Feb. 16, 1932. W. P. WHITE ET AL 1,846,009

APPARATUS FOR HANDLING RECEPTACLES

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Fig. 1.

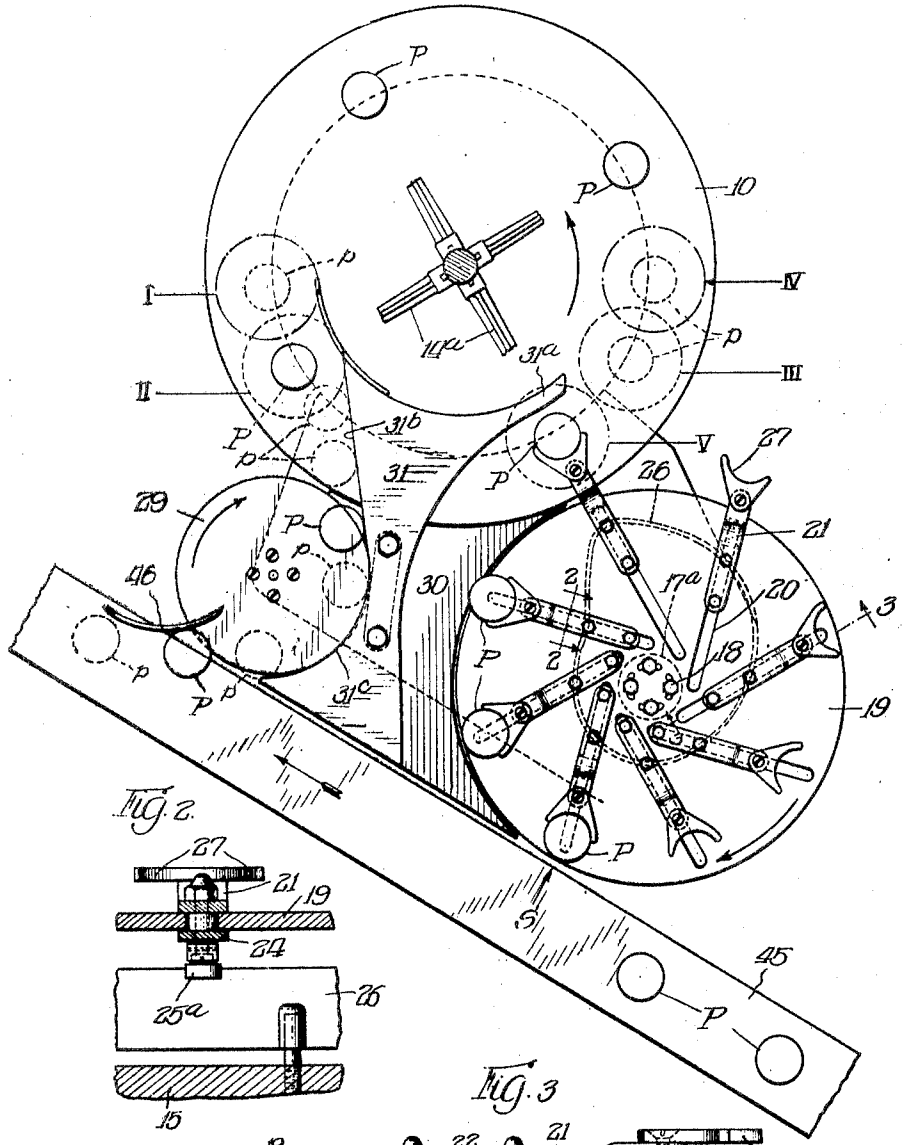
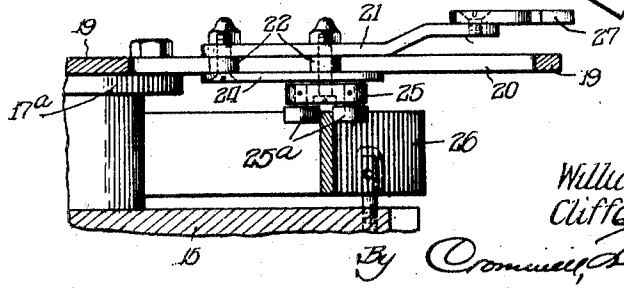


Fig. 2.

