Oct. 29, 1963 G. D. WOODY 3,108,679

CONVEYING APPARATUS

Filed July 13, 1962 2 Sheets-Sheet 1

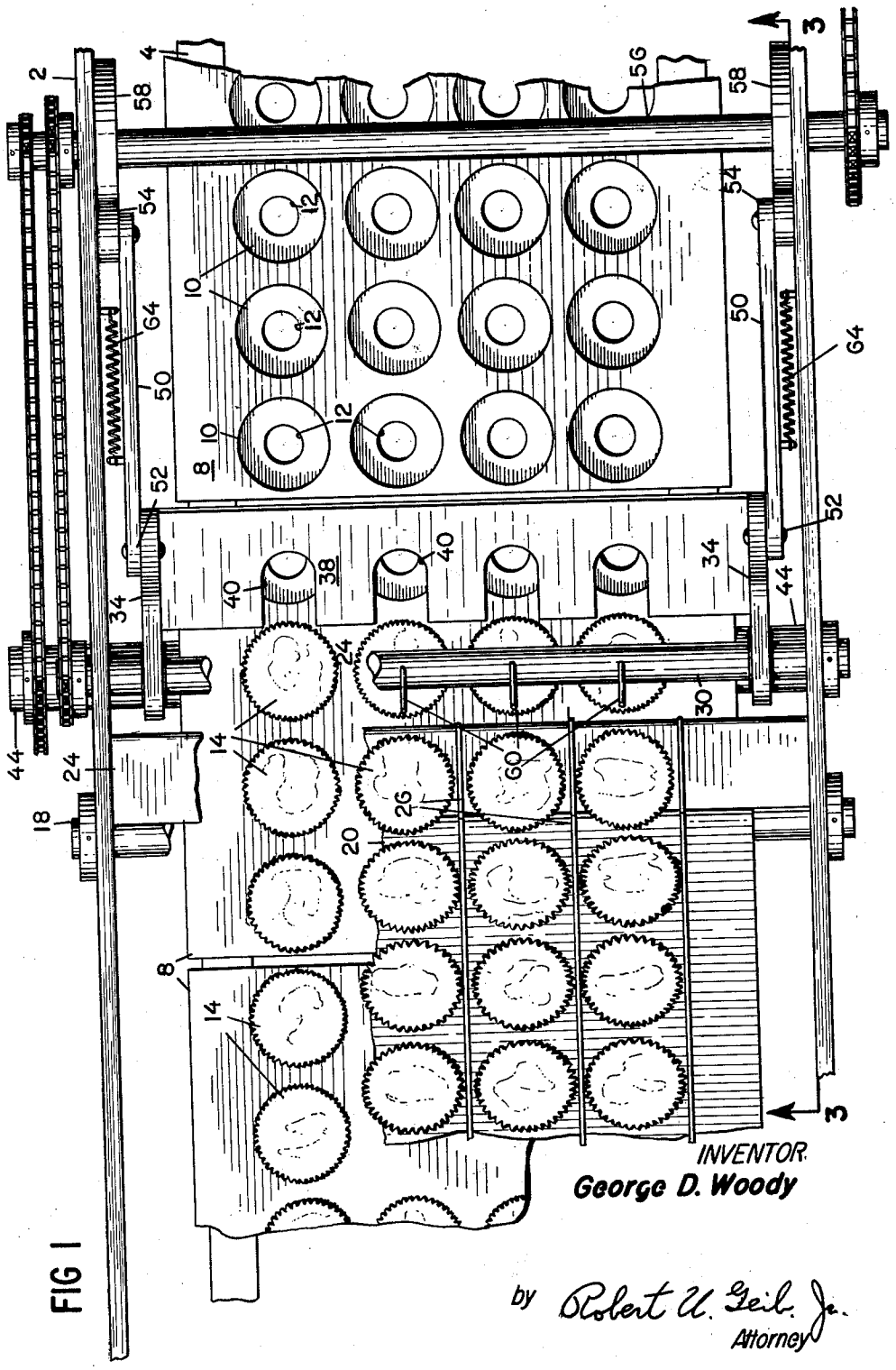


FIG 1

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CONVEYING APPARATUS

Filed July 13, 1962 2 Sheets-Sheet 2

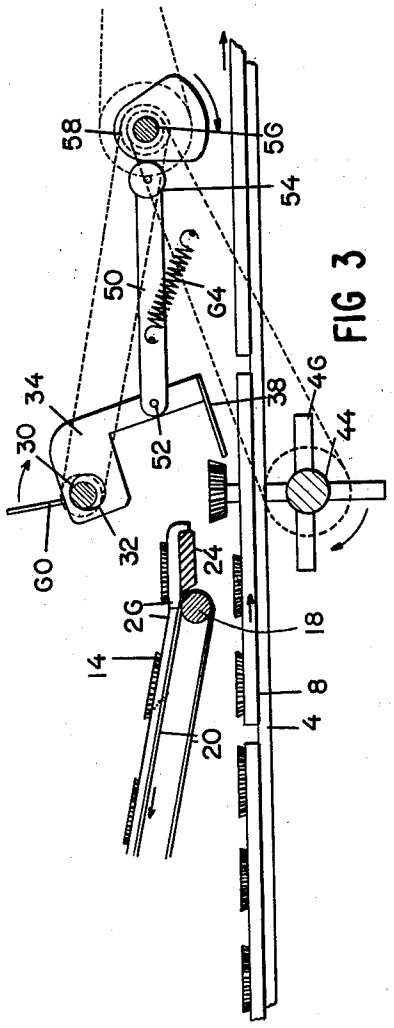


FIG 3

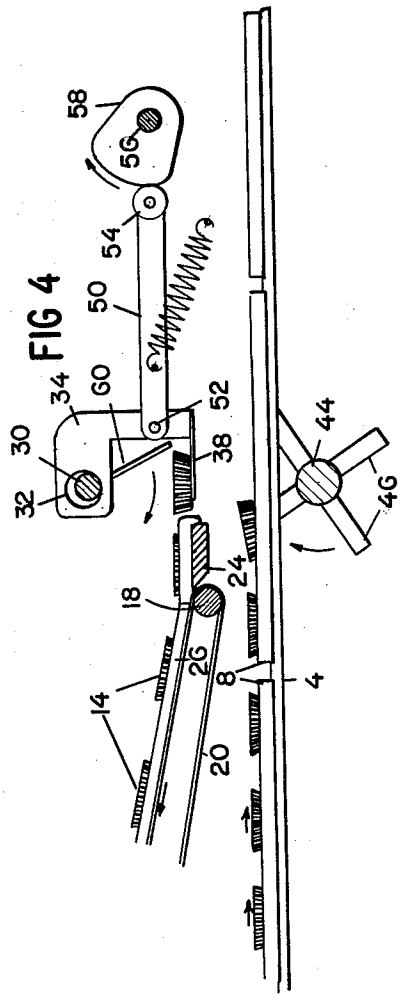


FIG 4

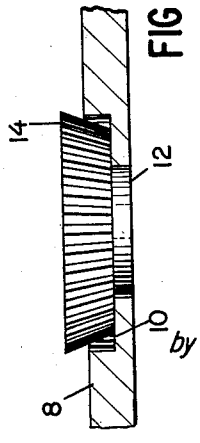


FIG 2

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3,108,679

CONVEYING APPARATUS

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4 Claims. (Cl. 198—25)

The present invention relates to conveying apparatus, and more particularly one wherein articles being moved along a substantially horizontal conveyor are removed therefrom and transferred to a superposed conveyor which extends angularly upward with respect thereto and which is adapted to elevate the articles and move then in a substantially rearward direction.

In the handling of various articles, it is frequently desired to transfer the same as they move from one processing operation to another processing operation in the manner described immediately hereinbefore; and the present invention seeks to obtain such movement in a rapid and efficient manner.

