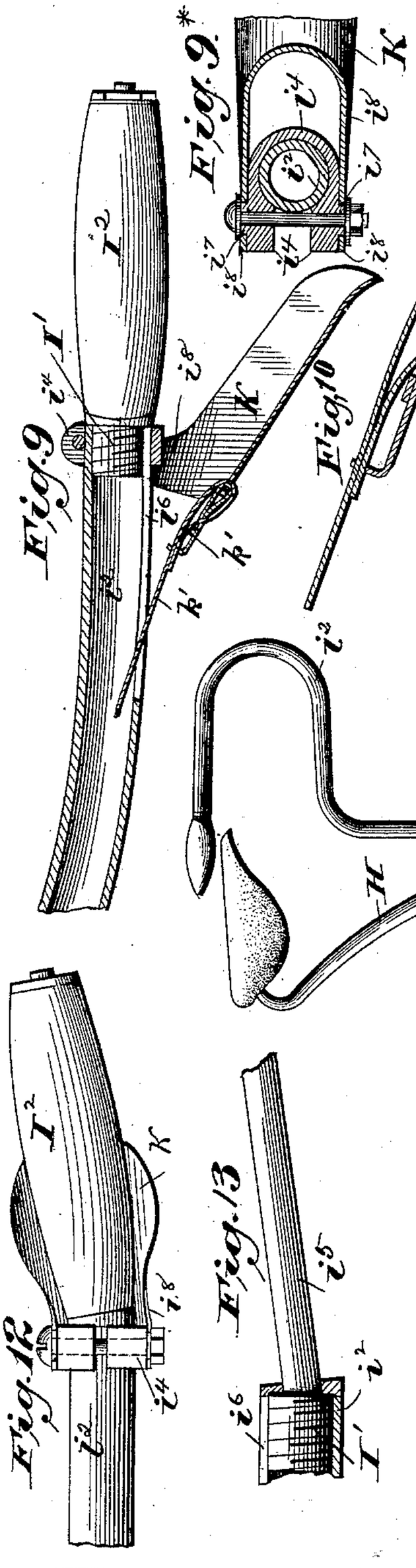
(No Model.)

4 Sheets—Sheet 1.

C. E. DURYEA.

VELOCIPEDE.

No. 432,124. Patented July 15, 1890.



(No Model.)

4 Sheets—Sheet 2.

C. E. DURYEA.

VELOCIPEDE.

No. 432,124. Patented July 15, 1890.

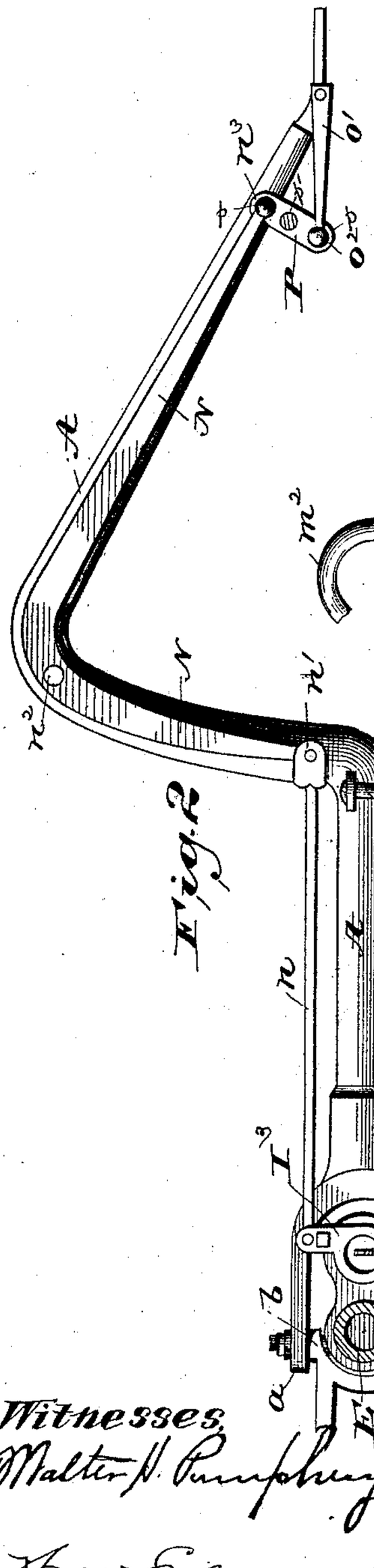
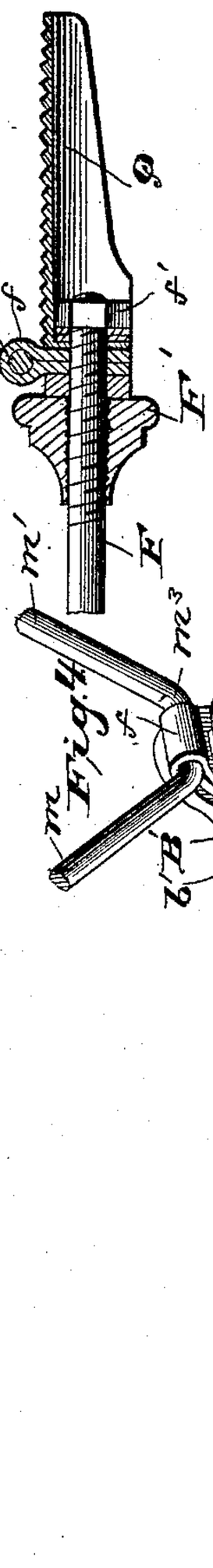


