

No. 635,964.

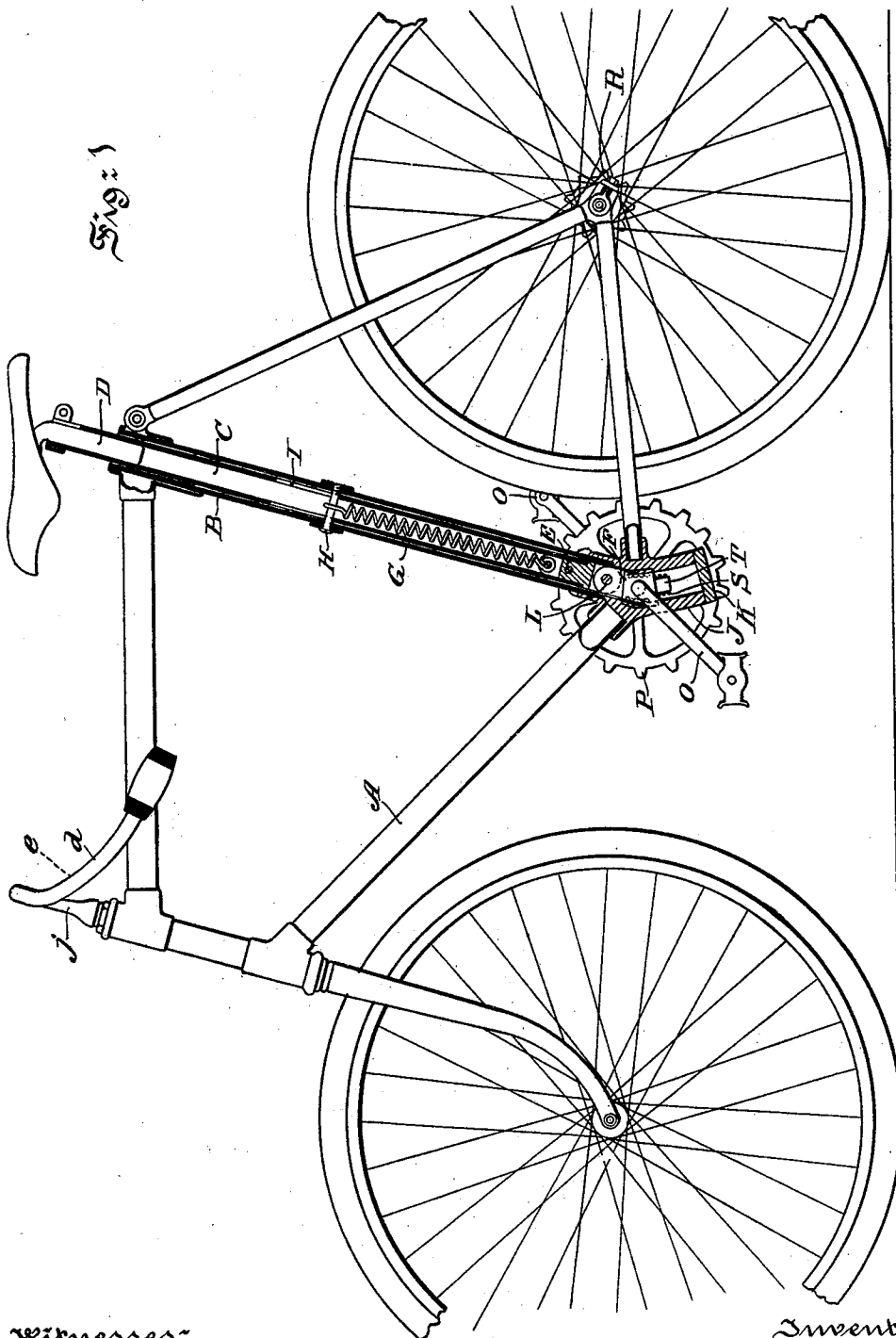
Patented Oct. 31, 1899.

J. HORN.
BICYCLE.

(Application filed Oct. 29, 1896.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
W. A. Schaffer.
J. M. Shields.

