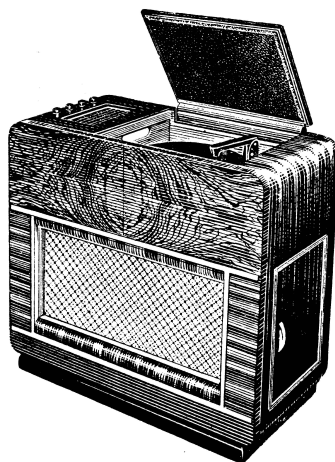


Private and Confidential



The Hallmark of Quality

For Trade Use Only



"His Master's Voice" SERVICE MANUAL

for

FIVE-VALVE A.C. DUAL-WAVE
AUTOMATIC RADIOGRAM
CONSOLE MODEL E43D



THE GRAMOPHONE COMPANY LTD.
(Incorporated in England)
HOMEBUSH - N.S.W.

TECHNICAL SPECIFICATION

POWER SUPPLY:

200 to 250 volts, 50 c.p.s.

CONSUMPTION:

Radio 45 watts.

Gram 55 watts.

FREQUENCY RANGE:

Broadcast: 540 Kc/s to 1600 Kcs.

Short-wave: 16.5 Metres to 51 Metres.

INTERMEDIATE FREQUENCY:

457.5 Kc/s.

VALVE COMPLEMENT:

6AN7 Frequency Changer

6AR7GT/EBF35 ... I.F. Amplifier, Demod.,
A.V.C.

6SJ7GT Audio Amplifier

6V6GT Power Amplifier

5Y3GT Rectifier.

DIAL LAMP:

240V.—15W. Pilot Lamp B.C.

LOUDSPEAKER:

12-inch, B0180 or B0180A.

Voice coil impedance at 400 c.p.s.:

B0180 2.0 ohms.

B0180A 6.5 ohms.

AUTOMATIC RECORD CHANGER:

C0537.

DIMENSIONS:

Width 31 ins.

Height 28 $\frac{3}{8}$ ins.

Depth 16 $\frac{1}{4}$ ins.

WEIGHT:

Gross 98 lbs.

Nett 88 lbs.

CIRCUIT DESCRIPTION

This model incorporates a 5-valve A.C. mains-operated radio-gramophone combination. The receiver is a dual-wave superheterodyne for broadcast and short-wave reception. An automatic record changer is incorporated for record reproduction.

FREQUENCY CHANGER

The aerial on the broadcast band is coupled to the signal frequency circuit by means of the iron dust cored aerial transformer L1-L2. For short-wave reception the short-wave aerial transformer L5-L6 is switched into circuit.

A triode hexode V1 is employed as frequency changer. Fixed padding capacitors are used on both bands. A variable padding adjustment is provided on the broadcast band by means of an iron dust bolt in the broadcast oscillator coil, L3-L4.

I.F. AMPLIFIER, A.V.C.-DEMOMULATOR

The frequency changer valve is transformer coupled to a duo-diode super control pentode, V2. A.V.C. voltage for the pentode section of this valve, and the frequency changer, is obtained from the diode which is capacity coupled to the primary of the second I.F. transformer. The potential across the back bias resistor, R11, in the high tension negative lead provides A.V.C. delay, and standing bias for the frequency changer and I.F. amplifier valves. Demodulation of the I.F. signal is effected by the remaining diode of V2.

A.F. AMPLIFIER

The input circuit of the A.F. amplifier pentode, V3, may be switched to either the demodulator diode load, R6, or to the pick-up by means of S1. Bias voltage is provided by the cathode resistor, R10.

Tone control is effected at this stage by means of switch S2, which gives bass, normal and speech conditions as required, by switching appropriate condensers in the volume control circuit.

Provision is made for the connection of the pick-up by means of two sockets marked "P.U." at the rear of the chassis.

The audio amplifier is resistance-capacity coupled to the grid of the beam power output valve, V4.

OUTPUT STAGE

A beam power valve, V4, is employed in this stage, working into a plate load of 5,000 ohms, and is coupled to the speaker by transformer T2. Negative feedback voltage is taken from the secondary of the output transformer, T2, and applied to the screen of V3 via condenser C30. This arrangement provides negative feedback over the two audio frequency stages and, since the feedback factor is constant at all settings of the volume control, a constant audio frequency response characteristic is maintained at high or low volume levels.

