No. 862,459. PATENTED AUG. 6, 1907.

H. L. FERRIS.

WAGON.

APPLICATION FILED FEB. 7, 1906.

4 SHEETS—SHEET 1.

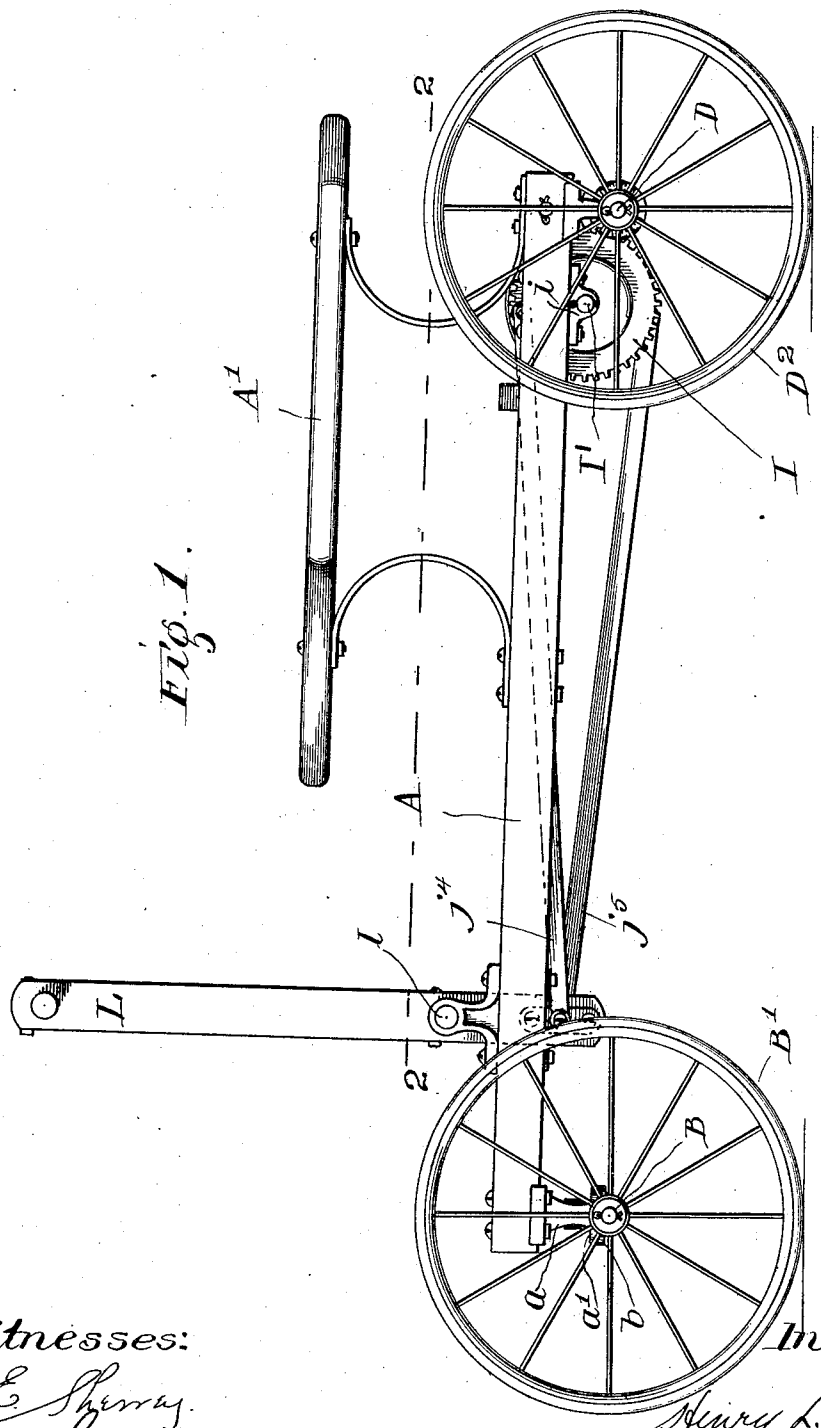


Fig. 1.

