United States Patent

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[54] **STACKING AND TRANSMISSION DEVICE FOR PACKAGES**
6 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **214/6,** 214/6.5
[51] **Int. Cl.** **B65g 57/04,** B65g 57/081
[50] **Field of Search** 214/6H, 6FS, 6K, 6.5, 6M, 6.1, 6G, 6P; 53/163

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ABSTRACT: Stacking device comprising a rotary head, a series of vertical package receiving chutes arranged in mutually spaced relation at the periphery thereof, a package stacking means at a fixed station, a vertically movable package support projectible up through a chute at the package stacking station, and step-by-step descending in timed relation to the stacking of the individual packages in the chute, in combination with means indexing the rotary head when the required number of packages have been stacked and the package support has been retracted therefrom, all under control of a commercial counter mechanism controlling the operation of the stacking and the indexing in timed relation.

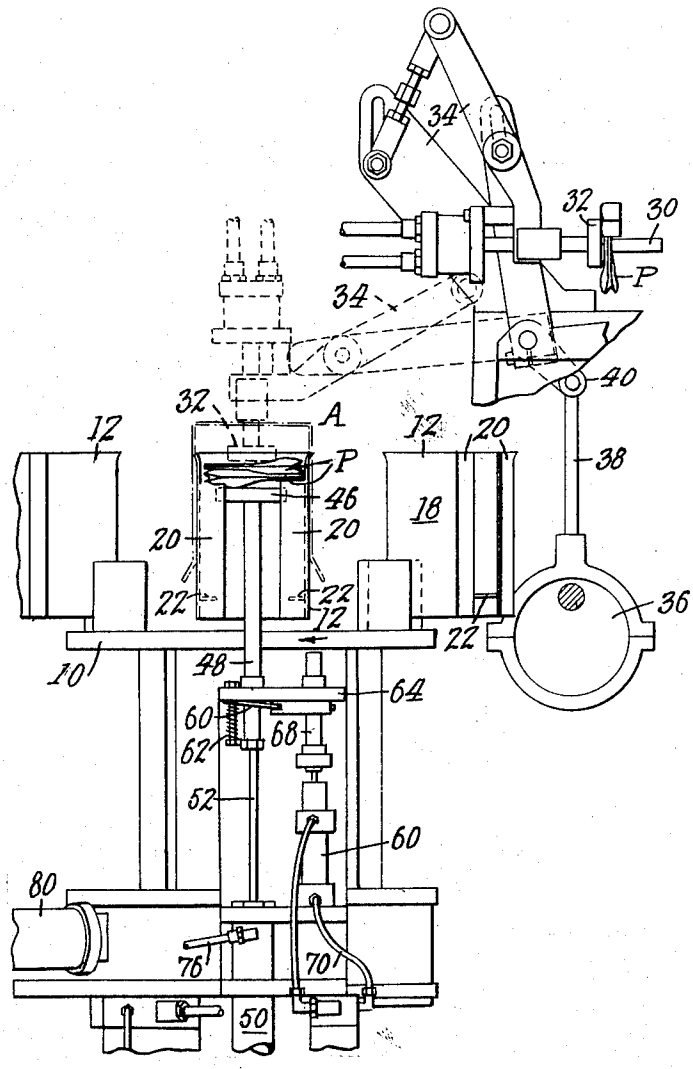
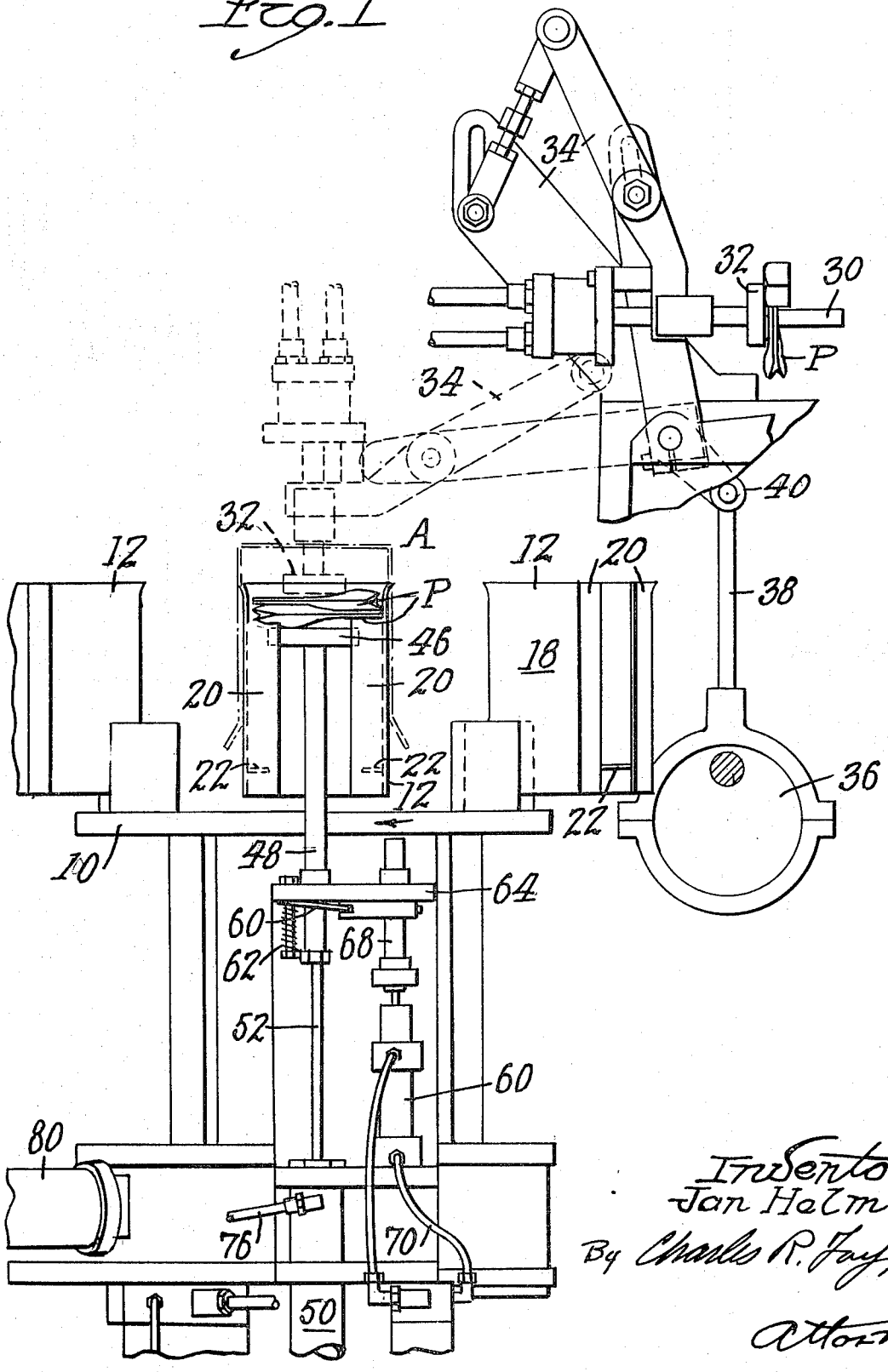


