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(54) **FEEDING UNIT FOR EDGEBANDING MACHINE**

(57) This invention relates to a feeding unit (1) for an edgbanding machine (B) that includes a storage unit (10) for storing one or more coils (2), where each coil includes an edging tape (20) made of plastic material;

and one or more heating elements (12) in the said storage unit (10) to heat the storage unit (10) to a storage temperature for the said plastic material.

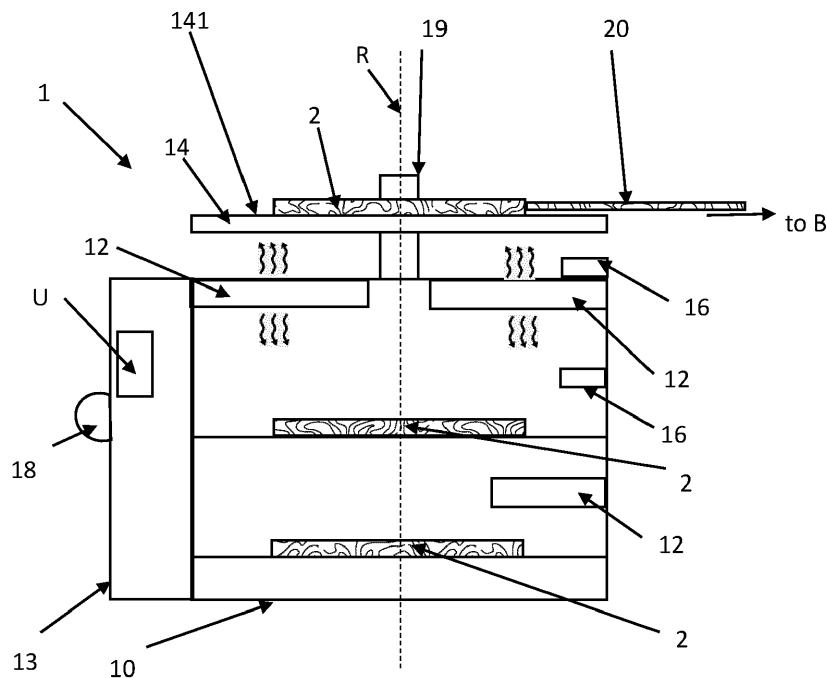


FIG. 2

Description

[0001] This invention pertains to a feeding unit for an edgebanding machine and a method for feeding an edgebanding machine with said feeding unit.

Field of the Invention

[0002] Specifically, the present invention relates to a feeding unit for an edgebanding machine comprising a storage unit, at least one heating element, and at least one heating plate.

[0003] The feeding unit allows to preheat one or more coils comprising a plurality of edging tapes before feeding the coils into the said edgebanding machine, thereby improving the quality of edgebanding, the uncoiling of the coil, and reducing downtime required to heat the edging tape to the working temperature.

[0004] More specifically, the invention also concerns a method for feeding an edgebanding machine with said feeding unit.

Background Art

[0005] It is known that edgebanding machines are designed to machine an edging tape and apply the tape to a panel that may be made of wood or other materials.

[0006] The application of the edging tape helps to seal a section of the panel to protect it from moisture. Edgebanding also provides a decorative effect.

[0007] An edgebanding machine is conventionally fed by a feeding unit with an edging tape to be applied to the panel. The edging tape may be made of plastic material.

[0008] It is known that heating the edging tape to a working temperature allows the plastic material to reach a state that makes its machining/processing easier.

[0009] However, working in low-temperature environments, the edging tape is in a rigid state before being machined, and the gluing effect and uncoiling are not optimal.

[0010] For example, edging tapes struggle to bend to pass through the multi-roll tracks and/or tend to resist uncoiling and get damaged during machining, with the result of a low-quality edgebanding and delays caused by the time required to heat the tapes during machining and/or the time required for replacing the damaged edging tapes.

[0011] Therefore, it is desirable to improve the operation of the feeding unit.

Aim of the Invention

[0012] The purpose of the present invention is to overcome these disadvantages by providing a feeding unit for an edgebanding machine and a method for feeding an edgebanding machine with said feeding unit so as to preheat the coils facilitating their uncoiling and machining, thus reducing the downtime needed to bring the edging

ing tape to the working temperature.

Object of the Invention

5 [0013] Thus, the object of the invention is a feeding unit for an edgebanding machine as claimed in claim 1, a system as claimed in claim 17, and a method for feeding an edgebanding machine with said feeding unit as claimed in claim 18.

10 [0014] Further preferred embodiments are described in the dependent claims.

List of the Attached Figures

15 [0015] The present invention will now be described, in an illustrative but not limitative way, according to one of its embodiments, with particular reference to the attached figures, where:

20 Fig. 1 is a perspective view of a system comprising an edgebanding machine and a feeding unit object of the present invention;

25 Fig. 2 is a schematic front view of a section of the feeding unit shown in Fig. 1, according to a first embodiment;

Fig. 3 is a schematic front view of a section of the feeding unit shown in Fig. 1, according to a second embodiment;

30 Fig. 4 is a top view of Section A-A of the feeding unit shown in Fig. 1, showing a heating plate;

Fig. 5 is a top view of Section B-B of the feeding unit shown in Fig. 1, showing the base of a storage unit compartment for air heating;

35 Fig. 6 is a top view of Section C-C of the feeding unit shown in Fig. 1, showing the heating elements;

Fig. 7 is a perspective view of a second embodiment of the feeding unit for an edgebanding machine object of the present invention; and

40 Fig. 8 shows a block diagram of a method for feeding an edgebanding machine, according to an embodiment object of the present invention.

