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**GARRARD
RECORD-CHANGER
RC65
RC65A**

THE changer is a self-contained unit fitted with either an induction motor (D16) for AC of 40/60c/s or with a universal motor (U16) for DC mains and AC of 25/60c/s. Both motors by adjustment of changeover links on a terminal block may be adapted for use on 200/250 or 100/130V.

The unit accommodates eight records mixed in any order. During playing both pickup and motor are disconnected from the changing mechanism which cannot therefore cause wear or damage to records.

SEQUENCE OF OPERATION

With up to eight mixed records on record spindle, overarm lowered, and a needle capable of playing ten or more records in the pickup head, the left-hand control is pushed to "Start" and held there a moment until the turntable commences to revolve.

The platform moves back, then forward, pushing lowest record off step on spindle. The pickup comes in and down and the run-in groove guides the needle into the groove. At the end of the record, the extra motion imparted to pickup by the run-off groove causes auto trip to set changing mechanism in action. Pickup rises, returns to rest, next record is lowered to turntable and the whole cycle repeated. This continues until last record falls on to turntable, when overarm, no longer supported by records, drops, releasing auto stop mechanism which then switches off motor at end of record.

PRINCIPLE OF OPERATION

The left-hand control knob is attached to lever 113 and when knob is moved to "Start or Reject" position, the lever, via switch link 115, pivots switch lever 117. This operates the dolly which closes main switch (situated underneath cover 132). The other end of 117 engages in step in catch lever 118. Spring 129 holds 117 and 118 together in step and prevents main switch opening when manual pressure on control knob is released.

At the same time 115 pivots reject lever 49 and release lever 31 which in turn releases clutch lever as explained later. Switch lever 117 pivots the knock-off clutch lever 133 out of path of clutch lever allowing spring 134 to pull clutch lever into mesh with clutch.

The motor turns the main cam spindle approximately two-thirds of a revolution and then the clutch lever is interrupted by release lever 31 causing



Fig. 1.—Model RC56 changer takes up to eight 10 and 12 in. records mixed in any order. In the RC65A, the arm will take plug-in pickups, a muting switch is fitted and the stop mechanism has been redesigned

it to disengage from clutch and thereby stopping the changing mechanism while allowing motor to continue to run.

During the two-thirds revolution of main cam the following movements take place:—

Platform. Cam assembly 138 moves platform, the diecast cam controlling tilting motion and the pressed steel cam controlling backwards and forwards movement. Both cams control movement one way only, the reverse movement being produced by tension of a spring. The tilting cam pulls the platform up and spring 99 pulls it down, and the other cam pulls platform forward against spring 100.

Pawl 204 performs a dual function: it pushes the record off spindle and also "sizes" the record and controls position of platform to suit. When a 10 in. record is to be played, the pawl is not depressed and so engages against stop 207 (Fig. 5) preventing spring 100 pulling platform back into 12 in. position, and also preventing cam follower roller on lever 213 from dropping into 12 in. track but compelling it to follow 10 in. track.

When a 12 in. record is to be played, the larger diameter of record rests on top of pawl, pressing it down and raising its rear tip allowing this to pass over stop. Spring 100 is, therefore, able to pull platform right back to 12 in. position, and cam roller is able to follow 12 in. track on cam.

After pawl has pushed record from spindle, platform continues its forward movement for a short distance and tilting cam (via lever 210) allows spring 99 to pull (or tilt) platform down to pass under records remaining on record spindle, and then tilts it up again to support records.

Pickup arm mechanism. Pickup arm 32 (Fig. 2) is attached to pivot bracket 181 by pivot spindle 182 and on this spindle is pivot spring 185 which counterbalances part of weight of pickup head and arm. Note: the inset end of the pivot spring locates in a groove around the pivot spindle to prevent the spindle working out as the changer is used.