Fig. 1



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Fig. 2

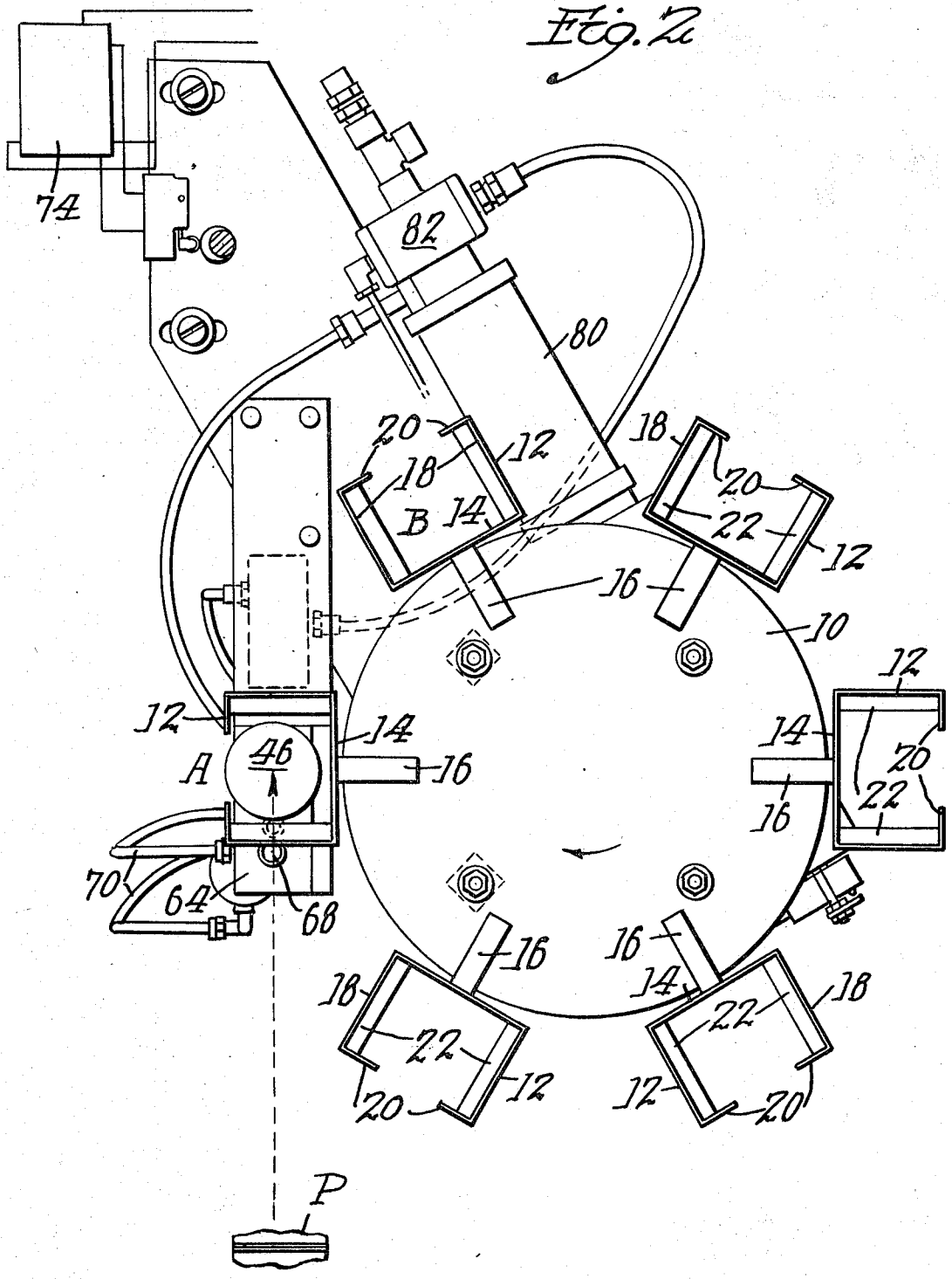


Fig. 4

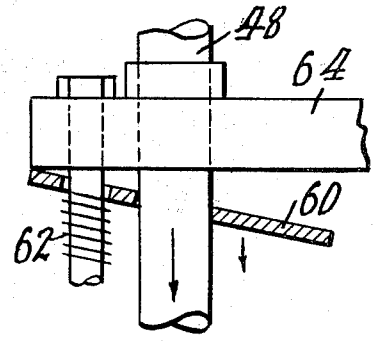
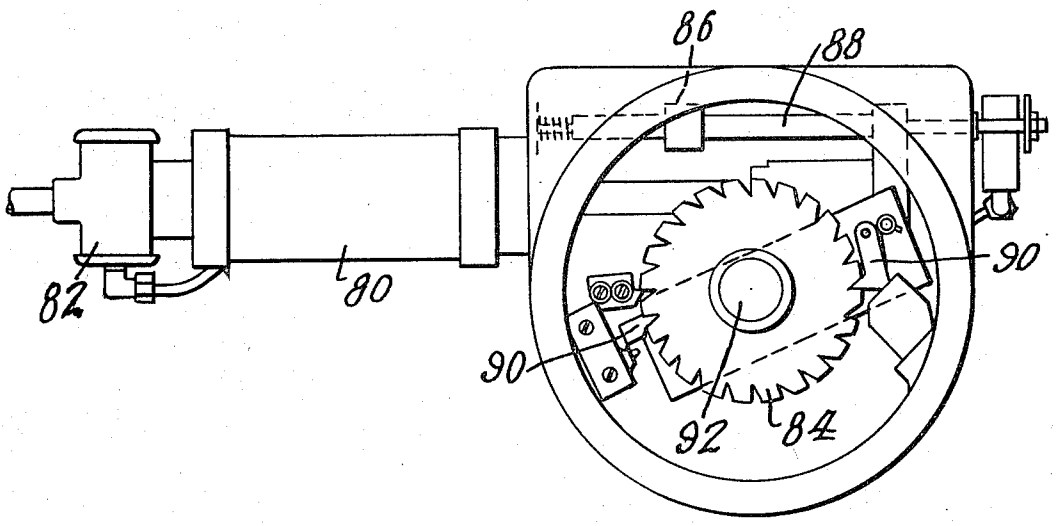

48
64
60
62

Fig. 3

14
46
48
12
20
20
22
22
46
10
64
62
60
68
52
66
80
70
76
72
78
50

Fig. 5



STACKING AND TRANSMISSION DEVICE FOR PACKAGES

BACKGROUND OF THE INVENTION

Reference is made to my copending application Ser. No. 636,484 filed May 5, 1967, now U.S. Pat. No. 3,456,423, disclosing a mechanism for stacking filled packages in alternate relationship with respect to chutes mounted on the periphery of an indexing head. Although the stacking mechanism operates perfectly in the construction exemplified by the aforesaid application for United States Letters Patent, the removal of the packages in stacks from the chutes for boxing has been considerably improved by the automatic indexing and package supporting means for the chutes as will be made more clear hereinafter.

