Feb. 14, 1956 P. D. LABOMBARDE 2,734,619

APPARATUS FOR SECURING UNIFORM ORIENTATION

Filed June 10, 1954 2 Sheets-Sheet 1

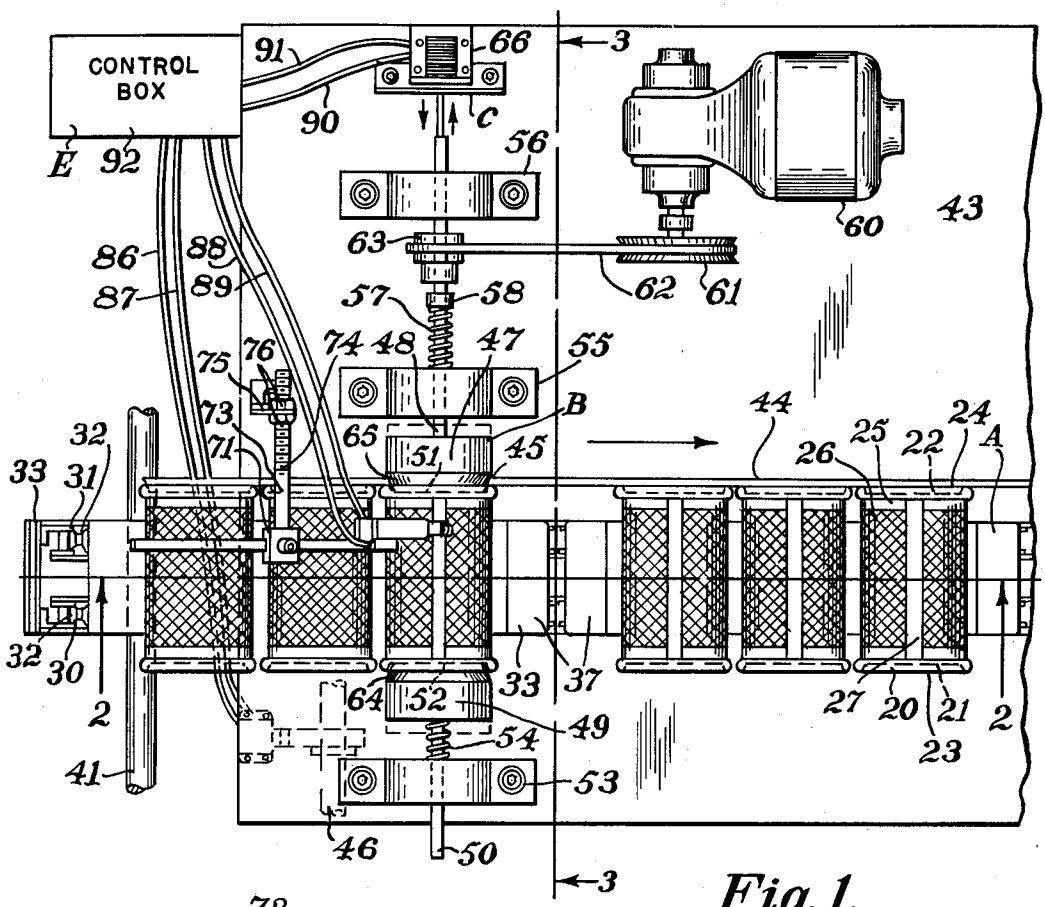


Fig. 1.

