(No Model.) 3 Sheets—Sheet 1.

W. E. HIBBERT & A. MANUEL.

BICYCLE.

No. 446,098. Patented Feb. 10, 1891.

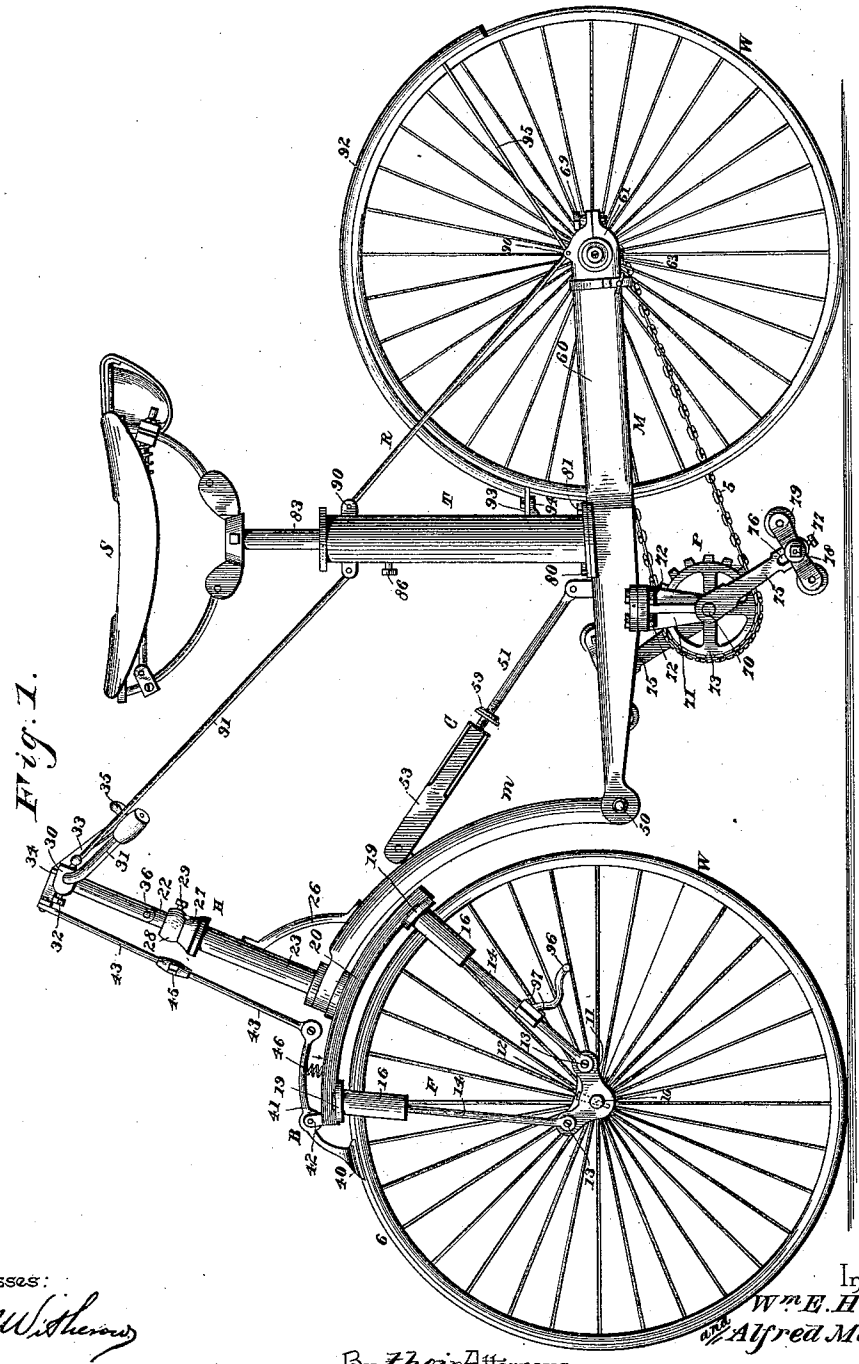


Fig. 1.

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Fig. 2.

