Nov. 22, 1932. E. E. SLICK 1,888,397

APPARATUS FOR SHAPING MATERIALS

Filed April 17, 1929

Fig. 2.

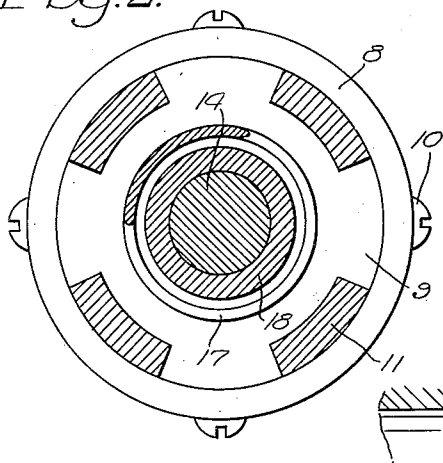


Fig. 3.

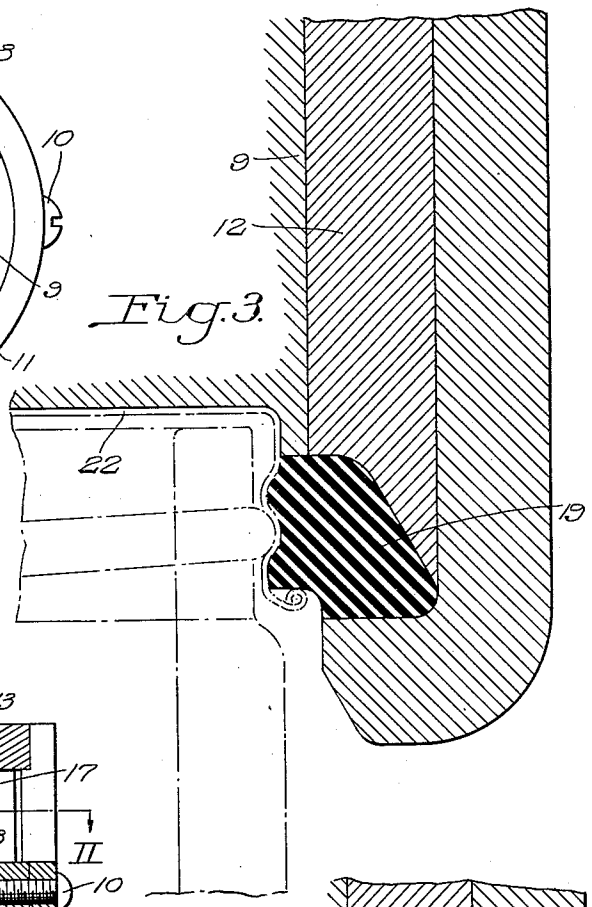


Fig. 1.

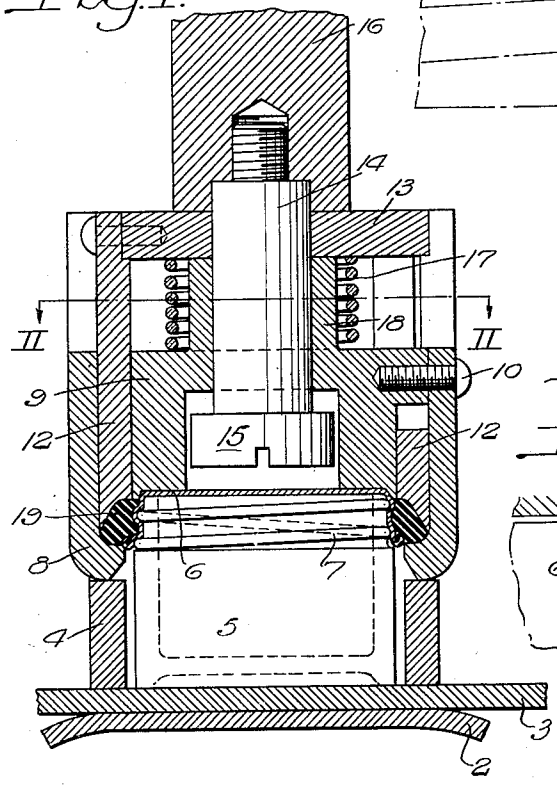
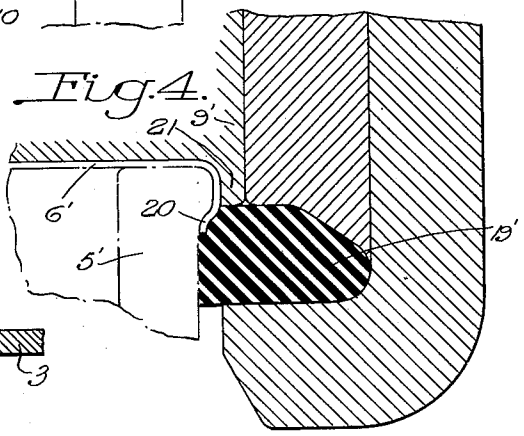


