PIONEER
The Art of Entertainment

Service Manual

ORDER NO.
CRT1800

CASSETTE MECHANISM UNIT

CX-644

NOTE:

- **This service manual describes the operation of the cassette mechanism incorporated in the models listed below.**
- **When performing repairs, use this manual together with the specific manual for the model under repair.**

Model	Service Manual	Cassette Mechanism Unit
KEH-2300R/X1MA/EW, /X1M/EW, /X1IN/EW KEH-2400R/X1MA/IT, /X1M/IT, /X1IN/IT KEH-2100R/X1MA/GR, /X1M/GR, /X1IN/GR	CRT1782	EXK3455
KEH-2300R/X1B/EW KEH-2400R/X1B/IT	CRT1817	
KEH-1300/X1M/EW, /X1MA/EW, /X1IN/EW, /X1N/EW KEH-1400/X1M/IT, /X1MA/IT, /X1IN/IT, /X1N/IT KEH-1300SDK/X1M/GR, /X1MAGR, /X1INGR, /X1NGR	CRT1799	EXK3435

Model	Service Manual	Cassette Mechanism Unit
KEH-1400/X1M/UC, /X1MA/UC, /X1IN/UC, /X1N/UC KEH-1450/X1M/ES, /X1MA/ES, /X1IN/ES, /X1N/ES KEH-1311/X1M/UC, /X1MA/UC, /X1IN/UC, /X1N/UC	CRT1798 CRT1799	EXK3435
KEH-1100/X1M/EW, /X1MA/EW, /X1IN/EW, /X1N/EW KEH-1200/X1M/IT, /X1MA/IT, /X1IN/IT, /X1N/IT	CRT1819	EXK3415
KEH-1100/X1M/UC, /X1MA/UC, /X1IN/UC, /X1N/UC KEH-1150/X1M/ES, /X1MA/ES, /X1IN/ES, /X1N/ES	CRT1798 CRT1799	

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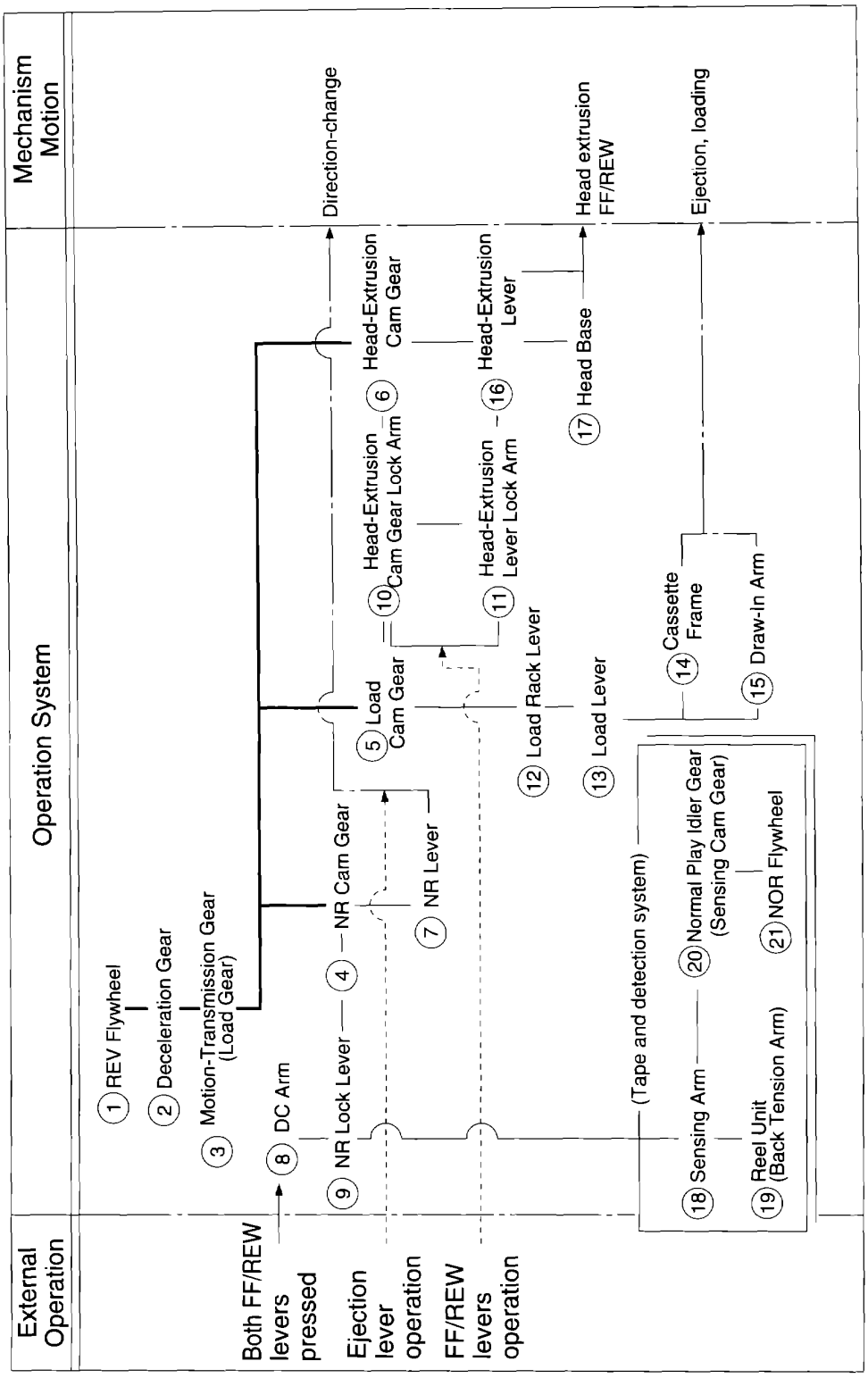
1. OPERATION SYSTEM PARTS INTERLINKAGE FLOWCHART



2. NAME OF EACH SECTION

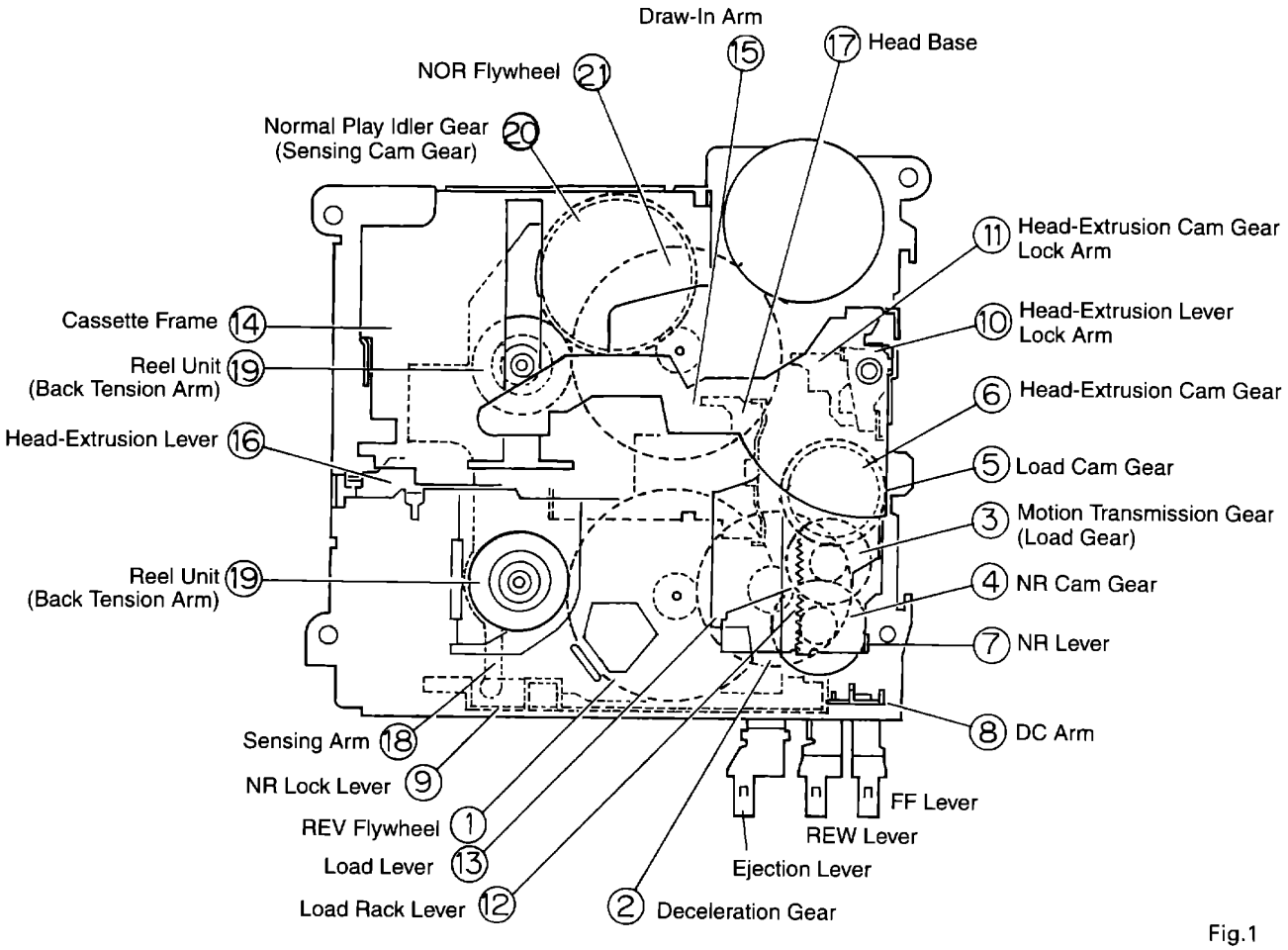


Fig.1

3. ELECTRICAL PART INTERLINKAGE

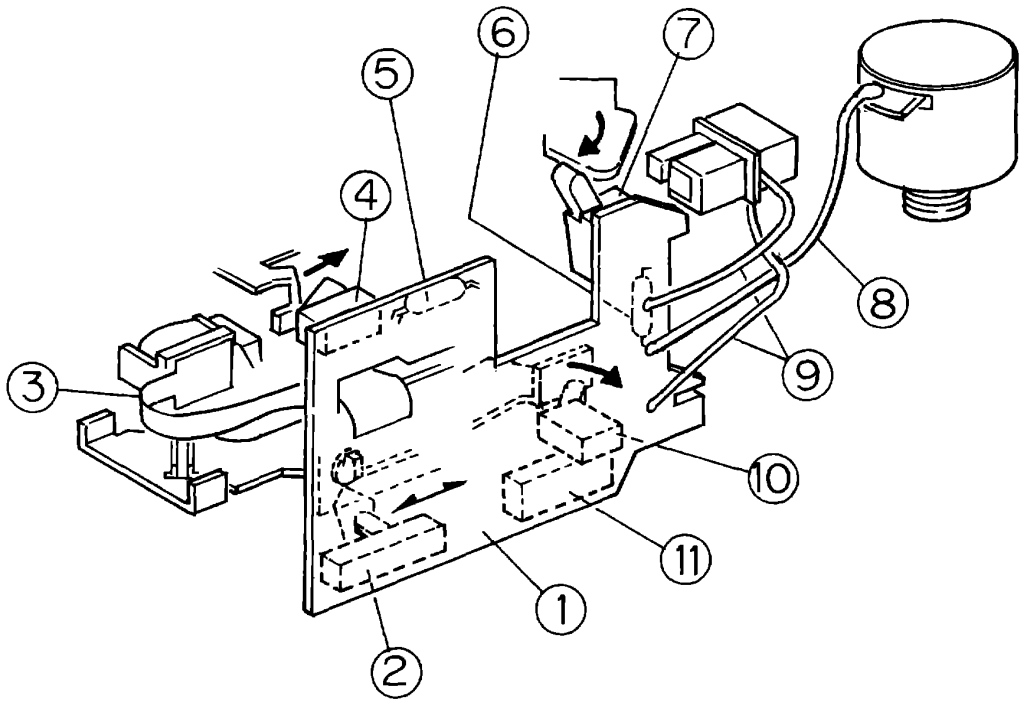


Fig.2

No.	Name	Content
1	Cassette P.C. Board	—
2	FWD/REV Select Switch	Interlinked with NR lever by a spring (for switching Head-signal)
3	Head Flexible Cable	Interlinking Head Unit and Cassette P.C. Board (for signal line)
4	Ejection Switch (only with EXK3455)	Operated by Ejection Lever (for detecting ejection)
5	Resistor (EXK3455)	Resistor for Ejection Switch
6	Diode (EXK3455)	For solenoid rectification
7	Load Switch	Interlinked with Draw-In Arm (for detecting cassette insertion)
8	Red lead wire	For the Motor, and +B power line
9	Blue lead wires, (2 pcs.) (EXK3455)	Lead wires attached to the solenoid
10	Mute Switch	Interlinked with Mute Arm (for turning Mute Circuit ON, OFF)
11	Connector	For connection with product mother P.C. Board

4. OVERVIEW OF THE MAIN CAM GEARS

In the operation system, two main cam gears work as the core of the operation and are controlled by the movements of Lock Arms and Levers.

The following cam gears are placed as shown in Fig.3:
(1) Load Cam Gear (for ejection or loading)
(2) Head-Extrusion Cam Gear (for play or FF/REW)
Both gears are interlinked with the Head-Extrusion Cam Gear Lock Arm to set the timing of Head extrusion:

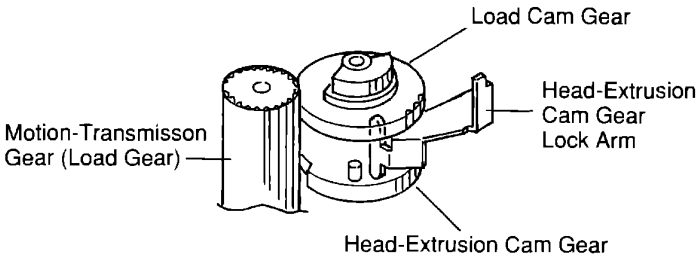


Fig.3

1) The movement of the Load Cam Gear

The Load Cam Gear consists of the following two gears:

Upper gear: Interlinked with the Rack Lever to perform loading.

