(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 061 212**
**A1**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **82200238.2**

(22) Date of filing: **26.02.82**

(51) Int. Cl.³: **B 65 H 75/44**
A 47 L 9/26

(30) Priority: **19.03.81 NL 8101338**

(43) Date of publication of application:
**29.09.82 Bulletin 82/39**

(84) Designated Contracting States:
**DE FR GB IT NL SE**

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## (54) Wheeled vacuum-cleaner.

(57) A wheeled vacuum-cleaner comprising a housing (6, 20, 34, 52) in which wheels (11, 29, 44, 58) are journalled, and a mechanism for automatically winding in an electric power cord (1, 14, 32, 46), which vacuum-cleaner is provided with a blocking device for at least one of the wheels, which blocking device is automatically actuated when the cord is pulled out.

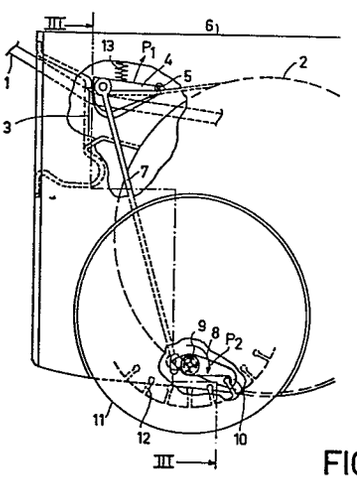


FIG.2

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"Wheeled vacuum-cleaner"

The invention relates to a wheeled vacuum-cleaner comprising a housing in which wheels are journalled and a mechanism for automatically winding in an electric power cord.

Such a vacuum-cleaner is generally known. When the cord is pulled out of the vacuum-cleaner housing it frequently happens that the vacuum-cleaner itself is pulled along. This is especially so if the cord is led out of the back of the vacuum-cleaner. The vacuum-cleaner then has to be held with a hand or foot, which is rather inconvenient. It is an object of the invention to provide a solution to this problem.

To this end the vacuum-cleaner according to the invention is characterized in that the vacuum-cleaner is equipped with a device for blocking at least one of the wheels, which blocking device is automatically actuated when the power cord is pulled out. The advantage of this is that the vacuum-cleaner is no longer pulled along when the cord is pulled out.

An embodiment of the vacuum-cleaner is characterized in that the blocking device comprises a stop and a catch which cooperates with said stop, the stop being arranged on the wheel and the catch being pivotable by means of the power cord into a position in which the catch engages the stop.

A further embodiment of the vacuum-cleaner is characterized in that the blocking device comprises a spring-loaded arm which at one end is pivotable about a fixed spindle in the housing and at the other end is pivotally coupled to one end of a rod, the other end of the rod being pivotally coupled to a lever which is also pivotable about a further fixed spindle in the housing and

of which one end is provided with the catch, and the arm being pivoted against spring force by the power cord when said cord is pulled out.

Preferably, the inner side of the wheel is provided with a plurality of stops which extend substantially radially inwards of the wheel.

A further embodiment of the vacuum-cleaner, in which the cord-winding mechanism comprises a drum surrounded by a drum housing, is characterized in that the blocking device is constituted by the drum housing, which is movable relative to the vacuum-cleaner housing by a spring which acts between the drum housing and the vacuum-cleaner housing; by a lever which is pivotally journalled in the vacuum-cleaner housing, one end of said lever being pivotally coupled to the drum housing and the other end comprising a pawl; and by a ring of ratchet teeth on the wheel, which ring is adapted to cooperate with the pawl, said drum housing being movable against the spring force of the spring by means of the power cord.

In yet another embodiment of the vacuum-cleaner, in which the cord winding mechanism comprises a rotatable drum, the blocking device is coupled to the drum. Such a vacuum-cleaner is further characterized in that the blocking device comprises centrifugal weights which rotate with the drum and are movable radially with respect thereto and which are coupled to an axially movable thrust ring, which thrust ring is provided with a pin which engages a stop on the wheel during rotation of the drum. The blocking device consequently blocks the wheel both when the cord is pulled out and during automatic take-up of the cord. If it is desired that the wheel should be blocked only when the cord is being pulled out, a uni-directional coupling is between the drum and the blocking device.

Yet another embodiment of the vacuum-cleaner is characterized in that the blocking device comprises a friction surface and a brake shoe which cooperates therewith, the friction surface being provided on the wheel and

the breakshoe being engagable with the friction wheel by means of the power cord.

