

No. 686,082.

Patented Nov. 5, 1901.

J. H. JUDGE.
VEHICLE WHEEL.

(Application filed Mar. 8, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

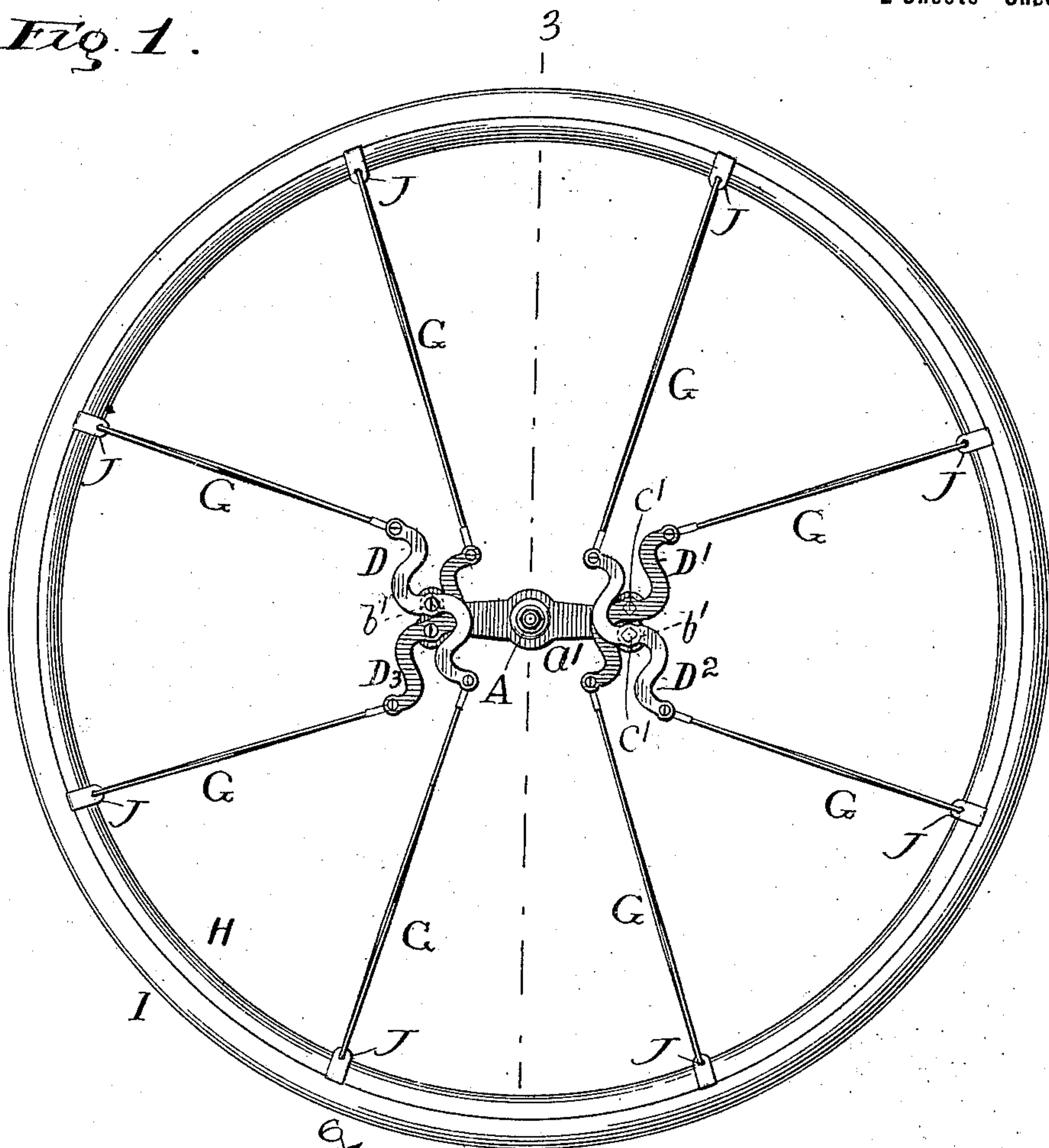
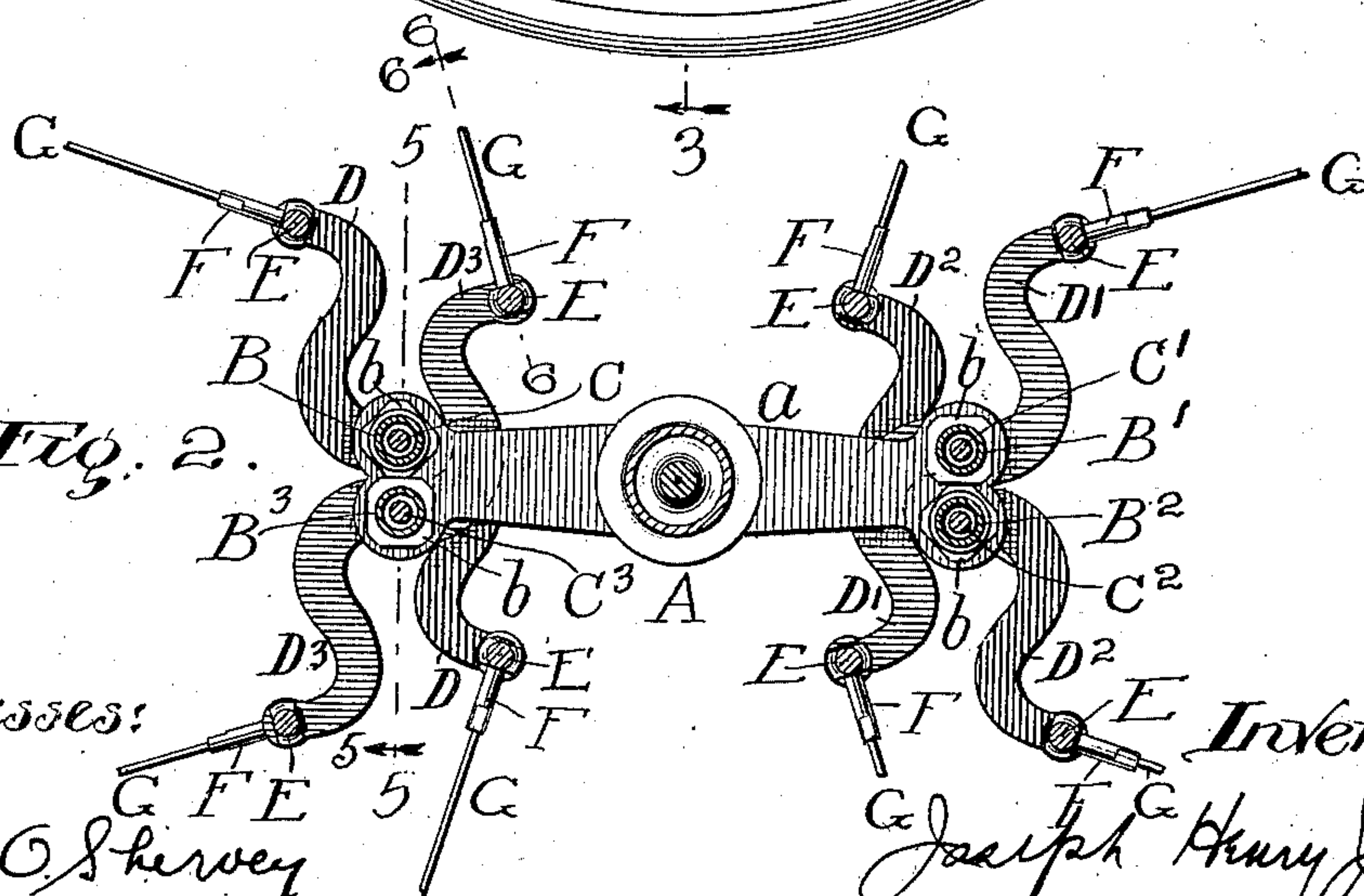


