(No Model.) 4 Sheets—Sheet 1.

E. G. LATTA.

VELOCIPEDE.

No. 438,551. Patented Oct. 14, 1890.

Fig. 1.

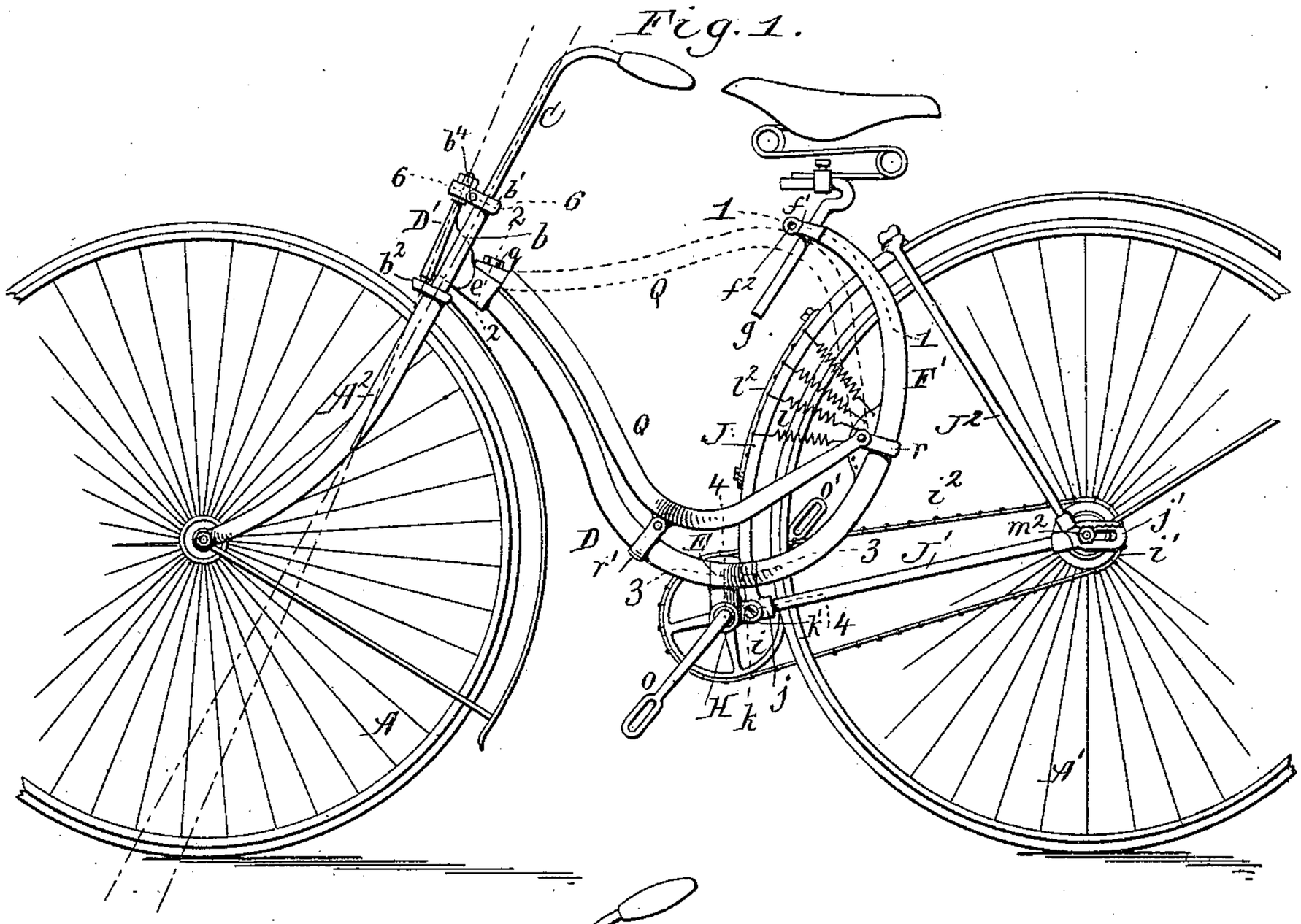

Fig. 2.

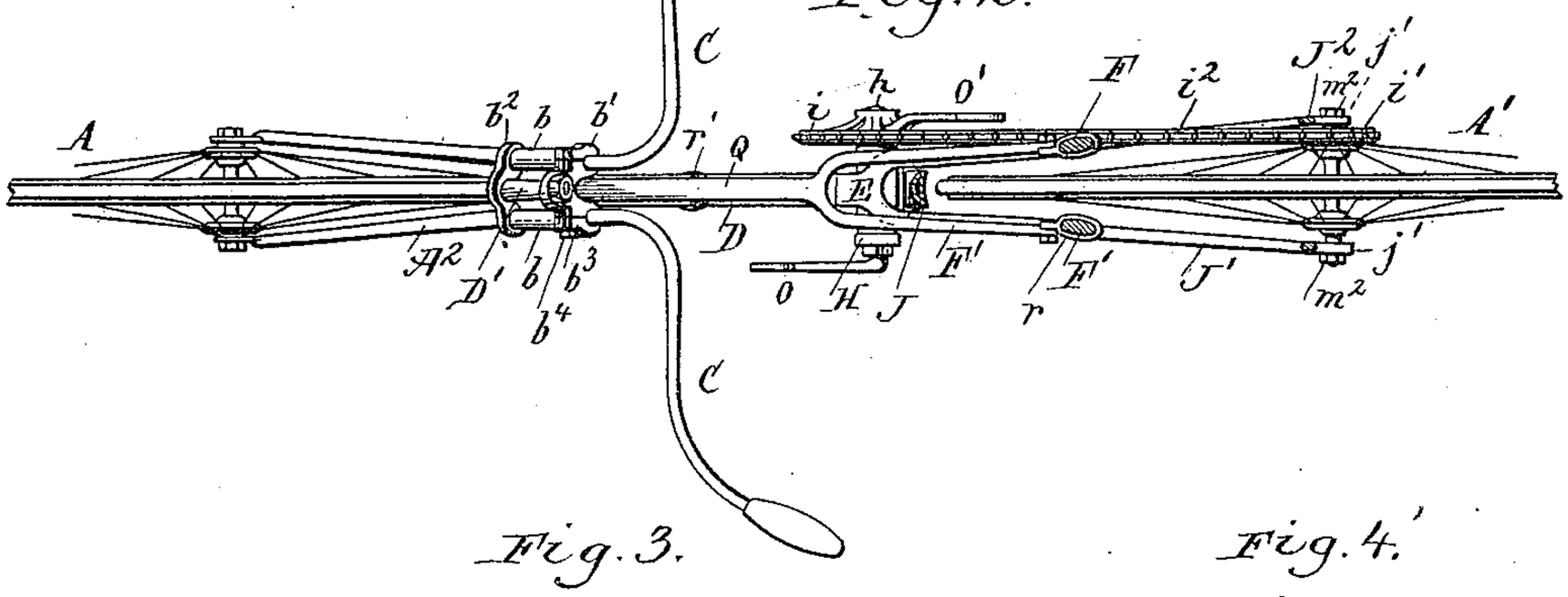

Fig. 3.