Detailed Description

45 [0016] In the various figures, similar parts will be indicated with the same reference numbers.

[0017] Referring to Fig. 1, there is shown a perspective view of a system comprising an edgebanding machine B and a feeding unit 1 operationally connected to said edgebanding machine B.

50 [0018] The edgebanding machine B allows to apply an edging/banding tape 20 to a panel and may include an edgebanding station and a finishing station.

[0019] The edgebanding station includes an edgebanding group to apply the edging tape 20 to at least one side of the panel, such as a panel made of wood, ceramic, plastic, glass, fiberglass, and the like.

[0020] The finishing station includes a finishing group

for finishing the applied edging tape 20.

[0021] The edgebanding machine B may be fed with the edging tape 20 to be applied to the panel via the feeding unit 1. For this purpose, the edgebanding machine B may include drive rollers to pull the edging tape 20 inside the edgebanding machine B.

[0022] The edging tape 20 can be made of plastic material, for example, thermoplastic material, and can be wound around a respective spool to form a coil 2. Such a coil 2 can be used to feed the edgebanding machine by uncoiling/unrolling of the edging tape 20.

[0023] The feeding unit 1 for the edgebanding machine B includes at least one heating plate 14 for heating and uncoiling a coil 2 to be fed to said edgebanding machine B, and a storage unit 10 to store and preheat coils 2 before uncoiling them.

[0024] Said at least one heating plate 14 can be rotatable relative to a rotation axis R to perform the uncoiling of said coil 2 to be fed to said edgebanding machine B.

[0025] For example, the feeding unit 1 may include at least one uncoiling/unrolling device 19 operationally connected to said at least one heating plate 14 and configured to rotate said heating plate 14 to perform the uncoiling of said coil 2 to be fed to said edgebanding machine B. The feeding unit 1 may include containment means 142, for containing the coil during its uncoiling. Such containment means can be arranged along the perimeter of the plate. The feeding unit 1 may also include guiding means configured to guide an edging tape from said coil 2 to said edgebanding machine B.

[0026] In a first embodiment shown in Figs. 1-6, said at least one heating plate 14 can be arranged externally to said storage unit 10. For example, the heating plate 14 can be placed in correspondence with at least one heating element 12.

[0027] Referring to Fig. 4, a heating plate 14 of the feeding unit 1 includes a contact surface 141 configured to contact the coil 2. Said at least one heating plate 14 can be made of heat-conductive material, for example, steel, aluminium, or similar, to transmit heat to the coil 2 by thermal conduction.

[0028] Said at least one heating plate 14 can be heated by said at least one heating element 12 to a working temperature of the plastic material of the coil 2 that will be uncoiled.

[0029] The working temperature of the plastic material can be a temperature included in a first softening range of the plastic material. Such working temperature allows reaching a state of the plastic material that facilitates its machining and/or makes uncoiling easier.

[0030] The working temperature of the plastic material is below the melting point of the plastic material and can be between 15-25°C.

[0031] Said at least one heating element 12 is configured to transmit heat to said at least one heating plate 14 by thermal convection.

[0032] The heating element 12 may be configured to heat the air and blow the air towards the heating plate 14.

[0033] For example, as shown in Figs. 3 and 6, said at least one heating element 12 may include one or more electrical resistances 121 and one or more fans 17 arranged in a compartment 11 for air heating. The fans 17 are configured to blow the heat radiated by said one or more electrical resistances 121 towards said at least one heating plate 14, thereby transmitting heat to said at least one heating plate 14 by thermal convection.

[0034] In particular, as shown in Fig. 6, the heating element 12 may be arranged in a central portion of the heating compartment, for example, on the base 113 or near the base 113 of the heating compartment 11.

[0035] The base 113 may include a plurality of openings 121, such as slits, arranged in a portion of the base 113 distal to the central portion of the base 113. Preferably, the openings 111 of the base 113 may be arranged along a plurality of concentric circular rows of the base.

[0036] The openings 111 are configured to allow at least partial passage of the heated air from said one or more electrical resistances 121 and blown by said one or more fans 17 so as to heat the storage unit 10 to a predefined storage temperature of said plastic material.

[0037] The openings can also be configured to adjust the heated air introduced into the storage unit. For example, the openings arranged in each row having a smaller diameter with respect to the remaining rows can, have a smaller size compared to the openings arranged in the remaining rows, this allows to limit the heat radiated near said one or more electrical resistances 121 that is introduced directly into the storage unit 10.

[0038] As shown in the figures, the feeding unit 1 for the edgebanding machine B also includes a storage unit 10 for storing one or more coils 2 to be uncoiled.

[0039] Referring to Figs. 2 and 3, the storage unit 10 includes a plurality of external walls suitable to define a storage space for storing said one or more coils 2.

[0040] The storage space can be accessible via doors of the storage unit 10 to facilitate the storage and extraction of coils 2 from the storage unit in order to perform the uncoiling.

[0041] The storage space is organized in one or more internal housings 15 of the storage unit to receive said one or more coils 2.

[0042] The feeding unit 1 for the edgebanding machine B includes at least one heating element 12 to heat said storage unit 10 to a predefined storage temperature of the plastic material of the edging tape 20.

[0043] As shown in Fig. 2, the storage unit 10 may include at least one heating element 12 placed near a heating plate 14 to heat the storage unit 10 and the heating plate 14.

[0044] The storage unit may also comprise one or more heating elements, each of which is placed near a respective one of said one or more internal housings 15 to heat the respective compartment to a predetermined storage temperature.

[0045] The storage temperature of the plastic material may comprise a temperature included in a second soft-

tening range of the plastic material.

