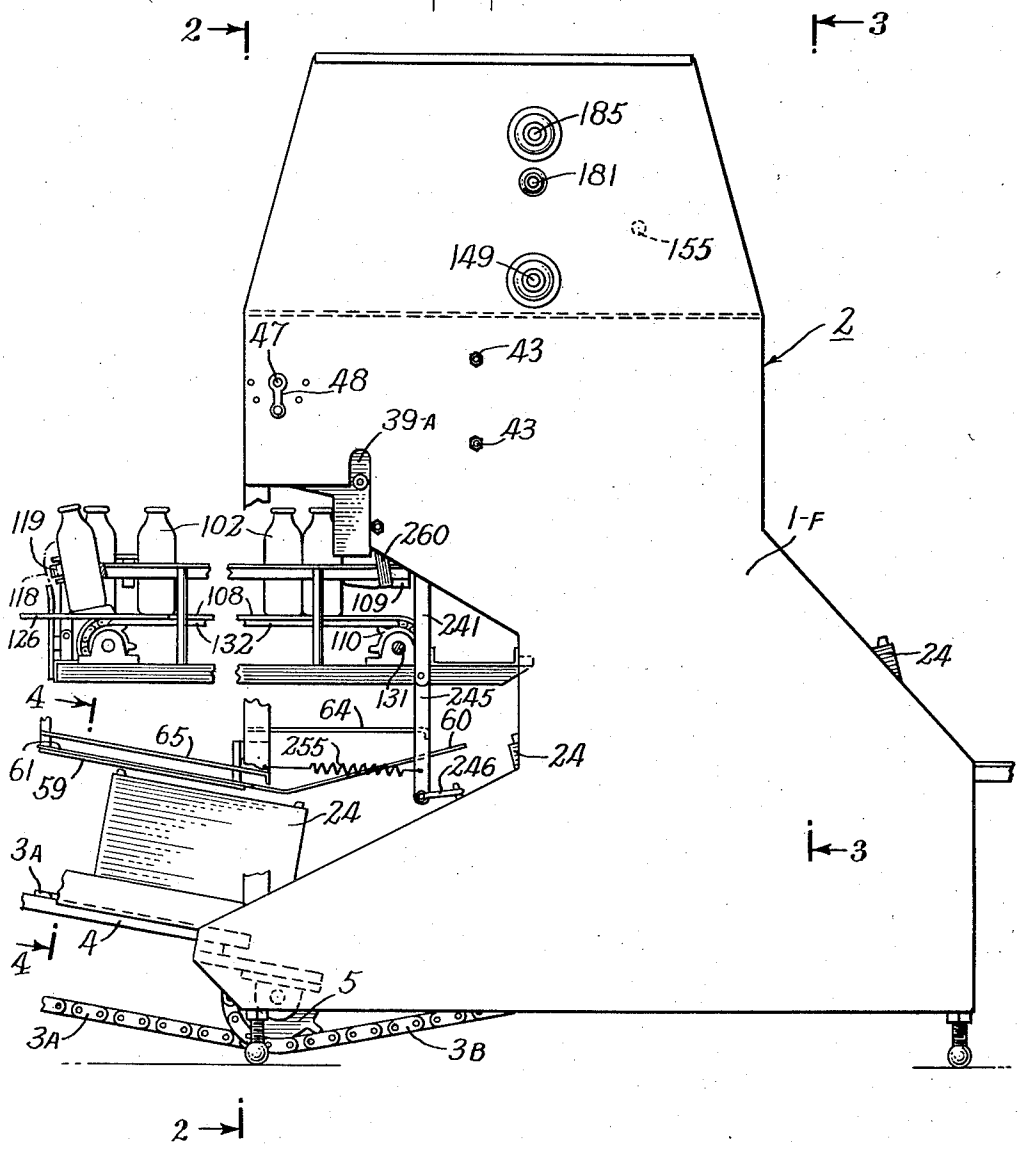
July 1, 1958 S. J. LEWIS 2,840,965

MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 1.



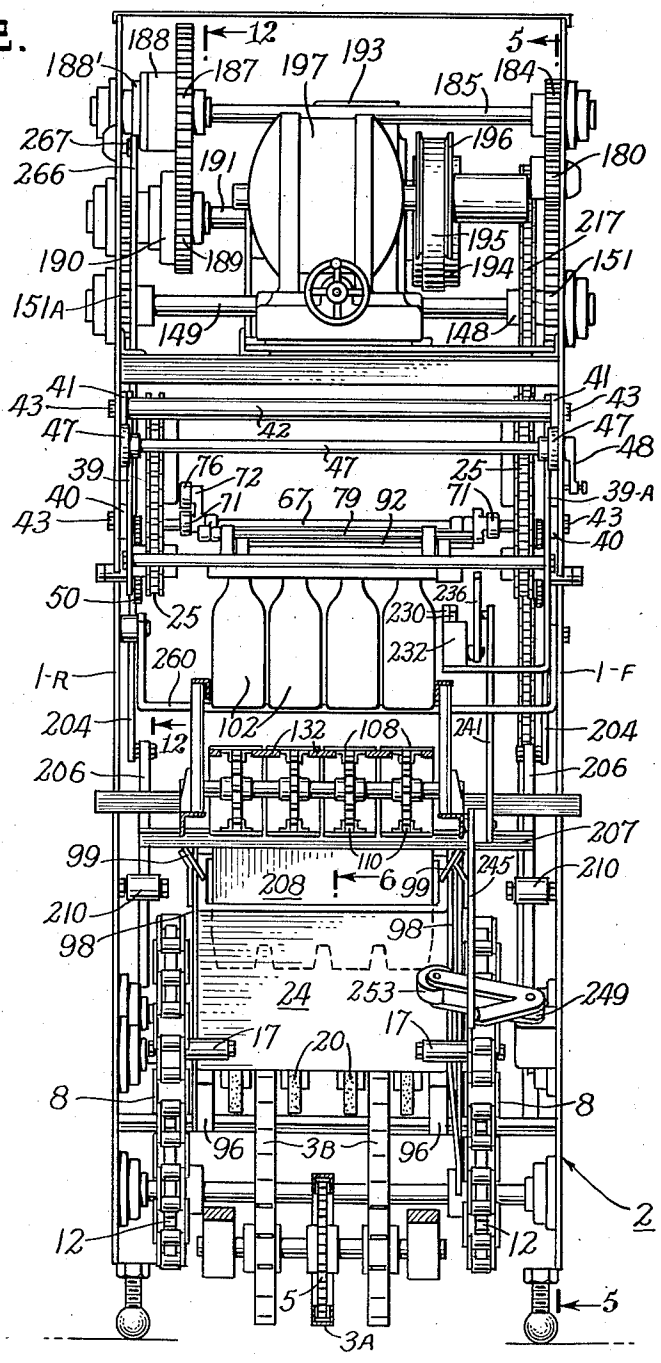
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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 2.



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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 3.

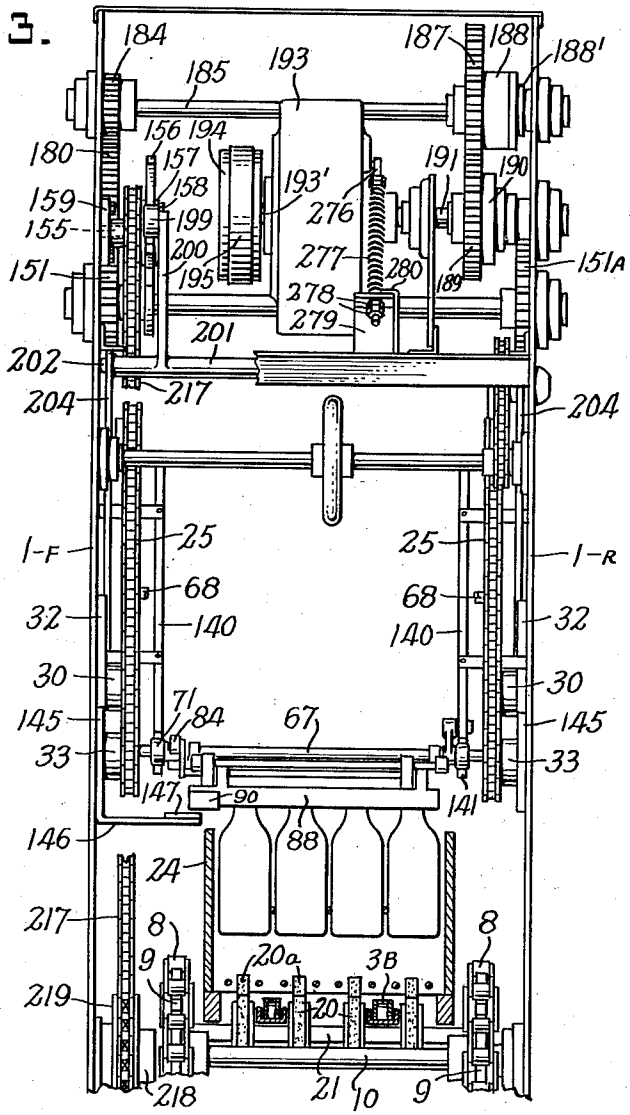
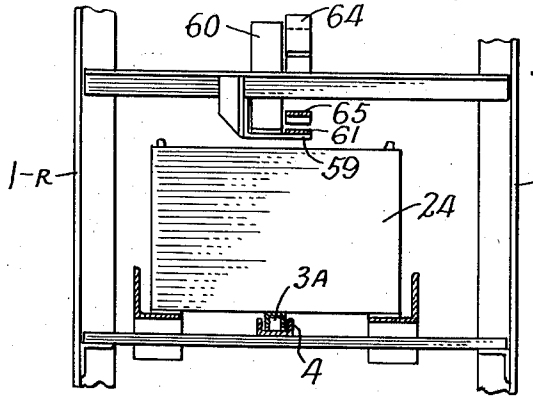


Fig. 4.