HIGH TENSION SUPPLY

The power supply employs a directly heated type high-vacuum rectifier, V5. The filter circuit consists of an iron cored choke, CK1, and two electrolytic condensers, C25 and C26.

PICK-UP

The pick-up is a low-impedance constant velocity device, having a D.C. resistance of 1.3 ohms. Ordinary needles should not be used with this pick-up. "Steel Miniature Stylii" or "Sapphire Miniature Stylii" should be used. The

needle should be inserted and pushed fully home without using undue pressure; it is normal for the needle to feel loose when correctly inserted; it should protrude $\frac{1}{4}$ -inch and be vertical to the pick-up face.

MOTOR

For transit purposes, the motor drive spindle is disengaged from the turntable rim by means of a transit screw. This screw, which is located on top of the motor plate, should be unscrewed sufficiently to allow the motor spindle to fully bear on the turntable rim; the locknut should then be retightened. The motor bearings are lubricated for many years' service. Subsequent

lubrication should be carried out by a competent service mechanic.

Re AUTOMATIC RECORD CHANGER

For description of the operational details and possible fault location complete with diagram, consult the separate manual for "The Automatic Record Changer," Type 45000.

DISMANTLING

REMOVAL OF CHASSIS

- (1) Disconnect power plug from supply mains.
- (2) Remove control knobs.
- (3) Disconnect speaker and pick-up leads from chassis.
- (4) Disconnect power cord from chassis to gram. motor and dial lamp at the bakelite connector.
- (5) Remove aerial and earth connections. Unscrew aerial and earth panel from cabinet back.
- (6) Unscrew wingnut holding dial lamp socket and remove.
- (7) Unscrew the wingnut and wood screw holding the chassis mounting board, lower board complete with chassis and withdraw from cabinet.

Note: A service hatch is provided in the chassis mounting board to facilitate servicing or, alternatively, the chassis may be removed from the board by removing the two fixing bolts.

REMOVAL OF AUTOMATIC RECORD CHANGER

- (1) Disconnect power plug from supply mains.
- (2) Disconnect power cord from chassis to turntable motor at the bakelite connector.
- (3) Remove pick-up leads from chassis.
- (4) Remove the four fixing screws from the top of the Automatic Record Changer.
- (5) Withdraw the Automatic Record Changer.

RECEIVER ALIGNMENT PROCEDURE

In any case where a component replacement has been made in either the tuned I.F. or R.F. circuits of a receiver, all circuits must be re-aligned. I.F. alignment should always precede R.F. alignment, and even if only one coil has been serviced, the whole of the re-alignment should be done in the order given. An output meter should always be connected across the voice coil terminals of the speaker to indicate when the circuits are tuned to resonance. In carrying out the following operations, it is important that the input to the receiver from the signal generator should be kept low and progressively reduced as the circuits are brought into line, so that the output meter does not exceed about 0.5 volt.

I.F. ALIGNMENT

- (1) Rotate the volume control fully clockwise, set the wave-change switch to "Medium Wave" (centre) position and fully enmesh the tuning condenser vanes. Connect the output leads of the signal generator to the grid of the 6AN7 frequency changer valve through a 0.1 mF. condenser, i.e., fixed plates of front section of 2-gang tuning condenser.
- (2) Tune the signal generator to exactly 457.5 Kc/s.
- (3) Adjust the I.F. transformer trimmer screws for maximum reading on the

output meter, commencing with the second I.F. transformer and following with the first.

- (4) Continue this alignment on each transformer in turn until no greater output can be obtained. It is necessary to repeat this procedure twice to ensure correct alignment.

Note: If the trimmer screws are screwed too far in, it may be possible to obtain a false peak due to coupling effects between the iron cores. Start alignment of each individual transformer by first screwing its core well out, and then advancing the core into the coil until resonance is obtained.

