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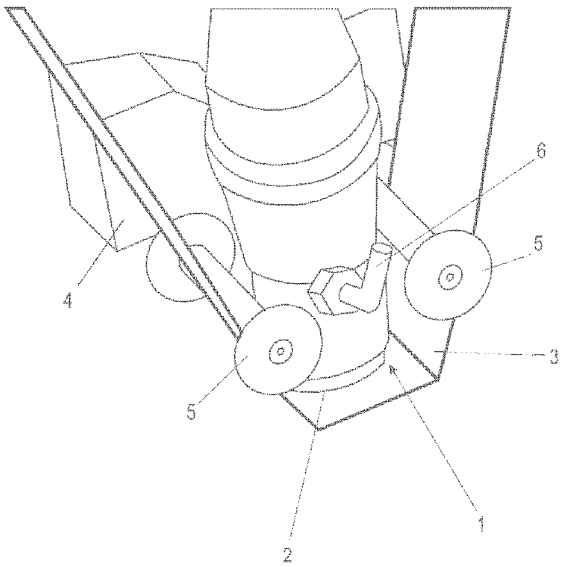
(54) Titre : DISPOSITIF DE MEULAGE
(54) Title: GRINDING DEVICE

Fig. 1



(57) Abrégé/Abstract:
The invention relates to a grinding device having a drivable backing pad (2) and a flexible grinding element (3) which is held on the backing pad (2) by suctioning and is provided with abrasive grains. The grinding device according to the invention is designed such that the grinding element (3) in the form of a grinding belt protrudes circumferentially with respect to the backing pad (2), the abrasive grains covering the entire area of the grinding element (3).

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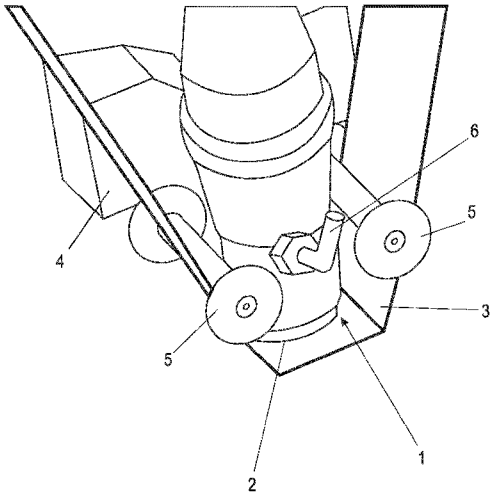
(54) **Title:** GRINDING DEVICE

(54) **Bezeichnung:** SCHLEIFVORRICHTUNG

Fig. 1



(57) **Abstract:** The invention relates to a grinding device having a drivable backing pad (2) and a flexible grinding element (3) which is held on the backing pad (2) by suctioning and is provided with abrasive grains. The grinding device according to the invention is designed such that the grinding element (3) in the form of a grinding belt protrudes circumferentially with respect to the backing pad (2), the abrasive grains covering the entire area of the grinding element (3).

(57) **Zusammenfassung:** Schleifvorrichtung mit einem antreibbaren Schleifteller (2) sowie einem flexiblen, am Schleifteller (2) durch Ansaugen gehaltenen, mit Schleifkörnern versehenen Schleifelement (3), ist so ausgebildet, dass das Schleifelement (3) in Form eines Schleifbandes umfänglich gegenüber dem Schleifteller (2) vorsteht, wobei die Schleifkörner das Schleifelement (3) vollflächig bedecken.

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Grinding device

The invention relates to a grinding device according to the preamble of claim 1.

Such a grinding device is known, for example, from EP 1 908 554 B1. The grinding element of this grinding device is of sheet-like design having a round, oval, square or rectangular base area and is held on the backing pad by suction. The base area of the grinding element corresponds in its dimension to the base area of the backing pad.

Moreover, the grinding elements used are in the form of individual sheets which have to be replaced when the grinding elements are worn out.

