

Feb. 17, 1953

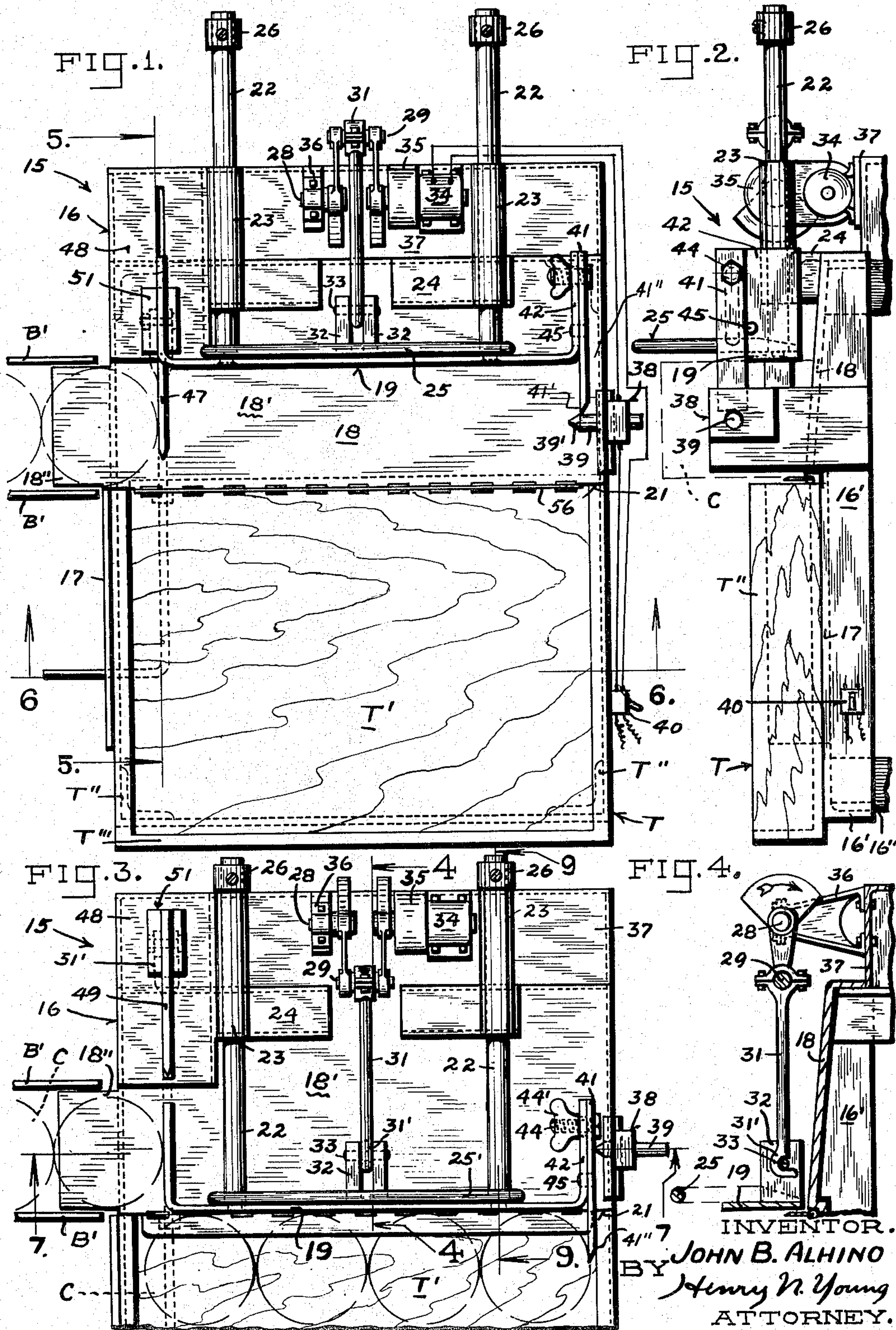
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2,628,754

