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(54) **PRODUCT DISPENSING DEVICE, PREFERABLY OF MEDICINAL PRODUCTS**

(57) The present disclosure relates to a device (100) for distributing products, preferably medicinal products, configured to transport and dispense medicinal products. Said distribution device (100) comprises a support frame (10) and at least one rotating drum (20) supported by said support frame (10) and rotatable with respect thereto about an axis of rotation (X). The at least one rotating drum (20) comprises a plurality of housings (20a, 20b, 20c), each housing of said plurality of housings (20a, 20b, 20c) being configured, in use, to contain a single medicinal product. The distribution device (100) further comprises at least one access opening (30) for access to a housing of said plurality of housings (20a, 20b, 20c), wherein said access opening (30) is defined inside said support frame (10) and allows a user to access said housing for withdrawal of a medicinal product, and a management unit (40) configured to select the housing of said plurality of housings (20a, 20b, 20c) containing the medicinal product to be dispensed and to control rotation means (50) configured to rotate said at least one rotating drum (20) about said axis of rotation (X) so that said housing containing the medicinal product to be dispensed is placed at said access opening (30).

The present disclosure also relates to a method for distribution of products, in particular medicinal products.

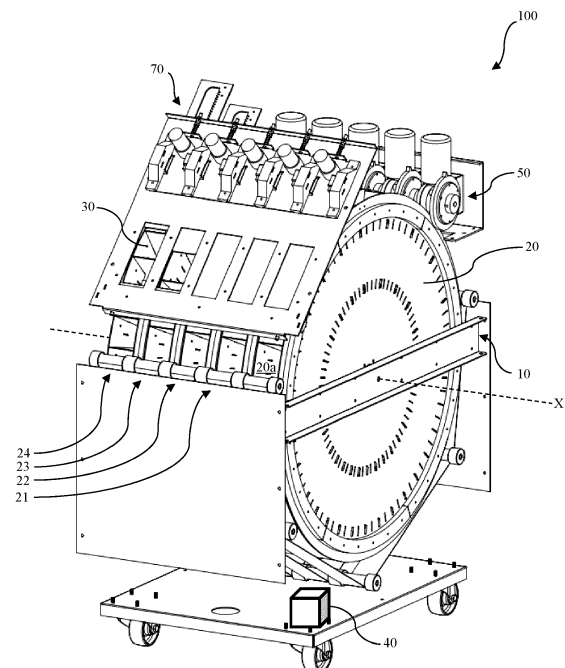


Fig. 1

Description

DESCRIPTION

[0001] The present disclosure relates in general to a device for distributing products. More particularly, the present disclosure relates to a distribution device configured to transport and dispense products, preferably medicinal products. In particular, the present disclosure relates to a trolley for distributing medicinal products intended to be used in hospital environments.

[0002] Within hospital or nursing structures or care homes the distribution of medicines to the patients is of particular importance.

[0003] As is known, the distribution of drugs or medicines within hospitals must be carried out in such a way that each patient is administered specific medicines during the day.

[0004] The distribution of these medicines must obviously be performed in accordance with each patient's medical prescription and may also involve the administration of several medicines to a single patient.

[0005] Errors in the distribution and subsequent administration of medicines may result in extremely serious consequences for the patients.

[0006] Possible errors in the interpretation of the medical prescriptions by the operators distributing the drugs to the patients are nowadays at least partially remedied by using a computerized system. In particular, as is known, each patient is assigned an "identifier" which can be recognized for example by means of a bracelet comprising a bar code. In the computerized system, the identifier of each patient is associated with a precise medicine to be administered to the patient and the dosage of this medicine.

[0007] The most frequent errors nowadays relates to the actual distribution of the drugs. In particular, the operators who distribute the medicines within the hospital structures must manage tens or hundreds of patients and, during distribution of the medicines, they are often distracted or interrupted by requests from other patients.

[0008] In fact, at present the operation of distributing the medicines to the patients is performed by an operator with the aid of a medicine distribution trolley. At the time when it is required to distribute a drug to a given patient, the operator identifies the medicines to be administered to the patient in question by reading, for example, by means of a bar-code reader, the identifier of the patient which is present, for example, on the patient's bracelet. At this point, by means of a screen which is present in the medicine distribution trolley, the operator sees the dosage and the drugs which are to be administered to the patient. As already mentioned above, in fact, the computer system of the hospital establishment associates with each patient identifier the exact medical prescription.

[0009] The operator then manually removes the medicines indicated on the trolley screen from the trolley itself. This step is of crucial importance.

[0010] In particular, the trolleys which are currently used contain one or more drawers inside which a plurality of boxes containing drugs are stored. This system of distributing the medicines contained inside the trolleys is particularly disadvantageous since the hospital staff may, by mistake, remove from the distribution drawer the wrong medicine for a given patient.

[0011] This operation is made even more critical by the fact that the hospital staff are subject to possible distractions in their working environment due, for example, to requests for assistance from other patients.

[0012] In addition to the risk of the wrong medicines being administered to a given patient, the trolleys which are currently used are such that the medicine distribution operations are particularly time-consuming.

[0013] The present disclosure proposes providing a device for the distribution of products, in particular medicinal products, which is able to overcome the drawbacks mentioned above with reference to the prior art and/or achieve further advantages.

[0014] This is obtained by means of a device for distributing products, preferably medicinal products, a combination and a method as defined in the respective independent claims. Secondary characteristics and particular embodiments forming the subject of the present disclosure are defined in the corresponding dependent claims.

[0015] The present disclosure is based on the recognition by the author of the present disclosure that the trolleys which are nowadays used in hospital and nursing structures or in care homes for the distribution of medicines are particularly disadvantageous.

[0016] In other words, the overall configuration of the known trolleys may result in the incorrect distribution, by the operating staff, of the drugs to the patients and the distribution operations are particularly long and complex owing to the fact that, since there are many types of medicines, medicines of different kinds are stored in the same compartment of the trolley and the operating staff must always pay particular attention when they pick out and choose the medicine.

