

IBM

**OPD CUSTOMER ENGINEERING
I/O Reference Manual
Section 3**

Reprinted July, 1966

F/N 241-5310-0

All rights to reproduce this material are reserved by IBM.

REMOVAL SECTION 3

	Page
Cycle Clutch & Cycle Shaft Removal.....	1
Belt Replacement	2
Rotate Spring Replacement	4
Lower Ball Socket & Tilt Ring Removal.....	5
Rotate Tape Replacement.....	5
Tilt Tape Replacement	6
Rotate Selection Differential Removal	6
Tilt Selection Differential Removal.....	8
Differential Plate Removal	8
Selector Bail Removal.....	10
Print Magnet Assembly Removal	11
Latch Pusher Removal.....	11
Shift Magnet Assembly Removal	11
Backspace Rack Removal	12
Shift Arm Removal	12
Operational Cam Check Pawl	12
Escapement Cam Follower Removal	12
Operational Cam Follower Removal	13
Operational Contact Removal	13
Operational Magnet Assembly Removal	13
Operational Latch Bracket Removal.....	14
Shift Cam Removal	14
Operational Shaft Removal	15
Operational Interposer Bracket Removal	15
Carrier Shoe Removal.....	15
Interposer Removal	16
Carrier and Rocker Removal	17
Cycle Clutch Pulley Removal	18
Cycle Clutch Pulley Removal, Late	18
Cord Replacement.....	18
Cord Adjustment.....	18

CYCLE CLUTCH AND CYCLE SHAFT REMOVAL

1. Remove the covers and ring mount (not shown).
2. Position the carrier to the extreme right.
3. Remove the degree wheel pointer (#1, Figure 1).
4. Remove the degree wheel (#2, Figure 1).
5. Remove the gear guard (#3, Figure 1).
6. Remove the left dust cover (not shown).
7. Remove the two screws (#1, Figure 2) that hold the contact plate to the frame. Remove the contact assembly and hold it to the front with a rubber band.
8. Remove the two pivot screws (#1, Figure 3).
9. Remove the front screw from the C1 - C2 contact assembly (#1, Figure 4) and swing the assembly down out of the way of the bearing plate.
10. Remove the cycle-clutch check pawl and spring (#1, Figure 5).
11. Remove the bronze intermediate gear (#3, Figure 4).
12. Remove the three bearing-plate screws (#2, Figure 4).
13. Remove the C1 - C2 cams (#4, Figure 4) and the cycle shaft gear (behind the C1 - C2 cams).
14. Remove the bearing plate (#5, Figure 4) by prying it away from the frame (front end first) with a screwdriver and sliding it off the cycle shaft.
15. Force the positive bail down with a screwdriver (#2, Figure 5), making sure all the latches are under the bail. Insert a bristol wrench through the lower left bearing plate mounting hole (#2, Figure 4) over the top of the bail to hold it down.
NOTE: Do not remove the positive bail restoring spring.
16. Remove the cycle shaft, pushing the Negative 5 and Rotate 2 links out of the way with a spring hook pusher end. The pusher-restoring-bail arms will easily bend to the left to allow removal.
17. Remove the shims from the old shaft and put them on the new one. Be sure the flexible nylon shim is the first one put on.

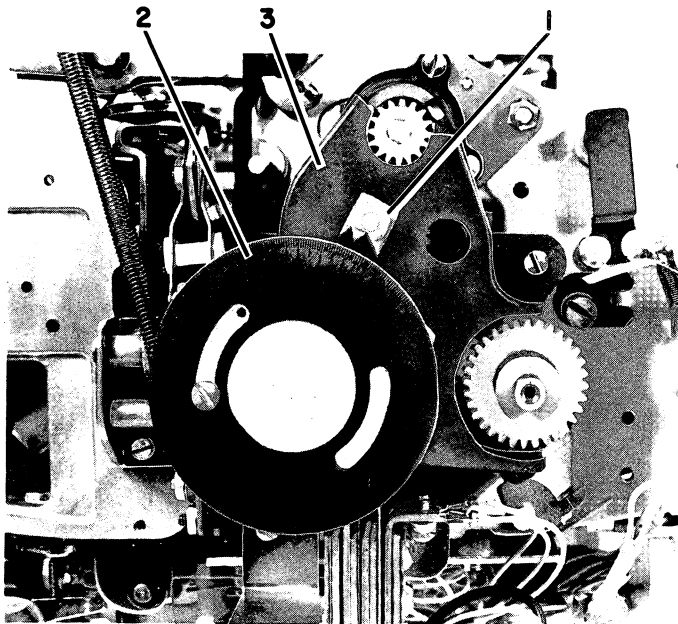


Figure 1. Cycle Clutch and Cycle Shaft Removal

18. The following adjustments should be checked after the cycle-shaft is replaced:
 - a. Idler Gears
 - b. Cycle Shaft End Play
 - c. Cycle-Clutch Spring
 - d. Cycle-Clutch Latch Bite
 - e. Damper Spring
 - f. Filter Shaft Timing
 - g. Print Shaft Timing
 - h. C1 and C2 Contact Timing

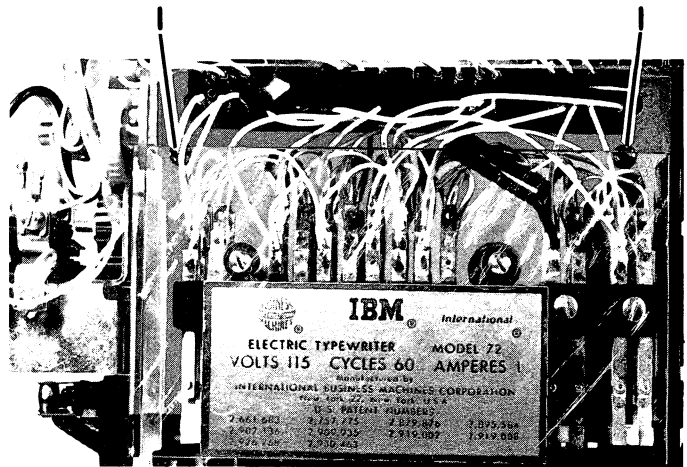


Figure 2. Cycle Clutch and Cycle Shaft Removal

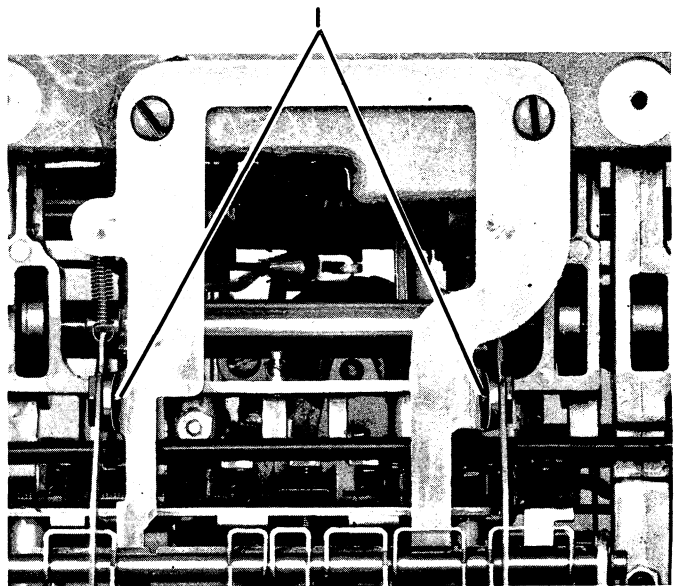


Figure 3. Cycle Clutch and Cycle Shaft Removal

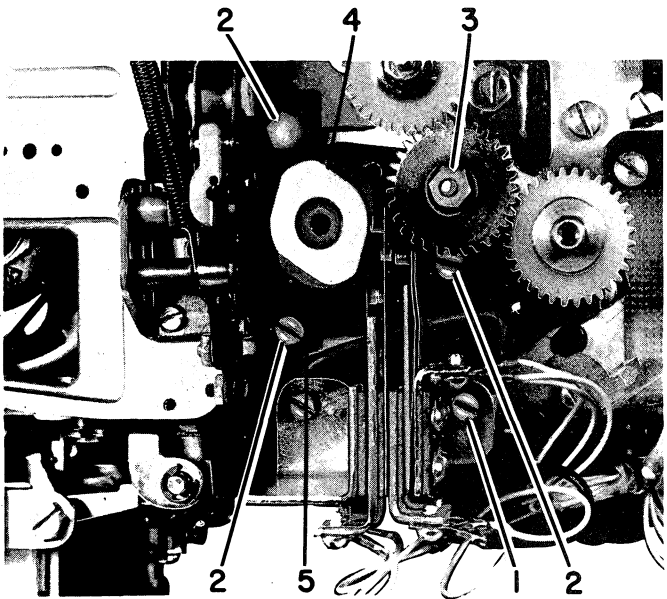


Figure 4. Cycle Clutch and Cycle Shaft Removal

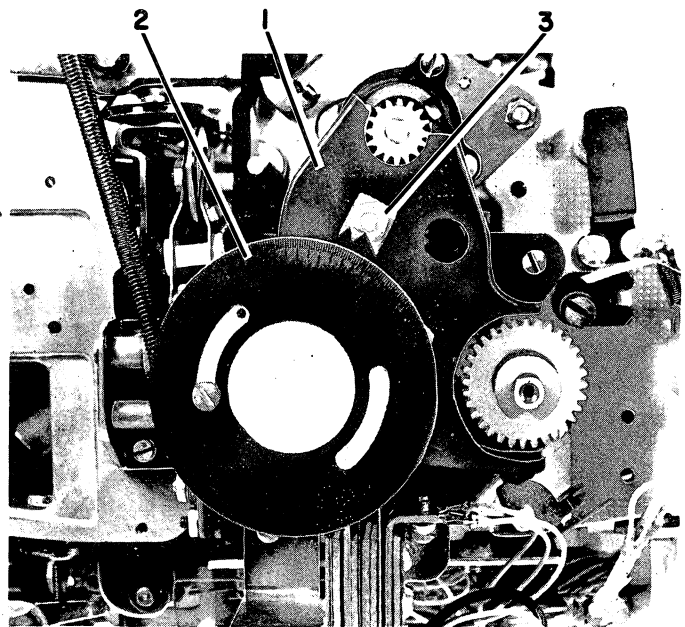


Figure 6. Belt Replacement

BELT REPLACEMENT

1. Position the carrier to the extreme right.
2. Remove the degree-wheel pointer (#3, Figure 6).
3. Remove the degree-wheel (#2, Figure 6).
4. Remove the gear guard (#1, Figure 6).
5. Remove the left dust cover (not shown).
6. Remove the two screws (#1, Figure 7) that hold the plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.

7. Remove the cycle-clutch check pawl and spring (#1, Figure 8).
8. Remove the front screw from the C1 and C2 contact assembly (#1, Figure 9) and swing the assembly down.
9. Remove the bronze intermediate gear (#3, Figure 9).
10. Remove the three bearing plate screws (#2, Figure 9) and remove the bearing plate.
11. Cut the old belt and remove it from the machine.
12. Force the positive bail down with a screwdriver (#1, Fig-

