

(No Model.)

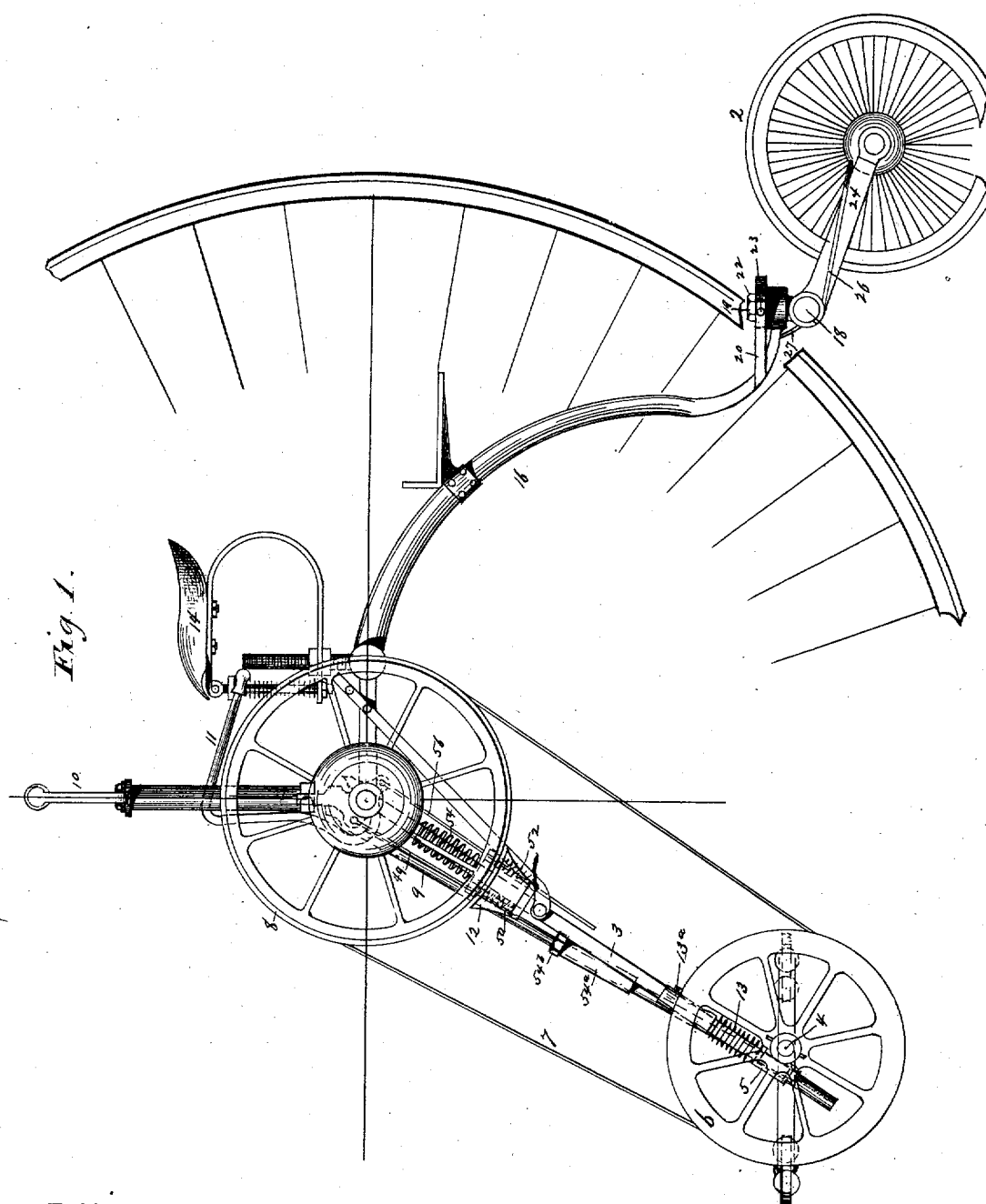
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E. C. F. OTTO.