Fig. 4.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR SHAPING MATERIALS

Application filed April 17, 1929. Serial No. 355,940.

The present invention relates broadly to the art of shaping or forming materials, and more particularly to an apparatus especially adapted for the production of closure means for bottles, jars, and the like of metal, foil or similar substance while in position on the container or other object.

It has heretofore been customary in the manufacture, for example, of closures for bottles and jars, to individually produce both the closure and the jar, and then to assemble the same. With a closure of the threaded type, the threads have been formed apart from the container, and the two parts thereafter assembled.

Where other types of closures have been utilized, of a type adapted to be more or less permanently sealed in position, more or less expensive and complicated sealing operations have been resorted to.

In accordance with the present invention, there is provided a method and apparatus by means of which closures may be given the desired contour while in position on the particular object with which they are designed to cooperate, whereby not only is more accurate interengagement of the respective parts insured, but the cost of manufacture is correspondingly reduced.

The present invention also contemplates the provision of apparatus of such nature that the desired forming operations may be carried out under such conditions as to reduce to a minimum any breakage in connection, for example, with the formation of closures on more or less frangible articles.

In the accompanying drawing there are shown for purposes of illustration only, certain preferred embodiments of the present invention.

In the drawing:—

Figure 1 is a vertical sectional view through one type of apparatus constructed in accordance with the present invention;

Figure 2 is a transverse sectional view on the line II—II of Figure 1, looking in the direction of the arrows;

Figure 3 is a partial detail view, on an enlarged scale, illustrating more clearly certain parts of the apparatus and their manner of operation; and

Figure 4 is a view similar to Figure 3 illustrating another embodiment of the present invention.

For purposes of convenience in description, the respective parts herein illustrated will be referred to respectively as a closure and a container. It is to be noted, however, that the expression "closure" is used generically as including within its definition, caps, covers, wrappers, closures, or the like, adapted for the sealing, closing, covering or cooperation with a desired article. The term "container" is likewise used generically as definitive of a bottle, jar, or other receptacle or object, regardless of its contour, construction, or purpose, to which it is desirable to apply a closure within the definition above given.

In carrying out the present invention, there may be provided a platen 2, over which there is adapted to travel a suitable belt or conveyor 3, on which there are suitably disposed and arranged a series of holders 4.

Positioned within each of the holders prior to the time that any particular holder is brought into position over the platen, is a container 5, having thereon a partially formed closure 6, the shaping of which it is desired to complete or accomplish.

In the embodiment of the invention illustrated in Figure 1, the container is shown as having threads 7 formed on its neck whereby it is necessary for the production of the desired results to produce similar threads in the closure 6.

Of such diameter as to move freely over the upper end of the container and closure is a holder or die 8, within which there is mounted a spider 9, secured to the holder 8

by suitable spaced fastening means 10, as clearly illustrated in Figure 2, whereby the spider and holder are adapted at all times during the operation of the apparatus to move in unison.

The spider is so shaped as to provide spaced openings or peripheral indentations through which extend arms 11 of a compression member 12, secured to their lower portions and herein illustrated as constituting a continuation thereof. The arms 11 at their upper ends are secured to a cross-head 13. This cross-head is provided with a central opening of such diameter as to cooperate with the stem 14 of a suitably shaped stud, the lower end or head 15 of which is positioned within the spider 9 and the upper end of which is threaded for cooperation with the press plunger 16.

