

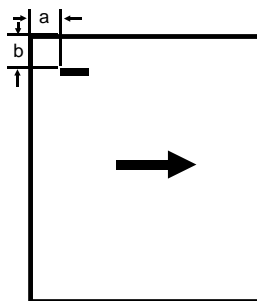
20-BIN SORTER STAPLER
(Machine Code: A554)

1. SPECIFICATIONS

Paper Size for Bins:	Sort or stack mode: Maximum: A3, 11" x 17" Minimum: A5, 5 1/2" x 8 1/2" lengthwise
	Staple mode: Maximum: A3, 11" x 17" Minimum: B5, 8 1/2" x 11"
Paper Weight for Bins:	Sort mode: 52 - 93 g/m ² , 14 - 24 lb Stack mode: 64 - 93 g/m ² , 17 - 24 lb Staple mode: 52 - 80 g/m ² , 14 - 21 lb
Number of Bins:	20 bins + proof tray
Bin Capacity:	Sort mode: 30 sheets (A4, 8 1/2" x 11") 15 sheets (A3, 11" x 17") Stack mode: 15 sheets Proof tray - 100 sheets (52 - 80 g/m ² , 14 - 21 lb) - 50 sheets (81 - 128 g/m ² , 22 - 34 lb) - 30 sheets (129 - 157 g/m ² , 35 - 42 lb)
Stapler Capacity:	A4, 8 1/2" x 11" or smaller: 2 - 20 copies B4, 8 1/2" x 14" or larger: 2 - 10 copies

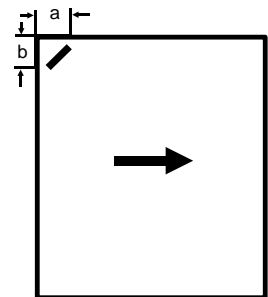
Stapling Position:

(Horizontal)



$$\begin{aligned}
 a &= b \\
 &= 6 \pm 3 \text{ mm} \\
 &= 0.24" \pm 0.12"
 \end{aligned}$$

(Diagonal)



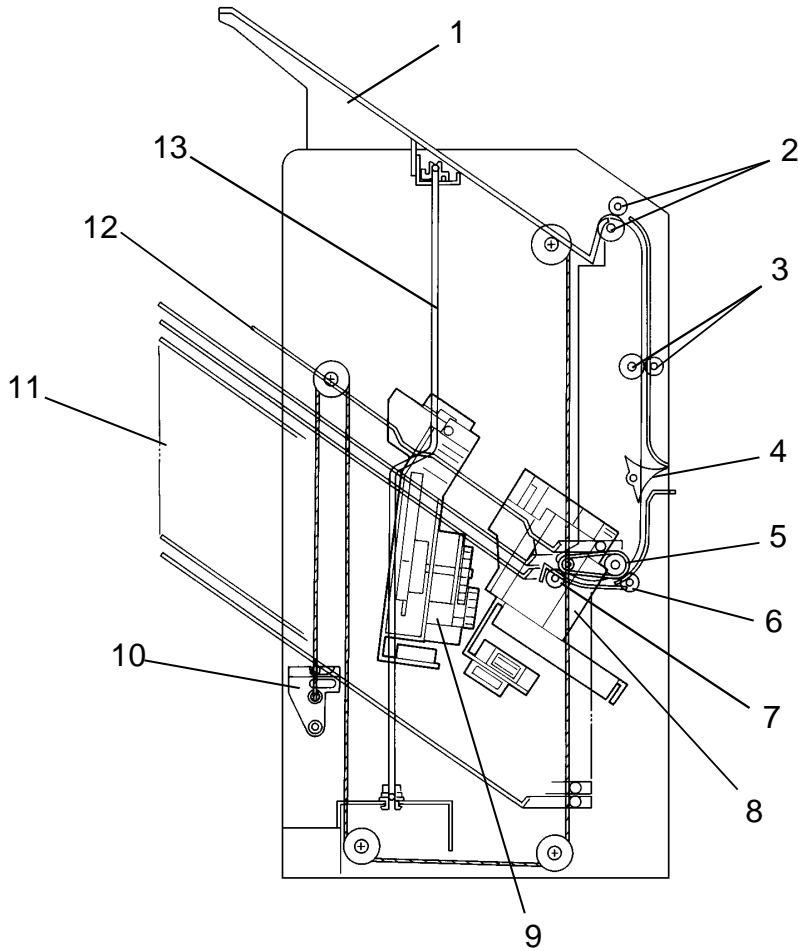
$$\begin{aligned}
 a &= 16 \pm 3 \text{ mm} \\
 &= 0.63" \pm 0.12" \\
 b &= 10 \pm 3 \text{ mm} \\
 &= 0.39" \pm 0.12"
 \end{aligned}$$

20-bin Sorter Stapler

Staple Replenishment:	Cartridge exchange (3,000 staples/cartridge)
Power Source:	DC 24V, 5V (form the copier)
Power Consumption:	34 W
Dimensions: (W x D x H)	412 x 600 x 690 mm (16.2" x 23.6" x 27.1")
Weight:	About 25 kg, 55.1 lb (Main Frame: 22 kg, 48.5 lb Mounting Frame: 3 kg, 6.6 lb)

2. COMPONENT LAYOUT

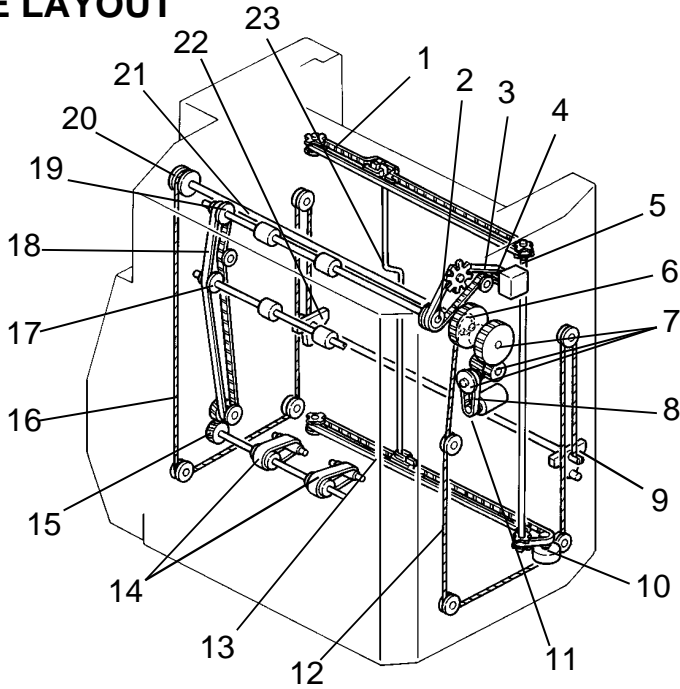
2.1 MECHANICAL COMPONENT LAYOUT



20-bin Sorter
Stapler

- | | |
|-------------------------------|-----------------------|
| 1. Proof Tray | 8. Stapler |
| 2. Proof Tray Exit Rollers | 9. Grip Assembly |
| 3. Vertical Transport Rollers | 10. Bin Support Block |
| 4. Turn Gate | 11. Bins |
| 5. Bin Transport Belt | 12. Support Bin |
| 6. Bin Transport Roller | 13. Jogger Bar |
| 7. Bin Exit Roller | |

2.2 DRIVE LAYOUT



- | | | |
|---|-------------------------------------|-----------------------------|
| 4. Roller Drive Motor Pulley | 11. Bin Lift Motor Pulley | |
| 3. Rear Roller Drive Belt | 8. Bin Lift Drive Belt | |
| 2. Proof Tray Exit Roller Pulley (Rear) | 7. Bin Lift Gears | |
| (Proof Tray Exit Roller) | 6. Bin Lift Gear/Pulley | 21. Bin Drive Shaft |
| 19. Proof Tray Exit Roller Pulley (Front) | | 20. Front Bin Lift Pulley |
| 18. Front Roller Drive Belt | 12. Rear Bin Lift Wire | 16. Front Bin Lift Wire |
| | 9. Rear Bin Support Block | 22. Front Bin Support Block |
| | 17. Vertical Transport Drive Pulley | 10. Jogger Motor Pulley |
| 15. Bin Transport Drive Gear | | 13. Lower Jogger Drive Belt |
| 14. Bin Transport Belts | | 5. Jogger Drive Shaft |
| | | 1. Upper Jogger Drive Belt |
| | | 23. Jogger Bar |

2.3 ELECTRICAL COMPONENT DESCRIPTION

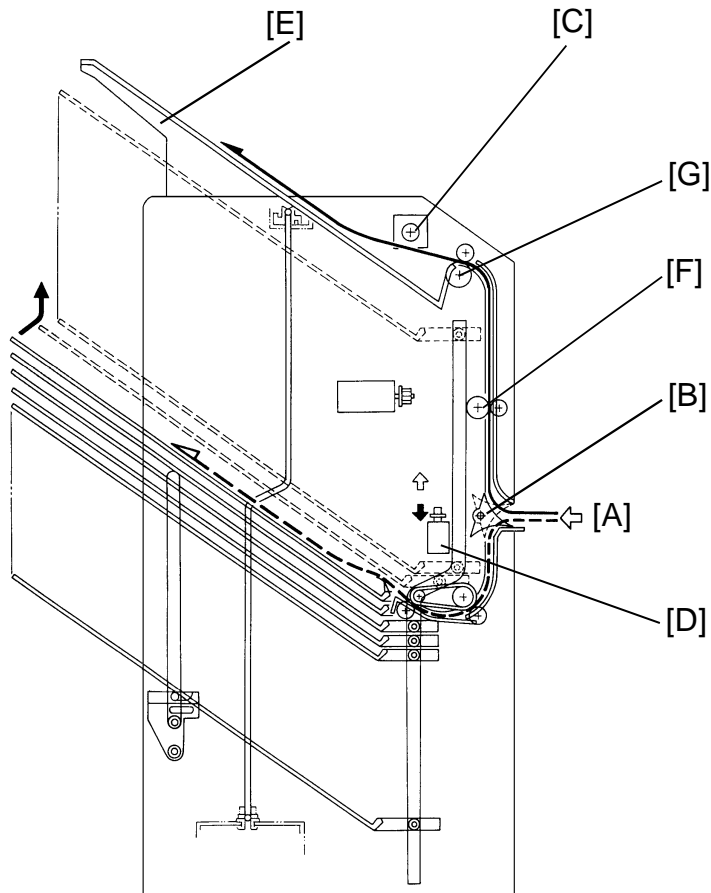
Refer to the electrical component layout on the reverse side of the Point to Point diagram (on waterproof paper).

Symbol	Name	Function	Index No.
Motors			
M1	Bin Lift	Lifts and lowers the bins via a belt, gears, and wires.	23
M2	Jogger	Drives the jogger bar to jog the copies against the front side plate.	20
M3	Grip	Drives the grip assembly into the bin to grip the copies and bring them to the stapling position.	13
M4	Stapler	Feeds the staples and drives the stapler hammer.	12
M5	Roller Drive	Drives the proof tray exit, vertical transport rollers, and bin transport belts.	1
Circuit Board			
PCB1	Main Control	Controls all sorter stapler functions.	18
Solenoid			
SOL 1	Turn Gate	Opens and closes the turn gate to direct the copies into either the proof tray or the bins.	6
Sensors			
S1	Bin Lift Timing -1	Monitors the rotation of the bin lift motor by detecting the timing disk.	24
S2	Bin Lift Timing -2	Controls the stop timing of the bin lift motor so that the bin lift timing sensor no. 1 can detect the timing disk properly.	25
S3	Jogger H.P.	Detects whether the jogger bar is at the home position.	19
S4	Paper	Detects whether there are any copies under the hammer.	8
S5	Bin (LED)	Detects whether there is any paper in the bins (light emitting element).	3
S6	Bin (Photo transistor)	Detects whether there is any paper in the bins (light receiving element).	17
S7	Grip H.P.	Detects whether the grip assembly is at the home position.	16
S8	Bin H.P.	Detects whether all the bins are in the down (home) position.	15
S9	Bin Exit	Detects paper jams at the bin exit area.	5
S10	Proof Tray Exit	Detects paper jams at the proof tray exit area.	4
S11	Roller Drive Timing	Monitors the roller drive motor speed by detecting the timing disk.	2

Symbol	Name	Function	Index No.
Switches			
SW1	Upper Lift Limit	The bin lift motor stops when this switch detects the upper limit position of the bins.	22
SW2	Wire Tension	The bin lift motor stops when this switch detects the lower limit position of the bins through the bin lift wire tension.	21
SW3	Front Door	Cuts the 24 Vdc line when the front door is open.	14
SW4	Sorter Stapler Set	Cuts the 24 Vdc line when the sorter stapler unit is open.	7
SW5	Staple End	Detects the staple end condition.	10
SW6	Staple Guide	Detects whether the staple guide plate is closed.	9
SW7	Staple H.P.	Detects whether the staple hammer is at the home position.	11

3. BASIC OPERATION

3.1 NORMAL MODE AND SORT/STACK MODE



20-bin Sorter
Stapler

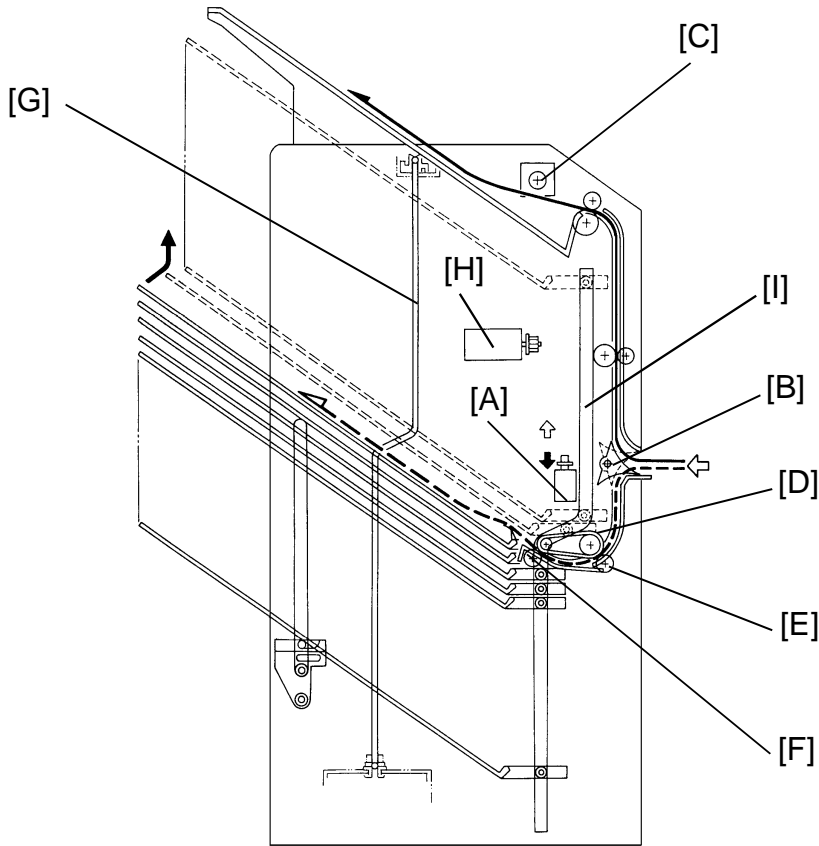
Copies [A] exiting the copier pass through the entrance guide plates to the turn gate area. The turn gate [B] will send copies either to the proof tray or to the bins, depending on the mode.

- Normal mode -

In this mode, copies pass from the turn gate section to the proof tray.

When the copier signals the S/S CPU to start the motor, the roller drive motor [C] rotates all the rollers in the S/S paper path. At the same time, the turn gate solenoid [D] is energized and the turn gate turns clockwise. The turn gate directs copies to the proof tray [E] through the vertical transport and proof tray exit rollers [F and G].

- Sort/Stack mode -



In this mode, copies pass from the turn gate section to the bins.

The turn gate solenoid [A] stays off and the turn gate [B] stays up when the S/S roller drive motor [C] starts rotating. The turn gate directs copies downward and the bin transport belt [D] exits copies to the bin through the bin transport and bin exit rollers [E and F].

The jogger bar [G] then moves the copy towards the front and jogs it against the front side plate to square the copies.

The bin lift motor [H] turns on when this jogging operation is almost finished and advances the bin one step up along the bin cam track [I]. The bin lift motor stops at the proper time to position the next bin at the bin exit area. This bin movement is done for each copy in sort mode and for the final copy of each original in stack mode.

The up and down movement of the bins in both sort and stack modes is the same as for other moving bin type sorters.

