

**500-SHEET FINISHER**  
**(Machine Code: B458)**

# 1. REPLACEMENT AND ADJUSTMENT

## ⚠ CAUTION

Turn off the main power switch and unplug the machine before beginning any of the procedures in this section.

**NOTE:** This manual uses the following symbols.

👁 : See or Refer to

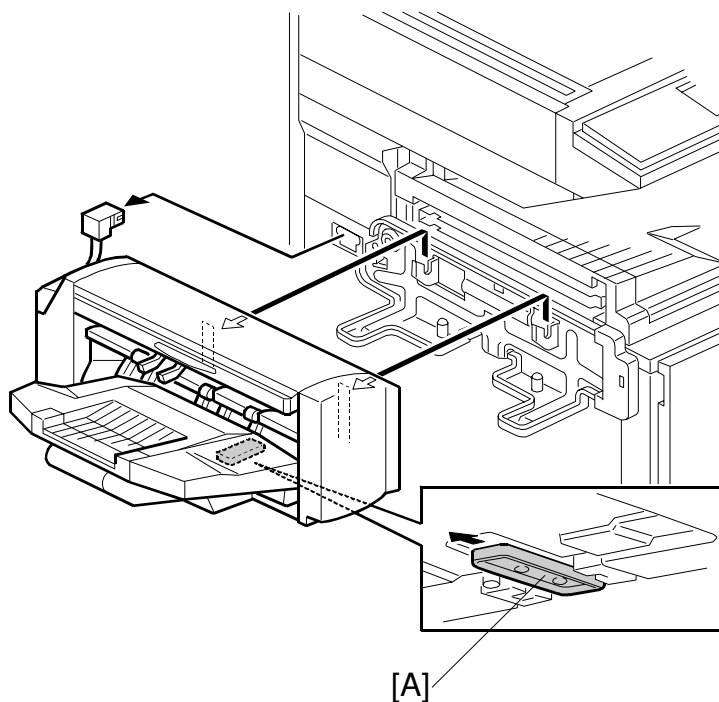
🔩 : Screws

🔌 : Connector

🔗 : Clip ring

Ⓒ : E-ring

## 1.1 EXTERIOR

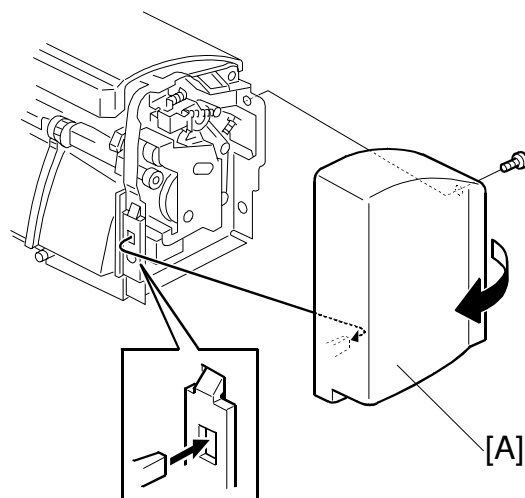


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Pull out the lever [A] under the finisher while lifting the finisher off the machine.

### **Front Cover**

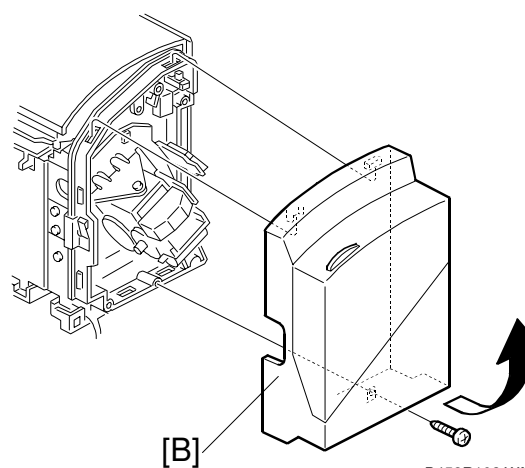
[A]: : Front cover (🔩 x 1)



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### **Rear Cover**

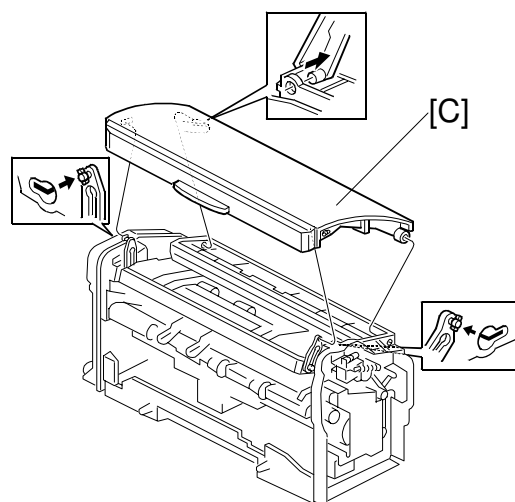
[B]: Rear cover (🔩 x 1)



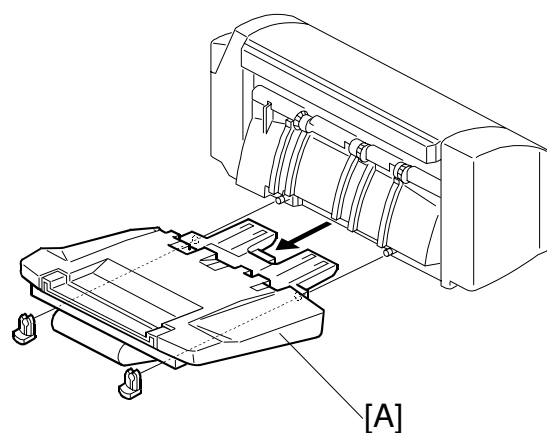
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### **Top Cover**

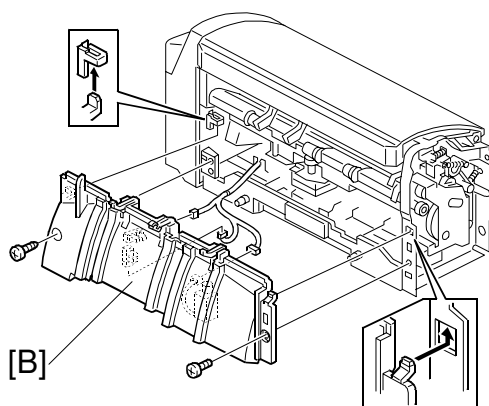
[C]: Top cover (2 links)



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**Front Lower Guide**

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[A]: Output tray (☞ x 2)

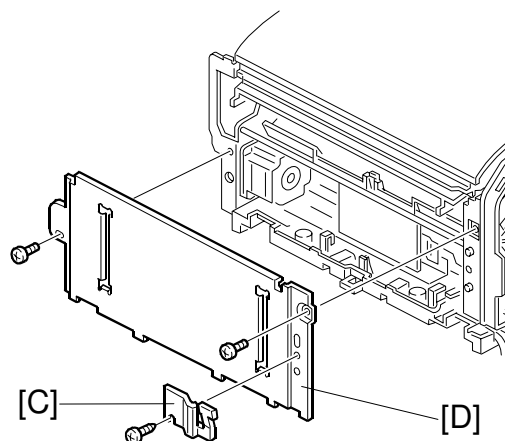
[B]: Front lower guide (☞ x 2)

**NOTE:** 1) When re-attaching the lower guide, be sure that it is not in contact with the exit lower guide and that the exit lower guide moves smoothly.  
2) Make sure that the blue and black cables are in the correct position, as engraved on the inside of the front lower guide.

