Nov. 13, 1923. 1,474,073

J. DLESK

DIES FOR FORMING BALL RETAINERS

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Fig. 1.

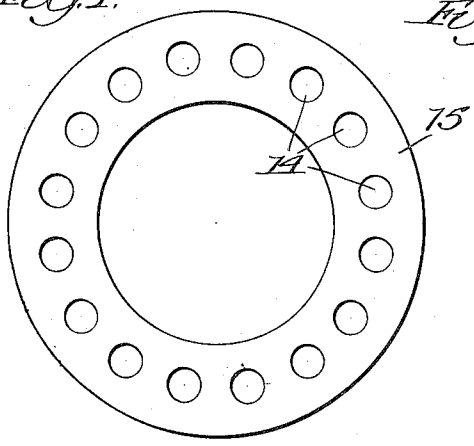


Fig. 2.

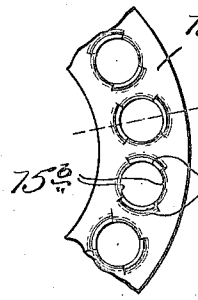


Fig. 3.

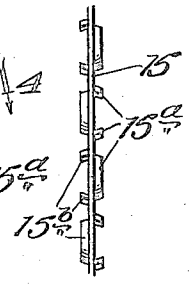


Fig. 4.

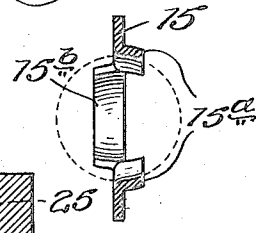


Fig. 5.

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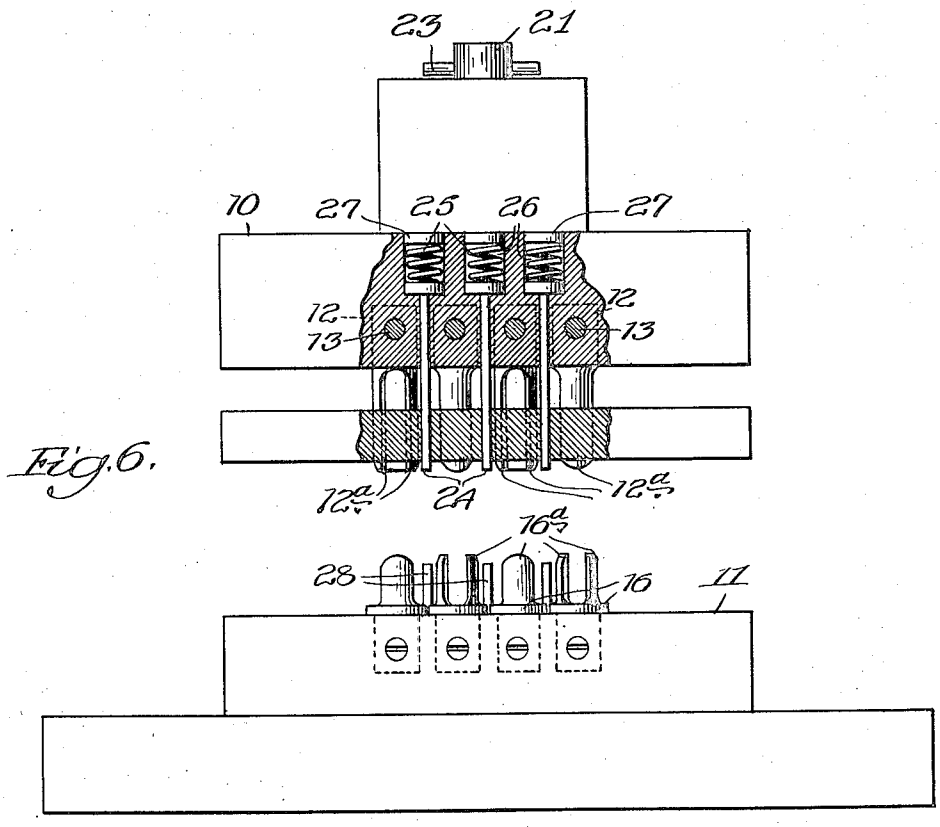


Fig. 6.

Fig. 7.

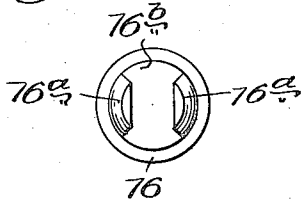
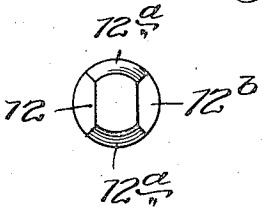


Fig. 8.



