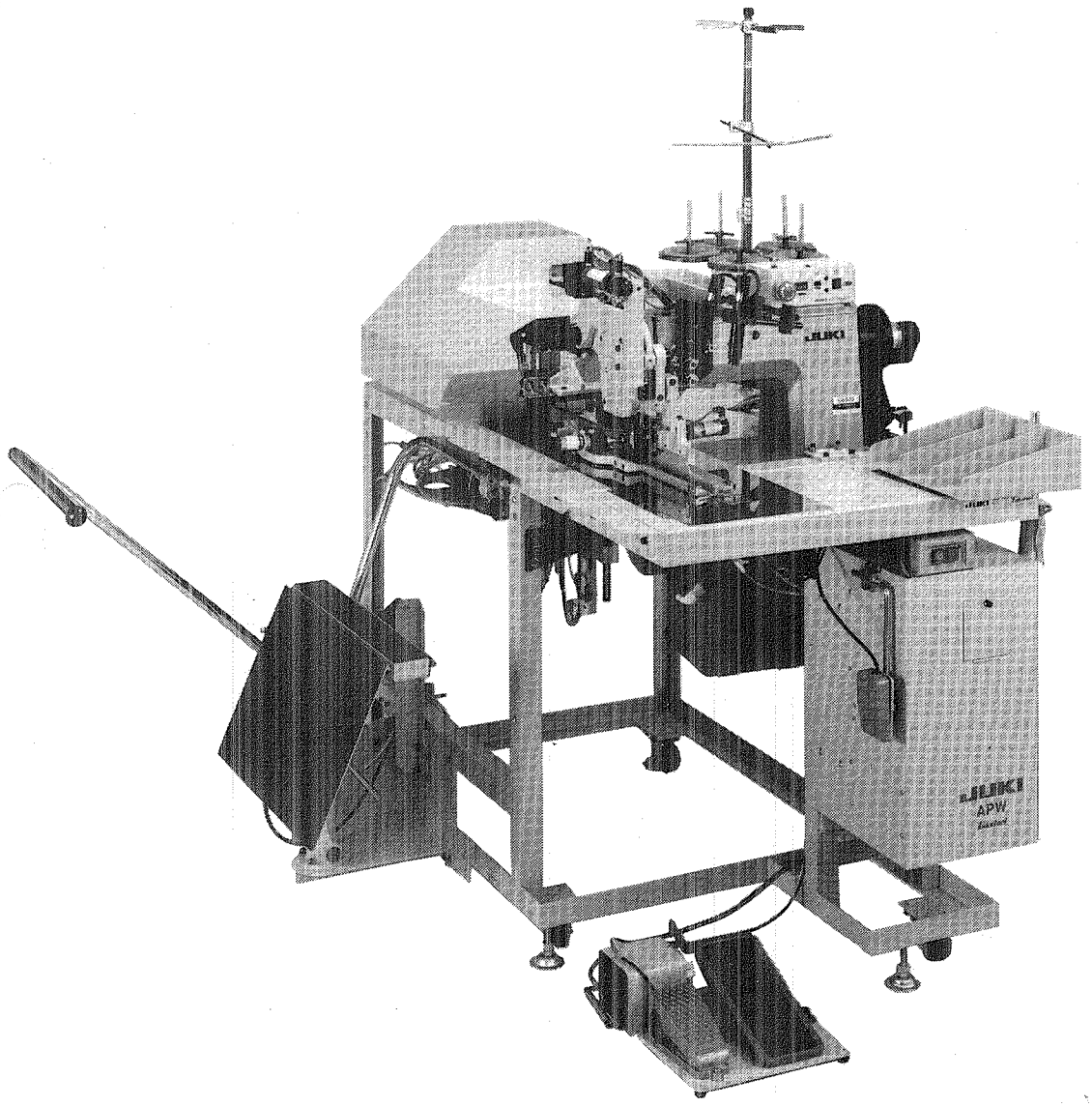
TERRY

JUKI

Automatic Lockstitch Welting Machine (Simplified Operation Type)

APW-192

ENGINEER'S MANUAL



PREFACE

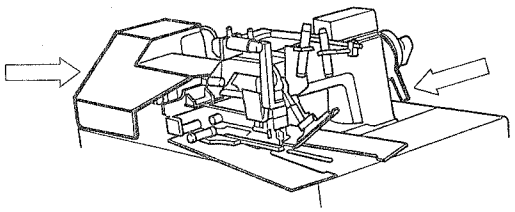
This engineer's manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machines. This manual presents detailed explanation of the adjusting procedures, etc. which are not covered by the Instruction Manual intended for the maintenance personnel and operators at a garment factory.

It is advisable to use this engineer's manual in combination with the pertinent Instruction Manual and Parts List when servicing the sewing machines of these models.

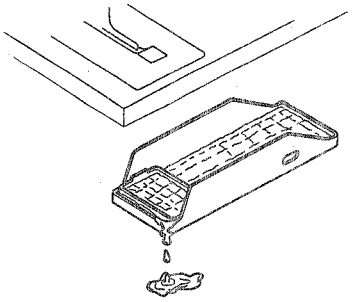
American Thread
Filco Xtra
Polyester Cotton 3/cord
Tex 40 SORT TKT 50
6000 Yds meters 5486
SSYA 257696

no Lower
Than Tex 27

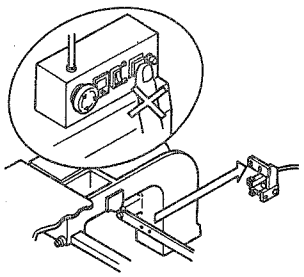
1. Be sure not to move the clamp foot with the sewing table open.



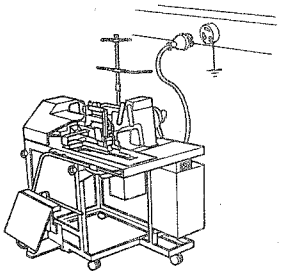
2. When removing the oil pan, take care not to allow oil in the oil pan to run out.



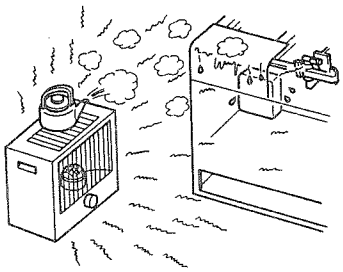
3. Be sure not to turn CLAMP FOOT TRAVEL switch ON, with the backside of the rear end detecting switch of the clamp foot removed.



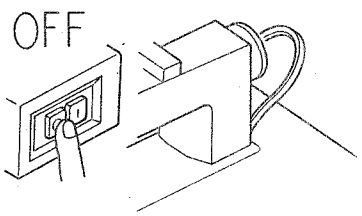
4. Be sure to connect FG wires of the power cables to an earth of the main power source.



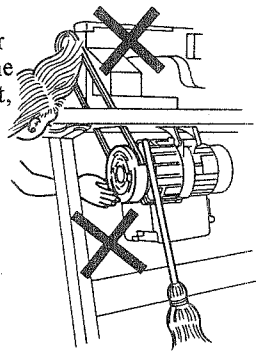
5. Do not place such things that might generate an intense heat or a high humidity around the electric control panel.



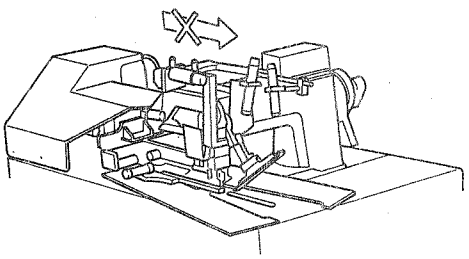
6. Be sure to turn OFF the power switch before removing the V belt.



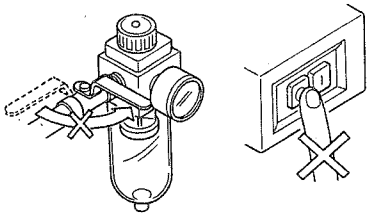
7. During operation, be careful not to allow your or any other person's head or hands to come close to the handwheel, V belt, bobbin winder, motor or any other driving components. Also, do not place anything close to them. Doing so may be very dangerous.



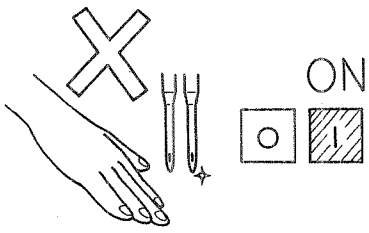
8. Do not operate the machine with the belt cover removed.



9. Do not turn OFF the power switch or do not stop air supply during operation.



10. Keep your hands away from the needle when you turn ON the power switch or while the machine is running.



CONTENTS

1. SPECIFICATIONS

(1) Mechanical Specifications

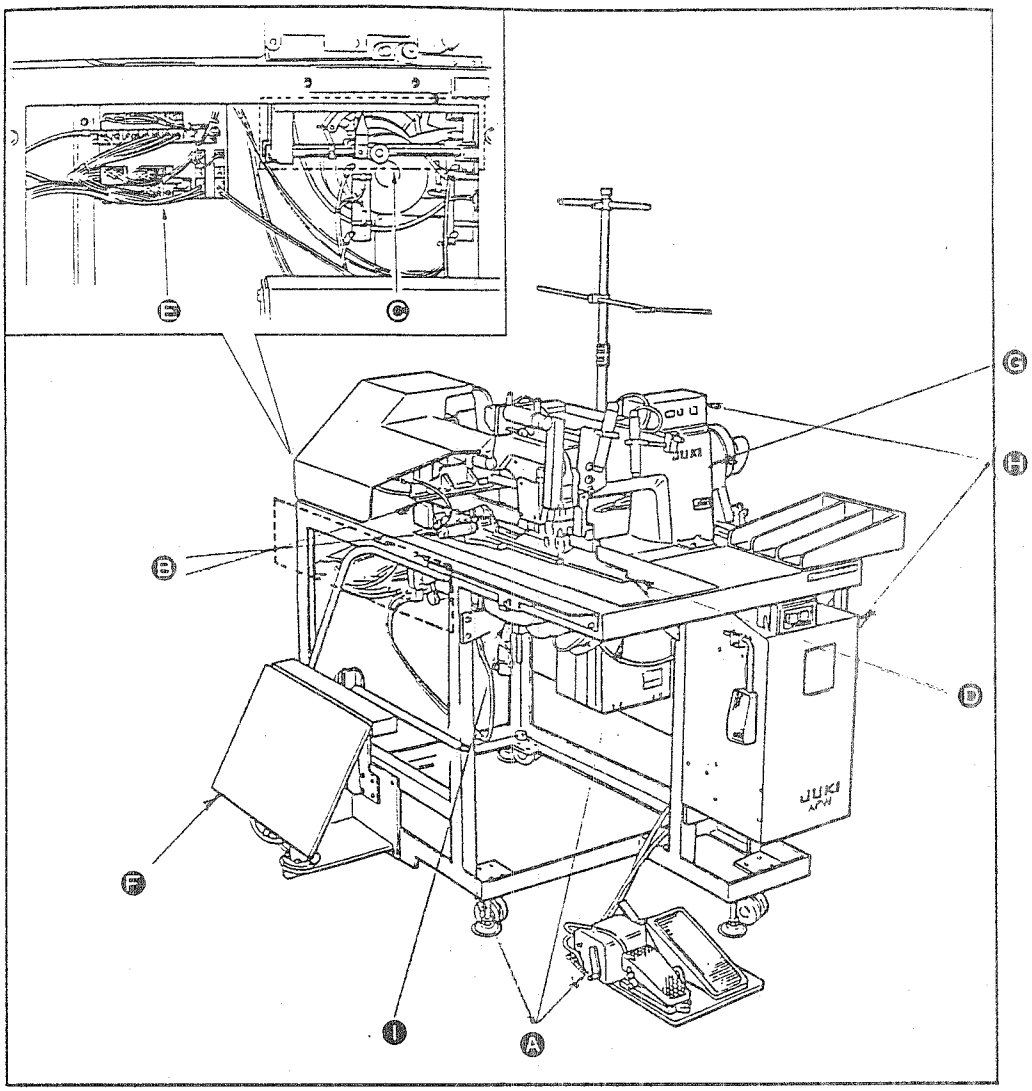
- Sewing machine : 2-needle, lockstitch machine with center knife (exclusive for the APW-192), LH-570E
- Sewing speed : 2,200 s.p.m. (standard)
- Stitch length :
  - Lockstitch : 2.0 to 3.0 mm (standard : 2.0 mm)
  - Condensation stitch : 0.5 to 1.5 mm (standard : 1.0 mm)
  - Back tack stitch : Same as lockstitch

  ] Condensation/ Back tack stitch selectable
- Types of welt : Parallel double welt, parallel single welt, parallel variant double welt, combined single welt] Each without flap
- Pocket lip length : Possible to set in 1 mm unit within the range of 35 mm (min.) to 180 mm (max.) (needle gauge 8 to 12 mm)