Fig. 3



Inventors:
William P. White,
Clifford E. Ives,
By Cromwell, Leist & Greenman
Attys.

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Fig. 4

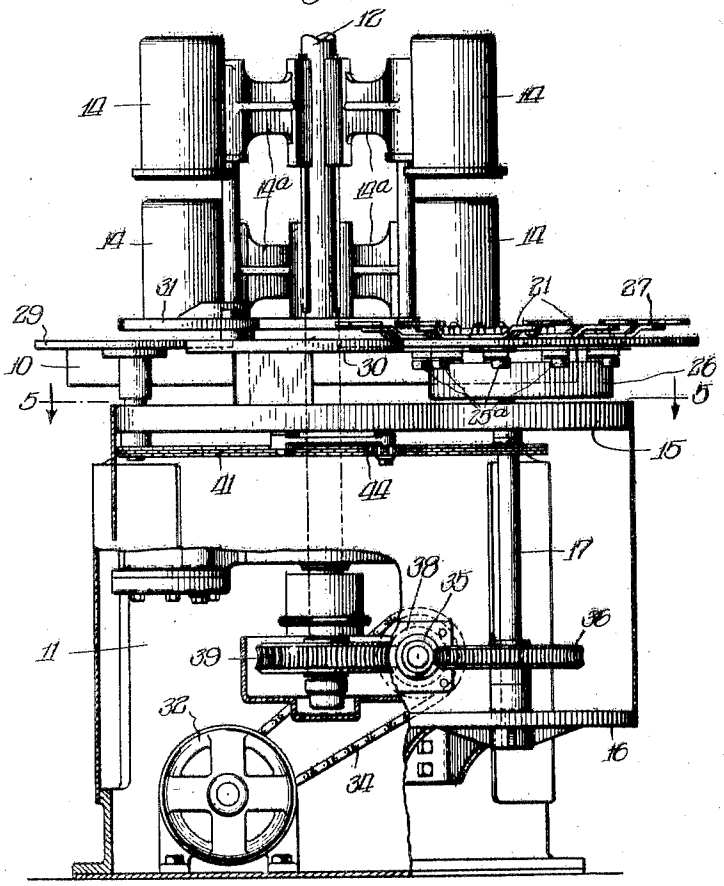
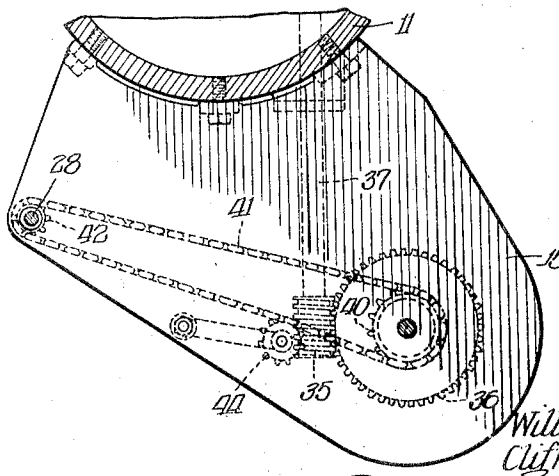


Fig. 5



Inventors:
William P. White,
Clifford E. Ives,
By Osmun, Reist & Leonard
Attys.

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1,846,009

UNITED STATES PATENT OFFICE

WILLIAM P. WHITE, OF CHICAGO, AND CLIFFORD E. IVES, OF WILMETTE, ILLINOIS, ASSIGNORS TO WHITE CAP COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

APPARATUS FOR HANDLING RECEPTACLES

Application filed February 17, 1928. Serial No. 255,051.

