No. 891,346. PATENTED JUNE 23, 1908.

K. H. KORHONEN.

ROTARY ENGINE.

APPLICATION FILED MAR. 2, 1907.

2 SHEETS—SHEET 1.

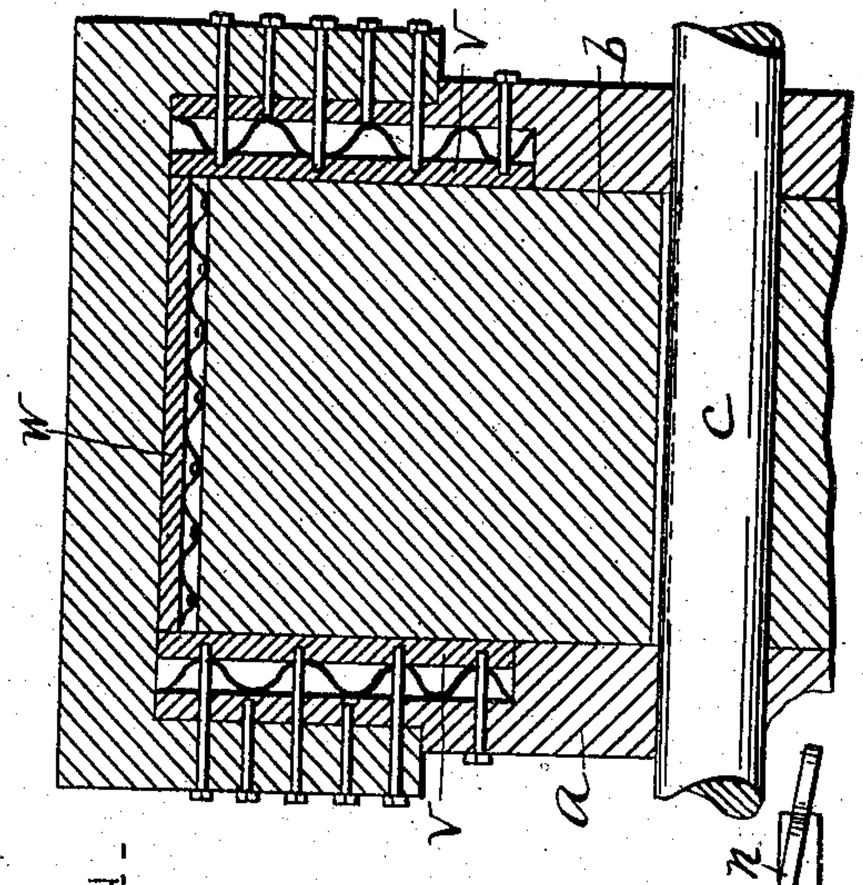

Fig. 4.

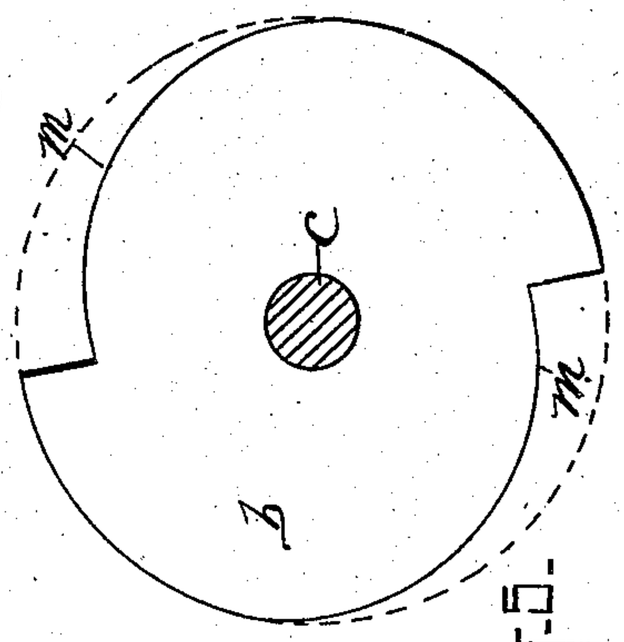

Fig. 5.

