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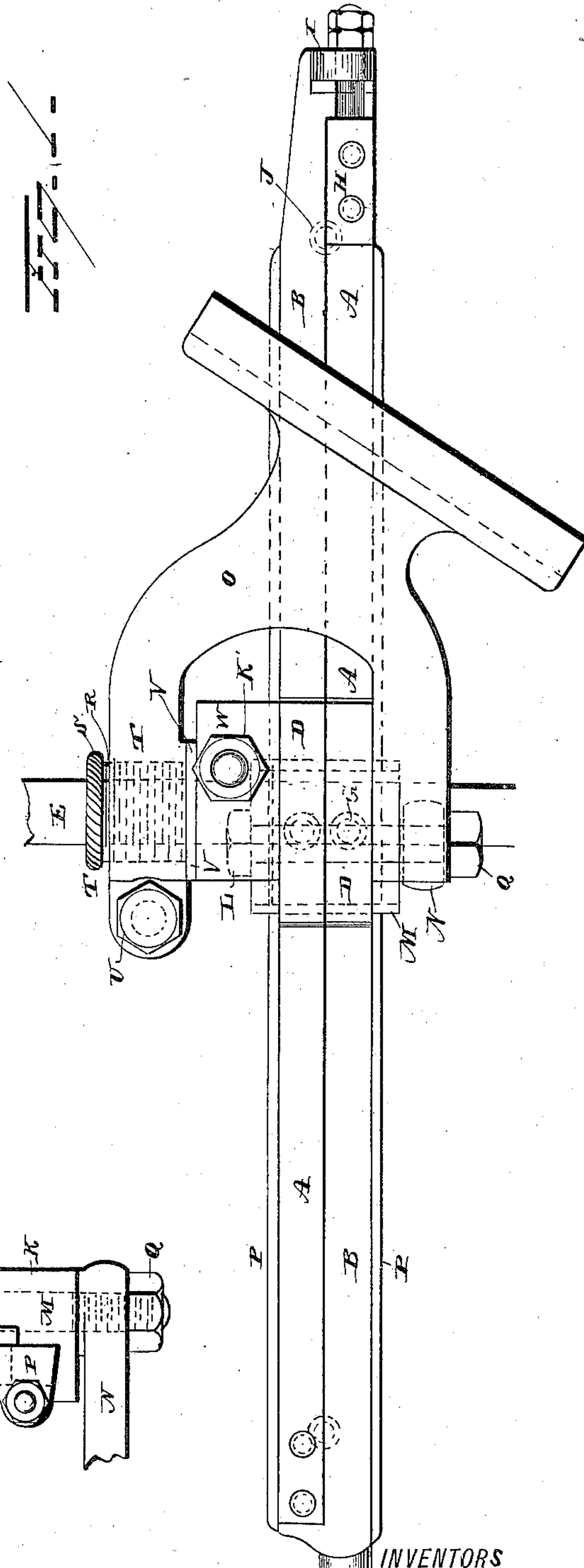
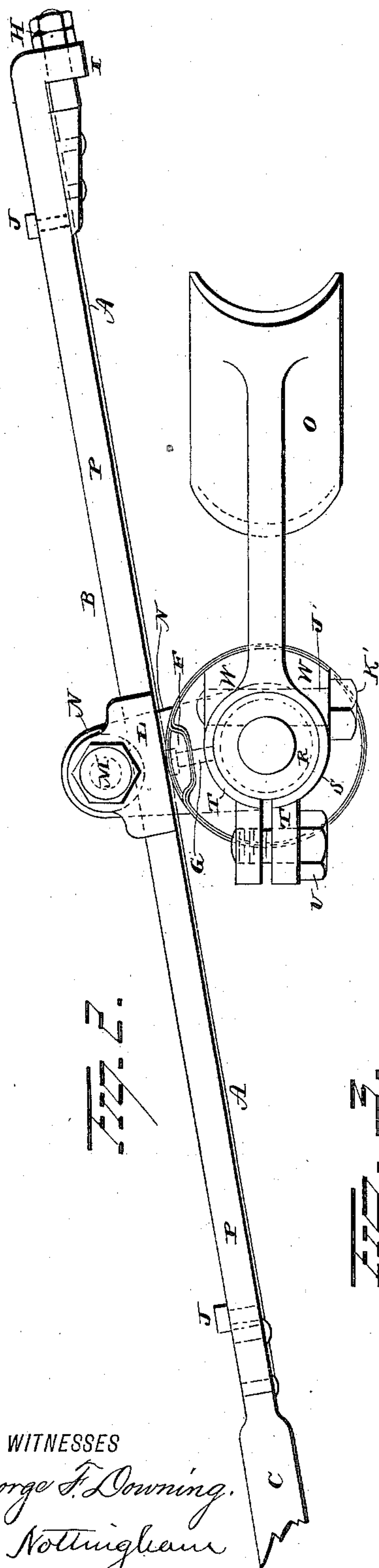
2 Sheets—Sheet 1.

