CHAPTER 5: SECOND PAPER FEED SECTION

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Mechanism

1. Second Paper Feed Mechanism

When the main motor operates during printing, the Main cam [A] rotates clockwise.

The Main cam [A] rotation moves the Timing gear [C] via the Cam follower arm [B], and this rotates the Timing cam [D].

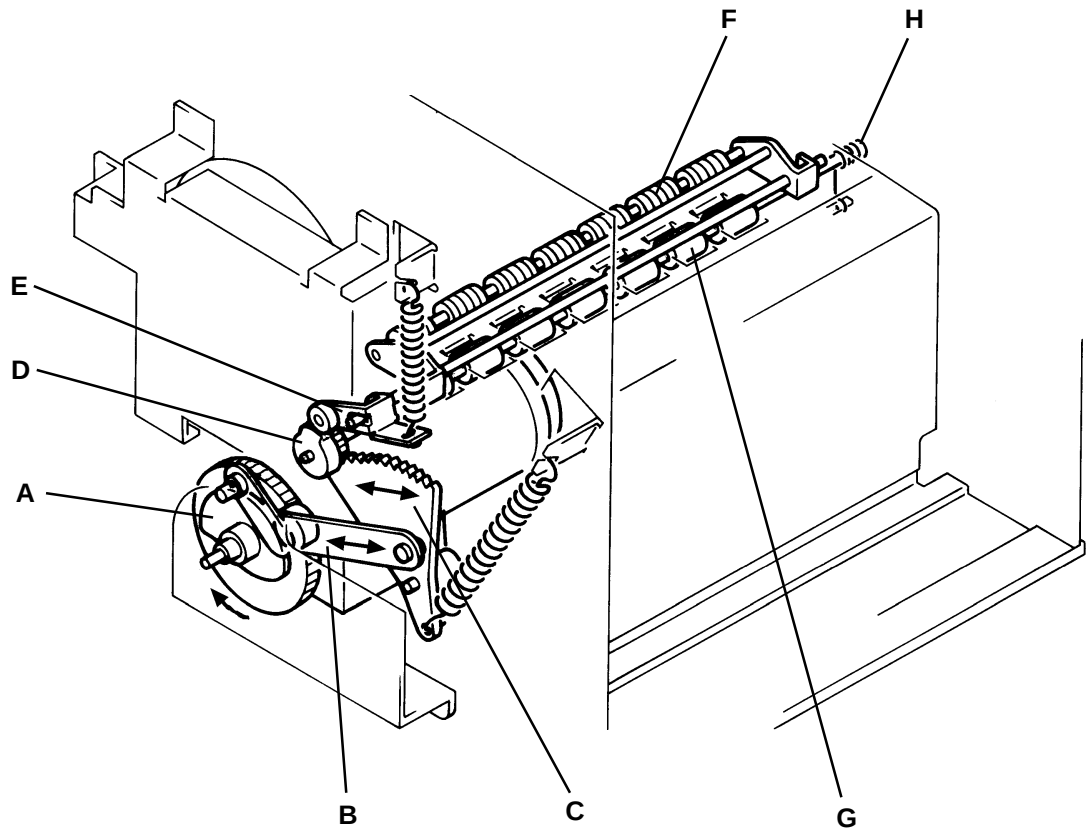
The Timing cam [D] contains a one-way clutch, so that when it rotates counter-clockwise, the rotation is transferred to the Timing roller [G], but when it rotates clockwise, the rotation is not transferred.

The Load spring [H] continuously applies a load to the Timing roller [G] to ensure that the Timing roller [G] stops immediately when it is not rotated.

The Timing roller [G] rotation also rotates the Guide roller [F] clockwise.

As the Timing cam [D] rotates, the protrusion pushes against the Timing lever [E] and raises the Guide roller [F].

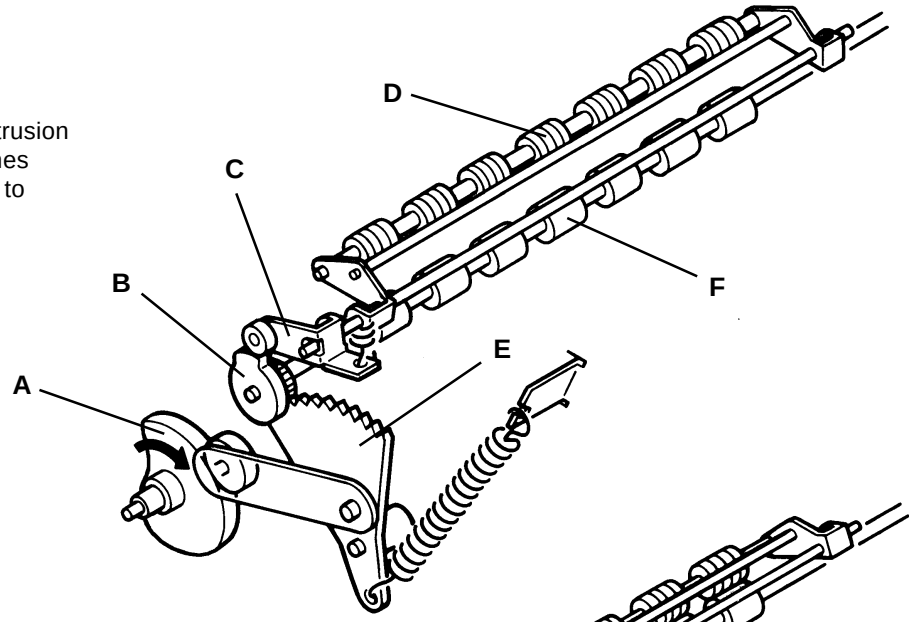
During printing, the Guide roller [F] moves down and contacts the Timing roller [G] during the first paper feed operation, and then rises once the Timing roller [G] stops rotating.



A: Main cam
B: Cam follower arm
C: Timing gear
D: Timing cam
E: Timing lever
F: Guide roller
G: Timing roller
H: Load spring

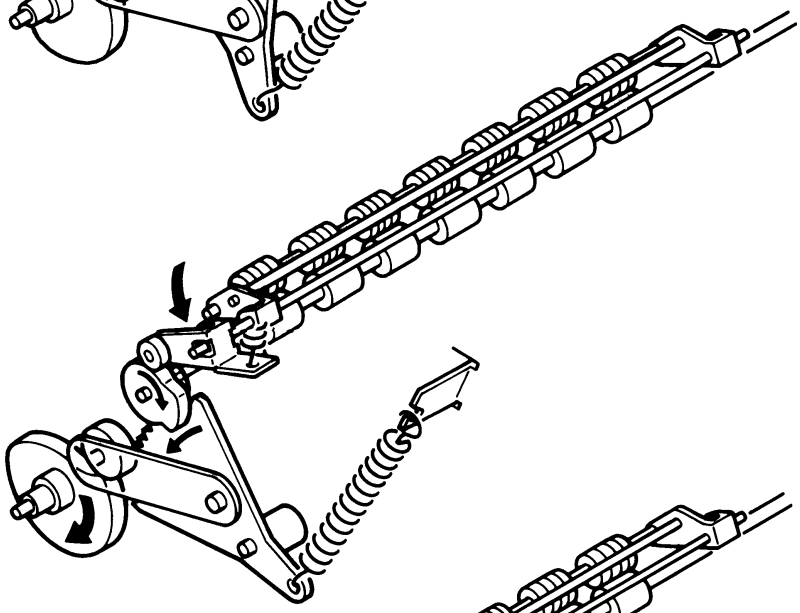
Drum Position-A

At Drum position-A, the protrusion on the Timing cam [B] pushes against the Timing lever [C] to raise the Guide roller [D].