SUMMARY OF THE INVENTION

The present invention provides a rotary indexing head having a series of chutes arranged vertically at the edge thereof in spaced relation, the chutes being open both at the top and bottom thereof and having a certain predetermined stacking position where the filled packages are received from the filling machine. At the stacking station, a package support enters the chute from the bottom and extends substantially to the top thereof in position to receive the first package, and means is provided for step-by-step lowering of said support as each package is applied thereto to the required number as predetermined by counting mechanism controlling the same.

Each chute is provided with a pair of oppositely disposed but spaced shelves between which the package support rises and descends, the shelves supporting the packages in a stack in the respective chute after the package support retracts fully downwardly from the chute so as to allow the rotary head to index, bringing the next empty chute into position for the package support to rise therein and repeat the operation.

At the same time, a rotary table indexing mechanism is operated in timed relationship with respect to the stacking operation, so that the rotary head is indexed each time a chute is filled with packages. For example, a dozen packages may be set in the chute on the descending package support, and when the latter is retracted from the chute, the rotary head is indexed. The time interval required for the indexing motion is at least as short as the time required between operations of the package stacking means, so that the latter and the packaging machine operate at the same rate of speed at all times. At the same time this provides for easy removal of the stack of packages from the chute at an unloading station where the operator applies a box to the chute and removes the box and all the packages together, so that all that is then necessary to do is to close the box and place the same in position for further packaging as in cartons.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in side elevation illustrating the invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is a view on a larger scale in elevation illustrating the operation of the package support with respect to a single chute;

FIG. 4 is a detail view partly in section illustrating the retracting means for the package support shown in FIG. 3, and

FIG. 5 is a plan view illustrating the table indexing mechanism.

PREFERRED EMBODIMENT OF THE INVENTION

Referring to FIG. 1 there is shown a rotary indexing table **10** mounting at its periphery a series of spaced upright chutes **12, 12**, each of which is open ended at top and bottom and has a back wall as at **14** mounted on a bracket **16**, see FIG. **2**. The back walls **14** are provided with side walls **18** having inturned ends **20, 20**, also see FIG. **2**, forming a compartment for the reception of a vertical stack of horizontal packages. These chutes each are provided with a bottom pair of opposite ledges

or shelves **22, 22** for the support of the packages in stacks thereon as will be later more fully herein described, but it will be seen that each chute is open at the top for the reception of packages.

At the package stacking station which is indicated at A, a mechanism which is more fully disclosed in my above identified application for patent, applies packages which are indicated at P in FIG. **1** to the chute, this mechanism operating in a time controlled relationship to stack packages one at a time. This mechanism includes means **30** for supporting packages P as they are moved, filled, and sealed one at a time.

These packages P are abstracted from a line of advance by a vacuum head or the like **32** picking up the individual packages by suction as shown in solid lines, and releasing the same in the position shown with the parts in dotted lines in FIG. **1**. The vacuum head **32** is moved between the solid line position of FIG. **1** to the dotted line position by means of the series of linkages indicated at **34** operated as disclosed in my above identified application by means of a cam or the like **36** operating the rod **38**, link **40**, etc. in order to bring the head from the solid line position of FIG. **1** where it picks up the package P from an oncoming line to the dotted line position of FIG. **1** where the package is dropped.

A package support is indicated at **46**, this table being mounted on a rod **48** having a vertical motion under influence of a cylinder **50**, see also FIG. **3**, this cylinder moving its piston rod **52** upwardly to approximately the position shown in FIG. **1** where the package support **46** is near its most highly elevated position. This motion is from the dotted line position of the table **46**, FIG. **3**, to the solid line position thereof to receive the first package from a batch and gradually step-by-step the table **46** retracts downwardly to the dotted line position in FIG. **3** to allow the table **10** to index when the chute is full.