ARTICLE-TRAYING UNIT

Filed July 24, 1947

2 SHEETS—SHEET 1

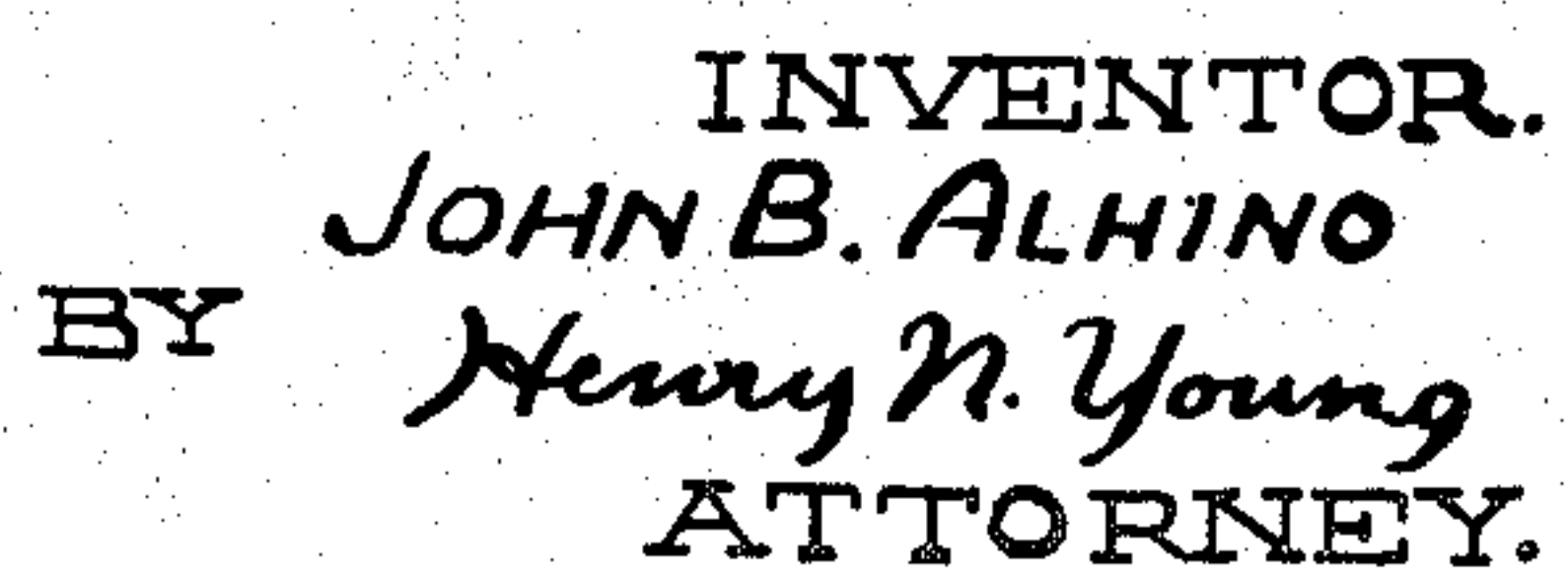


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Filed July 24, 1947

ARTICLE-TRAYING UNIT

2 SHEETS--SHEET 2



UNITED STATES PATENT OFFICE

2,628,754

ARTICLE-TRAYING UNIT

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Application July 24, 1947, Serial No. 763,358

3 Claims. (Cl. 226—15)

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The invention relates to a mechanical means for transferring articles of like form and size from a conveyor onto a tray in a predetermined and orderly arrangement of the articles.

A general object of the invention is to provide an article-traying unit which is particularly arranged for the traying of filled cans before the same are capped and/or sealed.

A more specific object is to provide an improved can-traying unit by which cans are delivered in rows upon a receiving tray.

Another object is to provide an automatically operative can-traying unit of the character described which may be arranged for manual actuation at will and without requiring the use of tools.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment of the unit and in the accompanying drawings in which,

Figure 1 is a plan view of a unit which is conditioned for the automatic traying of cans therewith.

Figure 2 is a left-side elevation of the structure and arrangement of Figure 1.

Figure 3 is a fragmentary plan view of the unit as it is conditioned at the end of a can-traying operation thereof.

Figure 4 is a fragmentary section at the line 4—4 in Figure 3.

Figure 5 is a fragmentary sectional view taken at the line 5—5 in Figure 1.