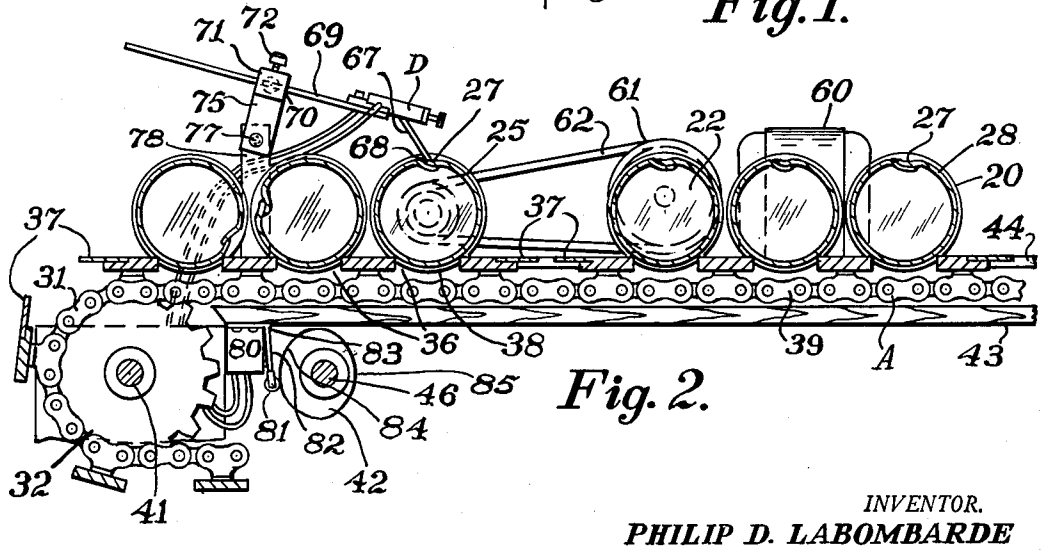


Fig. 2.

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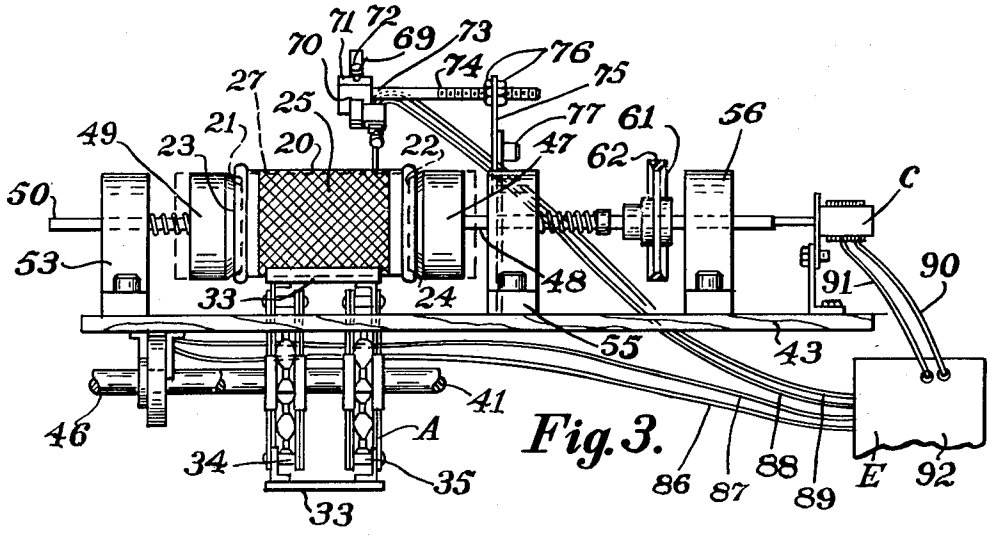


Fig. 3.

