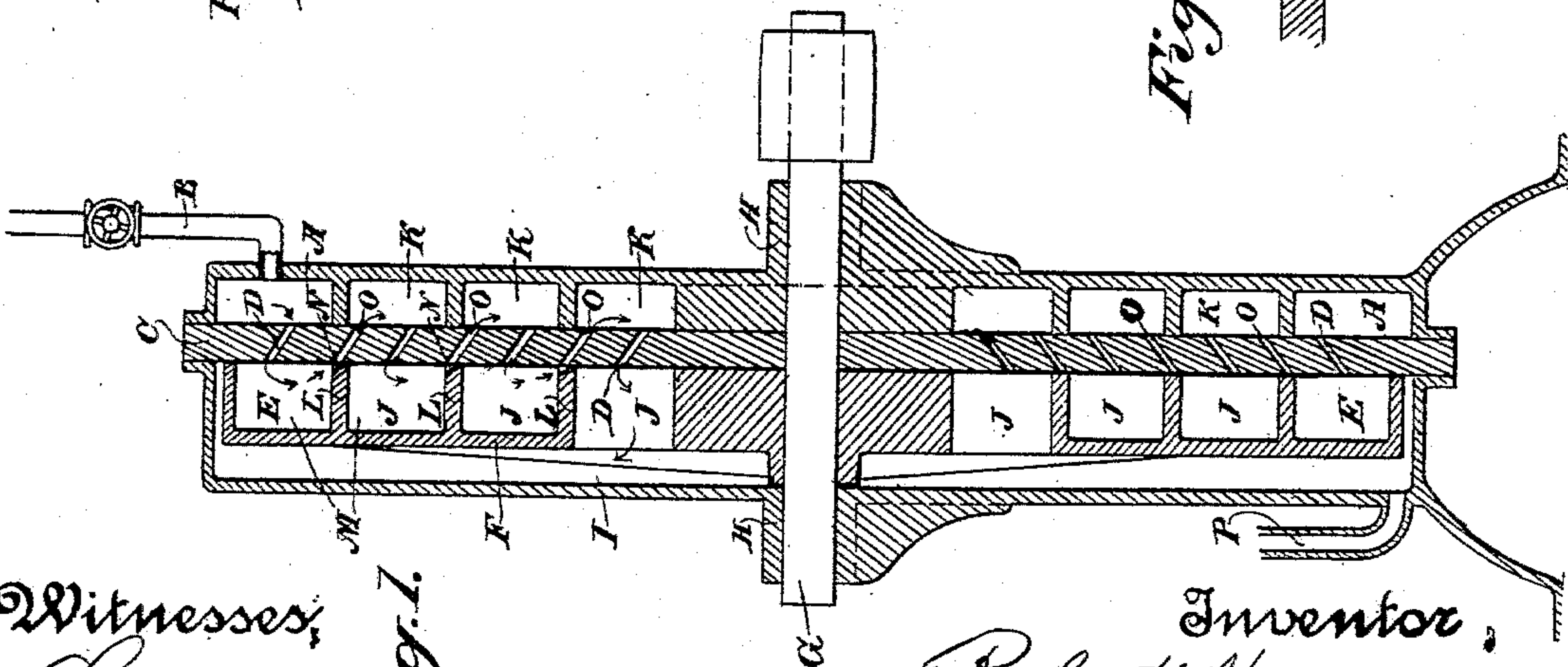