[0046] Such storage temperature allows the conservation of the plastic material at a temperature higher than the temperature of the working environment and is advantageous in case of that the external temperature is lower.

[0047] In particular, the storage temperature is a temperature sufficient to reduce the thermal shock caused by heating the edging tape at working temperature from a rigid state.

[0048] Preferably the storage temperature can be between 18-30°C.

[0049] The feeding unit 1 may also include a logic control unit U configured to regulate the temperature of said at least one heating element 12.

[0050] The logic control unit U may also be configured to regulate the rotation of the fan 17 to control the air flow directed towards the heating plate 14.

[0051] The logic control unit U may include one or more processors configured to execute instructions related to the one or more processes to regulate the temperature and/or rotation of the fan 17.

[0052] In some embodiments, the logic control unit may be configured to generate status information, for example, a report of the measured temperatures, or respond to received information, such as control information received from a terminal.

[0053] The logic control unit may also include other auxiliary components, such as a random access memory (RAM), a read-only memory (ROM), and/or a computer memory. The portions of software code containing the instructions for controlling the temperature and/or rotation of the fans 17 may be stored on a computer product, such as a computer memory or RAM.

[0054] The feeding unit 1 may also include at least one sensor 16 capable of detecting a temperature value associated with said storage unit 10 and/or said at least one heating plate 14 and communicating said temperature value to said logic control unit U.

[0055] Said at least one sensor 16 can be coupled to said logic control unit U to transmit measurements, for example, via a wired or wireless communication channel.

[0056] Said at least one sensor 16 may be placed near a respective internal housing 15 of the storage unit to measure a temperature value associated with the respective compartment 15 or a temperature value associated with the entire storage unit.

[0057] In addition or alternatively, said at least one sensor 16 may be placed near the heating plate 14 to measure a temperature value associated with said heating plate 14.

[0058] The logic control unit U may be configured to regulate the temperature of said at least one heating element 12 and/or the rotation of the fan 17 in response to one or more detected temperature values, in order to maintain the heating plate 14 at said working temperature and the storage unit 10 at said storage temperature.

[0059] The logic control unit U may be configured to

selectively regulate the temperature of said one or more heating elements 12 to selectively control the temperature of the heating plate 14 and the temperature of each respective compartment 15 of the storage unit 10.

[0060] The feeding unit 1 may also be equipped with an alarm 18. The alarm 18 can be an acoustic, visual, or tactile signalling device, to provide information to the operator about the reached temperature. The alarm 18 can be, for example, a warning LED to indicate that said one or more coils 2 have reached said threshold temperature as shown in Fig. 2.

[0061] The alarm 18 is coupled to said logic control unit U, for example, via a wired or wireless communication channel, for its operation.

[0062] The logic control unit U may be configured to compare a detected temperature value with a threshold value to determine whether the temperature value reaches said threshold value. The feeding unit 1 may be configured to activate an alarm 18 if said temperature value reaches said threshold value.

[0063] In a second embodiment shown in Fig. 7, said at least one heating plate 14 may include a plurality of heating plates 14 arranged internally, rather than externally, to said storage unit 10. Each of said plurality of plates may be configured to heat a respective coil 2 to be fed to said edgebanding machine B.

[0064] Therefore, in the second embodiment, since the heating plates 14 are arranged inside the storage unit 10 are preheated to a storage temperature and subsequently to a working temperature during the uncoiling phase, for example, by means of dedicated heated elements and/or said at least one heating element 12. In this case, the heating element 12 includes a heating surface 123 configured to heat said plurality of heating plates 14 to said working temperature.

[0065] The method 800 for feeding an edgebanding machine B with a feeding unit 1 will now be described with reference to the block diagram shown in Fig. 8.

[0066] The method 800 includes a step 810 of arranging one or more coils 2 in said storage unit 10 for preheating the coils to be fed to said edgebanding machine B.

[0067] The method 800 continues with the activation step 830 of at least one heating element 12 to heat said storage unit 10 to said storage temperature and to heat one or more plates of said at least one heating plate 14 to said working temperature.

[0068] Subsequently, in the positioning step 850 the coil 2 to be fed to said edgebanding machine B is positioned in contact with a respective one of said one or more plates for heating said coil 2 during feeding to said edgebanding machine B.

[0069] The method 800 also includes an uncoiling step 870 of said coil 2 to feed said coil 2 to said edgebanding machine B.

[0070] Advantageously, by means of the feeding unit, object of the invention, it is possible to preheat the coils to a storage temperature, facilitating their uncoiling and

machining, thus improving the quality of the edgebanding, the uncoiling of the coil, and reducing the downtime to bring the edging tape to the working temperature to be fed to said edgebanding machine.

[0071] A second advantage is given by the fact that the edging tape is preheated to a storage temperature that allows softening the plastic material of the edging tape, reducing the thermal shock caused by heating the edging tape to the working temperature, thus avoiding fractures in the tape and improving the gluing effect and uncoiling of the tape, and therefore the efficiency when machining the tape.

[0072] A second advantage is given by the fact that by heating the tape it is possible that when the heated glue, at melting temperature, gets into contact with the edge at room temperature, has more time to cool/crystallize. This improves the bonding between the panel and the edging tape.

[0073] This invention has been described by way of illustration, but not limitation, according to its preferred embodiments, however it is to be understood that variations and/or modifications can be made by those skilled in the art without thereby departing from the scope of protection, as defined by the appended claims.

Claims

1. Feeding unit (1) for edgebanding machine (B) comprising:

a storage unit (10) for storing one or more coils (2), each coil comprising an edging tape (20) made of plastic material; and
one or more heating elements (12) of said storage unit (10) for heating said storage unit (10) at a storage temperature of said plastic material.

