

ENGINEER'S SERVICE MANUAL

Garrard

AUTOSLIM

AND LABORATORY SERIES

TYPE A.T.6

(ALSO COVERING TYPE A.T.5)

GARRARD ENGINEERING LIMITED

Technical Service Dept. and Factory: NEWCASTLE ST. - SWINDON - WILTS - ENGLAND Tel. 5381

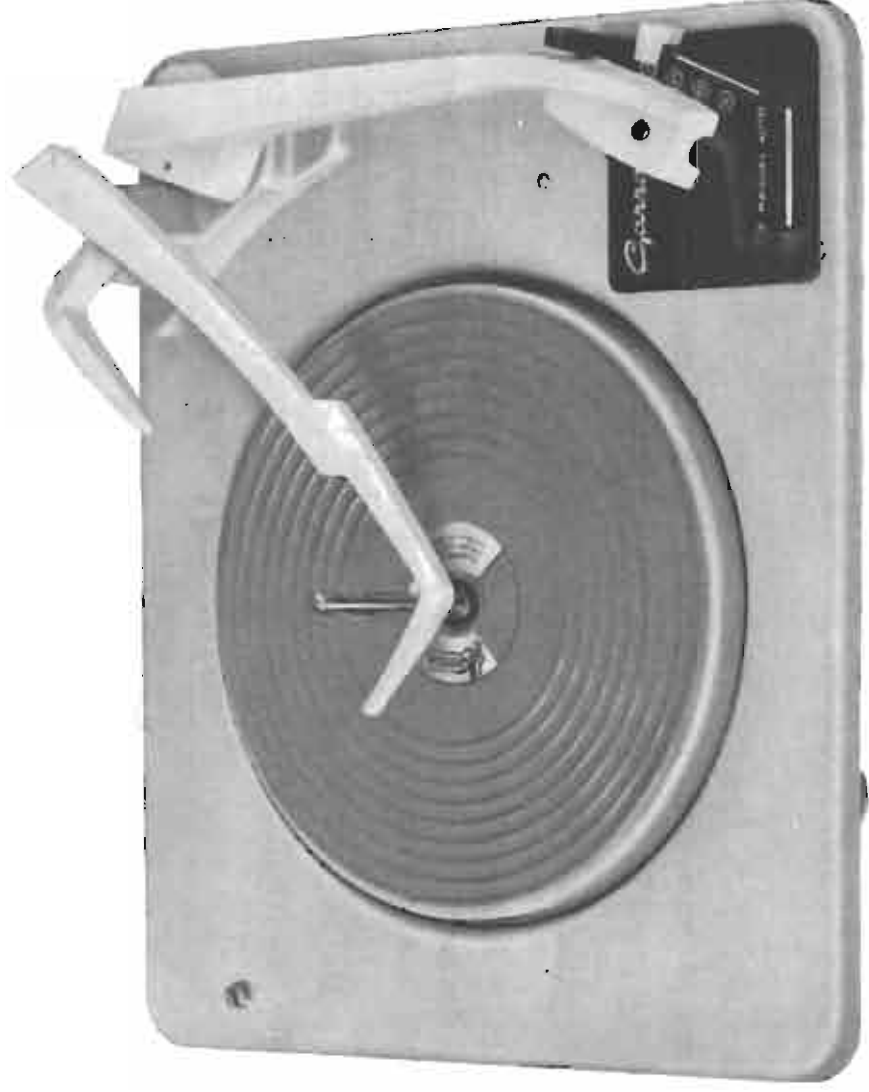
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THE *Garrard* AUTOSLIM

Note:

The Garrard model A.T.5 is similar in appearance to the Autoslim and uses the same mechanism, but is distinguished by its larger turntable.

AUTOSLIM *The Record Player and Changer has facilities for complete manual and automatic operation*

Description

It will play automatically 7", 10" or 12" diameter records which can be mixed in any order, providing they are of the same speed. No setting for record size is required, the selection being completely automatic. The changer may be stopped and started without rejecting the record being played and records can be played manually as on a single record player. 7" 45 r.p.m. records with large centre holes may be played automatically using the large record spindle type LRS 5 available as an optional extra.

This unit is designed to play records made to B.S. 1928/1961 and similar standards in other countries.

To Operate

1. See that correct stylus is in position for type of record to be played and raise pickup arm to release from catch so that the arm is free on its rest.
2. Move speed change control to speed required.
3. Place records horizontally on record spindle and swing record overarm fully inward to its operating position, making sure that it drops with the arm resting on the top record.
4. To switch on, move the control to "Auto", pause and release, allowing it to spring back to "Manual".

To Unload

1. When unit has switched off automatically, lift record overarm and move it to right hand side.
2. Lift records off spindle. If replaying the same records, lift them clear of the spindle before replacing.

Manual Operation

Place record on the turntable by threading it over the record spindle, moving it horizontally over the step in the spindle. Swing the record overarm in to its operating position. Move the control to "Manual", then place pickup stylus on the record. A short manual spindle is available as an optional extra.

A record being played can be rejected by moving the control to "Auto".

Stop

The changer stops automatically on completion of playing the records placed on it. If it is required to stop the unit while playing a record, move the control to "Off". This will stop the motor with the pickup remaining on the record. To restart, move the control to "Manual" and the record will continue playing.

Note

In order to prevent damage to the stylus the control should not be switched to the "Auto" position until the records have been loaded on to the record spindle.

Do not leave records on the changer when not in use.

Keep the stylus point free from dust.

To obtain the best results from records, see that they are stored and cleaned as recommended by the record manufacturers.

Before connecting the record changer to the amplifier make sure that the pickup circuit of the radio set or amplifier, to which it is to be connected, is isolated from the power supply. If it is not, then it is essential for isolating components, condensers or transformers, to be incorporated in the pickup circuit. When using a crystal pickup, a 0.1 mfd condenser in each lead may be found suitable. The value of the condensers should be as low as possible in order to maintain the pickup response while giving the minimum of hum. 0.1 mfd condensers are usually satisfactory, but 0.01 mfd may be more suitable if hum is not introduced. The condenser should have a working voltage of at least 1,000 volts. The screening and braiding of the pickup lead must be connected to a true earth and not to the amplifier chassis; it should also be kept as short as possible to avoid hum pick up.

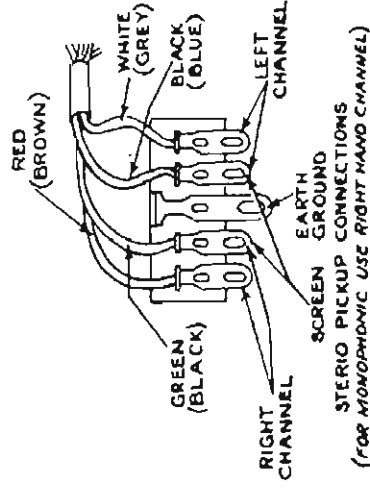


Diagram 2

This diagram shows the connections for monophonic and stereophonic pickups. Alternative coding in brackets.

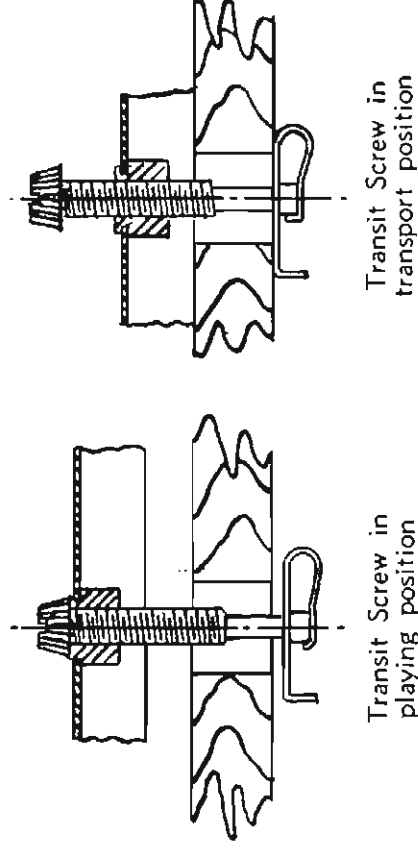
If your unit is fitted with phono-jack leads, the above diagram may be ignored.

Brown phono lead is R.H. Channel.

Grey phono lead is L.H. Channel.

For monophonic play, use Brown phono lead.

The unit should be placed on the board so that the spring mountings seat in their locations and the transit screws go through their respective holes. When in position the spring-locks on the ends of the transit screws should be turned through 90° so that they lie parallel to the motor board, as on diagram below. In use check that these two screws are screwed down clockwise and that the unit is floating freely on its suspension springs.



Clip must be vertical when assembling unit to motor board

TRANSIT SCREW DETAILS

Diagram 3

Units mounted on "Garrard B8 Base" do not have transit screws or spring mountings as Diagram 3, the base itself being mounted on springs.

Service Adjustments

Maintenance

The motor, turntable spindle and rubber intermediate wheel bearings are of the oil-retaining type and rarely need lubricating. When the need for oil is apparent, remove the turntable and lubricate these bearings with a fine grade of machine oil. Carefully remove all traces of surplus oil—especially from the motor pulley, rubber intermediate wheel and inside of turntable rim.

To Remove and Replace the Turntable

To remove the turntable: slide off the retaining clip and lift the turntable with equal pressure on diametrically opposite sides.

To replace the turntable: check that the gap in the teeth of the main gear is adjacent to the turntable spindle and that the automatic trip pawl is pushed away from the turntable spindle. The turntable will now slide on easily. Assemble the retaining clip in the groove in the turntable spindle, making sure that the wedge part on the clip fits in the slot in the groove.

Record Spindle Assembly

Place the record spindle in position and rotate it until location is felt, then press firmly downwards to secure in the turntable clip; this holds it in position.

Pickup Height

The height of pickup lift is adjusted by turning the top screw at the rear of the pickup arm. The height should be adjusted so that the pickup stylus point is 27/32" above the turntable mat surface at the outside edge position of a 7" record as the pickup returns to its rest. With power supply switched off move the control to "Manual" or "Auto" and revolve the turntable clockwise by hand through the changer cycle to obtain the adjusting position.

Pickup Dropping Position

To adjust the pickup dropping position: lift the pickup arm which will reveal a horizontal screw and locknut (Diagram 4). The slotted head of this screw should be turned to obtain adjustment, clockwise to move arm in and anti-clockwise to move arm out. The locknut need not be touched for either adjustment.

Stylus Pressure

The maximum stylus pressure should be 8 grammes for stereophonic and 10 grammes for monophonic pickups. However, there are now available many pickup cartridges having stylus compliances such that they will track at stylus pressures lower than the maximum figures quoted above. It is recommended that a periodical check be made, preferably with a Garrard stylus pressure gauge, to see that the correct pressure is maintained. To adjust the stylus pressure, turn the knurled nut on the underside of the pickup arm, clockwise to decrease, and anti-clockwise to increase stylus pressure. Shown on Diagram 4.

