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(54) **DEVICE FOR CAPTURING, SORTING, STORING AND SUBSEQUENTLY DISPENSING COINS**

(57) Device for capturing, sorting, storing and dispensing coins, characterized in that it comprises a flat fixed support (11), formed by a rectangular straight parallelepiped sheet, one of the bottom ends of which is concavely arched, acquiring a greater surface area. According to the invention, a circular support tray (3) moved by a circular support pulley (12) is located above said widened end, and a pulley (13) fixed to the flat fixed support (11) by means of a free shaft (14) is arranged at the end opposite the circular support pulley, wherein a support pulley (16) located at the end of the parallel part of the flat fixed support (11) is disposed between the circular support pulley (12) and the pulley (13), a coin conveyor belt (C) being arranged between the three support pulleys. The flat fixed support (11) comprises a fixed ramp (2) for returning coins to the system to prevent the coins from overlapping or jamming, and a coin detection device (4) which returns coins that do not meet the requirements directly to an outlet channel (5). The fixed support (11) also comprises a plurality of consecutive openings of different sizes in the form of inclined planes or ramps (9) in the upper area of same, said ramps being exactly the same size as the coins that pass along the inclined plane to sorted coin drawers (6), where an inclined channel (7) controlled by two coin-release control sensors (8) is located, for issuing the sorted coins.

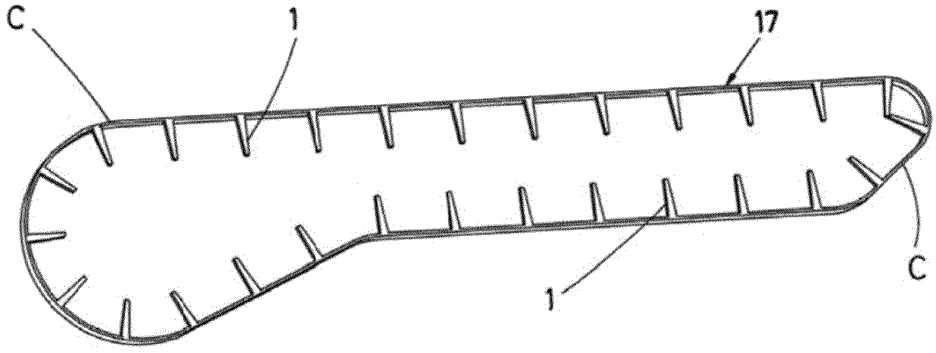


FIG.1

EP 4 428 838 A1

Description

OBJECT OF THE INVENTION

[0001] The present invention, as expressed in the statement of this descriptive memory, refers to a device for capturing, sorting, storing and dispensing coins, by means of the application of a new mechanical procedure that improves the reliability and performance of the present devices on the market.

FIELD OF APPLICATION OF THE INVENTION

[0002] The field of the invention corresponds to the auxiliary industry of coin handling machines and devices.

BACKGROUND OF THE INVENTION

[0003] There are different antecedents on coin capture, sorting, storage and dispensing devices.

[0004] All of them are bulky and complicated, and not too fast.

[0005] Among them we can mention:

Utility Model ES101352, for "Coin handling device" applied for by Mars Incorporated (USA), which presents a complicated procedure based on deformable plastic parts that in its practical realization differs completely from the present report.

[0006] Also detected within the same international classification is file ES2653730 called "Coin sorting device" applied for by Crane Payment Innovations GmbH; which also performs coin sorting, but does not use the novel belt of the recommended invention, but rather discs that imprison the coin and, depending on the diameter, make it fall into predetermined boxes. It is from the patent family, but it is not a remarkable precedent.

[0007] The inventor does not know of any similar device on the claimed invention which could be considered as a remarkable antecedent.

DESCRIPTION OF THE INVENTION

[0008] The device incorporates a plurality of novel features in relation to other elements used within the sector and which solves problems which had not hitherto arisen.