Fig. 2



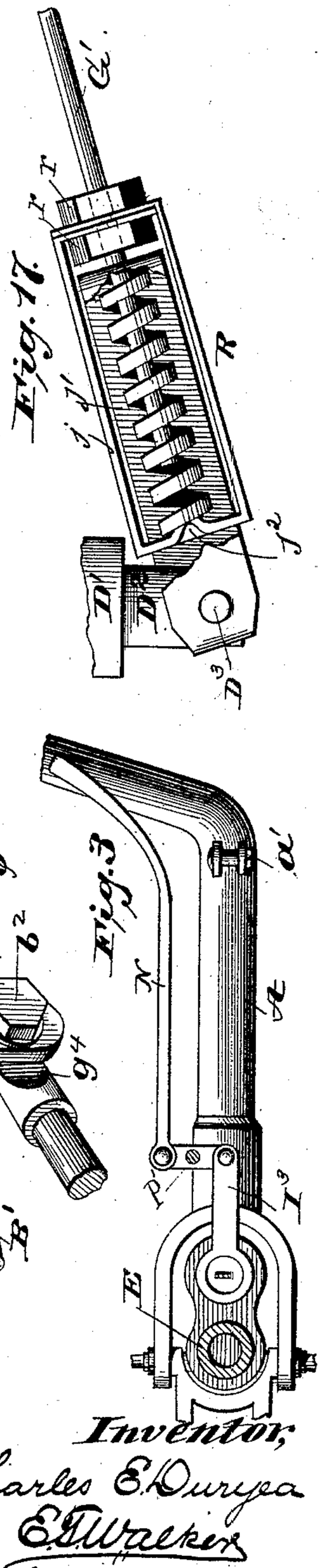


Fig. 1.

Fig. 3

Witnesses,
Walter N. Dunphey
H. W. Elmore

Inventor,
Charles E. Duryea
by E. G. Walker
his Attorney

(No Model.)

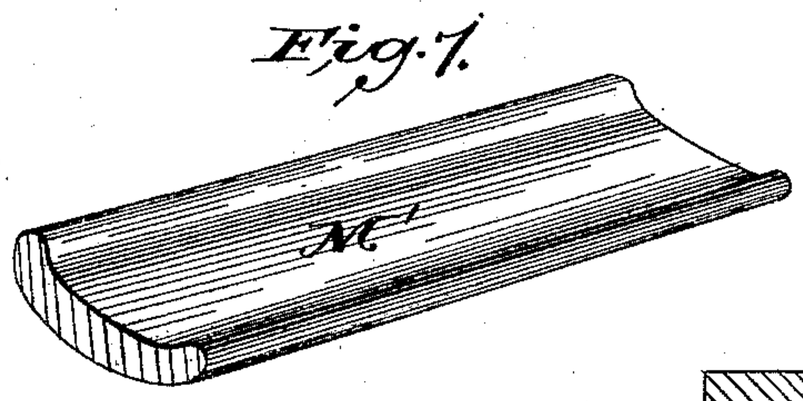
4 Sheets—Sheet 3.

C. E. DURYEA.

VELOCIPEDE.

No. 432,124. Patented July 15, 1890.

Fig. 7.



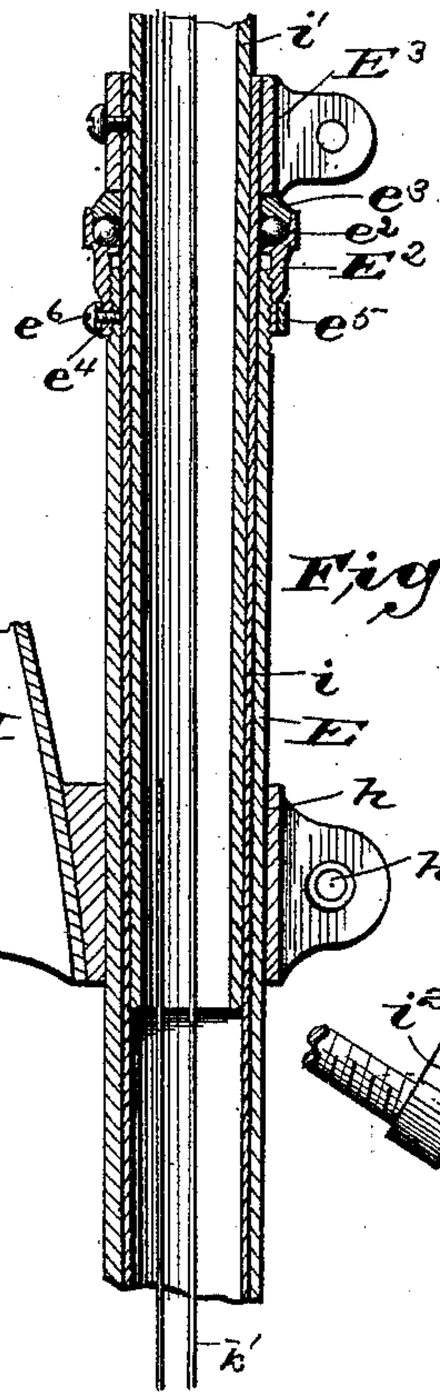


Fig. 11.

Fig. 6.