Figure 6 is a sectional elevation taken at the line 6—6 in Figure 1.

Figure 7 is a sectional elevation taken at the line 7—7 in Figure 3.

Figure 8 is a perspective view of a manually settable control element of the unit.

Figure 9 is a fragmentary section taken at the line 9—9 in Figure 3.

Figure 10 is an enlarged showing of the right side portion of a ramp member of the unit disposed as shown in Figure 6.

Figure 11 is a section taken at the right end of the ramp member as shown in Figure 10.

Essentially, an article-traying unit 15 of my invention comprises a suitably supported bedplate 16 carrying the mechanism of the unit and providing a front tray-supporting plate 17 and a transfer plate 18 extending from and along the rear edge of the plate 17. The transfer plate 18 is arranged to receive from one side thereof cylindrical articles comprising, in the present instance,

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cans C having their bottoms resting on the plate for a sliding of the cans across the plate for an initial alignment of the received cans along the plate and a subsequent forward movement of the cans into a tray T positioned upon the plate 17; the tray T is of a usual structure having a bottom T' from which side members T'' and a connecting front member T''' extend, no rear side being provided. The lateral transfer of a completed line of cans from the plate 18 onto the tray bottom is arranged to be effected by reason of the forward movement of an upright push plate 19 against the line of positioned cans on the plate 18 to push the latter onto the tray while the supply of cans is held back.

Cans may be supplied to the transfer plate 18 by any suitable means which maintains the supply of cans in appropriate position for their feeding movement over the plate. In the present structure, a lip extension 18' of the plate 18 is cooperative with a continuous conveyor belt B for receiving cans from the belt for movement therefrom to the transfer zone of the plate 18 when such movement is permitted; when a forward movement of the cans is prevented, the belt slides beneath their bottoms to constantly urge a forward delivery of the line of cans. Appropriately spaced guide plates B' extend from the conveyor assembly at opposite sides of the belt and the lip 18' for maintaining the feeding alignment of the supported cans while the same are either static or moving.

Preferably, and as shown, the transfer plate 18 has its upper face 18' offset upwardly from the upper face 17' of the tray-supporting plate 17 at the common line of the plates, the step thus provided having a height which equals or exceeds the thickness of a tray bottom T'. In the present structure, the plates 17 and 18 are parts of a single bed-plate member whereby the step between the upper plate faces 17' and 18' is defined at an upright shoulder 21 which is arranged to be engaged by the inner edge of a tray bottom as a positioning stop for the tray; the arrangement is generally such that cans may be pushed from the transfer plate 18 onto a tray bottom T' without tilting. For a reason which will hereinafter appear, the transfer plate 18, or at least its top face 18', preferably slopes downwardly from the top of the shoulder 21. The bedplate 16 may be supported at an appropriate height with respect to the feeding level of cans or to its transfer portion 18 on a suitable support; in the present instance, the bedplate 16 is provided with an integral apron 16' about its

edges, and support legs 16'' extend from the bedplate corners.

The push plate 19 is mounted on and between mutually parallel support rods 22 of uniform cross-section and which are longitudinally slidable in complementary bores provided by tubular guideway members 23 supported from the rear portion of the bedplate 16 on support blocks 24 fixed to the bedplate. The forward ends of the guide members 23 are so spaced from the shoulder 21 that they permit a disposal of the push plate 19 in generally coplanar relation with the rearward guide plate B' of the conveyor assembly. A handle 25 is provided for use in manually actuating the push plate 19; as particularly shown, the handle 25 comprises a U-shaped member having its ends downturned and fixed to the back of the plate 19, and having its intermediate portion 25' extending above the top of the plate in spaced parallel relation thereto for grasping by the hand of an operator positioned at the front of the unit for reciprocating the push plate to deliver a line of cans from the transfer plate 18 upon a tray bottom T' and for returning the plate to its initial position. Stop collars 26 are adjustably mounted on the rear ends of the rods 22 for limiting the forward movement of the push plate to the alignment of its working face with the shoulder 21.

