

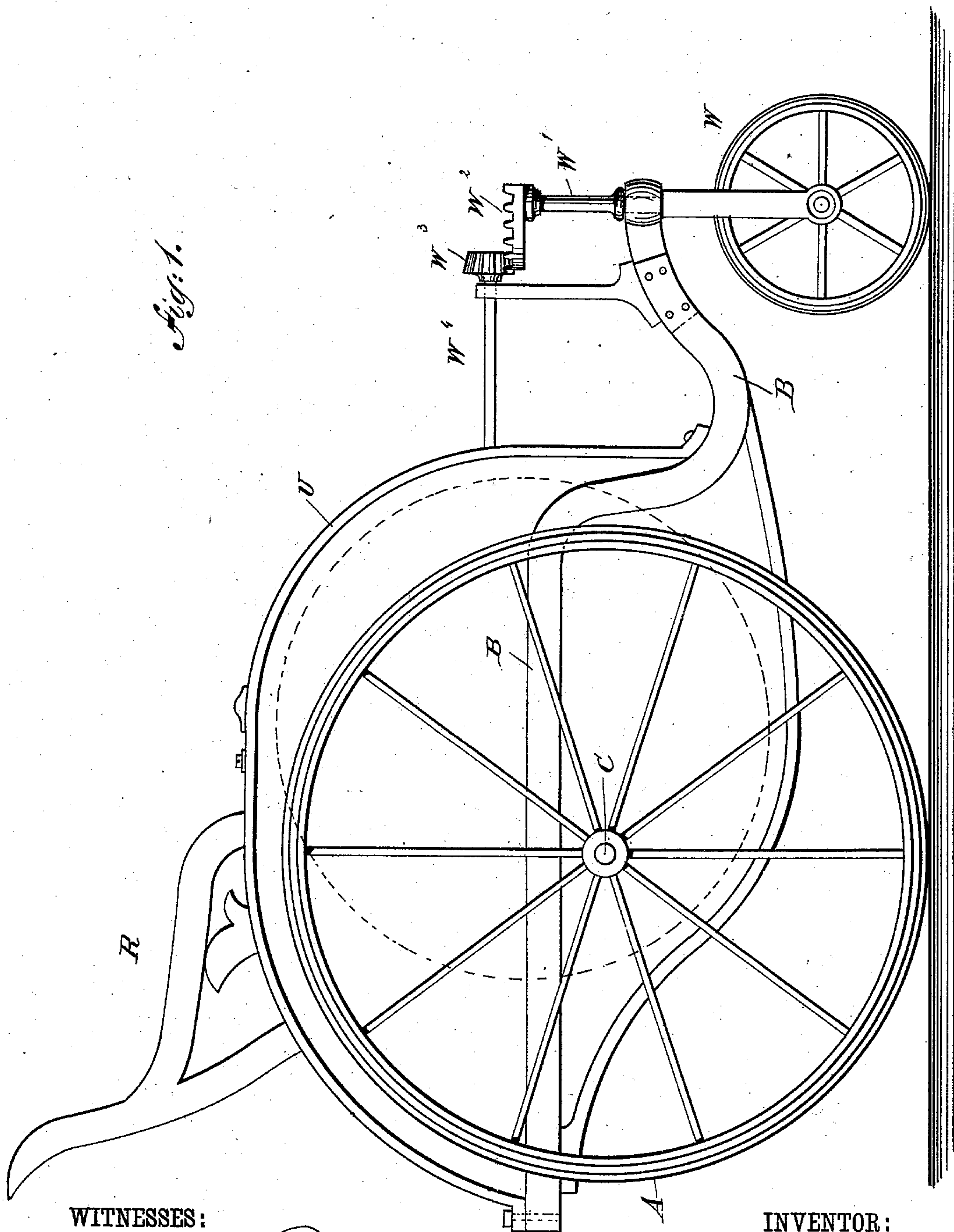
(No Model.)

4 Sheets—Sheet 1.

H. T. FRIE.
TRICYCLE.

No. 373,282.

