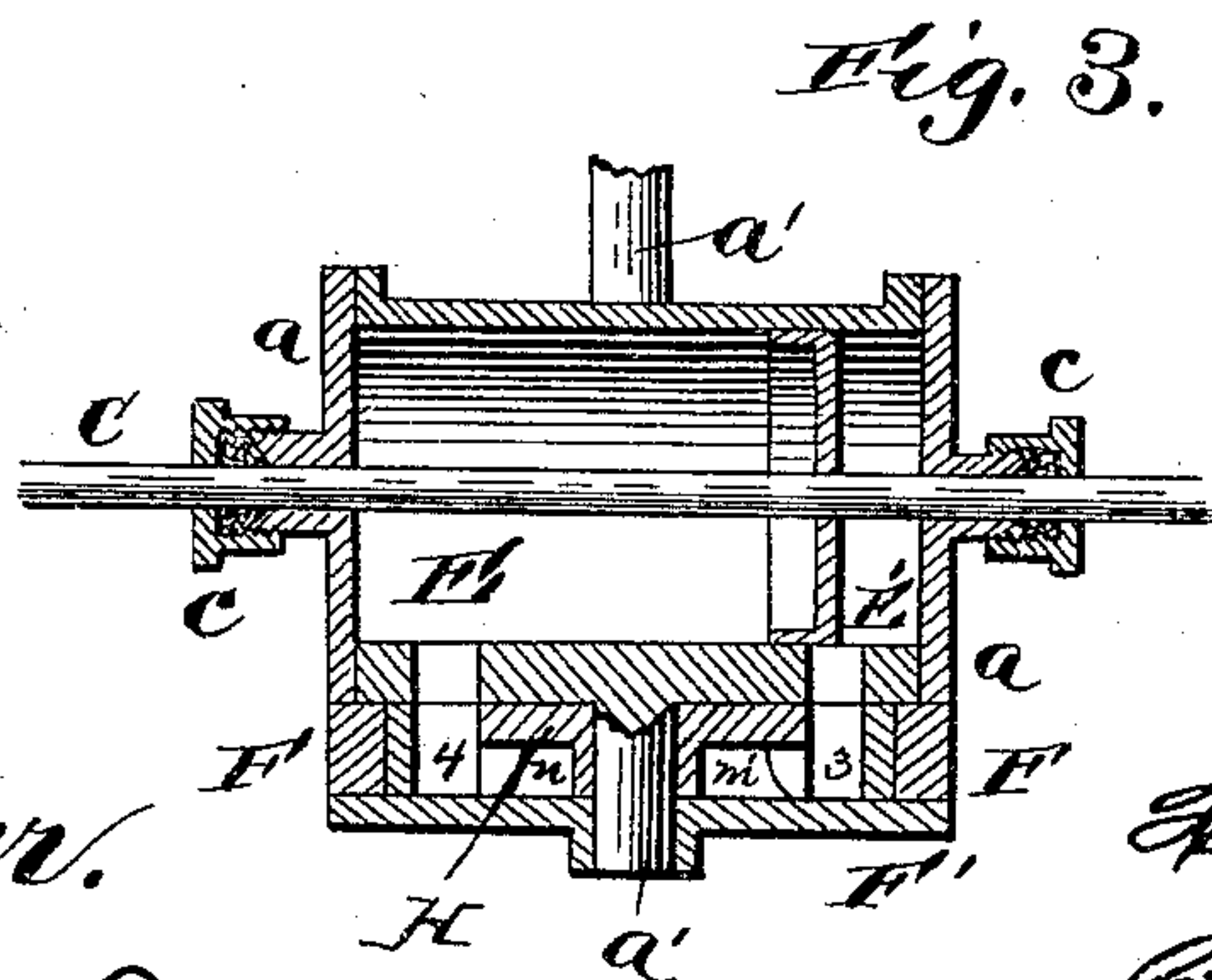