A. H. OVERMAN & C. F. HADLEY.

STEERING DEVICE FOR TRICYCLES.

No. 313,018.

Patented Feb. 24, 1885.



WITNESSES
George F. Downing.
S. Nottingham

INVENTORS
Albion H. Overman and
Charles F. Hadley.
By Geo. W. Seymour Attorney

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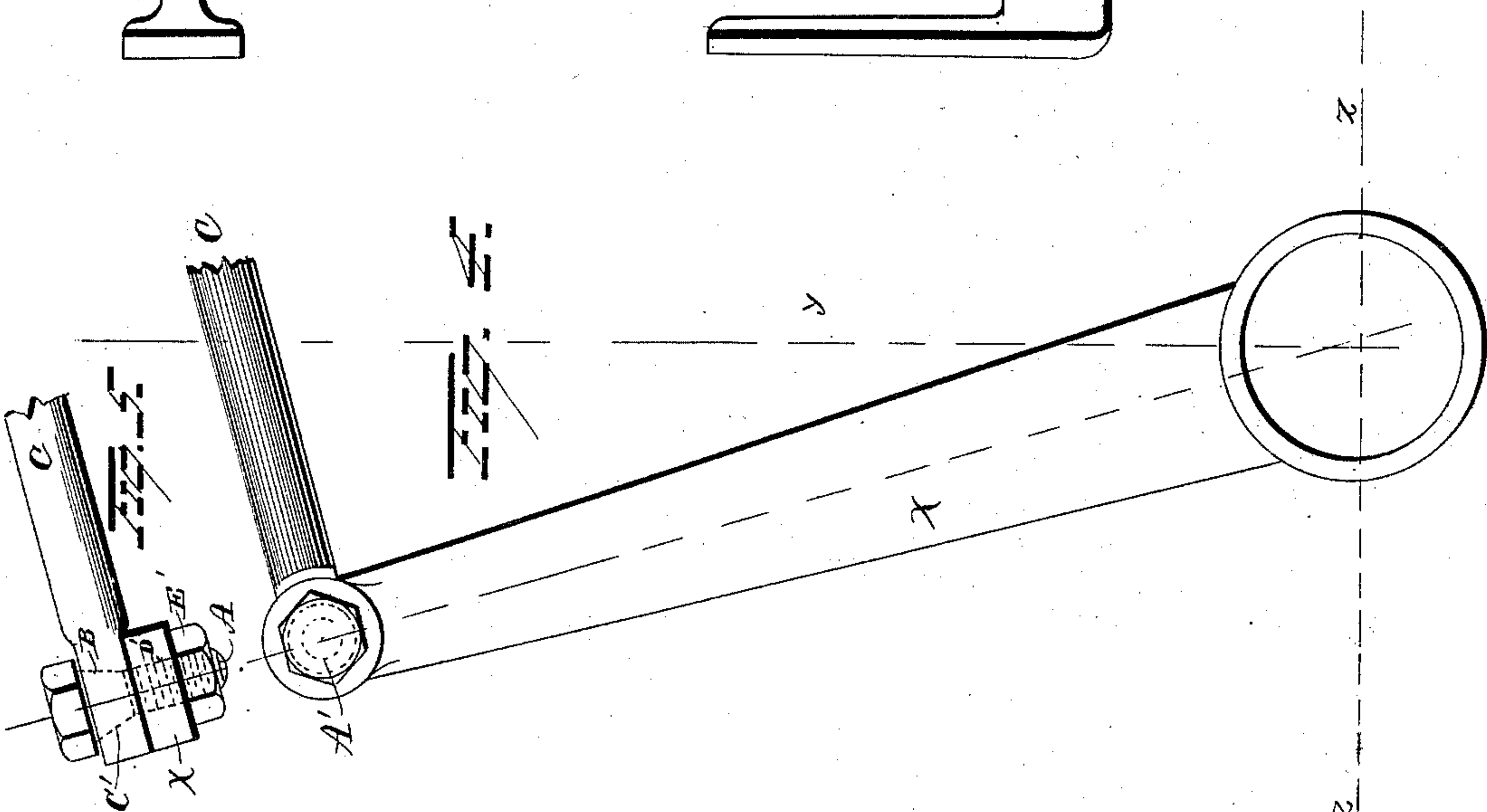