Another object is to achieve the foregoing by the use of an apparatus which is comparatively simple and inexpensive to manufacture, install, operate and maintain.

With the foregoing objects in view, together with others which will appear as the description proceeds, the invention resides in the novel construction, assemblage, and arrangement of parts which will be described more fully in the discussion, illustrated in the drawings, and particularly pointed out in the claims.

In the drawings:

FIGURE 1 is a fragmentary plan view illustrating practically all of the operative elements of the apparatus of the present invention;

FIGURE 2 is a fragmentary elevational view, partly in section, of a portion of one of the trays from which the articles are to be removed and transferred;

FIGURE 3 is an elevational view illustrating, schematically, the manner in which the elements cooperate to obtain the objectives set forth hereinbefore; and

FIGURE 4 is a view similar to FIGURE 3, but illustrating the position of the elements about one-half cycle later.

Referring particularly to FIGURE 1, the numeral 2 designates a pair of substantially horizontally extending, parallel side frame members which support the apparatus. Between the side frame members, there is disposed a pair of parallel and suitably driven endless conveyor belts or chains 4 which are adapted to move in the direction of the arrows and convey a successive series of trays 8 carrying the articles to be transferred.

As shown most clearly in FIGURE 2, and the right side of FIGURE 1, each of the trays 8 is substantially rectangular in plan and provided with a series of aligned circular recesses 10 which extend horizontally and transversely; each of the said recesses having a central bore 12.

In the present illustrative embodiment, the articles to be handled are shown as comprising relatively shallow paper cups 14 which may contain confectionery (such as peanut butter cups, etc.) and which are to be transferred after a cooling step to a packing or packaging area.

As shown most clearly in FIGURES 3 and 4, a transverse rotatable shaft 18 is disposed above the pair of endless conveyor belts 4 and supports the lower end of a suitably driven inclined endless conveyor belt 20, the upper end of which is not shown. However, it will be understood that the upper end of the inclined endless conveyor belt 20 terminates adjacent the desired area to which it is desired to transfer the articles (i.e., paper cups 14, etc.) from the trays 8.

A horizontally disposed stationary plate 24 is suitably mounted to extend in close parallelism with the rotatable shaft 18 and with its upper surface in substantial alignment with the upper surface of the inclined endless conveyor belt 20. Parallel guide strips 26 extend from the stationary plate 24 upwardly along the upper surface of the inclined endless belt 20, the same being spaced apart a distance which corresponds with the spacing of the paper cups 14 which are carried by the trays 8.

Referring now to the mechanism which elevates the paper cups 14 (or other articles) from the trays 8 onto the stationary plate 24 to there be engaged by the lowermost portion of the upper surface of the inclined endless conveyor belt 20, a rotatable shaft 30 extends transversely across the horizontally disposed endless belts 4 substantially above the stationary plate 24 and carries a pair of widely spaced eccentrics 32. These widely spaced eccentrics 32, which are shown as being circular collars secured to the rotatable shaft 30 in off-center relationship, rotate in suitable journals in a pair of inverted L-shaped leg members 34 which depend or extend downwardly therefrom for a substantial distance and carry a lifting-plate 38 which generally extends toward the lower end of the inclined endless conveyor belt 20 and the adjacent horizontally disposed stationary plate 24.

Referring to the approximate transverse centerline of FIGURE 1, the forward edge of the lifting-plate 38 is provided with a series of recesses 40, the purpose of which will appear hereinafter.

A rotatable shaft 44, which is disposed below the pair of endless conveyor belts 4, extends in parallelism with the rotatable shaft 30 (which carries the eccentrics 32, etc.) and is provided at spaced intervals with a series of evenly spaced radially extending pegs 46, the same being shown as four in number and with their outer ends flattened (see FIGS. 3 and 4). These radially extending pegs are of such length and so spaced as to enter the central bores 12 in the circular recesses 10 in the successively advancing trays 8 and raise the paper cups 14 to the position shown in FIGURE 3. With the trays 8 shown as provided with four rows of four symmetrically arranged circular and centrally bored recesses, the pegs 46 which extend radially from the rotatable shaft 44 likewise assume four series of four each.