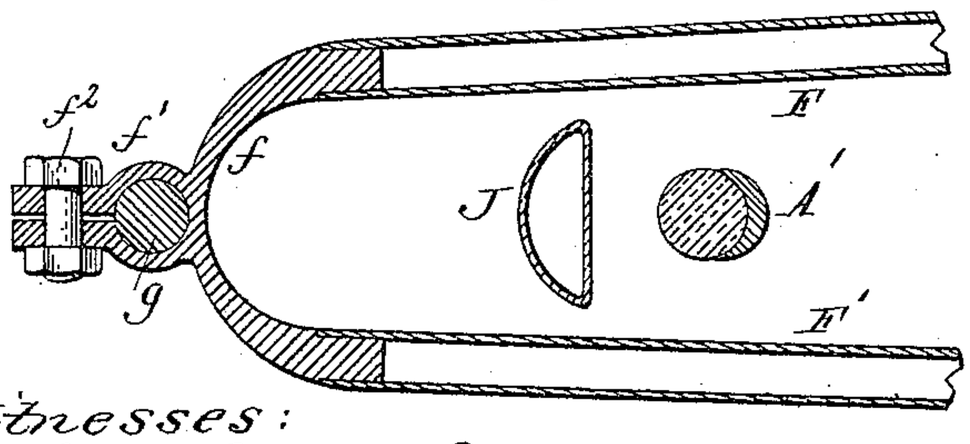

Fig. 4.

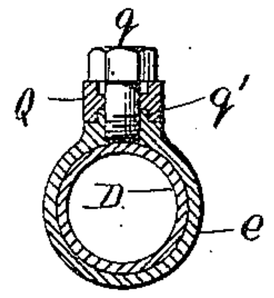

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Fig. 5.

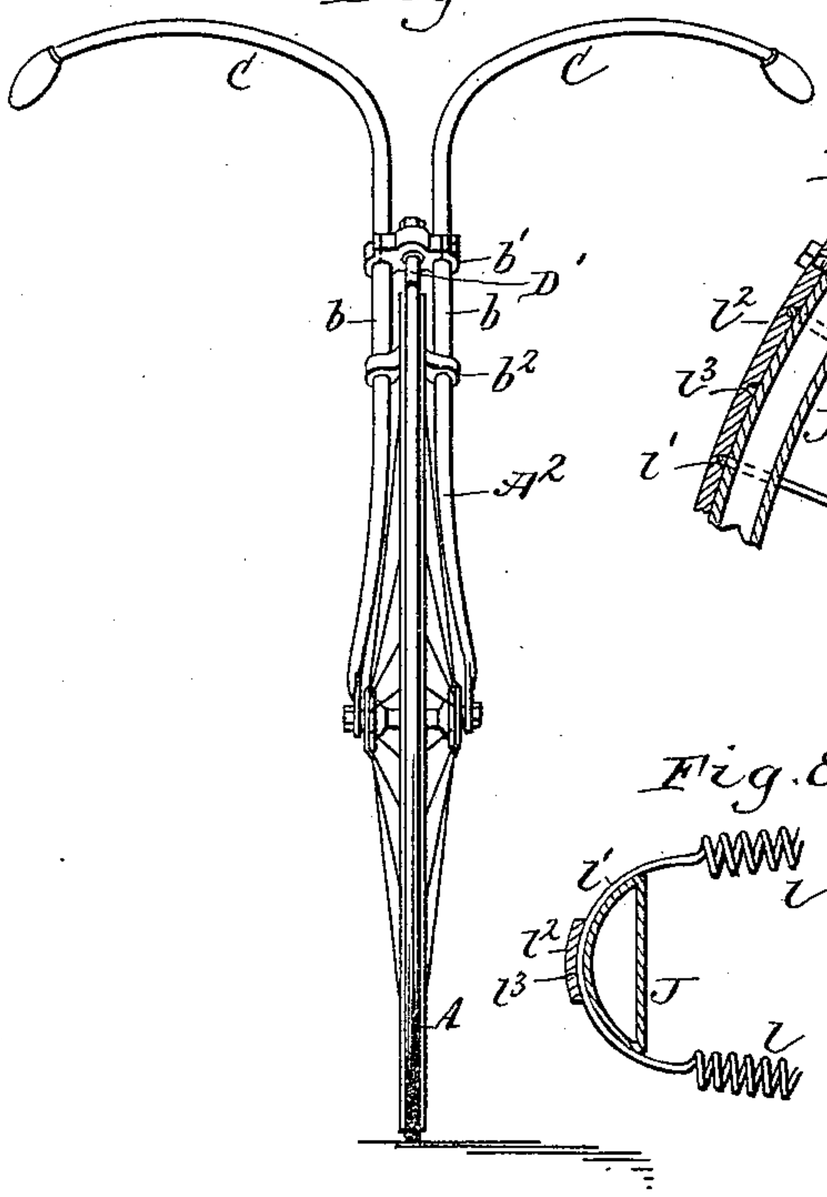

Fig. 7.

Fig. 8.

Fig. 9.