Especially in industrial use, i.e. when continuous grinding operation is desired, the set-up times resulting from a grinding element change are unacceptable, especially if the grinding device is to be operated automatically, for example by means of a robot.

The grinding result itself also often does not meet the requirements, mainly due to the same base area dimensions of the backing pad on the one hand and the grinding element on the other. In this case, the transition to the non-grinding area is too abrupt, so to speak, so that time-consuming reworking is necessary.

The grinding device known from the aforementioned EP 1 908 554 B1 is designed for manual use, which, however, results in a number of necessary operations that are particularly detrimental to cost optimization.

The considerable amount of time required to change the grinding element results in particular from the fact that the grinding element must be attached to the backing pad with an exact fit, centrically and with the correct side.

All in all, the known generic grinding device is not suitable to meet the requirements, in particular with regard to the quality of the grinding result,

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but also with regard to an optimized processing time.

In DE 102 22 956 A1, a grinding device is disclosed in which a grinding belt is used which is continuously pulled over the carrier surface of a backing pad. The adhesion of the grinding belt to the backing pad is to be supported by vacuum tension, wherein the adhesion, i.e., a resulting frictional force, must be smaller than the tensile force with which the grinding belt is continuously moved.

A generic grinding device is further known from DE 10 2017 108 191 A1. In principle, this grinding device has proven itself in practice, but the problems mentioned for EP 1 908 554 B1 also occur in operation.

The invention is based on the object of further developing a grinding device of the generic type in such a way that reworking of the grinding points is not necessary and the machining time, including the set-up times, is shortened.

This object is solved by a grinding device having the features of claim 1.

The grinding device according to the invention offers significant advantages over a grinding device according to the prior art. First of all, it should be noted that the circumferential edge projection of the grinding element provided in accordance with the invention means that the machined grinding points can be polished out more quickly in the formed edge region, since this edge region has a lower roughness depth, resulting in a higher-quality machining result.

With a circular backing pad, rectangularly formed grinding points with the aforementioned lower roughness depth are produced in the edge area, primarily because the contact pressure exerted by the backing pad only has a reduced effect.

According to another idea of the invention, the backing pad is rectangular instead of having a circular base, wherein this rectangular shape is particularly suitable for grinding beads.

According to the invention, a grinding belt is used as a grinding element, which is preferably present in rolled form and is unwound, for which purpose a suitable device is provided.

Due to the feed of the grinding belt, new grinding elements are fed to the backing pad at certain intervals when the grinding element is worn out, so to speak, with the result that set-up and changeover times are minimized.

This is also due to the fact that the grinding belt is precisely aligned with the backing pad in the contact area, which optimizes the processing time and the grinding result.

According to a further idea of the invention, the backing pad has a multilayer design, preferably consisting of a connecting piece having, for example, a threaded hole for fastening to a grinding machine, wherein this connecting piece is preferably made of plastic.

Held against this, facing the grinding element, is an elastic intermediate layer, in particular made of a foam material, which is covered by a dimensionally stable support plate, in particular made of an elastomer with a planar support surface, against which the grinding element rests with suction.

In addition to the design of the connecting piece made of plastic, the connecting piece can also be made of another material, in particular also of metal, wherein a connecting element is screwed into the threaded bore and is firmly connected to a drive.

The thread pairing of connecting element/connecting piece is of self-locking design, so that on the one hand a secure hold is guaranteed even during operation and on the other hand a tool-free change is possible.

The connecting element, as well as the connecting piece, the elastic intermediate layer and the support plate are provided with a central air line, which is of angled design in the connecting element as a suction connection.

This lateral suction connection allows the use of a commercially available, orbitally driven grinding machine, wherein this design allows the backing pad to be decoupled from the drive of the grinding machine. The drive motor and the backing pad can, for example, be operatively connected via a toothed belt drive.

