Jan. 7, 1964 T. L. CARTER 3,116,579

MACHINE FOR PACKING PARTITIONED CASES

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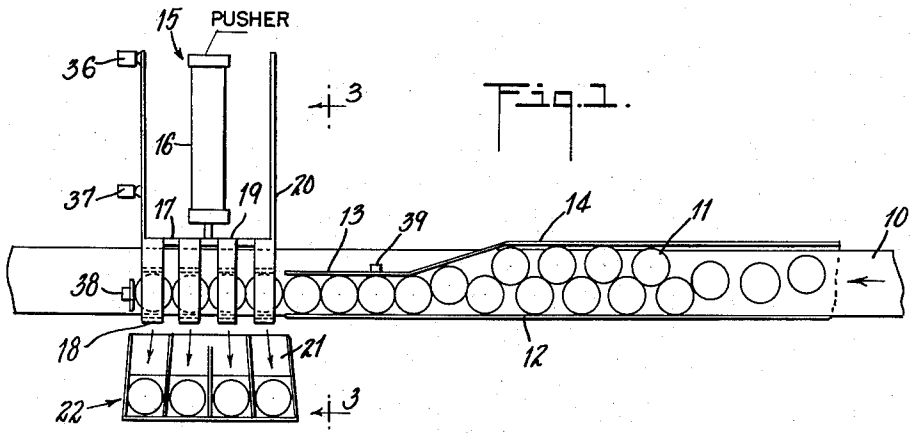


Fig. 1.

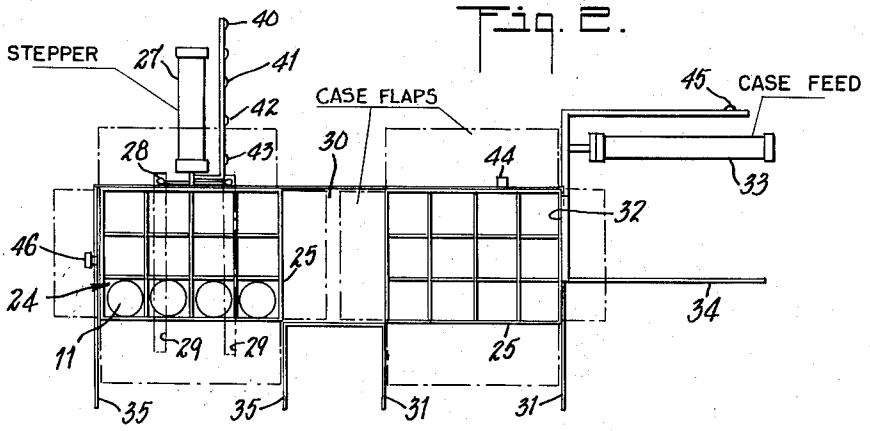


Fig. 2.

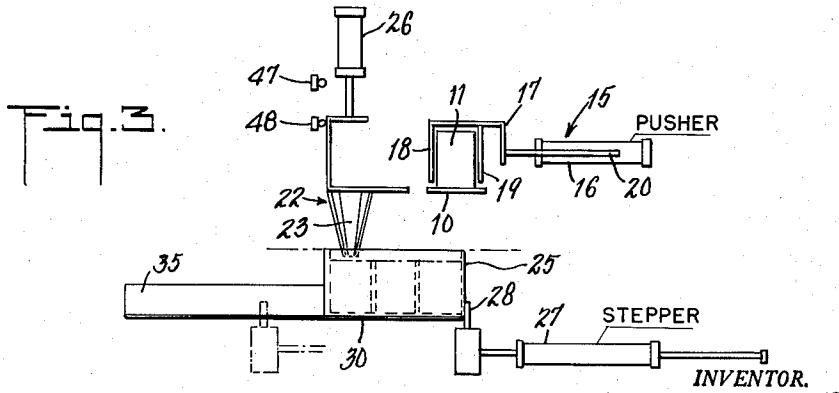


Fig. 3.