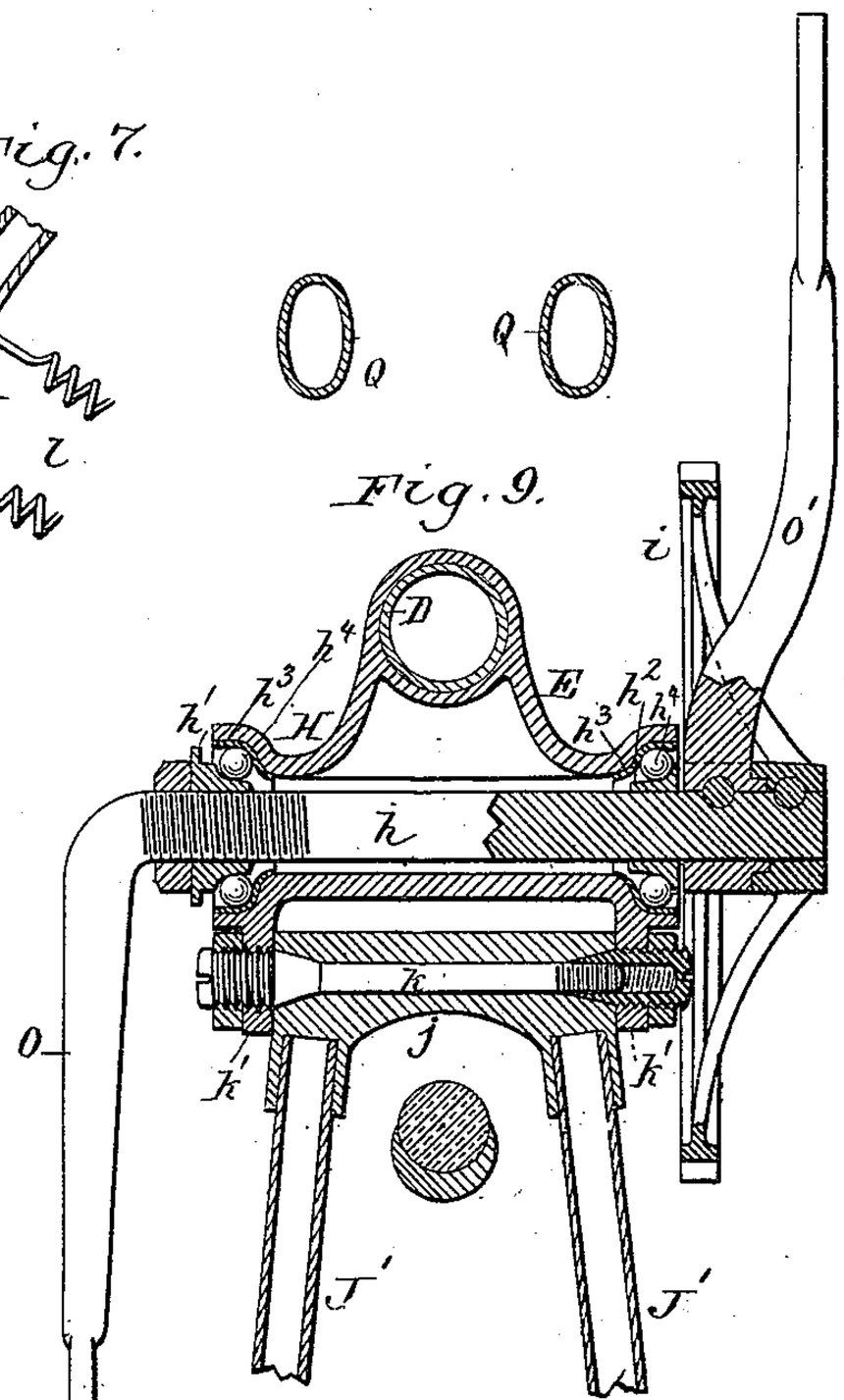

Fig. 6.

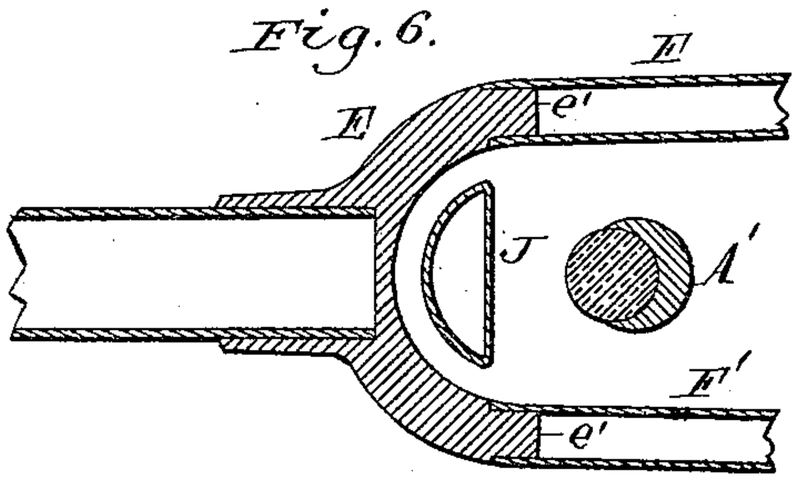

Fig. 10.

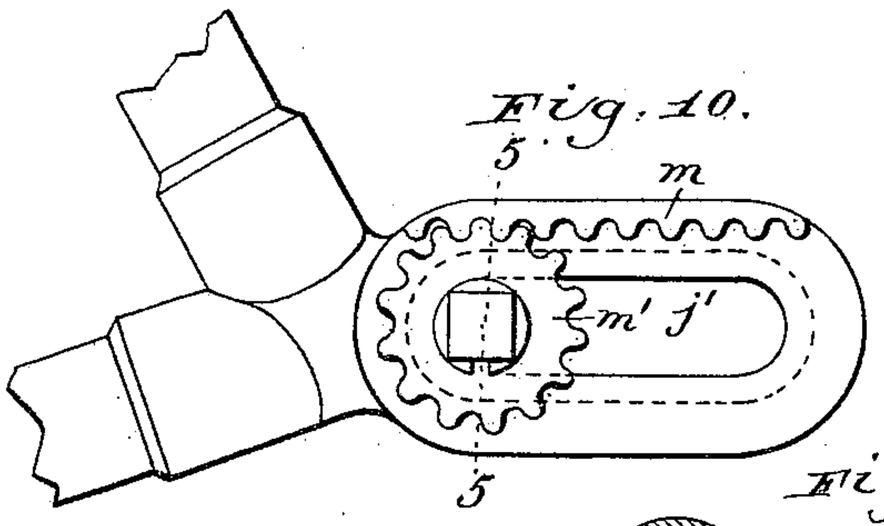

Fig. 11.

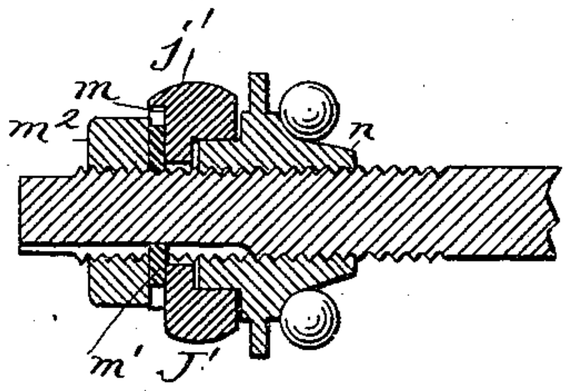

Fig. 12.

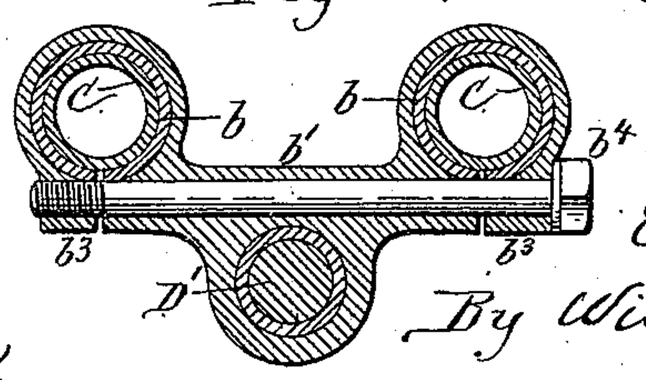

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Fig. 13.

