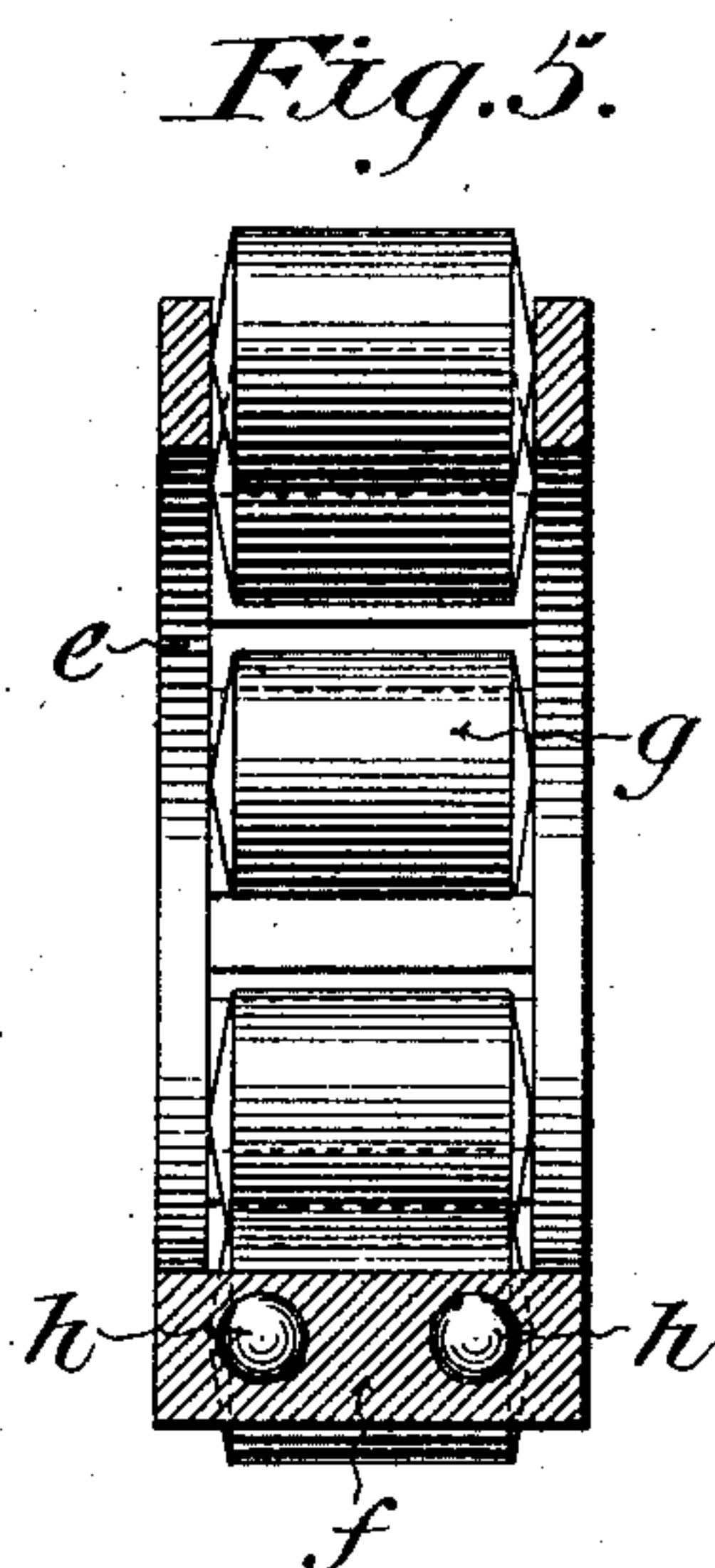
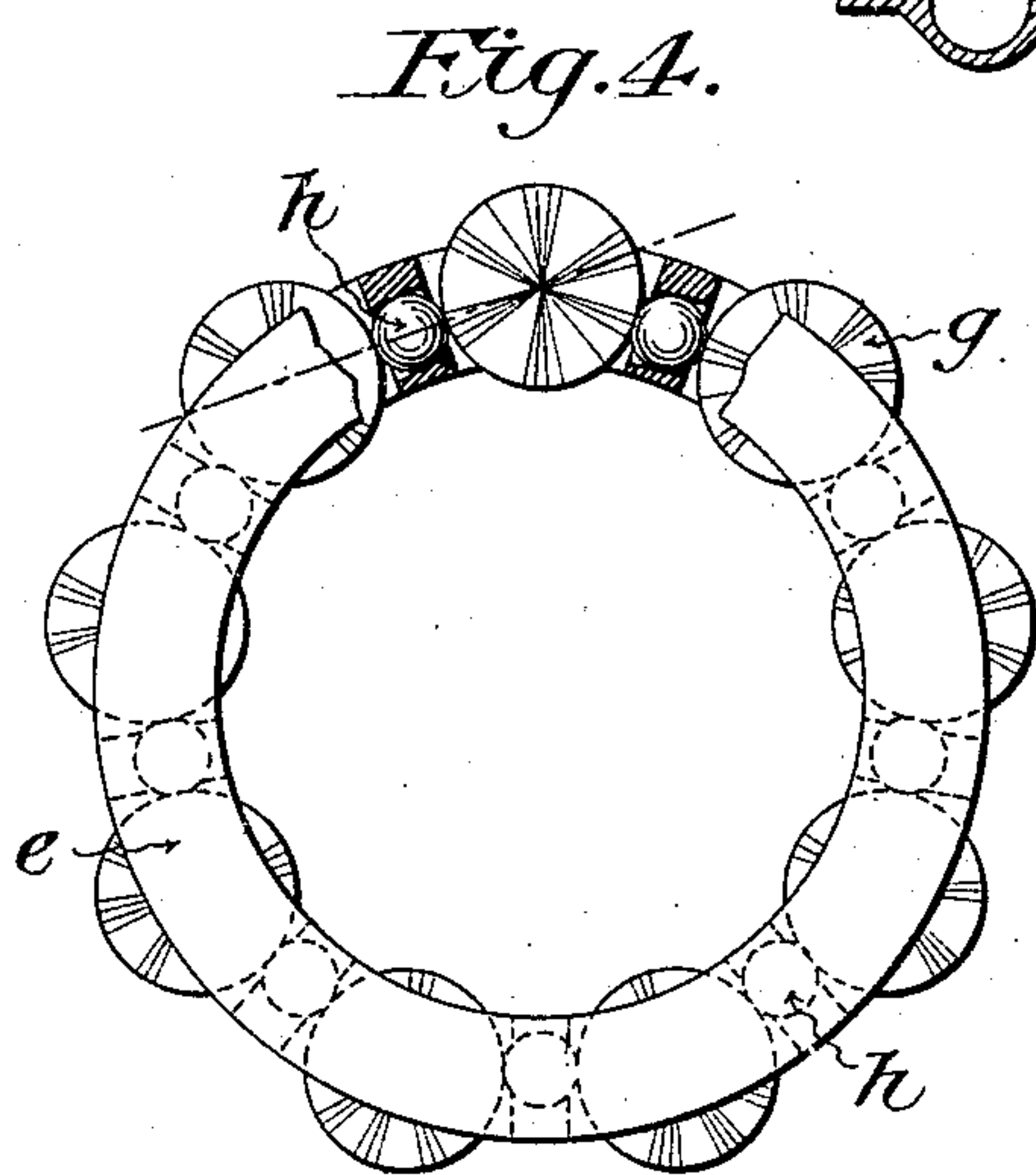