Witnesses:
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K. M. Connall

Inventor:
Henry L. Ferris
by Pitman Wilcox & Sherrey
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THE NORRIS PETERS CO., WASHINGTON, D. C.

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4 SHEETS—SHEET 2.

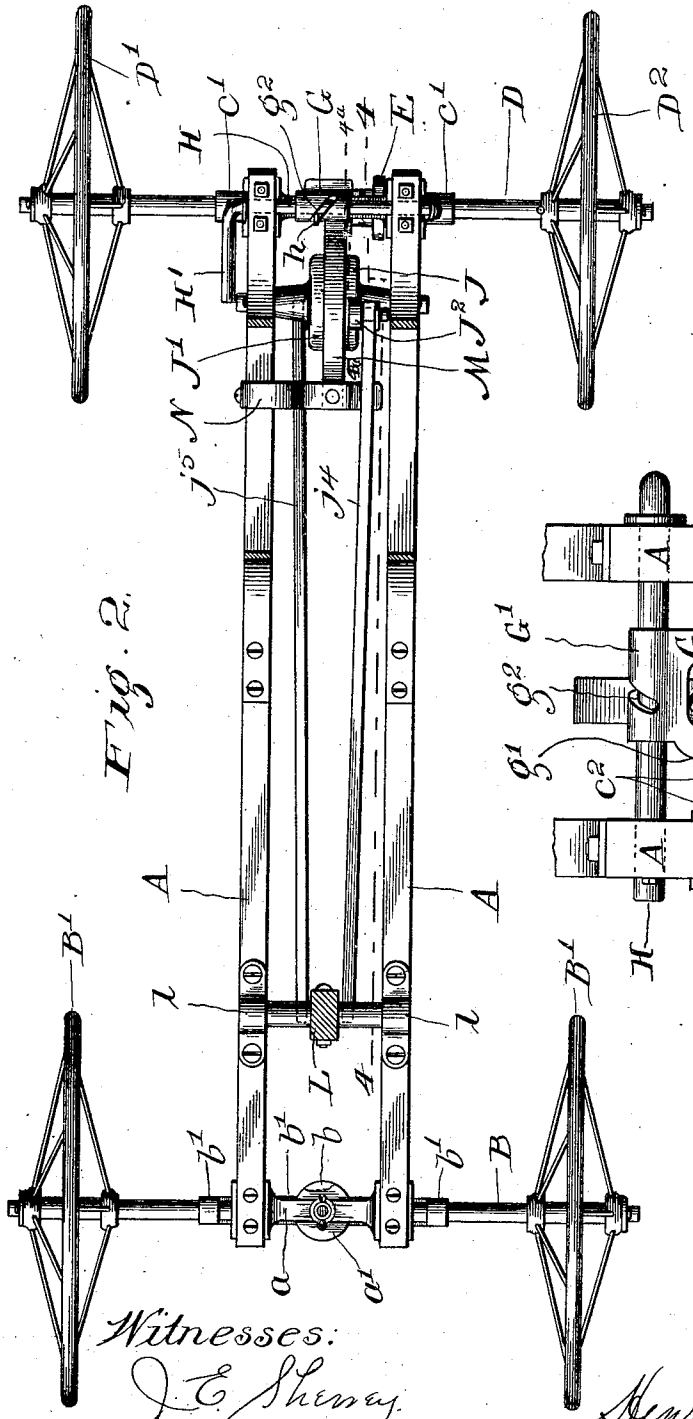


Fig. 2.

