



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.11.2008 Bulletin 2008/45

(51) Int Cl.:
A47L 9/10 (2006.01)

(21) Application number: **08000808.9**

(22) Date of filing: **17.01.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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(30) Priority: **30.04.2007 US 926832 P**
18.06.2007 KR 20070059502

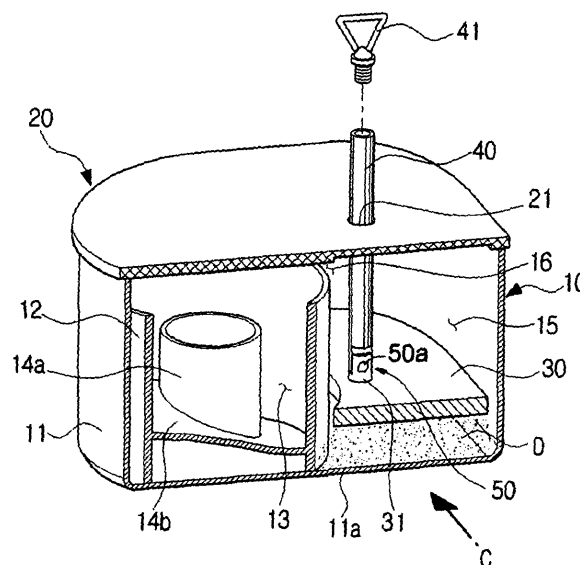
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(54) **Dust collecting apparatus for vacuum cleaner**

(57) A dust collecting apparatus for a vacuum cleaner is provided that includes a dust collecting unit (10), detachably mounted in a main body of the vacuum cleaner. The dust collecting unit (10) comprises an inlet and an exhaust port; a cover (20) to open and close an upper part of the dust collecting unit (10); a dust compression plate (30) capable of upward and downward movement inside the dust collecting unit (10); and a plunger (40) which penetrates the cover (20). One end of the plunger (40) is attached to the dust compression plate (30) by a hinge (50) so that the dust compression plate (30) moves upwardly and downwardly when dust compression is being performed, and the plunger (40) is retracted and folded down toward the cover (20) about one end of the plunger (40) when dust compression is not being performed.

FIG. 2



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present disclosure relates to a vacuum cleaner, and more particularly, to a dust collecting apparatus for a vacuum cleaner, which collects dust from a surface to be cleaned along with air drawn-in through a suction nozzle using a suction force generated from a suction motor, and discharges dust-laden air to the outside of the vacuum cleaner.

2. Description of the Related Art

[0002] In general, dust collecting apparatuses for vacuum cleaners are divided into dust collecting apparatuses using dust bags and bag less dust collecting apparatuses in which dust bins are used semi-permanently. Modern vacuum cleaners mainly include bagless dust collecting apparatuses in which dust bins are used semi-permanently. Such bagless dust collecting apparatuses separate dust from a surface to be cleaned from drawn-in air using vacuum pressure generated between a suction nozzle and the surface to be cleaned, collect the separated dust, filter air from which the dust has been separated, and discharge the filtered air to the outside of vacuum cleaners.

[0003] If a predetermined amount of dust is collected in such a dust collecting apparatus, a user may separate the dust collecting apparatus from a vacuum cleaner and empty the dust collecting apparatus. In this situation, if the dust collecting apparatus has a small size, a user may experience inconvenience due to the frequency at which the dust collecting apparatus needs to be emptied.

[0004] In order to reduce user inconvenience, Japanese Laid Open Patent Application No. 54-99355 discloses a dust collecting apparatus including a dust compression plate to compress dust collected in a dust collecting chamber, and a plunger to operate the dust compression plate. However, since the plunger of a conventional dust collecting apparatus has a short length, a short compression motion during which dust is compressed using the dust compression plate causes a small amount of dust to be compressed, and accordingly, the degree of compression of the dust is small.

