Dec. 27, 1932. B. STOCKFLETH 1,892,175

METHOD OF MAKING BEARING SLEEVES

Filed June 10, 1929 2 Sheets-Sheet 1

Fig. 1.

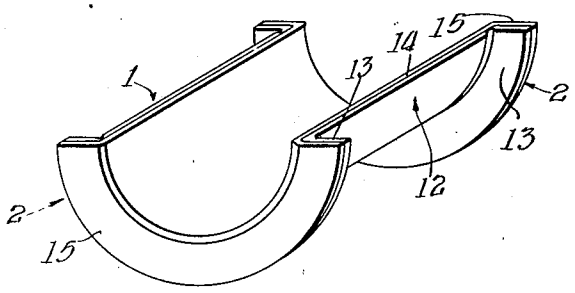


Fig. 2.

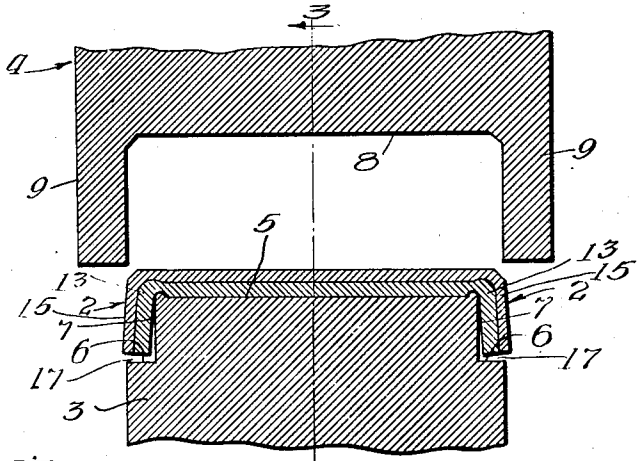
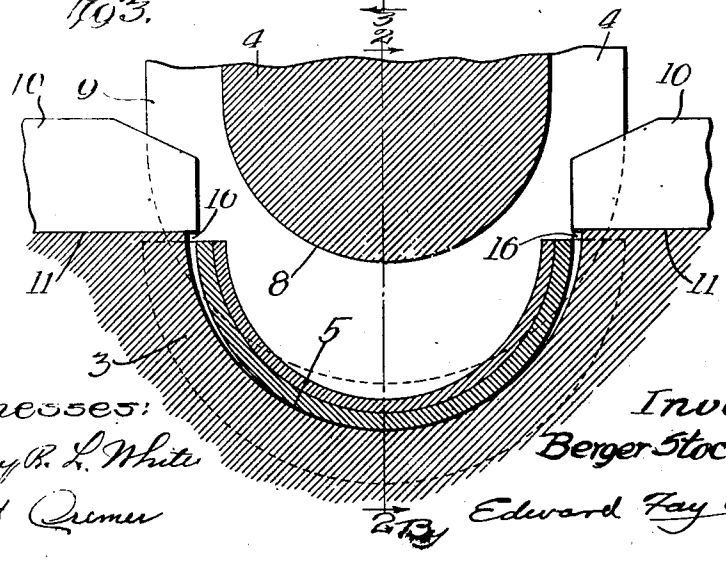


Fig. 3.



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Fig. 4.

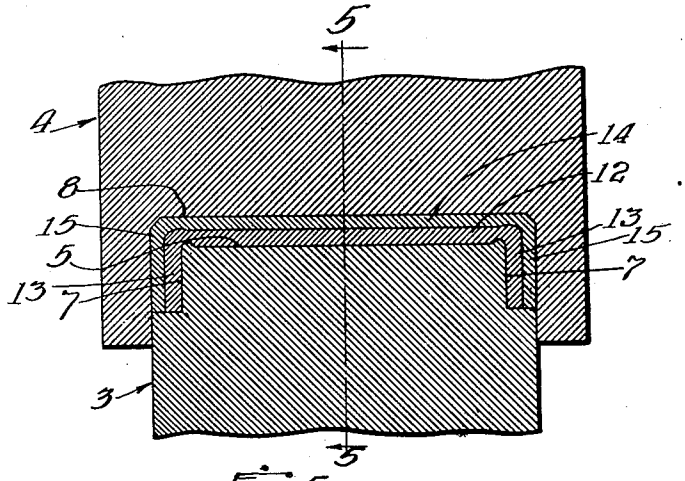


Fig. 5.

