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- (73) Patenthaver: **Hilti Aktiengesellschaft, Feldkircherstrasse 100, 9494 Schaan, Liechtenstein**
- (72) Opfinder: **Ohlendorf, Oliver, Edith-Stein-Straße 9 A, 86899 Landsberg, Tyskland**
- (74) Fuldmægtig i Danmark: **Zacco Denmark A/S, Arne Jacobsens Allé 15, 2300 København S, Danmark**
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Description

[0001] The present invention relates to a dust hood for a grinder equipped with a gear neck for fastening the dust hood. The dust hood is equipped with a hood body for at least partially covering a circular grinding wheel and with an extraction port via which abrasively removed substrate can be extracted from the hood body. A main extraction duct connected to the extraction port is formed in the hood body and extends tangentially to the grinding wheel and is located on a connection side of the hood body.

[0002] Dust hoods of the type mentioned at the beginning are basically known from the prior art. They are used to prevent dust from spreading during cut-off work in order to protect the health of a user of the cut-off grinder. For example, JP 2013 173 232 A discloses a method for cutting reinforced concrete. The document JP 2013 173 232 A also discloses the preamble of claim 1.

[0003] It is an object of the present invention to provide a dust hood that offers improved extraction performance.

[0004] The object is achieved according to claim 1 in that in a rear side of the hood body opposite the connection side, an inflow opening is formed via which ambient air can flow into the hood body during cutting operation.

[0005] The invention includes the knowledge that although prior art dust hoods already have comparatively good extraction performance, a significant reduction in the concentration of particulate matter is nevertheless desirable. Namely, it has been recognized that prior art dust hoods emit particulate matter on the rear side of the hood body because an abrasively removed substrate (particulate matter) is typically not completely captured and removed by the main extraction duct. In the context of the present invention, the rear side of the hood body is to be understood as the side of the hood body on which the circular cut-off wheel, with reference to the direction of rotation of the cut-off wheel, plunges into the substrate to be cut.

[0006] The connection side and the rear side can be opposite one another with regard to a dividing plane, the dividing plane preferably being spanned by the axis of rotation of the cut-off wheel and a straight line which extends parallel to the main extraction duct extending tangentially to the cut-off wheel.

[0007] Due to the fact that an inflow opening is formed at the rear side of the hood body, a flushing flow is generated during cutting operation, via which an abrasively removed substrate which has not been captured in the main extraction duct can be fed to a rear “back-flow” flow and can be fed to the main extraction duct by a high flow velocity prevailing there. This can significantly reduce the dust exposure for the user of the grinder. In addition, it has been observed, in particular in the case of diamond cut-off wheels, that due to the inflow opening arranged according to the invention, an optimized cooling behavior is also generated which, on the one hand, enables an increased cutting speed and, on the other hand, an increased tool life. Due to the mentioned “back-flow” flow, which is made possible by the inflow opening, the kerf created in the substrate is kept almost dust-free during cutting operation.

[0008] As a further advantage, it has been shown that the dust hood according to the invention can be designed to be significantly narrower than dust hoods of the prior art.

[0009] It has been found to be advantageous if the inflow opening is provided in addition to a wheel outlet opening of the hood body. A wheel outlet opening of the hood body means the opening of the hood body at which the circular cut-off wheel for the cutting operation projects beyond the hood body. The inflow opening according to the invention is different from this wheel outlet opening. This has the advantage that the improved extraction performance is also achieved with the cut-off wheel plunged into the substrate to the maximum extent (full cut).

[0010] According to the invention, the inflow opening is formed as a slot. The slot can open the hood body, with regard to the cut-off wheel, in the radial direction. Alternatively or additionally, the inflow opening can open up the hood body, with regard to the cut-off wheel, in the axial direction.

[0011] It has been found advantageous if the inflow opening, which is formed as a slot, is located in a wheel plane of the cut-off wheel. Likewise advantageously, the inflow opening is formed on an end face of the hood body.

