April 22, 1941. R. W. FORRER 2,239,557

MEANS FOR OPENING THE SPOUTS OF SPOUTED CONTAINERS

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FIG. 7.

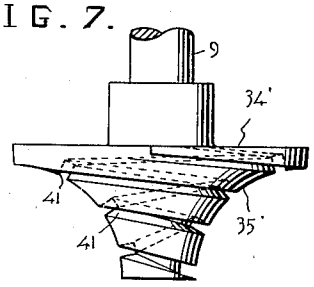


FIG. 8.

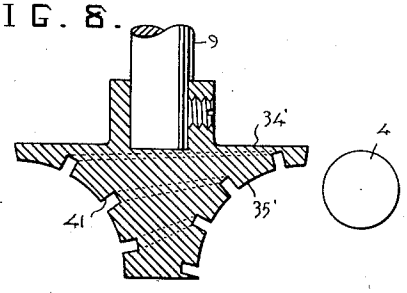


FIG. 1.

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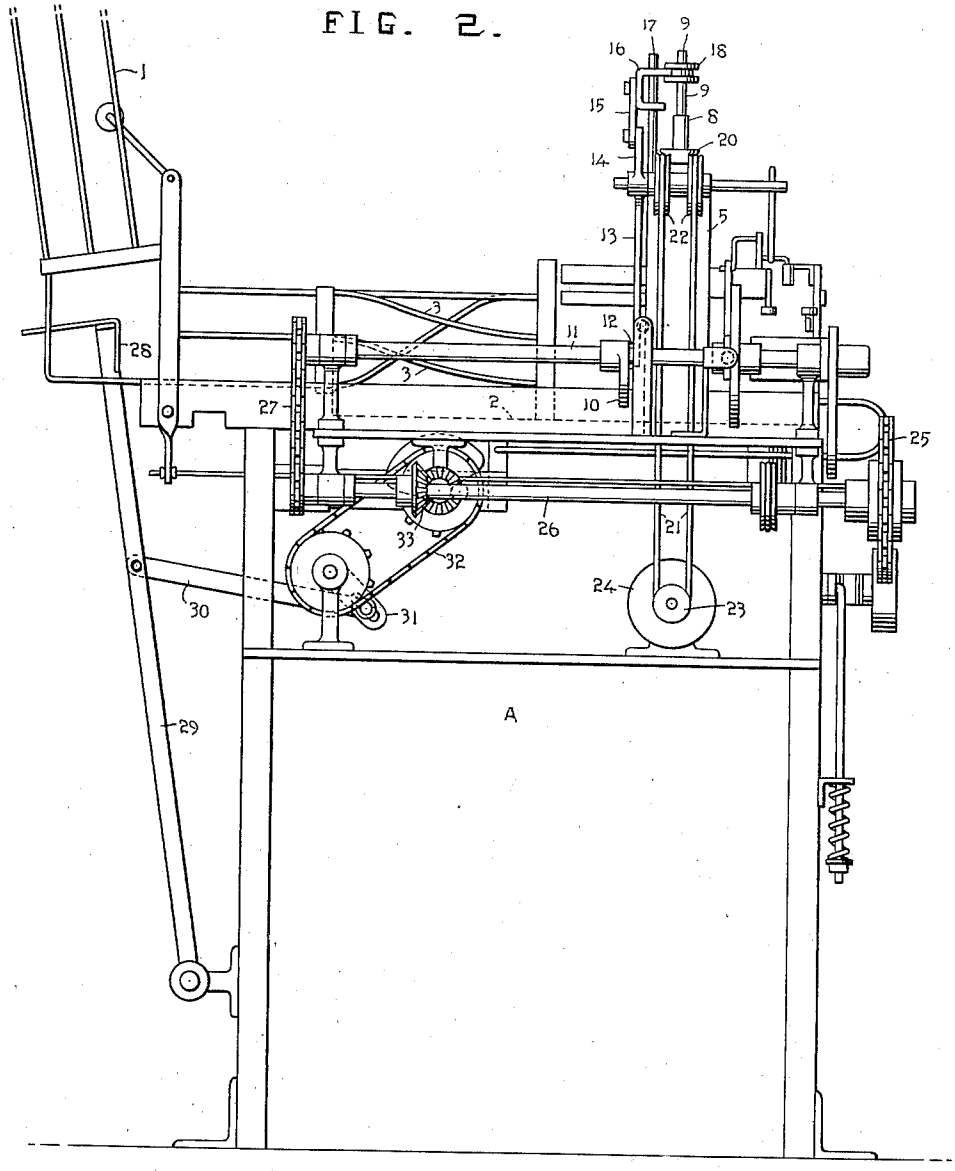
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MEANS FOR OPENING THE SPOUTS OF SPOUTED CONTAINERS

