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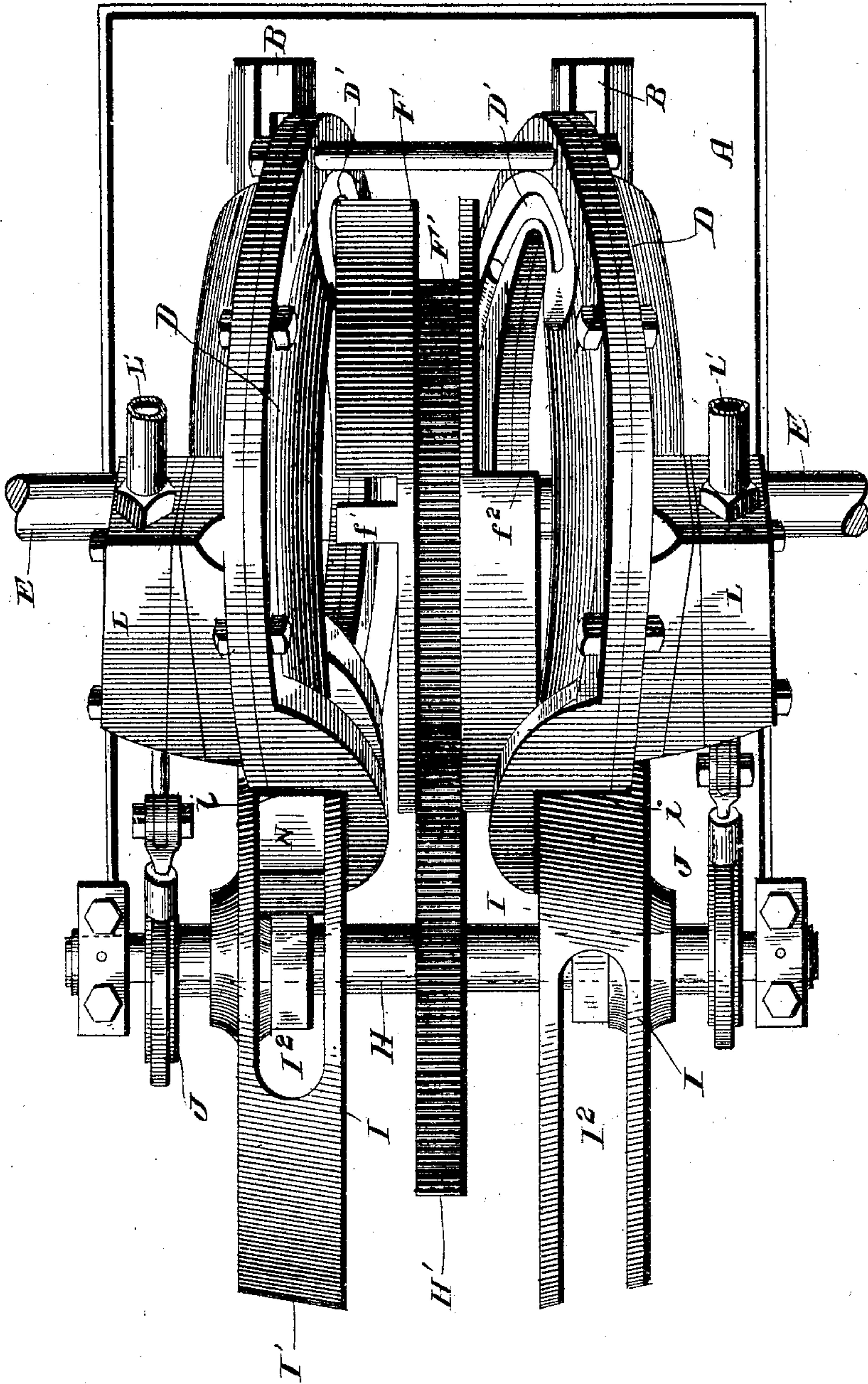
PATENTED AUG. 1, 1905.

L. VAN D. SUTTON.
ROTARY ENGINE.

APPLICATION FILED JAN. 4, 1905.