[0009] More precisely, the recommended patent refers to a device for capturing, sorting, storing and dispensing coins, by means of the application of a new mechanical procedure that improves the reliability and performance of the current devices on the market and also improves notably the ergonomics of the device over similar ones on the market, due to the 50º/70º angle disposition on the horizontal of the element that sorts the coins.

[0010] Likewise, the present invention is intended to process legal tender coins by proceeding to evaluate their authenticity as well as their state of use and then separating them into corresponding receptacles from which they can be subsequently dispensed at the operator's will.

[0011] To carry out its task, the procedure begins with the reception of the mixed coins in bulk in the input tray from where they are separated at a rate of up to 12 units per second and transported by a dedicated system that performs this function and also serves to transport the coins, already separated, to be sorted by denomination in the corresponding receptacles.

[0012] Prior to the classification of the coins, they pass through electronic sensors that determine their dimensions in addition to making precise measurements of their electro-magnetic behavior and, as a combination of all of these, inform the electronic control of the set about their genuineness, whether it is an attempt at fraud (counterfeit coins), or if they are simply objects that although they look like coins, their dimensions are not seen as an attempt to coincide with any of the coins for which the system is programmed.

[0013] In relation to the above, the system is prepared to be able to retain counterfeit coins, return coins from other countries as well as objects not recognizable as coins, and to separate coins which, being legal tender, the device considers to be in poor condition and therefore should not be dispensed.

[0014] And this means that the total volume compared to similar devices on the market is reduced by approximately 35-45%. For coin sorting devices, which are usually attached to general devices of bank cashiers and above all of commercial retail establishments, this reduction in size, not achieved until now, makes the device recommended in this invention memory enjoy an important novelty and inventive activity, above all for the sum of technical elements incorporated.

DESCRIPTION OF THE DRAWINGS

[0015] In order to complement the description that is being made and, with the object of helping to a better understanding of the characteristics of the invention, a sheet of drawings is attached to the present descriptive memory, as an integral part of the same, in which with identical references identical elements are indicated and where with illustrative and not limiting character, the following has been represented:

FIGURE N° 1.

[0016] Plan view of the coin conveyor belt.

FIGURE Nº 2.

[0017] Schematic view of the main parts of the device.

[0018] And in these figures the same elements are identified with identical numbering:

(D). - device,
(C). - coin carrying strap,
(1), - appendages of the transport belt,

(2).- safety ramp,
(3). - support tray,
(4). - coin detector
(4.1).- dimension detector, (4.2).
(4.2).- color detector,
(4.3).- magnetic permeability detector,
(4.4).- separation electromagnet.
(5). - coin return ramp,
(6). - coin sorting drawers,
(7). - coin dispensing chute,
(8). - Coin output control sensors,
(9). - sorting ramps,
(10).- coins,
(11).- flat fixed support,
(12).- support pulley,
(13.).- pulley,
(14).- free turning shaft,
(15).- drive pulley joint shaft,
(16).- support pulley,
(17).- closed toothed belt
(21).- counterfeit coin hopper,
(22).- deposit of currency not belonging to the country,
(23).- deposit of coins in bad condition,
(24).- deposit of coins and unclassifiable objects.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] The device which the invention proposes incorporates novel features in relation to other elements used within the sector and which solves problems which until now were complicated to solve, with great simplicity and ergonomics.

[0020] More precisely, the recommended patent refers to a device for capturing, sorting, storing and dispensing coins, by means of the application of a new mechanical procedure that improves the reliability and performance of the current devices on the market and also significantly improves the ergonomics of the device over similar ones on the market, due to the 50º/70º angle arrangement of the coin sorting element on the horizontal.

[0021] The device for capturing, sorting, storing and dispensing coins (D) consists of a flat fixed support (11), formed by a straight rectangular parallelepiped sheet at one of whose lower ends arches in a concave manner acquiring more surface and where above said widened end is located a circular support tray (3) moved by a circular support pulley (12), fixed to the flat fixed support (11) by means of a solidary shaft (15) moved by an electric motor. This fixed flat support (11) is located in a plane that forms an angle of between 50º/70º with the vertical and has several openings in the form of an inclined plane as sorting ramps (9) in the upper area of the same.