R.F. ALIGNMENT (BROADCAST)

- (1) With the controls set as for I.F. alignment, connect the signal generator output leads in series with a 200 mmF. condenser to the aerial and earth terminals of the receiver.
- (2) Check that when the gang is fully enmeshed the pointer coincides with the setting line on the dial scale. If necessary, the pointer may be adjusted to this position by softening the wax securing the drive cord to the pointer carrier.
- (3) Tune the signal generator to 600 Kc/s.
- (4) Rotate the tuning knob until the pointer is exactly under the 600 Kc/s calibration mark on the dial and adjust the padder screw for maximum response.
- (5) Tune the signal generator to 1500 Kc/s.

ADDITIONAL DATA

Any further information desired may be obtained by addressing an enquiry to the "Service Department, The Gramophone Co. Ltd., 2 Parramatta Road, Homebush, N.S.W."

- (6) Rotate the tuning knob until the pointer coincides with the 1500 Kc/s calibration mark and adjust the oscillator trimmer and aerial trimmer in turn for maximum response.
- (7) Repeat operations (3) to (6) inclusive for correct alignment.

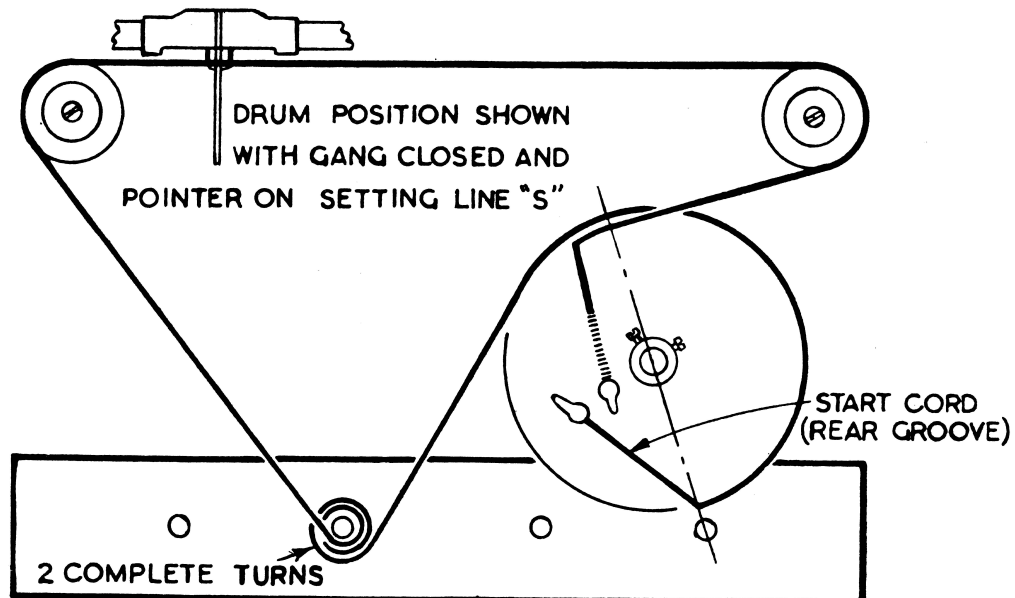
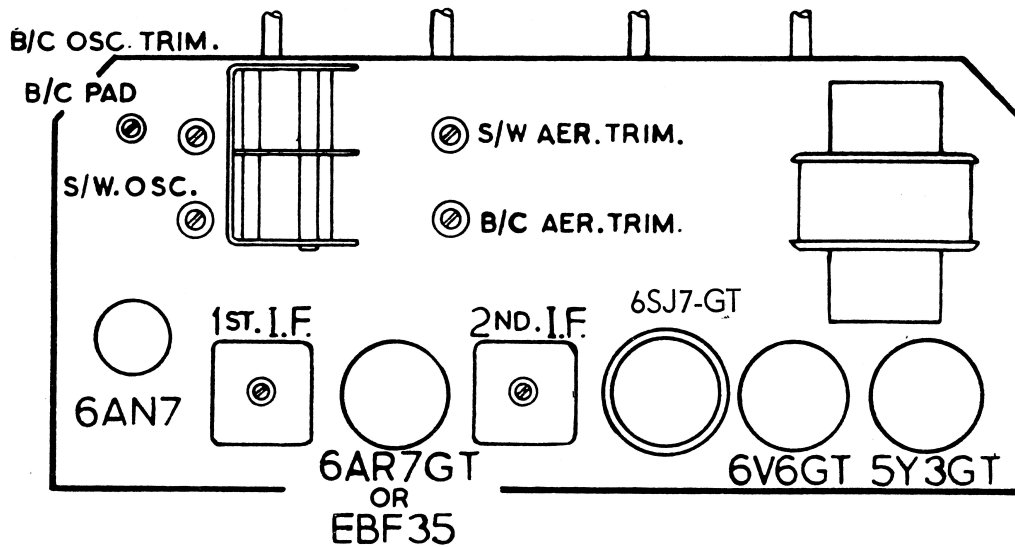
R.F. ALIGNMENT (SHORT-WAVE)