Lower gear: Interlinked with the Head-Extrusion Cam Gear Lock Arm to set the timing of Head extrusion.

① **Loading area**
The Head-Extrusion Cam Gear Lock Arm locks and retains the Head-Extrusion Cam Gear during loading or ejecting.

② **Mechanism operation area**
The Head-Extrusion Cam Gear Lock Arm is released to enable its separate movements. (The position of the Load Cam Gear is held by the pressure spring.)

③ **Head-Extrusion Cam Gear release area**
The Head-Extrusion Cam Gear is released from PLAY or FF/REW lock and rotated to the release position.

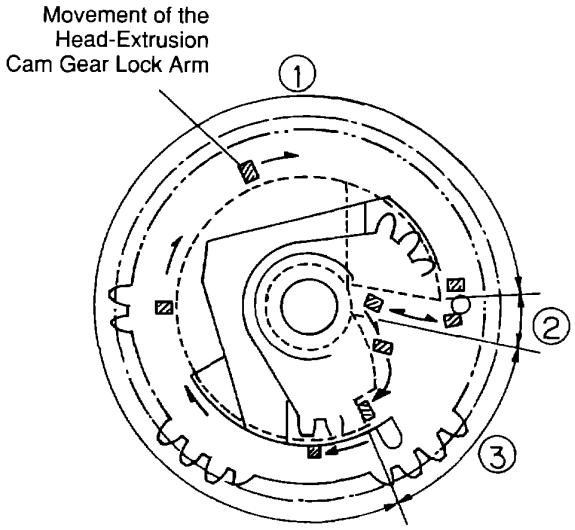


Fig.4

2) The movement of the Head-Extrusion Cam Gear

The Head-Extrusion Cam Gear consists of a cam and gear.

Cam (upper): Interlinked with the Head-Extrusion Cam Gear Lock Arm to set the timing of Head extrusion.

Gear (lower): Interlinked with the Head-Extrusion Lever to extrude the head.

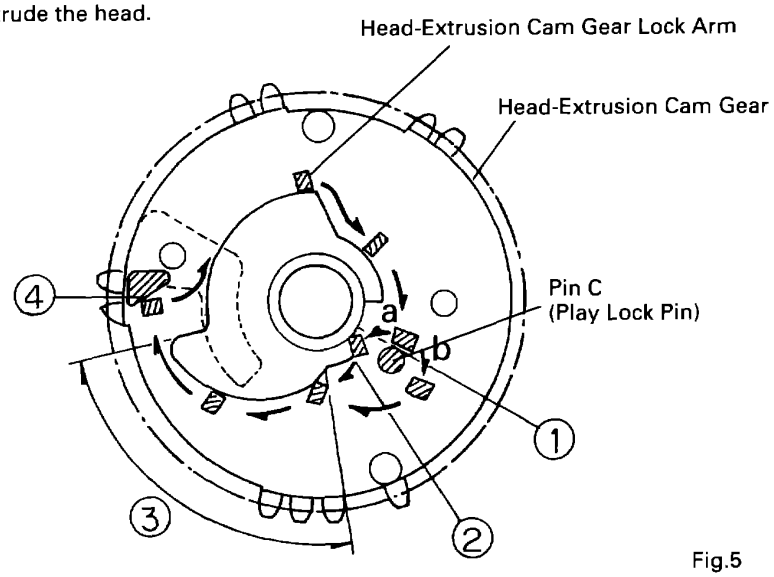


Fig.5

① Play lock position

The Head-Extrusion Lever is advanced by a full stroke. The cam of the Head-Extrusion Cam Gear is locked at this position. For FF/REW, the lock is released in the (a) direction, and for ejection, in the (b) direction as shown in Fig. 5.

② FF/REW lock position

The Head-Extrusion Cam Gear Lock Arm locks the FF or REW Lever for FF/REW, and stops at this position.

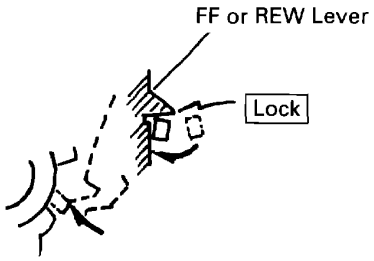


Fig.6

③ Head-Extrusion Lever release area

The Head-Extrusion Cam Gear Lock Arm is drawn in, and then it draws in the Head-Extrusion Lever Lock Arm to release the locked Head-Extrusion Lever.

④ Release lock position

After the Head-Extrusion Lever lowers in the Head-Extrusion Lever release area ③, the Head-Extrusion Cam Gear is locked at this position in the loading area of the Load Cam Gear (Play lock position).

5. THE PRINCIPLES OF OPERATION
5.1 HEAD EXTRUSION AND PLAY

Head extrusion and Play motions are performed according to the following procedures and mechanism.

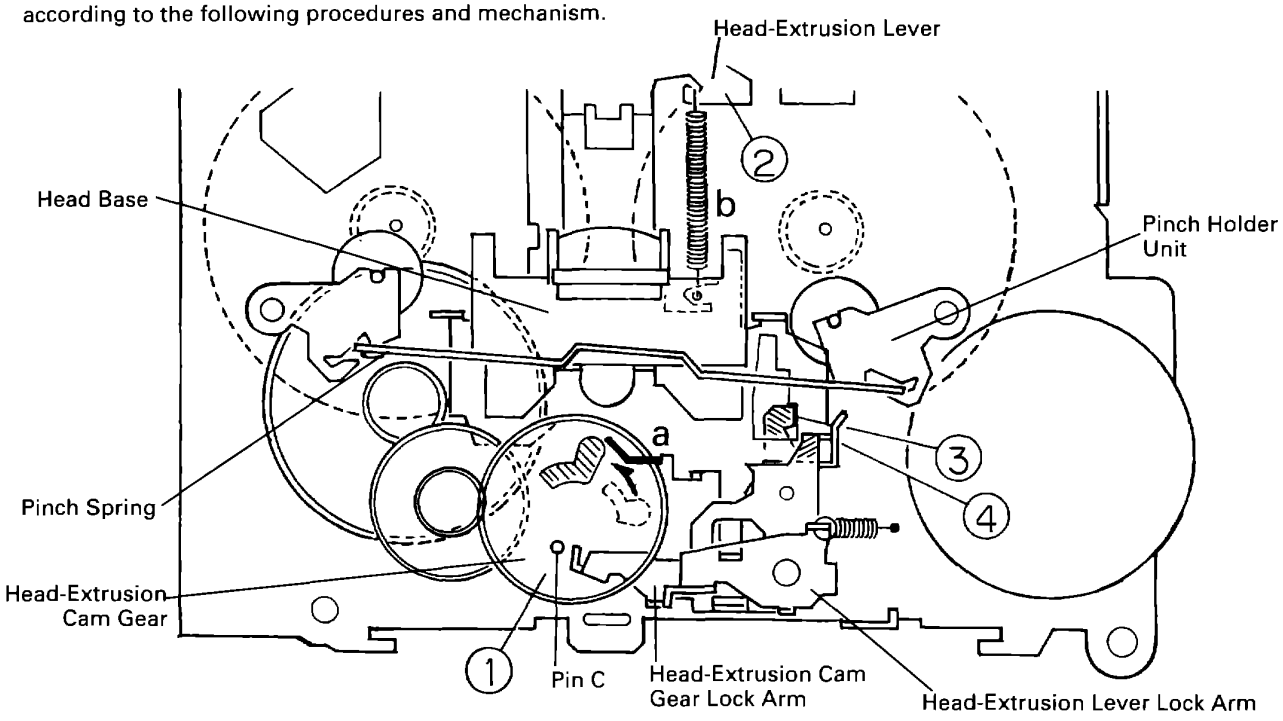


Fig.7

① When the Head-Extrusion Cam Gear Lock Arm starts its rotation from the release position, the lower surface cam of the Head-Extrusion Cam Gear presses the (a) part of the Head-Extrusion Lever to advance it.

② The Head Extrusion Lever draws out the Head Base with the (b) spring (Head-Extrusion Buffer Spring).

③ The Head-Extrusion Lever drawn out by a full stroke is locked by the Head-Extrusion Lever Lock Arm. (The Head-Extrusion Lever Lock Arm is given motive force by the spring.) The Head Base applies pressure to the Pinch Spring, and in turn the Pinch Holder Unit released from the Head-Extrusion lever sets a tape into motion.

④ When the Head-Extrusion Lever is locked at the Play Lock position, it retains the Head-Extrusion Cam Gear Lock Arm at the PLAY position with the Bend Guide. The Head-Extrusion Cam Gear Lock Arm locks the Head-Extrusion Cam Gear at Pin C (Play-Lock Pin).

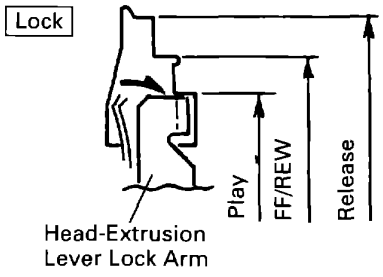


Fig.8

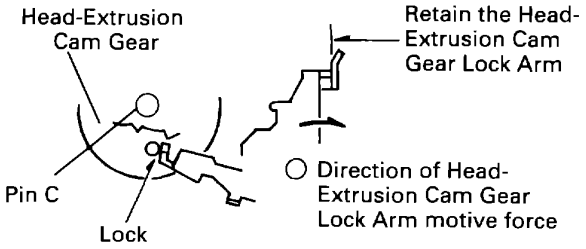


Fig.9

● Tape Operation System for Play

When the Head-Extrusion Lever is locked at the Play position, as stated previously, the play operation system starts its operation in the following order.

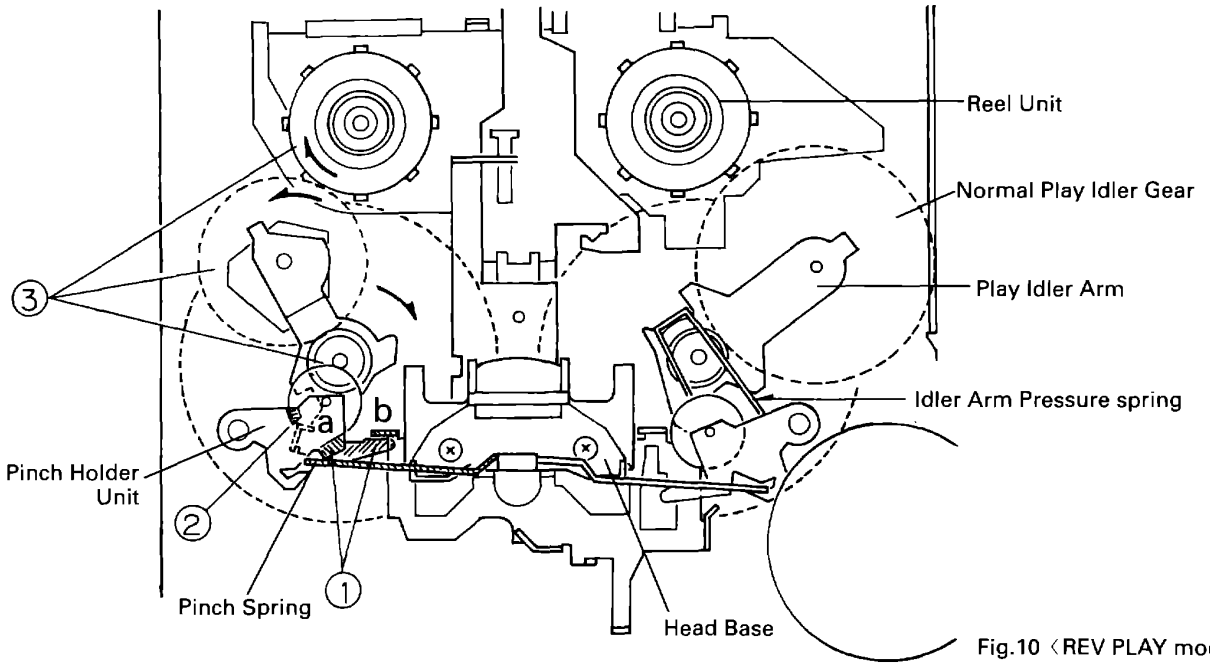


Fig.10 〈REV PLAY mode〉

① The Pinch Spring stressed by the Head Base, presses the (a) part of the Pinch Holder Unit. When the Head-Extrusion Lever further advances, the Pinch Holder Unit is released from the lock of the (b) bend to make the Pinch Roller press the Capstan.

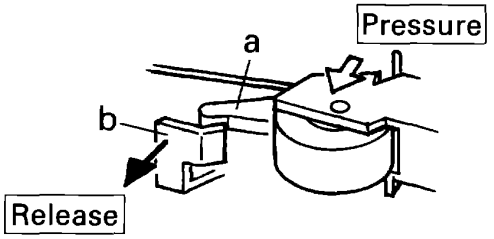


Fig.11

② Linked with the movement of the Pinch Holder Unit, the Play Idler Arm is drawn out by the spring to interlink the Reel Unit and the NOR flywheel.

