

(No Model.)

J. S. COPELAND.

5 Sheets—Sheet 1.

VELOCIPÈDE.

No. 391,947.

Patented Oct. 30, 1888.

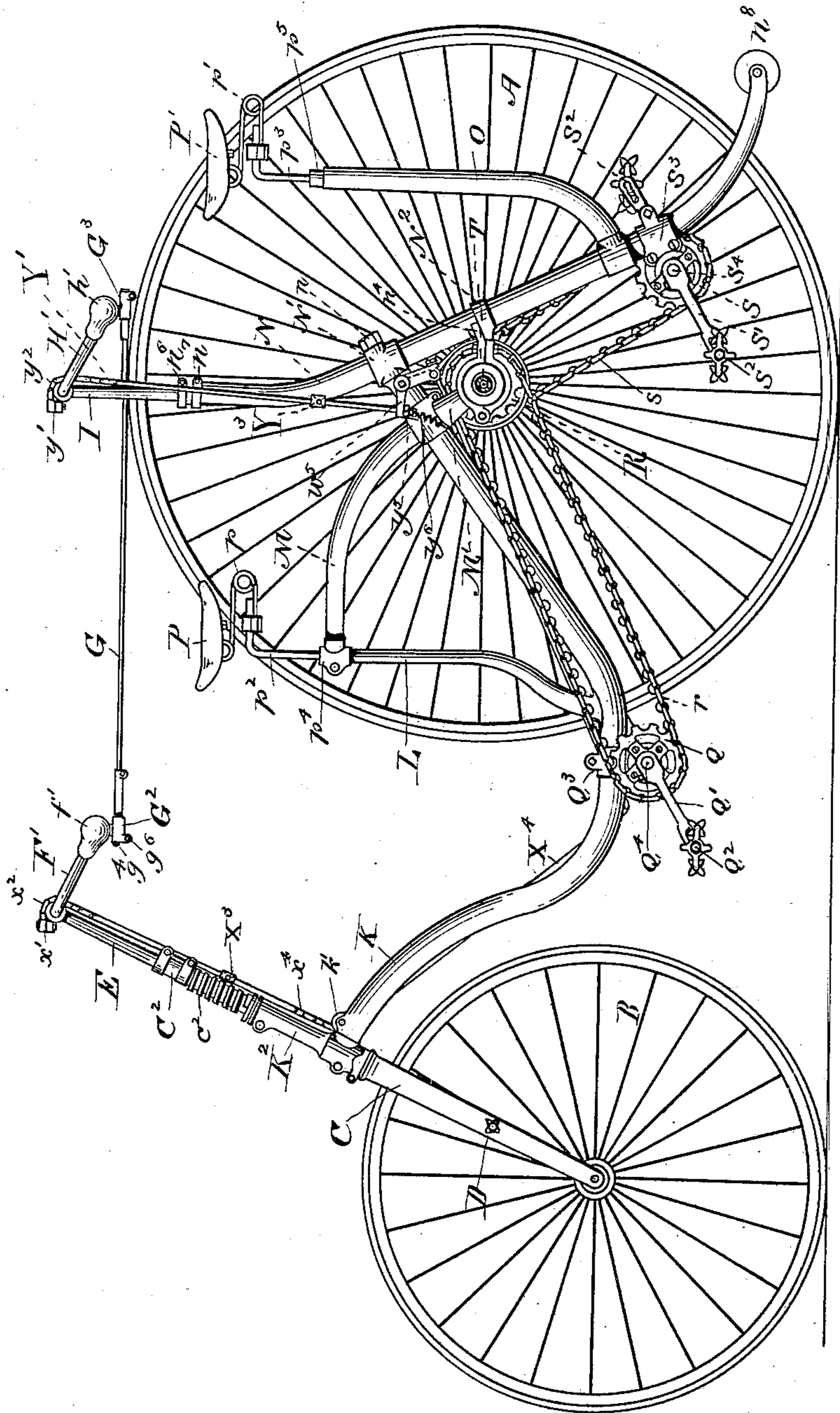


FIG. 1.

WITNESSES.

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G. F. Kew.

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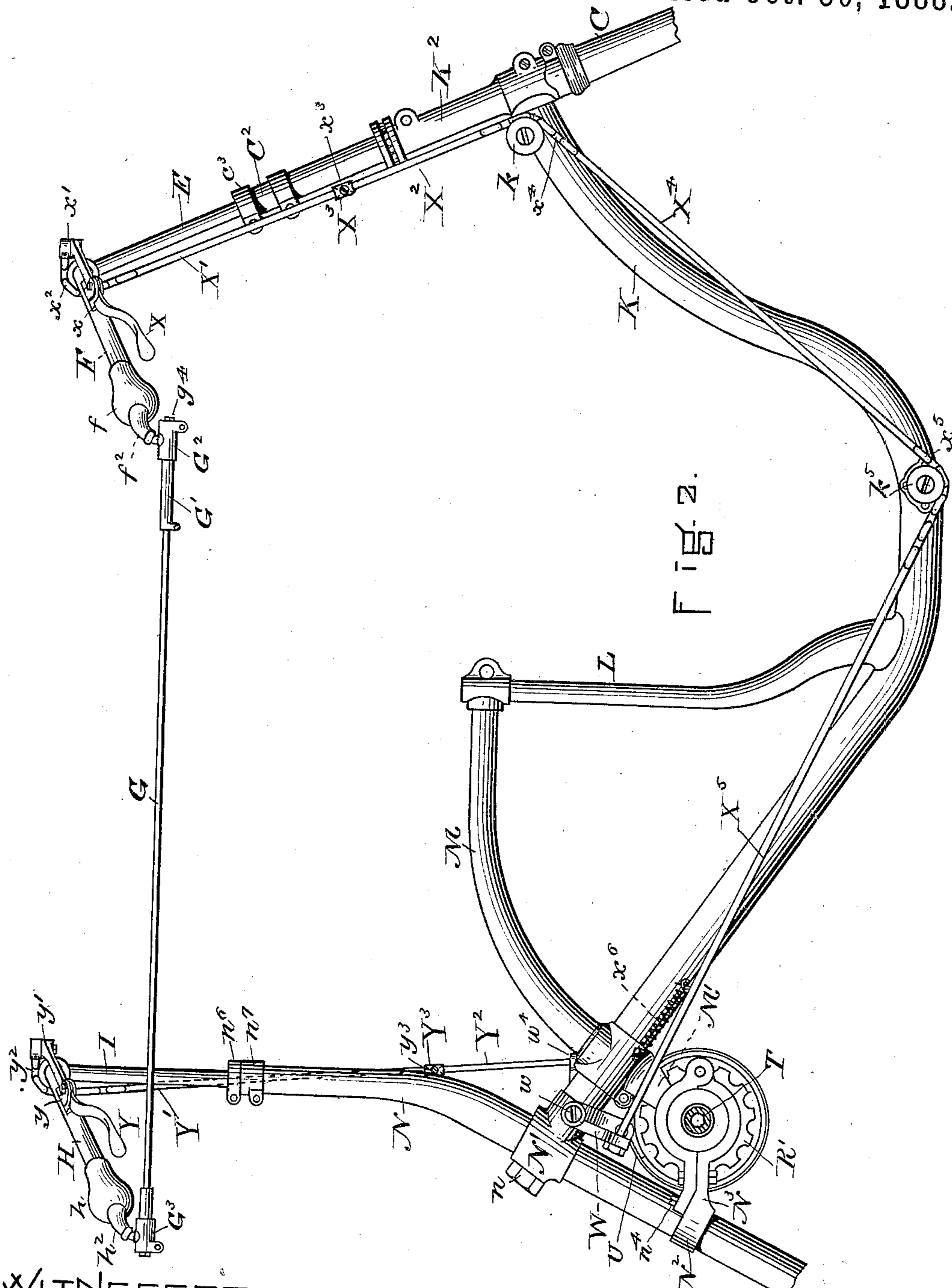