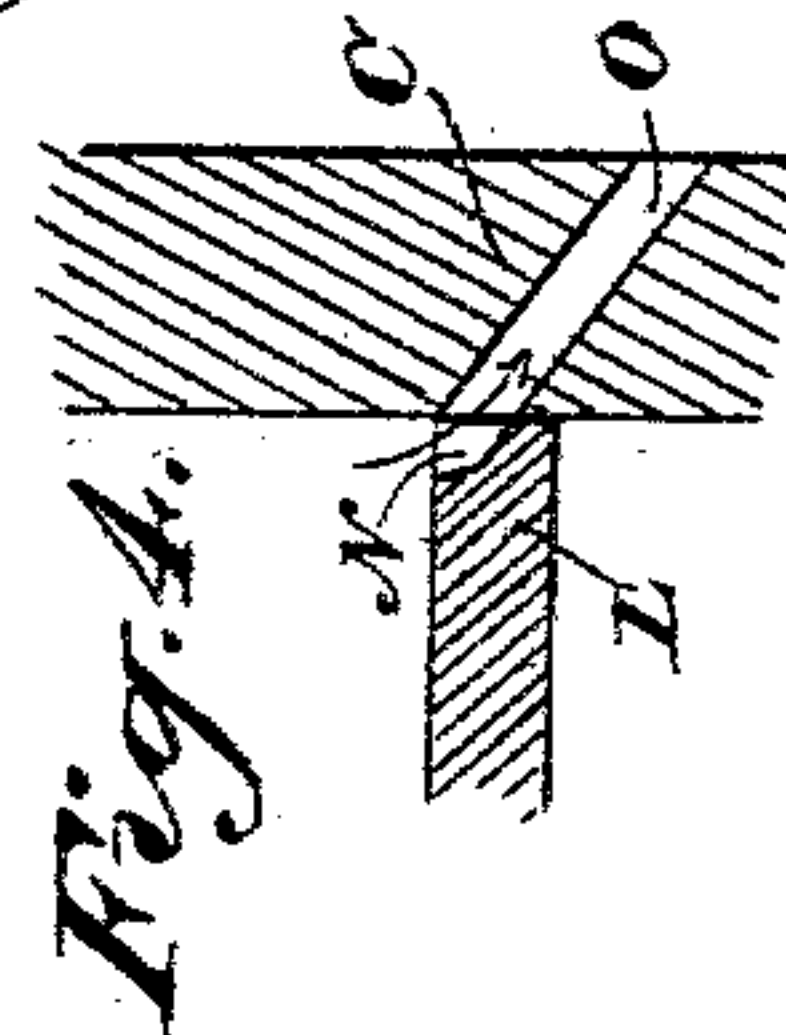
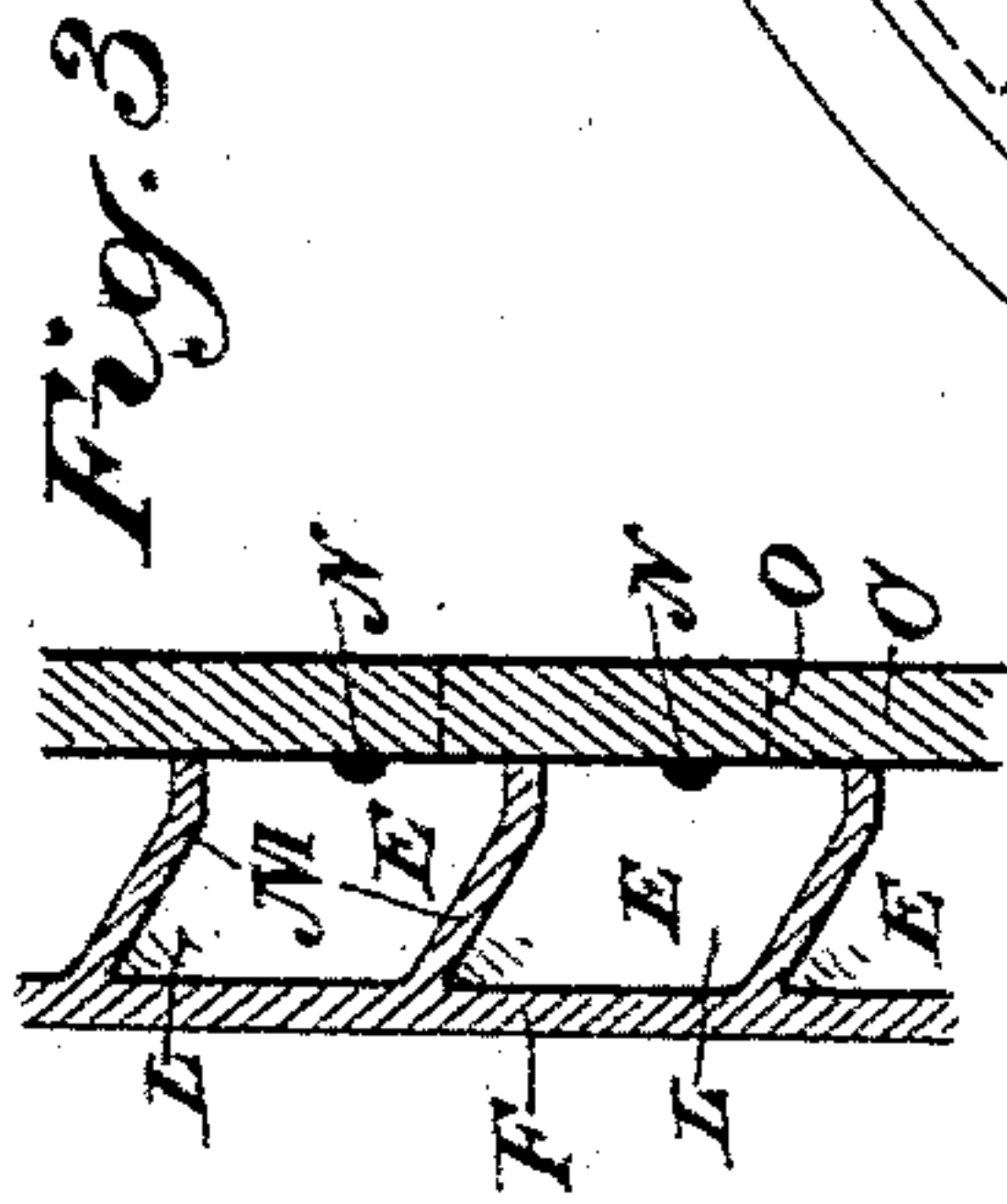
