EXTRACTION VALVES

The function of the extraction valve is to control the flow of steam toward the exhaust, thus maintaining in the cylinder zone on the high pressure side of the extraction valve, that pressure which is desired in the extraction system. Figure 1 shows the plug type, multi-valve arrangement used in conjunction with a solid diaphragm in the cylinder. The diaphragm forms a labyrinth seal around the rotor to reduce leakage to a minimum and a hole is provided in the lower half of the diaphragm to pass sufficient steam to insure proper cooling of the low pressure blading when the extraction valves close. The valve body is cast integrally with the cylinder cover and contains suitable cored passages through which the steam enters from the turbine cylinder and that portion which is not required by the extraction system is led through the extraction valves back to the turbine on the low pressure side of the diaphragm.

The valves are arranged in parallel within the body, that is, all valves are surrounded with steam at approximately extraction pressure. These valves are of the single seated plug type. The seats are pressed into the body and can be replaced if necessary. The extraction valve servo-motor raises and lowers the valve bar "18" keeping it perfectly horizontal at all times. The bar, in turn, lifts the valves by engaging the adjusting nuts "17". As shown in the illustration, the adjusting nuts are threaded on the valves and hence the point at which each valve opens and the amount of opening can be varied by means of these nuts. There is an unbalanced steam force tending to close the valves, but in addition, a positive closing force is obtained by the lower edge of the bar "18" engaging the lower shoulder on each valve.

The valve bar stem packing consists of two closely fitting bushings "2" and "5" with suitable leakoff openings.

An additional positive closing force is exerted by the unbalanced steam force on the valve bar stems "1". Steam at full throttle pressure is introduced between the stem bushings which subjects the annular area of the valve stem (above the lower bushing) to full throttle pressure while the bottom of the stem is subject to the extraction steam pressure. Two leakoffs are provided from the upper bushing. The lower one is led through internal passages to the extraction zone. The upper one should be led to a point at atmospheric pressure where a small amount of escaping steam is not objectionable.

The two valve bar stems are connected to the extraction valve servo-motor rockshaft by coupling nuts and links. This construction gives ample flexibility to allow the stems to maintain correct alignment throughout the entire stroke of the mechanism.

With the operating levers fulcrumed as shown, it is obvious that downward movement of the extraction valve servo-motor piston closes the valves and upward movement of the piston opens them.

As stated above, the illustration shows a typical arrangement in which the first valve is in the center, and the sixth and seventh on the ends. However, the number of valves and the position of each in the chest may vary to suit different steam and load conditions. For each particular turbine, there is an "Extraction Valve Setting Diagram" which shows the correct valve locations and the dimensions for setting the valve adjusting nuts "17" to obtain the proper sequence of opening. A print of this diagram will be found in the instruction book for each unit.

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

Item No.	Name of Part
1	Valve Bar Stem
2	Valve Bar Stem Bushing (Lower)
3	Valve Body Cover
4	Valve Bar Stem Bushing Sleeve
5	Valve Bar Stem Bushing (Upper)
6	Valve Bar Stem Bushing Retainer
7	Valve Bar Stem Nut
8	Valve Bar Stem Operating Lever
9	Valve Bar Stem Operating Lever Bearing Cap
10	Valve Bar Stem Operating Lever Bearing Bracket
11	Valve Bar Stem Operating Lever Link (In Pairs)
12	Valve Bar Stem Operating Lever Bearing (Complete) (In Halves)
13	Valve Bar Stem Operating Lever Link Bushing (In Pairs)
14	Valve Bar Operating Lever Bushing
15	Valve Bar Stem Operating Lever Link Pin
16	Valve Adjusting Nut
17	Valve Adjusting Nut Locknut
18	Valve Bar
19	Valve Seat
20	Valve
21	Valve Seat
22	Valve
23	Valve Seat
24	Valve
25	Valve Seat
26	Valve
27	Valve Seat
28	Valve
29	Valve Seat
30	Valve
31	Valve Seat
32	Valve

