

1,061,672.

Fig. 1 is a perspective view of a mechanical device. It features a large, curved, bowl-shaped component (4) mounted on a base (5). A horizontal rod (10) passes through the bowl, secured by a nut (8) and a washer (9). A vertical rod (17) is also shown. A cylindrical component (12) is connected to the bowl via a bracket (14). A long, thin rod (15) is attached to the bowl and extends downwards, ending in a hook-like structure (21). A small, rectangular component (22) is mounted on the bowl. A small, cylindrical component (16) is shown in a separate view (Fig. 2) at the bottom left, which is a cross-sectional view of the component (16) showing internal details (18, 19, 20, 21).

Fig. 2 is a cross-sectional view of the component (16) shown in Fig. 1. It shows a cylindrical body (16) with a central hole (18) and a flange (19) at the top. A small, rectangular component (20) is mounted on the flange. A small, cylindrical component (21) is shown in a separate view (Fig. 2) at the bottom left, which is a cross-sectional view of the component (21) showing internal details (22, 23, 24, 25).

WITNESSES:

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SUPPORTING MEANS FOR TURBINES.

1,061,672.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed August 30, 1910. Serial No. 579,788.

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 Supporting Means for Turbines, of which the following is a specification.

My invention relates to supporting means for the rotor and stator elements of turbines.

An object of my invention is to produce improved means for supporting the rotor and stator elements of the turbine and the driven shaft directly connected to the turbine shaft, in which the difficulties, ordinarily encountered and resulting from variations of temperature, are substantially overcome.

A further object is to produce means for supporting the turbine and the driven shaft directly connected to the turbine, and for providing means for maintaining the supporting means at a substantially constant and equal temperature.

I have found from experience that it is advisable to mount a stator element of the turbine on supports which are formed independently of the stator element. Such an arrangement avoids the necessity of forming feet or supports integrally with the stator, and thereby complicating the operation of casting the stator and producing temperature strains due to unequal expansion throughout the stator. I have also found from experience that the shaft or rotor element of the turbine is liable to be thrown out of alinement with the driven shaft coupled to it by variations in the temperatures of the bearing supports of the rotor and the shaft. The exhaust end of the turbine is liable to be heated up during the operation of starting and to impart heat to the casing supporting pedestals while the supporting pedestal of the driven shaft remains at a normal temperature; or the supporting pedestal of the driven shaft may be heated up during the operation of the turbine while the exhaust end of the turbine is cold. Either set of conditions will tend to destroy the alinement between the turbine rotor and the driven shaft.

My present invention contemplates providing means for maintaining the temperature of the supporting pedestals of the turbine and the adjacent pedestal of the driven shaft coupled to the turbine rotor, at a constant temperature and of also equalizing the temperatures of the pedestals.

In the drawings accompanying this application and forming a part thereof, Figure 1 is a perspective view of a portion of a turbine in connection with a pedestal or bearing support for a driven shaft directly connected to the turbine. Fig. 2 is a vertical section of a supporting pedestal for a bearing support, which forms a detail of my invention.

In the turbine shown, the stator or casing 4 is provided at its ends with supports or supporting pedestals 5 (one of which is shown) and the rotor element is journaled in bearings located at the ends of the casing and supported by the casing. The pedestals 5 may be located at each side and near the end of the casing 4 and the casing may be provided with integrally formed shoulders 8, which rest on and engage shoulders 9 provided on the pedestals 5. The shoulders 8 and 9 preferably extend axially of the casing 4 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 5 by means of bolts 10, which extend through holes provided in the shoulders 9 and are secured to the casing in such a way that the casing may expand and move longitudinally of the shoulder. The pedestals 5 are of such section that they are capable of sustaining the weight of the casing, but they are so constructed that they yield to the expansive and contractive forces and deflect to accommodate the lateral expansion and contraction of the casing. The only points of contact between the supporting pedestals 5 and the casing are the shoulders 9; the other portions of the pedestal are removed from the casing so that currents of air may circulate between them and the casing and thus form a temperature insulating space.

