(No Model.) 2 Sheets—Sheet 1.

M. B. RYAN.

FOLDING BICYCLE.

No. 569,354. Patented Oct. 13, 1896.

Fig. 1.

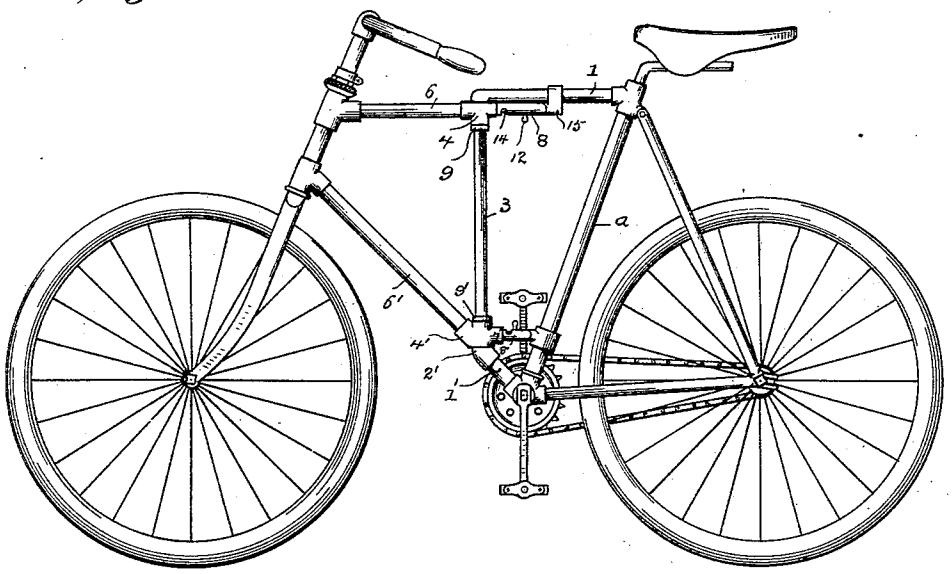


Fig. 3.

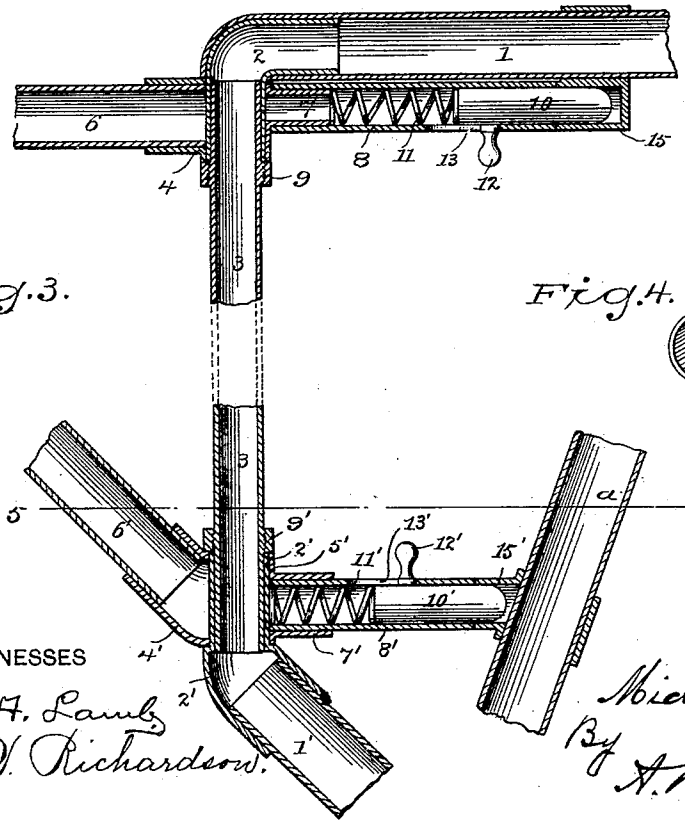
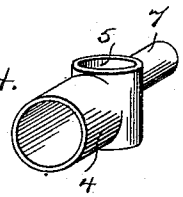


Fig. 4.