  (Welt length) : Possible to set in 1 mm unit within the range of 50 mm (min.) to 180 mm (max.) (needle gauge 14 to 16 mm)
- Welting width : (Needle gauge) 10 mm (standard) (8, 12, 14, 16, 18 and 20 mm)
- Needles : ORGAN Mt x 190 #16 through #18 (standard #16)
  SCHMETZ 190R #100 through #110 (standard #100)
- Thread : Exclusively used with the automatic sewing machines
- Hook : Full rotary, vertical-axis, self-lubrication hook
- Thread take-up lever : Slide thread take-up lever
- Needle bar stroke : 34.4 mm
- Cloth feed mechanism : Driven by servomotor
- Control : TTL control by a micro-computer
- Safety mechanism : Machine operation is automatically stopped if the cloth feed mechanism detector, the needle thread detector or any of the various safety devices is actuated.
- Lubricating oil : JUKI New Defrix Oil No. 2
- Operating air pressure : 5.0 kg/cm^2
- Air consumption : Approx. 40Nℓ/min.
- Dimensions of the machine : 735 mm (width) x 1,250 mm (length) x 1,200 mm (height)
- Weight : Approx. 200 kg

(2) Electrical Specifications

- Input power : 3-phase 200, 220, 240, 380, 415, 440
  Single-phase 200, 220, 230, 240, 250 } 50/60Hz
  (Voltage fluctuation should not exceed 10% of the rated voltage.)
- Power consumption : 500 W



The APW-192 consists mainly of the following nine units;

- Ⓐ Frame and structural components
  (Frame, sewing table, covers, foot switch etc.)
- Ⓑ Clamp foot unit and feed mechanism
- Ⓒ Corner knife unit
- Ⓓ Binder unit
  (Binder components and its driving components)
- Ⓔ Pneumatic control unit
  (Control devices and pipings)
- Ⓕ Stacker unit
- Ⓖ Sewing machine head
- Ⓗ Electric control unit
  (Control panel and operation panel)
- Ⓘ Oil pan

Fig. 1

With this machine, you can do desired welting work simply by setting materials (garment body, interlining piece, welting patch etc.) in place and operating the switches on the operation panel.

3. INSTALLATION

(1) Levelling the machine

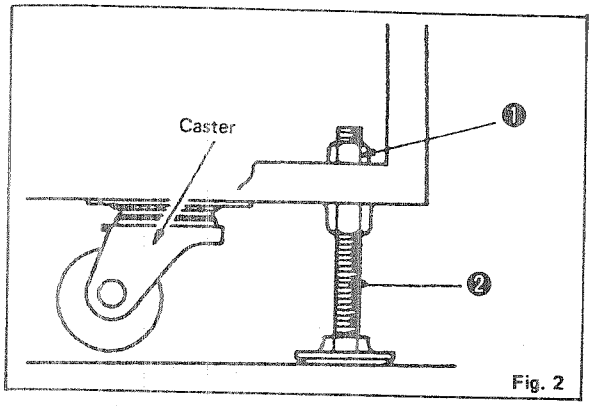


Fig. 2

Install the machine on a flat and vibration-free floor. Loosen four locknuts ❶ of adjusting bolts ❷ at the bottom of the machine frame and level the machine. Do not forget to retighten the locknuts after adjusting the bolts.

Make sure that the casters do not contact with the floor, except when the machine is moved.

(2) Installing the accessory components

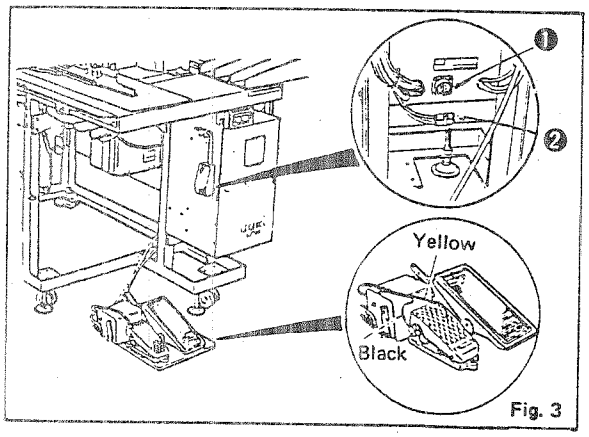


Fig. 3

1. Connect the electric cords and air tubes of the foot switch unit.
   - ○ Electric cord ❶
   - ○ Air tubes ❷

   Place the foot switch unit on the floor for the operator's convenience.

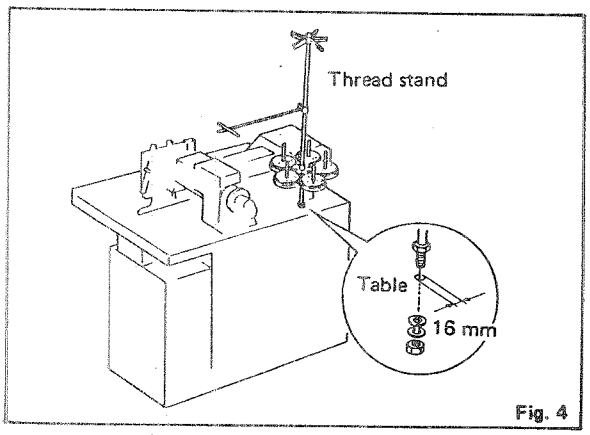


Fig. 4

2. Set up the spool thread stand at the prescribed place on the table and fix it using the screws supplied with it.

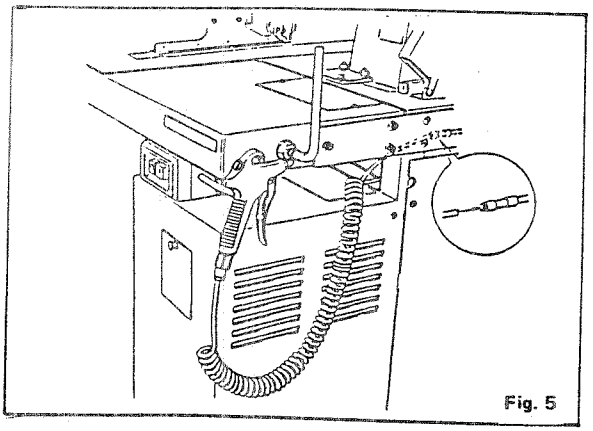


Fig. 5

3. Install the air gun.
   Install the air gun as shown in Fig. 5 and connect it to the air tube of the machine.

1) Installing the grasping stacker or bar stacker

1. Install the stacker to the fixed position on the left side of the machine observed by the operator, with bolts ❶ (4 bolts).
2. Fix the stacker safety pipe to the fixed position with bolts and nuts ❷ (2 ea.).
3. Install the solenoid valves for cylinders in position. (Refer to "18. Circuit diagram" for how to arrange the solenoid valves.)
4. Connect air tubes of each cylinder.

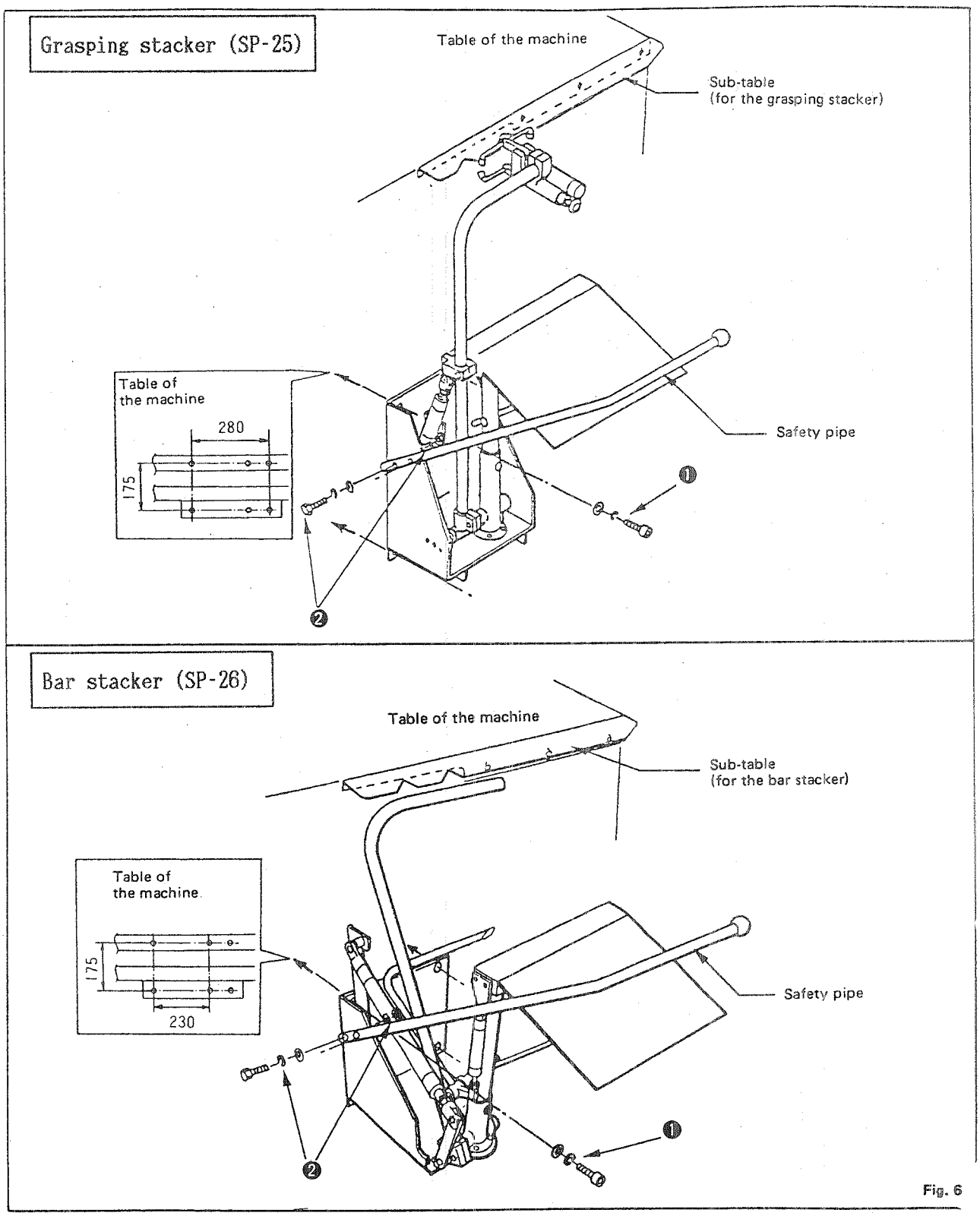


Fig. 6

4. CONNECTION OF ELECTRIC POWER SOURCE AND AIR SUPPLY SOURCE

(1) Connection of electric power source

Connect the power supply cord of the operation panel to the power source outlet (R.S.T.E.). When connecting the lead wires, make sure that the sewing machine rotates in the correct direction.

(Rotating direction)

Turn the handwheel to let the needle down to its lowest point and turn the power supply switch "on" as you watch the rotating direction of the handwheel. When the wire connection is correct, the handwheel will rotate in the counterclockwise direction (viewed from the handwheel's side) to stop the needle in its highest position. If not, alternate the connection of two wires out of three wires (R.S.T.).

(Precaution in the electric connection)

1. Connect the ground wire to the earth without exception.
2. Quality of power
   - Voltage fluctuation must not exceed ±10% of the rated voltage.
   - Rapid change of power voltage may stop the machine.
   - Surge current or electromagnetic induction in power may lead the machine to malfunction.