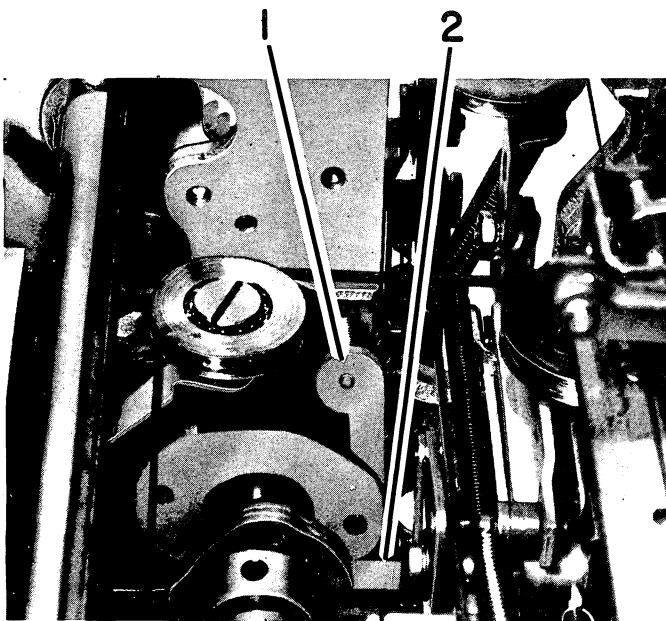


Figure 5. Cycle Clutch and Cycle Shaft Removal

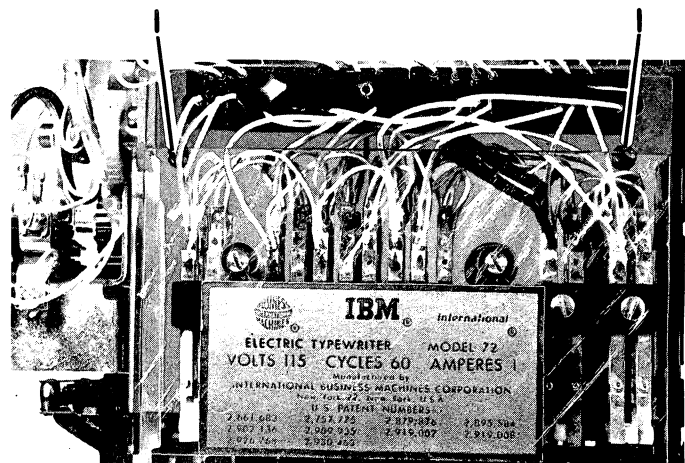


Figure 7. Belt Replacement

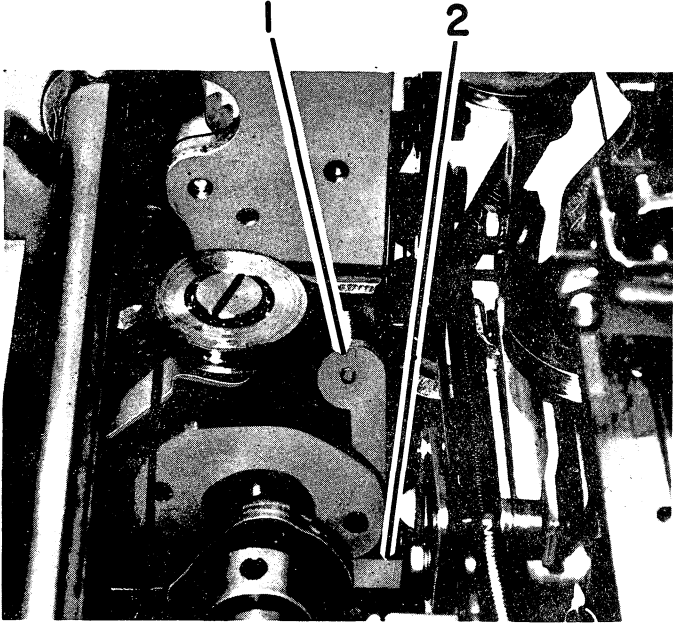


Figure 8. Belt Replacement

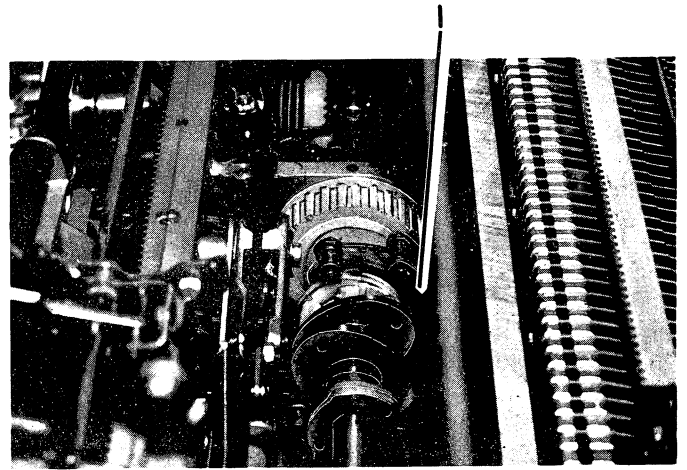


Figure 10. Belt Replacement

ure 11) making sure all the latches are under the bail. Insert a bristol wrench through the lower left bearing plate mounting hole over the top of the bail to hold it down.

13. Loosen the two cycle-clutch latch-bracket mounting screws (#1, Figure 10). Slip the new belt through the bearing plate hole, around the shaft, and over across the cycle shaft to the cycle-clutch latch (Figure 11). Work it between the latch and the cycle-clutch sleeve.
14. Loosen the motor mount and slip the belt over the cen-

trifugal clutch.

15. The following adjustments should be checked after the belt is replaced:
 - a. Idler gears
 - b. Damper spring
 - c. Filter shaft timing
 - d. Print shaft timing
 - e. C1 and C2 contact timing
 - f. Cycle clutch latch bracket height

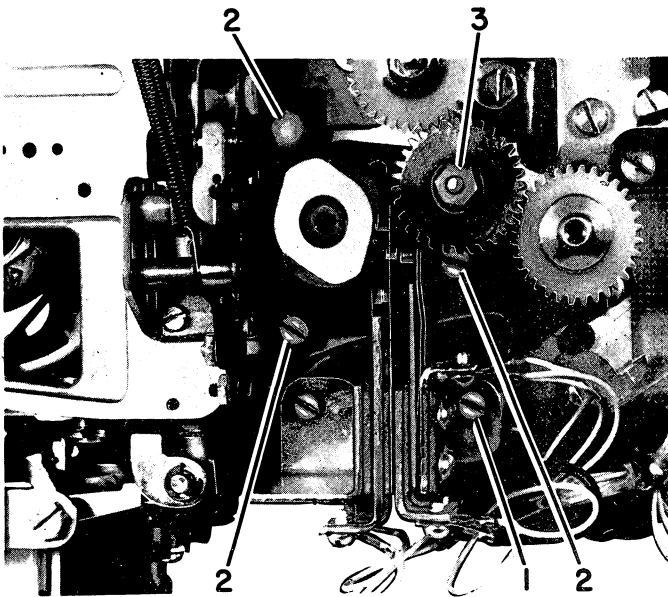


Figure 9. Belt Replacement

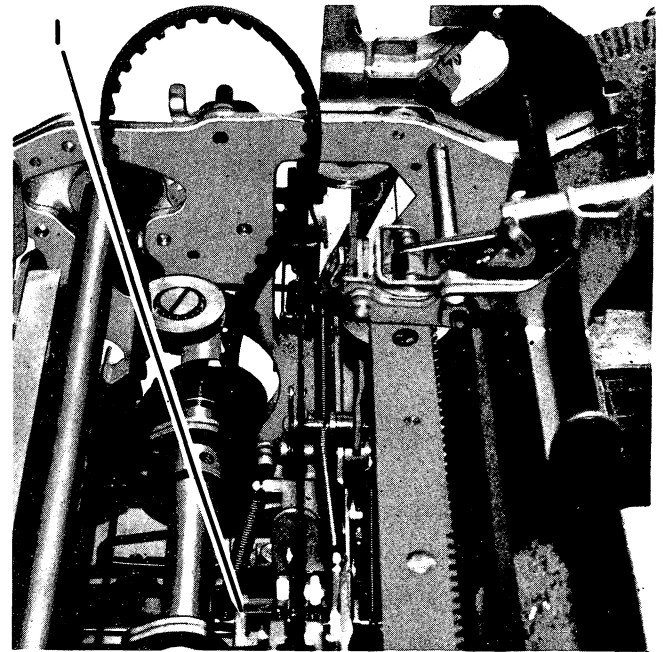


Figure 11. Belt Replacement

ROTATE SPRING REPLACEMENT

1. Remove the left dust cover.
2. Remove the ribbon cartridge.
3. Center the carrier over the camshaft.
4. Remove the two screws (#1, Figure 12) that hold the contact plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.
5. Remove the two nuts (#1, Figure 13), one on newer machines, immediately to the right of the yoke on the carrier, remove the black clip from under the nut (#2, Figure 13) and gradually remove the tension from the rotate spring.
6.
 - a. On older machines, back out the two screws (#1, Figure 14) on the right 1/4" and remove the screw on the left, which is under the cycle shaft (#2, Figure 14).
 - b. On newer machines, remove the lower right and left screws and back out the upper right screw 1/4" (Figure 14).

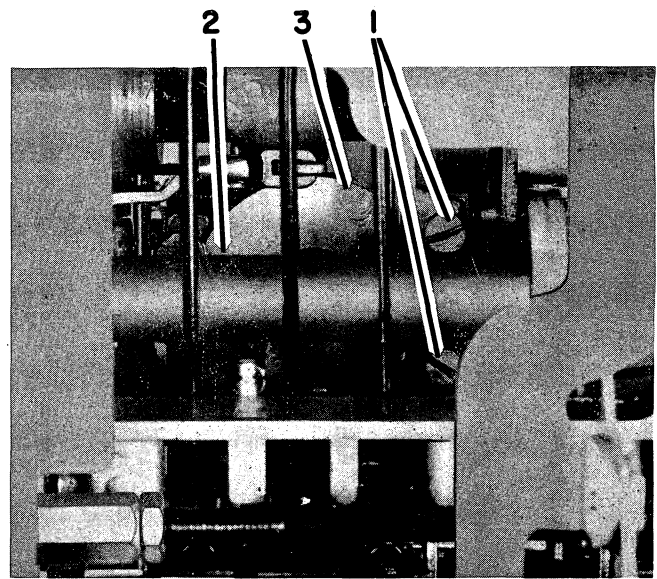


Figure 14. Rotate Spring Replacement

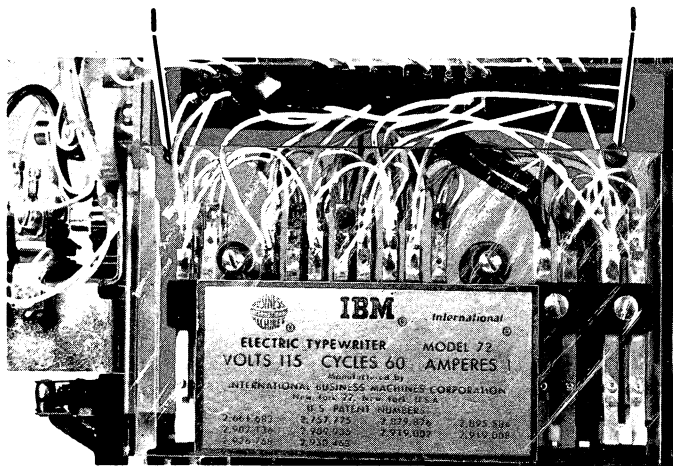


Figure 12. Rotate Spring Replacement

7. Remove the striker and rotate-spring retaining plate (#3, Figure 14). The rotate spring can now be removed.

NOTE: In newer machines there may be a spring clip (PN 1141238) that prevents the spring from being trapped in the pulley notch. If not, one should be added on re-assembly.
8. NOTE: On some machines it may be necessary to shim the retaining plate and striker because they will cause the new rotate spring to bind.
9. The following adjustments should be checked after the rotate-spring is replaced:
 - a. Rotate Spring Tension
 - b. Typehead Homing
 - c. Damper Spring

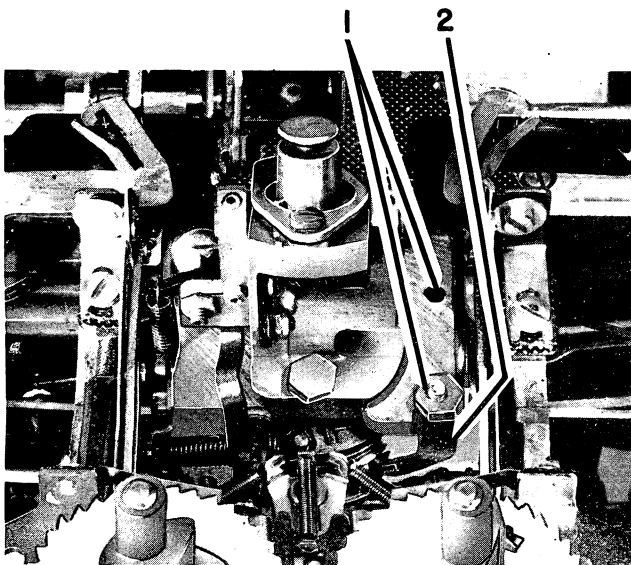


Figure 13. Rotate Spring Replacement

LOWER BALL SOCKET AND TILT RING REMOVAL

1. Remove the left dust cover and ribbon cartridge. Center the carrier over the cycle shaft.
2. Shift into upper case.
3. Remove the two screws (#1, Figure 12) that hold the print contact plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.
4. Half cycle a 0-rotate 1-tilt character. Note which position the tilt detent is in for replacement and be sure the machine is still in upper case.
5. Loosen the two set screws (#1, Figure 15).
6. Remove the two pivot pins (#2, Figure 15).
7. Remove the tilt ring (#3, Figure 15) and remove the ball joint.
8. Loosen the rotate pulley set screw (#1, Figure 16).
9. Use the butt end of a small spring hook as a follower to push out the lower ball socket (#2, Figure 16). **NOTE:** This prevents the wedge from being lost. When replacing the socket be sure the pin is pointing toward the front-left and right-rear corners.
10. The following adjustments should be checked after the lower ball socket and tilt ring is replaced.
 - a. Tilt Detenting
 - b. Typehead Homing
 - c. Tilt Ring
 - d. Upper Ball Socket

