

(No Model.)

R. W. HENT.
ROLLER BEARING.

No. 413,446.

Patented Oct. 22, 1889.

Fig. 1.

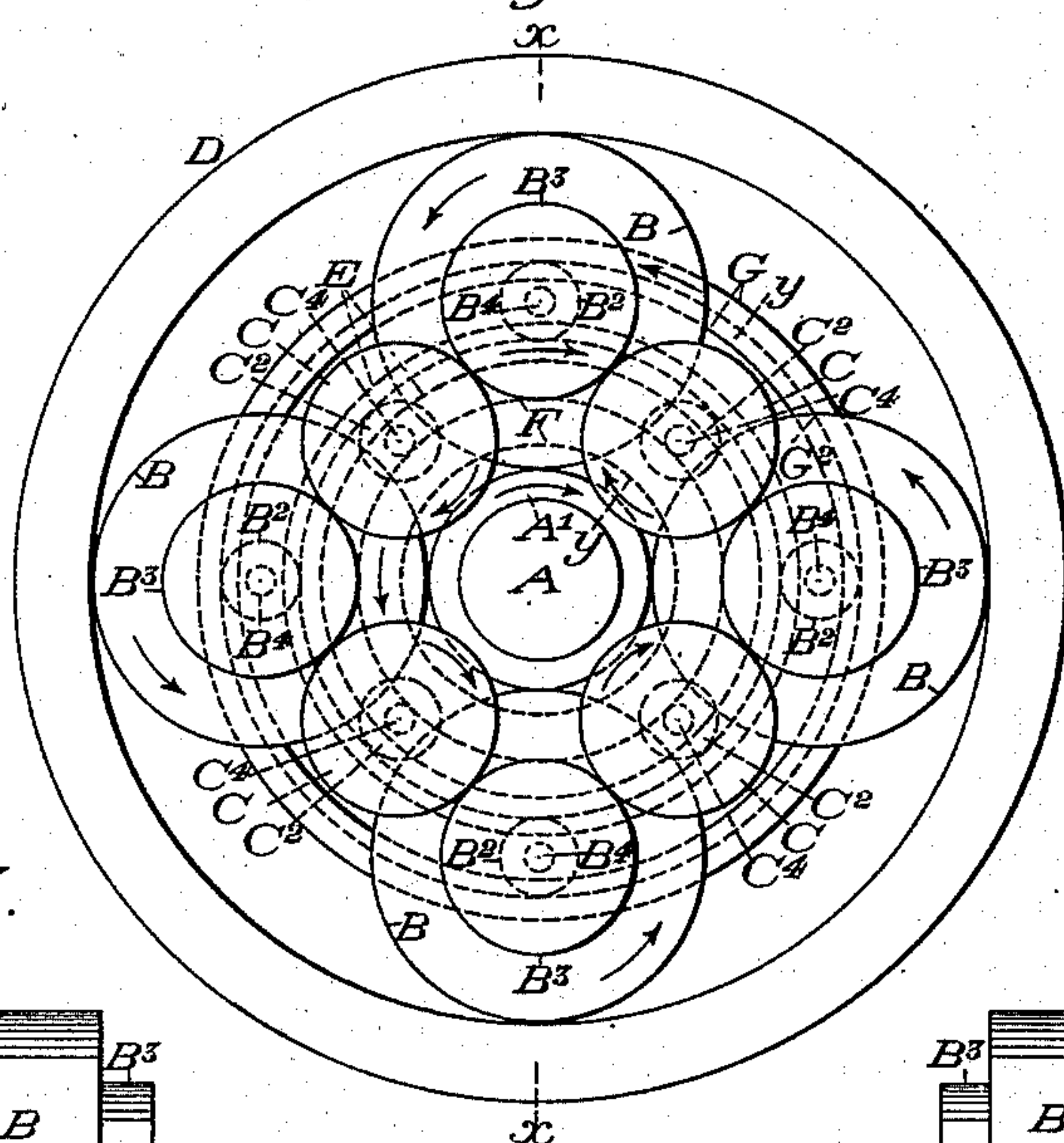


Fig. 3.

