

(No Model.)

W. & L. CARTER.
ROTARY ENGINE.

2 Sheets—Sheet 1.

No. 448,121.

Patented Mar. 10, 1891.

Fig. 2.

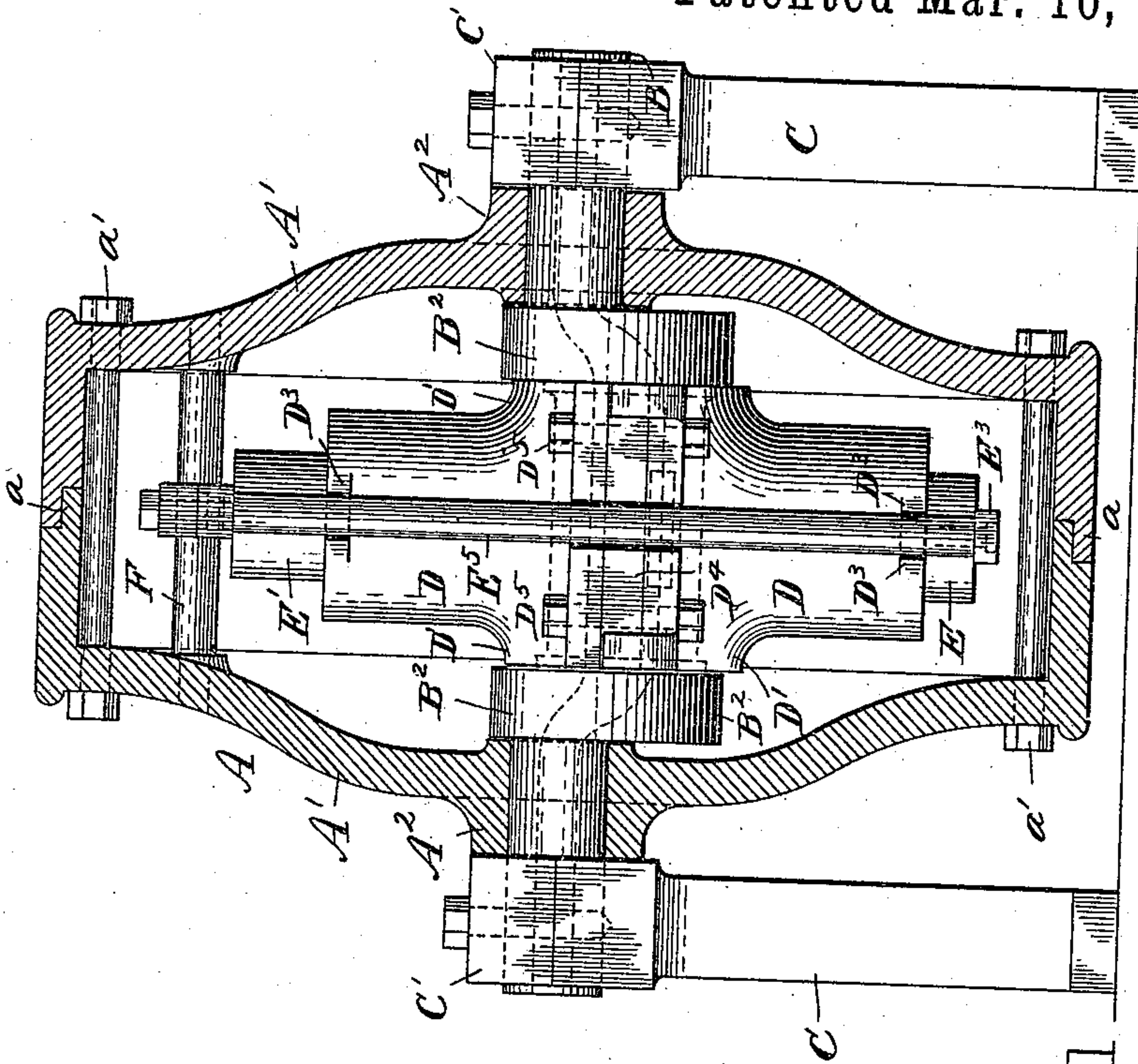
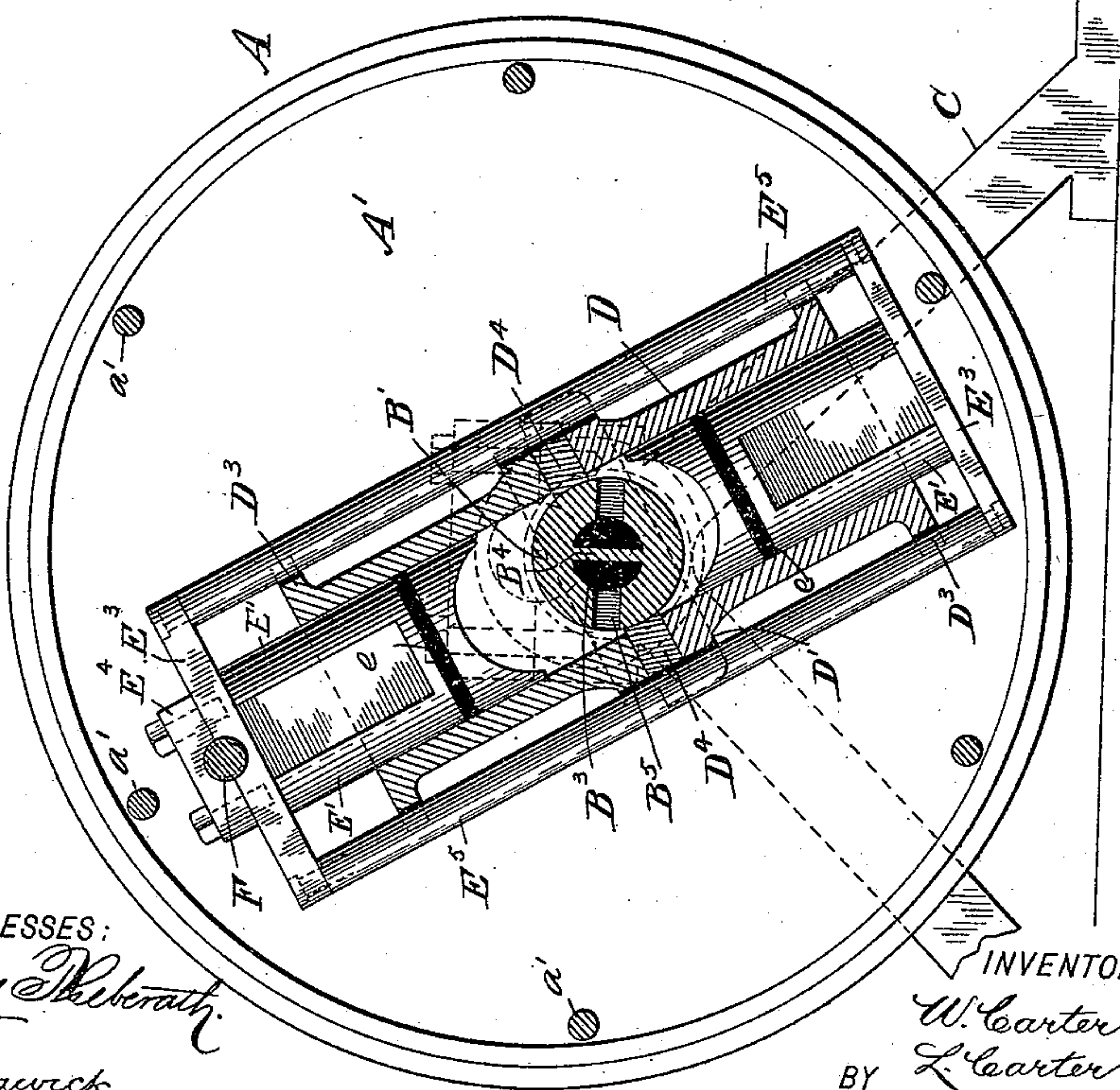


