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Description

- The invention relates to a rail grinding machine, which is displaceable manually on the rails of a track in a longitudinal direction, the rail grinding machine comprising
- a machine frame supportable on a rail by means of guide rolls, and
 - a grinding apparatus mounted on the machine frame in such a way as to be pivotable about a pivoting axis running in the longitudinal direction,
- the grinding apparatus having a grinding drive motor with a drive shaft for a grinding tool to be arranged below the drive motor, the grinding tool being drivable for rotation by means of the grinding drive motor.

- Rail grinding machines of this type, which are known from WO 2011/147527 A1 (corresponding to DE 20 2010 007 264 U1), for example, are very flexible in use and can be moved rapidly from one position to be machined to another, for example for grinding the welding beads between weld joints. As a general rule, even for manually displaceable rail grinding machines of this type, there is the requirement that they should provide a maximum grinding performance and a high grinding quality at the same time.

- From US 5,111,624 A, it is known to arrange a blower directly on the grinding wheel of a rail grinding machine, said blower not being used for cooling the grinding stone but being provided to deflect grinding dust and sparks and the like in a downward direction.

- Therefore, the invention is based on the object of refining a rail grinding machine of the generic type in such a way as to provide an improved grinding performance as well as an improved grinding quality.

According to the invention, this object is achieved for a rail grinding machine according to the preamble of claim 1 in such a way that a blower is arranged above the grinding tool in order to move air downwardly past the drive motor and the grinding tool during use, and that a jacket is provided, which surrounds the drive motor and the grinding tool at least partly, with air ducts being formed between the jacket and the drive motor on the one hand and the grinding tool on the other, the air ducts being connected to the blower.

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This measure ensures that the aspirated air is guided past the drive motor, causing it to be cooled to the required extent, and that this air, which is at the same time the cooling exhaust air of the motor, is then guided past the grinding tool, causing the grinding tool to be cooled as well, which results in an increased service life and, therefore, an increased grinding performance thereof. Guiding the air from the motor downwardly past the grinding tool will cause the air to strike the rail head surface such that chips and metal dust adhering thereto are removed. This increases the grinding quality, in other words the surface roughness of the ground rail head surface is reduced. A targeted and, therefore, highly efficient air guidance past the motor and then towards the grinding tool is ensured.

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According to a particularly advantageous refinement, the blower is arranged between the drive motor and the grinding tool, wherein the air duct between the drive motor and the jacket is an air intake duct while the duct between the grinding tool and the jacket is an exhaust air duct. This arrangement of the blower results in an optimized air guidance as the air flow takes place partly on the suction side of the blower and partly on the discharge side of the blower.

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An optimum design of the blower is achieved if it has an impeller that is provided with a cover with a central intake opening and is coupled to the drive shaft in a co-rotational manner. When the air flows from the intake duct between the jacket and the drive motor to the central opening, the air
5 flows through the gap between the housing of the drive motor and the cover, with the result that the drive motor is also cooled at its front end. In other words, the air intake duct is extended, between the cover and the drive motor, towards the intake opening.

10 An optimized air flow on the discharge side of the blower is obtained if the cover has, at its outer edge, a deflecting portion leading to the exhaust air duct. This ensures a loss-free air flow into the exhaust air duct, which in turn results in an optimized cooling of the grinding tool.

15 In practical application, the grinding apparatus has, in the vast majority of cases, a servo-motor arranged above the drive motor for the axial displacement of the drive shaft, which enables the grinding tool to be fed towards the rail and readjusted in the event of corresponding wear. In this regard, it is advantageous if the blower is fastened to the drive shaft in
20 such a way that it is not displaceable axially in relation to the drive shaft. In other words, the blower is moved together with the grinding tool, causing the disk-shaped gap between the drive motor and the blower to be increased.

25 Further advantages, details and features of the invention will emerge from the ensuing description of an exemplary embodiment, taken in conjunction with the drawing, in which

Fig. 1 shows a side view of a manually guided rail grinding machine,
30 and

Fig. 2 shows a vertical longitudinal section through the grinding apparatus of the grinding machine as shown in Fig. 1.

