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E. J. GOULD.

COMPENSATING GEAR.

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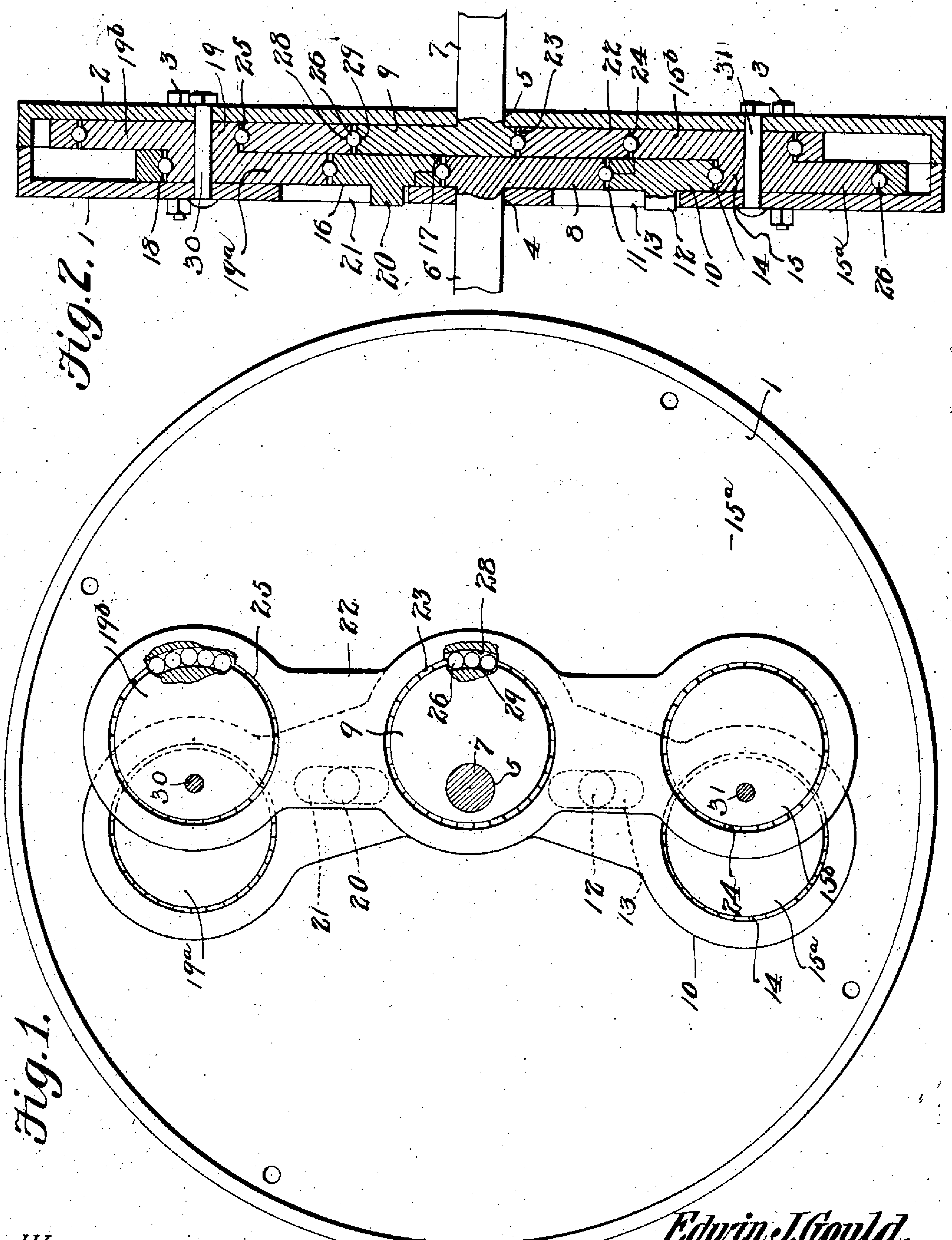

Fig. 2.

Fig. 1.

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COMPENSATING GEAR.

No. 834,902. Specification of Letters Patent. Patented Nov. 6, 1906.

