No. 625,859. Patented May 30, 1899.

J. E. THORNTON & J. P. LEA.

FRICTION GEAR.

(Application filed Dec. 29, 1897.)

(No Model.)

2 Sheets—Sheet 1.

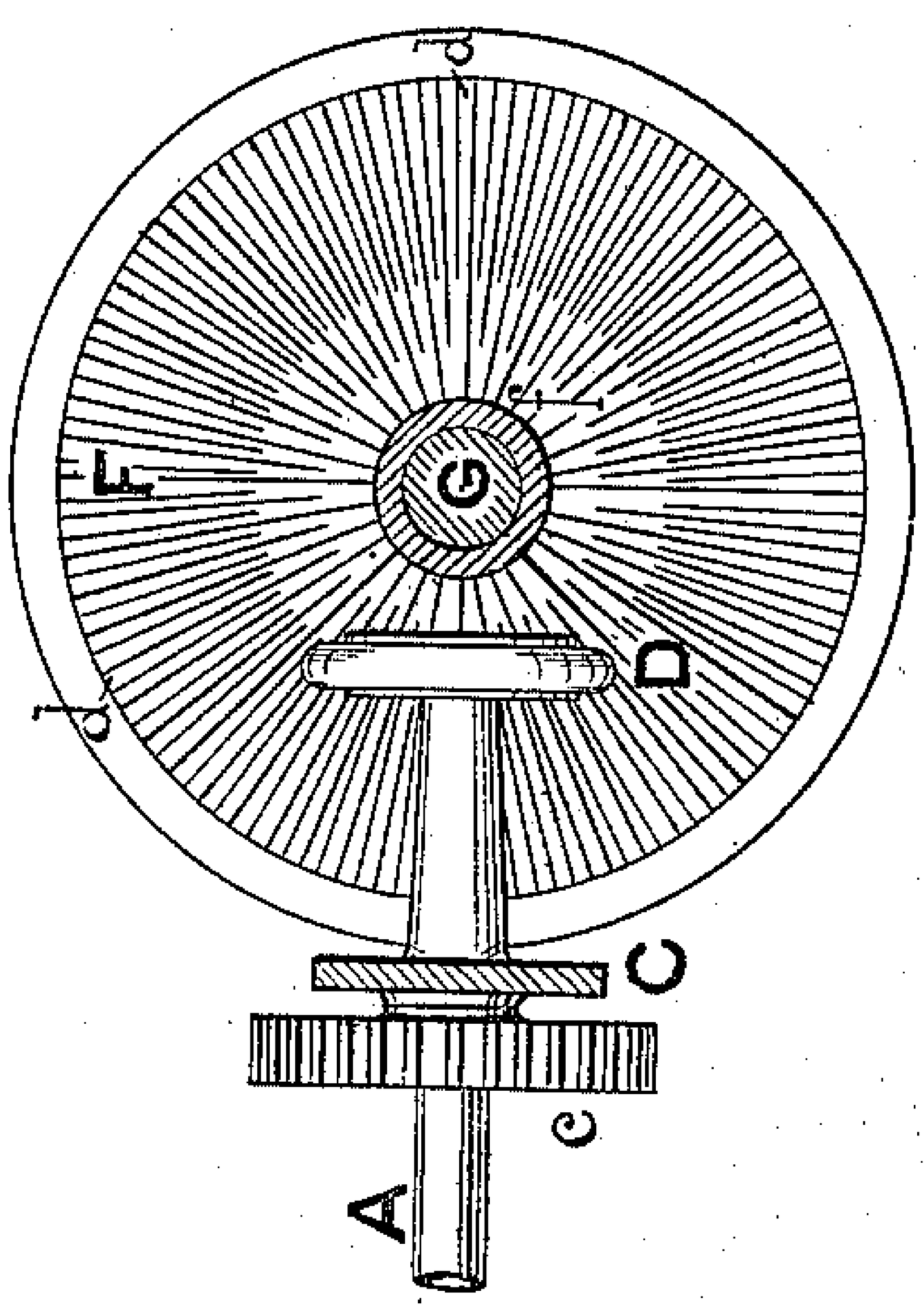
FIG. 2.