Patented Nov. 15, 1887.



WITNESSES:

Charles Nida.
C. Sedgwick

INVENTOR:

H. T. Frie

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Munn & Co

ATTORNEYS.

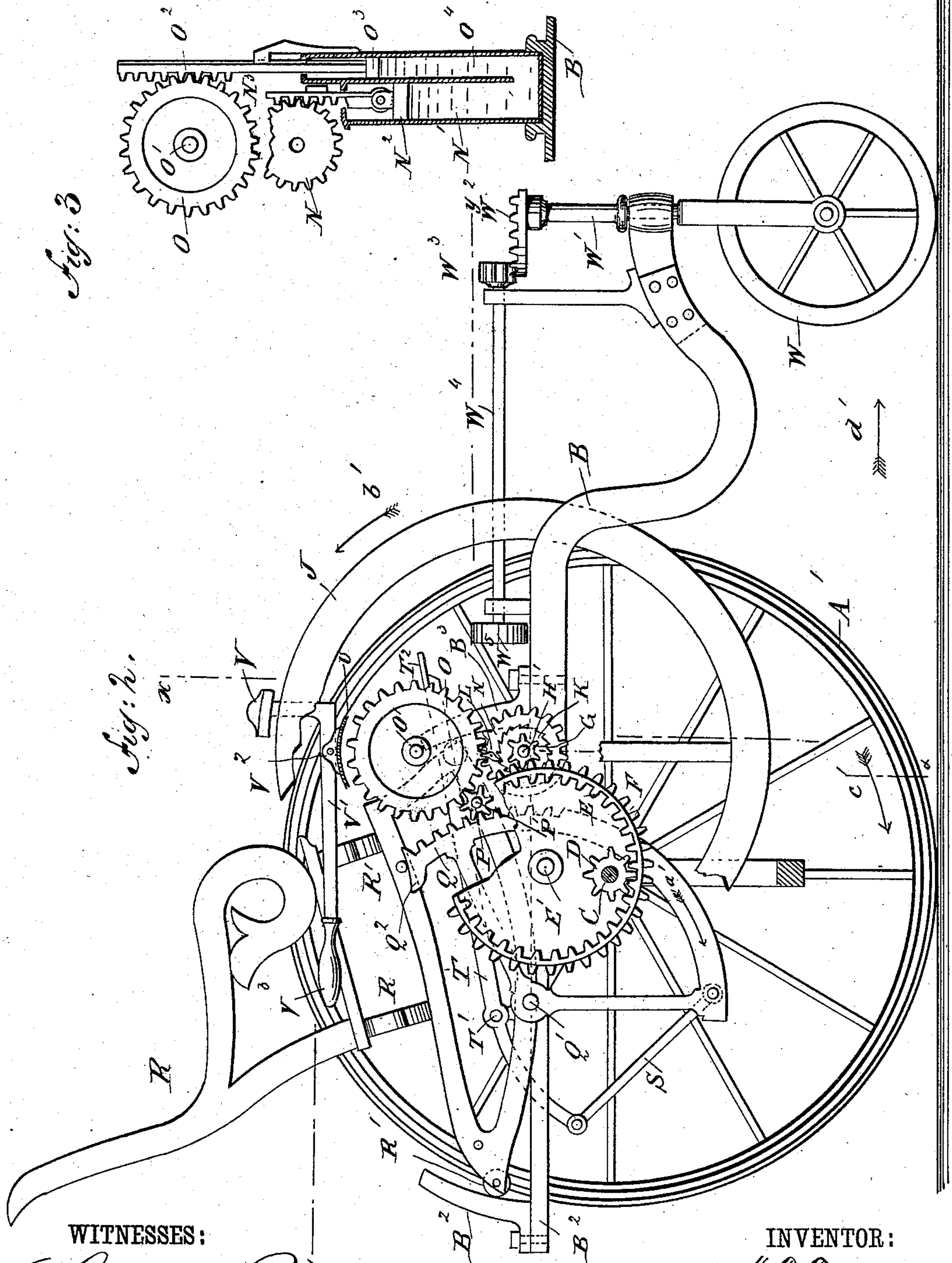
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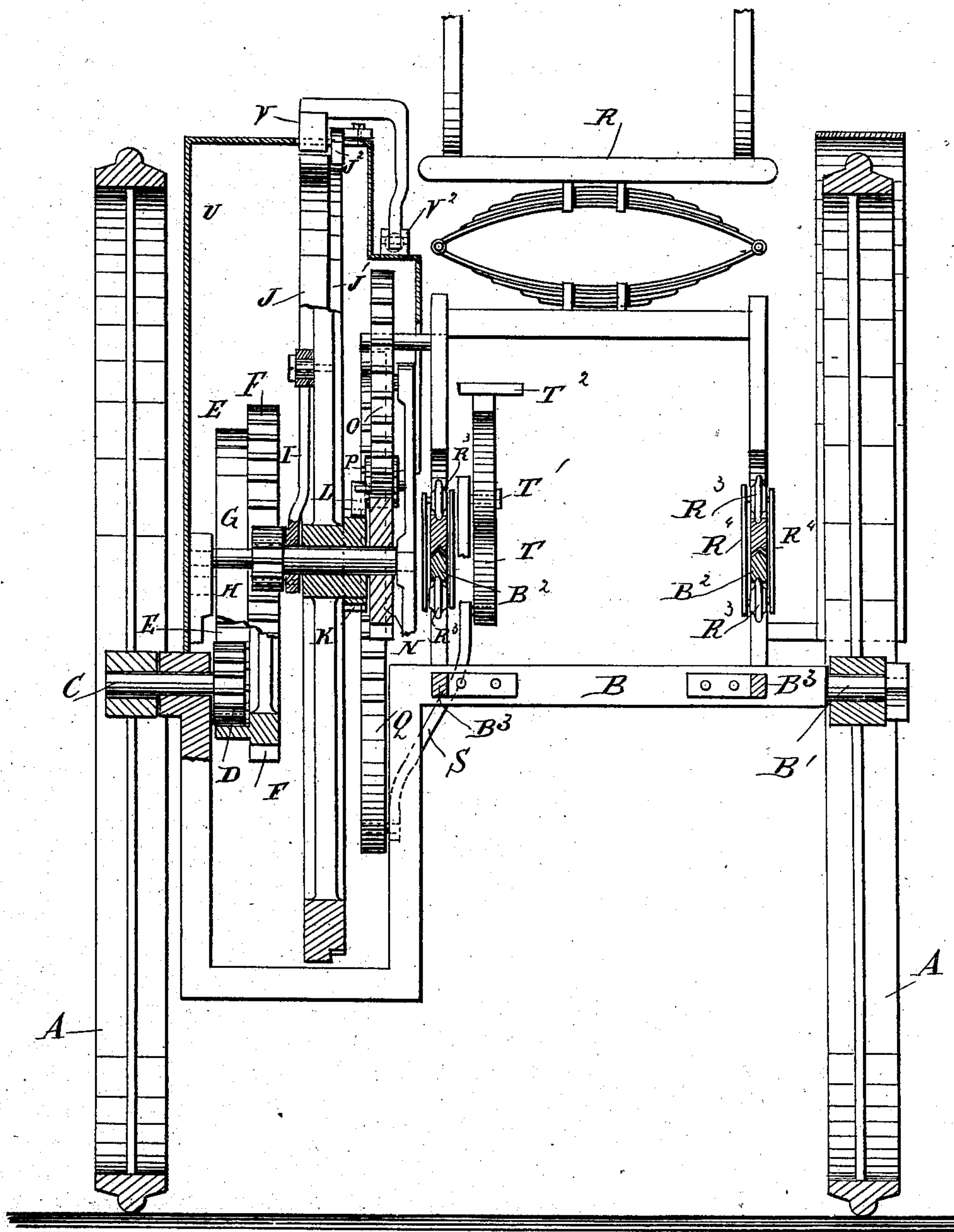
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Fig: 4.



