No. 633,127. Patented Sept. 19, 1899.

P. F. DUFFY.

BICYCLE FRAME.

(Application filed Aug. 30, 1898.)

(No Model.) 2 Sheets—Sheet 1.

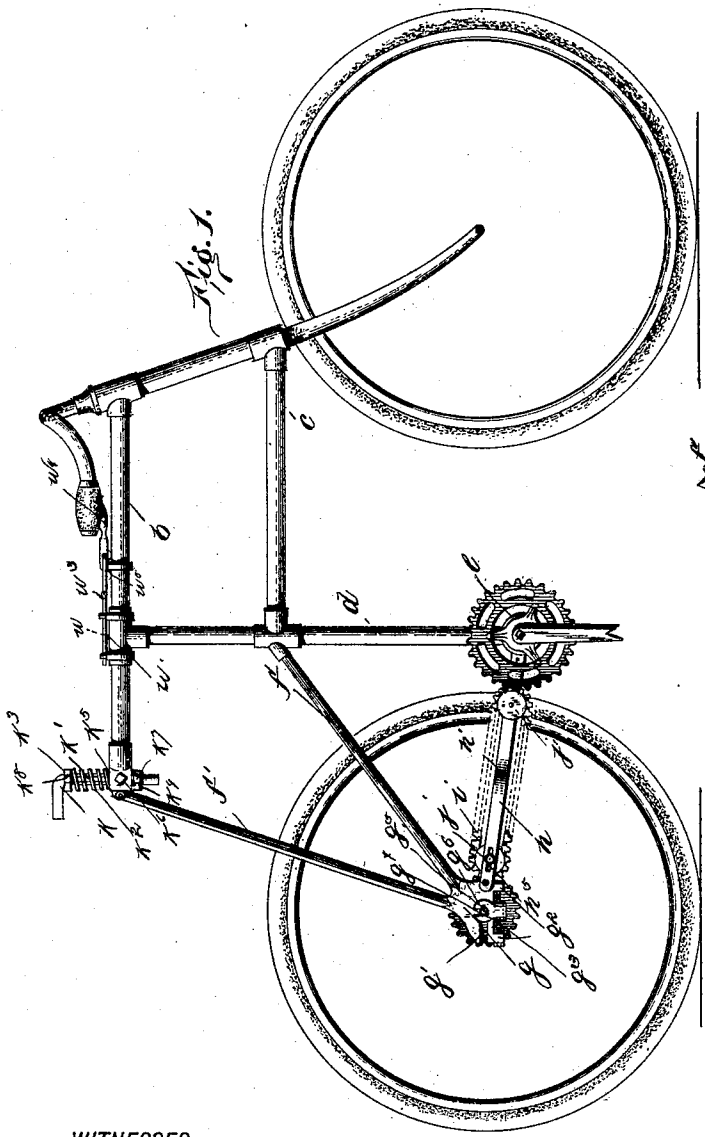


Fig. 1.

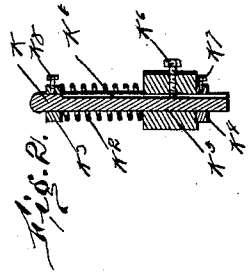


Fig. 2.

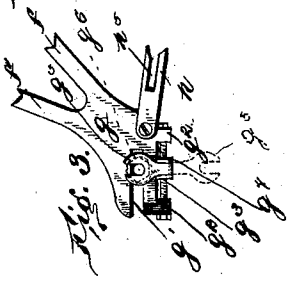


Fig. 3.

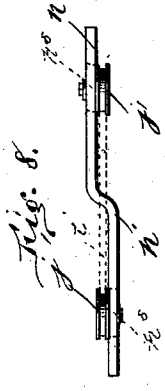


Fig. 8.

WITNESSES:

C. E. Duffy

C. H. Duffy

INVENTOR

Patrick F. Duffy

BY O. E. Duffy

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

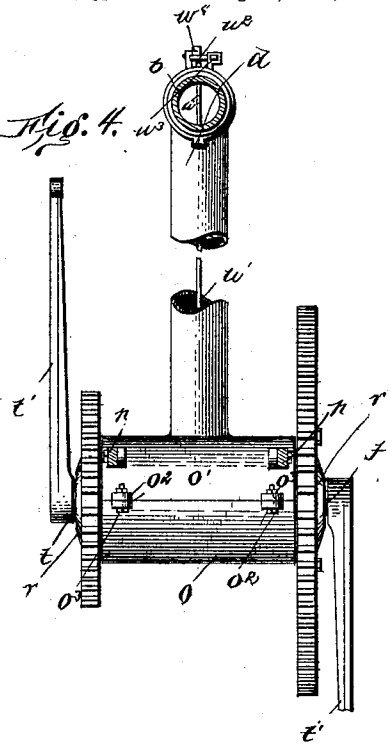


Fig. 5.