4 SHEETS—SHEET 1.

Fig. 1



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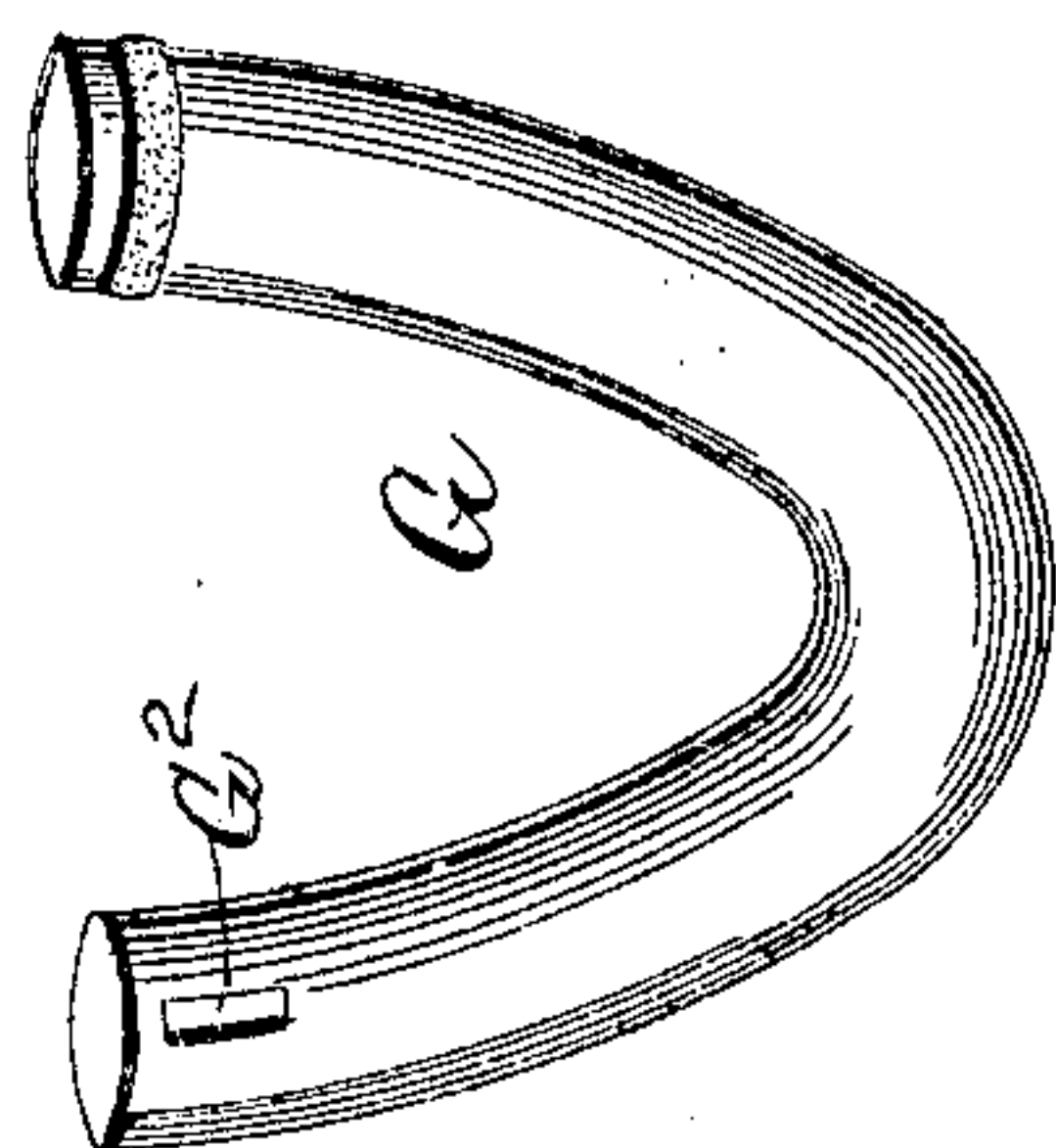
