July 12, 1955 S. W. CHAMBERS 2,712,689

ELECTRICALLY OPERATED AUTOMATIC CAN OPENER

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FIG. 1

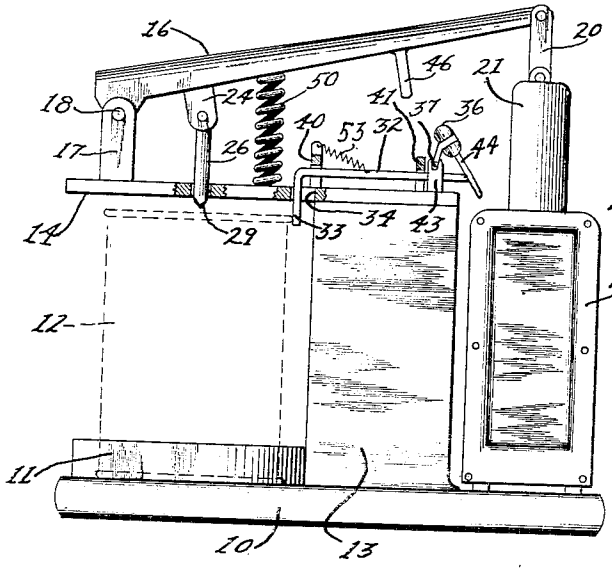


FIG. 2

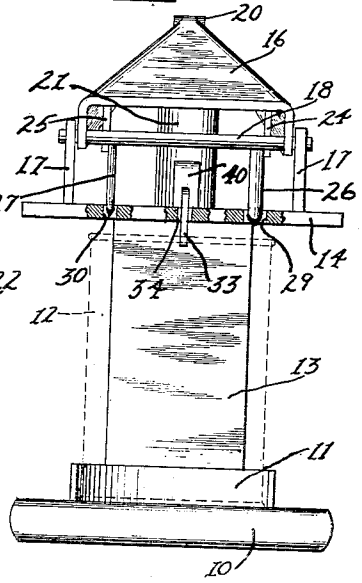
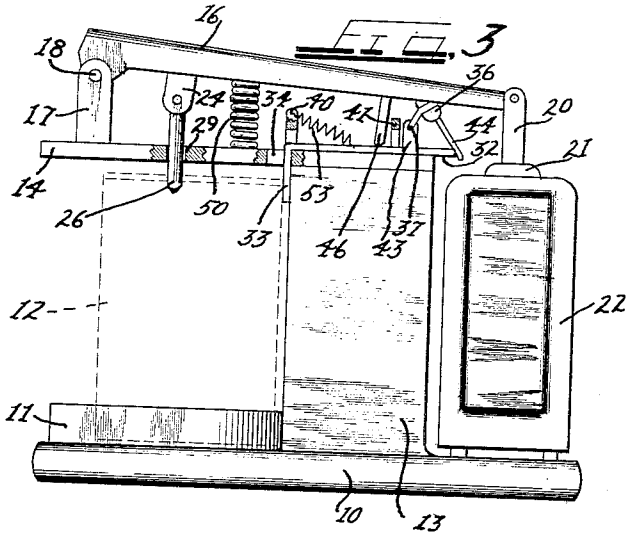


FIG. 3



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ELECTRICALLY OPERATED AUTOMATIC CAN OPENER

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5 Claims. (Cl. 30—4)

This invention relates to an electrically operated automatic can opener for punching apertures in the top of a container to provide means for emptying the liquid contents thereof.

It is an important object of the present invention to provide a rugged and reliable electrically operated can opening apparatus which is designed to provide a powerful can opening leverage.

It is a further important object of the present invention to provide an electrically operated can opener which is automatically actuated by proper positioning of a container in relation thereto.

Still a further object of the present invention is to provide a novel and improved automatic can opening device which automatically executes an opening stroke and thereafter is automatically retracted to its initial position.

Other and further objects, features and advantages of the present invention will be more fully apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view of an automatic can opening apparatus according to the present invention with portions of the apparatus broken away and in section to better illustrate the construction of the device and showing the apparatus in its initial condition prior to complete insertion of a container into the apparatus;

Figure 2 is an end elevational view of the structure of Figure 1 with portions broken away and in section; and

Figure 3 is a side elevational view similar to Figure 1 but illustrating the apparatus in its actuated condition.

