

Wood & Dumke,

Rotary Steam Engine.

N^o 44,247.

Patented Sep. 13, 1864.

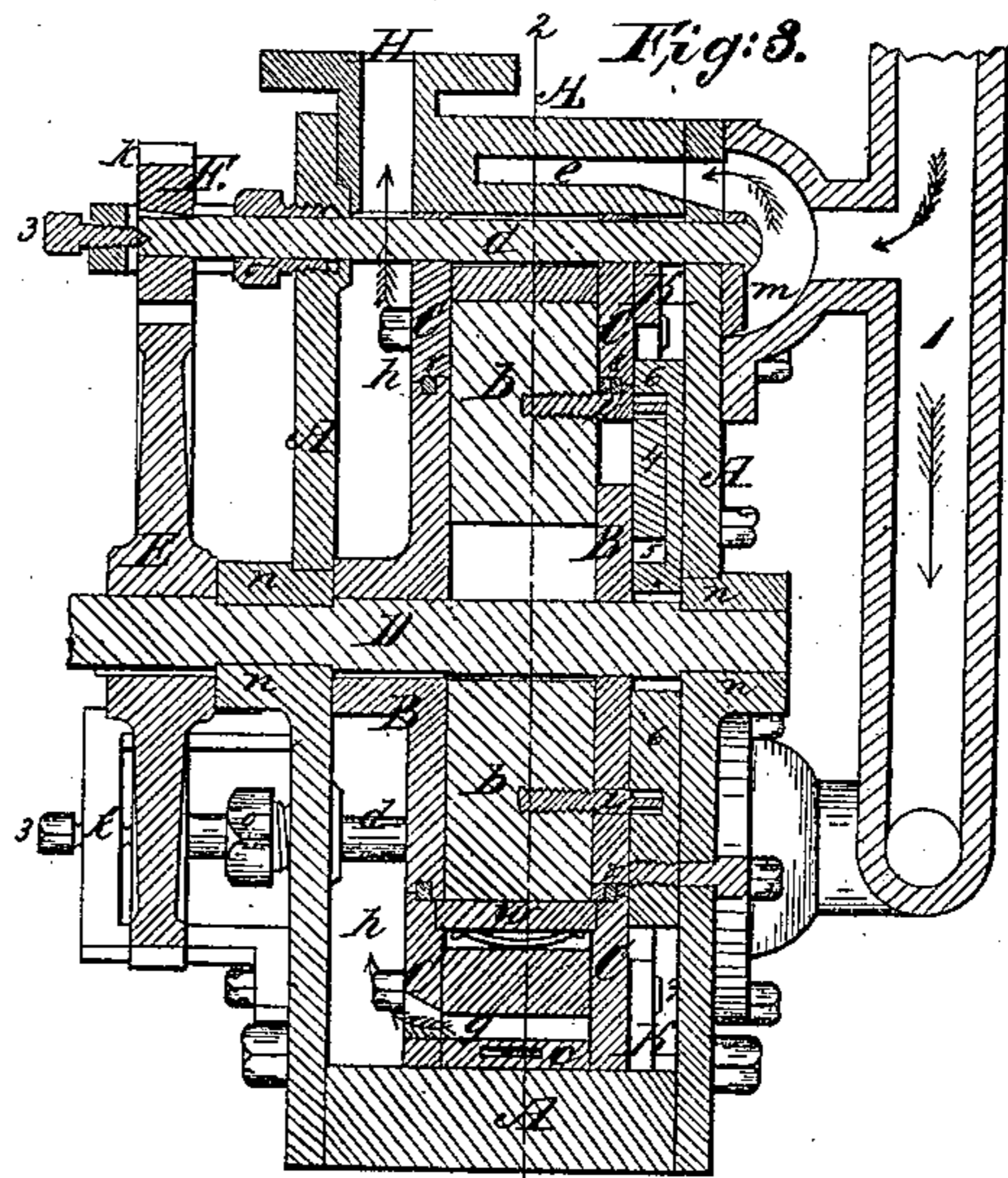
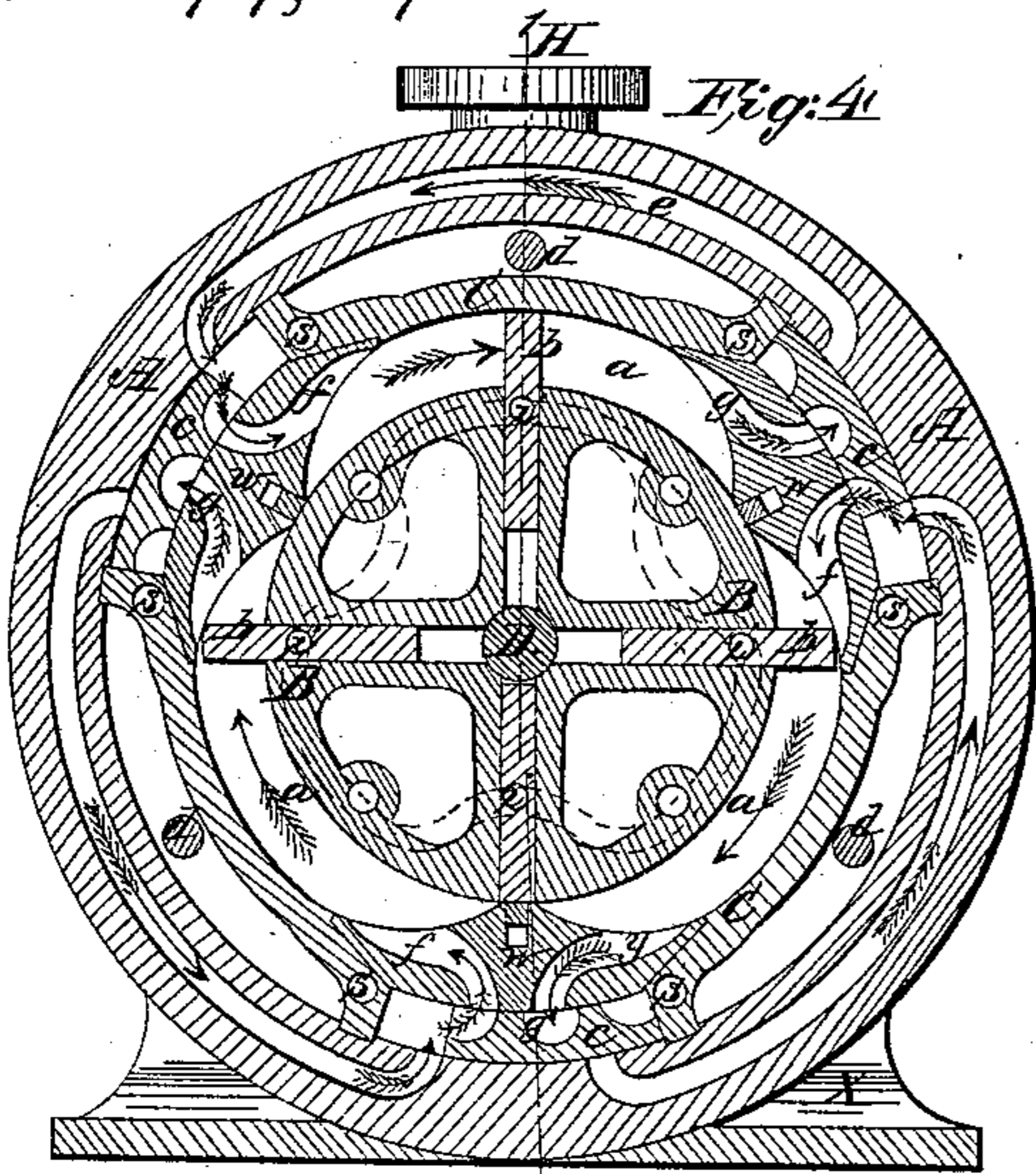


