R. MAY.

TURBINE.

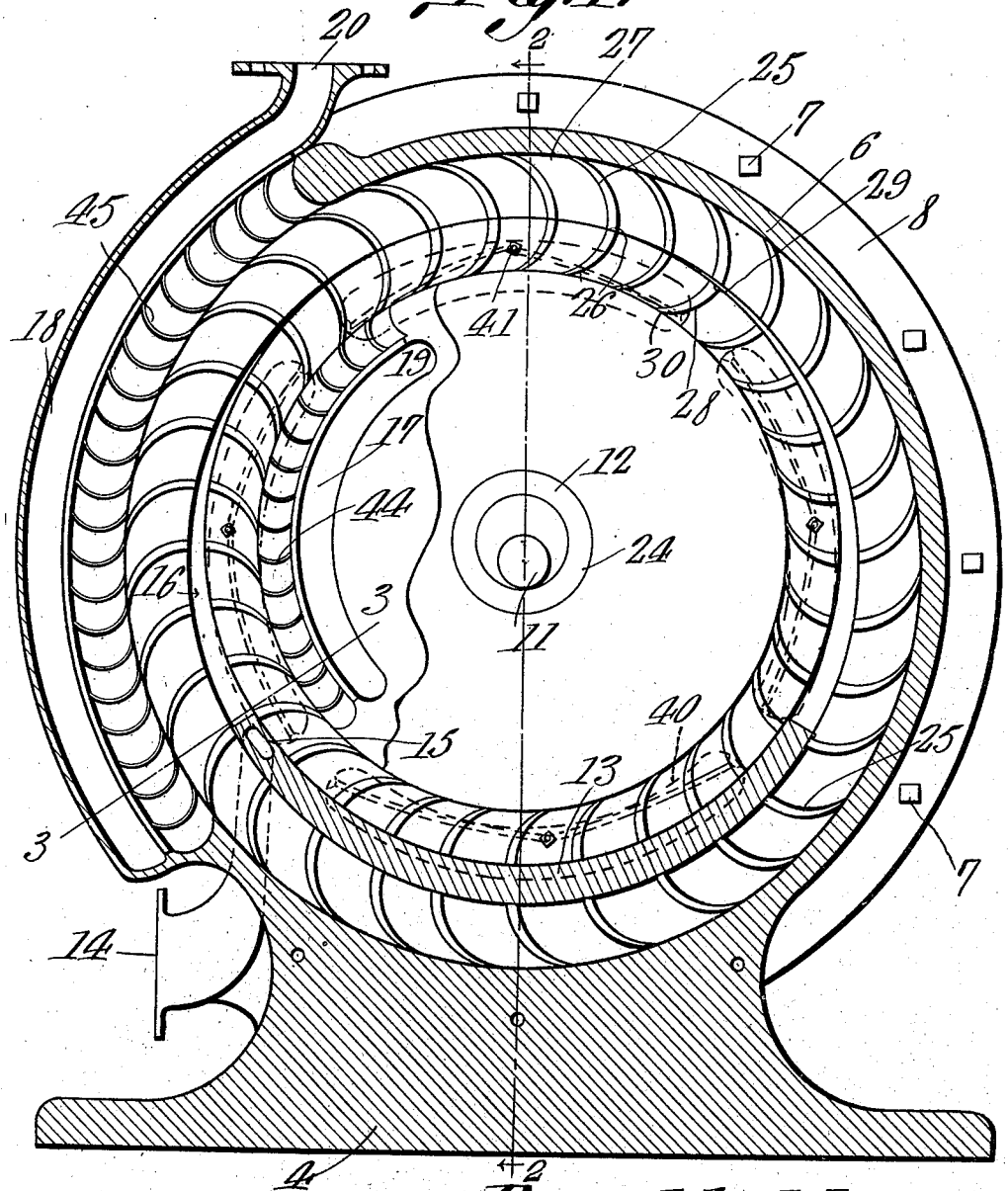
APPLICATION FILED DEC. 1, 1910.

1,001,874.