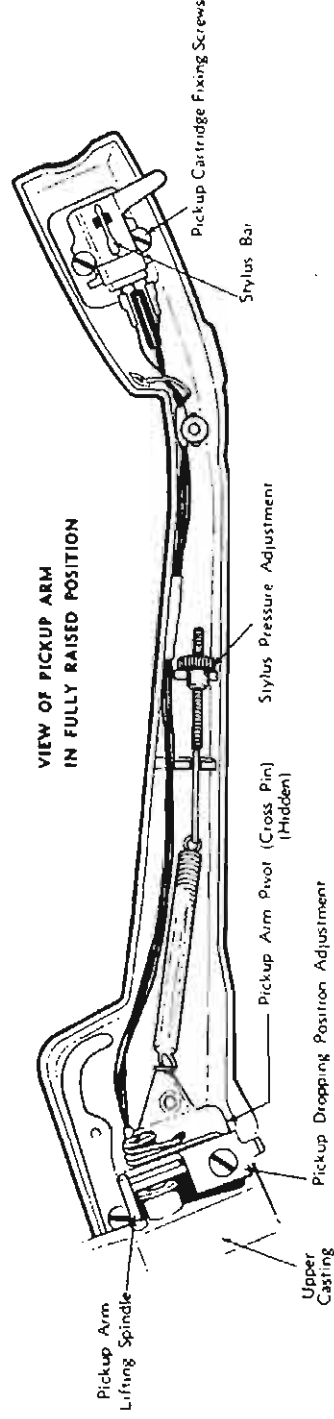


Diagram 4

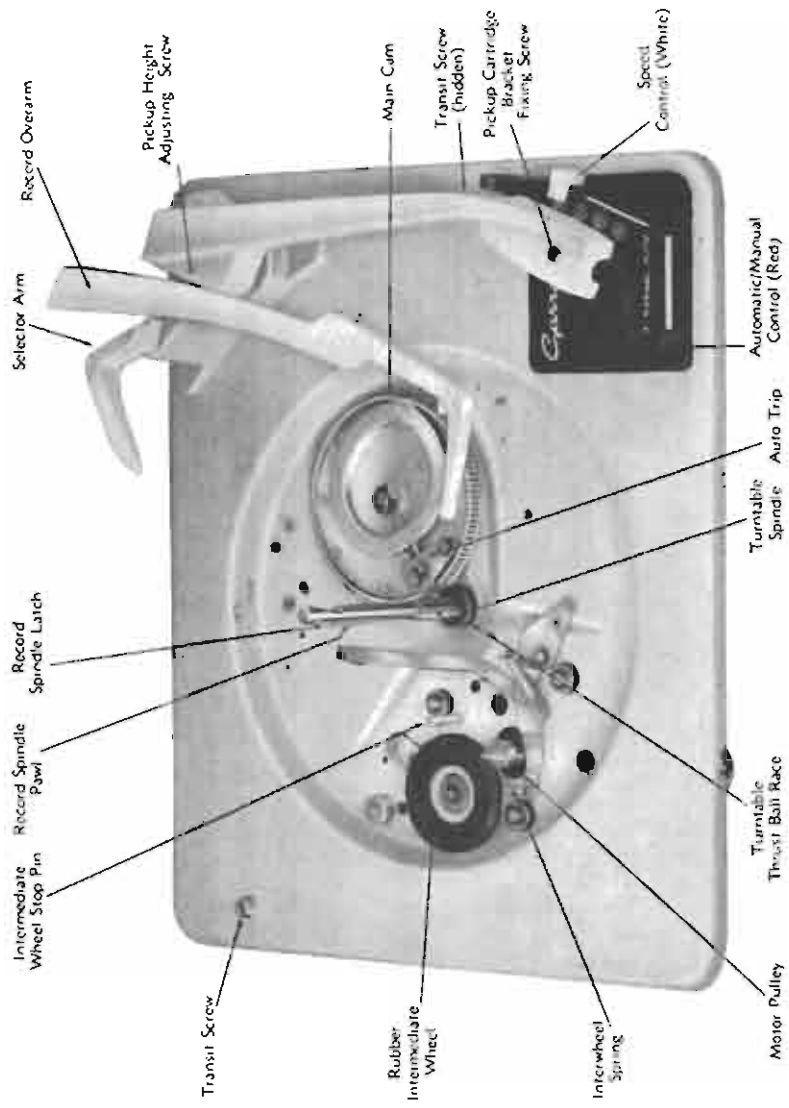


Diagram 5

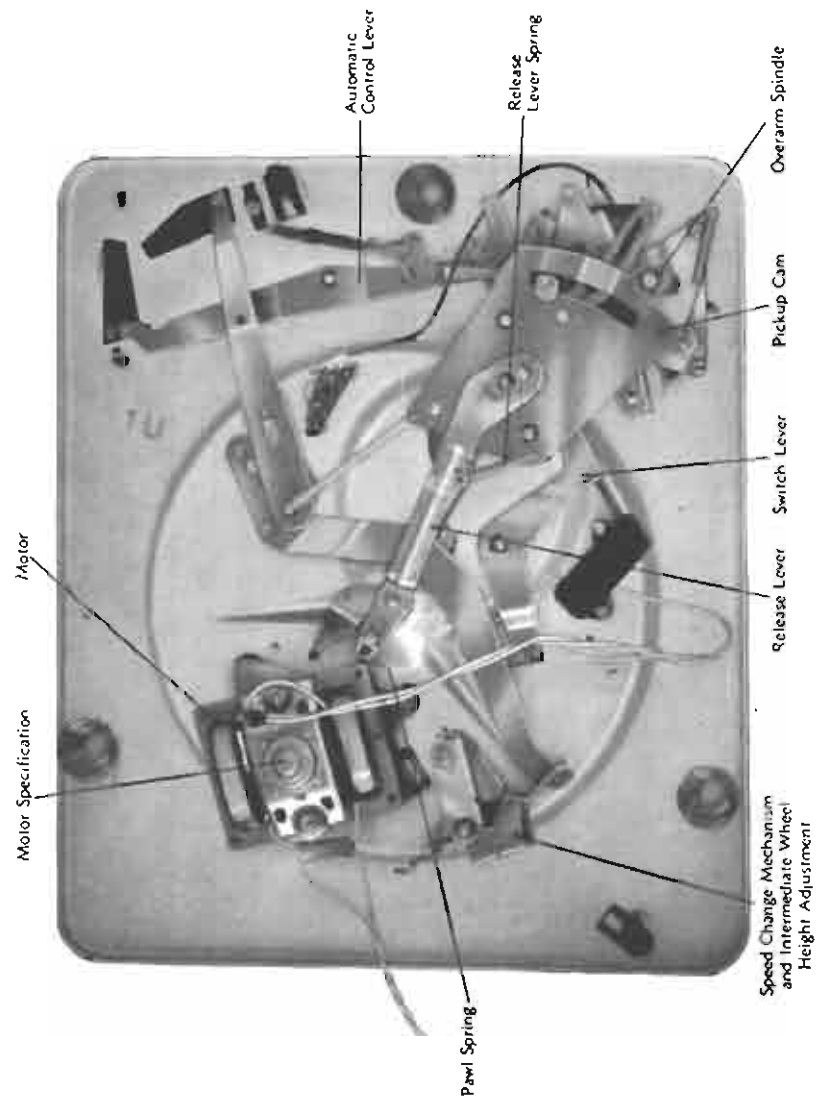


Diagram 6

Automatic Trip

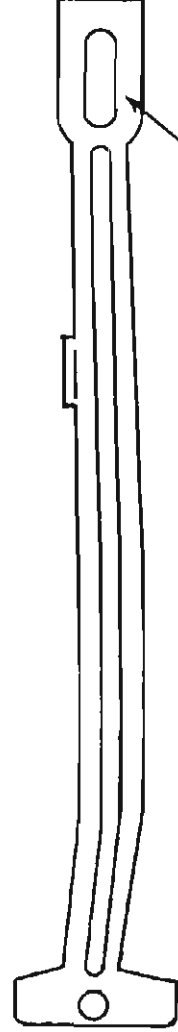
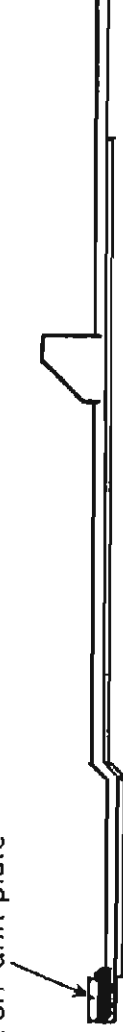
(A) Pickup remains in centre of record or repeats in record groove when nearing centre of record.

Faults

- (1) Stylus pressure too light.
- (2) Worn stylus.
- (3) Pickup cartridge case touching on record or record label.
- (4) Pickup leads not free.
- (5) Too much friction on automatic trip links.

1. Make sure that the pivot for up and down movement of the pickup arm is free. Lubricate cross pin if necessary with light machine oil (see Diagram 4). Check stylus pressure and adjust as described under "Service Adjustments."
2. Check stylus for wear, replace it if worn. See "Pickup Arm Movement" paragraph (A)2 page 14.
3. Check that the cartridge bracket fixing screw on top of the pickup arm (see Diagram 5), and the cartridge fixing screws underneath pickup arm (see Diagram 4) are tight. Then make sure that the stylus bar is not bent; if so, replace it.
4. Check that the pickup leads at the rear of the pickup arm are not strained in any way, and do not bias the free movement of the pickup arm as it moves across a record.
5. Check the freeness of the automatic trip links by moving the pickup arm slowly inward as if playing a record by hand. Should any stiffness be felt, carefully check all associated levers for freeness and see that they are not obstructed by any leads. Lightly grease automatic trip lever at points shown on diagram below.

Grease here on underside of lever and on unit plate



Grease slot

Diagram 7

This lever is positioned underneath the release lever and pickup cam (see Diagram 6).

Turntable Speed

(A) Turntable runs excessively fast or slow

Faults

- (1) Incorrect stroboscope being used.
- (2) Voltage range of motor set incorrectly.
- (3)a Incorrect motor pulley (4 pole motor).
- (3)b Incorrect motor pulley (2 pole motor).
- (4) Stiff intermediate wheel bearing.
- (5) Motor pulley or rubber intermediate wheel height incorrect.

1. When checking turntable speed, the pickup should be playing a record. Check that the stroboscope used is the correct one for the frequency of the power supply.
2. Disconnect the power supply and if dual voltage range unit, check the connections inside the voltage change-over block. They should be as shown on the block cover corresponding to the voltage of the power supply. Also check that the links are tight and making good contact. If the unit is for single voltage, check that the supply is correct for the motor, as stated on specification under turntable mat and, if necessary, check with specification stamped on flange of motor end cover.
- 3a. Remove turntable (see Page 5). Check motor pulley; it is colour finished, nickel for 50 cycles and brass for 60 cycles power supply. If incorrect, change it for one obtained from our Spares Department. When ordering, please quote model type and frequency of power supply (see Diagram 6).
- 3b. The 2 pole motor pulley is colour finished on the 78 r.p.m. collar, nickel for 50 cycles, brass for 60 cycle power supply. If incorrect, exchange motor for one supplied by our Spares Dept., as pulley is not removable.
4. Spin the rubber intermediate wheel to check that it runs freely (see Diagram 5). If it is stiff, remove its retaining clip and take it off its spindle. Wipe the spindle with a clean rag, then oil it with light machine oil. Replace the rubber intermediate wheel and check that it spins freely; then assemble its washer and retaining clip.
5. The relative height of motor pulley and rubber intermediate wheel (see Diagram 5) must be such that, when they are in contact on either the $16\frac{3}{4}$, $33\frac{1}{4}$ or 45 r.p.m. steps, the lower face of the rubber intermediate wheel is about $\frac{1}{16}$ " clear of the adjacent pulley step. To make this setting, first set the motor pulley height such that the level of the top of the pulley, i.e. top of $16\frac{3}{4}$ r.p.m. step, is on a level with the top of the rubber intermediate wheel stop pin in the unit plate (see Diagram 5).
The motor pulley (4 pole) is held on the rotor shaft by two small screws; care should be taken that they are tight and also tightened evenly. Now that the motor pulley has been set, adjust the height of the rubber intermediate wheel from underneath the unit (see Diagrams 6 and 8).

The 2 pole motor pulley is integral with its rotor shaft and its position is dependent on the motor suspensions. Therefore only the rubber intermediate wheel height is adjustable.

(B) Speed slightly fast or slow

Fault

(1) Pulley size.

If it is not possible to obtain the correct turntable speed within reasonable limits by the preceding instructions, carefully check the speed of the turntable. Attach a marking tab to the turntable and time its revs./min. with a watch, while playing a record. Write to our Technical Service Department stating the type of unit, the speed of the turntable in r.p.m., and enclosing the existing pulley which will be replaced with one to give the correct speed.
2 pole motors should run well within reasonable limits, but a 2 pole motor running slightly slow or fast may be exchanged if the above details, excepting pulley size, are communicated.

