

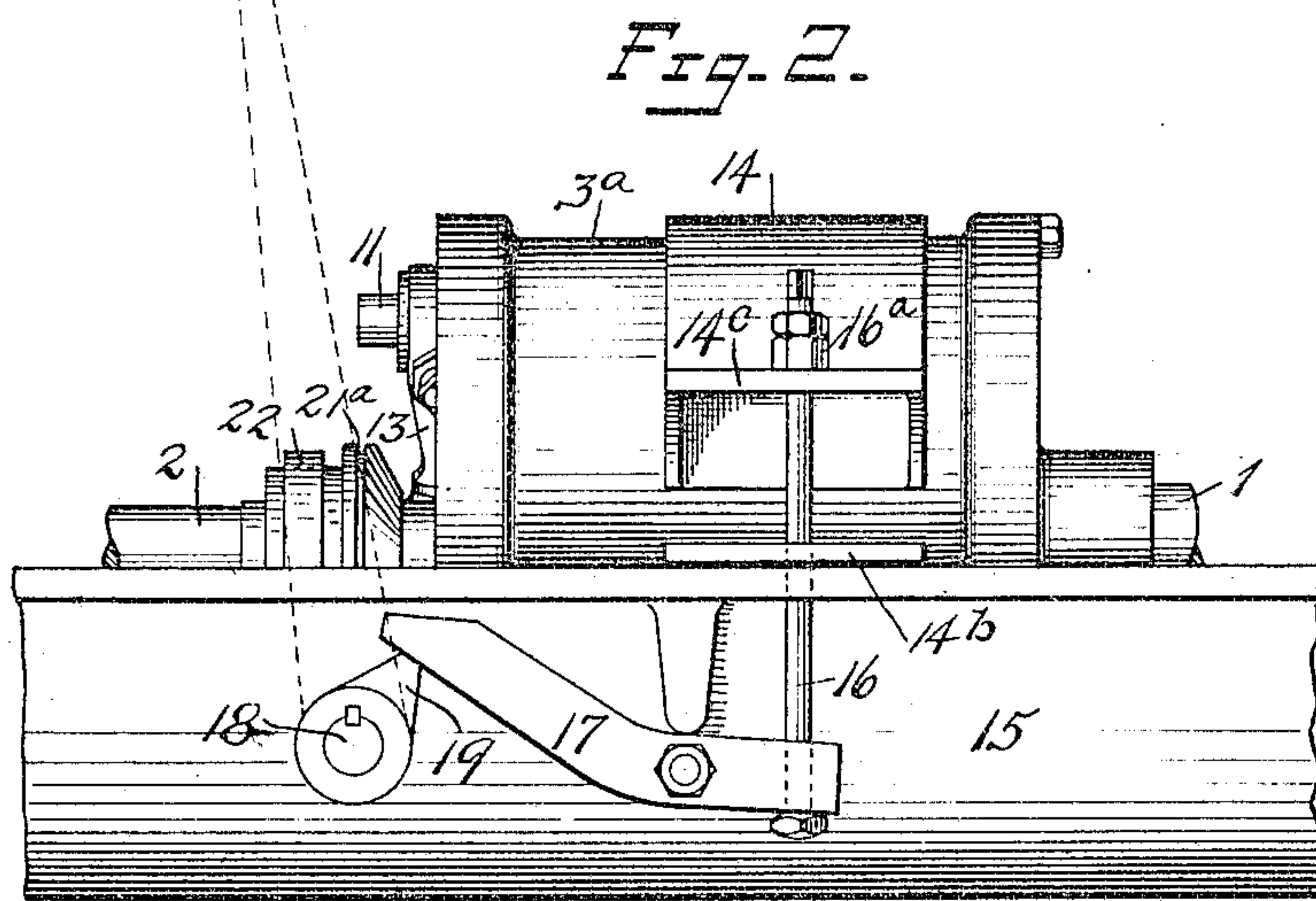