Fig. 1.



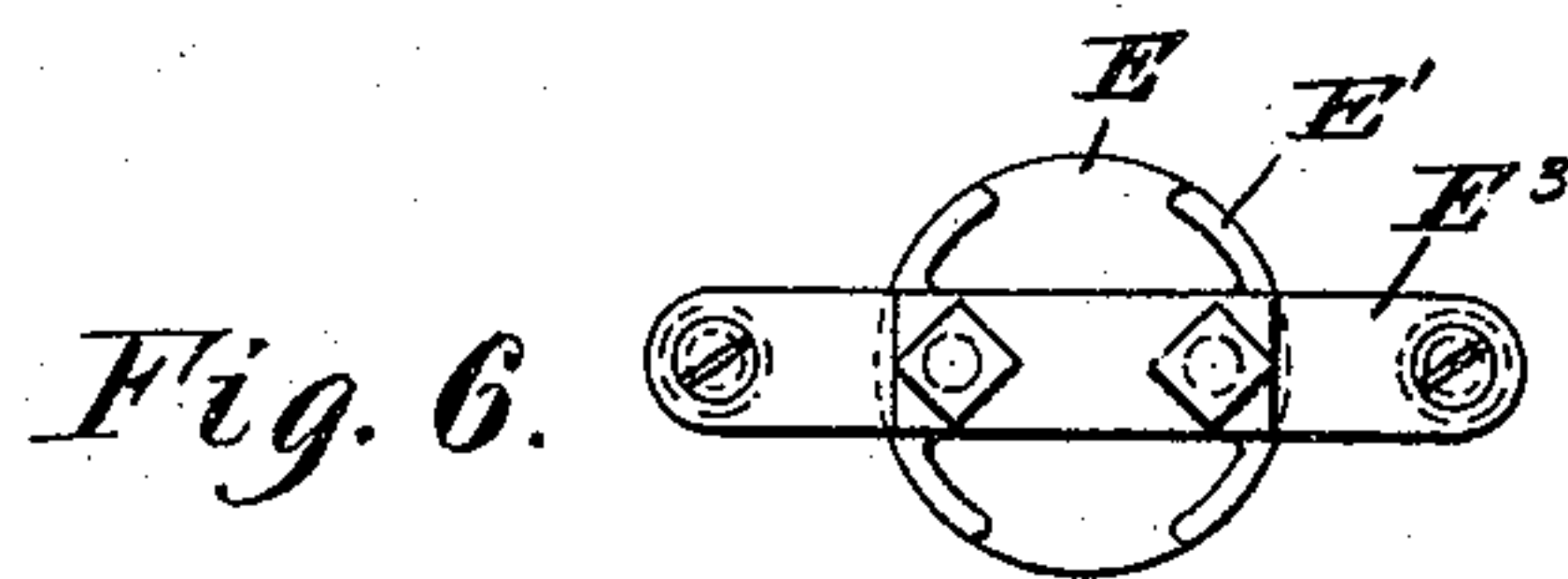
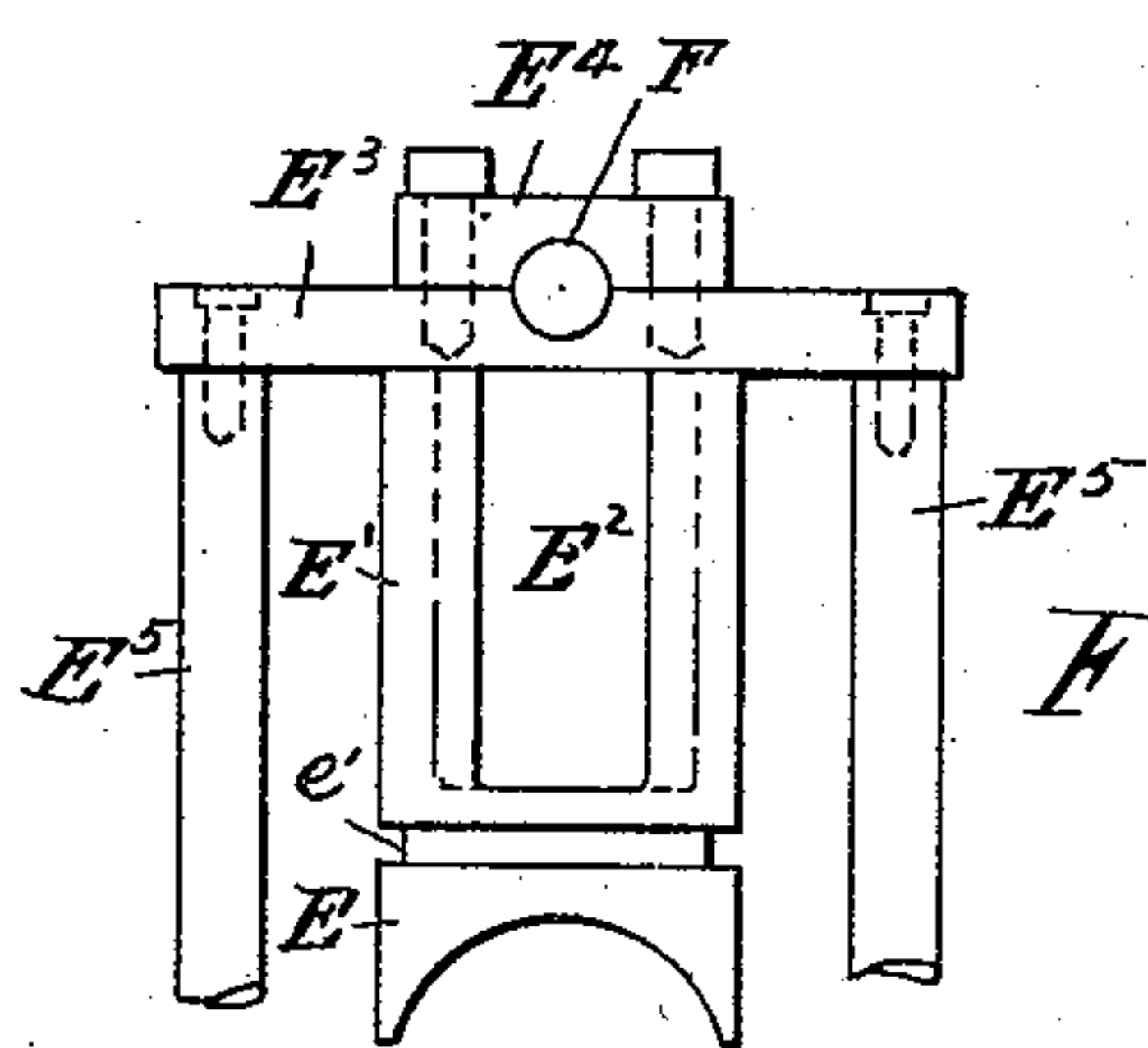
