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(54) Title: DISPENSER DEVICE FOR PRODUCTS, PARTICULARLY FOR VENDING MACHINES

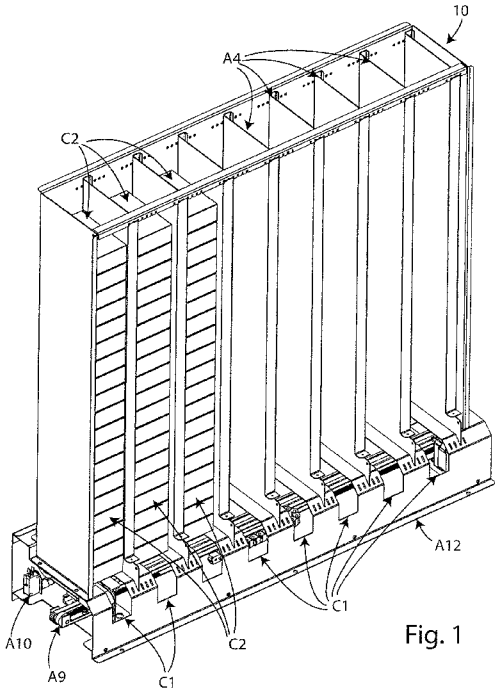

Fig. 1

(57) Abstract: A dispenser device for products, in particular for vending machines, is constituted by a modular structure (10), which has two rails or longitudinal axles (A1, B1), perpendicular to each other and both motorized, wherein a longitudinal first axle (A1) has dimensions variable in relation to a prefixed number of selections of products to be dispensed; said first axle (A1) is fixed on a plane (A3) placed below a plurality of racks (A4) where a series of containers (C2) are stacked (C2), said containers (C2) containing the products to be dispensed.

DISPENSER DEVICE FOR PRODUCTS, PARTICULARLY FOR VENDING MACHINES

The present invention generally relates to a dispensing device for products, such as edible goods or durable goods of various kinds, in particular for vending machines.

More particularly, the invention relates to a mechanism for separating and dispensing canned products, which is configured to replace the dispensing devices of products already normally used and spread, but limited in flexibility, easiness of construction, material costs, wiring times, electronic management and total reliability of the system.

The dispenser device for products, which is the object of the invention, is perfectly compatible with the size, as well as with the software and the hardware currently in use in known vending machines.

The known dispensing devices of canned products, in particular for vending machines, have a plurality of loading channels, arranged in rows, wherein at each channel corresponds a motor for discharging the product and an end-product detection system, configured to signal the depletion of the products in the related row.

Since the most complex and capacious systems house even more than one hundred of rows and, consequently, more than one hundred selections of this type, it is necessary to use more than one hundred motors and more than one hundred end-product detection systems (switches).

Obviously such a large number of mechanisms greatly affects the material costs, the wiring times, the electronic management and the total reliability of the system.

The present invention aims to overcome the above mentioned drawbacks of the prior art and, in particular, a main object of the invention is to provide a product dispensing device, in particular for vending machines, that allows to minimize the use of materials and the installation and wiring times, with respect to the known dispensing devices.

Another object of the present invention is to provide a product dispensing device, in particular for vending machines, which guarantees an efficient electronic management and the complete reliability of the final product.

A further object of the invention is to provide a product dispensing device, in particular for vending machines, at low costs, considering the achieved advantages, with respect to the known dispensing devices.

These and other objects are achieved by a product dispensing device, in particular for vending machines, according to the appended claim 1; other detailed technical characteristics of the device are mentioned in the dependent claims.

Advantageosuly, the dispensing device according to the present invention is completely modular and avoids the use of individual wirings and motors which are currently used in known dispensing devices.

It follows that the realization and operation costs are considerably low.

Each module of the dispensing device according to the invention is a true "plug and play" module which is contained within the automatic vending machines.

Moreover, each module is self-contained and equipped with its own software, provided by a small microprocessor, which is able to communicate with the electronic card of the vending machine, via serial cable, via Bluetooth® or via Wi-Fi, so as to only make the wiring related to the respective mains power supplies.

The above mentioned objects and advantages, as well as others that will be better highlighted in the following, will be more clear from the following description, relating to preferred embodiments of the product dispensing device, in particular for vending machines, and from the encosed drawings, in which:

- figure 1 is a partial perspective view of a first embodiment of the products dispensing device, in particular for vending machines, according to the invention;
- figure 1A is a partial perspective view of a second embodiment of the products dispensing device, in particular for vending machines, according to the invention;
- figures 2 and 2A are two partial perspective views of an element used in the products dispensing device, in particular for vending machines, according to the invention;
- figure 2B shows an enlarged detail of the element of figures 2 and 2A, according to the present invention;
- figure 3 is a full perspective view of figures 2 and 2A, according to the present invention;
- figure 4 is a further full perspective view of the element of figures 2 and 2A, according to the present invention;
- figure 4A shows an enlarged detail of the element of figure 4, according

to the present invention;

- figure 5 is a full perspective view of the products dispensing device of figure 1, according to the present invention;

- figure 6 is a full perspective view of a further embodiment of the products dispensing device, in particular for vending machines, according to the invention.

With reference to the above mentioned figures, the products dispensing device, in particular for vending machines, according to the present invention, is constituted by a modular structure 10, which has two guides or axles A1, B1, perpendicular to each other and both motorized.