WITNESSES

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INVENTOR

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Atty.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

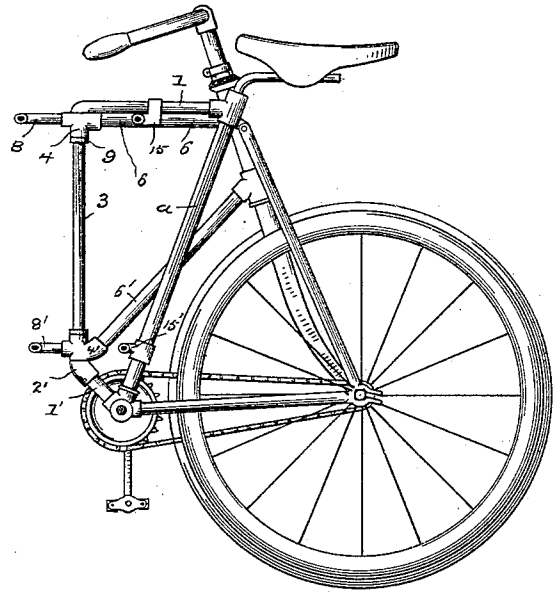


Fig. 5.

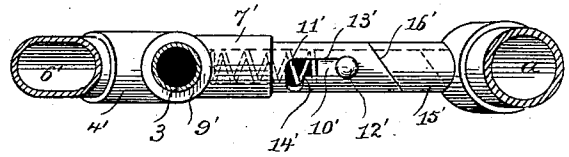
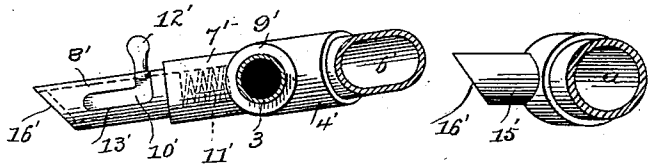


Fig. 6.



WITNESSES

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INVENTOR

Michael B. Ryan

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UNITED STATES PATENT OFFICE.

MICHAEL B. RYAN, OF BRIDGEPORT, CONNECTICUT.

FOLDING BICYCLE.

SPECIFICATION forming part of Letters Patent No. 569,354, dated October 13, 1896.

Application filed March 26, 1896. Serial No. 584,921. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL B. RYAN, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Folding Bicycles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to bicycles, and has particular reference to a construction which enables the frame to be folded to bring the front and rear wheels substantially side by side.

The object of the invention is to produce a practical and reliable machine of this type which will not materially differ in weight or appearance from the usual safety-bicycle, and which may be quickly reduced to a small compass in order that the machine may be easily carried up or down stairs and stored in a small space, or may be readily transported for use in military operations.

To these ends the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

In the drawings which accompany and form part of this specification, Figure 1 represents a side elevation of a machine embodying the invention and ready for use. Fig. 2 is a side elevation of the machine when folded. Fig. 3 is an enlarged detail sectional view of the hinge members when in the position shown in Fig. 1. Fig. 4 is a detail perspective view hereinafter described. Fig. 5 is a section on line 5 5 of Fig. 3. Fig. 6 is a similar view of the same parts when the machine is folded.

Similar reference-characters denote the same parts in the several views.

The front and rear wheels, driving mechanism, fork, steering-head, handle-bar, saddle-post, saddle, &c., are or may be of a common type and require no description, the invention consisting solely in the means whereby the frame is so divided and hingedly connected as to fold on a substantially vertical pivotal line.

The rear portion 1 of the horizontal bar of the frame has its front end bent downward and receives the horizontal part of a coupling-tube 2, the lower vertical end of which receives the upper end of the vertical brace 3, these parts, as well as others hereinafter mentioned, except those described as having relative movement, being permanently united in the manner common with the tubular parts of the framing of bicycles.

Around the vertical portion of the coupling 2 is fitted the sleeve portion 5 of the fulcrum-piece or hinge member 4, (shown in detail in Fig. 4,) said member 4 being adapted to turn on the vertical portion of the coupling 2 and having its front end receiving and secured to the rear end of the front portion 6 of the horizontal bar. The rear end 7 of the fulcrum-piece enters and is secured in the bolt-casing 8, and a nut 9 on the brace 3 abuts against the lower end of sleeve 5 to prevent vertical movement of the fulcrum-piece on said brace.

The casing contains a bolt 10, which is normally pressed outward by a spring 11, the bolt being provided with a knob or handle 12, projecting through a slot 13 in the casing, said slot having an offset portion at one end to form a retaining-shoulder 14 for the knob 12.

