"Axial Clearance" Labyrinth Seal

Figure 1 shows an "axial clearance" type of labyrinth seal in which the close running clearance is in an axial direction instead of radial. This construction permits closer running clearances and thereby decreases the tip leakage which is of great importance in turbines using high pressure steam. Furthermore, by using our thrust bearing equipped with the adjusting mechanism which allows axial movement of the rotor, these running clearances can be increased temporarily during the starting and stopping periods, thus greatly decreasing the possibility of rubs due to unequal temperature changes of the rotating and stationary parts. Consequently, this type of seal is used when justified by the steam conditions.

The arrangement shown in the illustration is commonly called the double strip type, in that two strips are secured in the same groove by a single locking strip. The seal strips are secured in the seal strip rings, and the rings, in turn, are secured in the turbine cylinder. The illustration shows two rings, each containing four complete seal strips. However, the number of rings used can be varied according to the number of seal strips required. By this arrangement, it is possible to get a greater number of seals in a given length and thus shorten the turbine. These seal strips are rolled angles (or L sections). They are bent to the proper radius and held in the grooves by the soft steel locking strips which are rolled into the grooves. The seal strip rings are inserted in grooves and secured by shoulder type caulking pieces driven into place. This construction is shown clearly in the Figure. The seal strips, locking strips and seal strip rings are made in half-rings. The shoulder type caulking pieces are made in short segments.

In order that this "axial clearance" principle can be most effective, it is necessary that the clearance between the strips and adjacent rotor lands be made the same throughout the entire seal, so that the strips in one ring will not make contact while those in another ring are still separated by an undetermined clearance. This equalization of clearances throughout the turbine is obtained by grinding the seal strips, by actual rubbing contact, with the machine in operation. After this grinding is completed, the desired running clearance can be obtained by means of the thrust bearing adjustment.

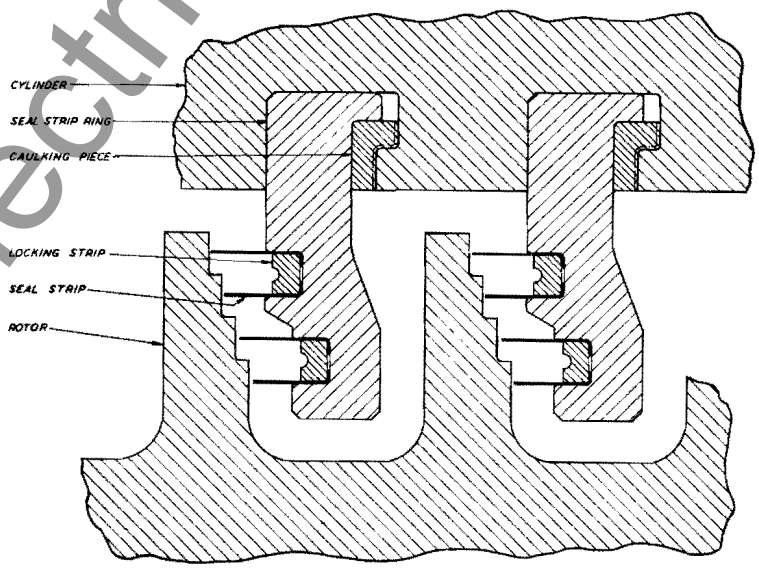

Fig. 1

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