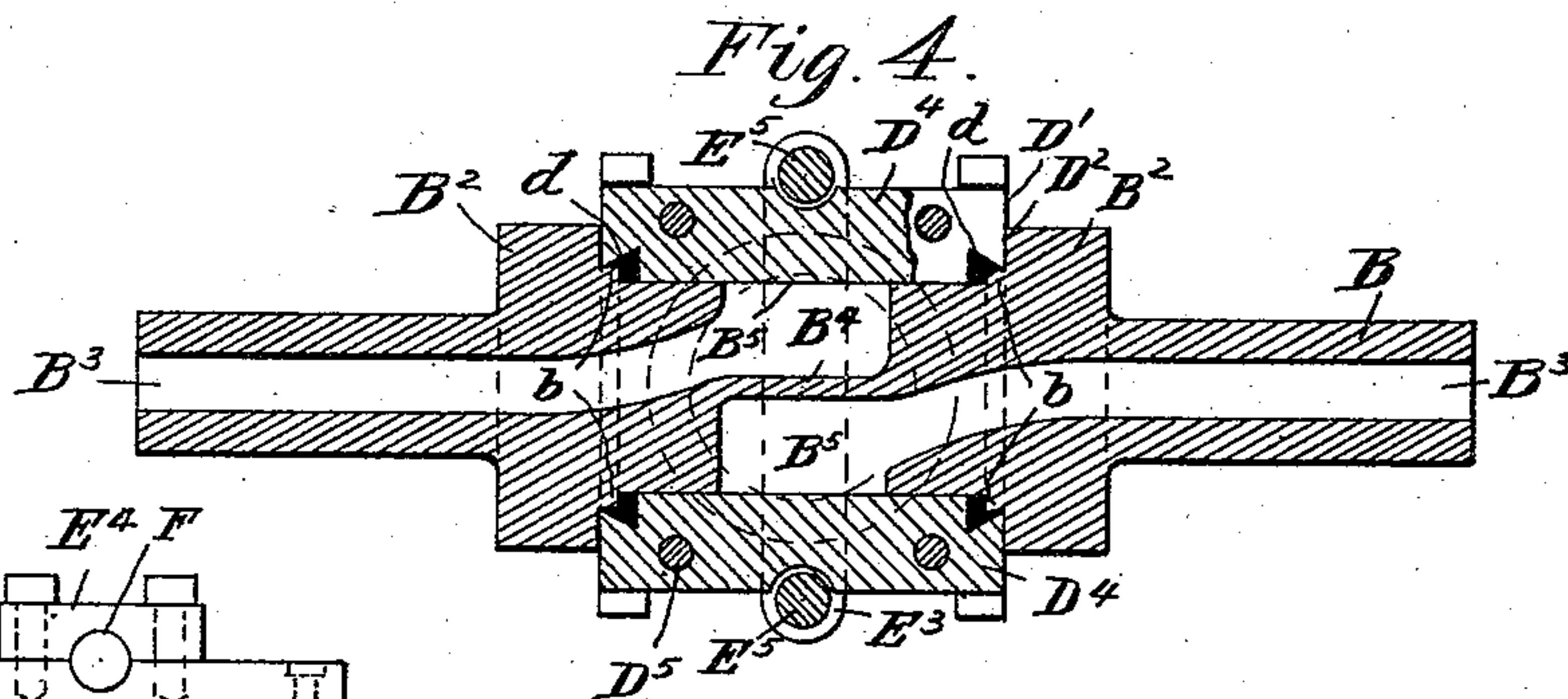
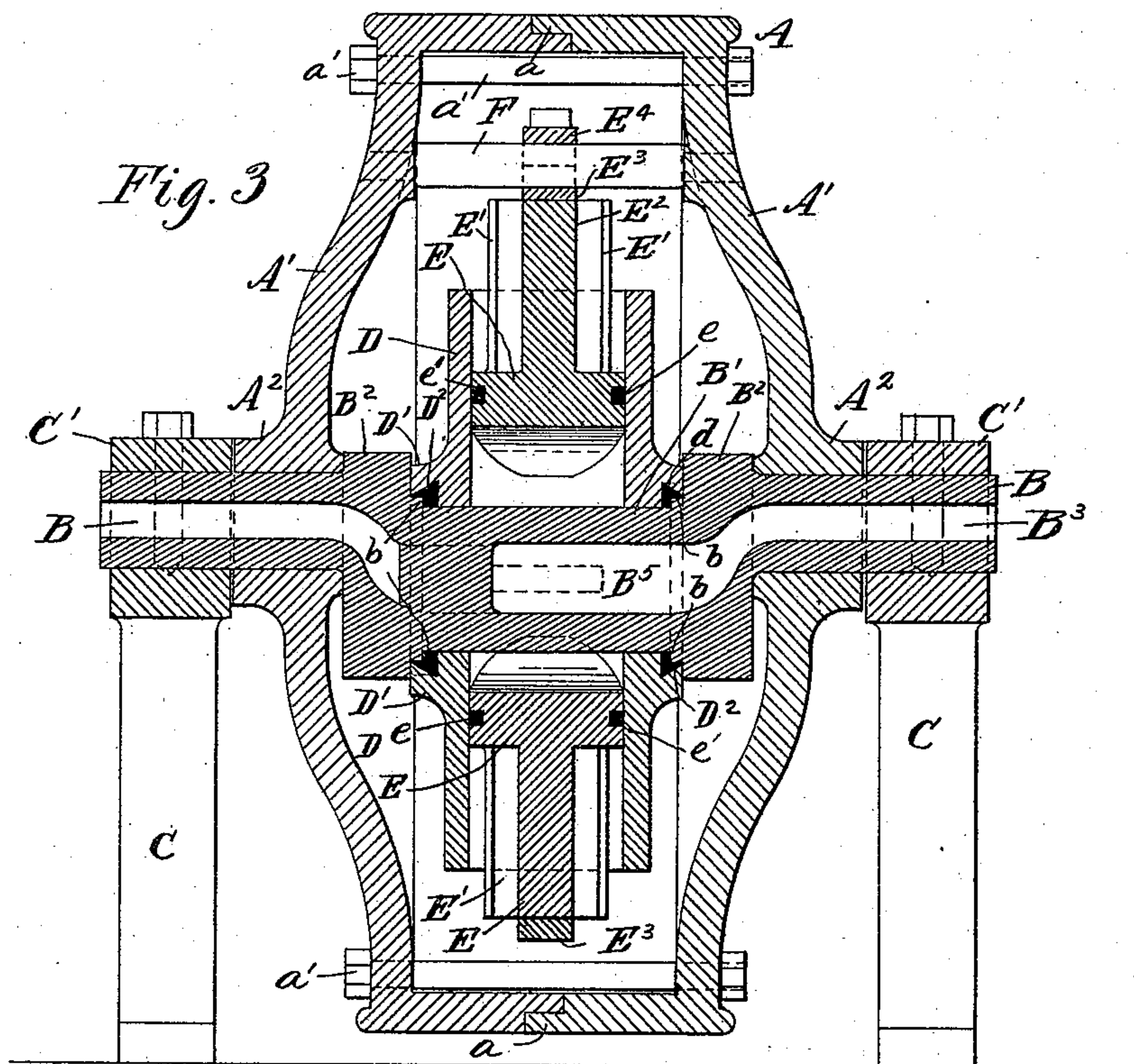
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UNITED STATES PATENT OFFICE.

