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TRADING

CASEBOOK
GARRARD RC80 CHANGER
HMV 1814 TV

GARRARD RC80 CHANGER

Model RC80 automatic record changer plays up to ten 10in. or 12in. standard 78 rpm records, ten 7in. 45 rpm and ten 7, 10 or 12in. 33 $\frac{1}{3}$ rpm long-playing records. Fitted with lightweight turnover magnetic or crystal pickup head with dual sapphire stylus or alternatively with separate plug-in type standard and long-playing magnetic or crystal heads with sapphire stylus. Model RC80/AC is for 100-130, 200-250V, AC, 40, 50 or 60c/s supply; RC80/DC for 100-130, 200-250V DC only; RC80/Universal for 100-130, 200-250V DC and AC 40/100c/s; RC80/6V and RC80/12V for 6 and 12V DC only. Special models for 100-130, 200-250V AC 25 cycles are available to order. Made by The Garrard Engineering and Manufacturing Co., Ltd., Swindon, Wilts

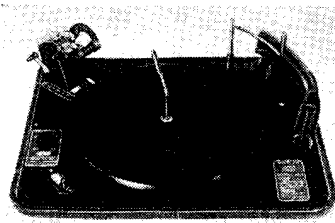


Fig. 1

THE changer (Fig. 1) is a self-contained brown-enamelled unit on a 15 by 12 $\frac{1}{2}$ in. plate and requiring cabinet space 15 $\frac{1}{2}$ in. wide by 13 $\frac{1}{2}$ in. deep with 5 $\frac{1}{2}$ in. clearance above and 3 $\frac{1}{2}$ in. below. With very slight alteration to motor board cut-out the RC80 will replace any post-war model.

An important feature of the design is the protection provided to safeguard the pickup against damage should the changer be switched on without a record in place on the spindle. The motor is switched off without pickup leaving its rest. A muting switch is fitted.

The 9 $\frac{1}{2}$ in. loaded turntable is a press fit on a tapered main drive hub rotating about a central record spindle locating boss and is drum driven through spring-loaded rubber-tyred intermediate wheel 28. Three turntable speeds are obtained by engaging 28 direct with motor drive shaft for 78 rpm or with either of rubber-belt-driven intermediate pulleys A and B for 45 or 33 $\frac{1}{3}$ rpm respectively.

Intermediate wheel is engaged with appropriate drive surface by operation of speed selector knob. With turntable removed and control knob in Reject position the mechanism may be manually operated by rotating main drive hub.

Records are stacked on a Garrard patent sloping spindle and are supported on one side by a record platform, the position of which is adjusted by lever at side to suit 12, 10 or 7in. records. With 12 and 10in. records the bottom record is pushed off spindle ledge by pawl 101. With 7in. records a subsidiary platform with extension pawl plate, is lowered into position to support edge of record, and bottom disc is pushed off spindle by extension pawl plate operated by pawl 101.

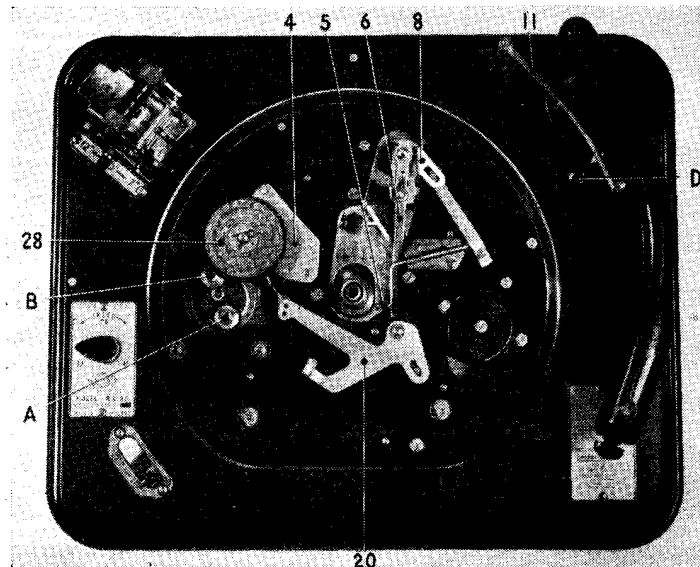
LP records with large centre hole are stacked on a special record spindle with release latch.

CYCLE OF OPERATION

One revolution of main cam 55 (Fig. 3) completes one changing cycle. With 10 records on spindle and unit set for correct size, control knob is moved to "Start." This closes switch via link 63 and lever 68, switch then being locked in On position

by tip of 68 engaging in step in lever 65 and held there by spring 67. At same time, a peg on 68, protruding up through unit plate into spring tension lever 20 (Fig. 2), pivots this lever and, via a spring attached to support plate 4, pulls intermediate wheel 28 into contact with motor drive shaft or pulleys A and B and with drum of turntable. Turntable commences to revolve.

