(No Model.) 4 Sheets—Sheet 1.

J. RIDGE.

VEHICLE.

No. 530,552. Patented Dec. 11, 1894.

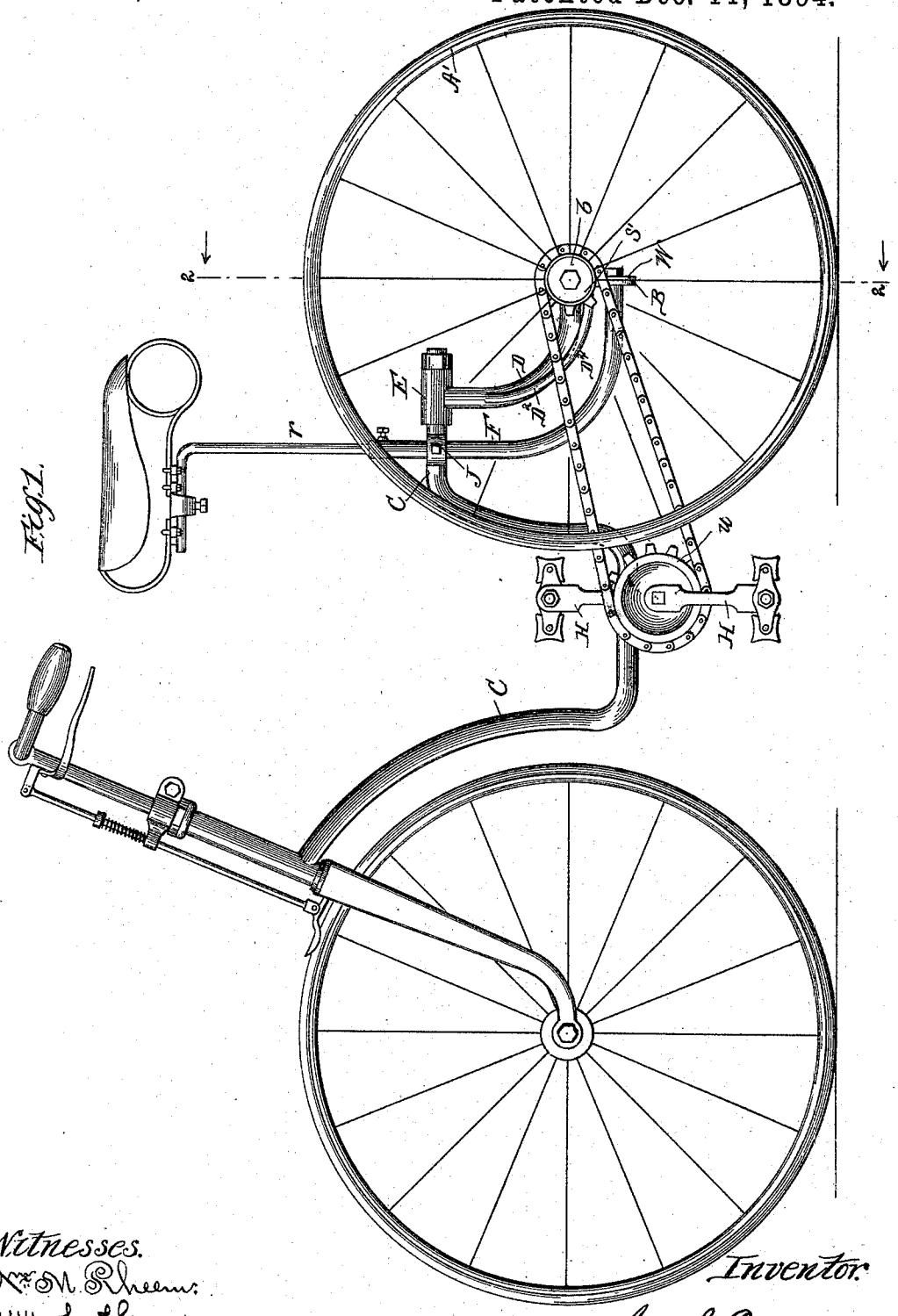

Fig. 1.

