(No Model.)

S. WILSON.

BICYCLE.

No. 477,033. Patented June 14, 1892.

Fig. 1.

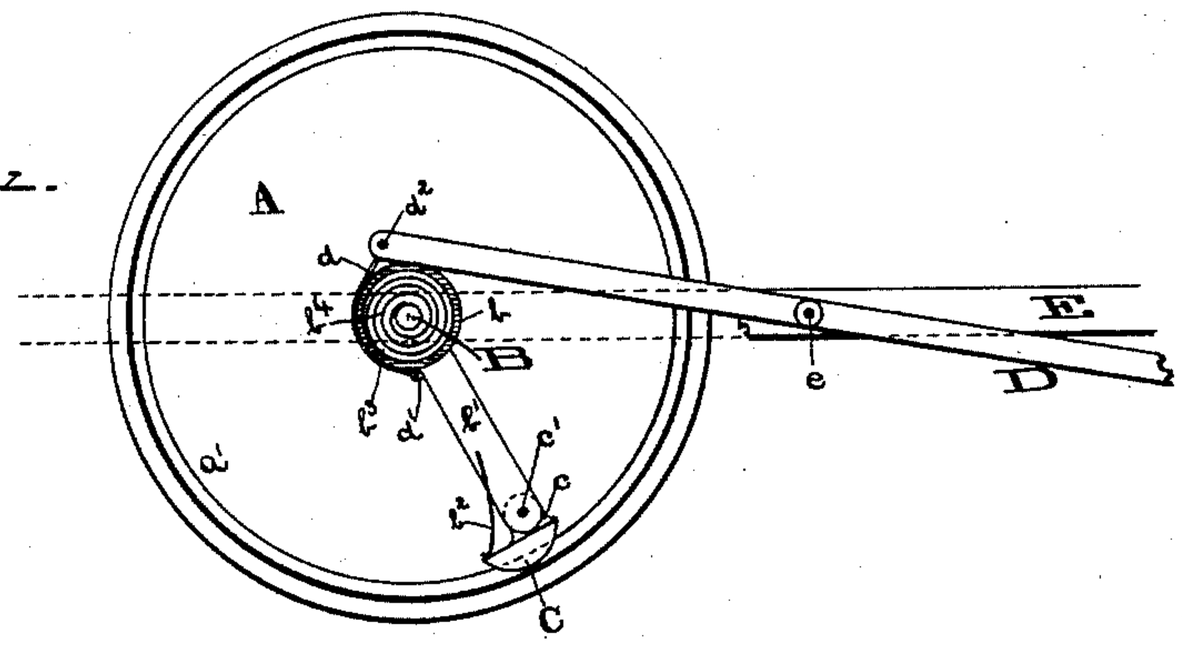


Fig. 3.

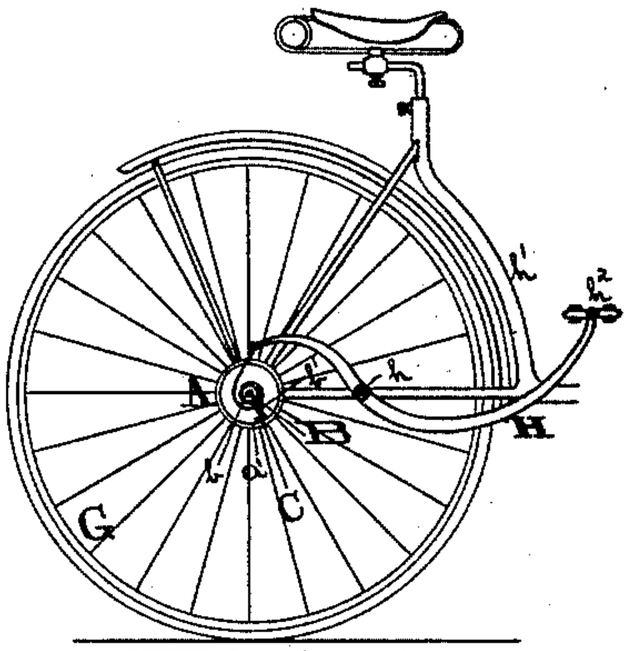


Fig. 2.

