

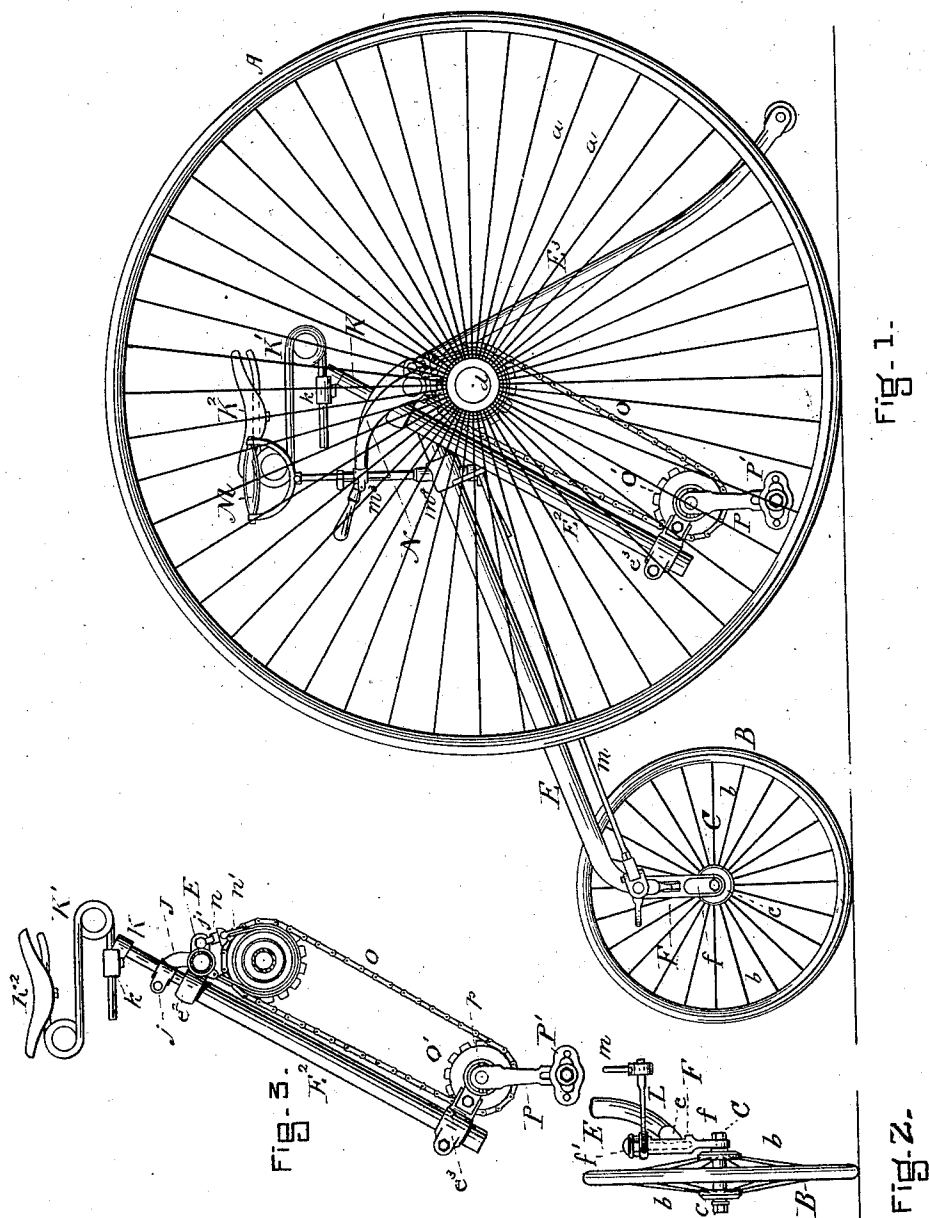
(No Model.)

3 Sheets—Sheet 1.

A. E. WALLACE.
VELOCIPÈDE.

No. 312,411.

Patented Feb. 17, 1885.



