Milwaukee Erwood
Automatic Record Changer

No. 10700 Series
R. M. A. Code Number 424

MANUFACTURED BY:

Milwaukee Stamping Company

Milwaukee 14, Wisconsin

MILWAUKEE ERWOOD
AUTOMATIC RECORD CHANGER

No. 10700 Series

R. M. A. Code Number 424

This Automatic Record Changer is a precision built, gearless, beltless, simple operating mechanism, designed to give you foolproof, trouble free record reproduction with minimum effort by means of a new, exclusively designed, operating mechanism. This machine is built to automatically change and play a maximum of twelve ten inch records or ten twelve inch records, with a minimum of needle and record wear. Will automatically play records of standard R.M.A. size and dimensions. Records not standard or without trip grooving can be played in manual operating position.

Machine designed to operate on 115 volt, 60 cycle alternating current unless otherwise specified on motor.

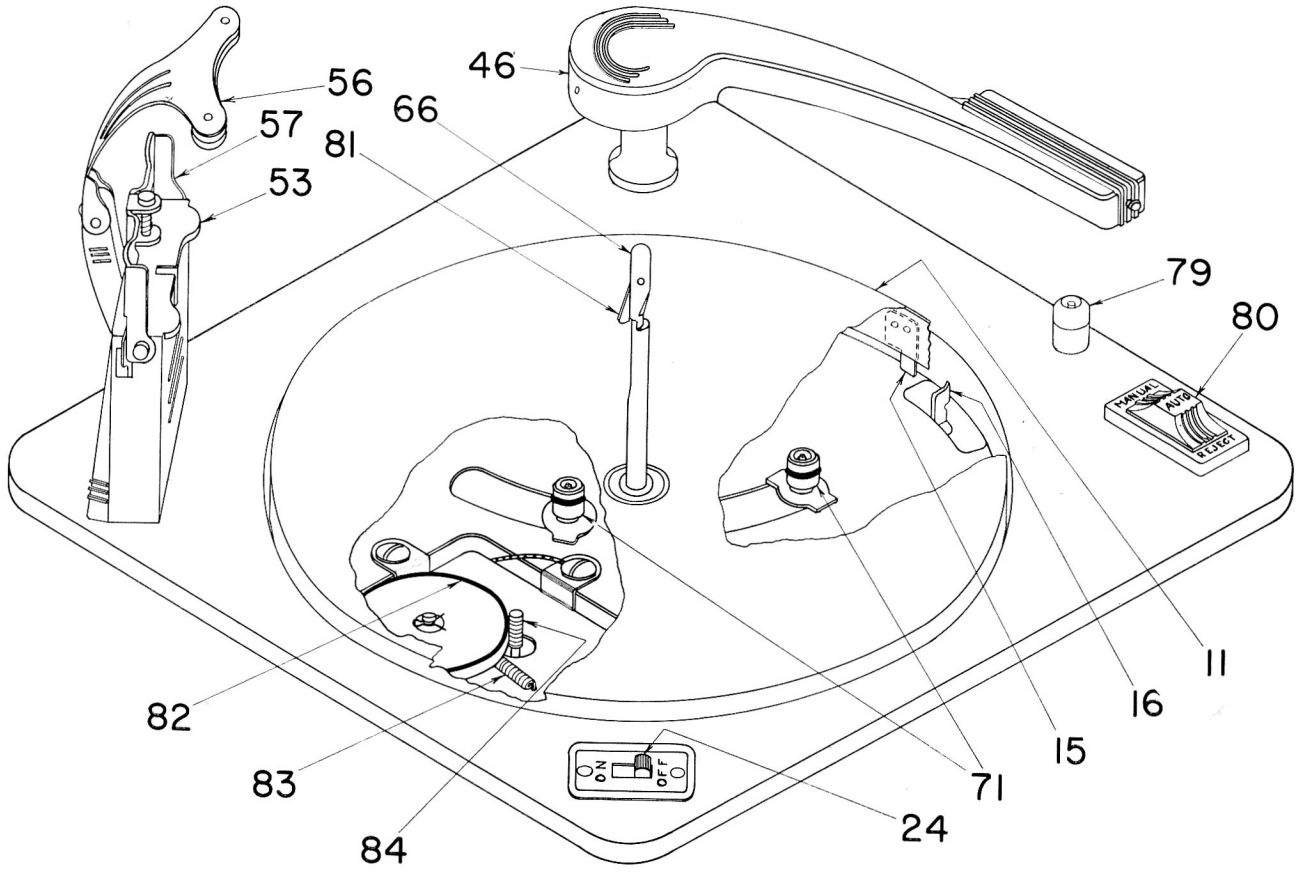


FIG. 1 TOP VIEW

OPERATING INSTRUCTIONS

For transportation and shipping purposes the changer plunger mechanism is locked in cycle or changing position. Push starting switch to "ON" position. If changer turntable does not rotate, push turntable clockwise until turntable rotates by motor power. Your changer now is in permanent operating position. Care must be taken to prevent pickup arm from dropping onto turntable in order to prevent needle from injuring surface of turntable.

