

Sparton Radio Service Manual

BULLETIN No. 10-B
Effective November 1, 1930

Service Data for Sparton Ensemble Model 235 Automatic Phonograph Mechanism

The automatic phonograph mechanism of the Model 235 SPARTON Ensemble consists of three principal divisions: The Driving mechanism, the Tripping mechanism, and the Discard mechanism. A description of the construction and function of each division is outlined in the following paragraphs.

DRIVING MECHANISM

The Driving Mechanism consists of (Figure A) Motor No. 1221-A mounted between Top Plate No. 1210 and Bottom Plate No. 1214, held parallel by Spreader No. 1261. These parts are held together by means of eight screws No. 1365 and eight lockwashers No. 1368. A worm in the Motor Shaft meshes with a Worm Gear which is fastened to the Turntable Shaft by means of a knurl, causing the Turntable Shaft to revolve. A portion of this shaft protrudes below the Worm Gear Chamber. On this shaft (Figure D) Pinion No. 1207 turns freely, being held in position by Thrust Washers No. 1257 bearing on the end of Sleeve No. 1255 (Figure B), on which Clutch Spool No. 1206 is mounted and held by Pin No. 1351. This Pin holds Sleeve No. 1255 integral with the Shaft but allows Clutch Spool No. 1206 to travel up and down, the pin working in the Slot of Clutch Spool No. 1206. Clutch Spool No. 1206 must revolve at all times with the Turntable Shaft. Raising Clutch Spool No. 1206 causes one of its three teeth to mesh with one of the two teeth in Pinion No. 1207 (Figure D), causing Pinion to turn with Turntable Shaft. The teeth of this Pinion mesh with the teeth in No. 1218 Intermediate Gear, causing it to revolve. The teeth in Intermediate Gear mesh with the teeth of Cam No. 1222, causing cam to revolve in a clockwise direction. The Intermediate Gear and Cam are held in position by Pivot Studs No. 1263 in Top Plate, and Pivot

Screws No. 1262, which are adjustable and locked into Bottom Plate by means of Nut No. 733. These Pivot Bearings should be adjusted so the parts turn freely but must by no means shake up and down. Cam No. 1222 is the heart of the machine, and all motions and power are derived from this one source except Turntable No. 1257-A (Figure B), which is driven by means of Rubber Washer No. 1321-1 acting against Driving Washer No. 1321-2, which is driven by a pin through the Turntable Shaft. The thrust from Turntable Shaft is taken by Thrust Screw No. 1256-A (Figure D), which is locked in position by Nut No. 733.

TRIPPING MECHANISM

When a record has finished playing, the needle in Pickup No. 1446 (Figure A) travels into the center of record by means of either the eccentric groove in Victor records or the spiral groove in Columbia or Brunswick records. This motion is transmitted through Adapter No. 1438 to Pickup Arm No. 1223-A, which is pivoted to Bracket No. 1269 (Figure D) by means of pivot screws No. 1270. Bracket No. 1269 is pivoted between Top and Bottom Plates at the top by means of Pivot Stud No. 1263 which is held in position by means of No. 1342 Top Support for Bearing Bracket, and at bottom by means of No. 1262 Screw Pivot. The motion of the Pickup No. 1446 causes Bracket No. 1269 to move on a vertical axis, Pawl Arm No. 1234-A, which is attached to Bracket No. 1269, moves in and out, causing Spiral Pawl No. 1245 to raise Trip Lever No. 1233 in case of Spiral Grooves, and Eccentric Pawl No. 1246 to raise Trip Lever No. 1233 in case of Eccentric Grooves. This causes Throw-out Lever No. 1275 to be released, allowing it to travel downward, acting on Clutch Lever No. 1277-A, which pivots on Stud No.