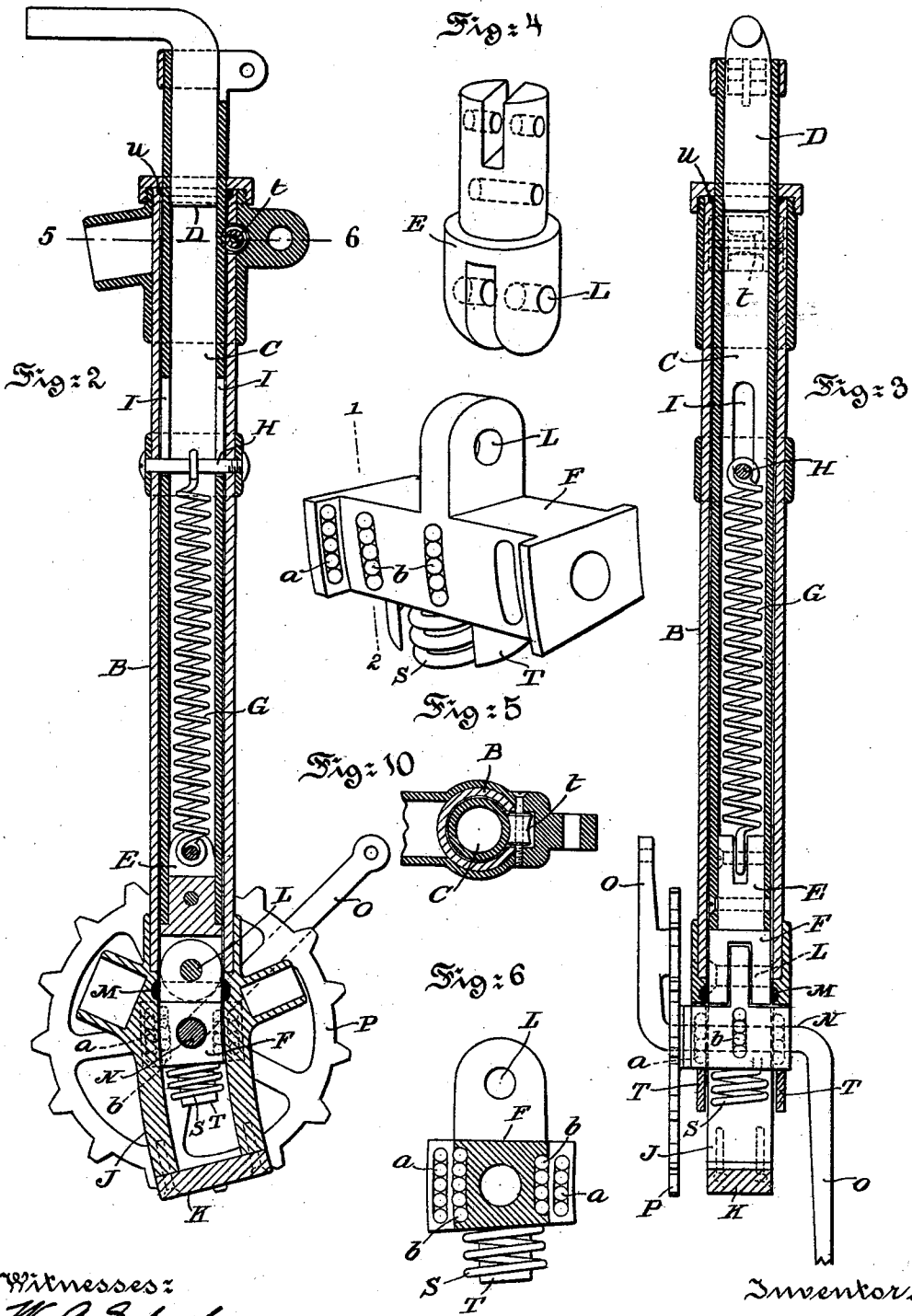
Inventor,
Joseph Horn.
 By his attorney, *Chas. A. Putter*

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(Application filed Oct. 29, 1896.)

(No Model.)