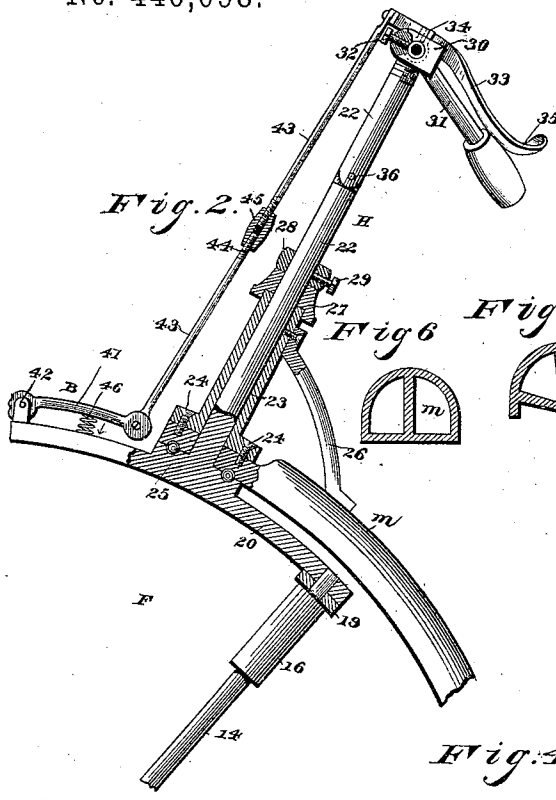


Fig. 3.

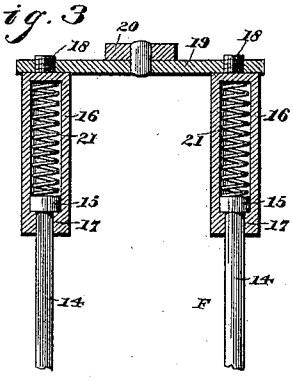


Fig. 6

Fig. 7.



Fig. 4.

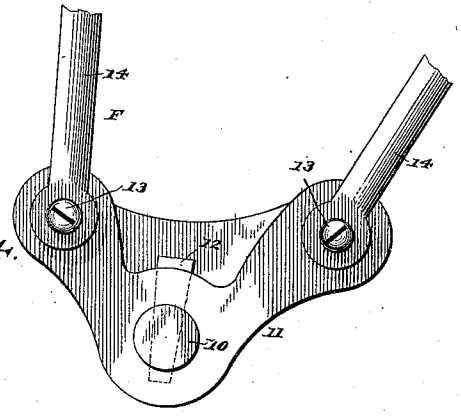
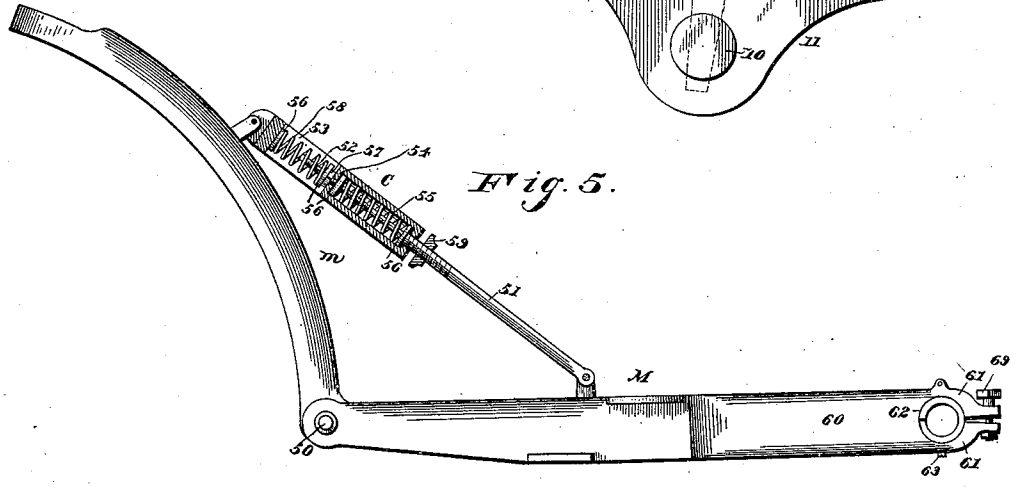


Fig. 5.



