

(No Model.)

2 Sheets—Sheet 1.

J. W. P. TAYLOR.

VALVE GEAR.

No. 390,819.

Patented Oct. 9, 1888.

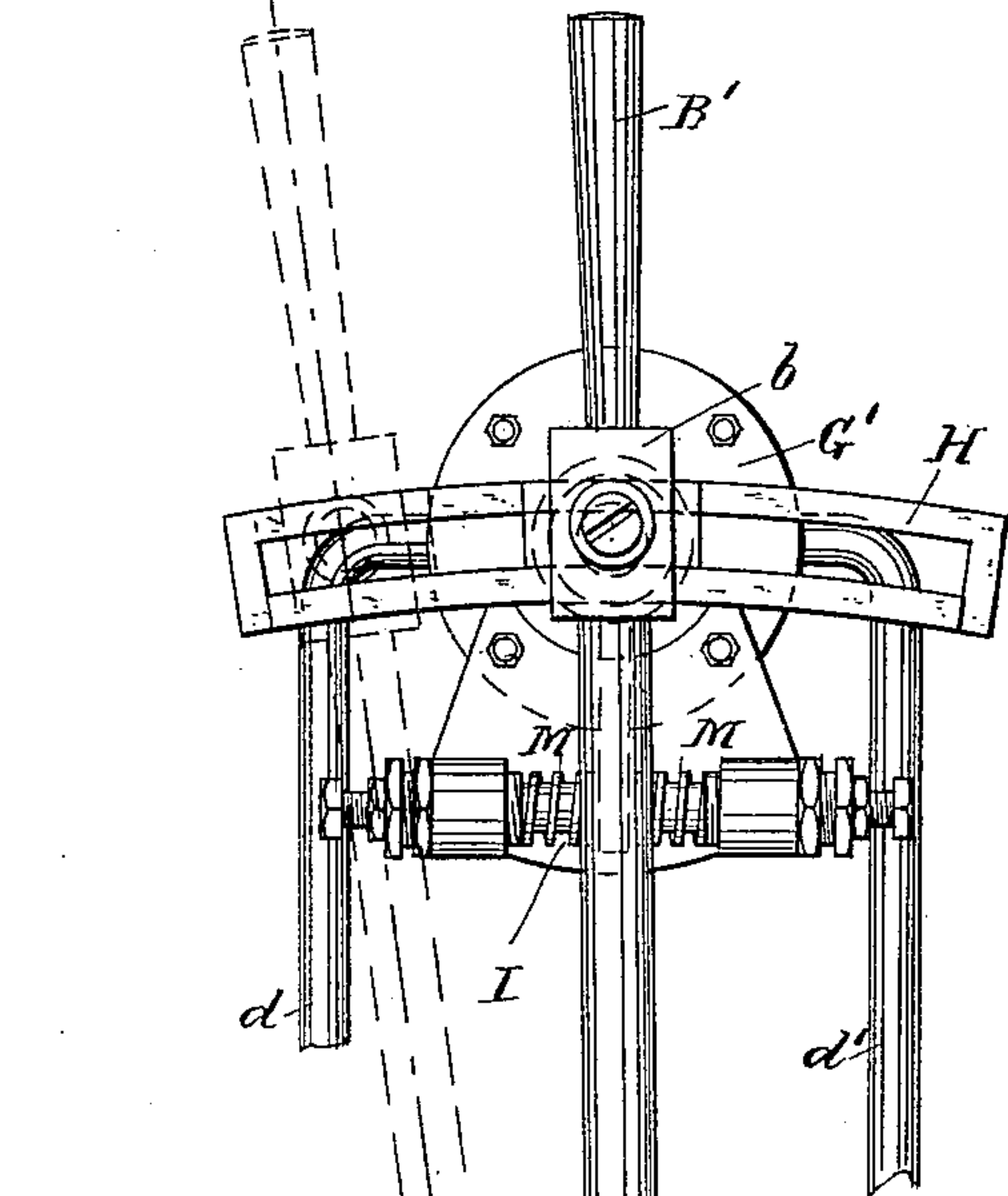


