

July 16, 1946.

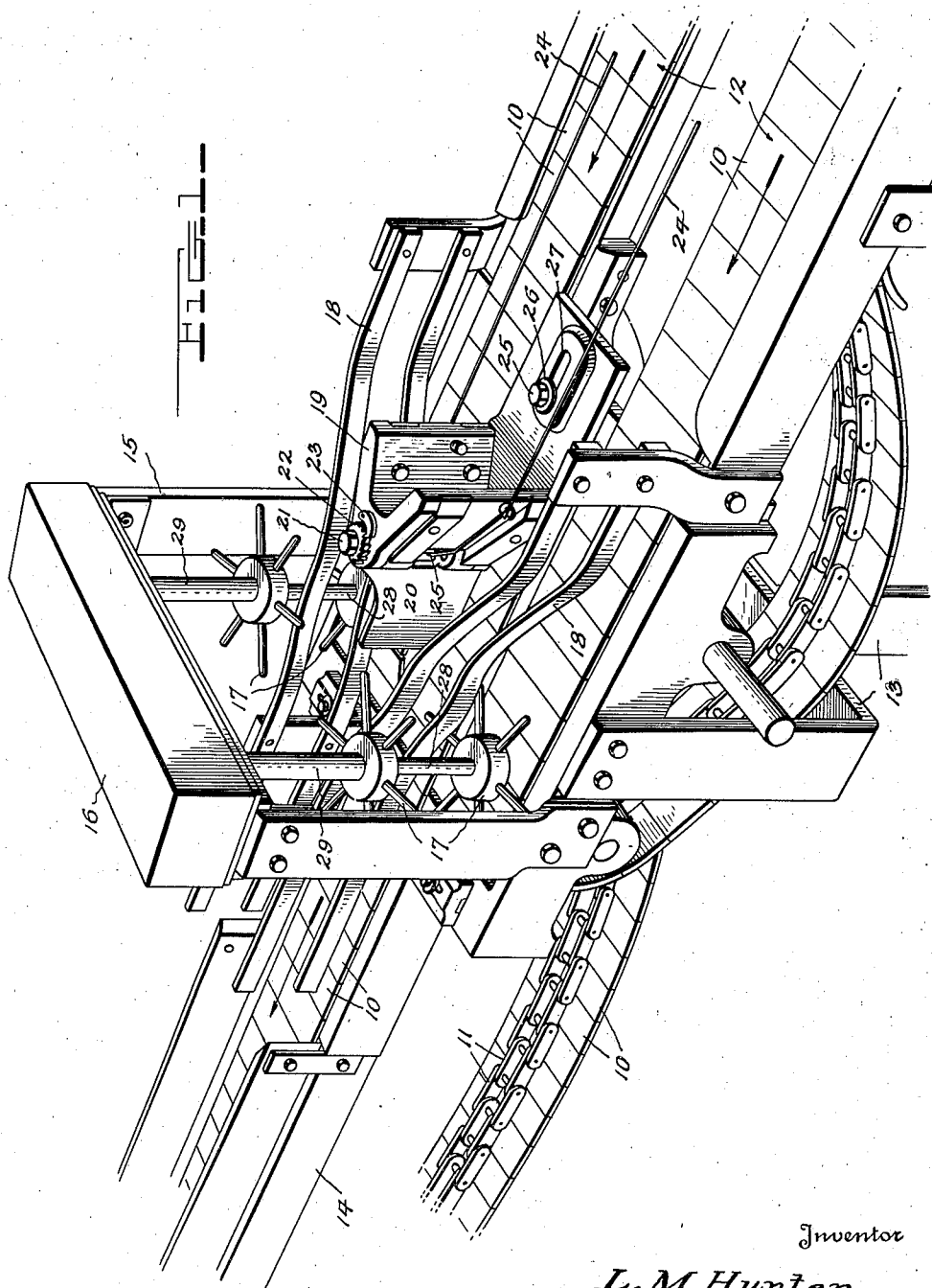
L. McL. HUNTER

2,404,232

COMBINING AND SEPARATING DEVICE

Filed Aug. 25, 1943

5 Sheets-Sheet 1



Inventor

L.M. Hunter.

