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(54) APPARATUS FOR THE TEMPORARY STORAGE OF OBJECTS

(57) An apparatus (1) for the temporary storage of objects (8), comprising: a casing (2) that can be transported from one area to another; at least one storage structure (3) located inside the casing (2), the storage structure (3) being provided with a plurality of compartments (7) each arranged to receive at least one object (8) to be stored; at least one storage management interface (16) located on the casing, (2) for depositing or removing an object (8) to be stored or which is stored in the storage structure (7) , the management interface (16) having at least one access opening (17) for depositing or removing at least one object (8); movement automatic means (18) operatively located inside the casing (2), the movement automatic means (18) being interposed between the management interface (16) and the storage structure (3) in order to move at least one compartment (7) between the latter and to allow performing a deposit operation of an object (8) to be stored in the storage structure (3) or a removal operation of an object (8) stored in the storage structure (3); storage management means operatively associated with the movement automatic means (19) in order to automatically associate a compartment (7) of the storage structure (3) with an object or a group of objects to be stored, the management means storing the compartments occupied by the stored objects in order to allow their removal.

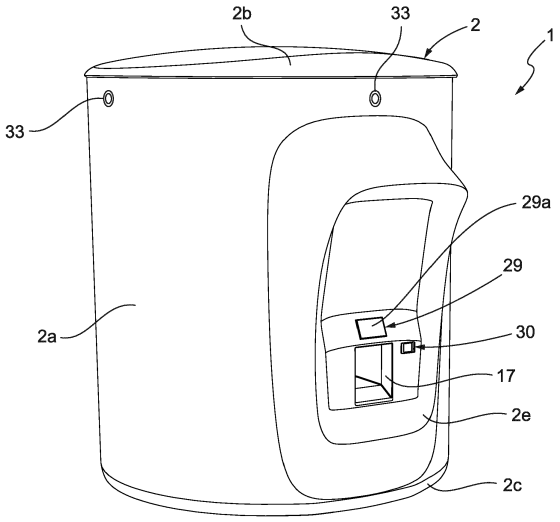

Fig. 1

EP 3 131 071 A1

Description

[0001] The present invention relates to an apparatus for the temporary storage of objects.

[0002] The object of the present invention is suitable to be used in any significantly crowded urban and non-urban area and/or an area subject to large flows of people, such as for example stadia, motor racing circuits, theatres, cinemas, car parks, shopping centers, trade fair areas, public transport stations, airports, beaches, skiing resorts, and the like.

[0003] In particular, the object of the present invention can be utilised in any context and any infrastructure where there is a large flow of people, whereon it is useful to place and store one or more personal objects in a secure place for a determined period of time.

[0004] As it is known, various types of storage structures exist in which personal objects and/or effects can be temporarily stored so that they can be retrieved at a later time.

[0005] Some types of permanent storage structures are in fact known, such as for example suitcase and baggage storage usually located in railway stations and airports or security lockers and boxes present in changing rooms in sports infrastructures, banks and/or in similar structures.

[0006] All of these forms of storage structure for the temporary storage of personal objects include a plurality of shelves and uprights which intersect to delimit respective storage areas, each of which can be closed from the outside by means of an appropriate closing hatch door. Each closing hatch door can be locked with the aid of a latch that can be controlled by an appropriate key, normally associated with the locker, or by a respective closing padlock or alternative locking systems, also of the electronic type.

[0007] Though known storage areas allow the temporary storage of personal objects and/or effects by keeping them inside respective closed storage areas, the Applicant found that these storage structures are however not free of some drawbacks and can be improved in various ways, mainly in relation to the practicality and ease of use thereof, their transportability, their overall dimensions, the security of the objects stored therein, as well as the simplicity and ease of installation thereof in different types of areas and infrastructures.

[0008] In particular, the Applicant found that the current storage structures for public use are very rudimentary since they require the objects to be stored to be placed manually inside respective storage areas directly by an operator or by a user, who also have to manage the manual closing thereof by means for example of keys, locks or other closing systems, and at a later time have to find the respective storage area still in order to be able to open it and retrieve the previously-deposited objects.

[0009] It is further noted that known storage structures all involve permanent structures that are to be installed at a site by fixing them to respective infrastructures that receive them. Therefore these storage structures cannot be easily moved from one place to another. In fact, moving a known storage structure inevitably requires disassembling it and subsequent reassembling it in the new location.

[0010] In addition, disassembling various components of the above-mentioned storage structures does not facilitate the transport thereof, thus making the stowing operations complicated and time-consuming.

[0011] Furthermore, known storage structures are excessively unwieldy, and therefore require wide rooms or areas.

[0012] Furthermore, it is to be considered that traditional public storage structures have various limitations in terms of security since they are easily subjected to burglaries. Such limitations are mainly due to the configuration of the storage structures, which are normally constituted by a series of adjacent lockers which each have structures and locking systems that are not particularly strong.

[0013] The main aim of the present invention is to propose an apparatus for the temporary storage of objects able to overcome the problems encountered in the prior art.

[0014] One aim of the present invention is to make an apparatus for the automatic storage of objects that is easy to be used without the aid of an operator.

[0015] A further aim of the present invention is to make an apparatus for the storage of objects that is easy to transport from one place to another without requiring disassembling.

[0016] A further aim of the present invention is to provide an apparatus for the storage of objects, which have reduced dimensions.

[0017] A further aim of the present invention is to make an apparatus for the storage of objects that is secure and that protects the objects deposited from any attempted burglary.

[0018] A further aim of the present invention is to make an apparatus for the storage of objects that has great flexibility of use, since it is easy to be installed in any place, area or infrastructure.

[0019] The above-specified aims and others again are substantially achieved thanks to an apparatus for the storage of objects as expressed and described in the following claims.

[0020] A preferred embodiment of an apparatus for the storage of objects according to the present invention is now described by way of example and without limiting the scope of the invention.

[0021] The following description will be made with reference to the accompanying drawings, which are only indicative and thus non-limiting, in which:

figure 1 is a perspective view of an apparatus for the storage of objects, according to the present invention;

figure 2 is a cross-section view of the apparatus of

figure 1, performed along a median vertical plane thereof;
figure 3 is a perspective cross-section view of a detail of the apparatus of the preceding figures;
figure 4 is a plan view of a detail of the apparatus of figures 1 and 2;
figure 5 is a perspective view of a component of the apparatus of figures 1 and 2;
figure 6 is a perspective cross-section view of the component illustrated in figure 5.

[0022] With reference to figures 1 and 2, reference numeral 1 denotes, in its entirety, an apparatus for the temporary storage of objects, according to the present invention.

[0023] As shown in figures 1 and 2, the apparatus 1 comprises a casing 2, optionally made of fibreglass or a similar material, which can be lifted and transported from one area to another.

[0024] In the embodiment illustrated in figures 1 and 2, the casing 2 has a substantially cylindrical lateral wall 2a, a substantially discoidal upper cover 2b and a substantially flat support bottom 2c provided with a plurality of preferably height-adjustable support elements 2d.

[0025] In greater detail, the lateral wall 2a, the cylindrical cover 2b and the bottom 2c give the casing 2 a substantially bell-shaped configuration and shape. With particular reference to figures from 2 to 4, the apparatus 1 comprises at least one storage structure 3 located inside the casing 2.

