No. 785,150. PATENTED MAR. 21, 1905.

C. H. CHAPMAN.

RETAINER AND SPACER FOR BALL BEARINGS.

APPLICATION FILED DEC. 18, 1902. RENEWED DEC. 7, 1903.

2 SHEETS—SHEET 1.

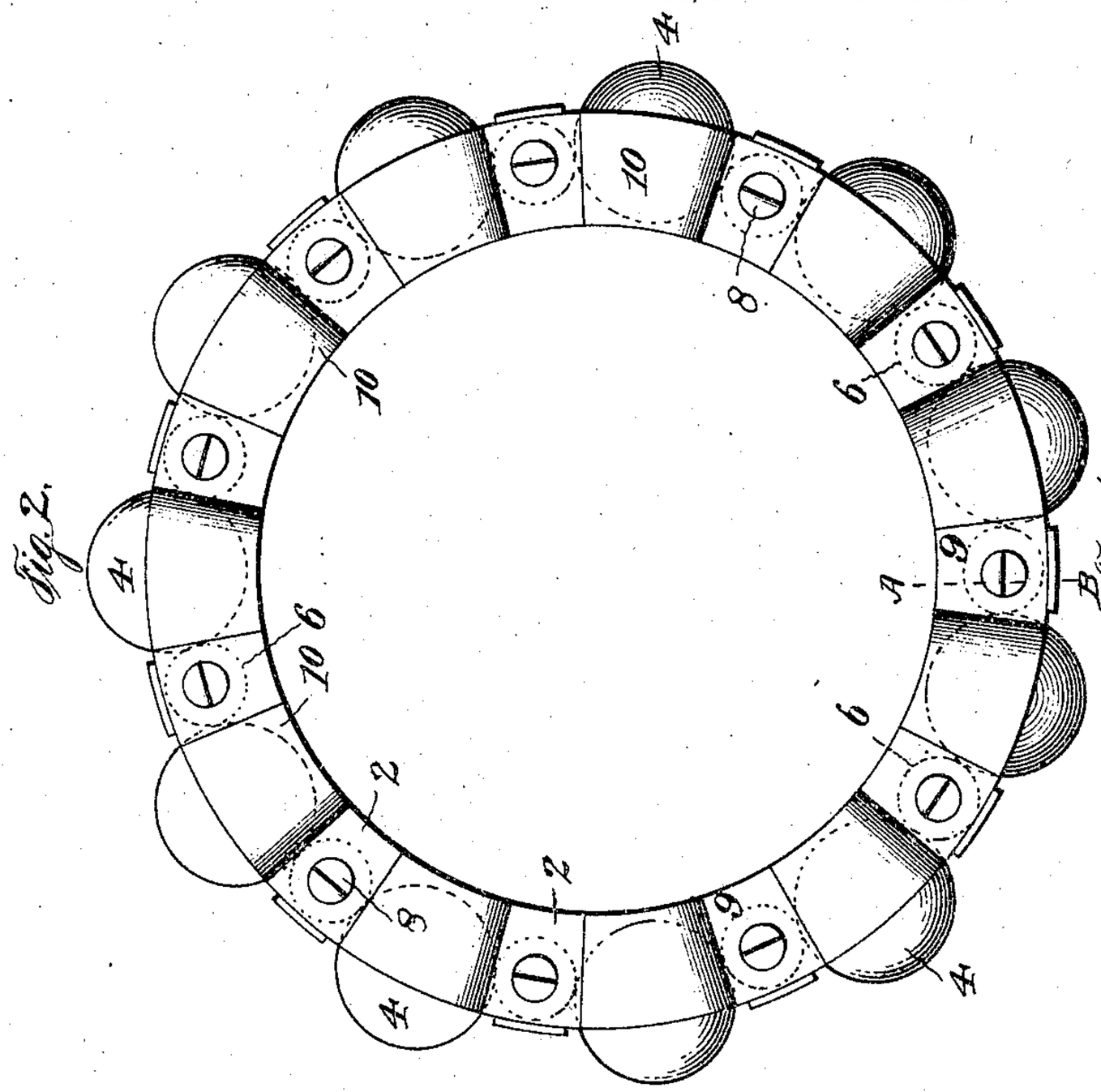

Fig. 2.

