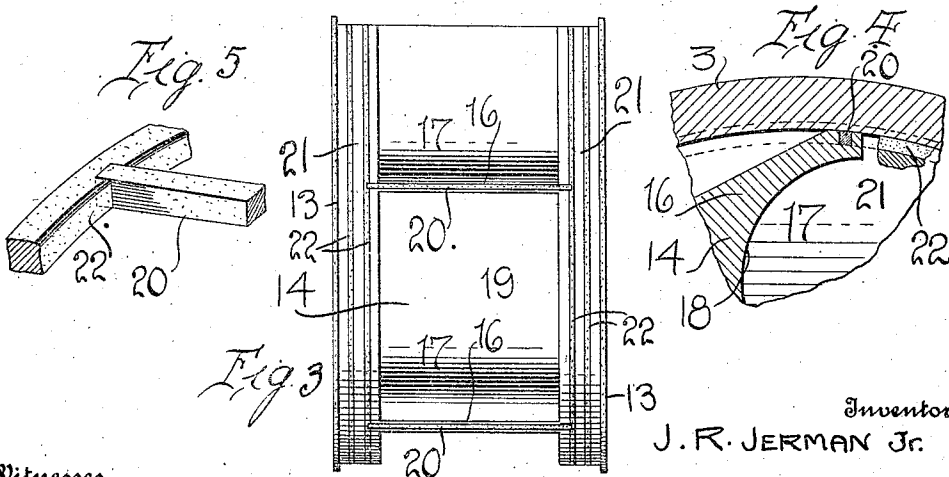
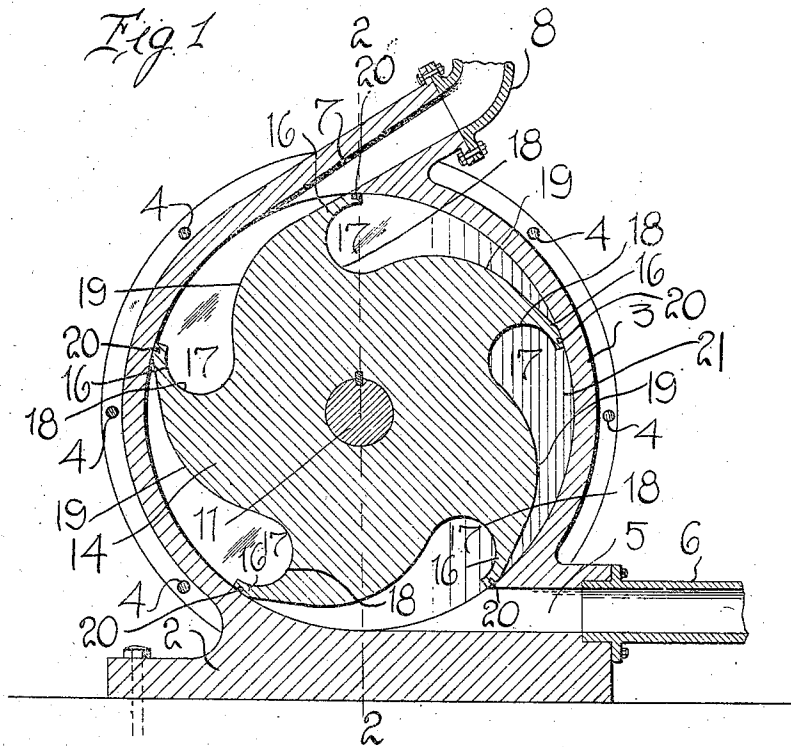


J. R. JERMAN, JR.  
 ROTARY ENGINE.  
 APPLICATION FILED FEB. 2, 1915.

1,149,523.

Patented Aug. 10, 1915.  
 2 SHEETS—SHEET 1.



Witnesses  
 Robert M. Sutphen.  
 A. I. Hind.

