

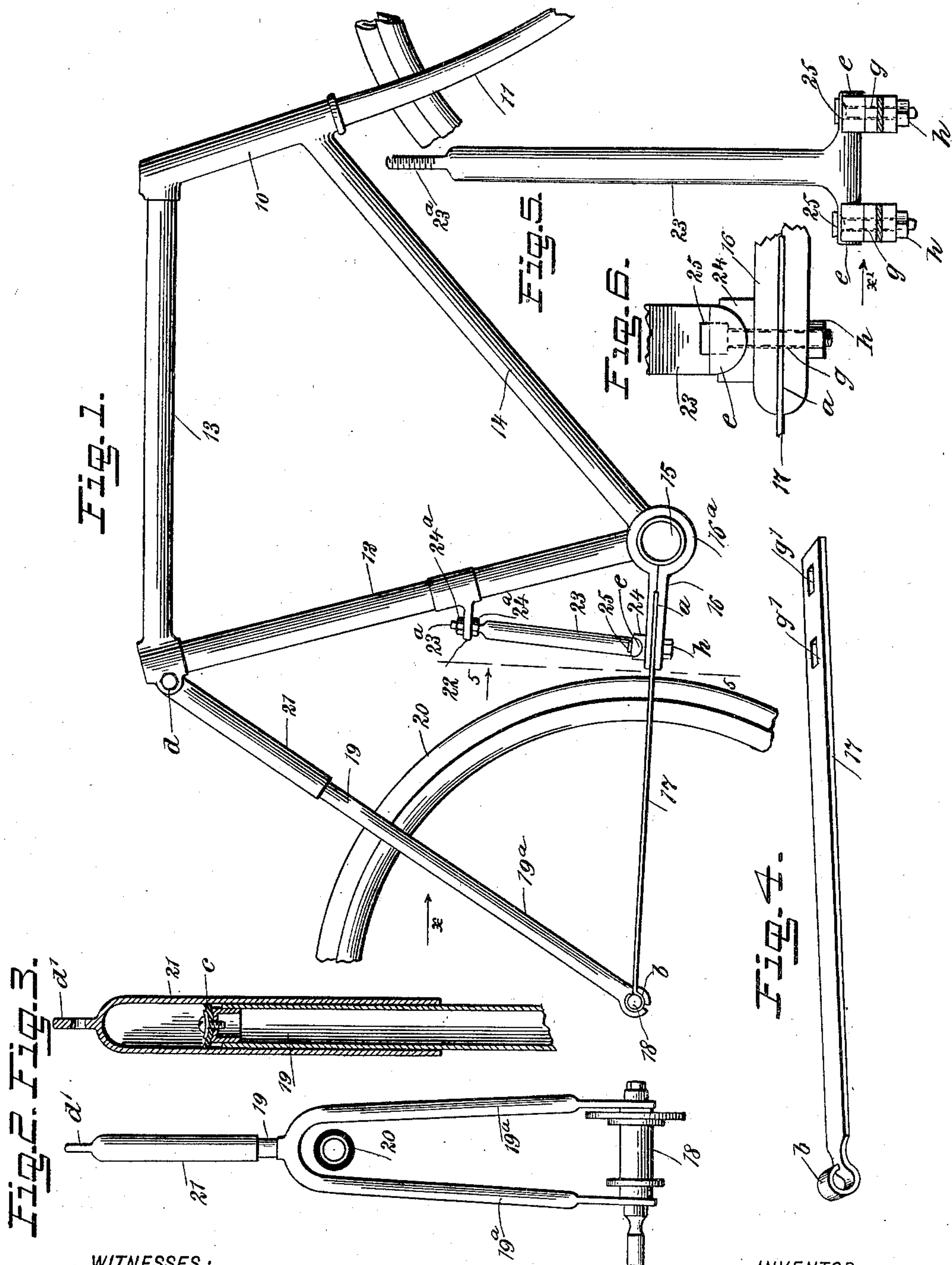
No. 709,718.

Patented Sept. 23, 1902.

R. F. MONAHAN.  
BICYCLE FRAME.

(Application filed Sept. 20, 1901.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## BICYCLE-FRAME.

SPECIFICATION forming part of Letters Patent No. 709,718, dated September 23, 1902.