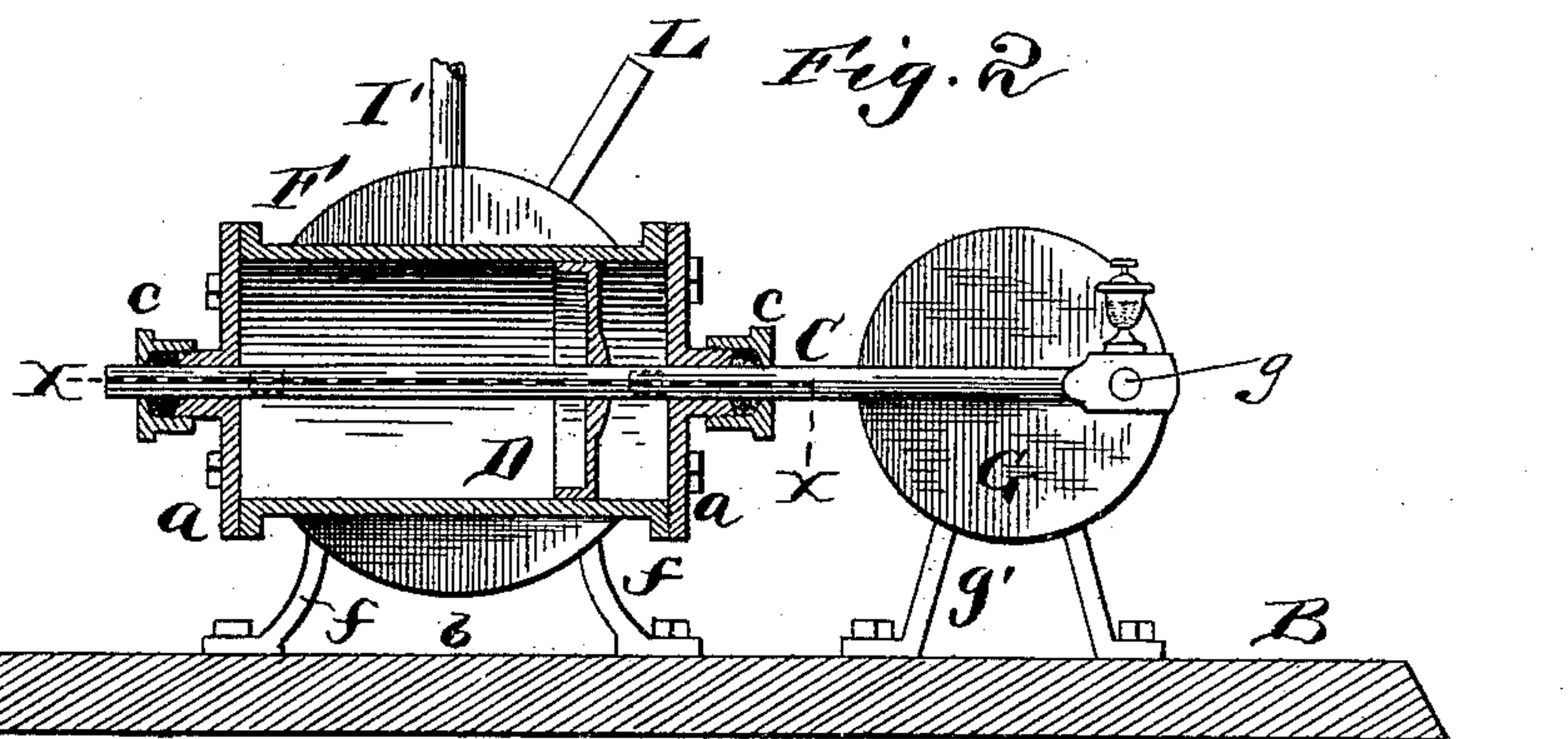


