

(No Model.)

2 Sheets—Sheet 1.

J. WHITE.  
TRICYCLE.

No. 269,609.

Patented Dec. 26, 1882.

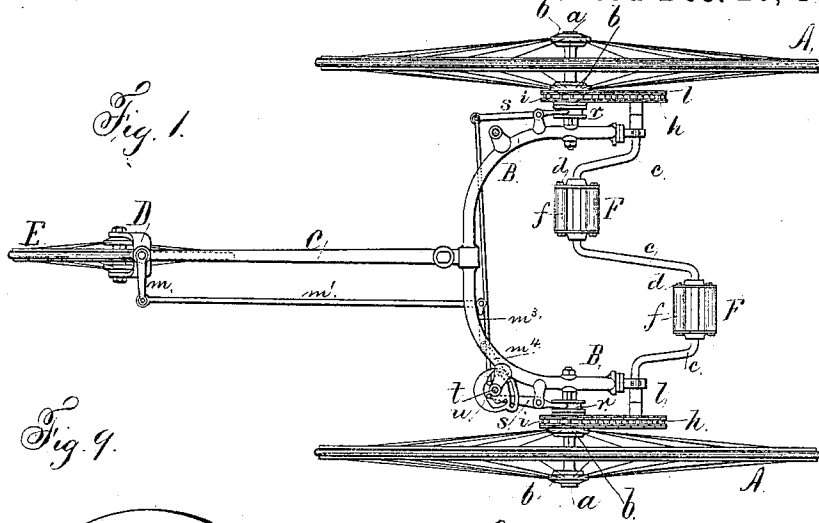


Fig. 1.

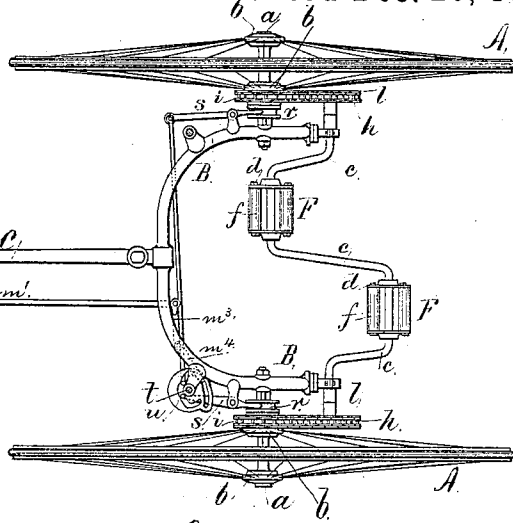


Fig. 4.

Fig. 6.

Fig. 7.

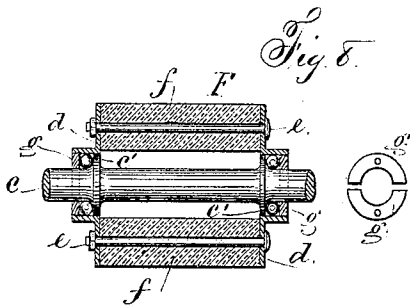
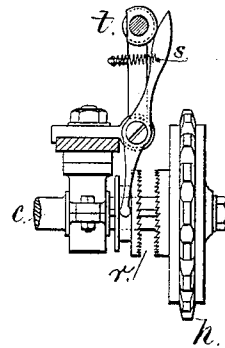
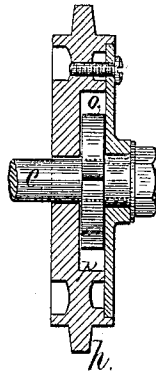
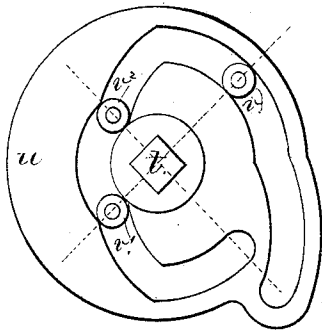


Fig. 8.

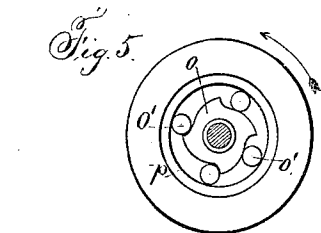


Fig. 5.