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Fig. 7.

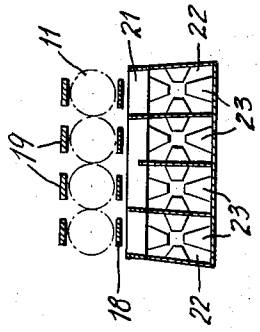


Fig. 4.

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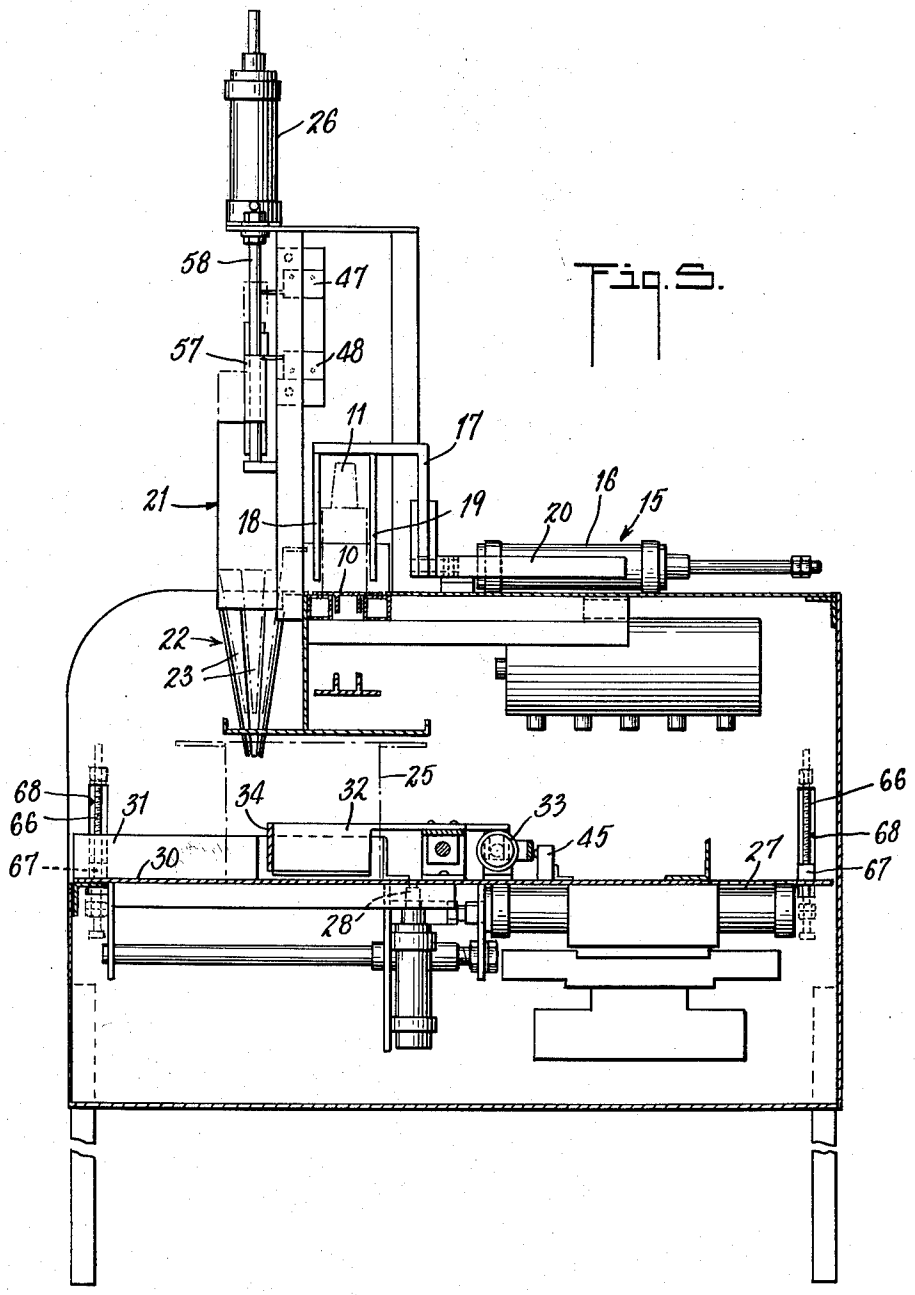


Fig. 5.