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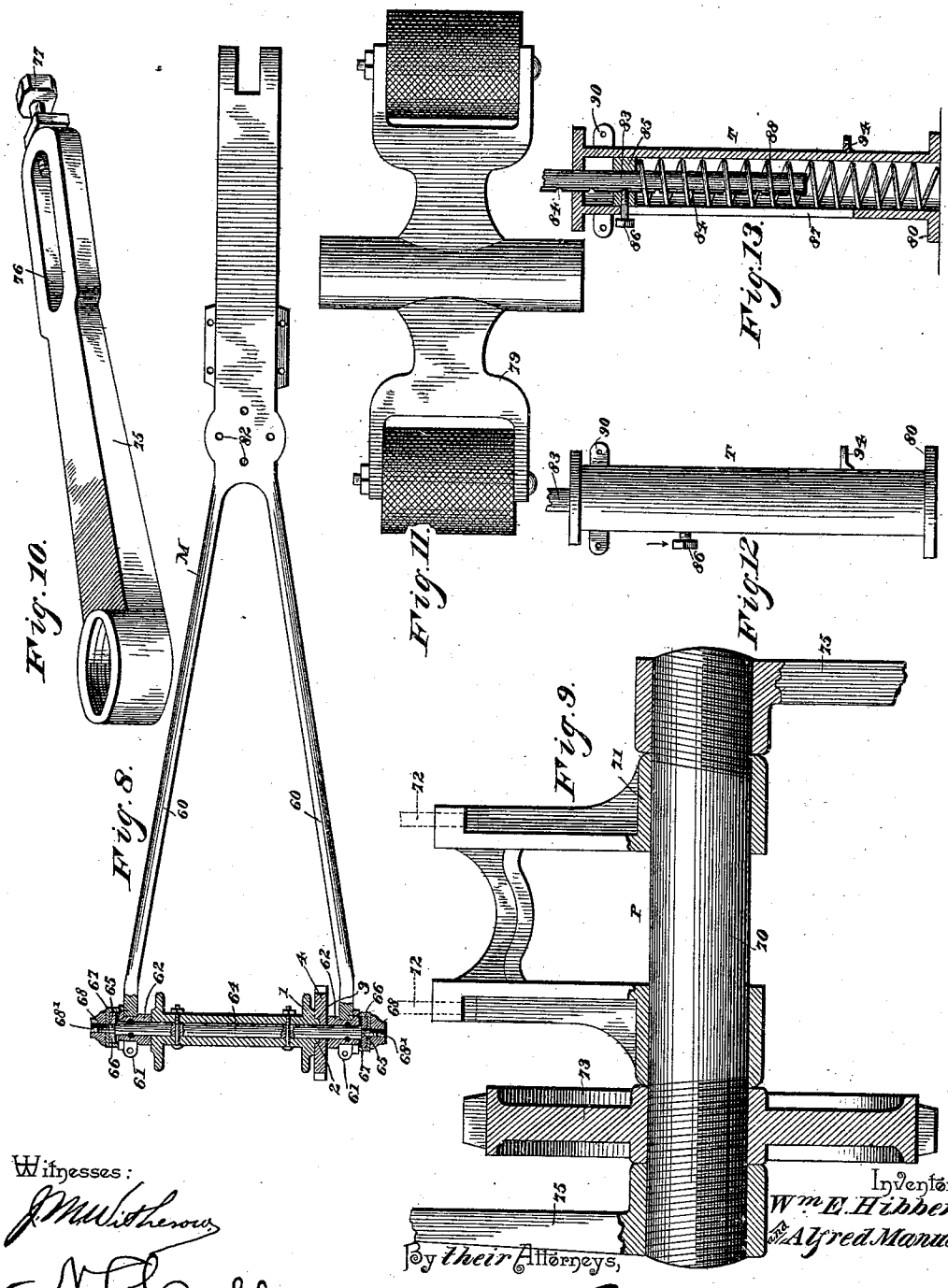
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W. E. HIBBERT & A. MANUEL.

BICYCLE.

No. 446,098. Patented Feb. 10, 1891.



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UNITED STATES PATENT OFFICE.

WILLIAM E. HIBBERT AND ALFRED MANUEL, OF WILMINGTON, DELAWARE; SAID MANUEL ASSIGNOR TO SAID HIBBERT.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 446,098, dated February 10, 1891.