[0026] The storage structure 3 comprises a plurality of optionally horizontal shelves 4 and a plurality of optionally vertical uprights 5.

[0027] The shelves 4 and the uprights 5 delimit a plurality of storage areas 6, each arranged to receive and house a respective compartment 7 that is a part of the storage structure 3.

[0028] Each compartment 7 of the storage structure 3 is designed to receive therein at least one object 8 to be stored.

[0029] Naturally, the capacity of each compartment 7 is established as a function of the type and dimensions of the objects 8 that will be contained therein.

[0030] In order to reduce the overall dimensions of the apparatus 1 to the greatest extent possible, as it is shown in figures 3 and 4, the storage structure 3 has a substantially rounded shape, preferably substantially cylindrical, longitudinally open 3a and delimiting, at least partially, a central area 9 that is also substantially cylindrical.

[0031] Still with reference to figure 4, the shelves 4 are substantially ring-shaped, radially open at the longitudinal opening of the storage structure 2. The uprights 5 are radially distributed about the central area 9 delimited by the storage structure 3. Each storage area 6 in turn substantially has a trapezoidal prism shape and is open towards the central area 9 delimited by the storage structure 3.

[0032] The storage structure 3 is advantageously provided with a substantially vertical perimetric wall 10, which is provided with a plurality of substantially flat faces 10a, each located between two adjacent uprights 5 and each intended to close, at least partially, on a side opposite to the central area 9, at least one storage area 6, preferably a group of storage areas 6 of the storage structure 3.

[0033] As shown in figures 5 and 6, each compartment 7 has a substantially box-like structure 11, preferably having a parallelepiped conformation, even more preferably made of a moulded thermoplastic material.

[0034] The structure 11 of each compartment 7 comprises: a bottom wall 11a; two lateral walls 11b extending substantially perpendicularly from the bottom wall 11a according to opposite positions; a rear wall 11c extending substantially perpendicularly from the bottom wall 11a between the lateral walls 11b; and an upper wall 11d engaged with the lateral walls 11b and with the rear wall 11c on the side opposite to the bottom wall 11a.

[0035] The bottom walls 11a, lateral walls 11b, rear wall 11c and the upper wall 11d of the structure 11 of each compartment 7 define a respective containment volume 11e which is open on the opposite side with respect to the rear wall 11c for positioning one or more objects 8 to be stored.

[0036] In order to allow closing and opening the containment volume 11e of the structure 11 of each compartment 7, each compartment 7 is provided with at least one closing partition 12 switchable from an open condition (figures 2, 4 and 5), in which the respective containment volume 11e is accessible, and a closed condition, in which the containment volume 11e is not accessible.

[0037] In order to allow the switching of the closing partition 12 of each compartment 7 between the open condition and the closed condition, the closing partition 12 is engaged in a sliding manner in respective sliding seatings 11f obtained in the lateral walls 11b of the respective structure 11.

[0038] Furthermore, the closing partition 12 of each compartment 7 has at least one opening hole 12a, through which it is possible to determine a relative movement between the respective structure 11 and the closing partition 12, between the opening condition and the closing condition.

[0039] Still with reference to figure 5, the structure 11 of each compartment 7 of the storage structure 3 is advantageously provided with one or more aeration openings 13, made for example in the upper wall 11d.

[0040] As shown in figure 6, the structure 11 of each compartment 7 of the storage structure 3 comprises at least one engagement element 14, preferably one or more engagement projections, arranged to be inserted into a respective engagement seat 15 located inside the respective storage area 6 of the storage structure 3, through the respective shelf 4.

[0041] As shown in figures 1, 2 and 4, the apparatus 1 comprises at least one management interface 16 for managing the storage of the objects 8.

[0042] The management interface 16 is at least partly located on the casing 2, preferably on a control area 2e made on the lateral wall 2a, so as to allow storing or removing from the outside, an object 8 to be stored or which is stored in the storage structure 3.

[0043] The management interface 16 has at least one access opening 17 (figures 1 and 2), which allows at least partial access to an internal area of the casing 2, intended to insert or extract at least one object 8 into or from a compartment 7 of the storage structure 3 or from a respective compartment 7 thereof.

[0044] The access opening 17 can be provided with at least one closing hatch door 18 (figure 2) appropriately designed and made in such a way as to resist any attempted burglary.

[0045] In order to allow storing and retrieving one or more objects to be stored in the storage structure 3, advantageously each compartment 7 is movable between a respective storage area 6 of the storage structure 3 and the above-mentioned management interface 16.

[0046] In this regard, the apparatus 1 comprises movement automatic means 19 (figures 2 and 4) operatively located inside the casing 2 according to a position interposed between the management interface 16 and the storage structure 3, in order to move at least one compartment 7 between the latter and to allow performing a deposit operation of an object 8 to be stored in the storage structure 3 or a removal operation of an object 8 stored in the storage structure 3.

[0047] In order to allow the movement automatic means 19 to move the compartments 7 between the storage structure 3 and the management interface 16, the structure 11 of each compartment 7 is advantageously provided with at least one coupling element 20, preferably two or more, which are properly engaged by the movement automatic means 19 during the movement of the compartments 7.

[0048] The coupling elements 20 are preferably arranged on the rear wall 11c of the structure 11 of the respective compartment 7, in such a way as to extend each on an opposite side of the respective closing partition 12. In detail, the coupling elements 20 of each compartment 7 include two engagement projections 20a having enlarged ends with respect to the base and at least one block 20b which extends from the rear wall 11c of the structure 1 and is provided with a transversal through-opening 20c.

[0049] In order to grasp the compartments 7 to be moved, the movement automatic means 19 comprise at least one manipulator 21 provided with at least one gripping flange 21a. The gripping flange 21a of the manipulator 21 is arranged to interact with at least one of the coupling elements 20, so as to ensure a stable engagement with the structure 11 of the relative compartment 7.

[0050] In detail, the gripping flange 21a comprises at least one coupling plate 21b provided with respective coupling holes (not shown in the figures) arranged to engage with the engagement projections 20a of each compartment 7 and to allow, following the movement of the movement automatic means 19, the gripping plate 21b to be interposed between the enlarged ends of the respective above-mentioned engagement projections 20a and the rear wall 11c of the respective compartment 7. In even greater detail, the engaging of each compartment 7 requires first an alignment of the coupling holes of the gripping plate 21b, afterwards it requires the plate 21b to get close to the rear wall 11c of the relative compartment 7 until it goes beyond the encumbrance of the enlarged ends of the corresponding engagement projections 20a and lastly, the lifting of such gripping plate 21b so as to prevent the extraction, and therefore the disengagement, of the engagement projections 20a from the respective coupling holes during the movement of the compartment 7.

[0051] The manipulator 21 of the movement automatic means 19 advantageously also comprises a coupling member (not shown in the accompanying figures) arranged to engage the opening 20c of the block 20 of the respective compartment 7 to be moved.

[0052] Still with reference to figures 2 and 4, the movement automatic means 19 comprise at least one movement mechanism 22 operatively associated with the manipulator 21 in order to move the manipulator 21 inside the casing 2 between the storage structure 3 and the management interface 16, at one or more compartments 7 to be moved.

