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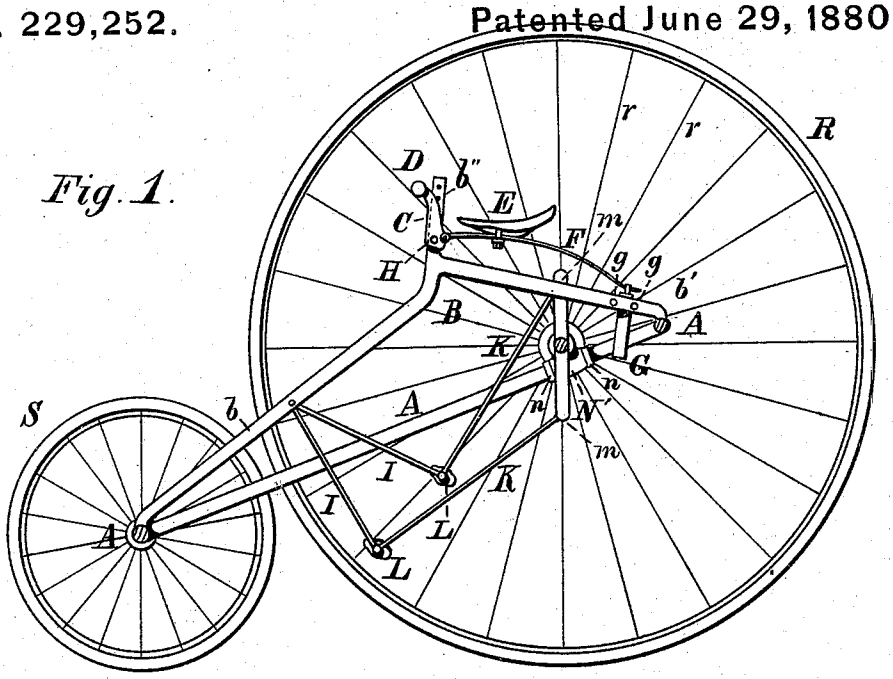
E. K. HILL, E. F. TOLMAN & A. H. HOWLAND.

Railroad Velocipede.

No. 229,252. Patented June 29, 1880.

Fig. 1.



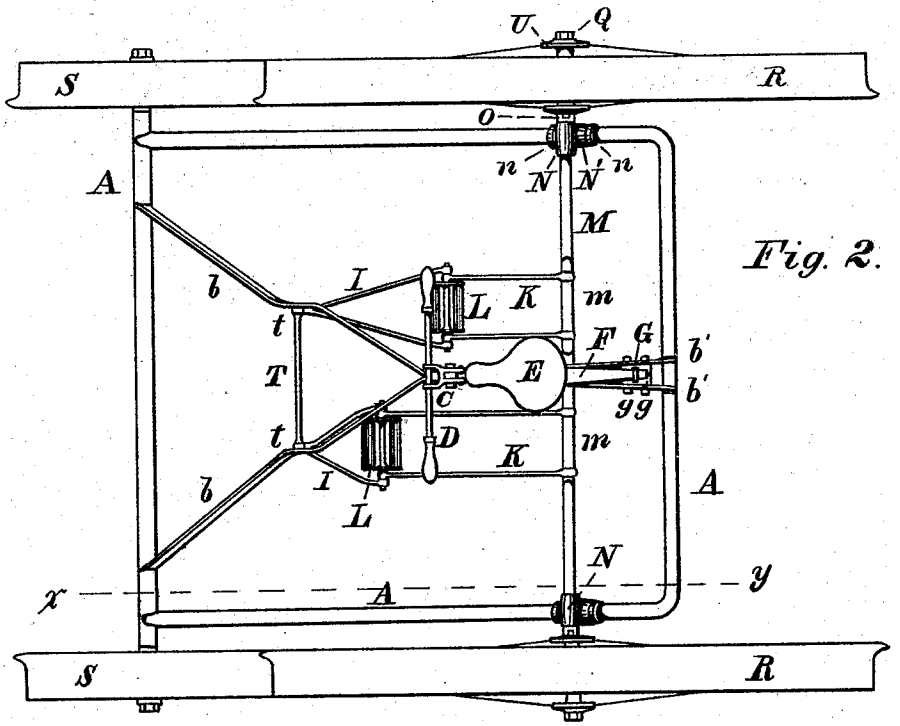


Fig. 2.