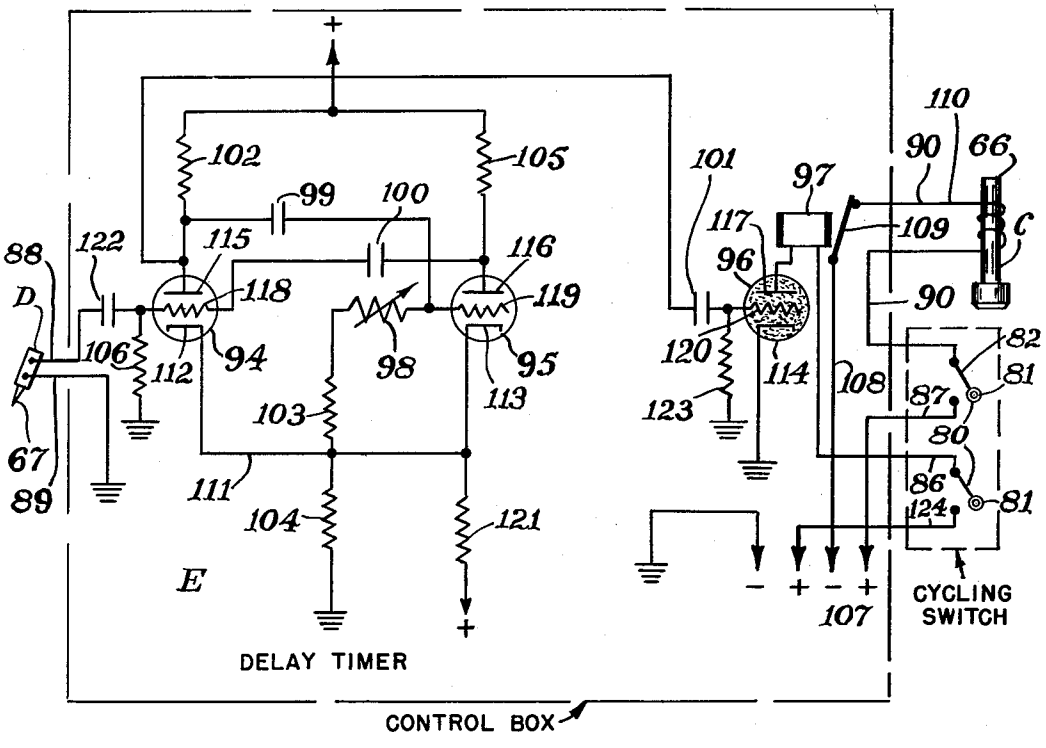


Fig. 4.

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United States Patent Office 2,734,619
Patented Feb. 14, 1956

2,734,619

APPARATUS FOR SECURING UNIFORM ORIENTATION

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Application June 10, 1954, Serial No. 435,871

8 Claims. (Cl. 198—33)

This invention relates to the orientation of labelled cylindrical containers, such as cans or bottles, to enable the packing of the same with the labels all facing in a desired direction.

The principal object of the invention is to provide a method and apparatus for automatically detecting the location of the essential pictorial or written matter on the labels of a plurality of containers and for then revolving said containers until the labels uniformly face in a predetermined direction.

In the packaging industry, articles such as cylindrical beverage or food containers are usually filled and sealed, then passed through a labelling machine which may imprint a label directly on the curved surface thereof, or may attach a paper label therearound. The use of paperboard carriers or cartons for shipping and selling such cylindrical containers has greatly increased in recent years and the carriers or cartons are often provided with openings or windows through which the containers and their labels may be seen. One of the disadvantages of known packaging machinery, when used to fill window type cartons, has been that the containers are delivered into the carton with their labels facing in different directions and the advertising value of the container label has been partially, or entirely, lost. The apparatus of this invention is intended to be installed after the affixing of labels on the containers and before the containers are delivered into the carriers, or cartons, whereby all of the container labels are thereby uniformly positioned in a predetermined manner and clearly readable through the windows or openings of the package.

I have discovered that most labelling machines apply printed matter directly on the curved surface of a cylindrical container, such as a metal beer can, with the subject matter of the label having a definite and uniform relationship to the longitudinally extending joint seam of the can. Similarly where a paper label is glued onto a container, the seam joint of the label always bears a definite and uniform relationship to the subject matter appearing on the label. Another object of this invention is, therefore, to provide apparatus for revolving or spinning cylindrical containers around their longitudinal axis until a longitudinal line of unusual thickness is detected and then positioning said containers with said lines in uniform positions which consequently positions the labels on the contaners in uniform positions.

A particular object of the invention is to provide apparatus for detecting the seams in a succession of metal cans by the sound of the seams as compared to the sound of the remainder of the curved wall of the containers, the seam detecting apparatus automatically causing the orientation of the containers thereafter.