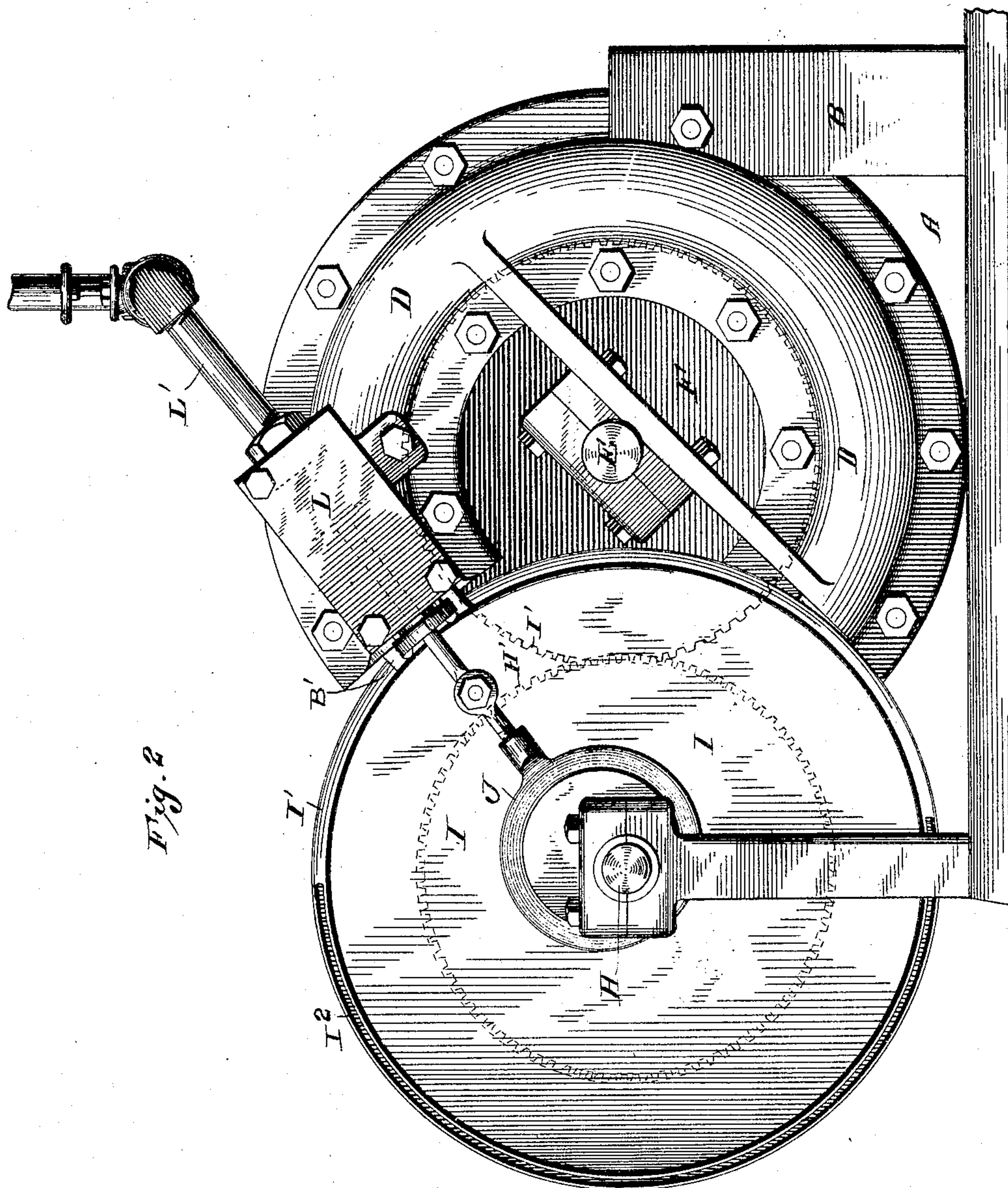
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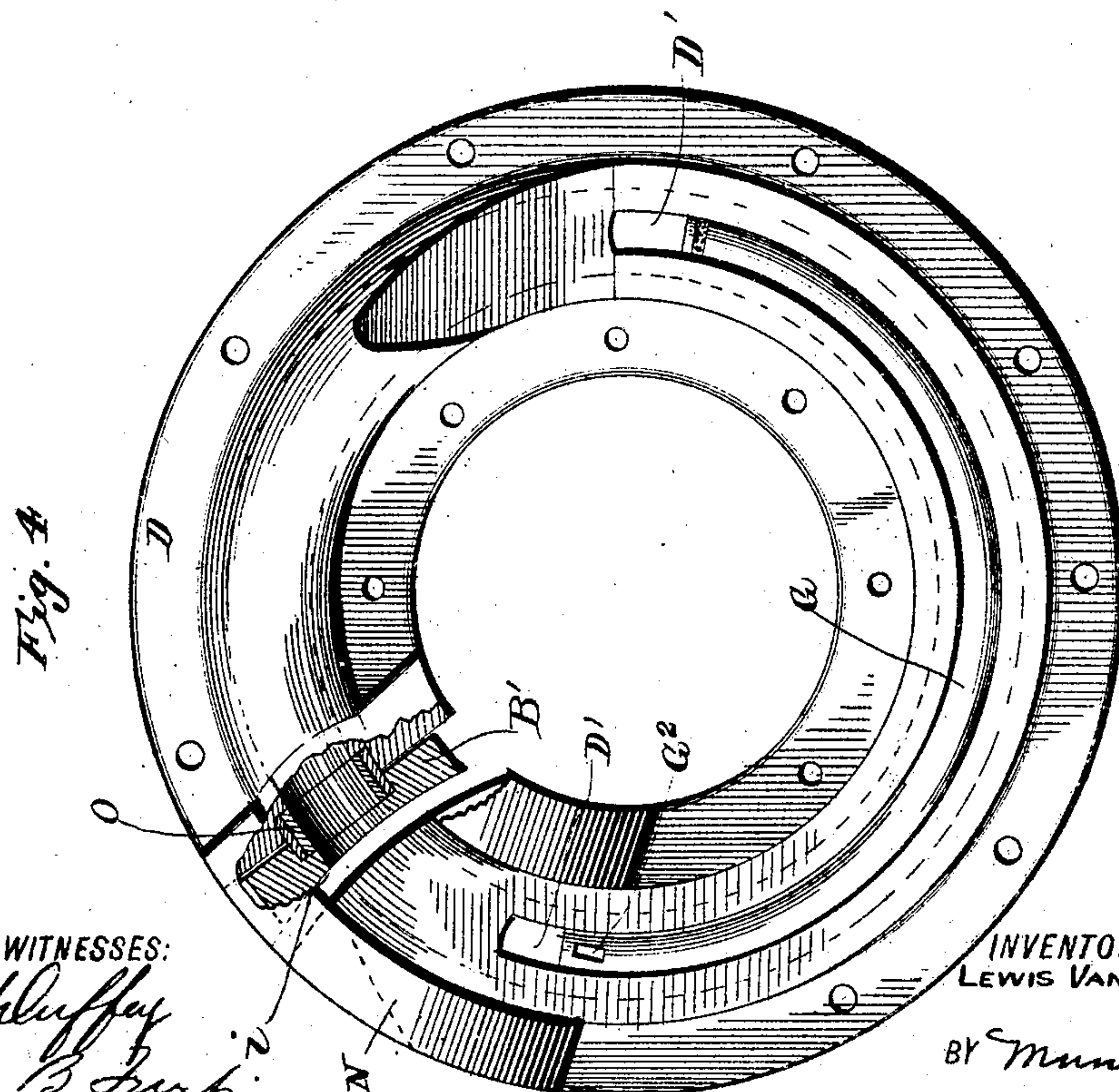
