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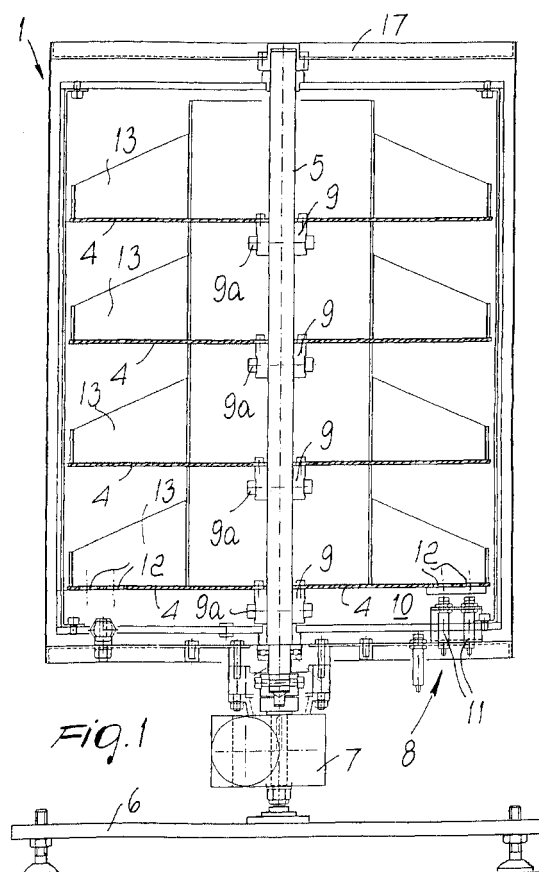
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(54) **Automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels**

(57) An automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels, comprises a plurality of stacked shelves (4) which are rotatably supported by a centered vertical shaft (5) provided with a footing (6) for resting on the ground; the shaft (5) is actuated so as to rotate continuously or discontinuously through circular arcs (A) with a motor-gearmotor assembly (7) which is controlled by control means (8) for counting and sensing the arcs (A).



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Description

[0001] The present invention relates to an automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels.

[0002] In the daily use of items, generally available in loose form, static or rotary storage containers are used to contain, select and classify said items according to common characteristics.

[0003] Static storage containers have a structure being substantially like a gridlike frame which supports a plurality of supporting shelves on which series of boxes or drawers are placed; the already-selected items are stored in said boxes or drawers so that they are easily available in case of need.

[0004] This is the case, merely by way of example, for sets of drawers containing screws and the like or all the findings used in factories, particularly mechanical ones.

[0005] Rotary storage containers are constituted by a plurality of shelves which are rotatably mounted on a common vertical shaft and are also provided, like static storage containers, with a series of drawers or boxes in which the items are stored once they have been selected.

[0006] In both cases, users provide themselves with the necessary items according to their characteristics by drawing them from said drawers or boxes, moving from one to the other in the case of static storage containers and turning the shelves manually until they reach the required drawers or boxes in the case of rotary storage containers.

[0007] These storage containers are used, moreover, by tire specialists who normally use balance weights of several values, with ranges from a few tenths of a gram to tens of grams, to balance vehicle wheels.

[0008] Particular and accurate balancing requires great care on the part of the operator, and any action that distracts his attention from the measurement instrument panel of the balancing machine becomes inconvenient and may cause reading errors and therefore incorrect balancing.

[0009] Moreover, the search for the balance weights of the required value may cause waste of time, especially if the indications placed on drawers or boxes bearing the values of said balance weights are applied inaccurately or illegibly, even more so if the user suffers from eyesight problems.

[0010] The aim of the present invention is to solve the above-noted problems of the prior art by providing an automatic storage dispenser for preselected loose items which allows operators to automatically and ergonomically access said items which have been preselected according to specific characteristics, with no possibility of error and without distracting the operators' attention from the work being performed, speeding up the step for searching for said items.

[0011] This aim and these and other objects are achieved by an automatic storage dispenser for pre-

lected loose items, particularly balance weights for balancing vehicle wheels, which comprises a plurality of stacked shelves which are rotatably supported by a centered vertical shaft provided with a footing for resting on the ground, characterized in that said shaft is actuated so as to rotate continuously or discontinuously through circular arcs with a motor-gearmotor assembly being controlled by control means for counting and sensing said arcs.