The elastic intermediate layer, preferably consisting of foam, adapts particularly well to contours to be ground, so that this grinding device according to the invention is particularly suitable for machining painted surfaces.

According to a further idea of the invention, the backing pad is convexly curved on the side facing the grinding element, i.e., the side on which the grinding element is held, wherein, as has been shown, beads to be ground can be machined particularly easily and effectively.

Further advantageous designs of the invention are identified in the subclaims.

Exemplary embodiments of the invention are described below with reference to the accompanying drawings, wherein:

Fig. 1 shows a grinding device according to the invention connected to a grinding machine in a schematic perspective view;

Fig. 2 shows a detail of the grinding machine in a sectional side view;

Fig. 3 shows a detail of the grinding device in different views;

Fig. 4 shows a further detail of the grinding device, also in different views;

Fig. 5 shows a further exemplary embodiment of the detail according to Fig. 4 in a perspective view.

Fig. 1 shows a grinding machine having a grinding device 1 to which a drive 4 is connected by means of which a backing pad 2 can be driven.

A grinding element 3 in the form of a grinding belt is held by suction on the free side of the backing pad 2, wherein a suction connection 6 (Fig. 2) is attached laterally to a connecting element 7 of the backing pad 2, which suction connection 6 is connected to a suction line which is not shown.

The grinding element 3 is guided around two deflection pulleys 5 arranged parallel and at a distance on both sides of the backing pad 2. The entire grinding machine can be attached to a robot or the like, which is not shown, and guided by computer control to the surfaces to be ground.

According to the invention, the grinding element 3 protrudes circumferentially with respect to the backing pad 2, wherein the useful side of the grinding element 3 is formed by grinding grains covering the entire surface thereof, i.e., the width of the grinding belt is greater than the associated dimension of the backing pad 2.

In Fig. 2, a part of the grinding machine is shown in a sectional side view. Of the backing pad 2, only one connecting element 7 is visible, which is shown as a detail in Fig. 3.

This connecting element 7 can be moved orbitally or eccentrically in a plane by means of the drive 4, wherein the drive means is preferably a toothed belt 8 which is guided laterally into the grinding device 1.

It can further be seen that the suction connection 6 is connected to a suction line 10 of the connecting element 7.

As mentioned, in Fig. 3 the connecting element 7 can be seen, namely in a perspective bottom view and a sectional side view.

This connecting element 7 has a threaded nipple 9 to which a connecting piece 11, which has a threaded hole 14, is screwed.

The suction line 10 extends in an angular manner with respect to the central axis of the connecting element 7, once as a blind bore and starting therefrom

in the axial direction through the threaded nipple 9.

Fig. 4 partially reproduces the backing pad 2. Here it can be seen that an elastic intermediate layer 12 is attached to the end of the connecting piece 11 facing away from the connecting element 7, to which in turn a support plate 13 is attached.

A through-bore 15 is passed through the three components and leads into the axial bore of the connecting element 7.

Due to the suction effect active during operation, the grinding element 3 is held securely against the support plate 13.

Moreover, the thread of the threaded hole 14 is of self-locking design in correspondence with the thread of the threaded nipple 9, so that the backing pad 2 can be loosened without tools.

Fig. 5 shows a further embodiment variant of the backing pad 2. In this case, the side of the support plate 13 and of the intermediate layer 12 facing the grinding element 3 has a rectangular base surface, which are convexly curved in the example. This shape of the backing pad 2 is particularly suitable for grinding beads or the like.

List of reference signs

1	Grinding device
2	Backing pad
3	Grinding element
4	Drive
5	Deflection pulley
6	Suction connection
7	Connecting element
8	Toothed belt
9	Threaded nipple
10	Suction line
11	Connecting piece
12	Intermediate layer
13	Support plate
14	Threaded hole
15	Through-bore

CLAIMS

1. Grinding device having a drivable backing pad (2) and a flexible grinding element (3) provided with abrasive grains and held on the backing pad (2) by suction, **characterized in that** the grinding element (3) in the form of a grinding belt projects circumferentially relative to the backing pad (2), wherein the abrasive grains cover the entire area of the grinding element (3).