FIG. 2.

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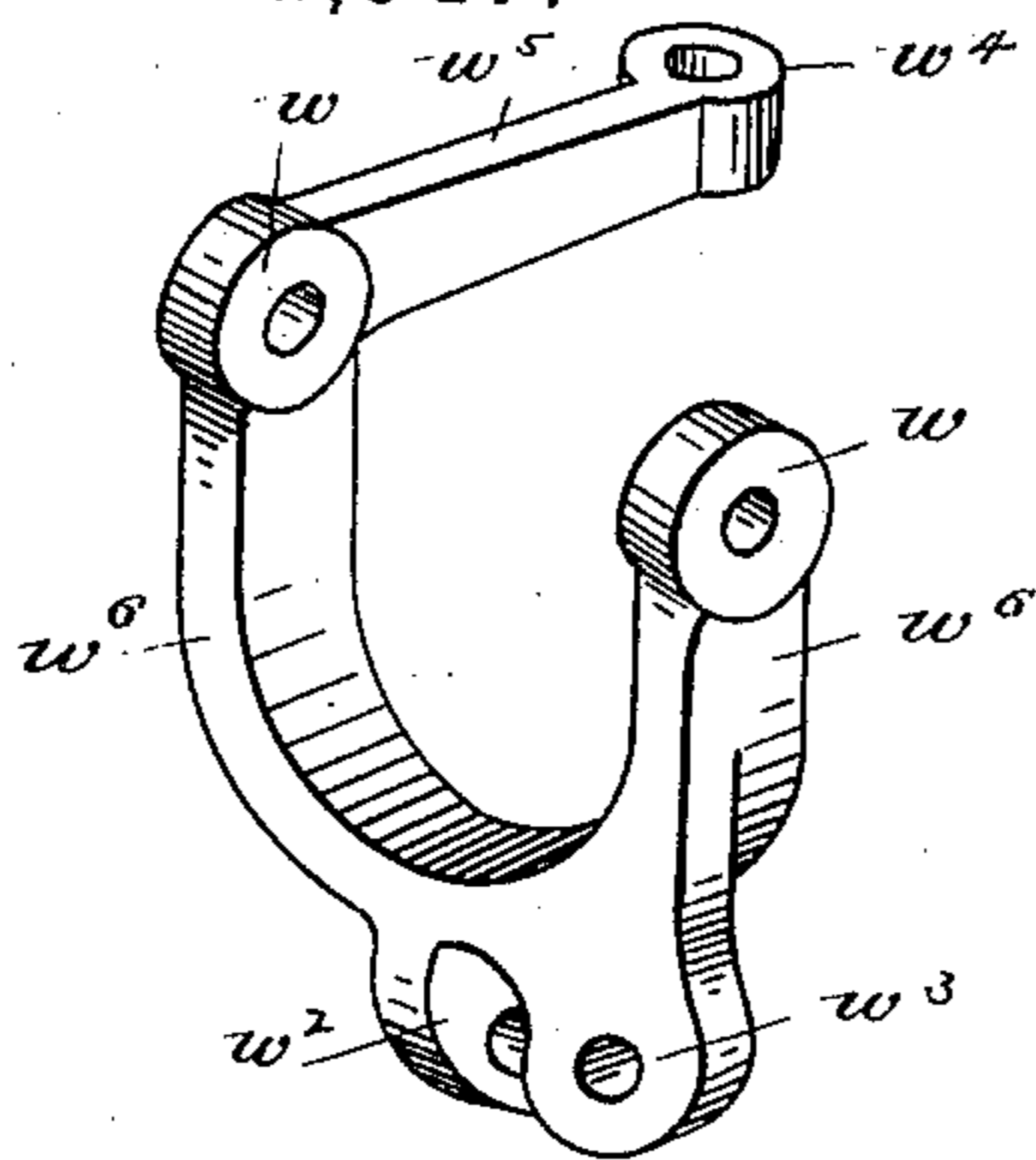


Fig. 4.

