

Sparton Radio Service Manual

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BULLETIN No. 10-B
Effective January 1, 1931

Service Data for Sparton Ensemble Model 103 and 578 Automatic Phonograph Mechanism

GENERAL OPERATION

At the completion of the reproduction portion of a record, the needle moves into the groove in the center of the record. The first oscillatory movement of the needle on an eccentric groove record, or the feed-in movement on a spiral groove record trips Trip Lever No. 814 *figure 1*.

Dog No. 813 *figure 2* for eccentric groove records and Spiral Trip Dog No. 533 for spiral groove records is attached to Pick-up Arm Lever No. 811 by means of Adjusting Stud No. 860 and Adjustment for Pick-up Lever No. 812. Pick-up Arm Lever No. 811 is attached to Pick-up unit No. 904 *figure 3* by means of Yoke No. 867 and Pick-up Arm No. 866 which is connected to Bracket No. 810 *figure 4*, onto which Pick-up Arm Lever No. 811 *figure 2* is attached by means of two screws No. 155 *figure 4*. This whole device is allowed to swing from right to left due to its attachment to Standard No. 788 by the Dog Point Set Screws No. 823 which fit into the Bearing in Bracket No. 810.

When Trip Lever No. 814 *figure 1* is tripped, it allows Throwout Lever No. 822 to drop, and this causes Clutch Lever No. 816-C to push Clutch No. 526 into the Pins of Clutch Collar No. 527-C which is revolving; acting thru Worm Gear No. 514-C which is driven by the Worm in Drive Shaft No. 793 connected to the Motor by means of Drive Spring No. 877. The connecting of this Clutch causes worm shaft No. 524-C which is meshed with Cam Worm Gear No. 528, to cause Cam No. 789 to revolve and lower the Turntable to the "swing back" elevation. This is accomplished by Lift Lever No. 817 *figure 2*

which is operated by Cam No. 789 *figure 1* acting on the bottom of Turntable Shaft No. 507-C, thru Turntable Lift No. 516 *figure 2* and Adjustment No. 818 to which the Turntable Shaft is attached.

Turntable No. 510-C *figure 1* is driven in a clockwise motion by means of Worm Gear No. 553-C (not shown), which is meshed with Drive Shaft No. 793. This Worm Gear is provided with inside lugs which fit into the grooves in Turntable Shaft No. 507-C and allows the Shaft to raise up and down without interfering with its turning motion.

DISCARD POSITION OF TURNTABLE

Returning to the action of Cam No. 789 *figure 1* as it rotates further, Turntable No. 510-C drops to the discard position, allowing the record to come in contact with discard Rubber No. 650 *figure 4*. This raises the record above Receiving Stud No. 508 *figure 3* and the rotation of Turntable No. 510-C then causes the record to be discarded into the Receiving Compartment.

"SWING BACK" OF PICK-UP UNIT

Before the Cam No. 789 *figure 1* allows the Turntable to be moved into the discard elevation, and while the Turntable is still in the "swing back" elevation, the Pick-up Unit is swung away from the record by means of Index Lever No. 815 *figure 2* which is connected to the Pick-up Arm thru Pick-up Arm Lever No. 811. The inner end of the slot in Index Lever No. 815 acts on Pin No. 763 *figure 1* that revolves with the Cam in a clockwise motion. It is thru this means that the Pick-up is swung away from the record.

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SLIDE MOVEMENT FOR 10" RECORDS

When Cam No. 789 *figure 1* starts to revolve, Eject Arm No. 790 *figure 2* also starts to revolve as it is driven by Dog No. 522. Roller No. 552 attached to Eject Arm No. 790, travels in the slot in Drive Lever No. 550 and causes it to move from the left to right, which moves Eject Slide No. 835-C and brings the center of the record over Receiving Pin No. 508 *figure 3* in Turntable No. 510-C. This motion is caused by Drive Lever No. 550 *figure 2* acting thru Link No. 852 attached to Lever No. 865 which is pinned to Shaft No. 558 connected to Top Lever No. 853-C which acts on Transverse Lever No. 854-C thru Link No. 856. The Transverse Lever is connected to the Twelve inch record Regulating Lever No. 859 which is fastened to Eject Slide No. 835-C by means of the Stud in the "L" shaped slot. This Stud remains in the "L" end of Lever No. 859 and allows Slide No. 835-C to place a ten inch record in the proper position over Receiving Stud No. 508 *figure 3*.