Secured to the bar 1 is a bolt socket or keeper 15, and the meeting ends of the casing and keeper are preferably beveled in the same way as indicated at 16′ in Fig. 5, which figure illustrates the hinge construction of the lower frame-bar. This latter construction is in all respects similar to the one just described, but differing therefrom slightly to adapt the feature to the different relative angles of the portions of the frame at the lower part thereof. It is briefly outlined in detail as follows: 1′ denotes the lower portion of the inclined bar or brace adjacent to the crank-bearing of the machine, 2′ the coupling, 4′ the fulcrum-piece secured to the upper or front portion 6′ of the inclined bar or brace, said fulcrum-piece having sleeve 5′, adapted to turn on the lower end of brace 3, a nut 9′ preventing longitudinal movement.

The end 7′ of the fulcrum-piece 4′ has secured to it the bolt-casing 8′, slotted at 13′ and containing bolt 10′ and spring 11′, and having a shoulder 14′ for the knob 12′ of the bolt. A keeper 15′ is secured to the main or center brace *a* of the frame. The meeting

ends of the bolt-casing and keeper are beveled at 16′ to form a stop when the casing is brought opposite the keeper and in alinement therewith. Since the bolt-casings and keepers come into alinement with each other and closely meet when the machine is unfolded for use, the bolts which then connect the casings and keepers insure a rigidity of the frame that cannot be obtained by the use of turn-buttons. Furthermore, accidental displacement of the bolts is impossible.

This machine is but very slightly heavier than the common form of diamond-frame bicycles, and when in use can hardly be distinguished therefrom in appearance.

When it is desired to fold up the machine for compact military transportation or to enable it to be carried through difficult stairways to small quarters, the bolts 10 and 10′ are retracted and the knobs 12 12′ engaged behind the shoulders 14 14′. The entire front section of the machine may then be swung on the hinge centers from the position shown in Fig. 1 to the position shown in Fig. 2, the fulcrum-pieces 4 4′ turning on the brace 3 and carrying the bolt-casings 8 8′ to the position shown in Figs. 2 and 6.

Owing to the keepers 15 and 15′ being located at a distance from the hinged connection and extending in a substantially horizontal direction to receive the horizontally-movable bolts, the two sections of the frame are locked firmly and rigidly together when the machine is ready for use, there being no opportunity for noticeable lost motion between the bolts and keepers.

Having now described my invention, what I claim is—

1. A bicycle comprising in its construction a frame formed in two sections hingedly connected together, one of said sections being provided with a bolt and the other section with a keeper for the bolt, the said bolt and keeper extending in a substantially horizontal direction and located at a distance from the hinged connection, and the bolt casing and keeper being adapted to closely meet, to insure rigidity of the frame in use.

2. A bicycle comprising in its construction a frame formed in two sections one of which is provided with a substantially vertical brace, and the other having fulcrum-pieces sleeved on the brace, and bolts and keepers carried by said sections, the said bolts and keepers extending in a substantially horizontal direction and located at a distance from the hinged connection, and the bolt casings and keepers being adapted to closely meet, to insure rigidity of the frame in use.

3. A bicycle comprising in its construction a frame formed in two sections one of which is provided with a substantially vertical brace, and with bolt-keepers and the other having fulcrum-pieces sleeved on the brace, bolt-casings carried by said fulcrum-pieces, and spring-bolts in said casings, the said bolts and keepers extending in a substantially horizontal direction and located at a distance from the hinged connection, and the bolt casings and keepers being adapted to closely meet, to insure rigidity of the frame in use.

4. In a bicycle, the combination with the bars 1, 1′, the brace 3 and the coupling-tubes 2, 2′, of the fulcrum-pieces 4, 4′, secured to the front frame-sections 6, 6′, and sleeved on the brace 3, and bolts and keepers for locking the fulcrum-pieces, the said bolts and keepers extending in a substantially horizontal direction and located at a distance from the hinged connection, and the bolt casings and keepers being adapted to closely meet, to insure rigidity of the frame in use, substantially as described.

5. In a bicycle, the combination with the bars 1, 1′, the brace 3 and the coupling-tubes 2, 2′, of the fulcrum-pieces 4, 4′ secured to the front frame-sections 6, 6′ and sleeved on the brace 3, the bolt-casings 8, 8′ secured to the fulcrum-pieces and containing spring-bolts, and keepers 15, 15′ secured to the bar 1 and to the main post *a* of the machine, substantially as described.

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

MICHAEL B. RYAN.

Witnesses:
A. M. WOOSTER,
S. V. RICHARDSON.