The pivot bracket is a press fit on the hollow pickup arm spindle 181 which revolves in a double ball

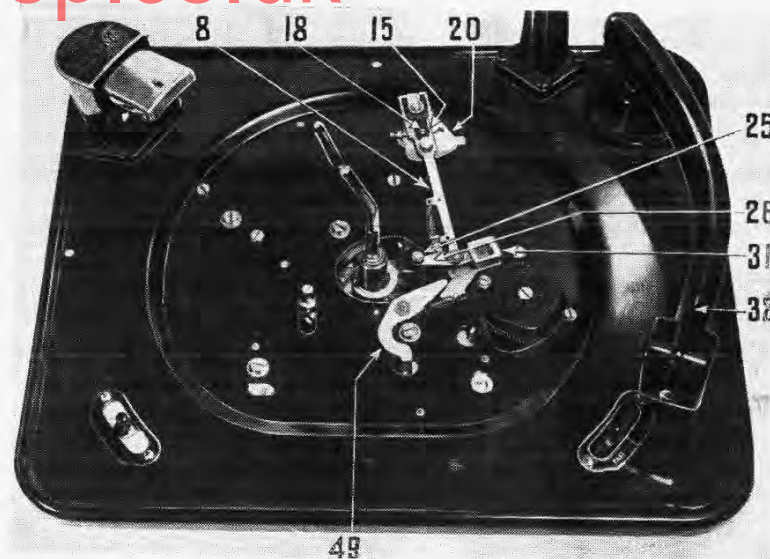


Fig. 2.—With turntable removed the auto-stop mechanism is exposed. See also the diagrams on page 2

race in base 177. Attached to the hollow spindle underneath base is a collar and set screw for adjusting ball race and underneath this is pickup lever 174 secured to spindle by clamping screw and nut. In hollow spindle 181 is fitted the lifting spindle to which is attached lifting plate 74.

Attached to pickup arm spindle by the screw and nut is lever 174 to which is pivoted selector 154. These two levers are normally held solid by spring 169, their relationship to each other being governed by eccentric pin 158, which can be turned through a hole in unit plate for purpose of adjusting dropping position of needle.

In the "stopped" position before control knob is moved to "Start," the selector lever 148 is in the 10 or 12 in. position according to last record played, and pickup arm on rest, while the pin on lever 148 prevents 154 following pickup lever to the rest position. Spring 169 is, therefore expanded and under tension. Lifting disc 69 has descended just sufficiently to allow pick-up to rest securely on its support.

When unit is switched on, 148 moves 154 to correct position for size of record, and cam 76 with associated lever, lifting disc and spindle, lifts pickup arm clear of support. Swing cam 77 releases lever holding pickup arm over rest and allows spring 169 to contract, pulling 174 inwards until eccentric pin 158 makes contact with 154 when needle will be in correct position for alighting on run-in groove.

Up to this point the friction discs on lifting disc and its associated disc on the base of lifting

spindle have acted as a brake to prevent pickup arm swinging in too far. Cam 76, via lifting lever 220, now lowers pickup on to record. Lowering the lifting lever still further separates the friction discs, leaving pickup and its associated arm and levers free to traverse record without any friction. During playing time the roller on lifting lever 220 lies in a deep valley in cam track, but immediately auto trip sets cam revolving again, roller mounts a steep side in valley which lifts needle straight up clear of record before swing cam 77 returns pickup to rest.

When platform moves forward and back before pushing record off record spindle (as explained under Platform) it has two different movements depending on whether platform pawl is or is not depressed. When platform moves right back into 12 in. position via 95 it pulls selector lever 148 into 12 in. position. When platform moves back only to 10 in. position, it does not affect lever unit 95 or selector lever 148, but when it moves forward to extreme position for pushing a 10 in. record off spindle, it pushes forward lever unit 95 thereby putting selector lever 148 in 10 in. position.

Auto-stop Mechanism. As stated earlier, the cam spindle revolves approximately two-thirds of one revolution from the time unit is switched on until needle commences playing record and clutch disengages cam spindle from motor. During the remaining one-third revolution, which takes place immediately the auto-trip mechanism sets the cam revolving again, the pickup arm returns

GARRARD—Continued

to rest and auto-stop mechanism switches off motor—providing no further records are on record spindle and overarm is lowered. As cam 138 reaches end of the revolution, node X pivots knock-off lever 140 which through link 128 moves catch lever 119 away from switch lever 117 and this, being pivoted by tension on spring 129, opens main switch and motor stops.

