

No. 606,797.

Patented July 5, 1898.

J. E. WILSON.
BICYCLE.

(Application filed Aug. 9, 1897.)

(No Model.)

2 Sheets—Sheet 1.

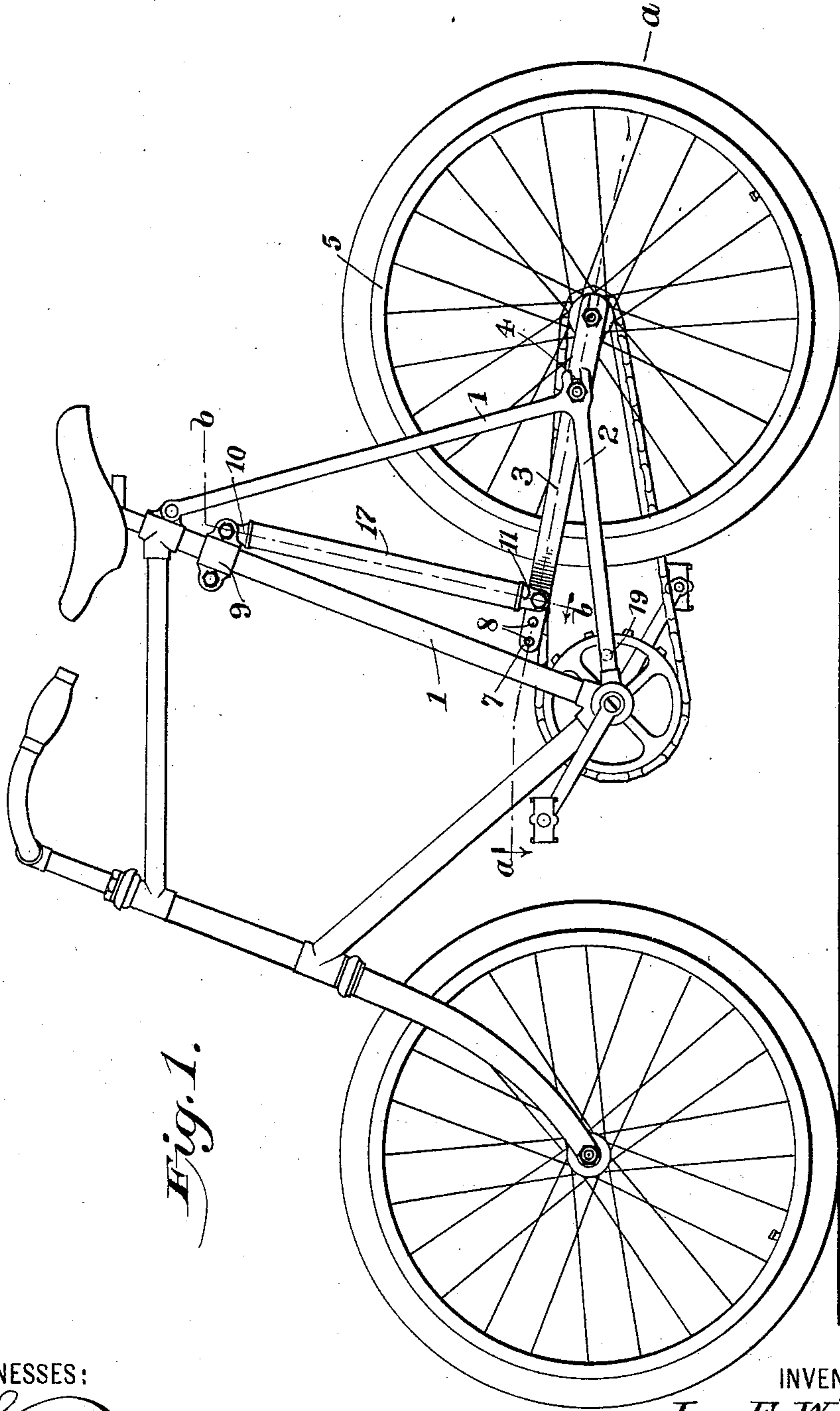


Fig. 1.

