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.
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 driving supply belt, on 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 devise 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 undertale 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 cantied 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 transporting 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 posi-
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direction with which it, if necessary, is stopped by the left finger 24° of the stop member 24. After that the tray falls reversely 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 26, 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 operative 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.