[0005] Japanese Laid Open Patent Application No. 54-51260 provides a dust collecting apparatus including a plunger having a relatively long length in order to increase the degree of compression of dust collected in a dust collecting chamber. However, in this situation, the plunger is disposed perpendicular to a dust compression plate regardless of whether the plunger is used or not, so the dust collecting apparatus should include a separate supporting unit and a separate space disposed above a dust collecting unit in order to support the plunger. This causes the height of the dust collecting unit to

increase. Accordingly, it is impossible to maintain a compact dust collecting unit.

SUMMARY OF THE INVENTION

[0006] An aspect of the present disclosure is to address at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present disclosure is to provide a dust collecting apparatus for a vacuum cleaner, which can increase the dust compression motion for compressing dust so that the degree of compression of the dust can be maximized, while a dust collecting case can be maintained as compact as possible.

[0007] The invention is defined in claims 1 and 4, respectively. Particular embodiments of the invention are set out in the dependent claims.

[0008] According to an aspect of the present disclosure, there is provided a dust collecting apparatus for a vacuum cleaner including a dust collecting unit, which is detachably mounted in a main body of the vacuum cleaner and comprises an inlet and an exhaust port, to separate dust from air flowing into the inlet, collect the separated dust and discharge air from which the dust has been separated to the exhaust port; a cover to open and close an upper part of the dust collecting unit; a dust compression plate which is capable of upward and downward movement inside the dust collecting unit; and a plunger which penetrates the cover, one end of the plunger being attached to the dust compression plate by a hinge mechanism; wherein the plunger enables the dust compression plate to move upwardly and downwardly when dust compression is being performed, and the plunger is retracted and folded down toward the cover about one end of the plunger when dust compression is not being performed.

[0009] Accordingly, the dust compression motion can be increased while the entire size of the dust collecting apparatus remains unchanged, so that the degree of compression of dust collected in the dust collecting unit and the space for collecting dust can increase, and thus there is no need to frequently empty the dust collecting unit.

[0010] The plunger may further comprise a grip part detachably coupled to the opposite end thereof. In this situation, during dust compression, a user grasps the grip part and presses the plunger downwards, and thus a user's force may be applied to the dust compression plate more effectively, thereby increasing the compression force. The grip part may be disposed on the same plane as the plunger so that the grip part may be prevented from protruding further than the plunger when the plunger is folded down.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The above and/or other aspects of the present disclosure will be more apparent by describing certain

exemplary embodiments of the present disclosure with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a dust collecting apparatus for a vacuum cleaner according to an exemplary embodiment of the present disclosure;

FIG. 2 is a partially cut-away view of a dust collecting apparatus for a vacuum cleaner according to an exemplary embodiment of the present disclosure;

FIG. 3 is a sectional view, in which the dust collecting apparatus of FIG. 1 is cut along line III-III in FIG. 1; and

FIG. 4 is a side sectional view of the dust collecting apparatus of FIG. 2 viewed from direction C in FIG. 2.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0012] Hereinafter, a dust-collecting apparatus of a vacuum cleaner according to exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0013] Referring to FIGS. 1 and 2, a dust collecting apparatus according to an exemplary embodiment of the present disclosure comprises a dust collecting unit 10, a cover 20, a dust compression plate 30 and a plunger 40.

[0014] The dust collecting unit 10 comprises a dust collecting case 11, a cyclone chamber 13 and a dust collecting chamber 15. The dust collecting case 11 includes an inlet (not shown) into which dust-laden air flows, and an exhaust port (not shown) through which air from which dust has been separated is discharged. The cyclone chamber 13 is separated from the dust collecting chamber 15 by a cylindrical part 12, and fluidly communicates with the inlet (not shown) and exhaust port (not shown).

[0015] The cyclone chamber 13 includes an exhaust pipe 14a which has a height lower than that of the cylindrical part 12 and which fluidly communicates with the exhaust port (not shown). A spiral guide 14b is disposed between the cylindrical part 12 and the exhaust pipe 14a to give a rotation force to air and dust flowing into the cyclone chamber 13. The dust collecting chamber 15 corresponds to the area of the dust collecting case 11 excluding the cylindrical part 12, in which dust D is stored after being discharged from a dust discharge space 16 formed between an upper end of the cylindrical part 12 and a bottom surface of the cover 20, as shown in FIG. 3.

