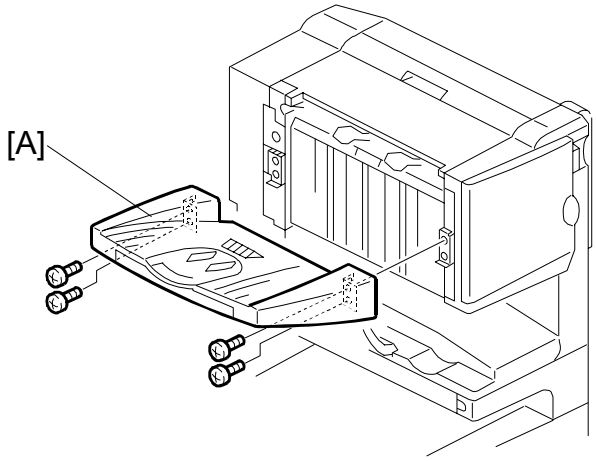
BOOKLET FINISHER

(Machine Code: B602)

1. REPLACEMENT AND ADJUSTMENT

1.1 REGULAR TRAY

Regular tray [A] (🔩 x 4)



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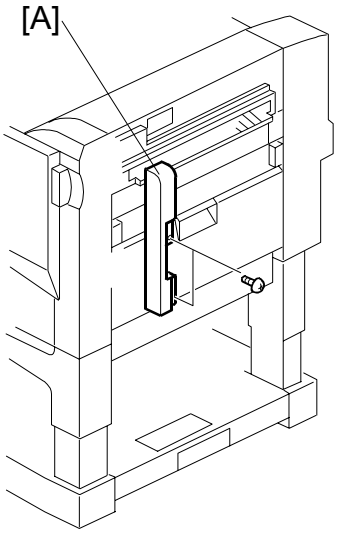
1.2 COVERS

1.2.1 FRONT COVER



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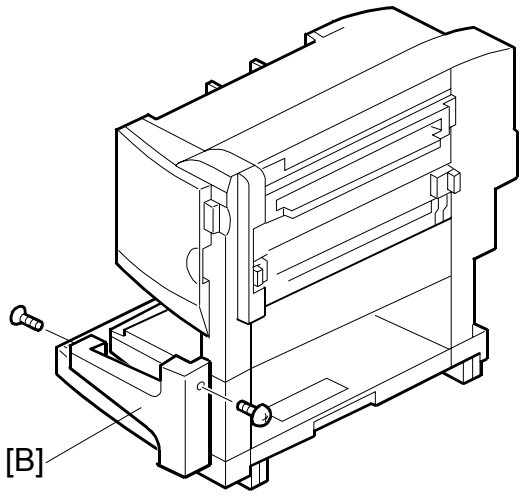

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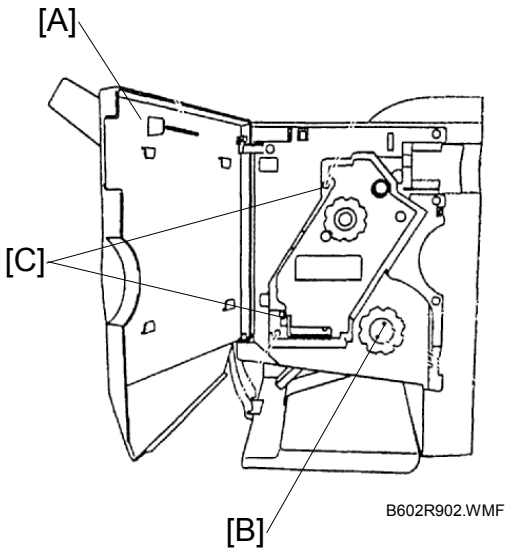
1. Joint guard [A] (🔩 x 2)
2. Front lower cover [B] (🔩 x 2)

3. Open the front door [A].
4. Release the stopper and remove the knob [B].
5. [C] x 2



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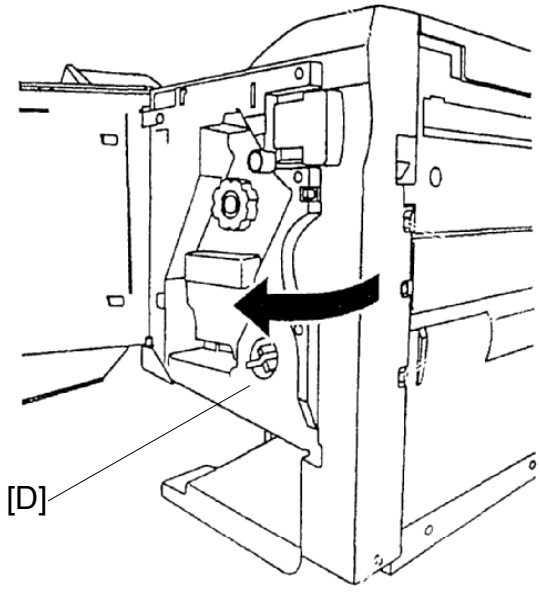
6. Front cover [D]



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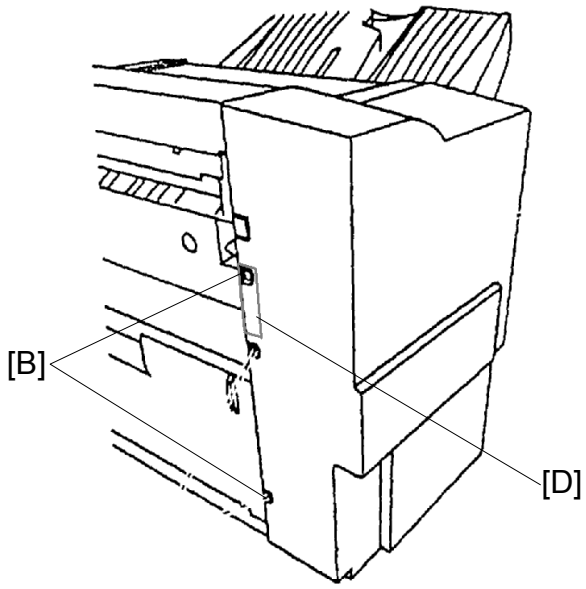
1.2.2 REAR COVER



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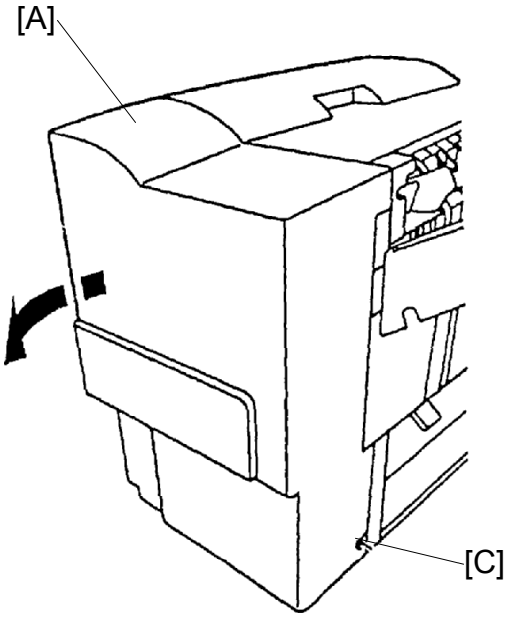

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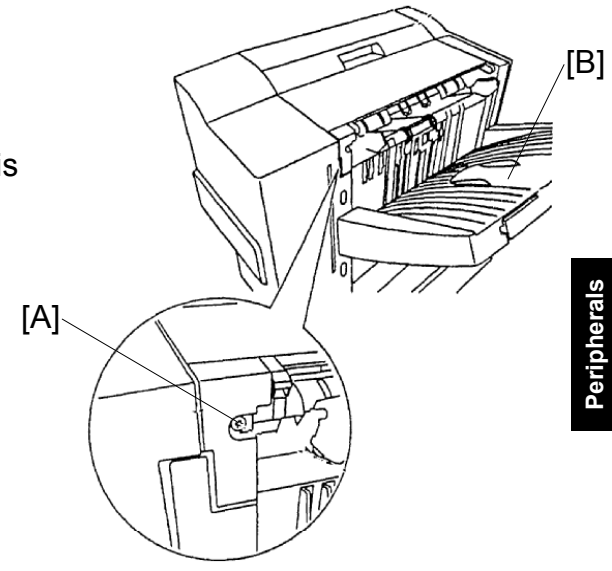
Rear cover [A] (☞ [B] x 2, ☞ [C] x 1)

NOTE: One of the screws is under the mylar [D].

1.2.3 LEFT/RIGHT TOP AND TRAY UPPER COVER

1. Front cover (☛ 1.2.1)
2. Rear cover (☛ 1.2.2)
3. Screw (on the right top cover holder) [A]

   NOTE: Remove the regular tray [B] if it is in its upper position.



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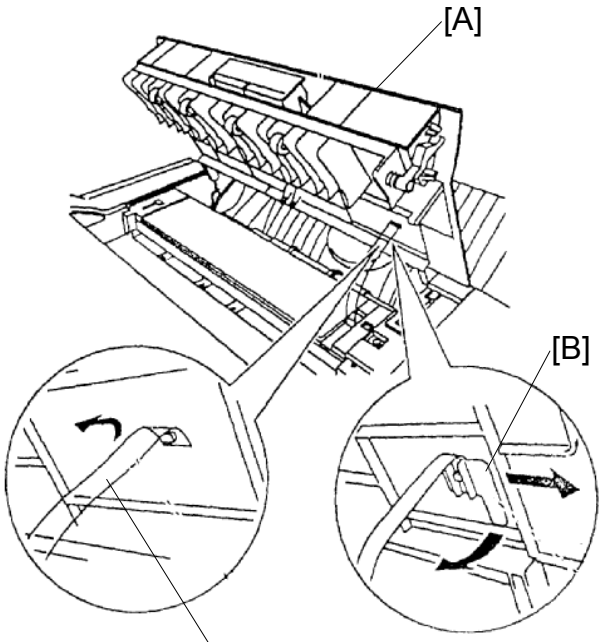

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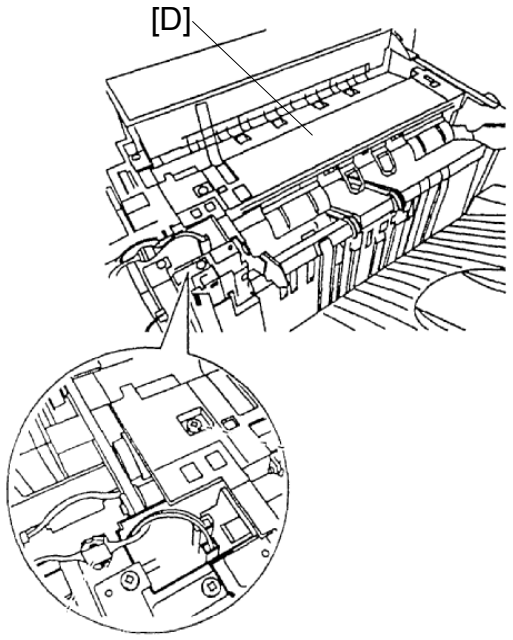

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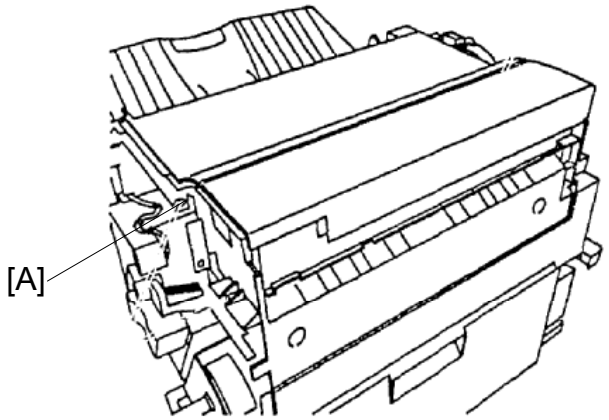
4. Open the left top cover [A].
5. Fastener [B]
6. Strap [C]
7. Tray upper cover [D] (x 1, x 1)
8. Right top cover (with the right top cover holder)

1.2.4 UPPER RIGHT COVER

1. Front cover (☛ 1.2.1)
2. Rear cover (☛ 1.2.2)
3. Left top cover (☛ 1.2.3)
4. [A] x 1



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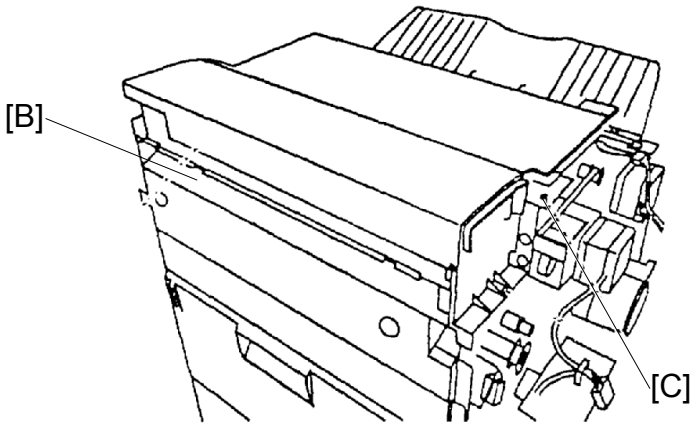
5. Upper right cover [B]
   ([C] x 1, 4 hooks)



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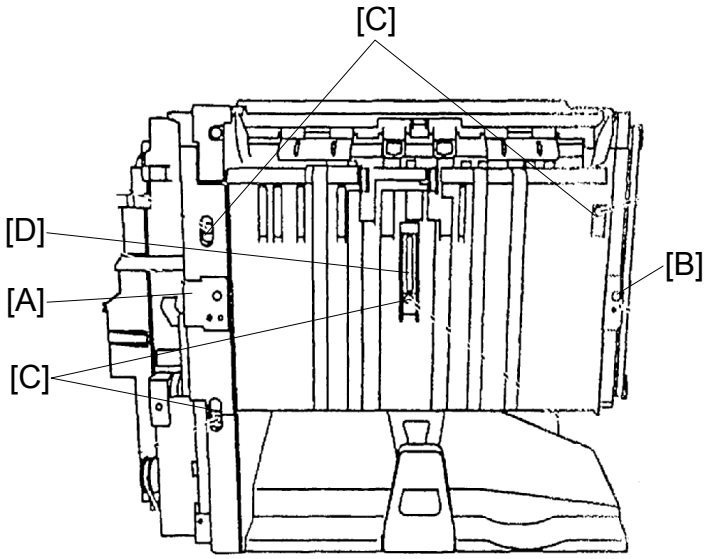
Peripherals

1.3 SIDE GUIDE

Removal

1. Regular tray (☛ 1.1)
2. Front cover (☛ 1.2.1)
3. Rear cover (☛ 1.2.2)
4. Regular tray holders [A][B] (☞ x 1 for each)
5. ☞ [C] x 4
6. Side-guide fastener [D]



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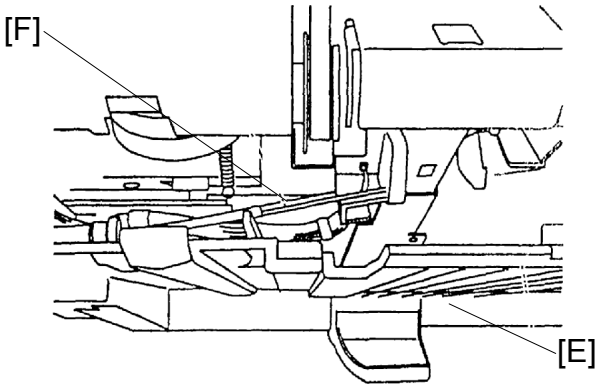
7. Open the side guide [E] and release the feeler link [F]. (The diagram shows the view seen from the top.)
8. Side guide



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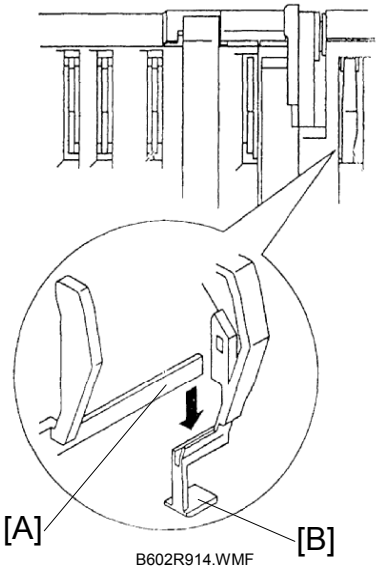
Reassembly

Place the feeler link [A] between the feeler [B] and the side guide. After installing the side guide, check that the feeler link moves with the feeler.



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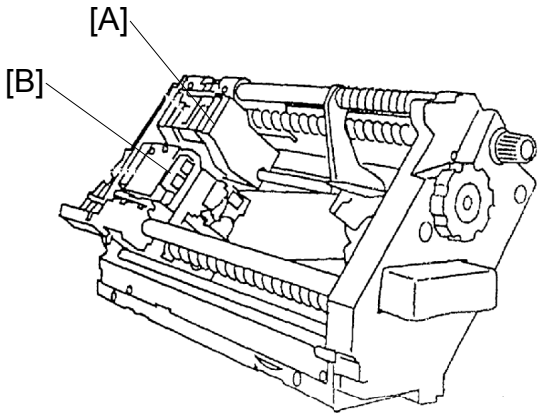
1.4 STAPLER UNIT

Removal

CAUTION: Do not remove the stapler [A] from the stapler unit. The stapler and the staple holder [B] must be in their original positions.



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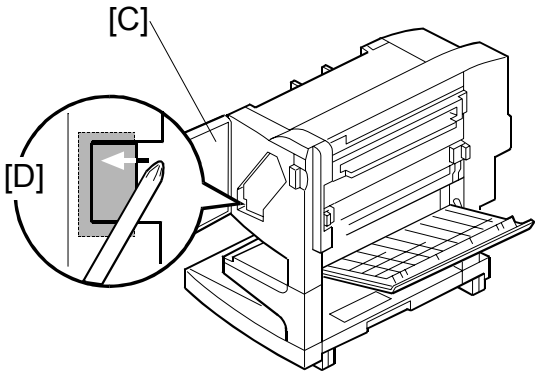
1. Open the front door [C].
2. Release the lever [D] and pull out the stapler unit.



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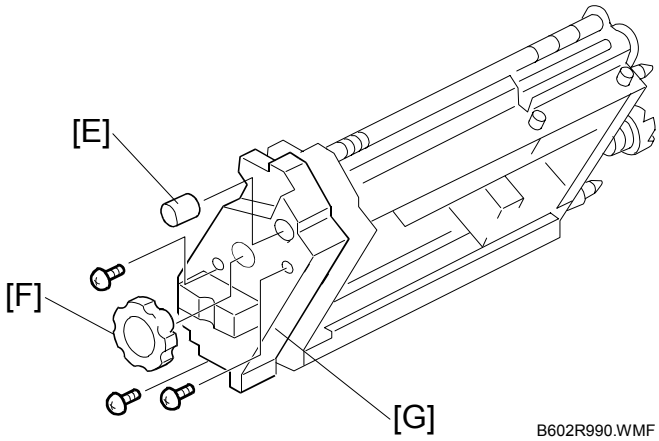
3. Stapler knob [E]
4. Jam-release knob [F] (℃ x 1)
5. Front cover [G] (☞ x 3)



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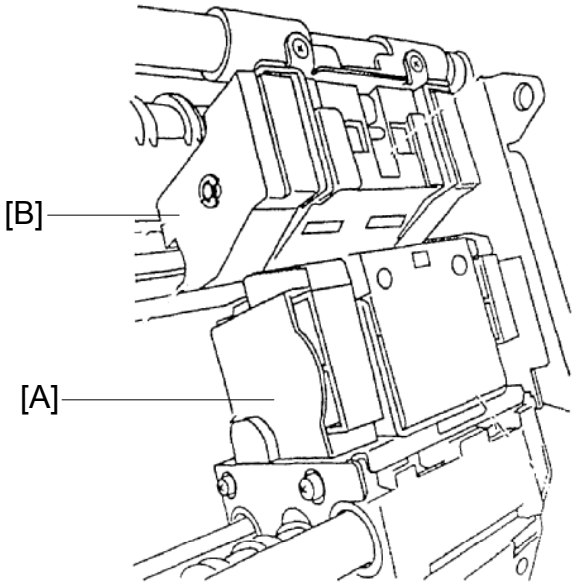
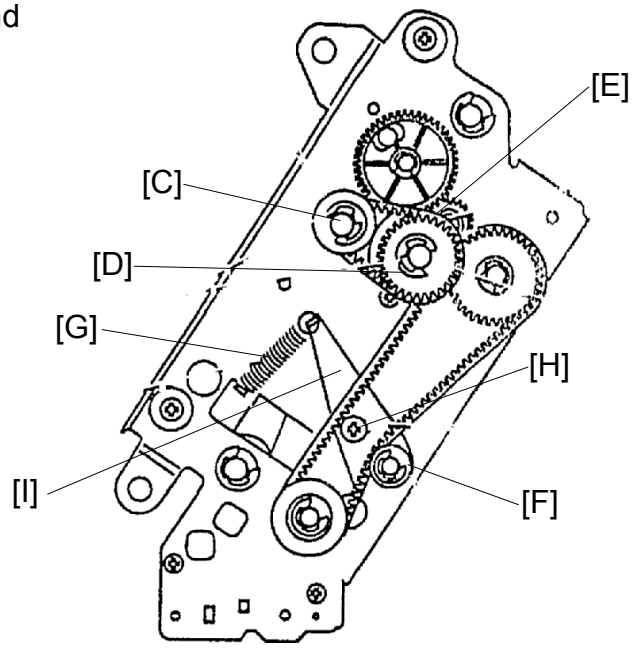
6. Gear cover [A] (2 hooks)
7. Side cover [B] (ℂ x 1)



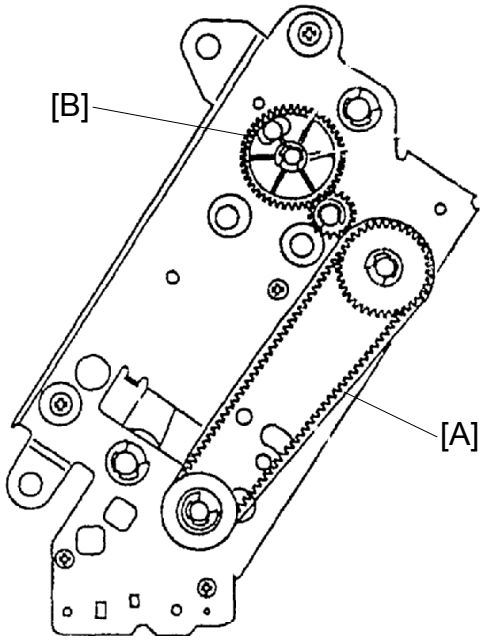
B602R918.WMF

8. Gear [C] (ℂ x 1), gear [D] (ℂ x 1), and timing belt [E]
9. Spacer (behind gear [C])
10. Gear (behind the spacer)
11. Belt guide [F]
    (ℂ x 1, Spring [G] x 1, 🔩 [H] x 1)
12. Tension bracket [I]



B602R919.WMF

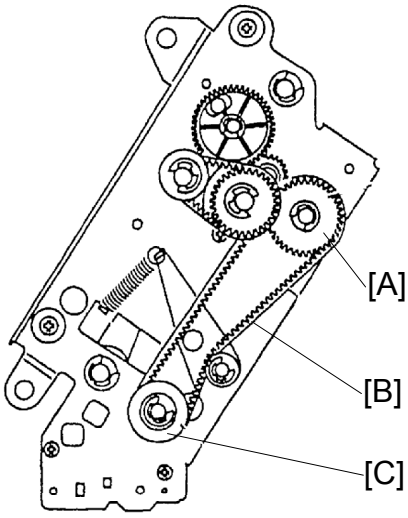
13. Timing belt [A]
14. Gear [B] (ℂ x 1)



B602R920.WMF

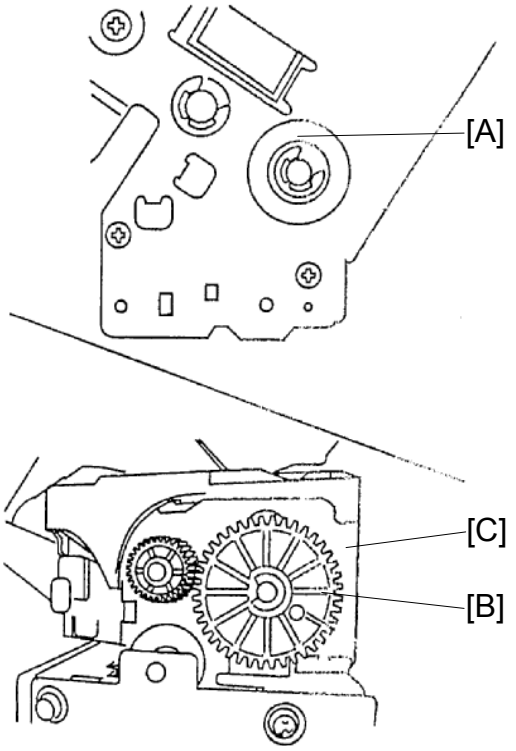
Adjusting the Stapler Gear Phase

If you remove the gears [A][C] and timing belt [B], you must adjust the phase of the gears when you reassemble the machine. These gears and the belt decide when the staple holder sends a staple and when the stapler bends the staple. The diagram shows the view seen from the rear.