(2) Connection of the air supply source

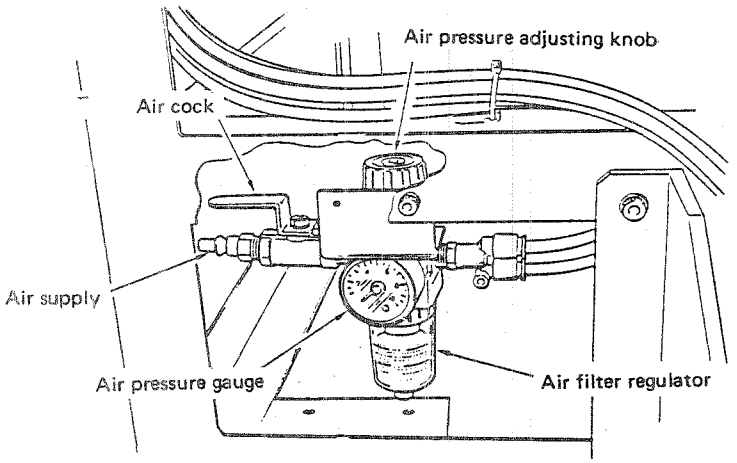


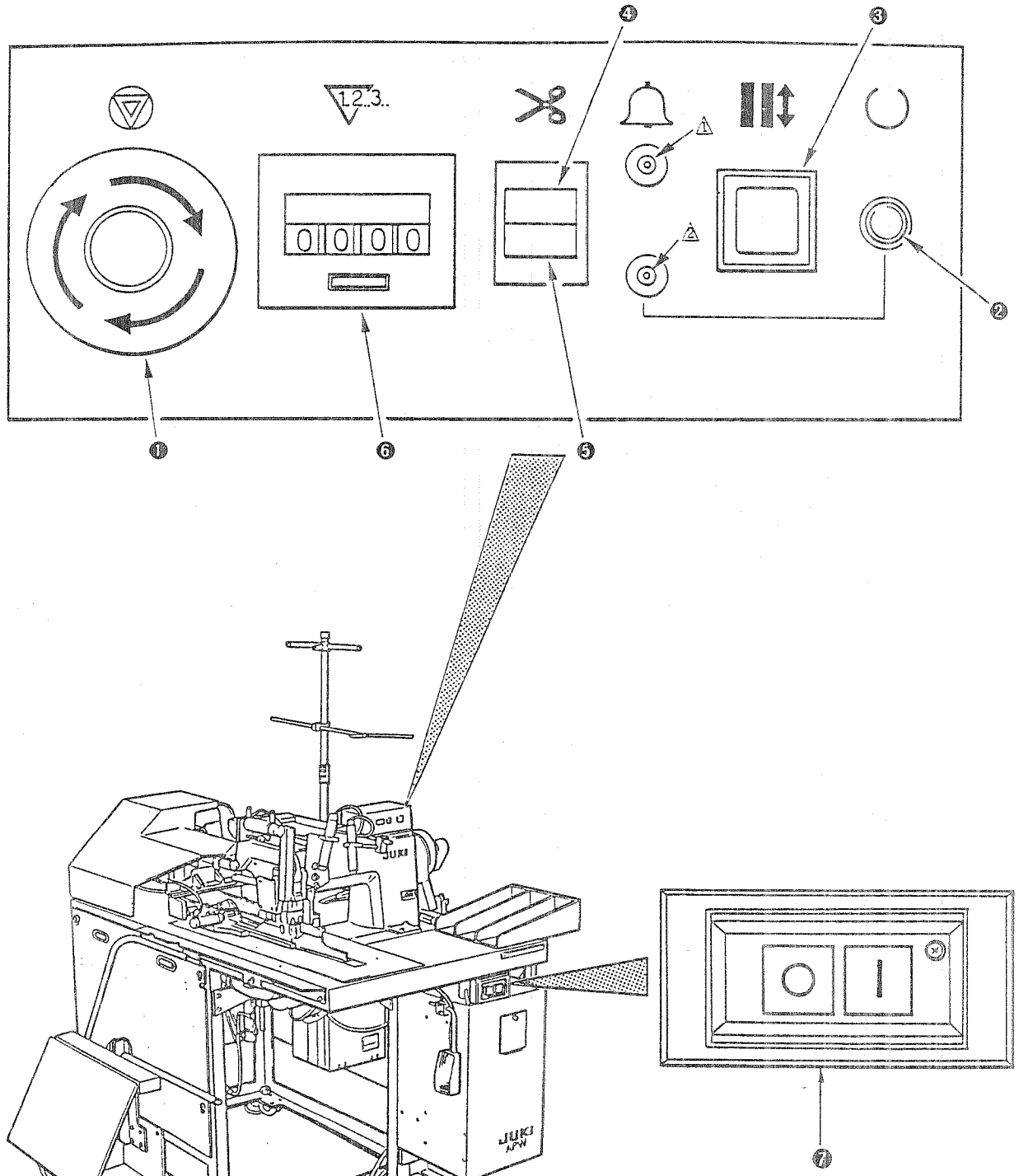
Fig. 7

1. Securely connect the air supply hose (1/4") to the air cock located on the rear face of the machine.
2. Open the air cock and adjust the air pressure so that the air pressure gauge indicates 5.0kg/cm^2 by the air pressure adjusting knob.

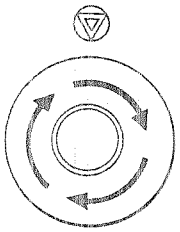
[Precautions for the air supply source]

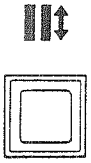
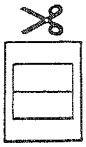
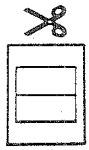
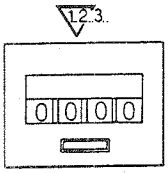
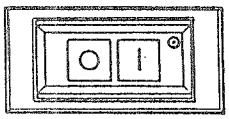
Refer to the article [(4) Precautions for the compressed air supplying (the air supply source) devices] of Inspection and maintenance.

(1) Control panel switches

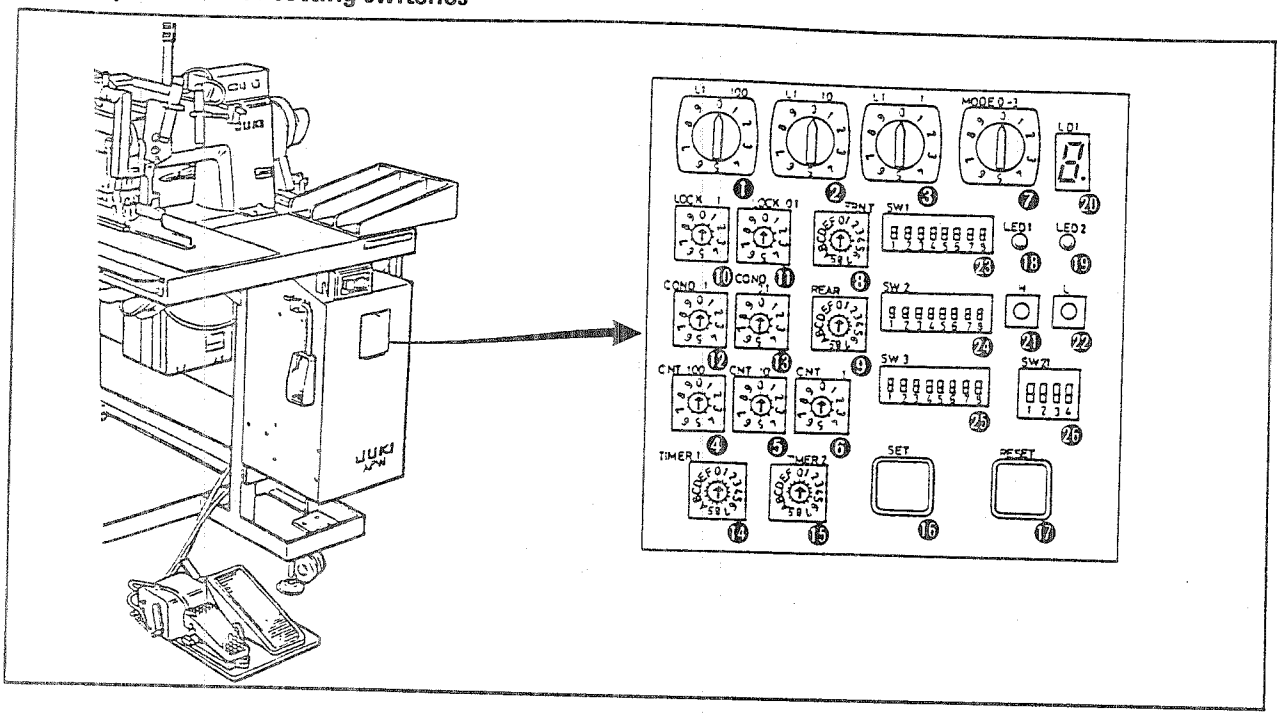


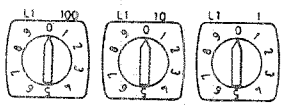
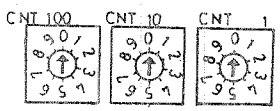
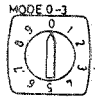
(2) Operation panel switches and indicator lamps

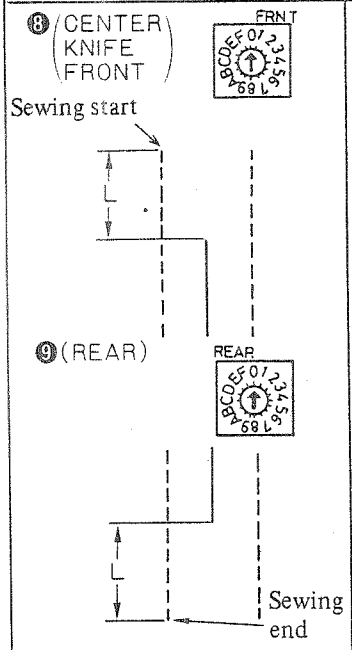
Panel indication	Function and operation
❶ EMERGENCY STOP switch 	When this push-button switch is pressed, ○ the machine stops with its needle up, ○ the clamp foot feed mechanism stops, and ○ the red LED lamp ❽ flashes ON and OFF. In the above state, the machine stops operating. To reset, turn the Emergency stop switch in the direction of the arrow, and press tact switch ⓱ , (P.11) in the control box.
❷ MACHINE READY indicator lamp and key 	1. When the green LED lamp ❾ flashes ON and OFF, the machine runs under the manual mode allowing the manual keys and setting keys to be input. 2. Now the machine comes to the automatic mode by pressing the 「○」 Machine Ready key. At this time, the green LED lamp ❾ comes to light up. When the 「○」 key is pressed, the machine checks whether the setting data and mechanical conditions are normal. If the machine confirms all of those data and conditions are normal, the machine comes to the automatic mode. However, if the machine detects any of the following abnormal conditions, the green LED lamp will not light up even when the 「○」 key is pressed. Instead of the green LED ❾ , the red LED lamp ❽ flashes ON and OFF. (1) The thread take-up lever is not in the highest position. → Alarm "AL-12" (Note 1) ● How to handle Move the thread take-up lever by hand until the highest position is reached. Now the red LED lamp ❽ stops flashing ON and OFF, and the green LED lamp ❾ flashes ON and OFF. Then press the 「○」 key, then the machine will come to the automatic mode and the green LED ❾ will light up instead of flashing ON and OFF. (2) When the sewing length has been set to the value exceeding the range of sewing length permitted by the sewing capability of the machine. → Alarm "AL-21" (Note 1) [When the gauge size is 8 mm to 12 mm : 35 mm to 180 mm When the gauge size is 14 mm to 20 mm : 50 mm to 180 mm] ● How to handle Press the Reset button in the setting switch section to make the red LED ❽ stop flashing ON and OFF and to make the green LED ❾ flash ON and OFF. Then, set the sewing length to the normal length, and press the 「○」 MACHINE READY key. Now the machine comes to the automatic mode and the green LED ❾ lights up. (3) For the details and other error codes, refer to the list of alarm codes. Note 1 : **The alarm code corresponding to the error occurred is indicated at the 7 segment LED in the setting switch section.** For example : AL-01 (The alarm code is indicated sequentially digit after digit.) When the 「○」 MACHINE READY key is pressed, the machine comes to the automatic mode and is ready to start sewing. At this time, even when the clamp foot is not in its predetermined position, it travels automatically to the rear end. Unless the green LED lamp ❾ lights up, the clamp foot does not come down even when you depress the foot switch.

❸ CLAMP FOOT TRAVEL key 	Each time you press this key, the clamp foot repeats forward travel and return travel alternately.; When the clamp foot is in its rear end → It travels to its front end. When the clamp foot is in its front end → It travels to its rear end. When the clamp foot is in a position where the corner knife is actuated The clamp foot travels forward by approximately 10 mm and then travels to its back end position. This key is used to let the clamp foot travel to its rear end in case of threading the machine head. Note that the WORK CLAMP TRAVEL key is inoperative under the following condition. (The machine does not operate under the manual mode)
❹ NEEDLE THREAD TRIMMING key 	As long as you press this key, the needle thread knife comes down. Note that the MANUAL THREAD TRIMMING key is inoperative under the following condition. [The machine does not operate under the manual mode. The clamp foot is not in its rear end.]
❺ BOBBIN THREAD TRIMMING key 	As long as this key is pressed, the bobbin thread is released. Note that the BOBBIN THREAD TRIMMING key is inoperative under the following condition. [The machine does not operate under the manual mode. The clamp foot is not in its rear end.]
❻ TOTAL COUNTER 	This counter displays total number of pieces sewn.
❼ POWER switch 	When the I side of the switch is pressed, the number indicators or the indicator lamp on the control panel light up. The power to the sewing machine circuit board is turned ON, and the motor starts rotating. When the O side of the switch is pressed, the power to the whole sewing machine is turned OFF. **(Caution) When the power is turned OFF by pressing the O side of the POWER switch, some sections in the control box will still be energized, so take care when adjusting the dials on the printed circuit board.**
❽ Red LED	1. This LED flashes ON and OFF to show that the machine is in alarm state.
❾ Green LED	1. This LED flashes ON and OFF to show that the machine is in the manual mode. At this time, the CLAMP FOOT TRAVEL key, the NEEDLE THREAD TRIMMING key and the BOBBIN THREAD TRIMMING key are operative. 2. This LED lights up to show that the machine is in the automatic mode. At this time, the machine is ready for sewing.
The red and green LEDs flash ON and OFF simultaneously.	The red and green LEDs flash ON and OFF simultaneously to indicate that the bobbin thread counter has counted up to the set value. "UP" is now indicated on the 7-segment LED. To reset the bobbin thread counter after it has counted up to the set value, press tact switch (SET) ⓰.