Fig. 1—

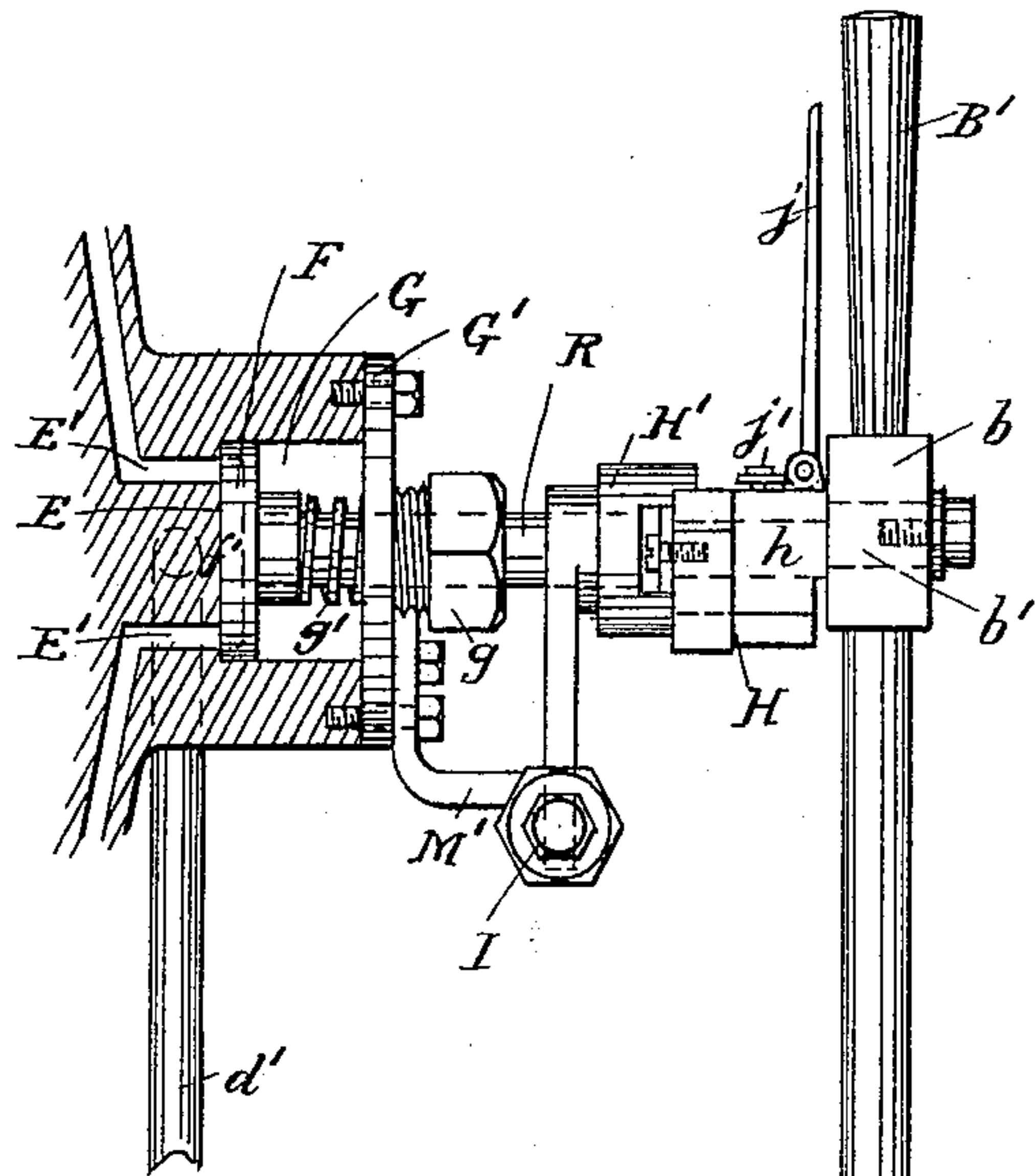


Fig. 2—

Witnesses

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(No Model.)