If, however, there are more records on the spindle, these prevent overarm falling and as long as it is raised knock-off release lever 78 is in the way of knock-off lever 140 and prevents it being pivoted by the node on the cam. To allow node to pass the locked knock-off lever, a small extension piece on the knock-off lever, normally held solid with it by spring 89, pivots on the lever.

When overarm falls or is lowered to its lowest position it presses down the thin spindle situated in front of overarm support bracket, and this pivots the knock-off release lever clear of knock-off lever and allows auto-stop to operate.

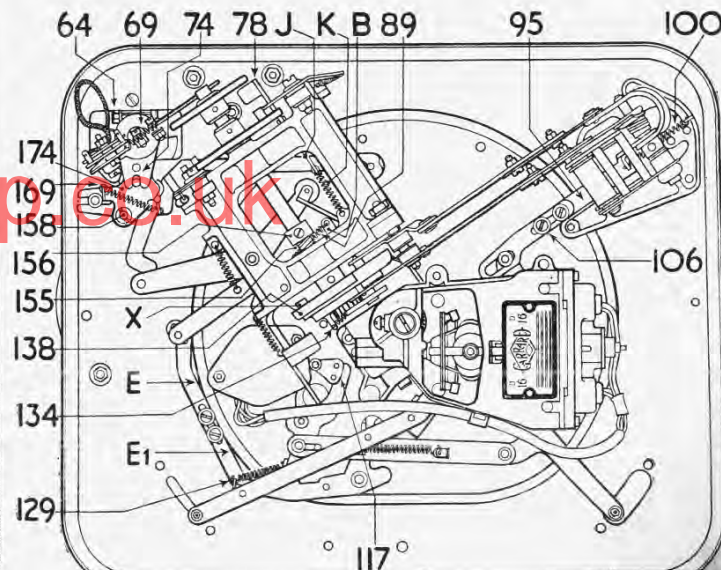
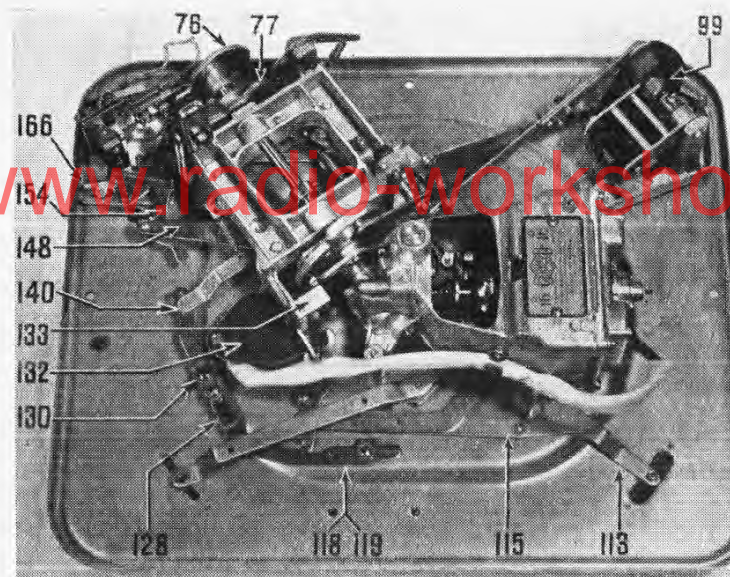
Clutch mechanism. Clutch lever attached to die-cast tilting cam is normally held in mesh with clutch gear attached to motor so that clutch can rotate cam shaft assembly. When needle alights on record, tail of release lever 31 moves into path of revolving clutch lever arresting its progress and causing it to pivot on its fulcrum and disengage with clutch gear. Also when pickup arm returns to rest, and the lowered overarm switches motor off, knock-off clutch lever 133 moves into path of clutch lever and acts similarly to release lever. The purpose of knock-off clutch lever disengaging clutch as motor switches off, is to allow motor a chance to gain momentum when next switched on.

Overthrow mechanism. Overthrow lever 212 normally rests with its lip in contact with leg of sub casting to which it is attached and is held there by tension on overthrow spring 211. As cam shaft revolves, three pegs (two with rollers attached) on flat surface of swing cam 77, pivot this lever and put increased tension on spring. This action is timed to take place just before clutch is disengaged by either release lever 31 or knock-off clutch lever 133, and pegs carrying rollers reach end of inclined plane on overthrow lever at the same moment as clutch is released. As roller passes tip of inclined plane, the tension stored in overthrow spring 211 restores overthrow lever to its normal position and in doing so the second inclined plane on lever gives the roller a forward push. This push gives cam assembly just that extra travel forward to ensure clutch lever is properly disengaged from clutch and will not, therefore, jump on teeth causing a clicking noise while record is being played.