Embodiments of the invention will now be described in more detail with reference to the drawings.

Figure 1 shows a wheeled vacuum-cleaner to which the invention is applied.

Figure 2 shows a blocking device.

Figure 3 represents the blocking device of Figure 2 in a sectional view taken on the line III-III.

Figure 4 represents a different blocking device.

Figure 5 shows the blocking device of Figure 4 in a sectional view taken on the line V-V.

Figure 6 shows yet another blocking device.

Figure 7 shows the blocking device of Figure 6 in a sectional view taken on the line VII-VII.

Figures 8 and 9 show two further blocking devices.

The vacuum-cleaner is provided with a mechanism for automatically winding an electric power cord 1 onto a drum 2. The power cord is led out through an opening 3 in the back of the vacuum cleaner.

The blocking device of Figures 2 and 3 comprises an arm 4 which at one end is pivotable about a spindle 5 in the vacuum-cleaner housing 6. The other end is pivotally coupled to one end of a rod 7, the other end of the rod in turn being pivotally coupled to one end of a lever 8. The lever is pivotable about a spindle 9 in the vacuum-cleaner housing 6. The other end of the lever is provided with a catch 10. The wheel 11 of the vacuum-cleaner is provided with a plurality of stops 12 which extend radially inwards of the wheel.

The operation of the blocking device is as follows: when the power cord is pulled out the arm 4 is lifted by the cord, because the cord is pulled up obliquely. The arm 4 is pivoted in the direction of the arrow P1. The rod 7 is lifted and causes the lever 8 to pivot about the spindle 9 in the direction of the arrow P2. As a result of this the catch 10 engages one of the stops 12 on the wheel 11 so that

said wheel is blocked. This prevents the vacuum-cleaner from being pulled backwards when the cord is pulled out. If the pull on the cord is relaxed, the arm, the rod and the lever will resume their original positions under the influence of the spring 13 and thereby release the wheel.

Figures 4 and 5 represent a different type of wheel-blocking device. The drum 15 for taking up the power cord 14 is surrounded by a drum housing 16. The drum housing is rotatable about a spindle 17. The drum housing is further provided with a lead-through 18 with an opening 19 through which the cord is passed. The back of the vacuum-cleaner housing 20 also has an opening 21 for the power cord. The edges 22 and 23 of the respective openings 19 and 21 each lie on the surface of an imaginary cylinder whose axis coincides with the axis of the spindle 17 of the drum housing 16. Between the lead-through 18 and the vacuum-cleaner housing 20 a compression spring 24 is arranged. A lever 25 is pivotally supported on the vacuum-cleaner housing. One end 26 of the lever is pivotally coupled to a lug 27 on the drum housing 16. The other end comprises a pawl 28. The inner side of the wheel 29 is provided with a ratchet teeth 30.

The blocking device thus comprises the drum housing 16 with lead-through 18, the spring 24, the lever 25 with the pawl 28 and the ratchet teeth 30 on the wheel.

The operation of the blocking device os Figure 4 is as follows: When the cord 14 is pulled up obliquely the drum housing 16 is rotated in the direction of the arrow P3, because the wall portion 31 of the lead-through 18 is lifted by the cord. The lug 27 on the drum housing also rotates in the direction of the arrow P3. As a result of this, the lever 25 is pivoted and the pawl 28 engages the teeth 30 and thereby blocks the wheel 29. When the cord is released the drum housing 16 returns to its original position under the influence of the spring 24, so that wheel is released.

The blocking device of Figures 6 and 7 resembles that of Figures 4 and 5. The drum housing 33 is now slidable

in the vacuum-cleaner housing 34. For this purpose the drum housing is mounted so as to be slidable in a guide 36 on the vacuum-cleaner housing by means of a support 35. Between the support 35 and the vacuum-cleaner housing 34 a tension spring 37 is arranged. The lead-through 38 on the drum housing 33 first slidably over the rim 39 of the opening 40 in the back of the vacuum-cleaner housing. The operation is substantially identical to that of the blocking device described in the foregoing.

When the power cord 32 is pulled the drum housing moves in the direction of the arrow P4 against the spring force of the spring 37. The lever 41 is thereby pivoted and the pawl 42 engages the ratchet teeth 43 on the wheel 44. When the cord is released, the drum housing slides back and the wheel is freed.

