



FIG. 1

## REPAIR OF A CAST IRON GEARCASE

### The Damage

During preparations for the removal of a complete H.P. turbine from a ship for repair, a horizontal row of four bolts securing the turbine to the gearcase was overlooked. These bolts are visible only through small handholes and no detailed drawings of the bolting arrangement of the turbine and gearcase were available in the ship.

When the turbine was lifted the cast iron gearcase fractured as shown in FIG. 1. It will be seen from this illustration that the fracture extended into the oil gallery below the H.P. pinion forward bearing.

### The Repair

A firm which specializes in this type of work undertook to effect a repair which would be oil-tight and would be at least as strong as the original casting.

The rough edges of the fracture were trimmed and faced and a wooden template was made to fit the aperture. With this template as a pattern, an iron



FIG. 2

patch was cast. The patch, which is shown lying in the foreground in FIG. 2, was provided with an integral web carefully mated with the horizontal 'floor' of the oil gallery.

The central vertical web of the damaged casting was drilled and tapped to take three set-screws which were used to hold the patch firmly in place during subsequent work. The patch was then placed in position and secured by the set-screws. Slots were cut transversely to the fracture to a depth of about two-thirds that of the parent metal, and keys of 50-ton alloy steel were driven into the slots, one after the other, in layers. The joint face remaining between the sets of keys was chain drilled and tapped and alloy steel studs were inserted across the face tangentially to each other.

The whole repair was then pneumatically cold-worked to ensure tightness and rigidity. To complete the operation the surface was ground smooth.

The finished repair is shown in FIG. 3. Most of the locking keys can be seen and the heads of the three set-screws which were used to position the patch are also shown.

### Proving the Work

After some discussion, it was decided to replace the four bolts which originally caused the trouble. This decision was influenced by the desirability of restoring, as near as possible, the original design, and by the consideration that the bolts would provide a good test of the repair in the plane of any potential weakness.

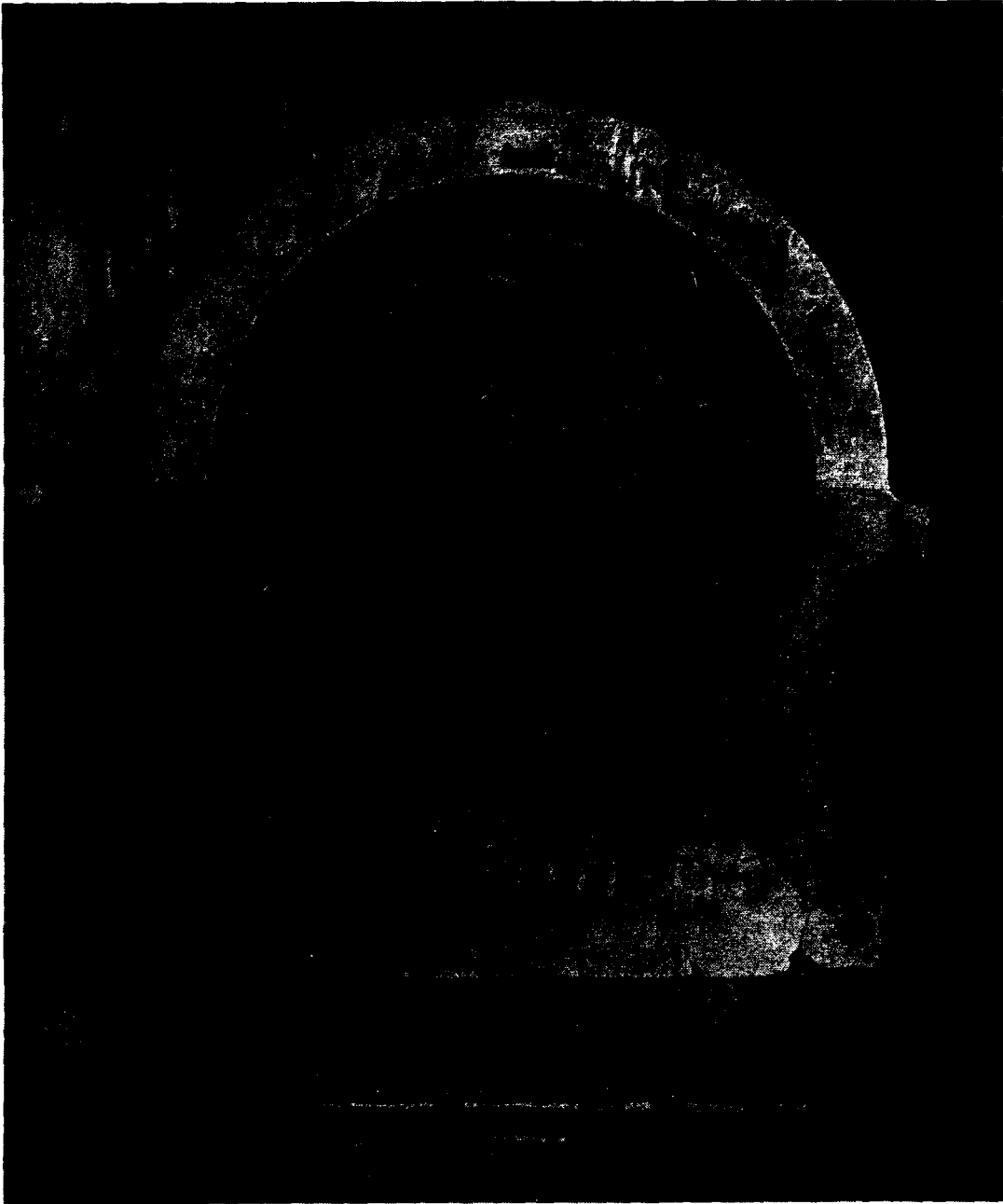


FIG. 3

No oil leakage from the repair was observed during rigorous sea trials and no trouble has since been reported.

This method has been successfully used in the Service for some years for the repair of fractured steam reciprocating engine cylinder valve chests.

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