FINISHER
(Machine Code : A300)

1. SPECIFICATIONS

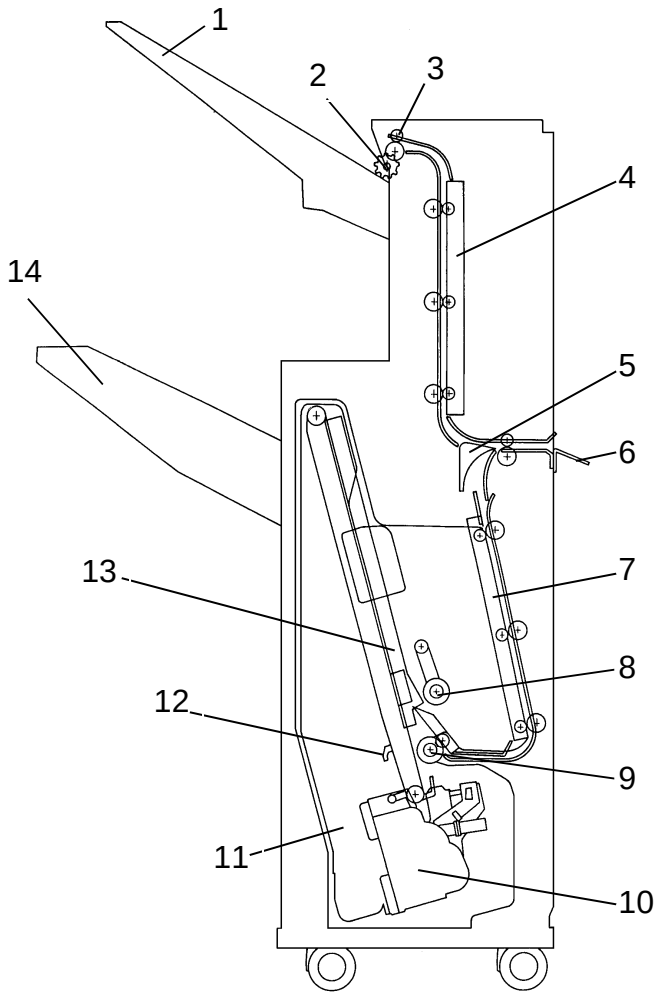
Shift Tray:

Paper Size:	Maximum: A3, 11"x17" Minimum: A6R, 5 1/2"x8 1/2"(lengthwise)
Paper Weight:	52~157 g/m^2 (14~42 lb)
Tray Capacity:	1,000 sheets A4, 8 1/2"x11" or smaller size 500 sheets B4, 8 1/2"x14" or larger size

Stapler Tray:

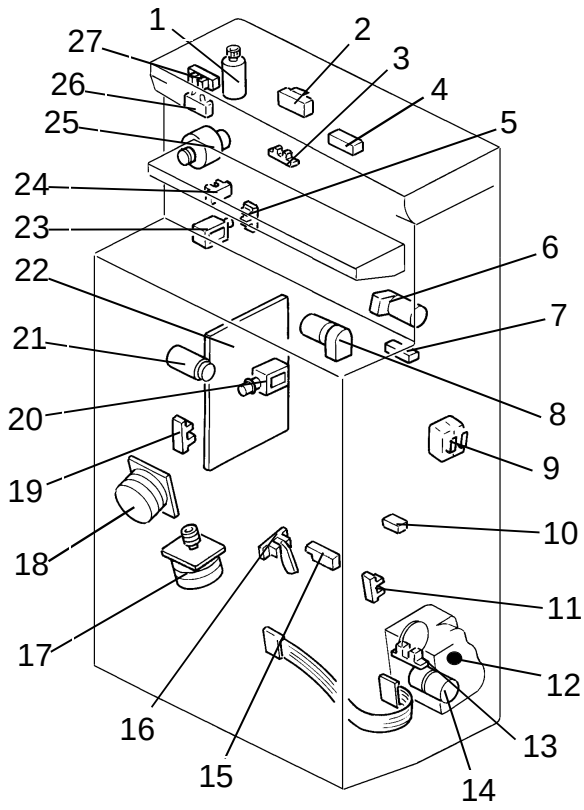
Paper Size:	Maximum: A3, 11"x17" Minimum: B5, 8 1/2"x11"
Paper Weight:	64~80 g/m^2 (17 lb~21 lb)
Tray Capacity:	30 sets or 600 sheets A4,8 1/2"x11" or smaller size 30 sets or 250 sheets B4, 8 1/2"x14" or larger size
Stapler Position:	3 stapler modes (top left, bottom left, and top/bottom left)
Dimension	(W) 585 mm x (D) 502 mm x (H) 940 mm (23.0" x 19.8" x 37.0")
Weight	37kg (81.6 lb)
Power Source	+24 volts from copier
Power Consumption	41W

2. MECHANICAL COMPONENT LAYOUT



1. Shift Tray
2. Shift Tray Positioning Roller
3. Shift Tray Exit Roller
4. Shift Tray Transport Unit
5. Stapler Gate
6. Entrance Relay Guide
7. Stapler Tray Transport Unit
8. Stapler Tray Positioning Roller
9. Stapler Alignment Brush Roller
10. Stapler
11. Stapler Unit
12. Stapler Lift Belt
13. Stapler Jogger
14. Stapler Tray

3. ELECTRICAL COMPONENTS



1. Shift Tray Up/Down Motor
2. Finisher Top Cover Switch
3. Shift Tray Upper Position Sensor
4. Shift Tray Exit Sensor
5. Shift Tray Position Sensor
6. Shift Tray Transport Motor
7. Finisher Inlet Sensor
8. Stapler Tray Transport Motor
9. Front Door Safety Switch
10. Stapler Entrance Sensor
11. Stapler Home Position Sensor
12. Staple End Sensor
13. Staple One-Turn Sensor
14. Staple Motor
15. Stapler Unit Paper Sensor
16. Stapler Lift Belt Home Position Sensor
17. Stapler Drive Motor
18. Stapler Jogger Motor
19. Stapler Jogger Home Position Sensor
20. Stapler Positioning Roller Solenoid
21. Stapler Lift Belt Motor
22. Finisher PCB
23. Stapler Gate Solenoid
24. Shift Tray Lower Limit Sensor
25. Shift Motor
26. Shift Tray Upper limit Safety Switch
27. Shift Tray Upper Limit Sensor

4. ELECTRICAL COMPONENT DESCRIPTIONS

MOTORS

NAME	FUNCTION	LOCATION
Shift	Moves the shift tray side to side.	25
Shift Tray Up/Down	Moves the shift tray up or down.	1
Shift Tray Transport	Drives the transport rollers to feed the copy out to the shift tray.	6
Staple	Drives the staple hammer to staple copies.	14
Stapler Drive	Moves the stapler to the proper staple position.	17
Stapler Tray Transport	Drives the transport rollers to feed the copy to the stapler section.	8
Stapler Jogger	Moves the stapler jogger fences.	18
Stapler Lift Belt	Drives the lift belt to feed the stapled copies out to the stapler tray.	21

SENSORS

NAME	FUNCTION	LOCATION
Finisher Inlet	Informs the CPU when a copy is delivered to the finisher entrance guide.	7
Shift Tray Exit	Informs the CPU when a copy is fed out to the shift tray.	4
Shift Tray Upper Position	Informs the CPU when the top sheet of copies reaches the upper position.	3
Shift Tray Position	Informs the CPU when the shift tray is fully shifted.	5
Shift Tray Upper Limit	Informs the CPU when the shift tray reaches the upper limit.	27
Shift Tray Lower Limit	Informs the CPU when the shift tray reaches the lower limit.	24
Staple End	Informs the CPU when the staple runs out.	12

NAME	FUNCTION	LOCATION
Stapler Tray Entrance	Informs the CPU when a copy is fed into the stapler tray.	10
Stapler Unit Paper	Informs the CPU when copies are in the stapler unit.	15
Stapler Jogger Home Position	Informs the CPU when the jogger fences are in the home position.	19
Stapler Lift Belt Home	Informs the CPU when the lift belt Position pawl is in the home position.	16
Stapler Home Position	Informs the CPU when the stapler is in the home position.	11
Staple One-turn	Informs the CPU when one staple cycle is completed.	13

SOLENOIDS

NAME	FUNCTION	LOCATION
Stapler Gate	Moves the stapler gate so that the copy enters the stapler section.	23
Stapler Positioning Roller	Lower the stapler positioning roller.	20

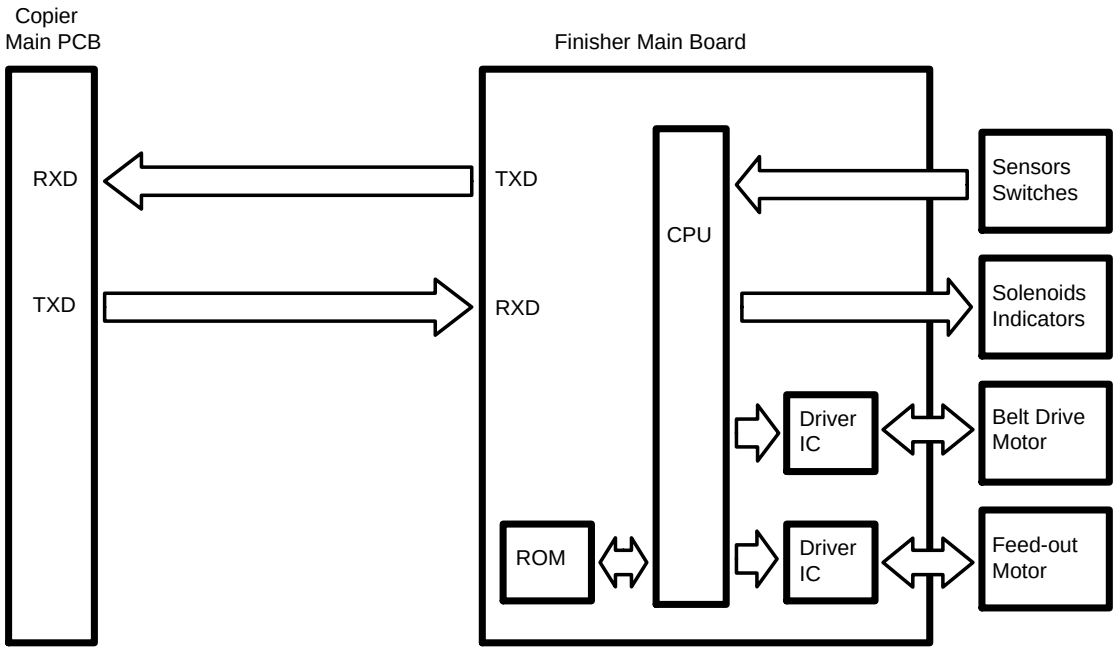
SWITCHES

NAME	FUNCTION	LOCATION
Finisher Top Cover	Informs the CPU when the top cover is opened.	2
Front Door Safety	Informs the CPU when the front door is opened.	9
Shift Tray Upper Limit Safety	Informs when the shift tray reaches at the upper limit.	26

PRINTED CIRCUIT BOARD

NAME	FUNCTION	LOCATION
Finisher	Controls all the finisher functions according to the signals from the sensors and copiers.	22