TRICYCLE.

No. 252,504.

Patented Jan. 17, 1882.



Witnesses:
Chas. S. Hyer
attest

Inventor:
Edouard Carl Friedrich Otto
by his Atty. *R. E. Eick*

(No Model.)

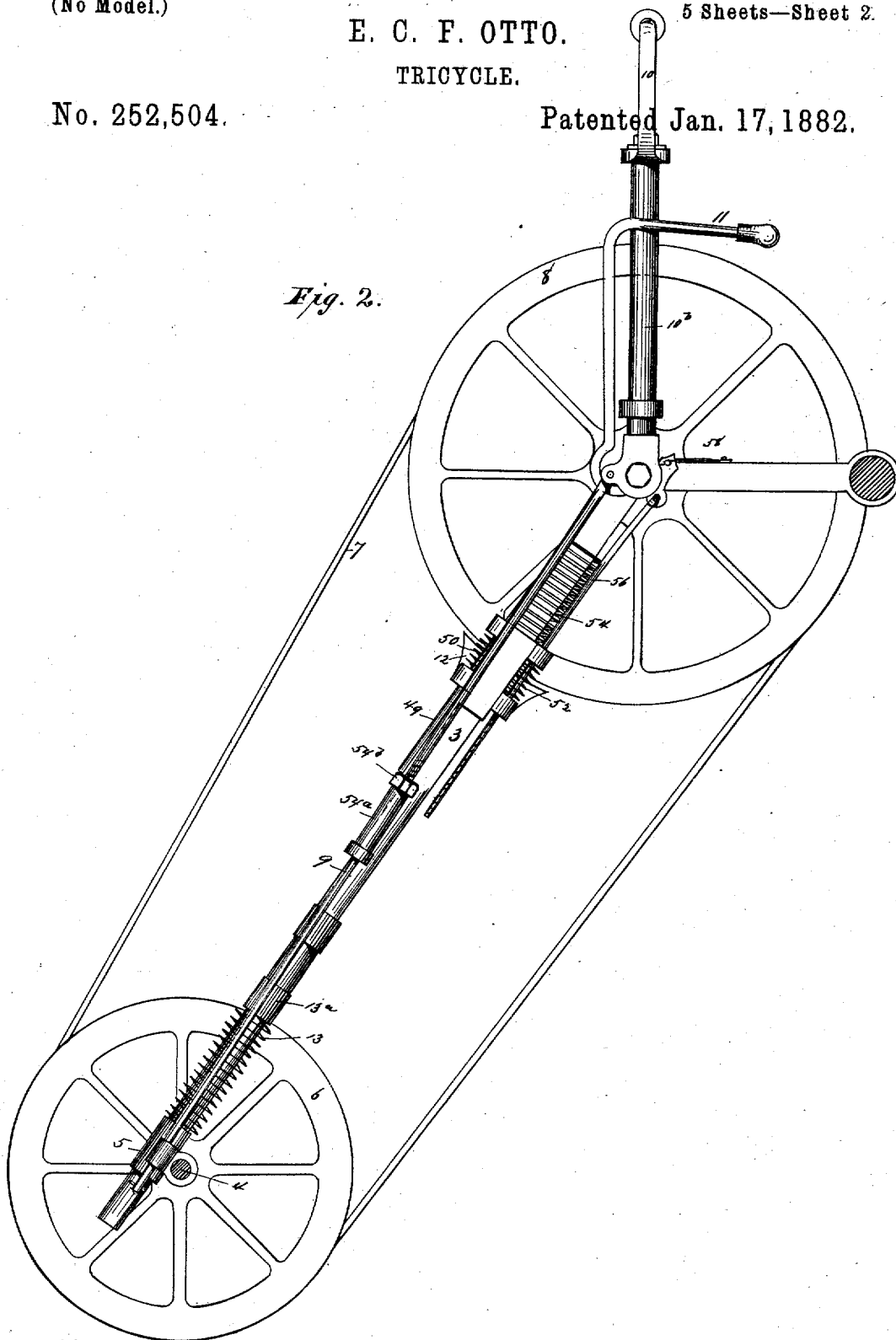
E. C. F. OTTO.
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Fig. 2.