Fig. 5.

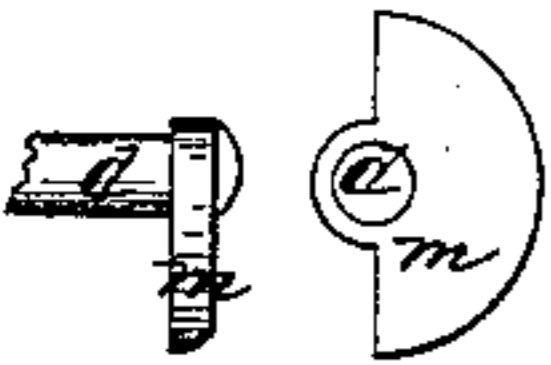


Fig. 6.

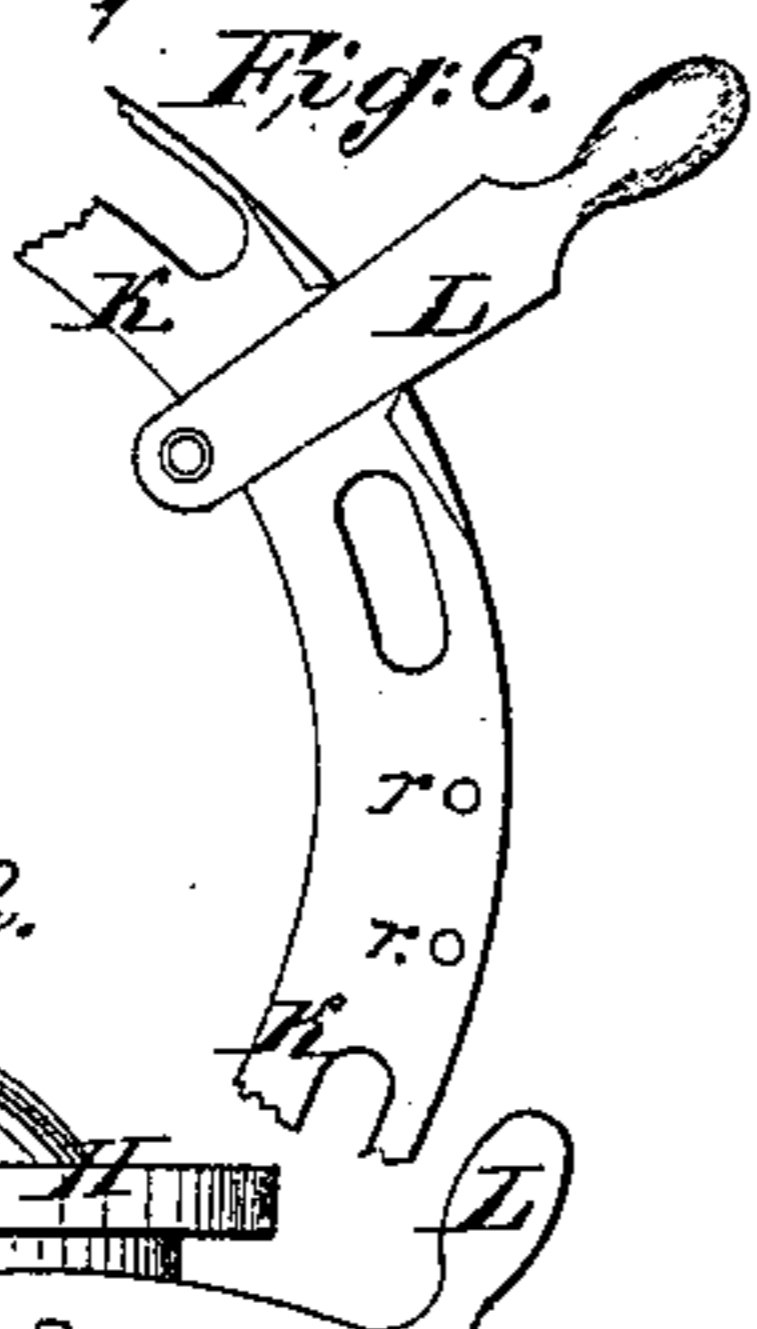


Fig. 7.

