(Model.)

4 Sheets—Sheet 1.

H. KARLSS.

Velocipede.

No. 238,915.

Patented March 15, 1881.

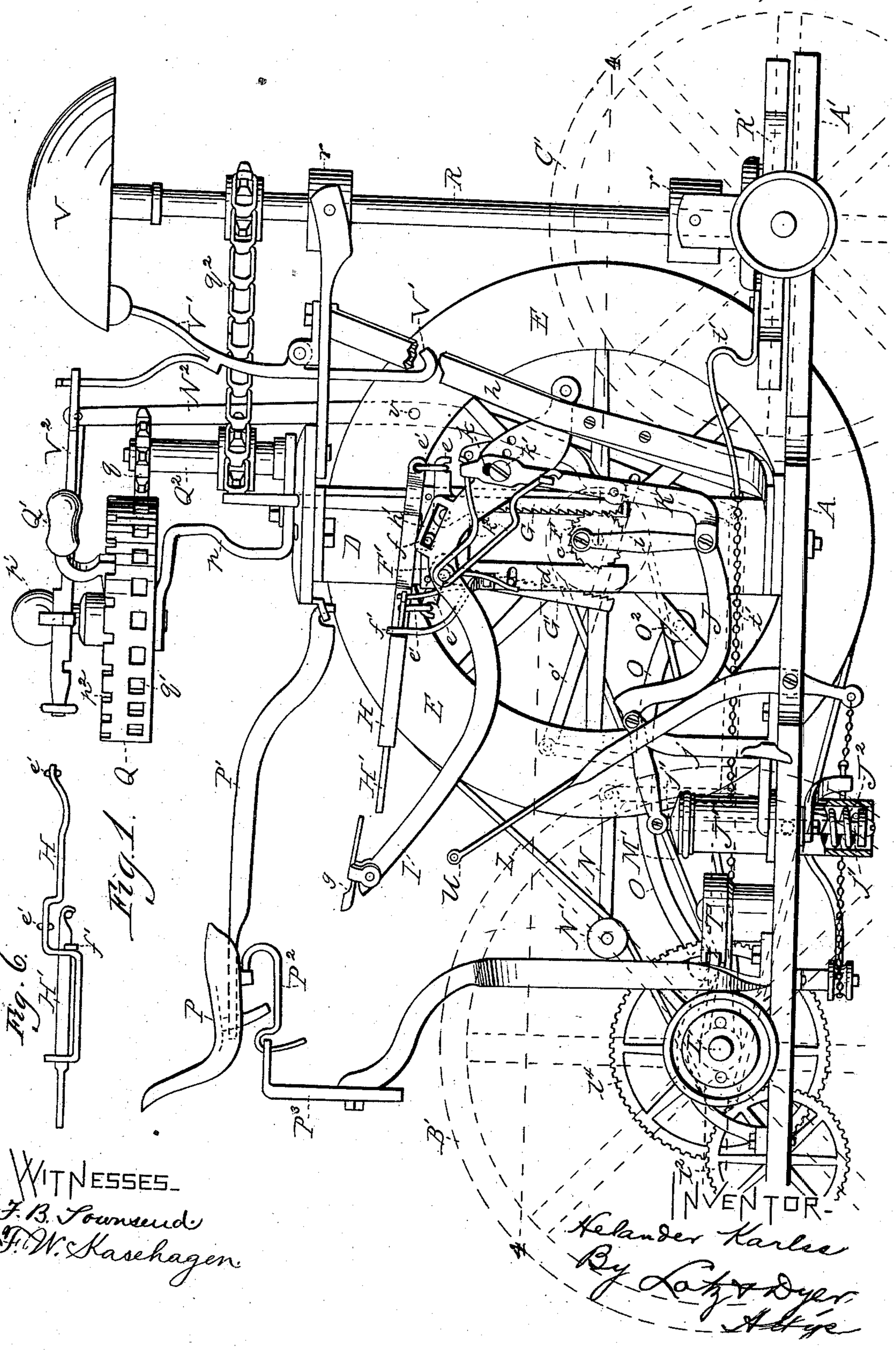

Fig. 1.

Fig. 6.

WITNESSES.

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(Model.)