3.2 STAPLE MODE

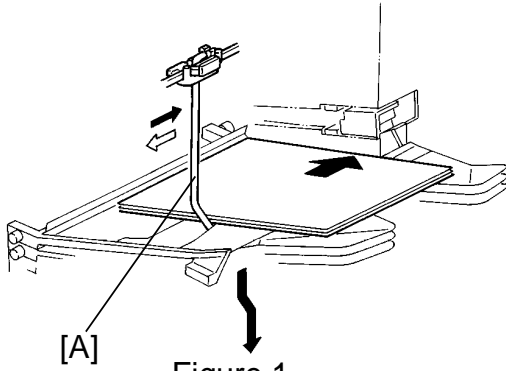


Figure 1

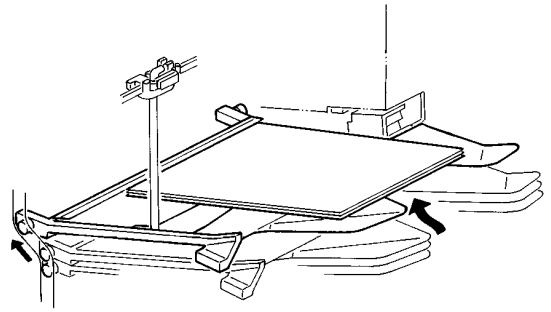


Figure 2

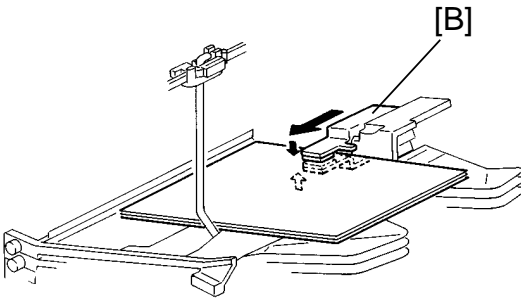


Figure 3

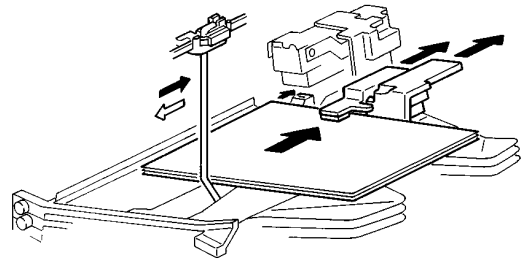


Figure 4

20-bin Sorter
Stapler

When the final set of copies has been jogged in sort mode, the staple unit staples the stacked copies as follows:

Figure 1:

If the final copy is fed out to a bin other than the first one, all the bins lower to the home position (the first bin is positioned at the bin exit area). The jogger bar [A] moves towards the front to jog the copies stacked in the first bin. Then it stops 15 mm away from the side edge of the paper.

Figure 2:

The bins move one step up to place the first bin at the stapling position.

Figure 3:

The grippers [B] move forward, and grip the copies.

Figure 4:

The grippers bring the copies up underneath the stapler. At the same time, the jogger bar jogs the copies stacked in the second bin to prepare for the next stapling operation. Then the jogger bar returns to the position 15 mm away from the side edge of the paper.

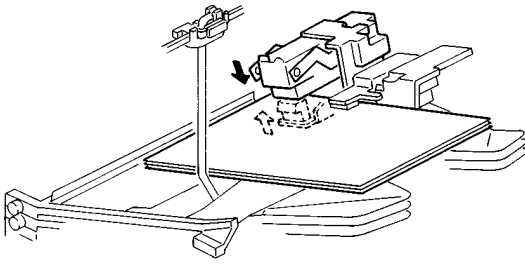


Figure 5

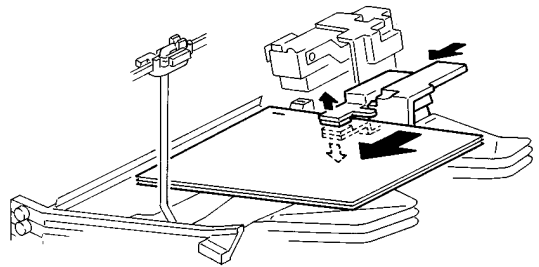


Figure 6

Figure 5:
The stapler staples the copies.

Figure 6:
The copies are pushed back into the bin. Then the grippers open and return to the home position.

The bins move one step up for the next stapling operation.

When the final set of copies is stapled, the bins lower and stop when the final bin that was used just before the entire stapling operation is positioned at the bin exit.

There are two staple modes.

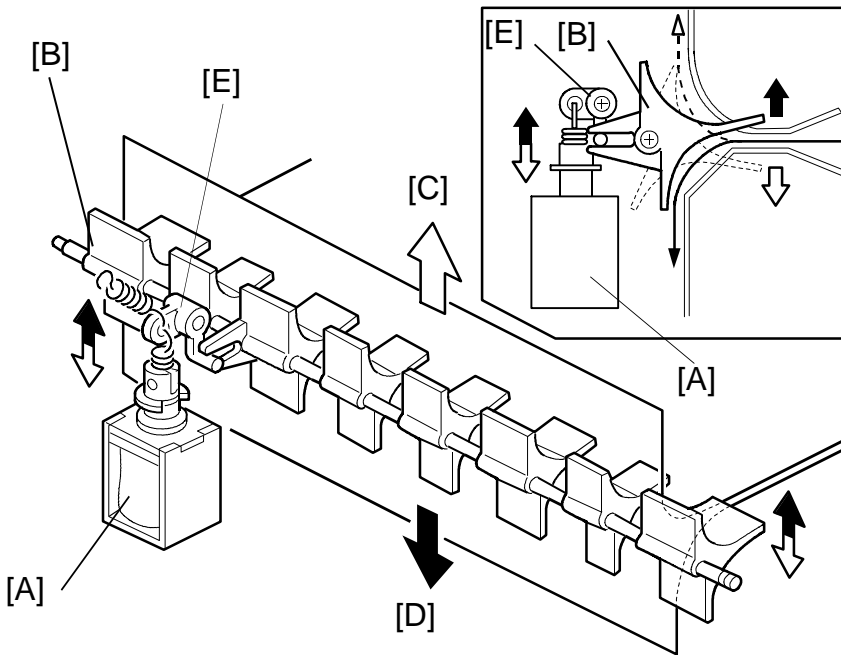
1) Automatic stapling:

In ADF/ARDF mode, when the user selects staple mode before pressing the Start key, the copies will be delivered to each bin and stapled automatically.

2) Manual stapling:

In sort mode, after copies are sorted in the bins, the copies will be stapled when the user presses the staple key after copying. In stack mode, manual stapling is impossible.

4. TURN GATE SECTION



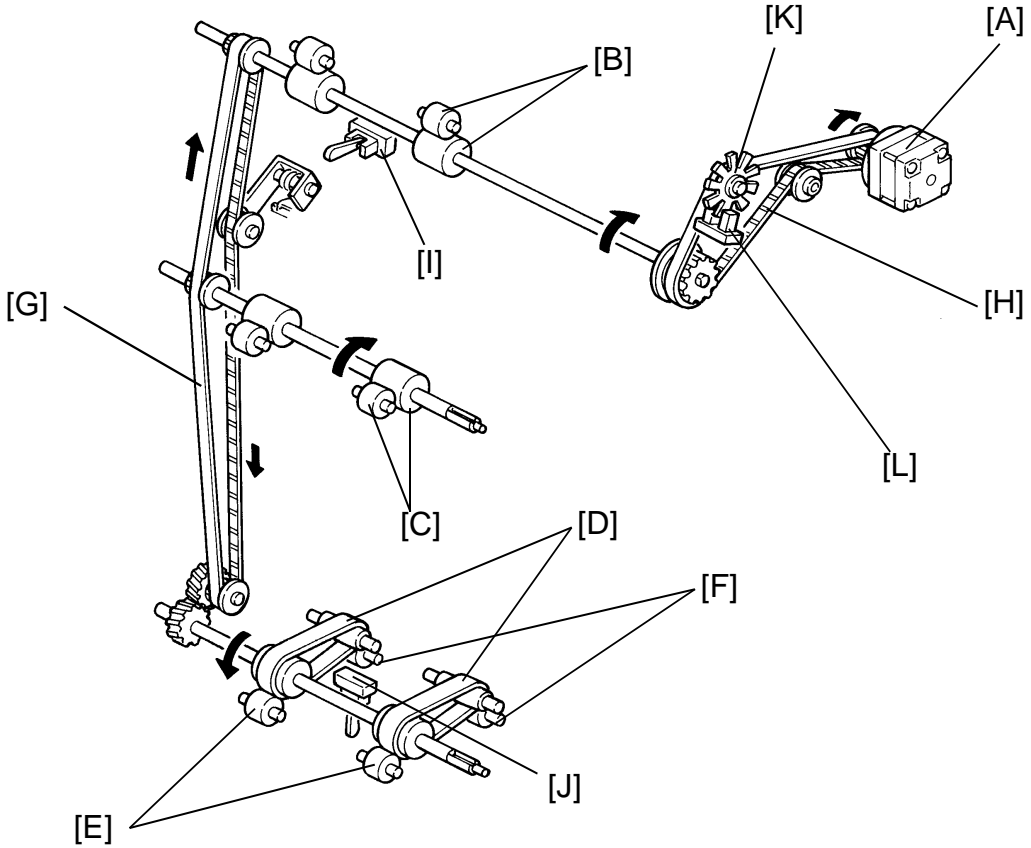
The turn gate directs copies to the proof tray or to the bins depending on the mode selected.

In the normal mode, the turn gate solenoid [A] turns on together with the roller drive motor when the copier signals the S/S CPU to start the motor. The turn gate [B] rotates clockwise to direct copies upward [C] through the vertical transport section to the proof tray. The turn gate solenoid stays on during the copy cycles, and turns off when the proof tray exit sensor detects the trailing edge of the last copy and the S/S CPU receives the signal from the copier to stop the motor.

In the sort, stack, or staple mode, the turn gate solenoid stays off to keep the turn gate up so that copies are directed downward [D] to the bin transport section.

The solenoid lever [E] is bent at a right angle to ensure that the lever moves only if the solenoid switches from on to off, or from off to on.

5. ROLLER DRIVE AND CONTROL



The roller drive motor (a stepper motor) [A] drives the proof tray exit rollers [B], vertical transport rollers [C], bin transport belts [D], bin transport rollers [E], and bin exit rollers [F] via the front and rear roller drive belts [G and H], pulleys, and gears, as shown above.

The roller drive motor turns on when the copier signals the S/S CPU to switch the motor on. When the proof tray exit sensor [I] (in the normal mode) or the bin exit sensor [J] (in the sort/stack/staple mode) detects the trailing edge of the final copy, the S/S CPU informs the copier through the fiber cable and the interface PCB. Then the copier signals the S/S to stop the roller drive motor.

The S/S CPU monitors the roller drive motor speed by counting pulses from the timing disc [K] through the roller drive timing sensor [L].

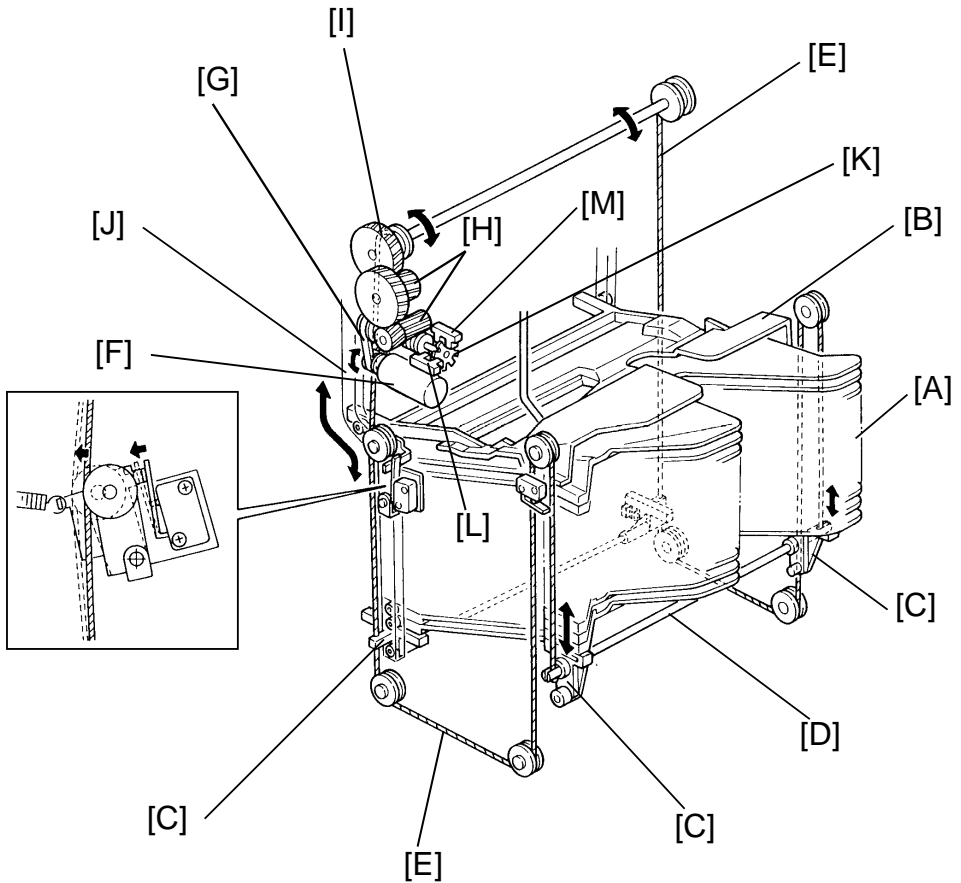
To feed copies out as fast as possible, the S/S CPU controls two motor rotation speeds.

The normal speed depends on the copier's paper transport speed. The S/S's paper transport speed is almost the same as but slightly faster than the copier's.

In the normal mode, the roller drive motor changes the paper transport speed from normal to high (500 mm/s, fixed) when the S/S CPU receives the paper exit signal from the copier. The roller drive motor changes the paper transport speed from high to normal 100 milliseconds after the proof tray exit sensor detects the trailing edge of the copy.

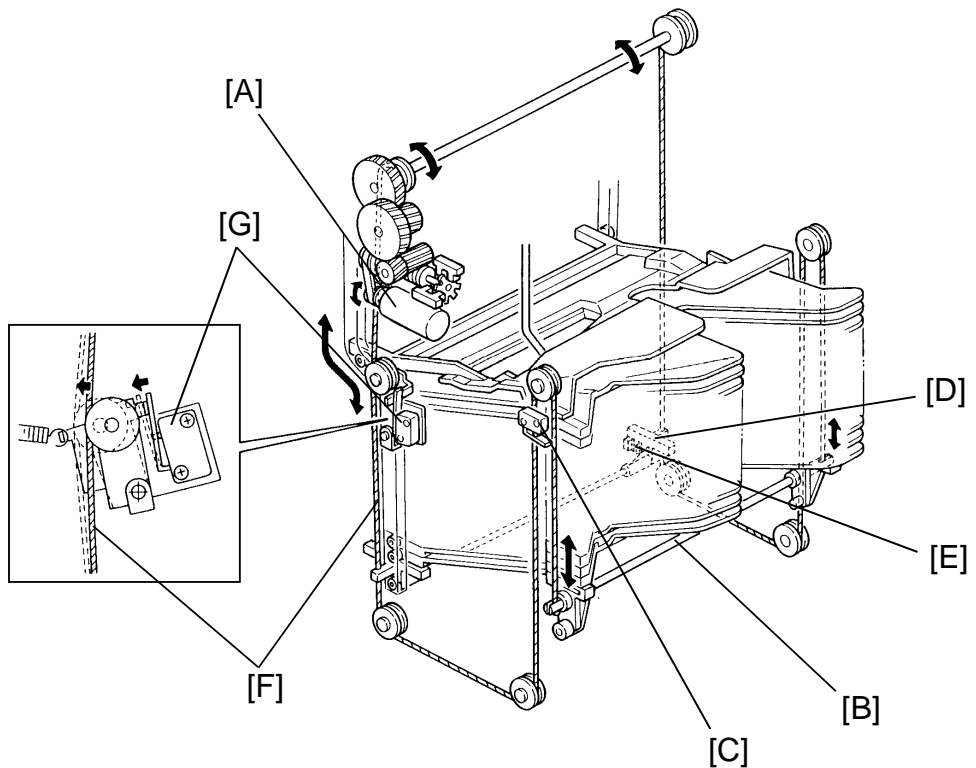
In the sort/stack/staple mode, the roller drive motor also changes the paper transport speed from normal to high and then from high to normal. The timing is the same as in the normal mode, but the bin exit sensor is used to detect the trailing edge instead of the proof tray exit sensor. The high speed is almost double the normal speed, and it changes depending on the paper size (900, 960, or 1,000 mm/second).

6. BIN DRIVE AND CONTROL



All the 20 bins [A] and the support bin [B] are piled up on the bin support blocks [C]. The front and rear bin support blocks are connected by the bin lift shafts [D], the ends of which are fixed to the bin lift wires [E] as shown. The bin lift motor [F] (dc motor) drives the bin lift wires through the bin lift drive belt [G], bin lift gears [H], and the bin lift gear/pulley [I]. Then the bins are driven up and down along the front and rear bin cam tracks [J].