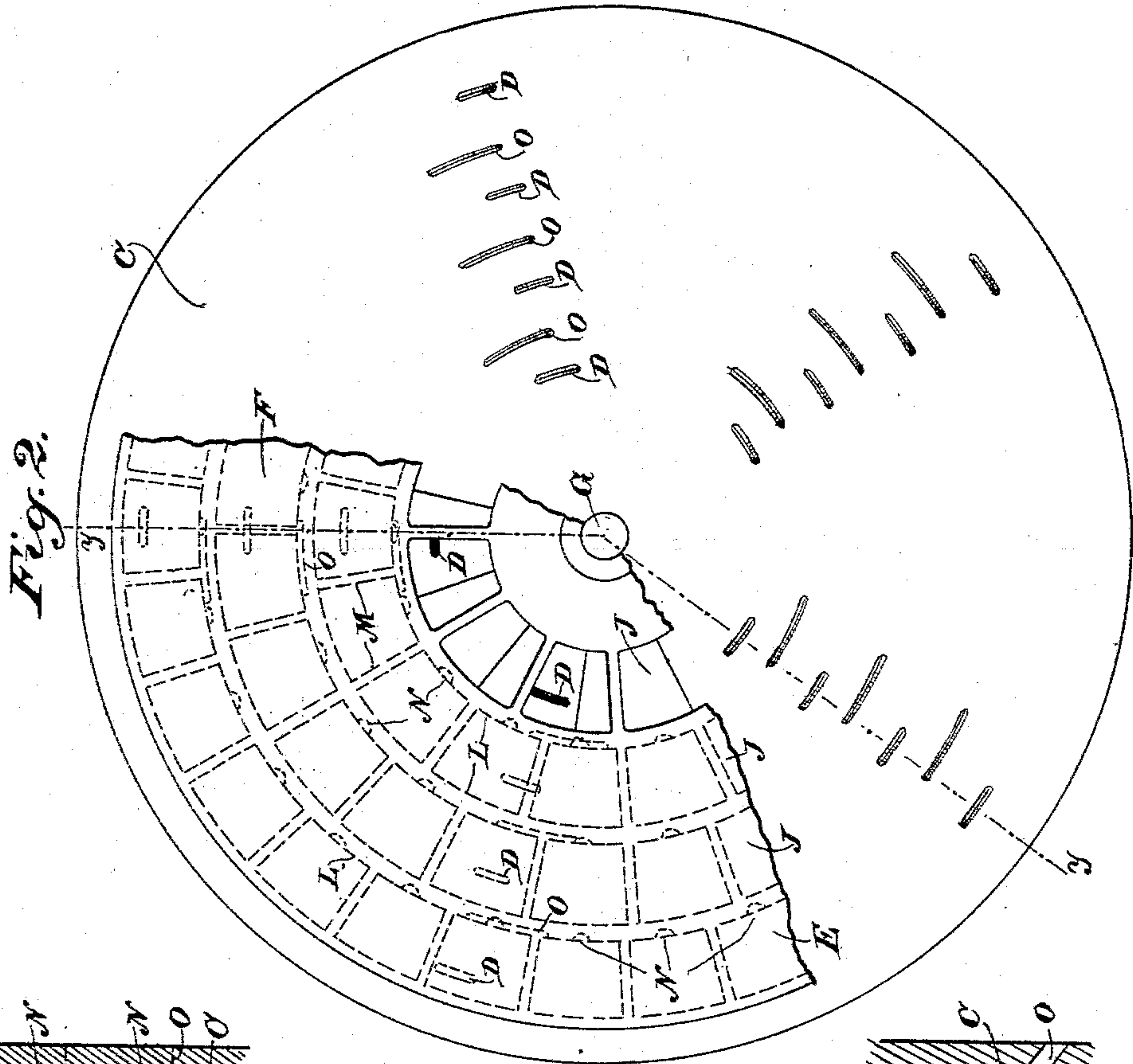