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Fig. 2.

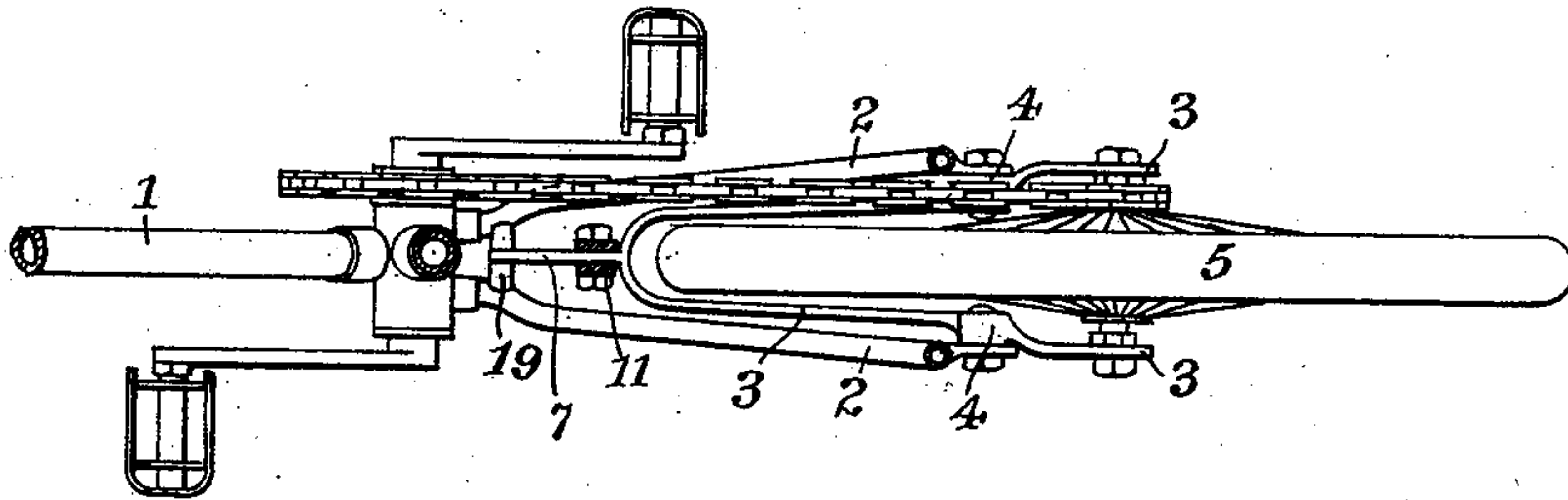


Fig. 3.