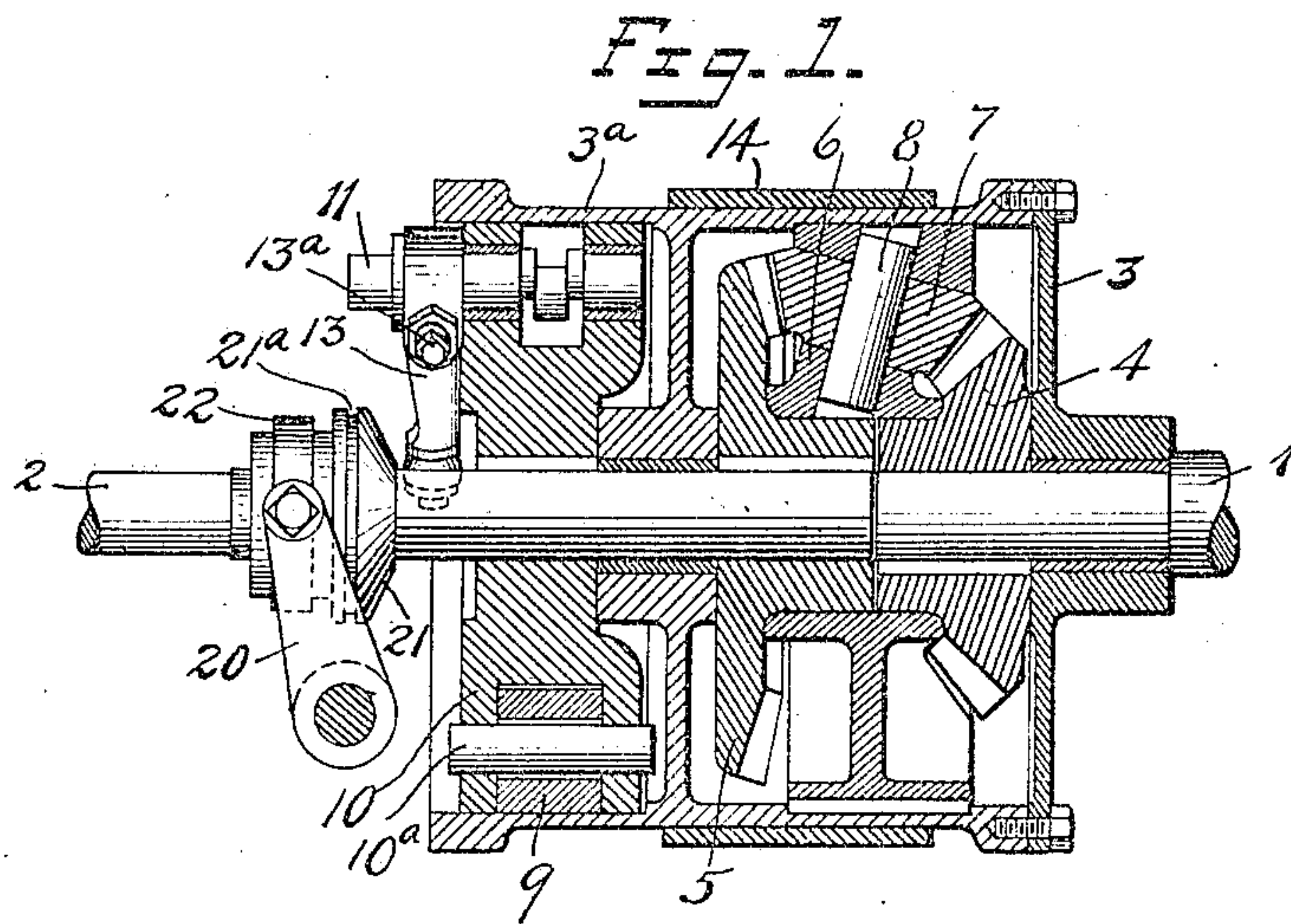
No. 837,125.

