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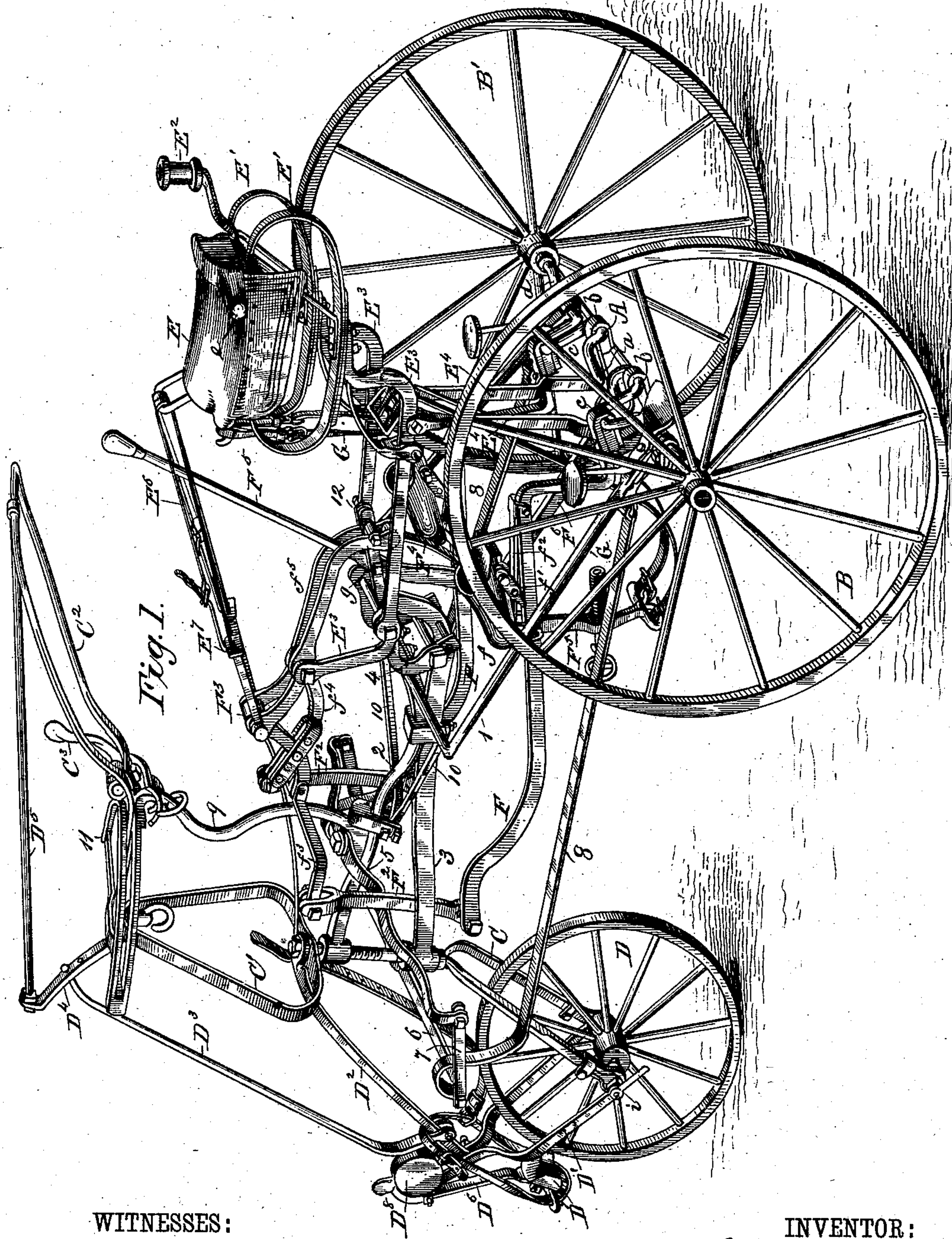
3 Sheets—Sheet 1.

H. SACHS.

TRICYCLE.

No. 290,117.

Patented Dec. 11, 1883.



WITNESSES:

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Edw. W. Byrum

INVENTOR:

IN VERDICT
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BY Mann & Co
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(No Model.)

