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

(11) **EP 4 335 341 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.03.2024 Bulletin 2024/11

(21) Application number: **22195102.3**

(22) Date of filing: **12.09.2022**

(51) International Patent Classification (IPC):
A47L 9/10 *(2006.01)* ***A47L 9/12*** *(2006.01)*
A47L 9/14 *(2006.01)* ***A47L 9/20*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A47L 9/108; A47L 9/12; A47L 9/1409; A47L 9/20

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

(71) Applicant: **BSH Hausgeräte GmbH**
81739 München (DE)

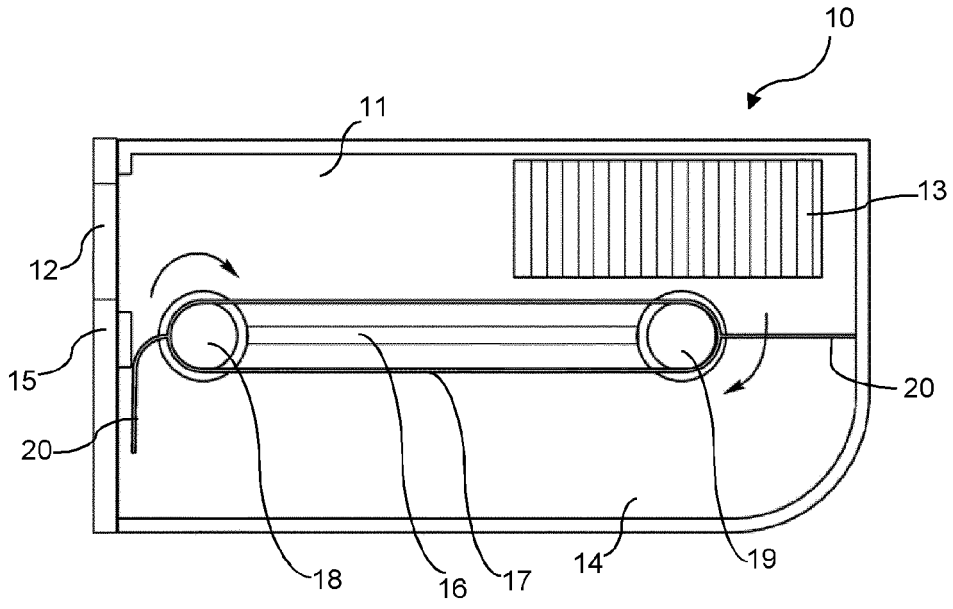
(72) Inventors:
- **Maksymowicz, Pawel**
37-100 Lancut (PL)
- **Hassfurter, Stefan**
96126 Maroldsweisach (DE)

(54) DUST CONTAINER OF VACUUM CLEANER

(57) A dust container (10) of a vacuum cleaner comprising a first compartment (11) provided with an air intake (12) and a filter (13), a second compartment (14) provided with a dirt outlet (15), wherein the first compartment (11) and the second compartment (14) are separated by a partition wall (16) provided with openings, wherein the dust container (10) has a dust compression unit comprising a conveyor belt (17), a driving shaft (18) and a pulley (19), wherein the conveyor belt (17) has at least two flaps (20) for dust distribution.

The present invention provides a dust container in which the dust storage capability was increased thanks to the dust compression unit. The present invention provides a vacuum cleaner in which the cleaning time without necessity of emptying the dust container was also increased and in which the air flow during the whole cleaning process is more constant.

Fig. 1



EP 4 335 341 A1

Description

[0001] The present invention relates to a dust container of a vacuum cleaner comprising a first compartment provided with an air intake and a filter, a second compartment provided with a dirt outlet, wherein the first compartment and the second compartment are separated by a partition wall provided with openings.

[0002] Dust containers are well known from the state of the art. The dust container is a removable part of vacuum cleaners of different types: a cyclonic vacuum cleaners, handheld vacuum cleaners or robot vacuum cleaners. Dust container collect dust during cleaning. Dust containers have limited capacity so it's often equipped with systems for dust compression to increase the cleaning time without necessity to emptying the dust container. A dust compression systems of dust containers are also well known from the state of the art. Dust compression systems are provided to compress the dust stored inside the dust container in order to increase the time of cleaning time of the vacuum cleaner without necessity of emptying the dust container.