Fig. 2.



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No. 686,082.

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J. H. JUDGE.
VEHICLE WHEEL.

(Application filed Mar. 6, 1901.)

(No Model.)

2 Sheets—Sheet 2.

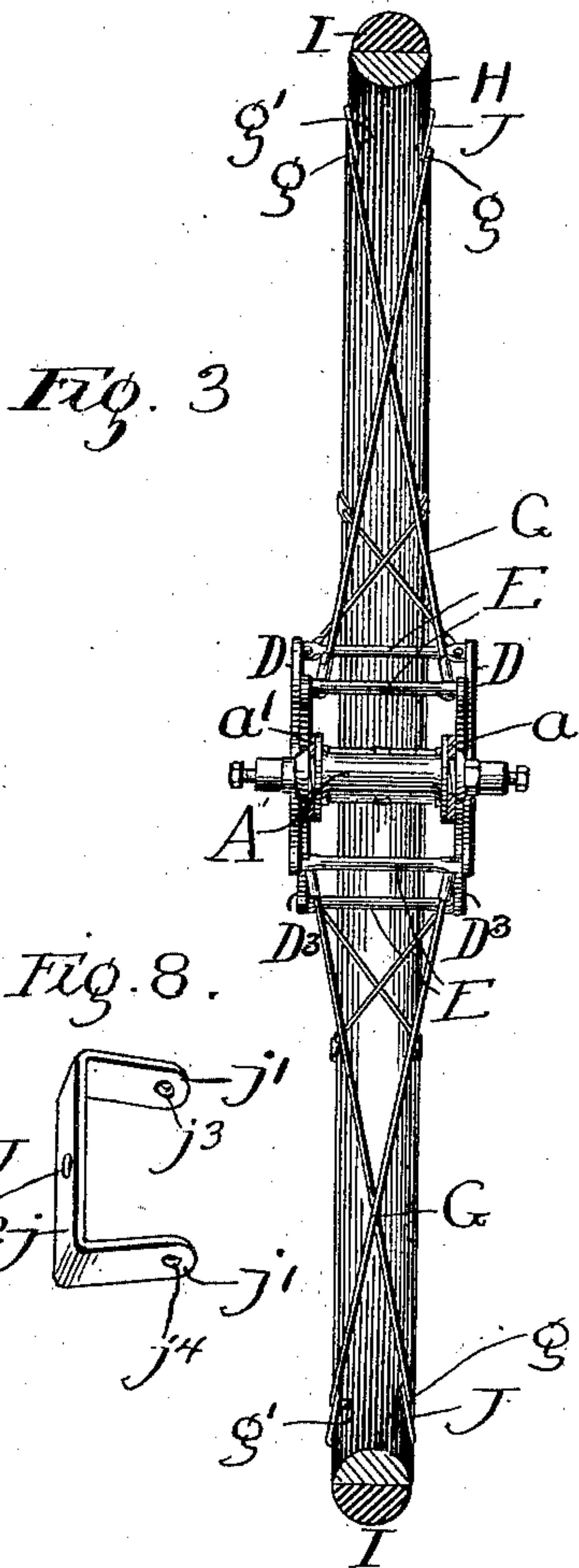


Fig. 3.