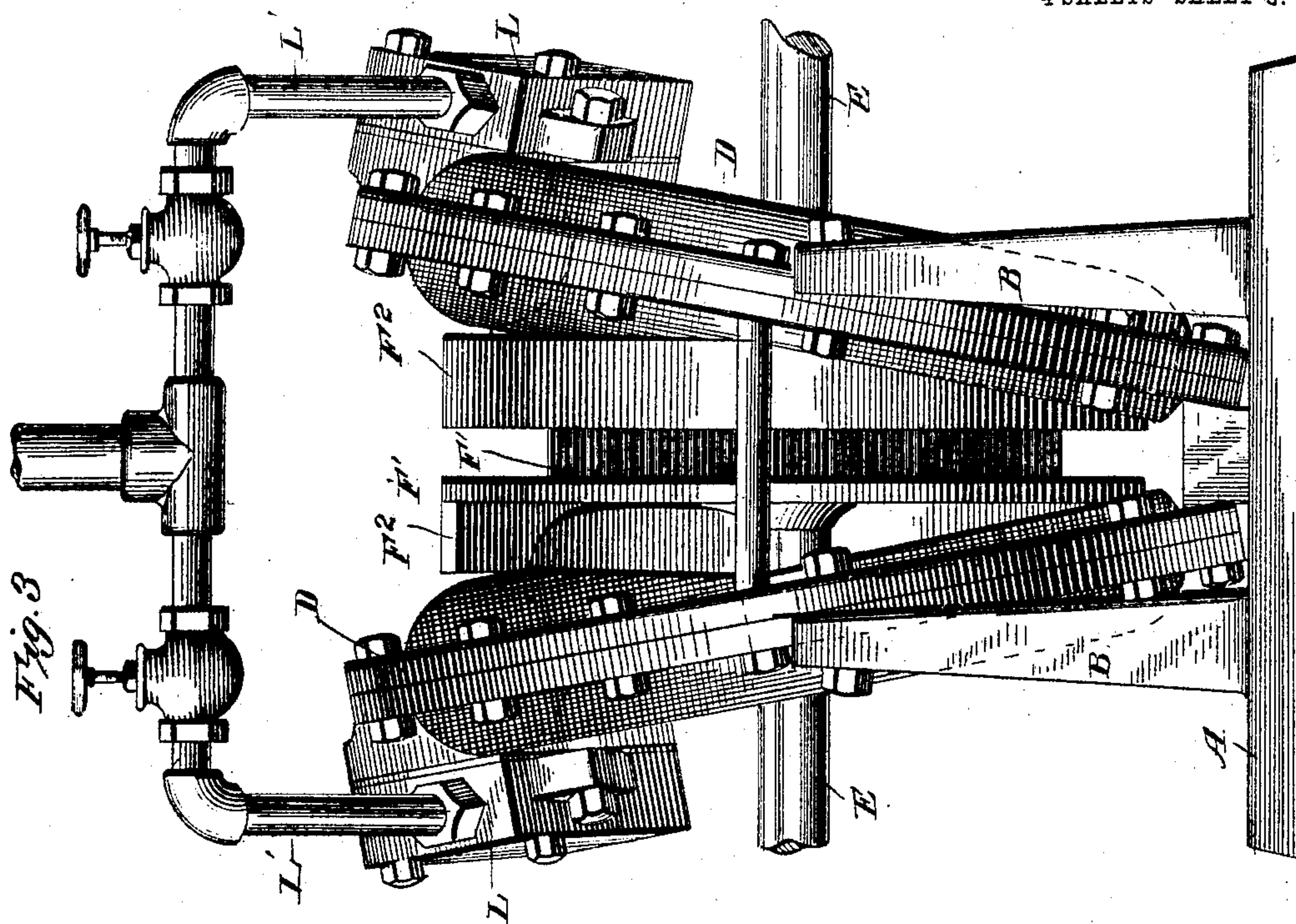
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4 SHEETS—SHEET 3.