[0003] Patent document EP 1 349 478 A1 discloses a device for a vacuum cleaner comprising a particle separator, which is provided with an inlet for dust laden air, an outlet for the separated particles, and an outlet for cleaned air that is connected to a vacuum source. The particle outlet is connected to a screw conveyor, which is provided with an outlet part ending in a mainly closed collecting chamber for the separated particles.

[0004] Patent document KR 20 110 062 729 A discloses a dust collecting unit of vacuum cleaner which includes a dust collecting vessel; a pressure member; and a power generator. The dust collecting vessel prepares a dust storage. The dust storage stores collected dusts. The pressure member compresses dusts saved in the dust storage. The power generator is connected to a plurality of pressure members. The power generator offers an active force for circulation. The pressure members have respective rotary shafts. Each rotary shaft is separated to each other. The pressure members rotate to the same direction and rotate within a range less than 360°. A dust collecting unit of vacuum cleaner is provided to increase a capacity of accepting dusts stored inside of a dust collector by forming only a rotary motion radius part of a pair of pressure members into a circular shape and by forming the other parts into various shapes.

[0005] The patent KR 10 1 196 070 B1 discloses a dust bag of vacuum cleaner comprises a dust collection body, a cleaning member, and a dust removing part. The dust collection body has a dust storage. the cleaning member is located in the dust storage to rotate. The cleaning member contacts with the inner circumference of the dust collection body and cleans the inner circumference. One or more dust removing parts are located within the dust collection body. One or more dust removing parts is located on the movement path of the cleaning member. One or more dust removing parts remove dust using the cleaning member.

[0006] It is the object of the present invention to provide a dust container of a vacuum cleaner in which the dust storage capability is increased and in which the flow of the air is more constant during cleaning time.

[0007] The object was solved by a dust container of a vacuum cleaner in which the dust container has a dust compression unit comprising a conveyor belt, a driving shaft and a pulley, wherein the conveyor belt has at least two flaps for dust distribution.

The dust container of a vacuum cleaner is a receptacle for collecting dust during cleaning process. The dust container is a removable part of the vacuum cleaner what enables emptying the dust container everywhere which is convenient for the user. The dust container of a vacuum cleaner comprises two compartments: a first compartment which is provided with an air intake and a filter, and a second compartment provided with a dirt outlet. The first compartment and the second compartment are separated by a partition wall having openings. The first compartment is an upper part of the dust container having an air intake through which the air sucked by a vacuum cleaner enters the dust container. The intake air is polluted with dust, debris, particles collected during vacuuming. The first compartment is provided with a filter. Preferably, the filter is a pleat filter. The first compartment is a temporary dust storage area. Inside the first compartment the dirty air is filtered by the filter. The second compartment is a dust storage area. The second compartment is a lower part of the dust container and is provided with a dirt outlet through which dust gets out the dust container. The first compartment and the second compartment are divided by a partition wall provided with openings. The partition wall is placed in the center area of the dust container. The partition wall divides the first compartment and the second compartment but not entirely. On both sides of the partition wall openings are provided. The openings are free spaces between the partition wall and the dust container walls.

[0008] The dust container is also provided with a compression unit for compressing the dust collected inside the dust container. The compression unit comprises a conveyor belt with flaps, a driving shaft and a pulley. The conveyor belt rotates around the driving shaft an a pulley. The driving shaft is a shaft which drives the conveyor belt. The pulley is a passive rotating shaft on which the conveyor belt rotates. The conveyor belt is made of an elastic material e.g. rubber. The conveyor belt has two flaps which can be produced as a one part element or the flaps can be made of different material than the conveyor belt and assembled together. The conveyor belt has two modes of operation. The first mode is when the vacuum cleaner is vacuuming and the conveyor belt is in position in which flaps close openings and makes the first compartment and the second compartment sealed. The second mode is when the vacuuming process is finished or when decreased air flow is detected. Then the conveyor belt rotates in order to distribute the dust from

the first compartment into the second compartment through openings. During the rotation of the conveyor belt one of the flap reach the pleats of the filter in order to clean the filter and second flap compress the dust in the vicinity of the dirt outlet. The positive effect is that the vacuuming time is extended and the airflow is constant during the whole cleaning cycle.