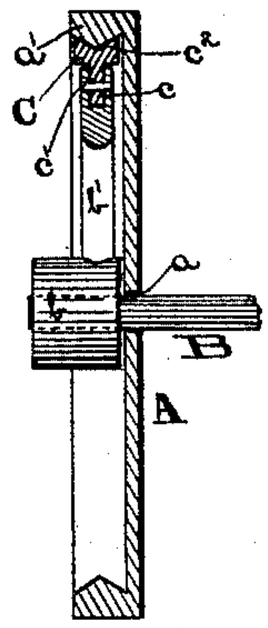
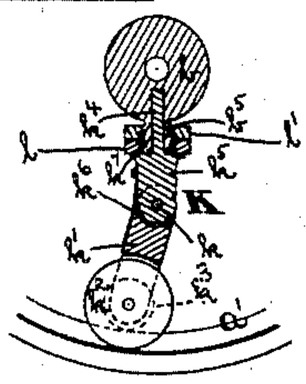


Fig. 5.



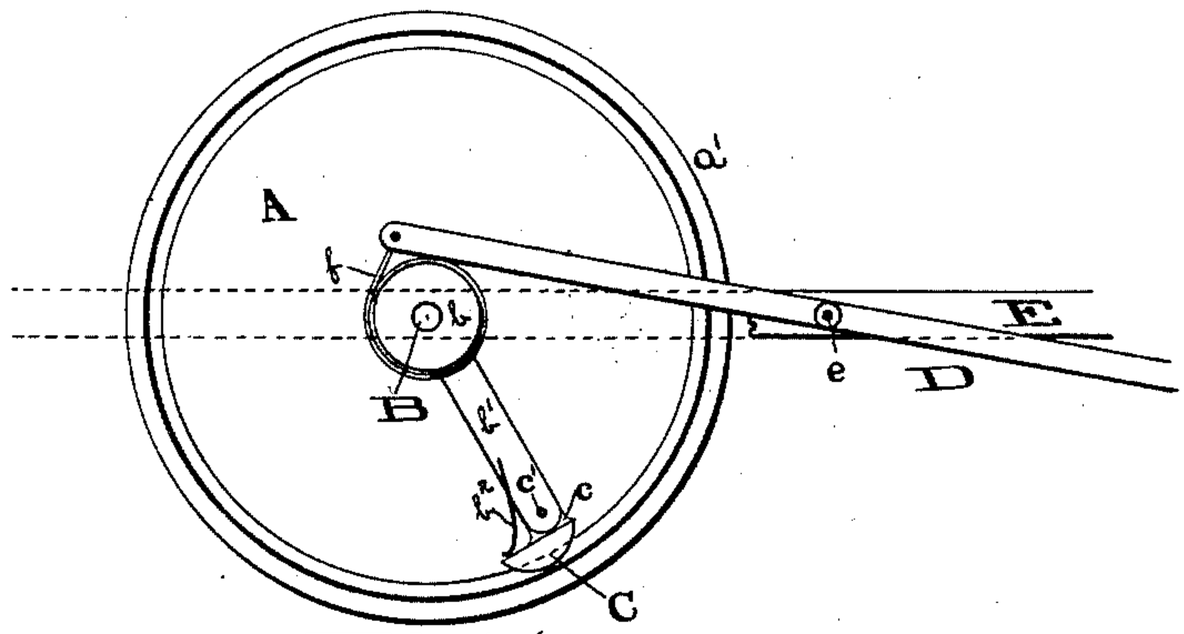


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

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BICYCLE.

SPECIFICATION forming part of Letters Patent No. 477,033, dated June 14, 1892.

Application filed July 7, 1891. Serial No. 398,720. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN WILSON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

My invention has relation to bicycles and similar vehicles, and has for its object the provision of novel, simple, and efficient means for the propulsion of the same.

Heretofore vehicles of the character above mentioned have in the main been driven through the employment of a sprocket-wheel and chain actuated through the medium of rotary cranks attached rigidly to a common shaft; also, such vehicles have been driven through the medium of reciprocating levers having leather straps secured to one of their ends and wound around spring-controlled drums, the latter communicating their motion to the driving-wheel through the medium of pawls and ratchets. The disadvantages of these levers are that the straps break under extra strain after use for a time and the pawls and ratchets are very noisy and productive of considerable friction.