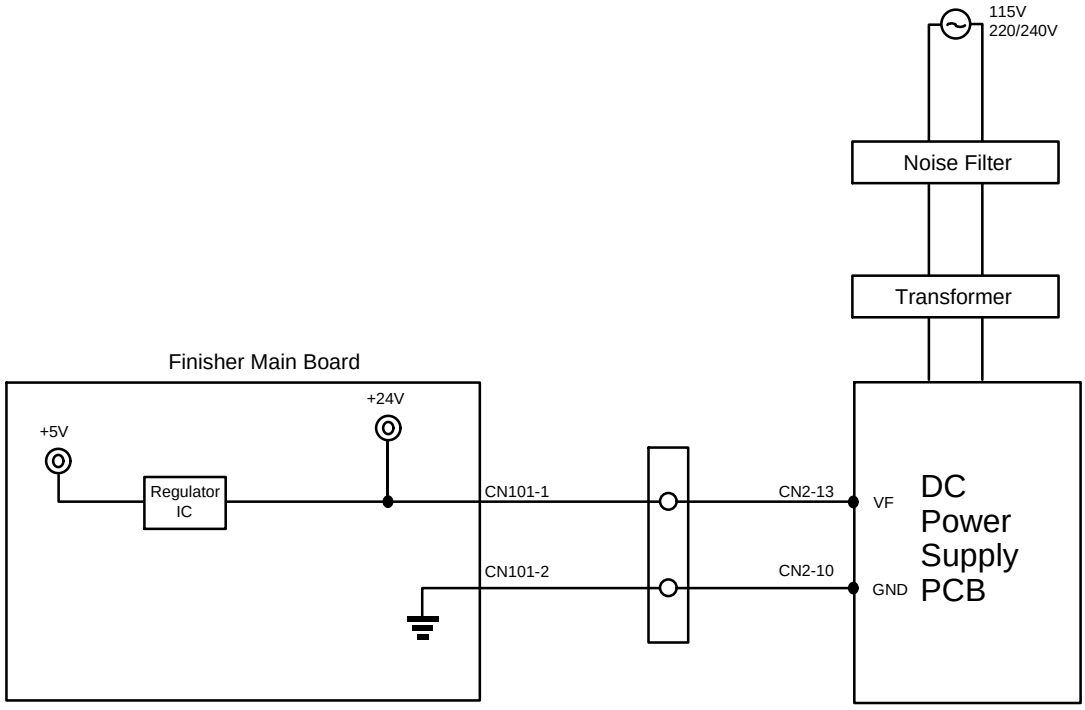
5. OVERALL MACHINE CONTROL



The Finisher CPU monitors the input signals from the sensors and switches, and energizes the solenoids and the indicator LEDs directly.
The belt-drive motor and the feed-out motor are controlled by the Finisher CPU through their respective driver ICs.

Also, the finisher CPU communicates with the main system using a fiber optic serial interface.

6. POWER DISTRIBUTION

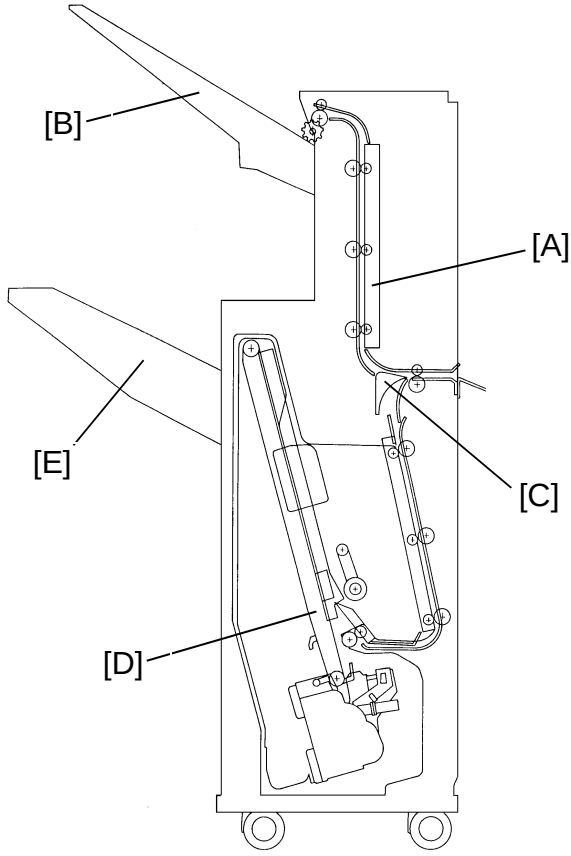


The Finisher uses two dc power levels : +24 volts and +5 volts.

The line voltage is applied to the power supply board of the main copier where it is stepped down and rectified to +24 volts. This dc voltages is supplied to the Finisher main board.

The regulator IC on the Finisher main board further steps down the +24 volts to +5 volts.

7. BASIC OPERATION



(1) Sort/Stack Mode

After the copy is completed, the paper is directed to the finisher. When the sort or stack mode is selected, the paper is moved up by the shift tray transport unit [A] and delivered to the shift tray [B].

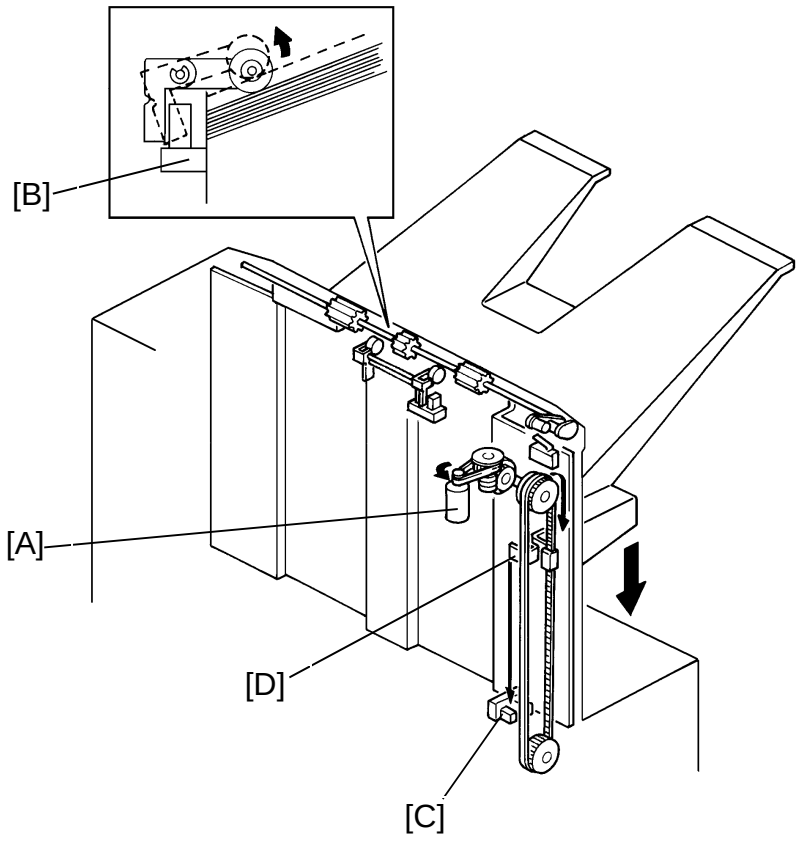
In both modes, the shift tray is shifted side to side to separate sets of copies. The amount of shift is 30 millimeters. After all the job is completed, the tray moves down so that the user can remove the copies easily.

(2) Staple Mode

When the staple mode is selected, the stapler gate [C] is opened and the paper is fed down to the stapler unit [D]. All copies to be stapled are stacked in the stapler unit. Each time a copy is delivered to the stapler unit, the stapler positioning roller, the alignment roller, and jogger fences square the stack of copies. After the final copy of the set is delivered, the set is stapled.

After being stapled, the set of copies are delivered to the stapler tray [E] by the stapler lift belt pawl.

8. SHIFT TRAY UP/DOWN MECHANISM



When the main switch is turned on, the shift tray up/down motor [A] turns on to initialize the shift tray position. When the tray lifts the lower exit rollers, the upper position sensor [B] turns on and the motor stops for 100 milliseconds. After that, the motor starts rotating in the opposite direction to lower the shift tray until the upper position sensor is deactivated.

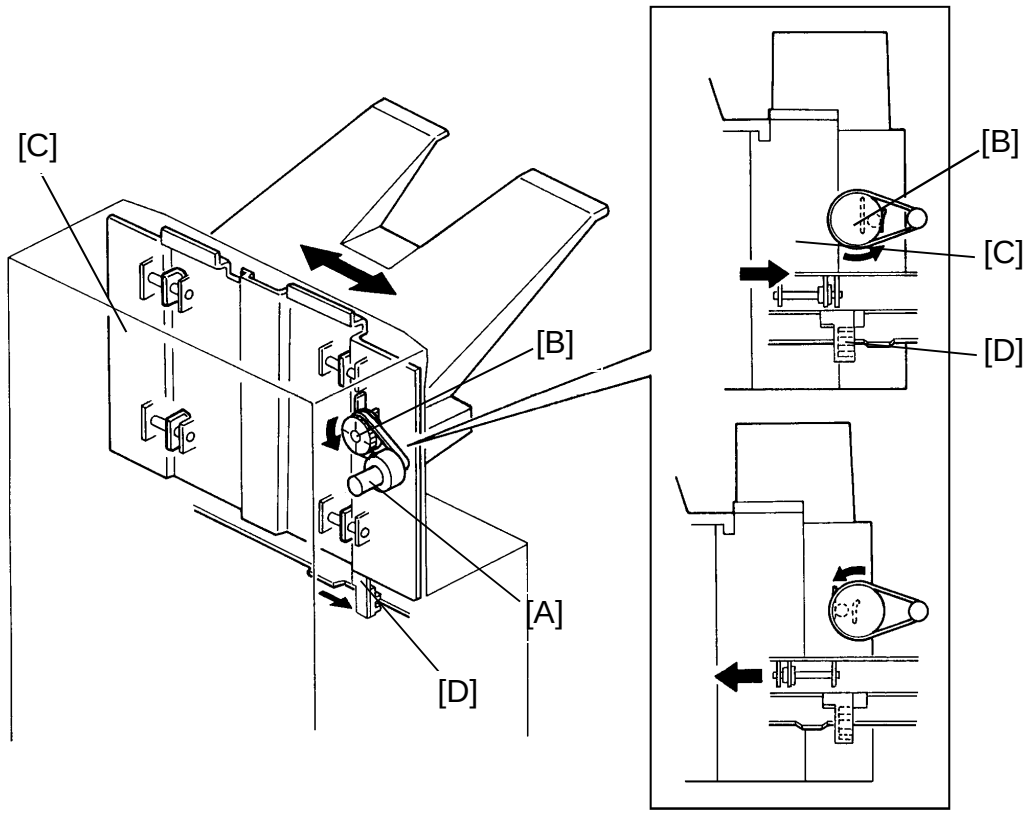
As copies are fed to the tray, the shift tray lowers gradually. (Whenever the top sheet of copies activates the upper position sensor, the shift tray is lowered.)

After all the copies are fed to the tray, the shift tray is fully shifted and then lowered for 300 milliseconds so that the user can remove the copies easily.

When the tray reaches its lower limit position, the lower limit sensor [C] is activated by the actuator on the up/down belt [D].

The shift tray up/down motor then stops.