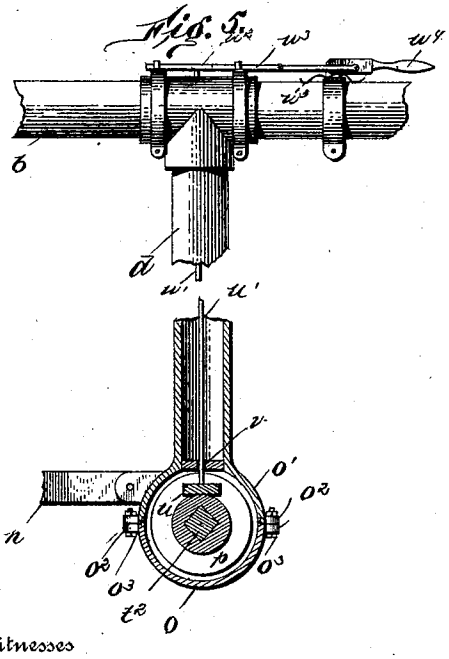


Fig. 6.

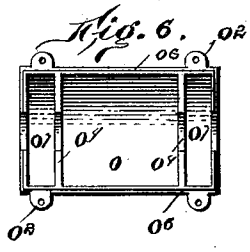
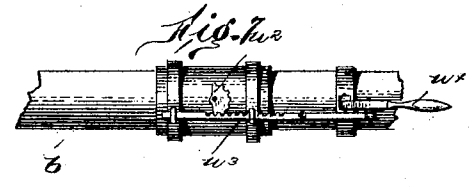


Fig. 7.



Witnesses
E. C. Duffy
C. H. Duffy

Inventor
Patrick F. Duffy
per O. E. Duffy
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PATRICK F. DUFFY, OF WASHINGTON, DISTRICT OF COLUMBIA.

BICYCLE-FRAME.

SPECIFICATION forming part of Letters Patent No. 633,127, dated September 19, 1899.

Application filed August 30, 1898. Serial No. 689,859. (No model.)

To all whom it may concern:

Be it known that I, PATRICK F. DUFFY, of Washington, District of Columbia, have invented certain new and useful Improvements in Bicycle-Frames; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain new and useful improvements in bicycle-frames, and has for its objects simplicity, durability, cheapness, and lightness of construction and ease, rapidity, and effectiveness in operation.

The object of the invention is to provide a bicycle-frame especially designed with relation to pending application Serial No. 663,875, but which can be used for any other kind of bicycle.

A further object of my invention is to provide a frame neat and symmetrical in outline, compact in form and build, of simple construction, and having a combination of lightness and strength.

The invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my frame, showing saddle-post adjuster, chain-bar, and crank-hanger. Fig. 2 is a vertical central sectional view of saddle-post and socket. Fig. 3 is an enlarged view of the rear-wheel adjuster. Fig. 4 is a vertical section taken on a line to the rear of the crank. Fig. 5 is a partial sectional view showing crank-hanger and gear-operating device. Fig. 6 is an interior view of the lower half of crank-hanger. Fig. 7 is a top plan of a section of the upper horizontal bar, showing gear-operating device. Fig. 8 is a plan view of the chain-bar bent to permit of the chain engaging the power and resistance wheel.

In the accompanying drawings I have illustrated a frame having the usual forks, stem, and handle-bars.

b is the top bar, and c is a horizontal bar extending rearwardly from the stem just above the crown and connecting with a vertical bar d, which depends from the top bar b to the crank-hanger e.

$f\,f'$ are brace-bars extending, respectively, from the rear-wheel forging g to the top bar b and to the intersection of the vertical bar d and the horizontal bar c.

h is a chain-bar, of flat steel, connecting the crank-hanger with the forging g, bent at h' to allow the chain to pass clear from the inside idler j to the outside idler j', which are clamped to said chain-bar and over which the chain runs. Slots h^5 are provided for the adjustment of the chain. The rear-wheel forging g is provided with means for adjusting the wheel, which consists of the elongated horizontal slot g', the depending lugs g^2, and a worm-screw journaled at each end in the said lugs. Traveling on said worm-screw g^3 is a box g^4, carrying the hinged fork g^5, in which rests the axle of the rear wheel of the bicycle, which is secured in the desired adjustment by the nut g^6.

k is a round saddle-post provided with an elongated groove k' for the purpose of guiding and preventing the post from turning in its socket k^5, attached to the top bar b. The screw k^6, fitting in the groove, loosely guides the saddle-post and can be also used for clamping it rigidly. The post works vertically through the socket k^5, giving way to any sudden jar by means of the spiral spring k^2, which can be set to any degree of tension by the adjustment of the collar k^3, clamped by the screw k^8. k^4 is another collar clamped by the screw k^7, by means of which the height of the seat is adjusted and the post prevented from jumping out of its socket.

