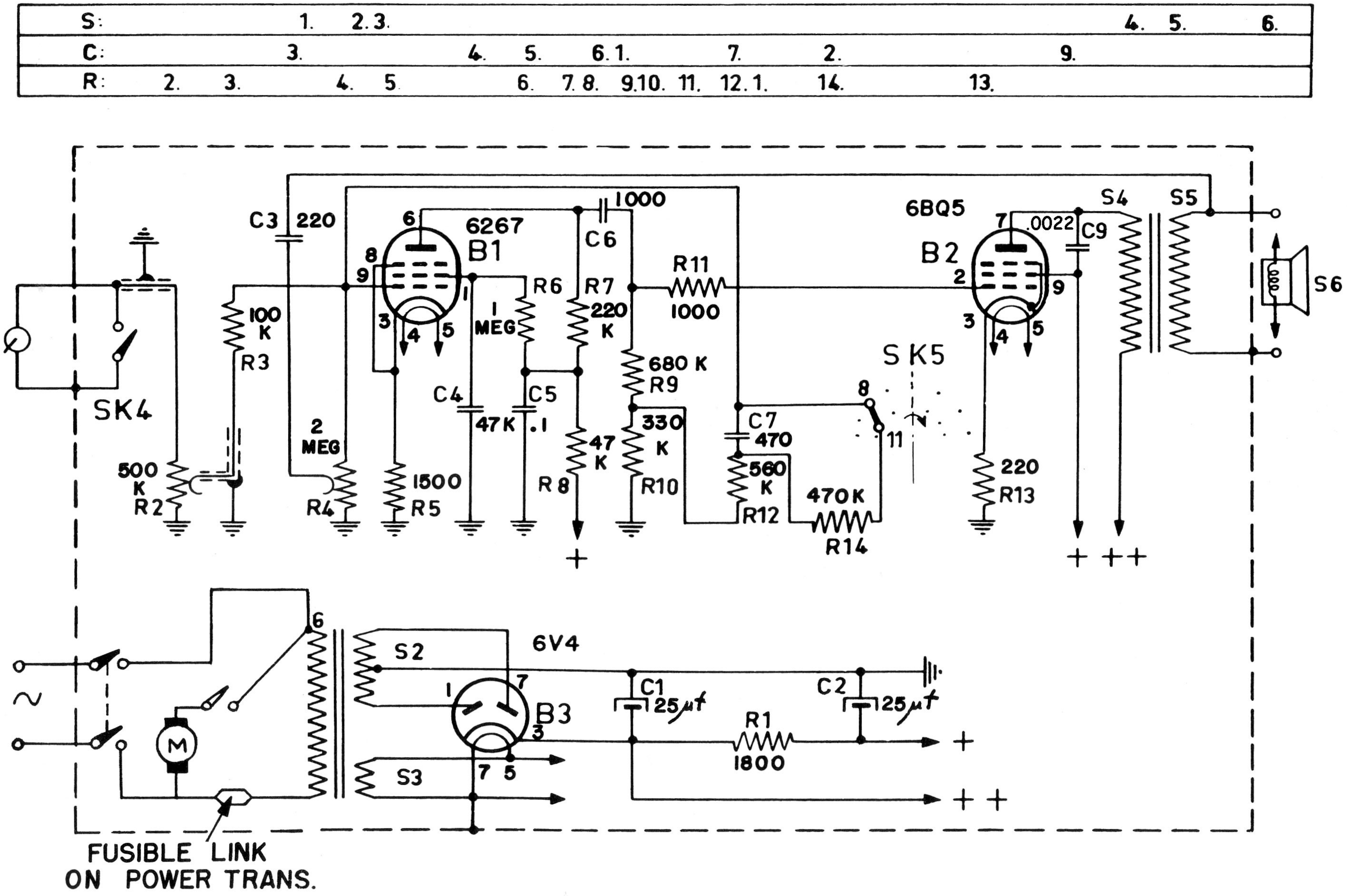

S: 1. 2.3. 4. 5. 6.
C: 3. 4. 5. 6. 1. 7. 2. 9.
R: 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 1. 14. 13.
SK4
500 K R2
100 K R3
C3 220
2 MEG R4
6267 B1
1500 R5
C4 47K
1 MEG R6
C5 .1
C6 1000
R7 220 K
R8 47 K
R11 1000
680 K R9
330 K R10
C7 470
560 K R12
470K R14
SK5
8
11
6BQ5 B2
220 R13
.0022 C9
S4
S5
S6
+
+ ++
6V4 B3
S2
S3
C1 25μf
C2 25μf
R1 1800
+
++
6
M
~
FUSIBLE LINK ON POWER TRANS.

