REACTION BLADING

(LOW PRESSURE)

Figure 1 shows an arrangement of shrouded, low pressure reaction blading with sealing details by means of which small running clearances are maintained in the radial direction.

The rotating blades are drop forged and are attached to the rotor by either the "Side entry" (buttress thread) or the "Straddle T-root" type of fastening. Both types are shown in the illustration. In either case, the blade bases are accurately machined to fit against the adjacent blades and to provide the correct blade spacing.

For the buttress thread fastening, the front and back faces of blade roots are curved and are machined with grooves which resemble a buttress thread. The rotors are machined in the form of discs, each disc carrying one row of blades, and the outer periphery of each disc is machined with grooves, approximately axial, corresponding to those on the blade roots. The blades are assembled in these grooves from the sides of the rotor disc. They are held against the top of the grooves by half-round segments caulked in place at the bottom, and are held against any axial movement by suitable locking segments fitted in off-set grooves machined in the side of the disc near the lower extremity of the blade roots.

The straddle T fastening consists of either a single or a double T-root with lugs machined on the blade shank which straddle and hold in the sides of the rotor groove, thus resisting the tendency of the blade pull to spread the groove. These blades, likewise, are held against the top of the groove by half round sections caulked in place at the bottom.

On the large, low pressure blades where lashing, in addition to the shroud, is used, the lashing wires are made in short segments of sufficient length to fit between two blades. These segments are then welded to the blades.

The stationary blades are either cast or forged without roots, and are trimmed and ground to the required accuracy. These plain blade sections are then arranged in groups of six to ten and a base is cast on to each group. These base sections are held in the cylinder grooves by a T-root fastening and are further secured by an off-set packing strip at the side.

Each row of blades is shrouded with a shroud strip fitted over tenions on the ends of the blades and are arc welded in place. Each blade shroud forms a close radial clearance with seal strips as shown. These seals consist of very thin flat strips and are held in place in the cylinder (or rotor) by soft steel locking strips which are rolled into the grooves. The strips, being very thin, permit running with close clearances without serious consequences in case of a rub.

These seal strips are removable and can be renewed if the clearances between them and the corresponding blade shrouds become excessive. The clearances desired for normal operation are given on the "Rotor Clearance Drawing" for each turbine.

When justified by the moisture content of the steam and the blade speed, the blades in the last rotating rows are shielded on the inlet edges with stellite strips to protect them against erosion. In addition, moisture removal troughs are provided for the purpose of extracting moisture from the steam path in the low pressure zones. These troughs are formed in the stationary blade roots as shown in the illustration. The water collected by them is drained either into the condenser or into a suitable condensate heater.

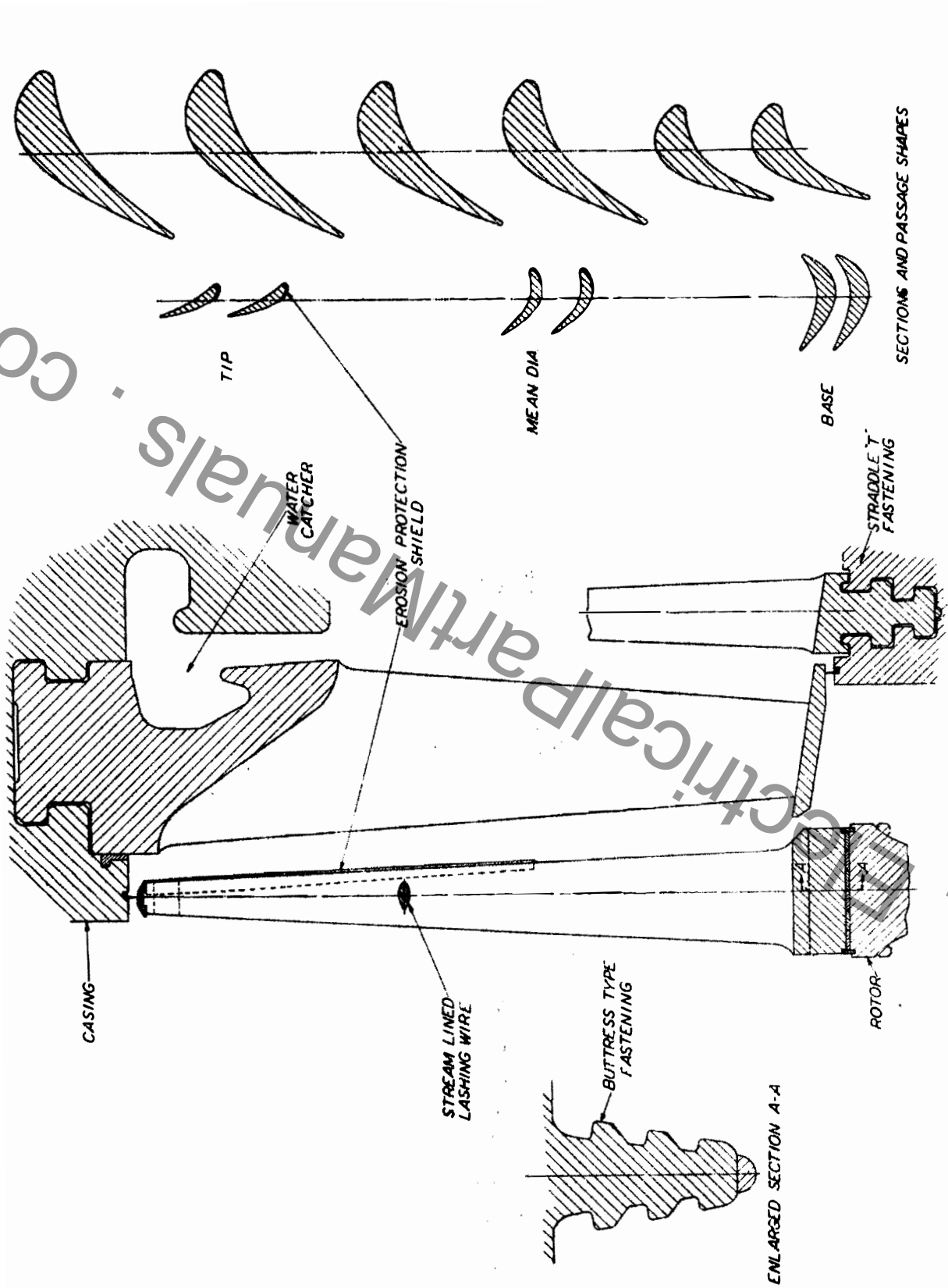

Figure 1