Intermediate the cross-head 13 and the spider 9 is a compression spring 17, which spring may be partially centered by means of a sleeve 18 formed on the spider.

The lower end or edge of the holder or die 8 is preferably in-turned, as clearly indicated in Figure 1, and is adapted for cooperation with, and the support of, a shaping body 19, herein illustrated as comprising an annulus, band, or sections of elastic material such as rubber. This material is referred to, by way of example, as a material possessing flow characteristics, it being essential in accordance with the present invention that deformation or flow of the shaping elements be possible during the forming or shaping process.

In accordance with the present invention, a container having a closure thereon as illustrated in Figure 1, is brought into position below the holder or die 8 and the plunger 16 lowered to bring such holder or die into engagement with the holder 4. Thereafter, continued descent of the plunger causes the arms 11 to move relatively to the spider 9, which spider in the meantime, has come into engagement with the upper portion of the closure, as indicated in this figure.

Continued downward movement of the arms 11 causes the compression element 12 to compress the shaping body 19 and squeeze it inwardly into intimate contact with the closure. The parts of the apparatus are so correlated that this compression of the shaping body is sufficient to bring all desired parts of the closure into intimate contact with the container, thereby not only sealing the container, but also simultaneously producing in the closure interlocking projections, ribs, threads, or the like, cooperating with similar parts on the container itself.

Since the shaping body possesses flow characteristics and is inherently more or less resilient, or flexible, it will be apparent that it adapts itself automatically to irregularities to either the closure or the container, and subjects all parts thereof within this zone of operation simultaneously to substantially the same pressure conditions, this condition, however, being such that breakage is effectively obviated.

In Figure 3 of the drawing there is illustrated in greater detail and on a larger scale, the operation of the apparatus for the production of a thread on a closure, the figure representing an enlargement of a portion of the structure shown in Figure 1.

In Figure 4 there is shown a slightly modified embodiment of the invention, in which parts corresponding to the parts already described are designated by the same reference characters having a prime affixed thereto. In this figure the shaping body 19″ is illustrated in such relation to the container 5′ and closure 6′ as to shape the lower edge of the closure 6′ under the shoulder 20 of the container due to the fact that the top and a part of the sides of the closure 6′ are not required to be shaped. It is apparent that the spider 9′ which in this, as in the other case, constitutes in effect a quasi-die member, may be provided with an extension 21 of greater dimensions than the corresponding extension illustrated in Figures 1 and 3 and adapted to embrace and hold in position that portion of the closure, distortion or shaping of which is not required.

In all cases it will be apparent that the closure may be provided with a suitable sealing gasket, as is customary in the art, a gasket 22 of the character contemplated being indicated in chain lines in Figure 3 of the drawing.

The advantages of the present invention arise not only from the fact that there is provided an apparatus capable of shaping a closure while in position on a container, but from the fact that such shaping may be accomplished through the medium of a shaping member or body possessing flow characteristics such as to accommodate itself to irregularities in the parts being operated upon and exert substantially uniform shaping pressure simultaneously to different parts thereof.

While I have herein disclosed certain preferred embodiments of the present invention, it will be understood that changes in the construction and operation of the parts as herein disclosed may be made without departing either from the spirit of the present invention or the scope of my claim.

I claim:—

Forming apparatus comprising a holder adapted to receive a portion of a container having a closure thereon, a compression member having a plurality of upwardly extending arms thereon, a shaping means having flow characteristics carried by the holder and adapted to cooperate with the closure, a spider formed to provide a plurality of spaced indentations along the periphery

thereof adapted to receive the arms of the compression member, said spider being adapted to cooperate with the holder, fastening means for securing the holder and the spider together, a crosshead connecting the upwardly extending arms, and means cooperating with the crosshead for moving the compression member relative to the spider.

In testimony whereof I have hereunto set my hand.

EDWIN E. SLICK.