WITNESSES:

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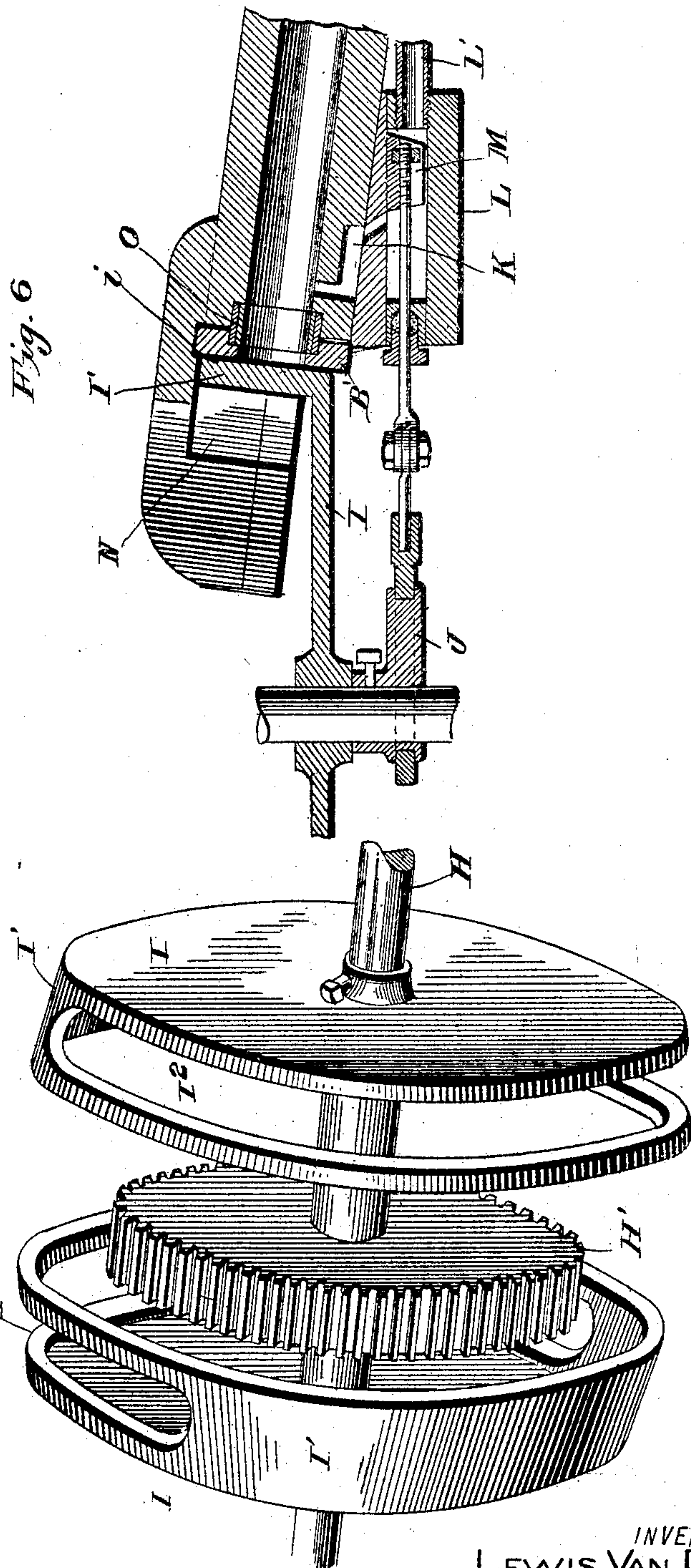
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4 SHEETS—SHEET 4.