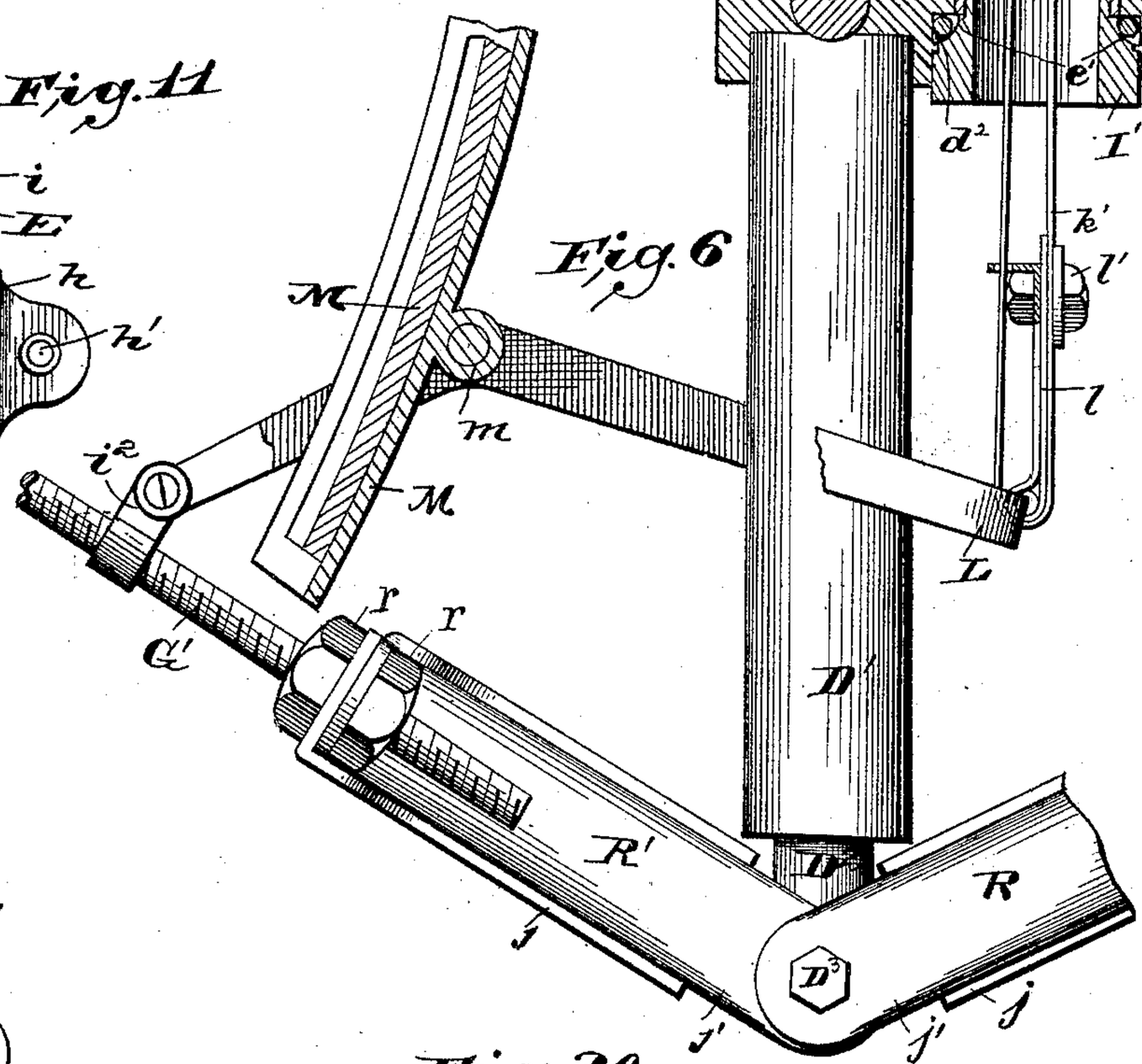


Fig. 8.

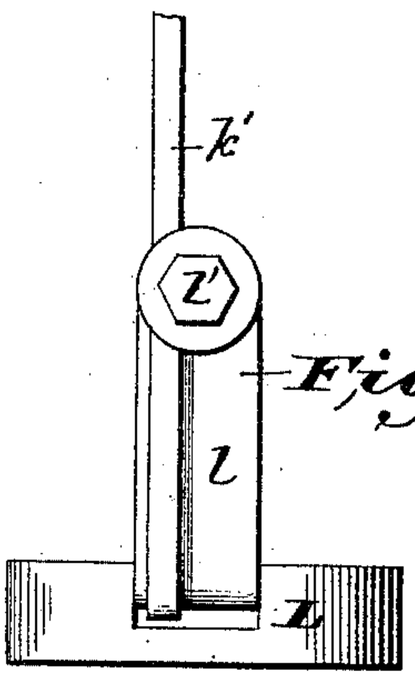


Fig. 20.

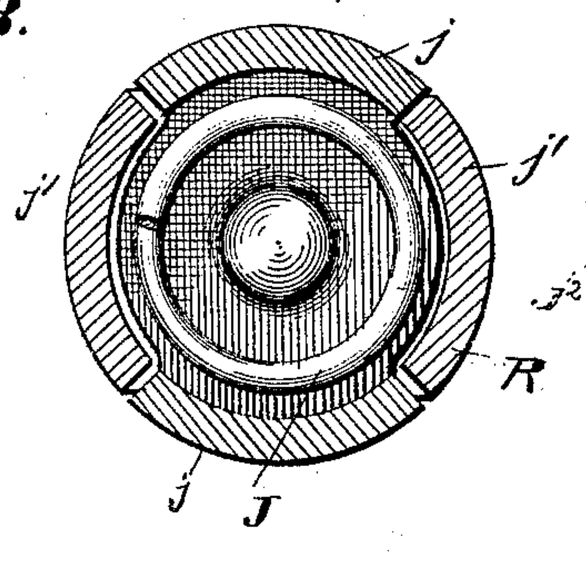
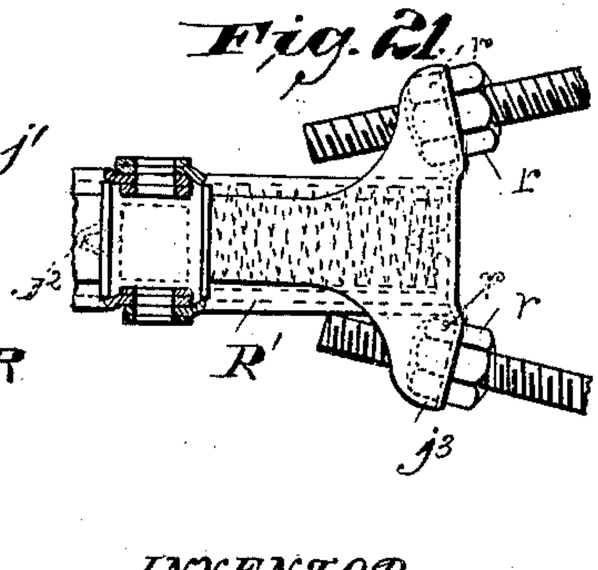


Fig. 21.