PATENTED NOV. 27, 1906.

C. C. RIOTTE.
GEARING.

APPLICATION FILED NOV. 23, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2

Fig. 3.

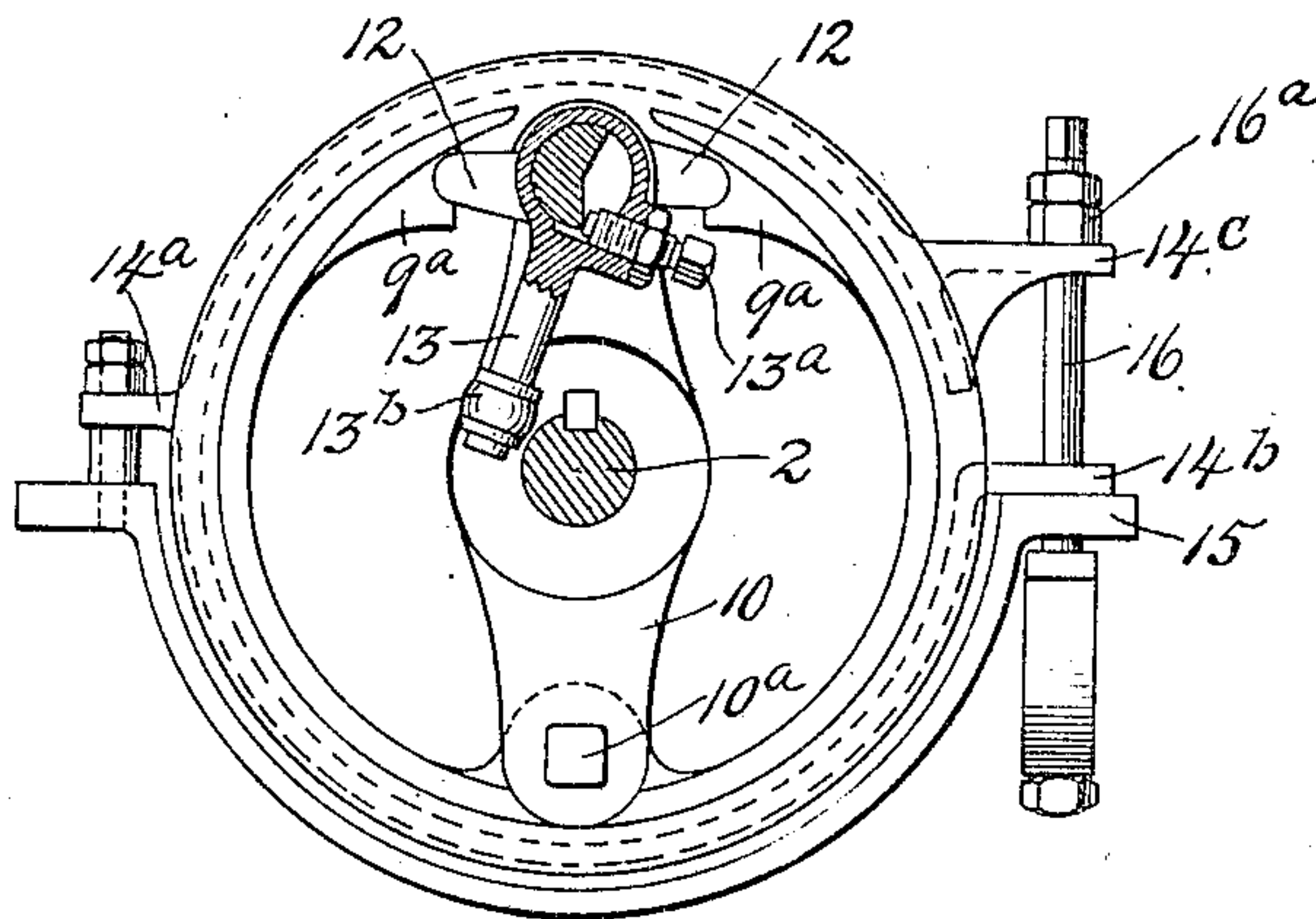


Fig. 4.