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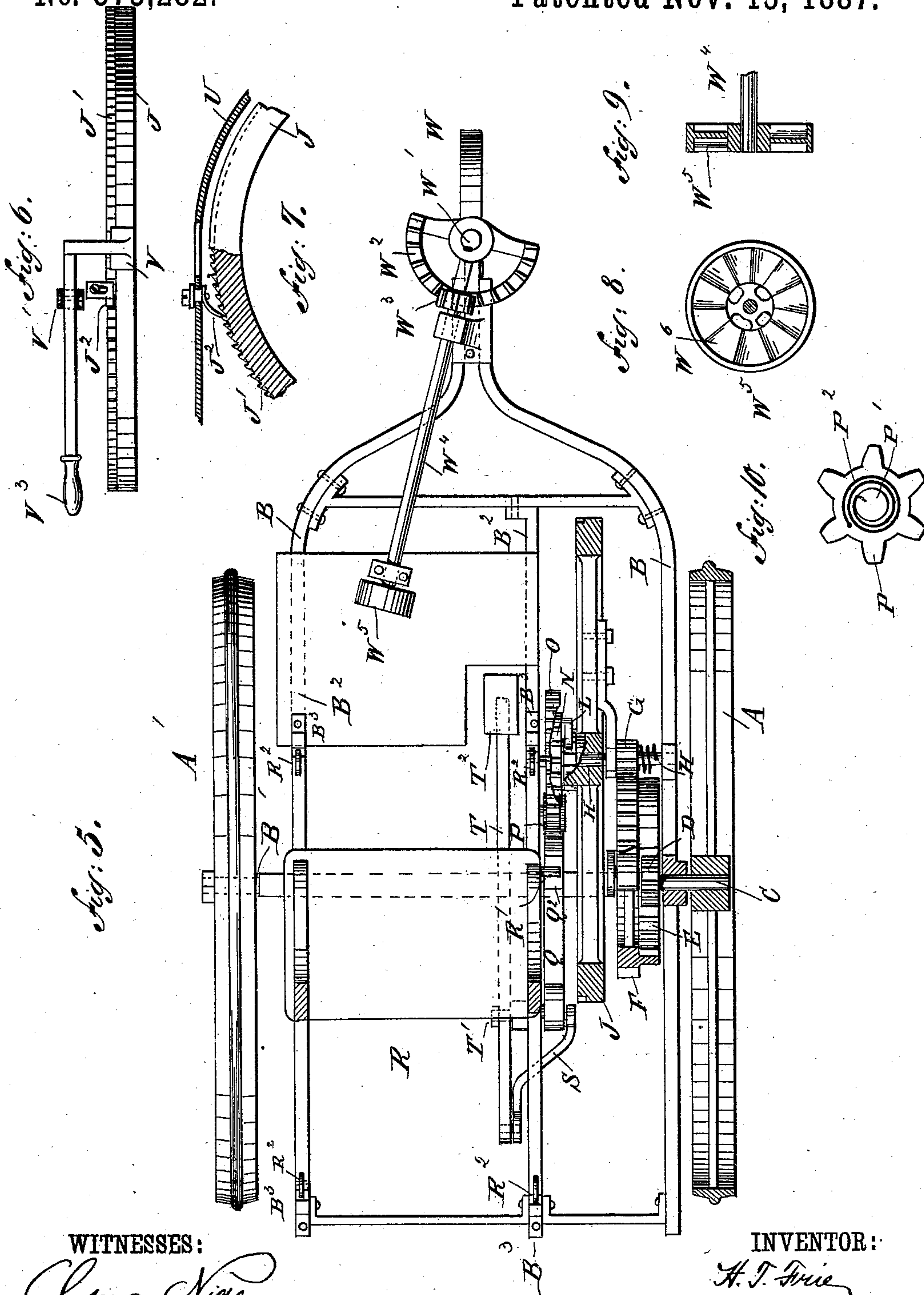
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WITNESSES:

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UNITED STATES PATENT OFFICE.

