M. C. LENOIR.

DIFFERENTIAL MECHANISM.

APPLICATION FILED MAR. 11, 1912.

1,052,155.

Patented Feb. 4, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

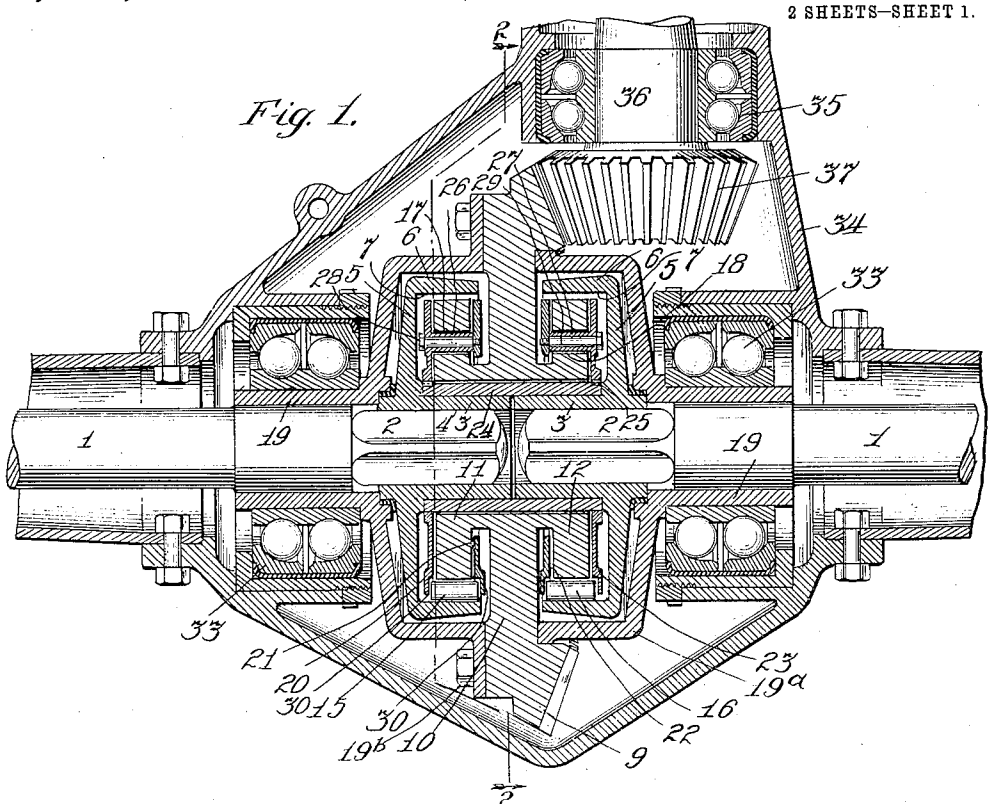
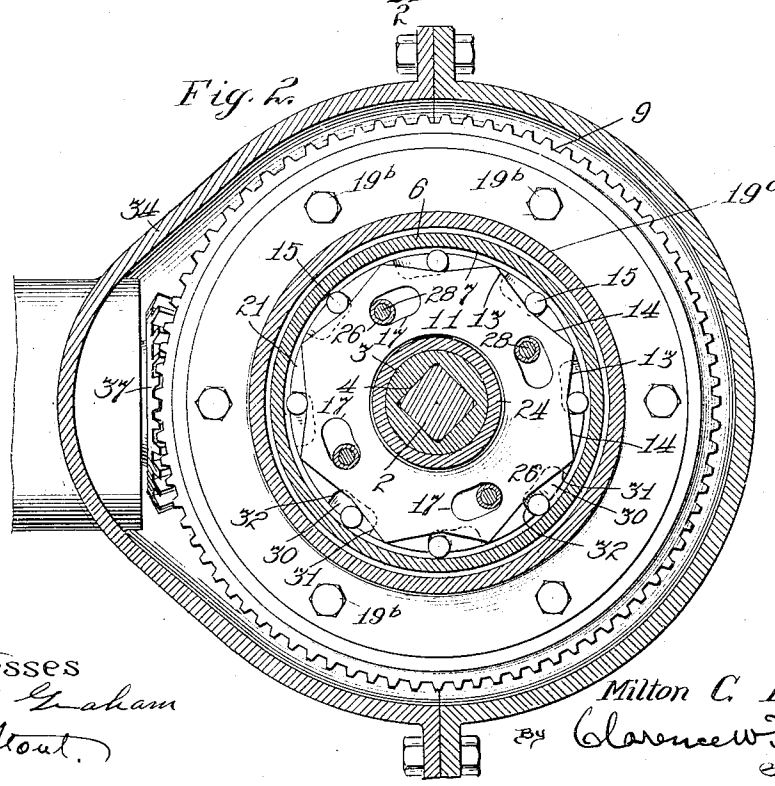


