

(No Model.)

T. B. VAN ANKEN.
STEAM ENGINE VALVE GEAR.

No. 323,238.

Patented July 28, 1885.

Fig. 1.

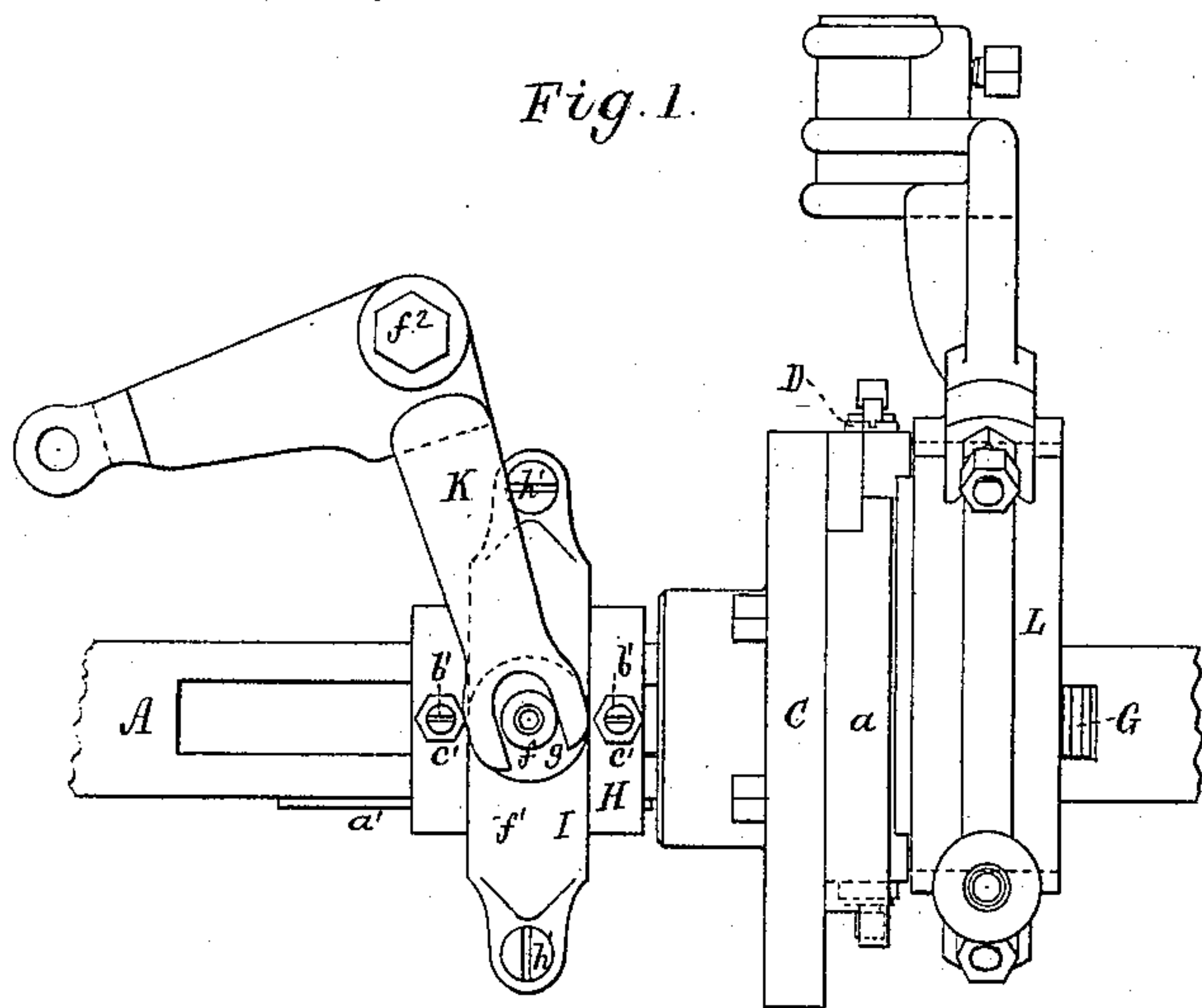


Fig. 6.

