Dec. 22, 1953 C. E. DASCOMB 2,663,401

JAR UNSCRAMBLER AND INVERTER

Filed June 2, 1950 3 Sheets-Sheet 1

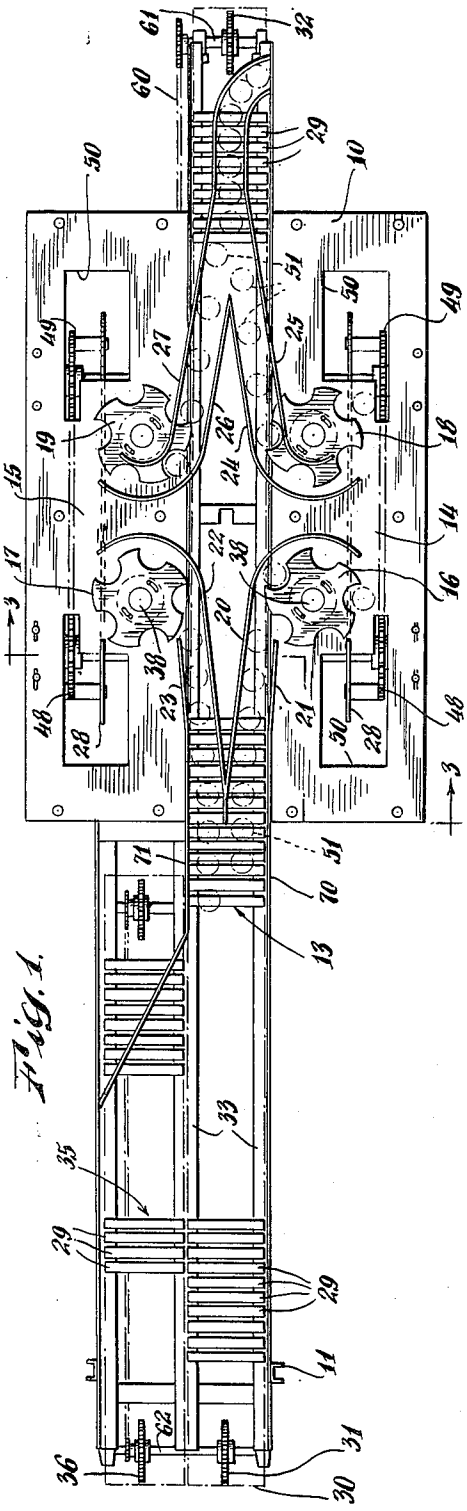


Fig. 1.