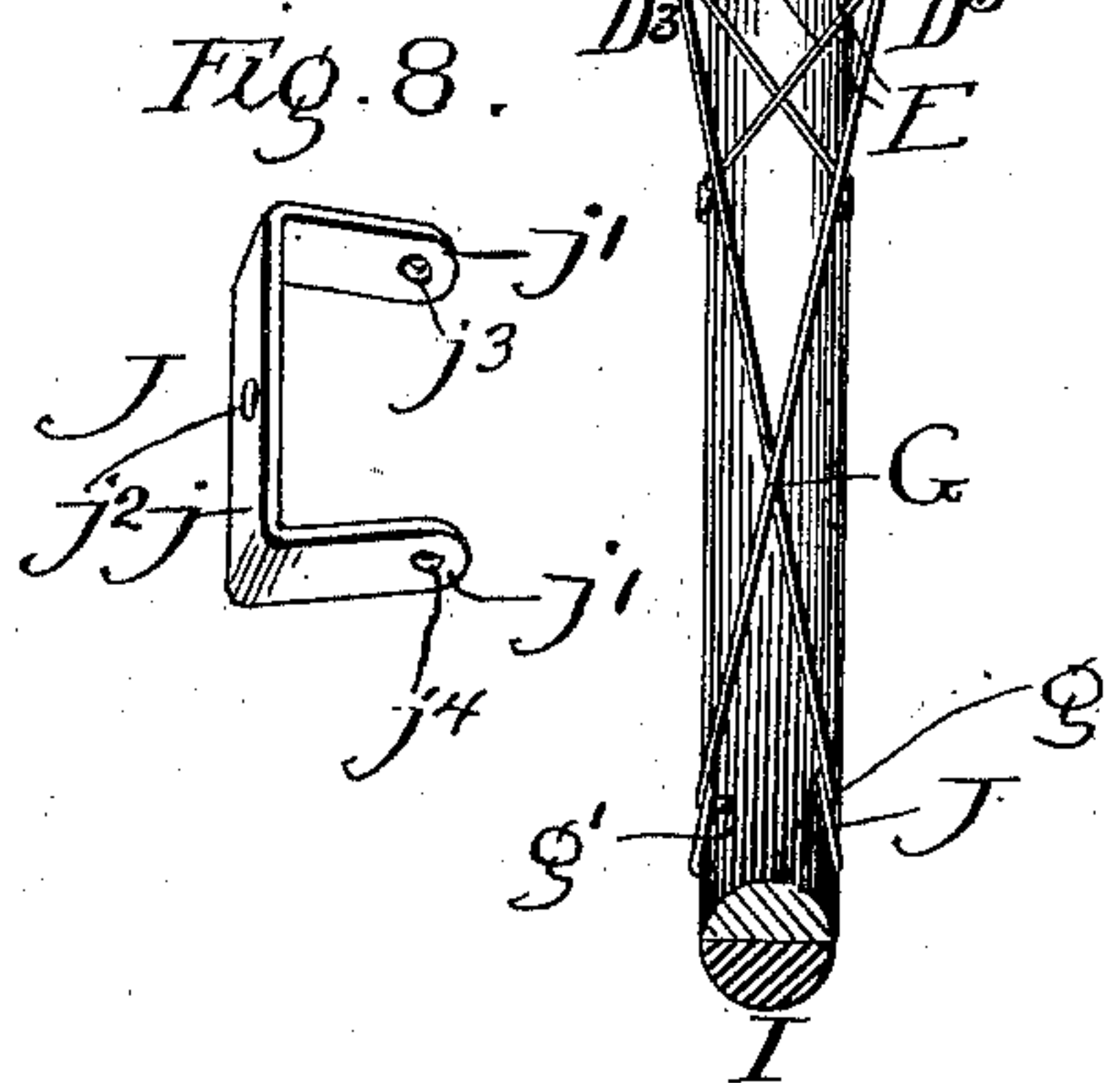


Fig. 8.