From the said crank-hanger e rearwardly extend the chain-bars h, on the outer side of which nearest the front gear-wheel is clamped the idler j', and on the inner side near the rear end in line with both the spockets is journaled the rear idler j. Over these idlers runs the chain i, which touches and engages corresponding teeth of the front and rear sprocket-wheel of the machine. In order to have the idlers j and j' in line with the sprocket-wheels, the chain-bar h is bent at h', as shown in Fig. 8. This crank-hanger e is made in two semicircular sections, the bottom section o being removable and secured to the upper section o' by means of ears o^2 and bolts o^3. o^4 are partitions in both sections of the crank-hanger, which correspond and form chambers o^7 for the bearing and the gear-changing clutches. o^6 is a tongue-and-groove joint

where the two sections of the crank-hanger join.

The crank-axle t, carrying the crank t', has the squared middle portion t^2 between the two gear-changing clutch-disks and on which the clutch p slides laterally by means of the cam u, operated by the rod u', which extends up the center post d, through the top bar b, where it is provided with a toothed segment u^2, which engages the rack u^3, sliding laterally in supports and operated by the handle u^4, pivoted on the top bar b and held in either vertical or horizontal adjustment by the flat spring u^5—that is, at either high or low gear or entirely out of gear. v is a guide for the rod u' to keep it centrally of the center bar d.

In operation the device is very simple, accurate, and is as follows: The crank-hanger casing e having its lower half o removed, the cam-rod u' is inserted in the center bar d through the top bar b, and on its top is placed the toothed segment u^2 in engagement with the bar u^3, operated by the handle u^4. The brace or guide u^5 is then screwed in place in the lower mouth of the center post. Then the cam u is attached, which completes the means for operating the gear-changing clutches. The hubs of the sprocket-wheels are now placed in position on the outer ends of the crank-axle t and secured thereto by any suitable means. To these hubs are secured the sprocket-wheels s and s', of any desired gear, preferably high and low. Now the cranks are attached to each end of the axle and the whole placed in the upper half o' of the crank-hanger e and the bottom half o fitted thereto by means of the tongue-and-groove joint and secured by screws or bolts through the ears carried by each half of the hanger. The rear wheel of the cycle carries two sprockets, one on either side, in line with the sprocket-wheels on the crank-axle and corresponding as to gear. The chain-rod h, attached to the crank-hanger e, and the rear-wheel casting g carries the idlers j and j' in line with the sprocket-wheels. The chain travels over said idlers, meshing with and operated by the front sprocket and imparting motion to the rear sprocket-wheel. The driving mechanism, as described, is now at the command of the rider, who can at pleasure shift from a high to low gear or from low to high or entirely out of gear by the movement of the handle u^4 on the top bar b.

It will be readily seen that the motive power is produced by the cranks t' and axle t to the front sprocket-wheels s or s', to the chain to the rear sprockets to the rear wheel of the machine.

The wheel-adjuster is carried by the rear-wheel forging, the axle of the wheel is inserted in the slot g', the hinged fork g^5 is turned up over said axle, the worm-screw carrying the fork g^5 is then turned until the wheel is in the desired position, when the securing-nut g^6 is screwed onto the axle and tightened, preventing the further lateral movement of the wheel.

It is evident that various slight changes may be made in the forms, arrangements, and construction of the parts described without departing from the spirit and scope of the invention. Hence I do not wish to limit myself to the exact construction herein set forth, but consider myself entitled to all such changes that fall within the spirit and scope of the invention.

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

1. In a bicycle-frame, the combination with the top bar, the steering-head and forks, and the rear-wheel casting, of a vertical center post depending from the top bar intermediate of its ends and carrying the crank-hanger, and brace-bars connecting the center post near its mid-length, with the steering-head and rear-wheel casting, substantially as described.

2. In a bicycle-frame, the combination of the top horizontal bar, the steering-head and forks, the vertical center post depending from the top bar intermediate of its ends, the horizontal bar connecting the steering-fork with the center post, the crank-hanger carried at the lower end of the center post, the rear-wheel casting the chain-bars connecting the crank-hanger and casting and the brace-bars extending from the casting to the center post at its intersection with the lower horizontal bar, substantially as described.

3. In a bicycle-frame, the combination of the top horizontal bar, the steering-head and forks, the vertical center post depending from the top bar intermediate of its ends, the horizontal bar connecting the steering-fork with the center post, the crank-hanger carried at the lower end of the center post, the rear-wheel casting the chain-bars connecting the crank-hanger and casting, the brace-bars extending from the casting to the rear end of the horizontal top bar, and the brace-bars extending from the casting to the center post at its intersection with the lower horizontal bar, substantially as described.

4. In a bicycle-frame the combination with the top bar of the saddle-post socket, the saddle-post passing through said socket, a washer on said post below the socket, an adjustable washer near the top of said post, a spring spiraled around said post between the socket and adjustable washer and a set-screw passing through said post at right angles to and into a vertical groove in the side of the post as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

PATRICK F. DUFFY.

Witnesses:
O. E. DUFFY,
E. C. DUFFY.