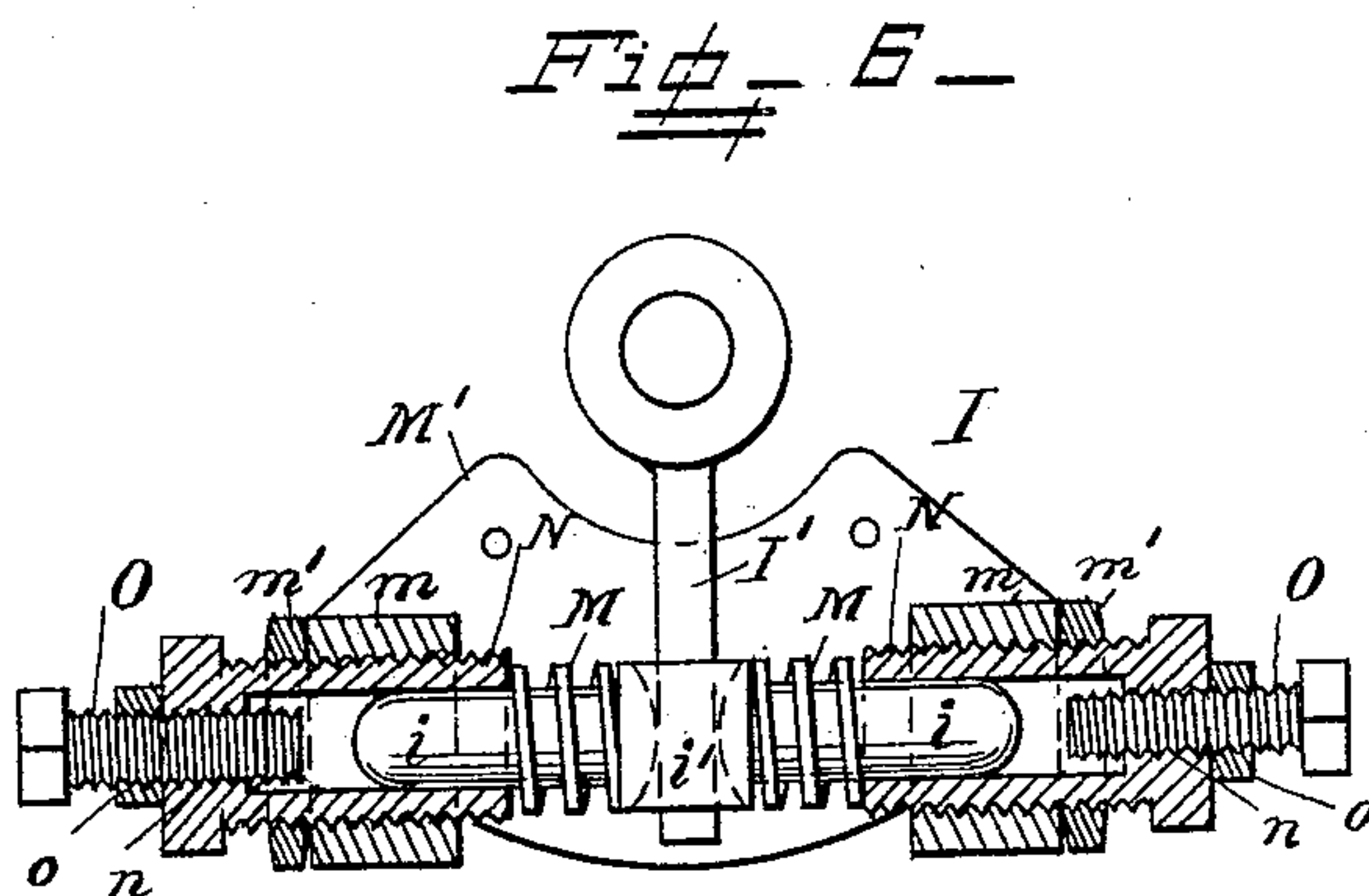
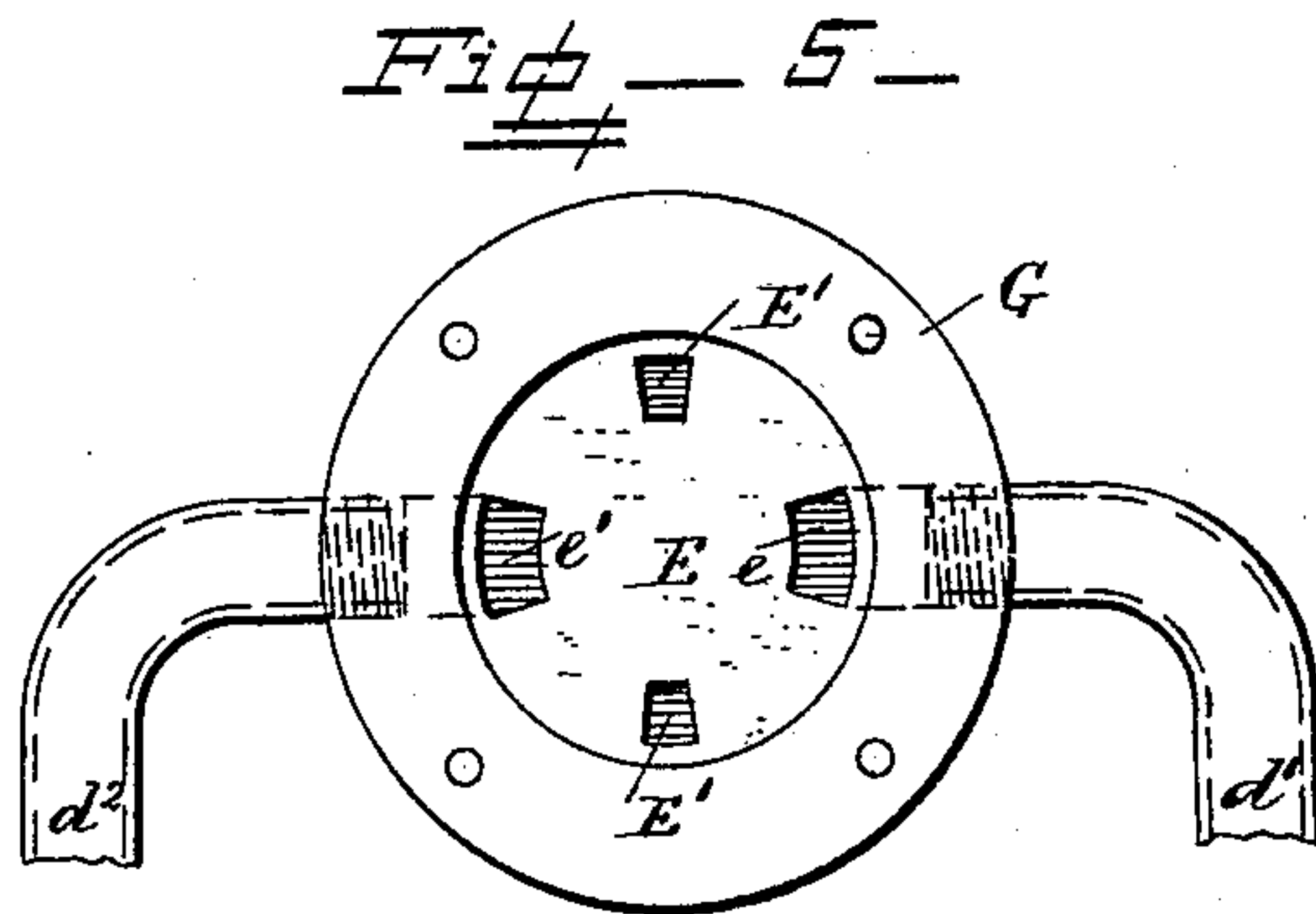
