REPAIRS TO AN F.L. PUMP

H.M.S. PROTECTOR

BY

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In these days, when the amount of skilled machine work demanded of a ships staff is frequently limited by dockyard and F.M.U. assistance and refit-by-replacement techniques, it is thought that perhaps the following article might prove of interest.

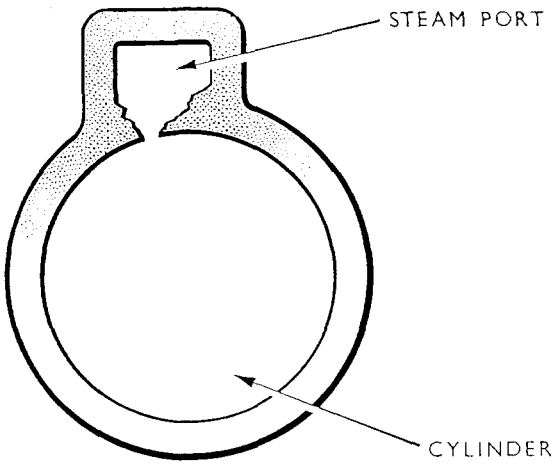

FIG. 1

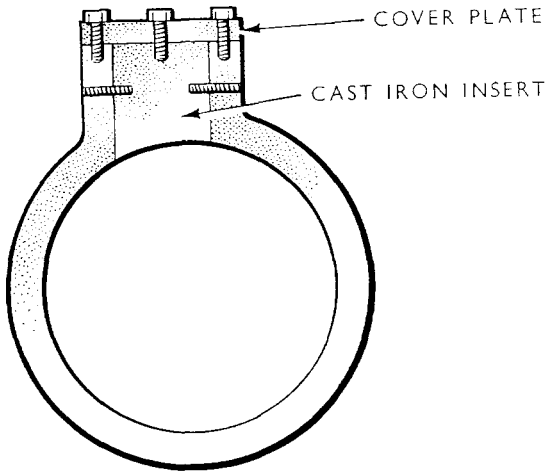

FIG. 2

H.M.S. *Protector* operates in the Falkland Islands and in the Antarctic where the nearest dry dock is over a thousand miles away and the nearest naval dockyard four thousand. No shore facilities of any kind are available for the whole of the time she is away from the U.K. and there is never any opportunity to shut down beyond auxiliary steaming throughout that time. Consequently, all repairs have to be carried out on board by the ships staff. Spares are often difficult to obtain for outdated machinery and if essential equipment has to be flown out, the ship must divert to a South American port to pick them up, since her operational area is well off any air route. As a result jobs often have to be tackled which, under other circumstances, would only be undertaken with assistance from shore. The one described here seems to fall into that category, besides being of an unusual nature.

Shortly after completing a sixteen-week refit and leaving the U.K. for the Antarctic, in November, 1966, considerable difficulty was experienced in running the port forced lubrication pump. The ship has three F.L. pumps of the Weir's double-acting reciprocating type. All three had been completely overhauled during the refit period, the steam cylinders and barrels being bored out as part of the overhauls.

On investigation it was found that a hole had appeared between the steam cylinder and steam port of the port F.L. Pump (see FIG. 1), thus breaking down the flow of steam to, and exhaust from, the top of the cylinder. The metal between the cylinder and steam port was found to be paper thin over a large area, due to a defect in the original casting. Initially, attempts were made to repair the defect with epoxy resin, but the araldite held on board was not sufficiently temperature resistant and these attempts were unsuccessful.

Protector is fortunate in possessing excellent workshop facilities and it was decided to attempt a repair by fitting a cast iron insert in way of the thin portion of casting (see FIGS. 2 and 3) and to by-pass this insert by means of an external steam pipe. A large slot was milled through the steam port casting and cylinder wall, removing the flawed area entirely. The cast iron insert was then made. Initially it was milled to a rectangular section, then mounted endwise on a lathe face plate and the curved, inner surface machined to conform to the inner cylinder wall. This operation was by no means simple since, as will be seen from the Figures, the steam port is offset from the axis of the cylinder. Finally, the semi-circular ends of the insert were part turned and finished by hand.