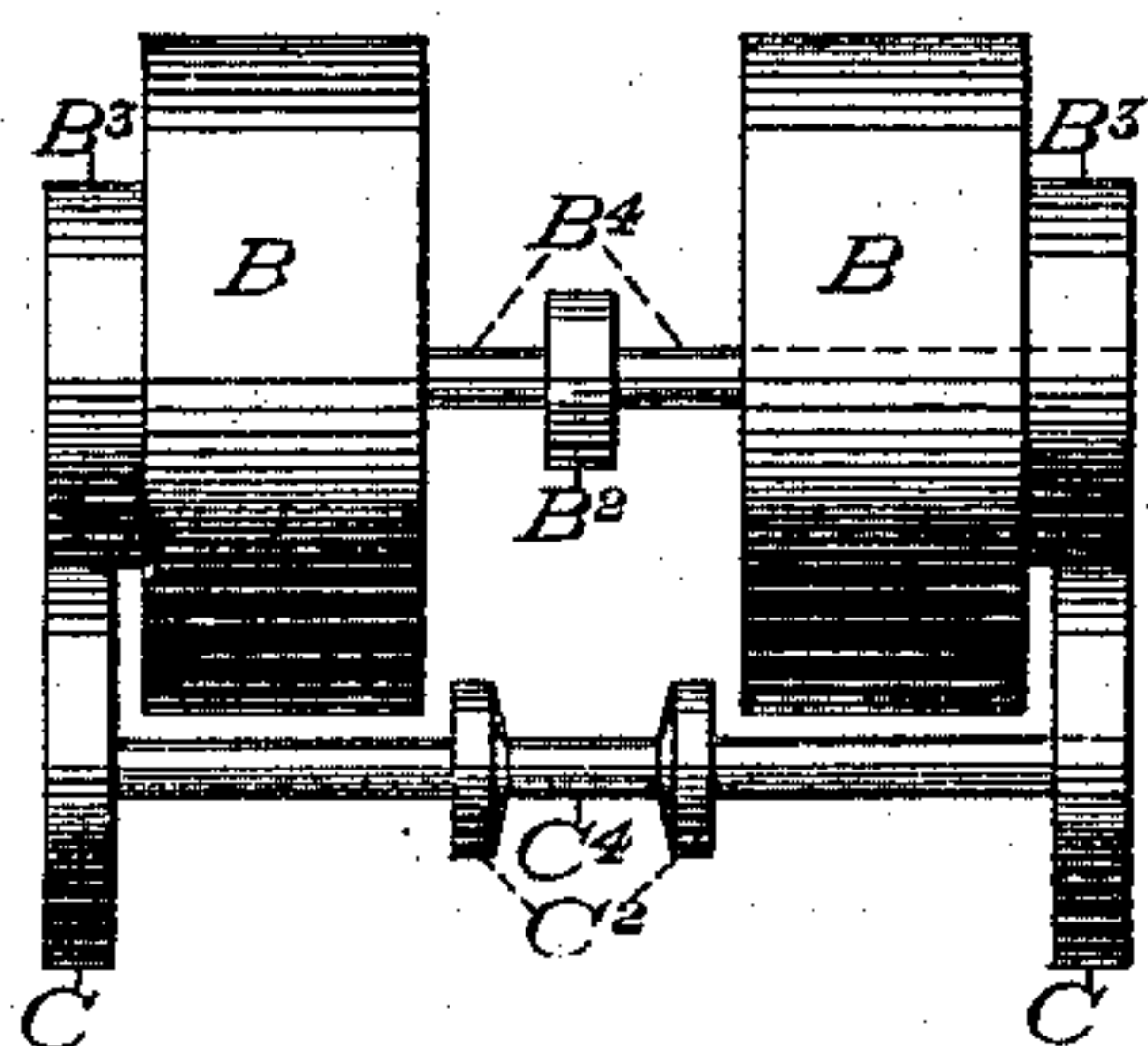


Fig. 4.