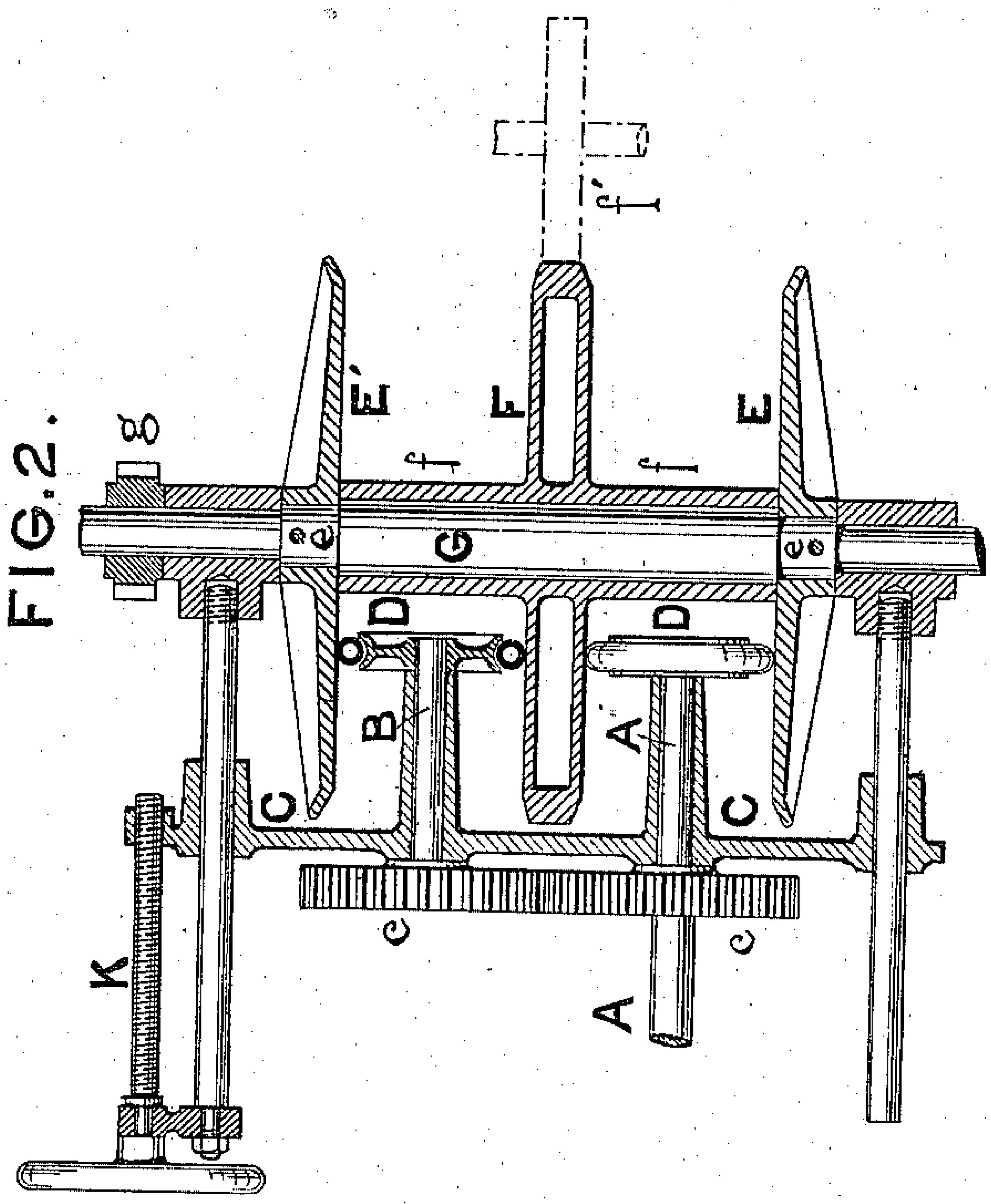
FIG. 1.