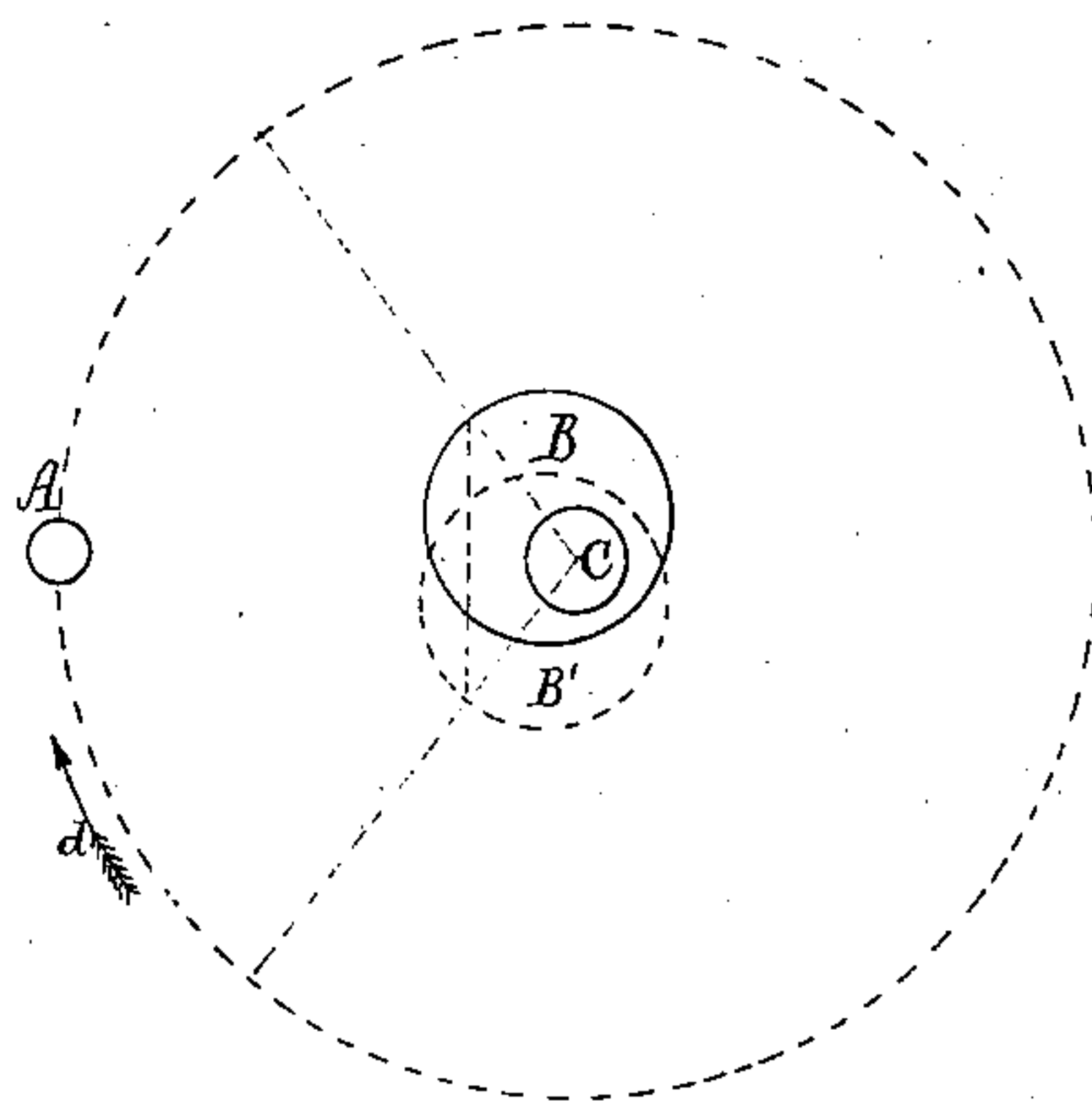


Fig. 4.

