No. 642,544.

Patented Jan. 30, 1900.

L. S. BURBANK.

BICYCLE.

(No Model.)

(Application filed Aug. 15, 1898.)

3 Sheets—Sheet 1.

Fig. 1.

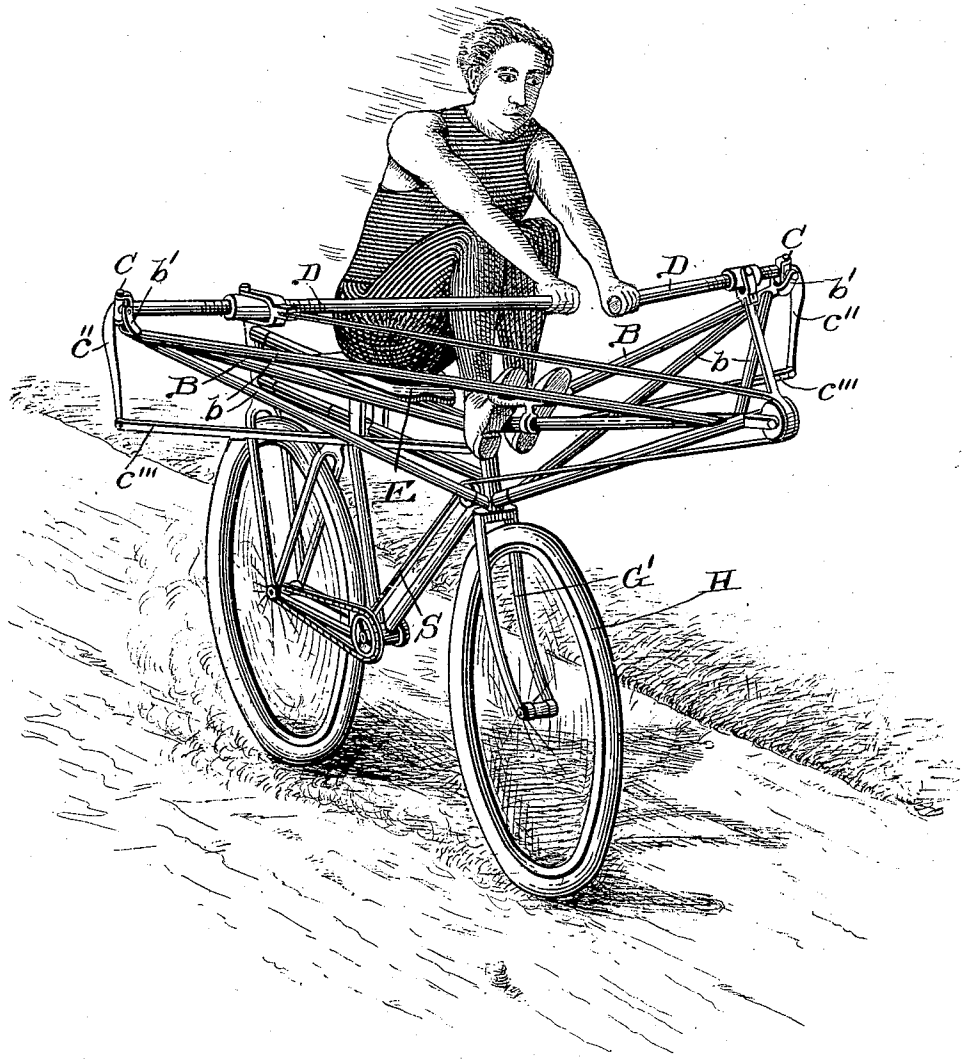

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Fig. 2.

