No. 645,579. Patented Mar. 20, 1900.

T. TOLSON.

VELOCIPEDE.

(Application filed Mar. 18, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

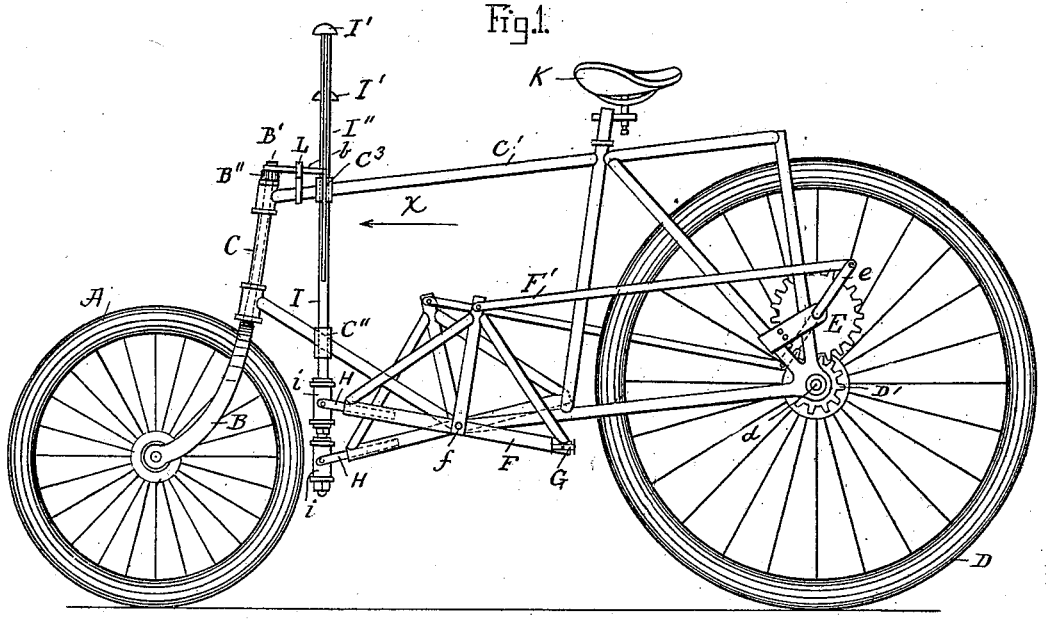


Fig. 2.

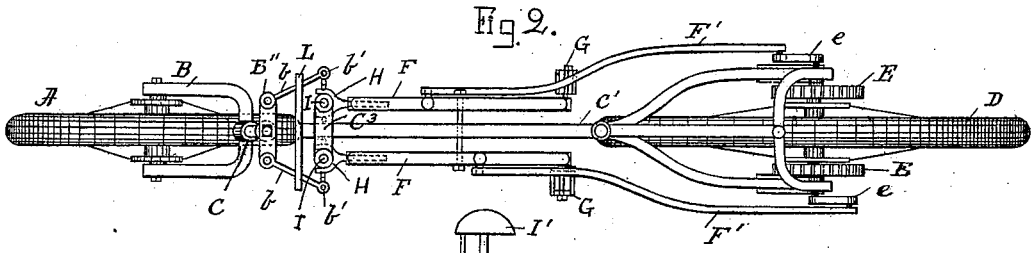
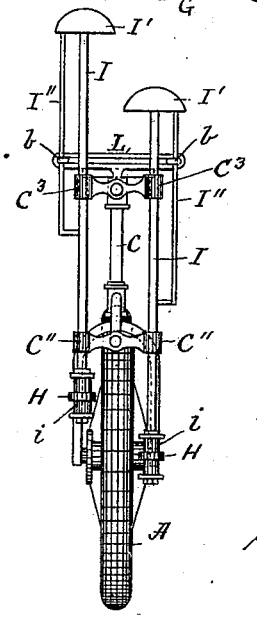


Fig. 3.



Witnesses.

Laurtz N. Möller.

Karl A. Andrén.

Inventor:

Thomas Tolson.

by Albert G. Davis.

his atty.

No. 645,579. Patented Mar. 20, 1900.

T. TOLSON.

VELOCIPEDE.