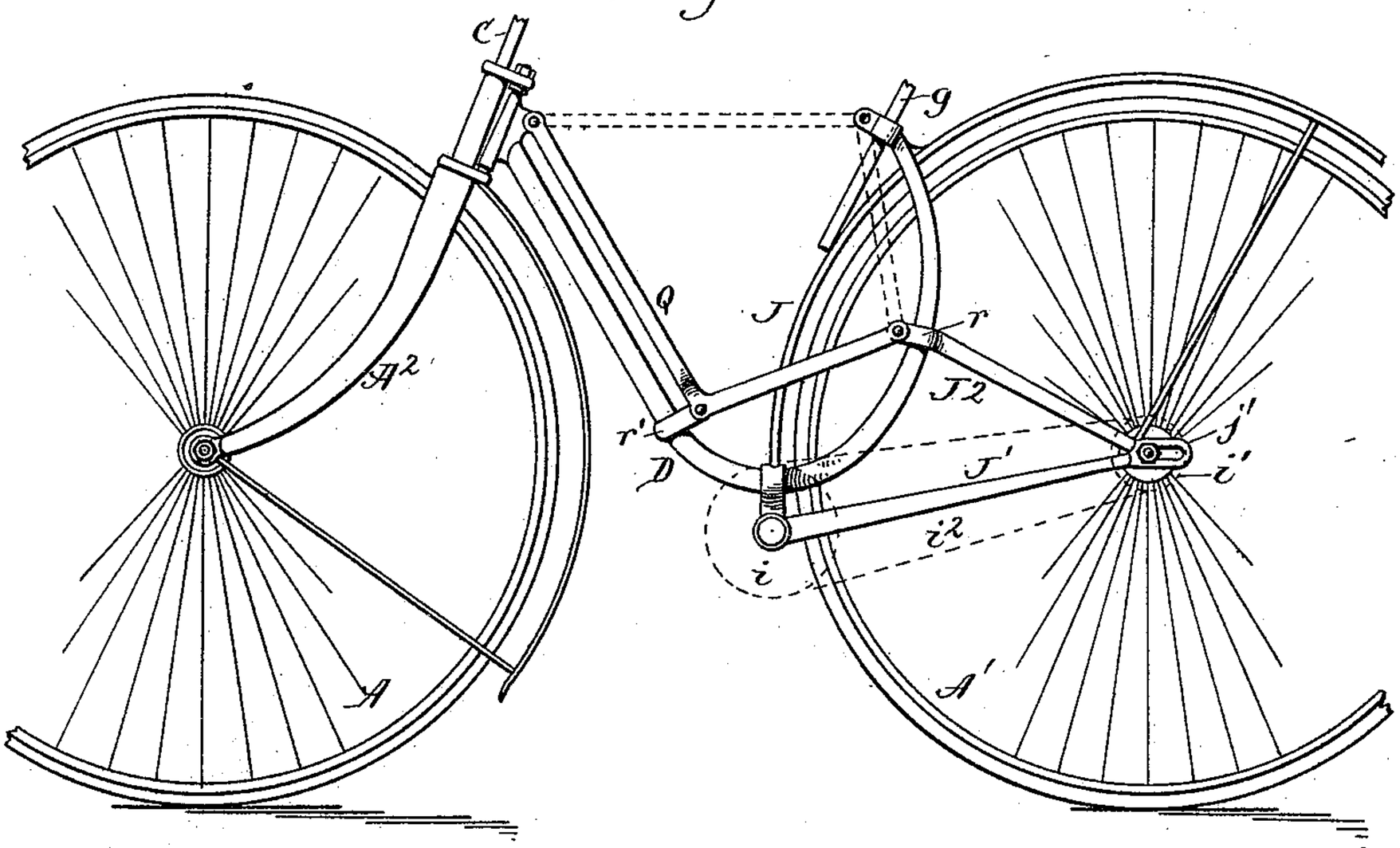

Fig. 14.

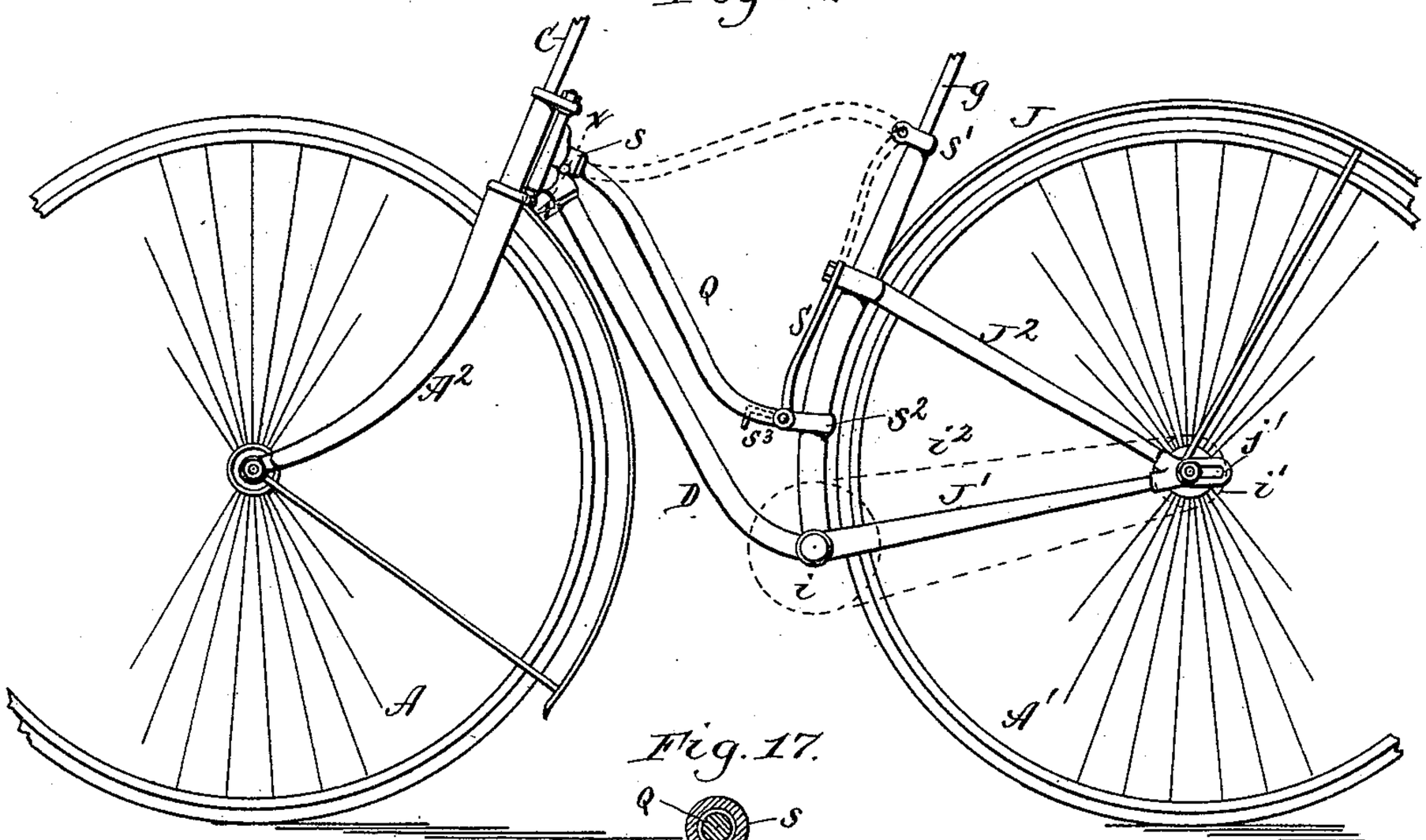

Fig. 17.