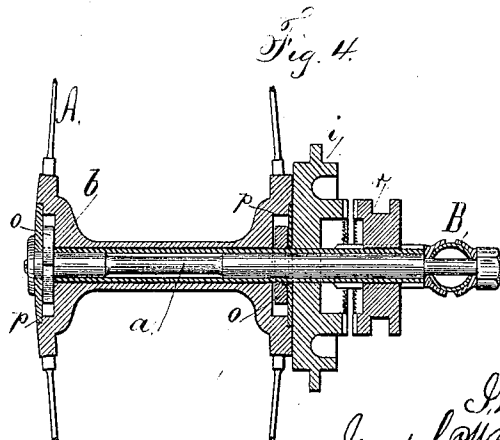


Fig. 4.

Witnesses  
Harold Serrell  
Chas. N. Smith

Inventor  
Joseph White  
per  
Lemuel W. Serrell

(No Model.)

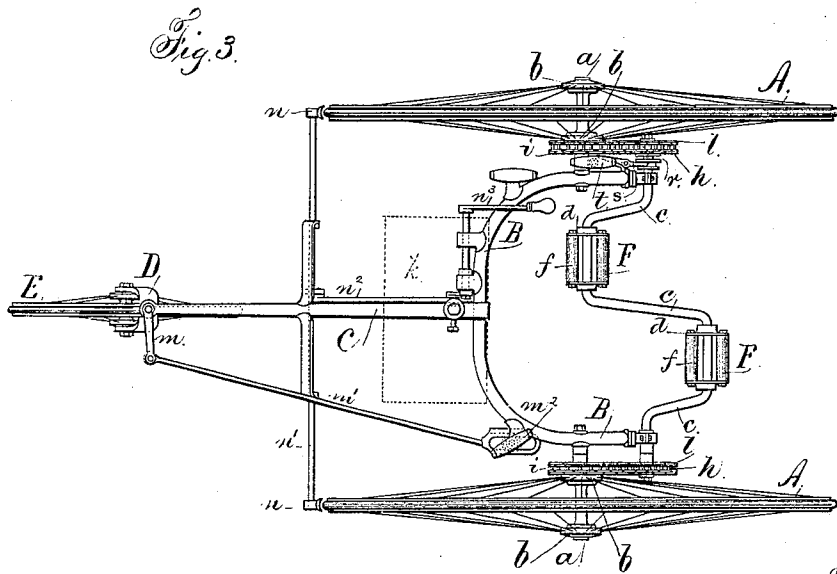
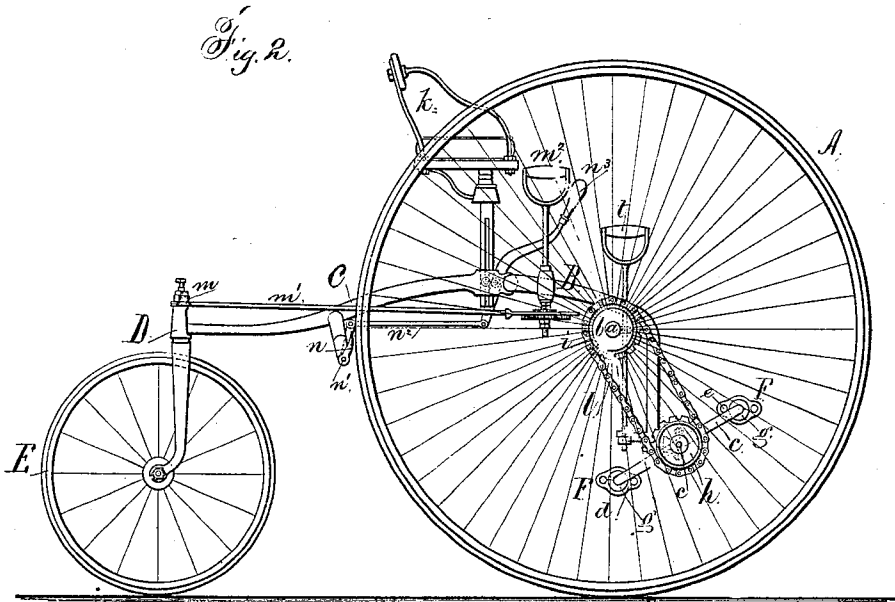
2 Sheets—Sheet 2.

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TRICYCLE.

No. 269,609.

Patented Dec. 26, 1882.



Witnesses,  
 Harold Ferrell  
 Chas. H. Smith

Inventor  
 per Joseph White  
 Lemuel W. Ferrell atty.

# UNITED STATES PATENT OFFICE.

JOSEPH WHITE, OF COVENTRY, COUNTY OF WARWICK, ENGLAND.

## TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 269,609, dated December 26, 1882.

Application filed February 6, 1882. (No model.) Patented in England February 7, 1881, No. 512.

