

No. 679,392.

Patented July 30, 1901

J. A. MCKENZIE.  
ROTARY ENGINE.

(Application filed June 25, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

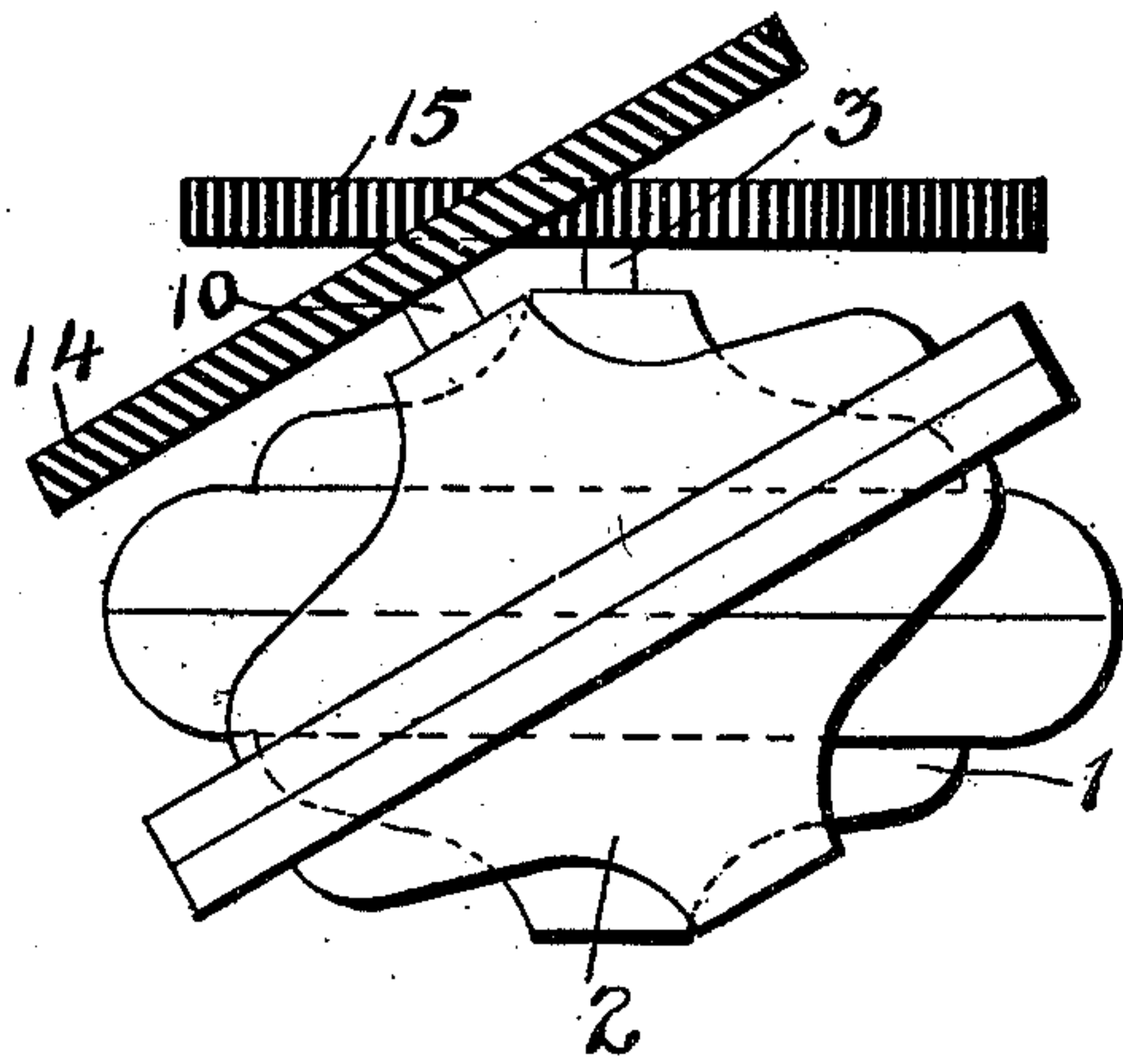
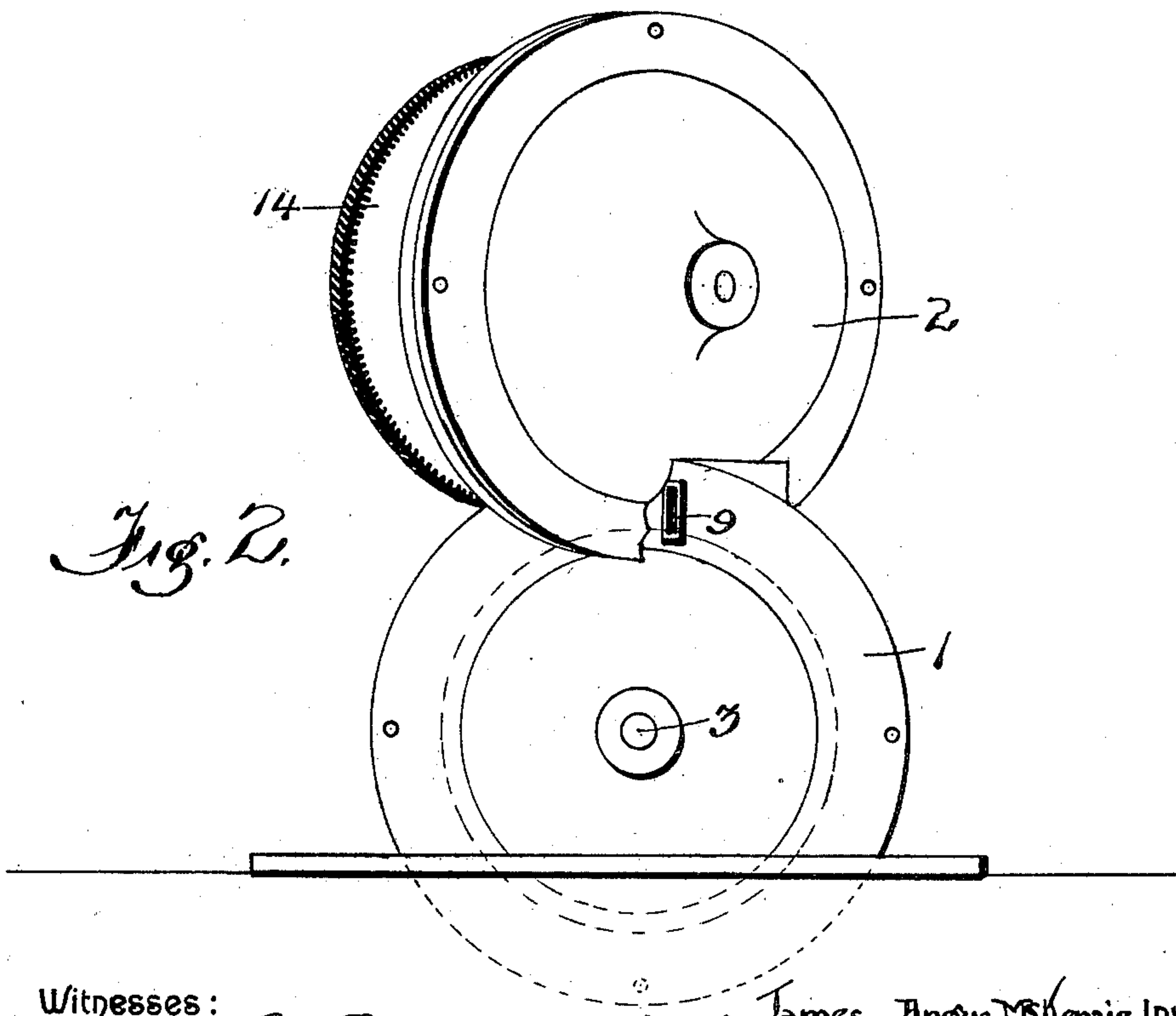