Reject lever 62 (Fig. 3), controlled by same initial movement, engages tip of trip lever 76 and releases impulse lever 38 from catch in trip lever. Impulse lever is biased by a strong spring so that, when released from 76, it is pulled towards centre of unit.



Knocking against a stud in cam unit 55 it rotates 55 just sufficiently for gear segment 54 to mesh with pinion on revolving main drive hub 112, thus commencing changing cycle.

Cam unit 55 commences to revolve and the outer cam, via lever 71, link 121 and crank 129, commences to lift pickup arm from rest. At same time a stud protruding downwards from main cam unit gear, via lever 40, link 36, lever 37, commences to move inwards knock-off arm 11, to ascertain whether there is a record on record spindle. If there is no record, unit completes changing cycle and switches off without pickup arm leaving rest.

When there is a record to be played peg 48 on outer cam, via coupling link 111 and an operating lever moves forward platform pawl 101 (Fig. 4), which pushes record off step on spindle. Swing lever 42, controlled by the inner cam on cam unit, moves away from pickup arm unit, releasing pickup lever 119 which, under bias of spring 84, moves inwards carrying pickup to dropping position.

When pickup is in position, pickup selector lever 118 and pickup lever 119 become solid, the swing lever continues to move outward but pickup remains behind in dropping position, and outer cam, via levers and links 71, 121, 129, commences to lower pickup to record. As stylus alights on record, cam unit arrives at position where blank section in gear is opposite revolving main spindle and changing cycle ceases. Pickup is released from changing mechanism and is free to traverse record.

When stylus enters run-off groove it operates auto-trip mechanism and sets changing mechanisms

again in action. The cycle is as described above for the commencement of a record, except that swing lever 42 is away from pickup arm mechanism and immediately pickup rises swing lever moves in, engages pickup lever 119 and moves arm back to its rest. If there are further records on spindle another one is dropped and cycle continues; if however, there are no further records pickup remains on rest and unit switches off.

SPECIAL NOTES

Auto-trip. The auto-trip mechanism does not act until pickup stylus reaches a point approximately 2 $\frac{1}{2}$ in. from main spindle centre; at that point setting lever 85 makes contact with roller on end of inter-lever 78; this is shaped rather like a letter "V," with roller on one tip below unit plate—the other end is carried up through unit plate and carries a small stud which engages in lever 8.

When 85 makes contact with 78 the motion of pickup arm across record is transmitted through 78 and 8 to operating lever 6, and this moves toward main spindle. When it comes within radius of striker 96 the lip on striker gently brushes felt pad in end of operating lever 6, moving it back.

These contrary movements are able to take place because there is only a delicate friction drive between 8 and a small felt pad contained in screw in 6. When, however, pickup enters run-off groove the extra motion imparted to 6 moves its tip right inside orbit of striker, which now passes underneath end of 6 and lifts it. This in turn raises end of trip rod 5 and pivots trip lever 76 exactly as if control lever had been moved to "Start" or "Reject." Impulse lever 38 is released from catch in 76 to commence changing cycle.

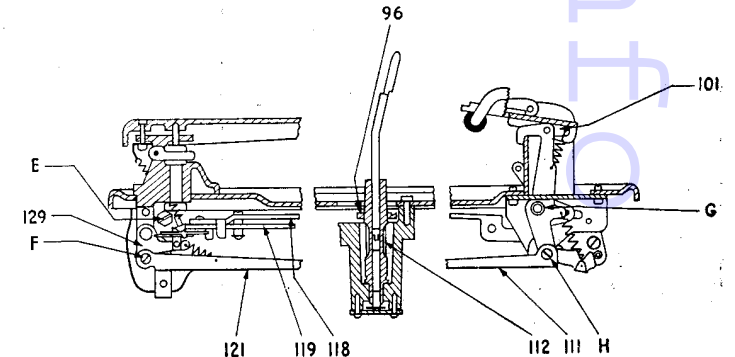
AUTO-STOP

The auto-stop mechanism (with which is incorporated the safety device to prevent pickup alighting on empty turntable) is controlled by knock-off arm 11, and peg on outer edge of main cam gear 55. As main cam revolves peg engages knock-off cam lever 40 and pivots it. If there are records on spindle to prevent knock-off arm 11 moving right in, spring 35 relaxes and allows 40 to move independently of link 36 and record is played.

