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E. C. F. OTTO.

VELOCIPEDE.

No. 246,031. Patented Aug. 23, 1881.

Fig. 2.

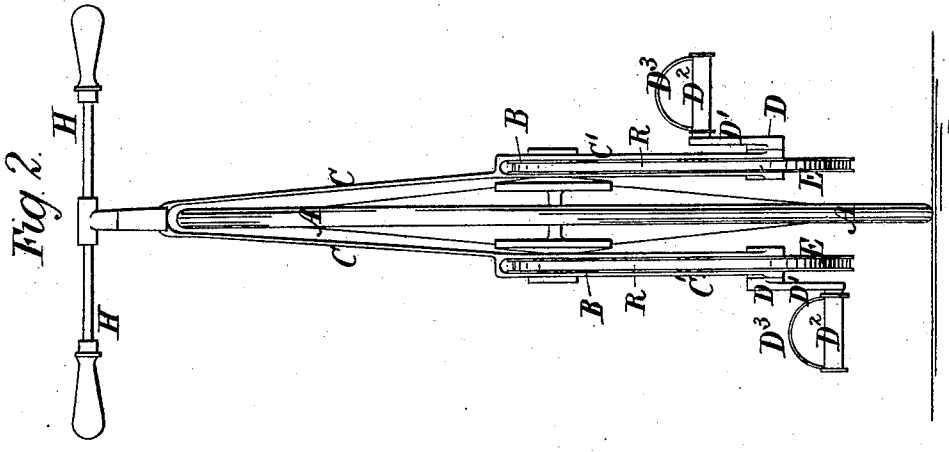
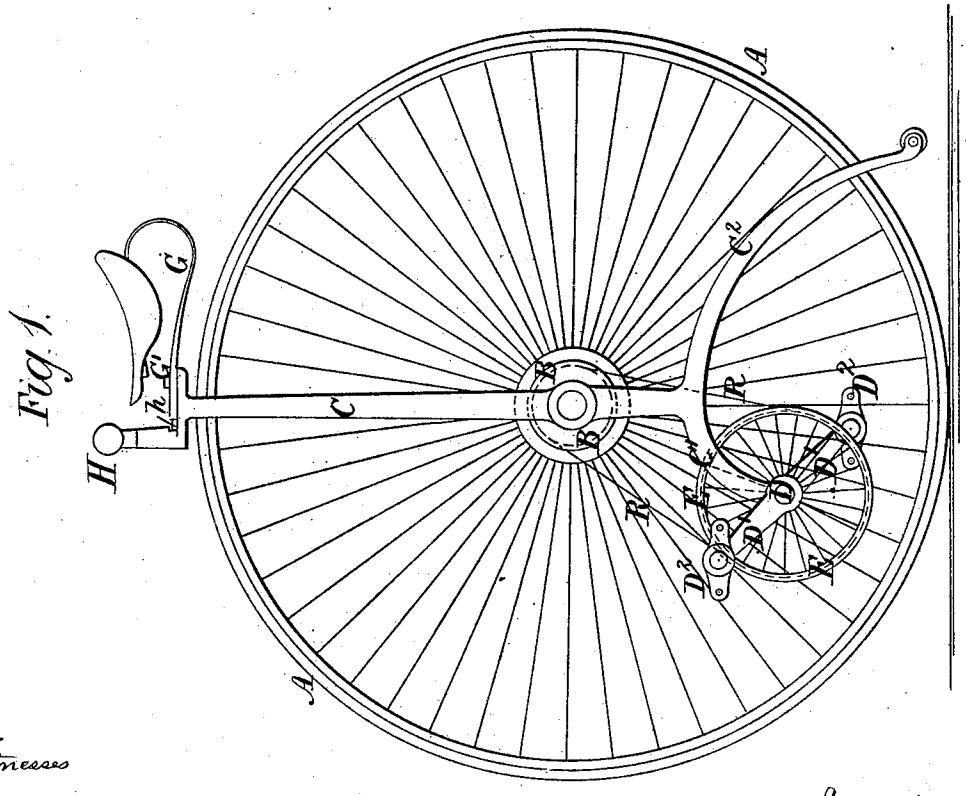


Fig. 1.