4 Sheets—Sheet 2.

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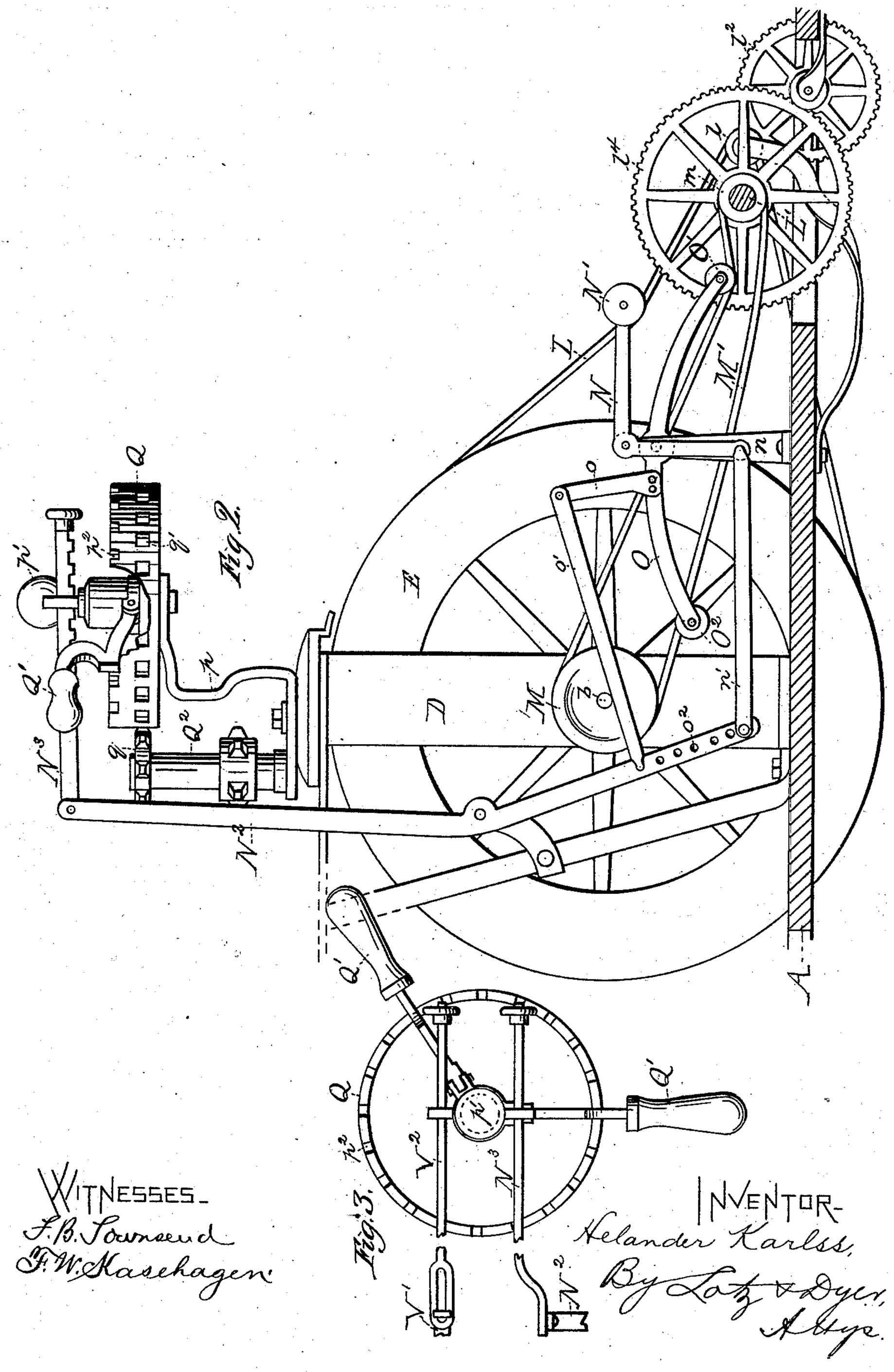

Fig. 2.

