No. 608,242. Patented Aug. 2, 1898.

H. WILCKE.

MOTOR.

(Application filed Mar. 4, 1898.)

(No Model.) 6 Sheets—Sheet 1.

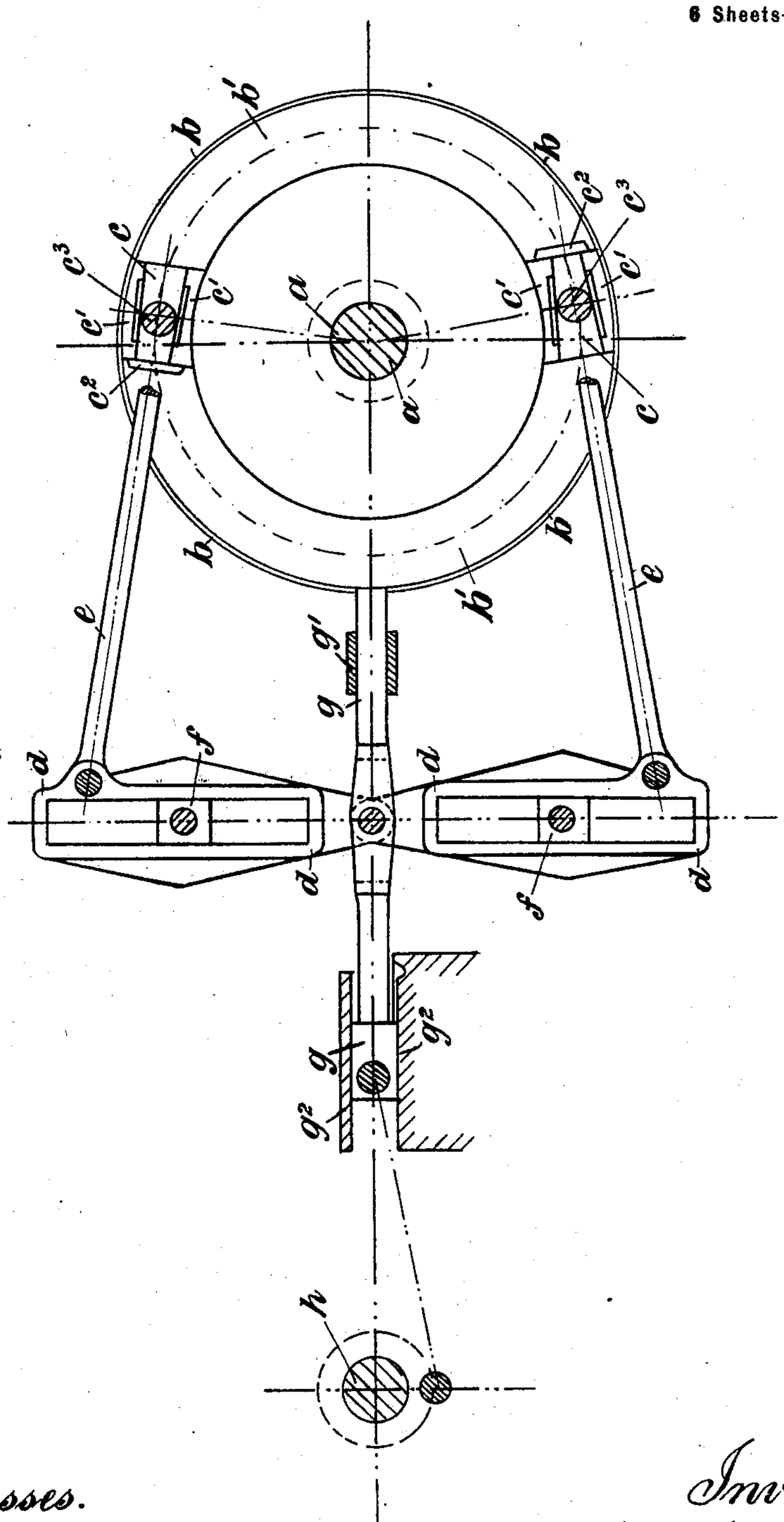

Fig. 1.