The grinding machine 1 shown in Fig. 1 for grinding in each case one rail 2 of a track has a machine frame 3, which is guided on the rail 2 via guide rolls 4. By means of a cross-beam not shown, the frame 3 is supported on the other rail (not shown) of the track as is common practice in practical application and known from DE 20 2010 007 264 U1. The machine frame 3 is provided with handles 5 allowing the grinding machine 1 to be arranged on and removed from the rail. In the machine frame 3, a grinding unit 6 is mounted such as to be pivotable about a pivot axis 7 parallel to the rail 2. This grinding unit 6 has a mounting bracket 8, which is mounted, at its ends, in pivot bearings 9 disposed on the machine frame 3, the pivot bearings 9 defining the pivot axis 7 and being supported on the rail 2 by means of sensing rollers 10. The upwardly bent mounting bracket 8 carries a grinding apparatus 11 arranged approximately in the centre thereof. This grinding apparatus 11 has, at its centre, an electric grinding drive motor 12 and a servo-motor 13, which is also electric, the servo-motor being arranged above said grinding drive motor 12. A grinding tool 14 configured as a cup grinding wheel is provided below the grinding drive motor 12. The drive motor 12 and the servo-motor 13 are supplied with electrical energy from an energy supply module arranged on the mentioned cross-beam, for example an electric generator, driven by means of an Otto-cycle engine, with a downstream storage battery as is common practice in practical application and known from DE 20 2010 007 264 U1. The grinding apparatus 11 is supplied with energy via a line 15. The mounting bracket 8 with the grinding apparatus 11 is pivoted manually by means of a pivot spindle drive 16.

As can be seen from Fig. 2, the grinding apparatus 11 has a housing 17, which is firmly connected to the mounting bracket 8. The drive motor 12 is

arranged below the mounting bracket 8. The drive motor 12 is a so-called external rotor motor the stator 18 of which is firmly connected to the housing 17. The rotor 19, which is arranged in the housing 17 radially outside the stator 18, is connected to the drive shaft 20 for the grinding tool 14 in a non-rotational manner while the drive shaft 20, however, is displaceable in relation to the rotor 19 in the direction of its longitudinal centre axis 21 forming the axis of rotation. With its inner rotor sleeve 22 that accommodates the drive shaft 20, the rotor 19 is rotatable in the stator 18 by means of roller bearings 23 but is mounted in such a way as to be non-displaceable in the direction of the longitudinal centre axis 21. Between the stator 18 and the radially outer sleeve-like rotor portion 24, the stator laminations 25 are arranged.

Above the mounting bracket 8, the servo-motor 13 is arranged on the housing 17, which is capable of driving, by means of its servo-motor shaft 26, a threaded spindle firmly connected thereto of a spindle nut drive 28. The threaded spindle 27 is arranged in a spindle nut 29, which moves the drive shaft 20 in the direction of the axis 21 when the servo-motor shaft 26 and, therefore, the threaded spindle 27, are being rotated, causing the grinding tool 14 to be shifted in the direction of the axis 21 as well.

On its lower side, the drive motor 12 is closed by means of a cover plate 30, which is firmly connected to the housing 17.

Between the drive motor 12 and the grinding tool 14 firmly connected to the drive shaft 20, a blower 31 is arranged, which is non-rotationally and non-displaceably connected to the drive shaft 20 and is shifted together with the drive shaft 20 in the direction of the longitudinal centre axis 21 when the drive shaft 20 is being displaced. In other words, the distance between the blower 31 and the grinding tool 14 is unchangeable whereas

the distance between the blower 31 and the drive motor 12 changes in the event of said axial displacements explained above.