WITNESSES

Maltis N. Pumphrey.

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his Attorney

(No Model.) 4 Sheets—Sheet 4.

C. E. DURYEA.

VELOCIPEDE.

No. 432,124. Patented July 15, 1890.

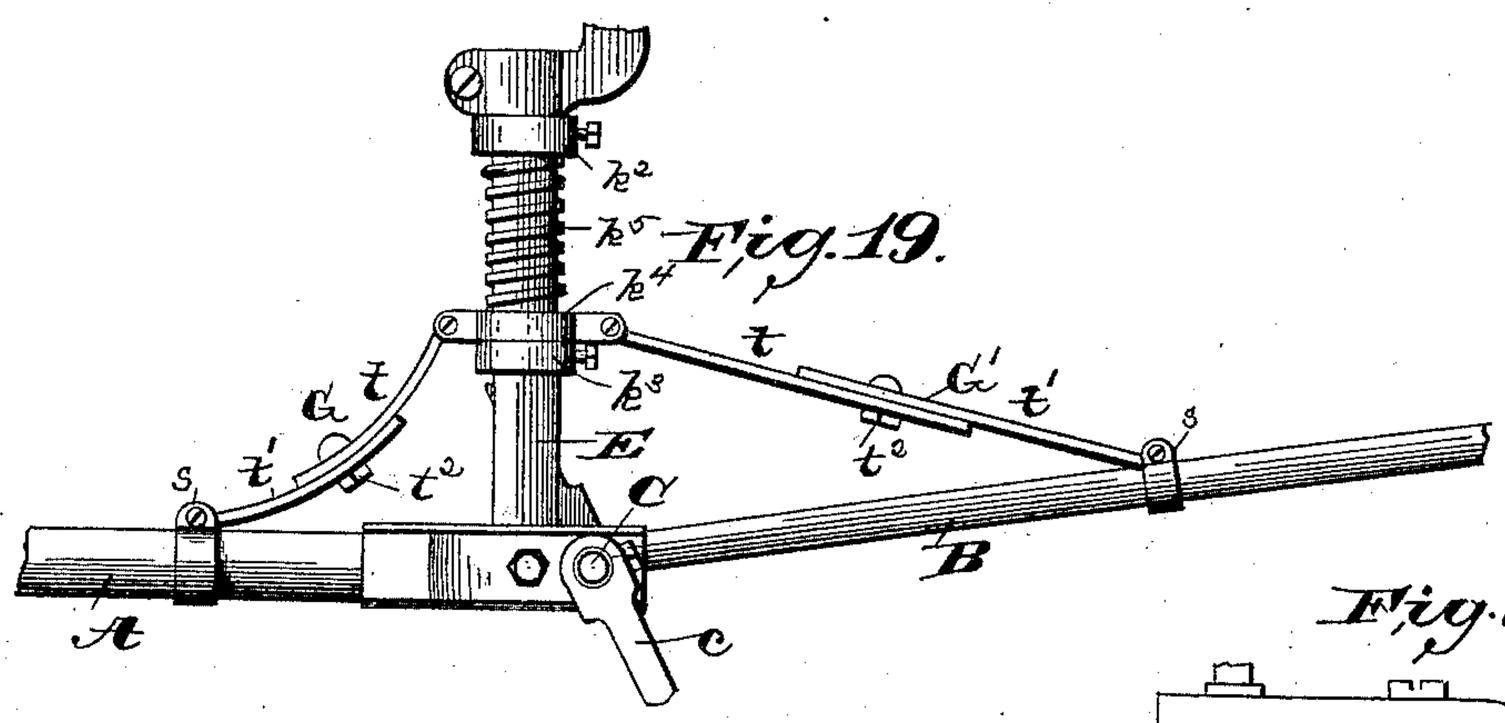

Fig. 19.

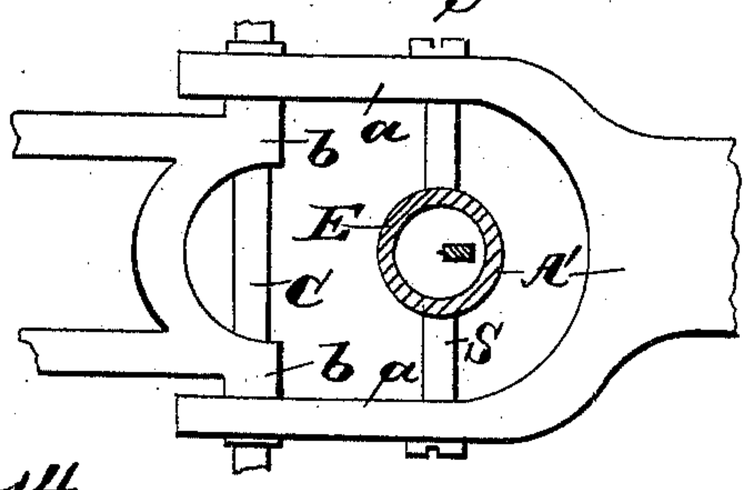

Fig. 22.

