No. 864,294. PATENTED AUG. 27, 1907.

# O. EBERT.

## ROTARY ENGINE.

APPLICATION FILED JUNE 14, 1907.

2 SHEETS—SHEET 1.

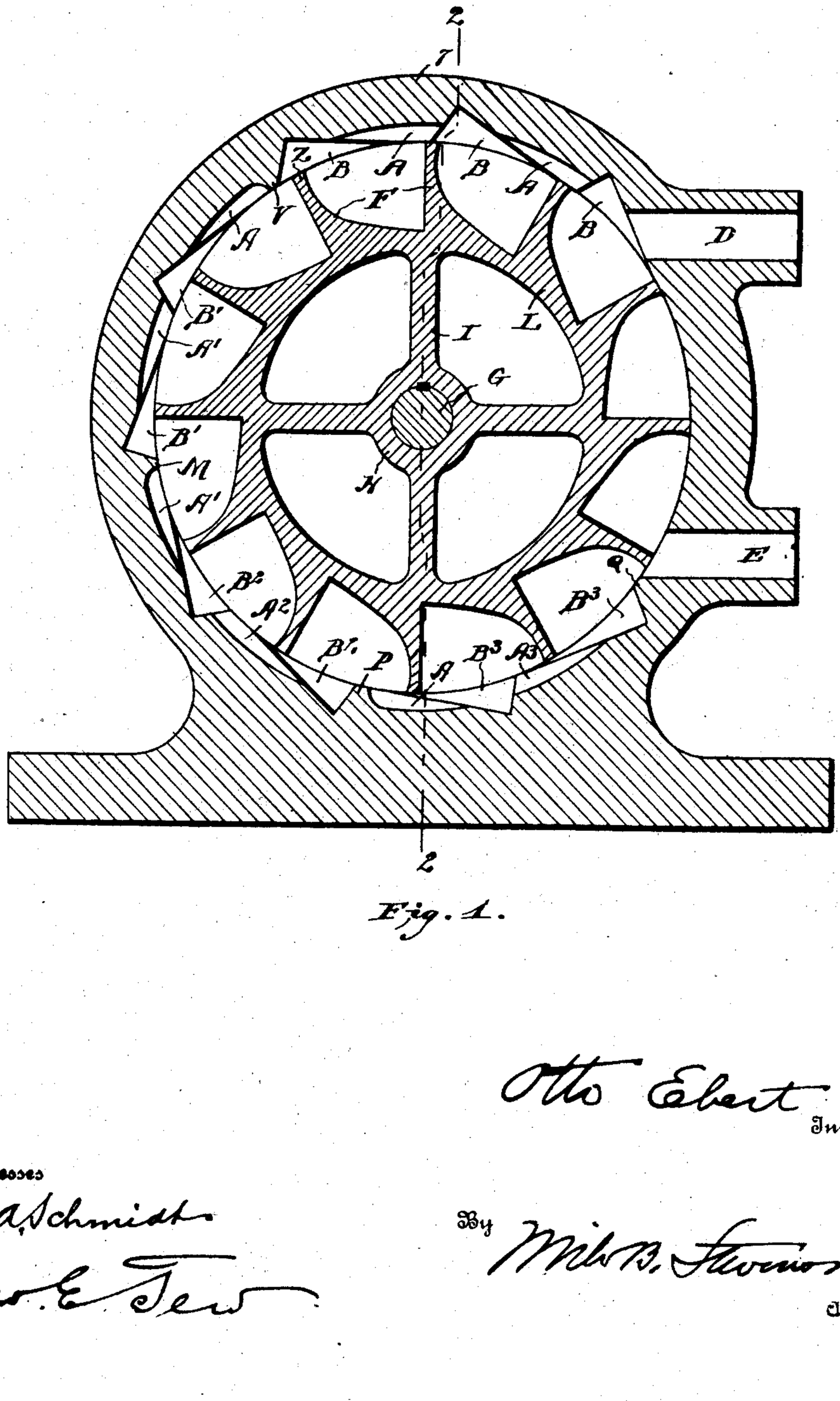


Fig. 1.