Application filed July 9, 1890. Serial No. 358,157. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. HIBBERT and ALFRED MANUEL, citizens of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented a new and useful Bicycle, of which the following is a specification.

This invention relates to velocipedes, and more particularly to that class known as "rear-driving Safety bicycles;" and the object thereof is to effect improvements in the construction and relative arrangement of the several component parts of a machine of this character, all as hereinafter more fully explained, and as illustrated in the drawings, in which—

Figure 1 is a general side elevation of our bicycle complete with saddle. Fig. 2 is a central longitudinal section of the head and front fork. Fig. 3 is a transverse section through the front pair of rods of said fork. Fig. 4 is an enlarged detail of the connection between the lower ends of said rods and the front axle. Fig. 5 is a side elevation of the frame with the spring-connection in section. Figs. 6 and 7 are transverse sections of the front and rear members of the frame, respectively. Fig. 8 is a plan of the rear frame member with the rear bearing in section. Fig. 9 is a transverse section through the propelling-shaft hanger, driving-sprocket, and cranks. Fig. 10 is a perspective detail of one of the cranks. Fig. 11 is a plan of one of the treadles. Fig. 12 is a side elevation, and Fig. 13 a central vertical section, of the seat-supporting tube.

In the said drawings is shown our improved bicycle supported upon wheels W.

m and M are the front and rear members of the frame, respectively, connected by the spring-connection C.

F is the front fork depending from the head H, which latter carries the brake B, and R is the rear brace-fork connecting the rear bearings with the upper end of the seat-tube T, carrying the saddle S. The whole is propelled by the shaft and sprocket driven by cranks, constituting the propelling devices P. These several parts will now be explained in detail.

Wheels of any ordinary or preferred construction may be used so long as they are light and strong and conform in general and specific characteristics with the other parts of the machine; but on the hub 1 of the rear wheel are formed lugs 2, adapted to engage notches 3 in the hub of a small sprocket-wheel 4, traveling inside the rear fork, and over this sprocket-wheel travels a chain 5, by which the machine is driven in a manner common in bicycles of this character. The hub of the front wheel 6 turns upon an axle 10, whose ends pass through plates 11 at each side of the wheel and are held therein by wedge-shaped pins 12; or, if preferred, the shaft 10 may be fast in the front wheel 6 and may turn in the plates 11 without departing from the spirit of my invention. Ball or cone bearings may be provided, also, without effecting material alterations in this device.

Pivoted at 13 in the front and rear ends of each plate 11 are rods 14, forming an important part of the front fork F. These rods extend upwardly and have heads 15 at their upper ends, which slide freely up and down within sockets 16, having reduced lower ends 17, whereby the heads 15 cannot slip therefrom. The upper ends of the sockets are closed and provided with reduced screw-threaded extensions 18, which pass through threaded holes in the ends of cross-bars 19, and said bars are secured at their centers to the front and rear ends of a curved arm 20.

Between the heads 15 of the rods 14 and the closed upper ends of the sockets 16 coiled expansive springs 21 are interposed, whereby the front wheel 6 is cushioned against jars, as in passing over stones or through gulleys on the road.

The curved arm 20 has an integral upward extension 22 rising from its center, which extension passes through the front end of the frame member *m*, and to the upper side of said member is secured the lower end of a sleeve 23 by countersunk screws 24, as shown in Fig. 2. The extensions 22 may have a shoulder 25, if desired, and this shoulder and the lower face of the member *m* may be grooved for the reception of balls, thereby forming a balled head. Said sleeve 23 may be also braced by a diagonal brace 26 between the member *m* and the sleeve, connected at its ends by screws or otherwise; but this brace

is not essential. On the extension 22 is a collar 27, having a lower end, which fits loosely over the upper end of the sleeve 23, and above said collar is a ring 28, secured to the extension by a set-screw 29, whereby the collar is held against the upper end of the sleeve, but may be adjusted closer to take up wear between the parts. Above the ring 28 the extension is jointed on a transverse pin 36, for a purpose to appear hereinafter. These devices constitute the head H of our improved bicycle. The upper end of the extension 22 is threaded, as shown, and screwed onto this threaded end is a block 30, having a hole therethrough for the handle-bar 31 and a set-screw 32 for holding said bar in place.