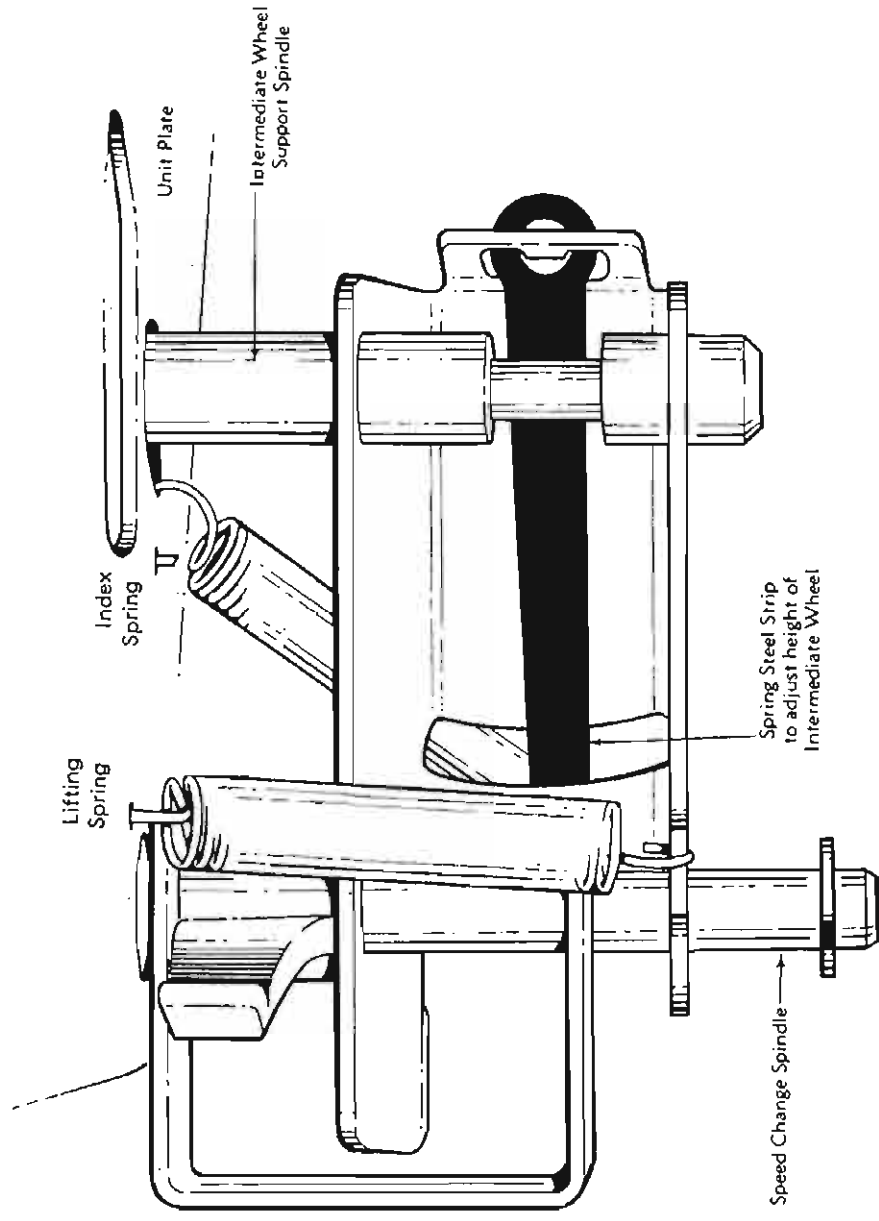


Diagram 8

(C) Speed varies erratically

Faults

- (1) Oil on driving surfaces.
- (2) Motor pulley loose or its height incorrect (4 pole motor).
- (3) Motor shaft tight.
- (4) Records slipping.

1. Remove turntable (see Page 5). With a clean rag wipe the motor pulley, rubber intermediate wheel and the inside rim of the turntable to remove any oil or dirt. Remove any other surplus oil that may be observed.
2. The motor pulley is held on the motor shaft by two small screws, both of which should be tight. Check that the motor pulley is at its correct height as described in this section, paragraph (A)5.
3. If the motor shaft is tight in its bearings, it will not spin freely when spun with the fingers. This will be caused by using too heavy a lubricating oil or the motor bearings being out of alignment. Instructions for correcting these points are found under the section dealing with "The Motor", paragraph (B)2.

4. Warped records may slip if placed one on top of another. This may be overcome by sticking a small strip of adhesive tape on the labels of the slipping records. These will tend to key together to give an improved drive.

(D) Speed varies consistently (Wow and Flutter)

Faults

- (1) **Tight turntable spindle.**
- (2) **Dirt on inside of turntable rim.**
- (3) **Loose motor pulley (4 pole motor).**
- (4) **Flats on rubber intermediate wheel.**
- (5) **Bent shaft or unbalanced rotor.**

1. Revolve turntable by hand, without the record changing mechanism in engagement; it should run freely. If rough or sticky, remove the turntable (see Page 5) and clean the turntable spindle (see Diagram 5). Oil the spindle and ball-race with light machine oil. Remove surplus oil.
2. Remove turntable (see Page 5), run fingers round the inside of the rim and remove any roughness or dirt that may be felt.
3. See this section, paragraph (C)2.
4. Flats on the rubber intermediate wheel are produced in two ways.
 - (a) By the mechanism slipping, causing the rubber to be worn away. Such flats cannot be cured and the faulty wheel should be replaced with one obtained from our Spares Department.
 - (b) By the rubber being deformed into a flat, as would be caused if the unit were repeatedly switched off from the power supply instead of using the control. They may be removed by running the unit continuously for a few hours. If, however, this does not cure the fault, then the intermediate wheel should be replaced.
5. A bent motor shaft or out of balance rotor could only be caused by bad handling in transit or installation. Should the motor shaft with pulley removed be more than .0005" out of truth, total indicator reading, or the motor vibrate badly, the rotor and shaft assembly should be replaced with one obtained from our Spares Department. The rotor and shaft are integral and no attempt should be made to separate them.

(E) Turntable does not revolve when motor is running.

Faults

- (1) **Oil on driving surfaces.**
- (2) **Rubber intermediate wheel spring off.**
- (3) **Rubber intermediate wheel bracket not free.**

1. Remove turntable (see Page 5). With a clean rag wipe the motor pulley, rubber intermediate wheel, and the inside rim of the turntable, until all traces of oil have been removed. Wipe off any other surplus oil that may be observed.
2. Check that the rubber intermediate wheel spring, shown in Diagram 5, is still in place. Move the control knob to "Manual" and watch the spring to make sure that it goes into tension. If not, it will mean that the spring has stretched and should be replaced with one obtained from our Spares Department.
3. Check that the rubber intermediate wheel support is free to move in the slot in the unit plate. The rubber intermediate wheel should firmly engage the motor pulley when moving the control to "Manual" and freely retract when switching to "Off". If the bracket is stiff, check the speed change mechanism underneath the unit plate (see Diagram 6). See that none of the mechanism is damaged and lubricate the rubber intermediate wheel support spindle and speed change spindle with light machine oil (see Diagram 8).

Automatic Switch

(A) Fails to switch off when last record has played or switches off without playing a record.

Faults

- (1) Record overarm spindle not free.
- (2) Excessive friction on the control lever.
- (3) Knock-off lever stiff.

1. Check that the record overarm when in its innermost (i.e. operating) position will drop freely under its own weight when lifted up. If not, remove the spring clip from the end of the overarm spindle underneath the unit and pull out the overarm (see Diagram 6). Wipe the spindle clean, then lightly oil it. Reassemble and check for freeness. To reset the overarm, check that the rubber washers, at the top of the spindle, are right against the overarm casting. Then with the overarm in its operating position and no records on the record spindle, check that the end of the overarm is not more than 7/32" below the step in the record spindle. Make sure that the record spindle is located properly (see "Service Adjustments").
2. Check that the movement of the control lever is not restricted and its associated levers are not damaged (see Diagram 6). Should any lever be damaged in transit, remove it to correct or replace it with one obtained from our Spares Department. Grease the end of the control lever where it operates the switch lever (situated near pickup operating mechanism).
3. Check that the knock-off lever moves freely under the lower casting (see Diagram 9). When the tail of this lever is moved away from the pickup arm, it should return under spring pressure. For the switch off mechanism to work properly, the tail of this lever must be square with the unit plate. If it has been bent during transit, carefully bend it square again. Lightly grease the knock-off lever as shown on Diagram 9.

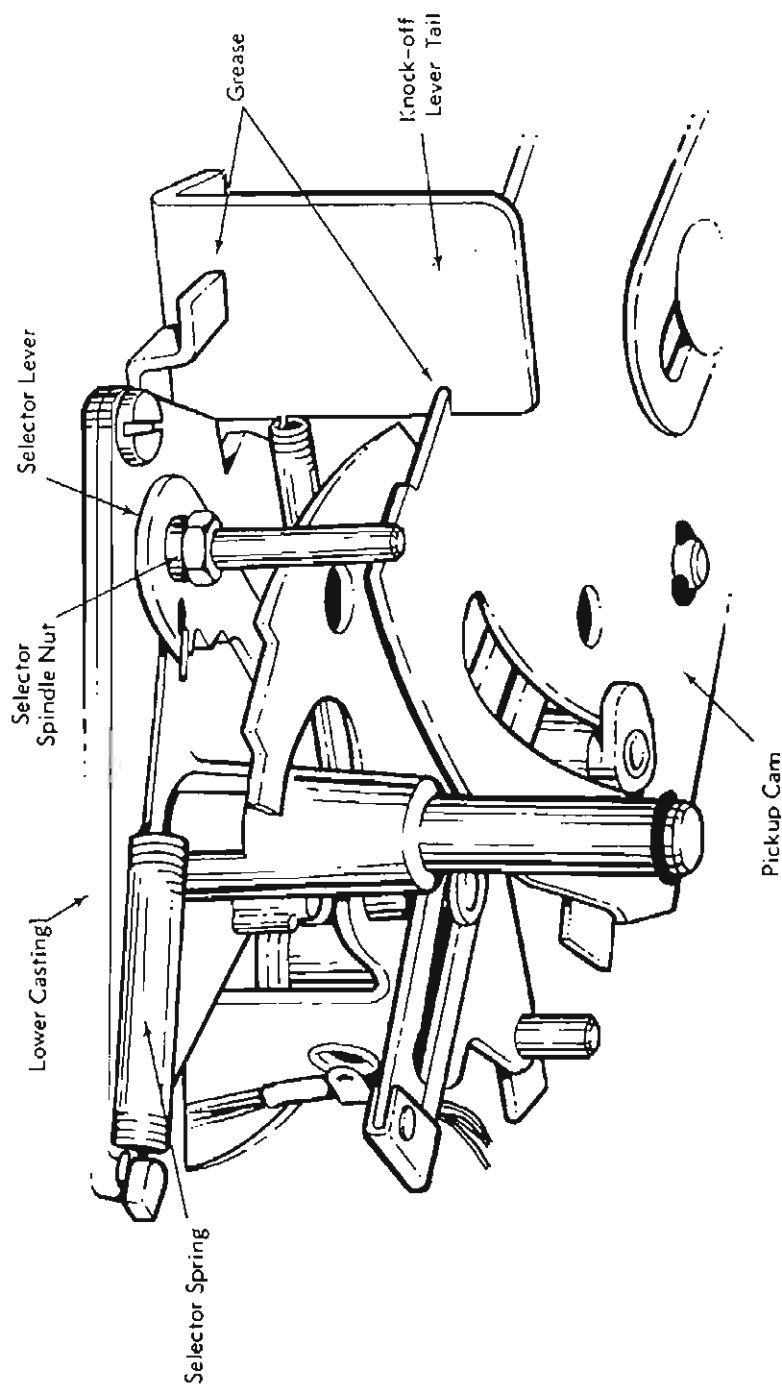


Diagram 9

Record Selection

Please make sure that the record overarm is set as described under "Automatic Switch" paragraph (A)1.

(A) Pickup consistently lands too far in or out.

Faults

- (1) Dropping position requires adjustment.
- (2) Selector lever nut loose.
- (3) Selector moulding damaged or out of position.