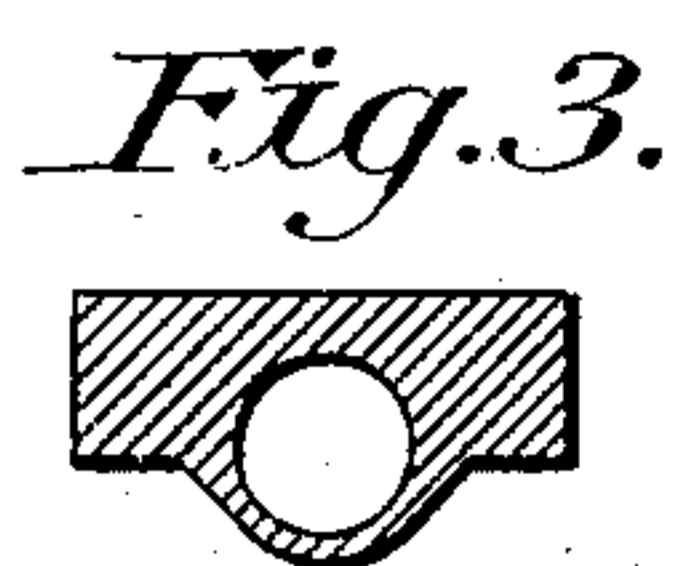