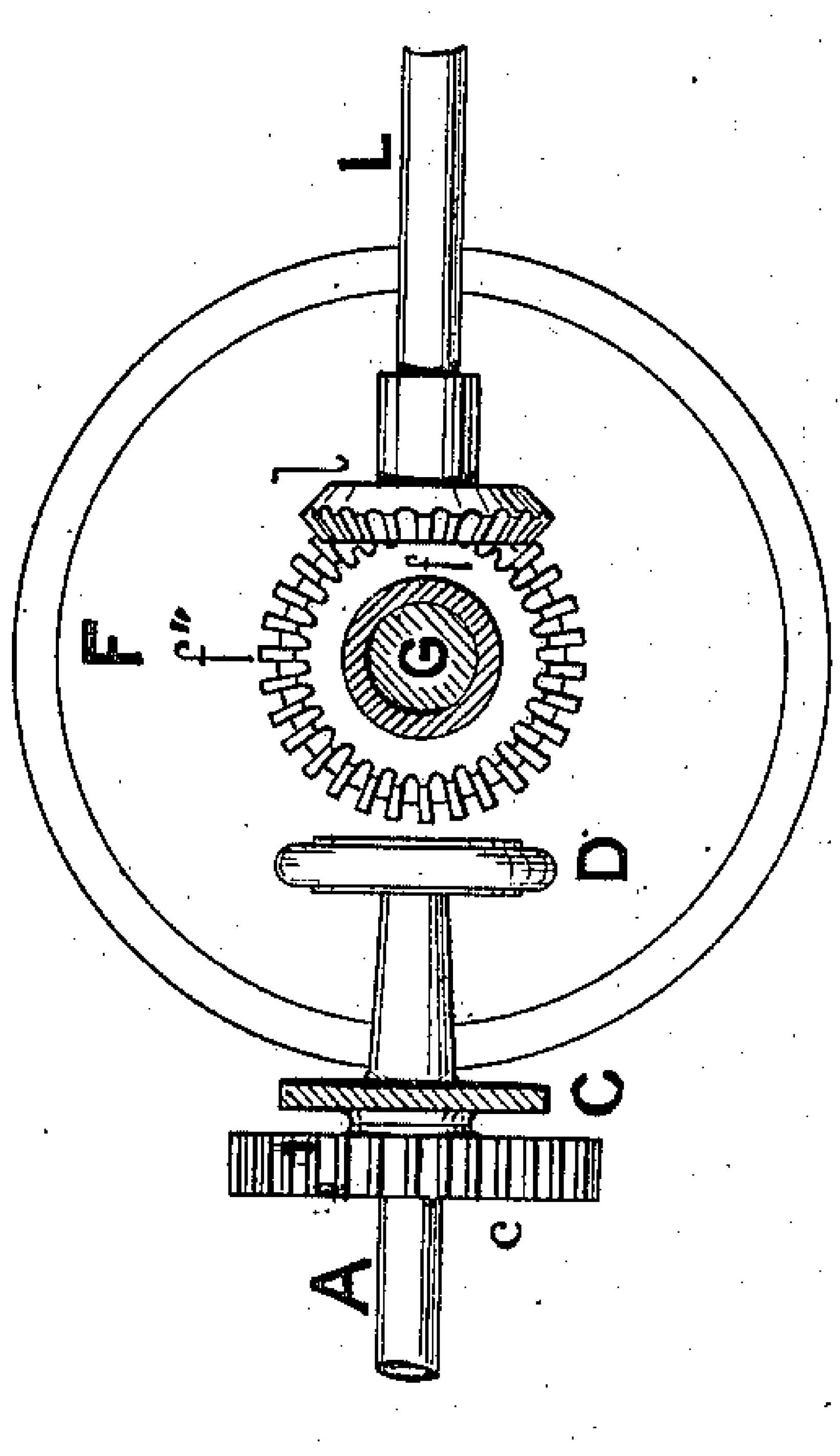
FIG. 4.

