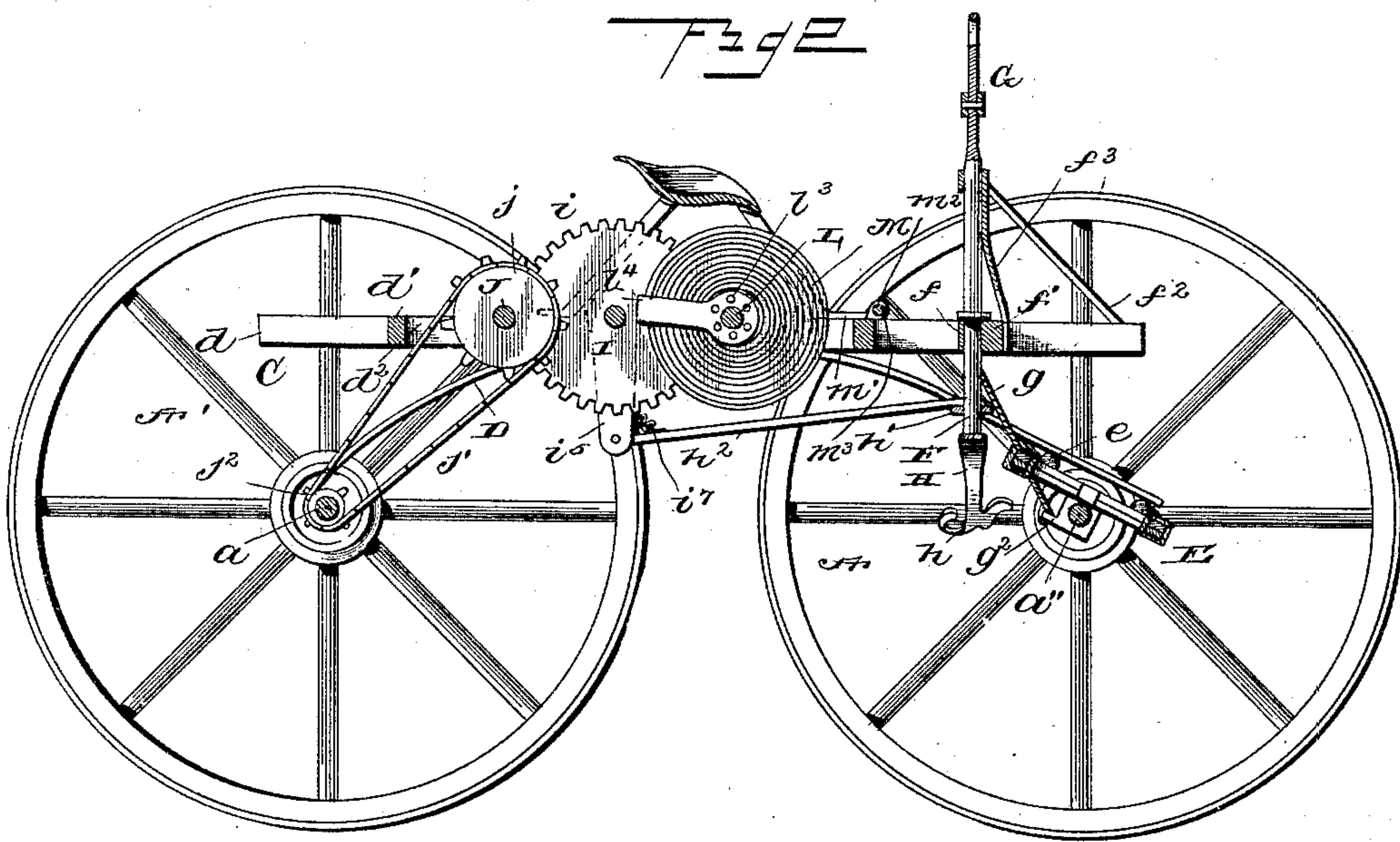