My invention contemplates the obviation of these disadvantages; and it consists of a pair of reciprocating levers connected, preferably, through the medium of a spring-metal strap, each with a rotary hub or sleeve loosely journaled on the axle or shaft of the driving-wheel, said strap being normally coiled around and secured to said collar and after being distended by operation of the lever, and thereby rotating the sleeve in one direction, resuming its normally-coiled condition, causing the rotation of such sleeve in the reverse direction and the return of the lever to its original position.

Secured to the driving-wheel independently of the axle or shaft is a circular box or shell having the inner surface of its rim perfectly smooth and preferably conical in cross-section, in the center of which box is located the rotary sleeve aforesaid, the latter being provided with a radial arm having an eccentrically-pivoted device with a conical groove therein for engagement with the rim, the effect being that in one direction of rotation of the sleeve the pivoted portion will jam against the rim and impart its motion to the circular box, and thus to the wheel, while in the other direction such portion will simply slide over the rim noiselessly and without appreciable friction.

The details of my invention are hereinafter fully described, and are shown, clearly, in the accompanying drawings, wherein—

Figure 1 is a front elevation, and Fig. 2 a vertical section, of my invention. Fig. 3 is a side elevation of the driving-wheel of a bicycle with my improvements applied thereto. Fig. 4 is a front elevation of a modification of my invention, and Fig. 5 is a sectional view of a modified detail.

In said drawings, A represents the metallic shell or box, provided with the central opening *a* and the rim *a'*, the latter having its inner surface conical or pyramidal in cross-section.

B is the shaft or axle of the wheel to be driven, which passes through the opening *a* and has loosely journaled thereon the rotary hub or sleeve *b*, said sleeve having secured thereto or integral therewith the radial arm *b'*, having its outer end forked for reception of the lug *c* of the shoe C, which shoe is longer on one side of its pivotal point than on the other.

c^2 is a groove in the shoe C, corresponding in shape to the conical rim and for engagement therewith. Through the center of the lug *c* and through the forked end of the arm *b'* passes the pin *c'*, upon which is pivoted the said shoe, the latter being eccentrically pivoted or having its pivotal point considerably off its center.

b^2 is a flat spring secured in a kerf in the side of the arm *b'* and bearing very lightly against the top of the shoe C, which spring is only necessary where the movement of the arm is above the horizontal plane of the axis thereof. Ordinarily, however, the weight of the shoe is sufficient to keep it in operative relation with the rim.

d is a strap, which may be of any character and may be secured to the sleeve *b* or secured, as shown, to an eye *d'* in the arm *b'*; or such strap may be wound around the sleeve before being secured, thus obtaining a more

extended rotary movement of the latter—say, for instance, a complete revolution, or more or less. The outer end of said strap is secured to a pin d^2 or otherwise to the inner end of the lever D, which lever is fulcrumed at e on the frame E. Obviously, if the lever D be depressed at its outer end the sleeve b will be rotated through the draft on the strap d and the arm b' swung upwardly toward the left and in the direction of the longer and heavier side of the shoe C, causing the latter to instantly jam on or grasp the rim a', (which jamming is facilitated by the great amount of bearing-surface afforded by the conical rim and groove without increasing the width thereof,) thus communicating the motion to the shell or box A and to the wheel to which it is attached, which wheel is free to rotate independently of the arm under the impulse imparted thereby, the momentum serving to keep the wheel going without decreasing its speed until the shoe operates again, so that the rotation of the wheel is regular.

The return of the arm b' to its normal position may be accomplished in various ways—such, for example, as shown in Figs. 1 and 4 of the drawings. In the first-mentioned figure the sleeve b has a recess b^3 formed therein, within which is located a coiled spring b^4, which spring is secured to said sleeve at one end and at the other end to the shaft B; or, instead of this, a coiled spring-strap f may be wound around the sleeve and secured thereto at its inner end. The outer end of this spring-strap is secured to the inner end of the lever D, so that after the lever is actuated, causing the uncoiling of the spring-strap and the rotation of the sleeve, and pressure is released from said lever the coiling of the spring and its natural return to its normal condition will cause the rotation of said sleeve in the reverse direction and the return of the arm b' and the lever D to their original positions.

