(No Model.) 2 Sheets—Sheet 1.

D. G. BIGGS.

VELOCIPEDE.

No. 343,753. Patented June 15, 1886.

Fig. 1

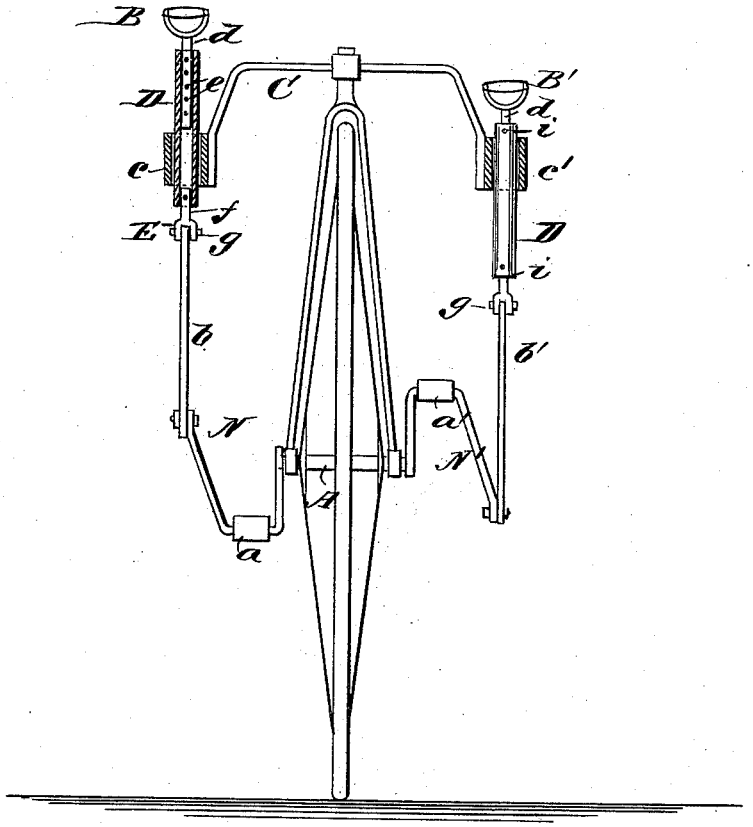


Fig. 6

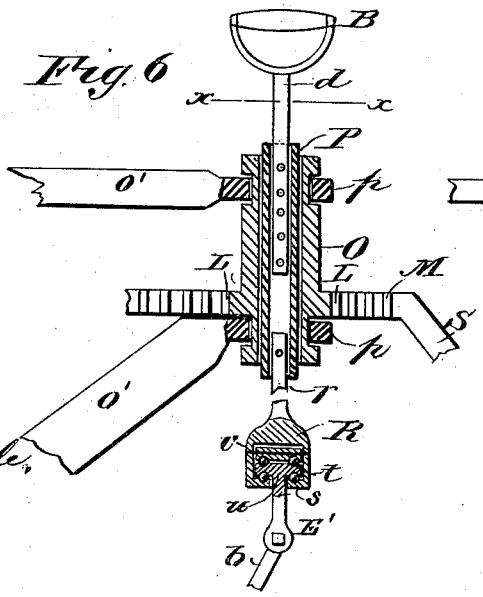
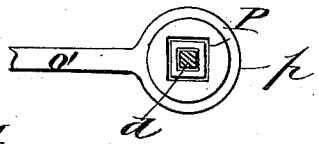


Fig. 7



WITNESSES:

F. McArdle.

C. Sedgwick

INVENTOR:

D. G. Biggs

BY Munn & Co.

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

D. G. BIGGS.

VELOCIPEDE.

No. 343,753. Patented June 15, 1886.