* The (c) part slides in the release direction, and the Play Idler Arm proceeds to be interlinked by the tension of the spring. (Fig.12)

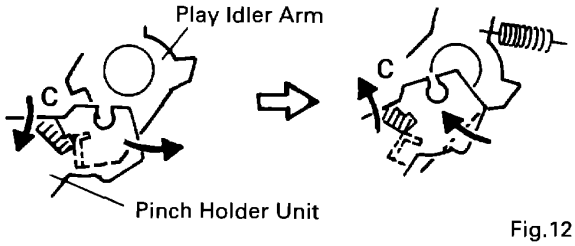


Fig.12

③ With the procedures described above, the NOR flywheel, the Normal Play Idler Gear and the Reel Unit are interlinked, and the Reel Unit rotates in the rewinding direction.

Note: The figure 10 shows the REV PLAY mode.
In the NOR PLAY mode, the procedure is reversed.

● Motions Accompanying Head Extrusion

The following accompanying motions are performed during Head extrusion.

Quasi-ATSC: The Supply Reel Unit is locked and the Take-up Reel Unit is rotated to remove any slack of a tape.

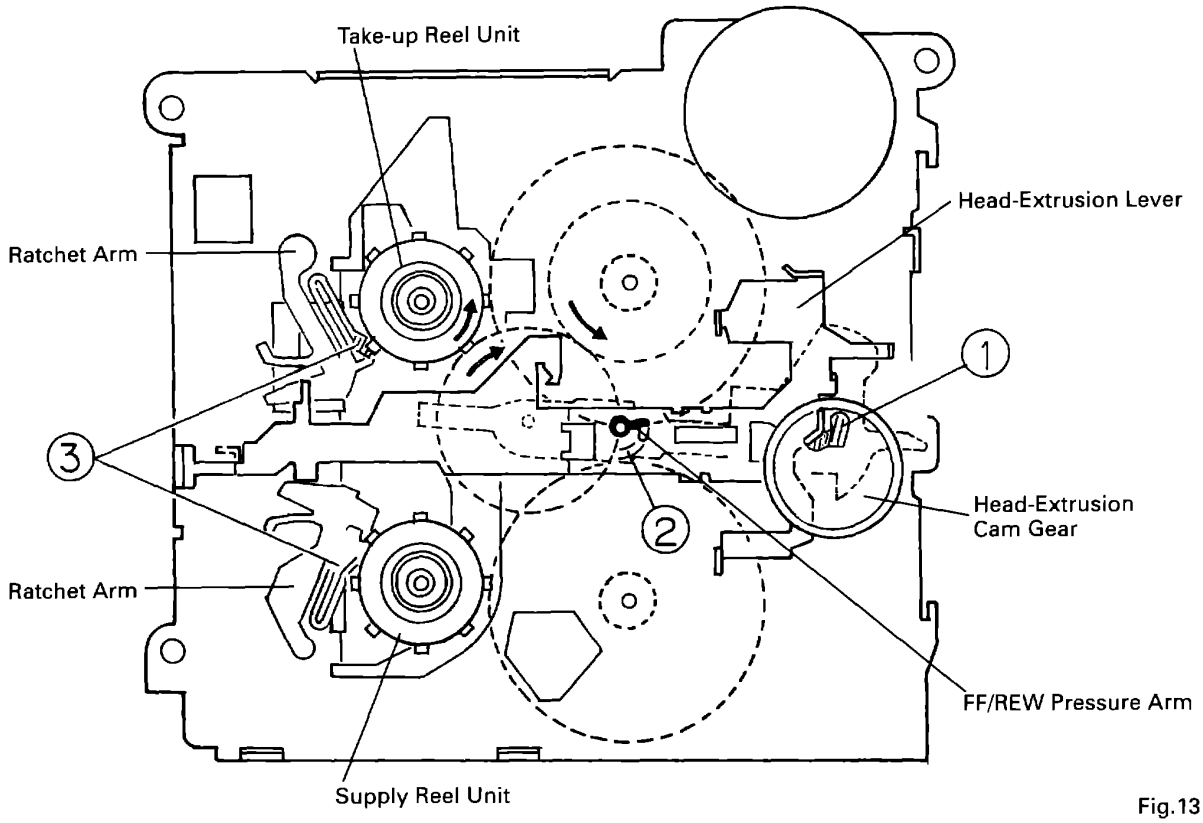


Fig.13

① The two-tier Head-Extrusion Cam Gear temporarily retains the Head-Extrusion Lever at the FF/REW position during Head extrusion.

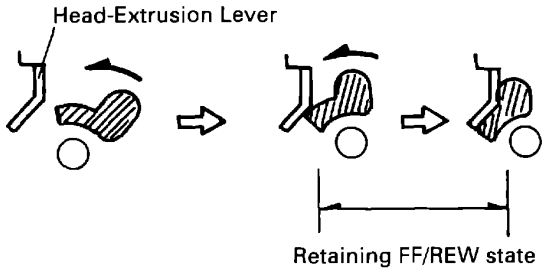
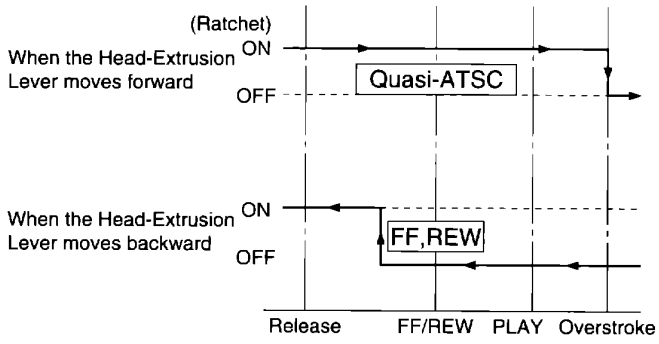


Fig.14

② At the FF/REW position, the Head-Extrusion Lever pushes the FF/REW Pressure Arm. This in turn sets the FF/REW Arm in the FF/REW mode, and the Reel Unit rotates in the rewinding direction at FF/REW speed.

③ At this point, the Ratchet Arm for NOR or REV mode is held at the Reel Lock position by the (a) locking boss. Therefore, the Supply Reel Unit stops, while only the Take-up Reel Unit rotates to remove any slack of a tape. This is Quasi-ATSC (Auto Tape Slack Cancellation).

Timing chart of the Ratchet Arms



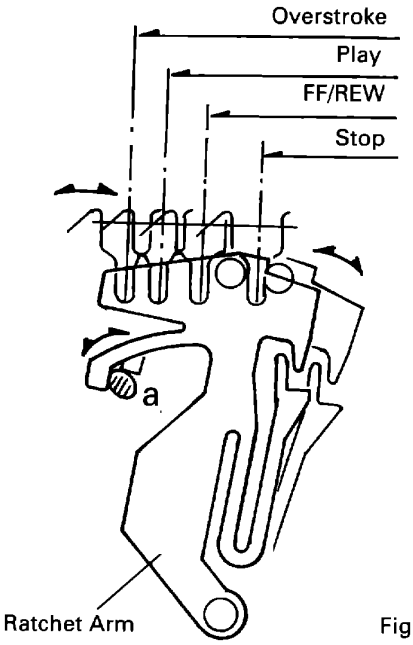


Fig.15

5.2 MS (MUSIC SEARCH) AND IGNITION-KEY-OFF RELEASE (EXK3435)

MS (Music Search) and Ignition-key-off (Key-off) release are performed according to the following procedures and mechanisms.

● **SOL Tip Adhesion Mode (PLAY, FF/REW):**
The SOL tip (a small iron plate) adheres to the body of the solenoid, while the two arms, Head-Extrusion Cam Gear Lock Arm and Head-Extrusion Lever Lock Arm, have freedom of movement.

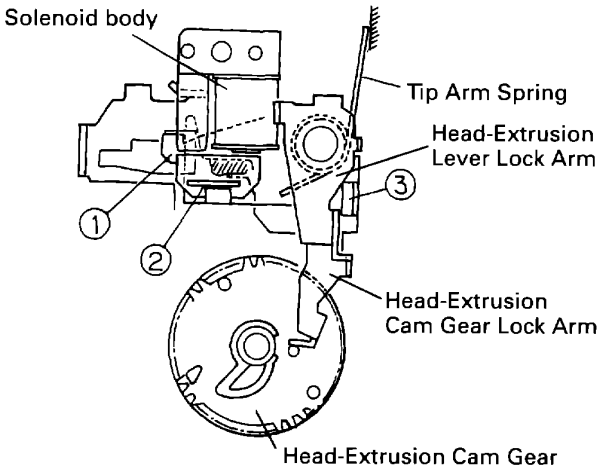


Fig.16

① The SOL tip and the body of the solenoid are in the adhesion state.
② There is no interference between the Head-Extrusion Lever Lock Arm and the Tip Arm.

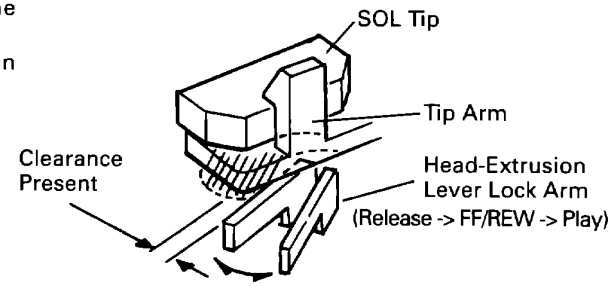


Fig.17

③ There is no interference between the Head-Extrusion Cam Gear Lock Arm and the Tip Arm.

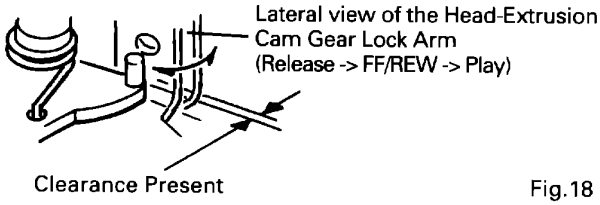


Fig.18

● **SOL Tip Release Mode (MS or Key-off Release):**
The Sol Tip is rotated counterclockwise by the Tip Arm Spring. The two arms, Head-Extrusion Cam Gear Lock Arm and Head-Extrusion Lever Lock Arm, are drawn in as follows:

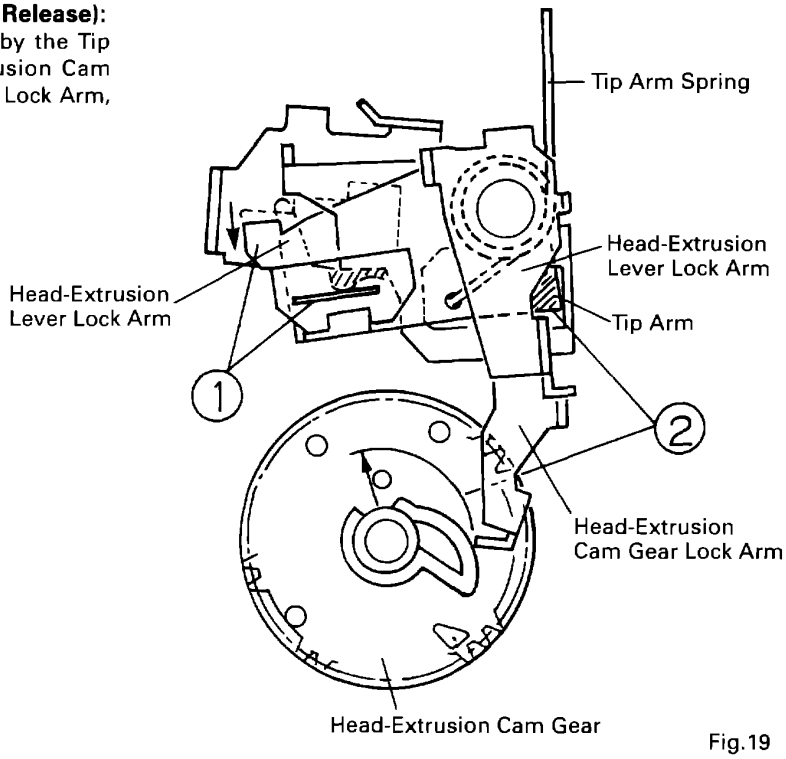


Fig.19

① The Head-Extrusion Lever Lock Arm is drawn to the release position by the Tip Arm. This motion releases the mechanism from the PLAY and FF/REW operations.

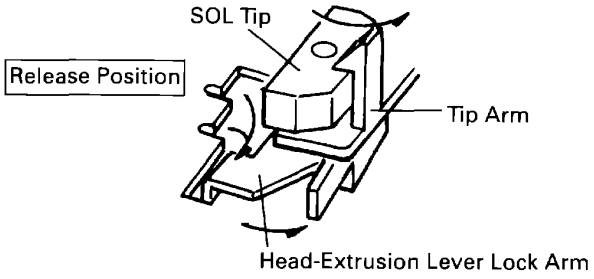


Fig.20

② The Head-Extrusion Cam Gear Lock Arm is released from the PLAY and FF/REW mode by the Tip Arm.

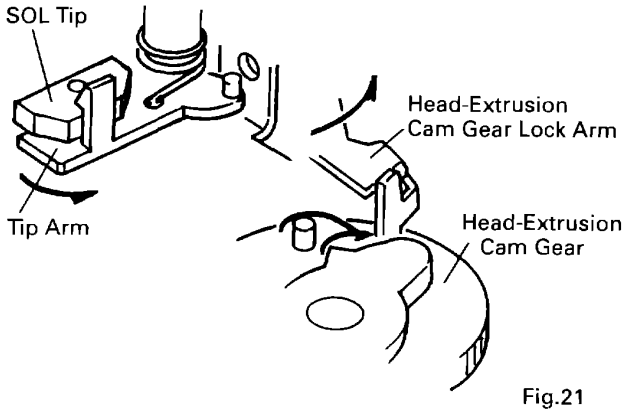


Fig.21

5.3 EJECTION AND HEAD RETRACTION

Ejection and head retraction are executed according to the following procedures and mechanisms.