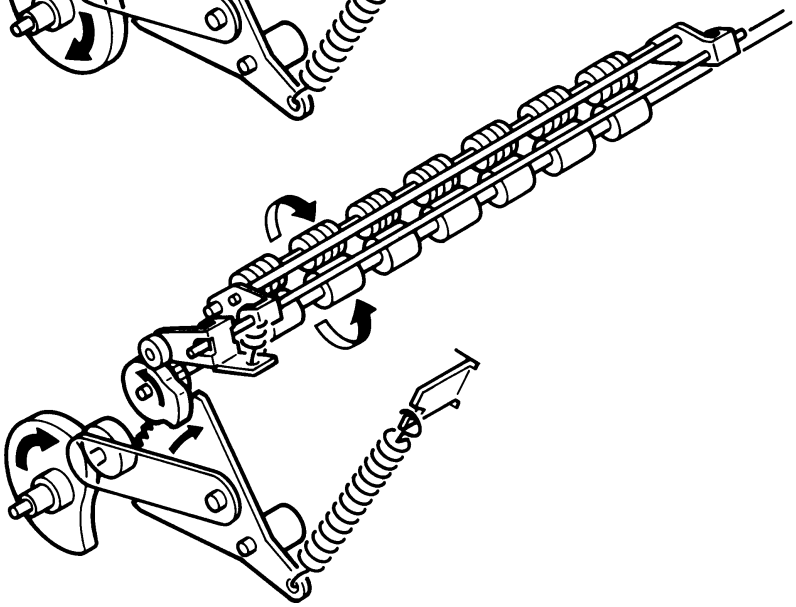
First paper feed start

When the first paper feed starts and the paper is fed in, the Timing gear [E] is rotated in the direction, indicated by arrow mark, by the Main cam [A]. This rotates the Timing cam [B], which lowers the Timing lever [C] to lower the Guide roller [D].



Second paper feed start

When the first paper feed ends, the Timing gear [E] is rotated by the Main cam [A] in the direction indicated by the arrow mark. This rotates the Timing cam [B] and also causes the timing roller [D] to rotate, feeding the paper. (The Guide roller [D] rotates on contact with the Timing roller [F].)



A: Main cam
B: Timing cam
C: Timing lever
D: Guide roller
E: Timing gear
F: Timing roller

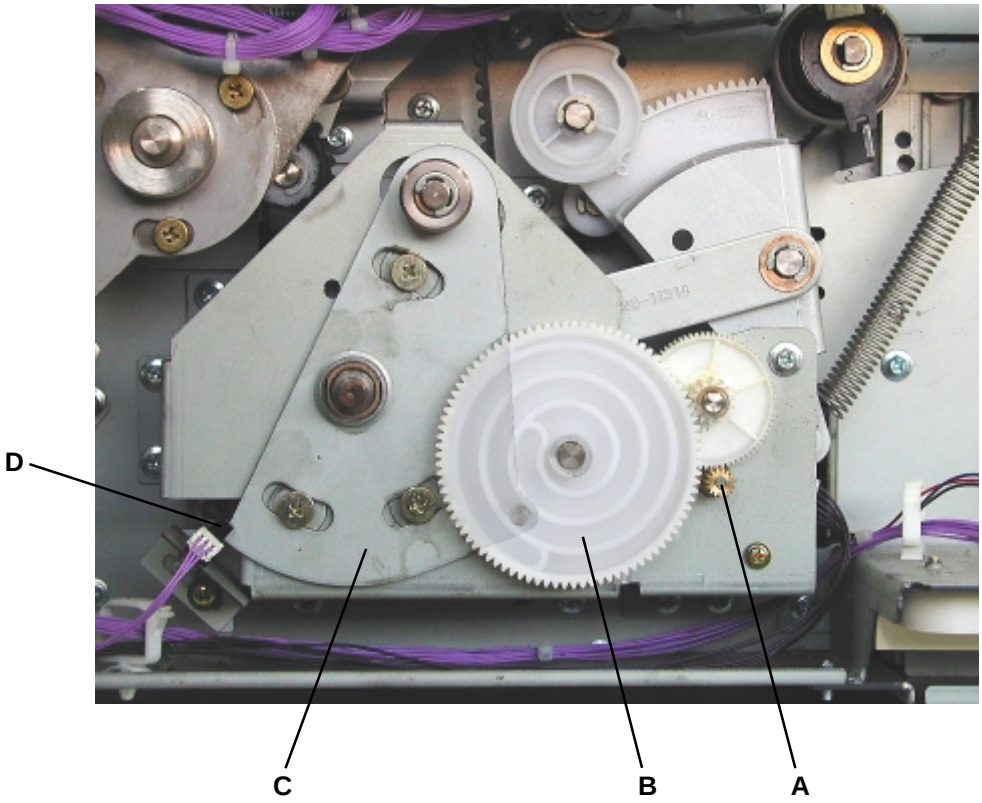
2. Vertical Print Positioning Mechanism

Pressing the <◀> or <▶> print position keys on the panel activates the Print positioning pulse motor [A], which rotates the Print positioning adjuster cam [B] to move the Print positioning plate ass'y [C].

The Print positioning plate ass'y [C] motion moves the Print positioning lever ass'y [E], changing the timing with the main cam.

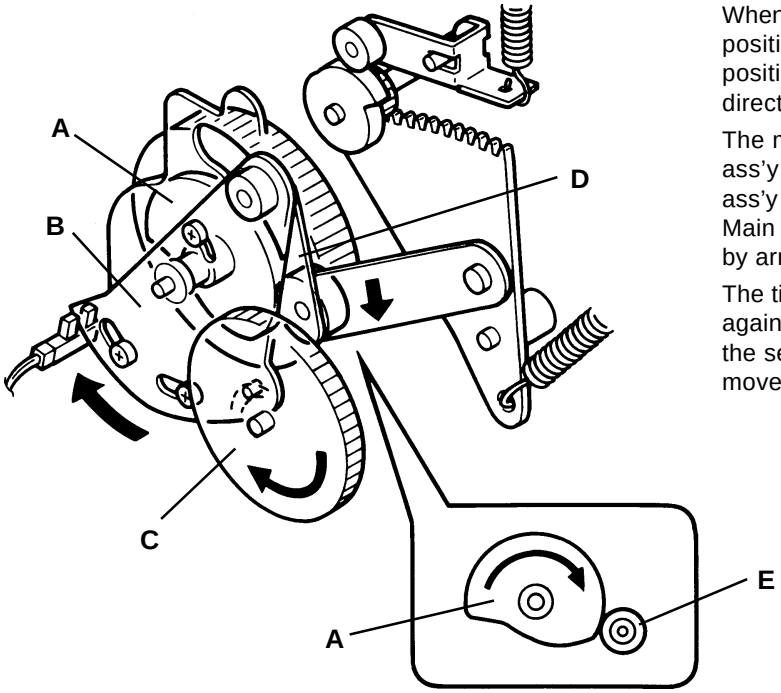
The second paper feed (timing roller rotation start) timing is thus changed, changing the vertical printing position.