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FIG. 2.



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MEANS FOR OPENING THE SPOUTS OF SPOUTED CONTAINERS

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FIG. 3.

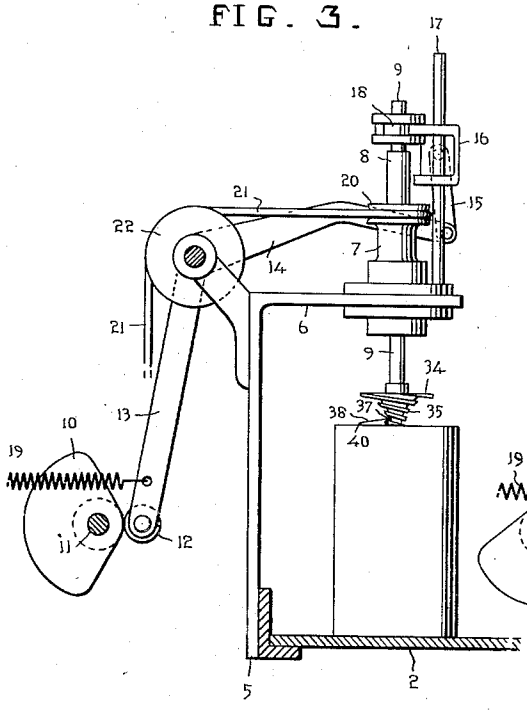


FIG. 4.

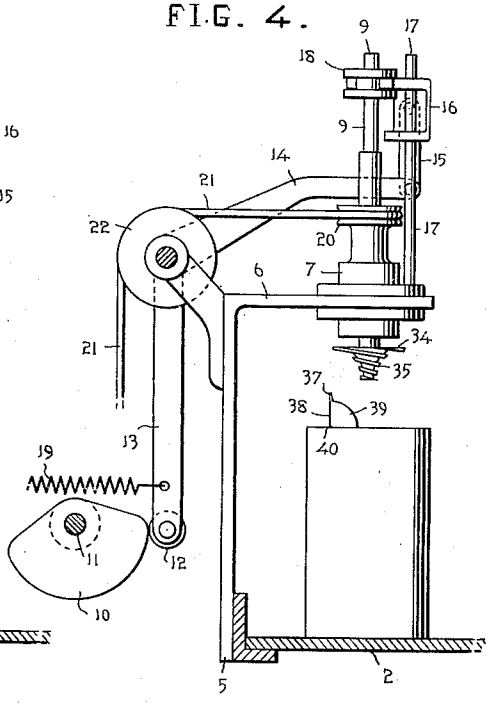


FIG. 5.

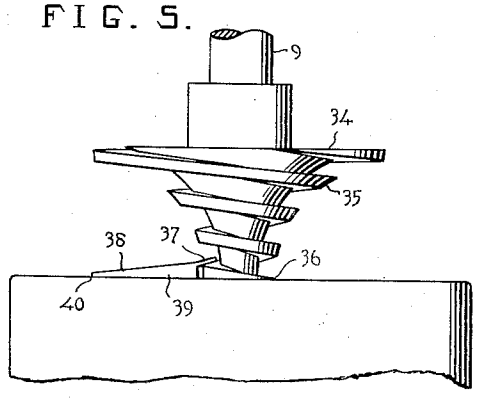
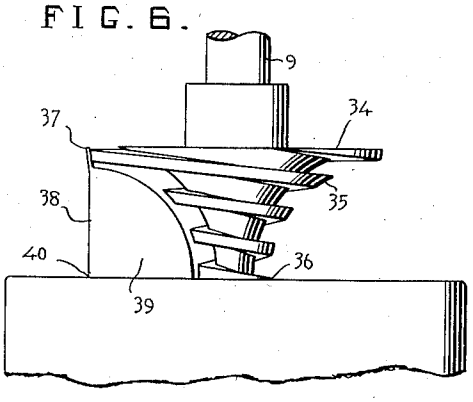


FIG. 6.



