F. W. DANBERG.

ARTICLE DELIVERY MECHANISM.

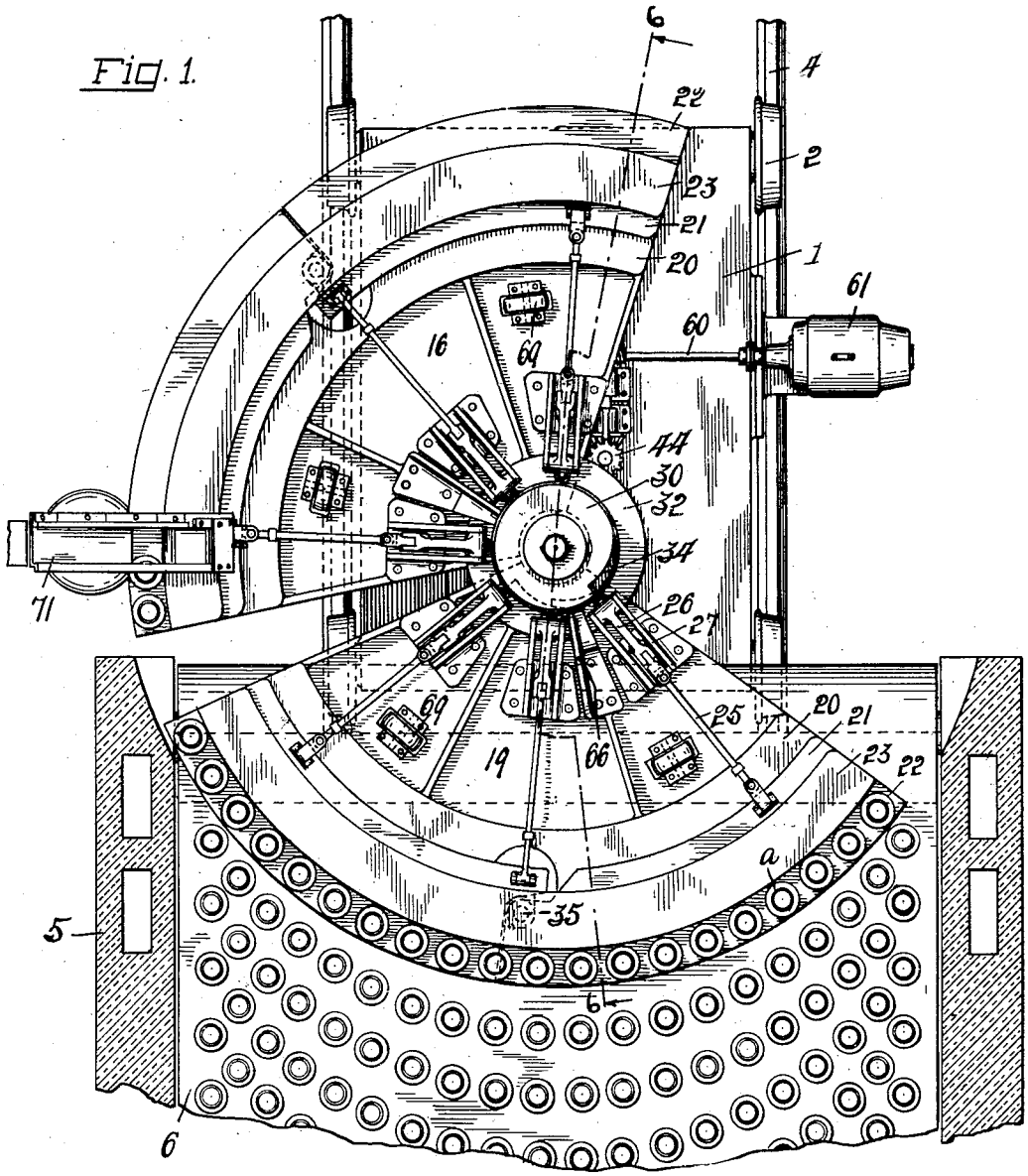
APPLICATION FILED DEC. 22, 1919.

1,381,287

Patented June 14, 1921.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

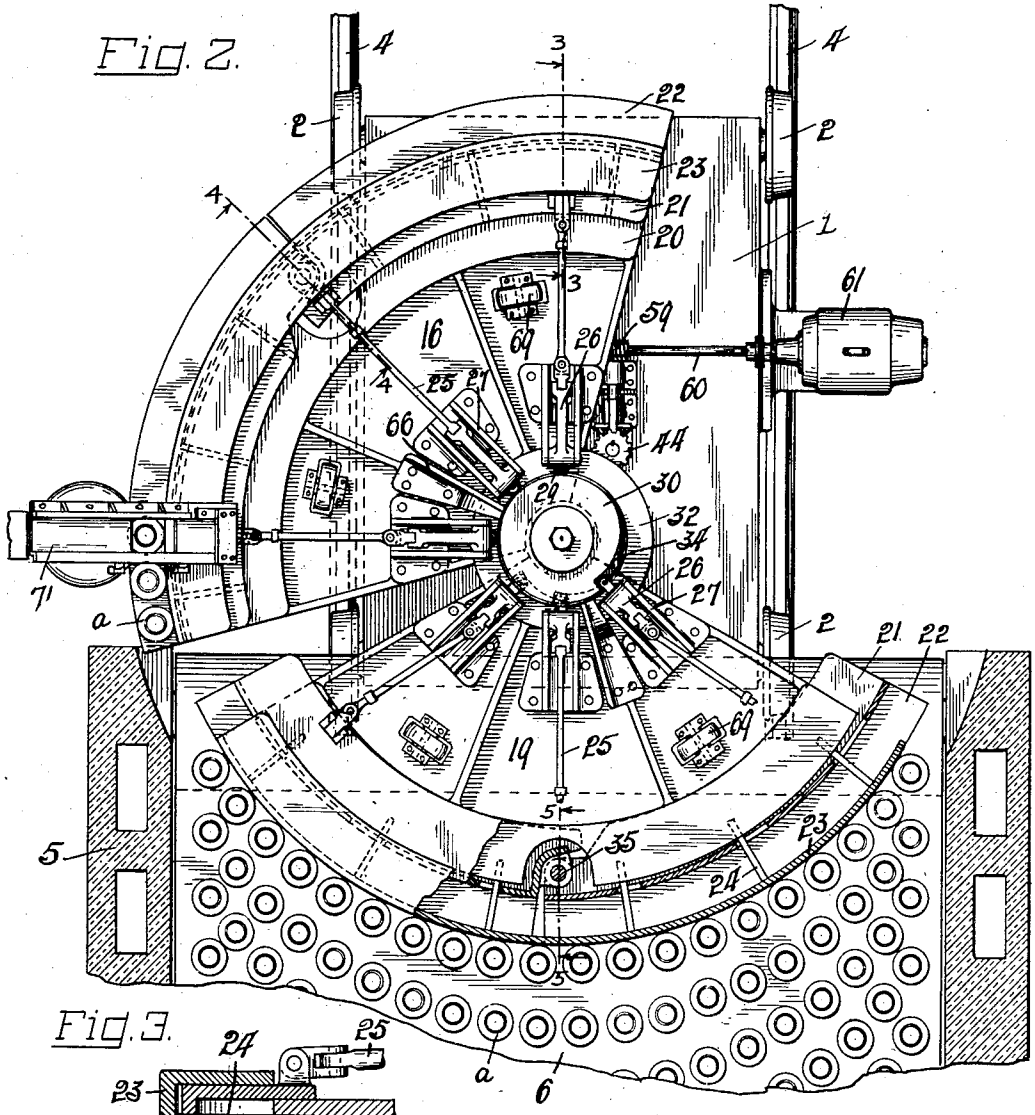


Fig. 3.

