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[31] **68/04963**

[56]

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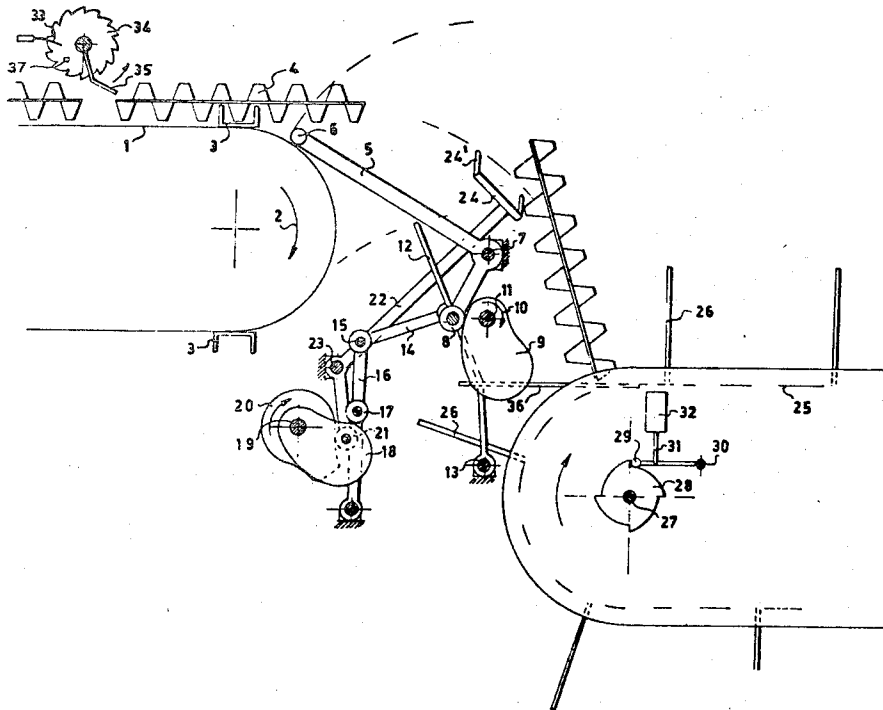
[54] **DEVICE FOR STACKING EGG-TRAYS**
 6 Claims, 4 Drawing Figs.