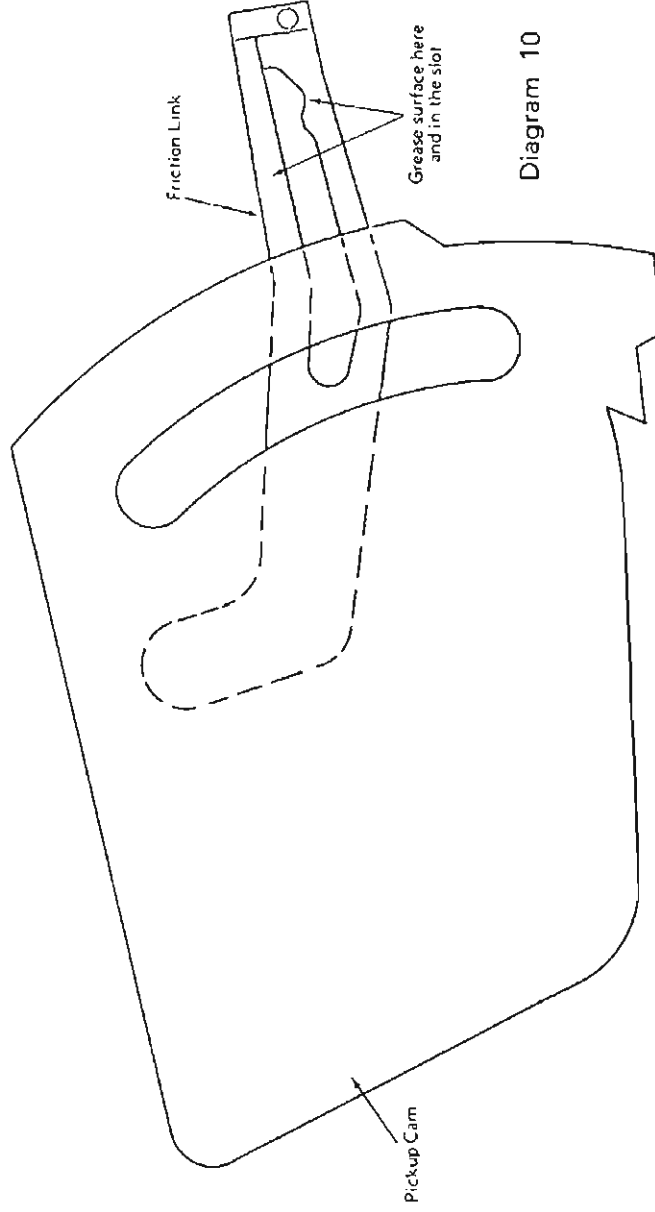
1. See "Service Adjustments", Page 5.
2. Check that the nut positioned on the selector spindle on the underside of the unit is tight (see Diagram 9). This will make sure that the selector lever is clamped securely.
3. Check that the selector arm is not chipped or damaged. Check its position thus: with no record on the record spindle and with power supply off, switch control to "Auto" and revolve the turntable by hand. Watch record spindle pawl as it moves out across the record spindle step. Stop turning the turntable when the pawl reaches its outermost position. Then with the overarm in its operating position check that the tip of the selector arm is between $4\frac{3}{4}$ " and $4\frac{1}{4}$ " radius from the turntable centre. Also move separately a 10" then 12" record slowly down the record spindle and make sure that the selector catches into its 10" and 12" selecting positions respectively. If the selector is faulty it should be replaced with one obtained from our Spares Department.

(B) Erratic selection of records.

Faults

- (1) Selector lever nut loose.
- (2) Friction link requires lubrication.
- (3) Selector spring weak or incorrectly assembled.

1. See paragraph (A)2 of this section.
2. Make sure that the friction link shown below is not damaged. Grease along slot as shown.



3. Check that the selector spring is working by first moving the overarm in to its operating position; this sets the selector arm. Then move the selector arm by hand away from the centre of the turntable; it should return by light spring pressure. If not, check the selector spring shown in Diagram 9, making sure that it is securely fixed to the selector lever and lower casting. If it has stretched, replace it with one obtained from our Spares Department.

Record Dropping

Please make sure that the record overarm is set as described under "Automatic Switch" paragraph (A)1, and that records lie parallel to turntable when on step of record spindle.

(A) Records do not drop.

Faults

- (1) Damaged record spindle.**
- (2) Top of record spindle pawl rough.**
- (3) Record overarm tight.**
- (4) Non-standard records.**
- (5) Release lever spring off or weak.**
- (6) Pawl spring off or weak.**

1. Carefully examine the record spindle for damage; it should not be bent. Press the record spindle pawl (see Diagram 5) into the spindle against its spring tension; it should readily return. If it sticks, the spindle has been damaged and should be replaced.
2. The top of the record spindle pawl (see Diagram 5) should be smooth to allow it to return inside the spindle when there are no records on it. Should it be rough, it should be lightly polished with a fine emery cloth.
3. The record overarm should be perfectly free and follow a stack of records downwards as dropping occurs. See that overarm is lubricated and set as described in "Automatic Switch" paragraph (A)1.
4. This unit is made to play records complying with B.S. 1928/1961 and corresponding specifications in other countries. If the record is thicker than .090" round the centre hole, then it may fail to drop. Records having an oversize centre hole may also give trouble in dropping. New records may have some label flash in their holes; this should be removed with a pen-knife.
5. Check that the release lever spring (see Diagram 6) is fixed to the release lever and pickup cam, and has not been stretched. If it is damaged or stretched, replace it with one obtained from our Spares Department.
6. Check that the pawl spring (see Diagram 6) is fixed to the release lever and unit plate, and has not been stretched. If it is damaged or stretched replace it with one obtained from our Spares Department.

(B) Two or more records drop together.

Faults

- (1) Record spindle latch not free.**
- (2) Non-standard records.**

1. Check that the record spindle latch (see Diagram 5) will move up and down freely; if it sticks up while playing records, then two or more may drop together. If the latch is not perfectly free, see if there is any noticeable burr on outside of latch and remove with a fine file. If necessary, remove latch by knocking out cross pin at top of spindle. The spindle should be withdrawn and supported so that no damage is incurred. Then make sure that the latch and its slot are smooth and that the latch is flat. Reassemble and lightly clinch hole to retain pin; check that spindle has not been damaged.
2. This unit is made to play records complying to B.S. 1928/1961 and corresponding specifications in other countries. If the records used are under .053" thick around the centre hole, then two may drop together.

Pickup Arm Movement

(A) Pickup lands on record and jumps first few grooves.

Faults

- (1) Stylus pressure too light.
- (2) Worn or wrong size stylus.
- (3) Changer not level.
- (4) Pickup leads not free.
- (5) Groove guard on record.
- (6) Too much friction in friction link.

1. See "Service Adjustments", page 5.
2. Check that the stylus is correct for the type of record being played. A stylus for 78 r.p.m. coarse groove records may jump if inadvertently used on fine groove (L.P.) records. Check stylus, replace if it is worn or damaged. There is a stylus tip radius of .001" for fine groove and .0025" for 78 r.p.m. coarse groove records. If when examined microscopically, the stylus tip radius shows an increase, is chipped or worn flat, the stylus should be replaced. Fall off in sound quality may also signify a worn stylus.
3. Make sure that the turntable is reasonably level, by placing a spirit level on a record on the turntable. Check from side to side and back to front.
4. See "Automatic Trip", paragraph (A)4.
5. Some records are made with a groove guard; this is a raised rim around the outside edge of the record. Should the stylus land on this and not be immediately picked up by the run-in groove, the pickup can slide down the slope and jump the first few grooves. To prevent this, set the dropping position so that the stylus lands just inside the raised rim. Instructions for this adjustment are given under "Service Adjustments", page 5.
6. Grease the friction link as shown in Diagram 10.

(B) Pickup arm does not lower on to record.

Faults

- (1) Lifting spindle sticking.
- (2) Pickup arm pivot not free.

1. Lift pickup arm and pull up the lifting spindle by hand (see Diagram 4). It should return readily under spring pressure. If it is found to be sticking, examine the part of the spindle underneath the record changer (see Diagram 11). Check that it is not fouled by any leads or parts of the mechanism and see that the lifting spring has not slipped over its retaining shoulder at the end of the lifting spindle. Oil the spindle with light machine oil as shown on Diagram 11.

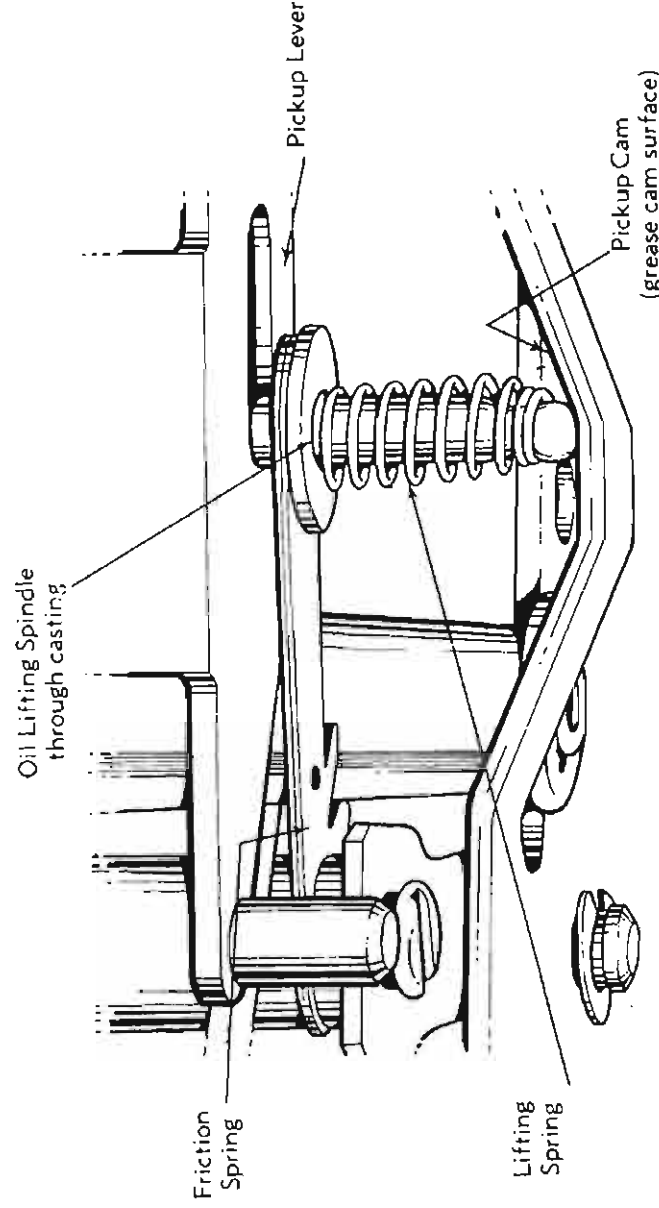


Diagram 11

2. Make sure that the pivot for the up and down movement of the pickup arm is free. Lubricate the cross pin with light machine oil (see Diagram 4). Check the stylus pressure and set it as described in "Service Adjustments", page 5.

(C) Pickup begins to lower, then swings in

Faults

- (1) **Pickup leads not free.**
- (2) **Lifting spring or friction spring not working.**

1. See "Automatic Trip", paragraph (A)4.
2. Check that the lifting spring (see Diagram 11) has not slipped over its retaining shoulder on the lifting spindle, and that it is not damaged or obstructed. Check that the spring steel friction spring (see Diagram 11) is working; with the lifting spring held clear, deflecting it away from the pickup cam; it should spring back. If either of these springs is faulty, replace it with one obtained from our Spares Department.

(D) Stylus fails to track.

Faults

- (1) **Stylus pressure too light.**
- (2) **Pickup arm pivot not free.**
- (3) **Worn or wrong size stylus.**

1. See "Service Adjustments", page 5.
2. See this section, paragraph (B)2.
3. See this section, paragraph (A)2.

Reproduction

(A) Rumble.