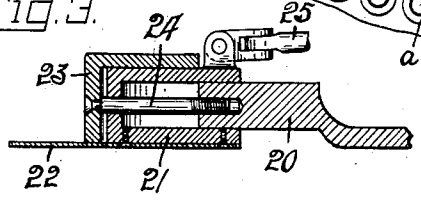


Fig. 4.

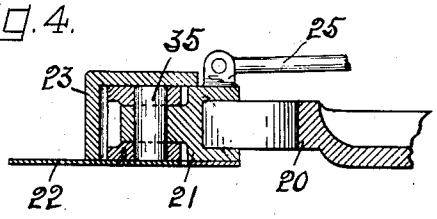
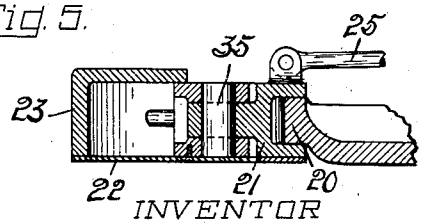


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 6

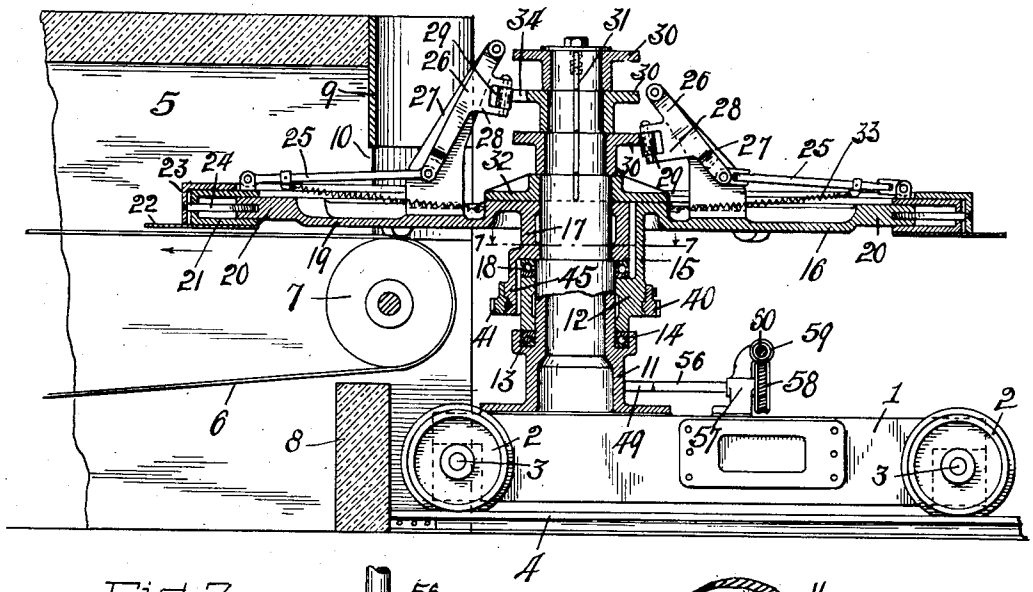
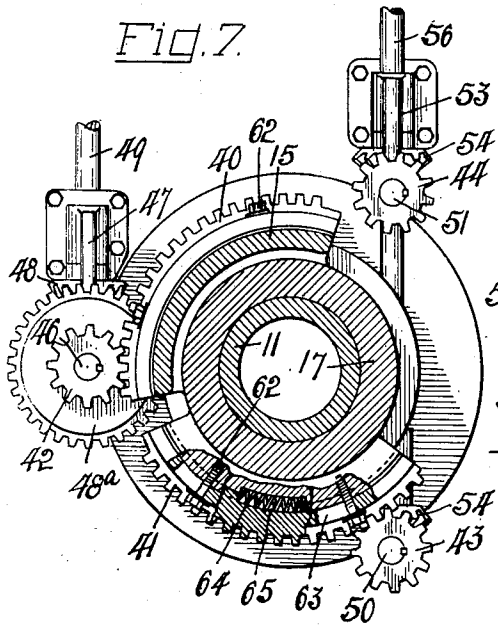


Fig. 7.



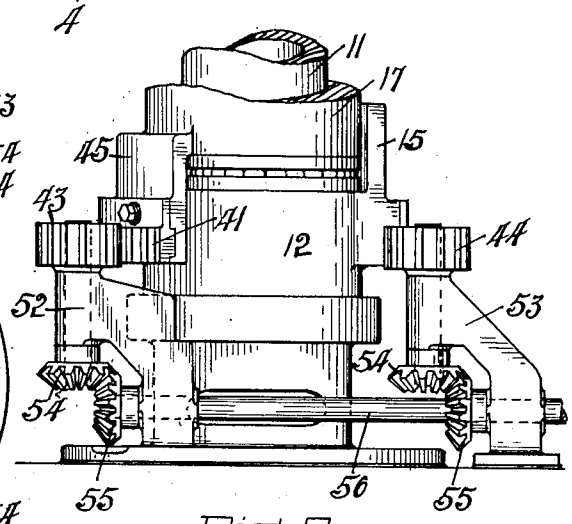


Fig. 8.

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RTICLE DELIVERY MECHANISM.

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1,381,287. Patented June 14, 1921.

4 SHEETS—SHEET 4.

Fig. 9.

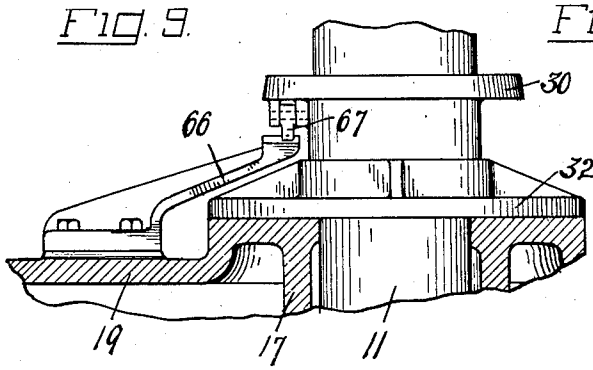


Fig. 10.

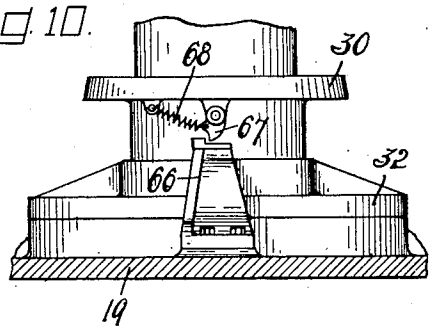


Fig. 11.

