

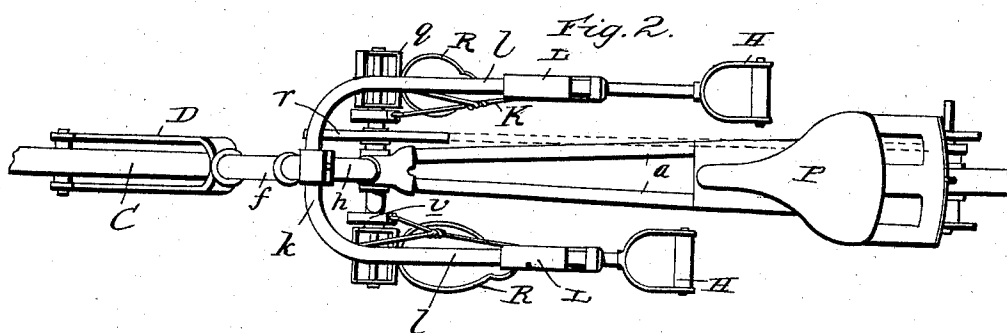
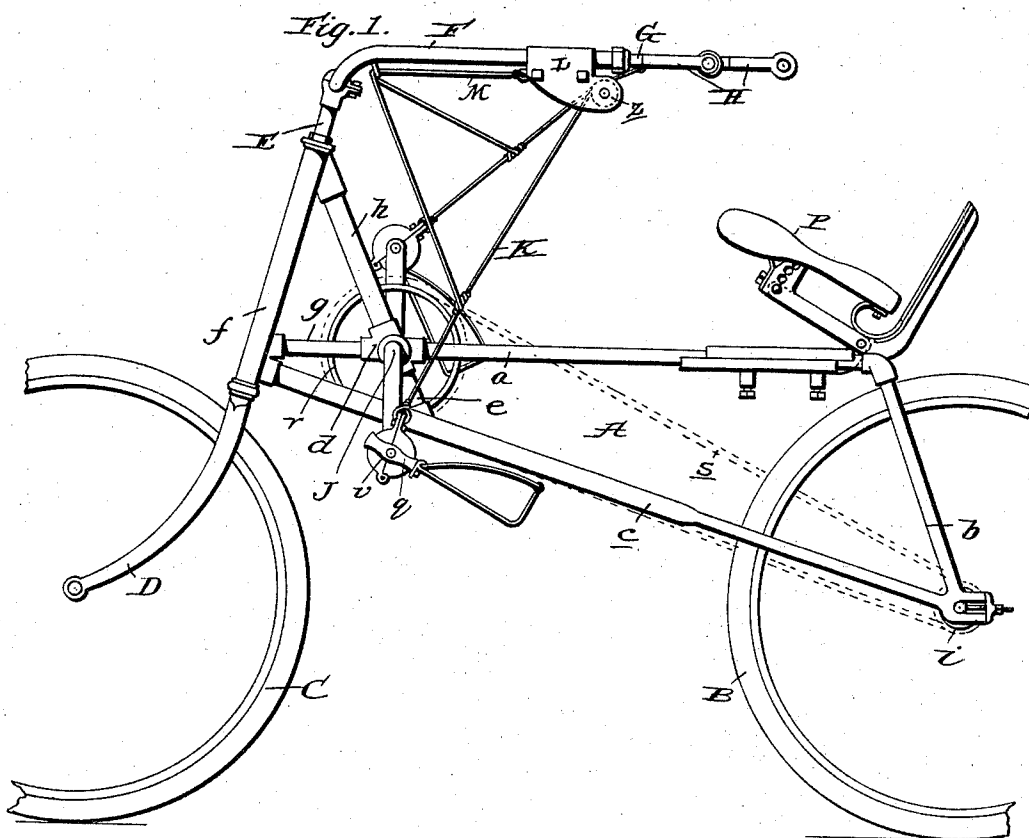
(No Model.)

2 Sheets—Sheet 1.

I. F. WALES.
BICYCLE.

No. 577,895.

Patented Mar. 2, 1897.