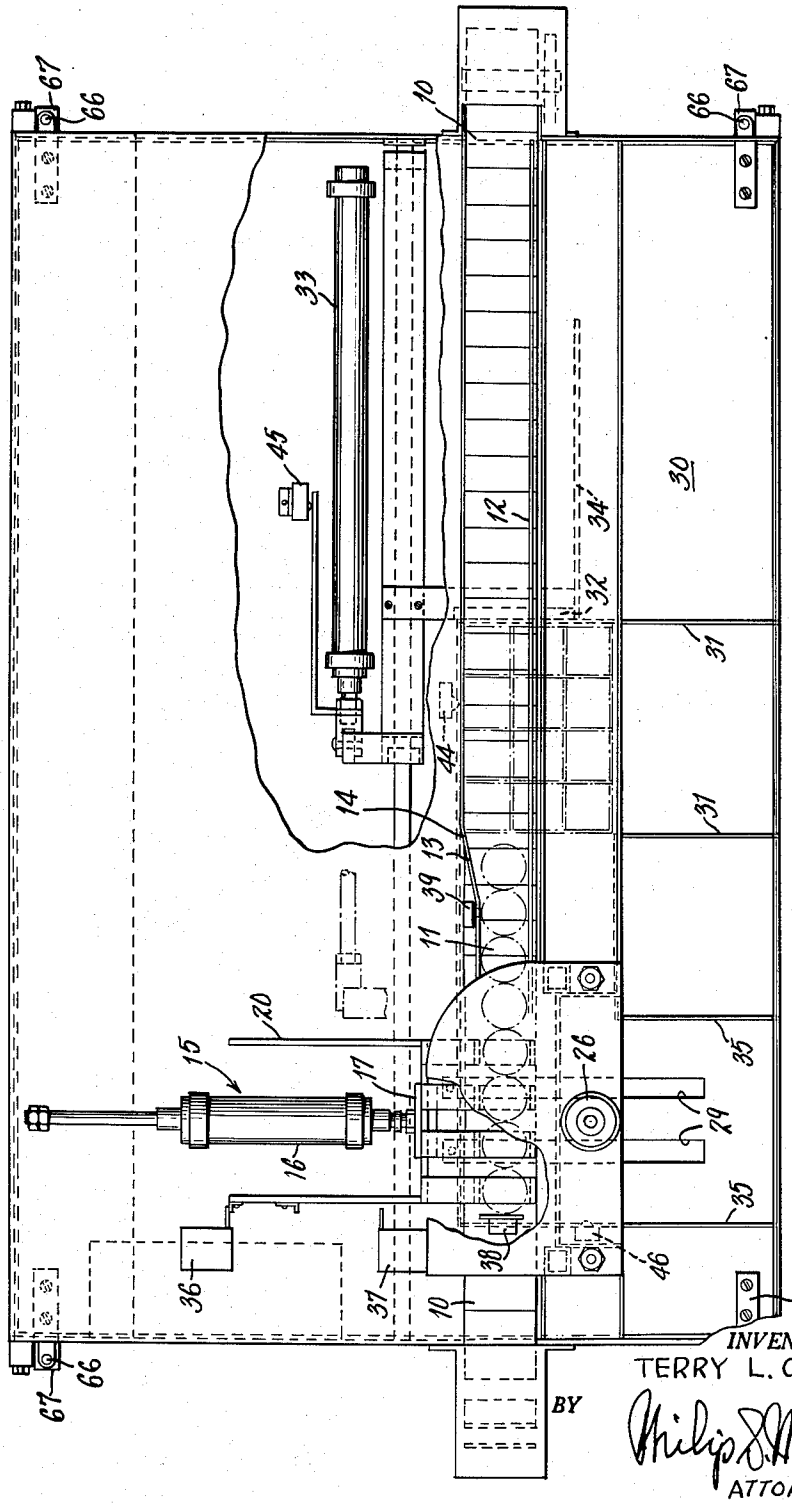
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Fig. 6.