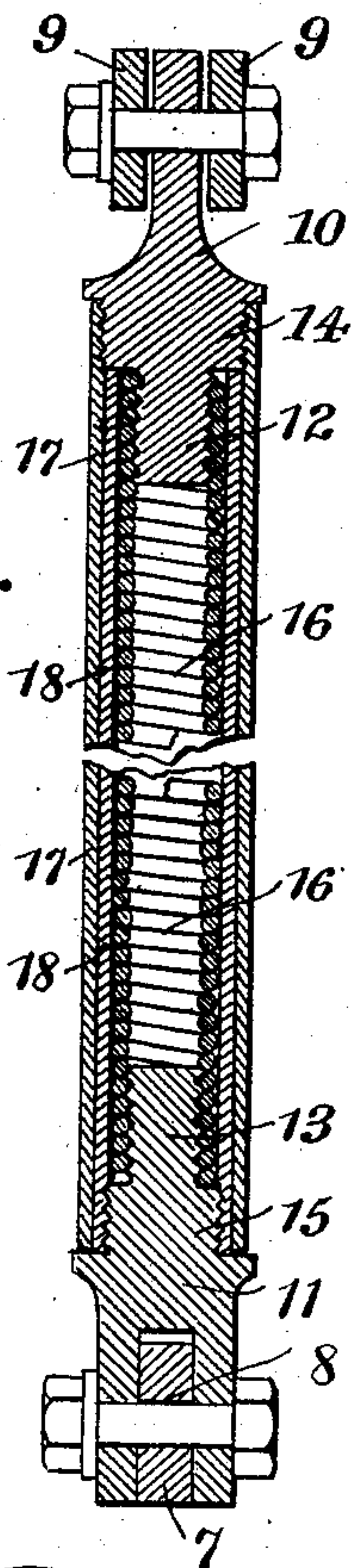
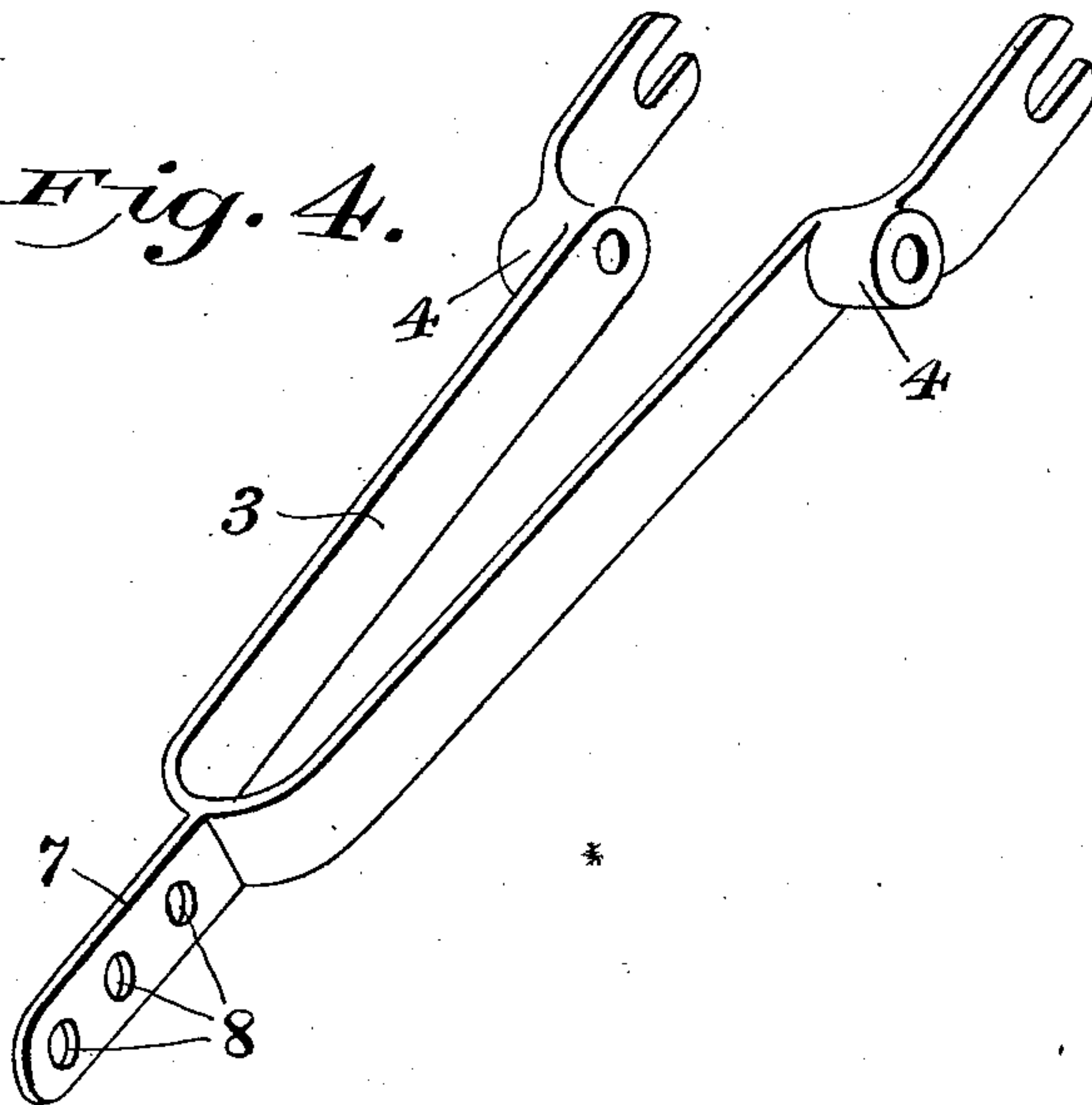


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BICYCLE.

