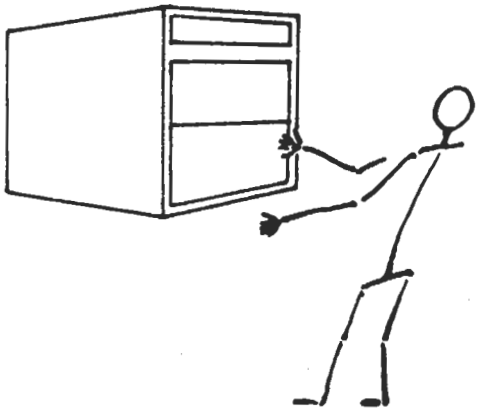
TYPE 274 & 275 SERVICING THE DISPLAY PANELS

THE MORAL IS :- TAKE CARE OF IT !.

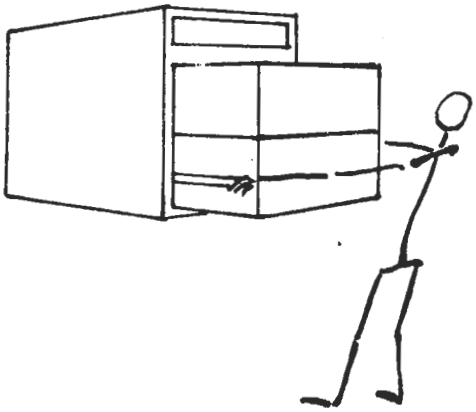
1

SOMETHING'S WRONG! THE RADIO MECHANIC
COMES AT ONCE. NO NEED TO PANIC



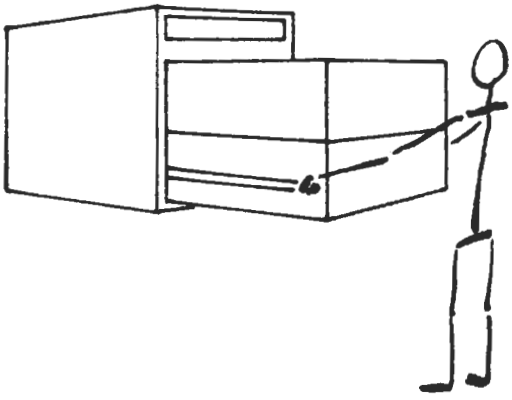
2

SO GENTLE JACK TO LOOK AT THE JOB
GETS THE KEY AND TURNS THE KNOB



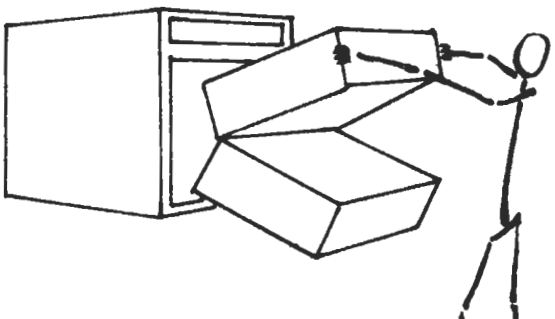
3

PULLS IT AJAR AND GRASPS THE SLIDES
TAKES THE WEIGHT AND OUT IT GLIDES



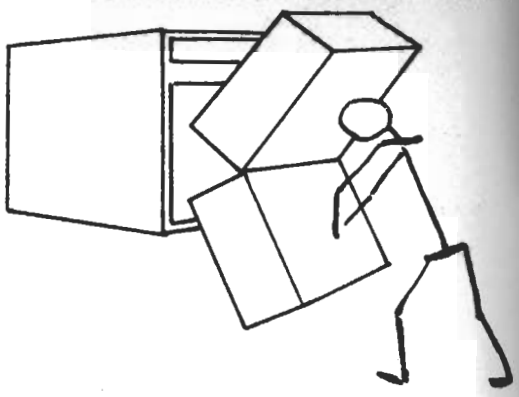
4

HE OPENS IT UP USING THE LATCHES
CARRYING ON HE FINDS IT CATCHES



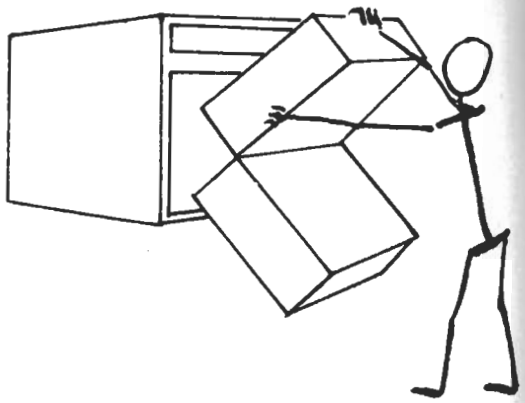
5

THERE'S THE FAULT – A DREADFUL SIGHT
BUT VERY SOON HE'LL PUT IT RIGHT



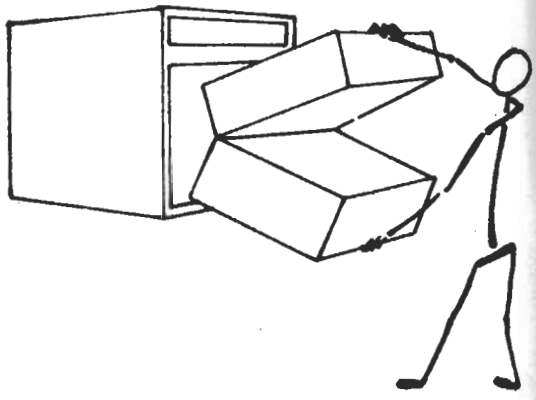
6

HE RELEASES THE PAWL-AT SIDE SITUATED
HOLDING THE CRADLES AS HEREIN RELATED



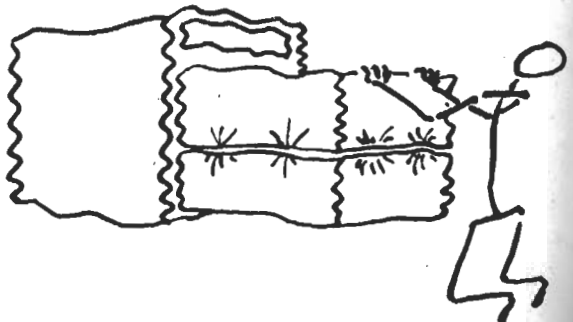
7

EXACTLY BALANCED HE SHUTS IT WITH EASE
ESPECIALLY CAREFUL IN HEAVY SEAS



8

GENTLY DOES IT -THERE'S NO NEED TO SLAM IT
LETTING IT CRASH HE WOULD ONLY JAM IT.



TYPE 275 THE NEW HA/LA GUNNERY FIRE CONTROL FIRE

Radar 275, the successor to Type 285, is expected to go to sea as part of the Mk.VI Directors (British) and Mk. XXXVII Directors (U.S.) in British and Dominion new construction destroyers and above starting June 1944. Radar 275 is an integral part of the ships' Fire Control System. It can provide accurate Radar Range, Radar Bearing and Radar Elevation (Angle of Sight) of a target.

This important new Gunnery Radar development, incorporating modern Radar technique, comprises the following items of equipment:-

(i) Duplicate Power Supplies, fitted in the Low Power Room where space permits.

(ii) Transmitter, Receiver and 242 Interrogator Aerials, fitted on the H.A. Director Tower.

(iii) Modulator and Receiver Panels } fitted in the H.A.C.P. or T.S. in Destroyers where space permits.

(iv) Display Panels }

(v) Interrogator 242, fitted with the Modulator and Receiver Panels.

The outstanding features of the set are the Aerial System and the Display Panels.

AERIAL SYSTEM.