Sparton Radio Service Manual

BULLETIN No. 10-B (Continued)

SERVICE DATA FOR SPARTON ENSEMBLE MODEL 235 PHONOGRAPH MECHANISM

1467. This allows the forked end to travel upward, which causes Clutch Spool No. 1206 to travel upward, its lugs engaging with lugs on Driving Pinion No. 1207, causing Pinion No. 1207 to turn which turns Cam No. 1222 through Intermediate Gear No. 1218. When the cam has nearly completed its cycle, Lug A passes under cam surface of Throw-out Lever No. 1275, causing it to rise and to be held in its upward position by allowing notch in Trip Lever No. 1233 to engage under projection step in Throw-out Lever No. 1275. However, Lug A prevents Clutch Lever No. 1277-A from rising. This holds Clutch Spool No. 1206 in mesh with Drive Pinion No. 1207, bringing a strain on Spring No. 1366. This is the position shown in Figure C. As soon as Lug A passes over end of Clutch Lever No. 1277-A, Clutch Lever No. 1277-A snaps up, the forked end snaps down, and causes Clutch Spool No. 1206 to disengage from Pinion No. 1207. This stops the cycle.

MOVEMENT OF PICKUP

The Pickup is moved by means of Follow-up Arm No. 1271-A (Figure A) (which is attached to Pickup Arm No. 1223-A by means of Screws Nos. 147 and 13830-9, which is moved by means of Pin No. 1450 which travels in groove on top of Cam No. 1222. For about a quarter of the way around the top of the Cam there are two grooves. When Pin is in the inner groove, the needle in Pickup No. 1446 will come down on the starting position for 10" records. When Pin No. 1450 is in the outer groove, the Pickup will come down on the starting position for 12" records. A good practice is to place one 12" Victor record on Turntable and set the needle so it comes down about $\frac{1}{8}$ " from the outside edge. Switch No. 1266 changes this pin into groove required. This is done by Switch Cam No. 1297 being raised up by means of Shift Lever No. 1303-A, which is pulled forward by Lever No. 1435-A (Figure D). When Switch Cam No. 1297 (Figure A), which is pivoted on Bracket No. 1357-A,

is in contact with Finger No. 1352, it causes the inner side of Cam to rise, making it engage on lower lug of Switch No. 1266. This turns the position of Switch, causing the necessary movement to make the needle come down on the playing position for 12" records.

DISCARD MECHANISM

Lift Lever No. 1302-A (Figure D) is attached to Bracket No. 1303-A. The Roller No. 1329 (Parts Plate) acts on a perpendicular surface inside of Cam No. 1222, causing it to rise at each revolution of Cam. If Lever No. 1303-A (Figure A) is in the proper position to raise Cam No. 1297 (Figure A), it also causes end of Lift Lever No. 1302-A (Figure D) to rise under the low part of Roller Arm No. 1471, causing Roller No. 1243 to ride on largest perpendicular cam surface on Cam No. 1222. This causes Discarder No. 1238-A (Figure B) to be pulled back into the proper position to discard 12" records, acting through Discarder Assembly No. 1238-A (Figure C). If Shift Lever No. 1303-A (Figure A) is not in the forward position, Lift Lever No. 1302-A (Figure D) does not come up under the low part of Roller Arm No. 1471 and Roller travels around on the smaller perpendicular surface of Cam No. 1222, and the Discarder No. 1238-A (Figure B) stays at the proper position to discard 10" records. The two above discarder motions are accomplished by the fork in Roller Arm No. 1471 (Figure D) engaging in fork of Link Yoke No. 1338 (Plate C) which is attached to the top and the bottom plates by Links No. 1217 and No. 1440 so the entire Discard Mechanism No. 1238-A can travel back and forth, being controlled by Roller Arm No. 1471, which acts on either of two perpendicular cam surfaces on Main Cam No. 1222. To Link Yoke No. 1338, Links No. 1225 are attached (Figure C). These Links are also attached to Discard Arm No. 1227 and Shoe No. 1226. This gives a parallel motion to Discard Arm up and down, and is raised up and down by means of Lift Lever No. 1224 act-

Sparton Radio Service Manual

BULLETIN No. 10-B (Continued)

SERVICE DATA FOR SPARTON ENSEMBLE MODEL 235 PHONOGRAPH MECHANISM

ing on Shoe No. 1226, causing Discard Arm to raise and lower when Lever No. 1224 is raised and lowered. Lever No. 1224 is raised and lowered by means of Lever No. 1279-A, which is acted upon by the stud in Lever No. 1279-A being in contact with the bottom surface of Cam No. 1222. The inward motion of the Discarder is caused by Spring No. 1370 (Figure C) acting at all times, and is stopped by means of Stop Stud No. 1379. This relieves the pressure of Roller No. 1243 (Figure D) and allows the Roller Arm No. 1471 to drop from the 12" position to the 10" position when the Roller is at the neutral part of cam surfaces. To prevent this roller from dropping down at any other time, Roller Arm Holdup No. 1452 (Figure C) is made use of because Roller Arm No. 1471 is always