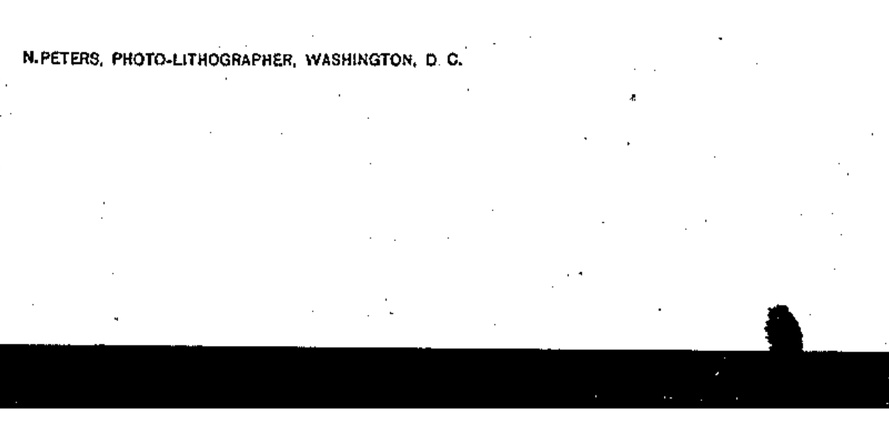

Fig. 3.

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(Model.)

4 Sheets—Sheet 3.

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No. 238,915. Patented March 15, 1881.