In Fig. 3 the shell A is secured to the spokes of the wheel G, forming practically the hub thereof, and the lever H is shaped after the usual pattern for treadle-levers, the same being pivoted at h on the bicycle-frame h' and having thereon the pedal h^2. In practice there is of course one of each such shell and lever, with their appurtenances, on each side of the wheel, such levers being operated alternately and imparting a continuous movement to the wheel G through the medium of the respective shells.

In lieu of the arm b', with the shoe C thereon, an arm K, hinged at or near its center on the pin k, may be employed, such arm having its outer section k' forked for reception of a roller k^2, the latter having therein a conical peripheral groove k^3 for engagement with the rim a', the sleeve b in this event having integral therewith an externally-threaded boss b^5 with a central angular socket therein, such socket receiving an angular extension k^4 of the inner section k^5 of the arm K, such angular extension and socket preventing the arm last mentioned from turning, said arm having its outer section at an angle relatively with its inner section for attaining the desired jamming of the roller against the conical rim. The inner section may also, if desired, have a spring k^6 secured thereto and bearing against the outer section for keeping the roller in operative relation with the rim a'. The nuts l l', the latter being a jam-nut, are provided for the purpose of taking up any lost motion due to wear on the roller, the nut l bearing against the shoulder k^7 of the inner arm-section, and when screwed outwardly, forces the arm K in the same direction and the roller k^2 into close relation with the rim.

What I claim as my invention is as follows:

1. The combination of a circular shell provided with a rim, a rotary arm in said shell, a friction device carried by said arm and engaging with said rim in one direction of rotation of the arm, a spring for returning the latter to its initial position, a reciprocating lever, and a connection intermediate and secured to the latter and the arm, substantially as shown and described.

2. The combination of a circular shell provided with a rim having a conical inner face, a rotary arm in said shell, a friction device carried by said arm and having therein a conical groove, the latter and the groove coming into engagement in one direction of rotation of the arm, a spring for returning the latter to its initial position, a reciprocating lever, and a connection intermediate and secured to the latter and the arm, substantially as shown and described.

3. The combination of a circular shell provided with a rim, a rotary arm in said shell, a friction device carried by said arm and engaging with said rim in one direction of rotation of the arm, a reciprocating lever, and a spring-strap coiled around and secured to the hub of the arm and to said lever, substantially as shown and described.

4. The combination of a circular shell provided with a rim having a conical inner face, a rotary arm in said shell, a friction device carried by said arm and having therein a conical groove, said groove and rim coming into engagement in one direction of rotation of the arm, a reciprocating lever, and a spring-strap coiled around and secured to the hub of the arm and to said lever, substantially as shown and described.

5. The combination of a circular shell provided with a rim having a conical inner face, a rotary arm in said shell, a friction device carried by said arm, having therein a conical groove, said groove and rim coming into engagement in one direction of rotation of the arm, means for returning the latter to its initial position, and a spring for keeping said friction device in operative relation with the arm, substantially as shown and described.

6. The combination of a circular shell provided with a rim having a conical inner face,

a rotary arm in said shell, a friction device carried by said arm and having therein a conical groove, said rim and groove coming into engagement in one direction of rotation of the arm, a reciprocating lever, a spring-strap coiled around and secured to the hub of the arm and to said lever, and a spring for keeping said friction device in operative relation with the rim, substantially as shown and described.

7. The combination of a circular shell provided with a rim, a rigid rotary arm in said shell, and a pivoted friction device carried by said arm, having its pivotal point intermediate its axis and rear end, said device being thereby adapted for frictional engagement with said rim upon the forward swing of the arm, substantially as shown and described.

8. The combination of a circular shell provided with a rim, a rigid rotary arm in said shell, a pivoted friction device carried by said arm, having its pivotal point intermediate its axis and rear end, said device being thereby adapted for frictional engagement with said rim upon the forward swing of the arm, a reciprocating lever, and a spring-strap coiled around and secured to the hub of the arm and to said lever, substantially as shown and described.

In testimony whereof I have hereunto set my hand this 2d day of July, A. D. 1891.

STEPHEN WILSON.

Witnesses:
R. DALE SPARHAWK,
WM. H. POWELL.