E. G. JONES & T. T. PATCHEL.

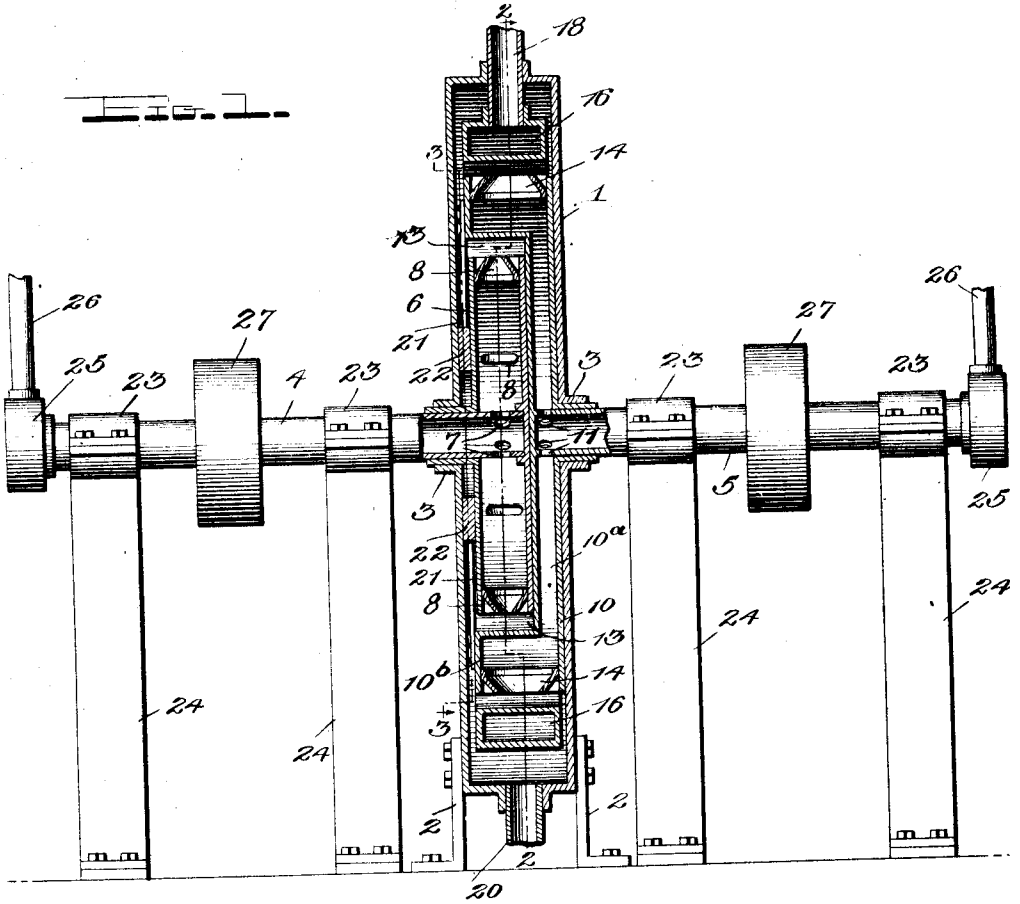
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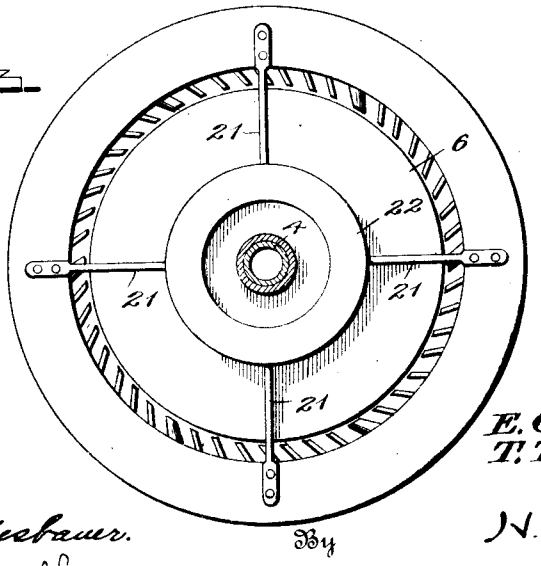
APPLICATION FILED APR. 11, 1913.