(3) Explanation of setting switches



Switch name	Function
❶×100 ❷×10 ❸×1  (Dimensions)	1) **Setting L Size** Sewing length (L size) (35 through 180 mm) The switches are used to specify the numbers for hundreds digit, tens digit and units digit respectively from the left-hand side. (Caution) **When you change the sewing length, be sure to adjust the corner knife.**
❹×100 ❺×10 ❻×1  (CNT)	2) **Setting the BOBBIN THREAD COUNTER** When "0" is reached, the BOBBIN THREAD COUNTER stops counting performance. The switches are used to specify the numbers for hundreds digit, tens digit and units digit respectively from the left-hand side. If "000" is specified for the BOBBIN THREAD COUNTER, the machine operates ignoring the BOBBIN THREAD COUNTER.
❼(MODE 0 ~ 3) 	3) **Selection of operation mode** Operation mode selectors (0 through 3) 0 : CLAMP FOOT travel 1 : CLAMP FOOT travel + Sewing machine driven 2 : CLAMP FOOT travel + Sewing machine driven + Center knife 3 : CLAMP FOOT travel + Sewing machine driven + Center knife + Corner knife When the dial is set to "0", the thread tension disc is closed. (Caution) **When the set value is not within 0 through 3, the followings may result.** When the dial is set to 4 : Operation mode 0 When the dial is set to 5 : Operation mode 1 When the dial is set to 6 : Operation mode 2 When the dial is set to 7 : Operation mode 3 When the dial is set to 8 : Operation mode 0 When the dial is set to 9 : Operation mode 1



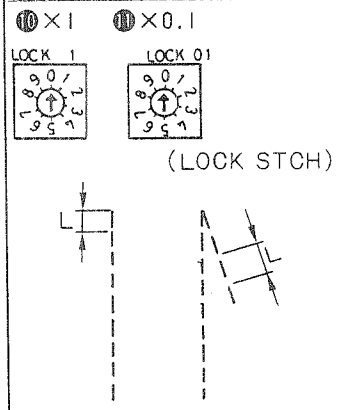
4) Setting the travel amount of the center knife

⑧ Distance L from the rear end of the adjustment value of the center knife stroke (0 through F) to the sewing start as illustrated in the figure is selected from among the followings.

0 : Prohibited	5 : 5 mm	A : 10 mm	F : 15 mm
1 : Prohibited	6 : 6 mm	B : 11 mm	
2 : Prohibited	7 : 7 mm	C : 12 mm	
3 : Prohibited	8 : 8 mm	D : 13 mm	
4 Prohibited	9 : 9 mm	E : 14 mm	

⑨ Distance L from the front end of the adjustment value of the center knife stroke (0 through F) to the sewing end as illustrated in the figure is selected from among the followings.

0 : Prohibited	5 : Prohibited	A : 10 mm	F : 15 mm
1 : Prohibited	6 : Prohibited	B : 11 mm	
2 : Prohibited	7 : 7 mm	C : 12 mm	
3 : Prohibited	8 : 8 mm	D : 13 mm	
4 : Prohibited	9 : 9 mm	E : 14 mm	



5) Setting the lockstitch and back tack pitch

Specify the lockstitch and back tack (when the back tack stitching is selected) pitch. The standard set value of lockstitch pitch and back tack pitch is 20 (stitch pitch: 2.0 mm).

⑩ : (1 mm) units digit ⑪ : (0.1 mm) first decimal place

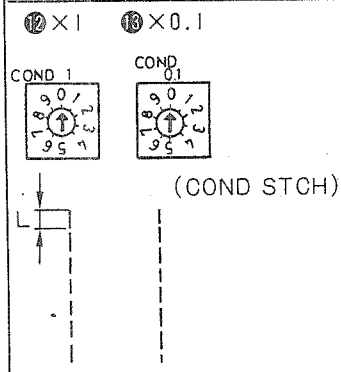
Set value 20 through 30 = Stitch pitch 2.0 through 3.0 mm

(Caution) *The lockstitch pitch is at the same time the back tack pitch. If you wish back tack stitching, you need to change over the setting of the DIP switches.

***When the set value is not within 20 through 30, the followings may result.**

Value set using the dials :

0 through 19 : "AL-26" occurs
31 through 59 : "AL-26" occurs
60 through 70 : Stitch pitch becomes 2.0 through 3.0 mm
71 through 99 : "AL-26" occurs



6) Setting the condensation pitch

Specify the condensation pitch L. The standard set value of lockstitch pitch and back tack pitch is 10 (stitch pitch: 1.0 mm)

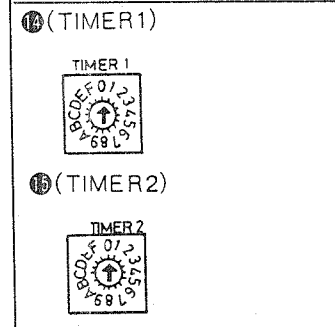
⑫ : (1 mm) units digit ⑬ : (0.1 mm) first decimal place

Set value 05 through 15 = Stitch pitch 0.5 through 1.5 mm

(Caution) *When the set value is not within 05 through 15, the followings may result.

Value set using the dials :

00 through 04 : "AL-27" occurs
16 through 44 : "AL-27" occurs
45 through 55 : Stitch pitch becomes 0.5 through 1.5 mm
58 through 84 : "AL-27" occurs
85 through 95 : Stitch pitch becomes 0.5 through 1.5 mm
96 through 99 : "AL-27" occurs

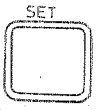
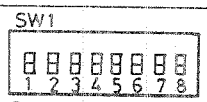
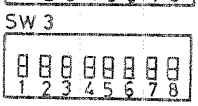
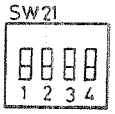


7) Setting the cylinder timer for the stacker

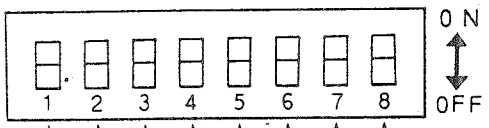
⑭ Universal timer 1 for the stackers etc. (0 through F)
When the bar stacker is used: For the work clamp arm
When the clamping stacker is used: For the clamping unit

⑮ Universal timer 2 for the stackers etc. (0 through F)
When the bar stacker is used: For the swing arm
When the clamping stacker is used: For the swing arm

0 : 0.5 sec.	5 : 3.0 sec.	A : 5.5 sec.	F : 8.0 sec.
1 : 1.0 sec.	6 : 3.5 sec.	B : 6.0 sec.	
2 : 1.5 sec.	7 : 4.0 sec.	C : 6.5 sec.	
3 : 2.0 sec.	8 : 4.5 sec.	D : 7.0 sec.	
4 : 2.5 sec.	9 : 5.0 sec.	E : 7.5 sec.	

Switch name	Function
⑯ Tact switch (Green) (SET) 	8) **Re-setting the BOBBIN THREAD COUNTER** Press this push-button switch when you wish to re-set the value on the BOBBIN THREAD COUNTERs ❹ through ❻ .
⑰ Tact switch (White) (RESET) 	9) **Reset switch** This switch is used to release the machine from the emergency stop state or the alarm state.
⑱ Light emitting diode (LD1)  ⑲ Light emitting diode (LD2) 	10) **LED for detection of thread breakage** ⑱ The LED is the indicator lamp of the left-hand needle thread breakage signal. ⑲ The LED is the indicator lamp of the right-hand needle thread breakage signal.
㉑ Volume resistance (H)  ㉒ Volume resistance (L) 	11) **Setting the rotational speed of the sewing machine motor** This is the variable resistor used for adjustment of the rotational speed of the machine motor. ㉑ Normally, it is set to high-speed (2,200 $^{-50}_{+0}$ rpm). ㉒ Normally, it is set to low-speed (1,500±50 rpm).
㉓  ㉔  ㉕ 	12) **DIP switches 1** These switches are used to change over the general performance of the machine. Refer to "(4) DIP switches" for the description of the function of the DIP switches.
⑳ 7 segment LED (DISP) 	13) **7 segment LED** • This LED indicates the relevant alarm number when an alarm occurred. (Example  The alarm number is indicated sequentially digit after digit.) • When the machine is independently operated, the sewing speed of the machine is indicated on this LED.
㉖ Four-digit DIP switches 	14) **DIP switches 2** These DIP switches are used to change over the general performance of the machine. (Not yet used)

DIP 1 ㉓



Clamp foot performance switching
OFF : Right to left/ON : Left to right

Flap presser performance switching
OFF : Right to left/ON : Left to right

Switching between with/without of Flap presser
OFF : Without/ON : With

Switching between release/not release Folding plate and Flap presser when Corner knife ascends
OFF : Not release/ON : Release

Switching between with/without Thread breakage detector
OFF : Without detector/ON : With detector

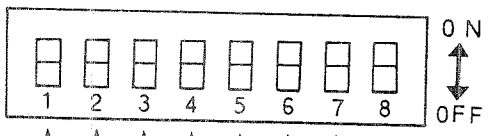
Switching between high speed/low speed operation of Sewing Machine at the time of back tack stitching.
OFF : Standard/ON : High-speed

Switching between condensation stitching/back tack stitching at the sewing end
OFF : Condensation stitching/ON : Back tack stitching

Switching between condensation stitching/back tack stitching at the sewing start
OFF : Condensation stitching/ON : Back tack stitching

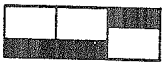
Caution : The data specified using the DIP switches are read at the time when the MACHINE READY key is pressed (change-over from the manual mode to the automatic mode).
Consequently, the data will remain even if the setting of the DIP switches are changed when the machine is in the automatic mode.

DIP 2 ㉔



Setting Gauge size

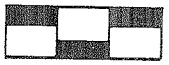

: 8 mm


: 10mm


: 12mm


: 14mm


: 16mm


: 18mm

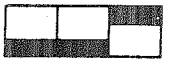

: 20mm

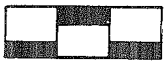
To be made to order

Stackers actuate/stop
OFF : Stop/ON : Actuate

Selection of stackers


: Auxiliary stacker

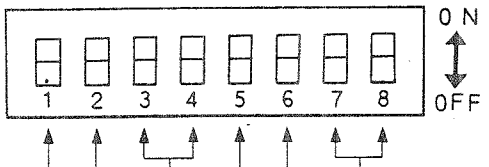

: Roller stacker


: Gasping stacker or Bar stacker

(If the DIP switches are set in a manner other than shown above, "AL-41" will be indicated.)

Switching between with/without of dart stretching
OFF : Without/ON : With

DIP 3 ㉕



Clamp foot return mode setting

: Clamp foot front end stop

: Clamp foot middle position return

: Clamp foot return
Unless the stacker performanc stop switch is set to its OFF side, the clamp foot return mode cannot be set.

: Clamp foot rear end stop

Sewing machine independent operation, sewing speed measurement switch
OFF : Stop/ON : Sewing machine driven

Sewing machine independent operation, high speed/low speed selection
OFF : Low speed/ON : High speed

Setting timing to actuate thread trimmer

: Earliest timing (standard)

: Intermediate timing

: Latest timing (until the corner knife actuation position is reached)

: Latest timing (until the corner knife actuation position is reached)

Stacker independent operation
OFF : Stops / ON : Stacker actuates

Check program execution
OFF : Stops / ON : Executes the program

(5) Sewing machine independent operation

You can operate the sewing machine independently when you specify the rotational speed of the sewing machine or carry out the adjustment of the sewing machine.

Independent operation of the sewing machine is possible when the green LED lamp flashes ON and OFF and the clamp foot is in its rear end position.

- If the green LED lamp lights up ⟶ Press the MACHINE READY key to make the green LED flash ON and OFF.
- If the clamp foot is not in its rear end → Press the CLAMP FOOT TRAVEL key to make the clamp foot stop in its rear end.

1) Sewing machine independent operation at high speed

- Set the DIP3-SW5 to its ON position. Then set the DIP3-SW6 to its ON position.
  At this time, the machine is allowed to operate independently.
- At this time, rotational speed of the sewing machine is indicated on the 7 segment LED.
- (Example) 「A-2 190」 (2,190 s.p.m.)

  Be sure to adjust so that the speed indicated on the LED is in the range of 2,150 to 2,200 s.p.m.
- Setting the DIP3-SW6 to its OFF position will stop the sewing machine in 0 to 2 seconds.
  (The LED remains indicating the sewing speed.)