SLIDE MOVEMENT FOR 12" RECORDS

In case a twelve inch record is on the Slide, Centering Lever No. 850-C *figure 4* is pushed out by the record to a position where its tail end trips the twelve inch Regulating Lever No. 859 *figure 2*. Eject Slide No. 835-C moves forward, causing the Stud to leave the "L" end of the slot in Lever No. 859 allowing Eject Slide No. 835-C to travel just far enough to place a twelve inch record over Receiving Stud No. 508 *figure 3*.

Ten or twelve inch records can be used without discrimination. The engagement of the needle on ten or twelve inch records is controlled by Engaging Regulator Weight No. 872 *figure 4* acting on Cable No. 900 which is attached to Index Lever No. 815 *figure 2*. When the Weight is allowed to Act, Index Lever No. 815 is pulled over and the long slot

engages on Pin No. 763 *figure 1* causing the Pick-up Unit to swing into the proper place to engage on a 12" record. If Regulator Weight No. 872 *figure 4* is not allowed to act, Index Lever No. 815 *figure 2* is carried over by means of Drag Link No. 530 *figure 1* so that the short notch engages on Pin No. 763 and the needle engages at the proper place to start a 10" record. Whether or not the Weight No. 872 *figure 4* is allowed to act depends on Shaft No. 824 which, when under Weight No. 872, keeps the Weight from acting, Shaft No. 824 is controlled by Engaging Regulator Arm No. 787.

When a 12" record is fed out, Centering Lever No. 850-C *figure 4* is pushed out. The Finger on it carries Arm No. 787 out with it, swinging end of Shaft No. 824 from under Weight No. 872, allowing No. 872 to act. Shaft No. 824 will remain in this position until a 10" record is fed out of the Hopper. Thus, a 12" record may be repeated on the Turntable as many times as desired. When a 10" record is fed out of the Hopper, Eject Slide No. 835-C *figure 2* goes out farther over the Turntable, allowing Pin No. 887 to come in contact with Arm No. 787 causing it to move so that Shaft No. 824 takes a position under Weight No. 872 and prevents it from acting. This position will be held until a 12" record is fed out of the Hopper, thus, a 10" Record will continue to repeat until the position of Shaft No. 824 is changed.

RECEIVING POSITION OF TURNTABLE

Again returning to the motion of Cam No. 789 *figure 1* further rotation of this Cam causes the Turntable to rise to receiving elevation in time to receive the record which has been moved to the positions just described. The Turntable remains in this position while the Cam rotates further, allowing Roller No. 552 *figure 2* which is attached to

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Eject Arm No. 790, to travel in the slot in Drive Lever No. 550 and return Eject Slide No. 835-C to its original position. As soon as Eject Slide No. 835-C has returned to this position, Cam No. 789 *figure 1* has revolved to a position where it allows the Turntable to drop to "the swing-in" elevation.

"SWING IN" MOVEMENT OF PICK-UP UNIT

At this time Pin No. 763 *figure 1* has revolved far enough to connect with either the ten or twelve inch notch in Index Lever No. 815 *figure 2*. Its further revolution causes the Pick-up to swing in over the record so the Needle rests on the smooth part of the record as the Turntable is raised to reproducing elevation by means of Cam No. 789 *figure 1*. Regulating Weight Lever No. 872 *figure 4* on Standard No. 788, now causes the Pick-up to move over from the smooth part of the record to the first reproducing groove. Reproduction of the record begins at once.

COCKING MECHANISM AND STOPPING CYCLE OF CAM

When the Pick-up Unit first swings away from the record, Pick-up Arm Lever No. 811 *figure 2* passes under the tail end of Throw-out Lever No. 822 *figure 1*, causing it to rise to a position where the notch in Trip Lever No. 814 is allowed to enter its proper place under the lug in Throw-out Lever No. 822, holding Throwout Lever No. 822 in this position after the Pick-up Arm Lever No. 811 *figure 2* no longer supports it. When the Throwout Lever is raised to this position, a spring tension is created which pulls on Clutch Lever No. 816-C *figure 1* attempting to pull back and open Clutch No. 526 but Clutch Lever No. 816-C is held in the engaging position by means of Control Disc No. 864-C until the Cam has completed its entire

revolution when a notch in the Control Disc allows the Clutch Lever to follow the urge of the spring and disengage the Clutch.