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

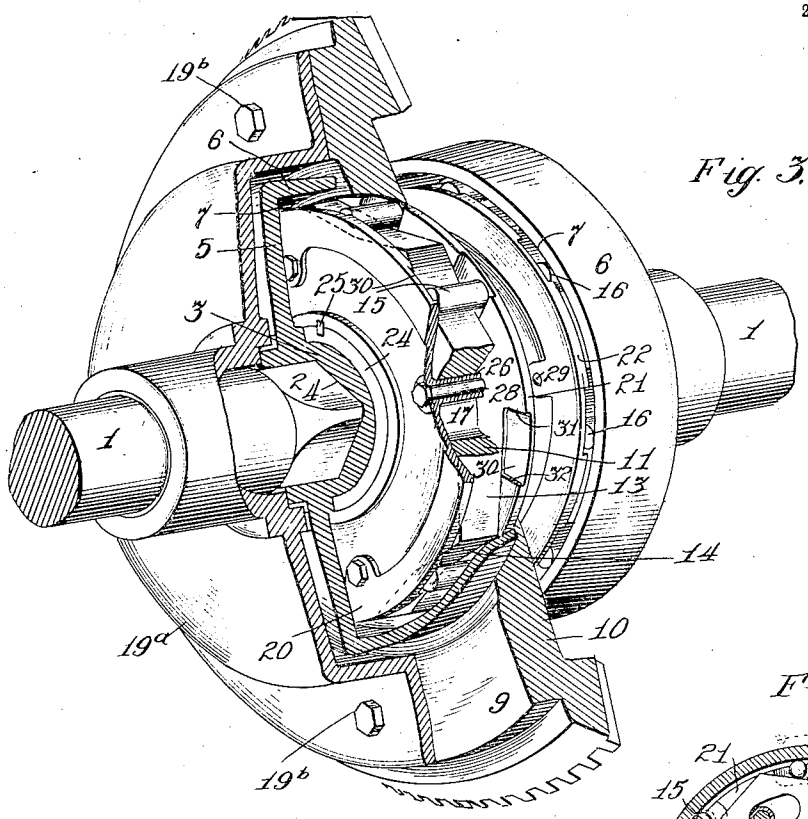


Fig. 5.

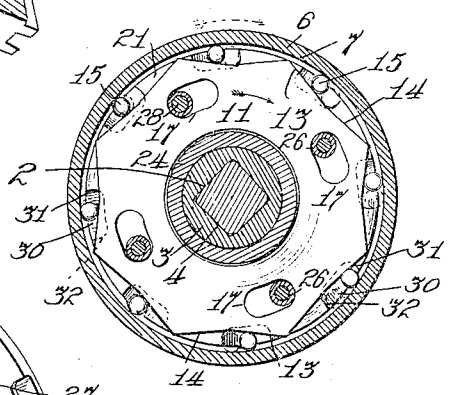
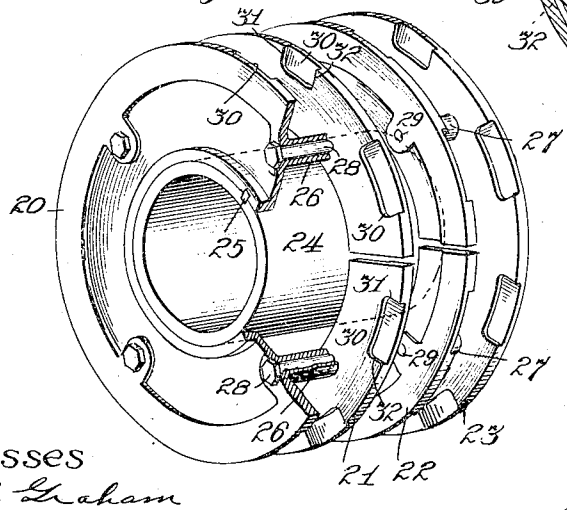


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DIFFERENTIAL MECHANISM.

1,052,155. Specification of Letters Patent. Patented Feb. 4, 1913.

Application filed March 11, 1912. Serial No. 683,043.

To all whom it may concern

Be it known that I, MILTON C. LENOIR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Differential Mechanism, of which the following is a specification.

My invention relates to improvements in differential mechanism, and the primary object thereof is the provision of a construction whereby both wheels of a motor-vehicle will be positively driven in either direction, and to permit either wheel to independently revolve faster in the direction of rotation than the driving shaft.