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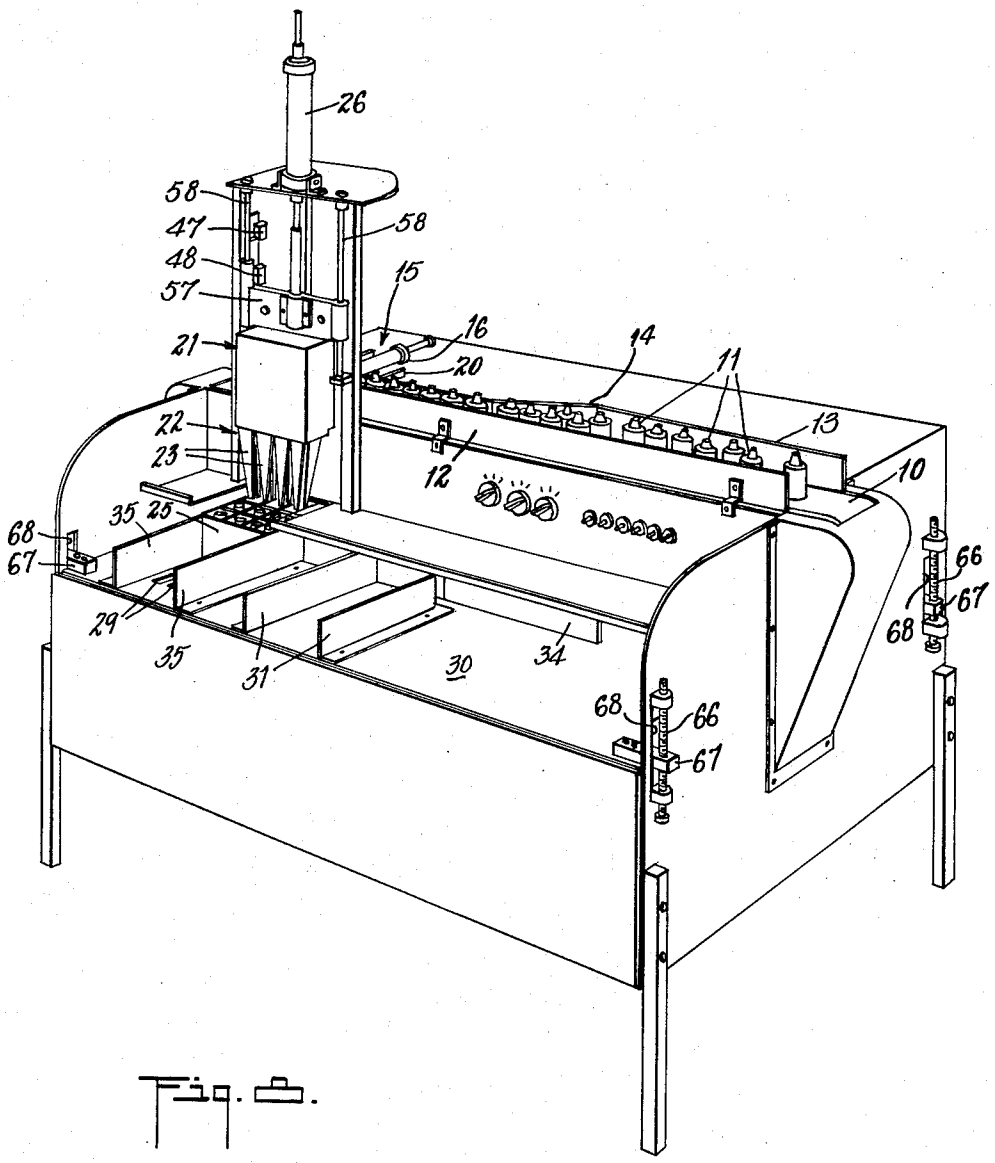


Fig. 5.