The 275 Aerial System will be fitted on:-

(i) Mk VI Director

(ii) Mk XXXVII Director (U.S. Director).

The Transmitter and Receiver arrays with certain items of the transmitter and the receiver equipment are fitted in Nacelles (egg like containers). On the Mk VI Director Tower, a nacelle is fitted on each side of the director, while on the Mk XXXVII Director Towers, they are fitted on top of the director.

An air conditioning system is fitted to reduce the temperature range to which the nacelles will be subjected. This is a closed-air system entirely carried on the director. The nacelles are mechanically coupled to the optical sights in the director and power elevated and trained with the optical sights on to a target.

Beam-switching in the form of Conical Scanning is provided in the Receiver Nacelle giving side-by-side presentation of echoes in the Display Equipment.

DISPLAY PANELS AND "TALLBOY".

The Display equipment provides, on four Cathode Ray Tubes, Radar range of the target, Radar bearing of the target and Radar elevation of the target, relative to the ship.

The equipment consists of four panels:-

(i) Elevation Display Panel.
Coarse elevation by "side-by-side" echoes on a C.R.Tube and a fine elevation on meter.

(ii) Coarse Range Display Panel.
Cathode Ray Tube.

(iii) Fine Range Display Panel.
Cathode Ray Tube.

(iv) Bearing Display Panel.
Coarse and Fine as for Elevation.

These display panels are built on top of the Remote Power Control units for Elevation and Training to the Director and Range to the H.A.C.S. or F.K.C. The whole has come to be known as the "Tallboy" from its pretentious resemblance to a solid piece of Victorian furniture.

Three units comprise the lower half of the "Tallboy".

(v) Elevation Control Unit (E.C.U.).

(vi) Continuous Prediction Unit C.P.U. Mk.II (which includes the R.T.U. and can also work as an A.B.U.).

(vii) Training Control Unit (T.C.U.).

Four operators are required for the "Tallboy".

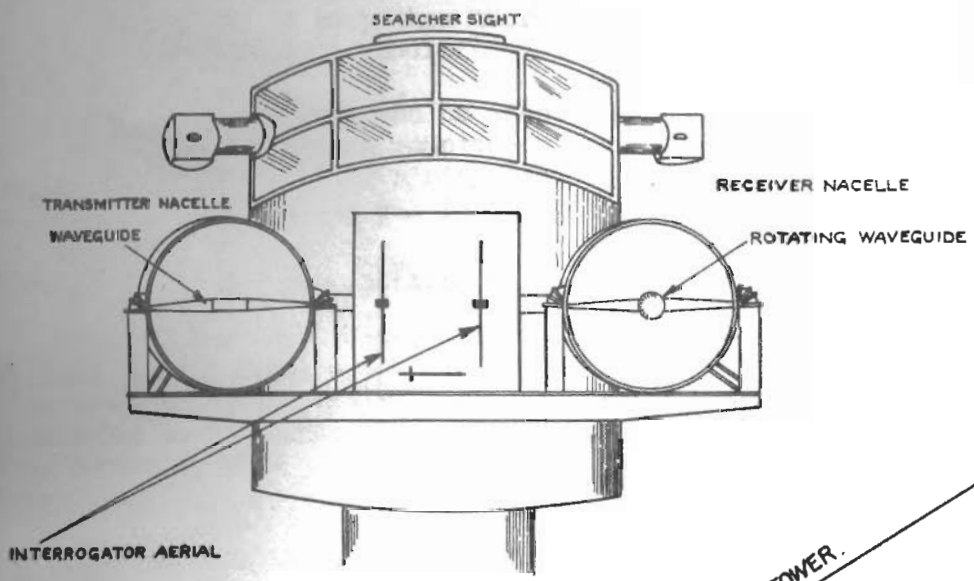
Elevation operator (Radar Layer) at the E.C.U.
Bearing operator (Radar Trainer) at the T.C.U.
Radar Range operator at the C.P.U. Mk.II (Captain of the Team).
A.B.U. operator on the Range operator's left at the C.P.U.