This invention relates to apparatus for the handling of packages or receptacles, such as jars, tumblers or cans, incident to packing operations in which same are employed. The invention resides in an improved automatic feeding or handling machine for delivering containers or packages to and from an associated apparatus, such as a filling machine or a sealing machine, and may be referred to, for convenience of designation, as a feeding apparatus.

The general object of the invention is the provision of such a feeding apparatus which will be effective to handle the packages rapidly and with certainty and position them accurately to the operation of associated apparatus.

Another object is the provision of a feeding apparatus which is adaptable to the handling of packages of different sizes.

A further object is the provision of such an apparatus which will reduce manual handling of the packages to a minimum.

Another object is the provision of an improved package handling mechanism which employs as a part thereof a portion of a continuously operating sealing machine.

A further object is the provision of such an apparatus which is simple in construction and operation, easily articulated with associated mechanisms, and operable with a minimum of power.

Other and further objects will be pointed out or indicated hereinafter or will be apparent to one skilled in the art upon employment of the invention in practice.

In the drawings forming a part of this specification we illustrate one structural form in which the invention may be embodied, but it is to be understood that this is presented for illustration only and is not to be accorded any effect of limiting the scope of the appended claims short of the true and most comprehensive scope of the invention in the art.

In said drawings:

Fig. 1 is a plan view of said apparatus showing it in association with a sealing machine, which is illustrated in diagrammatic or fragmentary fashion;

Fig. 2 is a detail in the nature of a section on line 2—2 of Fig. 1;

Fig. 3 is another detail in the nature of a section on line 3—3 of Fig. 1;

Fig. 4 is a front elevational view of the machine, shown in association with a sealing machine, which is illustrated in fragmentary fashion, casing parts being broken away to show the driving mechanism, and

Fig. 5 is a section on line 5—5 of Fig. 4.

In the packing of various commodities, such as foodstuffs, in cans, tumblers or jars, it is necessary to transfer the containers or the packages from one machine to another, such as from a filling machine to a capping or sealing machine, and from the latter to a labeling or other machine. Certainty and precision in such handling, as well as speed, are essential to a high rate of output, not only in order to maintain the entire line of associated machines in uninterrupted operation, but also to insure accurate sealing of the packages and prevent waste from breakage or spilling. Various other conditions which must be taken into account are the facts that the machine must be able to handle packages of different kinds of materials, liquid as well as solid, that the packages most frequently must be handled while quite hot, that the containers are fragile, and that contamination of the contents from foreign matter must be avoided.

Described generally, the present invention involves a handling apparatus which may be operated continuously and in accurately articulated or timed relationship to other machines, such as filling machines, cap applying machines, sealing and vacuumizing machines and labeling machines, and which will feed the packages in a continuous operation, position them accurately and discharge them at proper intervals.

The nature of the invention may be more definitely ascertained by reference to the example illustrated in the drawings. The reference numeral 10 designates a horizontal circular table which is supported for rotation on a suitable base 11, and with which is associated a vacuumizing and sealing mechanism which may be of the form disclosed in

United States Letters Patent No. 1,801,062, granted April 14, 1931. Certain portions of the sealing and vacuumizing apparatus here illustrated include the vertical shaft 12 which rotates with the table 10, and the bells 14 which are carried on arms 14ª extending radially of the shaft and which revolve with the table, and which are adapted to be raised and lowered at definite points in their orbit. When lowered they seat on the table 10 so that each will envelop a package positioned on the table 10 below it while it is in the elevated position. For example, at the position I. in Fig. 1 the bell starts to rise, reaching its full elevation at position II., and remaining elevated until it reaches the position III., where it starts to descend, its descent being completed at position IV., whence it remains seated on the table until it again reaches the position I. During the time of its travel from position IV., to I., the air is exhausted from within the bell, to vacuumize the package, and the package is sealed. By the employment of the plurality of bells, therefore, incident to the continuous rotation of the table, a continuous progressive feed of the packages is maintained, some undergoing the vacuumizing and sealing operations while others are being positioned and discharged.