[0017] According to the present disclosure, the device for distributing products, preferably medicinal products, is configured to separate medicines of different kinds in different compartments of a trolley. In particular the device consists of a device for distributing products, preferably medicinal products, which is configured for the transport and dispensing of products according to the present disclosure and which comprises a support frame and a rotating drum supported by this support frame and rotatable with respect thereto about an axis of rotation. Preferably, the rotating drum is a cylinder. The rotating drum of the product distribution device comprises in turn a plurality of housings in which each housing is configured, in use, to contain a product, preferably a medicinal product, preferably a single product, preferably a medicinal product, namely a single type of medicine. In other words, different medicines are not arranged inside the same distribution drawer of the distribution device, but

housed separately inside a respective housing defined inside a rotating drum of the device itself. Moreover, each housing is configured to contain one and only one medicinal product, for example a box, blister pack or phial containing a specific drug, namely a single type of medicine.

[0018] The term "medicinal product" is understood in the broad sense as meaning a product intended for the cure or treatment of a person.

[0019] The distribution device further comprises, in said support frame, at least one access opening for access to one of the housings of the plurality of housings of the rotating drum. Said access opening allows a user access to this housing and withdrawal of the product, preferably a medicinal product, contained therein. Furthermore, the distribution device according to the present disclosure comprises a management unit configured to select the housing containing a specific product, preferably a medicinal product, to be dispensed. The management unit is also configured to control means for rotation of the rotating drum which rotate said drum about the axis of the rotation so that the housing containing the product, preferably a medicinal product, to be dispensed and administered to a patient is located at the access opening.

[0020] Each housing may have dimensions so as to contain a single package of a medicinal product or several packages of the same type of medicine.

[0021] Basically, each housing of the plurality of housings contains a single type of medicine. Moreover, the management unit selects the specific housing containing the product, preferably a medicinal product, to be dispensed to the patient and controls the rotation means so that only that given product, preferably a medicinal product, may be dispensed through the access opening and administered to the patient.

[0022] According to this aspect, therefore, the distribution device dispenses automatically only one type of product, preferably a medicinal product, at a time. Moreover, the errors which may be made by the staff during withdrawal of the medicine and administration thereof to the patient are eliminated or reduced by the fact that the device selects the medicinal product to be administered and allows the dispensing only of that medicinal product.

[0023] According to a preferred aspect of the present disclosure, the plurality of housings of the rotating drum is defined by a plurality of circular sectors arranged consecutively along a circumferential direction of the rotating drum.

[0024] In other words, each housing is a circular sector of the rotating drum. The entire circumference of the drum is thus made use of and the space of the trolley is made full use of by dividing it up into sectors.

[0025] Basically, the drawer which is configured, in use, to contain the medicinal products in conventional trolleys is replaced by a drum, preferably a cylindrical drum comprising a plurality of circular sectors each defining a housing configured to contain a single medicinal

product. As a result, advantageously, only one medicinal product may be dispensed at a time, while a very large number of medicines may be contained inside the device.

[0026] It is as though the drum were divided up into a plurality of "segments" distributed around the axis of rotation.

[0027] Preferably, moreover, the housing containing the product, preferably a medicinal product, to be dispensed is selected automatically and arranged, or placed, at the access opening by the rotation means. This therefore eliminates the possibility of the operator having to select manually a medicinal product contained inside a drawer from among a plurality of other medicinal products to be administered to the patient. Therefore, the risks of picking out and administering a wrong medicine to a given patient are reduced or eliminated.

[0028] According to a further preferred aspect of the present disclosure, the distribution device comprises an adjustment device configured to modify the dimensions of a housing defined by a circular sector of the rotating drum.

[0029] Preferably, such an adjustment device comprises an abutment element arranged inside the housing and variation means for changing the position of the abutment element inside the housing in a radial direction with respect to the axis of rotation. Basically, the abutment element is slidable inside the housing along a radial direction with respect to the axis of rotation of the rotating drum. The abutment element acts in fact as a bottom wall of the housing.

[0030] Consequently, the dimensions of each housing may be modified depending on the product, preferably a medicinal product, intended, in use, to be contained within this specific housing of the plurality of housings. Therefore, the withdrawal of this medicinal product may be facilitated.

[0031] According to a preferred aspect of the present disclosure, a housing identifier is associated with each housing of the plurality of housings. Similarly, a product identifier, preferably a medicinal identifier, is associated with each product, preferably a medicinal product, intended, in use, to be contained inside a housing of the plurality of housings of the distribution device. According to this aspect, moreover, the management unit of the distribution device is configured to save the housing identifier and the product identifier, preferably medicinal identifier, and associate the housing identifier of each housing of the plurality of housings with the product identifier, preferably medicinal identifier, of the product, preferably a medicinal product, contained, in use, in said housing.

[0032] Consequently, a unique association exists or may exist between a housing and the product, in particular medicinal product, contained in said housing. More particularly, there exists a unique correspondence or association between the product identifier, or medicinal identifier, and the housing identifier of the housing in which the medicine identified by said medicinal identifier is contained. Advantageously, therefore, the dispensing

of the product may be performed in a substantially automatic manner.

[0033] According to a further preferred aspect, the distribution device comprises means for reading a patient identifier which is configured to be associated at least with a product identifier, preferably a medicinal identifier. Consequently, the management unit may control automatically the dispensing of a product, preferably a medicinal product, which may be associated with said patient identifier once the identifier associated with said user has been determined, read, or identified.

[0034] According to a further preferred aspect of the present disclosure, the distribution device according to the present disclosure comprises a plurality of rotating drums or cylinders arranged consecutively and side by side along the axis of rotation, each rotating drum being configured to rotate about said axis of rotation independently of the other rotating drums. According to this aspect, moreover, each rotating drum comprises a plurality of housings, each of which is configured to contain, or house, a single product, preferably a medicinal product. In other words, according to this aspect, the distribution device comprises a plurality of rotating drums which are identical or substantially identical to each other and which may rotate independently of each other. Viewed in another way, it is as though a large drum were divided up into several "slices". Each "slice" of the drum therefore comprises several "segments" each corresponding to a housing, and each housing may contain a single medicine or a single type of medicine.

[0035] Consequently, according to this aspect, the product distribution device may contain a greater number of products, preferably medicinal products. Moreover, the operations for distributing the products, preferably medicinal products, to the patients may be performed more quickly

[0036] According to a preferred aspect of the present disclosure, the distribution device comprises an access opening for each of the rotating drums of the plurality of rotating drums. Each of these access openings is configured to allow access to a housing of a corresponding of a corresponding rotating drum. In other words, each rotating drum has a corresponds access opening which allows access to a housing of the plurality of housings of said rotating drum.

[0037] According to a further preferred aspect, the management unit is further configured to select a rotating drum of the plurality of rotating drums to be rotated by means of the rotation means.