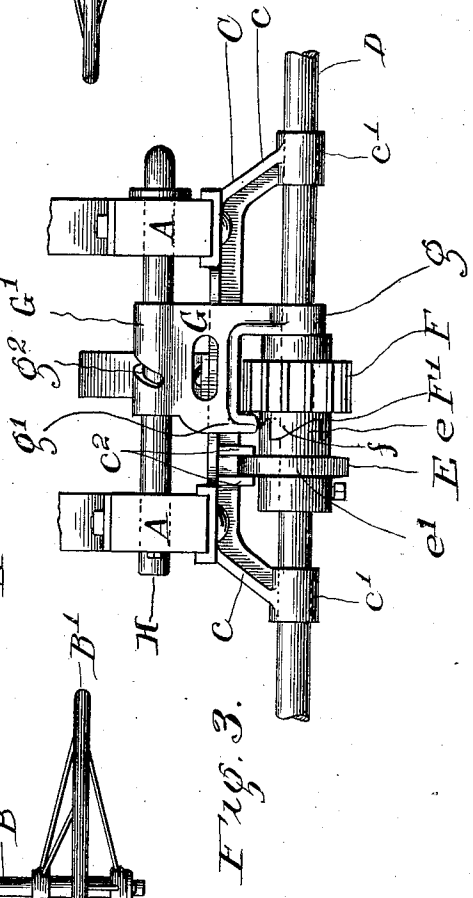


Fig. 3.

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4 SHEETS—SHEET 3.

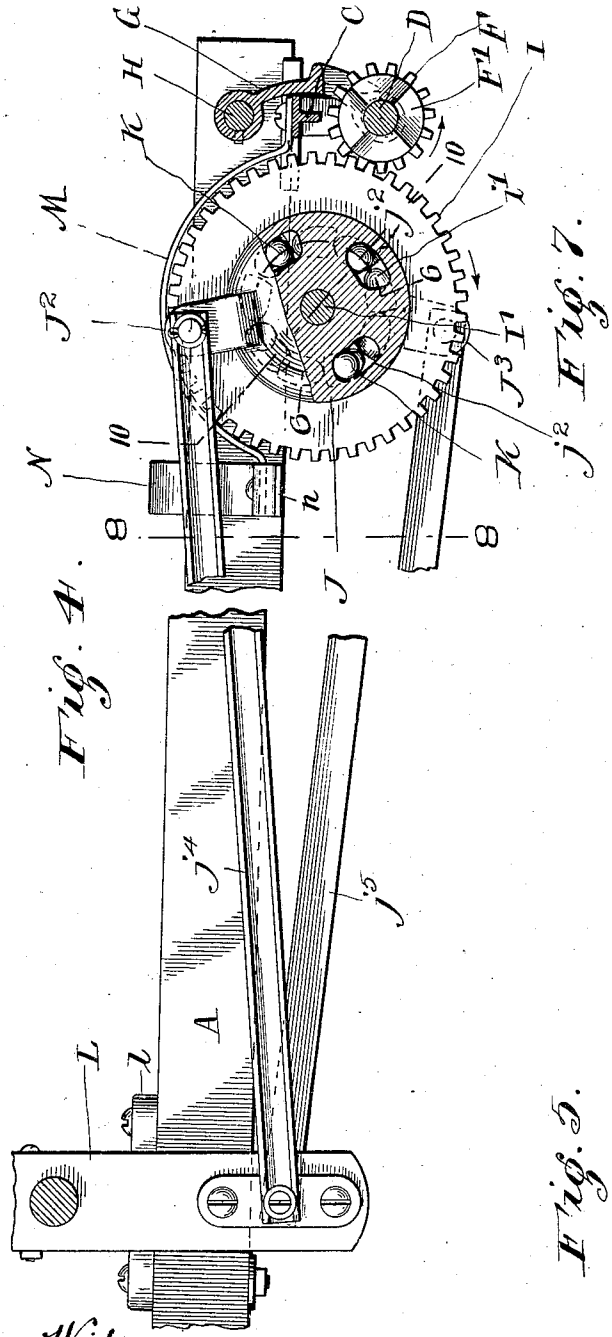


Fig. 4.

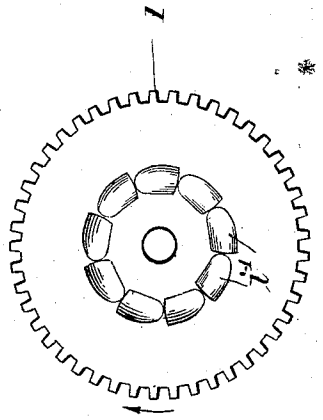


Fig. 7.

