Sept. 27, 1966 B. R. MENNESSON 3,275,339

FRAMES OF BICYCLES, ESPECIALLY IN THOSE OF BICYCLES PROVIDED WITH AN AUXILIARY ENGINE

Filed Dec. 22, 1964 2 Sheets-Sheet 1

Fig. 1.

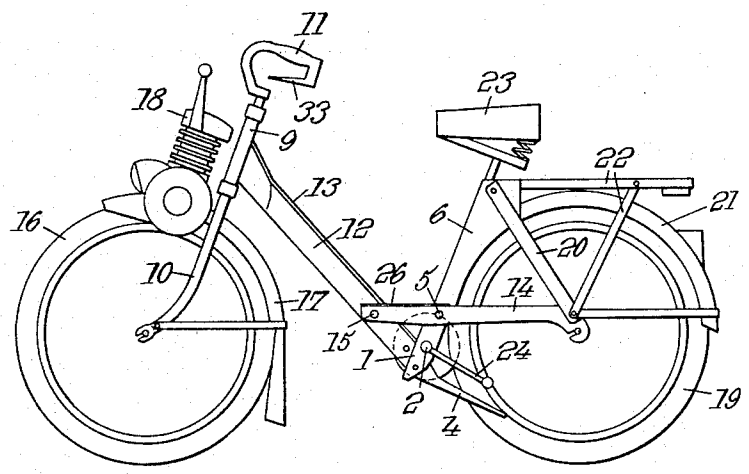

Fig. 3.

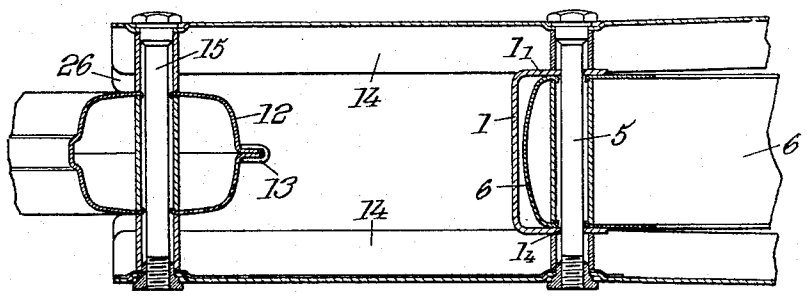

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Fig. 2.