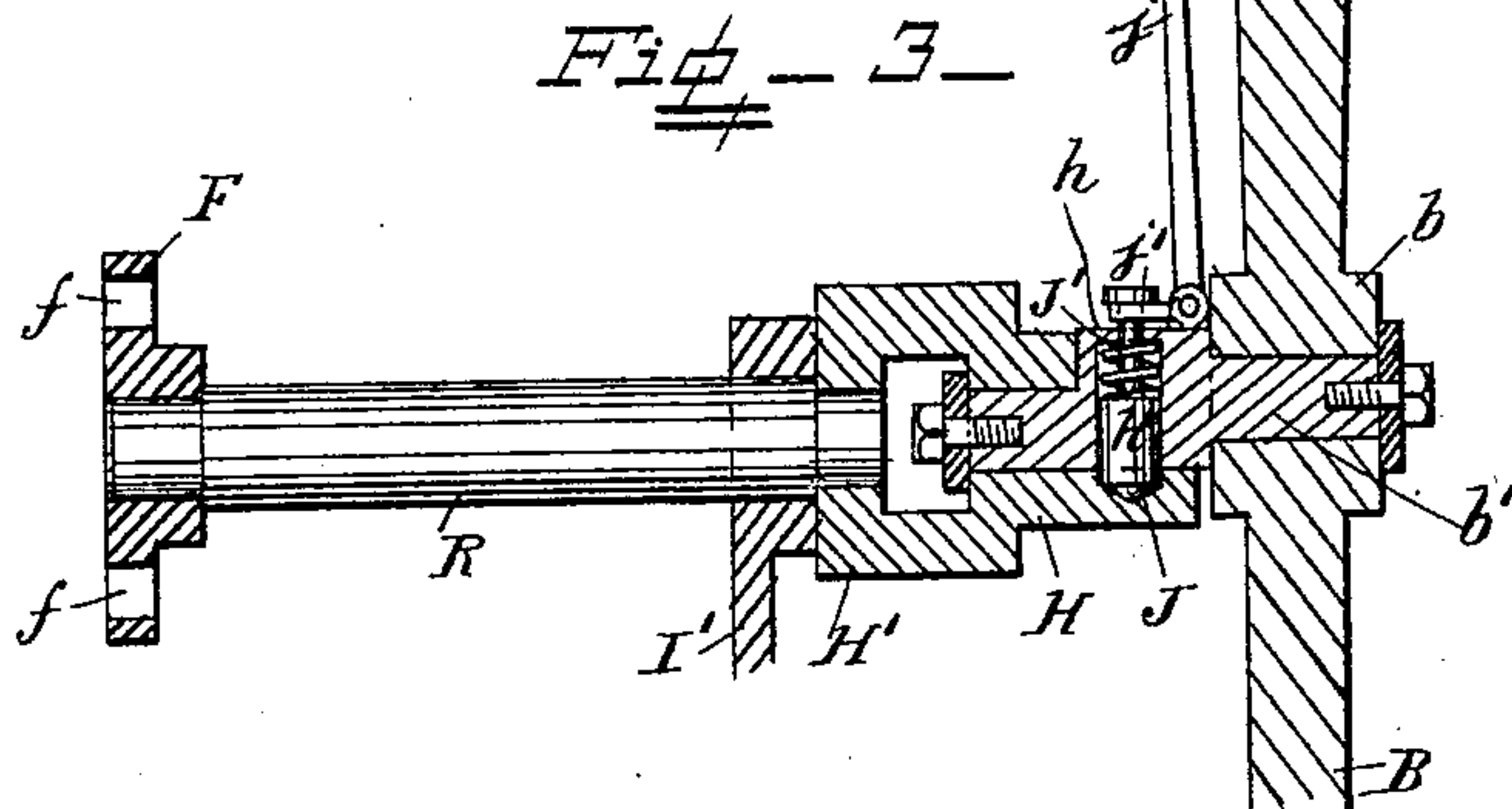
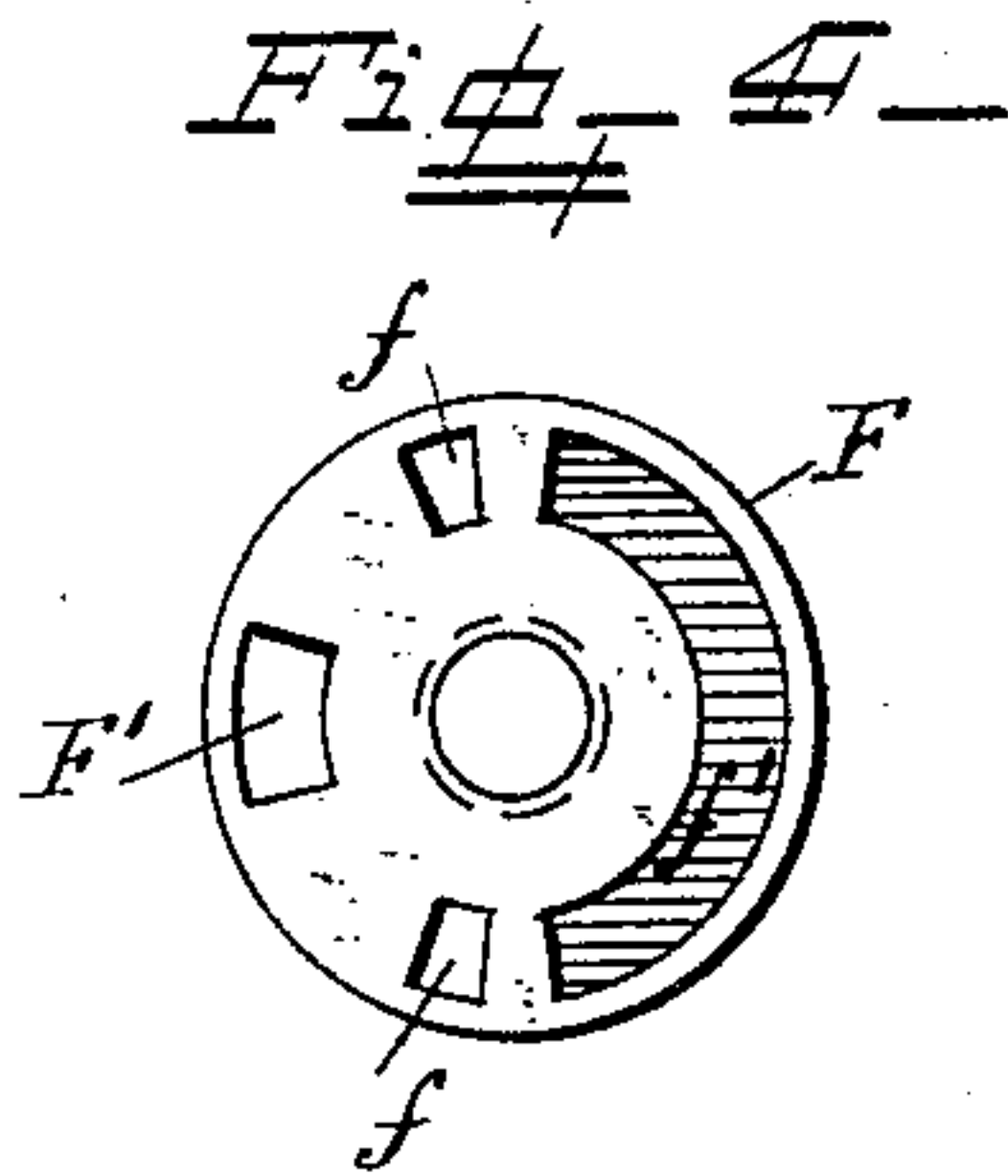
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Witnesses,

