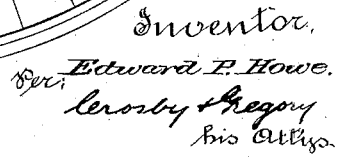


Patented June 29, 1886.



# UNITED STATES PATENT OFFICE.

EDWARD P. HOWE, OF NORTHBOROUGH, ASSIGNOR OF ONE - HALF TO  
CHARLES R. ROGERS AND JOHN J. SHAW, OF PLYMOUTH, MASS.

## TREADLE-MOTION FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 344,529, dated June 29, 1886.

Application filed November 18, 1885. Serial No. 183,210. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. HOWE, of Northborough, county of Worcester, and State of Massachusetts, have invented an Improvement in Treadle-Motions, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the construction of that class of treadle-motions wherein one end of the pedal-lever is pivoted to any suitable frame-work, the power applied to its opposite end, and the connecting rod or strap, by means of which the power is transmitted to the machine, is connected at an intermediate point, thereby forming a lever of the second class.

It has been found advantageous in treadle motions of this class, when applied to some kinds of machines, that the force of power required to move the lever should be expended variably, or that the amount of power required to start the lever should be diminished, while that required to continue the movement should be continually increased.

To this end my invention consists in a pedal-lever pivoted at one end to the frame-work, and a movable block mounted thereon, combined with a connecting rod or strap joined to the said block, by which power is transmitted to other portions of the machine, and with an auxiliary rod pivoted eccentrically to the pedal-lever, its free end joining the movable block, so that as said pedal-lever is turned on its fulcrum, carrying the block with it, the auxiliary connecting-rod, also caused to move on its fulcrum, moves the said block more or less distant from the fulcrum of the pedal-lever, all substantially as will be herein more fully set forth.

Other features of my invention will be hereinafter described, and pointed out in the claims at the end of this specification.

Figure 1 shows in side elevation a treadle-movement constructed in accordance with this invention and applied to a tricycle; Fig. 2, a sectional detail of Fig. 1, taken on the dotted line  $x x$ , showing the treadle-movement in elevation; Fig. 3, a detail taken on the dotted line  $x' x'$ , and Fig. 4 a detail taken on the dotted line  $x'' x''$ .

The treadle to be described is herein shown as applied to a tricycle, and in order to make an operative construction two such treadle-motions are employed.

The main pedal-lever A, one end of which is pivoted to a portion of the frame-work B at 2, while its opposite end is suitably constructed to receive the power applied to it, is of any usual or suitable design. At an intermediate point along the pedal-lever a movable block, C, is located, to which the connecting rod or strap E, by which the power is transmitted to the actuating parts of the machine, is attached, the said strap in this instance passing over a suitable ratchet-clutch mechanism, D, mounted upon the main rotating shaft. An auxiliary connecting-rod, F, one end of which is pivoted to a shaft,  $e$ , attached to another part of the frame-work B, has its opposite end connected to the movable block C.

The block C, (see details, Figs. 3 and 4,) consists of two side plates,  $a a'$ , placed each side of the pedal-lever A, said side plates being connected together in any suitable manner, as, for instance, by connection with the parts between them, to be described.

A friction-roll,  $b$ , mounted upon the shaft  $b'$  above the pedal-lever A, normally slightly bears upon the upper side of the said lever, being retained in engagement by suitable springs, 4. Beneath the lever A two like friction-rolls,  $c c'$ , (see Fig. 1,) are mounted upon suitable shafts, also having their bearings in the side plates,  $a a'$ , while a small roll or shaft,  $e$ , is located between the side plates,  $a a'$ , and between the rolls  $c c'$ , to which latter shaft the auxiliary connecting-rod F is attached. A yoke,  $f$ , astrides the block C, its free ends being connected with the shaft  $e$ , while to the crown of the yoke is attached the connecting rod or strap, by which power is transmitted to the machine. As the connecting rod or strap E pulls upon the yoke  $f$ , it in turn causes the friction-rolls  $c c'$  to bear upon the under side of the pedal-lever A. As the pedal-lever A is depressed the movable block C is carried downward with it, thereby pulling upon the connecting rod or strap E, while in the meantime the auxiliary connecting-rod F is caused to move on its pivot, which

latter, being a short distance from and eccentric to the pivot 2, causes the block C to move upon the pedal-lever A away from the pivot or fulcrum 2. Thus it will be seen that as the block C at the normal position of the pedal-lever is nearest the fulcrum 2, and by the intervention of the auxiliary rod F is gradually moved away therefrom as the pedal-lever is moved, the power necessary to start the lever A will be comparatively small, and during the downward movement must consequently increase, while it is also obvious that the distance the block C will travel in the arc of a circle about the fulcrum 2 will be smallest at the start, and will gradually increase, thereby gradually increasing the speed of the actuating parts of the machine. This movement is of particular advantage in tricycles, because the rider cannot easily expend the power with his leg raised that he can after he has materially lowered the same.