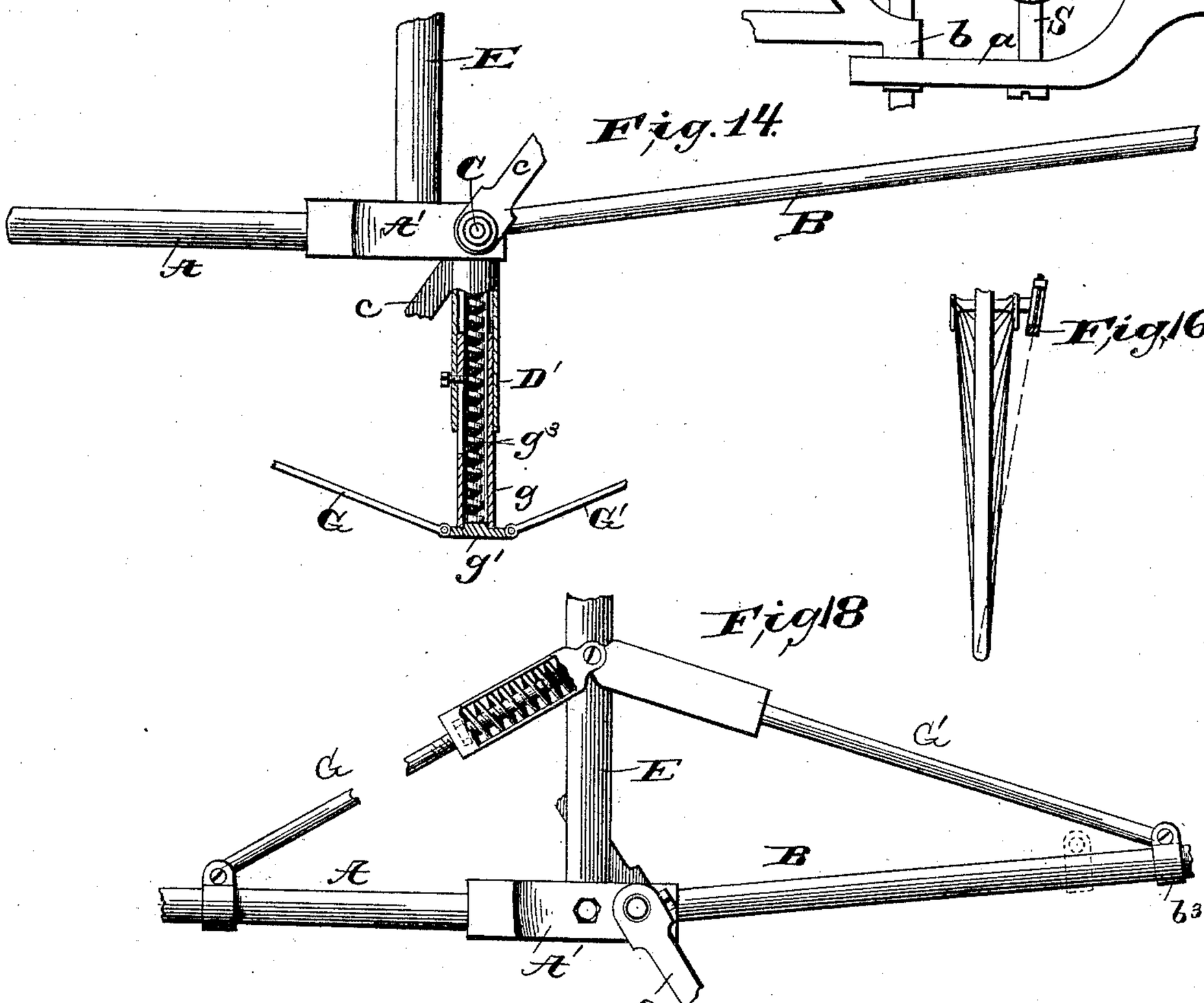

Fig. 14.

Fig. 16.

Fig. 18

WITNESSES

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by E. T. Walker

his attorney

UNITED STATES PATENT OFFICE.

CHARLES E. DURYEA, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE ROUSE-DURYEA CYCLE COMPANY, OF PEORIA, ILLINOIS.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 432,124, dated July 15, 1890.

Application filed November 19, 1889. Serial No. 330,893. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. DURYEA, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Velocipedes; 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.

This invention relates to that class of velocipedes known as "rear-driving Safety bicycles," and is designed as an improvement on the spring-frame bicycle of that class described in United States Letters Patent No. 402,313, granted to me on the 30th day of April, 1889.

One object of this invention is to provide an adjustable truss-frame for the support of the spring or springs of the bicycle-frame, thus imparting rigidity to the frame of the machine as a whole without limiting the vertical play thereof.

Another object of the invention is to facilitate adjustments of the frame-springs.

Another object of the invention is to so arrange the steering-head with relation to the wheel-base as to avoid side draft in mounting obstacles.

Another object of the invention is to provide for adjusting the inclination of the hand-grip with relation to the rider.

Another object of the invention is to facilitate adjustments of the chains.

With these and minor objects in view the invention consists in novel features of construction and combinations to be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of my improved bicycle. Fig. 2 is a bottom plan of the reach, showing the steering device. Fig. 3 is a modification of the same. Fig. 4 is a detail perspective showing the means for adjusting the driving-chain and supporting-spring. Fig. 5 is a sectional view showing the step and mud-guard brace mounted on the rear axle. Figs. 6, 7, 8, 9, 9*, and 10 are details of the brake mechanism. Fig. 11 is a vertical section of the steering and seat-supporting post. Figs. 12 and 13 are details of the adjustable handles. Fig. 14 is a detail, partly in section, showing the main supporting-spring. Figs. 15 and 16 are details of the steering-center. Figs. 17, 18, and 19 are modifications of the truss-frame. Figs. 20 and 21 are details of the same. Fig. 22 is a modification showing the manner of supporting the saddle-post.

The same letters of reference indicate identical parts in all the figures.

The frame of the machine now to be described is the same in general outline as that described in my Letters Patent hereinbefore referred to, and is also made of front and rear sections A and B, or "reach and forks," as I shall term them, the meeting ends of which are provided with perforated lugs *a* and *b* to receive a connecting bolt or shaft C, which may also be utilized to carry the cranks *c* and driving-sprocket *c'*, as shown.

The rear end of the reach A terminates in a yoke A', within which a center block D is suspended by the shaft C, and rising from this center block D is a tubular post E, which, in connection with adjuncts to be presently described, carries the saddle-post and steering-post of the machine. By this arrangement the saddle, handle-bar, and pedals are supported by the crank-shaft C, on which the front and rear ends are pivoted.

