

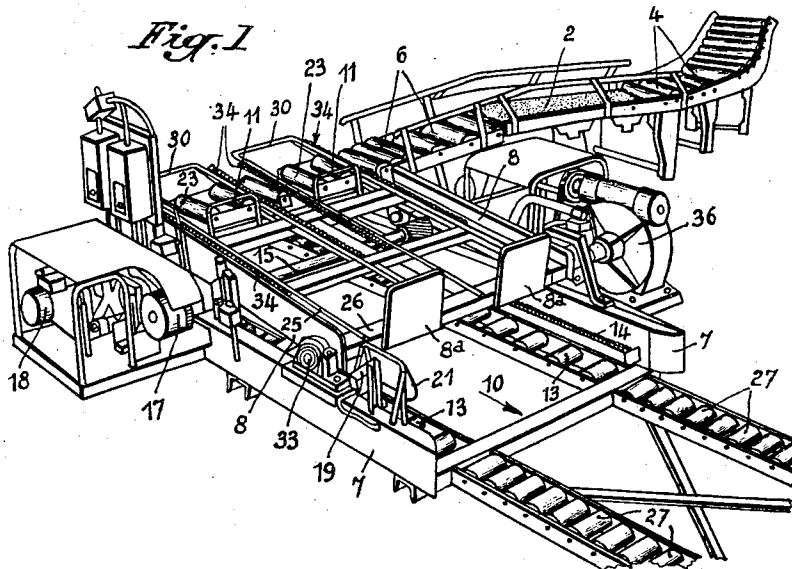
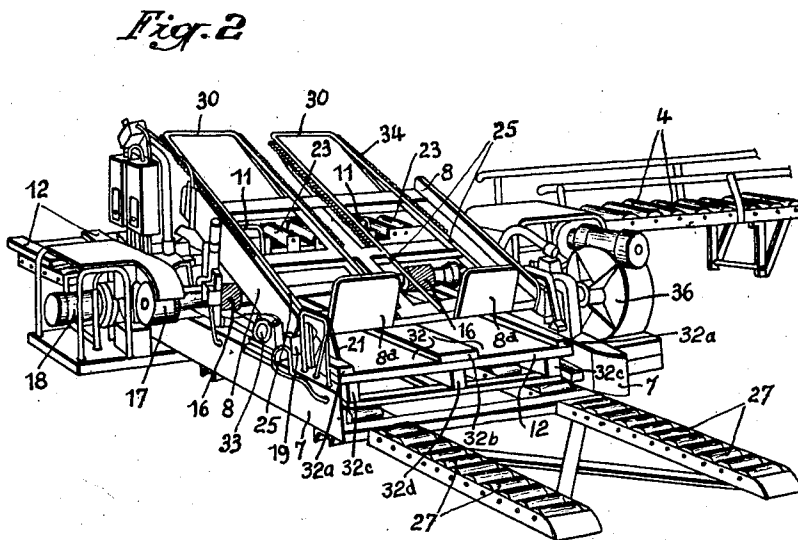
Dec. 25, 1962

