

## AMPLIFIER, R.F., No. 2

## FIRST ECHELON WORK

## MAINTENANCE

## General

1. Regular and careful maintenance is essential for keeping the amplifier in good working order. The maintenance described here should be carried out by a Signals electrician at least once a fortnight. Whenever he maintains the amplifier, he should fill in the maintenance chart, which is kept by the Signal Officer for each set under his control.

## Lubrication and general cleaning

2. Clean slow-motion drive, edge of dial and flick discs, using a rag moistened with petrol and wrapped round a pointed stick. Apply Oildag to all of these, or, if none is available, use thick oil. Apply thin oil to all moving parts of flick mechanism. Check tightness of screws securing flick arms and stops. If the latter are loose, fix them so that the dial stops definitely engage before the condenser stops are reached. Clean interior of amplifier and look for loose or dirty connections; dry out if necessary. Pay particular attention to all external plug and socket connections. All oils and greases used must be of the correct grade to suit the prevailing climatic conditions.

## Controls

3. Check mechanical action of all controls. The most important points are:—

- (a) Switches—check for clean action.
- (b) Slow-motion drive—should turn dial smoothly and without slip. Check that groove in slow-motion spindle readily engages on edge of driving disc when the flick lever is turned from FLICK to SET; test this at several positions of the dial.
- (c) FLICK control—check for smooth operation and positive engagement.
- (d) DRIVE adjustment—check that pointer is at max. in fully clockwise position.
- (e) All knobs—check that grub screws are tight.

If results obtained on (b) and (c) are not satisfactory, the equipment should be handed in to R.E.M.E. workshops.

## Relays

4. See that contacts and pole pieces are clean; inspect the latter, especially for bits of iron dust. Check that the contacts make and break correctly and that none of the wiring is fouling moving parts of the relays. Test send/receive operation by pencil switch with the amplifier connected to a Wireless set No. 19. Relay D/1 should operate about a second after relay C/1. Inspect contacts of starter relays to see that they are not badly burned or pitted.

## Valves

5. See that valves are held firmly in sockets; if loose, lightly squeeze contacts of sockets. Check that anode clips fit tightly on top caps of valves and that the caps are secure. Inspect the leads soldered to the anode clips; if frayed at the tag, remake joint. Check that all valves are of the same type, namely, A.T.S. 25 or A.T.S. 25A.

## Aerial tuning inductance

6. Check that the control knob turns easily and that the clamp locks the dial securely. Clean output terminal insulator and see that it is not cracked. Rotate control knob clockwise until the stop is reached and check reading of index windows (98). Repeat for anti-clockwise rotation when index numbers should read 00 and the dial index 0. Check clutch action by turning control knob beyond stop; the friction must be great enough to prevent slip when tuning. With the amplifier working on send, tune aerial inductance through resonance and see that the aerial current indicated on the panel meter rises and falls smoothly with rotation of control knob. Repeat at several frequencies in order to test the inductance at several points. If the pointer moves unsteadily, the inductance requires cleaning. Rectification of faults is described in para. 14.

## Power supply

7. (a) Fuse—unscrew and check that fuse is of correct rating (500 mA). Screw in firmly.
- (b) Commutators—inspect thoroughly. Wipe with clean, soft rag, if necessary, moistened with carbon-tetrachloride. Replace brushes if too worn or badly bedded. Turn tuning condenser to maximum capacity position before removing inner H.T. brush. This gives more room and prevents damage to the condenser. Do not oil bearings as special lubricant is needed. When replacing H.T. brushes put the side marked with the maker's name uppermost.
- (c) Cooling fan—see that blades are set at the correct angle (45°) and that they do not foul the end frame. With the amplifier in its case, remove and clean air filter and check that fan blades are clear of the filter box (see Working Instructions, ZA. 10396).

## Aerials and aerial feeders

8. Follow the general instructions given in Tels. F. 253/3, paras. 8 and 9.

## Set test

9. Carry out the tests for daily maintenance of complete installation (see Working Instructions for Wireless set No. 19, ZA. 21575, and Amplifiers, R.F. No. 2, Mks. I and II, ZA. 10396).

## Valve tests

10. The only simple voltage test that can be made with the Wireless set No. 19 meter and a 200k  $\Omega$  resistor, is measurement of cathode voltage. If this test is made at regular intervals, the Signals electrician will be able to detect any change in the performance of the valves and so maintain reliability. The value of this test figure depends upon it being taken under the same conditions on each occasion. The conditions are:—

DRIVE adjustment set to min.

A fully charged battery.

The same voltmeter or panel meter must be used on every occasion.

The cathode voltage measured at the junction of R5A and C12A should be approx. 24V on the 100V range of the Avometer, universal, 46 range, and 144V on the 600V scale of the set meter

when used with a  $200k\Omega$  series resistance). In addition to his voltage test, a record of the AE reading at 2, 5, 4, 5 and 7 Mc/s should be taken when the complete installation is fully tuned on R/T with the drive accurately set to 6V.

### Maintenance chart

1. A specimen maintenance chart is shown in Fig. 1001. The Signals electrician, after carrying out each item of his maintenance, puts a tick in the corresponding square on the chart. If he carries out any minor repairs, he puts an R in the square and writes the details in the remarks column. If he finds that a major repair, which he cannot carry out himself, is needed, he puts an X in the square and hands in the set. He notes also in the remarks column the details of any work done since the set was last maintained; the chart thus gives a complete history of the set.

