

ELECTRIC PROPULSION IN WARSHIPS.

One of the most revolutionary propelling machinery developments introduced into H.M. navy since the outbreak of hostilities is that installed in the U.S.-designed destroyer escorts, known as the Captains Class frigates. Five different types of propelling machinery are fitted in U.S. vessels of the class, but only two, the turbo-electric and diesel-electric types, are supplied to the Royal Navy.

Turbo-Electric Type.

The propelling machinery develops a total of 12,000 H.P. on two shafts. Steam at 450 lbs. per sq. in. and 740° F. is supplied by two Foster Wheeler Express boilers arranged in separate boiler rooms as shown in Fig. 1. Main steam cross connections are provided so that either boiler can supply steam to one or both units. A boiler overload of 20% is permissible, so that on one boiler both shafts can develop 60% of full power.

In each engine room a main propulsion motor and its associated turbo generator are installed. The turbo generator running at 5,000 r.p.m. supplies current at 2,700 volts. A.C. The main propulsion motor at full speed runs at 400 r.p.m. No turbo-generator overload is provided so that no increase in power is permissible should one generator be out of action.

Steam to the auxiliaries is supplied from a desuperheated line at full boiler pressure, while a reduced pressure of 150 lbs. per sq. in. desuperheated, supplies ship's services through reducing valves.

Once ships' companies and maintenance staffs become familiar with the installation of these ships, little trouble is experienced.

Diesel-Electric Type.

In this design the machinery arrangement is also of the two shaft type, but the total S.H.P. developed is 6,000.

The machinery consists of two units, each comprising two General Motors 16-cylinder Model 16-278A diesel engines driving D.C. generators. The generators in each unit supply power to two D.C. motors arranged in tandem driving a main propeller shaft. As may be seen from Fig. 2, the machinery is arranged in four compartments, two containing the diesel engines and the other two the generators and main propulsion motors.

The generators each develop 1,200 K.W. at 750 r.p.m. maximum, the motors 1,500 H.P. each at 600 r.p.m., pressure is 525 volts.

Ship's lighting and power for auxiliaries is supplied by two 8-cylinder 200 K.W. 450 volt. A.C. General Motors Model 8-268A diesel generators, one being arranged in each Diesel room. A 40 K.W. D.C. generator is also coupled to the auxiliary diesel engine. A 3-cylinder 100 K.W. A.C. generator for harbour services but without D.C. generator is provided in No. 1 Diesel room while a similar machine arranged for automatic starting for use in the event of a total power failure is installed in No. 2 Motor room.

Steam for the evaporator, heating and domestic services, is provided by two cylindrical return-tube, oil-fired auxiliary boilers automatically controlled. Each has an output of 2,600 lb. steam per hour at 100 lb. per sq. in.

