No. 644,685. Patented Mar. 6, 1900.

J. R. ROWLANDS.

TRICYCLE.

(Application filed Sept. 20, 1897.)

(No Model.) 4 Sheets—Sheet 1.

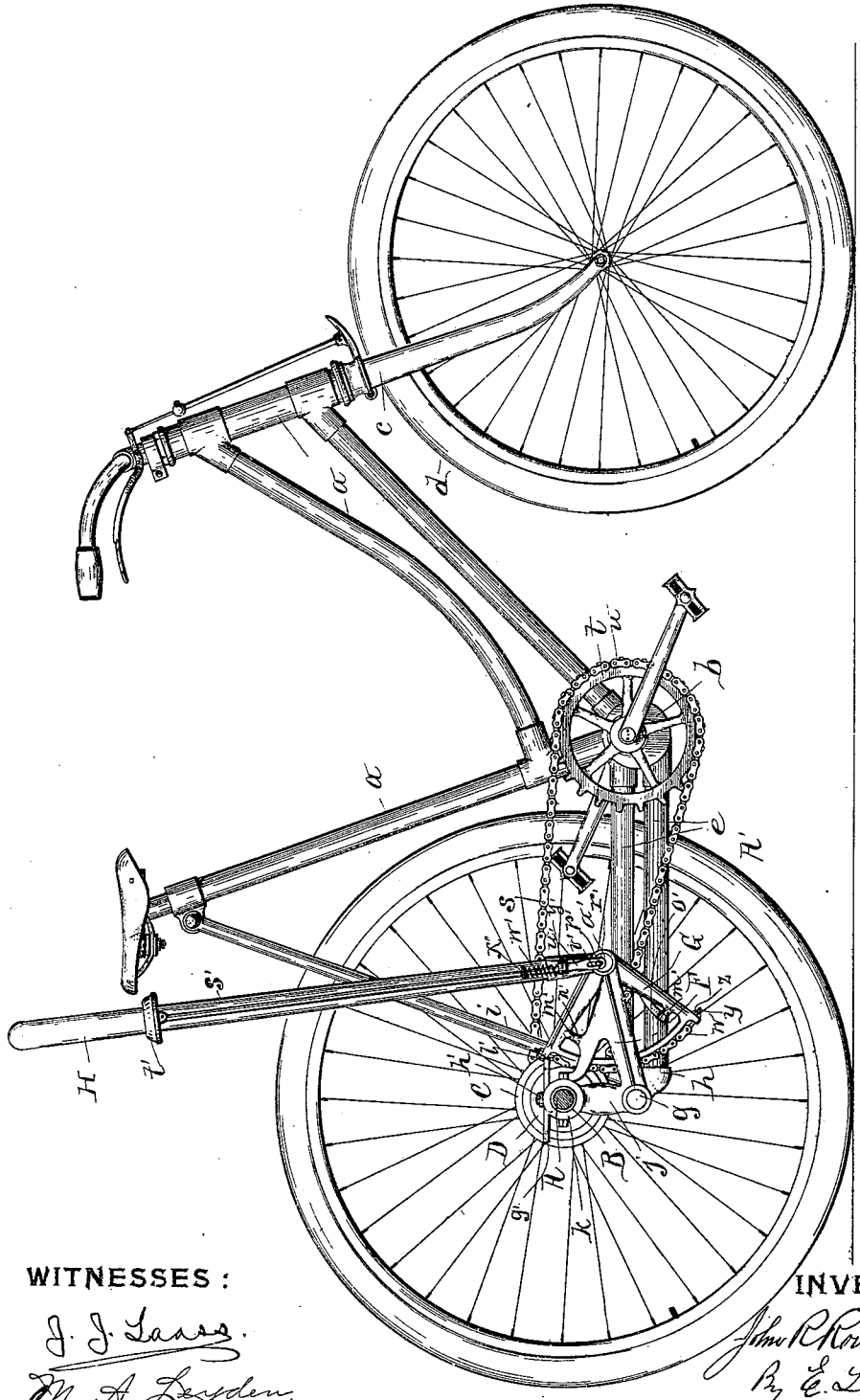


Fig. 1

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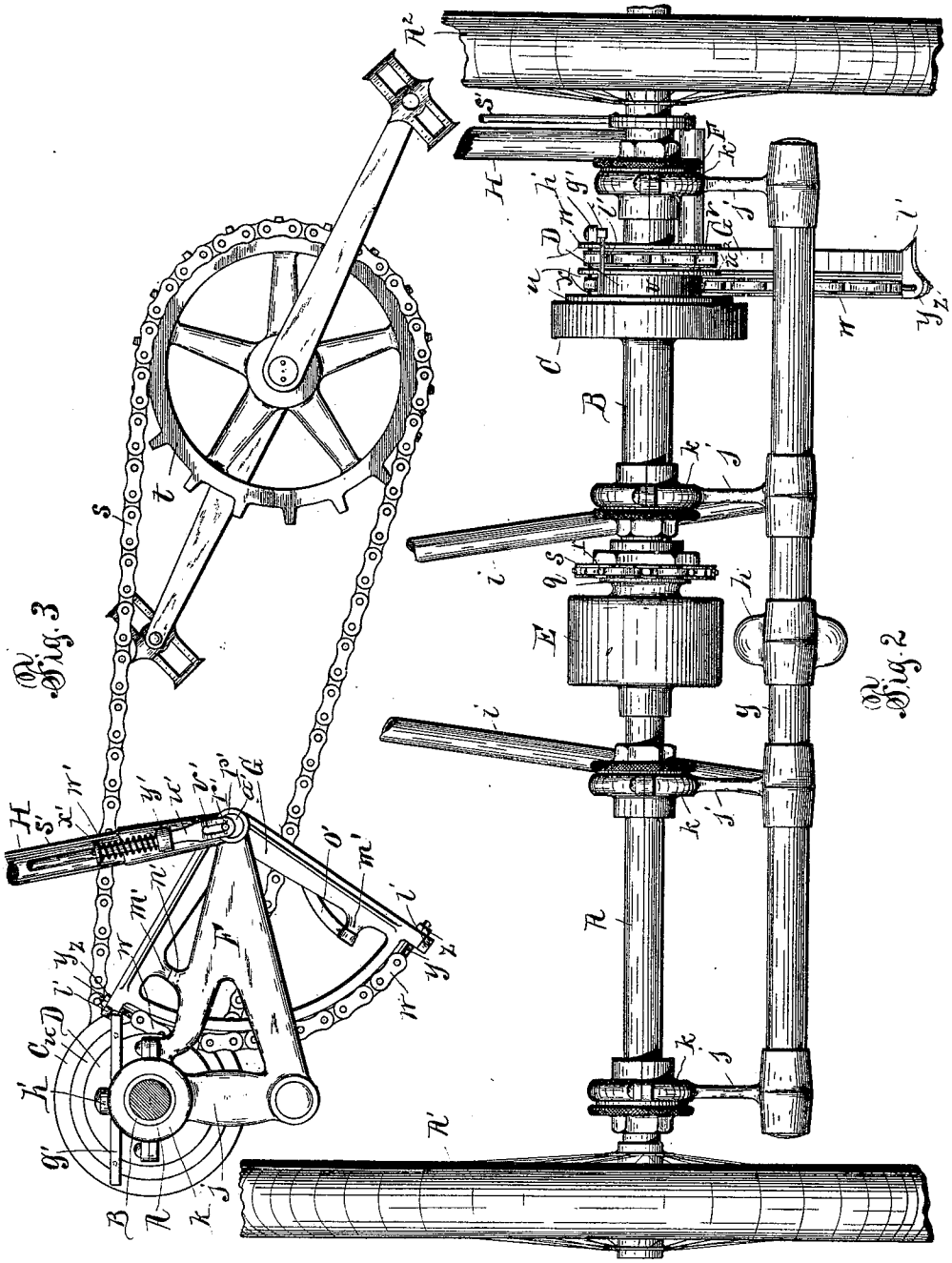