Fig. 2.



Witnesses:

Horace E. Seitz  
H. J. Foxworth

James Angus McKenzie, Inventor.

By

Marion & Marion

His Attorneys.

No. 679,392.

Patented July 30, 1901.

J. A. MCKENZIE.  
ROTARY ENGINE.

(Application filed June 25, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 3

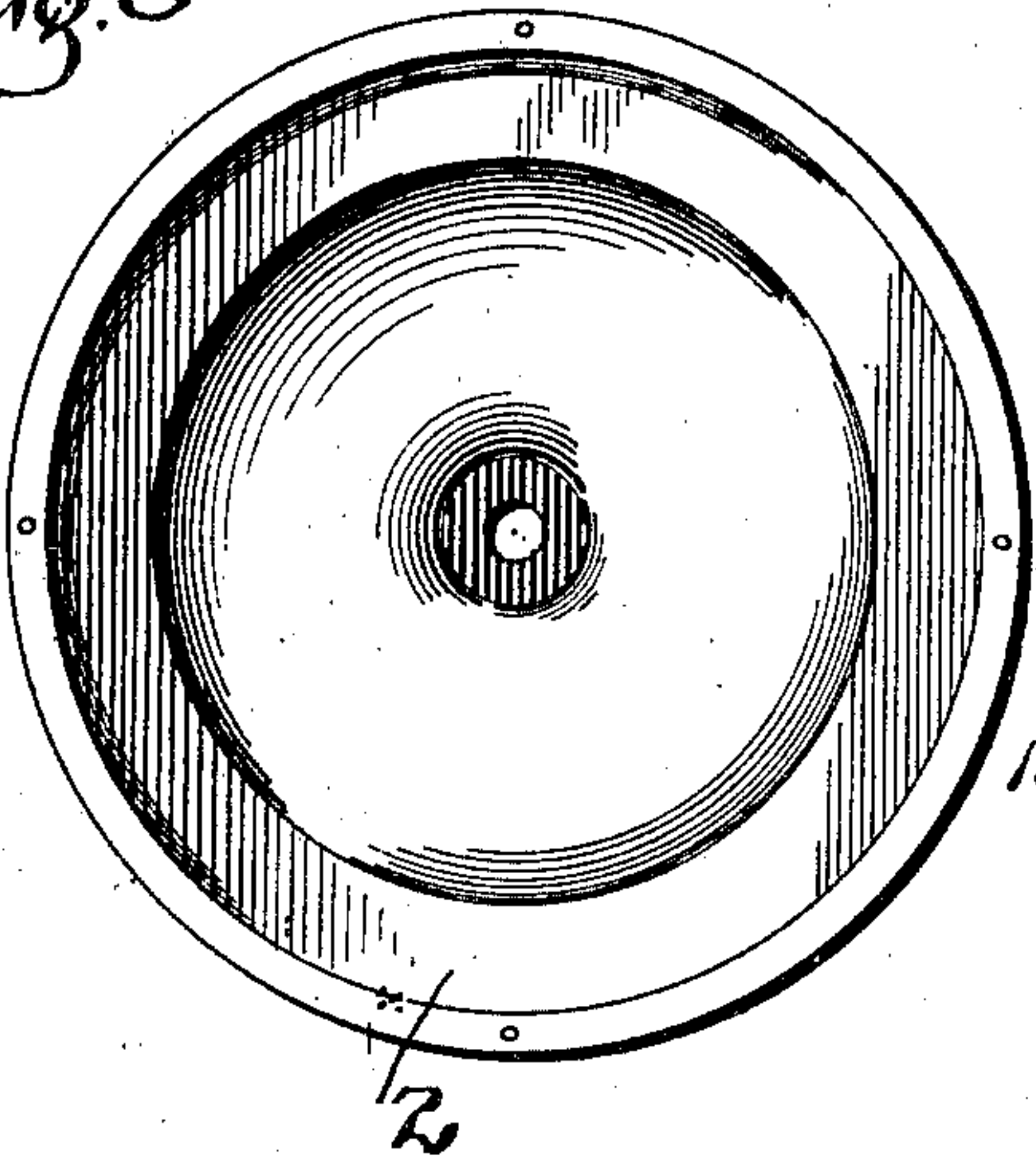


Fig. 4.