3 Sheets—Sheet 2.



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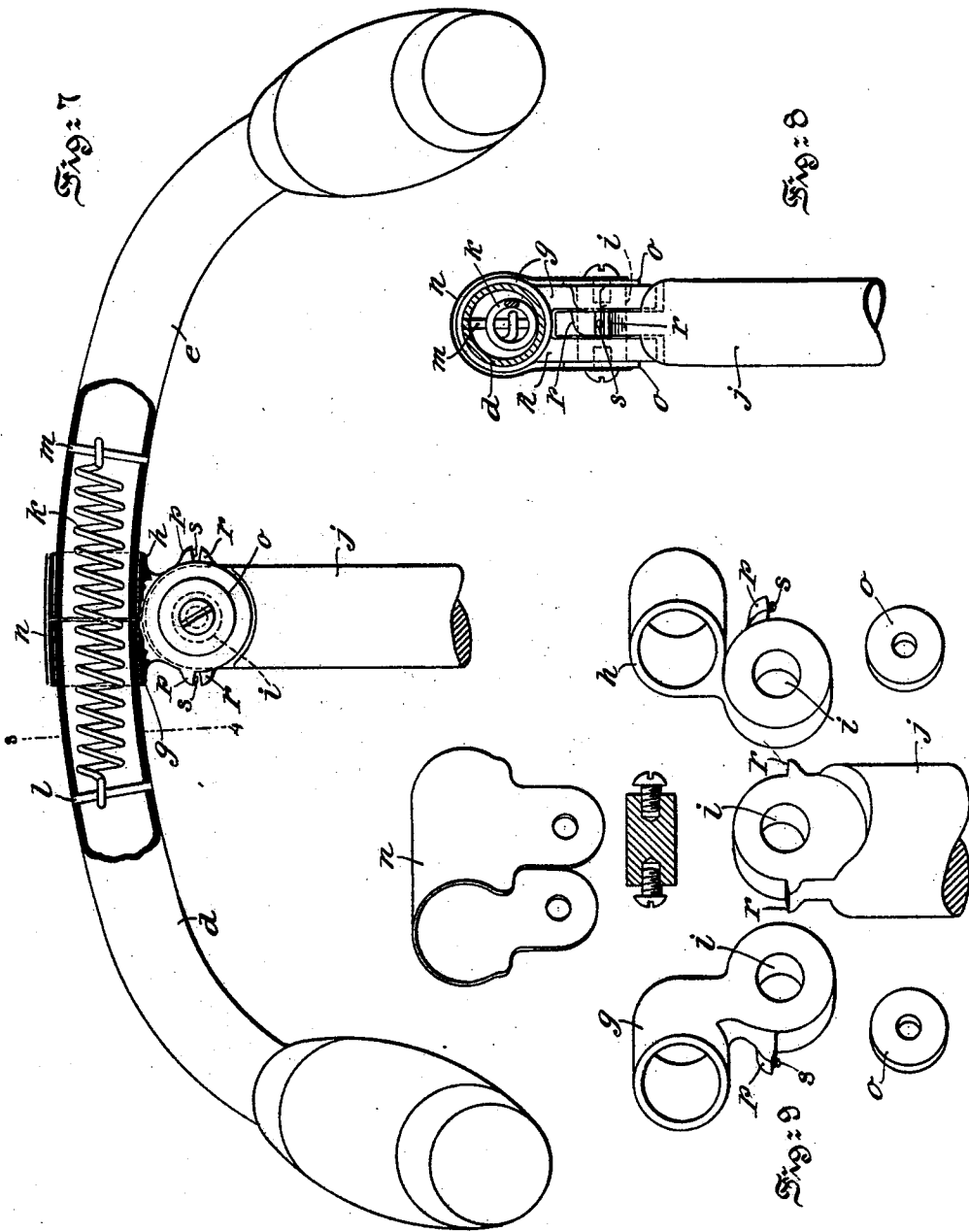
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3 Sheets—Sheet 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH HORN, OF PHILADELPHIA, PENNSYLVANIA.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 635,964, dated October 31, 1899.

Application filed October 29, 1896. Serial No. 610,411. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HORN, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

My invention relates to improvements in bicycles or similar vehicles which are propelled by the rider; and the object of my invention is to furnish, in connection with such a vehicle, means for taking up the jar to which such vehicles are subject when moving over uneven ground and prevent it being communicated to the rider.

In the accompanying drawings, forming part of this specification, and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a side elevation; partly in section, of a bicycle furnished with my improvements; Fig. 2, an enlarged central sectional side elevation of the tube within which is placed the mechanism for preventing the jar of the machine from reaching the saddle or seat; Fig. 3, a central sectional front elevation of the tube, Fig. 2, and its connected parts; Fig. 4, a perspective view of connection between spring and hub; Fig. 5, a perspective view of hub; Fig. 6, a section of hub on line 1 2, Fig. 5; Fig. 7, an end elevation, partly in section, of the handle-bars, showing spring for taking up vibration; Fig. 8, a section of Fig. 7 on line 3 4; Fig. 9, details of handle-bar connections, &c.; Fig. 10, a section of Fig. 2 on line 5 6.