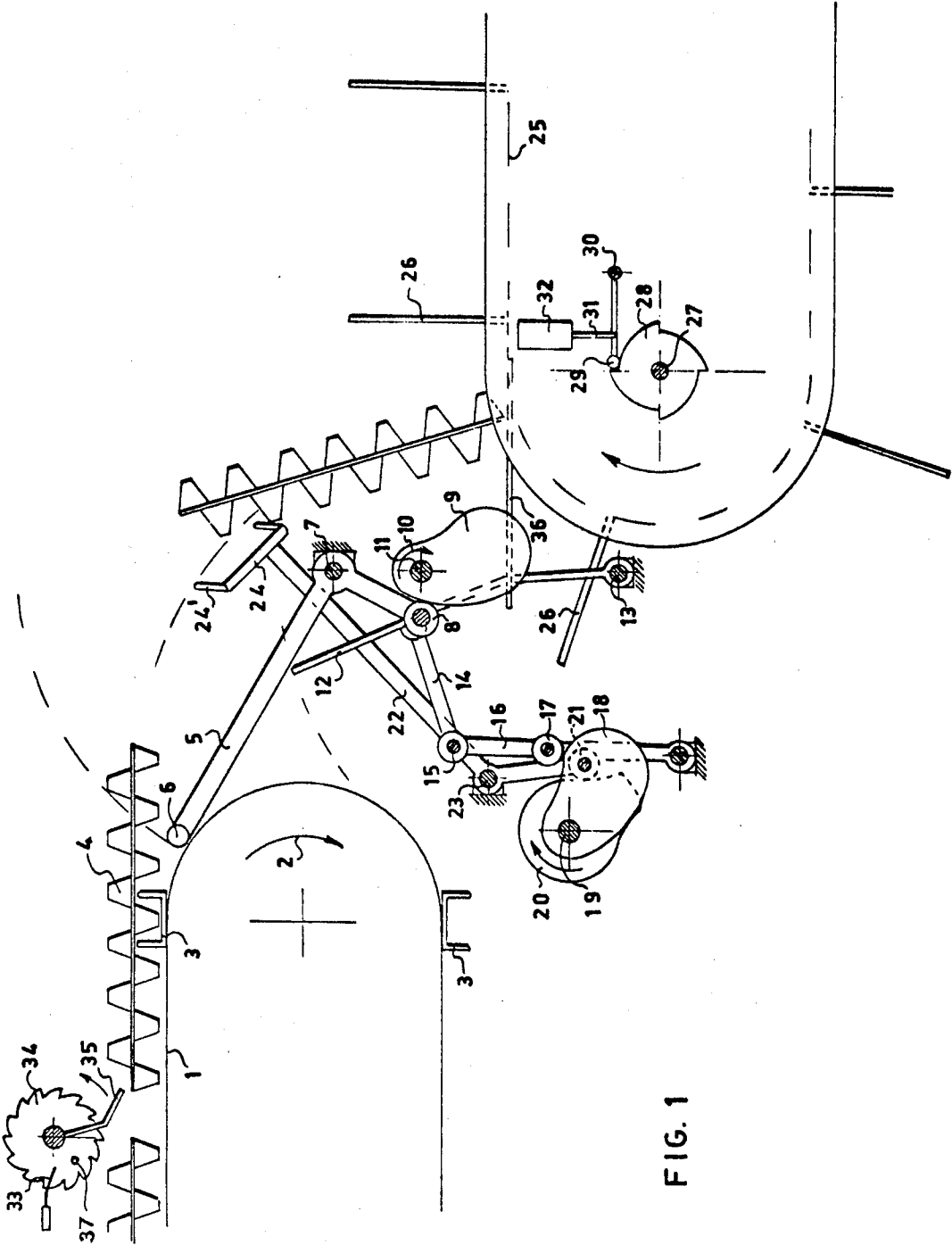
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198/135

[51] Int. Cl. **B65h 3/30**

[50] Field of Search **198/27, 33**
R, 35, 20

ABSTRACT: The invention relates to a device for handling mainly flat objects, which device has a supply belt, a swinging member for lifting an edge of a flat object protruding from the output end of the supply belt to inverse said object, a swingable flap for receiving the objects and bringing them into a standing position unto a transport belt, as well as means for backing the object for preventing it from falling back when moved unto said transport belt.