2 Sheets—Sheet 1.

No. 452,298.

Patented May 12, 1891.



Witnesses:
J. B. McGirr.
N. J. Berkhof

Inventor:
Henry L. Wilson
By his Attorneys,
Edson Bros.,

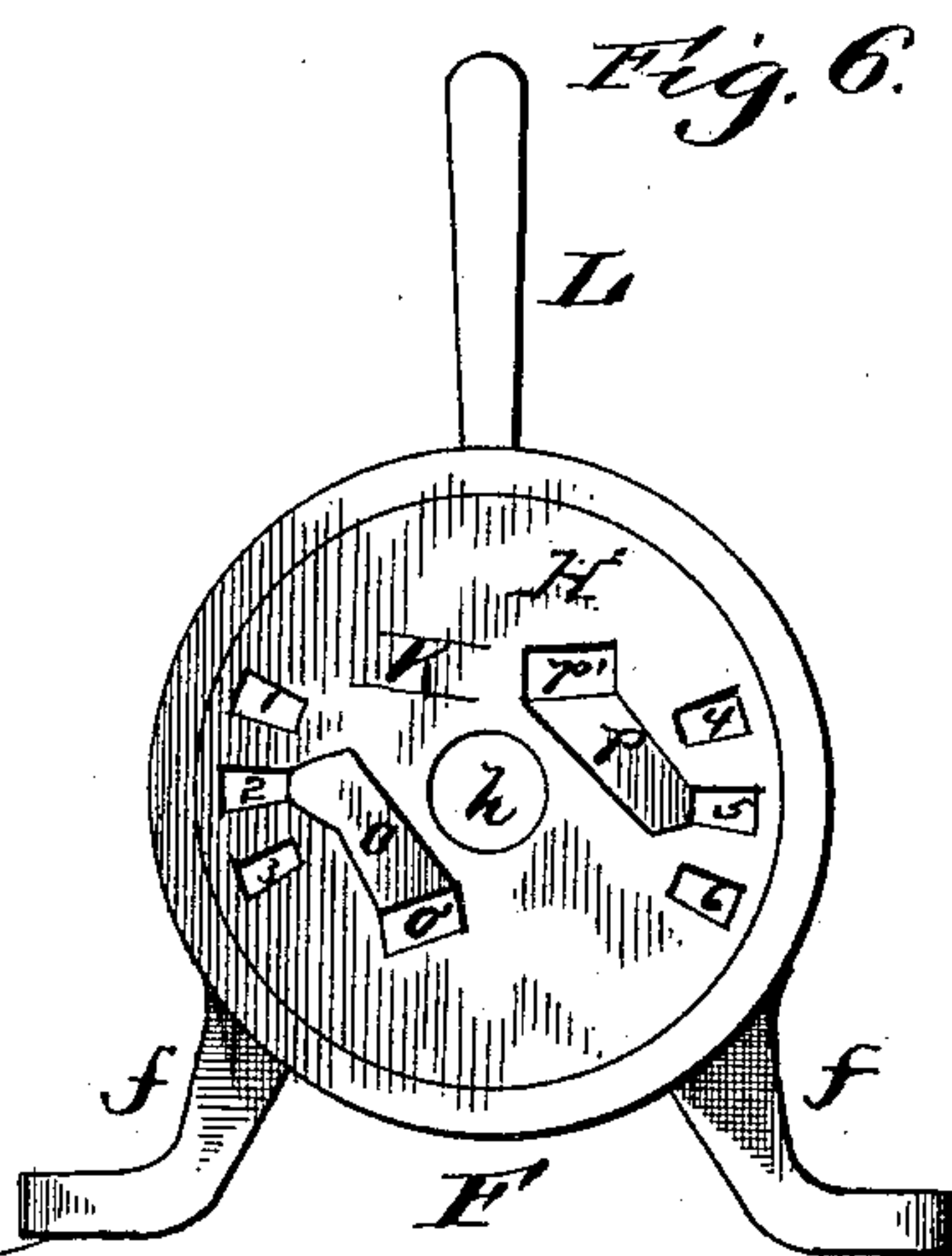
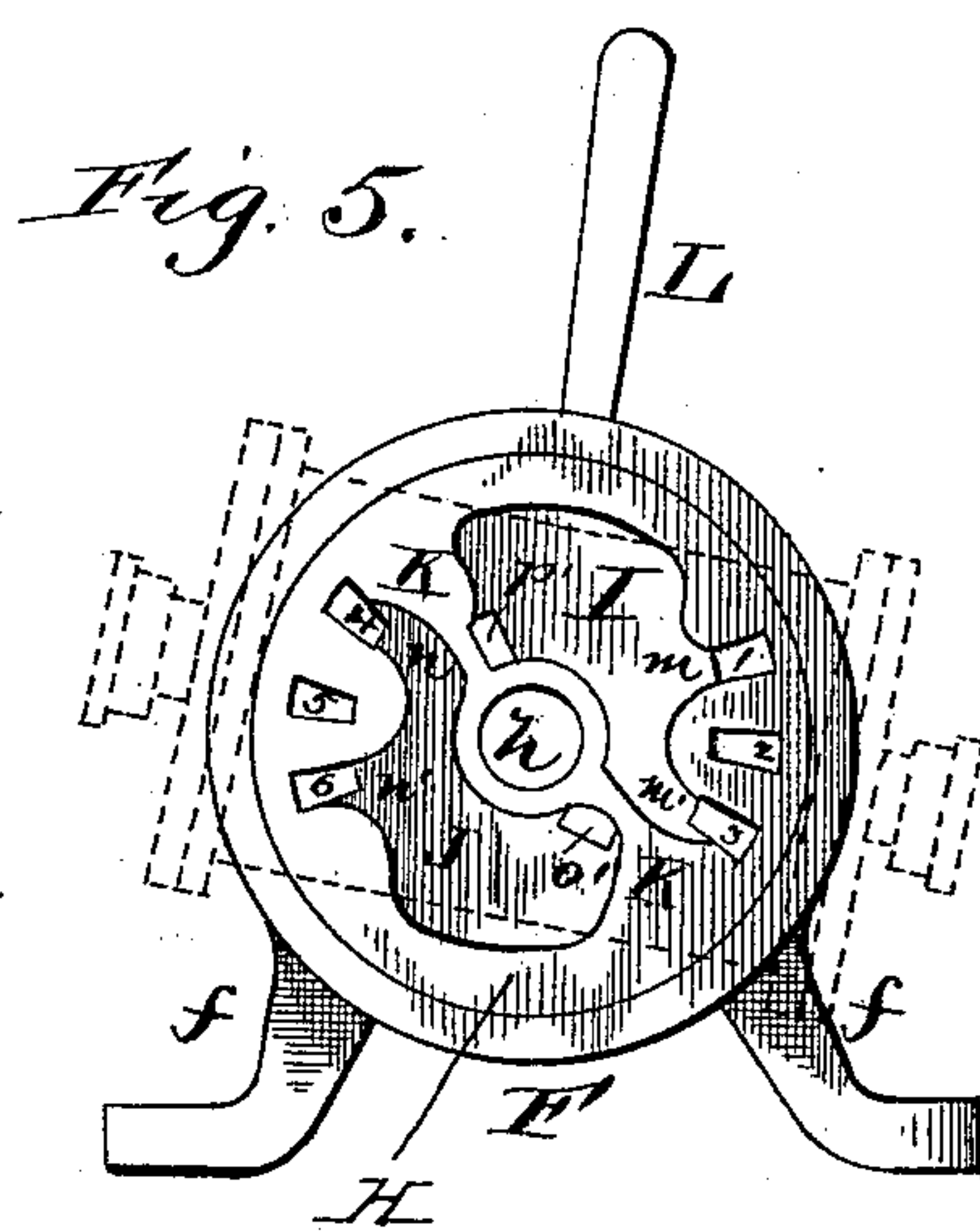
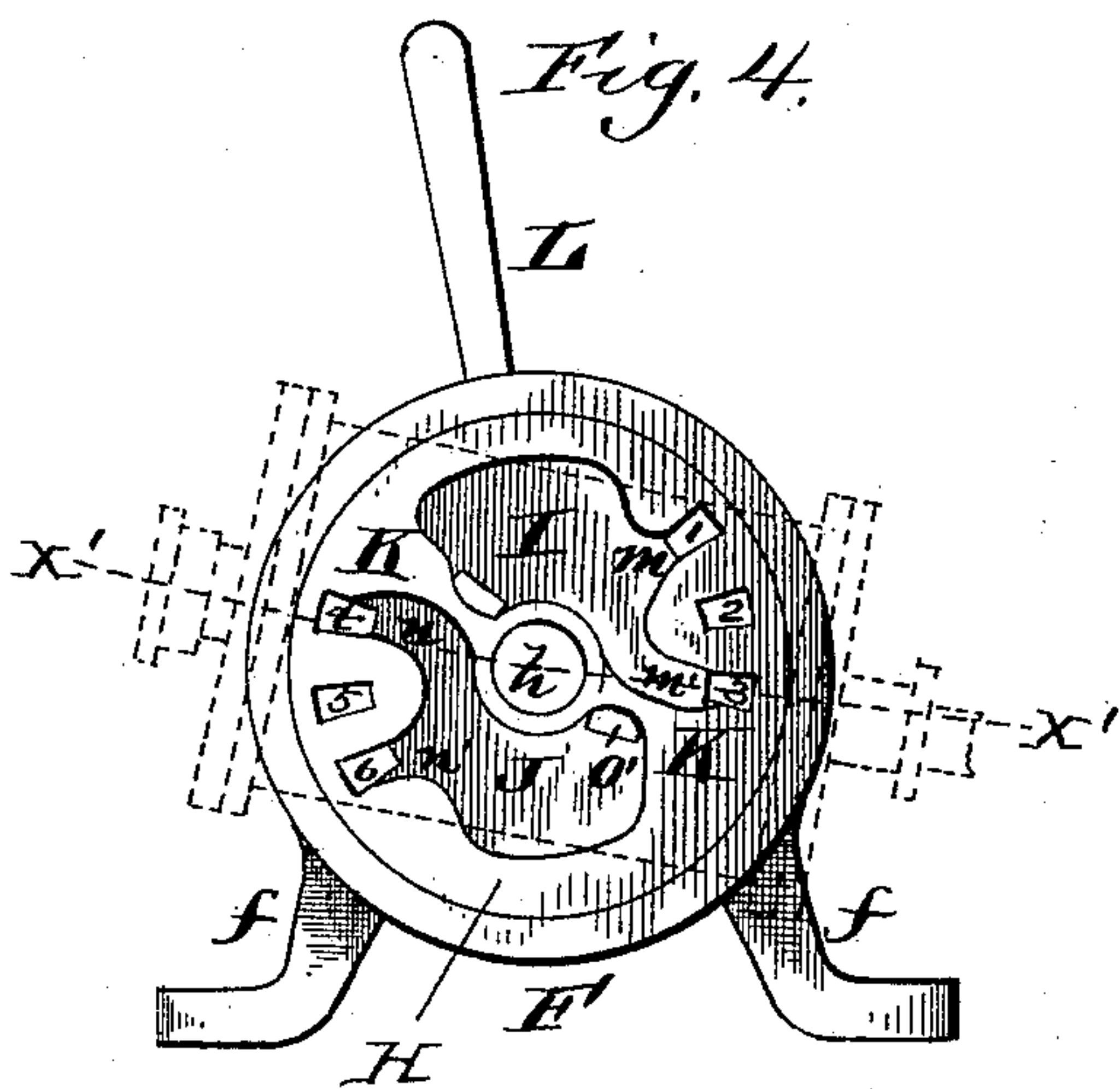
(No Model.)