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UNITED STATES PATENT OFFICE.

JAMES W. P. TAYLOR, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
OF ONE-THIRD TO LEWIS B. TAYLOR, OF SAME PLACE.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 390,819, dated October 9, 1888.

Application filed June 14, 1888. Serial No. 277,106. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. P. TAYLOR, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Steam-Engine Valve-Gears; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to valve-gears for steam-engines; and it consists in the novel construction and combination of the parts, hereinafter fully described and claimed, whereby the engine may be reversed and the admission of steam regulated.

In the drawings, Figure 1 is a front view of the valve-gear when the valve is on the center, and the dotted lines indicate the position of the parts when the valve is about to admit steam to the engine-cylinder to turn the crank in the direction of the arrow. Fig. 2 is a side view, partly in section, of the parts shown in Fig. 1. Fig. 3 is a vertical cross-section through the valve and the link, showing the spring-catch. Fig. 4 shows the face of the valve. Fig. 5 shows the face of the steam-chest against which the valve works. Fig. 6 is a detail sectional view of the device for moving the link to its central position, as shown in Fig. 1.

The engine is provided with a cylinder, framing, crank, crank-shaft, and other necessary co-operating parts, all of which are of any approved construction.

The valve is operated by a single eccentric, A, secured upon the crank-shaft A' at right angles to the crank. It is immaterial whether the eccentric is set in advance of or behind the crank, so that it is substantially at right angles to it and suitably connected to the pin of the link-block. The eccentric-strap *a* has the guides *a'* cast integral with or otherwise firmly secured to it, and *a²* is a collar connecting the top ends of the said guides.

B is the eccentric-rod, provided with the handle B', and *b* is a boss, in which the pin *b'* of the link-block is pivoted.

CCaresprings upon each side of the collar *a²*, and which form a spring-connection between

the eccentric-rod and the eccentric. A sleeve, *c*, bears against the top of the upper spring, C, and *c'* are nuts screwed upon the rod and bearing against the sleeve for adjusting the tension of the upper spring.

D is a sleeve provided with lugs D', which slide in the guides *a'*. This sleeve D is slid upon the lower end of the eccentric-rod and bears against the lower spring in a similar manner to which sleeve *c* bears against the upper spring, and *d* are nuts screwed upon the end of the rod for tightening up the lower spring. The nuts *d* or *c'* alone would be sufficient to adjust the pressure of both springs; but upper and lower nuts are used, so that the tension of both springs may be regulated without altering the length of the eccentric-rod.

E is the face of the valve-chest against which the valve works.

E' are the steam-ports which lead to the ends of the cylinder, and *e e'* are respectively the steam and exhaust ports in the said face, provided with steam and exhaust pipes *d'* and *d²*.

It is immaterial in carrying out this invention which of the two ports, *e* or *e'*, is used for steam-inlet and which for exhaust, as will hereinafter be more fully set forth.

F is the valve, which is a circular disk-valve provided with the steam-inlet passage F', the steam-supply ports *f*, and the exhaust-cavity *f'*.