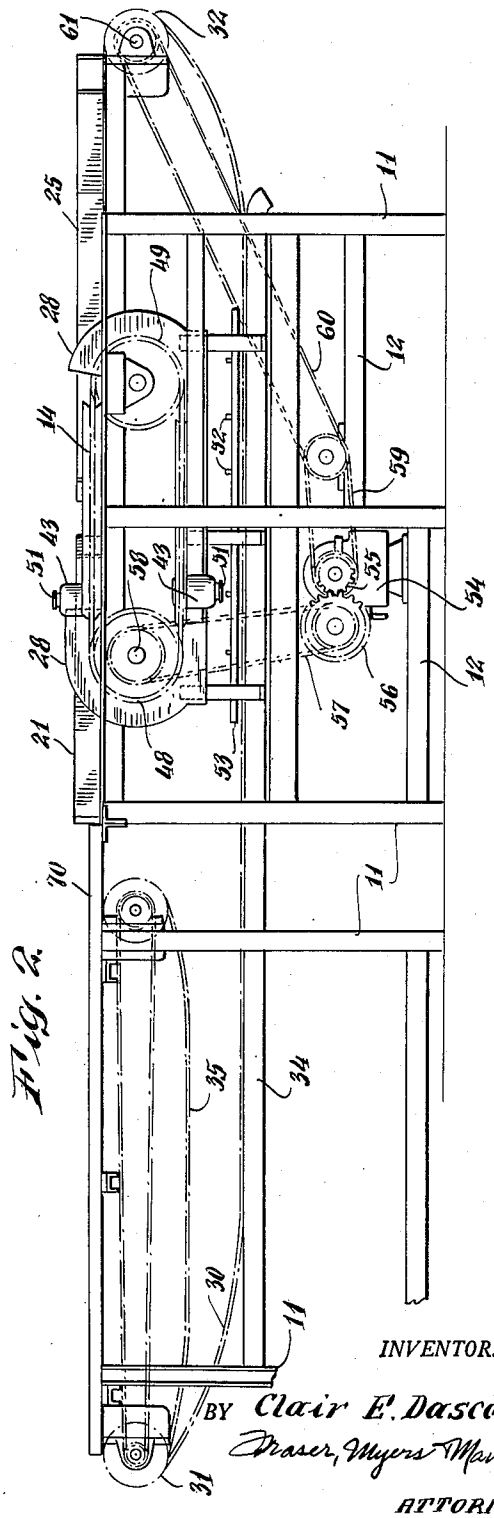


Fig. 2.

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Dec. 22, 1953 C. E. DASCOMB 2,663,401

JAR UNSCRAMBLER AND INVERTER

Filed June 2, 1950 3 Sheets-Sheet 2

Fig. 3.

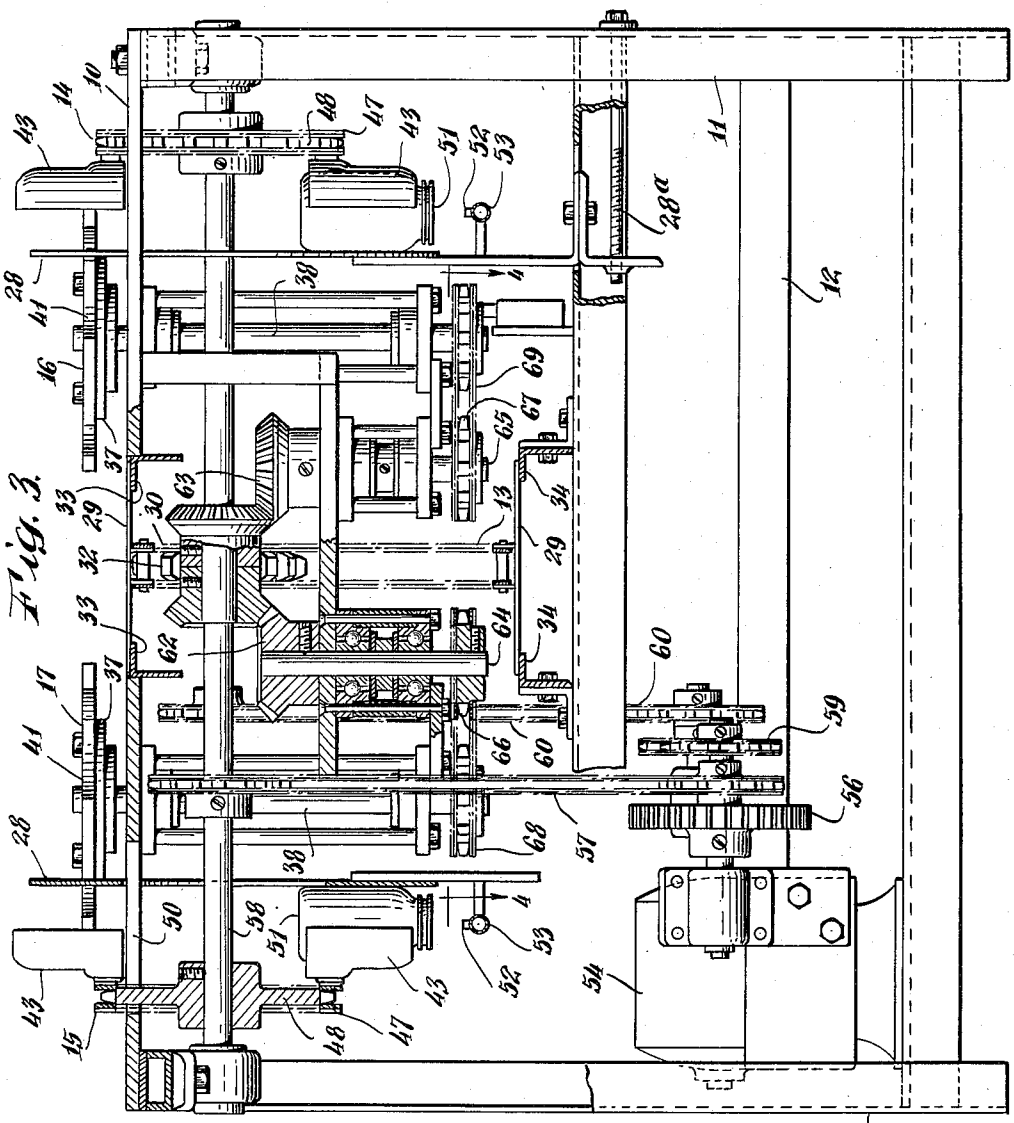
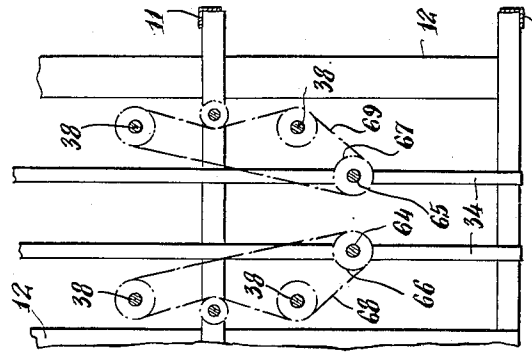