**Right Cover**

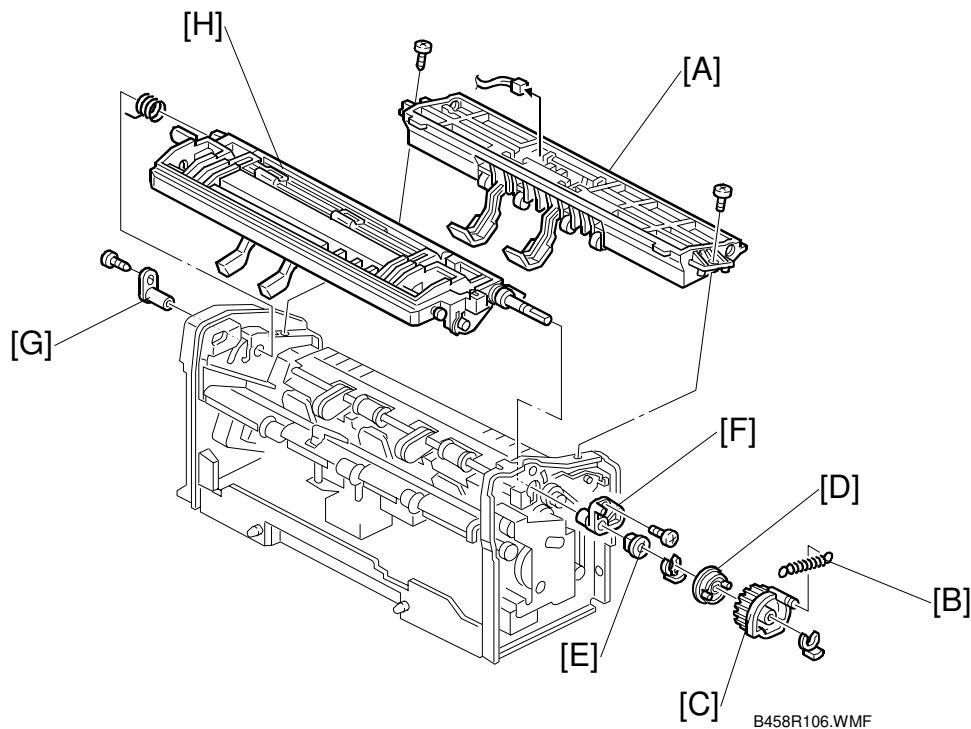
[C]: Grounding plate (☞ x 1)

[D]: Right cover (☞ x 2)



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## 1.2 ENTRANCE UPPER GUIDE/PAPER EXIT UNIT



- Front, rear, and top covers and front lower guide (☛ 1.1 Exterior)

[A]: Entrance upper guide (🔩 x 2, 📏 x 1)

[B]: Paddle gear spring

[C]: Paddle gear (📏 x 1)

[D]: Paddle gear holder

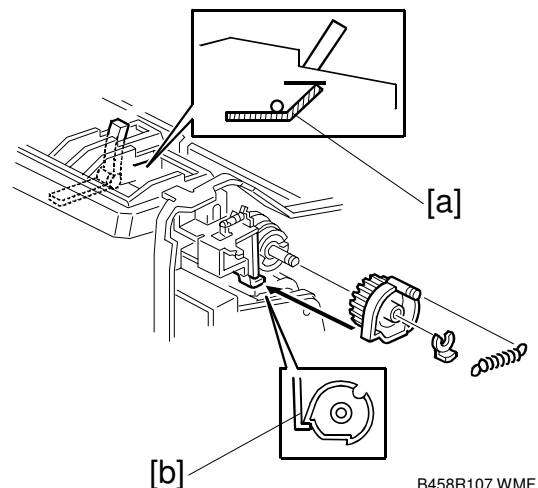
[E]: Bushing (📏 x 1)

[F]: Paper exit unit holder (🔩 x 1)

[G]: Rear paper exit unit holder (🔩 x 1)

[H]: Exit unit

**NOTE:** Keep the paper exit unit stays in the upper position. Rotate the paddle roller into the position shown in the illustration [a]. Then, insert the paddle gear, making sure that the pawl on the gear's outer frame is resting on the clutch link [b].

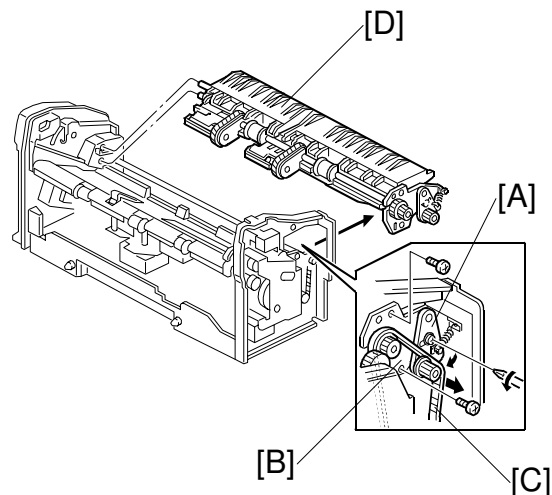


### 1.3 ENTRANCE LOWER GUIDE

- Entrance upper guide (☛ 1.2 Entrance upper guide/Exit unit)
- Exit unit (☛ 1.2 Entrance upper guide/Exit unit)

[A]: Release tension bracket (🔩 x 1)  
 [B]: Reverse roller gear bracket (🔩 x 2)  
 [C]: Timing belt  
 [D]: Entrance lower guide

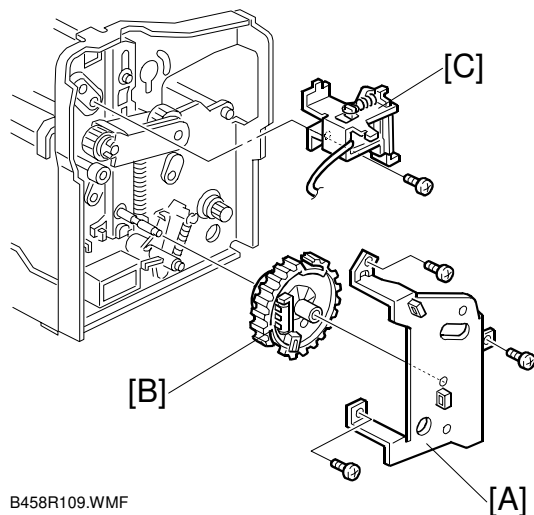
**NOTE:** When re-attaching the tension bracket, rotate the main motor counterclockwise to tighten the timing belt.



