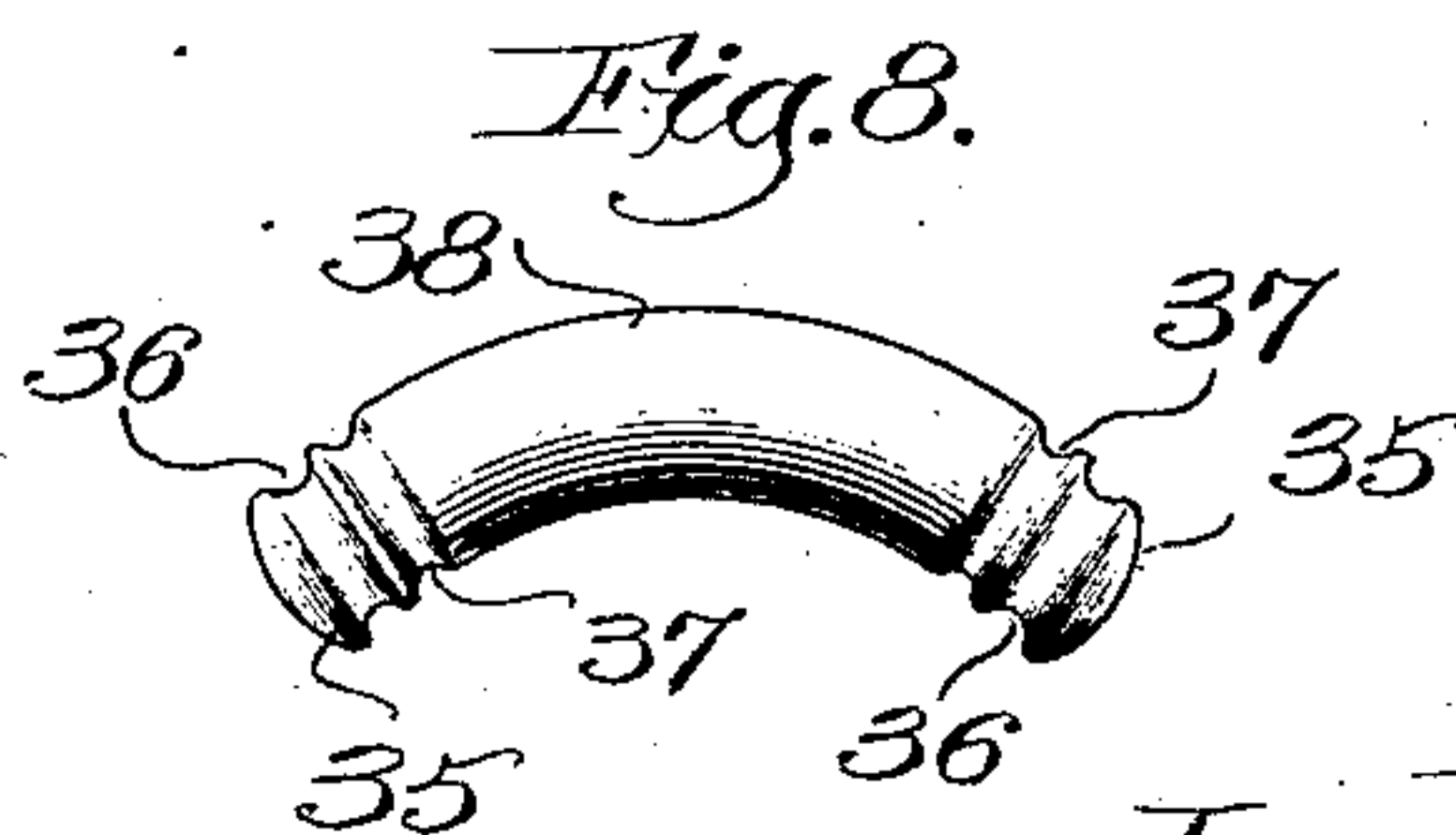
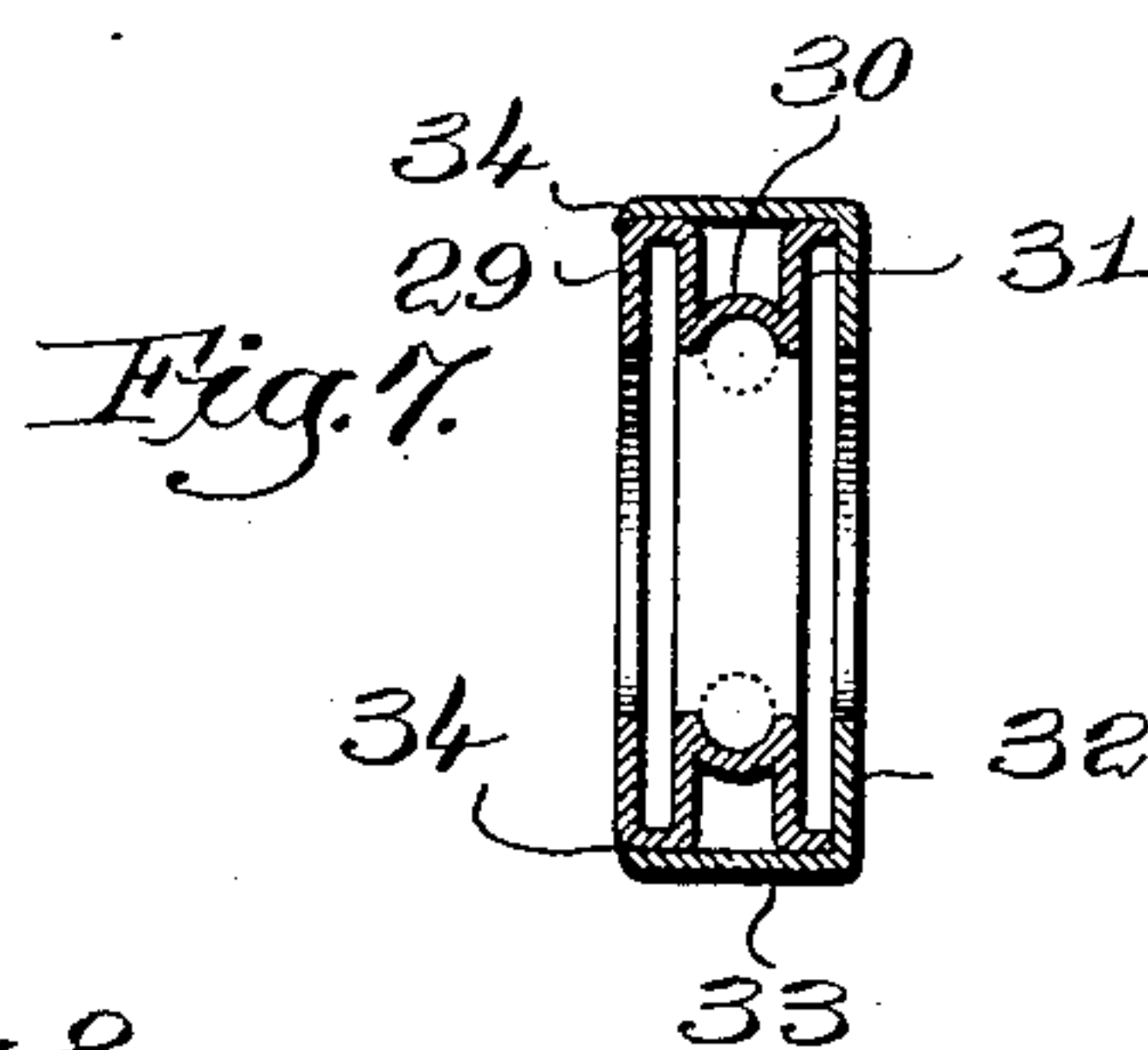