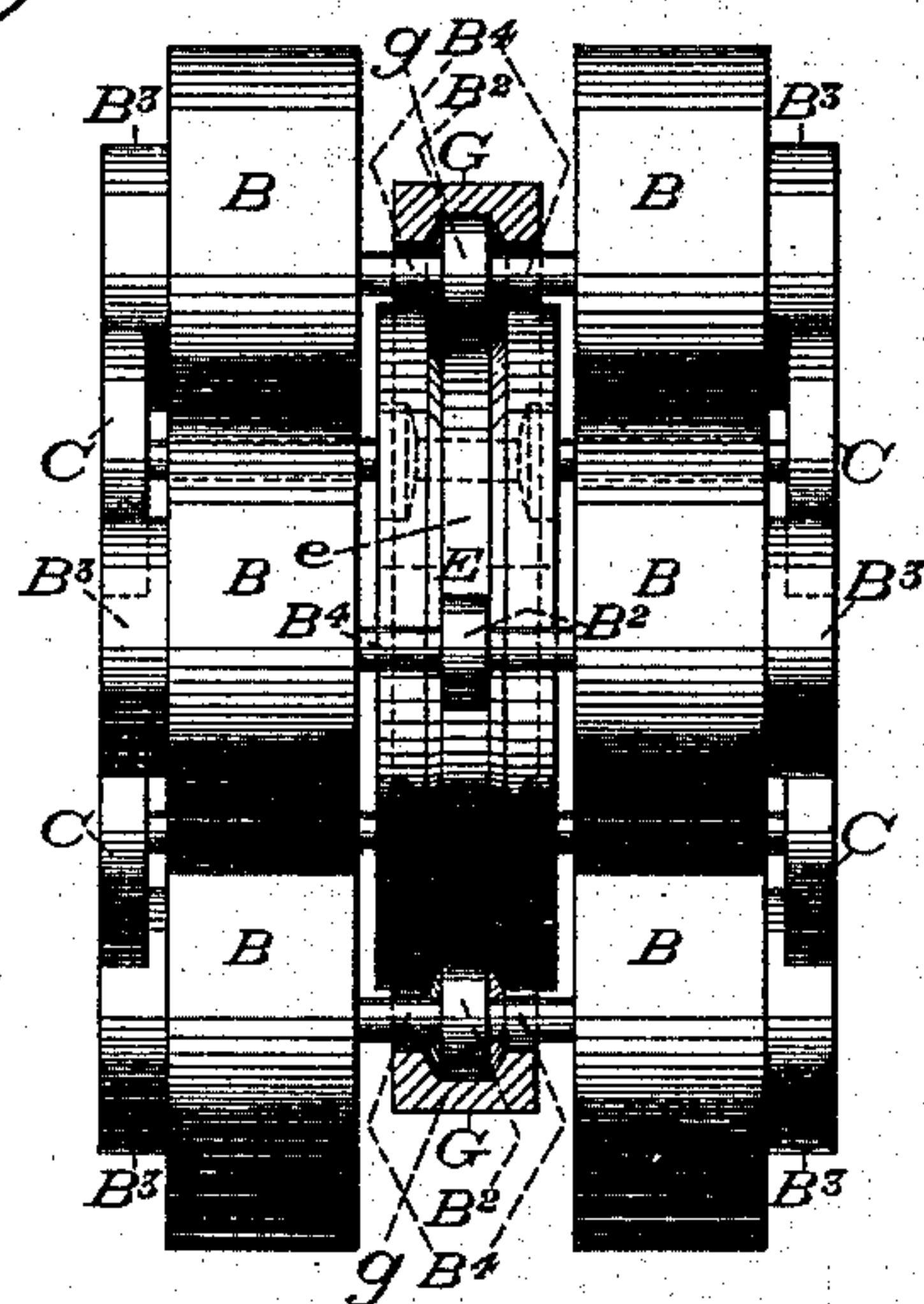


Fig. 2.

