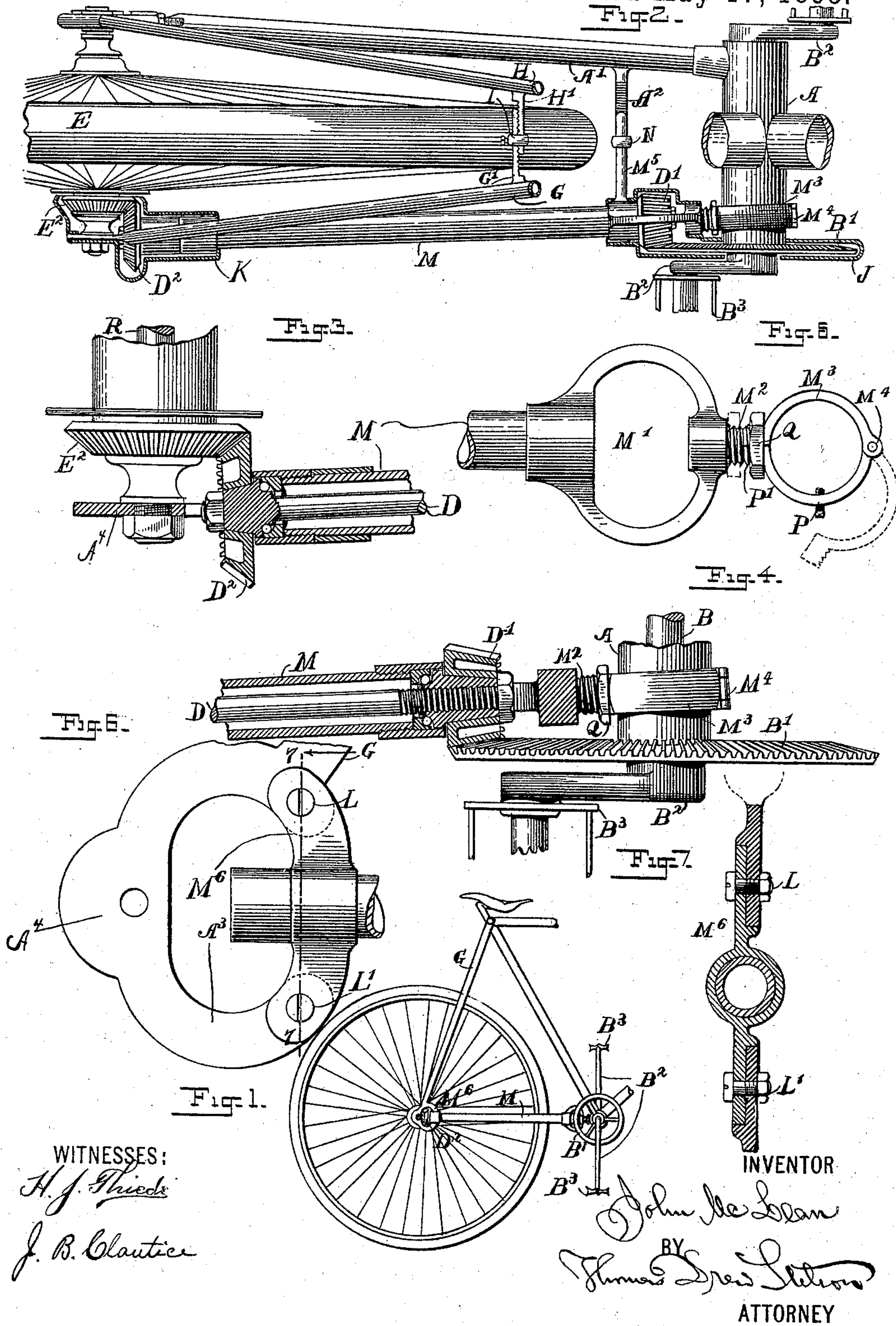


(No Model.)

J. McLEAN.
BICYCLE.

No. 604,073.

Patented May 17, 1898.



UNITED STATES PATENT OFFICE.

JOHN MCLEAN, OF NEW YORK, N. Y.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 604,073, dated May 17, 1898.

