F. S. HITCHCOCK.

SELF ALINING BEARING.

APPLICATION FILED APR. 7, 1908.

1,042,114. Patented Oct. 22, 1912.

Fig. 1.

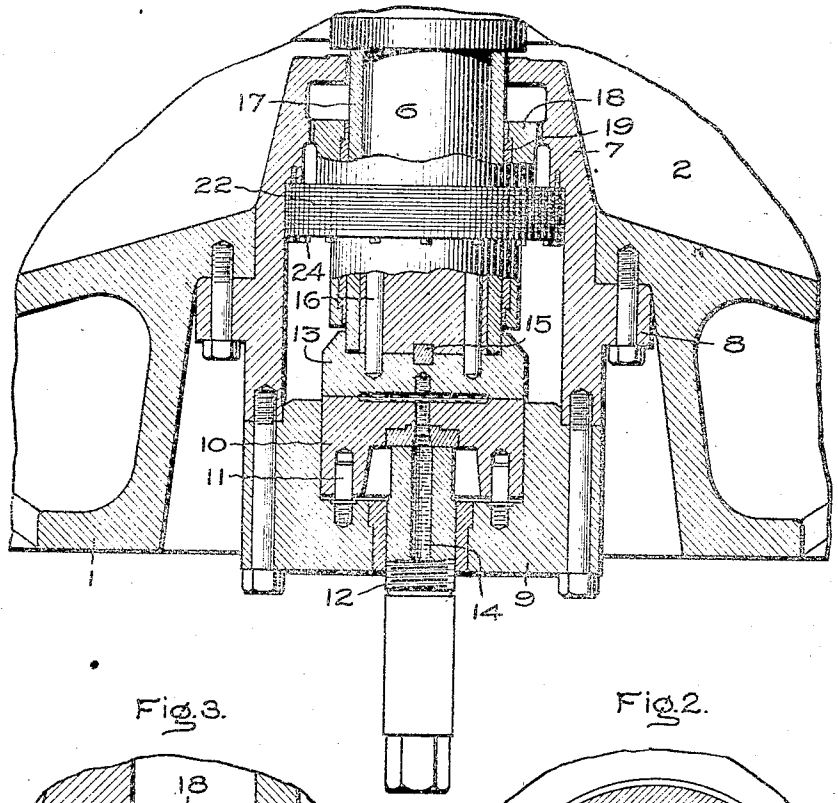



Fig. 3.

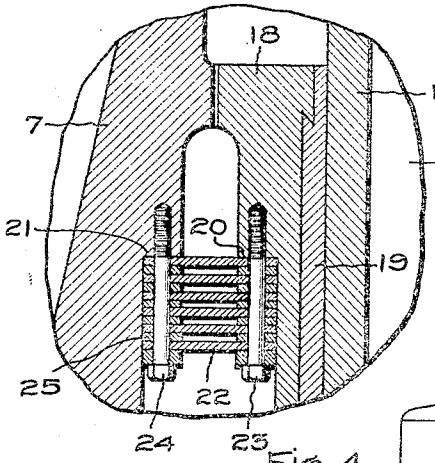



Fig. 2.

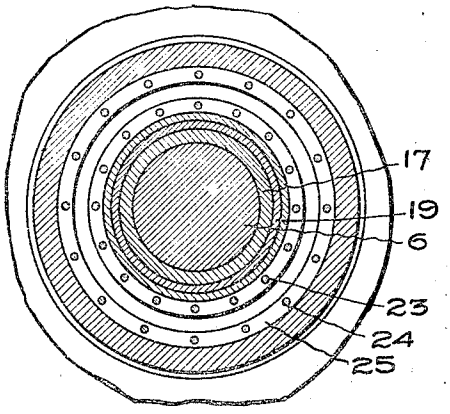
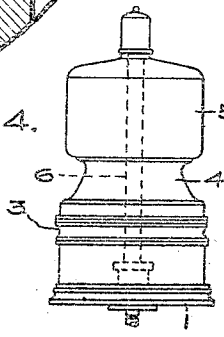



Fig. 4.




Witnesses:

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# UNITED STATES PATENT OFFICE.

FREDERICK S. HITCHCOCK, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## SELF-ALINING BEARING.

1,042,114. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed April 7, 1908. Serial No. 425,653.

*To all whom it may concern:*

Be it known that I, FREDERICK S. HITCHCOCK, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Self-Alining Bearings, of which the following is a specification.

The present invention relates to self-alining bearings, and more especially to those intended for use in elastic fluid turbines wherein the shaft speeds are relatively high, and where the tendency to distortion due to temperature changes is more or less great.