2. Feeding unit (1) according to the claim 1, where said storage unit (10) comprises a plurality of external walls capable of defining a storage space for storing said one or more coils (2), and one or more internal housings (15) for receiving said one or more coils (2).

3. Feeding unit (1) according to claim 2, where each heating element of said one or more heating elements (12) is located in proximity of a respective one of said one or more internal housings (15) for heating said respective housing.

4. Feeding unit (1) according to any one of the preceding claims, **characterized in that** it comprises at least one heating plate (14) for heating a coil (2) to be fed to said edgebanding machine (B), and wherein said one or more heating elements (12) are configured to heat said at least one heating plate (14) at a working temperature.

5. Feeding unit (1) according to claim 1, where said at least one heating plate (14) is made of heat-conducting material and includes a contact surface (141) configured to contact said coil (2) and transmit heat to said coil (2) by thermal conduction.

6. Feeding unit (1) according to any one of the preceding claims, where said one or more heating elements (12) are configured to transmit heat to said at least one heating plate (14) by thermal convection.

7. Feeding unit (1) according to any one of the preceding claims, where said one or more heating elements (12) comprises one or more electrical resistances (121) and one or more fans (17).

8. Feeding unit (1) according to any one of the preceding claims, comprising a logic control unit (U); and at least one sensor (16) configured to detect a temperature value associated with said storage unit (10) and/or said at least one heating plate (14) and communicate said temperature value to said logic control unit (U);
wherein said logic control unit (U) is configured to adjust the temperature of said one or more heating elements (12) in response to the measured temperature value, so as to maintain said temperature value at said working temperature.

9. Feeding unit (1) according to claim 8, wherein said logic control unit (U) is configured to read said temperature value, compare said temperature value with a threshold value and activate an alarm (18) if said temperature value reaches said threshold value.

10. Feeding unit (1) according to claim 9, where said alarm includes a warning led to indicate that said one or more coils (2) have reached said threshold temperature.

11. Feeding unit (1) according to any one of the preceding claims, where said at least one heating plate (14) is rotatable with respect to said storage unit (10) and wherein said feeding unit includes (1) at least one uncoiling/unrolling device (19) operationally connected to said at least one heating plate (14) and configured to rotate said heating plate to uncoil/unroll said coil (2) to be fed to said edgebanding machine (B).

12. Feeding unit (1) according to claim 11, where at least one heating plate (14) is located outside the said storage unit (10) and preferably at an upper end of said storage unit (10).

13. Feeding unit (1) according to any one of claims 1-11, where said at least one heating plate (14) comprises a plurality of heating plates (14) arranged inside that

storage unit (10), each of said plurality of plates being configured to heat a respective coil (3) to be fed to said edgebanding machine (B).

14. Feeding unit (1) according to claim 13, in which said one or more heating elements (12) includes a heating surface (123) configured to heat said plurality of heating plates (14) at said working temperature. 5
15. Feeding unit (1) according to any one of the preceding claims including guiding means for guiding an edging tape of said coil (3) to be fed to said edgebanding (B). 10
16. Feeding unit (1) according to any of the above claims in which said plastic material includes a thermoplastic material. 15
17. System comprising an edgebanding machine (B) and a feeding unit (1) according to any of the preceding claims, where said feeding unit (1) is operationally connected to said edgebanding machine (B). 20
18. Method (800) for feeding an edgebanding machine (B) with a feeding unit (1) according to any one of claims 1-16, comprising: 25
 - arranging (810) said one or more coils (2) within said storage unit (10);
 - activating (830) said one or more heating elements (12) to heat the storage unit (10) at said storage temperature and one or more plates of said at least one heating plate (14) at said working temperature; 30
 - positioning (850) a coil (3) to be fed to the said edgebanding machine (B) in contact with one or more plates for heating said coil (3) during feeding to said edgebanding machine (B); and 35
 - uncoiling/unrolling (870) said coil (3) to feed said coil (3) to said edgebanding machine (B). 40