9. TRAY SHIFT



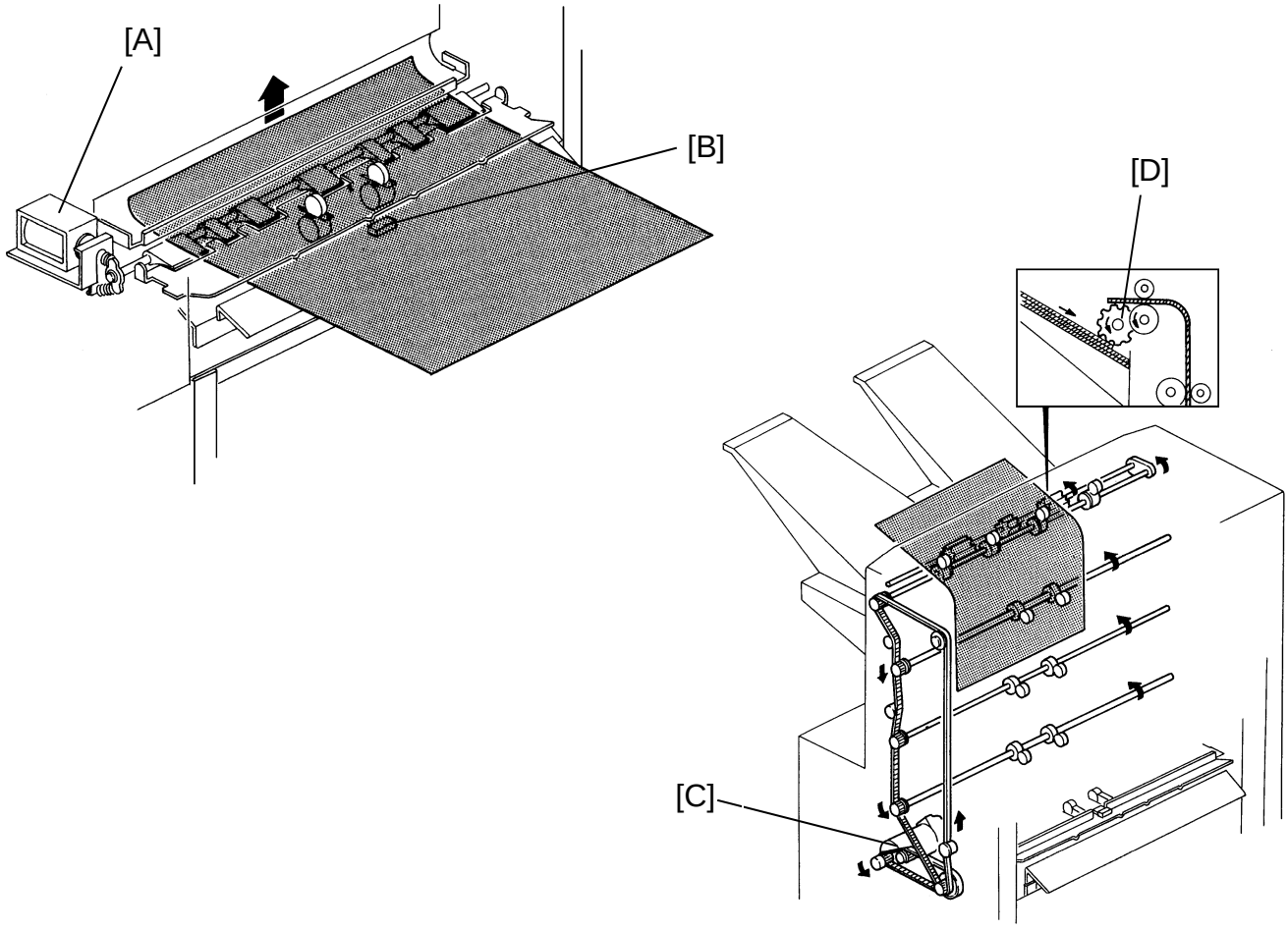
The shift tray is shifted sideways to initialize its position when the main switch is turned on.

After a set of copies is completed, the shift tray motor [A] turns on. The eccentric pulley [B] is rotated by the timing belt and its pin pushes the shift tray base plate [C] side to side.

The shift tray position sensor [D] stops the shift tray when it is fully shifted (ON - OFF - ON).

The amount of shift is about 30 millimeters.

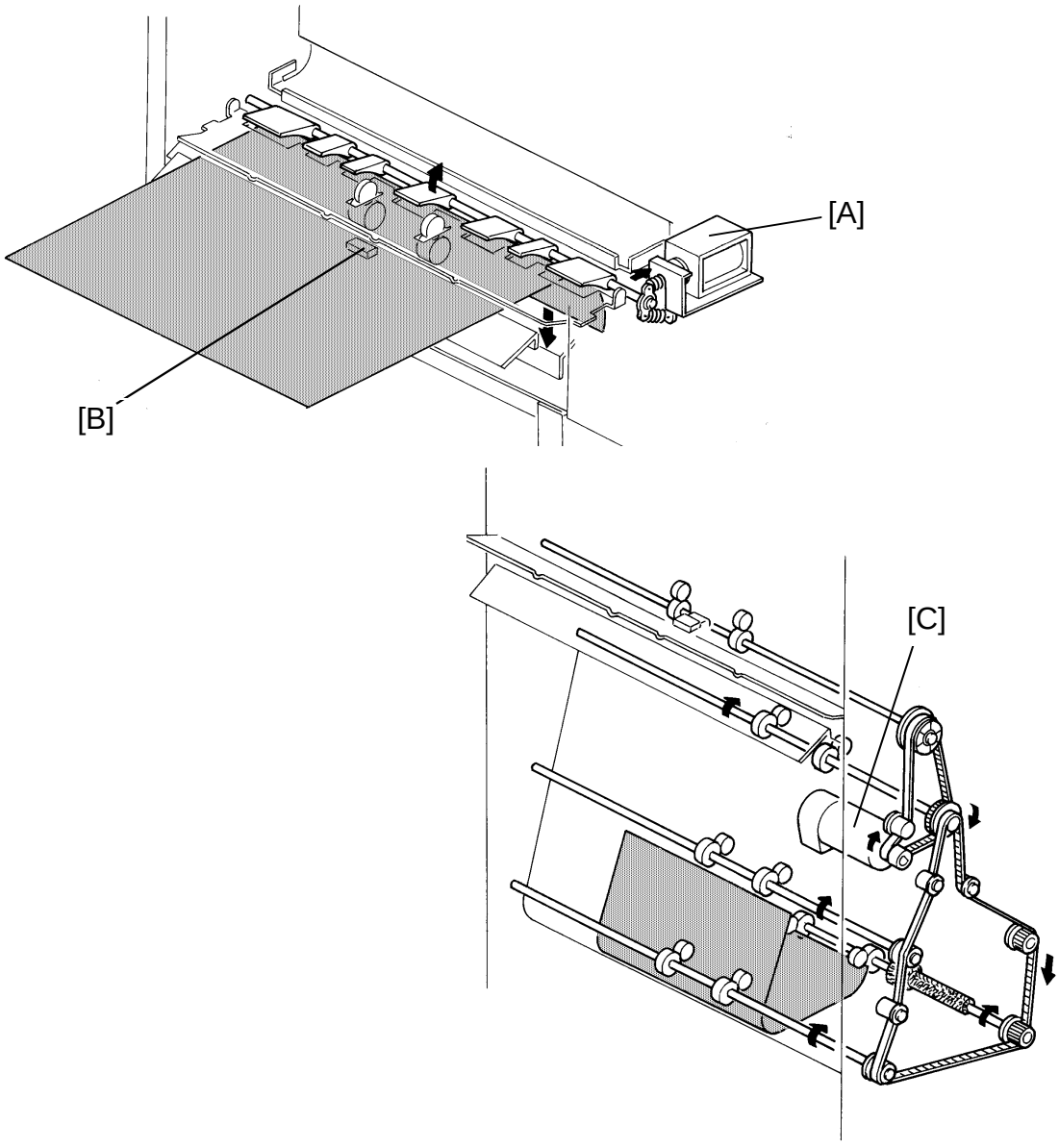
10. FEED-OUT TO SHIFT TRAY



When the Sort/Stack mode is selected, the stapler gate solenoid [A] stays off. Copies are directed to the finisher entrance guide from the copier. When the leading edge of a copy reaches the finisher inlet sensor [B], the shift tray transport motor [C] starts turning. It transports copies at 330 mm/s, which is a little faster than the copier's transport speed (300 mm/s). The shift tray transport section is driven by the shift tray motor through timing belts. The paper is transported by the transport rollers to the exit rollers and then fed out to the shift tray. When the trailing edge of the copy passes the copier exit sensor, the transport speed is increased to 800 mm/s.

The shift tray positioning roller [D] ensures that the copies are stacked properly in the shift tray.

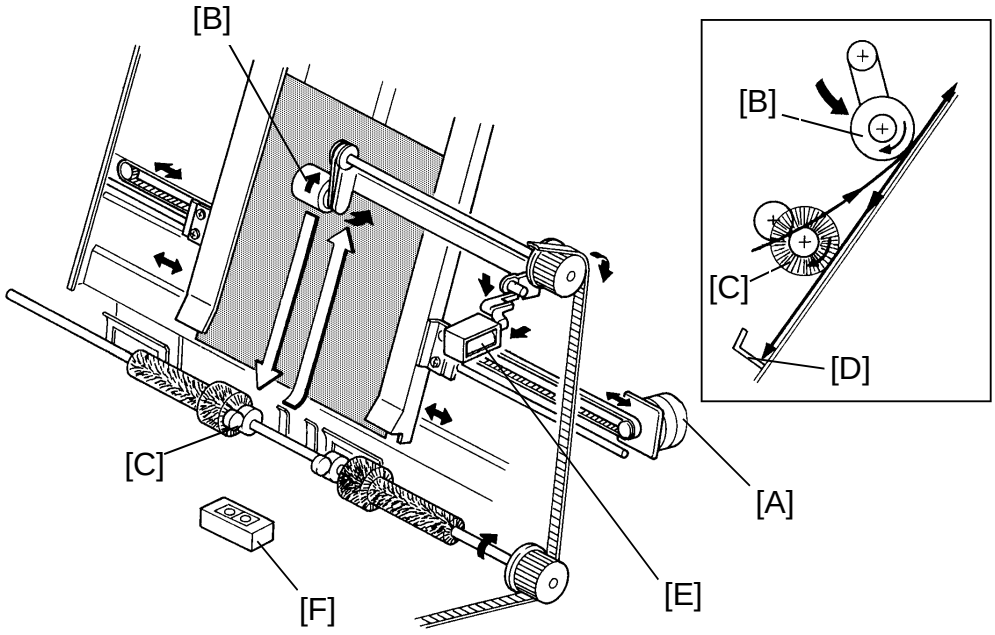
11. FEED-IN TO STAPLER UNIT

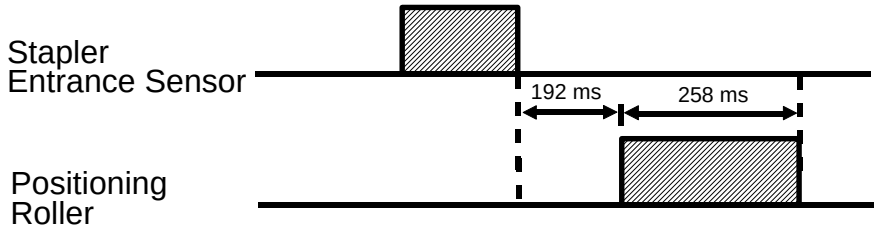


In the staple mode, when the leading edge of the copy reaches the copier exit sensor, the stapler gate solenoid [A] is energized. Then, when the leading edge of the copy reaches the finisher inlet sensor [B], the stapler transport motor [C] starts rotating. It transports copies at 330mm/s, which is a little faster than the transport speed of the copier (300 mm/s). All the transport rollers are driven by this motor through timing belts.

When the trailing edge of the copy passes the copier exit sensor, the transport speed is increased to 800 mm/s.