The blower 31 has an impeller 32, which has radially extending blades 33.
5 In the direction of the drive motor 12, the blades 33 are covered by a cover 34, which has a large central opening 35. Between the cover 34 fastened to the blades 33 and the cover plate 30 of the drive motor 12, an air gap 36 is formed, which changes its axial width when the grinding tool 14 is being shifted as explained above. The cover 34 is bent downwardly in
10 its outer area such that a downwardly directed deflecting portion 37 is formed that guides the air towards the outer circumference 38 of the grinding tool 14.

The drive motor 12, the blower 31 and the grinding tool 14 are surrounded
15 by a substantially cylindrical jacket 39, which defines an air intake duct 40 between the jacket 39 and the region of the housing that is associated to the drive motor 12. This is adjoined by the air gap 36 so the aspirated air flows around the outer circumference and the lower side of the drive motor 12 in such a way that a corresponding cooling effect is obtained. The
20 air is aspirated centrally through the opening 35 of the blower 31 and accelerated radially outwardly by means of the impeller 32 and discharged again in the direction of the rail 2 through an exhaust air duct 41 between the grinding tool 14 and the jacket 39. The grinding tool is cooled in this manner. Also, grinding chips disposed on the rail 2 are blown away so the
25 grinding head is cleaned. The air flow as a whole is designated by reference numeral 42. The jacket 39 is provided with lateral protective plates 43 serving as a protection against free-flowing chips.

Patentkrav

1. Skinneslibemaskine (1) der kan forskydes manuelt på skinnerne (2) af et spor i en længderetning,

- 5 - med en maskinramme (3), som kan understøttes på en skinne (2) ved hjælp af styreruller (4), og
- et slibeaggregat (11) der er monteret på maskinrammen (3) på en sådan måde, at det kan drejes omkring en svingakse (7), der løber i en længderetning,
- 10 - som omfatter en slibedrivmotor (12) med en drivaksel (20) til et roterbart drevet slibeværktøj (14), som skal anbringes under drivmotoren (12),

kendetegnet ved,

at en blæser (31) er anbragt over slibeværktøjet (14), hvilken blæser (31) fører luft nedad forbi drivmotoren (12) og slibeværktøjet (14) under brug, og

- 15 **at** der er tilvejebragt en kappe (39), som mindst delvist omgiver drivmotoren (12) og slibeværktøjet (14), hvor luftkanaler (40, 41) er tilvejebragt mellem kappen (39) og drivmotoren (12) på den ene side og slibeværktøjet (14) på den anden side, hvilke luftkanaler (40, 41) er forbundet til blæseren (31).

2. Slibemaskinen (1) ifølge krav 1, kendetegnet ved,

- 20 **at** blæseren (31) er anbragt mellem drivmotoren (12) og slibeværktøjet (14), hvor luftkanalen mellem drivmotoren (12) og kappen (39) er en luftindsugningskanal (40), mens kanalen mellem slibeværktøjet (14) og kappen (39) er en udblæsningskanal (41).

25 3. Slibemaskine (1) ifølge krav 1 eller 2, kendetegnet ved,

at blæseren (31) omfatter et skovlhjul (32), der er forsynet med et dæksel (34) med en central indsugningsåbning (35), hvilket skovlhjul (32) er koblet roterbart til drivakslens (20).

30 4. Slibemaskinen (1) ifølge krav 3, kendetegnet ved,

at luftindsugningskanalen (40) føres mod indsugningsåbningen (35) radiale i retning af drivakslens (20) mellem dækslet (34) og drivmotoren (12).

5. Slibemaskine (1) ifølge krav 3 eller 4, **kendetegnet ved,**
at dækslet (34) omfatter en afbøjningssektion (37) ved sin ydre kant, hvilken afbøjningssektion (37) fører til udblæsningskanalen (41).

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6. Slibemaskine (1) ifølge et hvilket som helst af kravene 1 til 5, **kendetegnet ved,**

at slibeaggregatet (11) omfatter en reguleringsmotor (13) der er anbragt over drivmotoren (12) til den aksiale forskydning af drivakslen (20), og

10 **at** blæseren (31) er fastgjort til drivakslen (20) på en sådan måde, at den ikke er aksial forskydelig i forhold til drivakslen (20).