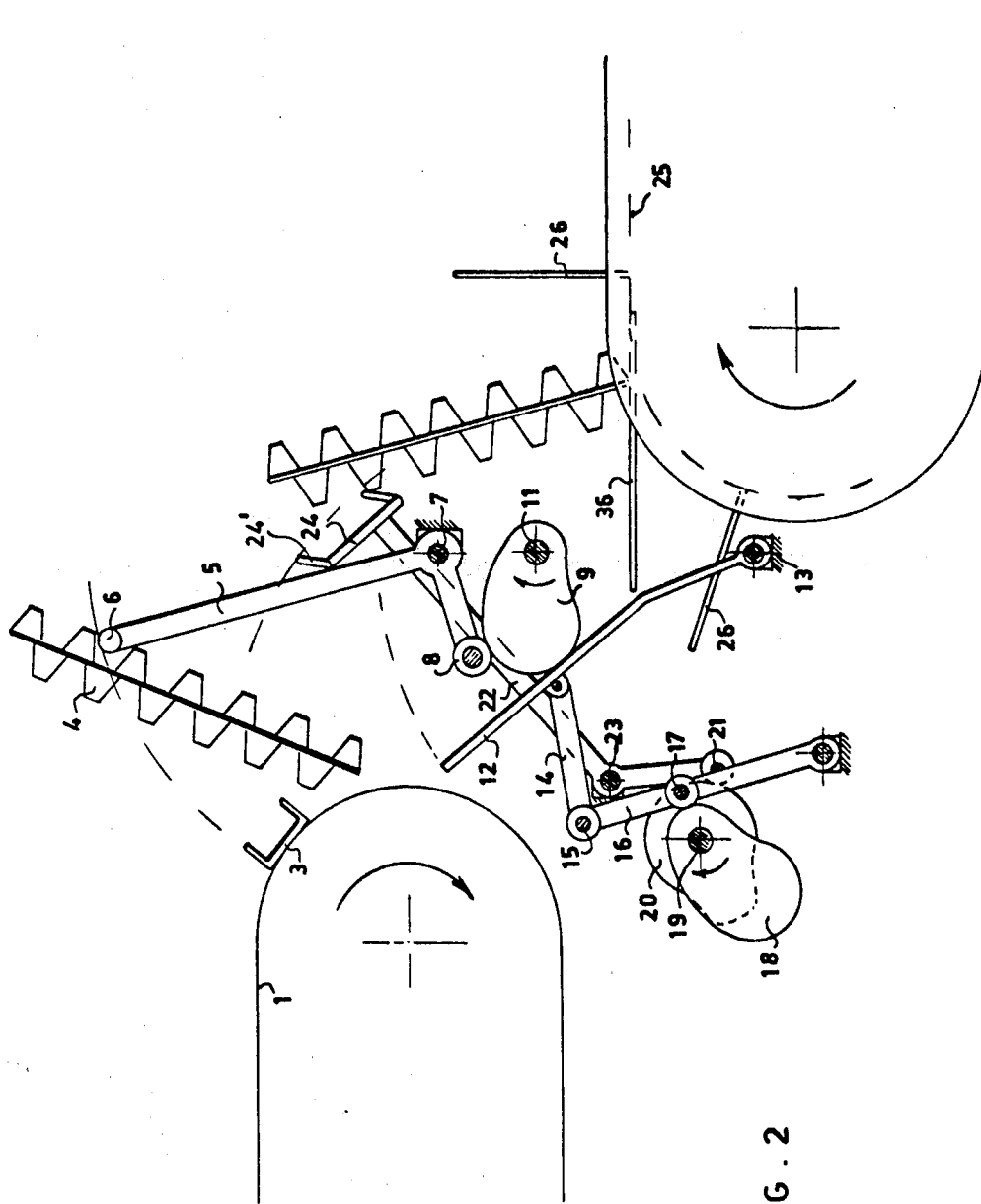