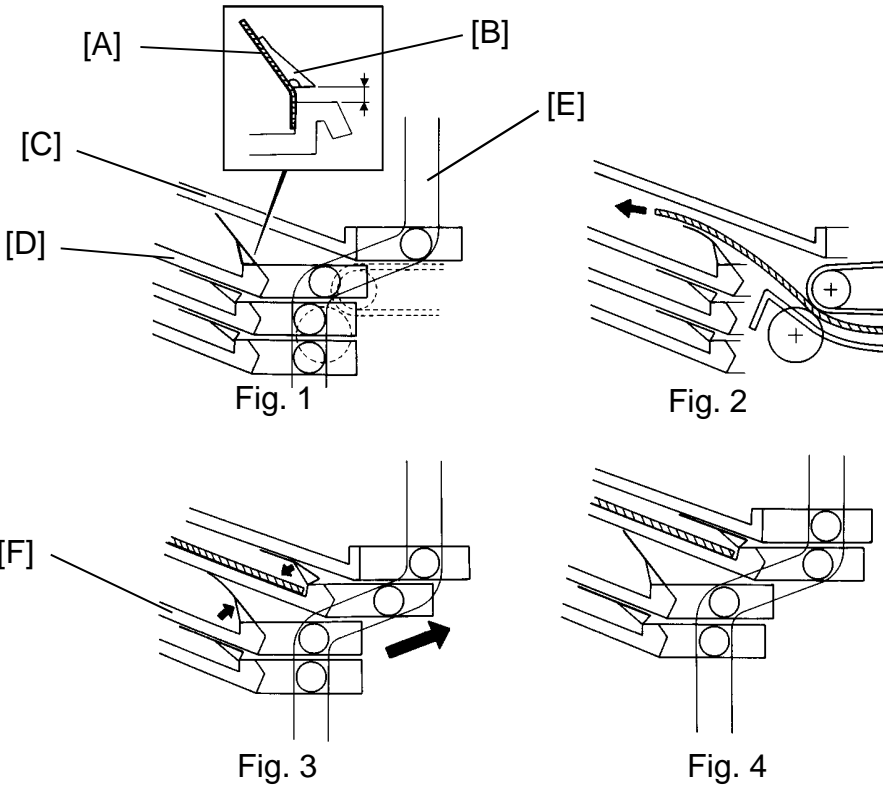
The S/S CPU controls the amount of bin lift motor rotation by monitoring the pulses from the timing disc [K] through the bin lift timing sensors 1 and 2 [L and M]. Bin lift timing sensor 1 (blue connector) is used for counting the timing pulses. Bin lift timing sensor 2 (white connector) is used to determine the motor stop timing so that the edge of the timing disc slots is not positioned at timing sensor 1.



If the bin lift motor [A] fails to stop the bins at the highest position, the rear end of the left bin lift shaft [B] activates the upper lift limit switch [C] (which is a normally-closed type) to open the 24 Vdc line to the bin lift motor.

The front right bin support block [D] has an actuator on its underside. When all the bins are lowered and the first bin is positioned at the bin exit area, the actuator activates the bin home position sensor [E] and the bin lift motor turns off.

If the bin lift motor fails to stop lowering the bins at the bin home position, the rear bin lift wire [F] slackens. Then the wire tension switch [G] (which is a normally-open type) is deactivated, which opens the 24 Vdc line to the bin lift motor.



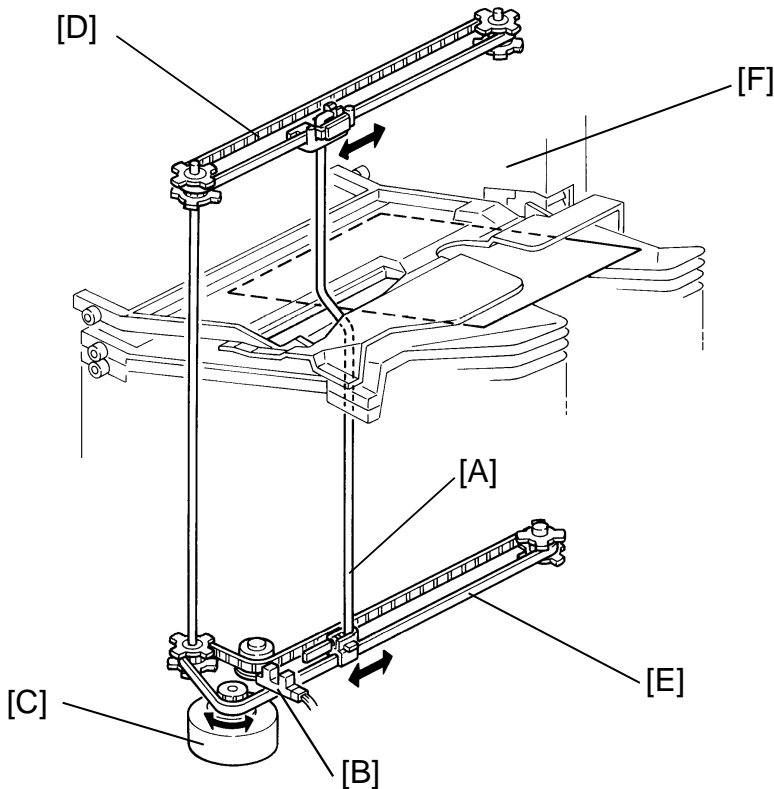
An end fence mylar [A] is attached to each bin entrance and an end fence block [B] is stuck on the mylar. These are attached with two-sided tape, as shown in figure 1. There is a twisted spring [E] at the rear end of the bin entrance to raise the end fence block and mylar. When the bins are at the bin home position, the support bin [C] and the first bin [D] are positioned at the bend in the bin cam track [E] as shown. The support and first bins have a space between them so that the end fence mylar can fully rise until the end fence block stops it.

The space between the support and first bins is at the bin entrance section as shown in figure 2. Since the end fence mylar is thin, the copy exits to the first bin over the mylar. The steep angle of the bin helps the exited copy slide back due to its own weight under the mylar against the bin entrance.

When the bins move up along the bend of the bin cam track, the end fence mylar and block of the first bin are pushed down by the support bin, and those of the second bin [F] rise as shown in figure 3.

When the bin lift motor stops, the first and second bins are positioned as shown in figure 4. The lowered end fence mylar helps to prevent the copy in the first bin from moving out of the jogged position. The end fence mylar and block of the second bin are ready to receive the next copy.

7. JOGGER SECTION



When the Start key is pressed in the sort, stack, or staple mode, the copier sends the paper size information to the sorter stapler. When a copy enters the sorter stapler entrance, the jogger bar [A] stays at the home position which is detected by the jogger home position sensor [B].

At the appropriate time (depending on the selected paper size) after the trailing edge of the copy is detected by the bin exit sensor, the jogger motor [C] (a stepper motor) rotates forward and in reverse to move the jogger bar via the upper and lower jogger drive belts [D and E]. As the copy is fed out into the bin at the center, the jogger bar moves the copy all the way to the front, and pushes the paper side edge by 5 mm (0.2") against the front side plate [F]. Then the jogger bar moves back to the position which matches the paper width. Shortly after that, the jogger bar returns to its home position. This jogger bar movement is performed for each copy to square the copy stack.

In the automatic or manual staple modes, the jogger bar also moves to ensure that the stacked copies are squared before stapling. For how the jogger moves, see "Basic Operation - Staple Mode".

- Jogger off conditions -

1. Under the following conditions, the jogger bar does not jog after a copy is delivered to the bin.
 - If paper is loaded in a bin by hand while the sort/stack or staple mode is selected.
 - If the selected paper size does not match the stapling specifications.
 - If copies of different width are delivered to the bins.

2. If there is paper in a bin before the main switch is turned on, the sort/stack mode is disabled when the sorter key is pressed.

8. GRIP ASSEMBLY

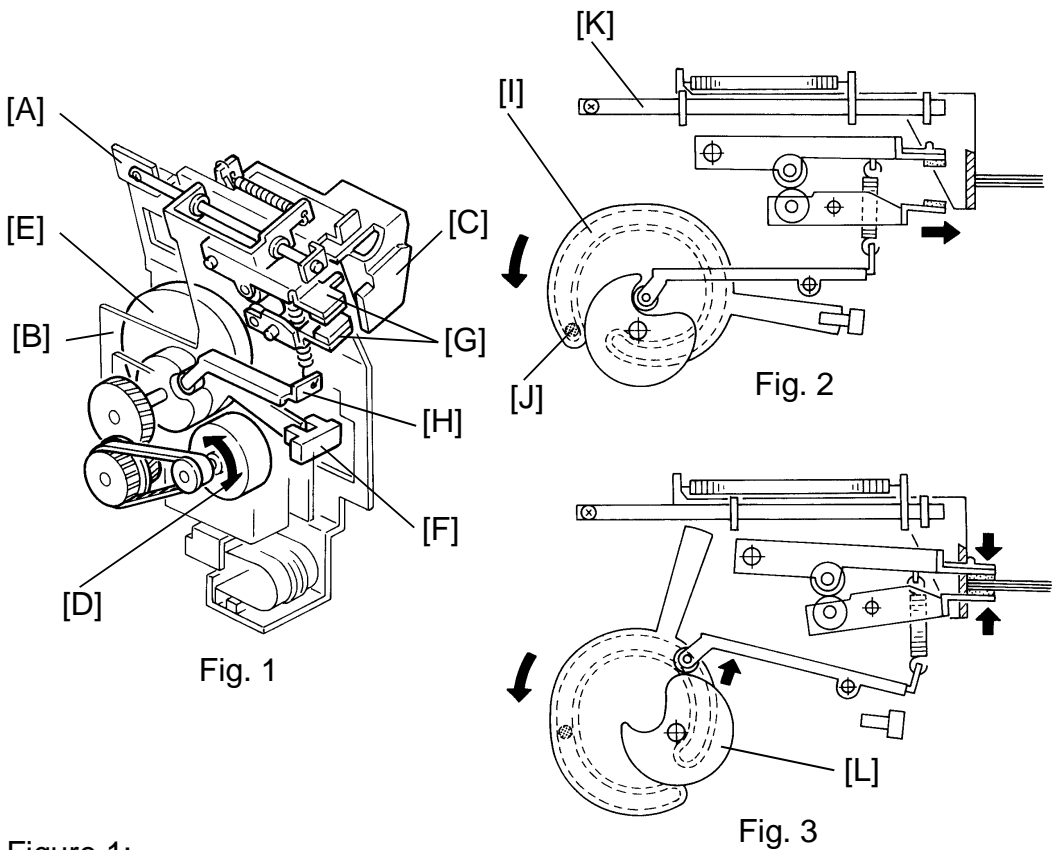


Figure 1:

The grip assembly consists of the gripper guide bracket [A], the gripper assembly [B], and the bin side plate [C]. The major components of the gripper assembly are the grip motor [D] (a stepper motor), dual cam plate [E], grip home position sensor [F], grippers [G], and grip cam follower [H].

When the copier main switch is turned on, the grip motor rotates forward and/or reverses to position the whole gripper assembly at the home position. The home position is detected by the grip home position sensor and the sensor actuator on the dual cam plate.

Figure 2:

When the bin lift motor stops during the automatic or manual stapling cycle, the grip motor starts rotating. As the dual cam plate turns counter-clockwise, the cam groove [I] and the pin [J] on the gripper guide bracket move the whole gripper assembly along the gripper guide rod [K] into the bin.

Figure 3:

When the high lobe of the grip cam [L] (the small cam on the dual cam plate) pushes up the grip cam follower, the grippers close to grip the copies that are stacked in the bin.

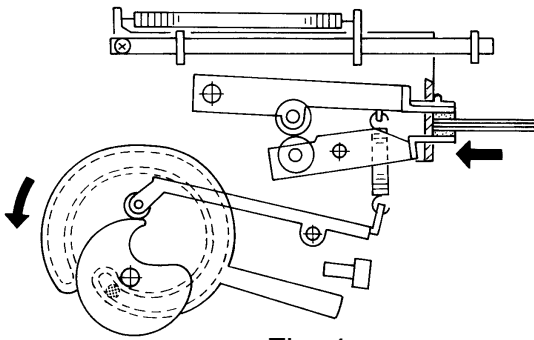


Fig. 4

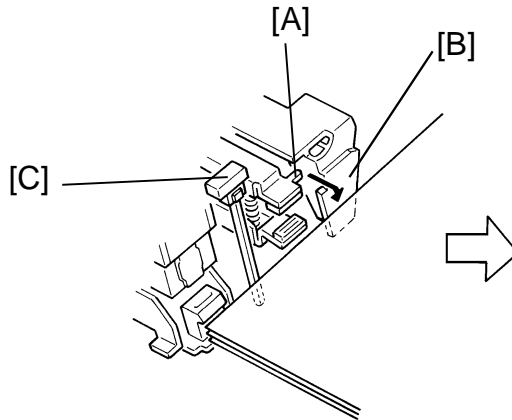


Fig. 5

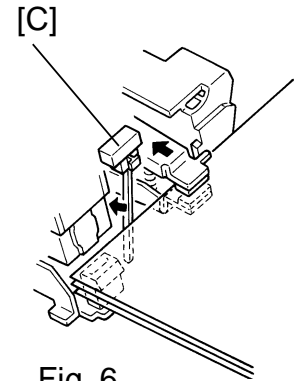


Fig. 6

Figure 4:

As the dual cam plate rotates further, the cam groove and the pin move the whole gripper assembly with the gripped copies back to the stapling position. Then the grip motor stops.

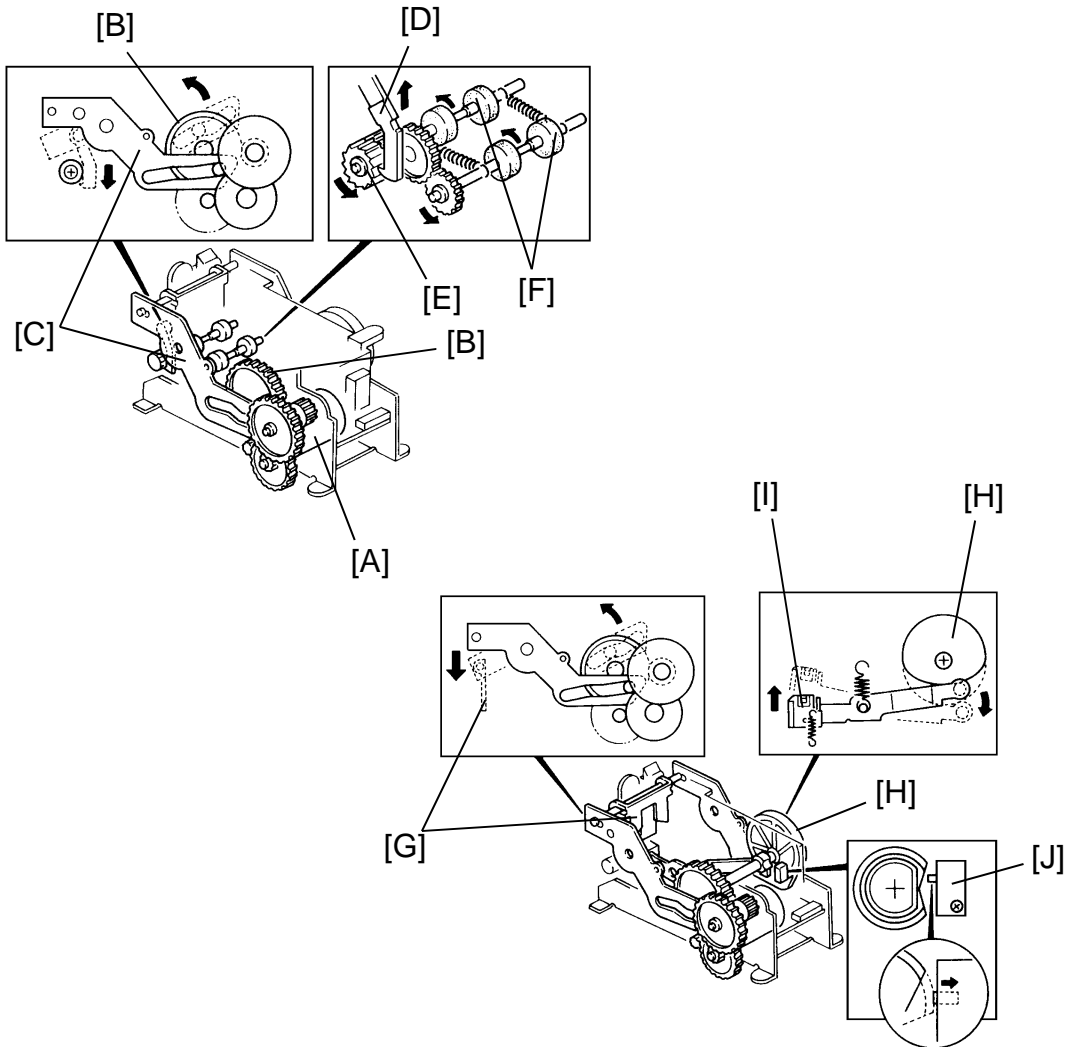
Figure 5 and 6:

The upper gripper has a projection [A] for hooking the bin side plate [B]. When the gripper moves into the bin, the projection moves over the bin side plate. When the grippers close, the projection hooks the bin side plate. Therefore, the grippers bring the stacked copies into the stapler together with the bin side plate.

When the grippers move to the stapling position, the S/S CPU checks the paper sensor [C] to see if there is any paper there or not. If the paper sensor is activated, the stapler motor starts rotating and the copies are stapled.

When the stapler motor stops, the grip motor starts rotating in reverse. Then the gripper assembly brings back the stapled copies into the bin, the grippers open, and the gripper assembly returns to the home position.