2. Grinding device according to claim 1, **characterized in that** the backing pad (2) comprises a rigid connecting piece (11) to which an elastic intermediate layer (12) is held, on which in turn on the side facing away from the connecting piece (11) a support plate (13) is held, against which the grinding element (3) rests in function.

3. Grinding device according to claim 1 or 2, **characterized in that** the elastic intermediate layer consists of a foam material.

4. Grinding device according to one of the preceding claims, **characterized in that** the support plate (13) consists of an elastomer.

5. Grinding device according to one of the preceding claims, **characterized in that** the backing pad (2) is screwed to a driven connecting element (7).

6. Grinding device according to one of the preceding claims, **characterized in that** the thread pairing of the connecting element (7) and the backing pad (2) is of self-locking design.

7. Grinding device according to one of the preceding claims, **characterized in that** the backing pad (2) is of rectangular design in plan view.

8. Grinding device according to one of the preceding claims, **characterized in that** the backing pad (2) is convexly curved on its side facing the grinding element (3).

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9. Grinding device according to one of the preceding claims, **characterized in that** the connecting element (7) comprises a radially oriented suction line (10) which merges into an axial suction line, wherein the axial suction line is continued by the backing pad (2).

10. Grinding device according to one of the preceding claims, **characterized in that** the backing pad (2) can be driven by means of a toothed belt (8) connected to a drive (4).

