C. H. WERNER.

SHEET METAL CAP.

APPLICATION FILED DEC. 7, 1909.

**975,914.** **Patented Nov. 15, 1910.**

*Fig. 1.*


*Fig. 2.*

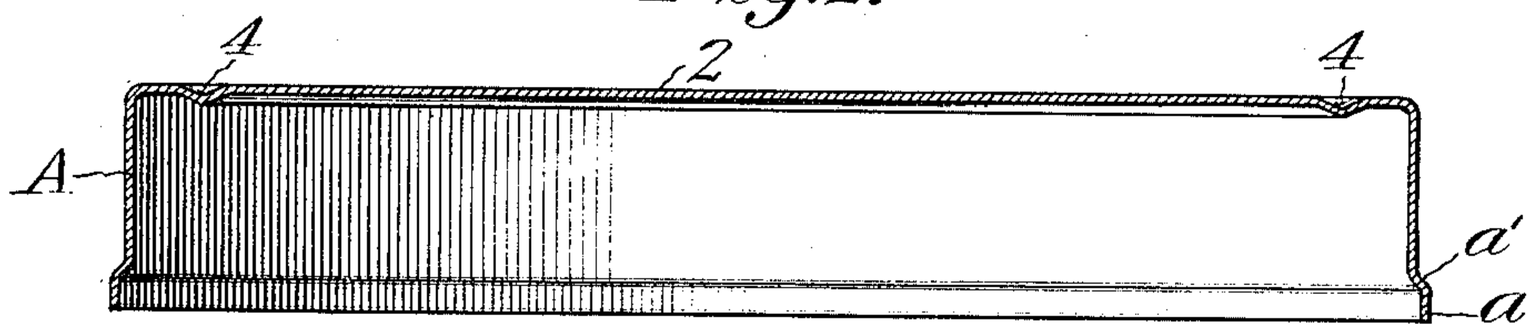



*Fig. 3.*

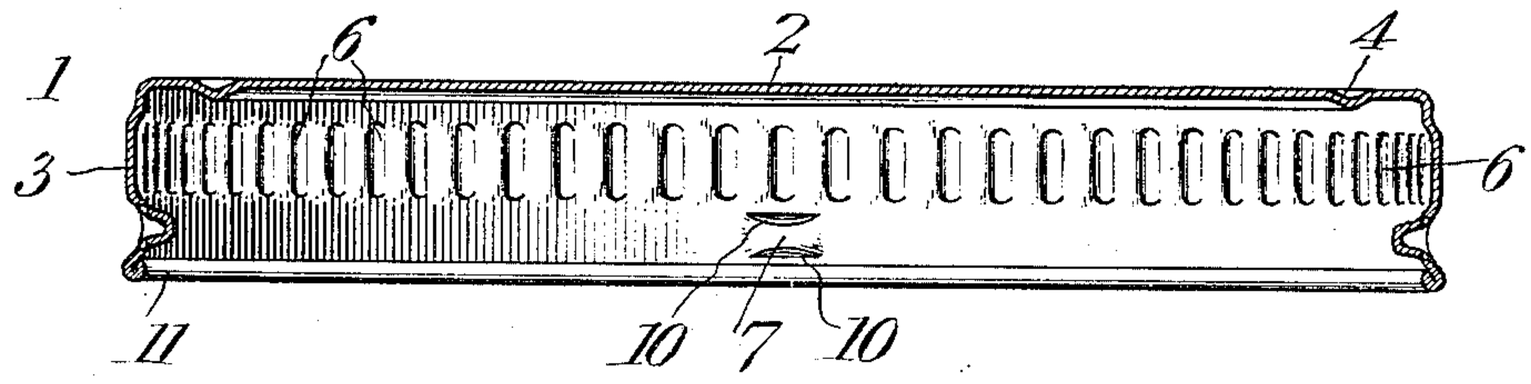



*Fig. 4.*

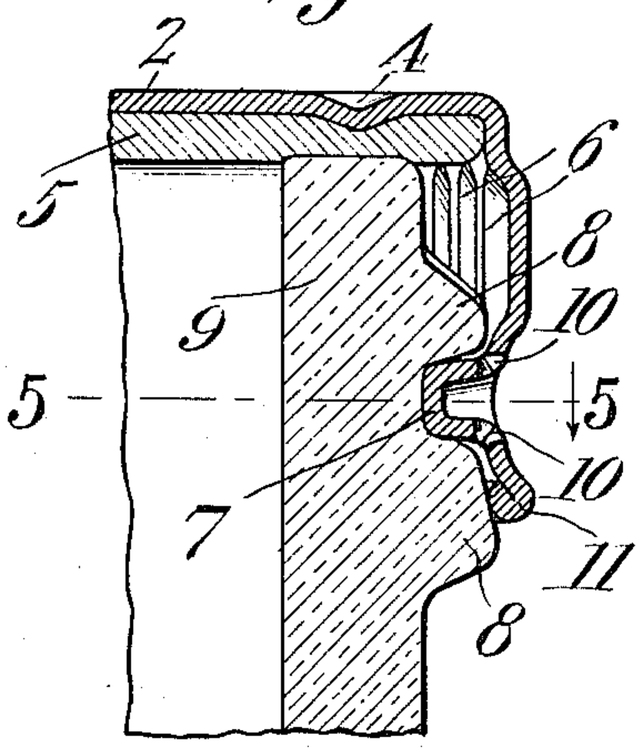
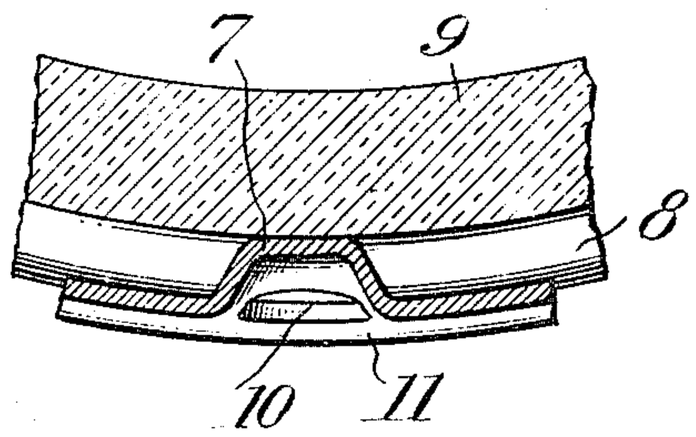



*Fig. 5.*




Witnesses

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# UNITED STATES PATENT OFFICE.

CHRISTIAN H. WERNER, OF NEW YORK, N. Y.

## SHEET-METAL CAP.

975,914. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed December 7, 1909. Serial No. 531,769.

*To all whom it may concern:*

Be it known that I, CHRISTIAN H. WERNER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Sheet-Metal Caps, of which the following is a specification.

This invention relates to sheet metal closure caps for bottles, jars and other like receptacles having separated spiral threads or cam surfaces with which projections upon the cap are adapted to interlock.

One object of the invention is to provide a construction and a method of manufacture by which caps of maximum strength may be made from comparatively thin sheet metal.

Another object of the invention is to provide a cap having inwardly extending locking lugs and a novel form of reinforced lower edge by which the lugs and body portion of the flange of the cap are strengthened to prevent their distortion under the strains imposed upon them.

Still another object of the invention is to provide a cap of the structure described which may be made in two complete operations.

The invention consists of the features of construction, combination and arrangement of parts hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is an edge view of a blank or piece of sheet metal from which the cap is to be made. Fig. 2 is a vertical transverse section through the cap in its first step or stage of formation. Fig. 3 is a similar view of the complete cap. Fig. 4 is a vertical section on an enlarged scale through a portion of the cap applied to a jar. Fig. 5 is a horizontal section on the line 5—5 of Fig. 4.

Referring to the drawing, 1 designates a metal cap of the usual general form and embodying a top or crown portion 2 and a depending annular flange 3, the said crown portion being preferably formed adjacent its outer edge with an annular bead or depressed portion 4 to bear upon and compress the underlying portion of the usual internal sealing disk 5 into close sealing contact with the rim edge of the mouth of the jar or other receptacle.