[0016] The cover 20 is disposed above the dust collecting case 11 to seal the dust collecting case 11. When a user removes dust collected in the dust collecting case 11, the cover 20 is removed from the dust collecting case 11 so that the upper part of the dust collecting case 11 is open. Additionally, the cover 20 comprises a through hole 21 through which the plunger 40 penetrates at a

position above the dust collecting chamber 15.

[0017] The dust compression plate 30 is disposed on the inside of the dust collecting chamber 15 so as to be able to ascend and descend inside the dust collecting chamber 15. The dust compression plate 30 is substantially parallel to a bottom wall 11a of the dust collecting case 11, so that the dust compression plate 30 can compress dust D collected in the dust collecting chamber 15 while moving downward inside the dust collecting chamber 15. A projection 31 coupled to the end of the plunger 40 adjacent to the dust compression plate 30 using a hinge pin 50a is formed on the upper surface of the dust compression plate 30. The projection 31 has a common axis with the through hole 21 of the cover 20 and has a diameter or a thickness relatively smaller than the through hole 21, so that the plunger 40 can pass through the through hole 21.

[0018] One end of the plunger 40 is connected to the dust compression plate 30 by a hinge mechanism 50, and a grip part 41 is detachably screwed to the opposite end thereof, as shown in FIG. 2. When the plunger 40 is laid down as shown in FIG. 1, the grip part 41 is disposed on the same plane as the plunger 40 is disposed, in order to prevent the grip part 41 from protruding from the top surface of the cover 20 further than the plunger 40.

[0019] A process of compressing dust of a dust collecting apparatus for a vacuum cleaner configured in accordance with an exemplary embodiment of the present disclosure is now described with reference to the accompanying drawings. FIG. 3 shows the dust collecting apparatus before dust is compressed, and FIG. 4 shows the dust collecting apparatus while dust is being compressed.

[0020] When dust D is collected in the dust collecting case 11 during vacuum cleaning, the dust compression plate 30 is disposed above the top of the cylindrical part 12, that is, substantially close to the bottom surface of the cover 20, so that dust discharged through the dust discharge space 16 can be collected in the dust collecting chamber 15 without interference, as shown in FIG. 3.

[0021] When compressing dust, a user grasps the grip part 41 of the plunger 40 and swivels the plunger 40 about the hinge pin 50a by approximately 90° in direction A, so that the plunger 40 is perpendicular to the dust compression plate 30.

[0022] If the user presses the plunger 40 in direction B while grasping the grip part 41, the plunger 40 may penetrate through the through hole 21 (referring to FIG. 2) and enter the dust collecting chamber 15, so that the dust compression plate 30 can move downwardly toward the bottom wall 11a of the dust collecting case 11. Accordingly, the dust compression plate 30 can compress dust D collected in the dust collecting chamber 15.

[0023] At this time, the user can compress dust D multiple times by repeatedly raising and lowering the dust compression plate 30 using the grip part 41. A relatively long dust compression motion can be ensured using the plunger 40 with a long length, and thus the degree of

compression of the dust can be maximized. Reference numeral H of FIG. 4 indicates the user's hand.

[0024] When dust compression is completed, a user can completely pull out the plunger 40 from the dust collecting case 11 through the through hole 21 in a direction opposite direction B, using the grip part 41. Next, the user swivels the plunger 41 in a direction opposite direction A about the hinge pin 50a, using the grip part 41, so that the plunger 40 can be laid down adjacent to the cover 20.

[0025] When dust compression is not being performed, the plunger 40 is laid down flat on the top surface of the cover 20.

[0026] According to the exemplary embodiment of the present disclosure described above, a plunger to move a dust compression plate up and down is long so that the dust compression motion can be as long as possible, and thus the degree of compression of the dust can increase, thereby ensuring a wide space for dust collection.

[0027] Additionally, a plunger may be kept laid down on top of the dust compression plate, so a separate space is not required to receive or support the plunger, and the dust collecting unit may have a low height.