It will now be noted that the push plate 19 is provided with a rearwardly extending member 27 at the end thereof nearest the receiving end of the transfer plate 18, and that said member comprises an arm which is arranged to function as a stop or gate against a movement of cans onto and along the plate while the push plate is disposed forwardly of its position in which the disposal of cans in front of it may be effected from the conveyor belt B or another source of cans to be trayed. The action of the member 27 is such that when the push plate 19 has moved forwardly from its position of Figure 1 to its position of Figure 3, the cans in front of it are pushed laterally from the transfer plate 18 onto a tray bottom T' while the next can in the supply line is engaged by the member 27 for holding back the supply of cans until the push plate has been restored to its starting position. As particularly shown, the stop, or gate, member 27 comprises an integral turned-back extension of the push plate 19.

Means are provided for mechanically effecting reciprocative cycles of the push plate 19. As particularly shown, a crankshaft 28 is journaled in suitable bearings provided rearwardly of, and at the level of, the push plate 19, and said crankshaft has its crankpin 29 connected to the plate 19 by a connecting rod 31 whereby each rotation of the shaft from a position in which the crankpin 29 is disposed in its rearmost position will effect the previously described reciprocation cycle of the push plate. The connecting rod 31 is releasably connected to the push plate 19 at the rear thereof whereby when it is disconnected from the plate, the plate may be reciprocated by hand for the described purposes. In the present structure, mutually spaced and opposed ears 32 extend rearwardly from the push plate 19 intermediately thereof and carry a wrist-pin 33 between them with which a hook-shaped forward end 31' of the connecting rod 31 may be gravitally held and releasably engaged; in this manner the crankshaft 28 may be rendered inoperative with respect to the push plate 19 at will and without requiring the use of any tools for making or

releasing the plate-operating connection provided by the connecting rod.

As particularly disclosed, actuations of the crankshaft 28 are arranged to be effected by means of an electric motor 34 connected to one shaft end through suitable reduction gearing housed in a casing 35, said casing and a standard 36 providing the bearing for the crank-shaft; the motor 34 and standard 36 are shown as mounted on a shelf 37 which extends from and between the rear support legs 16'' for the bedplate 16. Recalling that the stroke of the push plate 19 is twice the throw of the crank-pin 29, means are provided for so controlling the operation of the motor 34 that the push plate 19 is normally disposed in its rearmost position and is reciprocated from and to such position between predetermined periods of quiescence during which a line of cans may be provided on the transfer plate 18 or a filled tray may be replaced by an empty tray.

A motor control switch 38 is provided on the bedplate 16 in line with a row of cans C on the transfer plate 18 and provides a normally extended push pin 39 for axial displacement by the first can of a line of cans moving along the transfer plate 18 to finally make contact for closing the motor circuit. As particularly shown, the push pin 39 has a conically tapered tip 39' which is arranged for engagement by the leading can of a line of cans delivered upon the plate 18 to axially displace the pin to a switch-closing position thereof for actuating the push plate 19 in a cycle of fore-and-aft movement thereof. As indicated in Figure 1, the motor 34 is arranged to receive its actuating power through a circuit including the switch 38 and from a supply switch 40 which is mounted at a side point of the bedplate within ready reach of an operator positioned in front of a mounted tray.

An arm 41 extends forwardly from the push plate 19 at the opposite end thereof from its gate member or arm 27, and has its forward edge bevelled for a wedging engagement with the pin tip 39' while the push plate 19 is disposed forwardly of its normal position. As particularly shown, the arm 41 comprises a flat bar which is mounted on a rearward terminal extension 42 of the plate 18, said arm being preferably adjustable on the extension in a fore-and-aft direction. In the present structure, the arm 41 carries a clamp bolt 44 which engages through a longitudinal slot provided in the extension 42, and the under edge of the arm 41 may rest on a pin 45 extending beneath it from said extension. When the nut 44' of the clamp bolt 44 is loosened, the arm 41 may be longitudinally adjusted on the extension and set in its adjusted position.

