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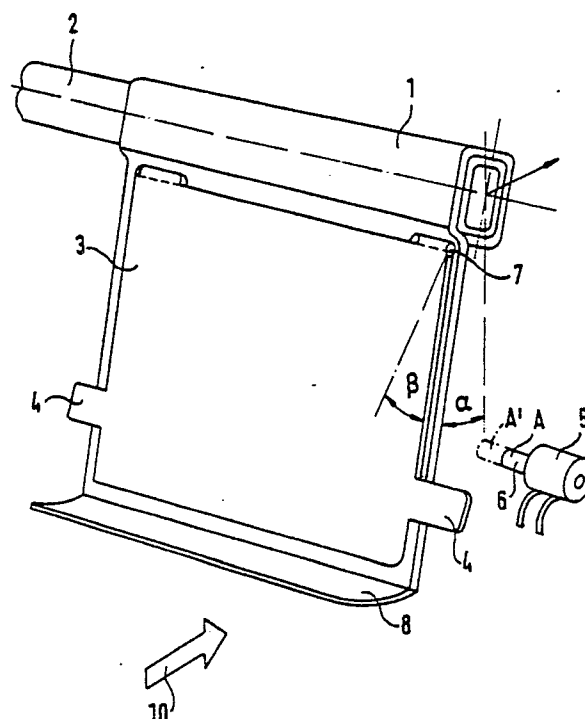
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DE FR GB IT(71) Applicant: **MECCANIZZAZIONE POSTALE E
AUTOMAZIONE SPA**
Piane S. Atto Casella Postale 132
I-64020 Teramo(IT)(72) Inventor: **Scata, Mario**
Via Fonte Baiano 74
Teramo(IT)(74) Representative: Weinmiller, Jürgen et al
Lennéstrasse 9 Postfach 24
D-8133 Feldafing(DE)(54) **Sorting device for systems designed to sort objects, particularly covers and the like.**

(57) There is provided a sorting device for systems designed to sort objects, particularly covers and the like, comprising a horizontal bracket movable along a sorting path, a supporting flat member fixed to the bracket and inclined toward the direction of motion, and with its lower end bent to support the object to be sorted, a plate-shaped ejector hinged to and overlapped to the flat member, and actuating means for rotating the ejector to drive the object out of the support thus dropping it in the container.

The actuation of the ejector occurs because of a lag, provided thereon, engaged by a stop element operated by an actuator, whilst the restoring occurs automatically due to force of gravity as soon as the lag overcomes the stop element or this latter is moved backward.

FIG. 1



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SORTING DEVICE FOR SYSTEMS DESIGNED TO SORT OBJECTS, PARTICULARLY COVERS AND THE LIKE.

The present invention relates to a sorting device for systems designed to sort objects, particularly covers and the like, in which the device, loaded with the object to be sorted, is moved over a pre-established path along which a succession of collecting containers are arranged to receive the carried object which, upon command, is dropped into one of them.

Sorting systems of the above mentioned type are used in various fields and particularly in the field of bulky postal correspondence, to select and forward correspondence.

As it is known, sorting systems of this kind consist essentially of a guide in the form of a monorail along which sorting mobile units are moved, each of said units having its motorization and control system and being capable to carry the objects to be sorted to an area where containers or bags are arranged to receive the sorted objects. Each of said mobile units consists generally of a carriage constituted by a succession of vertical containing compartments each for housing a single object to be sorted.

Each of these compartments is in the form of an upperly open pigeon hole for charging the objects and is closed lowerly by a base wall-openable on command for discharging the objects into underlying containers.

At first, the objects to be sorted are coded at codification stations and then forwarded to a loading station where, following to a command from a programmed control unit, the objects are loaded each into a respective compartment. Each compartment, having reached the sorting area, passes above all containers arranged along its path and, when it arrives above the one corresponding to the desired destination for the carried object, the control unit operates the opening of the bottom wall and the object falls into the container.

The sorting devices of the prior art have, on the whole, good features, but they are not immune from drawbacks.

First of all, sorting into containers occurs pell-mell due to the vertical position of compartments and this is undesirable, especially if the orientation of the object leading edge is to be held in order to facilitate the identification code reading.