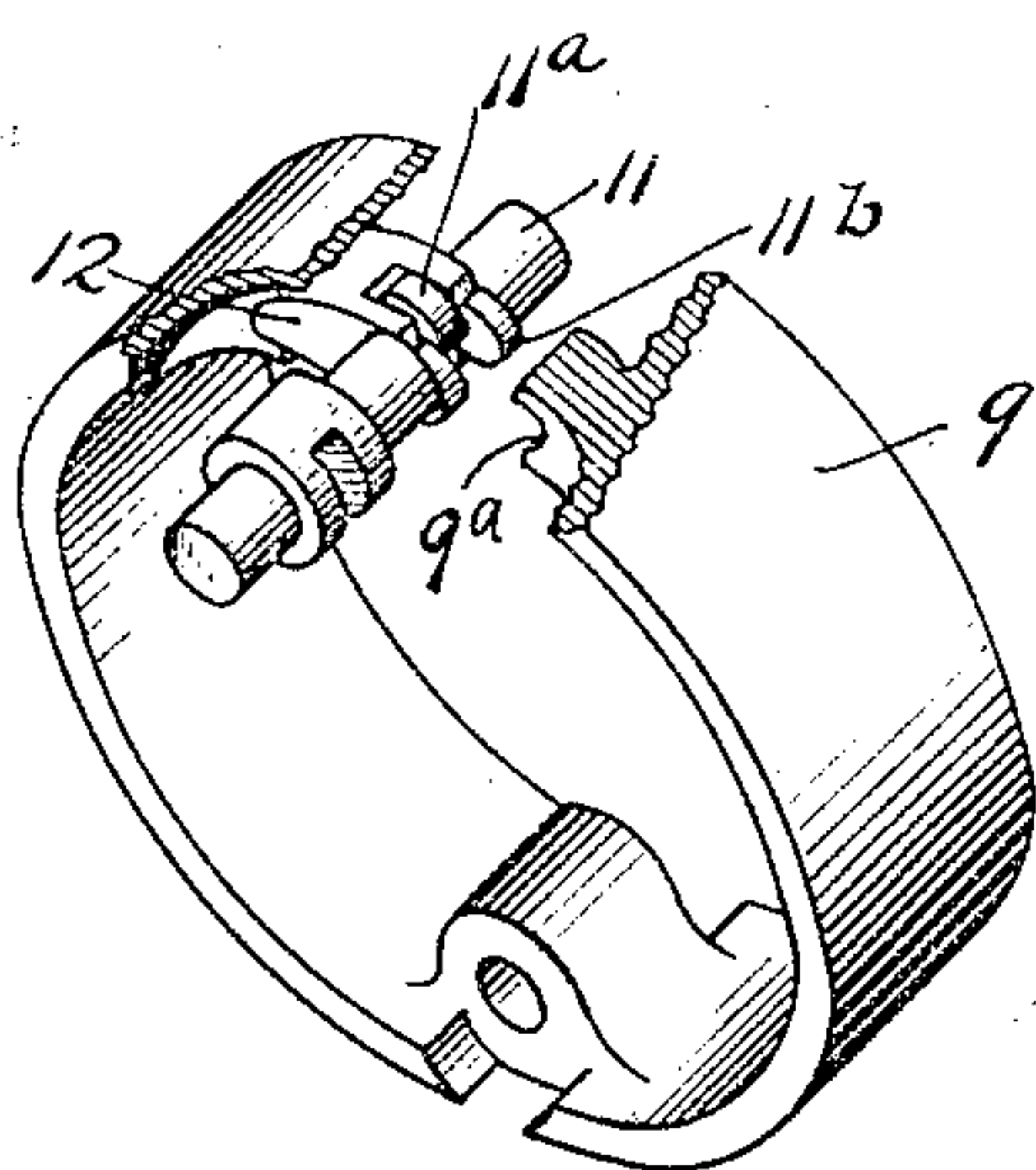


Fig. 5.

