

No. 645,716.

Patented Mar. 20, 1900.

E. F. CREAGER.  
RETAINER FOR BALL BEARINGS.

(Application filed May 1, 1899. Renewed Feb. 17, 1900.)

(No Model.)

Fig. 2.

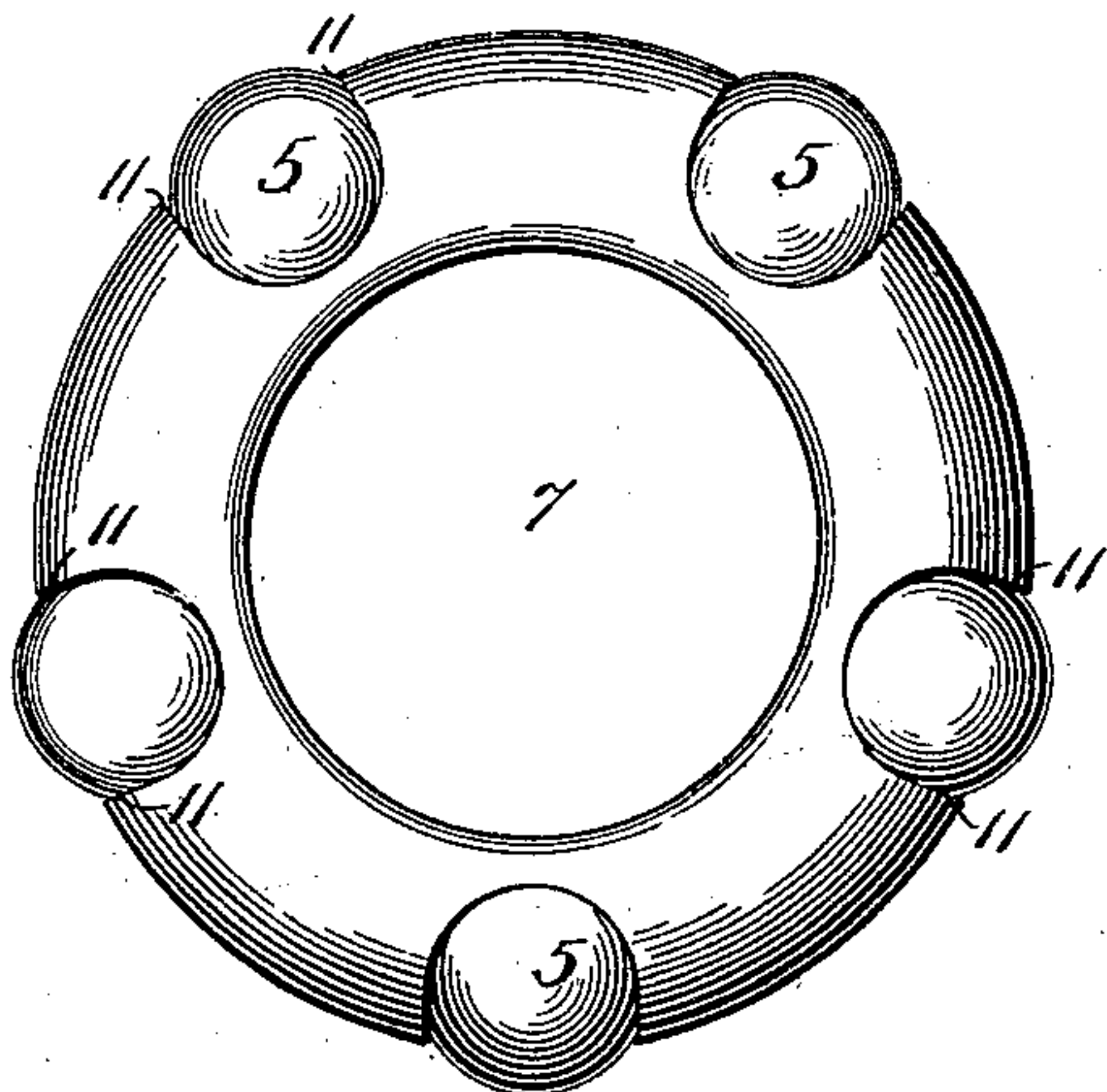


Fig. 3.