33 is the brake-lever, pivoted between its ends, as at 34, to the upper side of the handle-bar and provided at its outer end with the turned-up lever-handle 35, whereby the rider may operate the brake from the top of the handle-bar instead of from the bottom or rear side, as heretofore.

The brake B of this machine comprises the brake-shoe 40 at the front end of the brake-arm 41, which is pivoted between its ends on a bifurcated lug 42 at the front end of the curved arm 20. The rear end of this brake-arm is bifurcated, and pivoted thereto is a rod 43, having a threaded upper end 44. Another rod 43 is pivoted to the inner end of the brake-lever 33, and is also screw-threaded, as at 44. A turn-buckle 45 connects the two threaded inner ends of these rods, and when this buckle is turned the brake-shoe will be adjusted with respect to the front wheel, as will be understood. Said shoe is held normally off the wheel by contractile spring 46 between the inner end of the brake-arm 41 and the curved arm 20.

The frame of this machine comprises a front member *m* and a rear member M, pivoted together, as at 50, the front member being of the cross-section shown in Fig. 6, and the rear as in Fig. 7, although considerable departure may be made from this exact construction, if desired. The front member is connected to and supported by the front fork in a manner just described, and the rear member is supported by the rear wheel, as hereinafter set forth. These two members are joined by the spring-connection C, which comprises the following parts: 51 is a rod pivoted at its lower end to a lug on the rear member M and reduced and threaded at its upper end, as at 52. 53 is a tube pivoted at its upper end to a lug on the front member *m* and having the upper portion of its body reduced on its interior, as shown at 54. The rod passes into the lower end of the tube, with its shoulder standing just inside the same, and a spring 55 is wound around said rod between its shoulder and the shoulder within the tube, rubber washers 56 being interposed between the ends of the spring and the metal faces, against which they strike to prevent noise. Above said tube-shoulder a nut 57 is placed on the threaded portion of the rod, and another spring 58 surrounds the upper end of the rod between this nut and the closed upper end of the tube, rubber washers 56 being used, as above. The upper side of the tube is left open above its center, whereby a wrench may be inserted to turn the nut 57. The larger spring 55 holds the two members of the frame normally apart, although allowing a certain motion between them, as when the machine is passing over rough roads; but the smaller spring is brought more or less into use by turning the nut 57, according as the rider is heavy or light or as the machine is to be used over very rough or very smooth roads or pavements. The spring-connection C therefore allows the machine to be adjusted as to its springing motion by the rider after it has been turned out from the manufactory. In some cases—as for racing, for instance—it may be desirable that the frame should have no spring whatever, and to allow of this we provide a nut 59 on the body of the rod 51, which, when screwed up against the lower end of the tube 53, prevents any motion whatever of either spring, and therefore causes the two frame members to be connected rigidly, as will be clearly understood. The rear end of the frame member M is bifurcated, as seen in Fig. 8, and the rear ends of its bifurcated arms 60 carry split boxes 61, whose members are connected by screws 69, which boxes are adapted to receive split bearings 62, held therein by screws 63. (See Fig. 5.) Through said bearings passes a shaft 64, to which the hub of the rear wheel is connected, and ball or cone bearings may be provided within the bearings without departing from the spirit of our invention. At each end of the shaft 64 it is reduced and threaded, as seen at 65, and over this reduced end is passed, first, a washer 66, then a cup-shaped rubber washer or sand-band 67, and then a nut 68, which latter is of such length that it will project beyond the end of the shaft, as shown. Into this projecting end is screwed a plug 68′, whereby all dust is prevented from entering the bearing, and the sand-band further serves to prevent its admission, as well as to avoid rattling between the parts. When the split boxes 61 are tightened by the screws 69, the split bearings 62 are reduced in size in a manner which will be obvious.

The propelling mechanism P comprises a shaft 70, journaled in a hanger 71, secured to the under side of the frame member M by bolts 72, as seen in Fig. 9. The ends of this shaft are threaded, as shown, for the reception of the cranks 75, and inside the right crank, preferably, the sprocket-wheel 73 is secured upon the shaft, over which passes the chain 5, connecting with the sprocket-wheel 4 upon the hub of the rear wheel, by which the machine is propelled. Each crank 75 has a slot 76 near its outer end, and a screw 77 extends inwardly into said outer end and passes into the slot, whereby if the screw

be tightened the pedal-pin 78 will be prevented from slipping outwardly within said slot in case the nut which holds said pin in place should become loose. Each pedal consists of a cross-shaped casting 79, bored centrally to pass over the pin 78, and corrugated or square rubbers mounted on pins at each end of the frame, as usual in bicycles.