Secondly, in order that the bottom walls do not open under drop impact of the loading objects, it is necessary to support them during loading operations which requires a more complicated structure of the plant.

In addition, once the object has been discharged, it is necessary to restore the bottom wall

by means of return springs or similar recovery devices. All that, besides requiring a more complicated structure of the device, does not prevent the device from jamming.

Therefore, the main object of this invention is to overcome the above mentioned drawbacks by providing a sorting device of the type referred at the beginning which allows to sort in an orderly manner covers and the like still maintaining their leading edge orientation.

A further object of the present invention is to provide a device of the above mentioned type so as to be simple in construction, inexpensive to manufacture, and free from jamming.

These and other objects which will become more apparent hereinafter, are achieved by a sorting device for systems designed to sort objects, particularly covers and the like, having the characteristics set forth in the characterizing portion of claim 1.

Advantageous embodiments of the device according to the invention are set forth in the sub-claims.

Further characteristics and advantages of the invention will result better from the detailed description of a preferred, but not exclusive, embodiment of a sorter device for systems designed to sort objects, particularly covers and the like, taken in conjunction with the accompanying drawings in which:

- fig.1 illustrates schematically the device according to the invention;

- fig.2 shows how the object to be sorted is ejected;

- fig.3 illustrates schematically a succession of devices, according to the invention, used in a sorting plant, and

- fig.4 shows a modified configuration for the ejector to be used in connection with floppy objects.

Referring now to fig.4, 2 stands for a bracket, movable horizontally in a direction 10, to which a supporting flat member 1 is rigidly connected at its upper end in a reading-desk fashion i.e. inclined towards the direction of motion, so that its surface of maximum size has its normal vector inclined downwards and making an acute angle with the velocity vector, said angle being preferably of 20° to 45°.

The supporting member 1 has a lower portion 8 bent backwards, substantially at right angle, so as to form a support for the object to be sorted.

Advantageously the bent portion 8 is curved

concave upward.

Moreover, the flat parts are made of, or coated with, antistatic, low friction material in order to help the sliding of sorted objects.

At the upper end of said supporting flat member 1 there is connected, by means of a hinge, the upper end of a plate shaped ejector 3 which extends downwards and, due to normal component of the force of gravity, it rests overlapped to the flat member 1 in a stable equilibrium condition.

During loading, the object 9 to be sorted is slid on the ejector 3 and finds its support on the bent end 8 (see fig.3).

The hinge and the connection between the flat member and the bracket 2 are embodied in such a way as not to hamper the fitting in of the objects during loading phase, as can be seen in fig.1.

The ejector, through actuating means 4,5, can be rotated, in a direction opposite to the motion, by an angle β , about the hinge 7 (see fig.2).

Preferably, said actuating means consist of a lag 4 arranged at least on one of the ejector side edges, close to its lower end and of an actuator 5 rigidly connected to the fixed frame of the plant and, therefore, in a condition of relative motion with respect to the lag 4.

The actuator 5, which can be, for instance, electromagnetically or hydropneumatically driven, actuates a stop element 6 which moves from a backward rest position A to a forward position A' in which latter it opposes the lag 4 in such a way to rotate backwards the ejector 3 through an angle β about the hinge 7.

The lag is sized and arranged in such a way that the angle β is so large as to make the sorting object to overcome the border of the support 8.

The actuator can be monostable (i.e. the stop element 6, by means of a return spring, comes back automatically in its backwards position) or bistable (i.e. the element 6 comes back upon a command).

Having described essentially the composition, the operation of the invented sorting device will now be described. The coded object is inserted in the respective sorting device by sliding it on the ejector.

When the device arrives above the container corresponding to the desired destination for the carried object, the control unit operates the actuator 5 which moves forwards the stop element 6 which, in turn, opposes the lag 4 hence rotating the ejector 3 backwards by an angle β , the object is driven out of the support edge 8, and the longitudinal component of force of gravity makes it to slide into container (fig.2) where it lands with a certain inclination and falls down so maintaining the desired orientation of the leading edge.