A is the frame of a bicycle, B the hollow rod, which usually carries the saddle-post and which extends from the upper part of frame to the lower part and which is secured immovably to or forms part of the frame. In my construction I place within the rod or tube B a hollow rod or tube C, to the upper end of which I attach the saddle-post D and the saddle in the usual manner. The lower end of the inner tube C is closed by a plug E, Figs. 1, 2, 3, and 4, to the lower end of which the hub F is pivotally attached and to the upper end of which is attached the lower end of a spring G, the upper end of which is carried by a pin H, which is carried by and passes from side to side of the tube B.

I are slots in the inner tube C, through

which pin H passes and which permit this tube to play up and down past pin H.

J is an arc forming a continuation of tube B. In this arc the hub F can play up and down. Its lower end is closed by a cap or keeper K, and its center is the center of the axle of the rear wheel of the bicycle.

L is the pivot, which secures the hub F to plug E.

a are balls carried by hub F, adapted to engage the sides of arc J. b balls carried by the hub, adapted to engage the inner faces of arc J.

M is a washer or dust ring carried by outer tube B or by the upper part of the casting or forging of the arc J, which bears against plug E or tube C and prevents dust passing up between the tubes B C.

N is the pedal-shaft, which passes through and is carried by hub F; O, the pedals; P, sprocket-wheel carried by and turning with pedal-shaft; R, sprocket-wheel carried by rear or driving axle of the machine.

The operation of this part of my improvement is as follows: The rider, being seated in the saddle, forces down inner tube C, expanding the spring G, the upper part of which is immovably secured to stationary pin H and the lower part to plug E, as previously described, and lowering the hub F a distance depending upon his own weight and the stiffness of the spring. The rider being carried by the spring, any jar that the machine may receive in passing over uneven surfaces instead of being transmitted directly to the rider through the frame and saddle is transmitted through the frame to the spring, which yields and takes it up, so that little or none of it is transmitted to the inner spring-supporting tube C, which carries the saddle-post and saddle. It will be observed that the saddle, saddle-post, inner tube C, and hub F, which carries the pedal-shaft N and the pedals, are all connected together, so that a movement of any one of them is followed by a corresponding movement of the others. Hence the distance from the saddle to the pedal-shaft is always the same. The central movable tube C and the plug E are guided in their movements by the tube B and always move in a straight line.

In order that the tension of the driving-

chain connecting sprocket P on the pedal-shaft and the sprocket R on the axle of the driving-wheel of the machine may not vary for the several positions of the pedal-shaft, this shaft is carried in a hub F, pivotally attached to plug E, which travels up and down in an arc the radius of which is equal to the distance from it to the center of the axle on the driving-wheel of the machine. By means of this arc the centers of the pedal-shaft and of the driving-wheel are always kept at the same distance, and hence the tension of the driving-chain is always the same for all positions of the hub and pedal-shaft. In order that the hub of the pedal-shaft may move with as little friction as possible in the arc J, I have furnished it with balls *a b*, previously referred to and the action of which will be understood without further description. For convenience in assembling the several parts of this device the lower end of the arc J is closed by a removable keeper or cap K, and in order to lessen the effect of an unusually heavy jar, one that would cause the bottom of hub F to strike the upper side of the keeper, I secure to the under side of the hub an open coil-spring S or a rubber spring or buffer, which is adapted to engage the top of keeper in the event of the machine sustaining a jar that would cause the hub and its connected parts to be lowered sufficiently to engage the keeper or cap. In order to protect the coil-spring, if a coil-spring be used, and to keep it out of sight, I surround it with a sheath or casing T, the front and rear ends of which are open, so as to permit it to pass down over the keeper when necessary.

It will be observed that the above-described device is almost entirely contained within the tube B and that a bicycle equipped with it differs but little in appearance from those of the usual construction. It in no way interferes with the rigidity of the frame, which is made in the usual manner, without moving joints.