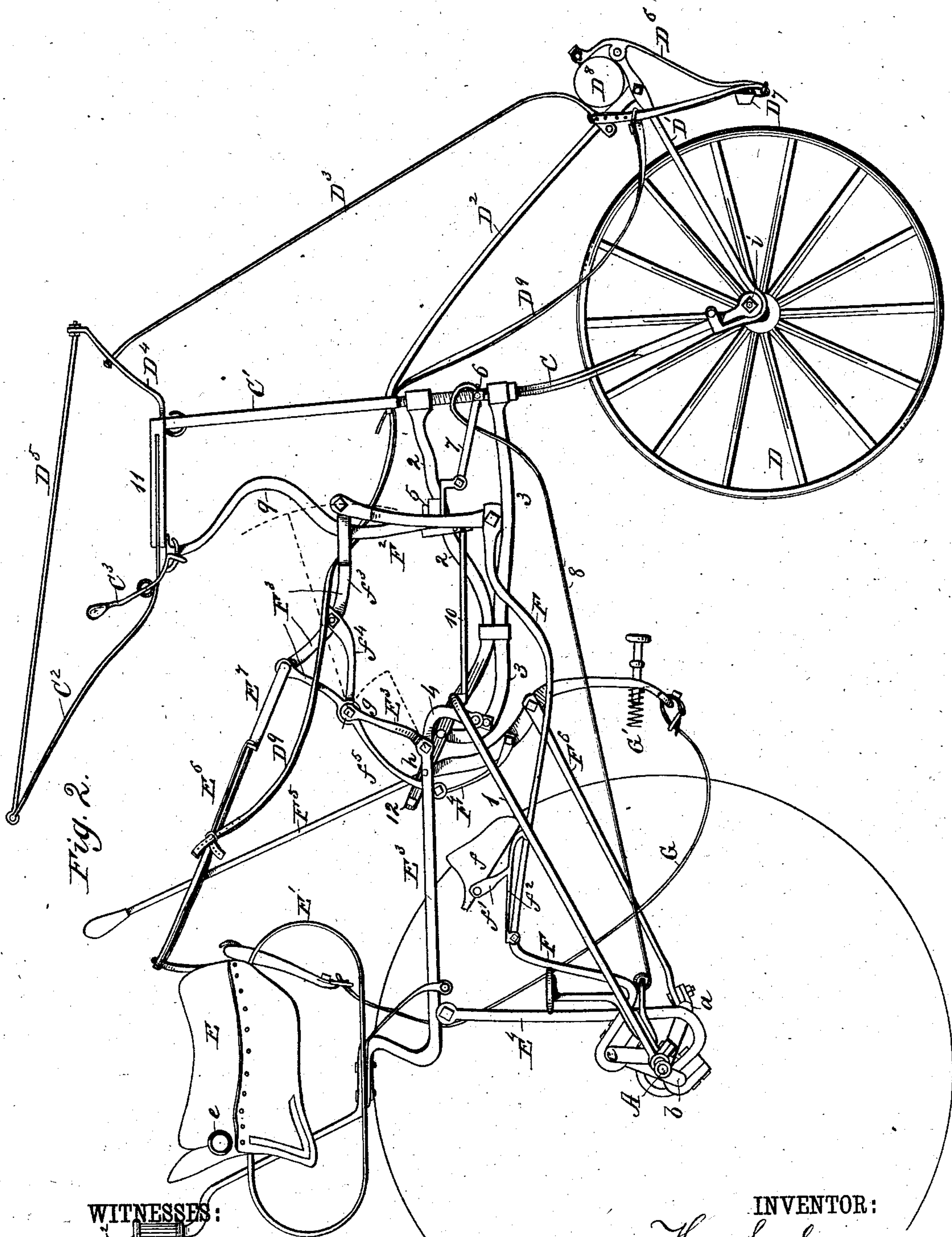
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WITNESSES:

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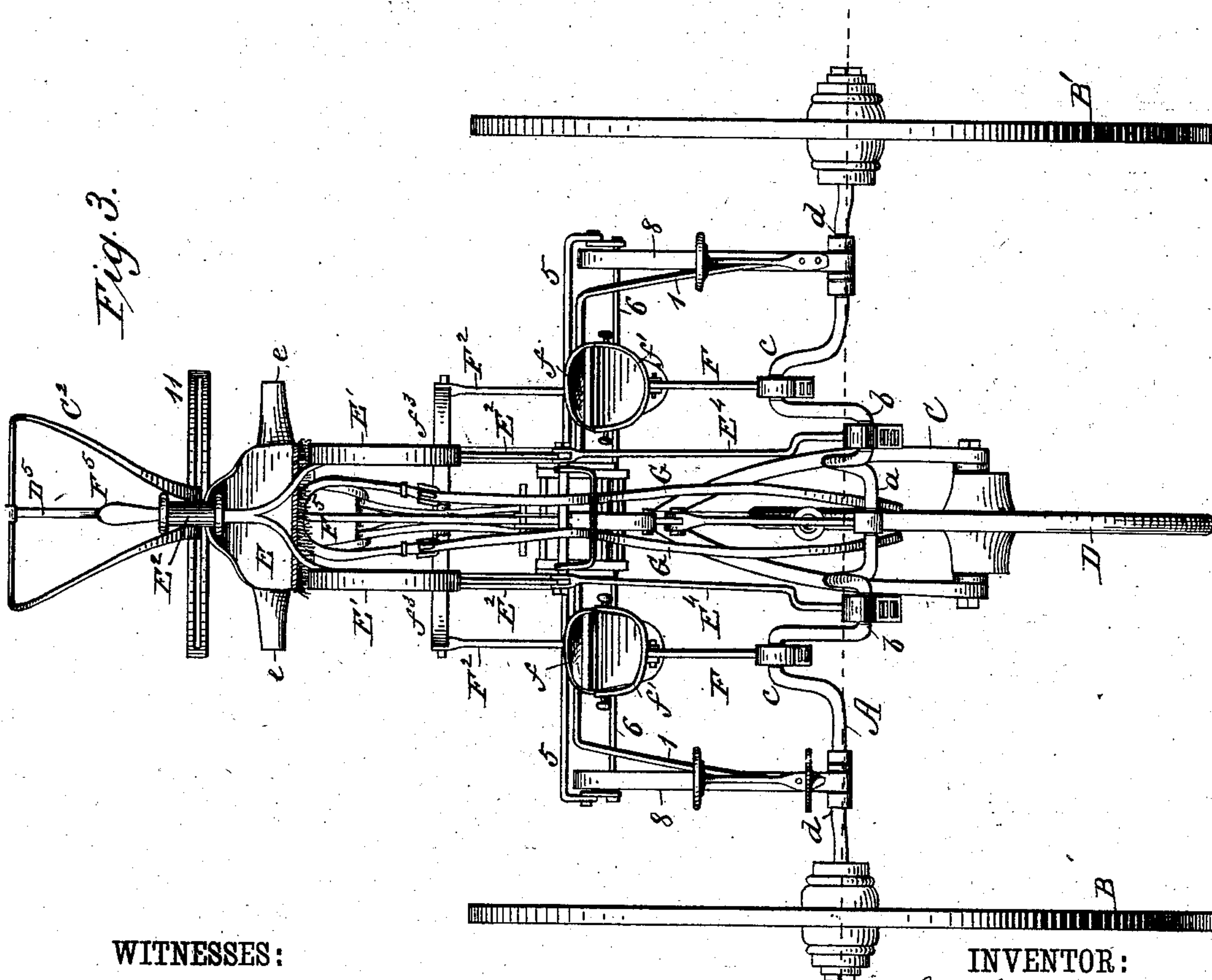
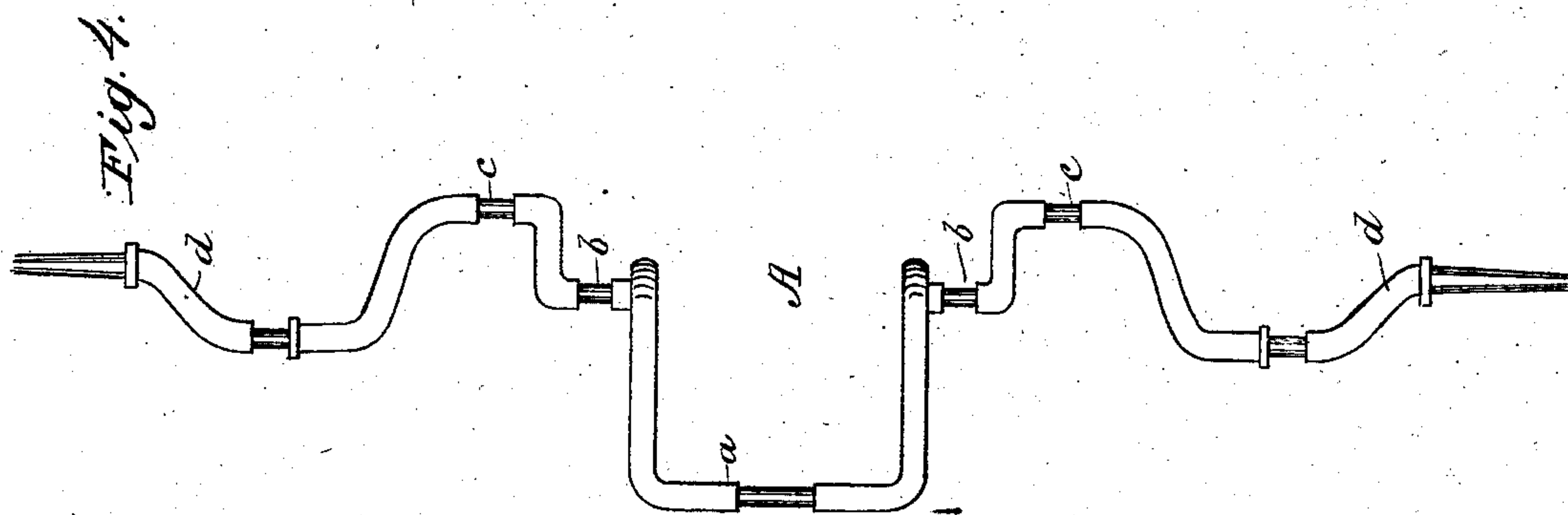
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UNITED STATES PATENT OFFICE