[0038] In other words, according to this aspect, the management unit selects the rotating drum comprising in one of its housings the product, preferably the medicinal product, to be dispensed and controls the rotation means so as to rotate said rotating drum so that the housing containing the product, preferably a medicinal product, to be dispensed is placed at the access opening corresponding to this rotating drum.

[0039] The present disclosure furthermore relates to a

method for distribution of products, preferably medicinal products. The method according to the present disclosure comprises a step of rotating a rotating drum about an axis of rotation in a support frame. Said rotating drum comprises a plurality of housings, each of which is configured, in use, to contain a product, preferably a medicinal product, preferably a single medicinal product. The method comprises a further step of accessing a housing of the plurality of housings for withdrawal of a product, preferably a medicinal product, to be dispensed. Also envisaged is a management step for managing and selecting the housing containing the product, preferably the medicinal product, to be dispensed. The method comprises a step of rotating, by means of the management unit, the at least one rotating drum about the axis of rotation so that the housing containing the product, preferably the medicinal product, to be dispensed is placed at an access opening.

[0040] According to this aspect, therefore, the method according to the present disclosure dispenses one medicinal product at a time. Consequently, any errors which may be made by the staff during withdrawal of a medicine are eliminated or reduced.

[0041] According to a further aspect of the present disclosure, a housing identifier is associated with each housing of the plurality of housings. Moreover, a product identifier, preferably a medicinal identifier, is associated with each product, preferably a medicinal product, intended to be contained in one of the housings. The management unit is configured to save said housing identifier and product identifier, preferably medicinal identifier, and to associate the housing identifier of each housing with the product identifier, or medicinal identifier, of the product, preferably a medicinal product, intended, in use, to be contained inside said housing.

[0042] Consequently, a unique association exists between a housing and the medicinal product contained in this housing. Advantageously, therefore, the dispensing of the product may be performed in a substantially automatic manner.

[0043] According to a further aspect of the present disclosure, the distribution device comprises means for reading a patient identifier. This patient identifier is configured to be associated with a product identifier, preferably medicinal identifier. The method according to the present disclosure comprises the step of detecting this patient identifier using said reading means.

[0044] According to this aspect, therefore, the dispensing of at least one medicinal product may be performed by simply identifying the patient identifier. Basically, once said patient identifier has been read or detected, the management unit identifies or selects the housing containing the medicinal product to be dispensed and rotates by means of the rotation means the at least one rotating drum so that said housing is located at the access opening so that the product may be withdrawn.

[0045] According to a further aspect of the present disclosure, the method comprises a further step of filling the

distribution device. The filling step comprises the determination of the medicinal identifiers of the product, preferably medicinal products, to be dispensed and the association, by means of the management unit, with the medicinal identifier of a medicinal product to be dispensed, of a housing identifier of a housing without, or not containing, a product, preferably a medicinal product. Finally the filling step involves housing the product, preferably a medicinal product, inside said housing.

[0046] As a result, advantageously, the filling step of the distribution device may also be automated. In other words, preferably, it is the distribution device itself, in particular the management unit, which indicates to the staff the medicinal products to be inserted inside the said distribution device. For example, the management unit indicates to the staff which medicinal products must be distributed during a following product distribution step. Thereafter, the management unit controls the rotation, via the rotation means, of the at least one rotating drum so that a housing of the plurality of housings without, or not containing, a medicinal device is placed at the access opening. Moreover, the management unit associates the identifier of the medicinal product to be inserted in the distribution device with the housing identifier of said housing which does not contain a medicinal device.

[0047] Further characteristic features and modes of use forming the subject of the present disclosure will become clear from the following detailed description of embodiments thereof, provided by way of a non-limiting example.

[0048] It is evident, however, that each embodiment forming the subject of the present disclosure may have one or more of the advantages listed above; in any case it is not required that each embodiment should have simultaneously all the advantages listed.

[0049] Reference will now be made to the figures in the attached drawings in which:

- Figure 1 shows a perspective view of a distribution device according to an embodiment of the present disclosure;
- Figure 2 shows a perspective view of a part of the distribution device according to an embodiment of the present disclosure, in which at least one access opening is visible;
- Figure 3 shows a further perspective view of a part of the distribution device according to an embodiment of the present disclosure, in which at least one access opening is visible;
- Figure 4 shows a cross-sectional view of a device for adjustment of the dimensions of a housing according to an embodiment of the present disclosure.

[0050] With reference to the accompanying drawings, an embodiment of a distribution device for distributing products is indicated by the reference number 100.

[0051] The expression "distribution device" is understood as meaning within the context of the present dis-

closure a device configured for the transport or distribution, or dispensing, of products, preferably medicinal products, referred to in the jargon also as "medicine trolley". Preferably, the product distribution device according to the present disclosure dispenses the products in an automatic or automated manner.

[0052] With particular reference to Figure 1, the distribution device 100 according to the present disclosure comprises a support frame 10 and at least one rotating drum 20 supported by said support frame 10 and rotatable with respect to the latter about an axis of rotation X. Preferably, the axis of rotation X is a horizontal axis, namely an axis parallel to a surface on which the distribution device 100 is configured to be displaced.

[0053] The rotating drum 20 of the distribution device 100 according to the present invention may have any form. Preferably, said rotating drum 20 is a rotating cylinder supported by the support frame 10 and rotatable with respect thereto about the axis of rotation X. Alternatively, the rotating drum 20 is a semi-cylinder, or a cylinder portion, supported by the support frame 10 and rotatable with respect thereto.

[0054] The at least one rotating drum 20 of the distribution device 100 according to the present disclosure comprises a plurality of housings 20a, 20b, 20c. Each housing of said plurality of housings 20a, 20b, 20c is configured, in use, to house or contain one and only one product, preferably a medicinal product.

[0055] The distribution device 100 furthermore comprises at least one access opening 30 for access to a housing of the plurality of housings 20a, 20b, 20c. Preferably, the access opening 30 is arranged in the support frame 100 and is configured to allow a user access to a housing, for example for withdrawal of a product, preferably a medicinal product contained, or housed, inside said housing.