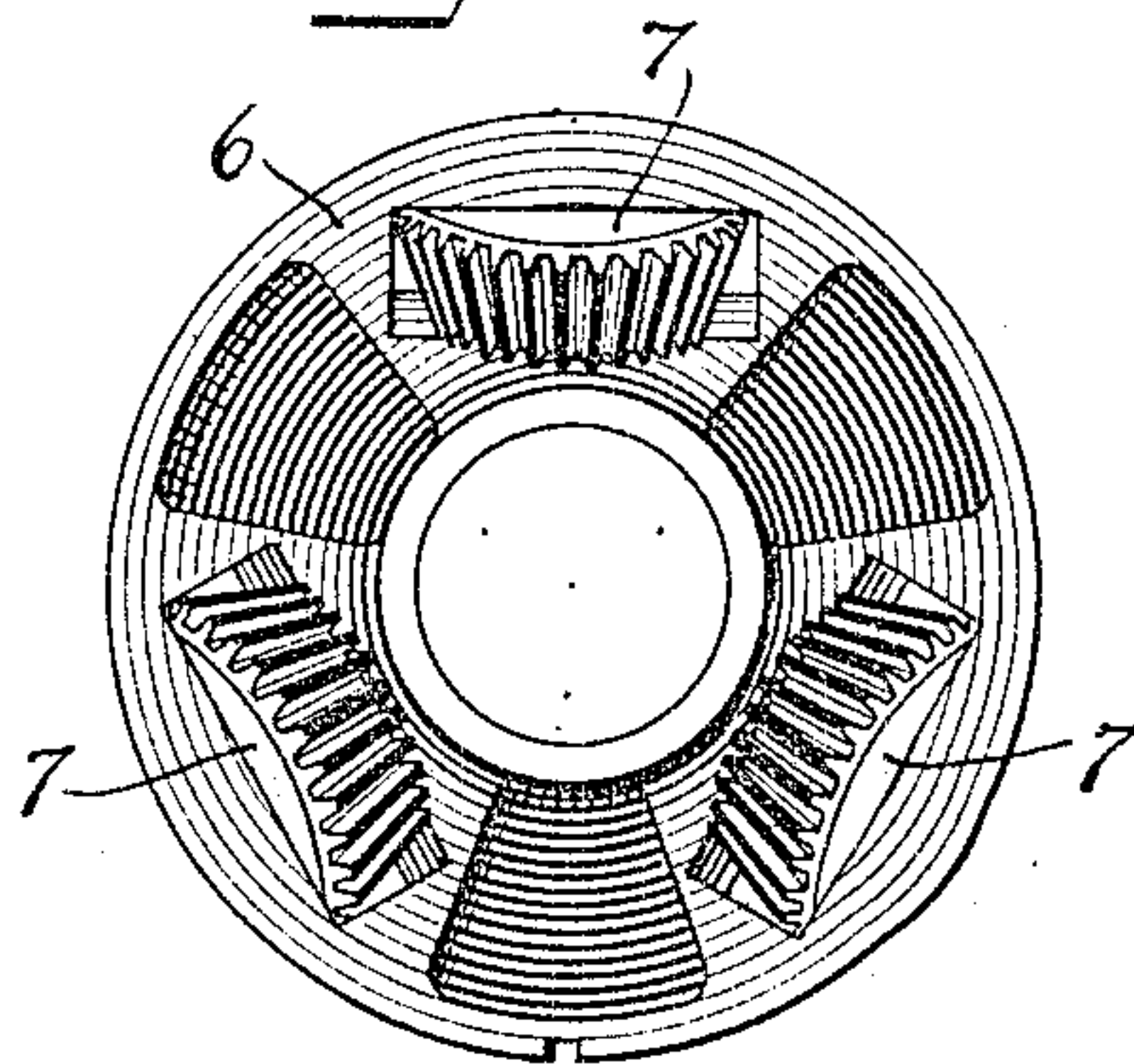
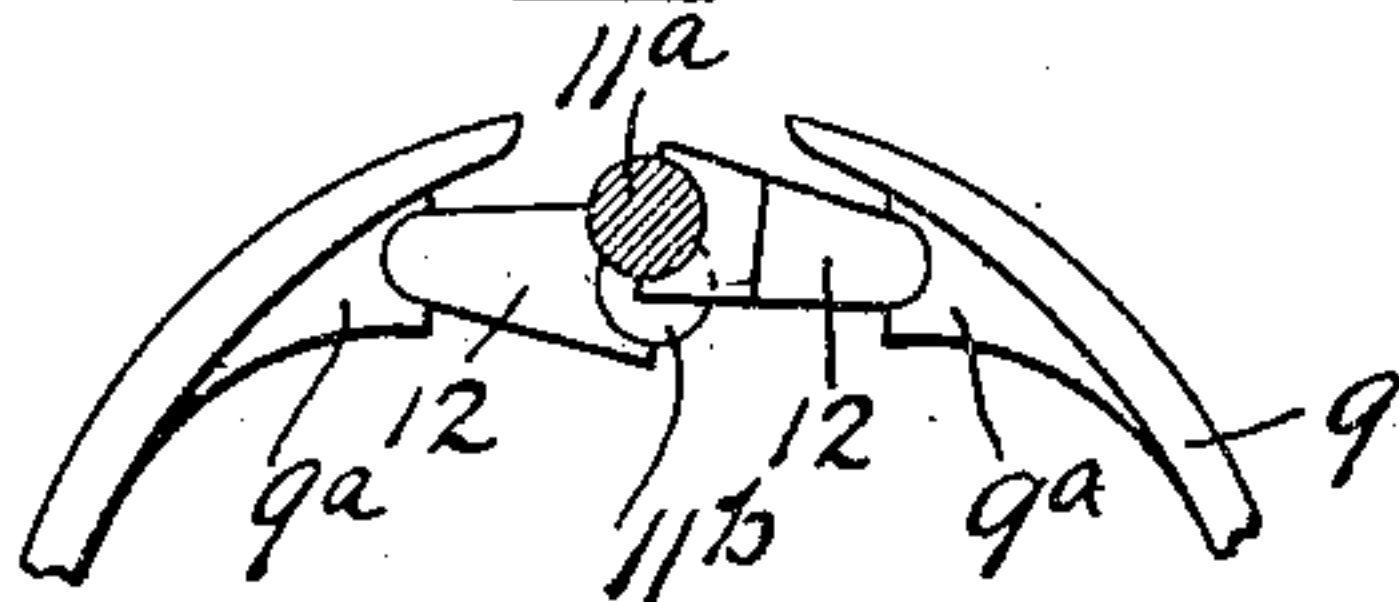