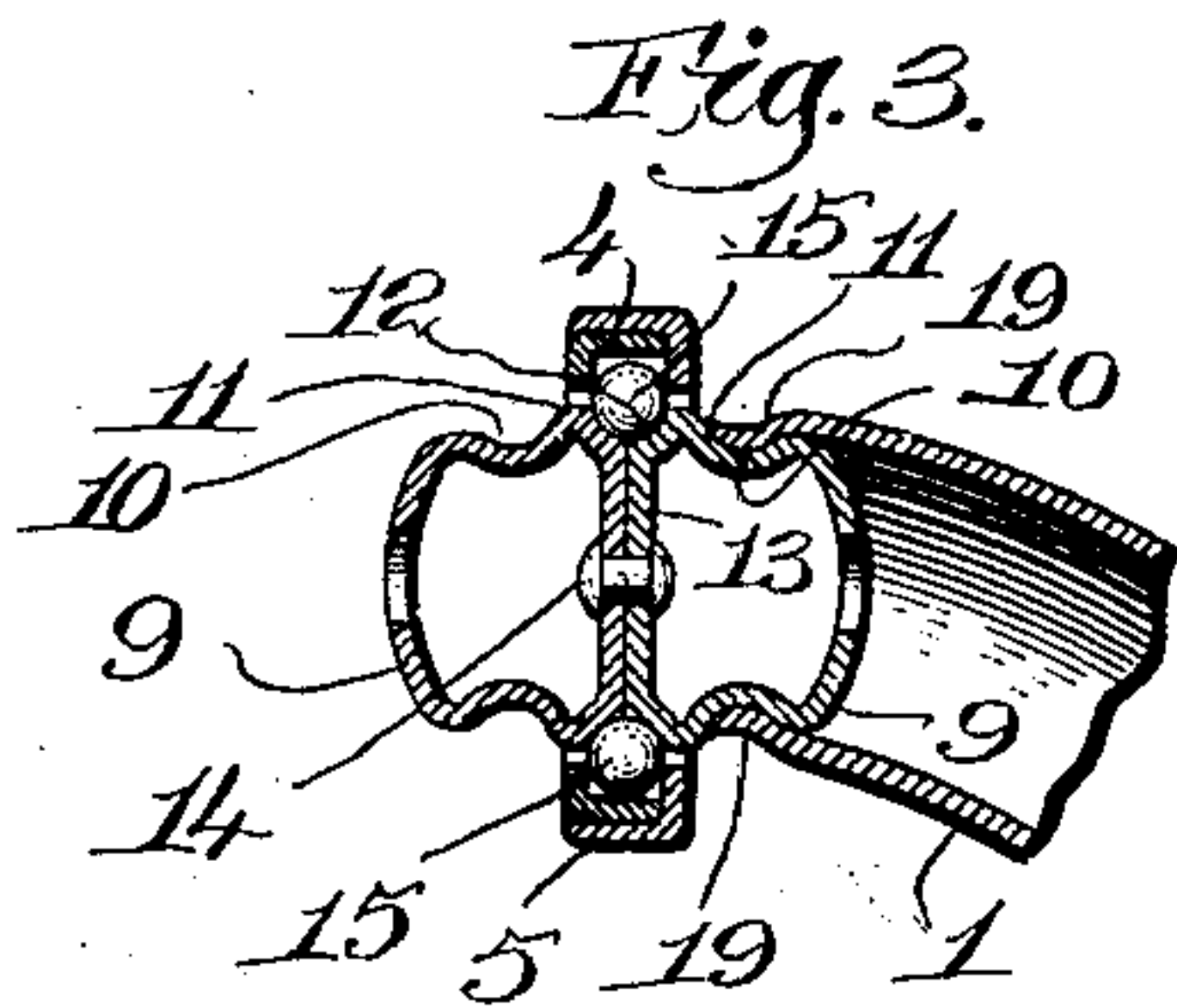