Auto-trip mechanism. When pickup has played approximately two-thirds of record a roller mounted on a pin riveted to pickup arm lever 174 makes contact with link 166 which, in turn, is attached to friction plate 20. These parts are then slowly moved inwards by motion of pickup traversing the last section of record.

Operating lever 8 is moved by friction plate 20 through a very delicate friction drive between a felt pad underneath operating lever and polished surface of friction plate.

As operating lever moves towards centre, rubber bush 25 comes slowly into orbit of revolving striker, which gently brushes surface of bush, pushing it back out of way. This process con-

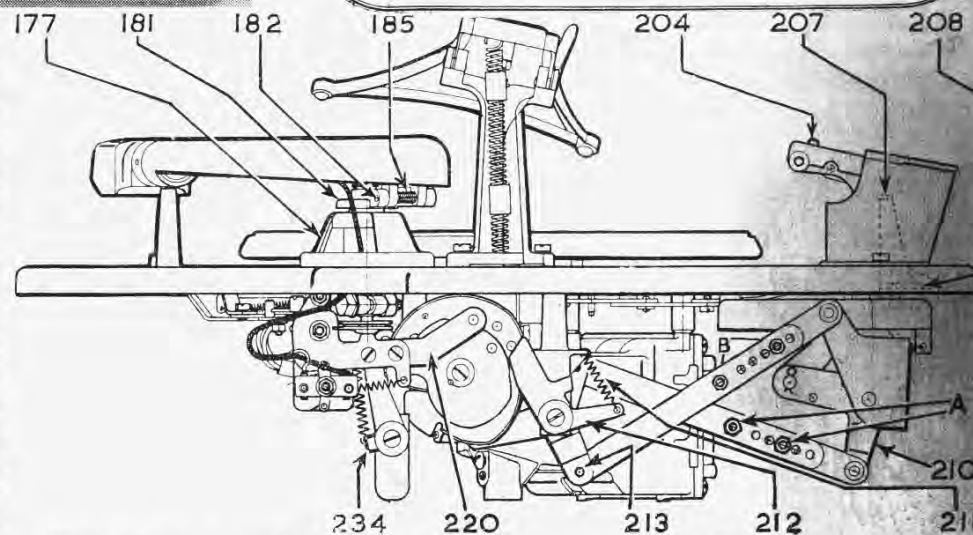


tinues as long as needle on record is in playing groove. The friction drive relaxes to allow these two contrary movements to take place.

When needle leaves playing groove and enters run-off groove, the extra motion imparted to operating lever 8 moves tip of trip lever 26 into orbit of striker which now instead of brushing back rubber bush strikes tip of trip lever, causing it to rise slightly to free friction drive and to pivot on its fulcrum and operate clutch release lever 31, this commencing the changing cycle.

The amount of friction between felt pad and friction plate 20 is controlled by adjusting screw 18 which, by raising or lowering tail of friction spring 15 increases or decreases its strength. If friction spring is too strong two faults may arise; first, the action of striker brushing back rubber bush 25 may be transmitted to pickup head and from thence fed through amplifier to speaker, and it will be heard as a recurrent "bump" every revolution. Secondly, with a very light pickup head action of striker may be sufficient to knock needle out of record groove. From this it follows that the friction spring should be adjusted to minimum amount of tension that will satisfactorily and consistently move in trip lever as pickup arm traverses record and trip auto-change mechanism when needle enters run-off groove.

Auto-stop mechanism. The final switch-off is controlled by position of the overarm. So long as overarm is raised the switch-off mechanism is locked out of action, but immediately last record falls on turntable allowing overarm to drop the "switch off" is unlocked and operates when last record has finished playing. When overarm is lowered and switch is free to operate, the node on main cam presses forward tip of lever B. This lever is pivoted on lever 140, to which it is held in a semi-solid condition by spring 155 and two levers move together as one. The end of lever 140 moves in downwards and through link 128 and lever 118/119 releases tip of switch lever from the catch.