Patented Aug. 29, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

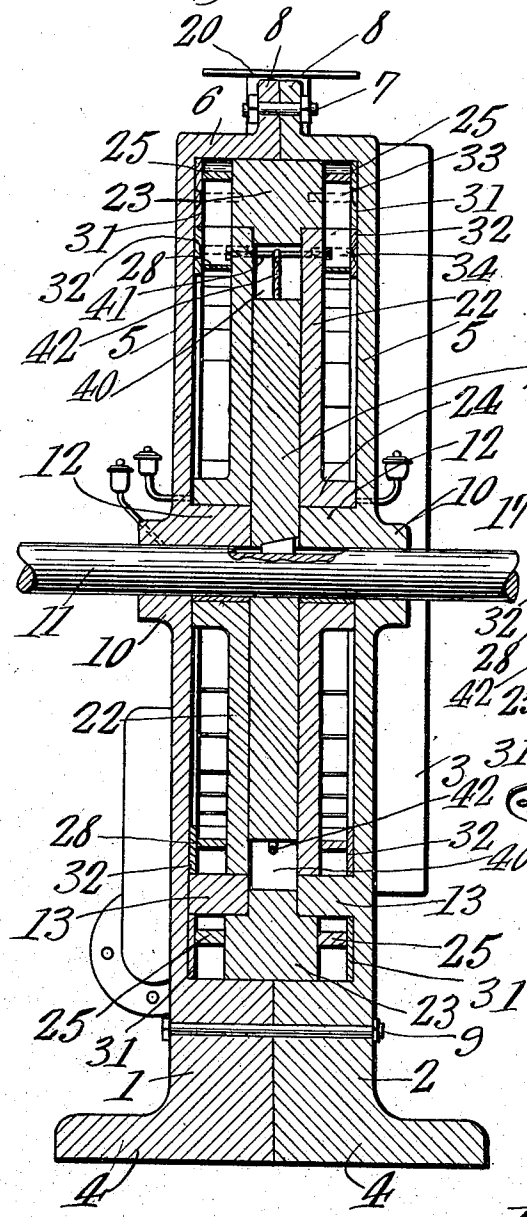
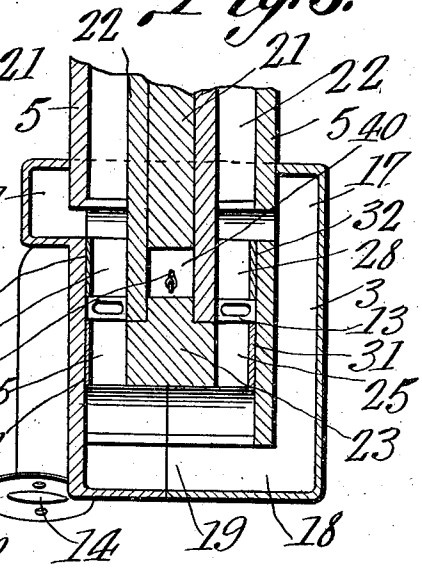


Fig. 3.



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UNITED STATES PATENT OFFICE.

REYNOLDS MAY, OF WHITEWRIGHT, TEXAS.

TURBINE.

1,001,874. Specification of Letters Patent. **Patented Aug. 29, 1911.**

Application filed December 1, 1910. Serial No. 595,075.

To all whom it may concern:

Be it known that I, REYNOLDS MAY, a citizen of the United States, residing at Whitewright, in the county of Grayson and State of Texas, have invented a new and useful Turbine-Engine, of which the following is a specification.

This invention relates to turbine engines, and more especially to that type thereof which employ the impact of the steam flowing radially into the casing; and the object of the same is to first utilize the impact of the steam against two sets of blades which move with equal speed and are approaching each other, then utilize the escape of the steam laterally through the blades by curving their outer ends to the rear, and also simultaneously to take advantage of the expansion of the steam by directing its escape toward baffles fixed in adjacent exhaust chambers.

With these and other objects in view, the invention consists in the construction described and claimed below, and shown in the drawings wherein—

Figure 1 is a vertical section partly broken away, Fig. 2 is a central vertical cross section of Fig. 1 on the line 2—2, and Fig. 3 is a horizontal section on the line 3—3 thereof.

The casing is shown as made in two upright parts 1 and 2 of which the latter has an offset 3 for a purpose to be described below, and said parts are cast with any suitable form of base 4 for resting on the floor, and with flat circular heads 5 and marginal rims 6 which meet each other around the edge of the heads, the parts being connected by bolts 7 in their marginal flanges 8 and possibly also by through bolts 9 within or just above the base. At their true centers, the heads are formed with outwardly projecting hubs 10, and through the hubs and heads are passages for oil as will be found necessary. The hubs are provided at the true center of the heads with alined openings through which passes the main shaft 11, but within the casing the hubs are continued toward each other in extensions 12 which while bored interiorly for the passage of the main shaft have their cylindrical extremities eccentric to said shaft as best seen in Fig. 2. The drawings show the eccentric or high portion of the extensions as above the shaft 11, though this is a matter of choice; and the drawings also show the shaft as projecting through both heads of the casing, although this also is a matter of choice. Relatively opposite to said high portion, the heads 5 contain interior abutments 13 which are of crescent shape and disposed opposite to each other, and the inlet 14 is bored through the base 4, thence through the offset 3, and then through one of these abutments at or near its extremity as seen at 15. From this point to the top of the casing there is a tapering inlet space 16 as best seen in Fig. 2, which space is formed by the blades of the disks yet to be described; and radially outside and inside from said space and opposite to it, the offset 3 carries two exhaust chambers 17 and 18 extending around perhaps a third or a quarter of the periphery, connected by a passage 19, and leading to the exhaust 20.