Automatic Operation

1. Loading The Changer
   a. Before placing records onto changer be sure pickup arm is placed on pickup arm rest.
   b. If 10 inch records are to be played, lower hinged 10 inch record support to rest horizontally on ejector box. For 12 inch records raise the hinged 10 inch record support into vertical position and rest records on 12 inch record support ears on ejector box.
   c. Place stack not to exceed twelve 10 inch records or ten 12 inch records over center post supported in the center on the center post and at one side on the record support.
   d. Place balance arm to rest on top record, this steadies the records and assures correct dropping of records.
2. Starting The Changer
   a. Push starting switch to "ON" position.
   b. To bring pickup arm into playing position pull reject button into reject position and changer will automatically drop first record and enter playing cycle.
   c. If the machine has been stopped in cycle position and turntable does not rotate after above instructions have been followed, push turntable clockwise until machine returns into normal operating cycle.
3. Rejecting Records
   Records may be rejected any time during playing operation by pulling reject button into reject position.
4. Shutting Off The Changer
   a. Before removing records it is advisable to drop all unplayed records onto turntable by repeatedly pulling reject button into reject position until all unplayed records have dropped onto turntable.
   b. Lift pickup arm and place it on pickup arm rest while turntable and records are rotating. Push starting switch to "OFF" position
   c. Caution. If above procedure is not followed changer will replay last record.
5. Unloading The Changer
   a. Raise balance arm and 10 inch record support upward to permit easy record re moval.
   b. Lift played records from turntable.

Manual Operation

1. Raise hinged 10 inch record support into vertical position.
2. Place record over spindle onto the turntable.
3. Push starting switch to "ON" position.
4. Push reject button into manual playing position.
5. Place pickup arm at beginning of record to start playing operation.
6. When through playing place pickup arm on pickup arm rest and push starting switch to "OFF" position.

Cycle of Operation of Correctly Adjusted Mechanism

1. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) and 10″ record support down, place stack of 10″ records on center post (66) and 10″ record support (57) ears. See Fig. (1).
2. Place balance arm (56) on records. See Fig. (1).

3. Push motor switch (24) to "ON" position. See Fig. (1).
4. Pull reject button (80) to reject position and release. See Fig. (1).
   a. Drops 1st record.
   b. Places pickup arm (46) in playing position.
5. Play 1st record.
6. Needle approaches center grooves carrying ratchet arm (2) towards adjusting stop lever (8). See Fig. (2).
7. Contact of ratchet arm (2) and adjusting stop lever (8) disengages jaws of adjusting stop lever (8) & kickoff lever arm (17). (See Fig. (2).

