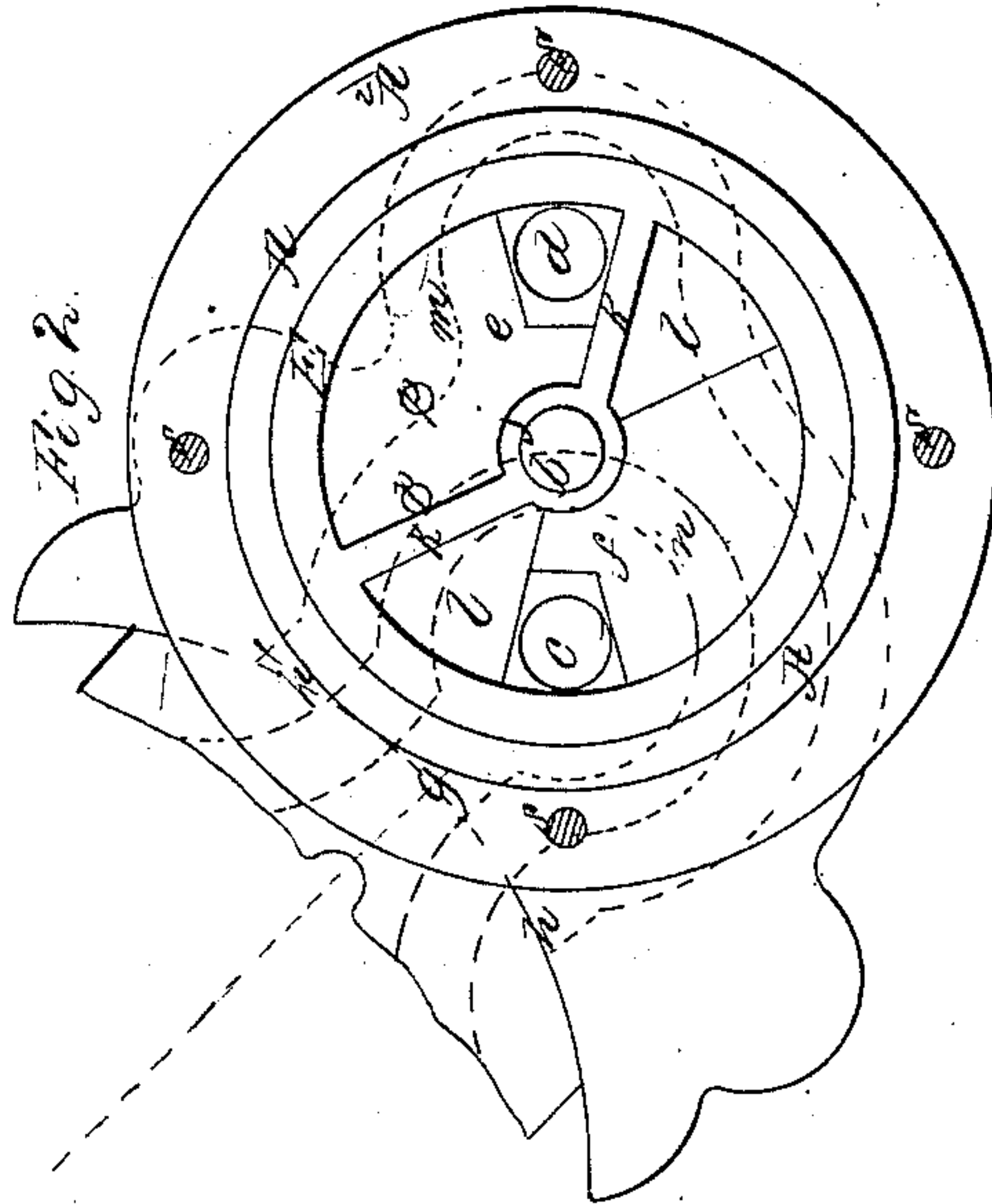