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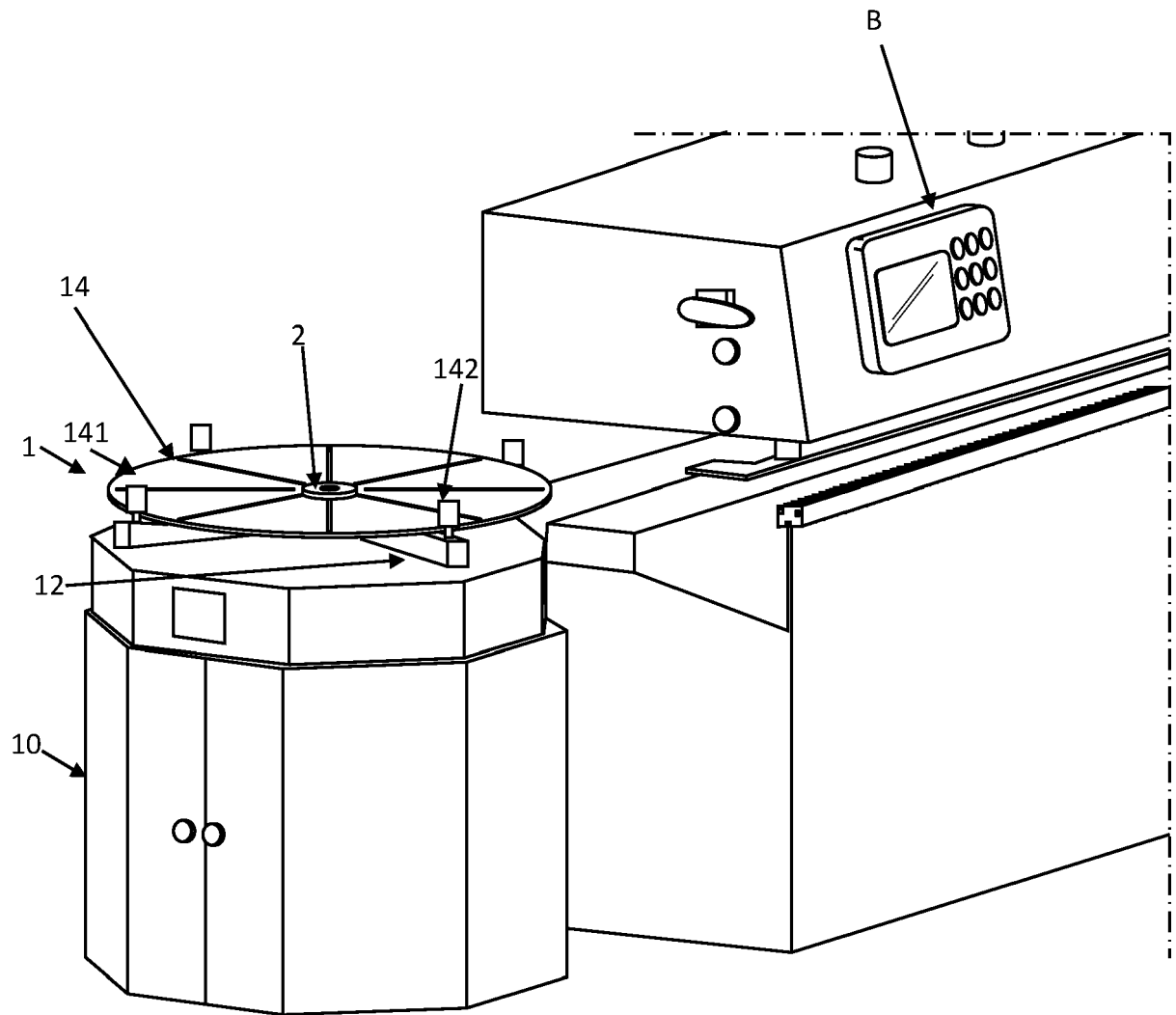