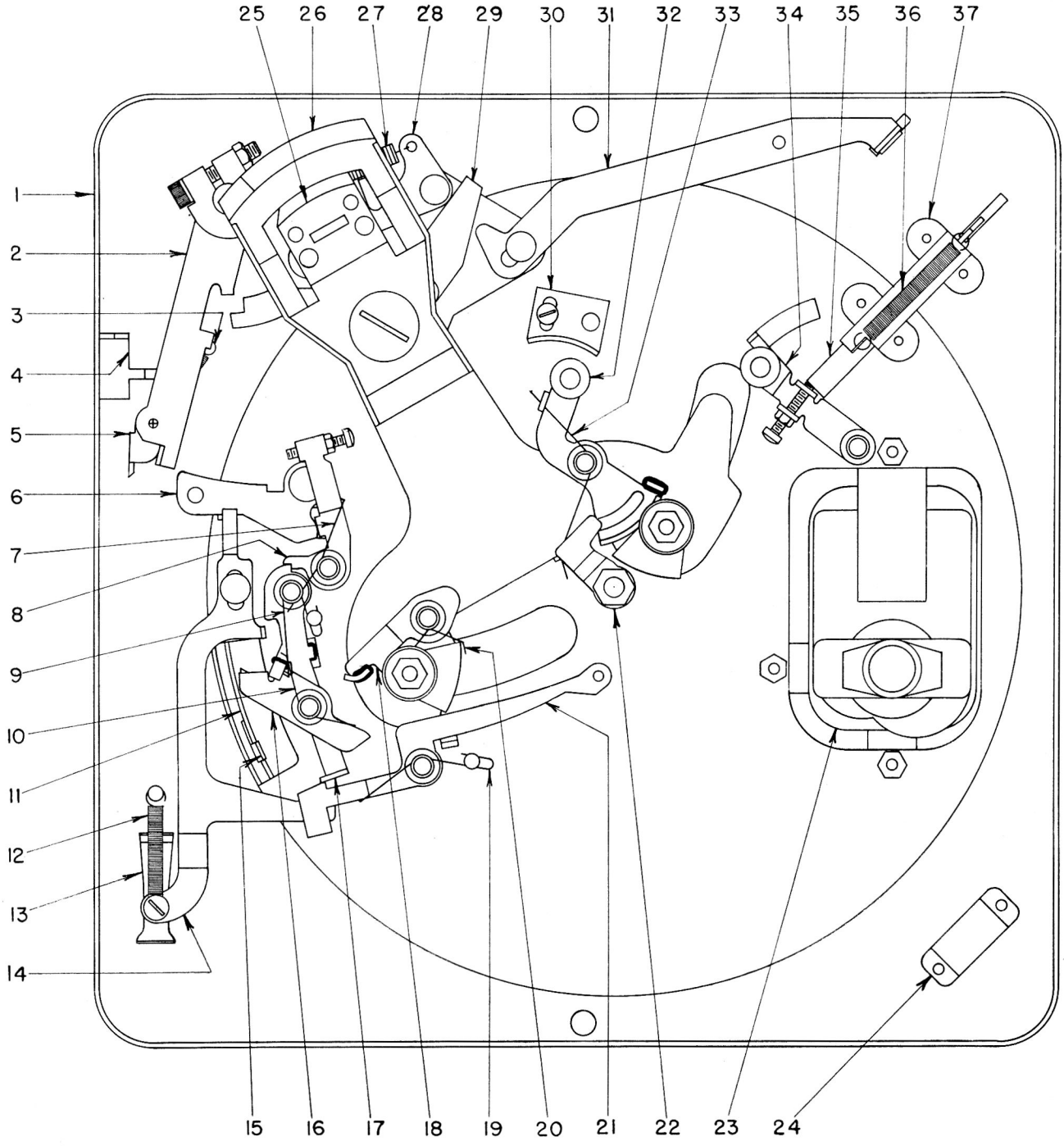


FIG. 2 BOTTOM VIEW

8. Jaws release kickoff lever arm (17) assembly, rotating it into path of kickoff spring (15) which rotates on turntable (11). See Fig. (2).
9. Contact of kickoff spring (15) & kickoff lever (16) rotates kickoff lever arm (17) assembly into locked position with locking lever (21). See Fig. (2).
10. Further movement of turntable (11) causes kickoff lever (16) to disengage dropping lever (18). See Fig. (2).

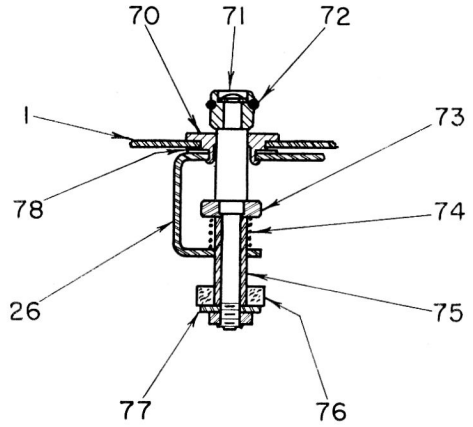
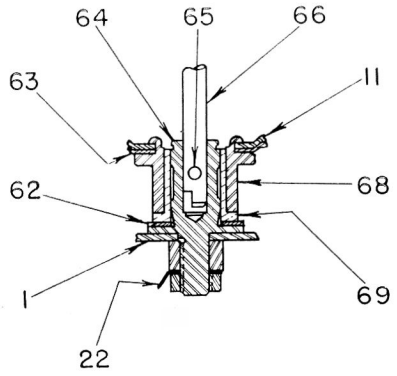
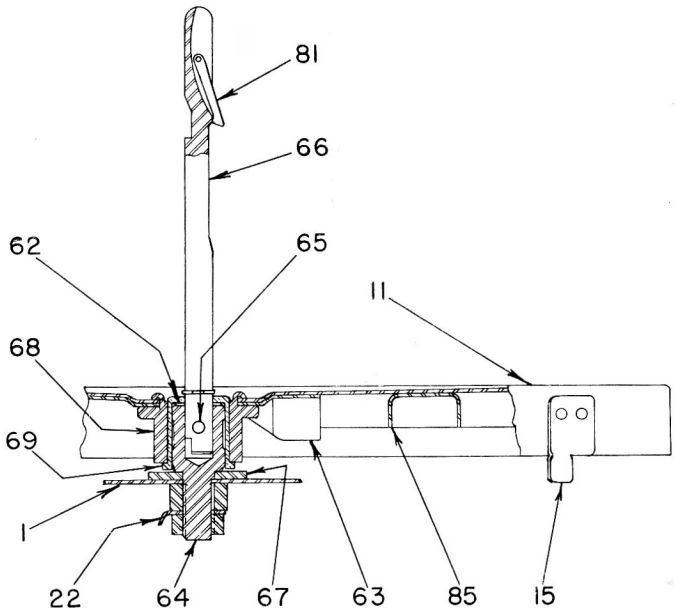


FIG. 3 LEAD OR RETURN DROPPING ROLLERS

11. Lead roller assembly Fig. (3) drops into turntable spiral (85). See Fig. (4).
12. Disengagement of kickoff spring (15) & kickoff lever (16) rotates kickoff lever to original position. See Fig. (2, 5).
13. Swing arm (26) assembly Fig. (2) is driven through first half of cycle by turntable spiral (85). See Fig. (4).
    a. Adjusting plunger pin (50), riding on swing arm (26) cam, elevates pickup arm (46). See Fig. (6).
    b. Assembly in Fig. (7) is set by arm cam (40) so as to position ratchet arm (2) Fig. (9) on return stroke for proper set down of needle.
    c. Ratchet arm friction springs (25) engage ratchet arm (2) rotating pickup arm (46) to clearance position. See Fig. (2).
    d. Ejector idler lever (34) driven by swing arm (26) Fig. (2) actuate record ejector assembly Fig. (8). Dropping next record from stack.
    e. Swing arm (26) ear, cams locking lever (21) resetting kickoff lever assembly (17). See Fig. (2).
    f. Cammed dropping lever (32) Fig. (2) releases return roller assembly Fig. (3) dropping it into turntable spiral (85) Fig. (4).
    g. Inner spiral cam (63) Fig. (4) raises lead roller assembly Fig. (3) permit-



ORIGINAL DESIGN



IMPROVED DESIGN

FIG. 4 CENTER POST AND TURNTABLE ASSEMBLIES

ting dropping lever (18) to rotate to setting position. See Fig. (2).