WITNESSES:
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UNITED STATES PATENT OFFICE.

LEWIS VAN D. SUTTON, OF WEST NEWTON, PENNSYLVANIA.

ROTARY ENGINE.

No. 796,370.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed January 4, 1905. Serial No. 239,561.

To all whom it may concern:

Be it known that I, LEWIS VAN D. SUTTON, a citizen of the United States, residing at West Newton, in the county of Westmoreland and State of Pennsylvania, have made certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention is an improvement in rotary engines, and particularly in that class of such engines which is represented by my former patent, No. 740,944, dated October 6, 1904, and in which cylinders consisting of annular tubes are arranged close together at their lower ends and diverge toward their upper ends, so that they afford space between them for the operation of a carrier which coöperates with pistons in the form of long curved cylindrical bodies and operating in the cylinders as more fully explained in the said former patent; and the present invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of an engine embodying my invention. Fig. 2 is a side view thereof. Fig. 3 is a rear elevation of the engine. Fig. 4 is a detail elevation of the inner side of one of the cylinders, partly broken away in section. Fig. 5 is a detail perspective view showing the counter-shaft, the gear thereon, and the abutment-wheels carried by said shaft. Fig. 6 is a detail section on about line 6 6 of Fig. 2, and Fig. 7 is a detail perspective view of one of the curved pistons.