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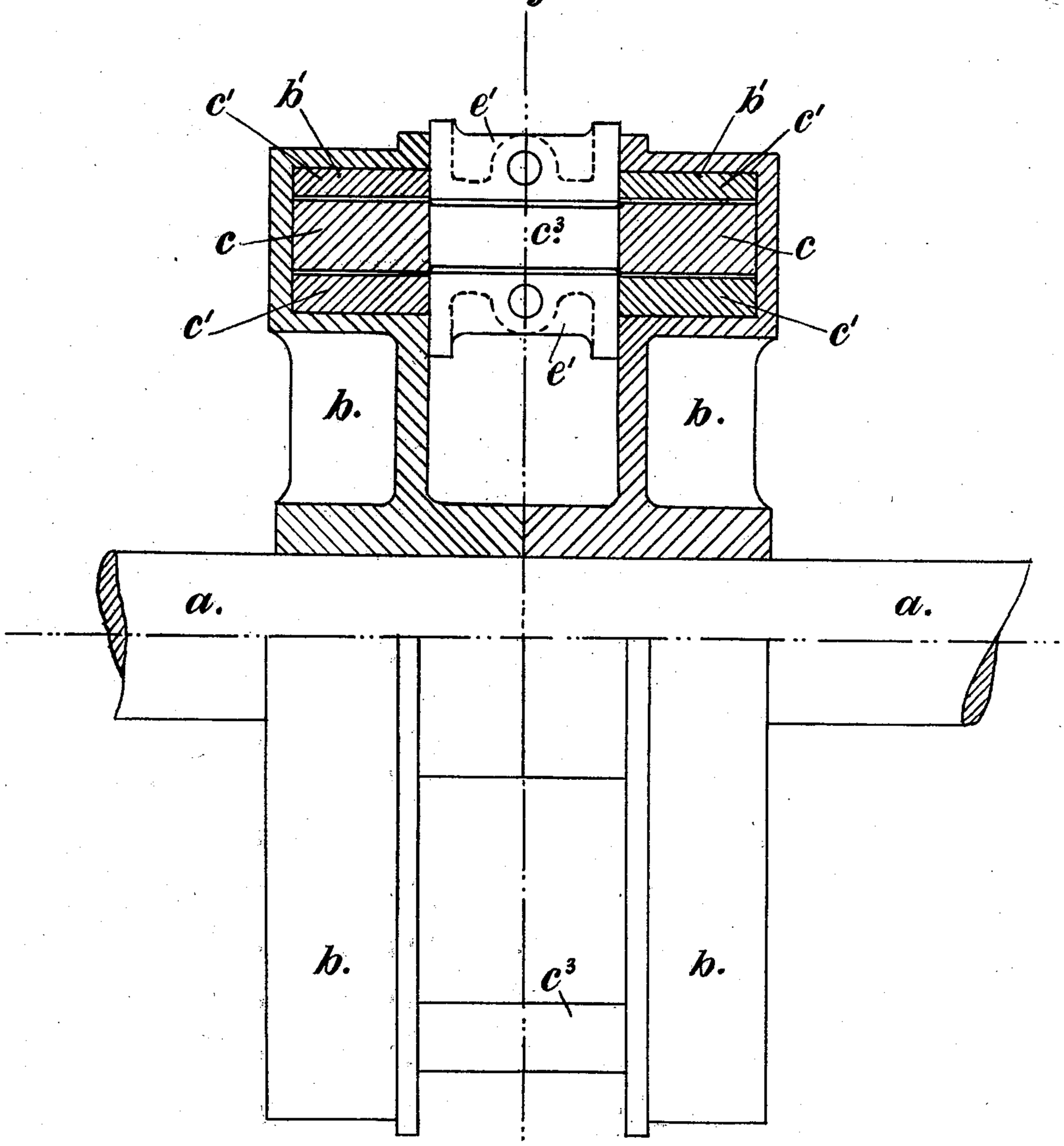
(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



Witnesses.