The Vertical centering sensor [D] checks the centering of the print positioning.



A: Print-positioning pulse motor
B: Print-positioning cam (with the spiral groove on its back side)
C: Print-positioning plate ass'y
D: Vertical centering sensor
E: Print-positioning lever ass'y

1) Pressing the <▶> (up) key on the panel

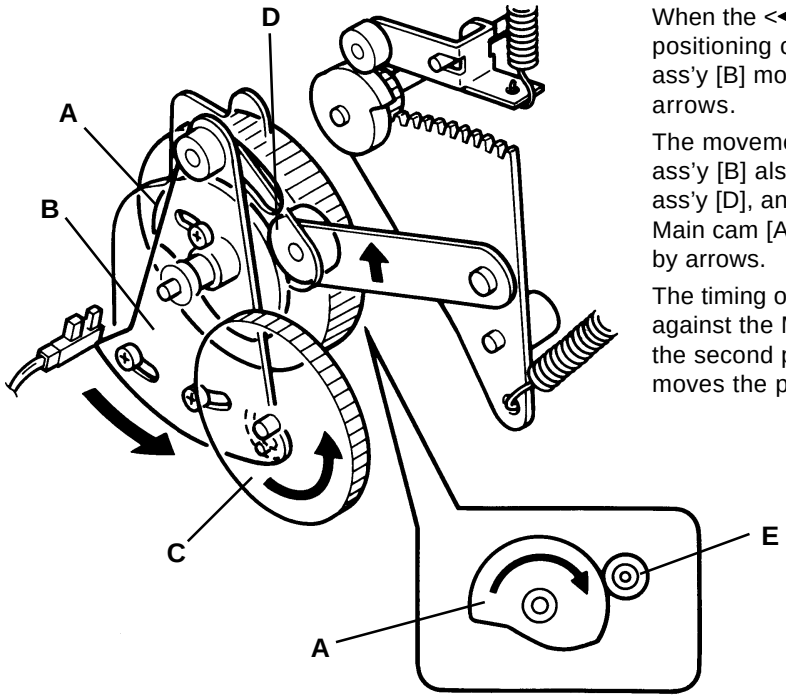


When the <▶> key is pressed, the print-positioning adjuster cam [C] and print-positioning adjuster plate ass'y [B] move in the directions indicated by arrows.

The movement of the Print-positioning plate ass'y [B] also moves the Print-positioning lever ass'y [D], and the bearing [E] in contact with the Main cam [A] moves in the direction indicated by arrows.

The timing of the contact of the bearing [E] against the Main cam [A] is delayed, causing the second paper feed timing to delay, and moves the print position up.

2) Pressing the <◀> (down) key on the panel



When the <◀> key is pressed, the Print-positioning cam [C] and Print-positioning plate ass'y [B] move in the directions indicated by arrows.

The movement of the Print-positioning plate ass'y [B] also moves the Print-positioning lever ass'y [D], and the bearing [E] in contact with the Main cam [A] moves in the direction indicated by arrows.

The timing of the contact of the bearing [E] against the Main cam [A] is advanced, causing the second paper feed timing to advance, and moves the print position down.

A: Main cam
B: Print-positioning plate ass'y
C: Print-positioning cam
D: Print-positioning lever ass'y
E: Bearing

Removal and Assembly

1. Removing the Guide Roller Ass'y

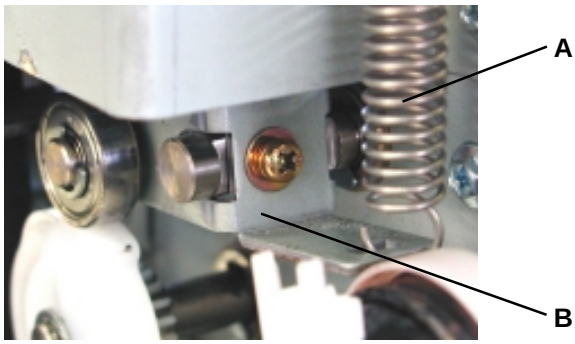
(1) Pull out the print drum and remove the following covers.
- Front door
- Front cover
- Rear cover

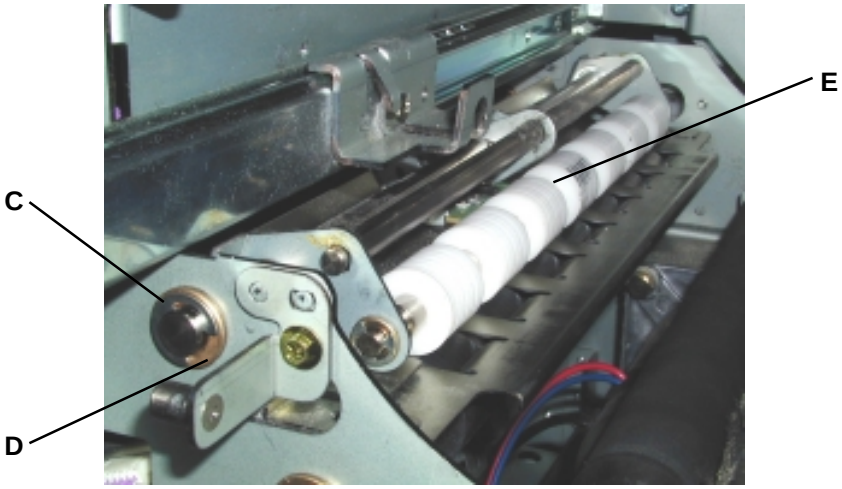
(2) Unplug the three connectors and remove the controller. (mounting screws M4 x 6: 2 pcs)

(3) Remove the Guide roller spring [A].

(4) Remove the Timing lever ass'y [B]. (mounting screws M4 x 8: 1 pc)

(5) Remove the E-rings [C] and bearing bushes [D] at both front and rear, and then remove the Guide roller ass'y [E].





A: Guide roller spring
B: Timing lever ass'y
C: E-ring
D: Bearing bush
E: Guide roller ass'y

2. Removing the Paper Guide Plate Ass'y

(1) Pull out the print drum and remove the following covers.