over the vertical leg of Hold-out Arm No. 1452 when it is acting on the 12" cam surface. Repeat Lever No. 1377 (Figure C) is used when the continuous playing of one record is desired. This Lever, when moved in, comes under Link No. 1225, making it impossible for Discard Arm No. 1227 to lower to position to discard record. Rest Hook No. 1349 (Figure A) is made use of when loading records. When Follow-Arm No. 1271-A is placed on this hook, Discard Holdup No. 1350 is brought over Lever No. 1279-A, preventing it from acting to lower Discard Mechanism No. 1238-A (Figure C), and remains in this position until it is pushed out by means of Lug A (Figure D) on Cam No. 1222. This is why the Pickup can be brought to the center of the record and tripped without discarding, enabling the needle to start in the proper position, according to the record that is to be played.

Adjustments of the Model 235 Automatic Phonograph Mechanism

CAUTION—Be sure that you understand exactly what the trouble is with the mechanism before starting to repair it. Do not attempt to "doctor" or "experiment". Remember, the mechanism operated perfectly at the factory.

TO ADJUST MECHANISM SO PICKUP COMES DOWN IN THE PROPER PLACE, adjust Screws No. 147 (Figure A) in and out as required. To keep the front surface of Follow-Arm No. 127-A parallel use Screws No. 13830-5, adjusting them in or out.

TO MAKE STOP SWITCH CUT OFF AT THE PROPER PLACE, which is just before Pick-up strikes Turntable, use screws which hold Stop Switch No. 1412-A (Figure A) by loosening or tightening front screw and holdout screw where Stop Switch attaches to top plate. On early models do this by adjusting Follower Arm.

TO ADJUST MECHANISM SO NEEDLE TRIPS ON INNER CIRCLE OF COLUMBIA

RECORDS, adjust Pawl Arm No. 1234-A (Figure C) by means of screws which attach it to Bracket No. 1266 so that Pawl Eccentric No. 1245 trips on vertical part of Trip Lever No. 1233. Eccentric Pawl No. 1245 should clear serrated surface on Trip Lever No. 1234 by about 1/32".

TO ADJUST CLUTCH LEVER No. 1277-A (Figure D), loosen Stud No. 1467, which is in a slot on Bracket No. 1224, until upper end of Clutch Lever clears Lug A by about 1/32" when Clutch Spool is up as far as it will go, and when mechanism is in the position shown on Figure D. If Clutch rattles or fails to operate properly, it is due to this adjustment. It is possible to change this adjustment by bending lever in some cases, where Stud No. 1467 (Figure D) is not in a slot. However, it is better not to try bending the lever unless mechanism is giving trouble.