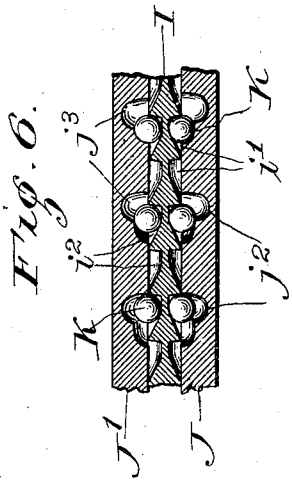


Fig. 6.

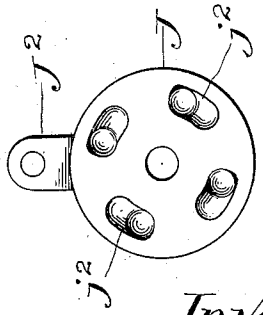


Fig. 5.

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No. 862,459. PATENTED AUG. 6, 1907.

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WAGON.

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4 SHEETS—SHEET 4.

Fig. 9.

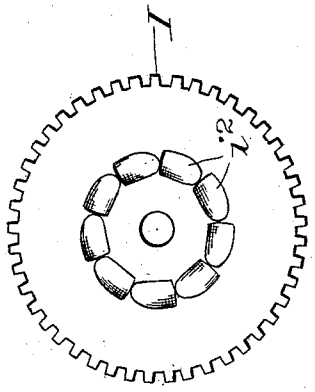


Fig. 11.

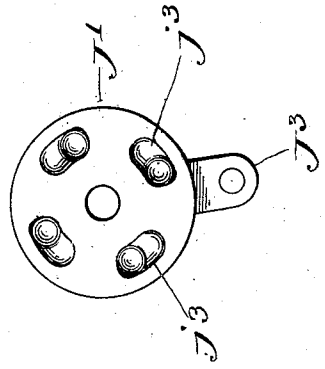


Fig. 8.

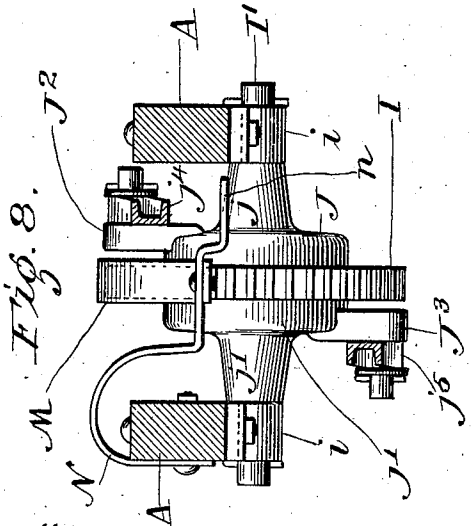
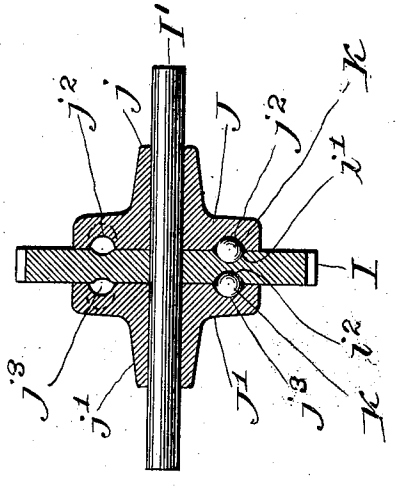


Fig. 10.



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UNITED STATES PATENT OFFICE.

HENRY L. FERRIS, OF HARVARD, ILLINOIS, ASSIGNOR TO HUNT, HELM, FERRIS & COMPANY, OF HARVARD, ILLINOIS, A CORPORATION OF ILLINOIS.

WAGON.

No. 862,459. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed February 7, 1906. Serial No. 299,870.

To all whom it may concern:

Be it known that I, HENRY L. FERRIS, a citizen of the United States of America, residing at Harvard, in the county of McHenry and State of Illinois, have invented certain new and useful Improvements in Wagons, of which the following is a specification.

