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

(11) **EP 1 492 646 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
**15.09.2010 Bulletin 2010/37**

(21) Application number: **03710559.0**

(22) Date of filing: **26.02.2003**

(51) Int Cl.:
***B24B 7/18*** *(2006.01)*

(86) International application number:
**PCT/SE2003/000311**

(87) International publication number:
**WO 2003/076131 (18.09.2003 Gazette 2003/38)**

# (54) A SYSTEM FOR GRINDING FLOOR SURFACES

System zum Schleifen von Bodenflächen

Système de meuler les surfaces de sol

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT SE SI SK TR**

(30) Priority: **12.03.2002 SE 0200743**

(43) Date of publication of application:
**05.01.2005 Bulletin 2005/01**

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(56) References cited:
**EP-A1- 0 563 432**
**WO-A1-92/02334**
**WO-A1-95/14140**
**US-A- 1 069 803**
**US-A- 3 837 028**
**US-A- 4 097 950**
**US-A- 5 199 996**
**US-B1- 6 238 277**

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## Description

**[0001]** The present invention relates to a system according to the pre-characterising clause of claim 1.

**[0002]** US 6238277 B1 discloses a mobile machine of the said type.

**[0003]** EP 0 845 326 A1 discloses a floor grinding machine having a motor-driven grinding or polishing disc, moved across the floor surface to be treated, enclosed by a housing provided with a handle for guiding the movement of the device across the floor. The grinding or polishing disc is formed by four smaller discs positioned in a circle and simultaneously driven in different directions.

**[0004]** In grinding floor surfaces the rate at which the grinding machine is advanced by an operator is naturally determined by the time it takes to obtain an acceptable grinding result. This rate is normally only a fraction of normal walking pace, something that the person advancing the machine ultimately finds very uncomfortable and tiring. Although it would be possible to advance the machine at normal walking pace, this would then involve the need for repeated grinding, which may result in a failure to observe any occurrence of sections where the grinding result is unacceptable.

**[0005]** The object of the present invention is to release the operator of the grinding machine from the actual propulsion of the machine. This is achieved in that the invention has the features specified in the characterising part of the patent claim.

**[0006]** The subordinate claims indicate alternative operative connections between operating devices and the control unit forming part of the arrangement according to the invention.

**[0007]** The invention furthermore affords the advantage that a dust/sludge suction unit, which is coupled to the grinding machine via a suction hose, can be located in close proximity to the grinding machine in the space normally occupied by the operator. The suction hose can thereby be made shorter so that the flow losses therein are reduced and the suction capacity is increased. If this increased suction capacity cannot be utilised in order to improve the result, there is the alternative option of reducing the energy required for the suction, thereby achieving an energy saving.

**[0008]** The operator is normally not required to continuously steer the machine but can concentrate on monitoring the grinding result and if necessary increasing or reducing the rate of advance, removing any obstacles or even controlling more than one grinding machine.

**[0009]** The invention will be explained in more detail below with reference to figures attached, of which:

Fig. 1 shows, in schematic form, a perspective front view of a grinding machine according to the invention having a dust suction unit coupled thereto by a short suction hose;

Fig. 2 shows, by way of example, a plan view of the grinding machine according to Fig. 1 from the rear and how an operator controls the grinding machine remotely;

Fig. 3 shows grinding disks arranged on a planet disk.

**[0010]** In the drawing 1 generally denotes a mobile machine for grinding floor surfaces according to the present invention. Fig. 1 shows how a dust suction unit 3 is connected to the grinding machine 1 by a very short suction hose 2. As already stated, the short suction hose 2 affords great advantages and is possible due to the fact that the dust suction unit 3 can be located in the space normally occupied by an operator.