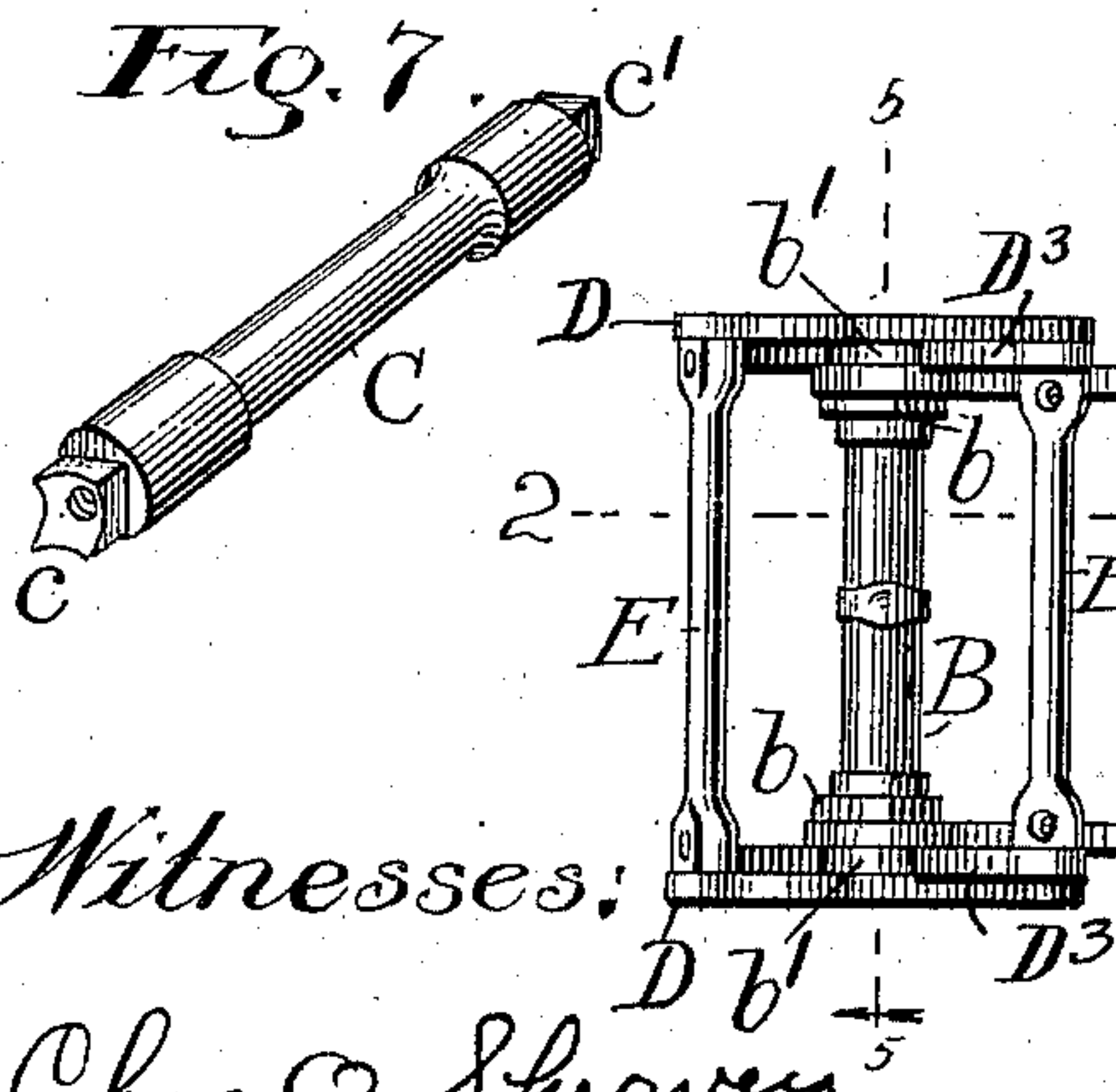


Fig. 7.

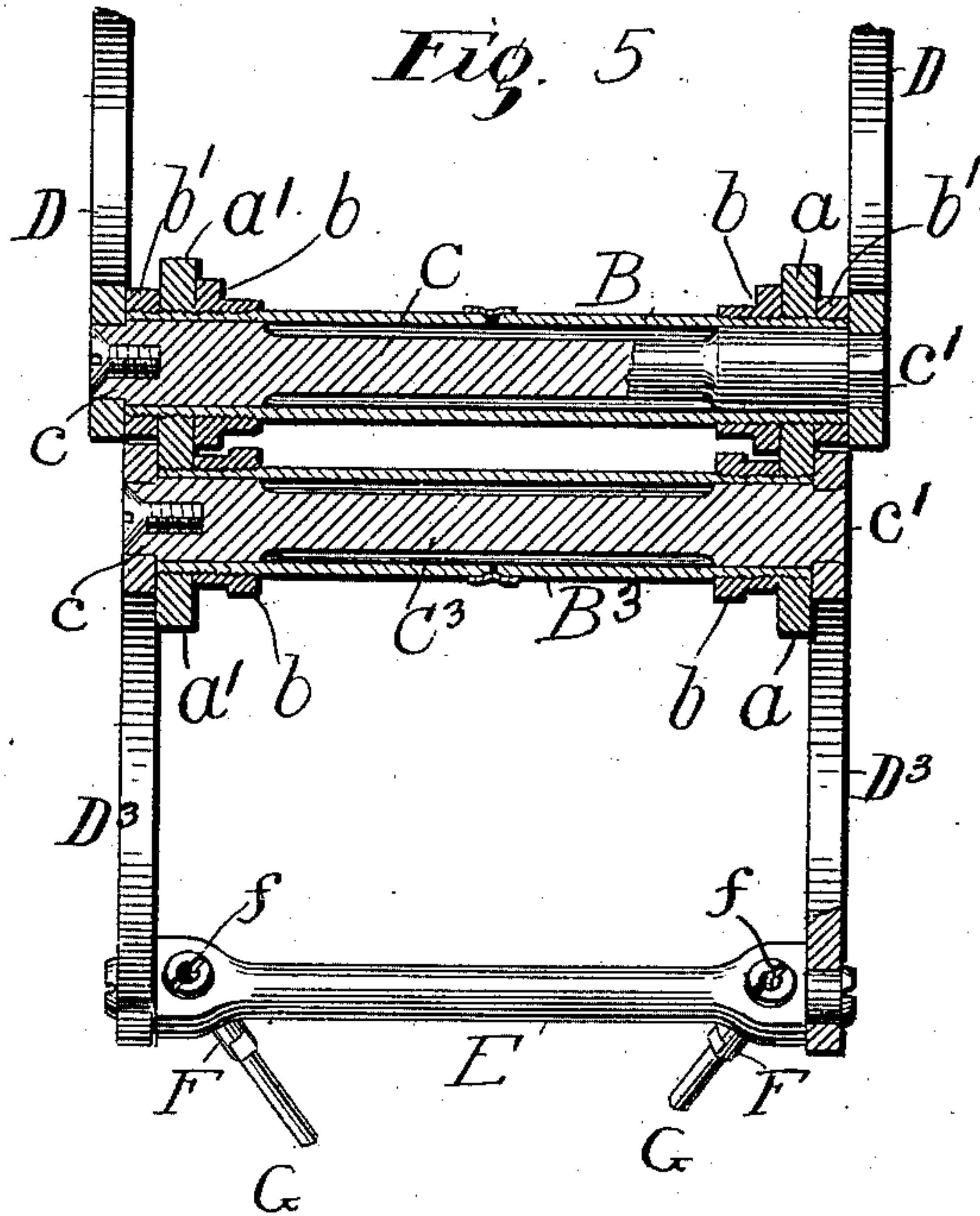


Fig. 5.