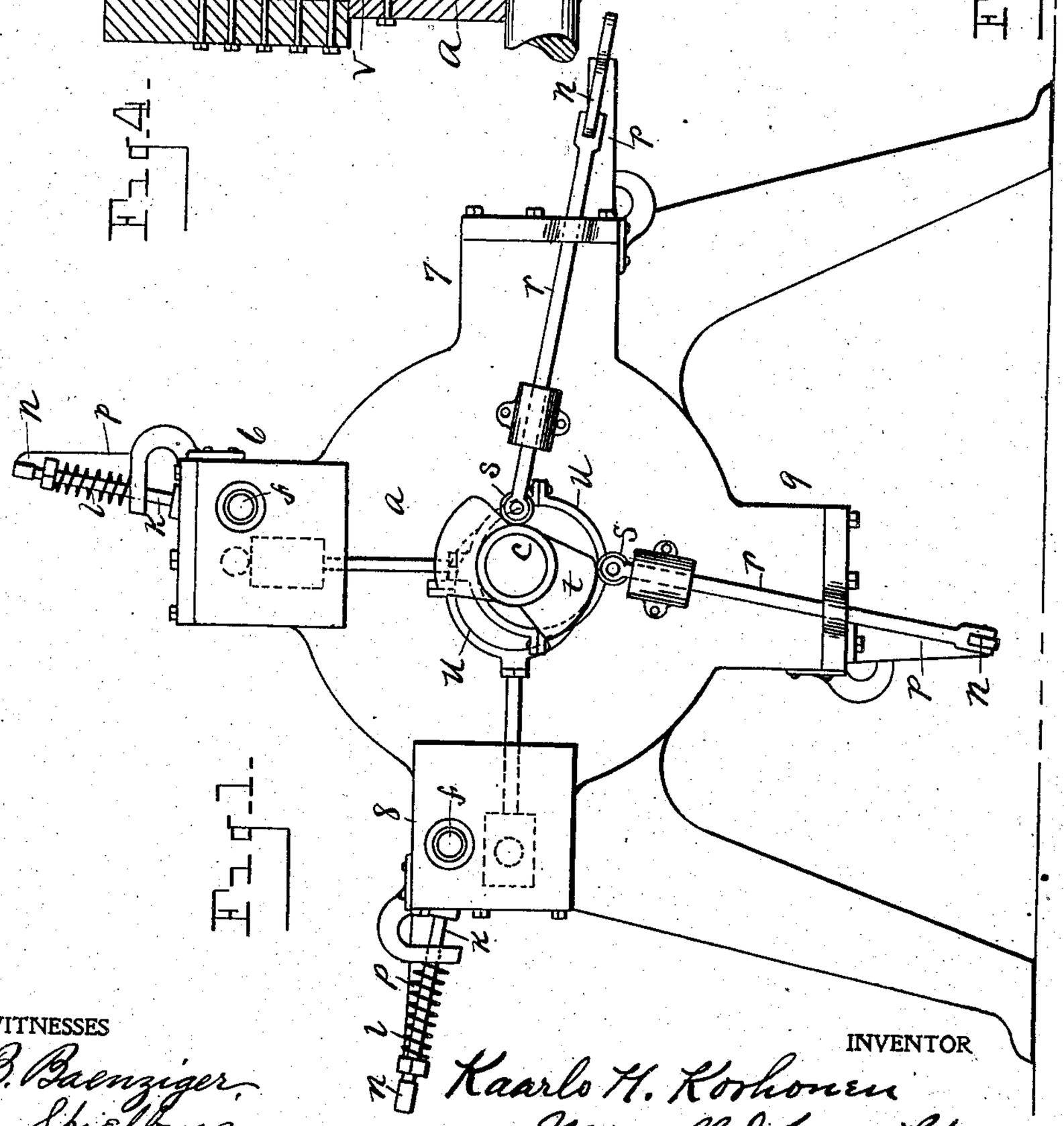

Fig. 1.