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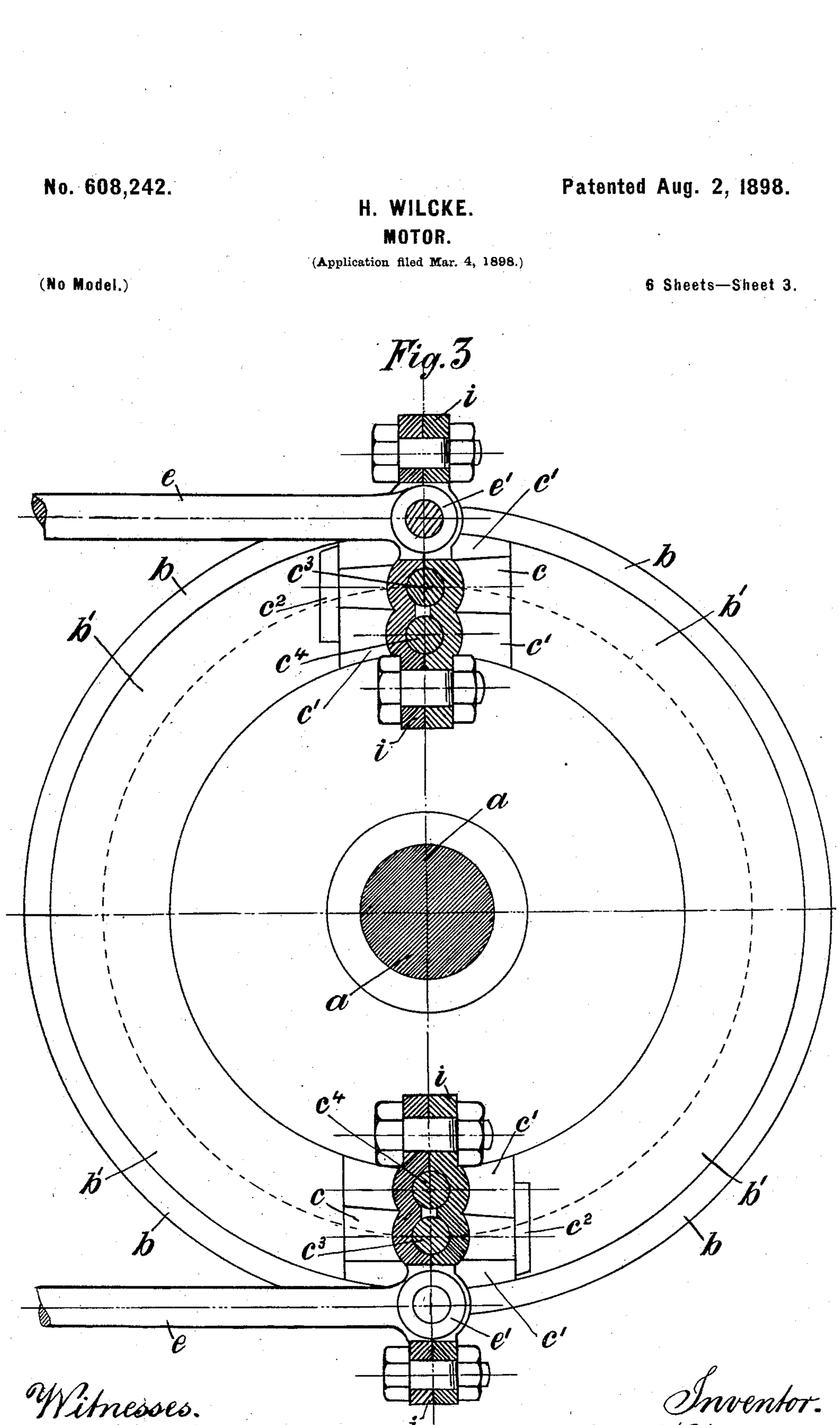
Fig. 3



Witnesses.
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(No Model.)