9. STAPLER

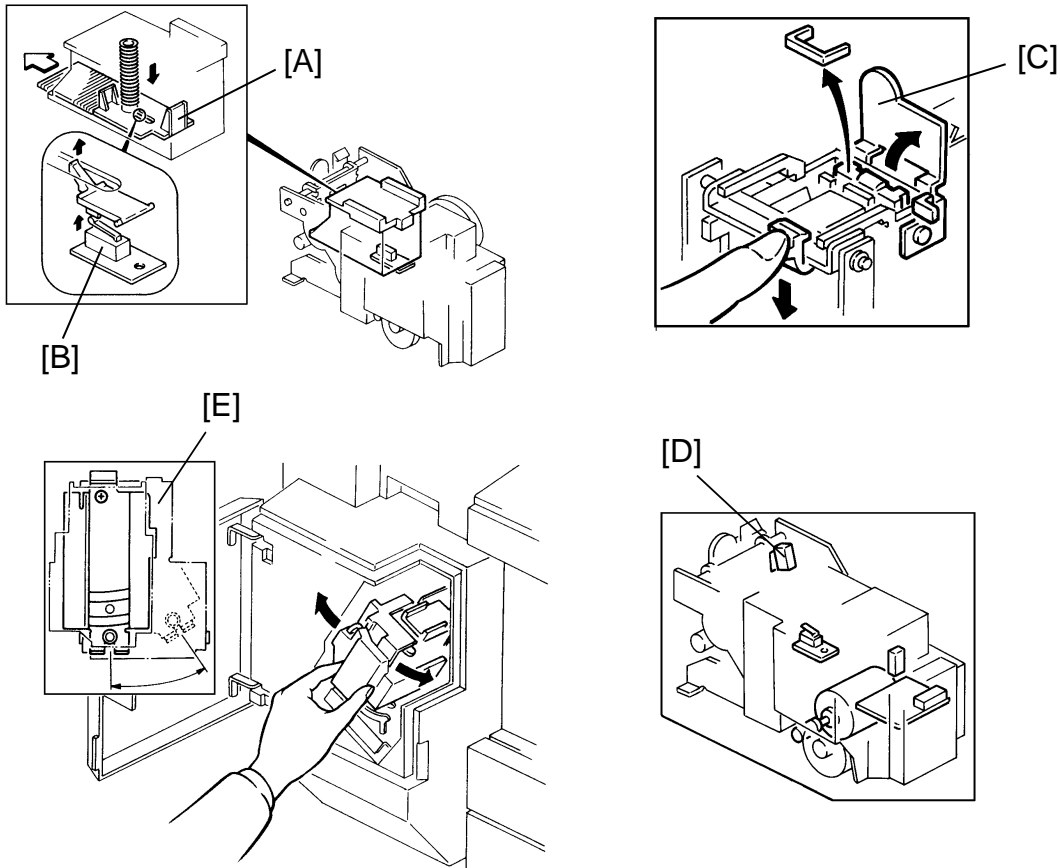


20-bin Sorter Stapler

In automatic or manual stapling mode, the stapler motor [A] rotates when the grip motor stops rotating after the grippers bring the stacked copies to the stapling position.

The staple gear [B] rotates counterclockwise, and the pin on the gear rotates the staple arm [C] counterclockwise, then clockwise. The ratchet [D] lowers and rises to rotate the ratchet wheel [E] counterclockwise. Then the staple feed rollers [F] turn via gears to feed a staple sheet to the hammer.

While both the front and rear staple arms rotate counterclockwise, the hammer [G] lowers. At the same time, the staple cam plate [H] lifts the clincher [I]. The hammer and the clincher staple the copies. Then, while the staple arms rotate clockwise, the hammer rises and the clincher lowers. When the staple home position switch (a normally-closed type) [J] is deactivated, the stapler motor stops.



When all the staple sheets are fed out of the staple cartridge, a notch cut out of the staple pressure plate [A] deactivates the staple end switch (a normally-closed type) [B]. The S/S CPU sends the staple end signal to the copier. After the stapling job is completed for all the bins, the Add Staples indicator lights on the copier operation panel and the Ready indicator turns off whenever the staple mode is selected.

Staple jams are easily cleared by opening the staple guide plate [C]. The staple guide switch (a normally-closed type) [D] detects whether the staple guide plate is closed or open. When the S/S front door and S/S unit itself are closed with the staple guide plate open, the Add Staples indicator lights on the copier operation panel.

The stapler can be swung on the stapler support bracket [E] and it has two lock positions. One is for horizontal stapling and the other is for diagonal stapling (at 25 degrees).

- Stapler inoperative conditions -

1. Under the following conditions, the staple mode is inoperative when the staple key on the operation panel is pressed.

- If there is paper in a bin before the main switch is turned on.
- If the selected paper size does not match the stapling specifications.

2. Under the following conditions, the staple mode is canceled.

- If paper is loaded into a bin by hand while staple mode is selected.
- If only one copy is delivered to the bin.
- If the jogger operation has not been performed.
- If some already-stapled copies are present in the bins.
- If the number of sheets delivered to the bin exceeds the stapler capacity.

Stapler capacity: 2 to 20 sheets for A4, B5, and 8 1/2" x 11"
 2 to 10 sheets for B4, A3, 8 1/2" x 14", and
 11" x 17"

The stapler capacity can be increased by 5 for both paper size types by changing the SP mode setting for the Stapling Limit. (If this is done, the stapling function is not guaranteed.)

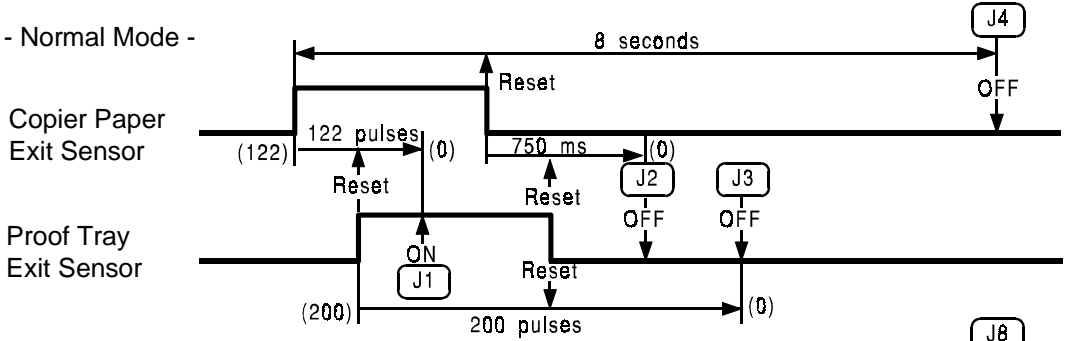
3. Under the following conditions, manual stapling mode in sort mode is inoperative.

- If paper is loaded into a bin by hand while sort mode is selected.
- If the paper size in the bin does not match the stapling specifications.
- If only one copy is delivered to the bin.
- If copies of different width are delivered to the bin.
- If some already-stapled copies are present in the bin.

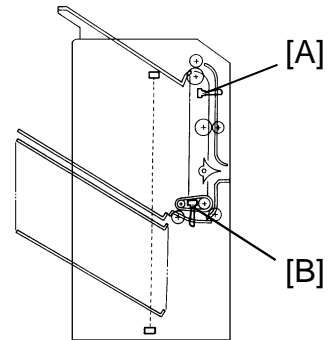
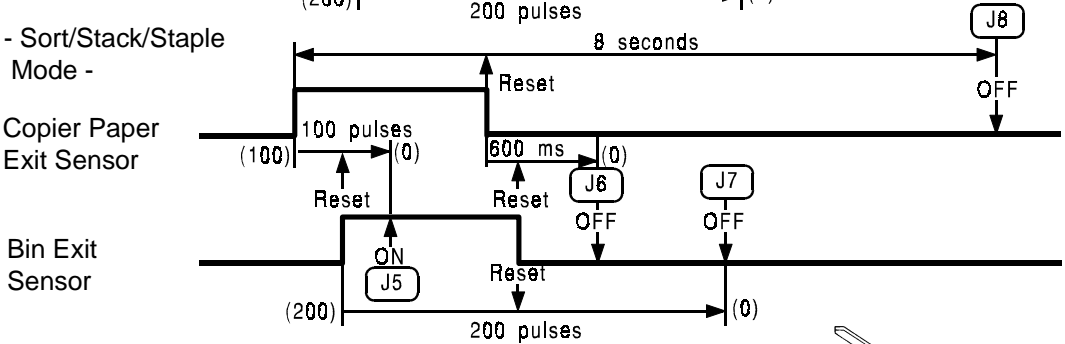
10. JAM DETECTION AND STAPLER ERROR

10.1 SORTER JAMS

- Normal Mode -



- Sort/Stack/Staple Mode -



The sorter stapler main control board detects paper jams in the sorter stapler, or between the sorter stapler and the copier. To detect jams, the S/S CPU uses the paper exit on/off signal from the copier, and the proof tray exit sensor [A] (in normal mode) or the bin exit sensor [B] (in sort/stack/staple mode).

Jam check timing in normal and in sort/stack/staple modes is shown above. There are two time scales: one in seconds and milliseconds, and one in pulses. The pulses are the timing pulses from the roller drive timing sensor. Since the paper transport speed of the sorter stapler (this is the normal speed mode) depends on that of the copier, the sorter stapler cannot operate on a fixed time scale. Therefore, to match the sorter stapler speed to the copier's, the copier sends a signal to the S/S CPU; this controls the normal speed of the roller drive motor (the speed in high speed mode never changes) and this generates the pulse rate.

If the proof tray exit sensor or the bin exit sensor is actuated when the sorter stapler unit or the front door is opened and closed, or when the main switch is turned on, a sorter jam signal is sent to the copier.

Sorter jam conditions are reset by opening and closing the sorter stapler unit or the front door after clearing the jammed paper.

When an abnormal condition of the main motor, bin lift motor, or jogger motor is detected for the first time, the copier's operation panel will indicate a sorter jam. When the abnormal condition is detected for the second time, the S/S CPU sends an error signal to the copier. The copier's operation panel will indicate a service call code.

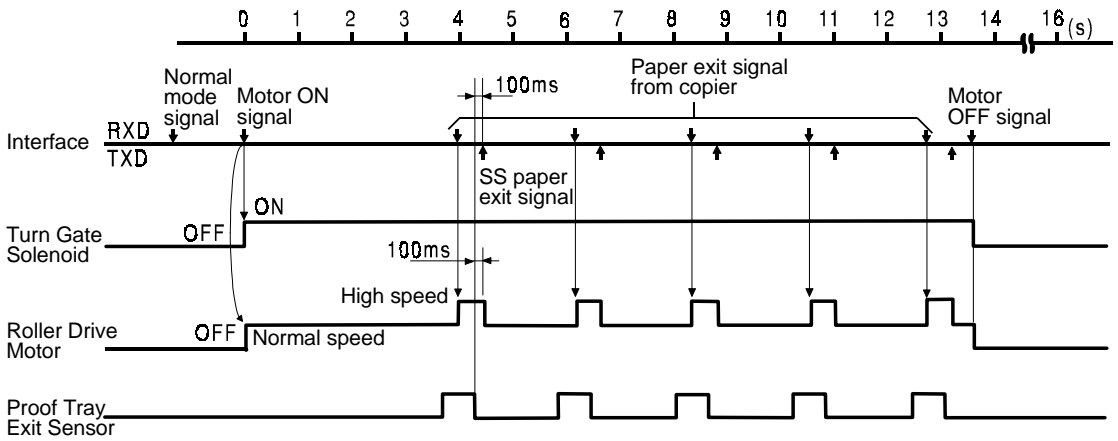
10.2 STAPLER ERROR

The sorter stapler main control board detects a stapler error when the following conditions are detected. The copier's operation panel will indicate a sorter jam, and stapling will stop in these cases.

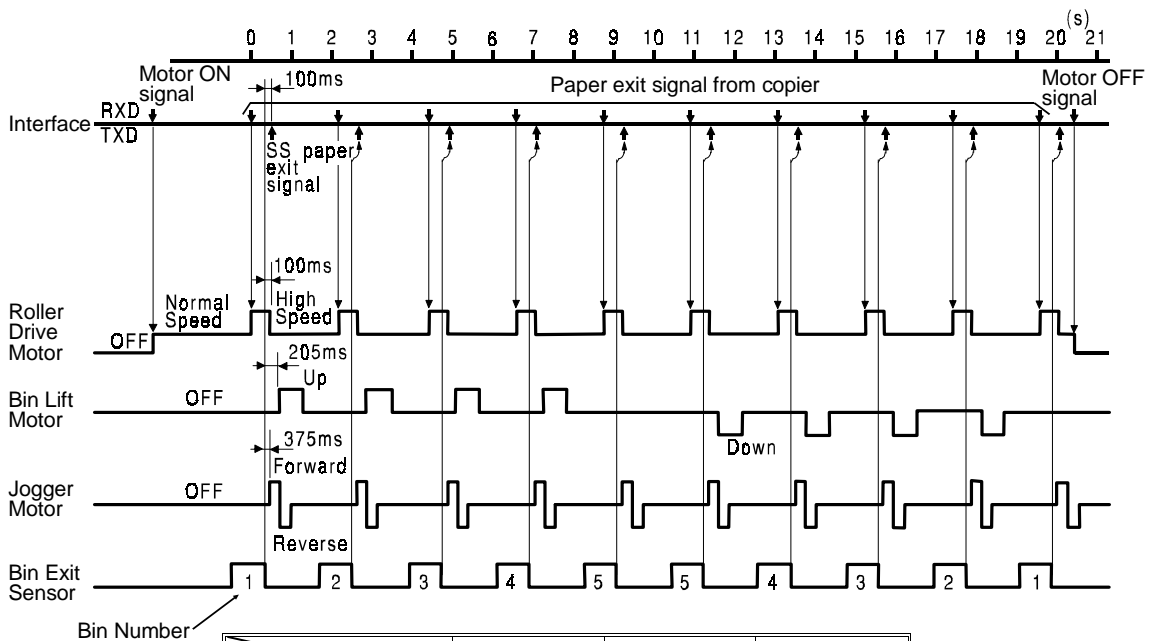
- If the paper sensor is actuated when the sorter stapler or the front door is opened or closed, or when the main switch is turned on.
- If the paper sensor is actuated when the grip assembly returns to the home position after the stapling operation.
- The first time an abnormal condition of the stapler motor or grip motor is detected.
The second time an abnormal condition is detected, the copier's operation panel will indicate a service call code.

11. TIMING CHARTS

Timing Chart 1: Normal Mode (A4 sideways, 5 copies)

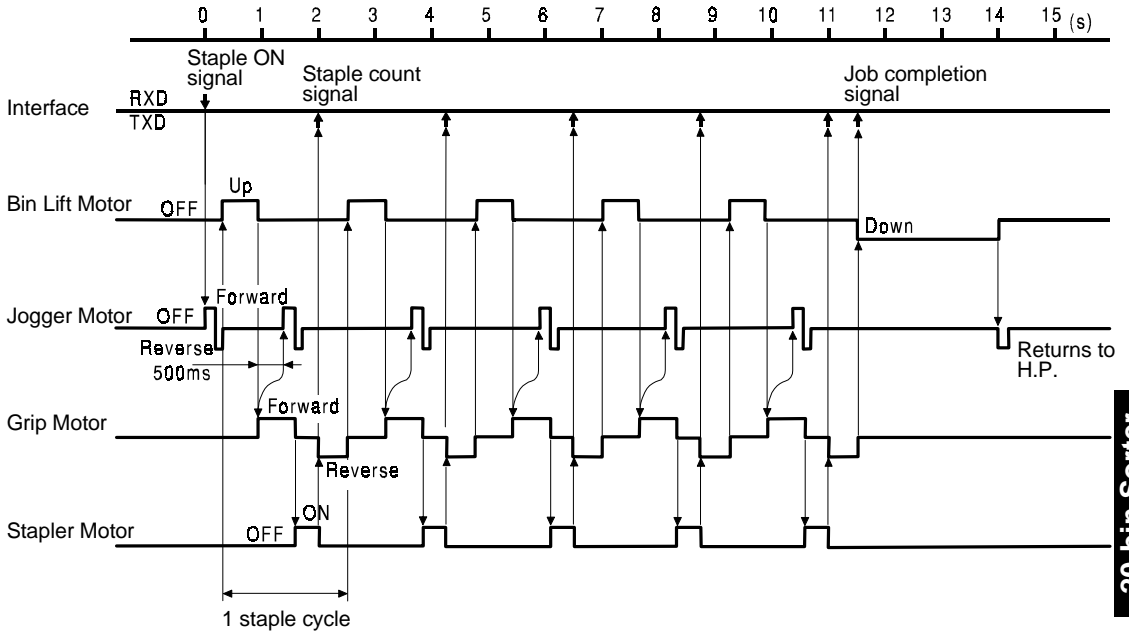


Timing Chart 2: Sort Mode (A4 sideways, 2 copies for 5 bins)



Paper Size	Bin Lift Motor ON Timing	Jogger Motor ON Timing	High Speed (mm/s)
A3	350 ms	190 ms	900
B4	350 ms	160 ms	900
A4 sideways	205 ms	375 ms	960
A4 lengthwise	610 ms	0 ms	900
B5 sideways	150 ms	370 ms	900
B5 lengthwise	230 ms	0 ms	900
11" x 17"	295 ms	130 ms	900
8 1/2" x 14"	675 ms	90 ms	900
8 1/2" x 11" sideways	130 ms	265 ms	960
8 1/2" x 11" lengthwise	625 ms	0 ms	900

Timing Chart 3: Stapling (A4 sideways, 2 copies for 5 bins)