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Patented Nov. 13, 1923. 1,474,073

UNITED STATES PATENT OFFICE.

JOHN DLESK, OF BERWYN, ILLINOIS, ASSIGNOR TO U. S. BALL BEARING MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DIES FOR FORMING BALL RETAINERS.

Application filed March 4, 1922. Serial No. 541,148.

To all whom it may concern:

Be it known that I, JOHN DLESK, a citizen of the United States, residing at Berwyn, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Dies for Forming Ball Retainers, of which the following is a specification.

This invention relates to dies for forming ball retainers and the like, and particularly those which are used in thrust bearings.

The invention is fully described in the following specification and shown in the accompanying drawings, in which Figure 1 is a front elevation of a blank before being acted upon by the die forming this invention, Fig. 2 is a partial elevation of the same after it has been acted upon by the dies, Fig. 3 is a partial side elevation of the retainer shown in Fig. 2, Fig. 4 is an enlarged section on the line 4 of Fig. 2, Fig. 5 is a longitudinal section through the die blocks, Fig. 6 is a side elevation of the same, and Figs. 7 and 8 are enlarged end views of the lower and upper die elements, respectively.

The embodiment illustrated consists of upper and lower die blocks 10 and 11, respectively, which are secured in any suitable manner in a press, not shown.

The upper die block has a series of die elements 12 secured therein in any suitable manner, as by means of screws 13, and so arranged as to correspond to one of the holes 14 in the retainer blank 15, which is shown in Fig. 2. Each die element 12 has two prongs 12^a, the outer surface of which is substantially cylindrical and cut through longitudinally with slots, the edges of which radiate from the center of the cylinder and are substantially 90° apart.

Similarly formed die elements 16 are secured in the lower die block 11, and have prongs 16^a. The die elements 12 are preferably placed so that the prongs alternately face toward the center of the die and at right angles to it, and the die elements 16 are each arranged at right angles to the die elements 12, so that the prongs 12^a pass down through the slots 16^b between the prongs 16^a. The ends of the prongs are made semispherical, so that as they pass through the blank, which is placed with a hole 14 between each of the opposing pairs of die elements, the lips 15^a which are turned up and the lips 15^b which are turned down will have a generally spherical form as shown in Figs. 3 and 4.

A pressure plate 17 is carried by the upper die block 10 and has a series of openings 18, through which the die elements 12 pass. A shoulder 19 is formed thereon, which is guided in the counter-bore 20. A pin 21 is secured to the shoulder 19 and passes axially through the upper die block 10. A spring 22 tends to force the pressure plate 17 down and it is normally retained in the position shown by means of the pin 23, which strikes the upper end of the die block 10.

An ejector pin 24 is preferably placed between each of the die elements 12 and is slidably guided in alined openings in the die block 10 and the pressure plate 17. Each pin is acted upon by a spring 25 in a hole 26, the upper end of which is closed by means of a plug 27.

Similar ejector pins 28 are placed in the lower die block 11 and these are pressed upwardly by means of springs 29.

The method of operation of this device is as follows: The die blocks are normally held separated in the machine in the position shown in Fig. 5. The blank 15, shown in Fig. 1, is placed upon the upper ends of the prongs 16^a of the lower die element, the holes 14 falling over these elements. The upper die block 10 is then forced down upon the blank and the prongs 12^a forced a predetermined distance into the prongs 16^a of the lower die elements, thereby forming the ball retainer as shown in Fig. 2. Upon raising the die block 10, the prongs are withdrawn from the ball retainer and the ejector pins 24 and 28 force the retainer off any prongs that have a tendency to stick. The purpose of the pressure plate 17 is to hold the blank 15 flat and prevent it from buckling during the time the dies are being forced together.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Change, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible in view of the prior art.

What I claim as new and desire to secure by Letters Patent, is:

1. A die for forming ball retainers comprising opposing blocks, each carrying a die element, each of said elements having a plurality of prongs, said prongs being spaced a distance equal to the width of the opposing prongs, each prong forming a segment of a circle, so that as said elements approach each other, the prongs of one element telescope upon the prongs of the other.

2. A die for forming ball retainers comprising opposing blocks, each carrying a plurality of die elements, each of said elements having two opposed prongs, each prong forming substantially one-fourth of a circle, so that as said elements approach each other, the prongs of one element telescope upon the prongs of the other.

3. A die for forming ball retainers comprising opposing blocks, each carrying a plurality of die elements, each of said elements having two opposed prongs terminating in spherical points, each prong forming substantially one-fourth of a circle, so that as said elements approach each other, the prongs of one element telescope upon the prongs of the other.

JOHN DLESK.