When overarm is raised, it releases the thin spindle situated in front of overarm bracket. This spindle rests on the lip of lever J and immediately the weight of overarm is taken off spindle spring K pivots lever J raising the lip and spindle, and lowering opposite end which now locks the movement of lever 140 preventing it operating auto switch. In order that node on cam may pass tip of lever B when lever 140 is locked spring 155 relaxes allowing lever B to move independently of lever 140.

ADJUSTMENTS

Pickup dropping position. If record changer has been stopped for any reason, with PU arm not on rest, arm should not be interfered with, but motor restarted and arm allowed to return to rest.

PU has been finely adjusted so that needle comes on to

10in. records in a 9 $\frac{1}{2}$ in. diameter circle and 12in. records in an 11 $\frac{1}{2}$ in. diameter circle. There may be a few records where the track starts further away from centre and in these exceptional cases needle may alight on record a few grooves from start of record. If PU was set for these exceptional records it would not be suitable for average records.

Should dropping position require adjustment, the adjusting screw which rotates eccentric pin 158 should be turned with changer in its start position—that is with PU on its rest. A quarter of a turn in either direction will give maximum adjustment.

If dropping position is so far out that adjusting screw has not sufficient movement to correct it, operate changer and allow it to switch off. Loosen screw 64, move PU arm until it is sitting squarely on rest and re-tighten screw. Adjusting screw should now be able to correct dropping position.

Pickup arm timing. Occasionally PU will select 12in. position irrespective of whether a 10 or 12in. record is to be

GARRARD—Continued

played. This is usually due to arm timing being set a shade too fine or having slipped.

To correct timing, loosen two screws 106 and revolve turntable slowly by hand until platform is in its most forward position. Put lever 148 in 10in. position (upwards), hold it there and push link towards centre of changer until it comes against the stop; then ease it back approximately $\frac{1}{32}$ in. and re-tighten screws 106.

Uncertain 12in. dropping, 10in. working correctly. This is due to timing causing selector lever 148 to move slightly as needle is being lowered to record. Reset timing as described above.

Pickup height. Height is controlled by lifting arm 220 and may be adjusted by loosening the set screw next to eccentric pivot and turning pivot as necessary. The longest needle should just clear surface of eighth record on turntable when PU is returning to rest.

Auto-trip mechanism. Satisfactory operation of changer depends upon operation of auto-trip. Occasional adjustment of auto-trip friction spring may be necessary.

If at end of a record, the PU remains on disc see that record has a run-off groove. If record is in order, increase tension of friction spring by turning screw 18 in an anti-clockwise direction; about half a turn is all that should be necessary. This screw is accessible on removing turntable.

When changer operates before end of record or a bumping or tapping noise is audible, first examine trip lever rubber 25, and if worn, give it half a turn to present a new surface to striker. If badly worn, renew. If trip lever rubber is in good condition, reduce tension of friction spring (half-a-turn in clockwise direction).

If excessive friction is required to move operating lever 8, it can be assumed that something is counteracting its movement, as when correctly adjusted lever will move without any pressure from spring. Lever should be examined to see if it, or trip lever 26, carried by it, is fouling another part of mechanism, or if felt pad situated underneath it (just in front of screw 18) has not worn flush with lever thereby allowing metal to touch friction plate 20. The felt pad should protrude from lever approximately $\frac{1}{32}$ in. and should be soaked with thin machine oil. There should be no oil on pivot of operating lever.

Certain records not operating changing mechanism. Radius of operation for auto-trip mechanism has been set to operate on all standard commercial recordings made in the last ten years or so. A few early 12in. recordings having a very meagre playing area and a large diameter run in groove, have been re-issued but modification for these cannot be made.

Auto-stop not acting correctly. If auto-stop does not switch off motor after last record has been played, read description of auto-stop mechanism above and check that when overarm has dropped, the adjusting screw underneath it (resting on thin knock-off spindle) has pressed spindle down to limit of its travel, and that end of lever J is lifted clear of lever 140 leaving it free to move. If it is not lifted clear, gently bend up lip which will give lever J more movement.

