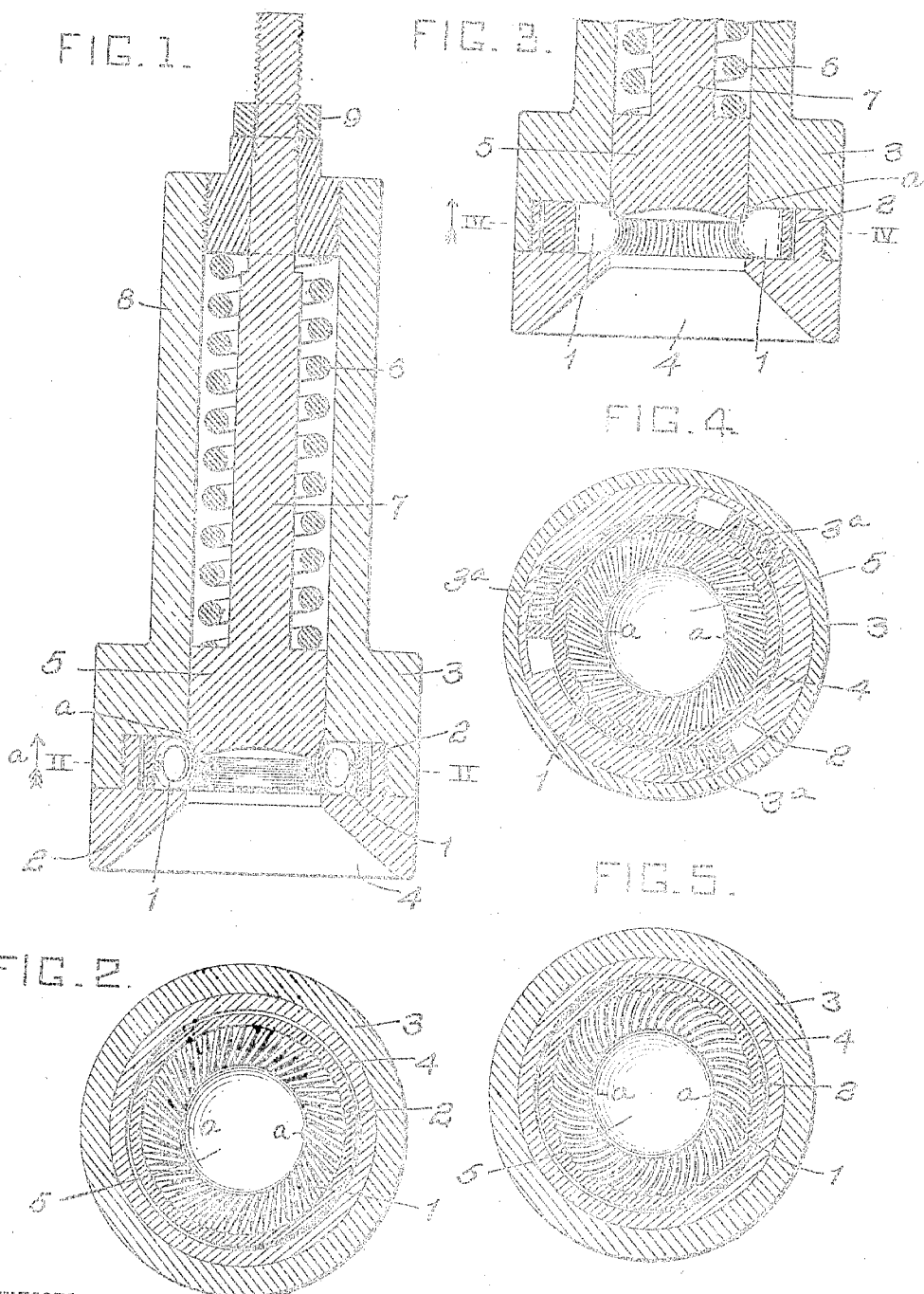


No. 883,128.