TO ADJUST DISCARD ARM No. 1238-A

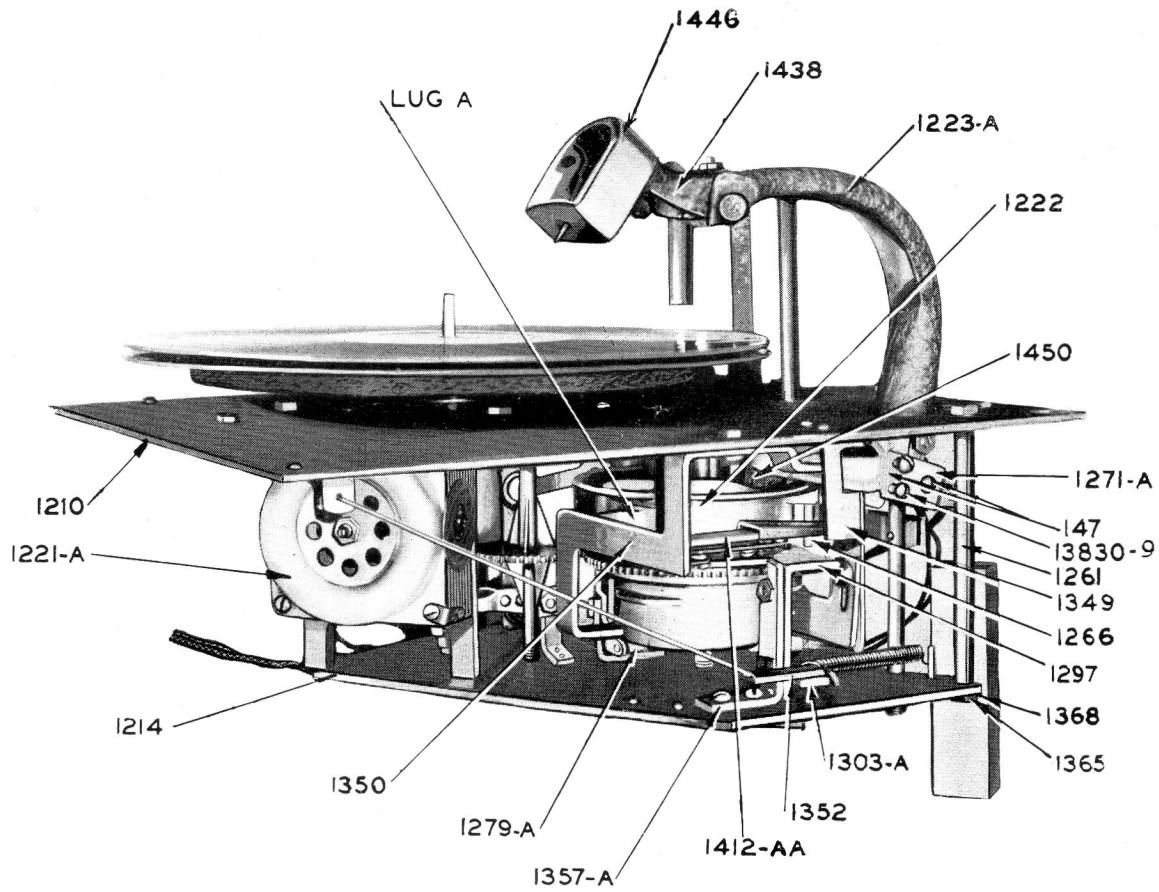


FIGURE A

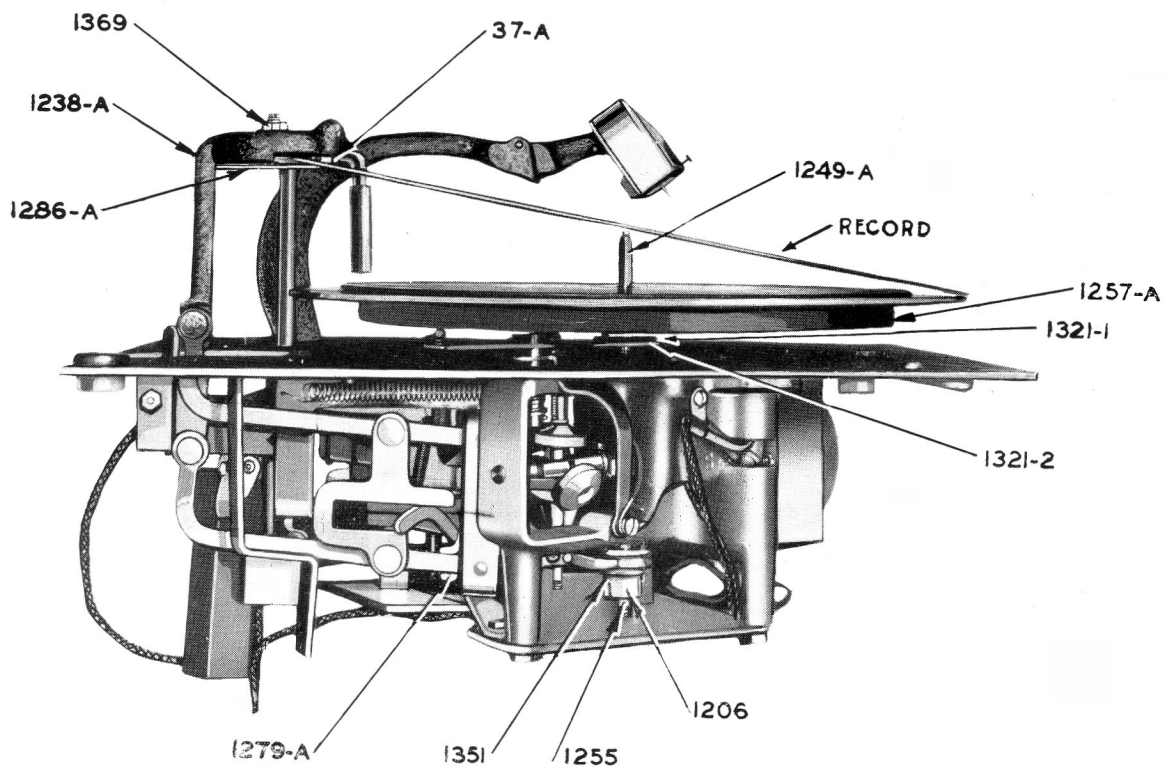


FIGURE B

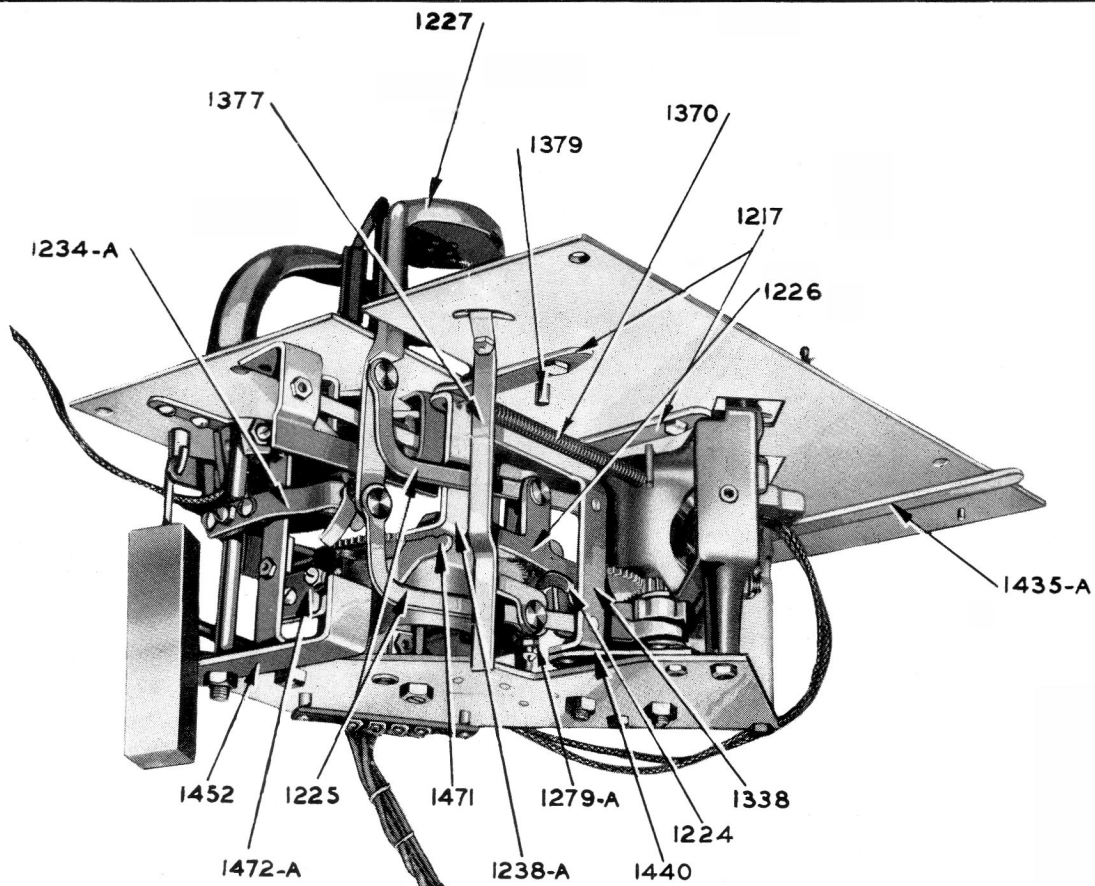


FIGURE C

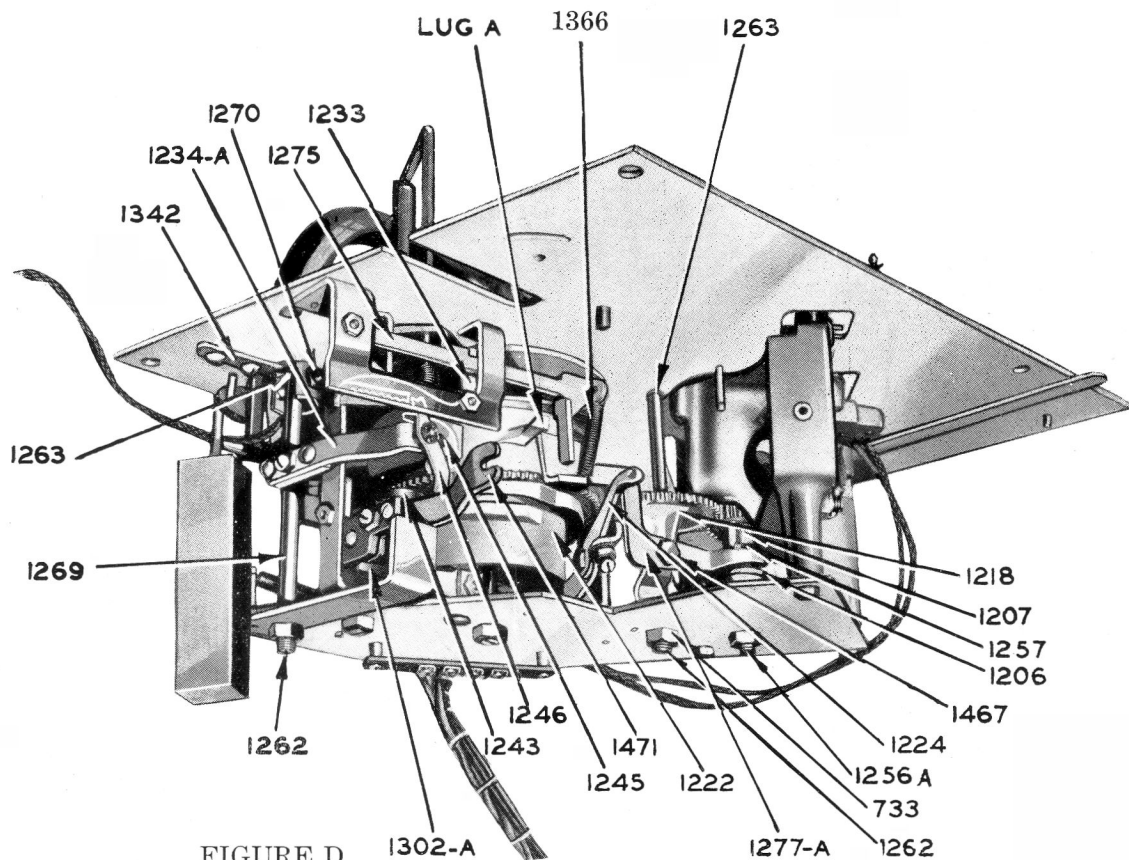


FIGURE D

Sparton Radio Service Manual

BULLETIN No. 10-B (Continued)

SERVICE DATA FOR SPARTON ENSEMBLE MODEL 235 PHONOGRAPH MECHANISM

(Figure B) UP AND DOWN, use set screw in Lever No. 1279-A (Figure B). This should be adjusted to the proper height so that 12" records just clear Spindle No. 1249-A when Discard Arm No. 1238-A is in its highest upward position.

TO ADJUST DISCARD DISC No. 1286-A (Figure B) loosen Nut No. 1369 and turn Discard Disc No. 1286-A to the proper height, then tighten Nut No. 1369. The proper distance for this adjustment is when Roller No. 37-A rests on record when Discard Arm No. 1238-A is in down position, there is just room for Disc No. 1286-A to pass under a normal size record.

TO ADJUST DISCARD ARM IN AND OUT adjust Discard Disc No. 1286-A (Figure B) so that it will just come down behind record in its lowest position, using screws which hold Roller Bracket No. 1472-A (Figure C) to Roller Arm No. 1471. Roller Arm may be bent to affect this change, when Roller Arm has no adjustment.

IF MECHANISM TRIPS HARD, it is probably due to the fact that notch in Trip Lever No. 1233 (Figure D) is not smooth or not machined at the correct angle. Also, it may be due to the fact that Spring No. 1366 (Figure D) has too much tension. A new spring has been designed which has less tension. All springs of the heavier type should be changed to the later design. Throw-out Lever No. 1275 (Figure D) should just rise high enough when Lug A is passing under it to allow notch in Trip Lever No. 1233 to enter under step in Throw-out Lever No. 1275.