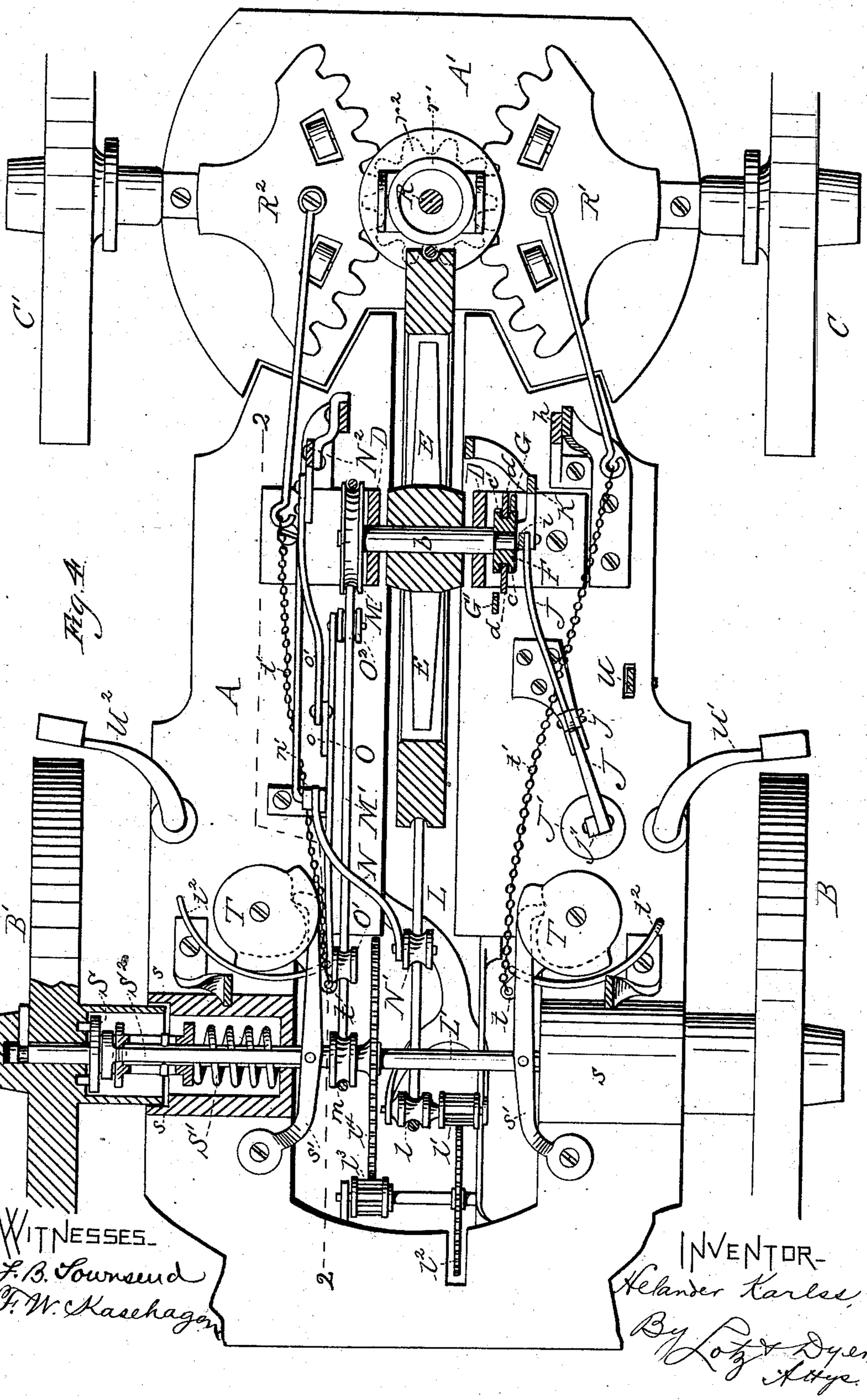

Fig. 4.

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4 Sheets—Sheet 4.

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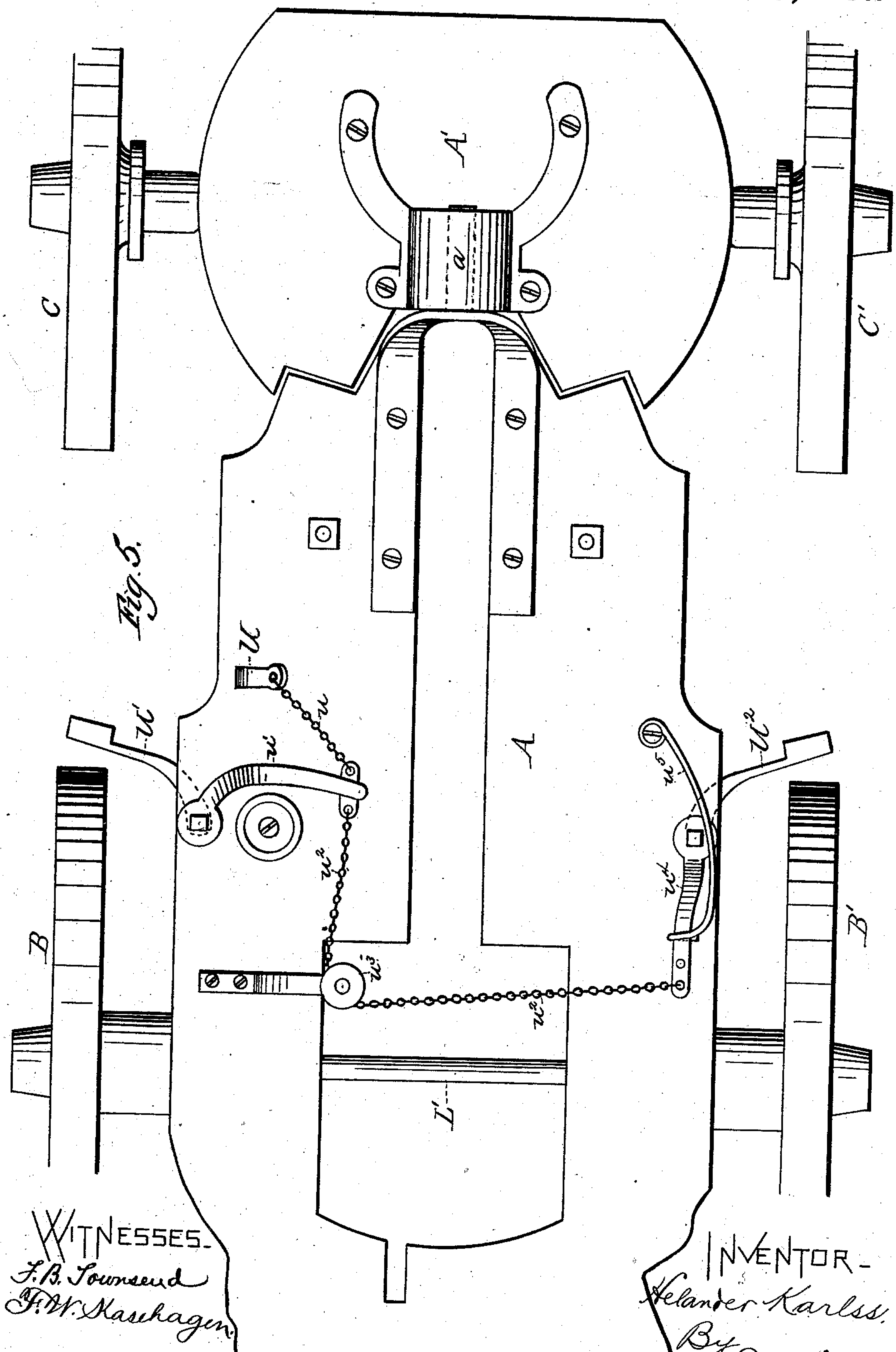