[0012] Further characteristics and advantages will become better apparent from the description of a preferred embodiment of an automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic sectional elevation view of the inside of the storage dispenser according to the invention;

Figure 2 is a schematic top view of the storage dispenser according to the invention, functionally combined with a vehicle wheel balancing machine;

Figure 3 is a top view of the storage dispenser according to the invention, shown in phantom lines.

[0013] With reference to the figures, 1 generally designates an automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels 2, which is functionally combined with a conventional balancing machine 3.

[0014] The storage dispenser 1 substantially comprises a plurality of superimposed shelves 4 being rotatably supported by a centered vertical shaft, which is generally designated by the reference numeral 5 and is provided with a footing 6 for resting on the ground.

[0015] The shaft 5 is actuated so as to rotate continuously or discontinuously through circular arcs A with a motor-gearmotor assembly 7 which is controlled by means 8 for counting and sensing said arcs.

[0016] The shaft 5 is preferably monolithic and its height is cut to size as needed; each shelf 4 supports a bush 9 which is centered and rigidly coupled, can be fitted snugly on said shaft 5 and can be fixed at predefined heights with interposed transverse pins 9a inserted in corresponding through holes provided transversely in the shaft 5 and in the bushes 9.

[0017] The counting and sensing means 8 comprise a series of references which are arranged circumferentially on a disk 10 which is keyed on the shaft 5 proximate to the footing 6 or on the lowermost shelf 4; said references can be sensed by means of a conventional element 11 which is arranged on said footing 6 and is directed towards the disk 10 or said lower shelf 4.

[0018] In the preferred embodiment of the invention, the references are constituted by through holes 12 which are distributed on the disk 10 with a constant angular spacing and substantially coincide with the arcs A.

[0019] The element 11 is constituted by a photosensor or, as an alternative, by an electronic device of the type known as encoder, which operatively cooperates with the shaft 5.

[0020] Each shelf 4 is provided with a plurality of containers 13 which are orientated radially and are arranged with constant angular spacings which coincide with said circular arcs A.

[0021] Said containers 13 can be arranged on the shelves 4 or hang below them.

[0022] The storage dispenser 1 is provided with a perimetric closure wall 14 in which there is provided at least one vertical opening 15 to allow simultaneous access to a stacked series of the containers 13.

[0023] The opening 15 can in turn be closed with a panel 16 hanging from a cross-member 17 which is in turn rotatably supported at the end of the shaft 5 and is moved with a hydraulic or pneumatic actuator 18.

[0024] Moreover, in the storage dispenser 1, said control means 8 for counting and sensing said circular arcs A can be interfaced with the conventional electronic circuit for controlling the functionality of the balancing machine 3.

[0025] The operation of the invention is described hereinafter with reference, merely by way of non-limitative example, to the use of the storage dispenser for containing balance weights for balancing vehicle wheels 2.

[0026] The height of the storage dispenser is defined beforehand by cutting to size the shaft 5 and fitting on it a preset number of shelves 4.

[0027] Each one of said shelves is locked at the intended height by inserting the transverse pins 9a in the holes provided in the bushes 9, which can be aligned with the corresponding holes formed in the shaft 5.

[0028] The balance weights are stacked in the containers 15, divided by weight.

[0029] When the operator B determines the imbalance of the wheel 2 mounted on the balancing machine 3 by turning it and subsequently stopping it at the references provided by the machine for the application of the balance weights, whose values also are indicated by the machine 3, the control logic of said machine activates the motor-gearmotor assembly 7, which in turn rotates the shaft 5 which, by rotating through arcs A, which are sensed by the element 11 that gets hold of, and counts the holes 12, arranges exactly at the opening 15 defined in the peripheral closure wall 14 the container 13 with the balance weights having the required value so that they are available to the grasp of the operator B, who can thus pick them up with the assurance that they correspond exactly to the one indicated and required by the machine 3.

[0030] All the angular positions of the containers 13 of the balance weights having a predefined weight are stored and have a vertical one-to-one correspondence with the through holes 12.

[0031] The element 11 is preset by setting an initial zero value; by counting the holes 12 during the rotation

of the shaft 5, said element drives the motor assembly 7 and defines in each instance the angular positioning of the containers 13.

[0032] The storage dispenser 1 can of course also be operated manually, albeit with greater inconvenience.

[0033] In the storage dispenser 1 it is possible to block access to the balance weights through the opening 15: said opening can in fact be closed and subsequently reopened by turning the panel 16 being suspended from the cross-member 17, which is in turn moved by the actuator 18.

[0034] In practice it has been found that the described invention achieves the intended aim and objects.