12. STAPLER UNIT PAPER POSITIONING





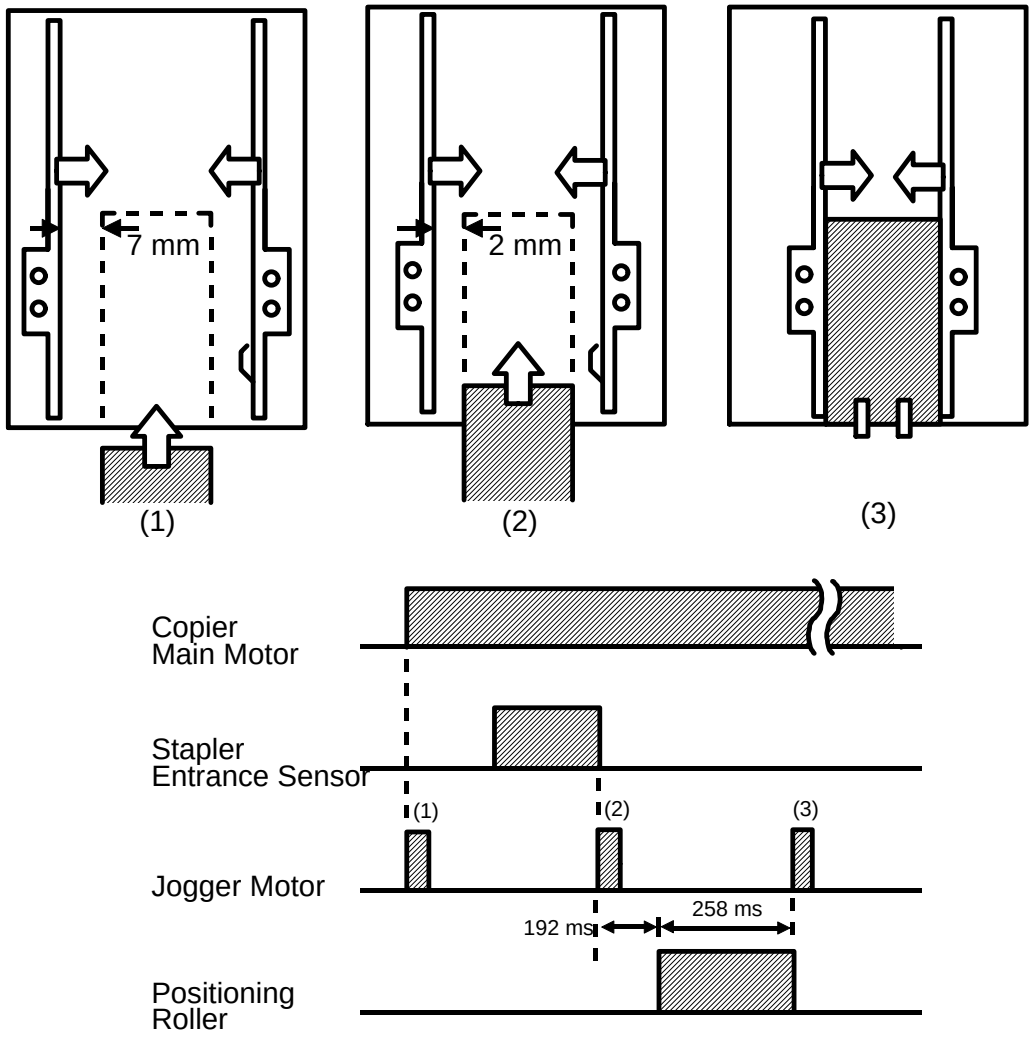
Before the copies can be stapled, the stapler unit must square the copies.

For horizontal paper alignment, the jogger motor [A] moves both the front and the rear jogger fences to jog the copies.

For vertical paper alignment, the stapler unit positioning roller [B] and the alignment brush roller [C] push the copy against the stapler stopper [D].

Both the positioning roller and the alignment roller rotates while the stapler transport motor is on. The positioning solenoid [E] turns on to lower the positioning roller 192 milliseconds after the copy's trailing edge passes the stapler entrance sensor [F]. The positioning roller is lifted 258 milliseconds later.

13. JOGGER MOVEMENT



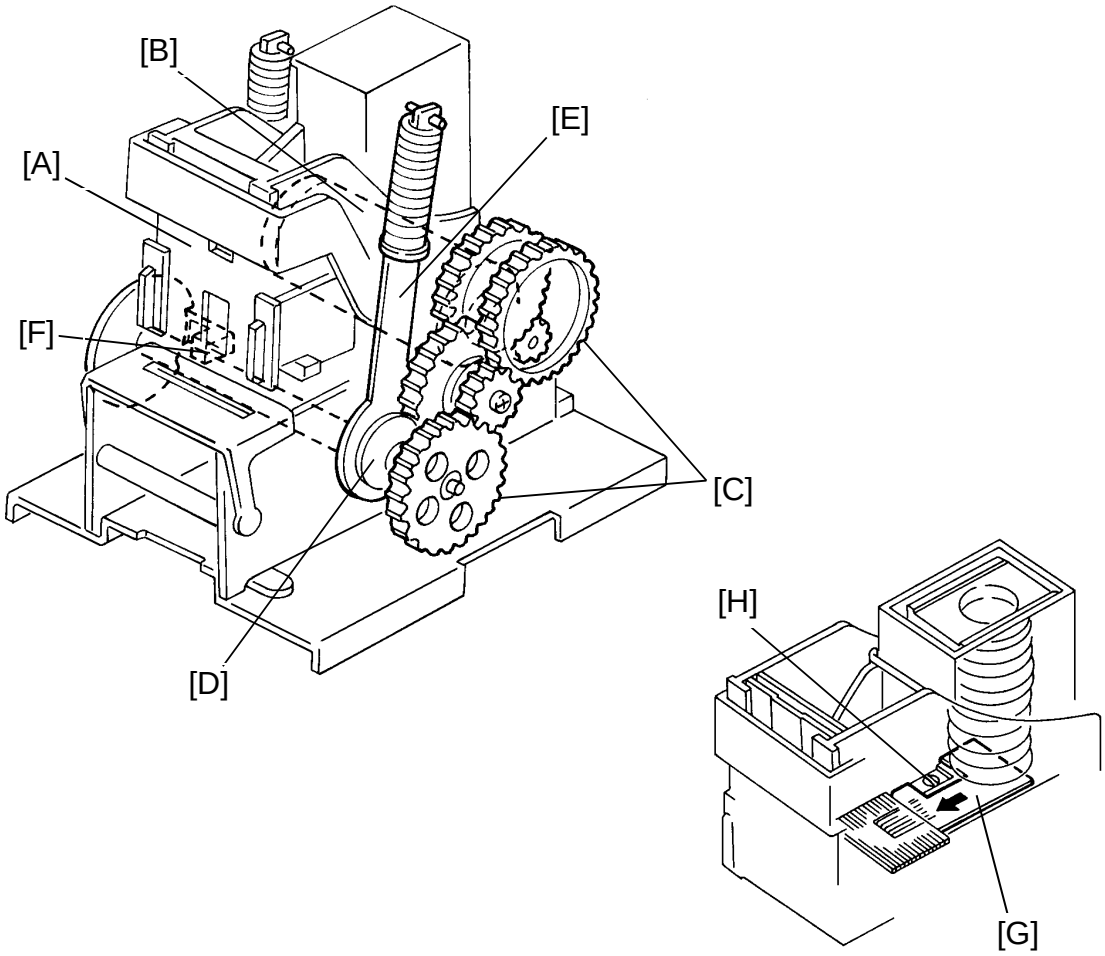
When the Start Key is pressed, the copier sends the paper size information to the finisher. In accordance with that data, the jogger motor moves both fences to where the width is 14 millimeter wider than the selected paper width. (1) This gives enough space for the copies to enter the jogger tray.

After the trailing edge of the copy passes the stapler unit entrance sensor, the each jogger fence moves inward 5 mm. This is 2 mm from the copy edge. (2)

Just after the positioning roller pushes the copy back, each jogger fences moves inward 2 mm more so that the leaf spring on the rear jogger fence pushes the copy side edge slightly. (3)

After a copy is stacked in the jogger tray, the jogger fences move back 7 mm from the copy edges for the next copy.

14. STAPLER

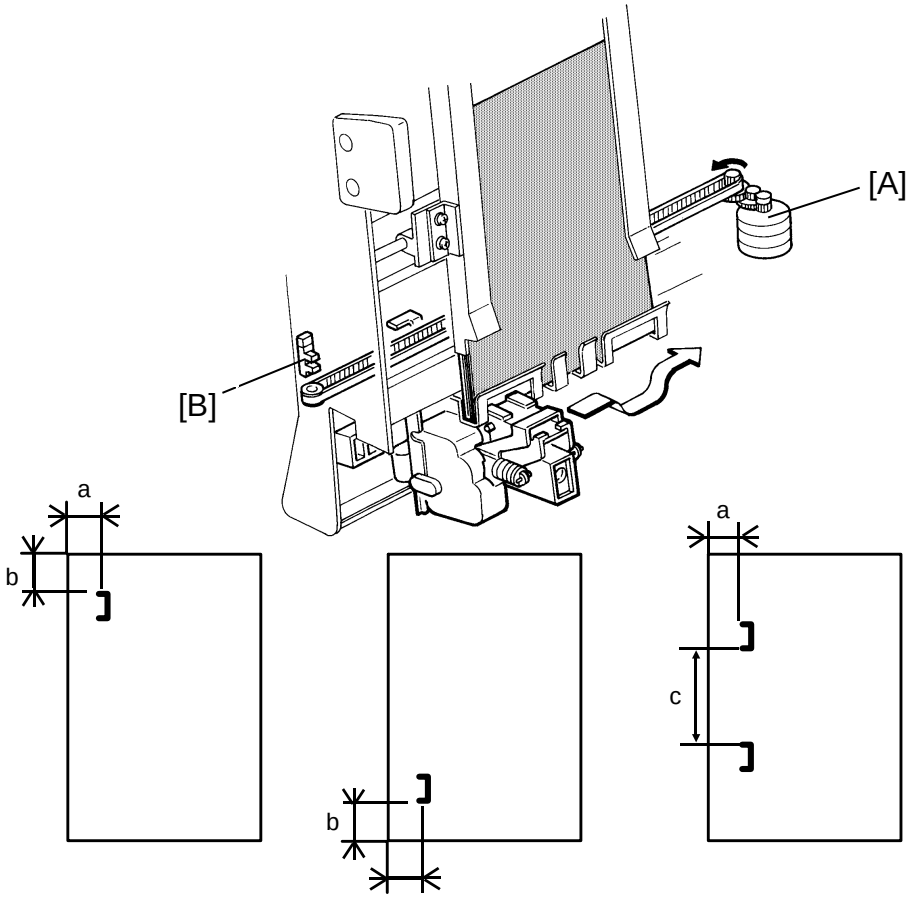


The staple hammer [A] is driven by the staple motor [B] via gears [C], two eccentric cams [D], and two links [E].

When the aligned copies are brought to the staple position by the positioning roller and the alignment roller, the stapler motor starts to rotate. When the cams complete one rotation, the stapler home position sensor turns on (one-turn sensor) [F]. The stapler motor then stops.

A strip of paper [G] with a notch cut-in is positioned at the bottom of the staple cartridge. This paper strip is fed out after the last staple strip. When the leading edge of the notch in the strip is detected by the staple end sensor [H], the finisher recognizes the staple near end condition. After the job is completed, the Add Staple indicator lights on the copier operation panel and the Start key turns to red.