● The Mesh of the Load Cam Gear

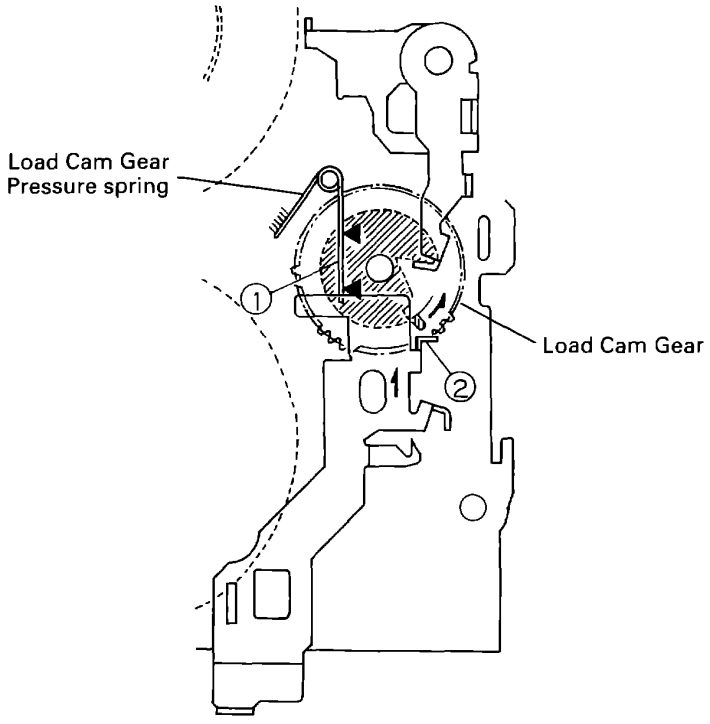


Fig.22

① During PLAY or FF/REW operation, the Load Cam Gear is retained at a certain position by the Load-Cam-Gear Pressure spring.

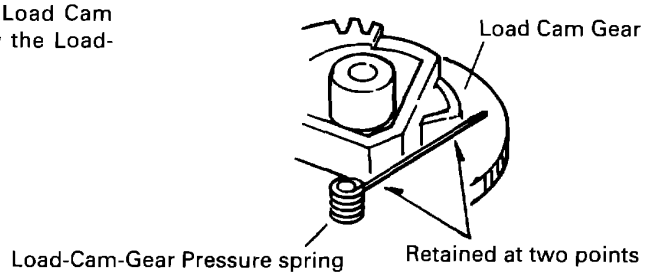


Fig.23

② With operation of the Eject Lever, the Load Cam Gear rotates counterclockwise and meshes with the Motion-Transmission Gear.

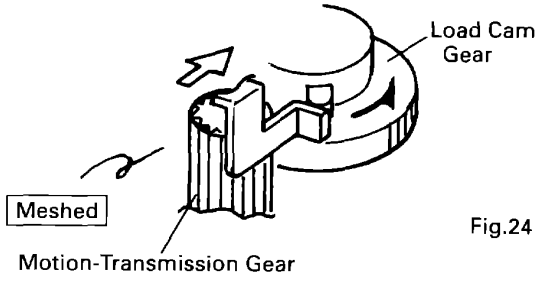


Fig.24

● A Chain of Movements of Load Cam Gear and Head-Extrusion Cam Gear for Ejection

(1) The Load Cam Gear starts rotating.

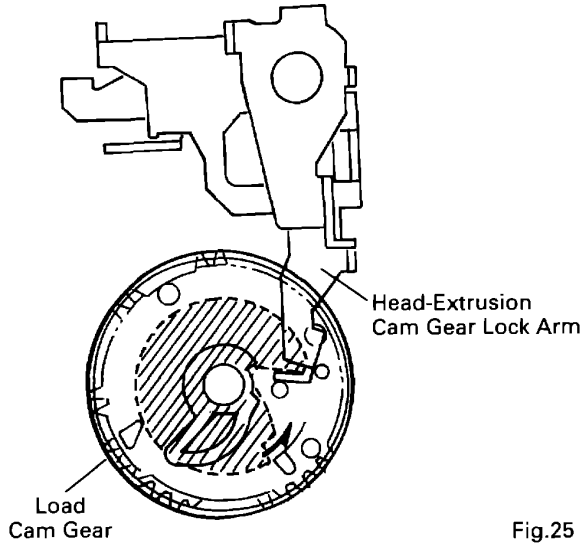


Fig.25

(2) The Head-Extrusion Cam Gear Lock Arm is released from the PLAY or FF/REW mode.

① The Head-Extrusion Cam Gear Lock Arm is drawn outside the PLAY or FF/REW lock area by the cam of the Load Cam Gear and the Head-Extrusion Cam Gear starts to rotate. (Fig.28)

② At this position, the Head-Extrusion Cam Gear Lock Arm locks the Load Cam Gear. (Fig. 29)

* The Head-Extrusion Cam Gear Lock Arm is in a free state (PLAY or FF/REW is possible.)

Fig.26

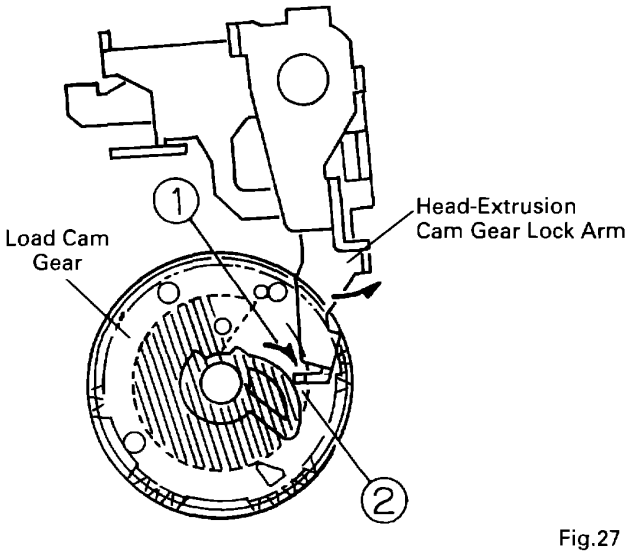


Fig.27

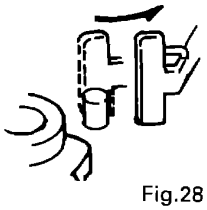


Fig.28

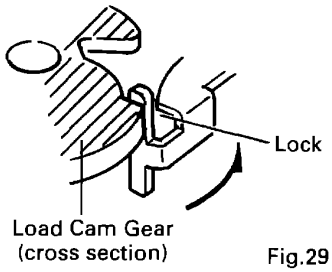


Fig.29

(3) Release of the Head-Extrusion Lever, lock of the Head-extrusion Cam Gear and resumption of Load Cam Gear rotation.

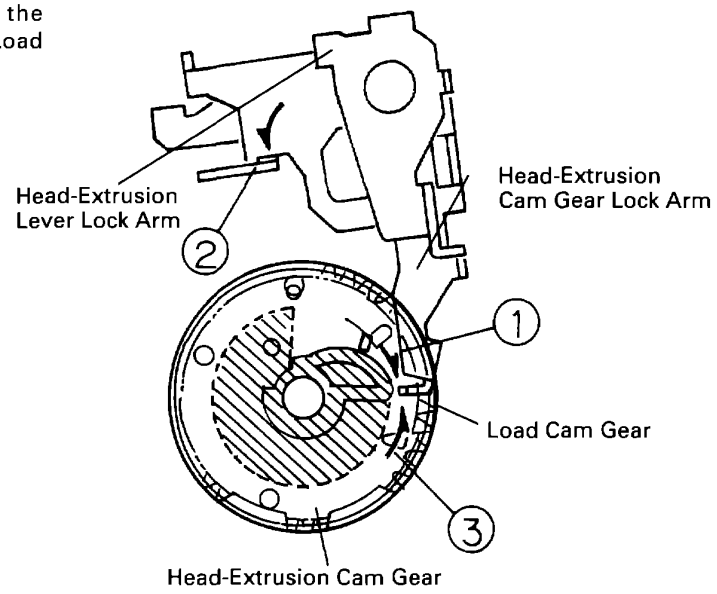


Fig.30

① The Head-Extrusion Cam Gear rotates to draw in the Head-Extrusion Cam Gear Lock Arm by a full stroke.
② The Head-Extrusion Cam Gear Lock Arm pushes the Head-Extrusion Lever Lock Arm to release the Head-Extrusion Lever.

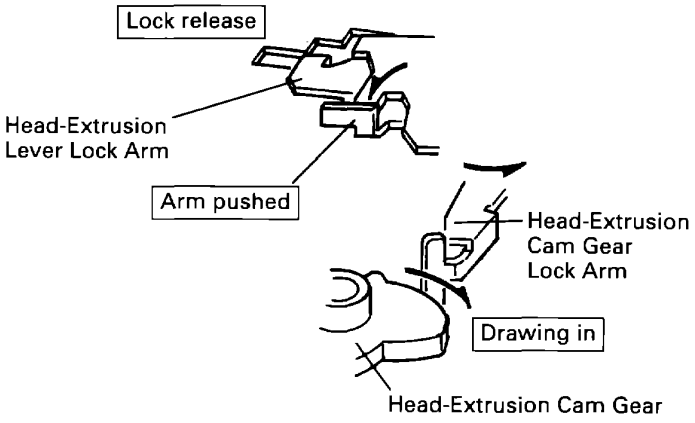


Fig.31

③ When the release of the Head-Extrusion Lever is completed, the Head-Extrusion Cam Gear Lock Arm unlocks the Load Cam Gear and makes it resume rotation for loading.
Also, the Head-Extrusion Cam Gear is retained at the release position with the Lock Cam.

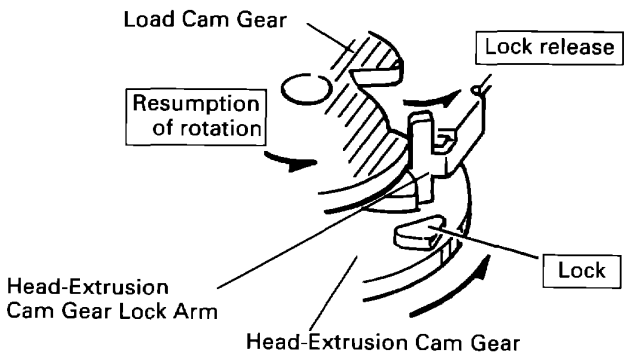


Fig.32

5.4 CASSETTE EJECTION

The movements of cassette ejection after head retraction are as follows.

① Sliding the Load Rack Lever and the Load Lever by rotation of the Load Cam Gear.
② Lifting up the Cassette Frame by sliding the Load Lever, and ejecting a cassette by the Draw-In Arm.
③ Turning off the LOAD Switch at the latter half of the Draw-In Arm rotation, and switching off the +B line by the microcomputer.

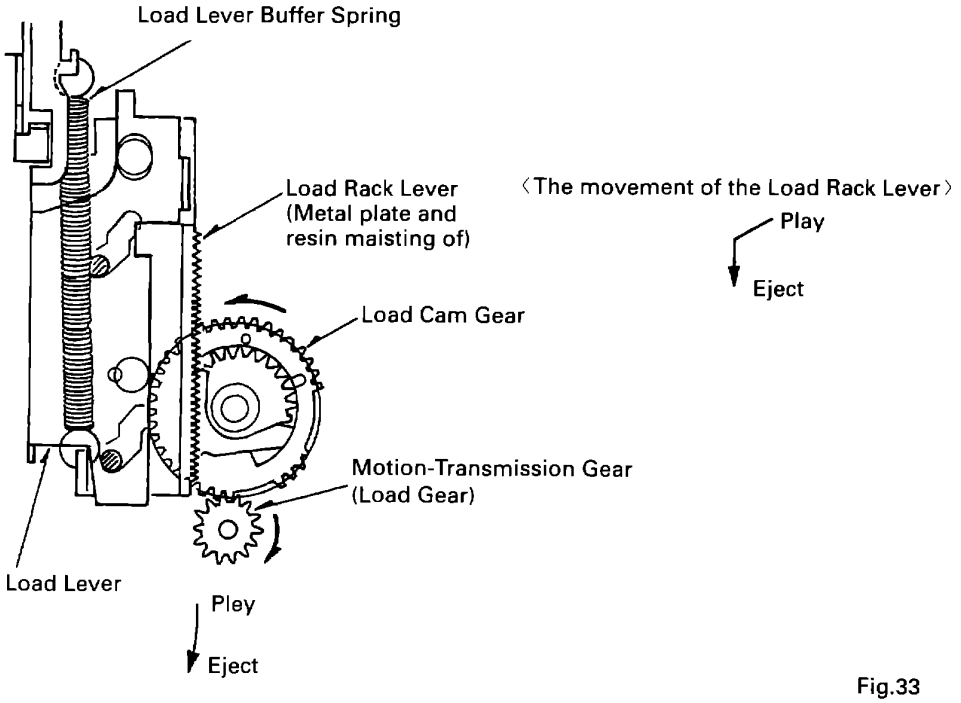


Fig.33

① After the Head is retracted and the Head-Extrusion Cam Gear Lock Arm is released in the preceding process, the Load Cam Gear is rotated by the Load Cam Gear Pressure Spring to mesh with the Motion-Transmission Gear. The Load Cam Gear rotates, and its small gear pushes down the Load Rack Lever as shown above. The Load Rack Lever pushes down the Load Lever via the Load Lever Buffer Spring. At this moment, the Load Rack Lever avoids the Motion-Transmission Gear by utilizing 2 sets of groove and boss of the Load Lever.