Fig. 5.

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UNITED STATES PATENT OFFICE.

HELANDER KARLSS, OF CHICAGO, ILLINOIS.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 238,915, dated March 15, 1881.

Application filed December 9, 1880. (Model.)

To all whom it may concern:

Be it known that I, HELANDER KARLSS, of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Velocipedes, of which the following is a specification.

The object I have in view is to produce a velocipede in which the speed can be changed from slow to fast, or vice versa, at pleasure, or the velocipede can be made to run forward or backward without changing or reversing the manner of applying the motive power.

My object is further to provide velocipedes with more efficient steering mechanism and with an automatic bell-ringing device, and, in general, to so improve machines of this class that they can be run easier and will be under more complete control than heretofore.

My invention consists in the various novel devices and combinations of devices employed by me, as fully hereinafter explained, and pointed out in the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a side elevation of the velocipede with the nearest wheels removed; Fig. 2, a vertical section through the frame, showing a portion of the mechanism in elevation from the opposite side; Fig. 3, a top view of the steering-handles and their immediate connections; Fig. 4, a horizontal section of the machine on line 4 4 in Fig. 1; Fig. 5, a bottom view of the frame of the machine, showing the brake-connections; and Fig. 6, a top view of the pawl-adjusting lever.

Like letters denote corresponding parts in all the figures.

The velocipede has a main frame or platform, A, supported by the two rear wheels, B B′, and connected by means of a swivel-joint, *a*, with the front platform, A′, which is supported by the front wheels, C C′.

From the main platform rise standards D, in which is journaled the shaft *b* of the heavy balance-wheel E, supported between such standards.

On one end of the shaft *b*, outside of one of the standards, is secured a ratchet-wheel, F, having two ratchets, *c c′*, with teeth beveled in opposite directions. This ratchet-wheel is embraced by the arms *d* of a vertically-sliding frame, F′, which arms slide on the plain surface of the wheel F between the ratchets.

To the outside of the frame F′, near its forward edge, is pivoted a pawl, G, having preferably a number of teeth. This pawl projects down against the outside of the forward arm, *d*, and is thrown by a spring into connection with the outer set of ratchet-teeth, *c*. On the inner side of the frame F′, near its rear edge, is pivoted another pawl, G′, similar in construction to the pawl G, and projecting down on the inner side of the rear arm, *d*. This pawl G′ is thrown by a spring into connection with the ratchet-teeth *c′*. Both pawls G and G′ act downwardly on the ratchet-teeth, which are inclined upwardly to engage with such pawls. These pawls have horizontal arms *e* projecting outwardly from their upper ends, which arms are connected by links *e′* with a lever, H, on opposite sides of the pivot thereof. This lever is pivoted on the pin *f*, projecting from the frame F′, and is provided with a spring locking-bar, H′, which engages with notches in a segment, *f′*, rising from the frame F′. By swinging the lever H to the uppermost limit of its movement the pawl G will be thrown into connection with the ratchet-teeth *c*, and the pawl G′ will be swung away from the ratchet-teeth *c′*, as shown in Figs. 1 and 4, while by dropping such lever to the lowest limit of its movement the pawl G′ will be thrown into, and the pawl G moved out of, engagement with their respective ratchet-teeth. If the lever is held at an intermediate point, both pawls will be out of engagement with the ratchets, and the movement of the operating-lever, to be presently described, will not affect the machine. When the pawl G is in connection with its ratchet the velocipede will be driven forward, the pawl G′ turns the balance-wheel in the opposite direction, and propels the machine backward without any change in the motions of the operator.