Still another object of the invention is to provide apparatus including an intermittent conveyor feeding a packaging machine wherein the conveyor halts at a station, a single container, or a predetermined group of containers, are revolved until the seam on the curved surface

thereof is suitably positioned and then the conveyor continues advancing into the packaging machine.

A further object of the invention is to provide container positioning apparatus, for orienting the labels on said containers which apparatus may be used with seamed metal cans, or other cylindrical containers having a longitudinal line of extra thickness on their curved surfaces, whether the containers are travelling horizontal or upright and whether they are entirely cylindrical or only substantially cylindrical in shape.

An embodiment of the invention is shown in the accompanying drawings and explained in the following detailed description, it being understood that the same are illustrative of the apparatus and method, but that the invention is not limited to the particular apparatus shown, but may be modified in order to operate with similar containers carried by similar conveyors.

In the drawings,

Fig. 1 is a plan view of the invention.

Fig. 2 is a side elevation on line 2—2 of Fig. 1.

Fig. 3 is a front elevation on line 3—3 of Fig. 1, and

Fig. 4 is a diagram of the electronic control means of the invention.

The apparatus of this invention may be applied to an existing endless conveyor between a labelling machine and a carton packing machine or may be applied to the feed conveyor of a carton packing machine in the event that labelling is accomplished elsewhere. The labelling machine and packing machine are not illustrated herein, since they form no part of this invention and may be of any suitable type well known in the trade.

The container conveyor means A, shown in Figs. 1, 2 and 3 receives filled and labelled containers at the portion shown at the left of the drawing, by manual or automatic placement, and bodily transports the same in the direction of the arrows and toward the portion shown at the right of the drawings, directly or indirectly into a carton packing machine. The illustrated cylindrical containers **20** are metal beer cans of identical size and shape, each having a pair of opposite flat ends **21** and **22** inset from the rims **23** and **24** and each having a curved surface **25** therearound. Printed or pictorial matter forming a label **26** is usually printed on the curved surface **25** and each can is constructed with a longitudinal seam **27**. The curved wall **28** of each container **20** is of uniform thickness except along the line of the seam **27** where it is usually at least double in thickness.

Preferably the container conveyor means A includes a pair of spaced apart, parallel endless chains **30** and **31**, trained around sprockets such as **32** and having spaced bars such as **33**, extending between opposite links **34** and **35** to form a plurality of spaced container recesses **36** along the conveyor. In the embodiment illustrated herein, the apparatus is arranged for use with a six can carton and the recesses **36** are therefore arranged in groups of three with every fourth recess filled in by plates such as **37**. The containers **20** are preferably each supported in horizontal position in a recess **36**, whereby the central longitudinal axis of each container is transverse to the direction of travel of the chains **30** and **31**, and the flat ends **21** and **22** of each container are vertical. Conveyor means A is intermittent and, as illustrated, advances each container to a station **38**, halts at that station for a predetermined interval, and then continues advancing away from the station. Any suitable means, not shown, provides such intermittent motion in a manner well known and a continuously revolving cam **42** is mounted on shaft **46** for a purpose to be described hereinafter. A platform **43** is provided beneath the upper stretch **39** of chains **30** and **31** to prevent sagging, the platform also serving as a support for other parts of the device. An upstanding elongated guide rail, or bar, **44** is also provided alongside

the path of one end of the containers to maintain the alignment thereof, the guide rail 44 having an opening 45 at station 38.

Container revolving means B of the invention includes at least one spindle head, mandrel, or jaw 47 carried at the free end of a revolving spindle, or shaft 48, and preferably a similar oppositely disposed member 49 carried at the free end of a freely revolvable spindle, or shaft 50. It is desirable to use a pair of mandrels 47 and 49, when the containers are conveyed in horizontal position, but it will be apparent that if the containers were conveyed in upright position a single, lower, spindle head, mandrel, turntable or smiliar element would usually be adequate. The forward face 51 of spindle head 47 and the forward face 52 of spindle head 49 are normally positioned just outside the path of the corresponding ends 21 and 22 of a container 20, at station 38, the head 47 being of a size to pass through opening 45 in guide rail 44.