On the base A are mounted uprights B, to which cylinders D are secured. These cylinders D, which may be alike except that they are rights and lefts, are supported so that they stand at an inclined angle to each other and at an inclined angle with respect to the main shaft E. As shown, the cylinders are arranged comparatively close together at their lower ends and diverge toward their upper ends, affording a space between them for the operation of the carrier F. (See Figs. 1 and 3.) The construction and arrangement of the cylinders, the pistons G therein, and the carrier F so far as described are substantially the same as in my former patent before referred to. In the present construction, however, the carrier F is provided centrally with a gear F', whose width increases the extreme width of the carrier and necessitates to such extent a spacing of the cylinders D that much farther apart. As in my former patent, the carrier is secured

upon the shaft and is arranged and operates between the opposite cylinders D and is provided on its opposite sides with the projecting webs or flanges F², which extend circumferentially around the circular carrier F for a portion of its circumference and project laterally, so they may enter the slots D' and operate within the cylinders D throughout a portion of length of said cylinders, the slots D' extending only for a portion of the length of said cylinders and the arrangement of the cylinders in a plane at an angle to that of the carrier permitting such operation, as will be understood from the drawings. The webs F² are arranged at one end f² to operate in rear of the piston G, in order to force said pistons around toward the position where they will be operated upon by the steam admitted from the feed-valve, the lugs or projections f' being arranged at the opposite ends of the webs F², so they may enter the recesses G² in the front end of the piston G, so the piston G will operate the carrier while the said piston is being positively operated by the admitted steam. It will thus be noticed that when steam is admitted to operate upon the piston G the lugs f' on the carrier will be engaged in the recess G² of the piston, so the said piston will positively operate the said carrier until the steam-pressure is relieved from the piston G, after which the end f² of the web F² opposite the lug f' will engage in rear of the piston G and will operate said piston around toward the point where it takes steam. This operation is identical with that disclosed in my former patent.

In connection with the devices before described I employ a counter-shaft H, on which are secured the abutment-wheels I and eccentrics J for operating the feed-valve, the said shaft H being also provided with a gear H', meshed with the gear F' of the carrier, so the counter-shaft H will be driven from the shaft E. This arrangement of the gearing F' H' is preferred, because thereby the operating strain incident to the shaft H is borne centrally between the opposite cylinders.

The feed-steam enters the cylinders through ports K from the valve-chest L, to which it is supplied by a pipe L', and the passage of steam through the port K is closed by a valve M, operated from the eccentric J on the counter-shaft, and the operation will be readily understood from the foregoing description and the accompanying drawings, reference being especially made to Figs. 1 and 6 of the

drawings. It will be noticed especially from Fig. 1 that the opposite eccentrics J are suitably arranged relatively to feed the steam alternately to the opposite cylinders D, so the steam is operating in one cylinder as the steam is exhausted in the other cylinder.

In my former patent I employ abutments in the form of gates movable reciprocally across the bores of their respective cylinders and operated by pistons through the medium of steam, the admission of which is controlled by valves operated from the main shaft. In the present construction the abutments are in the form of abutment-wheels I, secured on the counter-shaft H and moving at i across their respective cylinders. These wheels are formed, as shown in Figs. 1 and 5, with the solid cut-off portions I' and the open or slotted portions I², the slotted portions I² permitting the passage of the curved pistons past the abutment and the plates I' forming the abutment-surfaces against which the steam will act in the operation of the invention. In other words, the wheels have for a portion of their circumference imperforate plates forming abutments for the steam, between which and the pistons the steam operates to drive the pistons and through the carrier connected with said pistons the main shaft E, which in turn, through the gearing before described, will operate the counter-shaft and so operate the abutments and the feed-valves, as before described. At the points where the abutment-wheels operate across the cylinders it will be noticed the cylinders are provided with projecting bosses B', and packing is provided at O in the form of rings, as best shown in Figs. 4 and 6 of the drawings. The packing-rings operate to prevent the steam from passing out between the bosses or shoes B' and the cylinder and also serve to hold the shoe in place. The shoe is used for the purpose of preventing the steam from escaping between the cylinders and the faces of the abutment-wheels. It will also be noticed that the imperforate plates of the abutment-wheels are set at an angle to the axis of said wheels, so that the said plates will cross their respective cylinders at approximately a right angle, as will be understood from Figs. 1 and 6 of the drawings. The imperforate plates of the abutment-wheels are arranged opposite each other—that is to say, the said plate of one wheel is arranged diametrically opposite the corresponding plate of the other wheel, as the pistons in the cylinders are operated so that one piston is being driven by the steam operating between it and its abutment-wheel while the other piston is being carried through the open portion of its abutment-wheel in the operation of the invention, as before described.

