A. R. PRIBIL.

PROCESS OF FORMING GREASE CUPS.

APPLICATION FILED MAR. 1, 1912.

1,265,954. Patented May 14, 1918.

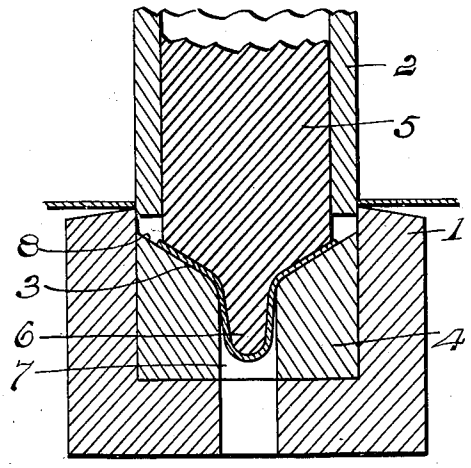


FIG. 1.

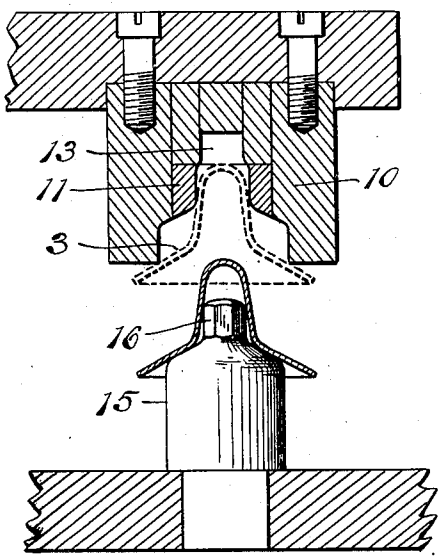


FIG. 2.

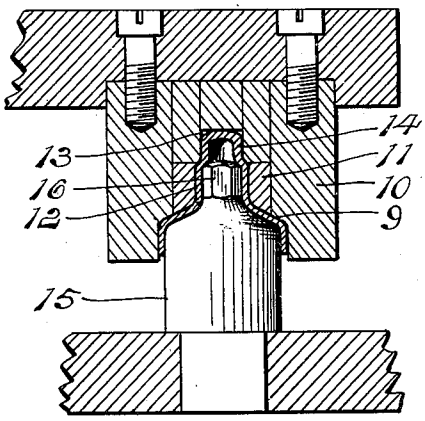


FIG. 3.

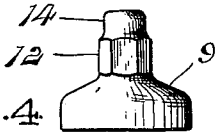


FIG. 4.

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PROCESS OF FORMING GREASE-CUPS.

1,265,954. Specification of Letters Patent. Patented May 14, 1918.

Application filed March 1, 1912. Serial No. 681,001.

To all whom it may concern:

Be it known that I, ALEXIS R. PRIBIL, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Processes of Forming Grease-Cups, of which the following is a specification, reference being had therein to the accompanying drawings.

In forming grease cups and like articles from sheet metal it is desirable that the metal of the extended end or shank portion of the cup be increased in thickness to give added strength and so that it may be screw-threaded without materially weakening the part. It is also desirable that the thickness of the metal forming the body of the cup be maintained so that the cup will not be weakened at its angles and break when a wrench is applied thereto. The object of this invention is to provide a simple process of forming such articles from sheet metal, which process embodies but few steps in the operation and insures the forming of the article with a wall of the proper thickness. The invention consists generally, in first applying pressure to the center only of the blank, to force it into a forming die with the whole body of the metal free to move inward and form around the forming punch, and then applying pressure to a portion of the interior of the partially formed article to force it into a finishing die and to contract and thicken the wall of that portion of the article to which internal pressure is not applied.

In the drawings illustrating the several steps in the operation of carrying out the process embodying the invention,

Figure 1 is a vertical section through a punch and die for use in carrying out the process and showing the punch within the die and the blank partially formed thereby;

Fig. 2 is a similar view of a finishing die with the partially formed blank in place in the die and a broach or male die in position to enter the same;

Fig. 3 is a view similar to Fig. 2 showing the parts in position at the end of the operation and the formed cup in place in the die; and

Fig. 4 is a side elevation of the formed cup detached.

This process of pressing single-piece grease cup bases from flat metal blanks consists in applying pressure to one side only of the central part of the blank and to the opposite side of the outer part of the blank and thereby forming at said central part a hollow elongated projection extending axially from said surrounding part of the blank, applying pressure to opposite sides of the outer part of the blank by opposing circular surfaces of truncated conical form having their radii arranged at an obtuse angle to the longitudinal axis of the hollow projection and thus forming the outer part of the blank into a truncated conical rim extending laterally from the base of the projection, supporting the blank on the interior surface of the inner part of the rim and applying pressure to the exterior surface only of the hollow projection and thereby reducing the diameter of the projection and thickening its wall, applying pressure to the exterior and interior surfaces of the outer part of said rim and thereby forming said outer part into a cylindrical marginal flange having its longitudinal axis coincident with the longitudinal axis of said projection, applying pressure from the interior of the projection outwardly and also against the exterior of the projection near the base thereof for forming the same into a hollow hexagonal shape, and applying pressure to the exterior and interior surfaces of the blank between the cylindrical flange and the base of the projection.