(Application filed Mar. 18, 1899.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

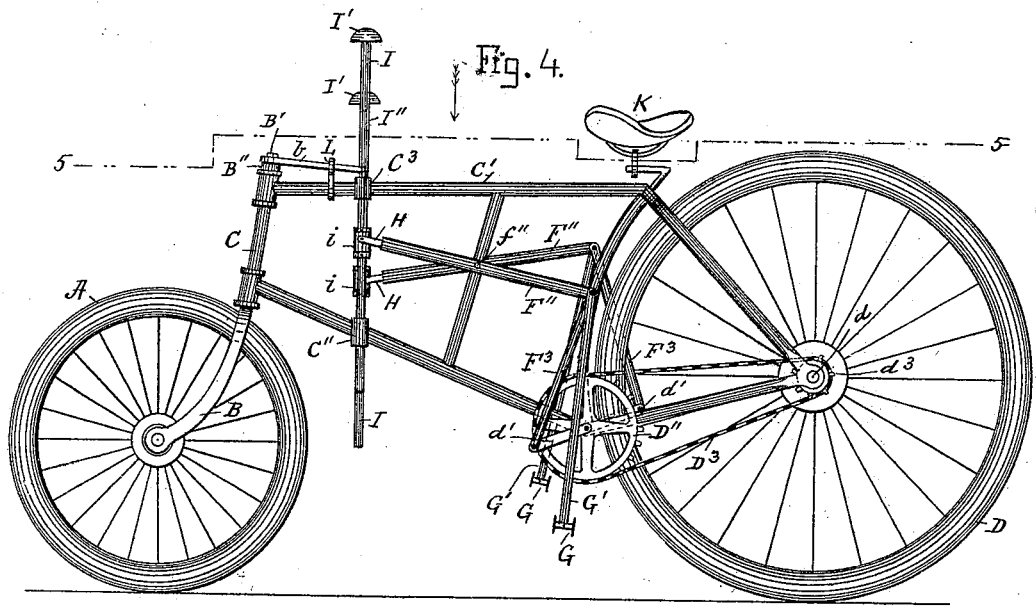
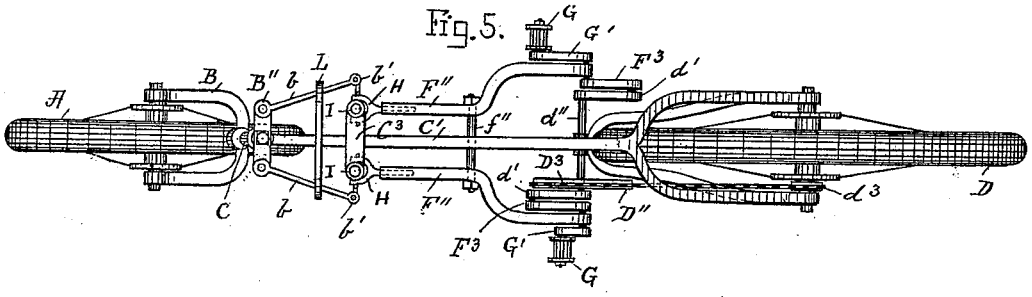


Fig. 5.



Witnesses.

Laurits N. Möller

Karl A. Andrén

Inventor:

Thomas Tolson.

by Wm. Andrew.

his atty.

No. 645,579. Patented Mar. 20, 1900.

T. TOLSON.

VELOCIPEDE.

(Application filed Mar. 18, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

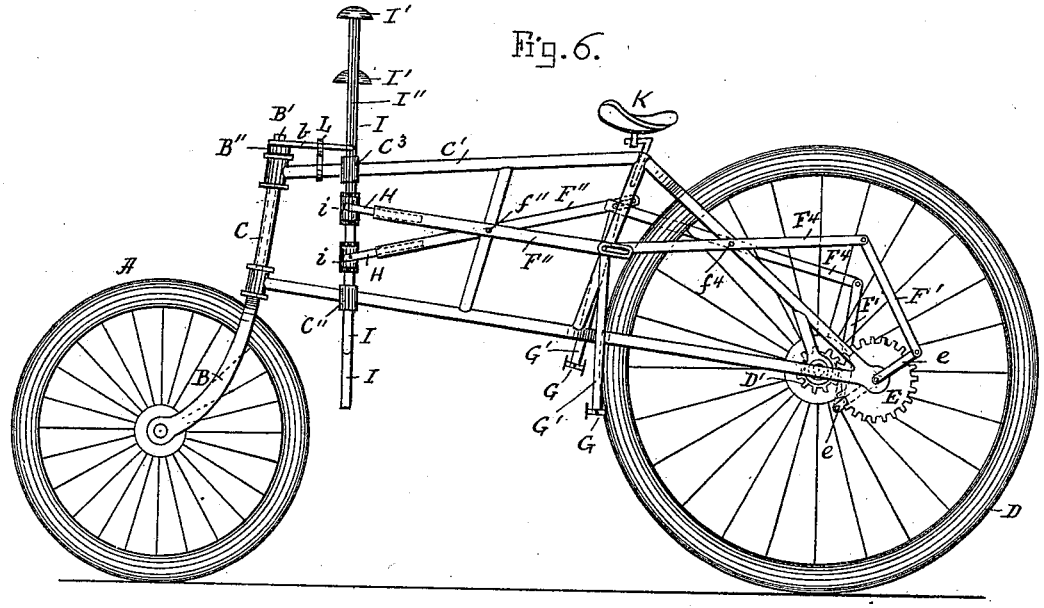
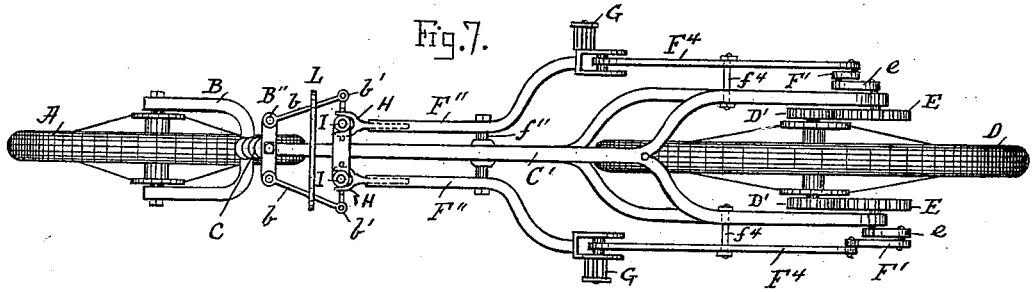