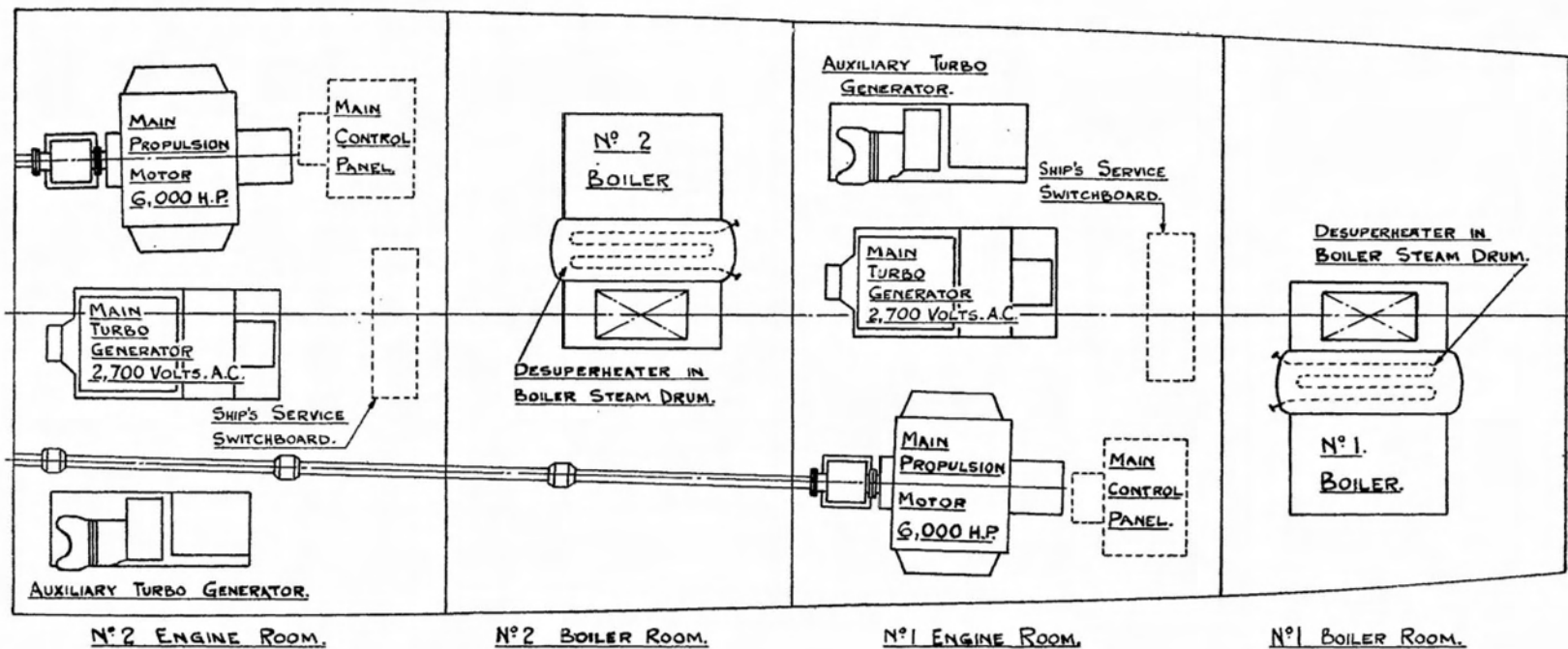


FIG. 1.—LAYOUT OF TURBO ELECTRIC MACHINERY IN 'CAPTAINS' CLASS FRIGATE.

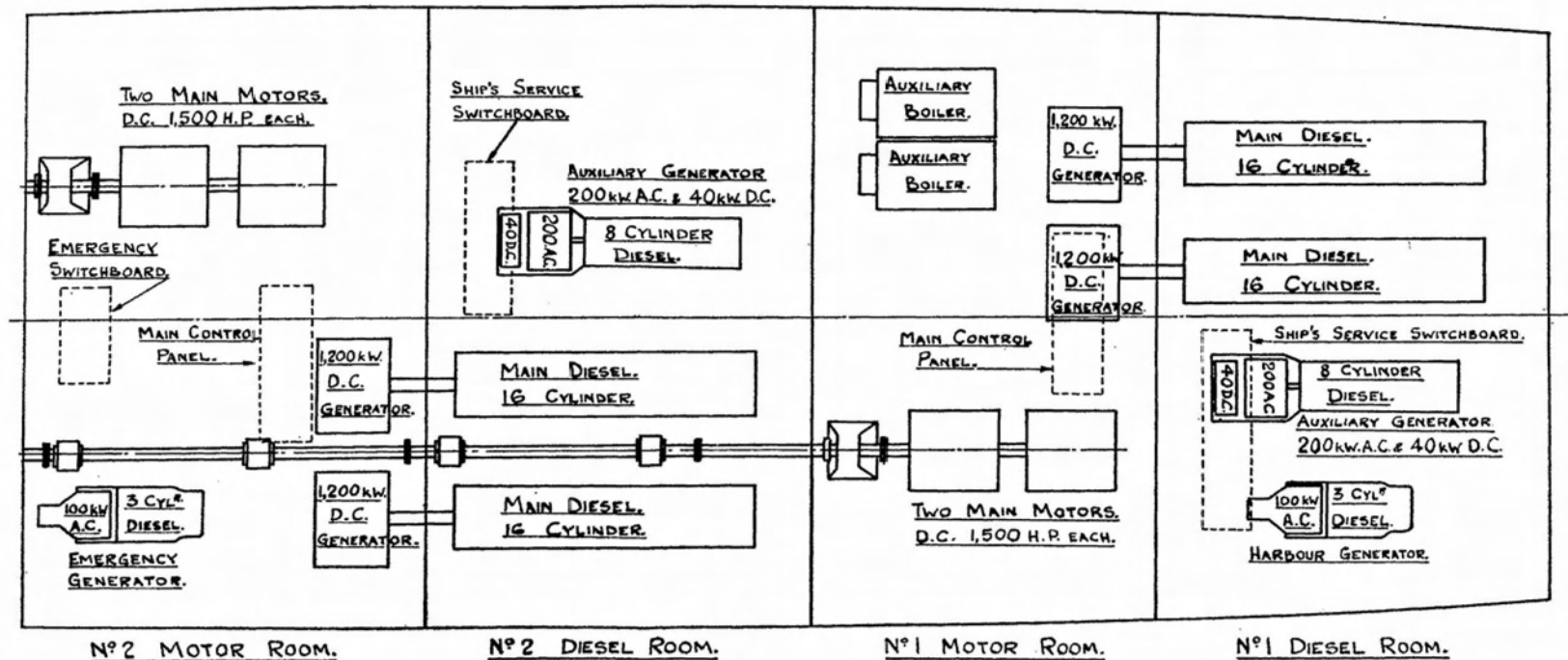


FIG. 2.—ARRANGEMENT OF DIESEL-ELECTRIC MACHINERY.

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