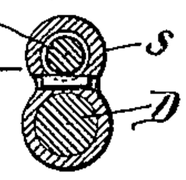

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Fig. 15

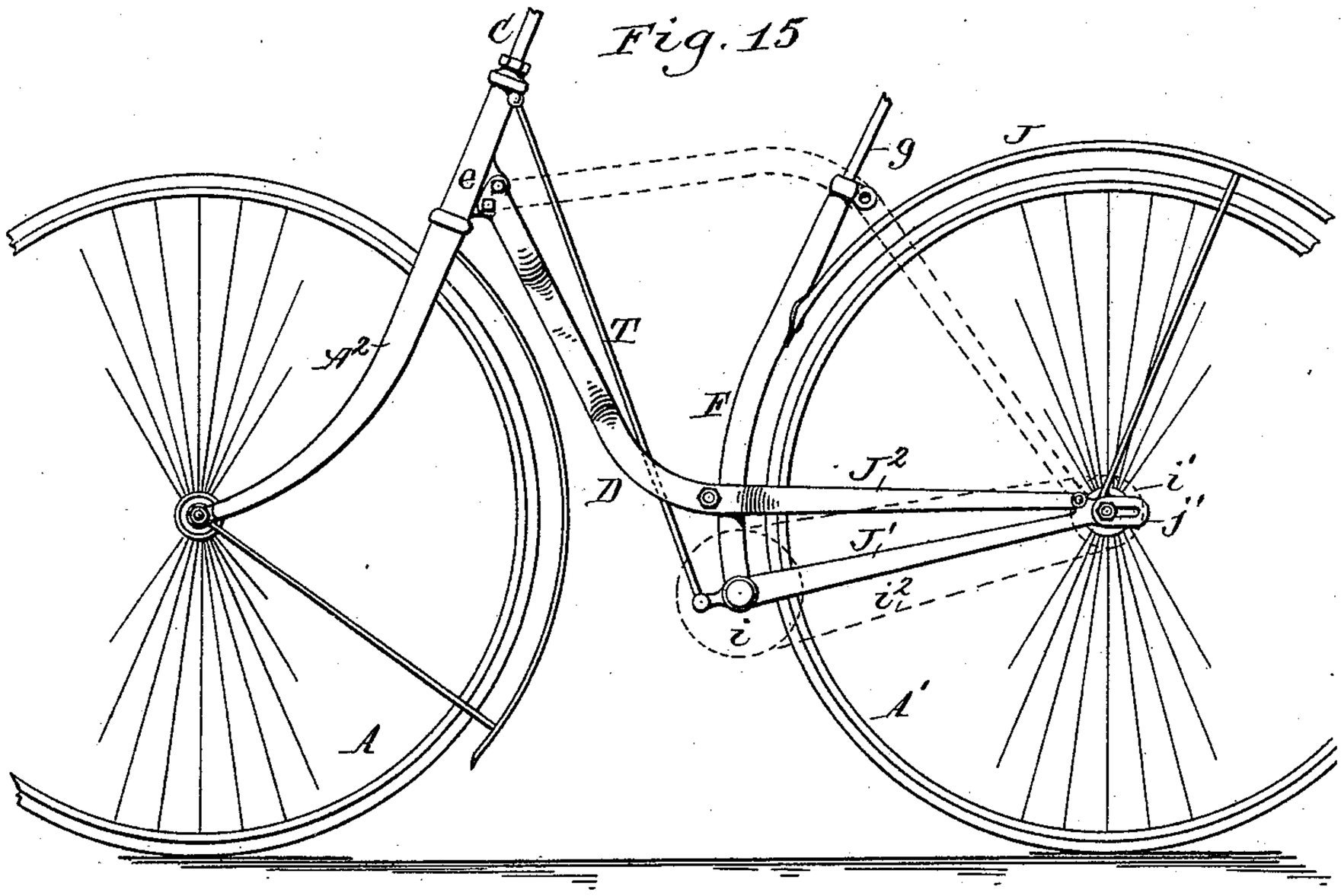
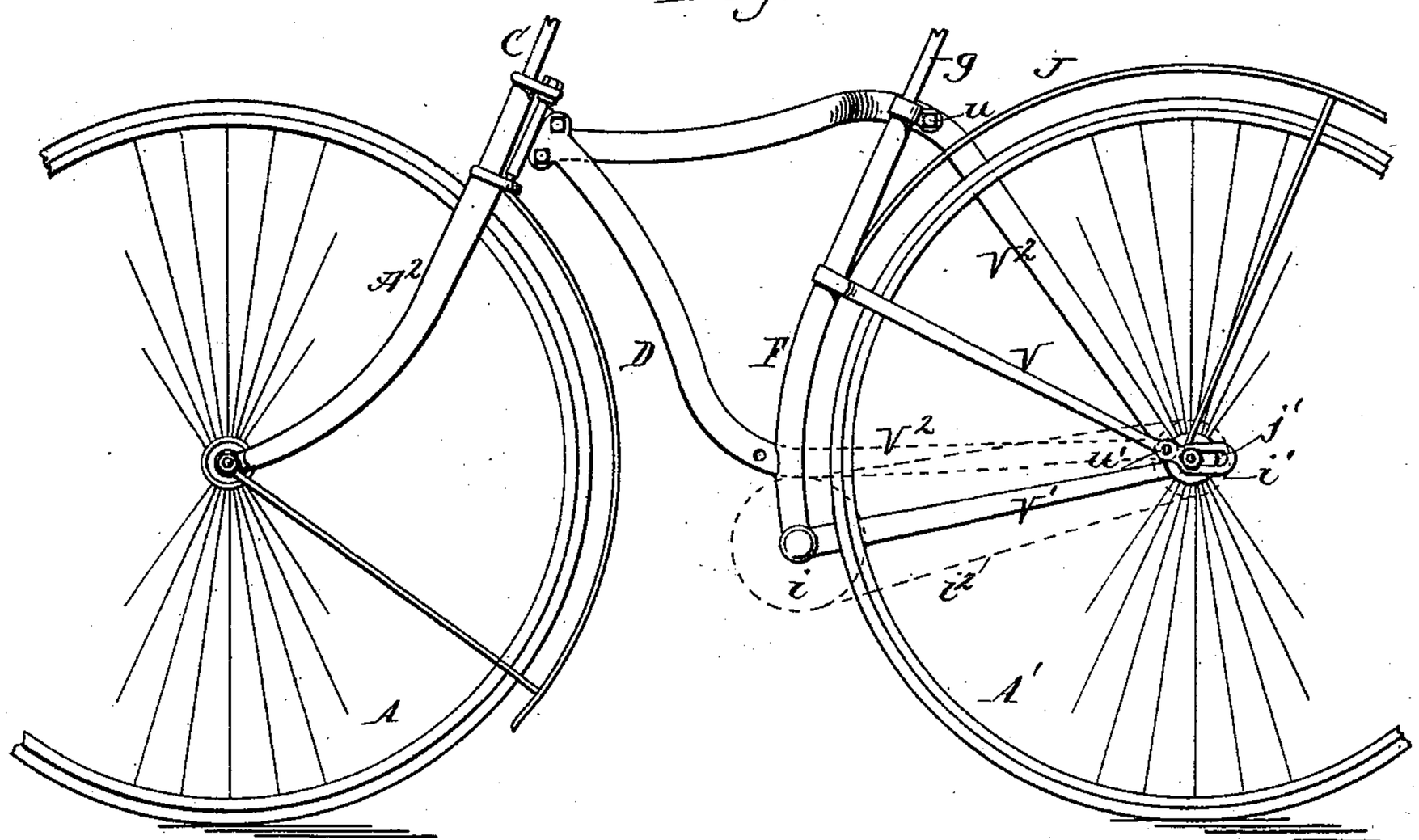


Fig. 16.