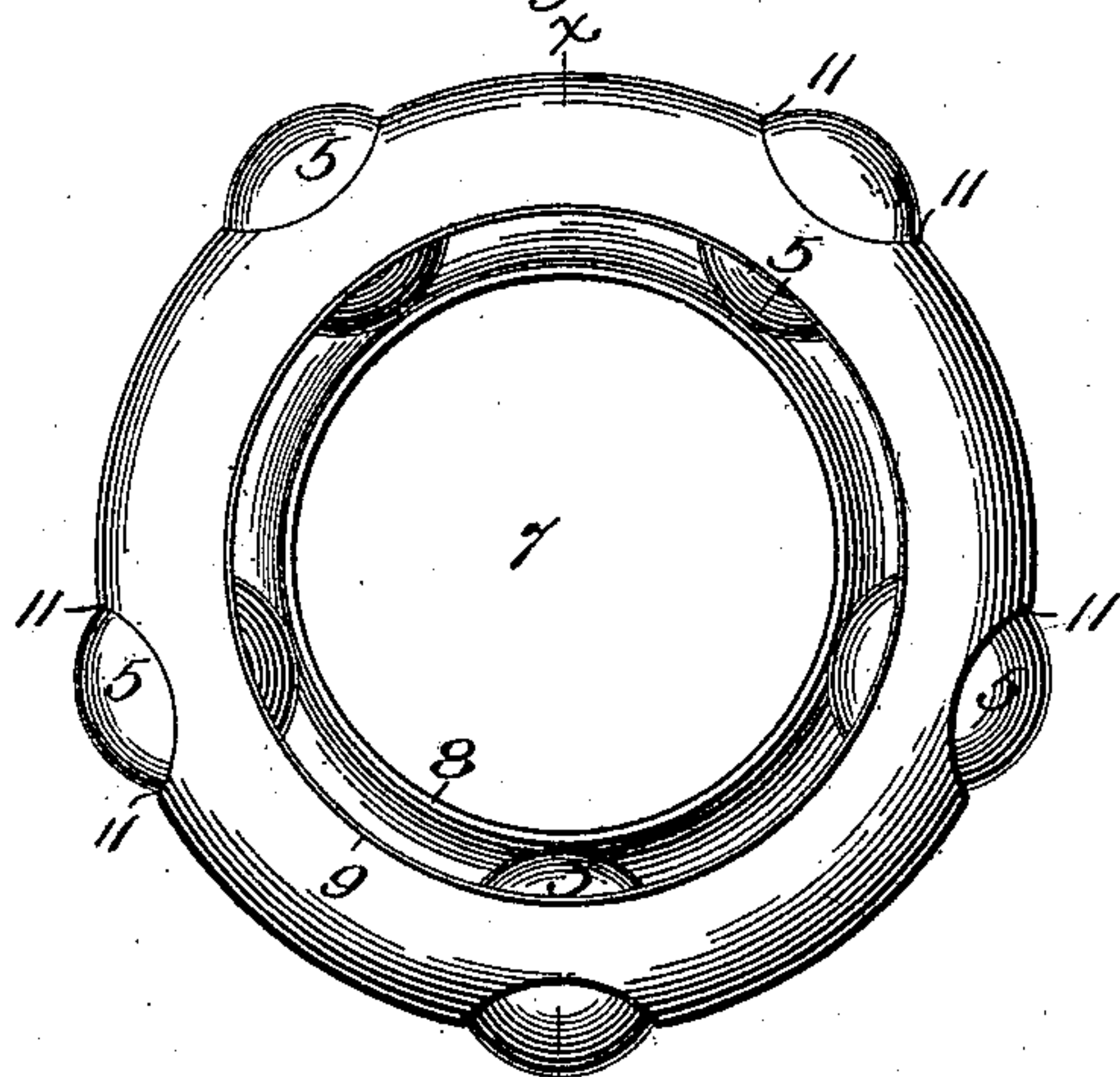


Fig. 4.