The seat-tube T comprises a tube having a flange 80 at its lower end, through which pass screws or bolts 81, taking into holes 82 in the rear frame member M, and within this tube is a rod 83, having depressions 84. A collar 85 surrounds this rod and is adjusted thereon by a set-screw 86, whose point takes into said depressions and whose body extends through a slot 87 in the side of the tube, and a coiled spring 88 is inserted within the tube between the upper faces of the frame M and the lower face of said collar. By this spring the rod 83 is pressed normally upward until the set-screw 86 strikes the upper end of said slot. By adjusting the collar on the rod the sustaining force of the spring can be varied according to the weight of the rider and the amount of resilience he desires the seat shall have. To the upper end of the rod 83 the seat or saddle S is attached, as will be clearly understood.

The rear brace-fork R consists of a pair of rods connected at their front ends to eyes 90 near the upper end of the tube T and at their rear ends to similar eyes 90 in the boxes 61 at the rear ends of the frame member M. A rod 91 also connects the tube T with the upper end of the head H, preferably the block 30, holding the handle-bar, whereby when the spring-connection C gives and the frame yields the handle-bar will be maintained at the same relative position from the seat and the operation of steering will not be interrupted. The dust-guard 92 passes over the rear wheel and at its front end has a bracket 93, connected to a similar bracket 94 on the tube T by a screw, and the rear end of this dust-guard is supported by rods 95, rising from the boxes 61 in the usual manner.

96 are foot-rests adjustably mounted on the rearmost of the rods 14 by set-screws 97.

From the above description of the several parts of this improved bicycle it is thought the construction thereof will be manifest.

The adjustments of parts to take up for wear are effected by the screws and other devices above illustrated and described and need not be rementioned here, as any skilled mechanic or user of machines of this character will be able to make such adjustments without further explanation.

We claim as the salient features of our invention—

1. In a velocipede, the combination, with a wheel having lugs on its hub, of a sprocket-wheel fitting said hub and having notches engaging said lugs, an endless chain passing over said sprocket-wheel, and propelling devices for driving said chain, substantially as described.

2. In a velocipede, the combination, with a wheel and a shaft therethrough, of plates having holes passing over the ends of said shaft, wedge-shaped pins inserted through said shaft outside said plates, and rods pivoted to the ends of each plate and connected to the frame of the velocipede, substantially as described.

3. In a velocipede, the combination, with the frame, a head turning therein, and a curved arm centrally connected to said head, of cross-bars attached to the ends of said arm and extending to each side thereof, sockets carried at the ends of said bars and having reduced lower ends, headed rods inserted in said sockets and connected at their lower ends with the bearings of the steering-wheel, and expansion-springs within said sockets between the heads of said rods and the closed upper ends of the sockets, substantially as described.

4. In a velocipede, the combination, with the frame, a head turning therein, and a curved arm centrally connected to said head, of cross-bars attached to the ends of said arm, extending to each side thereof, and having threaded holes in their ends, sockets having reduced, closed, and threaded upper ends, seated in the holes in said bars, and also having reduced lower ends, rods having headed upper ends seated in said sockets, expansion-springs within said sockets between their closed upper ends and the heads on said rods, and plates on each side of the steering-wheel, to whose ends the lower ends of said rods are pivotally connected and to whose center the bearing of said wheel is attached, substantially as described,

5. In a velocipede, the combination, with the steering-wheel, the front fork carrying the same and having an upward extension provided with a joint below the handle-bar, and the frame within which said extension is pivoted, of a joint in the frame dividing it into front and rear members, and a rod connecting the upper end of said extension with the rear member of the frame, the whole operating substantially as described.

6. In a velocipede, the combination, with the handle-bar, the head, the front fork, and the steering-wheel, of the brake-lever located above said handle-bar and centrally pivoted thereto and the brake connected to said lever and adapted to be applied thereby to said steering-wheel, substantially as described.