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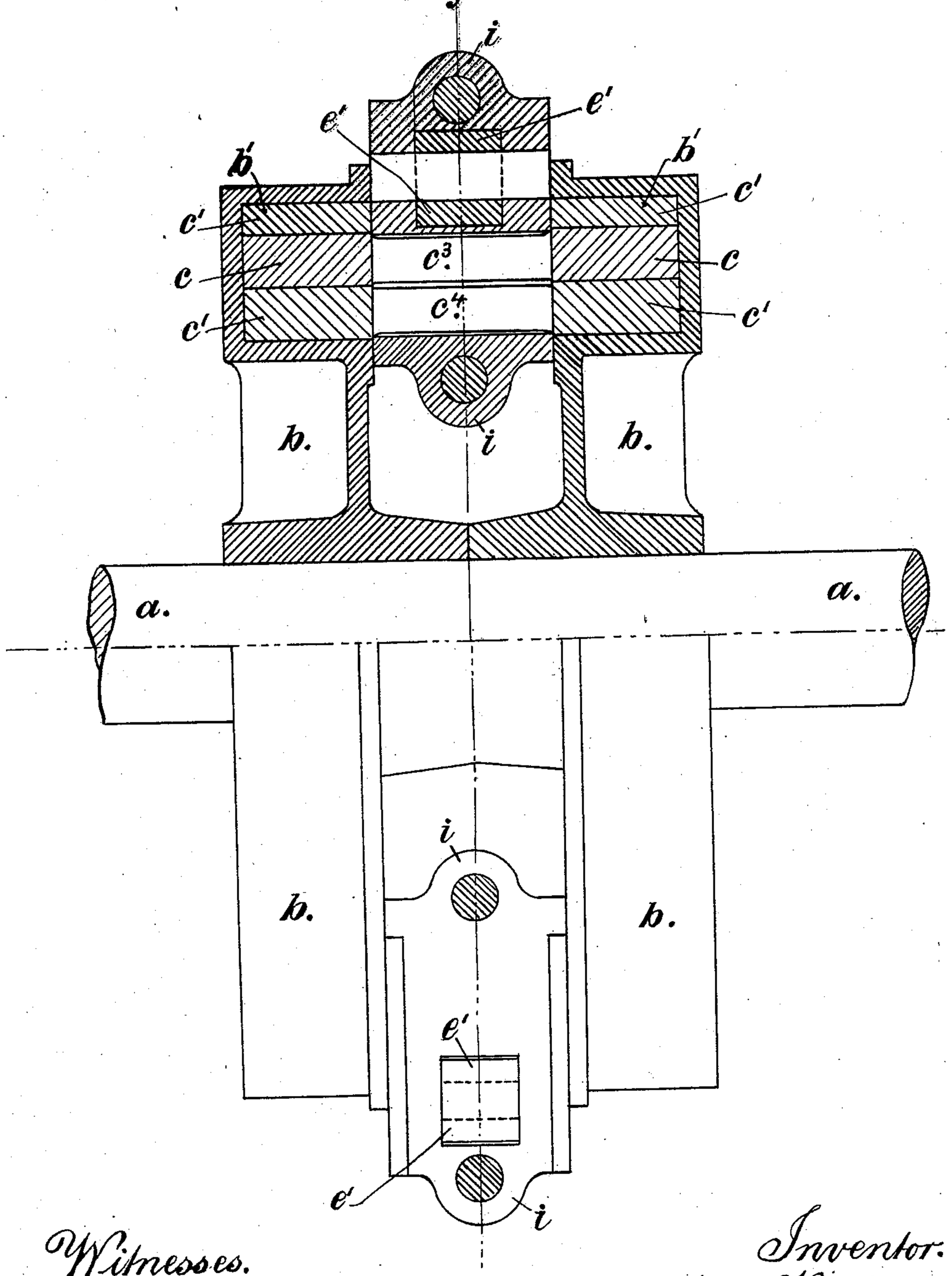
Fig. 4.



Witnesses.

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(Application filed Mar. 4, 1898.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 5.