By *C. W. L. Loeber*

Attorney

July 16, 1946.

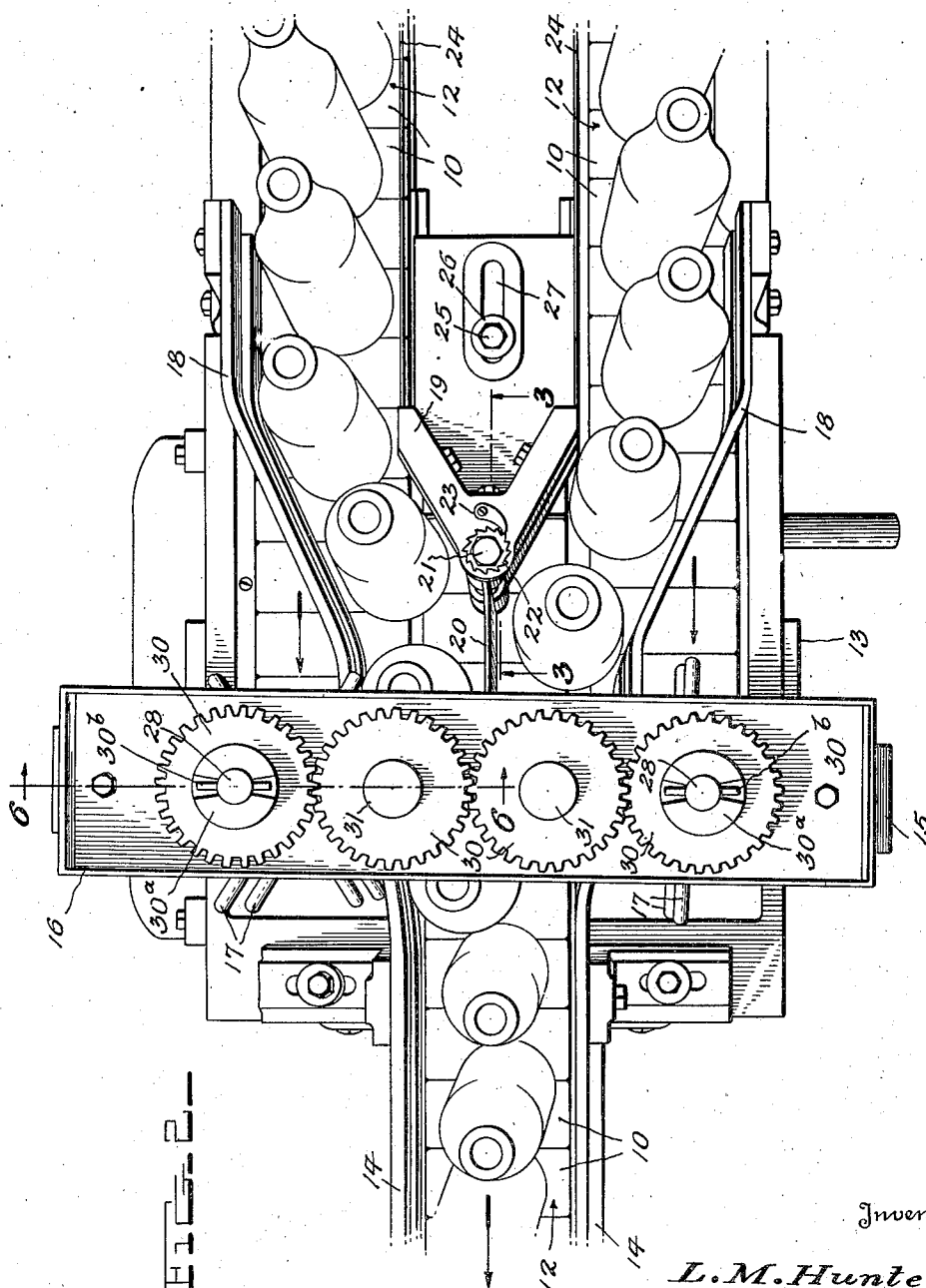
L. McL. HUNTER

2,404,232

COMBINING AND SEPARATING DEVICE

Filed Aug. 25, 1943

5 Sheets-Sheet 2



Inventor

L.M. Hunter.