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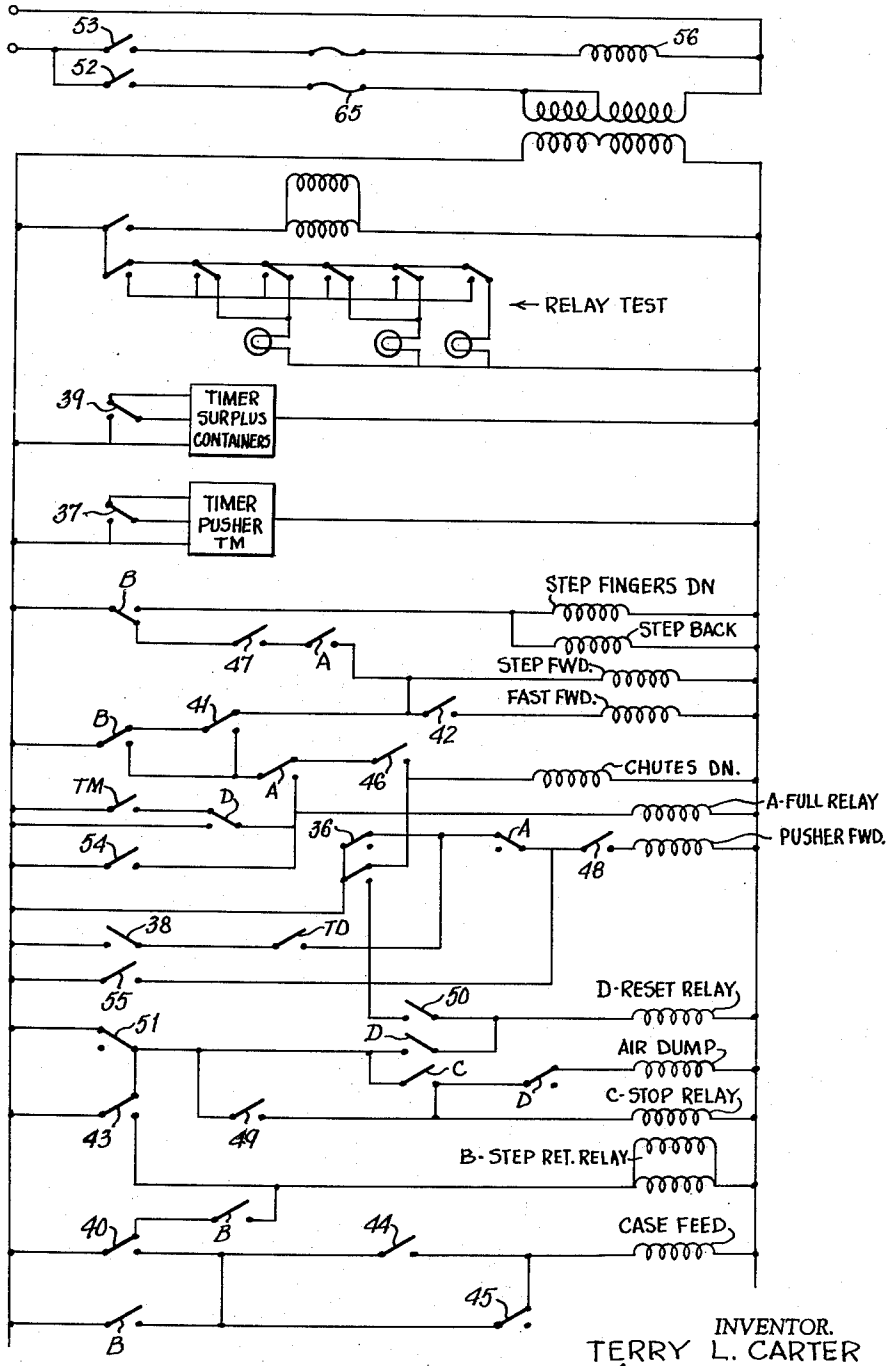


Fig. 9.