  Caution : **If the sewing speed of the sewing machine is too low, 「L 0」 will be indicated on the 7 segment LED.**

2) Sewing machine independent operation at low speed

- Set the DIP3-SW5 to its OFF position. Then set the DIP3-SW6 to its ON position
  At this time, the machine is allowed to operate independently.
  - Be sure to adjust so that the speed indicated on the LED is in the range of 1,450 to 1,550 s.p.m.
  - Regarding the sewing speed indication, the description same as the sewing machine independent operation at high speed is applied.
- Setting the DIP3-SW6 to its OFF position will stop the sewing machine in 0 to 2 seconds.

(6) Other indications for checking

When operating the APW-192, the machine may not proceed to the next stop of procedure until the sensor state has changed. If the sensor state does not change from a certain state, the following indications may be given. Then, check the sensors accordingly.

- CH-02 : Waiting for the servomotor [COIN] signal
  (This indication is shown when a failure of the motor used to move the clamp foot occurs.)
- CH-11 : Waiting for the binder lowest end sensor changing
- CH-12 : Waiting for the needle up signal changing

(1) Cross (+) mark lamps for setting sewing

There are two cross (+) mark lamps. A lamp closer to the operator is used to determine the point (rear reference and seam ends) and the other lamp on the far side is used to determine the point at which a seam starts (front reference) and adjust the parallelism or the workpiece.

(1) How to adjust the irradiation position of the cross (+) mark lamps

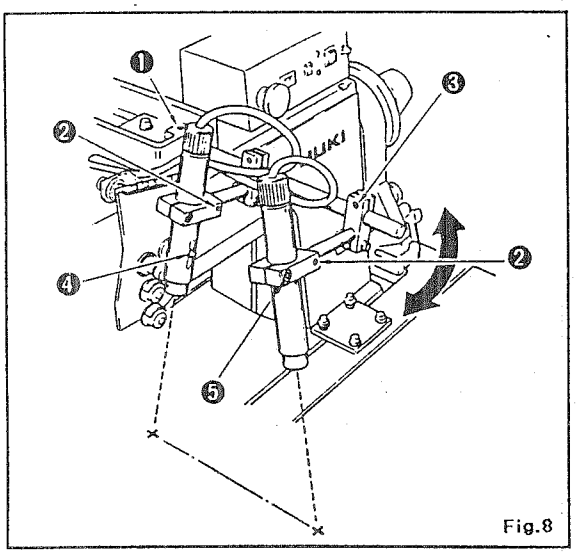


Fig.8

Adjust the cross (+) mark lamps irradiation point in the following steps of procedure.

1. Set the machine to its predetermined position, and turn ON the power switch. (The cross (+) mark lamps light up.)
2. First adjust the lateral position of the cross (+) mark lamps referring to parallelism checking cross mark lamp light Ⓐ. Loosen setscrew ❶, and slide the entire unit of the cross mark lamps in the direction of the arrow until cross mark lamp Ⓐ on the far side irradiates the middle point between two needles. Now re-tighten setscrew ❶.

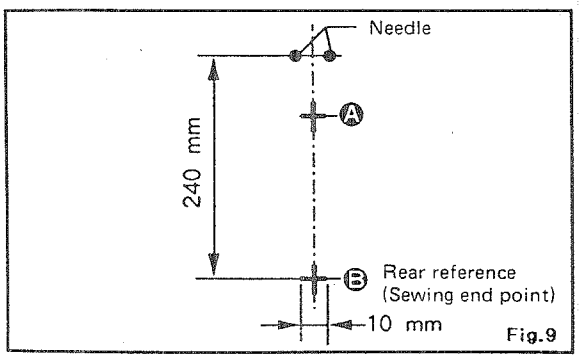


Fig.9

3. Loosen setscrews ❷ and ❸ in the cross mark lamp on the near side. This cross mark lamp is used to determine the rear reference for sewing. Now adjust the position of lamp Ⓑ so that it irradiates point B as illustrated in the figure.
   The distance from the needle to the lamp should be 240 mm.
4. Lastly, loosen mark lamp clamp screws ❺ and setscrew ❹, and adjust the height of the lamps to bring the cross mark images into the sharpest focus having the width of 10 mm. Now firmly tighten clamp screw ❺ and setscrew ❹.
5. After the adjustment of the focus, be sure to confirm that the proper distance (240 mm) is provided between the needle and the lamp and that the cross mark images projected by the lamps are aligned with the middle line between the needles.

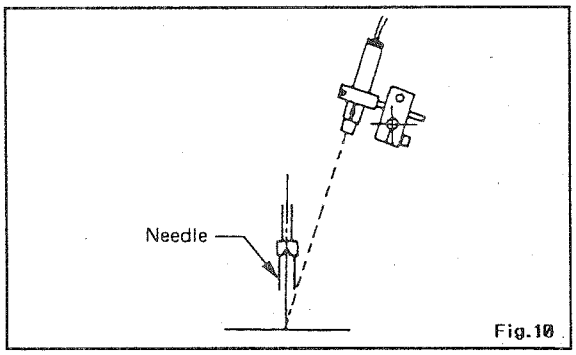


Fig.10

(2) How to replace the bulb in the cross mark clamp

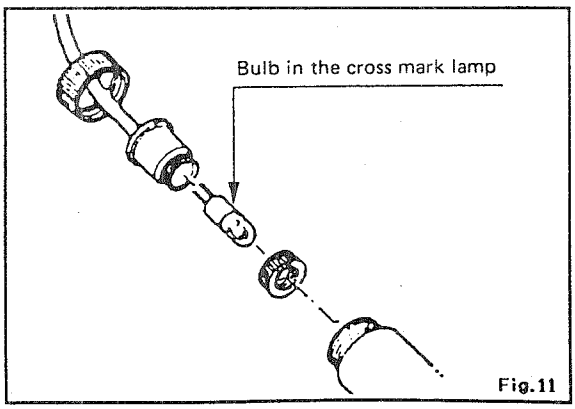


Fig.11

Disassemble the lamp unit as illustrated in the figure. Replace the bulb with a new one, and then reassemble the lamp unit accordingly.

7. AIR CONTROL SWITCHES

(1) Foot valve switch

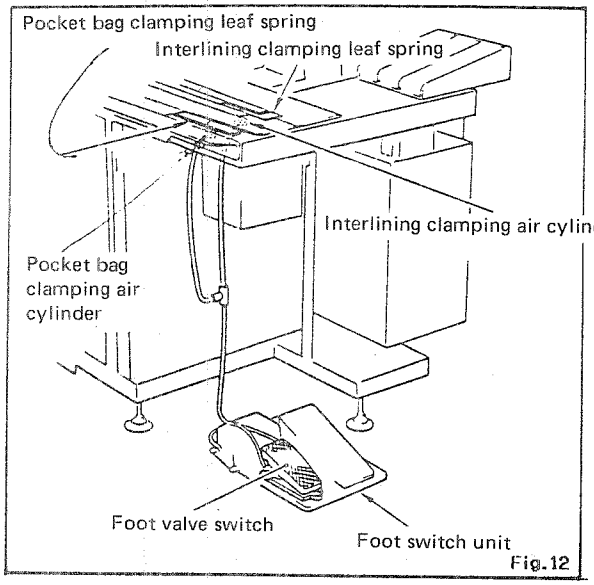


Fig.12

The foot valve switch is used to actuate the interlining clamping leaf spring as shown Fig. Depress the foot valve switch, and it will permit the interlining clamping air cylinder to operate causing the leaf springs to rise. While you are depressing the foot valve switch, insert an interlining piece between the sewing table and the leaf spring and accurately position them using the cross-mark light, then release the foot valve switch.
When attached the pocket bag clamping device, it performs the same operation as interlining by the foot valve switch.

(2) Points requiring special attention when operating the air cylinder independently (Manual operation of the solenoid valve)

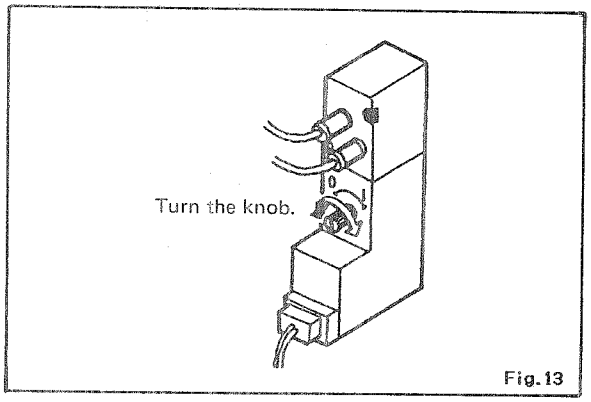


Fig.13

The corner knife can be manually raised/lowered, while the solenoid valve in the center knife can also be manually operated by turning the operation knob, as illustrated in Fig. 13, in the direction of the arrow. This allows each of the air cylinders to be driven independently. This kind of operation should be used when adjusting the functions of the sewing machine and when checking the peerformance of the machine. Normally, the operation knob should be set to the "0" side.

(Caution) Be sure to manually operate the corner knife and the center knife after making the clamp foot travel to its back end position.

(3) Pressure switch

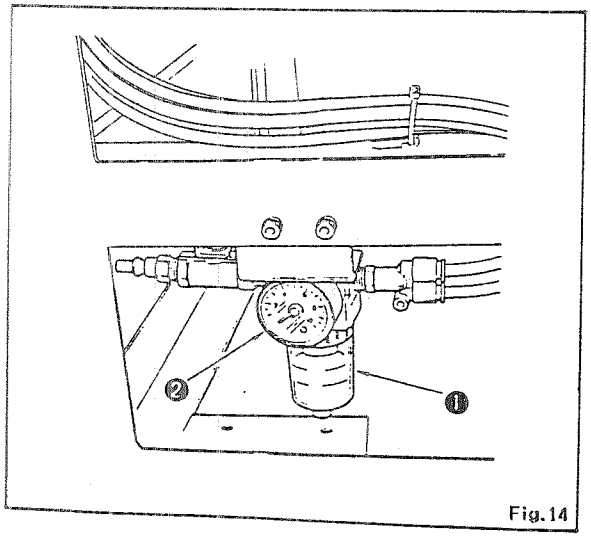


Fig.14

This machine is not provided with the air pressure detector switch.
Before operating the sewing machine, Check the air pressure on meter ❷ for filter regulator ❶.

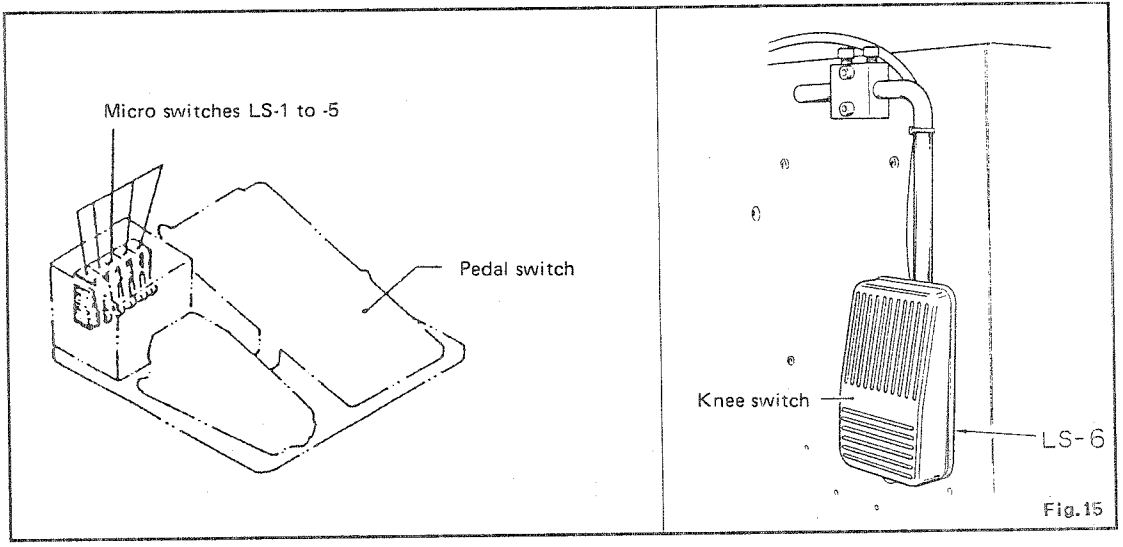


Fig.15

Sewing preparation from the clamp foot forwarding to the rapid feed of the material is all performed by operating this pedal switch.

[Standard specifications]

1st step (LS-1) . . . . . Clamp foot forward
↓ (After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.)
Clamp foot (right) comes down

2nd step (LS-2) . . . . . Clamp foot (left) comes down

3rd step (LS-3) . . . . . Binder comes down
↓ (Clamp foot comes down 0.2 sec. after the binder lowest end sensor is turned ON.)
Welting patch is folded

4th step (LS-4) . . . . . (No operation)

5th step (LS-5) . . . . . (No operation)

Knee switch (LS-6) . . . . . Rapid feed

Even if the pedal switch is depressed continuously from the first to the fifth step, the machine will perform the above actions in sequence at constant intervals.