Fig. 2 (left).—The motor plate as seen when the turntable is removed

Fig. 3.—See overleaf for this illustration showing most of the mechanism

Fig. 4 (below).—Details of platform, spindle and pickup column



If there are no records on spindle, when 40 is pivoted it carries with it 36 which pivots 34, moving it into position so that catch engages a small peg in 42, preventing it following inner cam on cam unit, but allowing it to run on outer cam track. On this there is a node which moves 42 a little more than during a changing cycle; the extra movement causes 42 to engage trip link 70. Via an extension, catch lever 65 is moved, thereby releasing switch lever 68, to allow spring 67 to pivot switch lever and switch off motor.

Just before unit switches off, stud on cam unit moves impulse lever 38 back into engagement with catch in trip lever 76 and at the same time impulse lever 38 moves catch lever 34 clear of stud on swing lever to leave swing lever free to swing outward when unit is next switched on. If there are no records on record spindle then knock-off arm 11 moves right in and resets catch lever 34 in knock-off position.

Pickup Dropping. When platform setting knob is moved to 12, 10 or 7 in. position, it adjusts position of platform and also, via platform-selector lever 53, inter-selector 50 and selector lever 39, sets pickup dropping position. Dropping position is determined by stud on 39 which rides in stepped cans cut in 118.

When 42 moves outward after first record has dropped, it releases 119 which, under pull of spring 84, moves inward until solid with 118—at this point pickup is in correct dropping position. To prevent pickup continuing to move in under momentum, lifting disc attached to lifting crank 129 and also disc attached to lifting spindle have felt and leatheroid washers which form a brake, this brake is removed as stylus touches record.

Muting. Movement of pickup lifting lever 71, via a connecting link, operates muting switch.

Large Spindle. For 45 rpm 7 in. records having a large diameter centre hole a special spindle is provided. Records are held on two spring-loaded pawls. When platform mechanism commences to operate during changing cycle, stud 48 operates centre cam lever 58 and via cranks 59 and 60 turns operating collar in record spindle and this moves outward the upper separator blades. These separate bottom record from stack and then bottom pawls move in allowing lowest record to drop. On latest models a spring-loaded lever is attached to 38; this makes setting of spindle mechanism less critical.

INSTALLATION

Motor board should be cut and drilled as shown on template supplied. Insert conical suspension springs, apex down, into holes. Insert the four long fixing bolts through holes in unit plate, place a spring washer and hexagonal nut over each and tighten up. Put a nut on each bolt so as to leave approximately 1/4 in. of thread below. Place changer carefully in position on suspension springs.

With spirit level on turntable adjust lower nuts on fixing bolts until unit is dead level. Changer will have to be raised out of suspension springs to carry out adjustment to nuts. When level, place large triangular washer, fixing nut and final lock nut on each fixing bolt and fully tighten.

Remove turntable and cover plate, held by single screw, on terminal box below. Check to see that links in terminal box are placed in correct voltage position—then connect mains leads to terminals adjacent to entry hole in block. Connect an earth lead to soldering tag provided under one of motor fixing nuts.

PICKUPS

Pickup arm is terminated in a shrouded three-pin socket to enable any of the Garrard magnetic, Decca magnetic and Cosmocord crystal type (GP19, GP25) heads to be plugged in. Pickup should be coupled to amplifier or receiver by twin screened lead soldered to tags provided on mounting switch assembly below unit plate.

If Changer is used with a universal AC/DC amplifier or receiver, it is advisable to connect pickup to apparatus through an isolating transformer or through suitable isolating capacitors.

Pickup weight. Adjust by turning milled nut C (Fig. 3) from underside, or by inserting thin screwdriver through aperture at rear of pickup base into slotted head of this screw from above. Recommended pressures in grammes of various pickup heads are:—

Garrard : Standard magnetic (78 rpm), 52; Miniature (78), 34; Miniature (78) low-impedance type, 17; Miniature (LP) low-impedance type, 10; High-fidelity (78), 17; High-fidelity (LP), 10; Turnover magnetic, 10.

Cosmocord : GP19 (78), 17; GP19 (LP), 10; GP25 turnover crystal, 10.

Decca : Magnetic (78), 20; Magnetic (LP), 10.

ADJUSTMENTS

Pickup drooping. Should minor adjustment be required rotate screw D (Fig. 2), accessible through hole in unit plate. Adjustment must be made only when pickup arm is on rest. Should arm have been forced out of position, set D in its centre position and loosen the large hexagon pickup lever clamping bolt E (immediately below base of pickup on underside of unit plate). Hold pickup lever 119 and move arm by required amount—tighten bolt E and then finally re-adjust screw D. Nut on other end of hexagon bolt referred to above is keyed to clamp.