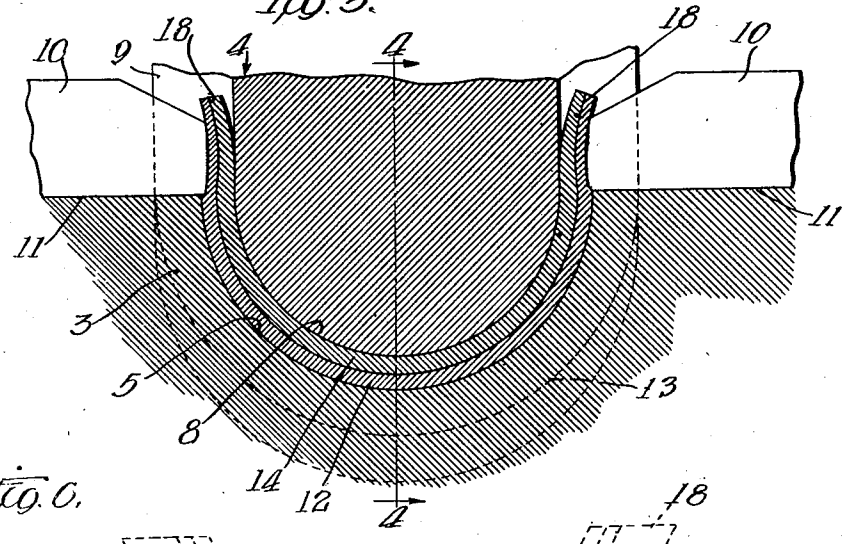
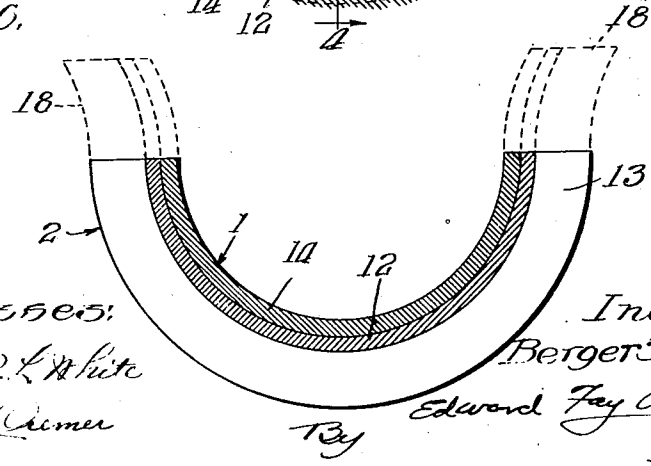


Fig. 6.



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Patented Dec. 27, 1932 1,892,175

UNITED STATES PATENT OFFICE

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METHOD OF MAKING BEARING SLEEVES

Application filed June 10, 1929. Serial No. 369,714.

This invention relates to improvements in methods and processes of making removable bearing shells of the kind which have stiff metal backs and bearing metal linings and has to do especially with the stiff backs which have end flanges.

The backs to which this invention relates are semi-cylindrical and are usually, though not necessarily, formed up out of sheet metal, the flanges being formed to project substantially radially. In the finished sleeves, the flanges project exactly radially.

In preparing the backs for making sleeves, I form the flanges flared outwardly a slight amount. This enables me to drop the blank or uniformed bearing into the die, and it drops easily and freely down to its place, ready for the punch to descend.

Another feature of importance relates to the diameter of the blank. As it is desired to drop the blank freely into the die and then to close certain die parts over the edges of the blank, I purposely make the blank of smaller diameter than the die space, and I also purposely make the blank of less height than the depth of the die opening in the lower die block for the purpose above mentioned. The pressure forming operation in the dies not only enlarges the shell to the required diameter but also lengthens the blank circumferentially so that it fills the die opening. It is preferably more than a half cylinder when it leaves the dies, the surplus being removed in a later operation.

The invention will be more readily understood by reference to the accompanying drawings forming part of this specification and in which:—

Fig. 1 is a perspective view of a finished semi-cylindrical bearing made in accordance with this invention;

Fig. 2 is a fragmentary longitudinal section, on the line 2—2 of Fig. 3, of a pair of die members with a rough blank therein;

Fig. 3 is a fragmentary transverse section on the line 3—3 of Fig 2;

Fig. 4 is a section similar to Fig. 2 but showing the dies closed;

Fig. 5 is a section similar to Fig. 3 but showing the dies closed; and

Fig. 6 is a transverse section of a finished bearing sleeve, the exuded portions being shown in dotted lines.

The finished sleeve 1, shown in Fig. 1, is semi-cylindrical and has end flanges 2. These sleeves are formed by the pressure method; that is, a roughly formed or sized blank sleeve is placed in suitable die members and these are then closed under very heavy pressure, and the rough sleeve is squeezed to the dimensions desired.

The dies consist of a lower die block 3 and an upper plunger member 4. The lower die block has a die opening with a semi-cylindrical lower end 5 for forming the outer side of the cylindrical part of the sleeve and circumferential end grooves 6 for forming the inner sides of the flanges 2. The vertical faces 7 of the end grooves 6 are at right angles to the surface 5. The upper die member or plunger 4 has a half cylindrical lower end 8 for entering the lower die and forming the inner surface of the bearing sleeve. At the ends of the upper die member, it is provided with depending flanges 9 which are adapted to pass down along the ends of the lower member and close the end grooves 6, as best shown in Fig. 4.