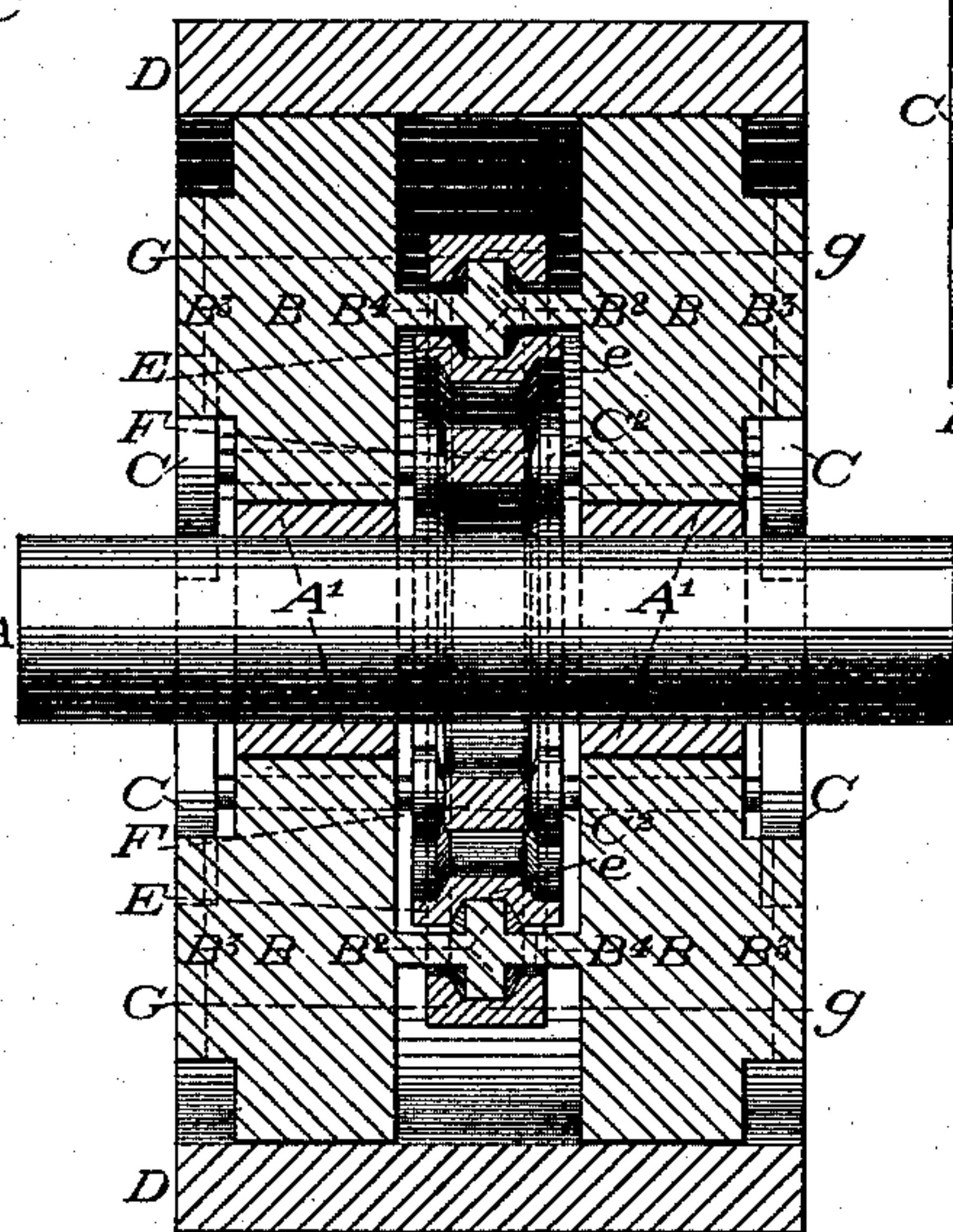


Fig. 5.

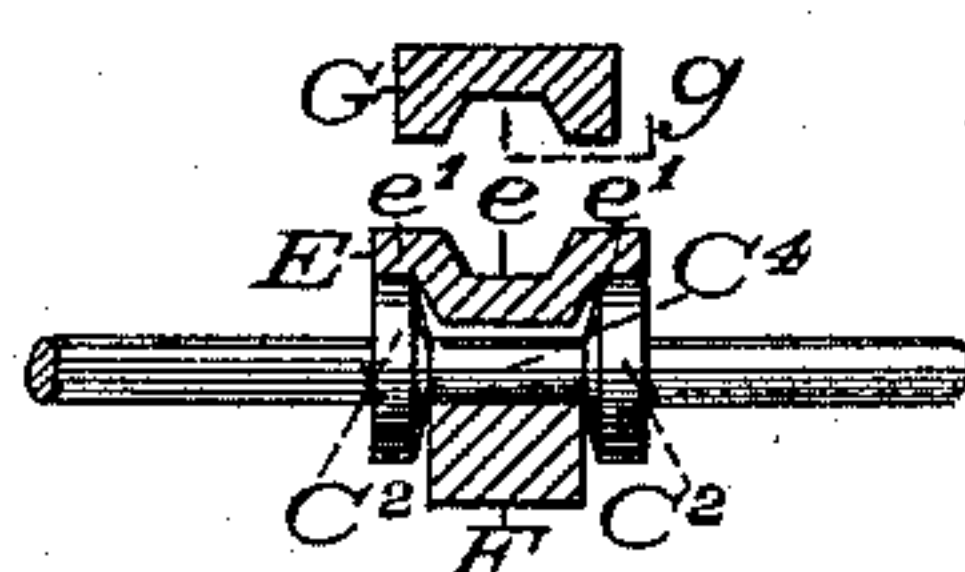


Fig. 6.