In Figures 8 and 9 the blocking devices are coupled to the rotatable drum 45 for the power cord 46.

The blocking device of Figure 8 comprises two centrifugal weights 47, which are each secured to one end of a bell-crank lever 48. The bell-crank levers are each pivotally mounted on the drum 45. For this purpose the drum is provided with two diametrically opposed bosses 49, in which slots 50 for the levers 48 are formed. The levers are provided with thrust pins 51. The housing 52 of the vacuum-cleaner is provided with a stud 53 on which a thrust ring 54 is slidable but not rotatable. Between the thrust ring and the vacuum-cleaner housing a compression spring 55 is arranged. The thrust ring is provided with a pin 56 which extends into an opening 57 in the vacuum-cleaner housing. The vacuum-cleaner wheel 58 is provided with stops 59 which extend radially inwards of the wheel. The opening 57 in the housing is disposed opposite the path of movement of said stops about the axis of rotation of the wheel 58.

The operation of the blocking device of Figure 8 is as follows: When the power cord 46 is pulled out, a rotary movement is imparted to the drum 45. Under the

centrifugal action the centrifugal weights 47 move outwards so that the bell-crank levers 48 are pivoted in the direction of the arrow P5. The thrust pins 51 are moved to the right and urge the thrust ring 54 also to the right against the pressure of the compression spring 55. As a result of this, the pin 56 slides through the opening 57 and engages between the cams 59 of the wheel 58 to block the wheel. When the cord 46 is released and the drum is stationary, the thrust ring 54 with the pin 56 is urged back to the left by the compression spring 55, the pin thereby being disengaged from the stops 59 so that the wheel 58 is no longer blocked. Also, the bell-crank levers 48 with the centrifugal weights 47 are returned to their original positions.

The blocking device of Figure 9 corresponds to that of Figure 8. Corresponding parts bear the same reference numerals. Instead of bell-crank levers with centrifugal weights the blocking device of Figure 9 comprises two centrifugal blocks 60 which are slidable radially of the drum 45 in the slots 50 in the bosses 49. The centrifugal blocks each have an inclined surface 61 for cooperation with a conical inclined surface 63 on the thrust ring 62. The operation of the blocking device is similar to that of Figure 8. Owing to the rotary movement of the drum 45 the centrifugal blocks 60 move outwards and as a result of the co-operation between the inclined surfaces 61 and 63 the thrust ring is urged to the right so that the pin 56 blocks the wheel. When the drum is stationary again, the thrust ring 62 is urged to the left by the compression spring 55 and, also, the centrifugal blocks 60 are urged inwards again.

Thus, these blocking devices are operative both during unwinding and take-up of the cord. If the blocking devices are required to block the wheel only when the cord is being unwound, a uni-directional coupling is arranged between the drum 45 and the blocking devices.

Instead of providing the wheel with stops or with ratchet teeth and a pin or pawl respectively

cooperating therewith, it is alternatively possible to provide the wheel with a friction surface and a brake shoe which cooperates therewith, which brake shoe can be pressed against the friction surface of the wheel by means of the power cord, thereby braking the wheel.

Obviously, all the blocking devices described inthe foregoing may be constructed in such a way that both vacuum-cleaner wheels are blocked or braked simultaneously.

CLAIMS

1. A wheeled vacuum-cleaner comprising a housing (6, 20, 34, 52) in which wheels (11, 29, 44, 58) are journalled and a mechanism for automatically winding in an electric power cord (1, 14, 32, 46), characterized in that the vacuum-cleaner is equipped with a device for blocking at least one of the wheels, which blocking device is automatically actuated when the power cord is pulled out.

2. A wheeled vacuum-cleaner as claimed in Claim 1, characterized in that the blocking device comprises a stop (12) and a catch (10) which cooperates with said stop, the stop (12) being arranged on the wheel (11) and the catch (10) being pivotable by means of the power cord (1) into a position in which the catch engages the stop.

3. A wheeled vacuum-cleaner as claimed in Claim 2, characterized in that the blocking device comprises a spring-loaded arm (4) which at one end is pivotable about a fixed spindle (5) in the housing (6) and at the other end is pivotally coupled to one end of a rod (7), the other end of the rod being pivotally coupled to a lever (8) which is also pivotable about a further fixed spindle (9) in the housing and of which one end is provided with the catch (10), and the arm being pivoted against spring force by the power cord when said cord is pulled out.