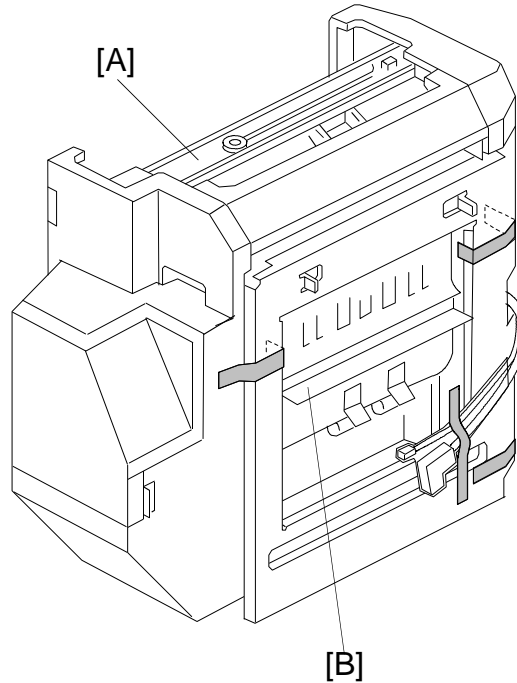


12. ACCESSORY CHECK

Check the quantity and condition of the accessories in the box as listed below:

- 1. Proof Tray 1
- 2. Staple Cartridge 1
- 3. Staple Position Decal 1
- 4. Stepped Screw 1
- 5. Philips Truss Head Screw - M4 x 6 1
- 6. Philips Pan Head Screw - M4 x 14 4
- 7. New Equipment Condition Report
(-17 machines only) 1
- 8. Installation Procedure 1

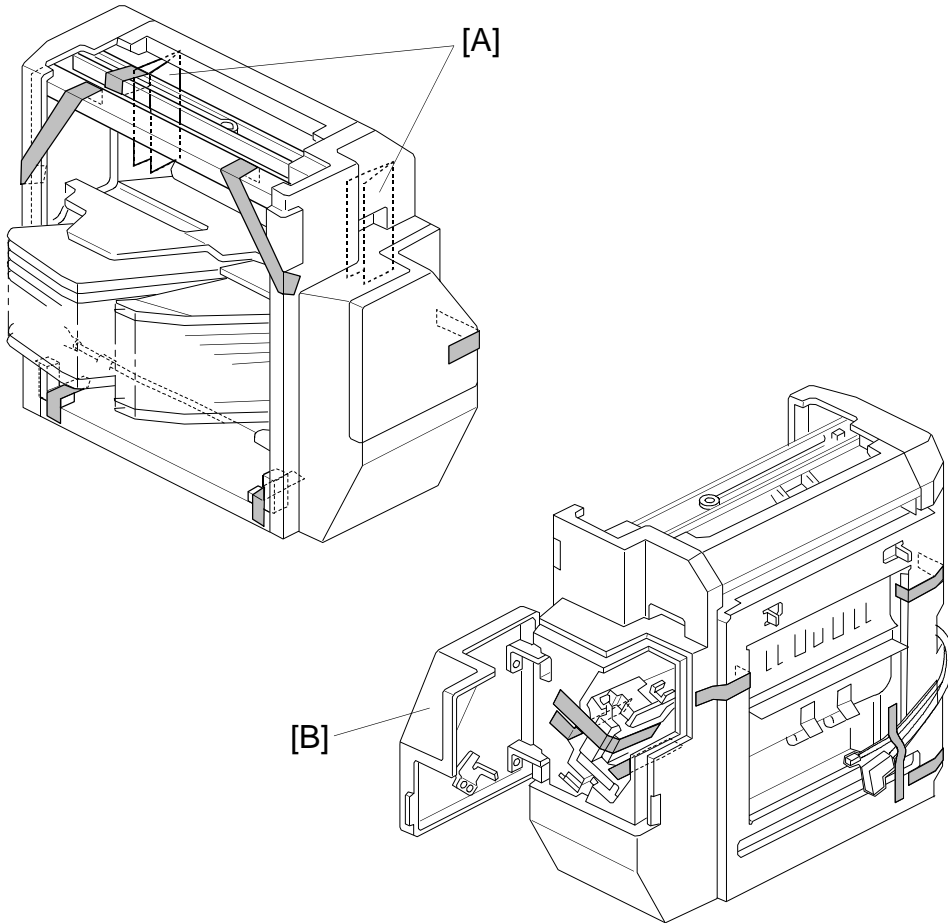
13. INSTALLATION PROCEDURE



20-bin Sorter
Stapler

Make sure to follow the instructions below when unpacking and installing the sorter stapler.

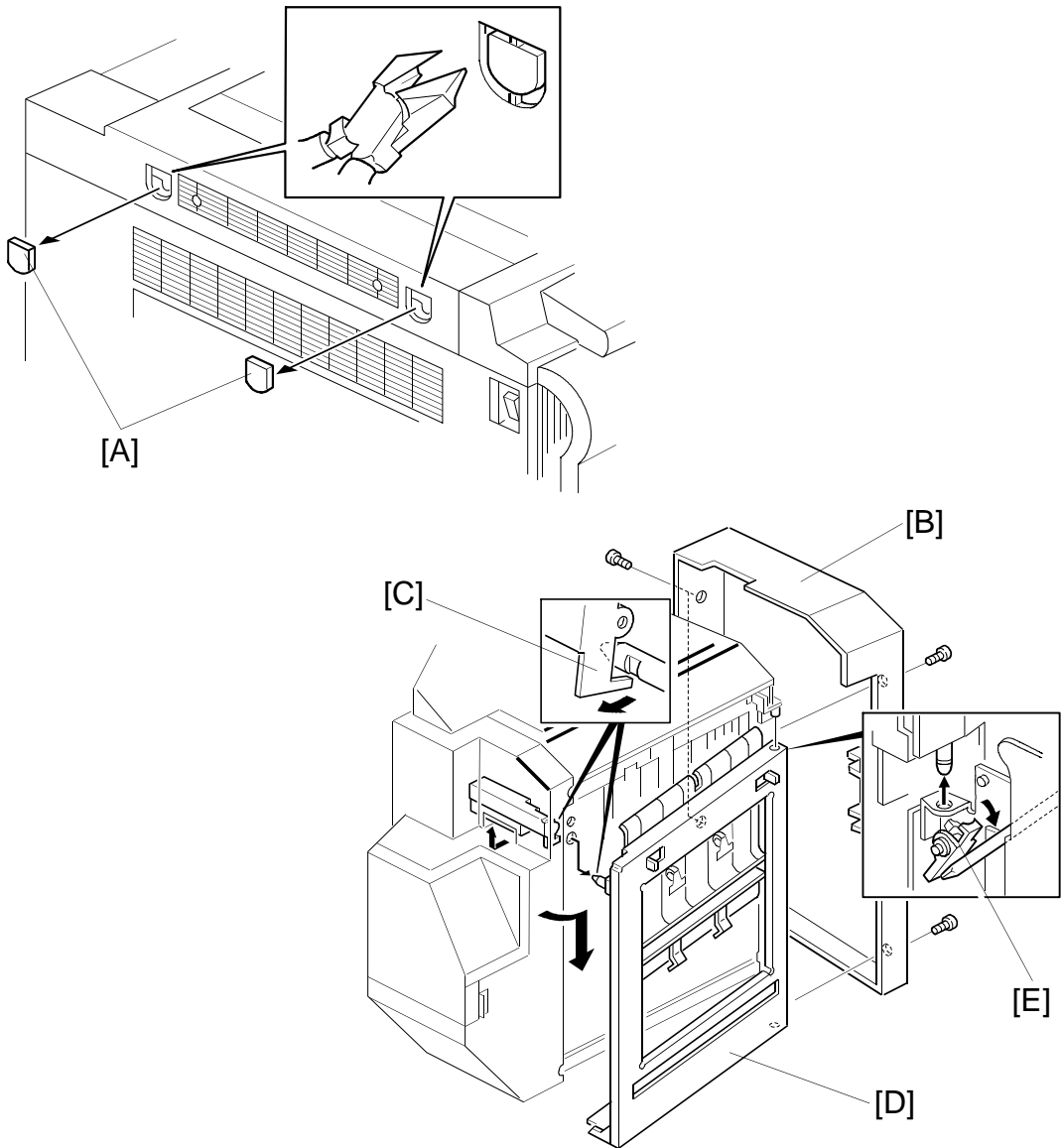
- Grasp the stay [A] when unpacking the sorter stapler.
- **Never** hold the guide plate [B] when unpacking the sorter stapler. If you hold the guide plate, it might be damaged and this will cause paper jams.
- **Avoid** catching the guide plate [B] on anything when installing the sorter stapler.



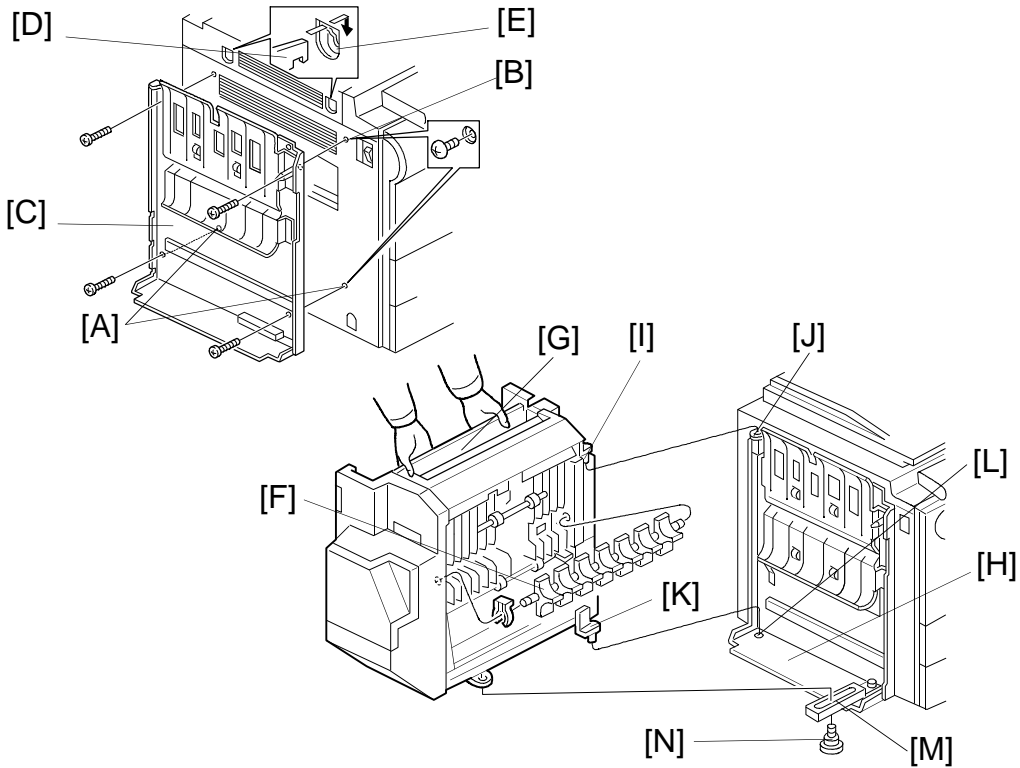
- NOTE:**
- (1) Keep the shipping retainers after installing the machine. They will be reused if the machine will be transported to an another location in the future.
 - (2) Proper reinstallation of the shipping retainers is required in order to avoid any transport damage.
 - (3) A sorter adapter (A568) is required to install this sorter stapler in the A157/A159/A160/A161/A162 copiers. Before installing this sorter stapler, please install the sorter adapter in the copier.

! CAUTION
Unplug the copier power cord before starting the following procedure.

- 1. Remove the strips of tape and the shipping retainers [A].
- 2. Open the front door [B] and remove the strips of tape from the staple unit and close the front door.



3. Remove the two plastic caps [A] from the copier left cover with nippers.
4. Remove the rear cover [B] of the sorter stapler.
5. Release the lock lever [C] of the sorter stapler and unhook the sorter stapler mounting frame [D] while releasing the stopper [E] as shown.



6. Remove the M4 x 8 round head screws from the left cover of the copier (**A153/A155/A156 copiers:** 2 screws [A], **A157/A159/A160/A161/A162 copiers:** 3 screws [A] and [B]).

7. Mount the sorter stapler mounting frame [C] on the copier as shown (4 – M4 x 14 screws).

NOTE: When hooking the sorter stapler mounting frame on the left side of the copier, make sure that the positioning hooks [D] on the frame are properly inserted in the positioning holes [E] in the copier.

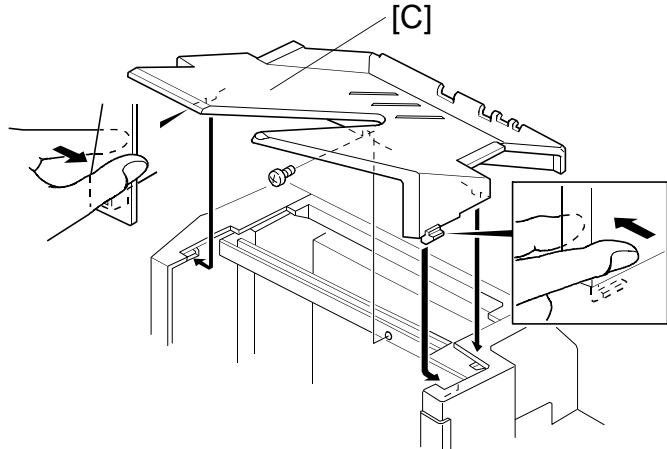
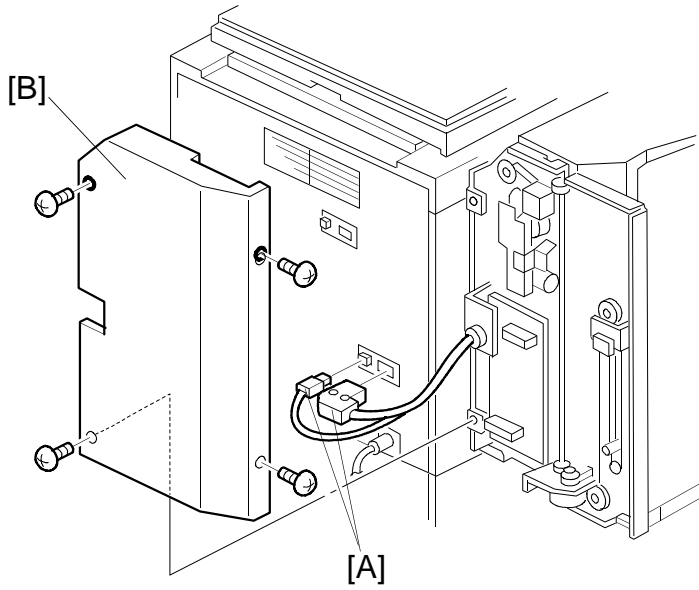
8. Remove the junction gate [F] (1 snap ring) before installing the sorter stapler. This prevents the junction gate from damaging the guide plate of the sorter stapler mounting frame.

9. Install the sorter stapler [G] on the sorter stapler mounting frame (2 hinge pins at the rear).

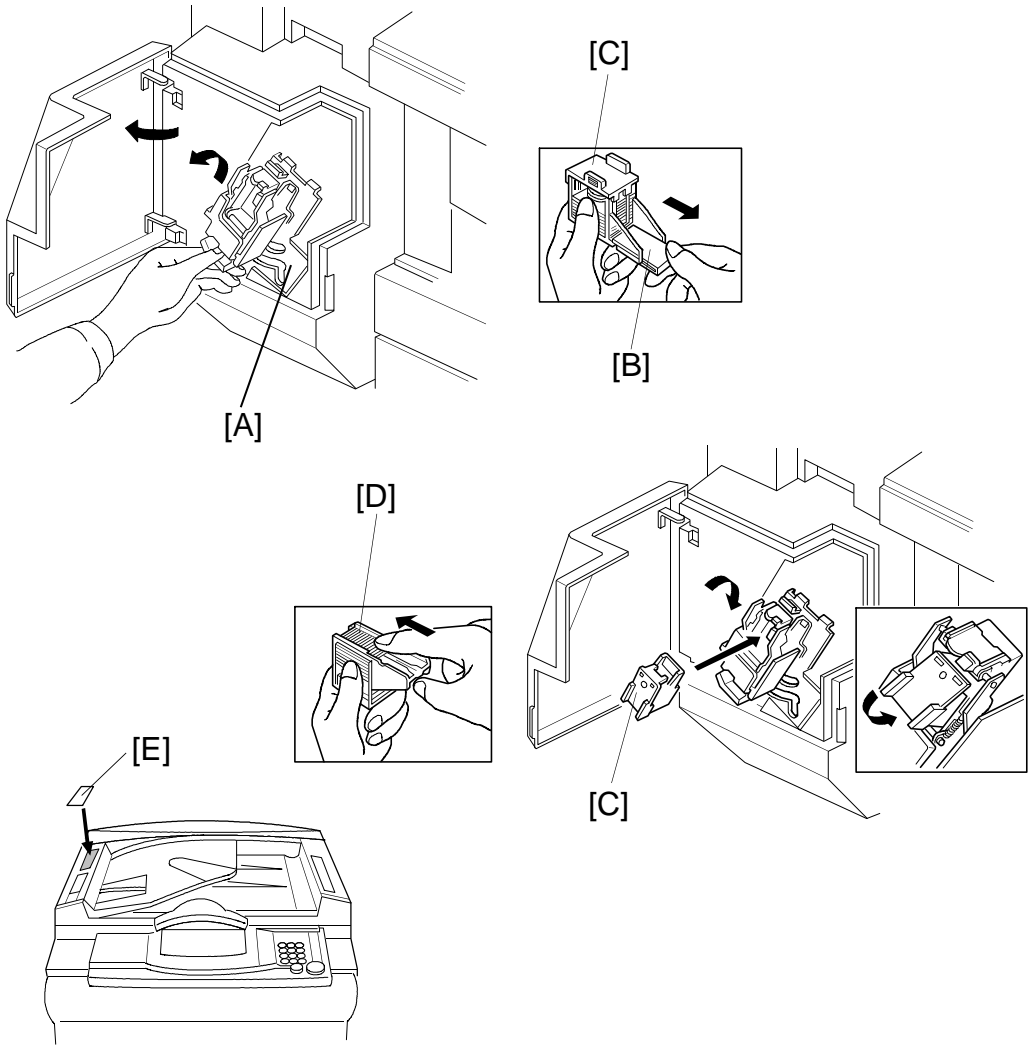
NOTE: First, lift the sorter stapler onto the support plate [H], opening the sorter stapler about 30 degrees. Then, insert the upper stud [I] into the upper hinge hole [J]. Finally, insert the lower stud [K] into the lower hinge hole [L].