(No Model.)

R. HEWSON.
ROTARY ENGINE.

No. 533,646.

Patented Feb. 5, 1895.



Witnesses:
J. H. H. H.
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Inventor,
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UNITED STATES PATENT OFFICE.

ROBERT HEWSON, OF SAN FRANCISCO, CALIFORNIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 533,646, dated February 5, 1895.

Application filed May 23, 1894. Serial No. 512,665. (No model.)

To all whom it may concern:

Be it known that I, ROBERT HEWSON, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Rotary Engines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a rotary engine in which steam or vapor under pressure is employed as a motor.

It consists of a peculiarly constructed wheel, with a series of concentric annular chambers or buckets into which the propelling medium is admitted under pressure, and conducted successively from one series of chambers to the next, operating expansively from each chamber to the following.

Referring to the accompanying drawings for a more complete explanation of my invention,—Figure 1 is a vertical section taken through $y-y$ of Fig. 2. Fig. 2 is a face view of the plate against which the wheel travels, showing part of the wheel in position. Fig. 3 is a sectional view of two of the buckets of the wheel looking toward the bottom of the buckets. Fig. 4 is a sectional view taken at right angles with Fig. 3 and cutting the exhaust passage.

A is an annular chamber into which steam is introduced by means of a pipe B from a boiler or other source.

C is a disk against the back of which the chamber A is formed, or fits closely and steam tight. Through this disk are made openings D so that steam from the chamber A, passing through the opening D, at an inclination, will enter the buckets E formed on the face of a rotary disk wheel F, as shown, and strike forcibly against the fronts of the buckets as they pass.

The buckets E are closed on all sides, except one, and this open side fits closely against the face of the disk C so as to run practically steam tight.

The wheel F is mounted upon a shaft G which is suitably journaled so as to rotate in journal-boxes H. The wheel F runs in an exterior case I which serves to receive the exhaust from the innermost series of buckets of the wheel, as will be hereinafter described.

Interior to the circular row of buckets E on

the wheel are other buckets J arranged concentrically, as shown, and interior to the steam chamber A are other steam chambers K also arranged concentrically, and corresponding in position with the buckets J of the wheel.

The circular diaphragms or partitions L between the concentric rows of buckets have formed in their inner edges, and about central between the radial partitions M forming the bottoms of the buckets, small depressed openings N as plainly shown in Fig. 4.

In the face of the disk C, which is presented toward the wheel F, are formed slots or channels O which extend through from that face of the disk which is adjacent to the wheel, to the opposite side, each channel inclining so as to open from a chamber J of the wheel, to the chamber K which is opposite the next interior chamber of the wheel as plainly shown in Fig. 1. These passages O are in line with the concentric diaphragms or partitions L of the wheel, so that when the wheel is in certain positions, the edges of the partitions L will close the ports O, but when the wheel is advanced so as to bring the depression N into line with the passages O, then the steam will be allowed to escape from the exterior buckets E or J into the steam chambers K next interior, and from thence it is again delivered through the steam passages D into the adjacent bucket of the wheel.