[0012] According to the invention, the inflow opening defines a circle segment of at most 30 degrees, wherein the circle segment is related to the direction of rotation of the cut-off wheel along a front side of the hood body.

[0013] In a further preferred configuration, a width of the inflow opening is at most half the size of a hood body width on the rear side of the hood body. Preferably, the widths are determined in the axial direction.

[0014] It has been found advantageous if the main extraction duct is subdivided by a hood bar into two suction chambers which are preferably symmetrical to each other. The hood bar can be located in a wheel plane of the cut-off wheel.

[0015] The object is also achieved by a cut-off grinder, in particular a diamond cut-off grinder, having a gear neck and having a dust hood of the type described above, wherein the dust hood is arranged or intended to be arranged on the gear neck.

[0016] Further advantages are apparent from the following description of figures. In the figures, various exemplary embodiments of the present invention are illustrated.

[0017] In the figures, the same and similar components are denoted by the same reference signs. In the figures:

Fig. 1 shows a grinder on which a dust hood according to a preferred exemplary embodiment of the invention is arranged;

Fig. 2 shows a perspective view of the dust hood of Fig. 1;

Fig. 3 shows a schematic sectional view of the exemplary embodiment of Figs. 1 and 2 to illustrate the flow conditions; and

Fig. 4 shows a sectional view through the exemplary embodiment of Figs. 1 to 3 for the purpose of further constructional explanations.

Exemplary embodiments:

[0018] Fig. 1 shows a dust hood 100 according to the invention which is arranged on a cut-off grinder 200. For this purpose, the cut-off grinder 200 has a gear neck 210 to which the dust hood 100 is fastened.

[0019] The dust hood 100 is equipped with a hood body 10 for at least partially covering a circular cut-off wheel 220. The cut-off wheel 220 is mounted or intended to be mounted on a drive spindle 230 of the cut-off grinder 200.

[0020] The dust hood 100 also includes an extraction port 40 through which an abrasively removed substrate (cf. Fig. 3, abrasively removed substrate S) can be extracted from the hood body 10. The extraction port 40 is connected to a main extraction duct 50 formed in the hood body 10. The main extraction duct 50 extends in a tangential direction T with respect to the cut-off wheel 220 and is located on a connection side AS of the hood body 10.

[0021] In a rear side RS of the hood body 10 opposite the connection side AS, an inflow opening 60 is formed, via which ambient air (cf. Fig. 3 ambient air UL) can flow into the hood body 10 during cutting operation.

[0022] The connection side AS and the rear side RS are opposite each other with regard to a dividing plane TE. The dividing plane TE is spanned by the axis of rotation RA of the cut-off wheel 220 and a straight line G which extends parallel to the main extraction duct 50 extending tangentially to the cut-off wheel 220.

[0023] As can be seen from Fig. 1, the inlet opening 60 is provided in addition to a wheel outlet opening 70 of the hood body 10. In other words, the circular cut-off wheel 220 is completely enclosed except for its portion in the region of the wheel outlet opening 70. With respect to the radial direction RR, the circular cut-off wheel 220 does not emerge from the inflow opening 60 at the rear side RS of the hood body.

[0024] As can also be seen from Fig. 1, the inflow opening 60 is formed as a slot which opens up the hood body 10 in the radial direction RR with regard to the cut-off wheel 220. In this case, the inflow opening 60 formed as a slot lies at least partially in a wheel plane SE of the cut-off wheel 220 (shown in Fig. 1 by the normal arrow of the wheel plane SE).

[0025] As can also be clearly seen from Fig. 1, the inflow opening 60 formed as a slot is formed on an end face 15 of the hood body 10.

[0026] Furthermore, the main extraction duct 50 is subdivided by a hood bar 20 into two suction chambers 30, 30', which are symmetrical with respect to each other in the presently illustrated embodiment. The hood bar 20 lies in the wheel plane SE of the cut-off wheel 220.