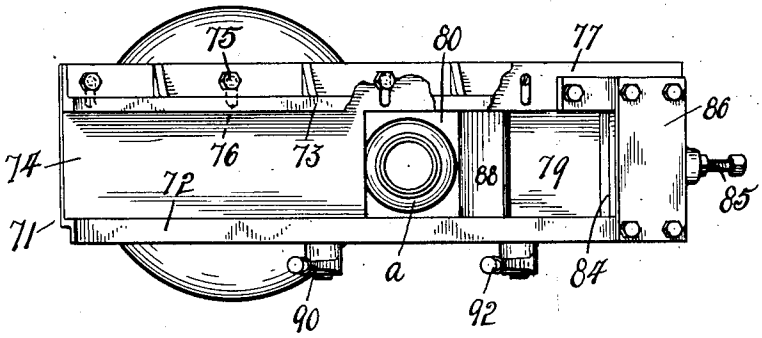
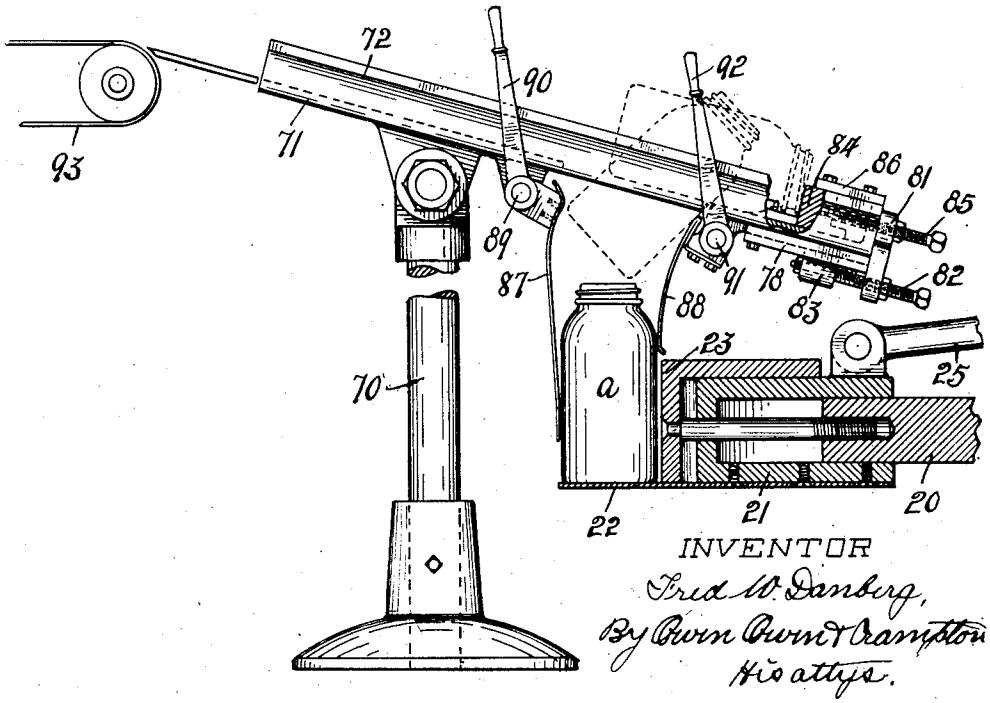


Fig. 12.



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UNITED STATES PATENT OFFICE.

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ARTICLE-DELIVERY MECHANISM.

1,381,287. Specification of Letters Patent. Patented June 14, 1921.

Application filed December 22, 1919. Serial No. 346,737.

To all whom it may concern:

Be it known that I, FRED W. DANBERG, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Article-Delivery Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to article delivery means and more particularly to a means of this class intended for use in delivering articles from a source of supply, for instance, as from a machine for forming glass bottles, jars, or the like, to a leer or annealing oven.

The primary object of my invention is the provision of a delivery means of the character described, which is not built into and forms a part of the leer structure, but which is a unit separate from the leer and capable of being easily and quickly moved into or out of operative relation to the article receiving end thereof without necessitating a shutting down and cooling of the leer preparatory to making repairs in or examining the delivery means. This is an important feature, as otherwise considerable time is lost in cooling down a leer to enable inspection and repairs of the delivery means and then bringing it up to the desired working temperature with the necessary expenditure of a considerable amount of fuel.

A further object of this invention is the provision of a means of the character described, which has no part thereof disposed within and exposed to the intense heat of the receiving end of the leer for any considerable length of time, but on the contrary has the parts thereof, which deliver the articles to the interior of the leer, movable into and out of the leer and which, during their movements through the leer, are only exposed for a very short period to the action of the heat therein, thus prolonging the life of the delivery parts and preventing a warping and distortion thereof from heat action.

A further object of the invention is the provision in an article delivery apparatus of the class described, of a simple and efficient means for carrying articles into the leer and, when at a predetermined point therein, quickly delivering the articles into upright position on the conveyer means in the leer.

A further object of the invention is the provision of simple and improved means for delivering bottles, jars, and other articles, in upright position to a receiving or carrying-away means in a rapid, efficient and accurate manner, such delivery means being adjustable to adapt it for handling articles of different shapes and sizes.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a plan view of an apparatus embodying the invention in operative relation to the receiving end of a leer, with the leer fragmentarily shown in horizontal section and with one of the article carrying segments of the apparatus near its article discharging position in the leer. Fig. 2 is a similar view thereof with the article carrying segment in article discharging position in the leer and with the article supporting shelves thereof retracted completely to article dropping position, and with parts of the segment broken away. Figs. 3, 4 and 5 are enlarged sections respectively on the lines 3—3, 4—4 and 5—5 in Fig. 2. Fig. 6 is a section of an apparatus on the line 6—6 in Fig. 1 in operative relation to a leer, with parts in full and with the adjacent end portion of the leer in vertical section. Fig. 7 is an enlarged section on the line 7—7 in Fig. 6. Fig. 8 is an enlarged fragmentary side elevation of the segment driving means of the apparatus. Figs. 9 and 10 are enlarged fragmentary details of the segment retarding and tripping means of the apparatus. Fig. 11 is a plan view of the means employed for delivering the articles in upright position to the means for delivering the articles to the leer, and Fig. 12 is a side elevation thereof with parts broken away and in operative relation to a supply means, fragmentarily shown, and to a delivery or carrying away apparatus shown in fragmentary section.

Referring to the drawings, 1 designates a truck frame of any suitable form and construction, supported by four wheels 2 carried at the ends of respective axles 3 and traveling on rails 4 forming a track leading

longitudinally from the article receiving end of a leer 5. This leer may be of any suitable construction and provided with the customary or any suitable form of conveying means for carrying articles from one end to the other thereof, which means, in the present instance, is shown in the form of a conveyer belt 6 passing around a guide roll 7 at the rear or receiving end of the leer. The heat from within the leer is prevented from escaping from the rear end of the leer as much as possible by a lower confining wall 8, extending from the bottom of the leer to adjacent the lower portion of the conveyer, and by an upper confining wall or curtain 9 extending downward from the top of the open end portion of the leer a sufficient distance to provide an opening 10 between said curtain and the top of the conveyer 6 sufficient to permit the entrance of the article delivery segments of the delivery apparatus therethrough, as hereinafter more fully described. It is thus evident that the rear end of the leer 5 is closed to the atmosphere except substantially for the provision of the opening 10 through which the delivery means operates.

A pedestal 11 is mounted on the truck frame 1 and forms a vertical journal which, in the present instance, is stepped at intervals, as shown in Fig. 6, to form bearings and supports for the respective parts intended to be carried thereby. A bearing sleeve 12 is journaled on the lower larger stepped portion of the pedestal 11 and is supported in position thereon by a subjacent annular flange 13 of the pedestal preferably through the medium of an interposed ball-bearing unit 14. The sleeve 12 has a segmental portion 15 rising from one side thereof in concentric horizontally spaced relation to the pedestal journal and forming a hub member from the upper end of which horizontally projects a segmental delivery table 16.