[0022] The number of openings will be equivalent to the number of coins of different denominations regardless of the countries to which they belong, thus the system advocated by the invention permits the simultaneous recycling of coins from more than one country at a time.

[0023] At the opposite end there is a pulley (13) fixed by means of a freely rotating shaft (14) to the flat fixed support (11).

[0024] Between the circular pulley (12) of the support tray (3), the pulley (13) and a support pulley (16) located at the end of the parallel part of the flat fixed support (11) is positioned a coin transport belt (C) consisting of a closed toothed belt (17), which has appendages (1), perpendicular to the perimeter on the inside, and trapezoidal in shape with minimum bases, approximately 1/10 in relation to the height, but always with the larger base attached to the coin transport belt (C). These appendages (1) are the ones that push the coins moving them along the fixed flat support that has a fixed ramp of return of coins (5) to the system to avoid overlapping of the same or jams and a fixed ramp of classification (9) of the exact size of each one of the coins in course and to its passage the coins (10) are falling by gravity to drawers of classified coins (6) for its later expedition.

[0025] Before reaching the sorting chutes (9) all the coins (10) pass through a detector device (4) containing specific detectors with the following functions:

(4.1).- coin dimensional detector.

(4.2).- coin color detector,

(4.3).- detector of the magnetic response of the coins.

(4.4).- electromagnet of separation.

[0026] And as the coins (10) pass through these detectors, depending on their classification, those which do not comply with their condition of being legal and in perfect state of conservation are repeatedly analyzed so that once their condition has been reconfirmed, they are taken by the fixed coin return ramp (5) by means of the electromagnetic drive (4.4) to the different deposits, being at least the following:
(21) - deposit of counterfeit currency,

(22).- deposit of currency not belonging to the country,

(23).- deposit of coins in bad condition,

(24).-deposit of coins and objects that cannot be classified.

[0027] With the purpose of, subsequently, returning them immediately to the depositor or storing them for processing as appropriate.

[0028] In the case of overlapping dimensions of two or more coins, they will be separated from each other by an electromagnet (4.4) as is done during the primary separation of genuine coins from the rest of the coins.

[0029] The coins are dispatched from the sorted coin

drawers by means of an inclined channel (7) and controlled by means of two coin outfeed control sensors (8). Said inclined channel can be withdrawn by means of electromagnetic actuation, in which case the dispensed coins will not be delivered to the outside of the device, but to a drawer located exactly on the vertical of said ramp so that it will serve either as an emptying drawer of the complete coin system, or of a selective emptying to avoid the overflowing of one or several of the sorted coin drawers.

[0030] Having sufficiently described the nature of the invention, as well as the manner of putting it into practice, it should be noted that the provisions previously indicated and represented in the attached drawings are susceptible to modifications of detail insofar as they do not alter their fundamental principles, set forth in the preceding paragraphs and summarized in the following claims.

Claims

1. Coin capture, sorting, storage and dispensing device **characterized in that** the device is constituted from a flat fixed support (11), formed by a rectangular straight parallelepiped sheet, one of whose lower ends arches in a concave way acquiring more surface and where above said widened end is located a circular support tray (3) moved by a circular support pulley (12), and where at the opposite end to the circular support pulley, there is a pulley (13) fixed by means of a free shaft (14) to the flat fixed support (11), and between the circular support pulley (12) and the pulley (13) there is a support pulley (16) located at the end of the parallel part of the flat fixed support (11) where between these three support pulleys there is a coin conveyor belt (C) and. wherein the fixed flat support (11) is provided with a fixed coin return ramp (2) to the system to avoid coin overlapping or jamming and a coin detecting device (4) that returns directly to the exit channel (5) the coins that do not meet the requirements; The fixed support (11) has several consecutive openings of different sizes in the form of an inclined plane (9) in the upper part of the same, ramps of an exact size according to the size of the coins that will run along said inclined plane to the sorted coin boxes (6) where, for the dispatch of the coins thus sorted, there is an inclined channel (7) controlled by means of two coin exit control sensors (8).