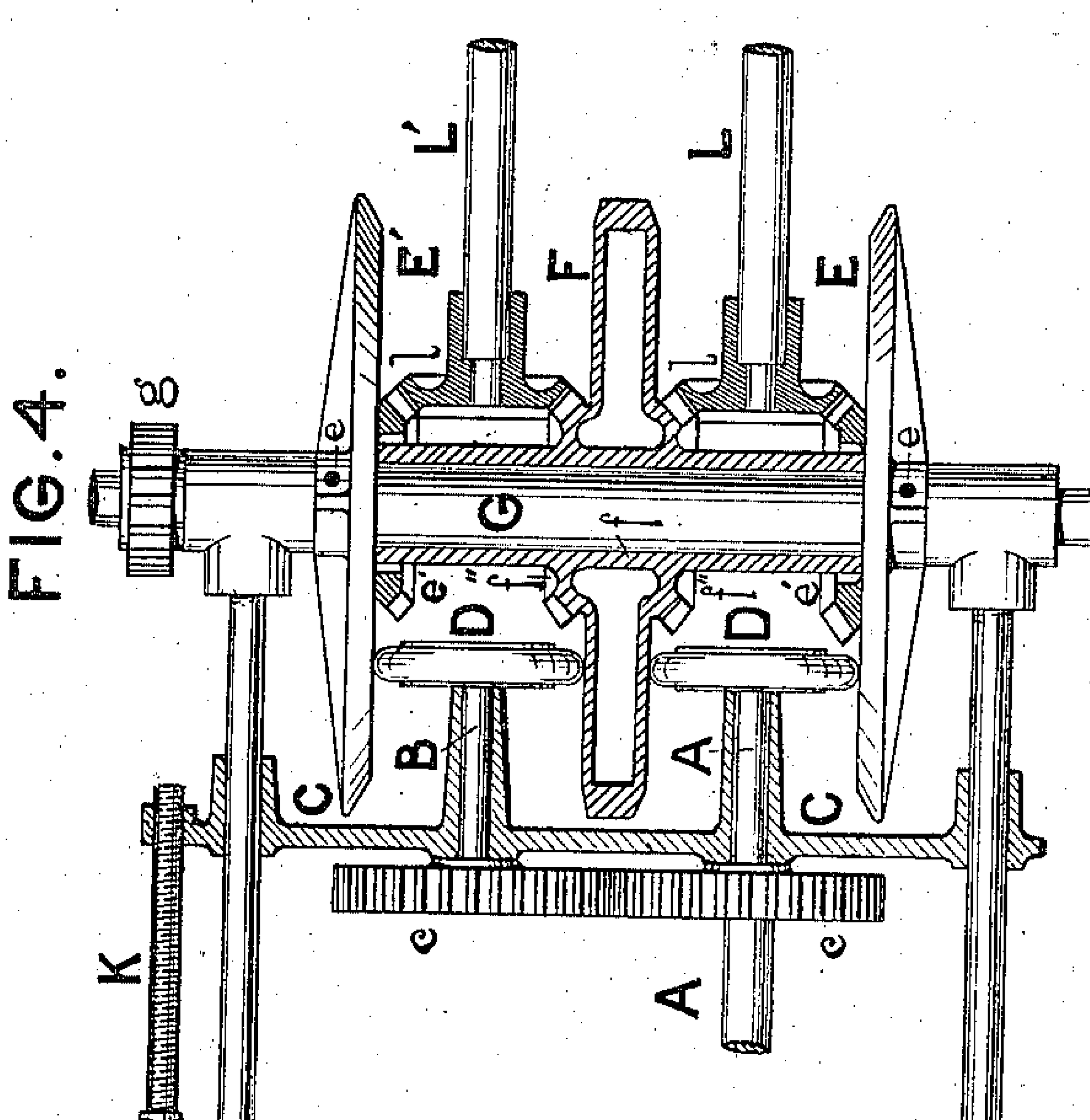
FIG. 3.

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FRICTION GEAR.

(Application filed Dec. 29, 1897.)