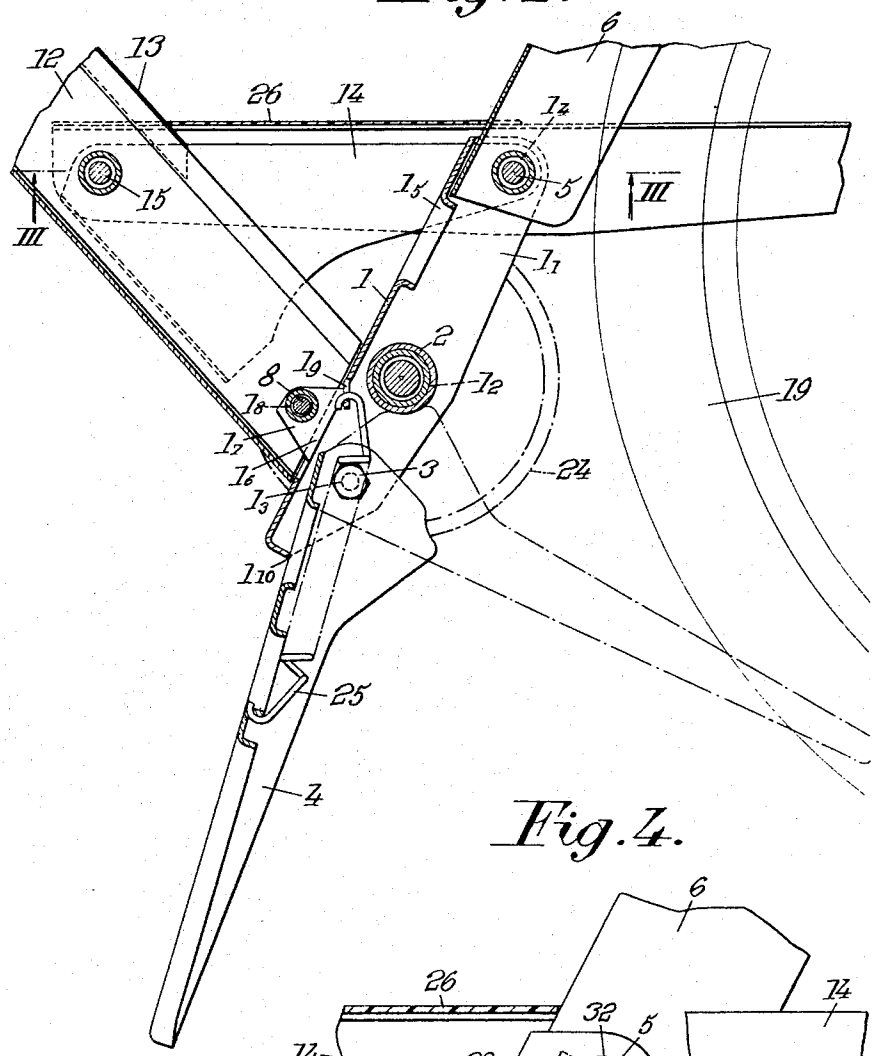
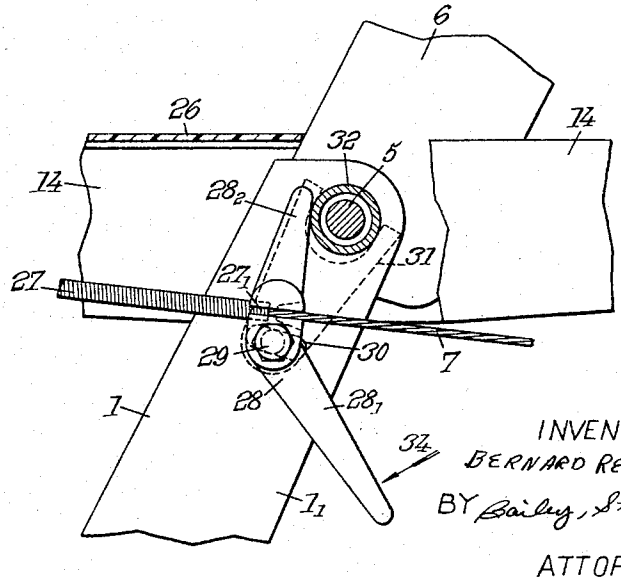


Fig. 4.



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United States Patent Office 3,275,339
Patented Sept. 27, 1966

3,275,339

FRAMES OF BICYCLES, ESPECIALLY IN THOSE OF BICYCLES PROVIDED WITH AN AUXILIARY ENGINE

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Filed Dec. 22, 1964, Ser. No. 420,273
Claims priority, application France, Dec. 31, 1963, 959,118
7 Claims. (Cl. 280—281)

The invention relates to the frames of bicycles, and in particular, though non-exclusively, to the frames of bicycles equipped with an auxiliary engine mounted on the front fork.

It is known from the prior art, especially from the French Patent No. 1,094,371 filed on November 14, 1953, to constitute the saddle support member of the frame by a reinforced iron sheet folded or curved to form a U having its concavity open to the rear and enveloping, like a fender does, part of the rear wheel, said saddle support member having its lower extremity also adapted to support the crank-gear housing.

Such a saddle support member is very advantageous owing to the simplicity of its construction and its easy cleaning.

However the saddle support member is usually made of a relatively thick iron-sheet owing to the many functions it has to perform, and since it withstands alone most of the efforts the frame is subjected to through the crank-gear. Thus such a frame is quite heavy due to the relatively important size of said saddle support member.

The object of the invention is to provide a frame assembly much lighter than the former and having the required sturdiness to perform the above mentioned functions.

Another object of the invention is to provide for a better distribution of the efforts the frame is subjected to on the different members or struts constituting said frame.

In order to meet these objects and the further objects which will become apparent as this description proceeds, the frame according to the invention comprises a slanted front strut carrying in its upper part a sleeve for journalling the steering elements of the bicycle, a saddle support slanted in a direction inverse of that of said front strut, a substantially horizontal rear fork rigidly secured, on the one hand, by its own extremity to said front strut above the lower extremity thereof and, on the other hand, at the lower extremity of said saddle support, said frame further comprising a rigid sole rigidly secured, by its upper end to both the lower extremity of said saddle support and the horizontal fork and, by its lower end, to the lower extremity of said front strut, whereby said sole, the lower portion of said front strut and the front portion of said horizontal fork define a rigid triangle.