FIG. 1

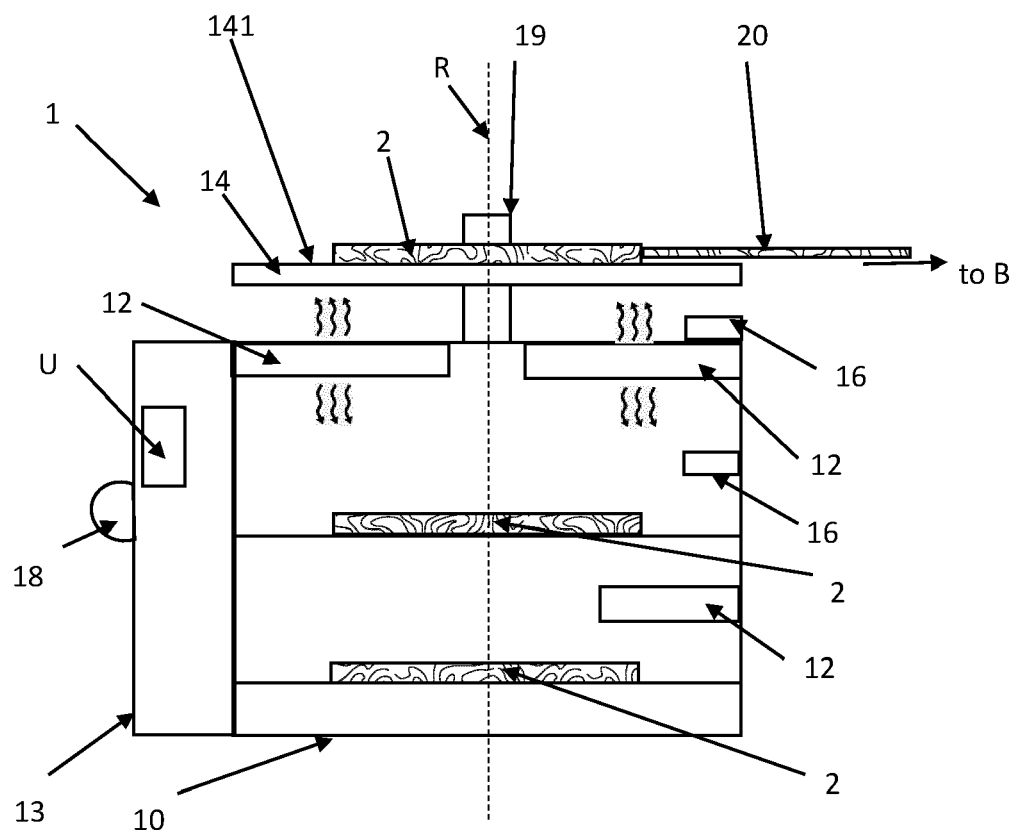


FIG. 2

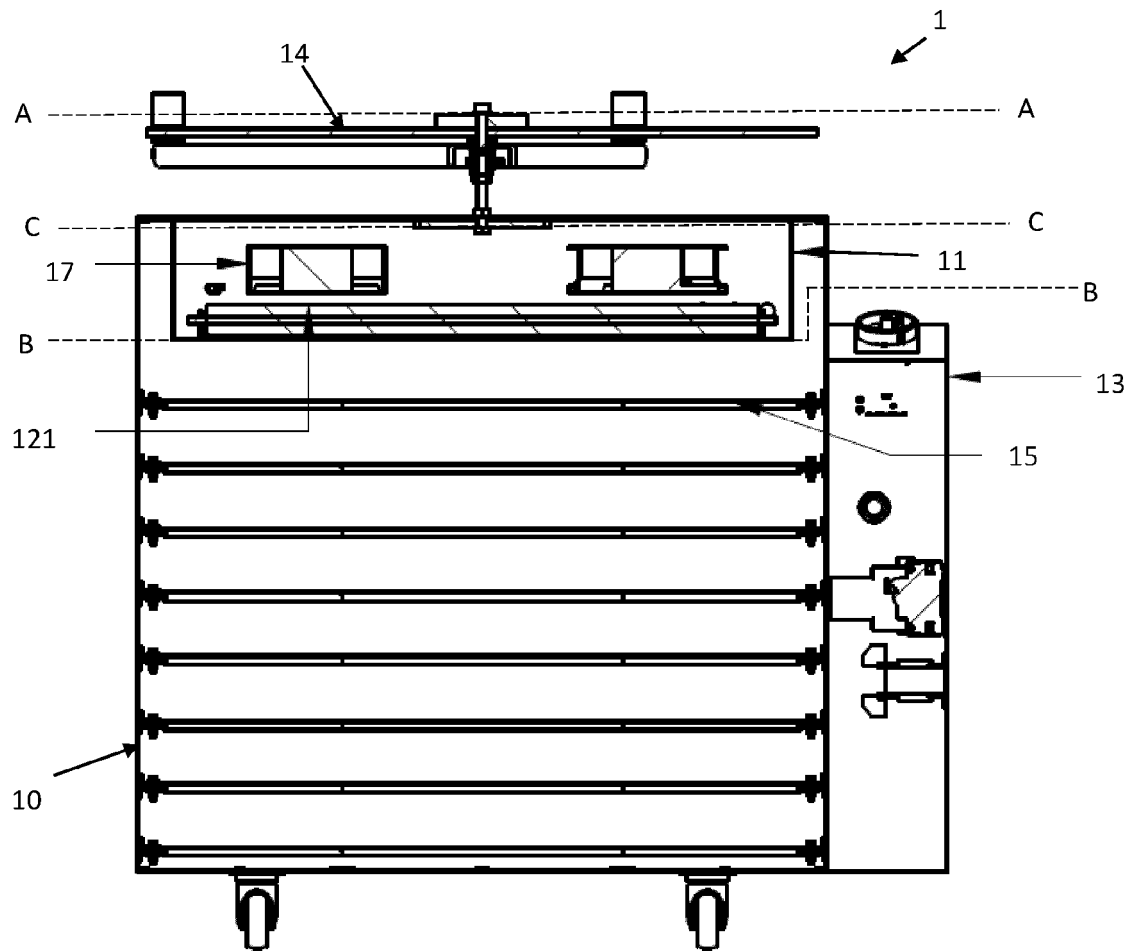


FIG. 3