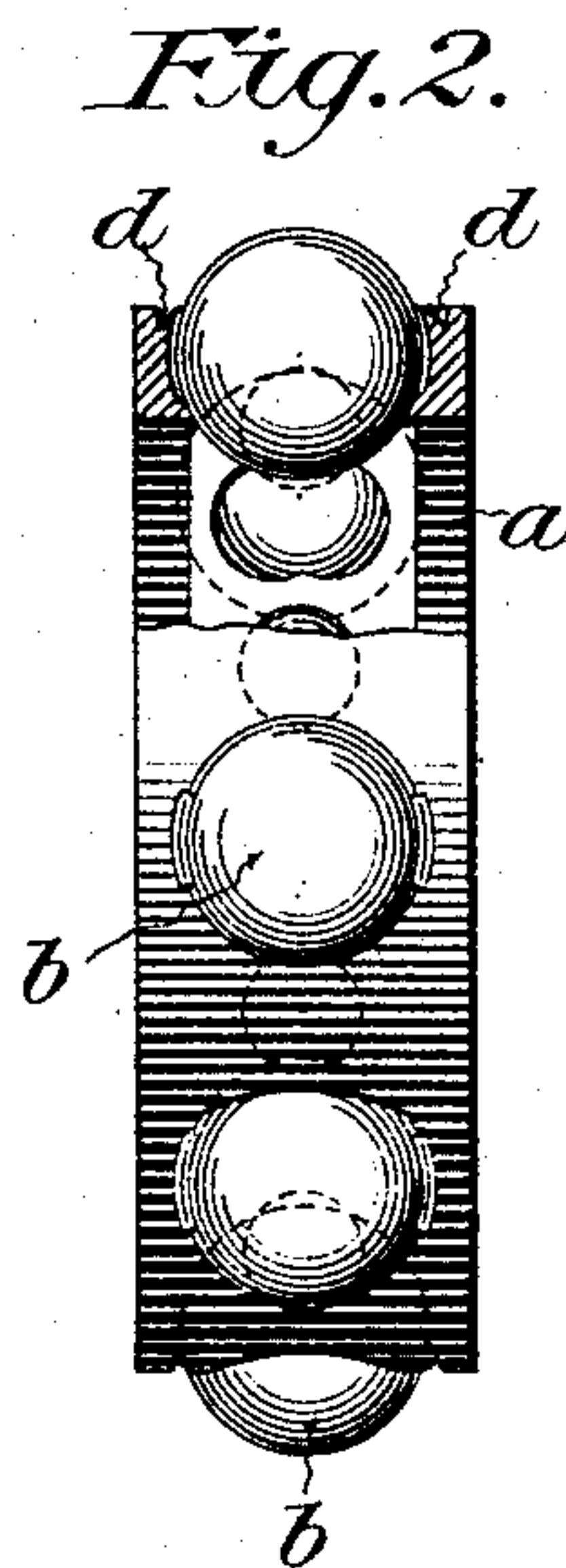
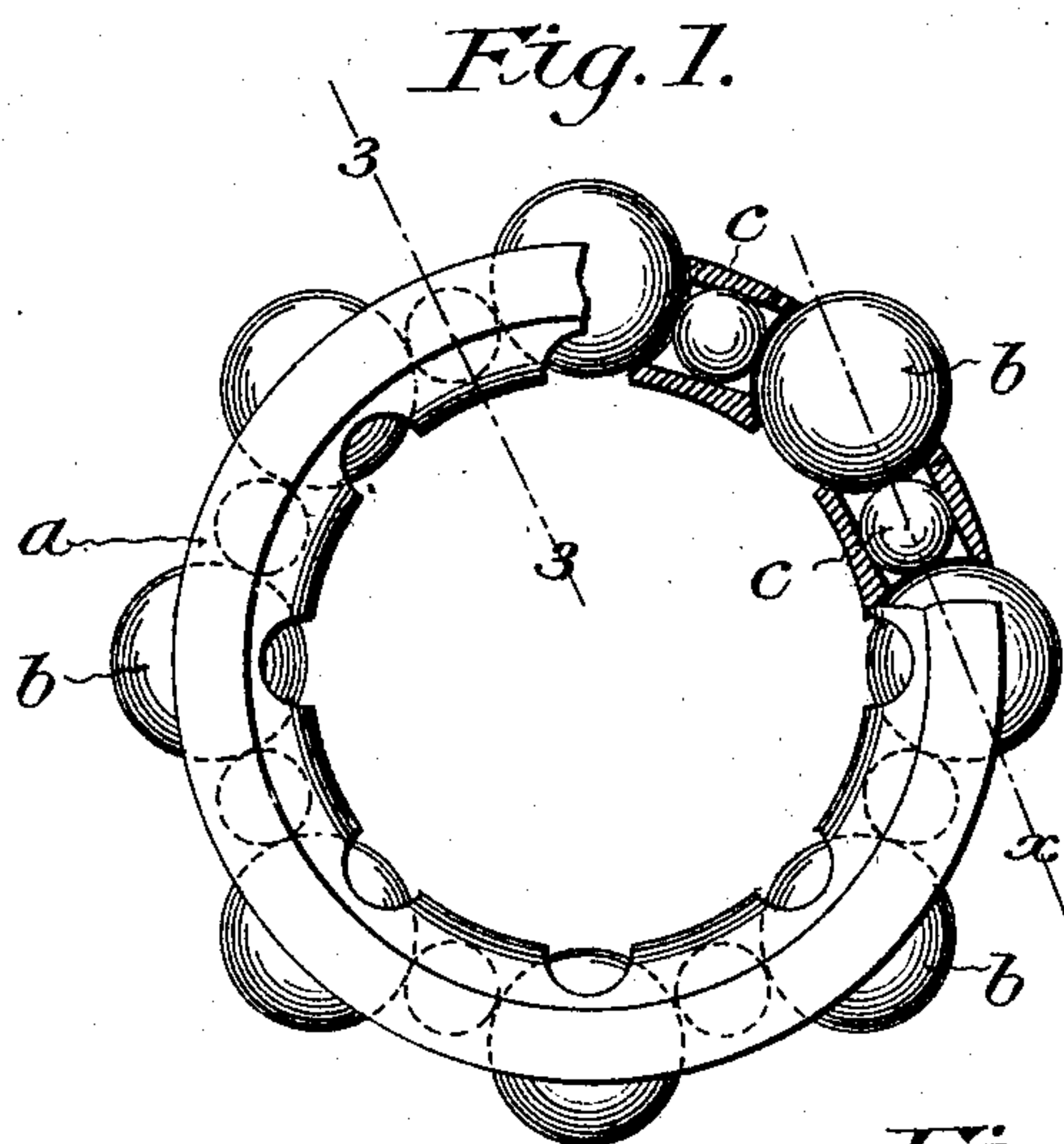