WITNESSES

Samuel H. Fiske
E. P. J. Morton

INVENTOR

Albert E. Wallace,
By Charles E. Pratt,
Atty

(No Model.)

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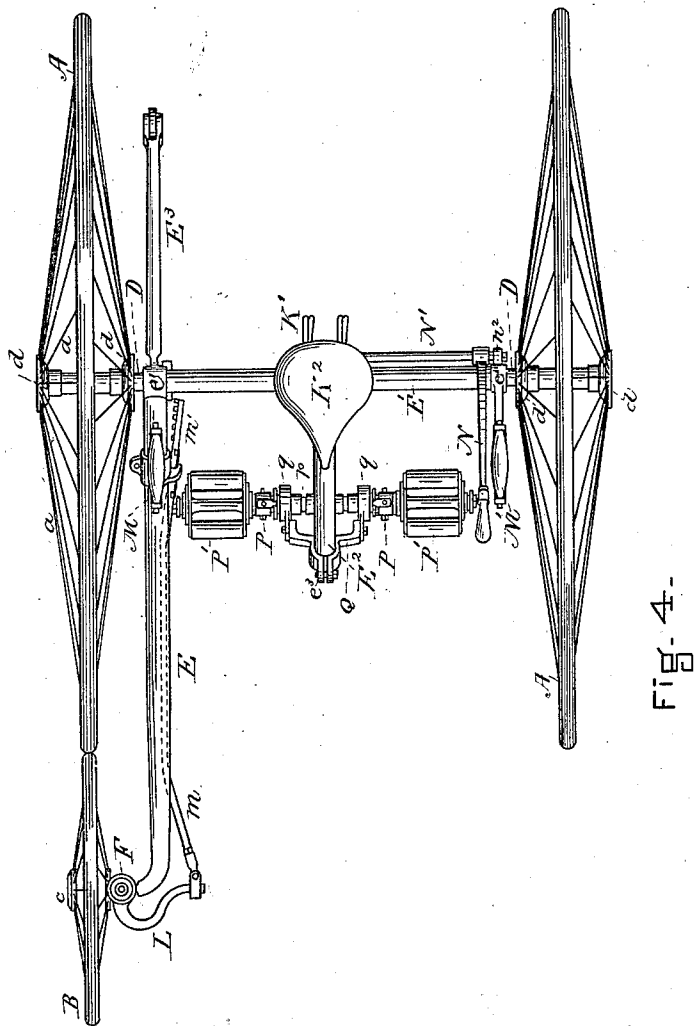


FIG. 4-

WITNESSES

Homer A. Fiske
E. P. J. Morton

INVENTOR

Albert E. Wallace,
By Charles E. Pratt,
Atty.