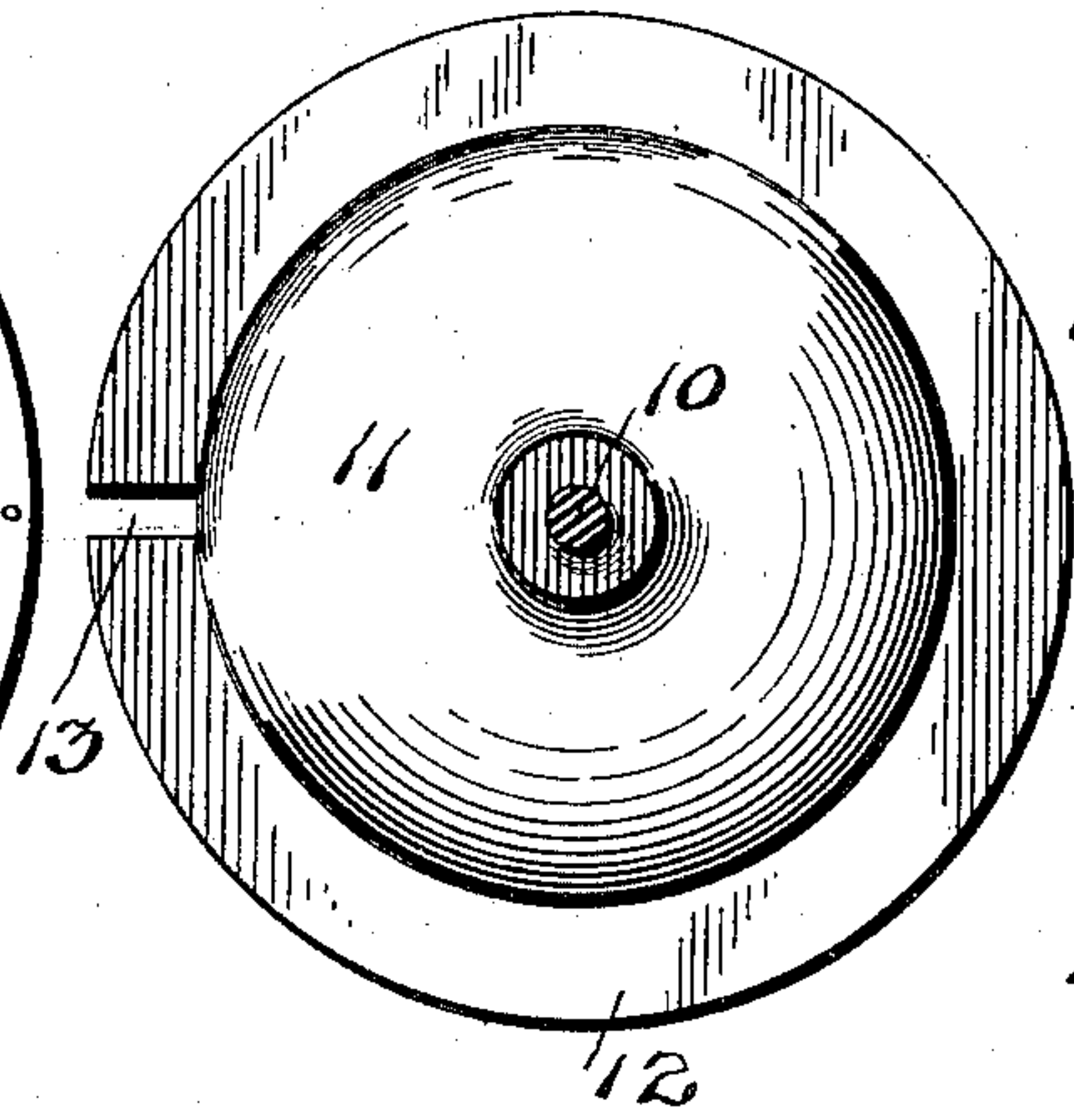


Fig. 5

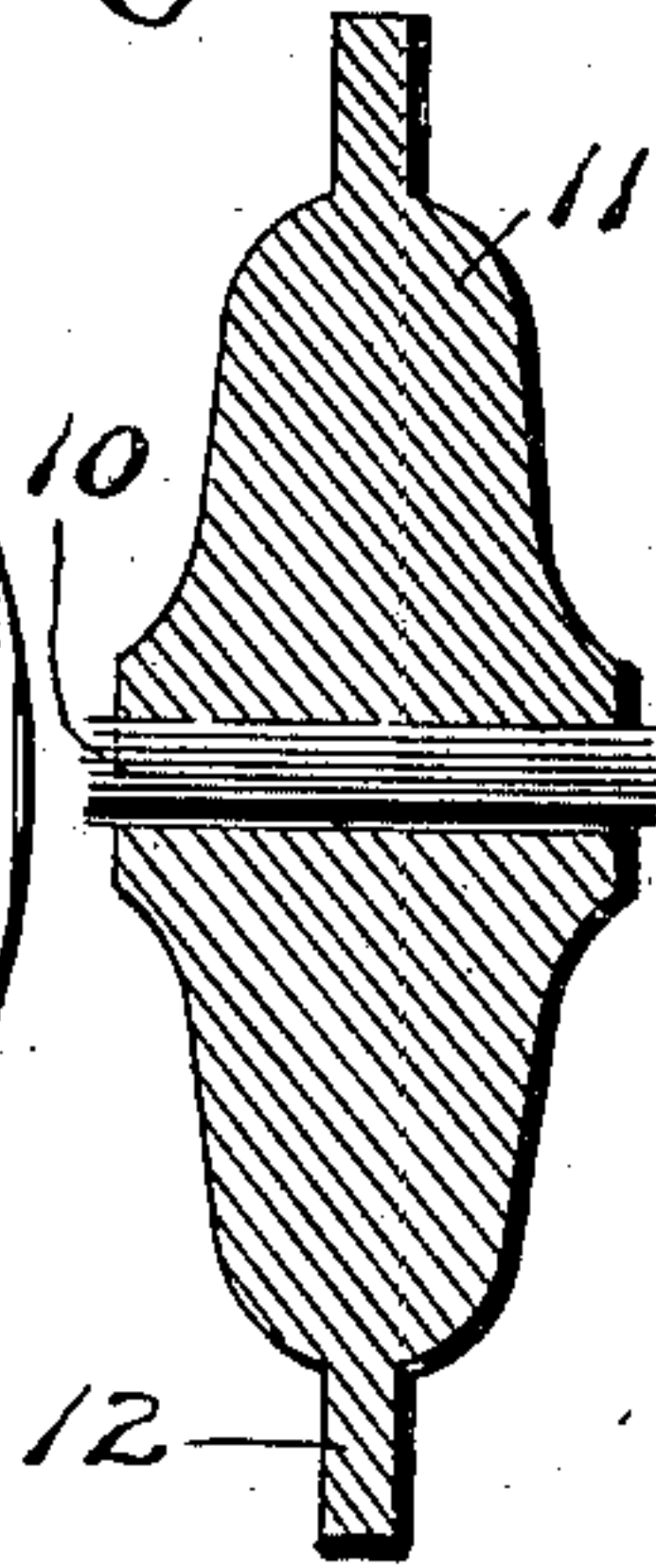


Fig. 9.

