall 24 by a pivot 40 and is held in a closed position by a user-operable catch 42. The end wall 26 can be moved from the closed position, in which dirt is retained within the dirt collector 38, to an open position, in which dirt can be removed from the dirt collector 38, by releasing the catch 42 and pivoting the end wall 26 away from the end of the cylindrical outer wall 24. The cleaning tool 10 is provided with retaining features (not shown) which engage with the central duct 30 so as to secure the cleaning tool 10 to the central duct 30. The cleaning tool 10 further comprises an annular collar 43 that abuts the end wall 26 thereby holding the end wall 26 in the closed position, and so prevents accidental opening of the end wall 26 while the cleaning tool 10 is attached. The cleaning tool 10 has a manually operated catch 44 that is actuated in order to disengage the retaining features from the central duct 24 in order to remove the tool 10 form the cyclonic separating unit 8.

A cylindrical shroud 45 is disposed centrally within the cyclonic separation chamber 28 and extends coaxially with the axis of the chamber 28. Apertures 46 provided through the shroud 45 define a fluid outlet from the cyclonic separation chamber 28.

A duct 48, which is formed in part by the shroud 45, provides fluid communication between the outlet from the cyclonic separation chamber formed by the apertures 46 and inlets 49 of the secondary cyclonic separators 20. Each secondary cyclonic separator 20 has a solids outlet 50 at one end which is in communication with a fine dust collector 51 that extends along the side of the primary cyclonic separator 18. A fluid outlet 52 at the end of each of the secondary cyclonic separators 20 opposite the solids outlet 50.

The cyclonic separating unit 8, suction generator 11 and battery 14 are expected to be the heaviest components of the vacuum cleaner 2. The separator 8 has a centre of gravity which is forward of the trigger guard 17 and so generates a clockwise moment about the trigger 16 and the trigger guard 17 (as viewed in **Figure 2**). The battery 14 has a centre of gravity which is rearward of the trigger guard 17. The battery 14 therefore exerts an anticlockwise moment about the trigger 16 and the trigger guard 17.

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The suction generator 11 also has a centre of gravity which is rearward of the trigger guard 17. The cyclonic separating unit 8, suction generator 11 and battery 14 are positioned such that the net moment of all of the components of the vacuum cleaner 2 about an axis that extends perpendicularly with respect to the handle 6 and the longitudinal axis X of the cyclonic separating unit 8 and which passes through a region immediately below the trigger guard 17 is zero. The centre of gravity of the vacuum cleaner 2 is therefore located within the region below the trigger guard 17 such that when the trigger 16 is released by a user, the handheld vacuum cleaner 2 is balanced about a point below the trigger guard 17 and so can be supported easily by the rest of the user's fingers on the handle 6 and the upper finger against the trigger guard 17 without tipping forwards or backwards. Furthermore, the vacuum cleaner 2 can be supported on the battery 14, which forms a base of the vacuum cleaner 2, without toppling over.

Figure 3 shows the vacuum cleaner 2 from the front. The cleaning tool 10 is relatively straight and slender and extends along the longitudinal axis X. The cleaning tool 10 therefore extends within the outer profile of the cyclonic separating unit 8 as viewed from the front of the vacuum cleaner 2 along the longitudinal axis X.

In use, the handheld vacuum cleaner 2 is activated by a user pressing the trigger 16 with an index finger. Dirty air is drawn by the suction generator 11 through the inlet duct 30, 36 and through the inlet 32 into the cyclonic separation chamber 28. The rotational flow promoted by the second portion of the central duct 30 within the cyclonic separation chamber 28 produces a cyclonic action that separates relatively heavy or large dirt from the air. Typically, the vacuum cleaner 2 is held such that the cyclonic separating unit 8 points downwardly from the handle 6. Dirt separated in the cyclonic separation chamber 28 therefore falls under the influence of gravity into the dirt collector 38. The partially cleaned air passes through the apertures 46 in the shroud 45 and is drawn along the duct 48 to the secondary cyclones 20. Smaller and lighter particles of dirt are separated from the air by the secondary cyclones 20 and expelled through the respective solids outlets into the fine dust collector 51. The cleaned air

exits the secondary cyclones 20 via the respective fluid outlets 52 of the secondary cyclones 20 through the suction generator 11 and out of vents (not shown) at the rear of the main body 4.

The alignment of the axis X of the cyclonic separating unit 8 with the cleaning tool 10 makes the vacuum cleaner 2 compact and enables the end of the cyclonic separating unit 8 to be inserted into confined spaces during cleaning, as illustrated in **Figure 4**. The vacuum cleaner 2 is therefore particularly suitable for cleaning places that are difficult to reach, such as gaps between items of furniture, walls and appliances. Furthermore, the cyclonic separating unit 8 can be rotated substantially within its own profile during cleaning. That is, the area swept by the cyclonic separating unit 8 (as viewed along the longitudinal axis X) as the cyclonic separating unit 8 is rotated about its longitudinal axis X, is not significantly greater than the actual area occupied by the cyclonic separating unit 8. A schematic illustration of the vacuum cleaner 2 with the handle in a vertical orientation is shown in **Figure 5b**. **Figures 5a and 5c** show the vacuum cleaner 2 rotated through 45 degrees away from the orientation shown in **Figure 5b** in each direction. The cyclonic separating unit 8 can therefore be rotated clockwise and anticlockwise within the confined space without colliding with surfaces of the confined space, and so can be manipulated easily in order to clean hard-to-reach surfaces.

In addition to the above benefits, the alignment of the cleaning tool 10 with the longitudinal axis X ensures that the inclination angle of the cyclonic separating unit 8 does not vary as the vacuum cleaner 2 is rotated about the longitudinal axis X and so the separation of efficiencies of the primary cyclonic separator 18 and the secondary cyclonic separators 20 remain approximately constant during use. This is particularly advantageous when the cleaning tool 10 is replaced with a wand 110 and a cleaner head 112 to form a stick vacuum cleaner 102, as shown in **Figure 6**.

The wand 110 extends coaxially with the longitudinal axis X of the cyclonic separating unit 8. The cleaner head 112 comprises an articulated neck 114 having first and second rotational axes Y, Z that are arranged perpendicular to each other. The arrangement of

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the axes Y, Z is such that, when the cleaner head 112 is placed on a surface with the wand 110 inclined with respect to the surface, rotation of the stick vacuum cleaner 102 about the longitudinal axis X of the cyclonic separating unit 8 (and hence rotation of the wand 110 about the wand axis) causes the cleaner head 112 to steer left or right, as shown in **Figures 7a to 7c**.

As mentioned above, the inclination of the longitudinal axis X of the cyclonic separating unit 8 remains substantially constant as the cleaner head 114 is steered across a surface being cleaned. Consequently, unlike known stick vacuum cleaners, the cyclonic separation efficiency remains substantially constant and the risk of re-entrainment remains low.

A further benefit is that the centre of gravity of the cyclonic separating unit 8 is located at or close to the axis of the wand 110. Consequently, the weight balance of the cyclonic separating unit 8 about the axis of the wand 110 remains approximately constant as the cyclonic separating unit 8 is rotated during cleaning. The vacuum cleaner 2 is therefore easy to manoeuvre.

Referring to **Figure 8**, in order to empty the dirt collector 38 and the fine dust collector 51 of either of the described embodiments, the user first disconnects the cleaning tool 10 or the wand 110. Then, whilst gripping the handle 6, the user points the vacuum cleaner 2 towards a suitable receptacle (e.g. a waste bin or bag) into which the dirt is to be emptied. The catch 42 is then released by the user and the end wall 26 pivoted from its closed position into its open position. Since the cyclonic separating unit 8 is pointed away from the user, there is no need for the user to adopt a different grip or posture from that which is adopted during normal cleaning. Consequently, the process by which the dirt collector 38 and the fine duct collector 51 are emptied is very intuitive and ergonomic. Furthermore, dirt exits the dirt collector 38/fine dust collector 51 from the end of the cyclonic separating unit 8 which is furthest from the handle 6. Therefore, there is less risk that dirt will spill from the dirt collector 38/fine dust collector 51 onto a user during emptying.

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In an alternative arrangement, the inlet duct may be spaced from the axis of the cyclonic separating unit 8. Nevertheless, the cyclonic separating unit may be arranged to extend partly around a portion of the inlet duct or to entirely surround a portion of the inlet duct. For example, the inlet duct may be recessed into the side of the cyclonic separating unit such that duct extends within the profile of the cyclonic separating unit when viewed along the axis of the cyclonic separating unit.

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CLAIMS

1. A handheld vacuum cleaner comprising:

a handle by which the vacuum cleaner is supported during normal use;

a cyclonic separating unit having a longitudinal axis and a dirt collector at one end of the cyclonic separating unit, the cyclonic separating unit comprising an end portion having a closed configuration in which dirt is retained within the dirt collector by the end portion and an open configuration for the removal of dirt from the dirt collector, wherein the handle has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

2. The handheld vacuum cleaner of claim 1, wherein the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 100 degrees and not greater than 125 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

3. The handheld vacuum cleaner of claim 1 or 2, wherein the end portion comprises an end wall of the cyclonic separating unit.

4. The handheld vacuum cleaner of any one of the preceding claims, wherein the end portion is arranged to pivot between the closed configuration and the open configuration.

5. The handheld vacuum cleaner of any one of the preceding claims, wherein the cyclonic separating unit comprises a dirty air inlet through the end portion.

6. The handheld vacuum cleaner of any one of the preceding claims, further comprising a connector and a cleaning tool connectable to the connector, wherein the cleaning tool is configured such that when the end portion is in the

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closed configuration and the cleaning tool is connected to the connector movement of the end portion from the closed configuration into the open configuration is prevented.

7. The handheld vacuum cleaner of claim 6, wherein the cleaning tool comprises a collar which abuts the end portion in order to hold the end portion in the closed configuration.

8. The handheld vacuum cleaner of any one of the preceding claims, wherein the dirt collector is disposed forward of the handle.

9. The handheld vacuum cleaner of any one of the preceding claims, wherein the longitudinal axis of the cyclonic separating unit extends in a plane which is located above the handle.

10. The handheld vacuum cleaner of any one of the preceding claims, wherein the cyclonic separating unit comprises a cyclonic separation having an axis that defines the longitudinal axis of the cyclonic separating unit.

11. A handheld vacuum cleaner substantially as described herein with reference to, and as shown in, the accompanying drawings.

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ABSTRACT

VACUUM CLEANER

A handheld vacuum cleaner 2 comprising a handle 6 by which the vacuum cleaner 2 is supported during normal use and a cyclonic separating unit 8 having a longitudinal axis and a dirt collector 38, 51 at one end of the cyclonic separating unit 8. The cyclonic separating unit 8 comprises an end portion 26 having a closed configuration in which dirt is retained within the dirt collector 38, 51 and an open configuration for the removal of dirt from the dirt collector 38, 51. The handle 6 has a pistol grip configuration in which the handle 6 is inclined with respect to the cyclonic separating unit 8 to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle 6 and the longitudinal axis X of the cyclonic separating unit 8.

[Figure 8]

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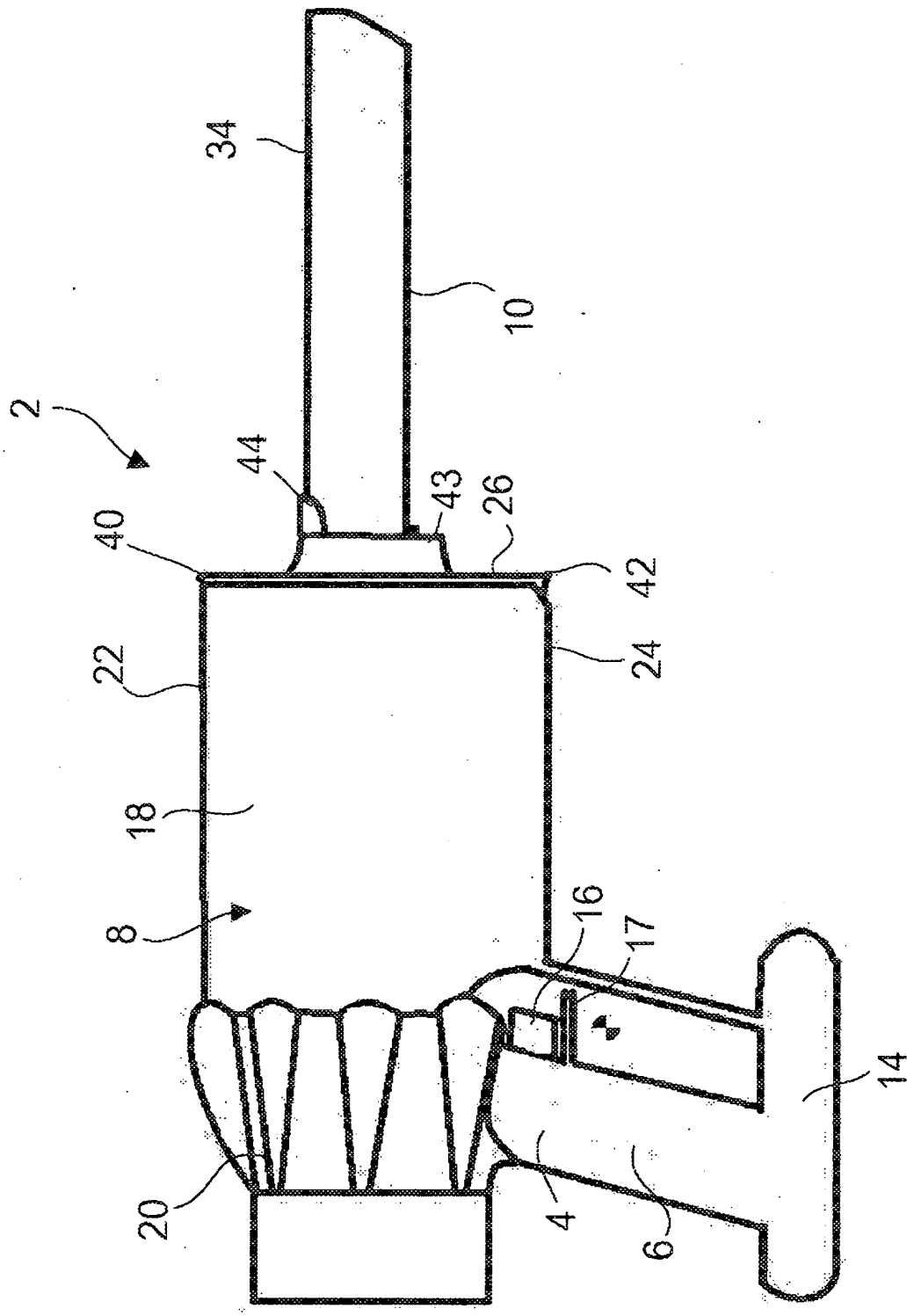