HERMANUS THEODORE FRIE, OF CURAÇOA, WEST INDIES.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 373,282, dated November 15, 1887.

Application filed August 20, 1887. Serial No. 247,429. (No model.)

To all whom it may concern:

Be it known that I, HERMANUS THEODORE FRIE, of Curaçoa, Dutch West Indies, have invented a new and Improved Tricycle, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved tricycle which can be easily and conveniently propelled at a high rate of speed without much exertion on the part of the operator.

The invention consists of a rocking-chair located on the frame and operating at its free end on a segmental gear-wheel connected by a train of gear-wheels with the axle of a driving-wheel.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improvement. Fig. 2 is a similar view of the same with parts removed. Fig. 3 is a sectional side elevation of a modified form of the device for transmitting power. Fig. 4 is an enlarged vertical cross-section of my improvement on the line *xx* of Fig. 2. Fig. 5 is a sectional plan view of the same on the line *yy* of Fig. 2. Fig. 6 is a plan view of the brake mechanism. Fig. 7 is a sectional side elevation of part of the same. Fig. 8 is a face view of the foot-wheel for the steering apparatus. Fig. 9 is a vertical cross-section of the same, and Fig. 10 is a detail view of the spring-pinion.

Of the two main driving-wheels *A A'*, the latter is loosely mounted on the spindle *B'* of the frame *B*, of suitable construction, and the other driving-wheel, *A*, is secured on a shaft, *C*, mounted to rotate in suitable bearings formed on said main frame *B*. On the inner end of the shaft *C* is secured a gear-wheel, *D*, which meshes into the internal gear-wheel, *E*, mounted to rotate loosely on the shaft *E'*, held on the main frame *B*.

On the internal gear-wheel, *E*, is formed an external gear-wheel, *F*, which meshes into the pinion *G*, loosely mounted on the shaft *H*,

which is mounted to rotate in suitable bearings formed on the main frame *B*. The pinion *G* is connected with a clutch held on the end of the arm *I*, pivotally connected with one of the spokes of the fly-wheel *J*, secured to said shaft *H* and provided on its hub with a ratchet-wheel, *K*, with which engages a pawl, *L*, pivoted on the gear-wheel *N*, mounted loosely on said shaft *H* and meshing into the gear-wheel *O*, secured to the shaft *O'*, mounted in suitable bearings on the main frame *B*. The gear-wheel *O* meshes into the pinion *P*, secured to the shaft *P'*, mounted to rotate in suitable bearings on the main frame *B*, and on said shaft *P'* is coiled a spring, *P²*, fastened by one end to the bearing of said shaft and by its other end either to said shaft *P'* or its pinion *P*.

The pinion *P* meshes into the segmental gear-wheel *Q*, fulcrumed at *Q'* to the main frame *B* and provided on its upper end with a segmental offset, *Q²*, on which rests a pin, *R'*, projecting from the upper arm of the rocking-chair *R*, of any approved construction. Each runner of the rocking-chair *R* is provided in its bottom edge with a V-shaped groove fitting on the V-shaped top edge of the longitudinal bar *B²*, secured to the main frame *B*. Each end of each runner of the rocking-chair *R* is provided with a friction-wheel, *R²*, rolling on a segmental arm, *B³*, secured to the main frame *B*, so as to prevent the rocking-chair *R* from moving laterally, but permitting a free rocking motion.

To prevent the runners of the rocking-chair *R* from jumping the longitudinal bars *B²*, I provide the rollers *R³*, connected with each other on each side by the rods *R⁴*, said rollers *R³* engaging, respectively, the top edges of the runners and the bottom edges of the longitudinal bars *B²*. These rollers *R³* travel on the lowest or contact points of the runners of the rocking-chair *R*, and thereby prevent the runners from jumping the respective tracks, but permit a free and easy rocking motion of the rocking-chair *R*.