Witnesses:

C. A. Haeder
H. A. James

Inventor

I. F. Wales

By *James Shuey*

Attorney

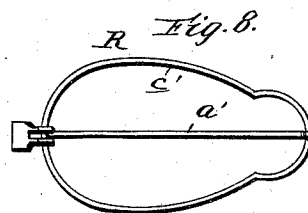
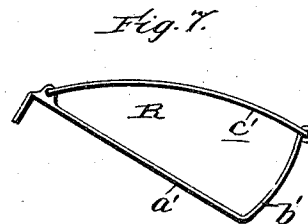
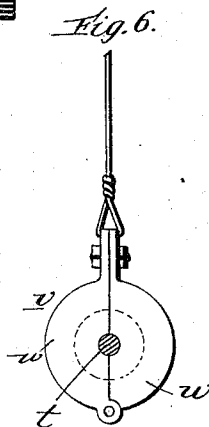
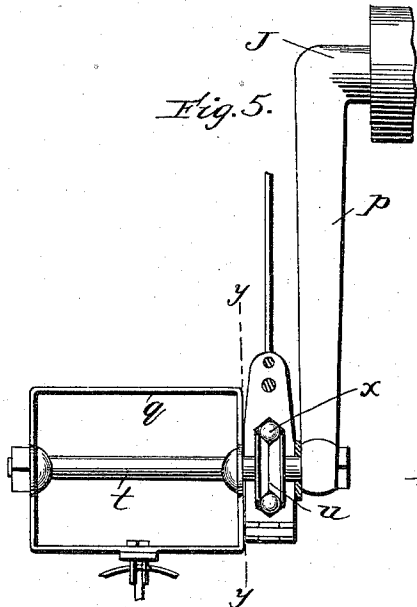
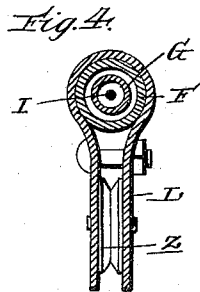
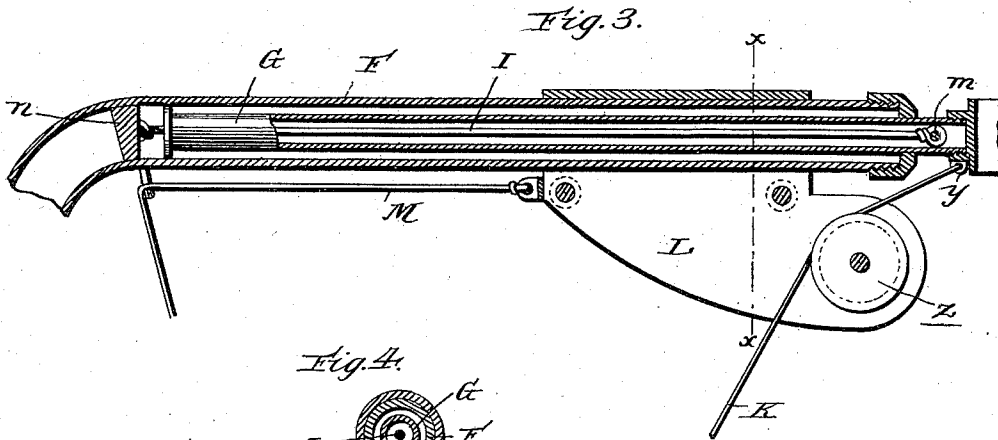
(No Model.)

2 Sheets—Sheet 2.

I. F. WALES.
BICYCLE.

No. 577,895.

Patented Mar. 2, 1897.



Witnesses:

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UNITED STATES PATENT OFFICE.

IRVING F. WALES, OF WOONSOCKET, RHODE ISLAND.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 577,895, dated March 2, 1897.

Application filed September 30, 1896. Serial No. 607,413. (No model.)

To all whom it may concern:

Be it known that I, IRVING F. WALES, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Bicycles; and I 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.