[0056] According to a preferred aspect of the present disclosure, the distribution device 100 comprises means 70 for closing the access opening 30. Preferably, these closing means are configured to be moved from a closed position of the access opening 30 to an open position of the said access opening 30. Preferably, this open position allows the withdrawal of a medicinal product housed inside one of the housings 20a, 20b, 20c. On the other hand, the closed position prevents the withdrawal of a medicinal product. In other words, when the closing means 70 are in said closed position, access to one of said housings 20a, 20b, 20c is prevented. The housings of the plurality of housings 20a, 20b, 20c are preferably arranged consecutively along a circumferential direction C, namely the housings are distributed around the axis of rotation X of the drum. In other words, the housings are arranged side by side in series or succession inside the at least one drum 20. Expressed differently, the housings are defined inside said at least one drum 20 so as to be arranged side by side, or in sequence, with respect to each other, preferably over the entire circumference of said at least one drum 20.

[0057] According to a preferred aspect of the present disclosure, the plurality of housings 20a, 20b, 20c is defined by a plurality of circular sectors arranged consecutively along the circumferential direction C of the at least one rotating drum 20, namely are distributed around the axis of rotation X. In other words, according to this aspect, each housing of the plurality of housings 20a, 20b, 20c is a circular sector of said at least one rotating drum 20. In general, preferably, the rotating drum 20 is a cylinder and the plurality of housings 20a, 20b, 20c are arranged in a circumferential direction C preferably over the whole length of the circumference of the rotating cylinder.

[0058] Preferably, each housing defined by said circular sectors is configured, in use, to contain only one product, preferably a medicinal product. "Medicinal product" is understood as meaning, in the context of the present disclosure, a box or a blister pack containing a medicine or a phial containing a medicine or a single type of medicine.

[0059] According to one aspect of the present disclosure, the distribution device 100 comprises an adjustment device 60 configured to modify the dimensions of a housing of the plurality of housings 20a, 20b, 20c defined by a circular sector of the plurality of circular sectors.

[0060] In particular, the adjustment device 60 is configured to vary the dimensions of a housing, in order to facilitate the withdrawal of a product, preferably a medicinal product, contained inside the said housing. In detail, the adjustment device 60 is configured to modify a depthwise dimension of said housing. In other words, the adjustment device 60 modifies the dimension of the housing in the radial direction.

[0061] Preferably, the adjustment device 60 comprises an abutment element 61 arranged inside said housing and acting as a bottom wall. Preferably, the abutment element 61 is arranged opposite, in a radial direction of the rotating drum 20, to the access opening 30 when the housing is located at said access opening 30. Basically, the abutment element 61 is a base or bottom element on which a medicinal device may rest when the housing inside which it is contained is located at the access opening 30.

[0062] As can be seen in Figure 4, the adjustment device 60 further comprises variation means 62 for changing the position of the abutment element 61 inside the housing in a radial direction with respect to the axis of rotation X. In other words, the variation means 62 are configured to change the depth of the housing inside which they are arranged. Consequently, the dimensions of each housing of the plurality of housings 20a, 20b, 20c may be modified depending on the medicinal product which, in use, they are configured to contain.

[0063] The distribution device 100 according to the present disclosure further comprises a management unit 40.

[0064] Said management unit 40 is configured, in use, to select, preferably during dispensing of a product, the housing of the plurality of housings 20a, 20b, 20c con-

taining the medicinal product to be dispensed.

[0065] More specifically, the management unit 40 is configured to control rotation means 50 which are configured to rotate the at least one rotating drum 20 about the axis of rotation X. In particular, the management unit 40 controls the rotation of the rotating drum 20 so that said selected housing, containing the medicinal product to be dispensed, is placed, or positioned, at the access opening 30. In other words, the management unit determines which housing of the plurality of housings 20a, 20b, 20c contains the medicinal product which must be dispensed and, by means of the rotation means 50, causes the rotation of the rotating drum 50 so that the product to be dispensed may be withdrawn through the access opening 30.

[0066] In combination, or alternatively, according to an aspect of the present disclosure, the management unit 40 causes the displacement, via for example displacement means, of the access opening 30 opposite the housing containing the medicinal product to be dispensed. In other words, according to this aspect, the drum 20 comprising the plurality of housings 20a, 20b, 20c containing the medicinal products may be fixed with respect to the support housing 10, and it is the access opening 30 which is displaced opposite the housing containing the product to be dispensed in order to allow the withdrawal of this medicinal product to be dispensed. Alternatively, both the drum 20 and the access opening 30 are movable and the management unit 40 is configured to perform the displacement of the drum 20 and the access opening 30 so as to allow the dispensing of a medicinal product contained inside a housing of the plurality of housings 20a, 20b, 20c of the drum 20. What is important is that the access opening 30 and the housing containing the medicinal product to be dispensed are in relative movement with respect to each other.

[0067] Preferably, moreover, as can be seen in Figures 2 and 3, the management unit 40 is configured to displace the closing means 70 of the access opening 30 from the closed position to the open position, and vice versa. More specifically, the closing means 70 are located preferably in a closed position of the access opening 70. Once the management unit 40 has performed the rotation of the at least one rotating drum 20 by means of the rotation means 50 so that the product to be dispensed may be withdrawn through the access opening 30, the management unit performs furthermore the displacement of the closing means 70 from said closed position into the open position of the access opening 30.

[0068] According to a preferred aspect of the present disclosure, the dispensing of a product, preferably a medicinal product, contained in the distribution device is automated.

[0069] According to this aspect, a housing identifier is associated with each housing of the plurality of housings 20a, 20b, 20c. Moreover, a product identifier, preferably a medicinal identifier, is associated with each product, preferably a medicinal product, intended, in use, to be

housed or contained in one of said housings 20a, 20b, 20c. In other words, both the housings and the medicinal products intended to be arranged inside said housings are characterized by a specific identifier. For example, the medicinal identifier of a specific medicinal product may be bar code of said medicine, while the housing identifier may be a number of said housing.

[0070] According to this aspect, the management unit 40 is configured to save said housing identifier and product identifier or medicinal identifier. In other words, the management unit 40 may comprise an internal memory configured to save said identifiers.

[0071] According to a preferred aspect, the management unit 40 is further configured to associate the product identifier, preferably medicinal identifier, of a specific product, preferably a medicine product, with the housing identifier of the housing which contains, in use, that specific medicine or which is configured, in use, to contain that medicinal product.

[0072] There exists in other words a unique correspondence or association between the product identifier, or medicinal identifier, and the housing identifier of the housing in which the product, preferably the medicine identified by said product identifier, or medicinal identifier, is contained.

[0073] In this way automatic or automated dispensing of a product, preferably a medicinal product, to be dispensed is possible.

