A PROPELLER PLANING MACHINE

An important development in propeller-finishing machines was described in a paper read at a recent meeting of the American Institute of Electrical Engineers. The machine was designed by the staff of the research laboratories of one of the leading firms of electrical manufacturers for use in a U.S. Navy yard and, described as an electronically-controlled 100-ton propeller planer, it is capable of dealing with ship's propellers up to 24 ft. in diameter. The tracer control with which it is equipped makes it possible to shape and finish rough propeller castings entirely by machine, the tracer automatically guiding two steel cutting tools over both sides of the blade simultaneously in accordance with the movement of a steel finger over the surface of a wooden or plastic model about one-fifth full size. The movement of this steel finger affects a sensitive instrument called a " silverstat " which controls the speed of the electric motors driving the cutters. As the tracing finger moves up or down in contact with the surface of the model, it compresses or releases a series of leaf springs on the ends of which are silver buttons wired in sequence to consecutive steps of a stationary voltage regulating resistance. The change of resistance varies the field current of a small generator, the tiny current being amplified by two sets of electronic tubes. It is stated that the movement of the tracing finger is duplicated to within 0.001 in. of the correct contour and that the machine can shape the blade surface of a 24 ft. propeller in two days, all hand work being eliminated except a minimum of finish grinding and buffing.

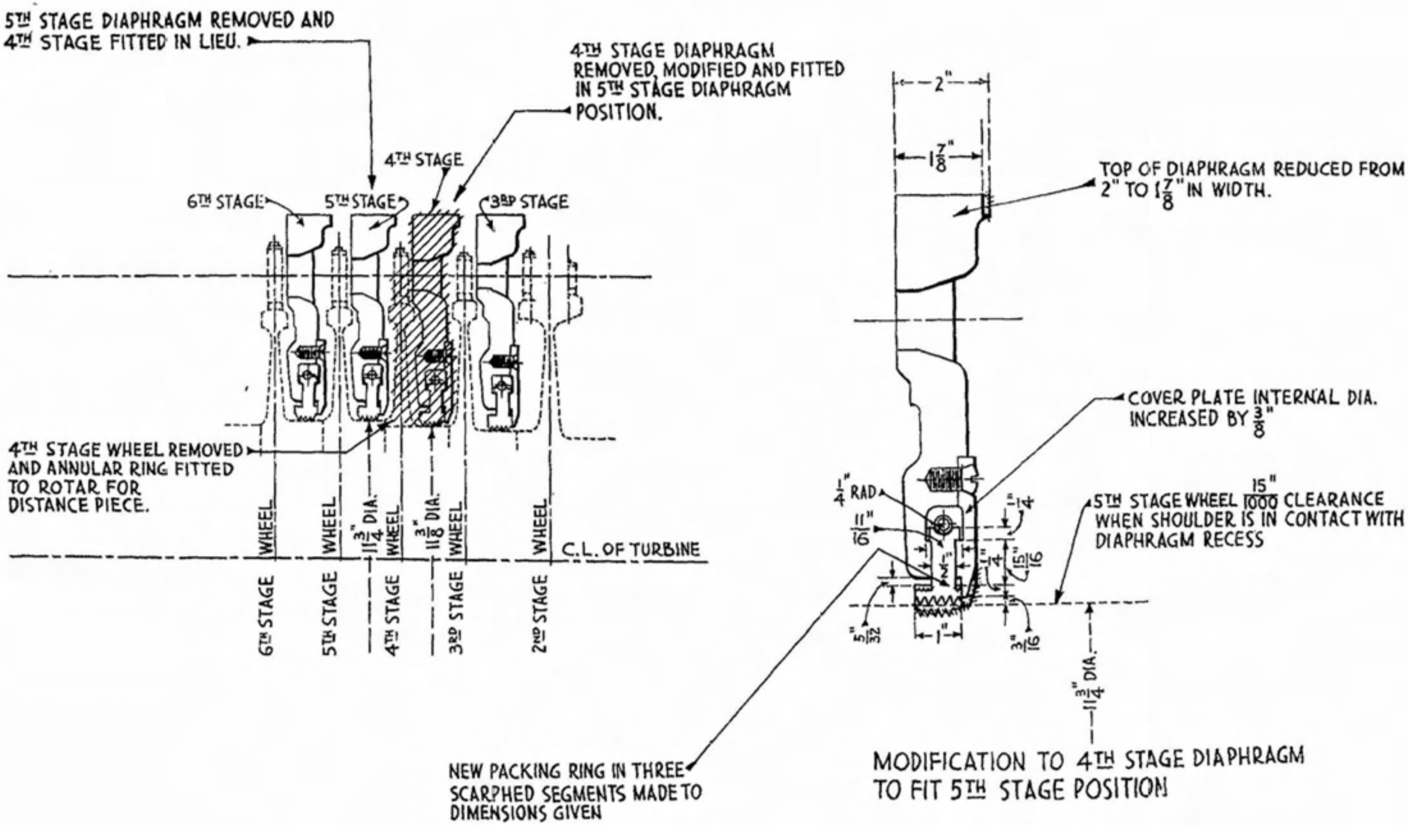
MODIFICATIONS TO H.P. TURBINE

The drawing on page 33 shows details of a rather unusual repair carried out at Devonport Dockyard during a refit to H.M. Yacht *Cutty Sark*.