Fig. 2

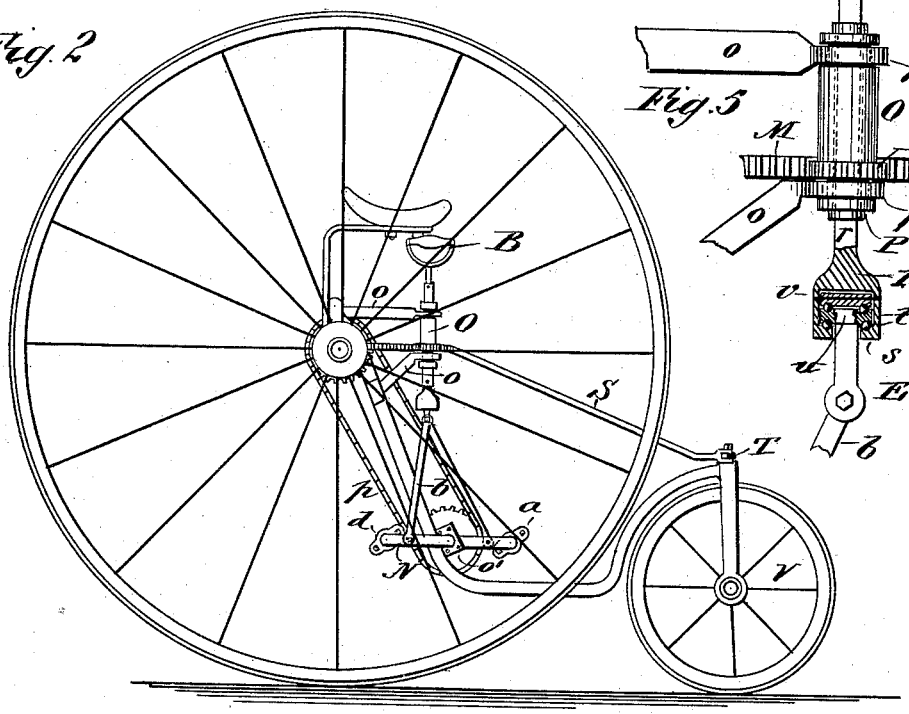


Fig. 5

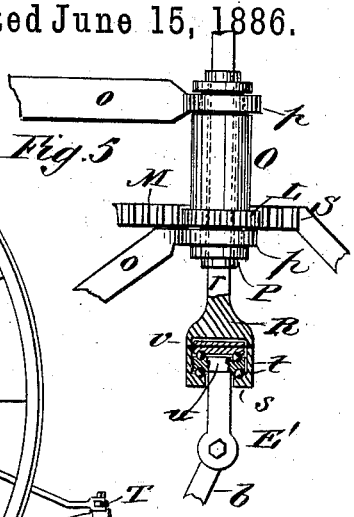


Fig. 3

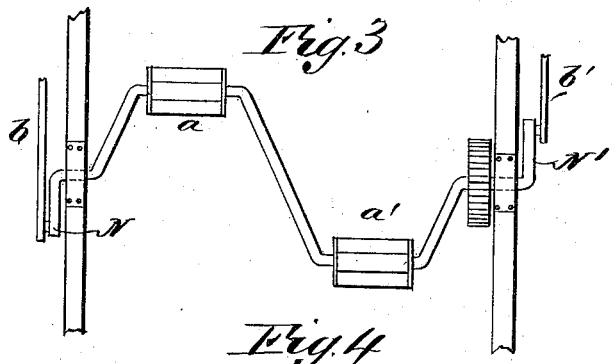
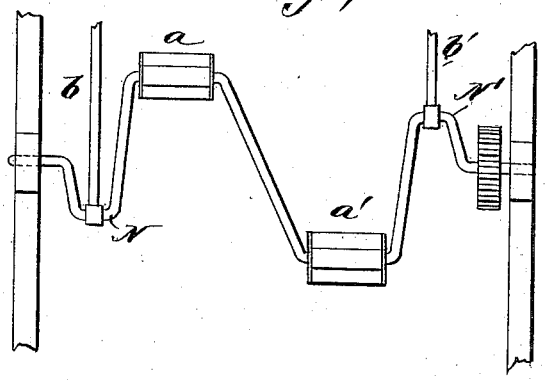


Fig. 4



WITNESSES:

H. McArdle

E. Bedgwick

INVENTOR:

D. G. Biggs

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

DAVID GUY BIGGS, OF LOUISVILLE, KENTUCKY.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 343,753, dated June 15, 1886.

Application filed March 12, 1886. Serial No. 195,044. (No model.)

To all whom it may concern:

Be it known that I, DAVID GUY BIGGS, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and Improved Velocipede, of which the following is a full, clear, and exact description.

My invention relates more particularly to a peculiar and novel arrangement of the crank-shaft and connections employed for the purpose of driving bicycles, tricycles, and other similar vehicles; and the invention consists, essentially, in the construction and arrangement of parts, as will be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front view of a bicycle provided with my improved crank-shaft and connections, certain portions of the device being shown in section to disclose the construction of the parts. Fig. 2 is a side view of a tricycle constructed in accordance with the terms of my invention. Figs. 3 and 4 illustrate modifications in the construction of a crank-shaft. Fig. 5 is a detail view illustrating the construction of the handle employed in connection with the steering-wheel, certain portions of the device being broken away to disclose the construction of the parts. Fig. 6 is a central vertical sectional view of the cylinder and connections shown in Fig. 5, and Fig. 7 is a sectional plan view on the line *x x* of Fig. 6.