The vibration that is transmitted from a bicycle to a rider is not from the seat only. The handle-bars are also subject to vibration, which is transmitted to the hands and arms of the rider and thence to his body. In order to overcome this vibration, I divide the handle-bars in the middle (see Fig. 7) and secure each side of the bar, as *d e*, the one in a collar *g*, the other in a collar *h*, Figs. 7, 8, and 9, which are pivoted at *i* to the steering-bar *j*.

k is a spring the ends of which are secured to pins *l m*, carried by parts *d e* of the handle-bar, or in some other suitable manner to these parts of the bar. The tension of this spring is sufficient to keep the inner ends of the two sides of the bar together when not in use; but when the rider bears upon the bar the spring is stretched and the inner ends of the bar are moved away from one another and any jar received by the steering-bar *j* is taken up by spring *k* and little or none of it is transmitted to the hands of the rider.

n is a metal cap covering the joint between the two sides of the handle-bar. The ends of this cap are brought down past the pivot upon which the collars *g h* work and are secured to this pivot by means of screws, as shown in Figs. 7 and 8. *o* are washers interposed between cap *n* and the pivot *i*.

In order to prevent the sides of the handle-bar being lowered too far, I furnish the arms on collars *g h* with stops *p* and the steering-bar with stops *r*, adapted to engage stops *p* and limit their movement. In order that these stops may not engage one another violently, one or the other of them may carry a spring *s*, which may be a coil-spring or a piece of rubber, to engage the other stop in order to lessen the shock.

The tube B in bicycles as at present constructed is inclined, as shown in Fig. 1, and in order that the inner tube C may move in the outer tube freely I may, if I desire, furnish the outer tube or a fixture carried by the outer tube with a roller *t*, Figs. 2, 3, and 10, against which the rear end of the inner tube may bear and which will support this tube and prevent its upper rear end from touching the outer tube, thus lessening the friction between the inner and outer tubes.

u is a washer or dust-ring on the upper end of tube B, the purpose of which is to prevent passage of dust at this point to the space between outer and inner tubes B C.

Having thus described my invention, I claim—

1. In a bicycle, in combination, a frame, a stationary tube forming part of said frame, a pin passing through and carried by said tube, a movable tube within said first tube the upper end of which is adapted to carry the saddle, a slot in said tube through which the pin carried by said first tube passes, a spring the upper end of which is secured to said pin, means for securing the lower end of said spring to said movable tube, a hub pivotally secured to said movable tube, an arc-shaped guide projecting down below said stationary tube whose center is the center of the driving-wheel for guiding said hub in its movements, a pedal-shaft and pedals carried by said hub, and a sprocket-wheel carried by said pedal-shaft.

2. The combination with the hub, the arc-shaped guide within which said hub operates, and a cap or keeper closing the lower end of said arc-shaped guide, of a spring one end of which is carried by the lower side of said hub, and a sheath or case made in two pieces and carried by the lower side of said hub, said sheath or case being adapted, in conjunction with said arc-shaped guide, to inclose said spring, and to pass down and over the sides of said keeper when said hub is lowered.

3. In a bicycle, in combination, a steering-bar, a hollow handle-bar divided transversely in the middle and each side of which is eccentrically pivoted to said steering-bar on an axis transverse of said handle-bar, and a ten-

sion-spring within said handle-bar one end of which is secured to one side of said handle-bar and the other end to the other side of said bar.

4. In a bicycle, in combination, a steering-
5 bar, collars pivotally connected to said steering-
bar, a hollow handle-bar divided transversely in the middle and secured one end to
one collar, the other end to the other collar, the two parts of said handle-bar being eccen-
10 trically pivoted to the steering-bar, on an axis transverse of said handle-bar, a tension-
spring within said handle-bar one end of which is secured to one part of said handle-
bar and the other end to the other part of said
15 bar, and a cap, substantially as described, covering the joint between the two sides of the
handle-bar.

5. The combination in a bicycle, of a steer-
ing-bar, collars pivoted to said steering-bar,
a hollow handle divided transversely in the 20
middle and secured to said collars, the two
parts of said handle-bar being eccentrically
pivoted to the steering-bar, on an axis trans-
verse of said handle-bar, a tension-spring
within said handle-bar the ends of which are 25
secured one to each side of the handle-bar, and
stops carried by said collars and said steering-
bar for limiting the downward movement of
said handle-bar.

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