(No Model.)

2 Sheets—Sheet 1.

D. E. HUNTER.

VELOCIPEDE.

No. 414,048. Patented Oct. 29, 1889.

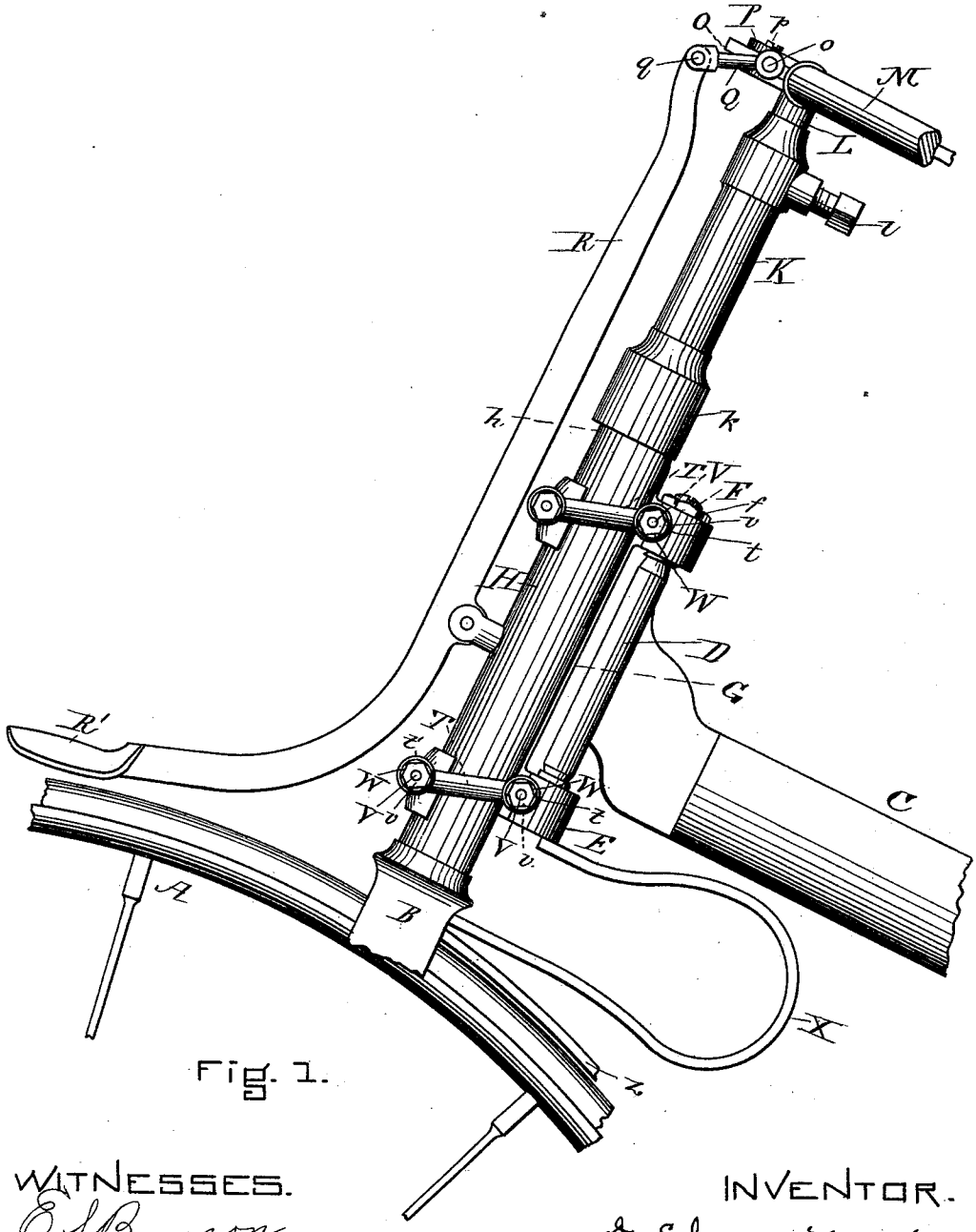


Fig. 1.

WITNESSES.

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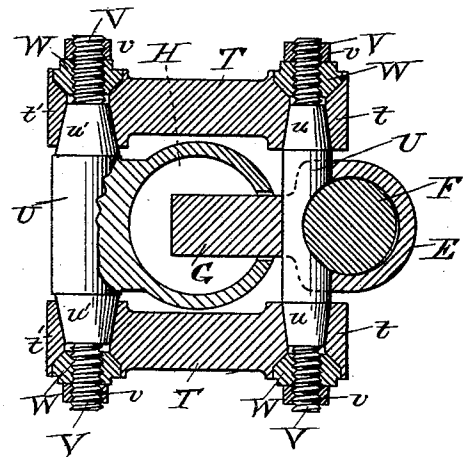


Fig. 3.

Fig. 2.

WITNESSES.

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UNITED STATES PATENT OFFICE.