Fig. 6.



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GEARING.

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To all whom it may concern:

Be it known that I, CARL C. RIOTTE, a citizen of the United States, residing at Jersey City, Hudson county, New Jersey, have invented certain new and useful Improvements in Gearing, of which the following is a full, clear, and exact description.

My invention relates to mechanism for use in connecting or disconnecting a driving-shaft with a driven shaft, the construction also being such that the driven shaft may be rotated in the same or a reverse direction to that of the driving-shaft or uncoupled therefrom.

It is the object of my invention to provide against overloading the engine when the driven shaft is reversed. In clutch mechanisms where planetary gears are employed when the driven shaft is reversed a considerable friction is set up which in addition to the load on the driven shaft tends to overload the engine and cut its speed down. Since such devices are ordinarily applied to gas-engines, it is obvious that the cutting down of the speed by an unnecessary frictional load is a double handicap, because not only is the speed cut down, but the engine being slowed down loses substantially in its efficiency. By my invention this danger is entirely eliminated, and the engine works with the same freedom and certainty when the reverse is applied as though the driven shaft were being propelled in the same direction as the engine-shaft.

Another object of the invention is to improve the clutch-actuating mechanism and to provide for convenient and ready adjustment of the same.

These and other advantages will be apparent to the mechanic skilled in the art from an understanding of the drawings and a reading of the specification.

Figure 1 is a longitudinal sectional view of an apparatus of my improved construction, certain parts being shown in elevation. Fig. 2 is a side elevation as said apparatus appears in place. Fig. 3 is an end elevation of the mechanism looking from left to right, certain parts being shown in section. Fig. 4 is a detail view in perspective. Fig. 5 is an end elevation of the planetary gears and their supporting frame or bracket. Fig. 6 is another detail view.

1 is the driving-shaft.

2 is the driven shaft.

3 is the gear-case mounted to revolve on the ends of the driving and driven shafts and overstanding the adjacent ends of said shafts.

4 is a bevel-gear fixed on shaft 1.

5 is a bevel-gear fixed on shaft 2.

6 is a frame or planetary-gear bracket.

7 7 are planetary gears mounted on suitable pivotal bearings 8 8 in said bracket 6. The bracket 6 is revolubly mounted on the hubs of the gears 4 and 5 and is keyed to the gear-case 3. The gears 4 5 are of relatively different diameters, the gear 4 being smaller than gear 5. The planetary gears 7 are mounted obliquely, so as to mesh with both of said gears 4 5 at all times.