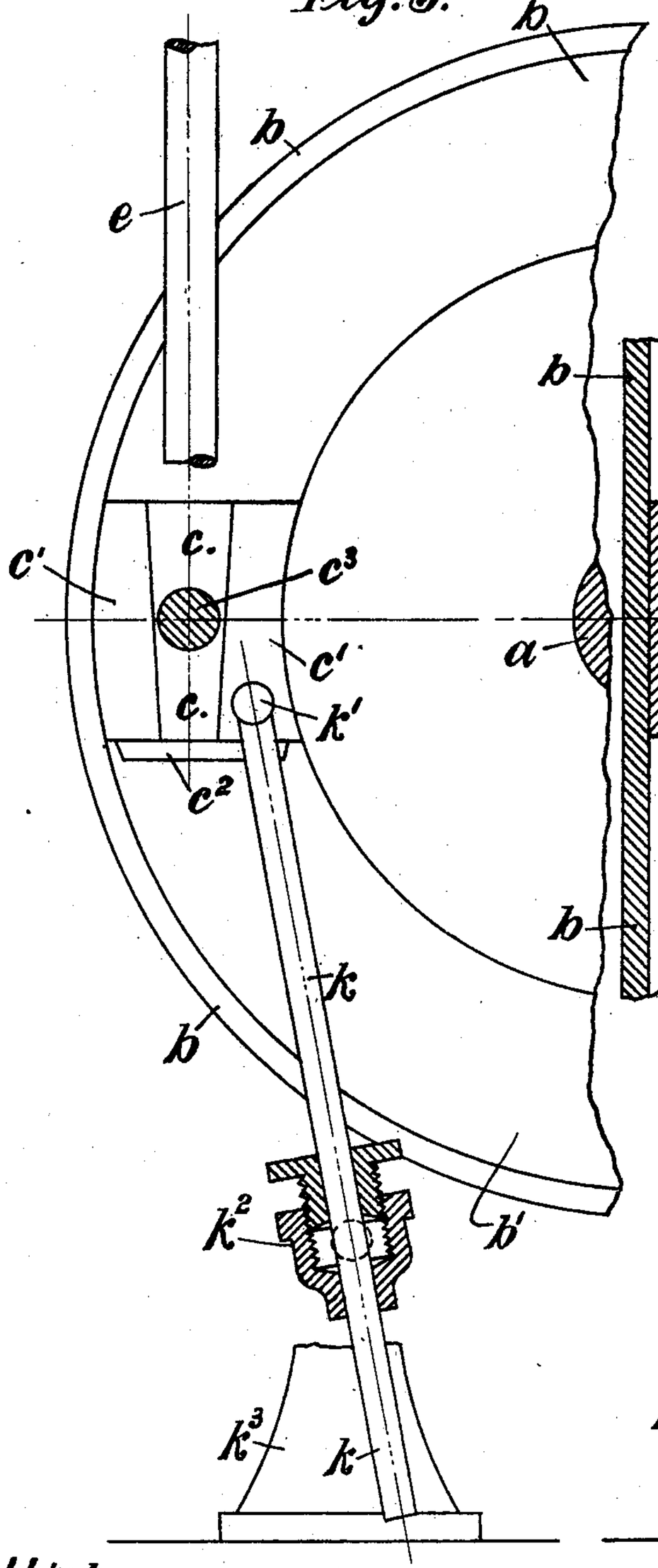
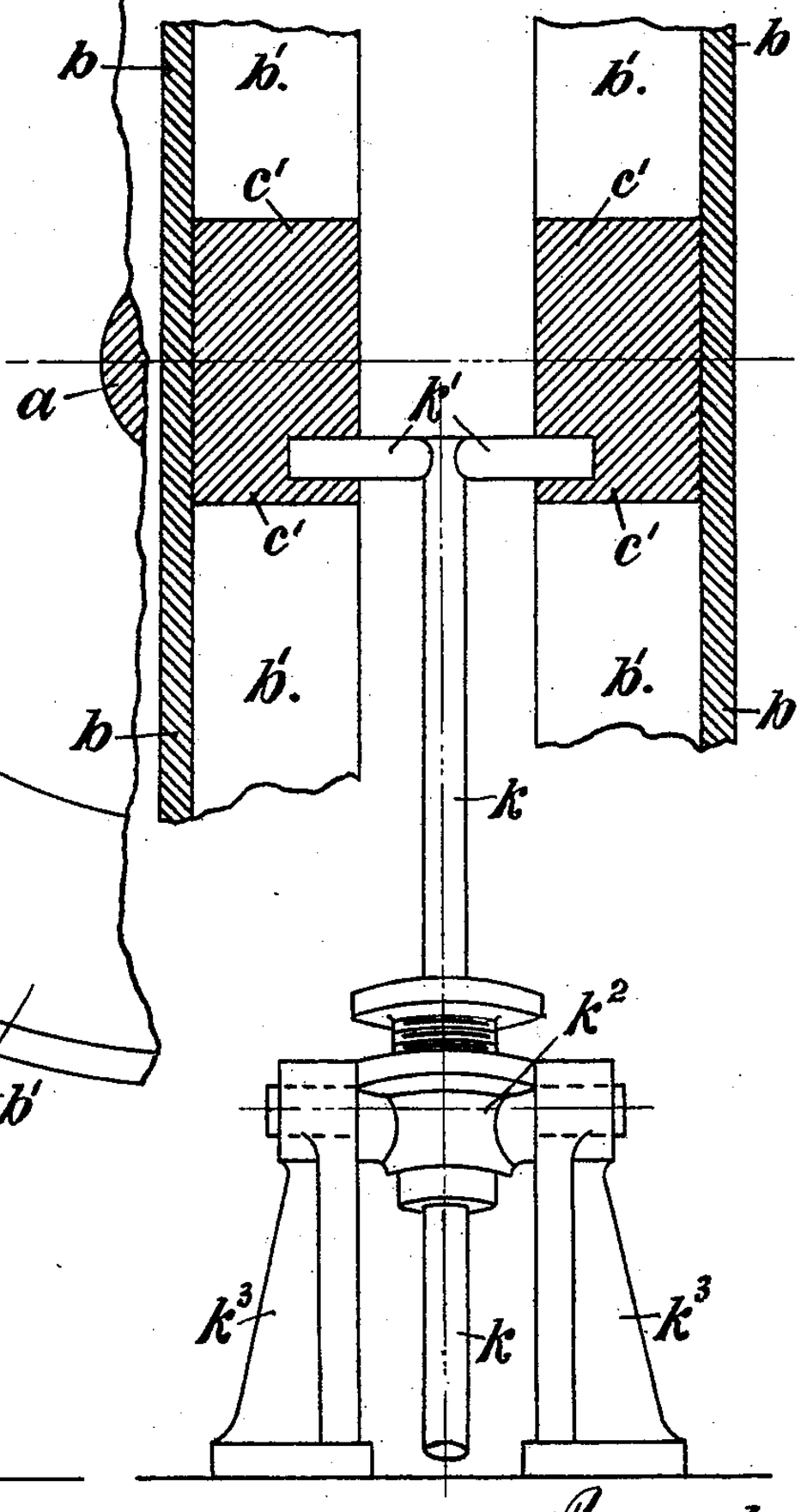


Fig. 6.