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### 1.4 PAPER EXIT UNIT GEAR/PADDLE ROLLER SOLENOID

- Front cover (☛ 1.1 Exterior)
- [A]: Gear bracket (🔩 x 3)  
 [B]: Paper exit unit gear  
 [C]: Paddle roller solenoid (🔩 x 1)

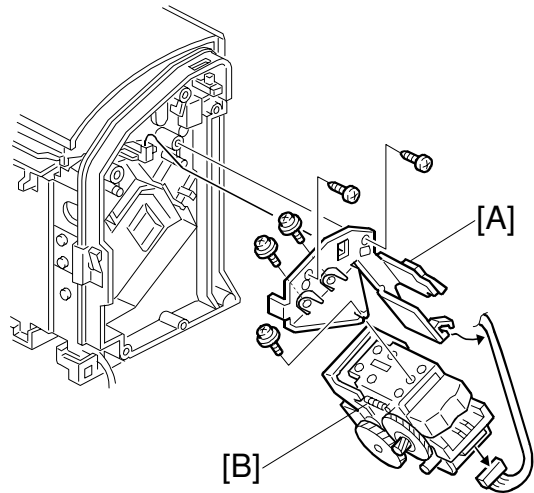


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Peripherals

## 1.5 STAPLER UNIT

- Rear cover (☛ 1.1 Exterior)
- [A]: Stapler unit bracket (⚙ x 2, 📌 x 1)
- [B]: Stapler unit (⚙ x 3)

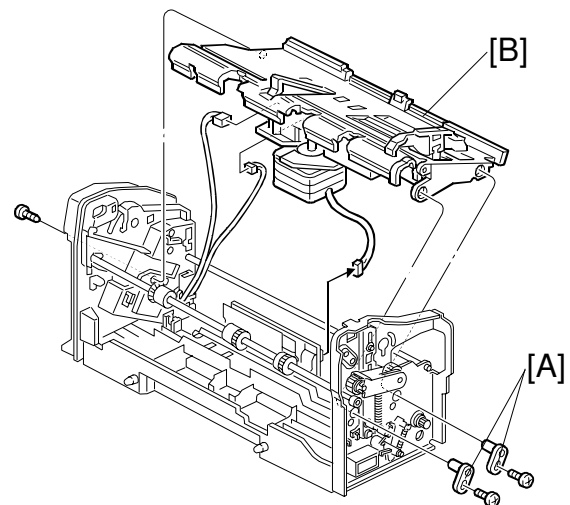


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## 1.6 JOGGER TRAY UNIT

- Entrance upper guide and paper exit unit (☛ 1.2 Entrance upper guide / paper exit unit)
- Entrance lower guide (☛ 1.2 Entrance lower guide)
- Paper exit unit gear and Paddle roller solenoid (☛ 1.4 Paper exit unit gear/ Paddle roller solenoid)
- Stapler unit (☛ 1.5 Stapler unit)
- [A]: Jogger tray unit holders (⚙ x 2)
- [B]: Jogger tray unit (⚙ x 1, 📌 x 3)

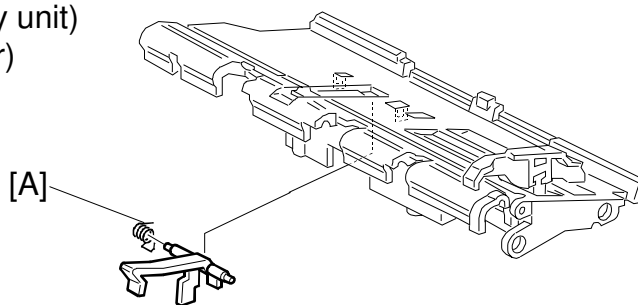
**NOTE:** Be sure to connect the black cable to the paper exit sensor and the blue one to the jogger home position sensor.



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## 1.7 PAPER EXIT SENSOR FEELER

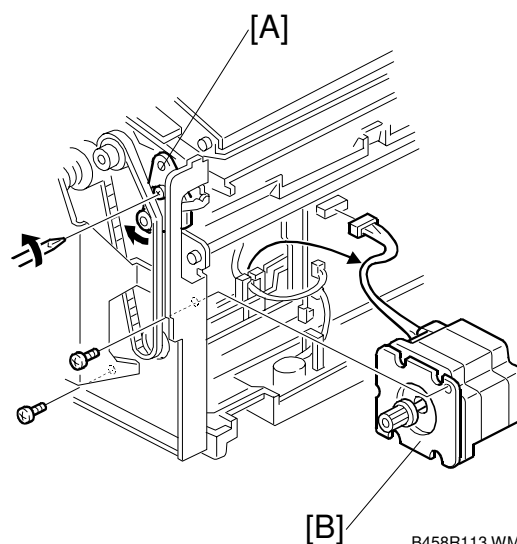
- Jogger tray unit (☛ 1.6 Jogger tray unit)
  - Jogger motor (☛ 1.9 Jogger motor)
- [A]: Paper exit sensor feeler



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## 1.8 MAIN MOTOR

- Right cover (☛ 1.1 Exterior)
- [A]: Release tension bracket (☛ x 1)  
 [B]: Main motor (☛ x 2, ☛ x 1)

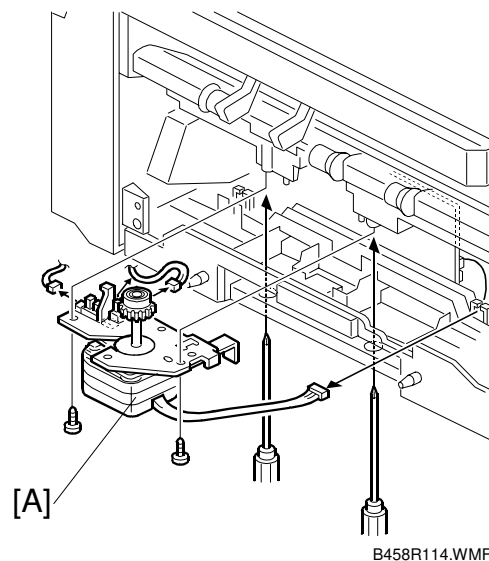


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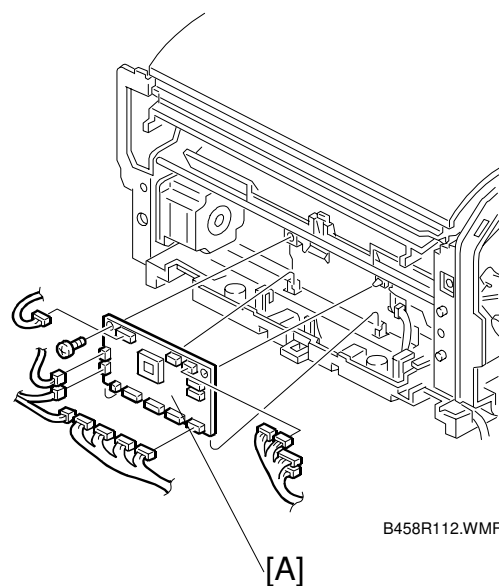
## 1.9 JOGGER MOTOR