Witnesses
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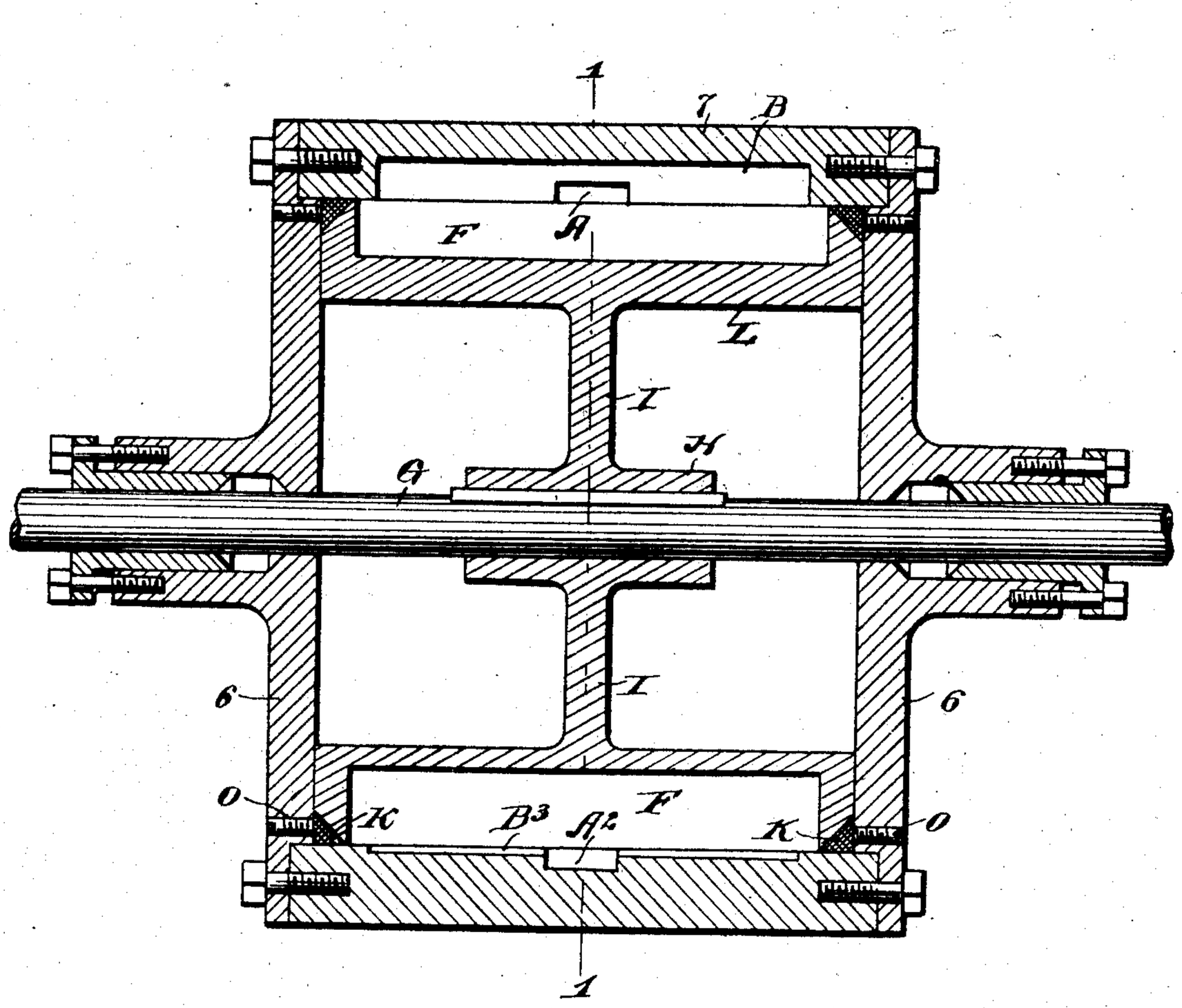


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## ROTARY ENGINE

No. 864,294. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed June 14, 1907. Serial No. 379,011.