L. M. Y. BARRIOL
APPARATUS FOR THE AUTOMATIC STACKING OF
PACKAGES ON MOVABLE PLATFORMS

3,070,240

Filed March 14, 1960

4 Sheets-Sheet 1



INVENTOR
LOUIS MARIE YVES BARRIOL
BY *Irwin S. Thompson*
ATTORNEY

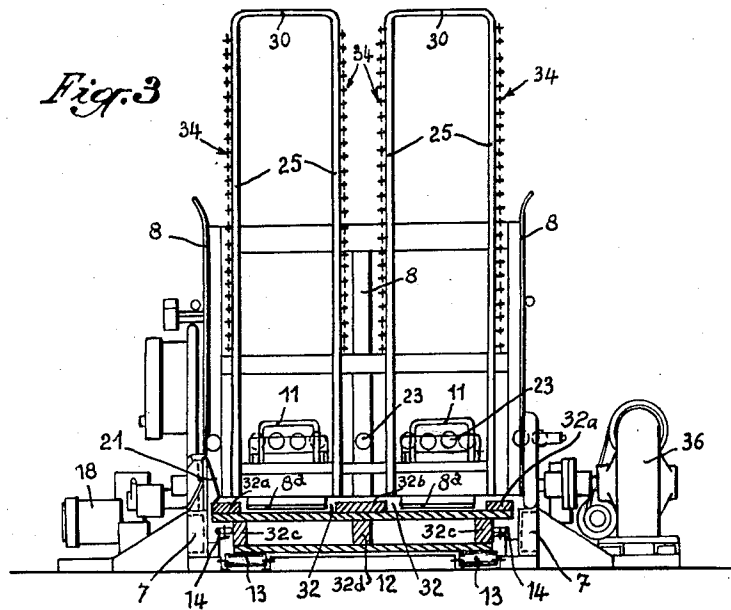
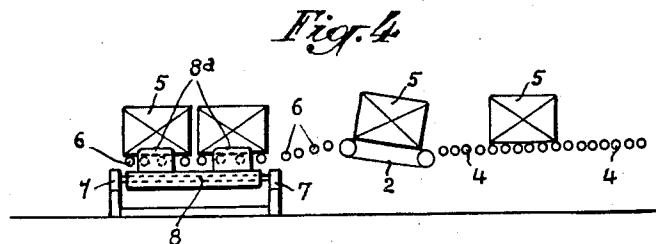
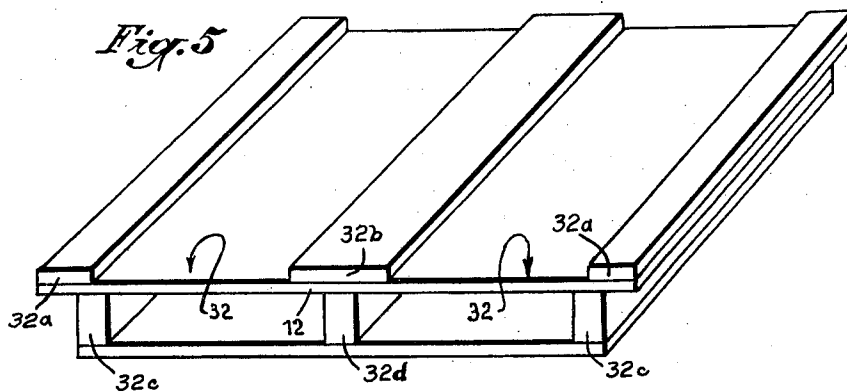
Dec. 25, 1962