Display: Each of the "Coarse" cathode ray tubes covers the maximum effective range of the set. In the Fine Range Display Panel, any selected 4,000 yards of the maximum range can be presented in an expanded form. This enables range of a target echo to be read with greater accuracy. The Coarse elevation, range and bearing tubes each have a bright spot (a Target Strobe) on the trace. This target strobe is adjustable in range, i.e. it is controlled by the Range operator and moves simultaneously on all three tubes. The Fine Range Panel has a similar bright spot (a Ranging Strobe) that remains in a fixed position near the middle of the fine range tube.

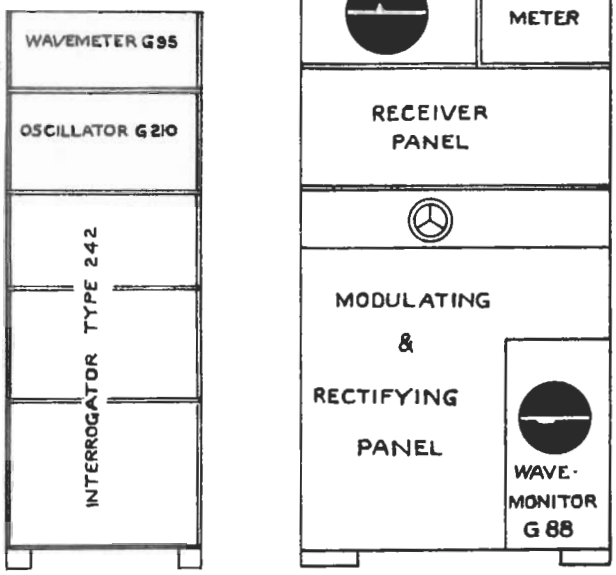
The signals received, as the result of conical scanning, relating to bearing and elevation of the target echo are displayed as two echoes (side-by-side presentation) on the bearing and elevation tubes.

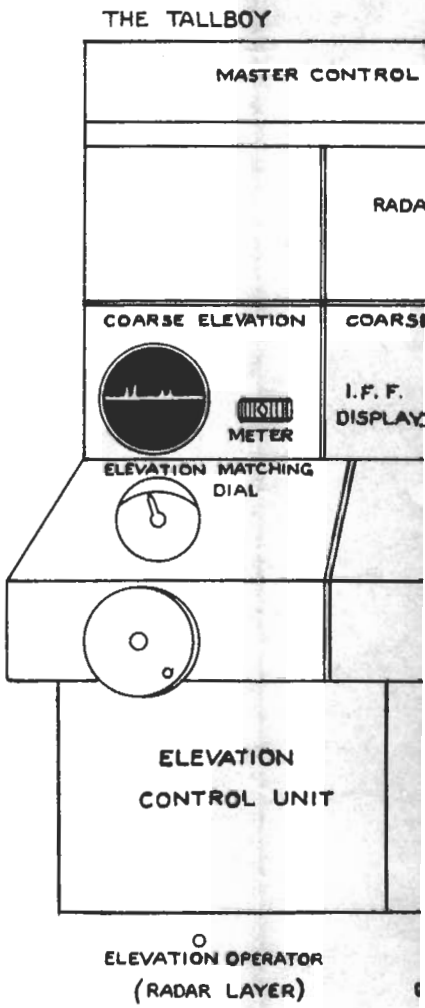
When the Radar line of sight coincides with the true line of sight to the target, i.e. Radar 275 aerials on target, the two target echoes appearing on the bearing tube and the two target echoes appearing on the elevation tube will be equal in height. Should the echoes not be of equal height then the radar line of sight will be either off bearing or off elevation or both.