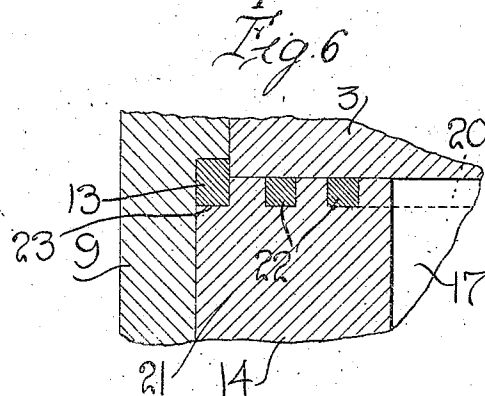
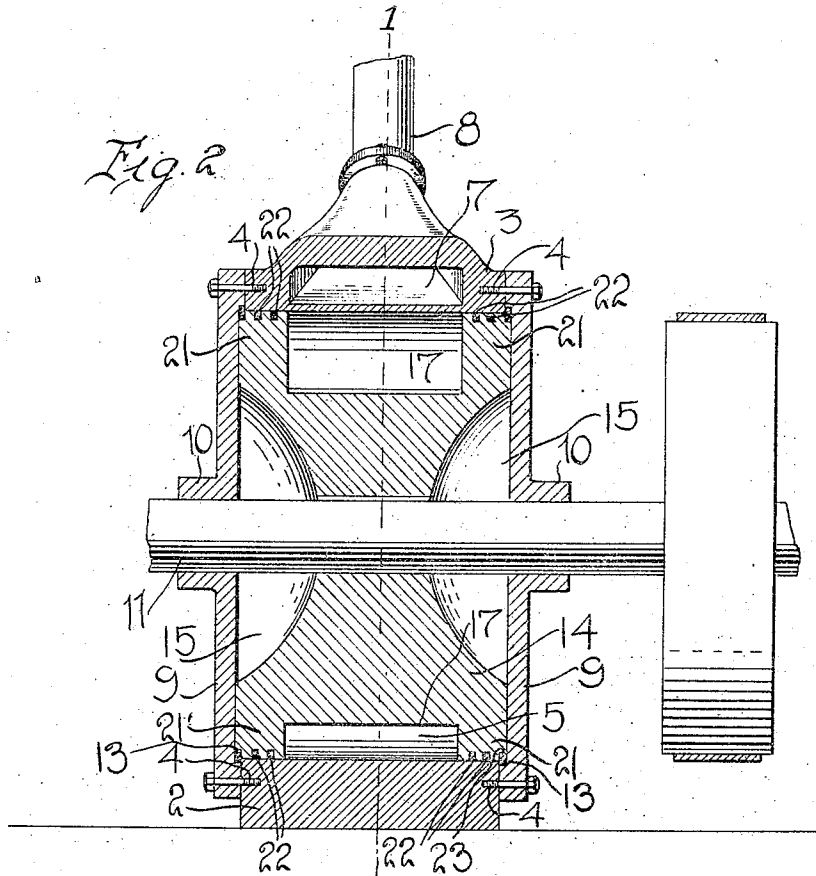
Inventor  
 J. R. JERMAN Jr.

By *Watson E. Coleman*  
 Attorney

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Witnesses  
 Robert M. Sutphen  
 W. L. Schmid

Inventor  
 J. R. JERMAN JR.

By *Watson & Coleman*  
 Attorney

## UNITED STATES PATENT OFFICE.

JOHN R. JERMAN, JR., OF DILLON, SOUTH CAROLINA.

## ROTARY ENGINE.

1,149,523.

Specification of Letters Patent.

Patented Aug. 10, 1915.

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*To all whom it may concern:*

Be it known that I, JOHN R. JERMAN, Jr., a citizen of the United States, residing at Dillon, in the county of Dillon and State of South Carolina, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to rotary engines, and particularly that type of rotary engine wherein a rotor is used against which the steam or other motive fluid under pressure is projected to cause the rotation of the rotor.

The primary object of my invention is the provision of a very simple but effective rotary engine of this type wherein the rotor is provided with a plurality of peripherally disposed pockets, the steam or other motive fluid being directed tangentially into the rotor casing and successively against and into the several pockets.