L. M. Y. BARRIOL
APPARATUS FOR THE AUTOMATIC STACKING OF
PACKAGES ON MOVABLE PLATFORMS

3,070,240

Filed March 14, 1960

4 Sheets-Sheet 2



INVENTOR
LOUIS MARIE YVES BARRIOL
BY *Iwin S. Thompson*
ATTORNEY

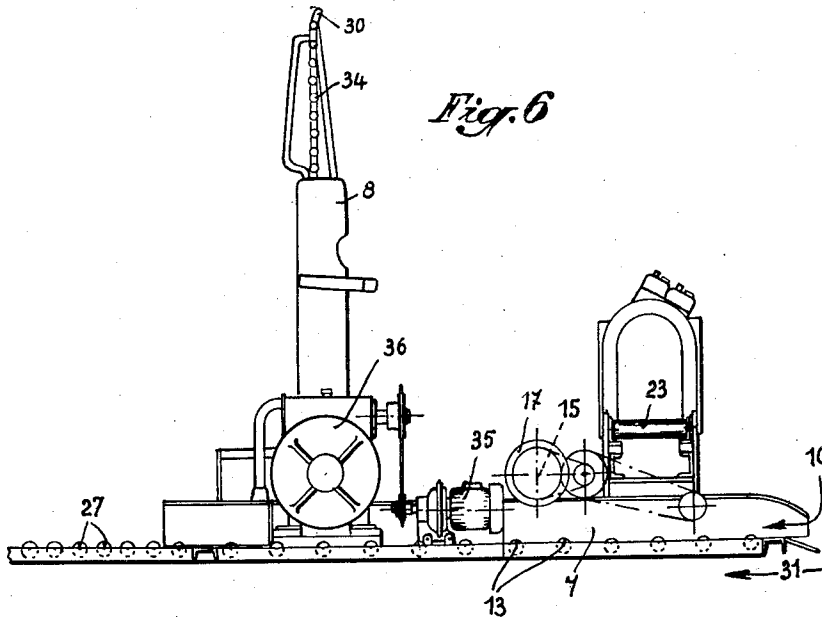
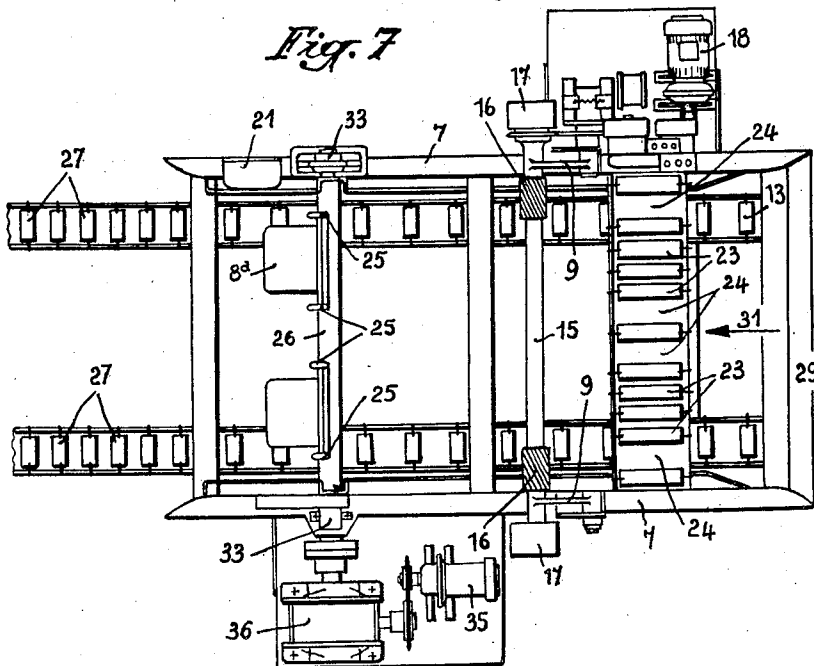
Dec. 25, 1962