The arrangement and relation of the push pin 39 and arm 41 is such that when the leading can of an array on the transfer plate 18 has pushed back the pin 39 for an engagement of the can with the inner side 41' of the arm 41 which faces it, the switch 38 then being closed, the subsequent forward movement of the arm 41 by reason of the action of the energized motor 34 to move the push plate 19 forwardly will wedgedly and further displace the pin for the riding of its tip upon and along the outer face 41'' of the arm to generally maintain a closed condition of the switch while the push plate is being advanced and retracted in its operative cycle. It will be understood that, because there are no cans engaging the push plate during its return stroke, the movement of the arm 41 from in front of the push pin 39 will permit the full switch-opening extension

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of the pin and so cut off the power to the motor for its stopping as the plate reaches its rearmost position. Owing to the inertia of the rotor of the motor and of the crank-shaft and connecting rod, the motor circuit must be opened at a pre-determined time interval before the push plate reaches its rearmost position; the adjustment of the arm 41 on the extension 42 permits any necessary adjustment to insure this relation and action.

Since the complete rearward disposal of the push plate 19 permits the provision of a new line of cans on the transfer plate 18 to again close the switch 38, the delivery cycle of the push plate is automatically repeated until a line-at-a-time loading of the tray is completed, after which the automatic succession of loading cycles must be stopped until the filled tray can be replaced by an empty tray. In the present structure, means are provided for stopping the delivery of cans upon the transfer plate 18 at the will of the operator, and necessarily when a tray has been filled. As is particularly brought out in Figs. 1 and 3 and 5 to 8, a gate or stop plate 47 is provided for disposal across the supply line of cans in the plane of action of the gate member 27 which is carried by the push plate, the gate 47 being disposed below the gate 27 which extends for only the upper part of the depth of the plate which is notched inwardly from its end below the gate 27 to permit an independent operative positioning of the gate 47 for all push plate positions. The present gate 47 is supported from a support plate 48 fixed on the bedplate 16 rearwardly of the used portion of the transfer plate 18 and below the line of travel of the gate 27, the top face of said plate being shown as flush with the tops of the support blocks 24, and the plate being provided with a guide slot 49 below said line.

The present gate 47 is fixedly carried by a base member 51 from which it extends upwardly and forwardly, and the member 51 is of T section having its head flanges 51' slidable along the top of the plate 48 while its stem 51' depends slidably through the slot 49 and through an underlying slot 50 in the transfer plate 18 to a pivoted connection with the rearward end of a push-and-pull rod 52. As shown, the rearward end of the rod 52 provides a fork 52' which receives the stem portion 51'' of the base 51 to which it is attached by a pivot pin 53, and the rod 53 is of rectangular section and extends forwardly from the base through a supporting guide opening 54 provided beneath the tray-supporting plate 17 adjacent the shoulder 21.

A forward portion 52'' of the rod 52 is turned outwardly beyond the edge of the bedplate for its manual engagement as a handle to move the stop plate 47 forwardly (as in Fig. 1) to hold back the supply of cans independently of the position of the gate 27, or be pushed back to its inoperative position as in Fig. 3. It will be understood that the stop plate 47 may be operatively disposed by the operator independently of the disposal of the push plate 19, and would be so disposed while a filled tray is being replaced with an empty tray.

Recalling the desirability of having cans advancing onto the transfer plate 18 in constant guided engagement with the working face of the push plate 19, and that the downward slope of the top face 18' of the transfer plate from the shoulder 21 is operative to urge such a relation, means are provided for action to further maintain the desired alignment of the cans against the push plate. As particularly shown, a plate member 56 is hingedly connected to the bedplate 16 at the

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shoulder 21, and is normally held in a limiting upright position by means of springs 57 which are appropriately cooperative between it and the bedplate. While erect, the plate 56 is operative as the forward side of a guideway for cans moving across the transfer plate to engage the push pin 39 of the switch 38, its function being to prevent an undue buckling of the cans in their line as they move to the position from which the push plate 19 is to shift them onto the tray bottom T'. When the push plate 19 is operatively actuated, it is arranged to push the cans against the plate 56 to swing the latter downwardly as a ramp over which the cans may move to their delivered position upon the tray bottom, the ramp plate 56 being so related to the shoulder 21 that its can-engaging face provides a smooth continuation of the upper transfer plate face.