Figure 1

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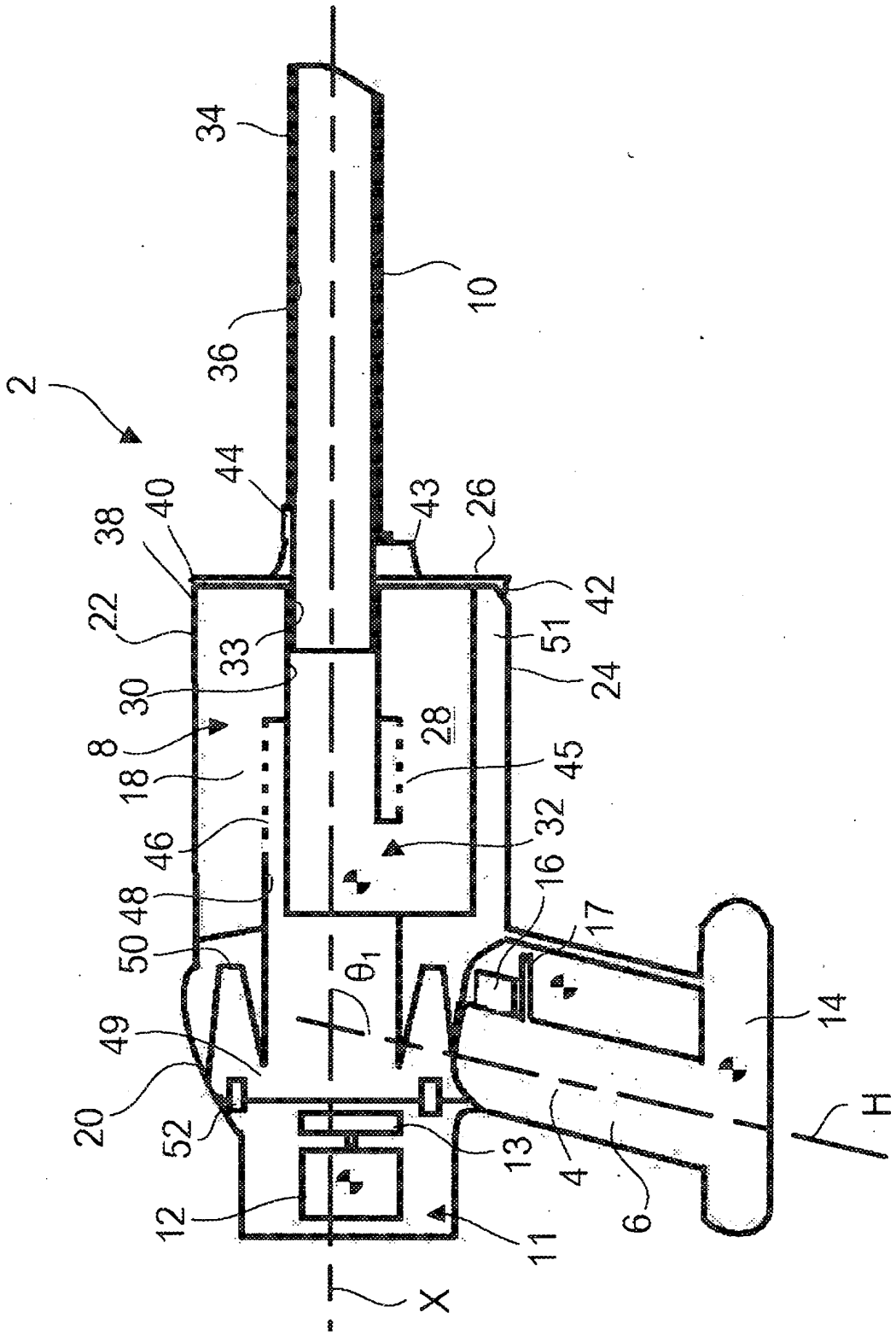