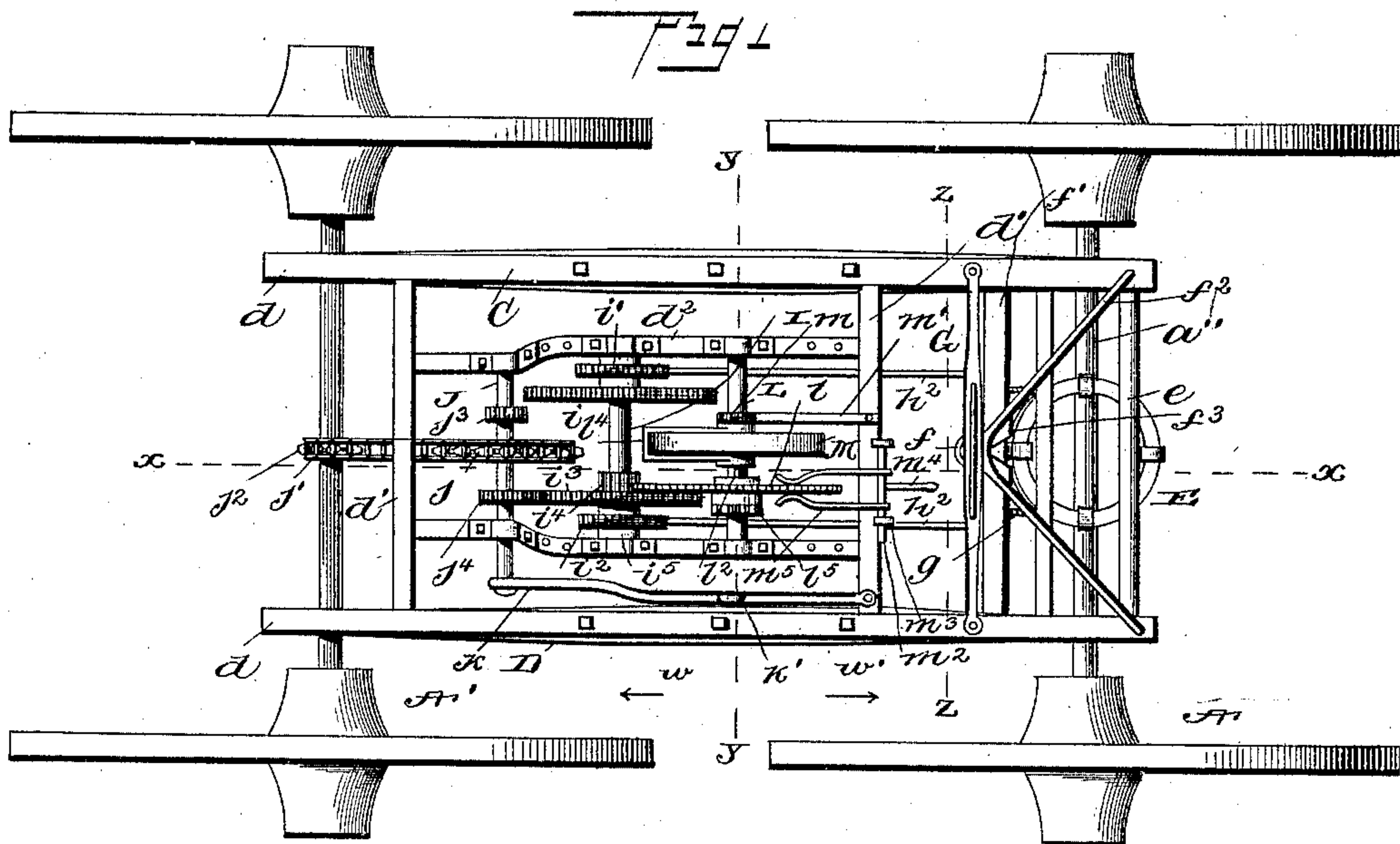


