(No Model.) 2 Sheets—Sheet 1.

F. BRADY.

RAILWAY VELOCIPEDE.

No. 447,935. Patented Mar. 10, 1891.

Fig. 1.

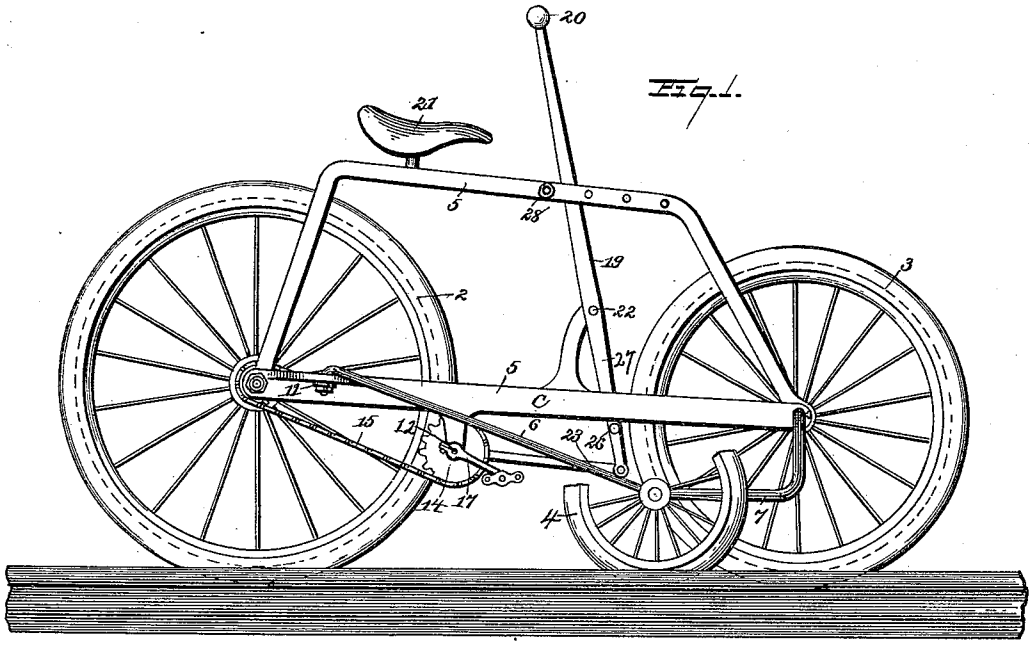
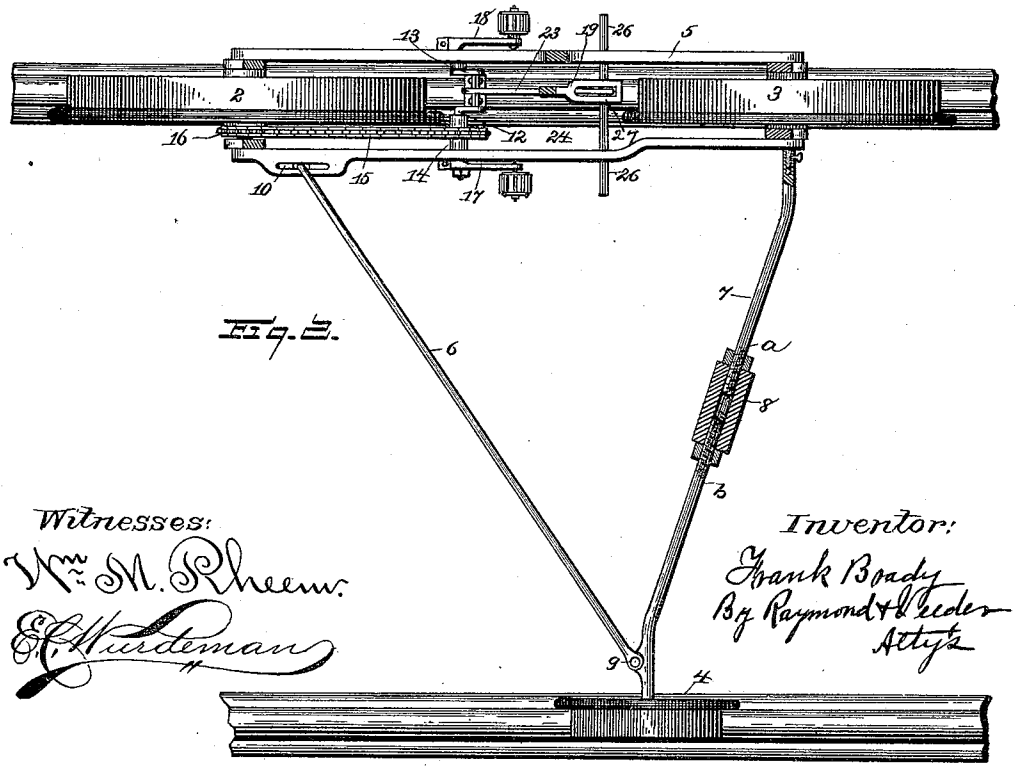