GENERAL INFORMATION

This portable unit consists of the record player AG2002 and an amplifier.

Controls

1. Tone control.
2. Bass switch.
3. Line switch + volume control.

Power Requirements

38 W 117V 60 c.

List of Illustrations

Fig. 1 Circuit diagram of the amplifier.
Fig. 2 Power transformer and output transformer.
Fig. 3 AG2002 Player

Loudspeaker

Type AD1720 (Z = 3 ohm)
Not repairable.

Tubes

6267 1st Audio
6BQ5 Output Tube
6V4 Rectifier

The loudspeaker has been mounted in the cover.

The cover can be taken off and set at any convenient place.

Description of the circuit diagrams.

The switches SK2 and SK4 belong to the record player.

The pick-up is short circuited by SK4 as soon as the motor is switched off.

In this way any clicks which occur when switching on and off cannot be heard in the loudspeaker.

SK2 is the motor switch.

Power and output transformer

If the original power or output transformer becomes defective it must be replaced by the standard transformer mentioned in the electrical parts list.

For connections see fig. 3.

RECORD PLAYER AG2002

This record player is suitable for:

1. Normal and microgroove records.
2. Three speeds: 78, 45 and 33 1/3 r.p.m.
3. Record diameters of 7", 10", and 12".
4. Line frequencies of 40, 50 and 60 c/s; adaptable by changing the pulley on the motor shaft.
5. P.U. heads type AG 3010, AG 3012 and AG 3013.
   The apparatus is provided with an automatic switching-off mechanism.

These Service Notes deal with the following subjects:

I Connection and operation
II The drive mechanism
III The switching-off mechanism
IV Adaptation to different line frequencies
V Repairs and mounting
VI Adjustments and checks
VII Transport
VIII Maintenance
IX Diagrams

I Connection and Operation

a. The connection points for the line voltage and P.U. are located under the cover (7 fig. 1). Fig. 3 shows how the connections have to be made. At the P.U.-connection point the screening braid of the P.U. flex must be connected to the middle soldering tag. At the other end of the P.U. flex the screening braid has to be connected to one of the conductors in the P.U. flex. The cover (7 fig. 1) can be removed by loosening the two fixing screws, thus giving access to the connection points. Before removing the cover, the P.U. arm should be tied to the P.U. rest and the P.U. head should be removed. The turntable can be lifted off its spindle after the speed-selecting lever has been placed in the "0" position.

b. After the motor has been connected to the line and the P.U. has been connected to a radio set or amplifier, the record player is ready for use. When playing a record, make certain that the speed-selecting lever is in the position which corresponds to the required speed for that particular record. Moreover, the correct P.U. head must be used; this is determined by the type to be played. The P.U. heads which are supplied with the different versions of this record player are marked either with the letter N or M or else with both, indicating that the head is suitable for either normal or microgroove records. Some heads are marked with a red dot for micro and green for normal.

P.U. heads marked with both letters can be set in two different positions, so that it is possible to change over from normal to microgroove and vice versa.

After a record has been put on the turntable, the P.U. arm is lifted off the rest and gently moved away from the turntable. This causes the motor to be switched on. As soon as the turntable begins to revolve the P.U. arm is brought over the run-in groove on the record and then lowered so that the needle is placed in the run-in groove. Once the motor is switched on, the P.U. arm must not be pushed any further away from the turntable since otherwise the mechanism will become out of adjustment.

When the record has been played to its end the motor is automatically switched off. The motor can be switched off, however, before a record has ended, by lifting the P.U. arm and moving it towards the centre of the record.