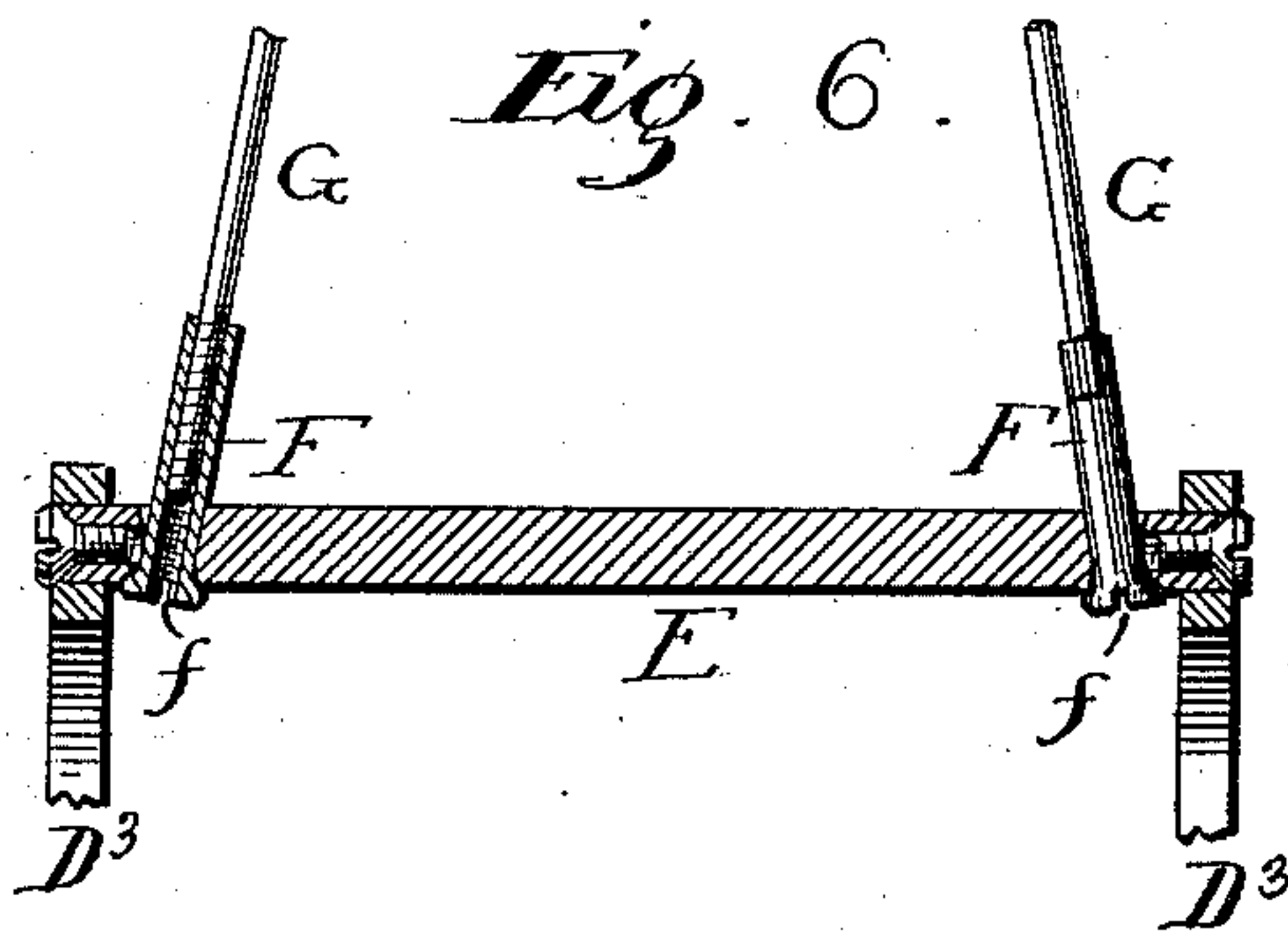


Fig. 6.