- (1) Set wave-change switch to "Short-wave" (extreme clockwise) position. Remove the 200 mmF. condenser from the output lead of the signal generator and replace with a 400 ohm non-inductive resistor; connect to the aerial and earth terminals as before.
- (2) Rotate the tuning knob until the pointer coincides with 17 Mc/s calibration mark.
- (3) Tune the signal generator to 17 Mc/s.
- (4) Adjust the S/W oscillator trimmer for maximum output. Two settings may be found at which this trimmer will peak; care must be taken that the setting finally chosen is that which gives the lower capacity. Failure to select the correct position of the two will cause serious tracking error and loss of sensitivity.
- (5) Tune the signal generator and receiver to 17.5 Mc/s.
- (6) Adjust the S/W aerial trimmer for maximum output whilst "rocking" the gang condenser slightly to obtain the true resonance point.
- (7) Note that the signal is still tuned in correctly on the dial; if not, readjust the S/W oscillator trimmer slightly until the dial reads correctly, and repeat operation (6).

MODEL E43 D

ALIGNMENT I.F. 457.5 K.C.

B/C { OSC. 600 & 1500 K.C. S/W { OSC. 17.0 M.C.
AER. _____ 1500 K.C. AER. 17.5 M.C.



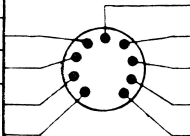
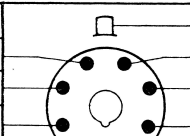
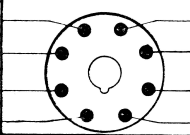
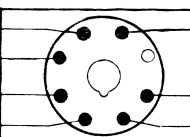
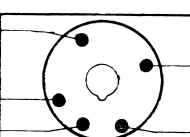
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— VOLTAGE TABLE —

(MODELS — D33A, C13C & E43D.)

- VOLTAGES AND CURRENTS ARE WITH THE RECEIVER OPERATING ON AVERAGE MAINS VOLTAGE, AND TUNED TO A POINT OF NO RECEPTION ON THE BROADCAST BAND.
- VOLTAGE READINGS TAKEN WITH METER RESISTANCE OF 1,000 OHMS PER VOLT.
- VOLTAGE AND CURRENT READINGS WITHIN $\pm 15\%$.
- RESISTANCE READINGS ARE APPROXIMATE.

