

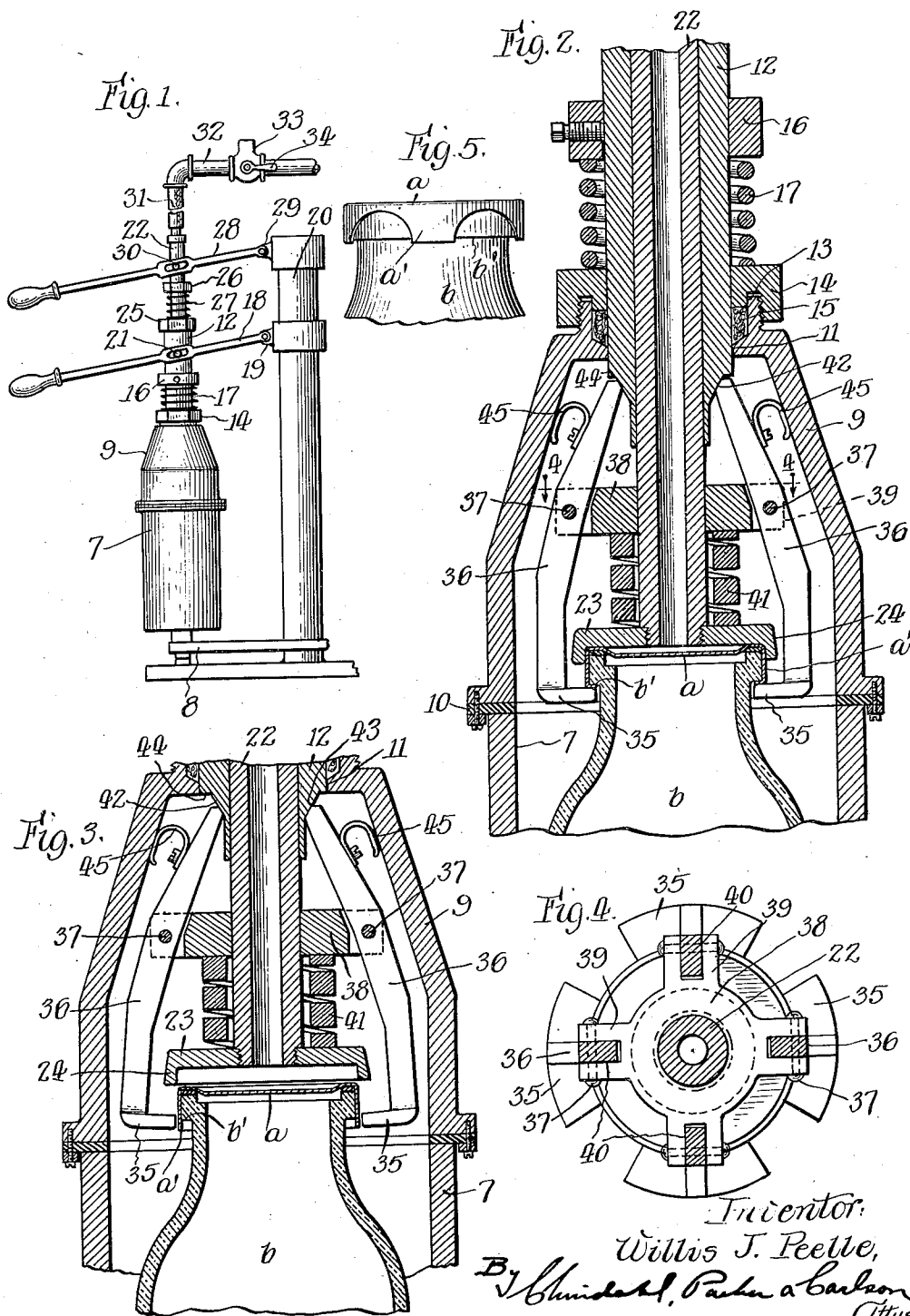
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JAR CAPPING MECHANISM

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JAR CAPPING MECHANISM

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The invention relates to a jar capping mechanism, and has especial reference to a means for fastening a sheet metal cap upon a container for food products, such as a glass jar; and in certain of its aspects the invention relates to such a jar-cap fastening or securing means combined with a means for producing a vacuum about the jar during the capping operation.

The primary object of my invention is to produce a jar capping means operable to crimp the skirt of a sealing cap beneath the locking shoulder of a jar, by the use of positive radially applied and nonrotating pressure means, whereby to perform the capping operation effectually, rapidly and economically.