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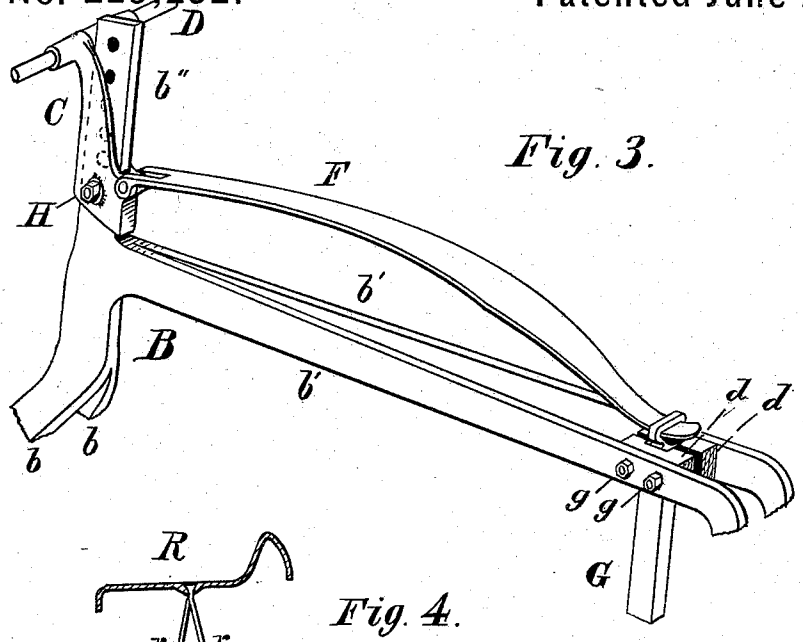
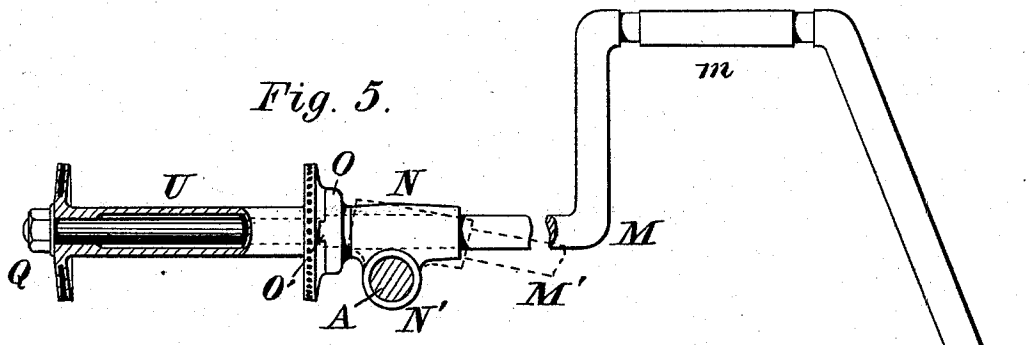


Fig. 3.

Fig. 4.

Fig. 5.



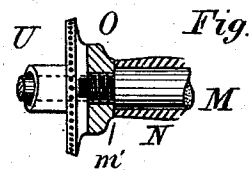


Fig. 7.

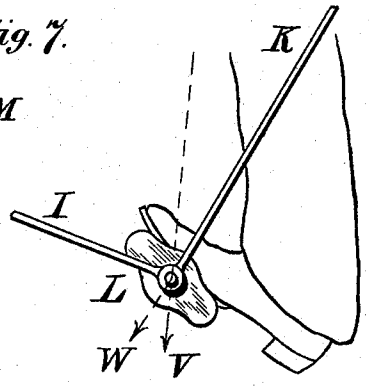


Fig. 6.