The rear ends of the tubular forks B are open and split to receive the threaded stems of the eyebolts B', within the eyes of which the ends of the rear axle F are seated, and between the eye of each bolt and the end of the fork is a nut *b'*, by the adjustment of which the axle may be forced rearward to take up slack in the driving-chain.

The frame is supported at its pivotal point—that is, between the wheels—by a spring or springs carried by a truss-frame, and of this arrangement I have shown several modifications, but will first describe the form illustrated in Fig. 14 and which I have had in practical use.

A depending sleeve D' is rigidly secured to

the under side of the center block D, and within this sleeve is mounted to slide another or piston sleeve g, carried by a stirrup-block g', the opposite sides of which are connected by pivot-bolts to the inner ends of the front and rear truss-rods G and G'. A stout coiled spring g^3 is seated within these sleeves, its lower end being supported by the stirrup-block g', while its upper end supports the outer sleeve D', whereby the weight of the rider is carried by this spring g^3 and its supporting truss-frame. To regulate the tension of the spring g^3 to suit riders of different weights, I compress it to a greater or less extent by adjusting the outer ends of the front and rear truss-rods or otherwise, as hereinafter shown.

The outer ends of the front truss-rod G are pivotally and adjustably secured to the reach at a' just in rear of the front or steering wheel in any suitable or preferred manner, while the outer ends of the rear truss-rods G' are fitted with eyes g^4 to receive a bolt b^2, which connects the opposite ends of a split sleeve b^3, embracing the rear split ends of the forks B. By this arrangement a single bolt b^2 can be utilized to secure the rear ends of the truss-rods and also to clamp the sides of the sleeve b^3 tightly, thus constituting a "pinch-bind" to hold the stems of the eye-bolts B' firmly within the rear ends of the forks until it is desired to change their adjustment.

The under side of the center block D is provided with an annular recess or ball-race d^2, from which the tubular post E rises, and within this post is loosely seated the lower section of the steering-bar I, consisting of a tube i, provided at its lower end with a coned ball race or track e', and carrying at its split upper end a rigidly-secured split collar E^3. The upper end of the tubular post E is provided with a male thread to receive a nut E^2, the upper end of which is shaped interiorly to form a ball-race e^2. Between this nut E^2 and the split collar E^3 is a ring e^3, having an annular recess in its lower end constituting the upper end of a ball-race. The lower end of the nut E^2 is provided with a circular series of perforations e^4, and surrounding the nut at this point is a light spring e^5, provided at one end with a pin e^6, adapted to pass through one or the other of the perforations e^4 and into a notch or recess in the tubular post E, thus securely locking the nut to the post after adjustment.

The saddle-post or L-rod H is provided at its lower end with a split sleeve h, which embraces the tubular post E, and may be tightly clamped thereon at any point of vertical adjustment by a bolt h', which engages a tapped lug h^2 on the opposite edge of the split sleeve, making what I term a "pinch-bind." Modifications of this may be used, as two binds, one above the other, as shown in dotted lines in Fig. 11.

The upper section i' of the steering-rod I, which is also tubular, as shown, fits snugly in the lower section i, and is adjustably clamped therein by a pinch-bind formed by the split collar E^3. The upper ends i' of this steering-bar have two branches properly curved to form the handle-bars i^2 of the machine, each branch being fitted at the end with an adjustable hand-grip consisting of a plug I', fitting within the handle-bar and clamped immovably therein by a pinch-bind i^4, as shown, but adapted to be rotated for adjustment when the pinch-bind is loosened. A stem i^5 projects at an obtuse angle from this plug I', and is provided with a horn, rubber, or other suitable hand-piece I^2. The pinch-bind i^4 is provided on opposite sides with projections or bosses i^7, through which the adjusting-bolt of the pinch-bind passes.

To one or both of the handle-bars—say i^2—near the grip, is pivoted a brake-lever K, consisting of a stout piece of sheet metal stamped up or swaged to straddle the handle-bar forward of the grip, the arms or wings i^8 thereof fitting over the projections or bosses i^7 and held thereon by washers or heads on the adjusting-bolt, the bosses i^7 being slightly thicker than the thickness of the brake-lever, so as to leave said lever free to move thereon, while the lever is slotted centrally to receive one end of a buckle k, of the form shown in Fig. 10, designed to hold one end of the brake-strap k'. This brake-strap is a light ribbon of steel or other tough metal, and passes from the brake-lever K through a slot i^6 into the hollow handle-bar, and thence down through the steering-bar, and is secured at its lower end by a binding-screw l' to a metal strap l, carried by the forward or free end of the brake-yoke L. I provide the brake-strap somewhat longer than necessary, and the overlapping end I return to the tube i of the steering-post. This brake-yoke is of U shape, its forward end straddling the sleeve D', while its rear end is pivoted to binding-collars l^2, adjustably secured to the rear truss-rods G'. At a suitable distance forward of its fulcrum the brake-yoke L is connected by a pivot-bolt to a lug m, projecting forward from the rear mud-guard M, which at this point is fitted on its rear or concave side with a brake-shoe M', which, as the mud-guard is not supported at its forward end except by the brake-yoke, may be forced against the rear-wheel tire by the proper manipulation of the brake-lever K.

The mud-guard is supported above the rear wheel by braces m', each formed of one continuous rod, the ends of which m^2 are connected together and to the mud-guard by any suitable means. These rods are bent at opposite points m^3, Figs. 1, 4, and 5, to form a substantially V-shaped frame. At the points m^3 the rods are embraced by straps f, secured on the ends of the rear axle F by the nuts f', which lock the adjusting-cones F'. (See Figs. 4 and 5.)

