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 and drilled so as 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 ends is thrown radially by the revolving collars "5" and "16" into the guide formed by the ends 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 "18". 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 connections are plugged, and an oil filling and level gage 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.

Leakage of condensation from the gland into the bearing is prevented by the shaft thrower "8". The thrower shown in the illustration is a separate ring secured on the shaft by a set screw. Whenever practical, it is machined integrally with the shaft.

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 shoes are supported on the leveling ring which, by means of its rocking motion, allows the shoes to take a position so that the babbitted faces are in the same vertical plane. Consequently each shoe takes an equal share of the load.

The thrust of the rotor is transmitted to the babbitted shoes 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 shoes "16" and leveling ring "15" 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 thrust collar "5" on the shaft riding against a two shoe Kingsbury bearing similar to that described above. The collar is prevented from rotating relative to the shaft by means of a feather key and thrower "8" which is secured to the shaft.

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 "14". 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 casing can be adjusted by varying the thickness of the shims "5" and "14". 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 "14" and decreasing shims "5" moves the rotor toward the inlet end. Conversely, decreasing shims "14" and increasing shims "5" 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. Leakage from the thrust bearing is reduced to a minimum by seal strips "17" which are carried in the thrust collars, 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 locking strips which are rolled into grooves. These grooves are slightly dovetailed to give the locking 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:

Item No.	Name
1	Bearing Pedestal (Lower Half)
2	Bearing (Lower Half)
3	Oil Seal Ring Complete
4	Thrust Bearing Shoe
5	Thrust Collar
6	Thrust Collar Shims
7	Thrust Bearing Leveling Ring
8	Shaft Water Thrower
9	Bearing (Upper Half)
10	Bearing Pedestal Cover
11	Thrust Bearing Overflow Pipe
12	Thrust Bearing Leveling Ring Pin
13	Bearing Stop Pin
14	Thrust Bearing Plates and Shims Complete
15	Thrust Bearing Leveling Ring (Inlet End)
16	Thrust Bearing Shoe (Inlet End)
17	Thrust Bearing Seal Strips
18	Oil Ring (For Journal Lubrication)
19	Thrust Bearing Shoe Disc Seat
20	Thrust Bearing Bearing Shoe Disc

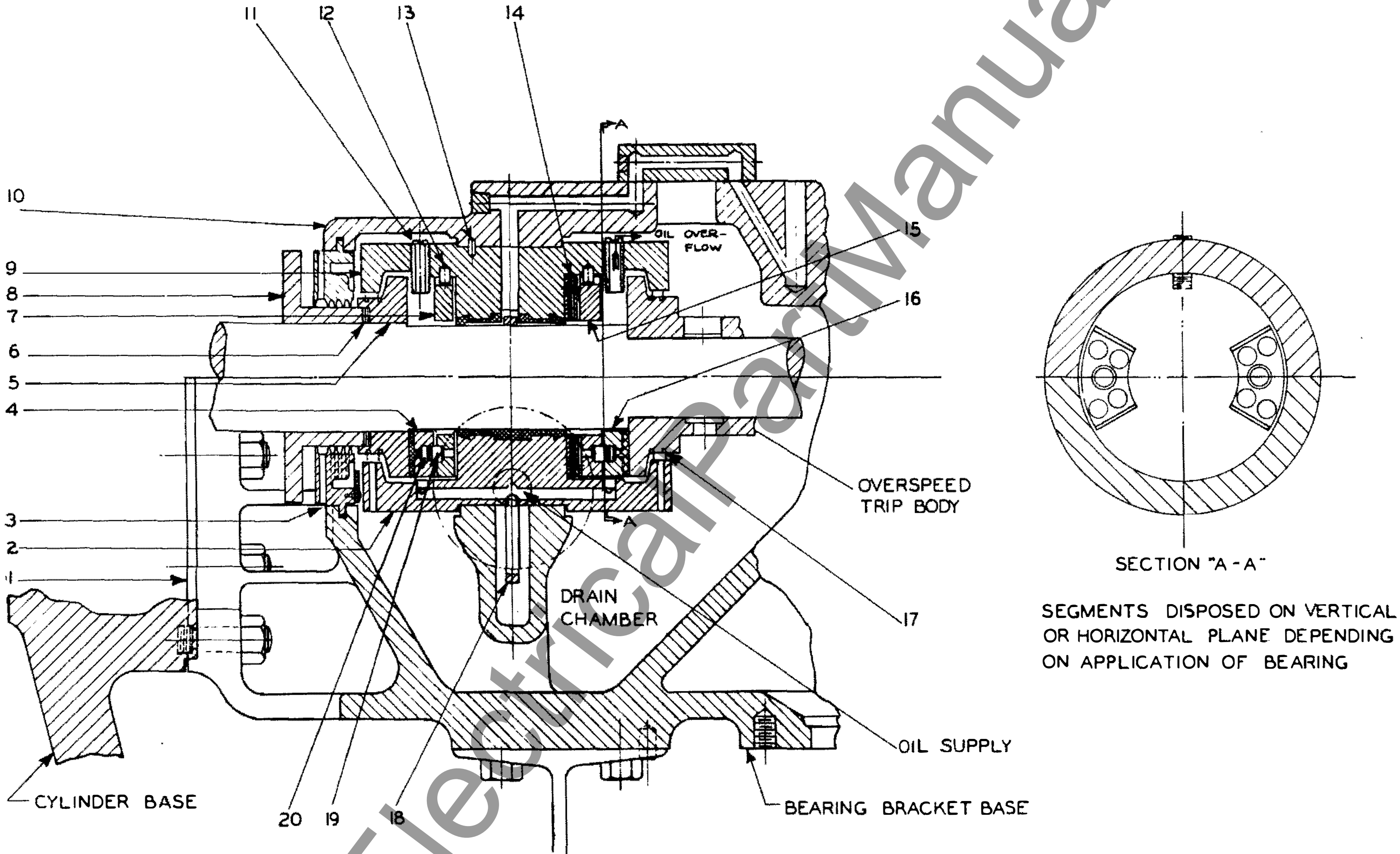
11
12
13
14
10
9
8
7
6
5
4
3
2
1
OIL OVER-FLOW
15
16
A
OVERSPEED TRIP BODY
17
DRAIN CHAMBER
OIL SUPPLY
CYLINDER BASE
20
19
18
BEARING BRACKET BASE
SECTION "A-A"
SEGMENTS DISPOSED ON VERTICAL OR HORIZONTAL PLANE DEPENDING ON APPLICATION OF BEARING

Figure 1