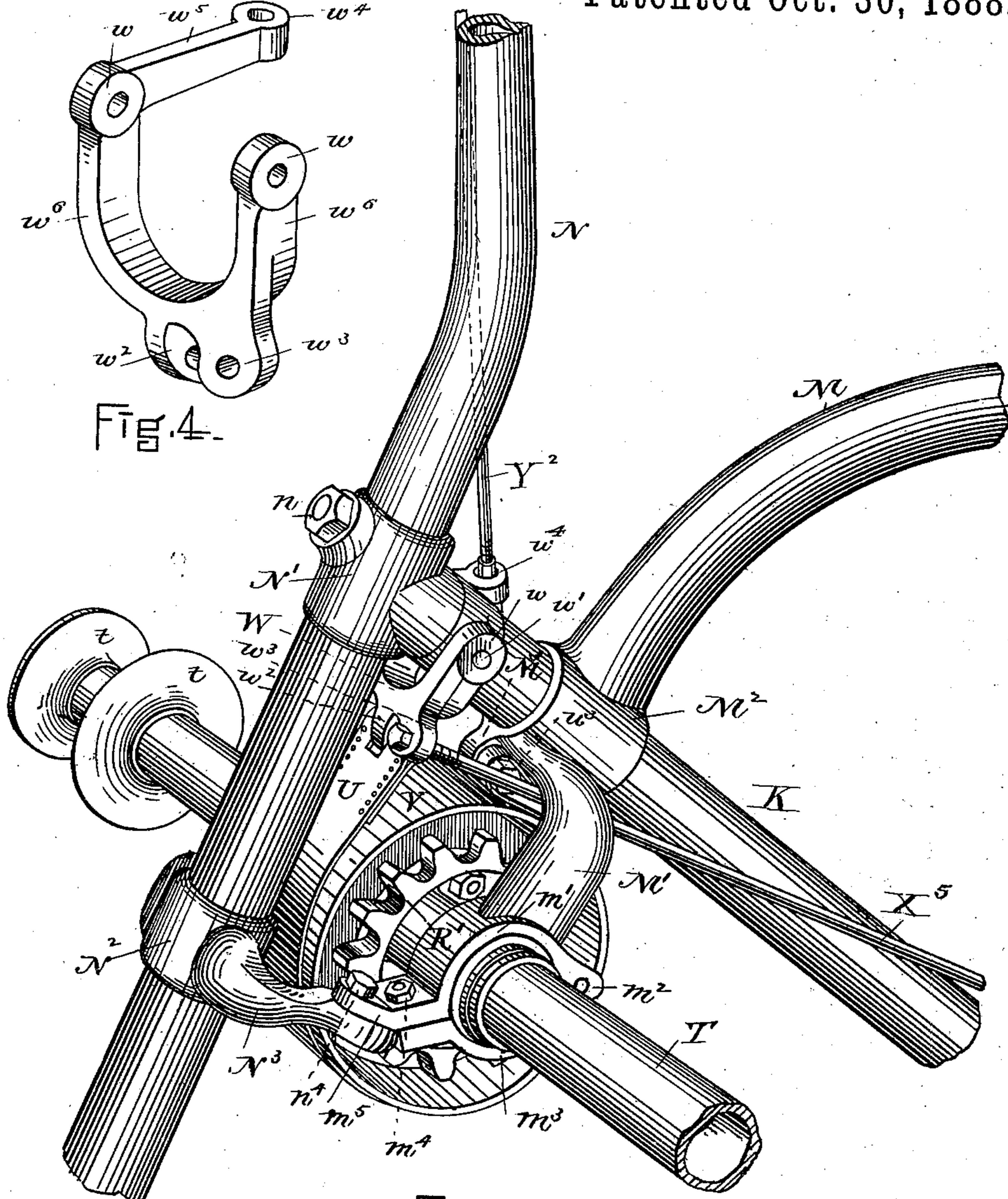


Fig. 3.

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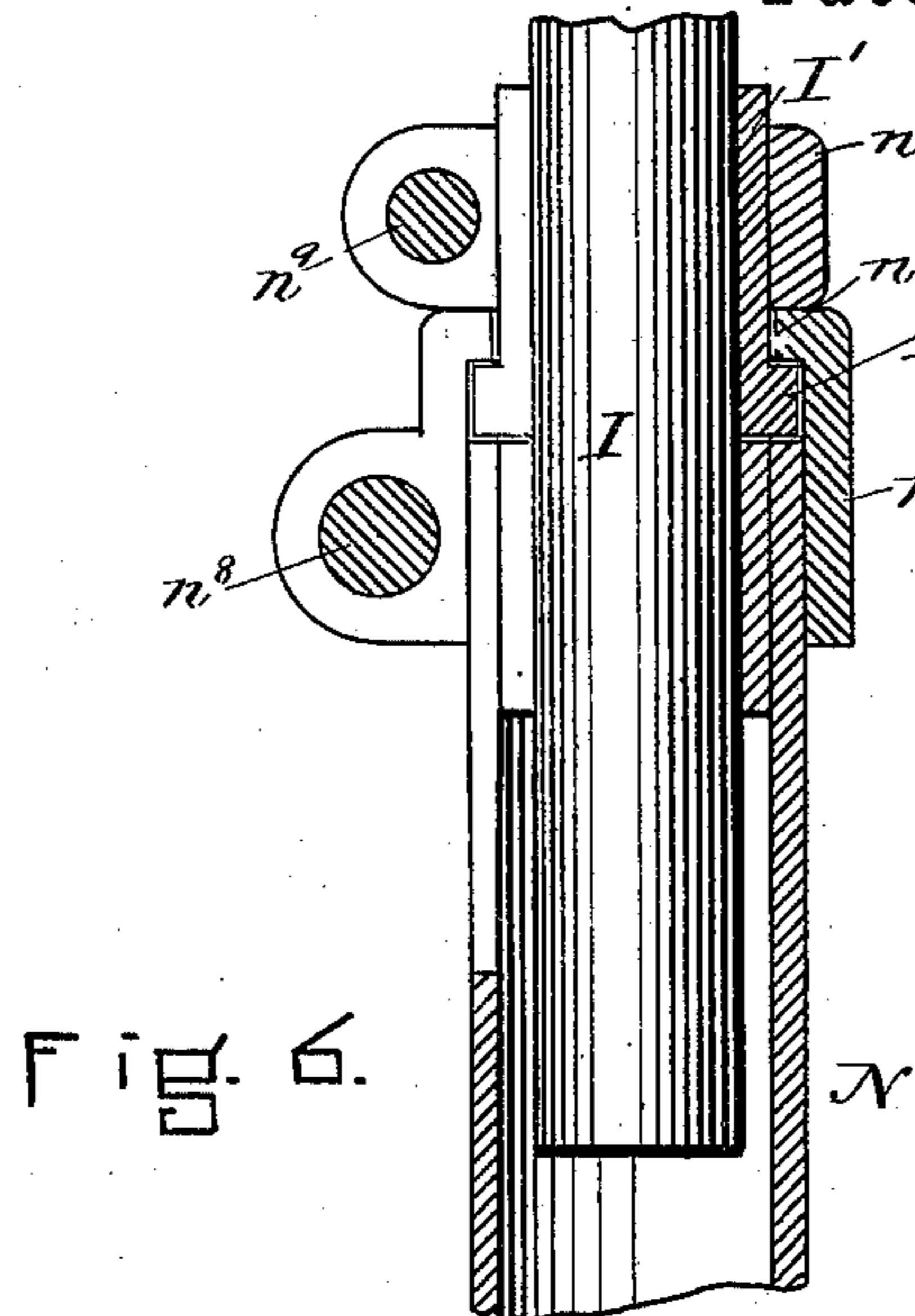