A disk or blank of the proper size to form a grease cup is cut from a sheet of brass, steel or other suitable metal of the desired thickness, by means of a blanking die 1 and a sleeve punch 2 which is forced downward into the blanking die by power applied to its upper end and severs a disk or blank 3 of metal from the sheet.

As a convenient means for carrying out the process of forming this blank into a grease cup, a forming die 4 is provided within the blanking die 1, and the blank when severed falls upon this forming die in position to be engaged at its center by a tapered axial extension or finger 6 on the lower end of a forming punch 5 which is reciprocable within the sleeve 2. The forming die is formed with an axial opening 7 and with an upper end forming surface 8 inclined downwardly toward said opening. The finger 6 of the forming punch enters the opening 7 in the die with a space between it and the wall of the opening, slightly greater than

the thickness of the metal of the blank, and the lower end of the forming punch is formed with an inclined surface or conical end corresponding to the incline of the surface 8 of the die.

The finger 6 of the forming punch thus engages the blank at its center when force is applied to the upper end of the punch to move it into the die, and the blank is forced downward into the die with the body of the blank free to move inward and form around the punch and its projecting finger. As the body of the metal is not held by the punch or die, said metal is not drawn but is formed or swaged into shape by the action of the punch and its thickness is determined by the space between the surface of the punch 5 and the surface of the die. This operation of applying pressure to the center of the blank to form it over the end of the forming punch constitutes the first step in the process embodying the invention.

A post or broach 15 is provided to enter a finishing die 10 and its body is just enough less in diameter than the internal diameter of the outer end of said die so that the projecting edge portion of the conical part 9 of the partially formed blank when placed upon the broach, with said conical part resting upon a conical upper end of the broach, will be bent and formed downward around said body of the broach without stretching or drawing the metal to any great extent but with a compressing or forming-in action. The broach is formed with a hexagonal or other angular end portion 16 integral with its conical end at the axis thereof to enter the member 11 of the die and form the portion 12 of the cup outward therein. This part 16 of the broach is not long enough to enter the inner portion 13 of the chamber of the die and therefore when the blank is forced into the die by the broach, the metal of the end portion 14 of the cup is free to compress and being limited in diameter and length by the walls of said chamber, the end and side walls of said end portion 14 of the cup are materially thickened. Such compression of these walls causes ribs to form upon the inner surface thereof, thus greatly increasing the strength of the part as well as providing ample thickness for cutting a screw-thread thereon. This operation of applying pressure to the interior of a portion of the partially formed blank to press or form that portion of the same outwardly into a finishing die and thereby force the interiorly unengaged portion into the die to compress the metal, constitutes the second step in the process.

In both steps of the process, the metal is bent and formed or swaged into shape, as distinguished from being stretched or drawn, and thus its thickness is maintained in all parts of the body to give the desired strength to all angles, and by compressing the metal forming other portions, the wall is thickened. A minimum of power is required to form cups by this process as very much less power is required to bend and swage metal than to draw it.

Having thus fully described the process embodying the invention and the manner of carrying out such process, what I claim is:—

1. The herein-described process of pressing single-piece grease-cup bases from flat sheet-metal blanks, the same consisting in applying pressure to one side only of the central part of the blank and to the opposite side of a part of the blank surrounding said central part and thereby forming a central hollow elongated projection extending axially from said surrounding part of the blank, applying pressure to opposite sides of the outer part of the blank by opposing circular surfaces having their radii arranged at an angle to the longitudinal axis of the hollow projection, and thus forming a circumferential rim extending laterally from the base of the projection, supporting the blank on the interior surface of the inner part of the rim, and applying pressure to the exterior surface only of the hollow projection and thereby reducing its diameter and thickening its wall, applying pressure to the exterior and interior surfaces of the outer part of the circumferential rim and thereby forming said outer part into a cylindrical flange having its longitudinal axis coincident with the longitudinal axis of said projection, and applying pressure from the interior of the base of the projection outwardly and also against the exterior of the base of said projection for forming said base into a hollow hexagonal shape, substantially as and for the purpose described.

2. The herein-described process of pressing single-piece grease-cup bases from flat sheet-metal blanks, the same consisting in applying pressure to one side only of the central part of the blank and to the opposite side of the outer part of the blank and thereby forming at such central part a hollow elongated projection extending axially of the blank from said opposite side of the outer part of the blank, applying pressure to opposite sides of the outer part of the blank by opposing circular surfaces of truncated conical form having their radii arranged at an obtuse angle to the longitudinal axis of the hollow projection, and thus forming the outer part of the blank into a truncated conical rim extending laterally from the base of the projection, supporting the blank on the interior surface of the inner part of the rim and applying pressure to the exterior surface only of the hollow projection and thereby reducing its diameter and thickening its wall, applying pressure to the exterior and interior surfaces of the outer part of said

rim and thereby forming said outer part into a cylindrical flange having its longitudinal axis coincident with the longitudinal axis of said projection, applying pressure from the interior of the projection outwardly and also against the exterior of the projection near the base thereof for forming the same into a hollow hexagonal shape, and applying pressure to the exterior and interior surfaces of the blank between the cylindrical flange and the base of the projection, substantially as and for the purpose set forth.

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

ALEXIS R. PRIBIL.

Witnesses:
ANNA M. DORR,
LEWIS E. FLANDERS.