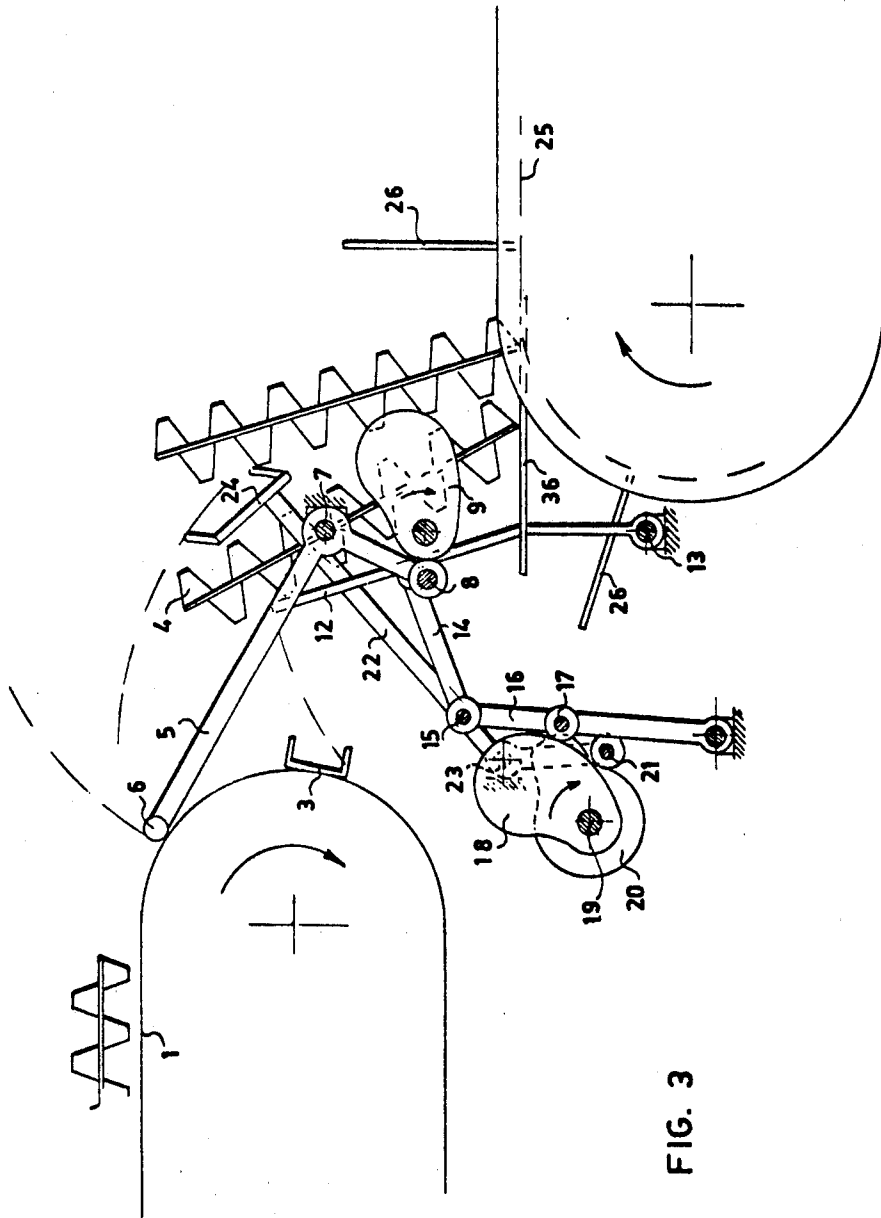