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2,239,557

UNITED STATES PATENT OFFICE

2,239,557

MEANS FOR OPENING THE SPOUTS OF SPOUTED CONTAINERS

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Application March 25, 1939, Serial No. 264,269

10 Claims. (Cl. 226—129)

This invention relates to means for opening the closed spouts of spouted containers, such as the containers used for packaging salt and other fluent materials or commodities, and it has particular reference to a member specially designed to automatically perform this spout opening operation and included in apparatus having, in general, the characteristics of that disclosed in the co-pending joint application of applicant with Frank E. Gilbert relating to Method of and apparatus for opening and orientating spouted containers, filed Mar. 25, 1939, Serial No. 264,268.

Spouted containers of the type upon which the device of the invention is adapted for operation ordinarily have tubular bodies and end closure members, therefor, one of which end closure members carries a hinged metal closure spout provided with a lip overlying the adjacent portion of the end closure member and serving as a means whereby the spout may be pivotally moved to open position.

Ordinarily, in filling such containers, when they are filled through their spout openings, as is customary, it is necessary, first, to pivotally move the spout of each container to open position and then place the container in a filling machine with its opened spout in appropriate cooperative relation to the filling nozzle of the machine. Heretofore, it has been customary to open the spouts of such containers by hand, usually by the operator inserting a finger nail beneath the lip of the spout and pivotally moving the spout with respect to the end closure member of the container to open position.

In the apparatus of the invention of the co-pending joint application hereinbefore referred to, a method and means are disclosed for automatically feeding containers, opening their spouts, and presenting them to the filling machine, and the present invention has reference, particularly, as hereinbefore pointed out, to the spout opening means as a distinct novel element, the object of which is, as stated, to automatically move the spouts of containers to open position, thus making unnecessary manual opening of the spouts as has heretofore been customary.

The invention contemplates means for opening the closed spouts of spouted containers, including a rotatable member, preferably of frusto-conical form, provided upon its peripheral face with a spiral thread element terminating at its portion of least diameter in a substantial knife edge for entrance beneath the lip of a container spout, and adapted during rotation to move the spout upon its pivot to open position by cooperation of the spout lip with the spiral thread element, all as will be explained hereinafter more fully and finally claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a plan view of apparatus similar to that disclosed in the co-pending joint application referred to, shown in cooperative arrangement with portions of a container filling machine of conventional form.

Fig. 2 is a front elevation of the apparatus of Fig. 1, but omitting the filling machine.

Figs. 3 and 4 are similar enlarged fragmentary detail views illustrating the spout opening means in the positions assumed by it during, and subsequent to, the spout opening operation, respectively.

Figs. 5 and 6 are further enlarged detail views illustrating the operation of the spout opening member, and

Figs. 7 and 8 are a side elevation and an axial section, respectively, of a modified form of the spout opening member.

The apparatus A, Figs. 1 and 2, of which the spout opening means of the invention may form a part, is preferably associated with a filling machine B of conventional form, the apparatus preferably including a chute 1 down which the containers, with their spouts closed, are fed, and the chute 1 continuing horizontally above a table 2 and terminating in a spiral portion 3 by which the containers, which normally descend the chute 1 with their axes horizontal, are turned through 90°, or up-ended, upon the table 2, with their spouted end closures uppermost.