- Front lower guide (☛ 1.1 Exterior)
- [A]: Jogger motor (⚙ x 2, 📡 x 3)

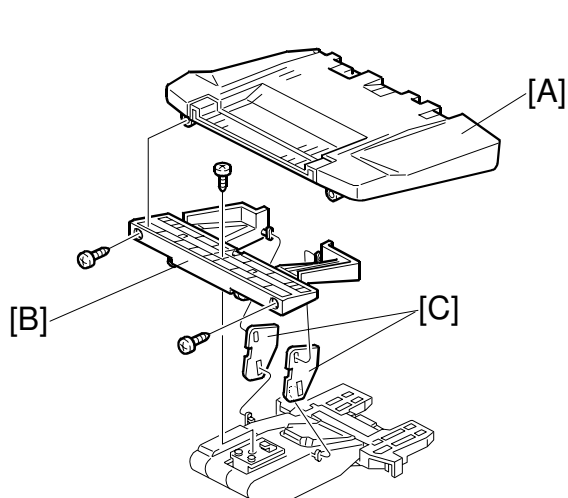


## 1.10 CONTROL BOARD

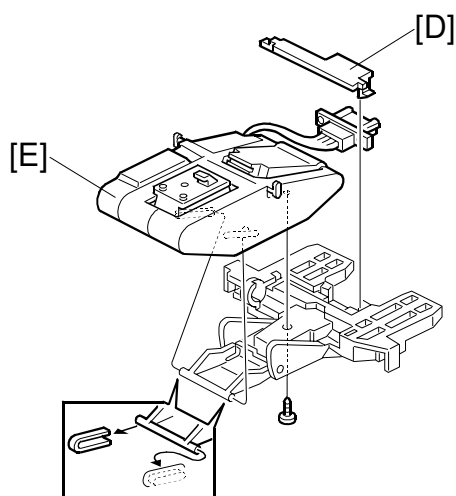
- Front lower guide (☛ 1.1 Exterior)
- [A]: Control board (⚙ x 1, 📡 x 12)



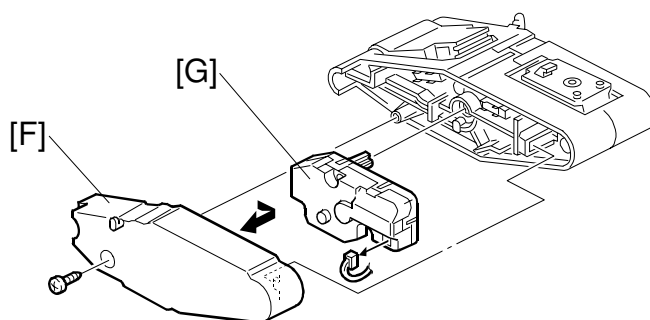
## 1.11 OUTPUT TRAY UNIT



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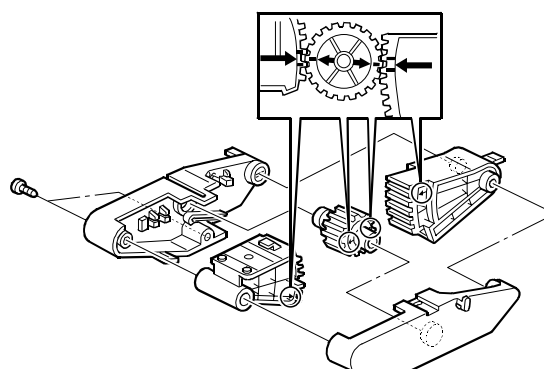
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- [A]: Output tray cover (x 2)
- [B]: Tray holder (x 1)
- [C]: Links
- [D]: Connector cover
- [E]: Output tray motor link unit (x 1)
- [F]: Rear cover (x 1)
- [G]: Output tray motor (x 1)

**NOTE:** When re-attaching the motor link unit, the arrows on each of the gears need to face each other as shown in the illustration.



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Peripherals

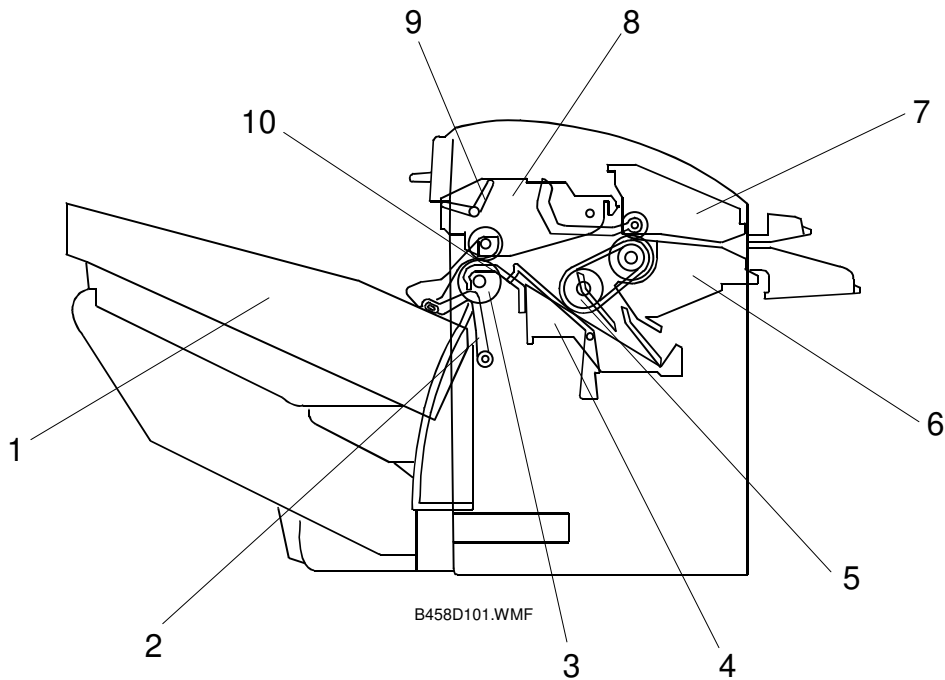
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## 2. DETAILED DESCRIPTIONS