Once fitted in place the insert was held firmly by screwed pins fitted through the sides of the steam porting, and a cover plate was made and fitted over the

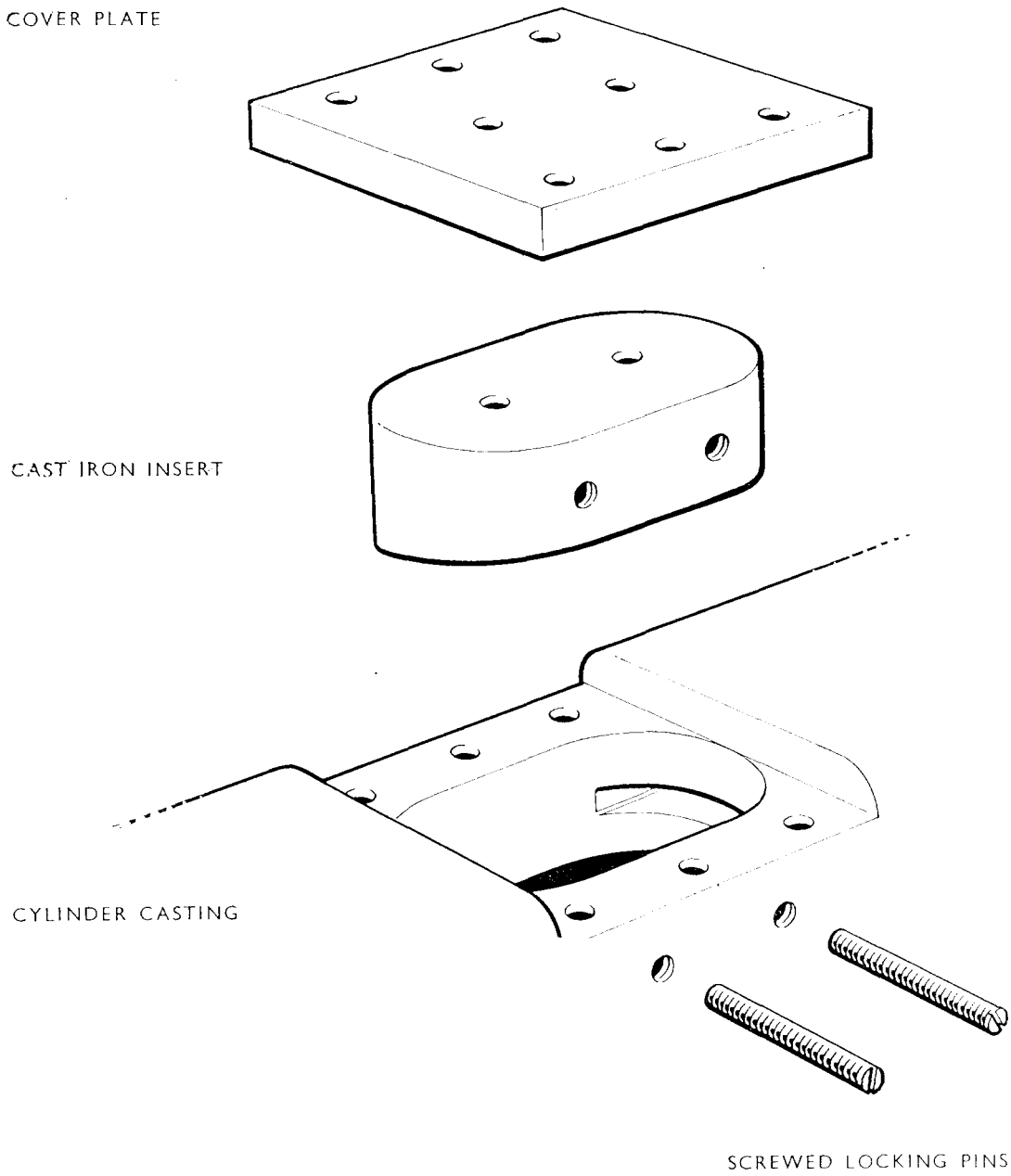

FIG. 3

external surface of the insert. Holes were drilled and tapped through to the steam port above and below the insert and a steam pipe fitted to carry steam to, and exhaust from, the upper cylinder.