[0027] In Fig. 2, the dust hood of Fig. 1 is shown in perspective view. The inlet opening 60 which is formed as a slot and is arranged at the rear side RS of the hood body 10 is clearly visible. The circular cut-off wheel 220 indicated by dashed lines in Fig. 2 is plunged into the substrate U to the maximum extent. In other words, the wheel outlet opening 70 of the hood body 10 stands on the substrate U. The inlet opening 60, which is provided in addition to the wheel outlet opening 70, allows ambient air UL to flow into the hood body 10 during cutting operation.

[0028] As can be seen from Fig. 2, a width BS of the inflow opening 60 is at most half the size of a hood body width BH on the rear side RS of the hood body 10. The width BS and the hood body width BH each relate to the axial direction AR.

[0029] Fig. 3 now shows a sectional view of the dust hood 100 of Fig. 2, which is in full section. As can be seen from Fig. 3, in this case, the circular cut-off wheel 220 is plunged into the substrate U to the maximum extent. The cut-off wheel 220 is in cutting operation and is therefore driven in the direction of rotation R, and at the same time, extraction power is provided via the extraction port 40.

[0030] During the cutting operation shown in Fig. 3, an abrasively removed substrate S originating from the substrate U is extracted via the main extraction duct 50 extending tangentially to the cut-off wheel 220 and the extraction port 40. Most of the extracted air passes along a primary flow path PP, which is shown in Fig. 3 in the form of solid arrowed lines. Along the primary flow path PP, air with a high particle concentration is conveyed via the main extraction duct 50 towards the extraction port 40. Part of the primary flow path PP runs through the inlet opening 60 formed according to the invention at the rear side RS of the hood body 10. This is shown in Fig. 3 by the ambient air UL entering the inlet opening 60.

[0031] Furthermore, through the inflow opening 60, a secondary flow path SK is induced, shown in Fig. 3 by the dashed and arrowed line, which flows through a secondary flow region SB. The secondary flow region is defined by the air gap between the end face 15 of the hood body 20 and the outer circumference of the circular cut-off wheel 220. In this secondary flow region SB, driving the circular cut-off wheel 220 in the direction of rotation R generates a vortex field in which a comparatively low concentration of abrasively removed substrate S prevails.

[0032] As indicated by the dashed arrow in Fig. 3, the secondary flow path SK is guided to the primary flow path PP upon leaving the secondary flow region SB, more specifically in the region of the inflow opening 60. In this manner, abrasively removed substrate S that was not extracted by the original primary flow path PP in the direction of the extraction port 40 can now be “collected” and extracted. In contrast to dust hoods of the prior art, escape of “lost” particles is thus effectively avoided. As already mentioned at the beginning, this improves the cooling of the cut-off wheel 220 and enables higher cutting speeds and longer tool life.

[0033] Finally, Fig. 4 shows the dust hood 100 of Fig. 3, with flow paths not plotted. As can be seen from Fig. 4, the inlet opening 60, which is in the form of a slot, is formed on a rear side RS of the hood body 10. The rear side RS is located, with respect to the dividing plane TE, opposite the connection side AS. As can also be seen from Fig. 4, the inflow opening 60, with regard to the direction of rotation R of the cut-off wheel 220 and along the end face 15 of the hood body 10, is delimited by a circle segment KS of at most of 30 degrees.

Reference list**[0034]**

10	hood body
15	front side
20	hood bar
30,30'	suction chamber
40	extraction port
50	main extraction duct
60	inlet port
70	wheel outlet opening
100	dust hood
200	cut-off grinder
210	gear neck
220	cut-off wheel
230	drive spindle
AR	axial direction
AS	connection side
BS	width of inlet opening
BH	hood body width
G	straight line
KS	circle segment
PP	primary flow path
SB	secondary flow region
SK	secondary flow path
R	direction of rotation
RA	axis of rotation
RS	rear side
RR	radial direction
S	abrasively removed substrate
SE	wheel plane
T	tangential direction