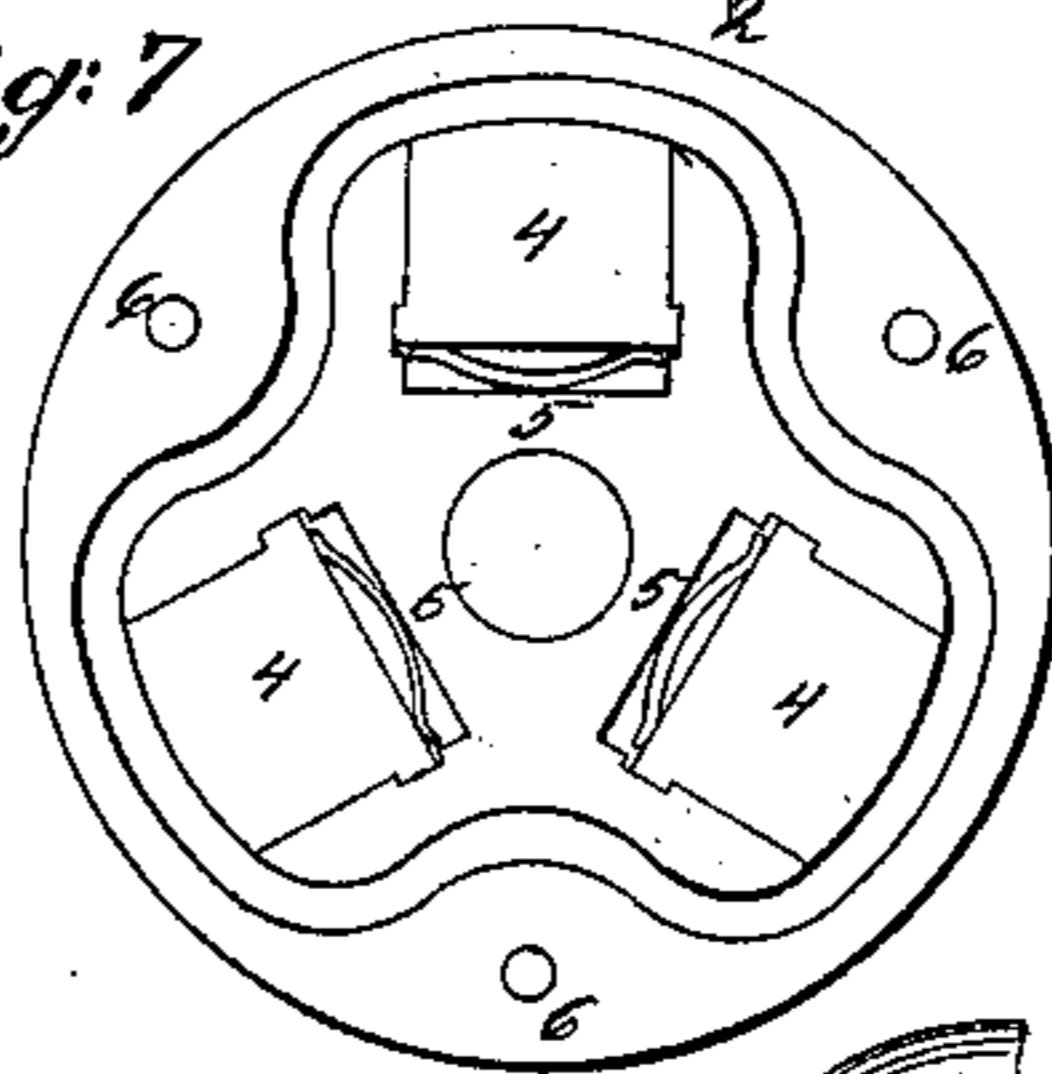