[0053] The movement mechanism 22 comprises at least one support rod 23 which extends preferably substantially vertically inside the casing 2. The support rod 22 is rotatable about an own longitudinal axis X, preferably under the action of a corresponding electric motor 23a, advantageously of the asynchronous type, optionally of the brushless type.

[0054] The movement mechanism 22 further comprises at least one support cross-piece 24 which develops transversally with respect to the support rod 23, preferably substantially horizontally.

[0055] The support cross piece 24 advantageously is extendable, optionally telescopic, according to a predetermined measurement, in such a way as to be lengthened and shortened so as to move the compartments 7 of the storage structure 3.

[0056] Furthermore, the support cross piece 24 is slidably engaged with the support rod 23, in such a way as to slide along the support rod 23 and to manage the vertical movement of the above-mentioned compartments 7 of the storage structure 3.

[0057] As shown in figures 2 and 4, the above-mentioned manipulator 21 is operatively engaged with a first end 24a of the support cross piece 24 so that it is movable inside a substantially cylindrical operative volume, preferably on the basis of a Cartesian coordinate system.

[0058] According to a preferred embodiment of the present invention, an auxiliary manipulator 25 of the movement means 19, having the same function as the manipulator 21, is operatively engaged with a second

end 24b of the support cross piece 24, opposite to the first end 24a. The auxiliary manipulator 25 is also movable inside a substantially cylindrical operative volume, preferably on the basis of a Cartesian coordinate system.

[0059] The auxiliary manipulator 25 comprises at least one gripping flange 25a provided with a respective coupling plate 25b arranged to interact with the coupling elements 20 of each compartment 7 of the storage structure 3 in order to grasp each compartment 3 and to allow movement thereof by the movement means 19, between the storage structure 3 and the management interface 16.

[0060] As shown in figure 4, the coupling plate 25b of the gripping flange 25a of the auxiliary manipulator 25 is orientated differently with respect to the coupling plate 21b of the gripping flange 21a of the manipulator 21, in order to allow the movement means 19 to have easy access to a determined group of compartments 7 of the storage structure 3.

[0061] In particular, unlike the configuration of the manipulator 21, the gripping flange 25b of the auxiliary manipulator 25 is orientated upwards in such a way as to facilitate the gripping of the compartments 7 located in the upper area of the storage structure 3. The above-mentioned management interface 16 advantageously comprises a support plane 26, located inside the casing 2 at the access opening 17, for the temporary support of an empty compartment 7 or a compartment 7 that is at least partly full.

[0062] The management interface 16 further comprises detection means 27 operatively associated with the support plane 26 to detect: the presence of a compartment 7 resting on the support plane 26; the insertion of one or more objects 8 into an empty or at least partially full compartment 7 resting on the support plane 26; and also the extraction of one or more objects 8 from an at least partially occupied compartment 7, resting on the support plane 26.

[0063] The detection means 27 comprise at least one weight detection unit, preferably a scale operatively associated with the support plane 26, so as to detect the variation in weight relative to the support plane itself, as well as the weight variations relative to the compartments 7 resting on the support plane 26.

[0064] In association with the weight detection unit, the detection means 27 can also include one or more detection optical units such as photocells or television cameras, for detecting the presence or the position of a compartment 7 resting on the support plane 26.

[0065] Advantageously the apparatus 1 further comprises a cooling device 28 housed inside the casing 2 in order to keep the storage structure 3 at a predetermined temperature and humidity level.

[0066] It is possible for the cooling device 28 to be arranged and configured to keep the storage structure 3 at an operating temperature adapted to preserve foodstuffs. If the storage structure 3 also serves to preserve fresh foodstuffs, the cooling device 28 used must be able to guarantee a temperature that oscillates between 0°C and 10°C, preferably between 2°C and 8°C.

[0067] If the storage structure 3 is instead also used as a refrigeration cell or blast chiller, the cooling device 28 must be designed and configured to keep its internal temperature below 0°C. It is also possible for the apparatus 1 to be provided with an internal system for sanitising both the storage structure 3 and its compartments 7, which can be activated upon explicit request by the managers of the apparatus itself, or which can be automatically activated based on suitable programs determined as a function of the type of objects to be stored or contingent requirements. Furthermore, the apparatus 1 comprises one or more blower and sanitising devices of the compartments 7, intended to keep them clean and ready to receive personal objects and items, such as for example personal accessories, general or specialised clothing (helmets, motorcycle suits, gloves and/or safety items for motorcyclists) and/or the like.

[0068] In accordance with an advantageous aspect of the present invention, the apparatus 1 comprises storage management means 29 for managing the objects 8, operatively associated with the movement automatic means 19 in order to automatically associate a compartment 7 of the storage structure 3 with an object 8 or a group of objects 8 to be stored.

[0069] The storage management means 29 preferably comprise at least one electronic processing unit (not shown in the accompanying figures) which, together with all the electrical components, is directly powered by an electrical power network.

[0070] The programmable electronic unit is provided with at least one data entry interface, at least one data output interface, at least one data calculating and processing unit, at least one data storage unit, which are operatively connected in order to ensure the correct storage of the objects 8 in the storage structure 3 as well as the correct retrieval of the stored objects 8.

[0071] In detail, the data entry and output interfaces are advantageously incorporated in a unique touch screen 29a appropriately arranged at the control area 2e of the casing 2, i.e. at the management interface 16 of the storage.

[0072] Naturally the touch screen can be replaced with any type of data entry and/or output interface, such as for example keyboards, acoustic systems and/or the like. The storage unit is arranged to store at least the input data, the processed data and the output data, the correspondence between the objects 8 stored in the respective compartments 7 of the storage structure 3, as well as the correspondence between the empty compartments 7 or the at least partially occupied compartments and the storage areas 6 of the storage structure 3, so as to ensure the correct removal of the deposited objects 8.

[0073] The management means advantageously can also include a data transfer system within a remote management circuit, i.e. by means of Internet platforms or appropriate applications which can be directly used via a portable device such as for example, a mobile tele-

phone, a tablet and the like.

[0074] The apparatus 1 further comprises a payment device 30 of an electronic type, such as for example a debit card, a credit card, applications for mobile telephones and computers, tickets, magnetic cards and/or the like. In order to protect the objects 8 stored inside the storage structure 3 from any attempted burglary, the apparatus 1 comprises at least one external wall made of fibreglass and an internal wall made of steel with an interspace coated with insulating material or a protection plate 31 located between at least the casing 2 and the storage structure 3 itself.

[0075] In order to allow easy transport of the apparatus 1 by means of appropriate lifting and transport systems, the apparatus 1 comprises one or more lifting hooks 32 constrained to the bearing structures of the apparatus itself and of the storage structure 3.

[0076] Advantageously, in order to increase the security of depositing the objects 8 inside the storage structure 3 and at the same time, to deter attempted burglary thereof, the apparatus 1 comprises a plurality of video-cameras 33 for video surveillance which are appropriately distributed on the cylindrical wall 2b according to positions that are difficult to access, i.e. at the upper cover 2b.

[0077] Furthermore, the apparatus 1 is provided with a global positioning system which allows controlling and monitoring the apparatus 1 remotely by using for example, suitable remote control systems or via specific applications for mobile telephones or tablets. In addition, the apparatus 1 comprises one or more detection devices (not shown in the accompanying figures) provided with suitable sensors for detecting and controlling the containment volume 11e of each compartment 7 and of the apparatus 1 itself, for detecting flammable, explosive or toxic material.