My invention relates to velocipedes, and more particularly to means for propelling the same; and its novelty and many advantages will be fully understood from the following description and claims when taken in conjunction with the annexed drawings, in which—

Figure 1 is a side elevation of a velocipede or bicycle embodying my invention with portions of the traveling wheels broken away and the sprocket-chain in dotted lines. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged longitudinal section taken through one of the handle-bars and its appurtenances. Fig. 4 is a vertical transverse section taken in the plane indicated by the line *xx* of Fig. 3. Fig. 5 is an enlarged detail elevation with parts in section, illustrating one of the pedal-cranks, the pedal thereon, and the means employed for connecting a strap to the spindle of the pedal. Fig. 6 is a detail section taken in the plane indicated by the line *yy* of Fig. 5. Fig. 7 is a side elevation of one of the heel supports or clips, and Fig. 8 is a plan view of the same.

In the said drawings similar letters designate corresponding parts in all of the views, referring to which—

A indicates the main frame of my improved machine, which is formed of tubing of suitable size. This frame A, as better shown in Figs. 1 and 2, comprises the horizontal top line-tubes *a*; the rear stays *b*, which are suitably connected with the rear ends of the tubes *a*; the bottom line-tubes *c*, which are connected with the lower ends of the rear stays *b* and extend forwardly and upwardly therefrom; the crank-shaft hanger *d*, which receives and is connected to the forward ends of the top line-tubes; the stays *e*, which connect said hanger and the bottom line-tubes:

the head-post *f*, which is connected with the forward ends of the bottom line-tubes *c*; the stay *g*, connecting the crank-shaft hanger and the lower end of the head-post, and the stay *h*, connecting the hanger and the upper end of the head-post, as shown. As will be readily appreciated, a frame constructed in the manner just described is exceedingly strong and durable and is well able to withstand the great shocks and strains to which the frames of bicycles and the like are ordinarily subjected.

B indicates the drive-wheel of the machine, which is mounted in the frame A in the ordinary manner and is provided with a sprocket *i*, (illustrated by dotted lines in Fig. 1,) and C indicates the front or pilot wheel. This pilot-wheel is mounted in the usual manner in a fork D at the lower end of a rod E, and the said rod E, which is suitably journaled in the head-post *f* of the frame, is fixedly connected at its upper end to the handle-bar F, whereby it will be seen that by moving said bar the rider is enabled to properly steer the machine. The said handle-bar F is preferably of the form shown, that is to say, it comprises the transverse portion *k* and the rearwardly-extending parallel and tubular portions *l*, which are of the proportional length shown. These parallel portions *l* are designed to receive rods G, which have handles H at their rear ends, whereby they may be readily reciprocated by the rider to assist in the propulsion of the machine, as will be presently described. The said rods G are preferably tubular, as illustrated in Fig. 3, to receive the elastic strips I or spiral springs, which are connected at one end to the rods at *m* and at their opposite ends to a block *n*, arranged in and connected to the portions *l* of the handle-bar F, and are designed to draw the rods forwardly, so as to assist the rider in reciprocating the same.

J indicates the crank-shaft, which is journaled in the hanger *d*, as better shown in Fig. 1. This crank-shaft is provided at its opposite ends with the usual cranks *p* and pedals *q*, and it is also provided with the sprocket-wheel *r*, which is connected by the chain *s* (illustrated by dotted lines) with the sprocket-wheel *i* of the drive-wheel, whereby it will be

seen that when the crank-shaft is rotated the drive-wheel will also be rotated and the machine propelled.

The shafts *t* of the pedals *q* are provided with peripherally-grooved wheels *u*, (see Fig. 5,) and receiving said shafts and the wheels *u* are the boxes *v*, which comprise two sections *w*, connected in a hinged manner at their lower ends. The boxes *v* serve to hold the balls *x*, which are arranged in a raceway formed by the wheels *u* and the boxes and are designed to reduce the friction between the two; and said boxes also serve for the connection of the flexible straps *K*, which may be of wire, chain, or other suitable material, and are connected at their upper ends to the rods *G*, as indicated by *y*, whereby it will be seen that when said rods are drawn rearwardly motion will be communicated to the crank-arms *p* and the crank-shaft *J* to assist in the rotation of the latter and the propulsion of the machine.

