

Oct. 11, 1966

P. J. SCHNEIDER
BOTTLE WIDTH SELECTOR

3,278,023

Filed Feb. 19, 1964

3 Sheets-Sheet 1

FIG. 1 -

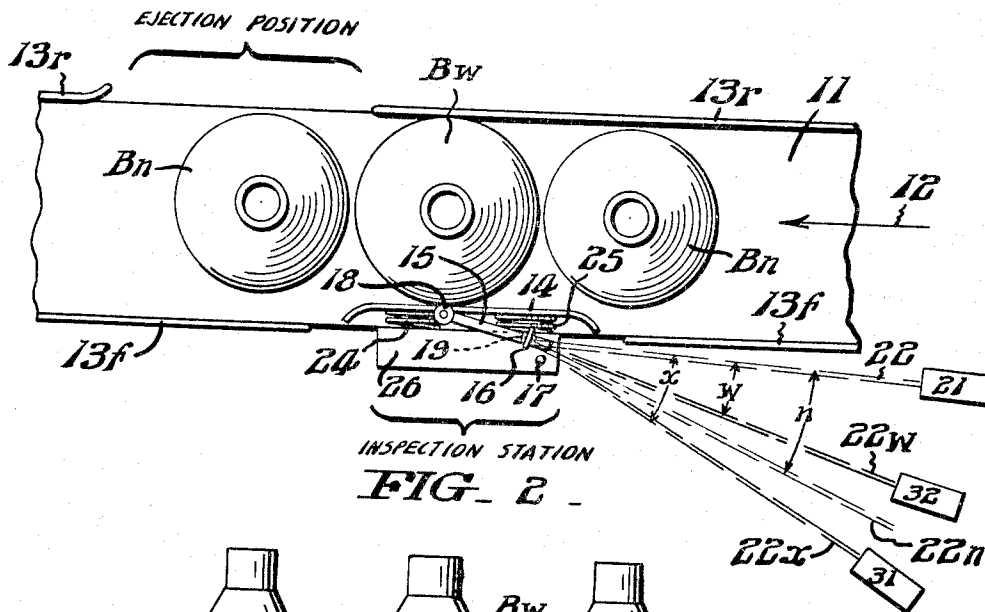
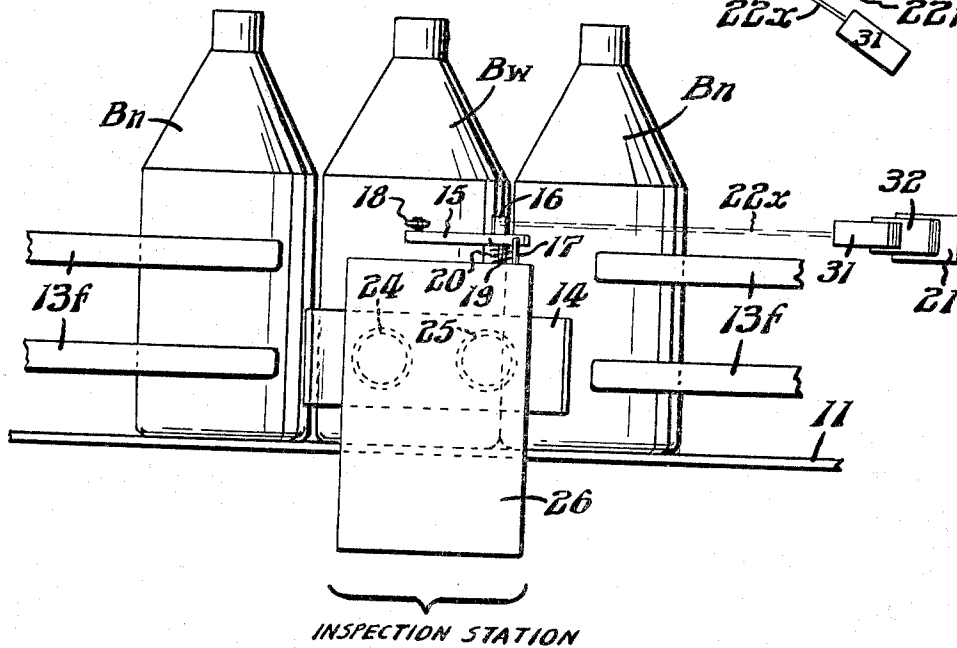