For the purpose of retaining the bearing being formed in the lower die member, side die members 10 are provided, which are adapted to be moved in transversely to overlap slightly the sides of the die space 5, as shown in Figs. 3 and 5. The lower faces 11 of these side members lie flat on the top of the lower die member, and the opening 5 in the lower die member is a half cylinder or more in depth.

The necessity for rapidity in operation which is required by the modern high pressure production necessitates that each operation be accomplished as easily and as quickly as possible, the accurate results wanted being taken into consideration.

The sleeve 1 is preferably formed of a harder metal back 12 having end flanges 13 and an inner lining 14 of relatively softer bearing metal such as Babbit metal. The bearing metal is formed around and covers the outer surfaces of the end flanges 13, as shown at 15,

thus completing the end flanges 2 of the bearing sleeve 1.

For the purpose of permitting the easy placement of the rough blank in the die for being formed, the end flanges 13 of the back 12 are formed slightly flared, as best shown in Fig. 2, being spread slightly more at their peripheries than the width of the lower die between the end walls 7. Also, the radius of the body of the rough blank is slightly less than the radius of the die opening 5, as best indicated in Fig. 3. It will now be clear that the rough blank can be freely inserted into the opening in the lower die as it does not fit tightly at any point.

Furthermore, as the side members are located on the top surface of the lower member, the rough blank is made of less height than the depth of the die opening 5, as best shown in Fig. 3, leaving clearance spaces 16 between the upper edges of the blank and the lower surfaces of the side die members and permitting the setting in of the side die members without necessitating any great accuracy in the placement of the rough blank in the die opening 5.

A further point to assist in the rapidity, ease and accuracy of operation and production relates to the flanges 2 of the rough blank. These are slightly smaller in radius than the finished flanges 2, so that, when the blank is set in the lower die member, as shown in Fig. 2, there is a slight clearance between the peripheries of these flanges, as shown at 17. But in the step of closing the dies, pressure is applied sufficient to force the material of the flanges to completely fill the whole of the end grooves 6, as best shown in Fig. 4, and accurately size same.

As shown in Fig. 4, the side parts or depending flanges 9 on the upper die member 4 close the end grooves 6 and force the flanges of the bearing in against the end surfaces 7. As shown in Fig. 5, the plunger 4 squeezes the blank, reducing it radially and expanding it circumferentially to such an extent that the backing 12 and lining 14 are forced out of the die space between the inner ends of the side members 10 and the sides of the plunger 4, as shown at 18, Fig. 5. In this operation, the blank is forced out against the wall of the die opening 5, and the surfaces of the bearing are caused to accurately conform to the surfaces of the die members except as to the lateral edges, which are extruded as explained above. These extruded portions are later cut off as indicated in Fig. 6, leaving a half cylindrical bearing sleeve.

It is thus seen that the rough blank is made smaller than the finished bearing sleeve in radius and circumferential dimensions and also as to the radius of the flanges, and that the flanges on the blank are formed slightly flared and that all of these combined assist in the free and easy placement of the blanks in the dies and consequently assist in the rapidity of production.

As many modifications of the invention will readily suggest themselves to one skilled in the art, the invention is not limited or confined to the specific details of construction or arrangement or combinations of parts herein shown and described.

I claim:

1. A blank back for use in making a bearing shell by the pressure method, the blank having end flanges, the inner surfaces of the end flanges being slightly flared as and for the purpose specified.

2. A blank back formed up out of sheet metal for use in forming a bearing shell by the pressure method, the back formed with end flanges which slightly flare outwardly.

3. The herein described method of making bearing sleeves which consists in providing stiff backs with end flanges which flare outwardly slightly, adding an inner lining of bearing metal, the lining extending over the outer faces of the flanges, placing the bearings in a die mechanism having a die block to receive the back of the sleeve and parallel end walls over which the end flanges lap and forcing the end flanges in against the ends of the die block to bring them into parallelism.

4. The herein described method of making half cylindrical bearing sleeves provided with end flanges, which consists in providing rough blanks having end flanges of less diameter than the finished flanges and by pressure enlarging the diameter of the flanges to the desired finished size.

5. The herein described method of making half cylindrical bearing sleeves provided with end flanges, which consists in providing rough blanks having end flanges of less diameter than the finished flanges and flared slightly outwardly and by pressure forming the flanges in parallelism and enlarging their diameter to the desired size.

In testimony whereof, I have hereunto set my hand this 28th day of May, 1929.

BERGER STOCKFLETH.