1,079,177.

Patented Nov. 18, 1913.

2 SHEETS—SHEET 1.





Witnesses

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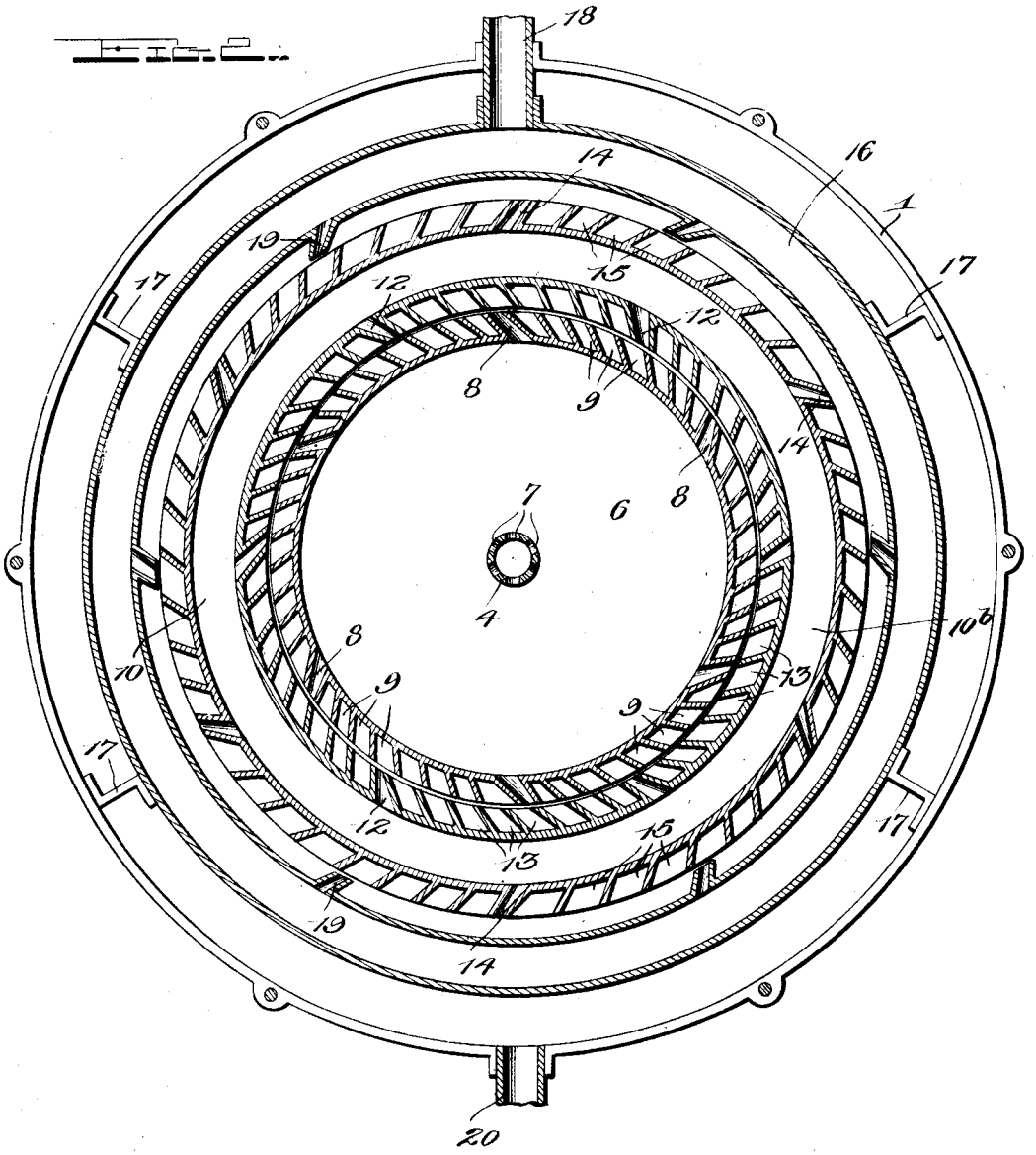
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UNITED STATES PATENT OFFICE.