Witnesses:
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test

Inventor:
Edouard Carl Friedrich Otto
by his Atty *[Signature]*

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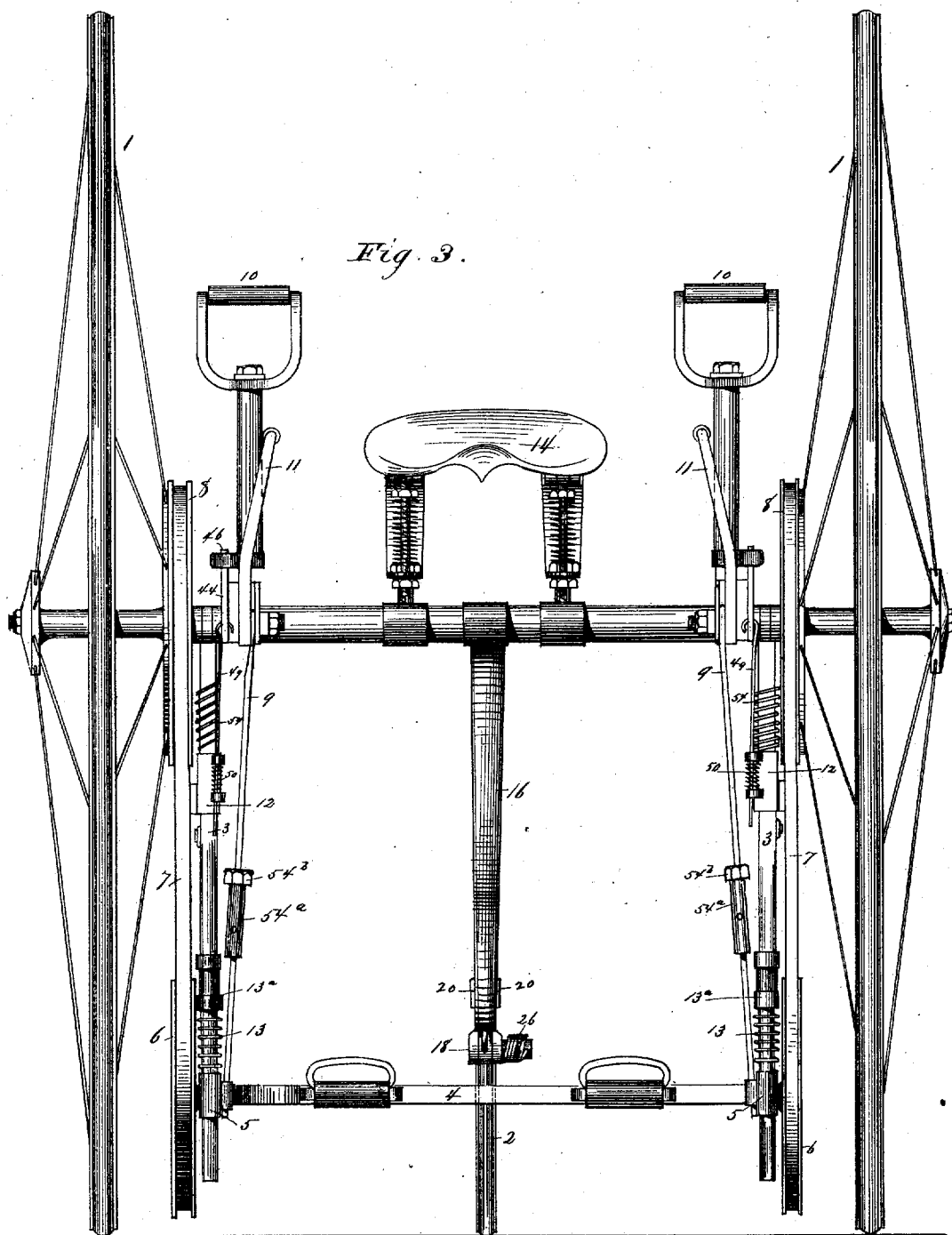
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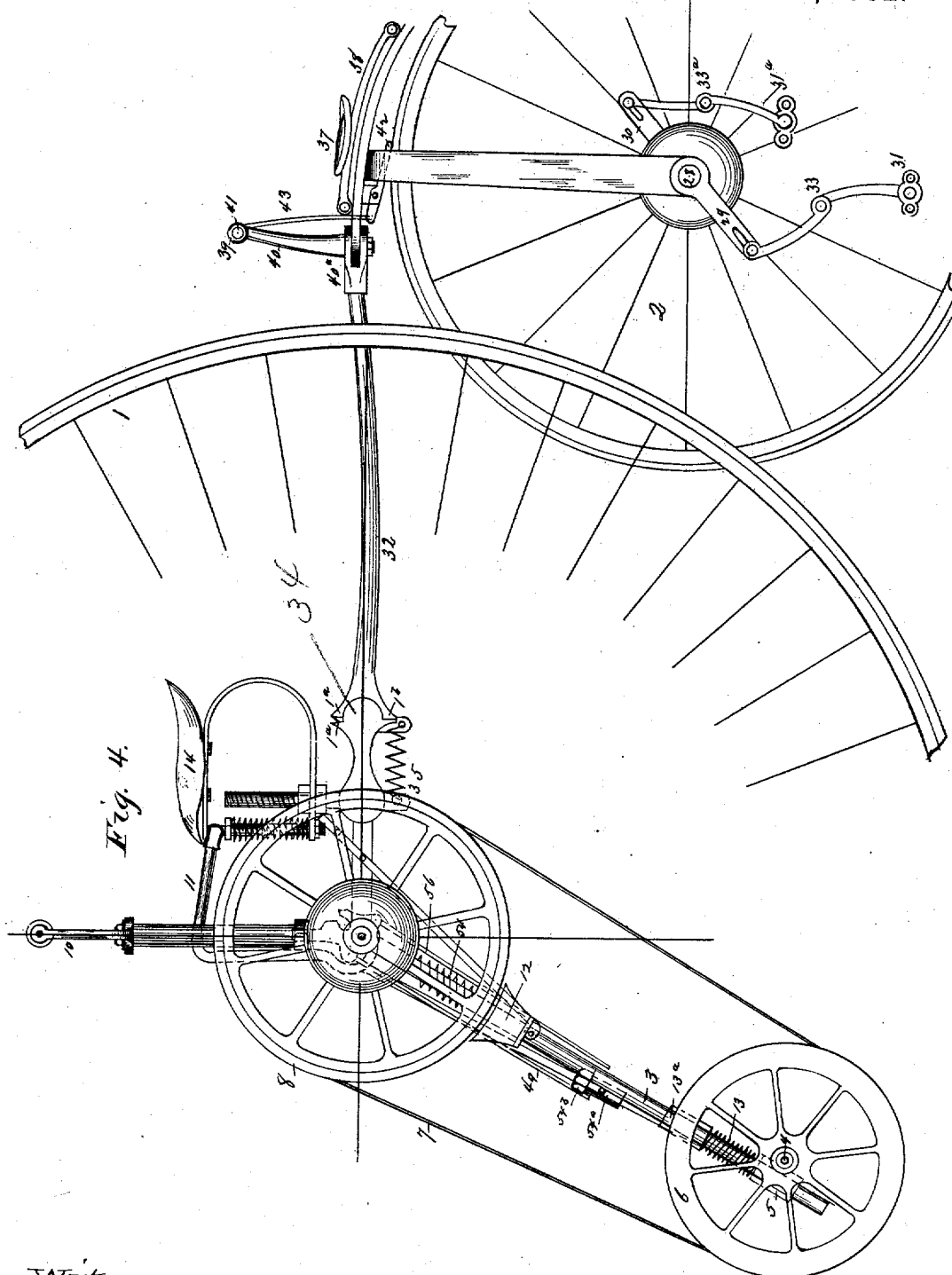
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