The reach is bent to the form shown and described in my former patent, terminates at

its forward end in a "neck" and center pin o^2, Figs. 1, 15, and 16, and the axle of the forward or steering wheel is provided with or rigidly secured to a rearwardly-extending bracket O, divided at its rear end into upper and lower branches o' o', carrying the steering-centers, which are so arranged that a line drawn centrally through them would cross the wheel forward of its base or point of contact with the ground and from one to two inches above a horizontal line drawn forward from said point of contact, as illustrated in Figs. 15 and 16. The lower branch o' of the bracket O is continued rearward past the lower center and terminates in a ball o.

Projecting laterally from the lower end of the steering-bar I is an arm I^3, to the outer end of which is pivoted the rear end of a connecting-rod n, the forward end of which is connected by an adjustable ball-and-socket joint n' to a bent lever N, fulcrumed on a stud n^2, projecting downward from or near the outer angle of the reach A. The forward end of this lever N terminates opposite the rear end of the lower branch o' of the bracket O, and is at this point provided with a ball n^3, which is coupled with the ball o^2 by a pair of link-plates P, the meeting faces of which are provided at the ends with hemispherical sockets p, within which the balls n^3 and o^2 are seated. These link-plates are adjustably secured together by a screw-bolt p', passing centrally through both plates P.

In Fig. 3 I have shown a modification of the steering device, in which case I dispense with the connecting-rod n, and the arm I^3, instead of projecting laterally from the steering-post I, as hereinbefore described, projects forwardly and is connected with a rearward extension on the bent lever N by a coupling-link P', similar to the coupling-links P. To the rear axle F is secured a step Q, consisting of a stout piece of sheet metal formed with downwardly-extending sides V. At one end the sides and top are bent inwardly at right angles to the sides to overlap each other and provided with openings which register with each other and adapted to fit over the end of the axle outside the strap f, and secured thereon by a nut f', which turns with the step.

While I have described the truss-rods and spring-supports shown in Fig. 14 as my preferred construction, it is evident that they may be greatly varied without departing from the principle of my invention. For instance, I may construct the spring truss-frame as shown in Fig. 1, in which the rods G G' are provided at their inner ends with expansion or spring joints R R', as shown in Figs. 6, 17, 20, and 21, each of which consists of two interlocking stirrups $j j'$, between which a coiled spring J is placed. The rods G G' are screw-threaded for a considerable distance at their inner ends and are provided with jam-nuts r r, by means of which the outer ends of the stirrups j j are adjustably secured to the truss-rods, and the stirrups j' j' straddle the ends of the stirrups j j and also a projection D^2 on the lower end of the depending sleeve D', to which they are pivotally secured by a bolt D^3. The stirrup j is provided at its inner end with a conical projection j^2, which, together with the projecting screw-threaded end of the rod G, serves to retain the spring J in place. The spring-joint R' in the rear truss-rods G' differs from the joint R in the front truss-rod only in that the stirrup j is provided with ears j^3 j^3 for the attachment of the truss-rods G', which pass one each side of the drive-wheel and are secured to the ends of the axle, as hereinbefore described, and the stirrups both front and rear are of such shape that when interlocked they form a joint substantially circular in cross-section, as shown in Fig. 20. The tension of the springs J is adjusted by adjusting the jam-nuts r r on the truss-rods.

In the construction of truss-frame shown in Fig. 18 I dispense with the projecting sleeve D' below the center block and connect the truss-rods G' G' to the seat-supporting post E at a suitable point above the crank-axle, the truss-rods being provided with tension or elastic joints of any suitable construction. The adjustment of the tension of the springs in the truss-frame may be effected by sliding the clevis or pinch-bind b^3 longitudinally on the frame of the machine, as shown by dotted lines in Fig. 18.

In Fig. 19 I have shown still another form of truss-frame. In this construction I provide the seat-supporting post E with two adjustable collars k^2 k^3. On the standard E, between the collars k^2 k^3, is placed a sliding collar k^4, to which the inner ends of the truss-rods G G' are pivotally connected, and the outer ends of said truss-rods are pivotally connected to a pinch-bind s s, adjustable on the sections A and B of the frame. On the standard E, between the upper collar k^2 and sliding collar k^4, is a coiled spring k^5, for supporting the weight of the rider. In order to provide for adjustment of the tension of the springs to suit different riders, I construct the truss-rods in two parts t t', clamped together by a clamping-bolt t^2.

In Fig. 22 I have shown the seat-supporting post E pivotally mounted in the yoke A' on a cross-pin or bolt S, in which case I dispense with the center block D, hereinbefore referred to.

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

1. In a velocipede, the combination, with the wheels thereof, of a jointed frame, a pivoted seat-support, and a spring truss-frame, substantially as and for the purposes described.

2. In a velocipede, the combination, with a jointed frame, of a strut or post pivotally connected with the frame at or near the joint thereof and adjustable spring truss-rods piv-

otally connected to the frame at front and rear and to the pivoted strut or post, substantially as and for the purposes described.

3. In a velocipede, the combination, with the wheels thereof, of a jointed frame, a seat-support mounted upon a spring on the frame, and an adjustable truss-frame, substantially as and for the purposes described.

4. In a velocipede, the combination, with the wheels thereof, of a jointed frame, a seat-support pivotally mounted on the frame at or near the joint thereof, and a spring truss-frame for supporting the jointed frame and seat-support, substantially as and for the purposes described.

5. In a velocipede, the combination, with the wheels thereof, of a jointed frame, the joint of which is concentric with the crank-axle, a seat-support mounted on the frame at or near the crank-axle, and a spring truss-frame for the jointed frame, substantially as and for the purposes described.

6. In a velocipede, the combination, with the wheels thereof, of a jointed frame, a combined seat-support and steering-post pivotally mounted on the frame at or near the crank-axle, and a spring truss-frame for supporting the seat-support in an upright position, substantially as and for the purposes described.

7. In a velocipede, the combination, with the wheels thereof, of a jointed frame, a tubular seat-support pivotally mounted on the frame, a spring truss-frame for supporting the seat-support in an upright position, a steering-post mounted in the tubular seat-support and having a crank-arm at its lower end, and means for connecting the crank-arm with the steering-wheel, substantially as and for the purposes described.