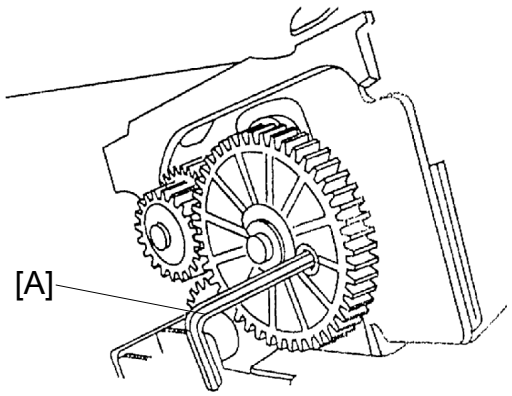
B602R917.WMF

1. By rotating the timing-belt gear [A], align the hole in the staple-holder gear [B] with the hole in the frame [C].



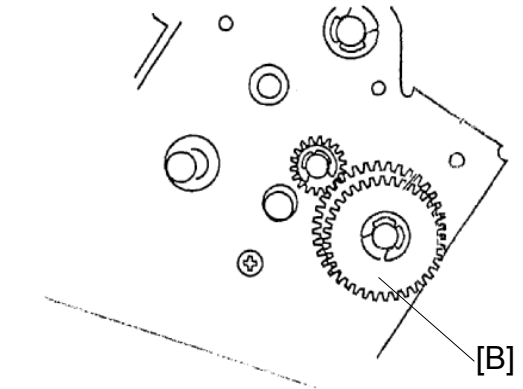
B602R921.WMF

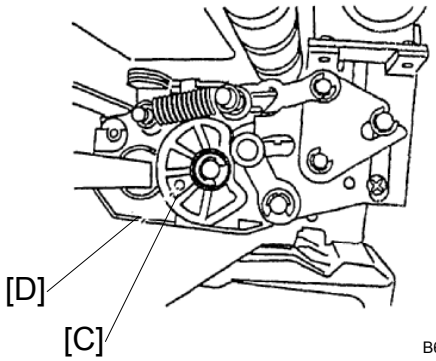
2. To fix the gear in position, place a thin tool [A] such as an Allen key or screwdriver through the holes.



B602R922.WMF

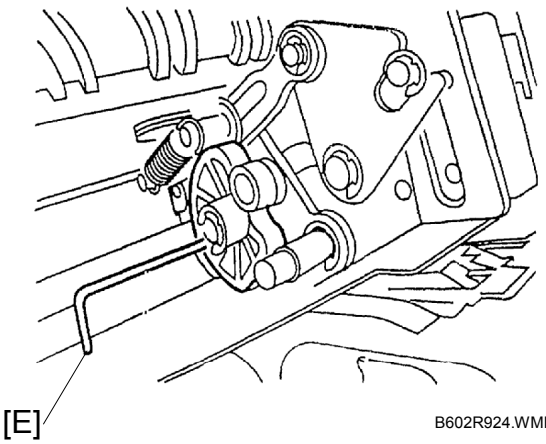
3. By rotating gear [B], align the hole in cam [C] with the hole in the frame [D].





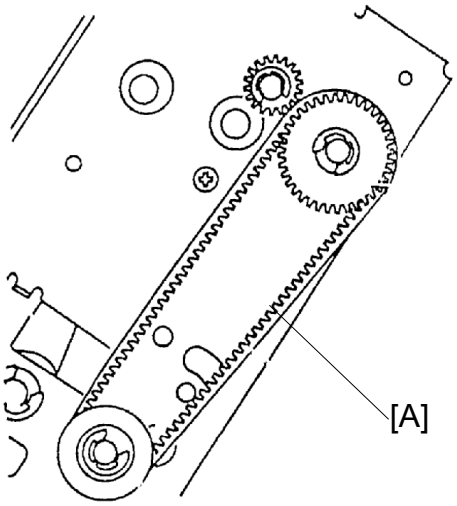
B602R923.WMF

4. To fix the gear in position, place a thin tool [E] such as an Allen key or screwdriver through the holes.



B602R924.WMF

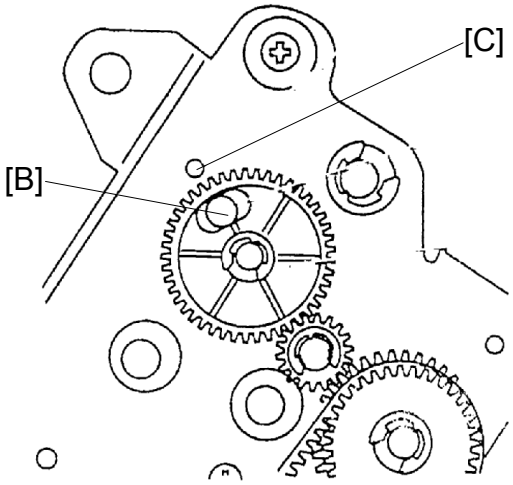
5. Install the timing belt [A].



B602R925.WMF

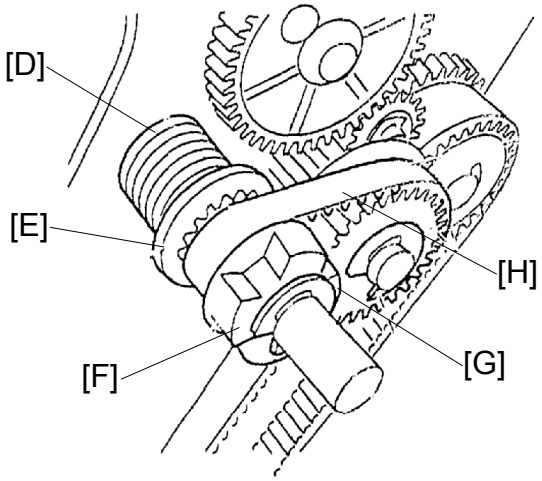
6. Align the blue mark [B] on the gear with the hole [C] in the frame, and install the gear.

   NOTE: The stapler is in the home position when the blue mark and the hole are aligned.



B602R926.WMF

7. Remove the two thin tools that you placed earlier to secure the gears in position.
8. Install the spring [D], spacer [E], gears [F][G], and timing belt [H].
9. Reassemble the whole stapler unit.
10. Check the operation.

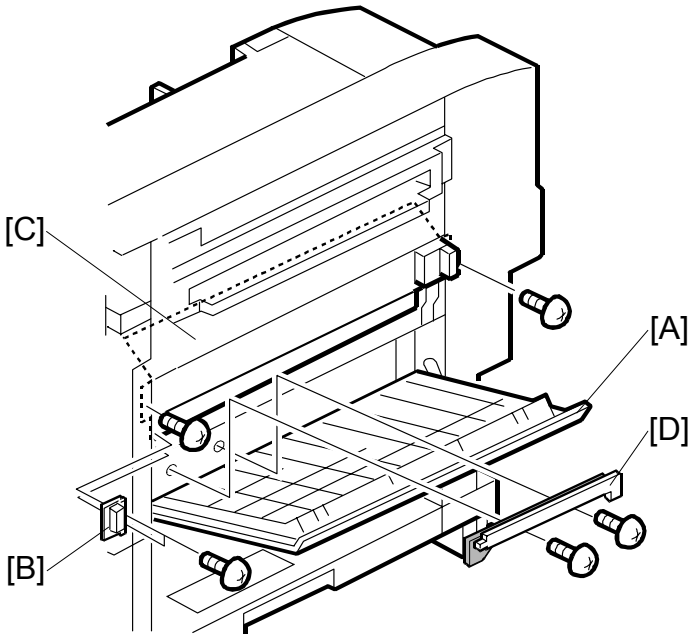


B602R927.WMF

1.5 FOLDING UNIT

Removal

1. Front cover (☛ 1.2.1)
2. Rear cover (☛ 1.2.2)
3. Open the right cover [A].
4. Magnet bracket [B] (☞ x 2)
5. Inner cover [C] (☞ x 2)
6. Tension plate [D]



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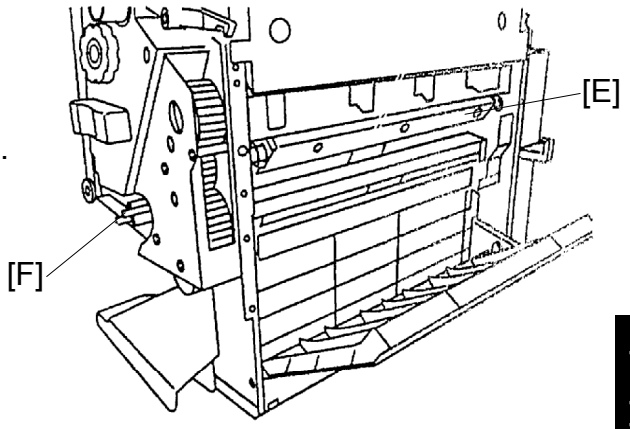
7. Rotate the shaft [F] clockwise and lower the folder plate [E].

   NOTE: You may have to rotate the shaft about 20 times (7,200°).



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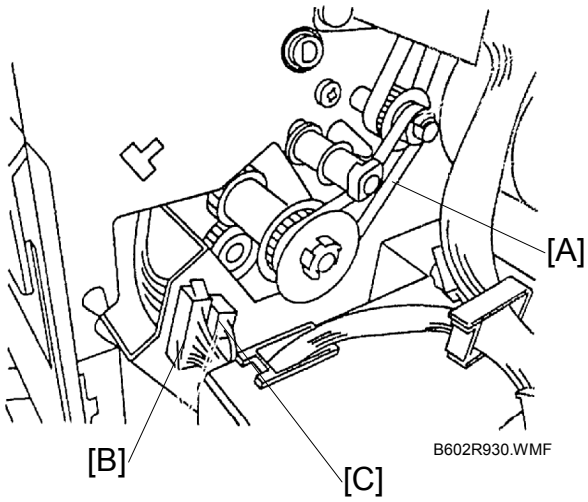
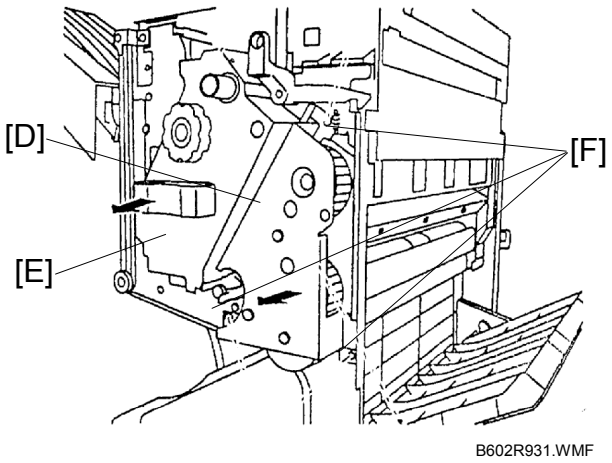
8. Timing belt [A] (x 1, 1 spacer)
9. Two connectors [B][C]

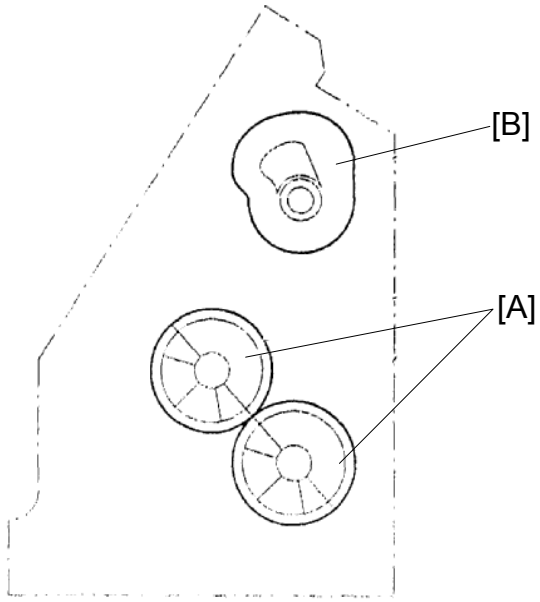


10. Stapler unit [D] (☛ 1.4).
11. Folding unit [E] ([F] x 3)



Adjusting the Folding Unit Gear Phase

If you remove gears from the folding unit, you must adjust the phase of the gears when you reassemble the folding unit.



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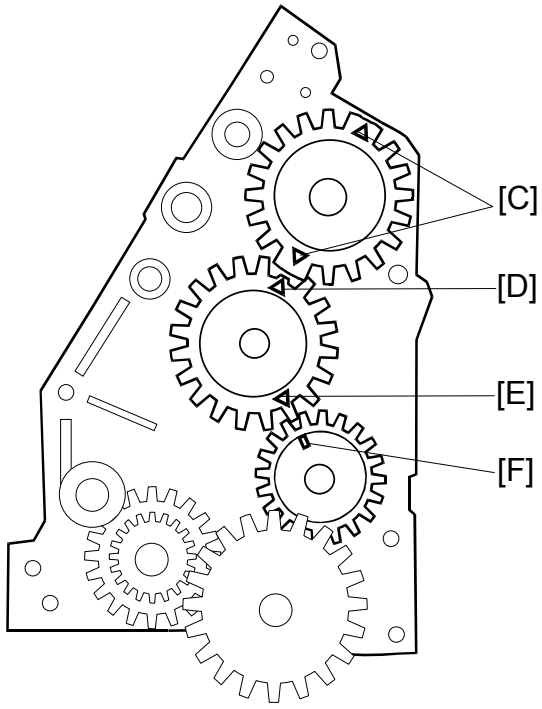

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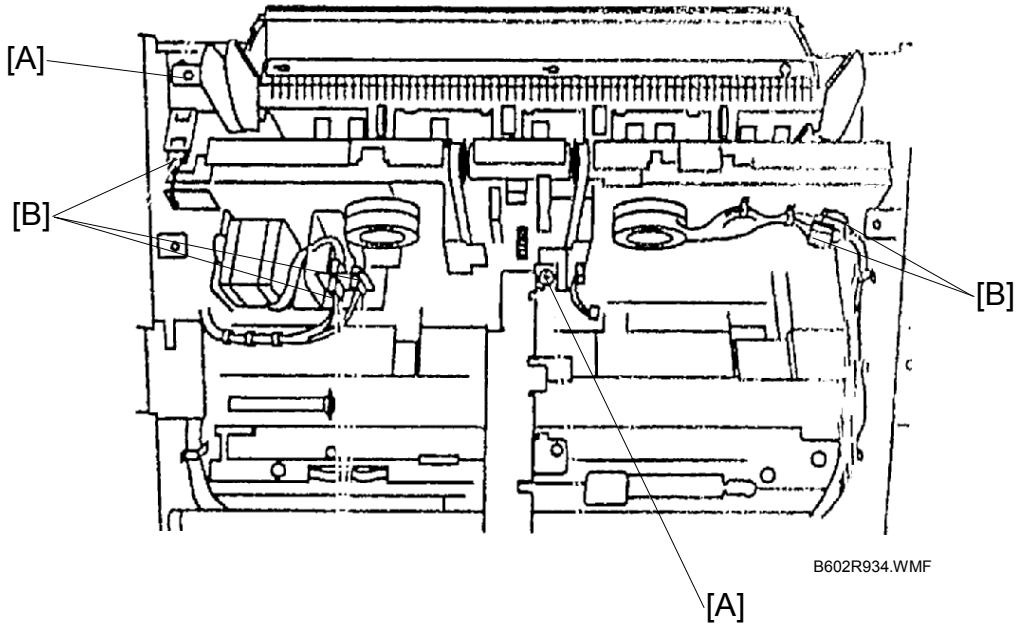
1. Arrange the folding rollers [A] and cam [B] as shown in the diagram.
2. Install the gears as follows:
   - Align either of the two "▲" marks [C] on the cam gear with one of the "▲" marks [D] on the relay gear. The "▲" marks on the relay gear must be at one o'clock [D] and five o'clock [E] respectively.
   - Align the other "▲" mark on the relay gear [E] with the protruding plastic tab ("▌") on the roller gear [F].

NOTE: When you have correctly installed the gears, the shorter teeth on the relay gear [D] are at the upper right, and the longer teeth are at the lower left.

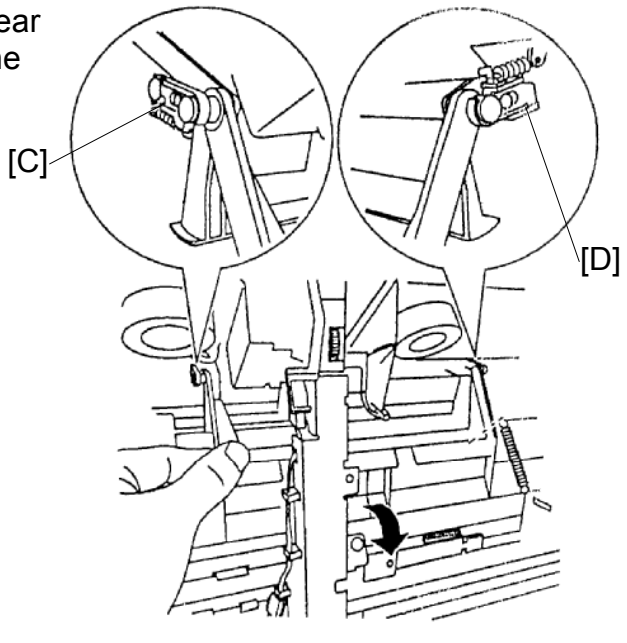
1.6 STACK TRAY AND JOGGER FENCE

1.6.1 STACK TRAY UNIT

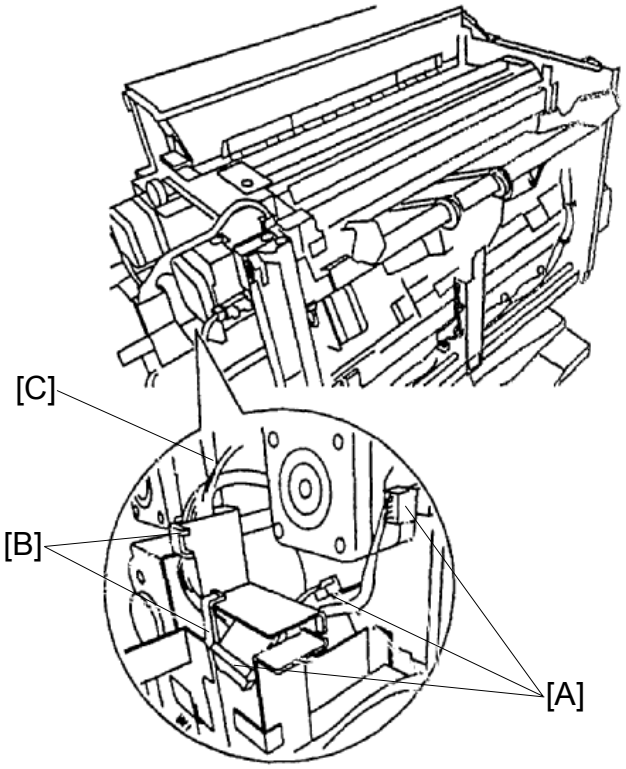


1. Left top cover, tray upper cover (☛ 1.2.3)
2. Side guide (☛ 1.3)
3. [A] x 2
4. [B] x 5, 2 standoffs

5. Release the front lock [D] and the rear lock [C] on the mechanical link of the stack-tray stopper.



6. [A] x 3
7. Open the cable fasteners [B].
8. Release the cables [C].



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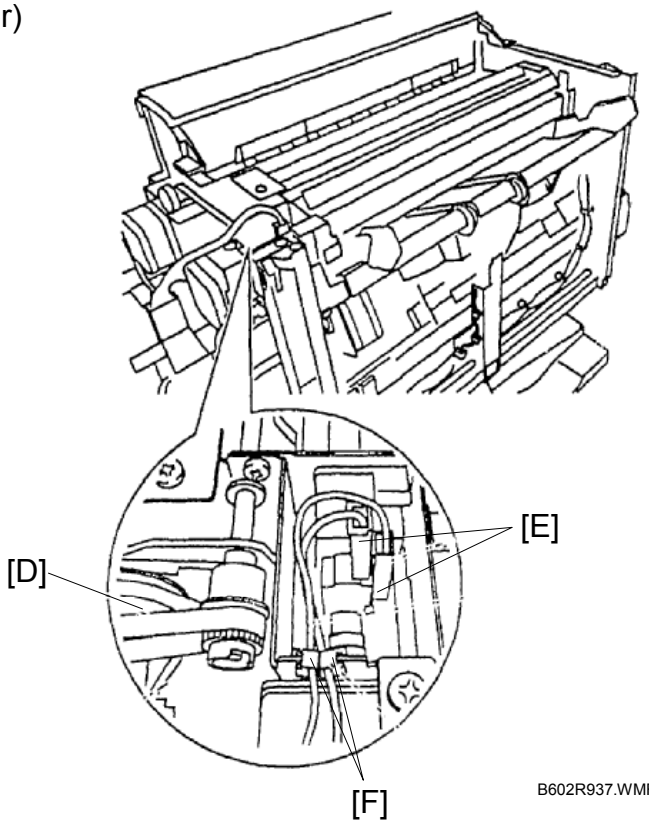
9. Timing belt [D] (x 1, 1 spacer)
10. 2 standoffs [E]



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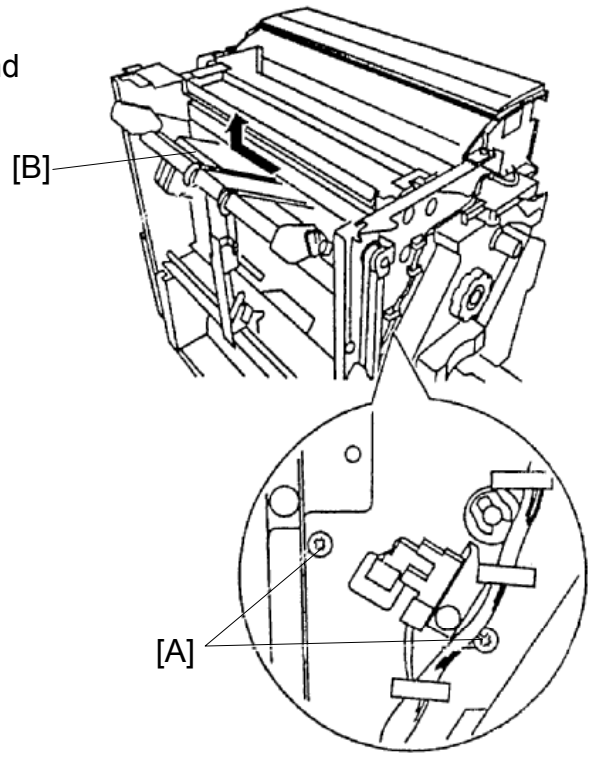
11. [A] x 2
12. Slide the stack tray [B] to the rear and lift it.