[0028] The foregoing exemplary embodiments and advantages are merely exemplary and are not to be construed as limiting the present disclosure. The present teaching can be readily applied to other types of apparatuses. Also, the description of the exemplary embodiments of the present disclosure is intended to be illustrative, and not to limit the scope of the claims, and many alternatives, modifications, and variations will be apparent to those skilled in the art.

Claims

1. A dust collecting apparatus for a vacuum cleaner, comprising:

a dust collecting unit (10) detachably mounted in a main body of the vacuum cleaner and comprises an inlet and an exhaust port, said dust collecting unit (10) being configured to separate dust from air flowing into the inlet, collect separated dust and discharge air from which the dust has been separated to the exhaust port;
a cover (20) to open and close an upper part of the dust collecting unit (10);
a dust compression plate (30) which is capable of upward and downward movement inside the dust collecting unit (10); and
a plunger (40) which penetrates the cover (20), said plunger (40) having a first end attached to the dust compression plate (30) by a hinge mechanism (50);

wherein the plunger (40) is configured to move the dust compression plate (30) upwardly and downwardly when dust compression is being performed,

and wherein the plunger (40) is retractable and foldable downward about one end of the plunger toward the cover (20) when dust compression is not being performed.

2. The dust collecting apparatus as claimed in claim 1, wherein the plunger (40) comprises a grip part (41) detachably coupled to a second end opposite the first end.
3. The dust collecting apparatus as claimed in claim 2, wherein the grip part (41) is disposed on the same plane as the plunger (40) is disposed in order to prevent the grip part (41) from protruding further than the plunger (40) when the plunger is folded downward about the first end of the plunger toward the cover (20).
4. A dust collecting apparatus comprising:
 - a dust collecting unit (10) having a dust collecting case (11) and a dust collecting chamber (15), said dust collecting case (11) having an inlet and an exhaust port;
 - a cover (20) above the dust collecting case (11);
 - a dust compression plate (30) inside of the dust collecting chamber (15); and
 - a plunger (40) through a through hole (21) in the cover (20), the plunger (40) being configured to move the dust compression plate (30) upwards and downwards in the collecting chamber (15) and a first end of the plunger (40) being connected to the dust compression plate (30) by a hinge mechanism (50).
5. The dust collecting apparatus as claimed in claim 4, wherein the plunger (40) comprises a grip part (41) detachably coupled to a second end opposite the first end.
6. The dust collecting apparatus as claimed in claim 5, wherein the grip part (41) is within the same plane as the plunger (40) in order to prevent the grip part (41) from protruding further than the plunger (40) when the plunger is folded downward about the first end of the plunger toward the cover (20).
7. The dust collecting apparatus as claimed in any of claims 4 to 6, wherein the dust collecting unit (10) further comprises a cyclone chamber (13), and wherein the cyclone chamber (13) is separated from the dust collecting chamber (15) by a cylindrical part (12) and fluidly communicates with the inlet and the exhaust port.
8. The dust collecting apparatus as claimed in claim 7, wherein the cyclone chamber (13) includes an exhaust pipe (14a) which has a height lower than that

of the cylindrical part (12) and which fluidly communicates with the exhaust port and a spiral guide (14b) between the cylindrical part (12) and the exhaust pipe (14a) to give a rotation force to air and dust flowing into the cyclone chamber (13).

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9. The dust collecting apparatus as claimed in claim 7 or 8, wherein the dust collecting chamber (15) corresponds to the area of the dust collecting case (11) excluding the cylindrical part (12), in which dust D is stored after being discharged from a dust discharge space (16) formed between an upper end of the cylindrical part (12) and a bottom surface of the cover (20).
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10. The dust collecting apparatus as claimed in any of claims 4 to 9, wherein the plunger (40) has a projection (31) coupled to the first end of the plunger (40) adjacent to the dust compression plate (30) by the hinge mechanism (50), and wherein the projection (31) has a common axis with the through hole (21) of the cover (20) and has a diameter or a thickness relatively smaller than the through hole (21).
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11. The dust collecting apparatus as claimed in any of claims 4 to 10, wherein the plunger (40) is configured to swivel about a hinge pin (50a) by approximately 90° in a first direction, so that the plunger is perpendicular to the dust compression plate (30) and swivel in a second direction opposite the first direction about the hinge mechanism (50) so that the plunger (40) can be laid down adjacent to the cover (20).
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12. The dust collecting apparatus as claimed in any of claims 4 to 11, wherein the plunger (40) is configured to move the dust compression plate (30) upwards and downwards in the dust collecting chamber (15) when the plunger (40) is perpendicular to the dust compression plate (30).
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13. The dust collecting apparatus as claimed in claim 12, wherein the plunger (40) is configured to move the dust compression plate (30) upwards and downwards in the dust collecting chamber (15) substantially a length of the plunger (40).
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FIG. 1