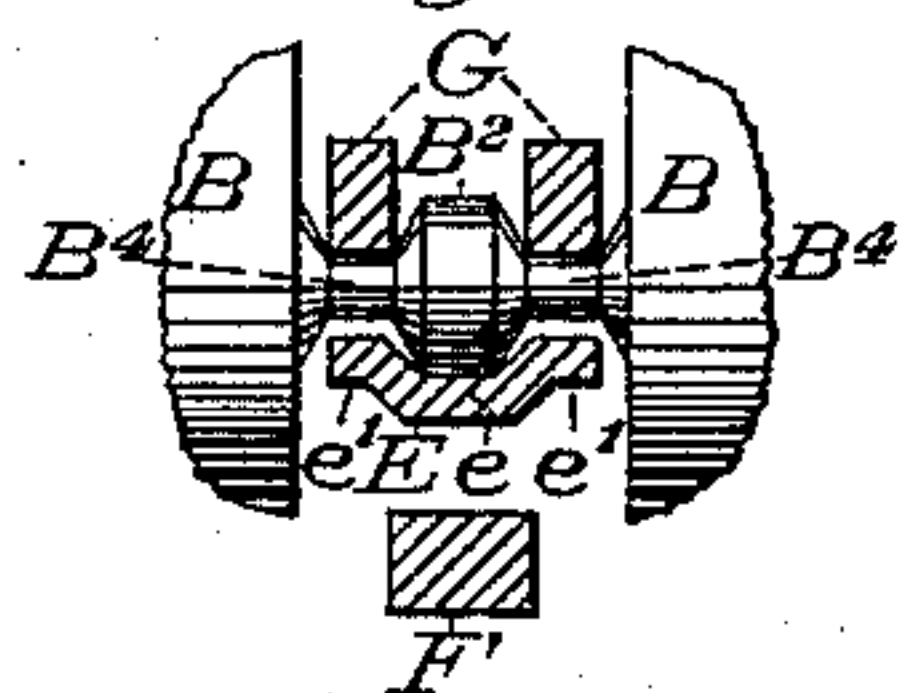
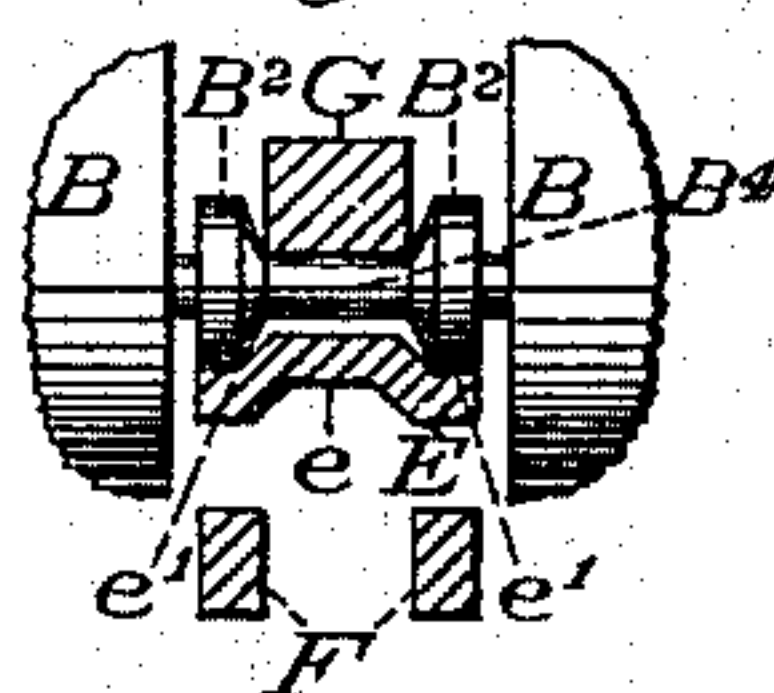


Fig. 7.



Witnesses:

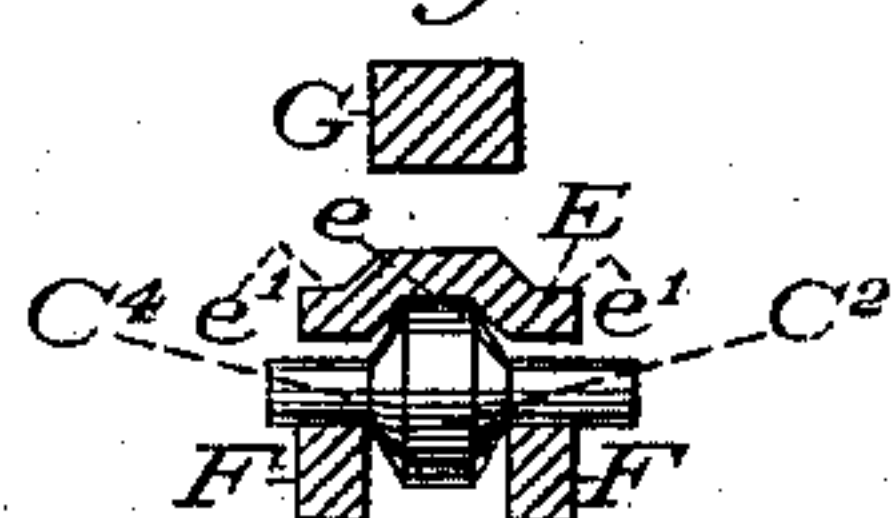
John C. Horne

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Fig. 8.



