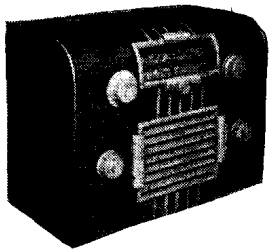
CHAMPION SKYMASTER



Four-valve two-waveband portable superhet for operation from 200-250V AC-DC mains or from self-contained all-dry batteries. Fabric covered cabinet with moulded plastic speaker grille and dial escutcheon and fitted with leather carrying handle. Made by Champion Electric Corporation, Ltd., Seaford, Sussex.

FRAME AERIAL, consisting of approximately 21 turns of enamelled copper wire, is wound in a self-supporting loop and is positioned around the inside of cabinet just at rear of chassis.

On MW band the frame aerial L1, which is coupled direct to g3 of heptode frequency-changer V1, is tuned by VC1 and trimmed by T2. AVC decoupled by R4, C11, R1, C1, is switched by S1 through the frame aerial L1 to g3 of V1.

On LW band a loading coil L2 is switched by S1 between bottom end of L1 and chassis, and an additional trimmer T1 is brought into circuit across the tuning capacitor VC1 by S2. No AVC is applied to g3 of V1 on LW band, the AVC feed being switched out of circuit by S1.

Oscillator is connected in a grid tuned series fed circuit. The grid coils L5(MW), L6(LW), which are padded by C3, C4, respectively, are switched by S4 to oscillator tuning capacitor VC2 and coupled by C5 to oscillator grid (g1) of V1.

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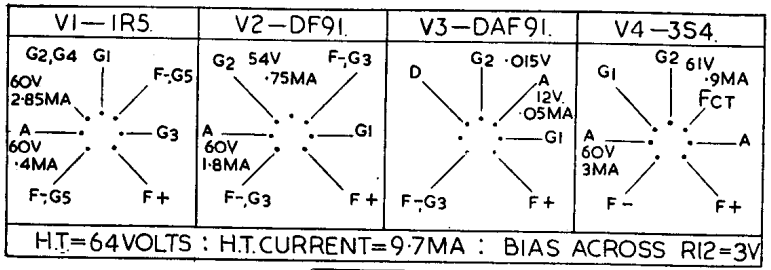
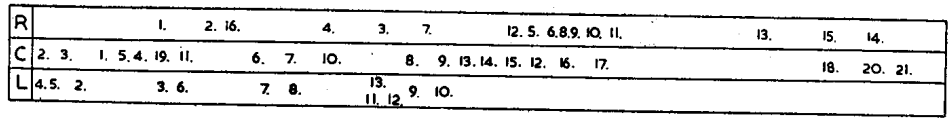
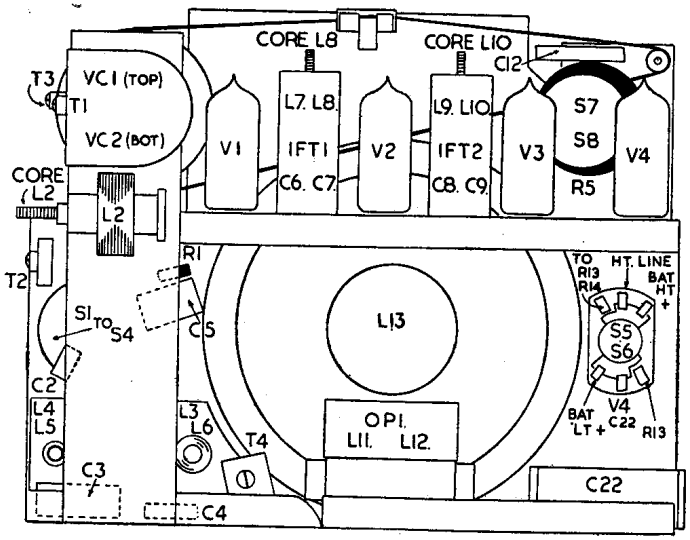
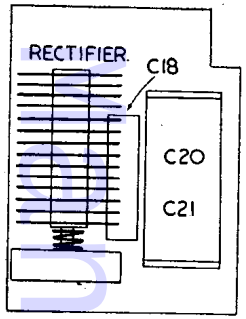