The lower end of the segmental gear-wheel *Q* is pivotally connected by a link, *S*, with the rear end of the foot-lever *T*, fulcrumed at *T'* to the main frame *B* and carrying at its front end a foot-piece, *T²*, operated on by the foot of the operator seated in the rocking-chair *R*.

The train of gear-wheels and connected parts above described are preferably covered by a hood, U, of any suitable material or shape, so as to prevent the operator from coming in contact with the train of gear-wheels, and also to prevent dust from settling on the said mechanism.

The fly-wheel J is provided on part of its rim with a ratchet-wheel, J', which engages a pawl, J², held adjustably on the hood U in such a manner as to move said pawl J² in or out of contact with the ratchet-wheel J'. The pawl J² serves to prevent the fly-wheel J from running in a wrong direction as long as the operator desires it. On part of the rim of the fly-wheel J operates a brake-shoe, V, secured to the lever V', fulcrumed at V² to the hood U, and provided at its rear end with a handle, V³, at the side of the rocking-chair, so as to be within convenient reach of the operator seated in the rocking-chair R.

The steering-wheel W is located in front of the driving-wheels A and A', and is mounted on the upwardly-extending rod W', having its bearing in the front end of the main frame B. On the upper end of said rod W' is secured the bevel gear-wheel W², meshing into the pinion W³, fastened on the horizontal shaft W⁴, mounted to rotate in suitable bearings formed on the main frame B, and the inner end of said shaft W⁴ carries the foot-wheel W⁵, provided on its inner face with notches or offsets W⁶, so as to permit the operator to turn said foot-wheel W⁵ with his foot conveniently, whereby a turning motion is imparted to the vertical rod W', so that the steering-wheel W is turned at an angle to the main driving-wheels A and A', whereby the entire apparatus is steered.

The operation is as follows: The operator is seated in the rocking-chair R, and by rocking in the same he imparts by the pin R' a downward motion in the direction of the arrow a' to the segmental gear-wheel Q, which rotates the pinion P, and the latter imparts a similar motion to the gear-wheel O, which transmits its motion to the gear-wheel N, rotating loosely on the shaft H, and said gear-wheel N imparts by its pawl L a rotary motion to the ratchet-wheel K, so that the fly-wheel J, on which said ratchet-wheel K is formed, is turned in the direction of the arrow b'. The fly-wheel J, by means of the clutch-arm I, imparts a rotary motion to the pinion G, mounted loosely on the shaft H, and said pinion G transmits its rotary motion to the external gear-wheel, F, which, on account of being connected with the internal gear-wheel, E, imparts a rotary motion to the pinion D, secured to the shaft C, and the latter, which carries the main driving-wheel A, thus imparts a rotary motion to the said main driving-wheel A in the direction of the arrow c', and thereby propels the machine forward in the direction of the arrow d'. As soon as the downward motion of the rocking-chair R is completed and the operator rocks backward, the segmental gear-wheel Q is

moved to its former position by the compressed coil-spring P², which had been wound up by the downward motion of said segmental gear-wheel Q. It will be seen that the return movement of the segmental gear-wheel Q, the pinion P, and the gear-wheel O does not affect the motion of the fly-wheel J, as said gear-wheel Q only imparts a motion in the direction of the arrow b' to said fly-wheel J by the gear-wheel N, carrying the pawl L, engaging the ratchet-wheel K. If the operator desires, he can press his foot on the foot-piece T² on the downward motion of the rocking-chair R, thus assisting the segmental gear-wheel Q in its downward movement, thereby increasing the transmission of the power to the main driving-wheel A, as before described. The operator can apply the brake V whenever desired to the fly-wheel J by raising the handle V³ of the lever V', so that the shoe V engages the rim of said fly-wheel J.