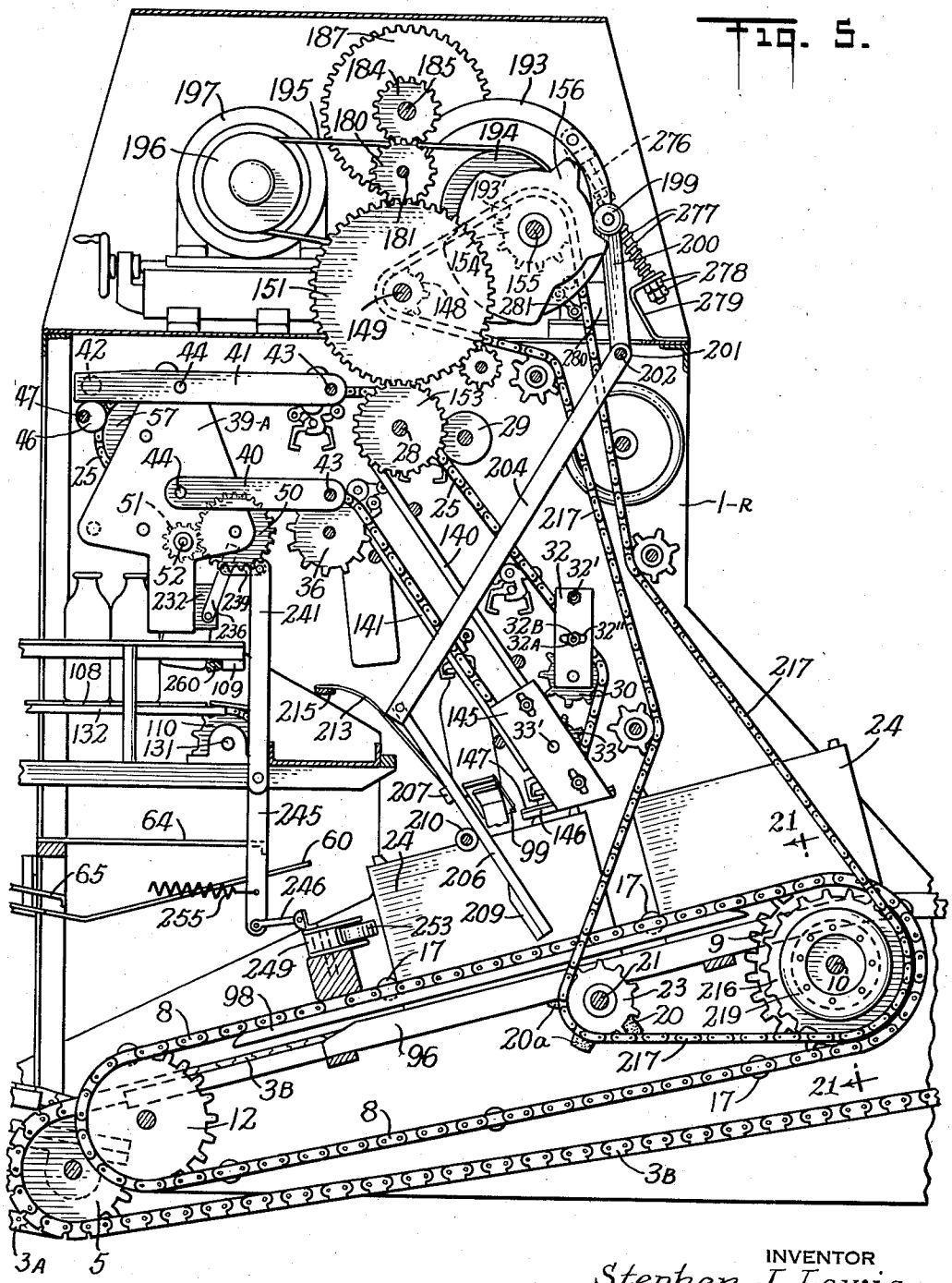
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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 5.



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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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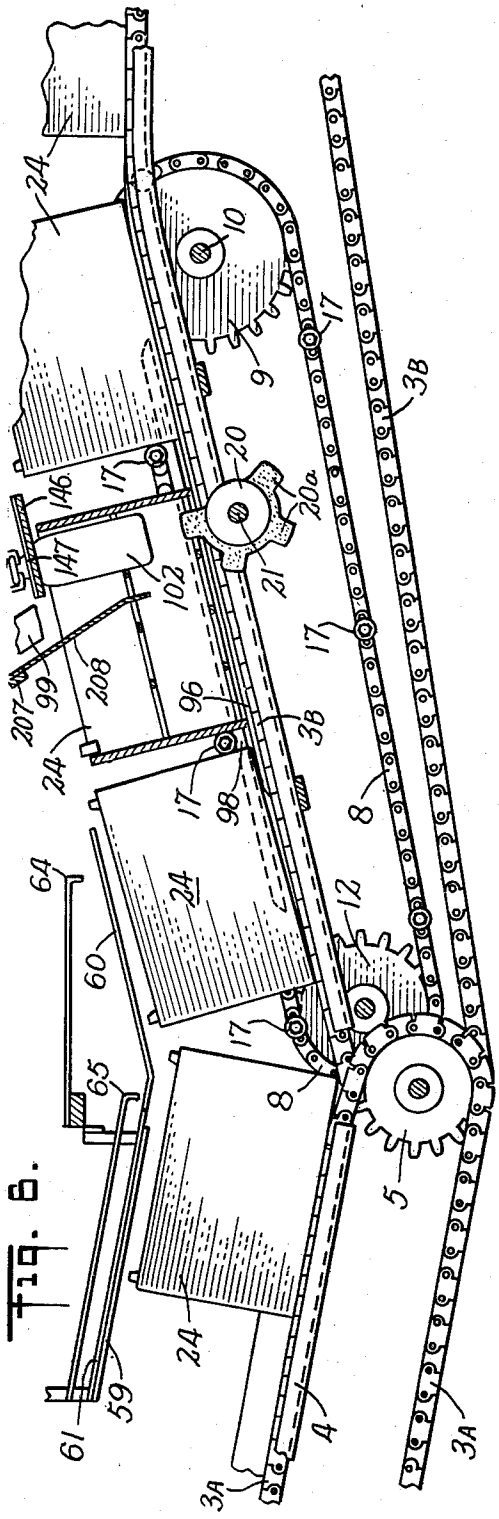


Fig. 6.

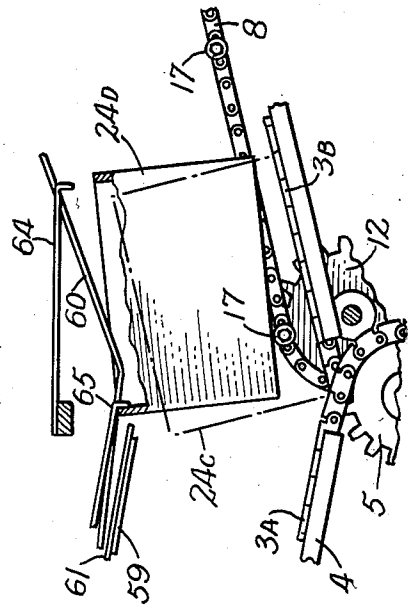


Fig. 8.

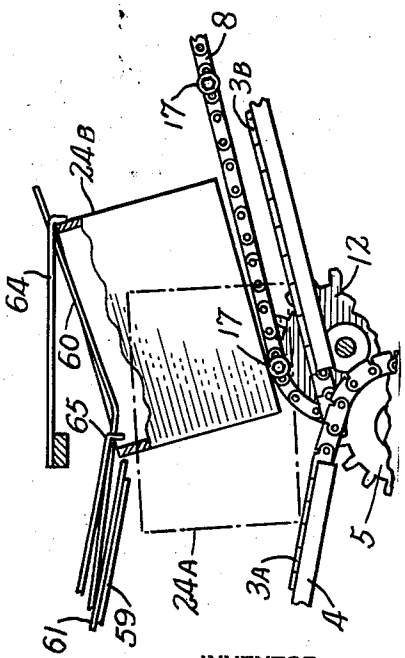


Fig. 7.

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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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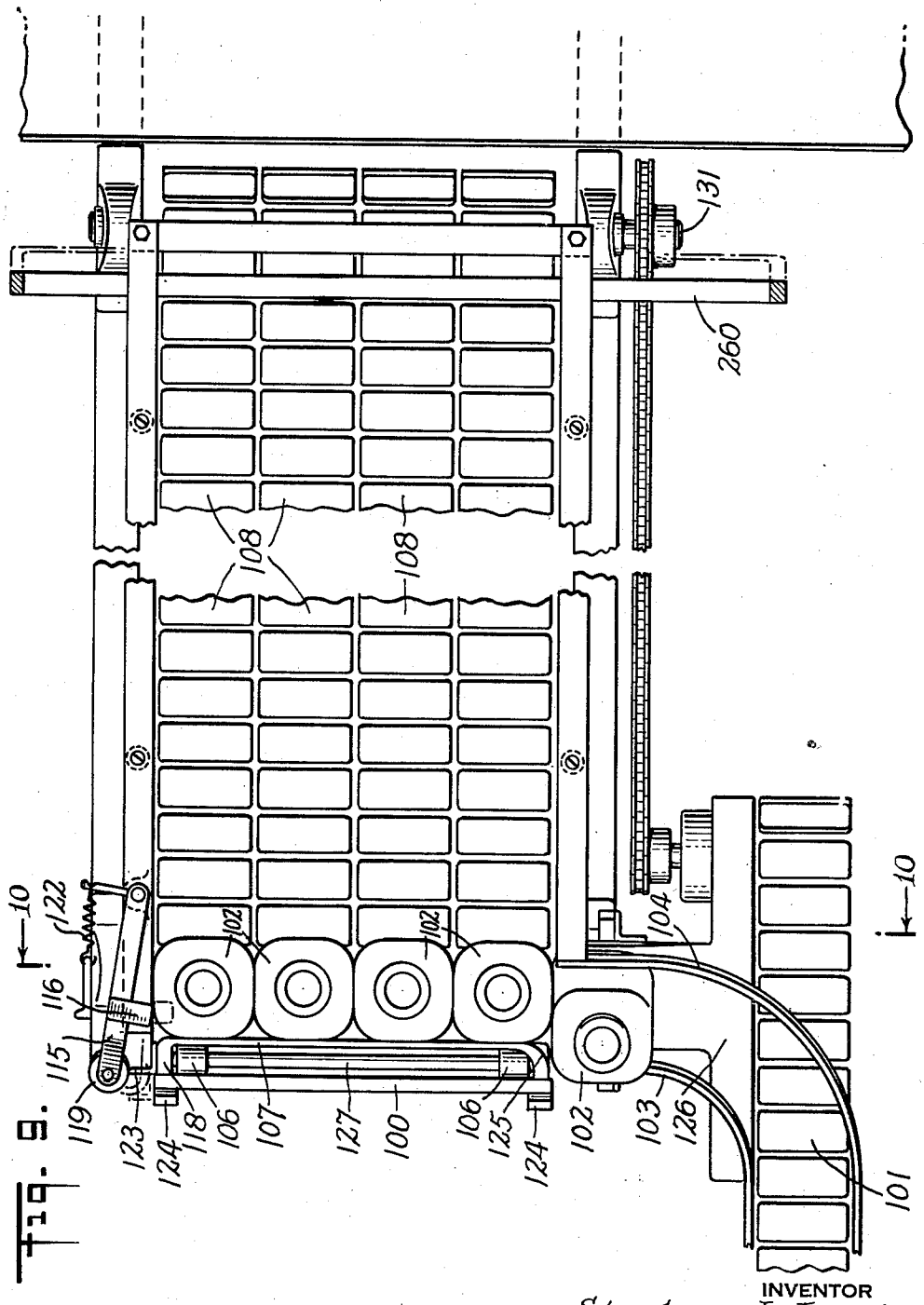


Fig. 9.

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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 10.