2 Sheets—Sheet 2.

H. L. WILSON.
OSCILLATING STEAM ENGINE.

No. 452,298.

Patented May 12, 1891.



Witnesses:
J. B. McGinnis
N. D. Berkauf

Inventor:
Henry L. Wilson
By his Attorneys,
Edson Bros.

UNITED STATES PATENT OFFICE.

HENRY L. WILSON, OF TERRE HAUTE, INDIANA.

OSCILLATING STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 452,298, dated May 12, 1891.

Application filed February 25, 1891. Serial No. 382,800. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. WILSON, a citizen of the United States, residing at the city of Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Oscillating Steam - Engines and Reverse Mechanism Therefor; 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 improvements in oscillating engines and reversing mechanism therefor; and the objects of the invention are, first, to simplify and compactly arrange the cylinder and valve, so as to dispense with the usual reciprocating cross-head and at the same time secure the direct steam-pressure on the piston-head; secondly, to provide a simple reverse mechanism applied directly to the oscillating cylinder and capable of being easily and quickly shifted by hand to reverse the engine and to so support the piston-head as to avoid undue friction and the "dragging" of the packing rings on the cylinder.

With these and other ends in view the invention consists in the combination of devices and novel construction and arrangement of parts, which will be hereinafter fully described, and pointed out in the claims.

To enable others to understand my invention, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a plan view of an oscillating steam-engine embodying my improvements. Fig. 2 is a sectional view taken longitudinally through the cylinder. Fig. 3 is a longitudinal section on the plane indicated by the dotted line *xx* of Fig. 2. Figs. 4 and 5 are detail views of the valve or reverse disk, showing the live and exhaust steam chambers and the several ports and with the same in their reverse positions; and Fig. 6 is a similar view of the reverse valve or disk, showing the opposite face of the same.