*To all whom it may concern:*

Be it known that I, OTTO EBERT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention is a rotary or turbine engine having for its object to provide improved means for utilizing the steam expansively, the steam having a circumferential flow and acting upon blades disposed around the periphery of a drum, with means to allow successive expansion as the steam travels from the inlet to the exhaust.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a cross section of the engine, on the line 1—1 of Fig. 2. Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

The engine has an outer cylindrical casing formed of two circular end plates 6 and a cylindrical rim or casing 7. This is mounted upon suitable base, and the shaft G extends through stuffing boxes on the end plates.

The rotary piston consists of a hub H keyed to the shaft, a web I, and a rim L formed with a series of curved longitudinally extending blades F the edges of which pass in contact with the rim 7 of the casing.

Steam chambers B are formed or cut in the inside of the rim 7, and connect at one end with the inlet D and at the other end with the exhaust E. The chambers B are divided into sets or expansion stages. The first set comprise three chambers which are connected by passages A formed in the rim 7, and at the end of said set is a cut-off partition V. The second set include two chambers B′, connected by a passage A′, at the end of which is a partition M, and beyond this are successive sets $B^2$ and $B^3$, with connecting passages $A^2$ and $A^3$, and a partition P therebetween.

The distance between the blades F is somewhat smaller than the length of the chambers B, so that there are fewer chambers than blades. The result of this is to divide the steam passage or chambers around the piston into a succession of stages delivering impulses successively to the blades and acting expansively from one set of chambers to the other. Thus, in the position shown in Fig. 1, steam entering the inlet D passes into the first chamber B and thence through the passages A to the second and third chambers, and while therein acts by impulse against the adjacent blades. When the blade indicated at Z moves to the edge of the partition V the said three pressure chambers B are closed, and being closed will receive the full pressure or impact of the steam. After traveling a sufficient distance to uncover the passages A′—which distance is about one-fourth the distance between the two blades, the pressure expands into the passages A′ and the chambers B′, thus bringing in two more blades and increasing the pressure area. The same movement closes the passage at the point or partition M, which produces or causes a pressure on the blades. Continued movement of the pistons cuts in the chambers $B^2$ and additional blades; and so on until the exhaust E is reached, where the partition at Q cuts off the last two chambers and allows the exhaust when the blade travels beyond the same, at which instant the piston will have rotated the space of one tooth and brought the parts into position for a fresh impulse. There are thus, in the embodiment shown, four successive expansion stages for exhaust.

Obviously any desired combination of chambers and blades may be used, to increase or decrease the number of expansion stages, or vary the number of chambers cut in at each stage.

The piston is rendered steam-tight by packing rings K at the edges, pressed by screws O, in the end plates 6.

The construction shown and disclosed gives an engine of high efficiency in small space, and with few and simple parts.

I claim:

1. In a rotary engine, the combination of a casing, and a rotary piston therein with blades, the casing having a series of circumferential chambers with partitions between the ends thereof positioned to be successively closed and then opened, by the passage of the blades across the same, to successively cut in additional expansion chambers, the partitions being of less width than the distance between the blades, and the relative lengths of the chambers, and said distances being unequal.

2. In a rotary engine, the combination of a casing having a series of chambers around in the rim thereof separated by partitions into successive sets, the chambers of each set being connected by passages in the casing, and a rotary piston in the casing with blades which successively pass said partitions as it rotates and successively cut in additional chambers, the relative length of the chambers and the distance between the blades being unequal.

3. In a rotary engine, the combination of a casing having a succession of chambers extending around the rim thereof from the inlet to the exhaust, said chambers being divided into a series of sets, and a rotary piston in the casing with blades which pass the chambers, the distance apart of the blades being slightly less than the length of the chambers, whereby said blades successively pass the divisions between the sets and cut in additional sets.

In testimony whereof I do affix my signature, in presence of two witnesses.

OTTO EBERT.

Witnesses:
EDITH D. COMER,
JOHN A. BOMMHARDT.