HEINRICH SACHS, OF WASHINGTON, DISTRICT OF COLUMBIA.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 290,117, dated December 11, 1883.

Application filed October 24, 1883. (No model.)

To all whom it may concern:


Be it known that I, HEINRICH SACHS, of Washington city, District of Columbia, have invented a new and useful Improvement in Tricycles; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view. Fig. 2 is a side elevation. Fig. 3 is a rear end elevation, and Fig. 4 is a detail of the crank-axle.

My invention relates to certain improvements upon that form of tricycle in which the seat is made movable and is connected with the crank-axle in such a manner as to co-operate with the foot-treadles in imparting a rotary motion to said axle.

My invention is designed to secure for this class of machine a greater power and speed, and to increase the ease of management and its general effectiveness; and to this end my invention consists in the peculiar construction of parts, which I will now proceed to particularly describe.

Before attempting to describe the working parts of the device, I will, for the sake of greater clearness, first describe the passive parts of the machine, or those which constitute the frame-work, then the features of secondary importance, and, finally, the principal or leading features.

First, as to the frame-work. This consists of the parts 1 2 3 4 5 6 7 8 9 10 11 12. (See Figs. 1 and 2.) The part 1 is in the nature of a -shaped bar, arranged inclinedly to the vertical, with its bent end in front and its branches projecting to the rear, and connected by straps to the crank-axle A, which latter is supported upon the rear running-wheels, B B'. One of these wheels, B, is loose on the axle and the other is tight or rigid with the axle, to permit one wheel to move faster than the other in turning, which is a necessary but common feature. The parts 2, 3, and 4 are strongly bolted together at the middle of the front end of bent bar 1. The parts 2 and 3 are arranged longitudinally to the machine and constitute the backbone, while 4 consists of two short arms projecting upwardly and rearwardly from the central coupling. 5 and 6 are cross-bars at

its front, of which 5 is connected to 2 near its front end, while 6 crosses 3 at its front end, the ends of 5 and 6 being connected by a link, 7, on each side of the machine and braced by the long braces 8 on each side, running obliquely back to the frame 1 at a point near the axle. Just back of the cross-bar 5 a vertical standard, 9, is fixed to the top section, 2, of the backbone, which latter is braced by diverging bars 10, running back from said standard to bar 1. At the top of the vertical standard 9 there is attached the semicircularly-curved plates 11.

I will now describe the means for guiding the machine.

In the front ends of the bars 2 and 3 there is swiveled the vertical standard of the fork C of the front wheel, D. To the upper end of the fork-standard is attached the bowed frame C'. This frame is made bowed, and provided with a hook at the top to receive a lantern at night. At its top said frame is connected by a vertical pivot to the center of the semicircular plate 11, and has a handle portion, C², extending through the slot of the curved plate backwardly to the rider. By swinging this handle to the right or left the vertical standard and fork C, carrying the front wheel, are turned and the machine directed to the right or left, as may be desired.