The object of my invention is to provide a suitable guide bearing which will yield slightly when the perpendicular relation of the shaft and some part of the wheel casing is disturbed, but which will hold the bearing as a whole rigidly against lateral motion.

In the accompanying drawing which illustrates one of the embodiments of my invention, Figure 1 is an axial section of a combined step and guide bearing for a vertical shaft elastic fluid turbine; Fig. 2 is a cross-section through the shaft and guide bearing; Fig. 3 is an enlarged detail view showing a part of the guide bearing in vertical section, and Fig. 4 is a view in elevation of a vertical shaft elastic fluid turbine and the generator driven thereby.

1 indicates the base of the machine which is provided with a chamber 2 that receives the exhaust from the bucket wheels located in the casing 3. Situated on top of the casing is a stool 4 that supports the generator 5.

6 indicates the vertical shaft which carries the bucket wheels and the rotating element of the generator.

The base 1 of the turbine is bored centrally to receive the housing 7, the latter being provided with a peripheral flange 8 by means of which it is secured to the base by bolts. The housing is provided with a lower head 9 in which is supported the lower step bearing block 10. This block is prevented from turning by pins 11. The position of the block can be adjusted by means of the adjusting screw 12, and lubricant is admitted to the chamber between the lower block and the upper block 13 by the conduit 14 formed in the adjusting screw. The upper block is cut out to receive the lower end of the shaft and the two are prevented from rotating independently of each other by the key 15 and the pins 16. Surrounding the shaft 6 and rotating with it is or may be a sleeve 17. This sleeve is located in a guide bearing 18 having a babbitt lining 19 and a peripheral shoulder 20. The housing 7 has an internal shoulder 21 and between it and the shoulder 20 is a plurality of disks 22 which are secured by sets of bolts 23 and 24. The disks are suitably spaced apart by distance pieces 25 which may take the form of washers, or they may be complete rings. In the first case the disks will only be supported adjacent to the bolts, while in the latter case the entire inner and outer portion of each disk will be supported. The disks 22 are preferably made of sheet steel or some other metal having the necessary strength and flexibility. These disks or laminations it will be seen form a flexible connector between the housing 7 and the guide bearing 18. Owing to the fact that each of these rings occupies a plane perpendicular to the shaft, it is evident that the bearing cannot be moved laterally or in a direction perpendicular to the shaft axis. On the other hand, since the rings forming the flexible connector are located approximately midway the length of the guide bearing and extend only a short distance in an axial direction, they will yield slightly if the base is distorted due to any cause, thus permitting the shaft to remain true and maintain its vertical position, and in so doing, reduce the tendency of the part to vibrate.

In a vertical shaft turbine if the base is not free from internal stresses, its lower wall carrying the bearing may warp or change its position slightly with changes in temperature, the latter being due to variations in load. By reason of my improved construction the effects of any such change are reduced to a minimum. My improved construction will also compensate for any change in the relation of parts which moves the upper end of the shaft slightly to one side of its normal position. It is to be understood that the relative change in position of the parts referred to is very small, but such as it is, it may cause serious damage to the machine unless provision is made to compensate for it.

The invention has been illustrated in connection with a vertical shaft turbine, but it may be employed in a horizontal shaft turbine or other machine wherein it is de-

sired to have a certain flexibility between the bearing and its support, the parts being so arranged however that the shaft is prevented from moving laterally under all conditions.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In combination, a guide bearing for a shaft, a housing therefor, a step bearing for the end of the shaft also carried by the housing, and a plurality of annular metal disks arranged perpendicular to the shaft, said disks being substantially rigid in a lateral direction with respect to the shaft and flexible in a longitudinal direction with respect thereto, and means for attaching the peripheral portions of the disks to said housing and the inner edges of the disks to the guide bearing, said disks forming the sole support for the guide bearing.

2. In combination, a supporting wall that is subjected to distortions due to temperature changes, a shouldered housing rigidly secured to the wall whose position is affected by said distortions, a bearing that surrounds the shaft and has a peripheral shoulder, thin annular metal disks that are substantially rigid in a lateral direction and are seated on the shoulders on the housing and on the bearing and occupy planes perpendicular to the shaft axis, said disks forming the sole support of the guide bearing, means for attaching the disks to said shoulders, and a step bearing for the end of the shaft that is rigidly secured to the housing and is affected by the distortions of said supporting wall.

In witness whereof, I have hereunto set my hand this fourth day of April, 1908.

FREDERICK S. HITCHCOCK.

Witnesses:

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