ERNEST G. JONES AND THOMAS T. PATCHEL, OF CAPE MAY, NEW JERSEY.

ROTARY ENGINE.

1,079,177. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed April 11, 1913. Serial No. 760,429.

To all whom it may concern:

Be it known that we, ERNEST G. JONES and THOMAS T. PATCHEL, citizens of the United States, residing at Cape May, in the county of Cape May and State of New Jersey, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The present invention relates to certain new and useful improvements in rotary engines, and has for its object to provide an engine of this character which embodies novel features of construction whereby the expansive power of the steam or other elastic fluid medium may be utilized to the best possible advantage in driving two concentric rotors mounted to revolve in opposite directions.

Further objects of the invention are to provide a rotary engine which is comparatively simple and inexpensive in its construction, which is economical in the use of steam or other elastic fluid medium, which is capable of developing great speed and power, and which can be readily assembled and taken apart as may be found necessary.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing, in which:—

Figure 1 is a vertical transverse sectional view through a rotary engine constructed in accordance with the invention, the outer ends of the hollow shafts together with the mountings for the same being shown in side elevation. Fig. 2 is an enlarged vertical sectional view on the line 2—2 of Fig. 1, and Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrow.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Specifically describing the present embodiment of the invention, the numeral 1 designates the exterior casing or shell which may be formed in any suitable manner, although it is preferably constructed in two complemental sections which can be assembled by applying the same to the rotors from opposite sides thereof. This outer casing or shell 1 is substantially cylindrical in shape and may be held rigidly in position in any suitable manner as by means of the supporting brackets 2.

Opposite sides of the casing 1 are formed with the alined and axially disposed bearings 3 which serve to receive the inner ends of the hollow shafts 4 and 5. The hollow shaft 4 carries a rotor 6 which has a hollow formation and is substantially cylindrical in shape. The end portion of the shaft 4 extends axially through the rotor 6 so as to have a positive engagement with both side walls thereof, and is provided with a series of lateral openings 7 which communicate with the interior of the rotor. The periphery of the rotor 6 is provided with a series of nozzles 8 which are arranged at equidistant intervals and are inclined in the same direction at an angle of substantially 45° to the radius. The periphery of the rotor 6 is also provided with the buckets 9 which are arranged between the nozzles 8 and are also inclined in the same direction at an angle of substantially 45° to the radius. The various nozzles 8 all communicate with the interior of the rotor 6 so as to receive a continuous supply of steam or other elastic fluid medium therefrom, the said steam or elastic fluid medium issuing from the nozzles in a series of jets.

A second rotor 10 is carried by the inner end of the hollow shaft 5, the said rotor 10 comprising a comparatively shallow body portion 10^a which is arranged at one side of the rotor 6, and a hollow rim portion 10^b which projects laterally from one side of the body portion 10^a and overhangs the inner rotor 6. The shaft 5 projects axially through the rotor 10 so as to have a positive engagement with both side walls thereof and is provided with the lateral openings 11 which communicate with the interior of the rotor.

The annular rim portion 10^b of the rotor 10 is provided upon the inner periphery thereof with an annular series of nozzles 12 and with the buckets 13 which are arranged between the nozzles, both the nozzles and the buckets being inclined in the same direction at an angle of substantially 45° to the radius. The outer periphery of the annular rim 10^b of the rotor 10 is also provided with an annular series of nozzles 14 and with the intermediate series of buckets 15. These nozzles 14 and buckets 15 are inclined in an opposite direction to that of the interior nozzles 12, so that the reaction resulting from the jets issuing from the inner nozzles 12 and outer nozzles 14 will tend to revolve the rotor 10 in the same direction.

A hollow annular steam ring or chest 16 surrounds the outer rotor 10 and is rigidly supported within the casing 1 in any suitable manner as by means of the brackets 17. The top of the steam ring 16 communicates with a steam supply pipe 18, while the inner periphery of the steam ring 16 is provided with a series of nozzles 19 which are inclined in the same direction and at an angle of about 45° to the radius, the jets from the nozzles 19 being directly opposed to the jets from the outer nozzles 14 of the rotor 10. The sides of the steam ring or chest 16 are slightly spaced from the sides of the casing 1 to admit of the expanded steam escaping around the sides thereof into the outer periphery of the casing 1, an exhaust pipe 20 being provided at the bottom of the casing.