In constructing such a bicycle as is illustrated in Fig. 1, above referred to, I provide a crank-shaft, A, carrying pedals *a a'*, beyond which the crank-arms N N' extend, to be engaged by connecting-rods *b b'*, that lead through mesne connections to the crank-operating handles B B'. Instead of using the vertical hand-bar, I provide a cross-bar, C, carrying sleeves *c c'*. In these sleeves I arrange tubes D, formed with apertures *i* near their upper and lower ends, and into these tubes I fit the shanks *d* of the handles, said shanks being held to place by keys or pins passed through the upper aperture, *i*, and one of the several apertures, *e e*, formed in the shank *d*. The shank *f* of a stirrup, E, is keyed within the lower end of each of the tubes D, the connecting-rods being pivotally connected to the stirrups E by bolts *g*, as shown. With such a crank-shaft and connections as I have described all of the force or power exerted by the rider is utilized in the driving of the machine, for, as will be readily understood from an inspection of the drawings, when power is applied to the right-foot crank or pedal *a* as it descends power will also be applied to the right-hand handle B, and this power so applied to the handle B will act to raise the right-hand crank N, and this movement has been found to materially decrease the so-called "wabbling" of this class of machines.

When my improved form of crank-shaft is applied to tricycles, it is extremely desirable that one of the crank-handles should be utilized as a steering-handle of the machine; and to this end I employ such a construction as is best illustrated in Figs. 5 and 6, to be presently described, it being understood that any form of crank-shaft having four points at which power is applied could be employed without departing from the spirit of my invention.

In Fig. 2 I have shown a crank-shaft supported in bearings *o'*, carried by the frame of the machine, as clearly indicated, and upon this shaft there is arranged a chain-wheel, *p*, which runs in engagement with a second chain or sprocket wheel carried by the main axle of the machine; but it will of course be understood that the crank-shaft might be mounted as shown in either Fig. 3 or Fig. 4, the idea being to have the two points at which power is applied upon each side of the center of the shaft arranged so that they will always move, as it were, in opposite directions—that is to say, when the pedal is moving down the crank upon the same side of the machine will always be moving up.

In order that one of the handles may be used to control the steering-wheel, (and I of course prefer that the right-hand handle should be so employed,) I arrange a cylinder, O, upon bracket-arms *o o*, which extend from the frame of the machine, the connection between the cylinder and the said bracket-arms being such that the cylinder is free to turn within the sockets *p p*, formed at the ends of the arms. The opening through the center of the cylinder O is square, and fitted within this square opening there is a sliding bar, P, corresponding in all respects with the cylinder D, except for

the fact that it is square. The right handle B is adjustably connected with the bar P in the same manner as described in connection with the cylinder D; but instead of having a stirrup, E, secured within the lower end of the bar P there is secured the shaft *r* of a cage, R, in which there is arranged an anti-friction connection of novel construction. At the lower side of the cage R there is an inwardly-projecting flange, *s*, formed with an annular groove, in which there are a number of anti-friction balls, *t t*, and upon these balls there is arranged a circular disk, *u*, carried by a stirrup, E', with which the connecting-rod *b*, leading to the crank N, is connected, the under face of this disk *u* being grooved in order to form a way for the balls *t*. A second groove is formed upon the top of the disk *u*, and in this groove there are arranged other anti-friction balls *t*, and still above that there is a disk, *v*, that is keyed within the cage, as indicated. From this construction it will be seen that by turning the handle B the cylinder O may be rotated without interfering with the connection between the handle and the connecting-rod *b*, and in order that this rotation of the cylinder may be utilized for the purpose of steering the machine said cylinder is provided with a gear or pinion, L, which meshes with a properly-guided rack, M, formed upon one end of the rod S, leading to the steering-bar T of the steering-wheel V, so that the said wheel V may be turned in the direction desired by simply turning the handle B, this construction enabling the operator to steer the machine without removing his hand from the crank-handle B.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a velocipede, the combination, with a crank-shaft, A, formed with cranks carrying pedals *a a'*, and cranks N N', of connecting-rods *b b'*, pivotally connected to stirrups E, tubes D, to which the shanks of the stirrups are connected, and handles B B', adjustably connected to the tubes D, which tubes are mounted in sleeves *c*, carried by a bar, C, substantially as described.

2. In a velocipede of the tricycle type, the combination, with the crank-shaft and one of the crank-handles, of an irregular-shaped sliding bar, a cylinder in which said bar is free to slide, but with which the cylinder turns, brackets supporting the cylinder, a swivel joint interposed between the sliding bar and the crank, a gear carried by the cylinder, and a rack connected to the steering-bar of the velocipede, substantially as described.

3. In a velocipede of the tricycle type, the combination, with the crank-shaft and one of the crank-handles, of a sliding bar, P, a cylinder in which the bar P rides, and in which it is free to slide, brackets supporting the cylinder, a swivel-joint interposed between the bar P and the crank-shaft N, said joint consisting of a cage, R, in which a disk, *u*, rides, the cage being formed with a grooved flange, *s*, a disk *v*, and anti-friction balls *t t*, a gear carried by the cylinder, and a rack connected to the steering-bar of the velocipede, substantially as described.

DAVID GUY BIGGS.

Witnesses:
JOHN P. SACKSTEDER,
J. E. LEATHERMAN.