Witnesses

Chas. H. Smith

J. Stahl

Inventor

E. C. F. Otto

per Lemuel W. Serrell

Atty

N. PETERS. Photo-Lithographer. Washington, D. C.

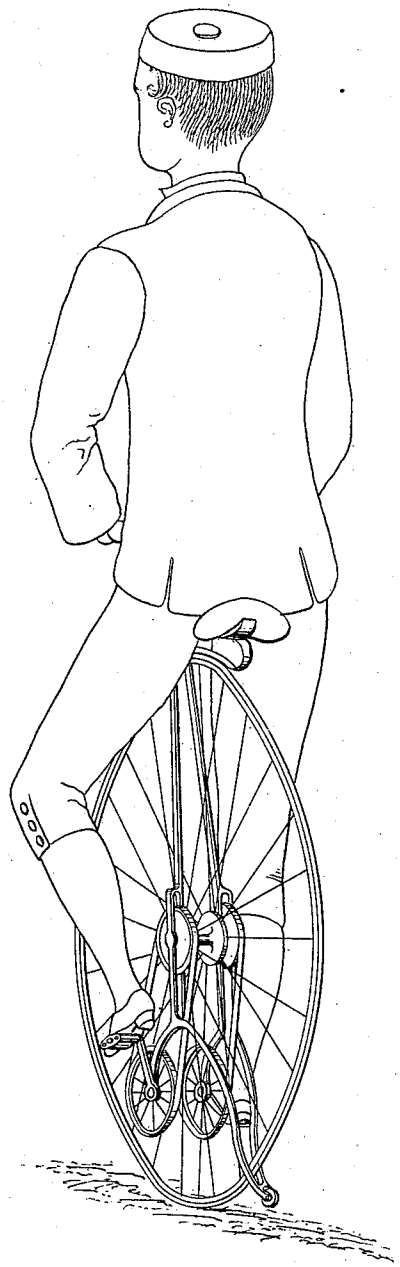
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E. C. F. OTTO.

VELOCIPEDE.

No. 246,031. Patented Aug. 23, 1881.

Fig. 1.



Witnesses

Chas. H. Smith

J. Stahl

Inventor

E. C. F. Otto

per Lemuel W. Serrell

Atty

N. PETERS. Photo-Lithographer. Washington, D. C.

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E. C. F. OTTO.

VELOCIPEDE.

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Fig. 3

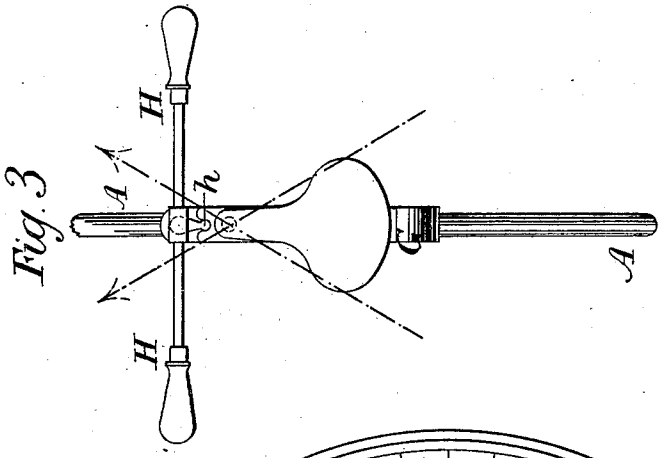
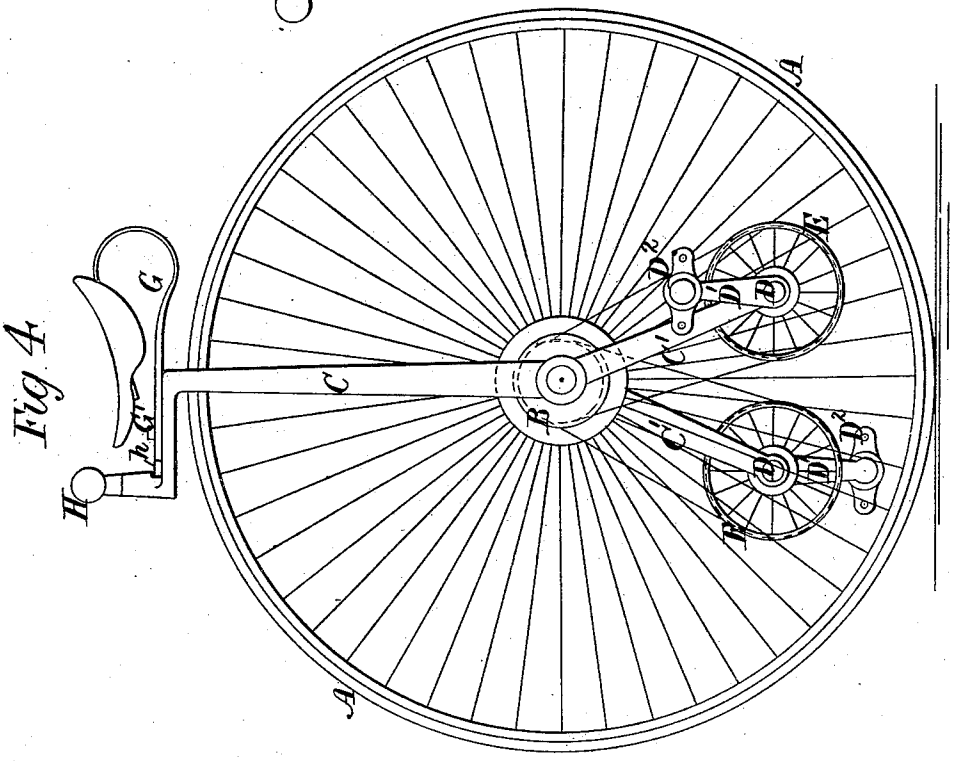