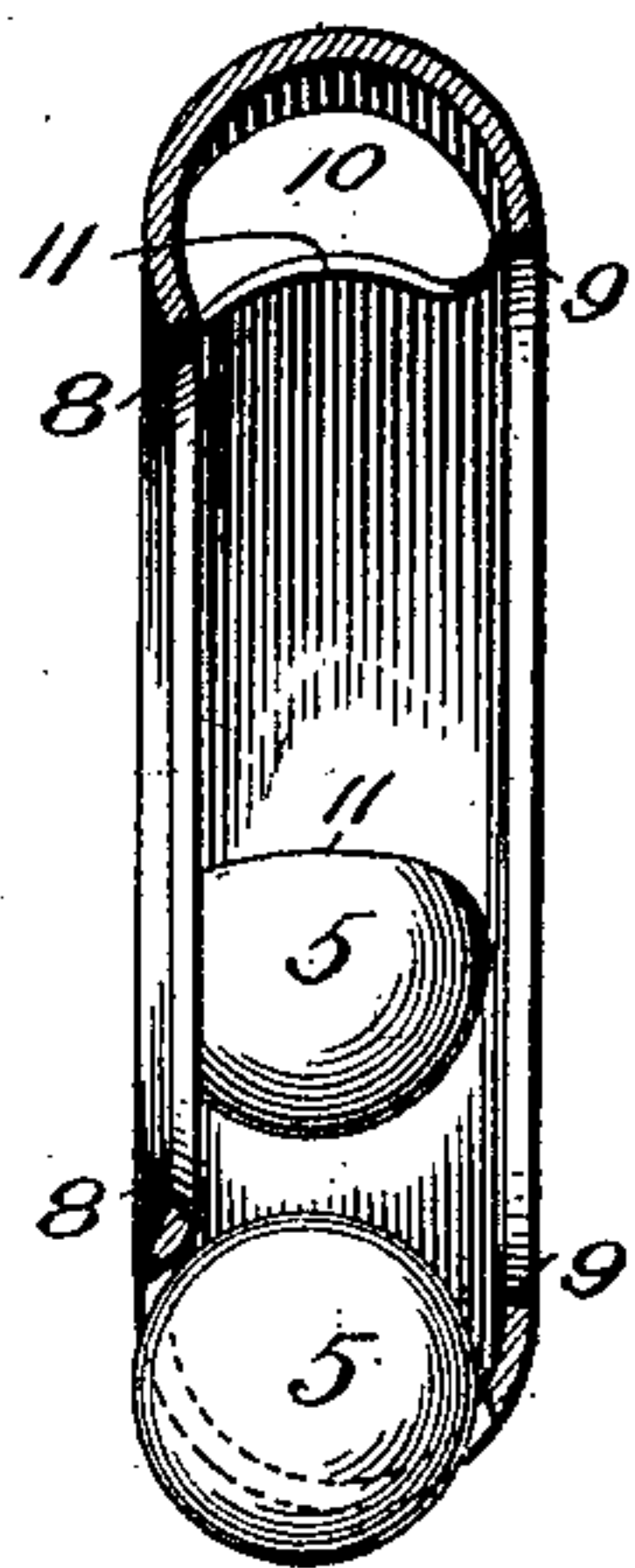