FIG. 2



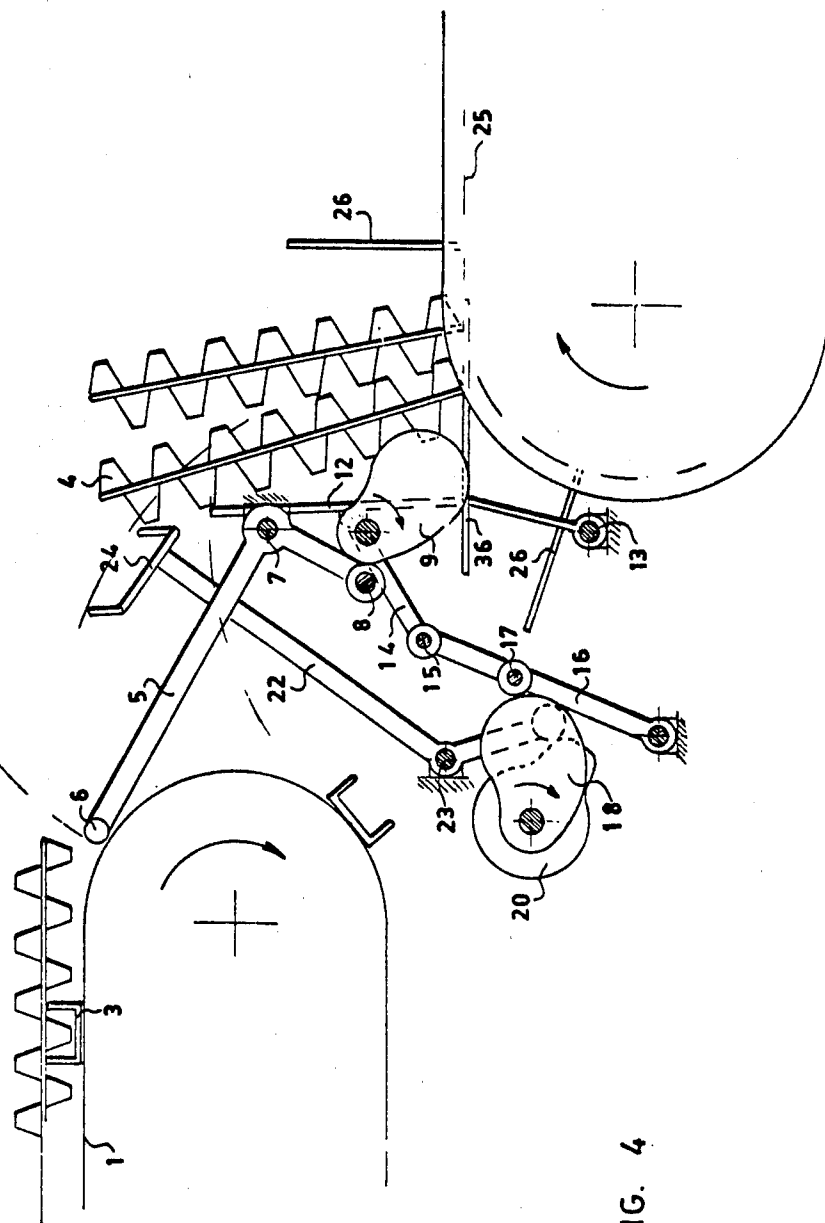


FIG. 4

DEVICE FOR STACKING EGG-TRAYS

The invention relates to a device for stacking objects, which mainly are flat, like egg-trays, in the following to be mentioned trays, provided with a driven supply-belt which belt is provided with members for taking along the trays.

Especially with automatic machines for handling eggs, e.g. the sorting thereof, the problem occurs, that the eggs are supplied on egg-trays, and that one has to see to an as much as possible automatic removal of these trays. Said egg trays are relatively large and consequently it is desired that such a device is as compact as possible and takes up little room.

A further important desire is, that the egg-trays are reversed, before being removed, so that they drop the dirt present on their upper sides. This is an important advantage when the trays are used again.

The invention provides a simple and, as experience has shown, reliable device, complying with the above mentioned desires.

Accordingly it is provided according to the invention that at the output end of the supply belt a pivotable taking over member has been mounted, which is connected with a driving mechanism that has been coupled with the movement of the supply belt and has been arranged to enforce a pivot movement to the taking over member, owing to which it grips the under side of the leading portion of a tray protruding outside the outlet end of the supply belt and swings upwardly for lifting the leading portion of the tray and to free the tray from the supply belt, with which the end portion of the tray swings downwardly and furtheron.

It is desired to give the downwardly inclined trays an exact location. Moreover it is advantageous to bring them into a vertical position in order to limit the length of the machine.

Accordingly it is provided according to the invention that a receiving flap is present, which flap can be swung to and fro and can swing between a position in which its end edge is near the output end of the supply belt and a second position, in which its end edge is positioned further away from the said output end and is higher than in the first position, which flap cooperates with a driving mechanism which has also been coupled with the movement of the supply belt, which driving mechanism allows the flap to carry out the movement from the first unto the second position, after the taking over member has been swung upwardly.

With this the trays are canted by which they take up only little room. In order to further automatize the removal it is provided according to a further elaboration of the invention, that a transport belt is provided having vertical stop members, which take over the tray in a vertical position from the flap, after the tray has been swung upwardly away from the supply belt.

Because the tray when applying the invention carries out a rather free swinging movement the possibility exists that it is e.g. caught a little bit too long by the taking along member and this disturbs the good working. It is also possible, when a flap that can be swung upwardly is used, that the tray will not remain standing in the vertical position.

These two possibilities of interruptions are removed according to a further elaboration of the invention, in that a stop member is present, which is connected with a driving mechanism coupled to the supply belt, which driving mechanism can swing the stop member from a first position into a second position, being nearer to the supply belt, said driving mechanism carrying out the movement from the first position into a second position in the course of time in which the flap swings the tray upwardly, while the stop member moves along the upper side of the tray for immediately hereafter moving back in order to stop the tray from falling back.