[0074] According to a further preferred aspect of the present disclosure, the distribution device 100 comprises furthermore means for reading a patient identifier. Preferably, each patient of a hospital structure can in fact be identified by means of a patient identifier contained, for example, in a bar code, or on an RFID label or in a QR code present, for example, on a patient's bracelet.

[0075] According to this aspect, the distribution device 100 therefore comprises means for reading said patient identifier, for example reading means configured to read a bar code, or an RFID label, or a QR code.

[0076] Preferably, each patient identifier is configured to be associated with at least one product identifier, preferably at least one medicinal identifier. In particular, following the medical prescription, one or a plurality of product identifiers, or medicinal identifiers, corresponding to the products, preferably medicinal products which the patient must take, is/are associated with each user identifier.

[0077] Preferably, the management unit 40 is furthermore configured to save said patient identifiers with which one or more product identifiers, or medicinal identifiers, is/are associated. In this way, in the management unit 40 the product identifiers, or medicinal identifiers, which represent the products, or the medicines, which the patient must take, and which the distribution device 100 must dispense to that given patient, are associated with each patient identified by means of said patient identifier.

[0078] In this way, once the patient identifier has been

read, the management unit 40 performs the rotation, by means of the rotation means 50, of the at least one rotating drum about the axis of rotation X, so that the housing identified by the housing identifier associated with the product identifier, or medicinal identifier which is in turn associated with the patient identifier, is arranged at the access opening 30.

[0079] According to a preferred aspect of the present disclosure, the distribution device 100 comprises a plurality of rotating drums 20, 21, 22, 23, 24. These rotating drums are arranged consecutively and side by side along the axis of the rotation X and are rotatable about said axis of rotation X independently of each other.

[0080] Moreover, according to this aspect, each drum of the plurality of rotating drums 20, 21, 22, 23, 24 is identical, or substantially identical, to the rotating drum 20 described above. In this sense, each rotating drum 20, 21, 22, 23, 24 comprises a plurality of housings 20a, 20b, 20c, each of which is configured, in use, to contain a single medicinal product. Preferably, each housing of each rotating drum is a circular sector of the respective rotating drum.

[0081] According to this aspect, moreover, the distribution device 100 comprises a plurality of access openings 30. Preferably, the distribution device 100 comprises an access opening 30 for each of the rotating drums of the plurality of rotating drums 20, 21, 22, 23, 24. Each access opening 30 is configured to allow the access to a housing of a respective rotating drum of the plurality of rotating drums 20, 21, 22, 23, 24.

[0082] According to a further preferred aspect, moreover, the management unit 40 is further configured to select a rotating drum of the plurality of rotating drums 20, 21, 22, 23, 24 to be rotated by means of the rotation means 50. In particular, according to this aspect, the rotation means 50 are configured to rotate each rotating drum of the plurality of rotating drums 20, 21, 22, 23, 24 independently of the other rotating drums. The management unit performs the rotation of the rotating drum which contains, in one of the respective housings, the product, preferably the medicinal product, to be dispensed. In other words, once the medicinal product to be dispensed has been identified, the management unit determines in which of the rotating drums this medicinal product to be dispensed is housed and, inside this rotating drum, determines in which housing the medicinal product to the dispensed is contained. Then it causes the rotation means 50 to rotate this drum until the associated housing comprising the product to be dispensed is located at the access opening 30 of that rotating drum.

[0083] According to one aspect of the present disclosure, the distribution device comprises closing means 70 for each of the access openings 30 of the rotating drums 20, 21, 22, 23, 24. More specifically, the closing means 70 are configured to close and/or open selectively the access openings 30 of the rotating drums 20, 21, 22, 23, 24. In other words, the closing means 70 of each access opening 30 may be moved from a closed position into an

open position, and vice versa, independently of the closing means 70 of the other access openings 30.

[0084] Preferably also, the management unit 40 is further configured to perform the movement of the closing means 70. Namely, once the housing containing the product, preferably a medicinal product, to be dispensed, has been positioned at an access opening 30, the management unit performs the opening of the closing means of that access opening 30, while maintaining the closed position of the closing means 70 of the other access openings 30.

[0085] The present disclosure furthermore relates to a method for distribution of products, preferably medicinal products.

[0086] In the description of this method, elements of the distribution device 100 involved in the method and having the same function and the same structure as the elements described above retain the same reference number and are not described again in detail.

[0087] In particular, the method according to the present disclosure comprises a step of providing a distribution device 100 for distributing products, preferably medicinal products, comprising at least one rotating drum 20 rotatable about an axis of rotation X. Said at least one rotating drum 20 is supported by a support frame 10 and comprises a plurality of housings 20a, 20b, 20c each of which is configured, in use, to contain a single medicinal product.

[0088] The method comprises a further step of providing in the support frame 10 an access opening 30 which allows access to a housing of the plurality of housings 20a, 20b, 20c for the withdrawal of a product, preferably a medicinal product, to be dispensed. Also is envisaged is a step of providing a management unit 40 configured to select the housing containing the product, preferably a medicinal product, to be dispensed.

[0089] The method also involves controlling, by means of the management unit 40, rotation means 50 configured to rotate the at least one rotating drum 20 about the axis of rotation X in such a way that the housing containing the product, preferably a medicinal product, to be dispensed is placed at the aforementioned access opening 30.

[0090] According to a preferred aspect, a housing identifier is associated with each housing of the plurality of housings 20a, 20b, 20c. Moreover, a product identifier, preferably a medicinal identifier, is associated with each product, preferably of the medicinal type, intended to be contained in one of the housings. The management unit 40 is configured to save said housing identifier and product identifier, or medicinal identifier, and to associate the housing identifier of each housing with the product identifier, preferably medicinal identifier, of the product, preferably a medicinal product, intended, in use, to be contained in said housing.

[0091] According to a further aspect of the present disclosure, the method involves the reading of a patient identifier. This patient identifier is configured to be associated

with a product identifier, preferably a medicinal identifier. The method according to the present disclosure comprises the step of detecting this patient identifier using said reading means. Consequently, the management unit 40, depending on the medicinal identifier associated with said patient identifier, performs the rotation of the rotating drum 20 via the rotation means 50 in such a way that the housing containing the product, preferably a medicinal product, to be dispensed is placed at the access opening 30.

[0092] Preferably, moreover, the management unit 40 performs the opening of the closing means 70 so that a user may withdraw the medicinal product from said housing.

