



(11)

EP 4 563 282 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
04.06.2025 Bulletin 2025/23

(51) International Patent Classification (IPC):
B24B 21/08 ^(2006.01) **B24B 21/18** ^(2006.01)
B24B 55/02 ^(2006.01)

(21) Application number: **22786553.2**

(52) Cooperative Patent Classification (CPC):
B24B 21/08; B24B 21/18; B24B 55/02

(22) Date of filing: **26.07.2022**

(86) International application number:
PCT/PT2022/050022

(87) International publication number:
WO 2024/025429 (01.02.2024 Gazette 2024/05)

(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

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(54) **SUPPORT OF A PRESSURE SHOE FOR A GRINDING BELT WITH FLUID CIRCULATION**

(57) The present invention is an accessory for installation on grinding machines. The accessory is the support body, or skate holder in industrial language, for receiving the skate, over which the grinding belt will slide. It is comprised of support guides (1). These are fixed to the support body by screws. In the support body (4) there is a groove through which the cooling coil (3) passes,

which is protected by the coil protection cover (2). Fixed to the opposite side of the support body (4) is the skate (5), which is an adjustable and mouldable structure, over which passes the grinding belt (6) that is in contact with the object to be ground or polished. The objective is to reduce temperature, decreasing the risk of fire and increasing productivity and grinding efficiency.

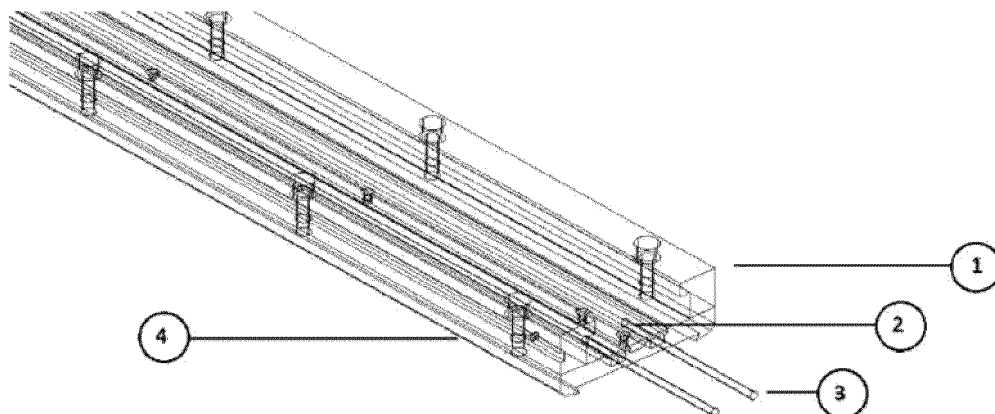


Fig. 2

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Description

Technical field of the invention

[0001] Currently industrial sanding or grinding systems for materials (such as wood, etc.) depend on increasingly sophisticated machines that make use of components that by themselves contribute to the continuous improvement of the process. In fact, industrial machines have been improving their sanding mechanisms, particularly through the improving of the components that can be coupled to each of these machines.

[0002] The construction of sanding machinery tends to be able to allow a long-lasting use, reducing the maintenance requirements of the machines. However, there is a set of components that can be considered essential, which are manageable and even adaptable according to each sanding typology.

[0003] It was, and is, precisely here, in the area of accessories/components of more accentuated/faster wear that the invention is focused.

[0004] For each type of material to be sanded, it is necessary to use different types of sandpaper/grinding belt, but also the intensity with which the sandpaper is applied. This intensity, along with the material to be sanded and the composition of the sandpaper itself, determines the quality of the sanding.

[0005] The grain of the sandpaper is yet another factor to be taken into account when using sandpaper to shape the material/object to be sanded.

[0006] The way sanding is performed, the manner in which the sandpaper is applied, the duration of application, and other components of this sanding process are essential in determining the lifetime of the sandpaper and therefore the costs associated with the sanding process.

[0007] An essential factor in both the lifespan of the sandpaper and the duration of the sanding process is the temperature reached by the sandpaper.

[0008] Solving or mitigating this problem of heating is preponderant for the industry.