SPECIFICATION forming part of Letters Patent No. 606,797, dated July 5, 1898.

Application filed August 9, 1897. Serial No. 647,617. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WILSON, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Bicycles; and I do hereby 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.

My invention relates to an improvement in bicycles and kindred vehicles, whereby the weight of the rider is sustained and carried free from the shock or vibration incidental to the roadway, the object of my invention being to provide the modern men's "diamond" and ladies' "drop" frame bicycles with a device which can be quickly applied or removed by unskilled hands without any mutilation, alterations, or modifications of the frame whatever; but my invention particularly relates to that class of bicycles in which the rear wheel is supported by an auxiliary lever pivoted to the rear fork of the frame, the forward extremity of the lever being backed up by some resilient means; and with the end in view to greatly improve upon this construction and to correct certain defects in prior constructions my invention consists in certain details of structure and arrangement and the combination of parts, such as will be hereinafter more fully set forth, and then specifically designated by the claims.

I am aware that various efforts have heretofore been made to accomplish the result aimed at by my invention, and also that a hinged lever has even been fitted to the rear fork of a specially-shortened frame, in the rear end of which lever, beyond the pivotal point, the rear wheel is journaled, while the forward extremity of the lever is connected by a coil-spring to some convenient portion of the frame; but these constructions have not only involved radical and expensive changes in the standard frame of a bicycle, but they are faulty and even fatally defective in that their arrangement is such that they do not and cannot accomplish the result sought for.

I have conducted most careful experiments and have built and equipped bicycles with my present improvement and I have ascertained that the conditions absolutely necessary to

success are as follows: First, the resiliency of the auxiliary frame or lever must be capable of ready adjustment to suit the weights of various riders on the same machine or to suit the caprice of an individual rider who at times may wish a spring element more or less stiff; second, the auxiliary lever must be light but must be of such form and strength as to resist severe strain without deflection or injury; third, this auxiliary frame must not materially enlarge the dimensions of the assembled machine or in any way interfere with the rider or his clothing or detract from the appearance of the machine itself; fourth, the parts added to the machine to accomplish the result aimed at must be so simple in construction and application that any person who is competent to care for a bicycle at all can put the improvement in place or remove it in a few minutes; fifth, the improvement must be economical in cost as compared with the expense of the bicycle itself. I therefore submit that the hereinafter-described construction fully meets the conditions above stated and will be readily understood by reference to the accompanying drawings, which form a part of this application, and in which—

Figure 1 is a side elevation showing a bicycle equipped with my improvement; Fig. 2, a section at the line *a a* of Fig. 1; Fig. 3, a section at the line *b b* of Fig. 1, and Fig. 4 a detail perspective of the yoke-lever.

Similar numbers of reference denote like parts in the several figures of the drawings.

1 is the usual diamond frame of a bicycle, and 2 is the rear fork, within which the rear wheel is usually journaled.

3 is what I term a "yoke-lever," provided with hubs 4 near its rear end, which hubs are pivoted within the rear fork 2 at the point where the rear wheel is usually supported.

5 is the rear wheel, which is supported and journaled within the rear extremity of the lever 3, while the forward extremity of this lever extends around the wheel and is capable of swinging in an arc of a circle in close proximity to the circumference of such wheel, as will be more clearly set forth hereinafter.

At the extreme forward end of the lever 3 is an extension 7, which is perforated at various points, as shown at 8, and secured to any convenient part of the frame above is a

clip 9. 10 11 are plugs which are pivotally secured to said clip and perforated extension, respectively, said plugs being threaded exteriorly at their inner ends, as shown at 12 and 13, respectively. These plugs are provided with annular shoulders 14 15, respectively, which are slightly larger in diameter than the threaded portions 12 13, and these shoulders are exteriorly threaded.