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To all whom it may concern:

Be it known that I, EDWIN J. GOULD, a citizen of the United States, residing at Boulder, in the county of Boulder and State of Colorado, have invented a new and useful Compensating Gear, of which the following is a specification.

This invention relates to gearing and is designed to provide an improved compensating gear wherein gear-teeth are dispensed with and positive interlocking of the parts is insured without liability of breakage thereof and the required backward movements of certain of the parts is permitted in a prompt and thoroughly-efficient manner.

In lieu of gears having teeth I employ eccentrics and links, which are so arranged as to positively transfer power from the drive elements to the shaft-sections and which are, furthermore, arranged to permit backward movements of the eccentrics within the links to permit of the shaft or axle sections running at different rates of speed.

A very important feature of the invention resides in having the drive element which is to be coupled to an engine or other suitable source of power constitute a case for containing and housing the links and eccentrics, whereby these elements are not exposed to accumulations of dirt and the effects of the weather, wherefore the present gear may be effectually maintained in the desired lubricated condition.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a face view of the present compensating gear having one of the combined case and drive sections removed to disclose the links and eccentrics, portions of the latter being broken away to show the ball-races and antifriction-balls. Fig. 2 is a cross-sectional view of the gear.

Similar numerals of reference designate corresponding parts in both figures of the drawings.

The case for housing the operating parts of the present compensating gear is made up of two cylindrical half-sections 1 and 2, which have their rims abutted and detachably connected by means of bolts or other fastenings 3, piercing the ends or heads of the case. These case-sections are provided, respectively, with central openings 4 and 5 for the rotatable reception of the respective shaft or axle sections 6 and 7, which are of course in longitudinal alinement. The shaft-section 6 is provided at its inner end with an eccentric 8, integral or otherwise disposed to work within the case-section 1, and a similar eccentric 9 is carried by the inner end of the shaft-section 7 and works within the case-section 2.

It will here be explained that the case-sections 1 and 2, in addition to housing the other elements of the gear, constitute the drive element and may be provided with gear-teeth secured to a separate gear or otherwise arranged to be coupled to an engine or other source of power. In other words, the power is first applied to the case and then transferred from the latter, through the links and eccentrics, to the shaft-sections.

Coöperating with the eccentric 8 is a flat link 10, which is provided at its inner end with a circular opening or seat 11, loosely embracing the eccentric and constituting an eccentric-strap. At the middle of this link there is a cylindrical stud or projection 12, working in a radial slot 13, formed in the drive-section 1. The outer end of the link 10 is provided with a circular opening 14, so as to form an eccentric-strap embracing the member 15^a of the double eccentric 15, the other member 15^b of which is of course disposed diametrically opposite the member 15^a.

At the opposite side of the eccentric 8 there is a flat link 16, which is a substantial duplicate of the link 10, its inner end being provided with an opening 17, receiving the eccentric 8, and its outer end having an opening 18, receiving the eccentric member 19^a of the double eccentric 19, the other eccentric member 19^b being located diametrically opposite the eccentric member 19^a. A cylindrical stud or projection 20 is carried by the outer side of the link 16 substantially midway of its ends and works in a radial slot 21, as explained for the link 8. As shown in Fig. 2 of the drawings, it will be noted that the inner overlapped end portions of the links 8 and 16

are laterally reduced so that their combined thicknesses will approximate the thickness of the outer end portion of each link.

Associated with the eccentric 9 is a link 22, which is provided at its middle with a circular opening 23, loosely receiving the eccentric 9, while its end portions are provided with the respective circular openings 24 and 25, loosely receiving the eccentric members 15^b and 19^b.

Between the periphery of each eccentric and the circular wall portion of the adjacent link there is a series of antifriction-balls 26, the eccentric being provided with a ball-race 29 and the circular wall of the link being provided with a ball-race 28, whereby friction between these parts is reduced to the minimum.

Edgewise movements other than rotary movements of the double eccentrics is prevented by means of the respective pivot pins or bolts 30 and 31 piercing the double eccentrics and the sections of the drive element, whereby the double eccentrics are connected to turn about fixed centers.