The spout opening operation is performed at the station *a*, and the containers are then properly orientated with respect to the filling machine, by reference to their opened spouts at the station *b*, and are thereafter moved from this station of orientation to the position *c* which locates them successively upon platforms or holders 4 of the filling machine appropriately presented at the station *c* by a step by step movement imparted to the member (not shown) of the filling machine with which they rotate. The means whereby the containers are successively presented at the various stations of the apparatus, and the mechanism whereby the various operations performed upon them are carried out, are fully explained in the co-pending joint application referred to, and will not be explained further here, except to say that when the con-

tainers fed through the chute 1 with their spouts in closed position are finally successively delivered to the platforms 4 of the filling machine, they will have had their spouts opened and will have been properly orientated with respect to the filling nozzle of the filling machine.

Referring now particularly to Figs. 1 to 6 inclusive, it will be seen that the spout opening means at the station *a* comprises, in the embodiment illustrated, a bracket 5 appropriately positioned with respect to the table 2 and having a lateral extension 6 in which is rotatably journalled a pulley member 7 provided with an axial bearing sleeve 8 within which is axially slidable a spindle 9 connected with the sleeve 8 in any appropriate manner, such as by a spline and key (not shown) so that it will rotate with the pulley member 7 but may be reciprocated axially of the sleeve 8 thereof under the influence of a cam 10 carried by a cam shaft 11 and operating upon the cam follower roller 12 of a bell crank lever 13, 14 carrying a link 15 connected with a yoke 16 slidable axially of a standard 17 and engaging a collar member 18 fixed upon the spindle 9. A spring 19 provides for cooperation between the cam 10 and follower roller 12.

The pulley member 7 carries a pulley 20 preferably constantly rotated at relatively high speed by a belt 21 passing over idle rollers 22 and driven from the drive pulley 23 of a motor 24 or other similar source of power.

The cam shaft 11 is rotated in timed relation to the step by step operation of the filling machine B, preferably by gearing 25 which drives a back shaft 26 geared at 27 to the cam shaft 11, and the containers are successively fed to the spout opening station *a* by a combined cut-off and pusher element 28 appropriately associated with the chute 1 and carried by a rock lever 29 actuated by a link 30 and crank 31 geared at 32 to a cross shaft operated by gearing 33 from the back shaft 26. Thus, as the containers are successively presented at the spout opening station with their closed spouts in proper axial relation to the spout opening member 34 carried by and rotatable and reciprocable with the spindle 9, the constantly rotating spindle 9 and spout opening member 34 will be vertically reciprocated and the lower end of the member 34 will be brought, under the influence of spring 19, into operative relation to, and preferably into contact with, the tops of successively presented containers (as illustrated in Fig. 3) and will be held in such operative position for an interval of time sufficient to permit such rotation of the spout opening member that its spiral thread element 35 will have an opportunity to enter its knife edge terminal or leading edge 36 beneath the lip 37 of the spout and pivotally move the spout to fully opened position, as illustrated in Figs. 3, 4, 5 and 6, the particular container operated upon being held against axial movement by the lower end of the member 34. Thereafter the spindle and spout opening member will be raised again to inoperative position, as illustrated in Fig. 4, so that another container may subsequently be positioned beneath it.

As will be apparent from an inspection of Figs. 5 and 6, the lip 37 of the container spout is formed as an extension of a top wall 38 having lateral extensions 39 the free edges of which are formed in the arc of a circle having its center at the pivotal point or hinge 40 of the spout.

In the form shown in Figs. 5 and 6, the spout opening member is substantially of frusto-conical form with its spout opening spiral thread element 35 upon its peripheral face, this spiral thread element being of a depth sufficient to accommodate the lip 37 of the spout, and being of gradually increasing diameter, so that its annular face lies substantially in the arc of a circle struck from the center of hinging or rotative movement of the container spout and hence parallels the free edges of the sides 39 thereof.

In this form of the device, it will be obvious that in order to accommodate the lip of the spout, as this lip travels upwardly during the spout opening operation, the spacing of the threads constituting the spiral thread element 35 must be such that the lip 37 of the spout will not bind between them. However, as illustrated in Figs. 7 and 8, the spout opening member 34' has its spiral thread element 35' so formed that its annular face substantially conforms to the arc of rotation of the spout, but its lateral faces 41 are generated in substantial conformity with the increasing angular arrangement of the lip 37 and the top wall 38 of the spout as the spout is opened, thereby making possible more intimate engagement of the spiral thread element with the spout lip than is possible with the type of spout opening member illustrated in Figs. 5 and 6, while at the same time avoiding binding of the spout lip in the spiral thread element.