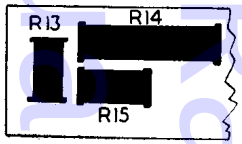
CAPACITORS

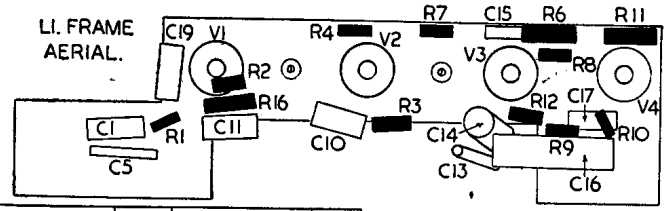
C	Capacity	Type
1	.1 Tubular	150V
2	15pF Silver Mica	
3	600pF Silver Mica	
4	100pF Silver Mica	
5	100pF Silver Mica	
6	100pF Silver Mica	
7	100pF Silver Mica	
8	100pF Silver Mica	
9	100pF Silver Mica	
10	.1 Tubular	150V
11	.1 Tubular	150V
12	100pF Silver Mica	
13	.005 Tubular	150V
14	.1 Tubular	150V
15	100pF Tubular	Ceramic
16	.01 Tubular	150V
17	.005 Tubular	150V
18	.01 Tubular	1000V
19	.1 Tubular	150V
20	32 Electrolytic	250V
21	32 Electrolytic	250V
22	50 Electrolytic	25V