2. Coin capture, sorting, storage and dispensing device according to the 1st claim and **characterized in that** the fixed flat support (11) is located in a plane that forms an angle of between 50º/70º with the horizontal of the device.

3. Coin capture, sorting, storage and dispensing device according to the 1st claim and **characterized in that** between the circular support pulley (12), the pulley (13) and a support pulley (16) located at the end of the parallel part of the flat fixed support (11) is placed a coin transport belt (C) constituted by a closed toothed belt (17), which has appendages (1), perpendicular to the perimeter on the inside, and trapezoidal in shape with minimum bases, approximately 1/10 in relation to the height, but always with the larger base attached to the coin transport belt (C).

4. Coin capture, sorting, storage and dispensing device according to the 1st claim and **characterized in that** before reaching the sorting ramps (9) all the coins (10) pass, at the beginning of the fixed ramp, through a detector device (4) containing specific detectors that allow one or more of the following coin characteristics to be obtained:

   (4.1).- dimension detector
   (4.2).- color detector
   (4.3).- magnetic characteristics detector,
   (4.4).- electromagnet of separation.

   And for those coins (10) which are not in perfect condition the following tanks are designed:

   (21).- counterfeit coin deposit,
   (22).- deposit of coins not belonging to the country,
   (23).- deposit of coins in bad condition,
   (24).- deposit of coins and unclassifiable objects,
   to where they are taken through the channel (5).

5. Device for capturing, sorting, storing and dispensing coins, **characterized in that** the procedure for capturing and sorting them begins when the coins (10) placed in the support tray (2), moved by the belt (C) after passing through the return ramp (3) and once sorted by the sensor (4) as correct, are sorted in the fixed support (11) where several ramp-shaped openings of different sizes in the form of an inclined plane (9) are located in the upper part of the same, ramps of exact size to the size of the coins that will run along this inclined plane to the sorted coin drawers (6) and where for the dispatch of the coins thus sorted there is an inclined channel (7) controlled by means of two coin outfeed control sensors (8).

6. Device for capturing, sorting, storing and dispensing coins in accordance with the previous claims and **characterized in that** the fixed support (11) will have a number of windows equivalent to the number of coins of different denominations regardless of the countries to which they belong, in this way the system advocated by the invention allows the simultaneous recycling of coins from more than one country at a time, and that in the case of coincidence of dimensions of two or more coins, these will be separated

from each other by a separating electromagnet (4. 4) just as is done during the primary separation between genuine coins and the rest of the coins.