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UNITED STATES PATENT OFFICE.

EMMIT G. LATTA, OF FRIENDSHIP, NEW YORK.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 438,551, dated October 14, 1890.

Application filed January 22, 1890. Serial No. 337,741. (No model.)

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, a citizen of the United States, residing at Friendship, in the county of Allegany and State of New York, have invented new and useful Improvements in Velocipedes, of which the following is a specification.

The objects of my invention are to produce a velocipede which may be used by either sex, to reduce the weight and cost of the main frame and construct the same in such manner as to render it particularly desirable for service on rough roads, to improve the steering mechanism, and, finally, to facilitate the interchanging of the driving-gears.

In the accompanying drawings, consisting of four sheets, Figure 1 is a side elevation of a velocipede containing my improvements. Fig. 2 is a top plan view thereof. Fig. 3 is a longitudinal section of the saddle-supports in line 1 1, Fig. 1, on an enlarged scale. Fig. 4 is a cross-section of the machine in line 2 2, Fig. 1, on an enlarged scale. Fig. 5 is a front elevation of the machine. Fig. 6 is a longitudinal section of the reach in line 3 3, Fig. 1. Fig. 7 is a fragmentary longitudinal section of the mud-guard and the springs attached thereto on an enlarged scale. Fig. 8 is a cross-section thereof. Fig. 9 is a sectional elevation of the crank-shaft and connecting parts, on an enlarged scale, the plane of section being in line 4 4, Fig. 1. Fig. 10 is a fragmentary side elevation of the rear wheel frame, on an enlarged scale, showing the adjusting mechanism of the rear axle. Fig. 11 is a cross-section in line 5 5, Fig. 10. Fig. 12 is a cross-section of the steering-head in line 6 6, Fig. 1, on an enlarged scale. Figs. 13 to 16, inclusive, represent modified constructions of the reversible reach. Fig. 17 is a cross-section in line $x\ x$, Fig. 14.

Like letters of reference refer to like parts in the several figures.

A represents the front wheel, A′ the rear wheel, and A^2 the hollow fork or frame of the front wheel.

$b\ b$ represent upward parallel extensions or continuations of the branches of the front fork and constituting together an open steering-head. These extensions are connected together by cross-heads or bridges $b'\ b^2$, having collars which embrace the extensions, as represented in Figs. 2, 5, and 12.

C C represent independent handle-bars arranged with their shanks in the tubular parts $b\ b$ of the steering-head, and which are adjustably clamped therein by the collars of the upper cross-head b'. The collars of the latter are split and each provided with a lug b^3, through which passes a horizontal clamping-bolt b^4, the lug of one of the collars being provided with a smooth opening, through which the headed portion of the bolt passes, and the lug of the other collar with a screw-threaded opening, with which the threaded end of the bolt engages, as represented in Fig. 12. Upon tightening this bolt both collars are contracted simultaneously, whereby the upper ends of the extensions b are caused to clamp the shanks of the handle-bars. The extensions b are also split to permit them to contract. The handle-bars are adjusted vertically to any desired elevation by loosening the clamping-bolt b^4 and again tightening the same after making the adjustment. The handle-bars are made right and left and extend upwardly from the steering-head parallel with the latter, thence outwardly, and thence backwardly to bring the handles into the same position as the handles of an ordinary transverse bar having rearwardly-bent ends. This construction of the steering-head and handle-bars requires fewer parts than the usual construction and reduces the weight correspondingly. It permits of the same vertical adjustment as ordinary handle-bars, and as the handle-bars are separate and movable independently of each other they can be turned backwardly or forwardly in their sockets to locate the handles in the most comfortable position for the rider.

D represents the reach, and D′ the steering-spindle, provided with the usual cones or steering-centers, which are seated in bearings in the cross-head or bridges $b'\ b^2$. Instead of arranging the spindle on a line with the steering-head, as heretofore proposed, the spindle is located in advance of the steering-head, as represented in Fig. 1, the inclination of the spindle being such that the planes of the spindle and steering-head intersect, as represented by dotted lines in Fig. 1. By this ar-

rangement the handle-bars are brought back to their proper position and the spindle is caused to assume a more desirable angle for easy steering than when the same stands in a plane with the steering-head or in rear thereof. The neck of the spindle is made longer than ordinarily to afford sufficient range of movement to the spindle. As represented in Fig. 1, the neck of the spindle terminates in a socket *e*, in which the upper front end of the reach D is secured by brazing or otherwise. The reach D extends downwardly and backwardly from the steering-spindle to a point immediately in front of the rear wheel, and is secured at its lower end in a socket formed in a coupling E.

F F′ represent the upright tubular saddle supports or posts rising on opposite sides of the rear wheel, and which are secured to the coupling E by rearwardly-projecting lugs *e′*, formed on the coupling E and fitting into the lower ends of the posts, as represented in Fig. 6. From the coupling E the tubular saddle-supports are curved backwardly and upwardly and thence forwardly, as represented in Fig. 1, forming with the reach a depressed frame of approximately U form. The saddle-supports are united at their upper ends by a cross-bar *f*, having a split clamping collar *f′* and a clamping-bolt f^2, so that the saddle-pillars *g*, arranged in said collar, may be adjusted vertically.

h represents the crank-shaft, which is supported in a transverse depending journal-box H, formed on the under side of the coupling E at the lower end of the reach D, as represented in Fig. 9.

i is the sprocket-wheel mounted on the crank-shaft, and *i′* the sprocket-wheel secured to the axle of the rear wheel and connected with the sprocket-wheel of the crank-shaft by a chain i^2 in the usual way. The crank-shaft is provided at its ends with the usual cones *h′* h^2, and the journal-box is formed at its open ends with cones having steel linings h^3, between which and the cones of the crank-shaft the balls h^4 are interposed.

J represents the mud-guard, J′ the lower fork of the rear wheel-frame, and J^2 the upper fork thereof. The branches of the lower fork J′ are firmly connected at their front ends by a head or cross-bar *j*, and are provided at their rear ends on opposite sides of the rear wheel with slotted lugs *j′*, in which the axle of the rear wheel is supported. The lower end of the mud-guard is secured to the head or cross-bar *j* by brazing or otherwise. The branches of the upper fork are secured at their lower ends to the slotted lugs *j′* and at their upper ends to the mud-guard. *k* is a horizontal pivot-bolt connecting the lower fork of the rear wheel to the journal-box H, and which is located in rear of the crank-shaft. This pivot-bolt passes through a central opening in the head *j* of the lower fork, and is secured with its threaded ends in screw-threaded openings arranged in rearwardly-projecting lugs *k′*, formed on the rear side of the journal-box, as represented in Fig. 9, the bolt being provided with clamping-nuts, which bear against the outer sides of said lugs. The mud-guard J and upper and lower forks J′ J^2 together form a triangular rear wheel-frame, which is pivotally attached to the reach or front frame of the machine by the bolt *k*, and which is capable of swinging on said pivot toward and from the front frame.