Fig. 3

Fig. 2

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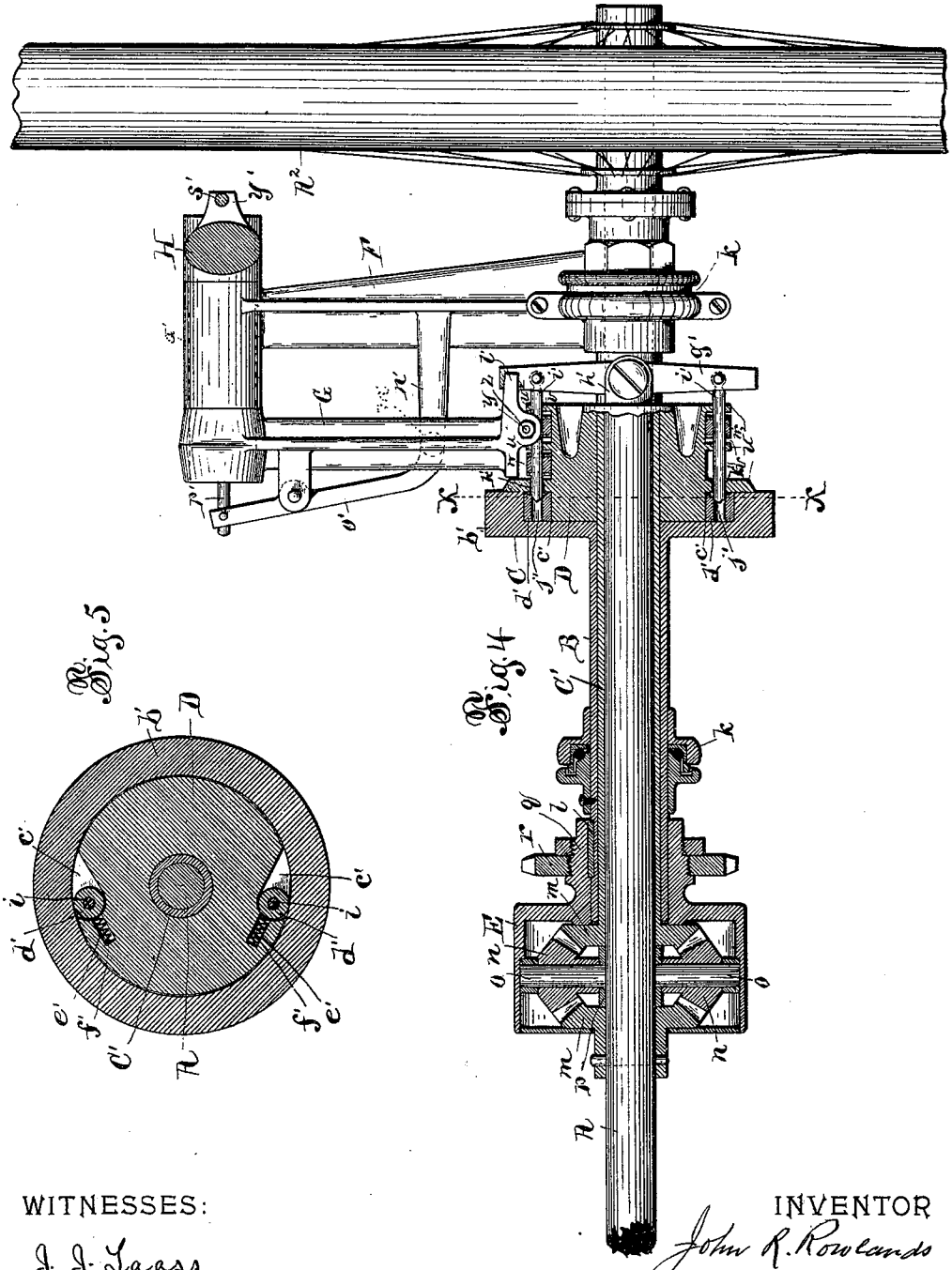


Fig. 4

Fig. 5

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(Application filed Sept. 20, 1897.)

(No Model.)