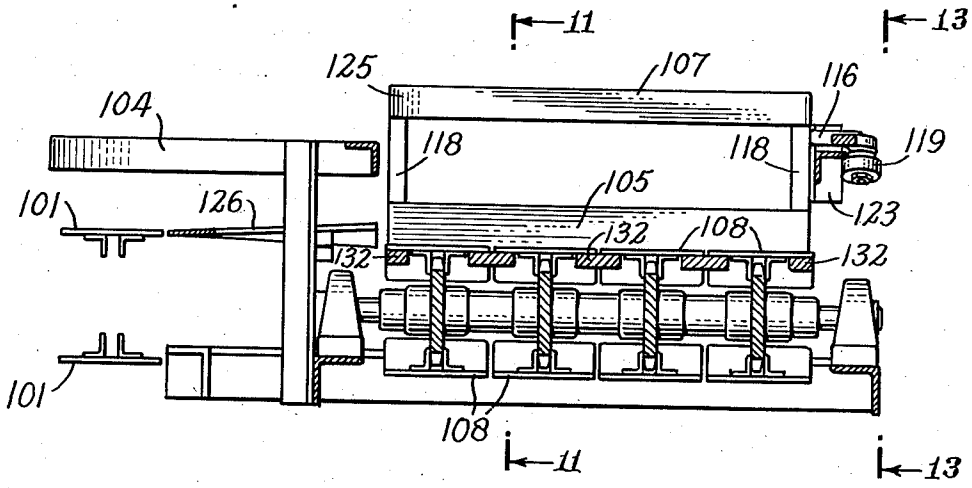
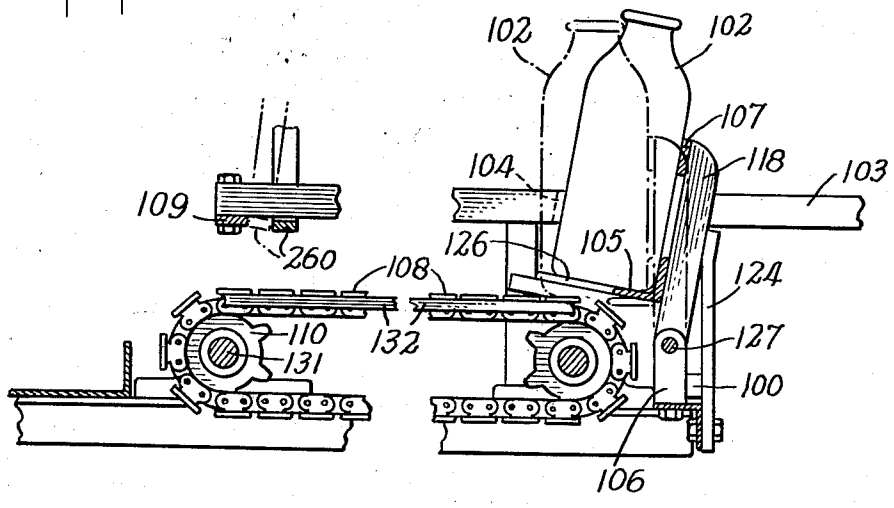


Fig. 11.



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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 12.

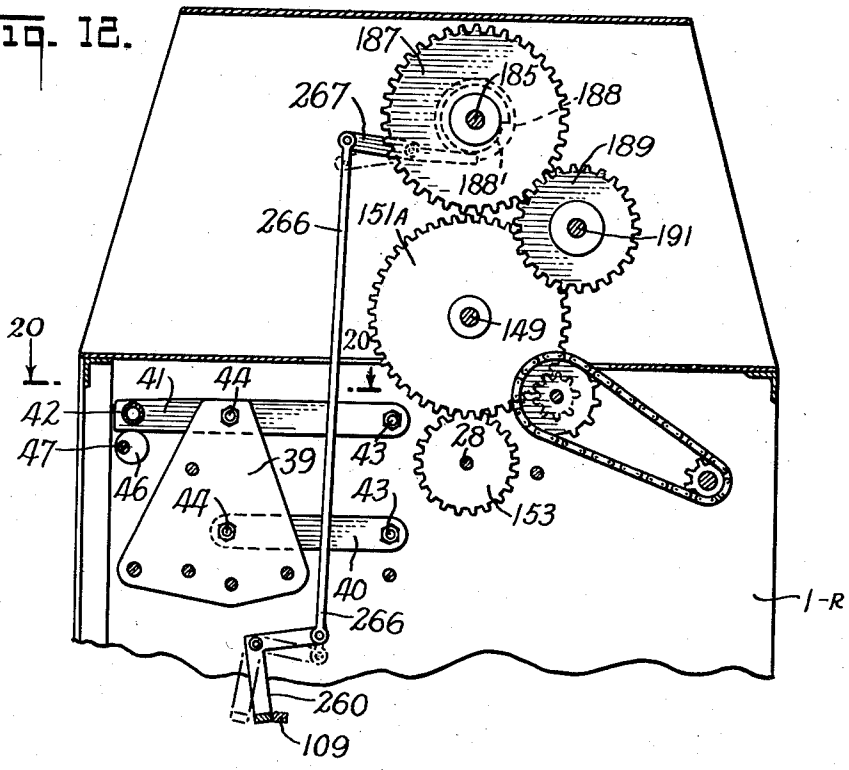
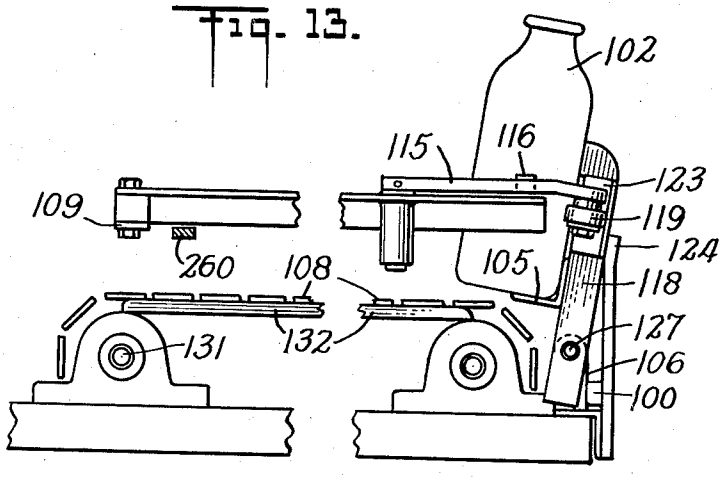


Fig. 13.



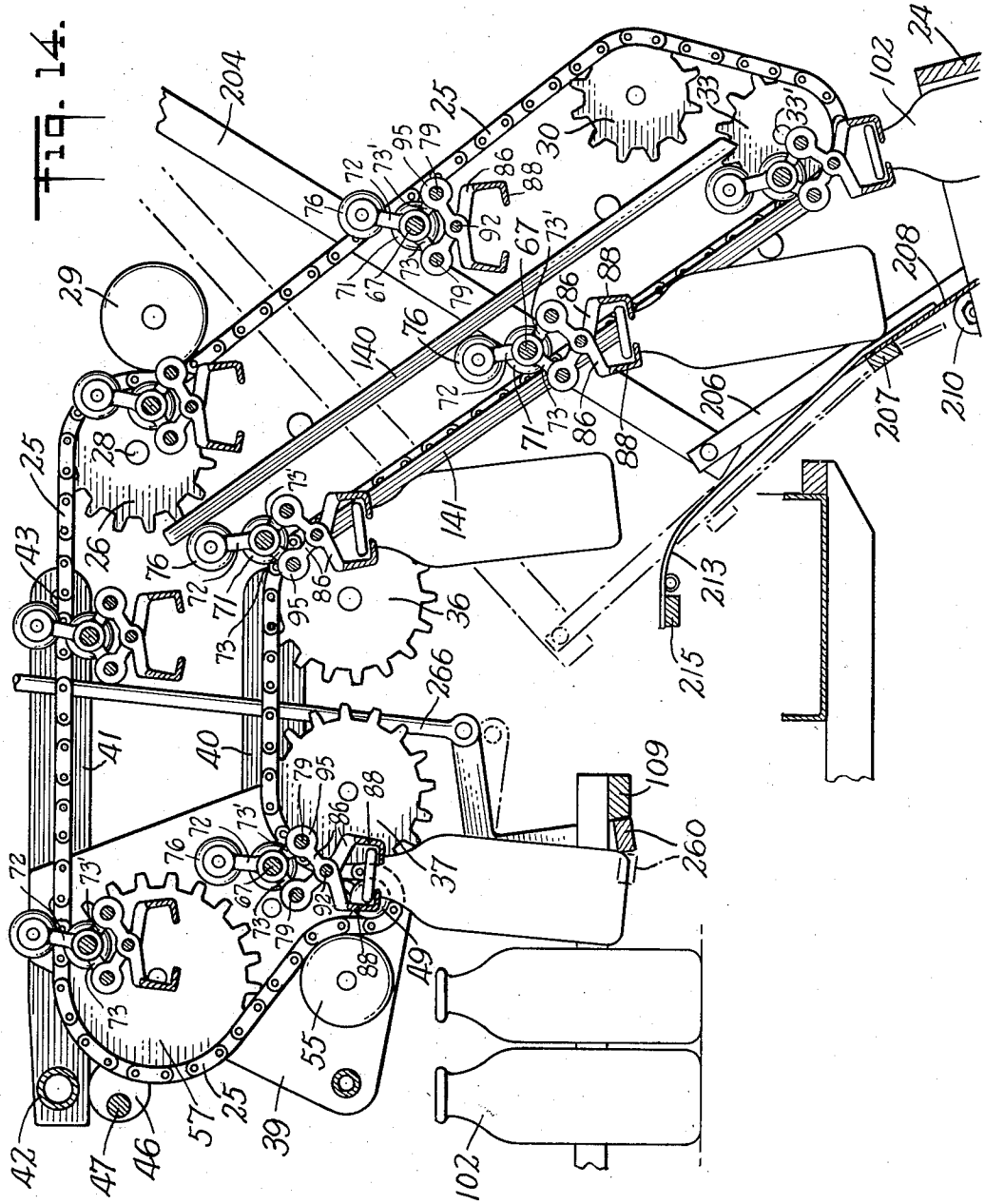
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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 14.



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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 15.

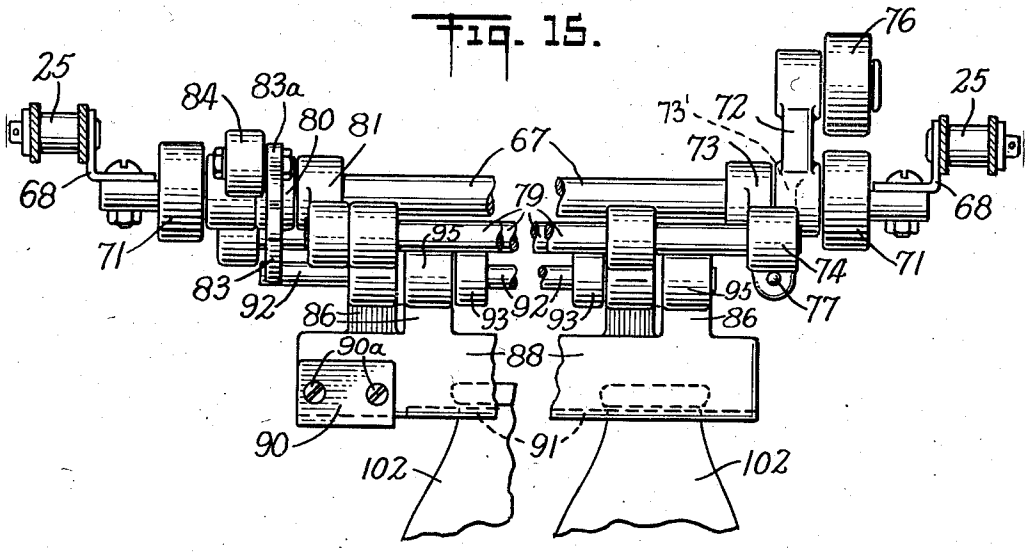


Fig. 16.