3^a is an open-ended extension at one end of the gear-case, within which is located an expanding clutch-ring 9. This expanding clutch-ring is best seen in Figs. 3, 4, and 6. The ring 9 is secured at 10^a to a bracket 10. The bracket 10 is keyed to the driven shaft 2. Between the free ends of the clutch-ring 9 I locate a novel form of expanding mechanism whereby said ring may be expanded and whereby wear may be compensated for whenever necessary. This expanding mechanism comprises a shaft 11, revolubly mounted in the bracket 10. 13 is a dog or arm mounted on said shaft 11 and capable of being angularly adjusted thereon. 11^a 11^b 11^c are cams or equivalent devices on shaft 11. 12 12 are spreader members serving as links, one end of each spreader member taking up against a suitable abutment 9^a 9^a on the ring 9, the other end of each of said members taking up against the cams 11^a 11^b, respectively. 13^a is an adjusting-screw carried by the arm 13, said screw end bearing against a suitable shoulder on the shaft 11, whereby the angular adjustment of the arm 13 may be effected by moving the screw in or out.

From the foregoing it will be seen that when the arm 13 is swung to the left, as viewed in Fig. 3, a rotary motion will be imparted to the shaft 11 and the cams 11^a 11^b, the latter spreading the links 12 12 and causing the ring 9 to expand, so as to bring it into locking engagement with the end 3^a of the case 3.

14 is a band-brake for the case 3. 14^a is an offset portion or shoulder, which may be fastened to the base 15 so as to prevent said brake rotating with the gear-case. One free end 14^b of said brake may also receive a rigid

support on the base 15, while the other end 14^c may be engaged by one end of a link 16, the other end of said link 16 engaging with a lever 17, pivoted to the frame or base 15.

5 16^a is an adjusting-nut on link 16.

The operating means comprises members arranged to alternately actuate the band-brake 14 and the expanding clutch-ring 9. A single lever (indicated in dotted lines) 10 serves to operate both of said controlling devices.

18 is the controller-lever shaft mounted on the base 15. 20 is an arm thereon. 19 is a cam on said shaft 18, arranged to alternately 15 operate with the arm 20.

21 is a cone slidable upon the driven shaft 2. The arm 20 is suitably engaged with the cone 21, as by a strap 22, so that by moving the arm 20 the cone 21 may be advanced or 20 retracted.

13^b is an antifriction-roller on the end of the arm 13 and in the path of movement of the cone 21.

21^a is an annular groove in the cone 21, in 25 which groove the periphery of the antifriction-roller 13^b stands when the cone is advanced. This serves as a means for preventing accidental dislodgment.

The end of the cam 19 may be flattened, as 30 indicated in Fig. 2, so that it will take a square bearing against the lever 17 when the same is set, said position being indicated in Fig. 2. This serves as a means to prevent the accidental dislodgment of the reverse 35 mechanism. The angular position of the arm 20 and the cam 19 is such that one is entirely thrown out before the other is thrown into action, with the result that all the parts are uncoupled at the intermediate position.

40 Operation: For normal running ahead the controlling-lever is moved so as to cause the cone 21 to swing the arm 13 and expand the ring 9, by which means the driven shaft 2 is then coupled with the gear-case 3. The 45 power going in through driving-shaft 1 will then take the following course: from driving-shaft 1 to gear 4, to gear 7, and to the gear-case 3. The gear-case 3 being locked to the shaft 2, all of the parts are required to re- 50 volve bodily, and hence the two shafts 1 and 2 will be revolved in the same direction at the same speed. To reverse, the controlling-lever is swung so as to retract the cone 21, which frees the arm 13, whereupon the ring 55 9 contracts and frees the case. The continued movement of the controlling-lever swings the cam 19 so as to operate lever 17, drawing the band-brake 14 tightly upon the case 3 and checking its rotation, whereupon 60 the power of the driving-shaft 1 will then be directed to the driven shaft 2 as follows: from shaft 1 to gear 4, to planet-gear 7, which latter then being incapable of planetary movement transmits the power in a reverse direc- 65 tion to gear 5, which being keyed to driven

shaft 2 rotates the latter in a corresponding direction.