Application filed September 20, 1901. Serial No. 75,676. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT FRANKLIN MONAHAN, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Bicycle-Frames, of which the following is a full, clear, and exact description.

The object of this invention is to provide novel features of construction for the frame of a bicycle which will render its rear portion measurably resilient and afford necessary strength to the frame.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of a bicycle-frame having the improvement thereon. Fig. 2 is a rear end elevation seen in the direction of the arrow *x* in Fig. 1. Fig. 3 is an enlarged transverse sectional view of a novel feature on the upper portion of the rear fork of the bicycle-frame. Fig. 4 is a perspective view of a resilient frame member that is a novel detail of the invention. Fig. 5 is an enlarged partly-sectional rear view of another novel feature of construction substantially on the line 55 in Fig. 1, and Fig. 6 is an enlarged side view in part of the feature of improvement shown in Fig. 5 seen in direction of the arrow *x'* in said figure.

The bicycle-frame having the improvements, broadly considered, is of the type popularly known as the "diamond" style of frame and, as indicated in Fig. 1, consists of a front post 10, carrying the front wheel-fork 11, a saddle-post 12, an upper longitudinally-extending brace 13, joining the saddle-post and front post 10, a lower inclined brace 14, joined at one end to the front post and at the opposite end merged into a transverse crank-shaft box 15, also connected with the saddle-post at the lower end of the same, the remaining rear portions of the bicycle-frame embodying the improvements to be described.

Upon the laterally - extended cylindric

ends of the crank-shaft box 15 two similar bracket-arms are loosely mounted, one of said arms being shown in Fig. 1. Each bracket-arm consists of a laterally-perforated hub 16<sup>a</sup>, the bore of which loosely receives a respective cylindric end of the shaft-box 15, and from said hub an integral arm 16 extends. The arm 16 is slitted horizontally from end to end, rendering the two members thus produced slightly resilient, and from the free end this slit *a* is enlarged vertically for a proper distance to adapt said slit to receive one end of the flat spring-bar 17. Such a length is given to the spring-bar 17 as will project it toward and opposite a respective end portion of the axle 18 on the rear wheel of the bicycle, said projecting ends being in the form of journals. The ends of the two similar flat spring-bars 17 which are opposite those occupying the slits *a* each have an eye *b* thereon for a loose engagement with a respective journal end on the rear axle 18. On the ends of the axle 18 at the inner side of the eyes *b* two depending limbs 19<sup>a</sup> of the rear frame-fork, having a stem 19, are loosely mounted, and, as usual, this fork straddles the rear wheel 20. The stem 19 of the rear frame-fork is tubular, and upon its true cylindrical body an air-cylinder 21 is slidably mounted, a disk-valve *c*, fixed on the upper end of the stem 19, engaging slidably with the inner surface of said air-cylinder. An ear *d'*, formed on the closed upper end of the air-cylinder 21, is pivoted upon a rearwardly-projecting clip-band *d*, secured on the upper end of the saddle-post 12 and connecting the top brace 13 thereto.

Above the box 15 a short arm 22 is secured upon the saddle-post 12 by an integral collar, and between said arm and the arms 16 an upright brace 23 is introduced and held as follows: The lower end of the brace 23 is extended oppositely in inverted-T form, these lateral limbs *e e* being rounded into semicircular form on their lower sides. Upon each arm 16 a box 24 is mounted, the upper sides of said boxes being concaved to fit upon the rounded lower sides of the respective limbs *e e*. A vertical perforation *g* is formed in each of the limbs *e* and passes down through a respective box 24 and arm 16, the perfora-



tion in each limb being cupped at its upper end. A bolt 25, having a head convexed on the lower side to seat in the cupped top of the perforation *g* in a respective limb *e*, is  
 5 passed down through each of the limbs in said perforations and fits loosely therein, a clamping-nut *h* on the threaded lower end of each bolt holding it sufficiently tight for effective service. The forward portion of each spring-  
 10 bar 17 may have two or more spaced perforations *g'* therein for accommodation of the bolt 25, so that the spring-bars may be applied upon bicycle-frames adapted for use on wheels 20 of various diameters, which would  
 15 require the bars to have corresponding lengths. The upper end 23<sup>a</sup> of the brace 23 is preferably reduced in diameter and threaded on said reduced portion, which is projected through a suitable perforation in the arm 22,  
 20 and upon the threaded bolt portion of the brace two nuts 24<sup>a</sup> are screwed, one above and the other below the arm 22, and it will be obvious that by an adjustment of the nuts 24<sup>a</sup> the brace 23 may be lengthened or shortened  
 25 a limited degree, and thus adjust the degree of resilience had by the spring-bars 17 to increase or diminish it.