Prior art

[0009] Nowadays, the use of grinding systems with the attachment to the grinding machine of a support of a pressing shoe for a grinding belt is already well established. It varies according to the type of machine to which it is coupled, and has a relatively standardized operation. All pre-existing systems, as this invention, struggle with the ability of their sandpaper supporting systems to be more or less efficient in terms of their ability to reduce the temperature. This function is ensured in all the pre-existing systems through natural cooling, which is more or less efficient, according to the type of construction and according to the type of materials, but without any induced form of temperature control.

Summary of the invention

[0010] The present invention relates to an accessory for installation on grinding machines. This accessory is the support for holding a pressing element of a pressing shoe, on top of which the sandpaper belt or grinding belt will slide for sanding or grinding the materials to be sanded/grinded.

[0011] Most industrial sanding machines have the capacity to attach a support of a pressing shoe for a grinding belt at their end, which will be the base for a pressing element. i.e., a sliding skid, over which the sandpaper will slide. This pressing element or skid has the important function of accommodating the sandpaper in a way that allows to get the most out of it, promoting the maximum efficiency of the sandpaper and thus reducing the operating cost.

[0012] The most efficient way to keep sanding machines long-lasting is the use of an accessory (the support for holding a pressing element of a pressing shoe) that will accommodate the system through which the sanding belt passes on the industrial machines. This holder support comprises, on one side, a support guide to promote the connection to the machine and, on the other side, the pressing element or sliding skid where the sanding belt will slide.

[0013] The present invention is a detachable skid-holder/holder of a pressing element of a pressing shoe through which the sanding belts pass, such holder being made of mechanized aluminium, or other metal that assures the mechanical resistance of the piece and the exchange of the heat generated during operation.

[0014] The cooling of the pressing element or skid, and consequently of the sanding belt, is the essential element of the present invention.

[0015] The temperature is referred to in several previous patents, as something to be combated during sanding, due to the risk of fire, premature wear of the pressing elements, sanding belts and several components of the machine.

[0016] In addition to the above, the temperature during sanding causes warping and superficial defects that are undesirable to the correct finishing of the products to be sanded.

[0017] However, the products available in the market only use natural air convection to cool the holding support of the pressing element of the pressing shoe. The product here disclosed is innovative in the sense that utilizes heat exchange through a fluid, obtaining in this way a reduction of the temperature much more effective, without depending on the outside temperature and with a much higher efficiency.

[0018] The cooling of the holding support of the pressing element of the pressing shoe through forced heat exchange by a fluid can be applied in many different sectors where grinding or polishing of surfaces is applied. A particular case presented herein is the case of the grinding process used in companies producing: chip-

board panels; MDF, which is an acronym standing for Medium Density Fibreboard, in Portuguese "placa de fibra de média densidade", which is a material that results from the mixing of wood fibres with synthetic resins and can be produced unprocessed or coated with melamine; HDF, which is an acronym standing for High Density Fibreboard, in Portuguese "placa de fibra de alta densidade", which is a material that results from the mixing of wood fibres with synthetic resins; OSB, which is an acronym standing for Oriented Strand Board, in Portuguese "aglomerado de partículas de madeira longas e orientadas"; wood veneer; veneered panels; laminated panels; etc.

[0019] The temperature of the holding support of the pressing element of the pressing shoe for a grinding belt is controlled by means of a probe to monitor and control the working temperature. The temperature is thus controlled by inducing a fluid in the serpentine embedded in the holding support of the pressing element of the pressing shoe for a grinding belt so that the latter, by decreasing its working temperature, can transmit to the pressing element of the pressing shoe for a grinding belt and consequently to the sandpaper the appropriate temperature for the application of the sandpaper to the sanded element, increasing the durability of the sanding belt, decreasing the risk of fire, increasing the control of the sanding quality, reducing/eliminating machine downtimes and contributing to the consequent reduction in the operating costs.

Description of the invention

[0020] The present invention is characterised by being a piece/part (support for holding a pressing element of a pressing shoe for a grinding belt) with variable dimensions depending on the machine to which it is coupled, but which will always have a supporting guide (1) which will be the way of joining the part to the grinding machine. Thus, the holding support of the pressing element of the pressing shoe for a grinding belt comprises a supporting guide that is fixed to the body (4) of the support. This body of the support has a slot in its entire length through which the cooling serpentine (3) passes. This cooling serpentine embedded within the body (4) of the support has an inlet and an outlet at the same end of the body (4) of the support and is connected to the cooler (not shown). The cooling serpentine (3) is manufactured in copper or other metal that enhances heat transfer, and a refrigerant fluid is forced to circulate through it in order to exchange the heat generated during the machine's operation. To protect the serpentine (3), a protection cover (2) is placed thereon, which is fixed to the body (4) of the support by means of screws.