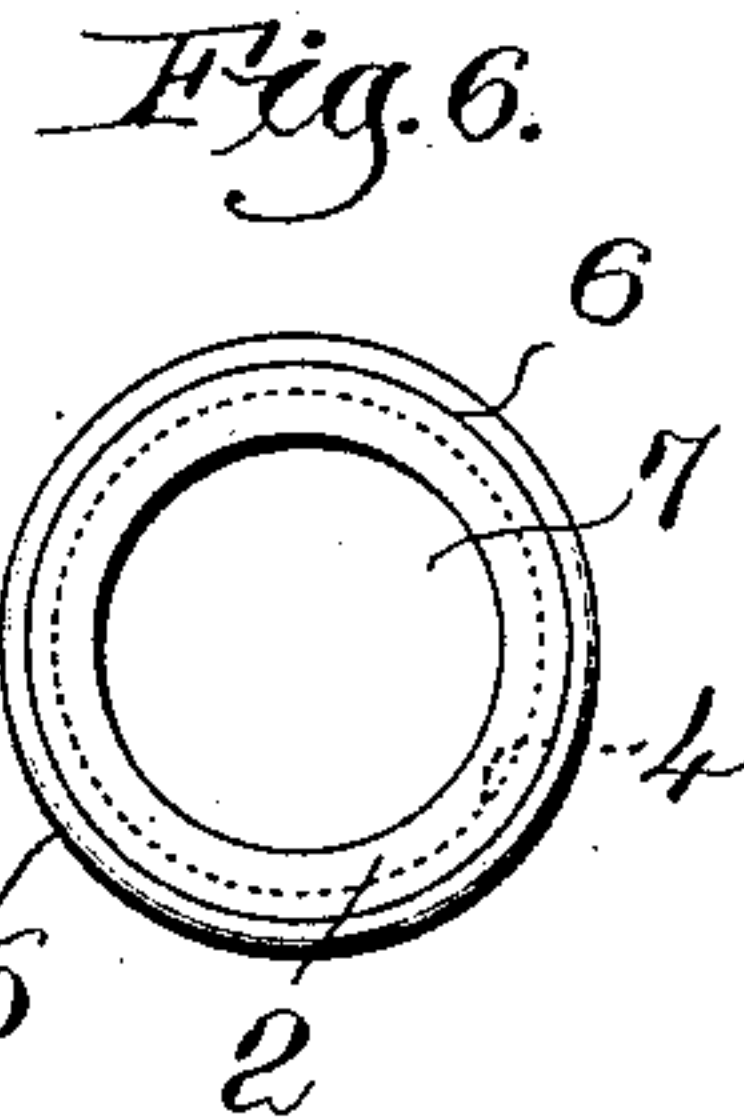
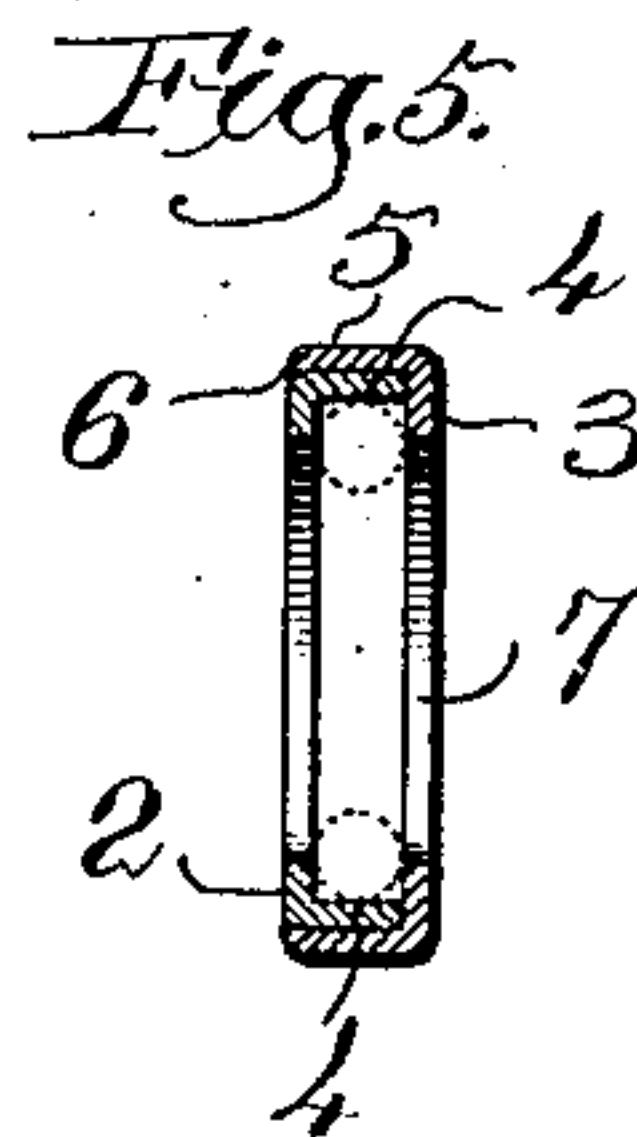