TO PREVENT SCRATCHING OR MARKING OF RECORDS WHEN THEY ARE DISCARDED, be sure that Fibre Tip No. 1460 is in the end of Spindle No. 1249-A (Figure B). Also, it is necessary that the edges of Spindle No. 1249 are smooth so that it will not enlarge hole in record.

IF NEEDLE FAILS TO SLIDE FROM THE SMOOTH PART OF RECORD into the grooves it is probably due to the Pickup Arm being tight or not properly adjusted. Bracket No. 1269 (Figure D) should be tilted toward the discard compartment at top, which gives a natural tendency for Pickup to swing toward the center of record. This can be effected by loosening screws which hold Top Bearing Plate No. 1342 (Figure C) and moving Plate No. 1342 to the proper position. If Pickup Arm is then out of center with the hole, it can be re-adjusted by Pivot Screws No. 1270.

IF TWELVE INCH RECORDS FAIL TO DISCARD be sure that Guide Plate, which fastens to inside of cabinet in front of mechanism, is proper to prevent 12" records from sliding off the Disc No. 1286-A (Figure B) after record has been raised high enough to clear Spindle No. 1249-A. At the same time there must be plenty of clearance to allow record to be discarded.

All machines should be provided with a kick-off which tends to help remove record from turntable. Kickoff can be adjusted by means of Screw No. 13830-11 shown on Parts Sheet and should be adjusted so that it will not hit Discard Arm No. 1227 (Figure C). Part No. 1382 on Parts Sheet is held by means of Set Screw A-7741, which engages on flat part of Kickoff Arm No. 1462. Be sure that this screw is tight, also that Pickup Weight No. 1372 is in the proper position.

IF PICKUP APPEARS TO UNDULY VIBRATE WHEN COMING DOWN ON A 12" RECORD, it is probably due to an imperfect Switch, Part No. 1266 (Parts Sheet) and should be replaced by a properly machined one. No. 1266 can be removed without taking out any screws by holding Spring No. 1367 away from Lug. Switch No. 1266 can be raised up and taken out. Vibration in Pickup also may be caused by the improper adjustment of Follow-

Sparton Radio Service Manual

BULLETIN No. 10-B (Continued)

SERVICE DATA FOR SPARTON ENSEMBLE MODEL 235 PHONOGRAPH MECHANISM

Arm Pin No. 1450 (Figure A), making it tight in groove on top of Cam No. 1222 (Figure A). This can be adjusted through Follow-Arm No. 1271-A. It may be necessary in some cases to smooth the edges of the pin with a file.

ALWAYS BE SURE THAT TURNTABLE IS OPERATING AT 78 R. P. M. Often apparent trouble is due to the improper speed that the turntable is set to run. If a speed indicator is not available, the speed of the turntable can be ascertained by placing a strip of paper underneath a record in playing position, so it will project just beyond the edge of the turntable. By placing the finger where the paper will strike it the number of revolutions per minute can be counted. Be sure to have the record playing, so the retarding action of the needle on the record will be taken into account while you are counting the revolutions. To regulate the speed of the motor, adjust the speed control lever which extends from beneath the record turntable. The movement of this control lever to the front will decrease the speed of the motor and to the back will increase the speed of the motor. Vary the setting of this lever until the

paper touches the finger seventy-eight (78) times while the second hand of a watch makes one complete revolution. The speed of the turntable has been properly adjusted at the factory for normal record reproduction, and under normal conditions should require no further adjustment.

TO REPLACE NEEDLE, turn the phonograph switch control to the "OFF" position, turn the screw located at the back and to the right of the pickup unit in a counter clockwise direction. The pickup head will then tilt upward, making it convenient to replace the needle.

BE SURE THAT FINGER (Part No. 1382, Parts Sheet) WHICH OPERATES KICKOFF is at the right height so that it engages properly with Cam No. 1290. If this finger is too high or too low, it is liable to cause a bind.

BE SURE THAT ALL JOINTS OPERATE FREELY AND SMOOTHLY. A little oil in all joints and wearing surfaces is a great help.

BE SURE THAT ENSEMBLE IS STANDING REASONABLY LEVEL.