L. M. Y. BARRIOL
APPARATUS FOR THE AUTOMATIC STACKING OF
PACKAGES ON MOVABLE PLATFORMS

3,070,240

Filed March 14, 1960

4 Sheets-Sheet 3



INVENTOR
LOUIS MARIE YVES BARRIOL
BY *Irwin S. Thompson*
ATTORNEY

Dec. 25, 1962

L. M. Y. BARRIOL
APPARATUS FOR THE AUTOMATIC STACKING OF
PACKAGES ON MOVABLE PLATFORMS

3,070,240

Filed March 14, 1960

4 Sheets-Sheet 4

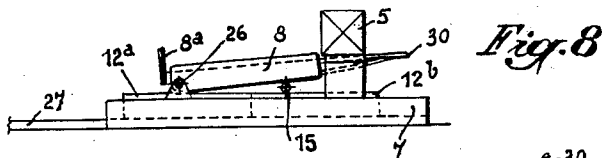


Fig. 8

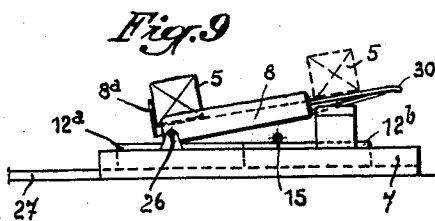


Fig. 9

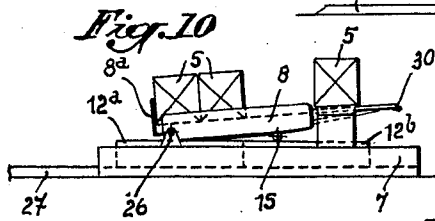


Fig. 10

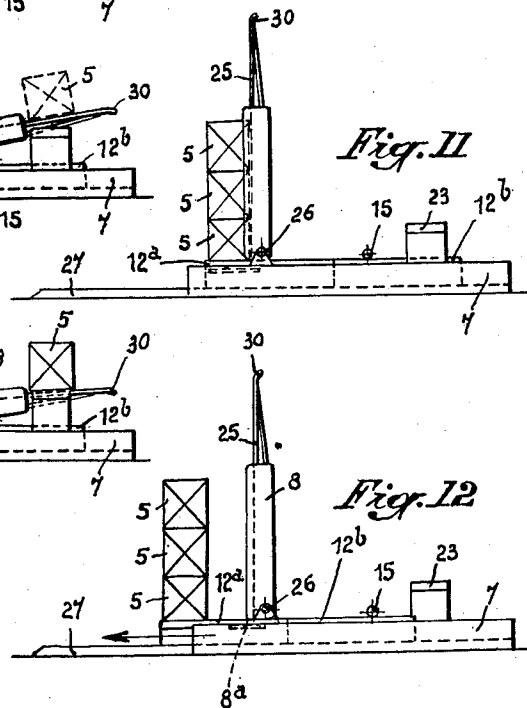


Fig. 11

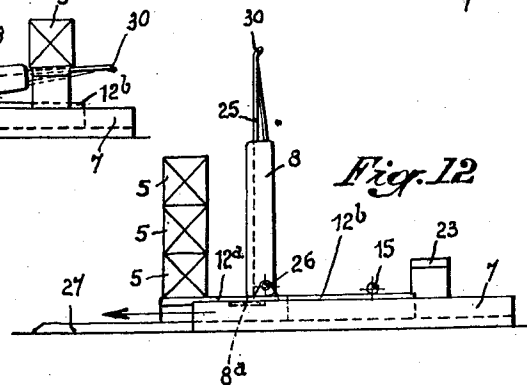


Fig. 12

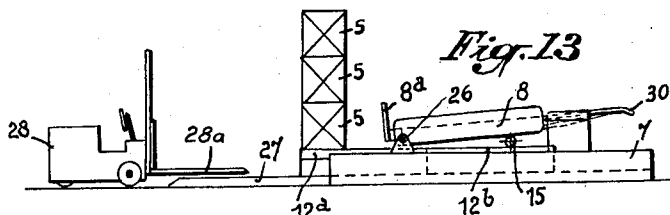


Fig. 13

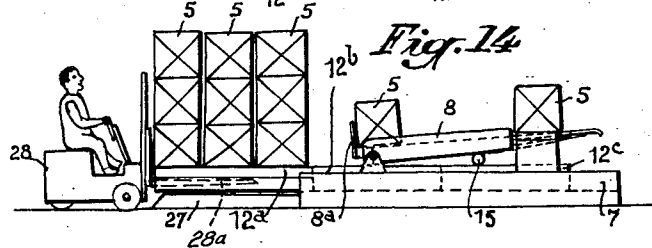


Fig. 14

INVENTOR

LOUIS MARIE YVES BARRIOL

BY *Irwin S. Thompson*
ATTORNEY

1

3,070,240

APPARATUS FOR THE AUTOMATIC STACKING OF PACKAGES ON MOVABLE PLATFORMS

Louis Marie Yves Barriol, Marseille, France, assignor to Etablissements Economiques du Casino, Guichard-Perachon & Cie, a company of France

Filed Mar. 14, 1960, Ser. No. 14,697

Claims priority, application France July 29, 1959

10 Claims. (Cl. 214-6)

Warehouses, such as those associated with commercial or transportation concerns, have to handle daily a large number of packages and boxes.