II The Drive Mechanism

The turntable is driven via the pulley (1 fig. 2) on the motor shaft and the intermediate wheel (4 fig. 1).

The intermediate wheel can be moved up and down the motor shaft by moving the speed-selecting lever (5 fig. 1). Dependent on the position of this lever, the intermediate wheel can be placed against each of the three different diameters of the motor pulley. In this way the required turntable speed is obtained.

III The Switching-off Mechanism

The switching-off mechanism ensures that at the end of the record which is being played, the motor is automatically switched off.

By lifting the P.U. arm off the rest F (fig. 1) and moving it away from the turntable, the operating lever A (fig. 1) is moved by the lever B in the direction of the turntable spindle.

As a consequence of this movement of the operating lever three things happen:

1. The arm E is moved slightly in a clockwise direction thereby opening the P.U. switch D (fig. 1)
2. The line switch (8 fig. 1) is closed and the motor starts running.
3. The nylon block (G, fig. 1) which is fixed to the operating lever, is moved away from the striker H which is moulded on the underside of the turntable. The P.U. arm must not be moved further than is necessary to switch on the motor.

   If after this, the P.U. arm is lowered on to a record on the turntable the needle will follow the grooves in the record and the P.U. arm will move slowly in towards the centre of the record.

The arm C, which is friction-coupled to the P.U. arm, now moves slowly towards the operating lever A. The friction between C and the P.U. arm is determined by the weight K (fig. 1a).

When about 3/4 of the record has been played the arm C reaches the operating lever and moves the latter in such a way that the nylon block G moves slowly in the direction of the turntable spindle.

At a certain moment the striker H rubs against the nylon block G and pushes the operating lever A back a little. During this movement the striker H slides against the long side of the nylon block (G).

From the moment that the needle reaches the run-out groove the operating lever A moves rapidly towards the turntable spindle so that the striker (H) strikes against the short side of the nylon block (G).

This pushes the operating lever A backwards in the direction of the pivot point of the P.U. arm, and as a result, the switch D is closed and the line switch is opened thereby switching off the motor.

For proper functioning of the mechanism it is necessary that the various moving parts turn extremely easily.

The holes for the fixing screws in the line switch are slotted. This allows the position of the switch to be adjusted so that the switching on and off is carried out correctly.

NOTE: It can be seen that switch D is open only when the motor is switched on. In this way any clicks which occur when switching on and off are prevented from being heard in the loudspeaker.

IV Adaptation to different line frequencies

In order to make it possible to operate the record player on a different frequency, the Service Division supplies service pulleys (1, fig. 2) suitable for 40, 50 and 60 c/s.

The pulley can be removed simply by unscrewing the set screw in the pulley and slipping the latter off the motor shaft.

When fitting a new pulley make certain that the screw seats on the flat part of the shaft.

When exchanging pulleys one might be tempted to use an old pulley from a record player that has already been adapted to another frequency.

This practice is entirely at one's own responsibility as we can guarantee a correct turntable speed only when service pulleys are used because these are made to special tolerances.

V Repairs and Mounting

a. Spring suspension of the motor plate (see fig. 4)

If during repairs, the motor plate has been removed from the mounting plate, the distance between both plates has to be carefully readjusted when reassembling. To this end, the mounting plate must be kept horizontal so that the motor plate is suspended only by the springs. The distance between both plates should be 1/16".

To avoid transmission of mechanical resonance, care must be taken that the washers (3, fig. 4) do not touch the springs.

b. P.U. arm

The P.U. arm pivots on a grub screw about its vertical axis.

c. Spring suspension of the mounting plate

In order to mount the record player in a cabinet various small parts are required. These are included in the "Parts List" in these Service Notes. Fig. 5 indicates clearly the mounting position of these parts.

d. Motor

The complete motor can be removed by unscrewing the three fixing screws on the starter (4, fig. 2). The three spacers then remain attached to the motor plate.

The exploded view (fig. 2) shows clearly how the various parts of the motor have to be mounted.