[0078] With particular reference to the storage methodology of the objects, as well as the operation of the above-described apparatus mainly in a structural sense, the storage of an object 8 starts with the selection, by a user, via the touch screen 29a, of the desired options, i. e. the option to store one or more objects 8 or the option to remove one or more objects 8.

[0079] When the user selects the deposit option, the relative deposit procedure of an object 8 is performed by requesting the user to: select the user language, define the payment mode, and lastly start the deposit operation.

[0080] When the deposit operation is started, the closing hatch door 18 is opened to allow access to the support plane 26, on which a compartment 7 is already present with the respective closing partition 12 open. Such a compartment 7 is engaged by the manipulator 21 or the auxiliary manipulator 25 in such a way as to provide the compartment 7 with a rear abutment that keeps it in the loading position.

[0081] In this situation, the user can position the object 8 inside the open compartment 7. The variation in weight of the compartment 7 is automatically detected by the detection means 27 and the weight detected is stored by the storage unit.

[0082] The closing hatch door 18 is then closed.

[0083] The storage unit can therefore proceed to automatically store the identifying code of the user and associate it with the compartment 7 used.

[0084] The user can request use of further compartments 7, which will always be associated with her/his identifying code.

[0085] It is also possible for the user to also be identified by means of facial or vocal recognition, or recognition of his/her fingerprint or by means of any other known method.

[0086] One or more persons can be associated with the user, who, following her/his consent, has the right to access the compartment 7 or compartments 7 occupied thereby. In this way, the user has the possibility of delegating third parties to access her/his compartments 7 and, when applicable, to remove and retrieve the objects and goods deposited by her/him. The closing partition 12 of the compartment 7 just loaded by the user is closed through the relative movement between the structure 11 thereof and the closing partition 12 thereof.

[0087] Once the closing partition 12 has been closed, the manipulator 21, 25 in use retracts the coupled compartment 7 and deposits it in the respective storage area 6 of the storage structure 3, establishing the exact location thereof.

[0088] Once the compartment 7 has been placed in the respective storage area 6, the manipulator 21, 25 in use is repositioned in a standby position at the support plane 26 waiting for a request for deposit or removal.

[0089] The removal operation of an object 8 previously stored occurs by first selecting the payment method of the service (for example by credit card, debit card, via an application or any other system provided for), and then starting the removal operation.

[0090] Upon completion of payment, the manipulator 21, 25 in use moves in the direction of the stored compartment 7 in order to couple thereto and to return it onto the support plane 26 in front of the closing hatch door 18. The closing hatch door 18 is opened to allow the user to remove the deposited object 8.

[0091] The programmable electronic unit automatically verifies that all the deposited objects 8 are removed by checking for weight variations of the compartment 7. When the removal is complete, the closing hatch door 18 closes and the apparatus 1 is ready for a new deposit. The object of the present invention solves the drawbacks of the prior art and ensures important advantages.

[0092] Primarily, the modularity and the versatility of the design with only constructional and not substantial modifications allow varying the dimensions and the nature of the objects to be stored, thus giving the apparatus a very high degree of flexibility of use.

[0093] The overall structure of the apparatus protects the storage structure compartments from external agents which might cause deteriorations in the nature thereof. The objects contained inside the compartments never

come into contact with mechanical or electrical elements or members and above all, do not risk to fall and to be damaged.

[0094] Furthermore, the internal cooling system keeps the deposited objects in optimal conditions.

[0095] The structure of the apparatus is also inaccessible from the outside and protects the objects stored from illicit attempts to appropriate them; in fact, the sole points of transition of the objects from the outside to the inside of the apparatus and vice versa are: the closing hatch door, which is always mechanically closed and does not have any locks in order to prevent possible intrusions, and any access doors to allow maintenance on the apparatus itself. Furthermore, it is worth noting that the movement of the objects is completely automatic and is started upon the activation of the deposit or removal operation.

[0096] Furthermore, the apparatus as developed is easy to transport, is self-levelling from one place to another and is particularly compact and has small dimensions. The storage structure thus conceived is advantageously suitable for being used in different ways according to contingent needs. Among the various possible uses, such a storage structure can be used as a temporary storage unit for packs, envelopes, letters and/or the like, and therefore can be used in aid of the postal service or courier services or similar transport services.

Claims

1. Apparatus (1) for the temporary storage of objects (8) comprising:

a casing (2) that can be transported from an area to another;
at least one storage structure (3) located inside said casing (2), said storage structure (3) being provided with a plurality of compartments (7) each arranged to receive at least one object (8) to be stored;
at least one storage management interface (16) located on said casing (2) for depositing or removing an object (8) to be stored or stored in said storage structure (7), said management interface (16) having at least one access opening (17) for depositing or removing at least one object (8);
movement automatic means (19) operatively located inside said casing (2), said movement automatic means (19) being interposed between said management interface (16) and said storage structure (3) in order to move at least one compartment (7) between the latter and allow performing a deposit operation of an object (8) to be stored in said storage structure (3) or a removal operation of an object (8) stored in said storage structure (3);
storage management means operatively associated with said movement automatic means (19) in order to automatically associate a compartment (7) of said storage structure (3) with an object or a group of objects (8) to be stored, said management means storing the compartments occupied by the stored objects in order to allow their removal.

2. Apparatus (1) according to claim 1, wherein said storage structure (3) comprises:

a plurality of optionally horizontal shelves (4);
a plurality of optionally vertical uprights (5), said shelves (4) and said uprights (5) delimiting a plurality of storage areas (6), each arranged to receive and house a respective compartment (7).

3. Apparatus (1) according to claim 1 or 2, wherein:

said storage structure (3) has a substantially rounded shape, preferably substantially cylindrical, longitudinally open and delimiting, at least partially, a central area (9);
each shelf (4) has a substantially ring shape, radially open at the longitudinal opening (3a) of said storage structure (3);
said uprights (5) are radially distributed around said central area (9) delimited by said storage structure (3);
each storage area (6) has a substantially trapezoidal prism shape and is open toward said central area (9) delimited by said storage structure (3), optionally each storage structure (7) is provided with a perimetric wall (10), substantially vertical, provided with a plurality of substantially flat faces (10a) each located between two adjacent uprights (5) and each intended to close, at least partially, at least one storage area (6), preferably a group of storage areas (6).

4. Apparatus (1) according to one or more of the preceding claims, wherein each compartment (7) has a substantially box-like structure (11) defining in its inside a containment volume (11e) for placing one or more objects (8) to be stored, said structure (11) of each compartment (7) being movable between a respective storage area (6) of said storage structure (3) and said management interface (16) and being provided with at least one closing partition (12) that can be switched between an open condition, in which the respective containment volume (11e) is accessible, and a closed condition, in which the respective containment volume (11e) is not accessible.

5. Apparatus (1) according to claim 4, wherein the structure (11) of each compartment (7) of said storage structure (3) is provided with at least one cou-

pling element (20), preferably two or more, in order to allow the engagement of said movement automatic means (19) when it is necessary to move said compartment (7) between said storage structure (3) and said management interface (16), optionally said coupling element (20) being arranged on a wall (11c) of said structure (11) of said compartment (7) opposite said closing partition (12).