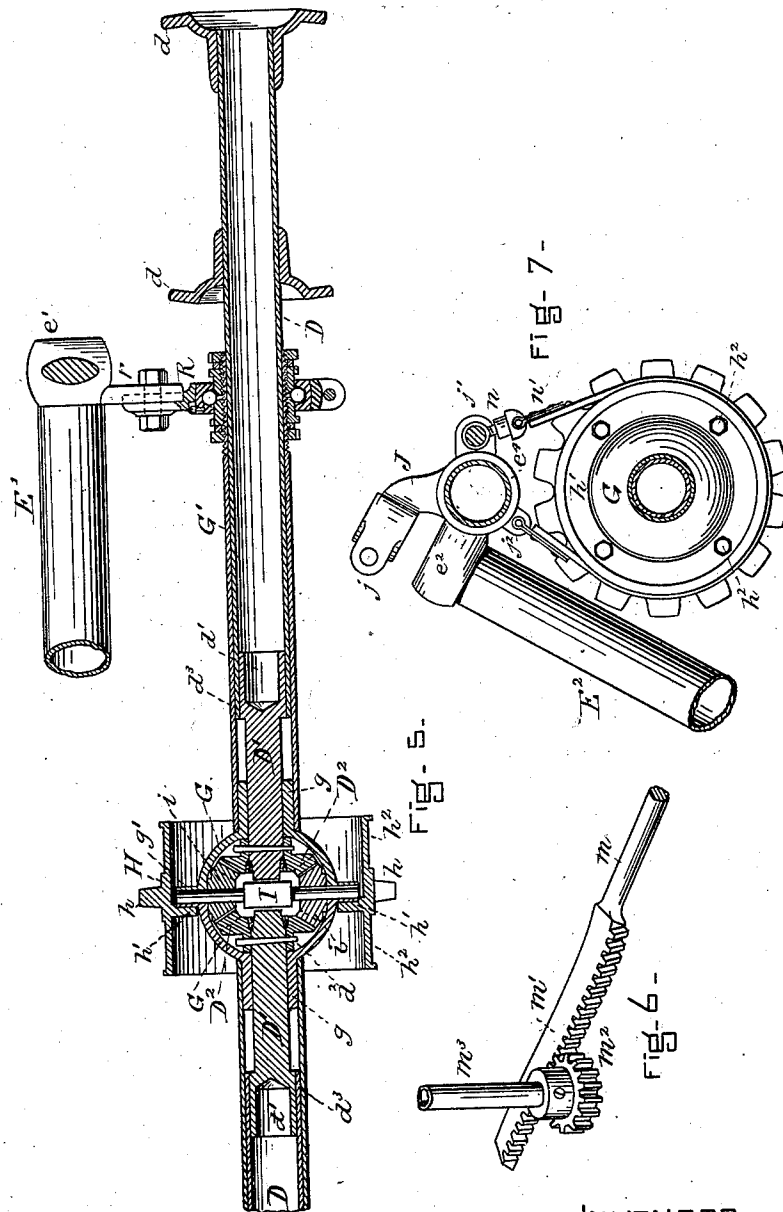
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 Homer A. Fiske
 C. P. J. Norton.

INVENTOR

Albert E. Wallace,
By Charles E. Pratt,
Atty.

UNITED STATES PATENT OFFICE.

ALBERT E. WALLACE, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE
POPE MANUFACTURING COMPANY, OF SAME PLACE.

VELOCIPEDÉ.

SPECIFICATION forming part of Letters Patent No. 312,411, dated February 17, 1905.

Application filed November 29, 1894. (No model.)

To all whom it may concern:

Be it known that I, ALBERT E. WALLACE, of the city of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Velocipedes, of which the following is a specification.

My improvements relate to that class of velocipedes known as "tricycles," although some of them are equally applicable to other machines; and they consist in the construction of a two-track, front-steering, double-driving, central gearing, rotary-motion, tubular-frame tricycle of greater simplicity, lighter weight, better adjustability, greater efficiency, and more economical construction than any of the tricycles heretofore in use, and in certain parts and combinations, hereinafter more specifically pointed out.

The nature and construction of my improvements will be more apparent from the following description, taken in connection with the drawings, in which—

Figure 1 represents in side elevation my improved tricycle. Fig. 2 shows in front elevation the steering-wheel and parts of the connecting mechanism. Fig. 3 shows in side elevation the seat, propelling mechanism, and part of the frame-work. Fig. 4 shows the top plan view of my improved tricycle. Fig. 5 shows in section on a vertical plane through the center of the driving-axes a part of the driving mechanism, a part of the frame, a balance axle-gear, the construction of the main axles, and hub of the driving-wheel. Fig. 6 shows in detail and perspective part of the steering mechanism, and Fig. 7 shows on a larger scale and in elevation a part of the mechanism shown in Fig. 3.

In all the drawings the same letters refer to the same parts.

A A are two wheels abreast, which may be called the "main wheels" or "driving-wheels" of the tricycle, having spokes *a a* and hub-flanges *b b*.

B is a smaller third wheel in front of one of the driving-wheels A, having spokes *b b*, hub *c*, and axle *C*, and which may be called the "steering-wheel."

D D are axles, which may be tubular, as shown, and which may form part of the hub of the wheel, the flanges of the wheels *d d* being secured directly to them.