Journaled on brackets 15 and 16 which are supported on the base frame 11, is a vertical shaft 17 which carries a hub flange 17ª at its upper end above the bracket 15. Mounted on this hub flange, and secured thereto by bolts 18 which permit of its limited rotary adjustment, is a feed table 19 in the form of a horizontal plate. The position of this feed table is such that its upper surface is on a level with the upper surface of the operating table 10, and their peripheries are near tangent. The table 19 is provided with guide slots 20 in which are guided the transfer arms 21. These carry rollers 22 which travel in the slots 20, and are secured for sliding movement on the table by plates 24 which span the slots. Secured to the transfer arms and positioned below the plates 24 are pivoted yokes 25 which carry rollers 25ª. These rollers are adapted for rolling cooperation with opposite sides of a stationary cam 26 which is mounted on the bracket 15, and formed of such contour as to induce reciprocating movement of the transfer arms incident to rotation of the table. At their outer ends the transfer arms carry the package positioning fingers 27, which are rigidly affixed thereto but are removable to afford interchangeability. The fingers 27 extend in divergent relationship from the arms 21, and are spaced apart to receive a portion of a package between them.

Journaled on the bracket 15 is a stub shaft 28 which extends vertically and carries on a flanged hub at its upper end a circular discharge table 29. This is positioned with its upper surface at the same level as that of the operation table 10, and with its periphery almost tangent with that of the operation table. Fixedly supported on the bracket 15 is a table plate 30, located between the tables 10, 19 and 29 and having its upper surface at the same level as theirs and its margins shaped to conform closely to their peripheries. This plate extends out to a line tangent to the peripheries of the tables 19 and 29. Fixedly mounted on the table plate 30 is a guide plate 31 which extends over a portion of the table 10 and between the tables 19 and 29. This guide plate 31 has a stop portion 31ª extending past the point at which the tables 10 and 19 are in closest proximity and located inwardly from the periphery of the table 10 at a distance corresponding approximately to the inner limit of the path over which the bells 14 travel. At its opposite edge over the table 10, the plate 31 forms a guide ledge 31ᵇ extending in chordal relationship to the orbit of the bells across the path over which they travel. The outer portion of the plate 31 forms a curved guide ledge 31ᶜ conforming approximately to the perimeter of the discharge table 29, and said plate terminates at a line tangent to the peripheries of the tables 19 and 29.

As seen in Figs. 4 and 5, the shaft 17 is driven from a motor 32 through the medium of a chain 34, worm 35 and worm wheel 36. The worm 35 is carried on the same shaft 37 as is the worm 38 which drives the worm wheel 39 that rotates the shaft 12 and table 10. The shaft 28 is rotated from the shaft 17 through the medium of a sprocket wheel 40, chain 41 and sprocket wheel 42. A chain tightener 44 is adjustable to maintain the chain 41 taut. Thus, it will be seen, the operation of tables 19 and 29 is definitely articulated with table 10.

For operation, the apparatus may be installed conveniently in association with a horizontally traveling conveyor belt 45 which transports packages P from the filling station. The speed of this belt is definitely timed with the speed of the articulated tables, and as each package is brought to the table 19 a cap is placed on the package and the package is positioned by hand on the table 19 between the positioning fingers 27 of the transfer arm which is at the charging station, designated S. The rotation of table 19 carries the package toward table 10, and just before it reaches the latter, the cam 26 initiates outward movement of the transfer arm. Due to the divergent relationship of the positioning fingers 27, this movement centers the package with respect to the transfer arm. As the movement continues, the package is slid onto the table 10 over the intervening portion of the table plate 30 at a gradually accelerated speed, until it reaches a position below one