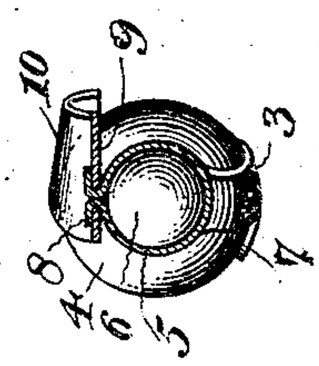

Fig. 4.

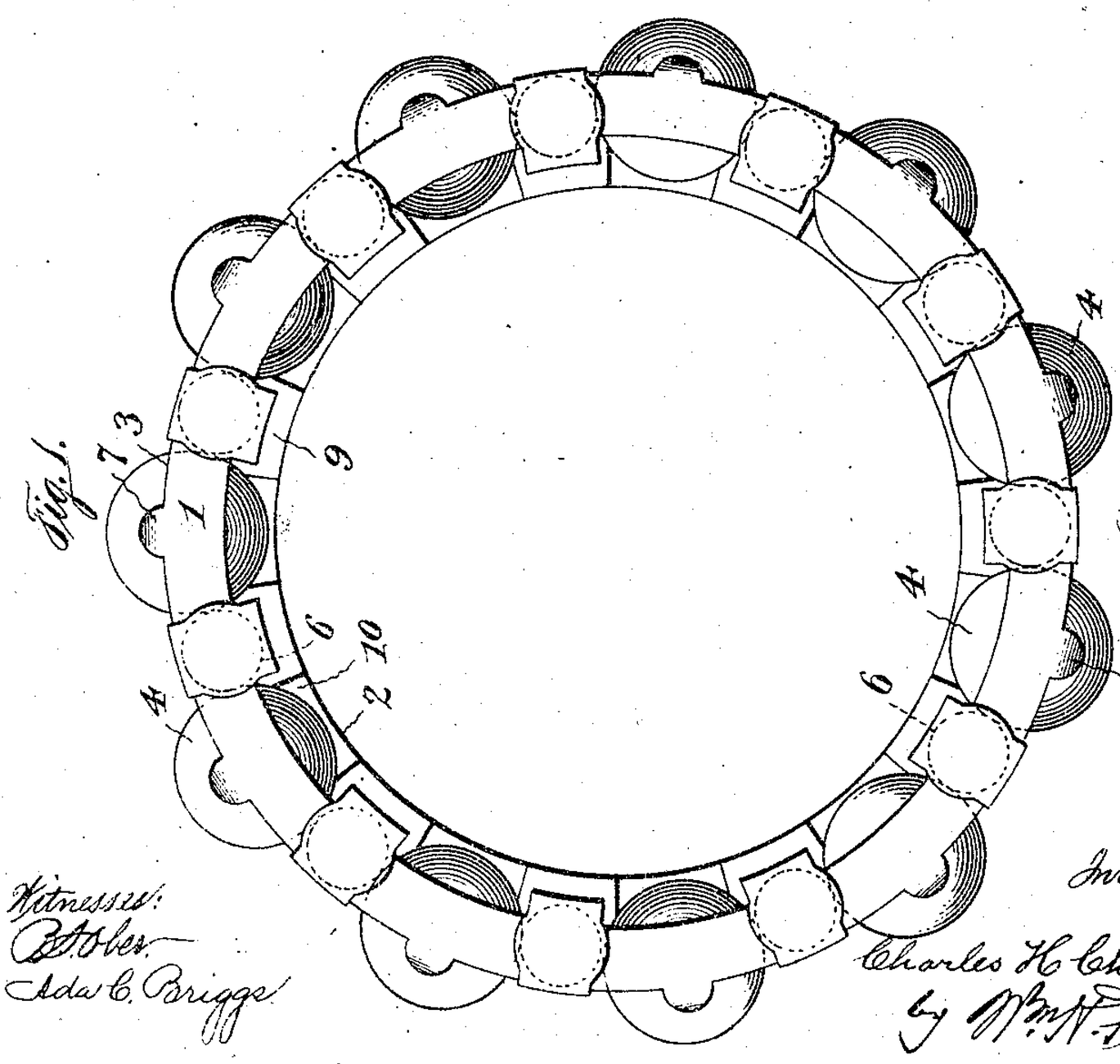

Fig. 1.