D' D' are extensions of the axles D D, which may be either solid or tubular, or part solid and part tubular, as shown, and each of which may be in separate piece and brazed or otherwise secured to the part D, or may be in one piece with the part D, the tubular parts *d' d'* being made so for lightness.

E is a tubular portion of the frame-work, bent downward and outward at its forward end, and connected at *e* by means of a vertical spindle or otherwise, with the steering-head F.

F is a dwarf steering-head, which may consist of a cylindrical middle part open at one side to receive the steering-center *e*, and affording a seat for the lower end of the spindle of the steering-center, and having an adjustable seat for the upper end of the steering-center on a threaded bolt or screw, *f'*, and having a short standard, *f*, to which the axle *C* is attached.

E is another tubular portion of the frame, secured to the portion E by a joint or bracket, *e*, and which may extend across the tricycle between the main wheels and above their axles. E is another tubular portion of the frame connecting, by a bracket or lug, *e*, *e'* with the portion E', and tangentially to it, and which may serve as that portion of the frame to support the lower part of the driving mechanism by means of the bracket *e* at its lower end, and at its upper end to support the seat and its adjusting mechanism.

E' is a back stay connecting with the frame at *e'*, and which may have a small truck or pulley at its lower end, and serve to prevent the tricycle from tipping over backward in any emergency.

G G are parts of the balance-gear box, which may have the lugs and shoulders *g g*, to afford bearings for the inner ends of the axles D' D', and flanges *g' g'*, by which the two parts G G may be bolted or otherwise secured together, and which contain bearings for the block-shaft *l*.

G' G' are tubular sleeves or extensions attached by their inner ends to the gear-box G, and at their outer ends affording supports for the bearings R and the lugs r, and connecting them with the frame.

H is a sprocket wheel or drum having a row of chain-teeth, h h, at its periphery, and one or two flanges, n² n², for the application of the band-brake, and having an internal flange, h', by which it may be bolted or otherwise attached to the balance-axle gear-box. The block-shaft I is constructed with a rectangular central part, which may serve as a stop for the ends of the axles D' D', and affords at its ends axles for the intermediate gear-wheels, i i, which turn free upon it.

D² D² are toothed wheels upon the ends of the axles D' D', meshing with the intermediate gear, i, and affording on their opposite sides shoulders which may bear against the inner surfaces of the parts G G of the gear-box, and which may be held upon the axles D' D' by means of keys d' d', or otherwise, so that when the parts are in position as shown in Fig. 5 each axle D' is prevented from longitudinal motion in one direction by the block-shaft I, and from such motion in the opposite direction by a shoulder on the wheel D² and the key d'. In the construction as shown a space is left inside the tubular part G' and between the shoulders or bearings g and d', so that the part D' may move far enough into the part G of the gear-box to place the gear-wheel D² upon it and secure it by means of the key d', or otherwise, in putting the machine together.

J is a bracket, which may be a part with or separate from the bracket e' e', and which may serve as a connection by means of the clamp j with the support for the seat-rod, and by means of the lugs j' j' as support for the band-brake, and also as a connection for the two parts of the frame E' E².

K is the seat-rod, with a clamp, k, to receive and hold the saddle-spring K', and which is held by means of the clamp j adjustable in any position, according to the height and size of the rider, with reference to the driving-shaft.

K² is the seat or saddle.

L is a lever connected at one end with the dwarf steering-head F, and at the other end by means of a joint with the steering-rod m, and this latter has at one end the rack m', curved to a form similar to a slow spiral on its plain sides adjacent to the teeth, and this rack may be bent forward, or the rod m may be bent outward, or both so that the two may be moved backward and forward without conflict with the spokes or any other part of the machine. The rack m' is operated by means of a pinion, m², upon a rod, m³, connecting with the steering-rod M, which latter may be adjustable and brought to the correct position for the hand of the rider.

M' is a supporting-handle on the opposite side.

N is a brake-lever fixed to a connecting-rod, N', which is free to be partially revolved in the lugs j' and n², and to which is fixed a projection or small lever, n. Connected with this short lever n is a band or strap, n', passing around the flange n² and connecting with the lug j², connected with the frame of the tricycle.