Like letters of reference denote corresponding parts in all the figures of the drawings.

A designates the oscillating cylinder of my improved steam-engine, which cylinder is provided at its ends with two heads *a a* and with the lateral trunnions *a' a'*, extending at right

angles to the axis of the cylinder at about the middle thereof and journaled in bearings *b b*, rigid with the pillow-blocks *b'*, mounted on the fixed stationary base B of the engine. The heads of the cylinder are provided with central aligned stuffing-boxes *c c*, and through these stuffing-boxes passes the piston-rod C, that protrudes beyond both ends of the cylinder and is supported firmly in stuffing-boxes *c c*, so that the packing-rings *d* of the piston-head D are prevented from having undue frictional contact with the wall of the cylinder or dragging thereon. The piston-head D is firmly secured to the rod C and reciprocates in the cylinder between the ports *E E'* therein, which ports are formed in the side of the cylinder next to the steam-chest F, and they are located near the ends of the cylinder. The piston-rod has one end thereof connected directly to the crank-pin *g*, carried by the crank-disk G, which disk is fixed to one end of the main shaft H, that is arranged in the bed B transversely to the cylinder and journaled in suitable bearings *g'* on the bed, the free end of the main shaft having a fly or balance wheel G'.

The steam-chest F is in the form of a ring or annulus, with the depending feet *f* and the face-plate F' applied to the outer side of the chest, so that the inner side of the chest when it is removed is open; but this open side of the steam-chest is applied directly against the cylinder, which thus serves to close the inner side of said chest. The depending feet *f* of the steam-chest are bolted or otherwise firmly secured to the bed B, and one of the trunnions of the cylinder passes through the chest concentric with the annular or ring-like part of the same, whereby the chest remains at rest as the cylinder oscillates and the necessary tight joint between the chest and cylinder is insured by the employment of self-packing reverse valve or disk H.

The reverse valve or disk is arranged tightly or snugly within the annular or steam chest, but it is free to be turned a limited distance in said steam-chest by a hand-lever, and in the valve or disk are formed the live or exhaust steam chambers and passages necessary for the passage of steam to the oscillating cylinder to insure its operation and to enable it to be reversed. The reverse valve

or disk fits close within the annular steam-chest and against the face-plate F'.

I will now proceed to a detailed description of the reverse disk or valve. (Shown more clearly in Figs. 4 and 5.) Centrally through the valve is an opening h , through which passes one of the trunnions of the cylinder, which is thus concentric with the valve and the steam-chest, as shown, and in the outer face of the reverse valve or in that side thereof contiguous to the face-plate F' of the steam-chest I provide two chambers I J, which are separated or divided from each other by the bridge-wall or partition K, extending radially through the axis or center of the disk-valve, the upper one of said chambers I constituting the live-steam chamber and the lower chamber J forming the exhaust-chamber. Near the edge of the disk or valve are two series of steam-ports, each series being composed of three ports, the ports of one series being designated by the numerals 1, 2, and 3, and the ports of the other series by 4, 5, and 6. The ports 1 and 3 of one series are the live-steam ports, which communicate by the short channels m m' in one face of the disk directly with the live-steam chamber, while the ports 4 6 of the other series are exhaust-ports, which in like manner communicate directly with the exhaust-chamber by means of the channels n n' , formed in the same or outer face of the disk or valve. The port 2 is situated between the live-steam ports 1 3, but it does not communicate with them, and it does communicate with the exhaust-chamber by a channel or groove o , which is formed in the inner surface of the disk or valve and opens into the exhaust-chamber through an opening o' . The port 5 of the other series of ports is a live-steam port, which is arranged between the two exhaust-ports 4 6; but it does not communicate with them, said exhaust-port 5 having a channel or groove p formed in the inner face of the disk or valve and extending to the live-steam chamber, into which it opens by the hole or aperture p' , the two openings o' p' being on opposite sides of the bridge or partition wall K.

The reverse valve or ring remains stationary or at rest within the steam-chest, while the cylinder oscillates vertically; but this valve or disk can be readily moved by hand to reverse the engine by means of a lever L, that extends upward from said valve and which works in a segmental slot l , formed in the top of the steam-chest.