UNITED STATES PATENT OFFICE.

REUBEN W. HENT, OF SAN FRANCISCO, CALIFORNIA.

ROLLER-BEARING.

SPECIFICATION forming part of Letters Patent No. 413,446, dated October 22, 1889.

Application filed March 25, 1889. Serial No. 304,646. (No model.)

To all whom it may concern:

Be it known that I, REUBEN W. HENT, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a certain new and useful Improvement in Roller-Bearings, of which the following is a specification.

My invention is an improvement on my roller-bearing shown and described in my application for patent filed April 13, 1888, Serial No. 270,567, in which a ring bears at its periphery on journals of the bearing-rollers and at its inner side on journals of separating-rollers, keeping the bearing-rollers separate from each other and bearing only on journals of the bearing-rollers of smaller diameter than the latter rollers, and in which an outer ring bears at its inner side on the first-mentioned journals and an inner ring bears at its periphery on said journals of the separating-rollers. In said roller-bearing, if, as is preferable, the anti-friction proportions are observed, either the separating-rollers must be of larger diameter than the journals of the bearing-rollers on which the separating-rollers bear, or the journals of the bearing-rollers on which the interposed ring bears must be of larger diameter than the journals of the separating-rollers.

My invention is an improvement also on my roller-bearing shown and described in my application for patent filed February 23, 1889, Serial No. 300,887, in which a ring is interposed between journals of the bearing-rollers on its inner side and journals of the separating-rollers on its periphery, a ring bears at its inner side on journals of the latter rollers, and a ring bears at its periphery on said journals of the bearing-rollers. In the latter roller-bearing the separating-rollers are necessarily located so near the casing that they are subject to some outward pressure both from their centrifugal force, on account of their large orbit, and from the bearing-rollers, and if the anti-friction proportions are observed, as is preferable, their diameter is such as to necessitate grooves or recesses of the casing to afford room for their operation.

The object of my improvement is to provide a construction which will not only permit the observance of said proportions and yet the journals on which the interposed ring bears be of equal diameters and the separating-rollers and the journals on which the

latter bear be also of equal diameters, but will also permit not only the employment of four bearing-rollers, which is impracticable in the class to which the first-mentioned roller-bearing belongs, but also the location of the axes of the separating-rollers in the planes of the axes of the bearing-rollers, (sides of the square formed by said planes,) which is impossible in the class to which the last-mentioned roller-bearing belongs. This object is attained by the employment, in place of the ring (hollow cylinder) interposed between the journals of the bearing and separating rollers in the first-mentioned roller-bearing, of a ring grooved at its longitudinal center in one of its sides and recessed at its ends in the other side, and by so constructing said journals that they bear only in said groove and recesses. In said ring provided with such groove and recesses in such journals, and in the peculiar construction and combinations of the parts hereinafter set forth, consists, essentially, my improvement. It is illustrated in the accompanying drawings, in which—

Figure 1 is an end view of a roller-bearing embodying my improvement. Fig. 2 is a longitudinal section through the center or on the line $x x$, Fig. 1, the shaft being shown in elevation. Fig. 3 is a side view of a bearing-roller and a separating-roller, showing the relative positions of the rollers as seen along the plane tangent to both. Fig. 4 is a side view of said roller-bearing as it appears after the removal of the shaft and casing, the outer ring being shown in section. Fig. 5 is a section of the rings on the line $y y$, Fig. 1, the journals of the separating-roller being shown in elevation. Fig. 6 is a section of the rings on the line $x x$, Fig. 1, when two outer rings are employed, the journals of the bearing-roller being shown in elevation. Figs. 7 and 8 are sections corresponding with sections 6 and 5, respectively, when the groove and recesses of the interposed ring are in its inner and outer sides, respectively.

A represents the shaft; A', sleeves of the shaft; B, the bearing-rollers; B² and B³, journals of the rollers B; B⁴, portions of the rollers B reduced in diameter, and when two outer rings are employed, as shown in Fig. 6, serving also as journals of the rollers B.

C represents the separating-rollers; C² and C⁴, the journals of the rollers C; D, the cas-

ing; E, the interposed ring; e , the groove of the ring E; e' , the recesses of the ring E; F, the inner ring or rings; G, the outer ring or rings, and g a groove in the ring G.