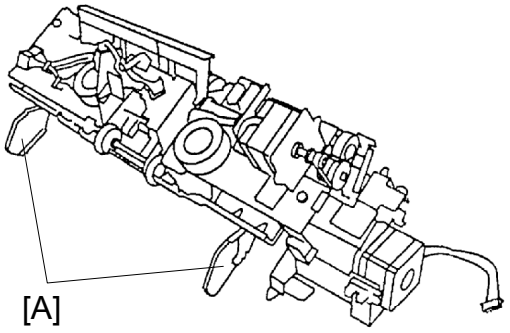


B602R938.WMF

1.6.2 JOGGER FENCE UNIT

CAUTION: Do not damage the jogger fences.

1. Stack tray (☛1.6.1)
2. Place the stack tray unit on a level surface. Check that the fences [A] are in safe positions.



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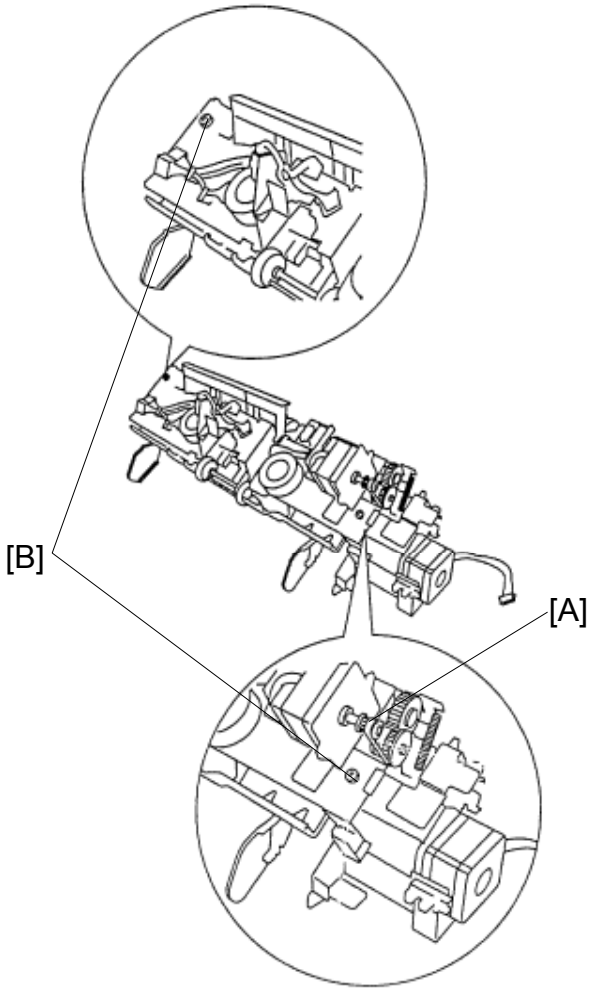
3. Timing belt [A]
4. [B] x 2



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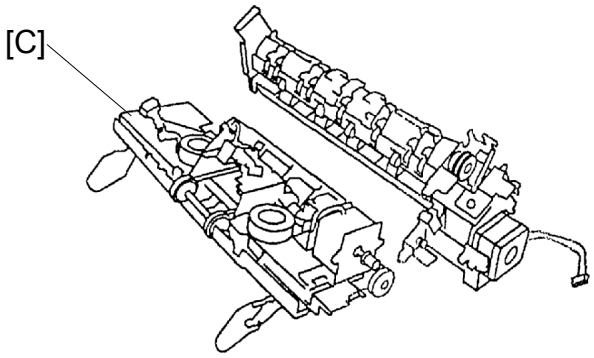
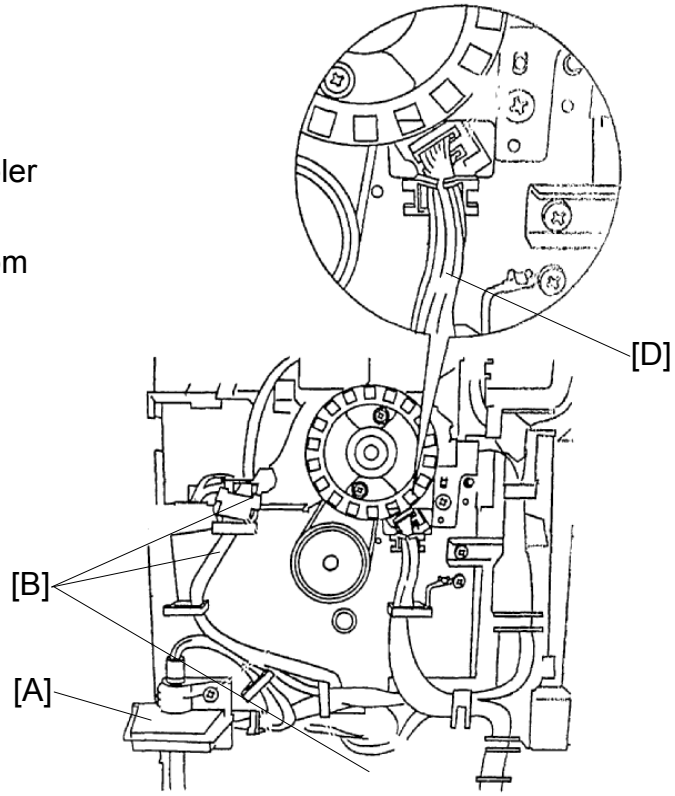
5. Jogger fence unit [C]



B602R941.WMF

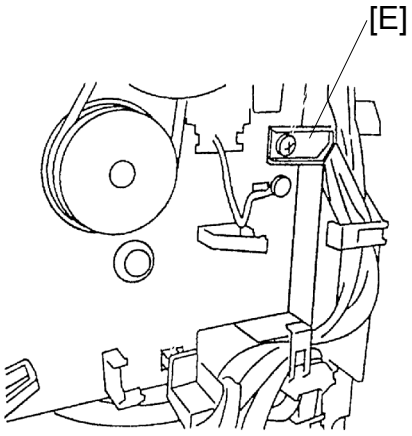
1.7 STAPLER MOTOR UNIT

1. Rear cover (☛ 1.2.2)
2. Stapler unit (☛ 1.4).
3. Connector holder [A] (☞ x 1)
4. Release all the cables (on the stapler motor unit) [B] from the clamps.
5. Release the cables [D] (☞ x 2 [from the stapler motor unit or from the controller])



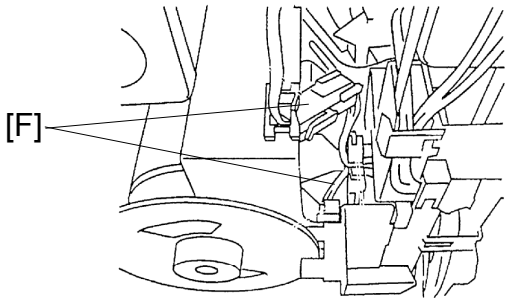
B602R942.WMF

6. Cable fastener [E] (☞ x 2)



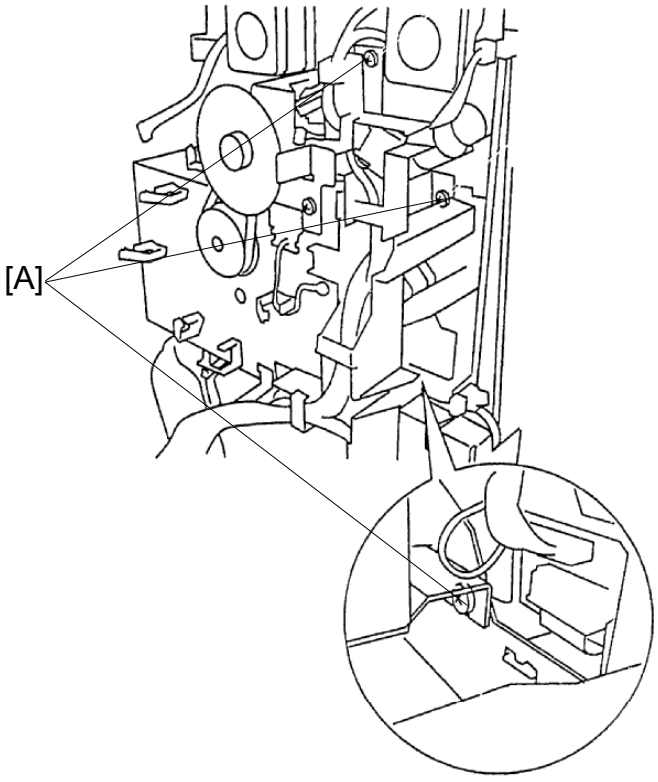
B602R944.WMF

7. Release the cables (☞ x 2)



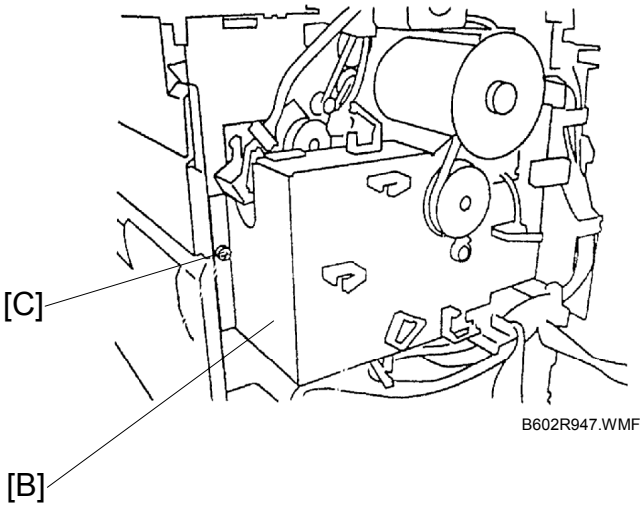
B602R945.WMF

8. [A] x 3



B602R946.WMF

9. Stapler motor unit [B] ([C] x 1)

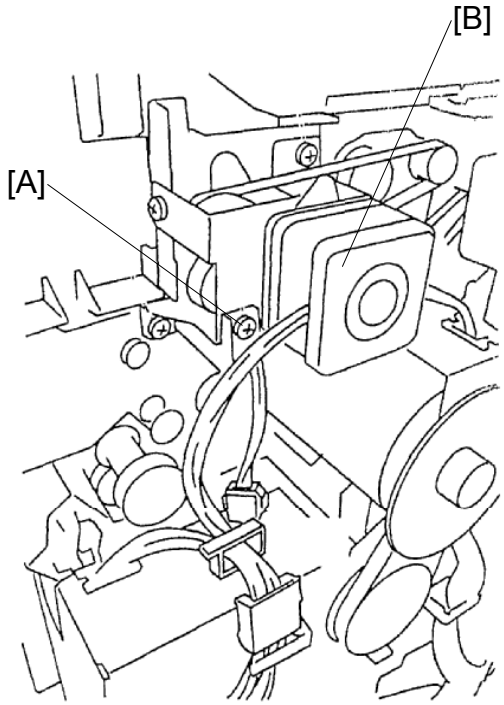


B602R947.WMF

1.8 TRANSPORT

1.8.1 TRANSPORT MOTOR

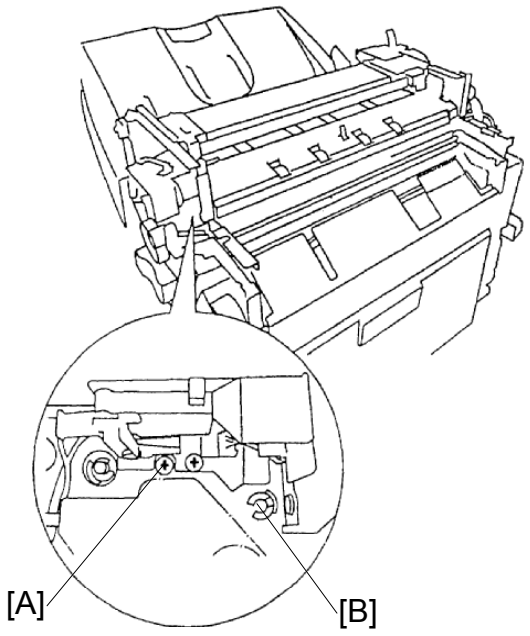
1. Rear cover (☛ 1.2.2)
2. Cable guide [A] (🔩 x 1)
3. Transport motor (with the timing belt behind) [B] (✋ x 1, 🔩 x 3)



B602R948.WMF

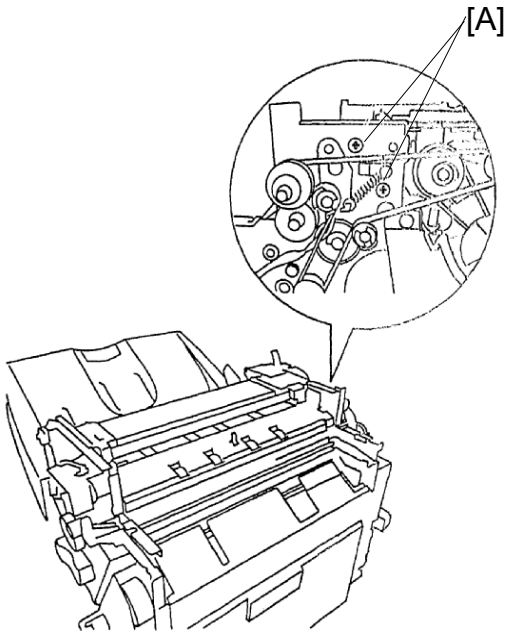
1.8.2 TRANSPORT ROLLER

1. Front cover (☛ 1.2.1)
2. Upper cover (☛ 1.2.3)
3. Upper right cover (☛ 1.2.4)
4. Transport motor (☛1.8.1)
5. 🔩 [A] x 1
6. Bushing [B] (⚙ x 1)



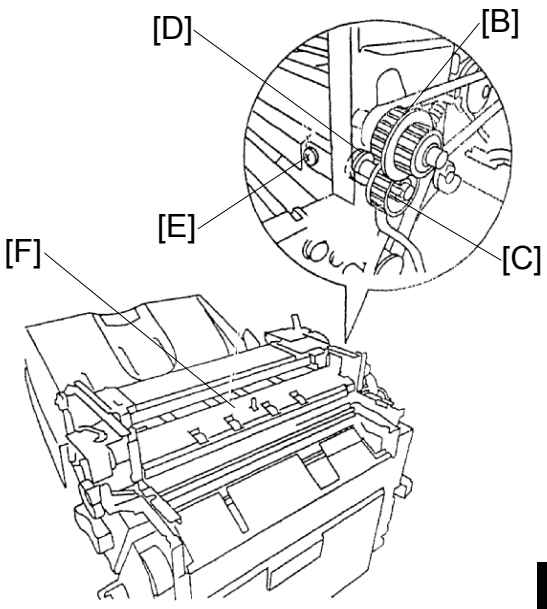
B602R949.WMF

7. [A] x 2



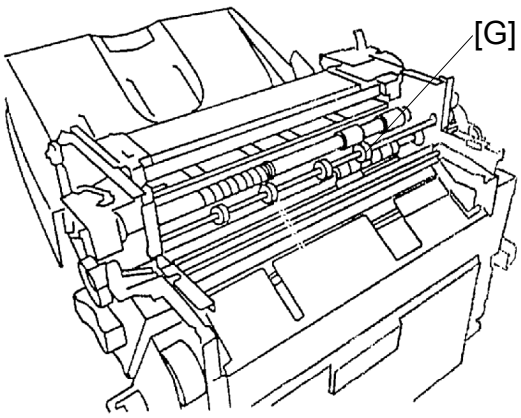
B602R950.WMF

8. Gear [B]
9. Gear (with the pin behind) [C]
10. Bushing [D] (x 1)
11. [E] x 1
12. Paper guide [F]



B602R951.WMF

13. Transport roller [G]

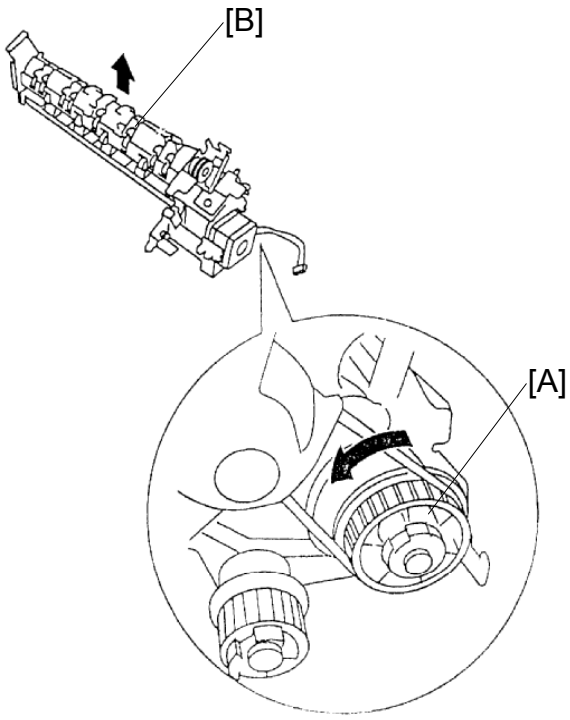


B602R952.WMF

1.9 STACK TRAY

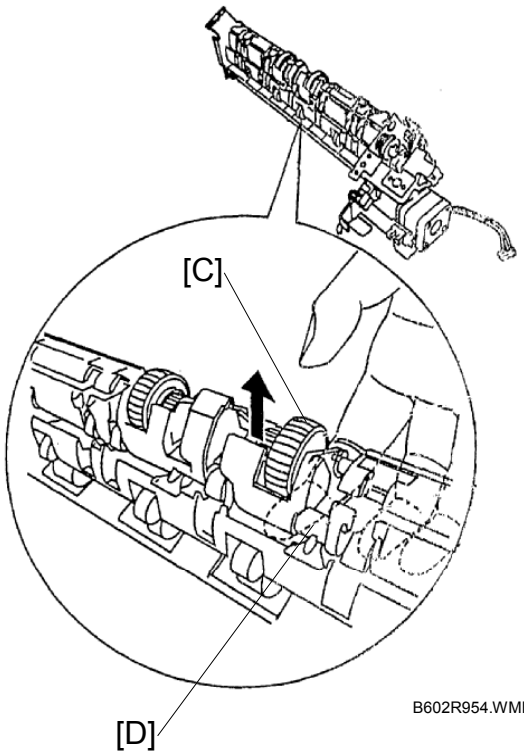
1.9.1 STACK TRAY UPPER ROLLER

1. Jogger fence unit (☛ 1.6.2)
2. Rotate the gear [A] counterclockwise and lift the stack tray upper roller unit [B].



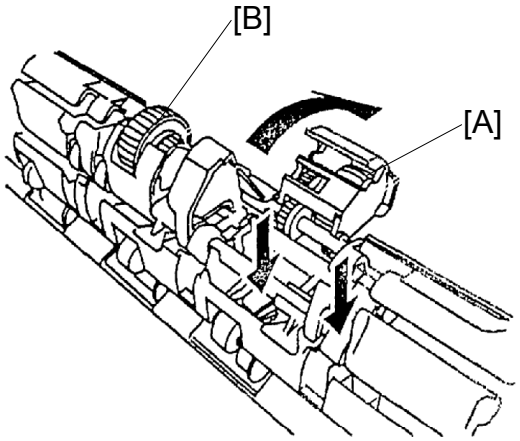
B602R953.WMF

3. Release the stack tray upper roller [C] from the shaft [D].



B602R954.WMF

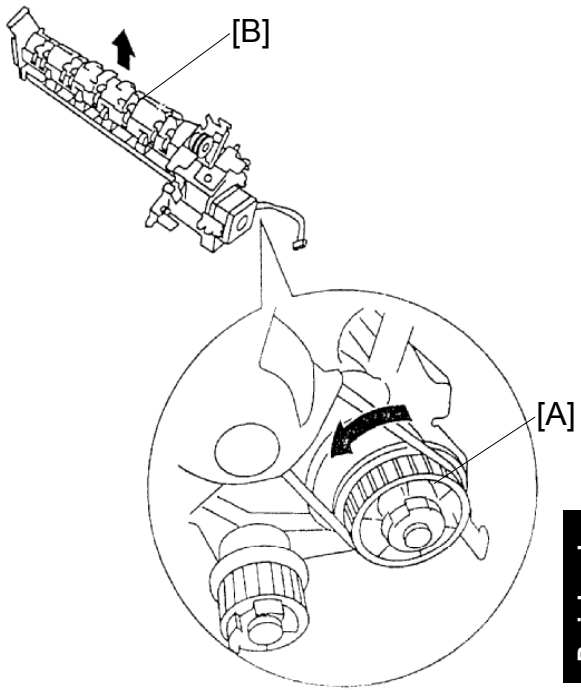
4. Lift up the stack tray upper roller [A], and push it down.
5. In the same manner, remove the other roller [B].



B602R955.WMF

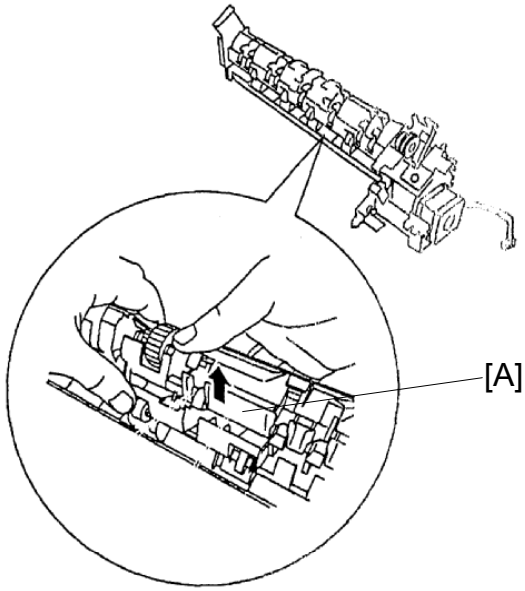
1.9.2 STACK TRAY PADDLE

1. Jogger fence unit (☛ 1.6.2)
2. Rotate the gear [A] counterclockwise and lift the stack tray upper roller unit [B].



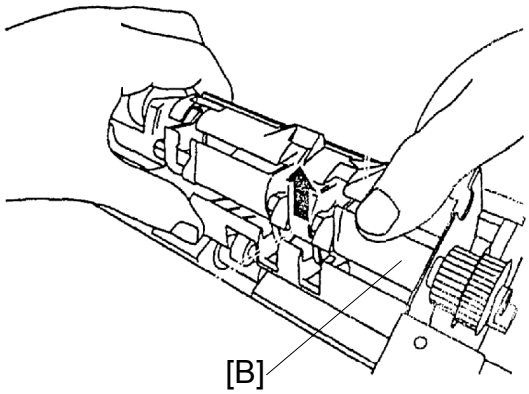
B602R953.WMF

3. Push the bottom of the guide [A] and release the rear side of it.



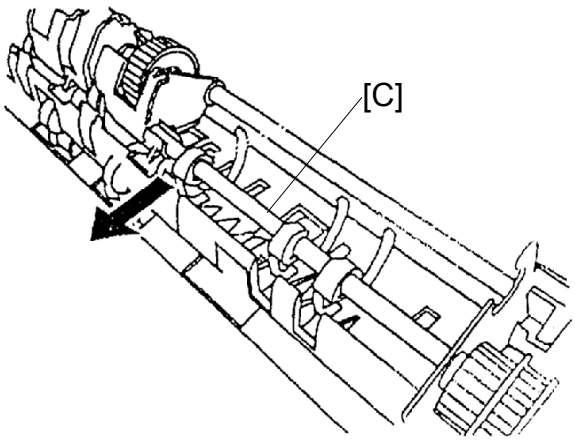
B602R956.WMF

4. Push the bottom of the guide [B] and release the front side of it.



B602R957.WMF

5. Paddle [C]

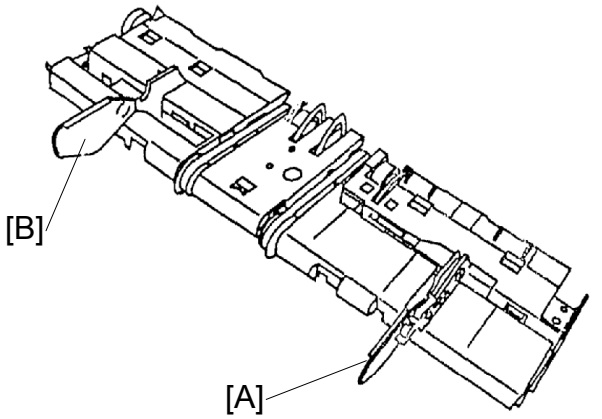


B602R958.WMF

1.9.3 STACK TRAY LOWER ROLLER

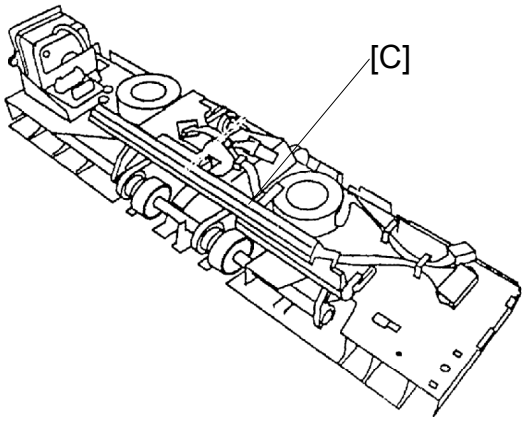
Removal

1. Jogger fence unit (☛ 1.6.2)
2. Slide the jogger fences (the front fence [A] to the front, the rear fence [B] to the rear) and remove them.



