D. E. ROSS.

DIFFERENTIAL MECHANISM.

APPLICATION FILED APR. 12, 1912.

1,175,300. Patented Mar. 14, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

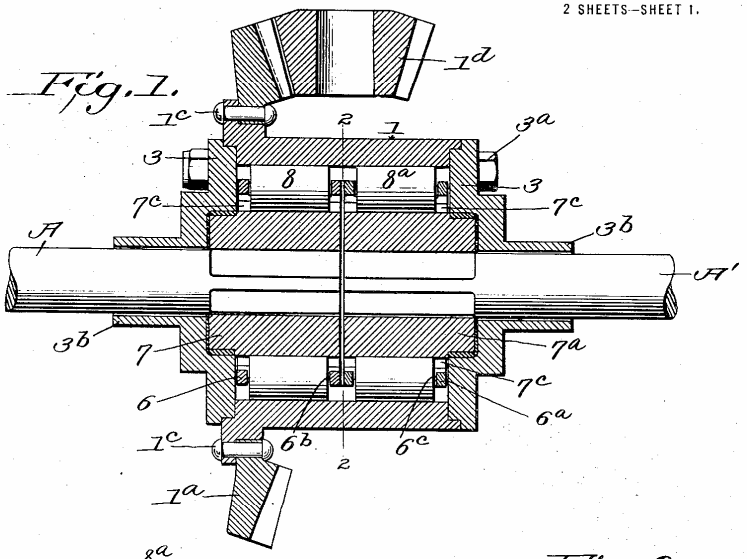
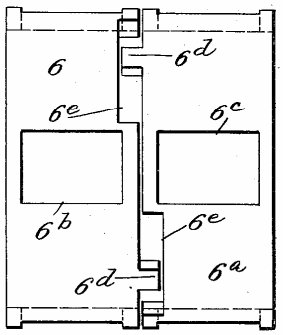


Fig. 3.



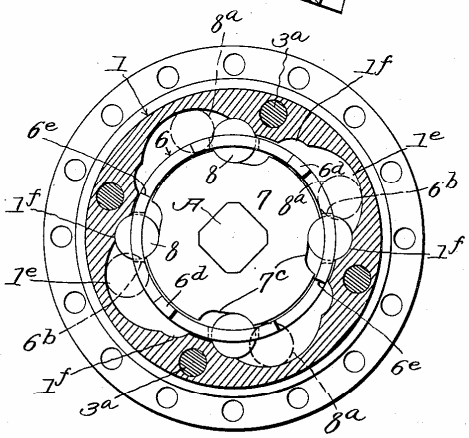


Fig. 2.

WITNESSES

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DIFFERENTIAL MECHANISM.

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To all whom it may concern:

Be it known that I, DAVID E. ROSS, of La Fayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements in Differential Mechanism; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel improvement in differential mechanism and its object is to provide a differential mechanism wherein one driven member cannot or will not race if less resistance should be offered thereto than to the other member; for example, if the mechanism is used to drive the rear wheels of an automobile, one driven wheel cannot race if it finds a soft place; and thus all the motive power can be utilized for effective tractive purposes, and not be wasted in driving any part idly.

Another object is to provide a differential mechanism containing the invention which can be substituted for or used in place of certain types of differential mechanism now in use with the advantage of economizing motive power and preventing racing as above noted.

I will explain the invention in detail as embodied in the differential mechanism illustrated in the accompanying drawings in which—

Figure 1 is a central longitudinal sectional view through a differential mechanism embodying the invention. Fig. 2 is a vertical transverse section on the line 2—2, Fig. 1. Fig. 3 is a side view of the roller cages. Fig. 4 is a longitudinal sectional elevation of such a mechanism provided with cage controlling springs. Fig. 5 is a transverse section on line 5—5, Fig. 4. Fig. 6 is a detail view of the cage-controlling castings shown in Figs. 4 and 5. Fig. 7 is a side view of one of such castings. Fig. 8 is a detail perspective view illustrating the operation of the cage-controlling devices.

Referring to Figs. 1 and 2 of the drawings, 1 designates a differential housing or casing which is in the form of a cylinder closed at its ends by heads 3 which are fitted to the ends of the housing and secured rigidly thereto by means of longitudinal bolts 3^a. These heads are provided with axially alined hubs or bearings 3^b for the inner ends of the shaft or axle sections A, A′, hereinafter referred to.

The housing 1 is adapted to be rotated axially by any suitable means. As shown a bevel gear 1^a is secured thereto by means of bolts 1^c; and this gear 1^a may be driven by means of a pinion 1^d connected to the engine shaft, (not shown) or any other suitable driver. The particular means for rotating the housing 1 forms no part of the present invention.

Within the casing 1 are a pair of adjacent disks 7, 7^a which are respectively keyed or otherwise fitted to the ends of the shaft sections A, A′, so that they cannot rotate relatively thereto. Each disk, 7, 7^a, is provided with a plurality of pockets 7^c in its periphery; and normally resting in the pockets of the disk 7 are rollers 8, and in the pockets of disk 7^a are rollers 8^a. These rollers lie between the disks 7, 7^a and the interior wall of the housing and project from the pocket 7^c into corresponding pocket 1^e in the inner periphery of the housing 1. The pockets 1^e in the housing are longer circumferentially than the pockets 7^c in the disks, and consequently as the housing turns each roller 8, 8^a will eventually be caught between the following end of a pocket 1^e in the casing and the leading end of a pocket 7^c in its disk, as indicated in Fig. 2; and the rollers thus form a clutch or lock between the casing and the disks, and transmit motion from the housing 1 to the disks in the direction in which the housing rotates.

The pockets 1^e in the housing preferably have contracted extensions at their ends, as indicated at 1^f, which fit the side of the rollers and afford broad bearing surfaces for the rollers 8, 8^a when the housing is locked to the disks by the rollers. If either disk moves to an intermediate position, so that the pocket 7^c therein registers about centrally with the pockets 1^e of the housing, then the roller 8, (or 8^a) in the disk would project into pockets 1^e as indicated in dotted lines in Fig. 2 and would not transmit motion from the housing to the disks, or vice versa.

To prevent excessive rotary movement of one disk relative to the other each set of rollers is kept properly spaced apart by a cage. As shown the rollers 8 are spaced apart by a cage 6 which may consist of an annular band slightly larger in diameter