Witnesses.

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No. 608,242.

Patented Aug. 2, 1898.

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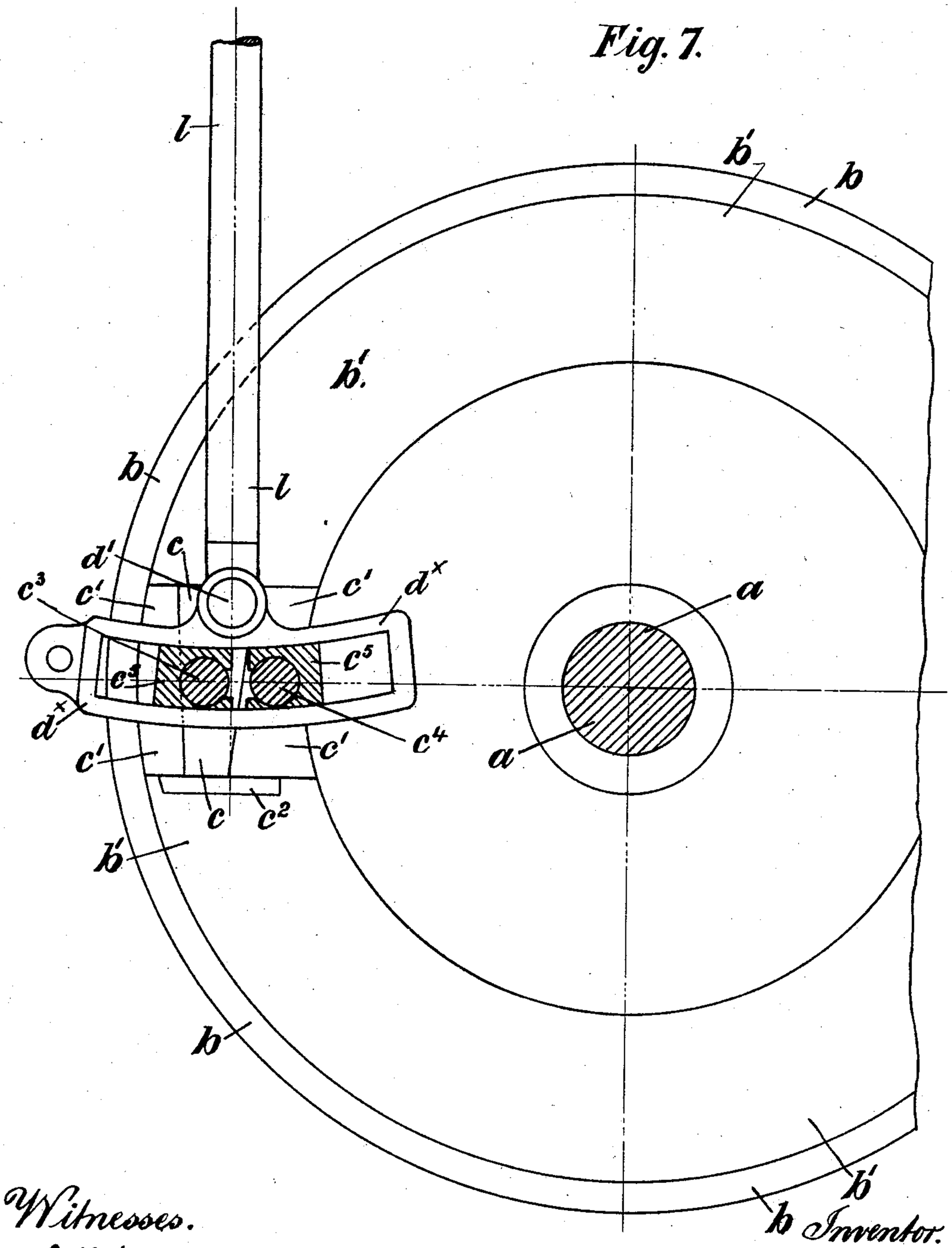
MOTOR.

(Application filed Mar. 4, 1898.)

(No Model.)

6 Sheets—Sheet 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY WILCKE, OF LIVERPOOL, ENGLAND.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 608,242, dated August 2, 1898.

Application filed March 4, 1898. Serial No. 672,572. (No model.)