Such a handling is obviously considerably furthered in the recent years by the use of roller conveyors and of belt conveyors ensuring, without requiring any muscular effort, the progression of the packages, while platforms or boards are used, over which a number of packages may be stacked, the transportation of said packages being then after ensured by means of a hand or power-operated load-lifting carriage, which raises slightly such platforms or boards, so as to move them into another location.

However, between the moment at which the packages enter the roller or belt conveyors and their further transportation on platforms or boards, there is a gap in mechanical operation during which it is necessary to resort to manual transfer; this transfer stage consists in the stacking up of the packages and their shifting onto the platform or board. An unskilled workman is therefore entrusted with the removal of the packages off the output end of the conveyor and their stacking on the platform, which forms a tedious work associated with a considerable loss of time.

The present invention has for its object an apparatus for automatically stacking up the packages over a platform intended for their transportation. Said apparatus includes the use in combination of the following parts:

An elevator of the running belt type, located at the end of a roller conveyor and adapted to provide for the automatic loading of the packages;

A rectangular support or frame laid at ground level and carrying the different means provided for the positioning of the boards or platforms to be loaded;

A rocking member designated hereinafter by the abridged expression "a rocker," which is secured to the frame, which, after it has been loaded with packages, executes a rotary movement through about one quarter of a circle, so as to lay the packages carried by it in superposed relationship on the platform or board which is suitably positioned in order to receive them.

The accompanying diagrammatic drawings illustrate, by way of example, a preferred embodiment of such an arrangement. In said drawings:

FIG. 1 is a general perspective view of the apparatus showing the rocker in its inoperative position.

FIG. 2 is a similar view showing the rocker at the beginning of its operative stroke.

FIG. 3 is a front view showing the rocker in its raised position for which the packages are adapted to be laid on a platform.

FIG. 4 shows diagrammatically the path of the packages towards the rocker.

FIG. 5 is a perspective view of a platform.

FIG. 6 is a side view of the apparatus with the rocker set in its raised position for the unloading of the packages.

FIG. 7 is a plan view of the apparatus.

FIGS. 8 to 14 are simplified views showing the different operative steps to be performed starting from the moment at which the packages arrive on the rocker to be laid by the latter on the platform which moves away after it has been loaded.

In the apparatus illustrated, the elevator is constituted

2

by a conveyor belt 2 actuated by an electric motor (FIGS. 1 to 4). Said belt, the length of which is about 1.50 meters, is located at the end of the roller conveyor 4.

The packages 5 fed by the roller conveyor 4 slide off the latter onto the belt 2 which carries them along and raises them slightly, say by about 15 cm., as illustrated in the example shown in FIG. 4, so as to lay them at the end of said belt onto a small slightly sloping conveyor including a few rollers 6.

Through said arrangement, the packages 5 slide automatically above and across the stationary frame 7 onto the rocker 8 which is thus loaded or fed automatically. The conveyor belt 2 does not operate continuously and it is controlled by roller-carrying contact-pieces, not illustrated, which are adapted to stop the belt by switching off the current as soon as two packages 5 have been set on the rocker 8 (FIGS. 4 and 8) and as long as said two packages have not slid down to the lower edge of said rocker. At this moment, the two roller-carrying contact-pieces are released, the current is restored and the belt 2 is started again, so as to feed the apparatus with two further packages 5.

The frame 7 (FIGS. 1, 2, 6 and 7) includes at its lower end a slideway into which are introduced the platforms 12 which are to serve for the further conveyance of the packages.

Said platforms 12 move forwardly over the rollers 13 and are guided laterally by the rollers 14 (FIG. 1) fitted over ball bearings.

Said platforms 12 are driven by a shaft 15 (FIG. 1) provided at its end with a helically fluted wheel 16 which is in contact with the wooden surfaces of the platforms 12, so as to drive the latter forwardly through friction.