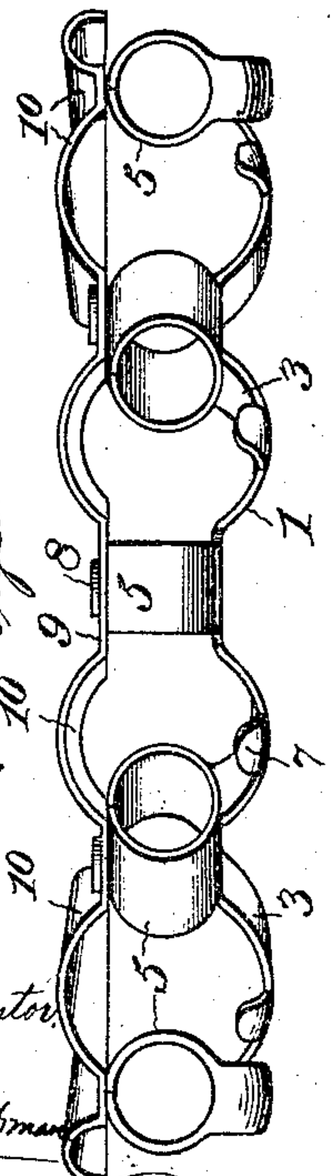

Fig. 3.

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2 SHEETS—SHEET 2.