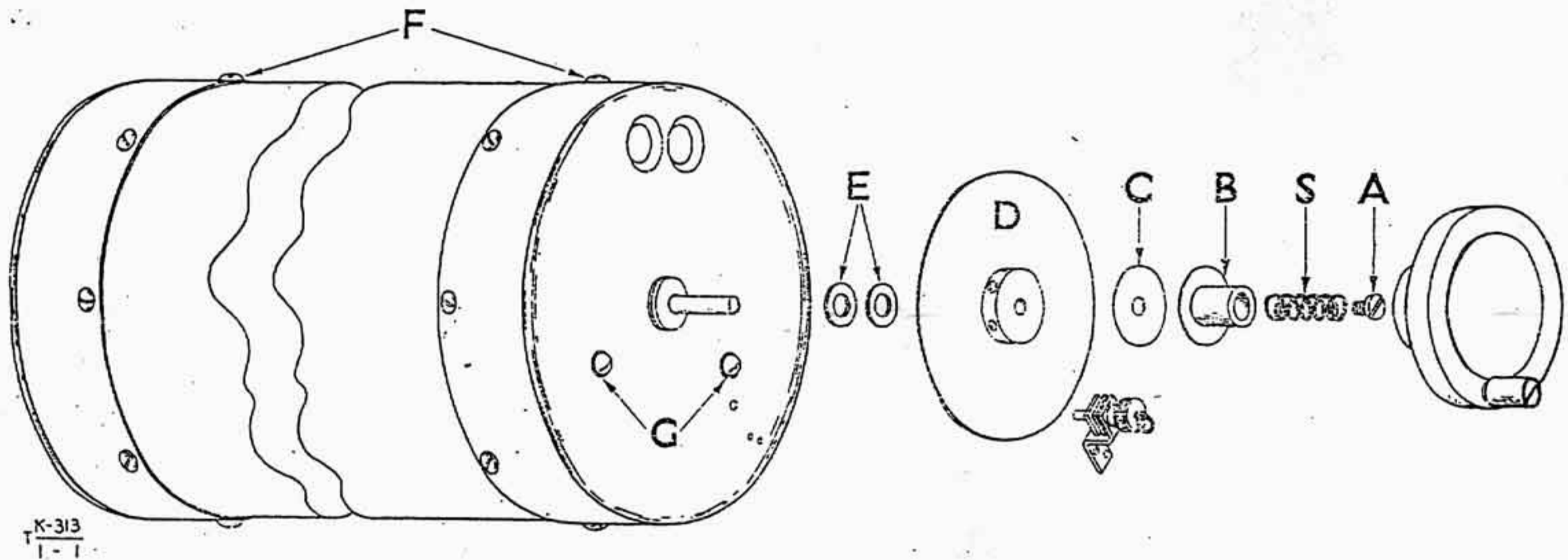


Fig. 1—Aerial tuning inductance

## MECHANICAL REPLACEMENTS AND ADJUSTMENTS

### Drive control

2. Remove knob, unscrew fixing nut and unsolder wires. When replacing make sure that the black (chassis) wire is connected to the centre tag.

### Point plugs

3. To replace CONTROL plug, first disconnect and remove the rotary transformer. The plug can then be disconnected and withdrawn. The L.T. INPUT plug can be replaced from the end of the chassis without removing the rotary transformer.

### Aerial tuning inductance

4. To clean and inspect the inductance study Fig. 1 in conjunction with the following:—

- Remove control knob by loosening both grub screws, undo clutch fixing screw A and remove pressure spring S, bearing bush B and washer C.
- Unscrew dial clamp from end cover, loosen grub screws holding dial D, then remove dial and clamp together. Remove packing washers E behind dial.
- Remove the two fixing screws G, loosen the eight screws F and remove end cover.
- Unsolder connection from coaxial plug to contact wheel spindle.

- Loosen the eight screws F on the remaining end cover and push the inductance out of its case, easing the end cover off at the same time.
- Examine spaces between turns of coil for signs of metal deposit, clean it by brisk application of a stiff brush. Inspect contact wheel and, if necessary, clean groove with a rag wrapped round a pointed stick. The contact wheel spindle should be cleaned.
- Check position of contact wheel as follows. With the coil rotated anti-clockwise against stop, and index numbers reading 00, the contact wheel should be one turn from the aerial end of the coil. Rotate coil clockwise and see that contact wheel runs freely along contact spindle.
- To reassemble, carry out operations (a) to (e) in reverse order. When refitting dial D make sure that

the packing washers E have been replaced. Do not tighten grub screws on dial D until the clutch has been assembled and screw A tightened up. The coil shaft should be rotated fully clockwise against the stop when replacing screw A.

### Rotary transformer connections

15. The rotary transformer has, in addition to the four brush terminals, a connecting tag on the top of the frame and a 5in. flexible lead-out wire from the shunt field. The machine is insulated from the chassis by the rubber mounting washers; its frame is connected to the coiled wire resistance R10A and to tag 4 of relay D/1. The positive input brush is wired to tag 1 on relay C/1, tag 2 on relay D/1 and to the filter condenser C10A. The flexible wire is connected direct to chassis. No external connection is made to the negative input brush.

## FAULT FINDING

### General

16. If a fault develops in the installation, the simple tests for operator's daily maintenance, described in Working Instructions for Wireless set No. 19, ZA 21575 and Amplifiers, R.F., No. 2, Mks. I and II, ZA 10396, should be carried out; these will localize most faults. This section describes the action to be taken when the various symptoms are recognised. The instructions printed in ordinary type may be carried out without special apparatus, and could, in an emergency, be done by the operator.