TE dividing plane
U substrate
UL ambient air

Patentkrav

- 5 **1.** Støvskaerm (100) til en vinkelsliber (200), der er udstyret med en gearhals (210) til fastgørelse af støvskaermen (100), med et skaermlegeme (10) til i det mindste afsnitsvis afdækning af en cirkulaer separationsskive (220) og med en udsugningstilslutning (40), som en underlagsafskæring (S) kan udsuges igennem fra skaermlegemet (10), hvor der i skaermlegemet (10) er udformet en hovedudsugningskanal (50), der er forbundet med udsugningstilslutningen (40), og som strækker sig tangentialt i forhold til separationsskiven (220) og
- 10 befinder sig på en tilslutningsside (AS) af skaermlegemet (10), **kendetegnet ved, at** der i en bagside (RS) af skaermlegemet (10), der ligger modsat tilslutningssiden (AS), er udformet en indstrømningsåbning (60), via hvilken omgivelserluft (UL) i separationsdrift kan strømme ind i skaermlegemet (10), hvor indstrømningsåbningen (60) er udformet som spalte og i forhold til separationsskivens (220) rotationsretning (R) og langs en frontside (15) af skaermlegemet (10) definerer en cirkelsektor (KS) med højst 30 grader.
- 15
- 2.** Støvskaerm (100) ifølge krav 1,
kendetegnet ved, at indstrømningsåbningen (60) er tilvejebragt som supplement til en skiveudgangsåbning (70) af skaermlegemet (10).
- 20
- 3.** Støvskaerm (100) ifølge krav 1 eller 2,
kendetegnet ved, at spalten, der danner indstrømningsåbningen (60), åbner skaermlegemet (10) i radial retning (RR) i forhold til separationsskiven (220).
- 25
- 4.** Støvskaerm (100) ifølge krav 3,
kendetegnet ved, at indstrømningsåbningen (60), der er udformet som spalte, ligger i et skiveplan (SE) af separationsskiven (220).
- 30
- 5.** Støvskaerm (100) ifølge et af de foregående krav,
kendetegnet ved, at indstrømningsåbningen (60) er udformet på en frontside (15) af skaermlegemet (10).

6. Støvskaerm (100) ifølge krav 1 eller 2,
kendetegnet ved, at indstrømningsåbningen (60) i forhold til separationsskiven (220) er udformet aksialt i skærmlegemet (10).
- 5 7. Støvskaerm (100) ifølge et af de foregående krav,
kendetegnet ved, at en bredde (BS) af indstrømningsåbningen (60) er højst halvt så stor som en skærmlegemebredde (BH) på bagsiden (RS) af skærmlegemet (10), hvor bredderne (BS, BH) er bestemt i aksialretningen (AR).
- 10 8. Støvskaerm (100) ifølge et af de foregående krav,
kendetegnet ved, at hovedudsugningskanalen (50) ved hjælp af et skærmlemmestykke (20) er delt i to sugekamre (30, 30'), der fortrinsvis er symmetriske i forhold til hinanden.
- 15 9. Støvskaerm (100) ifølge krav 7,
kendetegnet ved, at skærmlemmestykket (20) ligger i et skiveplan (SE) af separationsskiven (220).
- 20 10. Støvskaerm (100) ifølge et af de foregående krav,
kendetegnet ved, at tilslutningssiden (AS) og bagsiden (RS) er modsat beliggende i forhold til et delplan (TE), hvor delplanet (TE) opspændes ved hjælp af separationsskivens (220) rotationsakse (RA) og en lige linje (G), der forløber parallelt med hovedudsugningskanalen (50), der strækker sig tangentialt i forhold til separationsskiven (220).
- 25 11. Vinkelsliber (200), især diamantvinkelsliber, med en gearhals (210) og med en støvskaerm (100) ifølge et af de foregående krav, hvor støvskaermen (100) er anbragt eller skal anbringes på gearhalsen (210).

