No. 659,222. Patented Oct. 9, 1900.

C. H. FOSTER.

SELF PROPELLED VEHICLE.

(Application filed Jan. 15, 1900.)

(No Model.)

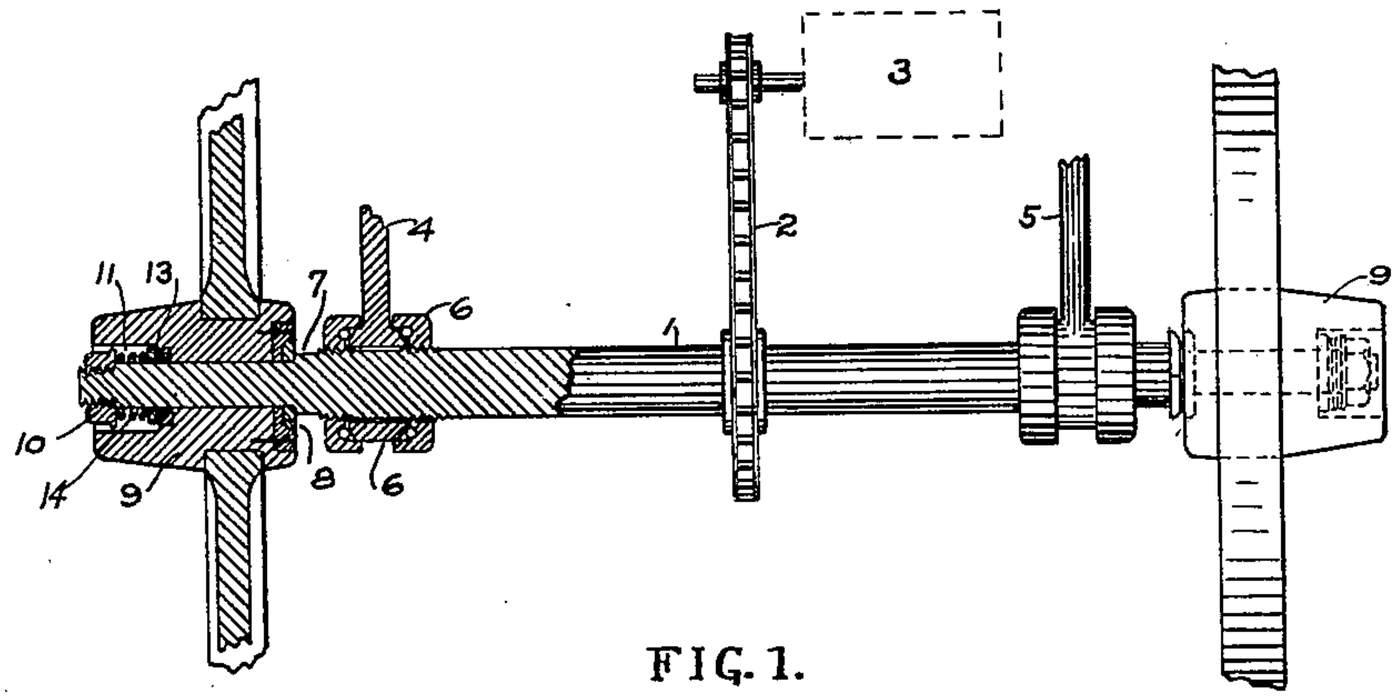

FIG. 1.