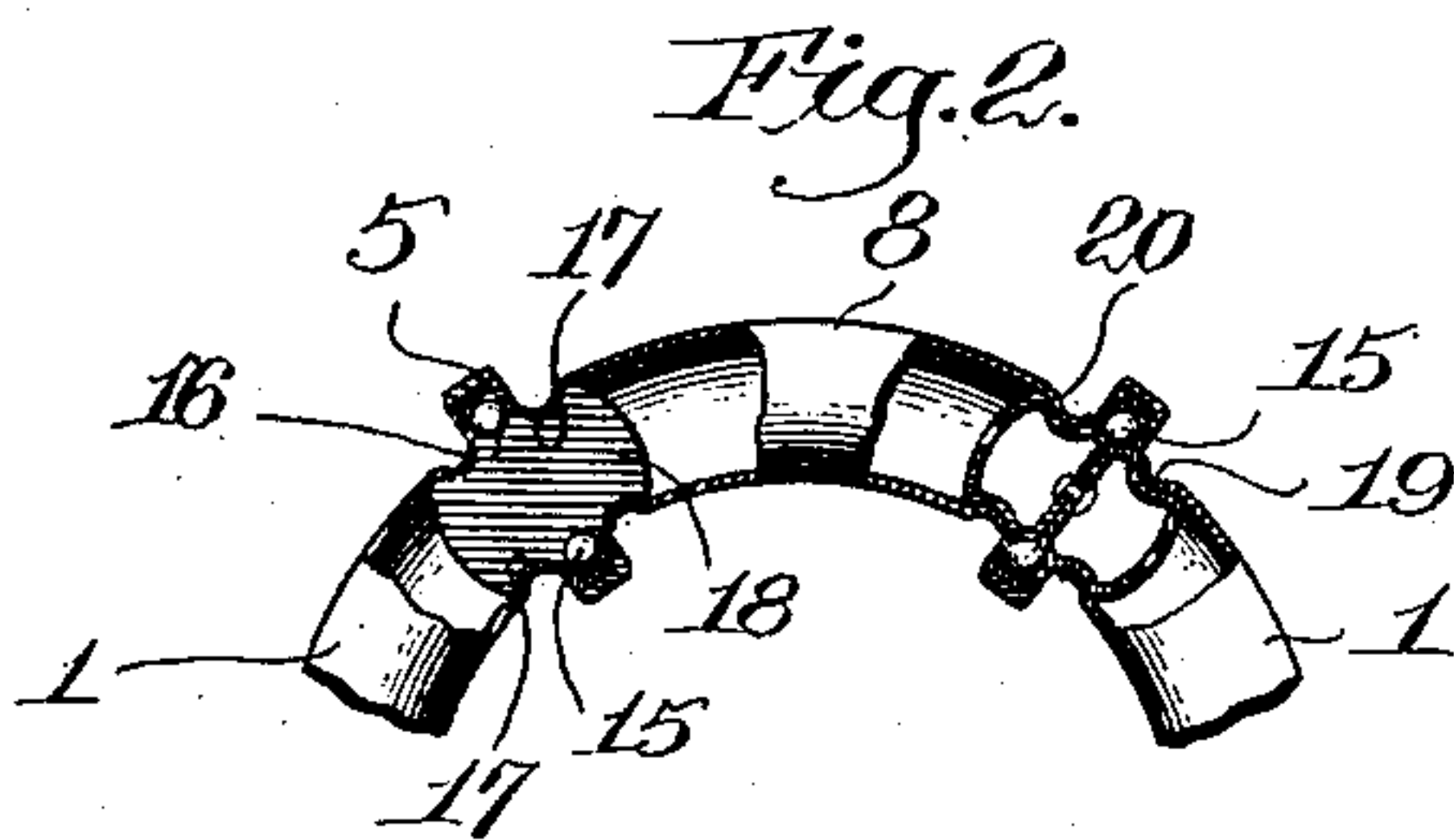