A further object of my invention is to provide for the outlet of exhausted motive fluid, and still another object is to provide means for preventing the escape of steam or other motive fluid around the rotor, and particularly in this connection to provide means for preventing the escape of steam at the time when the rotor is being started when the pressure of the steam is particularly great.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section on the line 1—1 of Fig. 2; Fig. 2 transverse section on the line 2—2 of Fig. 1; Fig. 3 is a face view of the rotor; Fig. 4 is an enlarged fragmentary sectional view of a portion of the rotor casing and one of the blades of the rotor showing the packing therein; Fig. 5 is a detail view of a portion of one of the blade packing strips and the adjacent packing ring; Fig. 6 is a fragmentary section of a portion of the rotor and the rotor casing in the same plane as Fig. 2.

Referring to these drawings, 2 designates a base upon which is mounted the body 3 of the rotor casing. This body 3 is hollow and cylindrical in form, as clearly illustrated in Figs. 1 and 2, the margins of this cylindrical body portion being formed with bolt openings as at 4 (see Fig. 2). Adjacent the base of the casing the casing is

formed with a tangentially extending outwardly flared outlet passage 5 which may be connected to any suitable exhaust pipe 6, and arranged diametrically opposite the exhaust passage 5 is an inlet passage 7 which likewise extends tangentially to the inner face of the rotor casing and which is adapted to be connected by any suitable union or joint to a feed pipe 8 connected to any source of fluid pressure, as a source of steam.

The ends of the body 2 of the rotor casing are closed by means of the end plates 9 each formed at its center with a projecting hub 10 or bearing through which passes the rotor shaft 11. These end plates are held to the body of the casing by means of bolts or in any other suitable manner. It is to be noted that each of the plates 9 is formed with a marginal shoulder 12 or thickened portion which bears against the adjacent end face of the casing body, the inner face of this shoulder being disposed slightly outward of the inner face of the casing, as shown clearly in Fig. 4, to provide for the reception of a packing ring 13.

Keyed or otherwise fastened upon the shaft 11 and disposed within the rotor casing is the rotor 14. Preferably the central portion of the rotor is cut away as at 15 so as to reduce the weight of the rotor. As illustrated in Figs. 1, 2 and 3, the rotor is formed with a plurality of blades 16 defining a plurality of pockets 17. The rear face of each blade is concavely curved as at 18 to form the end wall of the corresponding pocket and the front face of each blade is curved centrally and in the direction of rotation of the rotor to form the rear face of the pocket, as at 19. The extremity of each blade is therefore relatively thin, as shown in Fig. 5, and disposed on the outer face of the extremity of each blade is a transversely extending packing strip 20. The blades 16 and the pockets 17 do not extend entirely across the rotor but only across the medial portion thereof to thereby provide the side walls 21 of the pockets, the peripheries of these side walls fitting snugly the internal diameter of the rotor casing and fitting snugly against the inner faces of the plates 9. These side walls 21 of the rotor are formed each with a plurality of circumferentially extending recesses within which are disposed the packing rings 22. The outer corner of each of the walls 21 is cut away as at 23 to accommodate the packing strips 13,

these packing strips 13 thus overlapping the edge of the rotor and the edge of the body of the casing. The purpose of this construction is of course to prevent steam from passing around the side walls 21 of the rotor and so down into the space 15 and escaping so that the entire pressure of the steam may be utilized, but the packing strips 13 are specifically for the purpose of preventing the escape of steam when the engine is not running and the steam is turned on. At this time when the rotor is just starting, the pressure of the steam is very great and the steam would probably escape past the packing rings 22. The pressure of the steam, however, against the packing ring 13 will force the packing ring laterally against the adjacent side wall of the casing and the greater the pressure of the steam the tighter will this packing ring 13 bear against the corresponding end plate so that the steam will be absolutely prevented from escaping.

It will be noted from Figs. 3 and 6 that the packing strip 20 which is mounted upon the edge of each blade is longer than the blade and extends into a notch formed in each of the inner packing rings 22. Thus the steam in one pocket cannot pass around the ends of the packing strip 20 and therefore cannot escape from the pocket.

It will be seen from Fig. 2 that the inlet passage 7 flares downward so that the outlet end of this passage has a width equal to the width of the blades and pockets 16 and 17, while the inlet end has a diameter approximately that of the feed pipe 8. Thus the impact of the steam will be distributed across the entire face of each blade and the pressure upon the rotor will be uniform.