In order to take up slack of the flexible connections *K* when the rods *G* are moving forwardly, so as to keep said connections taut at all times, I provide the slidable carriages *L*, which are arranged and adapted to move on the portions *l* of the handle-bar *F* and are provided with antifriction-wheels *z*, which engage the flexible connections, and the elastic strips or springs *M*, which take through guides on the handle-bar and are connected at their opposite ends to the carriages *L* and the flexible connections *K*, as shown. By reason of this construction the connections *K* are kept taut at all times, so that motion will be immediately transmitted from the rods *G* to the crank-arms *p*.

P indicates the saddle of my improved machine. This saddle forms the subject-matter of my contemporary application of even date herewith and is fully described therein. I prefer to employ such saddle upon my improved machine, because it is peculiarly suited to the same, but I do not desire to be understood as confining myself to the employment of such a saddle, as any suitable saddle may be employed.

The saddle *P* is arranged upon the top line-tubes *a* of the frame at the rear end thereof, and therefore, in order to enable the rider to better keep his feet upon the pedals *q*, I provide the heel supports or clips *R*. (Better illustrated in Figs. 7 and 8 of the drawings.) These heel supports or clips respectively comprise the longitudinal central bar *a'*, which is adapted at its forward end to be connected to the rear side of a pedal *q* and has its rear end bent upwardly, as indicated by *b'*, and the loop or bar *c'*, which is connected to the bar *a'* at the forward and rear ends thereof and is preferably shaped as shown. These clips *R* serve to receive the rear portions of the feet and hold the same upon the pedals, so as to enable the rider to ride with greater ease and comfort.

It will be seen from the foregoing that by reason of the construction of my improved machine a rider is enabled to use both his feet and hands in the propulsion of the same, and is consequently enabled to drive the machine at a high rate of speed with but a minimum amount of exertion. It will also be seen that by reason of the construction of my improved machine a rider is enabled to use his hands in the propulsion of the machine without interfering with his ability to steer the same. It will also be seen that the rider sits very low on the frame, and is therefore not liable to be injured in the event of a fall.

Having described my invention, what I claim is—

1. In a bicycle or other velocipede, the combination of a main frame having top line-tubes, rear stays connected with the top line-tubes, bottom line-tubes connected to and extending forwardly and upwardly from the lower ends of the rear stays, the head-post connected at its lower end to the forward ends of the bottom line-tubes, the crank-shaft hanger receiving and connected to the top line-tubes, braces *e*, connecting the crank-shaft hanger and the bottom line-tubes, a brace *g*, connecting the hanger and the lower portion of the head-post, and a brace *h*, connecting the hanger and the upper end of the head-post, a drive-wheel mounted in and supporting the main frame, a pilot-wheel, a fork carrying said wheel and having a rod journaled in the main frame, a handle-bar connected to the said rod and having the rearwardly-extending tubular portions, reciprocating rods arranged and adapted to move in the said portions of the handle-bar, a crank-shaft journaled in the hanger and having pedal-cranks and pedals thereon, gearing intermediate of said crank-shaft and the drive-wheel and connections intermediate of the crank-shaft and the reciprocating rods, substantially as specified.

2. In a bicycle or other velocipede, the combination of a main frame, a drive-wheel mounted in and supporting said frame, a pilot-wheel, a fork carrying said wheel and having a rod journaled in the main frame, a handle-bar connected to the said rod and having the rearwardly-extending tubular portions, reciprocating rods arranged and adapted to move in the said portions of the handle-bar, a crank-shaft journaled in the main frame and having pedal-cranks and pedals thereon, gearing intermediate of said crank-shaft and the drive-wheel, flexible connections between the reciprocating rods and the crank-shaft, slides arranged on the handle-bar and having wheels engaging said flexible connections, elastic devices connected at opposite ends to the flexible connections and slides and taking over guides on the main frame and means for assisting the forward movement of the reciprocating rods, substantially as specified.

3. In a bicycle or other velocipede, a pedal

and a clip connected to the rear side of the pedal and comprising a longitudinal central bar having the upwardly-bent rear end, and the loop connected to the forward end of the longitudinal central bar and the upper end of the rear branch thereof, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

IRVING F. WALES.

Witnesses:

GEO. W. SPAULDING,
E. LE ROY SPAULDING.