14. Swing arm (26) assembly Fig. (2) is driven through second half of cycle by turntable spiral (85) Fig. (4).
    a. Pickup arm (46) is positioned for set down driven by engaged ratchet arm friction springs (25) and ratchet arm (2) and located by interference of ratchet arm lever (29). See Fig. (2, 9).
    b. Record ejector assembly Fig. (8) is reset to original position.
    c. Swing arm (26) ear releases locking lever (21) allowing it to assume original position. See Fig. (2).
    d. Operation of brake spring (22) prevents acceleration of swing arm (26) at completion of cycle. Gentle set down of pickup arm (46) is so effected. See Fig. (2).
    e. Adjusting plunger pin (50) riding on swing arm (26) cam causes pickup arm (46) to descend to playing position. See Fig. (6).
    f. Assembly in Fig. (7) is released by arm cam (40) resetting ratchet arm lever (29) in clearance position as shown in Fig. (2).
    g. Inner spiral cam (63) Fig. (4) raises return roller assembly Fig. (3). Rotation of cammed dropping lever (32) Fig. (2) provides clearance between inner spiral cam and return roller assembly. This completes the change cycle.
15. Tripping of mechanism by eccentric grooves in center of record.
    a. As record is being played ratchet dog (5) and ratchet lever (6) make contact. See Fig. (2).
    b. Eccentric grooves in record produce oscillation of ratchet arm (2) and ratchet dog (5). See Fig. (2).
    c. Oscillation of ratchet dog (5) across ratchet lever (6) lengthens ratchet arm (2) assembly, rotating ratchet lever (6). See Fig. (2).
    d. Rotating ratchet lever (6), rotates adjusting stop lever (8) disengaging jaws of adjusting stop lever (8) and kickoff lever arm (17). See Fig. (2).
16. For remainder of cycle see parts 8 through 14 above.

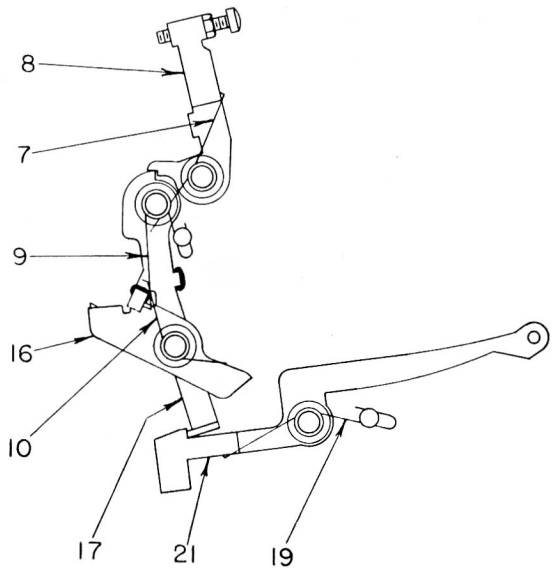


FIG. 5 TRIPPING LEVERS IN LOCKED POSITION

Servicing Procedure

Procedure & Adjustments

1. The following procedure, when followed, will provide the service man with a method of repair which will save him much unnecessary time and effort. Start servicing the changer by performing adjustment #10. This will assure the service man that the changer is in the correct position for proper operation.

2. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) down, place stack of 12 new 10″ records on center post (66) and 10″ record support (5() ears. See Fig. (1).
3. Push starting switch (24) to "ON" position. See Fig. (1).

4. Pull reject button (80) Fig. (1) to reject position and release, observing changer action for any of following possible difficulties. Difficulties encountered may be corrected by following the respective procedure and adjustments indicated.

a. Turntable does not rotate.	#1,2,3,4,5,6
b. Pickup arm does not rise.	#7,8
c. Pickup arm rises but does not rotate into playing position and remains suspended in air. Turntable continues to turn. Click heard on each revolution.	#9
d. Pickup arm rises but does not rotate into playing position and remains suspended in air. Turntable comes to a dead stop cannot be turned by hand.	#10,9,11,12
e. Pickup arm rises but does not rotate into playing position, then sets to rest on pickup arm rest.	#13,14
f. Bottom record does not drop off of supporting ears of 10″ record support (57) and center post (66) Fig. (1).	#15,16,17
g. Pickup arm hits bottom record of not played records.	#8
h. Needle does not set down correctly for 10″ or 12″ records.	#18,19
i. Pickup arm drops fast when setting needle on record.	#20

j. Pickup arm needle does not track in groove.	#21,22,23,24,25
k. Pickup arm needle jumps out of recording grooves and doesn't trip mechanism.	#22,23,24,25,26
l. Mechanism does not trip at end of record.	#26,27,28,29,30,31
m. Eccentric groove on 10″ records does not trip mechanism.	#31,32
n. Changer does not play entire record.	#29
o. Pickup arm does not lift high enough to clear stack of 12-10″ records on turntable.	#8

5. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) down, place stock of 10 new 12″ records on center post (66) and 12″ record support ears of ejector box (53). Fig. (1).