2 Sheets—Sheet 1.

No. 466,893.

Patented Jan. 12, 1892.



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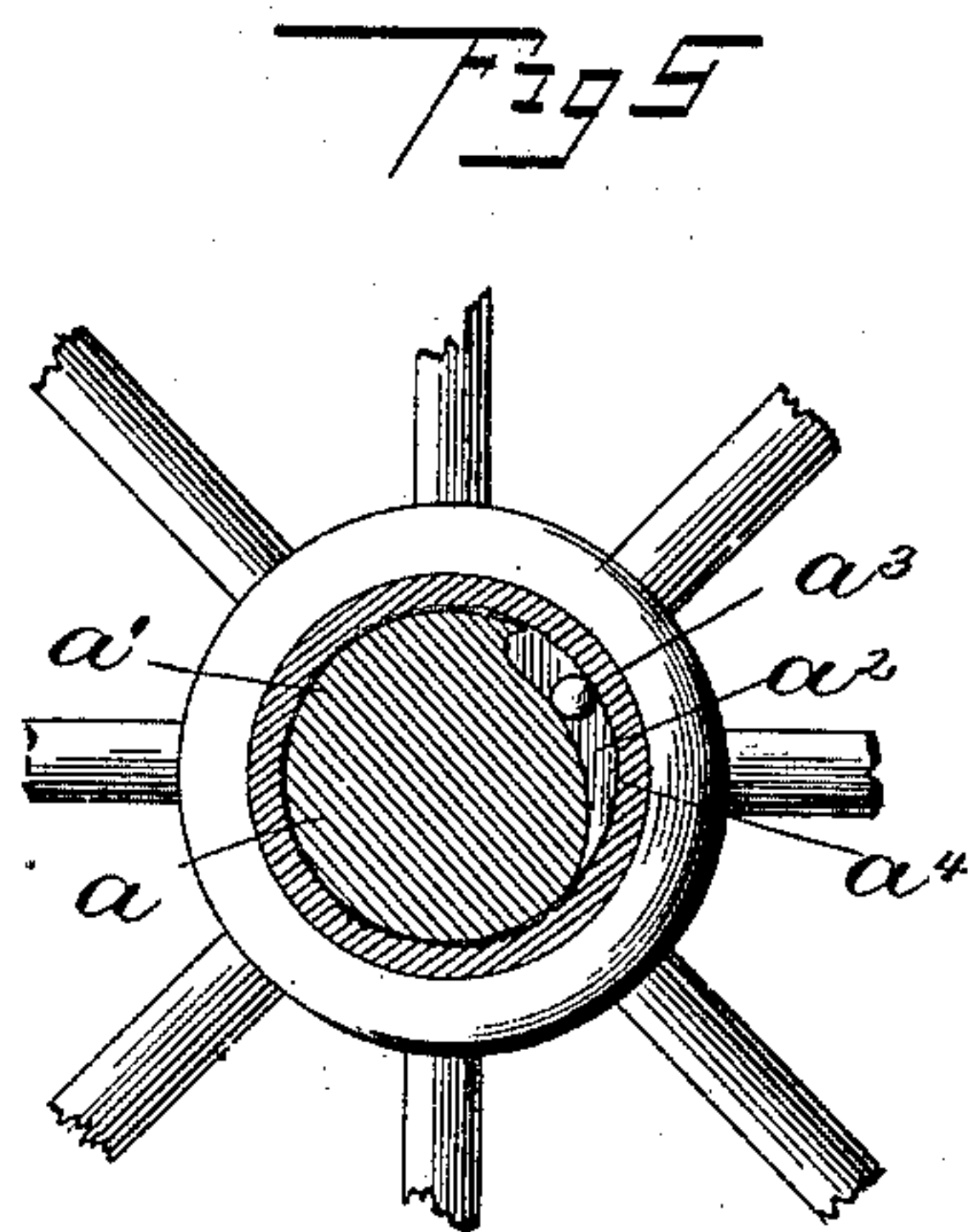
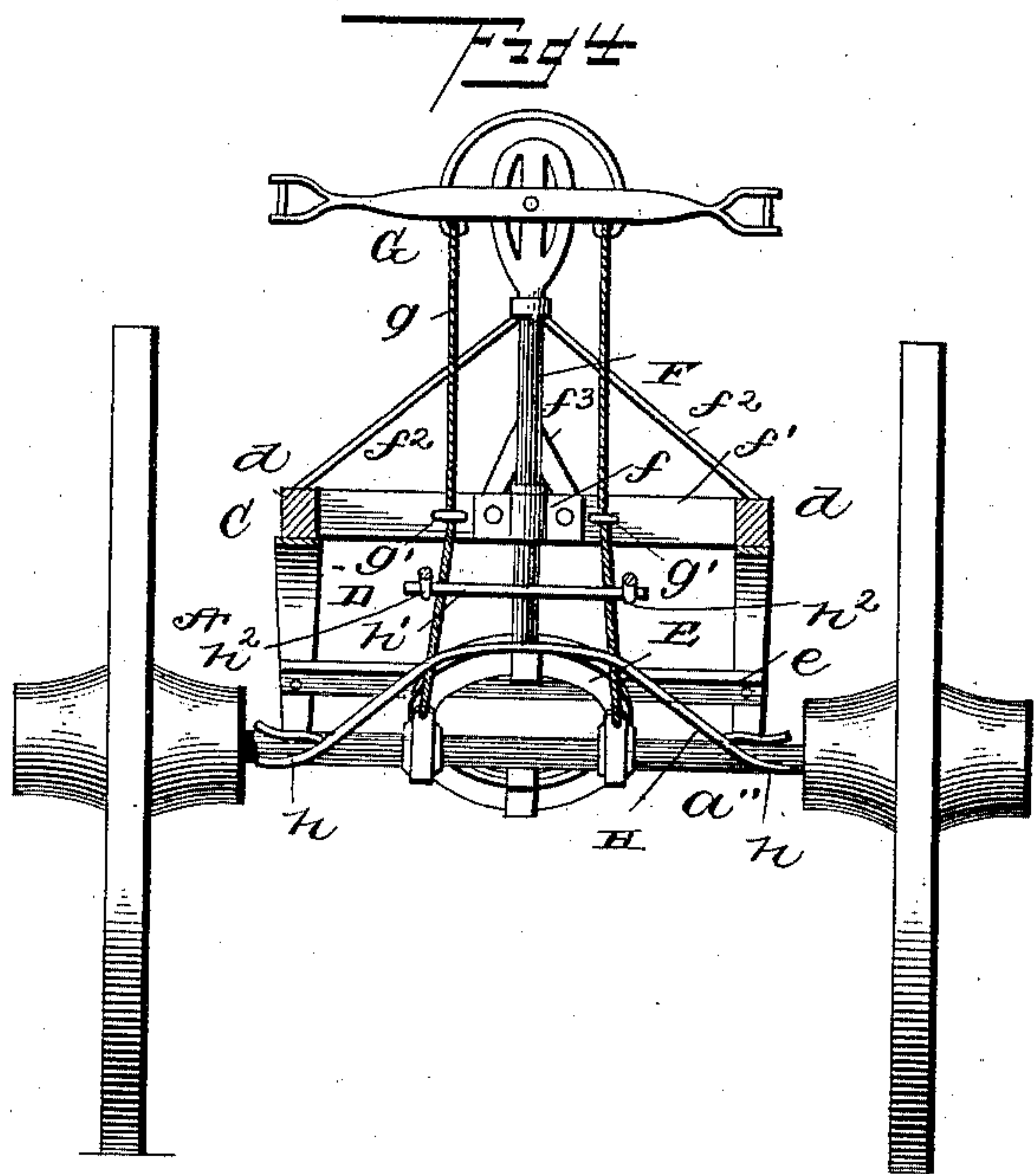
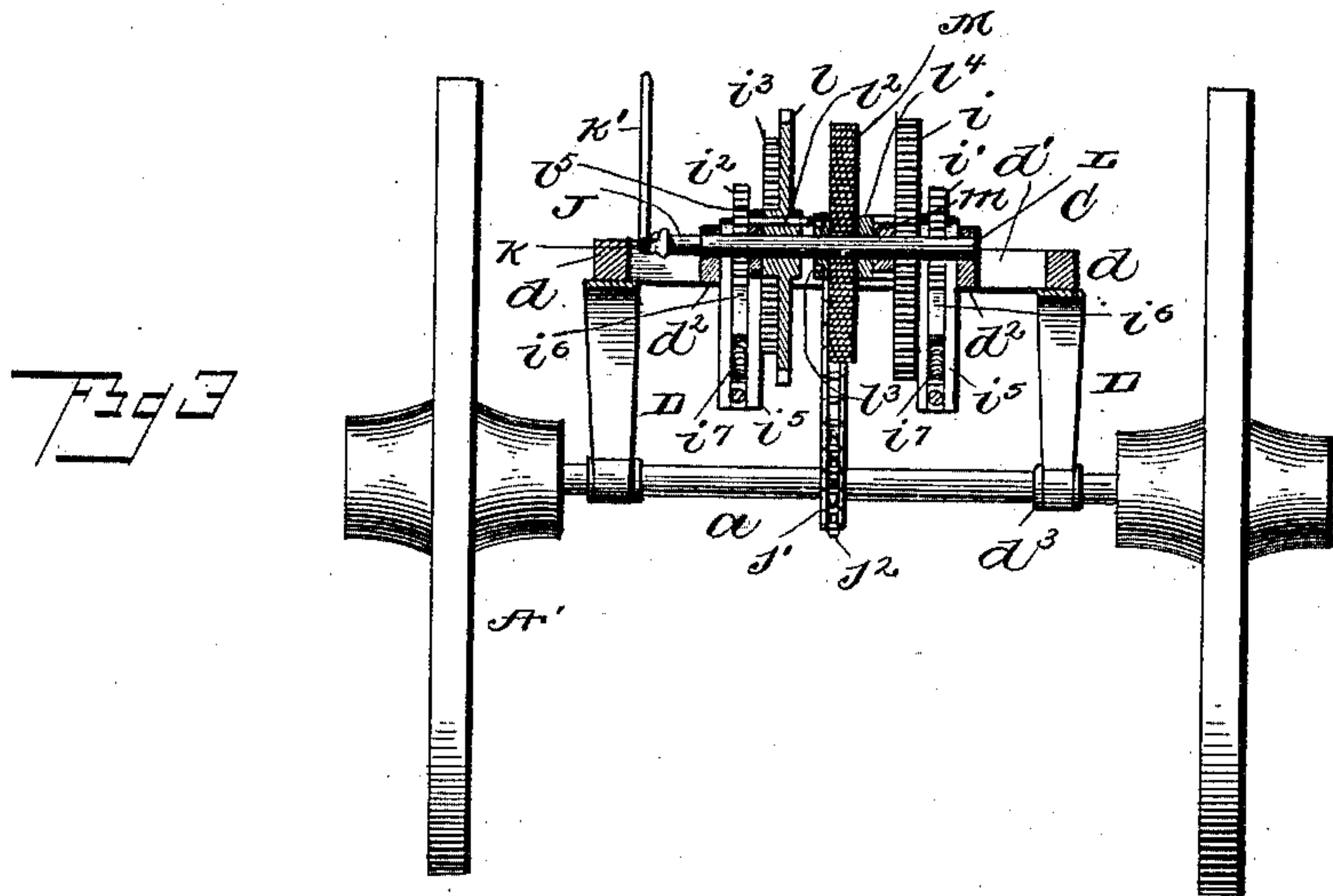
(No Model.)