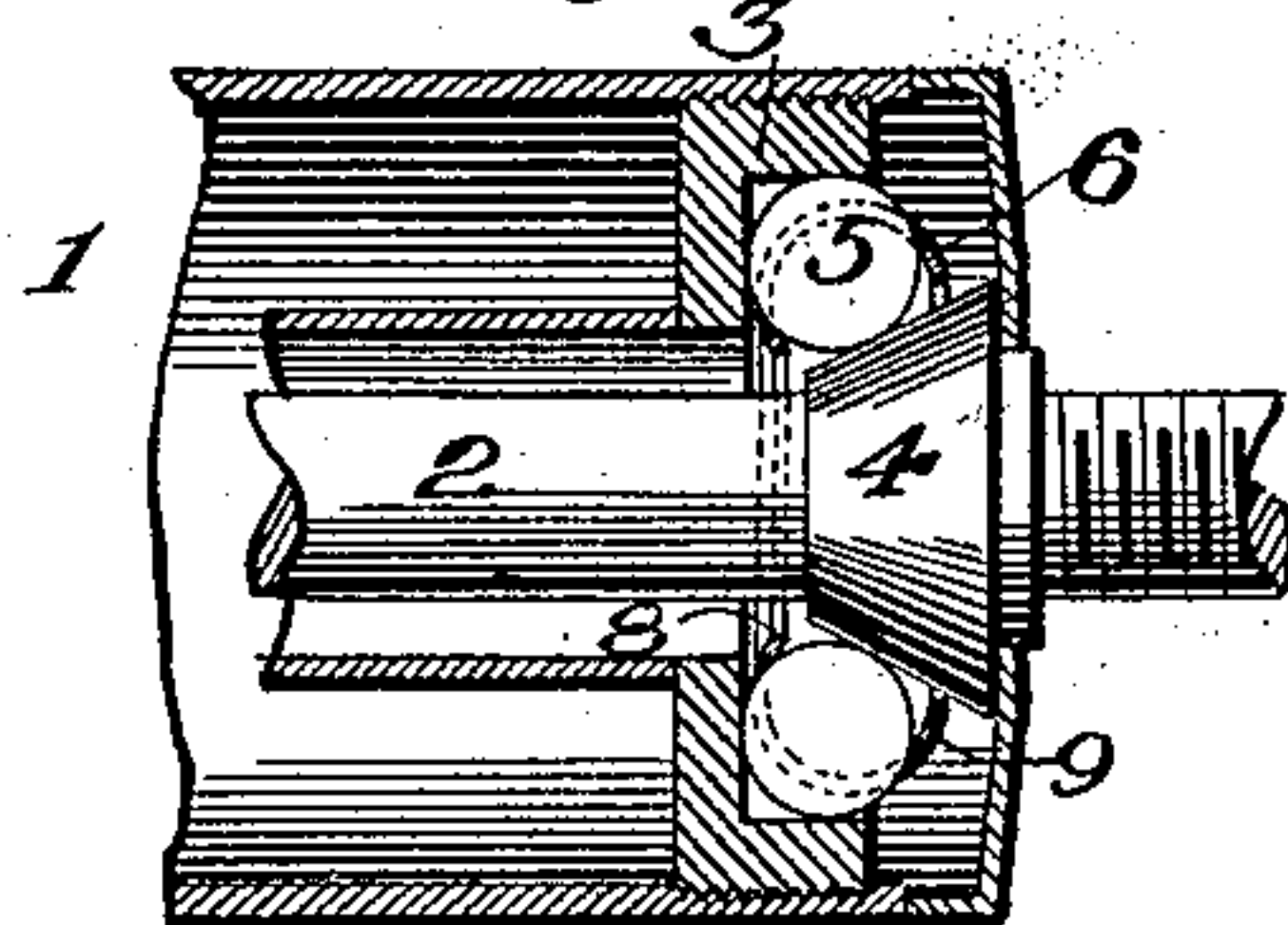