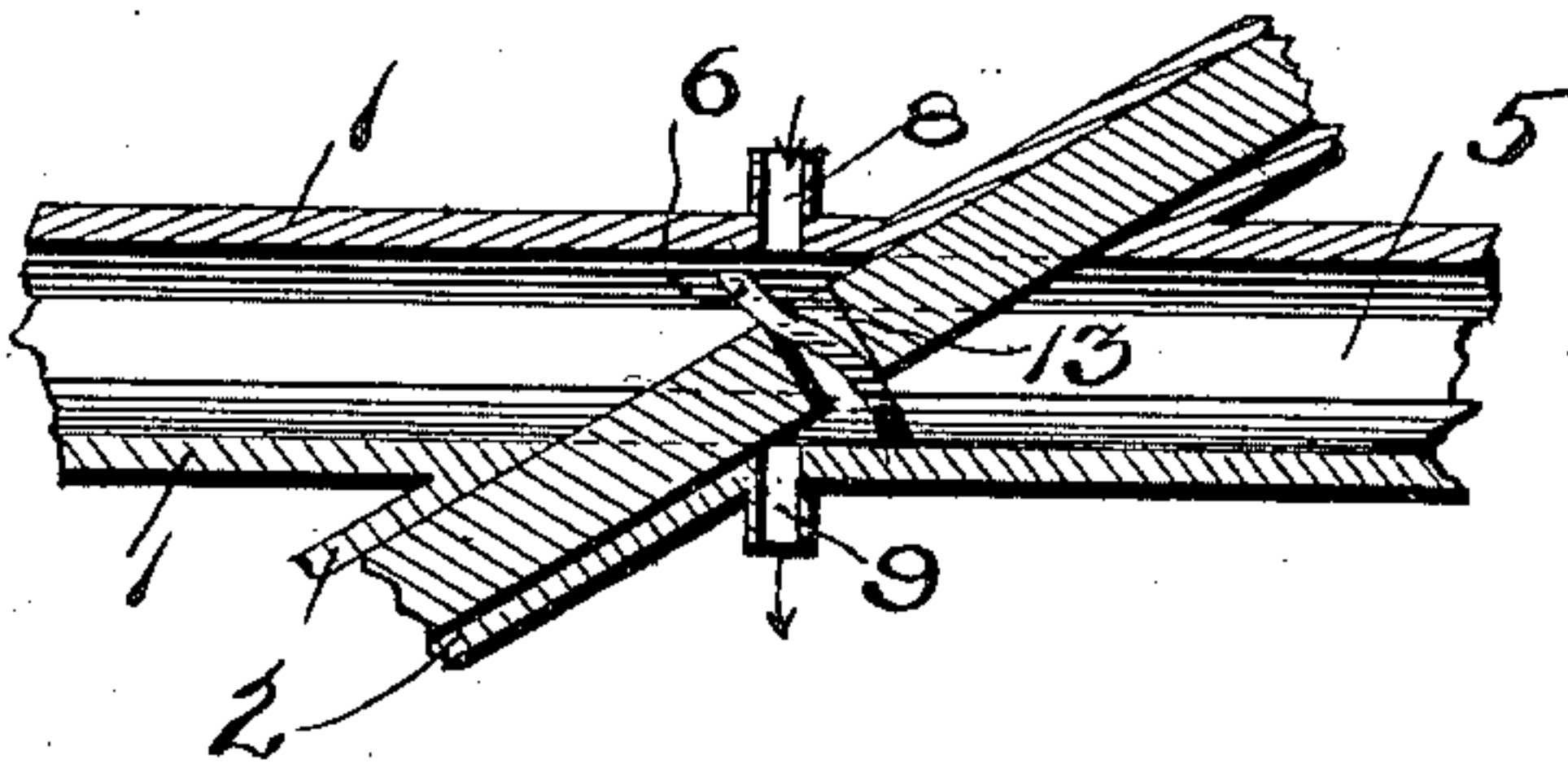


Fig. 6

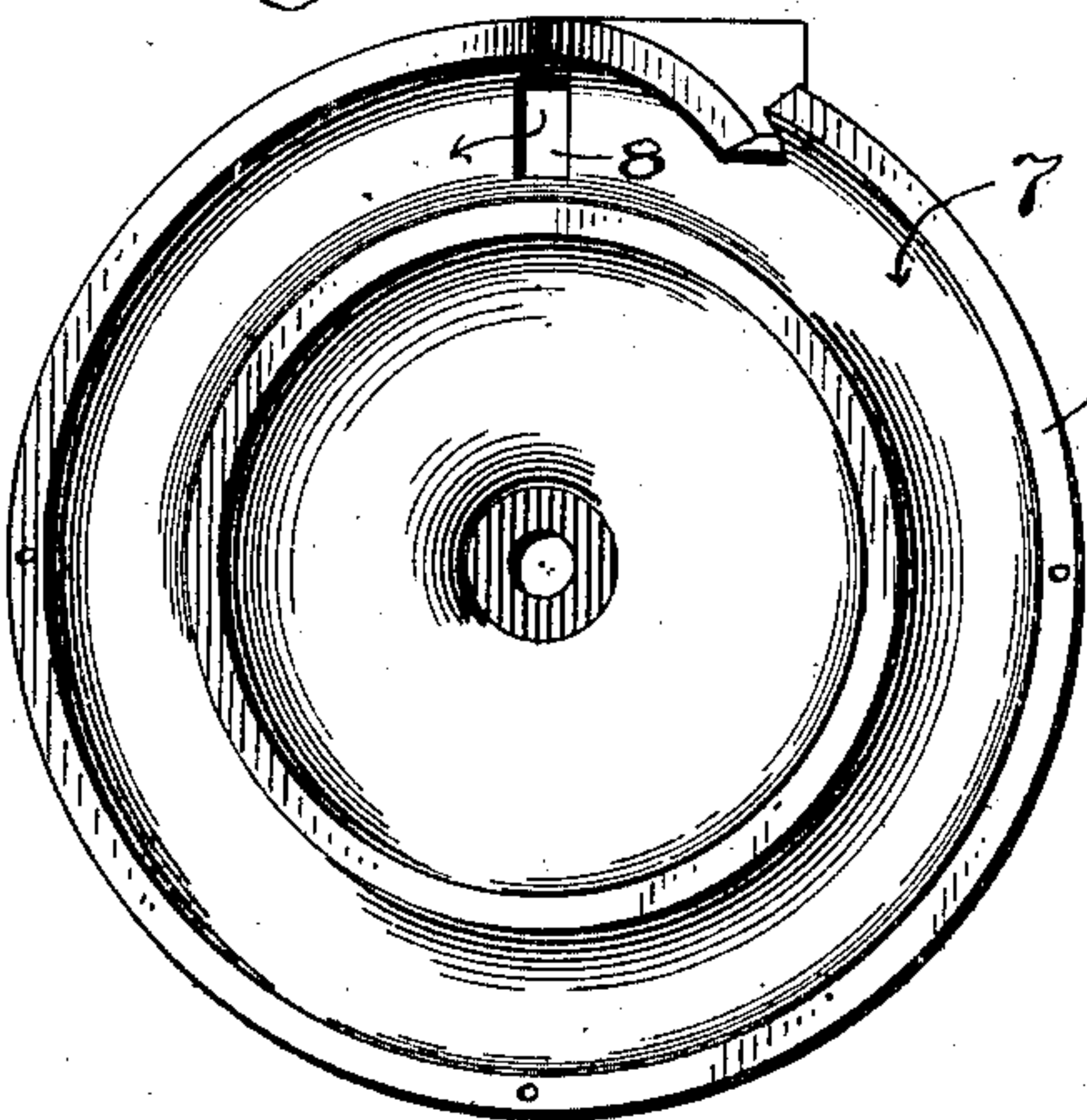


Fig. 7.