By *L. Wilson* Esq.

Attorney

July 16, 1946.

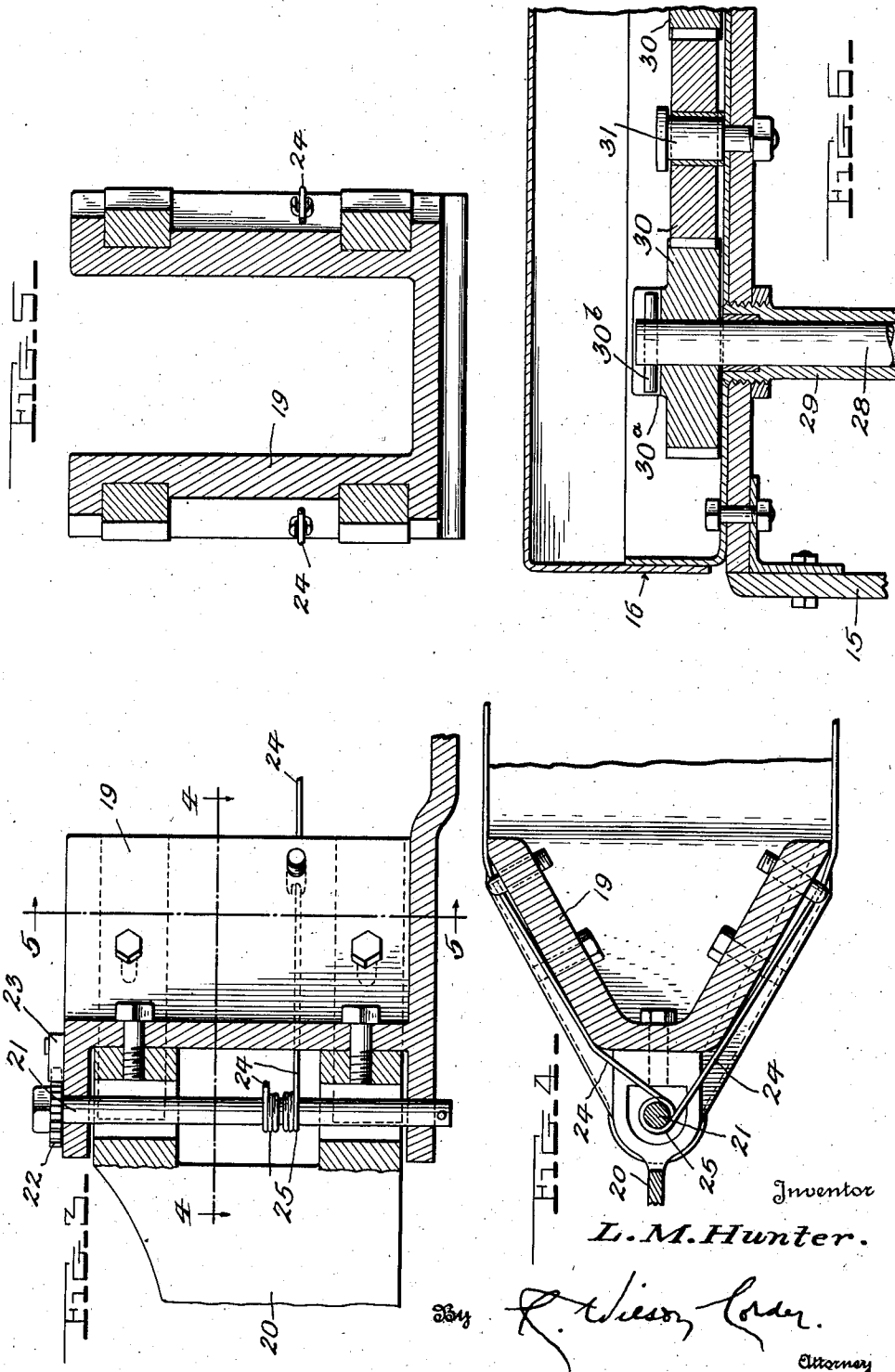
L. McL. HUNTER

2,404,232

COMBINING AND SEPARATING DEVICE

Filed Aug. 25, 1943

5 Sheets-Sheet 3



Inventor
L. M. Hunter.