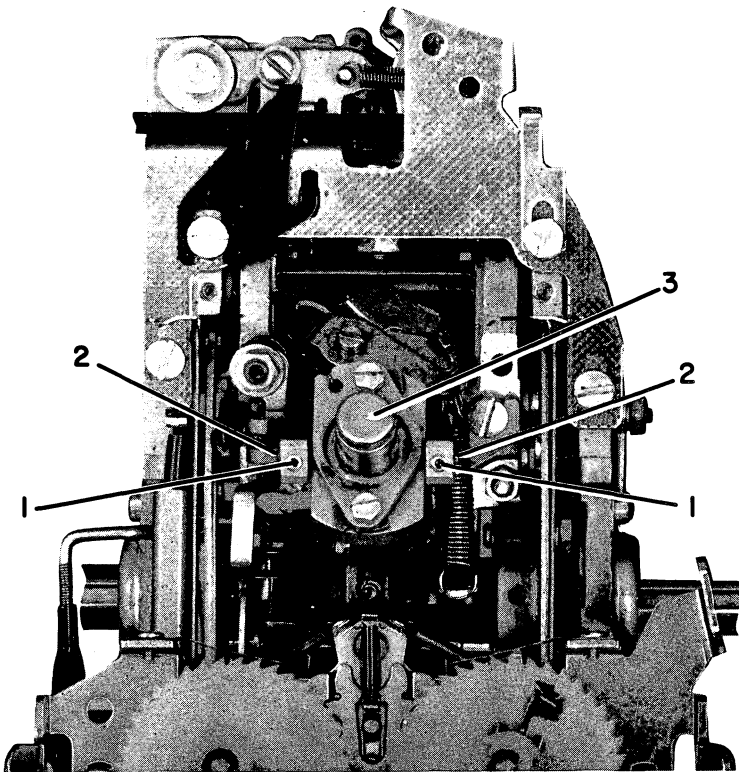


Figure 15. Lower Ball Socket and Tilt Ring Removal

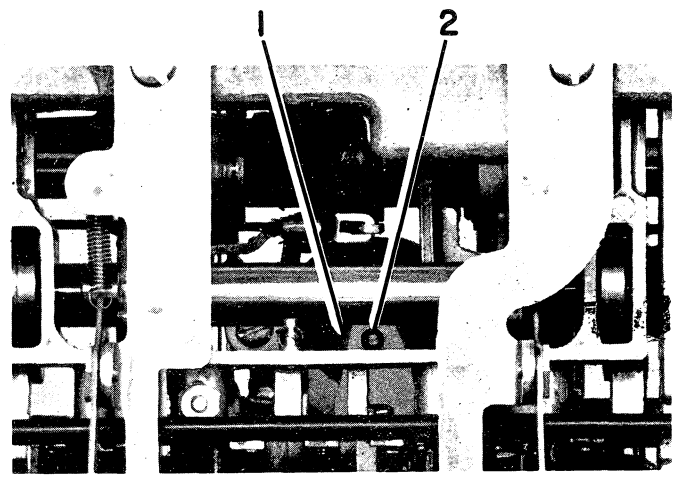


Figure 16. Lower Ball Socket and Tilt Ring Removal

ROTATE TAPE REPLACEMENT

1. Remove the left and right dust covers.
2. Position the carrier 3" from the left frame.
3. Remove the broken pieces of tape from the machine.
4. Pull the tilt ring toward the front of the machine and turn the rotate pulley until the T-slot is accessible (#1, Figure 17).
5. Insert the rotate tape, eyelet first (#2, Figure 17), between the rotate pulley and the right side of the yoke from beneath the ribbon mechanism.
6. Pull the tape through and insert the T-tip of the tape into the T-slot of the pulley (#1, Figure 18).
7. Thread the tape around the rotate-arm pulley, top to front, keeping it under the carrier-return cord, around the shift-arm pulley, and anchor it to the carrier.
8. Connect the tilt-pulley spring with the open end to the rear (#2, Figure 19).
9. Restore the 2 pounds of rotate-spring tension.
10. Check the typehead homing adjustment.

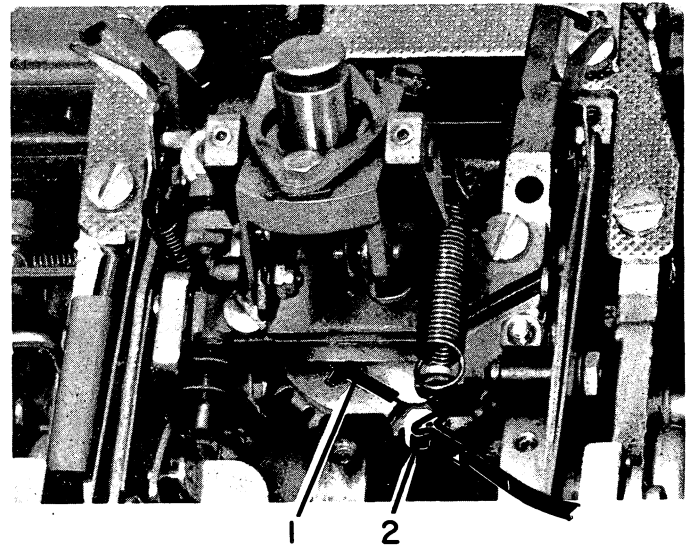


Figure 17. Rotate Tape Replacement

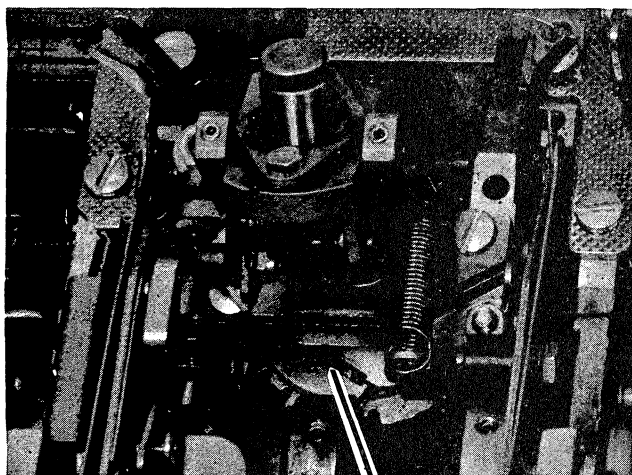


Figure 18. Rotate Tape Replacement

TILT TAPE REPLACEMENT

NOTE: Photos and procedures are for Gearless Tilt. Gear type may vary slightly.

1. Remove the left and right dust covers.
2. Position the carrier 3" from the left frame.
3. Half cycle a zero rotate, 0 Tilt character (to lock rotate spring tension).
4. Remove the broken pieces of tape from the machine.
5. Place the eyelet on the tilt pulley bellcrank (#1, Figure 19).
6. Thread the tape around the left tilt-arm pulley, right tilt-arm pulley, and take up the slack in the tape.
7. Withdraw the rotate detent, turn the head counterclockwise to relieve the rotate-tape tension, tilt the head to the front, and restore the detent.
8. Remove the tape retaining pin from the carrier and insert the tilt tape, keeping it on top of the rotate tape.
9. Restore the typehead to the rest position.
10. Check the tilt detent adjustment. (R.H. Tilt Pulley)

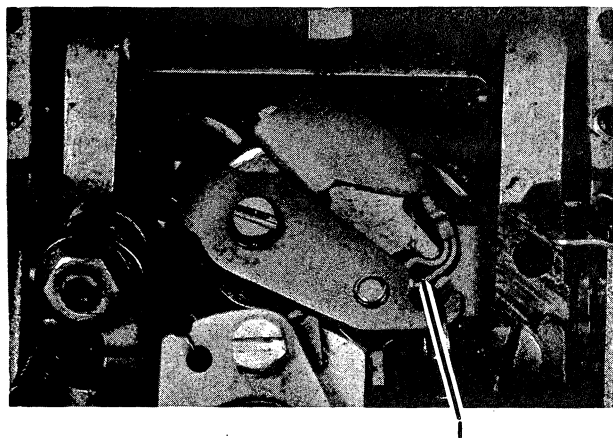


Figure 19. Tilt Tape Replacement

ROTATE SELECTION DIFFERENTIAL REMOVAL

1. Position the carrier to the extreme right.
2. Remove the left dust cover, platen, feed rolls, and paper deflector.
3. Remove the two screws (#1, Figure 21) that hold the plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.
4. Disconnect the clevises and remove them from the links (#2, Figure 20).
5. Remove the springs from the rotate interposers (#1, Figure 20).
6. Disconnect the rotate link at both ends and remove it (#1, Figure 22).
7. Remove the latch-bail spring (#2, Figure 22).
8. Remove the motor.
9. Remove the rotate-latch springs (#1, Figure 23).
10. Pull out the rotate links (#2, Figure 23).
11. Remove the check-latch spring (#3, Figure 23).
12. Remove the guide-bracket mounting stud and screw (#4, Figure 23).
13. Remove the balance-arm mounting stud (#1, Figure 24).
14. Disconnect the minus-five bail drive link from the right end of the balance arm (#2, Figure 24).
15. Disconnect the tilt-differential spring (#3, Figure 24).
16. Rotate the cycle shaft until the cam followers are on the low points of the cams.
17. Remove the rotate-differential assembly.
18. The following adjustments should be checked after the rotate-selection-differential assembly is replaced:
 - a. Typehead Homing
 - b. Rotate Latch Clearance
 - c. Rotate Differential Guides

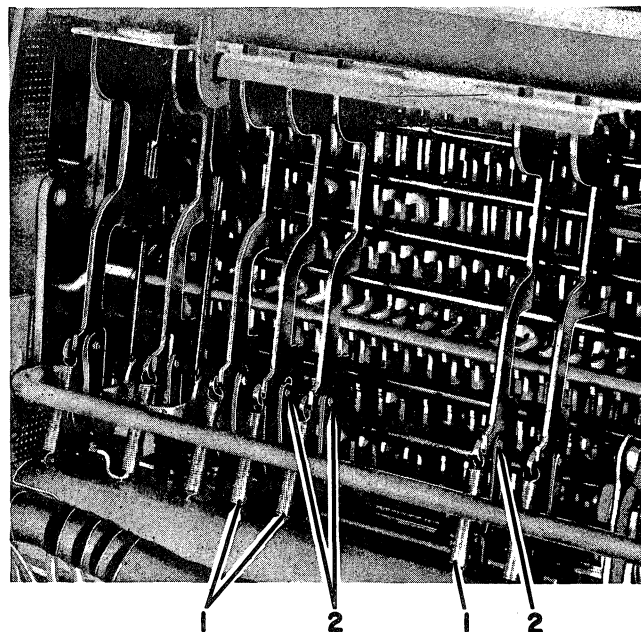


Figure 20. Rotate Selection Differential Removal

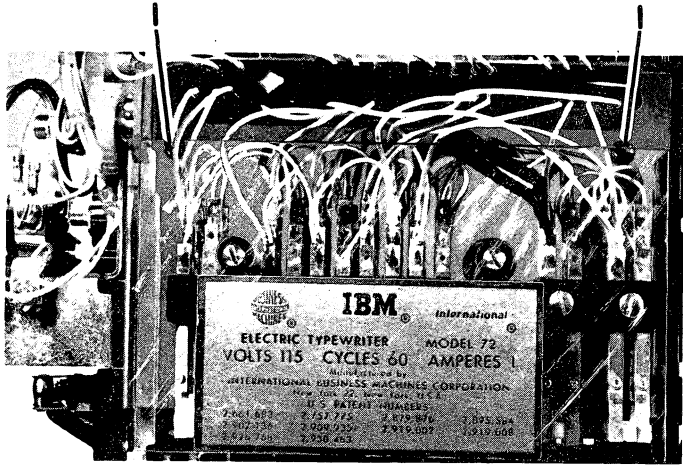


Figure 21. Rotate Selection Differential Removal

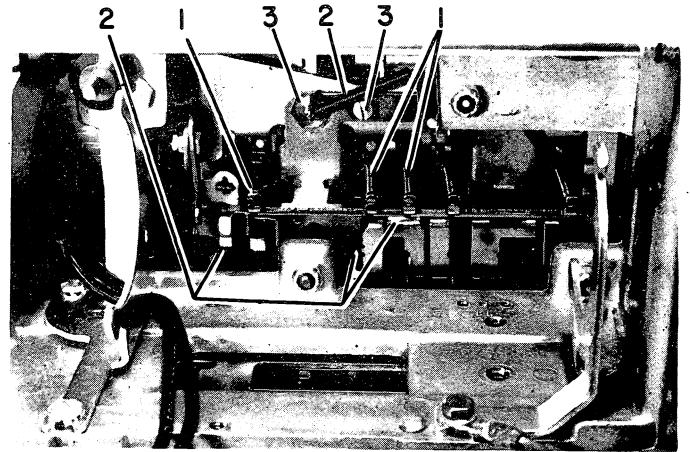


Figure 23. Rotate Selection Differential Removal.