Fig. 6.

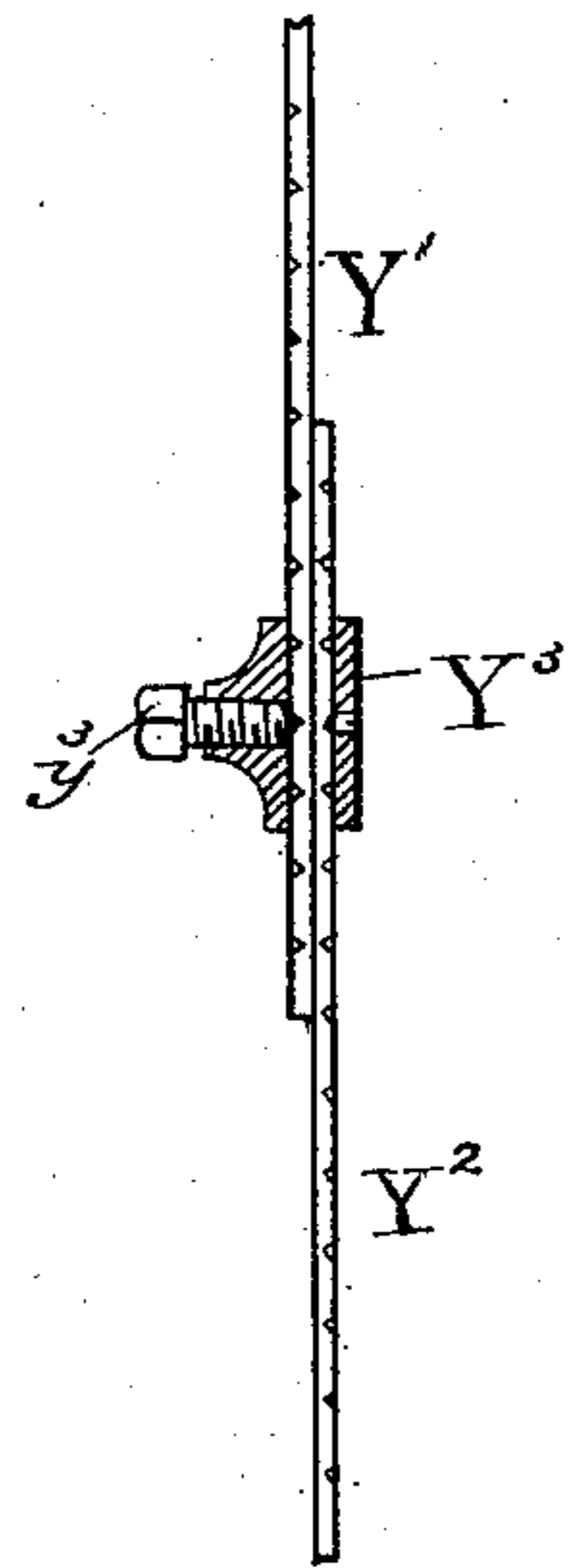


Fig. 7.