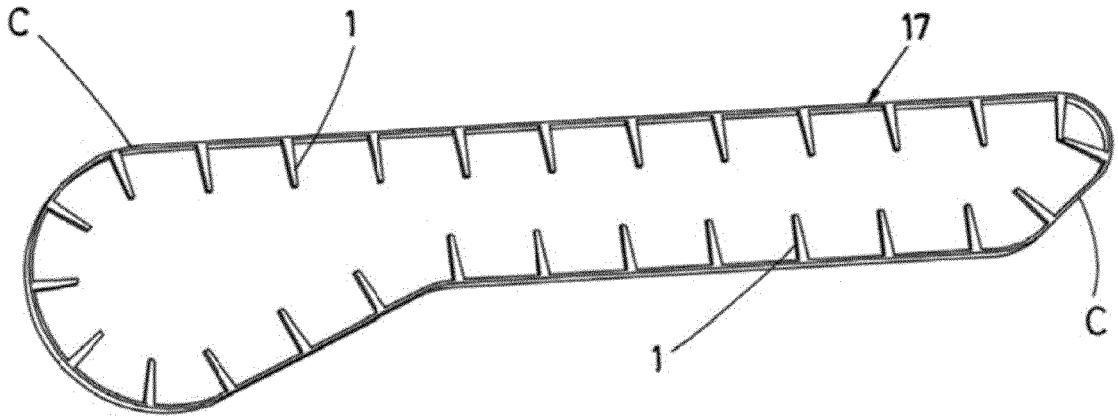
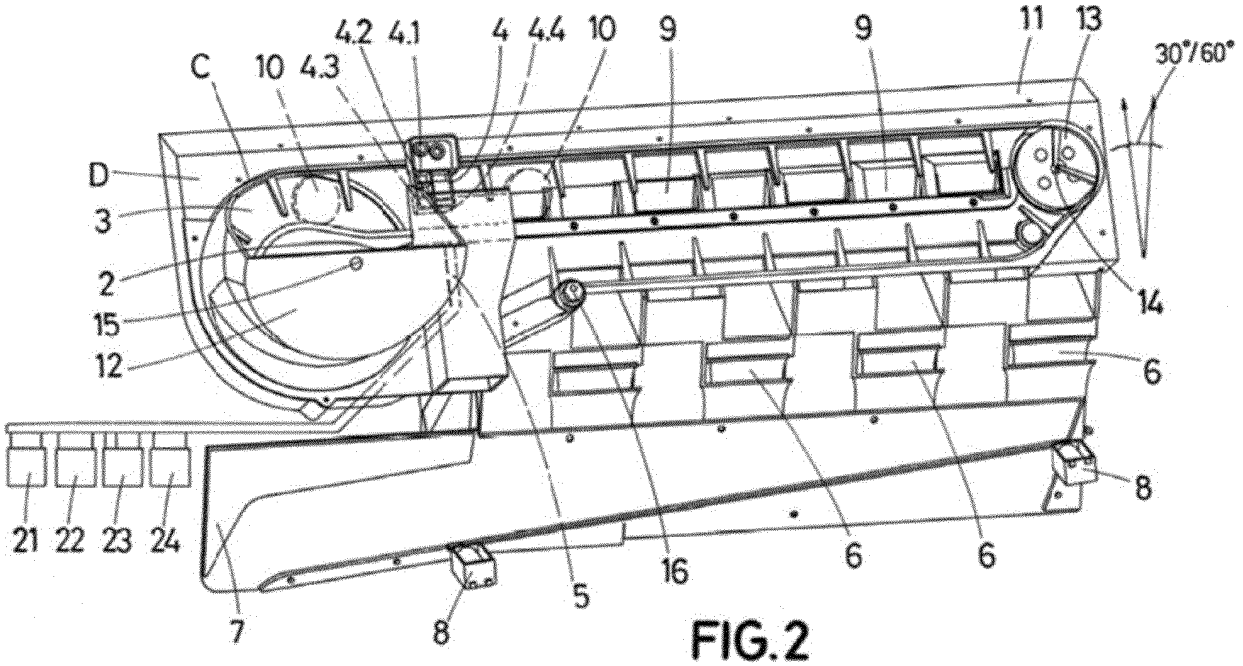


FIG.1


4.2
4.1
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4.4
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9
11
13
30°/60°
C
10
4.3
D
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FIG.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2022/070685

A. CLASSIFICATION OF SUBJECT MATTER

G07D13/00 (2006.01)

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)
G07D

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)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013035024 A1 (OKAWA, KAZUYA) 07/02/2013, desc.; figs. 1-4.	1-6
X	JP 2019003709 A (GLORY KOGYO KK) 10/01/2019, abstract.	1-6
X	JP 2016177468 A (GLORY KOGYO KK) 06/10/2016, abstract.	1-6
X	JP 2017182351 A (OKI ELECTRIC IND CO LTD) 05/10/2017, abstract.	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03/11/2022	**(07/11/2022)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer G. Madariaga Domínguez Telephone No. 91 3495384

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2022/070685

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US2013035024 A1	07.02.2013	JP2013033409 A JP5373007B B2 CN102915602 A	14.02.2013 18.12.2013 06.02.2013
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JP2017182351 A	05.10.2017	NONE	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 101352 **[0005]**
- ES 2653730 **[0006]**