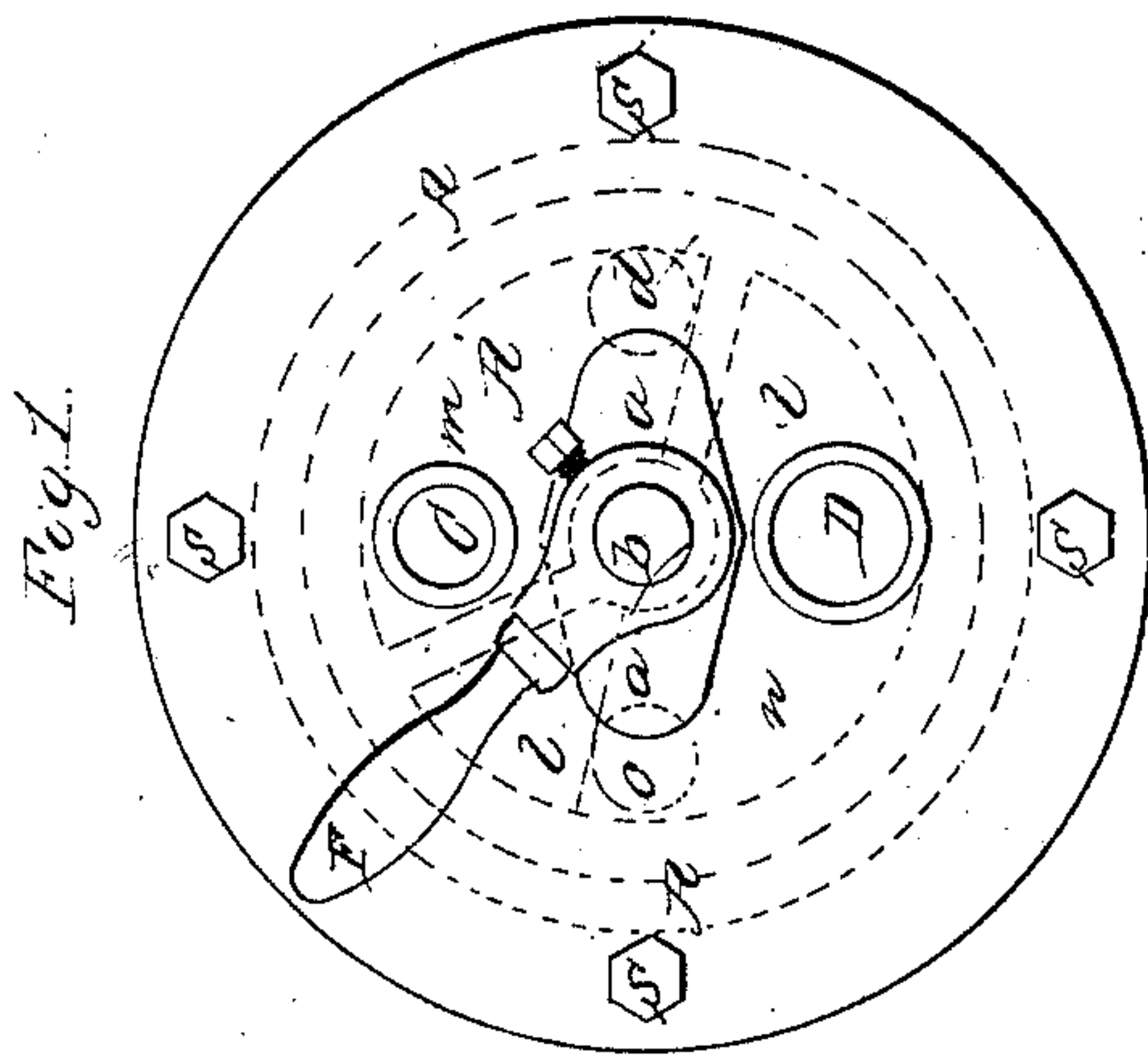