FIG. 2 -



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FIG. 3 -

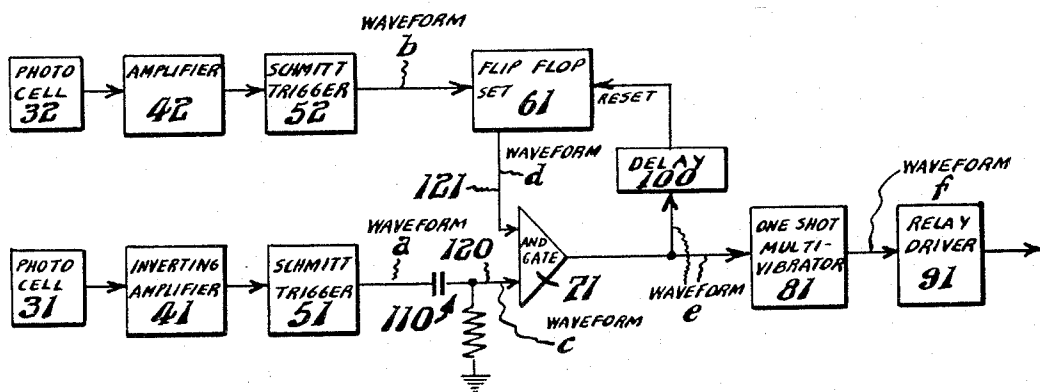
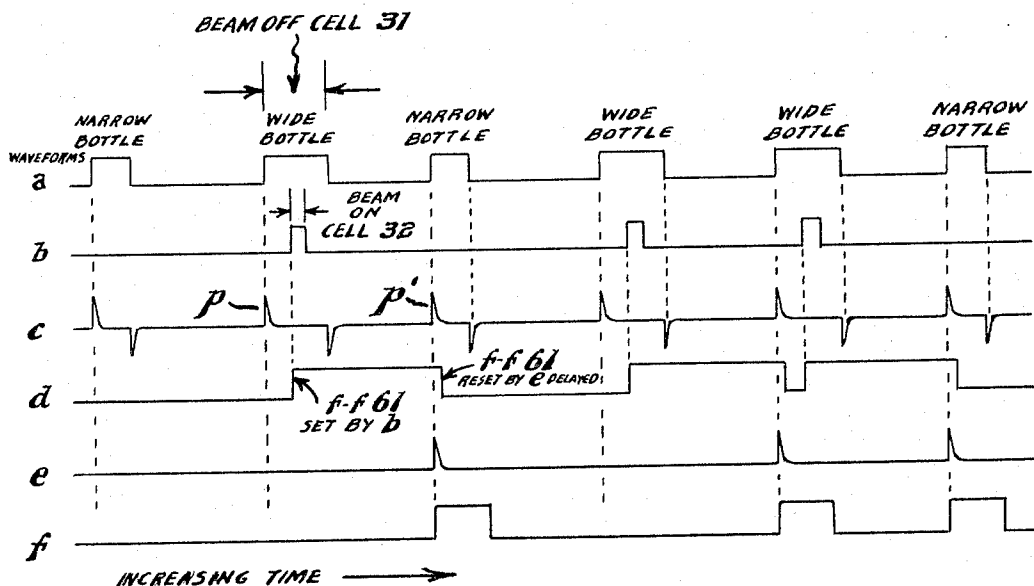


