Auxiliary Oil Pump

Figure 1 shows the turbine driven, centrifugal type auxiliary pump which is used to supply oil (or any other fluid used for lubrication or valve operation) to the system during the starting and stopping periods when the pressure delivered by the main pump is too low for the requirements of the turbine. It will also start automatically at any time when the main turbine is running, if the oil pressure in the system drops below the predetermined point for which the regulator is set.

The unit, as shown in the illustration, is designed for mounting on the oil reservoir so that the pump impeller is always below the minimum oil level. This arrangement insures a positive suction head and eliminates the necessity of priming the pump.

The pump impeller is keyed on the lower end of the shaft "15" and further secured by the nut "9". Leakage from the discharge side back to the suction is limited to a minimum by labyrinth seals machined on the impeller hubs so as to form close clearances with the body "5" on one side and the cover liner "11" on the other side. The sheet metal screen "8" is used to protect the impeller against debris.

The pump is driven by a small impulse turbine having two rows of rotating blades. The rotor disc "28" is keyed to the upper end of the shaft "15" by the key "30" and further secured by the nut "29". The rotating blades "32" and "33" are carried in grooves cut in the periphery of the disc and the stationary or reversing blades "27" are held in grooves in the blade holder "22", which in turn is bolted to the casing "19". Steam leakage from the turbine casing along the shaft is limited to a minimum by the gland packing "36" which is of the conventional carbon ring type. Any steam or water that does leak past the packing is thrown outward by the thrower "37" and is removed by means of a drain which discharges to atmosphere.

The entire rotating element is carried by a thrust bearing and two shaft bearings. The thrust bearing consists of the collar "2" which is pinned to the shaft, running against the babbitt-faced disc "3". The two shaft bearings are of the straight, babbitt-lined type. The upper one has a split shell, while the lower one is a plain sleeve type. Both bearings are lubricated by oil supplied from the pump discharge chamber. The connection to the upper bearing is made by means of an external pipe with an orifice to limit the flow to the desired amount. The thrust and lower bearings are supplied through drilled passages.

The steam flow to the turbine, and hence the speed of the pump, is controlled automatically by a separate regulator (or governor). This regulator is actuated by oil pressure from the bearing oil supply line. A steam by-pass around the regulator is provided so the pump can be operated in cases of emergency if the regulator fails to function.

The turbine exhaust steam should be led to a point at atmospheric pressure and the piping arranged so the exhaust pressure at the turbine will not in any case exceed 5 lbs. gauge. Both the steam inlet and the exhaust pipe lines should be drained continuously to eliminate any accumulation of water. This is of utmost importance, in order to insure quick starting of the pump in case of an emergency. The elimination of water in the inlet steam will also greatly prolong the life of the pump regulator valve, turbine nozzles, etc.