Application filed October 21, 1897. Serial No. 655,986. (No model.)

To all whom it may concern:

Be it known that I, JOHN MCLEAN, a citizen of the United States, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Bicycles, of which the following is a specification.

My improvement applies to that class of bicycles in which a longitudinal shaft with bevel-gears is employed to communicate the rotary motion from the pedal-shaft to the rear wheel, such shaft extending through a longitudinal tubular portion of the frame.

I form a strong and conveniently operable clamp connection at the junction of such frame-piece with the ordinary short cross-tube which incloses the crank-shaft, and I provide convenient means in connection therewith for adjusting its position and for removing it and replacing it when required. The improvement allows me by such change of position of the framing to not only vary the engagement of the gears, but also by a little labor to change the gearing by substituting higher or lower gears at will.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out this invention.

Figure 1 (near the bottom of the sheet) is a general side elevation, on a small scale, showing the whole of that portion of the bicycle to which the invention relates. Fig. 2 is a plan view, on a larger scale, with certain upper portions broken away. The casings which inclose the gears are in horizontal section in the plane of the respective axes. The remaining figures are on a still larger scale. Fig. 3 is a plan view, partly in horizontal section, of parts at and adjacent to the rear-wheel hub. Fig. 4 is a corresponding plan view and horizontal section showing the parts at and near the crank-axle. Fig. 5 is a side elevation of certain parts corresponding to Fig. 4. Fig. 6 is a side elevation of certain parts corresponding to Fig. 3. Fig. 7 is a vertical cross-section on the line 7 7 in Fig. 6.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the ordinary short cross-tube, strongly supported in the frame, and which serves to

support the crank-shaft, with the ordinary or any suitable arrangement of antifriction-balls in each end.

B is the crank-shaft, turned by cranks B² and pedals B³ B³ in the ordinary and long-approved manner.

B' is a bevel gear-wheel, keyed or otherwise firmly secured on the shaft B. Its teeth should be nicely cut, and its conicity should be adapted to give motion properly to the smaller bevel gear-wheel D' on the front end of the longitudinal shaft D, having a quicker rotation according to the difference in the size of the gears. The rear end of the shaft D carries a bevel gear-wheel D², shown as a miter-bevel, which engages with a corresponding bevel gear-wheel E² on the rear wheel E.

The longitudinal shaft D extends through a hollow portion M of the frame, corresponding to the ordinary fixed tube lying in that position, but there are certain peculiarities. Near the front end the tubular condition terminates, the further extension forward being formed first by a loop M' of sufficient size to afford ample room for the gear-wheel D'. Beyond this it is extended forward a little distance in a solid or tubular form M², the front portion of which is cut away on the under side, so as to make it only half-cylindrical. This portion of the framing extends still farther forward, all integrally, the forward portion being arched or bent in a semi-circle M³, terminating in a knuckle M⁴. A correspondingly-curved piece P is joined to the knuckle M⁴ and can turn thereon. These two parts thus knuckled together form a clamp the interior of which is accurately matched to the exterior of the cross-tube A of the frame, so that it may firmly embrace it. A short length P' at the rear end of the part P stands radially to the curve and is semicylindrical in cross-section. The exteriors, both of the parts M² and P', are screw-threaded and slightly tapered, small end rearward. They receive a nut Q, which on being screwed forward upon the matched semicylinders M² and P' hold the clamp tightly closed. In this condition these portions of the framing are firmly united and mutually supported. On the nut Q being turned to carry it sufficiently rearward it leaves the part P' free and allows the clamp to be opened.

The nearly horizontal tube M is not exactly at right angles to the cross-tube A and its inclosed shaft B. The interiors of the curved portions M³ and P of the clamp are
 5 bored or otherwise truly finished with a corresponding degree of obliquity. This clamp will match accurately and take a firm hold on the exterior of the adjacent portion of the tube A, with capacity to be slackened and ad-
 10 justed laterally to a considerable extent thereon to allow the depth of the engagement of the teeth of the bevel-wheels B' and D' to be accurately adjusted.