The shaft 50 of spindle head 49 is revolvable in, and axially slidable in, a bearing 53 mounted on platform 43 and a compression spring 54 is provided between the head and bearing to permit outward yielding and return of the head. The shaft 48 of spindle head 47 is revolvable in, and axially slidable in, bearings 55 and 56 also mounted on platform 43 and a compression spring 57 is provided between a collar 58 and bearing 55 to move the head outwardly after it has been moved inwardly toward the opposite head 49. A motor 60 having a drive pulley 61 connected by a belt 62 to a driven pulley 63 on shaft 48 is connected to a source of current not shown, and continuously revolves the spindle head 47 during the operation of the apparatus.

It is preferred that the central longitudinal axis of the spindle heads 47 and 49, be slightly above and parallel to the central longitudinal axis of a container 20, supported in a recess 36 and halted at station 38. It is also preferred that the forward peripheral edges 64 and 65 of the spindle heads 47 and 49 be tapered and of a diameter to fit within the inset portion of rims 23 and 24 of a container 20. Thus, when a spindle head 47 is advanced toward the opposite spindle head 49 to engage the ends 21 and 22 of a can, the tapered peripheral edges 64 and 65 tend to lift the container out of recess 36 while centering and revolving the container.

Spindle head advancing means C is provided in the form of an electric solenoid 66 operatively connected to spindle shaft 48 and arranged to slidably advance the revolving shaft in its bearings when the solenoid is actuated or energized. The advancing of shaft 48 causes spindle head 47 to engage the adjacent end 24 of a container 20 and push the other end 23 into engagement with the spindle head 49, whereby the container is caused to revolve around its central longitudinal axis.

The sound sensing means D of the invention comprises an electric sound pick-up needle 67 of a well known type, the needle 67 having its tip 68 in position to engage the curved surface 25 of a container 20 being revolved at station 38 by container revolving means B. Preferably needle 67 is fixed at the end of a resilient flexible arm 69 in order that the initial impact from the container on the needle may be absorbed by the arm and to permit the needle to freely follow any projections or depressions in the curved surface 25 of the containers. Arm 69 is fixed in a slot 70 in a block 71 by a set screw 72 whereby it may be adjusted as to position. Block 71 is carried at the free end 73 of a threaded rod 74 the rod 74 being held in the desired transverse position in a strap 75 by means of nuts 76.

Strap 75 is angularly adjustable by a set screw 77 at the top of an upright post 78 which in turn is supported on platform 43.

A cycling switch 80 is mounted below platform 43 and is provided with a roller 81 at the end of a switch contact arm 82 pivoted at 83 to close the switch when the roller 81 engages the raised surface portion 84 of the continuously revolving cam 42. When roller 81 engages the non raised surface portion 85 of cam 42, the switch 80 remains open. Suitable wire leads such as 86, 87, 88, 89, 90 and 91 connect the cycling switch 80, the pick-up needle 67 and the solenoid 66 to the control box 92 of the apparatus which houses the electronic control means E of the invention.

In Fig. 4, a schematic diagram illustrates the various electrical components of the electronic control means E used for causing the advancing means B to retract to release a container 20 upon an indication received from the sound sensing means D. The control circuit includes a gaseous filled triode 96, a relay 97 and preferably time delay elements in the form of two triodes 94 and 95, a variable resistor 98 and capacitors or condensers 99, 100, 101 and 122, plus suitable resistors 102, 103, 104, 105, 106, 121 and 123. As indicated at the right of the diagram, the solenoid circuit 110 is preferably separate from the control circuit 111 and includes a source of current 107, conductor 108, the contact arm 109 of relay 97, conductor 90 for energizing solenoid 66, the contact arm 82 of cam switch 80 and conductor 87. Thus, since contact arm 109 of relay 97 is normally closed, the closing of cycling switch 80 by the cam 42, energizes solenoid 66 and actuates the advancing means B, thereby causing the container 20 at station 38 to be revolved. The solenoid 66 remains energized while the switch 80 is closed, but the solenoid circuit is opened and the container released if and when relay 97 attracts contact arm 109 during this time interval.