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

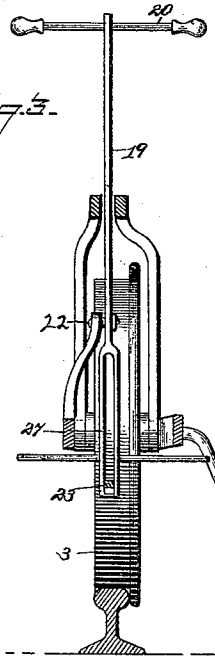
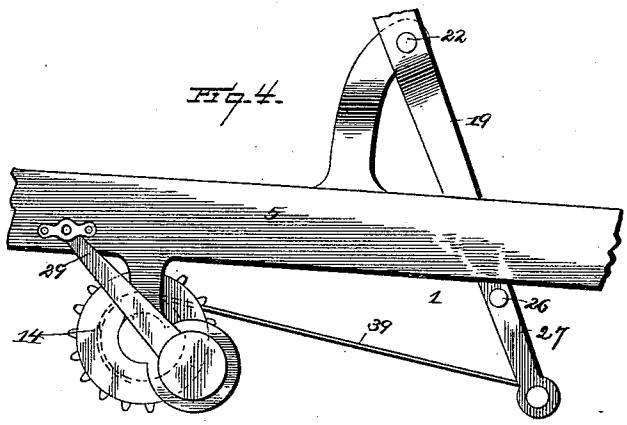


Fig. 4.



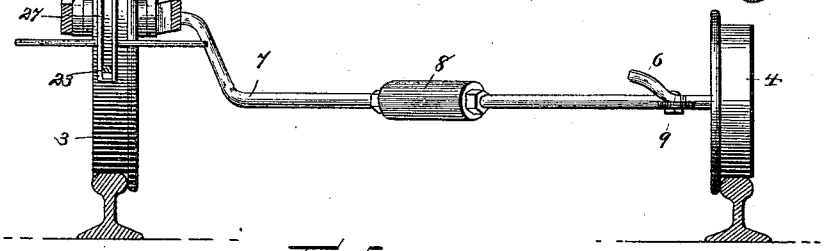


Fig. 5.

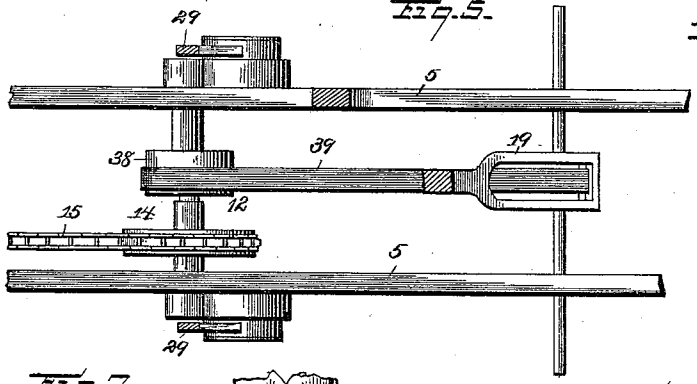


Fig. 6.

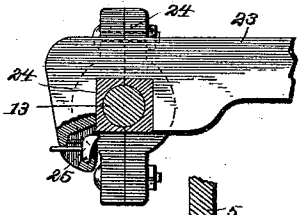


Fig. 7.

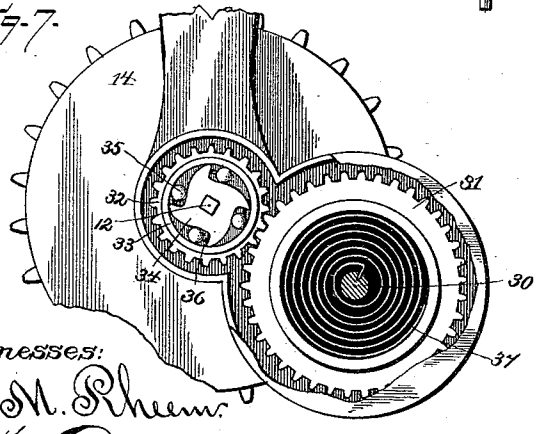
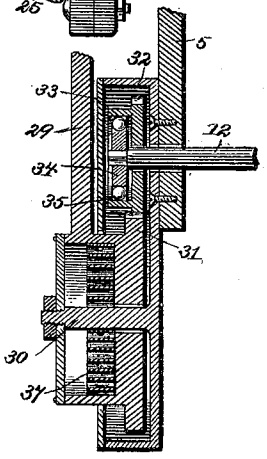


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANK BRADY, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN RAILWAY TRICYCLE COMPANY, OF PORTLAND, MAINE.