2 Sheets—Sheet 2.

D. I. LYBE & W. O. NICKLES.  
VELOCIPÈDE.

No. 466,893.

Patented Jan. 12, 1892.



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# UNITED STATES PATENT OFFICE.

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## VELOCIPEDÉ.

SPECIFICATION forming part of Letters Patent No. 466,893, dated January 12, 1892.

Application filed August 10, 1891. Serial No. 402,287. (No model.)

*To all whom it may concern:*

Be it known that we, DANIEL I. LYBE and WILLIAM O. NICKLES, citizens of Iowa, residing at Sidney, in the county of Fremont and State of Iowa, have invented certain new and useful Improvements in Velocipedes; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in velocipedes, and has for its object the production of simple and highly efficient means whereby power is stored or accumulated while the vehicle is descending a hill, and the same is utilized in ascending an inclined plane or on level ground.

The invention comprises the detail construction, combination, and arrangement of parts, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view illustrative of our invention. Fig. 2 is a longitudinal sectional view thereof on the line  $x x$ , Fig. 1. Fig. 3 is a transverse sectional view on the line  $y y$ , Fig. 1, looking in the direction of the arrow  $w$ . Fig. 4 is a similar view on the line  $z z$ , Fig. 1, looking in the direction of the arrow  $w'$ . Fig. 5 is a cross-sectional view of one of the wheel-hubs, showing the ball-and-ratchet connection between the same and its axle.

Referring to the drawings, A A' designate the front and rear sets of carrying-wheels, the latter of which have their axle  $a$  provided near one end with a collar  $a'$ , wherein is formed a peripheral groove or recess  $a^2$ , the depth of which increases from its outer to its inner end. In this groove or recess a ball  $a^3$  is free to move, the same being designed to be engaged by a ratcheted surface  $a^4$  on the inner periphery of the hub  $b$  of one of the carrying-wheels, preferably the rear right-hand wheel. In revolving this wheel will bind the ball  $a^3$  down against the shoulder formed by

the inner end of the groove or recess  $a^2$ , and thus effect the conjoint turning of the axle and wheel.