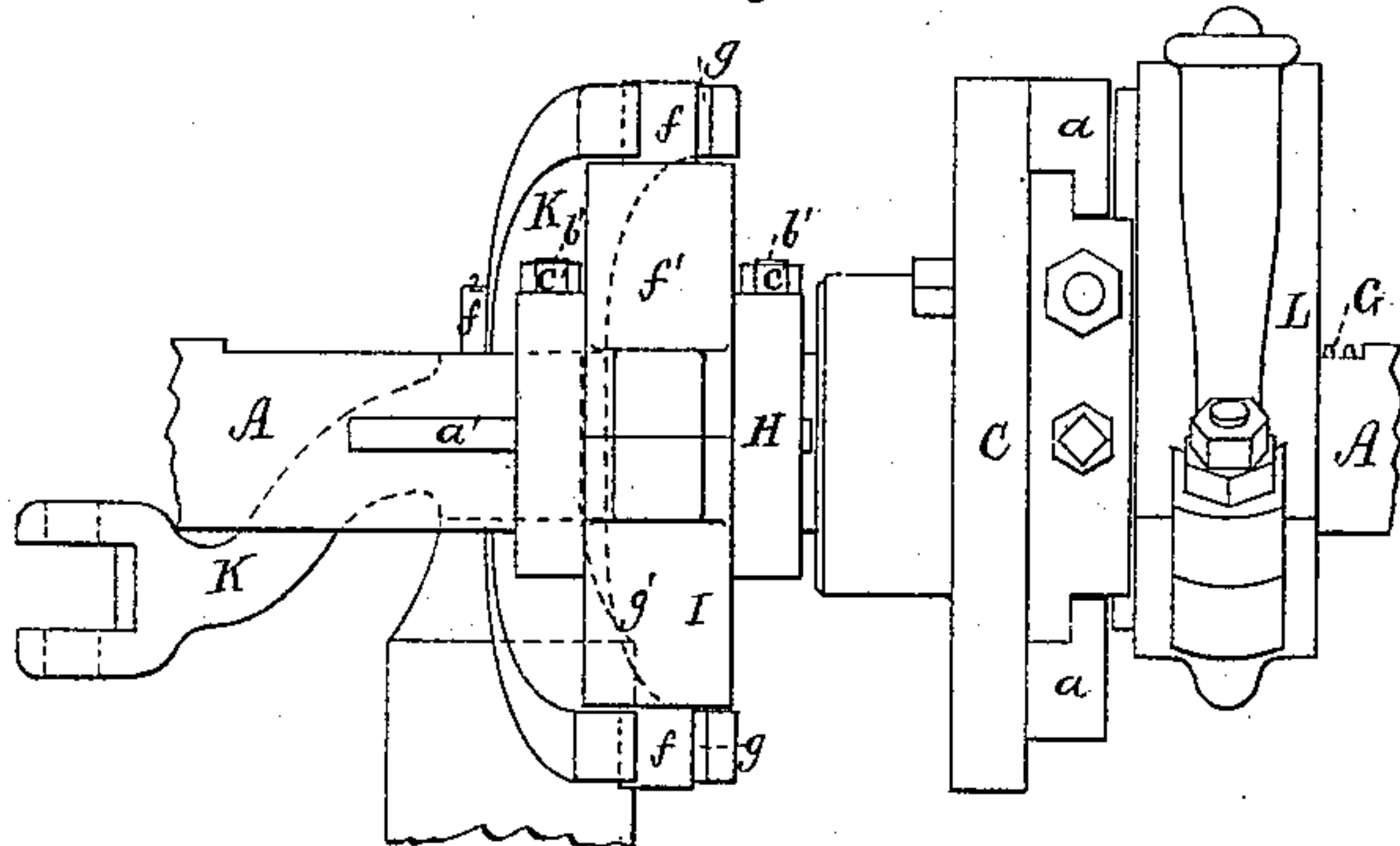


Fig. 5.