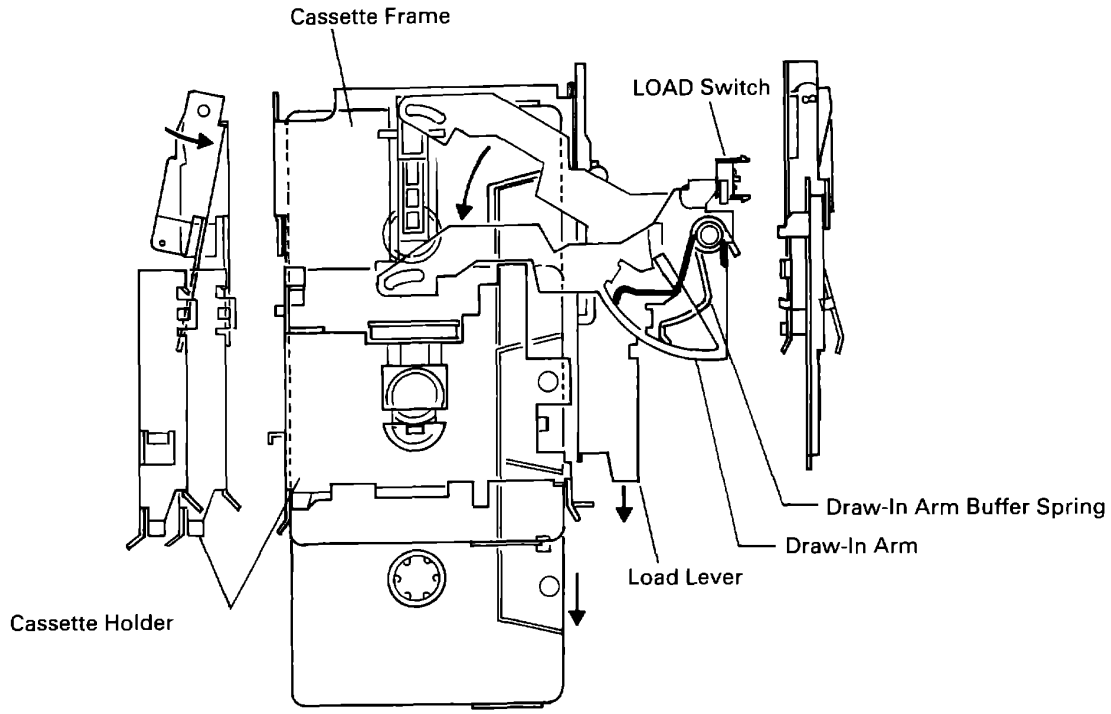


Fig.34

Operations of the Load Lever and Draw-In Arm

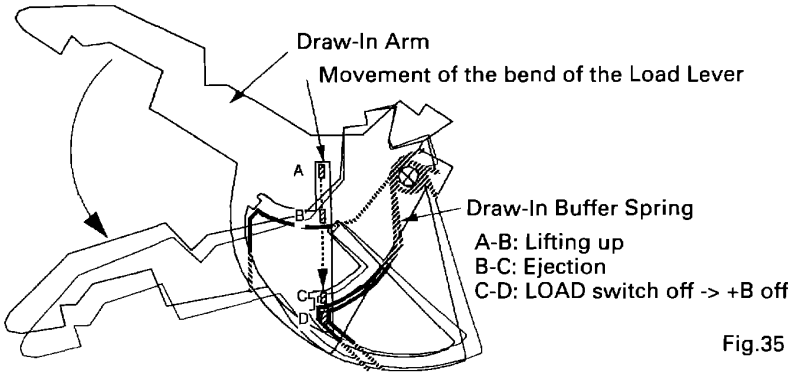
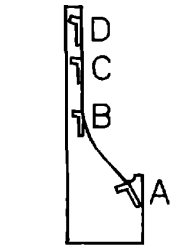


Fig.35

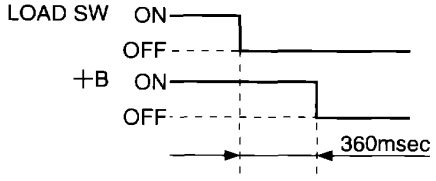


Detail of the Cam of the Load Lever

Fig.36

② In the figure 34, when the Load Lever slides downwards, the Cassette Frame is first raised with the cam part of the Load Lever (Fig. 36). And then, the bend of the Load Lever passes through the cam part consisting of the Draw-In Arm and the Draw-In Buffer Spring (Fig. 35). At this time, the Draw-In Arm Buffer Spring is pressed. It causes the Draw-In Arm to rotate and a cassette to be ejected.

③ Immediately before the completion of ejection by the Draw-In Arm, the LOAD Switch is turned off, and the +B line is also turned off 360msec later under microcomputer control. Then, the Draw-In Arm rotates further to complete ejection.



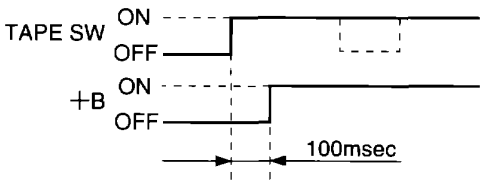
5.5 CASSETTE LOADING

The loading operations, from the cassette insertion to the setting to the PLAY position, are described below.

① Rotation of the Draw-In Arm by insertion of a cassette, and turning on the LOAD Switch.
② Rotation of the Load Cam Gear, sliding the Load Rack Lever and applying the +B line.
③ Drawing in and seating a cassette.

---

① The Draw-In Arm rotates upon insertion of a cassette, turning on the LOAD Switch. The microcomputer, after confirming it for 100msec, applies the +B line.



② When the +B line is applied, the Load Cam Gear leaves the rack section of the Load Rack Lever. Next, the Load Rack Lever meshes with the Motion-Transmission Gear to slide upward as shown in the figure 37. At this moment, rotation of the Load Cam Gear is stopped by the cam lobe of the Load Rack Lever, so that Head-extrusion is prevented.

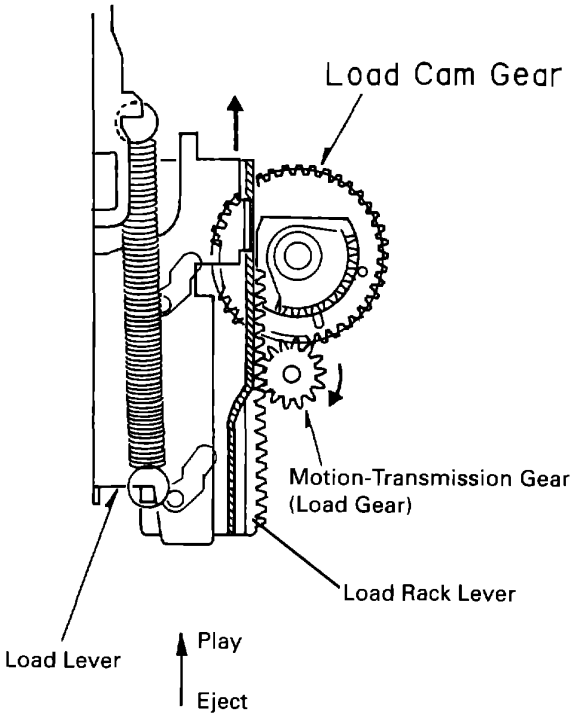


Fig.37

③ When the Load Lever slides, drawing in and seating a cassette is executed in the reverse procedure of Cassette Ejection (5.4-2). When the Load Lever reaches the Play position, the Load Cam Gear starts rotating for head extrusion.

5.6 TAPE-END DETECTION (SENSING)

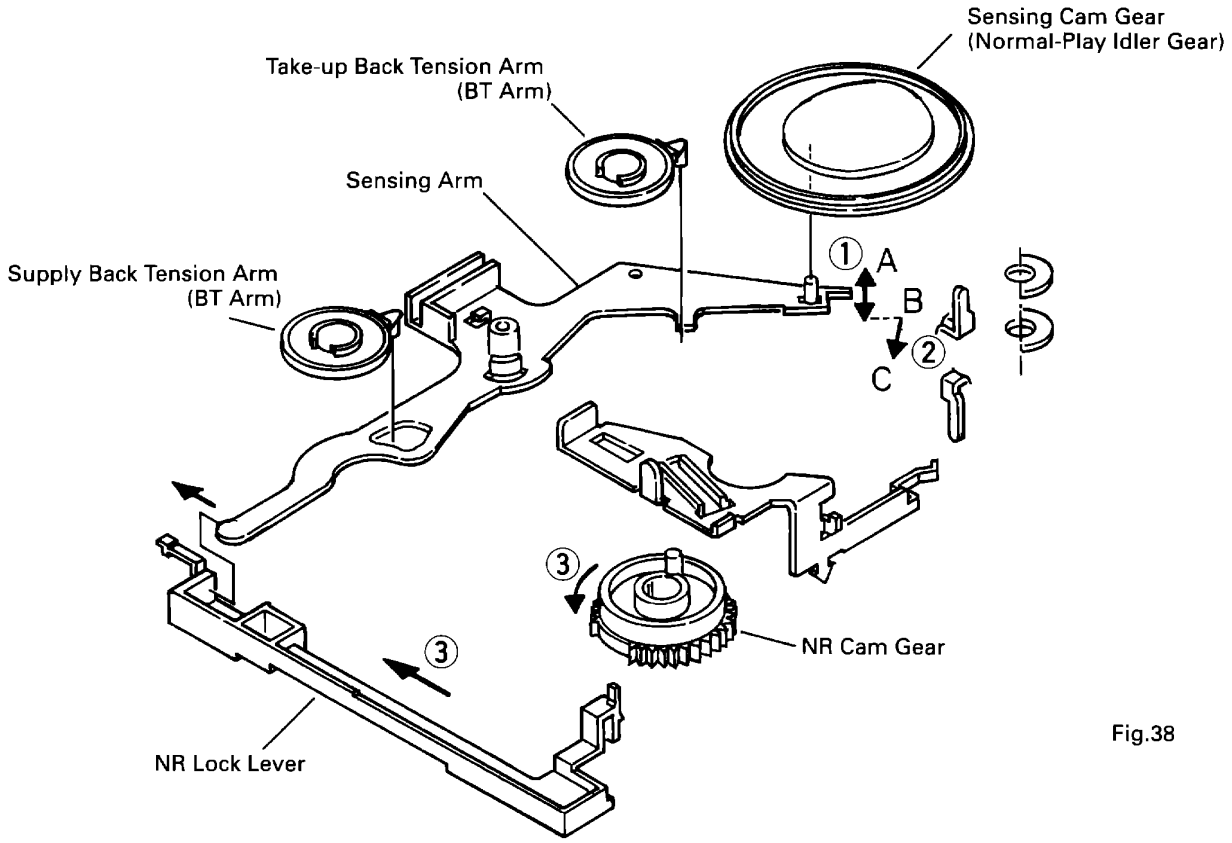


Fig.38

① **During tape running** .....The Sensing Arm is disturbed by the pull of the Back Tension Arm (BT Arm) for the Take-up Reel (Position A to B in Fig. 38).

② **Tape ends** .....The pull of the BT Arm disappears, and the Sensing Arm stops at the B position. The Sensing Arm is then drawn in to the C position by the triangle cam of the Sensing Cam Gear.

③ **Tape direction change** .....As the Sensing Arm is drawn in to C, the NR Lock Lever slides in the direction of an arrow. It unlocks the NR Cam Gear to start rotating it. Then, the tape running direction changes.

5.7 TAPE DIRECTION CHANGE

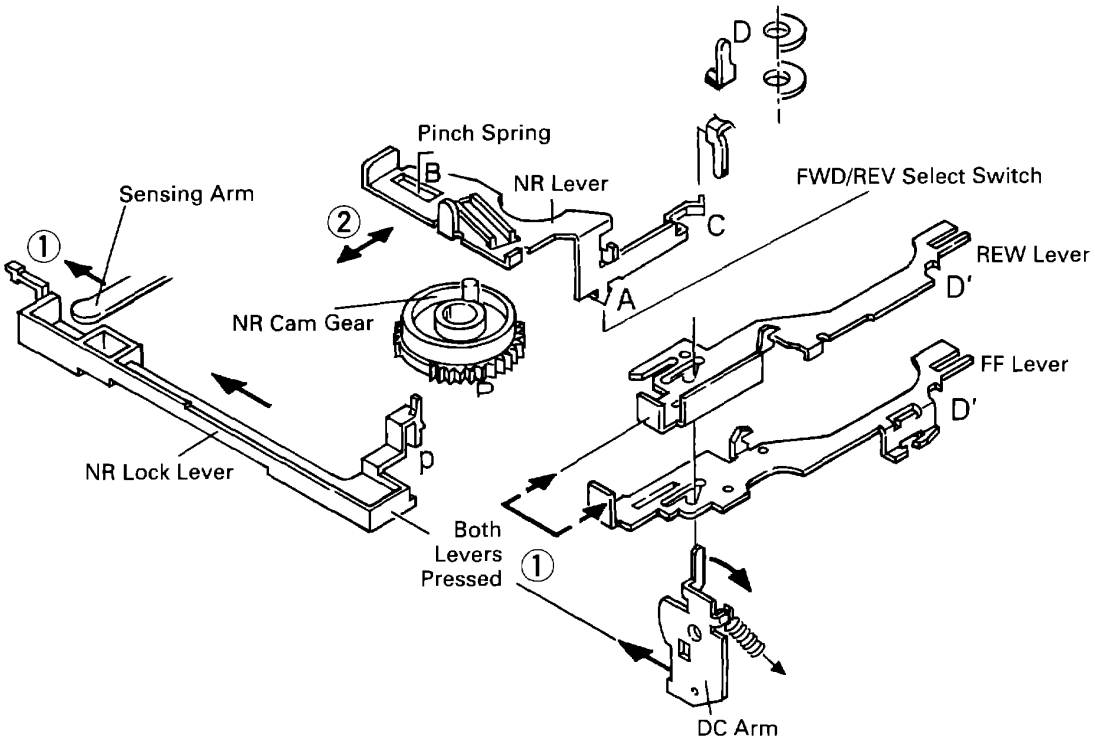


Fig.39

① Triggers for tape direction change

1. When the end of a tape is detected, the Sensing Arm induces the NR Lock Lever to slide as shown in Fig. 39 (Sensing operation).
2. When both the FF and REW Levers are pressed, the DC Arm rotates clockwise and the NR Lock Lever slides in the direction of an arrow (Manual DC operation). (See Fig. 39)

* The NR Cam Gear is locked by the pin of the NR Lock Lever after direction change is completed. Therefore, even if the FF and REW Levers are kept pressed, the NR Cam Gear no longer rotates for another DC operation.