[0035] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0036] All the details may further be replaced with other technically equivalent ones.

[0037] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0038] The disclosures in Italian Utility Model Application No. M02000U000013 from which this application claims priority are incorporated herein by reference.

[0039] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

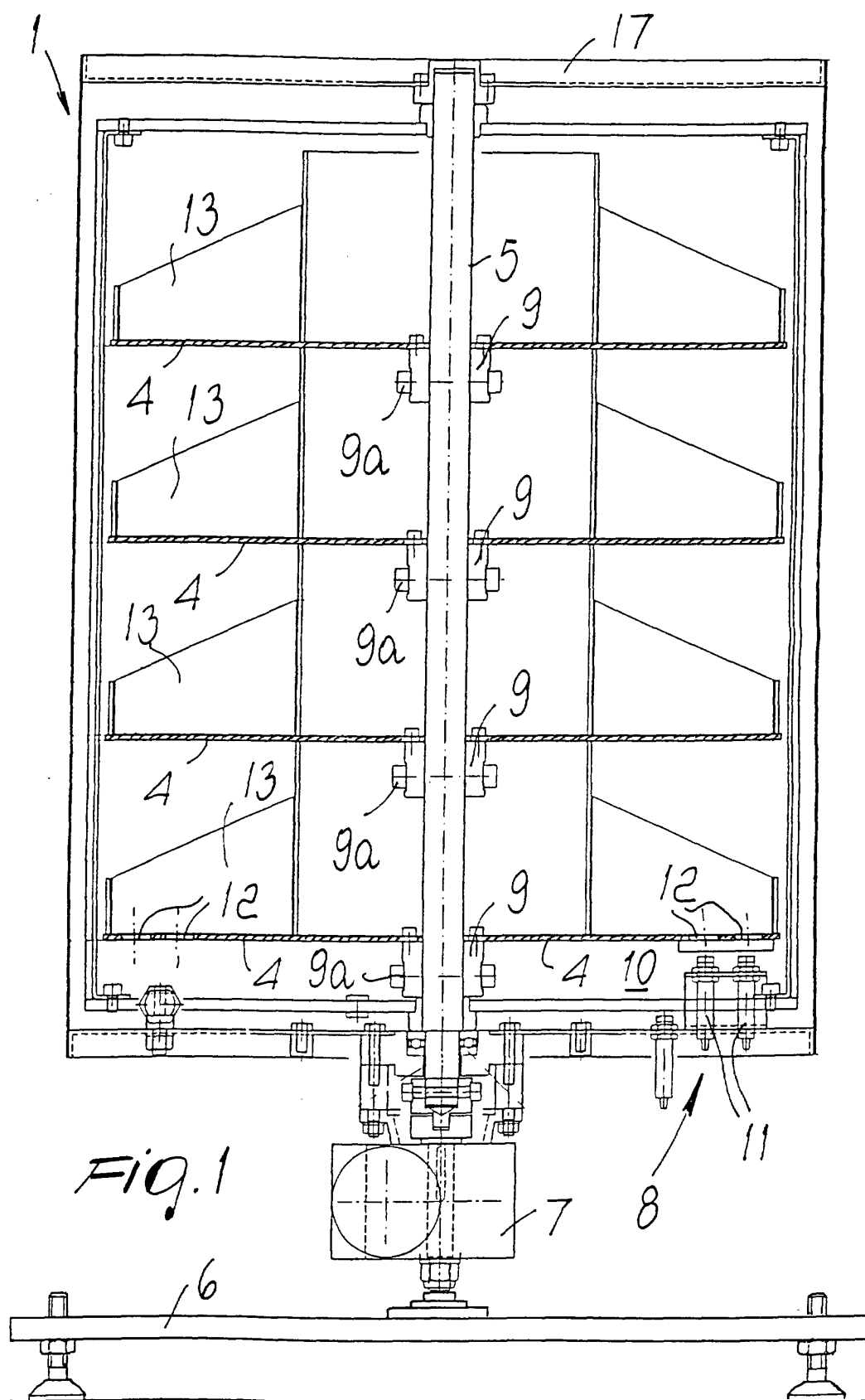
1. An automatic storage dispenser for preselected loose items, particularly balance weights for balancing vehicle wheels, comprising a plurality of stacked shelves (4) which are rotatably supported by a centered vertical shaft (5) provided with a footing (6) for resting on the ground, **characterized in that** said shaft (5) is actuated so as to rotate continuously or discontinuously through circular arcs (A) with a motor-gearmotor assembly (7) which is controlled by control means (8) for counting and sensing said arcs.
2. The storage dispenser according to claim 1, **characterized in that** said shaft (5) is substantially monolithic and can be cut to size, interlocking means (9) for mutual interlocking being provided for the stacked arrangement of said shelves (4).
3. The storage dispenser according to claim 1, **characterized in that** said counting and sensing control means (8) comprise a series of references (12) arranged circumferentially on a lower face of the low-

ermost shelf (4, 10), said references (12) being detectable with a conventional sensor (11) arranged on said footing (6) and directed towards said lowermost shelf (4, 10).