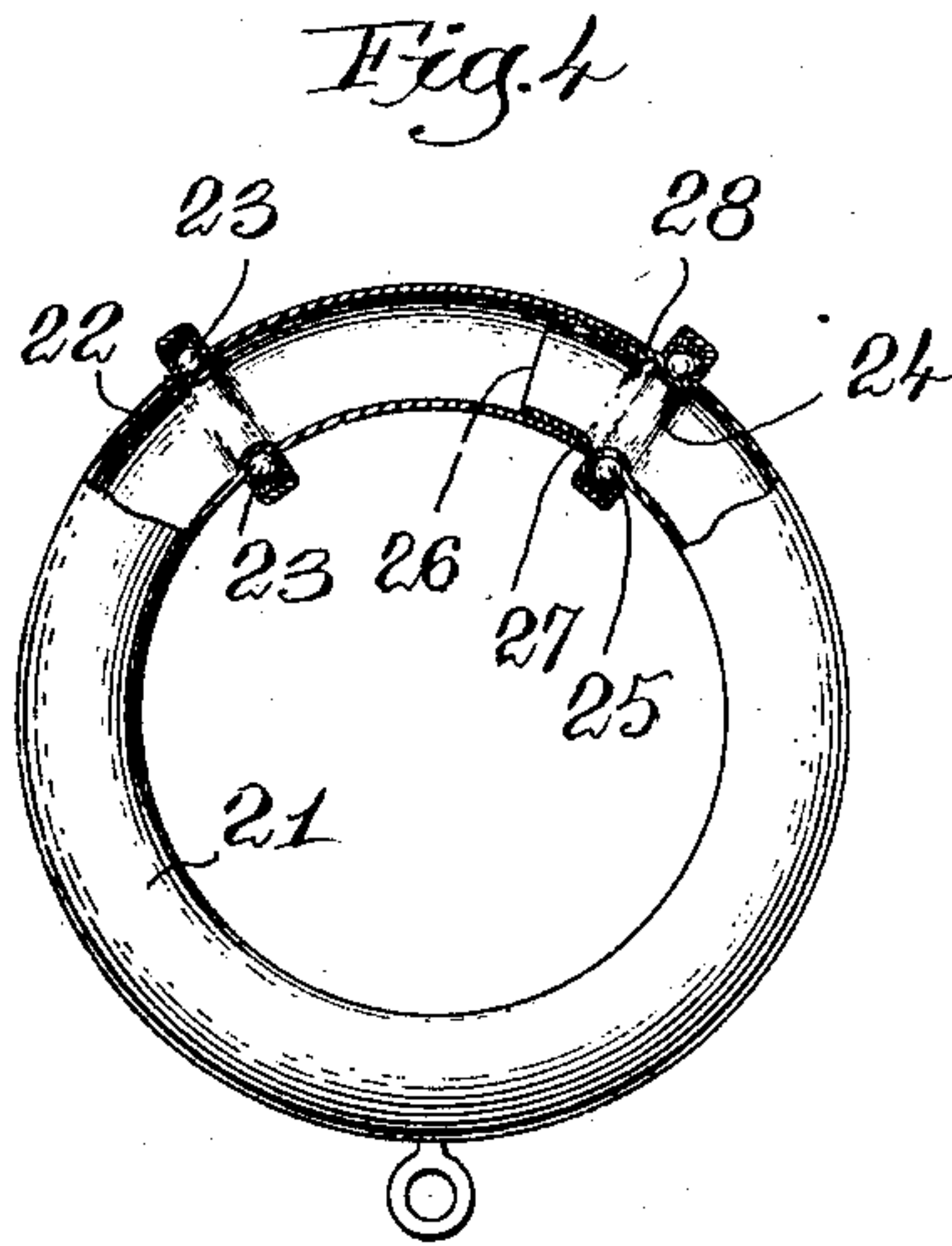
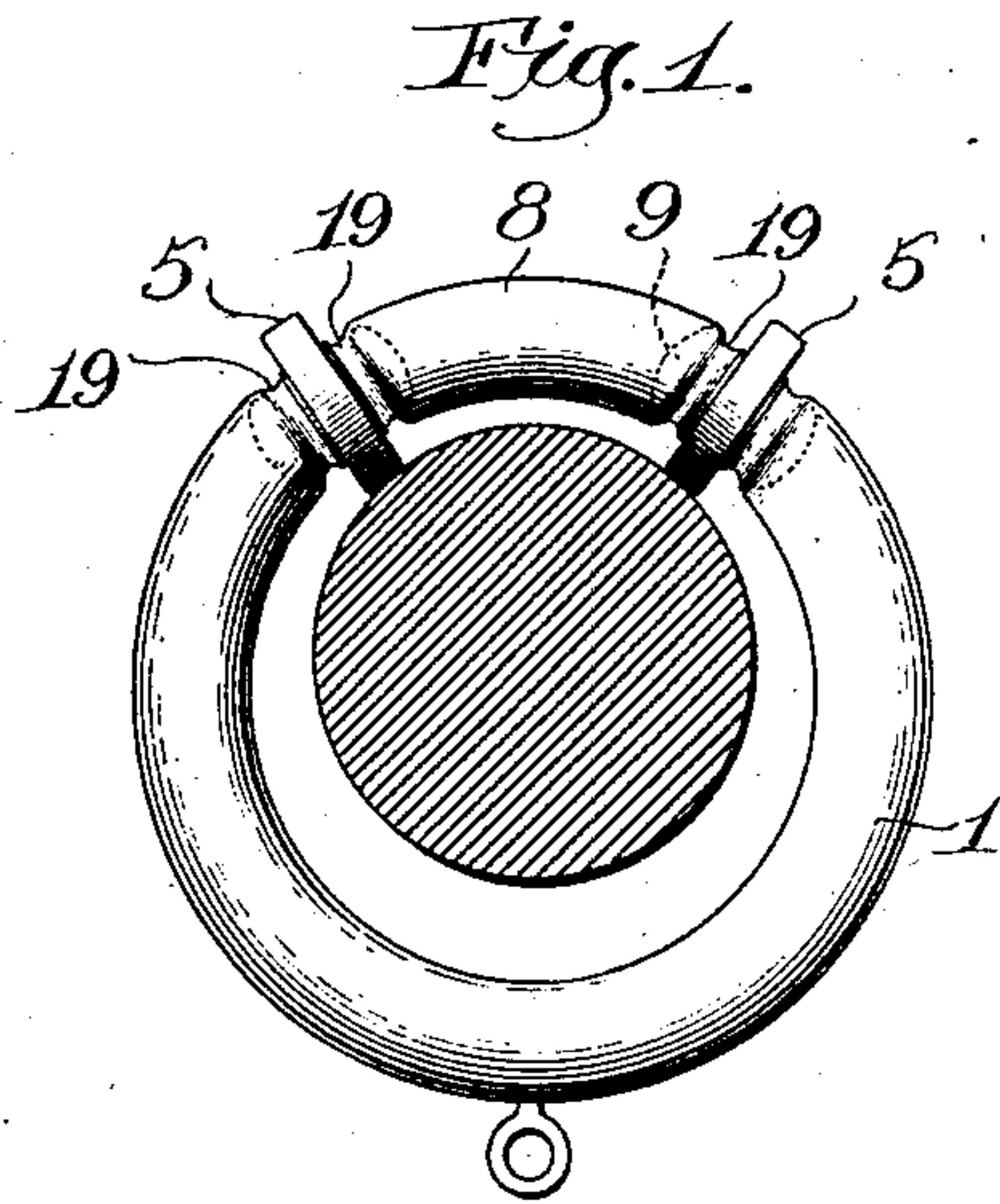