WILLIS CARTER AND LYMAN CARTER, OF SPOKANE FALLS, WASHINGTON.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 448,121, dated March 10, 1891.

Application filed June 26, 1890. Serial No. 356,792. (No model.)

To all whom it may concern:

Be it known that we, WILLIS CARTER and LYMAN CARTER, both of Spokane Falls, in the county of Spokane and State of Washington, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

Our invention relates to improvements in rotary engines; and the object of our invention is to produce an engine that may be run at high speed, that will be evenly balanced, and that will be very durable, and also to produce an engine in which great power will be generated with a small amount of steam.

To this end our invention consists in a rotary engine constructed substantially as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical transverse section of the engine. Fig. 2 is a side elevation of the cylinder and its connections mounted in the case, and with the case in vertical section. Fig. 3 is a vertical longitudinal section of the engine. Fig. 4 is a horizontal longitudinal section of the supporting-shaft and the cylinder thereon. Fig. 5 is a detail view of one of the pistons and the piston-frame connected therewith, and Fig. 6 is a plan view of the same.

The case A is composed of two separable members A', said members having centrally formed thereon the hubs A², which are loosely mounted on the shaft B, and the members A' are provided with interlocking shoulders a and are held together by the bolts a', which project through the members near their outer circumference. The outer circumference of the members A' is flattened, as shown, so that when the members are united they will form a suitable driving-pulley. The shaft B is fixed in the boxes C' of the supports C, and is provided with a central depending crank portion B' and with disks B², which are formed thereon at the ends of the crank portion B', and which prevent any lateral motion of the case A or cylinder D on the shaft. The shaft B is also provided with central bores B³, which enter the shaft on either end, said bores ex-

tending into the crank portion B' and terminating in ports B⁵, which open through opposite sides of the crank portion B', and which are separated by the central partition B⁴, so that one of said ports will admit live steam and the other will form an exhaust-exit, as hereinafter described.

A compound cylinder D is mounted loosely upon the crank portion B' of the shaft B, the two ends of the cylinder extending from opposite sides thereof, and the cylinder is provided with central annular bosses D', which abut with the disks B² of the shaft B, and which are provided with tapering annular grooves D², which receive the projecting annular shoulders b of the disks B², a suitable packing d being inserted between the parts D² and b. The cylinder D is made in two sections connected by the bolts D⁵, and plates D⁴ are interposed between the sections, said plates being concaved on their inner edges to fit the crank B' and form a steam-tight joint between the two sections of the cylinder. The grooves D² for the packing d extend across the plates D⁴.