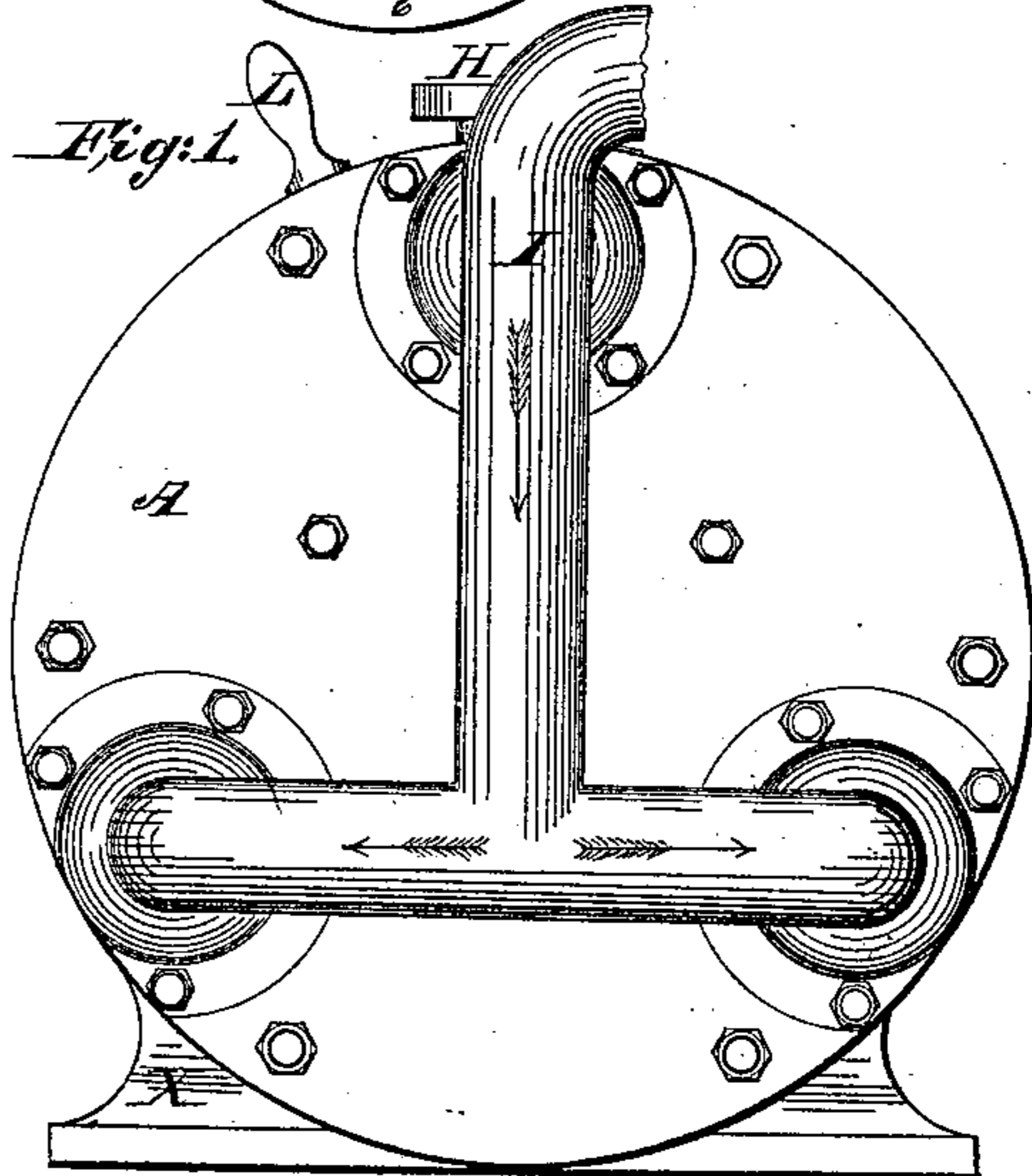
