April 15, 1952 P. CUQ 2,592,867

DEVICE FOR COLD SHAPING HOLLOW ARTICLES

Filed Feb. 26, 1946

Fig.3.

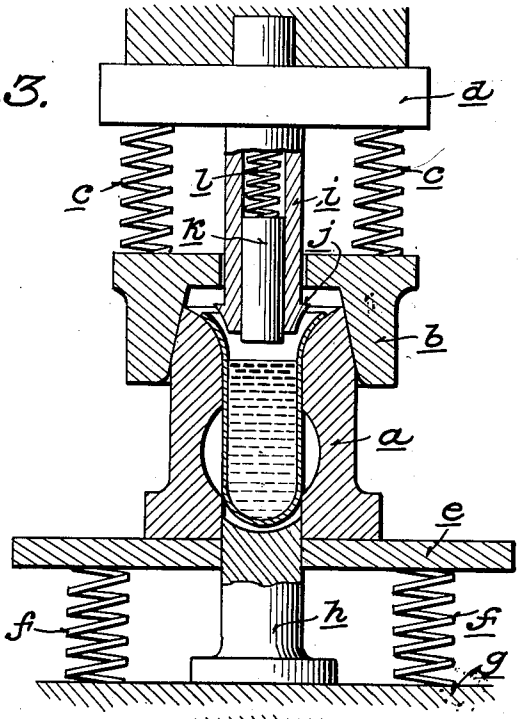


Fig.1.

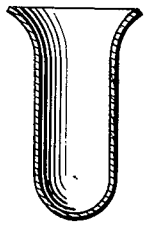


Fig.4.

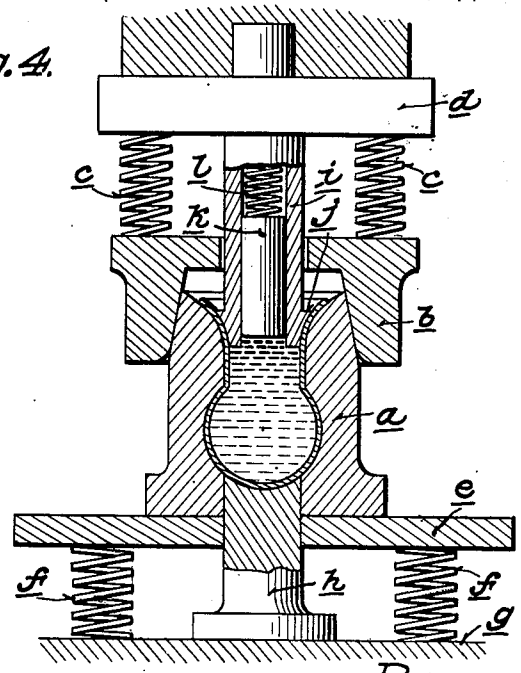
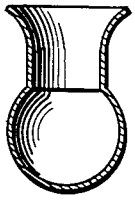


Fig.2.



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DEVICE FOR COLD SHAPING HOLLOW ARTICLES

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In France October 4, 1944

1 Claim. (Cl. 113—44)

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My invention relates to the manufacture of hollow articles by pressing.

A first object of my invention is to provide a method of manufacturing hollow articles wherein the internal dimensions of the finished article are larger than the dimensions of its inlet or neck, in such a manner that it could not be obtained by the usual methods of pressing by means of a punch.

A further object of my invention is a method wherein a substantially blind tubular blank is inflated by liquid pressure obtained by compressing the blank axially within an appropriately shaped mould or matrix.

My invention also concerns a pressing device comprising a mould or matrix open at opposite ends and adapted to receive at one end a plug forming a tight closure for the open end of the blank disposed within the matrix, and at the other end a shaping piston adapted to compress axially the closed end of the blank.

Still another object of my invention is a pressing device of the kind above referred to, wherein the plug and piston are respectively carried by one and the other part of a press, while the matrix or mould is held between the said parts by spring means, said spring means being so devised that the plug cooperates with the open end of the blank before the piston cooperates with the closed end of the same.

In the annexed drawings:

Fig. 1 is a longitudinal section of a blind hollow cylindrical blank.

Fig. 2 is a longitudinal section of the finished article.

Fig. 3 diagrammatically illustrates in longitudinal section a device adapted to press the blank of Fig. 1 into the article of Fig. 2, the parts being shown before the pressing operation.

Fig. 4 is a view similar to Fig. 3, but showing the parts at the end of the pressing operation.

Referring to Figs. 3 and 4, *a* is a mould or matrix in two parts, adapted to open in two halves, each half being shaped to the shape of the finished article of Fig. 2. Matrix *a* is open at its upper and lower end, as shown.

The outer upper end of matrix *a* is conical and adapted to receive a circular cap *b* in one piece which fits on the conical surface and holds the two halves together in spite of internal pressure. Coil springs *c* are interposed between the circular cap *b* and the movable plate *d* of the press.

The matrix *a* rests on a movable plate *e* which is elastically supported by coil springs *f* resting on the fixed plate or table *g* of the press.

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A piston *h* resting on table *g* is engaged into the lower cylindrical open end of matrix *a* through an opening provided in plate *e*. The upper end of piston *h* is shaped to the external profile of the base of the article to be produced (Fig. 2).

Plate *d* carries a movable plug *i* which is passed through cap *b* and is formed with an end shoulder *j* adapted to fit into the flaring open end of the blank (Fig. 1). Plug *i* is tubular and it accommodates an inner axial piston *k* urged downwardly by a compression spring *l*.

The operation is as follows:

There is first prepared a blind hollow cylindrical blank (Fig. 1) by the known pressing methods. This blank forms a hollow pocket with a closed base and its dimensions are exactly determined to permit conversion to the finished article of Fig. 2.

A liquid such as oil or water is poured into the blank and the latter is disposed in the matrix *a*, as illustrated in Fig. 3, and the press is actuated.

Springs *c* and *f* are so determined that plug *i* closes the flaring upper end of the blank before the closed lower end of the latter comes into contact with the upper end of piston *h*. Owing to shoulder *j*, this closure is liquid-tight and when the blank is axially compressed between the plug *i* and piston *h* which plays the role of a lower punch, the body of the blank is inflated within the mould or matrix *a* by liquid pressure.

Any excess of liquid, which would cause overpressure and breakage, is accommodated by piston *k* which rises within plug *i* against the action of spring *l*, the latter being strong enough to withstand the pressure necessary to cause inflation of the blank.

When the operation is finished, matrix *a* is open and the liquid is poured off.

My improved method permits of manufacturing from sheet metal any kind of vessel with a narrow neck, hollow pulleys with triangular groove, household articles, and so on.

I claim:

A device for the shaping of an expanded hollow article from a tubular blank, closed at one end and filled with a liquid, comprising a mold having a shaping cavity, and having opposed bores communicating with said cavity, said mold being openable to permit removal of the shaped article, and said blank being initially received in said bores and passing through said cavity; a closure plug fixable in the open end of the blank to seal the liquid therein and wedge the end of the blank in its associated bore, said plug having an inwardly facing recess; yieldable pressure control

means in said recess contacting the liquid and adapted to fluctuate with volumetric changes within the blank during the shaping process; a shaping piston in the other bore and adapted to operate against the closed end of the blank and forming with the cavity at the end of its inward travel a completed mold shaped to the external form of the expanded article; and means for forcibly moving said shaping piston in the bore toward the cavity.

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