As it is obvious, on tricycles two pedal-levers are required. Consequently some of the parts may be joined together by shafts, that they may move in unison. The block C can be adjusted to any desired distance from the fulcrum 2 at any time by the following mechanism, which is especially applicable to tricycles, although it is obvious that a similar construction could be employed for other machines—*i. e.*, to opposite ends of the shaft *o*, to which the auxiliary connecting-rods F are pivoted: Rods *m* are attached, which in turn are connected to suitable projections or arms, *s*, of a rock-shaft, *n*, having a hand-lever, *n'*, under the control of the rider, so that whenever it is desired to increase the speed of the machine, or, in other words, to place the block C normally farther away from the fulcrum 2, the rider has but to partially turn the said rock-shaft *n'* and draw the rods *m* upward, thus causing the rod *o* to travel along in the slot 10 in the frame-work B, the auxiliary connecting-rod F at such time moving the said block C farther from the fulcrum 2.

It is obvious that other devices may be designed to adjust the auxiliary connecting-rods F with good results; but the construction herein shown is preferable; also, that the moving-block C may be somewhat modified without departing from my invention.

I claim—

1. In a treadle-motion, a main or treadle lever, one end of which is pivoted to any suitable stationary frame-work, while its opposite end receives the power applied to it, and the connecting rod or strap by which the power is transmitted to the machine, a movable block located upon the said treadle-lever at an intermediate point, to which the said connecting rod or strap is attached, combined with an auxiliary connecting-rod, one end of which is pivoted to another portion of the said stationary frame-work eccentric to the pivot of the said main or treadle lever, while its opposite

end is connected with the movable block, all substantially as and for the purpose set forth.

2. In a treadle-motion, the main or pedal lever, one end of which is pivoted to any suitable stationary frame-work, while its opposite end receives the power applied to it, and the connecting rod or strap E, combined with a movable block located upon the pedal-lever at an intermediate point, and to which the rod or strap E is attached, and the auxiliary connecting-rod, one end of which is adjustably pivoted to the stationary frame-work eccentric to the said lever, while its opposite end is connected with the movable block, all substantially as described.

3. In a treadle-motion, a main or pedal lever, one end of which is pivoted to any suitable frame-work, while its opposite end receives the power applied to it, and the connecting rod or strap E, combined with a movable block consisting of the side plates, *a a'*, friction-rolls mounted upon shafts between said side plates, all located upon the pedal-lever at an intermediate point, means, substantially as described, for attaching the connecting rod or strap E with said movable block, and the auxiliary connecting-rod, one end of which is pivoted to the frame-work eccentric to the said lever, while its opposite end is connected with the movable block, and means, substantially as described, for connecting said auxiliary connecting-rod to the movable block, all substantially as described.

4. In a treadle-motion, the pivoted pedal and connecting rod or strap E, combined with the block C, consisting of the side plates, *a a'*, friction-rolls *cc'*, having bearings between the side plates, the spring-compressed roll *b*, the yoke *f*, to which the connecting rod or strap E is attached, the shaft *e*, to which the yoke *f* is attached, and the pivoted auxiliary connecting-lever F, also connected to the shaft *e*, all substantially as described.

5. In a treadle-motion, a main or pedal lever, one end of which is pivoted to any suitable frame-work, while its opposite end receives the power applied to it, and the connecting rod or strap E, combined with a movable block located upon the main or pedal lever at an intermediate point, and to which the rod or strap E is attached, and the auxiliary connecting-rod, one end of which is adjustably pivoted to the said stationary frame-work eccentric to the pivot of the main or pedal lever, as described, for adjusting the auxiliary connecting-lever and locking devices, substantially as described therefor, all as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD P. HOWE.

Witnesses:

B. J. NOYES,  
C. M. CONE.