② Tape direction change operation

The NR Lever slides as the NR Cam Gear rotates. The FWD/REV Select Switch and the Pinch Spring are also shifted by the movement of the NR Lever to change the direction.

1. Shifting the FWD/REV Select Switch
   The FWD/REV Select Switch is shifted by the SW Shifting Spring attached to the A section of the NR Lever. The NR Lever, which has overstroke over the switch, secures the motive force during Lock mode.

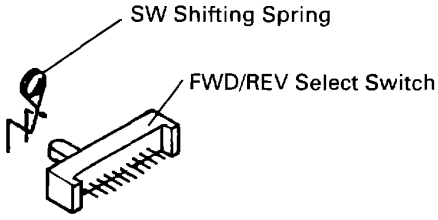
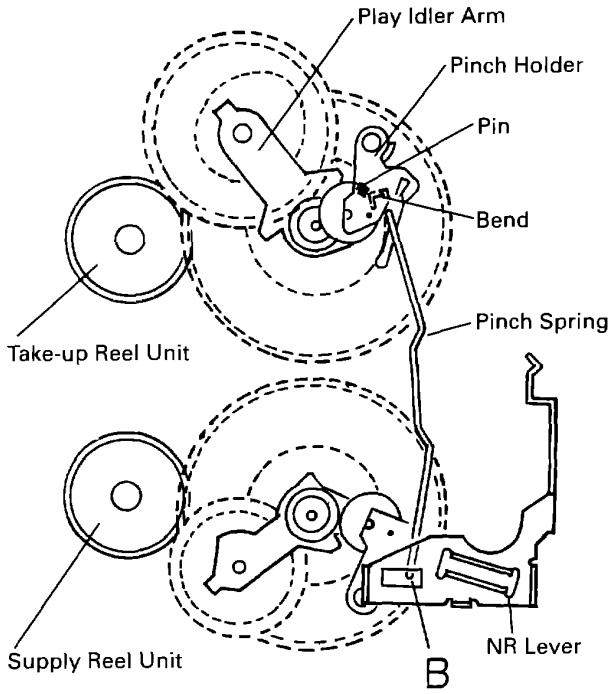


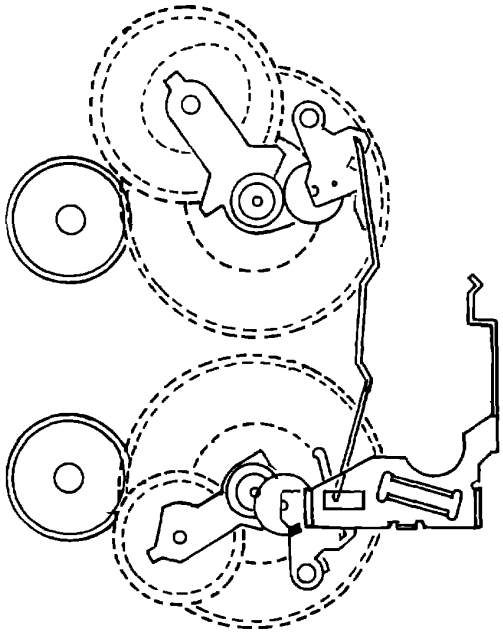
Fig.40

2. Shifting the Pinch Spring



Normal Play

Fig.41



Reverse Play

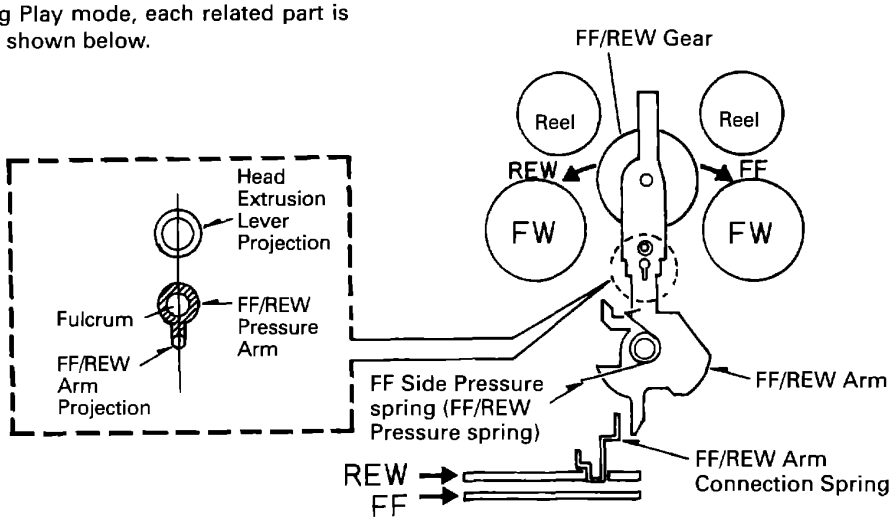
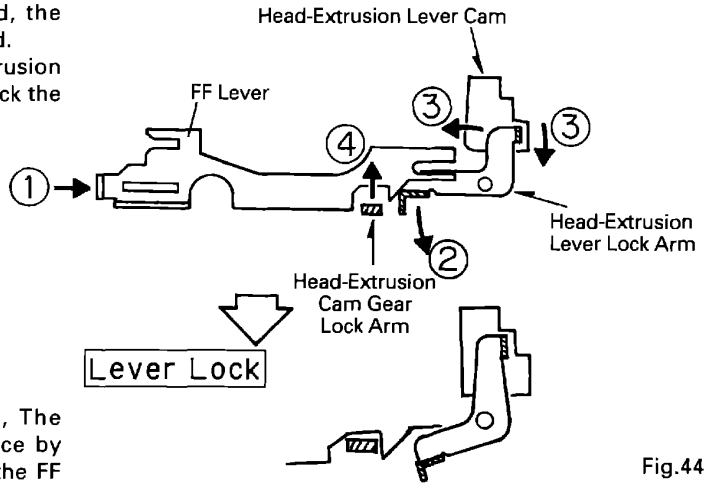
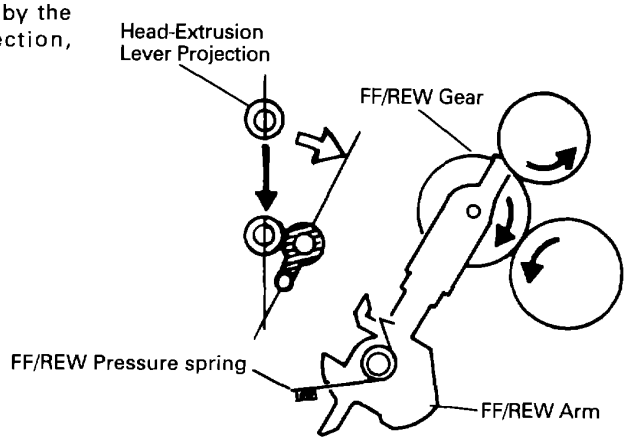
Fig.42

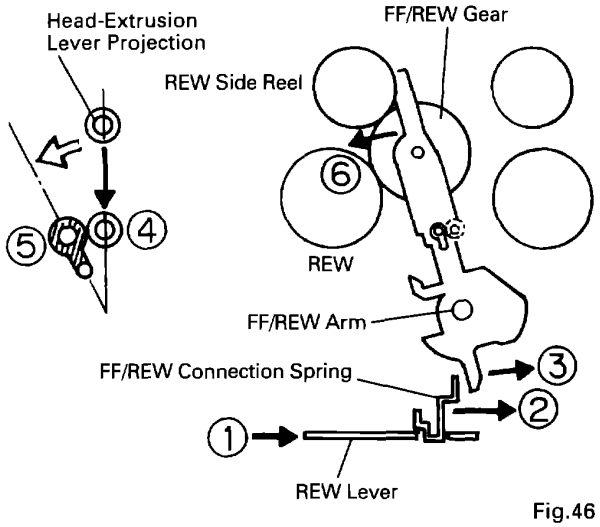
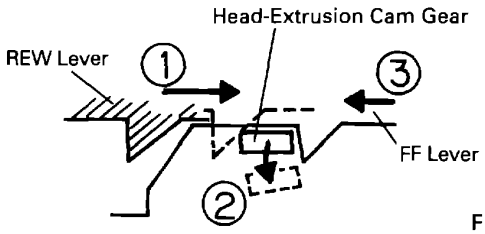
Sliding the NR Lever causes the Pinch Spring in the B hole to slide. The Pinch Spring moves the Pinch Holders alternately. In other words, when one Pinch Holder is pushed toward the Capstan, the other is forcibly retracted. The lower section of each Pinch Holder has a pin (marked with a black circle in the Fig. 41). So, when the Pinch Holder is retracted, its pin pushes the bend of the Play Idler Arm to keep the Idler Gear and the Reel Unit disengaged.

③ Auto Replay (FF/REW Tape-End Direction Change)

When a tape comes to its end in FF or REW mode, the Reel Unit stops to rotate and the NR Cam Gear rotates via the sensing motion. This rotation in turn induces the C section of the NR Lever to rotate the Head-Extrusion Cam Gear Lock Arm counterclockwise to release the lock at the D' sections of the FF and REW Levers. (See Fig. 39) At the same time, as it also releases the lock of the Head-Extrusion Cam Gear, the Head Base is put into the Play mode from the FF/REW position via the release position. When the tape reaches its end in the Play mode, the tape direction changes to perform reverse play operation.

5.8 FF/REW

Operation mode	Contents of operation
Play	During Play mode, each related part is set as shown below.  Fig.43
FF	When the FF Lever is operated, the Head-Extrusion Lever, is unlocked. At the same time, the Head-Extrusion Cam Gear Lock Arm rotates to lock the FF lever.  Fig.44 When the Head Base recedes, The FF/REW Arm, given motive force by the FF/REW pressure spring to the FF side, is pressed to the FF side by the Head-Extrusion Lever Projection, causing FF rotation.  Fig.45

Operation mode	Contents of operation	
REW	When the REW Lever is operated during Play mode, the REW Lever is locked using the same principle as in FF mode. The FF/REW Arm, via REW lever, FF/REW Connection spring and FF/REW Arm (①~③), draws in the FF/REW Arm to the REW side. At the same time, of the movement of Head-Extrusion Lever Projection (④) the FF/REW gear meshes with the REW Flywheel, causing REW rotation.(⑤,⑥)	 Fig.46
FF ↓ Lock release	In order to release the FF Lever lock, the REW Lever is operated. The REW Lever rotates the Head-Extrusion Cam Gear Lock Arm, inducing the release of the FF Lever lock (①~③). Afterwards, the Head-Extrusion Cam Gear rotates to start Play mode. Caution: Direct change between FF and REW modes is not allowed.	 Fig.47
REW ↓ Lock release	Operation of the FF Lever releases the REW Lever, causing Play mode to start. (Same as FF release)	

● **FF/REW Block Diagram**

※The following figure shows FF mode.