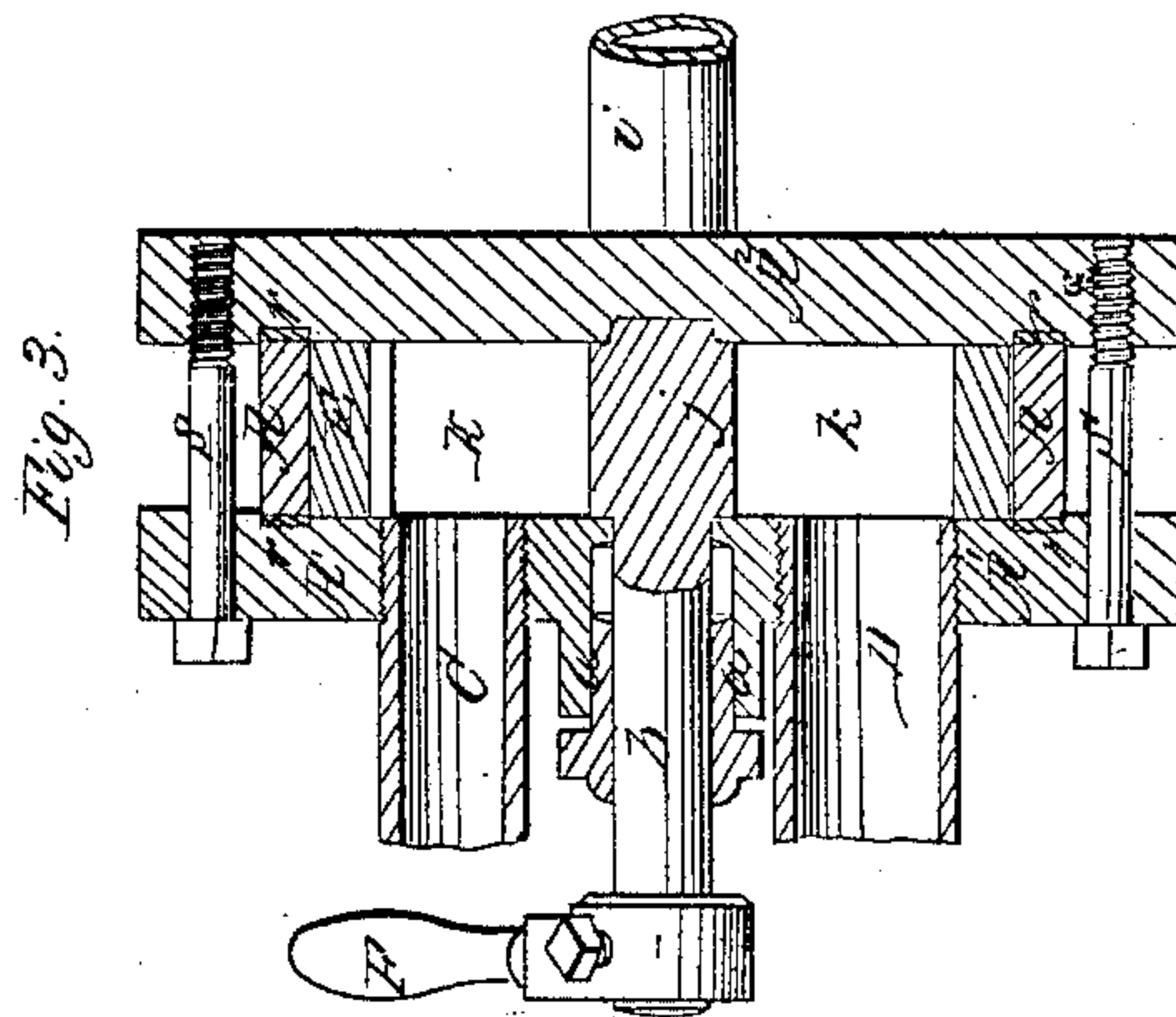