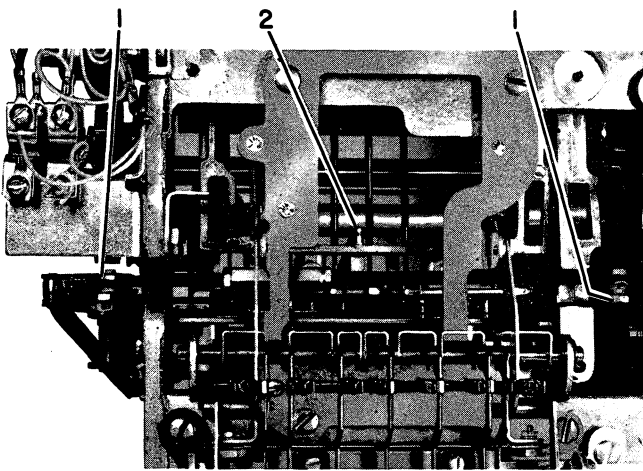


Figure 22. Rotate Selection Differential Removal

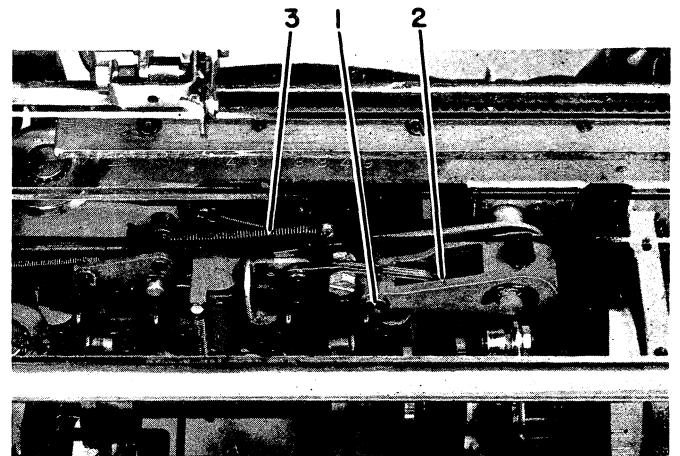


Figure 24. Rotate Selection Differential Removal

TILT SELECTION DIFFERENTIAL REMOVAL

1. Position the carrier to the extreme right.
2. Remove the left dust cover, platen, feed rolls, and paper deflector.
3. Remove the springs from the tilt interposers (#1, Figure 25).
4. Disconnect the clevises and remove them from the links (#2, Figure 25).
5. Remove the motor.
6. Remove the tilt-latch springs (#1, Figure 26).
7. Remove the tilt links (#2, Figure 26).
8. Remove the positive bail spring (#1, Figure 27).
9. Remove the tilt-differential spring (#2, Figure 27).
10. Remove the rotate-arm spring (#3, Figure 27).
11. Remove the two C-clips and remove the tilt-differential assembly (#4, Figure 27).
12. The following adjustments should be checked after the tilt-differential assembly is replaced.
 - a. Tilt Detenting
 - b. Latch Clearance
 - c. Rotate Differential Guides

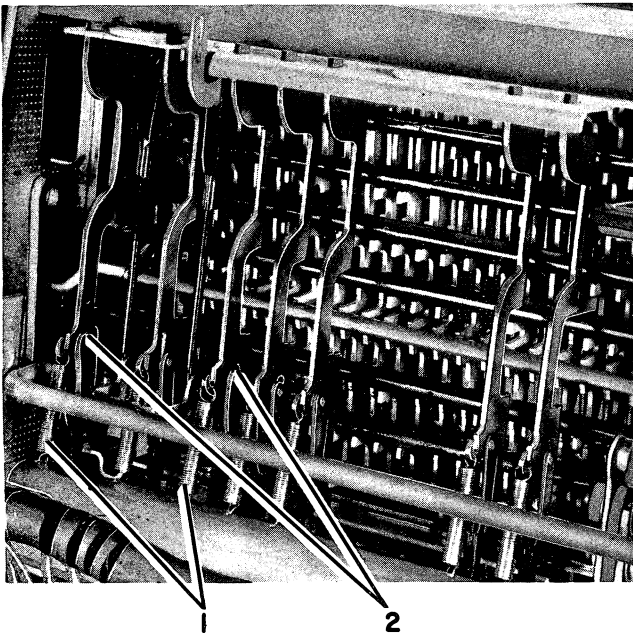


Figure 25. Tilt Selection Differential Removal

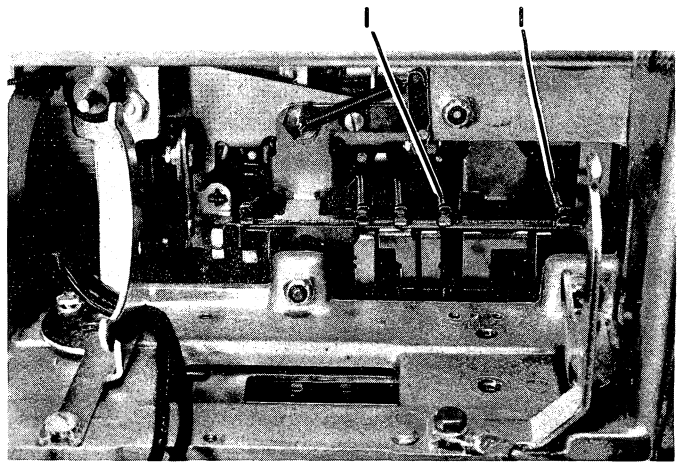


Figure 26. Tilt Selection Differential Removal

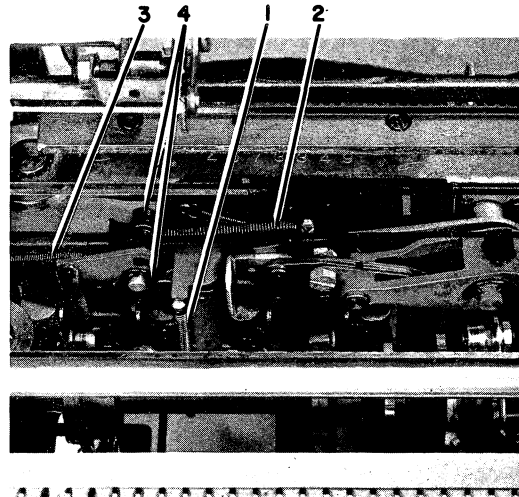


Figure 27. Tilt Selection Differential Removal

DIFFERENTIAL PLATE REMOVAL

1. Position the carrier to the extreme right.
2. Remove the left dust cover, platen, feed rolls, and paper deflector.
3. Remove all the springs from the interposers (#1, Figure 28).
4. Disconnect the clevises and remove them from the links (#2, Figure 28).
5. Remove the two screws (#1, Figure 29) that hold the contact plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.

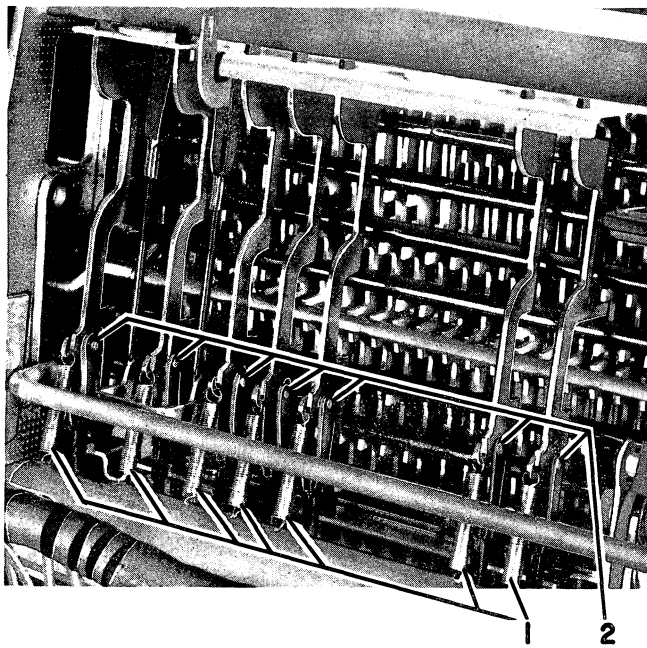


Figure 28. Differential Plate Removal

16. Complete the Cycle-Shaft Removal section.
17. Remove the cycle-clutch latch bracket (#1, Figure 32).
18. Remove the C-clip from the negative latch link (#2, Figure 32).
19. Remove the C-clip from the tilt-link stud (#3, Figure 32).
20. Remove the rotate-arm spring (#4, Figure 32).
21. Detach the check-latch clevis (#5, Figure 32).
22. Remove the differential-bracket assembly.
23. The following adjustments should be checked after the differential-plate is replaced.
 - a. Rotate Differential Guides
 - b. Tilt Differential Guides
 - c. Rotate Latch Clearance
 - d. Tilt Latch Clearance
 - e. Tilt Detenting
 - f. Typehead Homing

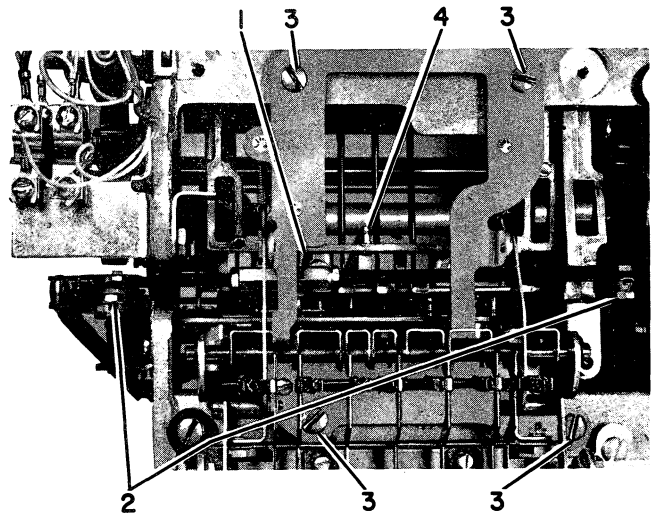


Figure 30. Differential Plate Removal

6. Unhook the check-latch-link spring (#1, Figure 30).
 7. Remove the rotate-arm link (#2, Figure 30).
 8. Scribe the position of the pusher-arm plate to the power frame and remove the four mounting screws (#3, Figure 30).
 9. Remove the positive bail spring (#4, Figure 30).
 10. Carefully remove the pusher-arm-plate assembly.
 11. Remove the motor.
 12. Remove all latch springs (#1, Figure 31).
 13. Remove all latch links (#2, Figure 31).
 14. Remove the left-hand motor mount (#3, Figure 31).
 15. Remove the four differential mounting nuts (#4, Figure 31).
- NOTE: Do not lose the wedge in the lower-left mounting stud.