[When the darts stretcher is installed] (Optional)

1st step (LS-1) . . . . . Dart stretcher operates
Clamp foot goes forward
(After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.)

2nd step (LS-2) . . . . . Clamp foot (right) comes down

3rd step (LS-3) . . . . . Clamp foot (left) comes down
Dart stretcher returns

4th step (LS-4) . . . . . Binder comes down
↓ (Clamp foot comes down 0.2 sec. after the binder lowest end sensor is turned ON.)
Welting patch is folded

5th step (LS-5) . . . . . (No operation)

Knee switch (LS-6) . . . . . Rapid feed

[When the flap presser is installed] (Optional)

1st step (LS-1)..... Clamp foot forward

↓ (After the front end detector sensor is turned ON, the clamp foot travels forward by 5 mm and stops there, which is followed by the next operation stated below.)

Clamp foot (right) comes down (Caution 1)

2nd step (LS-2)..... Clamp foot (left) comes down (Caution 1)

3rd step (LS-3)..... Binder comes down

↓ (0.2 sec. after the binder lowest end detector sensor is turned ON.)

Welting patch folding plate is closed.

4th step (LS-4)..... Flap presser (right) is closed (Caution 2)

5th step (LS-5)..... Flap presser (left) is closed (Caution 2)

Start switch ..... Rapid feed

Caution 1 : You can change the order of these steps of procedure so that the left-hand side clamp foot comes down when the pedal switch is depressed to the 1st step and the right-hand side clamp foot comes down when it is depressed to the 2nd step by setting the DIP-1 SW-8 to its ON position.

Caution 2 : The flap presser is available as optional.
The flap presser does not actuate unless the DIP1-SW6 is set to its ON position.
You can change the order of these steps of procedure so that the left-hand side flap presser is closed when the pedal switch is depressed to the 4th step and the right-hand side flap presser is closed when it is depressed to the 5th step by setting the DIP-1 SW-7 to its ON position.

Caution 3 : When the short pin on the "OFF" side input/output circuit board, JP1 (jumper post) is set to the "ON" side, the start switch is turned ON when the pedal switch is depressed.

Make sure the following points before starting operation of the machine or day-to-day work.

1) Check that the electric supply cord and other electric connectors are firmly connected.
Turn the power switch ON and check that the indicator figures or indicator lamps on the control panel are both lighting. Also make sure that the motor of the machine properly rotates.

2) Check for the connection of each air supply hose including those to the stacker and ensure that the pressure gauge indicates 5.0 kg/cm^2. When necessary, adjust the pressure by the air regulator knob.

3) Check for the lubrication.
Fill the oil reservoir of the machine head with the lubricating oil.

4) Check that the remainings of the needle thread and bobbin thread are enough for the operation.

5) Make sure that the machine is in the standby position;
① The binder is in its upper position.
② The clamp foot is in the operator's side. (standby position)

How to remove the sewing table when winding the bobbin thread

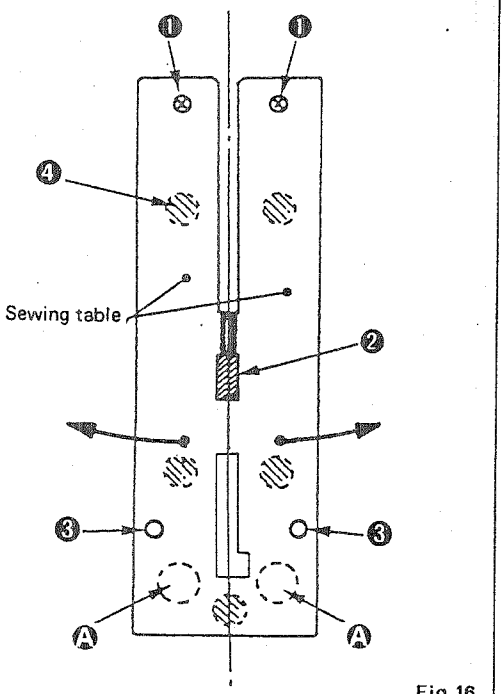


Fig.16

1. Move the clamp foot to the rear end.
2. Insert your fingers in holes Ⓐ in the under side of the sewing table and push up the sewing table with your fingers.
3. Move the left/right sewing table to the direction of the arrow with being kept pushed up, the bobbin case can be observed by you.

(Note) **Be careful in moving the sewing table so as not to contact the needle.**

4. After the completion of winding the bobbin thread, securely fit the sewing table to throat plate ❷ and positioning pins ❸ by following to the procedure for removing the sewing table inversely.
The sewing table is attracted by magnets ❹ at five points.

(Note) **Follow the same procedure to remove the sewing table when changing the needle gauge.**

10. HOW TO SET WORKPIECES AND OPERATE SWITCHES FOR PRACTICAL OPERATION

For the standard operation, set the workpieces and operate the switches in the following order;
Before starting operation, check for the related setting keys, switch-over keys, and indicators.

① Depress the foot valve switch.

The interlining clamping air cylinder will operate to push up the interlining clamp leaf spring.

② Set an interlining piece .

Place an interlining piece under the interlining clamp leaf spring in alignment with the cross-marks and release the foot valve switch.
Now the interlining piece is firmly held by the clamp leaf spring and the sewing table surface.

③ Set a body of garment material.

Place a garment material in a correct position using the cross-mark light in the similar way to ② , and check the parallellism of the garment material using the cross-mark light on the far side.

④ Depress the pedal switch to the 1st step.

The work clamp foot (right) will come down to clamp one side of the garment material.
Remove wrinkles, if any, by hand from the clamped garment material.

⑤ Depress the pedal switch to the second step.

The work clamp foot (left) will come down to clamp the garment material firmly in place.

⑥ Set a welting patch.

Place a welting patch in between the left and right clamp feet utilizing the cross-mark light.

⑦ Depress the pedal switch to the third step.

The binder will come down to clamp the welting patch and then fold it.

⑧ Depress the knee switch.

The work clamp foot will travel to the sewing position.

⑨ Release the pedal switch after the work clamp foot begins a travel.

The pedal switch must be released at the moment, otherwise the machine will directly go into the next clamping action immediately after it has reached the sewing position.

(Note) **The fourth and fifth step of the pedal switch will not actuate when depressed. Note that the pedal switch will be operated in a different way when a dart stretching flap presser is installed in option.**

The machine undergoes an emergency stop under the following conditions. The 7-segment LED on the setting switches in the control box now indicates the relevant error code, and the machine stops.

(1) Emergency stop by manual operation

If an abnormal noise is heard during an operation or when the machine needs to be stopped in an emergency, press the emergency stop switch mounted on the top of the machine head.

- ○ The machine stops with the needle stopped in its upper position.
- ○ The feeding mechanism stops with the clamp foot lowered.

The function of the machine will stop in the above conditions and error code "AL-01" will be displayed.

[How to reset]

Correct the trouble which made the emergency stop function, release the emergency stop switch, and then press the reset key.

The clamp foot will travel to the rear end, and then the clamp foot and binder will return to home position.

The set ready indicator lamp will go off and manual mode will start to function.

(2) Automatical emergency stop

The automatical emergency stop mechanism will be actuated by one of the following reasons;

[See (3) "List of alarm codes"]

(3) List of alarm codes

Alarm code	Description	Corrective measures	Time of detection	Remarks
AL-01	Emergency stop switch is turned ON.	Depress the reset key.	Anytime.	Momentary stop during operation
AL-02	Servomotor overload alarm for clamp foot travel	Eliminate the cause, and press the reset key after confirming that the servomotor normally runs.		
AL-04	Thread breakage is detected.	Check the needle thread and bobbin thread, and press the reset key.	Automatic mode, while the machine rotates.	
AL-09	Failure in detection of the corner knife being in the lower end position.	Check the operation of corner knife, and press the reset key.	When the clamp foot starts feeding action. First step of pedal switch.	
AL-10	Failure in detection of the center knife being in the upper end position	Confirm the center knife upper position detecting function normally works, then press the reset key.	When the clamp foot starts feeding action. First step of pedal switch.	
AL-11	The binder is not in the correct position.	Check the operation of binder and the operation of the sensor to detect the lowest position of the binder, and press the reset key. When the dart stretcher is used, check the performance of the binder upper position sensor.	When the power to the machine is turned ON. When the clamp foot starts the feeding action. When the MACHINE READY key is pressed.	
AL-12	The thread take-up lever is not in its highest dead point.	Adjust the thread take-up lever to the highest dead point.	When the clamp foot starts feeding action. When operating the pedal switch. When the MACHINE READY key is pressed.	
AL-17	The roller stacker is not detected to be in its upper end position.	Confirm the action of the roller unit and the roller stacker upper position detecting function normally works, then press the reset key again.	While the clamp foot is engaged in feeding action.	The detection is made only when the optional roller stacker has been connected.
AL-18	The darts stretcher is not detected to be in its upper end position.	Confirm the dart upper position detecting function normally works, then press the reset key. Then press the machine ready key again.	When the binder comes down. When the MACHINE READY key is pressed.	The detection is made only when the optional darts stretcher is used.

Alarm code	Description	Corrective measures	Time of detection	Remarks
AL-21	Size, outside the range of data	Press the reset key, and input the correct data again.	When the MACHINE READY key is pressed.	Gauge size 8 through mm. 35 through 180 mm Gauge size 14 through 20 mm. 50 through 180 mm
AL-26	Lockstitch pitch, outside the range of data	Press the reset key, and input the correct data again.	When the MACHINE READY key is pressed.	2.0 through 3.0 mm
AL-27	Condensation pitch, outside the range of data			0.5 through 1.5 mm
AL-31	Center knife front, outside the range of data			5 through 15 mm
AL-32	Center knife rear, outside the range of data			7 through 15 mm
AL-41	Error in setting the stacker	Press the reset key, and input the correct data again.	When the MACHINE READY key is pressed.	
AL-43	Error in setting the gauge size			Gauge size 8 through mm
AL-44	RAM error check	Turn OFF the power to the machine, and inform JUKI of the occurrence of error.	When the power to the machine is turned ON.	This type of error will occur in ordinary sewi works. It is necessary check the CPU circuit board.
AL-45	Error of the sensors to detect the front end and the rear end of the clamp foot travel	Check the sensor to detect the front end and the rear end of the clamp foot travel, and press the reset key.	When the clamp foot travels to its front/rear end.	

12. ADJUSTMENTS

(1) Binder mechanism

When you depress the pedal switch to the third step, the air cylinder will actuate and the binder will be lowered between the left and right clamp feet.
After a welt has been made, the corner knife has completed its cutting operation, the air cylinder raises the binder to its upper position.

1) Position of the binder when lowered

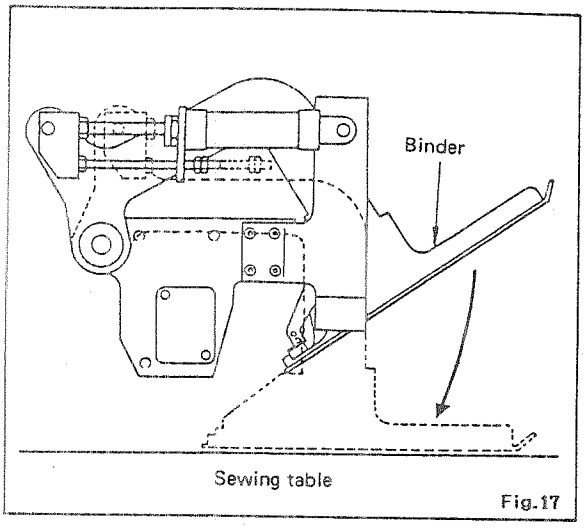


Fig.17

1. Turn the power switch off and lower the binder pressing it to the direction of the arrow manually.

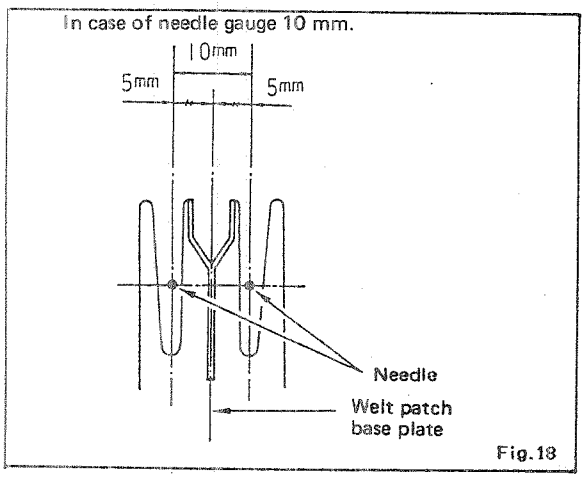


Fig.18

2. Confirm that the binder rests just in the middle of two needles and that both needles do not come into contact with the welting patch base plate as shown in Fig. 18.