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Figure 2

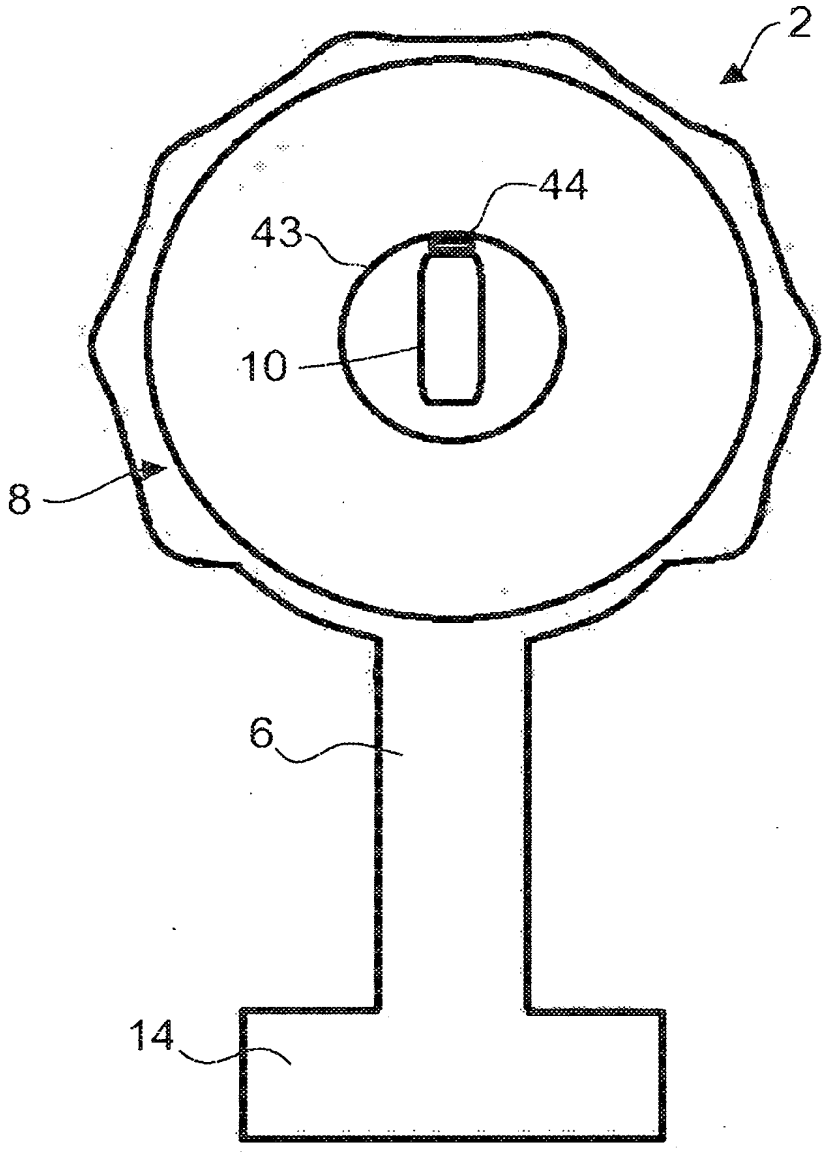


Figure 3

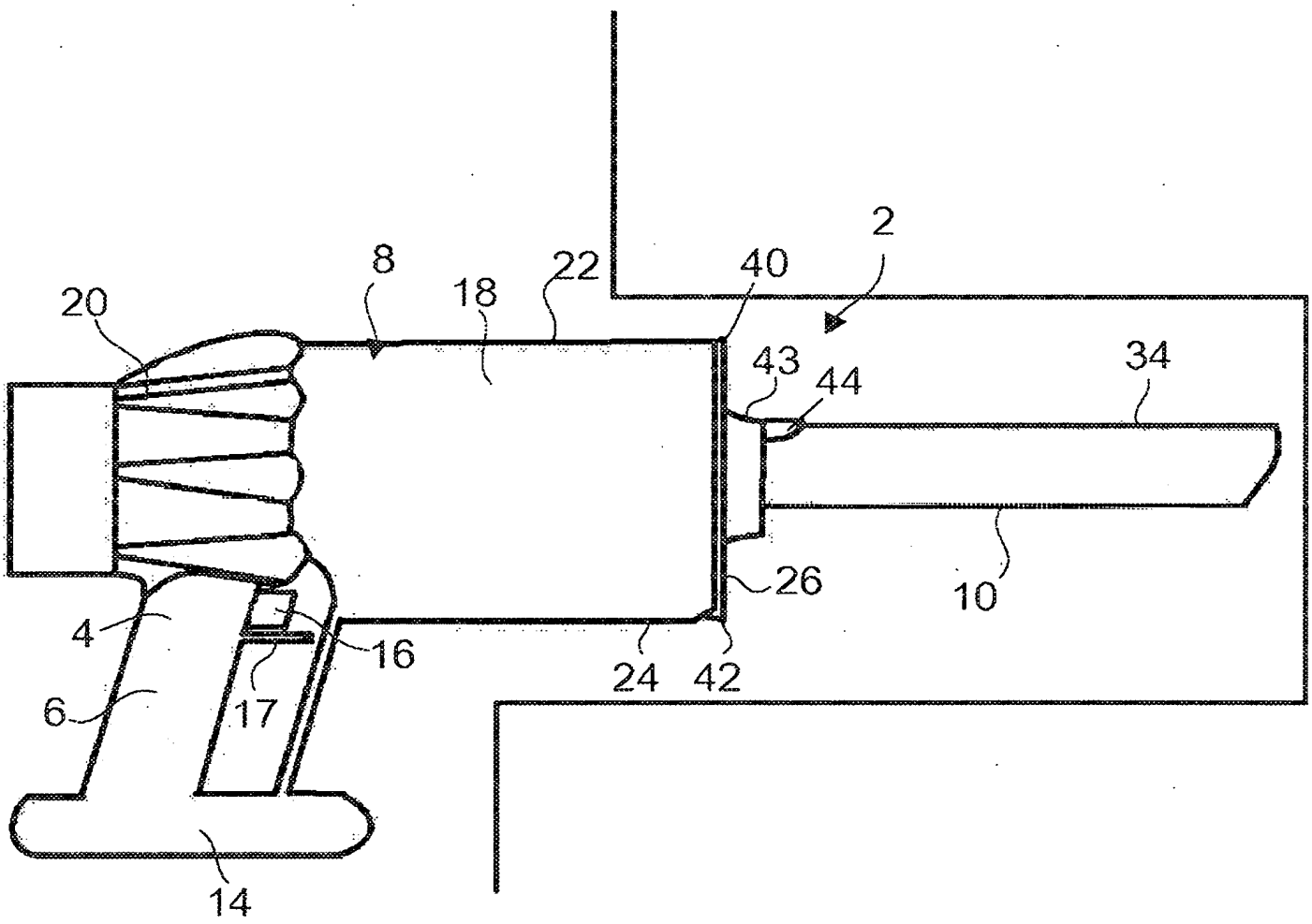


Figure 4

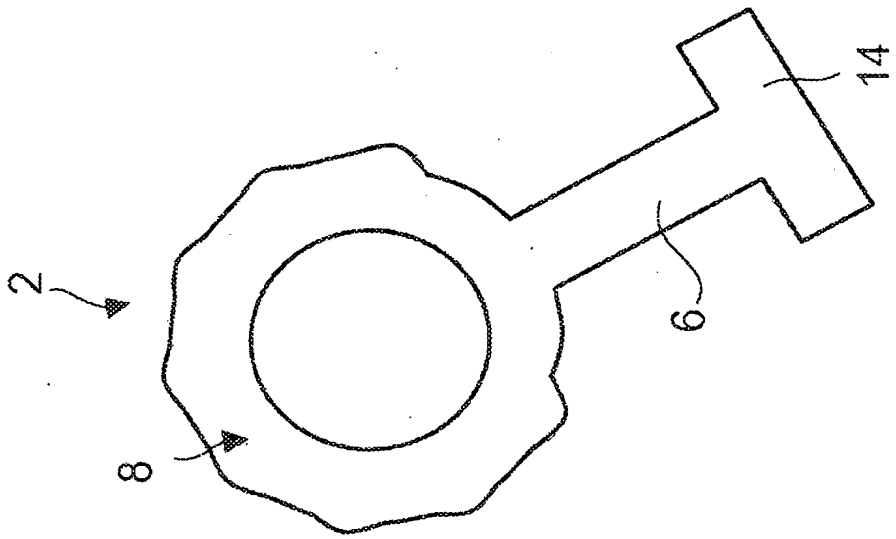


Figure 5c

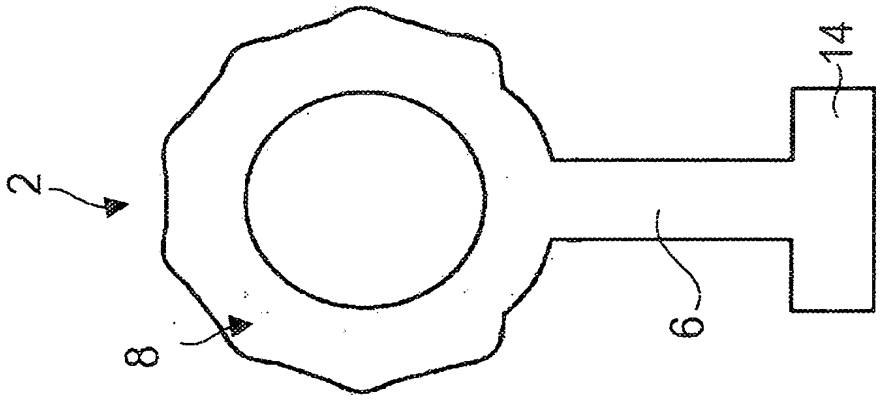


Figure 5b

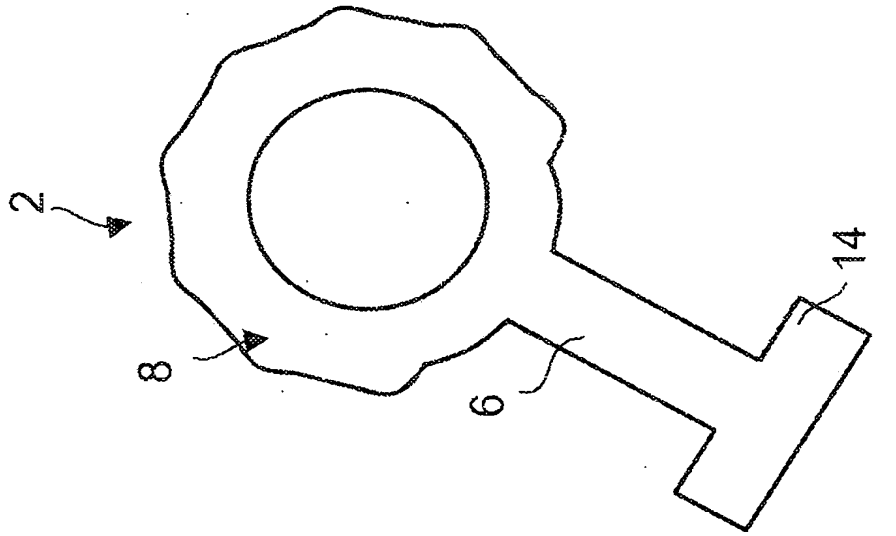


Figure 5a

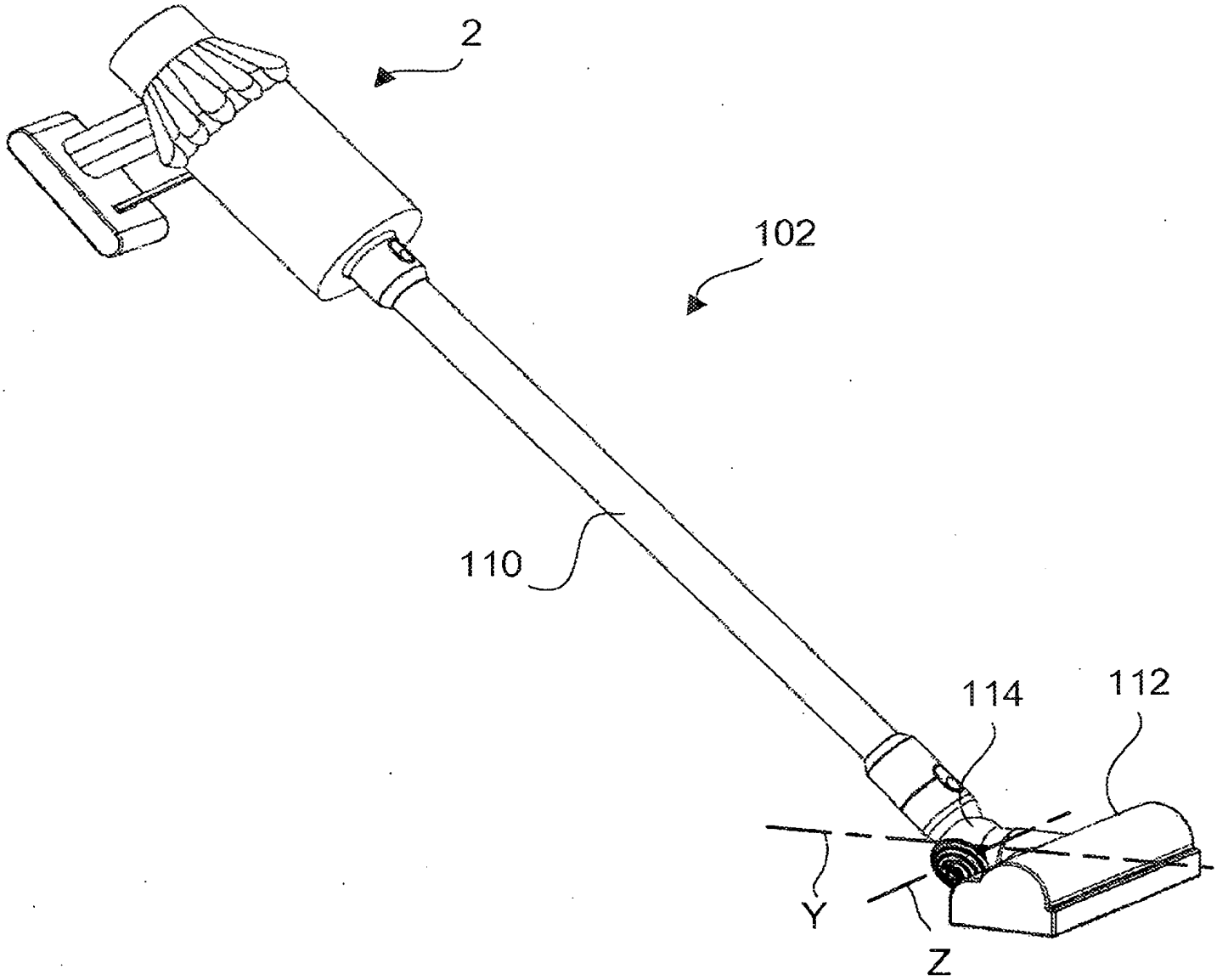


Figure 6

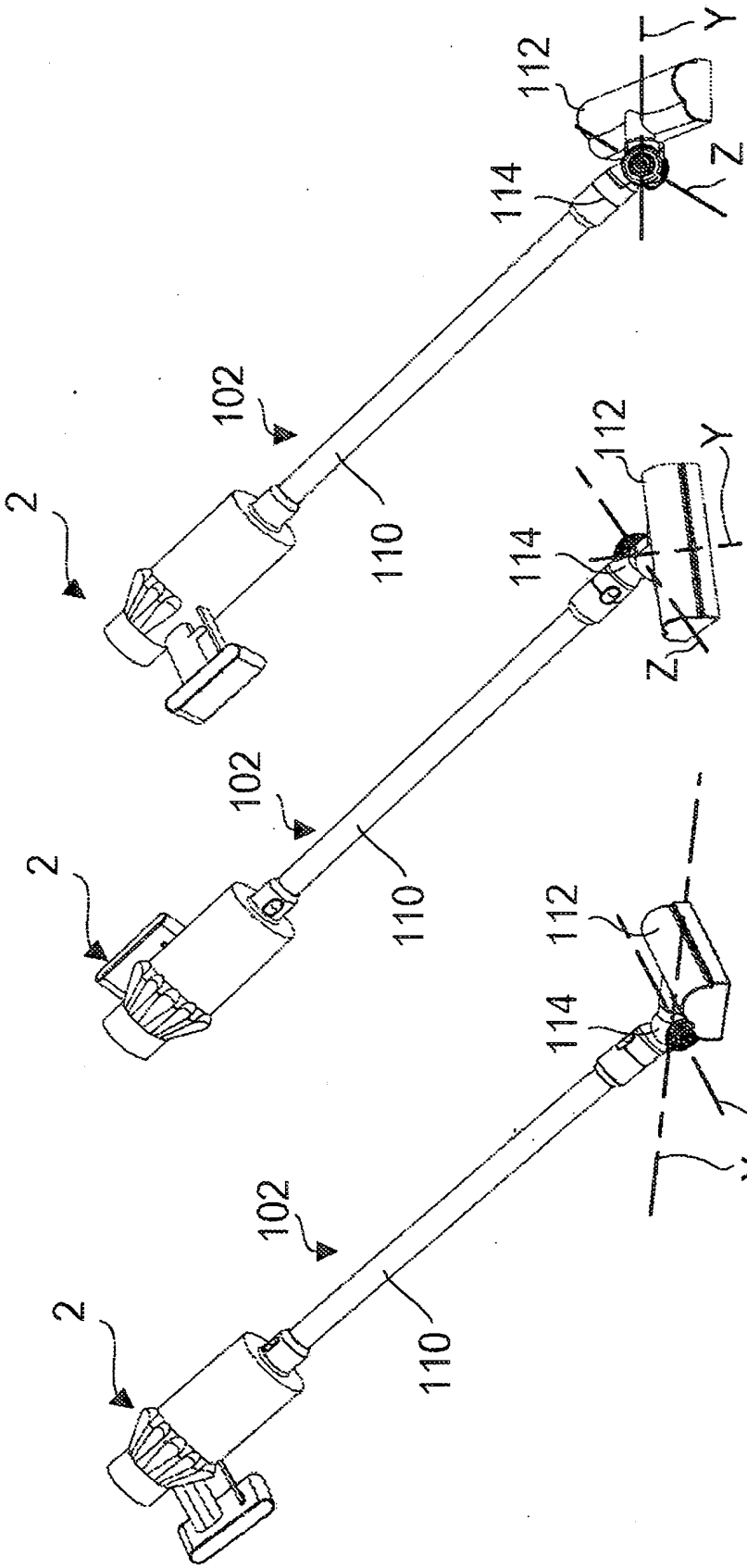


Figure 7a

Figure 7b

Figure 7c

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SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01322
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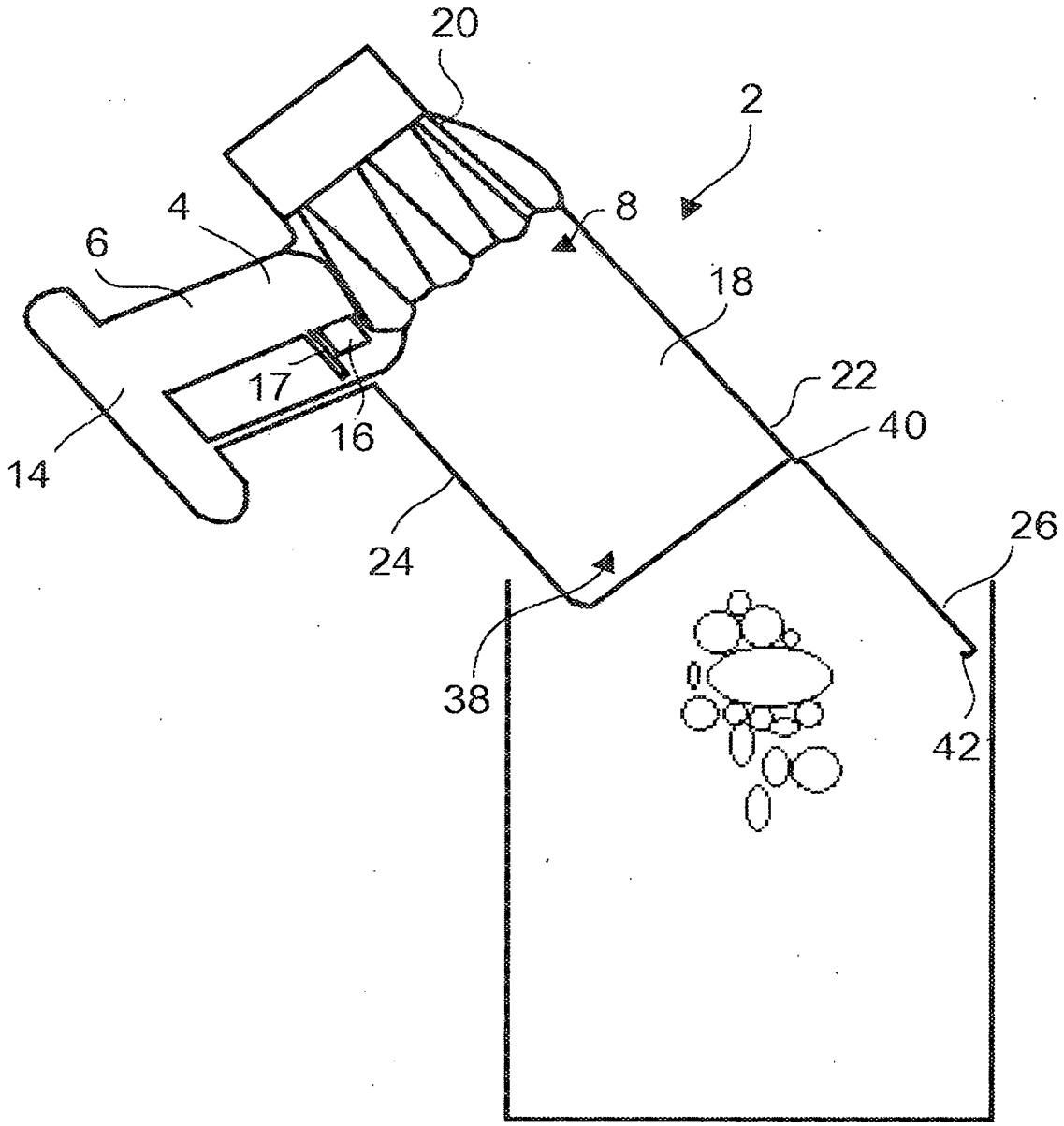


Figure 8

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/269,430

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	10 minus 20 =	*			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 420 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1600

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/269,430	09/19/2016	3723	1740	424662105900	10	1

CONFIRMATION NO. 6526

UPDATED FILING RECEIPT

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102



Date Mailed: 12/01/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Stephen Robert DIMBYLOW, Swindon, UNITED KINGDOM;

Applicant(s)

Dyson Technology Limited, Wiltshire, UNITED KINGDOM;

Assignment For Published Patent Application

Dyson Technology Limited, Wiltshire, UNITED KINGDOM

Power of Attorney: The patent practitioners associated with Customer Number 25227

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1516499.9 09/17/2015 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 09/28/2016

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01322
Page 1609 of 1677

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/269,430**

Projected Publication Date: 03/23/2017

Non-Publication Request: No

Early Publication Request: No
Title

VACUUM CLEANER

Preliminary Class

015

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01322
Page 1610 of 1677

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Electronic Patent Application Fee Transmittal

Application Number:	15269430
Filing Date:	19-Sep-2016
Title of Invention:	VACUUM CLEANER
First Named Inventor/Applicant Name:	
Filer:	Christopher Elmose Gloria/Donna Bernecker
Attorney Docket Number:	424662105900

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**140**

I hereby certify that this paper is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: November 29, 2016
Electronic Signature for Donna Bernecker: /dbernecker/

PATENT
Docket No. 424662105900

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the patent of: Stephen Robert DIMBYLOW	Examiner: Not Yet Assigned
Serial No. 15/269,430	Art Unit: 3723
Filing Date: September 19, 2016	Confirmation No.: 6526
For: VACUUM CLEANER	

REQUEST TO CORRECT INVENTORSHIP PURSUANT TO 37 CFR 1.48

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants respectfully request that the inventorship of the above-captioned patent application be corrected to delete James DYSON.

In support of this request, the following are enclosed:

- a corrective Application Data Sheet identifying the actual inventors, and
- an executed declaration by the remaining sole inventor.

The processing fee under 37 CFR 1.17(i) is being paid concurrently with this filing.

In the event that the Patent and Trademark Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time

va-485341

and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing Docket No. **424662105900**.

Dated: November 29, 2016

Respectfully submitted,

Electronic signature: /christopher gloria/
Christopher Gloria
Registration No. 71,907
MORRISON & FOERSTER LLP
1650 Tysons Blvd., Suite 400
McLean, Virginia 22102
Telephone: (703) 760-7389

I hereby certify that this paper is being transmitted via the Office electronic filing system in accordance with 37 CFR § 1.6(a)(4).

Dated: November 29, 2016
Electronic Signature for Donna Bernecker: /dbernecker/

Docket No.: 424662105900
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Stephen Robert DIMBYLOW

Application No.: 15/269,430 | Confirmation Number: 6526

Filed: September 19, 2016 | Art Unit: 3723

For: VACUUM CLEANER | Examiner: Not Yet Assigned

SUBMISSION OF REPLACEMENT DRAWINGS

MS Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice to File Corrected Application Papers dated September 29, 2016, submitted herewith is one set (eight sheets, twelve figures) of replacement drawings for filing in the above-identified patent application. Kindly substitute the enclosed drawings for the drawings submitted with the originally filed application.

Dated: November 29, 2016

Respectfully submitted,

Electronic signature: /christopher gloria/
Christopher Gloria
Registration No.: 71,907
MORRISON & FOERSTER LLP
1650 Tysons Blvd, Suite 400
McLean, Virginia 22102
(703) 760-7389

va-485340

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	VACUUM CLEANER

As the below named inventor, I hereby declare that:

This declaration is directed to:

[ ] The attached application, or

[x] United States application or PCT international application number 15/269,430 filed on September 19, 2016 .

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Stephen Robert DIMBYLOW Date (Optional) : 25/11/16

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

Docket No.: 424662105900
Client Reference No.: USP1549A

va-483137

Electronic Acknowledgement Receipt

EFS ID:	27642663
Application Number:	15269430
International Application Number:	
Confirmation Number:	6526
Title of Invention:	VACUUM CLEANER
First Named Inventor/Applicant Name:	James DYSON
Customer Number:	25227
Filer:	Christopher Elmose Gloria/Donna Bernecker
Filer Authorized By:	Christopher Elmose Gloria
Attorney Docket Number:	424662105900
Receipt Date:	29-NOV-2016
Filing Date:	19-SEP-2016
Time Stamp:	18:43:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	ResptoCorrectAppPapers_424662105900.pdf	20266 9c92df102b5140bce2db203f6c62536b64e46df5	no	1

Warnings:

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01322

Information:					
2	Drawings-only black and white line drawings	ReplaceDraws_424662105900.pdf	242374 7fcae0cdbe9a57a0ef646ea87294485a384e1e07	no	8
Warnings:					
Information:					
			Total Files Size (in bytes):	262640	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	27639189
Application Number:	15269430
International Application Number:	
Confirmation Number:	6526
Title of Invention:	VACUUM CLEANER
First Named Inventor/Applicant Name:	
Customer Number:	25227
Filer:	Christopher Elmose Gloria/Donna Bernecker
Filer Authorized By:	Christopher Elmose Gloria
Attorney Docket Number:	424662105900
Receipt Date:	29-NOV-2016
Filing Date:	19-SEP-2016
Time Stamp:	18:41:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$140
RAM confirmation Number	113016INTEFSW00006080031952
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request under Rule 48 correcting inventorship	ReqCorrectInventorship_424662105900.pdf	29622 cf4868c324eed4b65d4c51f5bc681564dfc3ec47	no	2
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration_424662105900.pdf	264716 778a22e688e58a1a3fddab68853ea2555adc9efa	no	1
Warnings:					
Information:					
3	Application Data Sheet to update/ correct info	CorrectedADS.pdf	74062 36aedf18b46068d09807bf7d644fdefc0cce7027	no	5
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30562 6b39ed07588698cb12b4e599bba6e27c1367cbb4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	398962		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