Fig. 4



Witnesses

Chas. A. Smith.
J. Stahl

Inventor

E. C. F. Otto.
by Lemuel W. Serrell
Atty

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 7 Sheets—Sheet 4.

E. C. F. OTTO.

VELOCIPEDE.

No. 246,031. Patented Aug. 23, 1881.

Fig. 6.

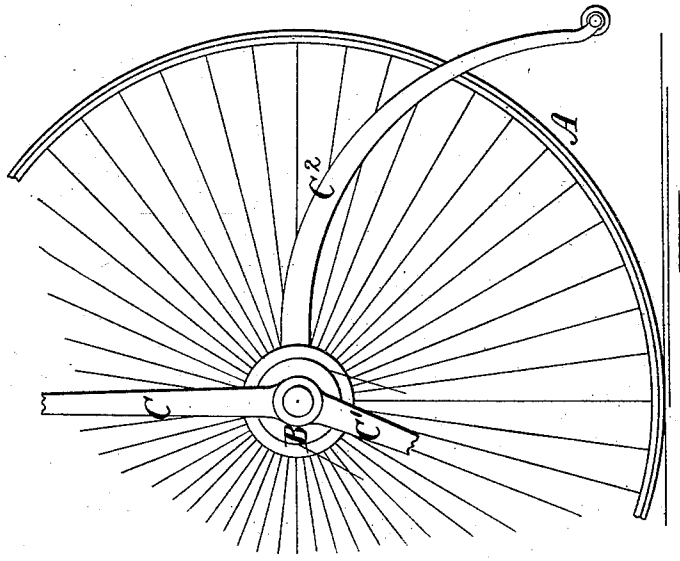
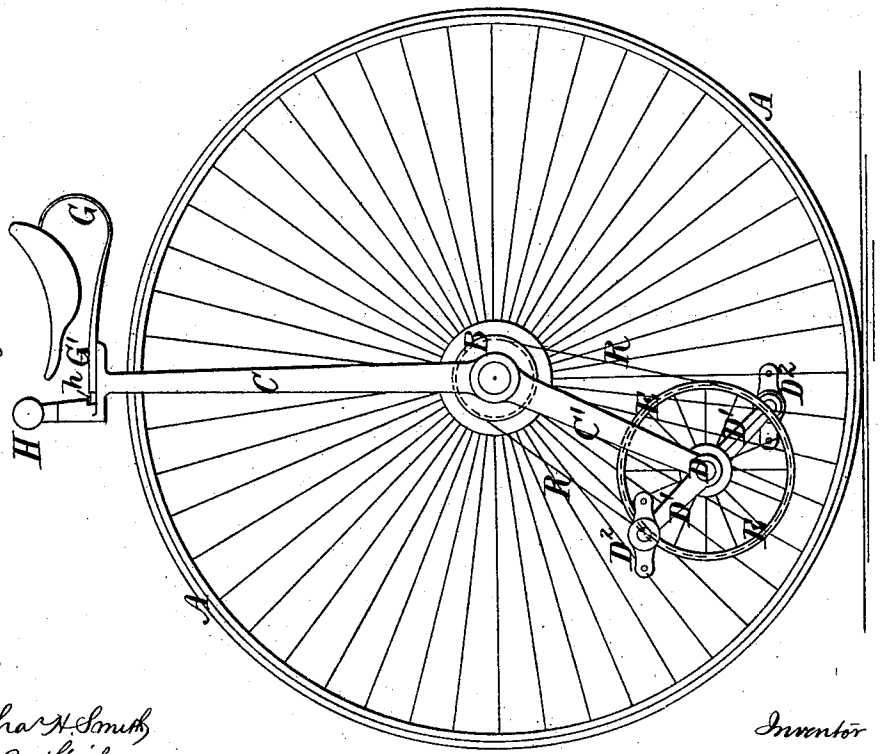