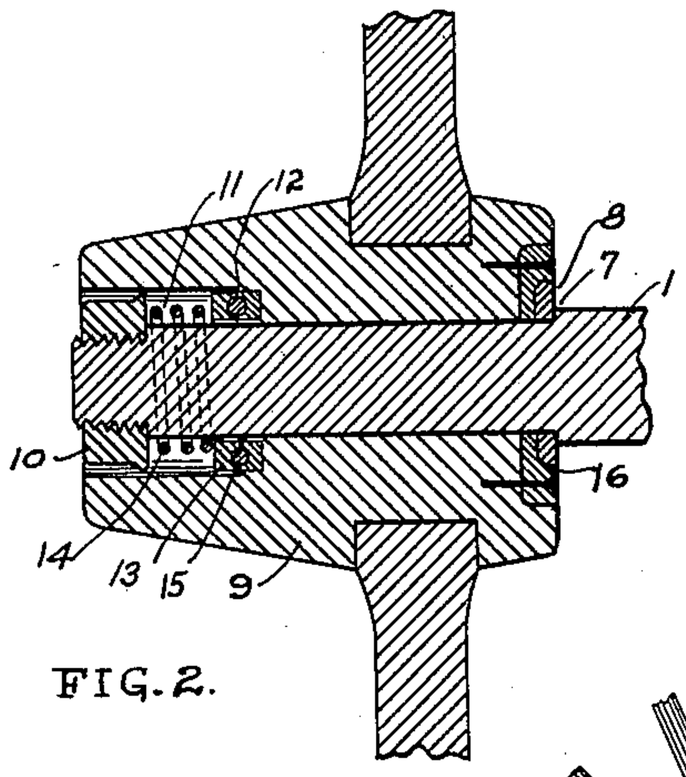

FIG. 2.

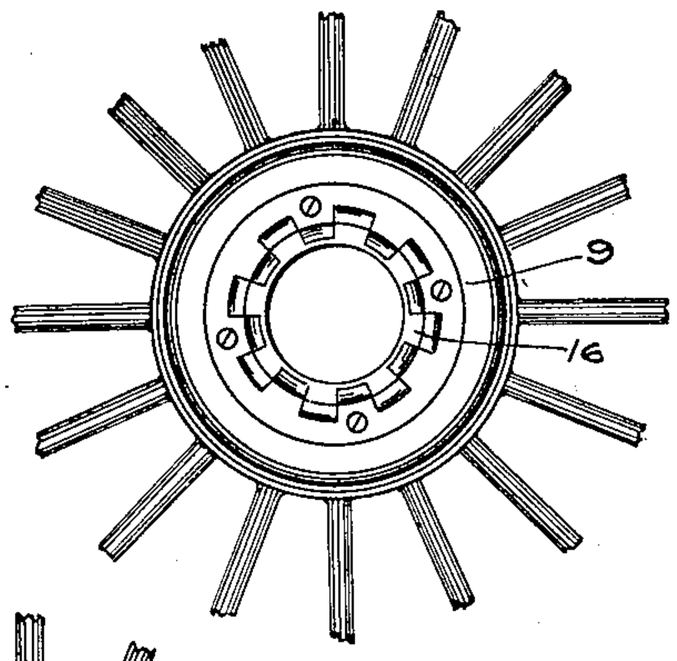

FIG. 4.

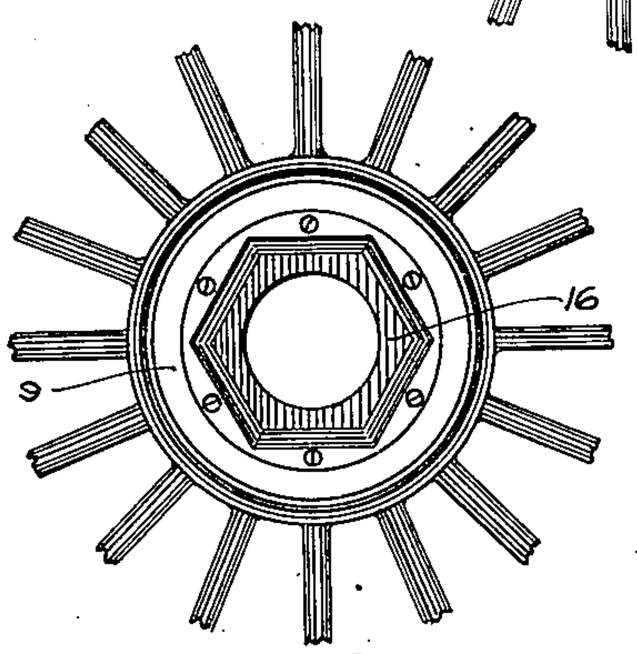

FIG. 3.