RAILWAY-VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 447,935, dated March 10, 1891.

Application filed February 17, 1890. Serial No. 340,664. (No model.)

To all whom it may concern:

Be it known that I, FRANK BRADY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Velocipedes, of which the following is a specification.

My invention is applicable to velocipedes adapted for use either on ordinary roadways or upon railways. I have, however, in the accompanying drawings shown it as applied to a railway-velocipede, that being the principal use to which I contemplate putting my invention.

The purpose of my invention is to economize the strength of the rider and enable him to apply it in the least fatiguing manner by allowing him to assume a new attitude when he has become fatigued by long exertion in one position, thus bringing a new set of muscles into action.

In the accompanying drawings, Figure 1 is a side elevation of a railway-velocipede constructed in accordance with my invention. Fig. 2 is a plan, partly in section, of the same. Fig. 3 is a cross-section. Fig. 4 is a fragmentary view showing a modified form of the driving apparatus. Figs. 5, 7, and 8 are different views of the same modification, hereinafter described in detail. Fig. 6 is a detail view of a portion of the first form of the driving apparatus.

2, Figs. 1 and 2, is a driving-wheel, and 3 the leading-wheel, both running on the same rail and provided with flanges in the manner of an ordinary car-wheel.

4 is a smaller wheel running on the other rail and connected to the frame-work 5 of the machine by braces 6 7, so as to keep it on the track and prevent its overturning. The distance of the wheel 4 from the other two can be regulated to suit the gage of the track by means of the threaded sleeve 8 on the brace 7, which joins the two parts *a b* of the brace 7, the adjacent ends of which have a right and left hand thread cut thereon, as shown. Brace 6 is connected to brace 7 by a pivot 9, and the end which is attached to the machine is adjustable in the slot 10. By moving the end in the slot 10 the brace 6 can be adjusted to correspond with the length of the brace 7, and when properly adjusted it is secured by tightening the nut 11 upon the end of the brace. Upon the lower horizontal bar *c* of the frame which joins the leading and driving wheels is mounted the driving mechanism, which I will now proceed to describe.

Journaled in the frame is a sprocket-wheel shaft 12, the portion between the two sides of the frame being occupied by a crank 13 for a part of its length and the remainder being occupied by a sprocket-wheel 14, from which a chain 15 passes to a sprocket-wheel 16 on the driving-wheel. At the outer end of the sprocket-wheel shaft 12 pedal-cranks 17 18 are affixed. Attached to the frame-work 5 is a vibratory lever 19, the upper end having a handle-bar 20 affixed thereto in convenient relation to the seat 21. The lever 19 is pivoted at 22, and its lower end is connected by a link 23 to the crank 13 of the shaft 12. The mode of connection will be understood by reference to Fig. 6, which shows the end of the link 23 and its connection. A box 24 is fitted to the crank 13, and at the middle of its length a groove is cut, leaving a square section, as shown in Fig. 6. Into this groove the link 23 is fitted, a square notch being cut in the side of the link near the end, so as to drop over the square portion of the box 24. A spring-catch 25 projects from one of the sides of the notch in the link 23, and abutting against the corner of the box 24 prevents the disconnection of the link 23, except upon the withdrawal of the catch. At or near the lower end of the lever 19 foot-rests 26 are secured. The fork 27 at the lower end of the lever 19, in which the link 23 is pivoted, is made quite long, as shown in Fig. 3, so that when the link 23 is disconnected from the crank 13 it may be turned up inside of the fork, and thus be out of the way.

The operation is as follows: Supposing the link 23 to be connected to the crank 13, as shown in Figs. 1 and 2, and the pedal-cranks 17 18 be fixed in the position shown, the velocipede is in condition to be driven by working the lever 19, power being furnished by the joint action of the feet upon the foot-rests 26, moving horizontally, and the hands upon

the bar 20. The pedal-cranks 17 18 are not at this time in use, and both are fixed on the sprocket-wheel shaft 12, so as to lie in the same direction as the crank 13, so that moving forward and back at the same time as the feet of the rider they will not interfere therewith. Should the rider become weary of this mode of propulsion, he can change his position and bring his muscles into play in a substantially different manner by employing the pedal-cranks 17 18, situated more directly beneath him (after disconnecting the link 23) in the following manner: One of the pedal-cranks—either 17 or 18—is fastened by a clamp, as shown in Fig. 1, or in any suitable manner, so that it can be easily loosened and turned half-way round on the shaft 12. The pedal-cranks will then be in proper position for use. The lever 19, being thrown out of operation by the disconnection of the link 23 from its crank, is made stationary by clamping the upper part of the frame 5 upon it by a bolt and nut 28, as shown, or in any other suitable manner, a purchase for the hands being thus given, so that greater pressure can be applied to the pedals than that due to the weight of the rider, if so desired. The change from one mode of propulsion to the other, as thus described, will allow the rider to exert a greater power and exert it for a much longer time than if he were confined to a single mode of propulsion, it being a well-known fact that a change in the mode of exertion is almost equivalent to a rest.