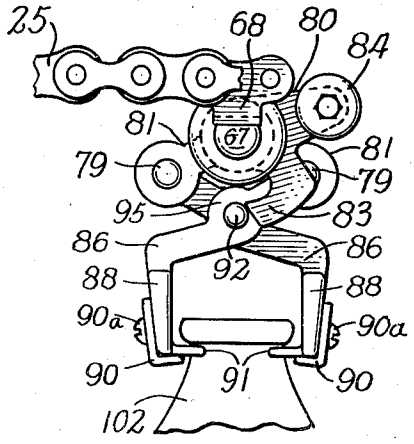


Fig. 17.

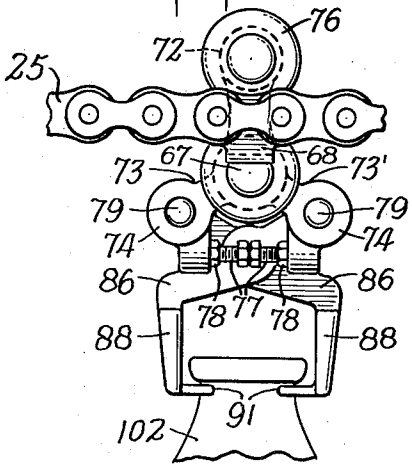
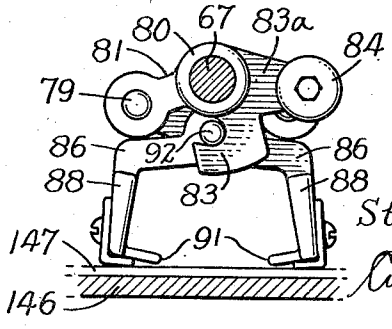


Fig. 18.



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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

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Fig. 18.

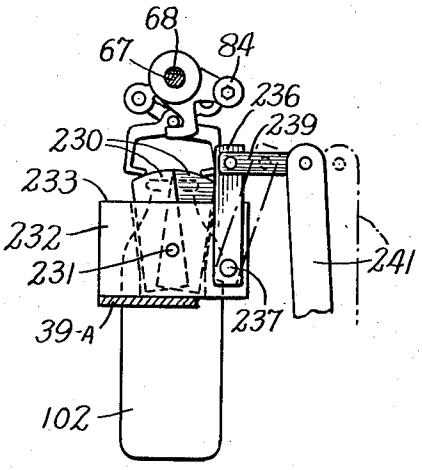


Fig. 21.

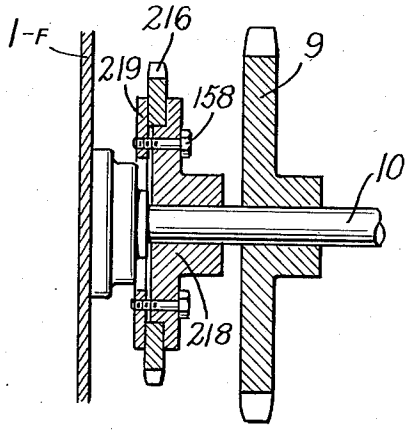
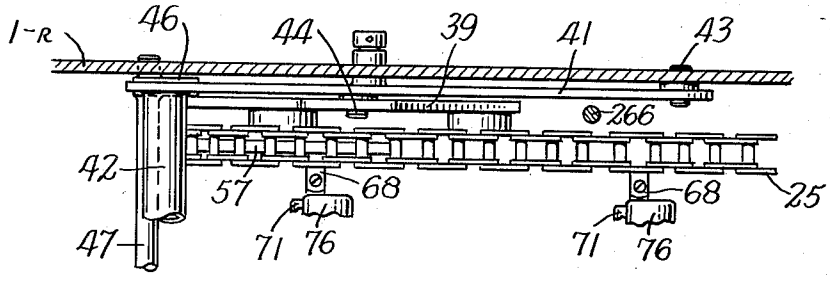


Fig. 20.



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United States Patent Office

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Patented July 1, 1958

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MACHINES FOR INSERTING FILLED CONTAINERS INTO CASES

Stephen John Lewis, Brooklyn, N. Y.

Application July 23, 1954, Serial No. 445,310

17 Claims. (Cl. 53—160)

This invention relates to machines for picking up packages, such, for example, as milk containers, milk bottles or other packages of uniform dimensions, and putting them into crates, boxes, cases or cartons, and it has for its general object the provision of a machine for such purposes which will perform its functions with speed and precision and without danger of injury to the packages or to the machine. More particularly the invention is directed to a machine for putting into crates, boxes, cases or cartons packages of such a character that they are preferably handled substantially in an upright position, the invention being herein shown as embodied in a machine particularly adapted for picking up milk bottles and placing them in upright position in the cases or crates in which they are carried to the retail stores or other retail outlets.

Although the term "container", as used in the milk trade, has come to signify usually the disposable paper container in which milk is now extensively delivered to retail customers, the term, as used hereinafter in the specification and claims, will not necessarily in all instances have such a restricted meaning but, where the context permits, will include both paper containers, glass bottles and any other form of container which could be handled by the mechanism described.

In my copending application Serial No. 201,193, filed December 16, 1950, now Patent No. 2,684,800, of which the present application is a continuation-in-part, I have disclosed a machine for the purposes aforesaid in which the containers or bottles to be placed in the cases or crates are brought to the case or crate packing machine on an endless conveyor in single file, assembled and then picked up in successive groups, which will fit the transverse dimensions of the case or crate, by suitable lifting devices and placed in successive positions in the case or crate, the latter being arranged to travel beneath the container handling means at such a synchronized speed that each succeeding group will arrange itself in the case or crate adjacent to or in other predetermined relation to the preceding group until the case or crate is full.

As pointed out in my copending application above-identified, an important feature of the invention therein disclosed is found in the novel means for and novel method of picking up the containers and carrying them to the point of deposit in the case, the novel means and the novel method including an arrangement of the endless carrier for the pick-up means and the mounting of the pick-up means on this carrier so that there is substantially no horizontal movement of the pick-up means while the pick-up operation is taking place.

In the improved machine of the present invention this novel feature is modified. In general, the same principle is employed but in a more perfect way in the arrangement of the travel of the pick-up means at the point where the discharge of the containers by the pick-up means takes place. This arrangement together with the other novel means hereinafter more fully set forth, eliminates any tendency of the container-carrying means to drag over the

containers during or after their deposit in the case or crate.

As also pointed out in my said copending application another important feature both of the machine therein disclosed and of the improved machine of the present invention is the movement of the pick-up means through a path that is inclined downwards at such an angle that the component of the motion of the container carrier means, parallel to the motion of the cases, is practically equal to and in the same direction as the synchronized motion of the said cases or crates into which the containers are to be inserted, whereby the delivery of each group of containers to the crate by the pick-up means will place them in immediate juxtaposition or other suitable relation to the group of containers already deposited in the crate, or to the crate end, if the containers thus delivered happen to be the first group placed in the crate.

A further important feature of the present invention is the provision of means for slightly tilting the containers, as they hang from the carriers, in the direction of movement of the crate while the containers are travelling downwardly through their steeply inclined path before they enter the crate, thereby insuring clearance of the front edge of the crate by the containers as they are moved into position to be deposited therein.

As in the machine of my said copending application, the means for picking up the containers of the present comprise tongs of the lever-grip type which, when suspended from their upper pivots on an endless carrier, as herein shown, tend to close by gravity. When these tongs arrive at the pick-up point, preparatory to picking up a case-wide row of containers, it is important, therefore, that either provision be made for opening the jaws of the tongs so that they may straddle and then engage the containers to be picked up, or that they arrive at this point in open condition and be released from any means that may hold them in such open condition, as they come into straddle relation to the containers, preparatory to their moving upwardly to pick up the containers. The provision of jaw opening means still serves a useful function, even when the tongs, as in the present disclosure, approach the pick-up point in locked-open condition, in that contact with the opening means prevents swinging of the tongs and acts to center the tongs in their container straddling operation.

An important feature of the present invention is the provision of means, preferably coming into operation at the point where the containers are discharged into the case or crate, for locking the jaws of the tongs in open condition and holding them in this open condition until they again arrive at the pick-up point.

It is important in a machine for the purposes of the machine of the present invention, and particularly in the machine herein shown, which is to place milk bottles into cases in transverse groups and to fill each case with a certain number of sets of such groups of bottles; that there always be a case in position to receive the bottles and that sufficient bottles be supplied to the pick-up and carrying means to fill the case or crate.

One of the objects of the present invention is, therefore, to provide a means activated by the cases, which will unlock the jaws of successive tongs and permit them to pick up rows of bottles, only if there is a corresponding case to receive the bottles. And, if there is no case in position the tongs will travel with their jaws locked open and will not pick up any bottles until a case does come in position to receive the bottles.

As hereinabove suggested, the casing machine of the present invention is usually connected to a filling machine which fills the containers with the milk or other container content and discharges the containers in single file onto

a conveyor or system of conveyors that carries the bottles to the casing machine.

The present embodiment of the invention provides a series of means, the first of which is a rack that receives the said bottles from the single file conveyor and discharges them in consecutive rows, each of the required number to fit the transverse capacity of the cases into which the bottles are to be inserted.

Second, there is provided an endless wide conveyor which receives the successive rows of bottles from the rack and carries them under the pick-up tongs, to be picked up and carried to the cases.

Third, there is provided a limit bar, above the wide container conveyor, transversely to it and just beyond the pick-up point. This limit bar holds each forward row of the bottles exactly at the pick-up point until a pair of tongs comes along, picks it up and carries the whole row to the case or crate below. Further the limit bar is so designed and mounted that if there be no row of bottles in position to be picked up, the limit bar swings towards the rack and by means of links, or other media, throws the trigger of a single revolution clutch, known to the the art, which disconnects the power from the pick-up conveyor before the next set of pick-up tongs arrives at the vacant pickup point and the entire casing machine remains idle until a succeeding row of bottles does approach the pick-up position. In so doing, each advance row of containers pushes the limit bar to its stop position, the single revolution clutch connects the power again and the awaiting tongs come to the pick-up point and pickup successively each forward row, thus avoiding any chance of the pick-up tonge coming to the pick-up point, if there is not a row of containers to be picked up, thus avoiding the possibility of a case being only partially filled.