6. Apparatus (1) according to claim 5, wherein the structure (11) of each compartment (7) of said storage structure (3) is provided with at least one engagement element (14), preferably one or more engagement projections, arranged to insert into at least one respective engagement seat (15) obtained in said storage structure (3) in order to keep the corresponding compartment (7) in a stable position.

7. Apparatus (1) according to one or more of the preceding claims, wherein said movement automatic means (19) comprise:

at least one manipulator (21) capable of grasping each compartment (7) of said storage structure (3);
at least one movement mechanism (22) operatively associated with said manipulator (21) in order to move the latter inside said casing (2) between said storage structure (3) and said management interface (16), at one or more compartments (7) to be moved.

8. Apparatus (1) according to claim 7 when dependent on claim 5 or 6, wherein said manipulator (21) of said movement automatic means (19) comprises at least one gripping flange (21a) arranged to interact with said coupling element (20) of each compartment (7) of said storage structure (3) in order to grasp such compartment (7) and to allow it to be moved by the movement automatic means (19), between said storage structure (3) and said management interface (16).

9. Apparatus (1) according to claim 7 or 8, wherein said movement mechanism (22) of said movement automatic means (19) comprises:

at least one support rod (23) extending, preferably substantially vertically, inside said casing (2), said support rod (23) being rotatable about an own longitudinal axis (X);
at least one support cross piece (24) extending transversally with respect to said support rod (23), preferably substantially horizontally, said support cross piece (24) being extendable, optionally telescopic, according to a predetermined measure, and being engaged in a sliding manner to said support rod (23) in order to slide along the latter, said manipulator (21) being operatively engaged to a first end (24a) of said support cross piece (24) so that it is movable inside a substantially cylindrical operative volume, preferably based on a Cartesian coordinate system.

10. Apparatus (1) according to claim 9, wherein said movement automatic means (19) comprise an auxiliary manipulator (25) operatively engaged to a second end (24b) of said support cross piece (24) opposite the first end (24a) so that said auxiliary manipulator (24a) is movable inside a substantially cylindrical operative volume, preferably based on a Cartesian coordinate system, said auxiliary manipulator (24) comprising at least one gripping flange (25a) arranged to interact with said coupling element (20) of each compartment (7) of said storage structure (3) in order to grasp such compartment (7) and to allow it to be moved by the movement automatic means (19), between said storage structure (3) and said management interface (16).

11. Apparatus (1) according to any of the preceding claims, wherein said management interface (16) comprises:

a support plane (26) for the temporarily support of an empty or at least partially full compartment (7);
detection means (27) operatively associated with said support plane (26) to detect: the presence of a compartment (7) resting on said support plane (26); the insertion of one or more objects into an empty or at least partially full compartment (78) resting on said support plane (26); or, the extraction of one or more objects from one compartment (7), at least partly occupied, resting on said support plane (26).

12. Apparatus (1) according to claim 11, wherein said detection means (27) comprise at least one weight detection unit, preferably a scale operatively associated with said support plane (26), in order to detect weight variations of the support plane (26) or of a compartment resting on the latter.

13. Apparatus (1) according to claim 11 or 12, wherein said detection means (27) comprise at least one detection optical unit operatively associated with said support plane (26) in order to detect the presence or the position of a compartment (7) resting on said support plane (26).

14. Apparatus (1) according to any of the preceding claims, further comprising a cooling device (28) housed inside the casing (2) in order to keep the storage structure 3 at a predetermined temperature

and humidity level.