In addition, the former saddle support member is now constituted of the two distinct elements consisting of the rigid sole and the saddle support above said sole, and, according to another feature of the invention the sole is made of a relatively thick iron sheet enabling the latter to bear the principal efforts generated in the frame whereas the saddle support is made of a relatively thin sheet sufficient to enable said saddle support to accomplish its only role of supporting the user.

In such a manner a light but sturdy frame construction is obtained.

When the bicycle is of the type having a brake working element operated from a hand grip on the handle bar through a cable protected by a flexible sheath but axially undeformable, the frame is adapted, according to a further

feature of the invention to carry on a side plate or check a mechanism which may act upon the efficiency of said brake by controlling the axial position of the extremity of said flexible sheath, on the side of said working element, said mechanism comprising a lever, one arm of which can be readily reached from outside and the other arm of which is applied through the tension of the cable against an abutment integral with said cheek, abutment such as an assembling bolt, the swivel pin of said lever being constituted of a bolt passing through an elongated aperture provided in said cheek and screwed into a small plate lapping said abutment without play.

Other features of the present invention will become apparent in the course of the following description of a preferred embodiment thereof, with reference to the appended drawings, in which:

FIG. 1 shows a side elevation of a bicycle provided with an auxiliary engine and with a frame according to the invention;

FIGS. 2 and 3 show respectively, on an enlarged scale, a vertical partial section of a part of said frame and a horizontal section thereof along the line III—III of FIG. 2;

FIG. 4 shows on an even larger scale than in FIG. 2 a vertical section, parallel to the same of FIG. 2, of an embodiment of the brake control mechanism according to the invention and carried by said frame.

As already mentioned the sole **1** carrying the housing **2** of the crank-gear **24** is made of a relatively thick iron sheet and is rigidly secured, by its lower end, to the lower extremity of the front strut **12** of the frame and is also rigidly secured by its upper end, on the one hand, to the arms of the rear fork **14**, whose front extremity is also connected to said front strut, and, on the other hand, to the saddle support **6**. The lower part of the front strut **12**, the front part of the rear fork **14** and the sole itself constitute a rigid approximately equilateral triangle.

In the embodiment shown the sole **1** has the form of a lid for a rectangular box, said sole being made of a thick iron sheet (for instance having a thickness of 2 millimeters) with folded longitudinal and vertical borders or cheeks 1_1. This sole is strongly slanted downwardly and forwardly with respect to the horizontal direction. The two longitudinal and vertical cheeks 1_1 are respectively perforated of a first pair of holes 1_2 facing each other transversely and adapted to receive the housing **2** of the crank-gear, of a second pair of holes 1_3 facing each other transversely and adapted to receive the pivoting axis **3** of a support stand **4** serving to stabilize the bicycle in a standing position when not in use, said cheeks being further perforated, in their upper part, of a third pair of holes 1_4 facing each other transversely and adapted to receive a bolt **5**. This bolt **5** itself passes through the two lateral cheeks of the saddle support **6** in the proximity of their lower ends as will be described hereafter.

This saddle support is itself constituted by a U-curved iron sheet turning its concavity to the rear and having two cheeks receiving in their lower part said bolt **5** and enveloping, like a fender, in a manner known per se a part of the rear wheel. This sheet may be much thinner than the same of said sole; for instance have a thickness of 1.2 millimeters.

The bottom of the lid constituting the sole **1** is provided with a first opening 1_5 (FIG. 2) for the passage of the brake cables **7** (FIG. 4) and the electric wires leading to the tail light, and with a second opening 1_6 bordered with two folded vertical and longitudinal ears 1_7. These two ears 1_7 are perforated with a pair of holes 1_8 facing each other and adapted to receive a bolt **8** for securing rigidly on said sole the lower end of the front strut **12**.