When the machines of the present invention are used for casing containers in cases or crates which have individual compartments for each container, as is the general practice in casing glass bottles in the milk industry; the bottles, as in the machine of my said copending application, are preferably guided into the case by a lead-in plate of special construction, this lead-in plate itself being moved into and out of the cases by a suitable synchronized cam.

The present invention aims to provide means for further facilitating the entering of the bottles into the case and into their individual compartments in the case. First, by inclining upwards the path of the cases from a point after the cases have assumed their separate spaced positions between the prongs or rollers of the timing chains to a point beyond the insertion of the last row of bottles in the cases. Further, the path of the bottle carrying tongs leading to the cases is likewise inclined cooperatively to the same degree so that the relative position of the path of the cases and of the path of the bottle carrying tongs is not altered in relation to each other from what already has been specified. Further means are provided for tilting the bottle carrying tongs in their downward path so that the row of bottles inclines with their bottoms forward and slide on the lead-in plate at an angle, to their vertical suspension, into line with the compartments of the case into which they are to be inserted, thus avoiding the tendency of the bottles to swing and strike the forward side of the case or the forward side of the compartments of the case. Also, the sliding of the bottles to their final rest in the case is less of a shock than would be a vertical drop.

The cases used for milk bottles are generally constructed with wire bottoms. It is an object of this invention to provide cushions of rubber or other soft material projecting through the wire mesh bottom of the case on which the bottles finally come to rest instead of dropping directly upon the bottom of the case, thus absorbing the shock. The cushions consist of tooth-like projections on a roller which engage the wire mesh bottom of the case like the teeth of a gear engage a gear rack.

Another object of this invention is to provide means for avoiding the crushing of bottles which accidentally may be out of place at the pick-up point, or avoiding accidents or injuries to workmen, also to make the machine easily adjustable from bottles of one height to bottles of another height, by mounting the sprockets which carry the chain of the pick-up tongs at the pick-up point on a vertically movable side of a parallelogram structure, whose other vertical side is pivotally fixed in position with respect to the frame of the casing machine; and to provide adjustable lower limits for the movable side of the parallelogram to rest upon.

In my said copending application, I have provided means for the separation and containment of the cases for the purpose of synchronizing them to the motion of the container carrying means. An object of this invention is to provide for the sake of compactness an alternative means of doing the same thing.

As hereinabove pointed out, slight variations in the construction and arrangement of certain parts of the machine of the present invention are required according as the machine is to be used for casing paper containers or is to be used for casing glass bottles. For the most part, however, the construction and arrangement of the elements of the machine will be the same for the two operations.

The present embodiment of my invention deals in particular with the method and means for picking up glass bottles, such as are used in marketing milk, and placing them in cases which have compartments for them.

It will be noted that the empty cases are brought to the machine in a single file with indefinite motion on a conveyor at a lower level. The machine separates and contains each of these cases between the rungs or rollers of a set of ladder like chains of definite motion.

Likewise the bottles are brought to the machine on an nedless chain conveyor in single file at a higher level to be picked up by the grippers in the manner disclosed in my said co-pending application or, as in the present machine be automatically rearranged in rows of the same number of bottles each as the number of compartments in a crosswise row of the cases. The machine of my present invention has a plurality of pickup tongs carried by a set of two chains, synchronized to the motion of the case timing chains, and each set of tongs in succession picks up the aforesaid rows of bottles and carries them into the corresponding compartments in the cases below.

The above general principles are the same as in my copending application.

My present invention includes a number of improvements consistent with the above general principles, namely:

(1) An alternative means of case separation and containment,

(2) An alternative means of arranging the bottles in rows of four, as herein shown, and bringing each row of bottles in succession to the pickup point of the machine,

(3) Means for stopping the working parts of the machine if there ar no bottles at the pickup point and means for motivating the machine when bottles do come in position to be picked up,

(4) Improvement in the tongs or bottle grippers,

(5) Improvements along the path of the tongs carrying means and of the case carrying means,

(6) Means for preventing the tongs from picking up bottles if there is no case in corresponding position to receive them, and means to assure that the grippers will not regrip the bottles and carry them beyond the discharge point,

(7) Means for readily adjusting the height of the pick-up position of the tongs for bottles of different height, and for preventing accidental damage to bottles or persons,

(8) Means for shutting off the motive power if there is a jam and the machine gets overloaded, and means for absorbing the kinetic energy in the machine in such a jam.

The above improvements will become more apparent with the description of each device and its component parts, and function,

Referring to the accompanying drawings, in which:

Figure 1 is a front elevation of the casing machine showing portions of the bottle and the case or crate conveyors;

Figure 2 is a sectional view taken looking to the right on line 2—2 of Figure 1;

Figure 3 is an elevational section taken on line 3—3 of Figure 1, looking to the left;

Figure 4 is a section on line 4—4 of Figure 1 looking to the right, as indicated;

Figure 5 is a vertical longitudinal section taken on line 5—5 of Figure 2, substantially just behind the front plate of the machine frame;

Figure 6 is a vertical section taken on line 6—6 of Figure 2, showing details of the crate conveyors and associated control members;

Figures 7 and 8 are detail views disclosing means for controlling the position of the crates as they are transferred from one to another part of the crate conveyor system;

Figure 9 is a plan view of conveyors and devices which function to transfer bottles entering the machine to the belts or conveyors which advance and carry them in groups of four to the bottle pick-up point of the apparatus;

Figure 10 is a vertical cross section taken on line 10—10 of Figure 9, bottles being omitted;

Figure 11 is a vertical section taken on line 11—11 of Figure 10, showing features automatically controlling the movement of the bottles in groups of four to the pick-up point and preventing such movement when less than four bottles have been delivered to the bottle casing apparatus;

Figure 12 is a vertical section taken on line 12—12 of Figure 2, as indicated;

Figure 13 is an elevational detail taken on line 13—13 of Figure 10, showing the positions taken by a group of bottles prior to their transfer to the conveyors taking them to the pick-up point;

Figure 14 is an enlarged detail view of parts shown in Figure 5, including the bottle pick-up by the grab hooks, and the path followed by the bottles as they pass to the bottle discharge point where they are deposited in the cases or boxes, other related parts being shown;

Figures 15, 16, 17 and 18 show details of the grab hooks, their supporting means and the latch hook which is one of the features of the present invention;

Figure 19 shows in detail certain parts which become ffective at the bottle pick-up point to make certain of an open condition of the tongs;

Figure 20 is a plan section taken on line 20—20 of Figure 12; and

Figure 21 is a detail section taken on line 21—21 of Figure 5.

The present embodiment of the invention is designed particularly for use in picking up glass bottles, such as now are used extensively for marketing milk, and placing them in crates or cases. It will be seen by reference to the drawings, that the bottles are brought to the machine at one level by means of an endless belt conveyor, which delivers them onto a smooth surface from which they are to be assembled beneath the pick-up means, as more fully described hereinafter, and that the cases into which the bottles are to be placed are carried through the machine by means of endless conveyors, operating at a lower level. Synchronization of the movements of the conveyor that brings the bottles to the machine with the movements of the conveyors that carries the crates or cases through the machine is not necessary but it is important, as will hereinafter appear, that the movement of the pick-up mechanism which picks the bottles up from the container conveyor, or from the plate on which they have been assembled, be positively synchronized with the movement of the cases or crates through the machine.

As best shown in Figures 1 to 6, the crates or cases 24, which are to receive the milk bottles after they have been picked up from the group arranging apparatus, are passed through the machine at a lower level than the bottle conveyor by means constituting a case separator consisting of endless conveyor chains 3A, guided in channels 4, and inclined downwardly to a meeting point with conveyor chains 3B which incline upwardly to and beyond the point in the machine where they receive the bottles from the grab hooks or tongs, the various working parts of the machine being supported on a frame 2 comprising front and rear vertical side plates 1–F and 1–R.

The conveyor chains, are driven from any suitable outside source of power, the power being transmitted by a set of sprockets 5 to the conveyors 3A and 3B, the former coming to the machine in downwardly inclined path and bringing in the empty cases 24. A set of two endless timing chains 8 pass around idler sprockets 12, ride on rails 98 and carry extending inwardly towards each other, oppositely paired rungs or stud rollers 17.

The movement of the conveyor chains 3A, 3B is faster than that of the timing chains 8 so that the cases 24 tend to butt against the roller 17 ahead of them; further the spacing of the rollers 17 is such that as the forward end of a case butts the roller ahead of it at the start of the upward incline, the succeeding set of rollers 17 at the bottom of the incline comes up around the sprocket 12 and enters the gap between the two cases, thus effecting a separation of the cases and the spaced containment of each case between succeeding rollers 17. With the further advance of the conveyors the cases are lifted off the conveyor chains onto suitably positioned tracks 96, which prevent the cases moving backwards and forwards within their containment space between the rollers, but are advanced steadily by the rollers. Thus the cases are effectively separated in desired spaced relation.

The fixed guard rails 59 and the springs 60 and 61 prevent the cases from rising and closing the gap at the bottom of the inclines where conveyors 3A and 3B meet. If the timing rollers 17 come up over the sprockets 12 at the bottom of the inclines, while a case is in the relatively premature position 24A (see Fig. 7) the forward end of the case and the spring 60 are lifted up; further the case may be pushed forward by the following case but soon is stopped in the position 24B by the spring hooks 64 and 65 (Figs. 6 and 7), and the forward end of the said following case is prevented from rising by the spring 61. As the rollers 17 advance from under the case 24B, the case drops to its normal separation position and is engaged by the next set of timing rollers, as described above. If the timing rollers come up while the case is in premature position 24C (Fig. 8), the case is lifted and held in position 24D by the spring hook 65 until the rollers advance from underneath the case and the case drops into its normal position between rollers, then to be picked up and carried on to its destination.

Device for arranging the bottles in rows

The device for arranging the bottles in rows is as follows (Figures 9, 10, 11 and 13):

The bottles 102 are brought from the filling machine by the single file conveyor 101, and are pushed along a curved path, as shown in Figure 9, onto a slide plate 126 which is formed to have a gradual twist, as indicated in Figure 10, that reclines the bottles in the position shown, against a rail 103. This rail leads onto a rockable rack comprising an angle base member or step 105, see Figure 11, secured by welding, or otherwise, onto up-

rights 118 having a transverse rail 107 made fast across their upper ends. The rack is mounted on pillow blocks 106 to rock with the supporting shaft 127. The outward swing of the rack is limited by a stop member 124, see Figure 11, and the inward swing by a stop member 100. The rack can be locked in its outward reclining position by a roller 119 carried by a lever 115, engaging behind an angle plate 123, which is rigidly mounted on the rack. While, as herein shown and described, the bottles are brought to the machine over a curved path, at the machine, it will be readily understood that the bottles might approach the grouping mechanism in single file along a straight path.