With the above and other objects in view, my invention consists in the novel features and in the novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings forming a part of this specification, and particularly pointed out in the claims hereunto appended.

In the accompanying drawings, Figure 1 is a horizontal central section; Fig. 2 is a cross section on line 2—2 of Fig. 1; Fig. 3 is a view in perspective with parts broken away; Fig. 4 is a perspective view of the carrier; Fig. 5 is a vertical cross sectional view of the driving and driven members in position for rotation in the direction indicated by the arrows.

The embodiment herein disclosed is applied to the rear divided axle of an automobile.

Like parts are identified by the same reference numerals throughout the several views.

Referring to the drawings by reference numerals, 1 denotes the opposing ends of a divided axle having squared inner ends 2, on which are the respective hubs 3, each having a squared axial opening 4 therethrough. Integral with each hub, or attached thereto, on each axle is the web portion 5 and the inwardly extending flange 6 with smooth inner face 7.

The respective driving parts are designated by 9, the bevel gear, 10 the web thereof, 11 the left star-shaped member fixed to bevel gear wheel, and 12 the right star shaped member carried by the bevel gear wheel.

The numerals 13 and 14 denote the oppositely disposed planes on which the rollers 15 and 16 travel into and out of engagement with the adjacent surfaces of the respective driven flanges 6, 6. The star shaped driving members 11 and 12 have concentric slots 17 and 18, respectively, for purposes hereinafter explained.

19, 19, indicate hub portions of a rotatable housing 19^a, 19^a which is fixed to the bevel gear wheel by bolt 19^b.

For the purpose of carrying and positively driving the rollers 15 and 16, I have provided two sets of carriers 20, 21, 22 and 23, which are coupled to a sleeve 24 by means of keys 25 and move simultaneously.

The reference numerals (see Fig. 4) 26 and 27 designate preferably integral sleeves carried by parts 20 and 23, with bolts 28 and 29, respectively, which have screw threaded engagement with the respective segments of the carrier rings 21 and 22. There is formed an annular series of journal recesses 30, in the opposing surfaces of the pairs of carrier rings, each recess has walls 31 and 32 to limit the movement of the rollers journaled therein. The bearings 33, resting upon the hubs 19, 19 of the rotatable housing, support the non-rotatable housing 34. The bearing 35 supports the shaft 36 with its bevel pinion 37 in mesh with the bevel gear 9.

The driving parts 11 and 12 are at liberty to engage with and release from the drums or flanges 6, 6, through the rollers 15 and 16 on movement of the carrier from normal position shown in Fig. 2 to the position shown in Fig. 5 when moving in the direction of the arrow. The length of the concentric slots in the parts 11 and 12 is intended to be sufficient to permit reversing the positions of the walls 31, 32 with respect to the rollers.

In operation, when the bevel gear wheel 9 is rotated in the direction indicated by the arrows in Fig. 5 the part 11 will rotate independently until the sleeve 26 contacts with the end of the slot 17 when the parts will be in the positions shown in said Fig. 5, or driving position. Suppose the vehicle wheel operated by the parts last mentioned is describing a longer radius curve and the speed of part 6 is greater than that of the part 11, then the parts are in the positions shown in Fig. 2, and the wheel is at liberty to rotate freely until a forward direction is

again taken when power transmission engagement is established as before.

It will be understood that changes, variations and modifications in the details of the invention within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In differential mechanism, a plurality of carriers formed and adapted to move together, in combination with independent shafts, a driven member fixed to one end of each shaft, rollers supported by each carrier, and a driving member formed to wedge the rollers of each carrier into grip engagement with the respective driven members.

2. In differential mechanism, a plurality of carriers composed of pairs of rings and bound together and capable of a substantially simultaneous rotative movement, each pair of rings having an annular series of journal recesses in the opposing surfaces thereof to limit the movement of the rollers therein.

3. In differential mechanism, the combination of a non-rotatable housing and a rotatable housing and a driving member having concentric slots carried therein, a driven member, a plurality of rollers, carriers having journal recesses to limit travel of said rollers with respect to the carriers.

4. In differential mechanism, the combination of a driving member having a plurality of concentric slots therethrough and oppositely positioned inclined planes, rollers operable upon said inclined planes, and carriers having journal recesses to permit travel of the rollers.

5. In differential mechanism, the combination of a driving member, driven members, a plurality of carriers bound together and capable of a simultaneous rotative movement, rollers supported by the respective carriers, the carriers and the driving member having relative movement.

In testimony whereof, I affix my signature in the presence of two witnesses.

MILTON C. LENOIR. [L. S.]

Witnesses:
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