of the bells traveling with the table 10 which is then at the position V. The peripheral speed of the table 10 is somewhat greater than that of the table 19, but the movement of the transfer arm brings the package movement up to approximately the speed of the table 10, so that when the arm reaches the limit of its movement, the package speed is at approximately that of table 10, which then carries it away from the positioning fingers. The latter immediately start back, leaving the package entirely free on the table in position to be enveloped by the bell when the latter is lowered at the position IV. Thus the package is transferred from the table 19 to the table 10, in proper position for sealing, without sudden change of direction or sudden change in its rate of travel. The stop arm 31[a] constitutes a safety guard which will prevent overthrow of the package in the event normal friction on table 10 should not stop it, and said guard will stop the package in a position where it will be enveloped by the bell upon its descent. As the package progresses with the rotary movement of the table 10, it is subjected, while confined in the bell, to the exhausting and sealing operations, and upon reaching position I. is completely sealed. Here, as stated above, the bell starts to rise, and is completely clear of the package at position II. The package meanwhile is continuously advanced by the movement of the table, until it comes into contact with the removal guide 31[b]. The angular relationship of the removal guide with respect to the axis of the table is such that the force frictionally transmitted to the package from the table will move the package outwardly along the removal guide and onto the marginal portion of the table 29. The friction from the latter on the bottom of the package will carry the latter still farther along the removal guide, which will guide it gradually onto said table, by which it will be carried to the margin of the conveyor belt 45, and guided onto said belt by the takeoff guide 46. The conveyor carries the package on to a discharging point where it may be diverted to a sterilizing operation or a labeling machine. In the illustration in Fig. 1, it is to be understood that the packages P illustrated in full lines represent the positions of different packages at a certain time, while the dotted circles *p* illustrate successive positions of a given package.

The apparatus may be operated continuously at an advantageously high rate of speed productive of a high output capacity. One of the factors contributing to this result resides in the arrangement of mechanism whereby the rate of travel of the package is given a gradual acceleration from the time it is set upon the table 19 until it is positioned at the sealing station, and the arrangement whereby accurate positioning is obtained at the latter point. For example, the rate of peripheral speed of the table 19 may be only one-half that of the table 10, and whereas the latter may be such as might make accurate positioning of the packages at the sealing stations by hand quite uncertain, the materially lower speed of the table 19 permits the packages to be positioned thereon by hand with the requisite accuracy. It is not necessary that the packages be accurately aligned with the transfer arms 21, as the positioning members 27 will center the packages during the outward movement of the arms, so that they will be delivered to the sealing stations in accurate disposal.

What we claim is:

1. In packaging apparatus, in combination, a rotary operation table and a rotary feed table disposed with their top surfaces in substantially the same horizontal plane and with their peripheries close together, said operation table affording a plurality of sealing stations and said feed table affording a larger number of package receiving stations, means for rotating said tables in timed relationship such that the rate of travel of the receiving stations is materially less than that of the sealing stations, and transfer members movable across the peripheries of both tables incident to rotation thereof to slide packages from the receiving stations to the sealing stations.

2. In packaging apparatus, a combination as specified in claim 1, and wherein said transfer means is operated to accelerate the speed of the packages between the receiving stations and the sealing stations.

3. Apparatus for handling packages comprising, in combination, a rotary operation table affording a plurality of package stations, a rotary feed table adjacent the operation table and affording a number of package receiving stations greater than the number of package stations on the operation table, means for rotating said tables in opposite directions and in timed relationship, the feed table at a lower rate of speed than the operation table, reciprocable transfer members carried by the feed table, positioning members carried by the transfer members and movable across the peripheries of both the tables, and means effective on the transfer members to gradually accelerate the speed of the positioning members incident to their outward movement.

4. In packaging apparatus, in combination, a rotary operation table carrying sealing bells movable in an orbit, a rotary feed table having its periphery adjacent that of the operation table and affording a number of package receiving stations greater than the number of bells, means for rotating said tables in opposite directions and in timed relationship such that the speed of the operation table is greater than that of the feed

table, and individually movable transfer devices carried by the feed table and projectible across the periphery thereof incident to the rotation of the tables to shift packages from respective receiving stations to positions under respective bells.

In testimony whereof we have hereunto subscribed our names.

WILLIAM P. WHITE.
CLIFFORD E. IVES.