A plurality of endless conveyors 108, of the same number as the number of bottles in a case row, pass around two sets of sprockets 110, ride on side rails 132 and are driven by a shaft 131, which is geared to run at a lower speed than the single file conveyor 101. Both conveyor 101 and the group of conveyors 108 are motivated by a common motor, not shown, and preferably separate from the casing machine.

The operation of the above device for arranging bottles is as follows:

Assuming the rack step 105 to be empty of bottles and in released condition, i. e., in forward position, the advancing bottles 102, carried by conveyor 101 constrained by the guide rails 103 and 104, cooperative with the slide plate 126, acting against the curved end 125 of the rack rail 107, push the rack to its reclining position. In that position, due to the action of a spring 122, the roller 119 on the pivotally mounted arm 115 engages behind an angle 123 on the rack and locks the rack in the reclining position, indicated by its full line position in Figure 11. Because of the push from the conveyor 101 the bottles 102 slide along the angular step of the rack 105 until the forward bottle engages and pushes outward the block 116 on the arm 115, thus unlocking the rack. Then the weight of the bottles causes the rack to swing inward, the bottles on the rack resting then, partly on the plates of the moving chain conveyors 108, are carried away thereby as a row of the desired number of bottles, four in the present embodiment of the invention, to the pick-up position of the grab hooks or tongs. This procedure is repeated with another group of four, so long as bottles are supplied to the casing machine. The four chains 108 may run parallel to each other or they may diverge to give any desired separation between the bottles at the pick-up point.

Grab hook drive, power drive, and overload cut-out device

The grab hook or tongs, which are of the lever-grip type, are suspended from pivot rods 67 extending from offsets 68 of certain links of two sprocket chains 25, which pass over driving sprocket wheels 26, carried near the opposite ends of a shaft 28, mounted in suitable bearings in the front and rear side frame members 1–F and 1–R. The shaft 28 is driven by a motor 197, mounted above upon cross members of the machine frame, through a train of connections as follows: Motor 197 by means of vario-speed pulley 196 (of known type) drives a belt 195 which turns the flat face pulley 194. The latter is mounted on the intake shaft 193' of a speed reducer 193, which is of the concentric differential type. The reducer 193 is supported on its out-put shaft 191. On that shaft is a slip clutch 190 on which is mounted a gear 189 (see Figure 2), meshed to drive gear 187 on the single revolution clutch 188. Single revolution clutch 188 when tripped by a lever 267, as will be explained later, does not transmit power at gear 187 to the shaft 191. It will be noted that the clutch 190 and gear 187 are at the rear side, as looked at in Figure 5 or the left side as seen in Figure 2. The shaft 185 extends from side member 1–R to side member 1–F and carries at the 1–F end a gear 184 which drives the intermediate gear 180, rotatable about a stud 181 mounted in side member 1–F. The gear 180 drives a gear 151 mounted at the near end of shaft 149. Shaft 149 also carries a like gear 151A, adjacent the rear side member 1–R. These two gears 151 drive two gears 153 located adjacent the respective sides of the machine. The two gears 153 are coupled respectively to sprockets 26 mounted on studs 28, to drive the two tongs carrier chains 25.

Drive of the case timing chains

On the above mentioned shaft 149 there is a sprocket 148 which drives the chain 217, which runs over and drives the cam sprocket 154 mounted on the side supported stud 155. From sprocket 154 the chain 217 descends to the sprocket 216 on the timer chain shaft 10, on which are a pair of sprockets 9, one at each side of the machine, and these sprockets 9 drive the paired case timing chains 8. The same chain 217 also drives a sprocket 23 on the shaft 21, upon which is mounted the shock absorbing or cushioning roller 20, which will be referred to again later.

It should be noted that the sprocket 216 is mounted on a hub 218 fast upon the shaft 10. When free the sprocket may be shifted about said hub to obtain a proper adjustment of the timer chain in synchronism with the chain carrying the grab hooks or tongs to correlate the movements of the groups of bottles with the advance of the cases through the machine. After the proper setting of the timer sprocket has been made it may be held in position by means of the clamp 219 and the bolts or screws 158. And it should also be noted that a similar structural arrangement is provided for the cam 156 so that both the timing chains and the cam can be set to the exact points corresponding to selected active positions of the timer carrier chains.

Drive of tongs carrier 25

It will be seen from the above that the driving arrangements for the sprocket chains 25 of the present invention differ from those in the machine of my copending application above-identified in that the driving sprockets are not located at the lowest point of travel of the sprocket chains. The grab hooks or tongs are arranged to discharge their groups of containers at their lowest point of travel and it is important that they be moved out of the way as quickly as possible. To accomplish this in the machine herein shown the sprocket chains are arranged to pass over sprockets 33 of relatively small diameter at the point where the grab hooks discharge the containers and to move upwardly abruptly beyond the point of discharge in order to lift the tongs away from the containers and thus avoid any movement of the tongs at the discharge point along the path of the cases, substantially larger than the movement of the cases, as more fully described hereinafter. Also, as more fully hereinafter described, the sprockets 33 at the point of discharge are not mounted on a shaft extending across the machine but on stud shafts 33', to give clearance to the offset tongs carrier rods 67 and otherwise permit the abrupt change in direction of the movement of the grab hooks.

Starting with the driving sprockets 26 the sprocket chains 25, which carry the tongs or grab hooks, travel over idlers 57, and roller 55 and then around a relatively small sprocket 49 of a radius substantially equal to the offset of the rods 67, so that, as in the machine of my copending application, when the sprocket chain reverses its direction of movement and travels upward parallel to its down movement, the downward and upward movements of the grab hooks or tongs will take place substantially in the same plane. The small sprocket 49, like the sprockets hereinabove referred to at the discharge point, are mounted on stud shafts in order to allow a clear space between them for the travel of the grab hook rods 67. It will be noted that the path of travel of the rods

67, by reason of their offset mounting on the sprocket chain 25, is the same when they carry the tongs down into pick-up position as it is when it lifts the tongs with the picked-up containers out of the pick-up position, except that it is in an opposite direction. This reversal of the path of travel of the sprocket chains 25, as the tongs approach and leave the pick-up point, which does away with any horizontal travel of the tongs while the pick-up operation is taking place, is an important feature of this casing machine, as fully pointed out and claimed in my copending application.

It will be noted that, in the machine of the present invention as distinguished from the machine of my copending application above identified, the sprocket chains 25 instead of traveling directly from the upper sprockets 57 to the small sprockets 49, about which they reverse their direction, pass first about the laterally offset rollers 55 from which they take the short down and up path about the sprockets 49, where the pick-up operation takes place. An important advantage of this novel feature of the present invention is that by thus offsetting the path of travel of the sprocket chains 25 first before their pick-up travel about the rollers 49 it is possible to space the successive grab hooks or tongs more closely on the chains without interference at the pick-up point. Closer spacing of the tongs permits the use of shorter sprocket chains 25 for a machine of the same capacity and, therefore, slower speed of linear travel of the chains.

At the end of the reverse or short upward travel of the chains 25, after they have passed over the sprockets 49, they travel over the idler sprockets 37 and 36 and then, in the machine of the present invention, they move abruptly into a steeply inclined path of travel along which novel means are provided for controlling any tendency of the container-carrying grab hooks or tongs to swing with their loads.

As shown, the sprocket chains travel in this steeply inclined path until they come to the sprockets 33 of relatively small diameter, hereinabove referred to, which are located at the discharge point and are mounted on stud shafts.

As shown, the sprocket chains 25 make an abrupt change in direction after passing over the sprocket wheels 33 but not so abrupt as at the pick-up point. Since gravity quickly removes the containers away from the grab hooks or tongs as soon as they are opened, a very slight horizontal movement at this point is not detrimental. From the sprocket wheels 33 the sprocket chains 25 pass over tensioning sprockets 30 mounted on arms 32 pivoted at 32' on the machine frame. Each of the arms 32 is provided with a slot 32'', concentric with the pivot 32', to permit adjustment of the sprockets 30 to vary the tension upon the chains 25, the arms 32 being secured in adjusted position by nuts 32A on threaded studs 32B extending through the slots 32''.

As shown more particularly in Figures 15 and 16 each grab hook or tongs member comprises package engaging jaw portions, which may be made up of sheet metal, bent as shown to provide a hook-like portion 91 that may enter the groove beneath the top edge of the ordinary milk bottle or other container, these jaw portions being attached in any suitable manner to a lever forging or casting 88 having two upwardly extending arms 86 provided with hubs 95 received upon a pivot rod 92. As above pointed out, the hook portions of the jaws are of such dimensions and so located lengthwise of the jaw levers 88 that in the illustrative embodiment of the invention they will engage and pick up four milk containers at one operation.

Each of the arms 86 is provided in the hub-like end of that part which extends above the pivot rod 92 with an opening to receive a second pivot rod 79, there being two of the pivot rods 79, one for each side of a grab hook, the latter being held in proper relation to each other by suitable means such as collars 93 clamped upon the pivot rods 92. It will be noted that the two grab hook or tong levers 88 are duplicates and that the jaw portion of each lever is at one end flush with the side of one arm 86 and that the other end extends beyond the other arm 86 so as to cooperate with that part of the jaw of the other lever which is flush with its arm.

The pivot rods 79 are supported at the right, as shown in Figure 15, by links 73 and 73' which pivot upon the rods 67 and, at their left ends, by links 81, also pivoted upon rods 67 adjacent the left ends of the latter. Each of these links 73—73' being provided with an offset hub 74 having a tangential ear tapped to receive an adjustable stop screw 77 held in adjusted position by a lock nut 78. It will be seen that when these links 73—73' are suspended in opposed relation upon the rod 67, which in turn is carried by the sprocket chains 25, with the rod-engaging hubs abutting laterally, the offset hubs 74 of the links will be brought into such relation to each other that the stop screws 77 are in axial alignment and, when suitably adjusted, will determine the closed position of the jaws of the grab hooks or tongs, thereby preventing the hook edges 91 from piercing or otherwise injuring the containers.

From the foregoing description it will be seen that the grab hooks or tongs, suspended from the rods 67 supported in offset relation to the sprocket chains 25, tend to move to their closed or package-engaging position under the action of gravity and that means must be provided to move them to open position or to hold them in open position in order that the hooks may be brought into pick-up relation to the containers 102 when they approach the pick-up point.

According to the present invention there are preferably two ways of insuring that the grab hooks or tongs will come into pick-up relation to the containers prior to their pick-up movement. Preferably, as a part of the discharge operation which drops the containers into the case or crate, locking or latching means are brought into operation to lock the jaws in their open or container discharging position. As herein shown, this lock or latch comprises a hook 83 having its shank portion 80 pivoted upon the rod 67 and arranged to swing to cause it to hook over the pivot rod 92 of the tongs when the jaws are in their open position, the hook being preferably so weighted and pivoted that it moves into hooked relation to the pivot rod 92 under the action of gravity as soon as the jaws have opened widely enough to lift the pivot rod 92 into proximity to the pivot rod 67. In the closed position of the jaws the long vertical edge of the hook 83 rests against the rod 92 and holds the hook against swinging into hooked relation to said rod until the jaws are in their wide position, as in Figure 18.