WITNESSES

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2 SHEETS—SHEET 2.

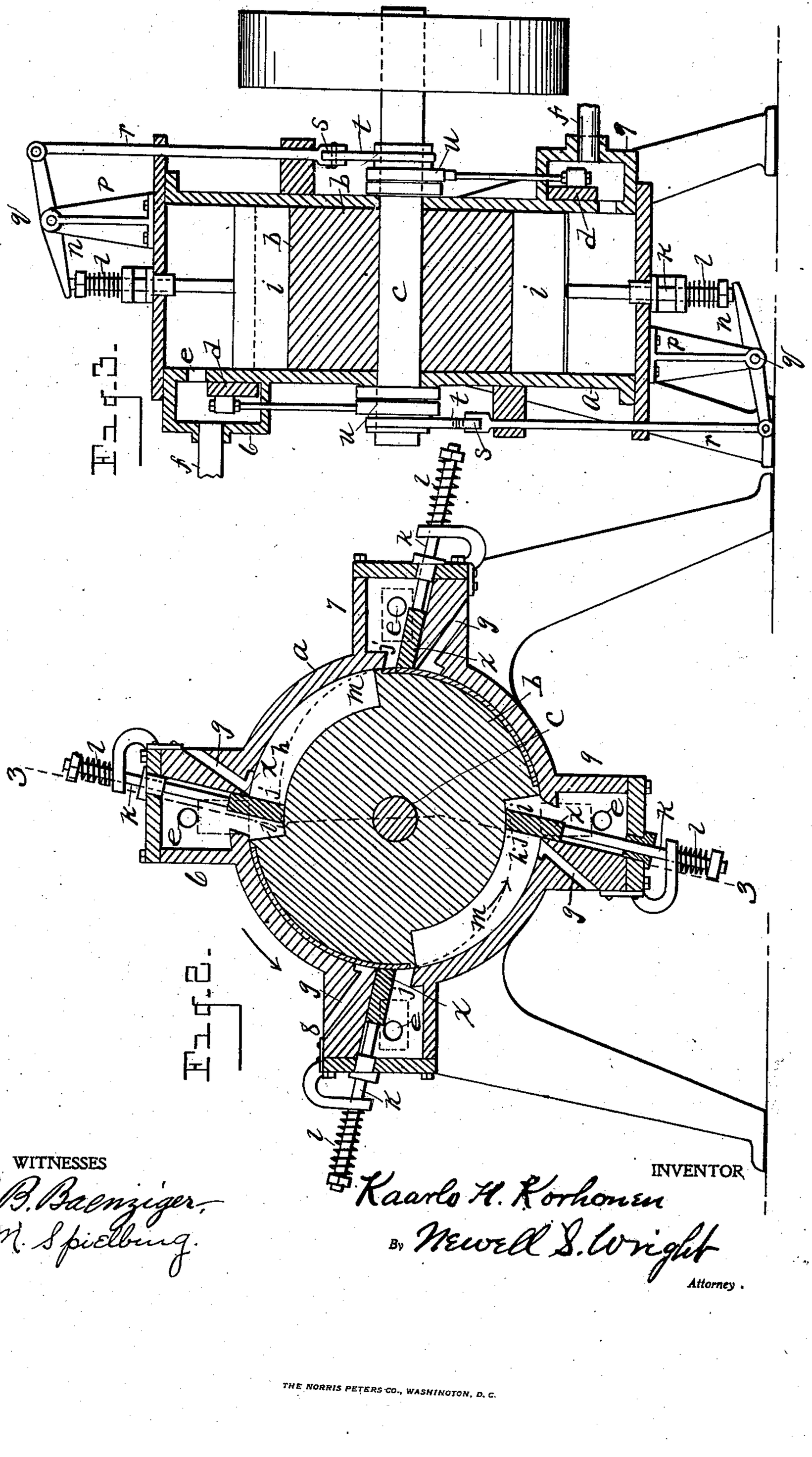

Fig. 2.