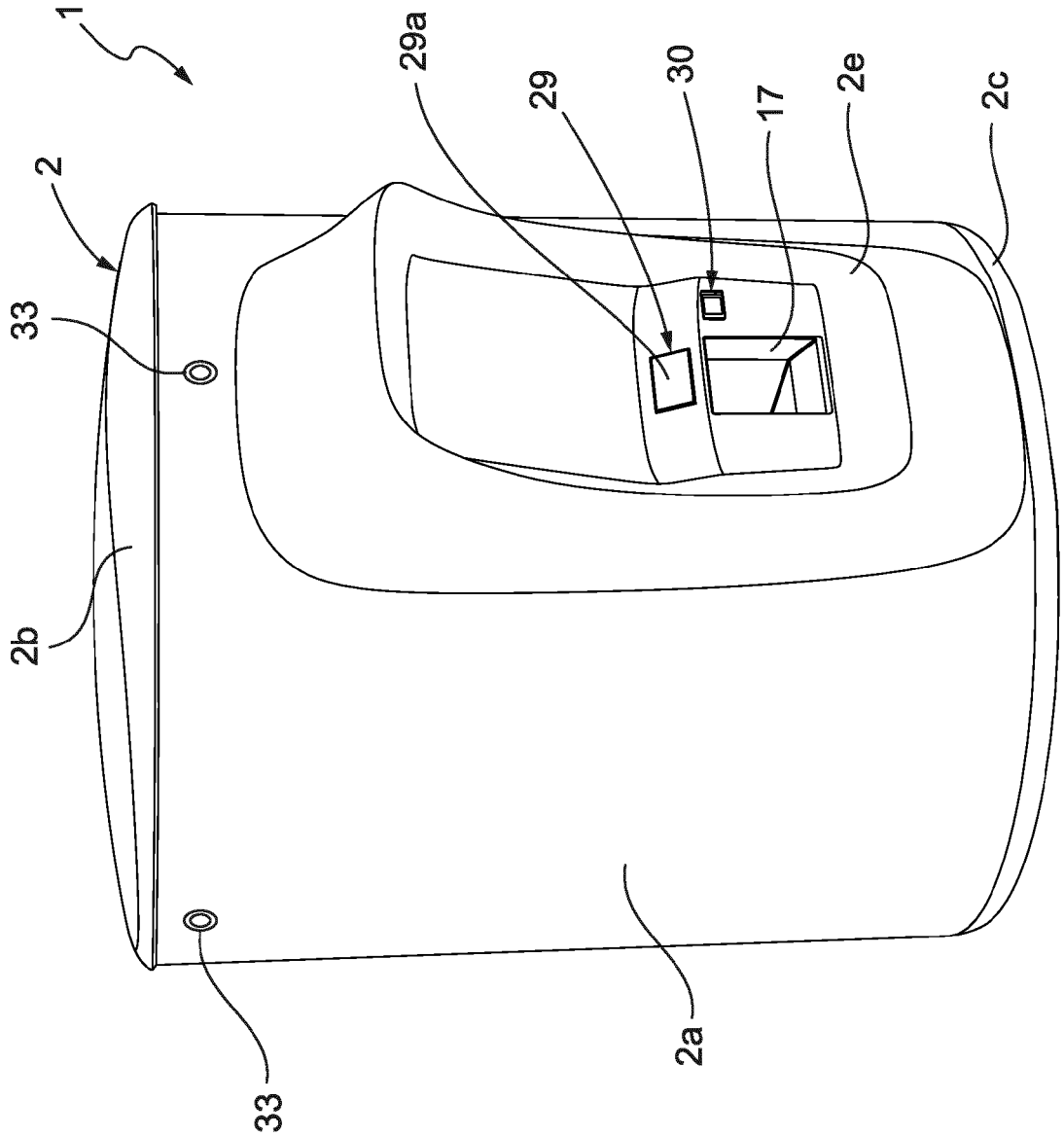

Fig. 1

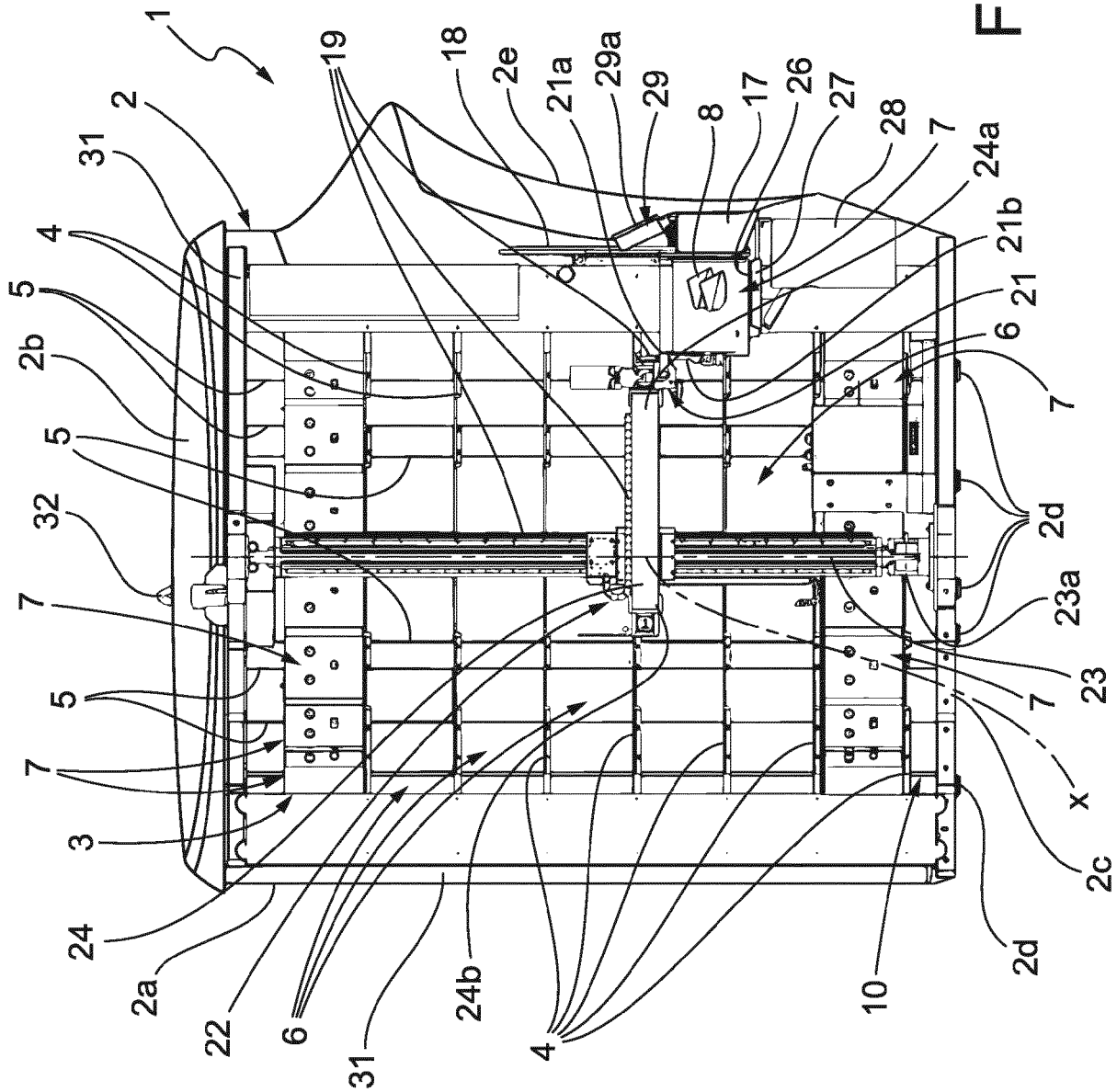
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Fig. 2

