Jan. 31, 1967 C. S. OCHS 3,302,103

NO CAP DETECTING MECHANISM

Filed Dec. 13, 1963

Fig. 1.

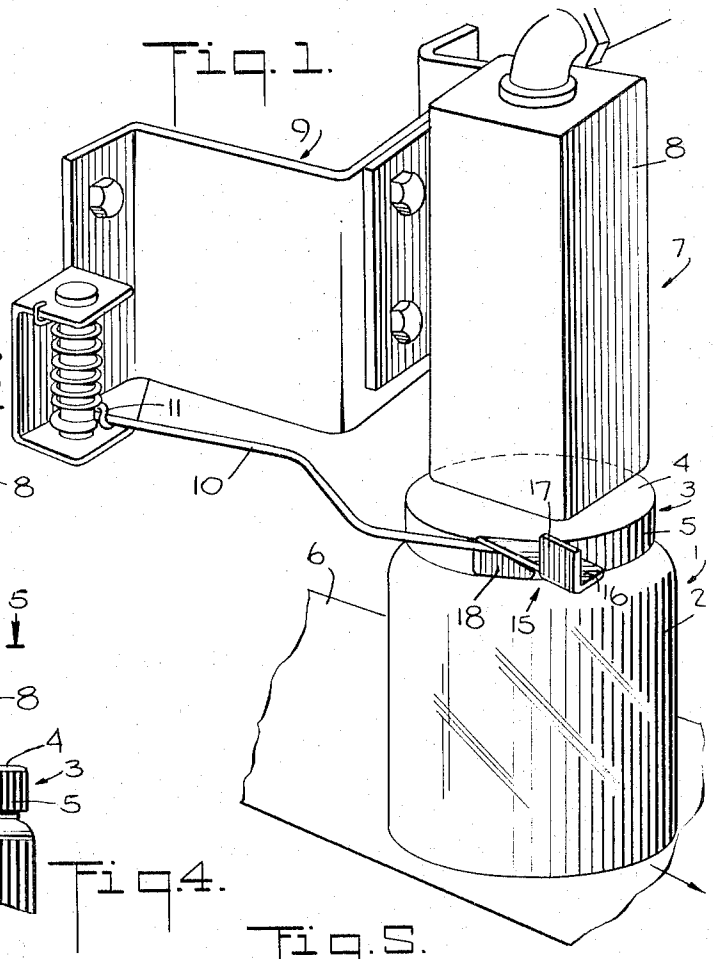
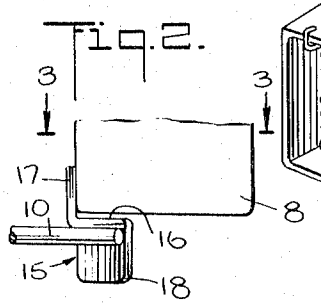


Fig. 2.



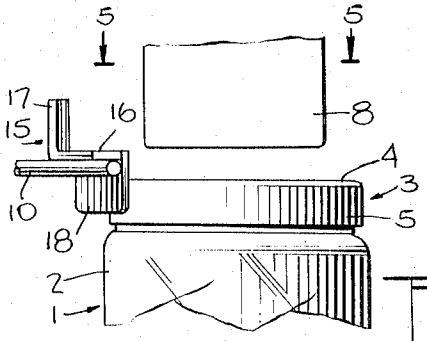
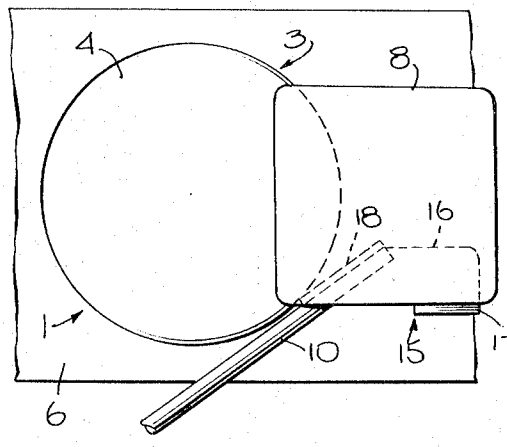


Fig. 4.

Fig. 5.



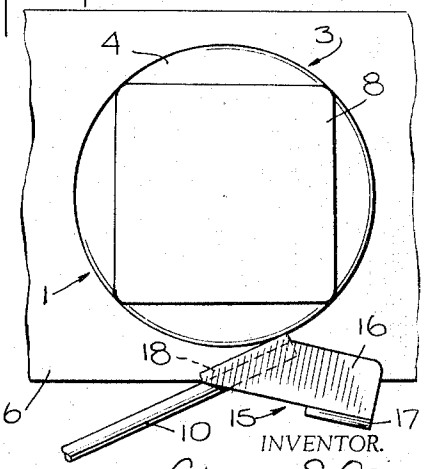


Fig. 3.

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NO CAP DETECTING MECHANISM

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3 Claims. (Cl. 324—34)

The present invention relates to a detecting mechanism and more particularly to an improved detecting mechanism for detecting the presence or absence of a closure cap on a sealed package.

Food products are increasingly being packaged in sealed packages which comprise a container, usually made of glass, and a closure cap, which is usually made of metal. Generally the container is first filled with a food product and thereafter a closure cap is applied over the mouth of the container to form a tight seal therewith.

It sometimes occurs that a closure cap is not deposited on a container and the container must then be removed.

Heretofore, cap detecting mechanisms have been used. Such mechanisms ordinarily include a sensing switch to detect the presence or absence of a closure cap and cooperate with a side-sensing mechanism which senses the presence of a container at the cap detecting station.