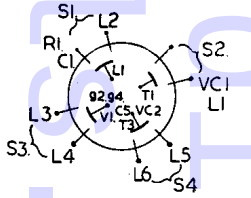


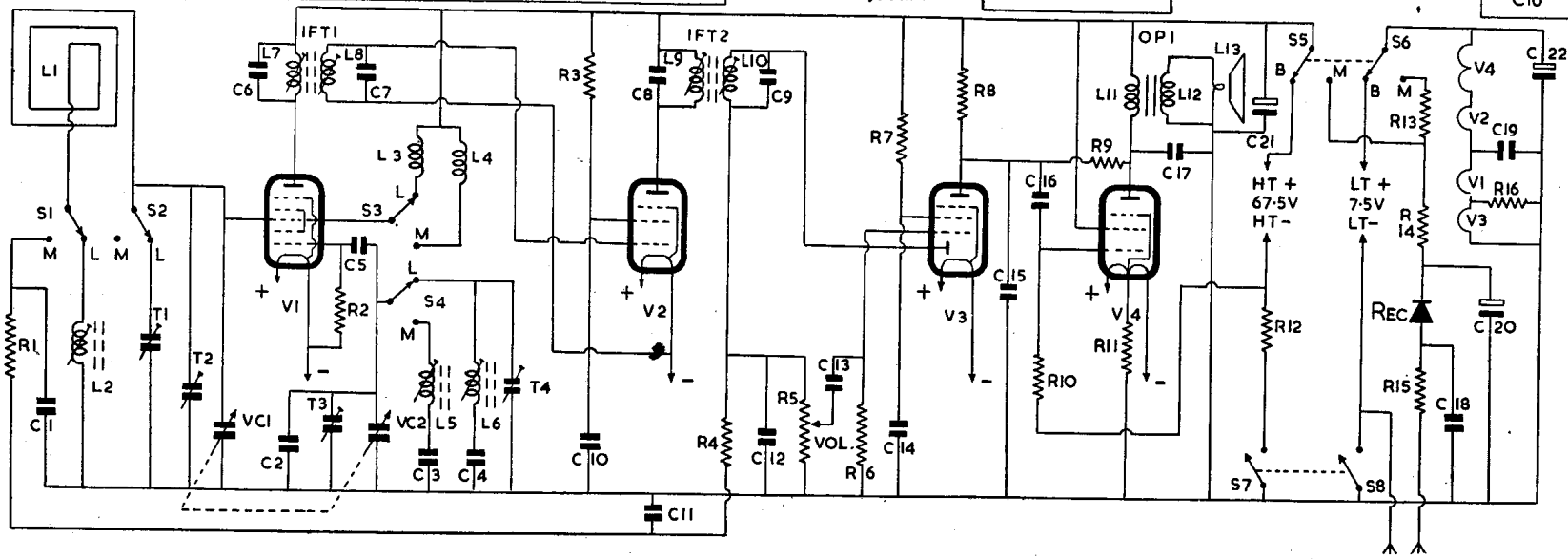












RESISTORS

R	Ohms	Watts
1	470K	1/4
2	100K	1/4
3	4.7K	1/4
4	2.2M	1/8
5	1M Potr. (with DPST Switch)	
6	6.8M	1/4
7	2.2M	1/8
8	470K	1/8
9	2.2M	1/8
10	1M	1/4
11	1.5K	1/4
12	220	1/4
13	1.4K	5
14	2.5K	10
15	150	5
16	240	1/2

INDUCTORS

L	Ohms
1	.5
2	10
3	3.25
4	.75
5	1.5
6	5
7-9	13
10	10
11	350
12	.5
13	2.5

BERRY'S 'NEW LOOK' WATER HEATER—*Continued*

ELECTRICAL SYSTEM

The element (Fig. 5) consists of a 750W spiral threaded through channels lengthwise in a five-section ceramic former. Spiral is connected to terminals on a ceramic base fitted with a locating slot which engages with stud on apparatus plate.

Temperature of water is controlled by a Satchwell type V thermostat. The thermostat is specially designed for control of domestic water heaters and is adjustable between 70 and 190 deg. F. In hard water districts a setting of not more than 160 deg. F. is recommended; with very soft water, temperatures up to 190 deg. do no harm.

The thermostat slides into a water-tight immersion tube on apparatus plate and is held in position by a spring clip. Thermostat is wired in series with live mains lead to heater element.

The housing is connected by a stout metal strap to gun-metal ring on bottom of water container. An earthing terminal is provided on apparatus plate. The three core mains cable is fed through insulated bush in bottom housing to terminals.

INSTALLATION

A metal plate provided with elongated screw holes is fitted to rear panel of heater for mounting purposes. Mounting screws require to be 9ins. apart and should be inserted in Rawlplugs.

A metal screw plate at bottom of rear panel is provided for securing heater after it has been hung in position on the two top screws.

The heater should be sufficiently high above sink or toilet basin so that clearance is available for withdrawal of apparatus plate when necessary.

Mains lead should be connected by a three-pin 5A plug to a switched wall socket. Mains should not be switched on until heater is filled with water.

ADJUSTMENTS AND MAINTENANCE

Outlet pipe continually dripping.—Remove small screw at side of top air valve and check that the ball valve is free to operate. If necessary remove the entire valve assembly by unscrewing it in an anti-clockwise direction. Check that base plate is clean and that inlet hole of ball valve is free of obstruction. If outlet still drips then re-new washer on stopcock.

Water continues to run a considerable time after stopcock is turned off. This is because rate of cold water inlet is greater than the maximum outlet flow through siphon.

Remove screw just above turnkey body cover and then remove locking screw exposed. Adjust the restrictor screw immediately behind locking screw until outlet flow stops within a few seconds of stopcock being turned off. Clockwise adjustment of restrictor screw decreases flow of input.