Witnesses.
Wm. M. Rheem.
Wm. P. Fleming

Inventor.
Joseph Ridge

(No Model.)

4 Sheets—Sheet 2.

J. RIDGE.

VEHICLE.

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Patented Dec. 11, 1894.

Fig. 2.

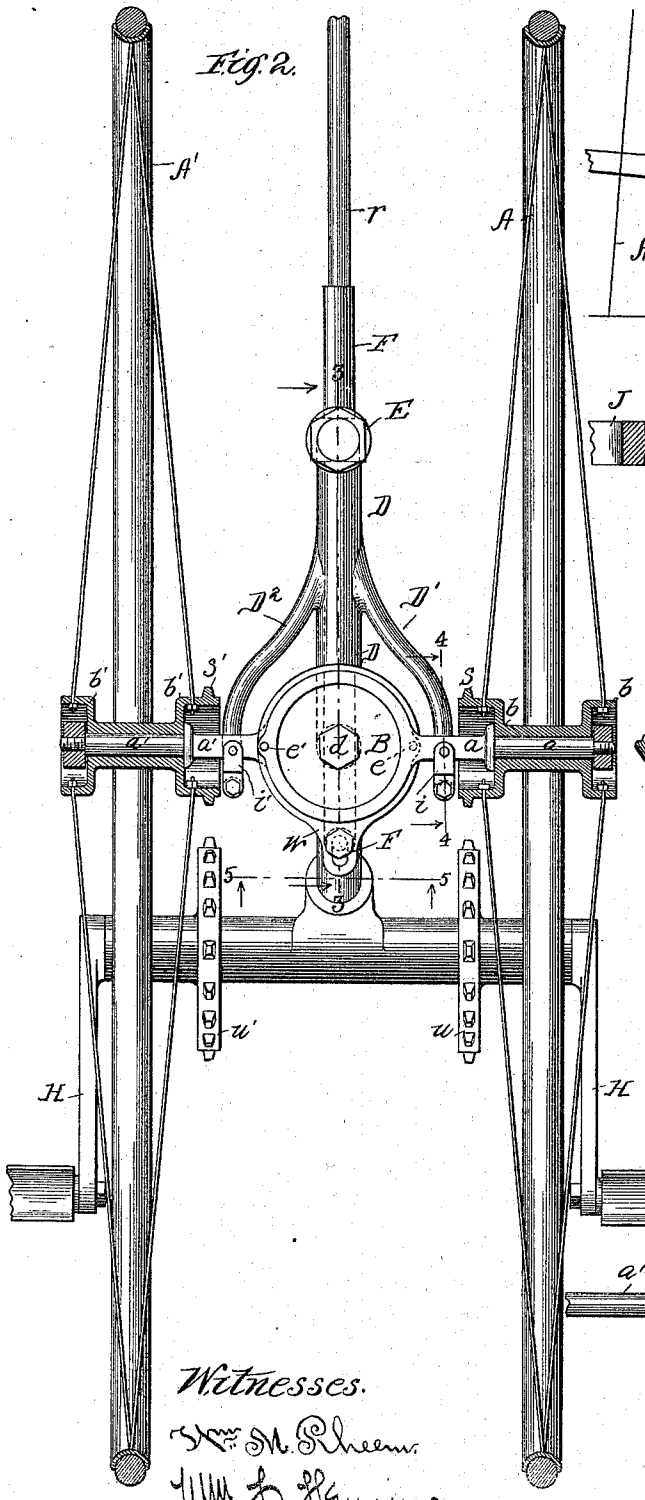


Fig. 2.a.

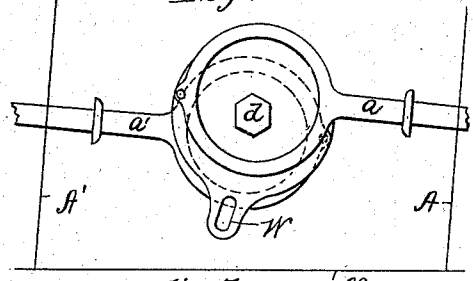


Fig. 3.