As shown on the drawings:

Referring to Figures 1 and 2, it will be observed that the automatic can opening device of the present invention comprises a base **10** which may be secured to any suitable structure such as a table for mounting the device in a generally upright orientation. The base **10** is provided with a container guide rail **11** which at its inner portion may be contoured to conform to the diameter of a can such as indicated in dash outline at **12** to precisely position the container in the receiving space therefor. The frame work of the device further includes an upright column **13** and a generally horizontal upper deck plate **14** mounted in spaced relation above the base **10**.

For providing the driving force for punching apertures in the container, a lever **16** is pivotally mounted at one end to fulcrum members **17** by means of a pivot shaft **18**. At its opposite end, the lever **16** is pivotally connected to a link **20** which in turn is connected with a vertically reciprocal armature **21** of a solenoid **22** mounted on the base **10** behind the column **13**. The lever **16** has depending ears **24** and **25** pivotally carrying punch members **26** and **27** which are guided for vertical movement into the container receiving space of the device by means of apertures **29** and **30** in the deck plate **14**. The punch members **26** and **27** are mounted

by the lever **16** in close relation to the fulcrum **17** so as to provide a substantial leverage advantage in driving the punch members into the top of the container.

For automatic actuation of the solenoid **22** upon proper positioning of a container such as **12** in the receiving space, a sensing arm **32** is provided having a downturned end **33** for engagement by the edge of the container **12** as the container is inserted into the receiving space. Movement of the container to proper position shifts the downturned end **33** in the elongated slot **34** of deck plate **14** so that the rear end of the sensing member **32** pivots a mercury switch **36** about a pivot **37** to close an energizing circuit to the solenoid **22**. As seen in Figure 1, the sensing member **32** is guided by means of a pair of posts **40** and **41** having vertical slots constraining the sensing member **32** against lateral movement. The mercury switch **36** is pivotally carried by means of a further post **43** and has an extension arm **44** for engagement with the end of the sensing member **32**.

As seen in Figure 3, upon completion of a downward stroke of the lever **16**, a depending abutment **46** carried by the lever engages the sensing member **32** and moves it straight downwardly in the slots in posts **40** and **41**. This downward movement of the sensing member **32** results in pivoting of the mercury switch back to its original angular position shown in Figure 1 to deenergize the solenoid. Thereupon a compression spring **50** confined between the deck plate **14** and the lever **16** is effective to pivot the lever upwardly to retract the punch members **26** and **27** from the container. When the lever has reached its upper position, the container may be removed from the device. Removal of the container allows a tension spring **53** diagonally connected between post **40** and sensing member **32** to shift the sensing member horizontally and then upwardly to its initial position shown in Figure 1. The solenoid is thus automatically energized and deenergized to execute a complete opening cycle each time a container is properly positioned in the receiving space.

The operation of the can opener will now be readily apparent. As a container **12** is moved into the position shown in dotted outline in Figure 3, the edge thereof engages a downturned end **33** of a sensing member **32** and shifts the sensing member horizontally to actuate a mercury switch **36**. Actuation of this switch energizes the solenoid **22** to move the lever **16** downwardly about its pivot **18** and drive the punches **26** and **27** into the top of the container. Upon completion of the downward stroke of the lever **16**, the abutment **46** moves the sensing arm **32** to a lower position shown in Figure 3 to release the mercury switch **36**. The spring **50** is then operative to return the lever to its upper position and the container **12** may be removed. Diagonal spring **53** is so disposed that it cannot lift sensing member **32** to its initial position until the opened container has been removed at the end of an opening cycle.

It will be apparent that many modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In an apparatus for opening containers, a frame providing a container receiving space, a fulcrum carried by said frame adjacent said receiving space, a lever pivotally secured at one end to said fulcrum and extending across said receiving space, a pair of punch members disposed adjacent said space and mounted for movement into and out of said space to puncture spaced apertures in a container disposed in said space, electrically operated solenoid means engaging the other end of said lever for driving said lever about said fulcrum, and said lever having means closer to said fulcrum than to the other

end thereof for engaging said punch members to drive the same into said receiving space upon energization of said solenoid means.