By *R. Wilson* *Law.*
Attorney

July 16, 1946.

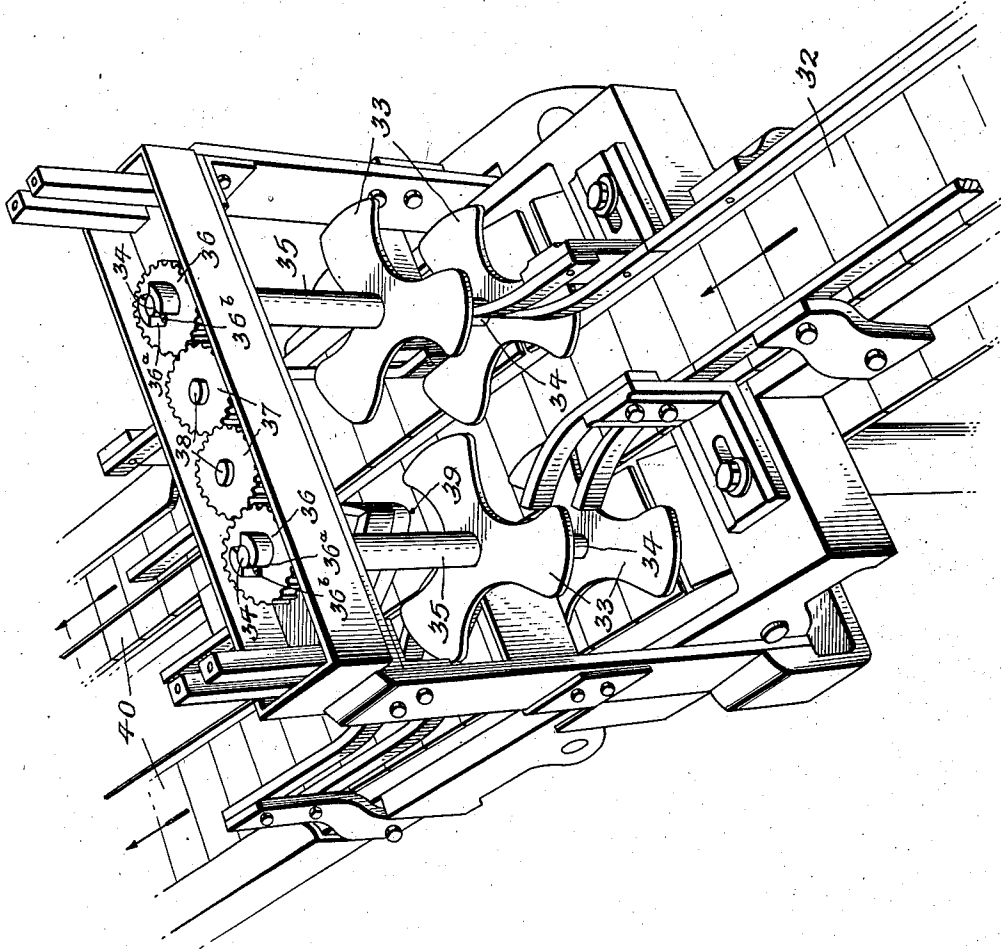
L. McL. HUNTER

2,404,232

COMBINING AND SEPARATING DEVICE

Filed Aug. 25, 1943

5 Sheets-Sheet 4



HIG-7-

Inventor

L. M. Hunter.

By

R. W. L. Loeber.

Attorney

July 16, 1946.