My invention relates to improvements in wagons and is fully described and explained in this specification and shown in the accompanying drawings, in which

Figure 1 is a side elevation of my improved vehicle; Fig. 2 is a section in the line 2—2 of Fig. 1; Fig. 3 is a rear elevation of the axle, clutch, and transmission gear; Fig. 4 is a section in the line 4—4 of Fig. 2, a portion of the view, however, being taken in the section indicated by the line 4^a—4^a of Fig. 2; Fig. 5 is an elevation of the left-hand ratchet member, looking from the right; Fig. 6 is a section in the curved line 6—6 of Fig. 4; Fig. 7 is an elevation of the driving-gear, looking from the left side of the vehicle, the parts outside the gear being removed; Fig. 8 is a vertical section in the line 8—8 of Fig. 4; Fig. 9 is an elevation similar to Fig. 7, but on the opposite side of the driving-gear; Fig. 10 is a section in the diagonal line 10—10 of Fig. 4; and Fig. 11 is an elevation of the right-hand ratchet member looking from the left.

Referring to the drawings, A, A, are two longitudinally-extending members or beams which support the seat, A^1, and which are spaced apart at their front ends by a bridge *a*, preferably of metal and provided at the bottom with a circular plate, a^1, which serves as the upper member of a turn-table. To the upper turn-table member is swiveled a lower turn-table member, *b*, formed with an integral, transversely-extending, hollow, cylindrical, axle-support, b^1, in which is mounted an axle, B, carrying wheels, B^1. The user of the vehicle when sitting upon the seat can place his feet on the axle or axle-support and thus steer the vehicle in the ordinary way. So much of the construction is, in all its essential particulars, old in the prior art and constitutes no portion of my present invention, for, as far as this invention is concerned, the steering gear could be of any desired sort and the axle could be mounted in any one of the numerous ways common in the art of wagon and vehicle construction.

The rear ends of the longitudinal members, A, are spaced apart by a bridge, C, provided with integral, downwardly- and outwardly-extending arms, *c*, each of which carries at its ends a sleeve, c^1, which together support a rear axle, D, upon which are mounted two wheels, D^1, D^2, the wheel, D^1, being loose upon the axle and the wheel, D^2 being keyed against rotation thereon, whereby the use of a differential or compensating gear is dispensed with. Rigidly secured to the axle, D, is a clutch-member, E, provided with teeth, *e*, at one end and also provided with a collar, e^1, which runs between downwardly-projecting ears, c^2, upon the bridge, C, whereby the driven clutch-member and the axle are prevented from lateral movement with respect to the bridge and the parts whose position is determined thereby.

Loose upon the axle, D, and adjacent to the driven clutch-member, E, is a driven-pinion, F, having rigidly secured to it a driving clutch-member, F^1, having teeth, *f*, adapted to engage the teeth, *e*, on the driven clutch-member to cause the rotation of the shaft in one direction. It will be obvious that when the driven-pinion, F, is rotated—by means hereafter to be described—the two clutch-members can be made to engage so that the vehicle will be driven forward, while, on the other hand, by disengaging the clutch-member, the shaft can be freed from the influence of the driven pinion. The longitudinal movement of the driven-pinion and driving clutch-member are effected by means of a fork, G, one of the lower ends, *g*, of which embraces the axle, D, upon one side of the driven-pinion, and the other lower end, g^1, of which overhangs the opposite side of the driven-pinion. The upper end of the fork, G, is made in the form of a hollow, horizontal sleeve, G^1, which embraces a rock-shaft, H, rotatably mounted in the rear ends of the members, A, of the frame of the machine, and provided with a handle, H^1, by means of which it can be rotated. The sleeve, G^1, is provided with a diagonal or spiral slot, g^2, in which runs a pin, *h*, (Fig. 2) projecting from the rock-shaft, H. It will be obvious that when the handle, H^1, of the rock-shaft is in the position shown in Fig. 2, the clutch-members will be in engagement, so that movement of the driven-pinion will drive the shaft and that by swinging the handle, H^1, backward, the rock-shaft will be rotated, causing the fork, G, to move to the right as viewed in (Fig. 3, and thus disengage the clutch-member.