[0021] On the opposite side of the body (4) of the support there is a slot for placing the pressing element of the pressing shoe (5) on which the sanding belt (6) will slide. The pressing element of the pressing shoe (5) is a spare part which serves as a pressing plate/shoe on the

contact point between the sanding belt (6) and the material being sanded or polished (7), being that the pressing elements of the pressing shoes (5) are static and the grinding belts and the material to be sanded are dynamic, causing a large temperature increase in that area.

[0022] The friction caused by the passage of the grinding belt (6) over the pressing element of the pressing shoe (5) induces high temperatures affecting both the accessory described herein and the material being sanded or polished (7).

[0023] The present invention may undergo modifications resulting from the specific machines where it is applied. Features as the materials of the machines, the dimension and the sanding speed generate possible variations of the invention. However, in all of them the principle that will always be applied is the cooling of the support for holding a pressing element of a pressing shoe through forced fluid exchange.

[0024] The flexibility in the construction design of the body of the support (holding support of the pressing element of the pressing shoe) guarantees the adaptation of the holding support to different types of machines, with the guarantee of maximizing efficiency.

Claims

1. - Support for holding a pressing element of a pressing shoe for a grinding belt, with cooling through forced fluid exchange, **characterized in that** it comprises a support guide that can be connected to a grinding machine and a groove in the support's body (4) through which passes a temperature cooling serpentine (3).
2. - Support according to claim 1, **characterized in that** the serpentine (3) is arranged along the entire length of the support's body (4), with the serpentine's inlet and outlet on the same side of the support's body (4), creating a closed circuit of the coolant refrigerant fluid.
3. - Support according to claims 1 and 2, **characterized in that** the serpentine (3) is manufactured in copper or other metal that enhances heat transfer.
4. - Support according to claims 1 to 3, **characterized in that** the serpentine (3) can be adjusted depending on the material of the body (4) of the support for holding a (5).
5. - Support according to claims 1 to 4, **characterized in that** it allows the reduction of the temperature of the pressing element of a pressing shoe (5), and consequently of the grinding belt (6).
6. - Support according to claims 1 to 5, **characterized in that** it allows a decrease in temperature that

allows reducing the risk of fire during sanding.

7. - Support according to claims 1 to 6, **characterized in that** it increases the lifespan of the disposable pressing element of a pressing shoe (5), due to the decrease in its temperature. 5
8. - Support according to claims 1 to 7, **characterized in that** it increases the lifespan of the grinding belt (6), due to the decrease in its temperature. 10
9. - Support according to claims 1 to 8, **characterized in that** decreases machine downtime due to overheating of components thereof. 15

Amended claims under Art. 19.1 PCT

1. - Support of a pressure shoe for a grinding belt (6), with fluid circulation, such support comprising a support's guide (1) that can be connected to a grinding machine, and a support's body (4) for holding a pressing element of a pressing shoe (5), the support being **characterized in that** the support's body (4) comprises a groove through which passes a cooling serpentine (3), for colling the temperature. 20 25
2. - Support according to claim 1, **characterized in that** the serpentine (3) is arranged along the entire length of the support's body (4), with the serpentine's inlet and outlet on the same side of the support's body (4), creating a closed circuit of the coolant refrigerant fluid. 30
3. - Support according to claims 1 and 2, **characterized in that** the serpentine (3) is manufactured in copper or other metal that enhances heat transfer. 35
4. - Support according to claims 1 to 3, **characterized in that** the serpentine (3) is connected to a refrigerator. 40
5. - Support according to claims 1 to 4, **characterized in that** it comprises a probe to monitor the working temperature. 45