C designates a supporting-frame, which comprises two longitudinal side bars  $d$ , two transverse bars  $d'$ , and two additional longitudinal bars  $d^2$ , connected to said transverse bars. To the under sides of longitudinal bars  $d$  are secured bent springs D, which at their rear ends are attached to axle  $a$  by means of a collar  $d^3$ , secured to said spring and encircling said axle. At their forward ends these springs are secured to the cross-bars  $e$  of a fifth-wheel E, the lower stationary plate of which is rigidly secured to the axle  $a''$  of the front carrying-wheels. By this arrangement the supporting-frame C can readily assume any position, and the front carrying-wheels and their axle are free to assume any angle with relation to said frame.

F is a vertical shaft supported by a box or casing  $f$ , rigidly secured to a cross-bar  $f'$  near the forward end of frame C. This shaft is additionally supported by inclined brace-rods  $f^2$ , secured to said frame C, and a forked plate  $f^3$ , secured to bar  $f'$ . To the upper end of this shaft F is pivotally secured a double handle-bar G, to which are secured ropes or chains  $g$ , which, after being passed through guide-loops  $g'$  of cross-bar  $f'$ , are connected to apertured plates  $g^2$ , projecting from the lower stationary plate of the fifth-wheel E. Thus by moving the double handle-bar G up and down at its ends the front carrying-wheels can be turned so as to guide the vehicle in any desired direction. To the lower end of shaft F is secured a bar H, which at its outer ends has foot-rests  $h$ , and just above this bar is a second shorter bar  $h'$ , to the ends of which are secured the forward ends of two parallel rods or pitmen  $h^2$ .

I designates a shaft journaled at its ends in boxes supported upon the longitudinal bars  $d^2$  of frame C. Upon this shaft is secured a gear-wheel  $i$ , adjacent to which is a ratchet-wheel  $i'$ , and a similar ratchet-wheel  $i^2$  is secured upon said shaft near the other end thereof. A second gear-wheel  $i^3$  is also secured on this shaft I, and adjacent thereto is a pinion  $i^4$ . On each side of ratchet-wheels



$i' i^2$  are the upper ends of parallel arms  $i^5$ , between which arms are pivotally-mounted pawls  $i^6$ , which are normally held in contact with the respective ratchet-wheels  $i' i^2$  by coil-springs  $i^7$ , secured thereto and to rods or pitmen  $h^2$ , which latter are secured to the lower ends of arms  $i^5$ . By moving the double handle-bar G back and forward or the foot-bar H in a similar manner the revolution of shaft I is accomplished.

J designates a movable shaft mounted at its ends in journal-boxes attached to the frame-bars  $d^2$ . Upon this shaft is secured a sprocket-wheel  $j$ , around which is passed a chain  $j'$ , which also encompasses a sprocket-wheel  $j^2$ , secured centrally upon the rear axle  $a$ . Upon this shaft are also secured large and small gear-wheels or pinions  $j^3 j^4$ , which are respectively designed to be engaged either with gear-wheel or pinion  $i^3$  or  $i$ , according as it is desired to impart a rapid or slow motion to the machine. The shifting of shaft J so as to secure this change of speed is accomplished by a rod  $k$ , secured to one end of said shaft and at its other end connected to cross-bar  $d'$  of frame C. This rod is provided with a handle  $k'$  within convenient reach of the operator.

From what has been said it will be seen that by turning shaft F horizontally through the agency of the handle-bar or foot-bar the mechanism is set in motion and the machine is driven forward through the agency of the sprocket-chain connection with the rear axle, a fast or slow motion being obtained, according to the position occupied by shaft J and its pinions.

We will now proceed to describe the mechanism by which a reservation of power is secured.

L designates a shaft journaled at its ends in bars  $d^2$ , and upon this shaft is loosely secured a gear-wheel  $l$ , whose hub  $l'$  is provided with a lug or stud  $l^2$ , extending beyond both sides thereof and designed to be projected into any one of a series of holes or apertures  $l^3$  in the enlarged circular end of a U-shaped plate or bracket  $l^4$  or into any one of a series of grooves or notches of a wheel  $l^5$  on said shaft. This shaft L is extended through both ends of the plate or bracket.

M is a spiral or coil spring, the inner end of which is secured to shaft L and its outer end is connected to plate or bracket  $l^4$ . Wheel  $l$  is designed to engage with pinion  $i^4$  of shaft I and thus effect the turning of said shaft and the winding of the spring, and also in this way impart motion to the operating mechanism from the spring in the unwinding thereof. The lug or stud  $l^2$  is placed in engagement with wheel  $l^5$  to effect the winding of the spring, and is thrown into any one of the holes or apertures  $l^3$  when the power of said spring is to be utilized in driving the vehicle. To the outer end of plate or bracket  $l^4$  is secured a ratchet-wheel  $m$ , with which engages a pawl or arm  $m'$ , which is pivotally mounted

at its outer end upon bar  $d'$  of frame C. This pawl prevents the shaft L from moving in the wrong direction.