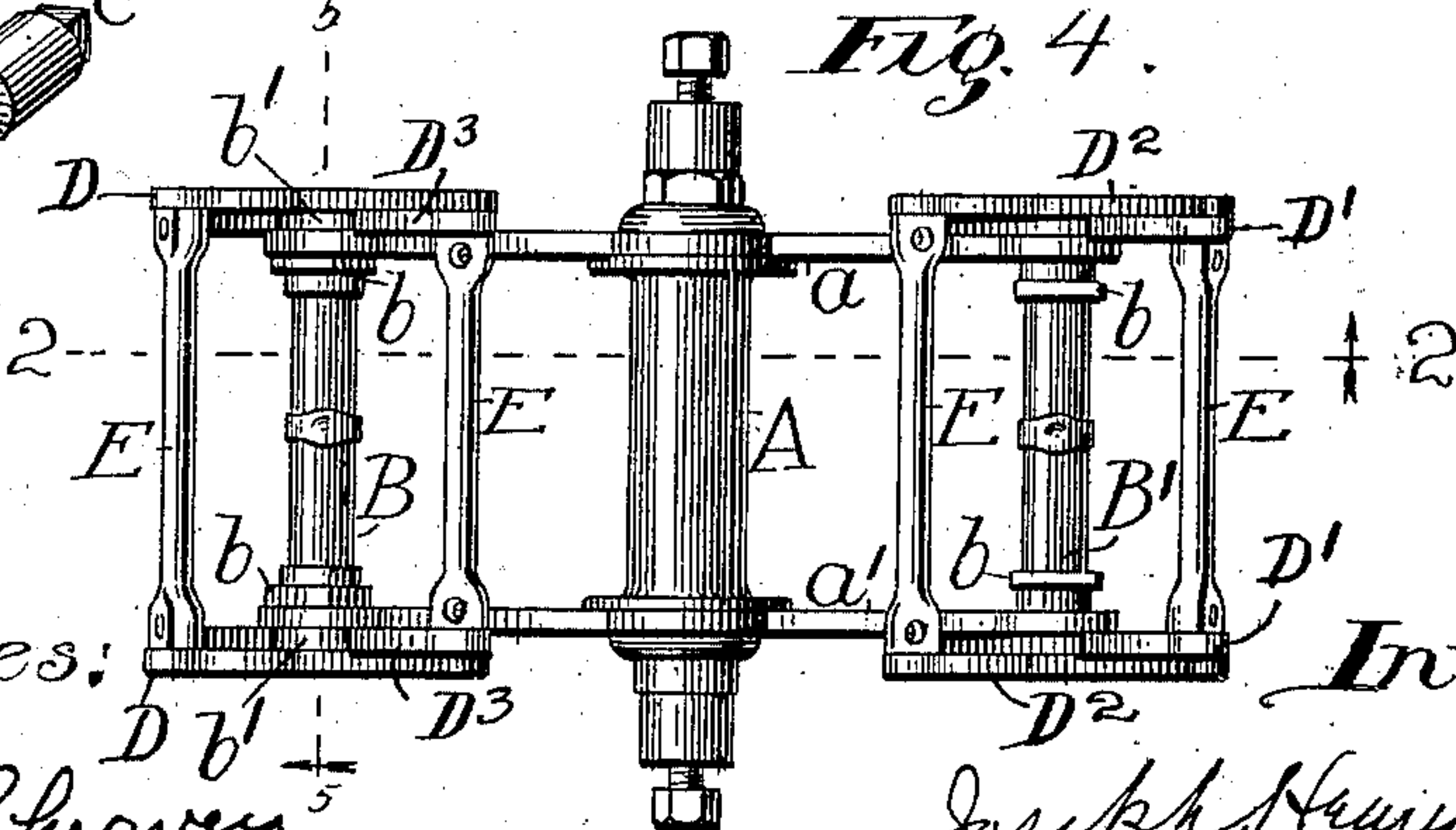


Fig. 4.

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JOSEPH HENRY JUDGE, OF MILWAUKEE, WISCONSIN.

VEHICLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 686,082, dated November 5, 1901.

Application filed March 6, 1901. Serial No. 50,090. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HENRY JUDGE, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Vehicle-Wheels, of which the following is a specification.

My invention relates to certain improvements in vehicle-wheels directed especially to affording the best possible combination of radial elasticity and lateral rigidity. Subordinate to these main purposes are a number of minor considerations having to do especially with the compactness, strength, and convenience of the various parts and the ease of adjusting the tension of the wheel to the various requirements.

In the drawings, Figure 1 is a side elevation of a wheel embodying my improvements in their preferred form. Fig. 2 is a vertical section in the line 2 2 of Fig. 4 looking in the direction of the arrow. Fig. 3 is a vertical section in the line 3 3 of Fig. 1. Fig. 4 is a plan of the hub and certain parts connected therewith. Fig. 5 is a vertical section, partly broken away, in the plane 5 5 of Fig. 2 looking in the direction of the arrow. Fig. 6 is an oblique section in the line 6 6 of Fig. 2 looking in the direction of the arrow. Fig. 7 is a perspective of one of the middle pivotal struts of the pivoted spoke-connecting frames, and Fig. 8 is a perspective view of one of the clips to which the outer ends of the spokes are attached.