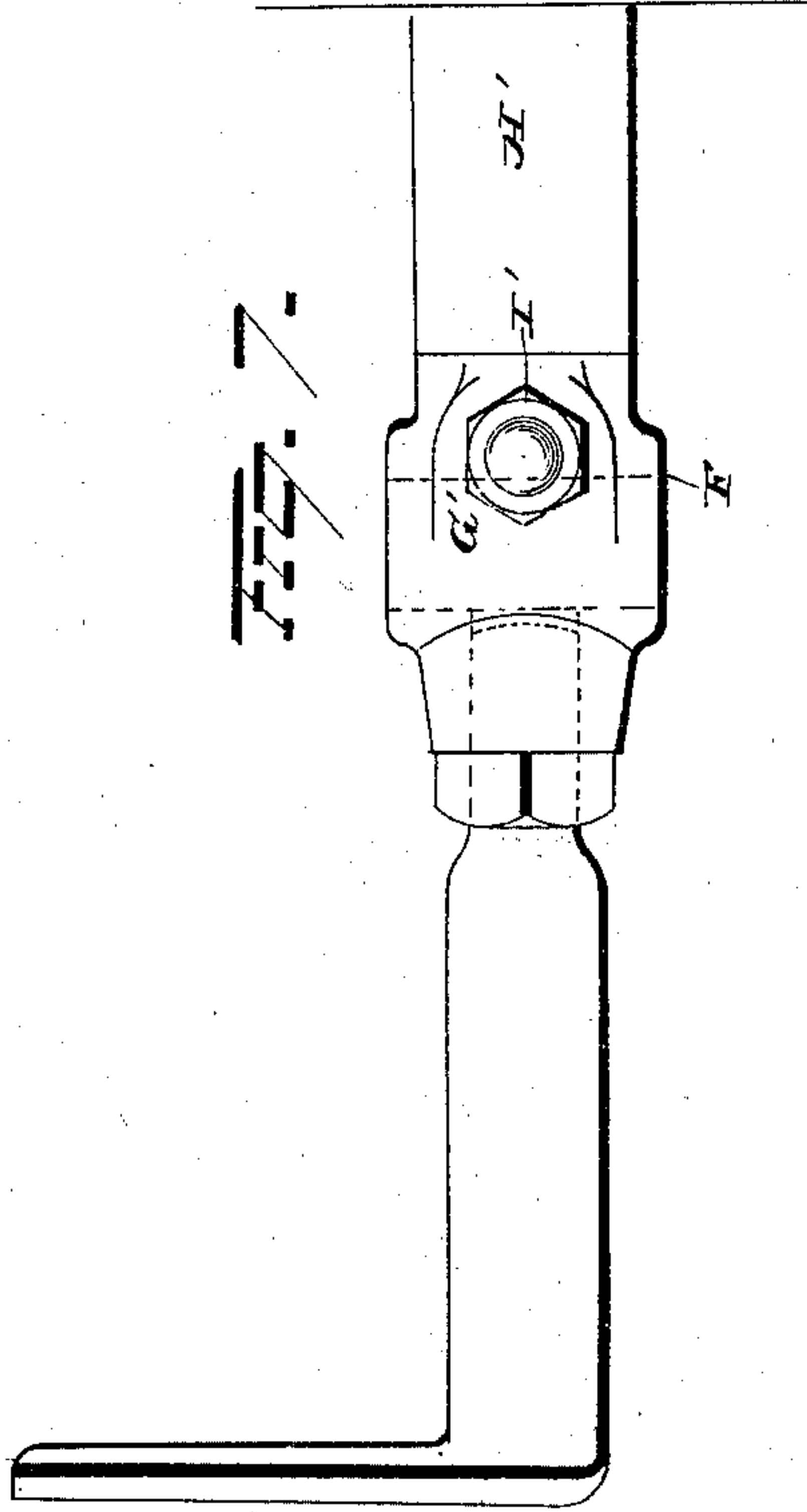
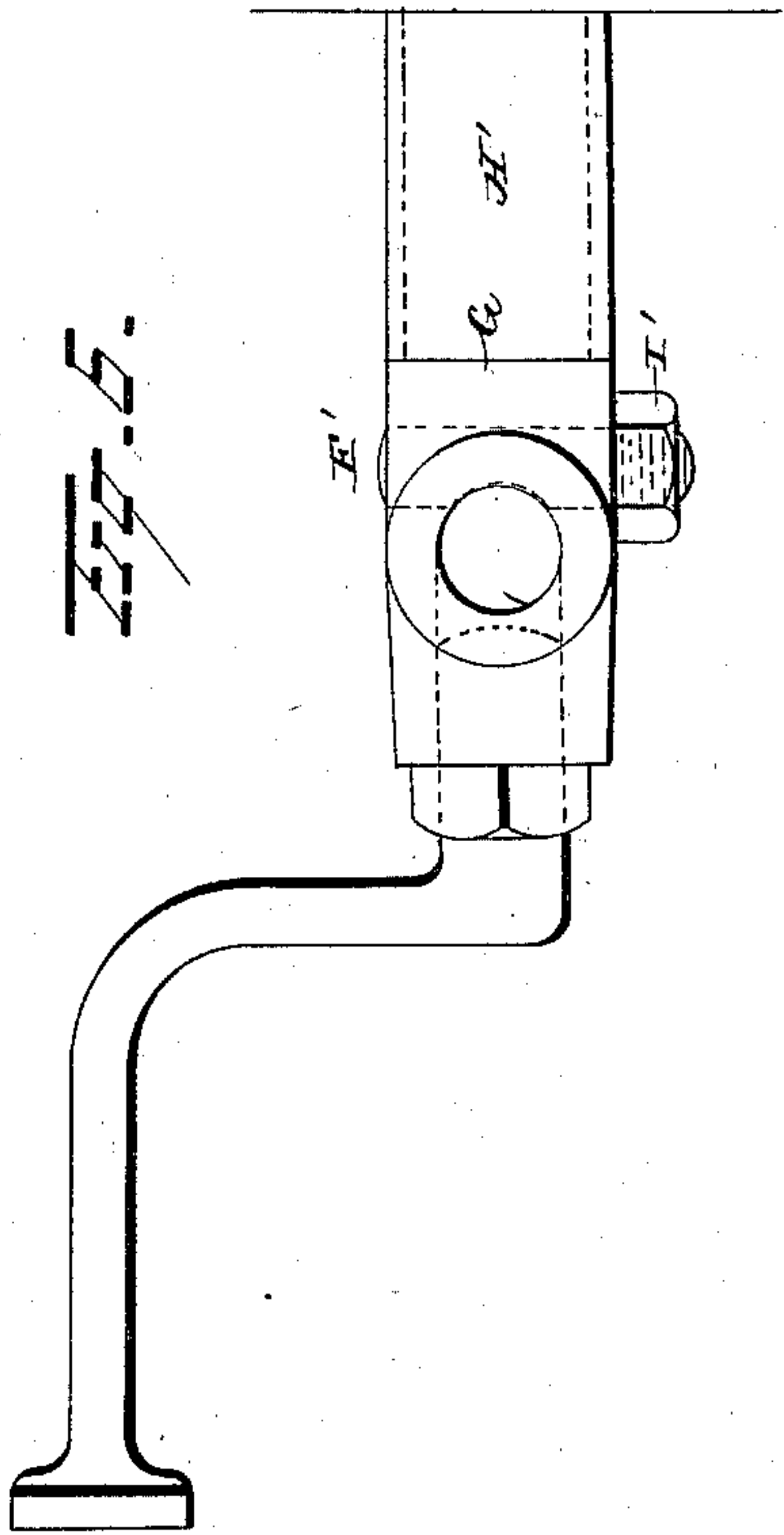
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UNITED STATES PATENT OFFICE.