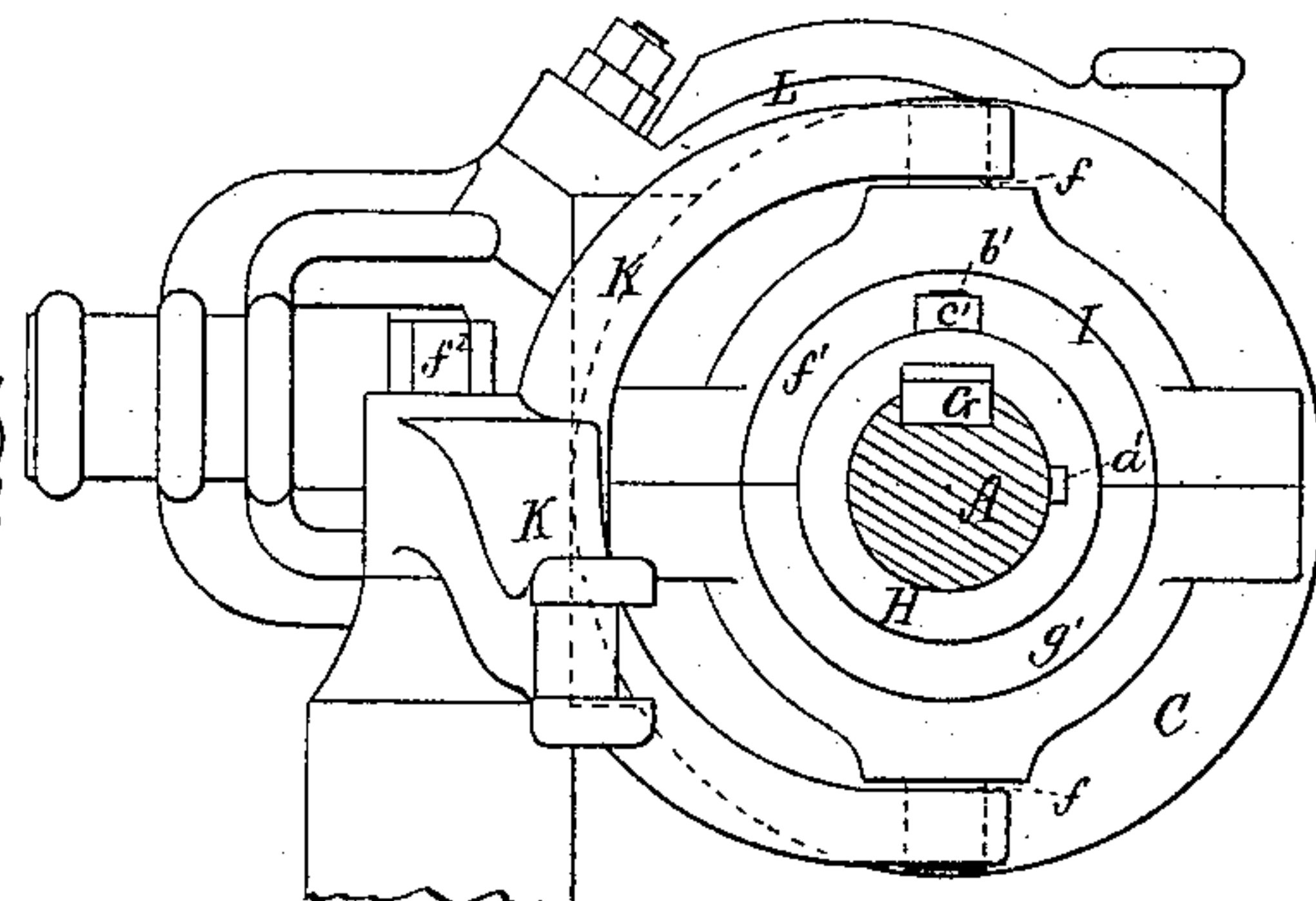


Fig. 3.