6. Push starting switch (24) to "ON" position. See Fig. (1).

7. Pull reject button (80) Fig. (1) to reject position and release, observing changer action for any of following possible difficulties.

a. Bottom record does not drop off of supporting ears of ejector box (53) and center post (66).	#15,16
b. 12″ record hits pickup arm when record drops to playing position.	#33,34
c. Eccentric groove on 12″ records does not trip mechanism.	#31,32

8. Play any record. Observe and listen for noises which not not seriously hamper operation of changer but detract from performance of changer.

a. Click is encountered on each revolution of turntable during playing cycle.	#11
b. Apparent growl or scroll noise caused by improper operation of roller (71) Fig. (3) on turntable spiral (85) Fig. (4) during change cycle.	#8,12,35,36,37
c. Extreme variation of turntable speed.	#3,4,5,6,38,39

d. Distortion of tone quality of recording.	#3,4,5,6,24,38,39,40,41
e. Excessive wear of records.	#23,24
f. Turntable vibrates or chatters.	#38

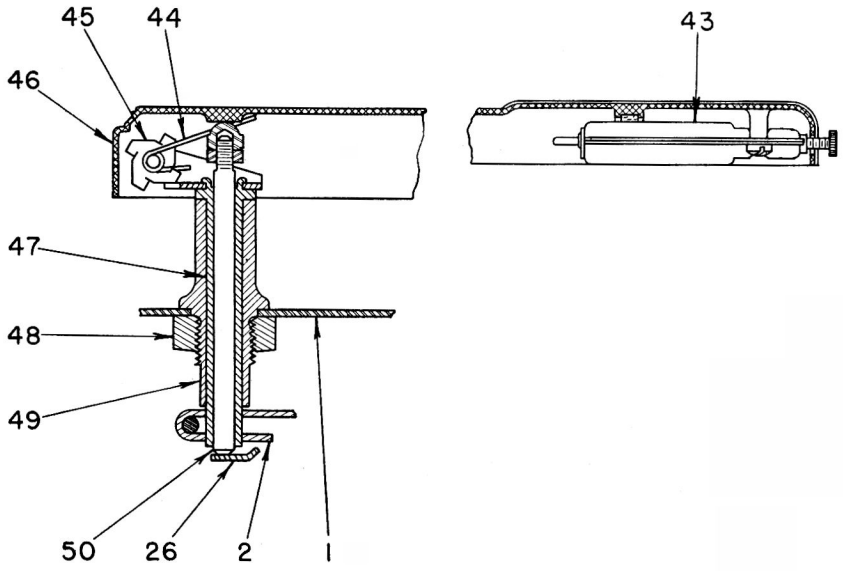


FIG. 6 PICKUP ASSEMBLY

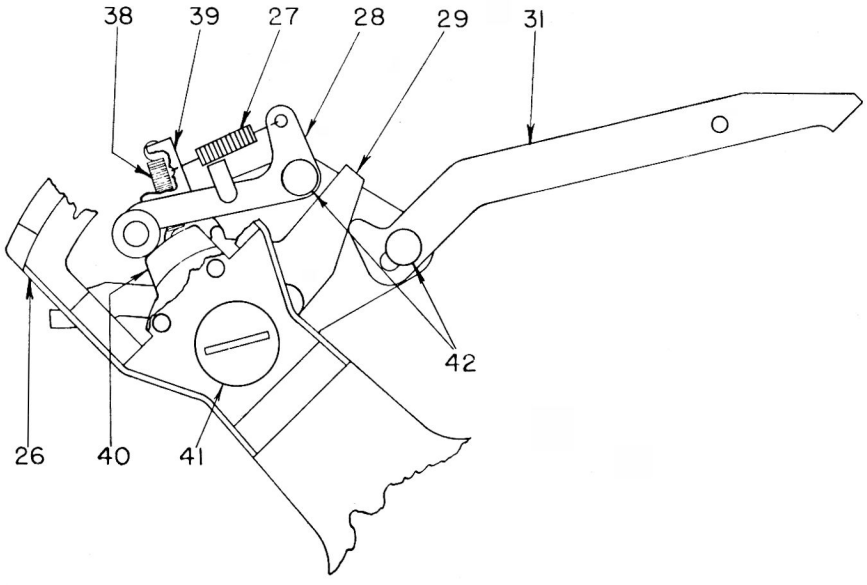


FIG. 7 OPERATION OF CHANGE LEVER PLATE ASSEMBLY

ADJUSTMENTS & PROCEDURES

1. Check power supply to motor. Motor operates at 115 volts 60 cycle alternating current unless otherwise specified on motor.
2. Remove turntable (11), move motor idler pulley (82) away from motor shaft (84) and check for motor performance Fig. (1).
3. Check for freedom of motion of motor idler pulley (82) and motor spring (83) tension on same. Fig. (1).
4. Check for grease or foreign matter on motor idler pulley (82) or turntable (11) rim which may cause slippage. Fig. (1).
5. Check for worn motor idler pulley (82) tire. Fig. (1).