4. The storage dispenser according to claim 1, **characterized in that** said counting and sensing control means (8) comprise a disk (10) which is keyed to said shaft (5) proximate to said footing (6), references (12) being detectable with a conventional sensor (11) which is arranged on said footing (6) and directed towards said disk (10). 10
5. The storage dispenser according to claims 3 and 4, **characterized in that** said references are constituted by through holes (12) which are distributed with a constant angular spacing. 15
6. The storage dispenser according to claim 1, **characterized in that** said counting and sensing control means (8) are constituted by an electronic device of the type known as encoder which operatively cooperates with said shaft (5). 20
7. The storage dispenser according to claim 2, **characterized in that** said mutual interlocking means are constituted, for each shelf (4), by a bush (9) which is coaxially rigidly coupled to it in a centered position and is crossed transversely by a corresponding through hole for the insertion of a corresponding pin (9a), said bush (9) being insertable on said shaft (5) and lockable on it at a height which is predefined by a corresponding second transverse hole. 25 30 35
8. The storage dispenser according to the preceding claims, **characterized in that** each shelf (4) can be provided with a plurality of containers (13) which are orientated radially and are arranged angularly with a constant spacing which coincides with said circular arcs (A). 40
9. The storage dispenser according to the preceding claims, **characterized in that** it is provided with a perimetric closure wall (14) in which there is provided at least one vertical opening (15) for simultaneously accessing a vertically stacked and aligned series of said containers (13). 45
10. The storage dispenser according to claim 9, **characterized in that** said opening (15) can be closed by way of a corresponding panel (16) which is supported so that it can rotate at the end of said shaft (5) with movement means (17, 18) interposed. 50 55
11. The storage dispenser according to claim 10, **characterized in that** said movement means comprise a cross-member (17) which is rotatably mounted at

the end of said shaft (5) and is rigidly coupled, at its ends, to the corresponding ends of said panel (16), said cross-member (17) being associated with a hydraulic or pneumatic actuator (18) for movement by circular arcs (A).

12. The storage dispenser according to the preceding claims, **characterized in that** said control means (8) for counting and sensing said circular arcs (A) can be interfaced with a conventional electronic circuit for controlling the operation of a vehicle wheel balancing machine.