[0093] According to a further aspect of the present disclosure, the method comprises a further step of filling the distribution device 100. The filling step comprises the determination of the product identifiers, preferably medicinal identifiers, of the products, preferably a medicinal product to be dispensed and the association, by means of the management unit 40, with the product identifier, or medicinal identifier, of a product, preferably a medicinal product, to be dispensed, of a housing identifier of a housing without, or not containing, a product, preferably a medicinal product. Finally, the filling step involves housing the product, preferably a medicinal product, inside said housing.

[0094] The subject-matter of the present disclosure has been described hitherto with reference to preferred embodiments thereof. It is to be understood that other embodiments relating to the same inventive idea may exist, all of these falling within the scope of protection of the claims which are illustrated hereinbelow.

Claims

1. Distribution device (100) for distributing products, preferably medicinal products, configured for the transport and dispensing of medicinal products, said distribution device (100) comprising a support frame (10) and at least one rotating drum (20) supported by said support frame (10) and rotatable with respect thereto about an axis of rotation (X), said at least one rotating drum (20) comprising a plurality of housings (20a, 20b, 20c), wherein each housing of said plurality of housings (20a, 20b, 20c) is configured, in use, to contain a product, preferably a medicinal product, the distribution device (100) further comprising at least one access opening (30) for accessing a housing of said plurality of housings (20a, 20b, 20c), wherein said access opening (30) is defined in said support frame (10) and allows a user to access to said housing for withdrawal of the product, preferably a medicinal product, and a management unit (40) configured to select the housing of said plurality of housings (20a, 20b, 20c) containing the product, preferably a medicinal product, to be dispensed and

- to control rotation means (50) configured to rotate said at least one rotating drum (20) about said axis of rotation (X) so that said housing containing the product, preferably a medicinal product to be dispensed, is placed at said access opening (30). 5
2. Distribution device (100) according to claim 1, wherein said plurality of housings (20a, 20b, 20c) is defined by a plurality of sectors arranged consecutively along a circumferential direction (C) of said at least one rotating drum (20) or sectors arranged around the axis of rotation. 10
 3. Distribution device (100) according to the preceding claim, comprising an adjustment device (60) configured to modify the dimensions of a housing (20a, 20b, 20c) defined by a circular sector of the plurality of circular sectors. 15
 4. Distribution device (100) according to the preceding claim, wherein said adjustment device (60) comprises an abutment element (61) arranged in said housing (20a, 20b, 20c) and adapted to act as bottom wall of the housing, and variation means (62) for changing the position of said abutment element (61) in said housing (20a, 20b, 20c) in a radial direction with respect to said axis of rotation (X). 20 25
 5. Distribution device (100) according to any one of the preceding claims, wherein each housing of said plurality of housings (20a, 20b, 20c) is associated with a housing identifier and wherein each product, preferably a medicinal product, intended, in use, to be contained inside a housing of said plurality of housings (20a, 20b, 20c) is associated with a product identifier, preferably a medicinal identifier, the management unit (40) being configured to save said housing identifier and said product identifier, preferably medicinal identifier, and to associate the housing identifier of each housing of the plurality of housings (20a, 20b, 20c) with the product identifier, preferably medicinal identifier, of the product, preferably a medicinal product, contained, in use, in said housing. 30 35 40
 6. Distribution device (100) according to any one of the preceding claims, further comprising means for reading a patient identifier, wherein said patient identifier is configured to be associated at least with a product identifier, preferably a medicinal identifier. 45 50
 7. Distribution device (100) according to any one of the preceding claims, comprising closing means (70) for closing said access opening (30), wherein said closing means (70) are configured to be moved from a closed position of the access opening (30) to an open position of the access opening (30), wherein said open position allows the withdrawal of a product, preferably a medicinal product, housed in one of said housings (20a, 20b, 20c). 55
 8. Distribution device (100) according to any one of the preceding claims, comprising a plurality of rotating drums (20, 21, 22, 23, 24) arranged consecutively and side by side along said axis of rotation (X), wherein each rotating drum of said plurality of rotating drums (20, 21, 22, 23, 24) is configured to rotate about said axis of rotation (X) independently of the other rotating drums of said plurality of rotating drums (20, 21, 22, 23, 24), and wherein each rotating drum of said plurality of rotating drums (20, 21, 22, 23, 24) comprises a plurality of housings (20a, 20b, 20c), wherein each housing of said plurality of housings (20a, 20b, 20c) is configured, in use, to contain a single product, preferably a medicinal product.
 9. Distribution device (100) according to the preceding claim, comprising an access opening (30) for each of said rotating drums of the plurality of rotating drums (20, 21, 22, 23, 24), wherein each access opening is configured to allow access to a housing of a corresponding rotating drum of said plurality of rotating drums (20, 21, 22, 23, 24).
 10. Distribution device according to claim 8 or 9, wherein the management unit (40) is further configured to select a rotating drum of said plurality of rotating drums (20, 21, 22, 23, 24) to be rotated by means of said rotation means (50).
 11. Combination of a distribution device according to any one of the preceding claims, and said products, preferably said medicinal products.
 12. Method for distribution of products, preferably medicinal products, comprising the following steps:
 - rotating at least one rotating drum (20) about an axis of rotation (X) in a support frame (10), wherein said at least one rotating drum (20) comprises a plurality of housings (20a, 20b, 20c), and wherein each housing of said plurality of housings (20a, 20b, 20c) is configured, in use, to contain a product, preferably a medicinal product;
 - accessing a housing of the plurality of housings (20a, 20b, 20c) in said support frame (10), wherein an access opening (30) allows a user to access said housing for withdrawal of a product, preferably a medicinal product;
 - selecting the housing of said plurality of housings (20a, 20b, 20c) containing the product, preferably a medicinal product, to be dispensed;
 - rotating the at least one rotating drum (20) about the axis of rotation (X) so that said housing containing the product, preferably a medicinal

product, to be dispensed is placed at said access opening (30).

housing is intended to house a single product, preferably a medicinal product, or a single type of product, preferably a medicinal product.

13. Method according to the preceding claim, wherein each housing of said plurality of housings (20a, 20b, 20c) is associated with a housing identifier and wherein each product, preferably a medicinal product, intended, in use, to be contained in a housing of said plurality of housings (20a, 20b, 20c) is associated with a product identifier, preferably a medicinal identifier, and wherein a management unit (40) saves said housing identifier and said product identifier, preferably medicinal identifier, and associates the housing identifier of each housing of the plurality of housings (20a, 20b, 20c) with the product identifier, preferably medicinal identifier, of the product, preferably a medicinal product, contained, in use, in said housing.