I is the operating-lever, having a pivoted foot-rest, *g*, for receiving the foot of the driver. This lever is pivoted at its forward end to the brace *h*, and has a slotted plate, *h′*, in which the pin *f* of the sliding frame F′ works, so that such frame will be moved vertically by the lever I.

The wheel F has a wrist-pin, which is connected by a pitman, *i*, with the inner end of a horizontal spring-lever, J. This lever J is pivoted in the top of a standard, *j*, and at its

outer end is connected with a rod, j', passing through the head of a vertical cylinder, J'. A spiral spring, J^2, is held on this rod j' within the cylinder, and resists the upward movement of the outer end, and the downward movement of the inner end, of the lever J. This spring is compressed when the wheel F is being forced by either pawl, and it assists said wheel when the pawls are being retracted. To allow for the lateral play of the outer end of the spring-lever J the cylinder J' is preferably mounted on trunnions, so that it can swing a limited distance.

An arm, K, is connected to the joint at the juncture of the pitman i and spring-lever J, which arm extends upwardly, and has a slot, k, in its upper end, which plays on a stud, k', projecting from the operating-lever I. A spring, k^2, acts upon the lever I and arm K, so as to keep the stud k' at the upper end of the slot k. The spring J^2 in the cylinder J' not only assists the upward movement of the pitman i, but throws the operating-lever up at the end of each stroke. In forcing down the lever I the pawl, in operative engagement, first acts on the wheel F. The pitman i, at the first part of the movement, does not travel downwardly so fast as the operating-lever on account of the lateral motion of such pitman. This difference in motion is taken up by the slot k and spring k^2. The spring J^2 is compressed by this downward movement until the lower center is passed, when such spring throws up the operating-lever and sliding frame and retracts the pawl, and at the same time forces the pitman up and turns the wheel F to its first position, ready for engagement with the operating-pawl. This movement has no dead-centers, and it is exceedingly easy on the operator.

The balance-wheel E, which is revolved by the means set forth, is grooved on its periphery to receive a belt, L, which passes around a pulley, l, connected by a train of power-gearing, l', l^2, l^3, and l^4, with the rear driving-axle, L'. This connection with the balance-wheel is for giving a slow motion to the velocipede.

On the end of the shaft b opposite to that on which the ratchet-wheel F is secured is fixed a grooved pulley, M, around which a belt, M', passes to a pulley, m, secured directly to the axle L'. This direct connection is for driving the velocipede at a high rate of speed.

For tightening the belts L M' alternately, and thus changing the speed from fast to slow, or vice versa, as desired, I employ the following means: To a standard, n, rising from the main platform is pivoted a bell-crank, N, carrying a tightening-wheel, N', on the end of its horizontal arm, which rides on the belt L. The vertical arm of the bell-crank is connected by a rod, n', with a vertical lever, N^2, which is pivoted to a standard, and at its upper end is connected with a horizontal rack-bar, N^3, within convenient reach of the operator. There is also pivoted to the standard n a double bar, O, carrying tightening-wheels O' O^2, which are located above and below the belt M'. This bar O has a vertical arm, o, rigidly connected thereto, to which is pivoted a rod, o', connected with the lever N^2. This lever has a number of holes, o^2, for making connection with rods n' and o', so that such rods can be adjusted with relation to each other and the fulcrum of such lever. When the operator draws the rack-bar N^3 toward him, the belt L will be tightened and the belt M' will hang loose. The velocipede will then have a slow motion. By pushing the bar N^3 from him the operator can tighten the belt M' and loosen the belt L, and thus greatly increase the speed of the velocipede, without necessitating a quicker movement of the operating-lever; or, by locking the rack-bar N^3 at an intermediate point, both belts will be slack, and the balance-wheel and operating-lever can be stopped without stopping the machine. This last adjustment would be used in running down hill, allowing the operator to give all his attention to steering and to applying the brake.

