

Journal Bearing and Thrust Bearing

Figure 1 shows the inlet end journal bearing, the thrust bearing and the bearing pedestal.

JOURNAL BEARING

The journal bearing consists of a shell, split horizontally to facilitate dismantling and assembly and lined with tin base babbitt. It is bored to give the proper clearance as given on the "Rotor Clearance" drawing and is grooved to provide proper lubrication, not only for itself but for the thrust bearing as well. This bearing operates equally well with either of two types of lubrication; namely, ring oiled or pressure circulation.

When used on units which require an oil pump for other purposes, such as valve operation or gear lubrication, the bearing is lubricated by a pressure circulating system. This is the arrangement shown in the illustration. Oil is supplied by the main pump and enters the bearing at the top. That passing out at the end of the bearing, is thrown radially by the revolving ring "11" into the guide formed on the end of the bearing shell, whence it is drained through holes in the bottom into the drain chamber.

During the starting and stopping periods, when the pressure delivered by the main pump is not sufficient to supply the bearings, lubrication is provided by the conventional type of revolving ring, shown as item "13". The bottom of the ring dips in oil in the ring cavity and carries it to the top of the journal. The oil ring cavity is automatically kept full of oil from the pressure circulating system after the unit has once been operated. This cavity should be filled with oil prior to starting the first time after installation and after an overhaul or repair.

When used on units which are not equipped with an oil pump, the bearing is ring oiled at all times. In such cases a hole is drilled through the bottom of the ring cavity connecting it to the main chamber of the bearing pedestal which serves as a reservoir. The oil inlet and drain openings (shown in the illustration) are plugged and an oil filling and level gauge fitting is provided on the side of the pedestal. The oil level in the pedestal should be maintained at the height indicated by the filling fitting.

Needless to say, on units which are equipped with pressure circulating systems and auxiliary oil pumps, the ring oiled feature is of no consequence. In such cases the revolving oil rings may be omitted.

The illustration shows water cooling chambers cast in the pedestal just below the oil chamber. This water cooling feature is used only when required by the operating conditions and in some bearings, the water chambers are omitted. When used, connections are provided for the circulation of cooling water. The flow may be in either direction and the quantity used will depend upon the temperature of the water and the results desired.

THRUST BEARING

Axial movement of the rotor toward the exhaust end is restrained by a Kingsbury bearing of the two shoe, leveling ring type, which automatically distributes the load on the shoes or segments. These segments are supported on the leveling ring, which by means of its rocking motion, allows the segments to take a position so that the babbitted faces are in the same vertical plane. Consequently, each segment takes an equal share of the load.

Journal Bearing and Thrust Bearing

The thrust of the rotor is transmitted to the babbitted segment by means of the collar which, in this case is the overspeed trip body. This body is keyed on the rotor shaft and further secured by a nut. The segments "19" and the leveling ring "18" are carried in the cage which is a part of the journal bearing shell.

Axial movement of the rotor toward the inlet end is restrained by the collar "11" on the shaft riding against a babbitted face on the end of the journal bearing. The collar "11" is prevented from rotating relative to the shaft by means of a pin "9" and sleeve "8" which is secured to the shaft by a set screw.

The total clearance between the thrust collars and the babbitted faces, that is, the axial clearance (or end play) should be between .007 and .010 of an inch. This clearance can be adjusted by varying the thickness of the shims "16". Increasing the thickness of the shims decreases the clearance. Decreasing the thickness of the shims increases the clearance.

The axial position of the rotor with respect to the cylinder can be adjusted by varying the thickness of shims "6" and "16". The rotor should be located axially so that the stationary impulse blades are central between the first and second rotating rows when the rotor is pushed toward the exhaust end as far as it will go. Increasing shims "16" and decreasing shims "6" moves the rotor toward the inlet end. Conversely, decreasing shims "16" and increasing shims "6" moves the rotor toward the exhaust end. When making this adjustment, the thickness of one set of shims must be changed exactly the same amount as the other set so that the thrust clearance adjustment (described in the paragraph above) will not be changed.

The thrust bearing is lubricated by oil supplied directly from the inlet chamber through passages drilled in the lower half of the bearing shell and also by the oil which passes out the end of the journal bearing. A vent is provided, as shown in the illustration, to eliminate any accumulation of air. Leakage from the thrust bearing is reduced to a minimum by seal strips "17" which are carried in the overspeed trip body, and the bearing is therefore partially flooded in oil at all times.

These seals consist of very thin flat strips and are held in place by soft steel caulking strips which are rolled into grooves. These grooves are slightly dovetailed to give the caulking strips a greater holding power. The strips are removable and can be renewed if the clearance between them and the thrust bearing cage becomes excessive. The clearance requirements are given on the "Rotor Clearance Drawing".