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United States Patent Office 3,116,579
Patented Jan. 7, 1964

3,116,579

MACHINE FOR PACKING PARTITIONED CASES

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Filed Nov. 2, 1960, Ser. No. 66,853
1 Claim. (Cl. 53—160)

The invention herein disclosed relates to the packing of such objects as bottles, cans, jars and the like into partitioned cases of the "egg crate" type.

Objects of the invention are to provide a machine of simple, inexpensive construction, which will automatically pack articles, row after row, in partitioned cases or cartons, without loss of time in assemblying and placing the articles, with accuracy and at a high production rate.

These and other desirable objects have been attained in this invention by certain novel features of construction, combinations and relations of parts, all as hereinafter described, and involving particularly a novel arrangement wherein articles are fed in a single row up to a pusher which operates to cut off and advance the articles for one case row into funnels which direct and drop the articles individually into the partitioned compartments for a row, in a case which has been positioned beneath the funnels and which case is then stepped one row after another until filled and discharged from the machine.

Other novel and advantageous features of the invention are set forth and will appear in the following specification.

The drawings accompanying and forming part of this specification illustrate a present commercial embodiment of the invention. Structure however may be modified and changed as regards the immediate illustration, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

FIG. 1 in the drawings is a diagrammatic plan view illustrating operation at the feeding in end of the machine, showing objects such as bottles or cans being supplied to the pusher which cuts off a case row at the end of the supply line and feeds it through separators into the guide funnels.

FIG. 2 is a diagrammatic representation illustrating action at a lower level in the machine showing in plan a case being loaded at the left and an empty case entered in the machine at the right.

FIG. 3 is a diagrammatic view showing in cross section as on the line 3—3 of FIG. 1 the pusher for advancing a case row off the supply belt into the guide funnels with the latter located over a row of compartments in a partitioned case and the case subjected to the stepper which shifts the case a row at a time as each row of compartments is filled.

FIG. 4 is a part sectional front elevation of the machine.

FIG. 5 is a cross sectional view on susbtantially the plane of line 5—5 of FIG. 4.

FIG. 6 is a broken part sectional plan view of the machine.

FIG. 7 is a horizontal sectional view on substantially the plane of line 7—7 of FIG. 4, showing particularly the flexible guide funnel construction.

FIG. 8 is a perspective view of the complete machine.

FIG. 9 is a simplified wiring diagram.

Referring first to the diagrammatic views, FIGS. 1, 2 and 3, the machine comprises a constantly running feed belt 10 carrying the bottles, jars, cans or other objects 11 to be packed, confined in a single row by guide rails or walls 12 and 13.

At the entrance end these guide rails are wider apart than necessary for a single row, as indicated at 14, providing spacing for accumulation on the conveyor, thus increasing conveyor storage capacity and particularly preventing backward falling of containers, especially small containers. The wider spaced guide rail at 14 is shown inclined to merge into the single row portion of the guide channel, thus to cause the containers to exert a wedging effect to assist each other to stand upright.

The containers are thus forced to accumulate in front of a row pusher 15, against a front stop 38, back to a surplus switch controlling timer indicated at 39.

The row pusher is shown made up of a power cylinder 16 having a piston actuated cross head 17 carrying dependent front and back arms 18, 19, FIG. 3, disposed over the conveyor belt and spaced to receive between them the objects being packed, there being a number of these arms corresponding to the number of objects to be packed in a row, four in the example and the pusher head carrying a cutoff skirt 20, FIG. 1, for shearing the row forming number of objects off the end of the supply line.