The seat, P, for the operator is mounted on bars P', hooked into eyes on the head of the standards D. These bars are supported at their rear ends by a spring-hook, P^2, on a vertically-adjustable bar, P^3. By these means the seat-bars and seat can be readily removed, and the seat can be adjusted vertically to suit the operator. A bracket, p, rises from the standards D, and has a stationary spindle, p', on which is mounted the steering-wheel Q. This wheel is turned by handles Q', which are pivoted vertically to independent collars on the spindle p'. These handles engage with notches p^2 in the top edge of the wheel Q, and can be advanced independently from one notch to another, so that the operator can turn the wheel the desired distance with but little movement of the handles.

In front of the wheel Q is a vertical revolving spindle, Q^2, having a toothed wheel, q, which engages with holes q' in the wheel Q. The spindle Q^2 has a sprocket-wheel below the wheel q, which is connected by a chain, q^2, with a sprocket-wheel on a vertical shaft, R. This shaft R slides freely through a double-swiveled ring, r, supported on a level with the tops of the standards D, and at its lower end it is connected by a double-swiveled joint, r', with a pinion, r^2, (shown in dotted lines in Fig. 4,) which pinion is journaled on a stud secured to the center of the front platform, A'. The spindles that carry the front wheels, C C', are pivoted on the front platform, and carry segmental gears R' R^2, which engage with opposite sides of the pinion r^2. When the shaft R is turned the segments R' R^2 will be moved in opposite directions, and the velocipede will be steered in the desired direction without turning the front platform, A'. By mounting the steering-shaft R in the manner described, and operating it by a chain-connection, the front platform can turn on its swivel to conform with

the unevenness of the road, or in running over obstructions, so that neither the frame nor the mechanism will be strained thereby.

In turning curves, the driving-wheels B B′ having different rates of speed, one of them would drag, and thus retard the speed of the velocipede. To remedy this I provide means for disengaging the inside wheel from the axle in running around curves. Two collars, S, are feathered on the axle, one near each end, and have pins, which engage with holes in the hubs of the wheels. These collars are forced forward by spiral springs S′. They are retracted so as to disengage the wheels from the axles by rods S^2, having forked ends, which rest in grooves in the collars S. These rods project inwardly through the boxes *s*, which inclose the collars and springs, and are connected with levers *s′*, pivoted to the main platform. The free ends of the levers *s′* work against cams T, which have arms *t*, connected with the segments R′ R^2 by chains and rods *t′*. These cams are partly revolved by the forward movement of the segments, and they are drawn back to their first position by springs t^2. Now it will be seen that in turning a curve the segment of the inside forward wheel will move forward, and in doing so will turn the cam T on that side of the velocipede and disengage the inner rear wheel from the driving-axle. When the forward wheels are again turned, to guide the velocipede straight forward, the spring will throw the collar immediately outward, and the pins on the collar will engage with the holes in the wheel, so that the wheel, before disengaged from the axle, will be fixed thereto.

The velocipede is provided with a brake-lever, U, which is worked by the foot of the operator. This lever is pivoted in the main platform, and extends through the same to its under side, where it is connected by a chain, *u*, with an arm, *u′*, which arm is fixed to the spindle of the brake-arm U′. From the arm *u′* a chain, u^2, extends around a wheel, u^3, and then across the platform to an arm, u^4, on the other side. This arm u^4 is fixed to the spindle of the brake-arm U^2. A spring, u^5, throws the brake-shoes out of contact with the wheels when the brake-lever is released. By forcing down on the brake-lever the brake-shoes are forced against the wheels.

An alarm-bell, V, is mounted on the upper end of the shaft R. The hammer of this bell is carried by a lever, V′, which is pivoted to the frame and hangs down close to the side of the balance-wheel E. A pin, *v*, on the side of the balance-wheel strikes the lower end of the bell-lever V′ and rings the bell every time such balance-wheel revolves. To move the bell-lever out of the way of the pin *v*, I provide a notched bar, V^2, which is carried by a loop on one side of the spindle *p′* above the steering-wheel Q. The rack-bar N^3, for working the tighteners, is carried by a loop on the other side of the head of said spindle.

The working parts of the machine can be inclosed in a suitable casing, if desired, so as to be hidden from sight and protected from dust. At the rear the main platform can be extended and be provided with one or more seats for passengers and a place to carry baggage.

As shown and described, the velocipede has but one foot-lever for operating the same; but it is evident that the other end of the shaft *b* could be provided with a double ratchet-wheel, engaging with pawls operated and adjusted in the same manner as those at the other end of such shaft. To accommodate these additional parts it would be necessary to place the pulley M between the standards D.