J. W. LESLIE.
 BALL BEARING CURTAIN RING.
 APPLICATION FILED FEB. 10, 1908.

912,476.

Patented Feb. 16, 1909.



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UNITED STATES PATENT OFFICE.

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BALL-BEARING CURTAIN-RING.

No. 912,476.

Specification of Letters Patent.

Patented Feb. 16, 1909.

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To all whom it may concern:

Be it known that I, JAMES W. LESLIE, a citizen of the United States, and resident of Wakefield, county of Middlesex, State of Massachusetts, have invented an Improvement in Ball-Bearing Curtain-Rings, of which the following description, in connection with the accompanying drawing, is a specification, like numerals on the drawing representing like parts.

This invention has for its object the production of an efficient, durable and cheap ball bearing curtain-ring for use in hanging curtains, portières, and the like, the ring being provided with one or more traverse-rolls mounted to revolve around the ring upon bearing balls. By this construction I attain a practically noiseless ring when moved along the usual supporting rod or pole, and one which can be moved with a minimum of friction.

Inasmuch as curtain-rings are sold at a relatively low price the structure must be such that the same can be made very cheaply and the different parts quickly and easily assembled, and at the same time due regard must be had to the strength and rigidity of the ring.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a view in elevation of a curtain ring embodying one form of my invention, provided with ball-bearing traverse-rolls, the supporting pole being shown in section; Fig. 2 is a sectional detail to illustrate the manner in which the separated ends of the ring are fixedly connected, and the structure of the ball-bearing feature, two different forms of the connecting member being shown; Fig. 3 is an enlarged sectional view of a portion of the structure shown in Figs. 1 and 2, to more clearly illustrate structural details; Fig. 4 is a view partly in section of another embodiment of my invention; Fig. 5 is an enlarged diametral section of the traverse-roll; Fig. 6 is a side elevation thereof; Fig. 7 is a diametral section of a traverse-roll having a large external diameter, for use with small bearing rolls; Fig. 8 is an elevation of a connecting member made as a single piece and provided with two ball races.

I prefer to provide the ring with two radially arranged traverse-rolls, as thereby the best and most practical results are se-

cured, and preferably the main or body portion of the ring is made of thin sheet-metal, bent into ring form, at 1, the ends of such ring body being separated in the structure illustrated in Figs. 1, 2 and 3.