The axle A1 has variable sizes with respect to the number of products selections to be obtained and with respect to the use of the modular structure 10.

The axle A1 is fixed on a plane A3 placed below a plurality of racks A4, which are adjustable according to the size of the products to be dispensed; the plane A3 also incorporates a linear guide A5 and a movable carriage A6, which is connected to a toothed belt A7 able to move the carriage A6 through the bidirectional motion of a motor (not shown in the enclosed figures) and its related pulleys A9.

The positioning of the carriage A6 takes place in a starting point or zero point of the system (as shown in the enclosed figure 2), which is signaled by one or more limit switches A10 of the system.

In order to vary the positioning of the carriage A6 along the X axis (see the enclosed figure 2), a motor with encoder or a stepper motor or a mixed motor can be used by referring to the starting point or zero point identified by the switch A10.

A support base A12 for supporting the axle or guide B1, placed along the Y axis (perpendicular to the X axis, as shown in the enclosed figure 2) and dimensioned according to the length of the products to be dispensed, is fixed on the movable carriage A6; said base A12 constitutes a fixing structure for a second motor B2 which moves the toothed belt A7; said belt A7 moves between two pulleys B4, B8 which have a pusher dowel or idler B3, a switch B5 and a product presence sensor B6.

The motor pulley B4 also has a cam function and, by acting on the switch B5, gives the necessary pulse for identifying the completion of one round of the toothed belt A7.

The system of guides or axles A1, B1 is free to move below the adjustable

racks A4 and said adjustable racks A4 are supported by the support surface A12 of the products, which has a plurality of adjustable containment blades A2, so that the support surface of the products is not continuous but has a split at the center of each products loading channel C1, through which the idler B3 goes from an initial position 12 to a final position 13 (product output), once activated the motor B2 up to the return of the pulley B4 on the contact switch B5 identifying the completion of one round of the belt A7 (as shown in the enclosed figure 4A).

The boxes or containers C2 containing the products to be dispensed are supported on the flat base A12 and only on the side edges of the blades A2, so that, in correspondence of the discontinuities of the base A12, moves the protruding part of the pusher idler B3, which is integral with the toothed belt A7, during each revolution made by said toothed belt A7, so as to remove each box C2 to bring it in the pickup area 14 (as shown in the enclosed figure 5).

The operation of the dispensing device, in particular for vending machines, according to the invention, is substantially the following.

The system gives a position to each selection of products and, therefore, to each rack A4 of the device (1 to n), starting from an initial position or zero point, at which the carriage A6 is positioned at the beginning of the guide or axle A1.

When a request for ejecting a boxed product placed in one of the racks A4 is done, the guide or axle A1 places the extraction guide or axle B1 exactly in correspondence of the rack's position where the required product is placed, according to a reference related to the stored encoder's pulses or to the required round-steps (depending on the drive motor).

Once the carriage A6 is positioned in correspondence of the selected rack A4, the motor B2 and the pulley B4 are activated so that the belt A7 makes one revolution and, therefore, the pusher idler B3 of the belt A7 goes through for a time below the box C2 of the selected product to be distributed, so that said box C2 is pushed toward the outside of the rack A4, making it slide downward the other stacked boxes C2.

After having done the selection and before a return of the system to the initial position at the limit switch A10, the product presence sensor B6, which is positioned on the axle B1, is able to verify if, after the ejection of the box C2, other boxes C2 still remain in the selected rack A4 or if said rack A4 is empty.

Where it is found that the selected rack A4 does not contain any products boxes C2, the selection of said rack A4 will be deleted from the list of products available to the user, so that the user can no longer select said products.

On the basis of the above description, it is understood, therefore, that the product dispensing device, in particular for vending machines, which is the object of the present invention, achieves the previously mentioned purposes and advantages.

In particular, the modular structure of the device (shown in the enclosed figure 6) allows to adapt it to different uses, adding more modules to each other and/or overlapping said modules, so as to obtain a complete flexibility of use about the quantity and quality of canned products that can be selected and then dispensed.

Obviously, increasing the products and user selections and then increasing the size of the device, flexibility, efficiency and cost effectiveness of the device of the invention increase, with respect to the known technical solutions.

In particular, it is thus possible to have different types of vending machines for different applications, while maintaining the same mechanism and the same electronic logic.

Finally, the modularity of the dispenser device according to the invention allows to use it according to the vending machine that you want to make (vandal-proof or not, indoor or outdoor vending machine, more or less large, more or less technological, etc.).

Finally, it is clear that other variations may be made to the dispenser device in question, without for this departing from the novelty principles inherent in the inventive idea of the appended claims, as well as it is clear that, in the practical embodiment, the materials, shapes and dimensions of the details may be any according to the needs and possibly replaced with other technically equivalent.

Where the technical features mentioned in the subsequent claims are followed by reference signs, said reference signs have been introduced with the sole purpose of increasing the intelligibility of the claims and accordingly, said reference signs do not have any limiting effect on the interpretation of each element, which is then identified by way purely of example by said reference signs.

CLAIMS

1. Dispenser device for products, in particular for vending machines, characterized in that it is constituted by a modular structure (10), which has two rails or longitudinal axles (A1, B1), perpendicular to each other and both motorized, in which a longitudinal first axle (A1) has dimensions variable in relation to a prefixed number of selections of products to be dispensed, said first axle (A1) being fixed on a plane (A3) placed below a plurality of racks (A4) where a series of containers (C2) are stacked (C2), said containers (C2) containing the products to be dispensed.