At each end of the cylinder D there is a piston E, which fits closely therein and has a suitable packing e, which fits in a groove e' of the piston to prevent the escape of steam from the cylinder, the said pistons having their inner faces rounded to fit the crank portion B' of the shaft B, and having outwardly-extending portions E', which act as guides for the cylinders and which are connected by transverse strengthening-ribs E². The ribs E² and the guides E' are each fixed to cross-pieces E³, which extend across the outer ends of the cylinder D and which are united by the side rods E⁵, which are guided upon opposite sides of the cylinder D in the lugs D³, and which are longer than the cylinder, so as to permit a full stroke of the pistons E. One of the cross-pieces E³ is held to a shaft F by a clamp E⁴, which incloses the shaft and is securely bolted to the cross-piece. The shaft F is mounted in the case A in alignment with the pistons E of the cylinder D, and the distance from the shaft to the outer end of the nearest cylinder should be such as to permit a full stroke of the piston.

From the foregoing description it will be

seen that the distance from the crank portion B' of the shaft B will be less to the bottom of the case A than to the top thereof, and consequently when the cylinder D is in a vertical position the lower piston E will nearly touch the crank portion B' of the shaft B, and the upper piston E will be in the upper portion of the cylinder D, thus bringing the greater weight of metal in the upper part of the case and giving it a tendency to turn from the center.

The engine operates as follows: The steam is admitted into one end of the shaft B through the central bore B³ and passes through one of the ports B⁵ into the cylinder D. If the cylinder D is in a nearly-vertical position, the steam entering the lower portion of the cylinder will force the lower piston E downwardly, and as said piston is connected with the upper piston and with the shaft F by the side pieces E⁵ the upper piston will likewise move downwardly, and as the shaft F is fixed in the case A the case will necessarily revolve. As the case revolves the shaft F will be brought nearer to the crank portion B' until it reaches the nearest point, which is directly below said crank portion. The position of the pistons will then be reversed and this action will be constantly repeated. It will be seen that as the cylinder D revolves the steam which has entered one end of the cylinder will be brought opposite the exhaust-port B⁵ and will pass out through the bore B³ of the shaft B at the opposite end of the shaft from which it entered. It will be seen that the direct steam may be admitted at either end of the shaft B and that when admitted at one end it will exhaust through the other end.

From the foregoing description it will be seen that the steam is applied directly to revolve the case and that there will be but little loss of power.

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

1. A rotary engine consisting, essentially, of a shaft fixed in suitable supports, having a central crank portion and having central bores extending from each end and opening through opposite sides of the crank portion, a separable case mounted loosely upon the shaft, a transversely-divided cylinder bolted

together at its inner ends and there mounted loosely upon the crank portion of the shaft, pistons movable in opposite ends of the cylinder and connected by a frame, as shown, and a transverse shaft mounted in the case and connected with one end of the piston-frame, substantially as described.

2. A rotary engine consisting, essentially, of a shaft mounted in suitable supports, having a central crank portion having disks formed at each end of the crank portion, as shown, and having central bores extending from each end of the shaft and opening through opposite portions of the crank, a longitudinally-separable case mounted loosely upon the shaft and having a flattened outer surface, as shown, a compound cylinder mounted upon the crank portion of the shaft, so as to extend from opposite sides of the same, pistons movable in the cylinder ends and connected by a suitable frame, and a shaft mounted in the case and connected with the piston-frame, substantially as described.

3. The combination, with the shaft B, mounted in supports C, as shown, said shaft having the crank portion B' and the disks B² formed thereon, and having the central bores B³, separated by the partition B⁴ and terminating in ports B⁵, and the separable case A, mounted loosely upon the shaft, of the cylinder D, mounted loosely upon the crank B', the pistons E, movable in the cylinder and connected by the cross-pieces E³ and side rods E⁵, and the shaft F, mounted in the case A and attached to one of the cross-pieces E³, substantially as described.

4. The combination, with the hollow shaft B, having the bores B³ and ports B⁵, and having the disks B², with shoulders b thereon, of the transversely-divided cylinder D, mounted upon the shaft, as shown, and provided with bosses D', having the tapering grooves D², which receive the shoulders of the disks, the plates D⁴ between the adjacent ends of the cylinder and concave on their inner edges to fit the hollow shaft, and the bolts D⁵, securing the two cylinder-sections together around the shaft, substantially as described.

WILLIS CARTER.

LYMAN CARTER.

Witnesses:

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