**[0011]** The grinding machine comprises a housing 1a with a drive motor 1b arranged thereon and is supported partly by two wheels 4, 5 and partly by grinding disks 1c1, 1c2, 1c3, 1c4 located at the bottom of the housing and rotatably supported on a planet disk 1d. For driving the planet disk 1d and the grinding disks 1c1, 1 c2, 1c3, 1c4, these are operatively connected to the motor 1b in a manner not further specified here, since this operative connection is not the subject matter of the present invention.

**[0012]** According to the invention, a drive motor 4a, 5a is mechanically connected to each wheel 4, 5 and is in turn electrically connected by leads 4b, 5b to a control unit 6. The latter comprises means, familiar to the person skilled in the art, for controlling the motors 4a, 4b and hence the direction of rotation and the rotational speed of the wheels 4, 5 as a function of control signals from an operating device 7, which is manually actuated by an operator 8. The control signals are transmitted from the operating device 7 to the control unit 6 via radio communications units in the operating device 7 and the control unit 6, as illustrated by antennae 6a and 7a connected to these respectively. The arrangement according to the invention allows the operator 8, from a location affording a good, clear view of the floor surface that is to be ground, to carry out this grinding and, if so required, to briefly study the grinding result at close quarters, and if required to control the machine in order to locally repeat the grinding.

**[0013]** The operator is naturally able, whenever appropriate, to carry out the grinding in the hitherto conventional way, that is to say by manually guiding the machine 1 by means of control handles le and controls If provided thereon. Also visible on the drawing are connections 1g for electrical cables supplying the motor 1b and the control unit 6. The said electrical cables are suitably brought together on a carriage (not shown) or suspended above the floor surface that is to be ground.

## Claims

1. A system for grinding floor surfaces, comprising a mobile floor grinding machine (1) comprising a housing (1a), which is supported only by two wheels (4, 5) and a number of rotatably supported grinding disks (1c1, 1c2, 1c3, 1c4), which are distributed over

a planet disk (1d) rotatably supported at the bottom of the housing (1a) and are operatively connected to a drive motor (1b), the planet disk (1d) being designed to be driven by the drive motor (1b), wherein the grinding disks are four in number, **characterized in that** the floor grinding machine comprises a respective drive motor (4a, 5a) mechanically connected to each wheel (4,5), and a control unit (6) influencing the direction of rotation and the rotational speed of the drive motors (4a, 5a), the control unit being operatively connected via a radio communications unit to an operating device (7), designed for manual actuation by an operator (8) for remote control of the grinding machine (1).

2. The system as claimed in claim 1, further comprising a dust/sludge suction unit, which is coupled to the grinding machine via a suction hose, and located in the space normally occupied by the operator.

3. The system as claimed in claim 1 or 2, wherein a dust suction unit (3) is connected to the floor grinding machine.

4. The system as claimed in claim 3, wherein dust suction unit (3) is located in the space normally occupied by an operator.

**Patentansprüche**

1. Ein System zum Schleifen von Bodenflächen umfassend eine mobile Bodenflächenschleifmaschine (1), umfassend ein Gehäuse (1a), welche lediglich durch zwei Räder (4, 5) und eine Anzahl von drehbar gelagerten Schleifscheiben (1c1, 1c2, 1c3, 1c4) getragen wird, wobei die Schleifscheiben auf einer Planetenscheibe (1d) angeordnet sind, die drehbar am Boden des Gehäuses (1a) angebracht ist, und wobei die Schleifscheiben mit einem Antriebsmotor (1b) wirkverbunden sind, wobei die Planetenscheibe (1d) so ausgelegt ist, dass sie durch den Antriebsmotor (1b) angetrieben wird, wobei die Anzahl der Schleifscheiben vier beträgt, **dadurch gekennzeichnet, dass** die Bodenschleifmaschine jeweils einen Antriebsmotor (4a, 5a) umfasst, der mit dem entsprechenden Rad (4, 5) mechanisch verbunden ist, und eine Steuereinheit (6), welche die Drehrichtung und Drehzahl der Antriebsmotoren (4a, 5a) beeinflusst, wobei die Steuereinheit über eine Funkkommunikationseinheit mit einem Bediengerät (7) wirkverbunden ist, welches für die manuelle Bedienung durch einen Anwender (8) zur Fernbedienung der Schleifmaschine (1) ausgelegt ist.