(No Model.) 2 Sheets—Sheet 2.

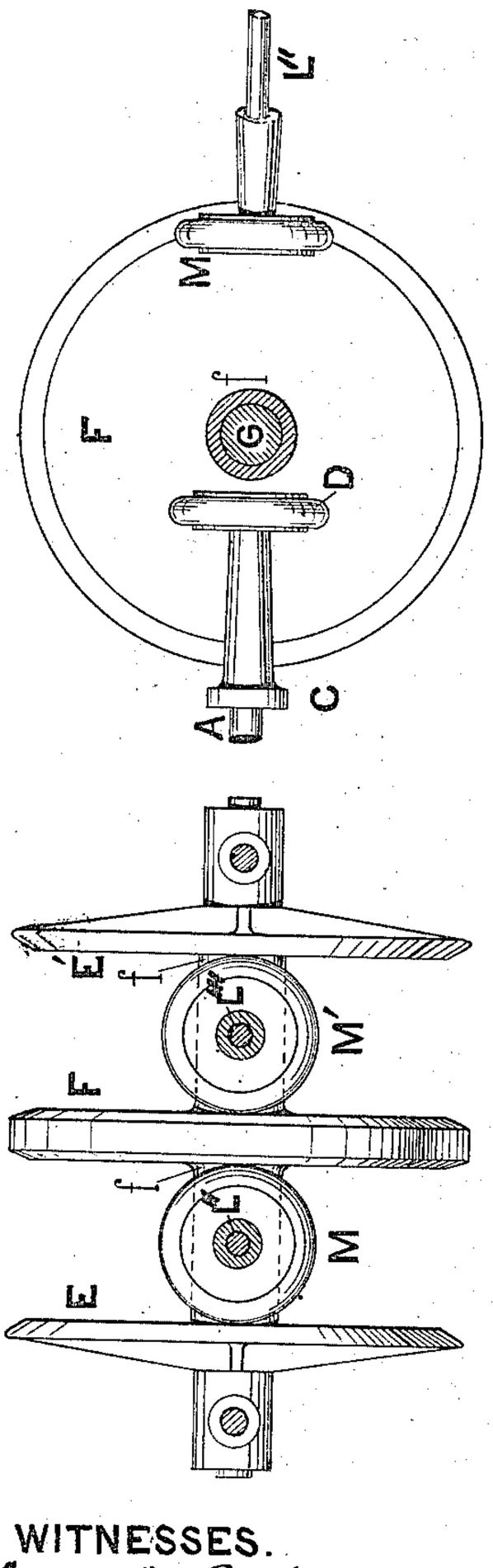

FIG. 6.