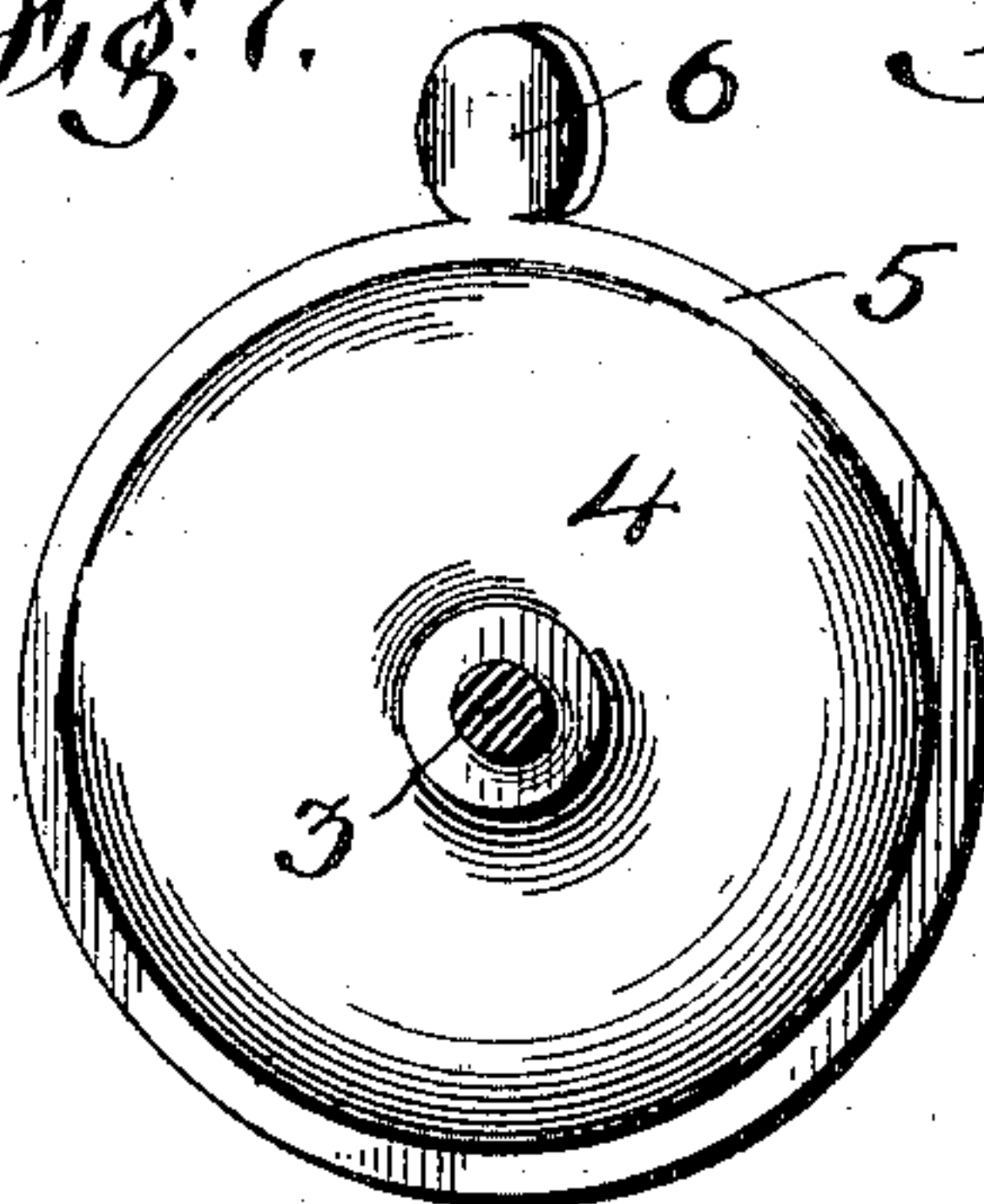
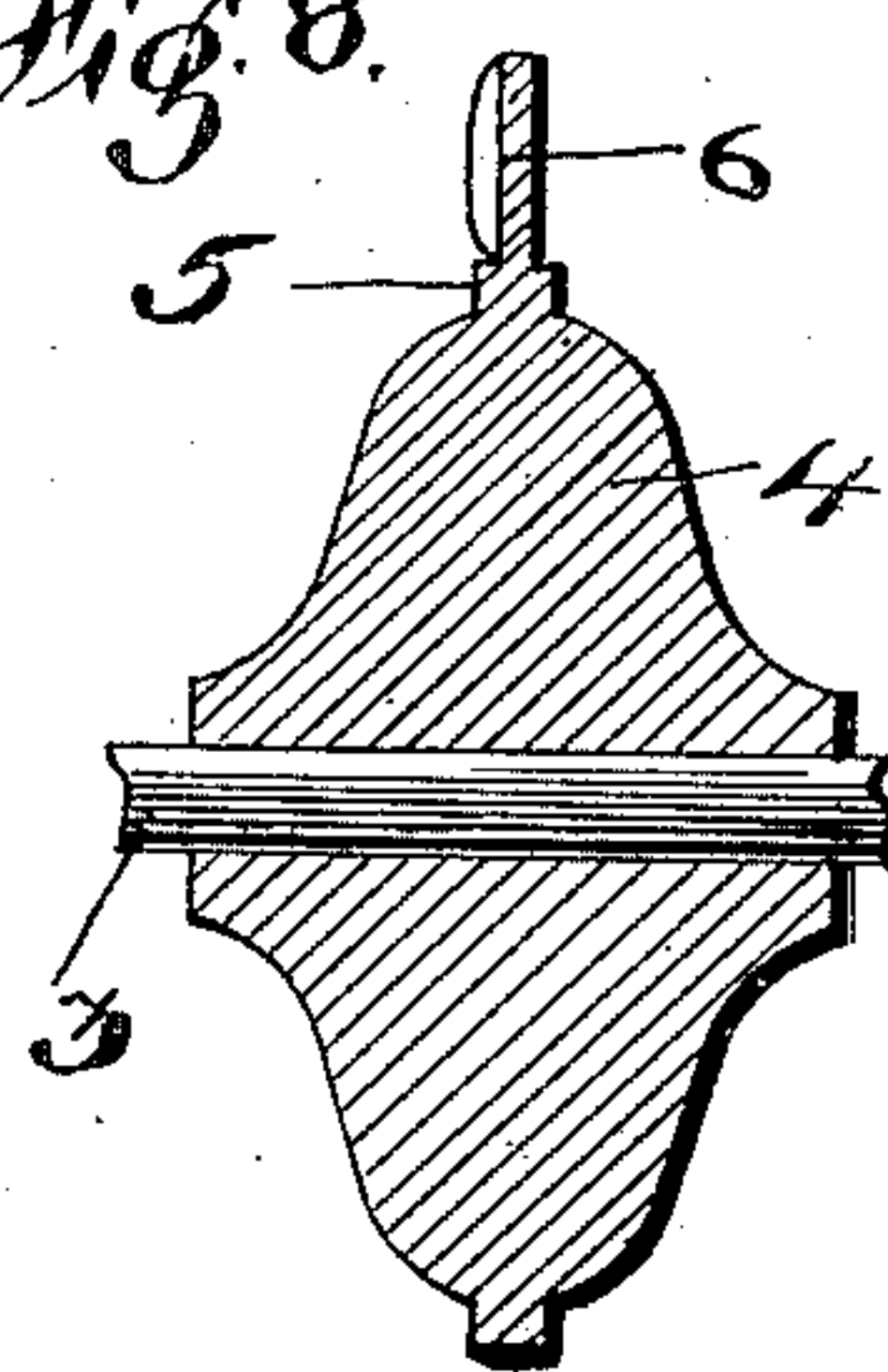