4. A wheeled vacuum-cleaner as claimed in Claim 2 or 3, characterized in that inner side of the wheel (11) is provided with a plurality of stops (12) which extend substantially radially inwards of the wheel.

5. A wheeled vacuum-cleaner as claimed in Claim 1, in which the cord-winding mechanism comprises a drum surrounded by a drum housing (16, 33), characterized in that the blocking device is constituted by the drum housing

(16, 33), which is movable relative to the vacuum-cleaner housing (20, 34) by a spring (24, 37) which acts between the drum housing and the vacuum-cleaner housing; by a lever (25, 41) which is pivotally journalled in the vacuum-cleaner housing, one end of said lever being pivotally coupled to the drum housing and the other end comprising a pawl (28, 42); and by a ring of ratchet teeth (30, 43) on the wheel (29, 44), which ring is adapted to cooperate with the pawl, said drum housing being movable against the spring force of the spring by means of the power cord (14, 32).

6. A wheeled vacuum-cleaner as claimed in Claim 5, characterized in that the drum housing (16) is rotatably journalled in the vacuum-cleaner housing (20) and the power cord (14) can act on a wall portion (31) of the drum housing.

7. A wheeled vacuum-cleaner as claimed in Claim 5, characterized in that the drum housing (33) is slidably mounted in the vacuum-cleaner housing (34).

8. A wheeled vacuum cleaner as claimed in Claim 1, the cord-winding mechanism (46) comprising a rotatable drum (45), characterized in that the blocking device is coupled to the drum.

9. A wheeled vacuum-cleaner as claimed in Claim 8, characterized in that the blocking device comprises centrifugal weights (47, 60) which rotate with the drum (45) and are movable radially with respect thereto and which are coupled to an axially movable thrust ring (54, 62), which thrust ring is provided with a pin (56) which engages a stop (59) on the wheel (58) during rotation of the drum.

10. A wheeled vacuum-cleaner as claimed in Claim 8 or 9, characterized in that a uni-directional coupling is arranged between the drum and the blocking device.

11. A wheeled vacuum-cleaner as claimed in Claim 1, characterized in that the blocking device comprises a friction surface and a brake shoe which cooperates therewith, the friction surface being provided on the wheel and the brake shoe being engagable with the friction wheel by means of the power cord.