Fig. 4.



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Dec. 22, 1953 C. E. DASCOMB 2,663,401

JAR UNSCRAMBLER AND INVERTER

Filed June 2, 1950 3 Sheets-Sheet 3

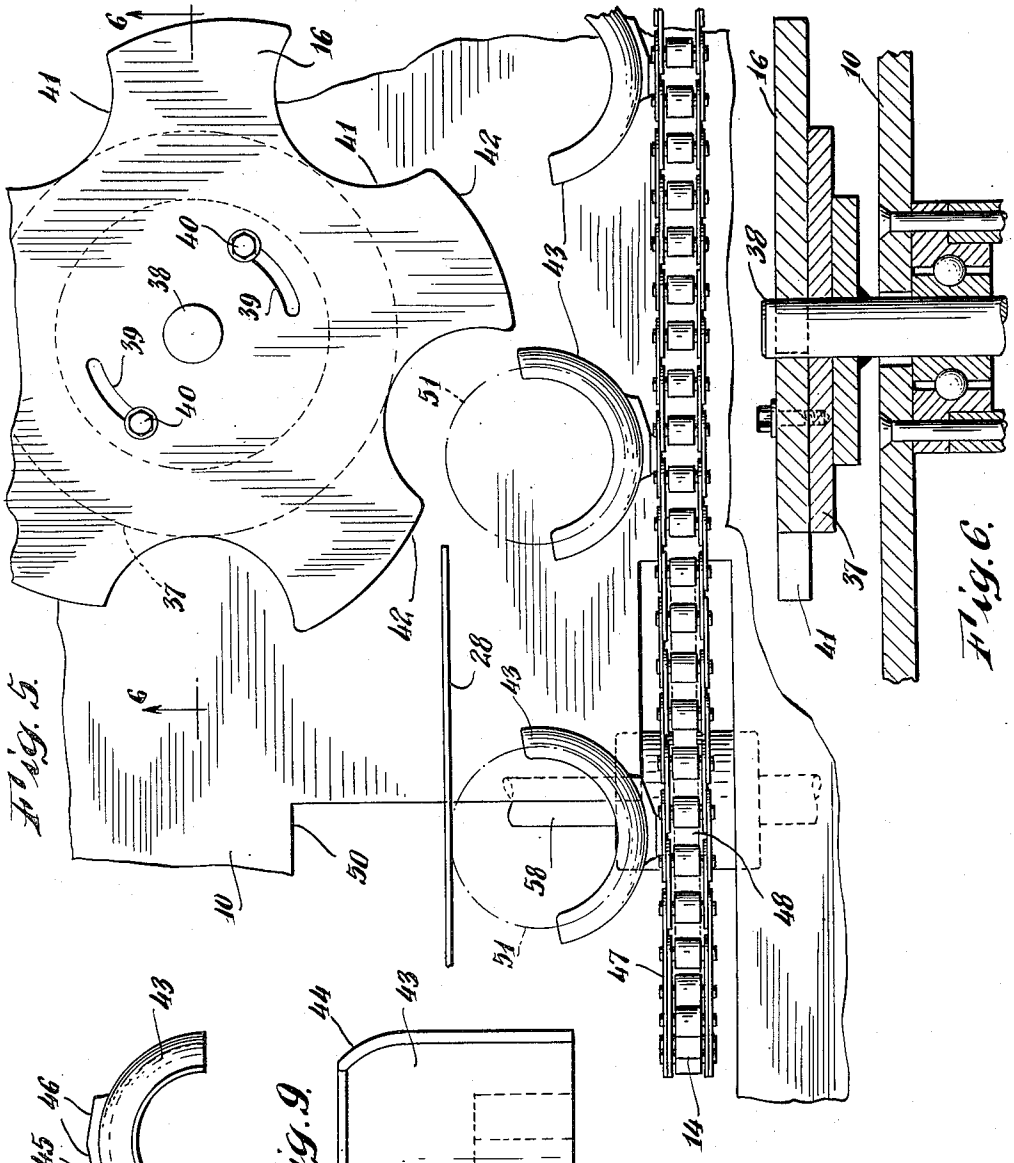


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 9.

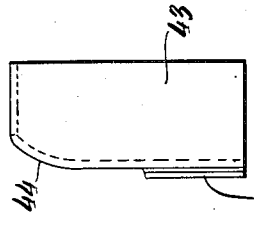


Fig. 8.

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UNITED STATES PATENT OFFICE

2,663,401

JAR UNSCRAMBLER AND INVERTER

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Application June 2, 1950, Serial No. 165,695

3 Claims. (Cl. 198—33)

1

The present invention relates to a machine for and method of handling jars or other articles preparatory to presenting them to a station whereat they are to be acted upon, and aims to provide certain improvements therein.

In the high speed filling of bottles or jars with various foodstuffs, cosmetics and the like, the filling of more than 200 units per minute is often desirable. At such high speeds, however, it is not possible for the operators stationed at the bottle or jar unscrambler and at the filling station to visually inspect the interior of the containers and remove those which contain foreign matter, such as broken glass, cardboard chips, fibers and the like. Hence it has been proposed to automatically eliminate the foreign matter by inverting the containers in transit from the unscrambler to the filling station and to either charge water or air under pressure thereinto and then upright the containers. Examination and study of existing commercial machines, however, disclosed that at the desired speeds adequate washing could not be attained if adequate draining were realized, or adequate draining could not be attained if adequate washing were realized.

The present invention accordingly has for its primary object to provide a machine for and a method of conveying and removing foreign matter from containers such as jars and the like at a speed greater than has been practicably attainable with available equipment.

A more specific object of the invention is to provide a machine embodying an unscrambler, an inverter, a cleaner and an uprighter for articles capable of delivering articles to a station where they may be subsequently acted upon at approximately twice the speed at which such articles are normally handled by conventional machines.