Witnesses
S. B. Scott.
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Claud H. Foster. Inventor

By his Attorney L. E. Foulé

UNITED STATES PATENT OFFICE.

CLAUD H. FOSTER, OF CLEVELAND, OHIO.

SELF-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 659,222, dated October 9, 1900.

Application filed January 15, 1900. Serial No. 1,441. (No model.)

To all whom it may concern:

Be it known that I, CLAUD H. FOSTER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Self-Propelled Vehicles, of which the following is a specification.

This invention relates generally to self-propelled vehicles, and has particular reference to that part of the vehicle which connects the driving-axle with the wheels. Considerable difficulty has been experienced by inventors and manufacturers of machines of this character in devising a successful form of connection between the driving-axle and the wheels which would permit the latter to turn with different velocities in rounding curves. Heretofore this result has been secured by using a driving connection which shifts, so as to drive the outside wheel more rapidly than the inner one, but which leaves both wheels in positive connection with the driving-axle. In order for a device of this character to work successfully, it is evident that the parts must be nicely proportioned with reference to each other, else one wheel will turn too rapidly for the other, with the consequence that one of the wheels must necessarily slide over the ground or else the driving connection must slip, either of which results would place great strain upon the vehicle.

In my improved device I utilize the centrifugal force of the vehicle to unclutch entirely the inner wheel from the driving-axle. This permits said wheel to remain perfectly stationary, if need be, while the outer wheel travels about the same with any velocity whatever.

In order to enable others to understand my invention, I have illustrated the same in the accompanying sheet of drawings, in which—

Figure 1 is a plan view of the driving-axle and portions of the wheels, showing these parts in their relative positions while the vehicle is rounding a curve and having the left-hand end in section. Fig. 2 is an enlarged detail view of the hub of a wheel, showing its connections with the driving-axle. Fig. 3 is a view of the inner end of the hub shown in Fig. 2, and Fig. 4 is a similar view of another hub with a modified form of clutch-engaging surface.

Like characters are used to designate corresponding parts in the several views.

1 represents the driving-axle, which is shown as connected through a chain-and-sprocket gearing 2 to a conventional form of motor 3, carried by the vehicle. The body of the vehicle is supported in its proper position relative to the driving-axle by any desired means, such as the frame-rods 4 and 5 shown. In order to reduce the friction to a minimum, I provide a ball-bearing connection between the frame-rods and the axle, said bearing being represented at 6. Each end of the shaft is turned down to a spindle with a smaller diameter, forming a shoulder at 7, against which is secured the axle clutch member 8. This member is fastened securely to the axle and turns therewith. As shown in Figs. 1, 2, and 3, it is hexagonal in shape, although any other form of engaging surface may be employed instead. The spindles, which are uniform in diameter throughout their lengths, pass into the hubs 9 of the wheels of the vehicle, and at their extreme ends they are threaded for the reception of the ordinary nut 10, which prevents the wheel from running off the same. The bore of the hubs is, as shown, made with two diameters, the inner and smaller portion fitting the spindle and the outer and larger portion 11 forming a shoulder 12 therewith. Over the outer portion of the spindles and within the larger portion 11 of the bore of the hubs are washers 13, which are held into contact with the shoulders 12 by means of coiled springs 14, which surround the ends of the spindles between the nuts 10 and the washers 13. These springs always exert more or less pressure against the washers, and in order to prevent excessive friction between the washers and the hub-shoulders I provide these parts with ball-bearings, the balls being shown at 15.