Fig. 5.



Witnesses

Chas. H. Smith

J. Hails

Inventor

E. C. F. Otto

per Lemuel W. Serrell

Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 7 Sheets—Sheet 5.

E. C. F. OTTO.

VELOCIPEDE.

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Fig. 8.

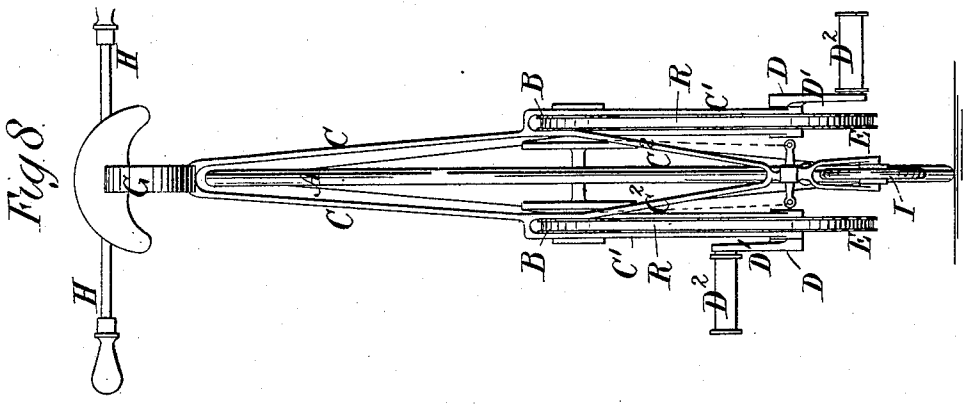
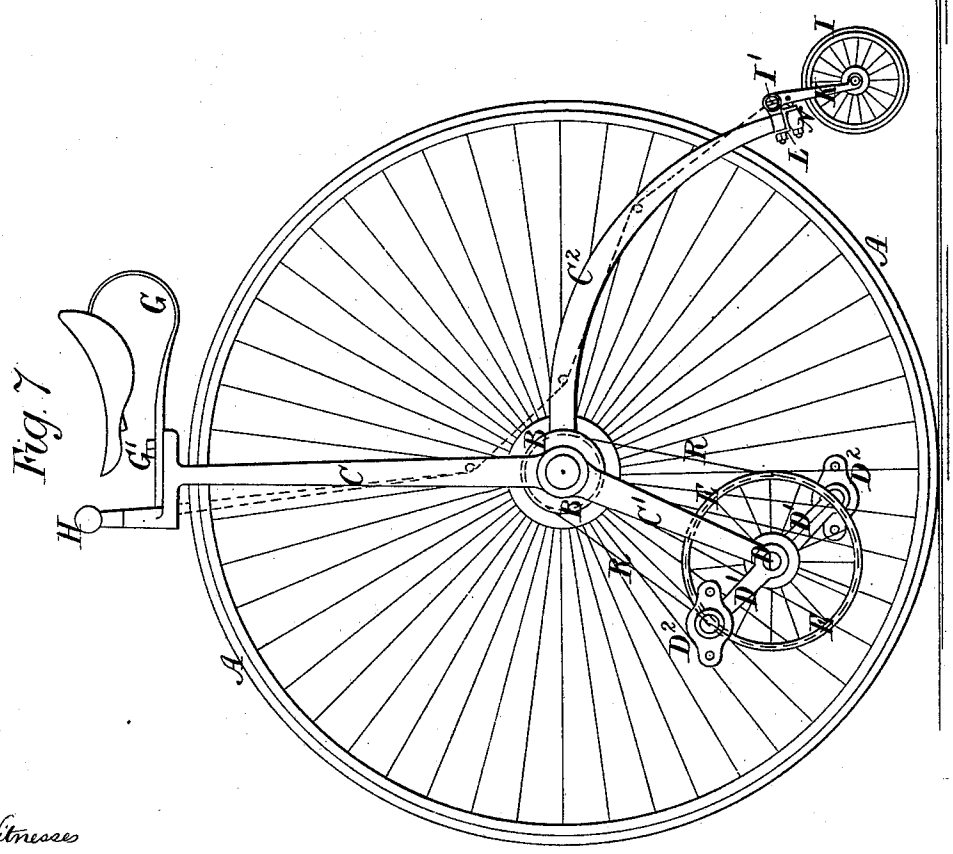