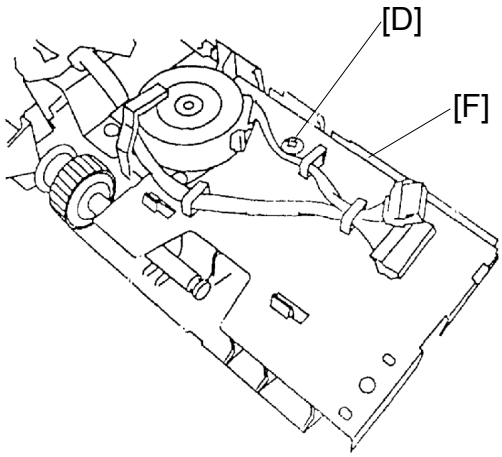
B602R959.WMF

3. Tray stopper [C] (2 clips)



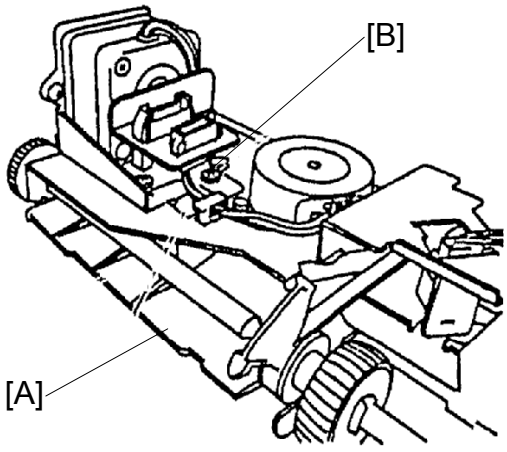
B602R960.WMF

4. Paper guide [F] (☞ [D] x 1)



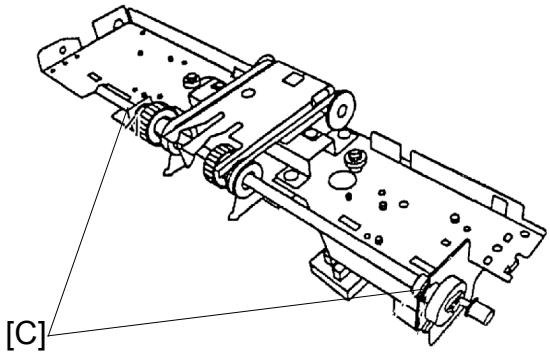
B602R961.WMF

5. Paper guide [A] ([B] x 1)



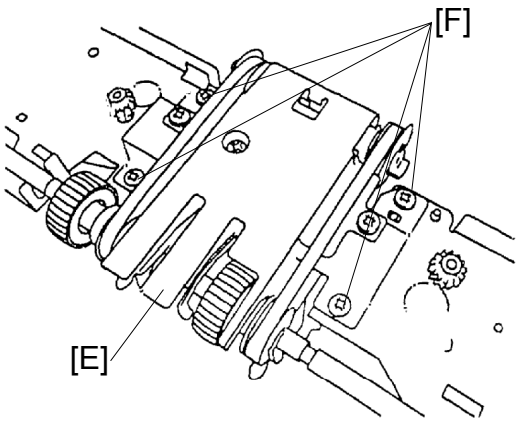
B602R962.WMF

6. Slide the bushing [C] (x 2).



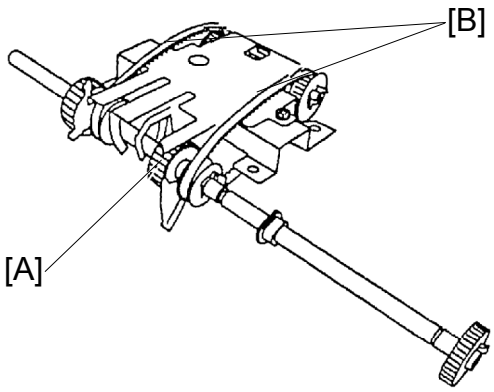
B602R963.WMF

7. Stack tray lower roller unit [E] ([F] x 4)



B602R964.WMF

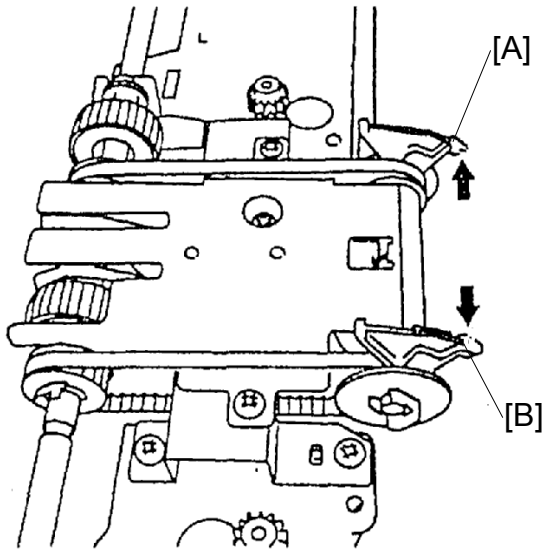
8. Stack tray lower roller [A]
9. Belt [B]



B602R965.WMF

Reassembly

When reassembling, align the positions of the belt pawls [A][B].



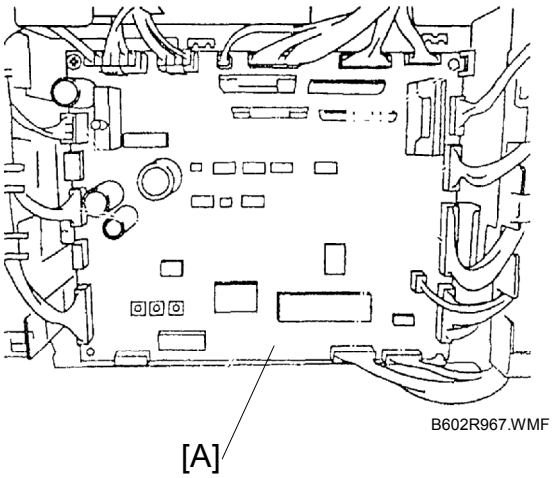
B602R966.WMF

1.10 CIRCUIT BOARD

1.10.1 CONTROLLER BOARD

1. Rear cover (☛ 1.2.2)
2. Controller board [A]
   (all 🖐's, 🪛 x 1, 3 hooks)

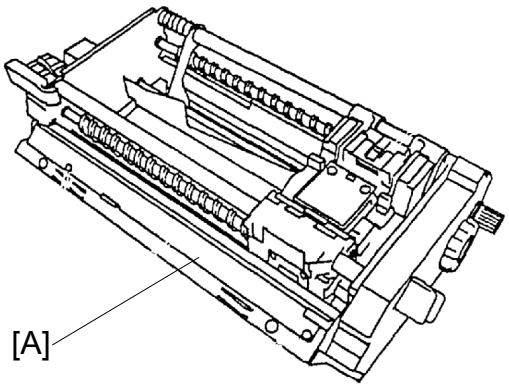
NOTE: After replacing the controller board, remove the NVRAM on the old board and install it on the new board.



B602R967.WMF

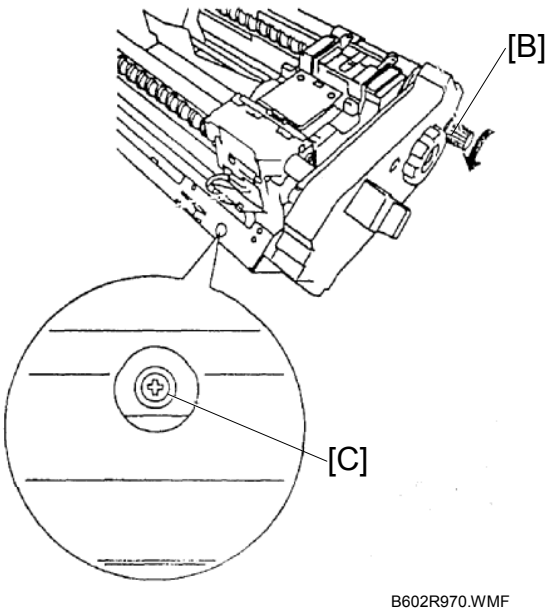
1.10.2 STAPLER HOME POSITION SENSOR BOARD

1. Stapler unit (☛ 1.4)
2. Guide [A] (🪛 x 2)



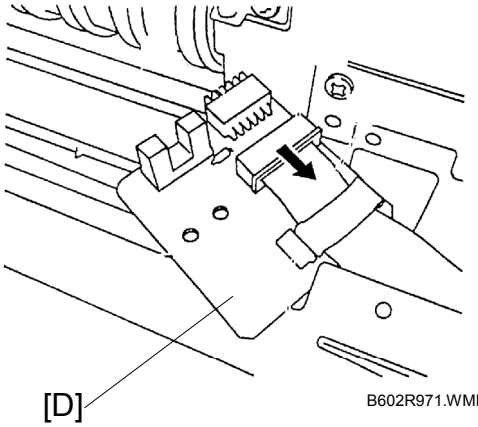
B602R969.WMF

3. Turn the knob [B] until you see the screw [C] (on the home position sensor board) through the opening. The home position board moves to the front when you turn the knob clockwise.
4. [C] x 1



B602R970.WMF

5. Home position board [D] (x 1, 1 flat cable)

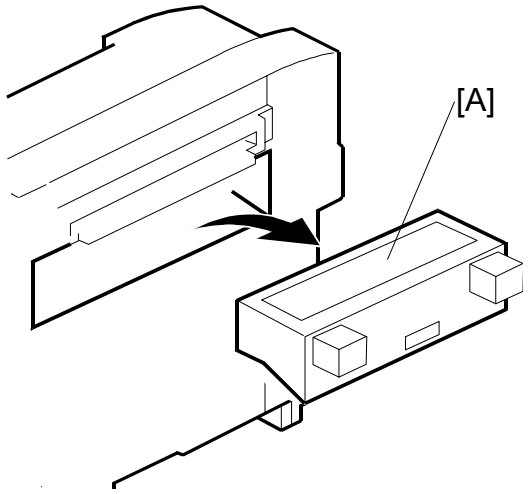


B602R971.WMF

1.11 PUNCH UNIT, MOTORS, AND CONTROLLER

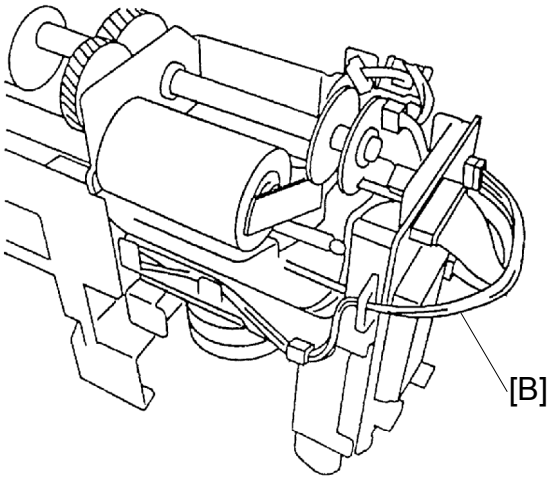
1.11.1 PUNCH UNIT AND PUNCH UNIT MOTOR

1. Right top cover (☛ 1.2.3)
2. Chad box [A]



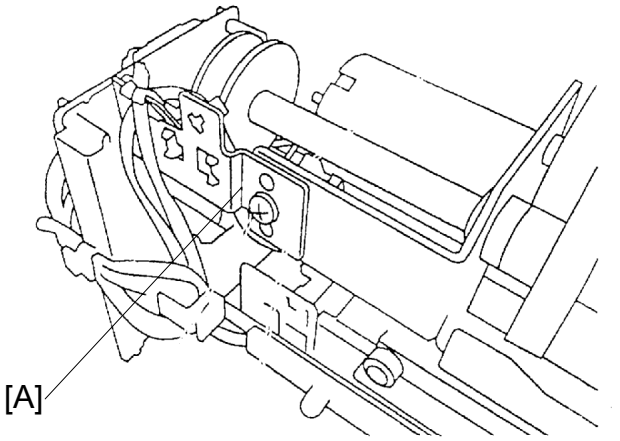
B602R993.WMF

3. Release the cables [B] (☞ x 1).



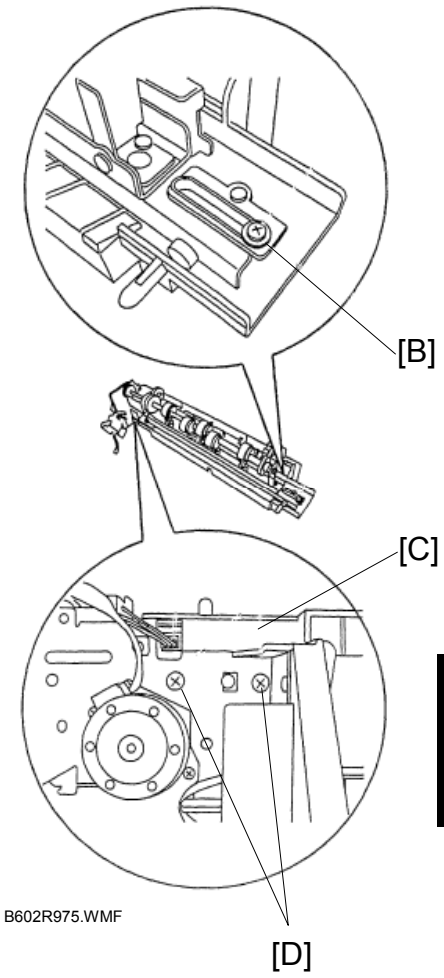
B602R973.WMF

4. Sensor bracket [A] (✋ x 1, 🔩 x 1)



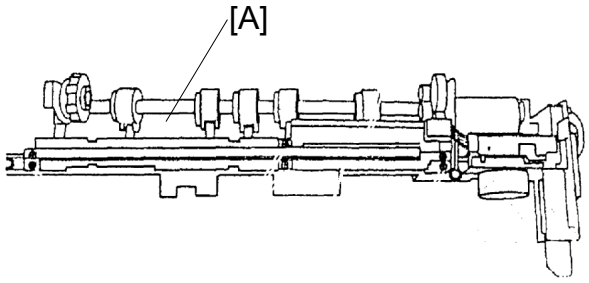
B602R974.WMF

5. Remove the whole punch unit from the saddle finisher.
6. Washer [B] (🔩 x 1)
7. Base cover [C] (✋ x 2, 🔩 [D] x 2) (The diagram shows the view seen from the bottom.)



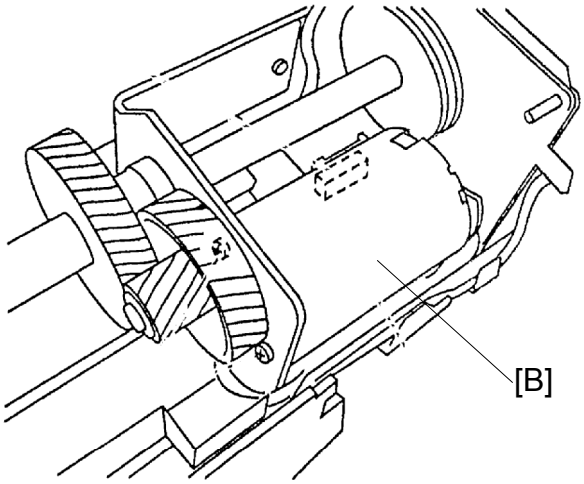
B602R975.WMF

8. Sensor unit [A] (x 2, x 3)



B602R976.WMF

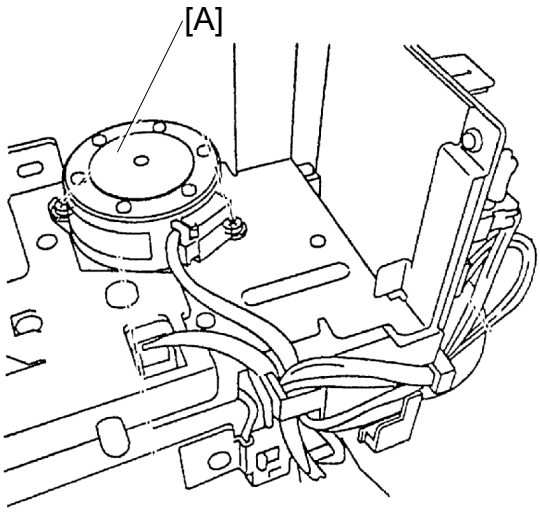
9. Punch unit motor [B] (x 2)



B602R978.WMF

1.11.2 REGISTRATION MOTOR

1. Remove the whole punch unit from the saddle finisher.
2. Registration motor [A] (x 1, x 2)

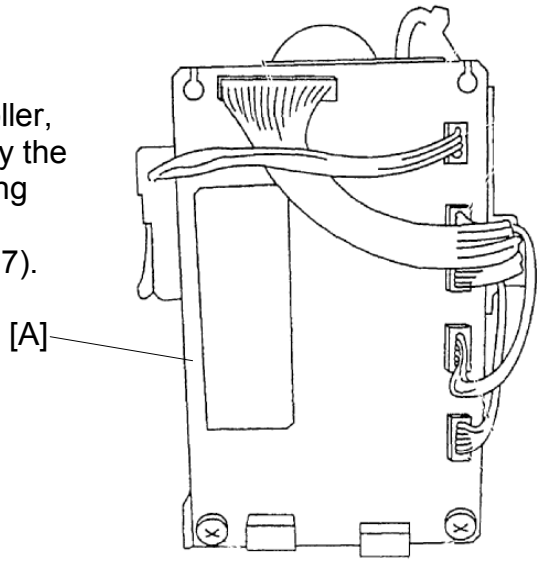


B602R979.WMF

1.11.3 CONTROLLER

1. Rear cover (☛ 1.2.2)
2. Punch unit controller [A] (all 🖐's, 🔩 x 2)

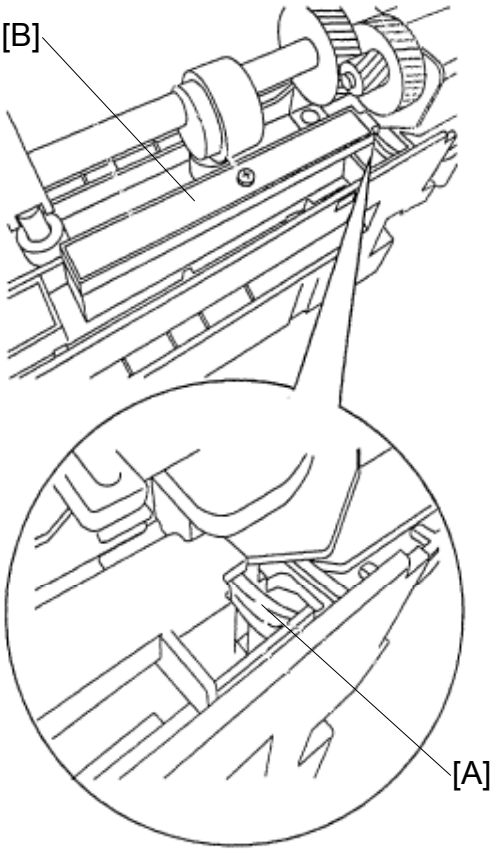
NOTE: After replacing the punch unit controller, adjust the sensor voltage and specify the punch type (☛ 1.11.7). After replacing the EEPROM, make the controller initialize the new EEPROM (☛ 1.11.7).



B602R980.WMF

1.11.4 PHOTO SENSOR BOARD

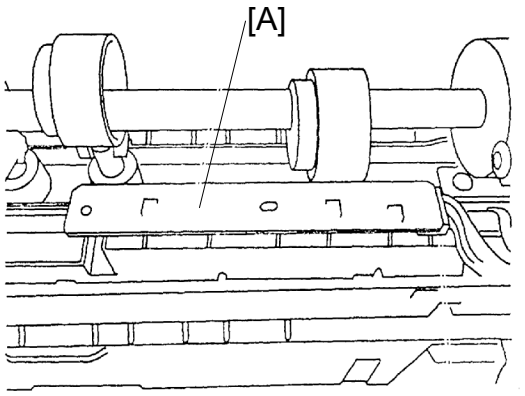
1. Base cover (☛ 1.11.1)
2. Release the cables [A]
3. Board cover [B] (🔩 x 1)



B602R981.WMF

4. Photo sensor board [A] (✋ x 1)

NOTE: After replacing the photo sensor board, adjust the sensor voltage (☛ 1.11.7).

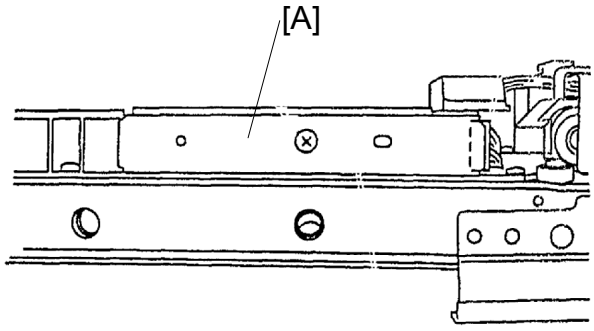


B602R982.WMF

1.11.5 LED BOARD

1. Base cover (☛ 1.11.1)
2. LED board [A] (✋ x 1, 🪛 x 1)

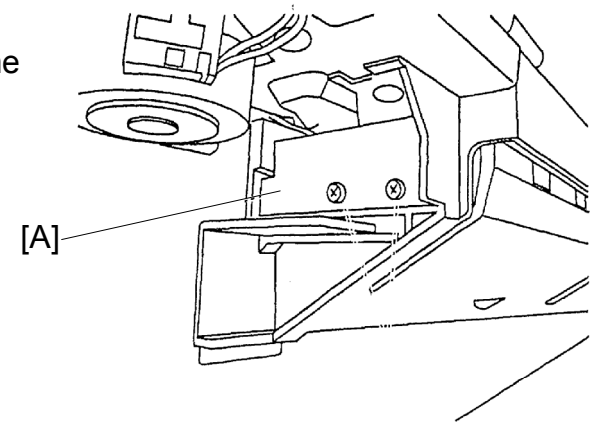
NOTE: After replacing the LED board, adjust the sensor voltage (☛ 1.11.7).