In the modification indicated in Fig. 4 the clutch-surfaces are formed with a number of radially-extending portions for engagement, the axle clutch member being of a shape approaching a bevel-gear and the hub member being a counterpart or negative of the same. As above stated, however, the precise shape of the engaging surfaces is not material, and they may be formed in any way which is found to be suitable for the purpose.

In view of the above description it will be evident that when the vehicle is running on a straight road the springs 14, being equal in strength, will hold the body of the vehicle midway between the wheels, with the clutch members on each side in engagement. When a curve is rounded by turning to the right, however, the inertia of the vehicle will cause the same to carry to the left. This will hold the left-hand clutch members in full engagement and will pull the right-hand members entirely apart, thus leaving the right-hand wheel to rotate idly and independently of the driving-axle, which is turning the left-hand wheel. Of course when the vehicle takes a straight road again the independent wheel will become clutched to the axle, and as the wheel and axle are already turning in the same direction there will be no perceptible shock due to the clutching action. It will be seen also that when the vehicle is turning to the right it is the outer or left-hand clutch members that remain in engagement. This results in slightly checking the speed of the vehicle, and thus lessens the tendency of the wheels to "dish." The clutch usually found on vehicles of this class maintains the connection between the axle and the slower-moving wheel. This being true, it is necessary to slow down the driving-axle or else the vehicle will be whirled around the corners with greater speed than is maintained on the straight road. This not only throws an intense lateral strain on the wheels, but it requires more power, as the load must travel farther than the power that is applied to it. By my clutch device the axle remains in engagement with the most rapidly moving wheel, which maintains its motion, and thus slows down the speed of the vehicle an amount dependent on the sharpness of the curve.

When the vehicle is turned in the opposite direction to that described, the clutch action will be reversed.

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

1. In a self-propelled vehicle a driving-axle, wheels on said axle and normally driven thereby, and connections between said wheels and axle such that when the vehicle rounds a curve the outer and faster-moving wheel remains in engagement with the axle while the inner and slower-moving wheel automatically disengages itself therefrom, substantially as described.

2. In a self-propelled vehicle a driving-axle, wheels on said axle and normally driven thereby, and connections between said wheels and axle such that the inertia of the vehicle in turning a curve will free one of said wheels from its axle and permit it to rotate independently thereof, substantially as described.

3. In a self-propelled vehicle a driving-axle, a wheel normally driven by said axle and capable of lateral movement thereon, and clutch members carried by the axle and wheel, the whole being so constructed that when the vehicle rounds a curve the wheel moves laterally with respect to the axle and unclutches itself therefrom, substantially as described.

4. In a self-propelled vehicle a driving-axle, wheels on said axle and capable of lateral movement thereon, clutch members carried by said axle, corresponding clutch members carried by the wheels, and means for normally maintaining such members in engagement, said means being so constructed that when the vehicle rounds a curve the inertia of the same causes the wheels and axle to move laterally with respect to each other so that the slowly-moving wheel is disengaged from the axle, substantially as described.

5. In a self-propelled vehicle a driving-axle, wheels on said axle and capable of lateral movement thereon, and driving connections between the wheels and axle such that the inertia of the vehicle in rounding a curve causes the wheels and axle to move laterally with respect to each other and thus to free one of the wheels from the axle so that it may rotate independently thereof, substantially as described.

6. In a self-propelled vehicle a driving-axle, spindles at the ends of said axle, wheel-hubs mounted on said spindles, clutch members carried by said axle and wheel-hubs, an enlarged bore in the outer ends of said hubs, and springs mounted in said enlarged bore and surrounding said spindle, said springs normally pressing the hubs inwardly to force the clutch members together, the whole being so constructed that when the vehicle rounds a corner the spring on the inner spindle will be compressed and the corresponding clutch members disengaged so that the wheel may turn independently of the axle, substantially as described.

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

CLAUD H. FOSTER.

Witnesses:
CHAS. LA MONTAGUE,
G. J. BAILEY.