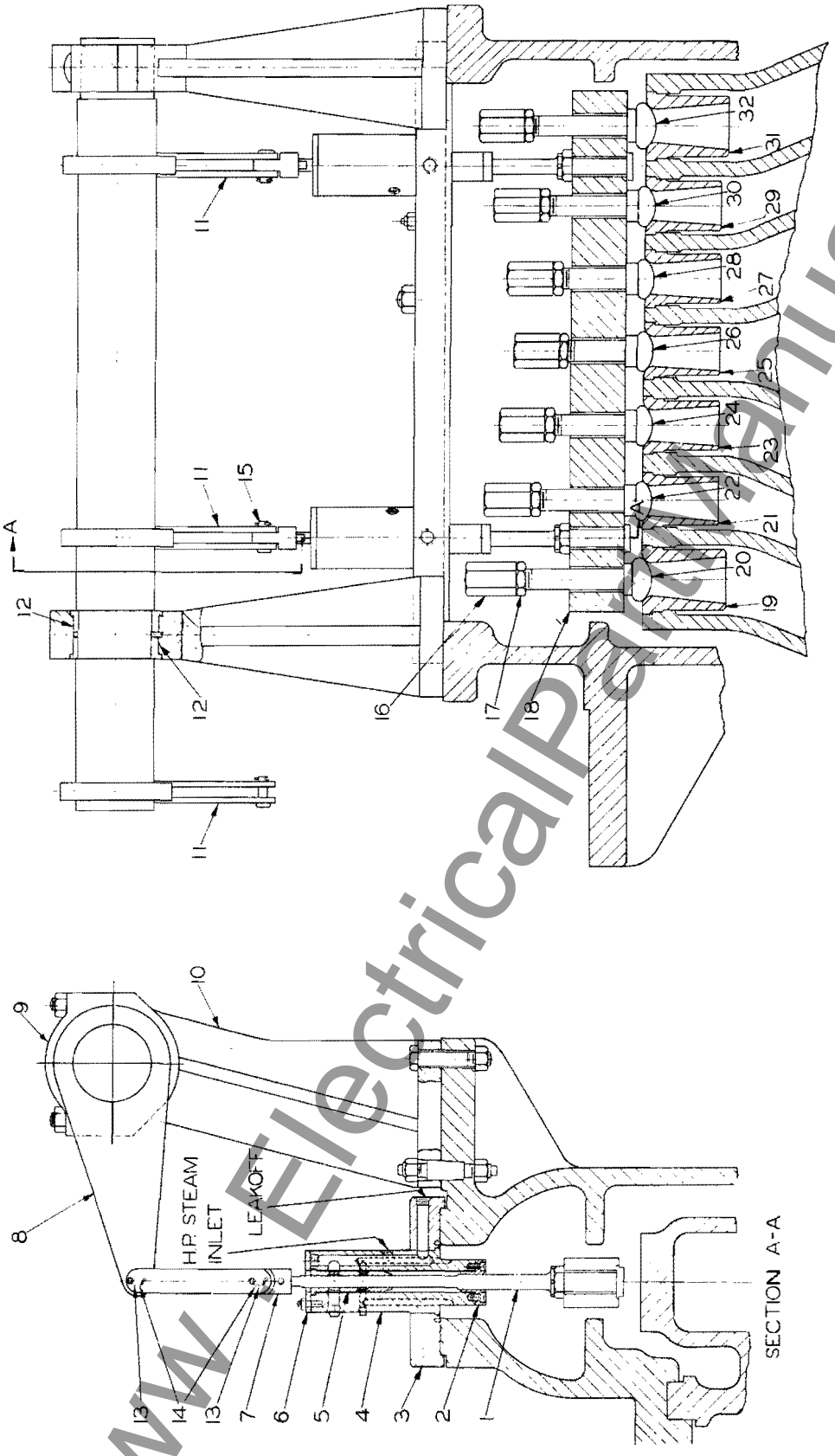

Figure 1