WITNESSES

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ROTARY ENGINE.

No. 891,346. Specification of Letters Patent. Patented June 23, 1908.

Application filed March 2, 1907. Serial No. 360,195.

To all whom it may concern:

Be it known that I, KAARLO H. KORHONEN, a subject of the Czar of Russia, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention has for its object certain new and useful improvements in a rotary engine.

The main features of my invention are adapted for use either as a steam engine or an internal combustion engine. I will describe my invention, however, as applied to steam propulsion.

The aim of my invention is to provide an engine of this class of superior efficiency, simplicity and utility.

My invention consists of the construction, combination and arrangement of devices and appliances hereinafter specified and claimed and illustrated in the accompanying drawings, in which,

Figure 1 is a view in side elevation. Fig. 2 is a view in vertical section. Fig. 3 is a view in vertical section on the line 3—3, Fig. 2. Fig. 4 is a partial sectional view illustrating a method of packing the rotary piston. Fig. 5 is a detail view of the rotary piston illustrating a modification of construction.

I carry out my invention as follows:

Any suitable cylinder is indicated at *a*, in which is located a rotatable piston *b* upon a driving shaft *c*. The mechanism shown herewith is provided with multiple power admission chambers illustrated by the numerals 6, 7, 8 and 9, the power admission chambers being provided each with a valve indicated at *d*, the cylinder being provided with ports *e* controlled by said valves respectively. The power admission chambers are provided with inlet steam pipes indicated at *f*. Exhaust ports indicated at *g* open through the outside wall of the casing. The piston is shown cut away to form chambers *h* and shoulders *i* against which the driving power is exerted to drive the piston. To cut off the driving power, as of steam, from the exhaust ports on its first entrance into the corresponding chamber *h*, while doing its work, a movable abutment in each of the power admission chambers is indicated at *j*, each of said abutments provided with a stem *k* extending to the exterior of the cylinder, each stem being provided with a spring *l* to normally unseat or lift the corresponding abutment. The abutments it will be seen, seat upon the cut away portion of the piston in front of the corresponding exhaust channel and may be unseated or lifted in any suitable manner. As shown in Fig. 5, and in dotted lines in Fig. 2, the cut away portion of the piston may be formed with a cam face as indicated at *m* which will lift the corresponding abutment as the cylinder is rotated. As shown in Figs. 1–3, the abutments *j* are closed or depressed by means of a lever *n* fulcrumed upon a suitable support *p* as indicated at *q*, one end of the lever *n* arranged to contact with the valve stem, the opposite end of the lever *n* is connected with a rod *r* which may be provided at its lower end with an anti-friction wheel *s* riding upon a cam *t* upon the driving shaft, the cam *t* being located on the driving shaft on opposite sides of the cylinder. The valves *d* of the power admission chambers, it will also be understood, are actuated by eccentrics *u* upon the driving shaft. To prevent the escape of steam I prefer to provide the rotatable piston with marginal packing rings indicated at *v*, *v*, and with a peripheral packing ring indicated at *w*, said packing rings being spring actuated in any suitable manner so as to have a yielding engagement with adjacent parts.

The operation of the device will be understood and is as follows: As shown in Fig. 2, for example, it will readily be seen that steam in the chests 6 and 9 is exerting its force upon the adjacent shoulders *i* of the piston while steam is exhausting also through the chests 6 and 9. The apparatus is so timed that when the steam is ready to be admitted against the shoulders of the rotatable piston, the abutments *j* are closed or depressed and held firmly in closed position until it is time for a given chest to exhaust when the force to close said abutments is removed and the spring lifts the corresponding abutment.

It will be seen that the abutments *j* work radially. The valve chests are constructed to form a guide and backing for the abutments in their reciprocation, as indicated at *x*. It will be observed that when the abutments *j* are closed, they close at one side of

the opening in the cylinder through which the chest communicates with the peripheral chamber of the piston, to confine the power so that it will impinge upon the impact shoulder of the piston.