It will be seen that, if this locking action of the latch or hook 83 takes place at the point of discharge, the jaws of the tongs will remain locked open until the operation of suitable means for effecting the unlatching or unlocking thereof. To effect the unlocking of the jaws, the latch or hook 83 is provided with a bellcrank arm 83*a* which extends from the pivot rod 67 in such a direction that its weight tends to move the hook or latch 83 into latching relation to the pivot rod 92. This bellcrank arm is preferably provided with a roller 84 that, in the normal travel of the tongs, towards the pick-up point, will be brought into engagement with a latch trip bar 236 in Figures 5 and 19. The engagement of the roller 84 with the latch trip bar 236 will rock the latch or hook 83 about the pivot rod 67 in a counter-clockwise direction, in Figures 5 and 19, thus releasing the pivot rod 92 and thus permitting the grab hook or tongs to close under the action of gravity, particularly when moving with the chain 25 upward from the pick-up position.

If for any reason the jaws are not locked open as they approach the pick-up point, it is important that pro-

vision be made for opening them before they meet the containers to be picked up and to this end wedge blocks or flips 230 are provided, which are pivoted at 231 to gravitate into the position shown in Figure 19. These wedge blocks operate in a manner somewht similar to the jaw-opening wedge blocks shown in my copending application above referred to. The wedge blocks 230 engage angle plates 90 fastened to the jaw levers by screws 90a, to open the jaws as they approach the containers at the pick-up point. These jaw-opening parts 11 will be referred to again as the description of the apparatus proceeds.

Provision is made, as hereinafter more fully described, for preventing the tripping of the latch or hook 83, and thus preventing the picking up of the containers, in the event that no case or crate will be in position to receive them when they reach the discharge point.

There is a further modification of the pick-up and carrying means of my copending application as it is embodied in the present invention which constitutes an important feature of the invention. As hereinabove pointed out, the grab hooks or tongs, after they leave the pick-up point and pass over the sprocket wheels 37 through a short horizontal path, immediately pass over sprocket wheels 36 and then move abruptly into the steeply inclined path which carries them to the discharge point. It is important, during their descent, that there shall be no substantial swinging of the tongs, with their container load, as they travel downwardly toward the case or crate and it is particularly important, in this compact arrangement of parts, to prevent any substantial swinging, in order to avoid interference. This will be more fully explained later.

Referring to the drawings, the no-bottle shut-off device is as follows:

When there are no rows of bottles to be picked up at the pick-up point on the conveyor 108, as hereinbefore described, a swing lever 260 (Figure 14) operatively pivoted in relation thereto, due to the weight of a link 266 (Figures 12 and 14) swings away from the stop 109, causing the clutch stop lever 267 to swing into position to engage the cam 183' of the single revolution clutch 183 which disconnects the power, and is geared so that it stops the casing machine with any one of the pick-up tongs 67 a fixed distance above the pick-up point, so that no tong will come to the pick-up point if there are no bottles in position to be picked up by it. When a number of rows of bottles come they push the lever 260 against the stops 109, the link 266 pushes the clutch lever 267 out of engagement with the cam of the clutch 183, the machine starts again and keeps going as long as there are bottles in position to be picked up.

As above described, the bottle grippers or tongs are basically the same as in my copending application hereinabove identified but with the following two improvements added.

First: The latch 83 locks the tongs in open position every time the tongs are brought into open position. The roller 84 on each of the latch hooks 83 acts as a weight urging the latch to the latching position, and is also used in unlocking the tongs, as will appear later.

Second: The arm of the link 72 carrying the roller 76 tilts the tongs to facilitate the deposits of the bottles in the case, as will be explained. The arm 72 and the link 73' together form a rigid crank arm to bring about the tongs tilting action. The tilting operation is entirely independent of the tong latching mechanism.

The tongs or gripper carrying means, and their synchronization to the case timing means are basically the same as in my copending application hereinabove identified, but with the following improvements.

(a) In advance of the bottle pick-up point the chain sprockets 57 and rollers 55 provide clearance between the downcoming and upgoing tongs 67, thus facilitating closer suspension of the tongs on the carrier chains 25, which increases the capacity of the chains and effects greater smoothness of operation of the present casing machine, as compared with that of my copending application.

(b) At the bottle pick-up point the bar 236, which will be explained more fully later on, engages the rollers 84 and unlocks the tongs 67, which then are free to pick up the successive rows of bottles that come to the pick-up point.

(c) The path of the tongs carrying means leading to the delivery point and the path of the empty cases leading to the same point have been given corresponding inclinations, without altering the inter-relation of the two paths or the synchronization of the two motions. The rails 141 (Figures 5 and 14) sustain the bottle load, during the descent of the tongs, while the rail 140 engages the roller 76 of the tongs and tilts the latter and supported bottles outwards over the stationary leadin plate 213 and the retractable leadin plate 208 (see Figures 5 and 14). Thus the bottles travel to the case, sliding on an incline of the same angle as that of the compartments of the cases into which they are to be inserted. The leadin carrier rails 206 have extra lifting blocks 209 at a position corresponding to the position of the leadin plate 208 in respect to the last row of bottles per case, to effect the advance of the leadin plate 208 to clear the stacking bars of the cases. This does not misplace the bottles in relation to their compartment below in the case, because, as the bottles come down, the case moves correspondingly forward while the leadin plate, resting on the fixed rollers 210, does not.

(d) At the delivery end the sprockets 33 have been made smaller so that, due to the offset mounting of the tongs 67 on the chain 25, the component of the motion of the tongs 67 parallel to the path of the cases will be approximately equal to the motion of the timing chains 8 moving the cases 24, so that there will be no dragging of the tongs over the cases and bottles.

Further, the sprockets 33 are mounted on adjustable brackets 145 which enable the machine to be set for cases of different height. The holding plate 146 is welded to one of the adjustment brackets 145 and holds the strike plate 147 which opens the jaws of the tongs and allows the bottles to drop into the case. Thus the adjustment for a different case does not change the relation of the jaw opening plate to the tongs.

Otherwise the mode of operation of the tong carrying means is the same as in my copending application hereinabove identified and will be explained further on in conjunction with the new improvements.

Referring to Figures 2 and 5, the no case-no bottle pickup device is as follows:

When there is no empty case in position to receive the bottles, under the action of the spring 255, the roller 253 projects into the path of the cases, the bell crank 249, the link 246, the swing lever (241—245), the link 239 (see Figure 19) pull the bar 236 out of engagement with the chain rollers 84. Thus, the latches 83 keep the tongs locked open and though the machine continues to operate the tongs do not pick up any bottles. Eventually as the case does come into position, the roller 253, is pushed out of the path of the cases and through the above links the bar 236 is pushed into engaging position with the rollers 84 and the pick-up tongs are free to pick up bottles as long as there is a case to receive them.

Referring to Figures 3 and 5, the cushion wheels 20 have projections 20a on their peripheries, of the same number as there are numbers of rows of compartments in a case, and there are cut-out portions between projections to clear the wires between rows of compartments in the case. Also a larger cut-out to clear the space between cases. It will be understood that there are as many cushion wheels as there are compartments in a cross row of a case. The wheels are mounted on the shaft 21 and mesh with the wire bottoms of the cases like a gear meshes

with a rack, and are synchronized so that every time a bottle is dropped in its compartment, in the case, it strikes a rubber projection of the wheels **20**, resulting in safer and smoother operation.

Adjusting device for bottles of different height.—Referring to Figures 2, 5, 12 and 20, the sprockets **57**, the rollers **55**, the rollers **49** and the sprockets **37** rotate on shafts mounted on and between vertical plates **39** and **39**–A, which in turn are supported between the plates 1F and 1R of the machine. These plates **39** and **30**–A are pivoted by the studs **44** on the horizontally disposed levers 40 and **41**, which in turn are anchored to the frame of the machine by the studs **43**, the whole chain supporting unit constituting pantograph-like parallelograms on each side of the machine. The levers **41** rest on a rotatable cam **46**, secured on a shaft **47**, which cam shaft is locked in a desired position by means of the lock **48** (see Figure 1). Thus by setting the cam at the required position the plates **39** and **39**–A and consequently the pick-up height at the pick-up point of the tongs can be set for bottles of different height. Further the plate **39**–A has an inturned angular extension which carries a housing **232**, which in turn carries the jaw opening flips or pivoted wedges **230**, the pivots **231** and **237** and the latch release bar **236** (Figure 19).

By this means the pick-up point may be set for different height bottles, the relation of the tongs and the jaw opening flips or wedges **230** not being altered. Likewise the relation of the tongs and the latch release bar **236** is not altered.

The levers **41** are welded to a yoke **42** (Figure 2) so that the parallelograms on both sides of the machine rise at the same time, as one unit.

Also, the levers **41** just rest on the cams **47** and the movable parts of the parallelograms are free to rise if the tongs **67** accidentally strike against the tops of the bottles **102** at the pick-up point; thus avoiding accidents.

The overload cut-out device.—As hereinbefore described, in the power transmission of the present machine, is interposed a speed reducer **193**, which is of the differential gear type, known to the art, whose housing must be restrained in one direction to transmit motion in the opposite direction of rotation. Instead of the solid restraining bar often used for this purpose, I provide the screw **276** with an eye anchorage on the reducer **193**, a spring **277** surrounding the screw, a bracket **279**, the adjustment nuts **278** for adjusting spring pressure and the electric switch **280**. If the machine jams from any cause the speed reducer **193** is loaded more than the spring **277** is set for and the housing of the reducer rotates towards the spring. In so doing it contacts the roller **281** of the switch **280** and opens the circuit of the holding coil of a magnetic starter for the motor (not shown), thus shutting off power to the motor. Further, it should be noted the kinetic energy of the moving parts is absorbed by the slip clutch **190**, on the output shaft **191** of the speed reducer **193**, thus avoiding damage to the bottles, cases or other equipment.

Referring to chain synchronizing means (see Figure 21) it should be noted that on the shaft **10** of the case timing chain **8** is fastened the hub **218**, which carries concentrically the before mentioned sprocket **216**, settable at any desired position and then clamped in position by means of a clamp ring **219**, and cap screws **158**. In similar fashion the sprocket **23** is fastened on the shaft **21** of the cushion wheels **20**, and both the timing chains and the cushion wheels are driven by the chains **217**.

A support **159**, secured to the side **1**–F of the frame of the machine, carries the stud **155**, on which rotates the sprocket **154**. On the hub of the sprocket **154** there is a recess in which is mounted the cam **156** clamped in any desired position by a clamp ring **157** and cap screws **158**.