2. Dispenser device according to claim 1, characterized in that said plane (A3) has a linear guide (A5) and a movable carriage (A6), which is connected to a toothed belt (A7) able to move said carriage (A6), through the bi-directional movement of a first motor and related pulleys (A9), from an initial position indicated by a limit switch (A10).

3. Dispenser device according to claim 2, characterized in that said first motor is a motor with encoder or a stepper motor or a mixed motor.

4. Dispenser device according to claim 2, characterized in that a base (A12) is fixed on said movable carriage (A6), said base (A12) being configured to support a second longitudinal axle (B1), placed crosswise with respect to said longitudinal first axle (A1) and dimensioned according to the size of the containers (C2) and the products to be dispensed.

5. Dispenser device according to claim 4, characterized in that said base (A12) forms a fastening structure of a second motor (B2), able to move a toothed belt (A7) which moves between two pulleys (B4, B8), with which are coupled a pusher block or pulley (B3), a contact switch (B5) which detects the completion of a revolution of said toothed belt (A7) and a sensor (B6) of the presence of said products.

6. Dispenser device according to claim 5, characterized in that said base (A12) supports said racks (A4) and has a series of adjustable containment blades (A2), so that the support surface of the products has a split in the center of each loading channel (C1) of said products, through which flows said pusher block (B3) from a starting position (12), in correspondence of one of said pulleys (B4, B8), to a final position (13), in correspondence of the exit of said products.

7. Dispenser device according to claim 6, characterized in that said containers (C2) of the products to be dispensed are placed horizontally on said base (A12) and laterally on the edges of said blades (A2), so that, in

correspondence with said split, a protruding portion of said pusher block (B3), integral with said toothed belt (A7), slides during each revolution performed by said toothed belt (A7), so as to remove each container (C2) of the products for carrying it into a withdrawal zone (14) where the user is able to take it.

8. Dispenser device according to claim 2, characterized in that each rack (A4) has a specific assigned position, starting from an initial position, in correspondence of which said carriage (A6) is placed at the beginning of said first longitudinal axle (A1).

9. Dispenser device according to claim 8, characterized in that said first longitudinal axle (A1) is configured to place said second longitudinal axle (B1) at the position of the rack (A4) when the container (C2) containing the required product is inserted, according to a reference provided by said first motor, so that said carriage (A6) is positioned at the selected rack (A4), before activating said second motor (B2), said belt (A7) and said pusher block (B3) which passes below said container (C2) of the selected product to be dispensed, so that said container (C2) is pushed towards the outside of the rack (A4) making it slide downward to the other stacked containers (C2).

10. Dispenser device according to claim 5, characterized in that said sensor (B6) of the presence of said products, which is placed on said second longitudinal axis (B1), is provided for verifying if, after the exiting of a container (C2) from said selected rack (A4), other containers (C2) still remain or not within said selected rack (A4), so that, if said selected rack (A4) does not have containers (C2), said selected rack (A4) is deleted from a list of products available and selectable for the user.

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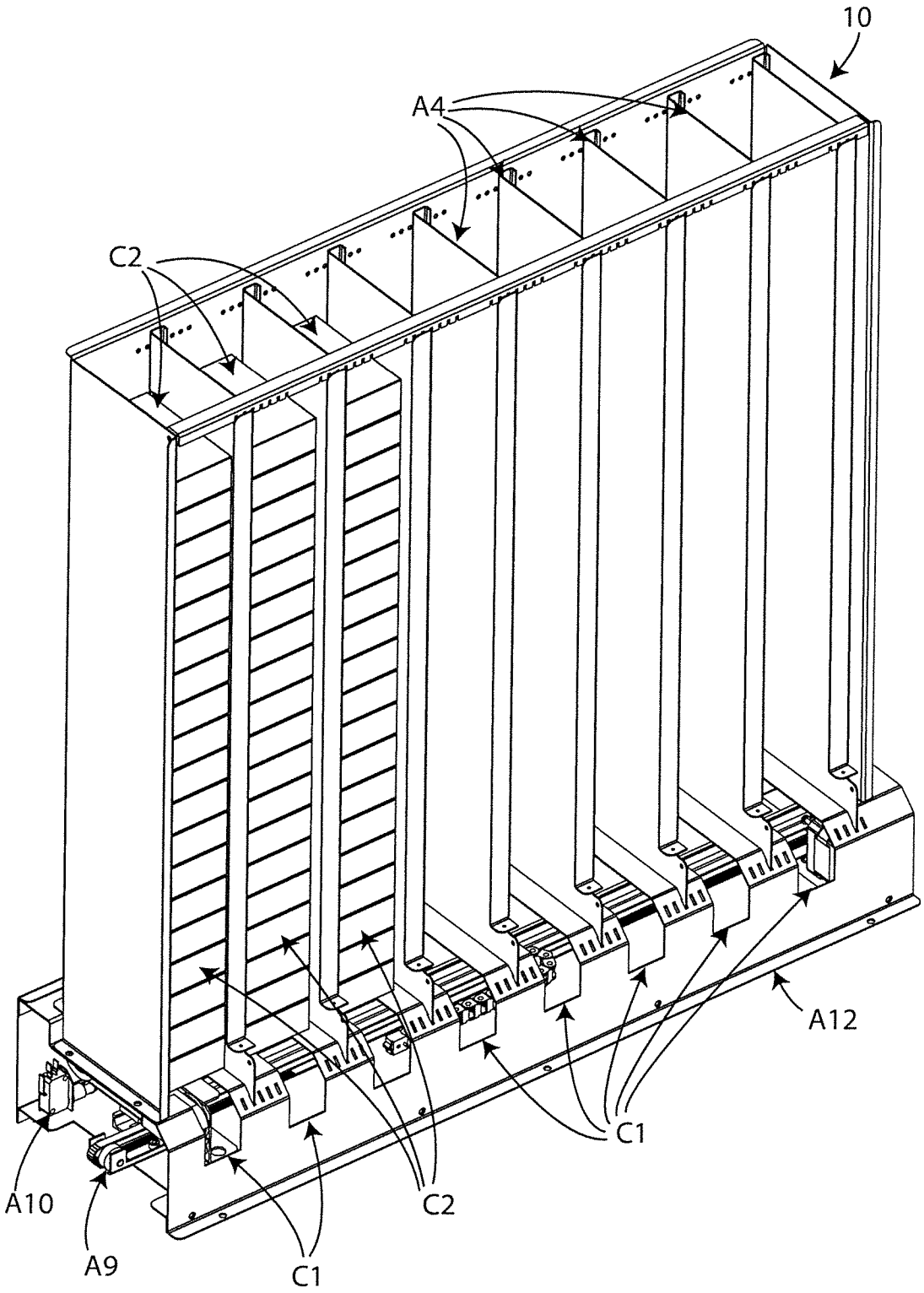