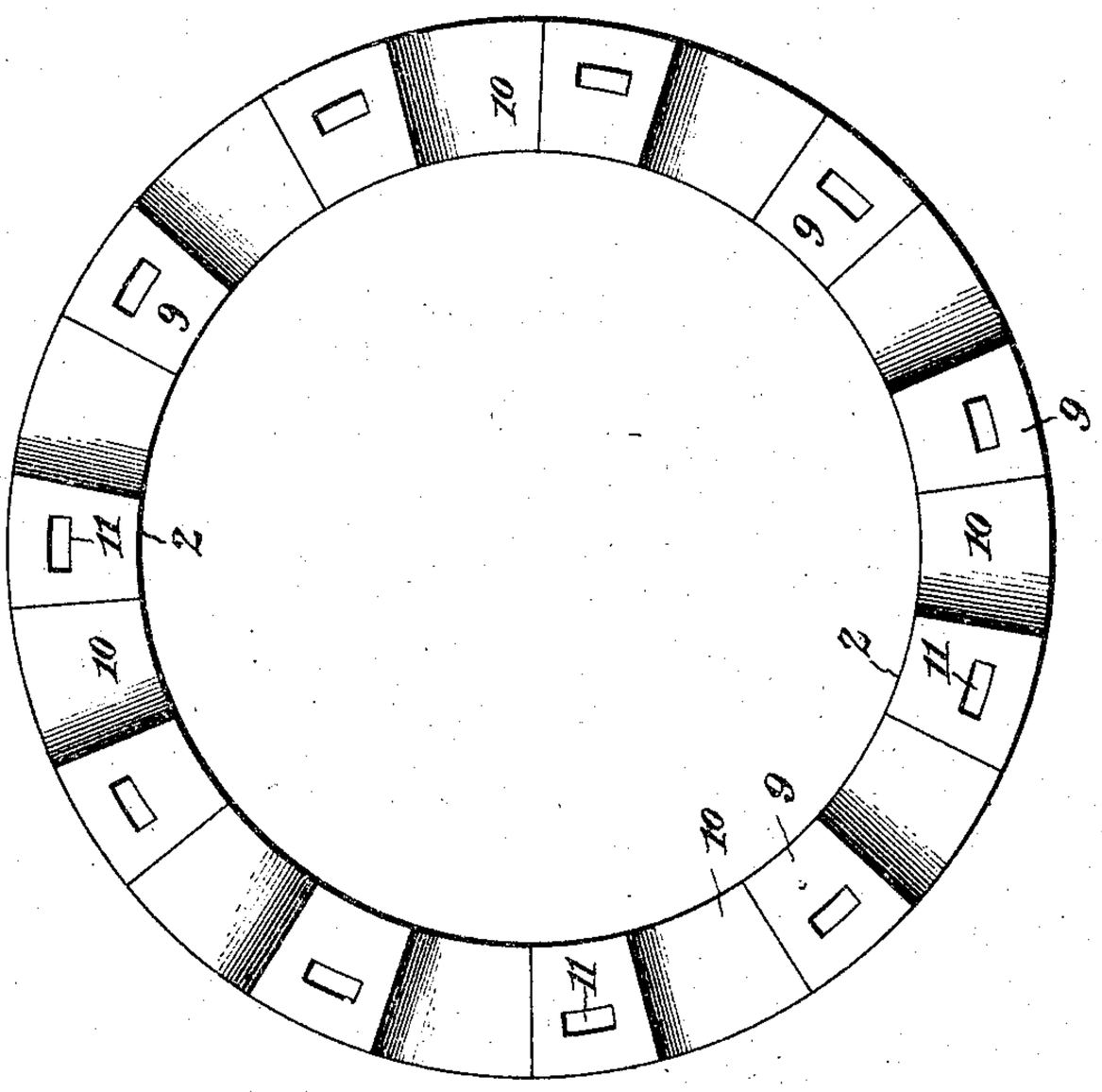

Fig. 6.