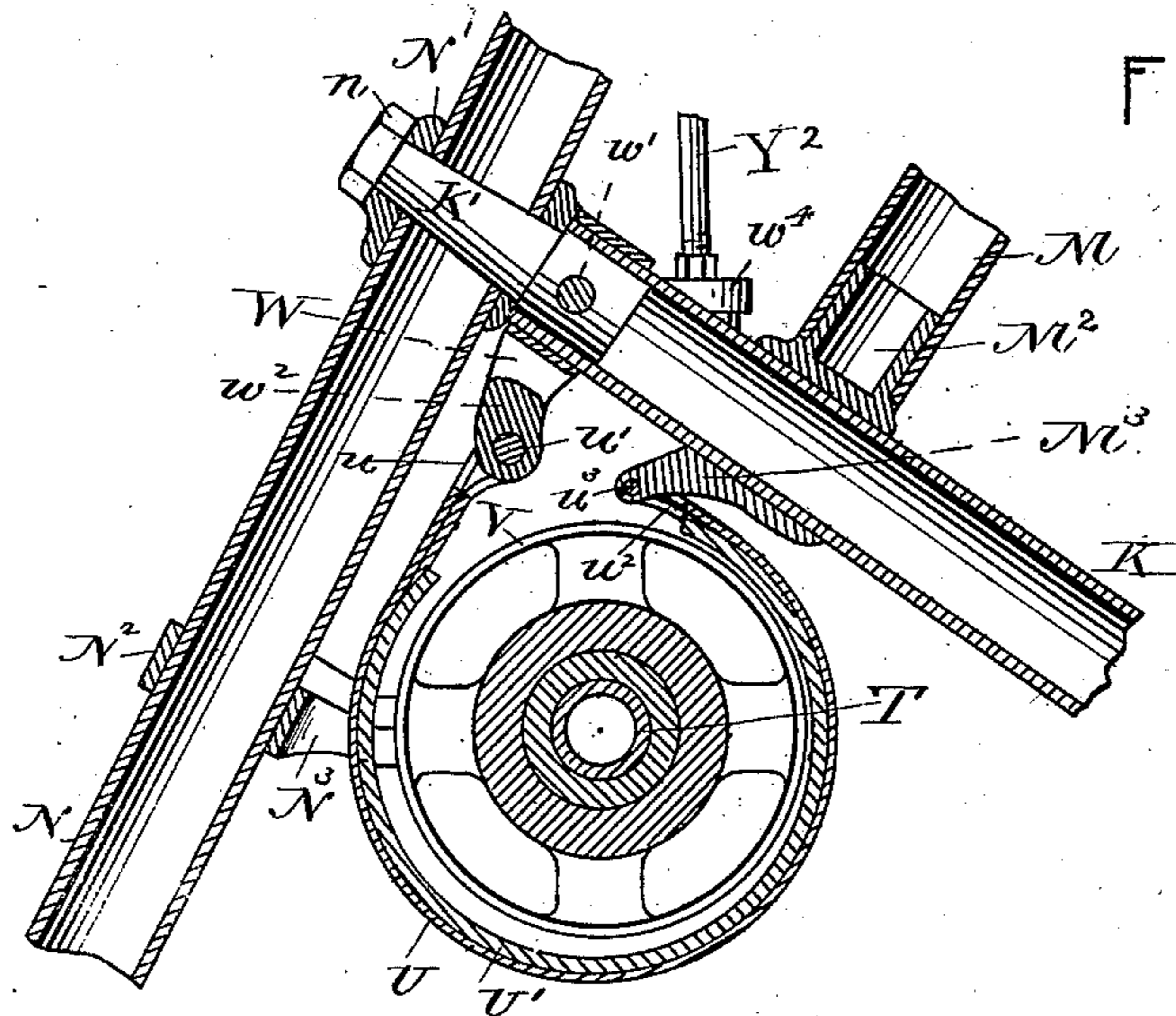


Fig. 5.

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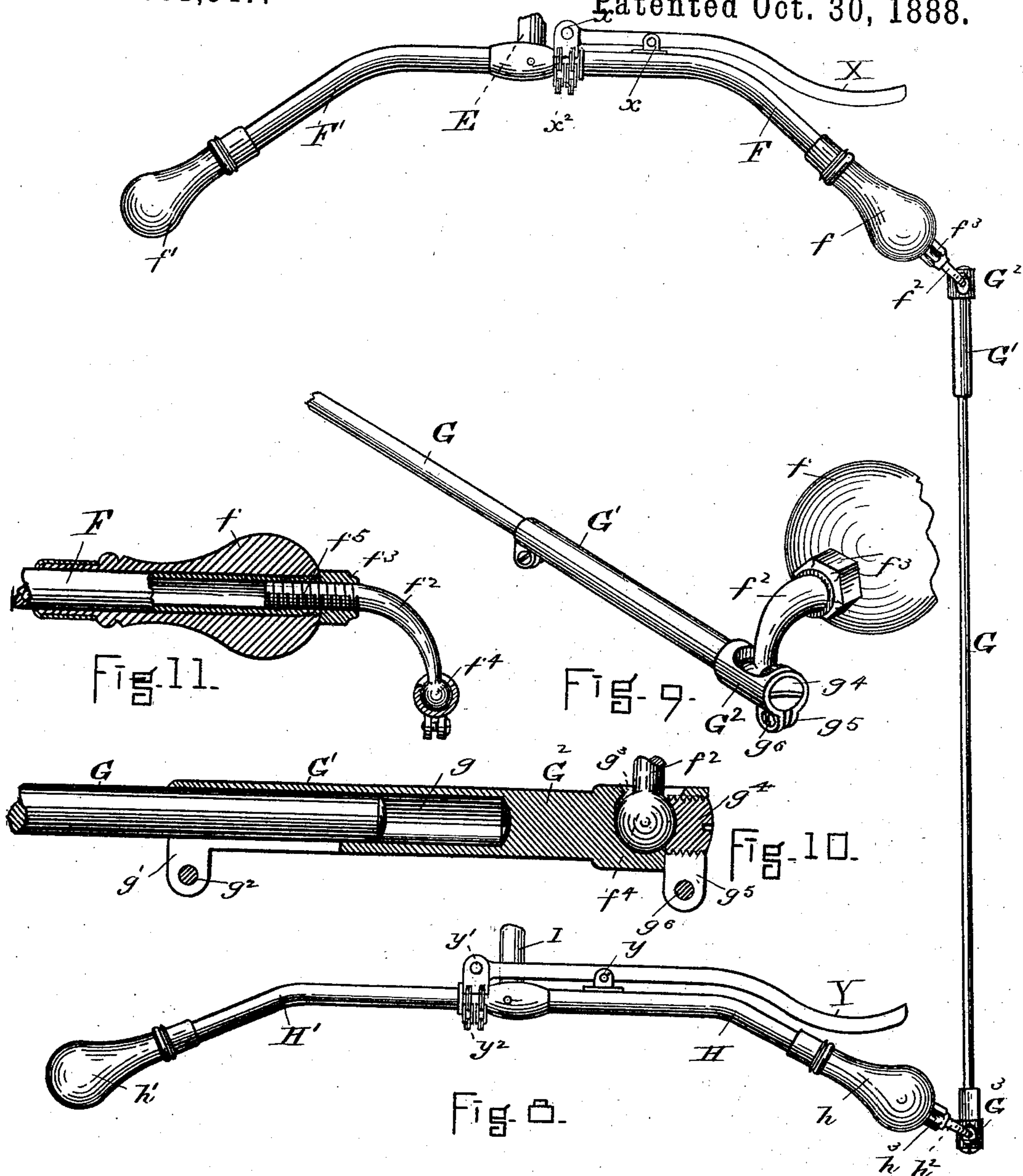
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WITNESSES.

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UNITED STATES PATENT OFFICE.

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VELOCIPEDÉ.

SPECIFICATION forming part of Letters Patent No. 391,947, dated October 30, 1888.

Application filed November 23, 1887. Serial No. 255,956. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. COPELAND, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Velocipedes, of which the following is a specification.