O is an endless chain passing around the sprocket-wheel O' and the drum H, bearing the teeth h. The sprocket O' is upon the crank-shaft p, bearing the cranks P P, on which are the pedals P' P', and which takes its bearings in the bracket Q, attached by a clamp, e², or otherwise, to the part E² of the frame.

The placing of the steering-wheel D on one side and in front of one of the driving-wheels A makes the machine substantially a two-track machine, with three points of support, avoiding much of the obstruction met with in the three-track machine, and leaves a substantially open front, much to the convenience and safety of the rider. The construction of the frame of substantially three tubular pieces and arranged as shown secures great rigidity and strength in all parts of the frame, with extreme lightness as well, and no superfluous material. The inclination of the part E² is such as to bring the crank-shaft substantially beneath the common center of gravity and effort of the rider, and the arrangement of the clamp e² enables the crank-shaft and its connected mechanism to be moved to adjust them to the proper tension of the chain. The construction of the dwarf steering-head on the inside of the steering-wheel, and the bending downward and outward of the part E of the frame connected with it, secures great lightness and accuracy of operation in the structure, steadiness of action, and economy in manufacturing. The spiral curve in the rack m' on the steering-rod m enables this rod, as shown, to follow substantially the direction of the part E of the frame, and make an angle greater than a right angle with the rod m², which carries the pinion m², and enables the rack m' to be operated by the pinion m², with the teeth in proper position throughout the length of the rack, thus obtaining greater efficiency, a saving in weight of the machine, and more comeliness in the structure. The construction of the inclined seat-rod K is such as to allow not only a vertical adjustment of the seat, or an extension of the rod between the seat and the pedal, but also to give with it a fore-and-aft adjustment physiologically and mechanically desirable, because greater reach implies greater length of leg in the rider, which means greater length of upper leg as well as lower, and of arm, and hence this incline of the seat-rod K gives a better adjustment of position for the rider. At the same time it enables part of the seat-rod below the clamp J, in which it is held, to pass into the tube E² out of the way without interfering or coming in contact with other parts of the mech-

anism, the combination construction in one part of the bracket J, and the lugs $e^2 j'$, and the cylindrical part e' , which passes around the part E' of the frame, securing greater rigidity, lightness, simplicity, and economy in the construction of the machine, though they are not necessarily all made in one part.

Heretofore in the joining of two tubular parts of the frame at right angles to each other in T form clamps or joints have been used having two cylindrical parts in one piece, so that the axial lines of these two parts would fall substantially in the same plane; but by the construction I have shown and described, in which the two parts e^2 and e' are tangential to each other, I secure not only the opportunity of allowing the inclined seat-rod A to pass into one of the tubes, but also such tangential arrangement of the two tubes joined by this bracket as to allow a better angle of direction for the tube E², and space for the operation of the sprocket-drum H around the main shaft, and between the latter and E², and a closer or lower position of the tube E', also more advantageous.

By the arrangement of the brake mechanism as shown I get the advantage of applying a double band-brake, and also of having the brake-lever at one side of the machine and the brake-drum at the middle of the machine upon the driving mechanism without the necessity of a separate drum.

By the construction of the wheel and its flanges $d d$ and the shaft or half-axle D as shown and described I am enabled to make a lighter, more secure, and more economical wheel and axle, the axle forming a part of the wheel, and much material being dispensed with, while greater strength is retained and a more accurate truing up of the wheel.

By the construction of the tubular parts D G' and their connections, as shown and described, with each other and with the balance-axle gear and sprocket-drum I secure not only greater lightness of structure, but more convenient and economical assembling, disassembling, and repair of the machine, and complete securing of the free axle D D' from end-play or lurch or rattle in operation; and by the general construction of the whole tricycle with these and other modifications of structure apparent from the foregoing description, some of which are essential, and all of which I think advantageous, I am able to produce a lighter, steadier, stronger, hand-somer, and more effective tricycle than has heretofore been produced.