Faults

- (1) Motor pulley height incorrect.
- (2) Lack of lubrication.
- (3) Power supply cable tight.
- (4) Dirt on rubber tyre of intermediate wheel.
- (5) Intermediate wheel rubber tyre perished.
- (6) Out of true motor pulley (4 pole motor).
- (7) Incorrect pickup match with amplifier.
- (8) Record changer not free on its suspensions.

1. See "Turntable Speed", paragraph (A)5.
2. Remove turntable (see page 5). Clean the turntable spindle and ball-race if necessary, and lubricate them with fine machine oil (see Diagram 5). Remove any excess oil.
3. Check that the motor is perfectly free on its suspensions and is not biased in any way by the attachment of a heavy power supply cable.
4. Examine the running face of the rubber intermediate wheel (see Diagram 5) and remove any obvious dirt. It may be necessary to scrape the surface lightly to remove it.
5. Should the rubber on the intermediate wheel have hardened, evidence of this may be a crack or cracks on the running surface; the wheel should be replaced with one obtained from our Spares Department.
6. The motor pulley (see Diagram 5) may be out of truth owing to its fixing screws not being equally tightened; loosen off the screws and re-tighten them, adjust the pulley height as described in "Turntable Speed", paragraph (A)5. If the rotor shaft is bent out of truth, replace it with one obtained from our Spares Department as described in "Turntable Speed", paragraph (D)5.
7. Make sure that pickup matching circuit is to the pickup cartridge manufacturers' recommendations.
8. Check that the transit screws are screwed down (Diagram 3) and that the spring suspensions float the record changer free of the motor board and cabinet surround.

(B) Interference on reproduction.

Faults

- (1) Bad switch contact.
- (2) Loose power supply lead connections.
- (3) Loose connections on pickup cartridge.

1. With the power supply switched off, remove the cover on the switch (see Diagram 6). Check that the leads are securely soldered to the switch blades and clean the contacts on the blades. Then make sure that the contacts close when the control is moved to "Manual". To do this it may be necessary to screw, temporarily, the switch to the unit plate without the cover on.
2. Examine all connections to make sure they are making good electrical contact. If dual voltage model, check that the voltage changeover links are tight and making good contact on the studs. Scrape the studs with a penknife to remove any tarnish that might cause bad contact with the links. Check that the links are set for correct voltage as shown on changeover block cover.

3. Check that the pickup leads are securely soldered to the pickup cartridge. The leads are of different colours, coded as follows:—

White—Left Hand Channel.

Black—Earthy Left Hand Channel.

Green—Earthy Right Hand Channel.

Red—Right Hand Channel.

For single channel connections, use the right hand channel, i.e. the Green and Red leads, or as per manufacturers' recommendation if 3 terminal type of cartridge.

(C) Mechanical Noise.

Faults

- (1) Lack of lubrication.**
- (2) Flats on rubber intermediate wheel.**
- (3) Loose lever.**

1. See this section, paragraph (A)2.
2. See "Turntable Speed", paragraph (D)4.
3. A buzz or chattering noise when the unit is playing could be caused by a loose lever which can be found by touching each lever in turn with the finger. When the offending lever is found, a spot of fine machine oil on its pivot and points of contact usually clears the trouble.

The Motor (4 pole)

(A) Motor will not start.

Faults

- (1) No power supply.**
- (2) Loose connections.**
- (3) Bad switch contact.**
- (4) Open circuit bobbin coils.**

1. Check that the current is reaching the motor.
2. See "Reproduction", paragraph (B)2.
3. See "Reproduction", paragraph (B)1.
4. Check the bobbins for continuity. When connected for high voltage range the total resistance should be 780 ohms and for low range 195 ohms. If the continuity check is not satisfied, the faulty bobbin should be replaced. Disconnect the power supply and motor leads, remove the turntable (see page 5) and take off the spring clips and washers covering the 3 rubber motor grommets. The motor can now be withdrawn from its suspensions for convenient dismantling. Note the lead connections, and remove the faulty bobbin from the stator pack by tapping out the two pins locating the pole piece on which the bobbin is assembled.

(B) Motor runs slowly.

Faults

- (1) Motor lubrication.**
- (2) Motor bearings out of line.**
- (3) Motor bobbins incorrect polarity.**
- (4) Motor bobbin open circuit.**

1. It is important that only fine machine oil be used to lubricate the motor bearings. If a thick oil or one that congeals has been inadvertently used, then the motor shaft will not spin freely; as a result the motor will run slowly. The motor should be dismantled, the bearings and shaft thoroughly cleaned, lubricated with thin machine oil and reassembled. Should the motor shaft still not spin freely, see the next paragraph.
2. Should the motor shaft not spin freely when spun with the fingers, which may occur after reassembly or mishandling, give the body of the motor a sharp blow with a piece of wood, such as the handle of a screwdriver; this should shock the self-aligning bearings into line and free the shaft. Should this treatment prove ineffective, the spring in one of the bearing housings which holds the bearings in place may have broken. Check this by removing the bearing covers and moving each bearing with a circular motion by means of the rotor shaft. Should the bearing feel tight in some positions, replace the whole cover and its bearing assembly with a new one.
3. On the type of motor used, the polarity of the poles on which the bobbins are assembled should be the same, that is, both north or both south, the opposite polarity being induced in the poles between the bobbins. Should a bobbin have been replaced and the motor runs slowly, check the polarity and correct if necessary by changing over the leads to one bobbin.
4. When connected to run on the low voltage range, 100/130 volts, on the dual voltage range model, the two bobbins are in parallel and should one become open circuit, the motor will still run, but slowly. Check bobbins for continuity as advised in this section, paragraph (A)4. On the single voltage range model the bobbins are connected in series.

(C) Motor runs hot.

Faults

- (1) Normal running conditions.**
- (2) Short circuit in bobbins.**
- (3) Incorrect voltage.**
- (4) Insulation leakage to earth.**

1. It may be found that after running for long periods the motor becomes rather hot to the touch. Provided the current does not exceed 10 watts or 0.1 amp. for high voltage range motors or 0.2 amp. for low voltage range motors, this would be its normal running temperature. The motor is designed to run under unventilated conditions, although as much ventilation as possible is beneficial.
2. Check the windings for short circuit with an ohmmeter; the correct resistance readings are given in this section, paragraph (A)4.
3. Check that the voltage changeover links are set correctly for the voltage of the power supply. Should the links be set on the low voltage range and the motor be connected to a higher voltage, then it would become extremely hot and the bobbins possibly burn out.
4. Test the insulation between the bobbin windings and frame with a 500 volt insulation test meter; it should not be less than 2 megohms. An earthing tag is provided under one of the motor cover fixing nuts and it is recommended that this tag be used to connect the motor frame to a good earthing point.

The Motor (2 pole)

The motor illustrated in this manual is 4 pole. In some units 2 pole motors are fitted, and may be distinguished by the rotor shaft, which has pulley steps ground in the shaft, or by the single bobbin.

(A) Motor will not start.

Faults

- (1) No power supply.
- (2) Loose connections.
- (3) Bad switch contact.
- (4) Open circuit bobbin coil.

1. Check that current is reaching the motor.
2. See "Reproduction" paragraph (B)2.
3. See "Reproduction" paragraph (B)1.
4. Check the bobbin for continuity. The correct resistances are given in the table. If the continuity check is not satisfied, the motor should be withdrawn from its suspensions as described under "The Motor (4 pole)" (A)4. Note the lead connections, particularly if a dual voltage motor, and dismantle the motor to replace the stator pack assembly, which includes the bobbin. The resistance chart applies to the range of motors fitted to the Autoslim and A.T.6 Mk. II. Use the figures corresponding to the lead colours for your type of motor.

2 POLE MOTOR RESISTANCE CHART

TYPE OF MOTOR	50/60 ~ DUAL VOLTAGE		50 ~ HIGH RANGE WITH 80 VOLTS TAP		50 ~ HIGH RANGE WITH 105 VOLTS TAP		50/60 ~ LOW RANGE
	BLACK TO WHITE	TOTAL BLACK TO RED TO YELLOW	BLACK TO YELLOW	WHITE TO YELLOW	BLACK TO RED	RED TO WHITE	
HIGH RESISTANCE Ω	198	396	252	144	198	198	65
LOW RESISTANCE Ω	180	360	229	131	180	180	60

The resistances in this chart are 70°F.

(B) Motor runs slowly.

Faults

- (1) Motor lubrication.
- (2) Motor bearings out of line.
- (3) Motor bobbin open circuit.
- (4) Motor frequency wrong.

1. See "The Motor (4 pole)" (B)1.
2. Check as described under "The Motor (4 pole)" (B)2. Should a faulty bearing or ineffective retaining spring be found, if in the bottom cover, the cover assembly should be replaced; if in the top cover, the top cover and rotor assembly should be replaced.
3. The two windings of the bobbin are connected in parallel to run on low voltage on the dual voltage range model. If one winding becomes open circuit, the motor will still run, but slowly. Check bobbin continuity, using resistance chart. On the single voltage range models the two windings of the bobbin are connected in series.
4. Check motor pulley colour finish, under "Turntable Speed" (A)3b. A motor running at a power frequency lower than the motor frequency will run slow and a motor running at a power frequency higher than the motor frequency will run fast.

(C) Motor runs hot.

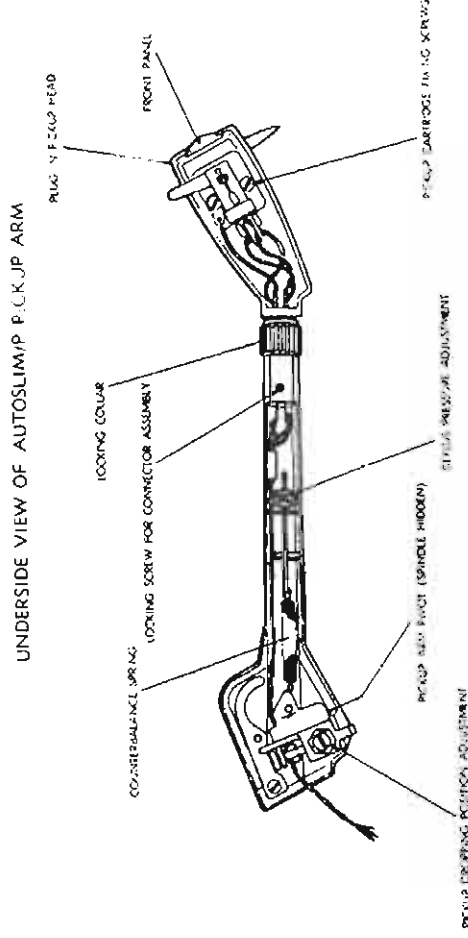
Faults

- (1) Normal running conditions.
- (2) Short circuit in bobbin.
- (3) Incorrect voltage.
- (4) Insulation leakage to earth.

1. See "The Motor (4 pole)" (C)1.
2. Check the windings for short circuit with an ohmmeter, the correct resistance readings are given in this section, paragraph (A)4.
3. Check that the voltage specification on the motor end cover corresponds to the voltage of the power supply. If the supply voltage is too high the bobbin may burn out. If a voltage change-over block is fitted, check that its links are set correctly.
4. See "The Motor (4 pole)" (C)4.

MODEL AUTOSLIM/P

The Garrard Autoslim is made in two versions; with a one piece pickup arm as illustrated in this service manual, or with a plug-in pickup arm as shown below. The latter version is known as the Autoslim/P. The Autoslim and Autoslim/P are identical apart from the difference stated.



Maintenance and Service Adjustments for the Autoslim/P are the same as for the Autoslim as are most components. Below is a list of spares items which are different or additional. Remember when ordering spares to quote model type, part number and colour of component if enamelled or moulded.