The step-by-step downward operation is provided by means of a "monkey-bite" device incorporating a cockable member **60**, see particularly FIG. **4**, tending to be held in the position shown by means of a spring **62** against a stop bar or the like **64**. The plate **60** has an aperture therethrough which receives the rod **48** and when in the position shown in FIG. **4**, moves the same down one step under influence of a cylinder **66**, see FIGS. **1** and **3**. This cylinder is reciprocated in timed relation to move the rod **48** down one step, and on release of the rod, to move back upwardly again with the plate **60** out of engagement with the rod **48**, so that on the upward stroke of the piston **68** of the cylinder **66**, no action is taken, but on the downward stroke the rod **48** and support **46** move a distance conforming approximately to the thickness of a single package applied thereto by means of the vacuum head **32**.

The cylinder **66** is provided with appropriate air lines **70, 70** under control of a valve **72**, the valve **72** in turn being controlled by an electric counter-timer of conventional design located as shown in FIG. **2** at **74**. The cylinder **50** is also controlled by appropriate lines **76, 76** also under control of this counter and the timing sequence is such that the package support **46** is lowered in steps by cylinder **66** while the cylinder **50** is quiescent, but at a certain interval of time, *i.e.*, when the next ensuing chute **12** assumes the position of the already filled chute shown in FIG. **1**, the timer causes actuation of the proper electric valve, *i.e.*, **78** in FIG. **3**, to cause cylinder **50** to move the piston **52** to raise package support **46** in one motion from its lowermost to its topmost position. Now referring to FIG. **5** there is another cylinder (air motor) **80** also under influence of a four-way valve **82** again under control of the counter-timer **74**, and this cylinder causes actuation of a ratchet gear **84** by means of a trip clamp or the like **86** operating on a rod **88** to cause a dog or dogs **90** to index and hold the ratchet gear the amount desired to bring the next chute into operative position. It is pointed out that the mechanism shown in FIG. **5** is commercially available. The ratchet gear is attached to the central shaft for the table **10**, see **92**, FIG. **5**, and the four-way valve is connected with respect to the counter **74** in FIG. **2** so as to properly index the table at the required point.

In the operation of the device with an empty chute at station A, FIG. 2, the package support 46 extends to its upwardmost position; the packages are applied thereto, preferably, in the alternate relationship explained in my patent application identified above, until a certain predetermined number are mounted on support 46, the latter having been lowered step-by-step as explained above to the position shown in dotted lines in FIG. 3 where the chute is clear thereof, at which time the cylinder or air motor 80 is actuated to index the table as for instance from the position indicated at A in FIG. 2 to the position shown at B.

The operation of the mechanism including the cam 36, lever 34 and head 32, etc., is operated in equal steps at equal intervals, so that the counter is set to operate to control the operation of all of the parts without any interruption to the filling operation. Appropriate valves are actuated at appropriate intervals for all the cylinders to carry this relation out.

When the filled chute gets around to the proper station, see FIG. 2, an inverted box is placed over the chute with the open side of the box down. The operator then places a finger under the chute and lifts the box and the stacked packages upwardly, inverts the same and closes the box. This completes the packaging operation except for the fact that the boxes may be later placed in cartons.

I claim:

1. A stacking device for packages comprising a rotary head, means to index the head in step-by-step relationship past a loading station, a series of chutes mounted on said rotary head at spaced intervals thereon, each chute being upright, each chute being open at the top and the bottom,

a package support, means for moving said package support up through the bottom of a predetermined chute at the loading station to a topmost position therein, means to supply a series of packages to said package support one at a time, means for lowering said package support step-by-step in approximately the degree of the thickness of the packages, said last-named means eventually removing said package support completely through the lower open end of said chute,

means on said chutes supporting said packages when said package support has been removed, said package support moving means being operated in timed relation to the head indexing means,

the means for lowering the package support including an angularly movable apertured plate, a rod passing through the aperture, the plate grasping the rod in one angular position and releasing it in another angular position, and means to reciprocate the plate moving it down while grasping the rod and moving it up while free.

2. The stacking device of claim 1 wherein the means indexing the rotary head operates during the time interval when the means for supplying the packages to the chute is moving from the chute to a station where it picks up the next package.

3. The stacking device of claim 1 wherein the means indexing the rotary head operates during the time interval when the means for supplying the packages to the chute is moving from the chute to a station where it picks up the next package, the package support remaining down out of interference with the head during the same interval.

4. The stacking device of claim 1 wherein the means moving the package support include air motors and a counter, said counter being constructed and arranged to control the operation of the air motors.

5. The stacking device of claim 1 wherein the means to move the package support upwards operates but once during a rotary head index cycle step.

6. The stacking device of claim 1 wherein the means to move the package support upwards operates but once during a rotary head index cycle step and moves the package support one vertical step, from the lowermost point thereof to its topmost position.