No. 785,661.

PATENTED MAR. 21, 1905.

C. H. CHAPMAN.
BEARING.

APPLICATION FILED MAR. 21, 1901. RENEWED MAR. 26, 1904.



Witnesses:

A. M. Long.
Howell Zantle.

Inventor:

Charles H. Chapman
by W. H. Turner
Atty

UNITED STATES PATENT OFFICE.

CHARLES H. CHAPMAN, OF GROTON, MASSACHUSETTS.

BEARING.

SPECIFICATION forming part of Letters Patent No. 785,661, dated March 21, 1905.

Original application filed February 28, 1900, Serial No. 6,859. Divided and this application filed March 21, 1901. Renewed March 26 1904. Serial No. 200,193.

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 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 is divided out of the case filed by me on February 28, 1900, Serial No. 6,859, in accordance with the requirements of the Patent Office.

The invention herein consists of an annular member apertured to receive load-supporting devices or roller-bearings, such as balls or rollers, and constructed to move with and be governed by the load-carrying devices, with separating-balls or roller-spacers interposed between such devices and held within perforations between the apertures and at or near the center line of the load-supporting devices, all as I will proceed to set forth and finally claim.

I wish to state once for all that while my invention is preferably embodied in a device using balls or spheres for the load-supporting devices, sometimes and herein called "bearing-rollers," I may use rollers or cylinders instead, and to include both balls or spheres and cylinders I use the generic term "rollers."

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a front elevation, partly broken away, showing one embodiment of my invention. Fig. 2 is an end elevation thereof with the upper part in section. Fig. 3 is a cross-section taken in the plane of line 3 3, Fig. 1. Fig. 4 is an elevation, partly broken away, showing the invention applied to cylinders as load-supports with ball-separators. Fig. 5 is a vertical section of the device of Fig. 4.