Description	Part No.	Description	Part No.
Plug in P.U. Arm Assembly	59092	Counterbalance Spring	44718
Pickup Arm Casting Only	59082	Locking Collar	58887
Lifting Screw (Adj. P.U. Height)	44191	Connector Assembly (With P.U. Lead)	58588
{Pivot Spindle	59984	Screw (Locking 58588)	40264
* {Spring Clip (for 59984)	43833	Pickup Head Assembly (Less Cartridge)	58892
{Pivot Spindle	59733	Front Panel	58901
* {Washer (for 59733)	40607	Pickup Head Cover	58906
{Split Pin (for 59733)	43333	Lead Assembly (4) for P.U. Head	70140
		(State Lead Colours)	52002
		Sleeves for Leads (4)	

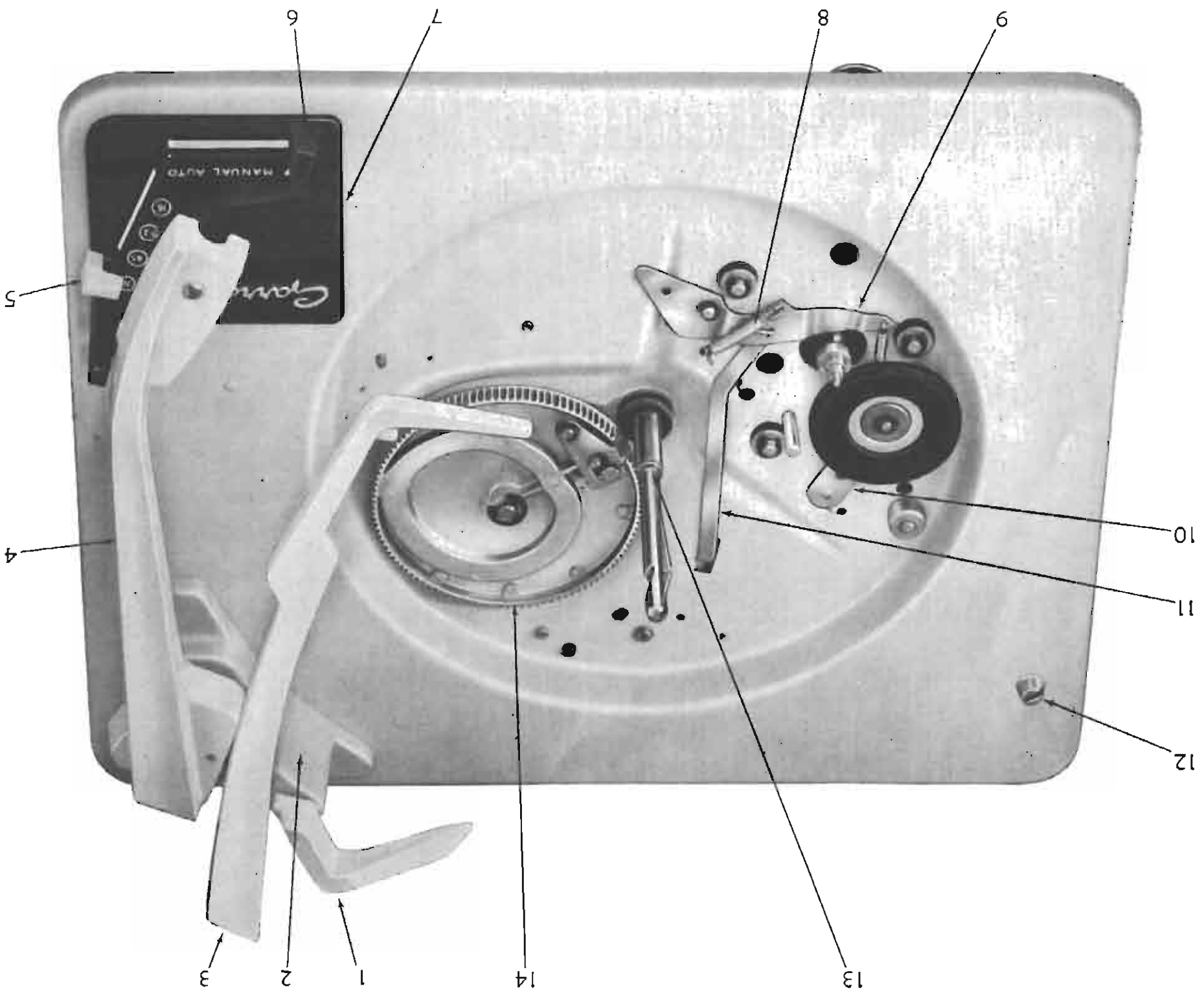
*Alternative Pivot Spindle assemblies.

Spare Parts for Autoslim

DESCRIPTION

When ordering spare parts, the Drawing Number as given in this list should be quoted. Should the part required be enamelled or if it is a moulding visible from the top of the unit, then the colour also must be given.

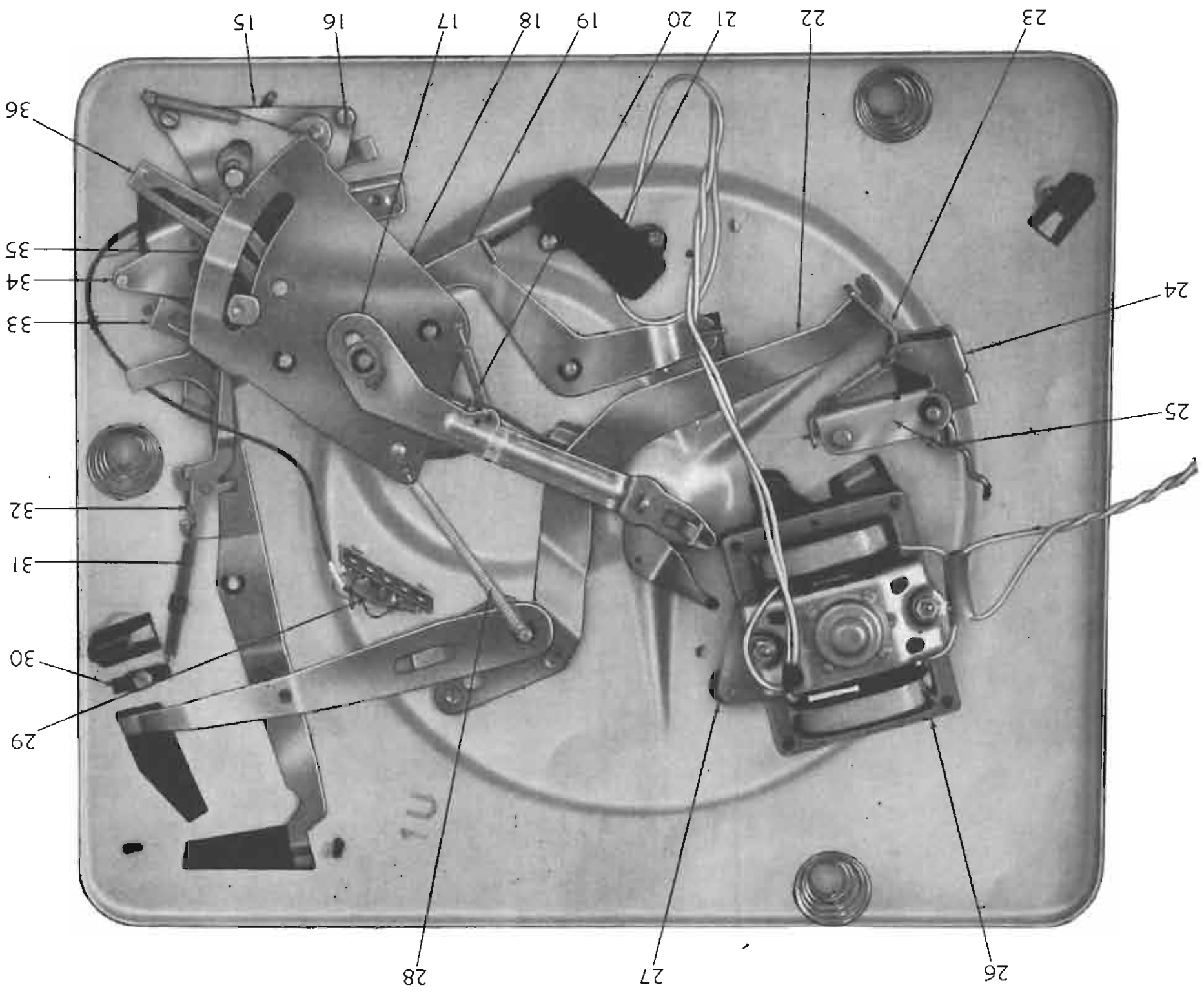
No. on Diagram	Part Number	Description	No. on Diagram	Part Number	Description
1	58301	Selector	41788	Spring Clip	
	58303	Selector Lever	58331	Pivot Plate Unit	
	41095	Fixing Nut	58335	Trip Pawl	
	44706	Selector Spring	41787	Spring Clip (2 per set)	
2	58284	Upper Casting	58563	Lower Casting Assembly	
3	58305	Overarm Unit	44125	Fixing Screws for 2 and 15	
	43813	Spring Clip	58324	Release Lever	
4	58380	Pickup Arm Assembly	40695	Washer	
	58382	Pickup Arm Casting Only	41787	Spring Clip	
	58385	Height Setting Blade	41759	Pawl Spring	
	40322	Fixing Screw for Height Setting Blade	58317	Pickup Cam Unit	
	40690	Washer	41787	Spring Clip	
	44705	Spring	58310	Switch Lever Unit	
	44191	Lifting Screw	41787	Spring Clip	
	58392	Pickup Arm Bracket Unit	41998	Return Spring	
	59984	Pivot Spindle	58277	Switch Body	
	41868	Spring Clip	58278	Switch Blade Unit	
	40000	Adjusting Screw for Pickup Dropping Position	58398	Contact Plate Unit	
	41107	Tension Nut for A40000	58280	Plunger	
	58384	Adjusting Plate for Stylus Pressure	58282	Cover (For units with suppressor network use cover 58731)	
	41104	Adjusting Nut	44129	Fixing Screws (2 per set)	
	44710	Counterbalance Spring	42526	Spring Washer (2 per set)	
	44127	Fixing Screw for Cartridge	41008	Nut (2 per set)	
	58633	Pickup Lead Only	58274	Speed Lever	
	58719	Bracket for Special Cartridges	58219	Speed Cam (Old Type)	
5	58271	Speed Control Lever Unit	70218	Speed Cam (New Type)	
	58273	Knob (Ivory)	58211	Index Bracket Assembly	
6	58325	Control Lever Unit	58212	Index Bracket	
	58273	Knob (Red)	58213	Index Roller	
	41787	Spring Clip	41848	Index Spring	
7	58396	Control Moulding	58208	Support Bracket Assembly	
8	41503	Tension Spring	58209	Support Bracket	
9	58298	Tension Lever	58210	Setting Blade	
	41787	Spring Clip	41787	Spring Clip	
	41992	Intermediate Wheel Spring	44708	Lifting Spring	
10	58215	Support Lever Unit	58640/01	High Range Motor Complete	
	58220	Intermediate Wheel Unit	58640/03	Low Range Motor Complete	
	40826	Presspahn Washer (2 per set)	58640/05	Dual Range Motor Complete	
	43818	Spring Clip	58654/01	Bobbin Assembly Left — High Range Motor	
11	58568	Tension Link	58655/01	Bobbin Assembly Right — High Range Motor	
12	44120	Transit Screw (2 per set)	58654/03	Bobbin Assembly Left — Low Range Motor	
13	41977	Transit Screw Clip (2 per set)	58655/03	Bobbin Assembly Right — Low Range Motor	
	58338	Record Spindle Assy.	58654/05	Bobbin Assembly Left — Dual Range Motor	
	43826	Turntable Clip	58655/05	Bobbin Assembly Right — Dual Range Motor	
	40894	Thrust Washer (2 per set)			
	58229	Ball Race			
	58749	Cushion Ring			
14	58328	Cam Assembly			
	58330	Cam			