- Front door
- Front cover
- Rear cover
- Master-removal lower cover

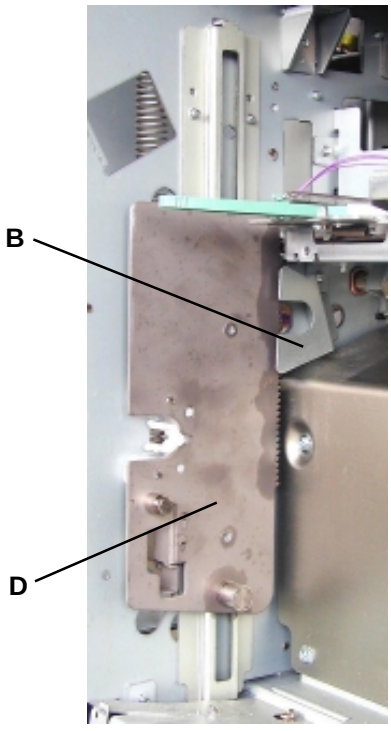
(2) Remove the following components.

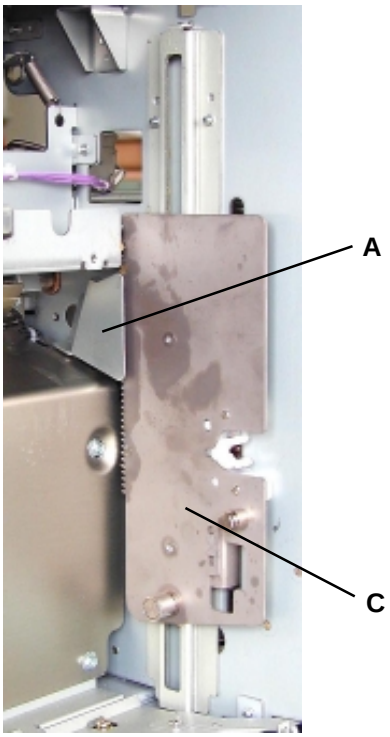
- Paper feed tray unit
- Stripper unit
- Paper feed clutch
- Pickup roller shaft ass'y
- Elevator motor
- Guide roller ass'y

(3) Unplug the connectors from the Main PCB and remove the Main PCB together with its mounting bracket. (mounting screws M3 x 6: 5 pcs)

(4) Loosen the retaining screws, and remove Guard plate F [A] and Guard plate R [B].

(5) Remove Elevator rack front [C] and Elevator rack rear [D]. (mounting screws M4 x 8: 4 pcs each)

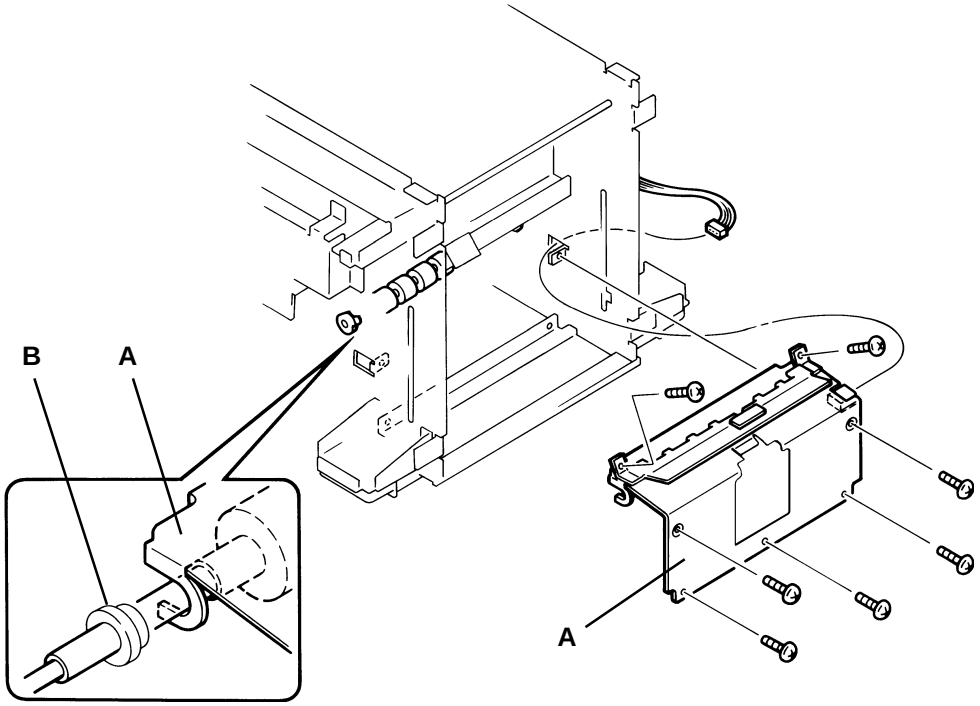




A: Guard plate F
B: Guard plate R
C: Elevator rack front
D: Elevator rack rear

REMOVING THE PAPER GUIDE PLATE ASS'Y

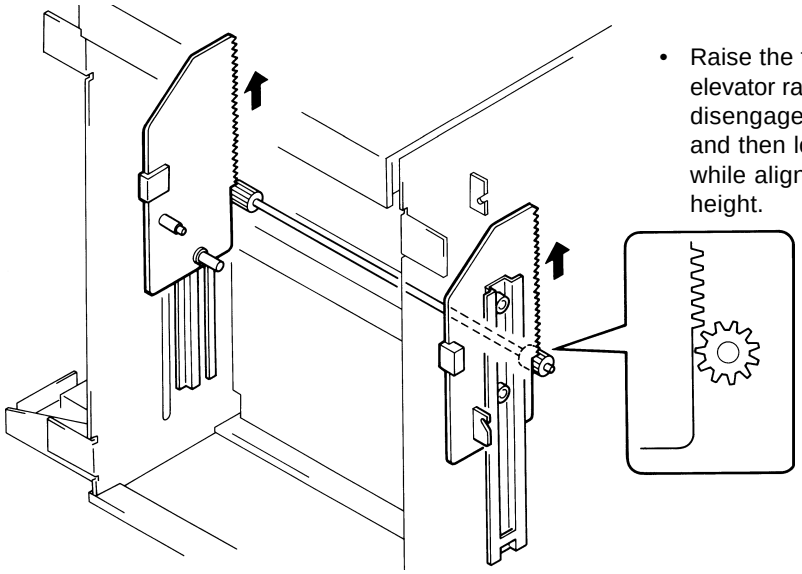
(6) Unplug the connector from the Paper guide plate [A], remove the mounting screws (M4 x 8: 7 pcs), and then remove the Paper guide plate [A].



Enlarged view

[Precautions on Reassembly]

- Hook the Paper guide plate [A] onto the timing roller bearing bushes [B]. (See enlarged view.)
- Align the half-pierced sections of the front and rear elevator racks.
- Align the gear height for the front and rear elevator racks.



- Raise the front and rear elevator racks fully to disengage the gears, and then lower them while aligning the height.

A: Paper guide plate
B: Bearing bush

3. Removing the Paper Sensor

(1) Pull out the print drum and remove the following covers.

- Front door
- Front cover
- Rear cover
- Master-removal lower cover

(2) Remove the following components.