M⁵ is a rigidly-attached arm extending horizontally inward from the tube M at the point represented. Its under surface is finely
 15 toothed and adapted to engage with a correspondingly-toothed arm A², extending horizontally inward from the opposite nearly
 20 horizontal longitudinal frame-tube A'. A clamp N embraces these arms M⁵ and A² and holds them stiffly united in any required position.

When for any reason, as the wear or the
 25 springing or bending of any part, the teeth of the bevel gear-wheels B' and D' do not engage sufficiently deep, the grip of the parts M³ and P on the tube A is relaxed, the clamp N is slackened by turning a set-screw, (not
 30 shown,) and when the proper adjustment of position is attained the parts are again tightened, so as to make the connections rigid and very strong.

At the rear end of the horizontal tube M
 35 are wings M⁶, fixed firmly thereon. The main frame is formed at this point as an open loop A³, having an open space at the front. The wings M⁶ bridge across the open front and apply above and below, as shown, and are
 40 held stiffly by screw-bolts L and nuts L'. (See Figs. 6 and 7.) The framing A⁴ holds the loop A³ and wings M⁶, and also performs the ordinary functions of this portion of the framing by making a strong and reliable connection
 45 to the fixed axis R of the rear wheel (see Fig. 3) and extending upward integrally to form the inclined brace G, held by a screw to the framing adjacent to the saddle-post in the ordinary manner.

An arm G' extends horizontally inward from the inclined frame-piece G above the wheel E. A corresponding inclined frame piece or brace
 50 H extends up on the opposite (the left) side of the bicycle, provided with an arm H', which is the counterpart of the arm G' and matches to it. These arms G' and H' are united by the aid of a clamp I, which is tightened and relaxed by a screw. This strongly and rigidly supports the said parts and allows their
 55 easy separation when required.

This construction facilitates the removal of the longitudinal shaft D and its attachments when it is necessary for cleaning or for repair or exchange. I can by making a still
 65 greater change of position of this shaft allow of changing the gears, substituting, for ex-

ample, a smaller bevel-wheel B' and a larger bevel-wheel D', and thus correspondingly lowering the gear. This requires simply shifting the clamp M³ P on the fixed cross-tube A,
 70 and correspondingly shifting the parts A² and M⁵ relatively to each other. The change in the angular position of the frame M, to thus make a considerable difference in the gearing at the front, will not ordinarily involve any
 75 appreciable difficulty. The tightness of the grip of this ring-clamp in the required position on the fixed cross-tube A may be increased by ordinary means, as a set-screw tapped through either of the parts. Fig. 5
 80 shows such a screw inserted through the hinged limb P at the lowest point.

J is a casing of thin metal properly formed and applied to inclose the gear-wheels B' D' at the front. A corresponding, but smaller,
 85 casing K incloses the wheels D² and E² at the rear.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I can bend the
 90 front portion at the junction of the arch M⁶, so that the clamp M³ P will take hold of the tube A in a position more nearly or exactly at right angles to the axis of the latter.

I claim as my invention—

1. In a bicycle operating by a longitudinal shaft D, extending through the tubular frame-piece M, a split clamp at the front end allowing of engagement and disengagement with the cross-tube A and also of lateral adjustment thereon, substantially as herein specified.
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2. In a bicycle operating by a longitudinal shaft D, extending through the tubular frame-piece M, a detachable clamp at the front end
 105 allowing of engagement and disengagement with the cross-tube A, in combination with the bracing-arms M⁵, A², and clamp N, adapted to allow the convenient assemblage and separation of the parts and also the adjustment of the engagement of the gear-wheels B', D', all substantially as herein specified.
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3. In a bicycle operating by a longitudinal shaft D, extending through the tubular frame-piece M, a split clamp at the front end allowing of lateral adjustment upon and also of engagement and disengagement with the cross-tube A and the open yoke A³, wings M⁶ and fastening means L, adapted to allow a strong and rigid connection and an easy disconnection and removal or change of position relatively to the tube M and its immediately-associated parts, all combined and arranged to serve substantially as herein specified.
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In testimony that I claim the invention
 125 above set forth I affix my signature in presence of two witnesses.

JOHN McLEAN.

Witnesses:

J. B. CLAUTICE,
 M. F. BOYLE.