Said shaft 15 should always bear in a uniform manner and without any exaggerated pressure against the platforms, so as to absorb the small possible differences in level between the latter and to prevent any jamming, or else, any idle skidding. To this end, said shaft 15 is carried by a pivoting arm 9 and is weighted at either end by a mass 17 (FIG. 7) ensuring a uniform friction.

The driving shaft 15 driving the platforms 12 is driven by an electric motor 18 controlled by a switch 19 (FIG. 1) which is actuated in its turn by the packages 5 urging downwardly a plate 21 when they have entered their normal position on a platform 12 (FIG. 13).

The frame 7 is provided also with conveyor rollers 23 parallel with the rollers 6 and adapted to carry the packages 5 when they are fed onto said frame (FIG. 7). In spaces 24 provided between certain rollers 6 are inserted collapsible uprights 25 forming part of the rocker 8, the pivotal shaft 26 of which is secured to the frame 7, as described hereinafter.

The part played by the frame 7 consists therefore in:

Collecting the packages 5 on the conveyor rollers 23;

Positioning the platforms 12 and providing for their forward motion;

Forming a support for the rocker 8.

The frame 7 lies at ground level and includes an extension resting on the ground through the agency of further rollers 27 which allow each platform 12, when loaded to be released and to enter the fork lift 28a of elevator carriage 28 adapted to provide for the further conveyance of the platforms, as illustrated in FIGS. 13 and 14.

Said frame allows therefore handling the packages as follows:

Two platforms 12 are inserted endwise over the frame in the direction of the arrow 31 (FIGS. 6, 7) through the rear end of said frame, as shown at 29 (FIG. 7), said platforms being guided inside the slideway 10, as shown in FIG. 6.

The platform 12a (FIGS. 8 to 13) is first carried along

3

frictionally by the shaft 15 and then urged forwardly by the second platform 12b which is driven in its turn by the shaft 15 and the first platform 12a is thus set automatically in the position in which it is to be loaded by the rocker.

When the platform 12a (FIG. 14) has been completely loaded, it is urged further out and onto the outer rollers 27 through the platform 12b entering in its turn its loading position, under the action of the thrust produced by the introduction of a further platform 12c, and so on.

As apparent from the preceding disclosure, the operation of said apparatus requires special platforms adapted to slide easily inside the frame. Such a platform designated as 12 in FIGS. 2, 3 and 5 is provided in the upper surface with lands or projecting sections 32a and 32b so as to form two recesses 32. The lower section of the rocker 8 has mounted thereon terminal plates 8a which are received in recesses 32 as shown in FIG. 3, so that said rocker can lay the packages 5 onto the platform, thereby easily receding after leaving the packages in position. Beneath the upper surface of platform 12 there are provided stringers 32c and 32d forming additional recesses 32e into which fork lift 28a of elevator carriage 28 can be inserted (FIG. 14).

The rocker 8 is constituted by a metal frame secured, through one edge, to the shaft 26 round which it may pivot. The two ends of said shaft 26 rest on the main frame 7 of the apparatus, through the agency of ball bearings 33.

The side of the rocker 8 facing away from the shaft 26 includes two forks 30 forming extensions of the uprights 25 rigid with the plates 8a, said forks being adapted to engage the intervals between the rollers 23 carried by the frame, so as to be capable of raising the packages which are positioned on said rollers.

Alongside the legs of said forks 30, there are provided four rows of balls 34 forming guiding raceways for the packages over the rocker.

Across the ends of said raceways, there are provided, in parallelism with the pivotal axis constituted by the shaft 26, the two terminal plates 8a of the rocker on which the packages 5 are adapted to bear.

The pivotal shaft 26 of the rocker is driven by an electric motor 35 (FIGS. 6, 7) through a speed reducer 36 including a worm and a worm wheel. A reversing system allows providing for the pivotal motion of the rocker forwardly and rearwardly, as required.

The operation of the arrangement described is as follows: the packages 5 having entered the rollers 23 on the frame 7, as provided through the agency of the conveyor belt elevator 2, they are raised by the forks 30 of the rocker 8 and are thus released with reference to the stops 11 secured to the frame 7.