6. Check for grease or foreign matter in bearing for turntable collar (62) and mechanism plate center stud (64). Fig. (4).
7. Check for absence of adjusting plunger pin (50). Fig. (6).
8. Adjusting plunger pin (50) incorrect length. Place pickup arm (46) in upright position and remove adjusting plunger pin (50) with acorn nut. Adjust overall length of pin assembly to give approximately ¼" clearance between top of pickup arm and bottom record of stack of unplayed records when unit is in change cycle. Fig. (6).
9. Trip mechanism and rotate turntable (11) by hand until swing arm (26) completes half of its cycle. Loosen screw in cam trip bracket (30) and rotate bracket until there is .012" to .014" clearance between leading edge of cam dropping lever (32) all in Fig. (2) and bearing pin shoulder nut (73) Fig. (3) of dropping roller. Return swing arm to original position. Retighten screw. Recheck this setting by tripping mechanism and rotating turntable by hand observing whether return roller assembly Fig. (3) enters turntable spiral (85) Fig. (4) at formed flat on turntable spiral at completion of half of swing arm cycle.
10. Back up turntable (11) turning it counter clockwise slightly and remove turntable. Push both rollers (71) of swing arm (26) down and push rollers (71) towards reject button (80) to the end of their travel. Re-

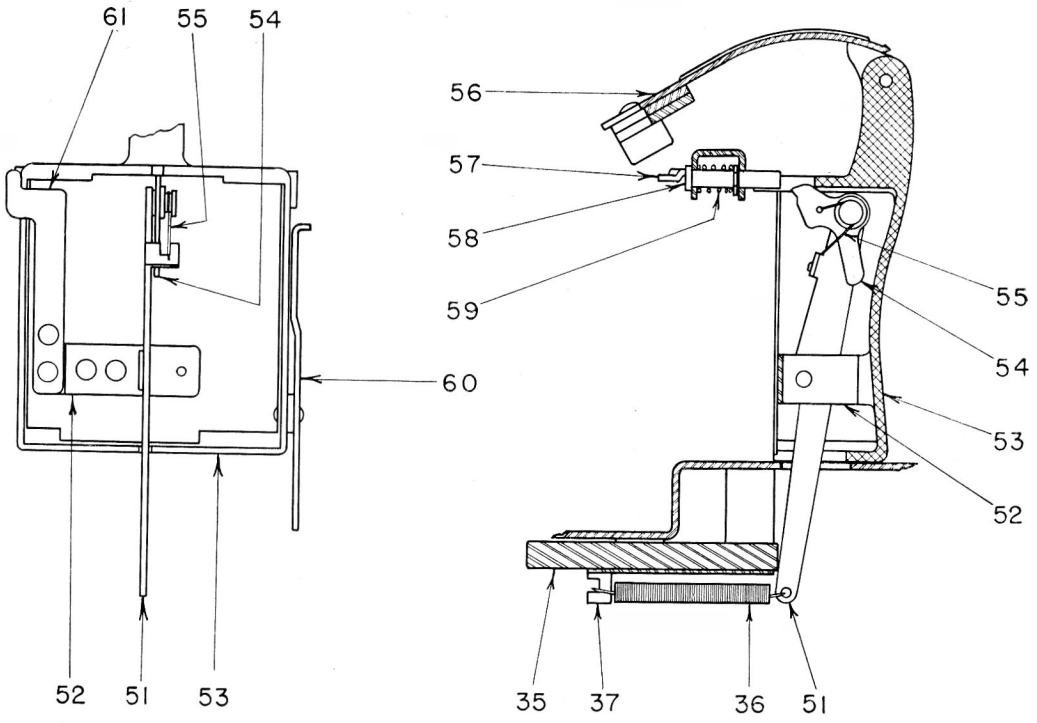


FIG. 8 EJECTOR BOX ASSEMBLY

place turntable and rotate by hand for at least one revolution. Fig. (1).

11. Check drop lever torsion spring (20) and cammed dropping lever torsion spring (33) for adequate tension. Fig. (2).
12. Check for worn or frayed rubber on dropping lever (18), replace if necessary. Grease rubber sleeve after installation. Fig. (2). This sleeve, above (73) Fig. 3, may be eliminated entirely for better operation.