DAVID EDGAR HUNTER, OF SALEM, MASSACHUSETTS, ASSIGNOR TO THE POPE MANUFACTURING COMPANY, OF PORTLAND, MAINE.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 414,048, dated October 29, 1889.

Application filed May 3, 1888. Serial No. 272,633. (No model.)

To all whom it may concern:

Be it known that I, DAVID EDGAR HUNTER, of Salem, in the county of Essex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Velocipedes, of which the following is a specification.

My improvements relate to certain constructions and connections between the main frame and the steering-handles and the guide-wheel forks of velocipedes, and in the brake-operating devices, and are especially applicable in tricycles and safety-machines; and they have for their object the relief from jars and shocks to the machine and the rider from the obstructions and unevenness of road affecting the guide-wheel or the other wheel or wheels, or both, thereby enabling easier operation of the machine, more comfort to the rider, and a lighter construction of the frame-work of the machine than is possible where the usual rigid connections are employed.

I have called my improved construction a "swing-spring cycle-cushion," since it softens, avoids, or reduces to a pleasant undulating motion the disagreeable vibrations and jars incident to the usual construction of velocipede-frames on rough or obstructed ways.

Heretofore it has been usual to construct the steering-head and connections of the guide-wheel with the main frame and handles in the following manner: A rigid fork spanning the guide-wheel has been rigidly secured to the axle of the wheel, and has had an extension or pillar above the wheel supporting the handle-bars. The frame or a reach therefrom is terminated in an upright or inclined spindle or socket held in or to the pillar or steering-head by a swivel-joint, or an upper and lower steering center, either in the steering-head or on it, or in brackets projecting from it. This is the rigid and usual construction. Springs have, however, been interposed between the fork ends and the axle of the guiding-wheel in some cases, and it has also been proposed in other cases to form the steering head or pillar in two parts, with a spring action interposed between the two parts to permit either a nearly-vertical relief or motion between the steering-head and the fork, or between the steering-head and the handle-bar. I am aware, also, that velocipede-frames have been made or shown with a joint and a spring, permitting one part of the frame to yield vertically with respect to the other part, so that neither a spring-fork, nor a spring-head, nor a spring-frame is broadly new with me; but by my improvements, with material modifications and differences of construction, I am enabled to secure the advantages of all three and to preserve at the same time the certainty and rigidness of steering obtained with the more usual rigid construction, and to avoid many of the imperfections and disadvantages which have made the other forms to which I have referred unsatisfactory and comparatively impracticable.

The nature of my improvements will be understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 shows in side elevation a velocipede steering-head and brake and parts of the guiding-wheel fork, reach of the main frame, and handle-bars; and Fig. 2 shows the same in vertical section, and Fig. 3 shows parts of the same in transverse section on the lines *x x* of Fig. 2.

A is the guide-wheel; B, the steering-fork; C, the reach of the main frame; D, the steering-spindle, having the steering-centers *d d;* L, the handle-bar support, held in the extension-tube K by means of the set-screw *l;* M, the handle-bar; O, the brake-lever, held by the bracket P to the handle-bar with the fulcrum-joint *p;* R, the brake-spoon lever fulcrumed at *r* by the bracket S to the steering-head and having the spoon R′ for operation upon the front-wheel tire, and Z is a mud-guard, and all these parts may be constructed in any suitable or well-known form.

G is an inner steering-head, which I prefer to make of a flattened forging wider in its fore-and-aft dimension, with the brackets E E on its rear side for holding the steering-spindle D. In the lower bracket E is a step *e* for the lower center *d*, and in the upper bracket E is an adjustable set-bolt F, threaded into the bracket, bearing at its lower end a seat for the upper center *d* and secured in position by the set-nut *f*. The inner steering-head G is brazed or otherwise secured to the

tubular extension K, which latter has a downward extension or tubular shield *k*.

H is an outer steering-head, which may be formed of a tube brazed or otherwise secured to the fork B above the arch that spans the wheel, and which is constructed with an opening on its rear side to receive the inner steering-head G or a part thereof, and to permit some vertical and fore-and-aft play or motion between the two heads. The upper part *h* of this outer head H enters and plays freely in the downward tubular extension or shield *k*, before described. On or attached to the front of the outer head I secure two transverse lugs U′ U′, having the conical bearing surfaces or seats *u′ u′* and the threaded tenons V V, and on or secured in the inner head G, I construct the transverse lugs U U, having the conical seats or bearing-surfaces *u u* and the threaded tenons V V. On these threaded tenons V V are bearing-nuts W and set-nuts *v*. I connect each pair of lugs U U′ by fore-and-aft links T T, having sockets *t t*, with conical bearing-surfaces inclosing and freely fitting upon the conical surfaces *u u′* of the transverse lugs and of the adjusting-nuts W. I construct these parts with conical surfaces and adjusting and set nuts, so as to make and preserve good free joints and permit the taking up or adjustment for wear in use.