Fig. 7.



Witnesses.

Laurits N. Möller

Karl A. Andrén.

Inventor.

Thomas Tolson.

by Ivan Andrén.

his atty.

UNITED STATES PATENT OFFICE.

THOMAS TOLSON, OF BOSTON, MASSACHUSETTS.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 645,579, dated March 20, 1900.

Application filed March 18, 1899. Serial No. 709,614. (No model.)

To all whom it may concern:

Be it known that I, THOMAS TOLSON, a citizen of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Velocipedes, of which the following is a specification.

This invention relates to improvements in that class of velocipedes in which combined hand and foot power is used for propelling the vehicle; and it relates more particularly to improvements in mechanism for propelling and steering the velocipede, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of my improved velocipede. Fig. 2 represents a top plan view of Fig. 1, showing the saddle and upper knobs on the handle-rods removed. Fig. 3 represents an end view of the hand propelling and steering device as seen from the arrow X in Fig. 1. Fig. 4 represents a side elevation of a modification of the invention, showing a substitution of a chain driving mechanism for the gear-and-crank device shown in Figs. 1 and 2. Fig. 5 represents a top plan of that portion lying below the line 5 5 shown in Fig. 4. Fig. 6 represents a side elevation of a modified form of the hand and foot power propelling device. Fig. 7 represents a top plan view of Fig. 6, showing the saddle and hand-rod knobs removed.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In Figs. 1, 2, and 3, A represents the front wheel, journaled in the front fork B, which is provided with the upwardly-projecting fork-spindle B′, journaled in the head C, that forms a part of the frame C′, as is common in vehicles of this kind.

D is the rear driving-wheel, journaled on a spindle *d*, secured to the rear forked portion of the frame C′. To opposite ends of the hub of said driving-wheel are secured pinions D′ D′, the teeth of which mesh in spur-gears E E, the shafts of which are suitably journaled in bearings in the rear portion of the frame and provided with cranks *e e*, as shown.

At *f* in Figs. 1 and 2 are pivoted on opposite sides of the frame C the preferably triangular or bell-crank levers F F, provided at their rear ends with pedals G G. The position of said bell-crank levers may be reversed and pivoted to the upper portion of the frame and their connecting parts arranged accordingly. The forward ends of the said triangular or bell-crank levers F F are preferably tubular and serve as guides for the cylindrical ends of the forks H H, which are pivoted to sleeves *i i*, journaled on the lower ends of the hand-rods I I, as shown. The said sleeves *i i* are, however, prevented from moving longitudinally on said rods I I, and for such purpose the said sleeves are preferably confined between collars or nuts on said hand-rods, although other or similar stop devices may be employed for such purpose. The hand-rods I I are guided and journaled in suitable bearings C″ C³, attached to or forming parts of the frame C′. To the upper ends of the hand-rods I I are secured the hand-knobs I′ I′, as shown in Figs. 1 and 3.

The upper ends of the triangular or bell-crank levers F F are connected by means of links F′ F′ to the cranks *e e*, as shown in Figs. 1 and 2.

In propelling the velocipede the operator while seated on the saddle K depresses with one foot the pedal G on one side of the machine and simultaneously depresses with one of his hands the rod I on the opposite side of the machine, and by thus alternately depressing the pedal on one side and the hand-rod on the opposite side rocking motions are imparted to the triangular or bell-crank levers, causing a continuous rotary motion to be imparted to the gears E E, pinions D′ D′, and rear driving-wheel D.