Fig. 7.



Witnesses

Chas. H. Smith
J. Hall

Inventor

E. C. F. Otto
per Lemuel W. Serrell
Atty

N. PETERS. Photo-Lithographer. Washington, D. C.

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E. C. F. OTTO.

VELOCIPEDE.

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Fig. 10

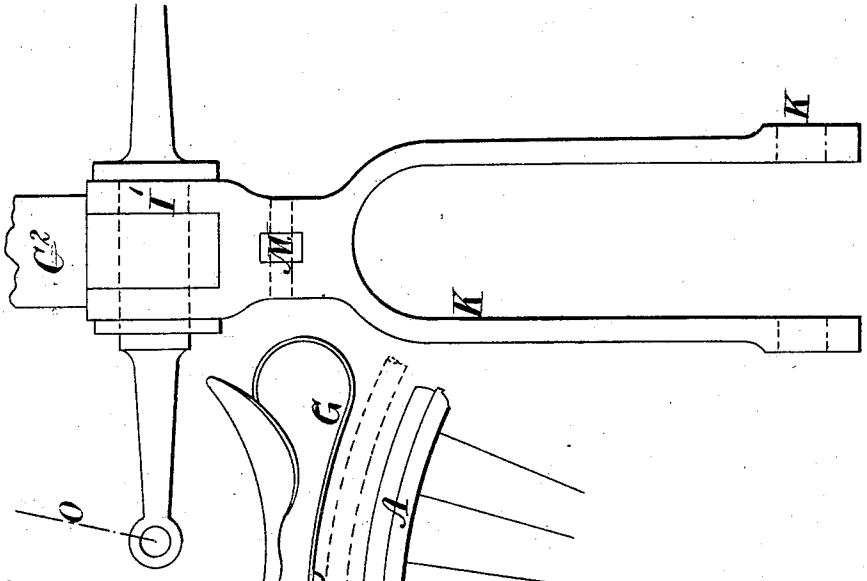


Fig. 11

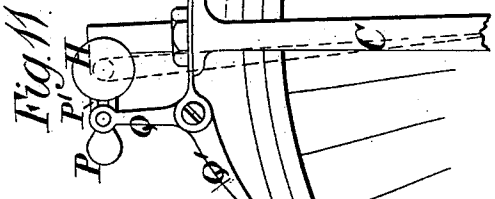
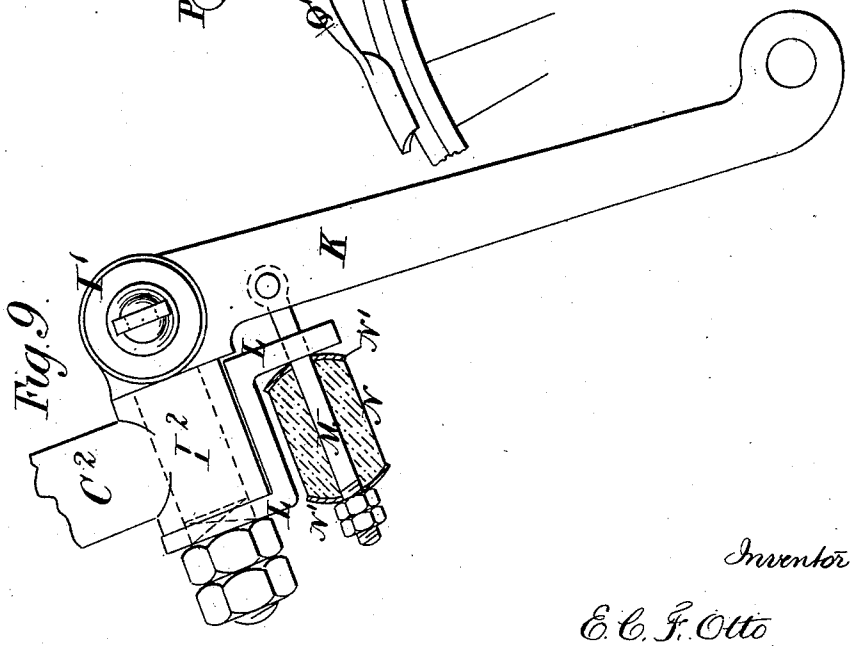