Fig. 8.



Witnesses:

Horace G. Seitz  
H. Joseph & Son

James Angus McKenzie, Inventor,

By Marion Marion

His Attorneys



13  
54

# UNITED STATES PATENT OFFICE.

JAMES ANGUS MCKENZIE, OF HANCOCK, MICHIGAN.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 679,392, dated July 30, 1901.

Application filed June 25, 1900. Serial No. 21,568. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES ANGUS MCKENZIE, a citizen of the United States, residing at Hancock, in the county of Houghton and State of Michigan, have invented a certain new and useful Improvement in Rotary Engines, of which the following is a specification.

My invention relates to improvements in rotary engines, and has particular relation to the manner in which the valves and pistons are adapted to cooperate.

One object of my invention is to provide a device which is durable in construction, simple and efficient in operation, and which can be made at a comparatively small cost.

A further object is to provide a construction in which the cylinder-head for the cylinder is formed by a rotating member which bisects the cylinder and which is provided with an opening for the passage of the piston during a certain period of rotation of the latter, both piston and cylinder-head being geared together and operating in conjunction with each other.

A further object is to provide a rotary engine with a rotating cylinder-head.

A further object is to provide a construction in which the piston and cylinder-head are mounted on different horizontal axes, but connected to cooperate with each other.

To these and other ends, the nature of which will appear as the invention is hereinafter disclosed, my said invention consists in the improved construction and combination of parts hereinafter fully described, and particularly pointed out in the appended claims, and illustrated in the accompanying drawings, forming a part of this specification, and in which similar numerals of reference indicate similar parts in all of the figures.

In the drawings, Figure 1 is a plan view of my improved device. Fig. 2 is a side elevation of the same. Fig. 3 is an inside elevation of one of the sections which form the casing for the rotating cylinder-head. Fig. 4 is a side elevation of the cylinder-head. Fig. 5 is a central vertical sectional view of the same. Fig. 6 is an inside elevation of one of the sections which form the casing for the piston and showing the cylinder of the en-

gine. Fig. 7 is a side elevation of the piston and its carrier. Fig. 8 is a central vertical sectional view of the construction shown in Fig. 7. Fig. 9 is a horizontal sectional view showing the manner in which the piston passes through the opening formed in the rotating cylinder-head.

1 designates the casing, in which is located the cylinder for the piston, and 2 designates the casing for the cylinder-head. Each of these casings is preferably formed in "halves," as shown, in order that they may be readily connected together, it being understood that such connections are formed steam-tight, as are also the connections for securing the two casings together one above the other, any suitable form of mounting being provided in so far as such mounting will serve to allow of the movements of the moving parts carried within said casings.