4 Sheets—Sheet 4.

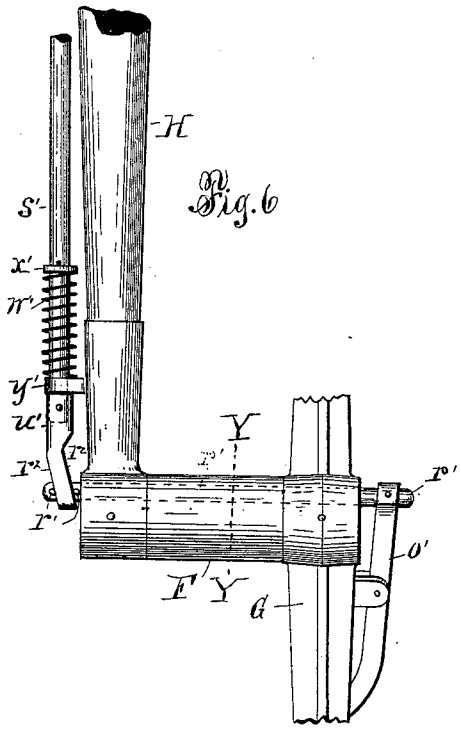


Fig. 6.

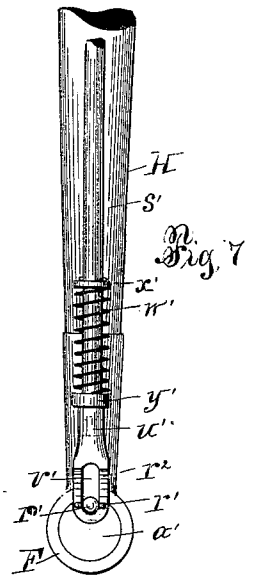


Fig. 7.

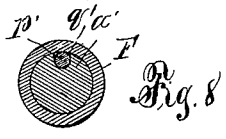


Fig. 8.

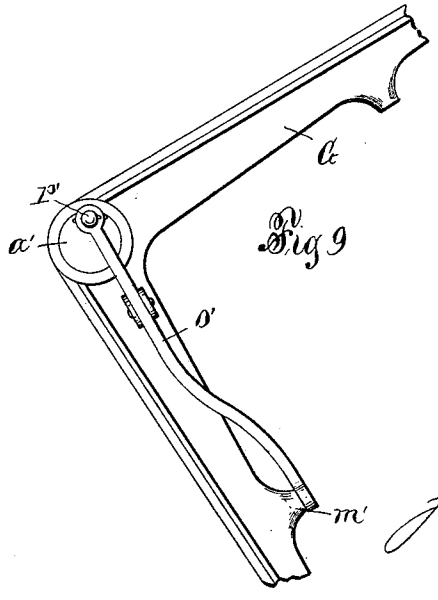


Fig. 9.

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UNITED STATES PATENT OFFICE.

JOHN R. ROWLANDS, OF SYRACUSE, NEW YORK, ASSIGNOR TO CHARLES H. SHATTUCK, OF SAME PLACE.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 644,685, dated March 6, 1900.

Application filed September 20, 1897. Serial No. 652,221. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. ROWLANDS, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Tricycles, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to an improvement in manually-operated vehicles, more particularly to the class of cycles commonly known as "tricycles," and it has special reference to that class in which the vehicle is provided with means for propelling it either by hand or foot power or both simultaneously; and the invention consists in the improved construction and combination of elements hereinafter described, and set forth in the claims.

In the annexed drawings, Figure 1 is a side elevation of a tricycle with the near traction-wheel removed to illustrate my improved propelling mechanism with which the vehicle is equipped. Fig. 2 is an enlarged rear end view with a portion of the frame broken away. Fig. 3 is an enlarged detail side view of said mechanism. Fig. 4 is a further-enlarged plan view of a portion of the axle of the traction-wheel and partly a sectional view. Fig. 5 is a vertical transverse section on line X X in Fig. 4. Fig. 6 is an enlarged detail front view of a portion of the propelling-lever and segment, illustrating the device which prevents the operation of the shifting-lever in one direction and the mechanism for operating the same. Fig. 7 is a side view of the propelling-lever. Fig. 8 is a vertical transverse section on line Y Y in Fig. 6; and Fig. 9 is a detail view of a portion of the oscillatory segment, showing said device.

In the drawings I have shown my improved propelling mechanism applied to a tricycle the frame of which is constructed partly on the lines of the well-known so-called "safety-bicycle," comprising the frame members *a a* and crank-hanger *b* and having the usual steering-fork *c* and steering-wheel *d*.