7. In a velocipede, the combination, with the steering-wheel, the fork carrying the same, comprising a curved arm over said wheel and rods connecting its ends with the bearings of the wheel, the head rising from the center of said curved arm, and the handle-bar carried by said head, of a brake-arm centrally pivoted to the front end of said curved arm and having a brake-shoe at its front

end, a spring between its rear end and said curved arm, a brake-lever pivoted to said handle-bar, and connections between said lever and brake-arm, the whole operating substantially as described.

8. In a Safety bicycle, the combination, with the front and rear wheels and the frame connecting them, said frame comprising a front and rear member pivotally connected, of a spring-connection between said members above their pivot, the same comprising a rod pivoted to one member and having its other end reduced, a tube pivoted to the other member, into which said reduced end extends, an expansive spring between the inner end of said tube and the shoulder on said rod, and nuts on said rod limiting its movement in both directions, substantially as described.

9. The herein-described spring-connection, the same comprising a rod having a reduced and threaded end, a tube having a reduced and shouldered interior, into the larger end of which tube said rod projects, an expansion-spring surrounding said rod between the shoulder thereon and that within the tube, a nut on said reduced end of the rod above the shoulder in the tube, and an expansive spring between said nut and the smaller end of the tube, as and for the purpose set forth.

10. In a Safety bicycle, the combination, with the front and rear wheels and the frame connecting them, said frame comprising a front and rear member pivotally connected, of a rod pivoted to said rear member and having a reduced upper end provided with threads, an open-top tube pivoted to said front member and having a reduced and shouldered interior, into the larger end of which tube said rod projects, an expansive spring surrounding said rod between the shoulder thereon and that within the tube, a nut on said reduced end of the rod above the shoulder in the tube, an expansive spring between said nut and the upper end of the tube, and a binding-nut on the body of the rod below the lower end of the tube, the whole adapted for use substantially as described.

11. In a Safety bicycle, the combination, with the front and rear wheels and the frame connecting them, said frame comprising a front and rear member pivotally connected, of the herein-described spring-connection, the same comprising a rod having a reduced and threaded end, a tube having a reduced and shouldered interior, into the larger end of which tube said rod projects, an expansive spring surrounding said rod between the shoulder thereon and that within the tube, a nut on said reduced end of the rod above the shoulder in the tube, an expansive spring between said nut and the smaller end of the tube, and rubber washers next each end of both springs, as and for the purpose set forth.

12. In a velocipede, the combination, with the bifurcated frame, the ends of whose arms carry split boxes, and set-screws for drawing said split boxes together, of split bearings within said boxes, screws holding said bearings therein, a shaft journaled in said bearings, and a wheel on said shaft, substantially as described.

13. The herein-described journal-box, the same comprising a shaft carrying a wheel and having reduced threaded ends, washers on said ends, cup-shaped rubber sand-bands over said washers also on said ends, nuts screwed onto and projecting beyond said ends, and plugs screwed into the open outer ends of the nuts, substantially as described.

14. The herein-described velocipede-crank having a transverse slot near its outer end, a pedal-pin secured within said slot, and a screw passing into the end of the crank and impinging against said pin, as and for the purpose set forth.

15. In a velocipede, the combination, with the frame, of a tube secured to and rising therefrom, said tube having a slot in its rear side, a rod sliding within said tube and having depressions in its rear side, a collar on said rod, a set-screw in said collar whose point takes into said depressions and whose head extends through said slot, a coiled spring within the tube around said rod between the lower end of the tube and the lower side of the collar, and a seat carried on the upper end of said rod, all substantially as described.

16. In a Safety bicycle, the combination, with the frame, the seat-tube mounted thereon, a spring within said tube, and a collar carried by the upper end of said spring and also within said tube, of a rod moving within said spring and extending from the upper end of said seat-tube, a seat on said rod, and means for adjusting said collar on the rod, substantially as described.

17. In a Safety bicycle, the combination, with the front fork composed of diverging rods at each side of the wheel connecting its bearings with a curved arm carried by the head, of foot-rests adjustably mounted on the rearmost of said rods and set-screws therein impinging against the rods, as and for the purpose hereinbefore set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

WILLIAM E. HIBBERT.
ALFRED MANUEL.

Witnesses:
HENRY R. SMITH,
JNO. P. BERTOLETTE.