[0009] In a preferred embodiment of the invention flaps are elastic. The positive effect is that the filter can be cleaned in efficient way and the dust is transferred by the conveyor belt from the first compartment to the second compartment in an easily and effectively.

[0010] In another embodiment of the invention the length of each flap is equal. The flaps are provided to facilitate the transfer of the dust from the first compartment to the second compartment and to close the first opening and the second opening during the cleaning mode of the vacuum cleaner and also to clean the filter. The positive effect is that each flap easily reach the filter, the second opening is sealed during the cleaning mode and the first opening is also sealed by the flap and the dust is compressed very well at the same time.

[0011] In another embodiment of the invention the partition wall has a first opening and a second opening and the diameter of the first opening is smaller than the length of the flap. The first opening and the second opening are the gaps between the partition wall and the walls of the dust container. The first opening is placed in the vicinity of the air intake. The second opening is placed opposite of the first opening. The size of the first opening is smaller than the size of the second opening and the size of the second opening fits the size of the flap. The positive effect of the fact that the size of the second opening is equal the length of the flap is that the dust is easy transferred between the first compartment and the second compartment. The positive effect of the fact that the size of the first opening is smaller than the length of the flap is that the flap compress the dust efficiently before passing through the first opening.

[0012] The object of the present invention is solved also by a vacuum cleaner comprising a dust container as described above.

[0013] The present invention provides a dust container in which the dust storage capability was increased thanks to the dust compression unit. The present invention provides a vacuum cleaner in which the cleaning time without necessity of emptying the dust container was also increased and in which the air flow during the whole cleaning process is constant.

[0014] The construction of the invention, however, together with additional objects and corresponding advantages will be best understood from the following description of specific embodiments and in connection with the accompanying drawing.

In the drawing:

[0015]

Fig. 1 shows a dust container with a conveyor belt in a first mode

Fig. 2 shows a dust container with a conveyor belt in a second mode

[0016] In cooperation with attached drawing, the technical contents and detailed description of the present invention are described thereinafter according to a preferable embodiment being not used to limit its executing scope. Any equivalent variation and modification made according to appended claims is all covered by the claimed by the present invention.

[0017] In the following description of the preferred embodiments of the present invention, similar identical reference numbers designate identical of comparable components.

[0018] Fig. 1 shows a dust container 10 of a vacuum cleaner. The dust container 10 comprises a first compartment 11 with an air intake 12 and a filter 13. An air intake 12 is a place where a tube of the vacuum cleaner (not shown on the figure) is connected through which the dirty air is transferred into the first compartment 11 of the dust container 10. The dust container 10 comprises a second compartment 14 having a dirt outlet 15. The first compartment 11 is separated from the second compartment 14 by a partition wall 16. The partition wall 16 divides the dust container 10 partially. On both sides of the partition wall 16, free spaces are provided, namely the first opening 21 and the second opening 22. The second opening 22 is provided to enable transferring the dust from the first compartment 11 into the second compartment 14. The first opening 21 is provided to enable passing the flap 20 through. The dust container 10 has a dust compression unit comprising a conveyor belt 17 which rotates on the driving shaft 18 and a pulley 19. The conveyor belt 17 has two flaps 20. Flaps 20 are positioned on the conveyor belt 17 on the opposite sides of the conveyor belt 17. Flaps 20 and the conveyor belt 17 are made as one part element which is responsible for transferring dust and dust compression.

[0019] Fig. 2 shows a dust container 10 in a second mode. The second mode is when the vacuum cleaner are in state after finishing vacuuming or in a state when a decreased air flow inside the dust container 10 is detected. In the second mode, the conveyor belt 17 rotates thanks to the driving shaft 18 and the pulley 19. During rotation of the conveyor belt 17 flaps 20 changes their position to transfer the dust from the first compartment 11 into the second compartment 14. The dust enters the first compartment 11 through the air intake 12. During the rotation of the conveyor belt 17 one of the flap 20 cleans the filter 13, the other flap 20 pushes the dust toward the dirt outlet 15 in order to press it against the wall of the dirt outlet 15. On one side of the partition wall 16 a first opening 21 is provided. On the opposite side of the partition wall 16 a second opening 22 is provided. In the first mode, flaps 20 are in position in which seal the first opening 21 and the second opening 22. In the