Fig. 1

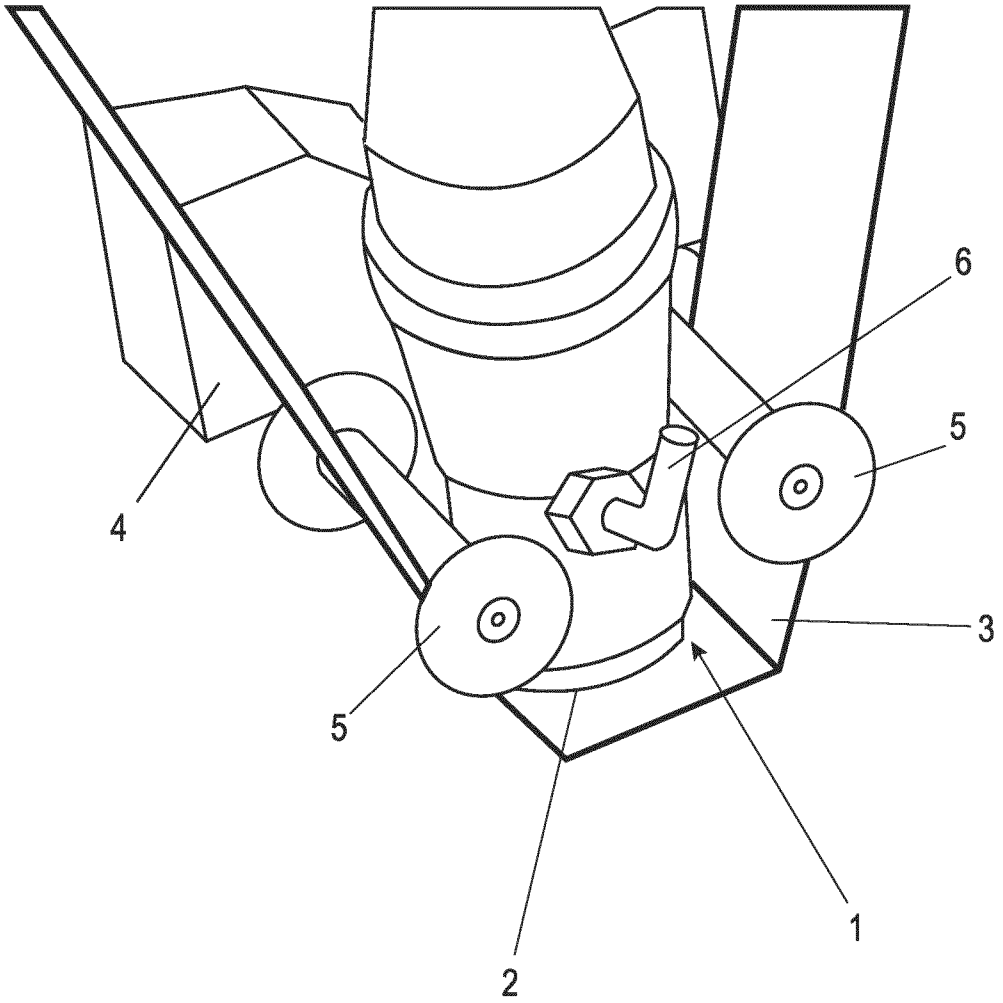

Fig. 2

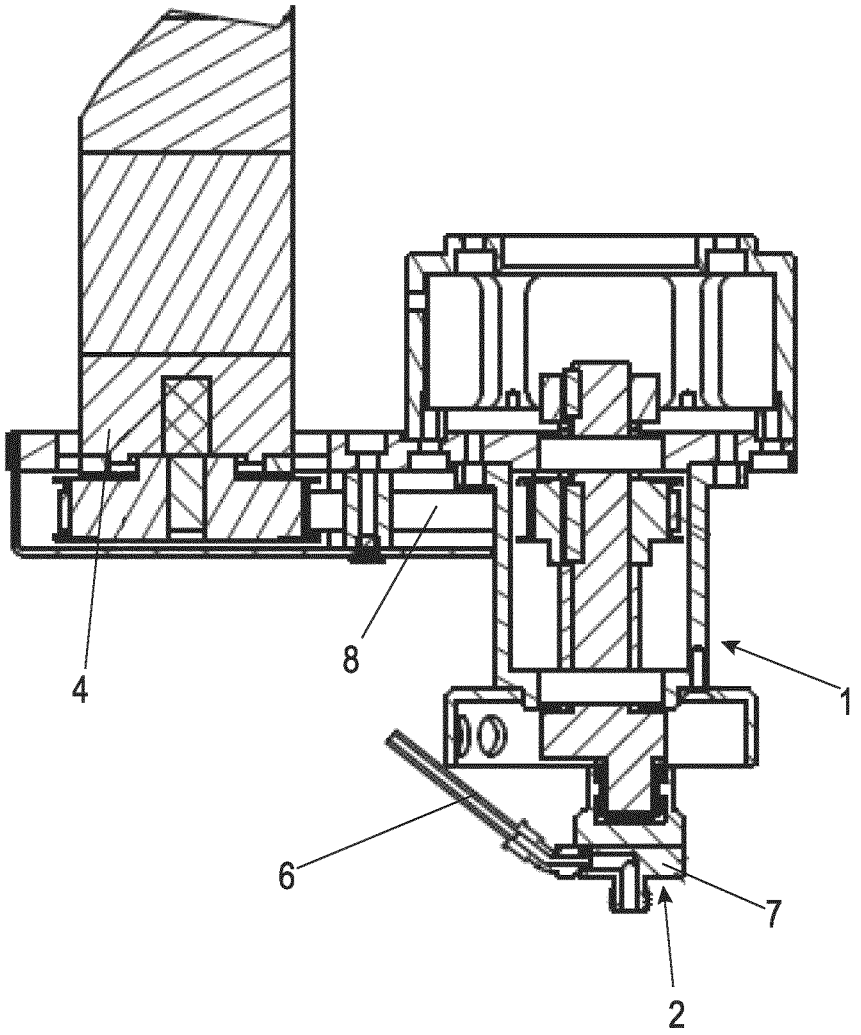

Fig. 3