A further object of the invention is to provide a machine of the character set forth having novel means for holding the articles while being conveyed in an upright position and to and from an inverted position.

A still further object is to generally improve and increase the efficiency of machines adapted for transporting and cleaning containers after being removed or dumped from the cartons in which they are supplied by the container manufacturer.

The foregoing and other objects of my invention not specifically enumerated I accomplish by providing what I term a semi-duplex machine wherein the articles, instead of being fed through

2

the machine in a single file, are fed to the machine and divided into two files or lines, which, after being inverted, acted upon and again uprighted, are then combined at the discharge end so that each of the operative lines of the machine is called upon to handle only one-half of the total number of articles and, as a corollary the articles remain inverted in passing through the machine for a considerably longer interval of time than would otherwise be practicable. The invention, the various combinations and subcombinations of elements, and the invention in general will be better understood from the detailed description which follows, when considered in connection with the accompanying drawing, wherein:

Figure 1 is a top plan view of a machine embodying my invention.

Fig. 2 is a side elevation of the machine shown in Fig. 1.

Fig. 3 is a section, on an enlarged scale, taken substantially along the plane of the broken line 3—3 of Fig. 1.

Fig. 4 is a diagrammatic representation of a section taken substantially along the plane of the line 4—4 of Fig. 3.

Fig. 5 is a fractional top plan, on an enlarged scale, of a transfer wheel and an article holding pocket, more specifically a jar holding pocket conveyor shown in Fig. 1.

Fig. 6 is a section taken along the plane of the line 6—6 of Fig. 5.

Figs. 7, 8 and 9 are a top plan, a side elevation and a front elevation, respectively, of an article holding pocket forming a part of my invention.