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UNITED STATES PATENT OFFICE.

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RAILROAD-VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 229,252, dated June 29, 1880.

Application filed February 14, 1880.

To all whom it may concern:

Be it known that we, EDWARD K. HILL, EDWARD F. TOLMAN, and ARTHUR H. HOWLAND, of Worcester, Massachusetts, have invented a new and useful Railroad-Velocipede, of which the following is a specification.

The object of our invention is to provide a velocipede driven by the rider, to run on rails, so constructed that the rider, sitting nearly over a cranked axle, can exert the combined force of his muscles and weight by pressing his feet on pedals alternately in a vertical, or nearly vertical, direction, as in walking, and of convenient form and light construction, so as to be easily, rapidly, and safely driven, as well as to be easily placed on or removed from the track by the single person operating the same, and to provide a simple means of reducing the bulk to facilitate transportation.

The form of machine which we have chosen to exhibit our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional side elevation, the plane of section being at *x y*, Fig. 2. Fig. 2 is a plan of the same. Fig. 3 is a perspective view of the seat-frame, showing in detail the arrangements for changing the height of the seat. Fig. 4 is a section of the wheel-rim. Fig. 5 is side elevation, showing the details of the crank-axle, oscillating box, and device for securing driving-wheels to the axle. Fig. 6 represents the direction of the foot-pressure and the direction of the applied power. Fig. 7 is a detailed view of the lock-nut and its application in securing the driving-wheel to the axle.

Referring to Figs. 1 and 2, A A A is a rectangular frame of tubing, with the forward reach extended on each side to form overhung axles for the front wheels, S S, Fig. 2. This main frame carries a seat-frame, B, which consists of the front and back forks, *b b* and *b′ b′*, of such shape as to give strength and properly support the adjustably-arranged seat E, while furnishing favorable points of support for the guide-links I I. The main frame also carries at its rear end the cranked axle M, turning in the boxes N N, and having oppositely-projecting cranks *m m*. This axle carries on its ends the driving-wheels R R. Suspended from the cranks *m m* are two pairs of pitmen, K K, supporting pedals L L, the path of motion of these pedals being determined by the guide-links I I, which are attached to them, and are pivoted to the tie-rod T in the seat-frame B. The pedals are constructed so as to turn on center-pins, which pass through the ends of the pitmen and guide-links.

The seat-frame B has a projecting post or head, *b″*, arranged to securely hold the handle-bar head C by the bolt H in any one of a series of positions. The head C carries the handle-bar and handles D, and also supports the head of a seat-spring or perch, F, the tail of which is connected to a supporting-bar, G, in such a manner as to allow free play to the end of the spring as it may deflect under the weight of the rider. This tail-bar G is securely held at any desired elevation by means of gripe-blocks *d d* and bolts *g g*, and is raised or lowered simultaneously with the head C, thereby changing the height of the seat E above the pedals to accommodate the different length of leg of different riders.

It is obvious that the head *b″* may be a part of the handle-bar head C, instead of being attached to or a part of the seat-frame, as shown, in which case it would project downward and be secured between the arms of the seat-frame by bolts in the same manner as is the tail-bar G in the arrangement shown.

The handle-bar D furnishes a point of application for the force of the muscles in the rider's arms, which, being exerted in a nearly vertical direction, becomes practically an addition to his weight. The relative positions of handle-bar and seat are important, and in this arrangement the relation remains unchanged as the seat is shifted from one position to another.

The combined requirements of the gage of rails and light construction necessitate a cranked axle of considerable length and small diameter, which axle, in operation, is liable to suffer more or less deflection. To prevent any binding in the boxes, which may result from this deflection, they are constructed to work loosely on the side pieces of the main frame, being prevented from moving longitudinally by the collars *n n*, between which said boxes are free to oscillate as the axle deflects. This arrangement is shown in Figs. 1, 2, and 5.