### 2.1 OVERALL MACHINE INFORMATION

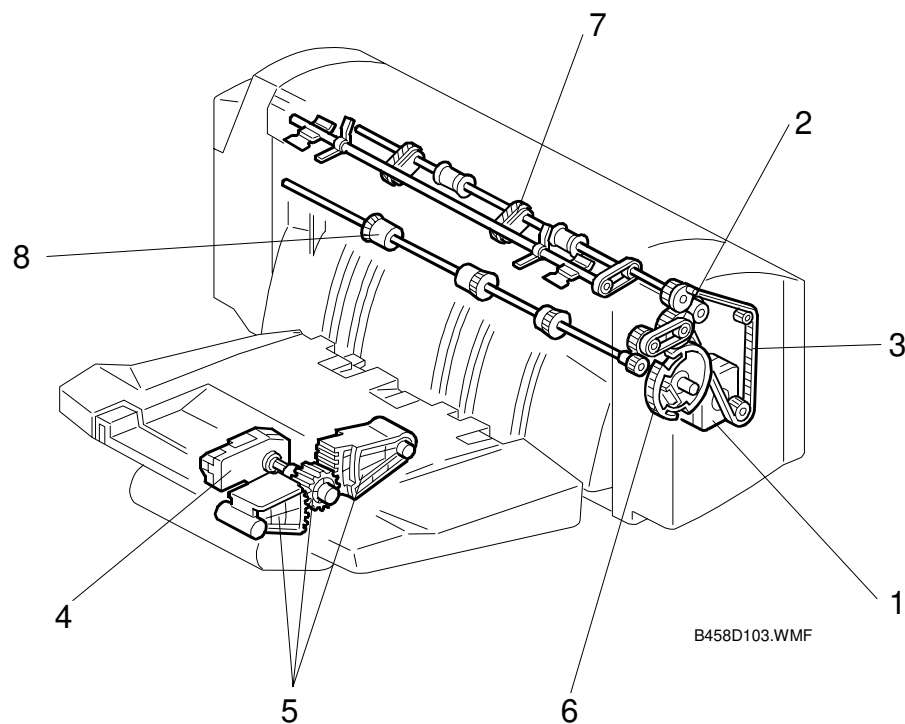
#### 2.1.1 COMPONENT LAYOUT

##### *Mechanical Component Layout*



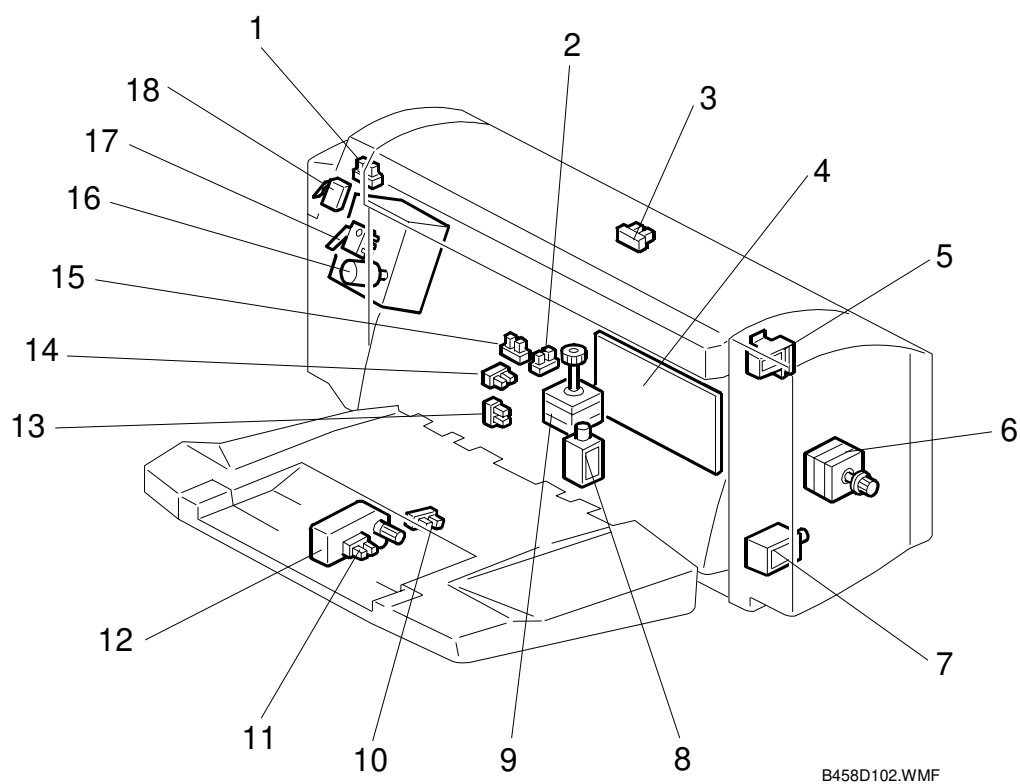
- |                                 |                         |
|---------------------------------|-------------------------|
| 1. Output tray                  | 6. Lower entrance guide |
| 2. Stack height detection lever | 7. Upper entrance guide |
| 3. Paper exit roller            | 8. Paper exit unit      |
| 4. Jogger tray                  | 9. Paddle roller        |
| 5. Reverse roller               | 10. Lower exit guide    |

## ***Drive Layout***



- |                            |                               |
|----------------------------|-------------------------------|
| 1. Main motor              | 5. Output tray link gears     |
| 2. Exit roller timing belt | 6. Paper exit unit drive gear |
| 3. Main motor timing belt  | 7. Reverse roller             |
| 4. Output tray motor       | 8. Paper exit roller          |

## 2.1.2 ELECTRICAL COMPONENT LAYOUT



See the next page for the component description table.