16 is a coil-spring within whose extremities the threaded portions 12 13 of the plugs are driven, so that it will be clear that any downward movement of the lever 3 will be effected against the resiliency of this spring.

17 18 are telescoping tubes which inclose the coil-spring, the outer extremities of these tubes being interiorly threaded and driven upon the threaded shoulders 14 15. As the spring is distended by the lowering of the lever 3 these tubes will of course distend, and the abutting of the free ends of these tubes against the plugs will afford a proper stop to arrest the upward movement of the lever 3, and thereby prevent the rear wheel from swinging inward beneath the frame of the bicycle when the frame is lifted from the ground or placed in inverted position. A stop 19, secured to the lower part of the bicycle-frame, will arrest any unusual downward movements of the lever 3, such as might possibly lower the frame to the extent that the pedals would strike the ground. This incasing of the spring element, while it may not be absolutely necessary, is nevertheless advisable, since it then becomes impossible for the coils of the spring to get entangled with the clothing, and also dirt and other foreign matter is thereby prevented from working into the coils of the spring and causing the latter to present an unsightly appearance. Should a greater spring resistance be desired, the lower plug 11 is simply pivoted to one of the perforations 8 farther out toward the end of the extension 7, since this will increase the effective length of the forward end of the lever from the pivotal point of the latter.

Referring particularly to Fig. 4, it will be seen that the rear ends of the lever 3 are spread outwardly or offset and that these offset ends are joined to the yoke portion of the lever by the intermediate hubs 4. It will also be noted that these hubs afford long bearings for the pins or screws by which the lever is pivoted within the rear fork 2, and right in this connection I desire to state that I consider it absolutely necessary that these hubs should be used, since they afford great strength at the points where the lever should be capable of withstanding the most severe strain.

In all modern bicycle-frames the rear fork must be spread in order to admit the rear wheel, and therefore, these hubs being exceedingly rigid, it follows that when the extreme ends of the offset portions are spread to admit the rear wheel the rear fork of the frame will also be spread and will be retained in this spread condition by the rigid hubs,

so that the wheel-spokes will have sufficient clearance. It will thus be seen and readily understood that when the rider mounts the machine the entire frame will automatically drop under his weight, and, moreover, the latter can be readily calculated from the position of the forward end of the lever 3 in its vertical displacement against the resiliency of the spring, it being of course clear that a heavy man will cause this extremity to be thrown in a lower plane, while a light man will not cause it to be depressed so far. It is absolutely necessary that this yoke-lever should extend and be located inside the bicycle-frame, for were it located outside the frame it would be impractical and dangerous, because it would interfere with the leg movements of the rider and would continually catch in his clothing, and in all modern machines that I know of, owing to the small clearance of the crank, such arrangement would interfere with the inside pedal-nut. Also it is absolutely necessary that the distance between the pivotal point of the yoke-lever and the point where the rear wheel is supported should be as short as possible and that the forward extremity of the yoke-lever should be distant from the pivotal point of the latter as far as possible in order that a light and sensitive spring element may be employed and in order that the weight of the rider may be thrown as much as possible on the axle of the rear wheel.

It would never do to locate the pivotal point of the yoke-lever about midway of its length, for in that event the extremity of the lever which supported the wheel would have an excessive movement, while the forward extremity of such lever would not have sufficient play to take advantage of enough of the spring element to counteract the shocks and vibrations while passing over obstructions and rough roads. Moreover, if the pivotal point of this lever were located midway of its length the frame of the machine would have to be cut off—that is to say, the rear fork would have to be shortened, so that the rear wheel could be brought close enough to the frame to permit the rider to mount. Unless the frame was cut off in this manner the whole machine would be so long and there would be such a distance between the rear wheel and the saddle that it would be practically impossible for a rider to mount. I have ascertained by actual experiment that the pivotal point of this yoke-lever must be in close proximity to the journal of the rear wheel, and therefore it will be seen that I am enabled to use an ordinary diamond frame of a bicycle without materially altering its dimensions as to length.