2. In an apparatus for opening containers, a frame providing a container receiving space, a fulcrum carried by said frame adjacent said receiving space, a lever pivotally secured at one end to said fulcrum and extending across said receiving space, a pair of punch members disposed adjacent said space mounted for movement into and out of said space to puncture spaced apertures in a container disposed in said space, electrically operated solenoid means engaging the other end of said lever for driving said lever about said fulcrum and said lever having means closer to said fulcrum than to the other end thereof for engaging said punch members to drive the same into said receiving space upon energization of said solenoid means, said punch members being pivotally connected to said lever adjacent said fulcrum, and said frame providing a plate extending across said space and having apertures guiding the movement of said punch members.

3. In an apparatus for opening containers, a frame providing a container receiving space, a fulcrum carried by said frame above said receiving space, a lever pivotally secured at one end of said fulcrum and extending above said receiving space, a pair of punch members disposed above said space mounted for vertical movement into and out of said space to puncture spaced apertures in a container disposed in said space, electrically operated solenoid means engaging the other end of said lever for driving said lever downwardly about said fulcrum, and said lever having means closer to said fulcrum than to the other end thereof for engaging said punch members to drive the same downwardly into said receiving space upon energization of said solenoid means, an electric switch, a sensing arm operatively associated with said switch and projecting into said receiving space for engagement by a container to actuate said switch, said solenoid means being controlled by said switch for automatic energization of said solenoid means upon insertion of a container in proper position in said space, and means for automatically deenergizing said solenoid means upon completion of a work stroke by said lever.

4. In an apparatus for opening containers, a frame providing a base, an upright column, and an upper deck plate extending in spaced relation to said base and defining with said base a container receiving space, a solenoid having a generally vertically reciprocal armature therein disposed on the opposite side of said column from said receiving space, a fulcrum carried by said deck plate at the outer end of said receiving space, an operating lever pivotally carried at one end by said fulcrum and pivotally connected at the other end to said armature for downward pivotal movement, a pair of punch members depending from said lever in close relation to said fulcrum and pivotally connected to said lever, said upper deck plate having apertures for guiding vertical movement of said punch members into and out of said space upon pivotal movement of said lever, spring means between said lever and said deck plate for urging said lever to upper position with said punch members retracted from said space, guide means carried by said base for positioning a container in said receiving space and underneath said punch members, and said solenoid means being operative to drive the punch members into the top of a container in said receiving space upon energization thereof.

5. In an apparatus for opening containers, a frame providing a base, an upright column, and an upper deck plate extending in spaced relation to said base and defining with said base a container receiving space, a solenoid having a generally vertically reciprocal armature therein disposed on the opposite side of said column from said receiving space, a fulcrum carried by said deck plate at the outer end of said receiving space, an operating lever pivotally carried at one end by said fulcrum and pivotally connected at the other end to said armature for downward pivotal movement, a pair of punch members depending from said lever in close relation to said fulcrum and pivotally connected to said lever, said upper deck plate having apertures for guiding vertical movement of said punch members into and out of said space upon pivotal movement of said lever, spring means between said lever and said deck plate for urging said lever to upper position with said punch members retracted from said space, guide means carried by said base for positioning a container in said receiving space and underneath said punch members, and said solenoid means being operative to drive the punch members into the top of a container in said receiving space upon energization thereof, a generally L-shaped sensing arm having a downturned end extending through a slot in the deck plate and projecting into said receiving space for engagement with a container inserted into said space for longitudinal shifting of said member as a container is inserted into said space, a mercury switch controlling energization of said solenoid means and pivotally carried by said deck plate, said switch having an extension arm engageable with said sensing member for pivoting of said mercury switch by longitudinal shifting of said sensing arm to energize said solenoid means, an abutment carried by said lever for engaging said sensing member and moving the same downwardly to accommodate shifting of said mercury switch back to initial orientation upon completion of a punching stroke of said lever, and diagonally disposed spring means for urging said sensing member horizonally away from said mercury switch and upwardly to restore said sensing member to its initial position upon removal of an opened container from the receiving space.

No references cited.