Extending rearwardly from the crank-hanger are two frame members *e e*, which are connected at their rear ends to a transverse bar *g* by means of a suitable coupling *h* and are arranged one above the other. Extending upward and forward from said bar are two braces *i i*, which support the rearwardly-inclined frame member *a*. To the aforesaid transverse bar *g* are secured two sets of hangers *j j*, provided with ball-bearing cases *k k*, in which the axle A and sleeve B are journaled, by which hangers the frame is suspended from said axle and sleeve.

A represents the driving-axle, which I form in one piece to obtain maximum strength and stability of said axle. To one end of the axle A is rigidly fastened the carrying-wheel A', and on the opposite end thereof is journaled the traction-wheel A^2, to which is attached a sleeve C', embracing the axle. On said sleeve is journaled a sleeve B, which latter sleeve is formed with a clutch-collar C. Loosely mounted on the sleeve C' and adjacent to said collar is a coöperating clutch member D, said clutch forming a part of the hand-actuated propelling mechanism.

On the inner end of the sleeve B is rigidly fastened a casing E, preferably by means of a key *l*, and within said casing are located equalizing-gears consisting of two main gears *m m*, one of which is formed integral with the sleeve C' and the other fastened rigidly to the axle A, said gears meshing with two intermediate pinions *n n*, journaled on two radial shafts *o o*, which are secured at their outer ends to the casing E and at their inner ends to a hub *p*, journaled on the axle A. The casing is formed with a hub *q*, which is screw-threaded externally, to which hub is secured the sprocket-wheel *r*, which is connected to the front sprocket-wheel *t* by means of the chain *s* in the usual manner.

In propelling the vehicle on level ground the above foot-operated chain mechanism is to be used, and when it is desired to apply more power to the traction-wheel, especially in ascending steep grades, the hand-actuated clutch mechanism can be brought into use. Said clutch mechanism comprises the following construction and combination of component parts, to wit:

On the outer hanger *j*, suspended from the sleeve B, is a forwardly-extending bracket F, preferably formed integral with said hanger, and on said bracket is pivoted an oscillatory segment G. The clutch member D is provided

with annular flanges u^2 u^2, which flanges form grooves v v, extending around the periphery of said clutch member. To the upper end of said segment is secured one end of a chain, cable, or analogous flexible device w, which extends thence to said clutch member and around the same in one direction within one of the aforesaid grooves and is secured to said member by a pin x, while to the lower end of said segment is secured one end of a similar chain or cable, which extends thence to said clutch member and around the same in the opposite direction, within the other groove thereof, and is secured at its end to said member by the aforesaid pin x. Thus it will be seen that oscillatory motion given to said segment imparts a corresponding oscillatory motion to said clutch member, and it will be understood that, as usual, suitable gripping devices are located within the clutch for transmitting motion from said member D to the collar C and that the motion of the latter is communicated to the traction-wheel A^2 by the sleeve B, on which the collar is formed and to which the wheel is secured. It will also be observed that by means of the aforesaid equalizing-gears the other carrying or traction wheel A′ is caused to move with the wheel A^2 while the vehicle is moving in a straight path, in which case the gears do not rotate, but turn with the casing E, shaft A, and sleeve B all as one member; but in propelling the vehicle in a circuitous path the gears rotate, whereby the vehicle is allowed to turn in a circle of a very small radius, as is well known. In order to adjust the tension of the chains or cables w w, I prefer to provide screw-threaded rods y y at the ends of the chains which pass through the ends of the segment and provide said rods with adjusting-nuts z z, which have a suitable bearing in the segment. The segment is oscillated by means of a hand-lever H, secured to the shaft a', to which the segment is fastened, which shaft is journaled in the bracket F.

On the outer face of the clutch-collar C is formed a ring b' at its periphery, and in the periphery of the clutch member D are formed reversely-tapered recesses c' c', in which are located gripping-rollers d' d'. Extending from the wider ends of said recesses are sockets e' e', in which are located spiral springs f' f', which bear against the rollers and force the same toward the narrower end of said recesses, as shown in Fig. 5 of the drawings. These rollers are forced and held one at a time against the action of the respective springs by a shifting device. (See Fig. 4.) This device comprises a lever g', pivoted on a support or bracket h', projecting from the clutch member D, to the ends of which lever are connected the outer ends of two horizontal rods i' i', the inner ends of which are located within or adjacent to channels j j, formed in the said rollers. The inner flange u on the clutch member D is larger than the other flanges thereon and covers the recesses c' c' and confines the rollers therein. Said flange is provided with two holes k' k', through which the rods i' i' pass and are thereby guided.