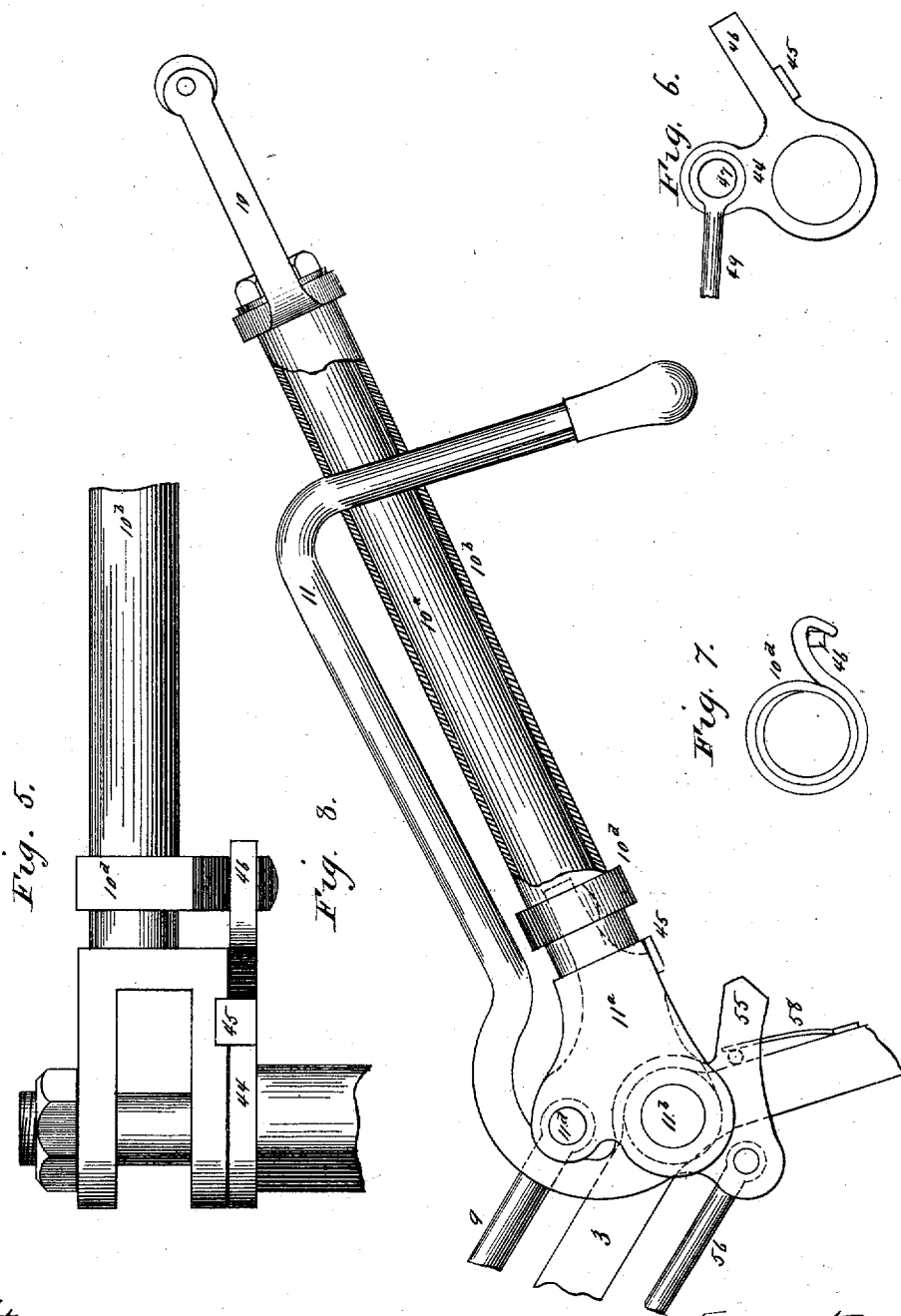
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Inventor:
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by his Att'y
J. E. Eide