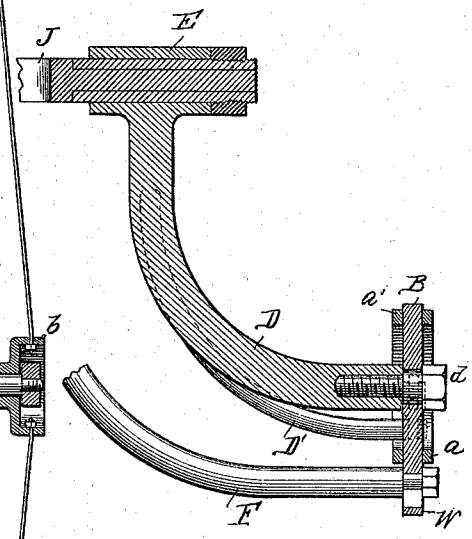


Fig. 4.

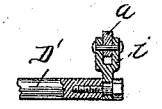
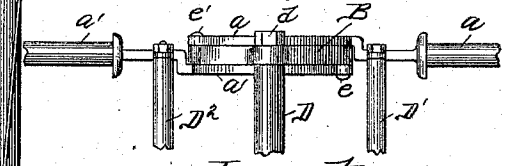


Fig. 5.



Witnesses.

Wm. M. Sheem.

Wm. P. Fleming.

Inventor.

Joseph Ridge

(No Model.)

4 Sheets—Sheet 3.

J. RIDGE.

VEHICLE.

No. 530,552. Patented Dec. 11, 1894.

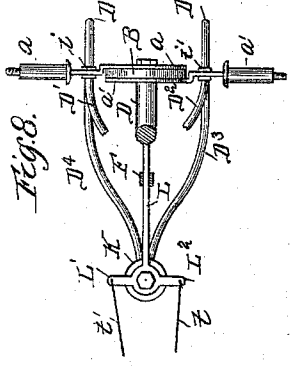


Fig. 8.

Fig. 9.

Fig. 7.

Witnesses.

Wm. M. Rheem.

Wm. F. Fleming

Inventor.

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(No Model.)

4 Sheets—Sheet 4.

J. RIDGE.

VEHICLE.

No. 530,552. Patented Dec. 11, 1894.

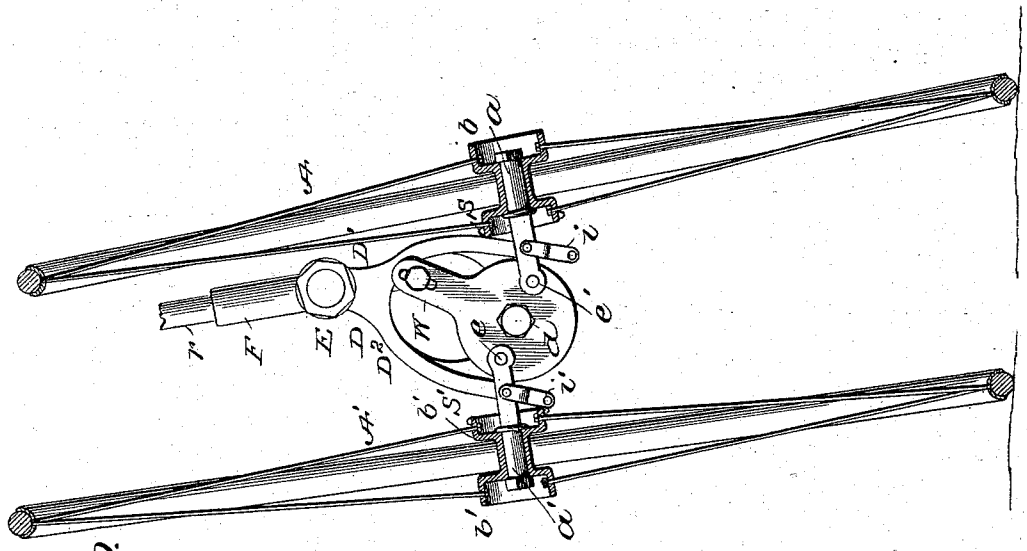

Fig. 10.