A second bearing sleeve 17 is journaled on the next stepped journal portion of the pedestal 11 and is supported by a foot-bearing 18 of the ball-type, in the present instance, which rests upon and is in turn supported by the upper end of the bearing sleeve 12. The bearing sleeve 17 is disposed within the upstanding segmental portion 15 of the sleeve 12 for free rotary movements relative thereto and has a segmental table 19 projecting horizontally from its upper end in substantially the horizontal plane of the table 16.

The segment formed by each table 16 and 19 preferably constitutes one-third of a circle, or substantially so, and each is provided at its outer peripheral edge with a horizontally disposed segmental rim portion 20, which enters and forms a guide for a reclining segmental U-shaped slide member 21. The slide member 21 of each table segment has a shelf 22 projecting outwardly from its lower edge horizontally thereof and extending from end to end of the associated member 21 and table rim 20 concentric therewith, being intended to act as a supporting shelf for articles to be carried to discharging position in the leer by each table segment as it revolves about its axis. The slide member 21 is overhung by an article ejector plate 23, which, in the present instance, is L-form in cross-section, and terminates at its lower edge adjacent to the rear or inner edge of the shelf 22, when the latter is in normal outwardly projected position, as shown in Fig. 3, the shelf projecting a sufficient distance beyond the same to form a support for the articles to be carried thereby. The ejector plate 23 is carried by and is radially spaced from the rim 20 of the respective table segment by pins or screws 24, the inner ends of which project through the slide member 21 and thread into or are otherwise suitably secured to the rim 20. The rearward movement of the slide member 21 on the segment rim 20 from its normal outward operative position is sufficient to withdraw the shelf 22 from in advance of the ejector plate 23, as best shown in Fig. 5, so that the shelf is entirely withdrawn as a support from an article disposed in advance of said plate.

A set of links 25 (three in the present instance) are connected at their outer ends to the upper inner edge of the slide member 21 of each table segment, being spaced along said member and extend inwardly therefrom and connect at their inner ends to respective levers 26, each of which extends upward from the link and is pivoted at its upper end for vertical rocking movement in a respective bearing bracket 27 rising from the associated table segment. The levers 26 are arranged in segmental series around the axis of the pedestal 11 and each has an arm 28 projecting inward therefrom (Fig. 6) and carrying a roller 29 in inward thrust contact with the periphery of a respective cam 30 mounted on the upper end portion of the pedestal 11. These cams correspond in number to the number of levers 26 employed in connection with a slide member 21, and are arranged in superposed relation, being mounted, in the present instance, on different successive stepped portions at the upper end of the pedestal 11 and secured against turning relative thereto and to each other by keys 31. A collar 32 is keyed to the pedestal 11 between the cams 30 and the upper ends of the hub portions of the respective table segments 16 and 19 to hold the bearing sleeves of said segments to their seats.

A series of contractile springs 33 connect each slide member 21 through links 25 to the associated table segment in a manner to

apply an inner drawing tension on the slide member, the inward movement of the member by reason of such spring tension being opposed by the action of the lever rolls 29 against the cams 30 with which they coact. In order that each slide member 21 and its shelf 22 may have a quick inward article dumping movement imparted thereto when the associated table segment is at a predetermined point in its movement within the leer 5, or, in other words, is in article dumping position in the leer, each lever roll 29 of the associated set moves into register with an abrupt depression 34 in its cam 30, which permits the several rolls of the set to simultaneously move into the respective cam notches and thereby permit the requisite inward movement of the associated slide member 21 to withdraw its shelf 22 from in advance of the ejector plate 23. The outgoing walls of the cam notches 34 are of cam form to effect a gradual outward movement or return of the rolls 29 to their outermost positions and a consequent positive return of the slide member 21 to its normal operative or article supporting position.

In order to cause the inward radial article dumping movement of each slide member 21 to be uniform throughout its length relative to the ejector plate 23, it is necessary to split the slide member at its center and to impart a slightly greater inward radial movement to the outer end portions of the sections than to the inner end portions thereof, as otherwise the shelf 22 would project a gradually increasing distance forward from the ejector plate 23 outward from the center thereof. The sections of the slide member 21 are pivoted together at their inner ends, as at 35 (Figs. 1, 2, 4 and 5). The relative inward breaking or pivotal movements of the two sections of a slide member and its shelf when in retracted or dumping position relative to its article receiving position is shown in Fig. 2. To permit the sections of the slide member to have the requisite relative pivotal movements the end links 25 of a set have universal joint connection at both their inner and outer ends with the respective parts to which attached.

Driving mechanism for staple segments.

In the operation of the machine each segment 16 and 19 during the article receiving period of its movement, which takes place while the table is passing a predetermined point in its revolution, is driven at a slow uniform speed, and during the period of its movement from article receiving position to article dumping position and then to article receiving position is moved at a greater substantially uniform speed, which, in the present instance, is twice as fast as the speed of movement thereof during its article receiving period. This faster speed of movement of each table during its article discharging or dumping period or cycle and while returning to article receiving position enables it to be quickly advanced to its dumping position in the leer, after leaving the article receiving portion of its cycle, and to then be quickly moved from the leer, after a momentary pause, which takes place at the dumping point, as hereinafter described, thereby reducing the period of exposure of the table to the intense heat of the leer a considerable extent over what it would be if the table had a uniform speed of movement throughout its entire revolution. This relative speed of movement of the tables during different portions of their revolutions is also important in that it is necessary to separate the rear end of a filled table from the forward end of a table being filled preparatory to retracting the slide member 21 and its article supporting shelf 22 to dump the articles carried by the filled table onto the top of the conveyer 6 within the leer, as otherwise the forward end of the receiving table would interfere with the rear end of the slide member 21 of the filled table in its dumping movement, and the forward end of the shelf 22 of the receiving table would also strike against and displace the rear end of the row of articles deposited on the leer conveyer by the filled table, before the last deposited row of articles could be advanced out of the path of movement of the shelf 22 of the receiving table by a forward movement of the leer conveyer.

To accomplish this the table segments 16 and 19 are respectively provided in a common horizontal plane on their hub portions with gear segments 40 and 41 each approximately 120° in length, which gear segments, during an article receiving portion of a cycle, mesh with and are driven by a slow pinion 42, and during successive portions of their remaining cycle of movement mesh with and are driven by fast pinions 43 and 44, said pinions being spaced substantially 120° apart. The gear segment 40, in the present instance, is carried directly by the sleeve 12 and the gear segment 41 is carried by a segmental flange 45 depending from the lower edge of the table sleeve 17.

The slow pinion 42 is carried by a vertical shaft 46 journaled in a bearing arm 47 rising from the truck frame 1, said shaft carrying a bevel gear 48^a in mesh with a smaller bevel gear 48 on a horizontal shaft 49. The fast pinions 43 and 44 are carried by respective vertical shafts 50 and 51, journaled in suitable bearing brackets 52 and 53 (Figs. 7 and 8), rising from the truck frame 1, and each of these shafts carries a bevel gear 54 in mesh, in the present instance, with a similar sized bevel gear 55 on a horizontal

shaft 56. The shafts 49 and 56 are journaled at their outer ends in respective bearing brackets 57 rising from the truck frame 1 and each carries a worm-wheel 58 (Fig. 6 in mesh with a respective driving worm 59 on a drive-shaft 60 having direct or other suitable connection with a motor 61 (Fig. 2) carried by the truck frame. While the shafts 49 and 56 are driven at the same speed the gearing between the shaft 49 and the shaft 46 is so proportioned relative to the gearing between the shaft 56 and the shafts 50 and 51 that the shaft 46 and its pinion 42 are driven one-half as fast, in the present instance, as the shafts 50 and 51 and the pinions 43 and 44 carried thereby. The relative arrangement of the pinions 42, 43 and 44 with respect to the lengths of the gear segments 40 and 41 is such that a gear segment will move into engagement at one end with any one of said pinions as it is leaving engagement at its other end with the next pinion at the rear so that there is no interruption in the movement of the gear segments as they pass from engagement with one pinion to engagement with another and there is also no locking action of the pinions and gear segments by reason of the relative speeds of driving of the segments by the different pinions.