PATENTED MAR. 24, 1908.

S. C. BOND.
METAL SHAPING TOOL.
APPLICATION FILED OCT. 29, 1906.



WITNESSES:

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BOND BOTTLE SEALING COMPANY, A CORPORATION OF DELAWARE.

METAL-SHAPING TOOL.

No. 883,128.

Specification of Letters Patent.

Patented March 24, 1908.

Application filed October 29, 1906. Serial No. 341,050.

To all whom it may concern:

Be it known that I, SAMUEL C. BOND, residing at Wilmington, in the county of New-castle and State of Delaware, a citizen of the United States, have invented or discovered certain new and useful Improvements in Metal-Shaping Tools, of which improvements the following is a specification.

The invention described herein relates to certain improvements in tools for effecting a shaping or conforming action on a plastic material, the tool being especially applicable for use in securing metal caps on bottles.

In general terms the invention consists of a tool automatically operative to exert a yielding shaping pressure on the material or article to be operated on.

The invention further consists in a tool having a series of wings or operative members arranged at an angle less than a right angle to the surface to be operated on and resilient means for holding such wings in the normal angular position.

In the accompanying drawings forming a part of this specification, Figure 1 is a sectional elevation of the head of a cap-applying machine having my improved tool arranged therein; Fig. 2 is a sectional view on a plane indicated by the line II—II Fig. 1, looking in the direction of the arrow, *a*; Fig. 3 is a view similar to Fig. 1 having a modified form of tool arranged therein; Fig. 4 is a sectional view on a plane indicated by the line IV—IV Fig. 3; and Fig. 5 is a view similar to Fig. 4, illustrating a further modification of the tool.

In the practice of my invention, the preferred form of tool consists of a spirally wound spring wire. The coils forming the tool on the side portion opposite their operative edges are supported by a wall or abutment 2. These coils are so formed and arranged that the planes passing through the operative ends and the ends bearing on the supporting abutment, will form angles less than right angles to the surface of the material operated. By reason of the angular relation of the coils to the material operated, pressure applied to the operative ends will tend to deflect the coils from their normal angular position, decreasing the angle of the coils to the surface operated on, rather than to flatten or distort the coil. This tendency to lateral movement is resisted by the resilience of the wire which is placed under torsional strain.

In lieu of a series of integrally connected

wings as in the coiled wire, the wings may be formed of a series of thin plates round or oblong in contour as shown in Figs. 3, 4 and 5.

In the construction shown in Fig. 5 the outer ends of the wings bear against a stationary abutment having suitable seats therefor. These wings are so constructed, *i. e.* with a slight camber, that when subjected to end thrust the wings will buckle or bend. Or as shown in Fig. 3 and 4 the wings may be made rigid and being arranged at an angle less than a right angle to the abutment, they will when subjected to end thrust tend to shift the abutment which is movable but yieldingly held as against movement by springs 3^a.

When the abutment 2 is shifted around against the springs 3^a, by pressure on the inner ends of the wings 1, the outer ends of the wings will move with abutment thereby so changing the angular position of the wings that the inner ends can move radially, increasing the internal perimeter of the opening formed by the wings. As will be seen by reference to Fig. 3 the lower end of the plunger 5 normally projects a short distance into the opening formed by the wings, and thereby prevents the latter from movement from normal position except when shifted as stated in the operation of capping.

In applying my improved tool to securing caps on bottles, the abutment 2 is made in the form of a ring inclosing the wings 1, which are arranged to form an annulus having a normal internal diameter somewhat less than the external diameter of the cap to be applied. The tool consisting of the abutment and radially arranged rings, is held within the head 3 by an annular block 4 having a flaring internal opening, the sides of said opening serving as guides in applying the cap. A cap pressing plunger 5 slightly conical and having a diameter at its lower end a little greater than that of the cap, is arranged in the head with its axis in line with the axis of the tool. The plunger is moved to open the tool, when the cap is to be placed therein before being applied to the bottle, by a spring 6 surrounding the stem 7 of the plunger and within the tubular extension 8 of the head. The movement of the plunger into the tool to open the same is regulated by any suitable means, as for example by a nut 9, screwing on to the stem and having a bearing on the tubular extension. As the lower end of the plunger is conical, the opening of

the tool can be adjusted according to the diameter of the cap to be applied.