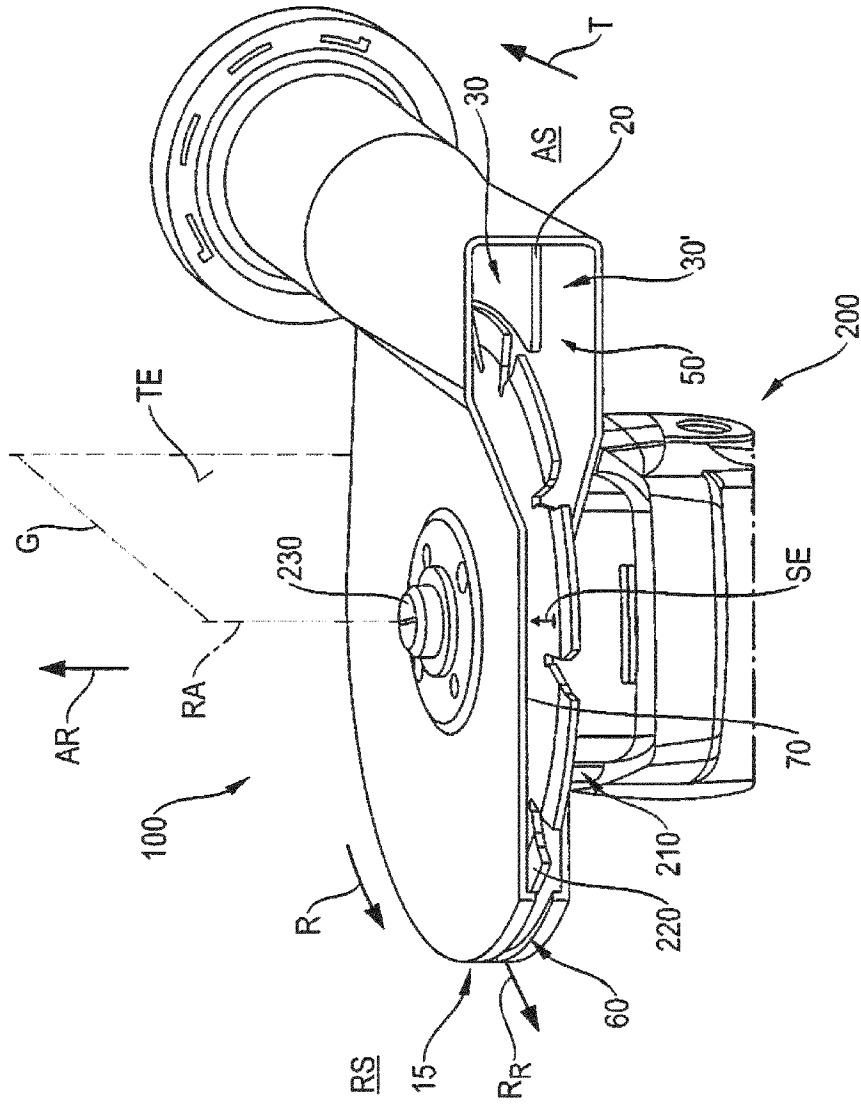


Fig. 1