REPEATING

In case it is desired to play the same record over, the repeat Button *figure 5* is moved to the left. This moves Repeat Lever No. 809 *figure 2* causing it to press against Drive Dog No. 522 causing the Dog to recede and not catch on Eject Drive Arm No. 790. Eject Drive Arm No. 790 remains stationary and the Eject Slide does not move. The Cam revolves and the Turntable goes thru all of the elevating positions except the discard elevation. Eject Arm No. 790 does not allow Roller No. 845 to drop to the discard elevation in Cam No. 789 *figure 1*, thus the record will be repeated until the Repeat Lever is moved to the right.

CONTROL OF RECORDS

When Eject Slide No. 835-C *figure 4* comes forward, the bottom record is caught between the "V" shaped plates No. 836 and No. 837 *figure 3* which brings the bottom record forward with the Slide. The other records slide over the top of these "V" shaped plates and remain in the Hopper. Only the bottom record is allowed to come out of the Hopper onto the Turntable. Other records are prevented from coming out by means of the two Admitters No. 819-C which are devised so they gauge themselves according to the thickness of the record. Thick, thin or warped records are fed out thru the action of the admitters without injury to the records or mechanism. The admitters are held down against the record by means of springs and are adjusted by Screws No. 902. Back Stops No. 871 prevent records from sliding too far back in Hopper.