Various changes and modifications are considered to be within the spirit of the invention and the scope of the following claims.

What I claim is:

1. Means for opening the closed spout of a spouted container, including a rotatable member provided with a spiral thread element of gradually increasing diameter from one end to the other and adapted for engagement with a part of the container spout.

2. Means for opening the closed spout of a spouted container, including a rotatable frusto-conical member provided with a spiral thread element for engagement with a part of the container spout.

3. Means for opening the closed spout of a spouted container, said spout having segmental side walls and opening by rotation in an arc of the radius of said segmental walls, said means including a rotatable member of substantially frusto-conical shape having its side wall provided with a spiral thread element the annular face of which substantially conforms to the arc of rotation of said spout, said spiral element being engageable with a part of said spout.

4. Means for opening the closed spout of a spouted container, said spout having segmental side walls and opening by rotation in an arc of the radius of said segmental walls, said means including a rotatable member of substantially frusto-conical shape having its side wall provided with a spiral thread element the annular face of which substantially conforms to the arc of rotation of said spout, said spiral element terminating in a relatively sharp edge engageable with a part of said spout.

5. Means for opening the closed spout of a spouted container, said spout having segmental side walls joined by a top wall and opening by rotation in an arc of the radius of said segmental walls, said means including a rotatable member of substantially frusto-conical shape having its side wall provided with a spiral thread element the annular face of which substantially conforms to the arc of rotation of said spout and the lateral faces of which are generated in substantial conformity with the increasing angular

arrangement of the said top wall as the spout is opened, said thread element terminating at one end in an edge engageable with a part of said spout.

6. Means for opening the closed spout of a spouted container, said spout having segmental side walls joined by a top wall provided with an offstanding lip and opening by rotation in an arc of the radius of said segmental walls, said means including a rotatable member of substantially frusto-conical shape having its side wall provided with a spiral thread element the annular face of which substantially conforms to the arc of rotation of said spout and the lateral faces of which are generated in substantial conformity with the increasing angular arrangement of the said top wall as the spout is opened, said thread element terminating at one end in an edge engageable with the lip of said spout.

7. Means for opening the pivoted spout of a spouted container from closed condition in contact with the spout-carrying wall of said container to opened condition, including a rotatable member having its axis perpendicular to the spout-carrying container wall and provided with means including a leading edge for entry between a part of the spout and said container wall, said means being shaped to maintain engagement with said spout part during full opening movement of the latter.

8. Means for opening the pivoted spout of a spouted container from closed condition in contact with the spout-carrying wall of said container to opened condition, including a rotatable member having its axis perpendicular to the spout-carrying container wall and provided with a spiral thread element upon its peripheral face, said thread element having a leading edge for entry between a part of the spout and said container wall, said thread element being shaped to maintain engagement with said spout part during full opening movement of the latter.

9. Means for opening the spout of a spouted container from closed condition in contact with the spout-carrying wall of said container to opened condition, including a rotatable member having an end for engagement with said container wall and provided with a spiral element having a leading edge for entry between a part of the spout and said container wall, means for rotating said member, and means for axially moving said member into and out of operative contact with said container wall.

10. Means for opening the spout of a spouted container from closed condition in contact with the spout-carrying wall of said container to opened condition, including a fixed support for the container, an axially movable rotatable spindle, a member rotatable with said spindle and provided with a spiral spout opening element having an end for engagement with said container wall and a leading edge for entry between a part of the spout and said container wall, means for rotating said spindle and its spiral element, and means for axially reciprocating said spindle and spiral element, axial movement thereof in one direction serving for engagement of the end of the rotating spiral element with said container wall, so that movement of the container axially between its support and said spiral element is prevented and entry of said leading edge between said spout part and said container wall is accomplished, whereby the rotative movement of said spiral element will serve to open said spout, reverse axial movement of said spiral element serving to clear the same from the container and its opened spout after completion of the spout opening operation.

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