In order to control at the same time the swinging movement of the tray when it is lifted by the taking along member, the stop member preferably has a portion lying in said first position

in the path of the end portion of a tray, when this, after having been freed from the supply belt, swings downwardly and swings furtheron.

A further elaboration of the invention consists in that the transport belt is provided with a stepwise working driving and in that the supply belt contains a counter, which, after counting a predetermined number of trays, operates the driving of the transport belt for moving said belt forwardly over a step, in which way it is possible to remove the trays in stacks of a predetermined number and vertically canted, so that they take up as little room as possible.

The invention is in the following further elucidated on hand of the schematical drawing, in which:

FIG. 1 shows a view of a device according to the invention in a first position;

FIG. 2 shows the same device in a following position;

FIG. 3 shows the same in still another position; and

FIG. 4 shows still another position of the same device.

In the drawing 1 indicates a transport belt which is driven in the direction of the arrow 2, which driving preferably is continuously. The transport belt 1 is provided with taking along members for egg-trays 4.

At the end of the transport belt a L-shaped lever 5 is present which bears a rod or arm 6 perpendicular to the plane of drawing, which rod serves to support the leading end of the tray until the trailing end thereof clears the end of belt 1 and is free to tumble downwardly while the leading end thereof remains supported by rod 6. The L-shaped lever 5 has a fixed pivot point at 7 and runs with a follower roll 8 on a cam 9, which is driven in the direction of the arrow 10. The shaft 11 of said cam 9 has been coupled with belt 1 such, that the cam carries out a complete revolution when the belt covers the distance between two succeeding taking along members 3.

Further a pivotable guide flap 12 has been mounted, which can pivot about a permanent shaft 13. With said flap a coupling rod 14 has been coupled which by means of a pivot 15 is connected with a swinging arm 16, which bears a cam follower roll 17, running on a cam 18. A further cam 20 is attached to the shaft 19 of said cam. The shaft 19 has been coupled with the driving of the belt 1 such, that it makes one revolution when this belt covers the distance between two taking along members 3. This means in other words that the shafts 11 and 19 have been coupled with each other, such that they rotate identically.

On cam 20 a follower 21 runs, which is attached to the end of a bent arm 22, which at 23 has a fixed pivot. At the end of arm 22 a short traverse arm 24 is present having upwardly inclined support fingers 24'.

Further a transport belt 25 is present bearing protruding baffles or props 26 perpendicular to the main plane of the belt 25. Belt 25 runs along a driving wheel (not shown) with the shaft 27. On said shaft a pawlwheel 28 has been mounted, which is stopped by a pawl 29, which is pivotably attached at 30 and is connected with an electromagnet 32 by means of a coupling rod 31. Said electromagnet is controlled by an electric contact 33 (above to the left in FIG. 1), which cooperates with a pawlwheel 34, having 14 teeth. Said pawlwheel is stepped one tooth further every time so that pawl 35 after being fallen into the interspace between two succeeding trays 4, is again pushed on by the next tray.

The working of the device as described is as follows.

In the position of FIG. 1 the swinging arm 5 with the taking along member 6 attached thereto is, because of the shape of the cam 9, at the beginning of a swinging movement to the right. When said movement starts the taking along member 6 grips the leading portion of the tray 4 at its lower side and swings it upwardly, with which the tray is released from the taking along member 3. Owing to the shape of the cam 18 arm 16 swings to the left and by this flap 12 swings also to the left. The stop member 24 moves somewhat further on to the right.

The next stage has been shown in FIG. 2, where the tray with its front side has been lifted so far, that the back side slides free of the belt 1. By this the tray swings in the reversed

direction with which it, if necessary, is stopped by the left finger 24' of the stop member 24. After that the tray falls reversedly on to the sloping flap 12, which in the mean time has swung to the left with respect to the position of FIG. 1. Thereupon said flap swings to the right owing to the movement of the cam 18 and the tray comes into the position shown in FIG. 3. At this moment the cam 20 has a strongly rising portion, which cooperates with the follower roll 21, so that the stop member 24 swings to the left, just along the upper rim of the tray 4. Shortly after that the stop member swings again to the right in order to then support and stabilize the tray 4 from behind (which tray in the mean time has been swung further on by the flap 12), and to prevent the tray from falling back, when flap 12 again swings to the left. This position is shown in FIG. 4.