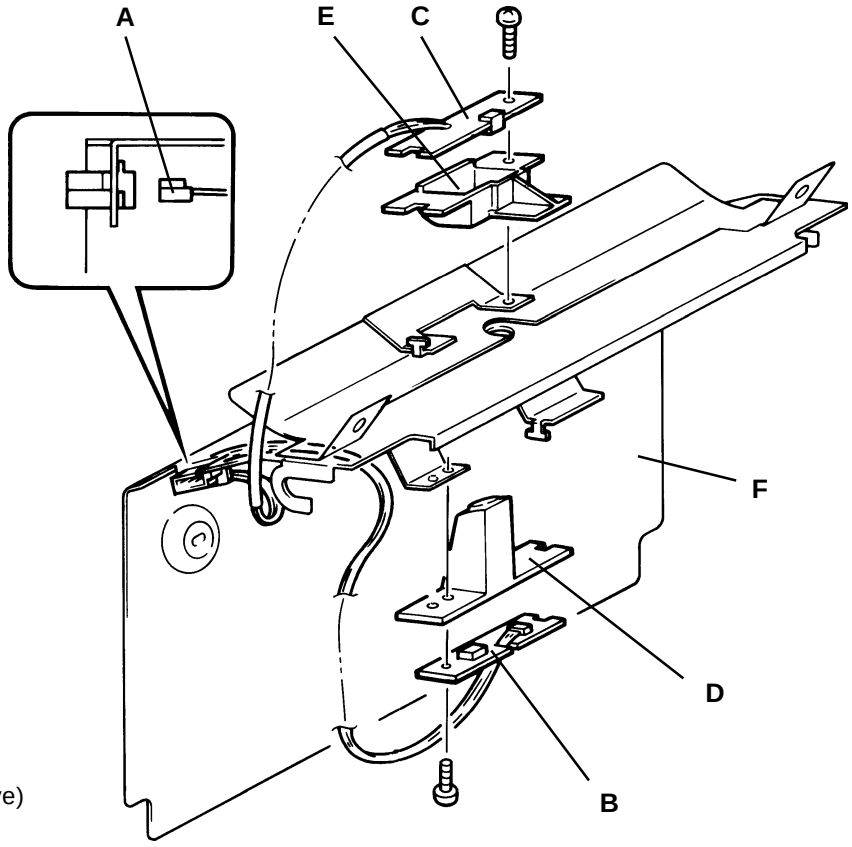
- Paper feed tray unit
- Stripper unit
- Paper feed clutch
- Pickup roller shaft ass'y
- Elevator motor
- Guide roller ass'y
- Paper guide plate

(3) Unplug the Paper sensor connector [A] from the Paper guide plate [F].

(4) Remove the Paper sensor (send) [B] mounting screw (M3 x 8: 1 pc) and Paper sensor (receive) [C] mounting screw (M3 x 8: 1 pc), remove the Paper-sensor covers [D] and [E], and then remove Paper sensors [B] and [C] from the Paper guide plate [F].

[Precautions on Reassembly]

- Hook the Paper sensors onto the retaining brackets of the Paper guide plate.



A: Connector
B: Paper sensor (send)
C: Paper sensor (receive)
D: Paper-sensor cover (send)
E: Paper-sensor cover (receive)
F: Paper guide plate

4. Removing the Timing Roller

(1) Remove the following covers.

- Front door
- Front cover
- Rear cover
- Master-removal lower cover

(2) Remove the following components.

- Paper feed tray unit
- Stripper unit
- Paper feed clutch
- Pickup roller shaft ass'y
- Elevator motor
- Guide roller ass'y
- Paper guide plate

(3) Remove the E-ring from the rear of the Timing roller [A], then remove the Timing cam [B].

(4) Remove the E-ring and collar [C] from the front of the Timing roller [A], then remove the Load spring [D].

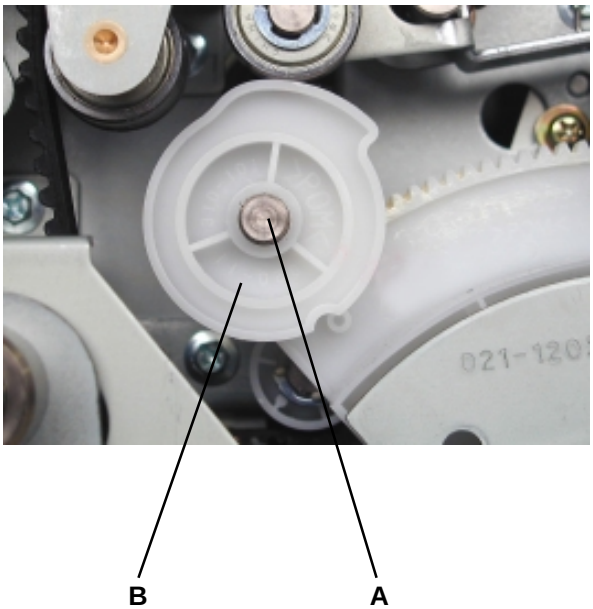
(5) Remove the E-rings and bearing bushes [E] from both ends of the Timing roller [A], and then remove the Timing roller [A].