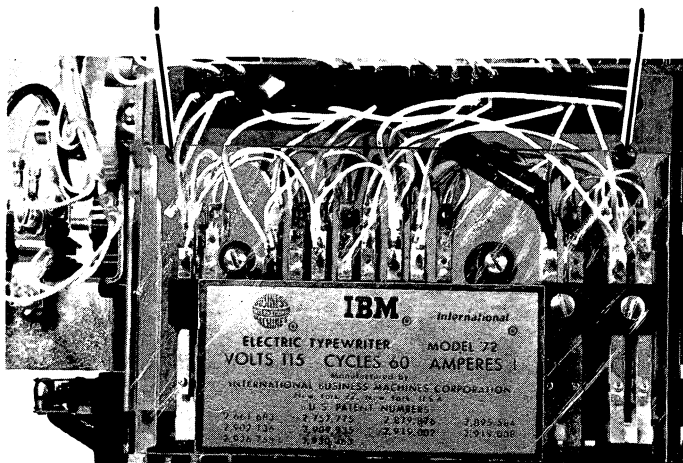


Figure 29. Differential Plate Removal

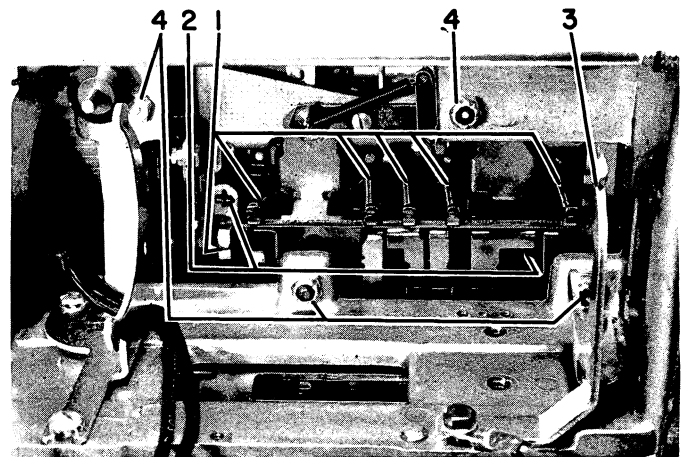


Figure 31. Differential Plate Removal

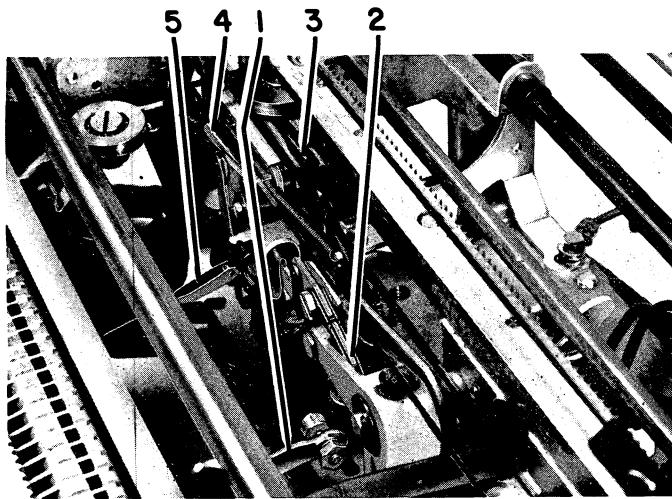


Figure 32. Differential Plate Removal

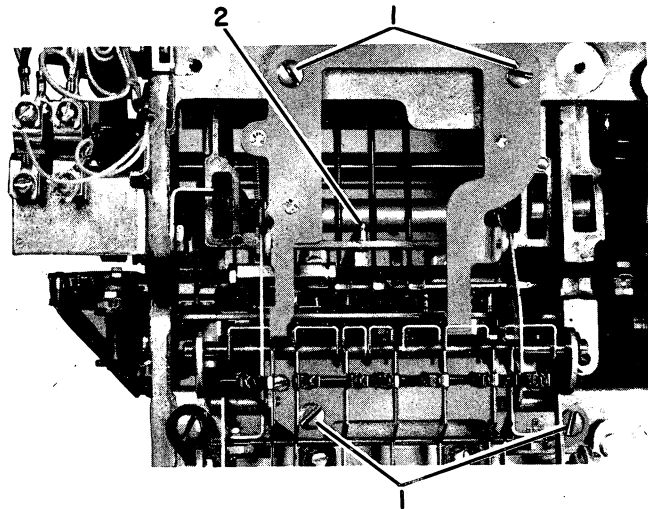


Figure 34. Selector Bail Removal

SELECTOR BAIL REMOVAL

1. Remove the two screws (#1, Figure 33) that hold the contact plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.
2. Scribe the power frame, remove the four mounting screws (#1, Figure 34), and carefully remove the pusher-arm assembly.
3. Remove the positive bail spring (#2, Figure 34) and pull the bail down.
4. Remove all the C-clips from the positive bail shaft (#1, Figure 35).
5. Swing the retainer (not shown) on the outside of the power frame out of the way and pull the bail shaft out.
6. Work the bail assembly out through the bottom of the machine.
7. The following adjustments should be checked after Selector-Bail is replaced.
 - a. Latch Clearance
 - b. Bail Down-Stop

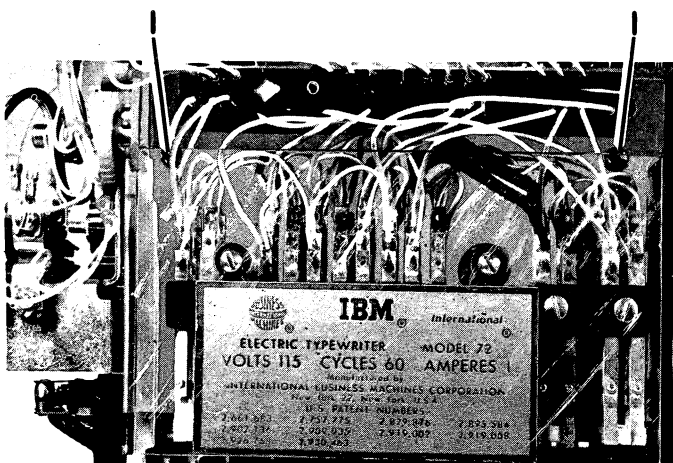


Figure 33. Selector Bail Removal

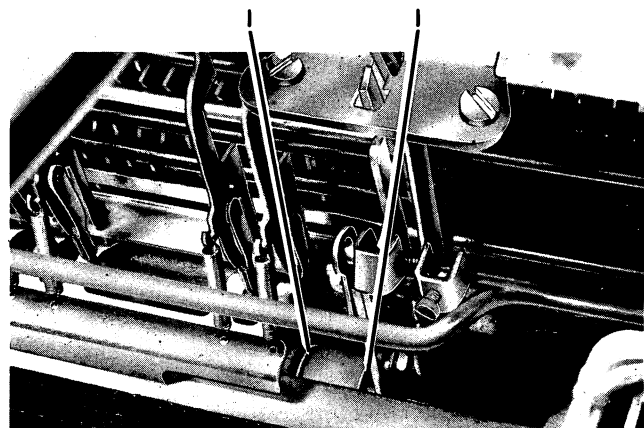


Figure 35. Selector Bail Removal

PRINT MAGNET ASSEMBLY REMOVAL

1. Disconnect the cycle-clutch trip link (#1, Figure 36).
2. Remove the support leg in the lower left corner (#2, Figure 36).
3. Remove the four mounting screws (#3, Figure 36).
4. Carefully remove the magnet assembly.

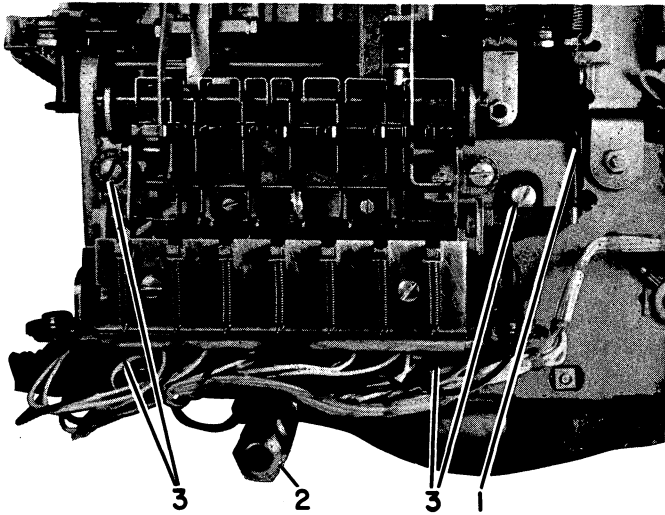


Figure 36. Print Magnet Assembly Removal

LATCH PUSHER REMOVAL

1. Remove the two screws (#1, Figure 37) that hold the contact plate to the frame. Remove the contact assembly, holding it to the front with a rubber band.
2. Disconnect the pusher springs (#1, Figure 38).
3. Remove the C-clip on the end of the shaft (#2, Figure 38) and remove the shaft until the desired pusher is free.
4. The following adjustments should be checked after a latch-pusher is replaced.
 - a. Latch to pusher clearance
 - b. Latch-pusher to armature clearance

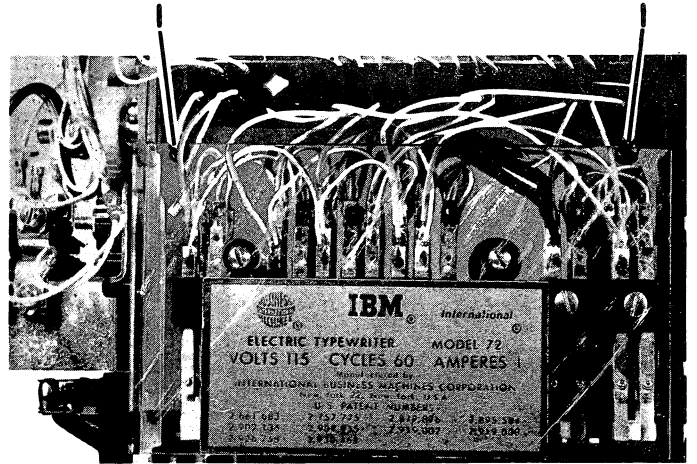


Figure 37. Latch Pusher Removal

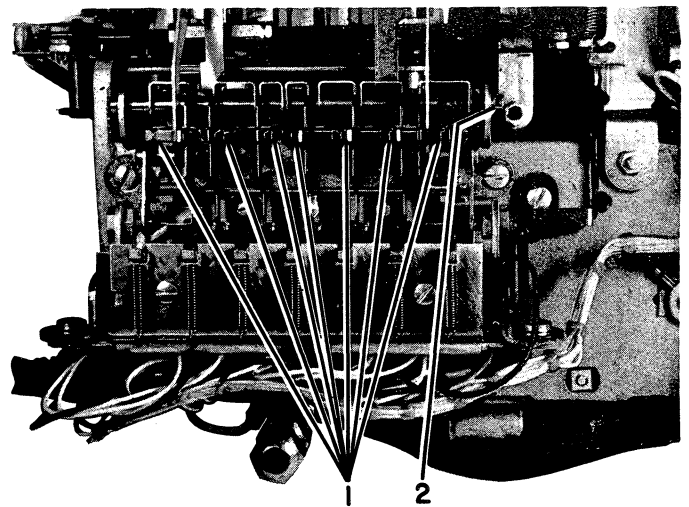


Figure 38. Latch Pusher Removal

SHIFT MAGNET ASSEMBLY REMOVAL

1. Remove the spring from the hold armature (#1, Figure 39).
2. Loosen the front mounting stud (#2, Figure 39).
3. Loosen the rear mounting screw (#3, Figure 39).
4. Slide the assembly forward and remove it.
5. The following adjustments should be checked after the shift magnet assembly is removed.
 - a. Shift-magnet assembly adjustments

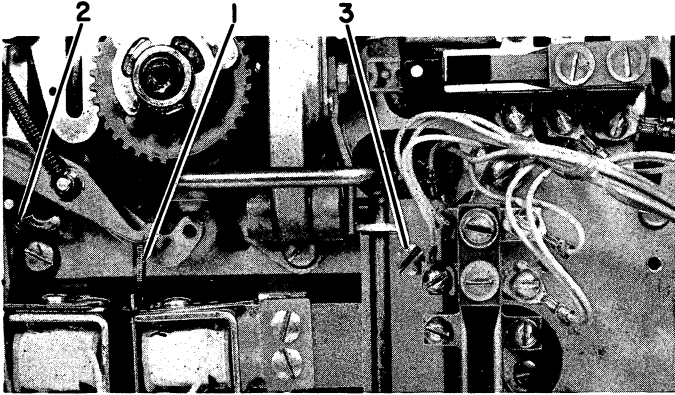


Figure 39. Shift Magnet Assembly Removal

SHIFT ARM REMOVAL

1. Position the carrier to the left and remove the right dust cover.
2. Remove the shift-contact assembly (#1, Figure 41).
3. Remove the shift-arm brace (#2, Figure 41).
4. Loosen the set screws that hold the shift-arm pivot (#3, Figure 41).
5. Rotate the head counterclockwise, remove the tape from the shift-arm pulley, and put it on the tilt pulley.
6. Remove the shift-arm pivot and arm.
7. The following adjustments should be checked after the shift-arm is replaced.
 - a. Typehead Homing
 - b. Shift Contact Adjustments