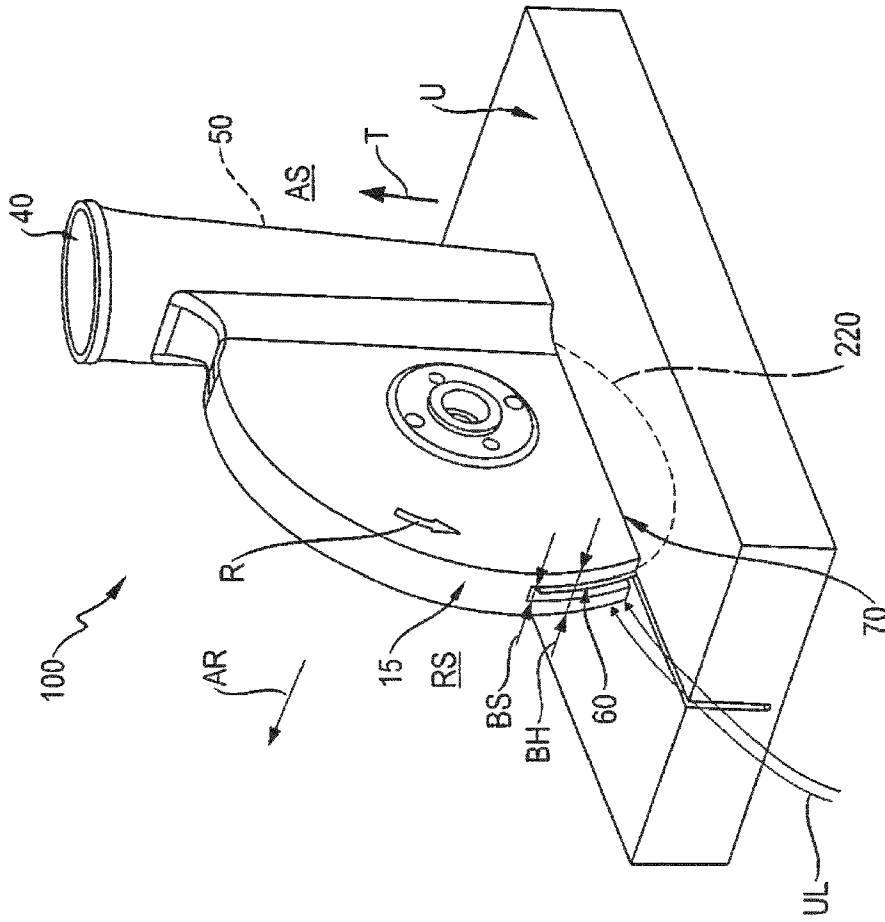


Fig. 2

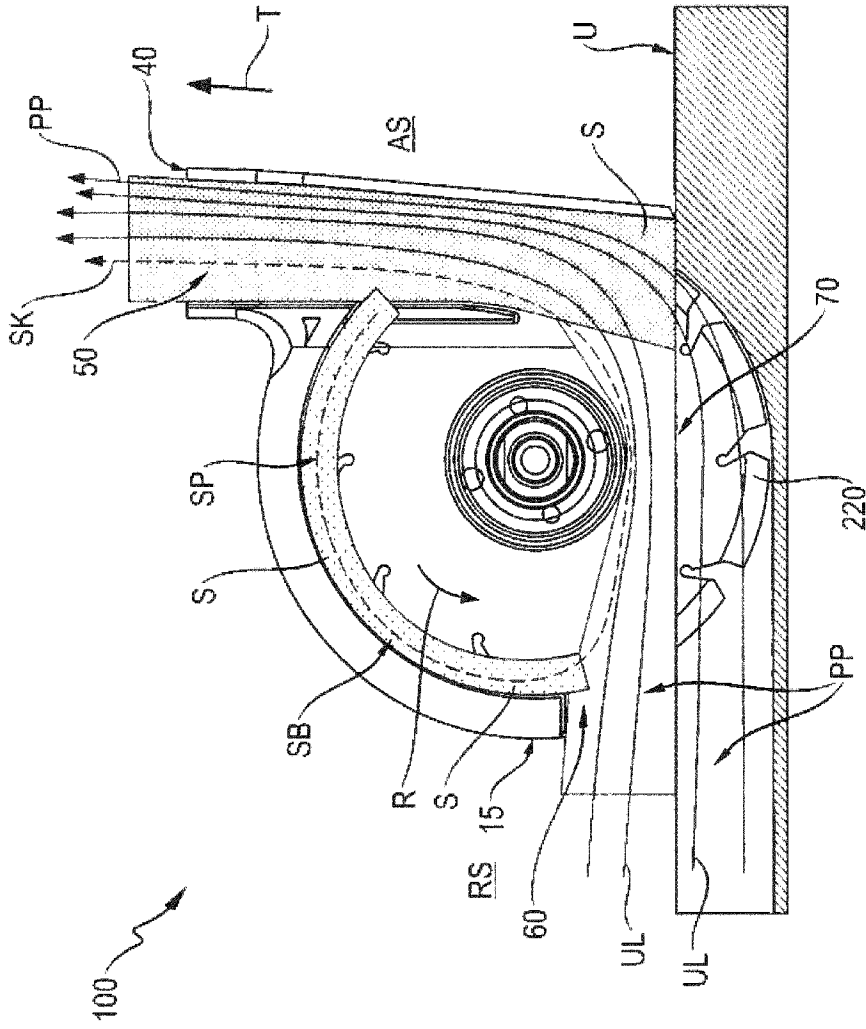