Fig. 8

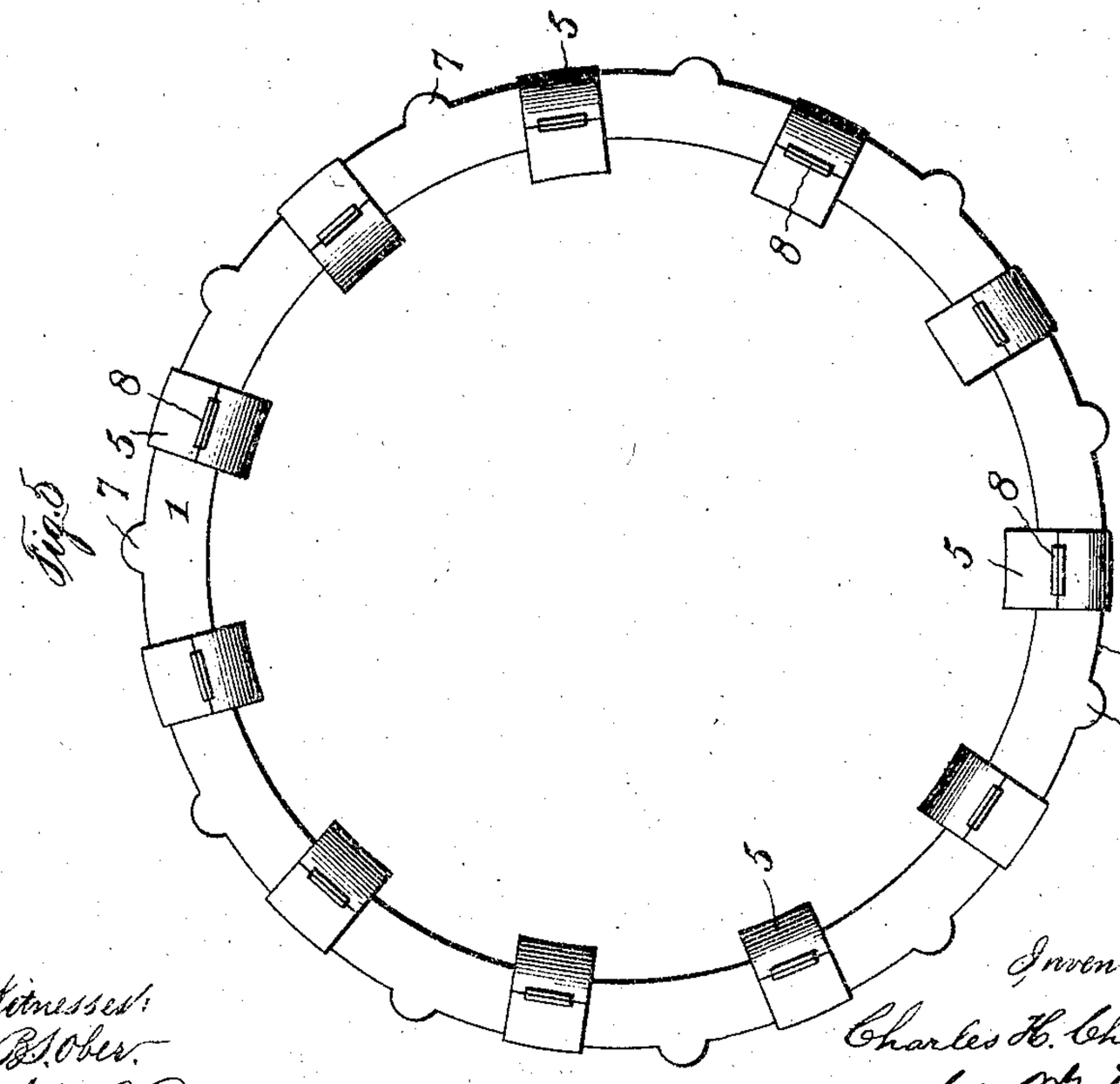

Fig. 5

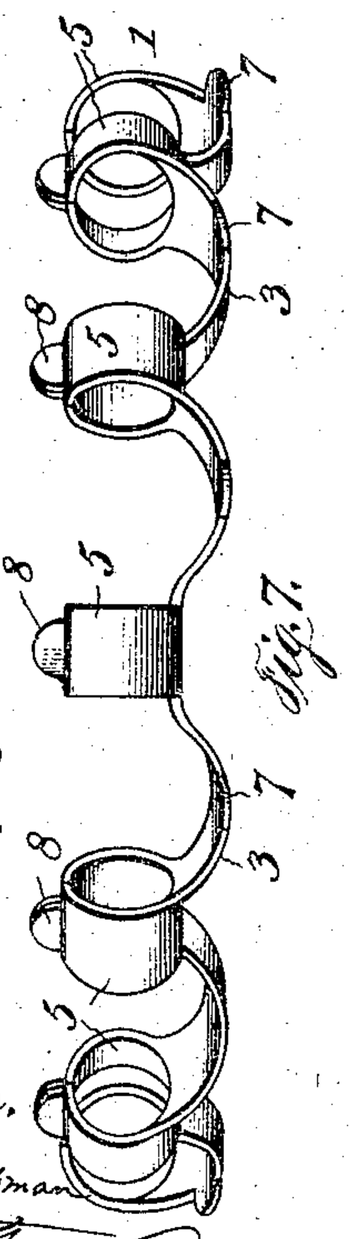

Fig. 7.

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No. 785,150. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

CHARLES H. CHAPMAN, OF GROTON, MASSACHUSETTS.

RETAINER AND SPACER FOR BALL-BEARINGS.

SPECIFICATION forming part of Letters Patent No. 785,150, dated March 21, 1905.

Application filed December 18, 1902. Renewed December 7, 1903. Serial No. 184,228.

To all whom it may concern:

Be it known that I, CHARLES H. CHAPMAN, a citizen of the United States, residing at Groton, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Retainers and Spacers for Antifriction-Bearings, of which the following is a full, clear, and exact description.

This invention relates to the "retainers" and "spacers" of ball-bearings, so officially designated in the classification of the United States Patent Office; and it consists of a ring-like frame constructed in two parts of sheet metal and adapted to contain load-carrying balls and separating-balls interposed between the load-carrying balls and held within the ring at or near the center line of the load-carrying balls, all as I will proceed to set forth and finally claim.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a front elevation. Fig. 2 is a rear elevation. Fig. 3 is a top plan view. Fig. 4 is a cross-section taken in the plane of line A B, Fig. 2. Fig. 5 is a rear elevation of the front half or side of Fig. 1. Fig. 6 is a front elevation of the half forming the back, as shown in Fig. 2. Fig. 7 is a top view of the half shown in Fig. 5. Fig. 8 is a top view of the half shown in Fig. 6.