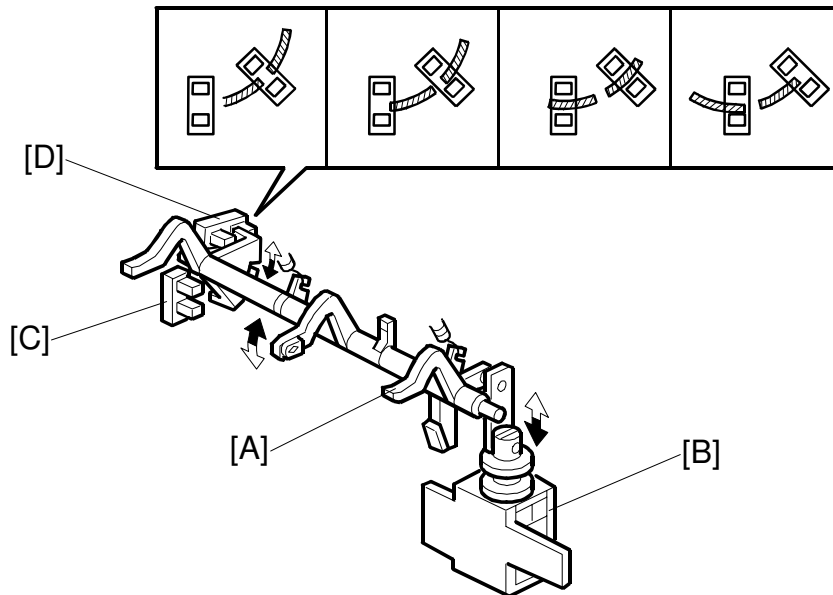
### 2.1.3 ELECTRICAL COMPONENT DESCRIPTIONS

Symbols	Name	Function	Index No.
<b>Motors</b>			
M1	Main	Drives all the rollers	6
M2	Jogger	Drives the jogger fence	9
M3	Output Tray	Drives the tray up and down	12
M4	Stapler	Drives the stapler	16
<b>Sensors</b>			
S1	Entrance	Detects paper at the entrance	3
S2	Exit	Detects paper at the exit	15
S3	Stack height	Detects the top of the paper stack	13
S4	Lever	Detects the position of stack height lever	14
S5	Jogger home position	Detects the position of the jogger fence	2
S6	Top cover	Detects if the top cover is open	1
S7	Tray upper limit	Detects when the tray is lifted to the upper limit	11
S8	Stack near-limit	Detects when the tray is at its lowest limit (almost full)	10
<b>Solenoids</b>			
SOL1	Exit unit gear	Moves the paper exit unit up and down	7
SOL2	Paddle roller	Switches paddle roller rotation on and off.	5
SOL3	Stack height lever	Moves the stack height lever into contact with the top of the stack.	8
<b>Switches</b>			
SW1	Paper exit unit	Switches DC for the stapler unit on and off.	18
SW2	Staple unit cover	Cuts DC when staple unit cover is open.	17
<b>PCBs</b>			
PCB1	Main control	Controls all finisher functions	4

## 2.2 DETAILED SECTION DESCRIPTIONS

### 2.2.1 OUTPUT TRAY MECHANISM

#### *Stack Height Detection*



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Stack height detection lever [A]: Driven by stack height lever solenoid [B].

Two sensors detect the height of the stack in the output tray: the stack height [C] and lever [D] sensors.

Stack height sensor	Lever sensor	Status
Off	Off	The stack height is below the target. The output tray is then lifted to the target position.
Off	On	Target stack height position
On	On	The stack height is above the target. The output tray is then lowered to the target position.
On	Off	The stack height detection lever is at home position.

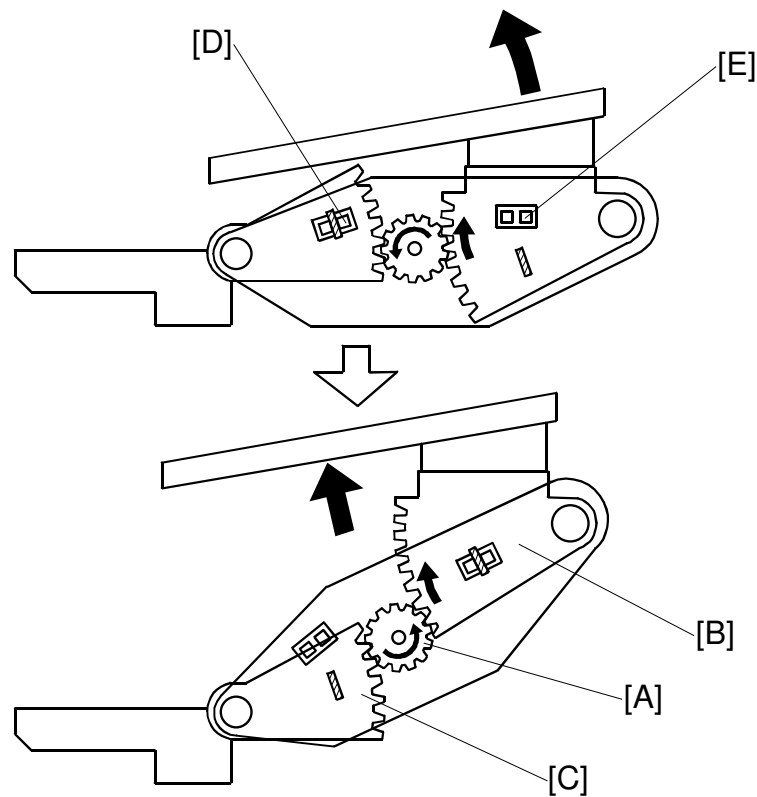
Off: Actuator not in sensor

At the start of a print job, the solenoid turns off. The stack height detection lever comes down, to detect the current stack level.

When a sheet of paper is being fed out, the solenoid turns on and the lever goes back up to home position (inside the unit).

After paper has been fed out, the solenoid turns on again, and the lever detects the level of the stack.

### ***Output Tray Up/Down Mechanism***



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#### ***Overview***

The output tray motor gear [A] lifts/lowers the tray if the stack height is not at the target position.

Gears [B] and [C] keep the angle of the tray constant at any tray position.

#### ***Output Tray Downward Movement***

The top of the paper stack is checked after every page (or set of pages) has been fed out. If the top of the stack is higher than the target level, the output tray motor moves the tray down.

When the stack near-limit sensor [D] detects the actuator on gear [C], a stack near-limit signal is transferred to the main frame. The tray cannot move any lower. The next time the top of the stack height is above the target level, printing stops.