Referring to the drawings, the machine of the present invention consists essentially of a table having a top 10 supported by a plurality of legs 11 and reinforced by longitudinally and transversely extending braces 12, certain of which serve as supporting members for the driving means, and other elements, as will be hereinafter described, a primary conveyor means 13, secondary conveyor means 14 and 15, article transfer means in the nature of star wheels 16, 17, 18 and 19, and guide means 20, 21, 22, 23, 24, 25, 26, 27 and 28, the functions for which will be presently explained.

The primary conveyor means 13 may be of any conventional type, herein shown as composed of a plurality of transversely extending flat elements 29 each pivotally connected at its central portion to a link chain 30 (Fig. 3), said conveyor being trained over a pair of sprocket wheels 31 and 32 at the opposite ends of the

table, and supported along its upper component on a pair of angle brackets 33 and on its lower component on angle brackets 34. If desired, the primary conveyor may be supplemented by a laterally disposed additional conveyor means 35, the upper component of which moves in a common plane with the upper component of the primary conveyor means and adapted to be driven by a sprocket wheel 36 mounted on the same shaft as the sprocket wheel 31. The primary conveyor means extends substantially centrally of the table 10 and provides, in effect, the means for receiving the articles to be acted upon by the machine and for discharging said articles from the machine after they have been carried along by the transfer means 16 to 19 and the secondary conveyors 14 and 15.

The star wheels 16 and 17 function to transfer the articles from the primary conveyor 13 to the secondary conveyors 14 and 15, respectively, and for dividing the articles which are usually dumped from cartons onto the conveyor 13 so that they will move in two separate files to the respective star wheels 16 and 17, the guide means 20, 21 and 22, 23 are disposed over the conveyor 13, the guides 20 and 22 having components which partially extend around the star wheels 16 and 17, respectively, in concentric relation thereto, while the guides 21 and 23 terminate in proximity to the peripheral orbit of the respective star wheels. The star wheels 16 and 17 are carried by plates 37 mounted on vertically disposed shafts 38 and are angularly adjustable with respect to said plates by being provided with arcuate slots 39 through which extend bolts 40 engageable in the plates 37. Each of the star wheels is provided with peripherally spaced, substantially semi-circular recesses 41 of a size to accommodate the particular article to be transferred, the periphery of the star wheel between adjacent recesses being cut back, as indicated at 42, to provide a clearance for the articles into and from said recesses, as will be presently explained. The star wheels 18 and 19 are identical in all respects with the star wheels 16 and 17, and the guide means 25, 27, and 24, 26 function to discharge the articles from the recesses in the star wheels 18 and 19 and guide them onto the discharge end of the primary conveyor 13.

The secondary conveyors 14 and 15 are identical in all respects except as to the side thereof on which they have mounted jackets 43 for cooperating with the recesses 41 in the star wheels. The jackets 43 are shown in detail in Figs. 7, 8 and 9 and each consists of a substantially semi-cylindrical receptacle having an inturned shoulder 44 at its top and on its exterior adjacent its base is formed with a protuberance 45 having angularly disposed outer surfaces 46, the said receptacles being fixedly carried by the links 47 of the conveyor 14 with an angular surface 46 extending parallel to the line of movement of the conveyor so that the receptacle will be disposed at a slight angle to the line of movement. The conveyor 15 may be of any well known type and, as herein shown, is of the roller type and is trained over sprocket wheels 48 and 49. The longitudinal spacing between the receptacles 43 on the conveyors 14 and 15 is equal to the peripheral distance between the centers of a pair of recesses 41 on the star wheels so that, when the star wheels and conveyors 14, 15 are driven at the same linear speed the receptacles will cooperate to move into complemental relation with the recesses and to transfer articles from one to the other. To accommodate the conveyors 14, 15 with their upstanding receptacles 43, the table top 10 is cut away to provide openings 50.

When an article such as a jar 51 is engaged by a receptacle 43 and removed from a recess 41 in a star wheel and moved along the table top, the guide means 23 serve to hold the jars within the receptacles, and as the conveyor moves about its controlling sprocket wheels to invert the jars, they will be retained in said receptacles by virtue of the shoulders 44 therein being in engagement with the shoulders on the jars and the further fact that the guide means 23 are plates which extend both above and below the table top 10 through openings 50 therein and are of a length below the top somewhat greater than the distance between the sprocket wheels 48 and 49.