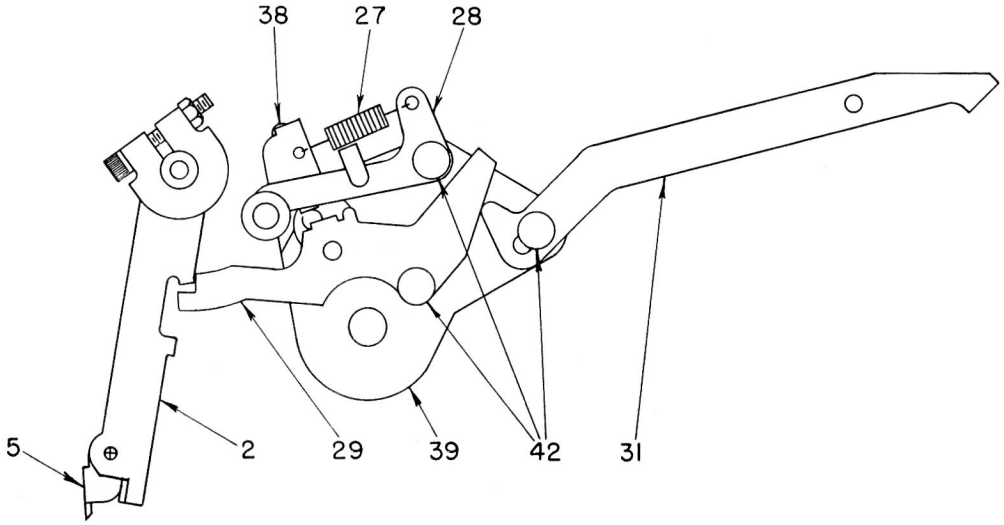


FIG. 9 POSITIONS OF LEVERS FOR NEEDLE SETDOWN

13. Check for defective ratchet arm friction springs (25). Fig. (2). If found to be

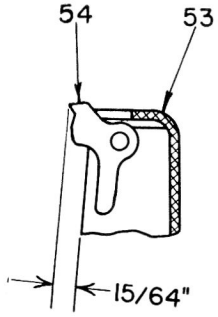


FIG. 10 FINGER TRAVEL OUT OF EJECTOR BOX

loose or weak, return changer to factory for adjustment.

14. Check ratchet arm (2) for tight engagement with pickup arm swing post (47). Fig. (2,6).
15. Trip mechanism and rotate turntable (11) by hand until swing arm (26) completes half of its cycle. Loosen lock nut on ejector idler lever (34) Fig. (2). Adjust screw until finger (54) protrudes outside of ejector box (53) 15/64". See Fig. (10). Tighten lock nut.
16. Check proper height from ejector box (53) ears to maximum rise of finger (54) top is .085" to .095". See Fig. (11). File to give proper dimension.
17. Check 10" record support (57) Fig. (8) for height differential between ears of 10" record support (57) and top of pusher pin (58). Pin should engage record by .080" to .090". Bend to suit.
18. Put a 10" record on turntable (11), loosen screw on ratchet arm (2) and place pickup needle approximately 1/8" from outside edge of record. Rotate by hand ratchet

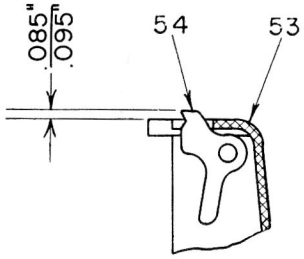


FIG. 11 FINGER TRAVEL ABOVE EJECTOR BOX

arm lever (29) and ratchet arm (2) to position shown on Fig. (9) and retighten screw. This setting will automatically set needle down correctly for 12" records also.

19. Move swing arm (26) away from reject button (80) for about 1" of its travel. Check movement of ratchet arm lever (29) which should assume position shown

on Fig. (7 or 9) when 10″ record support (57) is in down position. Hampered movement may be caused by defective ratchet arm extension spring (38) or excess friction.

20. Remove brake spring (22) and inspect for possible fracture. Replace fractured spring, use two springs if necessary. Fig. (2).
21. Check for defective cam lever extension spring (27) and possible excess friction in parts. Fig. (7).
22. Check for adequate freedom of pickup cartridge wire.
23. Pickup arm (46) should weigh 1¼ oz. when scale is applied at set screw. To adjust weight rotate ratchet for pickup arm (45) so to decrease or increase tension on pickup arm balance spring (44). See Fig. (6).
24. Needle may be worn beyond use.
25. Check to see that changer is level.
26. Check freedom of movement of adjusting stop lever (8) Fig. (2 or 5).
27. Check for presence of all springs See Fig. (2).
28. Tripping levers may assume position shown in Fig. (5). Reset levers by pulling reject button (80). If occurance is frequent observe for extreme wear of nib at point where kickoff spring (15) contacts kickoff lever (16). Fig. (2). Replace kickoff lever arm (17) assembly and remove 1/32″ of mechanism plate (1) increasing size of hole which limits outward travel of kickoff lever arm (17). Remove material from farthest edge from center post (66) allowing greater movement of kickoff lever arm (17) assembly.
29. Set pickup needle at a point 1⅞″ from center of record, loosen lock nut and turn screw on adjusting stop lever (8) Fig. (2) until kickoff lever arm (17) releases allowing 1/64″ clearance between jaws of adjusting stop lever (8) and kickoff lever arm (17). See Fig. (12). Tighten lock nut.
30. Check for distorted or fractured kickoff spring (15) Fig. (4).
31. Records not manufactured under R.M.A. specifications may not trip changer.
32. Bend the ear on the adjusting stop lever (8) slightly towards heel of ratchet lever (6), to produce increased interference of ratchet dog (5) and teeth of ratchet lever (6). Fig. (2).