VI Adjustments and checks

A. Without cover

1. Set the intermediate wheel to the neutral position (speed selecting lever in position "0").
2. The pivot pin of the operating lever A (fig. 1) should be perpendicular to the mounting plate.
3. Loosen a few turns the screws (N-fig. 1) which fix the line switch to the mounting plate so that the switch can be moved about. Push the operating lever A (fig. 1) at the pivot point in the direction of the turntable spindle (9, fig. 1). The arm E (fig. 1) on which the operating lever is pivoted should now touch the stop lip (M-fig. 1) on the mounting plate. Now turn the operating lever as close as possible towards the turntable spindle. The corner of the nylon block (G fig. 1) closest to the end of the operating lever A (fig. 1) should now be exactly opposite the centre line of the turntable spindle, or at the very most 1/64" to the right of it.

   This can be adjusted by bending the stop lip (M fig. 1).

4. Adjustment of the line switch

In the switched-on position, the pin on the arm of the line switch must not touch the edges of the slotted hole in the operating lever (A fig. 1). To adjust, turn the complete switch.

When the switch is closed the arm of the line switch should rest against the stop lip (L fig. 1).

After the switch has been correctly adjusted the screws (N fig. 1) should be tightened firmly.

5. Fit the turntable and push the operating lever (A fig. 1) against the the striker (H fig. 1) on the turntable. The underside of the nylon block (G fig. 1) should be about 5/64" above the underside of the striker (H fig. 1).

At the same time the end (R fig. 1) of the operating lever should be able to move freely under its guiding bracket.

The horizontal parts of the operating lever should be parallel to the mounting plate.

6. Switching off

Turn the turntable by hand in a clockwise direction and move the operating lever (A fig. 1) towards the turntable until the striker (H fig. 1) touches the nylon block (G fig. 1) then the operating lever is pushed back and the line switch is opened. When doing this the operating lever must be moved away sufficiently from the turntable spindle so that on the following revolution the striker clears the nylon block. This is adjustable by bending the nose (R fig. 1) of the operating lever in a horizontal plane.

a. If after switching off, the striker (H fig. 1) again touches the nylon block, the nose (R) of the operating lever must be bent towards the turntable spindle.

b. If the switch does not operate because the striker (H) touches the nylon block insufficiently or not at all, it will be necessary to bend the nose (R) away from the turntable spindle.

7. The force which is necessary to push the operating lever (from the switched-off position) back as far as it will go, should be ± 50 g. If necessary adjustments can be made by bending the contact spring of P.U. switch.

8. In the open position of the P.U. switch (D) the distance between the contacts should be 3/64" . The contacts should be properly closed when the line switch is opened.

9. Friction adjustment of the operating lever (A fig. 1)

This is measured at the first screw from the bearing bush of the operating lever and should be 0.5-0.8 g. To reach this low value the bearing of the operating lever should be kept thoroughly clean and lubricated with with watchmaker's oil. Check with line switch closed (pay attention to the requirement made in points 4 and 5).

B. Adjustment with cover on

10. Switching-on point

When the P.U. arm is turned the P.U. arm lever (B) must not touch the philite cover, but when the P.U. arm is turned in as far as it will go, the lever (B) must strike against the projection moulded on the inside of the cover.

11. Switch the line switch off by hand. If the P.U. arm is now moved outwards from the P.U. rest it should switch on the line switch when it has turned through 26 ± 2°. This corresponds to a movement of the needle across a horizontal distance of 3" to 3-5/8 to the right.

If the line switch is switched on too soon, shorten the operating lever by sliding the strip P (fig. 1) inwards towards the line switch. If on the other hand the switch operates too late, slide (P) in the opposite direction i.e. outwards. This adjustment is made possible by loosening the two screws which hold the strip P to the operating lever.

12. The friction of the arm (C fig. 1) (measured at the extremity of the bracket) must be 1.5-2 g. When checking this, keep the record player in a level position.

This friction is maintained by keeping the friction surfaces clean and lubricated with watchmaker's oil.