15. STAPLE MODES



a: 5±2 mm
b: 5±2 mm
c: 132±2 mm

This copier selects one of the following three different staple modes:

Staple 1: Top left
Staple 2: Bottom left
Staple 3: Top/Bottom left

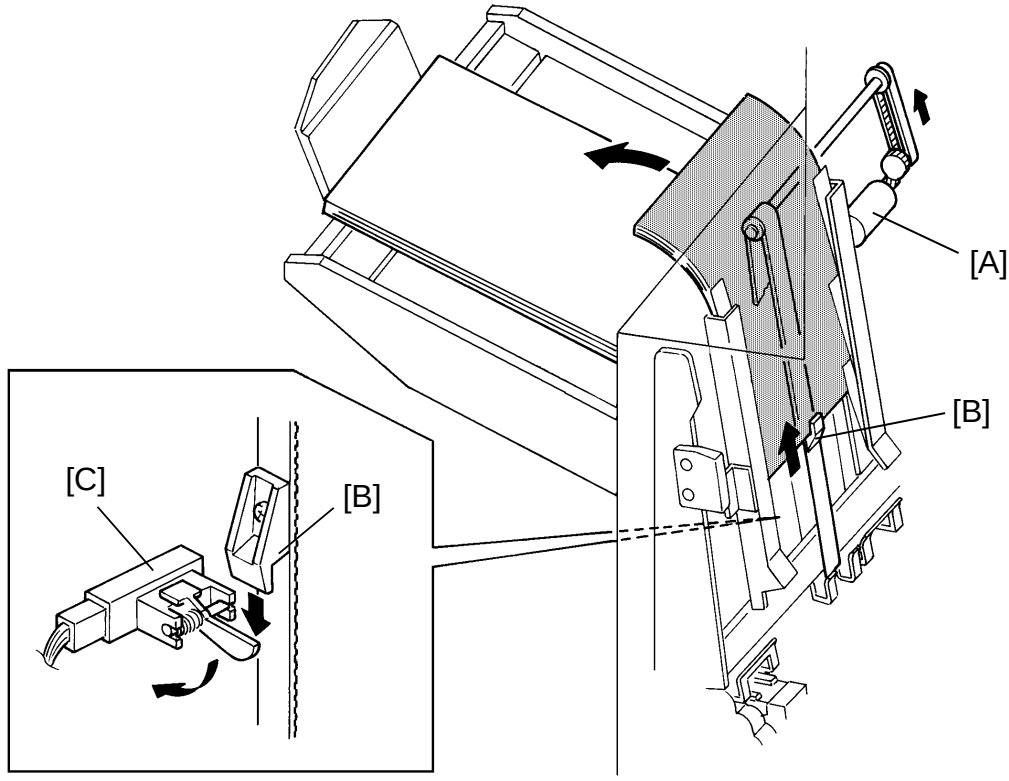
The stapler is moved side to side by the stapler drive motor [A] (stepping motor).

When the Start key is pressed, the stapler moves from the home position (sensor [B]) to the selected staple position.

If staple 3 mode is selected, the stapler moves to the front staple position first and then moves to the rear side. However, for the next copy set, it staples at the rear side first and then moves to the front.

After the job is completed, the stapler comes back to its home position.

16. FEED-OUT TO STAPLER TRAY



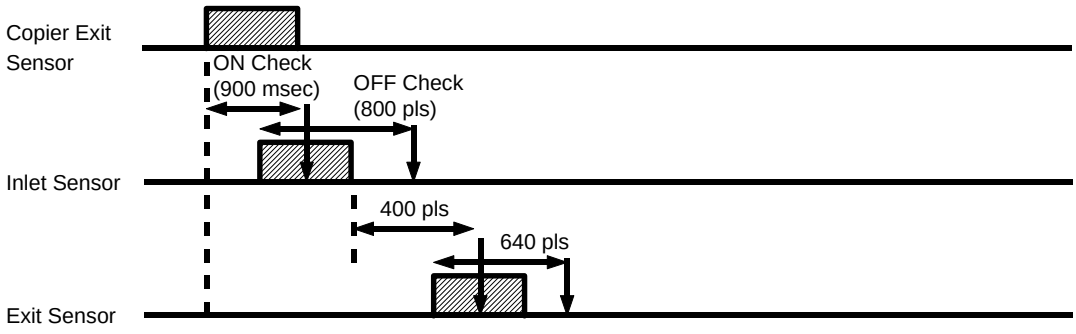
After being stapled, the stapler lift belt motor [A] starts turning. The pawl [B] on the lift belt transports the set of stapled copies up and feeds it to the staple tray.

The belt speed is 316 mm/s at first. After 104 pulses, it is increased to 850 mm/s.

The stapler lift belt stops when the pawl activates its home position sensor [C].

17. MISFEED DETECTION

(1) Shift Tray Mode

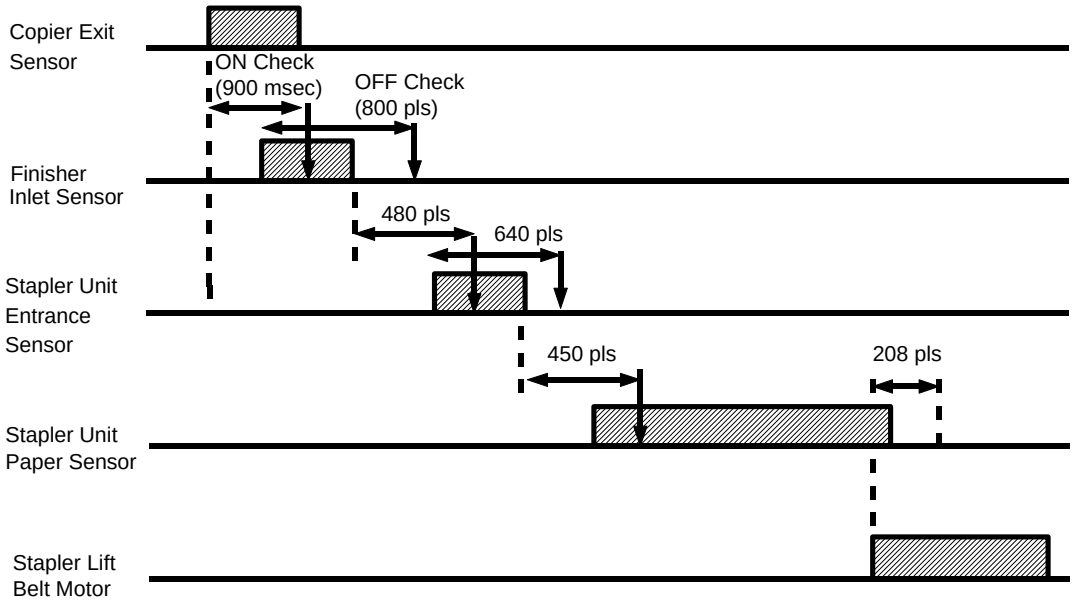


1. Shift Tray

If the finisher inlet sensor is not actuated within 900 milliseconds after the leading edge of copy reaches the copier exit sensor, the Finisher Misfeed indicator lights (ON check). If the inlet sensor does not turn off within 800 pulses (encoder pulses of the shift tray transport motor), the CPU determines that there has been a copy misfeed (OFF check).

If the shift tray exit sensor is not actuated within 400 pulses after the copy passes the finisher inlet sensor, the Finisher Misfeed indicator lights (ON check). If the shift tray exit sensor does not turn off within 640 pulses, the Finisher Misfeed indicator also lights (OFF check).

(2) Stapler Tray Mode



2. Stapler Tray

The ON/OFF checks of the three sensors are as follows:

Finisher Inlet Sensor:
(ON check)
900 ms after the copier exit sensor turns on.
(OFF check)
800 pulses after the inlet sensor turns on.

Stapler Unit Entrance Sensor :
(ON check)
480 pulses after the inlet sensor turns off.
(OFF check)
640 pulses after the stapler unit entrance sensor turns on.

Stapler Paper Sensor:
(ON check)
450 pulses after the stapler unit entrance sensor turns off.
(OFF check)
208 pulses after the stapler lift belt motor turns on.

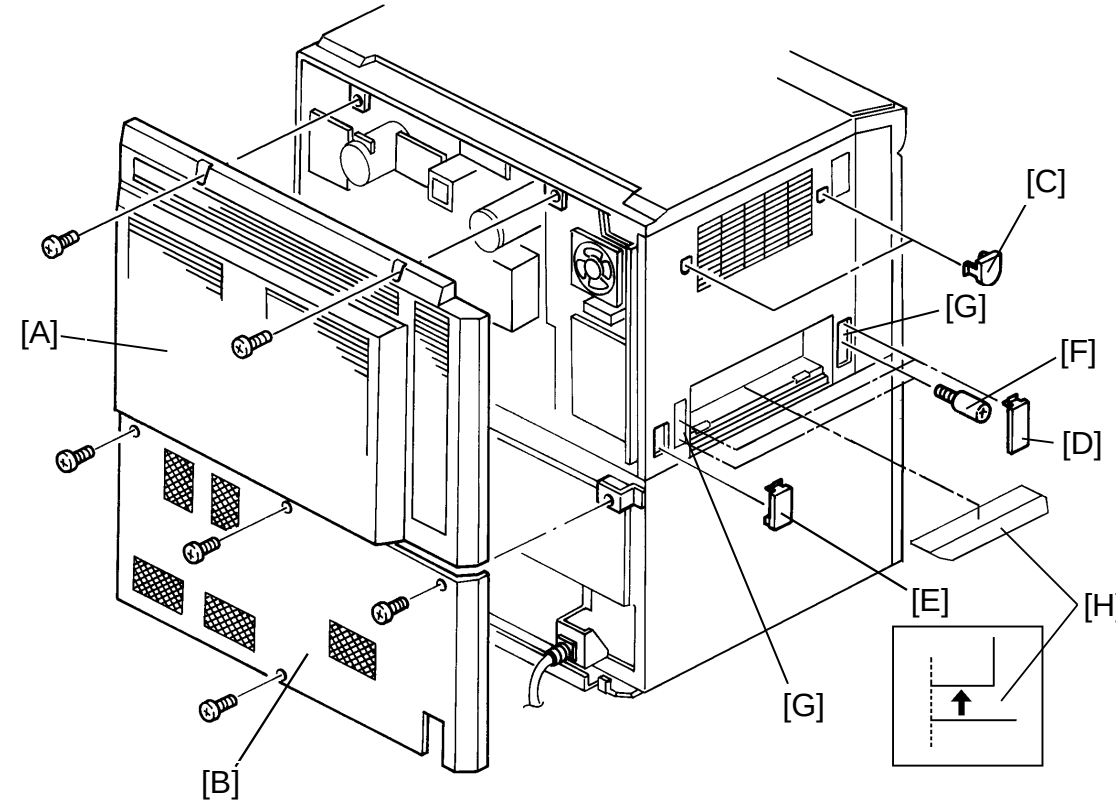
18. INSTALLATION

18.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box according to the following list:

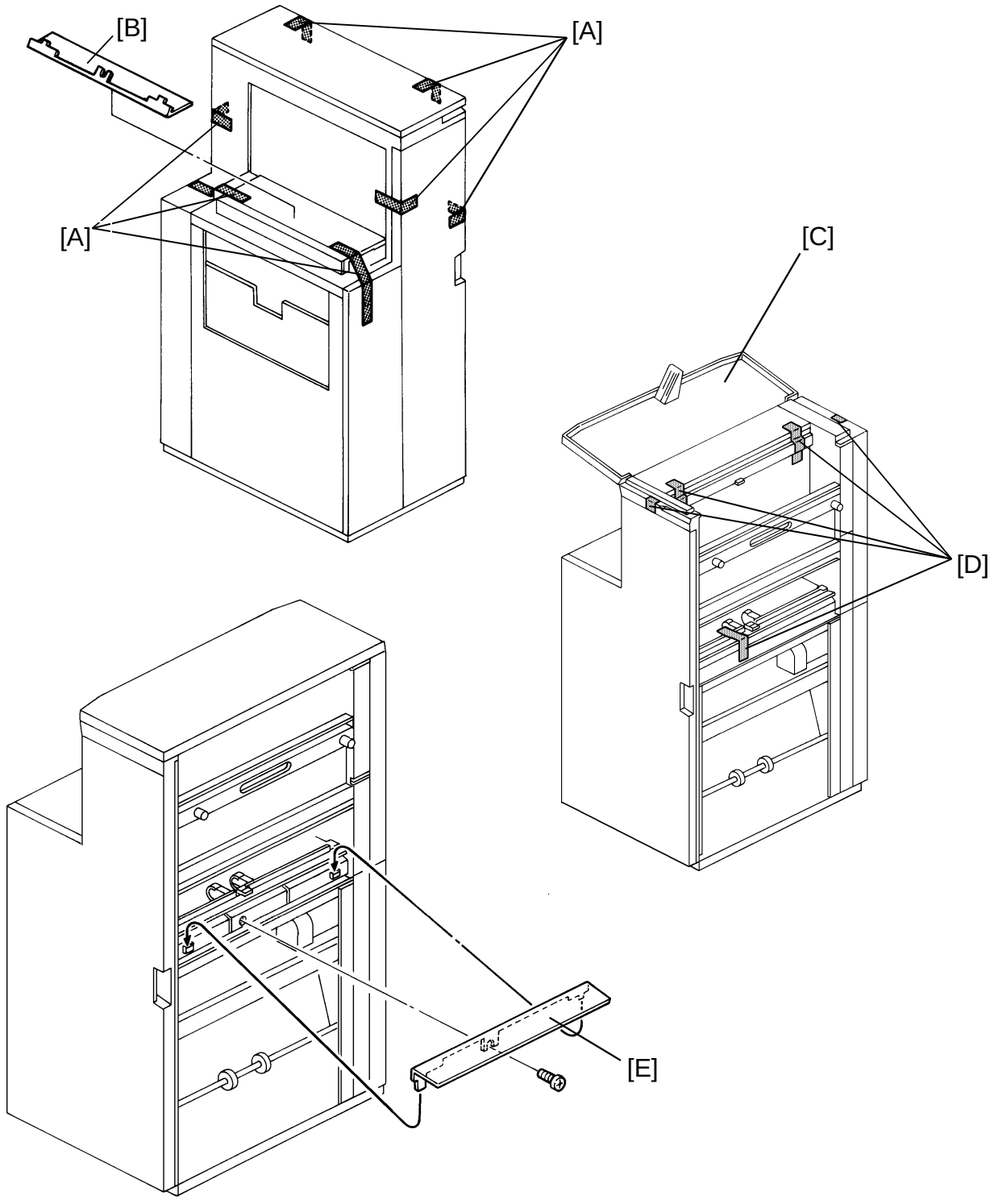
1. Shift Tray	1
2. Finishing Tray	1
3. Installation Procedure	1
4. Staple Unit	1
5. Docking Rod Bracket (Right & Left)	2
6. Stud Screw	2
7. Knob Screw	3
8. Ground Screw	1
9. Toothed Washer	1
10. Pan Head Screw (Long)	2
11. Pan Head Screw (Black)	5
12. Finishing Tray Exit Mylar	1
13. Staple Cartridge	1
14. Shoulder Screw	4
15. Rubber Washer	4
16. Washer	4
17. Relay Guide	1
18. Entrance Mylar	1
19. Decal-Staple Position	1
20. NECR	1
21. Envelope-NECR	1

18.2 INSTALLATION PROCEDURE

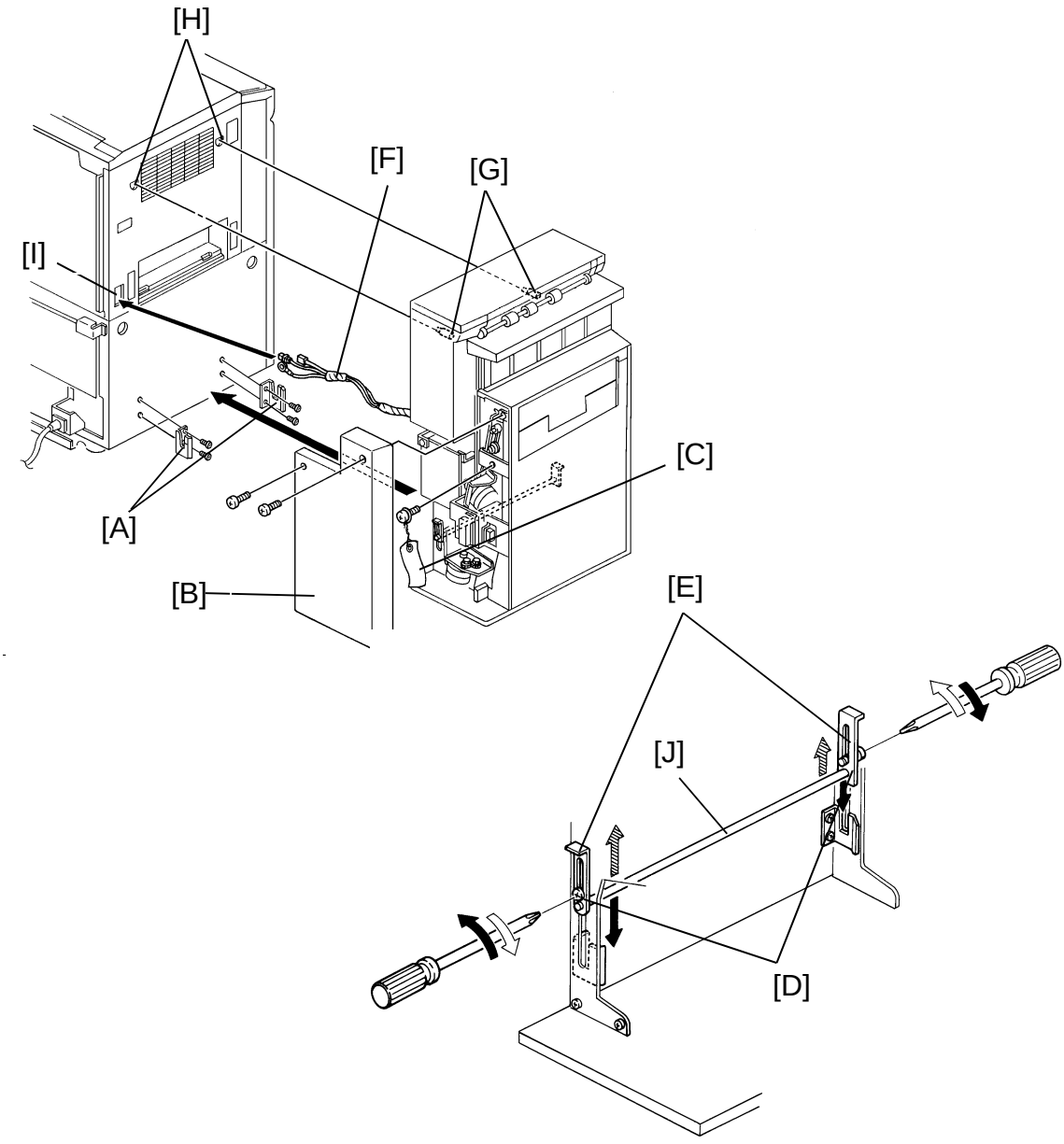


Warning: Before installing the finisher, make sure the copier is unplugged.

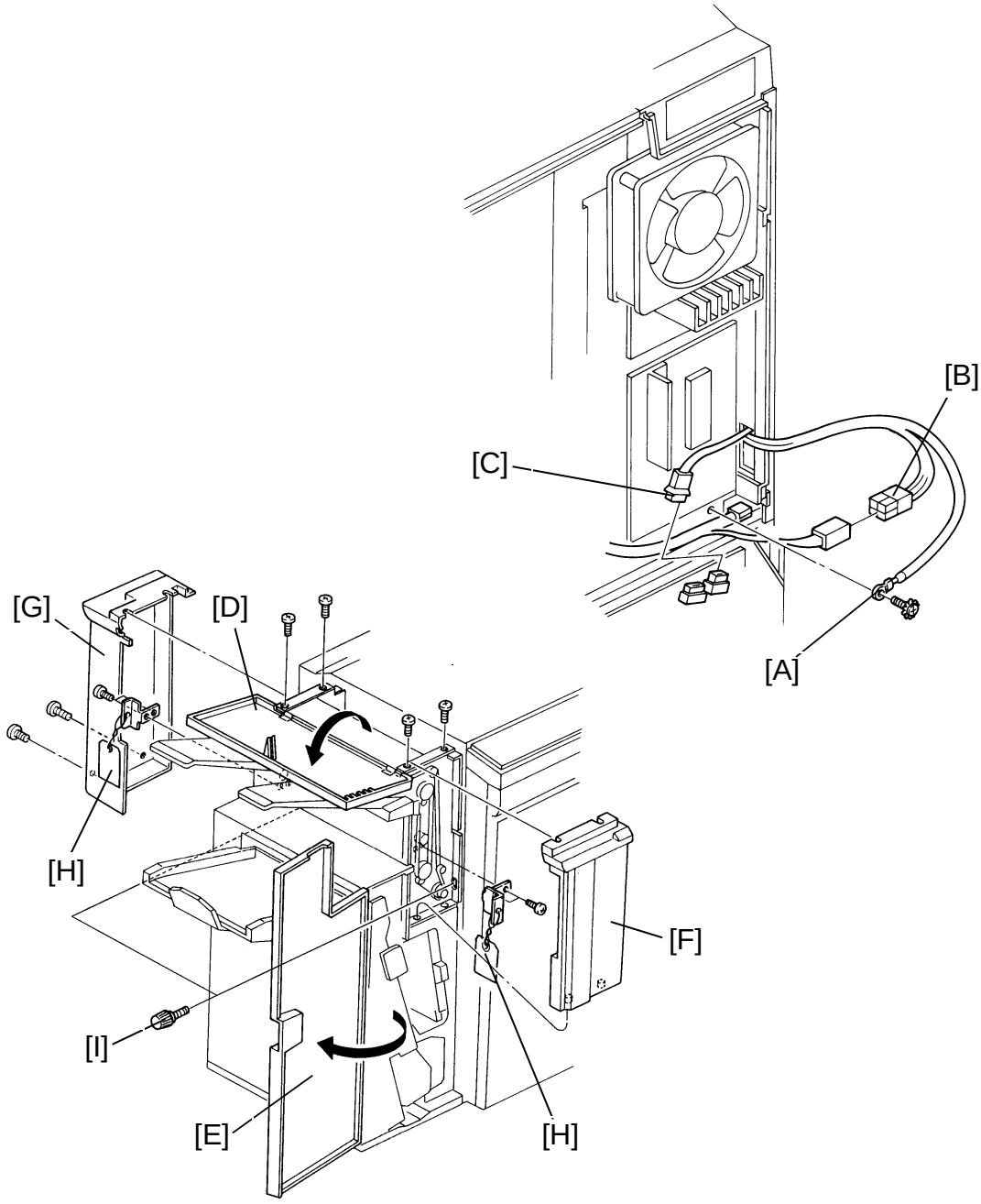
1. Remove the copier rear covers [A] (2 screws) [B] (4 screws).
2. Remove the five plastic caps [C] x 2, [D] x 2, and [E] from the left cover.
3. Install the 2 stud screws [F] in the upper screw holes [G].
4. Stick the entrance mylar [H] (strip) to the top edge of the paper exit. The inside edge of the mylar must contact the foam strip on the antistatic brush.



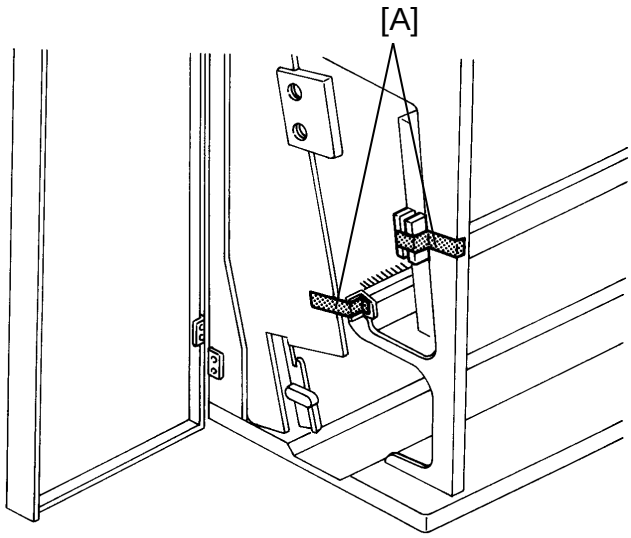
5. Remove 7 strips of tape [A] and the entrance guide plate [B].
6. Open the finisher top cover [C], then remove 5 strips of tape [D].
7. Install the entrance guide plate [E] (1 pan head screw).