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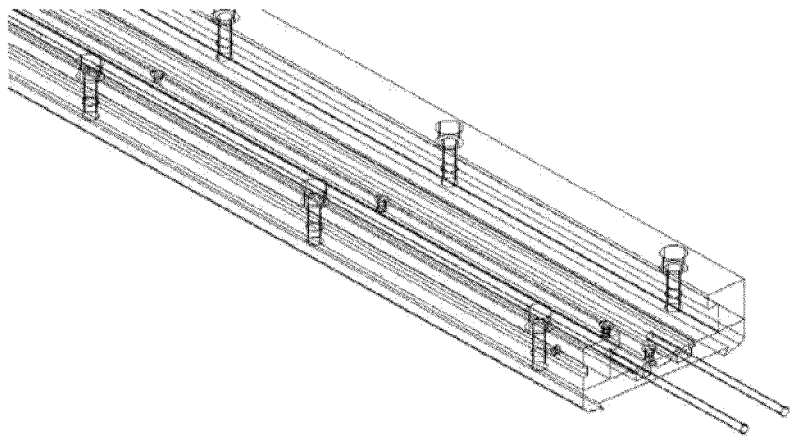


Fig. 1

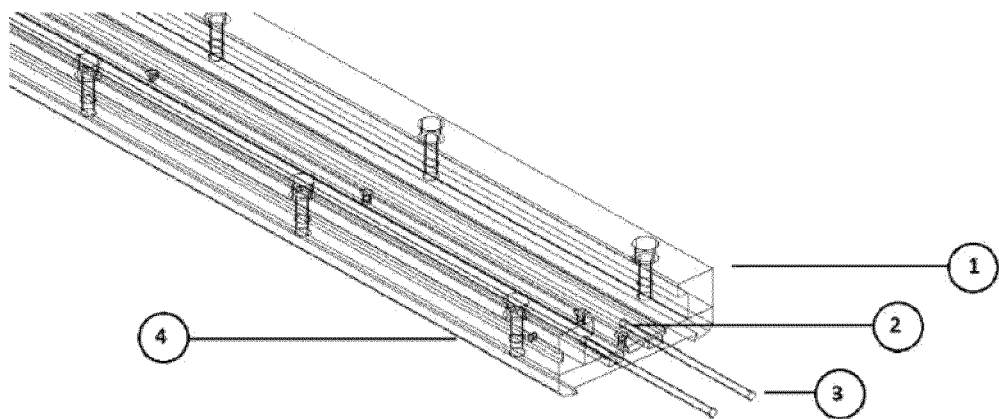


Fig. 2

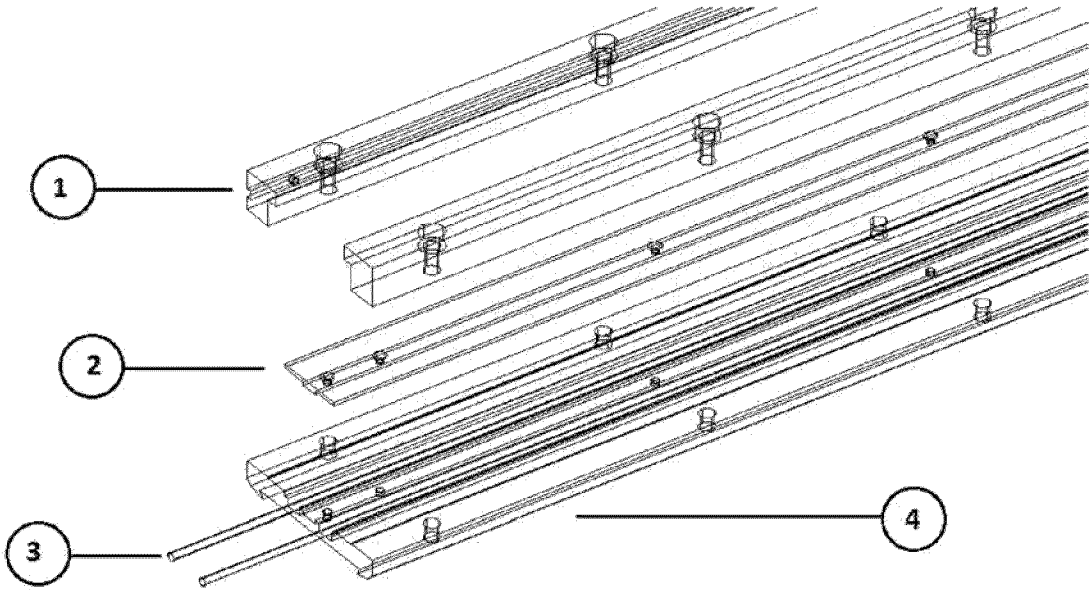


Fig. 3

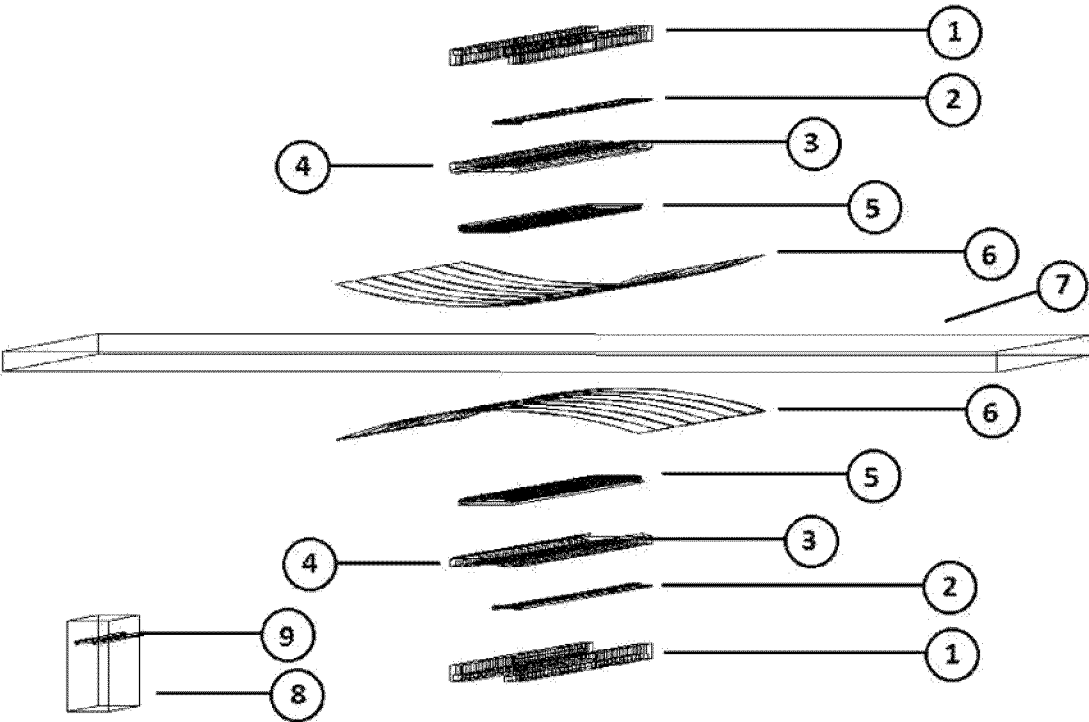


Fig. 4

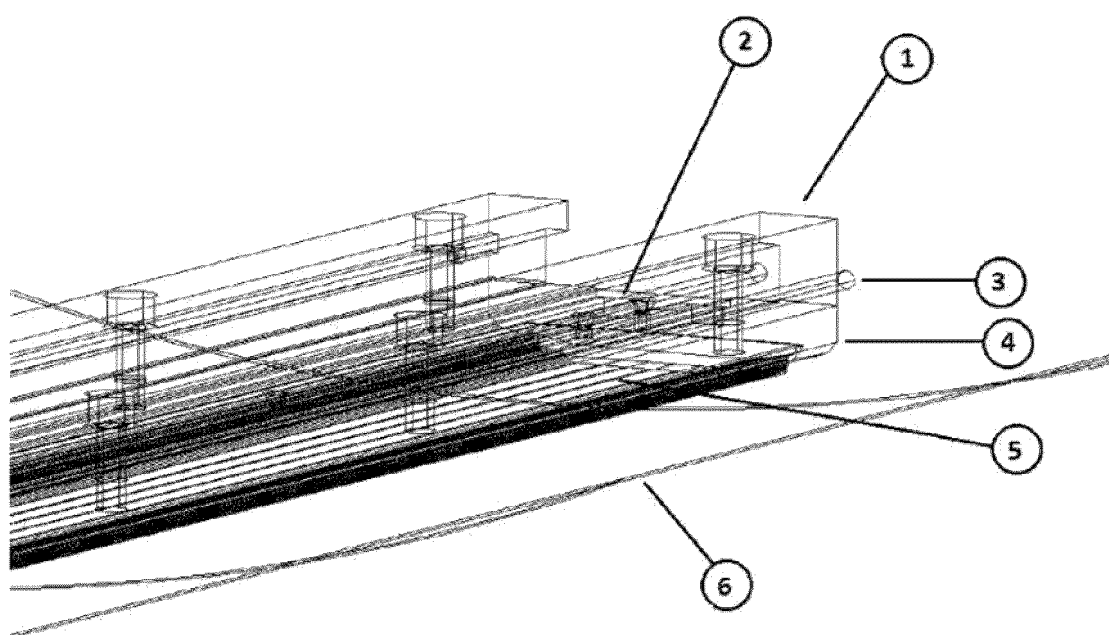


Fig. 5

RELATÓRIO DE PESQUISA INTERNACIONAL

Pedido internacional N°

PCT/PT2022/050022

A. CLASSIFICAÇÃO DO OBJETO

B24B 21/08(2006.01)i; **B24B 21/18**(2006.01)i; **B24B 55/02**(2006.01)i

De acordo com a Classificação Internacional de Patentes (IPC) ou com a classificação nacional e IPC

B. DOMÍNIOS ABRANGIDOS PELA PESQUISA

Documentação mínima pesquisada (sistema de classificação seguido pelo símbolo da classificação)

B24B

Documentação adicional pesquisada, além da mínima, na medida em que tais documentos estão incluídos nos domínios pesquisados

Base de dados eletrônica consultada durante a pesquisa internacional (nome da base de dados e, se possível, termos usados na pesquisa)

EPO-Internal, WPI Data

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoria*	Documentos citados, com indicação das partes relevantes, se apropriado	Relevante para as reivindicações N°
