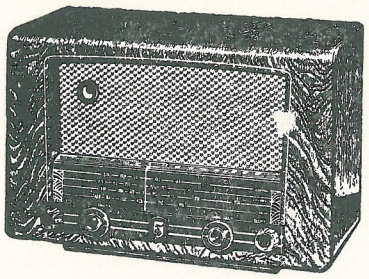
PHILIPS RADIOPLAYER: MODEL BZ446A

6 Valve Superheterodyne Receiver
Mains Supply: 210–235 volts, 50 c/s
Wave Range: Broadcast 535–1740 Kc/s
Intermediate Frequency: 455 Kc/s



REMOVAL FROM THE CABINET

The majority of service work may be carried out without removing the chassis from the cabinet. However, for repairs to dial drive, replacement of volume or tone controls, etc., it will be found necessary to remove the chassis, and the following procedure should be adopted.

Remove the mains plug from the supply. Remove the bottom cover—there are four screws under the cabinet and three screws in the back of the chassis. Loosen off the pointer clamping screw, which is accessible from under the cabinet, and lift the cable free. Slip the Normal/High Fidelity/Gram switch indicator cord from the lever screw on the shaft. Disconnect the plate aerial by turning the 'speed Fix' nut, holding the phosphor bronze contact, through 90 degrees. Slide both nut and contact off the boss.

Remove the speaker plug from its socket.

Remove the four control knobs by unscrewing and removing the four grub screws.

After removing the four chassis mounting bolts the chassis may be lifted clear of the cabinet. To replace the cabinet, reverse the above procedure.

REMOVAL OF DIAL SCALE

To remove the dial scale, remove the control knobs, as above. Unscrew the two ornamental screws on the knob escutcheon, and lift clear. Lift off the injection moulded scale.

REPLACING THE PANEL LAMP

Remove the bottom cover plate. Unscrew the pilot lamp bracket mounting screw, and slide the holder out of position. When replacing the holder, fit the bracket into position and refit the screw, but do not tighten.

Switch on the receiver and adjust the position of the pilot lamp for the best illumination of the dial by sliding the bracket along the screw. When best results are obtained, tighten the clamping screw. Replace the bottom cover.

ALIGNMENT OF THE RECEIVER

All alignment adjustments are accessible while the chassis is assembled in the cabinet.

Remove the bottom cover to expose the trimmers. The intermediate frequency filters and coil adjustments are accessible on the top of the chassis (see trimmer location diagram). Switch on the receiver and allow it to warm up for a few minutes.

Turn the volume control to the maximum position and the tuning control to minimum capacity position. Turn the selector switch to the 'normal' position. Apply a signal of 455 Kc/s modulated 30% through a capacity of 0.01 mfd to the control grid of the ECH81.

Screw all the intermediate frequency filter adjusting slugs right out, then carefully adjust each one for maximum output in the sequence:—(1) Diode coil. (2) EBF80 Plate coil. (3) ECH81 Plate coil. (4) EBF80 Grid coil. Do not repeat.

If each tuned circuit is carefully adjusted, a symmetrical selectivity curve will result, both in 'normal' and 'high fidelity' positions. If in tuning across 455 Kc/s the selectivity curve appears non-symmetrical, screw out the adjusting slugs, and repeat the adjustments as before.

When the intermediate frequency filters have been correctly adjusted, disconnect the 0.01 mfd coupling condenser from the control grid of the ECH81. Turn the tuning condenser to the maximum capacity position, and set the pointer to the reference line at the low frequency end of the dial scale.

Connect the signal generator, through a standard dummy, to the aerial and earth connections of the receiver. Turn the pointer to the 600 Kc/s position on the scale, and apply a signal of 600 Kc/s to the aerial. Adjust the padder until the signal is tuned in; adjust the aerial and translator inductance for maximum output.

Turn the pointer to the 1500 Kc/s position on the scale, and apply a signal of 1500 Kc/s to the aerial. Adjust the oscillator trimmer until the signal is tuned in; adjust the aerial and translator trimmers for maximum output.