To lock the wheel D in a position to go straight ahead, a lever, C³, is fulcrumed to the handle C², and below its fulcrum has a forked end, which, when the wheel is straight, passes upon both sides of the vertical standard 9 of the stationary frame, and holds the vertical fork and wheel in this position. Upon the front wheel, D, I arrange my brake, and for this purpose the fork C has connected to it a forwardly-inclined fork, D', which is braced by rod D² to the bowed frame C' and by rods D³, D⁴, and D⁵ to the handle C². To this forked frame D' is fulcrumed a brake-lever, D⁶, bearing brake-shoe D⁷, adapted to bear against the front wheel. A counter-weight, D⁸, at the upper end of this lever, holds the shoe normally away from the wheel, and a flexible strap, D⁹, serves to apply it.

I will now proceed to describe the co-operation of the foot-treadle and the seat in driving the machine.

The axle A is bent into seven crank-loops, (see Figs. 3 and 4,) a single crank-loop, *a*, in the middle, a corresponding crank-loop, *b* and *b*, on each side of this, another corresponding pair, *c* and *c*, outside of these, and still another pair, *d* *d*, of slight eccentricity, outside of these, or next to the wheels. For the present the cranks *b* *b* and *c* *c* are the only ones to be considered, as they are the ones that act in conjunction with the seat and foot-treadles.

E is the seat or saddle, which is arranged to be straddled, and has hand-holds *e* projecting laterally from its rear end. This seat is mounted upon two elliptical springs, *E'*, and has behind it a socketed standard, *E''*, for an umbrella or sun-shade, which standard has two legs that rest upon the bottom of the springs and brace the latter sidewise. Said seat, with its springs and umbrella-supports, is mounted upon and securely attached to the rear ends of two levers, *E³* *E³*, which are fulcrumed upon the stationary fixed arms 4 4 of the frame-work. These levers *E³* are jointed just below the seat to vertical pitmen *E⁴* *E⁴*, which connect at their lower ends with the inner pair of crank-loops, *b* *b*. The crank-loops *c* *c*, upon the outside of these, are connected to the treadle-levers *F* *F*, bearing pedals or foot-supports *f* *f*, each of which is hinged to its yoke *f'*, (see Fig. 3,) and which yoke is fastened to or made in one piece with an upwardly-arched spring, *f''*, bolted to the top of the treadle-levers. The front ends of the treadle-levers are suspended by links *F²* from the ends of a frame, *F³*. This frame, as shown, is made of three pieces, *f³* *f⁴* *f⁵*, of which the forward piece, *f³*, is made forked in front to connect with the links *F²* *F²* on each side of the machine, and is bolted to the parts *f⁴* and *f⁵*, and of which *f⁴* is made in the form of a fork, and *f⁵* as two bars, arranged side by side. These three parts *f³*, *f⁴*, and *f⁵*, constituting frame *F³*, may, however, be made in one piece, and it, as a whole, is fulcrumed at the point *g* to the front and upturned ends of the seat-levers *E³* *E³*. The rear end of the part *f⁵* of frame *F³* is connected by a link, *F⁴*, to a nearly vertical handle-lever, *F⁵*, which extends from the level of the seat down to the lower part of the machine. This handle-lever *F⁵* is fulcrumed at *h* to a rearwardly-projecting bar, 12, of the main frame, and below this is connected by a pitman, *F⁶*, to the middle crank, *a*, of the axle.

Now, in explaining the function and value of the parts just described, I would state that the seat-cranks *b* *b* and the treadle-cranks *c* *c* are nearly diametrically opposite each other, and there is, therefore, a certain time in the revolution of the axle when these two sets of cranks are in the vertical line and on the dead-center. The mechanism referred to is designed to carry the cranks past the dead-center, and to secure a more uniform running and a better utilization of the power expended. It operates in the following manner: When the seat E has,

through its lever *E³* and pitman *E⁴*, made its complete downstroke on the cranks *b* *b*, the treadle-cranks *c* *c* are nearly vertical, (see Fig. 2,) and have not yet felt the influence of the treadles; but the front ends of the treadle-levers pulling down on link *F²* produce at this movement a driving effect by pulling down the front end of tripple-barred lever *F³*, rocking it about the movable fulcrum *g*, and by pulling up the link *F⁴* it throws the lower end of lever *F⁵* to the rear, and this, through pitman *F⁶*, pushes back on the middle crank, *a*, which is nearly at right angles to *b* and *c*, and drives the machine forward. It will therefore be seen that power is applied to the crank-axle successively through the seat and cranks *b* *b*, then through mechanism connecting with the front end of the treadles and the middle crank, *a*, and then through the treadle-levers and their proper cranks, *c* *c*, securing a very uniform, easy, and powerful driving effect. I run the lever *F⁵* up to easy reach from the seat and form a handle on it for the purpose of enabling the rider to grasp and work it with his hands, and still further increase the power of the machine, as may be required in climbing hills or passing over bad roads. As an alternative device to be used in place of this lever, I connect straps *G* to a loop on the lower end of this lever *F⁵* and run them up and fasten them to the seat for the same purpose of operating said lever by hand. To prevent the lower end of said lever *F⁵* from striking the link *F⁶* with a sudden blow, I place a cushion-spring, *G'*, on said lower end of said lever. To brace and stiffen the seat E, it is connected by straps *E⁶* to a stirrup, *E⁷*, secured to the tripple-barred frame *F³*.