No. on Diagram	Part Number	Description	No. on Diagram	Part Number	Description
58653/01		Stator Assembly Complete—High Range Motor	27	43129	Flexible Motor Mount (3 per set)
58653/03		Stator Assembly Complete—Low Range Motor		40695	Washer for Motor Mount (3 per set)
58653/05		Stator Assembly Complete—Dual Range Motor		41787	Spring Clip for Motor Mount (3 per set)
53962		Motor Cover Top Complete with Bearing	28	41993	Index Spring
53963		Motor Cover Bottom Complete with Bearing	29	58356	Pickup Connector
54413		Rotor Assembly Complete with Shaft		44126	Fixing Screw for Pickup Connector
43209		Thrust Ball for Bottom Cover	30	41991	Spring Blade
58642		Motor Plate Unit		44125	Fixing Screw for Spring Blade
58534		Stud (2 per set)	31	41631	Return Spring
58533		Distance Piece (3 per set)	32	52417	Rubber Sleeve for Return Spring
42501		Spring Washer (2 per set)		58327	Reject Lever
41012		Nut (4 per set)	33	58313	Auto Stop Link Unit
54981		Voltage Changeover Block Assembly, with Connector Bushes, Eyelets and Terminal Nuts (Dual voltage range units only).		58316	Collar
40443		Fixing Stud for Changeover Block	34	44133	Screw for Auto Stop Link
41012		Nut for fixing Changeover Block (2 per set)		58293	Pickup Lever Unit
42501		Spring Washer		44119	Pivot Screw Top
40515		Washer		43200	Steel Ball (2 per set)
51333		Insulation Plate		41987	Spring
58646		Pulley 50 Cycle		40504	Washer
58650		Pulley 60 Cycle		41888	Overload Spring
44052		Screw Fixing Pulley (2 per set)	35	58343	Lifting Spindle Unit — Hidden from view by Pickup Cam
				41985	Friction Spring — Hidden from view by Pickup Cam
					view by Pickup Cam
			36	58348	Friction Link Unit
				41787	Spring Clip
			NotShown	58224	Turntable Unit
			NotShown	58361	Turntable Mat

Below is the spare parts list for the 2 Pole Motor which is used in some units but not illustrated in this manual. When ordering 2 Pole Motor parts quote the voltage range.

Part No.	Description
58570	2 Pole Motor complete
58571	Stator Assembly complete with Bobbin
70493	Top Cover and Rotor Assembly
58373	Bottom Cover Assembly
40215	Screw through Pack (3 per set)
40793	Washer (3 per set)
42501	Spring Washer (3 per set)
40754	Spacing Washer
59107	Screen Plate Assembly



MODEL A.T.6 Record Player and Changer has facilities for complete manual and automatic operation



AUTO TURNTABLE MODEL A.T.6

Description

The Garrard A.T.6 has a similar mechanism to the Autoslim its distinguishing features being:—

A mass counter-balanced transcription pickup arm which has a built-in stylus pressure adjustment with no variation from first to last record.

A large diameter heavy turntable.

Adjustable spring mountings.

A laboratory balanced motor.

A switch click suppressor and dual channel muting switch.

It will play automatically 7", 10" or 12" diameter records which can be mixed in any order, providing they are of the same speed. No setting for record size is required, the selection being completely automatic. The changer may be stopped and started without rejecting the record being played and records can be played manually as on a single record player. 7" 45 r.p.m. records with large centre holes may be played automatically using the large record spindle type LRS 6, available as an optional extra.

This unit is designed to play records made to B.S. 1928/1961 and similar standards in other countries.

The transit screws are the same as for the Autoslim (see Diagram 3 page 4).

The correct electrical connections are explained in the Autoslim section of this manual and these should be read before fitting the unit into a cabinet. The stereophonic and monophonic wiring to the muting switch is shown here in Diagram 13.

The four pickup head connecting pins are wired as shown in Diagram 14, viewed in section from the front of the pickup head.

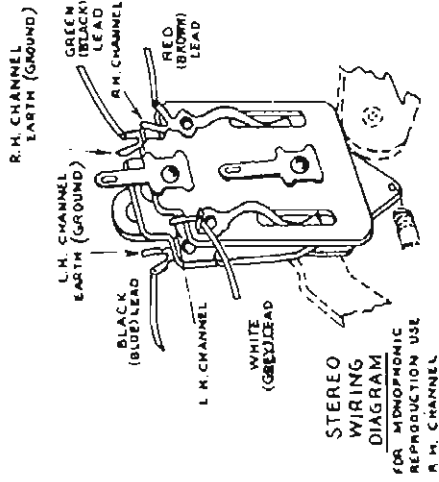
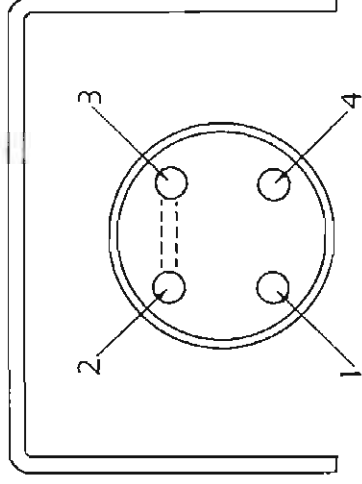


Diagram 13

The leads are colour coded as follows:-

White lead to pin No. 1	---	Left Hand Channel
Black lead to pin No. 2	---	Earthy Left Hand Channel
Green lead to pin No. 3	---	Earthy Right Hand Channel
Red lead to pin No. 4	---	Right Hand Channel

Diagram 14



For single channel connection use Red and Green leads.

Alternative coding, shown in brackets.

Grey lead to pin No. 1	---	Left Hand Channel
Blue lead to pin No. 2	---	Earthy Left Hand Channel
Black lead to pin No. 3	---	Earthy Right Hand Channel
Brown lead to pin No. 4	---	Right Hand Channel

For single channel connection use Brown and Black leads.

For 3 wire stereophonic systems, pins 2 and 3 may be bridged if required.

To remove and replace the pickup head

To remove pickup head, unscrew its locking collar clockwise (see Diagram 15) and gently pull it from the arm. To replace the pickup head, locate the pin on the pickup head in the slot of the pickup arm and slide the head in. Bring the locking collar forward, locating its slot over the pickup head pin and screw the collar up until tight.

Service Adjustments

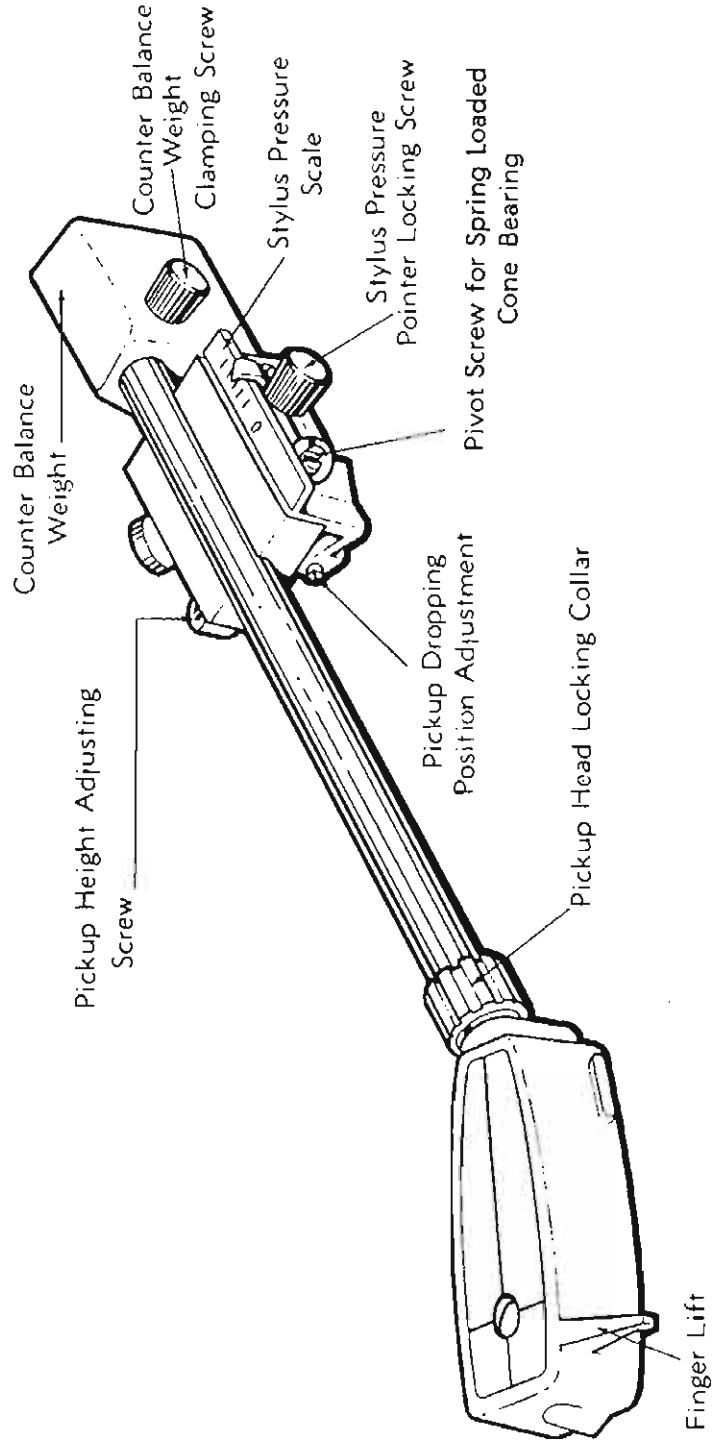


Diagram 15

Stylus Pressure Adjustment

Slacken the stylus pressure pointer locking screw (see Diagram 15) and slide the pointer forward to the position marked 0 on the scale; do not retighten the screw. Slacken the counter balance weight clamping screw, so that the weight is free to slide on the pickup arm's rear extension.

With the pickup head off its rest and over the turntable, slide the weight along the arm until the point of balance with the pickup head is obtained, then firmly tighten the screw. To apply the necessary stylus pressure move the pointer along the scale, which is graduated in 1 gram divisions; then fix it in place by tightening the locking screw. The stylus pressure should be set to the amount advised by the cartridge manufacturer.

Pickup Height

The height of pickup lift is adjusted by turning the vertical slotted head screw shown in Diagram 15. It should be set so that the stylus point is lifted $\frac{3}{8}$ " above the turntable mat as the pickup is returned to its rest. This setting may need to be reduced if cartridges of a greater overall height than the normal range are fitted. Reducing the setting decreases the number of records that can be played automatically.

Pickup Dropping Position

The pickup arm dropping position is adjusted by turning the slotted screw head shown in Diagram 15. Turn it clockwise to move the arm in and anti-clockwise to move it out.

Maintenance

This is the same as for the Autoslim.

To remove and replace the turntable

Pull out the record spindle then prise out the name plate from the centre of the turntable. Slide off the retaining clip and lift the turntable with equal pressure on diametrically opposite sides.

To replace the turntable, check that the gap in the teeth of the main gear is adjacent to the turntable spindle and that the autotrip pawl is pushed away from the turntable spindle. The turntable will now slide on easily. Assemble the turntable clip in the groove in the turntable spindle making sure that the wedge part of the clip fits in the slot in the groove. Push the name plate back into the dish at the centre of the turntable.

Record Spindle Assembly

Place record spindle in position and rotate until location is felt, then press firmly downward to secure in turntable clip.

Note:—The record changing spindles for the Autoslim and Garrard A.T.6 are not interchangeable, the spindle for the Garrard A.T.6 being longer than the Autoslim spindle.

Variations from Autoslim

The operating mechanism is in general the same as the Autoslim, therefore faults can be corrected as described in the Autoslim section of this manual. The exceptions are:—

1. The pivot for vertical movement of the pickup arm differs from that of the Autoslim. The pickup arm pivots on 2 cones, bearing on ball races set in the arm. The inner cone is screwed into a set position, with the head of the coned pivot screw flush against the pivot bracket casting. The outer cone is spring loaded. Its pivot screw, shown in Diagram 15, is set so that the pickup arm is held in the bracket with an even spring pressure. No adjustment should be necessary to this screw and no lubrication should be necessary to the pivots, as the ball races are greased.
2. The A.T.6 has a Muting Switch wired into its pickup circuit. This switch cuts out the noise from the mechanism during the record changing cycle. If it fails to function properly, check that the bracket on which the Muting Switch is mounted, is correctly positioned against the 2 small, half-pierced lugs in the unit plate. If it is not, loosen the bracket fixing screw and position correctly. Check that the Muting Spring is in position and working properly. Check that the wiring is secure (Diagram 13) and that the Muting Switch contacts are making and breaking properly.
3. The motor switch incorporates a condenser and resistor wired in series across the switch blades to act as a switch click suppressor. See Diagram 16.