The following list has been compiled to facilitate ordering spare or renewal parts by name and number, together with the serial number of the turbine:

<u>Item</u> <u>No.</u>	<u>Name</u>	<u>Item</u> <u>No.</u>	<u>Name</u>
1	Water Chamber Cover Tap Bolt	12	Bearing (Upper Half)
2	Water Chamber Cover	13	Oil Ring
3	Gasket	14	Bearing Stop Pin
4	Bearing Pedestal (Lower Half)	15	Thrust Bearing Plate
5	Bearing (Lower Half)	16	Thrust Bearing Shims
6	Thrust Collar Shims	17	Thrust Bearing Plate
7	Shaft Thrust Sleeve Set Screw	18	Thrust Bearing Leveling Ring
8	Shaft Thrust Sleeve	19	Thrust Bearing Segment
9	Shaft Thrust Sleeve Pin	20	Seal Strip
10	Bearing Cover	21	Thrust Bearing Segment Disc
11	Thrust Collar	22	Thrust Bearing Segment Disc Seat

Journal Bearing and Thrust Bearing

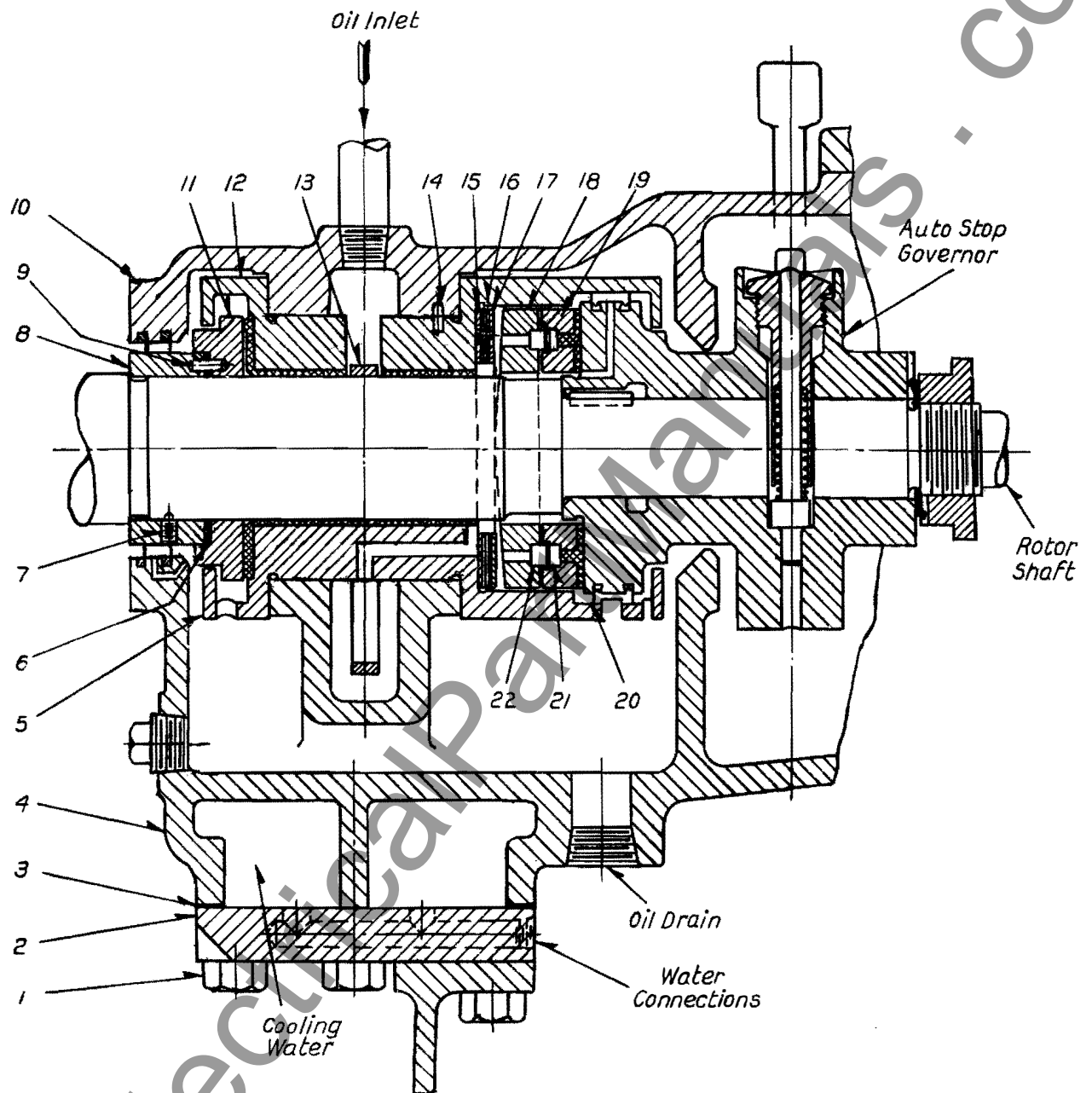


Fig. 1 - Journal Bearing and Thrust Bearing