The package slide under the action of mere gravity along the raceways constituted by the balls 34 until it impinges against the terminal plates 8a on the rocker 8 (FIG. 9).

After this first stage, the rocker returns into its original position illustrated in FIG. 8 and, two further packages being positioned on the rollers 23, they are raised in their turn by the forks 30 of the rocker and they slide, as disclosed precedingly, under the action of gravity along the raceways until they are arrested by the two preceding packages (FIG. 10).

The operation is repeated a third time so that, three times two packages are loaded on the rocker 8, which is then caused to assume a vertical position, as illustrated in FIG. 11. Its terminal plates 8a enter then the empty spaces or recesses 32 in the underlying platform, so that the packages 5 rest on the projecting sections or lands 32a and 32b of said platform. The packages thus laid over the platform bear on the plate 21 secured to the frame 7, which plate controls switch 19 controlling the progression of the platforms, each of which progresses then by a length equal to that of the contact plate, i.e.

4

by the length of the packages 5 which is equal thereto.

At this moment, the terminal plates 8a of the rocker are released and the rocker may pivot rearwardly, so as to return into its starting position, with a view to executing a further operation having for its result to set a further series of three times two packages onto the platform adjacent the first series of packages and so on until the platform has been completely loaded.

At this moment, the platform projects entirely outside the frame 7, while another platform enters the location thus abandoned by the first platform and the operative cycle begins once over again.

The rocking operation has for its result to pile up the packages over transverse surfaces of the latter, instead of over the surface through which said packages bear when they enter the roller conveyor. This produces a considerable advantage in the case of racks for bottles such as wine bottles which have to be arranged horizontally when stored, but it may occur that it is necessary to pile up the packages in an upright position. To this end, it is sufficient for the operator to lay down the packages at the moment at which they enter the apparatus. This is a very easy operation, since the operator does not have to raise the packages, but only makes them pivot round one of their ridges, so as to turn them by 90°.

Through said means, the packages are raised into their upright position when the rocker lays them over the platform or carrier board.

The apparatus disclosed hereinabove for the automatic stacking of the packages is of a simple and cheap execution. It allows, without any handicraft being required, taking the packages at the output of a roller conveyor and stacking them up in a methodical manner over the platforms serving for their subsequent transportation. Said apparatus is more particularly of interest, but by no means in an exclusive manner, in the case of warehouses wherein boxes, bottle racks of wood or metal, which may be full or otherwise, are to be handled, as is required chiefly in the industries and trades relating to wine, beer, lemonade, mineral waters and the like. But it will be readily ascertained that the apparatus described may serve for the transportation of any other type of packages.

Obviously, the apparatus described is not limited to the sole embodiment which has been more particularly described and it covers all the modifications thereof falling within the scope of the accompanying claims. In particular, it is possible to make the apparatus operate with three independent electric motors actuating respectively:

The conveyor belt feeding the packages into the apparatus;

The progression of the platforms over their path;

A third electric motor providing for a pivotal motion of the rocker round its shaft from front to rear and reversely.

The operation of said motors is synchronized and controlled by a set of contact-pieces which stop and start the elevator provided with an endless belt and which provide for the progression of the platforms in accordance with a predetermined timing and raise the rocker either partly (FIG. 2), so as to make the packages slide over it, or else, completely, so as to set the packages in vertical relationship (FIG. 11), after which the rocker is returned into its starting position (FIG. 8). However, the three motors may as well be replaced by a single motor provided with a system of oleopneumatic control means. Similarly, it is possible to provide for control through photo-cells instead of through mechanically operating switches.

The apparatus has been described as providing for the handling of two juxtaposed rows of groups of three superposed packages, but, obviously, the same apparatus may serve for handling a single row of superposed pack-

5

ages, or else, for three or four or even more rows, while the number of packages to be superposed may be different from three.