R is the oscillating valve stem, which is connected to the valve for the purpose of giving it its motion. The valve works in a circular steam-chest, G, provided with a cover, G', and *g* is a stuffing-box for keeping the valve-stem steam-tight. A spring, *g'*, is interposed between the cover and the valve for the purpose of keeping the valve against the face E; but this spring may be dispensed with, if desired.

H is the link, provided with the boss H' for securing it centrally upon the projecting end of the valve-spindle. It is not material that this link should be exactly in the center; but its ends must extend for a sufficient distance on each side of the valve to permit it to be used as a reversing-link. The link is radial to the center of the crank-shaft when in its central position, as shown in Fig. 1; and *h* is the sliding link-block, provided with the pin *b'* for

connection with the eccentric-rod. A spring catch-pin, *h'*, is provided for connecting the link-block to the link in various positions.

The operation of the device is as follows:

5 When the parts are in the position indicated by the full lines in Fig. 1, the bars of metal between the steam-ports and the ends of the exhaust-cavity in the valve cover the steam-ports *E'*, and the cylinder does not receive any
10 steam, because the link is held in its neutral position by the device *I*, which will be more fully described hereinafter. When the eccentric-rod is moved to the left, as indicated by the dotted lines, the motion of the eccentric in
15 the direction of the arrow will raise the left-hand end of the link and open the lower steam-port. This brings the exhaust-cavity over the upper steam-port and causes the piston to make its upstroke. The crank moves in the
20 direction of the arrow in Fig. 1, this direction being that in which the eccentric must move to open the lower steam-port fully as the crank moves on. If the eccentric-rod were moved to the right-hand end of the link, the crank
25 would be obliged to revolve in the reverse direction to the arrow, since it is necessary that the right-hand end of the link should be depressed in order that the lower steam-port may be fully opened for the admission of steam,
30 and this depression can only be accomplished by the movement of the eccentric by the crank-shaft in the reverse direction to the arrow.

The amount of opening of the steam-ports is regulated by placing the link-block in different
35 positions between the center and the ends of the link. When the block is at either extreme end of the link, the oscillating motion of the valve-stem is least, so that less steam is admitted. As the link is brought nearer to
40 the center, the oscillation of the valve-stem increases until the full maximum opening is attained. The spring-connection of the eccentric-rod to the eccentric permits the link-block to be moved from one end of the link to the
45 other, irrespective of the angular position of the link, so that the engine may be reversed at any point of its stroke. The springs *C* also prevent the engine from running at an injuriously high speed, since if the speed should
50 materially increase by reason of the driving-belt breaking, or from any other cause, the friction of the valve will also increase with the increase of speed and the eccentric will expend a portion of its stroke in compressing
55 the said springs before it actuates the link, and the valve-stem will consequently receive a smaller oscillation and the valve will admit less steam to the cylinder. The spring catch-pin *h'* engages with holes *J* in the link.

60 *J'* is the catch-pin spring, and *j* is a trigger pivoted to the link-block and having a forked end engaging with a head, *j'*, on the end of the stem of the pin, which projects through a hole in the top of the link-block.

65 The device *I*, for placing the link in a central position, consists of the arm *I'*, secured to the valve-stem, and springs *M*, arranged upon

each side of the arm to cause it to assume a central position when the tension of the said springs is not overcome by the eccentric-rod. A sliding bar, *i*, is provided, having a
70 central pocket, *i'*, with which the end of arm *I'* engages.

M' is the bracket which supports bar *i* and which is bolted to some stationary portion of
75 the engine. The bracket *M'* has screwed bosses *m*, and *N* are thimbles which are screwed into the said bosses and serve for the adjustment of the side springs, *M*, check-nuts *m'* being provided to secure the said thimbles in the bosses.
80 The ends of bar *i* slide in the thimbles *N*. The outer end of each thimble has a flange for turning it and an internal screw-threaded portion, *n*.

O are check-screws for limiting the motion
85 of the bar *i*. These screws *O* are screwed into the ends of the thimbles and have lock-nuts *o* to prevent them from slipping. These screws *O* limit the oscillation of the valve-stem and cause the springs *C* of the eccentric-rod to be
90 compressed, thereby preventing too much oscillation of the valve-stem, which might occur when the link-block is brought very near the center of the link.