As before stated, the gear 4, being smaller than gear 5, drives the latter more freely 70 than if it were the same size, and the difference in ratios of said gears is sufficient to compensate for the added friction produced by the rotation of the planetary gears 7 on their own axes. As a result of this arrangement 75 the load upon the engine is constant whether the driven shaft is rotated in the forward direction or in a reverse direction.

What I claim is—

1. In an apparatus of the character described, a driving-shaft, a driven shaft in line 80 therewith, beveled gears on the ends of said shafts, said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a beveled planetary gear arranged obliquely and meshing 85 at all times with said first-mentioned gears, a gear-case, a bracket carried thereby, in turn carrying said planetary gear, means for locking said gear-case to the driven shaft, means for locking said gear-case against rotation, 90 said locking means working alternately.

2. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears carried thereby, 95 said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a planetary beveled gear arranged obliquely and meshing with said first-mentioned gears at all times, a bracket 100 for said planetary gears, a gear-case revolvably mounted on said shafts and carrying said bracket, means for locking said gear-case to said driven shaft, comprising a clutch-ring, a bracket therefor, said bracket being carried 105 by said driven shaft, a cam-shaft carried by said bracket, means of connection between said cam-shaft and said clutch-ring, means for rotating said cam-shaft, comprising a swinging arm carried by said cam-shaft, and 110 an arm-operating member carried by said driven shaft.

3. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears carried thereby, 115 said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a planetary beveled gear arranged obliquely and meshing with said first-mentioned gears at all times, a bracket 120 for said planetary gears, a gear-case revolvably mounted on said shafts and carrying said bracket, means for locking said gear-case to said driven shaft, comprising a clutch-ring, a bracket therefor, said bracket being carried 125 by said driven shaft, a cam-shaft carried by said bracket, means of connection between said cam-shaft and said clutch-ring, means for rotating said cam-shaft, comprising a swinging arm carried by said cam-shaft, and 130 an arm-operating member carried by said

driven shaft, and means for adjusting the angular position of said arm of said cam-shaft.

4. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears carried by said shafts, said gears, being of different diameters, the smaller of said gears being always carried by the driving-shaft, a gear-case, a planetary beveled gear obliquely mounted within said gear-case and meshing at all times with said first-mentioned gears, means for locking said gear-case against rotation, comprising a band-brake for the outer side of said gear-case, said band-brake being held against rotary movement, a link connecting one free end of said band-brake, a lever engaging said link, and a cam for engaging said lever, means for moving said cam to swing said lever and operate said brake.

5. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears carried by said shafts, said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a gear-case, a planetary beveled gear obliquely mounted within said gear-case and meshing at all times with said first-mentioned gears, means for locking said gear-case against rotation, comprising a band-brake for the outer side of said gear-case, said band-brake being held against rotary movement, a link connecting one free end of said band-brake, a lever engaging said link, and a cam for engaging said lever, means for moving said cam to swing said lever and operate said brake, and means for adjusting the band-brake connection to vary the degree of clamping pressure upon the gear-case and compensate for wear.

6. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears on the ends of said shafts, said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a beveled planetary gear arranged obliquely and meshing at all times with said first-mentioned gears, a gear-case, a bracket carried thereby, in turn carrying said planetary gear, means for locking said gear-case to the driven shaft, means for locking said gear-case against rotation, said locking means working alternately and being formed so as to be held against accidental disengagement from their locking positions respectively.

7. In an apparatus of the character described, a driving-shaft, a driven shaft in line therewith, beveled gears on the ends of said shafts, said gears being of different diameters, the smaller of said gears being always carried by the driving-shaft, a beveled planetary gear arranged obliquely and meshing at all times with said first-mentioned gears, a gear-case, bracket carried thereby, in turn carrying said planetary gear, means for locking said gear-case to the driven shaft, means for locking said gear-case against rotation, said locking means working alternately, and controlling means for alternately actuating said locking devices, comprising a single shaft and devices thereon for making contact with and moving said locking device from the locking position to the unlocking position and vice versa.

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Witnesses:

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