5 The sleeves A', with those portions of the shaft A upon which they are fitted, constitute the central journal. They are of the exact length of the bearing portions of the rollers B, and, being intended only to keep the
10 rollers C from contact with the shaft, may be omitted if the diameter of the rollers C is permitted to be a little smaller than that of the journals B³. The rollers B bear on the central journal and the casing, and form rolling bearings either for a rotating casing or a
15 rotating central journal. The journals B³ are formed at the ends of the rollers B, and, as shown in the drawings, are of smaller diameter than these rollers; but they may be
20 mere projections of the rollers B beyond sleeves of the shaft and casing, and therefore of the same diameter. If the object is not to reduce the speed of the axial rotations of the rollers C or to make the diameters of these
25 rollers and the journals B³ equal, or to provide bearings for the rollers C that will retain their original dimensions, these journals or said projections may be omitted and the rollers C permitted to bear on the portions of
30 the rollers B bearing on the central journal and the casing. The rollers C, keeping the rollers B separate from each other, are reduced in diameter portions of their lengths, so as to bear only on the journals B³, and the
35 latter journals are adapted to bear only on the rollers C. The ring E is provided with a groove e at its longitudinal center in one of its sides, and recesses e' at its ends in its other side, being grooved and recessed either
40 in its outer and inner sides, respectively, Figs. 1, 2, 4, 5, and 6, or in its inner and outer sides, Figs. 7 and 8, respectively. Sufficient metal is left between the groove and the recesses to meet the requirements of the ring.
45 The journals B² and C² are adapted to bear only in the groove and recesses, the journals B² in the groove, Figs. 1, 2, 4, and 6, or the recesses, Fig. 7, in the outer side, and the journals C² in the groove, Fig. 8, or the recesses, Figs. 1, 2, 4, and 5, in the inner side of
50 the ring E. Consequently, if the ring is grooved in its outer side, each roller B has one journal B², and each roller C two journals C², Figs. 1, 2, 3, 4, 5, and 6, and if the
55 ring is grooved in its inner side each roller B has two journals B², and each roller C one journal C², Figs. 7 and 8. The parts B⁴ and C⁴ of the rollers adjoining the outer ends of or between the journals B² or C², respectively,
60 are reduced in diameter, so that the rollers will not touch the ring E, such reduced portions serving also as journals of the rollers bearing on the rings F and G. The ring F bears at its periphery on the journals
65 C⁴. If the ring E is grooved in its inner side, each roller C then having two journals C⁴, two rings F are preferably employed, as shown

in Fig. 8. The ring G is provided with a groove g at its longitudinal center in its inner side, or provided with flanges at its ends
70 to keep it in its longitudinal position, and bears in its groove g on the journals B². Instead of such grooved ring G, preferably two rings G, bearing at their inner sides on the journals B⁴, are employed, as shown in Fig.
75 6. If the ring E is grooved in its inner side, necessitating two journals B² to each roller B, the ring G may be kept in its position between these journals without any groove, as shown in Fig. 7. If the depths of the groove
80 and recesses are each equal to half the thickness of the ring E, or the sum of the depths of the groove, and a recess equals the thickness of the ring, the anti-friction proportions will require journals B² and C² of equal di-
85 ameters, and journals B³ and rollers C of equal diameters also, and the ring F being employed the axes of the rollers C may be located in the sides of the square formed by the planes of the axes of the rollers B, thus preventing
90 all outward pressure of the rollers B on the rollers C and greatly reducing the orbit (centrifugal force) of the latter. Preferably, therefore, said groove and recesses are made of said depths.

95 The arrow-heads indicate the relative directions, when the casing is stationary, of the axial rotations of the shaft and rollers and of the rings caused by the axial rotations of the journals B², B⁴, C², and C⁴.

100 In this improved as in said roller-bearing application, Serial No. 300,887, if said proportions are observed, as is preferable, and the number of rollers B does not exceed four, as is preferable, the rollers C, the rings, and all
105 said journals, being exempt from sliding friction and from the pressure of the load, and being mere guides, are substantially exempt from wear and changes in their dimensions, and consequently the two series of rollers
110 will be held and kept compactly and exactly in their proper positions relatively to each other, whatever the wear and changes in the dimensions of the parts subject thereto. The rollers C may be retained longitudinally by
115 the ring E, or by flanges of the rollers or the journals B³, or by any equivalent means.

I claim as my invention—

1. In a roller-bearing, the combination, with a series of bearing-rollers bearing on the cen-
120 tral journal and the casing, and a series of separating-rollers keeping the bearing-rollers separate from each other, of a ring having a groove at its longitudinal center in one of its sides and recesses at its ends in its other side,
125 and bearing in the groove or recesses in its outer side on journals of the bearing-rollers and in the groove or recesses in its inner side on journals of the separating-rollers, all substantially as set forth.

2. In a roller-bearing, the combination, with the central journal and the casing, of the series of rollers B, bearing on said journal and casing and having journals B², the series of

rollers C, keeping the rollers B separate from each other and having journals C², and the ring E, having the groove *e* and the recesses *e'*, substantially as shown and described, and for the purposes set forth.