In order to appropriately assist in the movement of the lifting-plate 38 in such manner as to transfer the paper cups 14 from atop the (lifting) pegs 46, an oscillatory back-and-forth movement is imparted to the L-shaped leg members 34 which are carried by, and depend from, the eccentrically mounted collars 32 on the rotatable shaft 30. In the illustrative embodiment, this is achieved by a pair of links or push-rods 50 which are pivotally connected, as at 52, to the L-shaped leg members 34 and which extend away from the inclined endless conveyor belt 20.

The outer end of each of the links or push-rods 50 is provided with a roller 54, the latter being adapted to reciprocate in suitable guideways (not shown).

Adjacent the reciprocable rollers 54 is a rotatable shaft 56 which is parallel with the rotatable shaft 30 which carries the L-shaped leg members 34.

A cam 58 is secured to the rotatable shaft 56 immedi-

ately opposite each of the reciprocating rollers 54 and adapted for peripheral contact therewith.

According to the foregoing construction and arrangement, the rotation of the shaft 56 will urge the reciprocable rollers 54 and their carrying links, or push-rods, 50 toward the L-shaped leg members 34, which, together with the eccentric mounting of the upper ends of the latter, results in the movement of the lifting-plate 38 from the position shown in FIGURE 3 into and beyond the (approximate) half-cycle position represented in FIGURE 4. In so doing, the recesses 40 in the forward edge of the lifting-plate 38 permit clearance with the lifting pegs 46 on the shaft 44. Accordingly, the upper surface of the lifting-plate 38 moves under the paper cups 14 and elevates them to a level which is closely proximate that of the upper surface of the stationary plate 24.

While the paper cups 14 of each row are in this last-mentioned position, they are contacted by a rod or finger 60 and pushed onto the upper surface of the stationary plate 24. These rods or fingers 60 are connected to, and extend radially from, the rotatable shaft 30; and they simultaneously move into contact with each elevated row of paper cups 14 for the purpose stated. Each paper cup which is contacted and moved by one of the fingers 60 displaces a cup which has previously been positioned on the stationary plate 24 and causes it to be pushed onto the adjacent surface of the lower end of the inclined endless conveyor belt 20. The newly positioned paper cups remain on the stationary plate 24 due to the fact that the fingers 60 are not long enough to displace them.

Immediately following the full movement of the lifting-plate 38 toward the stationary plate 24 at the foot of the inclined endless conveyor belt 20, springs 64 which are connected between the links or push-rods 50 and the side frame members 2 return the lifting-plate 38 to the position shown in FIGURE 3 preparatory to its moving under, and elevating, the next succeeding row of paper cups atop the flat-ended pegs 46.

As will be well understood by those skilled in the art, various means may be employed for driving the horizontal endless conveyor belts 4, the inclined conveyor belt 20, and the rotatable shafts 30, 44 and 56; the chain-and-sprocket arrangements shown in FIGURES 1 and 3 being illustrative only.

From the foregoing, it will be observed that the apparatus of the invention can readily be adapted to accommodate varying arrangements wherein the centrally-bored article pockets (or recesses) in the trays are consistently spaced, the only necessary changes being in the eccentrically mounted collars 32, cams 58 and the arrangement of the flat-top radially extending pegs 46 on the shaft 44. That is, by using special cams in lieu of the eccentrics 32 illustrated herein, various longitudinal spacing patterns for the tray holes or article pockets may be accommodated.