#### ***Output Tray Upward Movement***

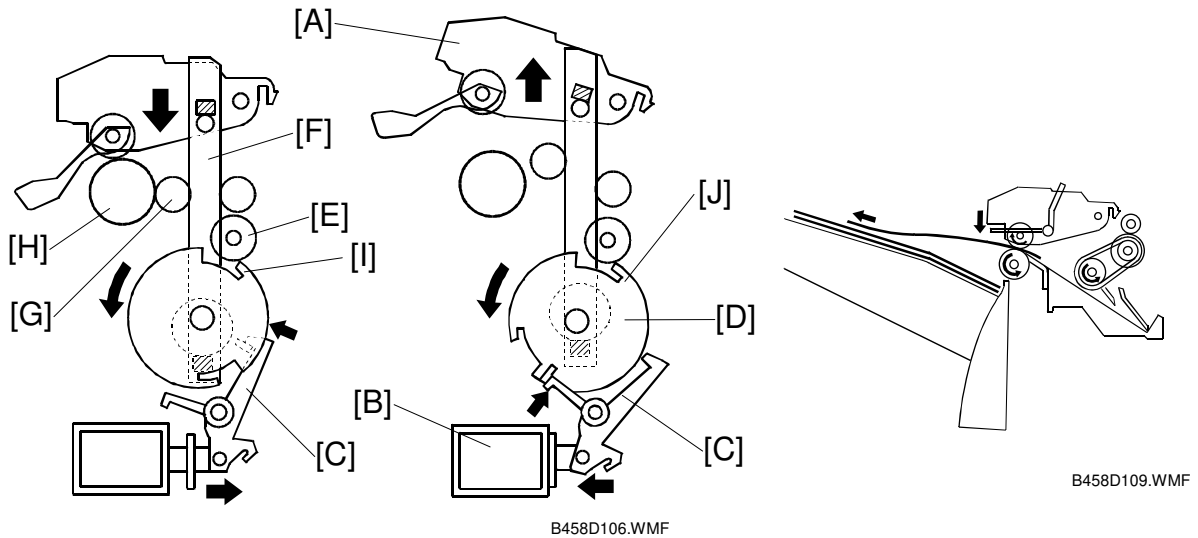
If paper is removed from the stack, the top of the stack will be lower than the target level, and the output tray motor moves the tray up.

When the tray upper limit sensor [E] detects the actuator on gear [B], the tray cannot be moved up any more, so the motor stops.



## 2.2.2 PAPER FEED

### *Straight Feed Out Mode*



Before the job, the exit unit [A] is up, and the exit unit gear solenoid [B] is on, pulling lever [C] away from the exit unit gear [D].

At the start of the job, the stack height detection lever detects the top of the stack. The tray moves up or down if the top of the stack is not at the correct level.

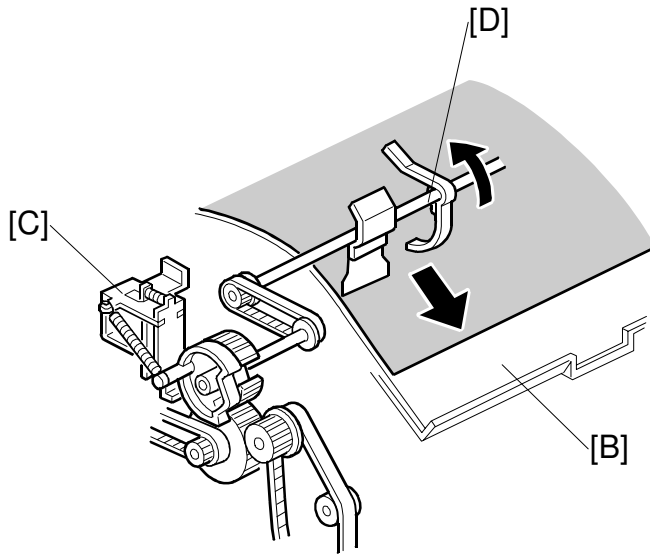
When the paper exit sensor in the main frame turns on, the finisher main motor starts. It drives the exit unit gear [D] through idle gear [E]. The gear pulls paper exit unit [A] down, using the paper exit link [F]. The link also moves the paper exit roller [H] up through the exit roller drive gear [G].

When the motor starts, the solenoid switches off and a spring pushes lever [C] into contact with the exit unit gear [D].

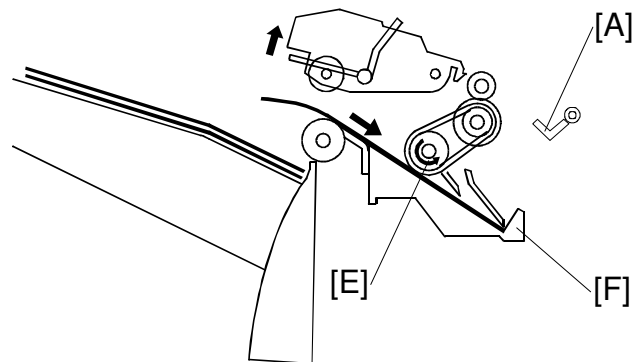
When a part of the exit unit gear without threads [I] faces the idle gear, the gear stops turning (see the left-hand diagram). The lever [C] catches a peg on the exit unit gear, to make sure that it stops at the correct position. The paper exit rollers [H] now contact each other and the main motor feeds out the paper.

When the last page has been fed out, the solenoid turns on to pull the lever away from the gear. The gear starts turning, to lift the exit unit to the standby position.

When the other part of the exit unit gear without threads [J] faces the idle gear, the exit unit gear stops. Then, the main motor stops and the solenoid turns off.

**Shift Sorting Mode**

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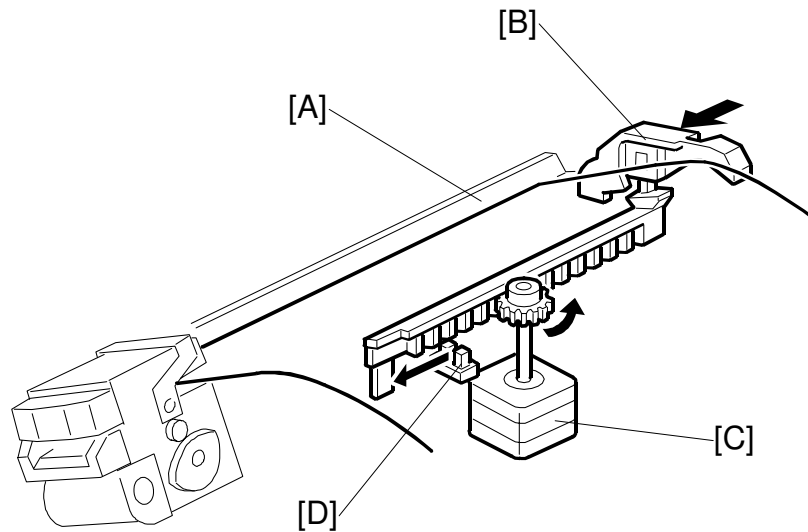
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At the start of the job, and for odd numbered sets of copies, the mechanism is the same as the straight feed out mode. However, even numbered sets are fed back to the jogger tray, which shifts the sets to one side before feeding them out.

This section describes what happens for even-numbered sets (sets 2, 4, 6 etc) of the job.

A short time after the entrance sensor [A] detects the first page of the set, the paper exit unit solenoid turns on to restart the rotation of the paper exit unit gear, raising the paper exit unit to the standby position. It stays there until after the last page of the set.

The paper cannot feed out (because the feed rollers are not contacting each other), so it drops into the jogger tray [B]. The paddle roller solenoid [C] turns on and the paddle roller [D] feeds the paper to the reverse roller [E]. The reverse roller feeds the paper to the end fence [F] of the jogger tray.