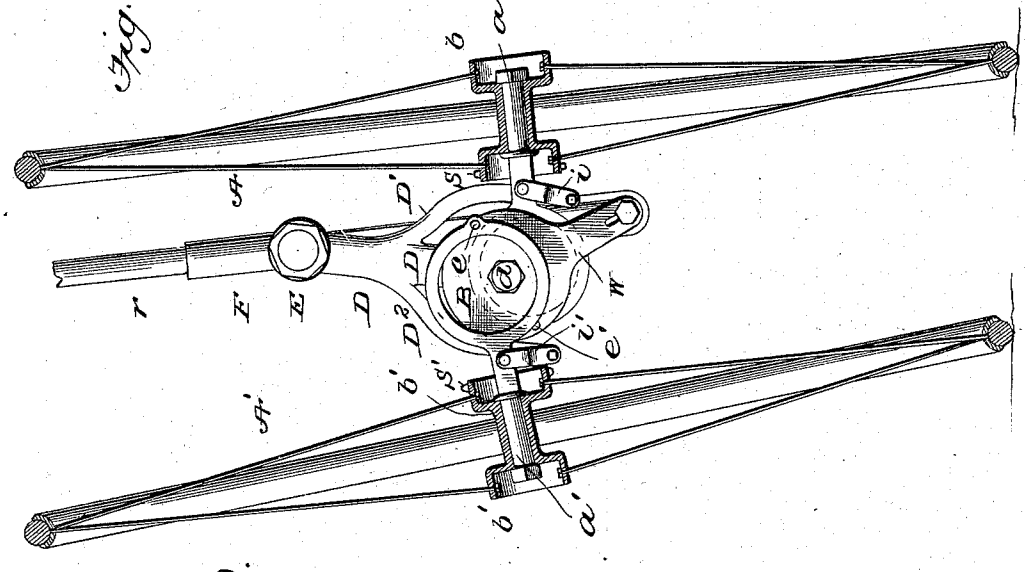

Fig. 9.

Witnesses

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Inventor

Joseph Ridge

UNITED STATES PATENT OFFICE.

JOSEPH RIDGE, OF CHICAGO, ILLINOIS.

VEHICLE.

SPECIFICATION forming part of Letters Patent No. 530,552, dated December 11, 1894.

Application filed June 20, 1892. Serial No. 437,326. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH RIDGE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vehicles, of which the following is a full and complete description.

The purpose of my invention is the production of a tricycle, wherein a pair of rear wheels may be united closely to each other for the purpose of compactness and neatness of the vehicle; and in doing this to so join said wheels that inclination laterally of their upper portion may be had in riding as with the single wheels of the bicycle. As a result of such provision a narrow base, afforded by the pair of wheels, closely together, is sufficient to allow a novice to maintain proper position and at the same time by reason of the oscillatory action allowed, the movements in curved paths that will counteract momentum are under control of the rider. This construction necessitates a provision that is an important feature thereof; that is, such construction must be had that the distance separating the base of one wheel from that of the other shall be constant. This would be normally the condition, were the hinging or pivoting that is employed to connect the two wheels at two or more points, in the plane of each wheel, or on corresponding sides, but as such connection is not the most practicable, provision for differential movement is made. As hereinafter described, I have shown one form by which this end is attained. For description of the mechanism, reference is had to the accompanying drawings, in which—

Figure 1 is a side elevation of the tricycle. Fig. 2, is a rear view in vertical section on line 2—2, Fig. 1. Fig. 2^a is a diagram showing position of parts when the wheels are inclined. Fig. 3 is a section on line 3—3, Fig. 2. Fig. 4 is a detail in section on line 4—4, Fig. 2. Fig. 5 is a plan view section on line 5—5, Fig. 2. Fig. 6 is a side elevation of the tricycle wherein some modifications are introduced for the purpose of guiding the front wheel by the inclination of the rear ones. Figs. 7 and 8 are details of the modifications. Fig. 9 is a vertical section, rear view, showing wheels and connecting parts, when in the inclined position. Fig. 10 is a modification of the connecting parts, showing the relation of the wheels to each other under such modification and when inclined.