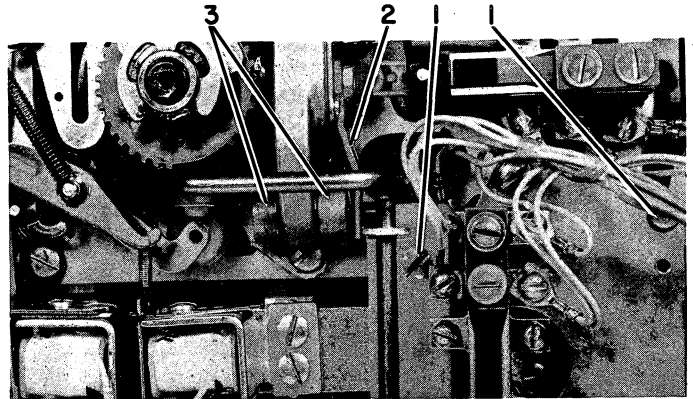


Figure 41. Shift Arm Removal

BACKSPACE RACK REMOVAL

1. Remove the motor.
2. Remove the backspace-rack spring (#1, Figure 40).
3. Remove the three backspace-rack mounting studs (#2, Figure 40), one of which is not shown, and remove the rack.
4. The following adjustments should be checked after the backspace rack is replaced.
 - a. Tab-Lever Stop
 - b. Backspace Rack
 - c. Intermediate Lever

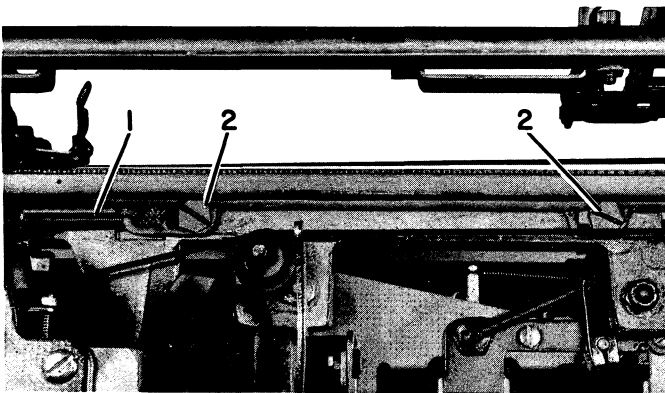


Figure 40. Backspace Rack Removal

OPERATIONAL CAM CHECK PAWL AND ESCAPEMENT CAM FOLLOWER REMOVAL

1. Position the carrier to the left and remove the right dust cover.
 2. Disconnect the escapement link (#1, Figure 42).
 3. Remove all C-clips from the check pawl shaft (#2, Figure 42).
 4. Slide the shaft to the left until the desired part is free.
- NOTE: Remove springs only as necessary.

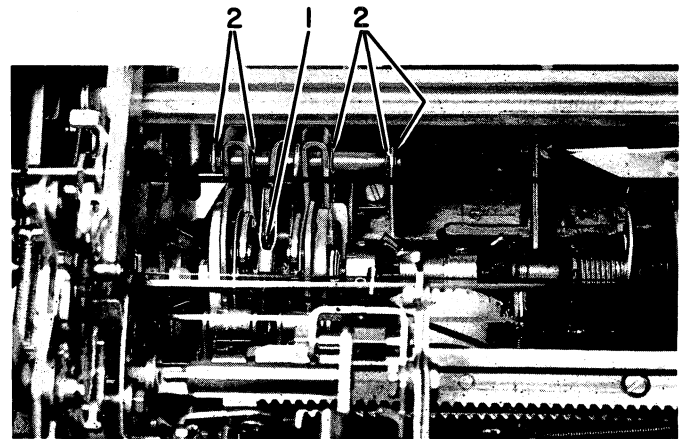


Figure 42. Operational Cam Check Pawl and Escapement Cam Follower Removal

OPERATIONAL CAM FOLLOWER REMOVAL

1. Remove the C-clips from the cam-follower pivot shaft (#1, Figure 43).
2. Remove the auxiliary cam-follower spring (#2, Figure 43).
3. Work the shaft to the right until the desired part is free.

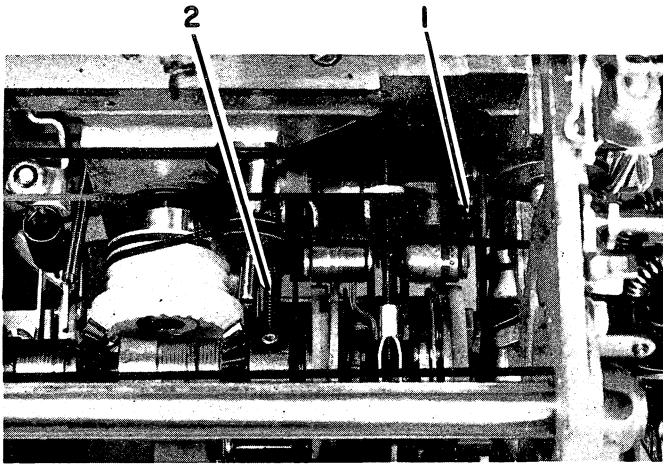


Figure 43. Operational Cam Follower Removal

OPERATIONAL MAGNET ASSEMBLY REMOVAL

1. Perform the Shift-Magnet-Assembly Removal.
2. Remove the actuator-arm spring (#1, Figure 45).
3. Remove the two mounting screws (#2, Figure 45).
4. Remove the actuator-arm pivot screw (#3, Figure 45).
5. Remove the armature-link clevises (#4, Figure 45).
6. Remove the mounting screw (#1, Figure 46).
7. Remove the nut (#2, Figure 46) and carefully remove the magnet assembly.

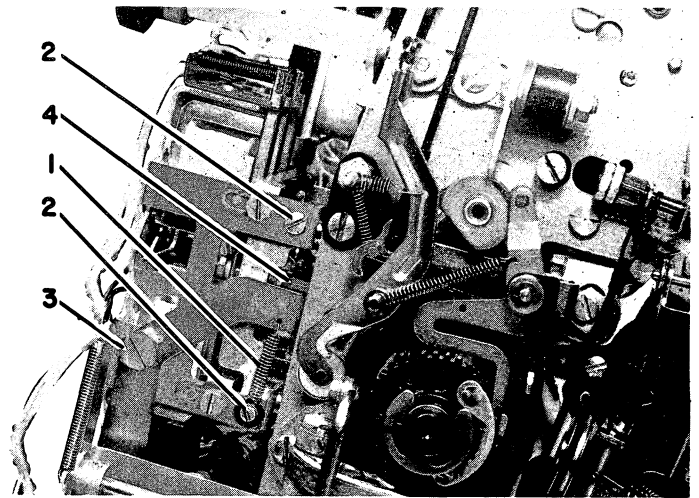


Figure 45. Operational Magnet Assembly Removal

OPERATIONAL CONTACT REMOVAL

1. Remove the right rear mounting leg (#1, Figure 44).
2. Remove the two mounting screws (#2, Figure 44) and remove the contact assembly.

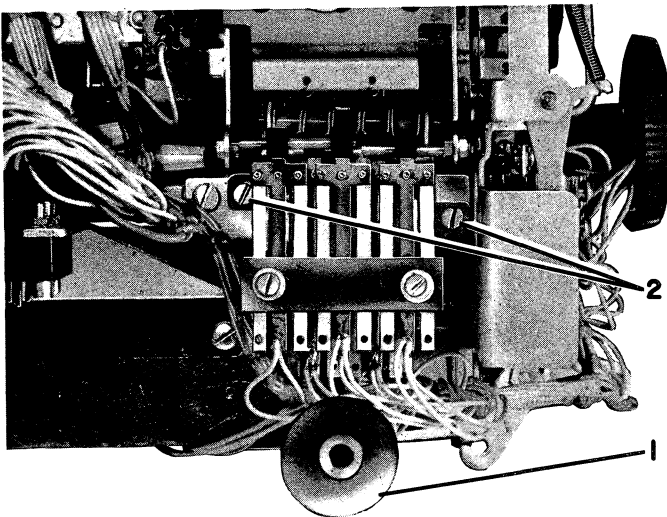


Figure 44. Operational Contact Removal

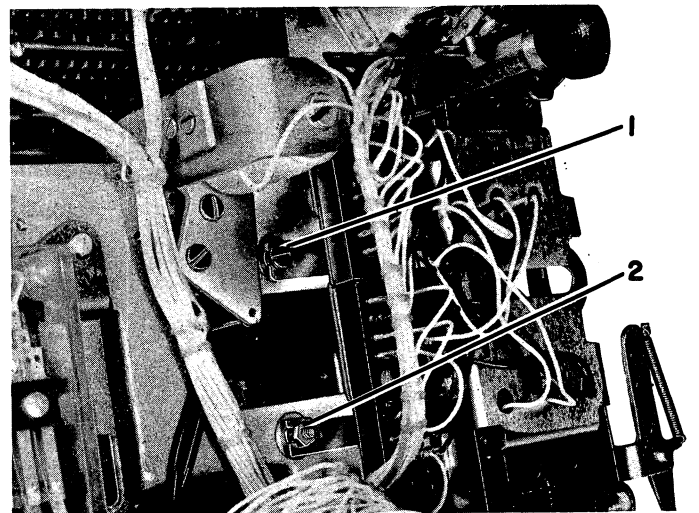


Figure 46. Operational Magnet Assembly Removal

OPERATIONAL LATCH BRACKET REMOVAL

1. Remove the feedback-contact-assembly bracket by loosening the two screws (#1, Figure 47).
2. Remove the mainspring and hub (#2, Figure 47).
CAUTION: Care must be used when unwinding and removing main spring.
3. Disconnect the backspace-latch spring (not shown).
4. Remove the back plate (#3, Figure 47).
5. Disconnect the backspace-rack spring (#1, Figure 48).
6. Disconnect the cam-follower spring (#2, Figure 48).
7. Disconnect the spacebar and tab-latch springs (#3, Figure 48).
8. Disconnect the tab-bellcrank link clevis (not shown).

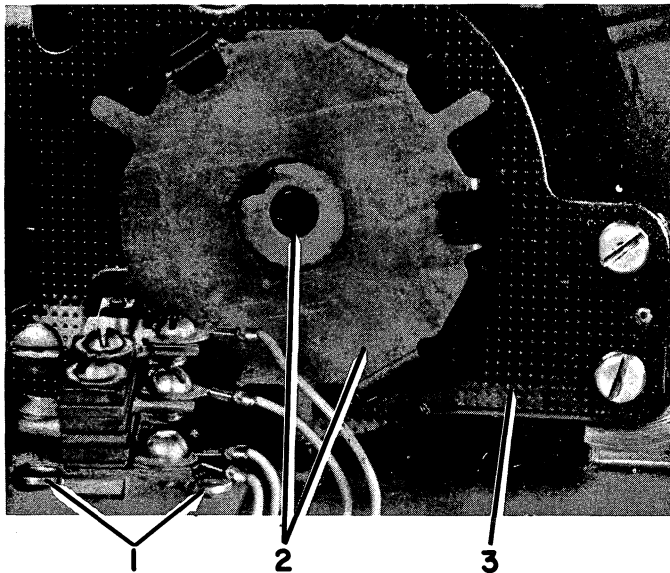


Figure 47. Operational Latch Bracket Removal

9. Disconnect the detent spring (#4, Figure 48).
10. Disconnect the carrier-return latch spring (#5, Figure 48).
11. Remove the index-selection link (#6, Figure 48).
12. Remove the carrier-return eccentric by removing the ec-

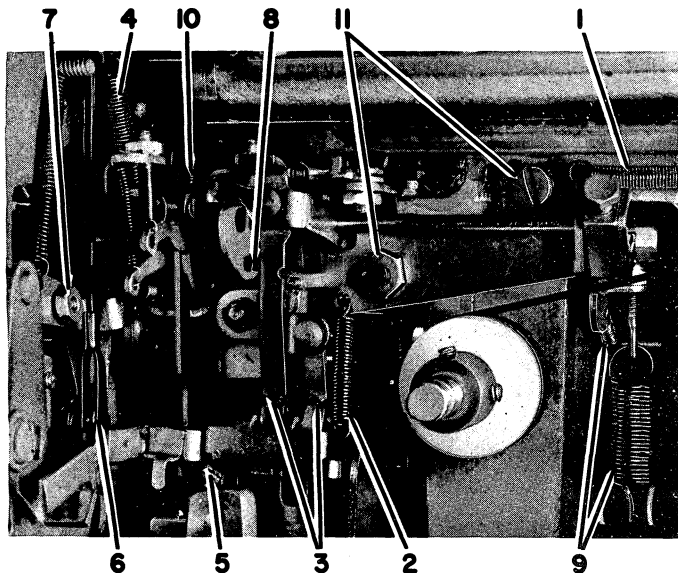


Figure 48. Operational Latch Bracket Removal

centric nut (#7, Figure 48).