Each gear segment 40 and 41 is attached to its respective hub member by screws 62, which thread into the hub member and project out through arcuate slots 63 in the gear segment, thus permitting limited arcuate sliding movements of the gear segments relative to the hub members by which they are carried. Each gear segment is yieldingly held at one limit of its sliding movement, in the present instance, by a coiled expansion spring 64 (Fig. 7) mounted in a socket 65 extending in parallel with the arc of the segment and formed substantially half in the segment and half in the hub member carrying the segment. When each article carrying table segment has reached a predetermined point in its movement into the leer, an arm 66 on the table segment (Figs. 1, 2, 9 and 10) moves into register with and engages a trip-lug 67 on the under side of the lower cam 30, a movement of which lug to release the arm is resisted by a spring 68. It is therefore apparent that a table segment, when its arm 66 is in engagement with the trip-lug 67, is caused to stand at rest while the forward movement of the gear segment of such table continues under the driving action of its pinion, until a predetermined relative movement of the table and gear segment are obtained, when the resistance of the spring 68 will be overcome and the lug 67 permitted to trip to allow the arm 66 to pass the same. The momentary dwell or pause, which the article carrying table is thus permitted to have, takes place approximately at the instant when the article supporting shelf 22 thereof is retracted to deposit the articles on the leer conveyer. It is evident that upon a release of the arm 66 by the trip-lug 67 the table segment will be caused to move forward relative to the gear segment so that they assume their normal relation.

It is preferable to provide each table segment with one or more supporting rolls or wheels 69 which may pass onto the adjacent end of the conveyer 6 in the leer and tend to support the table in proper relation thereto. The use of these rolls is not important, however, and may be limited, if desired.

Article setting up means.

In order that the articles may be delivered to the table segments of the feeding-in mechanism for the leer, I provide a simple and efficient mechanism which is adapted to receive the articles in reclining position as they are delivered by any suitable conveying means from the source of supply and to set the same in upright or any position desired on the shelf 22 of the receiving table segment. This mechanism comprises a standard 70 (Fig. 12), which is preferably adjustable as to height and carries a longitudinally inclined trough-like member 71 at its upper end preferably for tilting adjustment to obtain the desired inclination of the member.

The trough member 71 is shown, in the present instance, as having at one side a fixed side wall 72 and at its other side a movable side wall 73, which latter is mounted on the bottom 74 of the trough for adjustment transversely thereof by reason of the securing screws or bolts 75 therefor projecting through transverse slots 76 in the trough bottom. The integral side 72 and an integral extension 77 on the opposite side edge of the bottom 74 extend a distance in advance of said bottom and form guides 78 between which a movable forward bottom section 79 is mounted for longitudinal adjusting movements, the bottom sections 74 and 79 forming an opening or jump-gap 80 therebetween, the size of which is regulated by a relative adjustment of such section. The adjustable side wall 73 of the trough extends forward beyond the opening 80 and for a distance along the adjacent side of the movable bottom section 79. A stationary end member 81 is provided at the forward end of the trough, being fixed to the side 72 and bottom extension 77, said end member having a screw 82 threaded through its lower portion and swiveled at its rear or inner end in a lug 83 on the bottom of the bottom section whereby an adjustment of such section may be effected by a turning of the screw. A bumper block 84, which may be of wood, is mounted over the forward

end of the bottom section 79 and is longitudinally adjusted relative thereto by the turning of a screw 85, which is threaded through the upper portion of the end member 81 and swiveled at its inner end in the block. A plate 86 is mounted over the bumper block 84 to hold it to its seat in the trough, said plate being screwed or otherwise suitably fixed to the side 72 and extension 77.

Guide wings 87 and 88, preferably of a yielding or flexible nature, extend downward respectively from the rear and forward edges of the trough opening 80 and are preferably mounted for swinging adjustment forward and away from each other to adapt them to be regulated to suit the size and style of article to be set up. For this purpose the rear wing 87 has its upper end fixed to a shaft 89 journaled in a lug or boss at the bottom of the forward edge of the bottom section 74, and a control handle 90 projects from this shaft to facilitate a locking adjustment of the guide wing. The forward guide wing 88 is carried in a similar manner by a shaft 91 journaled in the under side of the bottom section 79 adjacent to its rear end and having a handle 92 projecting therefrom to facilitate adjustment.

93 designates a conveyer of any suitable form which delivers articles in reclining position and with preferably the top ends thereof, in the case of a container, such for instance as a bottle, jar or the like, foremost.

An article, upon being delivered to the trough 71, slides down the same, being held in lengthwise relation thereto by the sides of the trough, which have suitable relative adjustment for such purpose, the speed of travel of the article down the trough being sufficient to carry it across the gap or opening 80 and into contact at its forward end with the bumper block 84. The adjustment of the bumper block may be such that the article when brought to a stop thereby will have its center of gravity disposed slightly to the rear of the rear edge of the front bottom section 79 of the trough so that the article will be overbalanced by the weight of its rear end portion and caused to fall rearward and downward in upright position through the opening 80 and between the guide wings 87 and 88, which latter direct the article to proper setting-up position on the subjacent shelf 22 or other support. The speed of movement of the subjacent support should be sufficient to advance the article a distance slightly greater than its width by the time the next article has been fed to toppling over position in the delivery trough. It is evident that the length of the gap 80 in the trough is determined by the length of the article operated on and may be varied by an adjustment of the bottom section 79 to suit the particular case. It is also evident that the inclination of the trough 71 is adjusted to suit the speed at which it is desired to feed an article down the trough in order that it may effectually jump the gap 80, and that the slight rebound which is given the article as it strikes the bumper block 84 assists in toppling it rearwardly down through the opening.

The operation of my apparatus in the delivery of articles to a leer is as follows:—

Each table segment 16 and 19 as it passes the delivery and setting-up trough 71 has articles *a* delivered thereto, said articles being intermittently and successively conveyed to the trough 71 down which they pass and through the delivery opening 80 through which they fall in upright position on the subjacent portion of the table shelf 22. As soon as the rear end of the table being filled has passed the delivery trough 72 the rear end of the gear segment 40 or 41 of such table, as the case may be, leaves the slow feeding drive pinion 42 and is immediately engaged by the fast driving pinion 43, thereby causing the table to be moved into article discharging position in the leer and then from such position out of the leer at a faster speed than the speed of the table during the article receiving portion of its cycle, the ratio of the movements in this case being two to one. When the table segment has reached its position in the leer shown by the table 19 in Fig. 2, the arm 66 thereon engages the trip-lug 67 and the forward feeding movement of the table is momentarily arrested thereby, due to the yielding spacing connection between the table and its gear segment. At the instant of stopping or arresting of the table the rolls 29, riding on the cams 30, move into register with and drop into the cam depressions 34 of the respective cams, thereby permitting a sudden inward drawing of the slide member 21 and its article supporting shelf sections 22, under the action of the springs 33, so that the articles carried by the shelf sections are deposited in upright position on the subjacent portion of the conveyer 6. When the articles have been deposited in this manner in the conveyer the trip-lug 67 releases the arm 66 and permits the table to move forward under the action of the spring 64 and catch up with its gear segment, which is continually driven during the period of rest of the table by the pinion 43. At approximately the same time, or before the advancing forward end of the succeeding table, which is then being filled, has entered the leer a sufficient distance to strike the adjacent end of the row of articles last deposited on the conveyer 6, the conveyer will have a forward feeding movement imparted thereto, as is