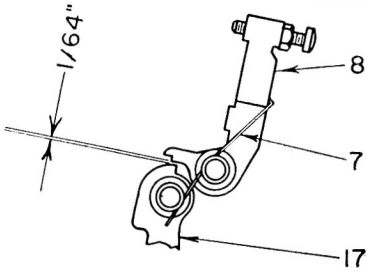


FIG. 12 ADJUSTMENT FOR TRIPPING

33. Apply force with pliers to bend ratchet arm stop bracket (4) away from reject button (80), until pickup arm (46) will rotate to a position allowing 12″ record to drop without interference. Fig. (2).

34 Check cabinet cutout for adequate clearance of ratchet arm (2). Fig. (2).

35. Check for worn roller tires (72). Fig. (3).
36. Remove friction spring washer (62) and replace with .010″ friction spring washer (62) or eliminate if necessary. Fig. (4).
37. With starting switch (24) "OFF", trip mechanism and rotate turntable (11) by hand. Check that lead roller assembly and return roller assembly Fig. (3) drops into turntable spiral (85) Fig. (4) without touching flange of turntable spiral. Check for foreign matter which would prevent roller assembly from dropping full extent of travel.
38. Lubricate bearing for turntable collar (69). Fig. (4). Use very light machine oil, 3 in 1 or equivalent.
39. Check for foreign matter between turntable (11) and mechanism plate (1). Fig. (1).
40. Defective records.
41. Defective cartridge and amplifier circuit.

PARTS LIST

Instructions

When ordering parts for Model #10700 Record Changer, specify changer serial number, item number, part number, and description. When ordering motor parts be sure to specify the motor number stamped on each motor. Order special rivets from respective part numbers.

MILWAUKEE ERWOOD

Item No.	*Description*	*Part Number*
1.	Mechanism Plate	10701
2.	Ratchet Arm	10759
3.	Ratchet Extension Spring	10761
4.	Ratchet Arm Stop Bracket	10843
5.	Ratchet Dog	10760
6.	Ratchet Lever	10777
7.	Adjusting Stop Lever Spring	10783
8.	Adjusting Stop Lever	10780
9.	Kickoff Lever Arm Spring	10789
10.	Kickoff Lever Spring	10790
11.	Turntable	10702
12.	Reject Arm Tension Spring	10826
13.	Reject Arm Spring	10814
14.	Reject Arm	10812
15.	Kickoff Spring	10707
16.	Kickoff Lever	10786
17.	Kickoff Lever Arm	10785
18.	Dropping Lever	10731
19.	Locking Lever Spring	10795
20.	Drop Lever Torsion Spring	10734
21.	Locking Lever	10793
22.	Brake Spring	10741
23.	Motor	10825
24.	Motor Switch	10824
25.	Ratchet Arm Friction Spring	10791
26.	Swing Arm	10729
27.	Cam Lever Extension Spring	10774
28.	Cam Lever	10769
29.	Ratchet Arm Lever	10772
30.	Cam Trip Bracket	10811
31.	Change Lever	10767
32.	Cammed Dropping Lever	10730
33.	Cammed Dropping Lever Torsion Spring	10733
34.	Ejector Idler Lever	10813
35.	Record Ejector Lower Push Pin	10804
36.	Ejector Arm Extension Spring	10728
37.	Ejector Pin Guide	10724
38.	Ratchet Arm Extension Spring	10775
39.	Change Lever Plate	10768

Item No.	*Description*	*Part Number*
40.	Arm Cam	10737
41.	Fulcrum Bearing Nut	10738
42.	Change Lever Fulcrum Pin	10773
43.	Pickup Cartridge	10753
44.	Spring for Pickup Arm Balance	10764
45.	Ratchet for Pickup Arm Balance	10766
46.	Pickup Arm	10752
47.	Pickup Arm Swing Post	10755
48.	5/8"-18 Light Jam Nut	10835
49.	Pickup Arm Stationary Post	10756
50.	Adjusting Plunger Pin	10757
51.	Finger Lever for Ejector	10718
52.	Lever Pivot	10719
53.	Ejector Box	10708
54.	Finger	10717
55.	Finger Torsion Spring	10721
56.	Balance Arm	10712
57.	10"Record Support	10713
58.	Pusher Pin for 10" Ejector	10714
59.	Ejector Compression Spring	10715
60.	Change Lever—Ejector	10722
61.	Pressure Spring—Ejector	10720
62.	Friction Spring Washer	10823
63.	Inner Spiral & Cam	10703
64.	Mechanism Plate Center Stud	10821
65.	Center Stud Taper Pin	10822
66.	Center Post	10820
67.	Reinforcement Washer for Center Stud	10828
68.	Turntable Collar	10705
69.	Bearing for Turntable Collar	10706
70.	Swing Arm Clamp	10745
71.	Roller Pin Assembly	10743
72.	Roller Tire	10748
73.	Bearing Pin Shoulder Nut	10742
74.	Compression Spring for Arm	10750
75.	Bearing Pin Spacer	10751
76.	Roller Cushion Washer	10744
77.	Washer for Bearing Pin	10801
78.	Swing Arm Slide Washer	10747
79.	Pickup Arm Rest	10803
80.	Reject Button	10816
81.	Center Post Dog	10802
82.	Motor Idler Pulley	10825
83.	Motor Spring	10825
84.	Motor Shaft	10825
85.	Turntable Outer Spiral	10704