

b. Constant temperature :

Since temperature at each point in the cycle can be maintained constant without regard to the load, the high efficiency achieved at full load can be attained even at partial loads down to approximately 30% of full load.

Also, at no load, the closed cycle type has low thermal consumption rate.

c. Abundant Fuel

Among the natural fuel resources in Japan, only coal is found relatively abundant and the fact that most prime movers in steam power plants must depend on coal for operation presents a meaning of great importance. In this point, it is in favor of the closed-cycle gas turbine because any source of heat energy, such as gaseous, liquid or solid fuels can be used.

d. Simplicity in mechanism :

As stated above, since the temperature at each point is maintained uniform, control is obtained simply by raising or lowering the level pressure of the cycle. There is no need for the use of a control valve in the high temperature points as is found in the steam turbine and the control is maintained by a simple operation of limiting the highly

compressed air flow. Although operating at high temperature, the safety of the gas turbine unit is no less if not better than that of steam power unit.

e. Cleanliness of the cycle :

Since the air used as the working fluid is completely cut-off from the outside, there is no contamination caused by dust in the atmosphere or by the combustion products. Also, since the working fluid has no corrosive properties as are present in fuel gases, there is no need for disassembling and cleaning the inside of the apparatus, and as a result, continuous operation can be maintained without reduction in efficiency.

III-3. 2,000 kW GAS-TURBINE UNIT

The principle and design of the closed-cycle gas turbine, manufactured in our Kawasaki Factory have already been published in detail in Vol. 2, No. 3 of this magazine. This unit which is to be installed at Toyotomi Power Plant of the Hokkaido Electric Power Company, has a turbine inlet temperature of 660°C, level cycle pressure of 8 ata and 2,000 kW output at the generator terminal.

IV. DIESEL ENGINES

The Fuji Diesel Engines are manufactured by the Fuji Diesel Company Ltd. (old name : Tateyama Seisakusho Company Ltd.)

The works was founded as the special factory for manufacture of Diesel engines of the Ikegai Teko-kosho (Ikegai Iron Works Ltd., established in 1889) which always occupied a leading position as a maker of Diesel engines and production machines in our country. The factory was constructed in 1942

at Tateyama city at the present site. Since then, the superior Diesel engines both for land use and for ships that have been manufactured there have come to be widely recognized by the industrial circles but in the year 1951 the works became a subsidiary company of the FUJI DENKI SEIZO K.K. and started as its special Diesel engine factory with superior technics and factory equipment. The followings show the recent products.

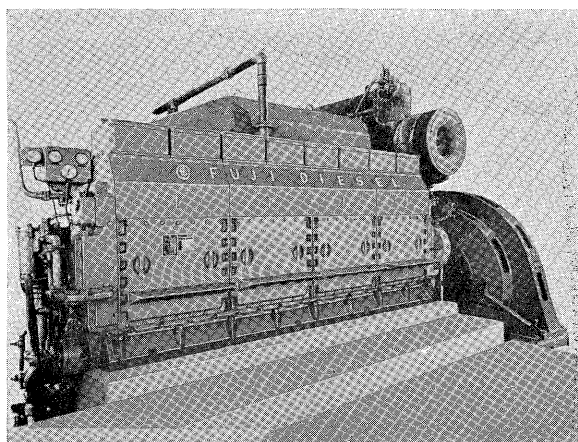


Fig. IV-1. Stationary Diesel Engine, Model 8MD27E
750 HP, 600 r.p.m., Coupled with 625 kVA
380 V 50 c/s A-c Generator, Supplied to
the Thai Prasit Company, Thailand

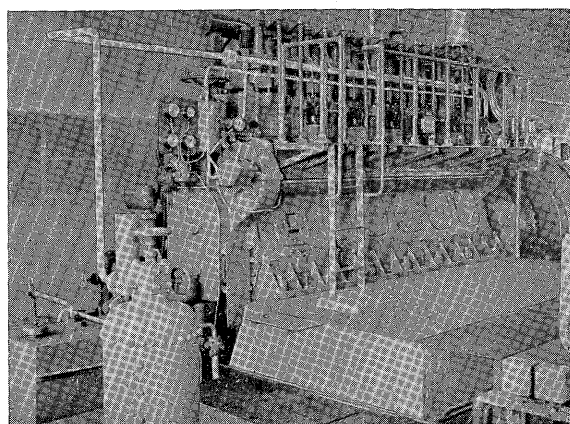


Fig. IV-2. Stationary Diesel Engine, Model 6SD33E
750 HP 375 r.p.m., Coupled with 625 kVA
3,300 V 50 c/s A-c Generator, Supplied to
Toyo Glass K.K.

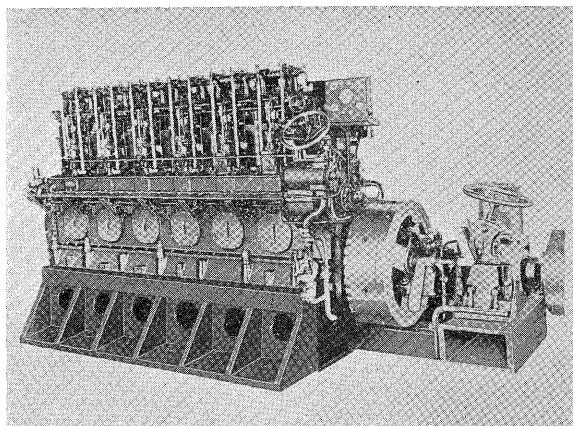


Fig. IV-3. Marine Diesel Engine for Fishing Boat
Model 6SD30, 400 HP, 360 r.p.m.