In order to support the cap within the tool until it is placed on the bottle, one or more notches *a* are formed in the side of the plunger, of a width approximately equal to the thickness of the operative ends of the wings. When the plunger is forced into the tool to spread the same the wing or wings opposite these notches or grooves *a* will not be forced out as far as the other wings and will therefore serve to grip the cap and hold it in position in the tool.

In the form of tool shown in Figs. 1 and 2 the wings of the tool are formed by a spirally coiled wire bent to annular form. The coils or wings are caused to assume a position at an angle to the radii of a circle whose center coincides with the axis of the annulus, by forcing a mandrel into the annulus and then giving it a partial turn, thereby giving the coils or wings a set at an angle to true radial planes. When the tool is opened by the plunger or a cap on a bottle, the force exerted on the operative inner portions or ends of the wings will tend to cause the coils or wings to assume a more angular position, or a position more nearly tangential to the perimeter of the cap or plunger. This shifting of the coils or wings places the wire under torsional strain, which will be sufficient to cause the operative portion of wing or coil to have an effective shaping pressure on the flange of the cap.

While it is preferred that the annular tool should be spread by the plunger to permit the cap being inserted and caused to engage the bottle by the contraction of the tool on the withdrawal of the plunger, it will be understood that the cap may be placed on the bottle and the tool in unexpanded condition forced down over the cap, by shifting the tool relative to the bottle or the latter relative to the head.

It is characteristic of my improvement that the peripheral length of the operative portion of the tool is less than the peripheral length of the cap to be applied, and that it presents a resilient resistance to expansion.

I claim herein as my invention:

1. A tool consisting of a series of wings arranged at an angle less than a right angle to the surface operated on, a wall or abutment for holding the wings in operative relation to the surface operated on and resilient means

for holding the wings in normal angular relation to said surface.

2. An annular tool for applying caps on bottles, having its operative portion formed of a series of independently movable parts arranged at an angle to the radii of the ring formed by said parts and resiliently held in such relation to each other, that the normal length of the inner periphery of the tool is less than the peripheral length of the cap to be applied.

3. A tool for applying caps on bottles having in combination an annular abutment or ring, a series of wings arranged within the abutment at an angle to radii of the ring, and resilient means for holding the wings in normal angular relation to the radii.

4. A tool for applying caps on bottles having in combination an annular abutment or ring, and a series of resilient wings arranged within the ring or abutment at an angle to radii of the ring or abutment.

5. A tool for applying caps on bottles having in combination a ring or annular abutment, and a ring formed of spirally coiled spring wire arranged within the abutment.

6. A means for applying caps on bottles, the combination of a head, an automatically contracting cap applying tool arranged within the head, a plunger for expanding said tool, and resilient means for shifting the plunger.

7. As a means for applying caps on bottles, the combination of a head, an automatically contracting cap applying tool arranged within the head, a plunger having a tapering lower portion, means for adjusting the plunger, and resilient means for shifting the plunger to expand the tool.

8. As a means for applying caps on bottles, the combination of a head, a series of wings arranged in said head to form an annular cap applying tool, resilient means for holding said wings normally in contracted position, a plunger having one or more grooves or notches of a width approximately equal to the thickness of the wings and resilient means for shifting said plunger.

In testimony whereof, I have hereunto set my hand.

SAMUEL C. BOND.

Witnesses:

WILLIAM H. GIBBONS,
H. L. FULLERWILLIS.