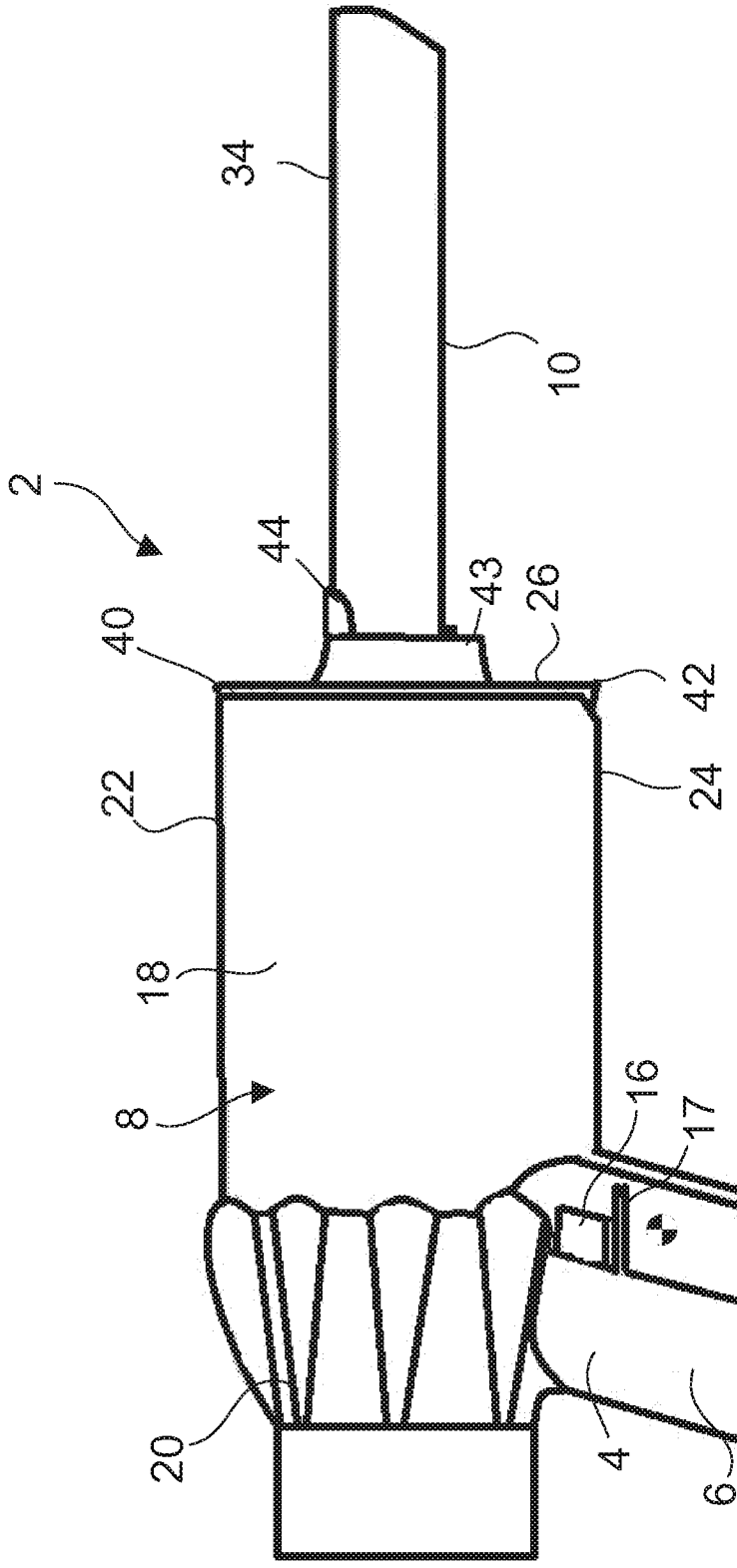


Figure 1

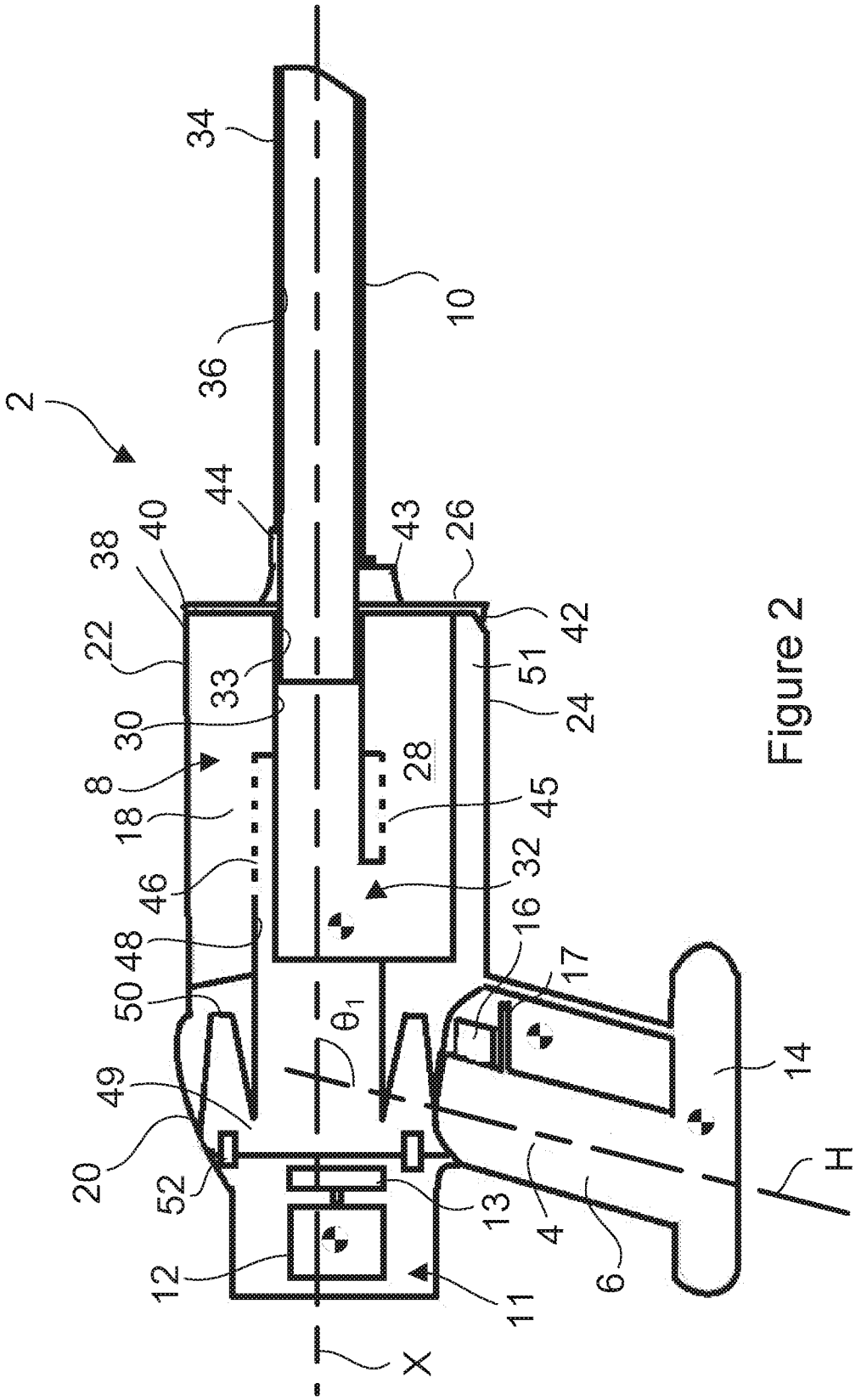

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Figure 2

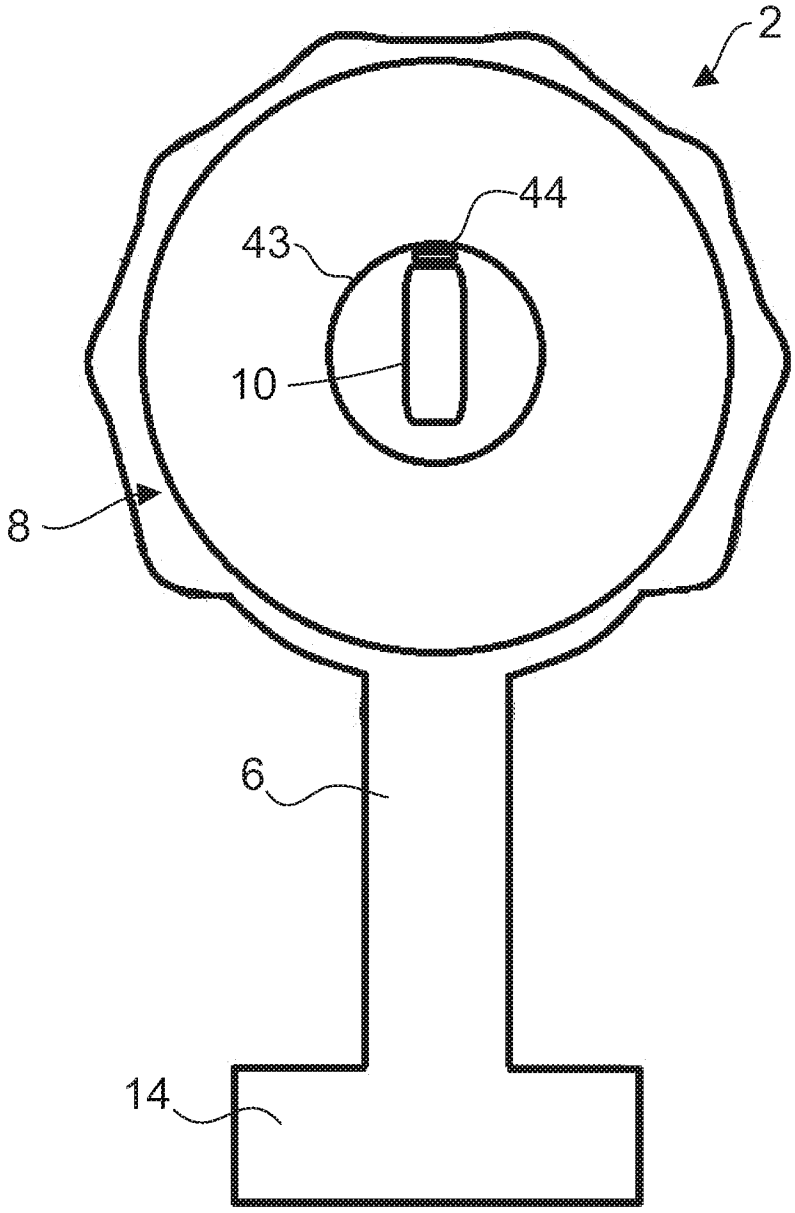


Figure 3

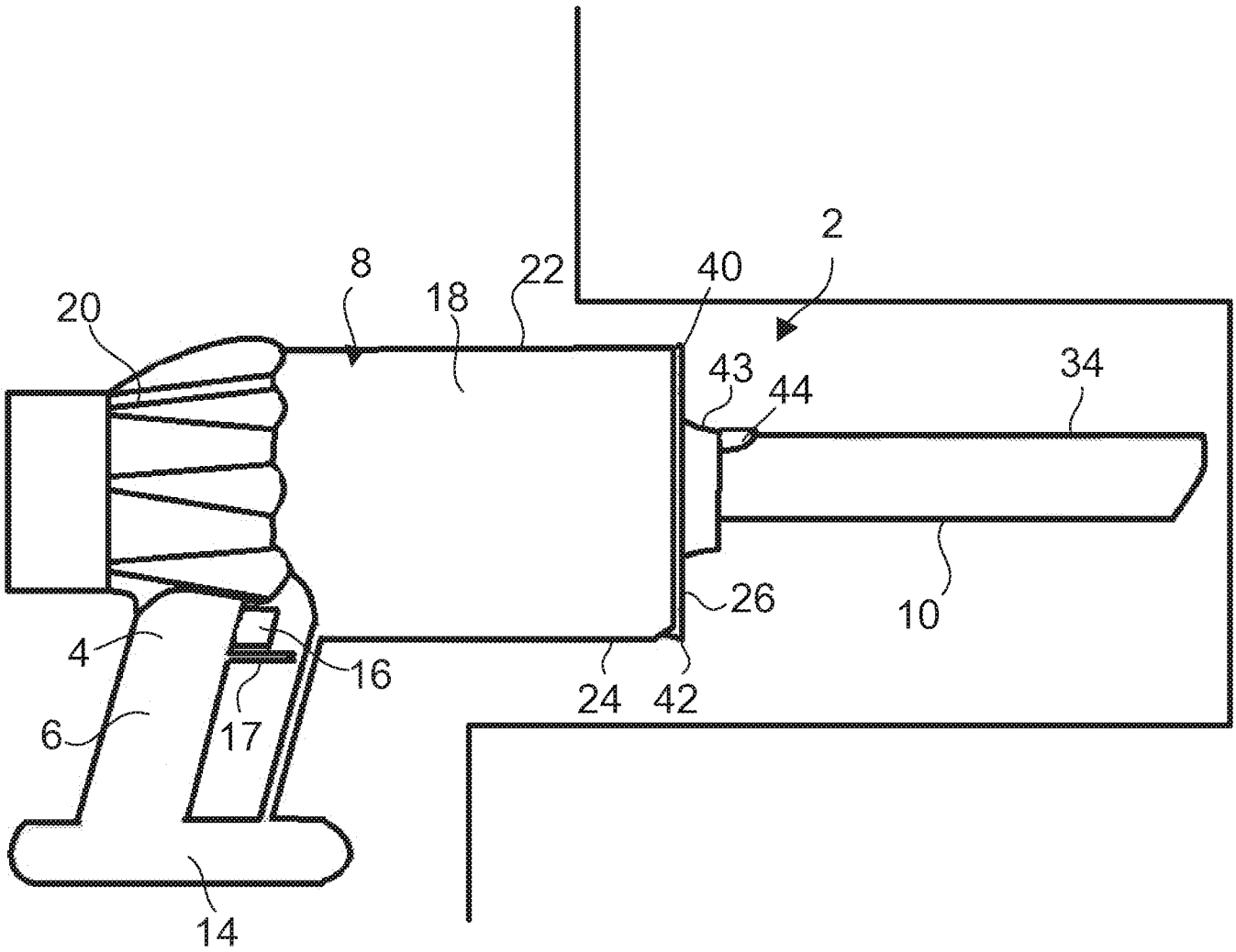


Figure 4

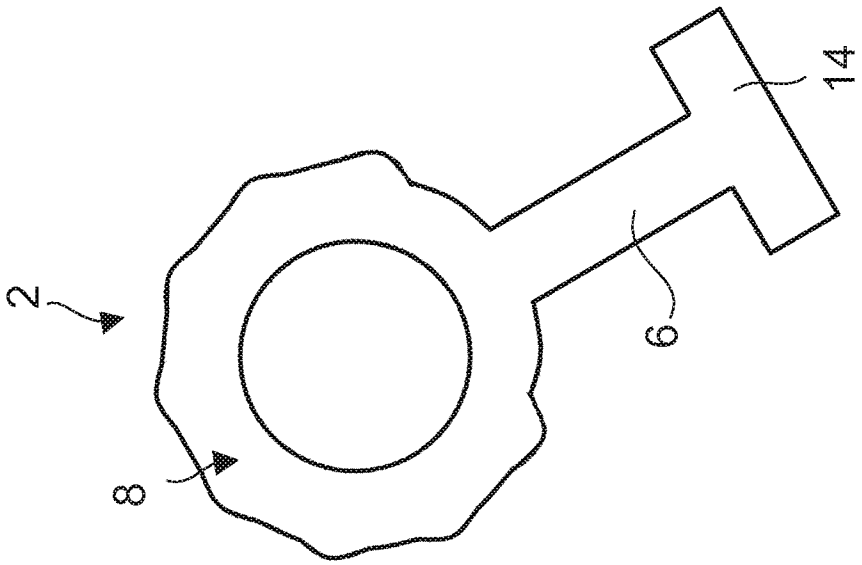


Figure 5c

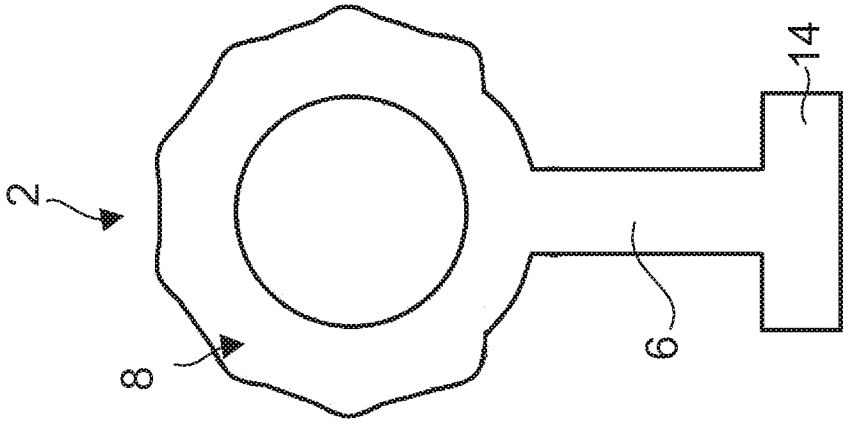


Figure 5b

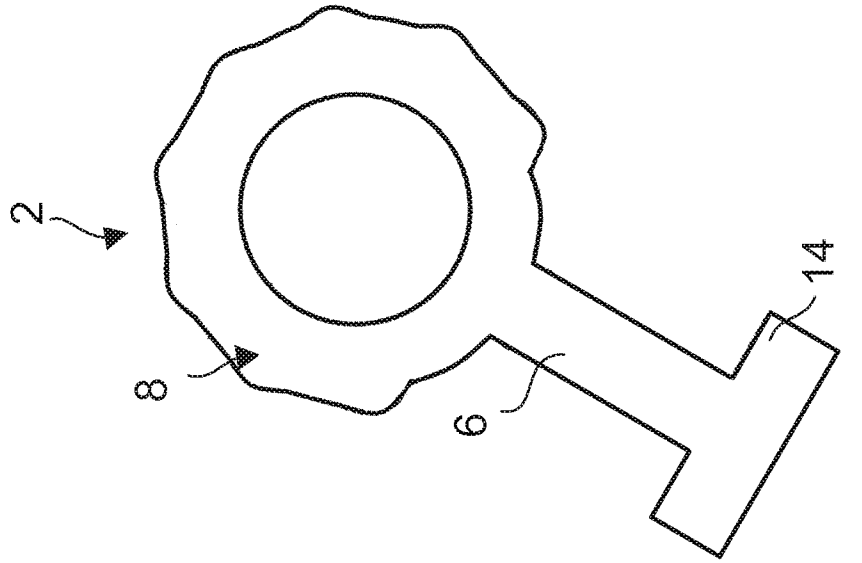


Figure 5a

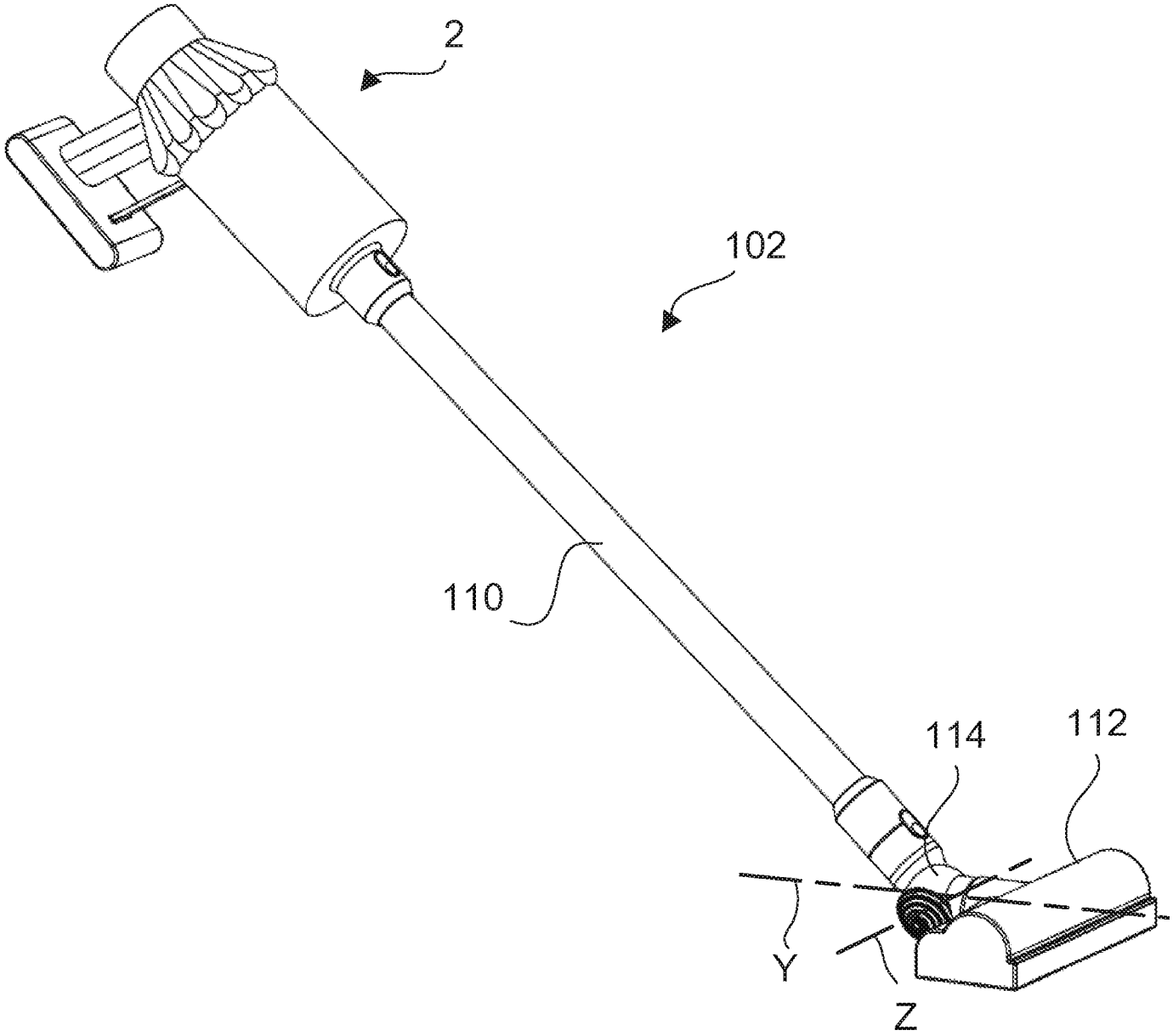


Figure 6

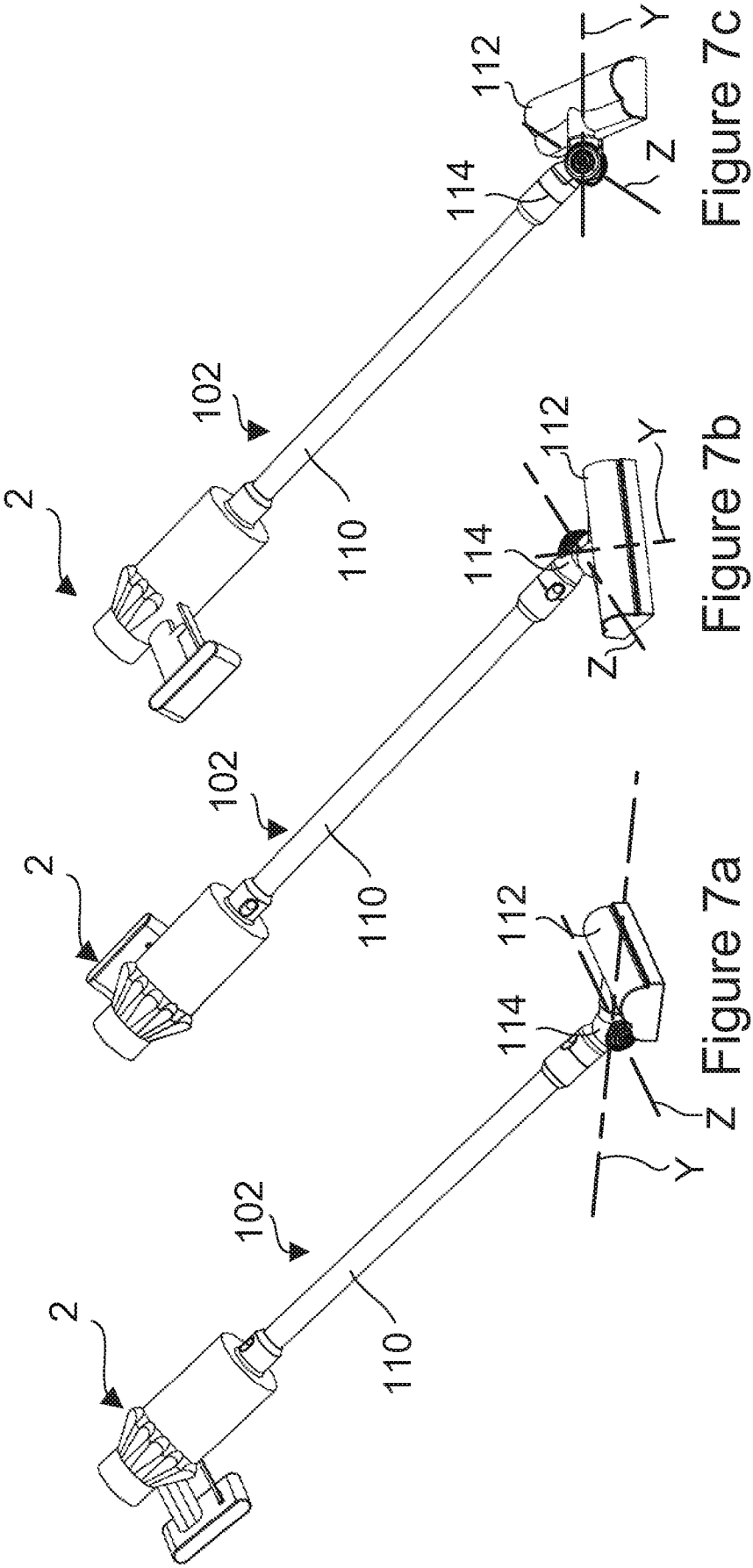


Figure 7a

Figure 7b

Figure 7c

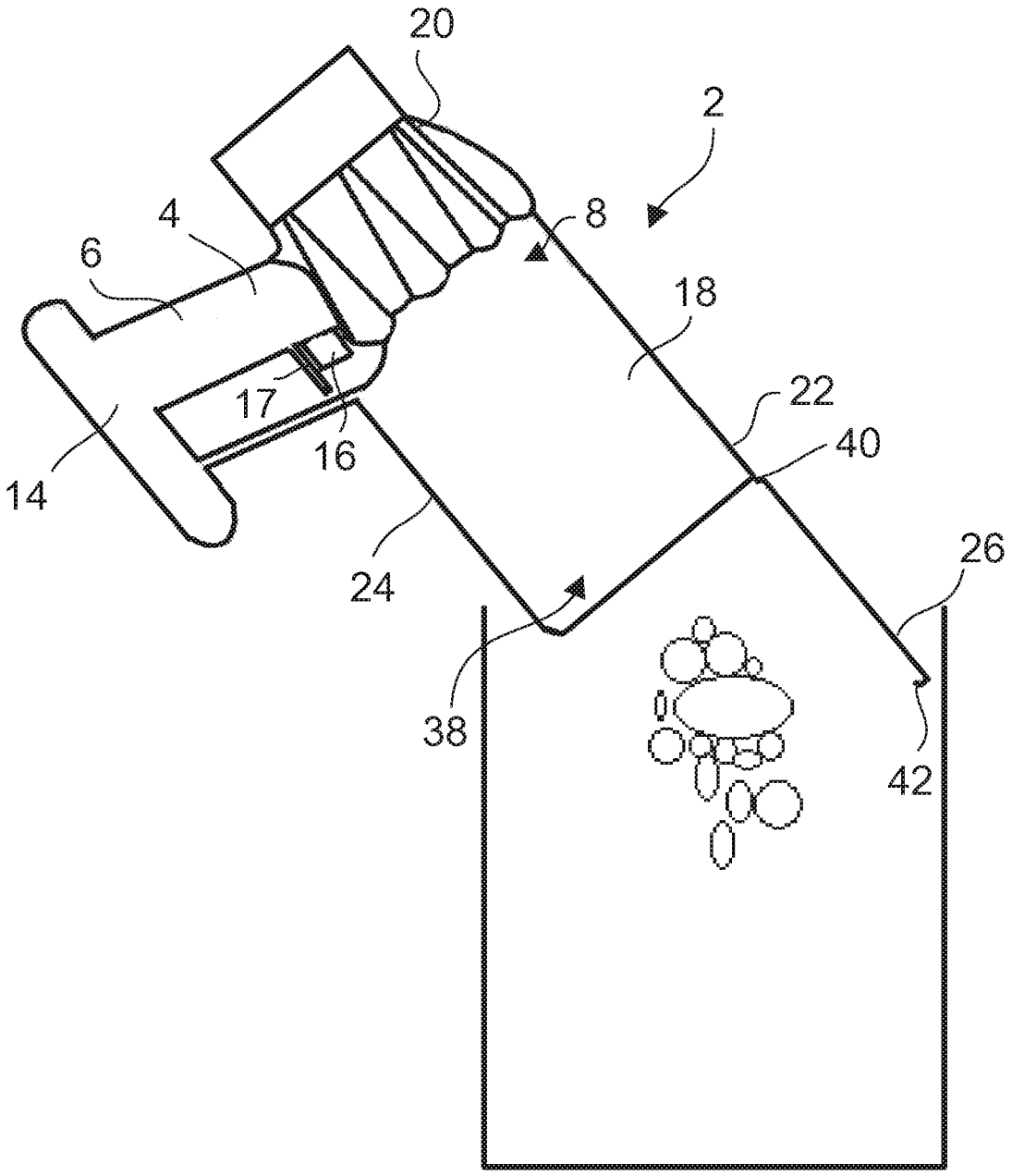


Figure 8

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

CORRECTED ADS FORM

Application Number	15269430
Title of Invention	VACUUM CLEANER

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number	1	
Name	~~James DYSON~~	Stephen Robert DIMBYLOW
Residence Information		
Residency	non-us-residency	
City	~~Bristol~~	Swindon
State		
Country of Residence	GB	
Mailing Address of Inventor		
Address 1	c/o Dyson Technology Limited	
Address 2	Tetbury Hill, Malmesbury	
City,State/Province, Postal Code	Wiltshire SN16 0RP	
Country	GB	

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Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

	Data of Record	Updated Data
Order Number	~~2~~	
Name	~~Stephen Robert DIMBYLOW~~	
Residence Information		
Residency	~~non-us-residency~~	
City	~~Swindon~~	
State		
Country of Residence	GB	
Mailing Address of Inventor		
Address 1	~~c/o Dyson Technology Limited~~	
Address 2	~~Tetbury Hill, Malmesbury~~	
City,State/Province, Postal Code	~~Wiltshire SN16 0RP~~	
Country	GB	

Application Information

	Data of Record	Updated Data
Title of Invention	VACUUM CLEANER	
Attorney Docket Number	424662105900	
Entity Type	Regular Undiscounted	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

		Data of Record	Updated Data
	Prior Application Status		
	Application Number		
	Continuity Type		
	Prior Application Number		
	Filing Date (YYYY-MM-DD)		
	Patent Number		
	Issue Date (YYYY-MM-DD)		

Foreign Priority Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

	Data of Record	Updated Data
Applicant Type		

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
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If applicant is the legal representative, indicate the authority to file the patent application, the inventor is		
Name of the Deceased or Legally Incapacitated Inventor		
Applicant is an Organization		
Name		
Organization Name		
Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		

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Organization Name		

Mailing Address

Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/christopher gloria/	Registration Number	71907
First Name	Christopher	Last Name	Gloria

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/269,430

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	10 minus 20 =	*			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 420 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1600

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/269,430	09/19/2016	James DYSON	424662105900

CONFIRMATION NO. 6526

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

FORMALITIES LETTER

OC000000086125664

Date Mailed: 09/29/2016

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings are not in compliance with 37 CFR 1.84 because figures 1-2 contain figure or view numbers that have incorrect orientation. Reference characters, sheet numbers, and view numbers must be oriented in the same direction as the view. See 37 CFR 1.84(p)(1).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  James DYSON
  Stephen Robert DIMBYLOW

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Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/zretta/

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/269,430	09/19/2016	3723	1740	424662105900	10	1

CONFIRMATION NO. 6526

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

FILING RECEIPT

OC000000088125883

Date Mailed: 09/29/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

James DYSON, Bristol, UNITED KINGDOM;
Stephen Robert DIMBYLOW, Swindon, UNITED KINGDOM;

Applicant(s)

Dyson Technology Limited, Wiltshire, UNITED KINGDOM;

Assignment For Published Patent Application