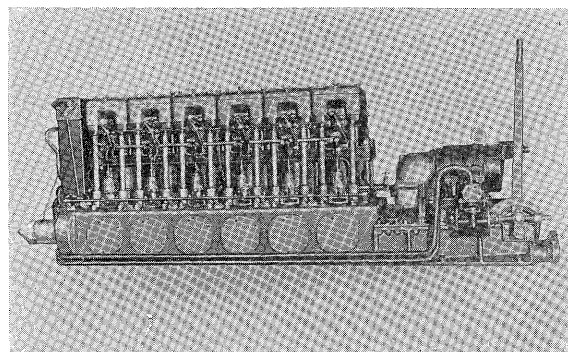


Fig. IV-4. Marine Diesel Engine for Main Motor
of Patrol Boat, Kaijo Hoan-cho, Model
6HD20, 350 HP, 1,200 r.p.m.

V. ALTERNATING CURRENT MACHINES

V-1. SYNCHRONOUS MACHINES

Our production of synchronous generators has increased year by year and now amounts to over 100,000 kVA per year. In table 1, our recent products of water turbine generators over 10,000 kVA are enumerated. Our record in capacity is 30,000 kVA generator of the Utsubo Power Station,¹⁾ but the gene-

erator of the Akiba Second Power Station, under construction, is the larger one, i.e. 41,000kVA generator.

Ordinarily, the form and construction of water turbine and generator are each separately designed and manufactured, but the thrust bearing of the 23,500 kVA Jintsugawa Second Power Station generator is arranged on the upper cover of the Kaplan turbine and this construction was the newest at the

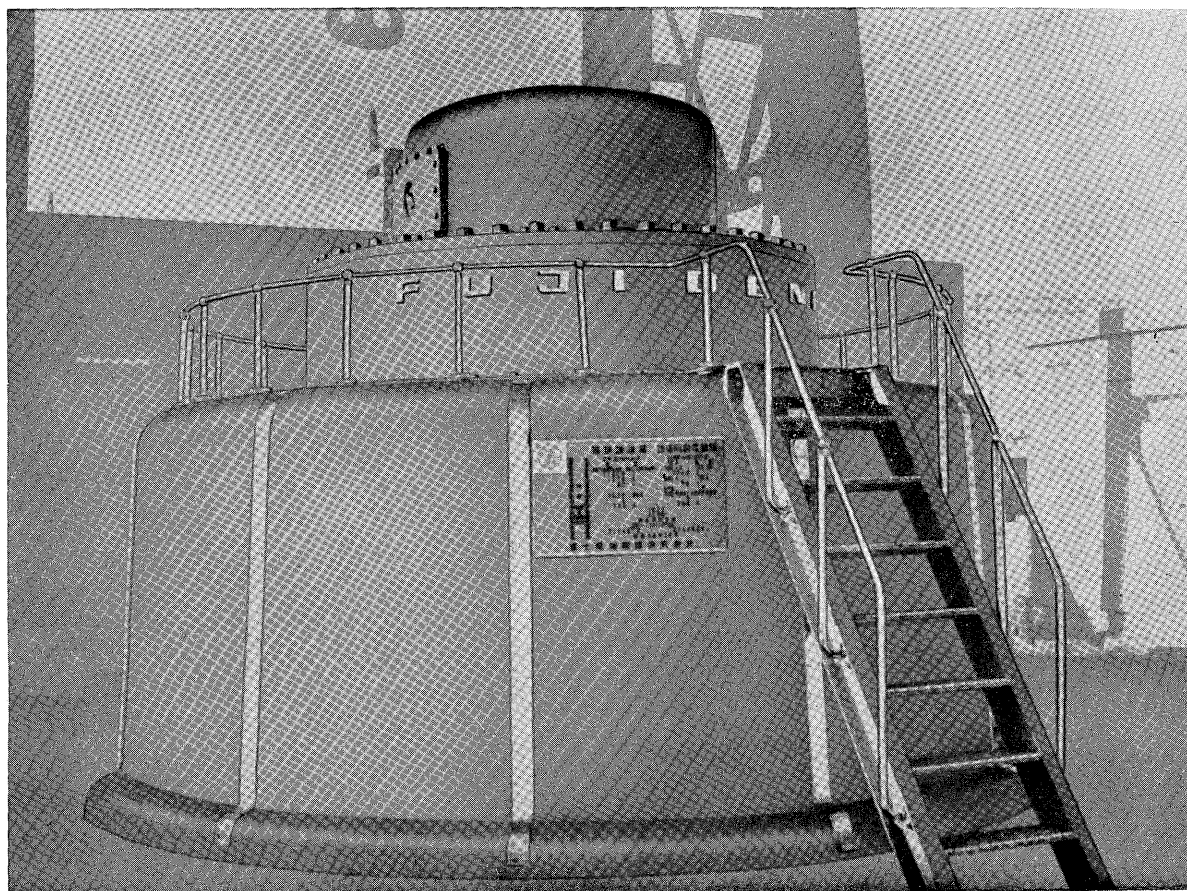


Fig. V-1. 30,000 kVA Rotary Condenser at Shin-Sapporo S.S. in Hokkaido Electric Power Co.