Such switch sensing mechanisms have been found to be unsatisfactory (especially for high speed operations) because the switch contacts require high power for operation and continued maintenance.

Furthermore, the side switch which is required increases costs and necessitates the use of increased circuitry between the cap sensing switch and the side switch.

In addition, such prior mechanisms do not operate effectively for containers of different sizes and must be changed when different size containers are being detected.

The present invention eliminates these drawbacks and has for one of its objects the provision of an improved detecting mechanism for sensing the presence or absence of a cap on a package, such caps on containers, lids on cans etc.

Another object of the present invention is the provision of an improved detecting mechanism which will eliminate the use of mechanically activated switches thereby reducing the cost and maintenance requirements of such detecting mechanisms.

Another object of the present invention is the provision of a cap detecting mechanism which will eliminate the use of a side-sensing switch.

Another object of the present invention is the provision of an improved detecting mechanism in which the same sensing means can be used to detect closure caps of different sizes without separate adjustment.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a perspective view showing the detecting mechanism of the present invention;

FIG. 2 is a detail showing the detecting unit when there is no container therebeneath;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2 and also showing a container being moved beneath the detecting unit;

FIG. 4 is an elevational view showing the detecting unit when there is a container therebeneath; and,

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4.

Referring more particularly to the drawings, the package **1** comprises a container **2** having a closure cap **3** thereon. The container **2** is ordinarily made of glass and the closure cap **3** is ordinarily made of ferrous metal. However, it will be understood that the present invention may also be used with the container and closure cap made of other materials, if desired.

The closure cap **3** comprises the usual cover portion **4** and depending skirt portion **5** and may be either a press-on type closure cap or a screw-type closure cap, as may be desired.

The sealed pacakge **1** is moved by a conveyor **6** beneath a detecting unit **7**. The detecting unit **7** comprises a proximity sensor **8** which may be of any conventional type for producing a magnetic or electrical field and which is adapted to sense the presence of a mass, such as a ferrous metal in its field and to activate or deactivate its associated control circuit.

The proximity sensor **8** is mounted on a bracket **9** and is provided with a spring-pressed arm **10** biased by spring **11** toward the sensor **8**. The forward end of the arm **10** is provided with a control unit **15** comprising a horizontal mass-plate **16** adapted to normally underlie sensor **8**, an upstanding stop portion **17** adapted to strike the sensor **8** to limit the inward movement of the arm **10**, and a depending cap contacting portion **18** adapted to be struck by the cap on a container **1** to move the arm **10** outwardly.

With this structure, it will be seen that the mass-plate **16** normally underlies the sensor **8** and is within the field of the sensor to maintain the sensor **8** activated.

When a container **1** having a closure cap **3** thereon passes beneath the sensor **8**, the closure cap **3** strikes the cap-contacting portion **18** of contact unit **15** to push the arm **10** outwardly. This moves the mass-plate **16** away from the sensor **8** and out of its field. However, the mass of the closure cap **3** is substituted for the mass of the plate **16** so that the sensor **8** is not de-activated.

However, when a container which does not have closure cap thereon is on the conveyor **6** and moves beneath sensor **8**, the arm **10** will still be pushed out of the way by the container striking the cap-contacting portion **18** and the mass-plate **16** is still moved out of the field of the sensor **8**. However, since there is no cap on the container **1**, no mass will be substituted for the mass-plate **16** so that the sensor **8** is de-activated. This will energize a mechanism which will either move the container off the conveyor or will give a suitable warning to the operator, such as, sound a bell or buzzer, light a bulb, etc.

While the invention has been described in connection with a proximity sensor which remains activated until a container is sensed with no cap thereon, it will be understood that it is within the purview of the present invention to utilize a proximity sensor which operates in the opposite manner, i.e., which remains de-activated until a container with no cap is sensed.

It will also be seen that the present invention may also be used to sense the presence of tops on articles other than glass containers, such as lids on metal cans, etc.

With this structure no switches are necessary for sensing either the closure cap or the side of the container

and various size containers may be sensed without the necessity of changing the detecting unit.

It will thus be seen that the present invention provides an improved mechanism for detecting the presence or absence of a closure cap on a container which eliminates the use of switches to detect the presence of a closure cap or the presence of a container at the detecting station and which may be used to detect containers of different sizes.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a no cap detecting mechanism in which containers normally having closure cap positioned thereon are moved past a detecting unit, the improvement which comprises a proximity sensor which produces a field when activated, an activating mass-plate associated with said detecting unit and movable from a normal position in the field of said proximity sensor to maintain said proximity sensor activated to a position away from the field of said proximity detector, said proximity sensor being activated by a container having a closure cap and being de-activated by a container having no closure cap thereon, said activating mass-plate being in the path of said containers so as to be moved by said containers

to a position away from the field of said sensor, whereby said sensor will remain activated when a container with a closure cap thereon passes thereby and will be de-activated when a container with no closure cap passes thereby.

2. A no cap detecting mechanism as claimed in claim **1** wherein said activating mass-plate is mounted on an arm associated with said detecting unit, said arm being normally biased toward said sensor to position said plate beneath said sensor and in the field of the sensor to maintain said proximity sensor activated and wherein said containers move said arm outwardly to position said mass-plate away from the field of said proximity sensor.

3. A detecting mechanism as claimed in claim **2,** wherein said mass-plate has an upwardly extending stop portion and a downwardly extending cap-contacting portion.

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