FIG. 4 -



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FIG. 5 -

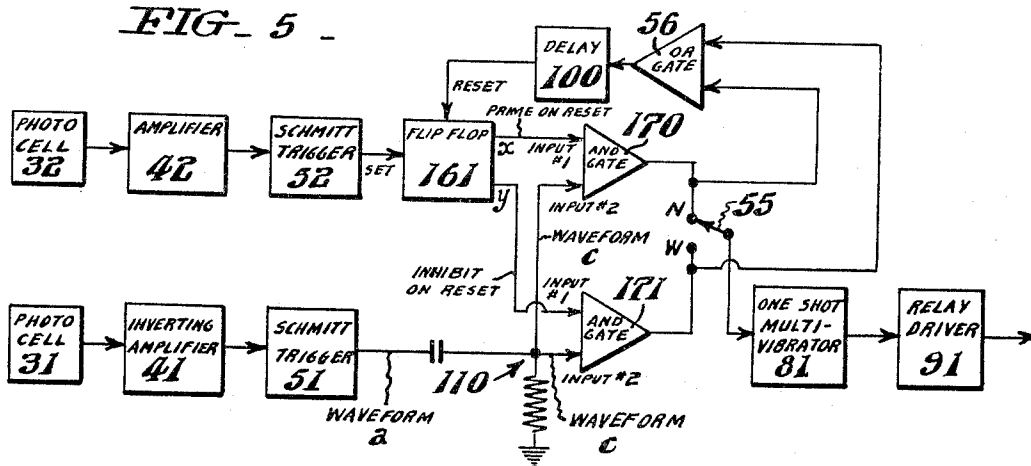


FIG. 6 -

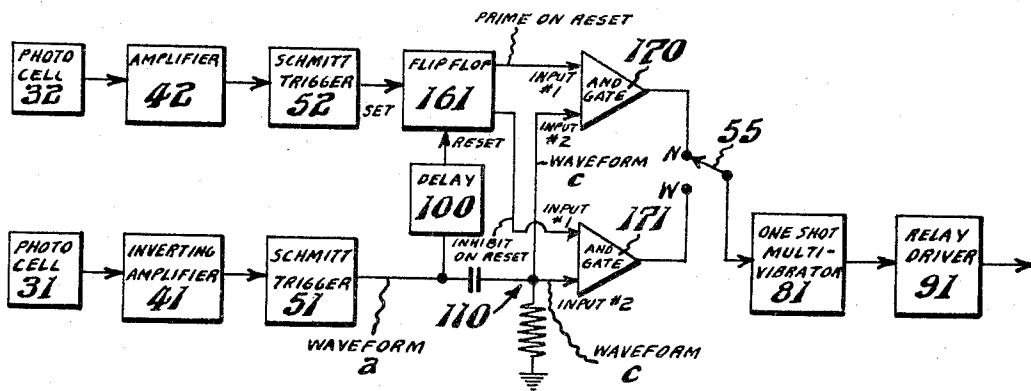
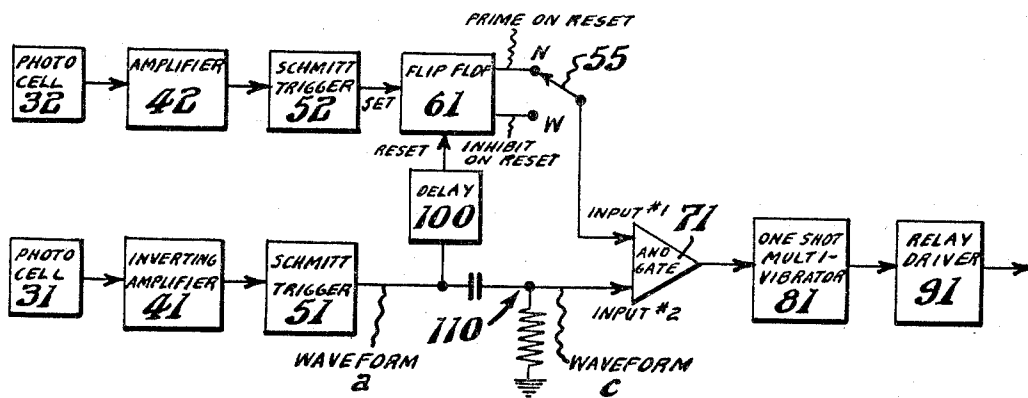


FIG. 7 -



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14 Claims. (Cl. 209-88)

This invention relates to an apparatus capable of detecting minor differences in the widths or diameters of bottles (or other containers) and for generating electrical control signals based upon the detected differences so that such generated control signals may be used to sort the bottles (or other containers) according to width.

The apparatus of the present invention employs light sources, photosensitive elements, optic elements, electronic circuits and mechanical elements in a manner to be described. A feature of the apparatus is the provision of delay means whereby each bottle is passed completely through, in fact beyond, an inspection station before it is directed into its proper classification.

In the drawing:

FIG. 1 is a top view of the inspection station;

FIG. 2 is a side elevational view of the inspection station;

FIG. 3 is a block diagram of one form of electronic control system for controlling the ejection of the wide bottles;

FIG. 4 shows a series of ideal waveforms used in the system of FIG. 3;

FIG. 5 is a block diagram of one form of electronic control system for controlling the ejection of the wide or narrow bottles; and

FIGS. 6 and 7 are modified forms of the control systems of FIGS. 5 and 3, respectively.

Referring now to FIGS. 1 and 2, reference numeral 11 depicts a conveyor for transporting, in the direction of the arrow 12, a mixed assortment of bottles of different diameters or widths. In the drawing, the first and third bottles B_n are illustrated as narrow (smaller diameter) bottles while the second or middle bottle B_w is represented as a wide (larger diameter) bottle.

Conveyor 11 is provided with a pair of rear guide rails 13r and a pair of front guide rails 13f. The front guide rails 13f have a gap therein at the inspection station. The rear guide rails 13r have a gap at the ejection position, which is just beyond the inspection station. The unwanted size of bottles are ejected through this gap; the wanted size of bottles continue on down the conveyor.

At the inspection station, a spring-loaded guide plate 14 forces each of the passing bottles back against the rear guide rails 13r. Guide plate 14 may be mounted in any suitable manner. It is illustrated as secured to the side of an upright support plate 26 by a pair of horizontally-disposed helical compression springs 24 and 25. The lower edge of support plate 26 may rest on the floor, or the plate may be supported in any convenient way.

Secured to the upper edge of support plate 26 is a vertically disposed pivot pin 19 on which an arm 15 is pivotally mounted for swinging movement in a horizontal plane. A torsion spring 20 surrounds pivot pin 19; one end of spring 20 bears against arm 15 and tends to cause arm 15 to rotate about pivot pin 19, in a clockwise direction as viewed in FIG. 1, so that the distal end of the arm 15 is forced inwardly relatively to the conveyor 11, i.e., is forced in the direction of the rear rails 13r. A vertically disposed stop pin 17 mounted in the upper surface of support plate 26 limits the inward excursions of the arm 15.

A small wheel 18 is mounted on the upper surface of arm 15 at its distal end. The wheel 18 is mounted for horizontal rotation about a vertical pin axle. It will be seen that the stop pin 17, by limiting the inward excursion of arm 15, limits the extent to which the wheel 18 moves

inwardly when no bottle is present on the conveyor at the inspection station.

A vertically-disposed mirror 16 is attached rigidly to the upper surface of arm 15 at the pivot point so that the extended axis of the pivot pin 19 would lie in the plane of the mirror surface. Mirror 16 may preferably be made from highly polished stainless steel or chromium plated steel.

A light source 21 is provided, which may be either incandescent or of the gas discharge type, and may be operated from either A.C. or D.C. power. The light source 21 is positioned to project a horizontal beam of light 22 on to the surface of the mirror 16. The mirror 16 is so oriented that when no bottle is at the inspection station and the wheel end of arm 15 occupies its most inward position, as controlled by the limit stop pin 17, the beam of light 22 received from source 21 is reflected at an angle x , identified as reflected beam 22x, on to a photocell 31. Photocell 31 may be any of a variety of photosensitive devices, preferably a phototransistor.

A second photocell 32, which may also be a phototransistor, is so positioned that when the wheel 18 is moved back from its inward limit position by a wide bottle passing through the inspection station, the mirror 16 is moved momentarily to such an orientation that the beam of light from source 21 is reflected at an angle w , the reflected beam being identified in FIG. 1 as beam 22w, and falls on to the phototransistor 32.

When a narrow bottle passes through the inspection station, the wheel 18 is moved back from its inward limit position to such a position that mirror 16 reflects the beam of light from source 21 at an angle n in which the reflected beam 22n falls between the phototransistor 31 and the phototransistor 32, and does not fall on either one.

Reference is now made to FIG. 3, which shows in block diagram one form of electronic system for developing control signals in response to the reflected light beam, according to whether or not the reflected beam falls on phototransistor 32 after the beam moves away from phototransistor 31. The system of FIG. 3 is arranged to cause the rejection of wide bottles. Later, a system will be described for ejecting either the wide bottles or the narrow bottles according to the position of a selection switch.

In the system of FIG. 3, the inverting amplifier 41 and the amplifier 42 may each be of transistor design. These amplifiers are used to amplify the electrical output signals of the phototransistors 31 and 32, respectively. The amplified signals are then applied to Schmitt trigger circuits 51 and 52, respectively. These Schmitt trigger circuits may also be of transistor design. The circuits of FIG. 3 are so arranged that when the reflected light beam is moved away from phototransistor 31, as by a bottle of either wide or narrow size passing through the inspection station, the Schmitt trigger 51 is triggered to a state in which its output lead rises to a prime level, as represented by waveform a of FIG. 4, and the Schmitt trigger 51 remains in such state so long as no light falls on the phototransistor 31. It will be seen that the time period during which the reflected beam is off of photocell 31 is longer when a wide bottle is passing through the station than when a narrow bottle is passing through.

When the bottle passing through the inspection station is a wide bottle, the beam is deflected sufficiently away from photocell 31 to cause it to fall on photocell 32. When the light beam falls on the phototransistor 32, the Schmitt trigger 52 is changed to a state in which its output lead rises to a prime level, as represented in FIG. 4 by waveform b . The Schmitt trigger 52 remains in this state only so long as the light beam falls on photocell 32.

The change in the output level of Schmitt trigger 51, represented by waveform a of FIG. 4 is differentiated

in network 110 to produce the positive and negative pulses represented in FIG. 4 by waveform *c*.

The rise in the output level of Schmitt trigger 52, represented by the leading edge of the pulses of waveform *b* of FIG. 4, sets the flip flop 61 and its output lead 121 rises to a prime level, as represented in FIG. 4 by waveform *d*. This condition then exists until the flip flop 61 is reset. Flip flop 61 may be a known form of transistor circuit.

Waveforms *d* and *c* are applied to the AND gate 71, which may be a known form of transistor circuit. This gate delivers an output, represented in FIG. 4 by waveform *e*, only when both of its input leads are at a prime level. The pulse, waveform *e*, is applied to the one-shot multivibrator 81. The one-shot multivibrator 81 may preferably be of transistor design, and, when triggered by a narrow pulse *e*, provides a gate pulse output of predetermined duration, represented in FIG. 4 by waveform *f*.

Relay driver 91 is preferably a transistor power amplifier which amplifies the gate signal, waveform *f*, produced by the one-shot multivibrator 81. The output of the relay driver 91 is an amplified gate pulse of predetermined duration which may be employed to drive a relay to actuate an electro-mechanical ejector (not shown) for ejecting an unwanted bottle through the gap in the guard rails 13*r* at the ejection position of FIG. 1.

The operation of the apparatus will now be described. Assume that a mixed assortment of wide and narrow bottles are moving along conveyor 11 in the direction of the arrow 12 and that it is desired to eject the wide bottles and to allow the narrow bottles to continue on down the conveyor. As each bottle reaches the measuring position, identified herein as the inspection station, the bottle is forced against the rear guide rails 13*r* by the action of the spring-loaded cam plate 14. The purpose of the cam plate 14 is to insure that each bottle at the inspection station is in contact with the rear guide rails 13*r*, the rear guide rails being used as a reference surface from which the width of the bottles is measured.

It will be understood from FIGS. 1 and 2 that the wheel 18 follows the contour of the central portion of each bottle as it passes by the inspection station. This movement of the wheel 18 causes the arm 15 to move horizontally through a small arc about the pivot pin 19. When no bottle is at the inspection station, the wheel end of arm 15 is at its inward limit position, as controlled by stop pin 17, and in this limit position the mirror 16 reflects the light beam 22 at an angle *x* on to the photocell 31.

It will be understood that when the wheel end of arm 15 is at its inner limit position, in which the arm 15 is resting against the stop pin 17, the distance between the wheel 18 and the rear guide rails 13*r* is less than the diameter of the narrow bottle. Thus, every bottle, whether it be a wide or a narrow bottle, will cause the wheel 18 to move toward the front guide rails 13*f*, and the resulting movement of the mirror 16 will cause the beam 22 to be deflected away from the photocell 31. However, only a wide bottle will cause the beam to be deflected a sufficient distance away from cell 31 to cause it to fall upon the photocell 32. In the case of a narrow bottle, the reflected beam will merely move to a position between the photocells 31 and 32, such as is illustrated in FIG. 1 by the beam 22*n*.

It should be pointed out that one of the principal advantages of the system is that very small differences in bottle diameters can be reliably detected. This advantage results from the fact that a small deflection of the wheel 18 is multiplied by the mirror 16 which causes the reflected light beam to be deflected through an arc which, in a typical case, at the location of the photocells 31, 32, may be of the order of six times as long as is the movement of the wheel 18.

Referring now to the electronic system of FIG. 3,

when no bottle is at the inspection station and the reflected light beam 22*x* is falling on the phototransistor 31, the electrical signal generated by the photocell 31 is inverted in the inverting amplifier 41 and an inhibit level signal is applied to the Schmitt trigger 51 which causes the Schmitt trigger 51 to remain in the OFF state. In the OFF state, the output of the Schmitt trigger 51 is an inhibit level signal at AND gate 71.

Whenever a bottle, whether wide or narrow, moves into measuring position, wheel 18 is moved and the reflected light beam is deflected away from photocell 31. This causes a prime level signal to be generated by the inverting amplifier 41 which causes the Schmitt trigger 51 to switch to the ON state, and its output level rises from an inhibit to a prime level, as represented in FIG. 4 by the waveform *a*. The leading edge of this level change is differentiated by the differentiating network 110 and a positive pulse (see waveform *c*) appears on the input lead 120 of the AND gate 71. Assuming the flip flop 61 is in its normal or reset state, lead 121 is at an inhibit level, and thus the AND gate 71 does not produce an output signal.

Assume that the first bottle moving through the inspection station is a narrow bottle *B_n*. When the narrow bottle moves through the measuring station, the reflected light beam moves away from photocell 31 to the position indicated in FIG. 1 by the reflected beam 22*n*. The beam then returns to its home position on photocell 31. The Schmitt trigger 51 is turned ON when the beam leaves photocell 31 and then turns OFF when the beam returns. The trailing edge of the level change is differentiated by the network 110 and a negative pulse appears on the lead 120. This negative pulse has no effect.

Assume that the next bottle to arrive at the measuring position is a wide bottle *B_w*. When this occurs, the wheel 18 is moved in a direction away from the rear guard rails 13*r* to such an extent that the reflected light beam will be deflected sufficiently away from photocell 31 to fall on the photocell 32. When the reflected light beam moves away from photocell 31, the Schmitt trigger 51 turns ON and a positive pulse appears on lead 120 at the output of differentiator 110, as illustrated by pulse *p* of waveform *c*, of FIG. 4. At this instant, the flip flop 61 is in the reset state, as indicated by waveform *d*, and lead 121 is at an inhibit level. Thus, no output will appear at the output of the AND gate 71. However, as soon as the reflected light beam arrives at the photocell 32, the photocell 32 will deliver an output which is amplified by amplifier 42 and applied to the Schmitt trigger 52 to turn the Schmitt trigger 52 ON. Its output then rises to a prime level, as represented by waveform *b* in FIG. 4, and this causes the flip flop 61 to be set. When flip flop 61 is set, lead 121 (waveform *d*) changes to a prime level, but the AND gate 71 does not deliver an output signal since the short pulse *p* of waveform *c* is no longer present on input lead 120.

As the wide bottle *B_w* passes on through the inspection station, the wheel 18 returns to its home position, causing a negative pulse to appear on the lead 120, but this pulse has no effect. As the next bottle (following a wide bottle) arrives at the inspection station, irrespective of whether it be a wide or narrow bottle, the reflected light beam is deflected away from photocell 31, the Schmitt trigger 51 is turned ON, and a positive pulse *p'* (of waveform *c*) developed in differentiator 110 and applied to the input lead 120 of the AND gate 71. The flip flop 61 is now in the set state (as a result of the preceding bottle having been a wide bottle) and the lead 121 is at a prime level. Accordingly, a pulse will appear on the output lead of AND gate 71, as indicated in FIG. 4 by waveform *e*. This pulse is applied to the one-shot multivibrator 81, and is also applied, after a delay in delay circuit 100, to the flip flop 61 to reset the flip flop. The purpose of the delay circuit 100 is to insure that the pulse output of the AND gate 71 (waveform *e*) has sufficient time to actuate the one-shot multi-

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vibrator 81 before the flip flop 61 is reset and the prime level removed from the lead 121 of the AND gate 71 (see waveform *d* of FIG. 4).

As has already been indicated, the one-shot multivibrator 81 produces a gate pulse of predetermined width. This width is selected according to the requirements of the ejector mechanism, which ejector mechanism is not per se part of the present invention. The output of the one-shot multivibrator 81 is used to turn on the relay driver 91 which produces an amplified signal to drive the electro-mechanical ejector mechanism.

It is to be particularly noted that in accordance with the system described above, the ejector mechanism is actuated by the next bottle following a wide bottle, irrespective of the size of the following bottle. This insures that the wide bottle to be ejected has moved beyond the measuring position and is at the ejection position.

It will be seen that the system described is adapted to sort a mixture of wide and narrow bottles, by ejecting all wide bottles and retaining all narrow bottles, and that the sorting step is performed when the next bottle is being measured.

It will also be seen that wide bottles having a diameter wider than the wide bottle Bw will also be ejected at the ejection position, since such wider bottles will deflect the beam across and beyond the photocell 32, thereby priming the AND gate 71 so that a bottle-removal control signal will be generated when the next bottle arrives at the inspection station.

It has just been described how the control system of FIG. 3 ejects the wide bottles and retains the narrow bottles. It is, of course, possible to arrange the control system to eject the narrow, rather than the wide, bottles and to retain the wide bottles. Such a system is illustrated in FIG. 5. As a matter of fact, the system of FIG. 5 will eject either the narrow, or the wide, bottles, depending upon the position of selection switch 55.

Assume that it is desired to eject the narrow bottles. The selection switch 55 is then set to position N, as shown in FIG. 5. Assume that the first and second bottles presented to the inspection stations are narrow bottles, Bn1 and Bn2, and that the third and fourth bottles are wide bottles, Bw3 and Bw4. Flip-flop 161 is in the reset state. This flip-flop has two output terminals *x* and *y*. When flip-flop 161 is in the reset state, output terminal *x* is at a prime level and output terminal *y* is at an inhibit level. Thus, AND gate 170 is primed, and AND gate 171 is inhibited, when flip-flop 161 is in the reset state.

When the first bottle Bn1, a narrow bottle, enters the inspection station of FIG. 1, the reflected light beam is moved away from photo-cell 31 and a positive pulse (waveform *c* of FIG. 4) is generated which is applied to Input No. 2 of each of the AND gates 170 and 171. Since Input No. 1 of AND gate 170 is at a prime level, gate 170 delivers an output signal to the one-shot multivibrator 81 by way of the selection switch 55 in the N position, and relay driver 91 is energized. This actuates the ejection mechanism at the ejection position but no bottle has yet arrived there and hence no bottle is ejected.

The second bottle Bn2, a narrow bottle, now arrives at the inspection station and the first bottle Bn1 is pushed forward to the ejection position. Second bottle Bn2, by moving the light beam away from photocell 31, also causes a positive pulse (waveform *c* of FIG. 4) to appear at Input No. 2 of each of the AND gates 170 and 171. Input No. 1 of gate 171 is at an inhibit level but Input No. 1 of gate 170 is at a prime level. Thus, gate 170 delivers an output signal which is applied by way of selection switch 55 in the N position to the one-shot multivibrator 81. Relay driver 91 is energized, and the first bottle Bn1 at the ejection position is ejected.

The third bottle Bw3, a wide bottle, now arrives at the inspection station and the second bottle Bn2 is pushed

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forward into ejection position. The third bottle Bw3 also causes a positive pulse (waveform *c* of FIG. 4) to appear at Input No. 2 of each of the AND gates 170 and 171. This pulse results from the reflected light beam 22x leaving the photocell 31 and hence this pulse occurs irrespective of whether the bottle arriving at the inspection station is a wide or a narrow bottle. The primed AND gate 170 delivers an output to terminal N of selection switch 55, the one-shot multivibrator 81 is triggered, relay driver 91 is energized and the second bottle Bn2 now at the ejection position is ejected.

The third bottle Bw3, being a wide bottle, causes the reflected light beam to be deflected on to photocell 32, and as soon as this happens, the Schmitt trigger 52 delivers a signal to set the flip-flop 161. This changes the signal level at output terminal *x* to an inhibit level and changes output terminal *y* to a prime level. Thus, AND gate 171 is now primed and gate 170 is now inhibited.

The fourth bottle Bw4, a wide bottle, now arrives at the inspection station and the third bottle Bw3 is pushed forward to the ejection position. A positive pulse (waveform *c* of FIG. 4) is generated by the fourth bottle and applied to Input No. 2 of each of the AND gates 170 and 171. However, since the preceding bottle Bw3 was a wide bottle, gate 170 is now inhibited at Input No. 1 and no output signal is applied to terminal N of selection switch 55. Hence, no signal is applied to the one-shot multivibrator 81. Thus, the third bottle Bw3 is not ejected. AND gate 171, however, has a prime level on the Input No. 1, when the positive pulse appears on its Input No. 2. Thus, this gate delivers an output signal which is applied to OR gate 56 and thence, after an appropriate delay in delay circuit 100, is applied to flip-flop 161 to reset the flip-flop. The delay is so chosen that when the flip-flop 161 is reset, as just described, the positive pulse (waveform *c* of FIG. 4) has terminated at Input No. 2 of each of the AND gates 170 and 171. When flip-flop 161 returns to the reset state, AND gate 170 is again primed while AND gate 171 is again inhibited.

The action described immediately above is caused by the removal of the reflected light beam from photocell 31 when the fourth bottle enters the inspection position. This action accordingly takes place whether the fourth bottle be a wide bottle or a narrow bottle. In the present example, the fourth bottle Bw4 is assumed to be a wider bottle and accordingly, the fourth bottle Bw4 causes the reflected light beam to be deflected on the photocell 32. When photocell 32 receives the deflected light beam, it triggers Schmitt trigger 52 and flip-flop 161 is again set. As a result, Input No. 1 at AND gate 170 is again placed at an inhibit level, while Input No. 1 of gate 171 is again placed at a prime level. Thus, when the next (fifth) bottle comes along and generates a position pulse (waveform *c* of FIG. 4) on Input No. 2 of each of the AND gates 170 and 171, no signal will be delivered to terminal N of switch 55 and hence no signal will be delivered to the one-shot multivibrator 81. Thus, the fourth bottle Bw4 will not be ejected.

It will be apparent from the foregoing description of the operation of the system of FIG. 5, that if the selection switch 55 be placed in the W position, instead of in the N position as shown, the wide bottles will be ejected and the narrow bottles retained. For, a wide bottle will set the flip-flop 161 and prime AND gate 171. Thus, the positive pulse (waveform *c*) developed by the following bottle, irrespective of its width, will pass through AND gate 171 and appear at terminal W of selection switch 55. This will trigger the one-shot multivibrator 81, and an ejection pulse will be developed to eject the preceding bottle.

FIG. 6 represents a slight modification of the system of FIG. 5. In FIG. 6, the pulse output of Schmitt trigger 51 (waveform *a*, FIG. 4) is used, after a suitable delay in delay circuit 100 to reset the flip-flop 161.

FIG. 7 represents a modification of the system of FIG. 3. In FIG. 7 (as in FIG. 6) the output of Schmitt trigger 51 is used, after a delay, to reset flip-flop 61. Also, by employing selection switch 55, either one of the two outputs of flip-flop 61 may be selected for application to the AND gate 71. In this manner, the system of FIG. 7 may be used to eject either the wide or the narrow bottles, as desired. To reject the narrow bottles, the selection switch 55 is placed in the N position. To reject the wide bottles, the switch is placed in the W position.

While the preferred embodiments of this invention have been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

Having thus described my invention, I claim:

1. Apparatus for sorting bottles according to width, said apparatus including an inspection station and means for transporting bottles through said inspection station, said inspection station including cam means for placing in alignment one edge of all bottles passing through said station, an arm pivotally mounted adjacent said conveyor at said inspection station and biased to extend normally into the path of the bottles moving through said station and adapted to be moved pivotally aside by each bottle moving through said station; a mirror mounted on said pivotal arm at the pivotal axis; a light source for directing a beam of light on to said mirror; a plurality of light-sensitive devices positioned to receive light reflected from said mirror when said arm is at different selected positions and adapted to generate electrical signals in response to the light received, said light sensitive devices including a first photosensitive device positioned to receive light reflected from said mirror when said arm is at the limit of its biased position, and a second photosensitive device positioned to receive light reflected from said mirror when said arm has been moved aside by a bottle of wide width; electronic means coupled to said light-responsive devices for developing a recognition signal in response to a bottle of unwanted size at said inspection station; and means for developing a bottle-removal control signal in response to the arrival at said inspection station of the next bottle following that which produced said recognition signal.

2. Apparatus according to claim 1 further characterized in that said electronic means includes a first trigger circuit coupled to said first photo-sensitive device and a second trigger circuit coupled to said second photosensitive device, and in that said first trigger circuit is adapted to be triggered in response to light leaving the photosensitive device to which it is coupled and said second trigger circuit is adapted to be triggered in response to light arriving at the photosensitive device to which it is coupled.

3. Apparatus according to claim 2 characterized in that said electronic means includes a flip flop, means coupling the output of said second trigger circuit to said flip flop as a set signal, and means for resetting said flip flop.

4. Apparatus according to claim 3 further characterized in that said electronic means includes an AND gate, means for coupling the output of said first trigger circuit to said AND gate, means for coupling the output of said flip flop to said AND gate, and means for utilizing the output of said AND gate as the bottle-removal control signal.

5. Apparatus according to claim 4 characterized in that said means for utilizing the output of said AND gate as the bottle-removal control signal includes a one-shot multivibrator coupled to the output of said AND gate for producing a control signal of predetermined duration.

6. Apparatus according to claim 5 characterized in that said means for resetting said flip flop includes delay means for coupling the output of said AND gate to said flip flop as a reset signal.

7. Apparatus according to claim 3 characterized in that said flip flop has two output terminals, and further characterized in that said electronic means includes two AND gates, means coupling the output of said first trigger circuit to an input of both said AND gates, means coupling one output terminal of said flip flop to an input of one of said AND gates, and means coupling the other output terminal of said flip flop to the other of said AND gates.

8. Apparatus according to claim 7 further characterized in that said electronic means includes a selection switch having two alternate input terminals and one output terminal, means coupling the output of one of said AND gates to one of said switch input terminals, means coupling the output of the other of said AND gates to the other of said switch input terminals, a one-shot multivibrator, means coupling the output terminal of said switch to said one-shot multivibrator, and means for utilizing the output of said one-shot multivibrator as a bottle-ejection control signal.

9. Apparatus according to claim 8 further characterized in that said means for resetting said flip flop includes an OR gate and delay means coupling the outputs of both said AND gates to said flip flop to reset said flip flop.

10. Apparatus according to claim 8 further characterized in that said means for resetting said flip flop includes delay means coupling the output of said first trigger circuit to said flip flop to reset said flip flop.

11. Apparatus according to claim 4 characterized in that said flip flop has two output terminals, and further characterized in that said means for coupling said output of said flip flop to said AND gate includes a selection switch having two alternate input terminals and one output terminal, one of said input terminals of said switch being connected to one of said output terminals of said flip flop, and the other of said switch input terminals being connected to the other of said flip-flop output terminals, said output terminal of said switch being coupled to said AND gate.

12. Apparatus according to claim 11 further characterized in that said means for utilizing the output of said AND gate includes a one-shot multivibrator and means for utilizing the output of said one-shot multivibrator as a control signal for control bottle ejection.

13. Apparatus according to claim 12 further characterized in that said means for resetting said flip flop includes delay means for coupling the output of said first trigger circuit to said flip flop to reset said flip flop.

14. Apparatus according to claim 5 characterized in that said means for resetting said flip flop includes delay means coupling the output of said first trigger to said flip flop to reset said flip flop.

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