It is not necessary for the purposes of this specification to give details of the construction of the parts of the casing, nor to state how its members are made or connected further than that it is necessary that as a whole it shall contain the above features.

Within the casing are disposed a central disk 21 and two like side disks 22. The former is fast upon the shaft 11 as by being shrunk or keyed thereon, and its body is of a thickness to close the space between the inner ends of the hub extensions 12 and the inner edges of the two abutments 13. Around its periphery is a rim 23 which fits within the rim 6 of the casing and which also passes outside the abutments 13; and the side disks 22 are by preference of a thickness to fill out that of the central disk so that the three disks when they lie together shall be of the same width as said rim 23. The side disks have hubs 24 journaled on the eccentric extensions 12 next inside the heads 5 of the casing, and the length of these hubs measures the length of the blades excepting that rings are preferably used against the outer ends of the blades as will now be explained. All blades on both disks project parallel with the axis, those on the central disk being disposed at the ends of its rim 23 and those on the side disks being disposed on their outer faces near their outer edges as best seen in Fig. 2. The outer blades 25 have their radially inner edges 26 set in advance of their radially outer edges 27 which latter lead to a line flush with the inner face of the casing rim 6, and throughout their length these blades

are curved as seen in Fig. 1. Similarly the blades 28 on the side disks 22 have their radially outer edges 29 set in advance of their radially inner edges 30. All the blades 25 and 28 are by preference curved throughout their length, and by preference the curvature is such that where the blades on the side disks meet those on the central disk the line of the curve should be uninterrupted. By preference I close the axial outer ends of the blades by means of rings 31 and 32, respectively secured by screws 33 and 34 to the rim 23 and to the side disks 22; and the adjacent edges of these rings come together at the top of the structure shown in Fig. 1 and are separated by the abutment 13 at its bottom.

By the construction above described there is therefore formed an outer rotary member comprising the central disk fast on the shaft and having blades at both sides of its rim, and an inner rotary member comprising the two side disks mounted eccentric to the shaft and having like blades around their outer edges. By preference there are an equal number of blades on the outer and inner members, and as above described the blades coact at the top of the structure to produce curved buckets as shown. In order to make their adjacent and forward edges 26 and 29 meet each other accurately, I form four curved slots 40 through the central disk 21, and connect the side disks 22 by bolts 41 passing through the slots at about their centers and connected with cables 42 attached to their ends. The bolts tie the two side disks 22 together into one inner member, and the engagement of their cables with the ends of the slot will cause the inner and outer members to rotate simultaneously while yet permitting them to rotate eccentrically to each other.

An important feature of the present invention which, although not absolutely necessary, I prefer to employ because of its advantages, consists in the use of curved baffles situated within the exhaust chambers 17 and 18 as indicated at 44 and 45 respectively. These when employed are curved reversely to the curvature of the blades 25 and 28, and by preference the baffles are disposed somewhat closer together than on the blades so that the steam passing through and out of each bucket will pass through and between more than a single pair of baffles. Specifically the advantage arising from their use is that the outflowing steam is directed against these baffles rather than into an open chamber and the very least of its force of impact or expansion is used to give a little further forward impulse to the rotating members. It is obvious that if the baffles were omitted, the escaping steam would slide off the rear ends of the blades and flow freely into the exhaust chambers without imparting this impulse to the members. It is obvious also that if the blades set radial to their disks the escaping steam would be directed radially inward and outward and not against these baffles even if they were then used. Finally the advantage of using curved blades will be apparent, when the curvature of the outer and inner blades is the same at their meeting point and increases toward the outlet, because the escaping steam passing off at the outlet ends of the blades is directed at a greater angle against these baffles by reason of such curvature.