10. Remount the junction gate [F] (1 snap ring).

11. Connect the link lever [M] to the sorter stapler using the stepped screw [N], then close the sorter stapler.



12. Connect the connectors [A] to the sockets on the rear of the copier.
13. Remount the rear cover [B] (4 screws).
14. Mount the proof tray [C] (1 screw) as shown.



15. Open the front door of the sorter stapler and swing the staple unit [A] up.
 16. Remove the green plastic clip [B] from the staple cartridge [C] and correct the position of the staple sheet [D] to make it flush with the other sheets in the cartridge.
 17. Install the cartridge in the stapler while holding the staple unit.
 18. Put the staple unit back in its original position, close the sorter stapler front door, and plug in the copier.
 19. Attach the staple position decal [E] to the ARDF as shown.
 20. Turn on the copier main switch and test the operation of the sorter stapler.
- NOTE:** The stapler will not be stapling for the first 10 or so copies until the first staple comes to the proper position from the cartridge.

14. SERVICE TABLES (MAIN BOARD)

14.1 DIP SWITCHES

DIP SW 100 - Combinations other than those below are used only at the factory.

1	2	3	4	5	Function	Remarks
0	0	0	0	0	Normal Machine Operation	
1	1	0	0	0	Sorter Free Run	#1
	0	1	0	0	Stapler Free Run	#2
	1	1	0	0	Sorter & Stapler Free Run	#3
0	0	0	0	1	Bin Sensor Adjustment (see section 15.6.2)	

To make a free run

1. Select the required free run mode with switches 2 and 3.
2. Set switch 1 to 1. The free run starts.
3. To end the free run, set switch 1 to 0, then set switches 2 and 3 back to 0.

Remarks

- #1 The roller drive motor turns on (alternately at low and high speed).
The sorting operation is repeated from the 1st bin to the 20th bin.

Operated components: • Turn gate solenoid

- Bin lift motor

- Jogger motor (for A4 sideways)

- #2 Stapling is repeated from the 1st bin to the 20th bin. (If there are staples in the staple unit, the stapling operation is skipped. If there is paper in the bins, the jogger motor does not turn on.)

Operated components: • Bin lift motor

- Grip motor

- Stapler motor

- Jogger motor (for A4 sideways)

- #3 #1 and #2 are repeated together alternately.

14.2 LED AND VARIABLE RESISTOR

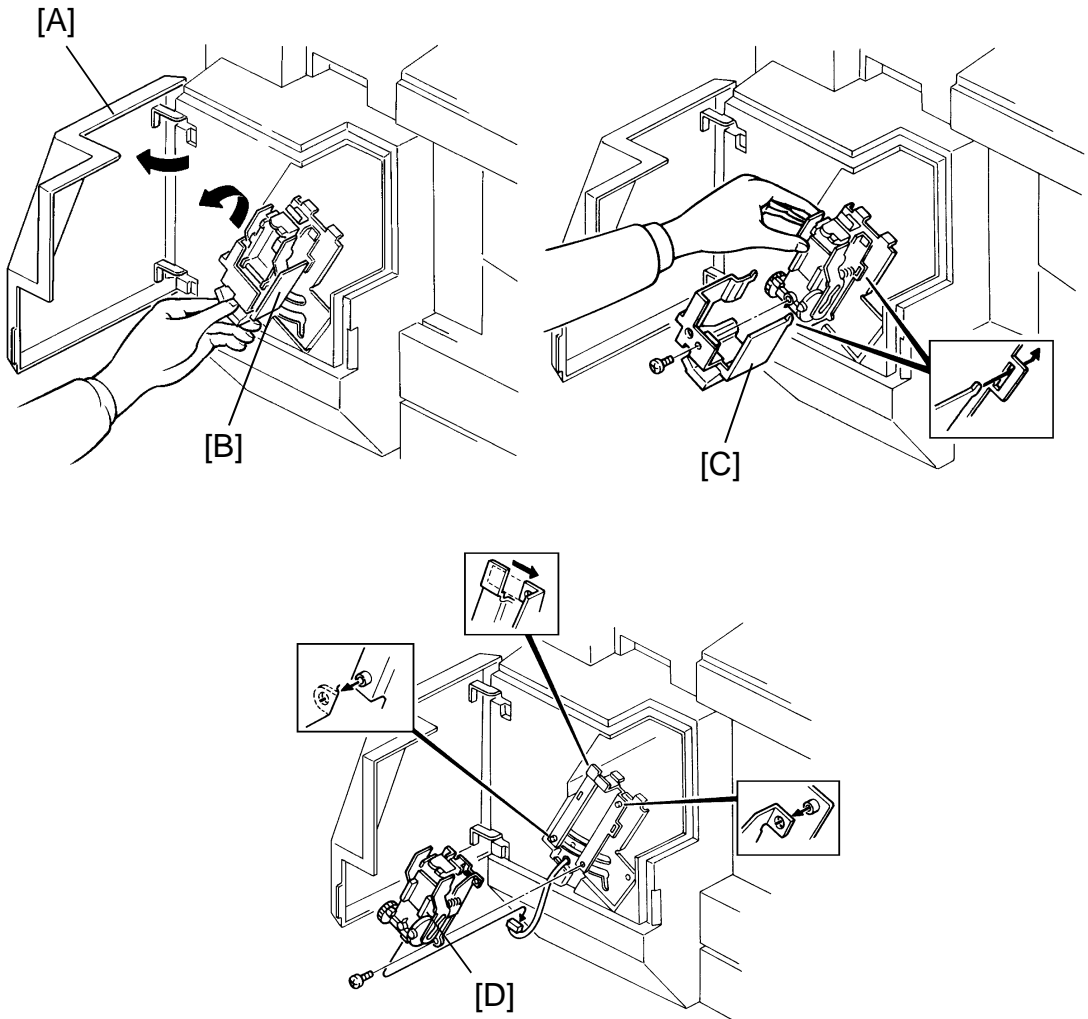
LED No.	VR No.	Function
100	100	Adjusts bin sensor sensitivity

14.3 TEST POINTS

Number	Function
TP100	GND
TP101	+24V
TP102	+5V

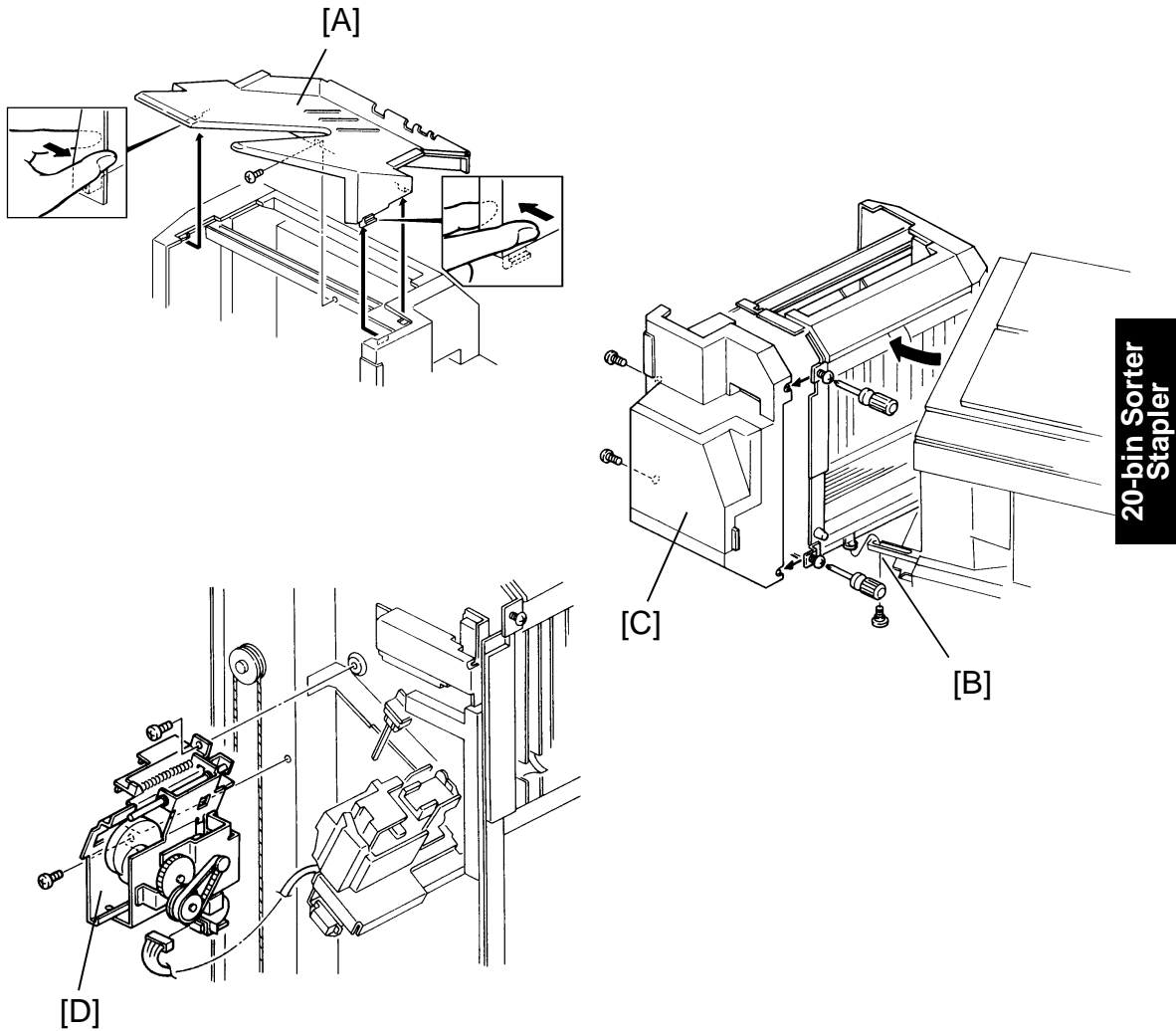
15. REPLACEMENT AND ADJUSTMENT

15.1 STAPLER REMOVAL



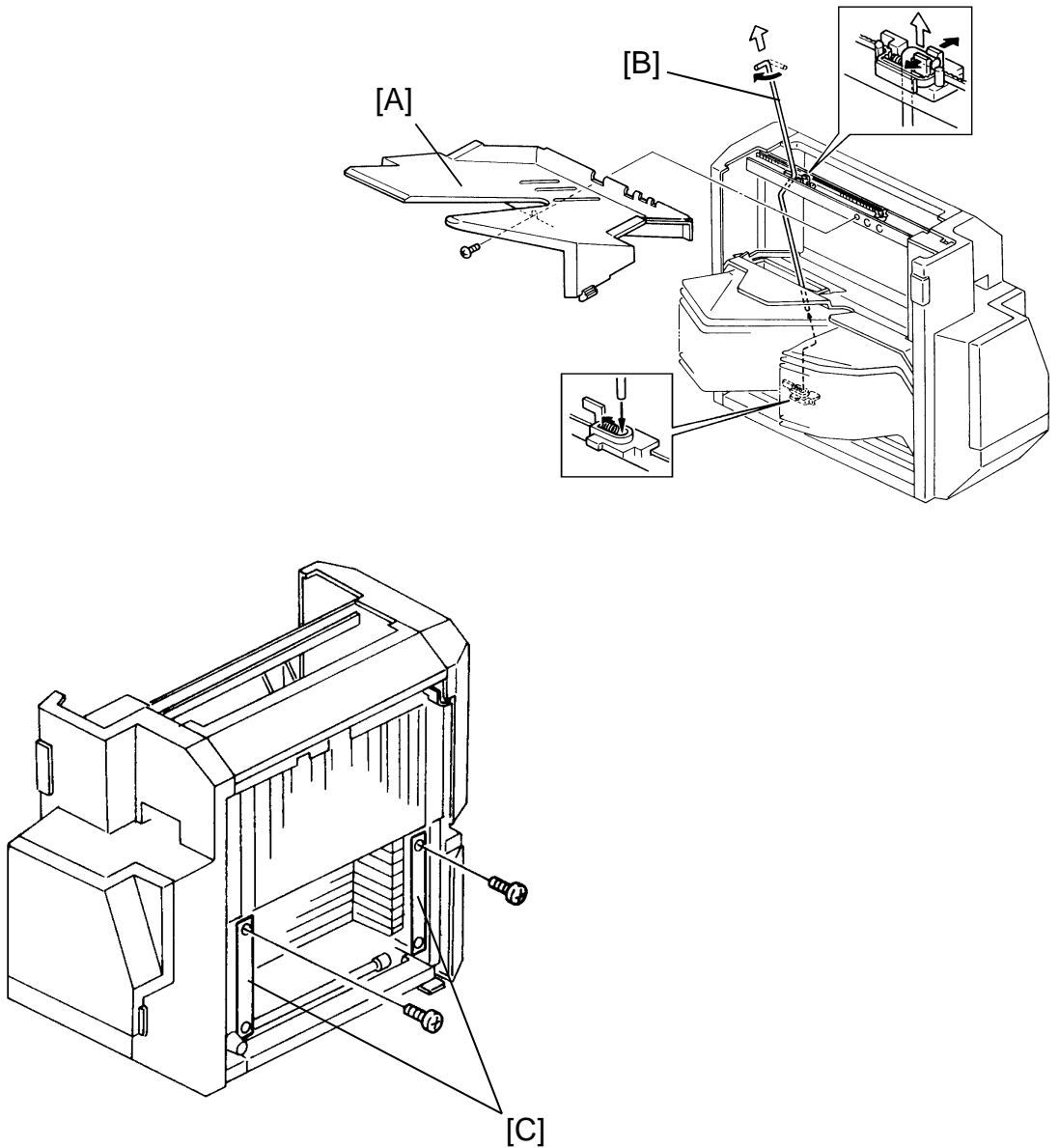
1. Open the front door [A] of the sorter stapler and swing the staple unit [B] up.
2. Remove the staple unit cover [C] (1 screw).
3. Remove the stapler [D] (1 screw and 1 connector).

15.2 GRIP ASSEMBLY REMOVAL

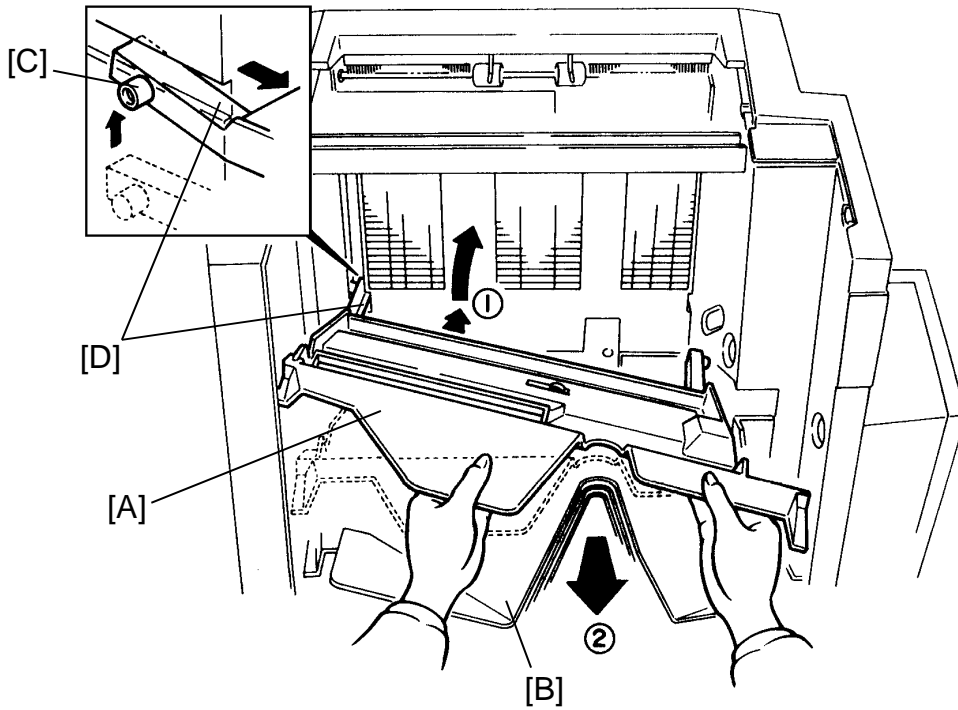


1. Remove the proof tray [A] (1 screw).
2. Swing out the sorter stapler and disconnect the link lever [B] (1 stepped screw).
3. Remove the front cover [C] (remove 2 screws and loosen 2 screws).
4. Remove the grip assembly [D] (2 screws and 1 connector).