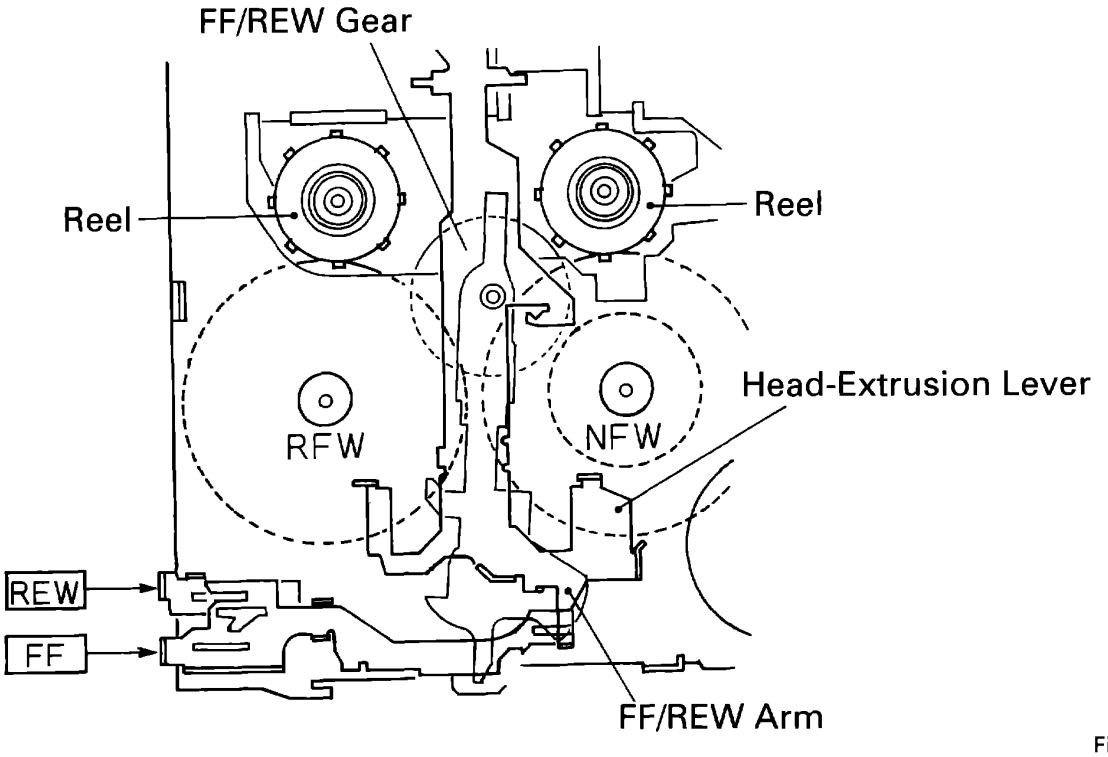


Fig.48

● **FF/REW Lever Lock Section**

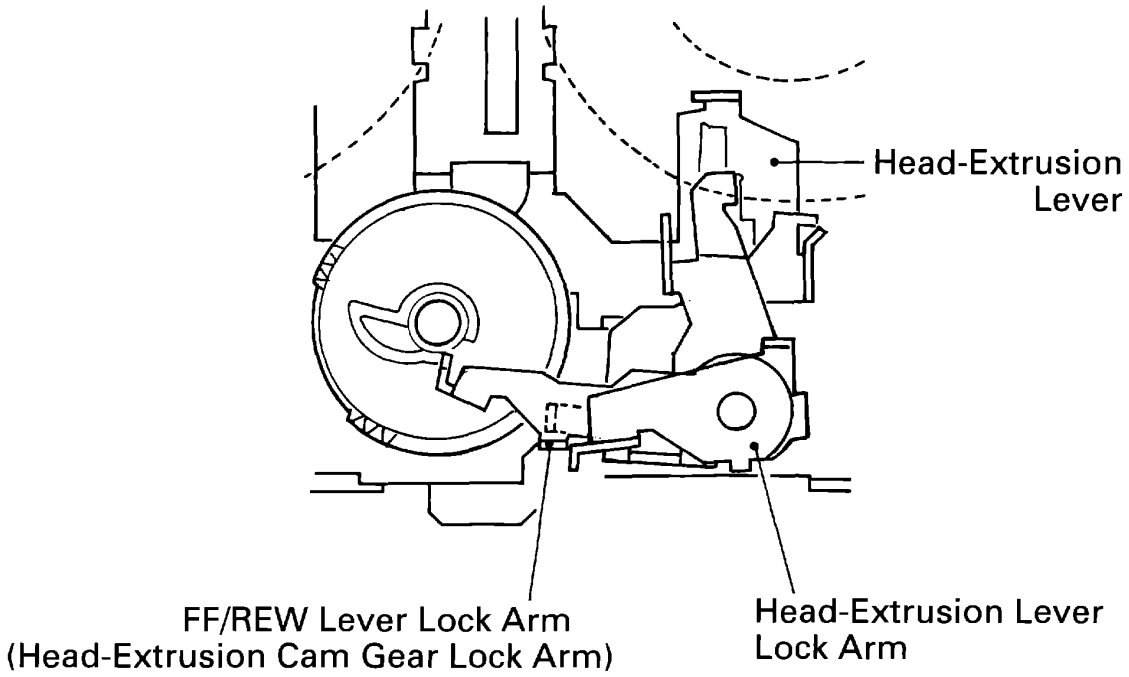


Fig.49

5.9 MUTE MECHANISM

The mute function is turned on by the following modes and operations.
1. Manual DC (Direction Change)
2. REW
3. FF
4. Head-Base release (key-off release)
5. Loading to Head-Base advance
6. Ejection

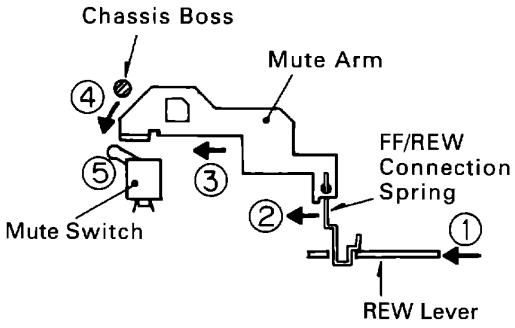
<table>
<tr><th>mode</th><th colspan="2">Operation and operation function</th></tr>
<tr><td>1.
Manual DC</td><td>When both of the FF and REW Levers are pressed, the Mute Switch is turned on in the following procedures:
REW Lever → FF/REW Connection Spring → Mute Arm hits the Chassis Boss and moves in the direction of the arrow ④. → Mute Switch is turned on.</td><td rowspan="2"><The rear side of the mechanism>
 

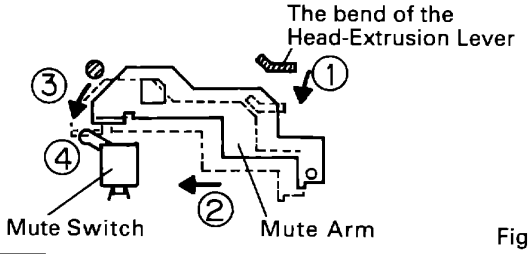
Fig.50</td></tr>
<tr><td>2.
REW</td><td>Same as manual DC.</td></tr>
<tr><td>3.
FF</td><td>FF operation causes the Head-Base to recede, and at the same time, the bend of the receding Head-Extrusion Lever moves the Mute Arm, which then turns the Mute Switch ON.</td><td> 

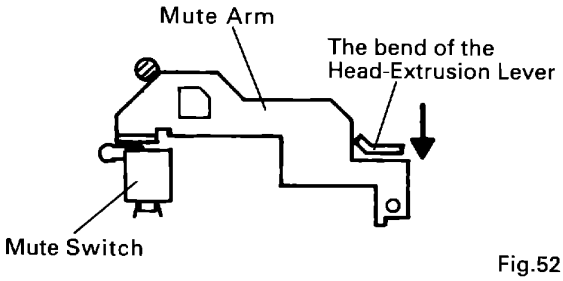
Fig.51</td></tr>
<tr><td>4.
Head Base Release (Key off Release)</td><td>As in the case of FF, the Mute Arm is pushed by the bend of the Head-Extrusion Lever to turn the Mute Switch ON.</td><td rowspan="2"> 

Fig.52
Note : When the Head-Base advances, Mute mode is turned off for an instant.</td></tr>
<tr><td>5.
Loading to Head-Base advance
6.
Ejection</td><td>As in the case of FF and Head-Base Release, the Mute Arm is pushed by the bend of the Head-Extrusion Lever to keep the Mute Switch on.</td></tr>
</table>

6. DISASSEMBLY

Replacement parts	Replacement and Disassembly procedure
1. Head	① Remove the Draw-In Arm (disengage the retainer pawl from the Head side). ② Remove the Cassette Holder (disengage the retainer pawl). Remove the Cassette Frame. Remove the Seating Buffer Spring (See "Tips for Assembly" for details.). ③ Unsolder the Cassette P.C. Board and remove the following. • Head Flexible Cable • Mute Switch • Lead Wire (for motor, solenoid) ④ Remove the P.C. Board screws. ⑤ Remove the P.C. Board. ⑥ Remove the Eject Lever Spring and the Ejection Lever (disengage the pawl). ⑦ Remove the FF/REW Lever Release Spring and the FF/REW Lever (disengage the pawl). ⑧ Remove the Load Lever Buffer Spring. ⑨ Remove the Load Lever. ⑩ Remove the Load Rack Lever Bracket. ⑪ Remove the Load Rack Lever. ⑫ Remove the Guide Bracket (disengage the retainer pawl from the motor side). See "Tips for Assembly" for installation of the Eject Cam Drive Spring for the Eject Cam Gear when assembling the Guide Bracket. ⑬ Remove the Pressure spring for the Load Cam Gear. ⑭ Remove the two screws of the Head. ⑮ Replace the Head. For assembly, reverse the disassembly procedures.

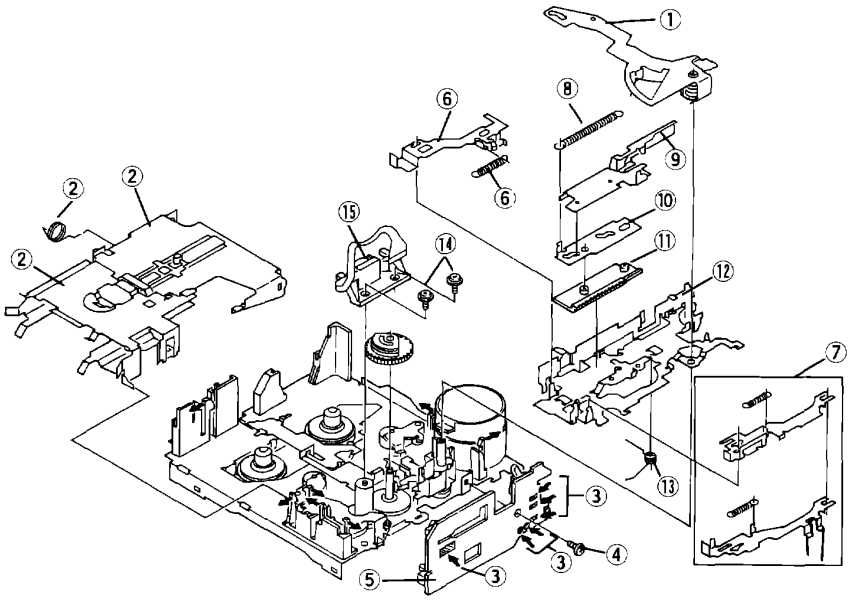


Fig.53

Caution : 1. Do not bend the chassis pawls beyond their allowable tension. They might become deformed.

Fig.54

2. Make sure that the flexible cable of the replacement Head is securely bent. Special care should be taken when the flexible cable is positioned. (to prevent the flexible cable from touching the NR Cam Gear for DC).

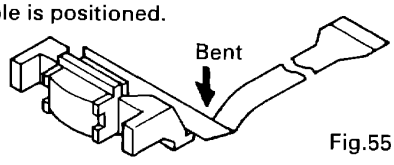
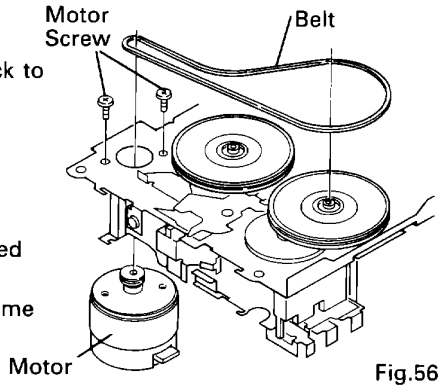
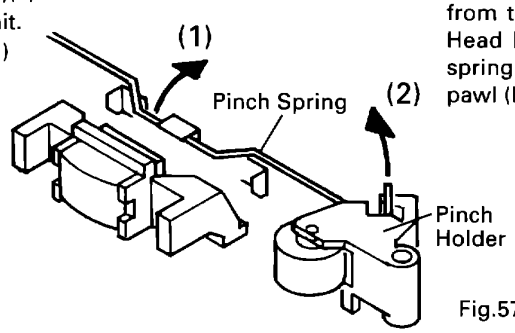
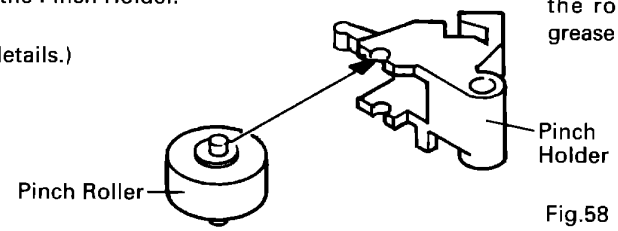
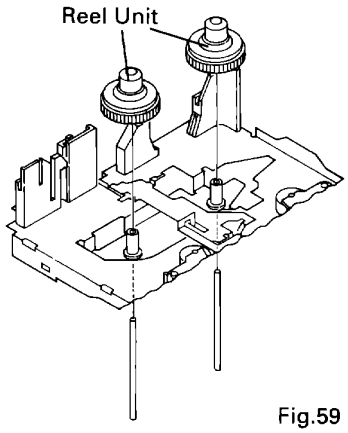


Fig.55

Replacement parts	Replacement and Disassembly procedure
2. Motor 3. Belt	① Unsolder the Motor lead. ② Flip the mechanism over. To avoid deformation, be cearful not to apply any schock to Cassette Holder and the Draw-In Arm. ③ Remove the Belt. ④ Remove the two Motor screws. ⑤ Remove the Motor. For assembly, reverse the above steps. Caution : 1. Use new Moter screws, because they are attached with adhesive. 2. The angle of Motor installation should be the same as the initial phase to reduce motor noises.  Fig.56
4. Pinch Holder	① Follow the same procedures 1to13 for Head replacement. ② Remove the Pinch Spring.(1),(2) ③ Remove the Pinch Holder unit. (disengage the retainer pawl) Unhook the Pinch Spring from the central bend of the Head Base, and remove the spring from the Pinch Holder pawl (N or R).  Fig.57
5. Pinch Roller	① Remove the Draw-In Arm and the Cassette Holder. ② Remove the Pinch Roller from the Pinch Holder. ③ Assemble a new Pinch Roller. (See "Tips for Assembly" for details.) Caution : After replacing the roller, apply grease to its shaft.  Fig.58
6. Reel Unit	① Remove the Draw-In Arm and the Cassette Holder. ② Insert a rod of about ϕ 2 mm into the Reel Unit fulcrum hole, and push it to remove the Reel Unit. Caution : When replacing the Reel Unit, apply grease to the retainer boss on the chassis.  Fig.59

7. CAUTIONS ON ASSEMBLY AND DISASSEMBLY

1. Do not bend the retainer pawls beyond their allowable tension. Or the pawls will become deformed, decreasing their ability to hold parts in place.
2. A lot of plastic parts are used for the chassis. Do not subject them to shock.
3. Do not push down the Cassette Holder in Eject mode. Or it will become deformed, because it has no buffer.