Pickup height. Amount that pickup lifts can be altered by loosening nut on F and adjusting screw slightly.

Auto-trip. Remove turntable and place control lever in Start position. Rotate main drive hub by hand at the same time holding back knock-off lever so as to set in motion pickup lifting and swinging operations. When pickup reaches dropping position place hand under head and continuing to rotate main drive. Slowly move pickup across as if it were playing a record.

When stylus point is nearly 2 1/2 in. from centre of main hub, friction plate 8 should begin to move operating lever 6 inwards. At 2 1/2 in. radius felt pad on 6 should be just touching outside edge of striker on main hub. If this is not so, loosen small grub screw in collar of setting lever 85 and adjust 85. Before replacing turntable see that felt pad on lever 6 is projecting a small amount and that its outer surface is clean and free from ragged edges.

Check that trip rod 5 is lifted when operating lever 6 is raised by action of striker on main hub. Position of trip rod can be adjusted by loosening two clamping screws and moving pivot plate. Finally, check that operating lever 6 is free to move upwards on end pivot and that felt pad and friction lever 8 below are clean and free from oil.

Turntable brake. Turntable brake is combined with lever 20 to remove tension from intermediate wheel when changer is switched off. Brake stops turntable revolving an excessive number of times.

Should turntable revolve after changer has switched off, examine felt pad which operates on turntable drum. It may have become worn or have been pushed back in curled part of lever holding it. In either case, push it through lever until end pointing to the main spindle projects a maximum of 1/8 in. and if it is loose squeeze curl with a pair of pliers until it grips pad. When pad becomes too short to make above adjustment, it should be replaced.

Record drooping. Check spindle to see it has not been damaged (if Garrard booklet is available shape can be checked against template on page 12). Set changer to play 10 in. records and place a 10 in. disc in position with its edge on record platform. Edge of record should overlap platform by 1/8 in. and there should be a 1/8 to 1/4 in. gap between front edge of pawl and record.

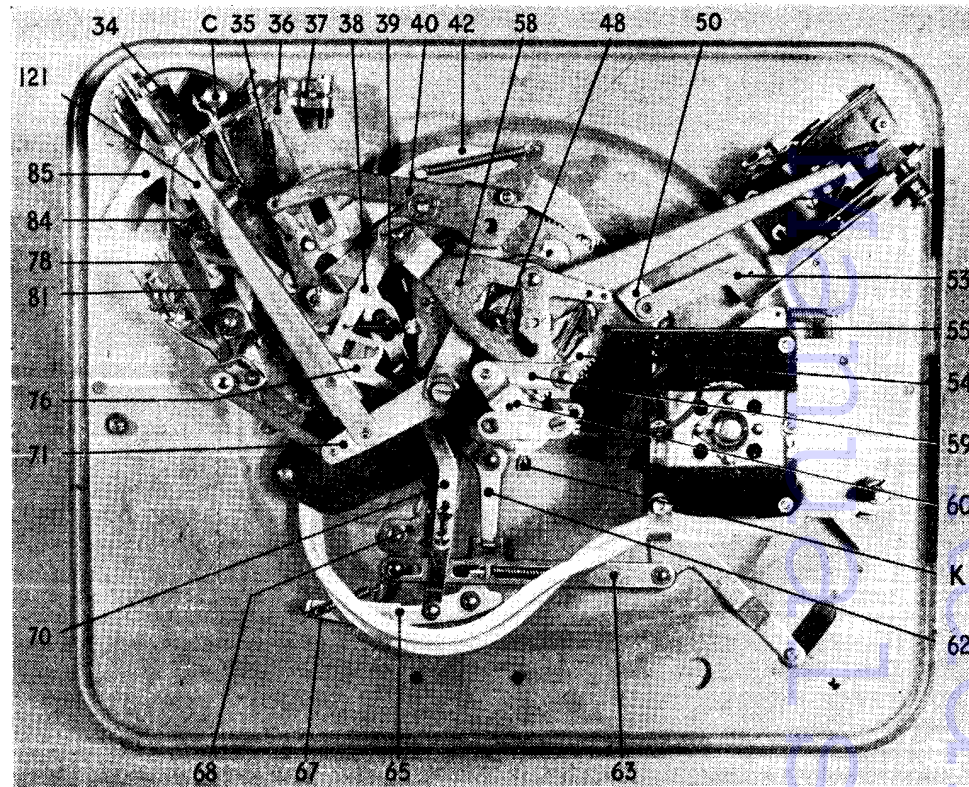
If platform position is incorrect, adjust screw on eccentric platform pivot G to give 1/8 in. overlap and then adjust eccentric screw H to shift position of pawl.