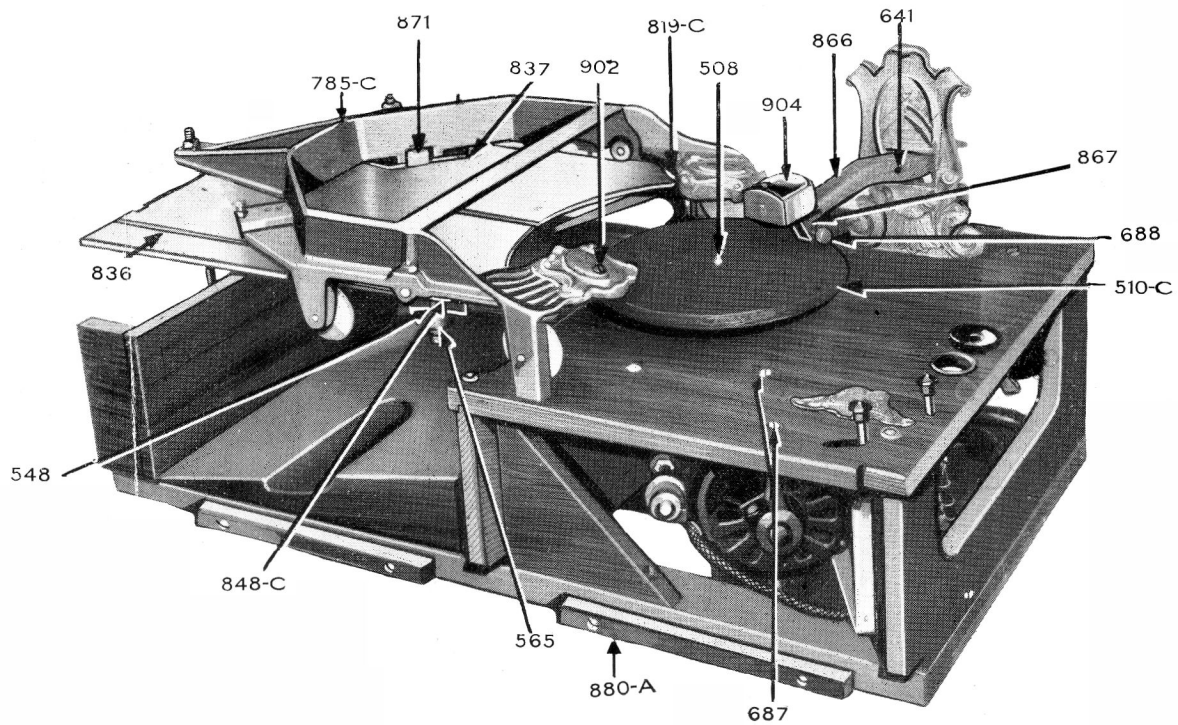


FIGURE 3

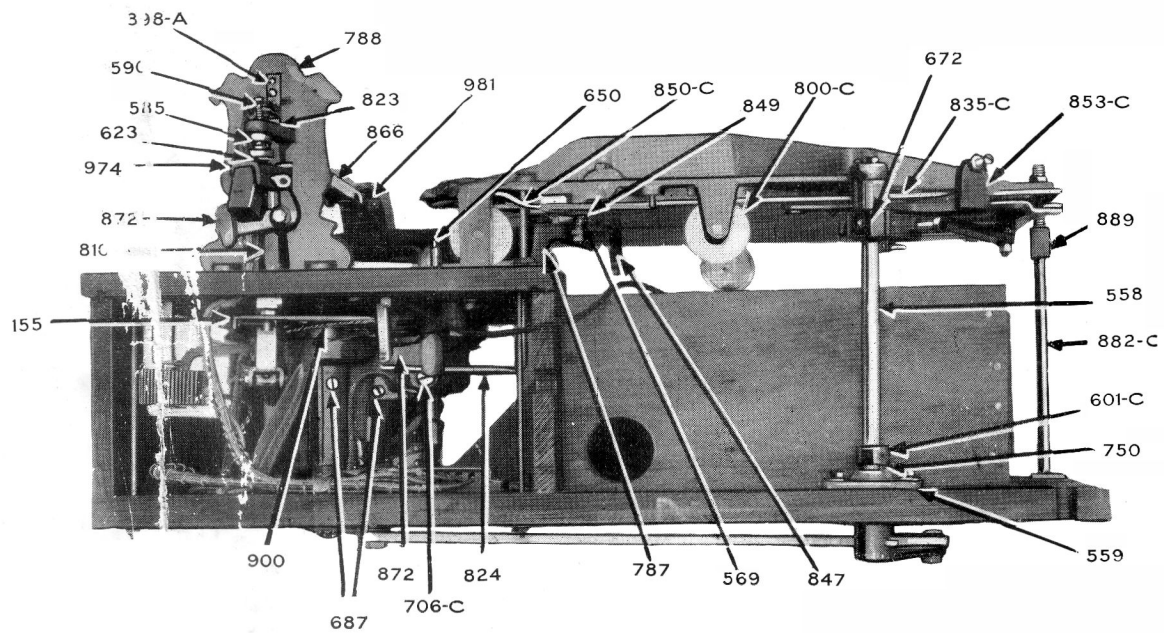


FIGURE 4

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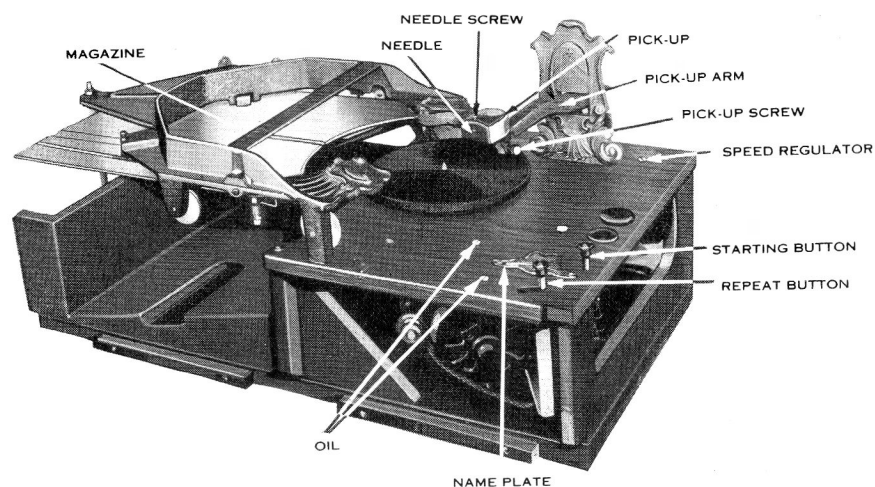


FIGURE 5

If a ten inch record is on the bottom and is not in the center, it is forced in the center by the two Centering Levers No. 850-C *figure 4* and No. 848-C *figure 3* which are held in position under tension by Springs No. 569 *figure 4* and No. 565 *figure 3*. These Springs are right and left hand and are attached to bushings in Studs, which have right and left hand threads and have a tendency to keep the spring from unscrewing the studs and nuts which hold them.