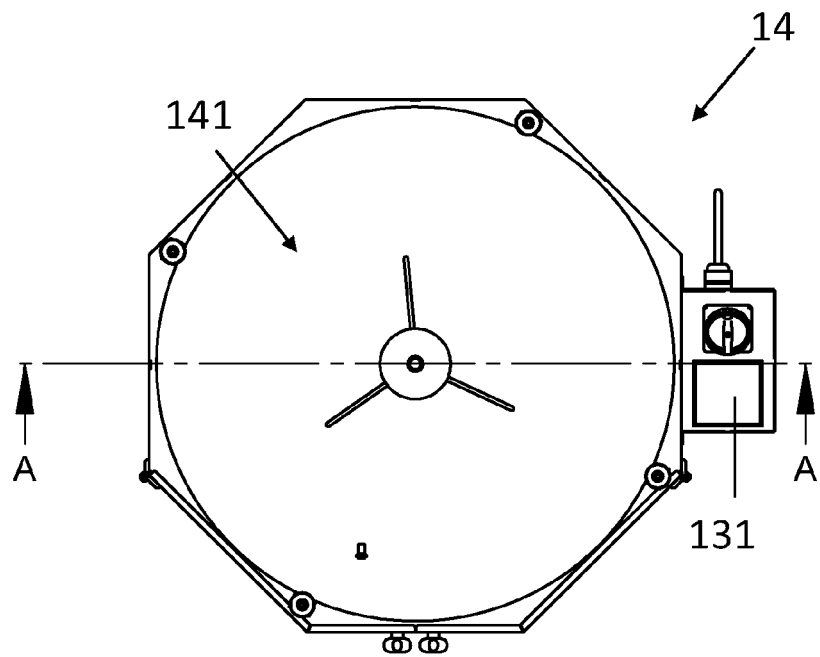
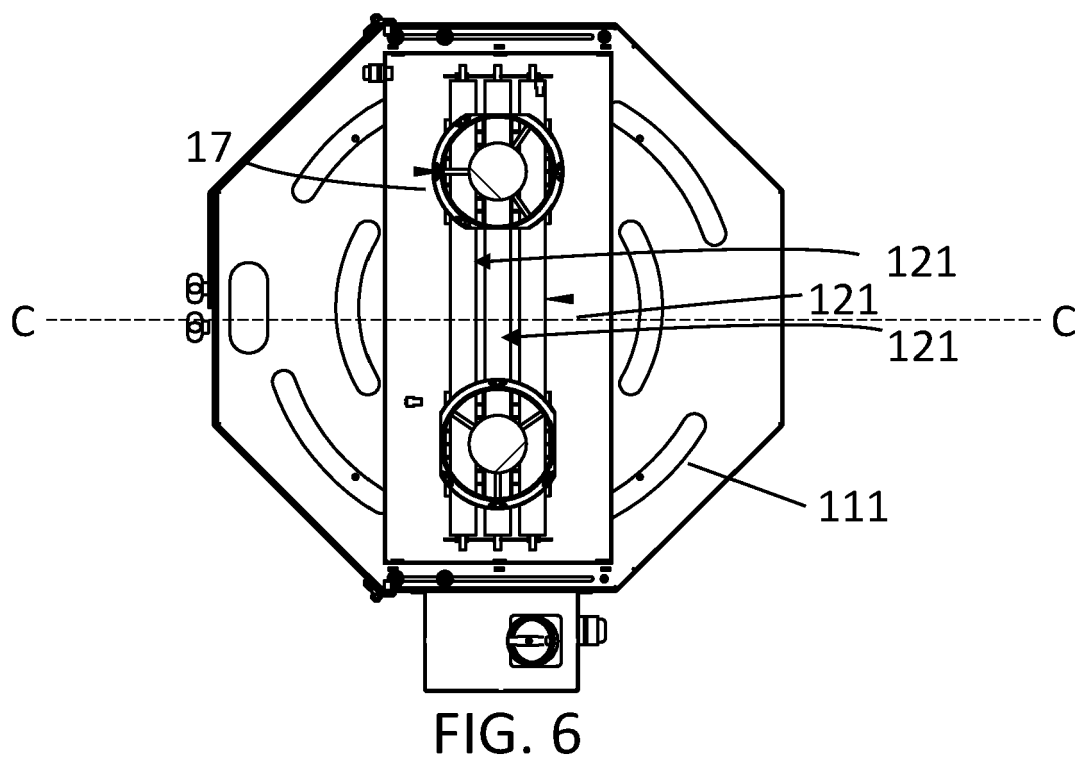
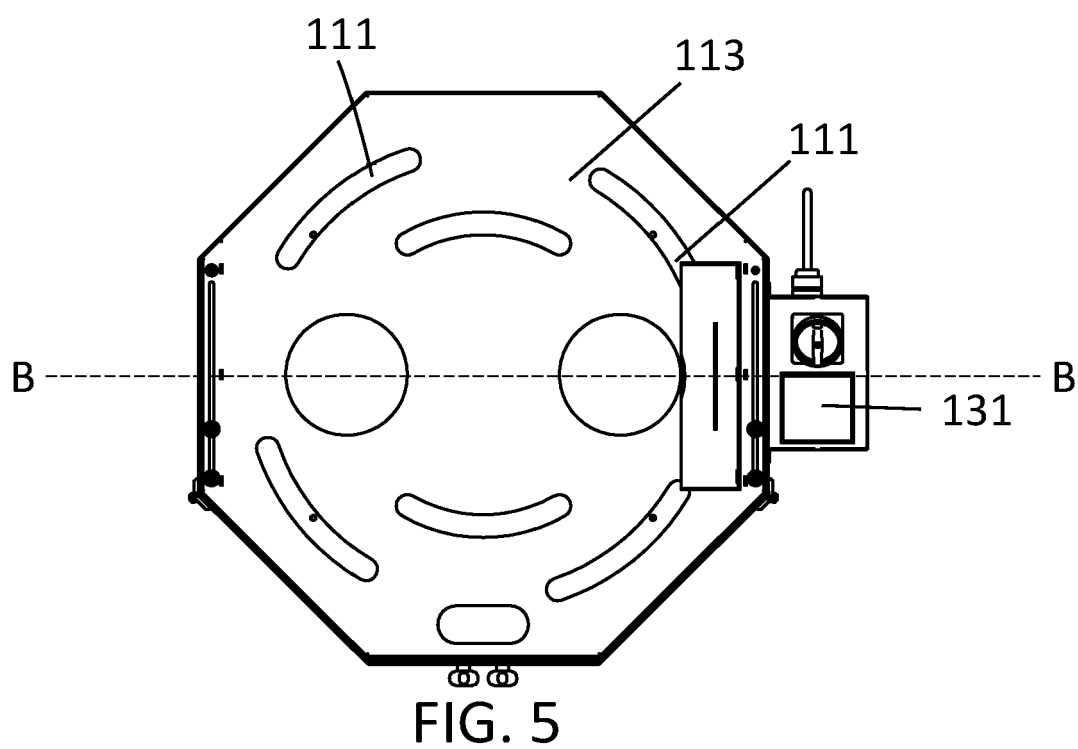