I will now proceed to describe another peculiar and distinctive feature of my invention.

There is a certain time in the revolution of the wheels when the inertia or weight of the body acts to influence the movement of the machine by the throw which the rider gives to his body in working it, and if this throw is made to act upon a descending crank it may be made to serve a useful effect. For this purpose the true axes of revolution are made eccentric to the centers of the running wheels. This is apparent, for the rear wheels, at the cranks *d* *d*, which cause the wheel-centers to be offset from the axis of the cranks *a* *b* *c*, as shown by the dotted line, Fig. 3. This eccentricity is also apparent in the front wheel where the bearings, *i*, Fig. 2, of the fork C are away from the center of the wheel. It will therefore be seen that the entire frame and running-gear, with the rider, rises and falls as the machine goes forward, and by timing the forward and downward thrust of the body, so as to coincide with the descending movement of the frame on the wheels, I obtain a useful driving effect from this arrangement.

Having thus described my invention, what I claim as new is—

1. The combination, with the main frame, of the swiveling fork bearing the front wheel,

the bowed frame C', attached thereto, the standard 9, mounted upon the main frame, and having at its top the semicircular plate 11, and the handle C², connected rigidly to the bowed frame, substantially as and for the purpose described.

2. The combination, with the front wheel and main fork C, of the additional or front fork, D', brake-lever D⁶, bearing shoe D⁷, and colter-weight D⁸, the brace-rods D² D³, and means for applying the brake to the wheel, substantially as described.

3. The combination, with the standard 9 of the main frame, bearing semicircular plate 11, of the handle C², bearing the forked lock-lever C³, adapted to pass upon both sides of the standard to lock the guide-wheel for a straight course, as described.

4. The combination, with the main frame, of the vertical fork C, bearing wheel D, the bowed frame C', and attached handle C², the standard 9, bearing semicircular plate 11, the brace-rods D² D³ D⁴ D⁵, the front fork, D', and the counterpoised brake-lever D⁶, substantially as shown and described.

5. The combination, with the crank-axle and the three wheels B B' D, of the main frame consisting of the parts 1 2 3 4 5 6 7 8 9 10 11 12, substantially as shown and described.

6. The combination, with the crank-axle, of the seat mounted upon one set of cranks, the treadle-levers mounted at their rear ends upon another set of cranks on said axle, and a mechanism, substantially as described, connecting the forward ends of the treadle to still another crank on the main axle to secure a movement past the dead-center, as described.

7. The combination, with the parts 1 2 3 4 of the main frame, of the seat-levers E³ E³, fulcrumed to the parts 4 of the main frame, and carrying at their rear ends the seat, the vertical pitmen C⁴ C⁴, and the crank-axle, substantially as and for the purpose described.

8. The straddle-seat E, having at its rear end the laterally projecting horns or handles e, as and for the purpose described.

9. The combination of the seat E, the elliptical springs E' E', the branched standard E², the seat-levers E³ E³, and the pitmen connecting the seat-levers to the crank-axle, as described.

10. The combination, with the crank-axle having middle crank-loop, a, and the cranks b b and c c on each side thereof, of the seat connected to the cranks b b, the treadle-levers F F, connected to cranks c c, the links F² F², the lever-frame F³, fulcrumed in the forward ends of the seat-levers, the link F⁴, lever F⁵, and pitman F⁶, connected to crank a of the main axle, substantially as described.

11. The combination, with the lever-frame F³ and the seat mounted on springs, of the levers E³, fulcrumed at h, and the strap E⁶, for connecting the seat to said frame to brace the seat, as set forth.

12. The combination, with the treadle-levers F, of the hinged foot-supports f and the yoke f', with upwardly-arched spring f², substantially as shown and described.

HEINRICH SACHS.

Witnesses:

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