3 designates a shaft extending centrally through the casing 1, said shaft being mounted in suitable bearings and having keyed or otherwise secured thereon the carrier 4, formed as shown in Figs. 7 and 8, the interior of the casing being formed to fit the curvature in cross-section of said carrier. The rim of the carrier is formed with a peripheral extension 5, preferably flat, which fits within a recess formed within the casing.

6 designates the piston secured on the periphery of the extension 5, which piston is mounted to move around an annular raceway or cylinder 7, circular in cross-section, formed in the casing, said piston being adapted to fit therein regardless of its special curvature, which may be as shown in Fig. 9.

8 designates the inlet and 9 the exhaust port to the cylinder 7, said ports being preferably arranged on opposite sides of the casing 1, as shown.

The casing 2 is provided with a suitable shaft 10, extending centrally therethrough, and on which is keyed or otherwise secured the cylinder-head 11, formed substantially as shown in Figs. 4 and 5, the outer portion being formed with a peripheral extension 12, which is adapted to fit in a suitable recess formed in the casing. The extension 12 is provided with a radially-extending opening 13, for a purpose hereinafter described.



The shafts 3 and 10 are provided with suitable gear-wheels 14 and 15, which are adapted to cooperate with each other to cause the piston and cylinder-head to have a simultaneous movement.

As shown in Figs. 1 and 2, the casing 2 while supported on the casing 1 is out of vertical alinement therewith, or, in other words, the axis of rotation of the shafts 3 and 10 and the parts carried thereby is not in relative vertical alinement, although the path of movement of said parts cross each other. By referring to Fig. 9 it will be seen that this relative crossing of the path of movement serves to form substantially a bisection of the raceway or cylinder, this bisection being substantially at an acute angle. Several important results are obtained by mounting the two casings in this manner, and thereby giving the moving piston and cylinder-head motions which intersect one another. One reason is that these parts may be made in a simple manner and at small cost; but the important result obtained is the fact that by this arrangement the cylinder-head forms an abutment arranged in such manner as to direct the steam forward into the path where it is to go, forming a substantial inclined abutment which directs the steam forwardly and prevents the formation of a steam-cushion, the construction necessarily causing a continual forward movement of the piston as long as steam enters. This inclined abutment also aids in the rapid exhaust of the steam, as this steam is directed toward the exhaust-port and is therefore positively driven therefrom by the pressure of the steam in rear of the piston.

It will be obvious that, if desired, the ports 8 and 9 may be reversed by simply changing the steam connections, and while I have shown the piston as having a particular form or curvature and have also provided the casings and the moving parts of particular curvature these may be varied as desired and as may be found most suitable for the purpose for which the construction is to be used, such modifications as well as any others which may be necessary being reserved by me in so far as they may fall within the spirit and scope of my invention as set forth in the appended claims.

While I have described the construction shown as a rotary steam-engine, it will be readily understood that the same may be used with but few, if any, modifications as a gas-engine, a water-wheel, a pump, a compressor, a fan, a water or gas meter, and for many other purposes not mentioned.

Having thus described my invention, what I claim as new is—

1. In a rotary engine, the combination with an annular raceway; and a piston therefor; of a moving abutment intersecting said raceway at an acute angle, said abutment and

piston having a cooperating rotary movement at equal speeds relatively to each other.

2. A rotary engine comprising a casing having an annular raceway; inlet and exhaust ports therefor; a piston rotatively mounted to move in said raceway; a superposed casing mounted on said first-mentioned casing, said casings being out of vertical alinement; and a rotating cylinder-head or abutment mounted in said superposed casing, said head bisecting said raceway at an acute angle, said head and said piston having an operative connection to cause a relative movement at equal speeds.

3. The combination in a rotary engine, of a rotary piston disk and head, and an annular cylinder or casing with a cylinder-head or abutment, consisting of an annular plate or ring placed at an acute angle with the plane of the piston's revolution and cutting the path of said piston and cylinder, the cylinder having a slot accommodating said ring, means for synchronously turning the ring and piston at equal speeds, and a slot or slots in the ring adapted to pass the piston there-through, substantially as described.

4. A rotary engine, having a cylinder provided with an annular steam-chamber, a rotating piston-disk and a head thereon fitting said steam-chamber, in combination with a cylinder-head or abutment consisting of an annular plate or ring lying at an acute angle with the cylinder and cutting through the steam-chamber, the walls of said steam-chamber having slots accommodating said ring and the ring having a slot or slots permitting the passage of the piston-head therethrough, a casing fitting closely about the projecting parts of said ring, and secured to the cylinder, and means for turning the ring in unison and equal speed with the piston-disk, substantially as described.

5. A rotary engine having a cylinder provided with an annular steam-chamber, a rotating piston-disk and a head thereon fitting said steam-chamber, in combination with a cylinder-head or abutment consisting of an annular plate or ring lying at an acute angle with the cylinder and cutting through the steam-chamber, the walls of said steam-chamber having slots accommodating said ring, and the ring having a slot permitting the passage of the piston-head therethrough, a casing fitting closely about the projecting parts of said ring and secured to the cylinder, and intermeshing gears carried by the piston-disk and ring whereby the two are turned synchronously at equal speeds, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JAMES ANGUS MCKENZIE.

Witnesses:

JOSEPH MALHERBE,

JAS. BAIN.