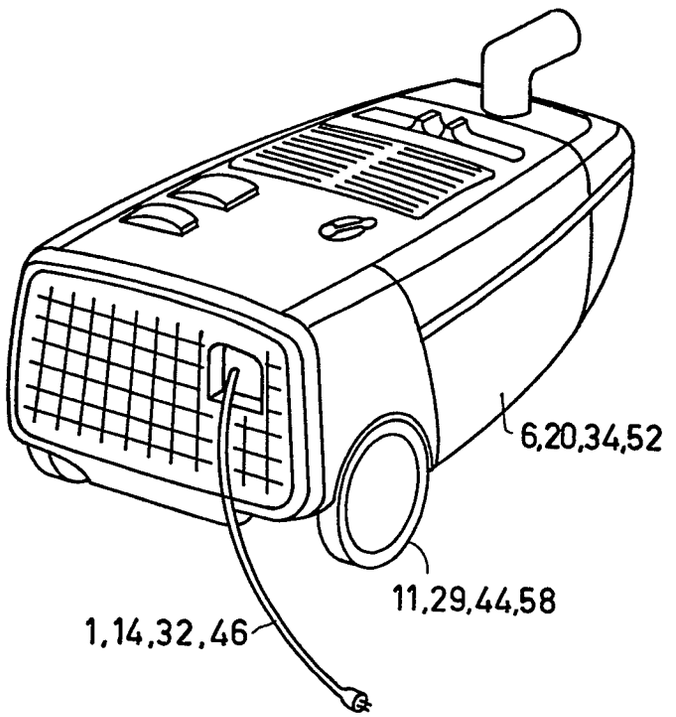


FIG.1

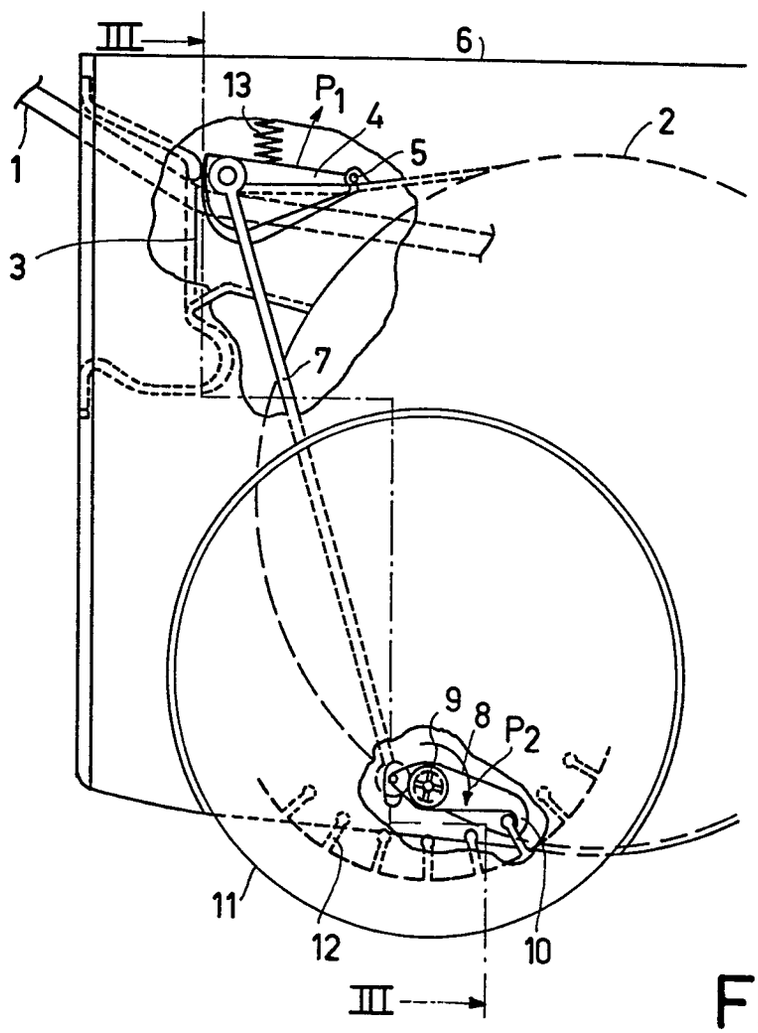


FIG.2

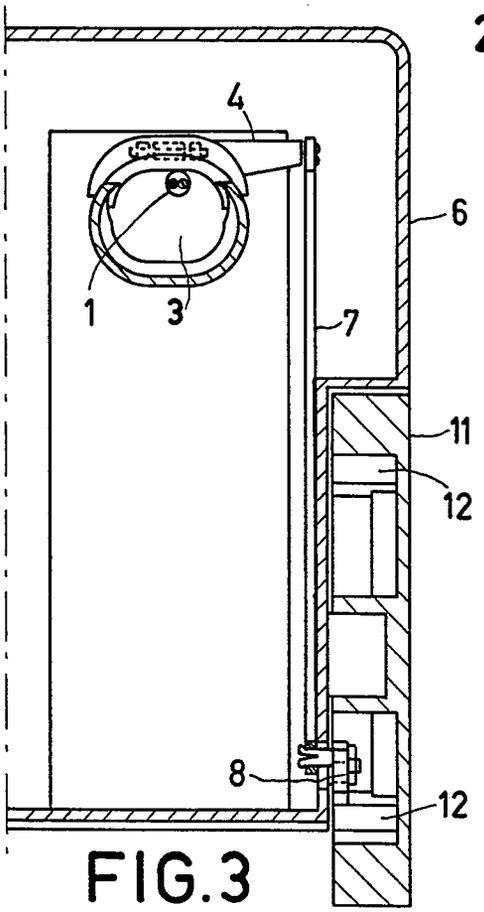


FIG.3