8. In a velocipede, the combination, with a jointed frame, of a tubular seat-support pivotally mounted on said jointed frame, a spring truss-frame for maintaining the seat-support in an upright position, a steering-post vertically adjustable in said tubular support and having a crank-arm at its lower end, and a lever and rod connecting the crank with the steering-wheel, substantially as and for the purposes described.

9. In a velocipede, the combination, with the frame, of a tubular seat-support, an extensible steering-post mounted in said tubular seat-support, said steering-post terminating at top in forked handle-bars and provided with a crank-arm at its lower end, and means for connecting the crank-arm with the steering-wheel, substantially as and for the purposes described.

10. The combination, with a vertically-adjustable and extensible tubular steering-post terminating at top in forked handle-bars, said handle-bars having split ends, of hand-grips adjustable in said split ends to vary the angle with relation to the handle-bars and a pinch-bind for securing the same therein after adjustment, substantially as and for the purposes described.

11. The combination, with a tubular seat-supporting standard, of a steering-post adjustable in said standard, said steering-post having forked handle-bars and adjustable hand-grips, substantially as and for the purposes described.

12. In a velocipede, the combination, with the tubular handle-bars having split outer ends, of hand-grips adjustably secured in said split ends, an open collar embracing said split ends and having bosses thereon, a brake-lever pivoted on said bosses, and a clamping-screw by which the open collar is clamped on the handle-bar and the brake-lever securely held on said bosses, substantially as and for the purposes described.

13. In a velocipede, the combination, with the frame and driving-wheel, of the steering-bars, a brake-lever pivoted on the frame, a mud-guard, one end of which is pivotally supported on said brake-lever and provided with a brake-shoe, a hand-lever on the handle-bar, and a connection between said brake-lever and hand-lever, substantially as and for the purposes described.

14. The combination, with the frame and driving-wheel, of steering-bars, a mud-guard supported at its rear end upon the axle of said wheel and at its forward end upon a lever pivoted to the main frame, a brake shoe on the mud-guard, a brake-lever on the steering-bar, and a flexible connection between the brake and brake-lever, substantially as and for the purposes described.

15. The combination, with the driving-wheel and frame, of a tubular seat-support, an extensible tubular steering-post provided with tubular handle-bars, a brake-shoe pivoted on the frame of the machine, a brake-lever on one or both of the handle-bars, and a flexible connection between the brake-shoe and brake-lever, said flexible connection being adjustable in length to compensate for the adjustment of the steering-post and inclosed in said handle-bars and steering-posts, substantially as and for the purposes described.

16. The combination, with the frame and drive-wheel of a velocipede, of a vertically-adjustable tubular steering-post having tubular handle-bars, a brake-shoe pivoted on the frame of the machine, a brake-lever pivoted on one of the handle-bars, and an adjustable flexible connection between the brake-shoe and brake-lever, said flexible connection inclosed in the handle-bar and steering-post, substantially as and for the purposes described.

17. The combination, with the driving-wheel and jointed frame, of a truss-rod on each side of said wheel, a U-shaped lever pivoted at its ends to said truss-rods, a brake-shoe pivoted between the arms of said lever, a steering-post having handle-bars, a brake-

lever on one of the handle-bars, and means for connecting the brake-lever with the U-shaped lever, substantially as and for the purposes described.

18. In a Safety bicycle, the combination of the frame having a fork between the arms of which the drive-wheel is located, said arms terminating in hollow ends, screw-threaded bolts loosely fitting in said hollow ends, said bolts having eyes at their outer ends in which the axle of the drive-wheel is secured, an adjusting-nut on said eyebolt for longitudinally adjusting the drive-wheel with relation to the crank-axle, and a chain gearing for transmitting motion from the crank-axle to the drive-wheel, substantially as and for the purposes described.

19. In a Safety bicycle, the combination, with the frame and crank-axle journaled thereon, of eyebolts in which said drive-wheel is held, said eyebolts being longitudinally adjustable in said frame, substantially as and for the purposes described.

20. The combination, with the wheels and frame of a Safety bicycle, said frame passing to one side only of the steering-wheel and provided with center-pins at its forward end, of a steering-post mounted on said frame and having a crank-arm at its lower end, a rearwardly-extending arm on the axle of the steering-wheel, substantially as described, for supporting the forward end of the frame, a lever pivoted to the frame and connected with the crank-arm of the steering-post, and a link connecting said lever with the arm on the steering-wheel, substantially as and for the purposes described.

21. The combination, with the frame having a neck or center-pins o^2 at its forward end, of a steering-wheel located to one side of said frame, a rearwardly-extending bracket secured to the axle of said steering-wheel and provided with bearings for said center-pins, said steering-centers being forwardly and inwardly inclined, so that a line drawn centrally through them will cross the wheel forward of its point of contact with the ground, substantially as and for the purposes described.

22. The combination, with the rear wheel, of a V-shaped frame each side of the drive-wheel, said frames embraced at their angles by metallic straps *f*, secured to the axle of the drive-wheel, and a mud-guard mounted on the ends of said V-shaped frames, substantially as and for the purposes described.

23. The combination, with a frame jointed at or near the crank-axle, of a seat-supporting post mounted on a center block pivotally mounted on the crank-axle, a downwardly-projecting post on said center block in line with the crank-axle, and truss-rods extending from said post to the frame of the machine to support the same, substantially as and for the purposes described.

24. In a velocipede, the combination, with the rear axle, of a step mounted thereon, said step consisting of a single piece of sheet metal having depending sides, the sides and top at one end being turned at right angles to overlap each other, and provided with registering openings adapted to fit over the end of the axle, and a nut for securing the step to the axle, substantially as and for the purposes described.

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

CHARLES E. DURYEA.

Witnesses:
E. T. WALKER,
C. S. DRURY.