The heater circuit for the tubes 94, 95 and 96 of control circuit 111 is not shown since the same is well understood in the art and it will be further understood that upon energization of the electronic control means E, the cathodes 112, 113 and 114 continually emit electrons which are screened from reaching their respective anodes 115, 116 and 117 by the grids 118, 119 and 120 while the grids are at a predetermined slightly negative potential.

The plate or anode 117 of the gas filled triode 96 collects enough electrons from the cathode 114 thereof to energize relay 97 only when the voltage of grid 120 is increased a definite amount. The voltage of grid 120 reaches such a definite amount when a pulse from needle 67, caused by the sensing of a seam in a container, increases the voltage of grid 118, thereby allowing electrons to collect on the anode 115 of triode 94 to the required voltage amount.

It is well known that once a gas filled triode such as 96 has been rendered conductive, the grid 120 loses control and the relay 97 remains energized until such time as the voltage of anode 117 is decreased to the point that conduction of the tube ceases.

The delay timer, consisting of triode 94 and 95 and its associated resistors and condensors, is basically a multivibrator, but possesses one marked difference from the usual form of this circuit; namely, that the grid 118 of tube 94 is biased negatively beyond cut-off, whereas the grid 119 of triode 95 is at the more usual 0 bias voltage. This is accomplished by passing current from a direct current supply through resistor 104 via resistor 121. Thus, at the start, triode 94 is non-conducting and triode 95 is conducting. A positive pulse on the grid 118 of triode 94 trips this tube, current flows through resistor 102, reducing the voltage on the anode of triode 94. This sends a negative pulse through condensor 99 onto the grid 119 of triode 95. The anode current through triode 95 is thereby reduced and its anode voltage increased. This positive pulse passes through condensor 100 to grid 118 of triode 94, augmenting the original input pulse. The inter-action continues until the anode voltage on triode 94 is very small. The circuit remains in this condition until the charge on condenser 99 leaks to the cathode through variable resistor 98 and fixed resistor 103. When the grid 119 of triode 95 reaches a

certain critical voltage, the entire process reverses itself to restore the original condition of triode **94** non-conducting and triode **95** conducting, and anode **115** triode **94** emits a positive pulse through condensor **101** to grid **120** of gas filled triode **96**. Thus an input pulse initiates a series of events wherein triode **95** is rendered non-conductive and then back conductive again sharply, after a definite time interval determined by the circuit constants, condensor **99**, variable resistor **98**, and fixed resistor **103**. By varying resistor **98**, this time interval or delay can be adjusted as desired.

The positive pulse to grid **120** causes anode **117** to collect enough electrons to energize relay **97** thereby attracting arm **109**, opening circuit **110** and de-energize solenoid **66**. The article, such as a beer can, being revolved by means B is thus dropped back into recess **36** of conveyor means A with the correct position of its seam and the corresponding correct position of its label. The relay **97** is de-energized by the opening of the circuit through conductors **86** and **124** when contact arm **82** of cycling switch **80** is opened by the rotation of cam **42** to prepare for the next cycle.

I claim:

1. In an apparatus of the class described, intermittent container conveyor means for transporting a line of cylindrical containers in spaced formation up to, and away from, a station on said conveyor means; continuously revolving spindle means positioned opposite the adjacent end of a container at said station for spinning a container around its central longitudinal axis while halted at said station; advancing means, actuated upon the arrival of a container at said station, for advancing said spindle means into engagement with the adjacent end of a container, a sound pick-up needle, at said station, in contact with the curved outer surface of a cylindrical container being revolved by said spindle means for sensing sound variations therearound and electronic means, controlled by said needle for retracting said spindle means upon the sensing of a pre-selected sound from the container by said needle.