Fig. 9



Witnesses

Chas. H. Smith

J. Hall

Inventor

E. C. F. Otto

per Lemuel W. Serrell

Atty

N. PETERS. Photo-Lithographer. Washington, D. C.

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E. C. F. OTTO.

VELOCIPEDE.

No. 246,031. Patented Aug. 23, 1881.

Fig. 19

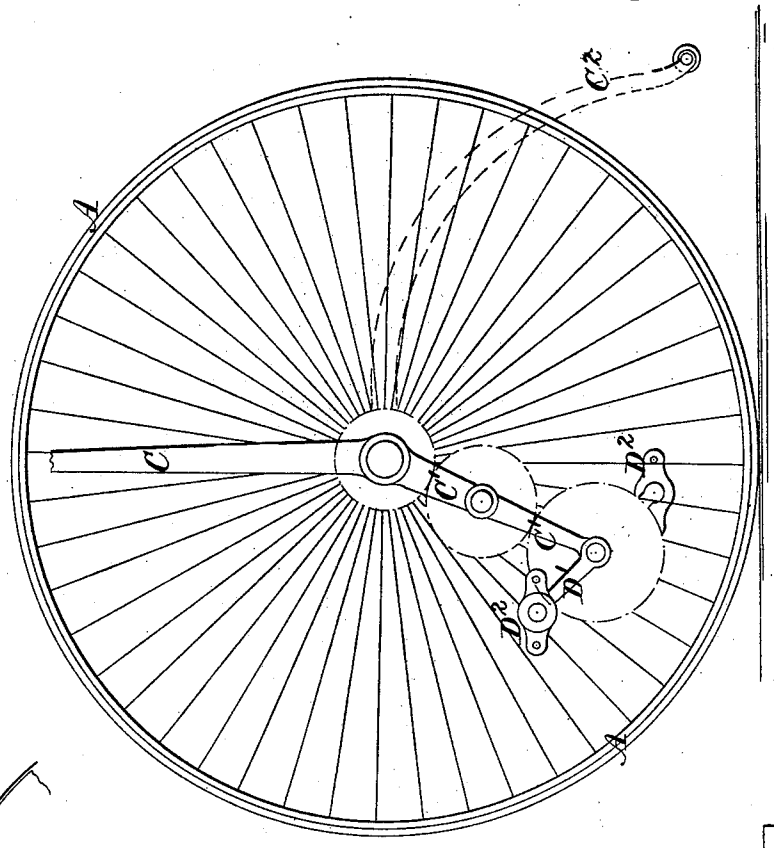


Fig. 12



Fig. 13



Fig. 14.



Fig. 15.



Fig. 16.



Fig. 17.

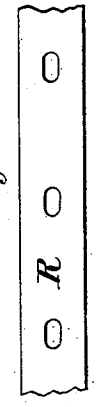
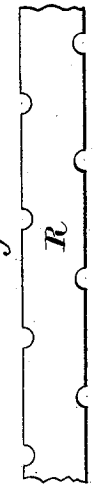


Fig. 18.



Witnesses

Chas. H. Smith

J. Hall

Inventor

E. C. F. Otto

per Samuel W. Terrell

atty

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

EDOUARD C. F. OTTO, OF PECKHAM, COUNTY OF SURREY, ENGLAND.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 246,031, dated August 23, 1881.