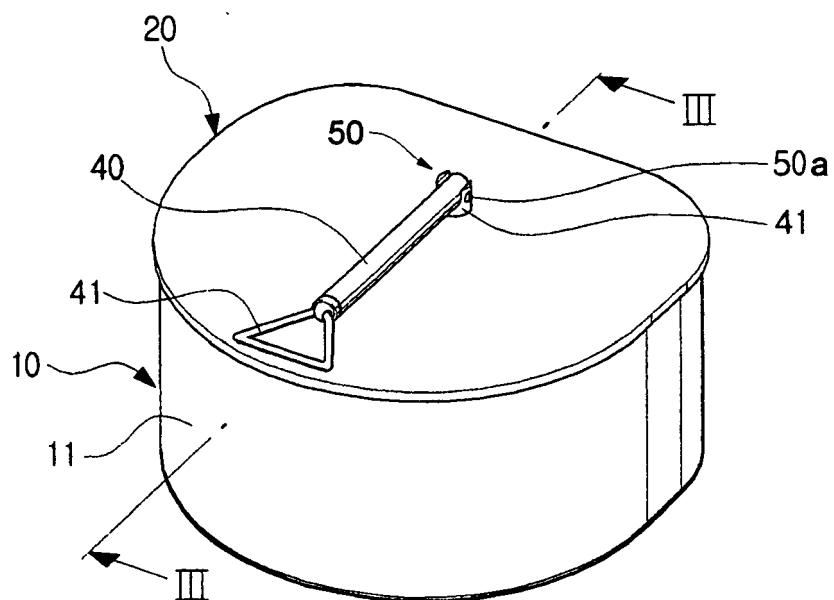


FIG. 2

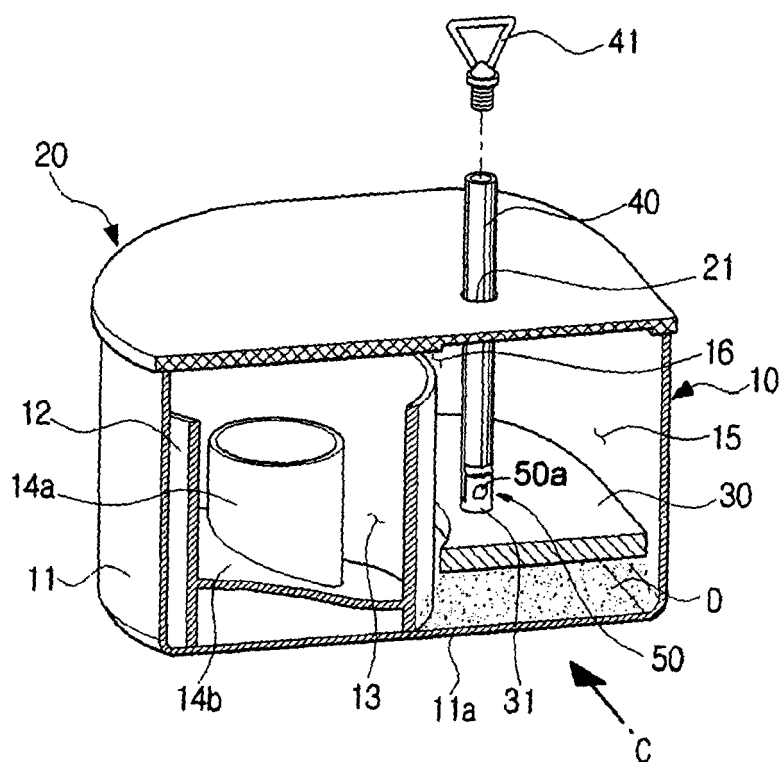


FIG. 3

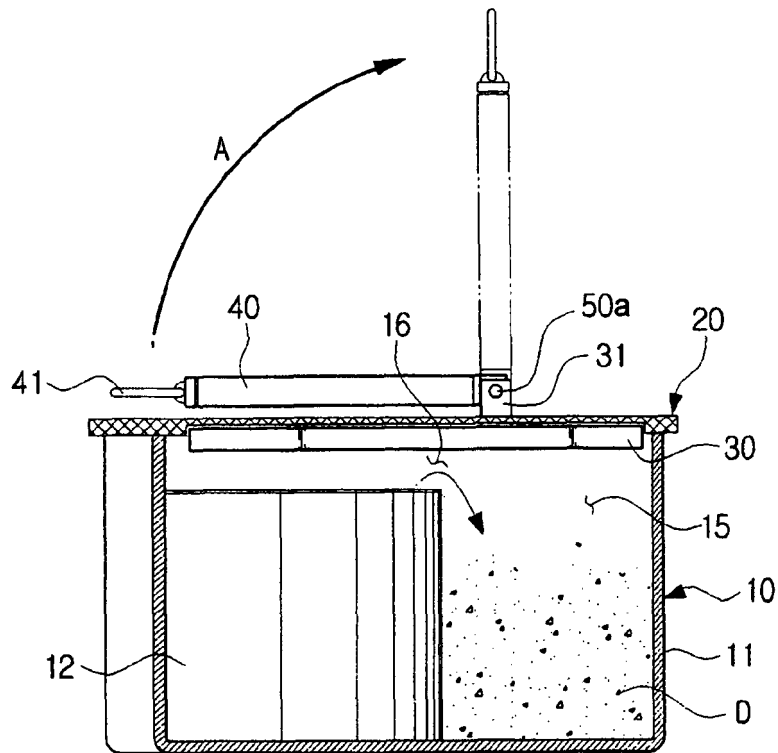