2. In an apparatus of the class described intermittent container conveyor means for transporting a line of horizontally positioned cylindrical containers in spaced formation up to, and away from, a station on said conveyor means; a pair of oppositely disposed, spaced apart, revolvable mandrels at least one of which is continuously revolving, for engaging the opposite ends of a container halted at said station and spinning said container around its central longitudinal axis; and electric solenoid operatively connected to one of said mandrels and energized by co-action with said conveyor means for moving said mandrel toward the other mandrel of the pair to grip the opposite ends of a container therebetween; a sound pick-up needle, at said station in contact with the curved outer surface of a cylindrical container gripped between, and revolving with said pair of mandrels; for sensing sound variations in the curved wall of said container and electronic means, controlled by said needle, for retracting at least one of said mandrels upon the sensing by said needle of a pre-selected sound.

3. Apparatus for uniformly positioning the labels on the curved surfaces of cylindrical cans, each can having a longitudinal joint seam, said apparatus comprising conveyor means for transporting a line of said cans in spaced formation; electrically actuated can lifting and revolving means, co-acting with said conveyor, for bodily lifting each successive can from said conveyor and spinning the same around its central longitudinal axis; and electronic sound pick-up control means, co-acting with said can lifting and revolving means, for sensing the sound of the seam in each can and deactuating said can lifting and revolving means at a pre-determined time interval thereafter, thereby uniformly positioning the seams of said cans on said conveyor.

4. Apparatus for uniformly positioning the labelling on the curved surfaces of a plurality of substantially, cylindrical containers, each container having a curved wall of uniform thickness except for a longitudinally extending seam therealong of a different thickness, said apparatus comprising the combination of an intermittently operating container conveyor, including a label positioning station and a continuously revolving cam synchronized with the travel of said conveyor, for transporting a succession of individual spaced containers with the longitudinal axis thereof transverse to the direction of conveyor travel up to, and away from, said station; container revolving means, including at least one revolving head, positioned outside the path of the adjacent end of a container at said station and movable in prolongation of the central axis of a container for engaging the adjacent end of a container and revolving the same; an electric solenoid, operably connected to said revolving head for axially moving said head into and out of engagement with the adjacent end of a container; an electric sound pick-up needle, mounted adjacent the path of the curved surface of a container, at said station, in position to engage said curved surface when a container is engaged and revolved by said container revolving means for sensing the location of the seam in said curved surface; a cycling switch, including a pivoted contact arm having its free end in contact with said continuously revolving cam for closing an electric circuit to said solenoid during the halt of said conveyor at said station; electronic means, controlled by said electric sound pick-up needle for opening said electric circuit to said solenoid to cause said head to move out of engagement with the end of a container upon the sensing of the sound of a container seam by said needle, and said electric circuit including said cycling switch, said solenoid, and a switch controlled by said electronic means.

5. A combination as specified in claim 4 wherein said container revolving means comprises a pair of oppositely disposed, spaced apart revolvable heads, at least one of which is continuously revolving and each of which is movable in prolongation of the central axis of a container at said station.

6. A combination as specified in claim 4 wherein said container revolving means comprises a pair of oppositely disposed, spaced apart, revolvable heads, at least one of which is continuously revolving and each of which includes means for lifting a container away from said conveyor as it engages said container.

7. A combination as specified in claim 4 plus a resilient arm, carrying said sound pick-up needle at its free end, and having its opposite end fixed outside the path of said containers for absorbing the impact of said containers on said pick-up needle.

8. Apparatus for positioning the labels of seamed beer cans prior to packing the same in a window type can carton said apparatus comprising the combination of an intermittent conveyor having spaced groups of can recesses, each group corresponding to the size of a carton; oppositely disposed pairs of can lifting and revolving mandrels at a station of said conveyor for lifting and revolving a group of said cans around the central longitudinal axis thereof; means for moving said mandrels in unison into engagement with a group of said cans; sound pick-up needles, at said station, each positioned to engage an individual can of said group and sense the sound of the seam therein and electronic means, controlled by said needles, for causing each individual pair of mandrels to move out of engagement with a can held thereby when the seam thereof is sensed by a needle.

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