B602R983.WMF

1.11.6 CHAD BOX FULL SENSOR BOARD AND LED BOARD

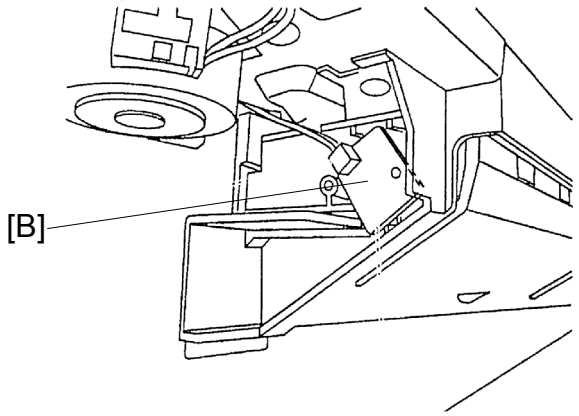
1. Punch unit controller (☛ 1.11.3)
2. Remove the whole punch unit from the saddle finisher.
3. Protector [A] (🔩 x 2)



B602R984.WMF

4. Sensor board [B] (✋ x 1)

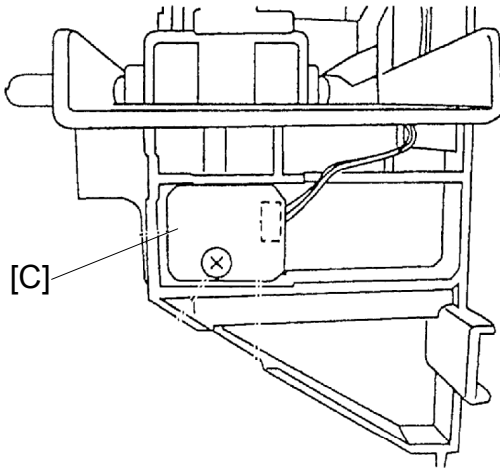
NOTE: After replacing the sensor board, adjust the sensor voltage (☛ 1.11.7).



B602R985.WMF

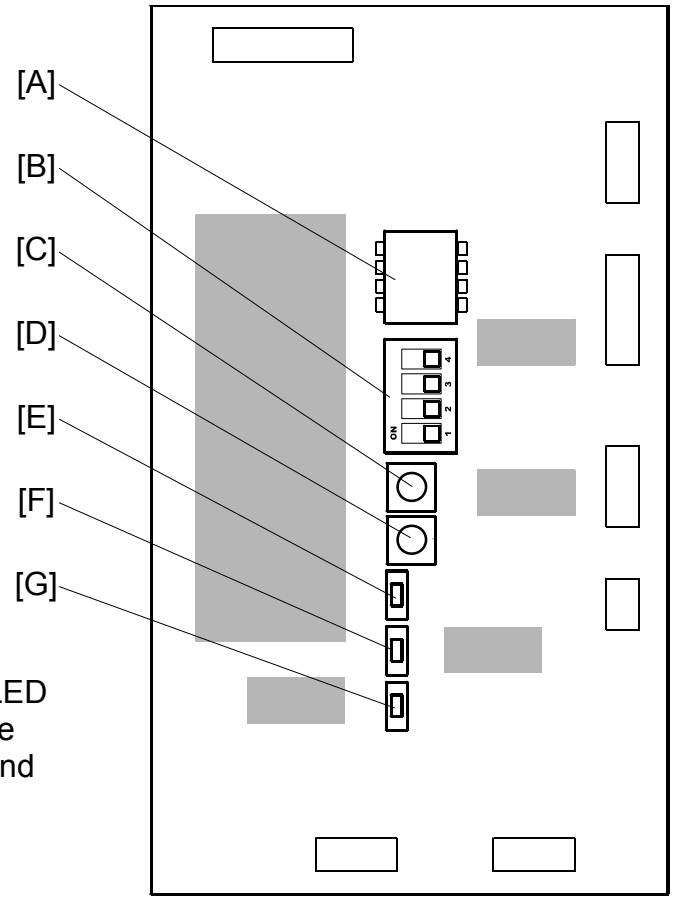
5. LED board [C] (🔩 x 1, ✋ x 1)

NOTE: After replacing the LED board, adjust the sensor voltage (☛ 1.11.7).



B602R986.WMF

1.11.7 ADJUSTMENT AND INITIALIZATION



B602R995.WMF

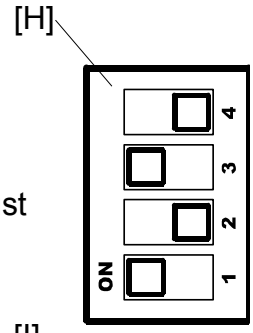
Sensor Voltage

You make the controller adjust the LED voltage of the sensors after you have replaced any of the following units and components:

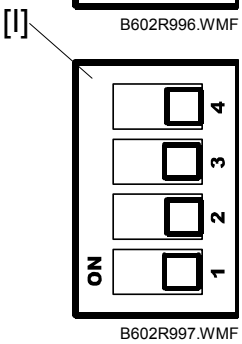
- Punch unit controller (☛ 1.11.3)
- Photo sensor board (☛ 1.11.4)
- LED board (☛ 1.11.5)
- Chad box full sensor board (☛ 1.11.6)
- Chad box LED board (☛ 1.11.6)

Perform as follows:

1. Set the DIP switch [B] on the punch-unit controller board as follows: 1 = ON, 2 = OFF, 3 = ON, 4 = OFF [H].
2. Push SW1002 [C] or SW1003 [D]. The controller starts to adjust the LED voltage of the sensors.
3. Wait until LED1001 [E], LED1002 [F], and LED1003 [G] light. This indicates the controller ends the adjustment.
4. Set the DIP switch as follows: 1 = OFF, 2 = OFF, 3 = OFF, 4 = OFF.



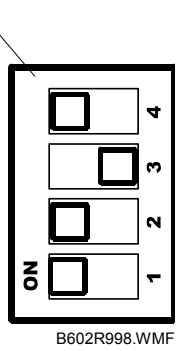
B602R996.WMF



B602R997.WMF

Punch Type

After you replace the punch-unit controller, specify the punch type as follows:



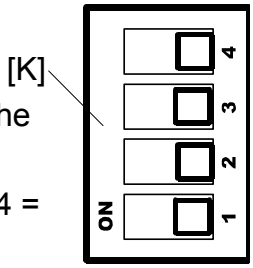
B602R998.WMF

1. Set the DIP switch [B] on the punch-unit controller board as follows: 1 = ON, 2 = ON, 3 = OFF, 4 = ON [J].
2. Push SW1002 [C] to select a punch type. As you push SW1002, the three LEDs [E][F][G] change as shown in the table. These LEDs indicate which punch type you have selected.

Punch Type	LED1001	LED1002	LED1003
2 holes	Lights	—	—
2 or 3 holes	Lights	Lights	—
4 holes*	—	Lights	—
4 holes**	—	—	Lights

** For the North Europe model
* Four the other models

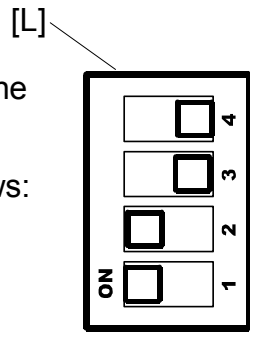
3. Push SW1003 [D]. The LEDs blink.
4. Push SW1003 again. The controller stores the punch type in the EEPROM.
5. Set the DIP switches as follows: 1 = OFF, 2 = OFF, 3 = OFF, 4 = OFF [K].



B602R997.WMF

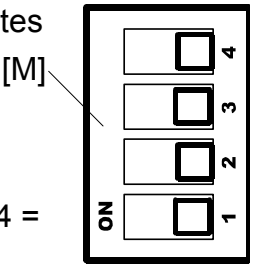
EEPROM

After you replace the EEPROM [A], make the controller initialize the new EEPROM as follows:



B602R999.WMF

1. Set the DIP switch on the punch-unit controller board as follows: 1 = ON, 2 = ON, 3 = OFF, 4 = OFF [L].
2. Push SW1002 and SW1003 at the same time. The controller starts initializing the EEPROM.
3. Wait until LED1001, LED1002, and LED1003 light. This indicates that the initialization ends.
4. Adjust the sensor voltage (☛ Sensor Voltage).
5. Specify the punch type (☛ Punch Type)
6. Set the DIP switches as follows: 1 = OFF, 2 = OFF, 3 = OFF, 4 = OFF [M].



B602R997.WMF

2. SERVICE TABLES

2.1 DIP SWITCH SETTINGS

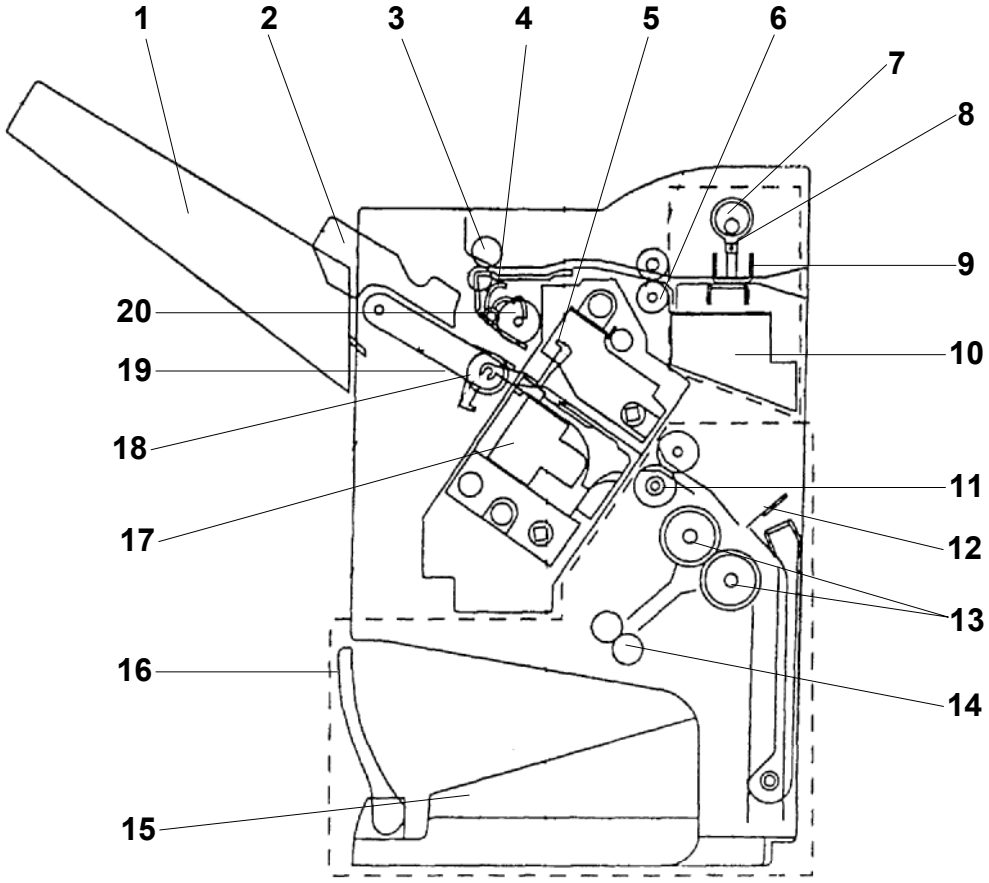
Punch Controller Board

The DIP switches should not be set to any combination other than those described in the table below.

SW1001				Mode	Description
1	2	3	4		
OFF	OFF	OFF	OFF	Default	
ON	OFF	ON	OFF	Sensor voltage adjustment	See 1.11.7.
ON	ON	OFF	ON	Punch type setting	See 1.11.7.
ON	ON	OFF	OFF	EEPROM initialization	See 1.11.7.

3. DETAILED DESCRIPTIONS

3.1 GENERAL LAYOUT

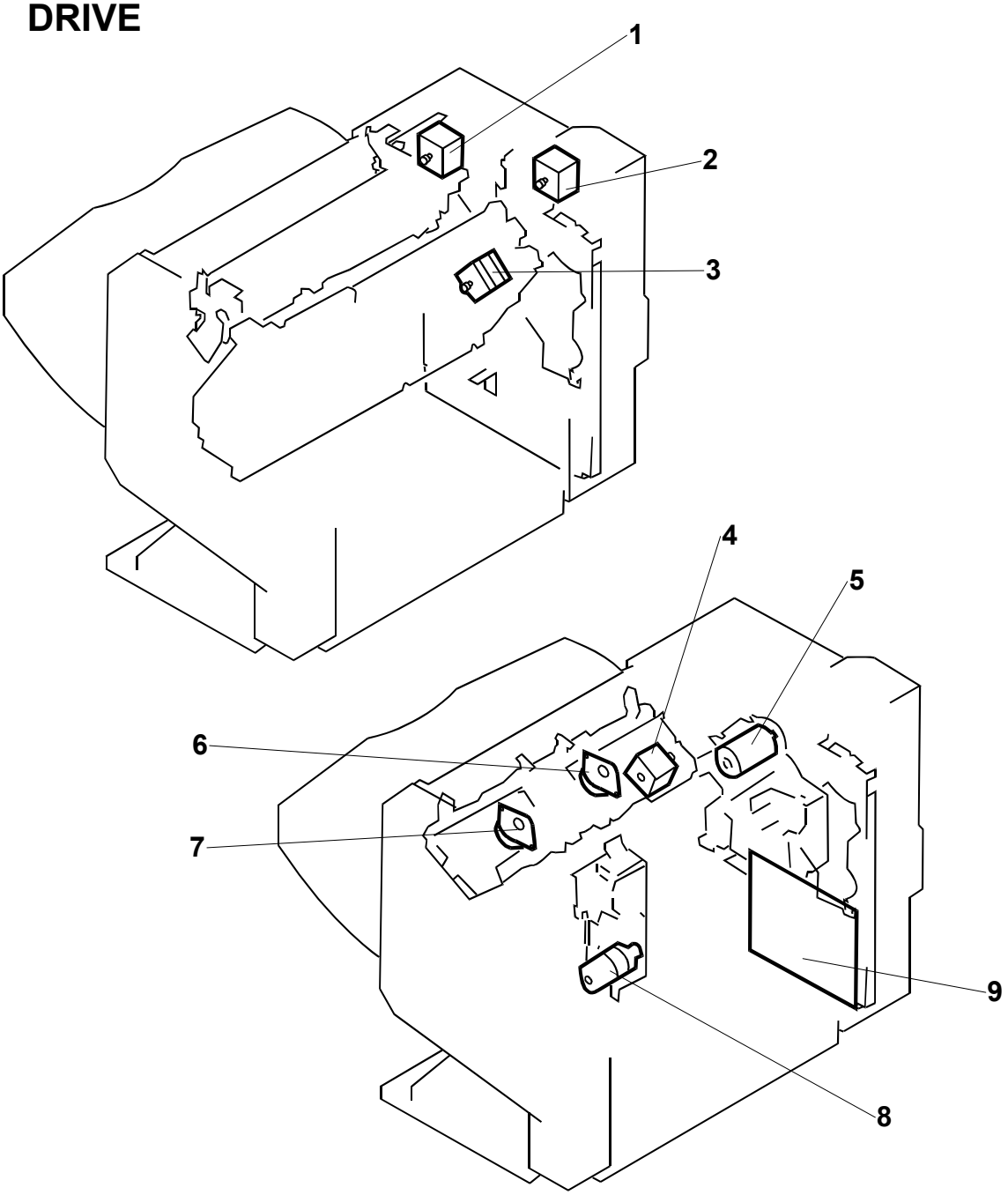


B602D901.WMF

1. Regular tray
2. Jogger fence
3. Exit roller
4. Paddle
5. Stack tray stopper
6. Transport roller
7. Cam*
8. Punch*
9. Punch base*
10. Chad box*
11. Stack-tray transport roller
12. Folding plate
13. Folder rollers
14. Booklet exit roller
15. Booklet tray
16. Booklet stopper
17. Stapler
18. Stack-tray lower roller
19. Stack-tray belt
20. Stack-tray upper roller

* Installed with the optional punch unit.

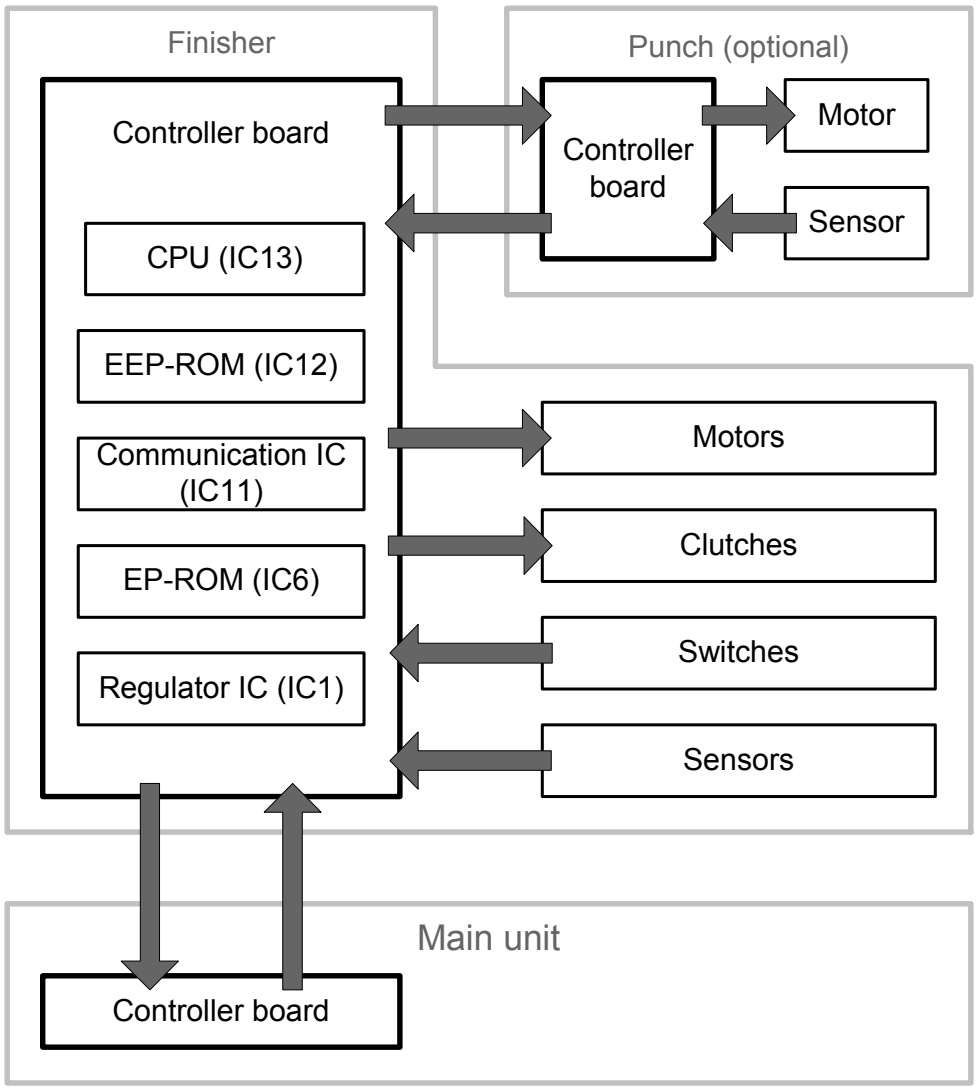
3.2 DRIVE



B602D902.WMF

1. Paddle motor
2. Transport motor
3. Stapler slide motor
4. Stack-tray exit motor
5. Stapler/folder motor
6. Rear fence motor
7. Front fence motor
8. Lift motor
9. Finisher controller

3.3 CONTROLLER



B602D903.WMF

The finisher controller board communicates with the controllers of the optional punch unit and the copier or printer. Listed below are the functions of important ICs:

- CPU (IC13): Controls the sequence or the processing.
- EEP-ROM (CS12): Stores adjustment settings.
- Communication IC (IC11): Contains the program.
- EP-ROM (IC6): Communicates with other controllers.
- Regulator IC (IC1): Generates 5-volt power source.

3.4 STACK TRAY

3.4.1 SIMPLE OUTPUT

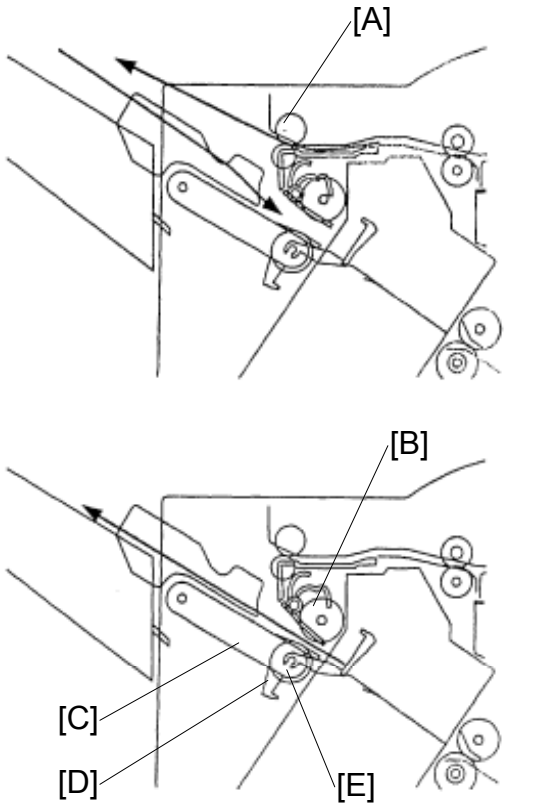
Mechanism

The exit roller transports the paper to the stack tray. The rollers and belts on the stack tray transport the paper to the regular tray. The finisher operates like this even when it handles one sheet of paper.

Phase 1: The transport motor drives the exit roller [A] to transport the paper to the stack tray.

Phase 2: The paddle motor operates in reverse to lower the stack-tray upper roller [B] onto the paper.

Phase 3: The stack-tray exit motor drives the stack-tray upper roller [B], the stack-tray lower roller [E], and the stack-tray belts [C] to transport the paper to the regular tray.



B602D904.WMF

Stack-Tray Belt

The stack tray has two stack-tray belts. Each stack-tray belt has a paper support [D] on its surface. As stack-tray exit motor rotates the stack-tray belts counterclockwise (viewed from the machine front), the paper supports moves counterclockwise. While moving, these paper supports transport the paper from the stack tray to the regular tray.

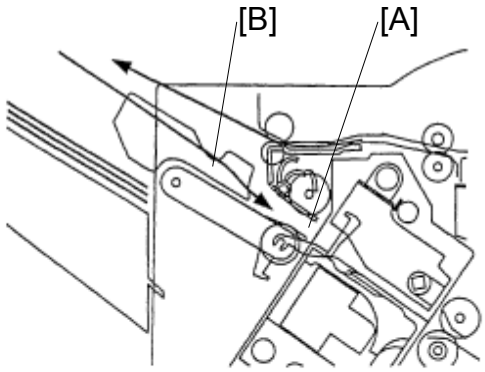
For the home position of the stack-tray belt, see “Stack-Tray Belt Home Position” in section 3.4.5.

3.4.2 SORT

The finisher can sort and stack the paper. To do this, it uses the stack tray and the regular tray.

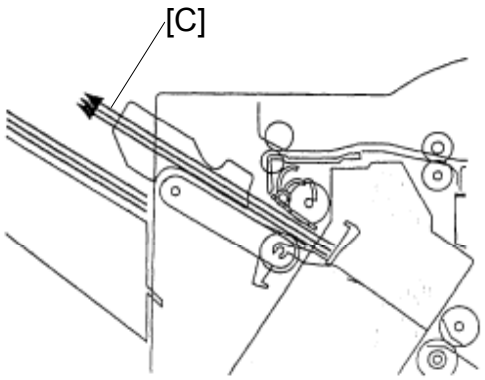
Phase 1: The exit roller transports the paper on the stack tray [A]. The front fence motor or the rear fence motor drives the jogger fence [B] to push the paper to the front or rear. The jogger fence handles the next paper in the same way, and pushes the paper in the same direction.