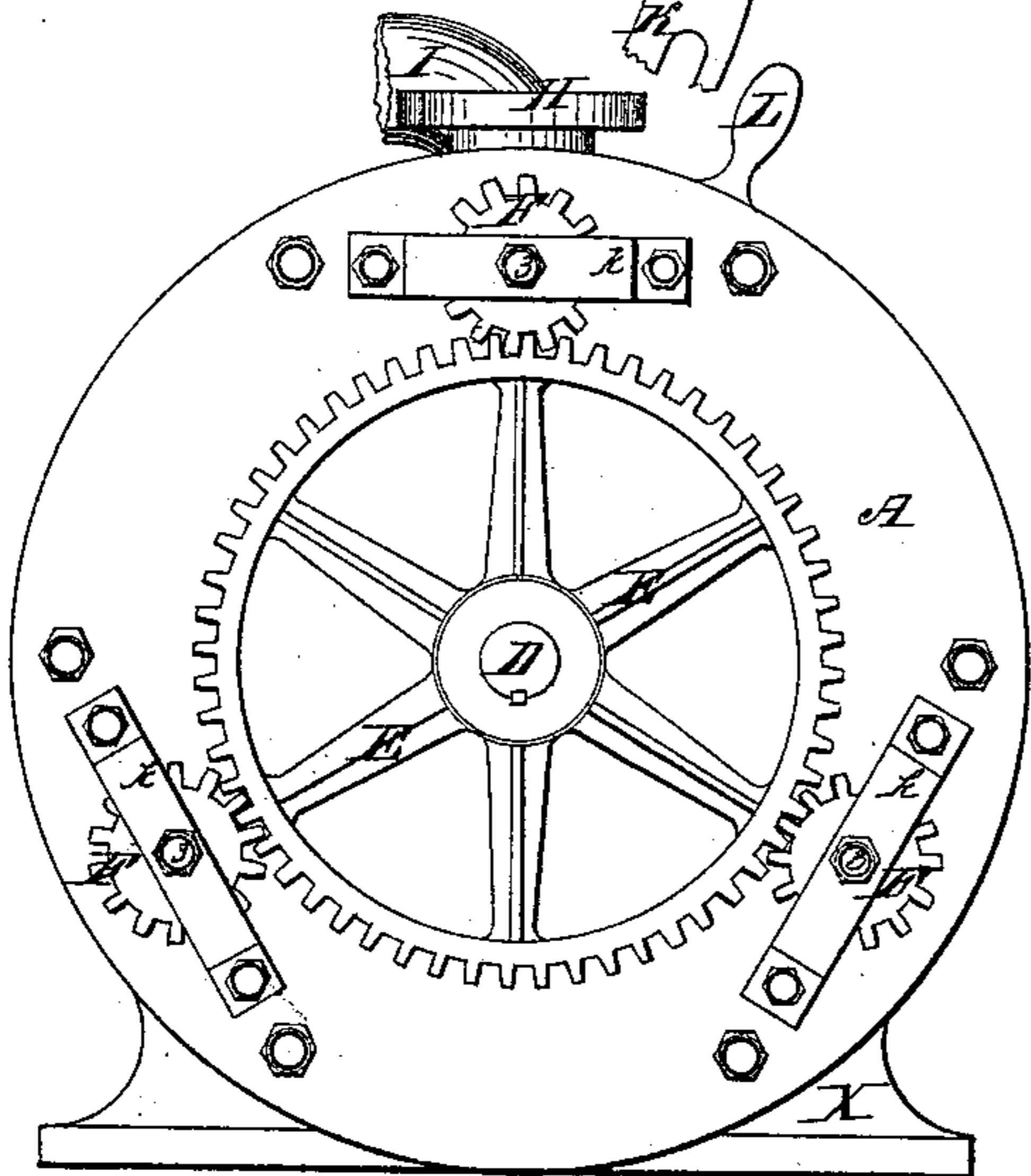