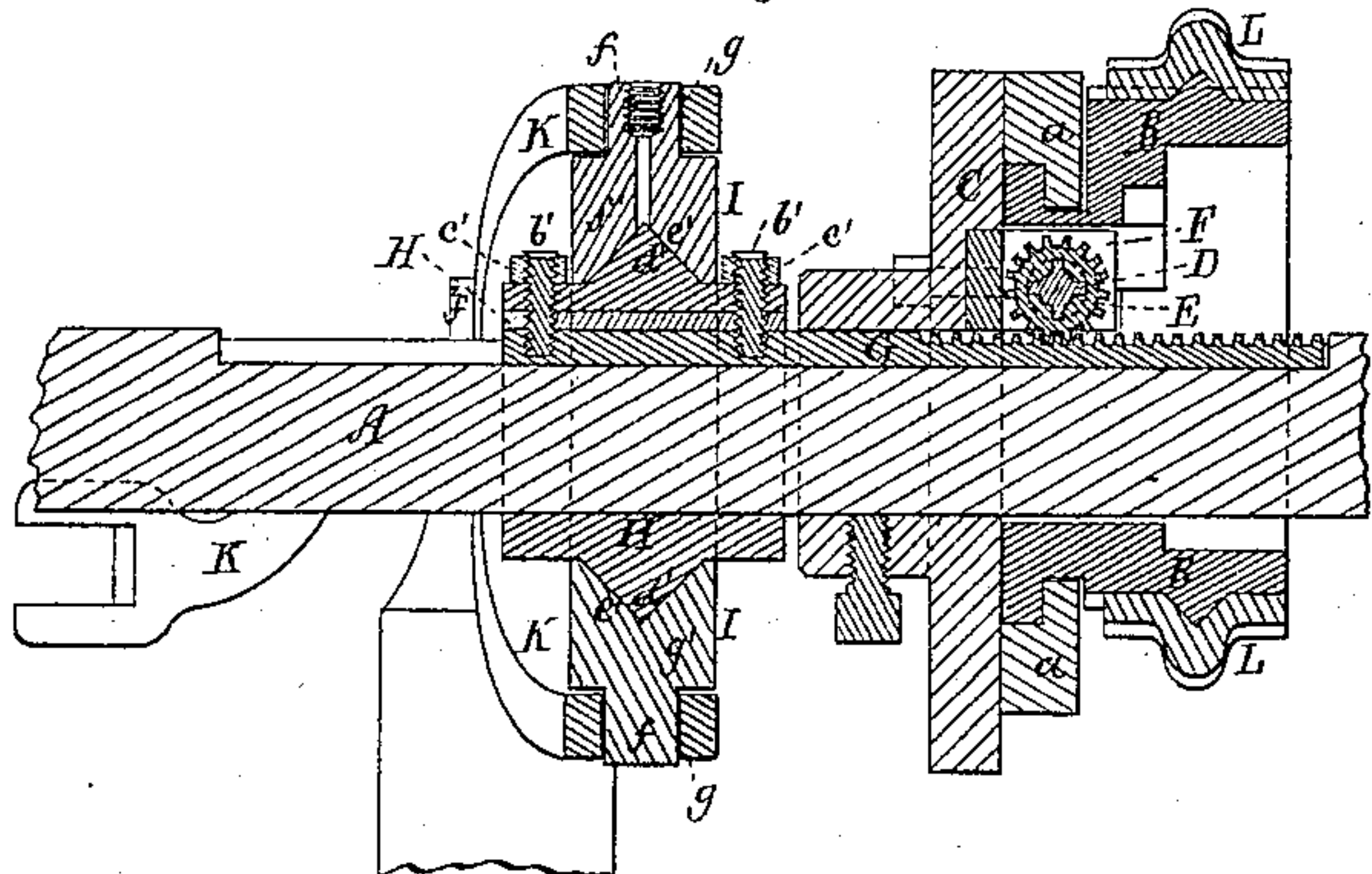