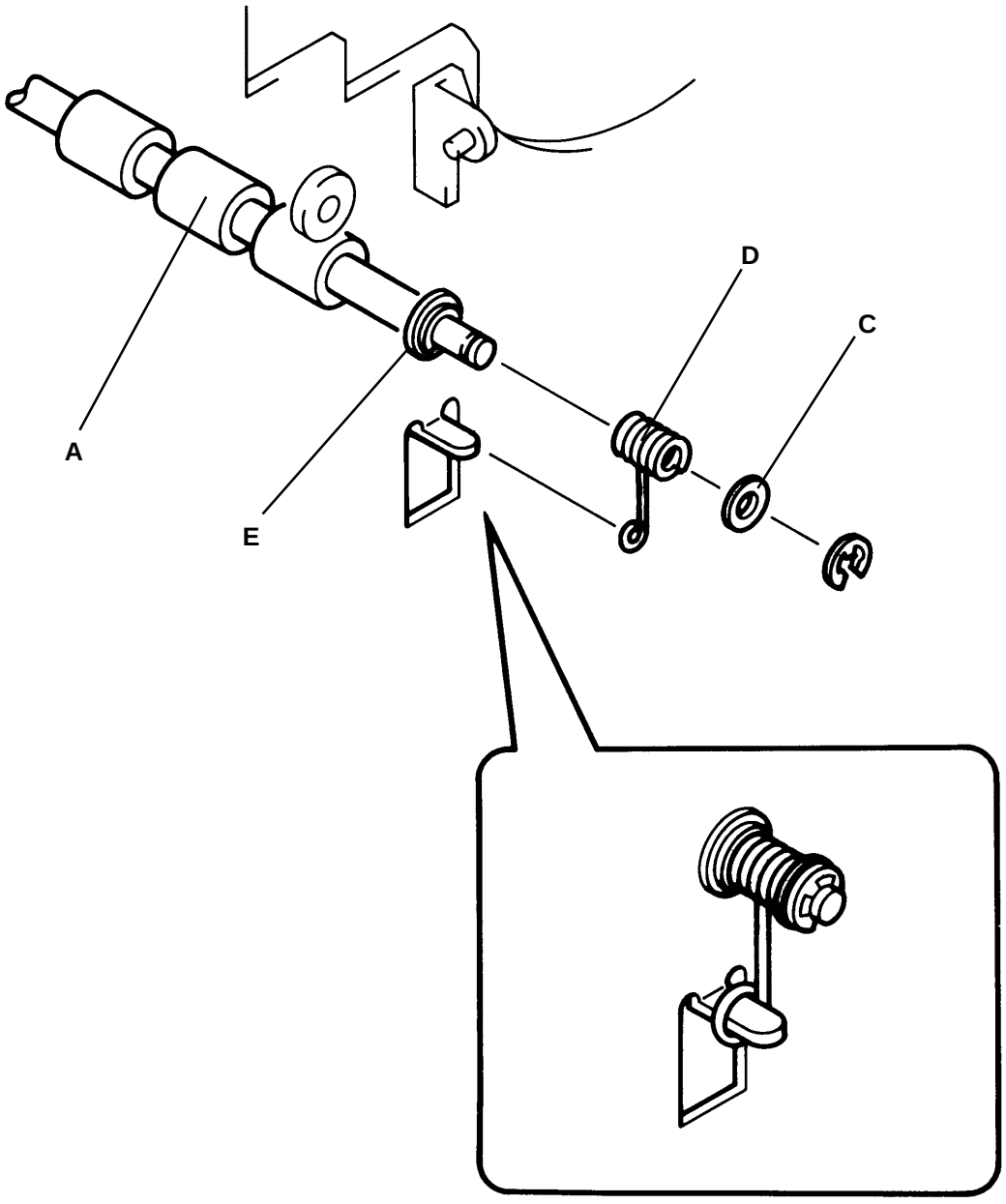
[Precautions on Reassembly]

- Note the direction in which the load spring is mounted. (See diagram.)

[Adjustment after Reassembly]

- Adjust the timing cam mounting position.





Load spring mounting direction

A: Timing roller
B: Timing cam
C: Collar
D: Load spring
E: Bearing bush

5. Removing the Print-Positioning Unit

(1) Remove the rear cover.

(2) Remove the controller.

(3) Remove the Timing gear spring [A].

(4) Unplug the connectors on the Vertical centering sensor [B] and Print-positioning pulse motor [C].

(5) Remove the E-ring on the Cam follower arm [D], and remove the Cam follower arm [D] and Washers [F] (one each on the front and rear of the Cam follower arm [D]) from the Timing gear [E].

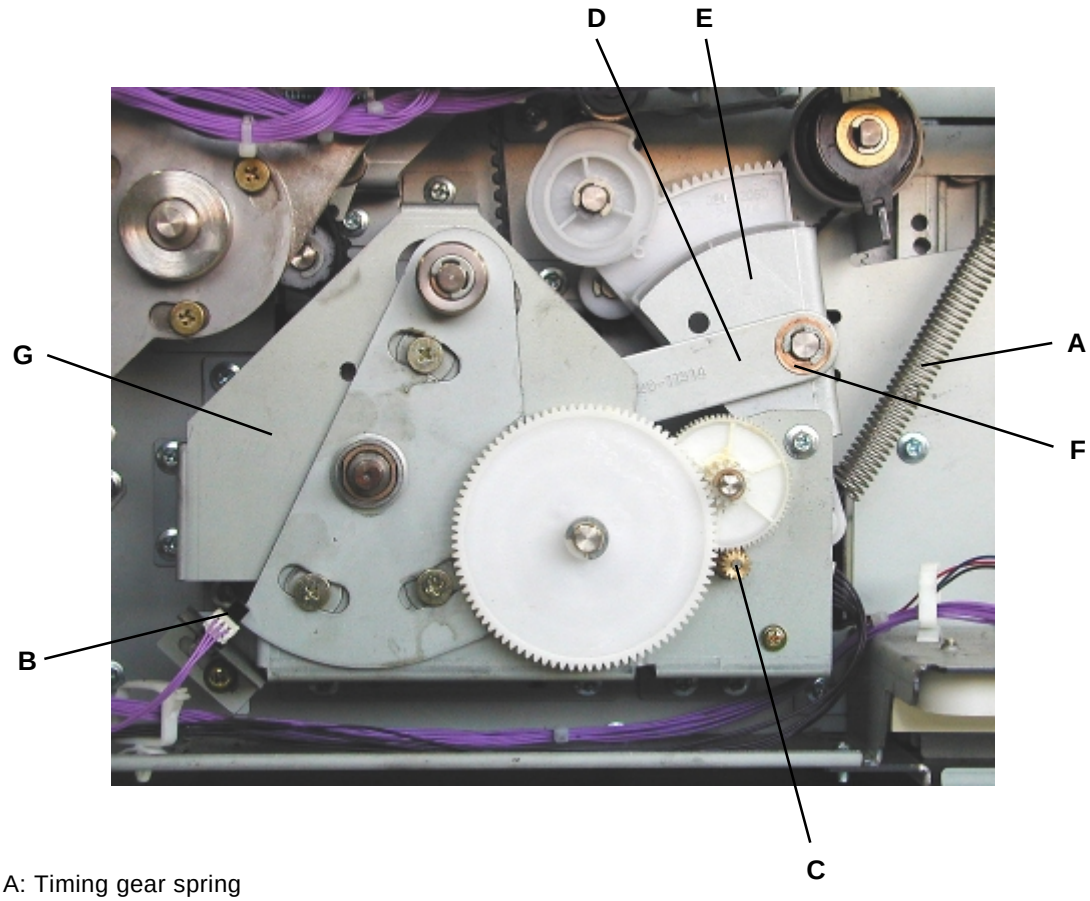
(6) Remove the mounting screws (M4 x 8: 8 pcs) on the Print-positioning unit [G], and then remove the Print-positioning unit [G].

[Precautions on Reassembly]

- When mounting the print-positioning unit [G], the Timing gear [E] should be turned all the way in the clockwise direction.

[Adjustment after Reassembly]

- Adjust the timing cam mounting position.