Dyson Technology Limited, Wiltshire, UNITED KINGDOM

Power of Attorney: The patent practitioners associated with Customer Number 25227

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1516499.9 09/17/2015 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 09/28/2016

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/269,430**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

Title

VACUUM CLEANER

Preliminary Class

015

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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SharkNinja et al. v. Dyson Technology Limited,
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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	VACUUM CLEANER
First Named Inventor/Applicant Name:	James DYSON
Filer:	Nathan Schuler Vogler
Attorney Docket Number:	424662105900

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	140	140
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1740**

VACUUM CLEANER

REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority of United Kingdom Application No. 1516499.9, filed September 17, 2015, the entire contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention relates to a handheld vacuum cleaner comprising a cyclonic separating unit.

BACKGROUND OF THE INVENTION

[0003] GB2440111B discloses a handheld vacuum cleaner comprising a main body having a handle and cyclonic separator arranged such that it extends alongside the handle. The cyclonic separator comprises a collector for collecting dirt separated by the cyclonic separator. The collector has a base that is pivotally mounted to an outer wall of the collector and held in a closed position by a catch. Release of the catch allows the base to swing open so that the collector can be emptied.

[0004] In order to empty the collector, a user positions the base over a waste bin and then releases the catch. The base swings open and dirt which has been collected falls from the collector into the waste bin. Although the arrangement provides a simple way in which to empty the collector, it is slightly awkward because the user typically has to twist his or her hand to one side or upwardly in order to direct the dirt away from themselves into the waste bin. An improved arrangement is therefore desirable.

SUMMARY OF THE INVENTION

[0005] According to the invention there is provided a handheld vacuum cleaner comprising a handle by which the vacuum cleaner is supported during normal use, a cyclonic separating unit having a longitudinal axis and a dirt collector at one end of the cyclonic separating unit, the cyclonic separating unit comprising an end portion having

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a closed configuration in which dirt is retained within the dirt collector by the end portion and an open configuration for the removal of dirt from the dirt collector, wherein the handle has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

[0006] A handheld vacuum cleaner in accordance with the invention can be emptied by pointing the cyclonic separating unit away from the user and opening the end portion while maintaining a natural grip on the handle. The process of emptying the dirt collector is therefore both ergonomic and intuitive. Furthermore, there is a low risk of the user coming into contact with the dirt as it is emptied because the dirt collector opens away from user.

[0007] The handle may be inclined with respect to the cyclonic separating unit to form an angle of not less than 100 degrees and not greater than 125 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

[0008] The end portion may comprise an end wall of the cyclonic separating unit. The end portion may be arranged to pivot between the closed configuration and the open configuration.

[0009] The cyclonic separating unit may comprise a dirty air inlet through the end portion. The handheld vacuum cleaner may further comprise a connector and a cleaning tool connectable to the connector, wherein the cleaning tool is configured such that when the end portion is in the closed configuration and the cleaning tool is connected to the connector movement of the end portion from the closed configuration into the open configuration is prevented.