A	US 5295329 A (ROTHLISBERGER JOHN A [US]) 22 de Março de 1994 (1994-03-22) reivindicações 1,9; figuras 1,2	1-3
A	DE 2608730 A1 (EHMANN SPEZIALMASCH) 08 de Setembro de 1977 (1977-09-08) reivindicações 1-5; figuras 1-5	1-3
A	DE 1045634 B (BUERKLE & CO ROBERT) 04 de Dezembro de 1958 (1958-12-04) figura 10 parágrafo [0009]	1-3
A	DE 2306660 A1 (WEHNER KG) 15 de Agosto de 1974 (1974-08-15) reivindicações 1-7; figuras 1,2	1-3

☒ Outros documentos estão listados na continuação do Quadro C.
 ☒ Ver o anexo relativo à família de patentes

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Data da conclusão da pesquisa internacional

14 de Março de 2023

Data do envio do relatório de pesquisa internacional

22 de Março de 2023

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Formulário PCT/ISA/210 (segunda folha) (Janeiro 2015)

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C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoria*	Documentos citados, com indicação das partes relevantes, se apropriado	Relevante para as reivindicações N°
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A	FR 2079743 A5 (SPIDEM STE NLE) 12 de Novembro de 1971 (1971-11-12) reivindicações 1,7-10; figuras 2,3	1-3
A	CN 205465581 U (HUZHOU ZHANBANG IND CO LTD) 17 de Agosto de 2016 (2016-08-17) reivindicações 9,10; figura 1	1-3
A	EP 2251139 A2 (BAUERRICHTER MASCHINEN UND TEC [DE]) 17 de Novembro de 2010 (2010-11-17) figura 2	1-3

Formulário PCT/ISA/210 (segunda folha) (Janeiro 2015)

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RELATÓRIO DE PESQUISA INTERNACIONAL

Informação relativa a membros da família de patentes

Pedido internacional N°

PCT/PT2022/050022

Documentos patentários citados no relatório de pesquisa			Data de publicação	Membro(s) da família de patentes	Data de publicação
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				US	5295329 A 22 de Março de 1994
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DE	1045634	B	04 de Dezembro de 1958	NENHUM	
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EP	2251139	A2	17 de Novembro de 2010	DE 202009006914 U1 23 de Setembro de 2010	
				EP 2251139 A2 17 de Novembro de 2010	

Formulário PCT/ISA/210 (anexo relativo à família de patentes) (Janeiro 2015)