What I claim as my invention is—

1. In a velocipede, the combination, with an operating-lever, of a pawl-and-ratchet driving mechanism worked by such lever, and a spring-lever connected with such operating-lever and with the ratchet-wheel, substantially as described and shown.

2. In a velocipede, the combination, with an operating-lever, of a pawl-and-ratchet driving mechanism worked by such operating-lever, and a spring-lever connected with the ratchet-wheel by a pitman, and with the operating-lever by a yielding connection, whereby the difference in motion will be taken up, substantially as described and shown.

3. In a velocipede, the combination, with an operating-lever, of a sliding frame worked by such lever and carrying double pawls, a double ratchet-wheel, and adjusting devices for throwing such pawls alternately into engagement with the ratchets, substantially as described and shown.

4. In a velocipede, the combination, with the double ratchet-wheel F, of the sliding pawl-frame F′, worked by the operating-lever and carrying pawls G G′, provided with arms *e*, and the pivoted adjusting-lever H, connected to such arms *e* on opposite sides of its center, substantially as described and shown.

5. In a velocipede, the combination, with the operating-lever I, of the sliding pawl-frame F′, carrying two pawls and means for adjusting them, the double ratchet-wheel F, and the spring-lever J, connected by pitman *i* with the ratchet-wheel, and by an arm, K, with the operating-lever, substantially as described and shown.

6. In a velocipede, the combination of the slow and fast belts L M′ with tighteners for tightening such belts alternately, substantially as described and shown.

7. In a velocipede, the combination, with the balance-wheel E, of a belt, L, encircling such wheel, and a pulley which is connected by a train of power-gearing with the driving-axle, a pulley, M, on the shaft of the balance-wheel, connected by a belt, M′, with a pulley on the driving-axle, and tighteners for tightening such belts alternately, substantially as described and shown.

8. In a velocipede, the combination, with the slow and fast belts L M′, of tighteners for both

belts, connected with a single lever, N^2, so that the movement of such lever will apply the tightness alternately, substantially as described and shown.

9. In a velocipede, the combination, with the slow and fast belts L M′, of the bell-crank N, carrying tightening-wheel N′, the bar O, having two tightening-wheels, O′ O^2, and arm *o*, the lever N^2, connecting-rods *n′ o′*, and the rack-bar N^3, substantially as described and shown.

10. In a four-wheel velocipede, the combination, with the main frame, of the front steering-wheels, having a swiveled connection with such main frame, whereby the steering-wheels and rear wheels can rock vertically independent of each other, substantially as described and shown.

11. In a four-wheel velocipede, the combination, with a main platform, of a front platform swiveled thereto, front steering-wheels mounted on independent spindles pivoted to such swiveled platform and carrying segmental gears, an intermediate pinion, and a vertical steering-shaft, connected to such pinion by a double-swiveled joint, substantially as described and shown.

12. In a four-wheel velocipede, the combination, with the front steering-wheels, C C′, mounted on independent pivoted spindles carrying swinging segmental gears R′ R^2, of the intermediate pinion, r^2, vertical steering-shaft R, chain q^2, spindle Q^2, steering-wheel Q, and handles Q′, substantially as described and shown.

13. In a four-wheel velocipede, the steering-wheel Q, mounted on a spindle and having a notched upper edge, in combination with the handles Q′, hinged to collars sleeved independently on the wheel-spindle, whereby the handles can be advanced independently on the steering-wheel, substantially as described and shown.

14. In a velocipede, the combination, with the driving-axle L′, of the driving-wheels B B′, fixed thereto by sliding spring-clutches S, the levers *s′*, connected with such clutches, the rotary cams T, working against the ends of said levers, and having arms *t*, the chains *t′*, connecting said arms *t* with the steering apparatus, and the springs t^2, for reversing the cams, substantially as described and shown.

15. In a velocipede, the combination, with the balance-wheel E, having pin *v*, of the bell V, the pivoted hammer-arm V′, hanging down into the path of the pin *v*, and the rod V^2, for throwing the hammer-arm out of the way of such pin, substantially as described and shown.

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Witnesses:
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