customary, so as to advance the deposited row of articles a predetermined distance. When the table which is leaving the leer has been driven one-third of its revolution by the pinion 43, it is picked up and driven the next third of its revolution by the pinion 44, which moves it to its initial article receiving position or in position to be engaged by the slow pinion 42. It is thus evident that during one-third of a revolution of each table a slow movement is imparted thereto, which takes place during the article receiving portion of its cycle, and that during the remaining two-thirds of its revolution the table is moved at twice the speed of its article receiving speed so as to be quickly moved through the leer and back to article receiving position by the time the table being filled leaves the slow pinion and passes into engagement with the fast pinion 43. It is evident that by moving each table quickly through the leer it is not subjected to the same injurious action of the intense heat of the leer that it would be if its speed of receiving movement were constant throughout the entire revolution of the table.

By constructing an article carrying-in or delivery means for a leer, as provided in my invention, it may be moved into or out of operative relation to the leer at will without stopping the leer or cooling the same. This is a very important feature as considerable time in the making of inspections and repairs thereof are not only saved but the expenditure of fuel incident to shutting down the leer and then bringing it up to the desired heat after inspection or repairs have been made is saved.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, or to the specific combination and arrangement of elements shown therein, as the machine shown is merely illustrative of one embodiment of the invention and is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In an apparatus of the class described, a revoluble article delivery member of segmental form, and means operable to move the member at different speeds during different predetermined portions of each cycle of movement.

2. In an apparatus of the class described, a pivotally horizontally movable article delivery member, and means automatically operable to move the member at one speed during a predetermined article receiving portion of its movement, and then at a faster speed to and a predetermined distance from article delivery position.

3. In an apparatus of the class described, a movable article delivery member, means automatically operable to move the member at one speed during a predetermined article receiving portion of its movement and then at a faster speed to and a predetermined distance from article delivery position, and means for momentarily arresting the movement of the member when in article delivery position.

4. In an apparatus of the class described, a revoluble article delivery member having a segmental article receiving and carrying portion, and means automatically operable to move the member at one speed while receiving articles and at a different speed to and a predetermined distance from article delivery position.

5. In an apparatus of the class described, a revoluble article delivery member having a segmental article receiving and carrying portion, and means automatically operable to move the member at one speed during a predetermined article receiving portion of its revolution and at a faster speed to and a predetermined distance from article delivery position.

6. In an apparatus of the class described, a revoluble article delivery member having a segmental article receiving and carrying portion, means automatically operable to move the member at one speed during a predetermined article receiving portion of its movement and then at a different speed to article delivery position and a predetermined distance therefrom, and means momentarily arresting the movement of the member when in article delivery position.

7. In an apparatus of the class described, revoluble means for receiving and carrying articles from one position to another, and means automatically operable to move the revoluble means at different speeds during different predetermined portions of each revolution.

8. In an apparatus of the class described, means for receiving and carrying articles from one position to another and having a marginal segmental carrying portion, and mechanism automatically operable to move the means at one speed during a predetermined article receiving portion of each revolution and at a faster speed to article delivery position and a predetermined distance therefrom.

9. In an apparatus of the class described, means for receiving and delivering articles from one position to another and having a predetermined path of movement and a relatively movable article carrying part, mechanism automatically operable to move the means at one speed during the article receiving portion of its movement and at a faster speed to and from article delivery position, and means automatically operable to move the article carrying part of the carrying

means to discharge articles carried thereby when the carrying means is in article delivery position.

10. In an apparatus of the class described, a revoluble member, article carrying means movably carried by the member, mechanism for moving the member in one direction at one speed during the article receiving portion of its revolution and at a different speed during its movement to and from article delivery position and back to receiving position, and means for moving the carrying means to discharge articles carried thereby when the member is in delivery position.

11. In an apparatus of the class described, a movable member having a predetermined course of movement, a retractable article carrying means carried by the member, and means automatically operable at a predetermined point in a cycle of movements of the member to quickly retract the carrying means to discharge articles therefrom.

12. In an apparatus of the class described, a movable member having a predetermined course of movement, a retractable article carrying shelf carried by the member, and means automatically operable at a predetermined point in a cycle of movements of the member to quickly withdraw the shelf from article supporting position.

13. In an apparatus of the class described, a movable member having a predetermined course of movement, a retractable article carrying means carried by the member, means automatically operable to move said member at one speed during a predetermined portion of its movement while receiving articles and then at another speed to article delivery position and back to receiving position, and means automatically operable at a predetermined point in a cycle of movements of the member to quickly withdraw the article carrying means from article supporting position when the member is in article delivery position.

14. In an apparatus of the class described, a revoluble member, an article carrying shelf carried marginally by the member and movable relative thereto, and means automatically operable at a predetermined point in a cycle of movements of the member to quickly withdraw the shelf from article supporting position.

15. In an apparatus of the class described, a revoluble member, article carrying means carried marginally by the member and movable relative thereto, and means automatically operable at a predetermined point in a cycle of movements of the member to quickly withdraw the carrying means from article supporting position.

16. In an apparatus of the class described, a revoluble member, article carrying means carried marginally by the member and movable relative thereto, means driving the member at different speeds during different predetermined portions of each revolution, and means automatically operable at a predetermined point in a cycle of movements of the member to move the carrying means from article supporting position.

17. In an apparatus of the class described, revoluble article carrying means, means for driving said means at one speed during a predetermined article receiving portion of its revolution and then at a faster speed to article delivery position and a predetermined distance from said position, and means automatically operable at a predetermined point in a revolution of the revoluble means to discharge therefrom articles carried thereby.

18. In an apparatus of the class described, revoluble article carrying means, means operable to move the carrying means at one speed during a predetermined article receiving portion of its revolution and to move the carrying means at a faster speed to and a predetermined distance from article delivery position, means for momentarily arresting the movement of the carrying means when in article delivery position, and means automatically operable to actuate the carrying means to discharge articles carried thereby during the arresting period of the carrying means.

19. In an apparatus of the class described, a revoluble article carrying member, means for driving said member at one speed during approximately one-third of its revolution and at a greater speed during approximately the remainder of the revolution, and means for arresting the member when at a predetermined point in the faster driving portion of its revolution.

20. In an apparatus of the class described, a revoluble article carrying member, means for driving the member at one speed during approximately one-third of a revolution to permit articles to be delivered thereto and for driving the member at a greater speed for approximately the remainder of its revolution except for a dwell in its movement, means for effecting said dwell at the article delivery point of the movement of said member, and means for operating the member to release articles carried thereby during the dwell period.

21. In an apparatus of the class described, a revoluble segmental member having a relatively movable marginal article carrying portion, means for revolving said member at a predetermined speed, and means automatically operable to move the article carrying portion of the member to discharge articles therefrom when the member is at a predetermined point in its revolution.