My improvements relate more particularly to that class of velocipedes known as "tricycles," and especially to the construction of a tandem tricycle, or a tricycle adapted for the use of two riders; and the objects of my improvements are to produce a practical and efficient tandem tricycle adapted for the use of one or two or more riders, and also a convertible tandem—that is to say, a tricycle which can be changed readily by the rider from a tandem into a single tricycle adapted for one rider only—and also to produce a tandem tricycle in which the steering may be effected through proper mechanism by either one or both riders, and also a tandem tricycle in which a strong and efficient brake may be operated by either one or both riders, and also a tandem tricycle which shall be a front-steerer—that is, have the guiding-wheel in front—and at the same time be adapted for ladies' use, and also a tandem tricycle in which the steering may be effected by either or both riders by means of handle-bars arranged in front of either or both riders after the manner of bicycle-steering mechanism, and also to provide certain other advantages of manufacture, use, and operation, which will be apparent from the following description and from the accompanying drawings, which exhibit my improvements applied in a convertible tandem, front-steering, handle-bar guiding, double-steering, and double-brake action tricycle.

Figure 1 shows in side elevation from the left-hand side of the machine the front wheel, one main driving-wheel, frame, and other parts of a tandem tricycle, the main axle being shown in vertical section on a plane between the left-hand main driving-wheel and the frame, and said left-hand driving-wheel and balance-gear mechanism not being shown. Fig. 2 shows, also, in side elevation from the right-hand side of the machine the handle-bars and part of the frame and connections of the same machine. Fig. 3 shows in perspective a portion of the frame-work adjacent to

the middle part of the main axle; and Fig. 5 shows the same parts as Fig. 3, but in vertical longitudinal section. Fig. 8 shows in top plan the handle-bars and connections; and Figs. 4, 55 6, 7, 9, 10, and 11 show details of construction, as will be more fully explained in the following description.

A is a main driving-wheel on a main shaft, T, and B is a guiding-wheel held between the steering-fork arms C C.

D is a foot-rest, one of which may be arranged on either side the steering fork for resting the front rider's foot in coasting.

C² is an extension of the steering head or spindle connected rigidly with the fork C.

E is a handle-bar supporting-rod held adjustably by a clamp, c³, in the extension C².

To the upper end of the supporting-rod E are attached the handle-bars F F', which may be in one continuous piece or otherwise constructed and attached to the supporting-rod in any desirable manner, so that when the handle-bars F F' are vibrated about the axis of the support E the wheel B will be accordingly deflected.

f f' are handles, and similar handles, h h', are on the handle-bars H H', supported upon the rod I, these parts being constructed substantially as the corresponding parts, F, F', and E. The rod I is supported so as to be vertically adjustable in the tubular arm N of the frame.

To the outer end of the handle f, or preferably to the end of the handle-bar F, on one side of the machine, I attach, as shown in vertical section in Fig. 11, a neck, f², threaded as at f³, and secured by a nut, f³, and having at its outer end a ball, f⁴. This ball f⁴ is held freely in a socket, G², on the end of a connecting-rod, G G'. To the other handle-bar, H, I attach in a similar manner a neck, h², which is held by a ball similar to f⁴ in a socket, G³, similar to G², and attached to the other end of the connecting-rod G. I make the connecting-rod G in two parts, G and G', the latter being hollow or having a cavity, as g, and a split lug, as g', and screw or bolt, as g², so that the connecting-rod may be extensible or contractible for adjustment to a correct distance between the handles f and h for a parallelism of the handle-bars, and I also make the socket G² or G³ with a cavity, as g³, to hold the ball f⁴, and

an opening in one side of the socket substantially of the same diameter as the ball to allow its being freely inserted and removed, and with a cap, g^4 , threaded into the end of the socket-piece G^2 and bearing on its inner end a complementary portion of the seat for the ball f^4 , and also with a split lug, g^5 , and screw or bolt g^6 , for securing the screw-cap g^4 in position when it has been adjusted. When the ball f^4 has been inserted in the cavity g^3 , the screw-cap g^4 is screwed inward until the ball f^4 is adjusted to a free but secure seat in the socket. Then the screw g^6 is tightened and all parts are held together. The socket g^3 is constructed in a similar manner, and it is obvious that when the two handle-bars F and H are connected in this manner any movement of one about the axis of its support will cause a corresponding movement of the other. It is also obvious that by this construction of connecting-rod, sockets, balls, and necks, and extensible device in the connecting-rod not only universal joints and parallel motion of the handle-bars are obtained when they are in the same plane, but also that either handle-bar may be raised or lowered without raising or lowering the others, to adapt it for different heights of riders, and still the connecting mechanism be correctly adjusted to preserve and transmit the proper motion of the parts in any different plane, and that thus the steering of the tricycle may be effected equally well by either the forward or the rearward rider, or by both simultaneously.

The main frame of this tricycle is tubular in construction, and consists of a reach, K , which extends from a position substantially midway over the main axle by an inclination downward and forward, and then upward over the steering-wheel, as shown in the drawings, this shape of the reach adapting it to receive connections with the forward pedal and driving mechanism near its middle part in such a position as to permit a lady to ride on the forward seat of the machine without obstruction to her dress. The frame further consists of a nearly upright tubular column, L , and brace M , affording a support for the forward seat, and also the arms $M' M'$ for support, by main bearings upon the main axle, and also of the back reach, N , which affords at its upper end a support for the rear steering mechanism, and at its lower end comes within a few inches of the ground by a backward inclination and curve terminating in a pulley, n^8 , to prevent the machine from tipping over backward when the forward wheel is raised, and also of the rear pillar, O , which affords a support for the rear seat. The forward end of the reach K is attached to a socket, K^2 , which has bearings on the steering-head, spindle, and extension O^2 , and the construction of the steering-head and socket and spring and other connections with the steering-wheel and the forward handle-bars, which I prefer is substantially the same as shown in my application Serial No. 229,134, filed February 28, 1887, for a patent thereon,

and need not be more particularly described here, since it is obvious that any well-known suitable construction of steering-head mechanism may be used in a machine having my present improvements.

The upright L and the brace M may be attached together and to the reach K by brazing or by lugs, or in any well-known manner; but I prefer to attach the rear end of the brace M by means of a forged or cast bracket, M^2 , having a tenon to receive the tubular brace M , a sleeve part to inclose the reach K , a lug, M^3 , for attachment of part of the brake mechanism, and two arms, $M' M'$, for carrying the main bearings on the main shaft—one on either side of the sprocket-wheels and brake-drum at the middle portion of the main axle. I attach the reach K to the back reach, N , by means of a forged or cast lug, N' , on the back reach, N , and a tapered tenon, K' , secured to the reach K and extending through the back reach, N , and its bracket N' , and secured there by a nut, n .