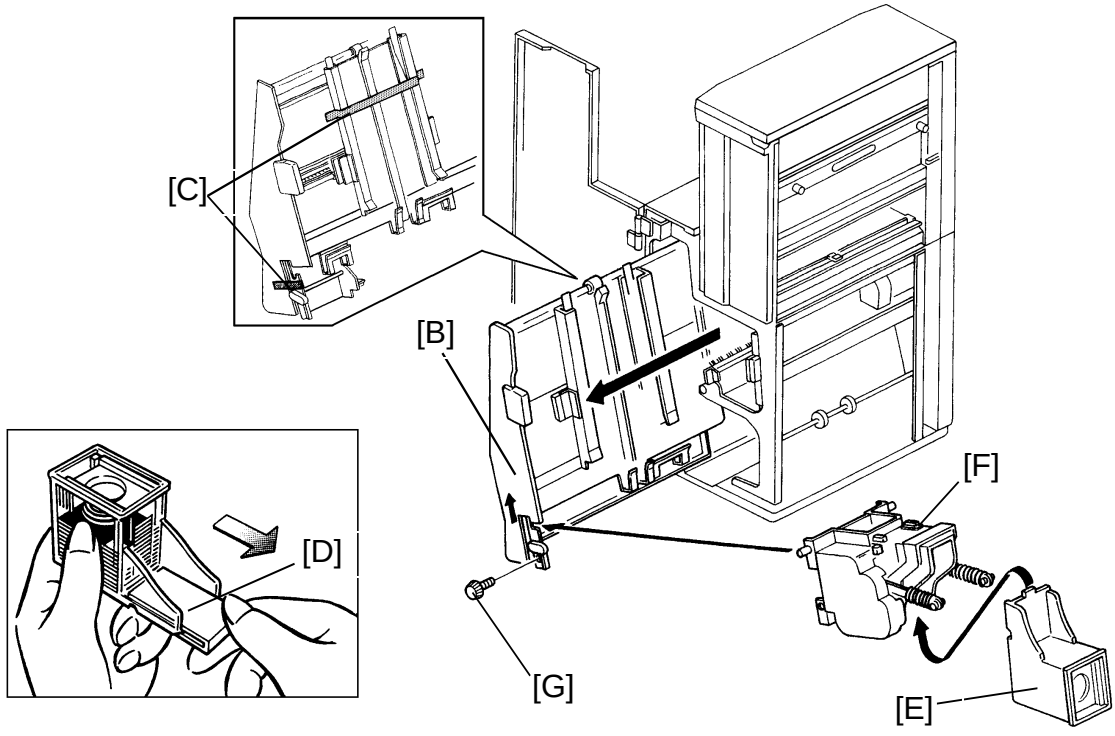


8. Mount both docking rod brackets [A] on the copier (2 screws per bracket).
9. Remove the finisher lower rear cover [B] (2 screws).
10. Remove the staple unit stopper screw (red tag) [C].
11. Loosen the screws [D] securing the docking rod brackets [E], then raise both docking rod brackets to the upper position and temporarily tighten the screws. (Be careful not to damage the fiber optics cable [F].)
12. Dock with copier and make sure that both studs [G] on the finisher are inserted in the copier docking holes [H]. Then pass the harness [F] through the access hole [I].
13. Loosen the docking rod bracket screws [D], then insert the docking rod [J] into the slots on the docking rod brackets and tighten the screws.

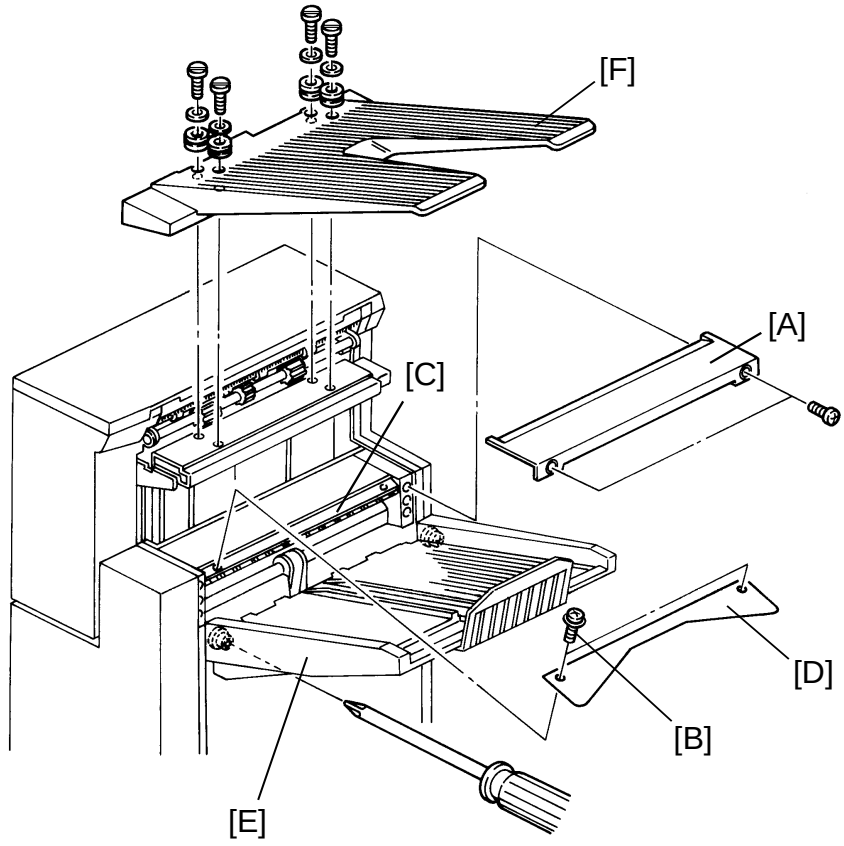


14. Secure the finisher ground wire [A] (1 ground screw).
15. Connect the two connectors as follows:
    White 4P to 4P Free [B]
    Fiber optic cable connector [C] to CN114.
16. Open the finisher top cover [D], and the finisher front door [E].
17. Remove the front top cover [F] (2 screws) and the rear top cover [G] (4 screws), then remove the 2 shift tray stoppers [H] (red tag) (2 screws each).
18. Tighten the knob screws [I] to secure the finisher to the copier.

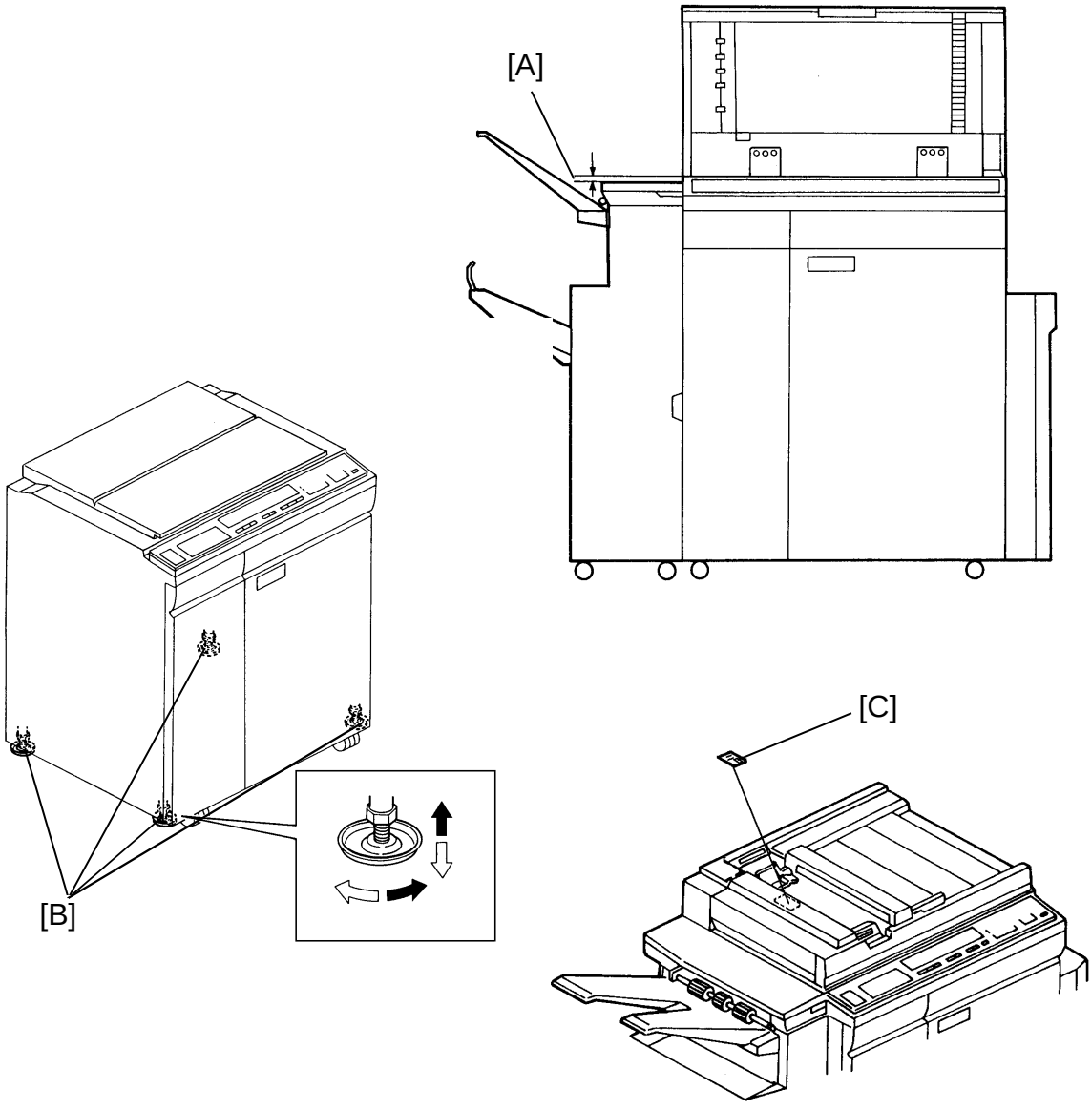




19. Remove 2 strips of tape [A].
20. Slide out the staple unit [B].
21. Remove 2 strips of tape [C].
22. Remove the green plastic clip [D], then install the staple cartridge [E] in the stapler [F].
23. Install the stapler in the stapler unit [B], securing the stapler with the knob screw [G].



24. Remove the stapler tray top cover [A] (2 screws).
25. Remove the screws [B] securing the antistatic brush [C] (2 screws).
26. Place the mylar [D] over the brush and then secure the mylar and the brush to the stapler tray exit using the 2 antistatic brush screws [B].
27. Install the stapler tray [E] (2 screws 4 x 10 mm) and the shift tray [F] (4 sets of screws, rubber washers and washers).
28. Reassemble.



29. Check the height gap [A] between the copier upper cover and the finisher top cover.
30. If the gap is not within specification (0 to 1.0mm), adjust the gap by changing the height of the main machine leveling feet [B].

NOTE: After the adjustment, make sure that the main machine is level.