Another object is to provide a cap securing means employing radial nonrotatable pressure devices which are positively actuated but capable of conforming to irregularities in the jar so as to avoid injury thereto or to the operating mechanism.

Still another object of the invention is to provide a cap securing device which is especially adapted for use in connection with caps having a plurality of fastening lugs formed in the skirt thereof at substantially equidistantly spaced intervals.

A further object is to produce a capping device of the character referred to, combined with means for producing a vacuum about the jar whereby the cap may be applied and secured to the jar under a vacuum.

A general object is to provide a jar capping mechanism which is exceedingly simple in construction and yet effectual in operation.

The objects of the invention thus generally stated, together with other and ancillary advantages, are attained by the construction and arrangement illustrated in the accompanying drawings forming part hereof. It should be understood however that it is contemplated that various changes in the construction and arrangement herein set forth may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims.

Figure 1 of the drawings is a fragmentary

side elevational view of a vacuum capping mechanism embodying my invention.

Fig. 2 is a fragmentary vertical sectional view through the device, on an enlarged scale and showing the parts in the position occupied at the end of the capping operation.

Fig. 3 is a similar view showing the relation of the parts at another stage in the capping operation.

Fig. 4 is a transverse sectional view taken approximately in the plane of line 4-4 of Fig. 2.

Fig. 5 is an elevational view of the upper end of a jar having applied thereto a cap with spaced fastening lugs formed in the skirt thereof.

In the embodiment selected for purposes of illustration, 7 designates a vacuum chamber carried by a suitable support such as a table 8 and having a hood 9 equipped with a suitable sealing gasket 10 adapted to seat upon the upper edge of the chamber 7. The hood 9 has a central opening 11 in its upper end through which is entered a tubular reciprocable member 12. As herein shown the hood is formed with an upwardly extending screw-threaded nipple 13 adapted to receive a gland nut 14 operable to compress packing material 15 around the plunger, thus forming a stuffing box permitting relative axial movement of the member 12 with respect to the hood 9 while maintaining a frictional engagement between the parts. Adjustably secured on the member 12 is a collar 16 between which and the nut 14 is interposed a helically coiled spring 17. Downward pressure applied to the member 12, as through the medium of a lever 18, is thus yieldably transmitted by the spring 17 to the hood 9 so as to hold the latter with its sealing gasket 10 seated on the upper edge of the vacuum chamber 7. The lever 18 may, as shown in Fig. 1, be mounted in any suitable way as, for example, upon a bracket 19 supported by a standard 20, the lever having a pin and slot connection 21 with the tubular member 12. The standard 20 may be, if desired, in the form of a column about which the table 8 may rotate for the purpose of

carrying the vacuum chamber 7 laterally into and out of relation to the hood 9.

Slidable axially within the tubular member 12 is a tubular stem 22 which is made of a length substantially greater than the member 12 so as to project from opposite ends thereof. The lower end of the stem 22 carries a cap-retaining head 23 in the form of a disk centrally apertured and screw-threaded upon the lower end of the stem, said disk having a peripheral flange 24 so that the head is slightly cupped to receive the cap *a*. A stuffing box 25, which may be similar in all substantial respects to the stuffing box 14, is provided between the upper end of the tubular member 12 and the stem 22, and between the nut of this stuffing box and a collar 26 on the tubular stem is interposed a coiled spring 27 tending to lift the capping head 23 relative to the hood 9. Means is provided for operating the tubular stem against the action of the spring, which means may comprise a hand lever 28 pivoted on a bracket 29 on the standard 20 and having a pin and slot connection 30 with the stem 22.

The upper end of the stem 22 may be connected as by means of a flexible hose 31 with a suitable vacuum producing apparatus, the hose being herein shown as connected to a pipe 32 leading to such an apparatus, and having therein a three-way valve 33 adapted to be operated manually by means of a hand lever 34. The valve is adapted to establish connection either with the vacuum producing apparatus or with the atmosphere, in a well known manner.

As herein shown the cap *a* has a peripheral skirt shaped to form a plurality of fastening lugs *a'* at substantially equidistantly spaced intervals, which lugs are adapted to be bent or crimped beneath the locking shoulder *b'* of a jar *b* of glass or other suitable material. The bending or crimping of the lugs *a'* into engagement with the locking shoulder *b'* of the jar is herein accomplished by means of four jaws 35, one for each of the lugs *a'*, these jaws being, according to the present invention, movable through the operation of the lever 18 acting through the tubular member 12 which constitutes a plunger for this purpose.