A: Timing gear spring
B: Vertical centering sensor
C: Print-positioning pulse motor
D: Cam follower arm
E: Timing gear
F: Washer
G: Print-positioning unit

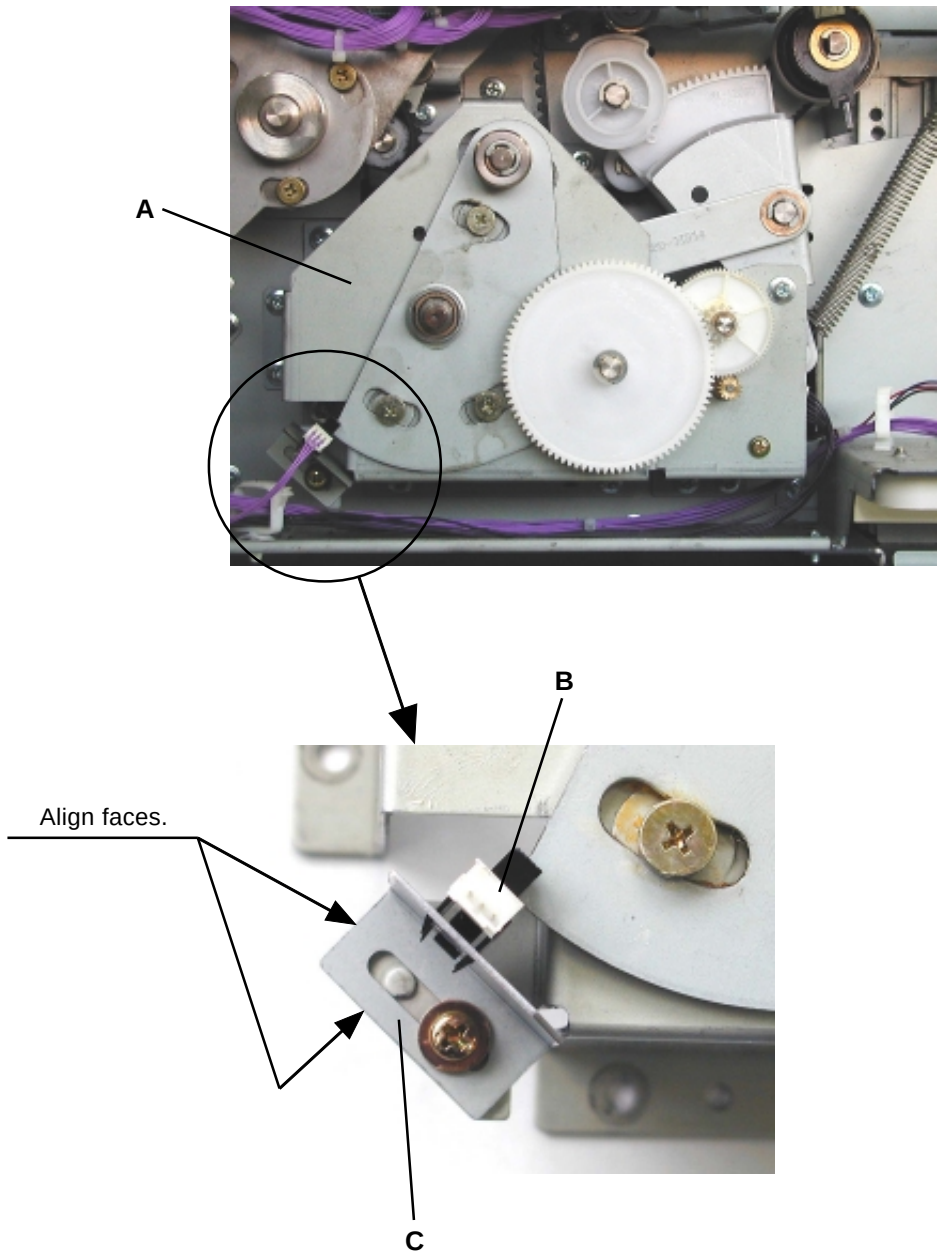
6. Removing the Vertical Centering Sensor

(1) Remove the rear cover.

(2) Unplug the connector, remove the mounting screw (3 x 6: 1 pc), and then remove the Vertical centering sensor [B] together with the Vertical centering sensor bracket [C].

[Precautions on Reassembly]

- Align the two faces of the Vertical centering sensor bracket [C] as shown in the photograph below.



A: Print-positioning base unit
B: Vertical centering sensor
C: Vertical centering sensor bracket

7. Removing the Print-Positioning Pulse Motor

(1) Remove the rear cover.

(2) Remove the following components.

- Controller
- Timing gear spring
- Print-positioning unit [A]

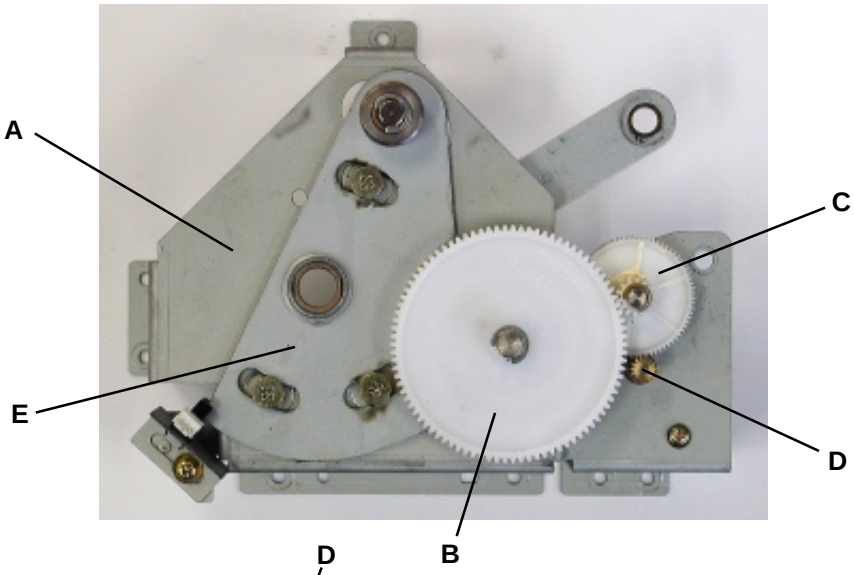
(3) Remove the E-ring and remove the Print-positioning cam [B].

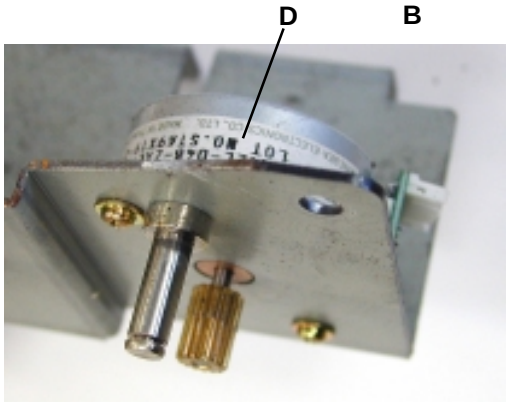
(4) Remove the E-ring and remove the Print-positioning intermediate gear [C].

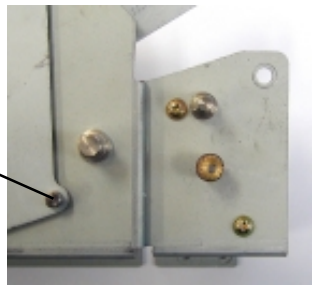
(5) Remove the mounting screws (M3 x 6: 2 pcs) on the Print-positioning pulse motor [D], and then remove the Print-positioning pulse motor [D].