In order to reinforce the overhanging annular rim portion 10^b of the rotor 10 against the centrifugal force which would be incident to high speeds, the outer side of the said overhanging annular rim portion 10^b of the rotor 10 is connected by radial arms 21 to a ring 22 which fits loosely between the casing and the inner rotor 6, forming in effect a spider which has a truss action and will effectively reinforce the overhanging peripheral portion of the outer rotor 10 against the strong centrifugal forces which are incident to high speeds.

The hollow shafts 4 and 5 project from opposite sides of the casing 1 and are shown as journaled in bearings 23 at the upper ends of standards 24. These hollow shafts 4 and 5 serve to supply the steam or other elastic fluid medium to the hollow rotors 6 and 10, each of the shafts having a suitable swivel action, as indicated at 25 with a steam supply pipe 26. It will also be observed that each of the hollow shafts 4 and 5 is provided with a suitable pulley 27 by means of which power may be taken from the same for driving any desired machinery performing any useful work.

The nozzles 8 of the rotor 6 are arranged to just clear the inner nozzles 12 of the outer rotor 10, while the outer nozzles 14 of the rotor 10 are arranged to just clear the nozzles 19 of the steam ring 16. The steam from the hollow shafts 4 and 5 enters the interior of the respective rotors 6 and 10 and issues from the various nozzles of the rotors in a series of jets, the jets issuing from the nozzles 8 of the rotors 6 are directly opposed to the jets issuing from the inner nozzles 12 of the rotor 10, so that the two jets react upon each other and tend to drive the two rotors 6 and 10 continuously in opposite directions. In a similar manner the jets of steam issuing from the outer nozzles 14 of the rotor 10 are directly and oppositely disposed to the jets issuing from the nozzles 19 of the annular steam ring 18 so that the two sets of jets react upon each other and assist in the driving of the outer rotor 10. The various buckets also serve to coöperate with the jets of steam to drive the rotors. After the expansive force of the steam has been utilized it escapes around the sides of the rotors and hollow steam ring 16 to the outer periphery of the casing 1, and from this casing through the main exhaust pipe 20. It will thus be obvious that the two rotors 6 and 10 will be driven in opposite directions at a high rate of speed, and the power generated by the two rotors may be utilized for performing useful work through the medium of the drive pulleys 27.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A rotary engine including a casing, a plurality of hollow rotors mounted within the casing and formed with oppositely disposed nozzles from which opposing jets of an elastic fluid medium are adapted to issue, and means for supplying an elastic fluid medium to the interior of the hollow rotors.

2. A rotary engine including a casing, a plurality of concentric hollow rotors mounted within the casing, the said rotors being provided with nozzles which communicate with the interior thereof and the nozzles of each rotor being oppositely disposed with respect to the nozzles of another rotor so that the jets of an elastic fluid medium issuing therefrom will be directly opposed to each other, and means for supplying an elastic fluid medium to the interior of the hollow rotors.

3. A rotary engine including a casing, a plurality of concentric hollow rotors mounted within the casing, each of said rotors being provided with an annular series of nozzles which communicate with the interior thereof and being provided with an annular series of buckets, the nozzles and buckets of each rotor bearing an opposed relation to the nozzles and buckets of another rotor, and means for supplying an elastic fluid medium to the interior of the hollow rotors.

4. A rotary engine including a casing, a plurality of concentric hollow rotors mounted within the casing, each of the rotors being provided with a peripheral series of nozzles which communicates with the interior thereof and the nozzles of each rotor having an opposed relation to the nozzles of another rotor, and hollow shafts journaled within the casing and carrying the respective rotors, the said hollow shafts being in communication with the interior of the respective hollow rotors, means being provided for supplying an elastic fluid medium to the hollow shafts.

5. A rotary engine including a casing, a pair of alined hollow shafts journaled in opposite sides of the casing, a pair of hollow rotors carried by the respective shafts and mounted within the casing, the said hollow rotors being in communication with the respective hollow shafts and being each provided with a peripheral series of inclined nozzles which have an opposed relation to the nozzles of the opposite rotor, and means for supplying an elastic fluid medium to the hollow shafts.