Fig. 3

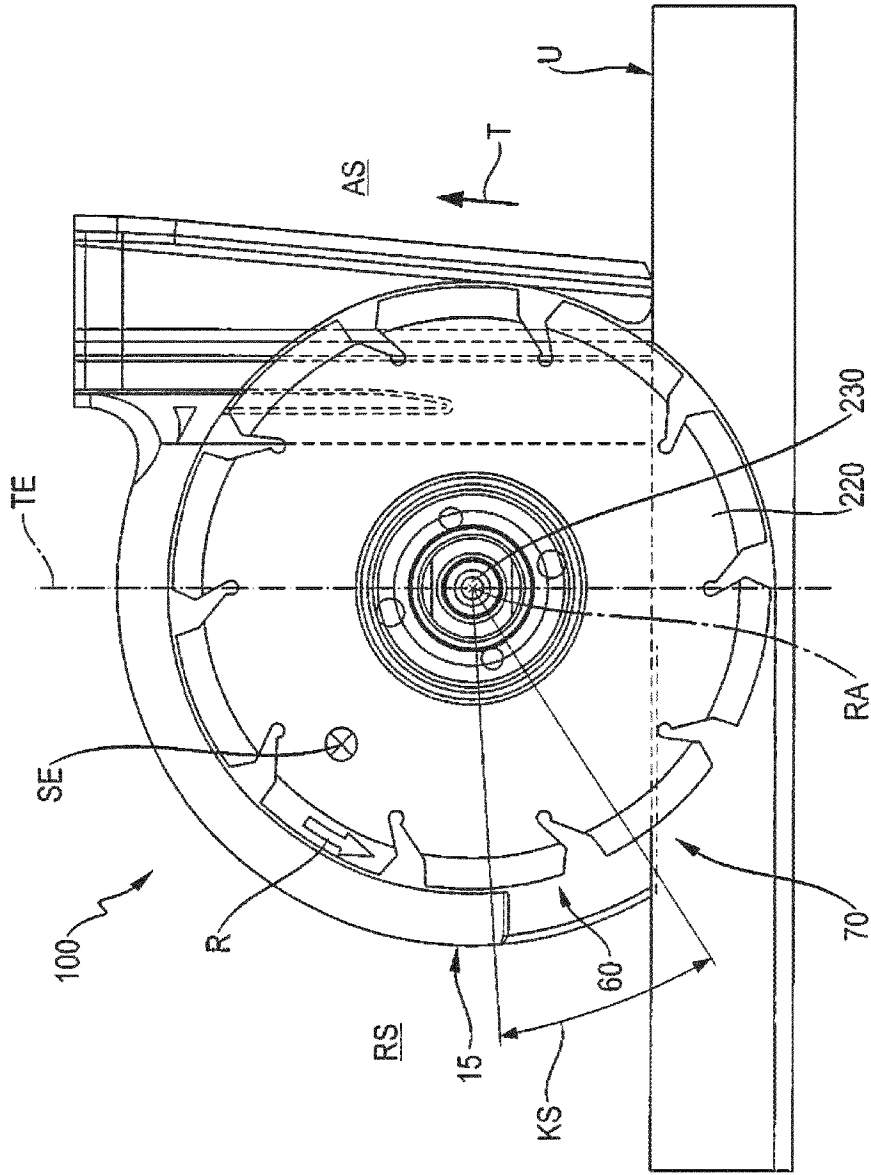


Fig. 4