ALBERT H. OVERMAN AND CHARLES F. HADLEY, OF CHICOPEE, MASS., AS-
SIGNORS TO THE OVERMAN WHEEL COMPANY, OF SAME PLACE.

STEERING DEVICE FOR TRICYCLES.

SPECIFICATION forming part of Letters Patent No. 313,018, dated February 24, 1885.

Application filed February 23, 1884. Renewed December 26, 1884. (No model.)

To all whom it may concern:

Be it known that we, ALBERT H. OVERMAN and CHARLES F. HADLEY, citizens of the United States, residing at Chicopee, in the
5 county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Steering Devices for Tricycles, of which the following is a specification, reference being had therein to the accompa-
10 nying drawings.

Our invention relates to an improvement in the steering apparatus of tricycles, the object being to avoid the loss of motion which the devices now employed entail; to insure posi-
15 tiveness and uniformity of action; to reduce the wear of the parts to the minimum; to compensate for such wear as occurs, to equalize the action of the apparatus in steering to the right and left, and to make improved provis-
20 ion for adjusting the steering-handle post and for locking it in its upper bearing.

With these ends in view our invention consists in the employment of ribbons, or their flexible equivalents, as a means of transmit-
25 ting the motion of the steering handle post to the steering-rod.

Our invention further consists of a recessed guide-block and a beveled plate pivotally and adjustably secured by a bolt to an arm offset-
30 ting from the hanger in which the lower end of the steering-handle post is journaled, and arranged to embrace a beveled bearing located at the rear end of the steering-rod.

Our invention further consists in a threaded bushing located in the hanger in which the
35 lower end of the steering-handle post is journaled, and arranged to be screwed down to take up the wear of the drum mounted in the said hanger, and having the said post secured
40 to it.

Our invention further consists in setting the tiller so as to form a right angle with the outer end of the steering-rod when the steering-
45 wheel is set for traveling straight ahead, and thus equalizing the action of the apparatus in steering to the right and left.

Our invention further consists in connect-
50 ing the steering-rod and tiller by means of a threaded bolt provided with a cone, which fits into a conical opening formed in one part, while the threaded end of the bolt is screwed

into a threaded opening formed in the other part.

Our invention further consists in means for locking the steering-handle post in its upper
55 bearing.

Our invention further consists in a recessed bolt located in a shoulder formed integral with the drum, through which the lower end of the steering-handle bolt passes, and ar-
60 ranged to engage with the said post and hold it in any position of vertical adjustment.

Our invention further consists in certain details of construction and combinations of parts, as will be hereinafter described, and
65 pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation, showing our im-
proved means for connecting the steering-handle post and the steering-rod, and for
70 taking up the wear of the drum and adjusting the steering-handle post therein, as well as for supporting and compensating for the wear of the steering-rod. Fig. 2 is a plan view of the
devices shown in Fig. 1, with the steering-
75 handle post removed. Fig. 3 is a detached view in elevation of the devices for supporting and for compensating for the wear of the steering-rod. Fig. 4 is a view showing the
80 tiller as set to equalize the action of the apparatus in steering to the right and left. Fig. 5 is a view in section, showing the improved connection between the steering-rod and tiller. Fig. 6 is a plan view of our improved means
85 for locking the steering-handle post in its upper bearing, and Fig. 7 is a view thereof in side elevation.

The first feature of the invention relates to an improvement in the means for transmitting the motion of the steering-handle post to the
90 steering-rod, the object being to avoid all loss of motion and to insure positiveness and uniformity of action throughout the operative range of the apparatus.

With these ends in view this first part of
95 the invention consists in the use of ribbons, or their flexible equivalents, for connecting the steering-handle post and the steering-rod.

In carrying out this part of the invention we preferably employ, as herein shown, two
100 strips, A, made of phosphor-bronze, and respectively attached to the opposite ends of a

flat bearing, B, located at the rear end of the steering-rod C, and wound in opposite directions upon and attached to a drum, D, in which the lower end of the steering-handle post E is adjustably secured. As shown herein, the ribbons are attached to the said drum by means of blocks F, let into the periphery thereof, and secured in place by screws G, or by equivalent means.

For the purpose of enabling the tension of the ribbons to be controlled, the ribbon running to the rear end of the said bearing is attached to an adjustable plate, H, mounted in a shoulder, I, formed upon the bearing, as shown. By means of this plate the tension of both ribbons is readily controlled, inasmuch as the forward ribbon is virtually shortened by being wound upon the drum in the same ratio that the rear ribbon is taken up by the plate.

For the purpose, also, of defining the operative range of the steering apparatus, stops J are secured to the outer face of the steering-rod. They may, however, give way to any other means for accomplishing the same result.