Obviously many modifications and variations of the invention as hereinabove set forth can be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. Apparatus for conveying successively fed articles comprising, in combination, a device for supporting and linearly advancing said articles; said device providing article-retaining means and having apertures extending therethrough; a rotatable shaft disposed beneath and extending transversely of said device; a series of article-supporting elements secured to and extending radially from said rotatable shaft; said article-supporting elements being adapted to successively penetrate the aforementioned apertures of said device and elevate said articles; an endless conveyor disposed above and extending angularly from said device; and means for removing the elevated articles from said article-supporting elements and transferring the same to said endless conveyor; said last-named

means including a hanger disposed adjacent to but above the lower end of said endless conveyor; a blade carried by and extending angularly from the lower end of said hanger and generally toward said endless conveyor; means connected with said hanger for moving said blade beneath each of said successively fed articles while elevated by said article-supporting elements and then upwardly into adjacency with the lower end of said endless conveyor; and means for moving said articles from said blade onto said endless conveyor.

2. Apparatus for conveying successively fed articles comprising, in combination, a substantially flat bed; a tray adapted to receive said articles and move along said bed; said tray having a series of apertured article-receiving areas; a rotatable shaft disposed beneath and extending transversely of said bed; a series of article-supporting elements secured to and extending radially from said rotatable shaft; said article-supporting elements being adapted to successively penetrate the aforementioned apertures of said tray and elevate said articles therefrom; an endless conveyor disposed above and extending angularly from said bed; and means for removing the elevated articles from said article-supporting elements and transferring the same to said endless conveyor; said last-named means including a hanger disposed adjacent to but above the lower end of said endless conveyor; a blade carried by and extending angularly from the lower end of said hanger and generally toward said endless conveyor; means connected with said hanger for moving said blade beneath each of said successively fed articles while elevated by said article-supporting elements and then upwardly into adjacency with the lower end of said endless conveyor; and means for moving said articles from said blade onto said endless conveyor.

3. Apparatus for conveying successively fed articles comprising, in combination, a device for supporting and linearly advancing said articles; said device providing article retaining means and having apertures extending therethrough; a rotatable shaft disposed beneath and extending transversely of said device; a series of article-supporting elements secured to and extending radially from said rotatable shaft; said article-supporting elements being adapted to successively penetrate the aforementioned apertures of said device and elevate said articles; an endless conveyor disposed above and extending angularly from said device; and means for removing the elevated articles from said article-supporting elements and transferring the same to said endless conveyor; said last-named means including a rotatable shaft disposed adjacent to but above the foot of said endless conveyor and transversely of the latter; a hanger; a blade carried by and extending angularly from the lower end of said hanger and generally toward said endless conveyor; said hanger being supported by and eccentrically connected to said second-named rotatable shaft; eccentrically operable means connected with said hanger for moving said blade in an oscillatory path beneath each of said successively fed articles while elevated by said article-supporting elements and then upwardly into adjacency with the lower end of said endless conveyor; and means for moving said articles from said blade onto said endless conveyor.

4. Apparatus for conveying successively fed articles comprising, in combination, a substantially flat bed, a tray adapted to receive said articles and move along said bed; said tray having a series of apertured article-receiving areas; a rotatable shaft disposed beneath and extending transversely of said bed; a series of article-supporting elements secured to and extending radially from said rotatable shaft; said article-supporting elements being adapted to successively penetrate the aforementioned apertures of said tray and elevate said articles therefrom; an endless conveyor disposed above and extending angularly from said bed; and means for removing the elevated articles from said article-supporting elements and transferring the same to said endless conveyor; said

last-named means including a rotatable shaft disposed adjacent to but above the foot of said endless conveyor and transversely of the latter; a hanger, a blade carried by and extending angularly from the lower end of said hanger and generally toward said endless conveyor; said hanger being supported by and eccentrically connected to said second-named rotatable shaft; eccentrically operable means connected with said hanger for moving said blade in an oscillatory path beneath each of said successively fed articles while elevated by said article-supporting elements and then upwardly into adjacency with the lower end of said endless conveyor; and means for moving said articles from said blade onto said endless conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

2,861,670 Read ---------- Nov. 25, 1958