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[0010] The cleaning tool may comprise a collar which abuts the end portion in order to hold the end portion in the closed configuration. The dirt collector may be disposed forward of the handle.

[0011] The longitudinal axis of the cyclonic separating unit may extend in a plane which is located above the handle.

[0012] The cyclonic separating unit may comprise a cyclonic separation chamber having an axis that defines the longitudinal axis of the cyclonic separating unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In order to better understand the present invention, and to show more clearly how the invention may be put into effect, the invention will now be described, by way of example, with reference to the following drawings:

[0014] Figure 1 is a profile view of a handheld vacuum cleaner;

[0015] Figure 2 is a profile sectional view of the handheld vacuum cleaner shown in Figure 1;

[0016] Figure 3 is a front view of the handheld vacuum cleaner shown in Figure 1;

[0017] Figure 4 shows the handheld vacuum cleaner shown in Figure 1, in use;

[0018] Figures 5a, 5b and 5c are representations of the handheld vacuum cleaner shown in Figure 1 in different orientations;

[0019] Figure 6 is a perspective view of a stick vacuum cleaner comprising the handheld vacuum cleaner shown in Figure 1;

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[0020] Figures 7a, 7b and 7c are show different orientations of the vacuum cleaner shown in Figure 6; and

[0021] Figure 8 shows the vacuum cleaner shown in Figure 1 being emptied.

DETAILED DESCRIPTION OF THE INVENTION

[0022] Figures 1 and 2 show a handheld vacuum cleaner 2 comprising a main body 4 having an elongate handle 6, a cyclonic separating unit 8 having a longitudinal axis X and a cleaning tool 10, in the form of a nozzle, which is secured to the cyclonic separating unit 8. The cyclonic separating unit 8 extends away from the handle 6 such that the cleaning tool 10 is at the end of the cyclonic separating unit 8 which is furthest from the handle 6. The cleaning tool 10 extends away from the cyclonic separating unit 8 along the longitudinal axis X of the cyclonic separating unit 8.

[0023] The main body 4 further comprises a suction generator 11 comprising a motor 12 and impeller 13 which are located above and towards the rear of the handle 6, and a battery 14 located directly below the handle 6. An actuator in the form of a finger-operated trigger 16 is provided at an upper portion of the handle 6. A trigger guard 17 extends forwardly from the handle below the trigger 16. The handle 6 is arranged at an angle $\theta 1$ with respect to the longitudinal axis X of the cyclonic separating unit 8 such that the handle 6 is in a pistol grip configuration. In the embodiment shown, a handle axis H is arranged at 110 degrees with respect to the longitudinal axis X of the cyclonic separating unit 8. The angle $\theta 1$ is the included angle between the longitudinal axis X extending forward of the handle 6 and the portion of the handle axis H extending through the handle 6.

[0024] The cyclonic separating unit 8 comprises a primary cyclonic separator 18 and a plurality of secondary cyclonic separators 20 positioned downstream of the primary cyclonic separator 18. The primary cyclonic separator 18 is adjacent a first end of the cyclonic separating unit 8 and the secondary cyclonic separators 20 are adjacent a second end of the cyclonic separating unit 8 which is opposite the first end. The

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secondary cyclonic separators 20 are arranged in a circular array which extend about the longitudinal axis X of the cyclonic separating unit 8.

[0025] The primary cyclonic separator 18 comprises a separator body 22 in the form of a bin having a cylindrical outer wall 24 and an end wall 26. The cylindrical outer wall 24 defines a cyclonic separation chamber 28. In the embodiment shown, it is the axis of the cyclonic separation chamber 28 which defines the longitudinal axis X of the cyclonic separating unit 8. A central duct 30 extends from the end wall 26 to an inlet 32 of the cyclonic separation chamber 28.

[0026] The cleaning tool 10 comprises a connector portion 33 and a nozzle portion 34 which define a duct 36 along the cleaning tool 10. The connector portion 33 has an outer diameter which is smaller than the inner diameter of the portion of the central duct 30 adjacent the end wall 26 such that the connector portion 33 can be inserted into the central duct 30 (as illustrated) thereby ensuring a rigid connection between the cleaning tool 10 and the cyclonic separating unit 8.

[0027] The central duct 30 and the duct 36 through the cleaning tool 10 together define an inlet duct 30, 36 which extends coaxially with the longitudinal axis X and through the end of the cyclonic separating unit 8 which is furthest from the handle 6. The inlet 32 of the cyclonic separation chamber 28 is spaced away from the end wall 26 and is located towards the end of the primary cyclonic separator 18 which is opposite the end of the cyclonic separating unit 8 to which the cleaning tool 10 is connected. The cyclonic separation chamber 28 therefore surrounds the portion of the inlet duct formed by the central duct 30. A first portion of the central duct 30 leading from the end wall 26 extends along the axis X of the cyclonic separation chamber 28. A second portion of the central duct 30 extends from the first portion to the inlet 32 of the cyclonic separation chamber 28. The second portion extends in a direction which has both radial and circumferential components with respect to the cyclonic separation chamber 28 so as to promote rotational flow within the cyclonic separation chamber 28 during use.

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[0028] The end wall 26 and the portion of the cylindrical outer wall 24 adjacent the end wall 26 define a dirt collector 38, which is in the form of a dirt collecting bin, in which dirt separated from the incoming flow by the primary cyclonic separator 18 is collected.

[0029] The end wall 26 is connected to the cylindrical outer wall 24 by a pivot 40 and is held in a closed position by a user-operable catch 42. The end wall 26 can be moved from the closed position, in which dirt is retained within the dirt collector 38, to an open position, in which dirt can be removed from the dirt collector 38, by releasing the catch 42 and pivoting the end wall 26 away from the end of the cylindrical outer wall 24. The cleaning tool 10 is provided with retaining features (not shown) which engage with the central duct 30 so as to secure the cleaning tool 10 to the central duct 30. The cleaning tool 10 further comprises an annular collar 43 that abuts the end wall 26 thereby holding the end wall 26 in the closed position, and so prevents accidental opening of the end wall 26 while the cleaning tool 10 is attached. The cleaning tool 10 has a manually operated catch 44 that is actuated in order to disengage the retaining features from the central duct 24 in order to remove the tool 10 form the cyclonic separating unit 8.

[0030] A cylindrical shroud 45 is disposed centrally within the cyclonic separation chamber 28 and extends coaxially with the axis of the chamber 28. Apertures 46 provided through the shroud 45 define a fluid outlet from the cyclonic separation chamber 28.

[0031] A duct 48, which is formed in part by the shroud 45, provides fluid communication between the outlet from the cyclonic separation chamber formed by the apertures 46 and inlets 49 of the secondary cyclonic separators 20. Each secondary cyclonic separator 20 has a solids outlet 50 at one end which is in communication with a fine dust collector 51 that extends along the side of the primary cyclonic separator 18. A fluid outlet 52 at the end of each of the secondary cyclonic separators 20 opposite the solids outlet 50.

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[0032] The cyclonic separating unit 8, suction generator 11 and battery 14 are expected to be the heaviest components of the vacuum cleaner 2. The separator 8 has a centre of gravity which is forward of the trigger guard 17 and so generates a clockwise moment about the trigger 16 and the trigger guard 17 (as viewed in Figure 2). The battery 14 has a centre of gravity which is rearward of the trigger guard 17. The battery 14 therefore exerts an anticlockwise moment about the trigger 16 and the trigger guard 17. The suction generator 11 also has a centre of gravity which is rearward of the trigger guard 17. The cyclonic separating unit 8, suction generator 11 and battery 14 are positioned such that the net moment of all of the components of the vacuum cleaner 2 about an axis that extends perpendicularly with respect to the handle 6 and the longitudinal axis X of the cyclonic separating unit 8 and which passes through a region immediately below the trigger guard 17 is zero. The centre of gravity of the vacuum cleaner 2 is therefore located within the region below the trigger guard 17 such that when the trigger 16 is released by a user, the handheld vacuum cleaner 2 is balanced about a point below the trigger guard 17 and so can be supported easily by the rest of the user's fingers on the handle 6 and the upper finger against the trigger guard 17 without tipping forwards or backwards. Furthermore, the vacuum cleaner 2 can be supported on the battery 14, which forms a base of the vacuum cleaner 2, without toppling over.

[0033] Figure 3 shows the vacuum cleaner 2 from the front. The cleaning tool 10 is relatively straight and slender and extends along the longitudinal axis X. The cleaning tool 10 therefore extends within the outer profile of the cyclonic separating unit 8 as viewed from the front of the vacuum cleaner 2 along the longitudinal axis X.

[0034] In use, the handheld vacuum cleaner 2 is activated by a user pressing the trigger 16 with an index finger. Dirty air is drawn by the suction generator 11 through the inlet duct 30, 36 and through the inlet 32 into the cyclonic separation chamber 28. The rotational flow promoted by the second portion of the central duct 30 within the cyclonic separation chamber 28 produces a cyclonic action that separates relatively heavy or large dirt from the air. Typically, the vacuum cleaner 2 is held such that the cyclonic separating unit 8 points downwardly from the handle 6. Dirt separated in the

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cyclonic separation chamber 28 therefore falls under the influence of gravity into the dirt collector 38. The partially cleaned air passes through the apertures 46 in the shroud 45 and is drawn along the duct 48 to the secondary cyclones 20. Smaller and lighter particles of dirt are separated from the air by the secondary cyclones 20 and expelled through the respective solids outlets into the fine dust collector 51. The cleaned air exits the secondary cyclones 20 via the respective fluid outlets 52 of the secondary cyclones 20 through the suction generator 11 and out of vents (not shown) at the rear of the main body 4.

[0035] The alignment of the axis X of the cyclonic separating unit 8 with the cleaning tool 10 makes the vacuum cleaner 2 compact and enables the end of the cyclonic separating unit 8 to be inserted into confined spaces during cleaning, as illustrated in Figure 4. The vacuum cleaner 2 is therefore particularly suitable for cleaning places that are difficult to reach, such as gaps between items of furniture, walls and appliances. Furthermore, the cyclonic separating unit 8 can be rotated substantially within its own profile during cleaning. That is, the area swept by the cyclonic separating unit 8 (as viewed along the longitudinal axis X) as the cyclonic separating unit 8 is rotated about its longitudinal axis X, is not significantly greater than the actual area occupied by the cyclonic separating unit 8. A schematic illustration of the vacuum cleaner 2 with the handle in a vertical orientation is shown in Figure 5b. Figures 5a and 5c show the vacuum cleaner 2 rotated through 45 degrees away from the orientation shown in Figure 5b in each direction. The cyclonic separating unit 8 can therefore be rotated clockwise and anticlockwise within the confined space without colliding with surfaces of the confined space, and so can be manipulated easily in order to clean hard-to-reach surfaces.

[0036] In addition to the above benefits, the alignment of the cleaning tool 10 with the longitudinal axis X ensures that the inclination angle of the cyclonic separating unit 8 does not vary as the vacuum cleaner 2 is rotated about the longitudinal axis X and so the separation of efficiencies of the primary cyclonic separator 18 and the secondary cyclonic separators 20 remain approximately constant during use. This is particularly

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advantageous when the cleaning tool 10 is replaced with a wand 110 and a cleaner head 112 to form a stick vacuum cleaner 102, as shown in Figure 6.

[0037] The wand 110 extends coaxially with the longitudinal axis X of the cyclonic separating unit 8. The cleaner head 112 comprises an articulated neck 114 having first and second rotational axes Y, Z that are arranged perpendicular to each other. The arrangement of the axes Y, Z is such that, when the cleaner head 112 is placed on a surface with the wand 110 inclined with respect to the surface, rotation of the stick vacuum cleaner 102 about the longitudinal axis X of the cyclonic separating unit 8 (and hence rotation of the wand 110 about the wand axis) causes the cleaner head 112 to steer left or right, as shown in Figures 7a to 7c.

[0038] As mentioned above, the inclination of the longitudinal axis X of the cyclonic separating unit 8 remains substantially constant as the cleaner head 114 is steered across a surface being cleaned. Consequently, unlike known stick vacuum cleaners, the cyclonic separation efficiency remains substantially constant and the risk of re-entrainment remains low.

[0039] A further benefit is that the centre of gravity of the cyclonic separating unit 8 is located at or close to the axis of the wand 110. Consequently, the weight balance of the cyclonic separating unit 8 about the axis of the wand 110 remains approximately constant as the cyclonic separating unit 8 is rotated during cleaning. The vacuum cleaner 2 is therefore easy to manoeuvre.

[0040] Referring to Figure 8, in order to empty the dirt collector 38 and the fine dust collector 51 of either of the described embodiments, the user first disconnects the cleaning tool 10 or the wand 110. Then, whilst gripping the handle 6, the user points the vacuum cleaner 2 towards a suitable receptacle (e.g. a waste bin or bag) into which the dirt is to be emptied. The catch 42 is then released by the user and the end wall 26 pivoted from its closed position into its open position. Since the cyclonic separating unit 8 is pointed away from the user, there is no need for the user to adopt a different

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grip or posture from that which is adopted during normal cleaning. Consequently, the process by which the dirt collector 38 and the fine duct collector 51 are emptied is very intuitive and ergonomic. Furthermore, dirt exits the dirt collector 38/fine dust collector 51 from the end of the cyclonic separating unit 8 which is furthest from the handle 6. Therefore, there is less risk that dirt will spill from the dirt collector 38/fine dust collector 51 onto a user during emptying.

[0041] In an alternative arrangement, the inlet duct may be spaced from the axis of the cyclonic separating unit 8. Nevertheless, the cyclonic separating unit may be arranged to extend partly around a portion of the inlet duct or to entirely surround a portion of the inlet duct. For example, the inlet duct may be recessed into the side of the cyclonic separating unit such that duct extends within the profile of the cyclonic separating unit when viewed along the axis of the cyclonic separating unit.

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Doc Code: PA..
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Application Number	Not Yet Assigned
Filing Date	Concurrently Herewith
First Named Inventor	James DYSON
Title	VACUUM CLEANER
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	424662105900

SIGNATURE of Applicant or Patent Practitioner

Signature	/christopher gloria/	Date (Optional)	September 19, 2016
Name	Christopher Gloria	Registration Number	71907
Title (if Applicant is a juristic entity)			
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I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Dyson Technology Limited

[ ] Inventor or Joint Inventor (title not required below)

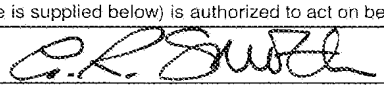
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SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	14. May. 2014
Name	Gillian R. Smith		
Title	Group IP Director, Dyson Technology Limited		

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EFS ID:	26963478
Application Number:	15269430
International Application Number:	
Confirmation Number:	6526
Title of Invention:	VACUUM CLEANER
First Named Inventor/Applicant Name:	James DYSON
Customer Number:	25227
Filer:	Nathan Schuler Vogler/Ghita Haronni
Filer Authorized By:	Nathan Schuler Vogler
Attorney Docket Number:	424662105900
Receipt Date:	19-SEP-2016
Filing Date:	
Time Stamp:	16:50:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1740
RAM confirmation Number	092016INTEFSW00004066031952
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Document Description	Start	End
Specification	1	10
Claims	11	12
Abstract	13	13

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3	Drawings-only black and white line drawings	Drawings_424662105900.pdf	239959 7ba33ff547283df4577d5128ad7b0e4585d0f00e	no	8
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4	Application Data Sheet	ADS_424662105900.PDF	1822461 2efe3891ac30c214b6a2b294db3db9a5a2e4ca8e	no	8
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5	Fee Worksheet (SB06)	fee-info.pdf	36652 238f6a9d87ef9f7803227013c4471382e9d3feea	no	2