The traverse-roll is made as a hollow shell, composed of two circular disks 2, 3, centrally apertured, and flanged at their outer circumferences at 4, 5 respectively, the flanges 5 overlapping the flanges 4, clearly shown in Fig. 5, and the two parts are fixedly connected in any suitable manner, as by rolling over the edge of the flange 5, as at 6. A roll of this construction is shown in my United States Patent No. 872,947 granted December 3, 1907.

The opening 7 through the roll is preferably slightly larger than the cross-sectional diameter of the ring 1, in order that the roll can be readily assembled thereon, and it will be seen that the inner circumference of the roll presents an annular, open trough.

A connecting member or axle is employed to rigidly connect the separated ends of the ring 1, said member being herein shown as provided with two radially arranged annular ball-races, constructed as grooves or depressions below the surface of the ring, the traverse-rolls loosely surrounding such portions, and a series of bearing balls is interposed between each fixed ball-race and the roll, the latter constituting the complementary, movable race.

When using two traverse-rolls, as in Figs. 1 and 2, the connecting member comprises a distance piece 8, preferably a piece of ring tubing, locked at each end to an enlargement at the inner end of the roll axle, a similar enlargement on the outer end of the axle being locked to the adjacent end of the ring 1.

The axle may be made of spun sheet metal, and comprises two parts each having an apertured enlargement or head 9, contracted to form an annular groove 10 and then widened to a shoulder 11, the inner face of the shoulder being concaved at 12 to form one-half of a ball-race, and then inwardly flanged at 13. The flanges 13 of the two parts are abutted, as clearly shown in Fig. 3, and fixedly connected by a suitable rivet 14, the upsetting of one end of the rivet being effected with a suitable tool through the opening in the enlargement or head 9. When so united the concaved parts 12 form a shallow annular groove or race for a series of bearing balls 15 which travel freely therein.

Instead of using sheet metal the axle member may be made solid and turned to shape, as shown at the left, Fig. 2, the central groove 16 forming the ball-race, with 5 annular grooves 17 around the bases of the enlargements 18.

One of the heads, whether of sheet-metal or solid, is inserted in the open or socket-like end of the ring 1, and the metal of the same 10 is forced into the groove 10 or 17, as the case may be, at 19, such compression of the metal of the ring securely locking the ring end to the outer enlargement of the axle, and in a similar manner the inner enlargement is 15 locked to the distance piece 8 by compressing the latter at 20. The two ends of the ring body are thus firmly and rigidly connected so that they cannot separate or twist apart, and the use of solder is avoided. Before the 20 ends of the ring body are connected the parts of the two traverse-rolls are slipped on, and the balls 15 are dropped into the cup-like part 2 of a roll, after which the part 3 is applied, its flange 5 telescopically receiving the 25 flange 4. Then the edge of the flange 5 is rolled over at 6, or otherwise secured, and the roll is assembled, inclosing within it the series of bearing rolls, the latter traveling in the fixed ball-race previously described. 30 The fixed race laterally positions the balls, preventing their displacement, the shoulders 11 nearly filling the roll opening 7, and the roll, which forms the outer, movable race, is supported by the balls and by them is held 35 from lateral displacement, as will be manifest. As the traverse-roll has rolling engagement with the balls, and the latter roll around the fixed ball-race, the friction is reduced to a minimum and the traverse of the 40 ring as a whole is practically noiseless and easily effected.

In Fig. 4 I have shown another form of my invention wherein the fixed ball-races are formed in the tubular ring itself, one end 45 of the latter being interlocked with the other. Near one end of the ring 21 an annular radially arranged groove or race 22 is formed in the ring by spinning over a former of suitable shape, for one set of balls 23, the traverse-roll surrounding them being the same 50 as that illustrated in Figs. 5 and 6. A similar race or groove 24 is formed near the other end of the ring, for the second set of balls 25, but beyond the race the ring is reduced in 55 diameter at 26, leaving a shoulder 27, the reduced end being forced into the opposite end of the ring, as shown, and secured thereto in any suitable manner, as by a drop of solder at 28, the shoulder 27 limiting the extent to 60 which the reduced end 26 enters the opposite end of the ring.

It is sometimes desirable to use a traverse-roll of relatively large external diameter, with small bearing balls, and in Fig. 7 I have 65 shown in section a two-part roll adapted for

such use, the disk portion 29 being bent over and inward at its outer edge, to form the ball-race 30, and then bent outward at 31, the disk 32 having its outer edge bent over to form an inclosing flange 33, which is rolled 70 over the disk 29 at 34.

The connecting member for securing together the separated ends of the ring body may be made as a single piece, as shown in Fig. 8, having enlarged heads 35 annularly 75 grooved at 36 to receive the compressed portions of the ring ends, the two ball-races 37 being formed at the ends of the central portion 38 of the connecting member.

Various changes or modifications may be 80 made by those skilled in the art, in respect to the different details of construction without departing from the spirit and scope of my invention as set forth in the appended claims.

