F. HODGKINSON.

ROTARY MOTOR.

APPLICATION FILED SEPT. 1, 1909.

1,011,788.

Patented Dec. 12, 1911.

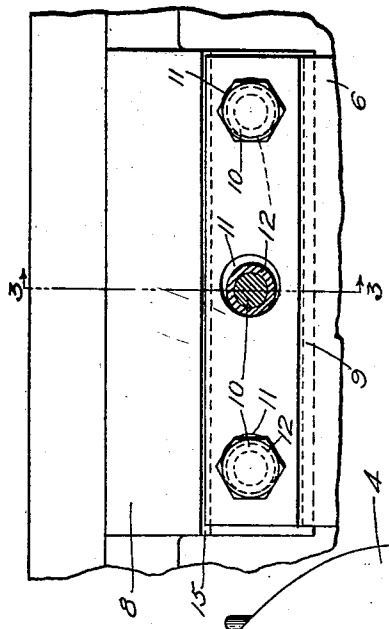

Fig. 2.

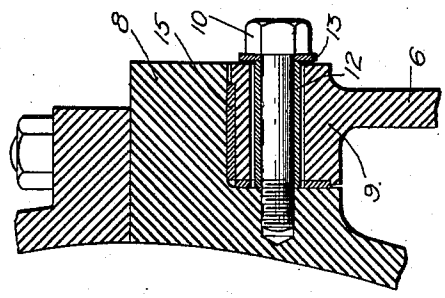

Fig. 3.

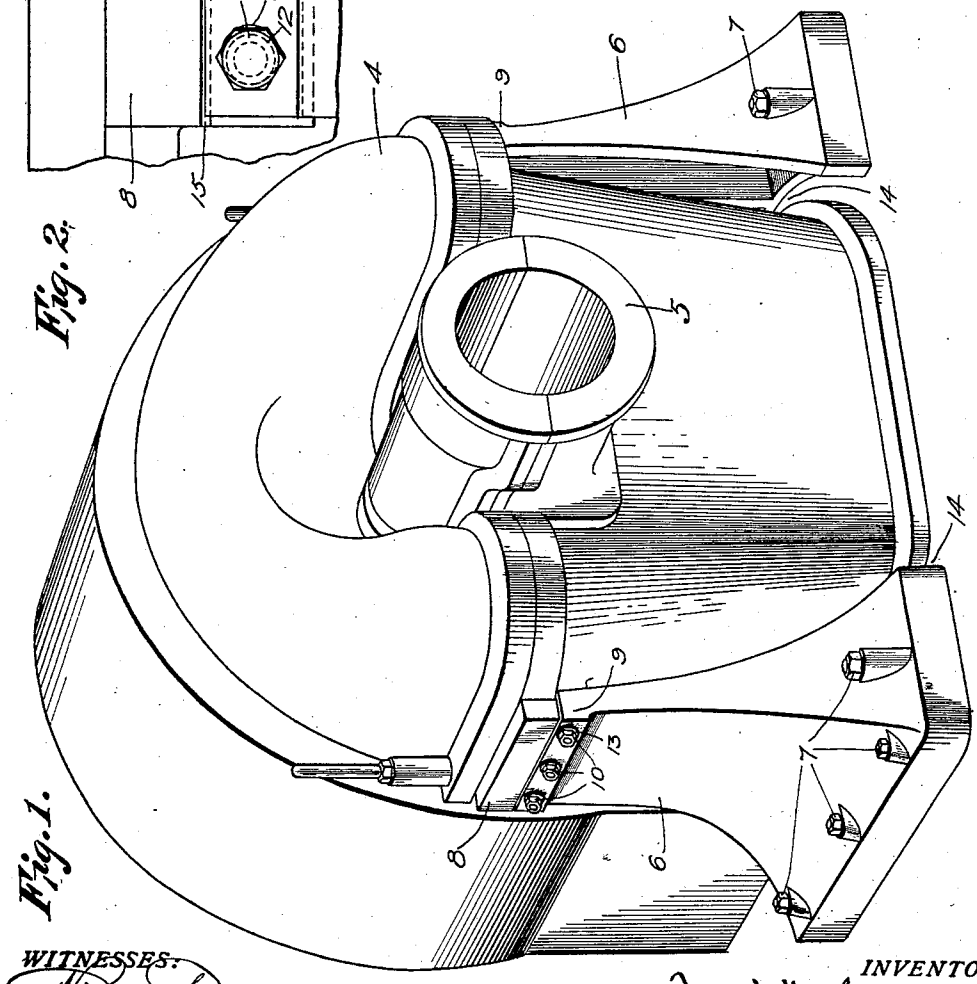

Fig. 1.

WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANCIS HODGKINSON, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE COLONIAL TRUST COMPANY, TRUSTEE, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ROTARY MOTOR.

1,011,788. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed September 1, 1909. Serial No. 515,556.

To all whom it may concern:

Be it known that I, FRANCIS HODGKINSON, a subject of the King of Great Britain and Ireland, and a resident of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Rotary Motors, of which the following is a specification.

This invention relates to rotary motors and more particularly to means for supporting such motors.

The casings of rotary motors and particularly the casings of multi-stage turbines are liable to distort and cause serious trouble unless they are provided with means for accommodating both the longitudinal and lateral expansion.

An object of this invention is to produce means for supporting the stationary casing of rotary motors which will permit the casing to expand and contract under the variations of temperature encountered.

A further object is to supply means for supporting both the stationary casing and the rotor element of the motor and for providing means whereby the longitudinal and lateral expansion of the casing is accommodated.