The objects fed into the receiving arms of the pusher head are advanced by the pusher off the belt through guide slots 21 fanned out as shown in FIG. 1 to separate and slightly spread the extracted objects to approximate the partition separations of the case, into position over funnels 22 having downwardly tapered spring guide fingers 23, FIG. 3, which enter one row of compartments 24 in a case 25.

After dropping a row of objects in a row of the case compartments the spring guide funnels are lifted by power cylinder 26 and the case is stepped forward one row by power cylinder 27 which has case engaging pusher fingers 28 operating up through slots 29 in the case supporting table 30.

Case guides 31 at the front of the machine assist an operator in placing an empty case, with the flaps turned out, into the right hand end of the machine, FIG. 2, in front of the head 32 of the case feed ram 33. This ram has a guard skirt 34 to prevent an operator from entering a case before this pusher is completely retracted ready for a case feeding stroke.

At the opposite end of the machine, guides 35 are provided for the loaded case which is pushed out of the machine by the stepper 27.

The power cylinders may be air operated, the supply belt may be driven by an electric motor and the various interrelated controls may be in the form of electric switches and relays so that the machine may be put into operation by simply making the necessary connections with a compressed air supply and with an available electric supply circuit.

In the diagrams controls are indicated as follows:

At 36, FIG. 1, a control indicating the row pusher 15 in full back position, control 37 the pusher in full forward position, 38 a full row of containers ready in front of the pusher, connected to work with 39 reserve supply of containers ready, 40, FIG. 2, the row stepper in full back

position, **41** stepper on compartment position collar, **42** stepper on fast forward discharge travel after completing last row of case, **43** stepper in full forward position, **44** empty case ready in case feed position, **45** case feed in full back position, **46**, case in loading or filling position, **47**, FIG. 3, funnel chutes in full up position and **48** funnel chutes in loading, down position.

As a safety measure an emergency switch **49**, FIG. 4, is provided which will shut off air supply and release pressure from all cylinders.

Also clear and reset switches may be provided to remove a partially filled case from the machine and ready the machine to start again with the next empty case, this for overcoming or preventing jams in the machine and for taking care of broken containers and the like.

These or other manual switches control individual functions of the machine independently of the automatic controls as for safety and adjustment purposes.

FIG. 4 shows these manual control switches mounted in convenient reach on the front of the machine, emergency stop switch at **49**, clear switch at **50**, reset switch **51**, controls **52**, conveyor **53**, step **54**, pusher **55**, fuse **65**.

In this front view the geared motor for driving the supply belt appears at **56**.

This view also shows how the spring fingered container guides **23** reach down into the case compartments in the lowered poistion, thus to accurately guide and to some extent break the fall of the containers into the case.

In raised position the guide funnels are clear of the case permitting unobstructed row stepping operation and feeding of empty case to follow.

The funnels or guide chutes are mounted for this vertical movement on a cross bar **57** sliding on vertical guides **58**.

The case feed ram **33** is shown in FIGS. 2, 4, 5 and 6 mounted on the case table **30** in back of and clear of the guides for the cases.

Case table **30** may be arranged for vertical adjustment to suit different height objects and cases, facilitating changeover from size to size. In the illustration this is accomplished by adjustment of table supporting screws **66**, FIGS. 4, 5, 6 and 8, at opposite ends of the machine engaged with projecting screw lugs **67** on the ends of the table, these lugs passing through the slots **68** in the end walls of the machine.

Operation

Articles to be packed, such as bottles or other filled containers, are fed by endless conveyor **10** through guideway **12, 13**, which is widened at the entrance end to accommodate and accumulate an excess of articles, providing to some extent storage space, which guideway, as shown in FIGS. 1 and 6, narrows down to reduce the advancing articles into a single line entering the open article receiving pockets **18, 19**, FIGS. 3 and 5, of the pusher, which are arched over the conveyor belt in the form of an open-ended tunnel of the length and width of a single row of the articles being packed.