I will now proceed to describe the modifications shown in Figs. 4, 5, 7, and 8. In these figures a reciprocating pedal-crank is used instead of a rotary one, and the connection of the vibratory lever 19 to the shaft carrying the sprocket-wheel and chain is by a strap which passes to a clutch-box upon the shaft. The pedal-crank 29 (*vide* Figs. 7 and 8) is pivoted upon a stud 30, affixed to the framework. Upon the inner end of the pedal-crank 29 is formed or affixed a gear 31, which meshes with a second gear 32, the latter being loosely pivoted upon the sprocket-shaft 12. Said gear 32 has an overhanging flange 33, forming a circular recess, within which is a friction-clutch formed by a corrugated or fluted cam 34, rigidly secured to the shaft 12, and balls or rollers 35 fit between the corrugations of the cam 34 and the flange 33 of the gear 32. One side of the corrugation has a very gradual slope, so that when the gear 32 is revolved in one direction the balls will be jammed between the slanting side of the corrugation and the overhanging flange of the gear, and hence the gear 32 and the cam 34 will be carried around together. The engagement of the gear and the cam is facilitated by springs 36 behind the rolls or balls. A reciprocating motion is given to the pedal-crank 29 by the foot, the return of the crank being effected by a coil-spring 37, one end of which is attached to the pedal-crank and the other end to the stud 30, as shown in Figs. 7 and 8. This reciprocating movement of the pedal-crank is communicated to the gear 32 through the gear 31 and is converted into a rotary motion of the sprocket-wheel 13 by means of the friction-clutch just described. No novelty is claimed for the pedal mechanism including the friction-clutch which has just been described, in itself, as it is one of the well-known forms of velocipede-driving mechanism. Upon the shaft 12 is secured a drum 38, containing a friction-clutch and spring, like that just described, and to this drum the strap 39 from the lever 19 is attached.

The operation of the device is evident from the foregoing description of it.

The last-described pedal mechanism and the clutch-and-strap connection of the lever 19 has some advantages not possessed by the other, as the change from one mode of propulsion to the other is facilitated. The pedal-cranks 29, when not in use, are automatically disconnected by the clutch and are at rest and out of the way of the feet. So, also, the drum 38 is disconnected and at rest when not in use, and the strap 39 does not need to be detached, the only change necessary (or, rather, desirable, for it is not absolutely necessary) being to make the lever 19 fast by clamping or otherwise when it is not in use for propulsion, so as to afford a more secure hold for the hands. If the lever 19 is not made fast when the crank-pedals are in use, it can be worked in conjunction with the latter; but such use is not so convenient as the use of the lever without the crank-pedals or the pedals without the use of the lever.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, with a velocipede, of driving mechanism having pedals adapted to be operated solely by the feet of the rider and an alternative device consisting of a vibratable lever located forward of said pedals, said lever being connected to the driving mechanism and having rests or holds for the hands and feet, whereby both may be utilized for propulsion, a detachable connection between the said lever and the driving-wheel, and a clamping device whereby the said lever may be fixed to afford a purchase for the hands when not in use for driving the velocipede, substantially as described.

2. The combination, with a velocipede, of driving mechanism comprising a shaft, as 12, a sprocket-wheel on said shaft, and a chain connecting said sprocket-wheel to a sprocket on the driving-wheel shaft, pedals driving the first-named shaft, and a vibratable lever provided with hand and foot holds and connected to and operating said first-named shaft, a detachable connection between the said lever and the driving-wheel, and a clamping device whereby the said lever may be fixed to afford a purchase for the hands when not in use for driving the velocipede, substantially as described.

3. The combination, with a velocipede, of a driving-shaft, pedals connected thereto and situated directly below the rider, an upright vibratory lever located forward of said pedals and driving-shaft and provided with hand and foot holds, one of said pedals being mounted on a movable crank whereby both cranks may be adjusted to lie in the same direction and to move in unison with the vibratable lever when the latter is in use, substantially as described.

4. The combination, with a velocipede, of a driving-shaft, as 12, vibratory pedals, a clutch connecting said shaft and pedals, a vibratory upright lever adapted to be worked by the rider, and a clutch upon said driving-shaft connected to and operated by said lever, substantially as described.

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