Referring to the drawings, A is an ordinary bicycle-hub.

$a a'$ are parallel bars preferably secured rigidly at their middle portions, respectively, to the opposite ends of the hub, Fig. 4.

$B B' B^2 B^3$ are hollow struts threaded in pairs in the opposite ends of the bars and secured rigidly against displacement therein by means of jam-nuts b . b' represents other jam-nuts serving as washers to furnish a suitable bearing-surface in the plane of the ends of the hollow struts $B B^2$.

$C C' C^2 C^3$ are middle pivotal struts journaled in the hollow struts just referred to and provided with non-circular ends $c c'$, preferably square.

$D D' D^2 D^3$ are a series of spoke-connecting frames, the middle portions of the opposite sides of the frames $D D^2$ being rigidly secured together by the pivotal struts $C C^2$ and the middle portions of the opposite sides of the frames $D' D^3$ being rigidly connected together by the pivotal struts $C' C^3$. The free ends of these levers are rigidly connected in pairs by means of end struts E , preferably extended laterally near their end portions to receive spoke-nipples F , in which the inner ends of the spokes G are threaded. By this means the four spoke-connecting frames are each made rigid as to its opposite sides, and provision is secured for an easy adjustment of the tension of the spokes by means of a screw-driver, which may be inserted in a slot f in the exposed end of the spoke-nipple.

H is the rim of the wheel, and I an elastic tire suitably secured thereto.

J represents a series of clips, preferably U-shaped, as shown in Fig. 8, having their middle portions j adapted to rest upon the outer surface of the rim and their end portions $j' j''$ adapted to embrace the sides of the rim. A perforation j^2 is preferably provided with a central portion to secure the clip against creeping on the rim, and perforations $j^3 j^4$ are provided in the ends, in which are secured the spokes G by means of bent ends g and heads g' . The spokes are crossed laterally between the spoke-connecting frames and the clips J , so as to obtain a more oblique position of the spokes with relation to the plane of the wheel, and thereby give said wheel greater lateral rigidity than could otherwise be obtained with the same width of hub.

By means of the pivoted spoke-connecting frames it should be noticed that the wheel is capable of a diametrical contraction or compression in one direction and a corresponding expansion in the direction of another diameter, so that the elasticity of the rim is utilized to take up any unpleasant jar or shock. The great rigidity of the spoke-connecting frames, due to their various members and the manner of connecting the same, taken in connection with the crossing of the spokes, gives the wheel ample lateral rigidity, while at the same time giving it the utmost freedom of radial movement.

The great ease of adjustment of the spoke tension should be noticed, and the same is of particular advantage in this class of wheel, inasmuch as it enables the tension of the wheel to be adjusted to the weight of the rider to give the greatest ease of movement in much the same way as the object is sought for in the use of the ordinary pneumatic tire by increasing or decreasing the air-pressure according to the weight of the rider.

While the above description has been made as specific and complete as possible for the purpose of fully disclosing the preferred form of the invention, it is not my intention to limit the invention to said preferred form, as certain of the novel characteristics are independent of the exact details.

I claim as new and desire to secure by Letters Patent—

1. A wheel comprising a hub, parallel bars secured rigidly to the opposite ends of the hub, each having its ends radiating therefrom in opposite directions, a series of tubular struts rigidly securing together the outer ends of the opposite bars, pivotal struts pivoted in said tubular struts, rigid spoke-connecting frames secured across their middle portions by said pivotal struts, and a series of laterally-crossed spokes arranged in pairs and connecting the free ends of said spoke-

connecting frames with the rim; substantially as described.

2. In a wheel, the combination with a suitable hub, rim and tire, of a series of clips secured between the rim and the tire, a series of spokes secured at their outer ends to the clips, a series of spoke-connecting frames pivotally connected to the hub, between their ends, and a series of spoke-nipples mounted in the ends of the spoke-connecting frames and threaded to the inner ends of the spokes; substantially as described.

3. In a wheel, the combination with a hub, a rim, and a tire, of a series of clips secured between the rim and the tire and having end portions extending inward upon opposite sides of the rim, and a series of spokes secured in pairs to said clips at one end, connected to the hub at the other end and crossing laterally between their ends; substantially as described.

In witness whereof I have hereunto set my hand, at Chicago, in the county of Cook and State of Illinois, this 27th day of February, A. D. 1901.

JOSEPH HENRY JUDGE.

Witnesses:

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