These Springs hold the Centering Lever against the Stop Pins which are so set that they hold the Centering Levers just the right distance to allow a 10" record to pass thru with a slight amount of tension. In case a 12" record is on the bottom, these Springs are allowed to open up and the Centering Lever No. 850-C *figure 4* acts to trip the mechanism as described under the paragraph about Slide Movement for 12" records.

THE STARTING BUTTON

In starting or rejecting records, the Starting Button *figure 5* is pressed. When this Button

is pressed slightly, it causes the contacts in switch No. 897-A *figure 2* to be spread apart which changes the fields in the motor from a series connection to a parallel connection for a greater starting torque. Pressing down further causes Lever No. 662 *figure 2* to act against Throwout Lever Trip No. 814 and trip mechanism which discards the record. This is the same action as though it were tripped with the Dogs No. 812 or 814.

THE CLUTCH SWITCH

Clutch Switch No. 896-A in a Bracket No. 876 *figure 1* is operated by Clutch Lever No. 816-C by means of a fibre switch Opener, the purpose of this switch is to allow switch No. 898-A *figure 4* to be opened when the Clutch is engaged and the Cam is in motion. This carries the current whenever Clutch is in motion and the Pick-up Unit is not resting on a Record.

THE PICK-UP UNIT SWITCH

Pick-up Switch No. 898-A *figure 4* is attached to the back of Standard No. 788. When the Pick-up is not resting on a record,

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the Pick-up Arm drops down, swiveling at Trunion Pin No. 641, *figure 3*. This allows the Brake Shoe on Pick-up Arm No. 866 to rise and press against Cork insert No. 623 *figure 4* which is in the Brake Adjustment No. 585. This retards the Swinging action of the Pick-up and allows it to move only when forced by Index Lever No. 815 *figure 2*. This Brake Adjustment No. 585 can be regulated to bring the Pick-up to the height desired and is locked in place by a nut. Thru the center of Brake Adjustment No. 585 is a Fibre Rod No. 590 *figure 4* which also rests

on Brake Shoe No. 974 and is raised whenever the Brake is closed. The upper end of this acts on the Contact Spring in Switch No. 898-A and causes it to open the Switch and break the entire circuit, acting the same as the Clutch Switch, in parallel with it. With both of these switches open, the power supply is entirely cut off. Also, when this switch is open a contact is formed with the upper part of the Switch which cuts out Speed Regulating Rheostat No. 544 *figure 2* and allows the full power to be used while the Cam is in the operating cycle.

Lubrication on the Sparton Ensemble Model 103 and 578 Automatic Phonograph Mechanism

The Model 103 automatic phonograph mechanism is thoroughly lubricated at the factory when assembled and requires no oiling or greasing except as noted in this section.

THE ELECTRIC MOTOR ARMATURE SHAFT BEARINGS. Oil once every six months. Use nothing but light fine oil. Located on the upper side of the motor board *see figure 5* are two (2) pipe plugs marked "OIL", remove these plugs and inject a quantity of oil in *see figure 5* under them, this lubricates both armature shaft bearings. The wick type oil wells used on the bearings keep the bearings well lubricated for a six (6) month period of normal operation.

KNUCKLES, JOINTS AND BEARINGS. Oil once every six (6) months. Use nothing but light fine oil.

AUTOMATIC MECHANISM GEARS AND BEARINGS. Grease once every year. Use nothing but a good grade of grease of about the consistency of vaseline, mixed with graphite if possible. In the main body casting, housing the turntable shaft and worm gears two (2) pipe plugs No. 687 *figure 4* marked "Grease" are located. Remove these Plugs and inject a small quantity of grease in the openings.

Adjustments on the Sparton Ensemble Model 103 and 578 Automatic Phonograph Mechanism

ADMITTER ASSEMBLY 819- FIGURE 3. Use Adjusting Screw No. 902. Turning this screw in a clockwise direction raises the end of the admitter higher. The height of the admitter should be just enough to touch a record on the Eject Slide No. 835-C, *figure 2*, when the slide is out.