The restoring of the ejector occurs automati-

cally because of the normal component of the force of gravity as soon as the engagement between the lag and the stop element ceases either because the lag overcomes the stop element or because the stop element moves backwards, according to what is programmed for next incoming device.

Thus the invention fully achieves all the intended objects.

In fact, the sorting device according to the invention is very simple both in its structure and in its operation and, hence, reliable.

Thanks to this solution, the ejection is assured whilst any destructive impact with the actuator is avoided because the motion itself causes the abandonment of the ejector raising lag.

The restoring occurs automatically due to gravity and therefore the return springs are eliminated along with any possibility of jamming.

Thanks to the inclination of the flat member, it is possible to obtain, from one side, an orderly sorting of covers while maintaining the orientation of the same and, from the other side, a smoother and noiseless fitting in during loading (the support bent end 8 may be, if necessary, provided with a silencer in order to further lower the noisiness level).

Advantageously, the slope of the flat member allows to transfer the object on further inclined surfaces in order to reach container or bag rows located at different levels.

By adjusting suitably the distance between adjacent sorting devices in the system (see fig. 3), in relation to the type of object to be sorted, it is possible to realise a sorting machine more compact than prior art machines and with low translation velocities at parity of flow.

Finally, systems built up of devices according to this invention, unlike the prior art systems, are actuated by external means only and do not require independent motorization and control means.

Naturally, various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

In particular, the ejector 3 may be provided with curved extensions 11 at its sides in order to provide support for objects in the form of papers or floppy objects (see fig.4)

Finally, a plurality of devices can be mounted on bracket 2 thus increasing the compactness of the system.

Claims

1. A sorting device for systems designed to sort objects, particularly covers and the like, characterized in that it comprises:
 - a bracket (2) movable horizontally over a pre-

established path;

- a supporting flat member (1) having its upper end rigidly connected to said bracket (2) and a lower end portion (8) bent substantially at right angle in a direction opposite to direction of motion so as to form a support for the object to be sorted, said flat member (1) having its surface of maximum size inclined towards the direction of motion, so that its normal vector results inclined downwards to make an acute angle α with respect to the velocity vector;

- a plate-shaped ejector (3) with an end hinged at the upper end of said flat member, said ejector extending downwards and being overlapped to said flat member in a stable equilibrium condition, because of normal component of gravity force, and

- actuating means (4,5) for rotating, upon command, said ejector through an acute angle β with respect to the stable equilibrium position, wherein the object to be sorted, loaded in a settled position on the ejector and lowerly leant on said support bent end (8), is driven out of the support border and, because of gravity, falls in the underlying container with a certain inclination, so as to maintain the desired orientation.

2. A sorting device according to claim 1 characterized in that said actuating means comprise:

- at least a lag (4) provided at the border of said ejector and projecting out of the perimetral line of said flat member (1); and

- an actuator (5) rigidly connected with the fixed frame of the plant, said actuator being designed to move, upon command a stop element (6) from a backward rest position (A) to a forward position (A') in which it engages said lag, wherein said ejector is rotated, opposite to direction of motion, through an angle β , so dropping the sorted object in the container and returns back in its equilibrium position as soon as such engagement lacks either because the stop element is moved to its backward position or because the lag overcomes the stop element in prosecuting its motion.

3. A sorting device according to claims 1 and 2, characterized in that said actuator is electromagnetically operated.

4. A sorting device according to claims 1 and 2 characterized in that said actuator is pneumatically operated.

5. A sorting device according to claims 1 and 2 characterized in that said actuator is operated in a monostable fashion.

6. A sorting device according to claims 1 and 2, characterized in that said actuator is operated in a bistable fashion.

7. A sorting device according to preceding claims characterized in that said bent end (8) of said flat member is curved and concave upward.

8. A sorting device according to preceding claims characterized in that said ejector (3) is provided, at its vertical sides, with two curved extensions (11), designed to provide support for floppy objects.

9. A sorting device according to preceding claims, characterized in that said ejector because of material which it is made of, or because of process which it has been exposed to, features antistatic characteristics and low friction factor.