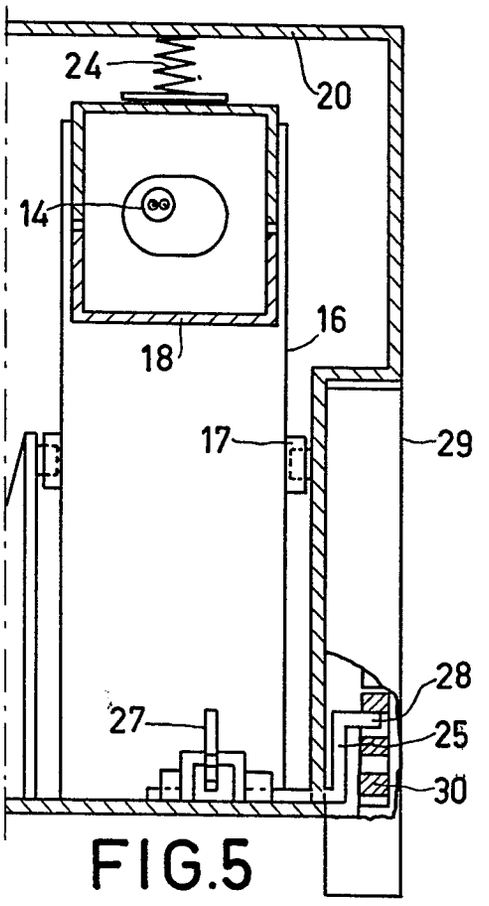


FIG.5

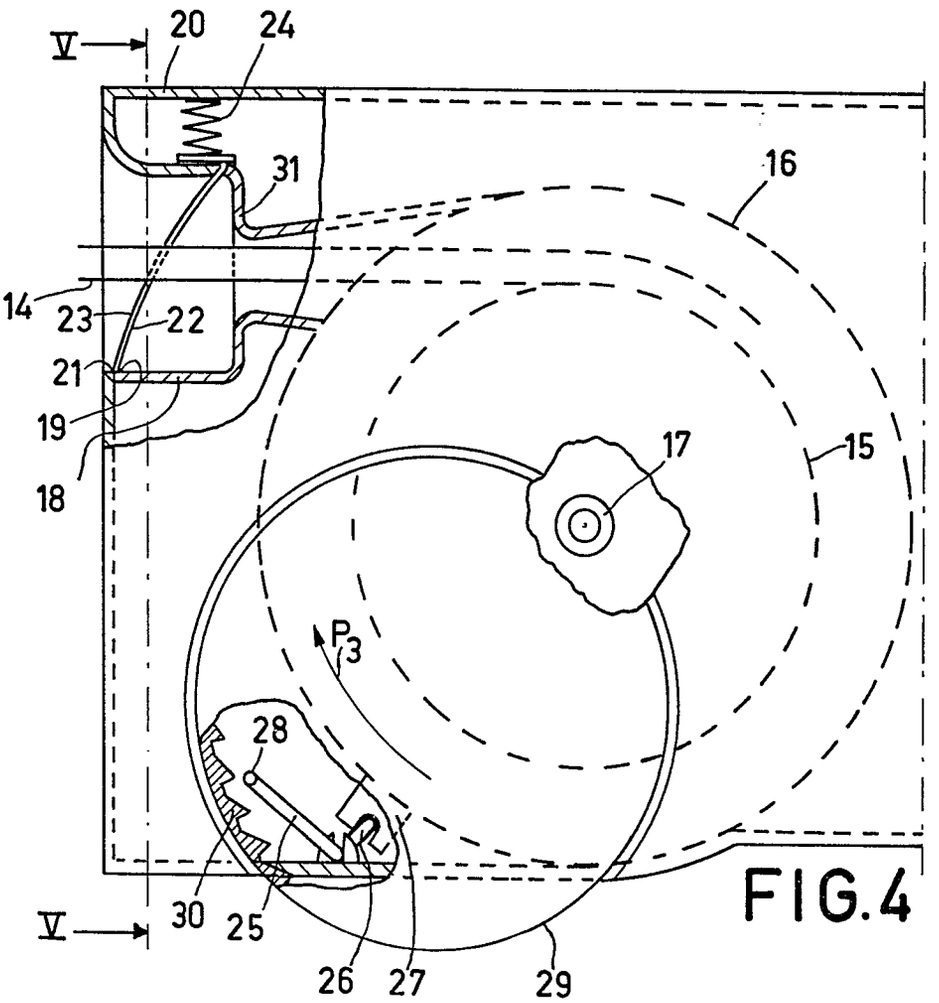


FIG.4

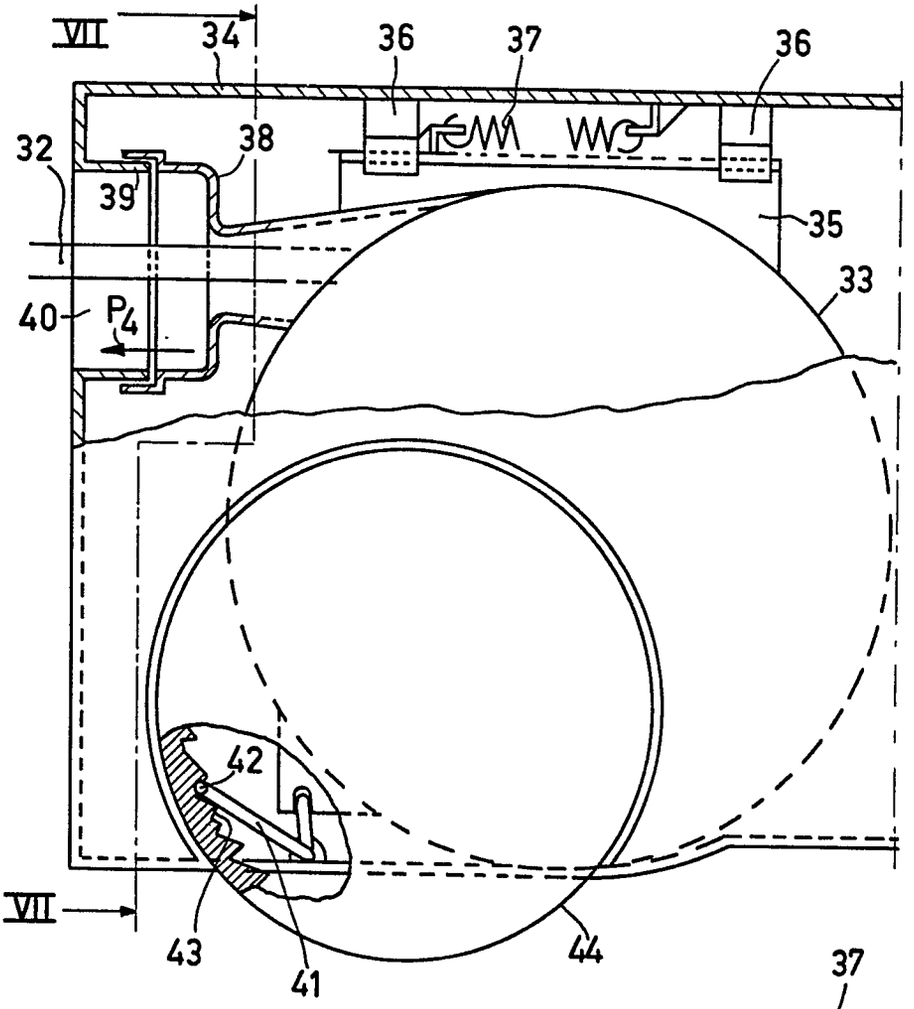