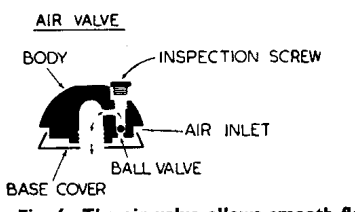


Fig. 6—The air valve allows smooth flow of water during siphoning. It is designed for simplicity and consequent reliability

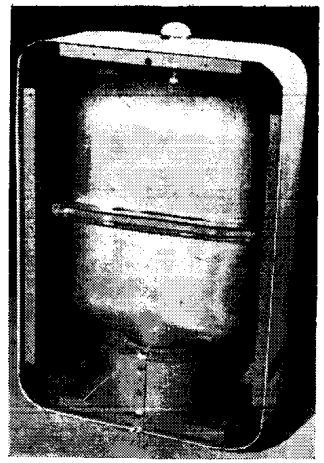


Fig. 7—The flat back and lagging removed to show the braced flat container resting on the fibre support tube

Uneven flow or spurting of hot water at outlet.—This is caused by faulty air valve—carry out check of air valve as described above. Irregular flow may also result if the cold inlet rate is too low.

De-furring cylinder.—Frequency will depend upon the hardness of the local water supply. Normally de-furring should be done every 12 months, or more frequently in some districts. With very soft water, de-furring may be necessary only in three or four years.

Switch off wall socket and remove mains plug from socket. Remove apparatus cover plates by loosening large milled centre screw. Undo cap on container drain pipe (next to the outlet tube) and allow water to drain out of container. Make sure stopcock is turned off—then uncouple top of stopcock from inlet tube. Remove swivel swan neck outlet pipe. Undo mains and earth wires from terminals and remove mains cable.

Undo the six hexagonal headed bolts around edge of apparatus plate. Insert two of these bolts into the two tapped holes provided at opposite sides of plate. Screw home these bolts gradually, turning each bolt alternately, until apparatus plate is "forced" away from joint on bottom ring of container.

Hold stopcock away from underneath the heater and then carefully withdraw apparatus plate.

Remove heater element and thermostat from the assembly and place assembly in a bath of Clensol and allow to soak for awhile. Then rub off fur and finally thoroughly rinse in clean water.

Container can be cleaned with a swab soaked in Clensol and then finally rinsed with clean water. If container is badly furred then it will be necessary to remove the whole heater from wall so that tank can be filled with Clensol. All parts treated should be thoroughly washed with clean water.

Renewal of heater spiral.—Withdraw heater element from its tube. Remove connecting wires from terminals. Undo nut at top of centre rod through heater and then remove both end pieces to allow old spiral to be removed from channels in ceramic supports. Carefully divide up new spiral into eight equal sections and then feed it through channels in supports. Reassemble and reconnect heater.

CHAMPION SKYMASTER

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T3, C2 which are shunted across tuning capacitor VC2 give MW trimming, whilst T4, which is shunted across L6, C4, provides LW trimming. Automatic bias for oscillator grid is developed on C5 with R2 as leak resistor.

Anode reaction voltages are developed inductively from across L4 (MW), L3 (LW), which are switched by S3 in series with the HT supply to oscillator anode (g2, g4) of V1.

IF amplifier operates at 465kc/s. IFT1 formed by L7, C6, L8, C7, in the anode circuit of V1, couples frequency changer signal to g1 of IF amplifier V2.

Screen (g2) voltage is obtained from R3 decoupled by C10. Suppressor (g3) is internally connected to negative side of filament. Primary L9, C8, of IFT2 is in the anode circuit.

Signal rectifier.—Secondary L10, C9, feeds signal to diode of V3. R5, the volume control, is the diode load and C12 a filter capacitor.

AVC is obtained by feeding the DC component of the rectified signal through decoupling network R4, C11, R1, C1, to g1 of frequency changer V1.

AF amplifier C13 feed signal from volume control R5 to g1 of pentode section of V3. Automatic bias for grid is developed on C13 with R6 as leak resistor. Screen (g2) voltage is obtained from R7 and decoupled by C14.

Suppressor (g3) is internally connected to negative side of filament. R8 is the anode lead and C15 anode by-pass capacitor.