In propelling the vehicle only one of the gripping-rollers d' at a time is allowed to assume operative position, the other roller being held out of operative position by one of the rods i', forced into said roller by the tilting of the lever g', and when it is desired to reverse the motion of the vehicle the lever g' is tilted in the opposite direction to withdraw the inwardly-forced rod i' from engagement with the adjacent roller. Said roller is then forced by the spring f' into its operative position in the narrower part of the recess c'. Simultaneously with the withdrawal of the aforesaid inwardly-forced rod the lever g' forces the other rod i' into the adjacent roller d' and crowds the same back into the larger part of the recess c' and confines it therein to retain it in inoperative position. It will be seen that when a roller is in operative position the channel j' is out of axial line with the rod i', and in order to insure that the rod will, when desired, enter said channel and force said roller into inoperative position I make said channels j' j' flaring at their outer ends and taper the adjacent ends of the rods i', as shown in Fig. 4 of the drawings.

The hand-lever H has a main and a secondary movement. When the vehicle is propelled either forward or backward, the lever has a main stroke, and when it is desired to reverse the travel of the traction-wheel the shifting-lever g' is operated by the secondary—that is to say, an excessive—stroke of the lever by providing cams l' l' on the ends of the segment G, one of which at a time is brought into engagement with one end of the shifting-lever g' to turn it upon its pivot in one direction and a reverse excessive stroke of the hand-lever H brings the other cam l' into engagement with the end of said shifting-lever to turn it in the other direction.

From the above description the operation of propelling the vehicle will be readily understood, as follows: In the forward stroke of the lever H when the vehicle is being propelled forward the clutch member D is caused to turn backward and the unlocked roller d' in the recess c', which is tapered in the latter direction, is unable to grip the clutch-collar C, and when said lever is given a rearward stroke the clutch member is given a forward turn, which causes said operative roller to become pinched between the clutch-collar C and clutch member D, whereby said clutch-collar is caused to turn forward with said clutch member, and its motion is transmitted by the sleeve B to the traction-wheel A^2 and to the shaft A, to which the other wheel A′ is fastened by the equalizing-gears, which gears, as before stated, do not rotate when the vehicle is moving in a straight path, but turn with the shaft A and sleeve B all as one member, and when the vehicle is propelled in a circuitous course the gears rotate, thus al-

lowing the vehicle to be propelled in a circle of a very small radius, as is well known. When the vehicle is moving in the aforesaid direction, the lever H is given a short forward stroke in order that the cam l' on the lower end of the segment G will not strike the lever g'; but when it is desired to reverse the direction of the travel of the vehicle the lever H is given a further forward stroke, thereby bringing said cam into engagement with the lever g', causing it to unlock the previously-inoperative roller and allow it to become operative and simultaneously to lock its previously-operative roller into inoperative position, whereby the now-operative roller is pinched between the ring B' on the collar C and clutch member D in the forward stroke of the hand-lever H, and it is released in the rearward stroke thereof in the manner aforesaid, and thus the vehicle is moved backward, and when it is desired again to travel forward the lever H is given a full rearward stroke, and thus the other cam is caused to shift the lever g'. Thus it will be observed that reversing the direction of the travel of the vehicle is effected simply by increasing the last stroke of the same hand-lever that is used to actuate the clutch mechanism for transmitting motion to the traction-wheels, and in case the rider releases the hand-lever H the foot-actuated mechanism continues to operate; but by the construction of the gripping mechanism the lever will cease to operate. To limit the stroke of the hand-lever H, stops are provided, comprising, preferably, two lugs m' m', formed on the segment G, and a horizontal arm n', projecting from the bracket F in the path of said lugs.