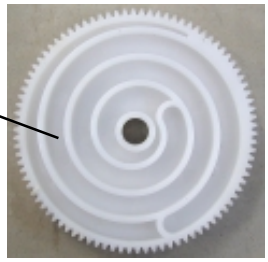
[Precautions on Reassembly]

- Insert the Print-positioning plate shaft [F] into the spiral groove [G] on the Print-positioning cam [B].









A: Print-positioning unit
B: Print-positioning cam
C: Print-positioning intermediate gear
D: Print-positioning pulse motor
E: Print-positioning plate ass'y
F: Print-positioning plate ass'y pin
G: Spiral groove on the Print-positioning cam

8. Removing the Timing Gear

(1) Remove the rear cover.

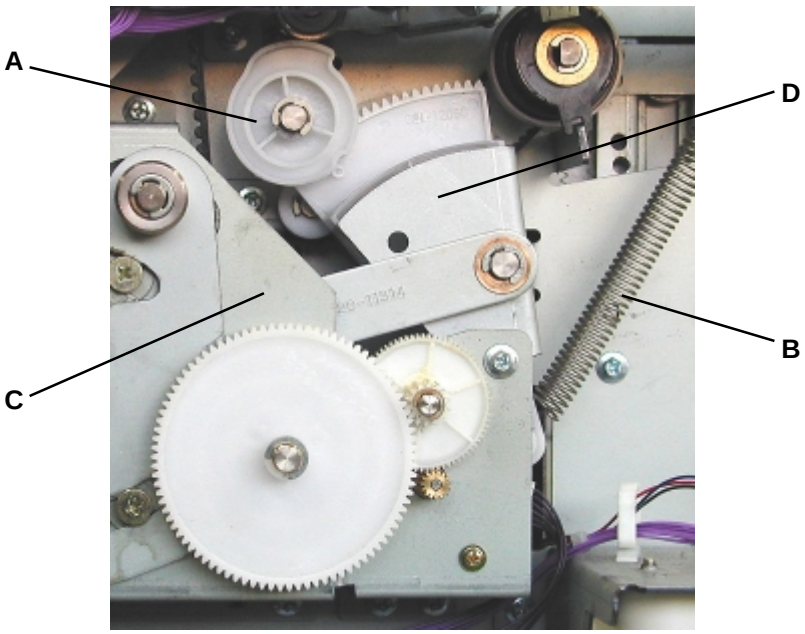
(2) Remove the following components.

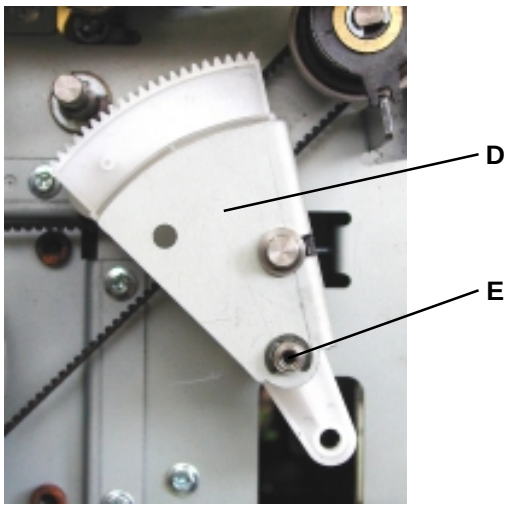
- Controller
- Guide roller spring
- Timing cam [A]
- Timing gear spring [B]
- Print-positioning unit [C]

(3) Remove the E-ring from the Timing gear shaft [E] and remove the Timing gear [D].

[Precautions on Reassembly]

- Adjust the mounting position of the timing cam.





A: Timing cam
B: Timing gear spring
C: Print-positioning unit
D: Timing gear
E: Timing gear shaft

Adjustment

1. Timing Cam Mounting Position

Procedure

(1) Move the print drum to position A, centralize the printing position, switch off the power, and then remove the rear cover.

(2) With the positioning marks aligned on the Main cam and print-positioning unit, check that the positioning marks [C] are aligned on the Timing gear [B] and Timing cam [A]. (See photograph 1.)

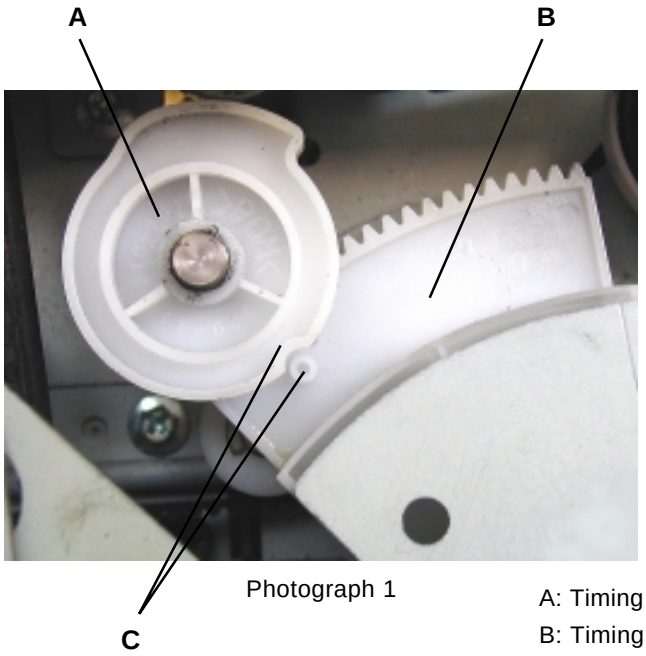
* The alignment may be offset in the direction shown in photograph 2, but not in the direction shown in photograph 3.

(3) If not aligned, remove the E-ring from the timing roller shaft and remove the timing cam [A].

(4) Mount the Timing cam [A] and Timing gear [B] with the positioning marks [C] aligned.

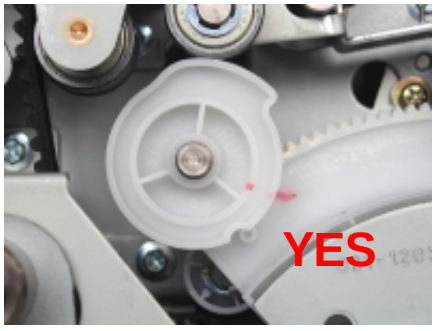
Symptoms

- If the timing cam is incorrectly positioned, the timing of the guide roller's vertical movement will be off, and paper jamming, print registration problems, or ghosting may occur.

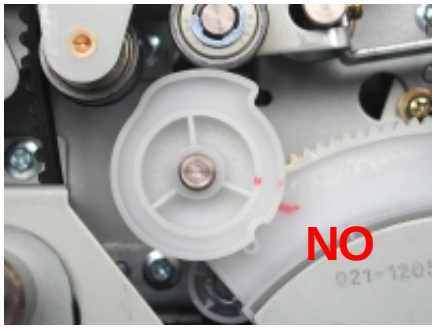


Photograph 1

A: Timing cam
B: Timing gear
C: Positioning marks



Photograph 2



Photograph 3