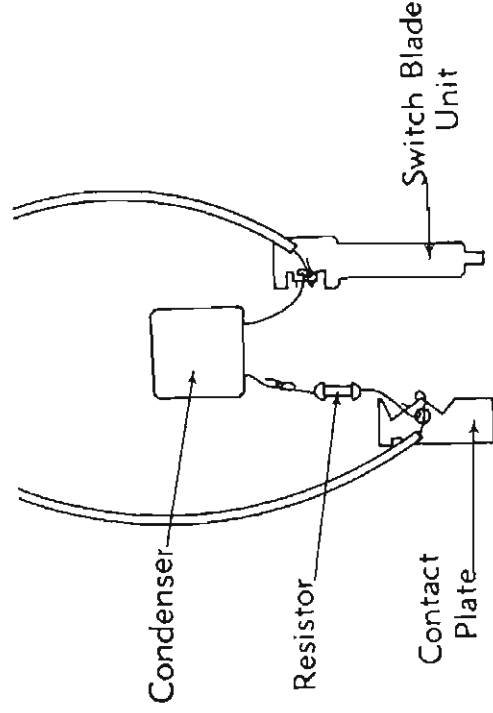


Diagram 16

Details of resistor: Erie type 7A 200 Ohms \pm 20% Garrard No. 58959.

Details of condenser: Erie type K 7002/CP3E 20,000 PF -2% + 80% Isolator Plate Ceramics Garrard No. 58960.

Spare Parts

All spare parts are as for Autoslim except as shown here.

DESCRIPTION

When ordering spare parts, the Part Number as given in this list should be quoted. Should the part required be enamelled or if it is a moulding visible from the top of the unit, then the colour also must be given.

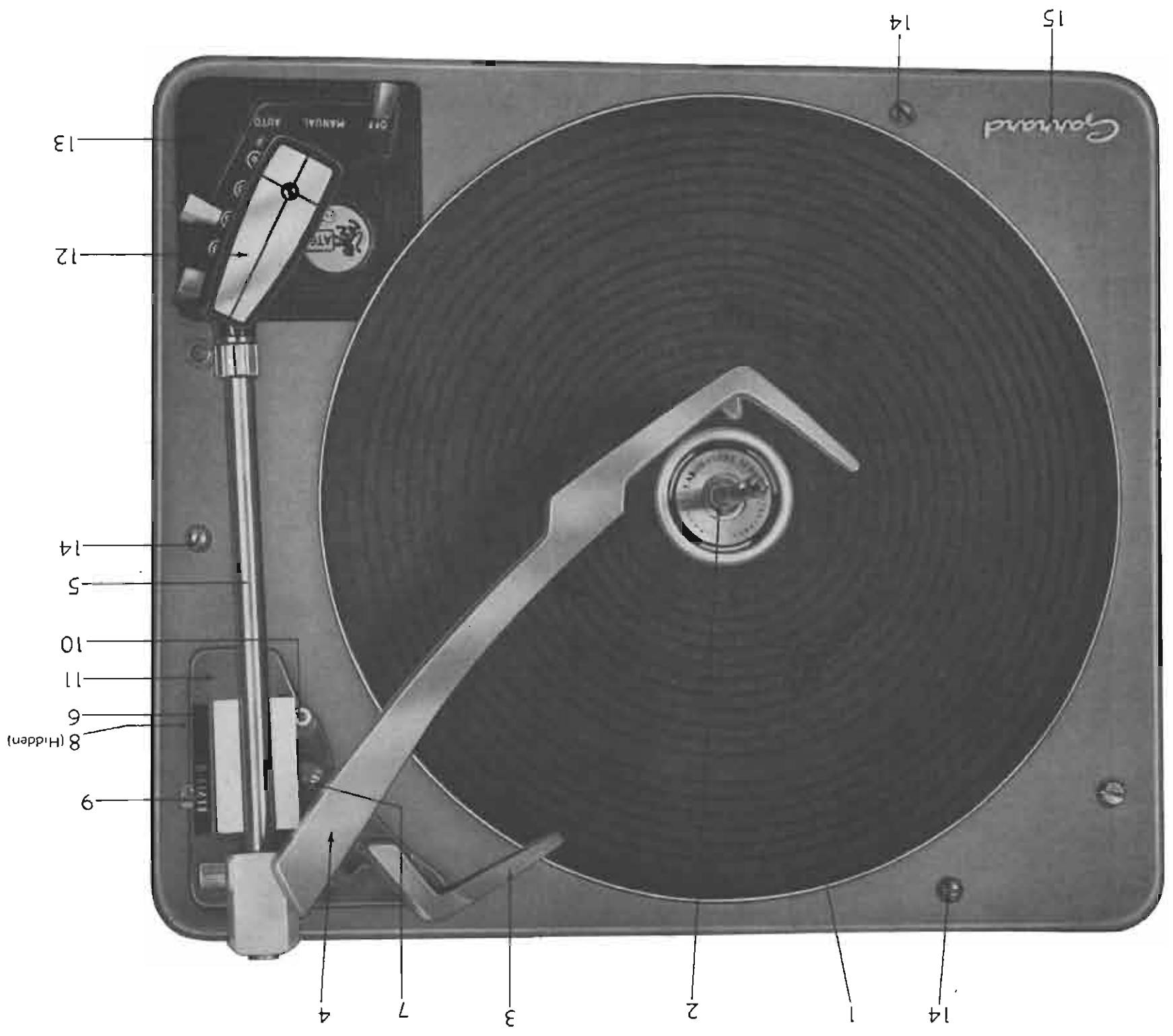
No. on Diagram	Description	Part Number	No. on Diagram	Description	Part Number
1.	Turntable Assembly - -	58856		Lifting Platform Grub Screw -	44082
	Turntable Mat - -	57422		Upper Casting Assembly - -	59022
	Turntable Name Plate - -	58011		Pickup Head Assembly M6 (less cartridge)	
2.	Record Spindle - -	58874		Removable Front Panel - -	58891
	Manual Spindle - -	58954		Control Moulding - -	58901
	(not shown)			Control Moulding Spring Blade -	58883
3.	Selector Arm Assembly - -	58868		Spring Mountings Lower Spring Assembly	44712
	Selector Extension - -	58953		Spring Mountings Screw - -	58952
4.	Overarm Assembly - -	58870		Spring Mountings Spring - -	40053
5.	Pickup Arm Assembly (complete less head)	58586		Spring Mountings Presspahn Washer	41724
	Pickup Arm Counter Balance Weight	58595		"Garrard" Motif - -	40777
	Counter Balance Fixing Screw Assembly	58919		Muting Switch Assembly - -	55992
6.	Pickup Bracket Assembly - -	58884		Muting Fixing Screw - -	58862
	Stylus Pressure Scale Plate - -	58909		Muting Spring - -	44126
7.	Pivot Screw Assembly - -	58590		Pickup Cam Assembly - -	41503
8.	Pivot Screw Assembly - -	59756		Index Spring - -	58958
9.	Pointer - -	58911		Motor D35 - -	44715
	Pointer Clamping Screw - -	44135		Quote whether dual voltage range, low voltage range 110/130 volts A.C. or high voltage range 200/250 volts A.V. is required.	58640
	Pointer Lock Nut - -	41099		Switch Cover - -	58731
	Pointer Stylus Pressure Spring -	44713		Condenser - -	58960
10.	Pickup Height Adjustment Screw -	40240		Resistor - -	58959
	Pickup Height Adjustment Nut -	41037			
	Pickup Height Adjustment Spring	44716			
	Lifting Platform - -	58593			

See Diagrams on pages 31 and 32

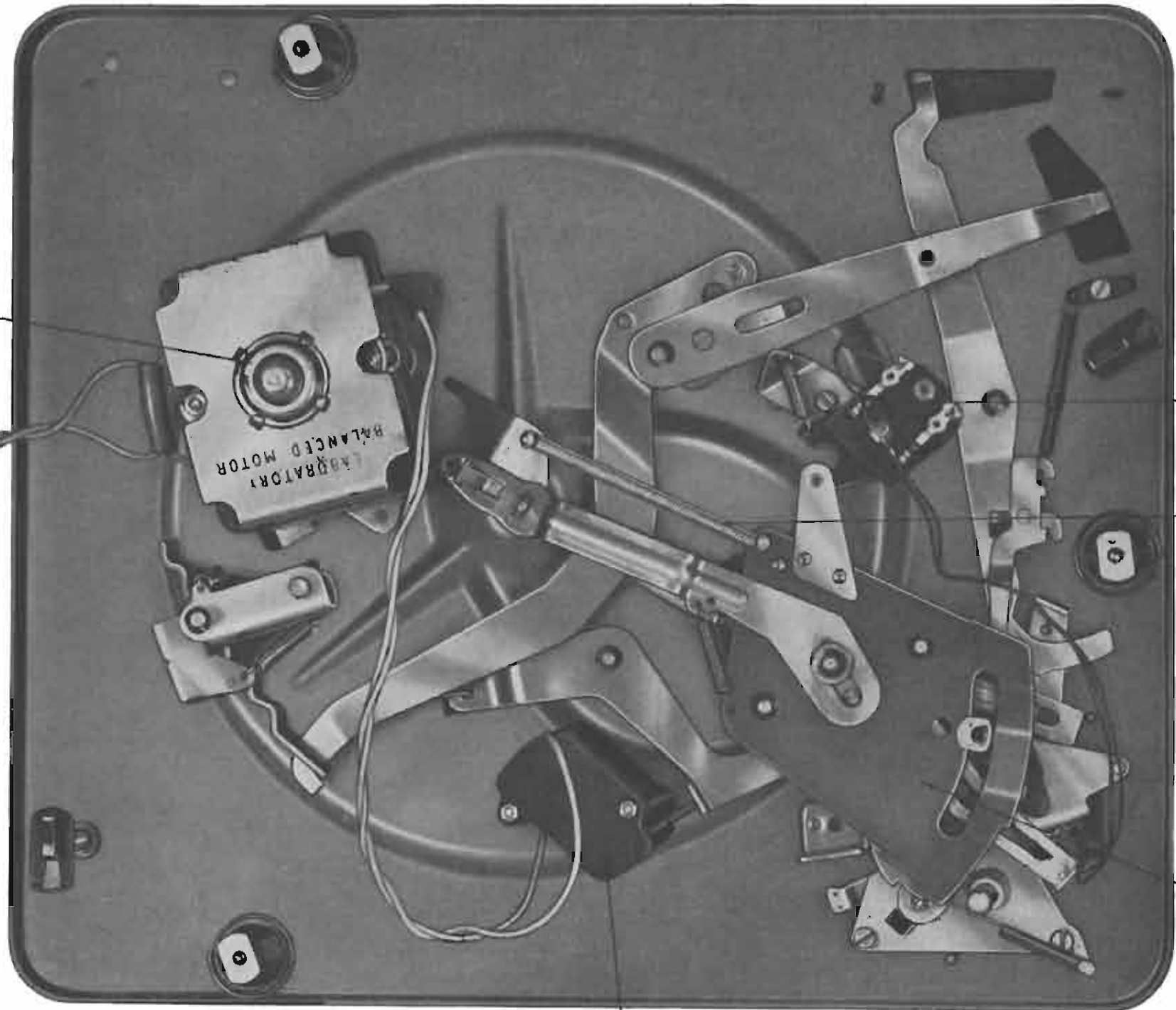
Addendum:

Pickup Lever Unit - - - - 70329

This item is not numbered, but takes the place of the Autoslim Pickup Lever Unit, on the A.T.6.



61



LABORATORY
BALANCED MOTOR

20

16

18

17

32