Assuming that all parts of the bicycle are provided and arranged as necessary for the  
 30 use of the vehicle and that the improved details which have been described are made portions of the bicycle-frame, the advantages resulting from use of the improvement are self-evident. As the weight imposed upon the  
 35 rear portion of the frame will be mainly sustained by parts of the same that are directly connected to the rear axle 18<sup>a</sup>, it will be seen that the rear wheel 20 will receive elastic support therefrom. In other words, the air-  
 40 cushion afforded by the telescopic engagement of the air-chamber 21 with the stem 19 coacts with the two resilient bars 17 to cushion the impact of the rear wheel 20 on a rough road-bed over which the bicycle may be pro-  
 45 pelled.

If found desirable in practice, the seat-post 12 may be reinforced in any suitable manner at the point of connection with the brace 23.

It is obvious that the employment of the im-  
 50 provement will increase the benefits derived from provision of pneumatic tires, and add to the durability of the bicycle, as well as to the ease of the rider in traveling over rough places on a road.

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

1. A bicycle wheel-frame, having resilient frame-bars extended between the saddle-post  
 60 and the rear axle, and a brace extending between the resilient frame-bars and the saddle-post.

2. A bicycle wheel-frame, having two resilient frame-bars extended between the sad-  
 65 dle-post and the rear axle, a brace extending

between the resilient frame-bars and saddle-post, and means for adjusting the length of said brace for the control of the resilience of said frame-bars.

3. A bicycle wheel-frame having an air- 70 cushion device on the rear frame-fork, and connected with the upper part of the saddle-post, two resilient frame-bars extending between the saddle-post and the rear axle, a brace extending between the resilient frame- 75 bars and the saddle-post, and means for adjusting the brace.

4. A bicycle wheel-frame, comprising two independent spring members loosely mounted at one end on the rear axle of the bicycle, 80 bracket-arms having hubs loosely mounted on projections from the lower end of the saddle-post, and arms integral with the said hubs, and with which the opposite ends of the said spring members are adjustably con- 85 nected.

5. A bicycle wheel-frame, embodying two spring members pivotally connected at their rear ends with the ends of the rear axle, a bracket-arm on the front end of each spring 90 member, having a hollow hub mounted on projections from the lower end of the saddle-post, and a brace extended from an arm on the saddle-post and adapted for connection with the two bracket-arms on the spring members. 95

6. A bicycle wheel-frame having two spring members pivotally connected at their rear ends with the ends of the rear axle, a bracket-arm on the front end of each spring member and each having a hub mounted on the ends 100 of the crank-shaft box, and an upright brace adjustably connected at its upper end with an arm on the saddle-post, the lower end of said brace having lateral limbs held in engagement with boxes mounted on the said 105 bracket-arm.

7. A bicycle wheel-frame having two spring members loosely mounted at one end on the rear axle of the bicycle, and brackets each comprising a hub mounted on the respective 110 end of the crank-axle box of the frame, and an integral arm slitted horizontally and adapted to receive the other end of the corresponding spring member.

8. A bicycle wheel-frame, embodying a two- 115 part rear frame-fork, the hollow upper member thereof sliding air-tight upon the cylindrical stem of the lower part, two spring-bars extended from the rear axle carried by the rear frame-fork, and brackets having hubs 120 mounted on projections on the lower ends of the saddle-post of the frame and arms integral with the respective hubs and slitted horizontally to receive the forward ends of said spring-bars. 125

9. A bicycle wheel-frame, embodying a two- part rear frame-fork, the hollow upper mem- 130 ber thereof sliding air-tight upon the cylindrical stem of the lower part, two spring-bars extended from the rear axle carried by the

5 rear frame-fork, bracket-arms connecting the forward ends of the spring-bars with the crank-axle box of the frame, and a brace adjustably connected with an arm on the saddle-post of the frame, and adapted for a slightly-yielding connection with the bracket-arms.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT FRANKLIN MONAHAN.

Witnesses:

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