| VOLTS TO CHASSIS | CURRENT M. A. | RESISTANCE TO CHASSIS | VALVE ELECTRODE | BOTTOM VIEW OF VALVE SOCKET | VALVE ELECTRODE | VOLTS TO CHASSIS | CURRENT M. A. | RESISTANCE TO CHASSIS |
|---|------------------|-----------------------------|--------------------|---|--------------------|------------------------|------------------|-----------------------------|
| V1 6AN7 FREQUENCY CHANGER | | | | | | | | |
| | | | |  | HEATER | 6.3 A.C. | 230 | — |
| | | NIL | HEATER | | INT. CONN. | — | — | — |
| NIL | 9.6 | NIL | CATHODE | | HEX. PLATE | 240 | 2.4 | INFIN. |
| | | 2.1 MEG. | CONTROL GRID | | OSC. PLATE | 95 | 4.6 | INFIN. |
| 80 | 2.3 | INFIN. | SCREEN GRID | | OSC. GRID | — | — | 50,000 Ω |
| V2 6AR7-GT OR EBF35 I.F. AMPLIFIER — DEMODULATOR — A.V.C. | | | | | | | | |
| | | | |  | GRID | — | — | 2 MEG Ω |
| 80 | 1.1 | INFIN. | SCREEN GRID | | DIODE № 2 | — | — | 300,000 Ω |
| 240 | 4 | INFIN. | PLATE | | DIODE № 1 | — | — | 1 MEG Ω |
| NIL | — | NIL | METAL SHELL | | CATHODE | NIL | 5.1 | NIL |
| NIL | — | NIL | HEATER | | HEATER | 6.3 A.C. | 300 | — |
| V3 6SJ7-GT AUDIO AMPLIFIER | | | | | | | | |
| | | | |  | CATHODE | 1.1 | 0.75 | 2,000 Ω |
| | | 1 MEG Ω (MAX) | GRID | | SCREEN GRID | 30 | 0.2 | INFIN. |
| 1.1 | — | 2,000 Ω | SUPPRESSOR | | HEATER | 6.3 A.C. | 300 | — |
| NIL | — | NIL | HEATER | | PLATE | 40 | 0.55 | INFIN. |
| NIL | — | NIL | BASE SLEEVE | | | | | |
| V4 6V6-GT OUTPUT | | | | | | | | |
| 240 | 3.5 | INFIN | SCREEN GRID |  | GRID | — | — | 0.6 MEG Ω |
| 222 | 42 | INFIN | PLATE | | HEATER | 6.3 A.C. | 450 | — |
| NIL | — | NIL | HEATER | | CATHODE | 10.5 | 45.5 | 250 Ω |
| | | | NO CONN. | | | | | |
| | | | | | | | | |
| V5 5Y3-GT RECTIFIER | | | | | | | | |
| 246 A.C. | — | 240 Ω | PLATE № 1 |  | PLATE № 2 | 246 A.C. | — | 240 Ω |
| | | | HEATER | | HEATER | 260 | — | INFIN |
| 260 | 2 AMP. A.C. | INFIN | NO CONN. | | | | | |
| | | | | | | | | |
| | | | | | | | | |

REMARKS:- UNFILTERED H.T. VOLTAGE = 260 VOLTS.
 FILTERED H.T. VOLTAGE = 240 VOLTS.
 TOTAL H.T. CURRENT = 60 MA.
 VOLTAGE ACROSS R11 = 2.4 VOLTS
 RECTIFIER HEATER VOLTAGE = 5 VOLTS