Repeat the adjustments of 600 Kc/s and 1500 Kc/s. Check the sensitivity and calibration at 950 Kc/s. If the calibration is not correct the sensitivity will be low, and if 950 Kc/s tunes in at a lower frequency position on the dial scale, then the oscillator inductance adjusting slug should be screwed in, slightly over-correcting, and the oscillator padder adjusted to correct 600 Kc/s and the oscillator trimmer to correct 1500 Kc/s.

If 950 Kc/s tunes in at a higher frequency position on the dial scale, then the oscillator inductance adjusting slug should be screwed out again, slightly over-correcting, and the oscillator padder adjusted to correct 600 Kc/s, and the oscillator trimmer adjusted to correct 1500 Kc/s.

Once the aerial and translator inductances and trimmers have been adjusted at their respective frequencies, they should not be moved during calibration adjustments. When all adjustments are completed seal all trimmers and adjusting slugs.

Average sensitivity figures are given overleaf. These are given mainly as a guide, since sensitivity should if anything be better than the figures quoted. The standard output is 50 milliwatts into a 5 ohm load.

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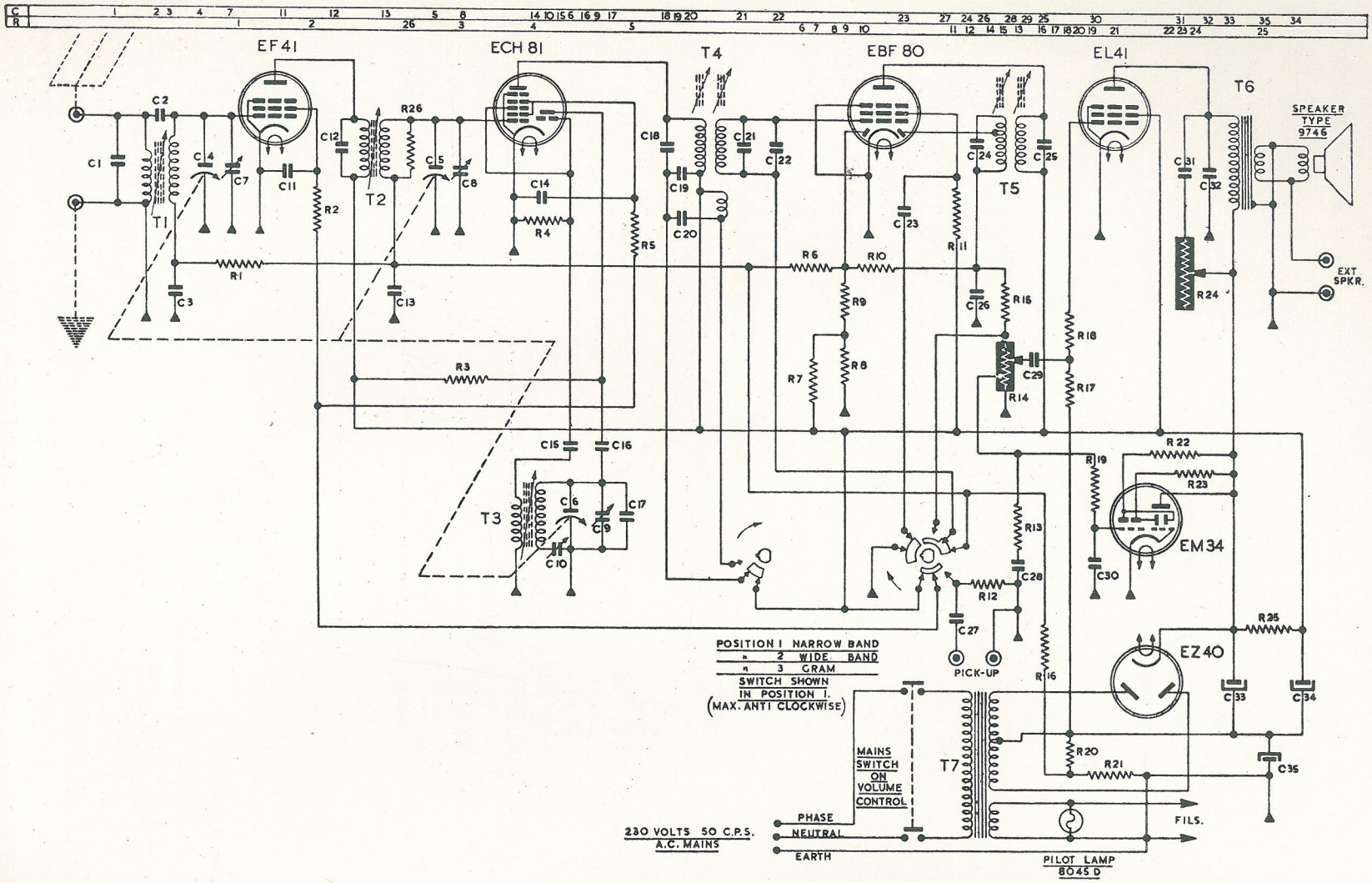
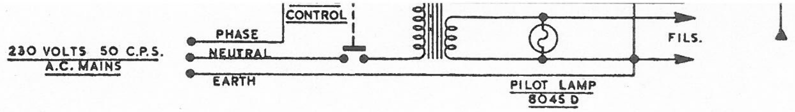
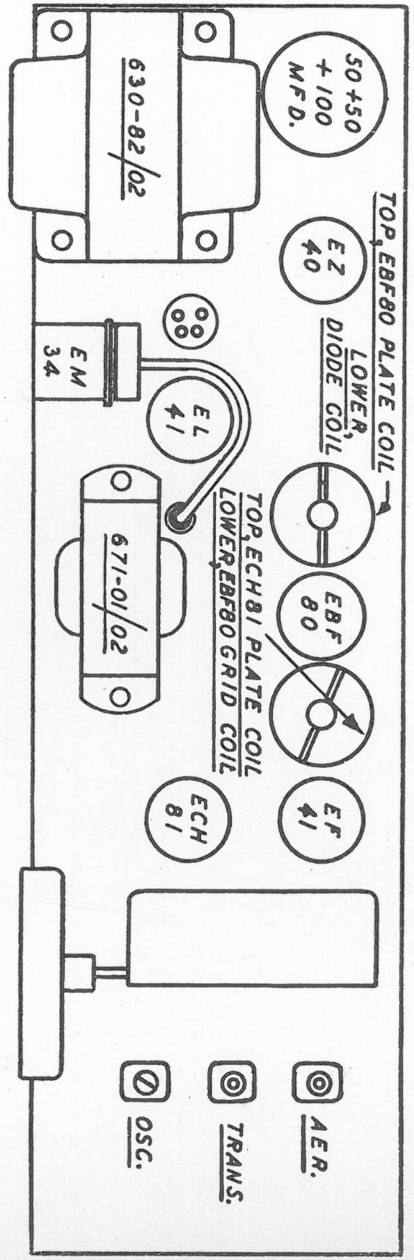
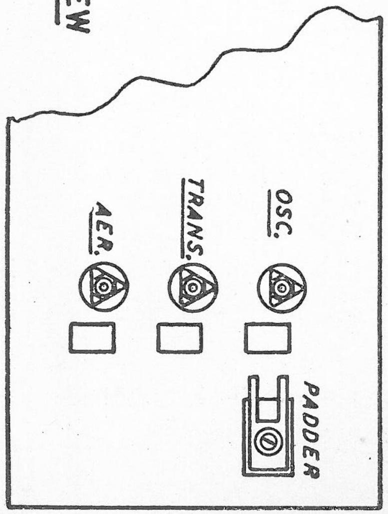




TRIMMER LOCATION DIAGRAMS MODEL BZ446A



TOP VIEW



BOTTOM VIEW

CONDENSERS

C1	10 mmfd ceramic
C2	3.9 ,, ,,
C3	0.05 mfd 350v. paper
C4	12-500 mmfd } 3 ganged condenser
C5	12-500 ,, } 3 ganged condenser
C6	12-500 ,, } 3 ganged condenser
C7	3-30 mmfd air trimmer
C8	3-30 ,, ,, ,,
C9	3-30 ,, ,, ,,
C10	150-750 mmfd t.p.8 padder
C11	0.01 mfd 500v. paper
C12	100 mmfd ceramic
C13	0.05 mfd 350v. paper
C14	0.01 ,, 500v. ,,
C15	47 mmfd ceramic
C16	150 ,, ,,
C17	10 ,, ,,
C18	115 ,, ,,
C19	1500 ,, ,,
C20	1500 ,, ,,
C21	115 ,, ,,
C22	115 ,, ,,
C23	0.01 mfd 500v. paper
C24	110 mmfd ceramic
C25	110 ,, ,,
C26	100 ,, ,,
C27	0.01 mfd 500v. paper
C28	0.01 ,, 500v. ,,
C29	0.01 ,, 500v. ,,
C30	0.05 ,, 500v. ,,
C31	0.05 ,, 500v. ,,
C32	0.005 ,, 750v. ,,
C33	50 mfd 350v. } triple electro-lytic
C34	50 ,, 350v. } triple electro-lytic
C35	100 ,, 10v. } triple electro-lytic

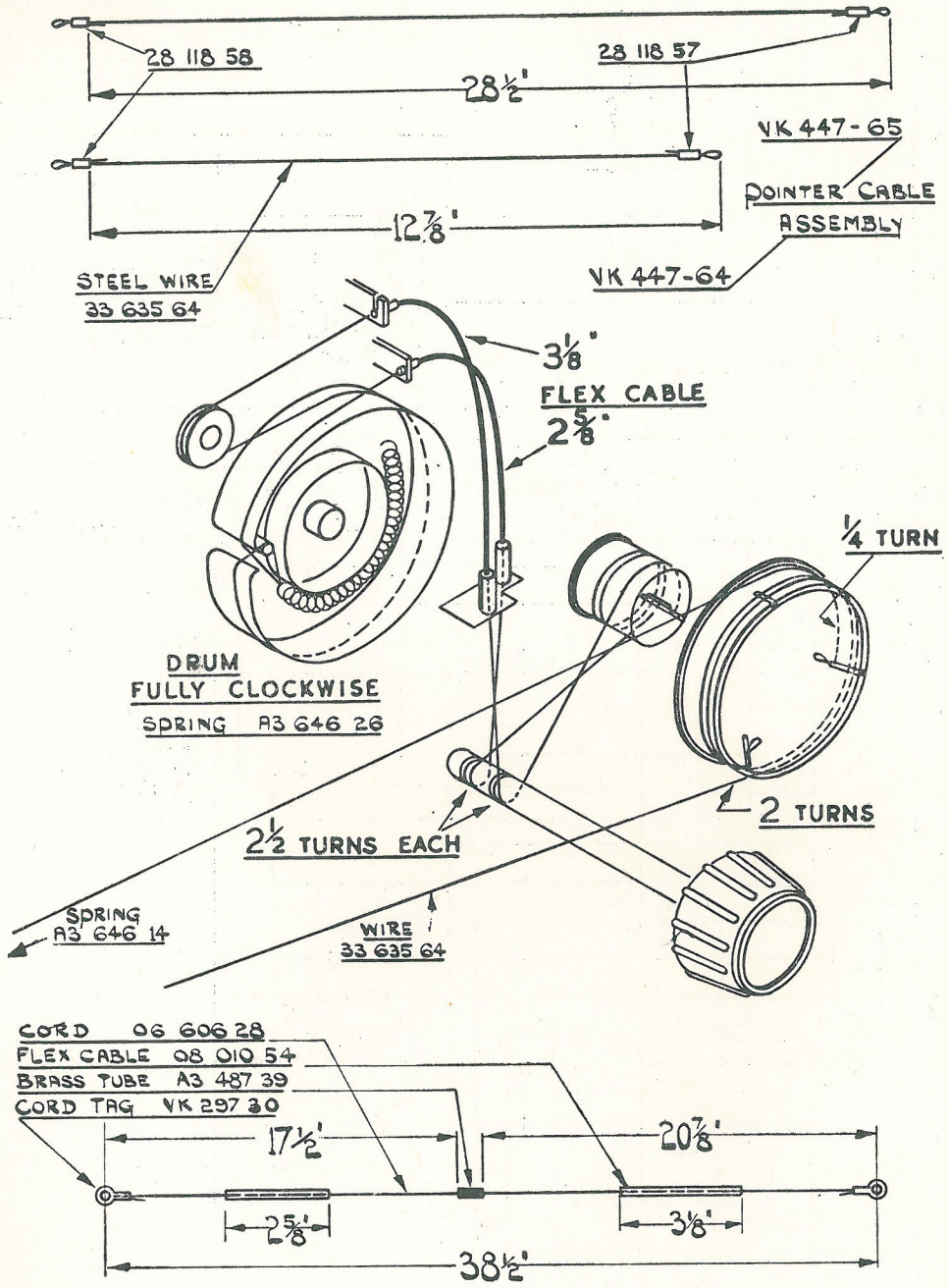
RESISTORS

R1	470k $\frac{1}{4}$w. carbon
R2	100k $\frac{1}{2}$w. ,,
R3	27k 1w. ,,
R4	47k $\frac{1}{4}$w. ,,
R5	27k 1w. ,,
R6	1 meg. $\frac{1}{4}$w. ,,
R7	470k $\frac{1}{4}$w. ,,
R8	100k $\frac{1}{4}$w. ,,
R9	10 meg. $\frac{1}{4}$w. ,,
R10	1 meg. $\frac{1}{4}$w. ,,
R11	100k $\frac{1}{2}$w. ,,
R12	4.7 meg. $\frac{1}{4}$w. ,,
R13	47k $\frac{1}{4}$w. ,,
R14	350k tapped at 15k carbon pot.
R15	33k $\frac{1}{4}$w. carbon
R16	1 meg. $\frac{1}{4}$w. ,,
R17	680k $\frac{1}{4}$w. ,,
R18	10k $\frac{1}{4}$w. ,,
R19	2 meg. $\frac{1}{4}$w. ,,
R20	82 ohms 1w. ,,
R21	25 ,, $\frac{1}{2}$w. ,,
R22	1 meg. $\frac{1}{4}$w. ,,
R23	1 ,, $\frac{1}{4}$w. ,,
R24	50k carbon potentiometer
R25	1500 ohms 4w. wire wound
R26	68k $\frac{1}{2}$w. carbon

NOTE.—R26 in late production only

COILS

T1	Aerial coil	VK-469-65
T2	Translator coil	VK-473-19
T3	Oscillator coil	VK-471-45
T4	I.F. transformer	A3-122-38
T5	I.F. ,,	VK-476-36
T6	Output transformer	VK-671-01/02
T7	Power transformer	VK-630-82/02



REPLACING THE POINTER DRIVE CABLE

With the ganged condenser in the maximum capacity position, place the smaller brass clamp (28-118-58) of the cable VK-447-64 in the longest slot of the pointer driving drum, which should be at approximately 4 o'clock position.

Take up the cable on to the drum, by placing over the drum in an anti-clockwise direction and turning the ganged condenser to minimum capacity. The longer slot in the drum will turn through approximately 510 degrees so that in the minimum capacity position it should be at approximately 9 o'clock position, with 1¾ turns of cable on the drum.

The spring A3-646-14 is attached to the free end of the cable, and the other end of the spring is attached to the cable VK-447-65 at the loop in the end (formed with the brass clamp 28-118-57), and the cable is passed over the left-hand idler pulley, and on to the bottom of the drum in an anti-clockwise direction.

Stretch the spring to allow the cable to be placed round the drum and fit the brass clamp (28-118-58) into the slot at the 1 o'clock position.

The cables should now be adjusted on the drum so that they do not cross. The rear cable should progress toward the back of the drum rim when it is taking up cable and the front cord should progress toward the front.

SENSITIVITY FIGURES

FREQUENCY	SIGNAL APPLIED TO	SENSITIVITY
455 Kc/s	ECH81 control grid via 0.01 mfd condenser	400 μV
600 Kc/s	Standard dummy to aerial connection	20 μV
950 Kc/s	" " " " "	20 μV
1500 Kc/s	" " " " "	20 μV

VOLTAGE TABLE

All readings taken with a primary input of 230 volts 50 c/s.
A.C. Full load primary current should not exceed 215 m/A.

VALVE	FUNCTION	FILAMENTS	CATHODE	SCREEN	PLATE
EF41	R.F. Amplifier	6.2	—	70	205
ECH81	Frequency converter and oscillator	6.2	—	80	Conv. 205 Osc. 75
EBF80	I.F. Amplifier, detector & delayed A.V.C.	6.2	—	65	205
EL41	Power output	6.2	—	205	245
EZ40	Full wave rectifier	6.2	260	—	A.C. per plate 260
EM34	Dual sensitivity tuning indicator	6.2	—	Target 260	30/25
8045D	Pilot lamp	6.2	—	—	—

Back bias across R20 + R21 6.25 volts
" " " R21 1.5 volts

The above voltages are measured between the points indicated and chassis with a meter having a resistance of 20,000 ohms per volt on D.C. and 1,000 ohms per volt on A.C. ranges. Variations up to + or — 5% are permissible. Selector switch in 'normal' position and tuning condenser at maximum capacity.

COIL AND TRANSFORMER RESISTANCES

CODE No.	FUNCTION	WINDING	D.C. RESISTANCE
VK-469-65	Aerial coil	Primary	40 ohms
		Secondary	2.3 "
VK-473-19	Translator coil	Primary	68 "
		Secondary	2.3 "
VK-471-45	Oscillator coil	Feedback	2.75 "
		Tuned	5.75 "
A3-122-38	Intermediate Frequency Filter	Primary	7.4 "
		Coupling	0.5 "
		Secondary	4.5 "
VK-476-36	Intermediate Frequency Filter	Each winding	7.25 "
		Tap	4.4 "
VK-671-01/02	Output Transformer	Primary	325 "
		Secondary	0.475 "
VK-630-82/02	Power Transformer	Primary	37.5 "
		Filament	0.055 "
		Secondary	265 "
			245 "

REPLACING THE GANG DRIVE CORD

It is necessary when replacing the gang drive cord, to remove the pointer drive cable drum. This is done by removing the pointer cable from the drum and removing the three fixing screws and sliding the drum forward.

Turn the gang to the maximum capacity position and attach the spring A3-646-26 (see diagram) securely to the drum, by bending the lug on the drum over one end of the spring.

The small bakelite driving drum has a slot across the rim, with two small grooves to position the cord (VK-447-22). Under the slot is a round hole into which the brass tube on the cord is fitted, with the short end (17½") of the cord towards the back of the drum. With the slot in the drum at 10 o'clock the back cord is passed round the drum one and a half times in a clockwise direction towards the front of the drum, and the front cord is passed round the drum one and a quarter times in an anti-clockwise direction. A small piece of cellulose tape placed over the turns and drum will assist in keeping the cord in place while further threading operations are carried out.

The back cord is next fed over the drive shaft in an anti-clockwise direction for three turns towards the chassis, and the flex cable (2⅜") is fitted into the right-hand cable socket on the chassis bracket, and the lower cable socket on the gang condenser bracket. This end of the cord is then placed over the gang drum and brought through the slot in the drum and the tag placed over the end of the spring. The gang condenser should now be opened slightly to take up the slack in the cord, without placing any tension on the small driving drum. The front cord of the driving drum is now fed under the driving shaft in a clockwise direction for two and a half turns towards the front of the shaft, and the flex cable (3⅛") is fitted into the left-hand cable socket on the chassis bracket and the upper socket on the gang condenser bracket. This end of the cord is next placed round the small brass pulley and round the gang drum in a clockwise direction.

Remove the cellulose tape from the small driving drum and with a pair of pliers expand the spring, at the same time taking up the slack in the free end of the cord, until it can be continued round the drum, and passes through the slot in the drum, round the capstan and over the end of the spring. Release the spring and see that the cord is positioned on the drive shaft in such a way that it does not bind in the chassis bearing and close up any gaps between adjacent turns. Turn the drive shaft a few times so that the tension is equalised, over the cord.

Replace the large pointer driving drum so that when the gang is in the maximum capacity position the longest slot in the rim of the drum is approximately at 4 o'clock.