As shown in Figs. 1, 2, and 3, that form of my invention using spheres as load-supports is constructed as follows: The ring *a* is made with a series of main holes to receive the load-

carrying balls or bearing-rollers *b*, and these holes are connected by cross-holes formed in the partitions between the main holes to receive the separating balls or spacers *c* and hold them in their relative positions one with the other, so that the separating-balls *c* when adjusted in the bearing will be practically held at or near what I term the "dead-center" line—that is to say, that an imaginary line passing from the center of one load-carrying ball to the center of the other load-carrying ball shall pass through or near the center of the separating-ball, as shown by dotted line *x* in Fig. 1. In this construction of ring I prefer to stake in the load-carrying balls, as shown in Fig. 2, by throwing in the edges of the holes, as at *d*, and thereby the balls cannot drop out when handling the ring out of the bearing. The partitions containing the separating-balls *c* serve also as cross-ties for uniting the opposite members of the ring.

As indicated by the shading in Fig. 1 and by the cross-section, Fig. 2, this form of my invention is designed to get bearing contact with the balls *b* as well inside as outside the ring and by tangential rather than radial engagement, and hence Fig. 1 shows said balls without projection below the inner circle of the ring. Obviously the ball-seats will be made to position the balls for the kind of contact required.

Referring to Figs. 4 and 5, wherein the load-supports are cylinders, the construction is as follows: The roller-carrier *e* is constructed of two rings connected together by cross-ties *f*. These cross-ties are arranged to come between the rollers *g* and are apertured to receive the separating-balls *h* and hold them on the center line of the rollers when in the bearing. Two separating-balls are used in each cross-tie, one at each end of the roller, as shown in Fig. 5. The holes for the several balls or rollers may be drilled.

It has been practically demonstrated beyond all question of doubt that in a ball-bearing, and considering the small points of contact of the balls with the shells or cups and cones, a positive revolution of the balls

must at all times be maintained, since any slipping or sliding of the balls when under a heavy load will cut the surfaces of the balls or cones or cups, either of which will destroy the bearing in a very short time.

With my construction, whereby I positively retain a separating-ball at or near the dead-center line of the load-carrying ball, I not only prevent any rubbing together of the load-carrying balls, but my separating-balls act as transmitters of the revolution of the load-carrying balls one with the other when crowding together. Rolls can be used in place of the separating-balls; but I much prefer the balls.

Since it is old in the art to make the retainer of a ball-bearing of parallel rings forming its sides and connected by cross-ties or rods and also to make the sides and cross-ties or rods as an integral casting, I wish to be understood as stating that my invention in its broader aspect is applicable to either form of retainer and desire so to claim it.

The specific claim for the form of the invention shown in Figs. 4 and 5, wherein the carrier is composed of two rings, is made in an application for patent divided out of this application in accordance with the requirement of the Patent Office and filed August 13, 1903, Serial No. 169,371.

What I claim is—

1. A ball retainer and spacer, constructed with series of holes, combined with and adapted to receive the bearing-rollers and separating-balls, and serving to sustain the separating-balls at or near the dead-center line of the bearing-rollers, substantially as described.

2. A ball retainer and spacer, apertured to receive bearing-rollers, and perforated between the apertures to receive separating-balls to retain them at or near the center

line of the bearing-rollers, combined with such separating-balls and bearing-rollers, substantially as described.

3. In a roller-bearing, the combination of bearing-rollers, an annular member supporting the bearing-rollers, said member comprising apertured cross-pieces retaining the bearing-rollers and annular member in relative position, and spacing-rollers radially inclosed in the apertures of the cross-pieces to engage the bearing-rollers, substantially as specified.

4. In a ball retainer and spacer, an annular member, bearing-rollers supported therein, said member comprising apertured partitions arranged transversely therein between the bearing-rollers, and separating or spacing rollers radially inclosed loosely in the apertures in said partitions and in contact with adjacent bearing-rollers.

5. In a ball-bearing, a retaining-ring formed in one piece, said retaining-ring having a series of openings forming a series of projections, there being passages in said projections between said openings, antifriction-balls in said openings, and antifriction spacing-rollers in said passages, substantially as specified.

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

In testimony whereof I have hereunto set my hand this 19th day of March, A. D. 1901.

CHARLES H. CHAPMAN.

Witnesses:

OSCAR E. STEVENS,
W. E. PUTNEY.