As hereinbefore described the power derived from the electric motor **197** is transmitted through the vario speed pulley unit **196** and the belt **195** to the speed reducer pulley **194**. On the output shaft **191** of the speed reducer **193** is fastened a slip clutch **190** which is set to transmit the required torque, but slips at overloads to avoid damage. On the slip clutch **190** is mounted the gear **189** which drives the gear **187** (see Figures 3 and 12). The gear **187** is coupled to the single revolution clutch **188** which is secured on the shaft **185**. If the cam of the clutch **188** be engaged by the lever **267** (Figure 12) which has been explained before, the clutch **188** free wheels and does not transmit power to the shaft **185**. When, however, the lever **267** is pulled out of engagement with the clutch cam **188**, the clutch drives the shaft **185** and the gear **184**, which in turn drives the gear **180** and then the gear **151**. Two gears **151** are mounted tightly on opposite ends of the shaft **149**, on which is fastened the sprocket **148**, which through the chain **217** drives the sprockets **23** of the cushion wheels **20**, the sprockets **216** of the timing chains **8** and the sprocket **154** of the cam **156** (Figures 3 and 5).

The latter is shaped with the appropriate rises and falls to advance and retract the leadin plate **208** over the partitions and ends of advancing cases **24**, by means of the following parts: The cam follower roller **199** moves the lever **200**, welded to the yoke **201**, on which are welded the two arms **204** to cause the whole unit to oscillate on the shaft **202**. The two carrier rails **206** are pivoted on the arms **204** and slide over the rollers **210** carried by the frame. The cross bar **207** is fastened on the rails **206** and carries the leadin plate **208** (Figures 5 and 6) as stated above. The rails **206** have the two upwardly tapering wedge blocks **209** which come over the rollers **210** when the leadin plate leads the last row of bottles past the end of the case, and the stacking bars of the case. The side plates **99** (Figures 2 and 5) lead the bottles past the sides of the cases. A cross bar **215** is fastened to the frame **1** of the machine and the leadin plate **213** is hinged thereon.

The two gears **151** drive the two gears **153** which are coupled to the two master sprockets **26**, which in turn drive the two tongs carrier chains **25**. The tension sprocket **30**, the delivery sprockets **33**, the slope sprockets **36**, the lift sprockets **37**, the clearance sprockets **57**, the holding wheels **29** and the contour wheels **55** are driven by the chains **25** on their respective studs, which are mounted in the two side plates **1**–F and **1**–R. The sprockets **37** are coupled to the gears **50** and through them drive the gears **51** which are keyed to the shafts **52** of the pick-up wheels **49**, and thereby drive the wheels **49** at the speed of the chains **25** without slippage.

There are as many grippers in a tongs set required to fill a case with milk bottles, suspended on the offset links **66**, as there are cross wire rows of compartments for bottles in a case. In practice it takes a length of chain **25** of two or more sets to span the circuit in a machine. The distance between suspension of the tongs within a set is uniform. The distance between sets can be made twice the length between suspensions within a set. The distance between sets depends upon the distance between the timing chain rollers **17** and the relation of the detent angle of the chain **25** to the angular path of travel of the cases and the synchronism of the rates of speed of the chains **25** and **217**.

The clutch **188** is geared so that it makes one revolution every time the tongs **67** are carried by the chain **25** from one position to a consecutive position within a set, and two revolutions between sets. The stopping point of the clutch **188** is always the same, and is geared so that the tongs stop a fixed distance above the pick-up point and do not obstruct the bottles coming to pick up position, nor do the tongs pass the pick-up point if there are no bottles in position to be picked up.

Mode of operation of my present invention

The mode of operation follows as a condensed restatement of the functions of the new devices, described above, in their orderly sequence, plus incidentals.

The cases come to the case separator; are contained between the rollers **17** of the timing chains **8**, and are brought in position to receive rows of bottles.

The bottles are brought in single file to the rack **105**, are arranged in rows, and these rows of bottles are conveyed in position to be picked up.

Prior to the bottles coming in position to be picked up, the swing bar **260** is in idle position, the cam of the clutch **188** is engaged and the machine is stopped with the tongs at a definite position above the pick-up point so that they do not interfere with the bottles coming to pick-up position. In order that the machine does not start and stop too frequently the link **266** is made appropriately heavy, or can be counter weighted or pulled downwards by a spring, so that it takes the accumulation of the desired number of rows of bottles to disengage the cam of the clutch **188** to start the machine. When the required rows of bottles do come the cam of the clutch **188** is disengaged and the machine starts. Normally the casing machine will be set at a higher speed than the filling machine supplying the bottles, so periodically the casing machine will stop and wait for the bottles.

When there are bottles in position to be picked up the tongs **67** come down to the pick-up point in a vertical path, normally with their jaws open but if the jaws are not open the flips **230** spread them open so that the jaws do not strike the bottles. Incidentally even when the jaws are open the flips **230** serve the purpose of stopping any oscillation the tongs may have. Also, assuming that there is a case in position to receive bottles and consequently the bar **236** is in engaging position, the flips **230** hold the tongs from swinging when the roller **84** strikes the bar **236** and unlocks the jaws of the tongs. As the tongs come closer to the pick-up point the strike plate **233** prevents the jaws from going further down than necessary. As the offset links **68** of the chains **25** go around the rollers **49** and up on the lift sprockets **37**, the bar **236** holds the latch **83** out of engaging position, the tongs are lifted upwards along the same vertical line that they came down, the jaws close on the bottles, lift them and carry them along. The stop bar **260** (Figure 14) tends to swing to idle position, the lever **267** (Figure 12) rides on the circular part of the cam of the clutch **188** and about the time the step of the cam rolls along a new row of bottles comes and pushes the lever **260** against the stops **109**, the lever **267** is lifted out of range of the step of the cam of the clutch **188** and so on, the process goes uninterrupted as long as there are bottles in position to be picked up.

As the aforesaid tongs carrying the row of bottles approach the downward slope, the tilting roller **76** contacts the rail **140**, and the rollers **71** roll on the rails **141**, the tongs are tilted with the bottles outwards over the stationary leadin plate **213** and then over the retractable leadin plate **208** and into the case which by that time has advanced so that the leadin plate **208** rests on the partition of the case. Eventually the two strike plates **99** of the tongs contact the strike plate **147**, the jaws of the tongs open and release the bottles into their compartments of the case upon the cushions **20***a* projecting into the case. Whenever the jaws of the tongs **67** are opened the latch **83** swings into locking position and locks the jaws of the tongs open. As the chains **25** and the offset links **68** go around the sprockets **33** the tongs **67** advance over the cases on the plate **147** at about the same speed as the cases below. Then the empty tongs are carried up to repeat the process and so on. Other details and safeguards in operation are, as explained above, in connection with the component devices of my invention.

I claim:

1. Container pick-up and carrying means for the purposes set forth, comprising tongs of the lever-grip type, endless conveyor means on which said tongs are pivotally suspended for gravity-induced self-closing action, means for presenting a container to be cased at a pick-up point in the path of travel of said tongs, and means adapted to prevent gravity closing action as the tongs respectively approach the container and to release said tongs as they come into embracing relation to the container at said pick-up point, to permit gravity closing of said tongs upon said container as they start to move away from the pick-up point.

2. Container pick-up and carrying means according to claim 1 which further comprises means acting upon the tongs, prior to their arrival at the pick-up point, to open the jaws for embracing the container.

3. Container pick-up and carrying means according to claim 1 which further comprises means at a discharge point along the path of travel of said tongs adapted to open the jaws of the tongs to discharge the container.

4. Container pick-up and carrying means according to claim 1 in which said means for preventing gravity action comprises a latch carried on one of the tongs pivots and adapted to cooperate with another tongs pivot to lock said tongs in open condition.

5. Container pick-up and carrying means according to claim 4 in which the tongs latch comprises a hook carried on one tongs pivot and adapted to hook over another tongs pivot.

6. Container pick-up and carrier means according to claim 4 in which the tongs latch has a trip arm projecting to one side of the path of travel of the tongs and a stop is positioned in the path of travel of said arm for engaging said arm to effect the latch tripping.

7. Container pick-up and carrying means according to claim 4 in which means is provided for urging the latch into latching relation to the appropriate tongs pivot whenever the tongs are opened to discharge a container.

8. Container pick-up and carrying means according to claim 4 in which the latch has means for biasing said latch toward latching position and operates to lock the tongs in open-jaw position as the container is discharged.

9. Container pick-up and carrying means for the purposes set forth comprising tongs, of the lever-grip type comprising a pair of links, endless chain conveyors on which said tongs are pivotally suspended for gravity induced self-closing action, one of the said links of the lever-grip tongs being rigidly extended beyond the suspension pivot of the tongs, and a guide rail extending along a relatively steep part of the path of travel of said tongs from a pick-up point toward a discharge point, said guide rail being arranged to be engaged by said link extension and cooperating therewith to tilt said tongs about their suspension pivot away from their normal vertical suspension as they approach the discharge point.

10. Container pick-up and carrying means according to claim 9 which further comprises case-presenting means, synchronized with the movement of the tongs and adapted to present a case at a discharge point to receive the discharged container and the guide rail is arranged to tilt the container forwardly in substantial parallelism with the leading side of the case arriving at the discharge point.

11. Container pick-up and carrier means according to claim 1 in which means are provided for successively presenting cases at a discharge point in the path of travel of the tongs to receive the discharged containers, and in which means are also provided, governed by the absence of a case in the case-presenting means, for preventing the pick-up action of the tongs at the pick-up point when no case will be in position at the discharge point to receive the containers.

12. Container pick-up and carrier means according to claim 11 which further comprises means for effecting a definite separation of succeeding cases as they approach

the container discharge point, including a case timing conveyor synchronized to move the cases at a predetermined speed relative to the travel of the tongs and a plurality of equally spaced propeller members on said case timing conveyor adapted at a certain point to engage and lift the rear end of each succeeding case and finally drop said case with predetermined clearance between appropriate propelling means.

13. Container pick-up apparatus according to claim 1 which further provides case presenting means and means for stopping operation of the container carrying and the case presenting means upon failure of containers to arrive at the pick-up point and cooperating means for reactivating said container carrying and case presenting means upon the arrival of containers in position to be picked up.

14. Container pick-up apparatus according to claim 13 in which said stopping and reactivating means comprises a cam controlled clutch cooperative with the power transmission mechanism of the machine and means disposed in the path of the containers at the pick-up point adapted to actuate said cam controlled clutch.

15. Container pick-up and carrier means according to claim 1 being further provided with pivoted plates supporting certain portions of the tongs adjacent the pick-up point, and manual means for adjusting the positions of

said plates whereby the pick-up height of the tongs may be set for containers of different height.

16. Container pick-up and carrying means according to claim 1 comprising means designed to pick up groups of milk containers at the pick-up point, carry them to and release them for storage in cases at a discharge point, each case comprising separate compartments for each container; in which the containers approach the discharge point through an inclined path, and movable means is provided for leading the containers into the case compartments as the containers reach the case, said lead-in means being timed in its operation by camming means driven in synchronism with the container carrying means.

17. Container pick-up and carrying means according to claim 16 being further provided with synchronized means adapted to project tooth-like cushions through the bottom of a case at the point of discharge and into each compartment, so as to protect each container as it is discharged and led into its appropriate place.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,840,965 July 1, 1958

Stephen John Lewis

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 11, line 11, strike out "11"; column 14, line 63, for "detent" read --descent--.

Signed and sealed this 14th day of October 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents