Oct. 20, 1942. W. PECHY 2,299,106

CAN END ASSEMBLING MACHINE

Filed Aug. 29, 1940 3 Sheets-Sheet 1

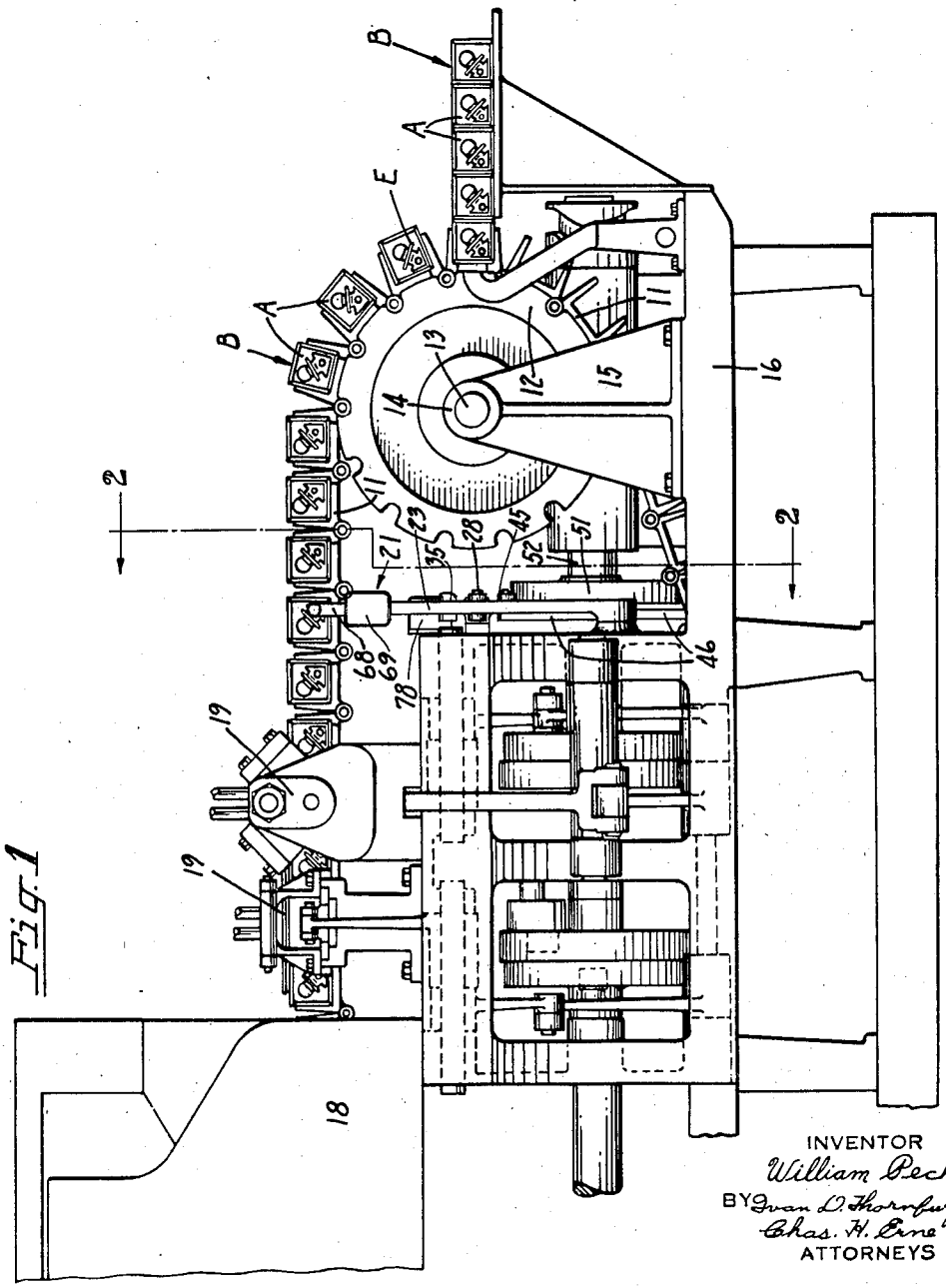

Fig. 1

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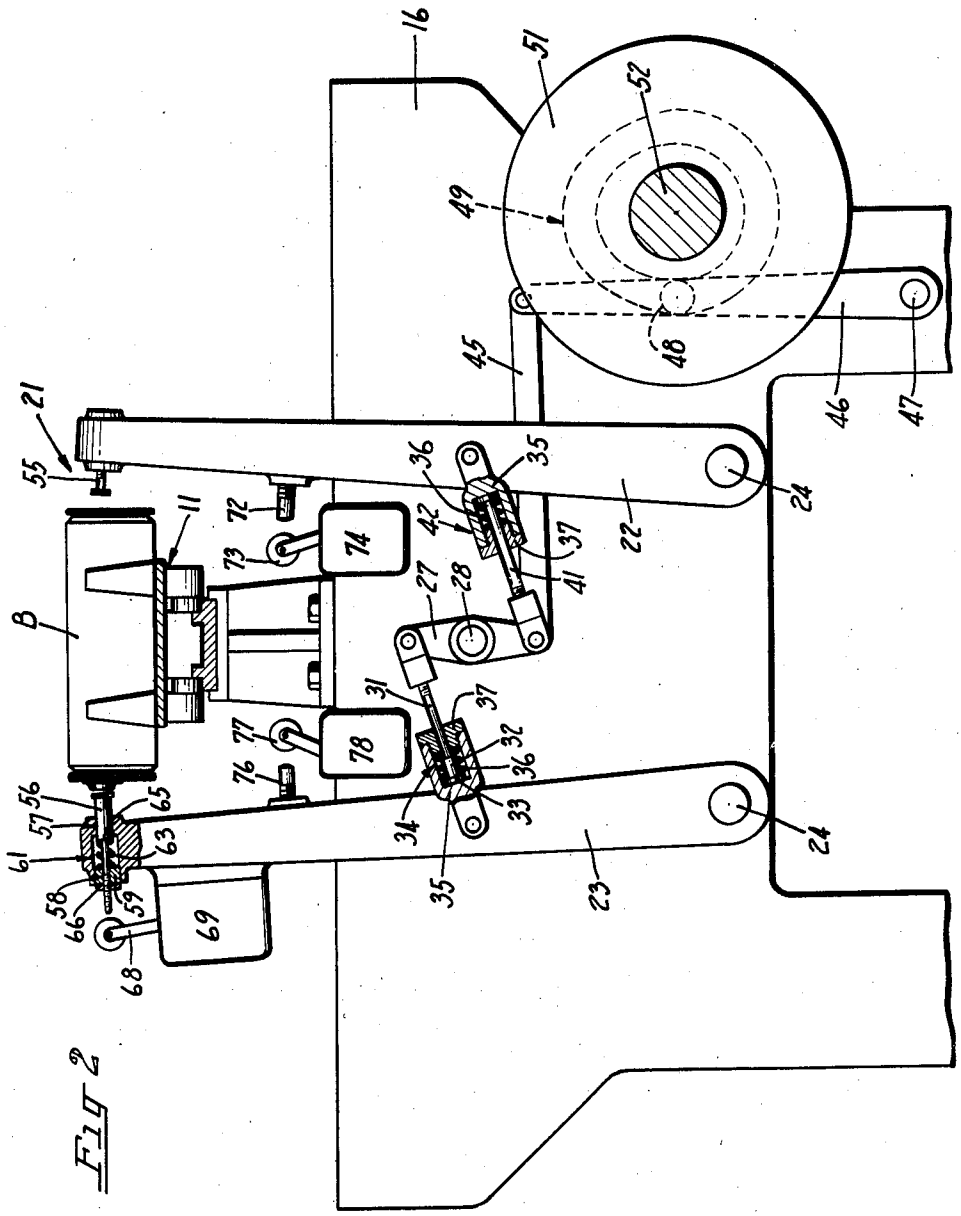

Fig 2

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Fig 3

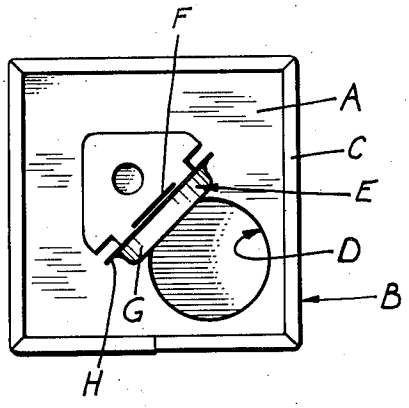


Fig 4

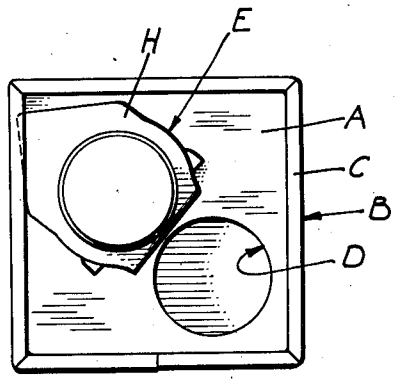
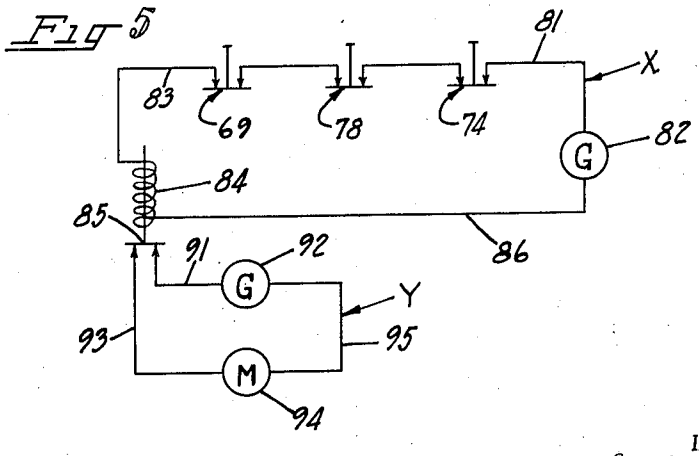


Fig 5



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2,299,106

UNITED STATES PATENT OFFICE

2,299,106

CAN END ASSEMBLING MACHINE

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9 Claims. (Cl. 192—125)

The present invention relates to can end sealing machines and the like for fibre containers having attached closure elements and has particular reference to detecting containers without end members and containers in which the closure elements are sealed back in an improper position. This is an improvement on the can end assembling machine disclosed in United States Patent 2,200,276, issued May 14, 1940, to J. M. Hothersall et al.

In the manufacture of rectangular fibre milk containers having attached closure elements, as for example, the container disclosed in United States Patent 2,085,979, issued July 6, 1937, to J. M. Hothersall, the closure element sometimes gets folded back in open position on the end member and when the container end member is sealed in position the turned back closure element occasionally is sealed down under the end seam flange. Such containers if permitted to remain in the machine will cause wrecks or jams at subsequent operating stations and it is therefore desirable to detect such containers and to eject them.

The instant invention contemplates a detector device which will detect containers having such turned back closure elements and which at the same time will detect containers in which one or both end members are lacking.

An object therefore of the invention is the provision in a can end assembling machine of a detector device which detects fibre containers having attached closure elements in which the closure element is sealed back in an improper position, a condition which renders the container useless, to the end that such containers may be ejected from the machine and thereby prevented from causing damage to the machine or to other machines in which subsequent operations are performed on the containers.

Another object is the provision of such a detector device which will also detect containers in which one or both of the end members are lacking so that such containers may also be ejected from the machine.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a side elevation of the container sealing portion of a can end assembling machine embodying the instant invention, with parts broken away;

Fig. 2 is an enlarged transverse sectional view taken substantially along the broken line 2—2 in Fig. 1, with parts broken away;

Fig. 3 is an end elevation of a container having an attached closure element in its proper position for traveling through the machine;

Fig. 4 is a view similar to Fig. 3 showing a turned back closure element sealed in improper position; and

Fig. 5 is a wiring diagram of the electric apparatus used in the machine.

As a preferred embodiment of the instant invention the drawings illustrate the container sealing portion of a can end assembling machine of the character disclosed in the above mentioned Hothersall Patent 2,200,276. Such a machine is adapted to secure square fibre end members A (Fig. 3) by a bending over of a cam body member flange C against the inserted end member. A thermoplastic adhesive which is carried on the end member and also on the body flange C and which has been previously heated to a tacky condition, forms the bond which secures the flange to the end member.

The container bottom end member is preferably plain while the top end member is formed with a dispensing opening D. This dispensing opening is subsequently closed with a hingeable closure element E which is secured by a wire staple F to the top end member adjacent the dispensing opening. The closure element has a drawn friction plug G which is adapted to fit into the dispensing opening D when the element is in container closing position. This drawn plug is surrounded by a brim or flange H which seats against the top surface of the end member and overlaps the sealed flange C when the element is in closed position.

When the containers enter the sealing portion of the machine the top and bottom end members A are in place within the ends of the body B and the flange C is partially folded over toward the end member and it is in an inclined position. The closure elements are projecting outwardly from the top end member at substantially right angles thereto as shown in Fig. 3.

The containers in this condition are carried through the machine in a horizontal position extending transversely of the machine, by an endless chain conveyor 11 (Figs. 1 and 2), operating over a pair of spaced sprockets 12 located at the ends of the machine. Only the sprocket at the discharge end of the machine is necessary for an understanding of the invention and such is shown in the drawings.

The sprockets are mounted on cross shafts 13 carried in bearings 14 formed in brackets 15 which are bolted to a machine main frame 16. One of the shafts is the driving shaft and this is rotated in any suitable manner to actuate the conveyor with an intermittent or step-by-step movement.

During the passage of the containers through the machine they are moved through an oven 18 in which the adhesive is heated as hereinbefore explained. A pair of sealing devices 19 are arranged one on each side of the machine and as the containers move into these stations a sealing head moves in toward the end of the container and forces the inclined and heated flange C down tight against the end member A.

If for any reason the closure element gets bent back too far toward the end member, its brim H sometimes gets caught under the flange and hence when the flange is sealed to the end member the brim of the closure element is also sealed down with the flange as shown in Fig. 4 so that it cannot be lifted up and hinged into position over the dispensing opening when desired. This character of container is exemplary of one form of improper container which is adapted to be detected and ejected from the machine.

Detection of these containers and also containers which lack one or both end members A is brought about by a detector device generally indicated by the numeral 21 (Figs. 1 and 2). This detector device includes a pair of vertically disposed rocker arms 22, 23 located one on each side of the machine. Arm 22 is disposed adjacent the end of the container which carries the bottom end member (at the right as viewed in Fig. 2), while arm 23 is disposed on the opposite side, i. e., the side adjacent the top end of the container (at the left as viewed in Fig. 2).

The lower ends of the rocker arms are mounted on pivot pins 24 which are secured in the main frame 16. The upper ends of the rocker arms terminate adjacent the oppositely positioned end members of the containers as the latter are moving with the conveyor 11.

The ends of the rocker arms 22, 23 are adapted to be moved toward and away from the ends of the containers in time with the movement of the conveyor through the machine. For this purpose each arm is joined through a yieldable connection to a rocker lever 27 mounted on a pivot pin 28 carried in the main frame 16. The upper end of the lever is connected to a link 31 having a shoulder portion 32 which terminates in a head 33. The shoulder portion and the head are located within a recess 34 of a housing 35 pivotally connected to the rocker arm 23. A compression spring 36 located within the recess surrounds the shoulder portion of the link and is interposed between the head 33 and a nut 37 threaded into the housing 35. The spring constitutes the yieldable part of the connection.

In a similar manner the lower end of the lever 27 is connected to the rocker arm 22 through the medium of a link 41 and a yieldable connection 42 which is identical with the connection just described for the rocker arm 23. The lower end of the lever 27 is also connected by a link 45 to the upper end of a cam arm 46 which is mounted on a pivot pin 47 carried in the main frame. Intermediate its length the cam arm carries a cam roller 48 which operates in a cam groove 49 of a face cam 51 mounted on a shaft 52 which constitutes the main drive shaft of the machine.

The upper end of the rocker arm 22 carries a fixed detector pin 55. The upper end of the rocker arm 23 carries a yieldable detector pin 56. The detector pin 56 is adapted to slide in a bore 57 formed in the arm 23 and in a bore 58 formed in a nut 59 threaded into the arm adjacent a recess 61. A compression spring 63 located in the recess 61 surrounds a reduced diameter portion of the pin and is interposed between the nut 59 and a shoulder 65 on the pin. The spring forces the pin inwardly toward the end member of the container while a lock nut 66 threaded on the outer end of the pin engages against the nut 58 and limits the inward travel of the pin.

The inner end of the yieldable pin 56 is disposed so as to be directly in alignment with a turned back closure element E should such abnormal condition exist. The outer end of the pin is in alignment with a movable switch element 68 of a normally closed electric switch 69 secured to the rocker arm 23.

Intermediate its ends the rocker arm 22 carries a fixed switch pin 72 which is in alignment with and in spaced relation to a movable switch element 73 of a normally closed electric switch 74 carried on the main frame 16. In a similar manner the rocker arm 23 carries a fixed switch pin 76 which is adapted to shift a movable element 77 of a normally closed electric switch 78 carried on the main frame 16.

Referring now to the wiring diagram in Fig. 5 it will be seen that the three normally closed switches 69, 74, 78 are connected in series and form a part of a control circuit X which controls the starting and stopping of the machine by establishing or breaking a motor circuit Y.

The switches 69, 74, 78 of the control circuit X are connected by a wire 81 to a control generator 82 and by a wire 83 to a solenoid 84 of a relay switch 85. The solenoid is also connected by a wire 86 to the control generator 82.

Hence when all of the switches 69, 74, 78 are normally closed, the control circuit is complete and electric energy from the control generator 82 flows through the circuit and energizes the solenoid 84. The energized solenoid keeps the relay switch 85 closed.

The relay switch 85 is included in the motor circuit Y and is connected by a wire 91 to a main generator 92. The switch is also connected by a wire 93 to an electric motor 94 which constitutes the source of power for driving the machine main shaft 52. The motor and the generator are connected together by a wire 95.

Hence as long as the relay switch 85 remains closed, electric energy from the main generator 92 flows through the motor circuit and excites the motor 94. This rotates the motor which in turn drives the main shaft 52.

Returning now to the operation of the detector arms 22, 23 as shown in Fig. 2, the arm 22 moves in toward a can B brought to rest at the detector station, and if a can end is properly in place in the can body the fixed detector pin 55 engages the can end. This arrests further movement of the arm, the full movement of the operating lever 27 and of the rod 41 thereafter being taken up by the yieldable connection 42 secured to the arm.

Arresting of the movement of the detector arm 22 keeps its switch pin 72 spaced from the movable element 73 of the switch 74 and the switch therefore is not opened. This leaves the control circuit X and the motor circuit Y intact and the motor continues to actuate the machine.

If no bottom end is in place in the can body, the detector pin 55 continues on into the interior of the body and the detector arm rocks through its full stroke. The switch pin 72 on the detector arm pushes against the movable element 73 of the switch 74 at such a time and this opens the switch. Opening of the switch breaks the control circuit X and this deenergizes the relay solenoid and opens the relay switch. Hence the motor circuit Y is broken and the motor ceases operation. This stops the machine so that the defective can body may be ejected.

In a similar manner the top end of the can body B is detected as will now be explained. The detector arm 23 moves in simultaneously with the arm 22 and when a can end A is in proper place in this end of the body the yieldable detector pin 56 engages the can end. The compression spring 63 surrounding the detector pin 56 is stronger than the spring 36 in the yieldable connection between the arm and its actuating link 31 and hence the top end of the can arrests further movement of the arm. The remainder of the stroke of the actuating link 31 is taken up by the yieldable connection. This keeps the fixed detector pin 76 in the arm spaced from the switch 78 and the control and motor circuits remain intact and the machine continues to operate.

When no top end A is in place in the can body, the yieldable detector pin 56 continues on into the interior of the body as the detector arm 23 rocks through its full stroke. The switch pin 76 thereupon pushes against the movable element 77 of the switch 78 and opens that switch. Opening of the switch breaks the control circuit X and this deenergizes the relay solenoid 84 and opens the relay switch 85 to break the motor circuit and thus stop the machine the same as hereinbefore explained.

If a top end member is in place in the body but has its closure element E turned back as shown in Fig. 4, when the detector arm 23 moves toward the container, the detector pin 56 first engages against the projecting plug section G of the closure element. This engagement temporarily arrests further movement of the detector arm until the shouldered portion 32 of the arm actuating link 31 engages the nut 37 of the yieldable connection. The connection thereafter ceases to yield and becomes a solid connection which rocks the detector arm through the remainder of the stroke of the link 31.

This forced rocking of the arm 23 overcomes the resistance of the compression spring 63 around the yieldable detector pin 56 and the arm continues to move toward the container while the pin remains stationary. In this manner the arm brings the movable element 68 of the switch 69, secured to the arm, into actuating engagement with the outer end of the detector pin and the switch opens. Opening of this switch also breaks the control circuit X and deenergizes the relay solenoid 84 and opens the motor switch 85 in the same manner as explained in connection with the no-end switches 74 and 78. The motor circuit Y is thus broken and the machine stops operating.

In some cases it may be desired to automatically throw out the can bodies which lack end members or have turned back closure elements instead of stopping the machine as herein explained. In such cases a time delay and throw-out device may be incorporated in the machine and operated by the detector switches 69, 74, 78. Such time delay and throw-out devices are well known in the can making art. By way of example one such device is disclosed in United States Patent 2,098,260, issued November 8, 1937, to W. R. Smith, on Filled can weighing and sorting apparatus.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for assembling end members to cans, one of said end members having a hinged closure element attached thereto, the combination of a pivotally mounted arm, means for rocking said arm toward and away from an end of a can, a yieldable detector pin carried in said arm for detecting cans which lack end members and for detecting cans in which the closure element is in a sealed back position, an electric switch carried on said arm and operable by said yieldable detector pin for stopping the machine when a can having an end member with a sealed back closure element is detected, and another electric switch operable by said arm for stopping the machine when a can lacking an end member is detected.

2. In a machine for assembling top and bottom end members to cans, said top end member having a hinged closure element attached thereto, the combination of a pair of detector instrumentalities located one adjacent each end of a can, said instrumentalities being movable toward and away from the ends of the can, a fixed detector element in one of said instrumentalities for detecting cans which lack bottom end members, and a yieldable detector element in the other of said instrumentalities for detecting cans which lack top end members having closure elements and for also detecting cans in which the closure element is in an undesired position.

3. In a machine for assembling end members to cans, one of said end members having a hinged closure element attached thereto, the combination of a can end detecting device including an instrumentality movable relative to an end of the can, a yieldable detector element in said instrumentality and means operable by said instrumentality for stopping the machine when said detector element yields upon contact with a sealed back hinged closure, and when said detector element does not yield as when cans lack end members.

4. In a machine for assembling end members to cans, one of said end members having a hinged closure element attached thereto, the combination of a can end detecting device including an instrumentality movable relative to an end of the can, a yieldable detector element in said instrumentality and means operable by said instrumentality and said yieldable detector for stopping the machine when said detector element yields upon contact with a sealed back hinged closure, and when said detector element does not yield as when cans lack end members.

5. In a machine for assembling end members to opposite ends of can bodies, one of said end members having a hinged closure element attached thereto, the combination of a can end detecting device axially movable relative to an

end of the can body, a yieldable detector element carried by said device for detecting cans in which the closure element is in a sealed back position, and means for imparting to said detector element a greater degree of yielding movement when engaging said closure element in sealed back position than is imparted to the detector element when engaging a said end member in which the closure element is not sealed back.

6. In a machine for assembling end members to can bodies, one of said end members having a hinged closure element attached thereto, the combination of a can end detecting device axially movable relative to an end of the can body, a yieldable detector element carried by said device, means for moving said detecting device toward and away from the cans being assembled, means disposed in the path of and operable by said yieldable detector element for stopping the machine, yieldable means for actuating said stopping means through engagement of said detector element with a sealed back hinged closure element on a positioned can end member, and means for preventing actuation of said stopping means when a hinged closure element is in proper assembled relation to a positioned end member on a said can body.

7. In a can end assembling machine, the combination of a conveyor having means for moving the same for advancing cans along a predetermined path of travel, said cans normally having end members applied thereto including a hinged closure element attached to one of said members, a can end testing device disposed in the path of said cans on opposite sides of said conveyor, said device including detector elements mounted for movement toward and away from the opposite ends of the can, means for actuating said detector elements, and means disposed in the path of movement of said elements and independently engageable thereby for stopping said conveyor moving means in the absence of an end member at either end of a said can.

8. In a machine for assembling end members to cans, one of said members having a hinged closure element attached thereto, the combination of means for advancing the cans in a predetermined path of travel, a can end detecting device disposed in the path of travel of the cans and movable towards an end of a can being so advanced, means for moving said detector device towards said can, and independent spaced means disposed in the path of movement of said detector device and engageable thereby for stopping said can advancing means, said independent means being respectively actuated by said device when an end is missing from a said can and when a hinged closure element is improperly located upon a positioned can end engaged by said detector device.

9. In a machine for assembling end members to cans, one of said members having a hinged closure element attached thereto, the combination of means for advancing the cans in a predetermined path of travel, a can end detecting device disposed in the path of travel of the cans and yieldably movable towards an end of a can being so advanced, means for moving said device towards said can to detect the presence of an end member thereon, means disposed in the path of said device and engageable thereby for stopping said can advancing means when an end member is detected as missing from said can, yielding means associated with said device for preventing engagement thereof with said stop means when and end member is detected as present on said can, and means associated with said detector device and engageable with said yielding means upon further yielding movement of the latter for stopping said can advancing means when an improperly located hinged closure element on a positioned can end member is detected by said detector device.

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