Application filed June 6, 1881. (No model.) Patented in England October 19, 1880.

To all whom it may concern:

Be it known that I, EDOUARD CARL FRIEDRICH OTTO, of Peckham, in the county of Surrey, England, have invented new useful Improvements in Velocipedes, (for which I have obtained a patent in Great Britain bearing date 19th October, 1880, No. 4,257,) of which the following is a specification.

In the specification of my United States patent application dated June 10, 1880, I have described a novel mode of and means for balancing a rider seated between two wheels and above their center. Now, the object of this present invention is to adapt the same improvement to a vehicle consisting of only one wheel, the rider being seated above it, and also to adapt it to a kind of bicycle.

Figure 1 is a side view of a unicycle constructed according to this invention, and Fig. 2 a front view of same. Fig. 1ª is a perspective view of the machine with a rider thereon, whereby the proportions of the unicycle are more clearly seen.

The road-wheel A is comparatively small and light; it may, however, be made with a comparative wide rim or tire, for the purpose of facilitating the mounting and balancing. On each side of its center I fix a small flanged pulley, B, and on a lower continuation, C′, of the fork-lever C, (which continuation C′, I prefer to make forked,) I arrange on each side a treadle-spindle, D, with flange-pulley E, treadle-crank D′, and treadle D^2, by preference, as shown here, provided with foot-strap D^3, Fig. 2. The propelling-power is transmitted from the flange-pulleys E to the road-wheel pulleys B by means of bands or chains, the pulleys being correspondingly formed with projections or recesses or otherwise, so as to prevent all slip between pulleys and bands or chains. I prefer to use a peculiar kind of band which will be described further on with reference to Figs. 12 to 17.

The driving-pulleys E are of a larger diameter than the driven pulleys B on the axis or hub of the road or main wheel A, for the purpose of increasing the speed of the machine equal to that of an ordinary bicycle, but with a less number of revolutions of the crank and a less expenditure of propelling force.

The forks C, carrying the pulleys E, are extended backward into a forked backbone or back rest, C^2, which terminates at the rear of the wheel A, carrying a small roller. This back rest assists the rider in mounting, and is also useful for steadying the machine when used by beginners; but this machine may also be made and used without such backbone or back rest, C^2. The top of the fork carries the handles, as well as the rider's seat or saddle.

The spring G is pivoted at G′ to the top part of the fork C, (more clearly seen in plan at Fig. 3.) H are the handles. On a lower extension thereof is a tooth, *h*, engaging with a corresponding notch in the fore part of the spring G, so that by the movement of the handles in the direction in which the machine is required to go the spring G, together with the rider's seat, will turn either one way or the other, as desired, as shown in dotted lines, and thus, by the assistance of the weight and balance of the rider, the machine will be directed either to the right or to the left or travel in a straight course. The rider has perfect control of the machine when mounted and with his feet upon the pedals, as is the case with the Otto safety-bicycle, described by me in the patent application aforesaid, of which patent the present invention may be said more especially to be a development or improvement.

Fig. 4 is an elevation of a modified form of unicycle, in which no back rest, C^2, is shown. The lower continuations, C′, of the fork C are here made diverging in opposite directions therefrom, the treadle-spindles D being otherwise arranged and driven in a similar manner. It will be seen that the rider in this case will have to sit more forward, and this position may be obtained by slanting the fork C, or by shifting the saddle into a more forward position, the fork C remaining about vertical, as shown.

Fig. 5 is a side elevation of a unicycle without a back rest, C^2, and with both the lower continuations C′ of the fork in the same direction. This unicycle may, however, be made with such a back rest, C^2, as shown in the part view, Fig. 6.