PARTS LIST

| REF. | PART No. | DESCRIPTION | REF. | PART No. | DESCRIPTION | REF. | PART No. | DESCRIPTION |
|---------------|----------|--|------------|----------|---------------------------|---------------|----------|---|
| RESISTORS | | | CONDENSERS | | | MISCELLANEOUS | | |
| R1 | J2X | 100,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C1 | D0243P | 100 mmF. $\pm 10\%$ | VC1 | D2399 | Tuning Cond., 2-gang |
| R2 | H2X | 50,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C2 | D0243BU | 3 mmF. ± 0.5 mmF. | VC2 | D2399 | Tuning Cond., 2-gang |
| R3 | W3X | 30,000 ohms 1 watt $\pm 10\%$ | C3 | D0243BJ | 10 mmF. $\pm 10\%$ | VR1/S3 | D3102 | 1 Megohm Potentio - meter including Mains Switch |
| R4 | P2X | 1 megohm $\frac{1}{2}$ watt $\pm 10\%$ | C4 | C0013M | 0.05 mF. 200V. wkg. | | | |
| R5 | P2X | 1 megohm $\frac{1}{2}$ watt $\pm 10\%$ | C5 | D0243BU | 3 mmF. ± 0.5 mmF. | S1 | D2951 | 5-Pole 3-Position Switch |
| R6 | N2X | 250,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C6 | D0243CW | 425 mmF. ± 5 mmF. | S2 | D2626A | 1-Pole 3-Position Switch |
| R7 | H2X | 50,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C7 | D0243CQ | 4,000 mmF. ± 100 mmF. | IFT1 | D2278 | 1st I.F. Transformer |
| R8 | J2X | 100,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C8 | D0243K | 1,000 mmF. $\pm 10\%$ | IFT2 | D2355 | 2nd I.F. Transformer |
| R9 | S3X | 40,000 ohms 1 watt $\pm 10\%$ | C9 | D0243BE | 25 mmF. $\pm 10\%$ | T1 | D2279 | Mains Transformer |
| R10 | AJ2X | 2,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C10 | D4405W | 100 mmF. $\pm 5\%$ | T2 | | Output Transformer (incorporated in Speaker Assembly) |
| R11 | AYW3X | 40 ohms 1 watt $\pm 10\%$ | C11 | C0014CM | 8 mF. 525PV. Electro. | | | |
| R12 | P3X | 1 megohm 1 watt $\pm 10\%$ | C12 | C0013N | 0.01 mF. 600V. wkg. | T3 | 34720E | P.U. Transformer |
| R13 | N3X | 250,000 ohms 1 watt $\pm 10\%$ | C13 | C00131 | 0.02 mF. 400V. wkg. | CK1 | D2237 | H.T. Filter Choke |
| R14 | H3X | 50,000 ohms 1 watt $\pm 10\%$ | C14 | D4405X | 50 mmF. $\pm 5\%$ | L1-2 | D1614F | B/C Aerial Coil |
| R15 | O2X | 500,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C15 | D0243BJ | 10 mmF. $\pm 10\%$ | L3-4 | D3018 | B/C Oscillator Coil |
| R16 | J2X | 100,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C16 | D4405F | 50 mmF. $\pm 10\%$ | L5-6 | D2276 | S/W Aerial Coil |
| R17 | ZW3X | 250 ohms 1 watt $\pm 10\%$ | C17 | D4405F | 50 mmF. $\pm 10\%$ | L7-8 | D2277/1 | S/W Oscillator Coil |
| R18 | J2X | 100,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C18 | D0243L | 500 mmF. $\pm 10\%$ | TC1 | D2395 | Trimmer Condenser |
| R19 | J2X | 100,000 ohms $\frac{1}{2}$ watt $\pm 10\%$ | C19 | C0013E | 0.1 mF. 400V. wkg. | TC2 | D2395 | Trimmer Condenser |
| | | | C20 | D4405W | 100 mmF. $\pm 5\%$ | TC3 | D2395 | Trimmer Condenser |
| | | | C21 | D0243P | 100 mmF. $\pm 10\%$ | TC4 | D2395 | Trimmer Condenser |
| | | | C22 | C0013M | 0.05 mF. 200V. wkg. | | | Dial Lamp, 240V., 15W. B.C. |
| | | | C23 | D0243L | 500 mmF. $\pm 10\%$ | Spkr. | B0180 | 12in. Speaker, 2.0 ohm, V. Coil |
| | | | C24 | D4405W | 100 mmF. $\pm 5\%$ | Spkr. | B0180A | 12in. Speaker, 6.5 ohm, V. Coil |
| | | | C25 | C0014CQ | 16 mF. 525P.V. Electro. | | | Control Knob |
| | | | C26 | C0014BZ | 16 mF. 525P.V. Electro. | D2961 | | Pointer Assembly |
| | | | C27 | C0014CF | 25 mF. 40P.V. Electro. | D2823 | | Dial Glass |
| | | | C28 | C0013C | 0.25 mF. 400V. wkg. | C0542A | | Auto. Record Changer |
| | | | C29 | C0013Z | 0.1 mF. 600V. wkg. | C0537 | | P.U. Panel |
| | | | C30 | C0013C | 0.25 mF. 400V. wkg. | D2286 | | P.U. Plugs |
| | | | C31 | C0013G | 0.05 mF. 400V. wkg. | D2364 | | Dial Back Plate |
| | | | C32 | C0014CC | 25 mF. 40P.V. Electro. | B0151 | | Dial Cord Spring |
| | | | C33 | C0013AS | 0.005 mF. 400V. wkg. | | | |
| | | | C34 | D0243DB | 150 mmF. $\pm 10\%$ | | | |
| | | | C35 | C0013AD | 0.05 mF. 600V. wkg. | | | |
| | | | | D3039 | Neutralising Capacitor | | | |
| MISCELLANEOUS | | | | | | | | |
| | D2338 | Dial Pulley | | | | | | |
| | D2815 | Dial Cord, 3ft. 6in. A. & E. Panel | | | | | | |