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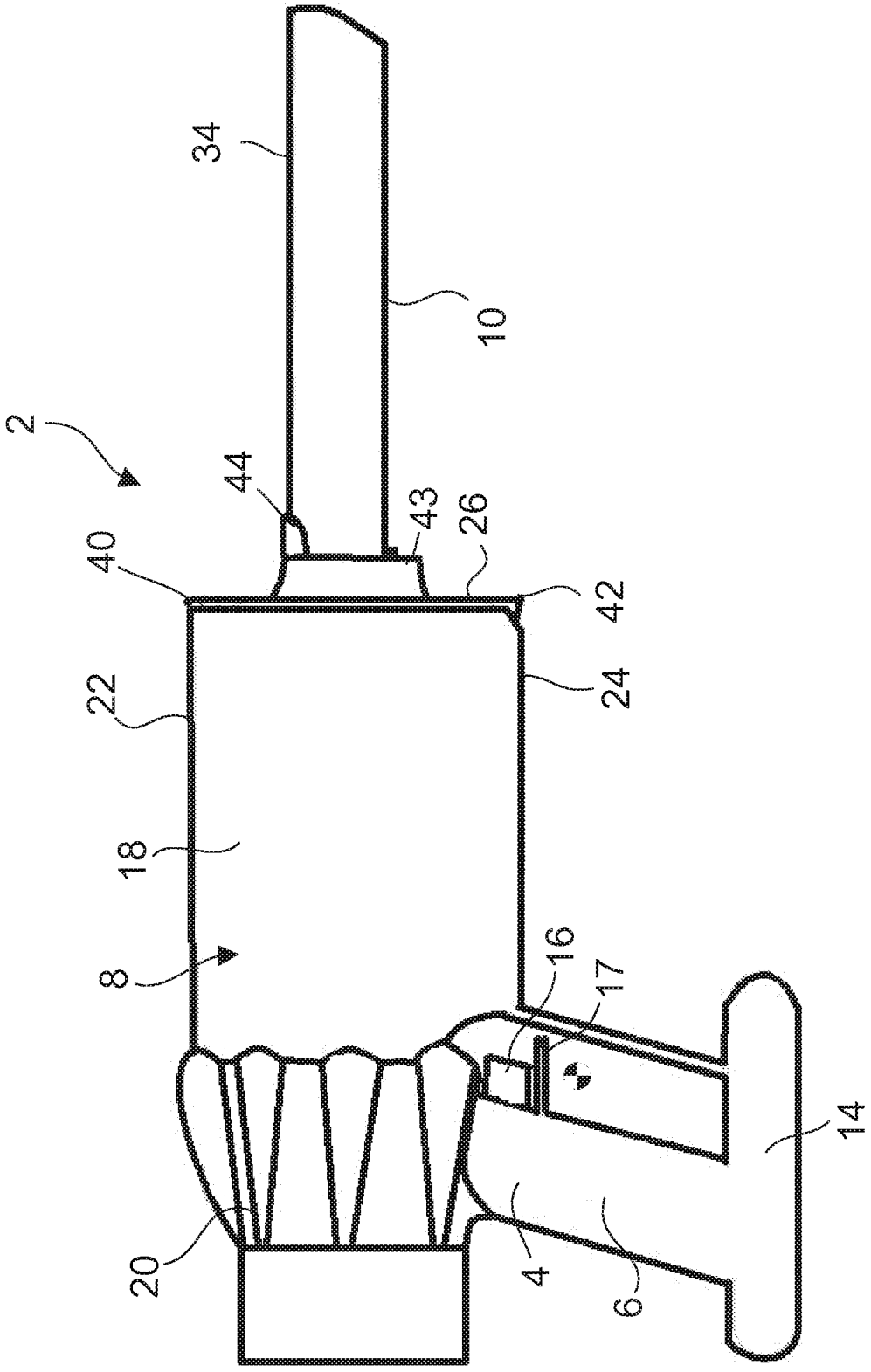