The foremost article entered in the pusher engages and actuates a front stop "ready" switch **38**, FIG. 1, and when the timer switch **39** signals that the row is complete in the pusher, the latter operates to slide the row of articles, four items in this case, through separating guides **21** into drop chutes **22** which are aligned over a row of compartments in the case **25**.

At this time the drop chutes are in the lowered position shown in FIG. 3 so as to accurately guide the articles into the respective compartments in a row. The tapered spring fingers **23** in the funneled formation shown in FIG. 5 grip and guide the articles sufficiently to assure their deposit in the individual compartments.

As each drop is completed the guide funnels are raised to clear the case and the case is advanced transversely of the conveyor, one row of compartments, ready for the next drop.

On completion of the last drop the filled case is stepped clear of the filling position and in a faster movement and in retreating from this faster case discharging action the stepper fingers **28** lower beneath the case **30** so that while the stepper is returning to the full back position a new empty case may be pushed by the case feeder **33** up into the loading position.

Empty cases are entered between guides **31**, FIG. 2, onto the case table **30** into position in front of the case feed pusher **33** which after the stepper has completed its last, quick stroke advancing a filled case out of the way, is energized to forward an empty case into position beneath the drop chutes.

The pusher fingers **28**, FIG. 3, of the row stepper project up through slots in the case table to advance the case being filled and to push the case when filled out of the way of an advancing empty case but these fingers drop down on the return retractive stroke of the stepper so as not to delay movement of an empty case into position beneath the drop chutes.

The wiring diagram, FIG. 9, illustrates electrical elements and connections described.

The reserve container switch **39** operates an electronic timer so that a passing container will not falsely indicate a "full" condition. This timer starts over after each individual container passes and signals only when a container has remained at this position for a timed interval. As a container will not stop at the reserve switch until the conveyor is full back to that point, switch **39** will signal only when enough of the containers have been actually accumulated.

In the wiring diagram FIG. 9, the parts are shown connected to effect operations described. Essential parts have been designated by name so that the action may be followed from above specification without further description.

In addition to parts described there is shown in the diagram a "relay test circuit" by which relays used in the machine may be tested, the lamps indicated showing in each instance the operativeness or lack of operativeness of any particular relay plugged into this test circuit.

What is claimed is:

A machine for packing, one row at a time, cases partitioned in a plurality of rows or compartments, comprising

a conveyor for the articles to be packed in said compartments,

a pusher at one side of said conveyor having dependent arms spaced transversely of the conveyor in the form of an open-ended tunnel over the conveyor of a length and width corresponding to the number of articles to form a single row,

article guiding means at the opposite side of the conveyor in line with the articles in said row confined between said tunnel forming arms of the pusher,

funnel means for the articles in said single row located below and connected to said article guiding means in line with the articles in the row directed by said article guiding means,

means for positioning a compartmented case below said funnels with a row of the compartments therein lined up with said funnels,

control means for activating said pusher to slide the single row of articles within the arms of the pusher through said article guiding means into said funnels when a complete row of articles is contained between the funnel forming arms of said pusher,

power means for raising and lowering the funnels in respect to said article guide means, arranged to automatically raise said funnels clear of one row of compartments in a positioned case, after the articles of one row have been dropped through said funnels into the compartments of the row and for automatically lowering the funnels with respect to compartments in an adjoining row of a case being loaded,

a case stepping means located below said row pusher and operating in the same direction, transversely of the conveyor line of feed,

means for activating said case stepping means to advance a case the distance of one row, after one row of the compartments therein has been filled,

and a control circuit for effecting actuation of said operating means in timed sequence to automatically load the cases described one row at a time.

References Cited in the file of this patent

UNITED STATES PATENTS

2,010,410	Novotny	Aug. 6, 1935
2,331,018	Fedorchak et al.	Oct. 5, 1943
2,890,553	Day et al.	June 16, 1959
2,952,955	Leichenich et al.	Sept. 20, 1960