13. Switching-off point

First push the operating lever outwards and then move the P.U. arm slowly inwards. The operating lever should now move inwards when the needle is approx. 2-9/16" away from the centre line of the turntable spindle.

By moving the P.U. arm further inwards until the needle is 2-3/8" from the turntable spindle, the nylon block (G) should come in front of the striker (H).

The friction arm (C) must not touch the cover or the P.U. flex.

If the motor is switched off too soon the top end of the friction arm (C) should be bent towards the operating lever. In the event of delayed switching off, bend the friction arm (C) in the opposite direction.

14. Final Check

Make sure that the soldering tags for the P.U. connections do not touch the motor plate.

Next, connect the record player to the line and check the switching-on and switching-off action. When doing this, play a few records and pay particular attention to the working of the automatic switching-off mechanism.

C. For a proper functioning of the mechanism the following requirements must be fulfilled:

The distance from the spindle of the speed-selecting lever to the front edge of the slotted hole in the motor plate, (i.e. the edge nearest the turntable) should be about 3/8" (speed-selecting lever in position 33 1/3).

This can be adjusted by sliding the turntable spindle in the slotted hole. Moreover, the spindle of the speed-selecting lever should be able to be moved to and fro in the slotted hole, whilst the speed-selecting lever should never touch any part of the cover when this is in place.

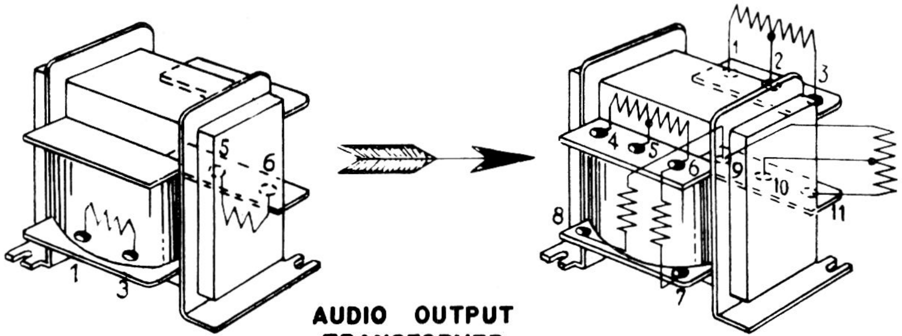
In the "78 r.p.m." position the spindle of the intermediate wheel must be parallel to motor and turntable spindles. This can be corrected if necessary by bending the bracket which carries the intermediate wheel.

Care should be taken, however, that this bracket is always parallel to the motor plate in all three positions of the speed-selecting lever. This bracket should also be easily movable along the spindle of the speed-selecting lever.

In the 78 r.p.m. position the bracket on which the spindle of the intermediate wheel has been mounted, should not touch the motor plate and the intermediate wheel should rest against the running surface of the turntable at a height of at least 1/16"from the lower edge. In the 33 1/3 r.p.m. position the spindle of the intermediate wheel must be completely free from the cover (fig. 1). The correct height of the intermediate wheel can always be obtained by bending the bracket.

In the three positions of the speed selecting lever the intermediate wheel has to run free from the bevelled edges of the motor pulley. To adjust the position of the intermediate wheel, one should bend the bracket which carries the intermediate wheel.

The tension of the spring of the intermediate wheel (4 fig. 1) should be 90 - 100 g. If the tensile force is too great, it can be diminished by stretching the spring, if the tensile force is too small, shorten the spring. If the pressure cannot be increased the spring has to be renewed. In the three positions of the speed selecting lever, the distance between the brackets A and B must be about 9/32" , when the turntable is fitted. This can be adjusted by bending the bracket. (B fig. 6).



AUDIO OUTPUT TRANSFORMER

Transport

Before transporting it is recommended:

a. to set the speed selecting lever in the "0" position
b. to remove the turntable
c. to fix the p.u. arm to its rest
d. to fasten the motorplate so that damage of the spring suspension of the motorplate is prevented.

If possible use the original packing.