Fig. 2.



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UNITED STATES PATENT OFFICE.

SYLVESTER A. WOOD AND AUGUST F. DUMKE, OF MANITOWOC, WIS.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 44,247, dated September 13, 1864.

To all whom it may concern:

Be it known that we, SYLVESTER A. WOOD and AUGUST F. DUMKE, of the village of Manitowoc, in the county of Manitowoc and State of Wisconsin, have invented a new and useful Improved Rotary Steam-Engine; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an outside view of the cover or case of that end of the engine to which steam is communicated through the main steam-pipe I. Fig. 2 is an outside view of the cover or case of the opposite end of the engine, showing the cog-wheels E and F, which open and shut the revolving cut-off valves in the main steam-pipes, as at *m* in Fig. 3. Fig. 3 is a longitudinal vertical section on the line 1 1, Fig. 4. Fig. 4 is a vertical cross-section on the line 2 2, Fig. 3. Fig. 5 represents a side and vertical view of the revolving cut-off valves situated in the main steam-pipes, and worked by the cog-wheels E and F, Fig. 2. Fig. 6 is a segment of a circular rim, K, attached to the reversing-valves *c c c*, Figs. 3 and 4, by the bolts *r r*, which rim is worked backward and forward by the lever L, and the oblong holes therein are to allow it to slip over the bolt-heads *s*, Fig. 3, and the revolving valve-shafts *d*, Figs. 3 and 4. Fig. 7 is a stationary cam-groove plate bolted to the stationary cylinder (or to the outside case) of the engine, as shown at 6 6, Fig. 3, the cam-groove in which plate is represented by the dotted lines on the revolving cylinder B, Fig. 4. Only one cam-groove plate is shown in the drawings and model, but as engines of large capacity will require two, in order to prevent the pistons from tipping and binding, it is intended to use two cam-groove plates instead of one in all cases where they shall become necessary, one to be placed on each side of the revolving cylinder.

The revolving cylinder B, Fig. 4, is securely fastened to the main shaft D, and has four sliding pistons, *b b b b*, Figs. 3 and 4, which are moved outward and inward by the pins *i i i i* in said pistons, working in the groove. (Shown in the cam-groove plate, Figs. 3 and 7.)

The revolving cylinder B is surrounded by the stationary cylinder C, and is divided into

three crescent-shaped compartments or steam-chambers, *a a a*, Fig. 4, the partitions or abutments between which compartments touch the revolving cylinder B, and work steam-tight on the outer circumference of the revolving cylinder by means of the spring-packing *w w w* in said abutments, Figs. 3 and 4.

Steam is admitted in three places through the main steam-pipe I, as shown in Figs. 1 and 3, in the direction of the arrows, Fig. 3, and passes into the small steam-pipes *e e e*, Figs. 3 and 4, and is conducted to the reversing-valves *c c c*, Figs. 3 and 4, situated over the abutments separating the steam-chambers, which reversing-valves are movable backward and forward by means of being attached to the circular rim K at *r r*, Fig. 6, by working the lever L, which rim is situated between the stationary cylinder C and the outside casing or cover, A, Figs. 3 and 4. The steam then enters the steam-chambers through the openings *f f f*, Fig. 4, in the direction of the arrows when the revolving cylinder is turning to the right, just at the point where the sliding pistons *b b b b*, Figs. 3 and 4, touch those parts of the tops of the steam-chambers, which are concentric with the revolving cylinder B, Fig. 4, at which time the pressure of the steam against the sliding pistons *b b b b* forces them forward, and thus turns the revolving cylinder B, the steam acting with full force on two of the sliding pistons at the same time. The steam is cut off by the revolving valves *m m*, Figs. 3 and 5, a little before the point where the sliding pistons cease to be in contact with those portions of the tops of the steam-chambers which are concentric with the revolving cylinder B, from which point the pistons are pushed forward a short distance by the expansion of steam until it exhausts at *g g g*, Figs. 3 and 4, through the circular holes in the center of the reversing-valves *c c c*, Fig. 4, into the chamber *h h*, and passes out through the exhaust-pipe H, Figs. 1, 2, 3, 4.

When it is required to turn the revolving cylinder to the right, as above described, the right ends of the small steam-pipes *e e e* are closed by the reversing-valves *c c c*, and the steam enters the steam-chambers at the left ends of said small steam-pipes *e e e*, and when it is required to reverse the engine or revolving cylinder all that is necessary to be done is to push the lever L attached to the circular

rim K, Figs. 3 and 6, to the right, thus closing the left ends of the small steam-pipes *e e e* by sliding the reversing-valves *c c c*, which are fastened to said rim, over them and opening the right ends of the small steam-pipes *e e e* and admitting the steam on the right sides of the sliding pistons, the pressure of which against said pistons turns the revolving cylinder to the left, the steam exhausting at *f f f* instead of at *g g g*, as when turned to the right.