A further object is to produce means for supporting the stationary casing of such engines, which avoids the necessity of casting feet or supports on the casing and thereby complicating the casting and producing temperature strains due to unequal expansion.

These and other objects I attain by means of apparatus embodying the features described and illustrated in the drawings accompanying this application and forming a part thereof.

In the drawings: Figure 1 is a partial perspective view of a turbine embodying my invention, Fig. 2 is a fragmental side elevation disclosing a detail of my invention and Fig. 3 is a section along the line 3, 3, of Fig. 2.

In the turbine shown, the stationary casing 4 supports the bearing 5 for the rotor element (not shown) and the casing is supported by means of supporting pedestals 6 which may be secured to the foundation of the turbine by means of bolts 7. The pedestals 6 may be located at each side and near one end of the casing 4 and the casing may be provided with integrally formed shoulders 8 which rest on or engage shoulders 9 provided on the pedestals 6. The shoulders 8 and 9 preferably extend axially with reference to the turbine and are of such size that the bearing surfaces are sufficient to permit relative motion without excessive wear.

The casing 4 may be secured to the pedestals 6 by means of bolts 10 which extend through holes 11 provided in the shoulders 9 and which are secured to the casing. Each bolt 10 is surrounded by a bushing 12 which may be provided with an integrally formed washer 13. Each bushing is of such length that it projects beyond the shoulder 9 when its inner end is held firmly against the casing. This holds the washer 13 free of the shoulder and the bolts 10 may be tightened and be firmly secured in place on the casing without causing the washer 13 to engage the shoulder. The holes 11 are of greater diameter than the bushings 12 and there is sufficient play between the bushings and the sides of the holes to accommodate the relative motion occasioned by longitudinal and lateral expansion and contraction of the turbine casing.

The longitudinal expansion of the casing 4 causes the shoulders 8 to slide longitudinally along the shoulders 9 of the supporting pedestals and the holes 11 are of sufficient size to accommodate this motion.

The pedestals 6 are of such section that, while they are capable of sustaining the weight of the casing and the rotor element of the turbine without deflection, they yield to the expansive and contractive forces and deflect to accommodate the expansion and contraction of the casing. The only points of contact between the supporting pedestals 6 and the casing are the shoulders 9, the other portions of the pedestals being separated by a space 14 from the sides of the casing through which cooling currents of air may circulate or which may be packed with heat insulating material so that the pedestals will not be affected by the heat of the casing.

The pedestals remain at a reasonably constant temperature, and although the temperature of the exhaust end of the turbine may vary considerably, due to different back pressures which the turbine encounters, the

axis of the turbine will remain in substantially the same position irrespective of the expansion and contraction of the turbine casing.

I find it preferable to introduce brass liners 15 between the pedestals 6 and the casing to reduce the friction and to permit the casing to move more freely. The bolts 10 with their bushings 12 and washers 13 form guides which limit the casing in its longitudinal and lateral movement, relative to the shoulders 9 and which at the same time permit sufficient motion to accommodate the expansive forces. Both ends of the turbine may be supported by pedestals 6.

What I claim is:

1. A rotary motor comprising stationary and rotatable parts, a bearing for the rotatable part supported by the stationary part, a flexible support for the stationary part adapted to accommodate the lateral expansion of that part and means for securing the stationary part to said support and for accommodating the longitudinal expansion of said stationary part.

2. A rotary motor, comprising stationary and rotatable parts, a bearing for the rotatable part supported by the stationary part, supporting means for the stationary part capable of deflecting for accommodating the lateral expansion of said part and means between said supporting means and said stationary part for accommodating the longitudinal expansion of said part.

3. A rotary motor, comprising stationary and rotatable parts, flexible supports for the stationary part and means for accommodating the longitudinal expansion of said part.

4. A turbine casing, a bearing supported by said casing, flexible supports for said casing adapted to accommodate the lateral expansion of the casing and means for accommodating the longitudinal expansion of the casing.

5. A turbine casing, a bearing supported by said casing, means for accommodating the longitudinal expansion of the casing and means for accommodating the lateral expansion of the casing.

6. A turbine casing, a support for said casing adapted to deflect to accommodate the lateral expansion of said casing and means between said support and said casing for accommodating the longitudinal expansion of the casing.

7. A turbine casing, a support for the casing capable of deflecting for accommodating the lateral expansion of the casing and means for securing said casing to said support and for accommodating the longitudinal expansion of said casing.

8. A turbine casing, a support therefor capable of deflecting for accommodating the expansion of the casing in one direction and means for securing said casing to said support and for accommodating the expansion in the other direction.

9. In a rotary motor, a stationary and rotatable part, a supporting pedestal for said stationary part capable of deflecting to accommodate the expansion of said part in one direction and means for preventing relative motion between said pedestal and said part in the direction of said expansion, and for permitting expansion of said part in the other direction.

10. A rotary motor, comprising a rotatable and stationary part, a supporting pedestal for the stationary part capable of deflecting to accommodate the expansion of said part in one direction and means for limiting the relative motion between said pedestal and said part in the direction of said expansion and for permitting relative motion to accommodate the expansion in the other direction.

11. In a rotary motor, a rotatable and a stationary part, a pedestal capable of deflecting to accommodate the lateral expansion of the stationary part, a shoulder formed on said part engaging a shoulder provided on said pedestal, and means for securing said stationary parts to said pedestal and for accommodating the longitudinal expansion of said parts.

In testimony whereof, I have hereunto subscribed my name this 26th day of August 1909.

FRANCIS HODGKINSON.

Witnesses:
C. W. McGhee,
Wm. H. Larimer.