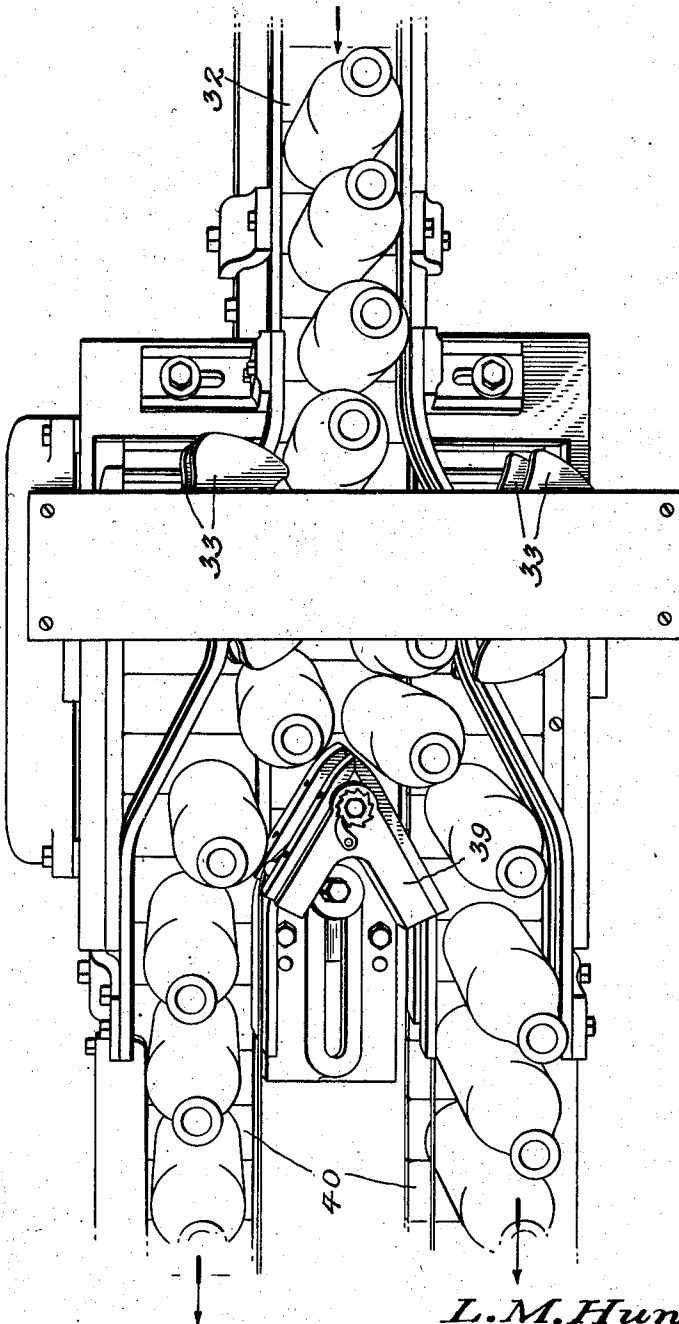
L. M^cL. HUNTER

2,404,232

COMBINING AND SEPARATING DEVICE

Filed Aug. 25, 1943

5 Sheets-Sheet 5



Inventor

L.M. Hunter.

By

G. W. L. L. L.

Attorney

UNITED STATES PATENT OFFICE

2,404,232

COMBINING AND SEPARATING DEVICE

Lawrence McLean Hunter, Toronto, Ontario,
Canada

Application August 25, 1943, Serial No. 500,178

2 Claims. (Cl. 198—31)

1

This invention relates to conveying mechanisms, and more particularly to a new and improved device for combining bottles from a double row to a single row on bottle conveyors, and vice versa.

In bottling plants and the like, containers are largely handled by means of chain and link, conveying mechanisms, this being characteristic of modern production line methods. For example, in a large capacity bottling plant, the containers coming from the soaker may be immediately deposited on a moving conveyor which takes them past a point of inspection, leads them to the filler and crowner, picks the bottles up when they have been filled, carries them past a second point of inspection, and finally deposits the filled containers either on an accumulating table, or into an automatic caser, from which the product passes into channels of trade.