To all whom it may concern:

Be it known that I, JOSEPH WHITE, of Coventry, in the county of Warwick, Great Britain, have invented an Improvement in Tricycles, of which the following is a specification.

Letters Patent No. 512 were granted, in Great Britain, February 7, 1881, containing my present invention; also other matters invented by George Davis.

My invention relates to an open-front tricycle, the same having two driving-wheels, a single rear-steering wheel, a separate treadle-shaft, and connections from the same to the driving-wheels. My special features of invention are more fully defined hereinafter. I however remark that this open-front tricycle allows the rider's seat to be placed about midway between the three wheels, where the rider can easily mount or dismount, and where he has perfect control of the machine in driving it by the pedals, or in stopping the machine by the brake, or steering it by the rear wheel.

In the drawings, Figure 1 is a plan view of the tricycle without the seat or brake. Fig. 2 is an elevation. Fig. 3 is a plan of a modified form of tricycle, showing the brake mechanism of the same. Fig. 4 is a section of the hub of one of the driving-wheels. Fig. 5 is an elevation of the coupling with the cap-plate removed. Fig. 6 is a section of the chain-wheel on the crank-shaft. Fig. 7 is an elevation of the coupling to the chain-wheel. Fig. 8 is a section of one of the pedals and an elevation of the divided rings, and Fig. 9 is a plan of the cam that is used to operate the rear wheel and the clutches to the driving-wheels. Figs. 4 to 8 are drawn larger for greater clearness.

The driving-wheels A A revolve upon the axles *a*, that project from the arched frame B. From this frame B there is a spine, C, extending to the pivoted fork D of the back wheel, E. The wheels themselves are by preference made on the suspension plan, with rods diverging from the rim to the hubs *b*; but any desired construction of wheels may be employed. The arch-frame B extends forward and downward beyond the axles *a*, and terminates with bearings for the crank-shaft *c*, upon which are the pedals F. Each pedal is made as represented in Fig. 8. There are two heads, *d*, that can be passed over the crank portions

of the shaft *c* to the respective collars *c'*. The bolts *e* connect the end pieces of the pedals together, and also confine the treads or rungs *f* of the pedals.

Small steel balls are introduced within the cylindrical hubs of the heads *d* against the crank-shaft and collars *c'*, and these balls are held in place by the dividing-rings *g*, having exterior screw-threads that screw into the cylindrical hubs *d* of the pedal ends. By this construction the pedals can be threaded upon the crank-shaft with facility, the holes in the heads *d* being large enough to pass over the bends of the cranks and over the collars, and the pedals are retained by the collars *c'*, balls and rings *g*, so that they cannot be displaced by an endwise movement.

Upon the ends of the crank-shaft *c* are the chain-wheels *h*, with chains to the wheels *i*, that are upon the hubs *b* of the driving-wheels A, or connected to such hubs, so that the driver upon the seat *k* can easily operate the pedals and crank-shaft *c*, and by the wheels *h* and *i* and chains *l* rotate the drivers A. The back wheel, E, is moved in steering the tricycle by the arm *m* upon the pivoted fork D, and a rod, *m'*, extending to the hand-lever *m''*. The brake-blocks *n* are upon the rock-shaft *n'*. This is supported by a T-shaped or other suitable bearing upon the spine C, and there is a link, *n''*, from a crank on the rock-shaft *n'* to a lever, *n'''*, that may be operated by hand at will. This device is shown especially in Figs. 2 and 3.

The two driving-wheels do not travel the same distance in turning a curve. It is therefore necessary to provide a friction-clutch that will allow one wheel to move faster than its pulley and chain. I find the friction-coupling shown in Figs. 4, 5, and 6 the best adapted to this purpose. The ratchet-wheel *o* has teeth, the surfaces of which are curved, as shown, and there are short cylinders *o'* between the teeth and the inner surface of the cylinder *p* when the ratchet *o* is moving with sufficient speed to drive the cylinder *p*; then the small cylinders *o'* block between the inclined curved surfaces of the teeth and the cylinder *p*. If, on the other hand, the wheel *o* is not moving as fast as the cylinder *p*, as in going down a steep hill or turning a sharp curve, the cylinders *o'* roll down the curved inclines, and this friction-

coupling is liberated. This said friction-coupling may be within the hubs of driving-wheels A, as seen in Figs. 1 and 4, the chain-wheels *i* and wheels *o* being fastened to sleeves around the axles *a*, or the clutch may be within the chain-wheels *h*, Figs. 3, 6, and 7, in which case the rider will not work the pedals in going downhill, but will control the speed by the brake-lever *n*<sup>3</sup>. In this arrangement, however, the pedals cannot be availed of to lessen the speed in going downhill. When desired, therefore, to "back-pedal" the machine, a clutch, *r*, Fig. 7, is provided, the same sliding on a feather, so that when operated by the lever *s* the shaft and chain wheel *h* will be firmly connected and the friction-coupling *o* will cease to be operative and the rider can back-pedal the machine to lessen its momentum.