In practice, the links being in any relation—for instance, in parallelism, as shown in Fig. 2—power is applied to the case, and the latter, together with the links and eccentrics, turn as a whole around the axis of the case by reason of the fact that the case, links, and eccentrics are positively connected through the medium of the pivot-pins 30 and 31. Should the rate of rotation of either shaft or axle-section be retarded—for instance, in the case of a motor-vehicle making a turn—that shaft-section which is retarded is practically turning in a rearward direction, and its eccentric will be shifted backward in its adjacent link. If it is the shaft-section 7 which is retarded, its eccentric 9 will also be retarded, thereby shifting the link 22 endwise, which swings the double eccentrics in a backward direction, thereby tilting and swinging the links 10 and 16 upon their pivots 12 and 20, which slide in the slots 13 and 21, thereby accommodating for the different relations between the eccentrics 8 and 9. Should it be the shaft-section 6 which is retarde its eccentric 8 will also be retarded, thereby pivotally shifting the links 10 and 16, the double eccentrics, and the link 20, so as to compensate for the change in the relation between the eccentrics 8 and 9. When the vehicle completes the turn and is running straight ahead, the shafts or axle-sections will be simultaneously driven at the same rate of speed with the links and eccentrics in the relation assumed at the end of the retarding or backward movement of one or the other of the shaft-sections.

It will of course be understood that when the rotary movement of either of the eccentrics 8 and 9 is retarded and the links shift in the manner hereinbefore described the rotary movement of the other eccentric will be accelerated in exactly the same proportion as the first-mentioned eccentric is retarded, whereby there is no sudden jerk or strain applied to the engine when either of the shaft-sections or axles is retarded.

While I have shown antifriction-balls between the eccentrics and the openings in the links, this is not absolutely necessary. Furthermore, instead of having the members of each double eccentric disposed diametrically opposite they can have other relations without impairing the effectiveness of the device.

Having thus described the invention, what is claimed is—

1. A compensating gear comprising separate driven elements, a drive element concentric with the driven elements, eccentrics upon the driven elements, double eccentrics having their members respectively alined with the eccentrics of the driven elements, a link provided with openings respectively receiving one of the driven eccentrics and corresponding members of the double eccentrics, and a pair of links having their inner ends embracing the other driven eccentrics and their outer ends embracing the other respective members of the double eccentrics, said pair of links having a radial slidable connection with the drive elements and also capable of pivotal movements upon their slidable connection.

2. A compensating gear comprising a drive element having a central opening and diametrically opposite radial guideways, separate driven elements alined with the opening in the drive element and provided with eccentrics, a pair of links having their inner ends overlapped and embracing one of the eccentrics, each link having a slidable and pivotal connection with one of the guideways, a pair of double eccentrics having corresponding members embraced by the outer ends of the links, and another link having its middle portion embracing the other driven eccentrics and its ends embracing the other corresponding members of the double eccentrics.

3. A compensating gear comprising a rotary case constituting a drive element, driven elements concentrically piercing the case and provided with eccentrics within the case, a pair of links having their inner ends overlapping and embracing one of the eccentrics, each link having a radially-slidable and pivotal connection with the case, double eccentrics with corresponding members embraced by the outer ends of the respective links, and a single link having its middle portion embracing the other driven eccentric with its ends embracing the other corresponding members of the double eccentrics.

4. A compensating gear comprising a case constituting the drive element, driven elements rotatably piercing the sides of the case, and compensating elements housed

within the case and extending between the case and the drive elements, said compensating elements including eccentrics and links embracing the same.

5. A compensating gear comprising a drive element, separate driven elements independent of the drive element and provided with eccentrics, pairs of double eccentrics pivotally supported upon the drive element, a link having a series of openings receiving one of the driven eccentrics and corresponding members of the double eccentrics, and a pair of links having openings receiving the other driven eccentric and the other members of the double eccentrics, each member of the pair of links having a slidable pivotal connection with the drive member.

6. A compensating gear comprising a drive-gear, double eccentrics pivotally carried by the gear, separate driven elements having eccentrics, and links having openings receiving the respective driven eccentrics and corresponding members of the double eccentrics.

7. A compensating gear comprising a drive-gear, driven elements, and eccentrics and eccentric links forming the connection between the drive-gear and the driven elements.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDWIN J. GOULD.

Witnesses:
T. R. RICE,
J. L. FOX.