By employing ribbons arranged as described, and kept very taut, as a means of transmitting the motions imparted to the steering-handle post to the steering-rod, all loss of motion is avoided and positiveness of action insured to the apparatus. From this results a sensitiveness of the apparatus, which renders it responsive to every motion of the steering-handle, however slight, and places the control of the vehicle entirely within the hands of the driver. The ribbons do not wear appreciably, and hence the action of the apparatus is uniform throughout the entire range of its operation, whereas the devices now employed in the same capacity, and notably the rack and pinion, become worn in the center, where most used, and operate with quite different tension at the worn and unworn points. It may also be observed, in this connection, that the use of ribbons, as herein described, obviates the objectionable vibration of the steering-handle occurring in tricycles employing a rack and pinion for connecting the steering-handle post and the steering-rod, and greatly augmented when such rack and pinion become worn. Inasmuch as the ribbons require no oil, they are always clean, and, furthermore, there is no chance for the dress of a lady to become involved in them, as sometimes occurs where a rack and pinion are employed. While thin strips of phosphor-bronze are employed by preference, ribbons made of steel or other metal may be used in their stead. If desired, also, metallic strips may be replaced by bands of other material, or by bands or chains made up of links of metal or of woven wires.

The second feature of our invention relates to the steering-rod; and it consists in means for supporting and for compensating for the wear of the same. For this purpose we employ a guide-block, K, and a beveled plate, L, the

same being secured by a bolt, M, to an arm, N, offsetting from the hanger O, in which the lower end of the steering-handle post is journaled. The recess of the block and the bevel of the plate are cut to conform to the beveled edges P of the bearing B of the steering-rod C, and arranged so that the said bearing sets in flush or nearly flush with the faces of the block and plate, as shown. By this construction the bearing is held in place, and virtually against the periphery of the drum, from which it is separated only by the ribbons, which latter are thus protected and prevented from being twisted or otherwise strained. What wear occurs between the beveled edges of the bearing and the guide-block and plate is readily compensated for by drawing down the latter by means of the bolt, which is provided with a nut, Q, for the purpose. It is to be noted that the block and plate are allowed to turn freely upon the bolt, so as to respond to the deflections of the steering-rod.

The third feature of the invention relates to means for taking up the wear of the drum D aforesaid. It consists in a threaded bushing, R, provided with a knurled rim, S, and located in a split bearing, T, formed in the upper arm of the hanger O, and furnished with a set-screw, U, as shown. When any wear in the drum is detected, the said screw is loosened for permitting the bushing to be turned down by the fingers upon a washer, V, interposed between the upper arm of the hanger and the shoulder W of the drum. After the wear has been fully taken up in this manner the screw is tightened for closing the bearing and preventing the bushing from working loose.

The fourth feature of the invention relates to the tiller, the object being to set the same so as to equalize the action of the apparatus in steering to the right and left. With this end in view the tiller X is set forward of the axle of the steering-wheel, so as to form a right angle with the steering-rod when the wheel is set for traveling straight ahead. This arrangement will be understood by reference to the drawings, in which the line Y represents the axle of the wheel and the line Z the wheel itself. This construction equalizes the action of the apparatus in steering to the right and left, for whatever be the position of the wheel it will be turned to the right and left in the same degree by the same amount of manipulation of the steering-handle.

The fifth feature of the invention relates to the connection between the steering-rod and the tiller, the object being to avoid all loss of motion and rattling at this point. For the purposes of this connection we employ a threaded bolt, A', provided with a cone, B', and furnish the outer end of the steering-rod with a conical aperture, C', and the end of the tiller with a threaded opening, D', as shown. The cone B' of the bolt fits into, without filling, the aperture C', while the threaded end of the bolt is screwed into the opening D' in the tiller. Under this arrangement the greater portion of

the wear falls upon the contiguous faces of the conical aperture, and the cone and this wear, as well as that occurring between the other faces of the parts, may be completely taken up by screwing down the bolt, and thus making a new joint between the cone and aperture. A nut, E', fitted upon the lower end of the bolt, is employed for preventing it from working loose. If desired, the conical aperture may be formed in the tiller, instead of in the rod, and so with the threaded opening.