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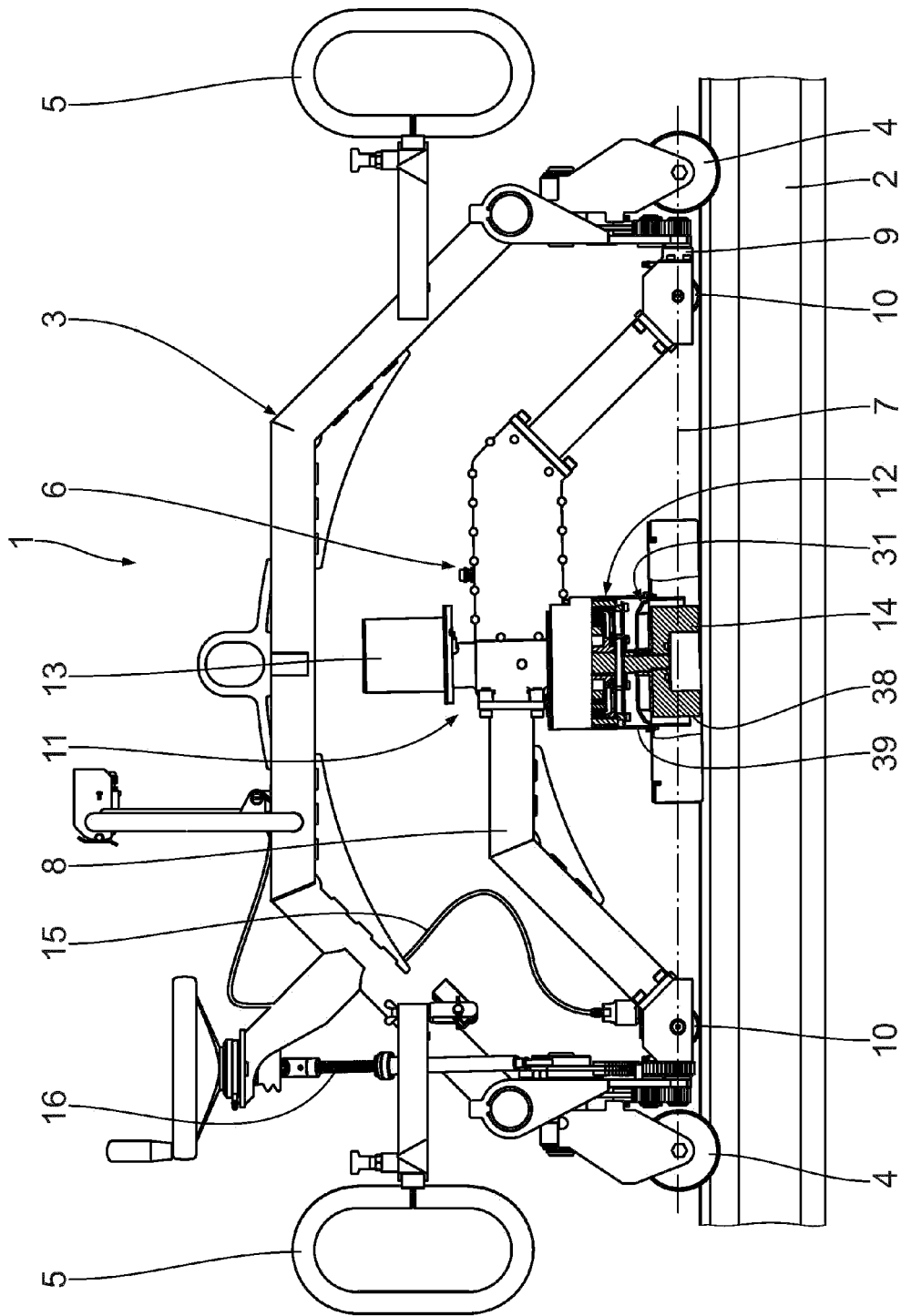