For the jogger fence mechanism, see section 3.4.4.



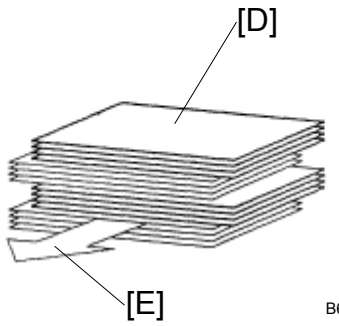
Phase 2: When the number of papers on the stack tray reaches one of the following numbers, the stack-tray upper roller, the stack-tray lower roller, and the stack-tray belts (☛ 3.4.1) transport the paper stack [C] to the regular tray.

Paper Size	Number of Sheets
300 mm and longer	10
Shorter than 300 mm	30



Phase 3: The finisher repeats Phase 1 and Phase 2 until it finishers handling the first set of paper.

Phase 4: For the next set, the finisher conducts phases 1 through 3 again. This time, the other jogger fence pushes the paper in the opposite direction in phase 1.

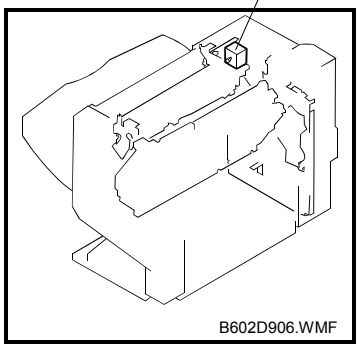


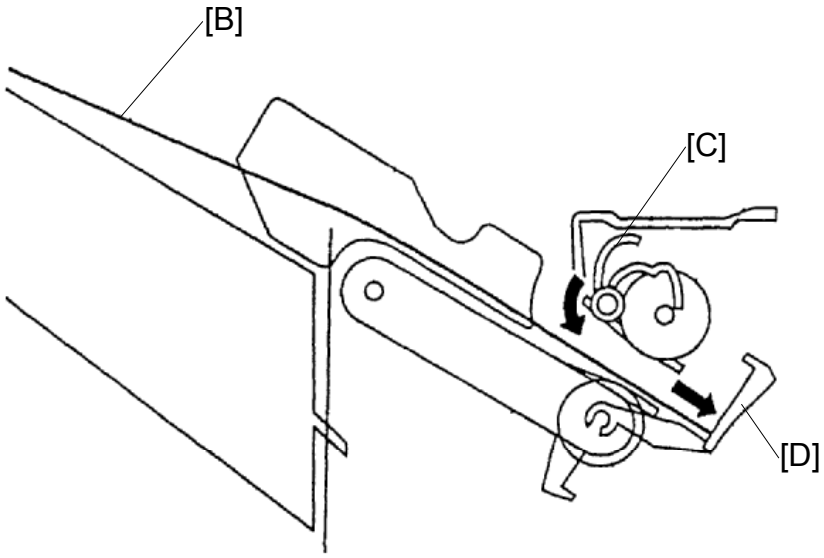
B602D905.WMF

Every time phase 3 ends, the finisher stacks one set of paper on the regular tray. The diagram shows the paper stack [D] on the regular tray after the finisher stacks four sets of paper. The arrow [E] indicates the direction of paper travel.

3.4.3 STACK

Paddle



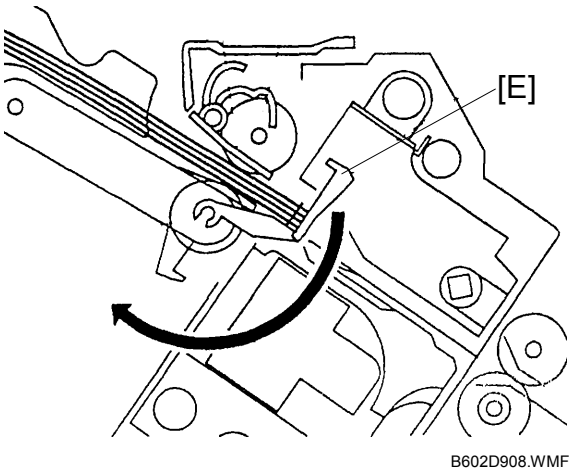


There are four paddles [C] above the stack tray. These paddles push down the paper [B] to the stack-tray stopper [D]. This aligns the right edges of the paper (viewed from the machine front). The paddle motor [A] drives these paddles.

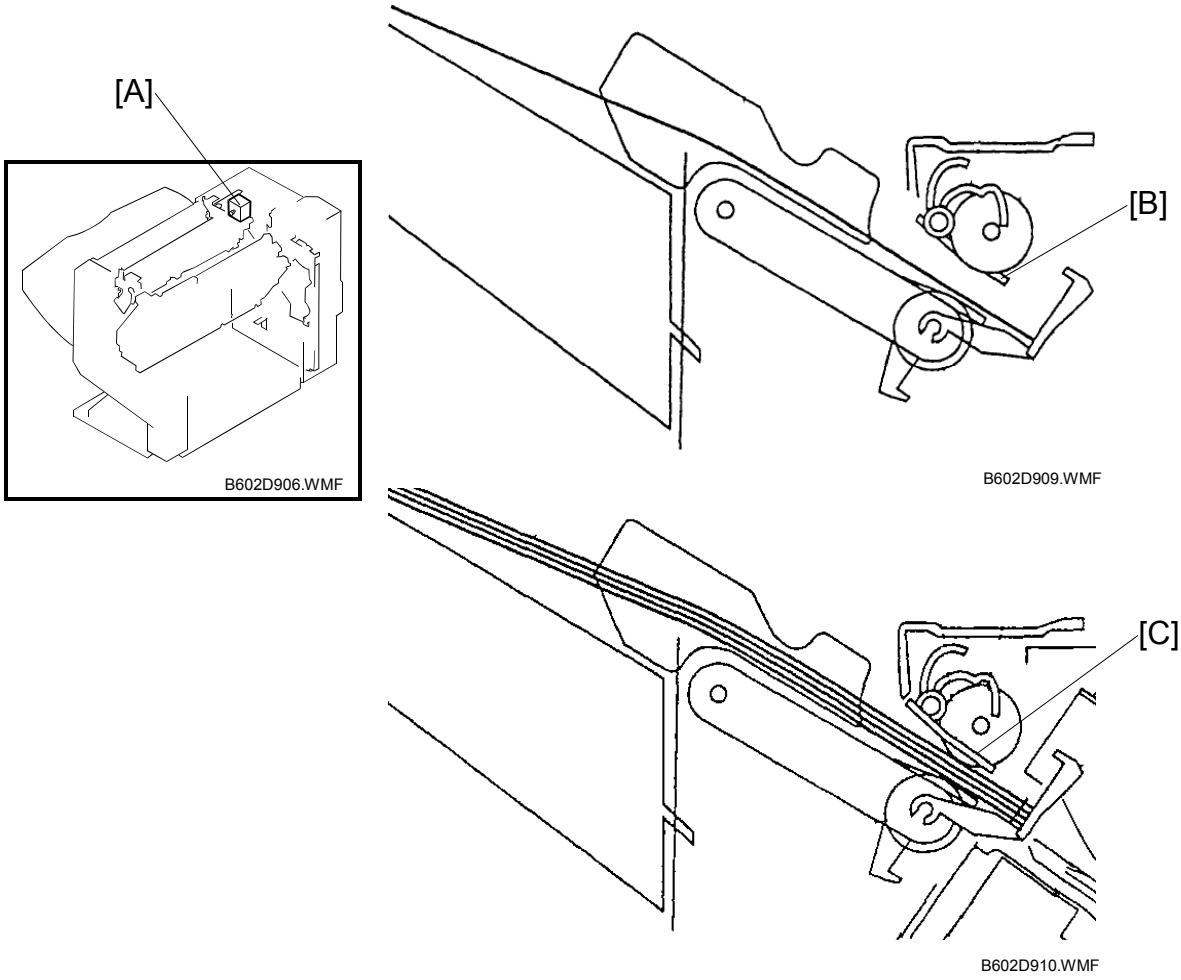
Stack-Tray Stopper

The stack-tray stopper [E] remains standing (as shown in the diagram) while the exit roller is transporting the paper to the stack tray.

Before the stack-tray upper and lower rollers transport the paper to the stapler (☛ 3.5 and 3.7), the stapler slide motor starts to move the stapler to the machine front. The stapler pushes the mechanical link of the stack-tray stopper (☛ 1.6.1). This link pulls down the stack-tray stopper.



Stack-Tray Guide Mechanism



The paddle motor [A] drives the stack-tray guide. The stack-tray guide stays away from the paper (the upper position [B]) under either of the following conditions:

- When the exit roller transports the paper to the stack tray
- When the jogger fences adjust the direction of the paper

The paddle motor drives the stack-tray guide onto the paper (the lower position [C]) under either of the following conditions:

- When the stapler operates
- When the stack-tray upper roller, stack-tray lower roller, and stack-tray belt transport the paper

Stack-Tray Guide Mechanism

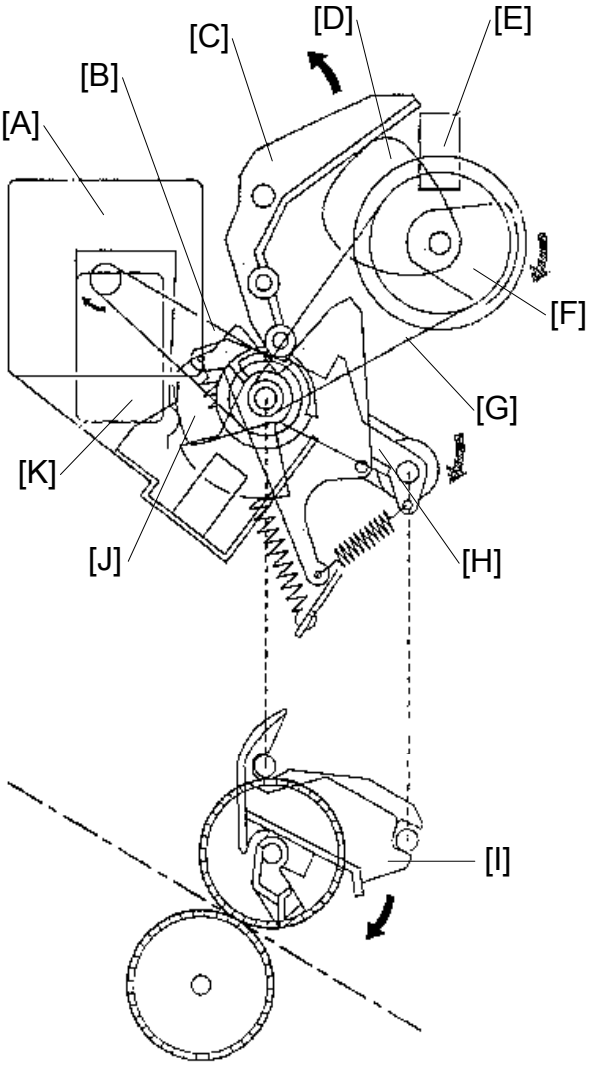
The paddle motor [A] moves the timing belts [B][G], which drive the cam [D]. The cam pushes up the first lever [C], which pushes down the second lever [H]. The second lever lowers the stack-tray guide [I].

Home Position

The actuator [F] moves with the cam [D]. The actuator interrupts the home position sensor [E] while the cam does not push the first lever [C] (in other words, while the stack-tray guide is in its upper position).

Stapler Switch

The second lever [H] moves with the stapler-switch actuator [J]. When the first lever pushes the second lever (in other words, when the stack tray guide is in its lower position), the actuator pushes the stapler switch [K], turning it on. The stapler can operate only when this switch is on.

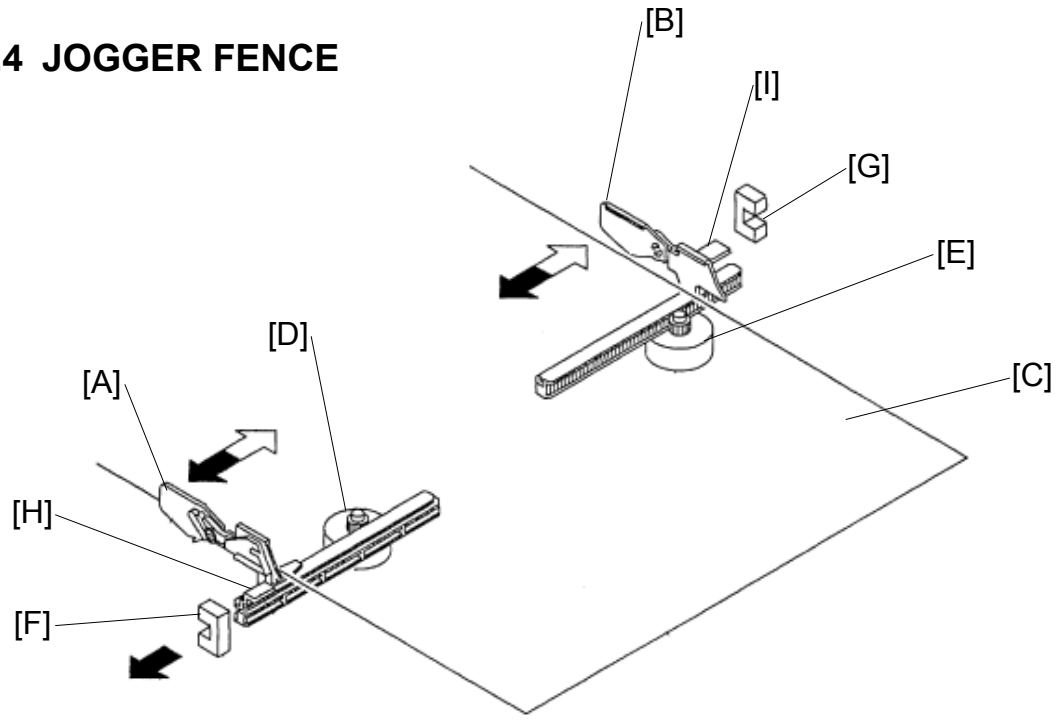


B602D949.WMF

Safety Feature

The stapler switch, along with the stack-tray guide mechanism, works as a safety feature. The stapler operates only when the stack-tray guide is in the lower position. When the stack-tray guide is in this position, the user cannot access the stapler through the opening between the stack-tray guide and the stack tray. Therefore, staples do not injure the user.

3.4.4 JOGGER FENCE



B602D911.WMF

Action

There are two jogger fences: the front fence [A] and the rear fence [B]. These two jogger fences adjust the position of the paper [C] on the stack tray.

Drive

The front-jogger-fence motor [D] and the rear-jogger-fence motor [E] drive the jogger fences.

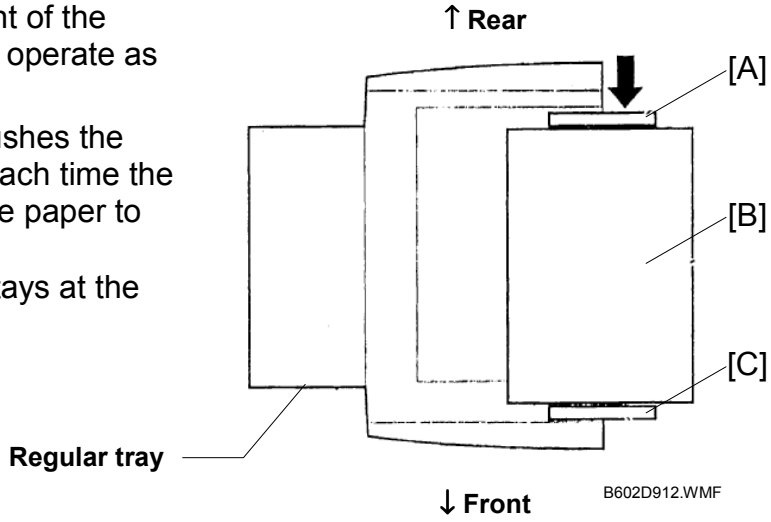
Home Position

There are two home position sensors: the front-fence home-position sensor [F] and the rear-fence home-position sensor [G]. Each jogger fence is linked to an actuator [H][I]. When the main switch is turned on, the front and rear fence motors drive the jogger fences until each home position sensor detected its actuator.

Paper Position

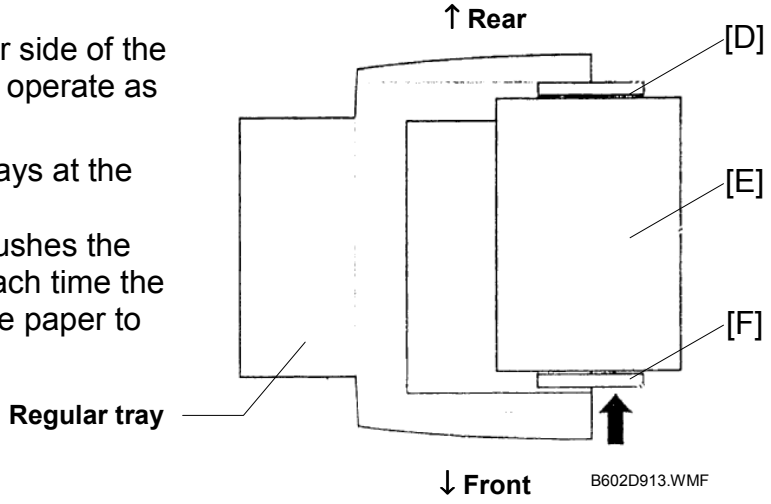
To align the paper to the front of the stack tray, the jogger fences operate as follows:

- The rear fence [A] pushes the paper [B] to the front each time the exit roller transports the paper to the stack tray.
- The front fence [C] stays at the front side.

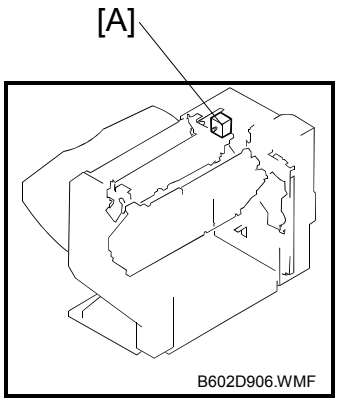


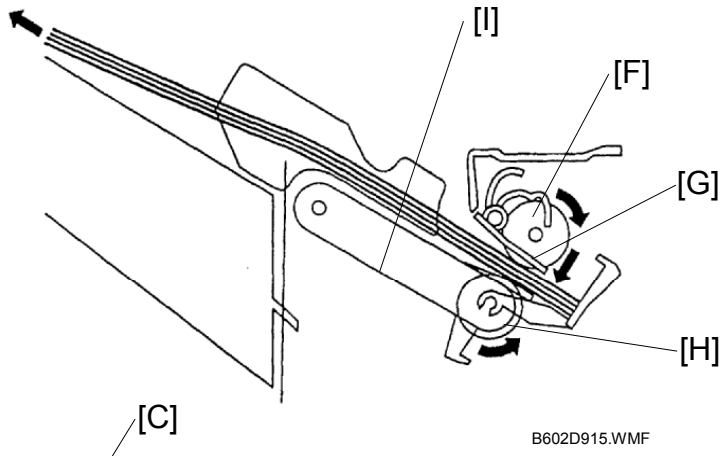
To align the paper to the rear side of the stack tray, the jogger fences operate as follows:

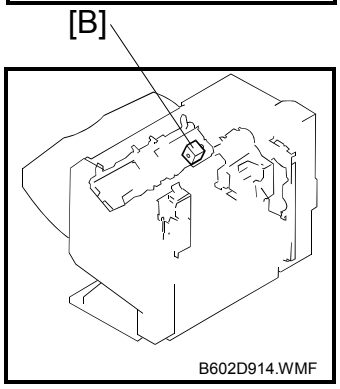
- The rear fence [D] stays at the rear side.
- The front fence [E] pushes the paper [F] to the rear each time the exit roller transports the paper to the stack tray.

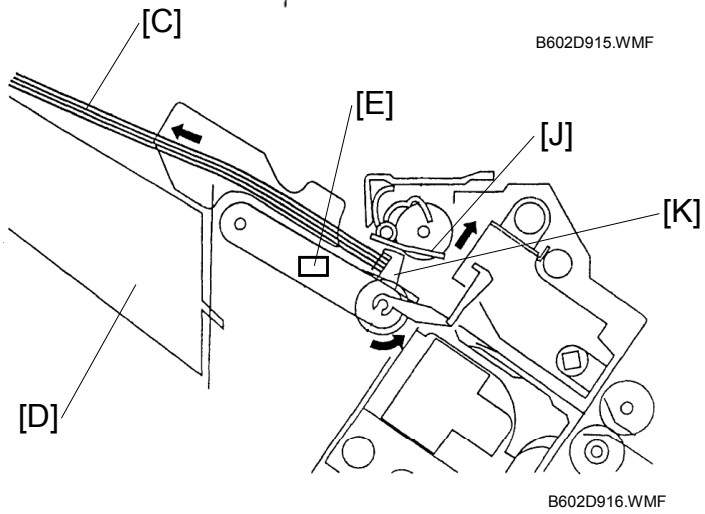


3.4.5 PAPER OUTPUT









Mechanism

The paper in the stack tray is transported to the regular tray as follows:

1. The paddle motor [A] moves the stack-tray guide to its lower position [G].
2. The stack-tray exit motor [B] drives the stack-tray upper roller [F], the stack-tray lower roller [H], and the stack-tray belt [I]. The stack-tray belt has a pair of paper supports [K] that push the paper [C] (☛ 3.4.1).
3. When the paper supports have left the home position, the controller starts to count the pulses of the stack-tray exit motor.
4. When the pulse count reaches the predefined number (not adjustable), the paddle motor moves the stack-tray guide to its upper position [J].
5. The paper supports keep pushing the paper to the regular tray [D].

Stack-Tray Belt Home Position

When the stack-tray belt is at its home position, one of the paper supports [K] pushes the actuator of the home position sensor [E].

3.5 STAPLING

3.5.1 OVERVIEW

The finisher staples the paper as follows:

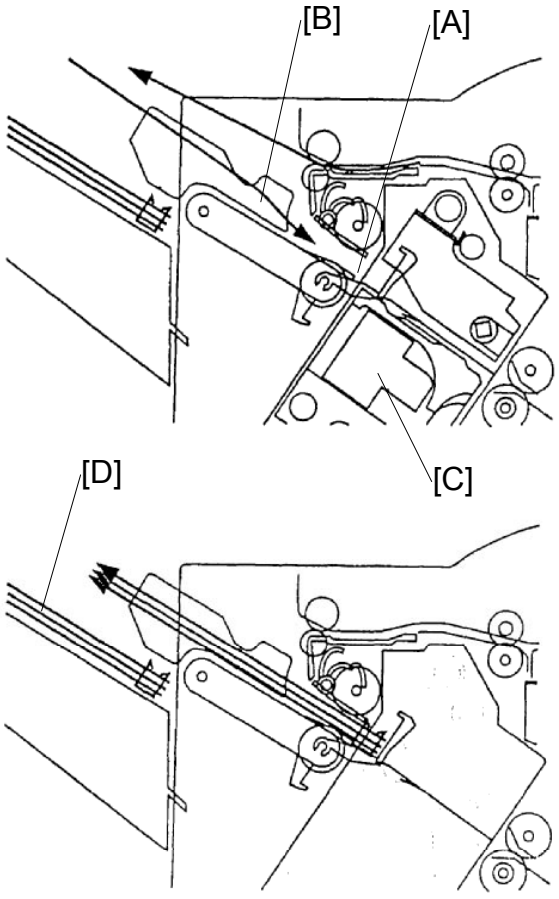
Phase 1: The exit roller transports the paper to the stack tray [A] until the number of papers reaches a specified number.