The jaws 35 are each carried at the lower end of a lever 36, the jaws being herein shown arcuate in form and substantially longer than the width of the levers 36 as shown in Fig. 4. The levers are pivoted at 37 in a supporting member or spider 38 slidable on the tubular stem 22, the arms 39 of the spider being slotted as at 40 to receive the levers. The spider is supported by a stiff helically coiled spring 41 with the upper ends of the levers disposed in the path of a downwardly and inwardly tapering cam surface 42 on the plunger 12, the upper ends of the levers being correspondingly beveled as at 43.

It will be seen that in the downward movement of the member 12, through the operation of the lever 18, the upper ends of the levers 36 are forced outwardly so as to carry the jaws 35 at the lower ends of the levers inwardly. In this operation a downward thrust is imparted to the levers so that the jaws are given a combined downward and inward movement, exerting a radial pressure upon the lugs *a'* of the cap. The spring 41 yields, in this operation, to permit the downward movement of the jaws as they move inwardly, the supporting spider 38, by reason of its fit on the stem 22, being capable of adjusting itself as may be required. This is especially desirable for the reason that in practice jars are found to be lacking in uniformity and to possess irregularities as regards the dimensions of the upper end portions of the jars.

Preferably the upper ends of the levers 36 are adapted to engage with a shoulder 44 on the member 12 to limit outward and upward movement of the upper ends of the levers. And to insure that the levers will disengage from the locking shoulder of the jar after the capping operation, a leaf spring 45 may be provided for each lever, such springs acting between the levers and the adjacent wall of the hood 9 to force the jaws 35 outwardly when pressure upon the lever 18 ceases.

In the operation of the capping mechanism as herein set forth, the jar is placed within the vacuum chamber 7 with a cap thereon as shown in Fig. 3. The uppermost lever 28 is first operated and acting through the spring 27 moves the plunger 12 downwardly, the hood 9 moving with the plunger until the gasket 10 is seated upon the upper end of the vacuum chamber 7. The valve 33 is now operated to establish communication between the closed vacuum sealing chamber and the vacuum producing means, and air within the chamber and within the jar is exhausted. The lever 28 is now operated still further to move the tubular stem 22 downwardly, carrying the cap retaining head 23 into engagement with the cap, the spring 27 yielding for this purpose. It will be observed (Fig. 3) that in this relation of the parts, the jaws 35 are positioned adjacent the skirt of the cap *a*, a short distance above the locking shoulder. When, therefore, downward pressure is now applied to the lever 18, the spring 17 yielding, the cam surface 42 engages with the beveled upper ends of the levers 36, and operates to force the lower ends of the levers inwardly while at the same time tending to move the levers downwardly. In this operation of the levers, the jaws 35 slidably engage with the outer sides of the lugs *a'* of the cap and due to their combined inward and downward movement, force the lower ends of the lugs projecting below the locking shoulder *b'*, posi-

tively inward so as to effect an interlocking of the cap with the jar. It will be apparent that any irregularities in the dimensions of the jar such as variations between its upper edge and the locking shoulder *b'* are compensated for by the yielding of the spring 41. Thus while the radial pressure exerted by the jaws on the cap is positive in character, the spring permits the jaws to accommodate themselves readily to the dimensions of the jar being capped. Finally the valve 33 is operated to cut off communication between the vacuum producing apparatus and the vacuum chamber, and the levers 18 and 28 operated to restore the parts to their initial positions. In this latter operation frictional engagement between the hood 9 and the plunger 12 effected by the stuffing box 13, 14 is sufficient to lift the hood 9 from off the chamber 7.

It will be understood that while I have herein described my invention as applied to the securing of a particular form of cap, it might readily be altered by increasing the number of jaws to operate upon caps of ordinary construction having the skirt of the cap of uniform depth throughout the periphery of the cap.

I claim as my invention:

1. A jar capping mechanism comprising, in combination, a reciprocating cap retaining head, a plurality of jaws, a plurality of levers carrying said jaws, spring means normally restraining rotation of said levers, a support for said levers movable with said head, a spring acting between said support and said head, and positively actuated means for swinging the levers to cause the jaws to move radially relative to a jar, said spring being adapted to yield to permit downward movement of the jaws while they move inwardly.