During these operations it is often necessary or desirable to divide a single line of bottles into two lines, or combine a double line into a single line. It is obvious that operations of this type should be conducted on an equal numerical basis, particularly in the case of division, and that the entire procedure must be carried out without jamming or breaking of bottles, scuffing, or other undesirable results.

An object of this invention is to provide means for combining a double row of bottles or the like, into a single row.

Another object is to accomplish this automatically.

Another object is to combine bottles in an orderly manner without breaking same.

Another object is to effect the foregoing in an efficient and economical manner.

A still further object of the instant invention is to provide means for dividing a single row of bottles into a double row.

Another object is to accomplish the foregoing, automatically; and with a minimum of moving parts.

Another object is to provide cheapness of construction in a device of this type.

These and other objects made apparent during the further progress of this specification are accomplished by means of my bottle handling invention, a full and complete understanding of which is facilitated by reference to the drawings herein, in which:

Fig. 1 is a view in perspective showing my invention as applied to the combining of two lines of bottles;

2

in Fig. 1, showing bottles moving through the device;

Fig. 3 is an enlarged vertical sectional view of certain structure, taken along the line 3—3, of Fig. 2;

Fig. 4 is an enlarged horizontal sectional view, taken along the line 4—4, of Fig. 3;

Fig. 5 is an enlarged vertical sectional view along the line 5—5, of Fig. 3, looking in the direction of the arrows.

Fig. 6 is an enlarged fragmentary vertical sectional view of certain other structure, taken along the line 6—6, of Fig. 2;

Fig. 7 is a view in perspective of a modification of the instant invention, employed to divide a single row of bottles into two rows; and

Fig. 8 is a top view of the structure illustrated in Fig. 7, showing bottles moving through the device.

Referring now to the drawings, Fig. 1, it will be seen that the instant device embraces conventional conveying mechanism constituting links 10 backed with chain-like elements 11 which ride on powered sprockets at appropriate points and by virtue of being thereby moved forward provide continuous flat conveying surfaces such as 12, conveyor belts of this type being well-known to the art. A supporting member 13, along with side members 14, assist in positioning the instant conveyor belts in an operable manner; and a frame-like member 15, having a top portion 16, provides anchoring means for a pair of six-pointed star wheels 17, which are positioned to either side of the conveyor line.

A pair of guards 18 facilitates the directing of bottles along a desired course; and adjustable island guide member 19 is positioned at a point adjacent that where the bottles are brought together. Member 19 has a rudder-like gate and directing element 20. A pair of guide wires 24 facilitate the movement of bottles along the conveyor line, said wires being wound around shaft 21 (Fig. 3), fixedly mounted to the top of which is a ratchet gear 22 associated with a dog 23. Relative tension on said wires 24 is thus governed by movement of said shaft and associated gear, turning such clockwise resulting in increased tension, and release of the ratchet having an opposite effect. Since divider member 19 is adjustable on its supporting bed by means of a bolt 25 with associated washer 26 operating along slot 27, it is both necessary and desirable that means be provided for adjusting wires 24, and to be most effective they should be maintained under reasonable tension.

3

Special attention is now called to star wheels 17, such members preferably constituting identical elements fixedly mounted on shafts 28, which shafts rotate freely in sleeves 29 (Fig. 6) adjacent their tops and which are coupled together at their upper ends by a series of gears 30 (Fig. 2), said gears being positioned to form a train; intermediate gear members revolving on shafts 31. It will be noted that preliminary to initially meshing said gears, the star wheels on the shafts below are so turned that an arm of one registers in a plane approximating one-half the distance between two exactly opposite arms of the adjacent star wheel, the gears then being brought into mesh and effectively securing the star wheels in operative position.

Special attention is now directed to the upper portions of outside gears 30, and the manner in which they are formed for the purpose of providing a small amount of slack or backlash in vertical shafts 28. It will be noted that the hubs 30a of said gears are formed with a slightly V slot, so that the shafts 28, and taper pin 30b are free to move back and forth, relative to 30, through an angle of a few degrees. This arrangement provides for a certain amount of flexibility in the operation of the star wheels, and tends to reduce scuffing, and other undesirable results likely to occur in the handling of glass objects. Actual use has demonstrated the desirability of this innovation.