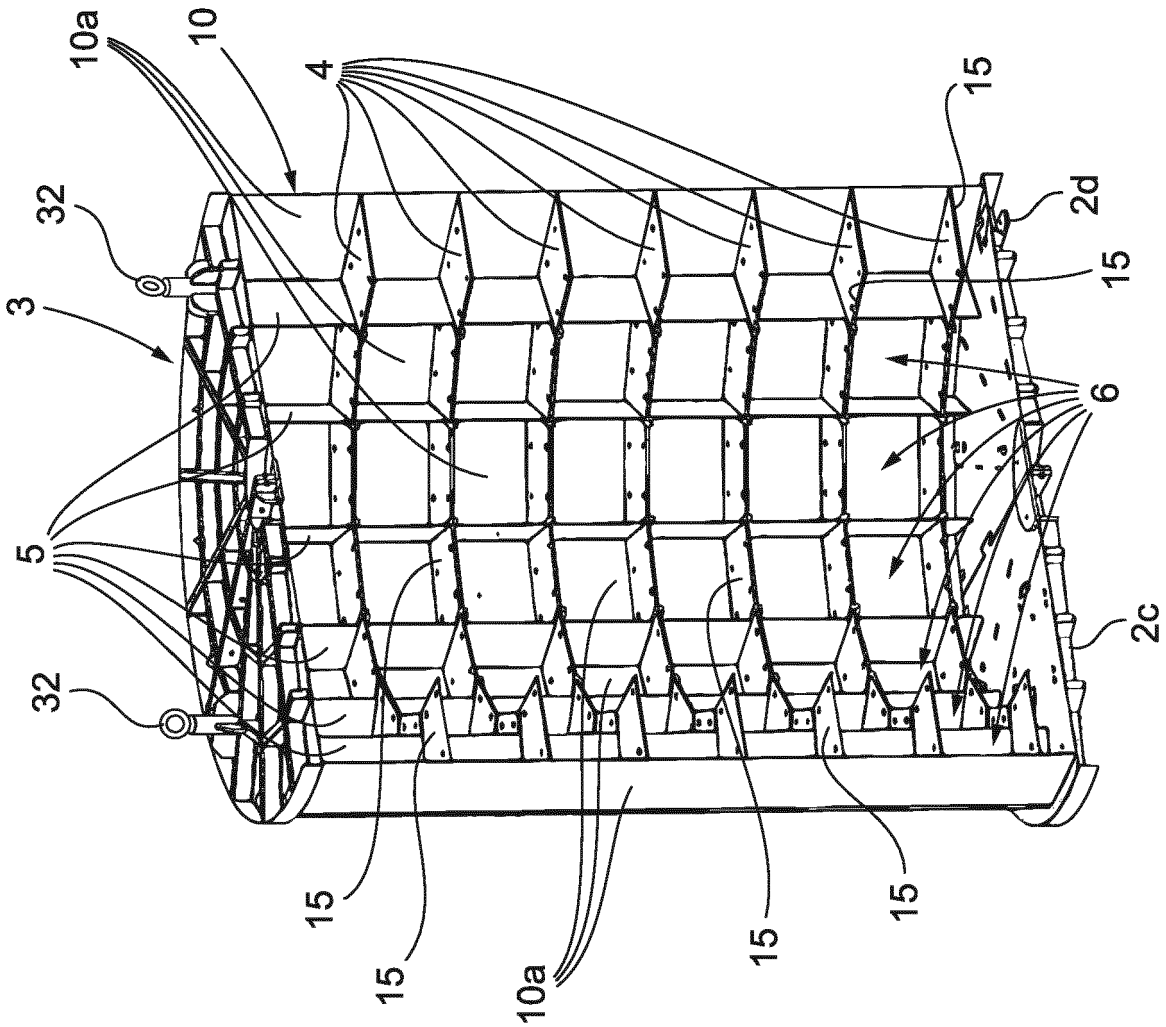

Fig. 3

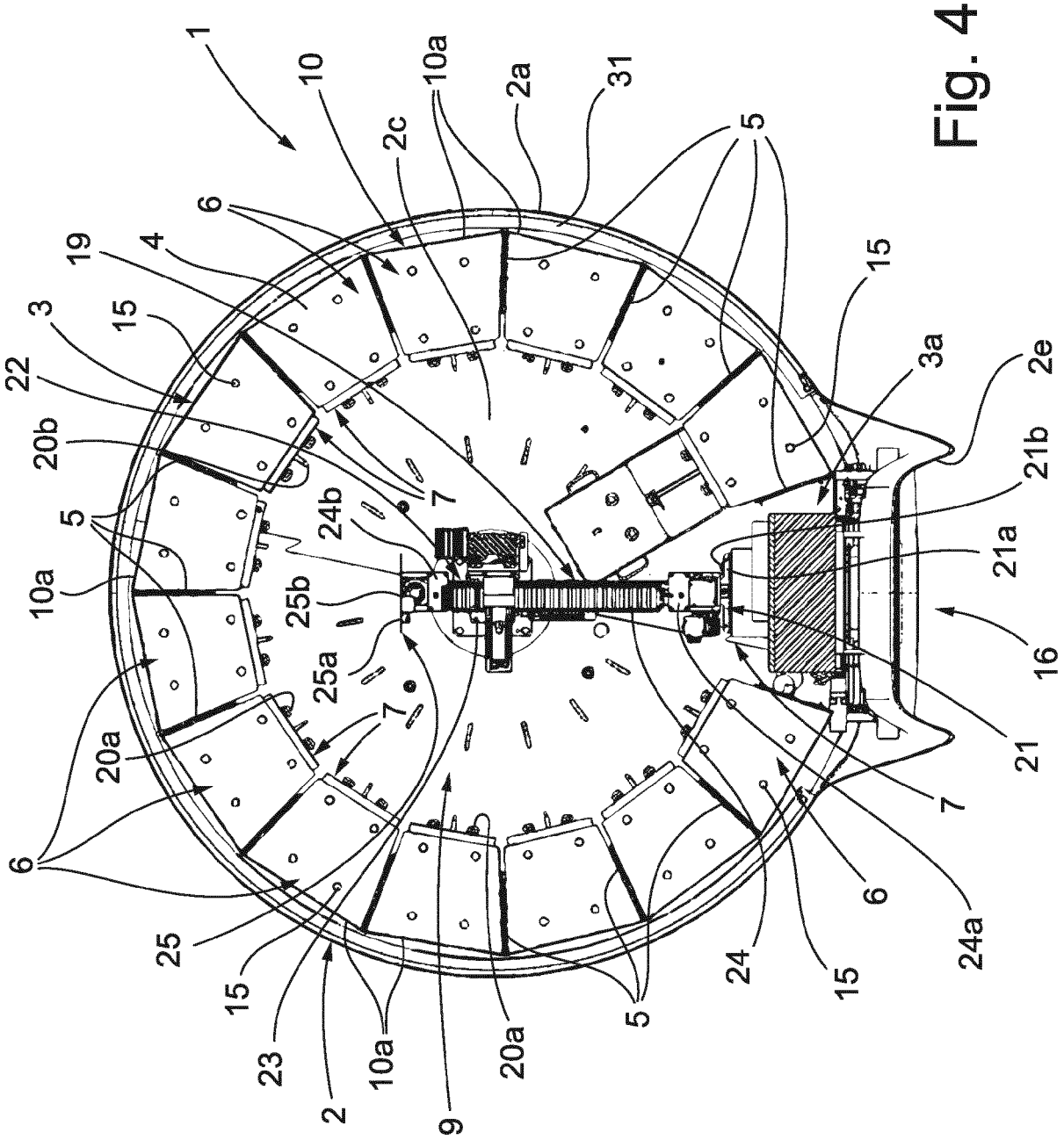
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Fig. 4