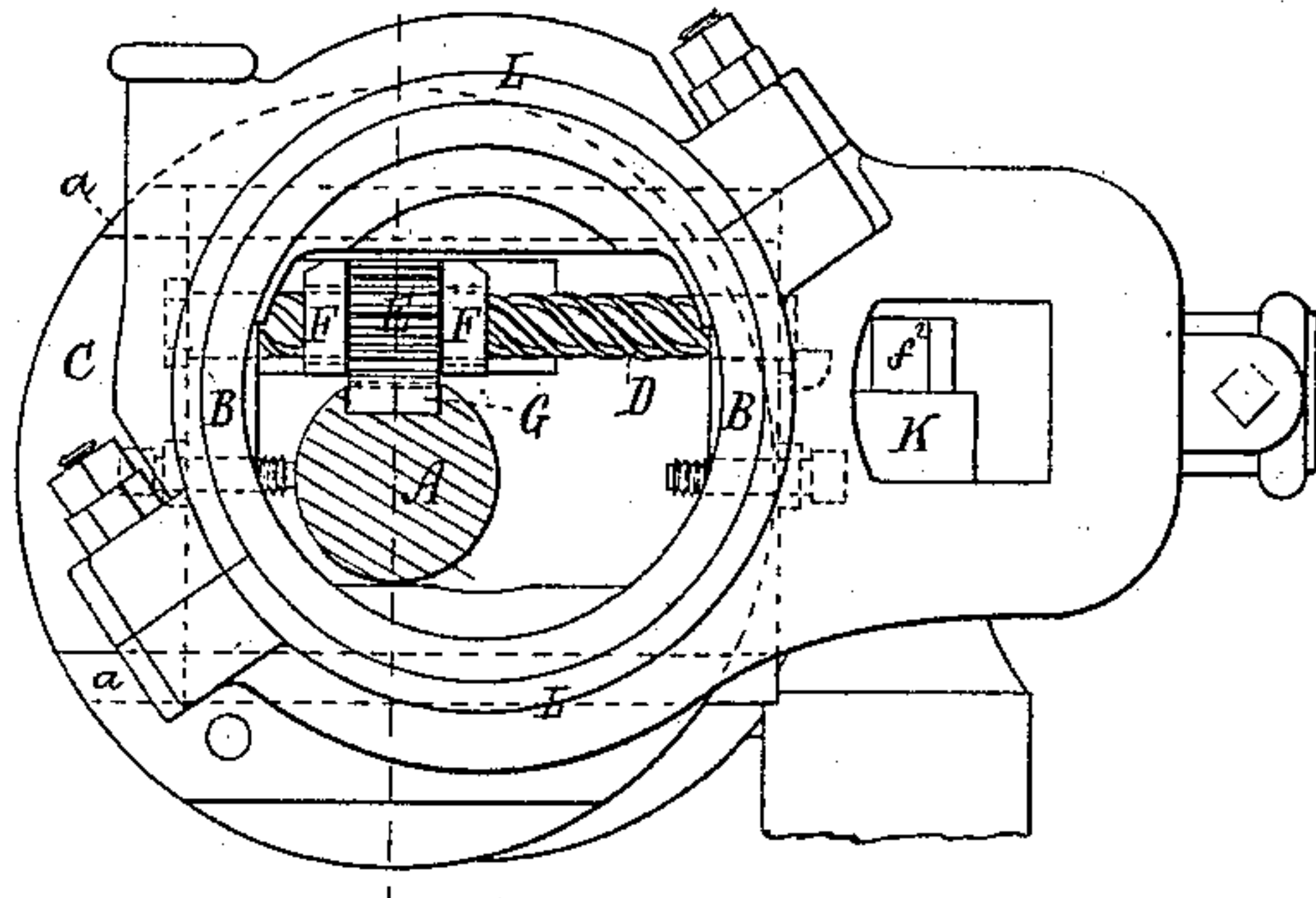