In Fig. 7 I have shown a side view, and in Fig. 8 an end view, of a bicycle constructed according to this invention. It is fitted with a swiveling trailing wheel, I, at the lower end

of the backbone C^2. This part is shown about full size in side view in Fig. 9, and in end view in Fig. 10. The fork-piece K, carrying the wheel I, is constructed somewhat similar to that described in the specification of my patent application filed June 10, 1880. It can swivel on a pivot, I′, which has an extension, I^2, that can swivel in the opposite direction in an eye formed at the lower junction of the fork end of the backbone C^2, and the extension I^2 of the pivot I′ is formed with a square part, on which is fitted a bracket, L, which, by means of a rod, M, is connected to the fork-piece K. The rod M carries an india-rubber or other buffer-spring, N, between two washers, N′. As the wheel I rises and falls to the inequalities of the road, turning on the pivot I′, it compresses the buffer-spring N, which latter thus takes up the jar; but the trailing wheel I serves also for steering, and for this purpose I connect two cords or wires, O, (by preference music-wire,) to the eye-shaped ends of the pin or pivot I′, the wires O passing up along the inside of the fork C′ C and winding in opposite directions two or more times around each side of the handle H. By turning the latter in one direction or the other the trailing-wheel I is canted toward one side or the other.

Fig. 11 is a part view, showing a usual form of brake which may be used against the top of the road-wheel A. The handle or lever P, turning on a fulcrum-pin, P′, is connected to the upper arm, Q, of the brake-lever Q′. I have also here shown in dotted lines a detachable back extension, Q^2, connected to the backbone or projection on the top of the fork C. This back extension carries a caster when used as a unicycle, but when used as a bicycle it may carry a trailing wheel, and need not be detachable.

It is evidently important, in this kind of unicycle or bicycle, that there be no slip in the driving band or chain in case of any undue or sudden strain, for in that case the relative position of the pedals or cranks would be shifted or altered. A chain may be used to connect the pulleys B and E, but a chain causes undue friction. A thin steel band, such as I have described in connection with my bicycle in my pending patent application filed November 18, 1880, would, if used with flange-pulleys, as therein described, require to be kept very tight, in order to prevent possibility of slipping, and this tightness would involve undue friction of the revolving parts. Hence I adapt my patent steel band to this present invention by forming it with any suitable indentations, perforations, or projections on the flat or on the edge or edges, and I form the grooves of the wheels B and E with corresponding projections or indentations. Fig. 12 shows part of such a steel band, R, having rivets R′ at regular intervals and applied to a wheel, B, having corresponding cup-shaped depressions B′. Fig. 13 is a plan of this band. Fig. 14 is a side view partly in section, and Fig. 15 a plan, of a band having cup-shaped indentations. The wheels must in that case have corresponding projections. Fig. 16 is a longitudinal section, and Fig. 17 a plan, of a band having perforations, the wheels being then formed with corresponding projections. In Fig. 18 I have shown a band with notched edges, the wheel-flanges being then formed with corresponding but slightly smaller projections, such as little steel pegs driven radially into the wheel along the inside of the flanges.

If I use my plain flat band without projections or indentations or notches, then I make the wheel-groove taper narrower at the bottom, so as to cause the band to bind between the flanges, and I cover the part between the flanges with a soft india-rubber band.

In Fig. 19 I have shown the outline of a unicycle, in which the treadle-spindles are driven by tooth-wheel gearing—that is, with an intermediate wheel between the wheel on the treadle spindle-wheel and the road-wheel spindle-wheel. This form of unicycle may, like those previously described, be formed with a back rest, C^2, as shown in dotted lines.

I claim—

1. In a one-wheeled velocipede, with rider's seat arranged above the wheel, the fork C, having lower continuations, C′, with treadle or pedal spindles, which receive revolving motion without slip from the wheel by means of band or other gearing, substantially as set forth.

2. The combination, in a velocipede, of the wheel A, fork C, lower continuation, C′, back prolongation, C^2, and hind or caster wheel, substantially as set forth.

3. The handle H, having a tooth, *h*, gearing with a notch in the seat-spring G, for the purpose of steering the velocipede, substantially as set forth.

4. The steering-handle H, having a tooth, *h*, gearing with a notch in the seat-spring G, in combination with the lateral prolongations of the spindle I′ on the pivoted hind-wheel fork K, having spring-connections L M N, and in combination with the cords or wires O O, the ends of which are wound on the handle H in opposite directions for steering by the hind wheel, substantially as set forth.

5. The combination, in a velocipede, of the wheel A, treadles D^2, band-wheels B and E, and metallic bands R, adapted to interlock with projections on the wheels B E, substantially as set forth.

E. C. F. OTTO.

Witnesses:

G. JENSEN,
33 *Chancery Lane, London.*

JN. DEAN,
17 *Gracechurch Street, London.*