Phase 2: The jogger fences [B] adjust the position of the paper. For the jogger fence mechanism, see section 3.4.4.

Phase 3: The stapler [C] staples the paper.

Phase 4: The stapled paper [D] is transported to the regular tray.

When the finisher has conducted phases 1 through 4, it starts the same processing from phase 1.



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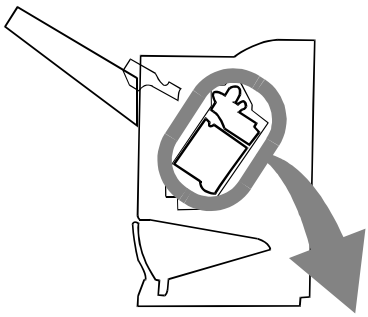
3.5.2 STAPLER

Mechanism



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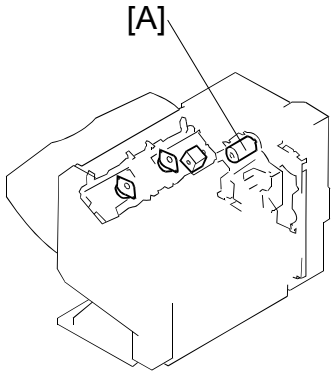

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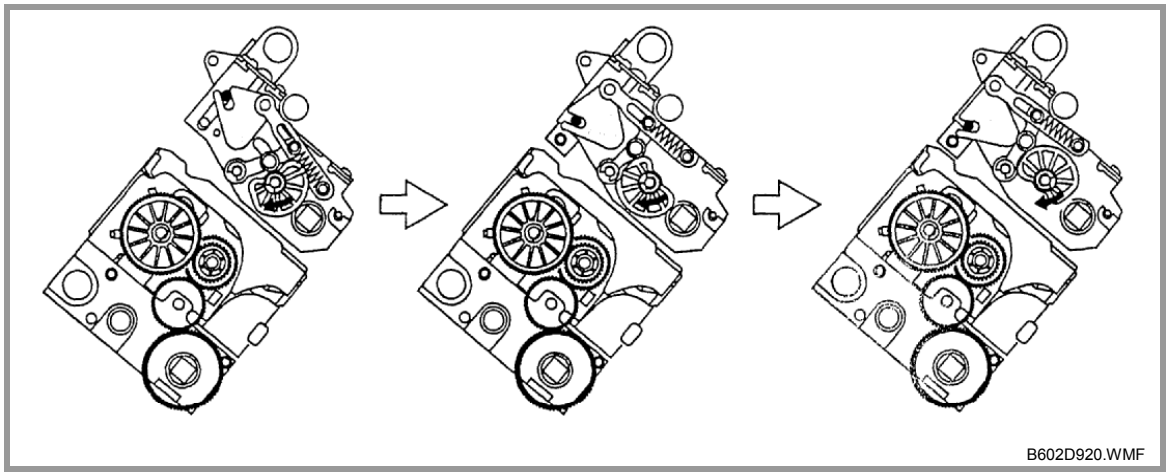


B602D920.WMF

The stapler/folder motor [A] drives the stapler (☛ "Action and Drive" in section 3.5.3).

Stapler Switch

See "Stapler Switch" in section 3.4.3.

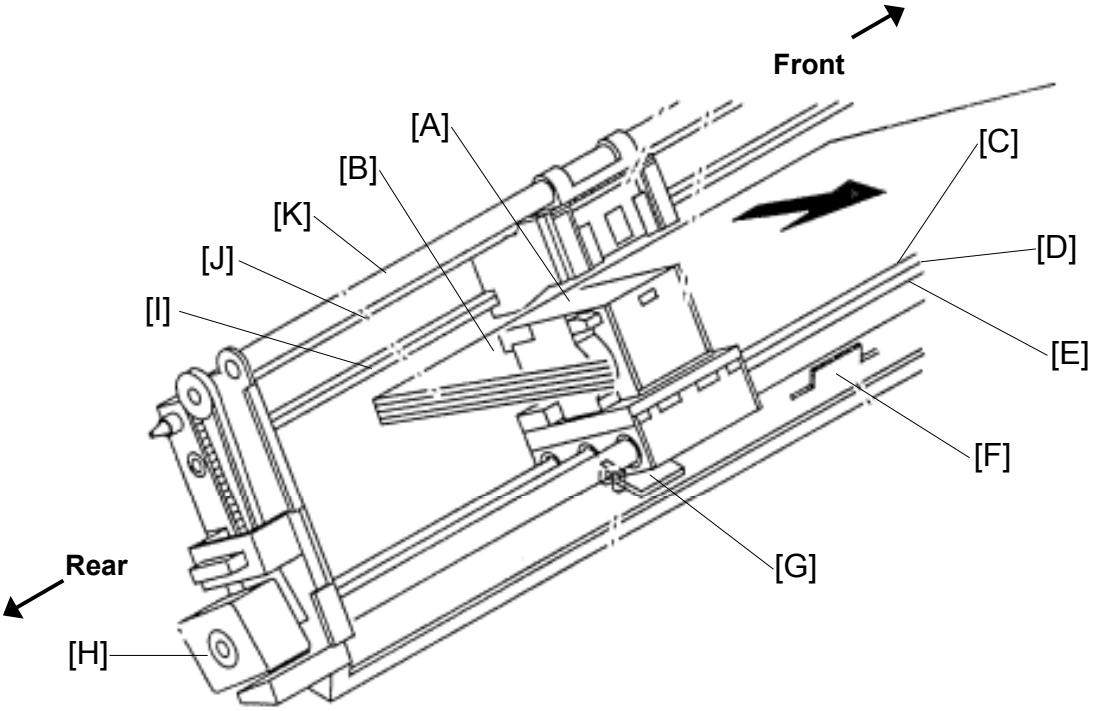
Sensors

There are three sensors inside the stapler:

- Staple Home Position Sensor: The staple home position sensor detects the cam position.
- Staple Sensor: The staple sensor detects the staples in the cartridge.
- Staple Ready Sensor: The staple ready sensor detects the upper end of the staple.

The staple home position sensor above is different from the home position sensor on the bottom of the stapler (☛ 3.5.3).

3.5.3 POSITIONING



B602D921.WMF

Action and Drive

There is one stapler [A] in the finisher. The stapler is on six rails [C][D][E][I]. The rail [C], rail [D], rail [I], and rail [J] transmit the drive power:

- The rail [C] and rail [I] transmit the drive power of the stapler/folder motor. The stapler uses this power to staple the paper (☛ 3.5.2).
- The rails [D] and [J] transmit the drive power of the staple slide motor [H]. This drive power moves the stapler to the front or rear.

In the diagram above, [B] is the paper stack on the stack tray.

Home Position and Ready Position

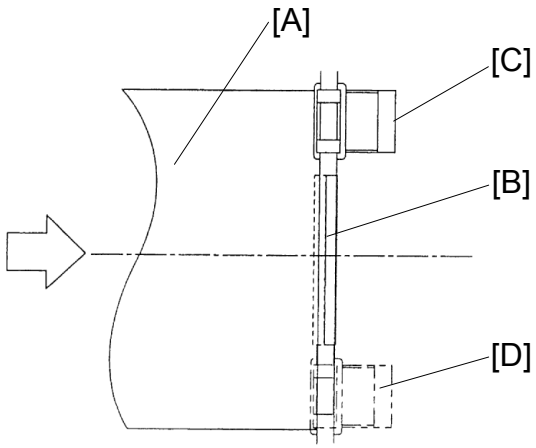
The home position sensor [G] is at the bottom of the stapler; the sensor blade [F] is on the frame of the unit. The controller references the home position sensor to set the stapler in its ready position. Note that the stapler is not in the home position when it is ready. The controller sets the stapler in the ready position as follows:

1. You turn the main switch on (or you close the front door of the finisher).
2. The slide motor drives the stapler from the rear side to the front side.
3. The home position sensor detects the sensor blade. The slide motor stops.
4. The slide motor starts in reverse to drive the stapler to the rear side. The controller starts to count the pulses of the motor.
5. When the pulse count reaches a predefined number (not adjustable), the controller stops the slide motor. The stapler is in its ready position.

Staple Position

The controller counts the pulses of the stapler slide motor to calculates the distance between the ready position (☛ Home Position and Ready Position) and the staple position

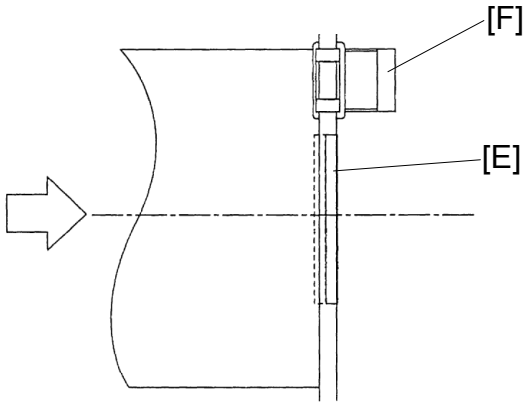
Front-End One Staple



B602D922.WMF

1. Before the stapler slide motor starts, the stapler is in the ready position [C].
2. The stapler slide motor starts to slide the stapler to the front. The controller counts the pulses of the stapler slide motor.
3. While moving to the front, the stapler lowers the stack-tray stopper [B] (☛ "Stack-Tray Stopper" in 3.4.3).
4. When the pulse count reaches the predefined number (not adjustable), the controller stops the stapler slide motor. The stapler is in the stapling position [D].
5. The stapler/folder motor drives the stapler. The stapler staples the paler [A].

Rear-End One Staple



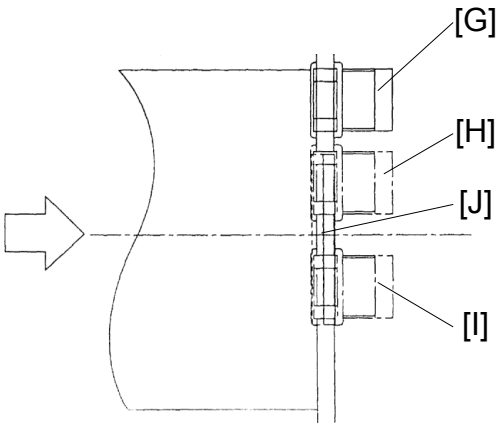
B602D923.WMF

1. The stapler is in the ready position [F].
2. The stapler/folder motor drives the stapler. The stapler staples the paper.

The stapler does not move to the front.

The stack-tray stopper [E] keeps standing

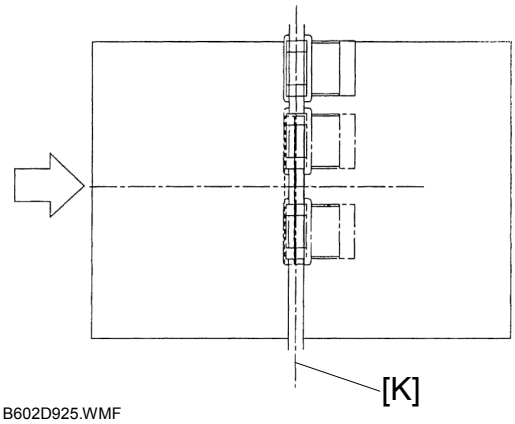
Two Staples



B602D924.WMF

1. Before the stapler slide motor starts, the stapler is in the ready position [G].
2. The stapler slide motor starts to slide the stapler to the front. The controller counts the pulses of the stapler slide motor.
3. While moving to the front, the stapler lowers the stack-tray stopper [J].
4. When the pulse count reaches the predefined number (not adjustable), the controller stops the stapler slide motor. The stapler is in the first stapling position [H].
5. The stapler/folder motor drives the stapler. The stapler staples the paler.
6. The stapler slide motor starts to slide the stapler to the front. The controller counts the pulses of he stapler slide motor.
7. When the pulse cont reaches the predefined number (not adjustable), the controller stops the stapler slide motor. The stapler is in the second stapling position [I].
8. The stapler/folder motor drives the stapler. The stapler staples the paper.

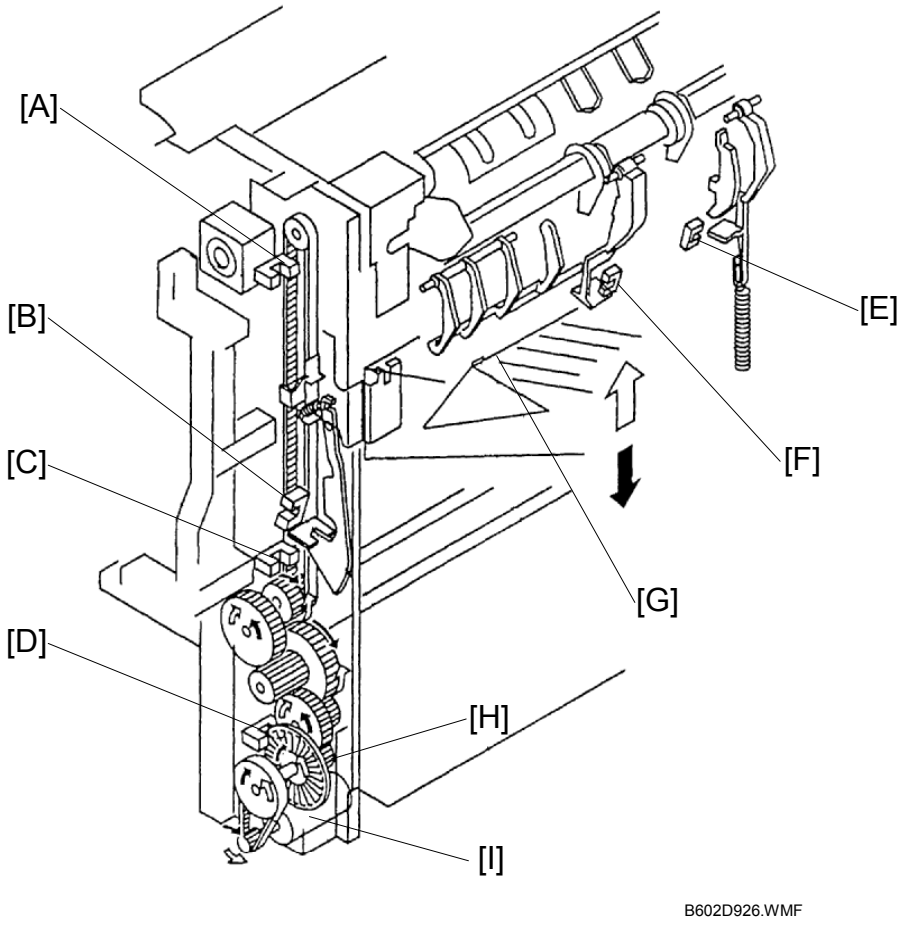
Saddle Stitch



B602D925.WMF

1. The stack-tray upper and lower rollers transport the paper to the stapler unit until the center of the paper [K] reaches the stapling positions (☛ 3.7.4).
2. The stapler operates as described in the previous paragraph (☛ Two Staples).

3.6 REGULAR TRAY



Action and Drive

The lift motor [I] drives the regular tray to adjust its height.

Ready Position

Before the stack-tray rollers and belts transport the paper to the regular tray, the lift motor sets the regular tray in the ready position:

1. The lift motor lowers the regular tray. The controller references the lift motor encoder sensor [D] to count how many turns the motor makes.
2. When the number of turns reaches a predefined number (not adjustable), the controller stops the lift motor.
3. The lift motor operates in reverse, lifting the regular tray.
4. The paper height sensor [F] detects the edge [G] of the tray or the top of the paper stack (☛Paper Sensor). The lift motor stops.

Paper Sensor

As illustrated in the previous paragraph (☛ Ready Position), the paper height sensor [F] can detect either the tray edge or the paper stack. Therefore, the signals from the paper height sensor are not enough to let the controller know if any paper is on the tray.

To find the paper on the regular tray, the controller references the paper sensor [E]. This sensor detects the paper but does not detect the tray.

Paper Full

While the stack-tray rollers and belts continue to transport the paper to the regular tray, the ready position becomes lower (☛ Ready Position). When the number of paper reaches about 500 sheets, the paper full sensor [B] is interrupted by its actuator. When the number of paper reaches about 1,000 sheets, the lower limit sensor [C] is interrupted by its actuator. To decide the paper-full status, the controller considers these sensor signals and the paper sizes. The table lists the paper sizes and the numbers of paper in the paper-full status.

Paper Size	Number of Paper
A3, B4, DLT, LG	About 500 sheets
Smaller sizes	About 1,000 sheets

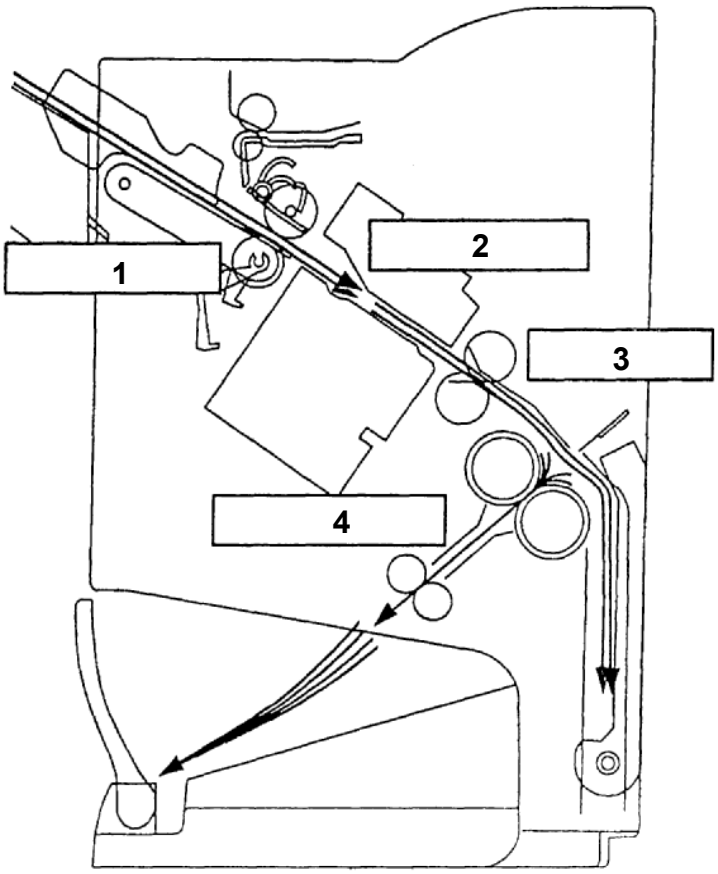
Fail Safe Feature

When the regular tray reaches its uppermost position, the upper limit sensor [A] detects it. The finisher stops its operation.

The regular tray does not reach this position in normal operations. The upper limit sensor works as a failsafe feature. If the regular tray fails to actuate the paper height sensor [F] because of some hardware error, this failsafe feature works.

3.7 SADDLE STITCH

3.7.1 OVERVIEW



B602D927.WMF

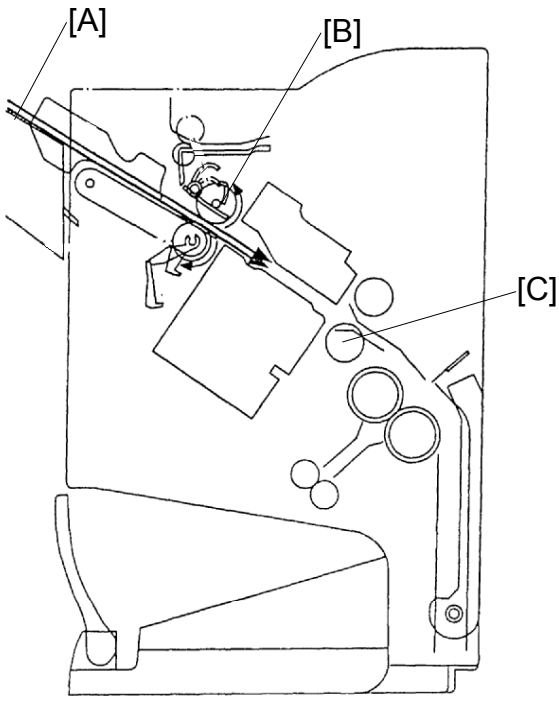
The saddle stitch process consists of the following four phases:

1. The stack tray aligns the paper (☛3.7.2).
2. The stapler staples the paper (☛ 3.7.3).
3. The rollers and the sensor cooperate to transport the paper in the folding position (☛ 3.7.4).
4. The folding plate and folder rollers cooperate to fold the paper and to transport it to the booklet tray (☛ 3.7.5).

3.7.2 STACK TRAY

The stack tray operates as follows:

1. The stack-tray stopper aligns the right edges of the paper in the stack tray (☛ "Stack-Tray Stopper" in 3.4.1).
2. The jogger fences adjust the position of the paper (☛ 3.4.4).
3. When a specified number of paper [A] is stacked, the paddle motor operates in reverse to lower the stack-tray guide and the stack-tray upper roller [B] onto the paper.
4. The stack-tray exit motor drives the stack-tray upper roller and lower roller to transport the paper to the stapler unit.



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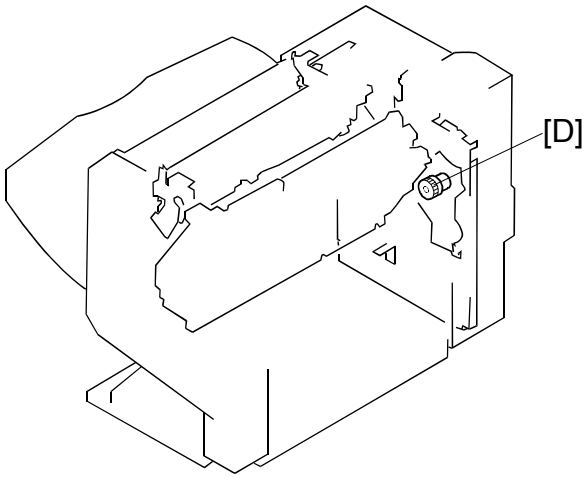
5. The booklet clutch [D] turns on. This clutch transmits the driver power of the transport motor to the stack-tray transport roller [C].



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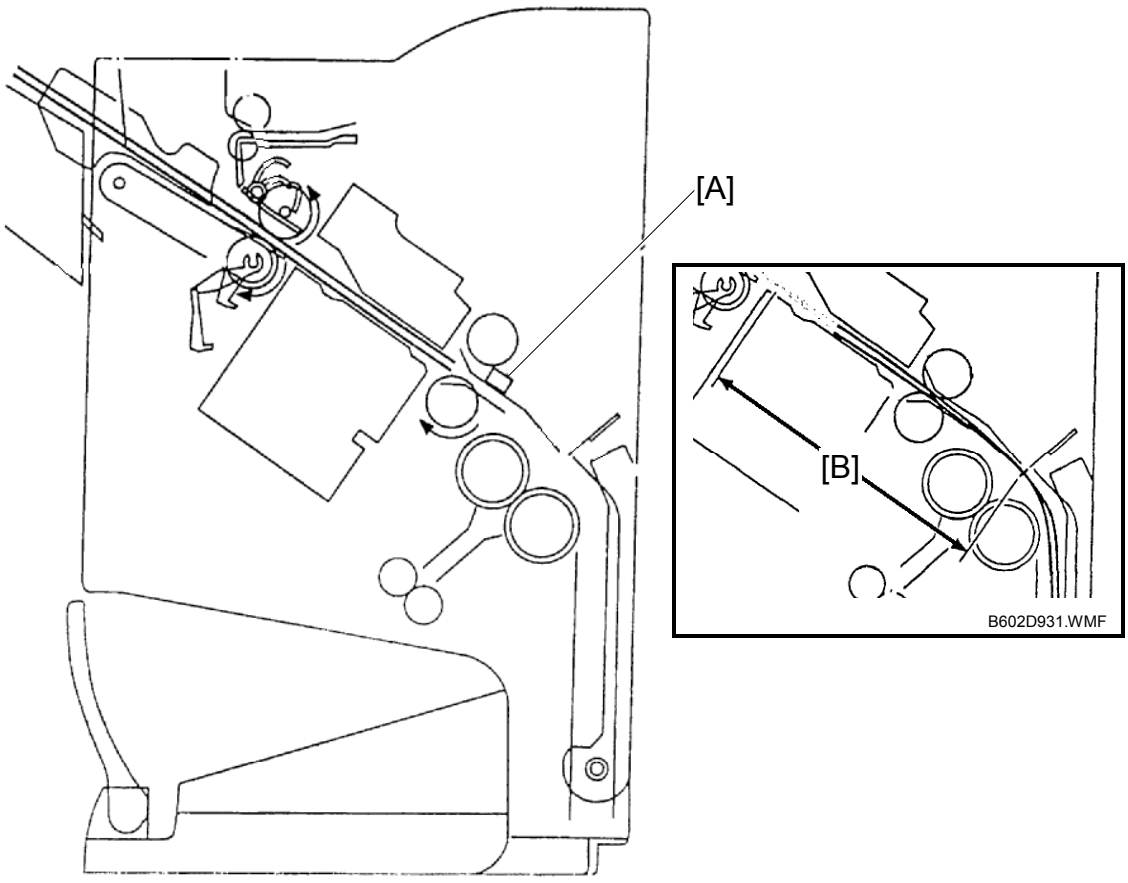
3.7.3 STAPLER

The stapler waits for the paper in the ready position, and operates when the paper is set to the stapler positions (☛ 3.5.3). When the finisher is processing one sheet of paper, the stapler does not staple the paper.