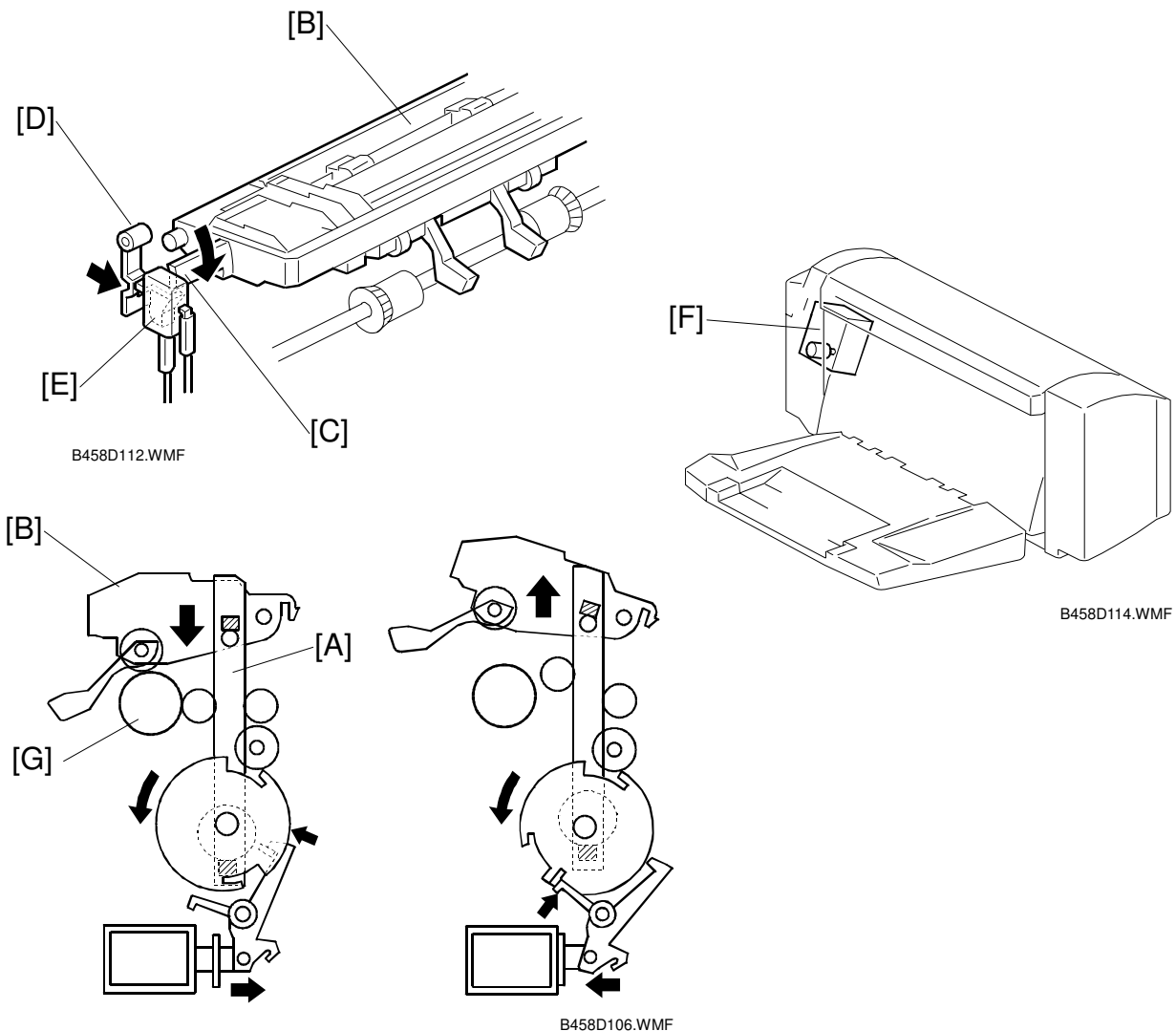
B458D107.WMF

After the paper reaches the end fence [A], the jogger fence [B] shifts the paper across. The jogger motor [C] drives the jogger fence. The home position sensor [D] detects when the jogger fence has returned to home position.

When the next set begins, the paper exit unit moves down, and the machine operates the same way as straight feed out mode. At this time, the entire set in the jogger tray is fed out at the same time as the first page of the next set. However, the set coming from the jogger tray has been shifted to one side.

If the last set is an even-numbered set, the paper exit unit must be pulled down to feed the final set out of the jogger tray. Then the exit unit moves back up to the standby position.

The capacity of the jogger tray is 30 sheets. If the set contains more than 30 sheets, the machine feeds out the first 30 from the jogger tray, then continues with the rest of the set, using the jogger tray.

**Stapling Mode**

The stapler is attached to the jogger tray, so all sets go to the jogger tray.

After all pages of a set have entered the jogger tray and been shifted across, the paper exit link [A] pulls the paper exit unit [B] down until knob [C] on the exit unit pushes the link lever [D] for the exit unit switch [E]. This turns on the exit unit switch. When this switch is on, dc is supplied to the stapler unit [F] and the main motor is turned off.

The exit unit switch is activated when the exit unit is pulled part-way down. After stapling the set of prints, the paper exit unit is pulled down again until the unit comes in contact with the paper exit roller [G], and the stapled set is fed out.

### 2.2.3 JAM CONDITIONS

	Sensors	Conditions
Remaining paper detection	Entrance Exit	Either the entrance or exit sensor detects paper just after the unit is initialized.
Non-feed at the entrance	Entrance	The entrance sensor is not activated within a certain period after the paper exit sensor detects paper.
Jamming at the entrance	Entrance	The entrance sensor is not de-activated after paper is fed 1.3 times the length of the paper.
Non-feed inside the unit (Straight feed out mode only)	Exit	The exit sensor is not activated within a certain period after the entrance sensor detects paper.
Jamming at the exit	Exit	The exit sensor is not de-activated after paper is fed for a certain period.
Jogger tray	Exit	The exit sensor is de-activated during paper shifting or stapling.

### 2.2.4 ERROR DETECTION

	Conditions
Jogger motor error	The jogger home position sensor does not shut off after the jogger motor starts.
Jogger motor home position detection error	The jogger home position sensor does not turn on after paper shifting.
Stapler error	The stapler home position sensor (inside the stapler unit) does not turn on after stapling.
Output tray upper limit error	The tray upper limit sensor is activated.
Output tray motor error	The output tray is away from the target position for more than 10 seconds.
Stack height detection error	The stack height detection lever does not return to its home position before going to detect the stack height.

**NOTE:** The above errors are indicated as “Finisher jam” at the first occurrence.  
If the same error happens again in the next job, “finisher error” is indicated.