RADAR TYPE

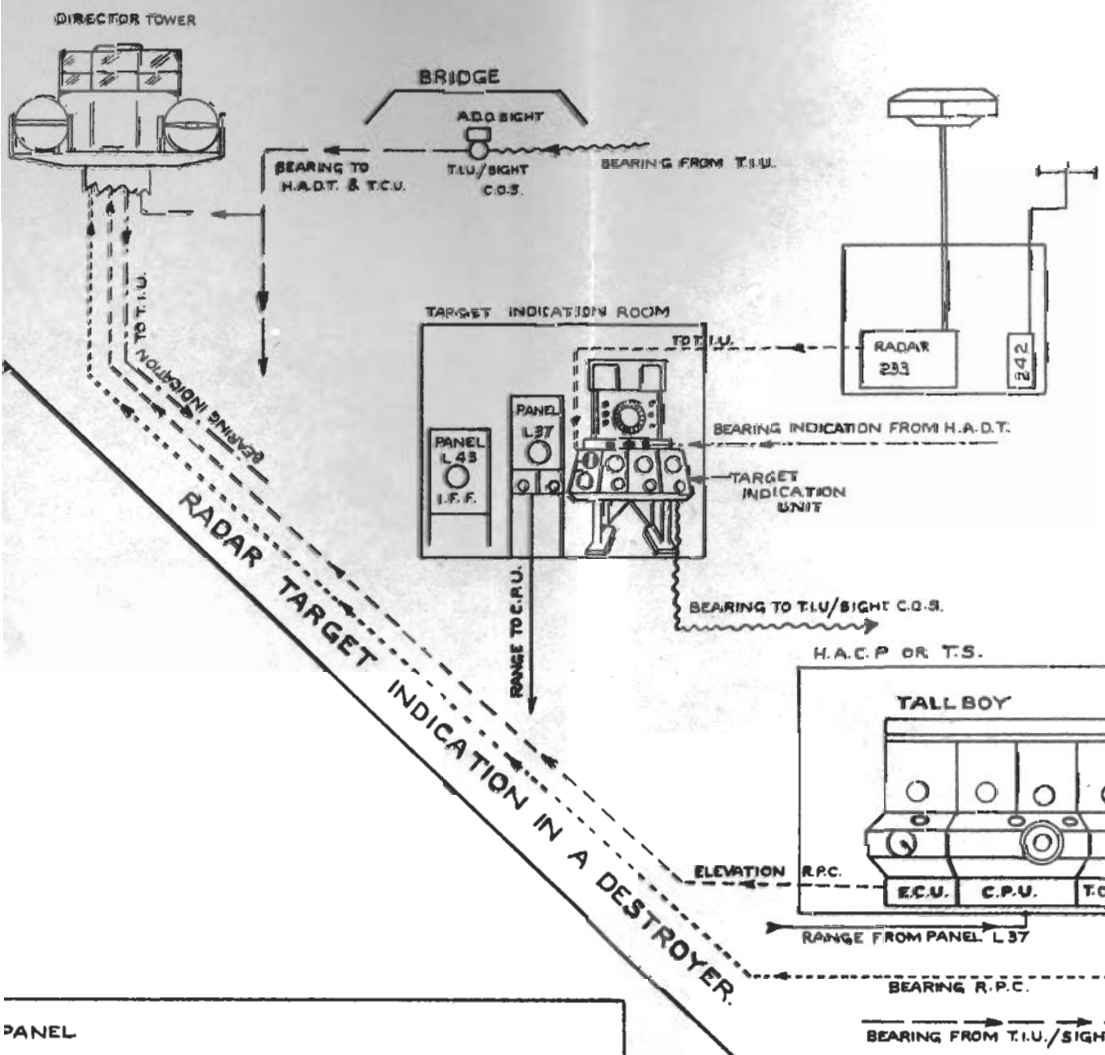


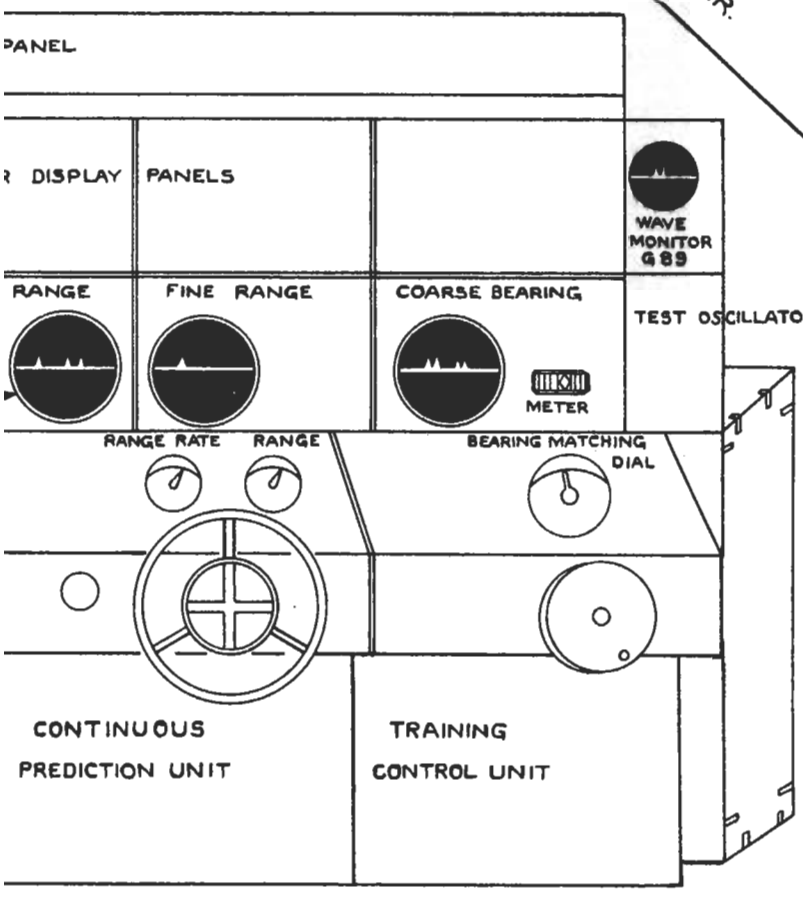
APPLICATION TO MK VI HA DIRECTOR TOWER.





H.A.C.P. OR T.S. IN DESTROYERS.





A. B. U. OPERATOR

RANGE OPERATOR

BEARING OPERATOR (RADAR TRAINER).

DATE. 1-5-44.

On the Elevation Display Panel and the Bearing Display Panel, a meter is fitted alongside the C.R.Tube. These meters, comprise an illuminated scale on which a vertical line of light is shown. Should one of the two echoes appearing on the bearing tube be at lower amplitude than the other as explained above, then the vertical line of light will move left or right, i.e. it is the business of the operators to bring the lines to the centres of the 2 meters and to keep them there by means of the E.C.U. and T.C.U. Rate aided control wheels.

The target echo can be identified as friendly or otherwise by depressing a switch mounted on the left-hand side of the Coarse Range Panel. It is spring loaded off (i.e. in central position) and operates the 242 Interrogator .

E.C.U.: C.P.U./R.T.U./A.B.U.: T.C.U.

The Elevation Control Unit (E.C.U.) fitted below the Elevation Display Panel has a rate-aided handwheel controlled by the Radar elevation operator (Radar Layer). This handwheel is connected to the Remote Power Control System (R.P.C.) and remotely controls, by Metadyne, the director sights with the nacelles, in elevation.

The Training Control Unit (T.C.U.) fitted below the Bearing Display Panel also has a rate-aided handwheel which is controlled by the Radar bearing operator (Radar Trainer). This handwheel is connected to the Remote Power Control System and remotely controls, by Metadyne, the director, and with it the nacelles, in bearing.

The E.C.U. and T.C.U. are provided with various dials showing the position of the director sights, etc.