In operation, bottles moving on conveyor 12 are directed by guides 18 towards elements 19 and 20, which have been appropriately spaced and the latter tensioned by spring 25. At this point the bottles are alternatively delayed, and permitted to go forward by the presence of the arms on star wheels 17 and gate 20, it being apparent that in view of the synchronization of the star wheels as described above, as respective bottles reach the critical point they either find their path momentarily barred, or open, the result being that alternate bottles on the two lines are directed into a single line. It is further apparent that the moving bottles on the conveyor themselves operate the star wheel guides, which are not themselves powered but which serve automatically to direct bottles in the manner described. Gate and guide member 20 cooperates with the arms of 17 in this connection.

A modification of the instant invention is disclosed in Figs. 7 and 8, in which bottles from a single conveyor line 32 contact two sets of three leaf blades 33 mounted on shafts 34 operating in sleeve members 35 and having gears 36 fixedly mounted to their tops and meshing with intermediate gears 37 which revolve freely on or with shafts 38, the blades initially being synchronized by so meshing the gear train at the top that a given blade will register directly between two opposite blades on the other divider element.

The same arrangement at the tops of shafts 34 in their connections with gears 36 as described heretofore with reference to the bottle combiner is deemed preferable, the hubs of the gears being formed with a V slot as at 36a, and pin 36b being free to move, along with shaft 34, in said slot whereby a certain amount of backlash is permitted in the shafts.

From the foregoing it is believed that the operation of this structure will be obvious, bottles moving along conveyor belt 32 encountering al-

4

ternate leaves of blades 33 and being directed to the left and right thereby. An island member 39 similar in structure to element 19 (with the omission of 20) facilitates this operation in furnishing a point of division.

It is thus apparent that the instant invention, with very slight modifications of structure, may be employed either to combine bottles moving on two or more conveyor lines, into a single line, or a multiple of one, determined by the number of feeders present; or to take bottles from a single line and direct them to a plurality of conveyors, the basic principle of alternate distribution once established, serving to function with equal facility for either purpose. That is, once the mechanism for alternate handling is set up, it may be employed, with some few obvious mechanical changes in a given structure, to either combine bottles or separate bottles, depending upon the requirements of a given operating situation, the direction of movement of the conveyors being the governing factor in securing the desired result.

In some instances it has been found expedient to increase or decrease the speed of conveyor belts 40 relative to that of 32, operating conditions and circumstances within a given plant suggesting optimums in this regard.

If the direction of the conveyors is reversed, and certain appropriate adjustments made, it will be apparent that this apparatus is also susceptible to use for the purpose of combining two lines of bottles with a single line.

It is further apparent that the foregoing arrangement is automatic and self-functioning, involving a minimum of parts and maximum ease of operation.

I have described herein a new and useful device and modification thereof to be employed in the handling of bottles on conveyor lines under conditions which indicate the dividing of two lines into one, and one line into two. My invention is ingenious in its simplicity; functions without attention, and is entirely effective for the intended purpose.

While I have described in some detail certain specific embodiments of the instant invention, I do not intend to be limited thereby, but on the contrary, the appended claims are to be given a scope and construction fairly in keeping with my contribution to the instant art.

I claim:

1. In a device of the character described, a supporting frame-work, a plurality of shafts rotary mounted thereon, object directing means associated with said shafts, a gear train connecting said shafts, the tops of one or more gears mounted to the shafts being formed with a V slot, and a pin engaging the shafts and the slots, whereby relative movement of the gear on the shaft is permitted and scuffing of bottles being handled, reduced or eliminated.

2. In a device of the character described, a plurality of shafts rotary mounted in oppositely disposed relationship, object handling elements fixedly mounted to the shafts, and means synchronizing the relative movement of said handling elements, said means including gears mounted on the shafts, and means permitting relative movement of said gears on the shafts for the purpose of providing flexibility when the assembly is operative.

LAWRENCE McLEAN HUNTER.