second mode, flaps 20 pass through the first opening 21 and the second opening 22, transferring the dust from the first compartment 11 into the second compartment 14 of the dust container 10. The first opening 21 is an area between the partition wall 16 and the wall of the dust container 10. The first opening 21 is placed in a vicinity of the dirt outlet 15. The second opening 22 is an area between the partition wall 16 and the wall of the dust container 10 on the opposite side of the dirt outlet 15. The size of the first opening 21 is smaller than the size of the flap 20 to provide the dust compression effect. The flap 20 press the dust collected in the second compartment 14 against the wall of the dirt outlet 15 and next passes through the first opening 21.

[0020] The present invention provides a dust container in which the dust storage capability was increased thanks to the dust compression unit. The present invention provides a vacuum cleaner in which the cleaning time without necessity of emptying the dust container was also increased.

REFERENCE SIGNS

[0021]

10 dust container
11 first compartment
12 air intake
13 filter
14 second compartment
15 dirt outlet
16 partition wall
17 conveyor belt
18 driving shaft
19 pulley
20 flap
21 first opening
22 second opening

Claims

1. A dust container (10) of a vacuum cleaner comprising a first compartment (11) provided with an air intake (12) and a filter (13), a second compartment (14) provided with a dirt outlet (15), wherein the first compartment (11) and the second compartment (14) are separated by a partition wall (16) provided with openings **characterized in that** the dust container (10) has a dust compression unit comprising a conveyor belt (17), a driving shaft (18) and a pulley (19), wherein the conveyor belt (17) has at least two flaps (20) for dust distribution.

2. The dust container (10) of a vacuum cleaner according to claim 1, **characterized in that** flaps (20) are elastic.

3. The dust container (10) according to any of the preceding claims, **characterized in that** the length of each flap (20) is equal.

4. The dust container (10) according to any of the preceding claims, **characterized in that** the partition wall (16) has a first opening (21) and a second opening (22).

5. The dust container (10) according to any of the preceding claims, **characterized in that** the size of the first opening (21) is smaller than the length of the flap (20).

6. The dust container (10) according to any of the preceding claims, **characterized in that** the size of the second opening (22) is equal the length of the flap (20).

7. A vacuum cleaner **characterized in that** comprises a dust container (10) according to any of the preceding claims 1-5.

Fig. 1

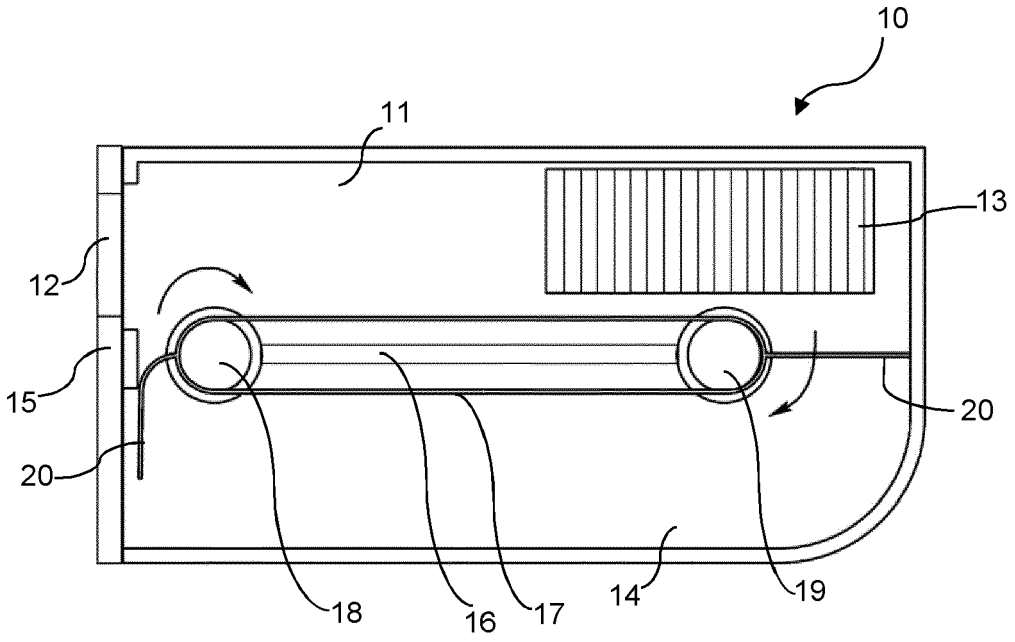
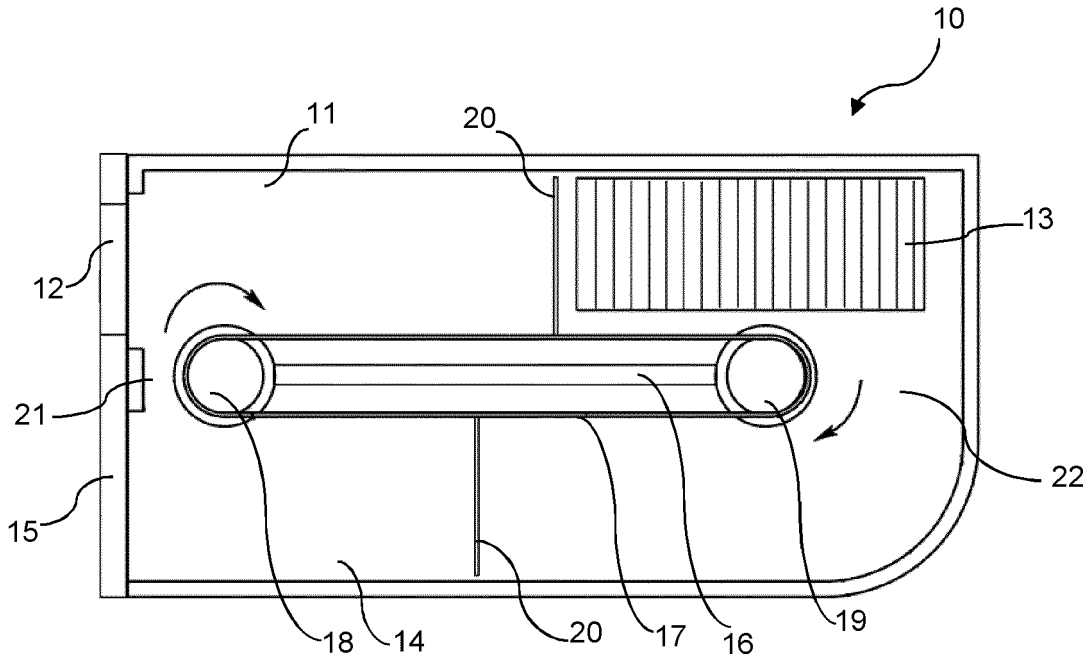

10
11
13
12
15
20
20
18
16
17
14
19

Fig. 2


10
11
20
13
12
21
22
15
18
14
20
17
16
19

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 19 5102

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 862 489 A1 (LG ELECTRONICS INC [KR]) 22 April 2015 (2015-04-22) * column 1, paragraph 9 * * column 9, paragraph 76 - column 13, paragraph 114 * * figures 1,3,5,6,8,9 *	1-7	INV. A47L9/10 A47L9/12 A47L9/14 A47L9/20
A	WO 2011/074716 A1 (LG ELECTRONICS INC [KR]; KANG SUNG-SU [KR]) 23 June 2011 (2011-06-23) * abstract * * figures 3-5 *	1,7	
A	US 10 064 528 B1 (EBRAHIMI AFROUZI ALI [US] ET AL) 4 September 2018 (2018-09-04) * figures 2A-2D *	1	

TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 April 2023	Redelsperger, C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 19 5102

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-04-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2862489 A1	22-04-2015	CN 104545691 A	29-04-2015
		EP 2862489 A1	22-04-2015
		ES 2620016 T3	27-06-2017
		KR 20150045154 A	28-04-2015
		US 2015107047 A1	23-04-2015
WO 2011074716 A1	23-06-2011	NONE	
US 10064528 B1	04-09-2018	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1349478 A1 **[0003]**
- KR 20110062729 A **[0004]**
- KR 101196070 B1 **[0005]**