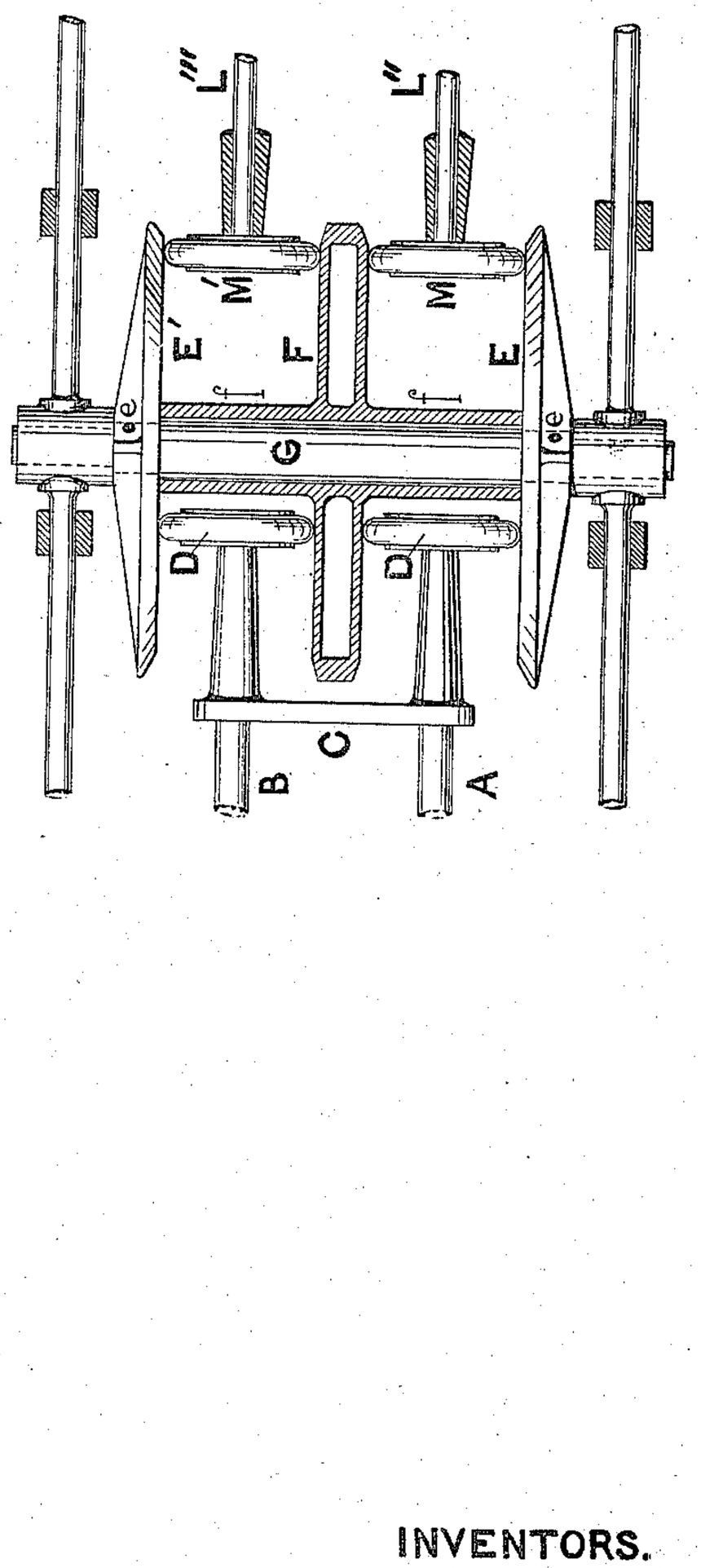

FIG. 5.

FIG. 7

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UNITED STATES PATENT OFFICE.

JOHN E. THORNTON AND JAMES P. LEA, OF ALTRINGHAM, ENGLAND.

FRICTION-GEAR.

SPECIFICATION forming part of Letters Patent No. 625,859, dated May 30, 1899.

Application filed December 29, 1897. Serial No. 664,460. (No model.)

To all whom it may concern:

Be it known that we, JOHN EDWARD THORNTON and JAMES POLLARD LEA, subjects of the Queen of Great Britain, and residents of Altringham, in the county of Chester, England, have invented certain new and useful Improvements in Friction-Gears for Transmitting Power, of which the following is a specification.

This invention relates to improved mechanism whereby the power from the main shaft of an engine or motor or other driving-shaft may be transmitted to another shaft or mechanism to be rotated at a variable speed to be varied or controlled at will and is designed to provide friction-gear in which all the strains set up are self-contained within the gearing and are not transmitted through the supporting-bearings, whereby undue friction upon and wear of the rotating parts are avoided.

It consists, essentially, of apparatus constructed with two rotating pulleys or disks rotating with a primary or driving shaft gearing with two friction-disks rigidly secured to and rotating with a secondary shaft and with a third disk rotating loosely on the same shaft.

It will be fully described with reference to the accompanying drawings, as examples of which three forms or modifications of the invention are illustrated.

Figure 1 is a plan, partly in section, showing the invention in its simplest form; Fig. 2, an end elevation of same, partly in section; Fig. 3, a plan, partly in section, showing the motion transmitted to two driven shafts by means of bevel-gearing; Fig. 4, an end elevation, partly in section, of Fig. 3; Fig. 5, a plan, partly in section, showing the motion transmitted to two driven shafts by frictional gearing; Fig. 6, an end elevation, partly in section, of Fig. 5; Fig. 7, a side elevation of same.