The front strut **8** is constituted by a section iron, the upper portion of which is welded to the steering sleeve **9**

(FIG. 1) for slidably journalling the front fork **10** and the stem of the handle bar **11**. This front strut **12** is preferably a tubular and straight iron section made of a relatively thin iron sheet (for instance having a thickness of 1.2 millimeters) which has been curved to form a hollow tube with two opposite borders which have been brought to face each other or to juxtapose and finally welded together as shown in FIGURE 3. The welded longitudinal band of the front strut **12** so formed is covered by a protection and trimming strip **13** made of a rust-proof steel or different material.

The rear fork **14** of the bicycle comprises two arms made of two angle irons which are both secured, on the one hand, by their front extremities to the section iron **12** through a transversal assembling bolt **15** and, on the other hand, to the sole **1** and to the saddle support **6** through the above mentioned bolt **5**.

As it can be seen on the FIGS. 1 and 2, the sole **1**, the front portion of the angle irons **14** and the lower portion of the front strut **12** define a non-deformable rigid triangle having substantially an equilateral shape. The different parts above described of the frame are very easy to dismantle and to reassemble.

The other following parts appear also on the figures:

The front wheel **16** of the bicycle with its fender **17** and the driving engine **18** carried by the front fork **10**,

The rear wheel **19** with its slanted fork **20** connecting the rear extremities respectively of the saddle support **6** and of the horizontal rear fork **14**, said rear wheel **19** being further protected by a fender **21** complementing the U-formed sheet of the saddle support **6**,

A rear luggage carrier **22**,

The saddle **23**,

The crank-gear **24**,

A spring **25** (FIG. 2) for the support stand **4**, said spring **25** being stretched between said stand support and a ring 1_9 formed in the bottom of the sole **1** at the border of the opening 1_8,

And a feet-supporting plate **26** for instance made of a plastic material and covering the two angle-irons **14** between the front strut **12** and the saddle support **6**.

The FIG. 2 shows equally that the front and rear abutments, which limit the pivotal motions of the support stand **4**, are respectively constituted by the inferior folded border 1_{10} of the sole **1** (for the standing position of the bicycle when not in use), and the crank-gear housing **2** (for the "circulation" position of said stand support as diagrammatically represented in dot-and-dash lines).

The cheeks of the sole **1** are particularly well fit for supporting a mechanism permitting to act very easily on the efficiency of the brakes, especially of the rear brake, of said bicycle, though of course said little mechanism could also be carried by some other appropriate part of the frame.

This mechanism is adapted to act on the axial position of the extremity 27_1 of the axially undeformable sheath **27** (FIG. 4) surrounding at least one of the brake cables **7** irrespective of the nature of the working element of the brake (shoe brake, drum-brake and analogous).

Said mechanism comprises essentially a bent lever **28**, a first arm 28_1 of which can be easily reached from outside whereas its second arm 28_2 is biased against an abutment **32** integral with the cheek 1_1, this abutment being advantageously constituted by the bolt **5** or its guiding tube (FIG. 4). The pivot pin of said lever is a bolt **29**, whose head can easily be reached by means of a wrench. This bolt **29**, which passes through the lever **28**, also passes through an elongated or oblong aperture **30** provided in the cheek 1_1 and oriented in a direction substantially parallel to the cable **7**, said bolt being screwed in a little plate **31** provided with the corresponding threaded hole said plate lapping the abutment **32** without play.

The cable **7** passes through the lever **28** near the axis of the pivot pin thereof and the sheath **27** of said cable is adapted to have its remotest extremity 27_1 from the hand grip **33** to come in abutment against said lever **28** thereby biasing the arm 28_2 thereof against the abutment **32**.

The operation of this control mechanism is as follows:

Initially the bolt **29** is screwed in the little plate **31** and the lever **28** is locked in position as well as the extremity 27_1 of the sheath.

If upon actuation of the hand grip **33** the braking appears to be either too strong or too weak the bolt **29** is unscrewed. The tension of the cable **7** and of its sheath **27** then tends to displace said bolt **29** in its elongated aperture **30** to the right as visible on FIG. 4. Such displacement of the bolt **29** is opposed by pressing the arm 28_1 with a finger in the direction of the arrow **34**, the strength of the braking increasing with the displacement of said arm 28_1, together with the extremity 27_1 of said sheath, in the direction of the arrow **34**. When the desired tension of the cable is obtained the bolt **29** is again locked in position thereby locking also the lever **28** and consequently the extremity 27_1 of the sheath in their respective new positions.