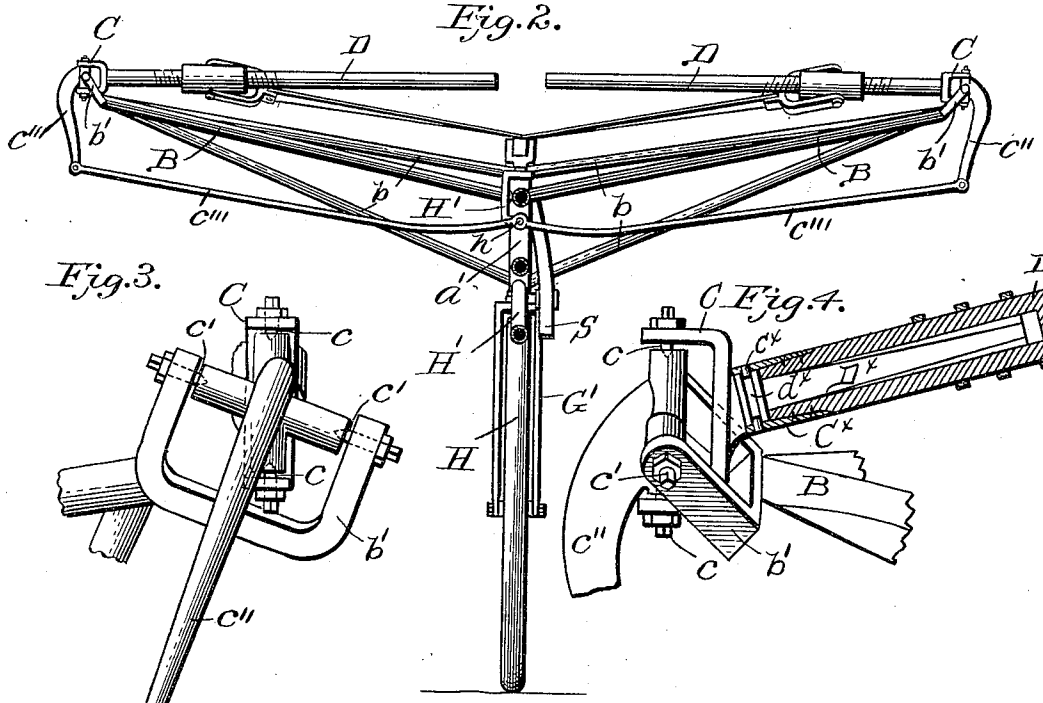

Fig. 3.

Fig. 4.

Fig. 5.

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Fig. 6.

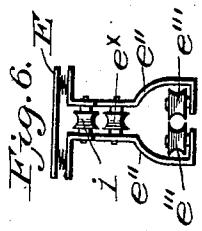

Fig. 7.

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UNITED STATES PATENT OFFICE.

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BICYCLE.

SPECIFICATION forming part of Letters Patent No. 642,544, dated January 30, 1900.

Application filed August 15, 1898. Serial No. 688,654. (No model.)

To all whom it may concern:

Be it known that I, LOUIS S. BURBANK, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Bicycles and other Vehicles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a perspective view showing the invention as in application. Fig. 2 is a sectional view on the line *x x*, Fig. 7. Fig. 3 is a detail view, partly in section, of the fulcrum of one of the operating-levers. Fig. 4 is a side view of the fulcrum of one of the operating-levers. Fig. 5 is a detail perspective view of bracket-arm H′. Fig. 6 is a detail view of seat, its bearing-rollers, &c. Fig. 7 is a side view of bicycle with friction-pulleys connected to shaft of rear wheel.

This invention has relation to bicycles and tricycles; and it consists in the novel construction and combination of devices constituting the propelling and steering mechanism.

The object of the invention is to provide means whereby one may enjoy with a bicycle or similar vehicle exercise like that of rowing with a pair of sculls, which is adapted to develop the muscles of the arms and body as well as those of the legs.

In the accompanying drawings, illustrating the invention applied to a bicycle, the letter A designates the frame, which is of elongated form in order to provide for the sliding seat and the propelling devices. The frame should be constructed of tubular metal and well braced.

B B represent the lateral arms or outriggers, secured to the main frame and well braced, as indicated at *b b*. These arms are provided at their ends with bearings *b′* for the pivotal devices C, which constitute the fulcrums of the operating-levers D, which extend in the lateral direction, being disposed in a similar manner to the inner portions of the oars of a boat.

The sliding seat E, usually provided with springs between the seat portion and the roller-frame *e*, rests upon the upper or back bar of the frame, which is extended in rear of the outriggers sufficiently to allow the seat free movement backward and forward in accordance with the motions of the rider. The frame *e* is provided with bearing-rollers *i′* and with downwardly-extending brace-arms *e″*, provided at their ends with lateral rollers *e‴*, adapted to bear against the sides of the parallel brace-bar *a* of the frame, which is below the back bar. The frame *e* may also be provided with a guard-roller $e^{\times}$ under the back bar.

F designates the foot-rests, which are secured to the frame forward of the bracing post or head *a′*, to which the outrigger-arms are connected. Seated in this head or post is the steering-fork G′, which carries the front wheel H and to the upper end of which is rigidly secured the downwardly and rearwardly bent arm H′.

The pivotal devices or swivels C of the levers D are provided with vertical pivots *c* for the levers, whose motion is horizontal or but little varied therefrom when being operated for propulsion, and with horizontal pivots *c′* for the steering apparatus, which is also controlled by the levers D, but through the up-and-down or vertical movement thereof. To this end each swivel C is provided with a depending arm *c″*, whose lower end is connected by means of a rod *c‴* to the rearwardly-bent portion *h* of the arm H′. Therefore when either lever is lowered the steering-fork G′ will be turned in such a manner as to turn the front wheel K toward the side of the lowered lever. This motion is similar to that employed by the sculler in a light shell.

The rear wheel M may be operated from the crank-shaft in the usual manner by sprocket chain-gear.