It will now be noted that the present tray-loading unit may be manually manipulated if and when desired merely by rendering the motor drive inoperative by opening the motor circuit at the main switch 40, and by unhooking the connecting rod 31 from the wrist-pin 33 and swinging it back and out of the way. Having the push plate 19 disposed in its forward position of Figure 3 whereby its gate extension 27 holds back the cans C in the supply line thereof, a manual reciprocation of the push plate 19 may be effected for transferring successive groups of cans C from their supply line into a tray T which is positioned on the plate 17 for its loading. Having the present unit so conditioned, an operator standing at the front of the unit may grasp the handle 25 of the forwardly-positioned push plate 19 and push back said plate until it is disposed at or beyond the plane of the rear guide plate B' to permit a movement of cans longitudinally along the transfer plate 18 until the leading can engages the arm 41 which extends forwardly from the push plate as a stop means. The push plate may then be pulled forwardly to its original position to deliver the line of cans in front of it upon the back portion of the tray bottom T' while disposing the gate extension 27 for its operation against the cans not shifted from the supply line. This reciprocation cycle is repeated until the tray is fully loaded, whereupon the filled tray may be replaced by an empty tray and the process repeated.

If the present can-traying unit is to be used solely manually, the motor 34 with its electrical and mechanical connections may, of course, be entirely omitted. Also, the gate 47 is of no particular use and may also be omitted from a present can-traying machine which is to be actuated solely manually.

While the present unit has been particularly shown and described as arranged for the traying of cylindrical containers, it will be understood that it is equally usable for the orderly traying of like-sized cylindrical articles generally. Also, containers trayed by the present unit may be either open or closed at the top during their traying, the unit therefore being particularly valuable in the food canning art.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the present article-traying unit will be readily understood by those skilled in the art to which the invention appertains. While I have described the principle of operation, together with arrangements which I now consider to be a preferred embodiment thereof, I desire to have it understood that the showings are primarily illustrative, and that such changes and developments

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may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In combination with a conveyor providing a supply line of articles to be loaded upon a tray, a bed-plate having slide-transfer and tray-supporting surfaces meeting at a common straight line and having said transfer surface aligned with the delivery line of the conveyor for receiving a line of articles from the conveyor, a normally withdrawn push member operative laterally against the positioned articles on the transfer plate in a line parallel to said first line to slidably move them from the latter onto the bottom of a tray disposed on the tray-supporting surface, a gate member carried by the push member in rigid relation thereto and operative directly through the supply line of articles to prevent their advancement into the zone of operation of the push member while the push member is operative, and a second gate member directly and shiftably carried by the bed-plate and operative as and independently of the first gate.

2. In combination with a conveyor means operative to provide an advancing supply line of articles to be loaded upon a tray, a bed-plate providing fixedly related coterminous slide-transfer and tray-supporting surfaces and having said transfer surface aligned with the said line of the conveyor for receiving a line of articles from the conveyor, a normally withdrawn push member operative laterally against the positioned articles on the transfer plate in a line parallel to said supply line to slidably move the articles from the transfer surface directly onto the bottom of a tray disposed on the tray-supporting surface, means for actuating said push member in working and return strokes thereof, an electric control circuit for said actuating means including a normally open switch, a switch-closing element directly displaceable by the leading article of a line of articles upon the transfer surface to close said switch when the line is completed whereby to initiate an actuation of the push member, and

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means on the push member engageable with said switch-closing member to maintain its switch-closing displacement during the subsequent working and return movements of the push member.

3. In combination with a means operative to provide an advancing supply line of articles to be loaded upon a tray, a bed-plate providing a slide-transfer surface receiving a line of the articles and providing a tray-support laterally of said transfer surface, a normally withdrawn push member operative laterally against the line of positioned articles on the transfer plate to slidably move the articles from the transfer surface directly onto the bottom of a tray fixedly positioned on the tray-supporting surface, an electric motor mechanically connected with said push member for actuating the same in working and return strokes thereof, an electric power circuit for said motor including a normally open switch, a switch-closing element directly displaceable by the leading article of a completed line of articles upon the transfer surface to close said switch for energizing the motor to actuate the push member, and means on the push member engageable with said switch-closing to maintain its switch-closing displacement for a continuous period during, and solely during, the subsequent working and return movements of the push member.

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