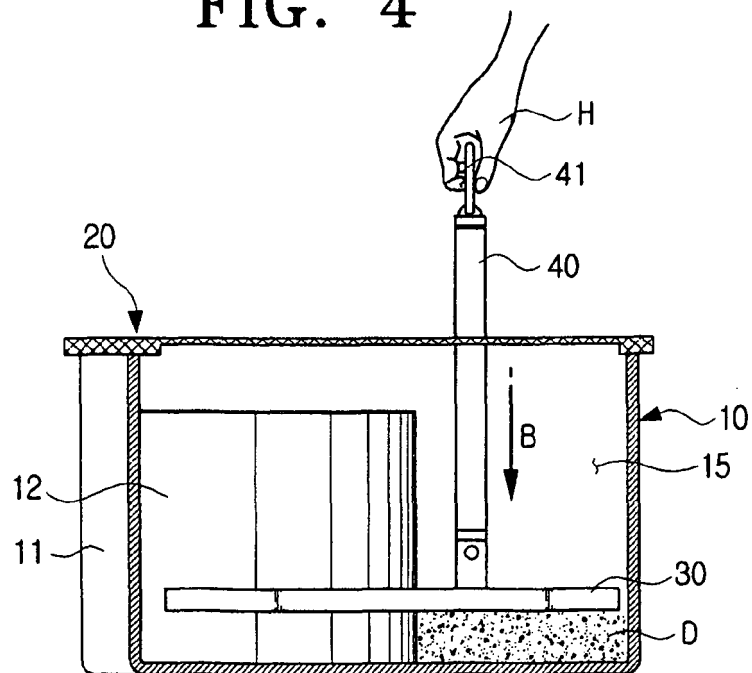


FIG. 4



REFERENCES CITED IN THE DESCRIPTION

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