l represents a series of spiral springs arranged on opposite sides of the rear wheel, and which connect the mud-guard J with the upright or curved saddle-supports F F′, forming an elastic or yielding connection between the front and rear wheel-frames. The springs *l* are arranged in pairs—one on each side of the rear wheels—and the springs of each pair are connected at their front ends by a bow *l′*, which embraces the mud-guard, as represented in Fig. 8. The springs are held against displacement on the mud-guard by a curved plate l^2, secured to the front side of the guard by screws or other means and provided on its inner side with transverse recesses or grooves l^3, in which the connecting-bows of the springs are confined. The rear ends of the springs are preferably provided with hooks, which are attached to perforated lugs on the saddle-supports F F′, as represented in Fig. 1. Upon removing one of the fastening-screws of the recessed plate l^2 the latter can be moved outward sufficiently to permit the springs to be adjusted higher or lower on the mud-guard, to cause the same to counterbalance the rider's weight. If the rider is comparatively light, one or more pairs of springs may be removed, and in case the machine is to be used by a very heavy rider one or more pairs of springs may be added. The spiral springs *l*, in connection with the curved saddle-supports F F′, also serve as an efficient dress-guard without requiring any additional parts or incurring extra expense.

By locating the joint *k* of the frame in rear of the crank-shaft the drive-chain is caused to slacken slightly at the instant that the wheel strikes an obstruction, thereby materially relieving the driving-gear from strain. This arrangement also causes the rear wheel to swing forwardly and upwardly on the connecting-joint in passing over an obstruction, the springs acting to push the wheel backward against the obstruction in passing down over it, thereby assisting in the forward propulsion of the machine and preventing side slip to a certain extent. A further advantage of this construction is that a rigid connection is obtained between the support of the crank-shaft and the saddle and reach, which materially reduces the wear of the connecting-pivot.

Each slotted lug *j′* of the rear wheel-frame is provided above its slot with a horizontal rack-bar *m*, and the rear axle is provided near opposite ends with pinions *m′ m′*, which mesh with said rack-bars, so that by turning the

axle in the lugs it will be moved forwardly or backwardly and the tension of the drive-chain adjusted accordingly. These pinions are held against turning on the axle by a tongue and groove on the respective parts, as represented in Fig. 10, or by other means. The ends of the axle are made square or flat-sided, so that the axle may be turned by a suitable wrench. In adjusting the drive-chain the check-nuts m^2, applied to the ends of the axle, (shown in Fig. 11,) are first loosened, preferably just sufficiently to permit the axle to be turned by using a little force. This movement of the axle is transmitted to both pinions m', causing both ends of the axle to be moved backward or forward simultaneously and uniformly. After the axle has been shifted to properly adjust the chain the check-nuts on the ends of the axle are again tightened. By this construction the adjustment is effected rapidly and accurately, and the rear wheel is held in the center of its frame and prevented from getting out of place, even if one of the check-nuts of the axle becomes loose, the axle and wheel being retained in place so long as the other check-nut is tight.

The journal-bearings of the axle are of the ordinary type, having a single row of balls, and are adjusted in the usual manner by means of the cone n, Fig. 11, without disturbing the chain adjustment, as but one of the check-nuts of the axle is required to be loosened to adjust the bearings. The pinions m' also serve the purpose of the usual washers employed in this place, so that no extra parts are required for the chain adjustment.

O represents one of the cranks, which is formed integral with the crank-shaft, as represented in Fig. 9, and O′ is the other crank detachably secured to the opposite end of the shaft. By forming one of the cranks in one piece with the crank-shaft the weight of one joint is avoided. The inner portion of the detachable crank is arranged inside of the sprocket-wheel i, while the hub of the latter occupies the place usually occupied by the crank. The web of the sprocket-wheel is dished or made concave, and the inner portion of the crank is bent or offset and passes through the web of the wheel to permit of this relative arrangement of the parts and locate its outer portion outside of the rim of the sprocket-wheel. This construction and arrangement permits the sprocket-wheel to be removed and another substituted therefor without necessitating the detachment of the crank or disturbing the adjustment of the crank-shaft bearings.

Referring to Fig. 1, Q represents a reversible brace or auxiliary reach connecting the main reach with the saddle-supports F F′, and having its rear portion forked or bifurcated to straddle the front portion of the rear wheel. This auxiliary reach is attached at its flattened front end to the socket e of the steering-spindle by a bolt q. The socket e is preferably provided on its upper side with a tongue or rib q', which enters one of two grooves arranged in opposite sides of the flattened portion of the auxiliary reach, as represented in Fig. 4, whereby the latter is prevented from twisting or moving laterally on the socket. In the position represented in Fig. 1 the reversible reach extends downwardly and rearwardly, and thence upwardly to the saddle-supports, to which latter it is detachably secured by a clip r, brazed or otherwise secured to said supports, and transverse bolts passing through the rear end of the reach and perforated lugs formed on said clips, as represented in Fig. 1. The central depressed portion of the auxiliary reach is detachably secured to the main reach by a similar clip r' and a connecting-bolt. When in this position, the auxiliary reach forms a depressed truss, which admits of the machine being used by a woman, while serving to sufficiently brace the frame to enable it to resist the various strains to which it is subjected. Upon removing the fastening-bolts of the auxiliary reach the same may be reversed and placed in the position represented by dotted lines in Fig. 1, the ends of the reach being secured to the socket e and clip r in both its raised and lowered positions, while its central portion is detachably secured to the upper ends of the saddle-supports F F′ by the clamping-bolt f^2, as shown. In this raised position the auxiliary reach considerably strengthens and stiffens the main frame and renders the machine especially servicable for a man upon rough roads.

In the modified construction represented in Fig. 13 the form of the auxiliary reach is substantially like that shown in Fig. 1; but the upper fork of the rear wheel-frame instead of being connected with the mud-guard is attached to the saddle-supports where the auxiliary reach is united to the latter.

In the modification illustrated in Fig. 14 the front end of the auxiliary reach is journaled in a socket s, formed on the steering-spindle, and the rear end thereof is attached to the outer end of an upright bar S, which latter is pivoted at its inner end to the front side of the saddle-supports, so that the reach may be swung upwardly and reversed, as represented by dotted lines in Fig. 14. The front end of the reach is held in its socket by a transverse pin arranged in the socket and entering an annular groove in the end of the reach. The rear portion of the reach is preferably secured in either position by a spring-catch s^3, arranged in the end of the tubular reach and engaging with either of two clips s' s^2, secured, respectively, to the upper and lower portions of the saddle-supports. If desired, a fastening-bolt may be employed in addition to said catch. This construction of the auxliary reach is cheaper than that shown in Fig. 1 and permits of a more rapid reversal of the reach.

In the modification represented in Fig. 15

the main reach D is made reversible and the upper fork of the rear wheel forms a continuation of the same.

T is a fixed brace connecting the upper end of the steering-post with the front end of the rear wheel-frame. The reversible reach is forked to permit it to straddle the fixed brace T in either position, and is detachably secured at its front end to the spindle-socket *e*, preferably by two bolts, as shown, at its central portion to the saddle-supporting post and at its rear end to the lug at the rear end of the rear wheel-frame.