When the hand-lever H is being used in propelling the vehicle forward, it is essential to provide means to prevent the accidental reversal of the vehicle, which means consists of the lever o', fulcrumed on the segment G, having one end adapted to move into and out of the path of the lower lug m' on the segment and the opposite end pivoted to a sliding rod p', extending through a longitudinal groove q' in the shaft a', to which shaft the segment is secured, which rod is provided at its outer end with two pins r' r', extending transversely through the same. On the hand-lever H and parallel thereto is journaled a push-rod s', provided at its upper end with a collar t', which slides on the hand-lever H and by which said rod is operated. To the lower end of the rod s' is secured a bar or plate u', formed with a slot v' to receive the outer end of the longitudinal rod p', which plate is also formed with two parallel inclined surfaces r^2 r^2 between the pins r' r' in the rod to oscillate said rod, whereby the lever o' is operated and its free end made to swing into and out of the path of the lower lug m' in the segment, as before stated. The lever o' is held normally in the path of said lug by a spring w', coiled around the rod s' and bearing against a disk x' and an arm y', secured to the rod and hand-lever H, respectively. Thus it will be observed that the hand-lever cannot be thrown ahead sufficiently for the lower cam t' on the segment G to strike the shifting-lever g'; but when it is desired to reverse the travel of the vehicle the rod s' is simply pushed down, thereby forcing the rod p' outward, which swings the free end of the lever o' out of the path of the lug m', whereby the hand-lever H can be given a full forward stroke (or secondary stroke) to operate the shifting-lever g', and when the rod s' is released the same is forced upward by the spring w' and the lever g' moved to its normal position, as aforesaid.

What I claim as my invention is—

1. In the herein-described tricycle, the combination with the driving-axle and traction-wheel, of a hand-operated device having a main and a secondary movement, means connecting said device with the traction-wheel and operated by the main movement of said propelling device to transmit motion to the traction-wheel, a reversing mechanism actuated by the secondary movement of said propelling device to reverse the travel of said traction-wheel, a device normally preventing the reversal of said mechanism during the forward movement of the tricycle, and means to operate said latter device to allow the reversal of the same during said movement, substantially as described.

2. In the herein-described tricycle, the combination with the driving-axle having a carrying-wheel rigidly secured thereto and a traction-wheel journaled thereon, of equalizing-gears connecting said traction-wheel and axle, a clutch-collar connected with the traction-wheel, a coöperating clutch member provided with suitable gripping devices to engage said collar, a suitably-pivoted oscillatory segment connected with said clutch member to transmit a like motion thereto, a hand propelling-lever connected with said segment and having a main and a secondary stroke, a shifting-lever on said clutch member and actuated by the secondary stroke of said hand-lever to operate said gripping devices to reverse the travel of the tricycle, a device carried on said segment and normally preventing a forward secondary stroke of the hand-lever, and hand-operated mechanism for actuating said device to allow said hand-lever to be given said latter movement for the purpose set forth.

3. In the herein-described tricycle, the combination with the driving-axle and traction-wheel, of a clutch-collar connected with the traction-wheel, a coöperating clutch member formed with reversely-tapered recesses adjacent to said collar, spring-pressed gripping-rollers within said recesses, a pivoted shifting-lever having rods to engage said rollers and lock the same, one at a time, in inoperative position, a suitably-journaled shaft, an oscillatory segment secured to said shaft and provided with cams on its ends, a hand propelling-lever secured to said shaft to impart

motion to said segment and having a main and a secondary stroke, said shifting-lever being arranged to be engaged by said cams when said hand-lever is given a secondary stroke, stops limiting the secondary strokes of the lever, a guard-lever pivoted to said segment and normally in the path of one of said stops to limit the forward main stroke of the hand-lever, a groove in the aforesaid shaft, a sliding rod in said groove and secured at one end to said guard-lever and provided with two transverse pins at its opposite end, a spring-actuated push-rod carried on the hand-lever and provided at its lower end with a slotted bar to receive the outer end of the aforesaid sliding bar, said bar being formed with two parallel inclined surfaces to engage the aforesaid pins to actuate said sliding bar for the purpose set forth.

In testimony whereof I have hereunto signed my name this 17th day of September, 1897.

JOHN R. ROWLANDS. [L. S.]

Witnesses:

JOHN J. LAASS,

H. B. SMITH.