When the velocipede is designed for carrying freight, I prefer to arrange the transmission of power from the gear-wheel O to the gear-wheel N in the manner illustrated in Fig. 3, in which the gear-wheel O meshes into a rack, O², carrying a piston, O³, operating in a small cylinder, O⁴, containing water and secured to the main frame B. Said small cylinder O⁴ connects at its lower end with a larger cylinder, N', in which operates a piston, N², connected with a rack, N³, meshing into the gear-wheel N, which latter, however, is not in mesh with the gear-wheel O, but is connected with the fly-wheel J in the manner above described. It will be seen that when the gear-wheel O is rotated, as above described, by the action of the rocking-chair R the piston O³ is forced downward, so that the water in the cylinder O⁴ presses the piston N² upward, thereby imparting motion by its rack N³ to the gear-wheel N. The difference in the sizes of the gear-wheels O and N and of the cylinders O⁴ and N' causes a strong transmission of power applied at a slow rate of speed.

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

1. In a tricycle, the combination, with a rocking-chair, of a segmental gear-wheel operated by the rocking of said chair, and a train of gear-wheels connecting said segmental gear-wheel with the shaft of one of the main driving-wheels, substantially as shown and described.

2. In a tricycle, the combination, with a rocking-chair, of a segmental gear-wheel operated by the downward rocking motion of said chair, a train of gear-wheels connected with said segmental gear-wheel and with the shaft of one of the driving-wheels, and a fly-wheel interposed in the said train of gear-wheels for giving momentum to said main driving-wheels, substantially as shown and described.

3. In a tricycle, the combination, with a rocking-chair, of a segmental gear-wheel op-

erated by the downward rocking motion of said chair, a train of gear-wheels connected by said segmental gear-wheel and with the shaft of one of the driving-wheels, a fly-wheel interposed in said train of gear-wheels for giving momentum to said main driving-wheels, and means, substantially as described, for preventing said fly-wheel from turning in the wrong direction, as set forth.

4. In a tricycle, the combination, with a rocking-chair, of a segmental gear-wheel operated by the rocking of said chair, a train of gear-wheels connected by said segmental gear-wheel and with the shaft of one of the driving-wheels, a fly-wheel interposed in said train of gear-wheels to give momentum to said driving-wheel, and means, substantially as described, for imparting a return motion to said segmental gear-wheel without affecting the forward motion of said main driving-wheel, substantially as shown and described.

5. In a tricycle, the combination, with a rocking-chair and a foot-lever, of a segmental gear-wheel operated on by said rocking-chair and said foot-lever, and a train of gear-wheels connected with said segmental gear-wheel and with the shaft of one of the main driving-wheels, substantially as shown and described.

6. In a tricycle, the combination, with the main frame having two longitudinal bars with V-shaped top edges, of a rocking-chair held with its runners on said longitudinal bars, a segmental gear-wheel operated on by said rocking-chair, and a train of gear-wheels connecting said segmental gear-wheel with the shaft of one of the main driving-wheels, substantially as shown and described.

7. In a tricycle, the combination, with the main frame having longitudinal bars provided with V shaped top edges, of a rocking-chair having runners provided in their bottom edges with V-shaped grooves fitting on the said V-shaped top edges, rollers held at the ends of said runners, and segmental arms fastened on said main frame and on which roll said rollers on the runners, so as to prevent the rocking-chair from moving laterally, substantially as shown and described.

8. In a tricycle, a rocking-chair, a segmental gear-wheel operated by the rocking of said chair, a pinion meshing into said segmental gear-wheel, a coil-spring for imparting a return movement to said pinion, a gear-wheel meshing into said pinion, and a second gear-wheel meshing into the last-named gear-wheel, in combination with a ratchet-wheel, a pawl operating on said ratchet-wheel and fulcrumed on the last-named gear-wheel, a fly-wheel carrying said ratchet-wheel, a pinion rotating loosely on the fly-wheel shaft and connected by a clutch and arm with one of the spokes of said fly-wheel, an external gear-wheel meshing into said pinion, an internal gear-wheel formed on said external gear-wheel, and a pinion meshing into said internal gear-wheel and secured to a shaft of one of the main driving-wheels fastened on said shaft, substantially as shown and described.

HERMANUS THEODORE FRIE.

Witnesses:

NICOLAAS A. CREMER,
LEON P. ALBERS.