In Fig. 16 is illustrated another modification of the reach, in which the latter consists of two reaches or perches constructed exactly alike, so that when in a depressed position they stand side by side. One of the reaches is permanently secured at its front end to the steering-spindle and at its opposite end to the rear wheel-frame, while the other member of the reach is reversible and attached at its front end to the spindle by two bolts, at its central portion to the fixed reach by a connecting-bolt *u* and at its rear end to the rear wheel-frame by a bolt *u'*. The fixed rear wheel-frame consists of an upper arm V, arranged on the left-hand side of the wheel, and a lower arm V' on the opposite side of the wheel, both of these arms being secured at their front ends to the saddle-support and terminating at their rear ends in a slotted lug for receiving the axle. The rear portion V^2 of the reversible member of the reach also forms a part of the rear wheel-frame, being located on the left-hand side of the wheel when in a lowered position and on the right-hand side thereof when in a raised position. This reversible feature of the reach is capable of many variations, and also applicable to tandem velocipedes, and I do not, therefore, wish to be confined to the forms herein shown and described.

I claim as my invention—

1. The combination, with the steering-pivot and a fork supporting the steering-wheel and having its two arms or branches extending above the steering-wheel, of a cross-bar or bridge connecting the portions of the fork branches above the steering-wheel and forming a support for the steering-pivot, and independent handle-bars extending outwardly from the upper ends of the fork branches, substantially as set forth.

2. The combination, with the steering-wheel, its fork, and the steering-pivot, of a steering-head composed of two hollow posts arranged side by side, a cross-bar or bridge connecting said posts and forming supports for the steering-pivots, and independent handle-bars attached to the upper ends of said hollow posts, substantially as set forth.

3. The combination, with the steering-pivot and the steering-wheel, of a tubular supporting-fork having its branches extending upwardly side by side above the steering-wheel to form a steering-head, bridges or cross-bars connecting the ascending hollow branches of the fork and supporting the steering-pivot, and independent handle-bars seated in the open upper ends of the fork-extensions, forming the steering-head, substantially as set forth.

4. The combination, with the steering-pivot and the steering-wheel, of a tubular fork supporting the steering-wheel at its lower end and having its branches extended upwardly side by side to form the steering-head, and independent handle-bars adjustably secured in the open upper ends of the ascending fork-extensions, substantially as set forth.

5. The combination, with a steering-head composed of two hollow posts open at their upper ends, of adjustable handle-bars seated in said posts and a clamping device whereby the handle-bars are held at any desired angle or elevation in said posts, substantially as set forth.

6. The combination, with a steering-head composed of two hollow posts each forming a socket for a handle-bar, of a clamp arranged upon each of said posts and a clamping-screw whereby both of said clamps are tightened or released simultaneously, substantially as set forth.

7. The combination, with the frame of the machine and an open steering-head composed of two hollow posts arranged side by side and open at their ends, of a cross-bar or bridge connecting said posts, a steering-spindle supported upon said bridge, and handle-bars arranged in the hollow posts of the steering-head, substantially as set forth.

8. The combination, with a steering-head composed of tubular posts, of ascending handle-bars seated in said posts and vertically adjustable therein and extending outwardly in opposite directions and thence backwardly to form supports for the handles, substantially as set forth.

9. The combination, with the front and rear wheel-frames and the steering-head, of a reach extending from the steering-head downwardly and rearwardly over the front wheel to a point in front of the rear wheel, and having branches extending upwardly and forwardly on opposite sides of the rear wheel and united over the front part of the latter to form a support for the saddle, substantially as set forth.

10. The combination, with the front and rear wheel-frames, the reach, and the saddle-supports, of a crank-shaft arranged between the wheels, a head or coupling having a socket for receiving the rear end of the reach and lugs or attachments for the lower ends of the saddle-supports, and a depending journal-box for the crank-shaft arranged on said head or coupling and provided on its rear side with lugs or attachments for the rear wheel-frame, substantially as set forth.

11. The combination, with the jointed front and rear wheel-frames, of a mud-guard arranged over the rear wheel, a main frame

connecting the wheel-frames and extending backwardly behind the mud-guard, and a spring or springs attached at their respective ends to the mud-guard and main frame, substantially as set forth.

12. The combination, with the jointed front and rear wheel-frames, of a mud-guard arranged over the rear wheel, a main frame connecting the wheel-frames and extending backwardly behind the mud-guard, and a spring or springs connecting the mud-guard and rear frame and made adjustable on the mud-guard, substantially as set forth.

13. The combination, with the jointed front and rear wheel-frames and the mud-guard, of the main connecting-frame having an extension overlapping the rear wheel in rear of the mud-guard, and springs connecting the mud-guard and the overlapping part of the main frame, substantially as set forth.

14. The combination, with a journal-box and a crank-shaft supported therein, of a crank formed integrally with the shaft at one end thereof, substantially as set forth.

15. The combination, with the journal-box, of a crank-shaft having a crank formed integrally therewith at one end and a detachable crank arranged at the opposite end of the shaft, substantially as set forth.

16. The combination, with a journal-bearing and a crank-shaft provided with a crank on each side of its bearing, of a detachable gear-wheel arranged on the shaft and having its central portion or hub outside of the adjacent crank, substantially as set forth.

17. The combination, with the crank-shaft and a crank secured thereto, of a concave or dished gear-wheel mounted on the crank-shaft and having its hub arranged outside of the crank and its rim inside of the same, substantially as set forth.

18. The combination, with the crank-shaft and a dished gear-wheel mounted thereon, of a crank having its inner portion arranged inside of the hub of the gear-wheel and bent or offset to bring its outer portion outside of the wheel-rim, substantially as set forth.

19. The combination, with the frame of a velocipede and a driving-wheel made adjustable thereon, of a driving-shaft, gear-wheels attached, respectively, to the axle of the wheel and the driving-shaft, a chain running around said gear-wheels, and a rack and pinion whereby the driving-wheel is adjusted in its frame, substantially as set forth.

20. The combination, with the frame of a velocipede and the driving-wheel having an axle made adjustable in the frame, of rack-bars arranged on the frame and pinions mounted on the axle and engaging with said rack-bars, substantially as set forth.

21. The combination, with the front and rear wheel-frames, of a reversible reach connecting said frames and having a bent or angular central portion arranged out of line with its end portions, whereby the central part of the reversible reach may be located in an elevated or depressed position, substantially as set forth.

22. The combination, with the front and rear wheel-frames and a main reach, of an auxiliary reversible reach having its central portion offset or bent at an angle to the end portions of the reach and fastenings whereby the auxiliary reach is secured to both the front and rear frames with its central part in a raised or depressed position, substantially as set forth.

23. The combination, with the front and rear wheel-frames, of a reversible connecting-reach having its central portion bent or made angular and provided with a bifurcated rear end which straddles the rear wheel, substantially as set forth.

24. The combination, with the front and rear wheel-frames and a main connecting reach or frame, of an adjustable auxiliary reach detachably secured at its end portions and central portion to the main frame or reach, substantially as set forth.

Witness my hand this 18th day of January, 1890.

EMMIT G. LATTA.

Witnesses:
FRED H. RICE,
S. M. NORTON.