It will be seen that with steam and exhaust
95 passages, as described, the steam enters through pipe *d'* and port *e* and passes into the steam-chest at the back of the valve through the passage *F'* in the valve, which passage is a broad opening and always in communication
100 with the port *e*. The steam is then admitted to the cylinder through ports *f* and *E'*, as before described, and passes out through the exhaust-cavity and pipe *d''*. The pipe *d''* might, however, have been made the pipe for the ad-
105 mission of steam and pipe *d'* the exhaust. The described arrangement is, however, preferred for a small engine, because it is desirable to have a pressure of steam upon the back of the valve. The ports may, however, be so ar-
110 ranged and proportioned as to balance or nearly balance the valve.

What I claim is--

1. The combination, with a steam-distributing valve, of an oscillating stem connected to
115 the valve, a reversing-link secured to the valve-stem, and a single eccentric for operating the link.

2. The combination, with a steam-distributing valve provided with an oscillating stem,
120 of a reversing-link secured upon the stem and extending on each side of its center, a single eccentric, and intermediate connecting mechanism for operating the link.

3. The combination, with a steam-distributing valve, of an oscillating stem connected to
125 the valve, a reversing-link secured to the stem, a sliding link-block, a single eccentric, an eccentric-rod pivoted to the link-block, and a spring-connection intermediate between the
130 eccentric-rod and the eccentric for permitting the block to slide in any position of the link.

4. The combination, in a steam-engine valve-gear, of an eccentric-rod for operating the

valve, an eccentric for operating the rod, and a spring-connection intermediate between the said eccentric and rod, substantially as and for the purpose set forth.

5 5. In a steam engine valve-gear, the combination, with an eccentric-rod for operating the valve, of an eccentric, an eccentric-strap provided with guides united by a collar through
10 upon each side of the collar and connected to the rod, and a guide-sleeve secured to the end of the said rod and sliding upon the said guides, substantially as set forth.

15 6. In a steam engine valve-gear, the combination, with an eccentric-rod for operating the valve, of an eccentric, an eccentric-strap provided with guides united by a collar through which the said rod passes, springs bearing
20 upon each side of the collar, nuts screwed upon the said rod for adjusting the tension of the springs, and a guide-sleeve connected to the rod and sliding between the said guides, substantially as set forth.

25 7. The combination, with a steam-distributing valve, of an oscillating stem connected to the valve, a reversing-link secured upon the stem, a block sliding in said link and connected thereto by a spring-catch, a single eccentric, an eccentric-rod pivoted to the link-
30 block, an eccentric-strap provided with guides, and separately adjustable springs upon the said rod connecting it to the eccentric-strap and permitting it to slide between the said guides, substantially as set forth.

35 8. The combination, with a steam-distributing valve, of an oscillating stem connected to the valve, a reversing-link secured upon the stem, a single eccentric operatively connected to the link, and springs connected to the
40 said stem and link for placing the valve in a central and neutral position when the eccentric is connected to the middle of the reversing-link, substantially as set forth.

45 9. The combination, with the oscillating stem of the steam-distributing valve, of a reversing-link secured to the stem, an arm se-

cured upon the said stem, a stationary bracket, and springs supported by said bracket and connected to the arm for placing the link in its central position, substantially as set forth. 50

10. The combination, with the oscillating stem of the steam-distributing valve, of the reversing-link secured thereto, an arm secured also to the said stem, a stationary bracket, a sliding bar provided with a pocket for the end
55 of the arm, adjustable thimbles sliding in said bracket and supporting the ends of the said bar, and springs interposed between the said arm and the thimbles, substantially as and for the purpose set forth. 60

11. The combination, with the oscillating stem of the steam-distributing valve, of the reversing-link secured to said stem, an arm also secured to the stem, a stationary bracket, a sliding bar provided with a pocket for the end
65 of the arm, adjustable thimbles sliding in said bracket and supporting the ends of the said bar, springs interposed between the said arm and the thimbles, and adjustable screws in the ends of the thimbles for limiting the motion
70 of the said sliding bar, substantially as and for the purpose set forth.

12. In a steam engine valve-gear, the combination, with a steam chest provided with a face having steam-ports leading to the ends of
75 the cylinder, an exhaust-port, and a port admitting steam into the valve-chest, of an oscillating disk-valve provided with a stem, an exhaust-cavity, and ports for admitting steam through the valve into the steam-chest and
80 from thence to the ends of the cylinder, as set forth, a reversing-link secured upon the said valve-stem, a single eccentric, and an eccentric-rod for operating the said link, substantially as set forth. 85

In testimony whereof I affix my signature in presence of two witnesses.

JAMES W. P. TAYLOR.

Witnesses:

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LEWIS B. TAYLOR.