The upper half or portion of the flange 3 of the cap is provided with an annular series of vertical corrugations 6 forming a milled gripping surface by which the cap may be conveniently manipulated, and serving also as stiffening members by which the strength of the flange is increased. These corrugations are formed by offsetting portions of the flange solely in an outward direction, so that there will be no inwardly extending portions of the corrugations to bind against the threads of the receptacle and interfere with a proper locking action between said threads and the locking lugs on the cap.

Below the corrugations the flange of the cap is provided with a desired number of equidistantly spaced inwardly extending locking lugs or projections 7 to engage spiral threads or cam surfaces 8 formed externally upon the mouth of the jar or receptacle 9 to which the cap is to be applied, by which the cap may be firmly secured in position to form in connection with the sealing disk 5 an effective closure. Each of these lugs is formed by providing in the body of the flange a pair of superposed circumferentially extending slits 10 and indenting the metal disposed between said slits by the action of a forming die. Through this arrangement of the slits and the form of the die each lug or indentation is projected inwardly in the shape of a hollow boss closed at its top, bottom, ends and inner side, said boss being longitudinally curved and having its surfaces rounded so as to snugly fit between the threads 8 and bind against the same and the intervening surface of the wall of the receptacle to insure a firm frictional engagement between them. This construction provides lugs of maximum strength which may bind firmly against the threads without liability of injury to the lugs or distortion of the flange, thus obviating all liability of possible leakage of the cap from distortion of the flange when the threads upon the cap are not perfectly formed. To further strengthen and reinforce the flange of the cap, the lower edge of said flange is turned inwardly and upwardly in the form of a stiffening coil or bead 11 whose folds lie snugly together and stiffen the lower edge of the cap sufficiently to prevent it from being bent or mutilated in application or from the pressure of the threads or surface of the jar on the lugs or indentations 7. This bead or coil is constructed by offsetting the portion of the flange below the plane of the lugs out-

wardly at an angle and then turning into the flange inwardly and upwardly at an angle, so that the coil as a whole will lie within the plane of the flange or with its inner surface flush with the inner face of the flange, by which the coil will be prevented from binding upon the threads and interfering with the application of the cap to a fine binding degree to form an absolutely tight closure. This construction and arrangement of the coil or stiffened bead is of primary importance, on account of the impossibility of making the threads 8 of uniform thickness or extent of projection upon the bottles or receptacles.

In the manufacture of the cap, constructed as above described, a cap body A of the form shown in Fig. 2 is stamped by the action of a die from a flat sheet metal blank B shown in Fig. 1, the flange of which cap body has its lower edge *a* projected outward beyond the plane of the body of the flange by an inclined intervening offset *a'*. The body A is then subjected to the action of a second die which simultaneously forms the corrugations 6 and lugs 7 and inturns the edge *a* below the offset to produce the reinforcing bead or coil 11. By this mode of manufacture the bead is not only arranged so that it will not contact with the threads of the receptacle, but by turning the metal inwardly in its formation the operations of forming the corrugations, lugs and bead may be simultaneously carried out or effected in a single step of manufacture, thus reducing the steps of manufacture from three or four to two, as would be necessary if the bead were formed by turning the metal outwardly, as will be readily understood by those versed in the art. Economy in the manufacture of the caps both from the reduction of steps and the capability of using very thin sheet metal is thus secured, an advantage of considerable importance.

I claim:—

A sheet metal closure cap provided with instruck locking projections, each comprising a substantially truncated triangular hollow boss partially separated from the body of the cap by upper and lower parallel circumferential slits and formed of top, bottom, inner and side walls, the top and bottom walls providing inclined bearing surfaces and the inner wall a curved bearing surface to bind respectively against adjacent threads and the intervening portion of the neck of a receptacle.

In testimony whereof I affix my signature in presence of two witnesses.

CHRISTIAN H. WERNER.

Witnesses:
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