FIG. 1

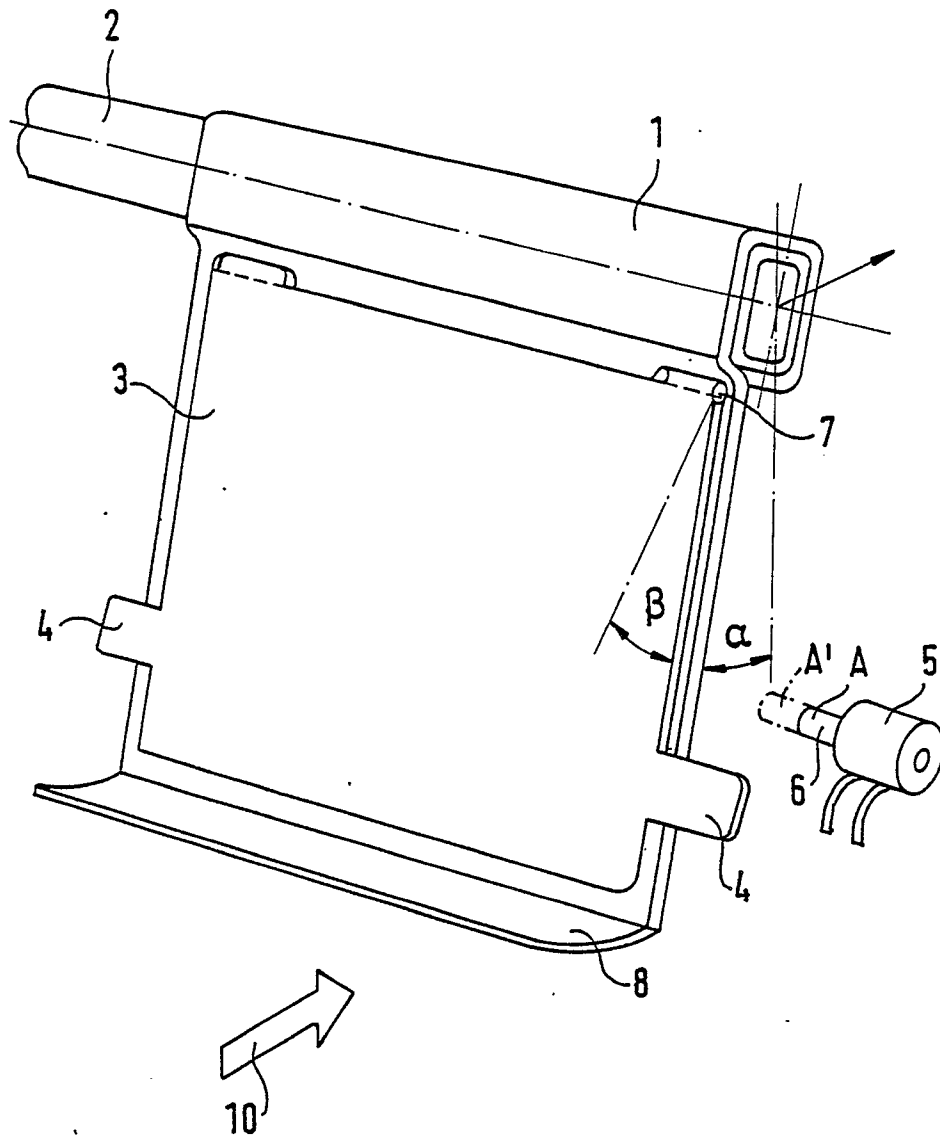


FIG. 2

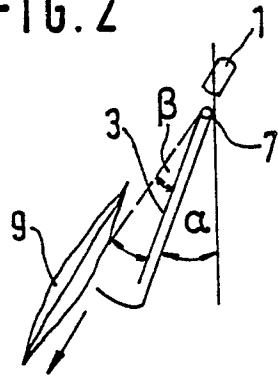


FIG. 3

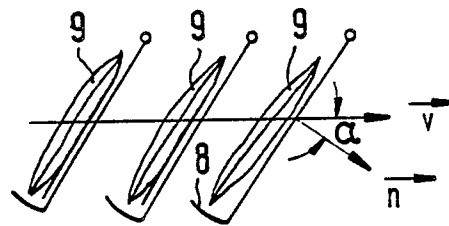


FIG. 4