It is obvious that modifications in form and arrangement of this tricycle and of its different parts may be made without departing from my invention, and I do not mean to limit myself to the precise forms and arrangements shown and described.

I claim as new and of my invention—

1. A tricycle-frame consisting in three tubular parts, E E' E², of which one, E, is substantially parallel with and shorter than the

axial line between the two main wheels and adapted to take its support on the axles thereof, one, E, is substantially at right angles to and attached at or near one end of the last and bent both downward and outward to take its connection with the steering mechanism, and one, E², at or near the middle of the former and inclined downward so as to take near its lower end the support of a crank-shaft, and said parts being, as at $e' e' e'$, connected rigidly together, essentially as set forth.

2. In a velocipede, a dwarf steering-head, F, with a short single vertical standard, f , to receive the axle of the steering-wheel, and a cylindrical part with step and adjustable follower for the steering-spindle, and an opening to receive and permit partial rotation of the steering-spindle, and neck e of the connecting-frame, and an arm connected with said steering-head for the attachment of a steering-rod, essentially as set forth.

3. In a rack-and-pinion steering mechanism for a velocipede, a bent spiral rack, essentially as set forth.

4. In a velocipede, the inclined seat-rod K, bracket J, clamp j' , and bracket k , constructed, combined, and adapted to operate essentially as set forth.

5. The combination-bracket J $e^2 e' j j'$, constructed and adapted to hold a seat-rod, a brake-rod, and two parts of the frame together, essentially as set forth.

6. A bracket, $e^2 e'$, consisting of two cylindrical parts whose axial lines are at right angles to each other, and adapted to hold two cylindrical parts of the frame together tangentially to each other, essentially as set forth.

7. A sprocket-cylinder, H, having a peripheral row of teeth, h , a band-brake flange, n^2 , and an inward flange, h' , for attachment to the axle mechanism of a velocipede, essentially as shown and described.

8. The combination, in a velocipede, of a sprocket-wheel, H, or its equivalent, a balance-axle gear, G G' I i D² D², or its equivalent, axles D' D', and extension-tubes G' G', constructed and adapted to operate essentially as set forth.

9. In a velocipede, a brake-drum, n^2 , located beneath the seat and connected with the driving mechanism, a band, n' , rod N', levers N n, and bearings and connections, constructed and combined to operate essentially as set forth.

10. In a velocipede, a tubular inner axle, D D', and a tubular outer axle, G', the former connected with a balance-axle mechanism and a main wheel, and the latter connected with the frame and the balance-axle mechanism and driving-gear, and a means for connecting and limiting the relative longitudinal motion of the two, essentially as set forth.

11. A combined axle and wheel hub consisting in a tubular part, D, bearing flanges for spokes, and extending beyond the wheel to take connections with the frame and the driving mechanism of a velocipede, essentially as set forth.

12. In a tricycle, a divided axle each part of which is constructed and adapted to be connected with a balance-axle gear and driving mechanism at one end, and at the other end has flanges for the spokes of a driving-wheel, essentially as set forth.

13. The combination of tube D, extension D', flanges *d d*, spokes *a a*, and a felly constructed and adapted to operate in a velocipede, essentially as and for the purposes set forth.

14. An improved tricycle consisting, substantially, of two driving-wheels abreast connected by a divided axle each part of which forms an integral part of one of the said wheels, a balance-gear and its box and sleeve extensions having bearings for the divided axle and the frame, a three-part tubular frame, one part

being transverse and carrying the seat and brake mechanisms, one part at right angles to the latter, centrally located, and bearing the driving mechanism, and one part, also at right angles to the first tube, located at one side and bent downward and outward and carrying the steering mechanism, a steering-wheel tracking with one of the driving-wheels and connected by a dwarf steering-head with the frame, pedal and crank driving mechanism, and seat, handle, and steering mechanisms, all constructed and combined to operate substantially as and for the purposes set forth.

ALBERT E. WALLACE.

Witnesses:

WM. B. NELSON,

W. B. BROTHERTON.