2. Das System gemäß Anspruch 1, des weiteren umfassend eine Staub/Schlammabsaugeinheit, die über einen Saugschlauch mit der Schleifmaschine verbunden ist und sich an der Stelle befindet, die normalerweise durch den Anwender eingenommen wird.

3. Das System gemäß Anspruch 1 oder 2, worin eine Staubabsaugeinheit (3) an die Bodenschleifmaschine angeschlossen ist.

4. Das System gemäß Anspruch 3, worin die Staubabsaugeinheit (3) sich an der Stelle befindet, die normalerweise durch einen Anwender eingenommen wird.

**Revendications**

1. Système de meulage des surfaces du sol, comprenant une machine de meulage du sol mobile (1) comprenant un boîtier (1a), qui est supporté uniquement par deux roues (4, 5) et un certain nombre de disques de meulage supportés en rotation (1c1, 1c2, 1c3, 1c4), qui sont répartis sur un disque planétaire (1d) supporté en rotation sur le fond du boîtier (1a) et sont raccordés de manière opérationnelle à un moteur de commande (1b), le disque planétaire (1d) étant conçu pour être entraîné par le moteur de commande (1b), dans lequel les disques de meulage sont au nombre de quatre, **caractérisé en ce que** la machine de meulage du sol comprend un moteur de commande respectif (4a, 5a), mécaniquement raccordé à chaque roue (4, 5) et une unité de commande (6) influençant le sens de rotation et la vitesse de rotation des moteurs de commande (4a, 5a), l'unité de commande étant raccordée de manière opérationnelle, par le biais d'une unité de radiocommunication, à un dispositif opérationnel (7), conçu pour un actionnement manuel par un opérateur (8) pour une commande à distance de la machine de meulage (1).

2. Système selon la revendication 1, comprenant en outre une unité d'aspiration de la poussière/la boue qui est raccordée à la machine de meulage par le biais d'un tuyau d'aspiration, et située dans l'espace normalement occupé par l'opérateur.

3. Système selon la revendication 1 ou 2, dans lequel une unité d'aspiration de poussière (3) est raccordée à la machine de meulage de sol.

4. Système selon la revendication 3, dans lequel l'unité d'aspiration (3) est située dans l'espace normalement occupé par un opérateur.