1 represents the front half, as separately shown in Figs. 5 and 7. 2 represents the back half, as separately shown in Figs. 6 and 8. The part 1 represents what I term the "front" side of my device, and it is constructed out of sheet metal and may be conveniently and economically made by striking up by the use of dies, substantially as follows: First, a piece of sheet metal is placed under and punched out with a punch formed to punch out an annular blank of the required shape. This blank is then struck up by dies into the desired form, as shown by Figs. 5 and 7, with the portions 3 curved longitudinally and transversely to form parts of sockets or pockets for the load-carrying balls 4 and with portions at opposite sides bent to form tubes 5, constituting pockets for the reception of the separating-balls 6. (Shown by dotted lines, Fig. 1.) The portions 3 are provided with the lips 7. The tubular portions have lips 8, and said tubular portions extend laterally and rearwardly from the main body of the front side, as shown in Fig. 7. The back side 2 of the device also is constructed of sheet metal, blanked out and struck up in dies, with the straight portions 9 alternating with curved portions 10, which latter coöperate with the curved portions 3 of the front side to complete the sockets for the load-carrying balls, while the straight portions 9 are made with slots 11, through which the lips 8 project and are then bent back upon the back side, as indicated in Figs. 2 and 4, to unite the two sides. The inside circle of the back side is made of a diameter to fit loosely and revolve around upon the cone, which insures the maintenance of the separating-balls on a center line of the load-carrying balls.

In assembling the ball-retainer the projecting lips 8 of the front side are passed through the slots 10 of the back side, after which the lips 8 are separated and riveted down tight on the outside of the back side, as shown in Figs. 2, 3, and 4, and the retainer is then ready for insertion of the balls, which is done as follows: I first place a load-carrying ball 4 into the circular opening formed by the conjunction of portions 3 and 10, (see Fig. 3,) after which I bend over the lip 7, as shown in Fig. 4, which prevents the load-carrying ball from dropping out of the ball-retainer. I then place the separating-ball 6 into the hole formed by the tube 5. (See Fig. 7.) I then place a load-carrying ball into the next circular opening and bend over the lip 7, as before described, and continue placing in the separating-balls and load-carrying balls alternately until the circle is completed. The ball-retainer is then ready to be placed in the bearing.

By this construction I not only produce a ball retainer, carrier, or cage of great strength and lightness, but I also greatly reduce the cost.

I wish it to be distinctly understood that I do not limit my invention to the specific form of construction herein shown and described, as I am well aware that different forms of dies can be made which will strike

up a ball-carrier in two pieces, which will when riveted together produce a sheet-metal ball-retainer of substantially my construction.

What I claim is—

1. A ball-retainer, composed of two pieces of sheet metal provided with sockets to receive the load-carrying balls and tubular connections alternating with the sockets to receive and sustain the separating-balls in their relative positions with the load-carrying balls.

2. A ball-retainer, composed of two pieces of sheet metal provided with sockets to receive the load-carrying balls, and tubular connections projecting from one of the pieces and alternating with the sockets to receive and sustain the separating-balls, and interlocked with the other piece.

3. A ball-retainer, comprising sheet-metal halves, constructed with curved portions to receive the load-carrying balls, and one of said halves constructed with tubular portions alternating with the curved portions to receive the separating-balls.

4. A ball-retainer, comprising front and back sides, the former constructed with curved portions each having a lip, and tubular-lipped portions, and the latter having curved portions to match the curved portions of the front side, and slots to receive the lips of the tubular portions of said front side.

5. A ball-retainer, comprising essentially a front side of sheet metal, with lipped curved portions, and projecting tubular portions having lips, and a back side having curved portions complemental to the curved portions of the front side, and slotted straight portions arranged next the tubular portions of the front side and adapted to be engaged by the lips of said tubular portions and thereby unite the two sides.

6. A ball-retainer, comprising sheet-metal halves, constructed with curved portions to receive the load-carrying balls, and one of said halves constructed with tubular portions alternating with the curved portions to receive the separating-balls, the other half having an interior bearing-surface.

7. In a ball-bearing, a ball-carrier consisting of members of shaped sheet metal and secured to each other, leaving bearing-ball pockets with connecting spacing-ball pockets between, said spacing-ball pockets extending concentrically of said carrier.

8. A ball-carrier, for ball-bearings, comprising a frame provided with bearing-ball pockets and spacing-ball pockets connecting said bearing-ball pockets and so arranged relatively to the latter that the center of each spacing-ball will be at all times in alinement with the centers of the adjacent bearing-balls.

In testimony whereof I have hereunto set my hand this 15th day of December, A. D. 1902.

CHARLES H. CHAPMAN.

Witnesses:

W. E. PUTNEY,

B. A. GOODMAN.