The repair has proved wholly satisfactory to date and the pump is capable of producing its maximum rated output.

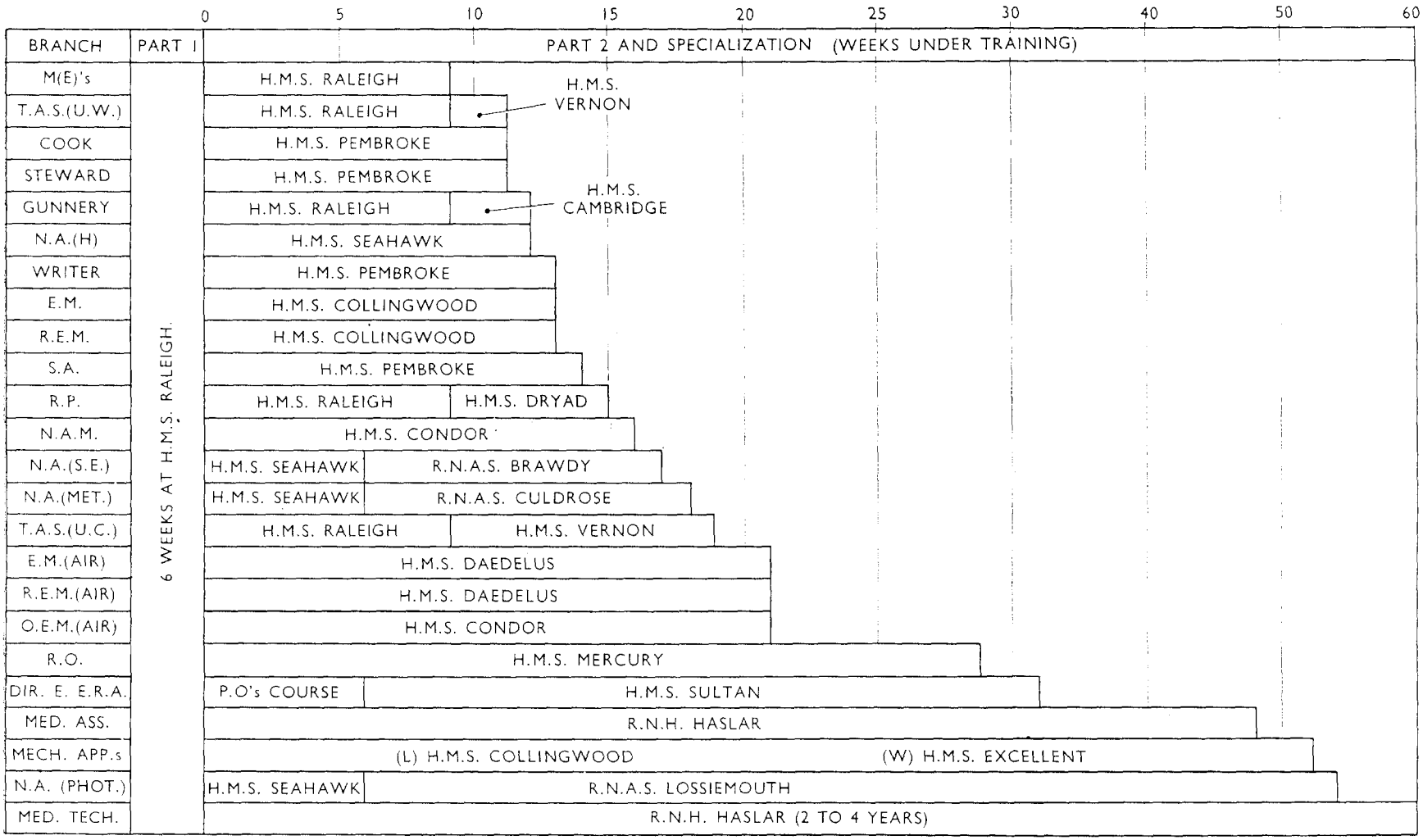

FIG. 1—COMPARATIVE LENGTHS OF INITIAL TRAINING PERIODS