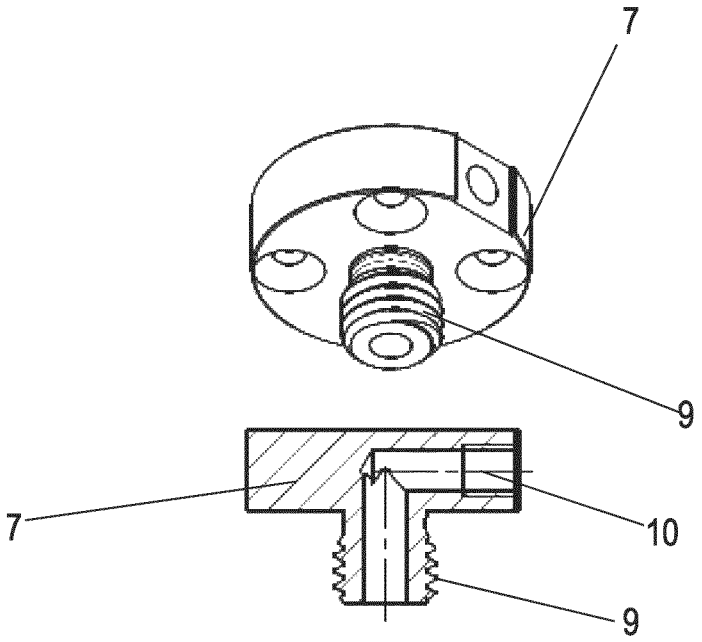

Fig. 4

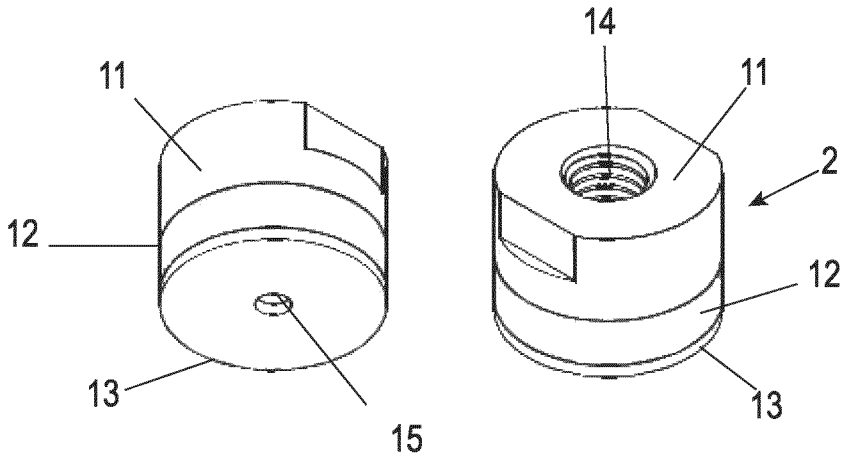

Fig. 5

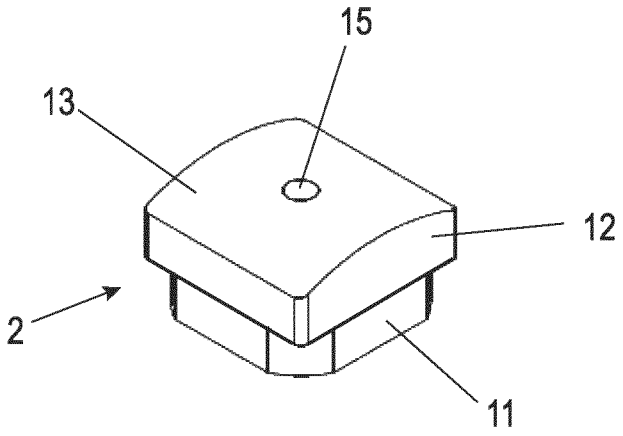

Fig. 1