I, represents the driving-gear of the vehicle, the same being journaled upon a transverse shaft, I^1, supported by brackets, *i*, secured to the lower edges of the longitudinal members, A, of the frame. The driving-gear, I, it will be noted is narrower than the driven-gear, F, and is consequently in mesh therewith, regardless of the position of the driven-pinion. The driving-gear, I, is provided on its two sides with a plurality of pits or depressions, i^1, i^2, (Figs. 6, 7, and 9), each of the pits or depressions having one deep and one shallow end. The pits upon each side of the gear are arranged in the form of a circle, the shallow sides of the pit all extending in the same direction on each side, and the shallow ends of the pits on the two sides extending in opposite directions when viewed in side elevation, or in the same direction when viewed in section, as in Fig. 6.

Mounted upon the transverse shaft, I^1, and in proximity to the gear, I, are journaled two ratchet members, J, J^1. These two members are circular in form and are provided with laterally-extending bosses, j, j^1, to form elongated bearings upon the shaft. The inner faces of the ratchet-members are provided with pits or depressions, j^2, j^3, each of which has one shallow and one deep end, the pits being arranged opposite the corresponding pits on the driving-pinion, I, and the shallow ends of the pits on the ratchet members corresponding to the shallow ends of the pits on the adjacent sides of the gear. Balls, K, are interposed between the ratchet members and the gear, so that when viewed as in Fig. 4, right-hand rotation of either of the members will cause corresponding rotation of the driving-pinion and forward movement of the vehicle when the gears are in engagement.

In order to produce the proper movement of the two ratchet-members, they are provided with arms, J^2, J^3, respectively (Fig. 8) the arm, J^2, extending upwards and the arm, J^3, extending downwards. These two arms are connected by links, j^4, j^5, respectively to a common pivot near the lower end of a rocking hand-lever, L, mounted between brackets, l, upon the frame of the device. When the lever is rocked by application of the manual power of the rider, the two links will be longitudinally reciprocated. Inasmuch, however, as the two links extend to opposite sides of the center of the driving-pinion and ratchet members, the two ratchet members will at all times rotate in opposite directions, *i. e.* when the handle is drawn backwards and the links are moving forward, the ratchet member, J, will turn to the left, as viewed in Fig. 4, while the ratchet member, J^1, will turn to the right. When the direction of movement of the handle is reversed at the end of a stroke, the two pinions will move in opposite directions respectively. It will be seen that as each of the ratchet members engage with the driving-pinion only in one direction, that is when rotated to the right as shown in Fig. 4, that one or the other of the ratchet members will continue in engagement with the driven-gear, and consequently reciprocation of the handle will cause a continuous, effective, forward propulsion of the vehicle.

In a structure of this sort, it is evidently desirable to prevent the links which connect the handle with the ratchet members from reaching the dead center. Evidently this will be prevented when the links move backward by engaging directly with the bosses on the ratchet-members. On the other hand, when the links move forward, so that they could not strike the bosses, it is necessary to provide some other means, and I accomplish the desired result and, at the same time, provide an effective brake for the vehicle by securing to the bridge, C, at the rear of the structure, a slightly flexible band, M, which lies outside of and above the driving-pinion, I. The forward end of this strip is secured to a flexible bracket, N, (Fig. 8) secured to one of the side members, A, of the vehicle, and this bracket has an end, n, which lies beneath the upper link, j^4. As the handle is swung back and the links move forward, the upper link finally strikes this end, n, and the links are thus prevented from reaching the dead center. In practice, however, the normal throw of the handle is not sufficient to cause the link to reach the point where it contacts with this boss. When it is desired to apply the brake to the vehicle, an abnormally long and hard backward swing of the handle throws the link into forcible contact with the end of the bracket, N, and drags the strap, M, down upon the gear.

It will be seen that the vehicle herein illustrated and described has many advantages over the common forms of toy hand-propelled wagons. In the first place, it is impossible for the driving-handle to reach the dead center at any time, and consequently the movement of the vehicle can be initiated by simple manipulation of the hand-lever at any time. In the second place, when the handle is held stationary and the vehicle is in motion, the driving-gear will run freely between the ratchet-members, without causing any movement of the handle and, as a result, the vehicle makes a very desirable coaster-wagon, in which the handle is stationary during the coasting. In the third place, owing to the arrangement of the gears and ratchet, the vehicle will not run backwards at all when the clutch is in engagement. As a result, in ascending a hill, the rider can stop to rest at any time without setting the brake and can be certain that the vehicle will not coast backwards down the hill. In making turns, it is often desirable to be able to roll the vehicle back for a few feet, and in such a case the clutch can be thrown out, as already set forth.