$m^2$  is a rock-shaft mounted in boxes  $m^3$  on bar  $d'$ , and to this rock-shaft is secured an operating-handle  $m^4$ . Two arms  $m^5$  are also secured to this rock-shaft, and the same encompass the opposite sides of the loose gear-wheel  $l$  and enable the latter to be shifted in the desired direction. The lug  $l^2$  being thrown into engagement with wheel  $l^5$  when the velocipede descends a hill, the coil-spring will be wound up on its shaft, and in ascending a hill, when said lug  $l^2$  is thrown into engagement with the apertured ends of plate or bracket  $l^4$ , the unwinding of the spring will impart sufficient power to drive the velocipede forward.

We claim as our invention—

1. The herein-described improved velocipede, comprising the carrying-wheels and their axles, the frame mounted on said axles, the sprocket-wheel secured on the rear axle, the vertical shaft capable of being moved horizontally, the driving-shaft connected with said vertical shaft, having gear-wheels, and the movable shaft also having gear-wheels capable of imparting different motions to the machine and having a sprocket-wheel, and a sprocket-chain encompassing said wheel and said former sprocket-wheel, substantially as set forth.

2. In a velocipede, the combination, with the carrying-wheels and their axles, of the supporting-frame and springs secured thereto and connected at their rear ends to the rear axle, and the fifth-wheel having its lower plate rigidly secured to the front axle and its movable plate connected to said springs, substantially as set forth.

3. In a velocipede, the combination, with the carrying-wheels and their axles, of the supporting-frame, the springs secured thereto, the fifth-wheel having its lower plate rigidly secured to the forward axle, the vertical shaft, the pivoted rack-bar secured to said shaft, and the chains or straps connected thereto and to said fifth-wheel, substantially as set forth.

4. In a velocipede, the combination, with the carrying-wheels and their axles, the rear one of which has a central sprocket-wheel, of the supporting-frame, the vertical shaft capable of horizontal movement and provided with an upper double handle-bar and a lower foot-bar, the main operating-shaft having ratchet-wheels, the spring-held pawls engaging therewith, the arms or plates carrying said pawls, the rods or pitmen connected to said arms or plates and to said vertical shaft, and the shaft engaged by said operating-shaft and having a sprocket-chain leading to said sprocket-wheel on the rear axle, substantially as set forth.

5. In a velocipede, the combination, with the carrying-wheels and their axles, the rear one of which has a central sprocket-wheel, of



a supporting-frame, the vertical shaft capable of horizontal movement and provided with operating-bars, the main operating-shaft having ratchet-wheels and large and small gear-wheels, the arms or plates carrying spring-held pawls engaging said ratchet-wheels, the rods or pitmen connected to said arms or plates and to said vertical shaft, the rear movable shaft having a sprocket-wheel and large and small pinions designed to engage said former gear-wheels, the sprocket-chain encompassing said sprocket-wheel and the sprocket-wheel on the rear axle, and the rod secured to said movable shaft for moving the same, substantially as set forth.

6. In a velocipede, the combination, with the operating mechanism, of a shaft having a coil-spring secured thereto, a wheel fast on said shaft having grooves or notches, a plate or bracket encompassing said spring and having a series of holes or apertures in one end, and a loosely-secured gear-wheel having a lug or stud designed to be projected into any one of said holes or apertures and to engage said grooved or notched wheel, said gear-wheel

engaging said operating mechanism, as set forth.

7. In a velocipede, the combination, with the operating mechanism, of the shaft, the coil-spring secured thereto at one end, the plate or bracket to which the other end of said coil-spring is secured, the ratchet-wheel secured to one end of said plate or bracket, the pawl or arm engaging therewith, the wheel fast on said shaft, having grooves or notches, the loosely-secured gear-wheel designed to engage with said plate or bracket and to also engage with the operating mechanism and with said grooved or notched wheel, the rock-shaft, the arms projecting therefrom, and the operating-bar secured to said rock-shaft, substantially as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

DANIEL I. LYBE.  
WILLIAM O. NICKLES.

Witnesses:

J. F. BARTHOLOMEW,  
H. CALVERT.