It will readily be understood that if the rotary piston be formed with the cam faces *m*, above mentioned, the cams *t* upon the shaft may be dispensed with, as well as the levers *n* and connecting rods *r*, in which case the corresponding valves might be seated by spring pressure.

The main features of my invention, beside being adapted for use as a steam or internal combustion engine, may also be employed with compressed air as a driving power.

What I claim as my invention is:

1. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon the shaft contacting on its periphery with the inner periphery of the cylinder and formed with peripheral chambers and radially extending adjacent impact shoulders, power admission chambers each communicating through the wall thereof with the corresponding peripheral chamber, an exhaust channel opening through the wall of each power admission chamber communicating with the peripheral chambers, successively, radially movable abutments located between the corresponding impact shoulder within the power admission chambers, respectively, and the corresponding exhaust channel, and means to actuate said abutments, said abutments being normally closed when the power is applied to the piston.

2. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon said shaft within the cylinder contacting on its periphery with the inner periphery of the cylinder and formed with peripheral chambers and adjacent radially extending impact shoulders to receive the impact of the propelling force, inlet and exhaust mechanism comprising power admission chambers each communicating through the wall thereof with the corresponding peripheral chambers of the piston, radially movable abutments located between the corresponding impact shoulders within the power admission chambers and the corresponding exhaust channel, respectively, said abutments provided with automatic mechanism to normally open the abutments, and cam actuated mechanism to close the abutments.

3. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon the shaft within the cylinder formed with peripheral chambers and adjacent impact shoulders, power admission chambers communicating with the peripheral chambers, respectively, an exhaust channel opening through the wall of each power admission chamber communicating with the peripheral chambers, respectively radially movable abutments located between the corresponding impact shoulders within the power admission chambers and the corresponding exhaust channel, respectively, said abutments provided with a spring actuated stem whereby the abutment is normally open, a lever bearing upon each of said abutments to seat the abutment, and cams located upon the driven shaft connected with the lever mechanism to actuate said mechanism.

4. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon the shaft contacting on its periphery with the inner periphery of the cylinder and formed with peripheral chambers and adjacent radially extended impact shoulders, power admission chambers communicating with the peripheral chambers, respectively, an exhaust channel opening through the wall of each power admission chamber communicating with the peripheral chambers, respectively, radially movable abutments located between the corresponding impact shoulders within the power admission chambers and the corresponding exhaust channel, respectively, means to seat said abutments, said abutments being normally open, and yielding packing at the sides and at the periphery of said piston.

5. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon the shaft within said cylinder contacting on its periphery with the inner periphery of the cylinder and formed with peripheral chambers and adjacent radially extending impact shoulders, power admission chambers provided with inlet ports communicating with the peripheral chambers of the piston, an exhaust channel opening through the wall of each power admission chamber communicating with the peripheral chambers, radially movable abutments located between the corresponding impact shoulders within the power admission chamber and the corresponding exhaust channel, respectively, means to seat said abutments when the power is applied to the piston, and valves to control the admission of power into the power admission chamber, the wall of each power admission chamber forming a guide and backing for the radially movable abutments.

6. A rotary engine comprising a cylinder, a driven shaft, a rotatable piston mounted upon the shaft within said cylinder contacting on its periphery with the inner periphery of the cylinder and formed with peripheral chambers and adjacent radially extending impact shoulders, power admission chambers provided with inlet ports communicating with the peripheral chambers of the piston, an exhaust channel opening through the wall of each power admission chamber communicating with the peripheral chambers, radially movable abutments located between the cor-

responding impact shoulders within the power admission chamber and the corresponding exhaust channel, respectively, means to seat said abutments when the power is applied to the piston, said abutments being normally open, and valves to control the admission of power into the power admission chamber, the wall of the power admission chamber forming a guide and backing for the abutments.

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

KAARLO H. KORHONEN.

Witnesses:

N. S. WRIGHT,

E. M. SPIELBURG.