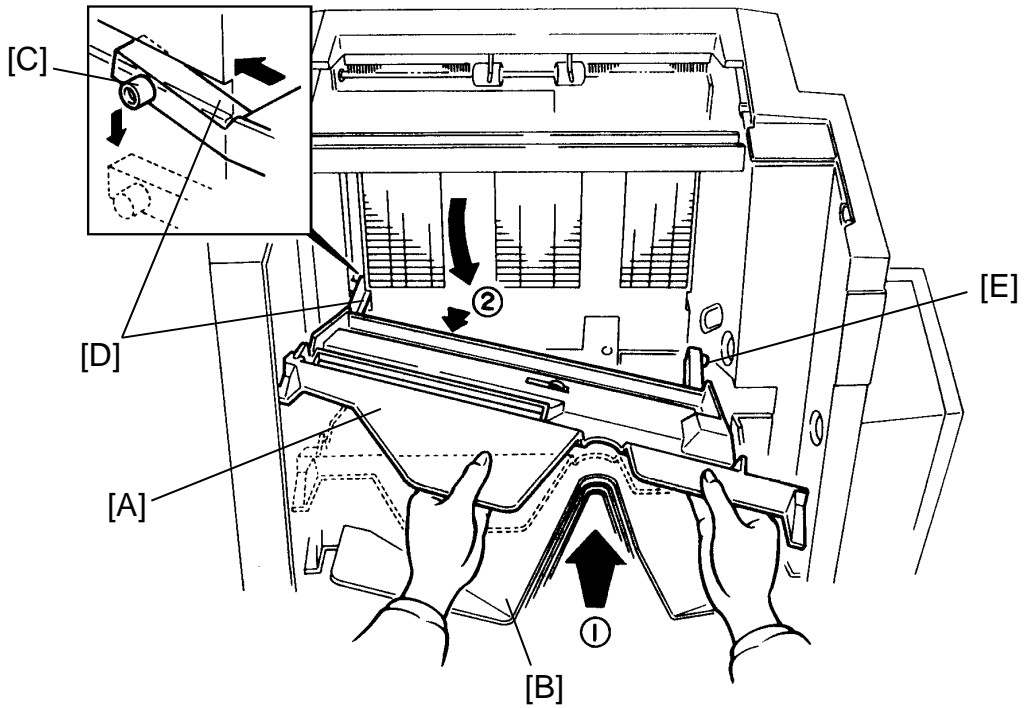
15.3 BIN REPLACEMENT



1. Remove the proof tray [A] (1 screw).
2. Remove the sorter stapler from the copier.
3. Remove the jogger bar [B] as shown.
4. Remove the upper securing screw of each bin link [C] (1 screw each).



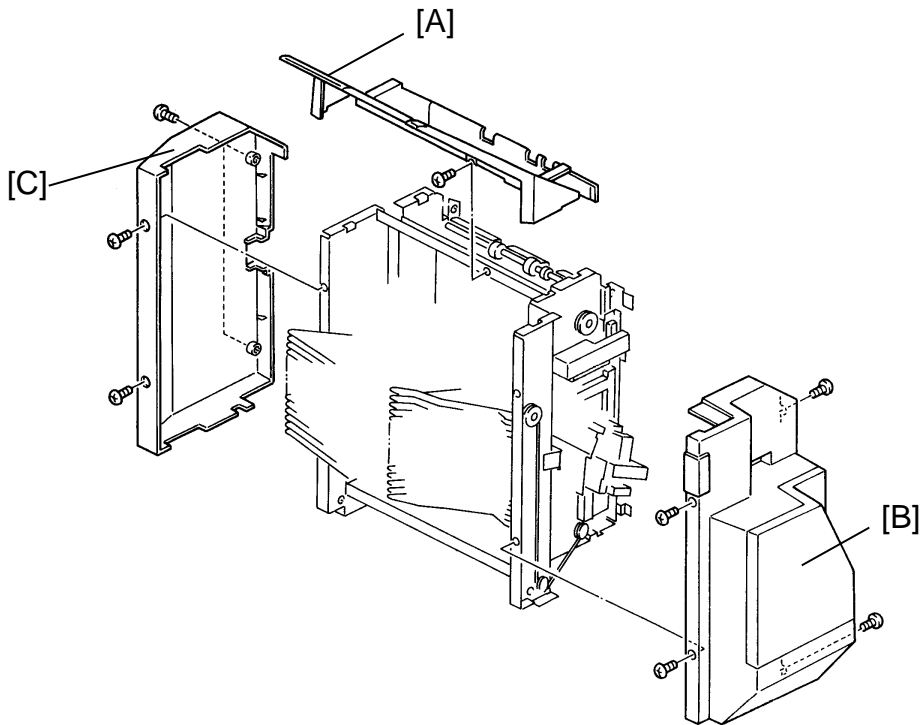
5. Remove the support bin [A] and the bins [B] one by one.
- (1) Hold the bin [A or B] with both hands.
 - (2) Push the bin forward until the wheels [C] reach the bend in the track.
 - (3) Push the left side of the bin forward and pull that side up.
 - (4) As you pull the left side up, the right wheel will leave its track.
 - (5) When the left wheel reaches the slot [D], pull the bin out.



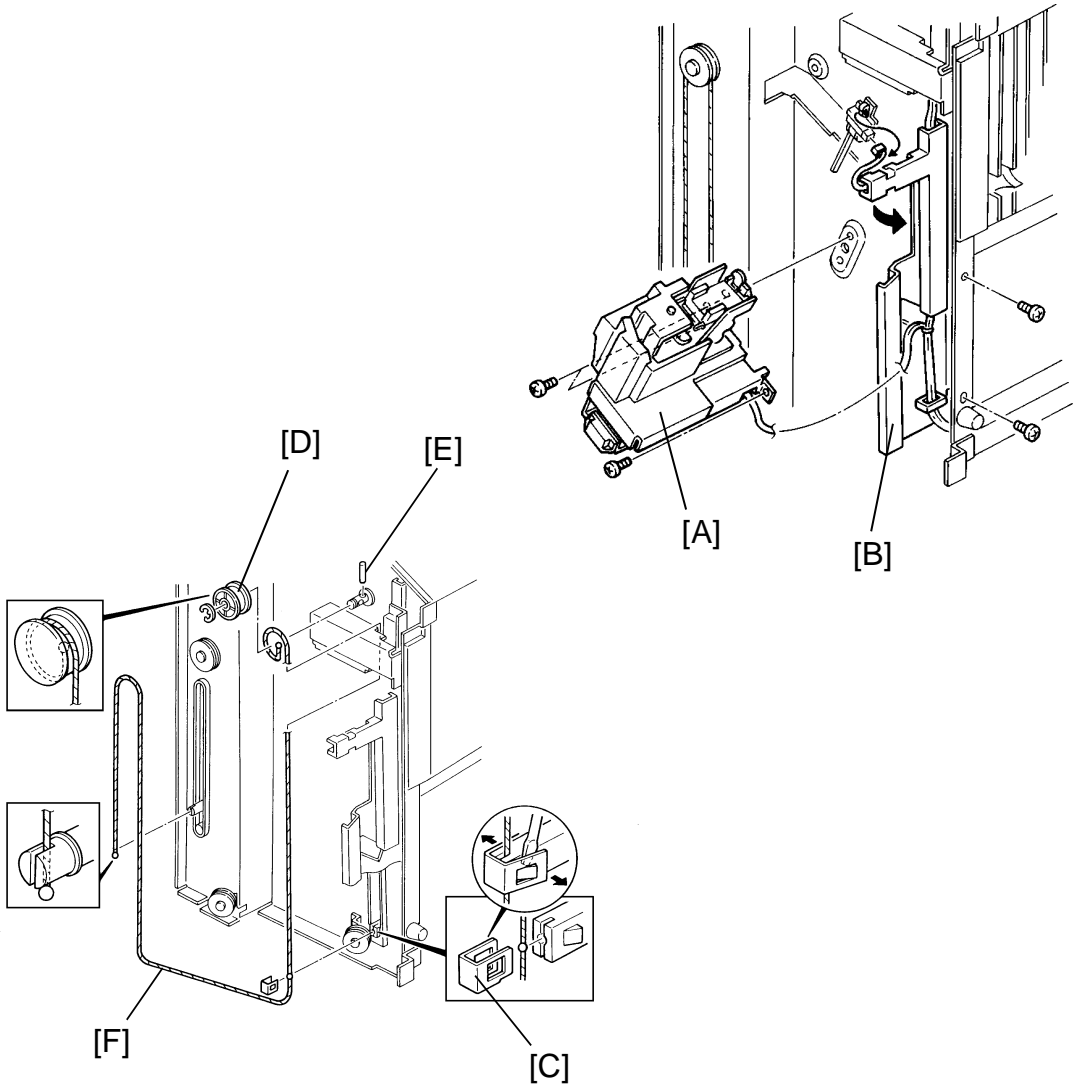
6. Install the support bin [A] and the bins [B] one by one.
 - (1) Hold the bin top side up with both hands.
 - (2) Tilt the bin so the left side is higher than the right side.
 - (3) Pass the left wheel [C] through the slot [D]. At the same time, pass the right wheel [E] just below the stapler opening.
 - (4) Set the left wheel into the left track, then push the right wheel into the right track.

15.4 BIN LIFT WIRE REPLACEMENT

15.4.1 Wire Removal

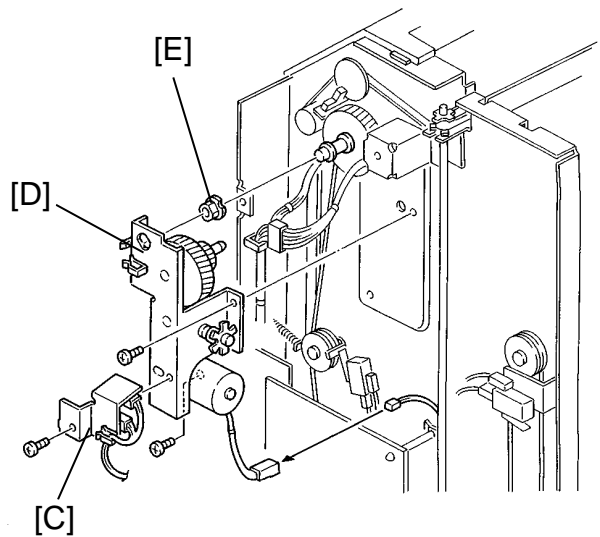
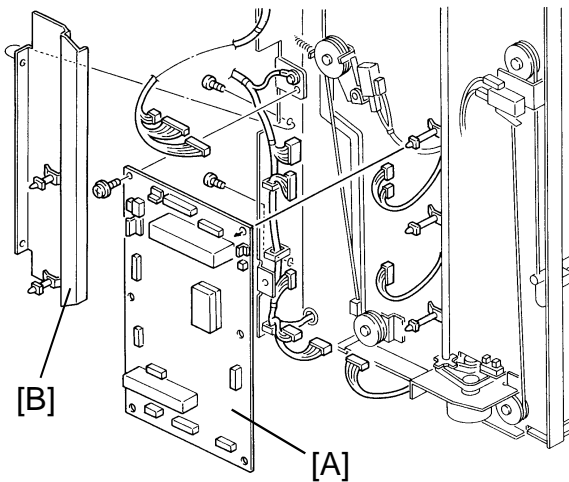


1. Remove the sorter stapler from the copier.
2. Remove the following parts:
 - Proof Tray [A] (1 screw).
 - Front Cover [B] (loosen 2 screws and remove 2 screws)
 - Rear Cover [C] (4 screws)
3. Turn the bin lift drive belt so that the bin lift gear/pulley component rotates counterclockwise. Continue this until the rear bin lift wire becomes loose enough to remove the wire.



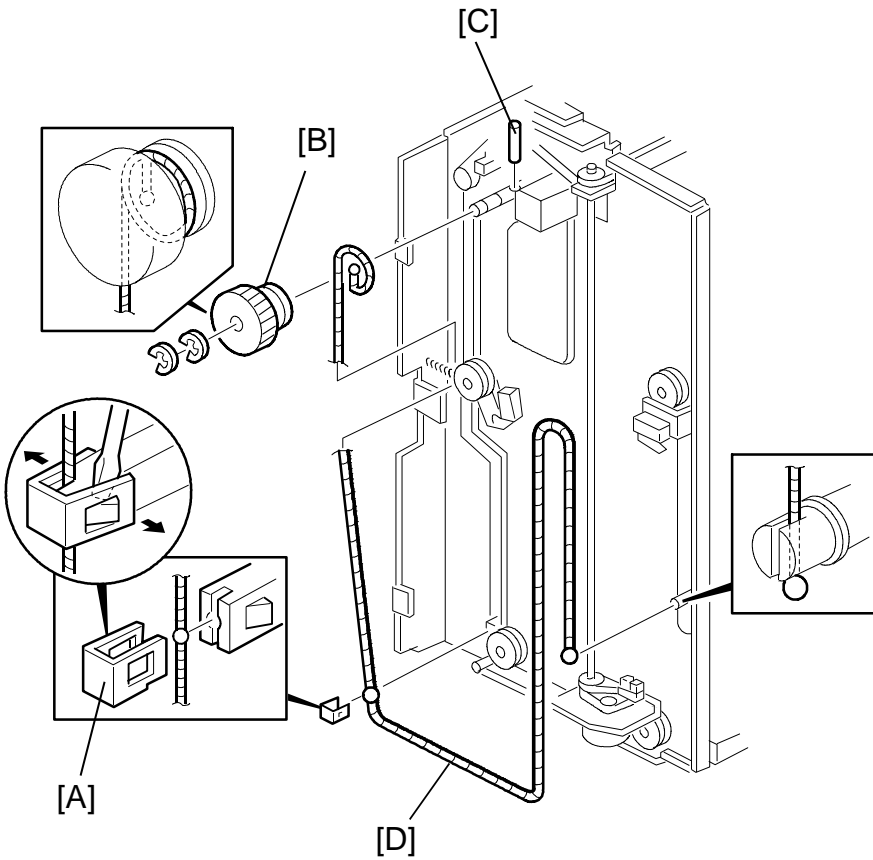
- Front side -

4. Remove the stapler unit [A] (3 screws and 1 connector [9P]).
5. Swing the bin shaft cover [B] as shown (2 screws and 1 connector).
6. Remove the bin support block stopper [C] as shown.
7. Remove the wire pulley [D] (1 E-ring).
NOTE: Be careful not to lose the pin [E].
8. Remove the bin lift wire [F].



- Rear side -

9. Remove the sorter power cord bracket (1 screw; see section 15.6.1).
10. Remove the main control board [A] (1 screw, 13 connectors, and 5 locking supports).
11. Remove the bin lift shaft cover [B] (2 screws).
12. Remove the timing sensor bracket [C] (1 screw).
13. Remove the bin drive bracket [D] (2 screws with spring washer, 1 connector, and 3 wire saddles).
14. Remove the bushing [E].