Near the middle of the compound main axle T , I mount two sprocket wheels, $R R'$, and a brake-drum, V , and each side of these one of the arms M' is supported by a hinged case, $m' m^2 m^3$, about a bearing, which I prefer to make an anti-friction ball-bearing, and is held thereon by means of the bolt m^4 . The upper half of the case m' , I extend backward, so as to form a lug, m^5 , on each side for the attachment of the arm N^3 on the back reach. In Fig. 3, $t t$ are the hub-flanges of a main driving-wheel on the main shaft.

In the construction of this tricycle I prefer to use a compound main-axle mechanism consisting of an inner and an outer axle and a balance-gear mechanism connected therewith, so as to constitute the machine a double driver—that is, so that both wheels may be driven and may take different speeds on curves—and I prefer to use in this construction the same mechanism as described in the application of Harry M. Pope, Serial No. 229,173, filed February 28, 1887, the details of which mechanism need not be further described here, since it is obvious that any other axle mechanism may be used in a machine containing my present improvements.

The back reach, N , is formed to support the handle-bar supporting-rod I , and I prefer to construct it, as shown in section in Fig. 6, with two clamping-sleeves, n^6 and n^7 , and their bolts and screws $n^8 n^9$, and an inserted split sleeve, I' , so that the handle-bar support I may be adjusted vertically in height to a suitable position for different sizes of riders and still be held from any vertical motion when it is set in position, but allowed to vibrate or partially rotate about its axial line in its support. In carrying out this the inserted piece I' may be clamped or tightened to the rod by means of the clamping-ring n^6 in any position, the clamping-ring n^9 resting freely on the upper side of the ring n^7 , which latter has an inwardly-projecting lip, n^{10} , resting upon the

outwardly-projecting flange, I^2 , on the insert I^1 , and this flange I^2 rests freely on the top of the tube N. When the clamping-ring n^1 is set, it binds only the tube N, but does not bind the flange I^2 , which latter, with the tube I^1 , is free to revolve in the upper end of the tube N.

Below the bracket N^2 , fixed to the back reach, N, and having the arms N^3 N^3 to engage and be removably secured to the lugs m^5 by means of the bolts n^4 , thus completing the attachment of the back reach of the frame, the bottom of the upright pillar O may be attached by means of a bracket or in any suitable manner to the back reach, N, and the top of it may be formed either with a clamping-ring and a split end or with a set-screw for the reception and securement of the rear seat-supporting rod, p^3 .

The saddles P P' may be of any desired construction and mounted on suitable springs, as p p' , which in turn are mounted on the seat-supporting rods p^2 p^3 , held, respectively, at p^4 and p^5 adjustably in any required vertical position to suit different heights of riders.

Near the lower middle portion of the reach K, I attach, by means of a forged or cast bracket, Q^3 , a sprocket-wheel, Q, and a fixed axle, Q^4 , and cranks Q^1 , and balls Q^2 , for the forward rider; and I connect this sprocket-wheel with the sprocket-wheel R on the main shaft by means of an endless chain, i , these parts being of any suitable or usual construction.

To the back reach, N, near its lower portion, I attach, by means of a bracket, S^3 , a sprocket-wheel, S, with its fixed shaft S^4 , cranks S^1 , and balls S^2 , for the feet of the rear rider, and I connect this sprocket-wheel S with the sprocket-wheel R' on the main shaft by means of an endless chain, s , and these parts may also be of any suitable or usual construction. I make these endless chains s with a detachable link or links, so that it can be removed when the other parts are removed, as will be hereinafter explained.

On the handle-bar F, I place a brake-lever, X, fulcrumed at x on the bar F and connected at its shorter end, as at x' , to a few links, x^2 , of chain, preferably for flexibility, which chain x^2 is connected with a light steel brake-pull in two parts, X^1 X^2 , overlapping upon each other and adjustable or detachable together by means of the small clamp X^3 and screw x^3 . The lower end of this brake-pull X^2 is connected with a few links of chain, x^4 , bearing upon the guide-pulley k , and so, by means of the strips or rods X^4 X^5 and the links x^5 and guide-pulley k' , to the lug w^3 on the bell-crank brake-lever W. I also place at the handle bar H another brake-lever, Y, fulcrumed at y to the handle-bar H and connected at y' with the chain-links y^2 , and so to the brake-pull Y^1 Y^2 , made of two parts of light steel bars overlapping each other and held by the small clamp Y^3 and screw y^3 , and the lower part of this brake-pull Y^2 is connected with the lug w^4 on the bell-crank brake-lever W.

The bell-crank brake-lever W, I prefer to

construct, as shown in Fig. 4, with the lugs w hinged or fulcrumed on the screws or trunnion-joints w' w' on the reach K or the bracket N' , by which it is attached to the back reach. N. The lever W also has the arm w^5 and lug w^4 for the attachment of one brake-pull, and the bent arm W^6 , carrying a lug, w^3 , for the attachment of the other brake-pull, and also with a lug, w^2 , for the attachment of one end of a band-brake.

The brake-drum V is mounted on the main shaft and fixed to rotate with the sprocket-wheels R R', as I have before described. Around and upon this drum is a brake strap or band, U, held by loops u and the pin u' , or in any other suitable manner, to the brake lug w^2 on the bell-crank brake-lever, and at the other end by the loops u^2 and pin u^3 , or otherwise, to the brake-lug M^3 on the bracket M^2 , and this band-brake is of such length as to nearly surround the brake drum, and may be held by a spring, U' , or in any suitable manner, free from the brake drum, except when power is applied through either of the brake-handles to operate the bell-crank brake-lever. When the bell crank lever, however, is operated either by the pulling upward of the lug w^4 or the pulling forward of the lug w^3 , or both, the lug w^2 on its bent arm will be forced forward, carrying the brake strap U tightly about the drum, and so retarding the progress of the machine. The brake-pulls X^1 X^2 and Y^1 Y^2 are made in two parts, adjustable in length not only for securing them in one proper length for operating the brake and leaving it free from contact when the brake-handles are not operated by the rider, but also for the purpose of allowing the brake-pull to be shortened or lengthened, according as the handle-bar is raised or lowered in its support for different heights of riders.