22. In an apparatus of the class described, a revoluble segmental member having a rela-

tively movable marginal article carrying portion, means normally holding the article carrying portion of said member in projected article carrying position and operable at a predetermined point in a revolution of the member to permit an inward article discharging movement of said portion, means for imparting a quick inward article discharging movement to the article carrying portion of the member when at a predetermined point in its revolution, and means for revolving said member.

23. In an apparatus of the class described, a revoluble member, a segmental article carrying shelf marginally carried by said member for relative radial movements, said shelf comprising a plurality of circularly alined sections, means engaging different portions of the shelf and operable at a predetermined point in a revolution of the member to permit an inward article discharging movement of the shelf with the end portions of the shelf moving a greater distance than the central portion thereof, means for imparting inward movement to the shelf when released by said operating means, and means for revolving the members.

24. In an apparatus of the class described, revoluble article carrying means, means for delivering articles to said means during a predetermined portion of a revolution thereof, mechanism for driving said carrying means at one speed during the article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, means for periodically arresting the movement of the carrying means in article delivery position, and means automatically operable to operate the carrying means to release articles carried thereby when in article delivery position.

25. In an apparatus of the class described, a revoluble segmental member, means for delivering articles to said member during a predetermined portion of its revolution, means for driving said member at one speed during the article receiving portion of its revolution and at a faster speed to and a predetermined distance from its article delivery position, means effecting a dwell of said member when in article delivery position, and means automatically operable to release articles carried by the member when the member is in article delivery position.

26. In an apparatus of the class described, a revoluble member having a marginally disposed segmental article carrying shelf which is radially movable relative to the member, means for delivering articles to said shelf during a predetermined portion of a revolution of the member, means for driving the member at one speed during the article receiving portion of its revolution and then at a faster speed to and a predetermined distance from article delivery position, means arresting the movement of the member in article delivery position, and means automatically operable when the member is in delivery position to radially retract the shelf to quickly drop articles carried thereby in upright position.

27. In an apparatus of the class described, a revoluble member having a marginally disposed relatively movable segmental article carrying portion, means for successively delivering articles to the marginal portion of said member during substantially one-third of a revolution of the member, means for driving said member at one speed during the article receiving portion of its revolution and at a faster speed during the remainder of its revolution except for a slight dwell in its movement, means for effecting said dwell of the member when at a predetermined point in its faster movement, and means automatically operable during the dwell period of the member to move the article carrying portion thereof to discharge articles therefrom.

28. In an apparatus of the class described, a revoluble article carrying member, means for driving said member including a yieldable element to permit a short dwell of the member during a predetermined portion of its revolution, and means automatically operable to deliver articles from the member during its dwell period.

29. In an apparatus of the class described, a revoluble segmental article carrying member, a gear element connected to said member for limited yielding revoluble movements relative thereto, means for coacting with said gear element to revolve said member, means operable at a predetermined point in a revolution of the member to hold the member to cause a periodical dwell of the member and then to release it, and means automatically operable to discharge articles from the member during its period of dwell.

30. In an apparatus of the class described, a revoluble article carrying member, a gear segment connected to said member for arcuate yielding movements relative thereto concentric to its axis, drive means having a plurality of drive pinions for engaging and driving said segment during different predetermined portions of its revolution, the driving of the member during the article receiving portion of its revolution being slower than its speed of driving during the remainder of its revolution, means operable to effect a dwell of the member at a predetermined point in its revolution, and means automatically operable to cause a discharge of articles from the member during its period of dwell.

31. In an apparatus of the class described, a plurality of relatively movable revoluble article carrying members, means for driving each of said members to cause it to move at one speed during a predetermined article receiving portion of its revolution and then at a different speed to and a predetermined distance from article delivery position.

32. In an apparatus of the class described, a plurality of relatively movable revoluble article carrying segments, means operable to drive each of said segments at one speed during a predetermined article receiving portion of its revolution and then to drive it at a faster speed to and a predetermined distance from article delivery position, and means operable to discharge articles from each segment when in article delivery position.

33. In an apparatus of the class described, a plurality of article carrying means revoluble about a common axis and relatively movable, mechanism for driving each of said means at one speed during a predetermined article receiving portion of its revolution and at a different speed to and a predetermined distance from its article delivery position, each of said means being automatically operable when in delivery position to discharge articles carried thereby.

34. In an apparatus of the class described, a plurality of article carrying means revoluble in a common plane about a common axis and relatively movable, mechanism for driving each of said means at different predetermined speeds during different predetermined portions of its revolution, and means automatically operable to discharge articles from each carrying means when at a predetermined point in its revolution.

35. In an apparatus of the class described, a plurality of segmental article carrying members relatively revoluble in a common plane about a common axis, said members combined being less than a complete circle whereby each may have a predetermined revoluble movement relative to the other, and mechanism operable to drive each member at one speed during a predetermined article receiving portion of its revolution and at a different speed to and a predetermined distance from article delivery position.

36. In an apparatus of the class described, a plurality of segmental article carrying members relatively revoluble in a common plane, the combined area of the members being less than the area of a complete circle, mechanism for driving each of said members at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, means for permitting and effecting a dwell of each member in article delivery position, and means automatically operable with respect to each member when the member is in article delivery position to discharge articles therefrom.

37. In an apparatus of the class described, a plurality of article carrying segments relatively revoluble in a common plane and together being less than a complete circle, each segment having a relatively movable marginal carrying means, mechanism operable to drive each segment at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, means effecting a dwell of each segment in article delivery position, and means automatically operable when each segment is in article delivery position to operate the article carrying means of the segment to discharge articles therefrom.

38. In an apparatus of the class described, two segmental article carrying members mounted for relative revoluble movements in a common plane and each describing approximately one-third of a circle, and means for driving each segment at one speed during approximately one-third of its revolution to permit articles to be delivered thereto and being driven at a greater speed during the remaining portion of its revolution except for a dwell in its movement at article delivery position, and means effecting said dwell in each revolution of each member.

39. In an apparatus of the class described, two segmental article carrying members each forming approximately one-third of a circle and being mounted for relative revoluble movements in a common plane about a common axis, mechanism for driving each segment at one speed during approximately one-third of its revolution during which period articles are delivered thereto and then being driven at substantially twice said speed to and a predetermined distance from article delivery position, and means automatically operable to effect a delivery of articles from each segment when in article delivery position.

40. In an apparatus of the class described, a pair of segments constituting less than a complete circle and being mounted for relative revoluble movements in a common plane, article carrying means marginally carried by each segment and movable relative thereto, mechanism operable to drive each segment at one speed during a predetermined article receiving portion of each revolution and then at a greater speed to and a predetermined distance from article delivery position, and means automatically operable to actuate the article carrying means of each segment to deliver articles therefrom when in article delivery position.

41. In an apparatus of the class described, a plurality of segmental article carrying members relatively revoluble in a common plane, a segment carried by each member, drive means having a plurality of drive pinions for successive engagement with the gear segments of each member and operable to drive the members at different predetermined speeds for different portions of each revolution thereof, and means automatically operable to deliver articles from each member when at a predetermined point in its revolution.

42. In an apparatus of the class described, a pair of segmental members mounted for relative revoluble movements in a common plane, a marginal article carrying shelf carried by each member for relative movements, mechanism for driving each member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, and means in association with each member and automatically operable to move its shelf to discharge articles therefrom when a member is in article delivery position.

43. In an apparatus of the class described, a plurality of segmental members relatively revoluble in a common plane and about a common axis and each having a retractable article carrying means at its margin, mechanism for driving each member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, means for effecting a dwell of each member in article delivery position, and means automatically operable to retract the article carrying portion of each member to deliver articles therefrom during the dwell period of the member.