The Continuous Prediction Unit (C.P.U.Mk.II) is fitted below the Coarse Range and Fine Range Display Panels. The C.P.U. Mk.II incorporates the R.T.U. It can be used either as a C.P.U. or as an A.B.U. The radar range operator is seated in front of the Fine Range Display Panel and the A.B.U. operator is seated in front of the Coarse Range Display Panel.

The range operator has two handwheels on one axis as on the A.B.U. - now at sea. Dials are fitted which indicate present range and the range-rate set in.

The A.B.U. operator is seated in front of two dials which show future target range and fuse number - he has no handwheels to control.

Once the target has been picked up by the 275 and the target echo is visible on the tubes in the Tallboy, the operating procedure is as follows:- (The means provided for "Putting-on" the 275 will be dealt with in a future issue of the Bulletin).

The Range Operator turns his handwheel, which moves the Range Strobe on the Coarse Range tube on to the target echo. In doing this he also moves the Target Strobe on the Bearing and Elevation Tubes, thus giving an indication to the Bearing and Elevation Operators which target they are to work on. (There may, besides the target echo, be other echoes appearing on the C.R. Tubes).

The task of the Bearing and Elevation operators is to make and keep their respective two echoes appearing on their respective C.R. tubes at equal height. They do this by adjusting their handwheels, as the layer and trainer in a director would do when holding a target visually. Accurate following is then achieved by keeping the meters centred.

REPAIR OF TRANSFORMERS AT SEA

It sometimes occurs that a Radar set is put out of action, while at sea, because of a burned out transformer and if no spare is available the set remains unserviceable until the end of the trip. This need not be so in all cases since it is possible to effect repairs to many types of transformer. It should be the aim of Radar Officers and Mechanics to do everything possible to get the set running again before finally giving up hope.

Most transformers are wound with shellac covered wire, the low voltage windings being of a heavy gauge and the high voltage H.T. secondaries being of finer wire. The higher the voltage output of the secondary the more turns of wire are used and generally the finer the gauge of wire.

It is, therefore, very much easier to rewind a filament transformer than it is one giving, say, 2000 volts.

The usual fault to be found is that the primary winding is shorted to earth or else a secondary filament winding, run at a high potential above or below earth, has shorted to the chassis or to the primary. If the transformer runs hot, switch off without delay, otherwise the charring inside may cause the unit to become unfit for repair.

A faulty transformer should be dismantled in the following way.

(a) Unsolder the winding leads from their respective tags and mark each one clearly so that no confusion arises when the time comes for reassembly.

(b) Remove the laminations, noting carefully how they are lapped together - this is often a difficult operation and requires care and much patience.

(c) Remove the outer insulation from the coil former and then carefully unwind the windings until the place where the insulation has broken down is found. Coil the wire on to a bobbin - a round tobacco tin is useful for this.

(d) The wire of the faulty windings should be carefully removed and kept because if it has to be replaced it is necessary to know the length required.

If it is necessary to use new wire because of the damage due to charring, do not give up because no spare reel is carried. In this circumstance, suitable wire can often be found, say, on an old pair of headphone coils or a disused speaker transformer. The exact gauge is not important, it is the length that matters and it must be either silk or shellac covered. Layers of ordinary black insulating tape can be used for a temporary interwinding insulation but Empire tape is more satisfactory if available.

Replace the winding as carefully as possible and make the layers regular, avoiding bunches and gaps (you cannot, of course, make as good a job of this as the manufacturer does, but with care a fairly neat job can be performed).

Test the windings for continuity and insulation with a megger before replacing the iron core.

When the laminations have been replaced, clamp them tightly together before testing the transformer, otherwise the windings will heat up again and much work will be wasted.

This sort of repair has often been carried out at sea and is well worth the trouble taken. It is well to remember to obtain a sound transformer on arrival in harbour because an emergency repair will not last for ever.

REPAIR OF TRANSFORMERS AT SEA