Fig 1

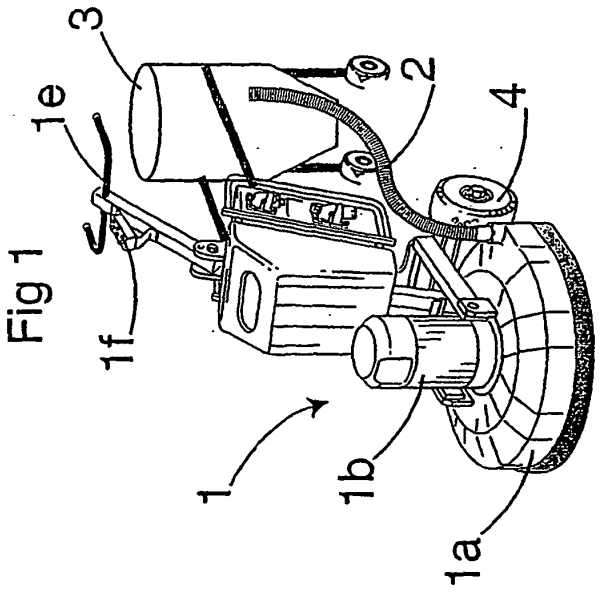



Fig 3

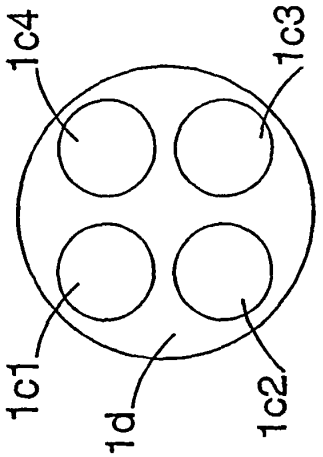
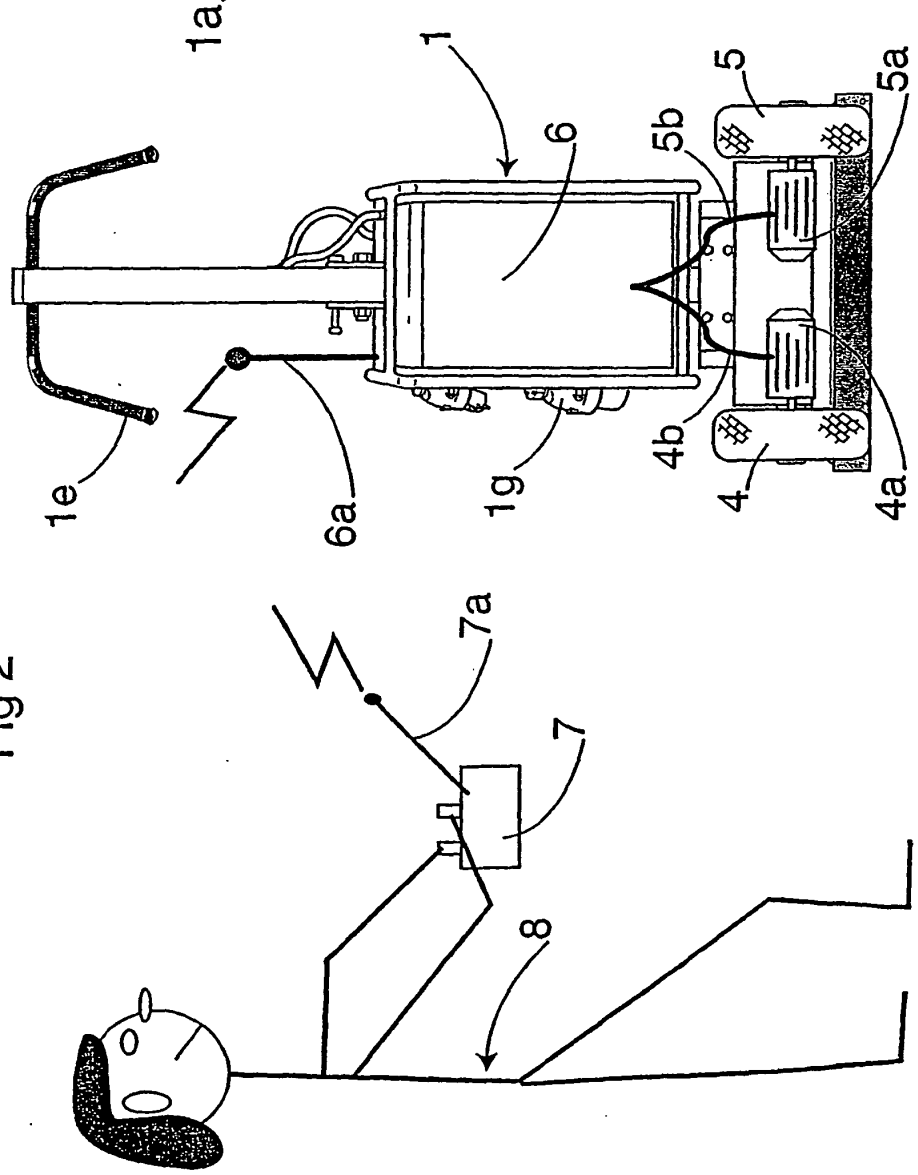



Fig 2



## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- US 6238277 B1 **[0002]**
- EP 0845326 A1 **[0003]**