Should the 7 in. 45 rpm records fail to drop or seem to hesitate and then fall at an angle, remove large record spindle and place sloping stepped record spindle in position. This spindle should lean and point to centre of record platform. It will probably be noticed that it is slightly out of this position. To correct this, loosen the two screws K which hold the spindle location in position, turn the record spindle until it is in line with record platform and re-tighten screws. This will correct the position of the large record spindle which should now operate correctly.

Fails to switch off after last record. See that knock-off arm moves freely. Gently push it about one inch to the rear—it should return to its original position when released. If tight, cause is probably due to vertical pillar having become bent, thus tightening it in bush in unit plate. Gently bend it straight. If this is not successful, remove spindle by unscrewing knock-off lever screw in the lever under the unit plate and true up in a lathe. After replacing set as described below.

Another cause of failure to switch off is the switch catch lever and its associated levers which may be sticky.

7 in. records drop but pickup does not leave rest. This condition is due to incorrect setting of knock-off arm. Operate changer until it switches off. Pickup arm should be on rest. Measure distance from centre of turntable to bent-up part of knock-off arm—this should be 6 1/2 in. Loosen knock-off lever screw, hold knock-off pillar and whilst holding knock-off lever under plate, turn knock-off arm to its correct position and re-tighten screw.



Pickup does not track. Should trouble be experienced with pickup failing to track correctly, i.e. rising in or out of groove, see that pickup weight is correct (8-10 grms) with LP pickup in position. See pickup arm pivots are free and that pickup lead is not strained or caught up. Changer must be floating freely on its suspension springs otherwise slightest vibration can cause pickup to skid.

In the case of persistent jumping stylus point should be suspected. If pickup jumps groove when nearing centre of record, although first part has played correctly, remove turntable and examine clearance between pickup lever, friction plate and unit plate. Prise levers upward to ensure adequate clearance and also see that top of roller on the other end of the pickup lever is not rubbing.

MAINTENANCE

Motor and intermediate wheel bearings, being oil retaining type, rarely need lubricating. When need for oil is apparent remove both belts and while holding intermediate wheel out of way, lubricate pulley and motor bearings. Remove all trace of surplus oil.

Rubber rim on intermediate wheel and two belts must be kept free from oil. If changer mechanism becomes noisy smear grease such as vaseline on all cam faces, and lightly lubricate lever pivots.

If speed of first record played is correct but it becomes erratic on records which follow, trouble is almost certainly caused by record slip.

Record slip may be due to warped records or incorrect pickup weight. If pickup is too heavy, especially on LP records they will slip. Slip can be reduced by sticking a transparent stamp hinge on each label. This is usually sufficient to provide enough key to drive records.

Motor on RC80 models for use on AC supplies is the induction type and while it is not synchronous, frequency of supply is the principal controlling factor in maintaining correct motor speed. However, as motor is not synchronous, the load applied to motor also affects speed and

should turntable run slow first see that motor shaft intermediate wheel, pulleys and main spindle are free. Should turntable run excessively fast or slow motor pulley may be incorrect for frequency of supply.

After use turntable may run one or two rpm fast due to bearings freeing. In this case hook interwheel tension spring in hole toward front of changer in spring tension lever. This usually increases load sufficiently to reduce speed slightly. Should spring already be in front hole or when hooked there speed is still fast, a new pulley should be obtained. When ordering state model number of changer and exact speed at which turntable is running.

DC and universal motor speeds. Speed on these models is controlled by a governor on armature shaft. Governor needs adjusting should any alteration be made to supply or if, after a period of use, motor runs fast. Governor is situated at lower end of motor and is screwed on to a thread on armature shaft being held in its set position by a screw in governor collar. To adjust speed loosen screw holding governor and while holding armature stationary by gripping motor pulley, turn governor anti-clockwise to increase speed or clockwise to reduce it.

Felt governor pads should be saturated with a fine grade of machine oil.

Varying speed of a DC or universal motor, may be due to bad commutation. First check that brushes are free in their tubes by removing cap and gently pulling and pushing brush spring. If the brush is sticky remove and clean sides by lightly rubbing with smooth file or scraping with a penknife. Tubes should be cleaned out with a piece of rag.

Brushes less than 3/8 in. should be replaced.

Commutator should have a smooth polished brush track. To remove armature take off two belts, motor pulley and remove carbon brushes (placing brushes so that they can be put back same way round). Undo two screws holding bottom bearing bracket and remove the bracket—armature can then be withdrawn. Clean commutator with rag; if scored, rub with a light rotary motion using a piece of very fine glass paper, finishing off with rag to remove dust.