The primary or driving shaft A is mounted in suitable bearings carried by a frame C or other convenient support and is geared to a corresponding shaft B by gear-wheels *c*, which is caused to rotate in the opposite direction. On the end of each of the shafts A and B are secured by keys or otherwise a friction disk or pulley D, the two friction-disks D also rotating in opposite directions. The two friction-pulleys D engage with the faces of three friction-disks E E′ and F. The friction-disks E E′ and F are fitted on a secondary shaft G, placed at right angles to the primary shaft A. The two outside disks E E′ are rigidly secured by pins *e* (or other suitable means) to rotate with it and without any movement thereon, and the central or intermediate disk F is free to rotate thereon and is preferably provided with a sleeve *f* or with collars to prevent lateral movement.

The rotary movement of the two pulleys or disks D as the shaft A rotates is transmitted to the disks E E′ and F, the two disks E E′, and with them the shaft G, rotating in one direction and the central disk F in the reverse direction. The motion imparted to the disks E E′ and F may be transmitted as required either from the disks E and E′ or shaft G or from the intermediate disk F, as found most desirable or convenient.

The speed of the disks E E′ and F and shaft G is increased or diminished, as required, by altering the position of the disks D relative to the disks E E′ and F by moving either to and from the other.

The edges of the disks E E′ and F are beveled to permit of the disks D being easily withdrawn and reëntered between them. The faces of the disks E E′ and F may be provided with radiating corrugations *d* or projecting points or the like to increase the friction or grip of the disks D. The peripheries of the disks D are provided with pneumatic tires or bands or with bands of leather or other suitable friction material.

In the arrangement shown in Figs. 1 and 2 the shafts A and B and the disks D are moved to and fro as desired by means of the frame C, in which they are supported. The frame is moved in either direction by the screw K. Motion is taken either from the secondary shaft G by a pulley or wheel *g*, placed upon it, or from the periphery of the central disk F by a wheel *f′*, engaging with it.

In the arrangement shown in Figs. 3 and 4 the movement of the disks D is similar to that described with reference to Figs. 1 and 2, and the motion is taken by two shafts L L′ and bevel-wheels *l* from the disks E E′ and F, which are provided with bevel-teeth *e′ f″*, which gear with the wheels *l*.

In the arrangement shown in Figs. 5, 6, and

7 the frame C, which carries the shafts A and B and the disks D, is stationary and the shaft G and disks E E′ and F are moved to and fro to vary the speed. The motion is taken by two shafts L″ L‴ and friction-disks M M′, which are rotated by contact with the disks E E′ and F. In this arrangement the alteration of the speed is twofold. As the disks D approach the periphery of the disks E E′ and F the latter are driven more slowly, and at the same time the disks M M′ approach the center and are also driven more slowly, and vice versa.

The friction-gear herein described is specially designed for motor cars and vehicles, but is applicable also for other purposes or mechanism where variations of speed are required.

What we claim as our invention, and desire to protect by Letters Patent, is—

1. In friction-gear for transmitting power the combination of the primary driving-shaft A the corresponding auxiliary shaft B geared thereto the supporting-framing capable of sliding to and fro the disks D affixed to and rotating with the shafts A and B the secondary driven shaft G the disks E and E′ rigidly affixed thereto and the intermediate disk free to rotate thereon with the faces of which the peripheries of the disks D engage to transmit motion thereto and means for conveying motion from such secondary shaft and disks substantially as and for the purpose described.

2. In friction-gear for transmitting power the combination with the driving-shafts A and B and disks D D rotating therewith of the secondary shaft G the disks E and E′ rigidly affixed thereto the disk F free to rotate thereon the sliding supporting-frame and the driven shafts L″ and L‴ with the disks M M′ secured thereto and rotated by the disks E E′ and F substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

J. E. THORNTON.
J. P. LEA.

Witnesses:
J. OWDEN O'BRIEN,
R. OVENDALE.