To all whom it may concern:

Be it known that I, HENRY WILCKE, a subject of the Queen of Great Britain, and a resident of Liverpool, Lancaster county, England, have invented certain new and useful Improvements in Motors, of which the following is a specification.

The invention consists in the features hereinafter described and fully pointed out in the claims.

Figure 1 is a side elevation, partly in section, and Fig. 2 an end view, partly in section, showing one modification. Figs. 3 and 4 are respectively sectional side elevation and end view, partly in section, of another modification. Figs. 5 and 6 are part sectional side elevation and end view, respectively, of a further modification. Fig. 7 is a side elevation of another modification.

The same letters of reference are used to denote the same or equivalent parts wherever they occur in the drawings.

Referring in the first instance to Figs. 1 and 2, these figures illustrate one example of the application of the invention and one form of apparatus for carrying it out.

In the drawings, *a* is a shaft—say the axle of the driving road wheel or wheels—of a motor-vehicle, (but it may be an intermediate shaft,) and *b* are two disk-wheels, which are mounted upon this shaft and through which the movement imparted by the apparatus to be described is transmitted to the road-wheels. Each of these disks *b* is provided at its periphery with an annular open channel *b'*, the open parts of the two lying in a vertical plane and facing each other, and through the inner and outer annular surfaces of the interior of these channels power from the driving mechanism is applied. The actuating mechanisms of these disks are of the reciprocating type and comprise an engaging and disengaging device (that shown being of the frictional order) operated in connection with the channels *b'*, reciprocating or rocking levers or their equivalents connected with and operating these devices and having variable fulcra or means for varying the leverage, and a steam, gas, or oil engine connected with and operating the levers.

The frictional device consists of wedge-shaped blocks *c* and inner and outer blocks *c'*, working internally in connection with the surfaces of *c* and externally with the surfaces of *b'*, the block *c* being held in connection with *c'* by the plates c^2, which are on *c*.

The actuating-levers are designated *d* and are connected at their outer parts with the blocks *c* by connecting-rods *e*, the outer heads *e'* of which work upon a pin c^3, coupling the two wedge-blocks *c* together.

The fulcra of the lever *d* consist of the pins and blocks *f*, which are adapted to move up and down in slots in the levers. Their movement or adjustment may be effected by any suitable known gear—such, for instance, as screw-gear or the like. The opposite ends of these levers *d* are connected with a reciprocating rod *g*, which is guided by the guides *g'* and g^2 (the latter being a slide-guide) and receives motion to and fro from a crank or crank or disk on a shaft *h*, having a continuous rotating movement, it being connected to *g* by a suitable connecting-rod. This shaft *h* may represent the crank-shaft of a steam, gas, oil, or other suitable engine and be assumed to revolve at a constant rate of speed.

With regard to the reciprocating gripping device, consisting of the parts *c* and *c'*, these preferably are so made and fitted together that they have substantially no visible movement in relation to each other when in the channels *b'*, the mere application of pull or push of the block *c* or *c c'* when moved in one direction being sufficient to cause the blocks *c'* to effect an immovable frictional connection between them and the surfaces of *b'* and when moved in the other direction to free them, so as to produce a perfectly free sliding connection between them.

In action the engine, being driven at, say, a constant rate of speed, will impart to the rod *g* a constant rate of reciprocation, the rate of movement of the rod, however, in the different parts of its stroke being variable—*i. e.*, slow at the ends and faster at the intermediate portions—this being due to its being driven by a revolving mechanism. The reciprocation of the block *c* through the levers *d* and connecting-rods *e* alternately press the grip-block forward and backward together, and these grip-blocks above and below being

arranged with their inclinations in opposite directions, as shown in Fig. 1, cause the blocks c', connected with them, to be respectively pressed outward and grip the disk b and to be relieved from gripping or pressing upon such disk. Thus by each forward-and-backward motion of these reciprocating parts the disk b will be moved, and practically a constant movement is produced by the alternate grippings and releasings, and thus the intermittent reciprocating movement of the device $c\,c'$ is converted to a continuous rotary one.

As regards the levers and gear shown in Figs. 1 and 2, these are largely diagrammatic and obviously susceptible of a great variety of modifications and forms.