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14. Method according to the preceding claim, wherein the management unit (40) comprises means for reading a patient identifier, wherein said patient identifier is configured to be associated with at least one product identifier, preferably medicinal identifier, wherein the method comprises the step of detecting said patient identifier using said reading means.

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15. Method according to the preceding claim, wherein, after said reading of the patient identifier, the management unit (40) identifies the housing of said plurality of housings (20a, 20b, 20c) containing a product, preferably a medicinal product, associated with said patient identifier and controls the rotation of said at least one rotating drum (20) by means of the rotation means (50), so that said housing containing the product, preferably a medicinal product, to be dispensed is placed at the access opening (30).

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16. Method according to any one of claims from 13 to 15, comprising a step of filling the distribution device, wherein said filling step involves:

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 - determining the product identifiers, preferably medicinal identifiers, of the products, preferably a medicinal product, to be dispensed;

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 - associating, by means of said management unit, with each product identifier, preferably medicinal identifier, of a product, preferably a medicinal product, to be dispensed, a housing identifier of a housing of said plurality of housings without, or not containing, a product, preferably a medicinal product;

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 - housing said product, preferably a medicinal product, in said housing.

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17. Device according to any one of claims 1 to 10 or method according to any one of claims 12 to 16, or combination according to claim 11, wherein each