Fig. 1.



Witnesses  
Jos. C. Stack  
Rufus W. Thayer

Inventor  
E. F. Creager  
Walter R. Rogers  
Attorney



# UNITED STATES PATENT OFFICE.

EDWIN FRANCIS CREAGER, OF LANCASTER, PENNSYLVANIA.

## RETAINER FOR BALL-BEARINGS.

SPECIFICATION forming part of Letters Patent No. 645,716, dated March 20, 1900.

Application filed May 1, 1899. Renewed February 17, 1900. Serial No. 5,650. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN FRANCIS CREAGER, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Retainers for Ball-Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in ball-bearings, and particularly to separators and retainers to be used with ball-bearings. Its object is to provide a retainer which may be easily manufactured, shall be applicable to ball-bearings generally, and shall give the greatest freedom to the balls in action.

It consists, essentially, of a perforated ring substantially in the form of a tubular annulus.

In the accompanying drawings, Figure 1 is a longitudinal section of an approved form of hub with the retainer and separator applied. Fig. 2 is, with reference to Fig. 1, an inner view of the retainer. Fig. 3 is an outer view, and Fig. 4 is a central vertical section on the line *xx* of Fig. 3.

In the drawings, 1 designates a hub; 2, a shaft or axle; 3, a cup or ball-chamber; 4, a cone; 5, antifriction-balls, and 6 the retainer as a whole.

7 is an axial perforation.

8 is a smaller circumference of the perforation.

9 is the larger circumference, 10 perforations substantially oblong or elliptical in form to receive the ball, and 11 the short axis of the perforations 10.

The retainer may be formed of metal cast, spun, or stamped in any approved manner, and I may form the retainer from a templet or plate in which the axial perforation 7 and the ball-receiving perforations 10 have been formed. The short axis 11 of each perforation 10 is less than the diameter of the ball it is to receive, so that it may guard or retain the ball in one direction. The ring is substantially in the form of a tubular annulus minus a segment. In the example shown the contact wall or circumference 8 is of less diameter than the opposing wall or circumfer-

ence 9. This, as shown in Fig. 1, permits the retainer to readily adapt itself to the action of a cone. The walls 8 and 9 approach each other, so that they are a less distance apart than the length of the diameter of a ball. In other words, the retainer is in the form of a hollow ring open at its inner side and provided at its periphery with openings of a size to allow the balls to project only partially beyond the ring, the edges of the ring at its open side being spaced apart a less distance than the diameter of a ball to allow the balls to project through the open side and yet to retain them in the openings.

In accompanying applications of even date I have more fully defined the principles of guarding balls by perforations in one direction and by approaching walls in the other direction. This application is a specific form within the broad claims of the accompanying application.

I have used the word "retainer" throughout the specification as a convenient term to designate a device having the functions of both a retainer and a separator—that is, a cage for holding all the balls in place when removed from the hub and preventing contact of the balls in action.

Having fully described my invention, what I claim is—

1. A ball-retainer comprising a ring substantially in the form of a curved tubular annulus minus a segment so that it has two opposing walls to retain balls in one direction and perforations to receive and retain balls in the opposite direction.

2. A ball-retainer comprising a ring substantially in the form of a curved tubular annulus minus a segment so bent that it has two opposite walls in different meridians to retain balls and perforations to receive and to retain balls in the opposite direction.

3. A ball-retainer comprising a ring substantially in the form of a tubular annulus having perforations to receive and retain balls in one direction and approaching circular walls of different diameters to retain its balls in the opposite direction.

4. A ball-retainer comprising a ring substantially in the form of a tubular annulus minus an interior segment, having perforations to receive and retain balls in one direc-

tion and continuous opposing walls to retain balls in the opposite direction.

- 5 5. A ball-retainer in the form of a hollow ring, open at its inner side and provided at its periphery with openings of a size to allow the balls to project only partially beyond the ring, the edges of the ring at its open side being spaced apart a less distance than the diameter of a ball to allow the balls to pro-

ject through the open side and yet to retain to them in the openings.

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

EDWIN FRANCIS CREAGER.

Witnesses:

JAS. F. ERISMAN,  
CHAS. H. FLICK.