What I claim is:

1. An apparatus for the automatic stacking of packages onto shiftable and portable pallets comprising first conveying means for moving packages therealong, a stationary frame disposed at substantially right angles to and at the end of said conveying means and carrying second conveying means for receiving said packages in predetermined numbers thereon, a slideway extending underneath and substantially at right angles to said first conveying means on which said pallets are intermittently moved, rocker means pivotally mounted on said stationary frame for rocking from a substantially horizontal position to a vertical position, said rocker means including third conveying means having a portion disposed across and beneath said second conveying means, means for rocking said rocker means from said substantially horizontal position to an intermediate position less than vertical to stack a predetermined number of packages on said rocker means whereupon said rocker means is rocked to said vertical position to deposit on a leading pallet a stack of packages and means for intermittently moving said pallets along said slideway after said rocker means has been rocked from said substantially horizontal position to said vertical position so as to deposit further stacks of packages on said leading pallet from said rocker means.

2. An apparatus according to claim 1 in which stop means are mounted on said second conveying means to maintain a predetermined number of packages on said second conveying means while said portion of said third conveying means engages the packages as said rocker means is being rocked from its substantially horizontal position.

3. An apparatus according to claim 1 in which said rocker means includes a plurality of upright members on which said third conveying means are disposed, an axis parallel with and spaced from the longitudinal axis of said first and second conveying means on which said upright members are pivotally mounted, and terminal plates disposed at the ends of said upright members at right angles thereto to receive said packages prior to being deposited on said pallets.

4. An apparatus according to claim 1 in which said slideway includes an extension of said frame disposed underneath said rocker means, roller means mounted on said extension for moving and guiding said pallets therealong.

5. An apparatus according to claim 1 in which said means for intermittently moving said pallets includes a shaft mounted on said frame above said slideway having engaging means for engaging said pallets to move same along said slideway upon rotation of said shaft, and motor means operatively connected to said shaft to rotate same.

6

6. An apparatus according to claim 3 in which said rocking means includes reduction gearing means connected to said axis on which said rocker means is pivotally mounted, and motor means operatively connected to said reduction gearing means to drive same.

7. An apparatus according to claim 1 in which contact makers controlled by the location of the packages and providing for operation in a predetermined time sequence are disposed adjacent said second conveying means to control operation of said first conveying means and said rocker means and adjacent said rocker means where the packages are deposited on the pallets to control operation of the pallet moving means.

8. An apparatus according to claim 3 in which each pallet includes longitudinal lands separated by recesses, said terminal members being disposed within the recesses as said rocker means deposits the packages on the longitudinal lands of the leading pallet.

9. In an automatic stacking apparatus for packages the combination of rocker means tiltable round a stationary horizontal axis mounted on a frame and including two carrier surfaces at substantially right angles with reference to each other, the first carrier surface being disposed on the rocker means, the second carrier surface being disposed on said frame, the first carrier surface having upright members separated by gaps extending perpendicularly to said horizontal axis and being angularly tiltable between a substantially horizontal position wherein a portion of said upright members is disposed across and underneath the second carrier surface and a vertical position, means for shifting a predetermined number of packages side by side onto the second carrier surface, and at least one platform adapted to be shifted intermittently underneath said rocker means along a substantially horizontal slideway at right angles to said stationary horizontal axis after said rocker means has been shifted from said substantially horizontal position to said vertical position so as to deposit stacks of packages on said platform from said rocker means.

10. In an automatic stacking apparatus according to claim 9 in which said upright members adjacent said stationary horizontal axis have terminal members disposed thereon to receive packages from the second carrier surface, said platform includes a number of lands parallel with the direction of shifting of said platform, said lands being separated by recesses, said terminal members being disposed within the recesses as said rocker means deposits packages on the lands of the platform.

References Cited in the file of this patent

UNITED STATES PATENTS

2,508,698	Von Beren	May 23, 1950
2,509,682	Golrick	May 30, 1950
2,947,125	Wilson et al.	Aug. 2, 1960
2,989,195	Dreyer	June 20, 1961