A bicycle equipped with my improvement rides with surprising ease and comfort to the rider and imparts the most intense exhilaration, and this is due solely to the fact that I employ an extremely sensitive and responsive spring element, and I am enabled to do this,

as I said before, owing to the fact that the distance between the forward end of the yoke-lever and the pivotal point of the latter is several times greater than the distance between such pivotal point and the journal of the rear wheel. In fact, I have ascertained that it is impossible to be thrown from the saddle or to lose the pedals when traveling at a fast gait over extremely rough and humpy roads.

In my experiments with and tests of my improvement I have ascertained that I can mount ascending grades with much greater ease than I can when riding the same wheel not equipped with my improvement, and I attribute this to the peculiar action of the spring and to the lowering of the frame and cranks and to the effect caused by the chain pulling over the point at which the lever is pivoted to the frame, thus tending to over-extend the spring during the revolution of the pedals at the moment when the power of the rider is most effectively exerted, so that the spring will really have stored energy which is utilized as the pressure on the pedals is released in passing a dead-center. In other words, there is an actual assistance from this spring which amounts to almost an avoidance of the dead-center in mounting grades.

As I said before, I am aware that it has heretofore been essayed to equip a bicycle with devices similar to my improvement; but I desire to disclaim any and all constructions in which the yoke-lever passes and operates outside the bicycle-frame, or in which such lever is pivoted at or about the center of its length to the bicycle-frame, or in which single levers are pivoted to the frame at one side of the rear wheel, and I therefore do not wish to be understood as claiming, broadly, the lever pivoted to the frame and supporting the rear wheel at one extremity and backed up by a spring at the other, the gist of my invention resting in the provision of a substantially integral lever, the front of which surrounds the forward portion of the rear wheel, while the rear extremities are spread outwardly into offsets and united to the yoke portion of the lever by substantial hubs, which hubs are pivoted inside the bicycle-frame, the rear wheel of the bicycle being journaled within the extremities of these offset portions. One of these offset hubs performs a very essential function in that it affords ample clearance for the chain, which latter passes both above and below this hub, and it will therefore be clear that my device would be impractical without these hubs.

While I do not wish to be understood as claiming, broadly, offsets in a lever, for the reason that such construction is common in the mechanical arts—as, for instance, in hand-rollers for lawns, hand-printing rolls, &c.—

nevertheless I have exercised my right to borrow this construction from the known mechanical arts and have utilized it in an entirely new connection and have made the offset portions and the hubs perform new functions, and therefore in this respect I believe that I am entitled to a patent.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bicycle, the combination of the rear fork of the ordinary frame, with the integral lever comprising a yoke which extends within the frame around the front of the rear wheel and rigid short offset portions at the ends of said yoke and separated from the latter by intermediate cylindrical hubs, said lever being pivoted within said fork at the point where the offset portions are joined to the yoke, the rear wheel journaled in the ends of said portions, and the spring connected to the frame and to the front part of said yoke, substantially as set forth.

2. In a bicycle, the combination of the frame having the usual rear fork, the lever which has a yoke portion that extends inside the frame around the front of the rear wheel and rigid outwardly-spread offsets which terminate the rear ends of said lever, the cylindrical hubs intermediate of said yoke and offsets and pivoted to said fork and within the same whereby clearance is afforded both for the rear wheel and the chain, the rear wheel journaled within said offsets immediately beyond said pivotal point, and the spring whose extremities are connected respectively with the forward end of said yoke and with the upper part of the bicycle-frame, substantially as set forth.

3. In a bicycle, the combination of the rear fork of the ordinary frame, the yoke-lever pivoted near its rear extremity to the rear end of said fork and inside the latter, the rear wheel journaled in the rear end of said lever immediately beyond the pivotal point thereof, the forward extremity of said yoke-lever extending inside the bicycle-frame and around the forward portion of the rear wheel and provided with a perforated extension, the plugs having threaded portions and pivoted respectively to said extension and to the upper portion of the frame, the coil-spring into whose extremities said plugs are driven, and the telescoping tubes inclosing said spring and respectively secured to said plugs, substantially as set forth.

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

JAMES E. WILSON.

Witnesses:

F. W. SMITH, Jr.,
M. T. LONGDEN.