FIG. 4



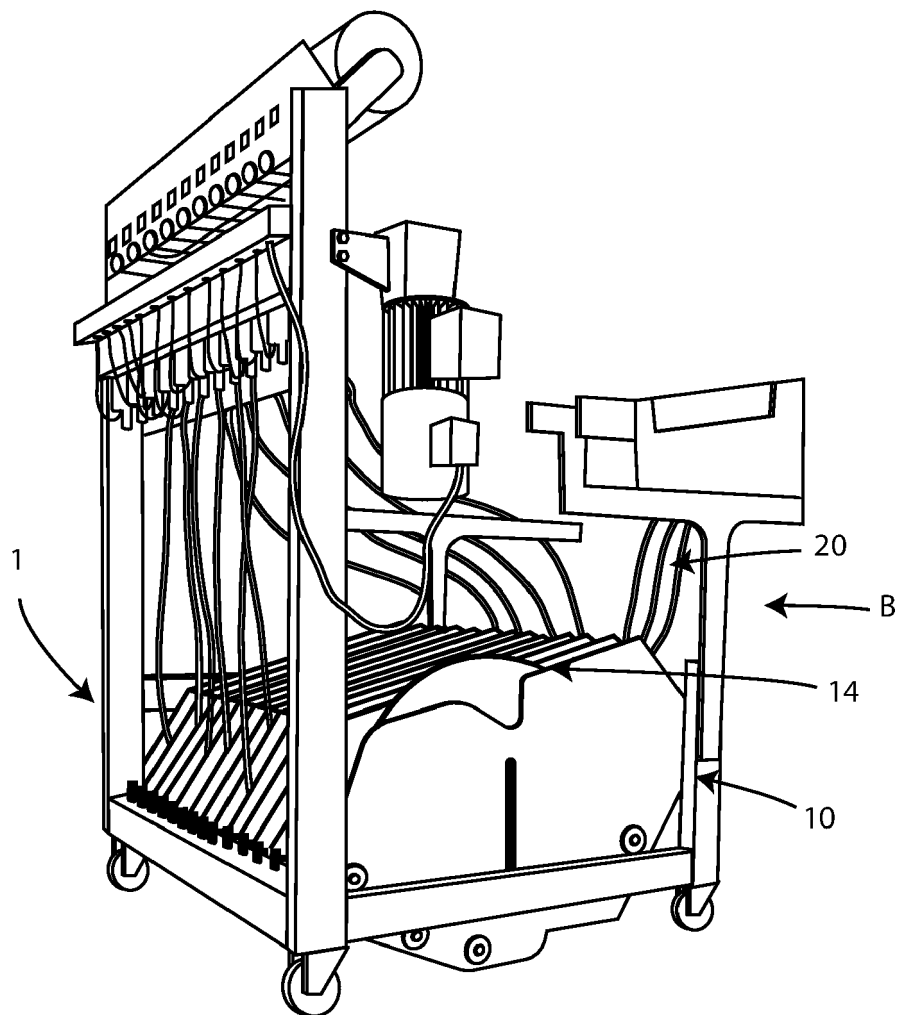


FIG. 7

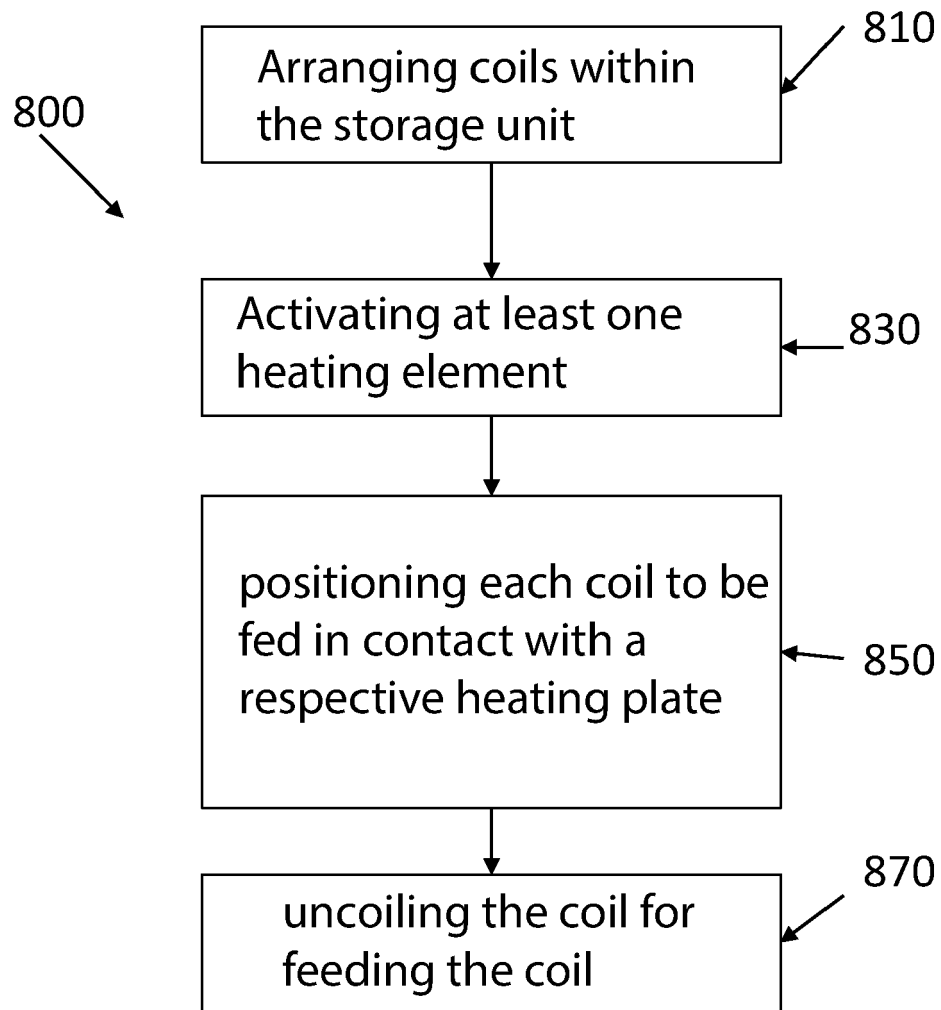


FIG. 8



EUROPEAN SEARCH REPORT

Application Number

EP 24 16 4039

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	* claim 1 * * figures *	11-18	

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			TECHNICAL FIELDS SEARCHED (IPC)
			B27D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 June 2024	Examiner Hamel, Pascal
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 24 16 4039

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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