ALIGNMENT OF MOTOR DRIVE SPRING NO. 877, FIGURE 1 WITH DRIVE SHAFT NO. 793. Two adjustments are provided for this purpose one for aligning the spring if it

is off center with the drive shaft horizontally and the other for alignment if the spring is off center vertically.

To align the spring if off center horizontally, loosen the four collars (see 574-C, *figure 1*) on Screw Studs No. 797. This will then allow either side of Motor No. 895-C to be moved back or forth on the studs as the case demands. To align the spring if off center vertically, the Hex. nut on Stud No. 799 should be loosened or tightened depending upon whether the motor is to be tipped up or down.

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PICKUP UNIT TO STRIKE AT PROPER PLACE ON RECORD. Use adjusting Screw No. 535, *figure 2*. The needle in the pickup unit should strike about $\frac{1}{8}$ inch from the outside edge of the record.

PICKUP UNIT TO TRIP MECHANISM ON SPIRAL GROOVE RECORD. Use adjusting Screw No. 812, *figure 2*. The mechanism should trip on a Columbia record with a $\frac{3}{8}$ inch diameter inner circle when the needle has followed the spiral groove to within $\frac{1}{16}$ inch of the groove's maximum inward travel.

PICKUP UNIT TO TRIP MECHANISM ON ECCENTRIC GROOVE RECORD. Use Adjusting Screw No. 860, *figure 2*. The tip of eccentric trip Dog No. 813 should be $\frac{1}{32}$ inch above trip lever No. 814 before it starts to travel in under this lever.

THE NEEDLE ENGAGING REGULATOR SHAFT NO. 824. Loosen Set Screw in Arm No. 787, *figure 4*, and move Shaft No. 824 to the required position. When a 10" record is on the turn-table being reproduced, Shaft No. 824 should be under Weight No. 872.

THE HEIGHT OF NEEDLE ABOVE RECORD. Use Adjusting Screw No. 585, *figure 4*. This adjustment should be made immediately after the pickup unit has swung in and just before the turn-table rises. When the turn-table is in this position, the needle should be $\frac{1}{8}$ inch above the record.

THE HEIGHT OF THE TURN-TABLE. Use Adjusting Screws No. 818, *figure 2*. The height of the turn-table should be $2\frac{1}{8}$ inches from top of motor board to top of turn-table when the turn-table is in the record receiving or highest position.

FORWARD STOP OF EJECT SLIDE. Use the screw in Top Lever No. 853-C, *figure 4*. The Eject slide should carry out a 10 inch Victor record to a distance where the tip of Receiving Stud No. 508, *figure 3*, enters the hole in the record at the front side of the hole.

If a 10" Columbia record is used to make this adjustment, the stud should enter the hole in the record at the rear side.

END PLAY IN CAM WORM SHAFT NO. 524-C FIGURE 1. Use Adjusting Screw 525-C. The end play in this shaft should be just enough to be detected when shaft is moved back and forth by hand. If end play is too great, the clutch will remain engaged and the mechanism will not automatically stop when the last record has been reproduced.

PICKUP SWITCH NO. 898-A, FIGURE 4. This switch is adjusted by loosening the two screws by which it is fastened to standard No. 788 and moving it up or down so the contacts will close when the pickup unit is on a record in reproducing position.

CLUTCH SWITCH NO. 896-A, FIGURE 1. This switch is adjusted by loosening the two screws which hold Bracket No. 876 to the body casting and moving the bracket one way or the other so the contacts will close when clutch No. 526 is in gear. Clutch No. 526 is placed in gear immediately after a record has been discarded automatically or manually.

END PLAY IN DRIVE SHAFT NO. 793, FIGURE 1. Use Adjusting Screw No. 706-C, *figure 4*. The end play in this shaft should be just enough to be detected when shaft is moved back and forth by hand. If end play is too great, the reproduction of a record will have a wavering effect.

SPRING TENSION ON CENTERING LEVER NO. 848-C and 850-C, FIGURE 4 and 3, RESPECTIVELY. Use Adjusting Screws No. 847 and No. 849, *figure 4*. The spring tension on these levers must be equal and sufficient to hold the center of a record in a line with Receiving Stud No. 508, *figure 3*. If the tension is insufficient or unequal, Eject Slide 835-C, *figure 2* will not center the record over turn-table No. 510-C. Loosen these screws and turn them to the right or left to increase or decrease tension as the case demands.

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