It is most advantageous to constitute the nut cooperating with the bolt **29** by the threaded little plate **31**. As a matter of fact this little plate cannot rotate about the axis of the bolt **29** since it is lapping the abutment **32** (thus rendering it unnecessary to lock it in position by means of a wrench while the bolt **29** is rotated). In addition, the little plate **31** permits the motion of said bolt **29** within the elongated aperture **30** in response to the control needs. Furthermore the manufacturing cost of this little plate is lower than that of a nut.

Thus a very efficient cooperation is obtained among the parts constituting the frame according to the invention, such frame, and in particular the assembly consisting of the saddle support **6** and the sole **1**, presenting all the sturdiness required while having a reduced weight owing to the fact that only said sole needs to be made of a relatively thick sheet.

In a general manner, while the above description discloses what is deemed to be a practical and efficient embodiment of the invention, it should be well understood that the invention is not to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle and scope of the present invention as comprehended within the scope of the appended claims.

What is claimed is:

1. A frame for a bicycle comprising a slanted front strut carrying in its upper part a sleeve for journalling the steering parts of the bicycle, a saddle support slanted in a direction opposite to that of said front strut, a substantially horizontal rear fork rigidly secured, on the one hand, by its own front extremity to said front strut above the lower extremity thereof and, on the other hand, at the lower extremity of said saddle support, said bicycle frame further comprising a rigid sole slanted in the same direction as said saddle support for carrying the housing of the crank-gear, said rigid sole being rigidly secured by its upper end to both the lower extremity of said saddle support and the horizontal fork, and by its lower end to the lower extremity of said front strut, whereby said sole, a portion of said front strut starting from its lower extremity and a portion of said horizontal fork starting from its front extremity define a rigid triangle.

2. A frame for a bicycle comprising a slanted front strut carrying in its upper part a sleeve for journalling the steering parts of the bicycle, a saddle support slanted in a direction opposite to that of said front strut, said front strut and said saddle support being formed of a relatively thin folded iron sheet sufficient to support the user of the bicycle, a substantially horizontal rear fork rigidly secured, on the one hand, by its own front extremity to said front strut above the lower extremity thereof and, on the other hand, at the lower extremity of

said saddle support, said bicycle frame further comprising a rigid sole slanted in the same direction as said saddle support for carrying the housing of the crank-gear, said rigid sole being made of a relatively thick folded iron sheet for enabling said sole to withstand the efforts generated in the frame by the crank-gear, and said rigid sole being rigidly secured by its upper end to both the lower extremity of said saddle support and the horizontal fork and by its lower end to the lower extremity of said front strut, whereby said sole, a portion of said front strut starting from its lower extremity and a portion of said horizontal fork starting from its front extremity define a rigid triangle.

3. A frame for a bicycle according to claim 2 wherein said sole is provided with folded borders to have a form similar to the form of a lid for a rectangular box.

4. A frame for a bicycle according to claim 2 wherein said saddle support is constituted by a U-curved iron sheet and wherein the same bolt ensures the rigid connection between, on the one hand, said sole and said saddle support and, on the other hand, said sole and the arms of said horizontal fork.

5. A frame for a bicycle according to claim 2 wherein said sole is provided with folded borders surrounding a flat bottom, two opposite ears being partially cut out from said bottom and folded to come in vertical longitudinal planes, said sole and said front strut being rigidly connected by a bolt passing through said ears.

6. A frame for a bicycle according to claim 2 wherein said sole carries a stand-support for the bicycle when the latter is not in operation.

7. A frame according to claim 2, for a bicycle equipped with a brake whose working element is actuated through a cable sliding within a flexible but axially undeformable sheath, wherein said sole is provided with folded borders defining vertical and longitudinal cheeks, at least one of said cheeks being provided with an elongated aperture, an abutment integral with said one cheek, a plate lapping said abutment and provided with a threaded opening in front of said elongated aperture, a bolt element screwed into said threaded opening and passing through said elongated aperture for locking said plate in position with respect to said one cheek, a bent lever pivoting about said bolt element and having a first arm biased against said abutment by the tension of said brake cable and a second arm easily reached from outside for shifting said lever in a direction opposite to said biasing for modifying said tension.

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KENNETH H. BETTS, *Primary Examiner.*