As the jars 51 in inverted position are conveyed by the jackets 43 they are subjected to a cleaning operation by blasts of air directed upwardly into the interior of the jars through nozzles 52 mounted on an air supply pipe 53. The air blast may be either continuous or intermittently controlled to operate as a jar comes into position above each nozzle. When the jars are again uprighted after passing over the sprocket wheels 49 they cooperate with the star wheels 18 and 19 and are deposited into the recesses 41 therein and, in turn, are disengaged from the star wheels by the guides 25 and 27 and caused to move onto the discharge end of the conveyors 13. The adjustments of the star wheels are so made that the jars or other articles are fed thereto in spaced, timed relation so that they will be discharged alternately from the star wheels 18 and 19 and will be guided into a single file by the converging walls of guides 25 and 27.

The recesses 41 in the star wheels and the sockets formed by the internal walls of the receptacles 43 are complementally shaped to accommodate the articles being conveyed. Where the articles are other than jars 51 of the size and shape shown, star wheels and receptacles of complemental shape to the articles will be substituted for those illustrated. To accommodate articles of larger or smaller diameter than the jars 51, the guide plate 23 is made laterally adjustable by being carried by adjustment bolts 23a.

Power for driving the various elements of the machine is provided by a motor 54 which, through meshing gears 55 and 56, drive shaft 58 upon which the sprocket wheels 48 is mounted, through a sprocket chain 57, and through the sprocket chains 59 and 60 drive a shaft 61 upon which the sprocket wheel 32 is mounted. The star wheels are driven from the shaft 58 through pairs of miter gears 62 and 63 which, in turn, drive stub shafts 64 and 65, respectively, carrying sprocket wheels 66 and 67, respectively, and through the medium of sprocket chains 68 and 69 which are trained over sprocket wheels on the shafts 38.

In the operation of the machine, cartons of jars or other articles to be fed through the machine are dumped onto the charging end of the conveyor 13 and the additional conveyor means 35 and are carried to the throat of the charging station between a pair of upstanding walls 70 and 71. As they move between said walls they are divided into two files at the juncture of guides 20 and 22 and are fed to the star wheels 16 and 17 in properly timed and spaced relation and from the star wheels are transferred to the receptacles 43 of the secondary conveyors 14 and 15. As the jars are being carried by the receptacles they are

inverted and subjected to the cleaning operation by the blasts from the nozzles 52; they are then uprighted and delivered to the star wheels 18 and 19, and from there alternately discharged through the guide means 24, 25 and 26, 27 and are caused to form into single file on the discharge end of the conveyor, from where they are transported to the filling station (not shown). The charging end of the conveyor with its upstanding walls 70, 71 and guides 21 to 23 act to unscramble the jars or other articles and feed them in single file to the star wheels 16 and 17 at a speed consonant with the handling of the articles in question. By virtue of the timed spacing of the articles by the star wheels and the re-combining of the two files of articles from the secondary conveyors 14, 15 into one file at the discharge end of the machine, it will be appreciated that the discharge rate of the articles is substantially twice the rate at which a single file of articles is fed to the respective secondary conveyors. Accordingly, it will be appreciated that the jars, while in inverted condition, may be subjected to a much longer cleaning period than would be possible if the rate of passage of the jars through the machine in single file, was equal to that of the discharge rate of the so-called duplex machine. Accordingly, jars or other articles can be handled with the present machine at a rate much faster than is practicable with the same degree of efficiency on the single file operating machines now commercially available.

While I have shown and described a preferred embodiment of my invention I do not wish to be limited to the specific details of construction and arrangement of parts, since these may be varied within the range of mechanical and engineering skill without departing from the spirit of my invention as hereinafter claimed.

What I claim is:

1. In a machine of the class described, a rotatable star wheel having peripheral spaced recesses each adapted to accommodate an article,

an endless conveyor movable in spaced tangential relation to the star wheel, said conveyor being provided with fixed receptacles longitudinally spaced therealong and adapted, when a receptacle and a recess in the star wheel come into complemental relation, for withdrawing an article from the recess and conveying said article along the path of the conveyor, and a guide plate extending in parallel spaced relation to the central plane of movement of the conveyor and providing a bearing surface for holding the articles within the receptacles.

2. A machine according to claim 1 wherein the receptacles each has an internal shoulder adapted to overlie an article in upright position and adapted to support the article in inverted position.

3. A machine according to claim 1 wherein the guide plate is adjustable to vary the parallel spaced relation thereof to the central plane of movement of the conveyor.

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