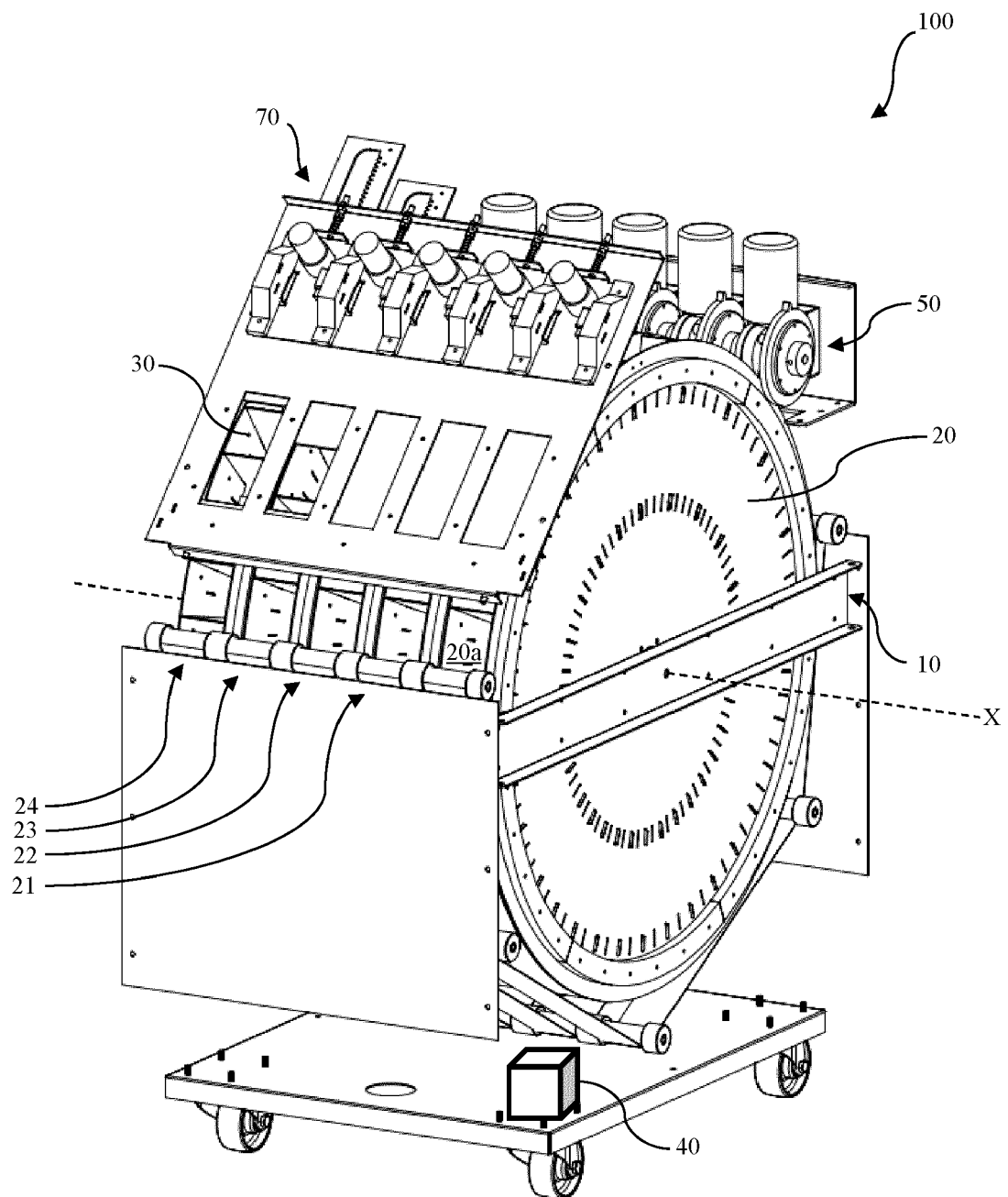


Fig. 1

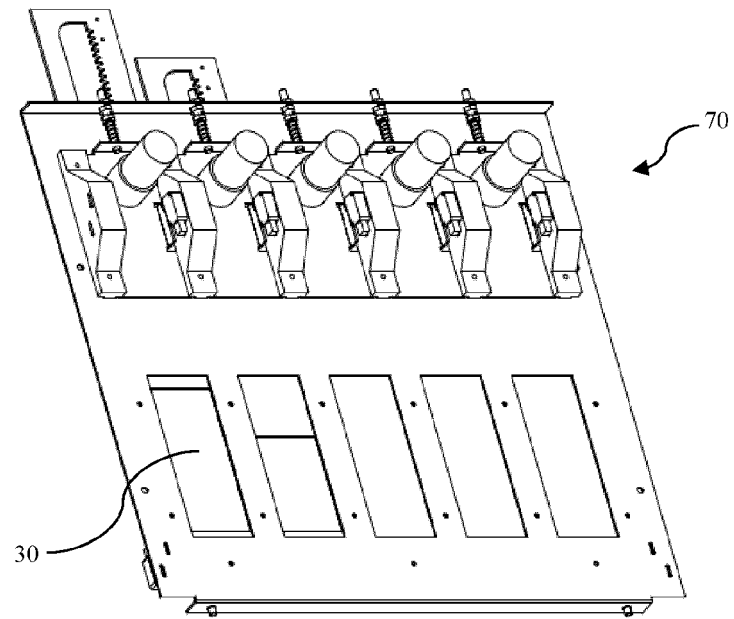


Fig. 2

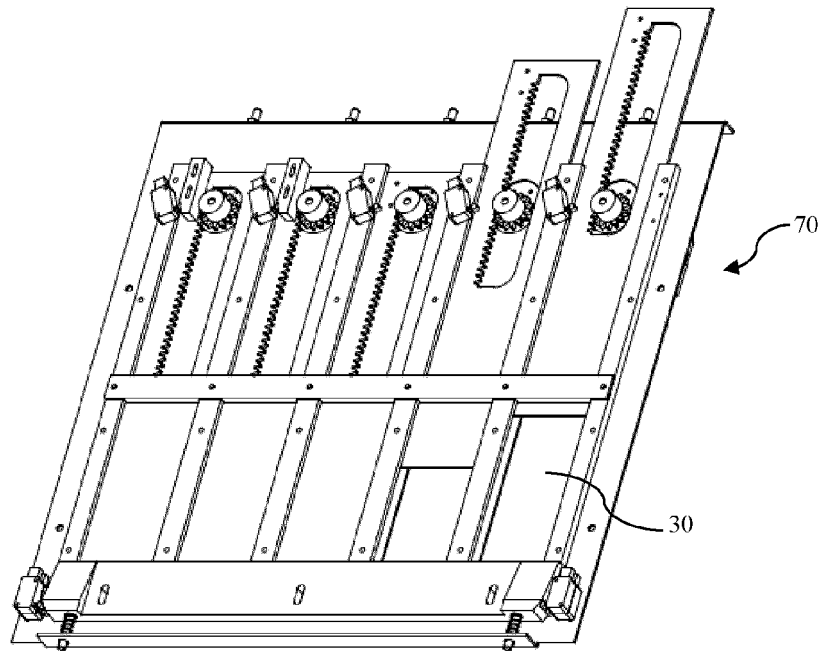


Fig. 3

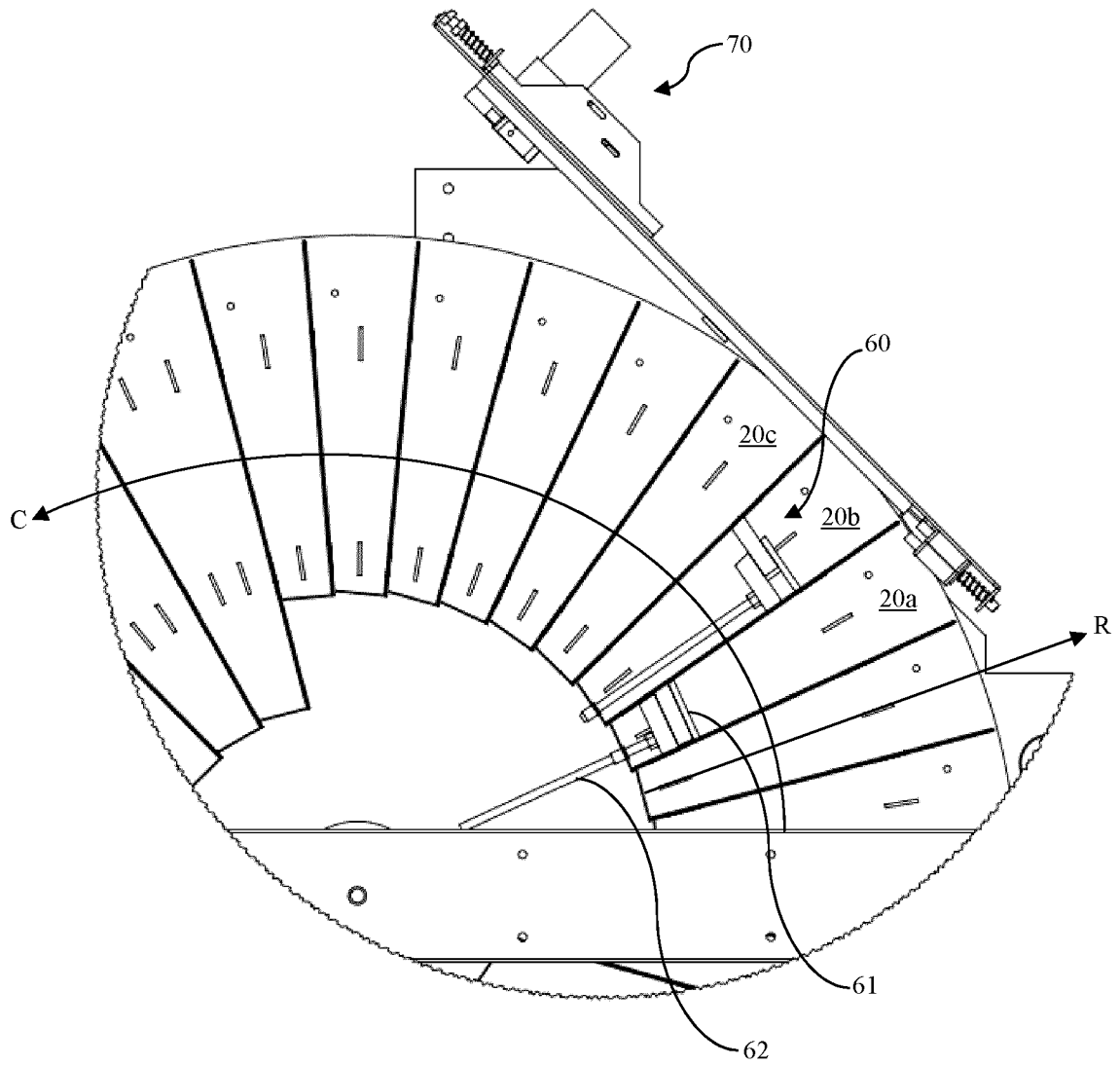


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 20 21 3176

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			A61J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 April 2021	Examiner Gkama, Alexandra
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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27-04-2021

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