It is also obvious now that the operation of the brake may be effected by the hand of either rider upon the brake-lever X or Y, or by both together.

It will now be also obvious from the described construction that the parts of this tricycle for operation by the rear rider may be removed and the tricycle converted into a single tricycle by simply loosening the screw g^5 and cap g^4 of the steering mechanism, removing the nut g^6 of the brake mechanism, removing the nuts n and n' of the frame mechanism, and slipping a detachable link of the chain S, and also that by a reverse process the attachments for the rear rider may be as readily brought and secured in position.

It is obvious that modifications may be made in the form and arrangement of the various parts of my improvements without departing from the substance of my invention; and I do not mean to limit myself to the precise things shown and described.

I claim as new and of my invention—

1. The combination, in a velocipede, of two handle-bars and handles, two ball-and-socket joints, and a connecting-rod.

2. The combination, in a velocipede, of two handle-bars and handles, two ball-and-socket joints, and an adjustable connecting-rod.
3. An improved attachment to a handle-bar, consisting in a curved neck or shank having at one end a threaded tang and set-nut for adjustment to the handle-bar or handle, and at the other end a ball for attachment to a connecting-rod and socket.
4. An improved detachable connecting-rod constructed with a socket at each end and an opening to admit a ball, and a holding screw-cap and a locking device in each socket.
5. An improved detachable and adjustable connecting-rod constructed in two parts extensibly and with a locking device, and with a socket at each end, and an opening to admit a ball, and a holding-screw and a locking device in each socket.
6. An improved universal joint device consisting in a ball and its neck, a cylindrical socket with an opening in the side to receive a ball, a seat for the ball eccentric to said opening, a holding-screw carrying a complementary seat, and a locking device.
7. The combination of handle-bars $F H$, necks $f^2 h^2$, balls $f^1 h^1$, sockets $G^2 G^2$, openings $g^3 g^3$, holding screw-caps $g^4 g^4$, locking devices $g^5 g^5$, connecting-rod $G G^1$, and locking device $g^7 g^7$, constructed and combined to operate essentially as set forth.
8. In a velocipede, the combination, with a band-brake and its drum, of two separate brake-pulls and connections, constructed for both separately and conjointly operating the brake.
9. In a velocipede-brake mechanism, a compound bell crank lever, as W , having two pull-arms, as $w^5 w^6$, and pull-lugs, as w^3 and w^4 , one or more fulcrum-lugs, as w , and a brake-lug, as w^2 , constructed to operate essentially as set forth.
10. The combination, with the frame of a velocipede, of two brake levers, as X and Y , a band-brake and its drum, and one or more bell-crank levers, a pull, and connections constructed, essentially as set forth, for operating the brake in connection with the front handle-bar mechanism or the rear handle-bar mechanism, or simultaneously by both.
11. The combination, with the frame of a velocipede, and with a band-brake and its drum and its end lever, as Y , and their connecting devices, of an adjustable pull, as $Y^1 Y^2$, and securing devices, as $Y^3 y^3$, constructed to operate essentially as set forth.
12. The combination, with the frame and main axle of a velocipede, of a brake-bracket, as M^2 , constructed with a stub or tenon to receive a part of the frame, as M , and with a brake-lug, as M^3 , and with arms, as $M^1 M^1$, and with main bearing-clamps for connection with the main axle and its bearings, essentially as set forth.
13. The combination, in a velocipede, of fore reach, K , back reach, N , brackets M^2 and N^1 , arms $N^3 N^3 M^1 M^1 m^1 m^1 m^2 m^2 m^3 m^3$, bolts $n^4 n^4$, tenon K^1 , and nut n , constructed to operate essentially as set forth.
14. The combination, in a velocipede, of handle-bar support I , pillar N , lipped sleeve $I^1 I^2$, clamping-rings $n^6 n^7$, and bolts $n^8 n^8$, constructed to operate, essentially as set forth, both in the vertical support and adjustment of the handle-bars and in the free rotation of the handle-bars in steering.
15. The combination, in a velocipede for two riders, of two transverse handle-bars, as $F F'$ and $H H'$, each supported on a vertically-adjustable rod partially rotative in the frame, and each connected with the steering-head and guiding-wheel for effecting the steering by either or both riders, essentially as set forth.
16. The combination, in a velocipede for two riders, with two transverse handle-bars, each supported on a vertically-adjustable and partially-rotative rod in the frame, of two brake-levers, as $X Y$, each connected by an adjustable pull with the same brake for operation by either or both riders, essentially as set forth.
17. The combination, in a velocipede for two riders, of two transverse handle-bars, each supported on a vertically-adjustable and partially-rotative rod in the frame and each connected with the steering-head and guiding-wheel for effecting the steering by either or both riders, and two brake-levers connected one with each handle-bar, to be adjusted and rotated with it, and each connected by an adjustable pull with the same brake, for operation by either or both riders, essentially as set forth.
18. In a velocipede, a transverse handle-bar, as $H H'$, a vertically adjustable and rotative supporting-rod, as I , a brake-lever, as W , and an adjustable brake-pull connected with the brake, and an adjustable guide-rod, as G , connected with the steering mechanism, all detachably constructed and combined with the front guiding-wheel, steering-head and spindle, and handle-bar, and frame, and driving-axle, and crank-shaft, and driving-gear of the velocipede, essentially as set forth.
19. An improved tandem tricycle consisting in two main driving-wheels and their axle mechanism, two sprocket-wheels and a brake-drum thereon, a fore reach, a driving mechanism and chain, and a back reach, a secondary driving mechanism and chain, a guide-wheel, a front steering mechanism with adjustable front handle-bars, and secondary adjustable rear handle-bars, and two adjustable seat mechanisms and steering and brake mechanisms connected with both the front handle-bar mechanism and the rear handle-bar mechanism, all constructed to operate essentially as set forth.

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Witnesses:

DAVID J. POST,
EDWIN S. HOUSE.