13. Remove the escapement link (#8, Figure 48).
14. Disconnect the carrier-return actuating spring and carrier-return actuating-arm spring (#9, Figure 48).
15. Remove the escapement-torque-bar restoring spring (#10, Figure 48).
16. Remove the two mounting screws (the left one is not visible) and one nut (#11, Figure 48).
17. Work the operational-latch bracket out of the machine.
18. The following adjustments should be checked after the operational-latch-bracket is replaced.
 - a. C5 and C6 Timing
 - b. Mainspring Tension

SHIFT CAM REMOVAL

1. Turn the typehead counterclockwise and remove the relaxed rotate tape from the shift-arm pulley and put it around the tilt pulley.
2. Remove the lower-case armature spring (#1, Figure 49).
3. Remove the cam-follower spring (#2, Figure 49).
4. Loosen the set screws and remove the cam follower arm (#3, Figure 49).
5. Remove the three springs (#5, Figure 49).
6. Remove the interlock C-clip (#6, Figure 49).
7. Remove the detent (#7, Figure 49).
8. Remove the C-clip from the shaft and remove the ratchet (#8, Figure 49).
9. Disconnect the shift link (#9, Figure 49).
10. Remove the shift-release arm (#10, Figure 49).
11. Remove the shift-clutch spring (behind the ratchet).
NOTE: Observe the spring position for replacement.
12. Remove the shift arbor (#11, Figure 49). NOTE: Do not rotate the shaft backward.
13. Remove the shift cam (#12, Figure 49).
14. The following adjustments should be checked after the shift-cam is replaced.
 - a. All shift mechanism adjustments
 - b. Shift Magnet Assembly
 - c. Upper Case Typehead Homing

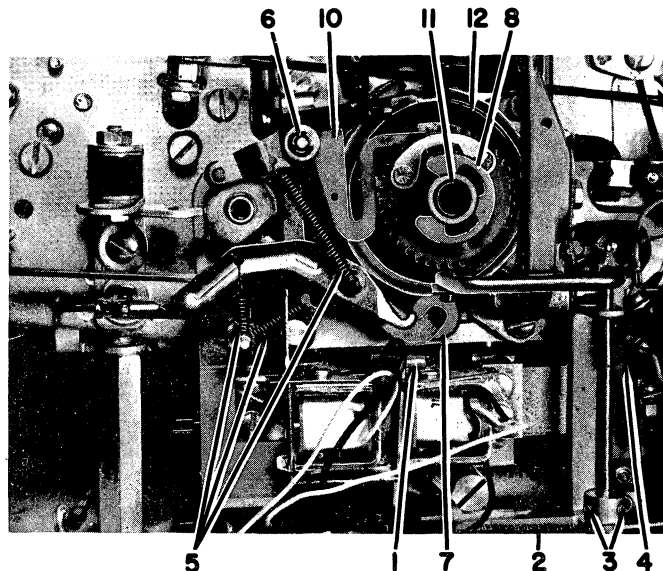
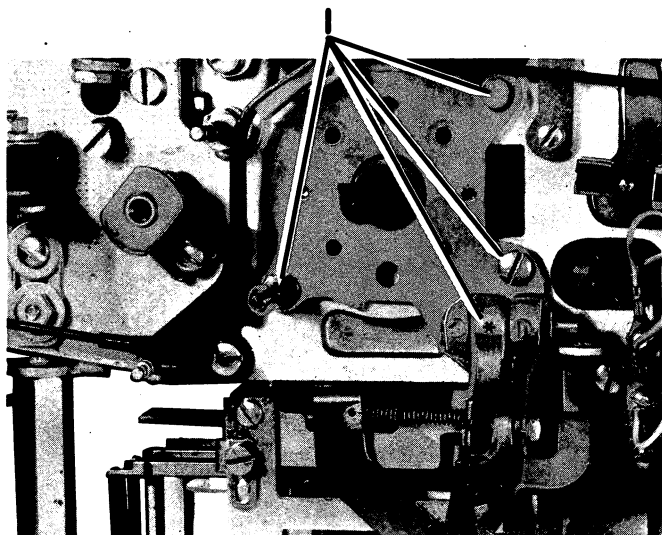


Figure 49. Shift Cam Removal

OPERATIONAL SHAFT REMOVAL

1. Complete the Shift-Cam Removal.
2. Remove the two lugs and two screws from the bearing mounting plate (#1, Figure 50) and slide the plate off.
3. Disconnect escapement link.
4. Work the operational shaft to the right until it clears the cycle clutch pulley hub, then lift shaft out the top.
5. The following adjustments should be checked after the operational shaft is replaced.
 - a. All Shift Mechanism Adjustments
 - b. Shift Magnet Assembly
 - c. Upper Case Typehead Homing
 - d. Gear Mesh



* Screw is hidden behind **SHIFT ARM**

Figure 50. Operational Shaft Removal

OPERATIONAL INTERPOSER BRACKET REMOVAL

1. Complete the Shift-Cam Removal.
2. Complete the Operational-Magnet Removal.
3. Complete the Operational-Shaft Removal.
4. Complete the Operational-Latch-Bracket Removal.
5. Remove the six (two shown) mounting screws (#1, Figure 51).
6. Remove the C5 Auxiliary Cam Follower.
7. Remove the key-lever pawl guides from the operational-interposer bracket (not shown).
8. Work bracket assembly out through rear of machine.
9. The following adjustments should be checked after the operational-interposer-bracket assembly is replaced.
 - a. All Shift Mechanism Adjustments
 - b. Shift Magnet Assembly
 - c. Upper Case Typehead Homing
 - d. Gear Mesh
 - e. Operational Latch Pivot Pin Eccentric
 - f. Escapement Trigger Guide
 - g. Mainspring Tension
 - h. Keylever Pawl to Interposer Clearance
 - i. Operational Latch Height
 - j. Backspace Rack
 - k. Pawl Clearance

- l. Clutch Latch Overthrow
- m. Carrier Return Actuating Arm
- n. Multiplying Control Lever

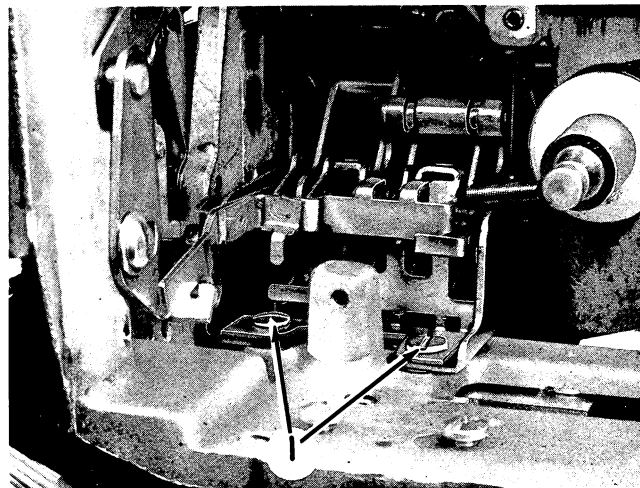


Figure 51. Operational Interposer Bracket Removal

CARRIER SHOE REMOVAL

1. Remove the two card-holder screws (#1, Figure 52).
2. Remove the two escapement-bracket screws (#2, Figure 52).
3. Work the carrier out from under the escapement bracket to the right.

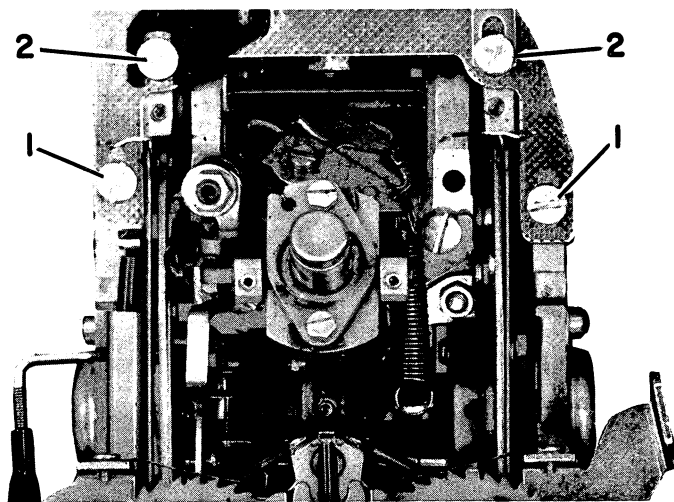


Figure 52. Carrier Shoe Removal

4. Remove the nut from the carrier-shoe stud and remove the shoe (#1, Figure 53).
5. The following adjustments should be checked after the carrier-shoe is replaced.
 - a. Carrier Shoe
 - b. Escapement Bracket

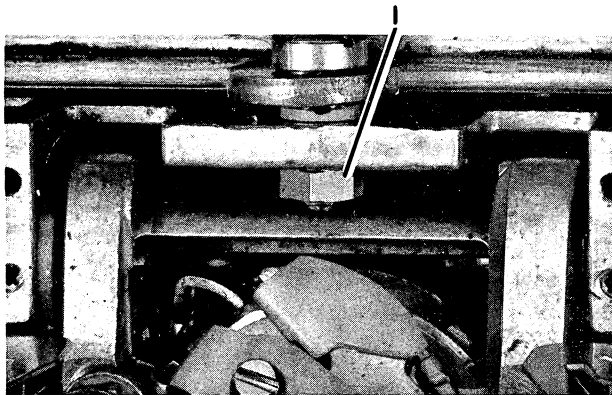


Figure 53. Carrier Shoe Removal

INTERPOSER REMOVAL

1. Align the carrier over the line lock interposer (#1, Figure 55).
2. Disconnect the operational keylever springs, carrier-return spring, and backspace spring (#2, Figure 55).
3. Remove keylever upstop (#4, Figure 55).
4. Remove the spacebar equalizing rod (#5, Figure 55).
5. Remove the bell bail lever (#6, Figure 55).
6. Remove the bell ringer bail (#7, Figure 55).
7. Remove the margin rack (#8, Figure 55).
8. Slip sound deadening over operational keybuttons (#9, Figure 55).

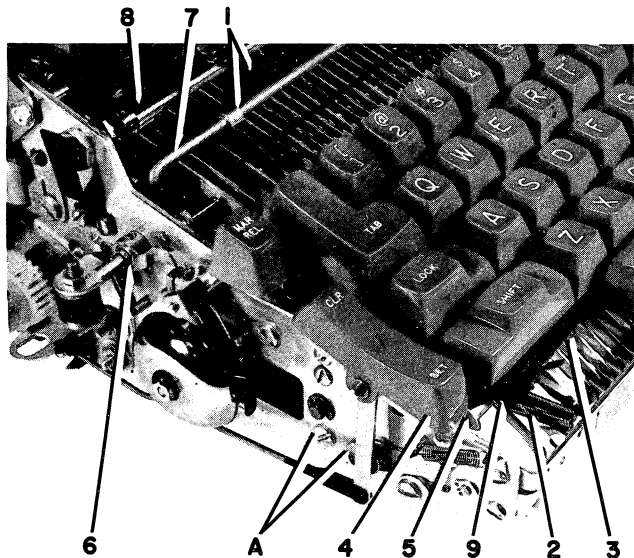


Figure 55. Interposer Removal

9. Push the fulcrum rod to the interposer being removed with a fulcrum rod tool (#1, Figure 56).
10. Remove the spring from the interposer being removed (#2, Figure 56).
11. To remove the line lock interposer, it is necessary to remove the screws marked "A" on Figure 55 and pull the interposer guide comb support forward (not shown).
12. The following adjustments should be checked after the interposer is replaced.
 - a. Keylever Guide
 - b. Bell Ringer Bail Lever

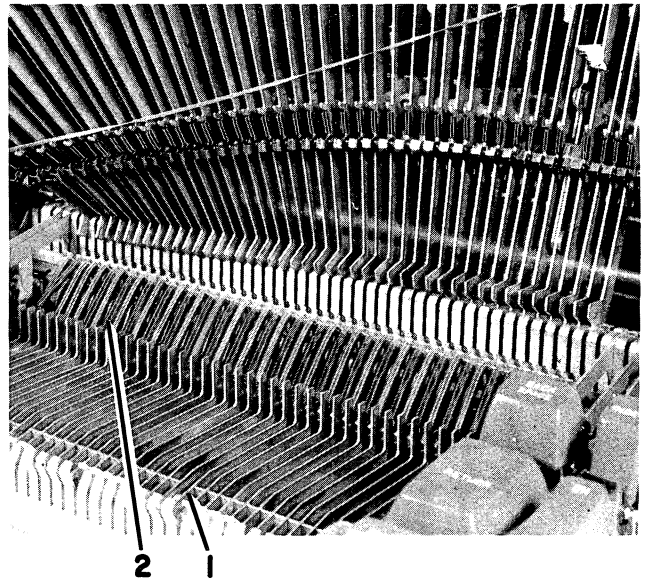


Figure 56. Interposer Removal

CARRIER AND ROCKER REMOVAL

1. Remove mounting screws (#1, Figure 57).
2. Remove card holders (#1, Figure 58).
3. Disconnect ribbon lift spring (#3, Figure 58).
4. Release rotate spring tension (#4, Figure 58).
5. Remove tilt pulley spring (#5, Figure 58).
6. Remove tape anchor screw (#6, Figure 58).
7. Remove tapes (#7, Figure 58).
8. Remove tape wiper (#8, Figure 58) if present.