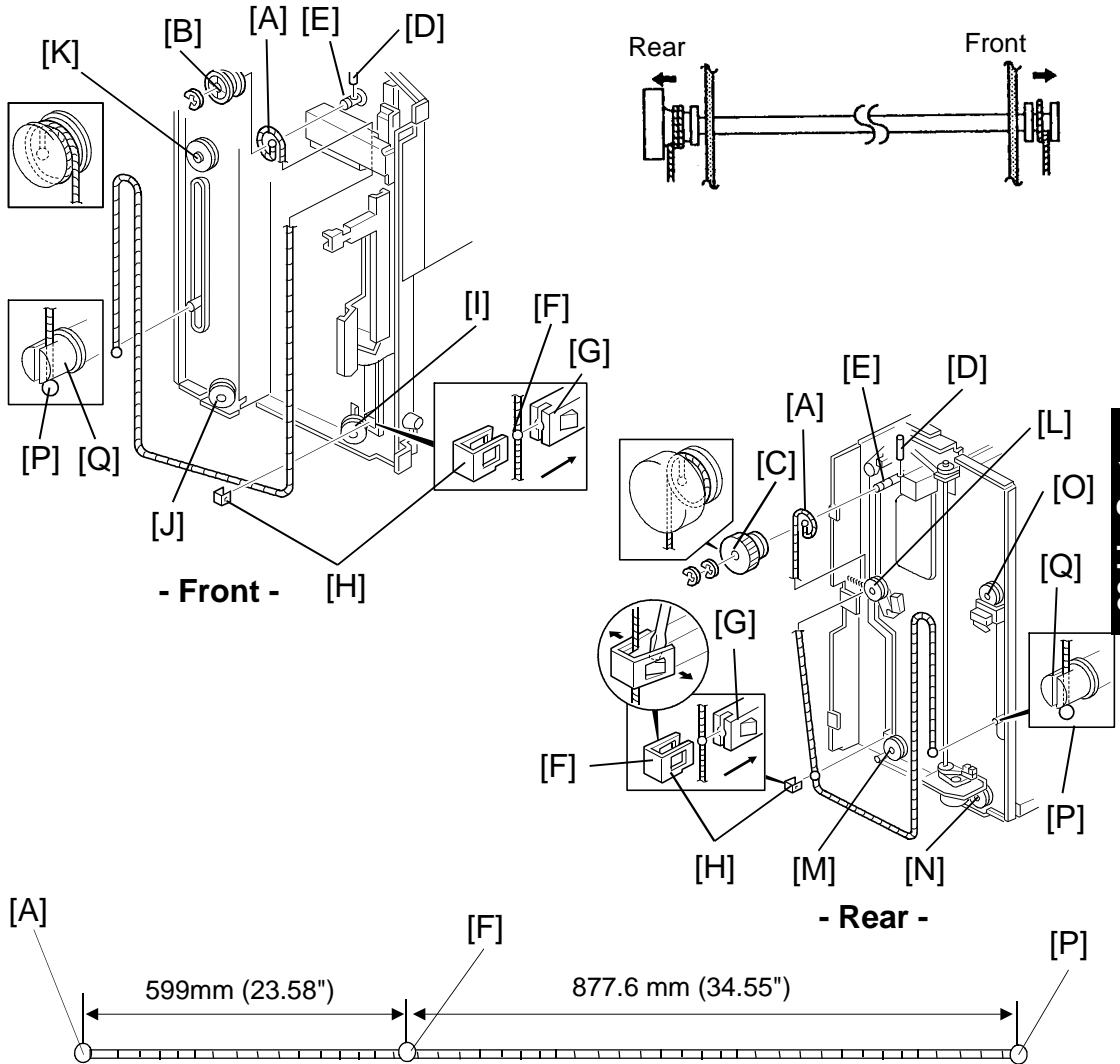
15. Remove the bin lift block stopper [A] as shown.

16. Remove the wire pulley/gear [B] (2 E-rings).

NOTE: Be careful not to lose the pin [C].

17. Remove the bin lift wire [D].

15.4.2 Wire Installation

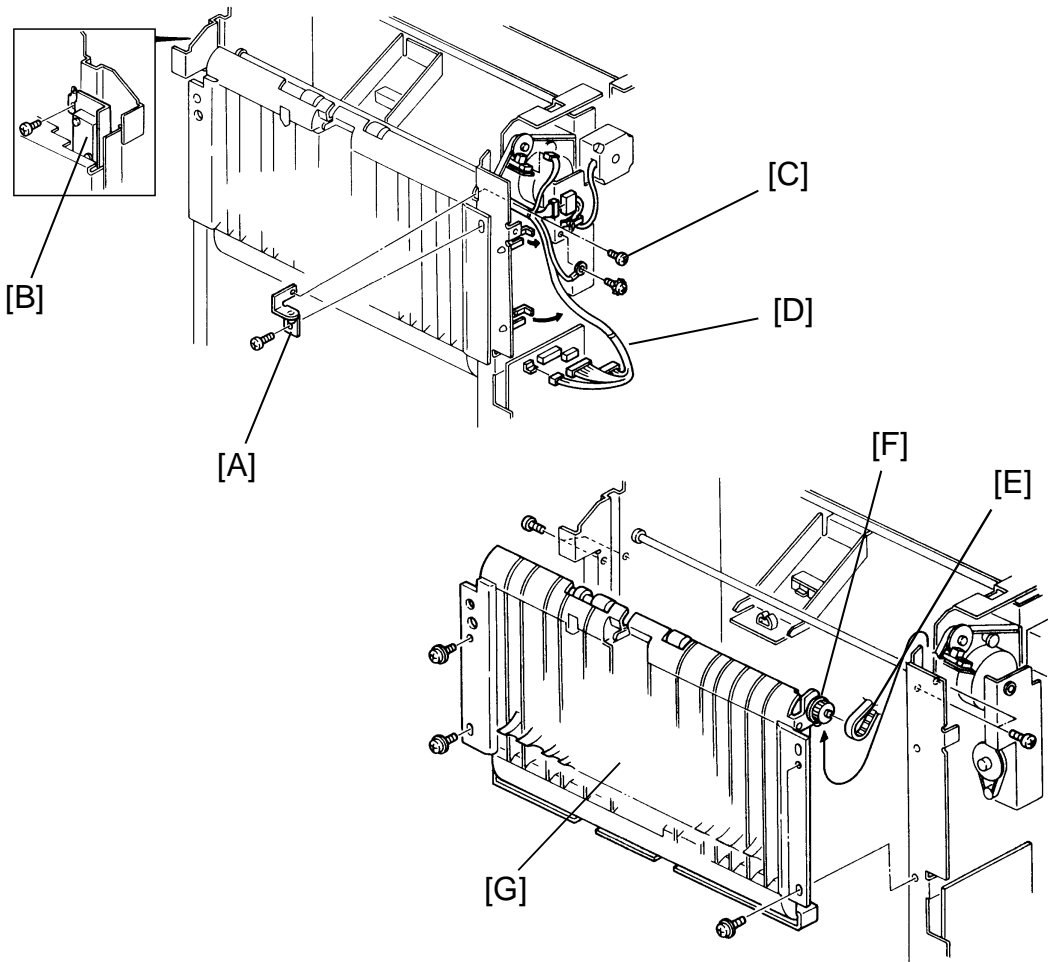


20-bin Sorter Stapler

1. Put the bead [A] at the end of the wire in the slot in the wire pulleys [B, C],
2. Insert the pin [D] into the bin drive shaft [E] and then push in the wire pulleys.
3. Wind the wire one and a half turns as shown and put the bead [F] in the slot in the bin support block [G].
4. Put the bin support block stopper [H] on the bin support block.
5. Run the wires over the pulleys [Front wire: I/J/K, Rear wire: L/M/N/O] and put the bead [P] in the slot in the bin lift shaft [Q].
6. Reassemble the sorter stapler.

NOTE: When installing the bin drive bracket, make sure that the bin lift wires are wound from the inner side to the outer side of the pulleys as shown.

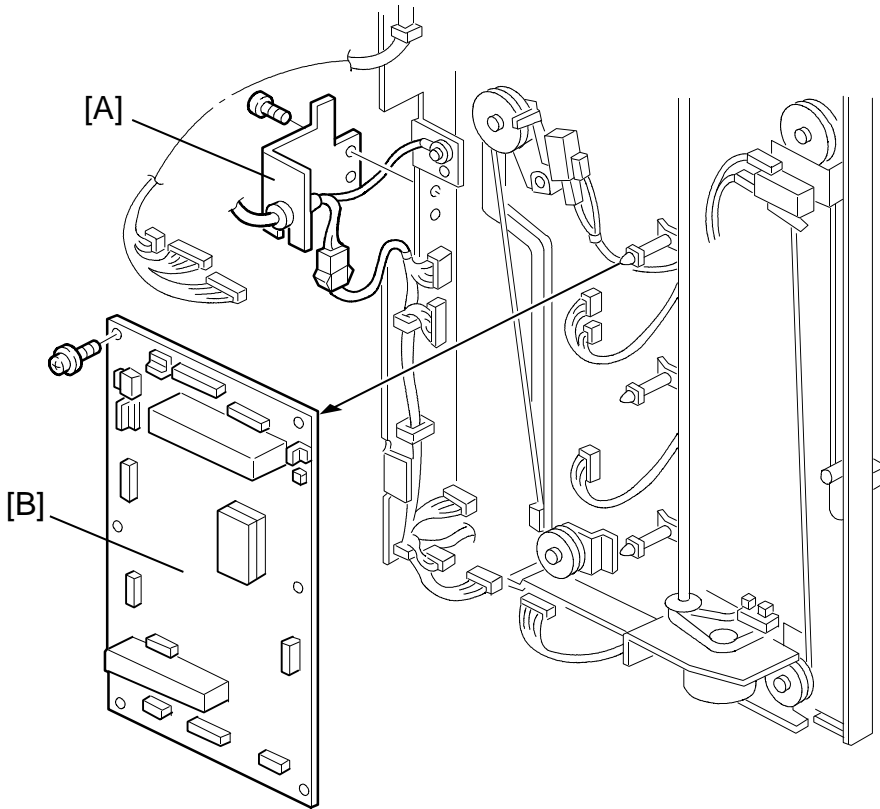
15.5 VERTICAL TRANSPORT UNIT REMOVAL



1. Remove the sorter stapler from the copier.
2. Remove the proof tray, the front cover, the rear cover, and the upper cover.
3. Remove the upper hinge [A] (2 screws) and the sorter stapler set switch bracket [B] (1 screw).
4. Remove the grounding screw [C] and disconnect the main harness [D] (5 connectors and 3 harness clamps).
5. Remove the timing belt [E] from the pulley [F].
6. Remove the vertical transport unit [G] (8 screws).

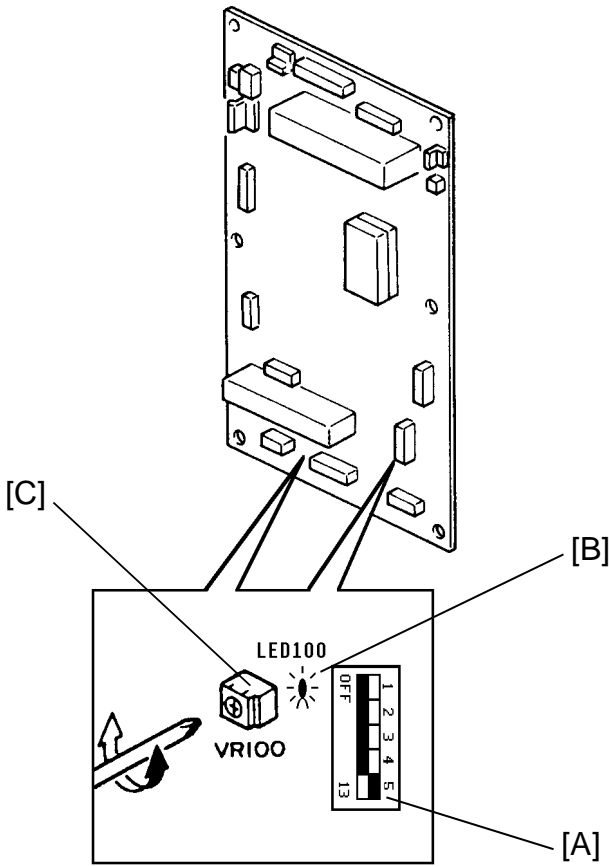
15.6 MAIN CONTROL BOARD REPLACEMENT AND ADJUSTMENT

15.6.1 Main Control Board Replacement



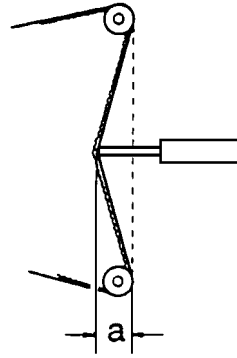
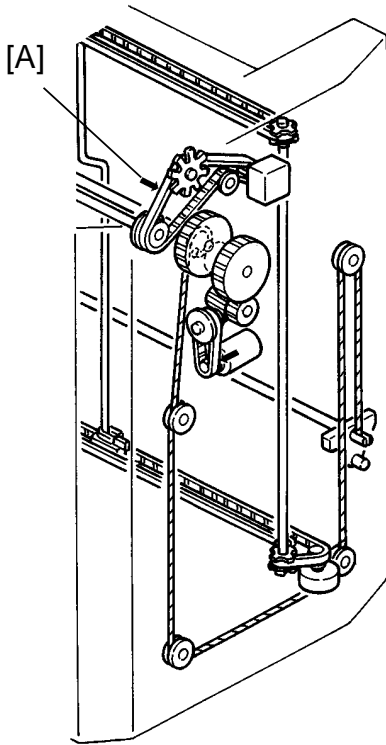
1. Remove the proof tray, the rear cover, and the power cord bracket [A].
2. Disconnect the main control board connectors and fiber cable.
3. Replace the main control board [B] and connect the connectors.
4. Turn on the copier main switch.
5. Adjust the bin sensor (see the next page).
6. Turn off the main switch.

15.6.2 Bin Sensor Adjustment

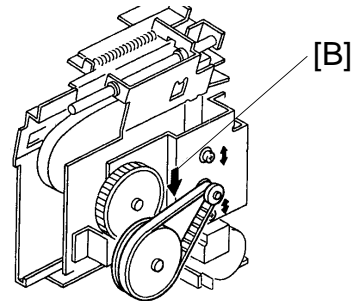


1. Turn on DIP SW100-5 [A]
2. If LED100 [B] is lit, turn VR100 [C] counterclockwise until LED100 turns off.
3. Turn VR100 clockwise until LED100 just turns on.
4. Turn off DIP SW100-5.

15.7 BELT TENSION ADJUSTMENT



Bending = a



20-bin Sorter
Stapler

1. Remove the required covers for the following belt tension adjustments as listed below:

Timing Belt [A]
(Roller Drive Motor) Proof Tray
Rear Cover

Timing Belt [B]
(Grip Motor) Proof Tray
Front Cover

2. Adjust the timing belt tension as follows:

Timing Belt	Bending	Tension
A	4 mm (0.16")	150±50 g
B	4 mm (0.16")	200±50 g





16. ELECTRICAL COMPONENT DEFECTS

16.1 SENSORS

Component (Symbol)	CN	Condition	Symptom	
			At main sw power-up	Ready condition
Bin Lift Timing -1 (S1)	170-8	Open (stays High)	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (721)" will be displayed.
		Shorted (stays Low)		
Bin Lift Timing -2 (S2)	170-5	Open (stays High)	-	-
		Shorted (stays Low)		
Jogger H.P. (S3)	170-2	Open (stays High)	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (722)" will be displayed.
		Shorted (stays Low)	The jogger motor keeps rotating until the Sorter Jam indicator starts blinking.	
Paper (S4)	140-5	Open (stays High)	-	Stapling does not occur even though there is a set of copies at the stapling position.
		Shorted (stays Low)	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode.

Component (Symbol)	CN	Condition	Symptom	
			At main sw power-up	Ready condition
Bin-LED (S5)	140-4	Open (stays Low)	The Sorter Jam indicator starts blinking when sort/stack or staple mode is selected.	
		Shorted (stays High)	-	-
Bin-Photo. Tr (S6)	155-3	Open (stays High)	-	Stapling does not occur even though copying has been completed in staple mode.
		Shorted (stays Low)	The Sorter Misfeed Location indicator starts blinking when sort/stack or staple mode is selected.	
Grip H.P. (S7)	115-2	Open (stays High)	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (723)" will be displayed.
		Shorted (stays Low)	The grip motor keeps rotating until the Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (723)" will be displayed.
Bin H.P. (S8)	130-11	Open (stays High)	-	-
		Shorted (stays Low)	The Sorter Jam indicator starts blinking.	-
Bin Exit (S9)	150-4	Open (stays High)	-	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode.
		Shorted (stays Low)	The Sorter Jam indicator starts blinking.	

20-bin Sorter Stapler

Component (Symbol)	CN	Condition	Symptom	
			At main sw power-up	Ready condition
Proof Tray Exit (S10)  $\geq 4.0\text{ V}$  $\leq 1.0\text{ V}$	150-7	Open (stays High)	–	The Sorter Jam indicator starts blinking when copies are made in normal mode.
		Shorted (stays Low)	The Sorter Jam indicator starts blinking.	
Roller Drive Timing (S11)  $\geq 4.0\text{ V}$  $\leq 1.0\text{ V}$	150-11	Open (stays High)	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking or " SC code (720) " is displayed when copies are made.
		Shorted (stays Low)		

16.2 SWITCHES

Component (Symbol)	CN No.	Condition	Symptom	
			At main sw power-up	Ready condition
Upper Limit (SW1)	165-1	Open	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (721)" will be displayed.
		Shorted	–	–
Wire Tension (SW2)	165-4	Open	The Sorter Jam indicator starts blinking.	The Sorter Jam indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (721)" will be displayed.
		Shorted	–	–
Front Door (SW3)	100-3	Open	"C-5" is displayed even if the front door is closed.	
		Shorted	"C-5" is not displayed even if the front door is opened.	
Sorter Stapler Set (SW4)	100-3	Open	"C-5" is displayed even if the sorter stapler is closed.	
		Shorted	"C-5" is not displayed even if the sorter stapler is opened.	
Staple End (SW5)	130-9	Open	The Add Staples indicator does not light even though the staple cartridge is empty.	
		Shorted	The Add Staples indicator lights even though the staple cartridge is not empty.	
Staple Guide (SW6)	130-8	Open	The Add Staples indicator does not light even though the staple guide is opened.	
		Shorted	The Add Staples indicator lights even though the staple guide is closed.	
Staple H.P. (SW7)	130-6	Open	The Sorter Jam indicator starts blinking or "SC code (724)" is displayed when copies are made in staple mode.	
		Shorted		

20-bin Sorter Stapler

16.3 FUSES

Component (Symbol)	Condition	Symptom
FU100 (Main Control Board)	Open	The Sorter Jam indicator starts blinking when copies are made in staple mode. After the sorter stapler or front door is opened/closed, "SC code (724)" will be displayed.

20) BIN SORTER STAPLER(A554) POINT TO POINT DIAGRAM