2. A jar capping mechanism comprising, in combination, a cap retaining head, a reciprocable stem carrying said head, a member encircling said stem, a plurality of levers pivoted to said member, crimping jaws actuated by said levers, a reciprocatory positively actuated cam member for actuating said levers, and a spring interposed between said first mentioned member and said head adapted to yield to permit downward movement of the jaws during the crimping operation.

3. A jar capping mechanism comprising, in combination, a pair of relatively movable coaxial members, the inner one of said members being tubular and adapted for connection with a vacuum producing apparatus, a cap retaining head carried by the inner member, a plurality of jaws mounted for radial movement, a vacuum sealing chamber comprising a hood movable with the outer member, and means also actuated in the movement of the outer member to operate said jaws.

4. A jar capping mechanism comprising, in combination, a pair of relatively movable

coaxial members, the inner one of said members being tubular and adapted for connection with a vacuum producing apparatus, a cap retaining head carried by the inner member, a plurality of jaws mounted for radial movement, a vacuum sealing chamber comprising a hood movable with the outer member, means also actuated in the movement of the outer member to operate said jaws, the last mentioned means comprising a plurality of levers, and cam means operated by said outer member and adapted to engage said levers, a support for said levers, and a spring acting between said support and said head adapted to permit said jaws to move axially in their movement by said outer member.

5. A jar capping mechanism comprising, in combination, a pair of relatively movable axial members the inner one of which is tubular and is adapted for connection with a vacuum producing apparatus, and cap-applying means comprising a capping head carried by the inner member, a plurality of levers each having a jaw at its lower end and a support encircling the inner one of said members and providing a fulcrum for each of said levers, the outer one of said members being adapted to engage with said levers to move the jaws radially, and a vacuum-sealing chamber comprising a hood movable by the outer member, said hood being adapted to enclose said cap-applying means.

6. A jar capping mechanism comprising, in combination, a pair of relatively movable axial members the inner one of which is tubular and is adapted for connection with a vacuum producing apparatus, and cap-applying means comprising a capping head carried by the inner member, a hood for enclosing the cap-applying means carried by the outer member, a plurality of levers each having a jaw at its lower end and a support providing a fulcrum for each of said levers, the outer one of said members being adapted to engage with said levers to move the jaws radially, and spring means acting between said hood and said levers tending to move said jaws outwardly.

7. A jar capping mechanism comprising, in combination, a tubular member mounted for up and down movements and adapted for connection with a vacuum producing apparatus, a cap-applying head carried by said member, a plurality of crimping jaws, means for pivotally supporting said jaws for radial movement, a vacuum sealing-chamber comprising separable sections, and means passing through one of said sections adapted to operate said jaws.

8. A jar capping mechanism comprising, in combination, a tubular member mounted for up and down movements and adapted for connection with a vacuum producing apparatus, a cap-applying head carried by said member, a plurality of crimping jaws, means

for pivotally supporting said jaws for radial movement, a vacuum sealing-chamber, and means passing through said chamber adapted to operate said jaws.

- 5 9. A jar capping mechanism comprising, in combination, a reciprocable member carrying a cap retaining head at one end, a second reciprocable member movable relative to said first member, a plurality of levers
10 slidably and pivotally mounted relative to said first member, crimping jaws actuated by said levers, yielding means to resist translation of said levers in one direction, and cam means on said second member acting
15 upon said levers to initially translate said levers in opposition to said yielding means and finally to rotate said levers to effect a crimping action on a cap.

10. A jar capping mechanism comprising, in combination, a pair of relatively movable coaxial members, a spider slidably fitted on the inner one of said members, a plurality of levers pivotally connected to said spider, spring means yieldably restraining movement
25 of said spider in one direction, a cam surface on the outer one of said members contacting with said levers to positively urge said spider in an opposed direction.

11. A jar capping mechanism, comprising, in combination, a pair of relatively movable coaxial members the inner one of which is hollow and is adapted for connection with a vacuum producing apparatus, and a cap-applying means comprising a capping head
35 carried by the inner member, a plurality of lever actuated jaws carried by and encircling said member, and a vacuum sealing chamber having separable sections, one of said sections being yieldably mounted on said outer
40 member to permit movement of said member relative to said section for the actuation of said jaws.

In testimony whereof, I have hereunto affixed my signature.

WILLIS J. PEELE.

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