Output stage C16 feeds signal to g1 of pentode output valve V4. R10, the grid resistor, is returned to chassis through R12 to provide a negative bias for its grid. Screen (g2) voltage is obtained direct from HT line. Suppressor (g3) is internally connected to centre tap of filament. L11 the primary of output matching transformer OP1 is in the anode circuit. Secondary L12 feeds signal to a 5in. PM speaker L13.

HT of 67.5V is provided by an Ever Ready Batrymax type B101 battery or alternatively from the mains supply. S5 switches the HT line of receiver to whichever source of supply is desired.

C21 provides HT battery decoupling and serves as smoothing capacitor on mains generated HT. The mains input is fed through limiter R15 to halfwave metal rectifier, after which the rectified voltage is smoothed and dropped by R14, C20, C21 to give the required output. C18 is mains input filter capacitor.

LT of 7.5V for the series-connected filaments of V1 to V4 is provided by an Ever Ready All-dry B1 battery or, alternatively, from the rectified and smoothed HT supply through dropper resistor R13. C22 is filament voltage smoothing capacitor. R11, R16 are shunt resistors and C19 bypass capacitor. S6, which is ganged to S5, switches filament line to appropriate source of supply. S7, S8, which are ganged to volume control spindle and break HT, LT and mains leads to chassis, form the receiver on-off switch.

Mains voltage adjustment. For 200-215V, resistor R15 should be a 65 ohm 5W type and for 250-260V it should be 450 ohms 5W rating.

Chassis removal.—Remove the four control knobs and batteries. Unsolder the two leads to frame aerial. Remove the three chassis bolts on underside of cabinet. Carefully withdraw chassis. Undo bolts, holding handle plates in position sufficiently to allow paxolin strips on inside of cabinet to be rotated off frame aerial. Lift out frame aerial. If alignment is being carried out connect up frame aerial to chassis and place batteries and frame on bench in approximately the position as they would occupy in the cabinet.

TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for max. output
(1) Remove chassis from cabinet and connect frame aerial in circuit. Remove resistance panel in centre of rear chassis to give access to OP1 for connection of an output meter.		
(2) 465kc/s to g3 of V1 via .01	—	Core L10, L9, L8, L7
(3) Place frame around chassis so that it occupies the same position as in cabinet.		
(4) 1.5mc/s to frame AE via a loop placed at a distance of 1 ft.	200 metres	T3, T2
(5) 600kc/s as above ..	500 metres	Core L5. Repeat (4) and (5)
(6) 300kc/s as above ..	1,000 metres	T4, T1
(7) 166.6kc/s as above	1,800 metres	Core L6, L2. Repeat (6) and (7)

Reseal IF cores after adjustment.

EHT DISCHARGE

SYMPTOM: raster covered with white blobs which appear in a random fashion, similar to car ignition interference, although somewhat smaller in size. Also heard on sound channel as continuous "frying" noise.

This fault is easily noticed, and due to its persistence it soon becomes obvious that it is not car interference. If there is any doubt, it can be checked by removing the aerial. In certain cases it is possible to hear the actual "hiss" of the discharge, and in extreme cases it may be accompanied by an ozone smell.

The exact location of the fault is usually at the CRT cap where a discharge from a sharp skirt or point shows up as a small blue glow. It can occur at the terminals of high-voltage reservoir condensers, where it has been known to be caused by a frayed flexible lead. In this case, corona discharges occur off the whiskers. The cure is to remove (where possible) all sharp projections from HV points and then to smear the point with a silicone jelly. In the case of a CRT cap, it is general practice to smear well round the cap and on to the surface of the bulb.

Similar trouble can occur on the anode cap of the line amplifier valve, but this is fortunately very rare. RF-oscillator EHT supplies are also prone to trouble of this nature. Before assuming that "corona" is due to natural causes (dampness, etc.) ensure that the EHT voltage has not arisen due to an open circuit bleeder chain.—K.K.