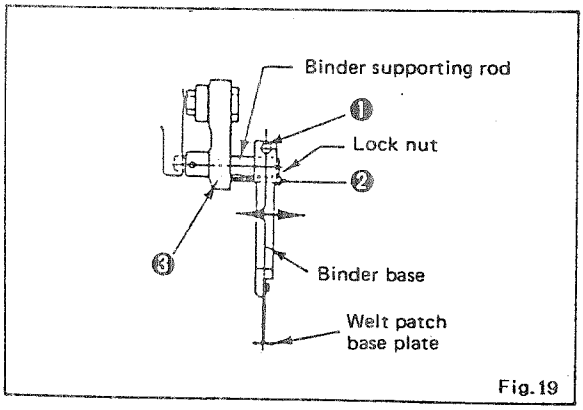


Fig.19

3. When the binder will not be lowered to its lowest position shown in Fig. 19, loosen setscrew ❶ and adjust the position of the binder by moving the binder unit to the direction of arrow along with the welt patch scale supporting pin.
Fit positioning bolt ❷ securely on to the side face of the binder base ❸ and tighten with the lock nut.

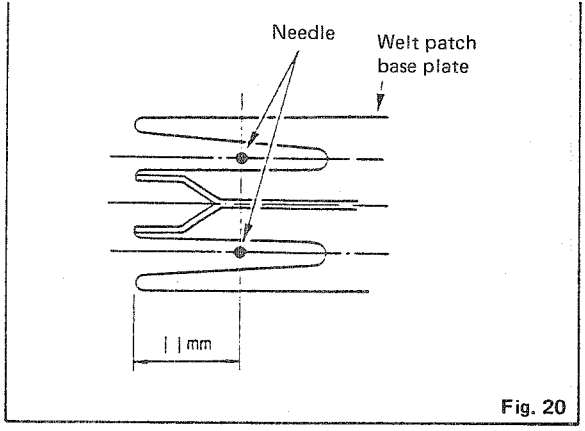


Fig. 20

4. Provide about 11 mm clearance between the needle entry point and the rear end of welt patch base plate.

(Caution) Confirm that the center knife does not come into contact with the knife cover of the binder circuit board.

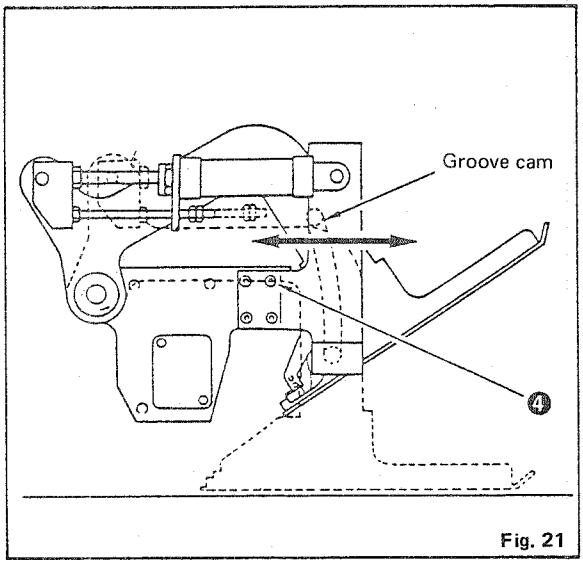


Fig. 21

5. If the distance given in Fig. 20 cannot be provided, loosen four screws ❹ which fix the groove cam illustrated in Fig. 21 in position, and adjust the distance moving the groove cam in the direction of the arrow. After the groove cam is moved, be sure to check the clearance between the binder and the sewing table. If the predetermined clearance is not provided between them, adjust the clearance properly referring to "3) Horizontal of the binder" on page 28.

(Caution) When you adjust each component, change the position of the needle by turning the handwheel with your hand with power "ON". After the adjustment, don't forget to set the thread take-up to its upper-stop position before you start sewing on trial.
Alternatively, you can set the machine with the thread take-up at its highest point simply by turning power "OFF" and then "ON".

2) **Concentricity between welt patch base plate and center of the needle**

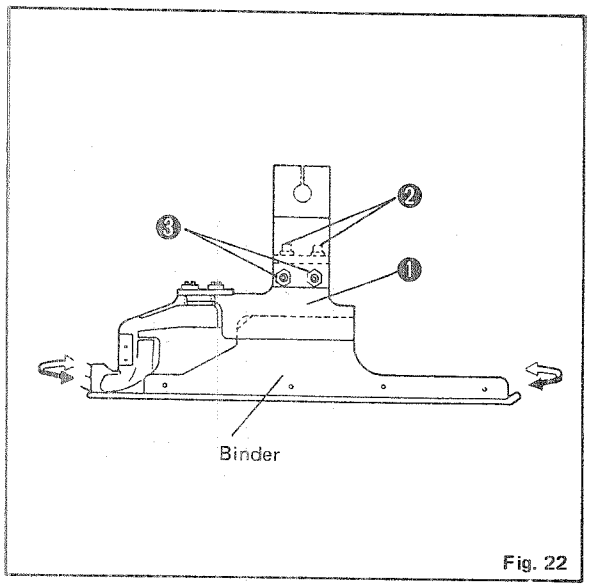


Fig. 22

1. Loosen bolt ❷ which fix binder mounting base ❶ in position.
2. Slide base can be swung to each direction of the arrows by tightening/loosening adjusting bolt ❸.
3. Provide proper concentric angles between welt patch base plate and the center of the needle and then tighten locknut of adjusting bolt ❸ and securely fix binder mounting base ❶ with bolt ❷.

(Caution) **If the concentricity of the binder and the clamp foot with regard to the direction of travel of the clamp foot is not obtained, adjust the position of the binder with regard to the clamp foot following the procedure described above. (Do not loosen the screw in the installation support (fixed on the machine head) for the clamp foot rail.)**

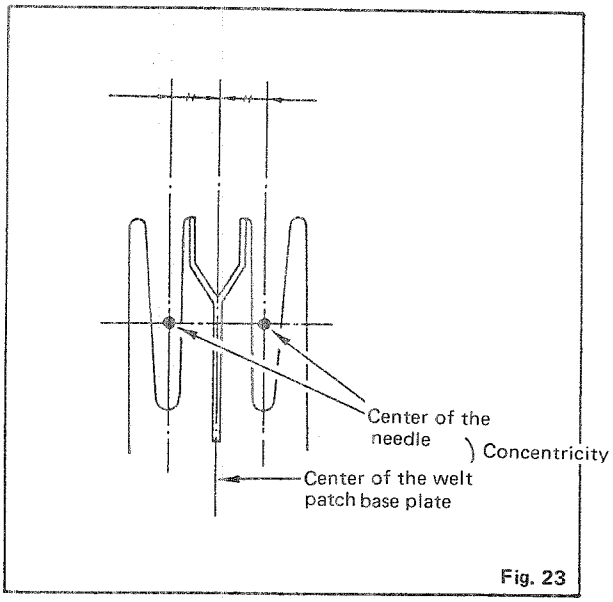


Fig. 23

Check and adjust the horizontal of the binder (the welt patch base plate is attached in parallel to the table surface), as well as the lower position of the binder and concentric angles.

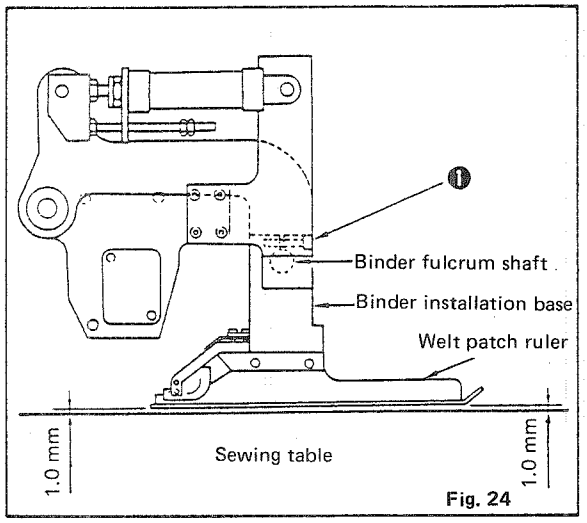


Fig. 24

1. Lower the binder manually in the same way as it is lowered when its lower position is adjusted.
2. Provide about a 1.0 mm clearance between the reverse side of the welt patch base plate and upper surface of the sewing table and make the clearance constant all the way between them (Be sure that the difference between the front and rear end of the welt patch base plate does not exceed 0.2 mm).
3. Adjust the horizontalness of the binder first. Loosen screw ❶ which fixes the binder installing base. Then swing the whole unit of the binder in the direction of the arrow centering the binder fulcrum shaft until the horizontalness of the binder is obtained. After the adjustment of the horizontalness of the binder, securely tighten screw ❶.

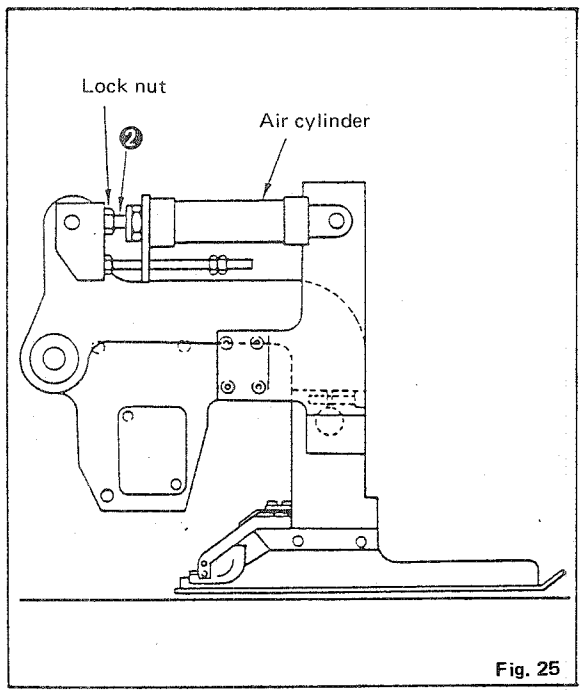


Fig. 25

4. Adjust the clearance (1.0 mm) between the bottom surface of the welt patch base plate and the top surface of the sewing table by turning cylinder rod ❷, at illustrated in Fig. 25. Loosen the locknut. Start screwing in cylinder rod ❷ in order to lower the welt patch ruler, or in the protruding direction to raise it. After a clearance of 1.0 mm has been obtained, tighten up the locknut.

4) Using the binder stopper nut

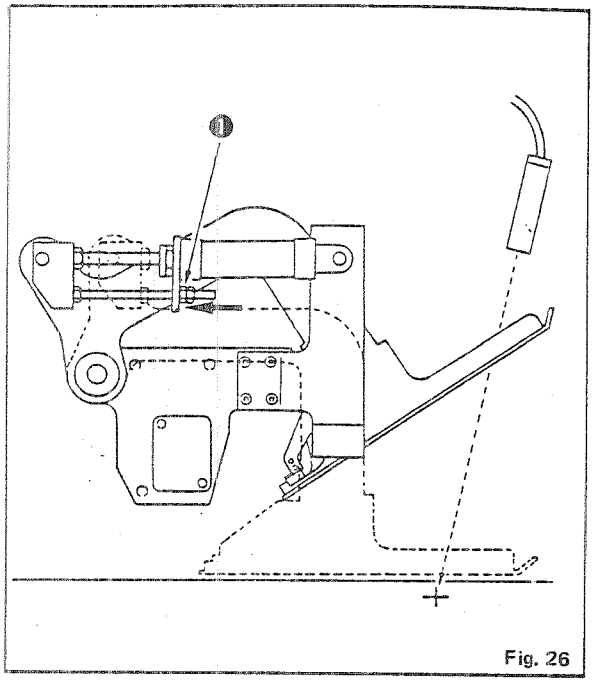


Fig. 26

To enhance productivity, this machine has been designed so that the lifting amount of the binder can be reduced, whereby the binder can be stopped in its intermediate position.
In this case, fix stopper nut ❶ in a deeper position, as illustrated in Fig. 26, then operate the binder.

(Caution) **The lifting amount of the binder should be reduced while confirming that there is enough light emitted from the + marking lamp.**

5) Cloth guide finger

The cloth guide finger stabilizes the welt patches while they are being sewn.