Having fully described my invention, what 85 I claim as new and desire to secure by Letters Patent is:—

1. The combination with a curtain ring having a radially arranged annular ball-race sunk below the external surface thereof, of a 90 two-part centrally open traverse roll, loosely embracing the ring about the ball-race, and a series of bearing balls interposed between the ball race and the roll and in direct rolling engagement with each, the central opening 95 of the traverse roll being of sufficient diameter to loosely embrace the ring.

2. The combination, with a curtain-ring, of a centrally apertured traverse roll loosely surrounding it and having a ball-race at its 100 inner circumference, the portion of the ring surrounded by the roll having an annular, radially arranged depression therein forming the complementary ball-race, and a series of bearing balls loosely mounted in the two 105 races, the normal cross-section of the ring being of less diameter than the central aperture of the roll.

3. The combination, with a curtain-ring having a radially arranged, annular ball-race, 110 of a series of bearing balls to travel therein, and a traverse-roll loosely surrounding the ring and embracing the balls, said roll comprising two parallel annular disks having their outer edges flanged and overlapped to 115 form a hollow shell having an annular open recess at its inner circumference, the edges of the side walls of the recess loosely embracing the ring at the sides of the ball-race.

4. The combination, with a metallic curtain ring body having fixedly connected ends, 120 of a traverse-roll centrally apertured to loosely surround the body and having an annular open recess at its inner circumference, the part of the ring body surrounded by said 125 roll being reduced in diameter to form an annular track, the cross-section of which is a circular arc, and a series of rotatable bearing balls interposed between the track and the 130 traverse rolls, the latter consisting of two par-

allel annular disks flanged at their outer edges and overlapped, the portions of the disks adjacent the flanges forming the sides of an annular, open recess and cooperating with the bearing balls at opposite sides of the series.

5 5. The combination, with a tubular metallic curtain ring body, made in one piece and having its ends fixedly connected, of a
10 hollow traverse roll loosely surrounding it and presenting an annular, open recess at its inner circumference, the part of the ring-body surrounded by the roll having a radially
15 arranged annular depression and a series of bearing-balls loosely interposed between said depression and the roll and extending into the open recess at the inner circumference thereof, the sides of the depression and the
20 sides of the recess cooperating with the balls to prevent sidewise movement of the roll on the ring body.

6. The combination, with a tubular metallic curtain ring-body, having an annular ball race presenting a circular arc in cross-section,
25 of a traverseroll loosely surrounding the body around the ball race, and a series of balls arranged to travel in the race in direct contact therewith and loosely entering the inner circumference of the roll, the latter
30 having a central aperture of greater diameter than the cross-section of the body.

7. The combination, with a curtain-ring, of a plurality of radially arranged traverse-rolls loosely surrounding it, the portions of
35 the ring surrounded by the rolls being reduced in diameter to form annular ball-races, and a series of balls interposed between each roll and the adjacent race and adapted to travel in the latter, the rolls
40 having each a central opening of greater diameter than the unreduced portions of the ring.

8. A ball-bearing curtain ring, comprising a ring, and a plurality of ball-bearings arranged radially upon the ring, each consisting of an inner, fixed annular ball-race sunk below the surface of the ring, and presenting a circular arc in cross-section, an outer, rotatable annular ball-race loosely surrounding
50 the ring, and a series of balls traveling in each inner race and interposed between it and the outer race and cooperating with the latter to support it and limit lateral movement thereof, the balls contacting directly
55 with the inner and outer races.

9. A ball-bearing curtain-ring, comprising a ring, and a ball-bearing arranged radially

thereupon, consisting of an inner, fixed annular ball-race of less diameter than the cross-section of the ring, an outer, rotatable, 60 annular ball-race loosely surrounding the ring and constituting a traverse-roll, it having an inner diameter greater than the cross-section of the ring, and a series of balls traveling in the inner race and interposed between it and the outer race, cooperating with the latter to support it and prevent lateral movement. 65

10. A ball-bearing curtain-ring, comprising a ring, and a ball-bearing arranged radially thereupon, consisting of an inner, fixed annular ball-race of less diameter than the cross-section of the ring, an outer, rotatable, annular ball-race loosely surrounding the ring, and having an inner diameter 75 greater than the cross-section of the ring, and a series of balls traveling in the inner race and interposed between it and the outer race, cooperating with the latter to support it and prevent lateral movement, 80 the outer race being composed of two circular members centrally apertured to receive the ring and having their outer edges flanged and overlapped, the annular portions of the circular members adjacent the 85 flanges cooperating with the portions of the balls exposed beyond the outer surface of the ring.

11. The combination with a one-piece tubular curtain-ring provided with a radially 90 arranged ball-race within the surface thereof, a series of bearing balls in the race, and a two-part traverse-roll loosely surrounding and traveling upon the series of balls, said roll having an axial opening of larger diameter 95 than the cross-section of the ring, but of less diameter than a circle tangential to and circumscribing the series of balls.

12. The combination with a tubular curtain-ring having a ball-support integral with 100 and of less diameter than the tube, a two-part traverse-roll of larger diameter than the tube, and bearing balls interposed between the roll and the support and traveling upon the latter, the bottom of the ball-support 105 being a circular arc in cross-section.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES W. LESLIE.

Witnesses:

JOHN C. EDWARDS,
MARGARET A. DUNN.