Fig. 1

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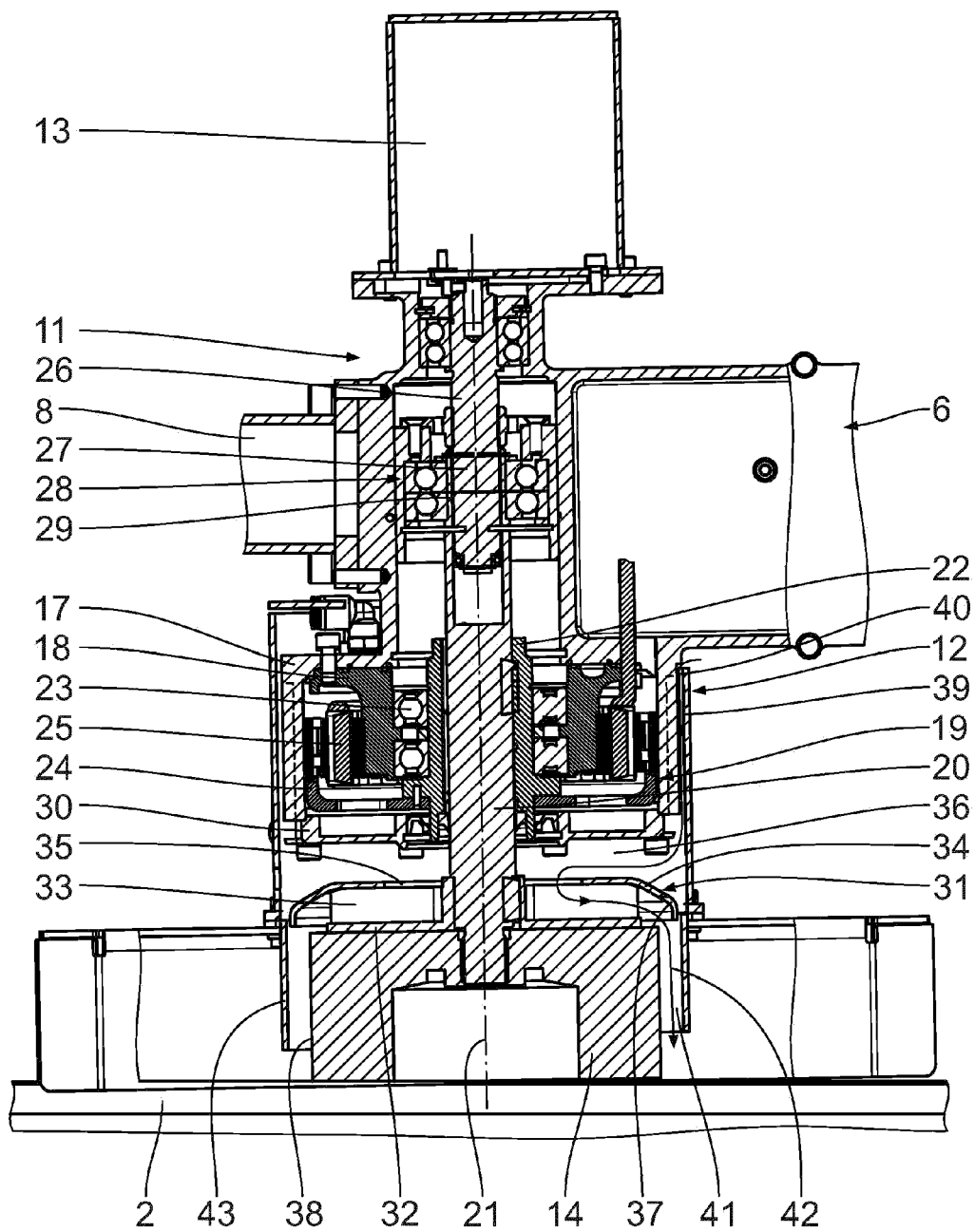


Fig. 2