A driven shaft 12 is directly connected to the shaft or to the rotor of the turbine by means of a coupling (not shown) and is

journaled in a bearing 14, which is supported by a pedestal 15. The pedestal 15 is provided with a chamber 16, which is adapted to be connected with a lubricant circulating system of the turbine. A pipe 17 of the circulating system communicates with a passage 18 formed in the pedestal 15 and delivers lubricant, through a short passage 19 to the bearing 14; and after the lubricant has lubricated the bearing, it flows from the ends of the bearing into the chamber 16, below the bearing. Discharge pipes 21 communicate with each side of the chamber 16 near the bottom of the pedestal and deliver lubricant to interior chambers or passages formed within the pedestals 5. Both the pedestals 5 are hollow so that they may be completely filled with lubricant and they are each provided with a discharge pipe 22, which communicates with the interior chamber or passage near the top of the pedestal. The pipe 17 communicates with a source of lubricant supply so arranged that a constant flow of lubricant is maintained through the bearings and the chamber 16, in the pedestal 15, and the interior chambers of the pedestals 5. The pipes 22 communicate with a reservoir, which may also communicate with the source of supply. The pipes 22 communicate with the interiors of the pedestals 5 at such points that the pedestals will be maintained full of oil, and still not cause the oil to overflow the ends of the bearing 14.

The purpose of circulating lubricant through the pedestals is to maintain them at a constant temperature and also to equalize the temperature of the pedestals so that the alinement of the turbine shaft and the driven shaft will not be destroyed by changes of temperature ordinarily encountered. The reservoir from which the pipe 17 receives lubricant and to which the pipes 22 return the lubricant may be of such size as to maintain a substantially constant temperature; or means may be employed for cooling the lubricant delivered by the pipes 22 and, in this manner, maintaining it at a constant or substantially constant temperature. By proportioning the flow of oil through the lubricating system, it will be apparent that the pedestals may be maintained almost absolutely at a constant temperature, and consequently there will be little or no tendency for the turbine shaft to be thrown out of alinement with the driven shaft. In addition to this, any small variation of temperature which may occur in one pedestal will be communicated to all the pedestals by the circulating lubricant, and consequently will not produce injurious results.

It will be apparent that the pedestals at both ends of the turbine may be included in the lubricant circulating system and that the circulating system may be a portion of

the lubricating system of the turbine; or that any cooling liquid or medium may be employed in the pedestals and that it may be circulated independently of the lubricating system of the turbine.

Having thus described my invention, what I claim is:

1. In combination with the rotor of a turbine, a shaft coupled to the rotor, a supporting pedestal for said shaft, supporting pedestals for the turbine and means for maintaining said pedestals at an approximately equal temperature.
2. In combination with the rotor of a turbine, a shaft coupled to the rotor, supporting pedestals for the rotor, a supporting pedestal for said shaft and means for maintaining said pedestals at approximate constant temperatures.
3. In combination with the rotor of a turbine, a shaft coupled to the rotor, a supporting pedestal for the shaft, supporting pedestals for the rotor and means for equalizing the temperatures of said pedestals and for maintaining them at approximately equal temperatures.
4. In combination with a turbine and a shaft coupled to the turbine rotor, a bearing for the shaft, a bearing support provided with an interior chamber and a passage between said chamber and said bearing, independently formed supports for the turbine provided with interior chambers and a lubricator circulating system for delivering lubricant to the chambers provided in said supports.
5. In combination with a turbine, and a shaft coupled to the turbine rotor, a supporting pedestal for said shaft provided with an interior chamber, supporting pedestals for the turbine provided with interior chambers and means for circulating a cooling medium through said chambers.
6. In combination with the stationary casing of a turbine, flexible supports for the casing provided with interior passages and means for accommodating the longitudinal expansion of said casing.
7. The combination with the stator of a turbine, supporting pedestals therefor, a rotor bearing and a lubricating system connecting with passages in said pedestal for maintaining the temperature of said pedestals approximately constant.
8. In combination with a turbine rotor and its bearings, pedestals for supporting said bearings and provided with internal passages, and a lubricating system for said bearings arranged in fluid-conducting relation with the passages in said pedestals.
9. In combination with the stator of a turbine, a rotor, bearings therefor, a lubricating system, supporting pedestals provided with interior passages, and means for circulating the lubricant through said passages.

10. In combination with the stator of a turbine, independently formed supporting pedestals for said stator provided with cooling chambers, a rotor and its bearings, and
5 means for cooling the lubricant and circulating it through said chambers.

In testimony whereof, I have hereunto

subscribed my name this 29th day of August 1910.

FRANCIS HODGKINSON.

Witnesses:

C. W. McGHEE,
B. F. FUNK.