Fig. 1

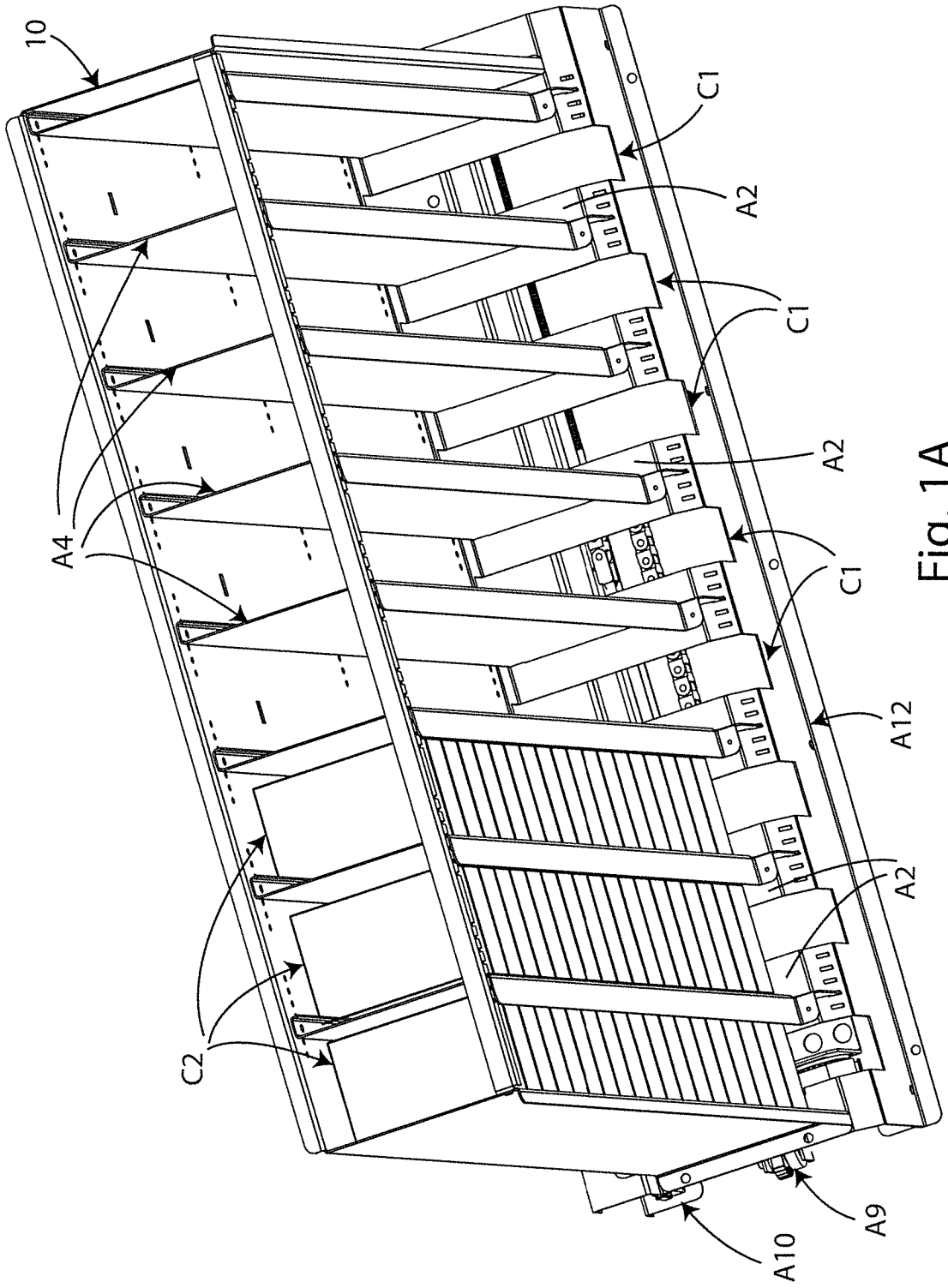

Fig. 1A

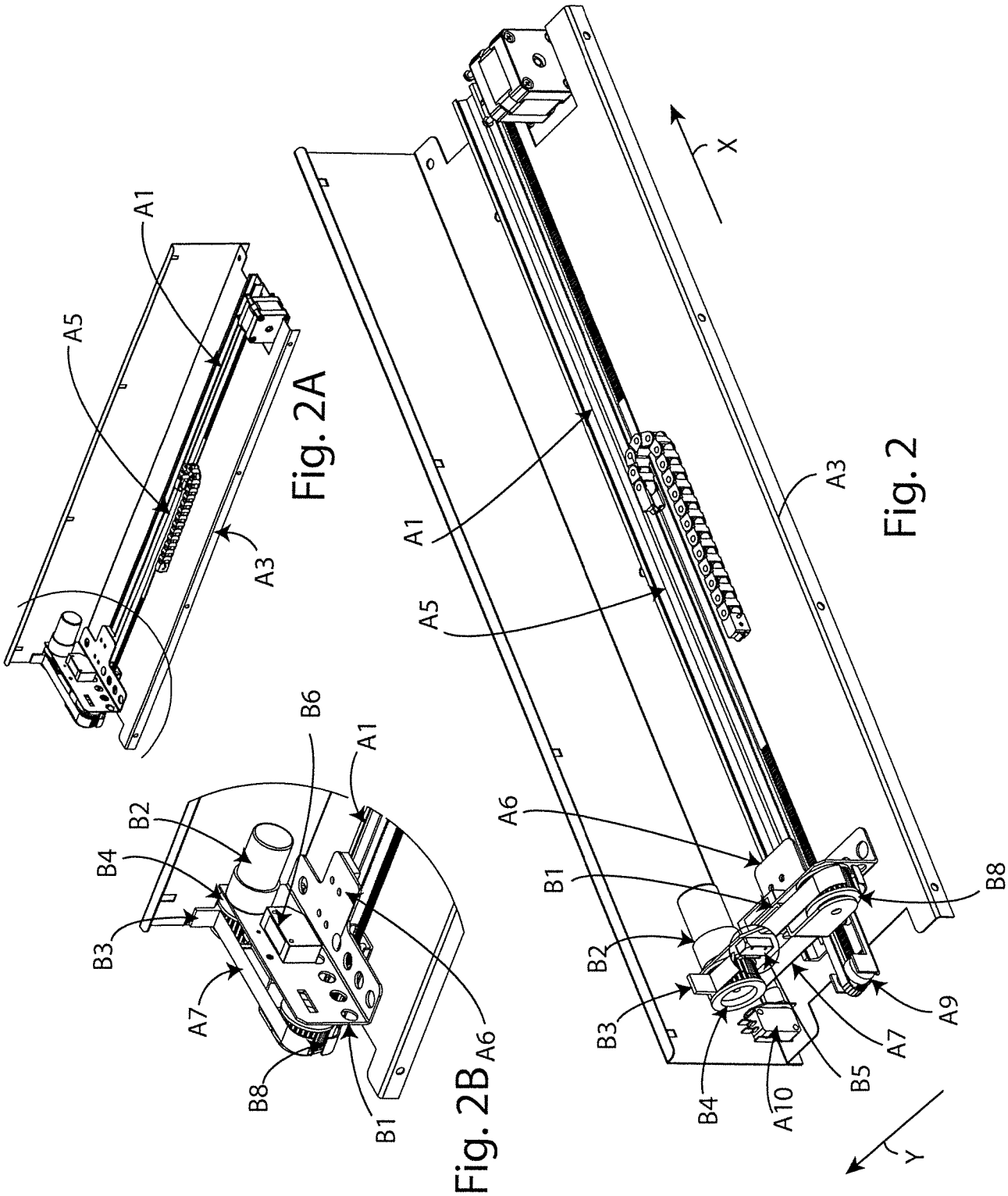

Fig. 2

Fig. 2A

Fig. 2B

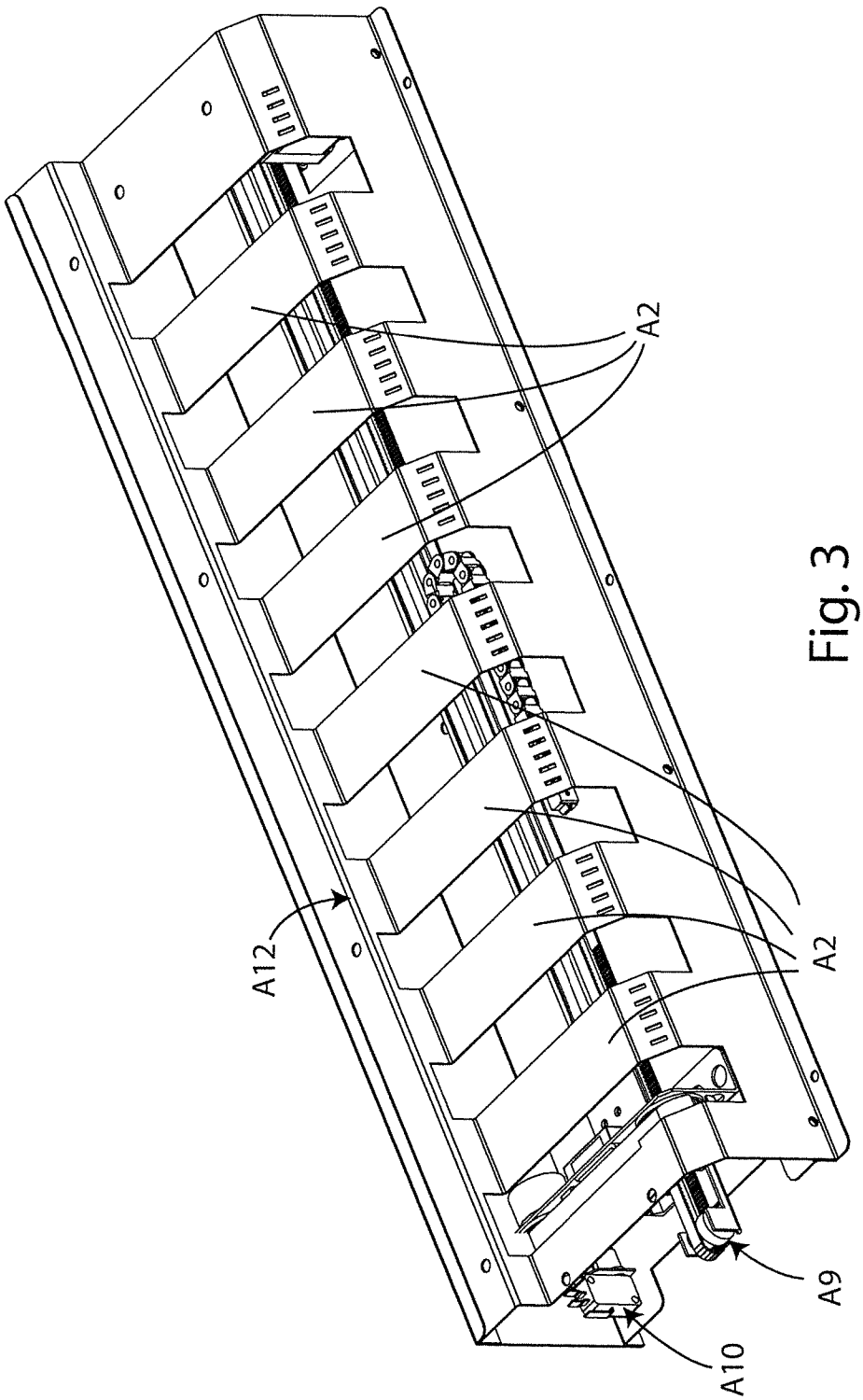

Fig. 3

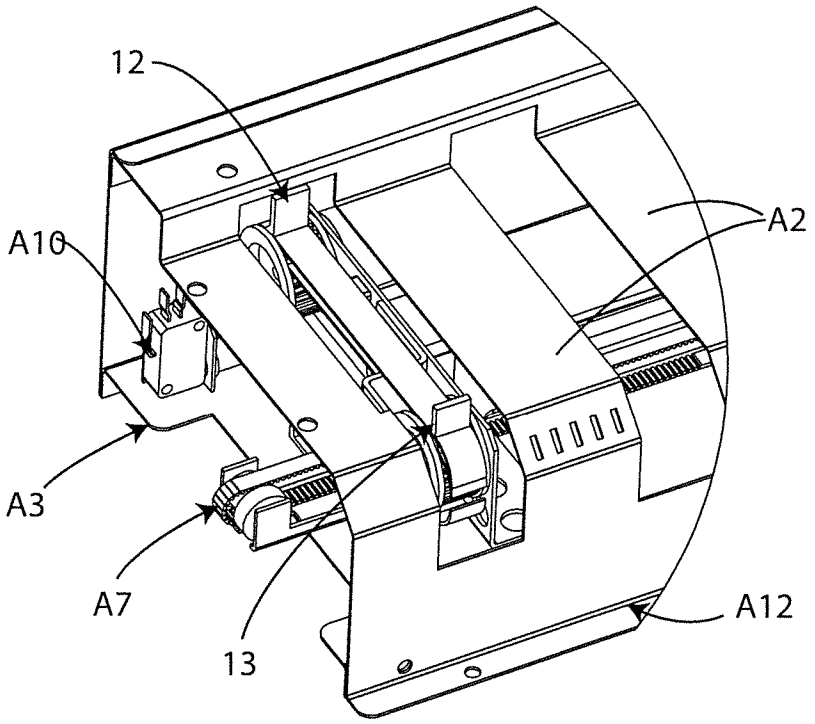

Fig. 4A

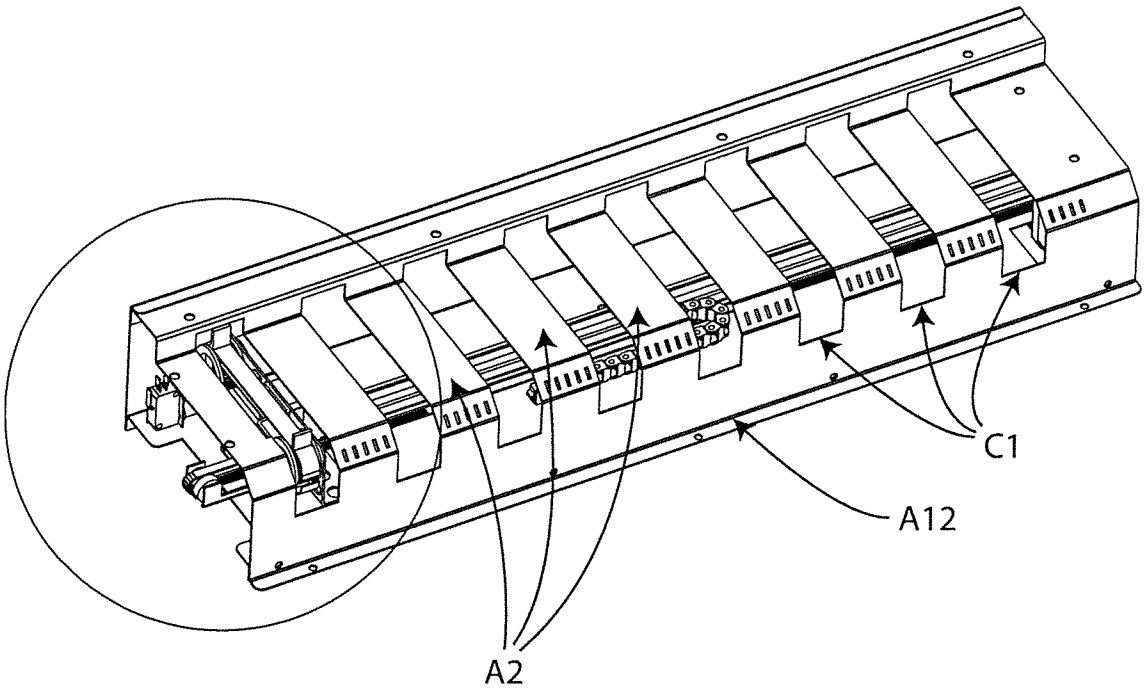

Fig. 4