Figure 1

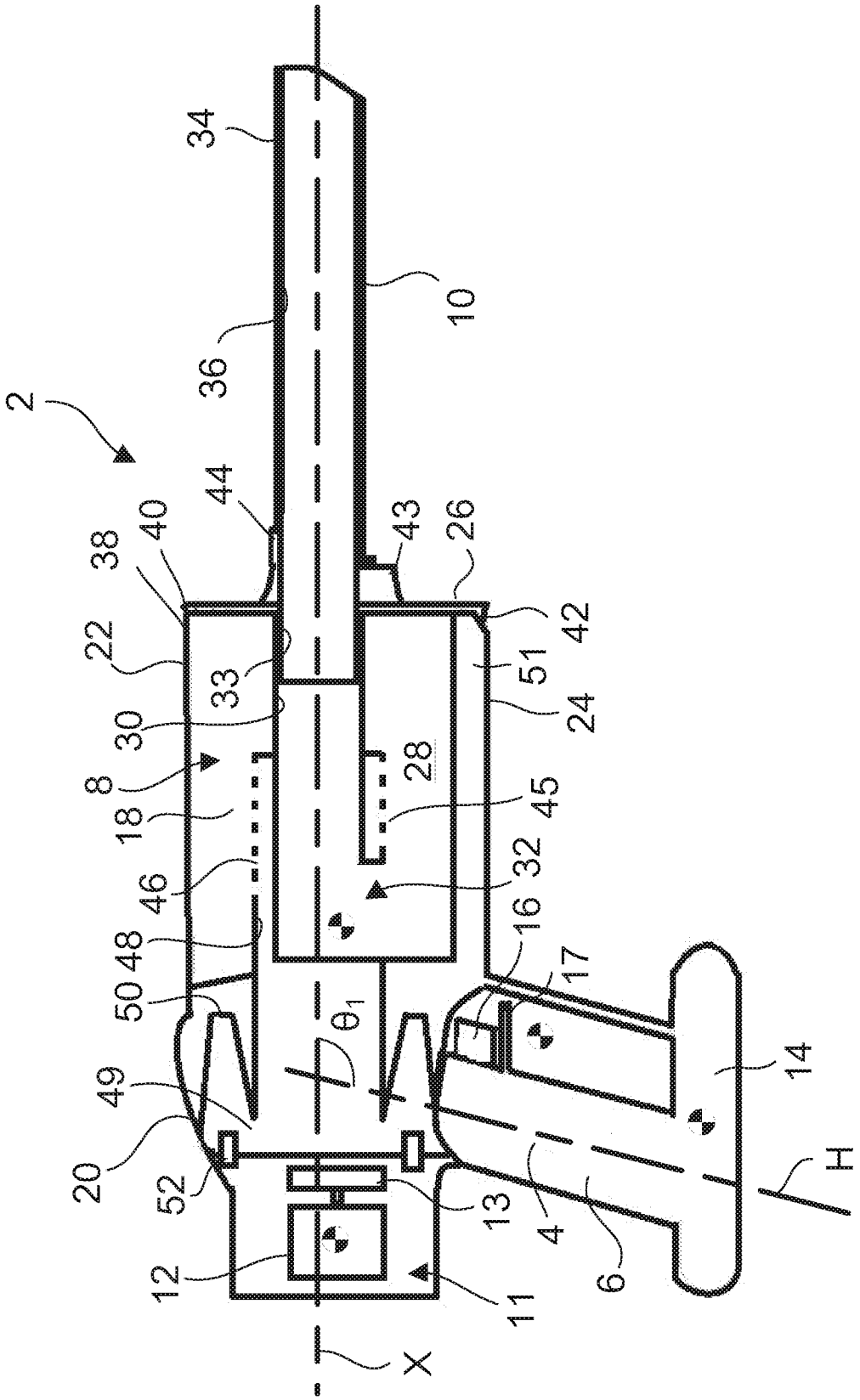

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Figure 2

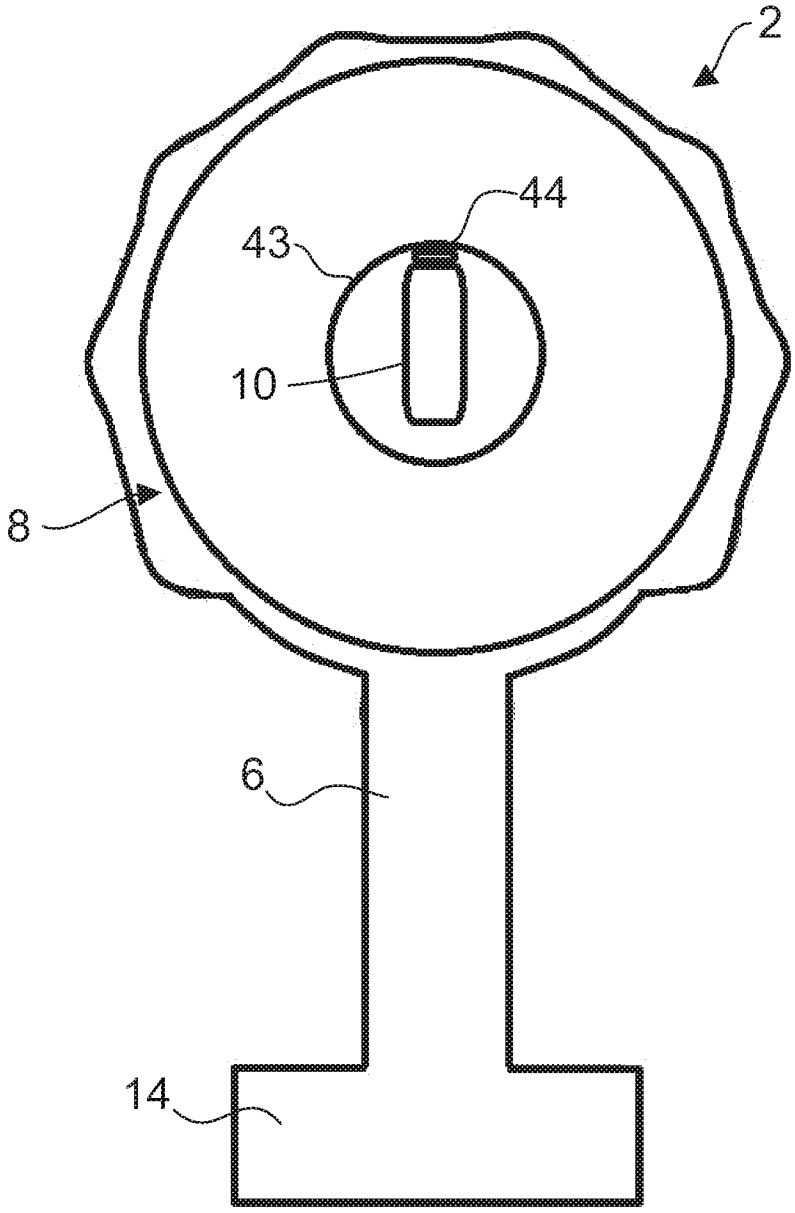


Figure 3

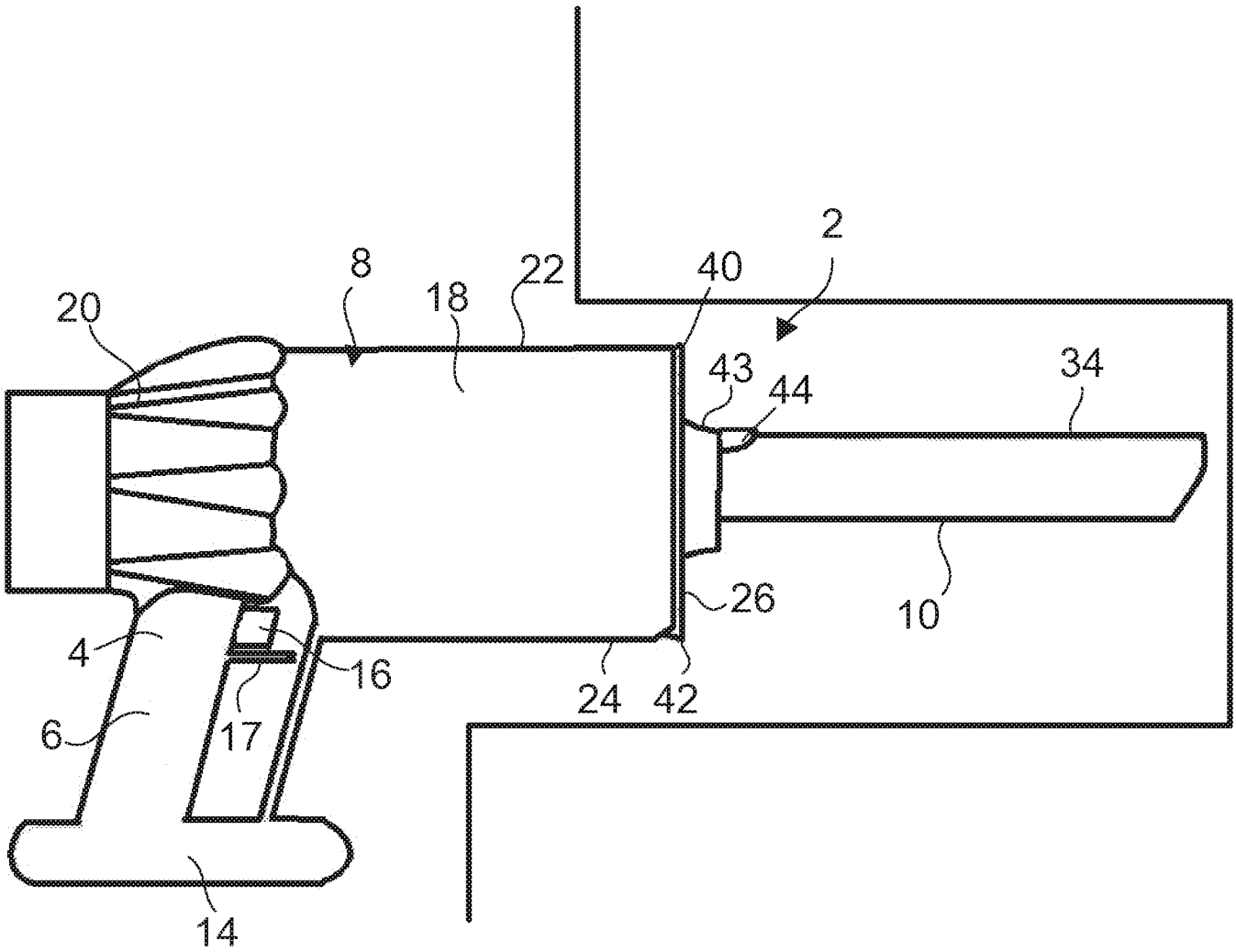


Figure 4

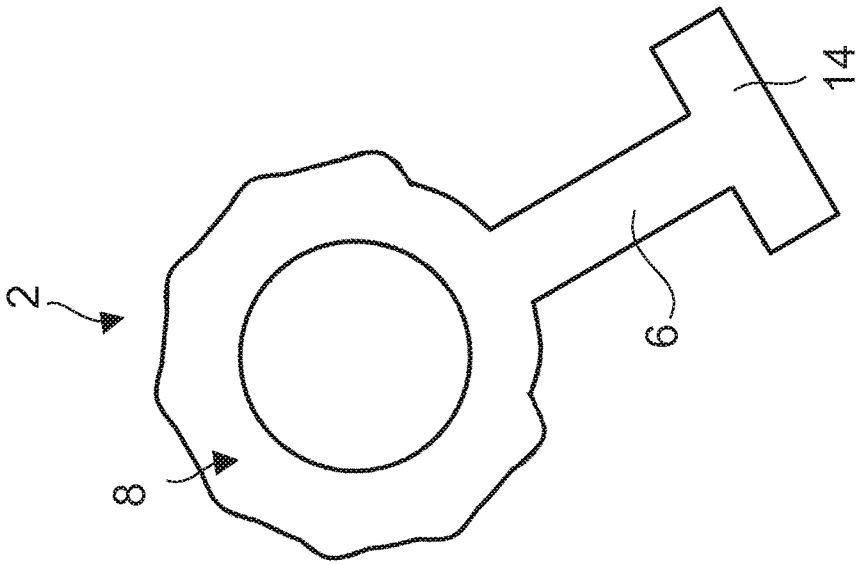


Figure 5c

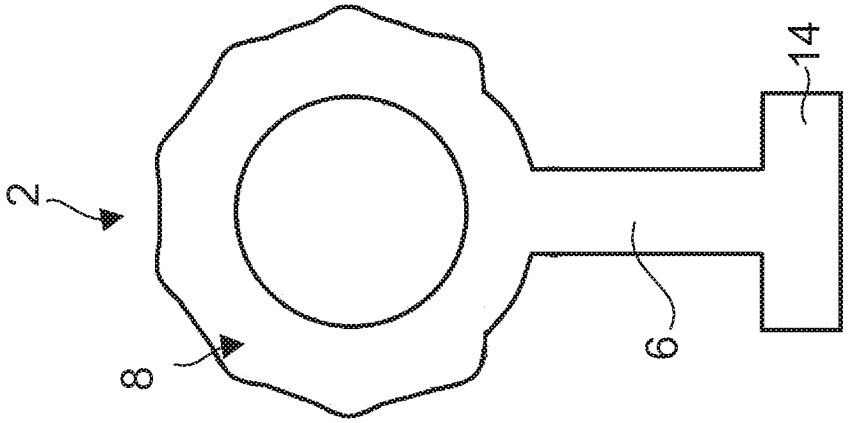


Figure 5b

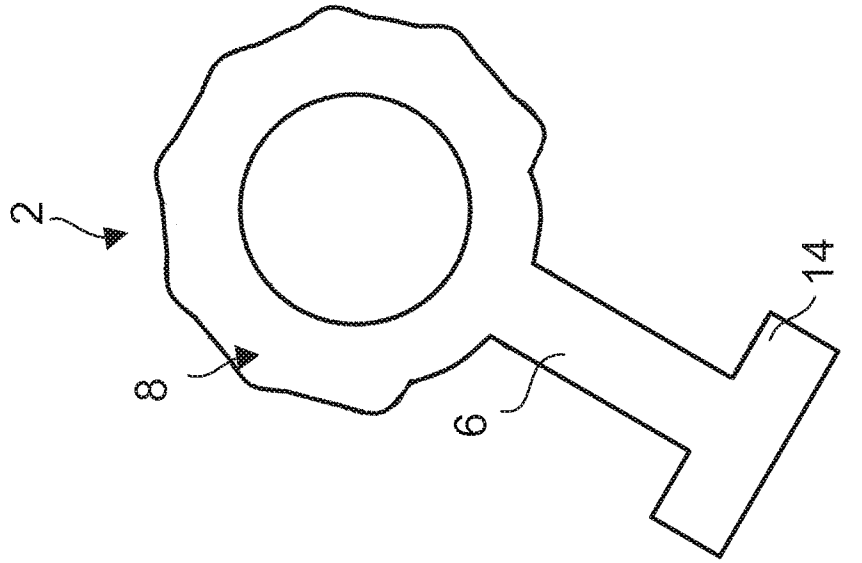


Figure 5a

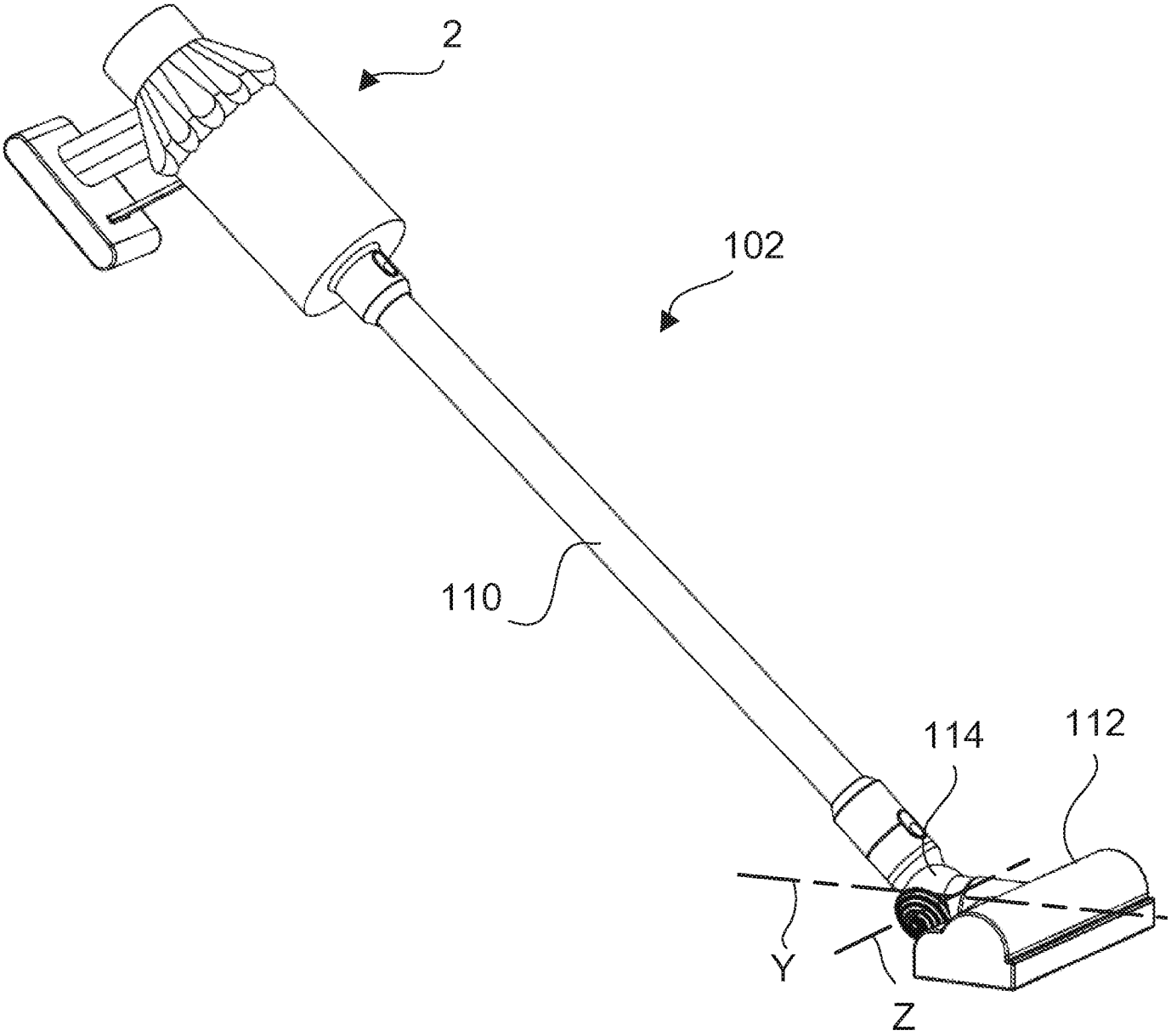


Figure 6

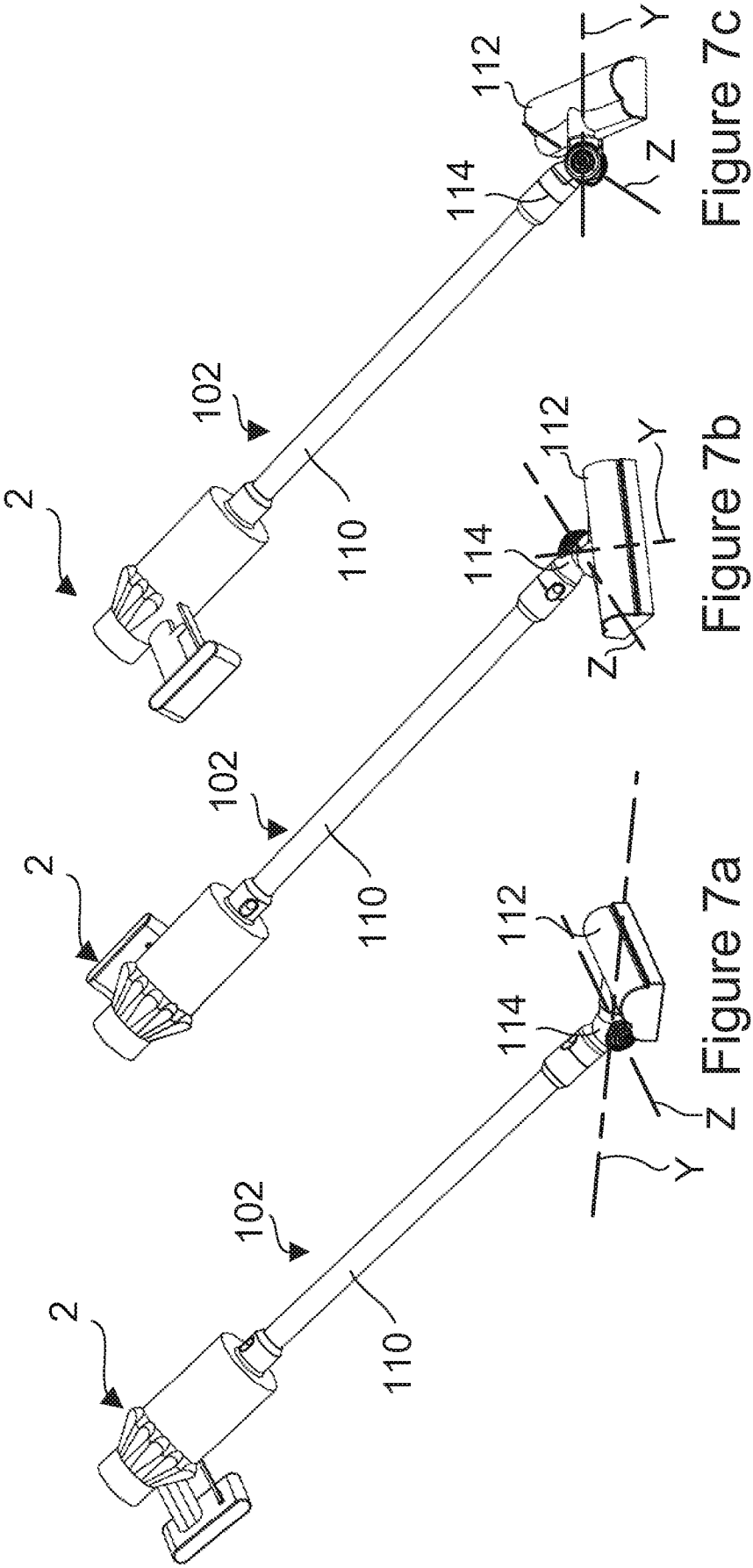


Figure 7a

Figure 7b

Figure 7c

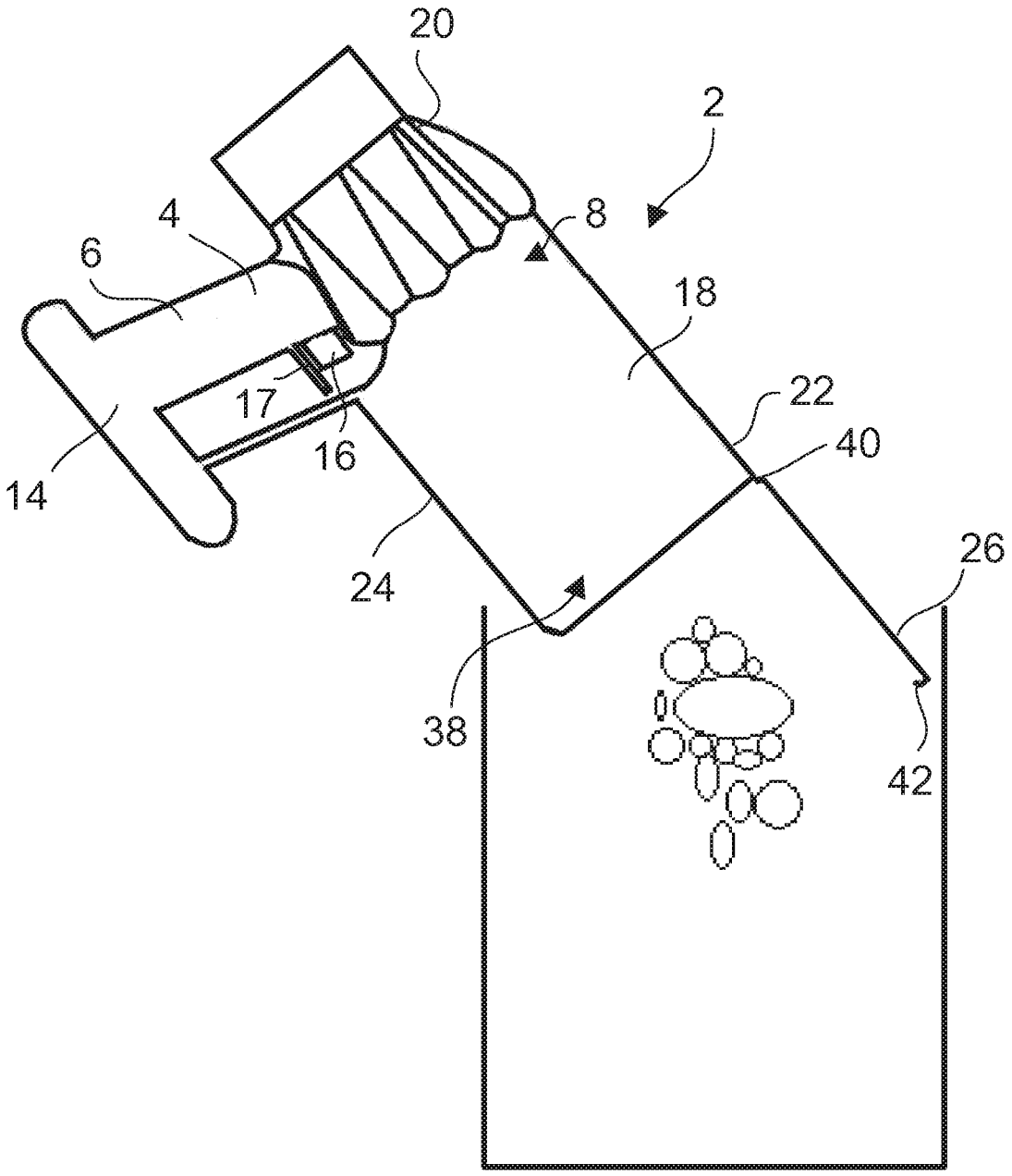


Figure 8

CLAIMS

1. A handheld vacuum cleaner comprising:

a handle by which the vacuum cleaner is supported during normal use;

a cyclonic separating unit having a longitudinal axis and a dirt collector at one end of the cyclonic separating unit, the cyclonic separating unit comprising an end portion having a closed configuration in which dirt is retained within the dirt collector by the end portion and an open configuration for the removal of dirt from the dirt collector, wherein the handle has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

2. The handheld vacuum cleaner of claim 1, wherein the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 100 degrees and not greater than 125 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

3. The handheld vacuum cleaner of claim 1, wherein the end portion comprises an end wall of the cyclonic separating unit.

4. The handheld vacuum cleaner of claim 1, wherein the end portion is arranged to pivot between the closed configuration and the open configuration.

5. The handheld vacuum cleaner of claim 1, wherein the cyclonic separating unit comprises a dirty air inlet through the end portion.

6. The handheld vacuum cleaner of claim 1, further comprising a connector and a cleaning tool connectable to the connector, wherein the cleaning tool is configured such that when the end portion is in the closed configuration and the cleaning tool is

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connected to the connector movement of the end portion from the closed configuration into the open configuration is prevented.

7. The handheld vacuum cleaner of claim 6, wherein the cleaning tool comprises a collar which abuts the end portion in order to hold the end portion in the closed configuration.

8. The handheld vacuum cleaner of claim 1, wherein the dirt collector is disposed forward of the handle.

9. The handheld vacuum cleaner of claim 1, wherein the longitudinal axis of the cyclonic separating unit extends in a plane which is located above the handle.

10. The handheld vacuum cleaner of claim 1, wherein the cyclonic separating unit comprises a cyclonic separation having an axis that defines the longitudinal axis of the cyclonic separating unit.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
	Application Number	
Title of Invention	VACUUM CLEANER	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	James		DYSON	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Bristol	Country of Residence i	GB

Mailing Address of Inventor:

Address 1	c/o Dyson Technology Limited		
Address 2	Tetbury Hill, Malmesbury		
City	Wiltshire	State/Province	
Postal Code	SN16 0RP	Country i	GB

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	Stephen	Robert	DIMBYLOW	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Swindon	Country of Residence i	GB

Mailing Address of Inventor:

Address 1	c/o Dyson Technology Limited		
Address 2	Tetbury Hill, Malmesbury		
City	Wiltshire	State/Province	
Postal Code	SN16 0RP	Country i	GB

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
	Application Number	
Title of Invention	VACUUM CLEANER	

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	25227		
Email Address	patentdocket@mofo.com	Add Email	Remove Email

Application Information:

Title of the Invention	VACUUM CLEANER		
Attorney Docket Number	424662105900	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	25227		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
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Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
1516499.9	GB	2015-09-17	

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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
	Application Number	
Title of Invention	VACUUM CLEANER	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Dyson Technology Limited		
Mailing Address Information For Applicant:			
Address 1	Tetbury Hill, Malmesbury		
Address 2			
City	Wiltshire	**State/Province**	
Country	GB	Postal Code	SN16 0RP
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
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Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	Dyson Technology Limited

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	Tetbury Hill, Malmesbury		
Address 2			
City	Wiltshire	**State/Province**	
Country i	GB	Postal Code	SN16 0RP
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/christopher gloria/			Date (YYYY-MM-DD)	2016-09-19
First Name	Christopher	Last Name	Gloria	Registration Number	71907

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	424662105900
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This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ABSTRACT

A handheld vacuum cleaner including a handle by which the vacuum cleaner is supported during normal use and a cyclonic separating unit having a longitudinal axis and a dirt collector at one end of the cyclonic separating unit. The cyclonic separating unit includes an end portion having a closed configuration in which dirt is retained within the dirt collector and an open configuration for the removal of dirt from the dirt collector. The handle has a pistol grip configuration in which the handle is inclined with respect to the cyclonic separating unit to form an angle of not less than 85 degrees and not greater than 140 degrees between the handle and the longitudinal axis of the cyclonic separating unit.

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