44. In an apparatus of the class described, two segmental members having relatively movable marginal article carrying portions, and being relatively revoluble in a common plane about a common axis, mechanism common to both members for driving each at one speed during substantially one-third of its revolution when the articles are fed thereto and then at a faster speed for approximately the remainder of its revolution to and from article delivery position, means effecting a momentary dwell of each member when in article delivery position, and means automatically operable to move the article carrying portion of each member to discharge articles therefrom when in article delivery position.

45. In an apparatus of the class described, a plurality of segmental article carrying members relatively revoluble in a common plane about a common axis, mechanism for driving each of said members at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, means operable to discharge articles from each member when in article delivery position, and means for delivering articles to each member during the article receiving portion of its movement.

46. In an apparatus of the class described, a plurality of segmental article carrying members mounted for relative revoluble movements in a common plane, means for delivering articles to each member during a predetermined portion of its revolution, mechanism for driving each member at one speed during the article receiving portion of its revolution and then at a greater speed to and from article delivery position to return it to position to have articles delivered thereto as the preceding member moves from article receiving position, and means for discharging articles from each member when in article delivery position.

47. In an apparatus of the class described, a pair of segmental article carrying members mounted for relative revoluble movements in a common plane and about a common axis and together constituting less than a complete circle, means for successively delivering articles to each member during a predetermined portion of its revolution, mechanism for driving each member at one speed during the article receiving portion of its revolution and then at a greater speed to and from its article delivery position to return it to position to have articles delivered thereto as the other member moves from article receiving position, and means for delivering articles from each member when in article delivery position.

48. The combination with a leer having an opening in its receiving end, of an article carrying means movable from article receiving position without the leer to article delivery position therein through its opening and to then return to article delivery position, and mechanism operable to move said means at one speed during a predetermined article receiving portion of its movement and then at a greater speed to and a predetermined distance from article delivery position within the leer.

49. The combination with a leer having an opening in its receiving end, of an article carrying means movable from article receiving position without the leer to article delivery position therein through its opening and to then return to article delivery position, mechanism operable to move said means at one speed during a predetermined article receiving portion of its movement and then at a greater speed to and a predetermined distance from article delivery position within the leer, and means operable

to discharge articles from the carrying means when in delivery position within the leer.

50. The combination with a leer having an opening in its receiving end, of a revoluble article carrying means movable from article receiving position without the leer to article receiving position within the leer through its opening, and mechanism operable to drive said means at one speed during a predetermined article receiving portion of its movement and then at a greater speed to and a predetermined distance from article delivery position and to return it to article receiving position.

51. The combination with a leer having an opening in its receiving end, of a revoluble article carrying means movable from article receiving position without the leer to article delivery position within the leer through its opening, mechanism for driving said means at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article receiving position and returning it to article receiving position, means operable to effect a dwell of the article carrying means when in delivery position, and means operable to discharge articles from the carrying means during its dwell period.

52. The combination with a leer having an opening in its receiving end, of a revoluble segmental article carrying member, means for driving said member at one speed for a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from delivery position within the leer through its opening, and means for discharging articles from the member when in delivery position.

53. The combination with a leer having an opening in its receiving end, of a segmental member revoluble in one direction into and out of the leer through said opening, means for delivering articles to the member without the leer, mechanism for driving the member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position within the leer, and means for discharging articles from the member when in article delivery position.

54. The combination with a leer having an opening in its receiving end, of a member revoluble in one direction into and out of the leer through its opening, said member having a relatively movable article carrying portion, means for delivering articles to the carrying portion of said member without the leer, mechanism for driving the member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position within the leer, means for effecting a dwell of the member in delivery position, and means for moving the article carrying portion of the member relative to the member when in delivery position to discharge articles therefrom.

55. The combination with a leer having an opening in its receiving end, of a plurality of article carrying means successively movable from article receiving position without the leer to delivery position within the leer and then back to article receiving position, and mechanism for driving each means at one speed during a predetermined article receiving portion of its movement and then at a greater speed to and a predetermined distance from article delivery position in the leer and back to receiving position.

56. The combination with a leer having an opening in its receiving end, of a plurality of article carrying means successively movable from article receiving position without the leer to delivery position within the leer and then back to article receiving position, mechanism for driving each means at one speed during a predetermined article receiving portion of its movement and then at a greater speed to and a predetermined distance from article delivery position in the leer and back to receiving position, and means operable to deliver articles from each means when in delivery position.

57. The combination with a leer having an opening in its receiving end, of a plurality of article carrying members mounted for relative revoluble movements to successively move from article receiving position without the leer to delivery position within the leer and then to return to receiving position, and mechanism operable to drive each member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position in the leer, and means for delivering articles from each member when in delivery position.

58. The combination with a leer having an opening in its receiving end, of a pair of article carrying members mounted for relative revoluble movements in a common plane to successively move from article receiving position without the leer to article delivery position within the leer through its opening and then to return to article receiving position, and mechanism operable to drive each segment at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position, and means operable to deliver articles from each member when in delivery position.

59. The combination with a leer having an opening in its receiving end, of a pair of segmental article carrying members mounted for relative revoluble movements in a common plane into and out of the leer through its opening, means for successively delivering articles to each member without the leer, mechanism for driving each member at one speed while passing the article delivery means and then at a greater speed to article delivery position in the leer and then to article receiving position, each member being moved into position to receive articles from the delivery means as the other member passes therefrom, and means for discharging articles from each member when in delivery position.

60. The combination with a leer having an opening in its receiving end, of a pair of revoluble article carrying means movable successively in one direction into and out of the leer through its opening, means for delivering articles to each carrying means without the leer during a predetermined portion of its revolution, mechanism for driving each article carrying means at one speed during the article receiving portion of its revolution and then at a greater speed to and a predetermined distance from delivery position, each carrying means entering the article receiving portion of the revolution as the other carrying means leaves such portion, said carrying means each being automatically operable to deliver articles therefrom into the leer when in delivery position.

61. The combination with a leer having an opening in its receiving end, of article carrying means movable into the leer through said opening and bodily movable into and out of operative relation to the leer.

62. The combination with a leer having an opening in its receiving end, of means working through the leer opening to deliver articles therein from without the leer, and portable means carrying said delivering means for movement into and out of operative relation to the leer.

63. The combination with a leer having an opening in its receiving end, of an article delivery member revolubly movable into and out of the leer through its opening to deliver articles thereto from without the leer, and means carrying said member for movement into and out of operative relation to the leer.

64. The combination with a leer having an opening in its receiving end, of portable means movable toward and away from the open end of said leer, an article carrying member mounted on said means for revoluble movements through the leer opening to deliver articles into the leer from without the same, means carried by said portable means for imparting predetermined revoluble movements to said member, and means operable to discharge articles from the member when at a predetermined point in the leer.

65. The combination with a leer having an opening in its receiving end, of an apparatus embodying a truck mounted for movements toward and away from the receiving end of the leer, a pair of article carrying members mounted on said truck for relative revoluble movements in a common plane about a common axis and having a portion of its movements into the leer through said opening, means carried by the truck for driving each member at one speed during a predetermined article receiving portion of its revolution and then at a greater speed to and a predetermined distance from article delivery position in the leer, and means operable to discharge articles from each member when in delivery position within the leer, said apparatus being movable into and out of operative relation to the leer.

In testimony whereof I have hereunto signed my name to this specification.

FRED DANBERG.