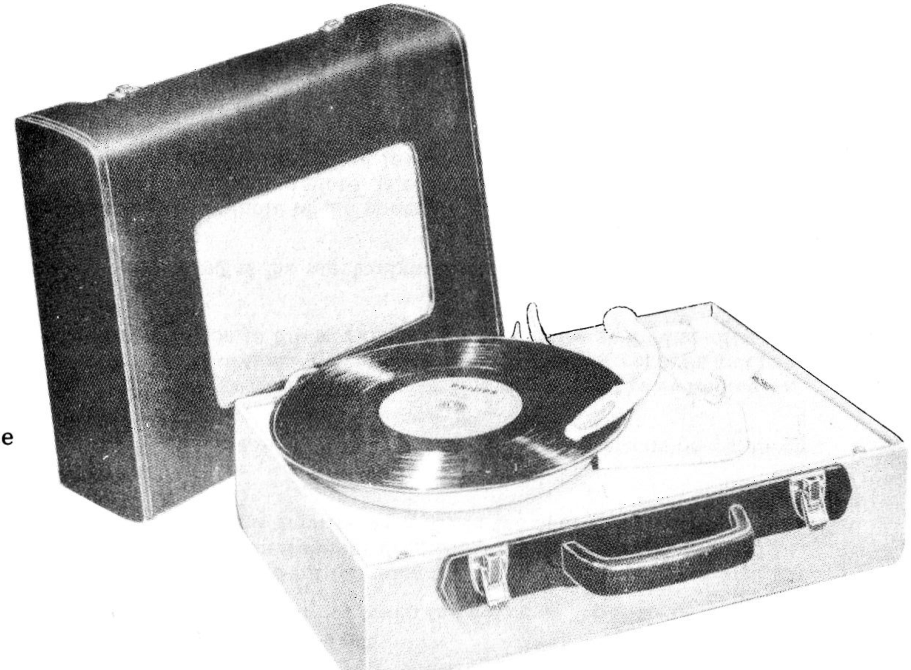
Maintenance

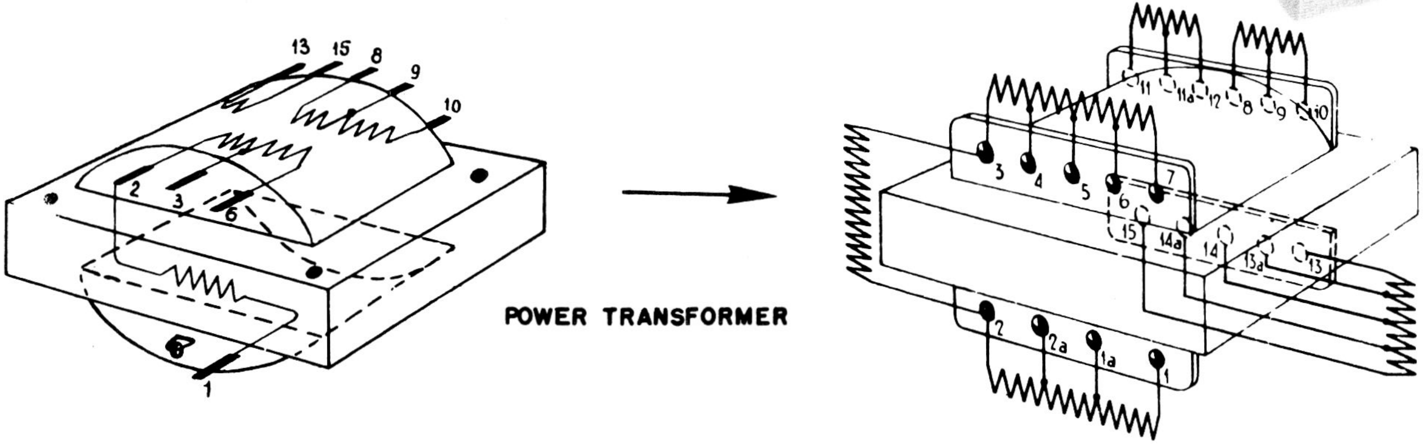
In order to ensure a faultless functioning of the mechanism it is necessary to oil or to grease the moving and rotating parts.