It will be noted from Fig. 1 that because of the fact that the passage 7 extends tangentially into the rotor casing, no blade will be submitted to the action of the steam during a relatively great angular movement, that is during a movement of the blade through ninety degrees. The amount of steam entering the rotor may of course be governed in any suitable manner by any ordinary throttle valve disposed within the feed pipe 8, and controlled by a governor driven from the motor shaft. The steam enters the rotor casing, impacts against a blade carrying the rotor around in a circular movement, and then escapes out through the passage 5 leaving the pocket ready to receive live steam.

A motor constructed in accordance with my invention is extremely simple and because of its simplicity will attain a maximum of power with a minimum amount of steam. The packing rings and strips reduce the friction of the rotor upon the rotor casing and prevent the loss of power through escaping steam. It will be seen that the steam passing through the pipe 8 will expand on

reaching the passage 7, thus adding to the force with which it will strike the several blades.

Attention is to be directed at this point to the fact that the blades extend tangentially by reason of the reentrant concavity of the pockets 18 and also to the fact that the edges of the blades are less in thickness than the vertical diameter of the passage 7. In consequence of this construction, when a blade has cleared the lower wall of the passage steam immediately enters around the blade and strikes the curved wall of the pocket 18 so as to force the rotor in the direction of its travel. Thus steam is entering the two pockets at the same time, and at no period is there a time when the steam is not impacting against at least one of the blades. Furthermore, because of the peculiar form of the pockets, the steam as it is projected from the passage 7 acts tangentially upon the blade which has just moved partially across the passage 7. This would not be the case were the wall of the pocket 18, that is, the rear face of the blade, approximately radial to the center of rotation. It is further pointed out that this tangential inclination given to the blades tends to prevent the steam from attempting to force a passage around the packing strip 20. If the blades had flat rear faces and no pocket 18 were formed therein, the steam would not be "pocketed" but would tend to pass around the packing strip.

While I have illustrated what I believe to be the best and most convenient form of my invention I wish it understood that I do not wish to be limited to the details of construction, as it is obvious that many changes might be made without departing from the principle thereof.

Having described my invention what I claim is:

1. A rotary engine of the character described including a casing having oppositely disposed tangentially extending inlet and exhaust passages, the inlet passage being laterally flared, and a rotor mounted within the casing and having a medially disposed series of blades having a width equal to the width of the flared inlet passage, the motor being provided with side walls fitting the interior diameter of the casing and provided with packing rings.

2. A rotary engine of the character described including a rotor casing having oppositely disposed tangentially extending inlet and exhaust passages, the inlet passage being laterally flared, and a rotor mounted within the casing and having a series of tangentially curved blades defining pockets, each of said blades carrying upon its extremity a transversely extending packing strip, the blades having a width equal to the extreme width of the flared portion of

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the inlet passage, the rotor being formed with side walls fitting the interior diameter of the rotor casing and formed with packing ring grooves, and packing rings disposed in said grooves.

3. In a rotary engine of the character described, a rotor casing having a cylindrical body and end walls, the end walls being outwardly recessed at the junction of the body with the walls, and a bladed rotor therein, the ends of the rotor carrying packing rings contacting with the inner face of the casing body, the end faces of the rotor being complementarily recessed with relation to the recesses formed in the end walls of the casing, and packing rings disposed within said complemental recesses and overlapping the joint between the periphery of the rotor and the inner face of the casing body.

4. In a rotary engine, a casing having oppositely disposed tangentially extending inlet and outlet passages, the inlet passage of the casing being laterally flared, the outlet

passage of the casing being also laterally flared, detachable end plates closing the ends of the rotor casing and forming part thereof, a shaft passing through the end plates, and a rotor mounted upon the shaft, said rotor being formed with a medially disposed series of blades defining pockets, each of said blades being tangentially curved and transversely recessed at its extremity, the ends of the rotor defining said pockets and fitting the interior of the rotor casing and bearing against the end plates, a plurality of packing rings mounted upon the peripheries of the end portions of the rotor, and packing strips disposed in the recesses in the rotor blades, the ends of said strips extending into recesses formed in the inner peripheral packing rings of the rotor.

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

JOHN R. JERMAN, Jr.

Witnesses:

FREDERIC B. WRIGHT,  
D. W. GALL