Steam is supplied to the live-steam chamber I by means of a pipe I', connected to the face-plate F', and the exhaust-steam may be conveyed away from the exhaust-chamber by a suitable pipe attached to the face-plate to receive the exhaust-steam from said chamber J.

This being the construction of my invention, the operation thereof may be briefly described as follows: Live steam is supplied to the chamber I, and with the valve or disk in

the position shown in Fig. 4, or adjusted to permit the engine-shaft to run in one direction, the steam is supplied to and exhausted from the cylinder in this wise: With the cylinder inclined so that its port E aligns with the port 3, steam is taken into the cylinder through ports E 3 and exhausted through ports E' 4; but as the cylinder oscillates and reverses its position (due to the pressure of steam on the piston-head and to the endwise movement of the piston-rod, which is tilted by the revolution of the crank-disk) the port E is brought into line with the exhaust-port 2, while the port E' aligns with the live-steam port 5, so that steam is supplied at E' 5 and exhausted at E 2. It will thus be seen that steam is alternately admitted to and exhausted from the cylinder at opposite ends of the same and that the cylinder automatically changes its position to take and exhaust steam and thus insure a steady continuous operation. To reverse the engine it is only necessary to turn the handle or lever I', which shifts the disk or valve and causes the ports therein to assume a position in which steam is supplied and exhausted as follows, reference being had more particularly to Fig. 5: With the cylinder inclined so that its port E aligns with the valve-port 1 steam passes through ports E 1 to the cylinder and is exhausted at E' 6; but as the piston and its rod are moved and the cylinder oscillated the port E is shifted to align with the exhaust-port 2, and the port E' aligns with the live-steam port 5 to take live steam at the other end of the cylinder, thus reversing the oscillation of the cylinder and the main shaft of the engine.

The parts are few in number and simple and durable in construction, as no cross-head is required, thus lessening the weight of the engine and the cost of constructing the same. The piston-head receives the direct pressure of the live steam, thus increasing efficiency of the engine and promoting economy, and the valve is self-packing and acts efficiently in reversing the engine, which can be easily and quickly accomplished by the simple movement of a lever.

I am aware that changes in the form and proportion of parts and details of construction of the mechanisms herein shown and described as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications as fairly fall within the scope of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an oscillating cylinder, of a stationary steam-chest and a stationary valve or disk provided with the separate live-steam chamber and exhaust-steam chamber and with live and exhaust ports communicating, respectively, with the live

and exhaust chambers, a single exhaust-port being arranged between the live-steam ports, and another live-port being arranged between the two exhaust-ports, substantially as described.

2. The combination, with an oscillating cylinder, of the stationary steam-chest having the slot in its upper side and a reverse-valve fitted tightly within said chamber and provided with a rigid handle which works through the slot in the steam-chest, said valve or disk being provided with live and exhaust chambers and with two steam-ports and two exhaust-ports arranged diametrically opposite, a single exhaust-port being between the live-ports, and another live-port being between the two exhaust-ports, substantially as described.

3. A reverse valve or disk for engines, provided with the live-steam chamber and the exhaust-steam chamber separated by an intermediate partition-wall, and live and exhaust ports communicating, respectively, with the live and exhaust chambers, a single exhaust-port arranged between the live-steam ports and having a channel or groove leading to the exhaust-chamber, and another live-port arranged between the exhaust-ports and hav-

ing a separate channel or groove leading to the live chamber, substantially as described.

4. A reverse valve or disk for engines, provided on one face with the live-steam chamber and the exhaust-steam chamber, which are separated by an intermediate partition-wall, the live-steam ports arranged on one side of the partition-wall and opening directly into the live-steam chamber, the exhaust-ports located in the reverse side of the partition-wall and opening directly into the exhaust-chamber, a single live-steam port located between the exhaust-ports and having a channel on the rear of the valve leading to the live-chamber, and another exhaust-port between the live-ports and likewise having channels on the rear of the valve leading to the exhaust-chamber, substantially as described.

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

HENRY L. ^{his} × WILSON.
mark

Witnesses:

MOSES T. AUDRICK,
RICHARD V. NEWTON.