Note

Avoid excessive lubrication. Do not spill oil or grease and take care that neither oil nor grease gets on to the running surface of the turntable, motor pulley or intermediate rubber wheel.

Oil deforms the rubber which is detrimental to the proper functioning of the record player.





POWER TRANSFORMER

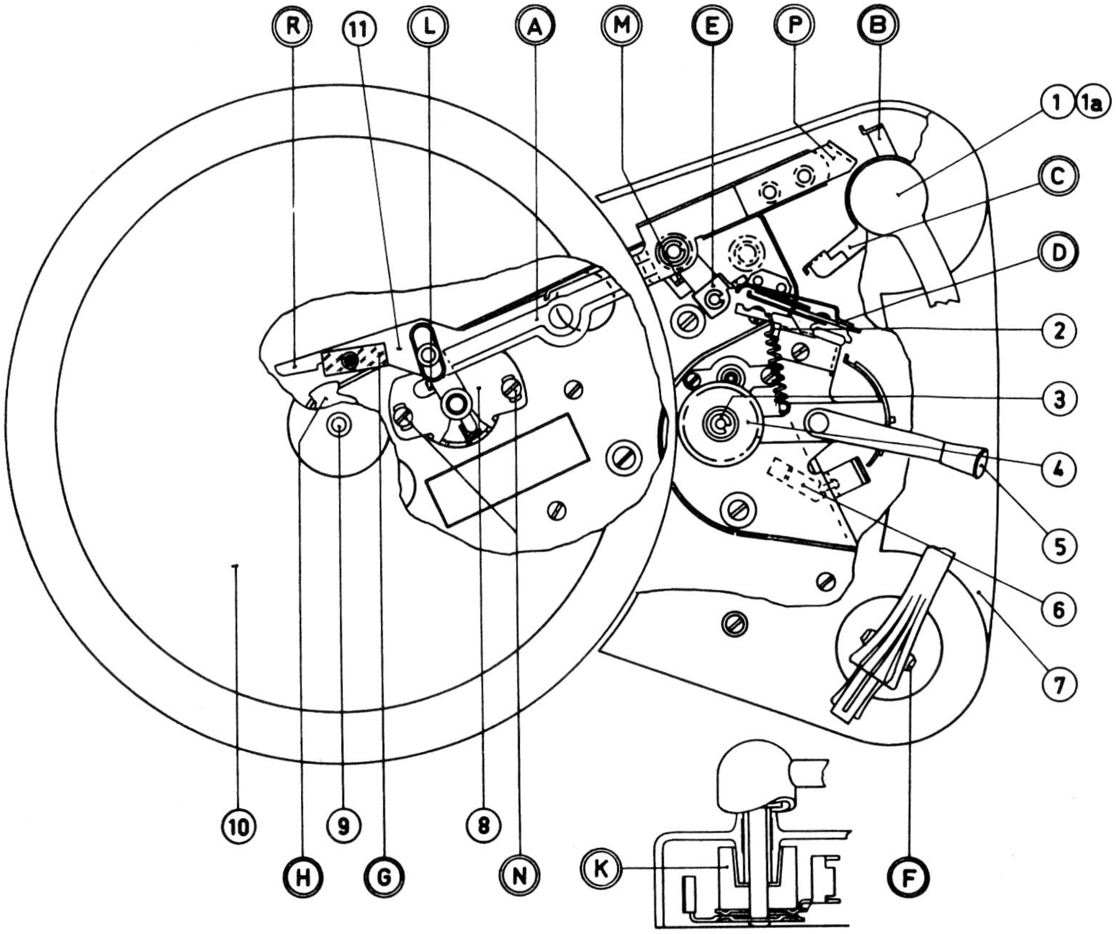


Fig.1

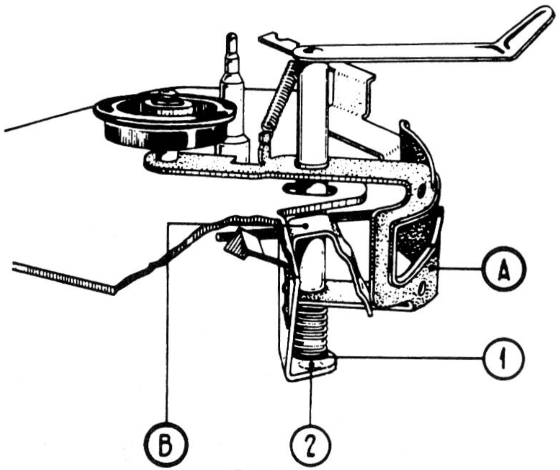


Fig.6

Diagrams:

Fig. 1	Top view
Fig. 2	Motorparts
Fig. 3	Circuit diagrams
Fig. 4	Spring suspension of the motorplate
Fig. 5	Spring suspension of the record player
Fig. 6	The mechanism for the speed selecting.

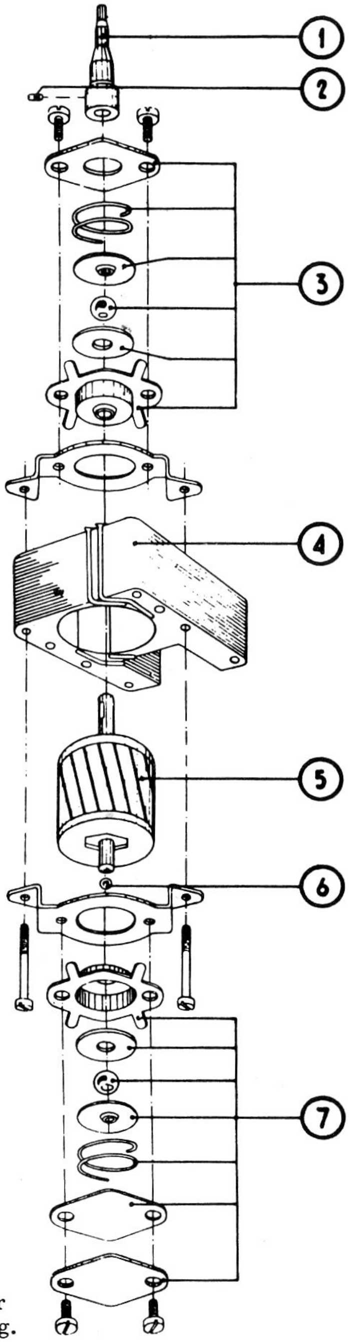


Fig.2

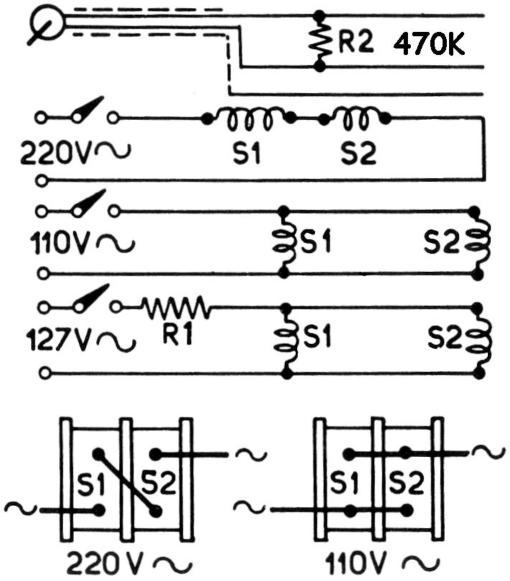


Fig.3

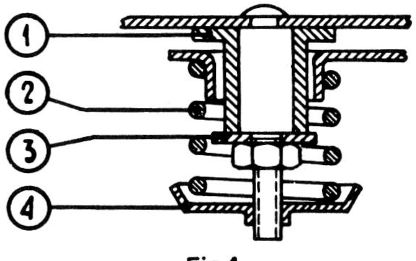


Fig.4

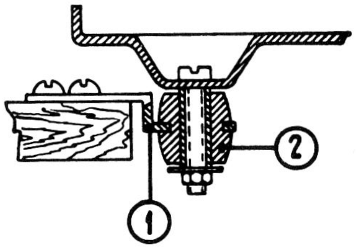


Fig.5