I realize that considerable variation is possible in the details of this construction, without departing from the spirit of my invention, and I do not intend, therefore, to limit myself to the specific form herein shown and described.

I claim as new and desire to secure by Letters Patent:—

1. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, a driving-member having connection with the shaft or axle, and a pair of ratchet devices having connection with the hand lever, whereby they are oscillated during each movement of the hand-lever, the engaging portions of said ratchet devices being constructed and arranged to engage with the driving-member alternately, and a clutch adapted to disengage the driving-member from the shaft or axle to permit the vehicle to run backward.

2. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, a driving-member having connection with the shaft or axle, a clutch adapted to engage and disengage the driving-member from the shaft or axle, two ratchet members, means of connection between the ratchet members and the hand-lever, whereby the ratchet members are simultaneously moved in opposite directions at all times, and pawls interposed between the ratchet members and driving-member and adapted to engage the ratchet members with the driving-member during their movement in one direction.

3. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, a driving-member, two ratchet devices having connection with the hand-lever, whereby they are simultaneously moved in opposite directions, and whereby each is reciprocated during an oscillation of the hand-lever, a brake, and means whereby an extreme oscillation of the hand-lever applies the brake.

4. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, a driving-member having connection with the shaft or axle, ratchet members, links connecting the ratchet members and oscillating lever together, so as to produce opposite oscillations of the ratchet members as the hand lever is oscillated, pawls

adapted to engage the ratchet members with the driving-member when the same are moved in one direction, a brake, and a device having operative connection with the brake and adapted to be engaged by one of said links when the same reaches an extreme position.

5. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, two ratchet devices having link connection with the hand-lever, means of connection between the ratchet devices and the shaft or axle, and a brake in position to be engaged by the link connection when in an extreme position.

6. The combination with a frame, a shaft or axle journaled at the rear thereof, a driven-gear upon said shaft or axle, a countershaft and a driving-gear journaled thereon, of two ratchet members journaled upon the countershaft, a longitudinally oscillating hand-lever, links connecting the ratchet members with the hand-lever to produce opposite movements of the ratchet members simultaneously, and pawls interposed between the ratchet members and driving-gear, a clutch-member secured to the shaft or axle, a second clutch-member secured to the driven-gear, and means for shifting the driven-gear.

7. The combination with a frame, a shaft or axle journaled at the rear thereof, a driven-gear upon said shaft or axle, a countershaft and a driving-gear journaled thereon, of two ratchet members journaled upon the countershaft, a longitudinally oscillating hand-lever, links connecting the ratchet members with the hand-lever to produce opposite movements of the ratchet members simultaneously, and pawls interposed between the ratchet members and driving-gear, a clutch-member secured to the shaft or axle, a second clutch-member secured to the driven-gear, a fork embracing the driven-gear, a rock-shaft journaled in the frame, and a pin on the rock-shaft embracing a spiral slot in the fork to shift the same to disengage the clutch-member.

8. The combination with a frame, a driving-axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand-lever, a ratchet device having a link connection with the hand-lever, means of connection between the ratchet device and the shaft or axle, and a brake in position to be engaged by the link connection when in an extreme position.

9. The combination with a frame, a driving axle or shaft, and a wheel having connection therewith, of a longitudinally oscillating hand lever, a ratchet device having a link connection with the hand lever, means of connection between the ratchet device and the shaft or axle, and a brake in position to engage one of the working parts and having a projecting portion in position to be engaged by the link connection when in an extreme position.

In witness whereof I have signed the above application for Letters Patent at Harvard, in the county of McHenry and State of Illinois, this 27th day of January, A. D. 1906.

HENRY L. FERRIS.

Witnesses:
P. E. SAUNDERS,
C. E. PETERS.