A and A′ represent the rear wheels; *a* and *a′*, the axles, having journal bearings in suitable hubs, *b* and *b′*.

Between the hubs is centrally located a link B, which in the present example has the form of a disk. Link B has a central pivot, *d*, provided, as hereinafter set forth. That in the hinge or pivotal movements that take place in order that the inner ends of the axles may have freedom of action, they are of annular formation, thus avoiding pivot *d*. The axles are pivoted to disk B, respectively at *e* and *e′*, and as a preferable construction on the opposite side of the disk from the wheel to which the axle belongs, as seen more definitely in Fig. 5.

As an axial superstructure, the curved frame support D is provided, having two lateral branches D′ and D^2. The middle stem of support D serves as the pivot for link B.

To the inner or flattened portions of the axles are respectively provided pivotal pendant links, *i* and *i′*. In the lower ends of the latter the branches D′ and D^2, have pivotal bearings whereby the frame is supported at its rear. The combination and arrangement of the parts set forth give suitable firmness to the combined axles, as a whole, while it permits the movements of the wheels sought.

At the upper end of support D is provided a horizontal journal bearing E. In this the rear end of reach C is pivotally supported. The curved tubular shaft F has a rigid connection with reach C at J, and serves as a support for the adjustable seat rod *r*, and also serves as a section of a lever, as hereinafter set forth. The lower end of shaft F is pivotally connected with a vertically slotted pendant extension W of the link B. I have shown two chains and sprocket wheels for same, of which latter S and S′ are of the rear wheels, and *u* and *u′* of the crank shaft. The proximity to each other of the rear wheels I design to so have that their peripheries shall come within the distance separating the cranks, as shown, to thus approximate as nearly as possible in general appearance, that of the bicycle.

The parts F and *r*, (which latter is the post for saddle G,) as represented, jointly become a lever having its fulcrum at J, and it is apparent that the weight of the rider, in the saddle, when thrown to either side, tends to produce such movement of the lower end of the lever as to turn link B, whereby the inner end of one axle is depressed and the other elevated, and vice versa, thus producing a corresponding inclination of the axles and the desired inclination of the wheels, as shown in Figs. 9 and 10.

The connection of the lever with link B is such, as apparent, that the inclination of the wheels and lever coincides.

The reach C is moved in its seat at E by the action of the lever, thus producing a movement at the cranks that causes the shaft of the latter to take an inclination corresponding to that of the wheels, and the lateral movement is also conveyed through reach C to the front wheel, as obvious.

While I have shown a chain for driving each of the rear wheels, I do not deem it essential, but advantageous for high speed. When two sets of sprockets are used, it becomes important that one of each set should be mounted with ratchet connection, that in curved movements of the vehicle the rear wheels may act independently, to permit of unequal velocity of the latter.

In the modification illustrated in Figs. 6, 7 and 8, instead of a curved lever, F, engaging with the pendant W, as previously described, it, in this example, engages with a horizontal lever L, which latter is pivotally supported at K, and has its rearward end extended through the slot of pendant W. The lower end of lever F is forked to engage on both sides of lever L. To provide a support for the disk or lever seat K, there are two branches of tubes or rods D^3 and D^4, that are secured in the rear ends of branches D′ and D^2 of the main support, and are curved downward and then brought forward to form a junction and to serve as a base for disk K. Lever L, is provided with lateral branches L′ and L^2. Respectively to the latter are attached cords *t* and *t′*, which extend to reach C, and following its course near their other extremities pass over pulleys on arm P. On the handle bar are lateral extensions *v*, *v′*. With the latter the ends of cords *t*, *t′* are respectively connected. In the modification a movement laterally in either direction of lever L is the result of a movement of lever F, actuated by the rider, as described in the other form of construction. The movement of lever L actuates the link B and then the hind wheels, and as apparent, the action of the extensions L′ and L^2 serve through the medium of the cords, to turn the front wheel on a horizontal axis, thus guiding the vehicle.

It is not essential that the inner ends of adjacent axles in my link connection should cross each to the opposite side of link B, from the wheel to which it belongs. Other modifications also may be employed, but I consider the manner I have described as being the preferable one.