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS BEADLE VAN ANKEN, OF AUBURN, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO HIMSELF AND WALTER W. JONES, OF SAME PLACE.

STEAM-ENGINE VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 323,238, dated July 28, 1885.

Application filed May 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BEADLE VAN ANKEN, of Auburn, in the county of Cayuga, of the State of New York, have invented a new and useful Improvement in Steam-Engine Valve-Gears; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front end elevation, Fig. 3 a longitudinal section, Fig. 4 a side elevation, and Fig. 5 a rear end view, of a valve-gear including my invention or improvement, the nature of which is defined in the claims hereinafter presented. Fig. 6 is a diagram illustrative of the extreme positions into which an eccentric has to be moved rectilinearly, by means hereinafter specified.

As most if not all steam-engines of the kinds termed "locomotive," "marine," or "traction" of necessity are obliged to be capable of running either in one or the opposite direction, they have to be furnished with means by which their motions can be instantly reversed, the usual practice being to employ two eccentrics—one for aiding in effecting what is termed the "forward" and the other for aiding in producing what is termed the "backward" motion—such eccentrics being suitably connected with the valve of the engine. With my improvement but one eccentric becomes necessary, there being employed with it and the engine-shaft a mechanism, as hereinafter described, for moving such eccentric into either of two extreme positions relatively to the shaft, or into any intermediate position, as desired, to effect or produce an earlier or later cut-off of the steam to the cylinder of the engine, thus allowing the steam to be economically used, or, in case of accident or breakage or derangement of the throttle-valve, enabling the engine to be completely stopped by moving the eccentric into a position midway between its two extreme ones. In order to produce a movement of the engine-piston in a given direction it becomes necessary to so place the eccentric that its point of greatest eccentricity relatively to the shaft shall be in

the direction required for the piston to be moved. To reverse the motion of the piston, the eccentric has to be moved laterally, so that its point of greatest eccentricity shall be in an opposite direction relatively to the shaft—that is to say, if we suppose, in Fig. 6, A to represent the crank-pin of an engine, C the shaft, and B the eccentric in position to cause the crank to be revolved in the direction of the arrow *d*, the dotted circle B' will show the position which the eccentric should have for effecting a reverse movement of the crank, the eccentric having to be moved rectilinearly from the position B to the position B', or vice versa. Mechanism to be herein described is to produce such a movement of the eccentric.

In the drawings, A denotes the engine-shaft, and B the eccentric through which the shaft extends. The eccentric is a cylindrical ring supported by a disk, C, which is fastened on the shaft concentrically, and so as to revolve with it, the eccentric being movable rectilinearly in parallel guides *a a*, projecting from one side of the disk.

Extending across the eccentric and permanently fixed in it, so as to be incapable of revolving, is a four-threaded screw, D, on which is screwed a spur gear or pinion, E, that is placed between two ears, F, projecting from the disk, the screw going loosely through but not being screwed into such ears. The screw is not necessarily a four-threaded one, as it may have a less or greater number of threads, as circumstances may require. The said pinion E engages with a rack, G, arranged lengthwise within the shaft A, and adapted to slide longitudinally therein.

Encompassing the shaft is a tube, H, which slides lengthwise on the shaft, and also revolves with it, such tube being held to the shaft by a spline or feather, *a'*. This tube is fastened to the rack G by screws *b'*, having set-nuts *c'*. From the tube, at its middle, there is extended a flange, *d'*, which is triangular in transverse section. This flange extends entirely around the tube and into a corresponding groove, *e'*, in a collar, I, made in two sections, *f'* and *g'*, connected by screws *h'*.