6. A rotary engine including a casing, a pair of alined hollow shafts journaled in opposite sides of the casing, a pair of hollow rotors carried by the respective hollow shafts and mounted within the casing, the said hollow rotors being in communication with the respective hollow shafts and being each provided with a peripheral series of buckets and a peripheral series of inclined nozzles which are oppositely disposed to the buckets and nozzles of the other rotor, and means for supplying an elastic fluid medium to the hollow shafts.

7. A rotary engine including a casing, a pair of alined hollow shafts journaled in opposite sides of the casing, a hollow rotor arranged within the casing and carried by one of the shafts, said hollow rotor being in communication with the shaft and being provided at the periphery thereof with a series of inclined nozzles, a second hollow rotor carried by the second hollow shaft and in communication therewith, the second rotor being provided with an enlarged rim portion which overhangs the first mentioned rotor and is provided upon its inner face with an annular series of inclined nozzles having an opposed relation to the nozzles of the first mentioned rotor, and means for supplying an elastic fluid medium to the hollow shafts.

8. A rotary engine including a casing, a pair of alined hollow shafts journaled in opposite sides of the casing, a hollow rotor carried by one of the shafts and in communication therewith, said hollow rotor being provided at the periphery thereof with an annular series of buckets and also with an annular series of inclined nozzles, a second rotor carried by the other hollow shaft and in communication therewith, the second hollow rotor being formed with an enlarged rim portion which overhangs the first mentioned rotor and is provided upon its inner face with an annular series of buckets and also with an annular series of inclined nozzles having an opposed relation to the buckets and nozzles of the first mentioned rotor, and means for supplying an elastic fluid medium to the hollow shafts.

9. A rotary engine including a casing, a pair of concentric hollow rotors mounted within the casing, a peripheral series of inclined nozzles carried by the inner rotor, an inner series of inclined nozzles carried by the outer rotor and having an opposed relation to the nozzles of the inner rotor, an outer annular series of inclined nozzles carried by the outer rotor, an annular drum within the casing, a series of inclined nozzles carried by the annular drum and having an opposed relation to the outer nozzles of the outer rotor, and means for supplying an elastic fluid medium to the drum and hollow rotors.

10. A rotary engine including a casing, a pair of concentric hollow rotors mounted within the casing, a peripheral row of buckets upon the inner rotor, an annular series of inclined nozzles projecting from the inner rotor, an inner peripheral series of buckets upon the outer rotor, an inner series of inclined nozzles projecting from the outer rotor, the inner buckets and nozzles of the outer rotor having an opposed relation to the buckets and nozzles of the inner rotor, an annular chest surrounding the outer rotor, an annular series of inclined nozzles projecting from the chest, an outer peripheral row of buckets upon the outer rotor, an outer annular series of inclined nozzles upon the outer rotor, the outer nozzles and buckets of the outer rotor having an opposed relation to the nozzles of the annular chest, and means for supplying an elastic fluid medium to the annular chest and hollow rotors.

11. A rotary engine including a casing, a pair of alined hollow shafts journaled in opposite sides of the casing, a hollow rotor carried by one of the shafts and in communication therewith, said hollow rotor being provided with a peripheral row of buckets and also with a peripheral row of inclined nozzles, a second hollow rotor carried by the opposite hollow shaft and in communication therewith, the said second hollow rotor being provided with an enlarged rim portion which overhangs the periphery of the first rotor and is provided with both interior and exterior peripheral series of buckets and inclined nozzles, the inner buckets and inclined nozzles having an opposed relation to the buckets and nozzles of the

first mentioned rotor, an annular chest surrounding the outer rotor, an inner peripheral row of inclined nozzles projecting from the annular chest and having an opposed relation to the outer buckets and nozzles of the second mentioned rotor, and means for supplying an elastic fluid medium to the annular chest and hollow shafts.

In testimony whereof we affix our signatures in presence of two witnesses.

ERNEST G. JONES.
THOMAS T. PATCHEL.

Witnesses:
M. E. HALL,
W. H. SLASHY, Jr.