In operation steam is admitted at the inlet 14 and enters the casing at the point 15 which is at the forward end of the abutment 13, and as the two members are rotating in the direction of the arrow their blades are constantly and rapidly passing the point 15 where their inner edges are separated and approaching the top of the structure where their inner edges are in contact. Therefore the space 16 is diminishing in width and the steam is forced laterally between the blades of the two members, and by reason of this fact the present engine can be used with other motive fluids than steam. However, if steam be employed it expands as it progresses along the space 16, and its increase of volume affords another reason for forcing it laterally between the blades in both members. Thence the outflowing steam passes between the baffles 44 at the inside and the baffles 45 at the outside, and here the final stroke of power is given as just described. Finally the steam reaches the chamber 18 and flows out the exhaust and some of it reaches chamber 17 and passes through the port 19 to the outlet. Hence, this turbine engine utilizes the impact of steam under considerable pressure (and by preference it is utilized against about sixteen blades as shown), it utilizes the force of laterally escaping steam against the baffles, and it utilizes the force of the expanding steam in the same way; and all these forces combine in exerting power upon sixteen blades which are moving in the direction of the steam, and, therefore, set up very little resistance to it.

What is claimed as new is:

1. In a turbine engine, the combination with two simultaneously moving members mounted on different centers and having blades which contact with each other at one point and are out of contact elsewhere; of a steam inlet directed between said blades and toward but remote from their point of contact, and exhaust chambers along the outlet ends of said blades and communicating with a common exhaust.

2. In a turbine engine, the combination with two simultaneously moving members mounted on different centers eccentric to each

other and having blades which contact with each other at one point and are out of contact elsewhere so as to leave a crescent-shaped space between them; of a fixed abutment occupying the widest portion of said space, a steam inlet directed between said blades at one end of said abutment and toward but remote from their point of contact, and exhaust chambers along the outlet ends of said blades and communicating with a common exhaust.

3. In a turbine engine, the combination with two simultaneously moving members mounted on different centers and having blades which contact with each other at one point and are out of contact elsewhere; of a steam inlet directed between said blades and toward but remote from their point of contact, exhaust chambers along the outlet ends of said blades between the inlet and their said point of contact, and fixed baffles within said chambers.

4. In a turbine engine, the combination with two simultaneously moving members mounted on different centers eccentric to each other and having blades which contact with each other at one point and are out of contact elsewhere so as to leave a crescent-shaped space between them; of a fixed abutment occupying the widest portion of said space, a steam inlet directed between said blades at one end of said abutment and toward but remote from their point of contact, two exhaust chambers extending from the steam inlet to the said point of contact between the blades, one along the inner and the other along the outer side thereof, communication between both chambers and the exhaust, and fixed baffles within the chambers spaced closer to each other than said blades are spaced apart.

5. In a turbine engine, the combination with two rotating annular members mounted eccentrically to each other and both having blades struck on curves which coact at points where the members contact with each other, the opposite ends of the blades being further to the rear in their direction of rotation; of an inlet for live steam directed into the space between said members and toward said contacting point, means for causing the members to rotate simultaneously, exhaust chambers inside the inner member and outside the outer member between said inlet and said point of contact, and fixed baffles within said chambers.

6. In a turbine engine, a cylindrical casing having a rim, a shaft journaled through its axis, a main disk fast thereon and having blades extending axially from its edge, a hub within the casing eccentric to said shaft, a disk journaled on the hub and having blades equal in number to and disposed just inside those on the main disk, an inlet directed into the space between said blades at a point where they are separated, an offset in the casing, and outlet chambers therein standing outside the blades of the main disk and inside those of the side disk and extending from said inlet toward the point where the blades contact and communicating with a common exhaust.

7. In a turbine engine, a casing having cylindrical heads and an annular rim, hubs at the center of the heads having eccentric interior offsets, a shaft journaled through said hubs, a main disk fast thereon and having blades around its edge at both sides thereof and curved slots through its body, side disks journaled on said hub extensions against opposite sides of the main disk and having blades around their edges at the outer sides thereof just inside the blades on the central disk, bolts connecting the side disks and passing through said slots, cables connecting the bolts with the ends of the slots, a steam inlet directed into the space between the adjacent edges of said blades, and exhaust chambers outside the outer blades and inside the inner blades between the inlet and the point where the blades contact.

8. In a turbine engine, a cylindrical casing having a rim, a shaft journaled through its axis, a main disk fast thereon and having blades extending axially from its edge, a hub within the casing eccentric to said shaft, side disks journaled on the hub and having blades extending axially from their edges just inside those on the main disk, an inlet directed into the space bteween the blades at a point where they are separated, outlets from the casing adjacent to the outer sides of said blades, and rings independently secured to the axial outer ends of the several sets of blades.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

REYNOLDS MAY.

Witnesses:
L. SELPH,
IRO DAVIS.