Suggestions for Servicing Model 235 Ensembles Serial Numbers 1 to 2100

1. Will not discard record or fails to discard last 12" record?

Add guide plate (Part No. 1464), placing it 7 9/16" centered from right hand side inside of the cabinet. Add kick-off lever. Remove discard disc and replace with discard disc (Part No. 1286-A) with sharpened edge.

2. Trip dog (Part No. 1246) rattles on side between dog and cotter pin of trip lever?

Add washer (Part No. 156) to lever holding trip dog.

3. Discards records when half through playing?

Shorten trip lever (Part No. 1233, Figure D) at rear end, so that it is 3/16" long from the bend. This can be done by removing and filing. Or obtain new part from factory.

4. Governor bearing too tight?

This is caused by paint dripping down on bearing when top of plate was painted and baked. Remove paint from inside of bearing.

5. Cutout switch (Part No. 1412-AA, Figure A) will not shut off?

Height of tone arm not properly adjusted. This is adjusted through follow-arm (Part No.

Sparton Radio Service Manual

BULLETIN No. 10-B (Continued)

SERVICE DATA FOR SPARTON ENSEMBLE MODEL 235 PHONOGRAPH MECHANISM

1271-A). Adjust pickup higher and set motor cutout switch lower.

6. Tone arm balance weight (Part No. 1372, 1439, and 1465, Parts Sheet) comes off tone arm (Part No. 1271-A, Figure A) ?

Drill hole in end of weight stem and insert cotter pin (Part No. 1465).

7. Motor binding ?

If greasing does not remedy the binding of the bearings, replace with complete AC motor.

8. Rejector spring (Part No. 1378) off ?
Put new loop in end of rejector spring.

9. Pickup would not come in groove of record ?

Cabinet not sitting level on floor, causing the angle of the pickup to be changed. Check the lower pivot bearing (Part No. 1262), to see if it is binding, also upper bearing, which should be moved toward discard compartment, letting bracket stand on an incline toward record compartment. This gives natural tendency for the pickup to swing in.

10. Pickup comes down and hits record too hard ?

Add heavier balance weight (Part No. 1372, Parts Sheet). Add new track switch (Part No. 1266) in cam. See that follow-arm is smooth and does not bind in groove on cam. This can be taken care of by filing.

11. Discarder (Part No. 1238-A) will not come in and pick up record and fibre disc is warped or worn in discarder ?

Loosen up all bearings so that they are not binding. Replace discard disc with new type (Part No. 1286-A, Figure C) with sharp edge.

12. Record spindle (Part No. 1249-A) rough, enlarging center hole of record ?

Sand and polish edges of spindle so that they are not sharp.

13. Records scratch when sliding over record spindle ?

Add new type spindle (Part No. 1249-A) with fibre tip.

14. Defective master switch (Part No. 5621-A) ?

Replace master switch assembly.

15. Follow-arm (Part No. 1271-A) loose ?
Add lockwasher (Part No. 148).

16. Motor weak, will not complete cycle ?
Be sure that motor is running at proper speed, 78 R.P.M., on turntable. If this does not correct the trouble, replace motor.

17. Motor changes speed ?
Replace motor.

18. Clutch (Part No. 1206) will not engage ?
Bend clutch lever (Part No. 1277-A, Figure D) so that it will engage in pinion gear (Part No. 1207) and so that end will just clear lug on cam (Part No. 1222) when clutch is in its furthest position. If this raises throw out lever too high when cocking, file off portion of throw out lever (Part No. 1275) which rests on clutch lever (Part No. 1277) until it releases clutch in "STOP" position.

19. Picks up two records at a time ?
Discard disc (Part No. 1286-A) in discard arm (Part No. 1238-A) not set correctly.

20. Pickup falls off last 12" record ?
Follow-arm not properly adjusted. Refer to Service Instruction Data.

21. Wobbly turntables ?
See that turntable is not bent. Determine this by replacing with new turntable. If this does not correct the trouble see if the shaft has an adapter. If so, replace motor.

22. Roller (Part No. 36) and discarder (Part No. 1227) will not roll ?

This is due to the roller shaft rusting and can be corrected by oiling.

THE SPARKS-WITHINGTON COMPANY

Jackson, Michigan, U. S. A.

SPARTON OF CANADA, LIMITED

London, Ontario, Canada