W. D. Andrews,
Rotary Steam Valve.
No 37,030. Patented Dec. 2, 1862.



Witnesses
R. Hawley
Amosby Thore

Wm D. Andrews
W.D.

UNITED STATES PATENT OFFICE.

WILLIAM D. ANDREWS, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 37,030, dated December 2, 1862.

To all whom it may concern:

Be it known that I, WILLIAM D. ANDREWS, of the city, county, and State of New York, have invented a new and useful Improvement in Reversing and Stop Valves for Oscillating and Rotary Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of a valve-casing, showing the relative arrangement of the pipes and ports. Fig. 2 exhibits a front view of the valve and valve-casing without the cover or front of the latter, and also shows the relation of the valve to the steam and exhaust ports of the engine. Fig. 3 is a central section of the valve and casing.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to valves of that class which effect the reversal of the engine by reversing the relation of the steam and exhaust pipes, with two chambers or passages or sets of passages in the steam-chest of the engine.

It consists in a certain construction of such valves of ring form and a certain arrangement of the ports and passages or pipe-connections in its casing, whereby the said valve and casing are enabled to be fitted up entirely in a turning-lathe, and the valve when in use is perfectly balanced.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

A A' A² is the valve-casing, consisting of a shallow cylindrical box having its back A² and its front or cover A' fitted to it with packing-rings *r r*, enabling them to be adjusted steam-tight upon the valve by means of the screw-bolts *s s*, which hold them in place, and avoiding the necessity of turning the box A and the valve of perfectly uniform depth or thickness. The inner surfaces of the back and front plates, A' A², of the box are faced in a turning-lathe. The cover A' is also bored centrally, and fitted with a stuffing-box, *a*, for the valve stem *b* to work through. In the back of the casing there are on opposite sides of the center two ports, *c* and *d*, one of which connects with one chamber and the other with another chamber in the steam-chest, as illustrated by the representation of the steam-chest and the several parts

of an oscillating engine in dotted outline in Fig. 2. *e* is one chamber, and *f* the other, the latter having a single port, *g*, terminating in the middle of the valve-seat, and the former having two ports, *h h'*, terminating in the valve-seat on opposite sides of *g*.

The connections of the ports *c d* with the two chambers of steam-chest may be made by means of separate pipes *i*; or the valve-casing A may be attached directly to or formed upon the steam-chest.

C is the steam-pipe by which steam is supplied from the boiler, and D is the exhaust-pipe leading from the casing A to the atmosphere or to a condenser. These pipes are connected with the cap or cover A' of the casing on opposite sides of the center thereof and midway between the ports *c* and *d*, as shown in Fig. 1, where the positions of the said ports are indicated in dotted outline.

E *j k l* is the valve, composed of a ring, E, connected with a hub, *j*, by partitions *k k*, which divide the interior of the ring into two separate spaces, and having on that side of each partition which is in communication with the exhaust-pipe D, at the edge next the back of the casing A, a flange or lip, *l*, broad enough to cover one of the ports *c d*. This valve has the front and back of its ring and partitions and hub faced in the lathe to fit steam-tight between the back of the casing A and the cap or cover A', and the lips faced flush with the back of the ring and partitions, to fit against the back of the casing. Its stem *b*, which is concentric with the ring, is furnished with a handle, F, by which to turn the valve, and stop-pins *p p* are secured in the back of the casing A for the partitions *k k* to come in contact with for the purpose of limiting the movement of the valve, that the said movement may be sufficient to bring the valve either to a position to make the space *m* included within the valve on one side of the partitions form a means of communication between the steam-pipe C and the port *d*, and the space *n* on the opposite side of the partitions a means of communication between the port *c* and the exhaust-pipe D, as shown in Fig. 1, or else to make the said space *m* form a means of communication between the steam-pipe C and the port *c*, and the space *n* a means of communication between the port *d* and the exhaust-pipe D. In the first-mentioned position

of the valve the ports *h h'* are induction-ports and the port *g* an eduction-port, and in the last-mentioned position the port *g* is an induction-port and the ports *h h'* are eduction-ports, and hence with the said valve in one position the engine will work in one direction and in the other position of the valve the engine will work in the opposite direction. By bringing the valves to such a position that the flanges *l l* cover and close the ports *c d* the induction and eduction of steam is prevented and the engine is stopped.

In the operation of the valve the pressure of the steam, being only within the space *m*, is perfectly balanced, for the flanges *l l* being always in communication with the exhaust-

pipe no pressure is produced upon them, and hence the valve works easily and with very little wear, and as the whole of the facing and fitting of the valve and seat is done in the lathe, it is of very cheap construction.

What I claim as my invention, and desire to secure by Letters Patent, is—

The construction of the valve with flanges *l*, attached, respectively, to the partitions *k k*, and arranged to operate in conjunction with the ports, all in the manner herein shown and described.

WM. D. ANDREWS.

Witnesses:

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I. W. COOMBS.