This collar I is provided with two journals, *f*, extending from it into notches *g* in the prongs of a furcated bent lever, *K*, to whose shorter arm a rod is to be attached for moving the lever on its fulcrum *f*². In practice a rod is jointed to the shorter arm of the lever *K* and to what is termed a "reversing-lever," such being for moving the lever *K* on its fulcrum.

The eccentric is encompassed by a collar, *L*, which in practice is connected with the slide-valve by suitable means to enable such valve to be reciprocated on its seat by the eccentric while in revolution with the shaft *A*.

From the above it will be seen that while the shaft *A* may be in revolution the aforesaid disk and the eccentric will be revolved with and by it, and should it be desirable to move the eccentric rectilinearly to either of its extreme positions such can be effected by moving the rack so as to cause the pinion to revolve between the two ears and on the screw. By means of the screw the throw of the eccentric can be increased or diminished, as may be desired, in order to effect an earlier or later cutting off of the steam to the cylinder, the power of the engine being increased by a later cut-off; or the steam may be used with more economy by an earlier cut-off. If we have an engine furnished with my improved valve-gear and doing a certain quantity of work—say a light load—and for any reason should not desire to control the position of the eccentric, and thereby, of course, the valve, by use of the reversing-lever hereinbefore referred to or mentioned, we can loosen the screw in its supports, if keyed thereto, as it generally should be, and by turning the screw, so as to decrease the throw of the eccentric, we can effect an earlier cut-off of the steam; or, should we desire to increase the power of the engine, we can turn the screw, so as to increase the throw of the eccentric, and thus effect a later cut-off, and a consequent increase of power of the engine. Traction-engines in particular, to which my improved valve-gear is peculiarly adaptable, are subjected to large variations of load, sometimes for weeks or months doing light

work, and next, perhaps, put to a very heavy duty. The being able to set the eccentric conveniently for these variations in the amount of power desired is a very important requisite.

I do not claim the combination of a ball-governor with an eccentric and with mechanism applied to such governor and eccentric for moving the latter laterally, all being as represented in the United States Patent No. 113,701, my invention having no ball-governor, but including the engine-shaft.

I claim—

1. The combination of the engine-shaft with the rack applied thereto, and provided with means of moving it (the said rack) lengthwise therein, the disk fixed on the said shaft and having means of supporting the eccentric and guiding it rectilinearly in its movements across the said disk, the ears projecting from the disk, the pinion engaging with the rack and arranged between and against the ears, and the screw arranged within and across and fastened to the eccentric, and going through the ears and screwed into and through the pinion concentrically therewith, all being substantially and to operate as and for the purpose set forth.

2. The combination of the engine-shaft *A*, the tube *H*, having the triangular flange *d'*, the collar *I*, encompassing such flange, and the furcated lever *K*, pivoted to such collar, the rack *G*, fixed to the tube *H* and adapted to slide lengthwise on the shaft, the disk *C*, fixed on the said shaft, the tubular eccentric *B*, supported, as described, by the said disk, so as to be capable of moving rectilinearly across it, the pinion *E*, pivoted to such disk and engaging with the said rack, and the screw *D*, arranged within and across and fastened to the eccentric, and screwed into and through the pinion concentrically therewith, all being substantially and to operate as set forth.

THOMAS BEADLE VAN ANKEN.

Witnesses:

WALTER W. JONES,
JOHN VAN KEUREN.

Corrections in Letters Patent No. 323,238.

Affidavit having been filed showing that the name of the patentee of Letters Patent No. 323,238, granted July 28, 1885, for an improvement in "Steam-Engine Valve-Gear" should have been written and printed "Thomas Beadle Van Auken," instead of *Thomas Beadle Van Anken*, it is hereby certified that the proper corrections have been made in the files and records pertaining to the case in the Patent Office, and should be read in the Letters Patent that the same may conform thereto.

Signed, countersigned, and sealed this 1st day of September, A. D. 1885.

[SEAL.]

G. A. JENKS,
Acting Secretary of the Interior.

Countersigned:

M. V. MONTGOMERY,
Commissioner of Patents.