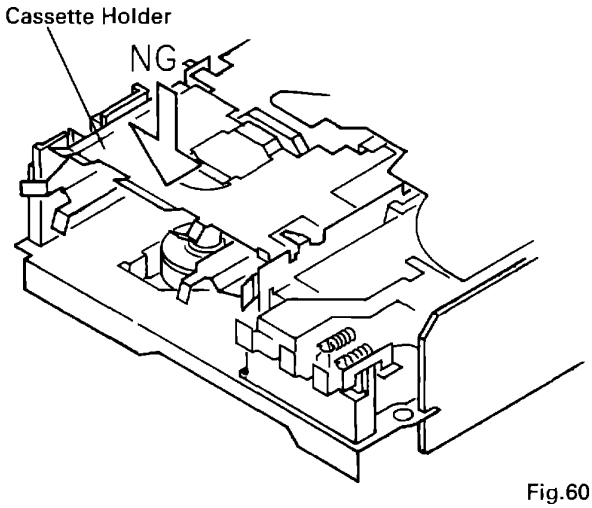


Fig.60

4. The Pressure spring for the Play Idler Arm is also used to ground the shaft holder to the chassis. Avoid any deformation of the spring.

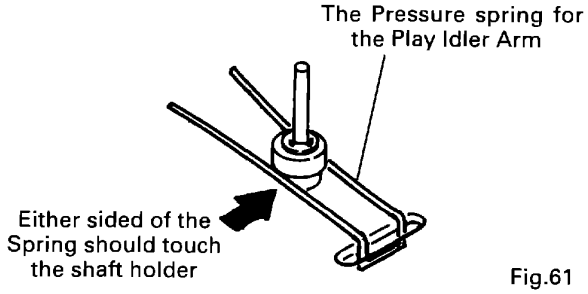


Fig.61

5. The rotation system is exposed, because there is no bottom cover. Handle the mechanism with care (to avoid deformation, loss of parts, damage)

8. TIPS FOR ASSEMBLY

● Removing/inserting the Frame Seating Spring from/into the Removable Block

< Removal >

* Set the Cassette Holder into the seating position.

Use a pair of tweezers or similar tools to grasp the Seating Spring and pull it out in the direction of the arrow.

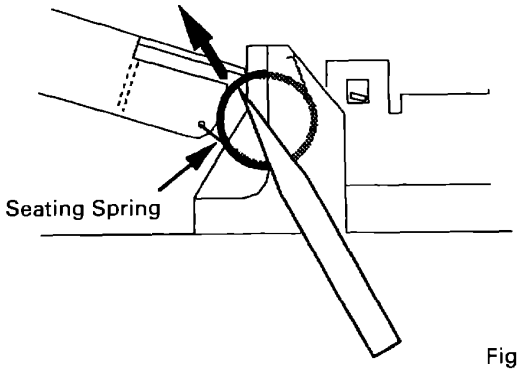


Fig.62

< Installation >

* Set the Cassette Holder into the seating position.

1. Hook the Seating Spring into the spring hole of the Cassette Holder.
2. Grasp the spring with the tweezers and push in the direction of the arrow.

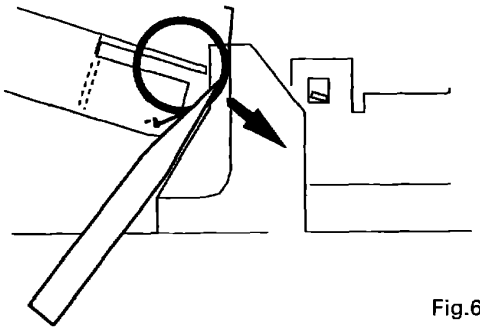


Fig.63

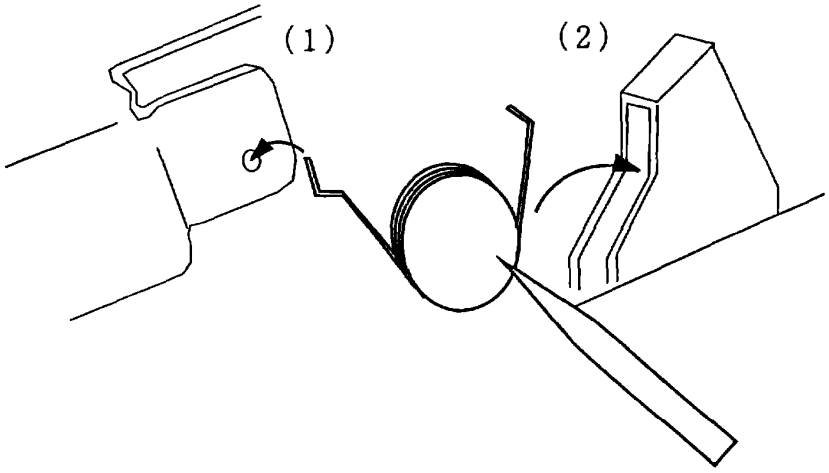


Fig.64

● Installing the Pressure Spring for the Load Cam Gear onto the Guide Bracket

The Pressure spring for the Load Cam Gear is installed on the rear of the Guide Bracket. When the Guide Bracket is removed for head replacement, this spring is also removed.
The Spring can be installed easily by the following method.

1. Hook the Pressure spring in sequence of (1), (2) and (3). In step (3), temporarily hook the spring on the Temporary Hook.

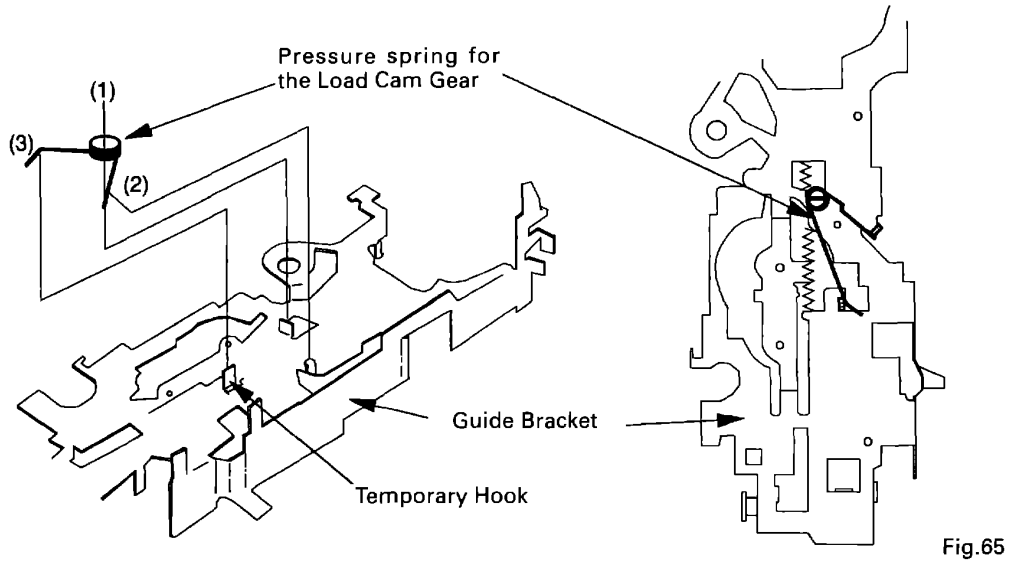


Fig.65

2. Install and fasten the Guide Bracket onto the Mechanism Chassis, then press the Pressure spring for the Load Cam Gear downward to release temporary hooking.

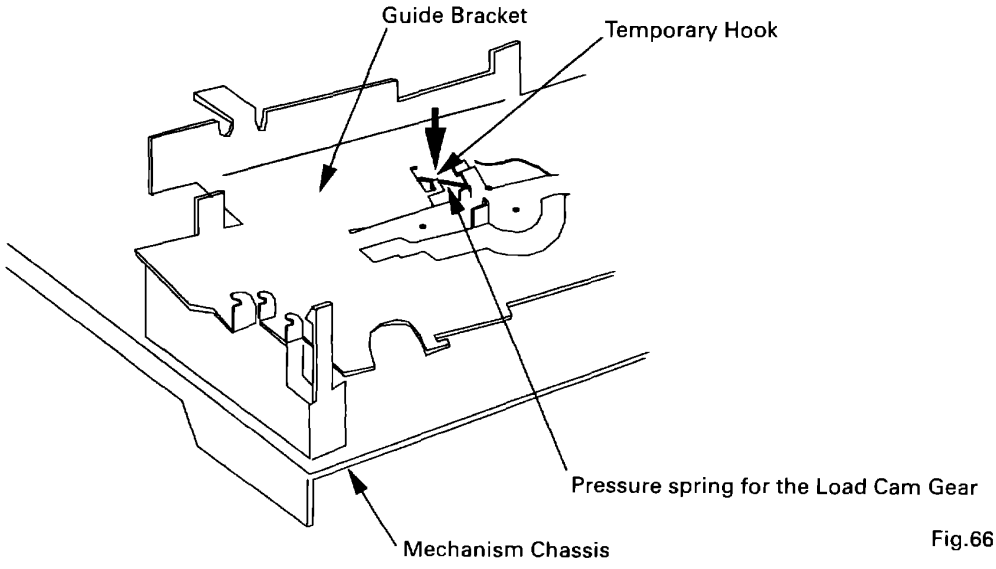


Fig.66

● Replacement of the Pinch Roller

The 2M mechanism uses snap-fit holders for the Pinch Roller. Should the rubber roller be found defective, it can be replaced easily without disassembling the mechanism.

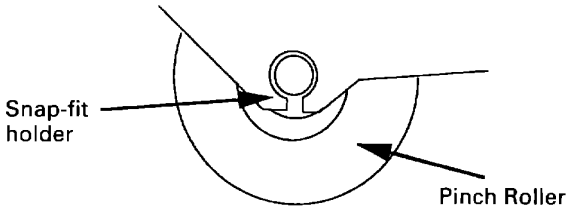


Fig.67

< Removal >

1. Set the Cassette Holder into the seating position.
2. Insert a pair of tweezers into the space through which the Pinch Roller is visible. Grasp the white plastic end of the roller shaft at the top of the Pinch Roller with the tweezers and pull it in the direction or the arrow. Remove the upper part of the roller shaft from the snap-fit holder.
3. Pull the rubber roller with the tweezers to remove the lower portion of the roller shaft from the snap-fit holders.

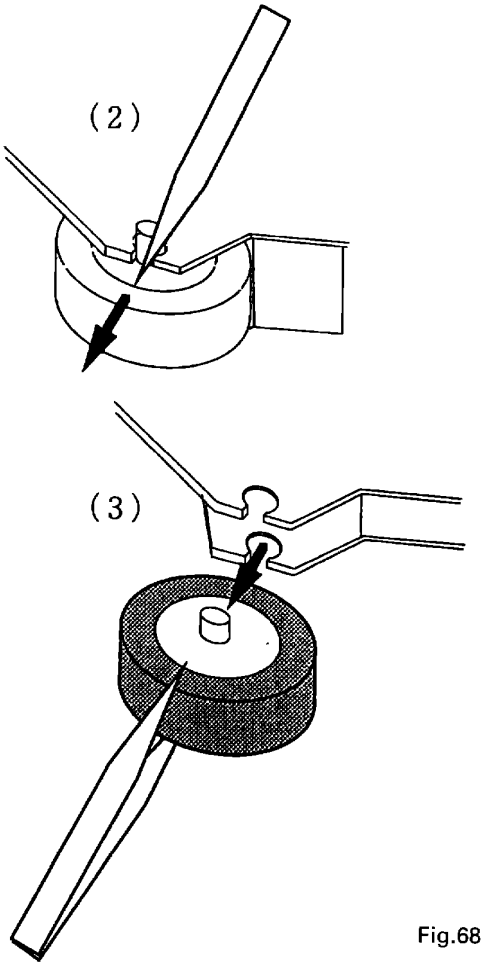


Fig.68

< Installation >

1. Position the cassette mechanism so that the head faces upward.
2. Place a new Pinch Roller on the top of the snap-fit holders.
3. Press the rubber roller with the tweezers to push the Pinch-Roller shaft into the shaft holders of the snap-fit system.

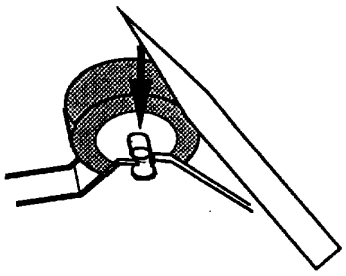


Fig.69

9. ADJUSTMENT

● Tape-speed adjustment

Adjust with a ceramic screwdriver.
Clockwise to increase ..... ⊕
Counterclockwise to decrease ..... ⊖
Adjustment value : 3030 Hz at normal start
Spec. : 3030 Hz ± 60 Hz (4.76 cm/s $^{+3}_{-1}$%)

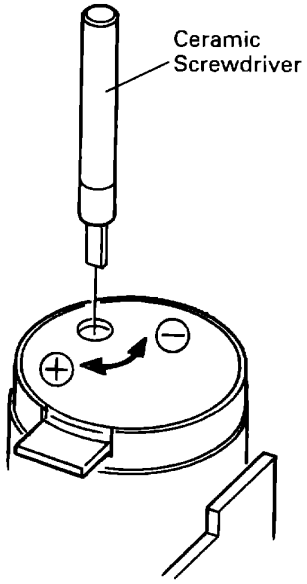


Fig.70