The steering mechanism for the purpose of guiding the velocipede is constructed as follows: To the upper end of the fork-spindle B′ is secured a cross-bar B″, to the ends of which are pivotally connected the links *b b*, the rear ends of which are perforated, as shown at *b′ b′* in Fig. 2. On the outer side of each hand-rod I is arranged a rod I″, which is secured in a suitable manner to said hand-rod. Such rod I″ passes loosely through the perforation *b′* in the rear end of the link *b*, as shown in Fig. 3, and it will thus be seen that the forward wheel A may be turned more or less to the right or left simply by turning the han-

dles I′ I′ correspondingly. L in Figs. 1, 2, and 3 is a longitudinally-slotted guide which is secured in a suitable manner to the forward portion of the frame C′. Said slotted guide is adapted to receive the links *b b* and serves to hold the latter in their horizontal position during the vertical reciprocating motion of the hand-rods I I.

In Figs. 4 and 5 is represented a modification of the propelling mechanism, showing it as applied to a sprocket-wheel and chain driving device. In said Figs. 4 and 5 the hand propelling and steering device is substantially like that shown in Figs. 1, 2, and 3. Instead of the triangular or bell-crank levers F (shown in Fig. 1) I make use, in this modification, of straight levers F″ F″, which are pivoted at *f″* to the frame of the machine. Said levers F″ are connected in their forward ends to the sleeves *i i* on the hand-rods I I as shown in Figs. 1, 2, and 3. To the rear end of each rock-lever F″ is pivoted a pedal-link G′, provided at its lower end with a pedal G, as shown in Figs. 4 and 5. To the rear end of each lever F″ is pivotally connected a pitman F^3, the lower end of which is pivoted to a crank *d′*, secured to a shaft *d″*, journaled in a bearing on the frame of the vehicle. To said shaft *d″* is secured a sprocket-wheel D″, from which leads an endless sprocket-chain D^3 to a small sprocket-wheel d^3, secured to the hub of the rear wheel D, as shown in Figs. 4 and 5. The manner of propelling the velocipede represented in the modification shown in Figs. 4 and 5 is similar to that described and shown in Figs. 1, 2, and 3—namely, the operator while seated on the saddle K depresses the pedal on one side of the machine and simultaneously depresses with one of his hands the rod I on the opposite side of the machine, and by this alternately depressing the pedal on one side and the hand-rod on the opposite side a continuous rotary motion is imparted to the rear driving-wheel D.

In Figs. 6 and 7 I have shown another modification similar to the one represented in Figs. 4 and 5, with this difference that instead of sprocket wheels and chains (shown in Figs. 4 and 5) I make use of spur-gears on the rear driving-wheel similar to those shown in Figs. 1 and 2.

In the modification represented in Figs. 6 and 7 I interpose between the rock-levers F″ and crank-rods F′ a lever F^4, (one on each side of the machine,) which is pivoted at f^4 to the frame of the velocipede and connected at its rear end to the pitman or crank rod F′ and at its forward end to the lever F″, and in practice I secure to the forward end of the intermediate lever F^4 a pin adapted to engage in a slotted perforation in the rear end of the rock-lever F″, as shown in Fig. 6. The steering and hand propelling device in this modification is substantially like that shown in Figs. 1, 2, 3, 4, and 5.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a velocipede, the combination of a pair of reciprocating handle-rods guided in bearings attached to the frame of the machine and having their lower ends universally connected to bell-crank or triangular rocking levers, pivotally connected to the frame and mounted on a fixed pivot on the driving mechanism of the rear wheel, and pedals connected to said rocking levers, substantially as and for the purpose set forth.

2. In a velocipede, the combination of a pair of reciprocating handle-rods guided in bearings attached to the frame of the machine and having their lower ends universally connected to bell-crank or triangular rocking levers pivotally connected to the frame and connected to the driving mechanism of the rear wheel, steering-rods attached to the handle-rods, and links pivotally connected to said steering-rods at their rear ends and pivotally connected at their forward ends to a cross-bar on the fork-spindle of the forward or steering wheel, substantially as and for the purpose set forth.

3. In a velocipede the herein-described steering device consisting in the combination of a pair of reciprocating handle-rods, steering-rods attached to said handle-rods, links pivotally connected to said steering-rods and to a cross-bar on the fork-spindle of the forward or steering wheel, and a slotted guide secured to the frame of the machine in which said links are guided and held from vertical movement substantially as and for the purpose set forth.

4. In a velocipede in combination a pair of reciprocating handle-rods, sleeves *i*, *i*, journaled on the same and held from longitudinal motion thereon, forks pivotally connected to said sleeves and having their rear ends guided in rocking pedal-levers, pivoted to the frame and suitably connected to the driving mechanism of the rear wheel substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS TOLSON.

Witnesses:
ALBAN ANDRÉN,
LAURITZ N. MÖLLER.