UNITED STATES PATENT OFFICE.

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

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 252,504, dated January 17, 1882.

Application filed August 26, 1881. (No model.) Patented in England May 31, 1879.

To all whom it may concern:

Be it known that I, EDOUARD CARL FRIEDRICH OTTO, of Peckham, in the county of Surrey, England, mechanical engineer, have invented new and useful Improvements in Tricycles, of which the following is a specification.

This invention relates to improvements in tricycles; and it consists in furnishing a tricycle with two driving-wheels, 1, which at the same time form the steering-wheels of the machine, while the third wheel, 2, serves only to steady same without acting as a guiding-wheel, which is a perfectly novel feature. By this improved construction going uphill is rendered far more easy, as the two driving-wheels have a better hold or bite of the ground, while the third wheel voluntarily assumes and remains in the proper position to the driving-wheels.

The frame-work of the machine has two connecting-rods, 3, to which a treadle-crank axle, 4, is so attached that it moves freely up and down with sliding boxes 5, within which it rotates. Two treadle-pulleys, 6, are firmly attached to the ends of treadle-crank axle, which transmit power by endless chains or bands 7 to two corresponding pulleys, 8, firmly attached to the driving-wheels, and thus immediately the treadle-crank is actuated to impart motion to the vehicle. The sliding boxes 5 are attached to steering-rods 9, actuated by steering-handles 10 and brake-levers 11, conveniently placed on either side. Thus the rider can lift either axle-box separately, together with its corresponding treadle-pulley, such upward movement slackening the chain or its equivalent, and allowing corresponding brake 12, placed under corresponding driving-pulley, to press against corresponding driving-wheel, thereby retarding or arresting motion, as desired.

To transmit to driving-wheels the full amount of power imparted to treadle-crank it is requisite to keep the endless chains 7 or their equivalents tight. This I effect by spiral springs 13, which depress axle-boxes 5, and also treadle-pulleys 6, and thus constantly keep such chains or their equivalents at a proper tension. Either one set of pulleys or two sets, one of larger diameter than the other, may be employed to impart increased speed when traveling over

level roads, or increased power on hilly roads, while the steering-gear is so constructed that although both large wheels are driving-wheels, yet, when required, they act either together or independently of each other as steering-wheels by pulling either or both handles toward the rider, and so retarding or arresting the corresponding wheel or wheels, thus fulfilling a double function. The seat 14 is placed between such wheels and furnished with springs constructed on the improved principle illustrated in the drawings, thus giving great elasticity and allowing the seat to readily assume that position toward the treadle-crank axle most convenient to the rider.

The third or following wheel, 2, is attached to the back of the vehicle by a backbone, 16, furnished with hinge having two joints, 18 19, allowing of its easy play. Joint 19 is furnished with two parallel springs, 20, which clasp two flat surfaces formed on backbone 16, and hold wheel 2 in position. Such parallel springs are firmly attached to a bolt and nut, 22, at 23, and fork 24 of wheel is also so connected to same at 18 as to move freely up and down, while a spring, 26, likewise fastened to the bolt at 18, constantly depresses wheel 2 as far as shoulders or pin 27 will permit. Joint 18 allows of the rider leaning backward when descending, whereby he depresses such joint and assumes such a position as to obviate all danger of his falling forward. Such double-jointed hinge and attachments are shown in Fig. 1, while Figs. 1, 3 show front and side elevations of my improved tricycle, and Fig. 2 sectional view of steering-gear, pulleys, and brake. By detaching such third wheel, bolt, and parallel springs and replacing same with a small roller, a tricycle, when constructed as shown in Figs. 1, 3, may be readily converted into my improved patent safety-bicycle.