The operation will then be as follows: Steam at full boiler pressure will be admitted to the chamber A. The steam passing through the inclined jet opening D into the buckets E of the wheel, acts by impact to rotate the wheel, and as the passage N in the bottom L of each bucket, comes in line with the elongated slot O which is made through the wall C, the steam will be discharged through this passage into the steam chamber K which is concentric with the interior of the chamber A. From this chamber the steam, at a less pressure than that of the chamber A, will again be discharged through the passage D into the wheel bucket J next interior to and concentric with the bucket E of the wheel, acting against the front of the bucket in the same manner as described for the exterior bucket. From this bucket it again escapes through the passages N and O into the next interior chamber K, and so on

with constantly decreasing pressure, until, at last, it is delivered into the last circle of buckets J nearest to the hub of the wheel. These latter buckets are open upon the outer side, so that the steam immediately escapes into the space between the back of the wheel and the casing I, and from this space it escapes through the exhaust pipe P to the open air.

10 By this construction I am enabled to utilize the full pressure of the steam to the very best advantage, and by expanding the steam from one set of buckets to another it finally escapes with its power utilized to the fullest extent.
15 I have found that the steam may be thus used over four times with good effect.

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

20 1. A rotary wheel consisting of a series of closed concentric buckets, a flat disk against which one side of the wheel fits and rotates, concentric steam chambers upon the opposite side of said disk, coinciding with the
25 wheel buckets, and openings made diagonally through the disk whereby steam is admitted into the buckets successively as they pass, and is exhausted therefrom from each bucket into a succeeding steam chamber and finally
30 to the outer steam chamber.

2. A rotary wheel having closed concentric buckets, a stationary disk against which one side of the wheel fits and rotates, concentric steam chambers upon the opposite side of the
35 disk, coinciding with the wheel buckets, diagonal slots made through the disk extending from the line of the bottom of each series of buckets to the next interior steam chambers, and depressed openings in the bottom of each
40 bucket adapted to coincide with the slots to allow the steam to exhaust from each bucket into the succeeding chamber.

3. The stationary disk with steam chambers upon one side, a bucket wheel rotatable
45 against its opposite face, inclined slots made through the disk from lines coincident with the bottoms of the wheel buckets on one side, to the steam chambers next interior on the opposite side, whereby the passages are closed
50 at intervals between adjacent buckets, and semi-circular depressions in the bottom of each bucket to coincide with the slots as the wheel revolves, and allow the steam to exhaust from the buckets into the chambers.

55 4. A rotary wheel having a series of concentric buckets open at one side and fitted to ro-

tate with the open side in close contact with a stationary disk or diaphragm, steam chambers fixed upon the opposite side of said disk with inclined openings through the disk
60 whereby steam under pressure is admitted to the exterior row of buckets successively as the wheel passes, depressions N formed in the bottom of each of the buckets, and slotted openings O adapted to coincide therewith as
65 the wheel rotates whereby the steam may escape through said passages into a series of steam chambers K interior to the exterior steam chambers, jet passages leading from these chambers through the disk so as to dis-
70 charge the steam against the front wall of the next interior circle of buckets whereby the steam is used successively and expansively upon two or more series of buckets in the same wheel.

5. A wheel mounted upon a shaft adapted to rotate within a closed casing and having two or more concentric series of buckets open at one side only, said side moving in contact with a flat disk or diaphragm which forms a
80 constant wall for the open side of the buckets, a steam chamber located upon the opposite side of the diaphragm in line with the outer row of buckets, passages through which steam is delivered against the front wall of
85 the buckets to impel the wheel, slotted openings made diagonally through the disk or diaphragm so that upon the side adjacent to the wheel these openings are normally closed by the concentric partitions between the rows
90 of buckets and upon the opposite side they open into steam chambers interior to the adjacent outer ones, passages N formed in the bottom of each bucket and communicating with the said inclined passages when they ar-
95 rive in line with them, whereby the steam is exhausted from each exterior bucket into the next interior steam chamber, and passages whereby the steam thus received is delivered into the adjacent series of wheel buckets, and
100 a final series of buckets interior to those described, having the outer side also open, whereby the steam is finally allowed to escape into an exterior casing, and thence delivered through an exhaust pipe or passage.

In witness whereof I have hereunto set my hand.

ROBERT HEWSON.

Witnesses:

S. H. NOURSE,
J. A. BAYLESS.