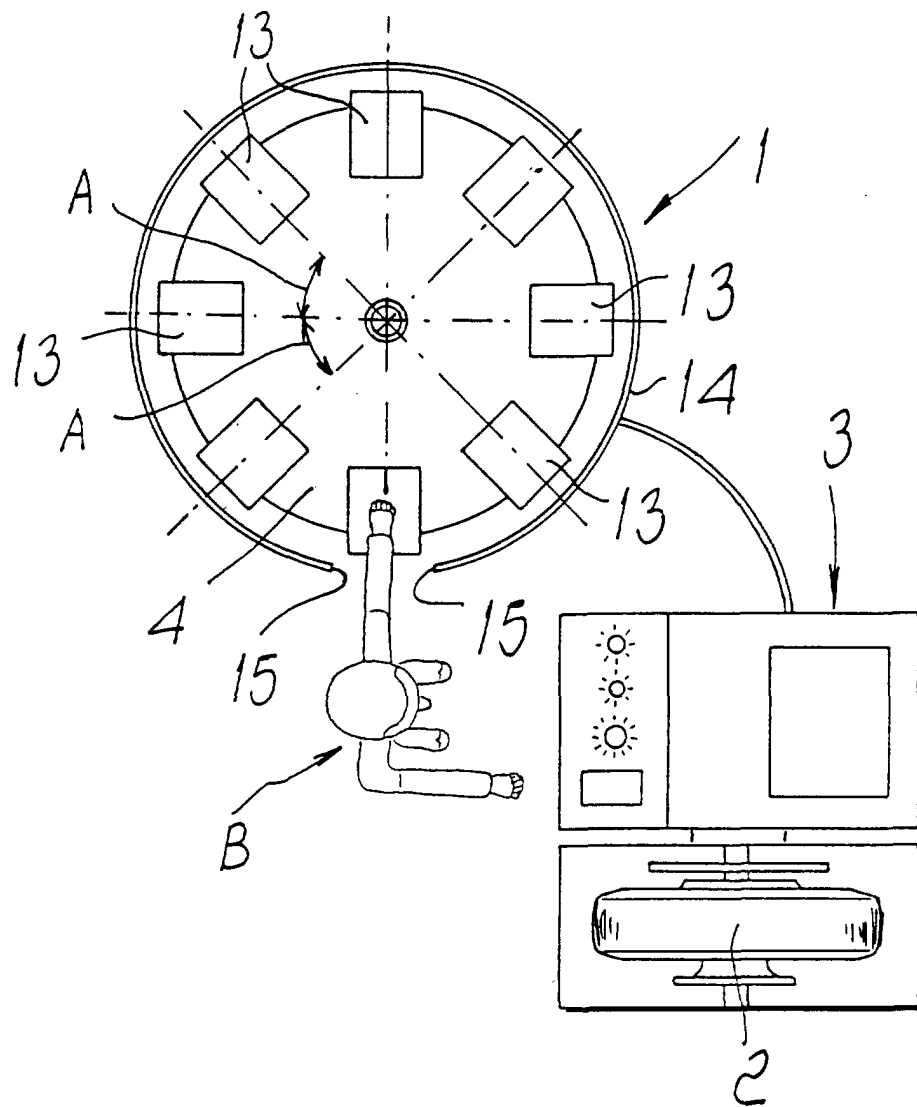


Fig. 2

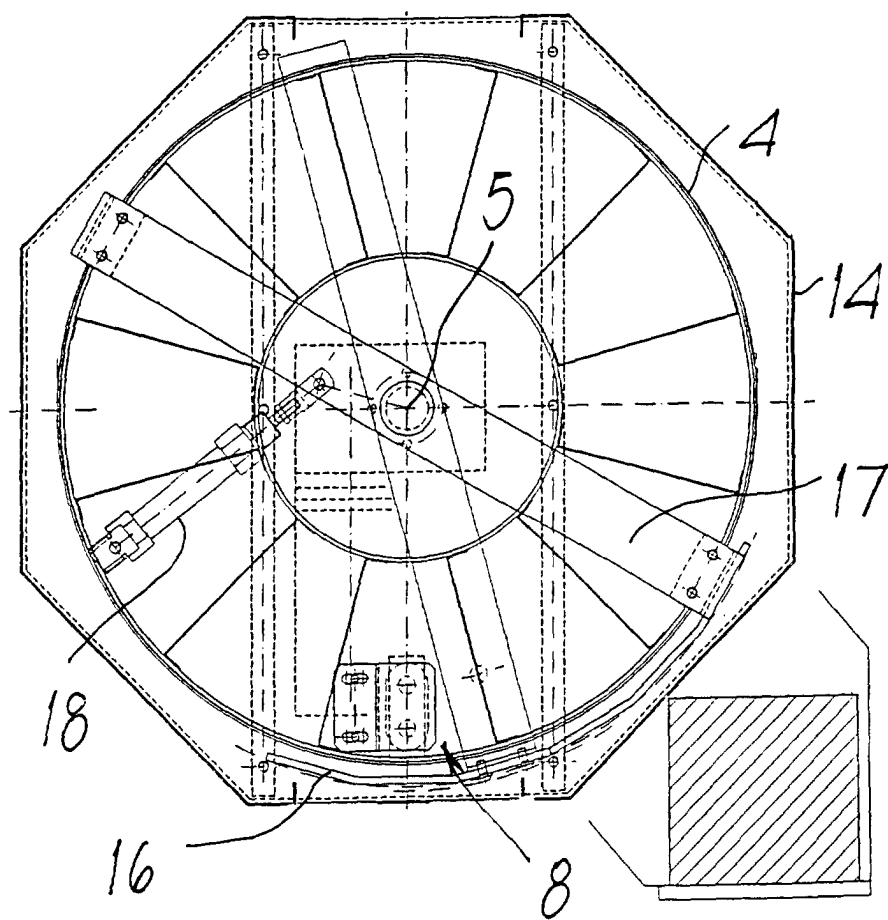


Fig. 3