If auto-stop switches off motor when there are records remaining on record spindle to be played, check that end of J is interfering with movement of lever 140 effectively locking it and preventing it moving. If end of J is not moving low enough, unlock adjusting screw underneath overarm and turn it up until with one 10in. record on platform and overarm resting on it, end of J is locking lever 140. If there is insufficient adjustment in the screw, bend down the lip just sufficient to produce desired result. If end of J has been bent sideways out of path of lever 140 it should be corrected as necessary.

If switch off mechanism is out of adjustment, slacken two screws 130. Lower overarm so that J is clear of lever 140. Rotate cam until the node is resting on tip of the lever B i.e. so that levers B and 140 are pivoted to the fullest extent of their travel. Move link E as far as it will go towards lever 140 and hold it there. Adjust link E1 until tip of switch lever 117 will just ride along radius of lever 118. Then re-tighten the two screws.

Mechanism failing to drop first record. This is due to knock-off clutch lever 133 failing to engage clutch lever at end of previous programme thereby allowing mechanism to over-run and pass through the record dropping operation of next cycle. To correct, bend lip lever 133 (which engages clutch) down for approximately $\frac{1}{16}$ in.

Pickup jumping groove or repeating. PU lead, where it

emerges from arm, should stand clear in a small half loop before passing down through unit plate, so ensuring that it does not put a bias on PU arm. Make sure both vertical and lateral movement pivots of arm are free; a spot of thin machine oil will help.

If a lightweight PU head is being used, and if it is under one ounce, weaken counterbalance spring 185.

Pickup skids. Providing the points mentioned in previous paragraph have been attended to, this trouble is usually due to the use of a needle with a curved shank which works the tracking arc forward.

Adjustment of camshaft spring. If spring 155 is too weak, the mechanism may operate in an erratic fashion and PU move in a series of jerks. If spring is too strong, it will put a heavy load on motor, paralyse overthrow action, and cause clutch to click.

Clutch clicking. Check tension on camshaft spring and observe overthrow action, as described earlier. If roller on cam is stopping on corner of overthrow lever and lever is not giving the final push to clear clutch, bend tail of lever 31 slightly away from clutch lever so that it will engage clutch lever a little later, this will let roller get past corner of overthrow lever before motor drive is cut off. If, however, it is found that roller passes corner on overthrow lever and lever gives it the final push before clutch disengages, bend tail of lever 31 towards clutch lever.

Adjustment of platform and platform stop. Load one 12in. record on spindle, operate changer slowly by braking turntable with the hand and stop immediately platform reaches its furthest point away from record. There should be a gap of approximately $\frac{1}{16}$ in. between edge of record and front edge of platform latch (or pawl 204) which pushes the record off spindle. If gap is incorrect it may be adjusted by moving screws B into an adjacent hole, which will alter the length of the link.

When changer is in the playing position, i.e. with needle on record, there should be a gap of approximately $\frac{1}{16}$ in. between tail of pawl 204 and front of stop 207. This can be adjusted by loosening the two screws 208. To obtain access to stop, the name plate may be slid off platform.

If pawl rides over stop when a 10in. record is to be played, or engages against stop when a 12in. record is next, the lip on stop should be bent up or down as necessary.

Platform tilt. When unit is in playing position the surface of platform should be in line with under surface of record resting on it. If it is otherwise, first check angle of record spindle by laying it on template printed in instruction manual supplied with unit, and having corrected, if necessary, by gently bending top of record spindle, the angle of platform may be adjusted by moving the screws A to an adjacent hole.

Record spindle. Record spindle should point directly to platform pawl. Make sure it is seating correctly in fixed spindle. Loosen two screws at bottom of main spindle shaft and turn fixed spindle until record spindle is pointing correctly.

Pickup. Garrard magnetic types are interchangeable with crystal without alteration to PU arm, provided PU is in a Garrard head.

To remove pickup head. Unscrew PU fixing screw, withdraw PU easing lead under arm, and remove two plug connections from back.

If reproduction ceases, or becomes distorted when fitted with a Garrard standard magnetic PU, first make sure amplifier is in order. Should this be found satisfactory, a slight adjustment to PU may be necessary or damping rubber may need renewing.

To examine PU: Remove cover and examine armature to see that it is in centre of gap between pole pieces. If it needs re-centring, loosen two screws holding adjusting plate.