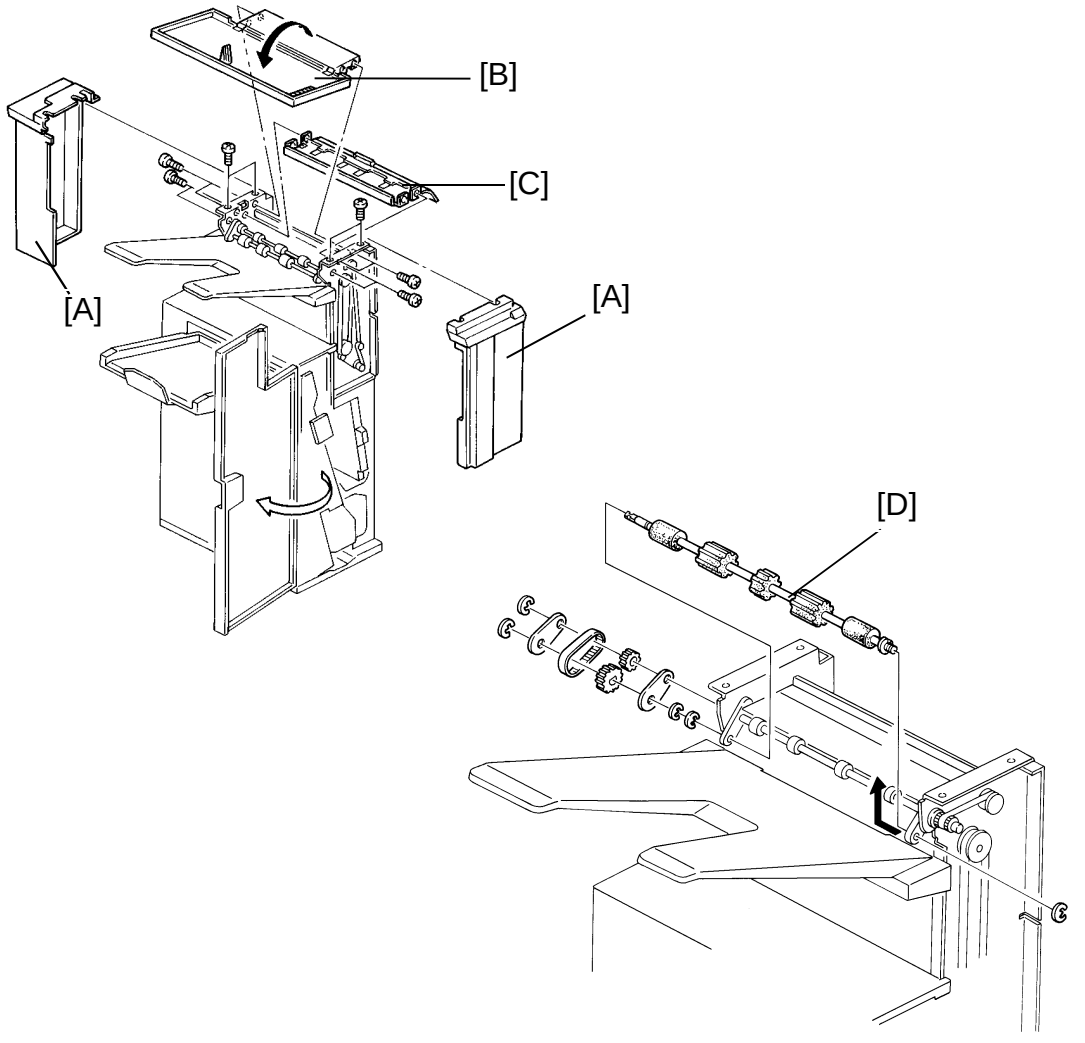
31. Check the finisher's operation.

NOTE: If the stapler at first is not stapling the copies, select 3rd staple mode (Double Stapling). This will raise the stapler to the correct position; there after, the stapler will function correctly in either mode.

32. Stick the decal [C] onto the RDH at the location shown.

19. REPLACEMENT AND ADJUSTMENT

19.1 SHIFT TRAY POSITIONING ROLLER REPLACEMENT

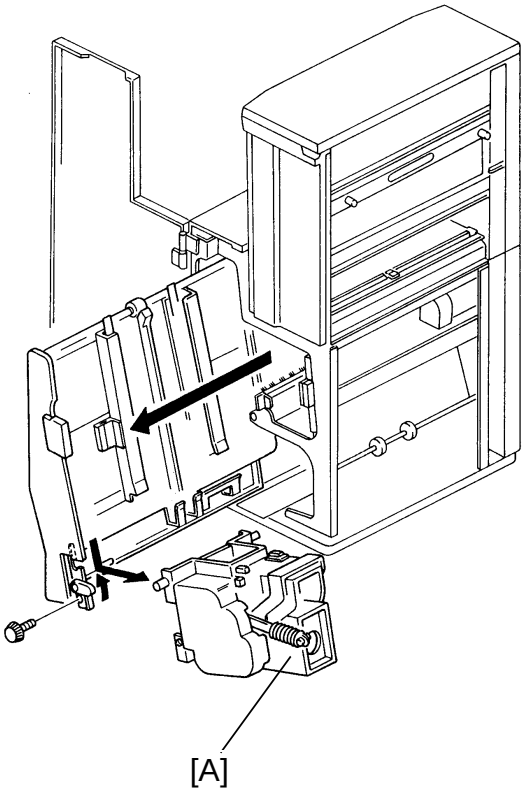


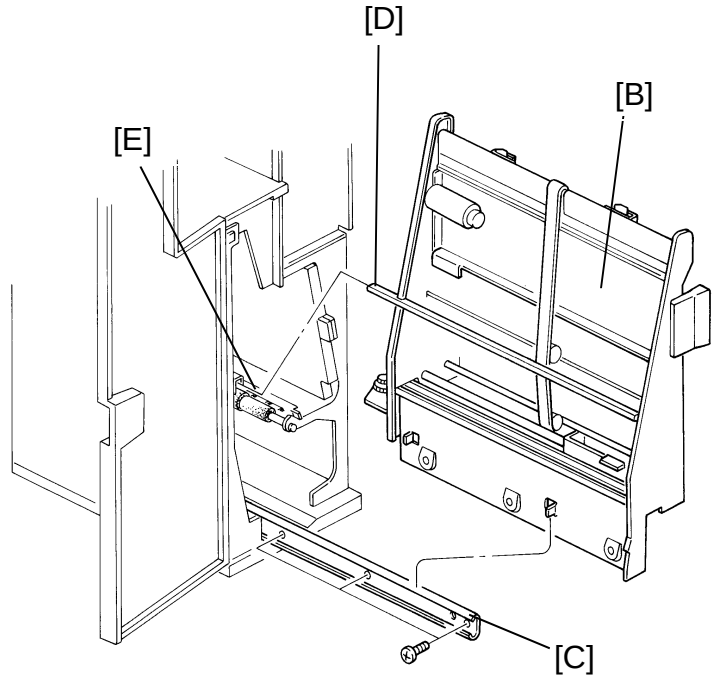
1. Remove the side top covers [A] (2 screws each).
2. Open the finisher side cover and the top cover, then remove the top cover unit [B] (4 screws).
3. Remove the paper exit guide plate [C] (4 screws).

NOTE: Do not remove the harness on the paper exit guide plate.

4. Disassemble the stacker positioning roller shaft drive unit (2 E-rings, 2 gears, 1 belt, and 2 side plates).
5. Remove the stacker positioning roller together with the shaft [D] (5 E-rings).

19.2 STAPLER UNIT REMOVAL/REPLACEMENT





Removal

1. open the finisher front door.
2. Slide out the stapler unit, then remove the stapler [A] (1 knob screw).
3. Remove the stapler unit [B] (3 screws).

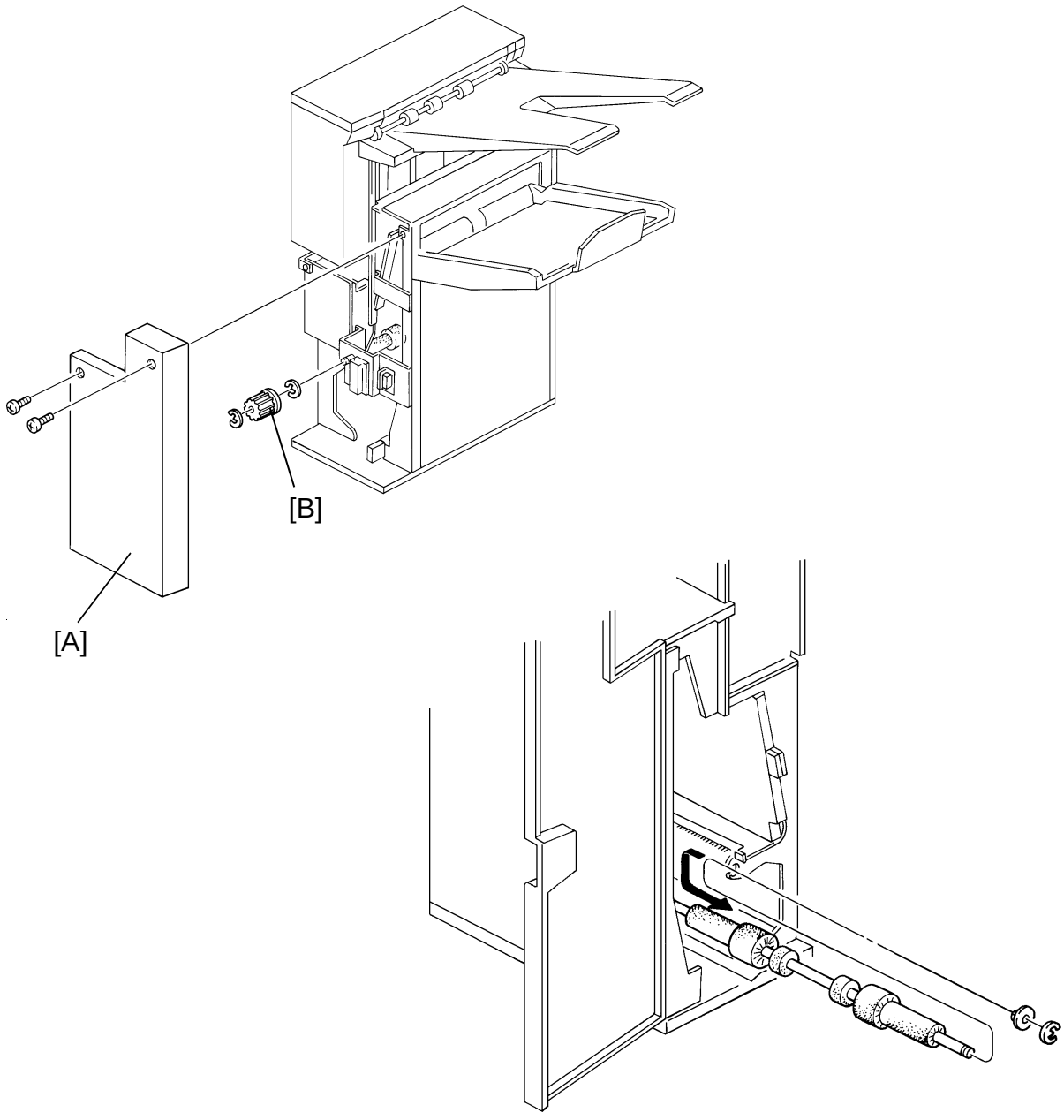
Reinstallation

1. Slide out the stapler unit rail [C].
2. Set the stapler unit on the rail, then slide it in once.

NOTE: The stapler unit guide [D] must fit onto the guide rail [E].

3. Slide out the stapler unit together with the rail
   (do this slowly and carefully so that the stapler unit does not drop off.)
4. Secure the stapler unit (3 screws).

19.3 ALIGNMENT ROLLER REPLACEMENT



1. Remove the lower rear cover [A] (2 screws).
2. Remove the alignment roller drive gear [B] (2 E-rings).
3. Open the front door, then slide the stapler unit all the way out.
4. Remove the alignment roller (1 E-ring and 1 bushing).

NOTE: Do not lose the rear bushing when installing the alignment roller.