When desired a second seat may be placed above wheel 2, as shown at Fig. 4. To accomplish this the following wheel 2 is made of larger diameter and furnished with an axle, 28, having adjustable cranks 29 30 and pedals 31 31^a attached thereto and connected by a backbone, 32, of modified form, with the main axle. Folding hinge-joints 33 33^a are provided wherewith to shorten or lengthen such adjustable cranks, which fold to any required angle

to suit different riders, and are held in position by bolts and screws.

To impart elasticity and allow the vehicle to readily pass over uneven ground, backbone 32 has hinge-joint 34 and coiled spring 35, which allows backbone to bend downward until the two upper shoulders, 1^a 1^a, meet, while the coiled spring keeps the two lower shoulders, 1^b 1^b, constantly together. This device imparts elasticity to the backbone when the rider in descending declivities leans backward.

At the outer extremity of backbone 32 is a joint, 40^a, whereto fork of wheel with seat 37 resting on spring 38 is attached. Handles 39 are attached to steering-head 40, which is rigidly connected with backbone. Such handles, by being twisted on horizontal pins 41, act on brake 42 by connecting-wires 43 or their equivalents. By this improved arrangement the hind wheel can readily assume any requisite position for steering purposes.

Fig. 8 is a side view, partly in section, of the upper portion of steering gear, wherein 10 is the handle; 10^a, pin of lever 11^a, which turns on axle 11^b. 11 is the brake-lever, and 9 steering-rods attached at one end to lever 11^a by pin 11^a, and at the other end to axle-boxes 5.

Fig. 6 shows a side view of a small lever, 44, turning round axle-pin 11^b over a projection formed on lever 11^a, with shoulder 45 resting on lever 11^a and extremity 46. The dotted lines, Fig. 8, show position of extremity 46 to lever 44, which acts as a supplementary lever to lever 11^a. At 47 brake-rod 49 is connected to 44. Such rod is furnished with spiral springs 50 to regulate pressure of brake, while springs 54 release wheel from such pressure. Steering-lever is fitted within hollow case 10^b, the end whereof 10^c is fitted with spring 10^d, which is securely attached thereto. The mechanism is so arranged that by twisting handle 10 on pin 10^a spring 10^d catches in lever 46, thereby raising it, and so pulling brake 12 by wire 49 against pulley 8. Lever 11 is

provided with shoulder 55 to determine its position, and is connected by wire 56 with brake 12, while such wire is provided with check-spring 52. The downward movement of lever 11 causes brake to bear on pulley 8 and arrest the wheel's motion, while spring 58 raises lever 11 to its original position.

54^a are tubular nuts with right and left hand threads, so that on turning them either way steering-rods 9 are lengthened or shortened. 54^b are lock-nuts which hold 54^a in position. 13^a are adjustable shoulders, regulating springs 13.

I claim as my invention and as novel in the construction of tricycles—

1. In a tricycle, the combination, substantially as before set forth, of the main axle, the backbone secured thereto, the fork of the following wheel hinged to the backbone, and another joint interposed between said fork and the main axle, operating at right angles to the hinge.

2. In a tricycle, the combination, substantially as before set forth, of the drive-wheels mounted on a common axle, the backbone connected to the axle and provided with fixed steering-handles, and the driving following wheel, the fork of which is pivoted to the backbone and provided with a saddle.

3. In a tricycle of the character described, the combination, substantially as before set forth, of the front seat mounted on the axle of and between the main or driving wheels, and the rear seat mounted above the following wheel.

4. In a backbone for tricycles, the combination, substantially as before set forth, of the vertically-operating hinge-joint and the spring.

EDOUARD CARL FRIEDRICH OTTO.

Witnesses:

SHIRLEY BOWDEN,
Patent Solicitor, London.
WILLIAM R. LOWMAN,
London.