If armature will not retain its centre position, it will be necessary to renew damping rubber.

Top damping rubber tends to perish in time. It should, therefore, be replaced whenever it appears that needle stiffness has increased.

Distortion can be caused by foreign matter in gap between pole pieces. Winding can be checked for continuity with an ohmmeter.

If a crystal or high-fidelity pickup is suspect, the head should be returned for examination.

Motor Maintenance.

If motor fails to start, check power supply and ascertain if current is reaching motor terminals. Next examine terminal block and see that leads and screws are tight; also examine switch contacts.

Motor requires occasional lubrication, depending on

how often changer is used. Lift off turntable and insert a few drops of Garrard or thin lubricating oil in oil holes. If a thick oil has been used to lubricate bearings the motor will appear weak or will not start. Motor will have to be dismantled and all traces of heavy oil removed.

Should motor run hot, check that voltage changeover links are properly set. Wavy reproduction from records is usually due to dry governor pads. These should be lubricated by saturating felt pads with oil. To cure governor rattle, put a little thick oil on shaft where governor sleeve slides.

RC65 D16. This is an induction motor for 40-60c/s AC of 100-130 and 200-250V. Maximum current should not exceed 110mA on 200-250V, 220mA on 100-130V or 240mA on 110V 60c/s.

RC65/U16. This is a universal for 100-130, 200-250V DC and 25-60c/s AC. Periodical examination of carbon brushes should be made. Brushes can be cleaned by slightly scraping contact surface with a penknife. It is essential that brushes be returned to their original holders and the same way round as previously. New brushes are $\frac{9}{16}$ in. long under the springs. When worn to $\frac{3}{8}$ in. they should be replaced.

In the event of it being necessary to clean the commutator, remove brushes and springs, (marking brushes to ensure they are replaced correctly), slacken screw which secures governor to armature spindle and remove the four screws which fix brush carrier. The brush carrier can now be drawn off as far as leads will allow and armature taken out leaving governor assembly in motor.

If, on testing, speed is too far out to be corrected by control lever, loosen governor fixing screw and slide governor along spindle towards felt pads to lower speed or away from pads to increase speed. Make sure that finally the fixing screw is tight.

RC65A Record Changer

There are three modifications in the RC65A. The PU arm has been redesigned to take the interchangeable plug-in heads; a muting switch has been fitted; the action of the stop mechanism has been re-designed.

Pickup Arm.—The new arm is fitted with a three-pin socket into which the PU head is plugged, connections to leads being made automatically.

Connections are so arranged that the lead from centre of PU coil is connected to top contact of muting switch, and the other lead to lower contact. If at any time it becomes necessary to renew the PU lead, connect top contact of muting switch to socket in the PU arm on righthand side when arm is viewed from front. The lefthand socket should be connected to lower switch contact, and lower socket via the lead screening to centre tag of muting switch which also acts as an earthing point for changer and motor.

Muting switch.—This is situated under changer at rear righthand corner and is also used as terminal point for PU lead. A twin core screened lead should be used for connecting changer to PU terminals on radio set or amplifier, and as centre of PU coil is connected to top contact of switch, it will generally be found desirable to connect top contact to PU terminal on set which links up with the grid of first amplifying valve.

The switch, which is controlled by the lifting lever for PU arm, is normally closed and is opened by lifting lever as it lowers needle on to record. The timing is so arranged that switch opens and closes as needle alights on record and lifts therefrom at end of a recording.

If reproduction ceases and tests reveal the PU head, PU lead and amplifier to be in good condition, examine muting switch to ensure that blades are separating correctly when needle alights on record.

The switch blades are made of nickel silver, and having a slight wiping effect at contact point are normally self-cleaning. If, however, noise is heard from speaker during the changing cycle when switch is closed, blades should be examined to ensure that contacts are clean.

Re-designed stop mechanism.—In the original RC65 moving the control knob to "Stop" only opened the motor switch causing the mechanism to "freeze" in whatever position it happened to be, the needle remaining on the record it was playing at the time.

If the knob was then moved to "Start," the changing cycle commenced and the next record was started.

In the RC65A moving the control knob to "Stop" does not affect the main switch, but instead it unlocks auto-stop and sets the changing cycle in motion, the unit then operates as if last record had been played—i.e., the PU returns to the rest before the motor switches off.