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

1. The improvement in rotary engines herein described, comprising a main shaft, car-

riers secured thereon, and provided with an intermediate gear and on opposite sides thereof with the laterally-projecting webs or flanges provided at one end with lugs or projections to enter recesses in the pistons and arranged at their opposite ends to operate in rear of the pistons, cylinders encircling the shaft on opposite sides of the carrier, and inclining outwardly from their lower toward their upper ends and having in their inner sides slots extending circumferentially for a portion of the circumference of the cylinders, pistons operating within the cylinders and arranged for engagement by the webs or flanges of the carrier, and means for controlling the admission of steam to the cylinders, a counter-shaft having a gear meshed with the gear of the carrier, and abutment-wheels secured on the counter-shaft and having imperforate plates crossing their respective cylinders and forming abutments for the steam, said abutment-plates being arranged diametrically opposite each other, substantially as and for the purposes set forth.

2. The combination with opposite inclined cylinders and pistons operating therein, of a main shaft, a carrier on the main shaft having webs or flanges for engagement with the pistons in the cylinders, a counter-shaft, gearing between the counter-shaft and the main shaft, and abutment-wheels on the counter-shaft and having imperforate plates arranged to cross their respective cylinders and form abutments for the steam operating therein, substantially as set forth.

3. The combination with a curved cylinder and a curved piston operating therein, of means for admitting steam to the cylinder, a carrier operating in connection with the curved piston in the cylinder, and a curved abutment-plate curved in the direction of its length crossing the cylinder and operating in unison with the carrier and having a continuous movement in one direction, substantially as set forth.

4. The combination with the curved cylinders, the curved pistons therein, and the carrier having means for engagement with the pistons, of the abutment-wheels having imperforate plates crossing their respective cylinders, and operating in unison with the carrier, substantially as set forth.

5. The combination of the curved cylinders, the curved pistons therein, the carrier having means for engagement with the piston, the abutment-wheels having imperforate plates crossing their respective cylinders, and the shoes and packing-rings substantially as set forth.

6. The combination with the opposite cylinders, the pistons therein, and a carrier between the cylinders and having means for engagement with the pistons, of a counter-shaft, gearing between the counter-shaft and the carrier, and abutment-wheels on the counter-

shaft and having imperforate plates crossing their respective cylinders, and open portions and arranged for operation, substantially as described.

7. The combination of the main shaft, the opposite cylinders, the pistons therein, a carrier between the cylinders and having means for engagement with the pistons of the opposite cylinders, a counter-shaft, gearing between said counter-shaft and the main shaft, abutment-wheels on the counter-shaft and crossing their respective cylinders, valves controlling the admission of steam to the cylinders and eccentrics on the counter-shaft and connected with the valve for operating the same, substantially as set forth.

8. A rotary engine having a pair of opposite cylinders inclining outwardly toward their upper ends and slotted in their inner faces for a portion of their circumference, curved pistons operating in said cylinders, a carrier between the cylinders and having the intermediate gear and the oppositely-projected webs operating in the slots of the cylinders and having means for engagement with the pistons of the opposite cylinders, a counter-shaft having a gear meshing with the intermediate gear of the carriers, and abutment-wheels on the counter-shaft and having the imperforate curved plates crossing their respective cylin-

ders, the said plates of the opposite abutment-wheels being arranged diametrically opposite each other, substantially as set forth.

9. The combination with the main shaft, the opposite cylinders inclining outwardly toward their upper ends and having curved pistons and a carrier between the cylinders and having means for engagement with the pistons, of a counter-shaft geared with the main shaft, curved abutment-plates carried by the counter-shaft and crossing their respective cylinders, valves for controlling admission of steam to the cylinders and means on the counter-shaft for operating said valve.

10. The combination with the circular cylinders inclining outwardly toward their upper ends, the main shaft, the pistons in the cylinders and the carrier on the main shaft and having means for engagement with the pistons, of the counter-shaft and the abutment-wheels on the counter-shaft and having curved plates crossing their respective cylinders and arranged in cross-section at an angle to the axis of the counter-shaft, substantially as set forth.

LEWIS VAN D. SUTTON.

Witnesses:

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P. S. OBLEY.