3.7.4 PAPER TRANSPORT



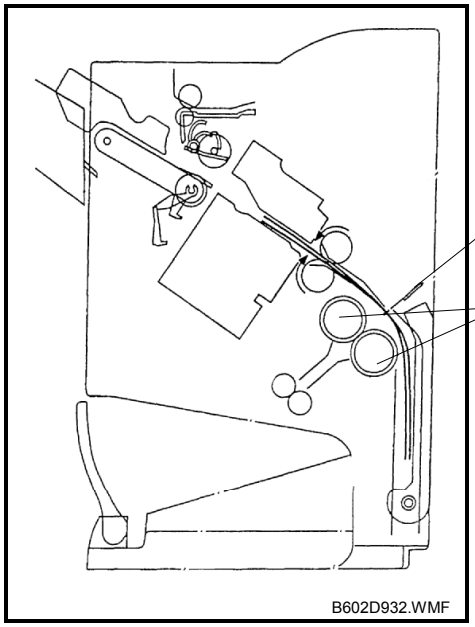
B602D930.WMF

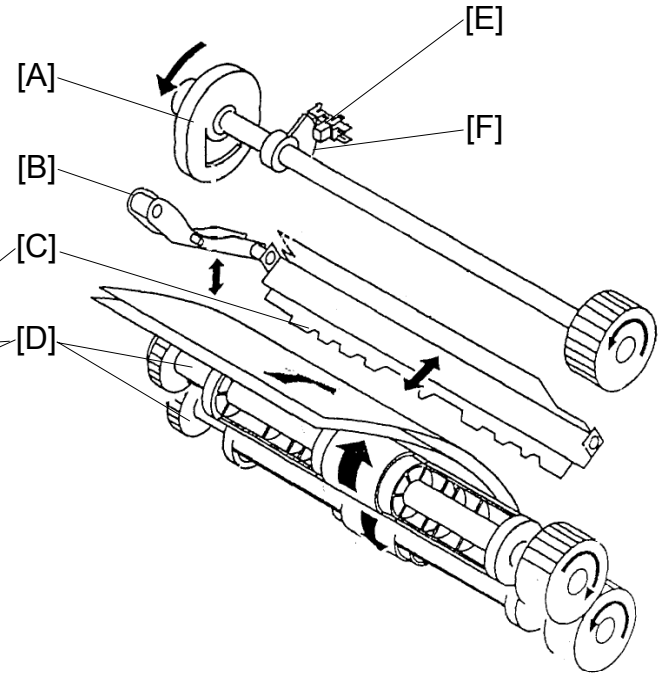
The rollers and the sensor cooperate to transport the paper as follows:

1. When the leading edge of the paper stack reaches the folder home position sensor [A], the controller starts to count the pulses of the transport motor.
2. When the pulse count reaches the number equivalent to the distance [B] between the stapler and the folding plate, the transport motor stops. The center of the paper is in the folding position.

3.7.5 PAPER OUTPUT

Folding Plate Mechanism





The folding plate is driven by the stapler/folder motor. The folding plate operates as follows:

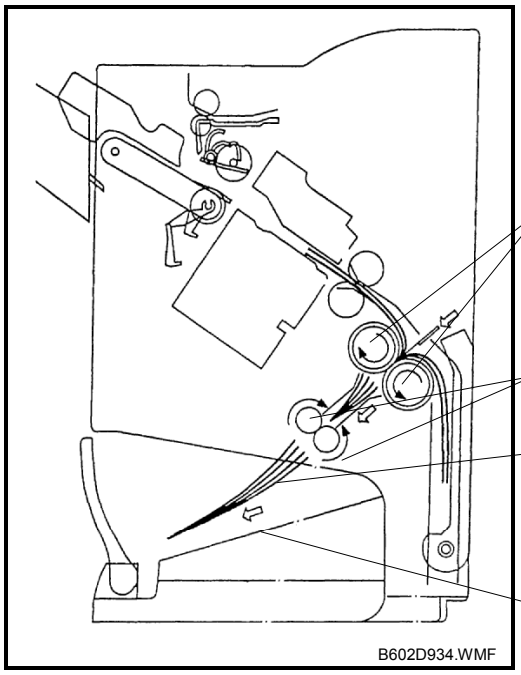
1. The folding plate waits for the stack-tray transport roller to transport the paper.
2. When the center of the paper is set in the folding position, the stapler/folder motor drives the folding plate [C] and the folder rollers [D]. The folding plate presses the paper between the folder rollers.
3. The folder rollers feed the paper about 10 mm, the folding plate returns to its home position. The folder rollers keep feeding the paper.

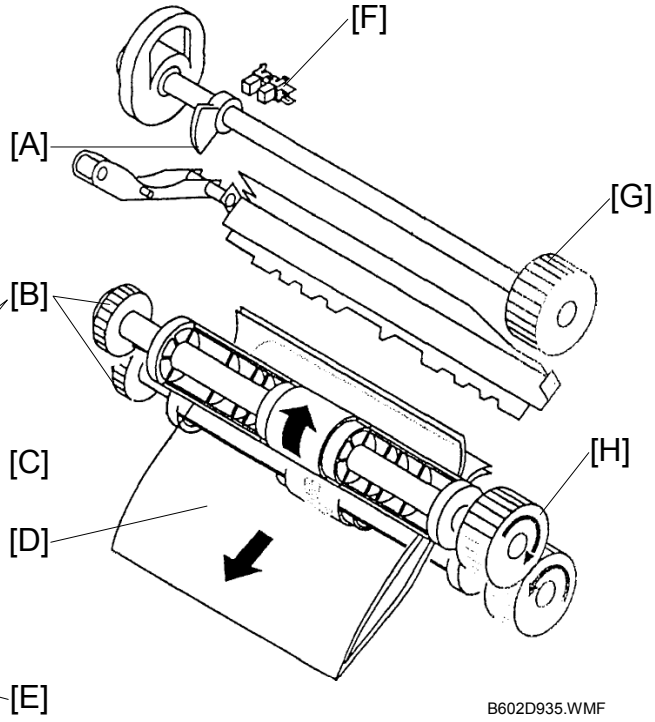
Folding Plate Home Position

The home position of the folding plate is detected by the folder home position sensor [E]. The actuator [F] is linked to the folding plate by way of cam [A] and lever [B] (though they are separated in the diagram).

The sensor also detects the home position of the folder rollers (☛ Folder Rollers Home Position).

Folder Rollers Mechanism





The folder rollers are driven by the stapler/folder motor. The folder rollers operate as follows:

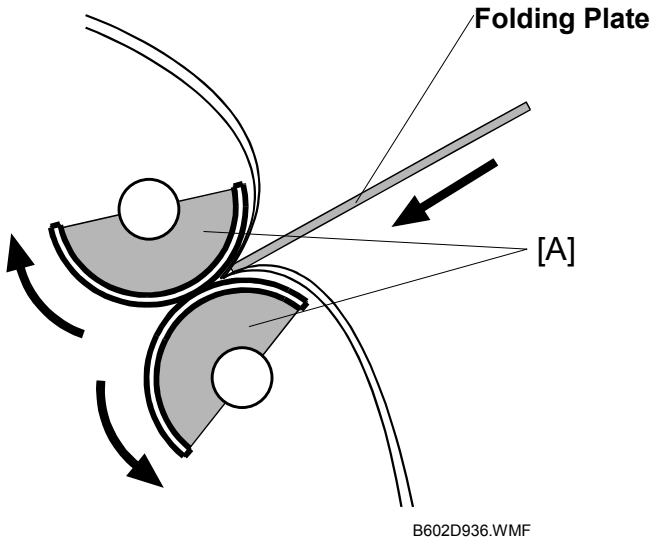
1. The folder rollers [B] feed the paper pressed by the folding plate.
2. The folder rollers and the booklet exit rollers [C] feed the paper [D] and transport it to the booklet tray [E].

Folder Rollers Home Position

The home position of the folder rollers is detected by the folder home position sensor [F]. The folder home position sensor blade [A] is linked to the folder rollers by way of the gears [G][H] (though they are separated in the diagram).

The sensor also detects the home position of the folding plate (☛ Folding Plate Home Position).

Shape of Folder Rollers



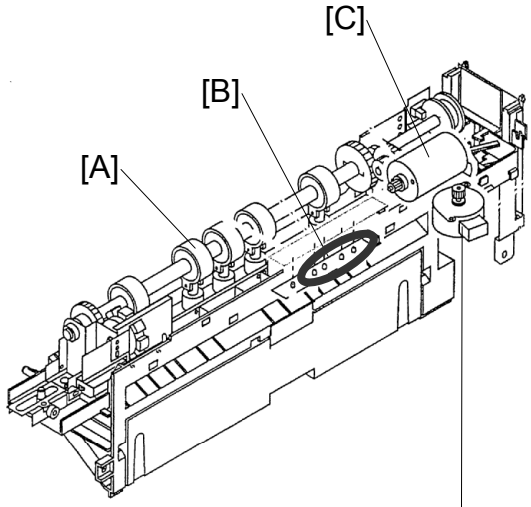
Viewed from the front or rear, each folder rollers is a half-circle [A] except both ends and middle. This structure prevents the rollers from crumpling the paper stack.

3.8 PUNCH UNIT (OPTIONAL)

3.8.1 REGISTRATION

Slide Unit

The slide unit includes the punch motor [C], the punch [A], and paper edge and size sensors [B]. This unit is driven by the registration motor [E].



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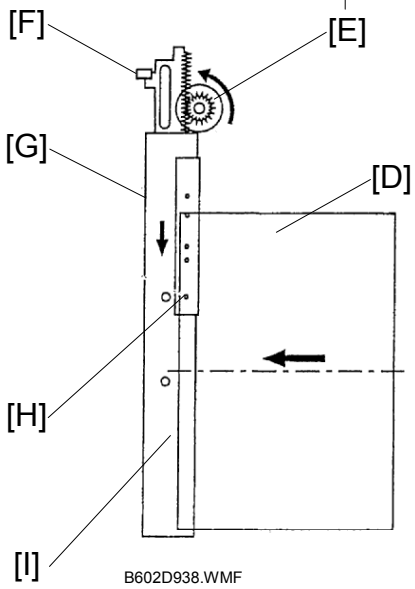
Home Position

The home position of the slide unit (in other words, the home position of the paper edge sensors) is detected by the registration home position sensor [F].

Registration

Registration is executed as follows:

1. When the paper [D] comes from the main unit, the leading edge [I] of the paper is detected by the paper edge sensor [H].
2. The registration motor starts to operate. The slide unit [G] moves to the front.



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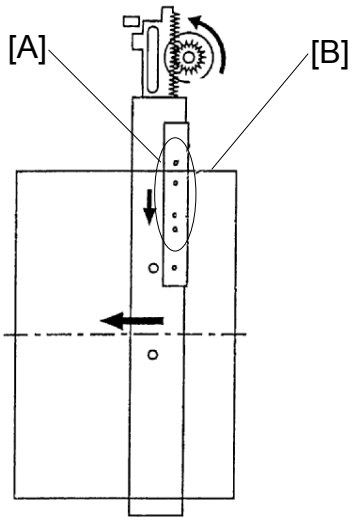
Peripherals

3. One of the paper size sensors [A] that corresponds to the paper size detects the rear end [B] of the paper.
4. When the slide unit is set in place, the registration motor stops its operations.



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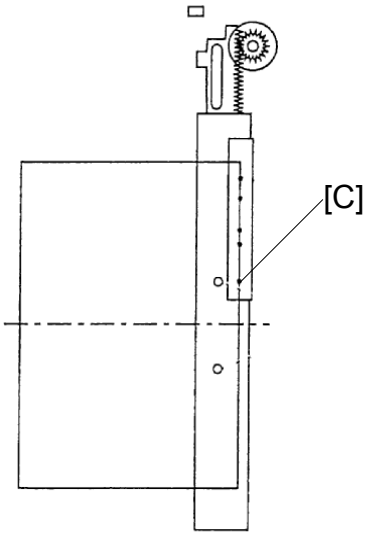
5. When the paper edge sensor [C] detects the trailing edge of the paper, the transport motor [D] (of the finisher) stops.



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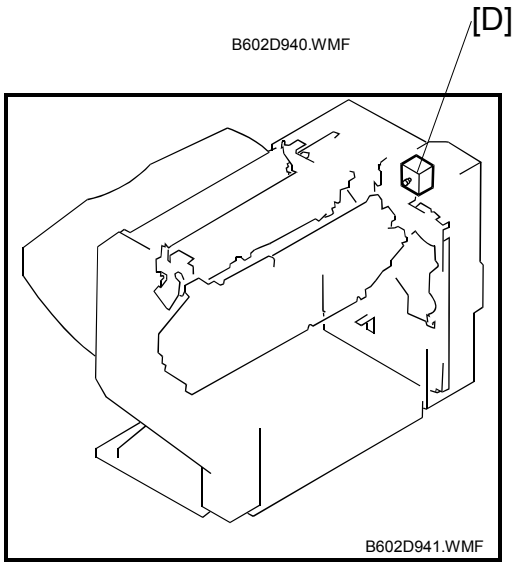

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3.8.2 PUNCH

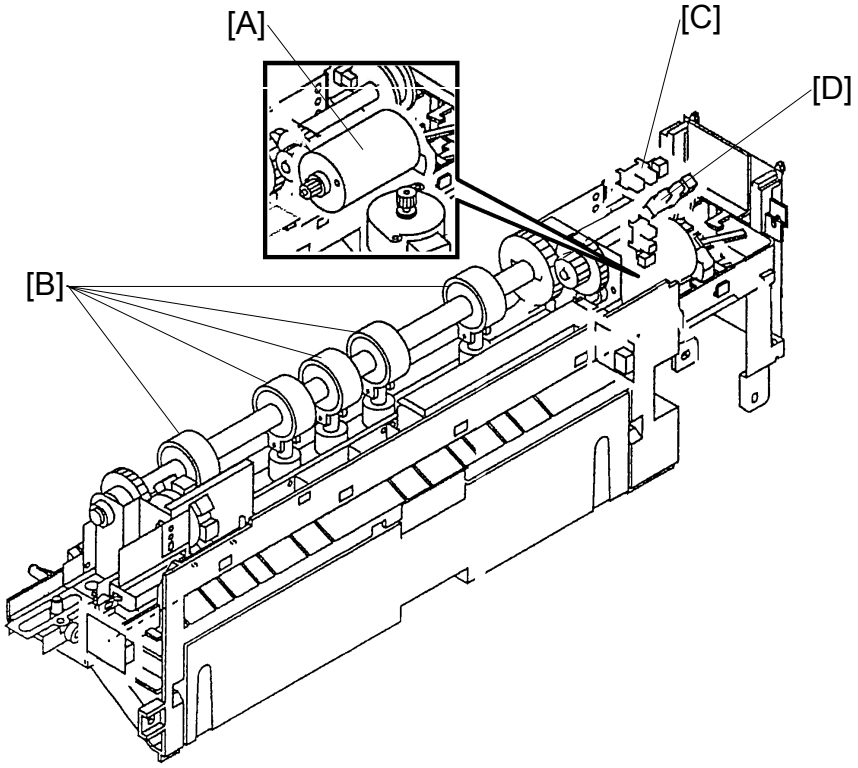
Types of Punch Unit

There are four types:

- 2 holes
- 2 or 3 holes (The user can select 2-hole punching or 3-hole punching from the operation panel or the printer driver.)
- 4 holes
- 4 holes

There are two 4-hole types: for the North Europe models and for the other models.

Drive



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The diagram shows the 2 or 3 holes type, which has five punch cams [B]: two of them are for 2-hole punching and the other three are for 3-hole punching. The punch motor [A] drives the punch cams.

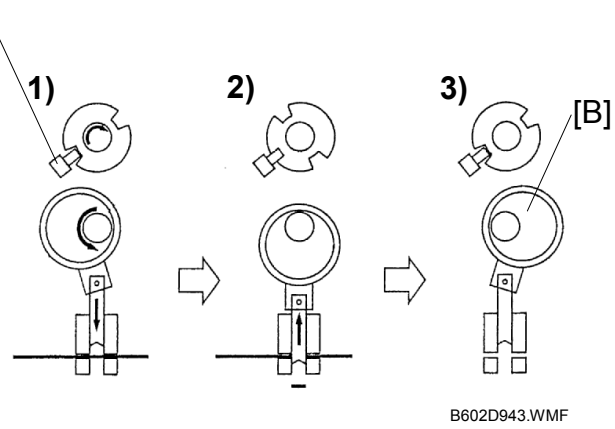
Home Position

The controller uses two sensors, the home position sensor [D] and the encoder sensor [C], to set the punch cams in the home position. The controller fine-adjusts the home position by referencing the encoder sensor signals.

Two Holes and Four Holes

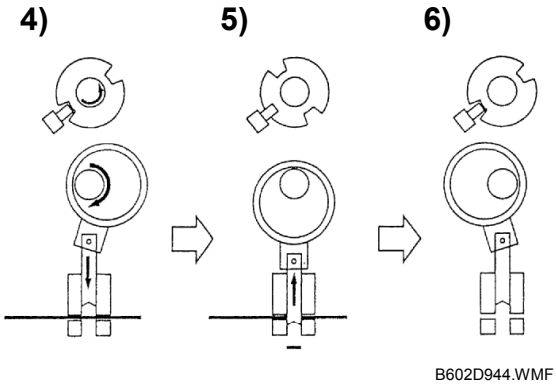
When the finisher punches holes, the punch motor drives all punches at the same time.

Phase 1



1) The punch is in the home position. The punch home position sensor [A] is on. When the first sheet of paper is set, the punch cam starts a forward turn.
2) When the punch cam has made a 90-degree turn, a hole is punched.
3) When the punch cam has made a 180-degree turn, the punch comes back to the home position. Note that the punch cam [B] is not in the previous position.

Phase 2



4) The punch is in the home position. The punch home position sensor is on. When the second sheet of paper is set, the punch cam starts a backward turn.
5) When the punch cam has made a 90-degree turn, a hole is punched.
6) When the punch cam has made 180-degree turn, the punch comes back to its home position. Note that the punch cam is not in the previous position but in the same position as the start fo phase 1.

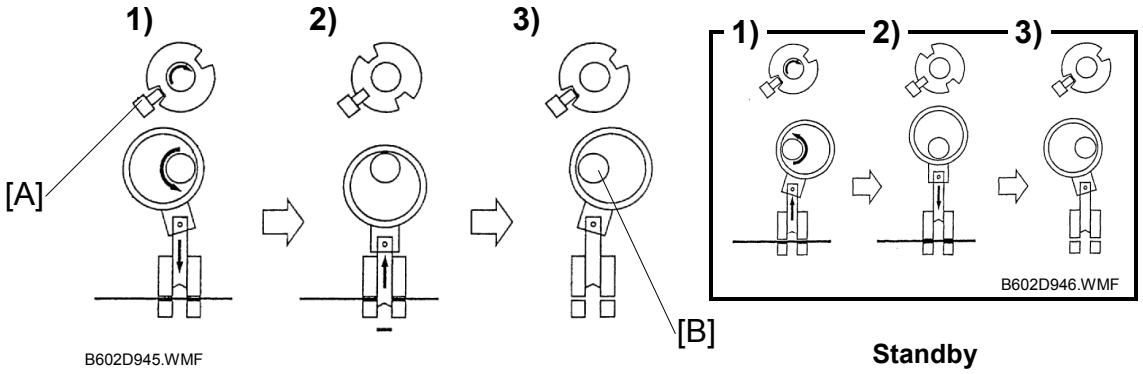
Phase 3

- Phase 1 and phase 2 are alternately executed.

Two or Three Holes

There are five punches. When the finisher punches holes, the punch drives all punches at the same time. But three of them do not reach the paper (when the finisher is punching two holes), or two of them do not reach the paper (when the finisher is punching three holes).

Phase 1



Working **Standby**

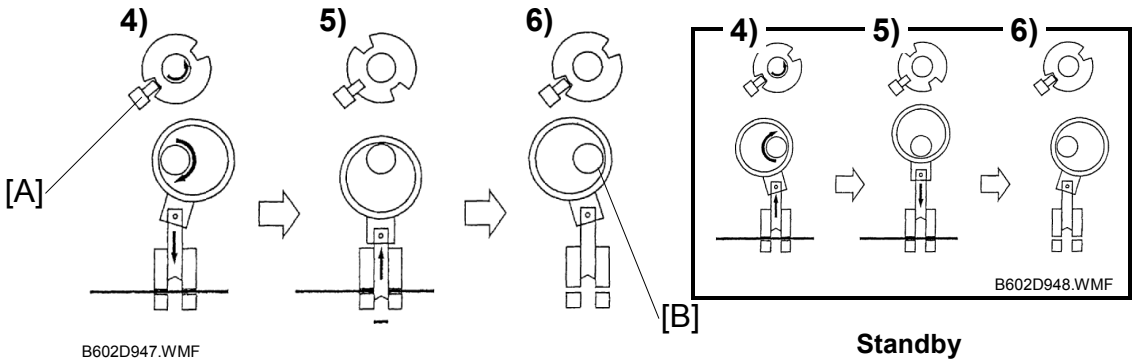
Working punches operate as follows:

1) The punch is in the home position. The punch home position sensor [A] is on. When the first sheet of paper is set, the punch cam starts a forward turn.
2) When the punch cam has made a 180-degree turn, a hole is punched.
3) When the punch cam has made a 180-degree turn, the punch comes back to the home position. Note that the punch cam [B] is not in the previous position.

Standby punches operate as follows:

1) When the first sheet of paper is set, the punch cam starts a forward turn.
2) When the punch cam has made a 90-degree turn, the punch is away from the paper.
3) When the punch cam has made a 180-degree turn, the punch is back to the home position.

Phase 2



Working **Standby**

Working punches operate as follows:

4) The punch is in the home position. The punch home position sensor [A] is on. When the next sheet of paper is set, the punch cam starts a backward turn.
5) When the punch cam has made a 90-degree turn, a hole is punched.
6) When the punch cam has made a 180-degree turn, the punch comes back to the home position. Note that the punch cam [B] is not in the previous position but in the same position as the start of phase 1.

Standby punches operate as follows:

4) When the next sheet of paper is set, the punch cam starts a backward turn.
5) When the punch cam has made a 90-degree turn, the punch is away from the paper.
6) When the punch cam has made a 180-degree turn. the punch comes back to the home position.

Phase 3

- Phase 1 and phase 2 are alternately executed.