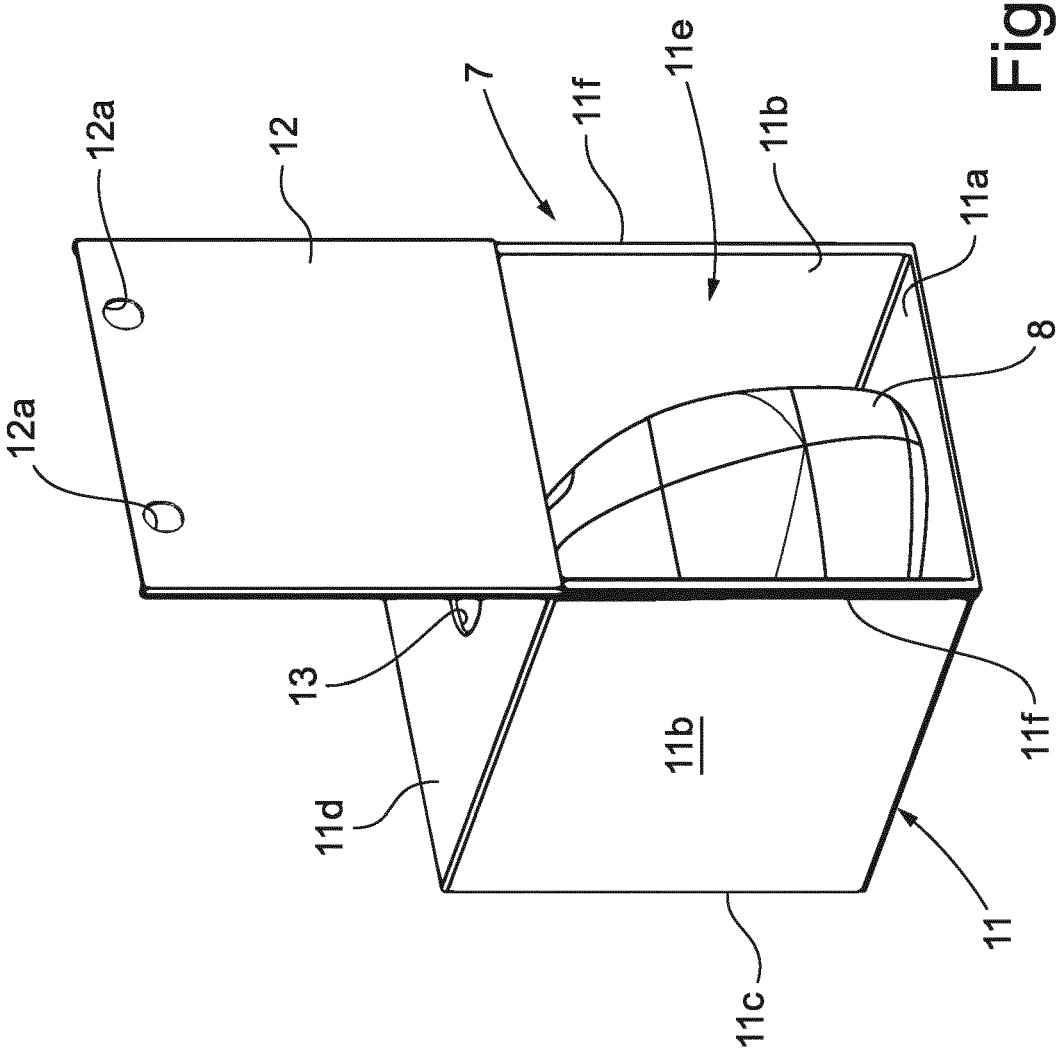

Fig. 5

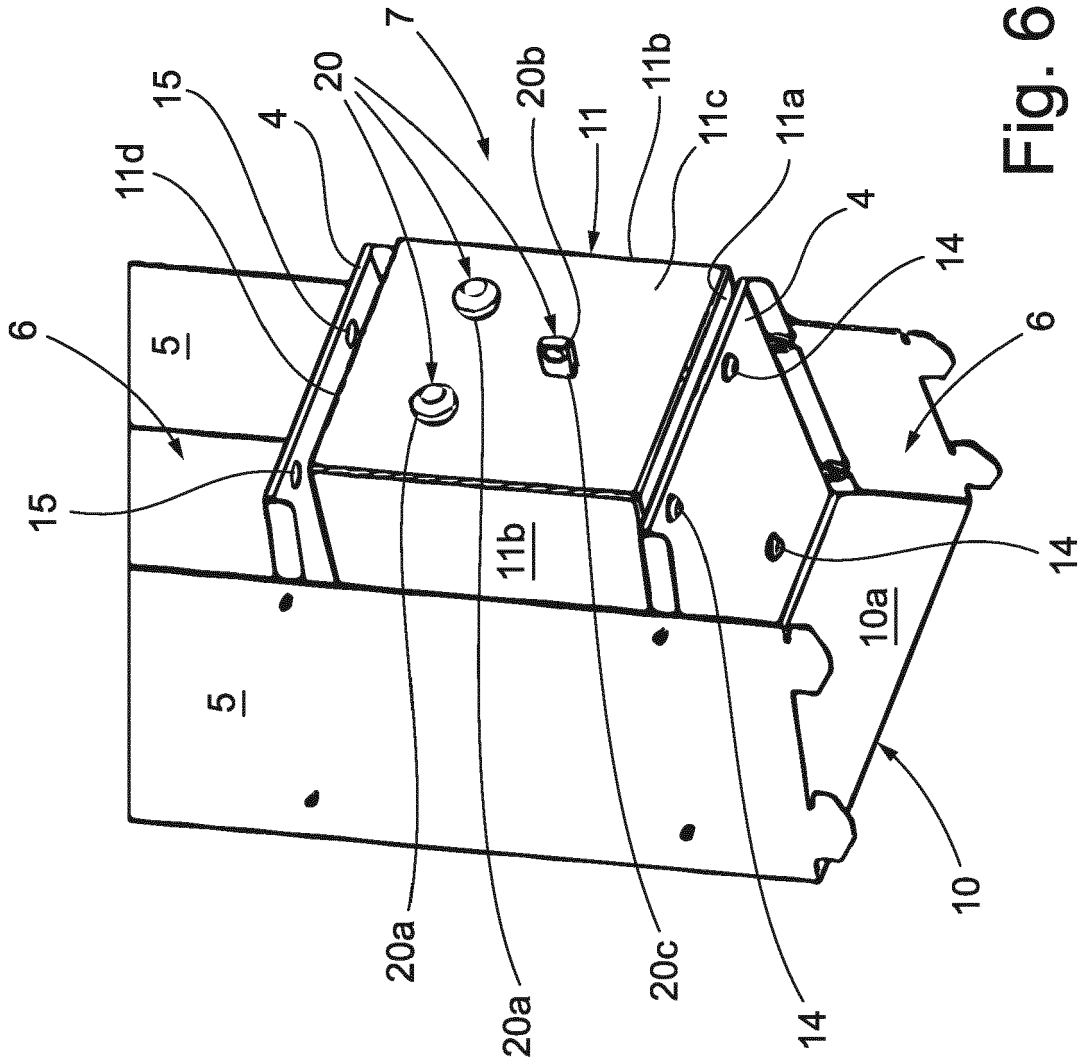
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Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 16 18 3467

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	ES 2 530 211 A1 (ORTIZ PADILLA BENITO MANUEL [ES]) 27 February 2015 (2015-02-27) * abstract * * page 3 - page 6; figures 1-5 *	1-14	INV. G07F17/12
X	WO 83/00578 A1 (ELECTRONIC LOCKS SWEDEN AB [SE]) 17 February 1983 (1983-02-17) * abstract * * page 1, line 1 - line 8 * * page 2, line 19 - line 32 * * page 3, line 23 - page 6, line 33; figures 1-3 *	1-14	
A	US 4 225 278 A (WEINER GEORGE C) 30 September 1980 (1980-09-30) * abstract * * column 1, line 49 - line 59 * * column 2, line 21 - column 5, line 20; figures 1-8 *	1-14	
A	US 2009/188272 A1 (CLOUTIER ROBERT P [US] ET AL) 30 July 2009 (2009-07-30) * abstract * * paragraphs [0001], [0014], [0017], [0031], [0032], [0047], [0051]; figures 1-13 *	1-14	TECHNICAL FIELDS SEARCHED (IPC) G07F
A	US 5 467 892 A (SCHLAMP HANS [DE]) 21 November 1995 (1995-11-21) * abstract * * column 2, lines 30-40; figure 2 *	1-14	
A	EP 1 273 531 A1 (CRISPLANT AS [DK]) 8 January 2003 (2003-01-08) * abstract * * paragraphs [0004], [0010], [0032]; figures 1-5 *	1-14	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 January 2017	Fyhr, Jonas

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Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 891 433 A1 (NEOPOST TECHNOLOGIES [FR]) 8 July 2015 (2015-07-08) * abstract * * paragraphs [0009] - [0011], [0022], [0023], [0033]; figures 1-6 * -----	1-14	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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03-01-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
ES 2530211 A1	27-02-2015	ES 2530211 A1	27-02-2015
		WO 2015197903 A1	30-12-2015
WO 8300578 A1	17-02-1983	EP 0085069 A1	10-08-1983
		WO 8300578 A1	17-02-1983
US 4225278 A	30-09-1980	NONE	
US 2009188272 A1	30-07-2009	CN 101970957 A	09-02-2011
		EP 2232175 A2	29-09-2010
		US 2009188272 A1	30-07-2009
		US 2011088424 A1	21-04-2011
		WO 2009094071 A2	30-07-2009
US 5467892 A	21-11-1995	DE 4202801 A1	05-08-1993
		EP 0553470 A1	04-08-1993
		US 5385265 A	31-01-1995
		US 5467892 A	21-11-1995
EP 1273531 A1	08-01-2003	EP 1273531 A1	08-01-2003
		US 2003065421 A1	03-04-2003
EP 2891433 A1	08-07-2015	EP 2891433 A1	08-07-2015
		US 2015193732 A1	09-07-2015

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