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FIG.6

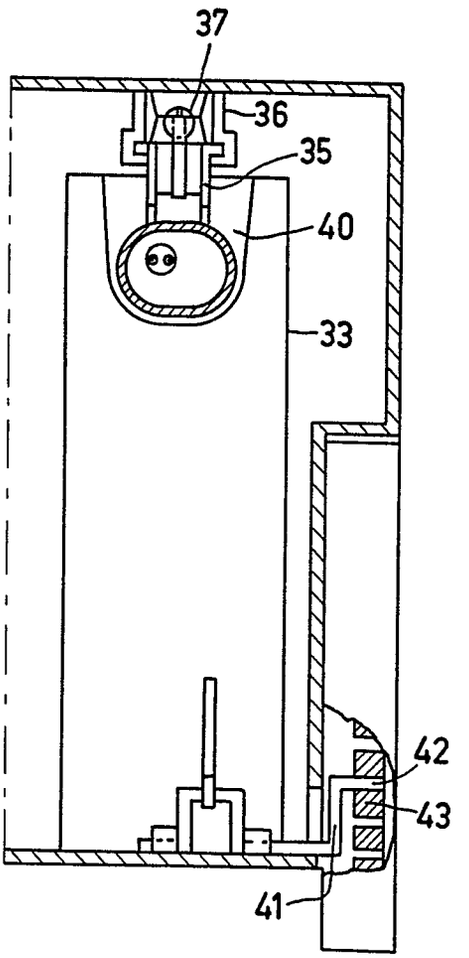
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FIG.7