With the swinging movement of the flap 12 from the position of FIG. 2 to that of FIG. 3 it moves along a supporting plate 36, which is provided with a recess for allowing the passage of the partitions 26.

It will be clear, that the cams, like 9, 18 and 20, are positioned outside the paths of the transport belts 1 and 25 and that it can be advantageous to mount on both sides of said belts a pair of such cams.

When a tray 4 passes the pawlwheel 34 is move every time a position further on in the direction of the arrow. When pin 37 cooperates with the switch 33, this is closed. This switch has been included in the feeding circuit of the electromagnet 32, owing to which the latter releases the pawlwheel 28. This is driven by a friction coupling (not shown) the driving side of which has been coupled with the movement of the belt 1. Therewith belt 25 shifts further on along a distance corresponding with the distance between two succeeding partitions 26. Between two of such partitions as many trays 4 are present in a vertical position then, as the pawlwheel 34 has teeth. The unit 33, 34, 35, 36, 37 forms a counter and it will be clear that every other suitable counter can replace this unit.

I claim:

1. Apparatus for at least substantially inverting generally flat traylike articles comprising:

1. A delivery conveyor 1 advancing said articles 4 in succession one by one along a predetermined path to a predetermined transfer point at the end of said conveyor;
2. A receiving conveyor 25 disposed generally parallel to and below said delivery conveyor for receiving the articles from said delivery conveyor, said receiving conveyor beginning at least adjacent said transfer point; and
3. A mechanism for transferring said articles from said first to said second conveyors while simultaneously substantially inverting the same, which comprises:
 - a. a front end support arm 5,6 for engaging the leading end of said each article in turn as the same leaves the end of said delivery conveyor at said transfer point, said

arm being movable from a position proximate said transfer point to a position sufficiently spaced therefrom generally in the direction of advance of said articles that the trailing end of the article clears the delivery conveyor while the leading end is supported by said support arm;

- b. Means 8,9 for moving said support arm 5,6 to and fro between said positions in timed relation to the arrival of said articles at said transfer point, and
- c. A guide flap (12) disposed generally obliquely between the two conveyors at said transfer point with the lower end thereof extending adjacent said second conveyor, said guide flap directing the initially trailing end of the article, upon release thereof from said first conveyor, onto said second conveyor while the initially leading end remains supported by said support arm (5,6) until said ends are substantially reversed, whereby said articles are received on said second conveyor in reversed endwise relation.

2. The apparatus of claim 1 wherein said delivery conveyor comprises an endless belt having cleats at spaced points therealong for engaging each of said article intermediate its ends and the second position of said support arm is also spaced above the path of said first conveyor to disengage said articles from the corresponding cleat.

3. The apparatus of claim 1 wherein said articles are stacked in generally angular relation on said second conveyor and said guide flap is pivotable about its lower end, and including means for swinging said guide flap about the lower end thereof upwardly to orient in said angular relation to said second conveyor the new trailing end of the article after release thereof from said support arm 5,6.

4. The apparatus of claim 3 wherein said receiving conveyor is an endless conveyor and includes at spaced points therealong upstanding props 26 to maintain groups of said articles in said stacked angular relation.

5. The apparatus of claim 4 including intermittently operating drive means 27,28,29 for said receiving conveyor, and counting means 33,34,35,37 associated with said delivery conveyor for counting the number of articles delivered thereby, said counting means actuating said intermittent drive means to advance said receiving conveyor to receive a fresh group of said articles after a predetermined number of articles constituting one group has been counted by said counting means.

6. The apparatus of claim 3 including a stabilizing backstop 24 movable between an operative position supporting the upper end of an article after delivery thereof in angular relation on said receiving conveyor by said guide flap to an inoperative position spaced clear of said article upper end to permit a further article to be delivered into place, and a drive for moving said backstop 24 between said positions in timed relation to the swinging movement of said guide flap.

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