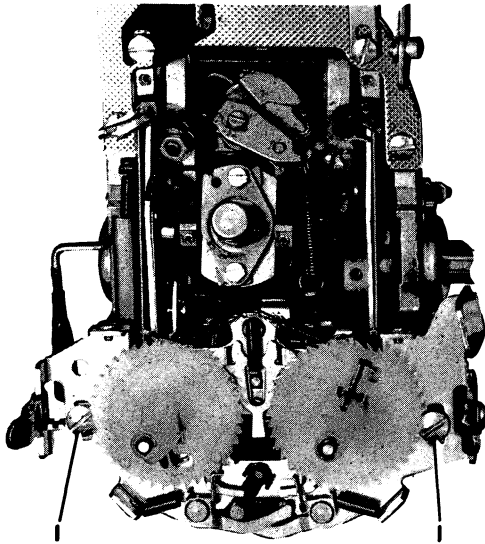


Figure 57. Carrier and Rocker Removal

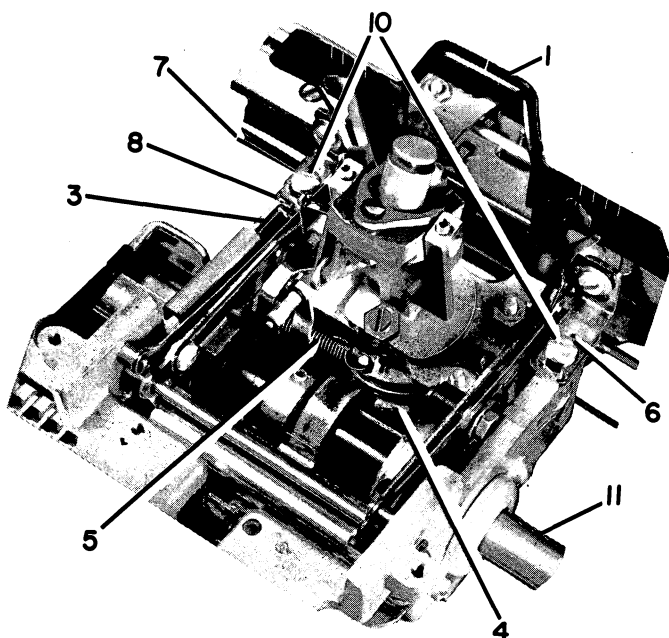


Figure 58. Carrier and Rocker Removal

9. Remove escapement bracket mounting screws (#10, Figure 58).
10. Remove transport spring bracket screw (#1, Figure 59).
11. Remove print shaft gear (not shown).
12. Remove print shaft (#11, Figure 58).
13. Remove Carrier & Rocker assembly.

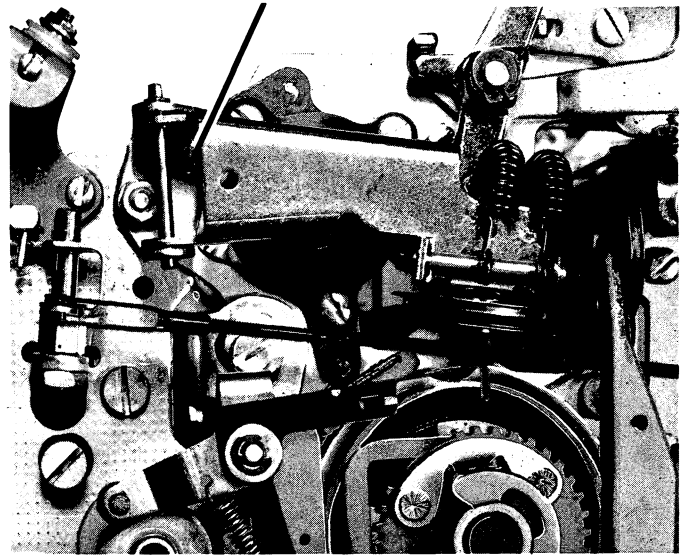


Figure 59. Carrier and Rocker Removal

NOTE: If rocker removal is necessary, complete the following steps:

14. Remove anvil striker (#1, Figure 60).
15. Remove rotate spring, cage and pulley (#2, Figure 60).
16. Remove tape guide (#3, Figure 60).
17. Remove "C" clip on rocker shaft (#4, Figure 60).
18. Loosen rocker shaft set screw and remove rocker shaft (#5, Figure 60).
19. Check carrier & rocker and alignment adjustments after reassembly.

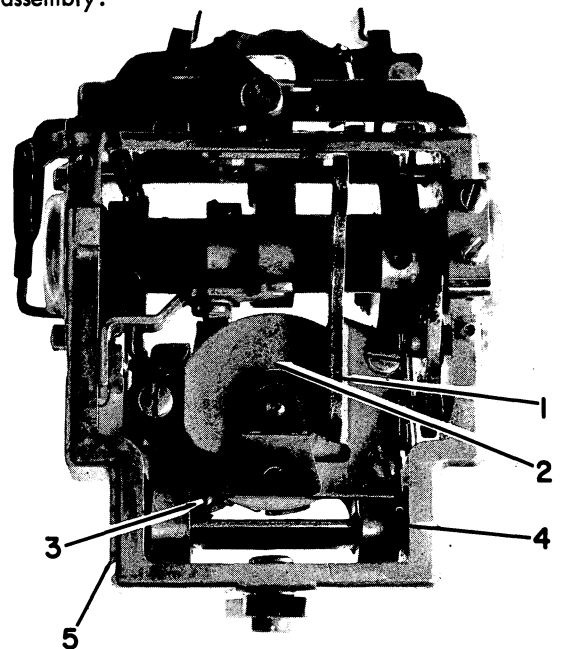


Figure 60. Carrier and Rocker Removal

CYCLE CLUTCH PULLEY REMOVAL (EARLY)

1. Perform the Cycle-Clutch and Cycle-Shaft removal.
2. Remove the "C" clip from the rotate bellcrank pivot pin (#1, Figure 61).
3. Disconnect the rotate link from the rotate bellcrank (not shown).
4. Remove "C" clip and remove pivot pin (#2, Figure 61).
5. Push down on the rotate balance arm (#3, Figure 61) and lift up on the rotate bellcrank until the two are clear of each other and then remove the bellcrank.
6. Remove the cycle-clutch-latch spring (not shown).
7. Remove the "C" clip which holds the cycle-clutch-latch link to the cycle-clutch latch and disconnect the link from the latch (not shown).
8. Remove the bottom latch screw, loosen the top latch screw and slide the latch up and out (#4, Figure 61).
9. Take the belt off the pulley and remove the pulley (#5, Figure 61).
10. The following adjustments should be checked after the cycle-clutch pulley is replaced.
 - a. Latch Height
 - b. Cycle Shaft End Play
 - c. Idler Gears
 - d. Cycle-Clutch Spring
 - e. Cycle-Clutch Latch Bite
 - f. Damper-Spring
 - g. Filter Shaft Timing
 - h. Print Shaft Timing
 - i. C1 and C2 Contact Timing

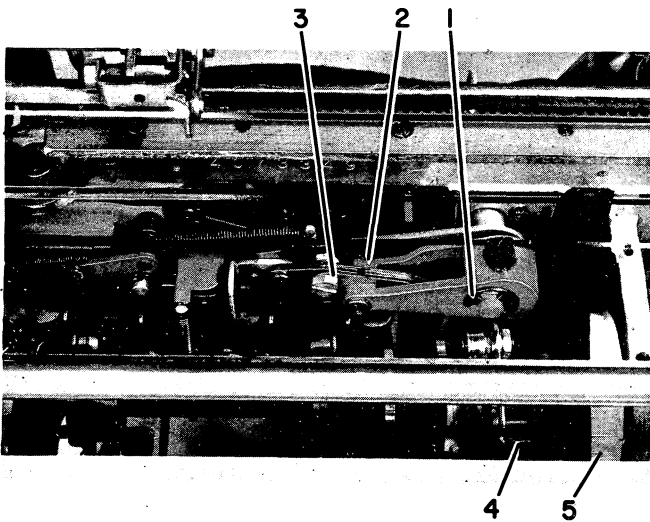


Figure 61. Cycle Clutch Pulley Removal

CYCLE CLUTCH PULLEY REMOVAL (LATE)

1. Perform the Cycle-Clutch and Cycle-Shaft removal.
2. Remove belt from pulley.
3. Remove two set screws from pulley. One on top of the other used as a lock screw.
4. Remove cycle clutch hub from pulley.
5. Perform section 10 of early style cycle clutch removal.

CORD REPLACEMENT

NOTE: Remove the main spring.

NOTE: Cut pre-stretched cords to following lengths for 11" & 15" machines:

Tab cords 11 inch machines = 18-3/4

Tab cords 15 inch machines = 23-1/2

Carrier Return 11 inch machines = 18-3/4

Carrier Return 15 inch machines - Cord should be correct length.

Above lengths allow 1" for Figure 8 knot.

1. With the carrier to the extreme right, feed the carrier return cord around the pulleys and connect to cord drum (#1, Figure 62).
2. Connect carrier return cord to carrier using long nose pliers and spring hook (#2, Figure 62).
3. Disconnect clutch unlatching link (#1, Figure 63).
4. Manually latch the clutch and turn the machine by hand until the carrier is pulled fully to the left.
5. Connect the escapement cord to the drum with about 1 turn of the cord on the drum (#2, Figure 63).
6. Connect the end of the cord to the carrier and then place it on the pulleys (#3, Figure 63).
7. Connect the clutch unlatching link.
8. Replace and adjust the main spring (5 turns) with the carrier resting at the extreme RH margin.

CORD ADJUSTMENT

A time saving method of transport card adjustment may be accomplished by tying a knot in the end of the cord as close to the hook as possible.

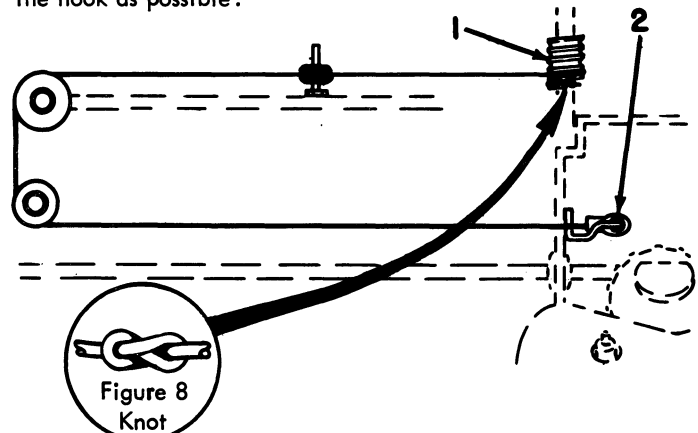


Figure 62. Carrier Return Cord Replacement

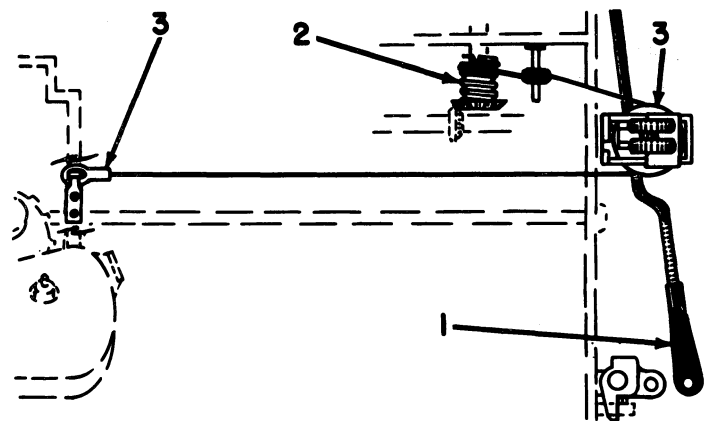


Figure 63. Escapement Cord Replacement