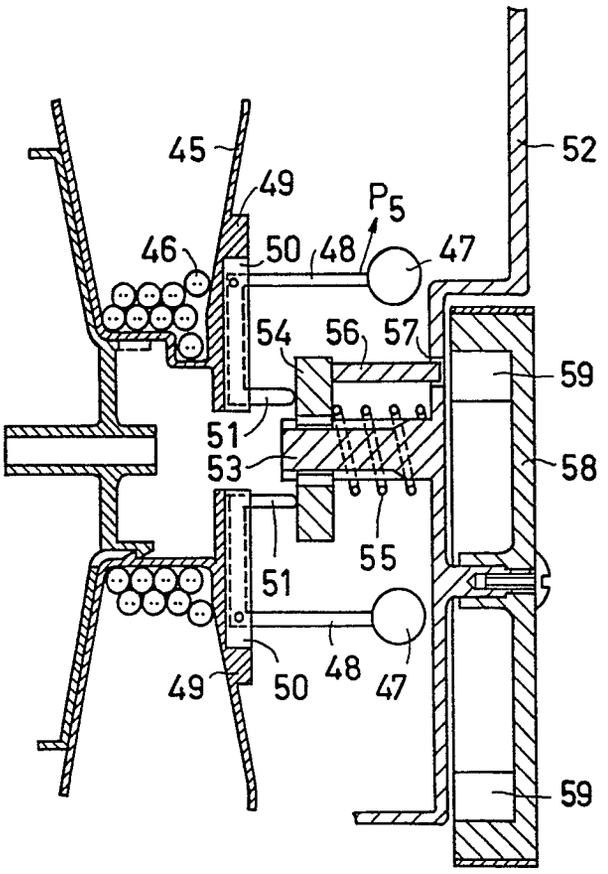
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FIG.8

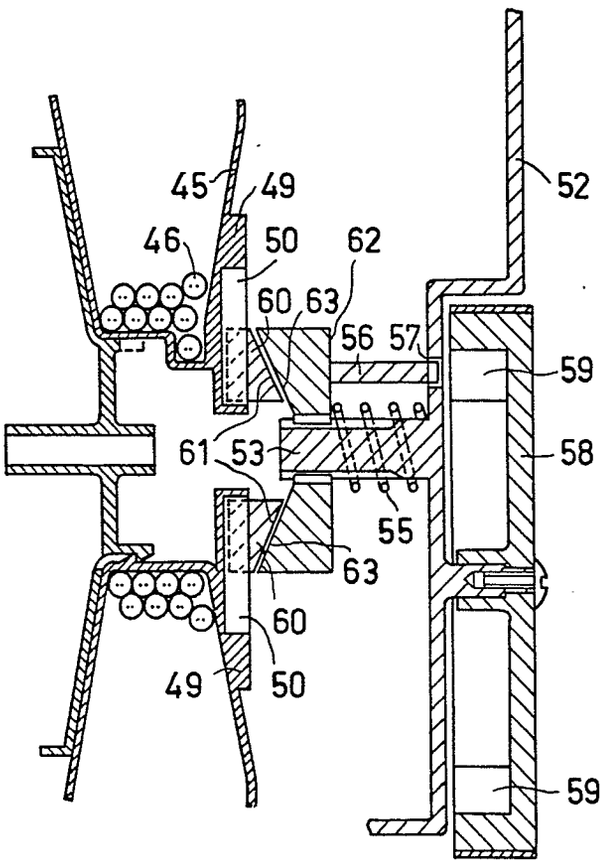
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FIG.9

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# EUROPEAN SEARCH REPORT

0061212
Application number

EP 82 20 0238

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl. ³) |
|---|---|---|---|
| A | FR-A-1 269 260 (DUSSAUGE, R. et al.) *Page 1, right-hand column, paragraphs 6-7; page 2, left-hand column; figures 2-3* | 1,2,4, 8 | B 65 H 75/44<br>A 47 L 9/26 |
| A | FR-A-2 192 550 (SIEMENS-ELECTROGERAETE GmbH) *Page 1, lines 31-38; figures 1-2* | 9 | |
| A | FR-A-1 485 306 (MAUZ & PFEIFFER) *Page 1, right-hand column; page 2, right-hand column, paragraphs 9-11; figure 1* | 11 | |
| A | FR-A- 931 338 (JEANDET G.) | | TECHNICAL FIELDS SEARCHED (Int. Cl. ³) |
| A | CH-A- 355 905 (CHATELLIER G.) | | A 47 L<br>B 65 H |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 25-06-1982 | MUNZER E. |

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