In Fig. 10, the modification above referred to, is shown, where the axles *a* and *a′* are connected with link B, on the portion of the latter nearest the wheel to which the axle belongs. In the former method in which the axles cross it will be observed, that the wheels when inclined, are separated more at the top than at the bases. It is a condition necessary, that when the axles extend from the hubs, as shown, and are joined at two or more points, one to the other, that in order to maintain a constant distance between the wheel bases, there must be variation between the tops of the wheels, *i. e.*, that the wheel bases may be pivotal points without change in distance separating them, whereby a sliding movement on the ground is prevented, must be provided for. This I do by a differential or subordinate movement of one connection to the other. The axles pivotally attached to link B, in the present examples, form one of these connections. The other connection is through the pendants *i* and *i′*, attached at their tops respectively to the axles and their lower ends connected by the branches D′ and D^2, of curved frame support D, (upper and lower ends pivotal.) This maintains a constant distance from each other of the lower ends of pendants *i* and *i′*. An inclination outwardly above their lower ends may be observed in Fig. 9. In Fig. 10, the reverse takes place, the wheel tops being brought nearer each other than when erect, and the pendants *i* and *i′* taking corresponding positions with relation to each other.

In order that the saddle may move in a direction corresponding to the movements of the wheels, in the modification as shown in Fig. 10, the extension from link B, that is downward in the first described form, is upward, and engages with the lower end of lever F above the pivot *d* instead of below the latter.

It is obvious that the mechanism employed to so unite the wheels as to permit oscillation also provides for a practically positive relation that will prevent undue or waste motion when the vehicle is in use.

It will be observed that in the present example, and as a preferable construction, for pedal propelled vehicles, the planes of the wheel peripheries are within the planes of movement of the propelling cranks.

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

1. In a vehicle having opposite wheels, an independent axle for each wheel in combination with pivoted connections joining said axles and so constructed as to preserve a constant distance between the points of contact of the wheels with the ground, but to permit

the wheels to incline about their contact points as a fulcrum without sliding and consequent friction on the ground.

2. In a vehicle, having opposite wheels an independent axle for each wheel, in combination with pivotal connections joining said axles and so constructed as to preserve a constant distance between the points of contact of the wheels with the ground, but to permit the wheels to incline about their contact points as a fulcrum without sliding and consequent friction on the ground, and a frame with a seat support mounted thereon which seat support is so joined with the axle connections that movement of the seat actuates and controls the wheels in their lateral inclinations or oscillations.

3. In a vehicle, opposite wheels and an independent axle for each wheel, in combination with pivotal connections joining said axles and so constructed as to preserve a constant distance between the points of contact of the wheels with the ground but to permit the wheels to incline about their contact points as a fulcrum without sliding and consequent friction on the ground, a frame, attached to said axles and having a front steering wheel, seat support or lever, carried by the frame and connected with the axle connections, and a cord or wire between said front wheel and seat lever whereby an inclination of the seat support serves to incline the rear wheels and automatically guide the vehicle.

4. In a vehicle, the combination of a pair of opposite wheels, an independent axle for each wheel, a frame support having lateral branches, a disk or connection to which the axles are pivotally attached, a frame support, a reach pivotally mounted on said frame support, a seat post or lever supported by said reach and connected with the disk, whereby the latter may be actuated, and pendent links pivotally connected with the axles and with the lateral branches of the frame support, substantially as and for the purposes set forth.

5. In a vehicle, the combination of a pair of opposite wheels, an independent axle for each wheel, a disk or connection to which the axles are pivotally attached, a frame support, a reach connecting with a steering wheel and having one of its ends pivotally supported upon said frame support, a seat and post or support for said seat, a horizontal lever, that is pivotally supported by the structure in a horizontal position, and engaging with the connecting link or disk between wheels and is provided with lateral extensions for attaching steering cords or wires, said seat post being so constructed and arranged as to engage with and actuate the horizontal lever, substantially as set forth and for the purpose described.

JOSEPH RIDGE.

Witnesses:
ALBERT RANSOM,
G. A. SALELBERG.