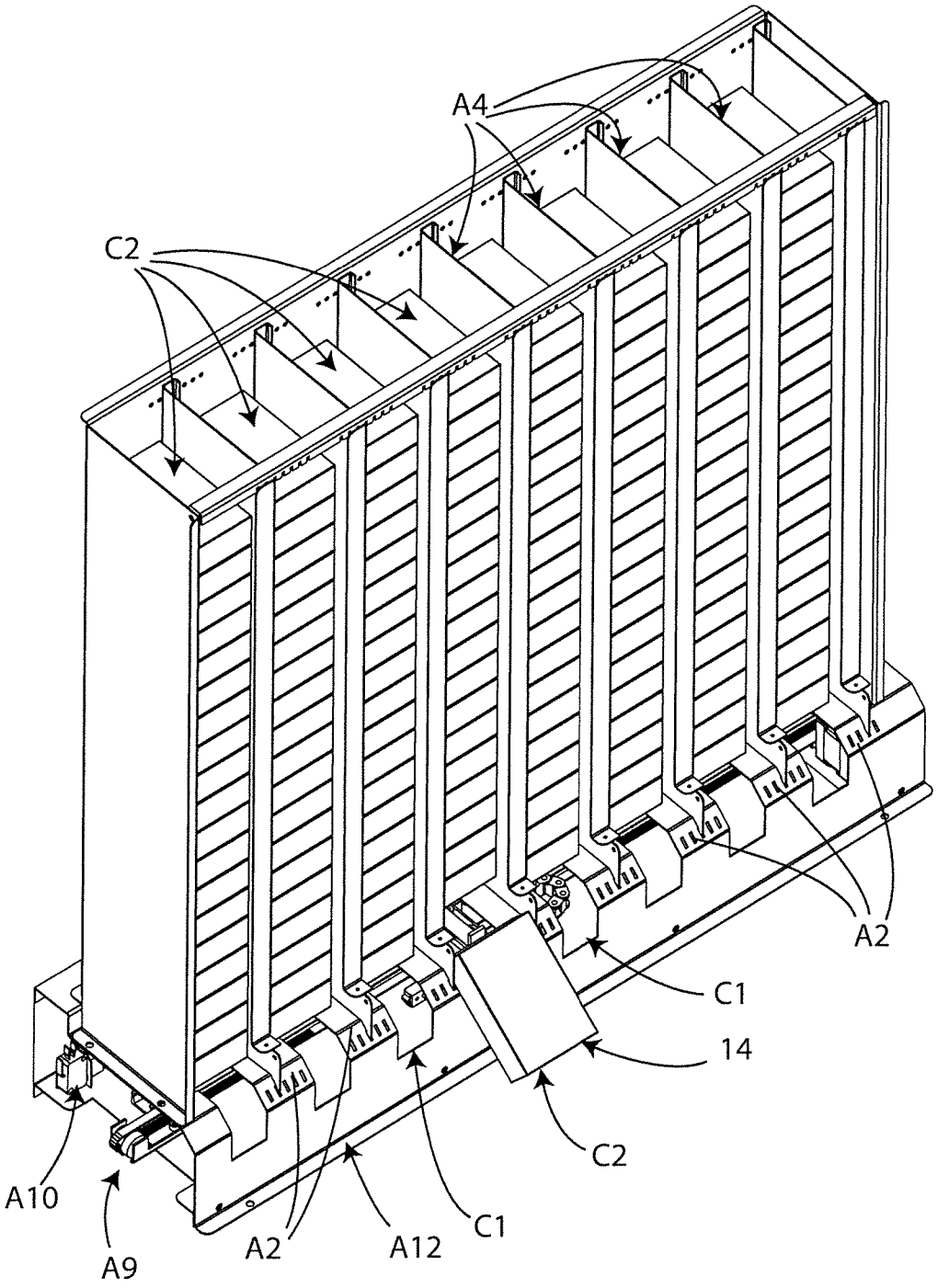

Fig. 5

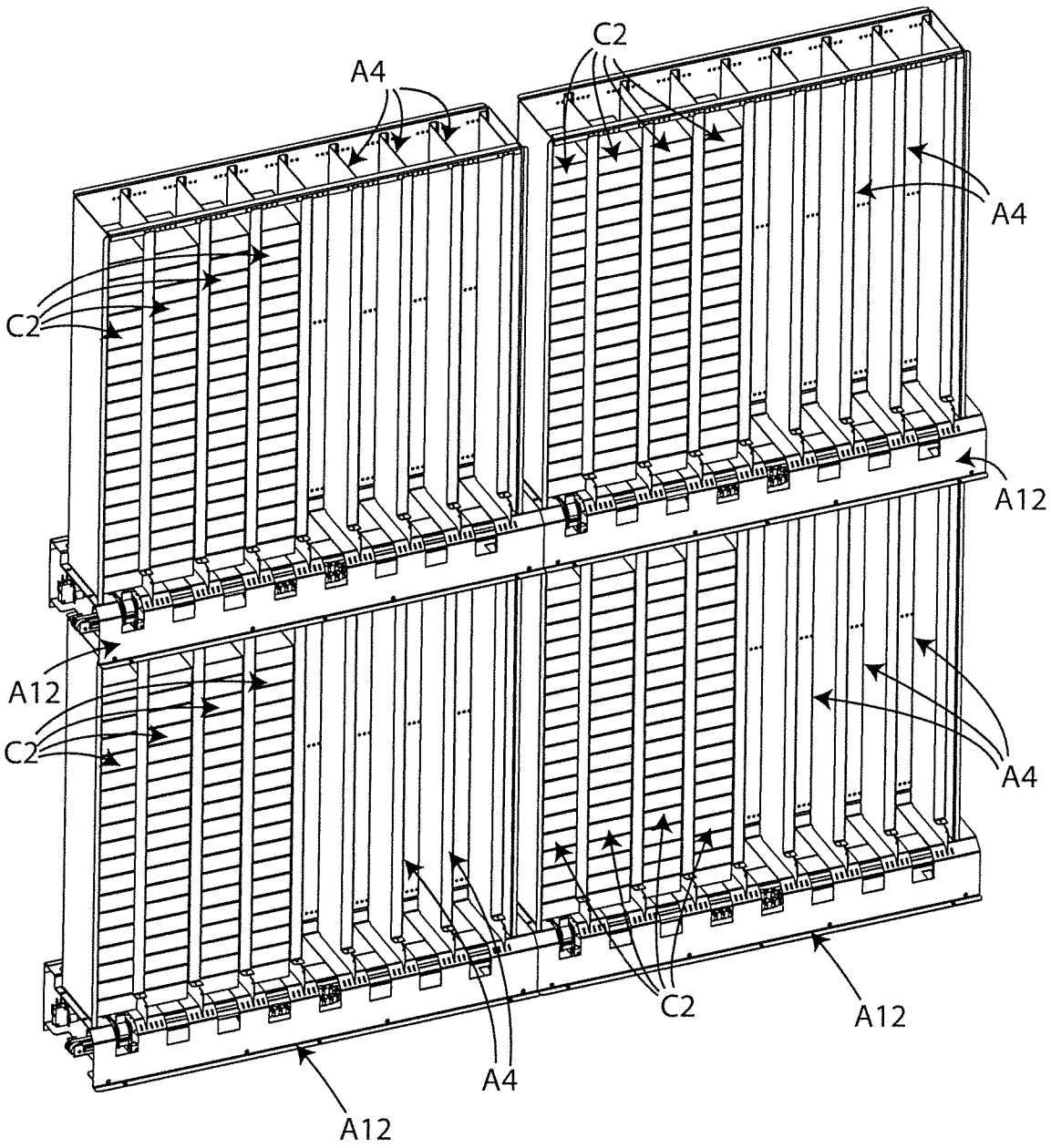

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2016/000192

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F11/16 G07F11/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/155370 A1 (MARTIN DOUGLAS A [US] ET AL) 21 August 2003 (2003-08-21) abstract paragraphs [0005] - [0008], [0018], [0022] - [0027], [0032] - [0038], [0041]; figures 2-5	1-10
A	US 6 415 952 B1 (OHTUKA YUJI [JP] ET AL) 9 July 2002 (2002-07-09) the whole document	1-10
A	JP 2008 033498 A (SAXA INC; NTT DATA CORP) 14 February 2008 (2008-02-14) the whole document	1-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Fyhr, Jonas

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IT2016/000192

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003155370 A1	21-08-2003	AT 382909 T	15-01-2008
		AU 2003215283 A1	09-09-2003
		CA 2476466 A1	28-08-2003
		EP 1474774 A1	10-11-2004
		US 2003155370 A1	21-08-2003
		US 2005139606 A1	30-06-2005
		US 2010327005 A1	30-12-2010
		WO 03071472 A1	28-08-2003
US 6415952 B1	09-07-2002	NONE	
JP 2008033498 A	14-02-2008	NONE	