With regard to the general characteristics of the invention and apparatus shown the effects accomplished are that by varying the amount of movement of the engaging and releasing device or the reciprocating parts which impart movement to the rotary moving part through an intermediate mechanism between the engine and these parts, which renders their throw variable, (such as by the means shown or specified,) and by running the engine at a constant speed (say its full power) the power which the engine is capable of applying to the parts moved is valuable in a high degree—that is, with a constant rate of movement of the engine a small movement of the engaging and disengaging device will produce a high leverage or power and slow propelling effect, while a large amount of movement with smaller leverage and power will produce a higher propelling effect, and hence an engine which is capable of driving a vehicle, say, upon the level at the desired speed is rendered capable of driving it up gradients at a lower speed and of starting it from a state of rest with the same certainty, and these effects are accomplished without the use of tooth or belt gearing or the like, and, further, these variable powers or leverages may be applied and changed while the mechanism is in motion and without having to throw mechanisms in and out of gear.

Referring now to the modifications shown in Figs. 3 and 4, in this case the reciprocating and gripping parts are substantially the same as those shown in Figs. 1 and 2, except that instead of the blocks c being alone moved by the connecting-rods both these blocks c and the inner of the blocks c' are moved, so that a positive movement of the two in relation to each other is produced, and this is effected through the link i, which is connected to the connecting-rod head e' and to the blocks c and inner blocks c' by the pins c^3, connected with c and c^4, connected with c'. It will be seen that when the connecting-rod e is moved one way or the other the blocks c and c' will be positively moved in relation to each other through the link i and the pins c^3 and c^4. In other respects the apparatus and its action are the same as that shown in Figs. 1 and 2.

The modification shown in Figs. 5 and 6 has for its object the same end as that shown in Figs. 3 and 4—namely, the positive movement of the parts c and c' in relation to each other—and as an equivalent to the mode of obtaining this end in lieu of the link I provide in connection with the inner blocks c' a rod or link k, connected to c' by the T or cross bar k' and passing through a frictional box k^2, (which is similar to a stuffing-box and gland,) mounted and arranged to oscillate upon trunnions supported in the brackets k^3. Obviously for each change of direction of motion of the blocks c and c' the block c', connected with k, will tend to resist such change, and consequently the action or movement in connection with these two blocks becomes a positive one.

In the modification shown in Fig. 7 the reciprocating and variable power link $d^\times$ is adapted as a reversing-link and is applied directly to the blocks $c\,c'$, the rod working this link in this case being the reciprocating rod l. In the construction shown the blocks c and c' are both operated similarly, as in Figs. 3 and 4, through pins c^3 and c^4, blocks c^5 being provided about these pins to work in the curved surfaces of the lever d. The link-lever d is moved in the manner of an ordinary engine-valve gear-link nearer to and farther from the shaft a, and consequently the farther the point of pressure—viz., the joint d' of l upon d—is from the axis of a or the nearer it is to the shaft the greater or smaller will be the leverage and the greater or smaller will be the stroke of the gripping device. The rod l has itself the same stroke each reciprocation. Then as a reversing device, according to which side of the blocks c and c' the pin-joint d' is, will depend the direction in which these blocks c and c' will be moved in the opposite strokes of rod l, and according to these they will either grip or move freely over the disk b. As a modification of this the link can be used solely as a reversing device, while the variable lever device would operate it, in which case the rod l would be the equivalent of the rod e in Figs. 1 to 6.

What is claimed in respect of the herein-described invention is—

1. In combination, the disk having the channel b' therein and the means for rotating the disk comprising the two sets of wedge-blocks each set comprising three wedge-blocks c,c',c', the said blocks c being arranged between the said wedge-blocks $c'\,c'$ and the latter bearing against the walls of the channel b', with means for limiting the movement of the block c in relation to the other blocks and means for moving the two sets of blocks, substantially as described.

2. In combination, the disk, the gripping devices, one on each side of the disk, the rods, connected to the gripping devices, the pivoted links d, d, connected to the rods the reciprocating rod g connected to the adjacent ends of the said links, the fulcrums for the links intermediate of the ends of the links, and

means for moving the rod *g*, substantially as described.

3. In combination, the disk having the groove in its lateral face, the gripping devices therein each comprising the plurality of wedge-blocks, the reciprocating rods for operating the said blocks with means for giving a movement to one block of each set in relation to the other block of that set, said means comprising links pivotally connected with one of the blocks of each set, substantially as described.

4. In combination, the disk, the gripping devices comprising the wedge-blocks, the reciprocating rods for operating the wedge-blocks, and the links between the rods and said wedge-blocks, said links being pivotally connected to the rods and also to the wedge-blocks, substantially as described.

5. In combination, the disk, the gripping devices comprising the wedge-blocks, the reciprocating rods for operating the wedge-blocks, and the adjustable link between the rods and said wedge-blocks whereby the movement may be reversed, said links being pivoted to the rods and to the wedge-blocks, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HENRY WILCKE.

Witnesses:
ERNEST R. ROYSTON,
JOHN H. WALKER.