3. In a roller-bearing, the combination, with the central journal and the casing, of the series of bearing-rollers B, having journals B² and B³, the series of separating-rollers C, bearing only on the journals B³ and having journals C², and the ring E, having the groove *e* and the recesses *e'*, and bearing in said groove and recesses on the journals B² and C², substantially as shown and described, and for the purposes set forth.

4. In a roller-bearing, the combination, with a series of bearing-rollers bearing on the central journal and the casing, and a series of separating-rollers keeping the bearing-rollers separate from each other, of a ring having a groove at its longitudinal center in one of its sides and recesses at its ends in its other side, and bearing in the groove or recesses in its outer side on journals of the bearing-rollers, and in the groove or recesses in its inner side on journals of the separating-rollers, and a ring bearing at its periphery on journals of the latter rollers, all substantially as set forth.

5. In a roller-bearing, the combination, with the central journal and the casing, of the series of rollers B, bearing on said journal and casing and having journals B², the series of rollers C, keeping the rollers B separate from each other and having journals C² and C⁴, the ring E, having the groove *e* and the recesses *e'*, and the ring or rings F, bearing at their peripheries on the journals C⁴, substantially as shown and described, and for the purposes set forth.

6. In a roller-bearing, the combination, with the central journal and the casing, of the series of bearing-rollers B, having journals B² and B³, the series of separating-rollers C, bearing only on the journals B³ and having journals C² and C⁴, the ring E, having the groove *e* and the recesses *e'* and bearing in said groove and recesses on the journals B² and C², and the ring or rings F, bearing at their peripheries on the journals C⁴, substantially as shown and described, and for the purposes set forth.

7. In a roller-bearing, the combination, with a series of bearing-rollers bearing on the central journal and the casing, and a series of separating-rollers keeping the bearing-rollers separate from each other, of a ring having a groove at its longitudinal center in one of its sides and recesses at its ends in its other side, and bearing in the groove or recesses in its outer side on journals of the bearing-rollers and in the groove or recesses in its inner side on journals of the separating-rollers, and a ring bearing at its inner side or in a groove therein on journals of the bearing-rollers, all substantially as set forth.

8. In a roller-bearing, the combination, with the central journal and the casing, of the se-

ries of rollers B, bearing on said journal and casing and having journals B², the series of rollers C keeping the rollers B separate from each other and having journals C², the ring E, having the groove *e* and the recesses *e'*, and the ring G, bearing in a groove *g* on the journals B², substantially as shown and described, and for the purposes set forth.

9. In a roller-bearing, the combination, with the central journal and the casing, of the series of bearing-rollers B, having journals B², B³, and B⁴, the series of separating-rollers C, bearing only on the journals B³ and having journals C², the ring E, having the groove *e* and the recesses *e'* and bearing in said groove and recesses on the journals B² and C², and the ring or rings G, bearing at their inner sides on the journals B⁴, substantially as shown and described, and for the purposes set forth.

10. In a roller-bearing, the combination, with a series of bearing-rollers bearing on the central journal and the casing, and a series of separating-rollers keeping the bearing-rollers separate from each other, of a ring having a groove at its longitudinal center in one of its sides and recesses at its ends in its other side, and bearing in the groove or recesses in its outer side on journals of the bearing-rollers and in the groove or recesses in its inner side on journals of the separating-rollers, a ring or rings bearing at their peripheries on journals of the latter rollers, and a ring or rings bearing at their inner sides on journals of the bearing-rollers, all substantially as set forth.

11. In a roller-bearing, the combination, with the central journal and the casing, of the series of rollers B, bearing on said journal and casing and having journals B² and B⁴, the series of rollers C, keeping the rollers B separate from each other and having journals C² and C⁴, the ring E, having the groove *e* and the recesses *e'*, the ring or rings F, bearing at their peripheries on the journals C⁴, and the ring or rings G, bearing at their inner sides on the journals B⁴, substantially as shown and described, and for the purposes set forth.

12. In a roller-bearing, the combination, with the central journal and the casing, of the series of bearing-rollers B, having journals B², B³, and B⁴, the series of separating-rollers C, bearing only on the journals B³ and having journals C² and C⁴, the ring E, having the groove *e* and the recesses *e'* and bearing in said groove and recesses on the journals B² and C², the ring or rings F, bearing at their peripheries on the journals C⁴, and the ring or rings G, bearing at their inner sides on the journals B⁴, all substantially as shown and described.

REUBEN W. HENT.

Witnesses:

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MCLELLAN HANCOCK.