RAYMOND F49—Contd. from p.7

chassis. (a) Tune primary L6 (bottom) and secondary L7 (top) of RFT3 for maximum output on AC output meter. (b) Increase signal until fair deflection (10-20V) is seen on DC meter. Tune L9 Trap coil for minimum deflection on DC meter. (c) Repeat (a) and re-tune RFT6 for maximum output on AC meter. Sound sensitivity should now be approximately 1.5 to 2 mV for 15V deflection on output meter.

(6) (a) Unscrew fully core of primary L11 (top) of RFT4 and turn VR2 to minimum. (b) Change signal to 42.25 mc/s and tune secondary L12 (bottom) for maximum deflection on DC meter. (c) Change signal to 45 mc/s and tune primary L11 (top) for maximum deflection on DC meter. (d) Repeat (b), (c), (b).

(e) Check bandwidth, which should be flat within 3dB from 42.5-45 mc/s. Sensitivity should be approximately 6 to 8mV for 25V deflection on DC meter.

7. (a) Tune signal generator to 43.5 mc/s and feed into aerial socket with appropriate plug. (b) Load secondary L4 of RFT2 with 1,000 ohm resistor and tune primary L3 (bottom) for maximum volts on DC meter. Remove resistor. (c) Load primary L3 with resistor and tune secondary L4 (top) for maximum volts on DC meter. Remove resistor. (d) Turn VR1 to minimum. Turn VR3 to maximum. Tune L2 of RFT1 (bottom) for maximum volts on DC meter.

8. Replace shield.

9. Turn VR1 to maximum and check bandwidth which should be flat within 3dB between 42.5 and 45 mc/s. Sensitivity at 45 mc/s should be approximately 80-100 microvolts for 25V deflection on DC meter.

10. Turn VR2 to maximum and check sound sensitivity at 41.5 mc/s which should be approximately 15-20 microvolts for 15V deflection on output meter.

11. Feed 100 microvolts at 45 mc/s into aerial socket and adjust VR3 until deflection on DC meter is 5 volts.

Tune signal to 41.5 mc/s and increase signal 100 times, i.e., 10 millivolts (make sure that generator frequency is accurate by locating with BBC).

Re-tune L9 trap coil until deflection is at minimum on DC meter (tuning is very sharp and core has to be turned very slowly). The deflection on DC meter should then be no more than 5 volts. Should the trap not be capable of reducing deflection to desired reading R9 may have to be slightly reduced by adding in parallel a resistor of between 1,000 to 22,000. This trap is capable of giving infinite rejection if R9 is of the correct value, but rejection of better than 100 to 1 is more than sufficient to eliminate sound break through on picture. (On no account must R9 160 ohm 1 per cent, high-stability resistance be replaced by a resistor of a different type.)

ALIGNMENT OF MIDLANDS MODEL—F49B

To align the Birmingham model F49B, a signal generator covering 55-65 mc/s is needed. Procedure is exactly as for the F49 but the following frequencies and sensitivities should be substituted for the figures given above.

2. Inject 60.5 mc/s. Response within 1dB over 61.75-59 mc/s.

4. Inject 58.25 mc/s. Sensitivity: 30-40mV for 15V deflection.

5. Inject 58.25 mc/s.

6. (b) Inject 59 mc/s. (c) 61.75 mc/s. (e) Bandwidth flat within 3dB from 61.75-59.25 mc/s. Sensitivity 8-11 mV for 25V deflection.

7. 60 mc/s.

9. Within 3dB from 61.75-59.25 mc/s. Sensitivity at 61.75 mc/s 160-220 microvolts for 25V deflection.

10. Sensitivity at 58.25 mc/s 30-40 microvolts for 15V deflection on output meter.

11. 61.75 mc/s. Tune to 58.25 mc/s and increase signal 100 times.

NEEDING A CHART?

When you need a Chart not contained in your file of MANUALS write to The Publisher, ELECTRICAL AND RADIO TRADING, 6 Catherine Street, London, WC2, asking if a Chart of that set is available. If the Publishing Dept. cannot supply, your letter will be passed to the Editorial Advice Bureau which may be able to lend you information from its files.