The sixth feature of our invention relates to means for locking the steering-handle post in its upper bearing, the object being to enable the vehicle to be tied up, as it were, when the rider leaves it, and to be set for continuous traveling in one line of motion or direction. These results are effected by locating a recessed bolt, F', in a shoulder, G', formed integral with the outer end of the arm H', in which the upper end of the steering-handle post is journaled. The said bolt is engaged with the post by means of the nut I', as shown. With the aid of this attachment the rider is not only enabled by a few turns of the nut to tie up his mount or to set it for continuous traveling in one direction, but also to stiffen the action of the post without locking it. This last will accommodate those riders who prefer to have the action of the steering apparatus somewhat stiff.

The seventh feature of the invention relates to the vertical adjustment of the steering-handle post, the objects being to avoid the expense and weakening effect of grooving the same, or of providing it with depressions to receive a set-screw, and to enable closer adjustments to be made.

With these ends in view the invention consists in a recessed bolt, J', located in the shoulder W of the drum D aforesaid. The lower end of the post, which is journaled in the hanger O, passes through the center of the said drum, and is engaged at any point of adjustment by the bolt, which is operated by a nut, K', as shown.

In view of the modification suggested, we would have it understood that we do not limit ourselves to the exact construction and combination of parts herein shown and described, but hold ourselves at liberty to make such changes and alterations as fairly fall within the spirit and scope of the invention.

We would also have it understood that, although the several improvements are described and shown herein as applied to front-steering tricycles, they are equally applicable to those having their steering apparatus located in the rear.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, and a flexible connection between the said post and rod, substantially as set forth.

2. A tricycle having a steering-handle post

and a steering-rod arranged substantially as shown, and metallic ribbons for connecting the said post and rod, substantially as set forth.

3. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, the former being provided with a drum, and a flexible connection between the said drum and rod, substantially as set forth.

4. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, the former being provided with a drum and the latter with a bearing, and ribbons attached to and connecting the said drum and bearing, substantially as set forth.

5. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, a flexible connection between the said post and rod, and means for controlling the tension of the said flexible connection, substantially as set forth.

6. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, ribbons for connecting the said post and rod, and an adjustable plate mounted in the steering-rod, and having the outer end of one of the ribbons attached to it, substantially as set forth.

7. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, the former being provided with a drum and the latter with a flat bearing, ribbons for connecting the said drum and bearing, and means for holding the bearing virtually against the periphery of the drum, substantially as set forth.

8. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, a flexible connection between the said post and rod, and means for limiting the play of the latter, substantially as set forth.

9. A tricycle having a steering-handle post and a steering-rod arranged substantially as shown, a flexible connection between the post and rod, and stops located upon the latter for limiting its play, substantially as set forth.

10. In the steering apparatus of a tricycle, a recessed guide-block and a beveled plate pivotally and adjustably secured by a bolt to an arm offsetting from the hanger in which the lower end of the steering-handle post is journaled, and arranged to embrace a beveled bearing located at the rear end of the steering-rod, substantially as set forth.

11. In the steering apparatus of a tricycle, a threaded bushing located in the hanger in which the lower end of the steering-handle post is journaled, and arranged to be screwed down to take up the wear of the drum mounted in the said hanger and having the said post secured to it, substantially as set forth.

12. In the steering apparatus of a tricycle, a threaded bushing located in a split bearing formed in the hanger in which the lower end of the steering-handle post is journaled, and arranged to be screwed down to take up the wear of the drum mounted in the hanger, and having the said post secured to it, and means

for closing the said bearing for preventing the bushing from working loose, substantially as set forth.

13. In the steering apparatus of a tricycle, the tiller set to form a right angle with the steering-rod when the steering-wheel is in position for steering straight ahead, substantially as set forth.

14. In the steering apparatus of a tricycle, a threaded bolt provided with a cone for connecting the steering-rod and the tiller, one of the said parts being provided with a conical aperture to receive the cone of the bolt, and the other with a threaded opening to receive its threaded end, substantially as set forth.

15. In the steering apparatus of a tricycle, means located in the arm in which the upper

end of the steering-handle post is journaled for locking the said post in its bearing, substantially as set forth.

16. In the steering apparatus of a tricycle, a recessed bolt located in a shoulder formed integral with the drum, through which the lower end of the steering-handle post passes, and arranged to engage with the said post and hold it in any desired position of vertical adjustment, substantially as set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ALBERT H. OVERMAN.
CHARLES F. HADLEY.

Witnesses:

GEO. D. SEYMOUR,
LUTHER WHITE.