To reduce the bulk of the velocipede for

transportation the driving-wheels are so attached to the cranked axle as to admit of their ready removal, and yet also of their secure attachment when replaced. This is accomplished as shown in Figs. 5 and 7, where O is a lock-nut screwed tightly up to a shoulder, *m'*, on the axle M, and having projecting lugs O', which engage with corresponding recesses in the hub U. This hub is fitted to the axle, and is held up to the nut O by the nut Q, which is tightly screwed up against the hub, having a reverse thread from that of the nut O. Now, if the direction of the tendency of the hub to rotate on the axle is such as to screw the nut O against its shoulder, there can be no rotation in that direction, and if the reverse tendency obtains the hub, being locked to the nut O, will cause a tendency to turn this nut away from its shoulder, which is met by the nut Q with an opposing thread, and this holds O against its shoulder, rendering it impossible for rotation to take place in either direction. The driving-wheels are easily removed by taking off the outer nuts, Q.

In order to make a wheel of sufficient strength with the least possible weight, we have devised a rim of sheet metal, which, in the machine shown, is combined with the tension-spokes and spool-hub of a suspension-wheel; but said rim may be used with ordinary wooden spokes, or in any convenient manner. This rim is made of thin sheet metal, shaped by any convenient process to the form of the surface of railroad-wheels, having a wide flat tread, a flange to keep the rim on the rail, and a return to form a guard in frogs and switches. A section of the rim is shown in Fig. 4 with portions of wire spokes attached, which illustrates the way we prefer to make it. The guard-return in this case is a continuation of the main flange; but it might be a separate piece riveted on, or it might consist of a loop of wood or other material attached to the main flange. To stiffen the thin tread, we turn a small inside flange on its outer edge, as shown, or this may be done by corrugating the surface as appears where the spokes are inserted, or in any convenient manner.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a railroad-velocipede, the tubular frame A A, in combination with a seat-frame, the front wheel-axles, the oscillating boxes, and a crank-axle, constructed substantially in the manner and for the purpose specified.

2. In a railroad-velocipede, the seat-frame B, having a head, *b''*, and arms *b b* and *b' b'*, in combination with a frame, A A, constructed substantially in the manner and for the purpose specified.

3. In a railroad-velocipede, the adjustable handle-bar head C, the handle D, the bolt H, the adjustable tail-bar G, the gripe-blocks *d d*, the bolts *g g*, and the arms *b' b'*, in combination with a spring or perch and the seat E, constructed substantially in the manner and for the purpose specified.

4. In a railroad-velocipede, the pedals L L, suspended from the cranks by the double pitmen K K, and held in place by the guide-links I I, arranged to confine their motion to a vertical, or nearly vertical, arc, operating substantially as described.

5. The oscillating journal-boxes N N and the collars *n n*, in combination with a supporting-frame constructed substantially in the manner and for the purpose specified.

6. The lock-nut O and the nut Q, having opposing screw-threads, in combination with a wheel hub and axle, constructed substantially in the manner and for the purpose specified.

7. A sheet-metal rim for railroad-velocipede wheels shaped to the form of the surface of railroad-wheel tires, with a flange to keep it on the rail, and a return to give a guard-bearing in frogs and switches, and a flange or corrugation to stiffen the tread of the rim, substantially as shown and described.

8. A sheet-metal rim for railroad-velocipede wheels, shaped to the form of the surface of railroad-wheel tires, with a flange to keep it on the rail, and a return to give a guard-bearing in frogs and switches, and a flange or corrugation to stiffen the tread of the rim, in combination with tension-spokes and hub of a suspension-wheel, substantially as described.

9. A railroad-velocipede with two driving-wheels attached to a cranked axle, and having two leading wheels attached to and carrying a tubular main frame, which supports a seat-frame having a seat that can be raised or lowered by means of an adjustable head and an adjustable tail-bar, the cranks being turned by the force of the rider's feet applied to pedals suspended from cranks by double pitmen, which are directed by guide-links, the connection of the crank-axle with the main frame being by oscillating boxes, the driving-wheels being attached to the axle by lock-nuts and reverse-thread nuts, and the wheels being constructed with skeleton flanged rims suspended from the hubs, constructed substantially in the manner and for the purpose specified.

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