The crank-shaft L is provided on each side with a ratchet or, preferably, a friction-pulley *l*, which may be of any well-known construction, such as that which has heretofore been used on certain kinds of bicycles, and carrying a strap S or chain or cord, which extends around the guide-pulleys P of the frame and is connected to the lever D. When the levers are pulled back, the straps by their

tension on the outer sections of the pulleys *l* cause the wedges of these outer sections to bind on the rollers and cramp them against the inner wedges of the shaft-sections, so that the pulleys become rigid and turn the shaft. When the levers are moved forward, the straps are relaxed, the wedge-bearings loosened, and the outer sections of the pulleys are turned back by their springs *v*, taking up the slack of the straps. The crank-shaft is usually employed to facilitate the initial movement of the bicycle; but it may be dispensed with and the friction-pulleys connected to the shaft of the rear wheel, as shown in Fig. 7 of the drawings.

The levers D have independent horizontal sweep or rowing motion, so that in the propulsion of the vehicle either or both of the levers may be operated. In the vertical pivotal motion for steering they are connected through the steering mechanism and have relatively opposite motion, so that in turning in either direction one lever is raised and the other lever relatively depressed.

The strap S is usually connected to the lever D by means of a swivel *m* and a sleeve *n*, which is threaded within to engage a thread *t* or screw-sleeve on the lever, and the lever is usually made in two portions, one part *d* being pivoted to the other part *d'*, as indicated at *d''*, the pivot thereof being in longitudinal alinement with said lever. The part *d'* of said lever consists of a U-shaped bracket carrying the vertical pivots *c*, said bracket having an extension $D^{\times}$ running into one end of the part *d'* of the lever and upon which said part *d'* has a pivotal bearing. A collar $C^{\times}$ of the part *d* secures the two parts *d* and *d'* together by means of pins $c^{\times}$ engaging a groove $d^{\times}$ of said pivotal extension. In order to increase the leverage, the handle portions of the levers are turned in the proper direction to move the strap-connecting sleeves *n* outward or toward the lever-fulcrums. In speeding, the handle portions of the levers may be turned in the opposite direction, so as to give a more extended sweep. These adjustments are easily effected while the vehicle is in motion and without interfering with the movements for propelling and steering.

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

1. The combination with a bicycle, having in its frame, adjacent vertically-alined parallel bars, and a seat mounted to slide upon the upper bar, said seat having a downward-bracing extension engaging and sliding upon the lower bar, of laterally-projecting outrigger-arms forward of said seat, levers pivoted to said arms, propelling mechanism operated by said levers, and means for steering the bicycle, substantially as specified.

2. The combination with a bicycle, having the laterally-projecting outrigger-arms, of the two-part operating-levers, the sections thereof being pivotally connected, and the outer of said sections being pivoted to the outrigger-arms, the threaded sleeve or nut-engaging threads of the inner of said sections, and adjustable thereon by pivotal movement of the inner section upon the outer section, straps connecting said nuts with driving-gear of the bicycle, and means for steering the bicycle, substantially as specified.

3. The combination with a bicycle, having adjacent parallel upper frame-bars, a seat mounted to slide on the said bars, and foot-rests adjacent to the bicycle-head, of the arms extended upwardly and laterally from the head, the braces therefor, the levers fulcrumed to said arms, connections between the said levers and the driving-gear of the machine whereby the latter is actuated by horizontal movement of said levers, and connections between the said levers and the steering-head of the bicycle, whereby said head is turned by vertical movement of said levers, substantially as specified.

4. The combination with a vehicle, having a front steering-wheel, and laterally-projecting outrigger-arms, of operating-levers swiveled to said arms, arms depending from said swivels, and rods connecting said arms with the steering-head, whereby upon upward and downward movement of said levers, the vehicle is steered, and driving connections between said levers and the driving-shaft of the vehicle, substantially as specified.

5. The combination with a vehicle, having a front steering-wheel, of swiveled operating-levers, connections between said levers and driving mechanism of the vehicle, operated upon forward and backward movement of the levers to propel the vehicle, and connections between said levers and the steering-wheel operated upon upward and downward movement of said levers to steer the vehicle, substantially as specified.

6. In a vehicle, the operating-levers, having pivots longitudinally alined therewith, the sleeves carried by said levers, means whereby said sleeves are adjusted by pivotal movement of said levers, and driving connections between said sleeves and the driving-shaft of the vehicle, substantially as specified.

7. The combination with a vehicle, having a front steering-wheel, of the swiveled operating-levers, formed in two pivotally-connected sections, the pivot of which is longitudinally alined therewith, arms depending from said swivels, rods connecting said arms with the steering-wheel, the sleeve carried by the outer section of each of said levers, means whereby said sleeves are adjusted by pivotal movement of said outer sections, and driving connections between said sleeves and the driving-shaft of the vehicle, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS S. BURBANK.

Witnesses:

WILLIAM EMANUEL SUNDBERG,

J. G. POMERENE.