The letters *k k*, Figs. 2 and 3, represent straps or supports for the set-screws 3 3 3, Figs. 2 and 3, which set-screws are against the ends of the revolving valve-shafts *d d*, Figs. 3 and 4, and are used to relieve the revolving valve from the pressure of steam against them, thus avoiding a large amount of friction which would otherwise be created by their pressing on the cover A.


In Fig. 3, *o o* are stuffing-boxes around the revolving valve-shafts *d d*, Figs. 3 and 4.

n n are main shaft-boxes.

4 4 4, Fig. 7, are sliding plates let into the cam-groove plate represented by said Fig. 7, which are pressed outward a very short distance into the cam-groove by the springs 5 5 5, Fig. 7, and when the revolving cylinder is in motion the pins *i i i*, in the pistons *b b b*, coming in contact with the edges of the plates 4 4 4, cause the pistons to be pressed steam-tight against the tops of the steam-chambers and to be held there until the pins pass by the edges of the plates 4 4 4, when the pistons are relieved from the pressure and friction created by the force of the springs 5 5 5.

w w w, Figs. 3 and 4, show the manner of packing the abutments between the steam-chambers. This is a metallic packing, and is a little longer than the width of the steam-chambers, so as to rest on the outer circumference of the revolving cylinder, and thus prevented from being pressed into the holes through which the sliding pistons work. The surface of these packings resting on the revolving cylinder is of the same circle as the cylinder, and being pressed slightly against it by springs, as at *w*, Fig. 3, effectually stop the steam without causing much friction. The surfaces of the outer ends of the sliding pistons are on the same circle of the tops of the steam-chambers and fit against them steam-tight, and are prevented from being pressed inward by the springs on the ends of the sliding plates 4 4 4, Fig. 7, which, while they stop the steam, do not press with sufficient force to cause much friction. The joint between the revolving cylinder B and the stationary cylinder C is packed by a metallic spring-ring packing, as shown at 8 8 8 8, Fig. 3. This packing will effectually stop the steam, and at the same time allow the joint between the two cylinders to be sufficiently open to avoid all friction whatever of the edges of the two cylinders against each other.

The letter X, in Figs. 1, 2, and 4, represents the engine-bed, which may be constructed in any style to suit the tastes of the builders.

To avoid friction as much as possible the pins in the sliding pistons have movable heads of an elongated shape—thus, —which heads fit nicely into the cam-groove, and, by turning on the center, are adjusted to the different curves of the cam-groove and pass along through it with much less friction than if the main body of the pins themselves worked in the groove.

Instead of the pin-heads above described, rollers may be put on the pins to run in the groove, but it is believed by us that the elongated and movable pin-heads are preferable to rollers, as less liable to get out of order from wear, and at the same time quite as free from friction as the rollers.

Having thus fully described our invention, what we claim therein as new, and desire to secure by Letters Patent, is—

1. The use of the sliding piston in the revolving cylinder B, in combination with the steam-chambers in the stationary cylinder C, and the ports for the introduction of steam at the different points communicating with all the steam-chambers, by the arrangement and combination of which the full surfaces of two pistons are constantly exposed to the pressure of active steam, thereby securing, at a given pressure of steam, a uniform power and velocity to the revolving cylinder throughout its entire revolution, substantially as herein represented and described.

2. The self-expanding, lap-pointed metallic rings 8 8 8 8, in combination with the rabbets and grooves in the revolving cylinder and the rabbets in the stationary cylinder for packing the joints between the revolving and stationary cylinders, substantially in the manner and for the purpose herein shown and set forth.

3. The sliding plates 4 4 4, in combination with the springs 5 5 5, attached in the cam-groove plates, substantially as and for the purpose herein shown and described.

4. The whole arrangement for reversing the engine by combination of the circular rim K, the valves *c c c*, the lever L, and the steam-pipes *e e e*, substantially in the manner and for the purpose herein represented and described.

5. The revolving cut-off valves *m* with the set-screw 3 at the ends of the valve-shafts *d d*, substantially in the manner and for the purpose herein shown and described.

Dated at Manitowoc, Wisconsin, this 1st day of June, A. D. 1864.

SYLVESTER A. WOOD.
AUGUST F. DUMKE.

Witnesses:

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