To the fork B, or outer steering-head H, I secure one end of the spring X—as, for instance, by the small bolt Y and nut *y*, and the other end of the spring X rests beneath and against the lower end of the inner steering-head G.

Between the end *o* of the brake-handle lever O and the upper end of the brake-spoon lever R, I interpose a link Q, pivoted at *q* to the brake-spoon lever and jointed at *o* to the brake-handle lever.

It is obvious that I may make the upper arm of the brake-spoon lever R extensible in any well-known manner to correspond in length with the extensible handle-bar support L K; but as that is no part of my present invention I do not show it in the drawings. I may also make other modifications in the form and arrangement of the devices here shown and described without departing from the substance of my invention. The spring X may be shaped or attached differently. The transverse lugs U U′ may be either formed on and integral with the pillars G and H, respectively, or may be formed separately and brazed or otherwise secured to them; or a socket and spindle, instead of centers and lugs, might be used for the swivel-joint connection between the reach and the pillar G. It will be obvious, also, that substantial parts of my improvements might be used, and a part of the advantages obtained, for instance, by making the two pillars or parts of the steering-head H and G entirely outside of each other, instead of making one of them slotted and the other within it, or by making them both solid or both tubular, or by attaching the handle-support to the fork-pillar B, instead of to the reach-pillar G, or by attaching the handle-support L and tubular extension K to the fork-pillar H, instead of to the reach-pillar G, or by using one link or one pair of links T T, instead of two pairs, provided the joints were constructed to secure sufficient strength and correctness of action; but I have shown in all these respects what I consider the best and most complete, effective, and durable construction for securing the advantages I have proposed.

The operation of these devices is as follows: The parts being assembled, as shown in the drawings, and combined in any tricycle or other velocipede, the guiding-wheel may be deflected for the purposes of steering the machine on the one hand, and on the other may be held in any desired position against the deflections or tendencies to deflect caused by irregularities in the road-bed, just as in the ordinary rigid construction, the power being applied to the handle-bars M being communicated through the support L, extension K, rigid pillar G, links T T, fork-pillar H, and fork B, to the axle of the guiding-wheel, for the construction described prevents any rotation of either part H or G on its axis without carrying the other part with it, or any angular deflection of either of these parts with respect to the other; secondly, the jar, shock, or vibration caused to the guiding-wheel or to the rear wheel or wheels will be wholly or partly absorbed and lessened by the spring X, and both the hands of the rider and the frame of the machine relieved thereof, since upon any such sudden action upon the front wheel, for instance, and its fork, the spring X will yield and the links T T permit the fork-pillar H to rise a short distance without raising the reach-pillar G and the handles, and a similar effect is produced when the rear wheel or the rear part of the frame receives a jar. By slotting the pillar H and inserting the pillar G within it, as shown, the machine is somewhat lightened, the looks improved, and the shield or extension *k* made available for keeping out the dust, and a closer, stronger, and better guided or steadied construction is obtained, and steadiness of construction is also favored by the use of the two pairs of links. By connecting the handle-bar support with the reach-pillar the hands of the rider are relieved from jar as well as the seat and the fork of the machine. I prefer to place the links T T at an inclined position to the pillars and the steering-head, as shown, and under the weight of the rider or the use of the machine they will take several positions either at right angles to the pillars, but more generally at greater or less angles, and this construction will permit, also, a slight fore-and-aft play and yielding effect as well as a vertical or inclined axle. I prefer to keep the steering-head inclined to a vertical line, as shown, rather than to have it constructed per-

pendicular to the base or road surface of the machine.

The brake is applied with the same readiness and without interruption by any change in the relative position of the handle-bars and the wheel by reason of the yielding parts above described, because when in applying the brake the brake-handle lever O is pressed at its outer end toward the handle-bar in the usual manner, and the shorter end *o* is forced outward from the handle-bar, it also forces the upper end of the brake-spoon lever R forward, and so applies the brake-spoon to the tire of the wheel, and then, if under the jar of obstructions and the yielding of the spring and other parts the distance between the tire of the wheel and the handle-bar is varied for a short distance, so as to be either longer or shorter, the swing-link Q provides for this change or variation of distance and permits it to take place without perceptibly changing the pressure on the brake.

I claim as new and of my invention—

1. The combination, in a velocipede-frame, of a spindle and reach and a pillar with bearing-seats for the spindle, another pillar connected with the first by one or more links on each side, having hinge-bearings to permit longitudinal movement of the pillars, and a spring, as X, constructed and operating to resist the relative longitudinal movement of the pillars, one of said pillars being constructed as an outer slotted tube and the other as an inner slide entering and operating substantially within the slotted tube.

2. The combination of fork B and a rigidly-connected pillar H, a brake-spoon lever R, fulcrumed on the fork-pillar, and a brake-handle lever O, fulcrumed on a handle-bar mounted on supporting devices, substantially as set forth, having a longitudinal motion with respect to the brake-spoon lever, and a swing-link Q between the brake-handle lever and the brake-spoon lever.

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Witnesses:
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