In Fig. 3 the chain-wheels *i* are represented as connected directly with the hub of the wheels A, and the chain-wheels *h* are to be made with friction-clutches *o*, as seen in Figs. 5 and 6, and with machines capable of being back-pedaled the coupling *r* will be applied to one of the wheels *h*, as in Fig. 7, so that one wheel can be kept under control by the pedals, as well as by the brake.

In the arrangement shown in Fig. 1 the friction-clutch, Fig. 7, is to be applied to the hubs of the wheels A, as in Figs. 1 and 4, and if the machine is to be back-pedaled I also provide a clutch, *r*, and lever *s* upon the sleeve that revolves upon the stationary axles, so as to connect one or both of the chain-wheels with the sleeve and driving-wheel, and thus prevent the wheel being thrown loose by the friction-clutch.

The levers *s* and clutches *r* are usually held out of action by a spring and thrown into action by the hand applied to the lever *t*. In some instances, however, it is desirable to apply the power to the outer wheel in turning curves and to throw the inner wheel loose. I accomplish this automatically by combining with the steering-wheel and levers *m m'* the cam *u*. (Shown in Fig. 9.) This cam has a groove of about the shape shown, and in that groove there are three studs or rollers. The roller *v* is on a lever-arm that operates the steering-wheel through the link *m*<sup>3</sup> and crank-arm *m*<sup>4</sup>. The stud *v'* is connected to the lever *s* at the right side of the machine, and the stud *v*<sup>2</sup> is at the end of a link that acts upon the lever at the left side of the machine. When the cam *u* is turned and the steering-wheel set to turn the tricycle to the right, the clutch *r* of the left wheel is connected with the chain-wheel, and the chain-wheel at the right is thrown loose to move slowly in traveling the shorter or inner curve. If the tricycle is steered to the left the clutch *r* of the right

wheel is connected by the action of the cam on the roller or stud *v'*, and the wheel at the left is thrown loose to travel the inner curve. By this arrangement the rider is able to drive the tricycle by the outer wheel in turning curves and the connection is made automatically. The shape of the cam shown in Fig. 9 is such that the coupling of the inner wheel will be disconnected, it being understood that when traveling straight both couplings interlock. The cam may be shaped so that the wheels A will be driven by the friction-clutches *o*, and the clutch *r* will be brought into action on the outer wheel in turning a curve.

I claim as my invention—

1. The combination, in a tricycle, with the frame B, spine C, rear steering-wheel and its guiding mechanism, and the driving-wheels A, of the crank-shaft *c*, chain-wheels *i h*, chains *l*, friction coupling-wheels *o*, having curved teeth, and secured on the ends of the crank-shaft *c* and the short cylinders *o'* within the chain-wheels *h*, substantially as specified, whereby one or both driving-wheels are connected with the crank-shaft or disconnected automatically, substantially as set forth.

2. The combination, in a tricycle, with the frame B, spine C, rear steering-wheel, its guiding mechanism, and the driving-wheels A, of the crank-shaft *c* and pedals upon the same, the chain-wheels *i h*, and chains *l*, the friction coupling-wheel *o* with curved teeth, the short cylinders *o'*, and the clutch *r* and lever *s*, substantially as set forth.

3. The combination, in a tricycle, of two driving-wheels, a steering-wheel, a spine, and open-front bow-frame, the axles for the front wheels, a crank-shaft, chain-wheels, and chains, clutches, and levers for the same, the cam and connections therefrom to the clutch-levers and steering-wheel, respectively, whereby the driving-wheels are coupled automatically in steering the machine, substantially as set forth.

4. In combination with a crank-shaft having collars *c'* upon the cranks, the pedals having heads *d*, with cylindrical openings corresponding in internal diameter to the collars, the screw-rings *g*, and ball-bearings, substantially as set forth.

5. The combination, in a tricycle, of the driving-wheels, the crank-shaft and treadles, the chain-wheels *i h*, chains *l*, clutch *r*, lever *s*, and mechanism for operating said lever, substantially as set forth.

Signed by me this 15th day of November, A. D. 1881.

JOSEPH WHITE.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.