On lifting the H.P. turbine casing it was found that the 4th stage wheel rim and blades together with the 5th stage diaphragm were damaged beyond repair. It was therefore decided to remove the 4th stage wheel and replace it by a cylindrical distance piece of the same dimensions as the boss of the wheel. The 5th stage diaphragm was also removed and the 4th stage diaphragm modified to fit the 5th stage position by reducing its width at the perimeter and fitting a suitable packing ring.

The power of the turbine was reduced by placing a limit on the receiver pressure so that the 5th stage pressure was about 25% less than that formerly carried.

1836



MODIFICATIONS CARRIED OUT TO H.P. TURBINE OF H.M. YACHT "CUTTY SARK"

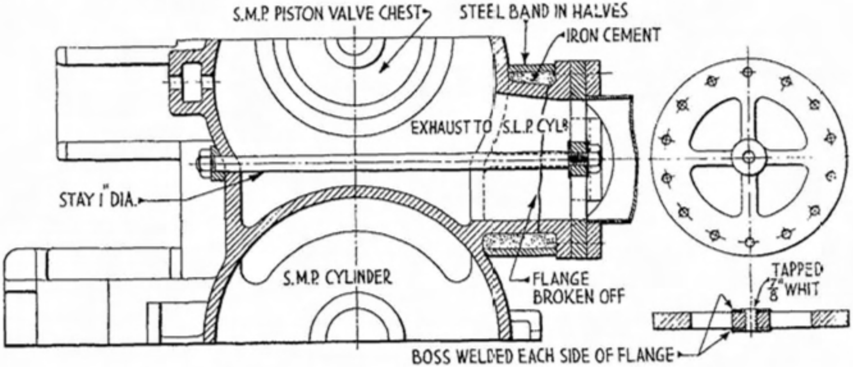
STANDARD ALUMINIUM ALLOYS

Attention has recently been drawn to the possibility of using lighter metal for the construction of various parts of the hull of a ship and its machinery It is of interest to note, therefore, that the British Standards Institution has issued a rationalised schedule of specifications for aluminium and its alloys. The schedule is divided into three sections, the first covering specifications for aluminium of four different degrees of purity; the second containing fifteen specifications for casting alloys; and the third eighteen specifications for wrought alloys. The cast alloys are divided into three groups, viz. cast alloys for general purposes, cast alloys for particular applications, and piston alloys while the wrought alloys are divided into the heat-treated and not heat-treated categories. General notes on the different alloys with explanations as to their uses are also provided, together with the relevant British Specification number, and there is in addition, a brief description of the specialised technique involved in the fabrication of aluminium alloys and their characteristic properties.

NOVEL REPAIR TO M.P. CYLINDER

The method adopted by Devonport Dockyard to repair the fractured M.P. exhaust branch of the starboard engine in *H.M.S. Selkirk* is shown below.

As may be seen from the drawing, a special steel flange was made, with a central boss held in position by four webs, and jointed to the existing flange by collar studs. A steel stay passing through the exhaust chamber was fitted and tightened to prevent the crack opening under working conditions. A steel band (in halves) was made and fitted to the fractured portion of the exhaust branch. "Smooth on" cement was then applied and the band tightened to ensure a steam tight joint at the crack. On completion of the repairs a water pressure test of 40 lbs./sq. in. was applied with satisfactory results.



EXHAUST BRANCH WITH FLANGE IN POSITION

GAS TURBINE FOR U.S. NAVY

The Elliott Company, Jeanette, Pa., U.S.A., have built a 2,500 h.p. gas turbine power plant for ship propulsion, and this plant was accepted recently by the United States Navy after undergoing trials. According to a report given in *Iron Age* and quoted by *Engineering* for September 14th, 1945, the new unit operates at a temperature of about 1,400° F., and shows an efficiency of 32 per cent. to 34 per cent. It occupies a space of 16 ft. by 12 ft. by 12 ft., and weighs less than 30 lb. per H.P. developed. Air is compressed by two separately-driven Lysholm compressors, which are arranged in series. After passing through a regenerator, the air is further heated by the combustion of fuel. It then proceeds to the high-pressure turbine (which drives the low-pressure compressor) and passes through another combustion chamber to the low-pressure turbine. The latter drives the high-pressure compressor and also the propeller of the ship. A further unit is being built for the Navy, and the Maritime Commission has ordered another.