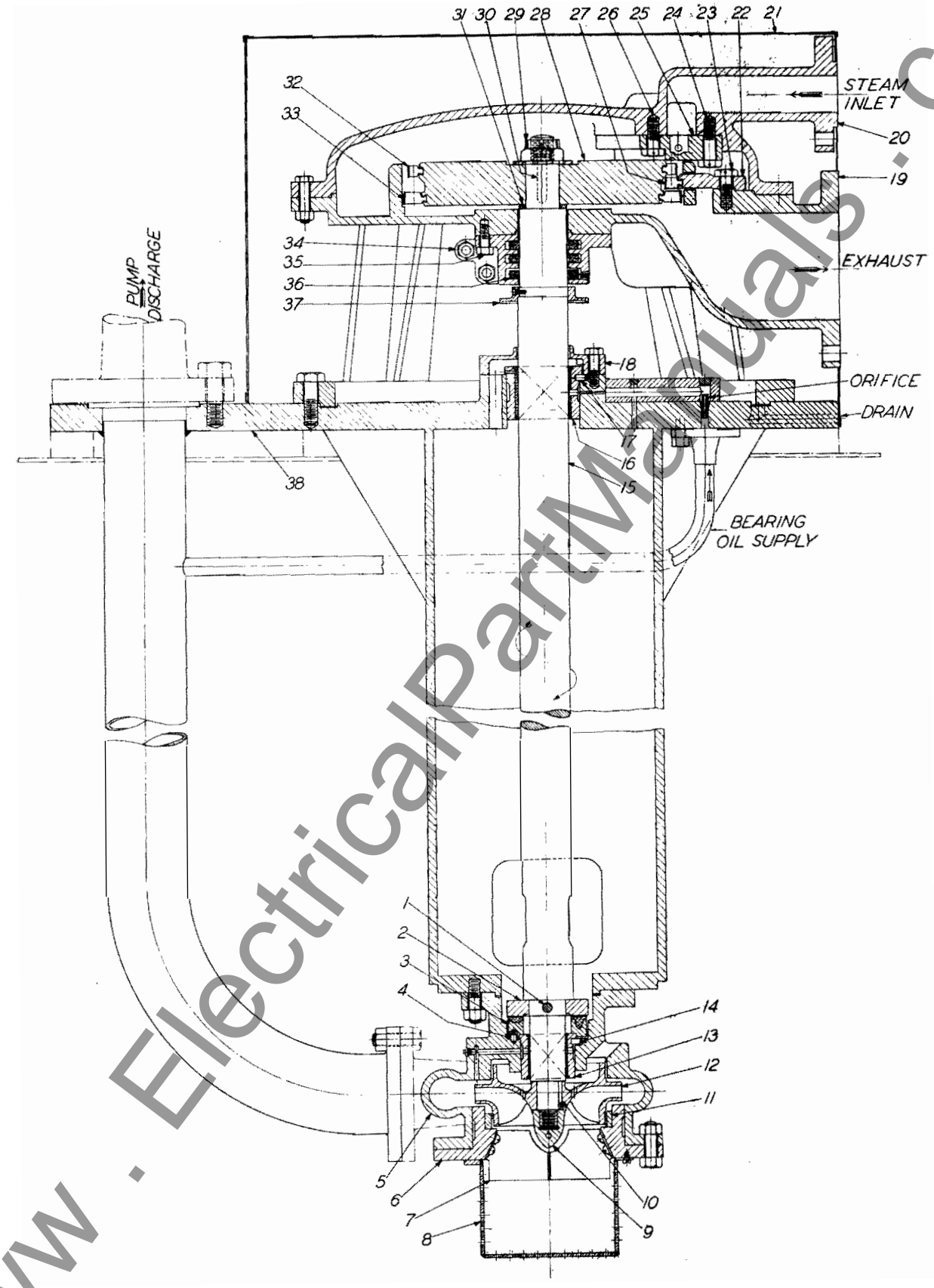

Fig. 1 - Auxiliary Oil Pump Assembly

The following list has been compiled for convenience in ordering spare and renewal parts by item number and name, together with the serial number of the turbine:

Item No.	Name
1	Pump Thrust Bearing Collar Pin
2	Pump Thrust Bearing Collar
3	Pump Thrust Bearing Disc
4	Pump Thrust Bearing Disc Pin
5	Pump Body
6	Pump Impeller Cover
7	Pump Impeller Suction Guide
8	Pump Impeller Screen
9	Pump Impeller Nut
10	Pump Impeller Key
11	Pump Impeller Cover Liner
12	Pump Impeller
13	Pump Shaft Bearing (Lower)
14	Pump Shaft Bearing Pin
15	Turbine and Pump Shaft
16	Turbine Shaft Bearing (Upper) (In Halves)
17	Turbine Shaft Bearing Pin
18	Turbine Shaft Bearing Oil Guard
19	Turbine Exhaust Casing
20	Turbine Inlet Casing
21	Turbine Casing Lagging
22	Turbine Stationary Blade Holder
23	Turbine Stationary Blade Holder Tap Bolt
24	Turbine Nozzle Block Tap Bolt
25	Turbine Nozzle Block
26	Turbine Nozzle Block Tap Bolt
27	Turbine Stationary Blades
28	Turbine Rotor
29	Turbine Rotor Nut
30	Turbine Rotor Key
31	Turbine Rotor Spacer
32	Turbine Rotor Blades (1st Rotating Row)
33	Turbine Rotor Blades (2nd Rotating Row)
34	Turbine Shaft Gland Case (Complete)
35	Turbine Shaft Gland Case Tap Bolt
36	Turbine Shaft Gland Packing Ring (Complete)
37	Turbine Shaft Thrower
38	Turbine and Pump Support

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