(Caution) **Be sure to carry out this adjustment when you have changed the needle gauge.**

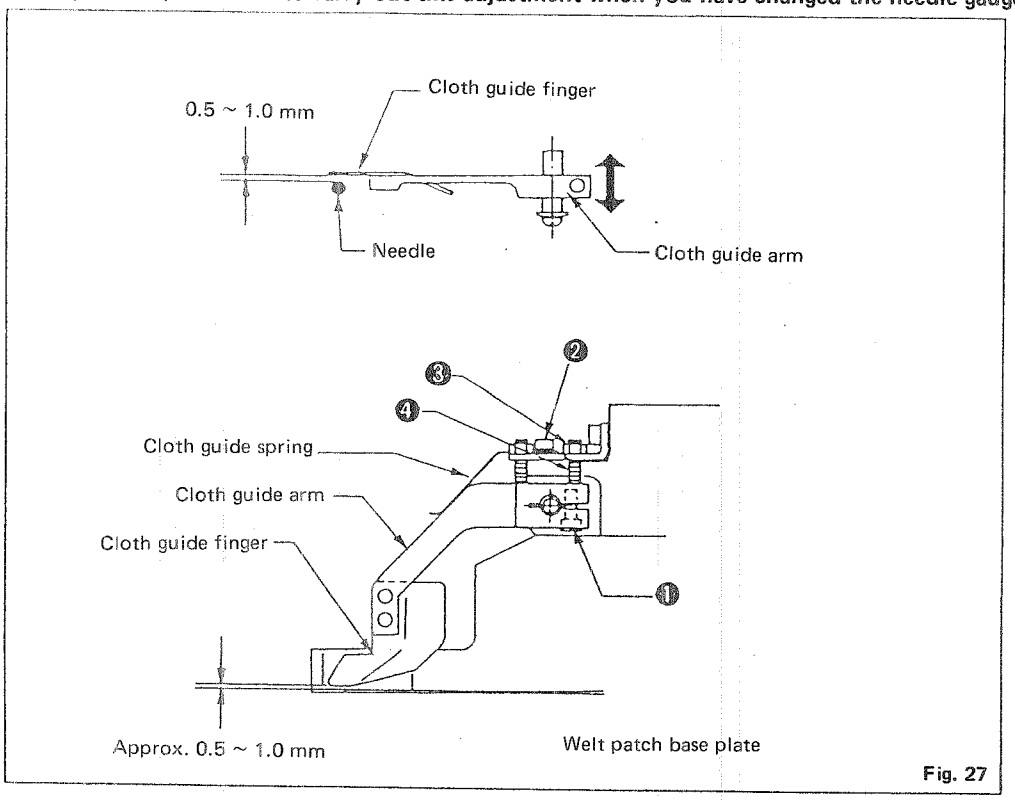


Fig. 27

1. Loosen cloth guide arm setscrew ❶ and move the cloth guide finger close to the needle so that approx. 0.5 to 1.0 mm clearance is provided between the side faces of the needle and the cloth guide finger.
2. Adjust the cloth guide spring so that it lightly presses the cloth guide arm. Be careful not to given an excessive pressure on the workpiece while being fed.
   The pressing pressure of the cloth guide spring can be adjusted by screw ❷.
3. Provide approx. 0.5 to 1.0 mm (thickness of a welt patch) between the cloth guide finger and welt patch base plate. When adjusted, loosen lock nut ❸ and provide a proper clearance with screw ❹.
   After adjusted, securely tighten lock nut ❸.

1) Tension of the clamp foot traveling belt

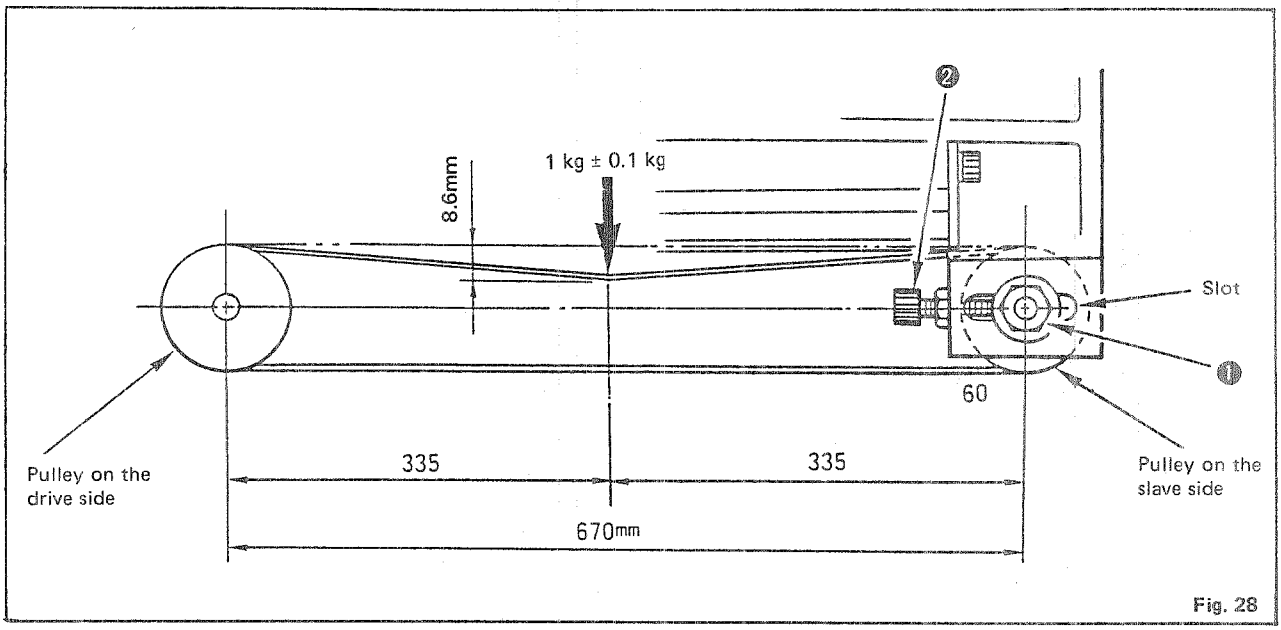


Fig. 28

The tension on the clamp foot feeding belt can be adjusted by loosening locknut ❶ and shifting the slave pulley inside the slot in the base. (The pulley can be shifted by moving adjustment screw ❷ back and forth.) The tension on the belt should be adjusted so that the middle of the belt slackens by 8.6 mm when a pressure of 1.05±0.15 kgf is applied.
After making the adjustment, tighten up locknut ❶.

2) Tension of the clamp foot driving belt

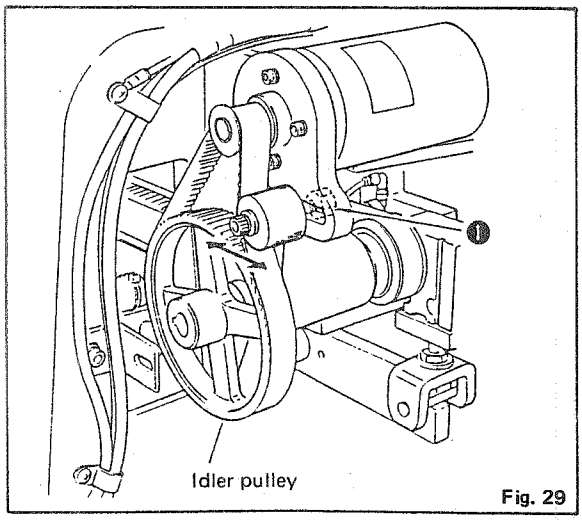


Fig. 29

Loosen set bolt ❶, and the tension of the clamp foot driving belt can be adjusted by the idler pulley. If the belt tension is proper, when 0.4 to 0.5 kg pressure is pressed on the belt at the middle of the pulleys, the belt will bend down approx. 1.5 mm. After adjusted, be sure to tighten set bolt ❶ securely.

3) Clamp foot front end stop position and rear end stop position

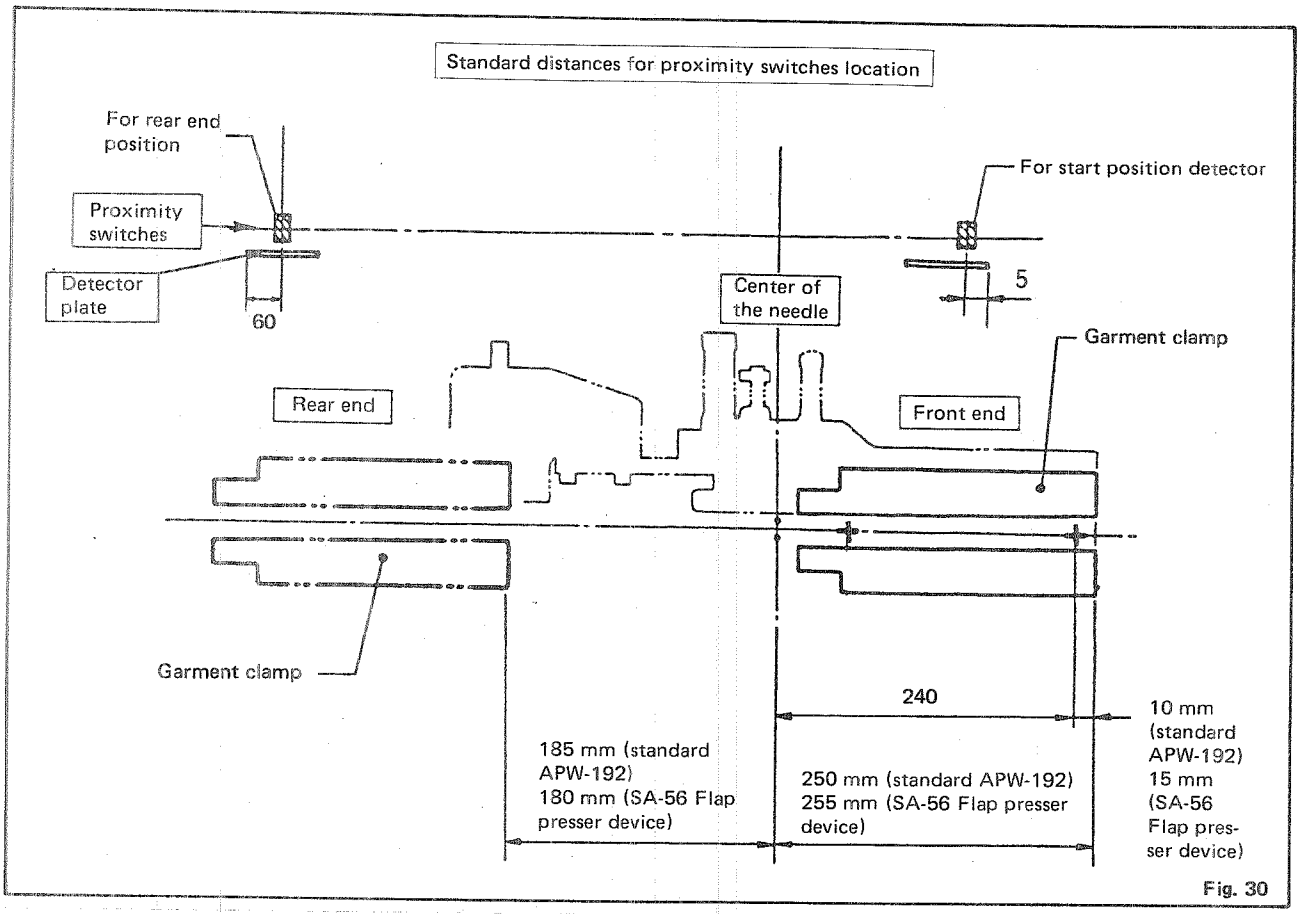


Fig. 30

Clamp foot front end stop position and rear end stop position are to be determined by the position of the proximity switches. Determine the stop positions of the clamp foot as shown in Fig. 30 refering to the standard distance for proximity switches.

- Clamp foot front end is where tip of the garment clamp is 250 mm (standard APW-192) or 255 mm (SA-56 Flap presser device) away from the center of the needle.
- Clamp foot rear end is where tip of the garment clamp is 185 mm (standard APW-192) or 180 mm (SA-56 Flap presser device) away from the center of the needle.

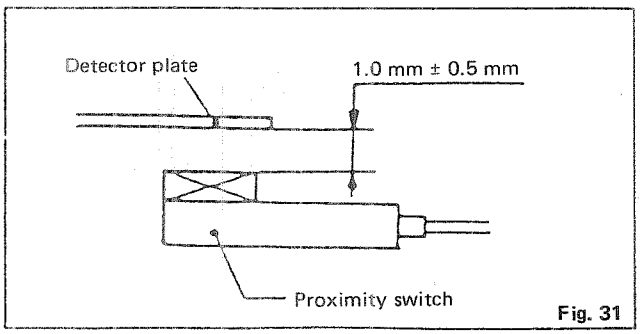


Fig. 31

Provide the clearance of 1.0±0.5 mm between the proximity switch and the detector plate.

1) Parallelism of the clamp feet

The left and right clamp feet must travel in parallel with needles and the welt patch base plate while switches are made. The parallelism of the clamp foot has already been adjusted in factory before shipment.

If readjustment is necessary for operation; adjust refering to "(1) Binder mechanism 2) Concentricity between welt patch base plate and center of the needle."

2) Adjusting the lateral position of the garment clamp

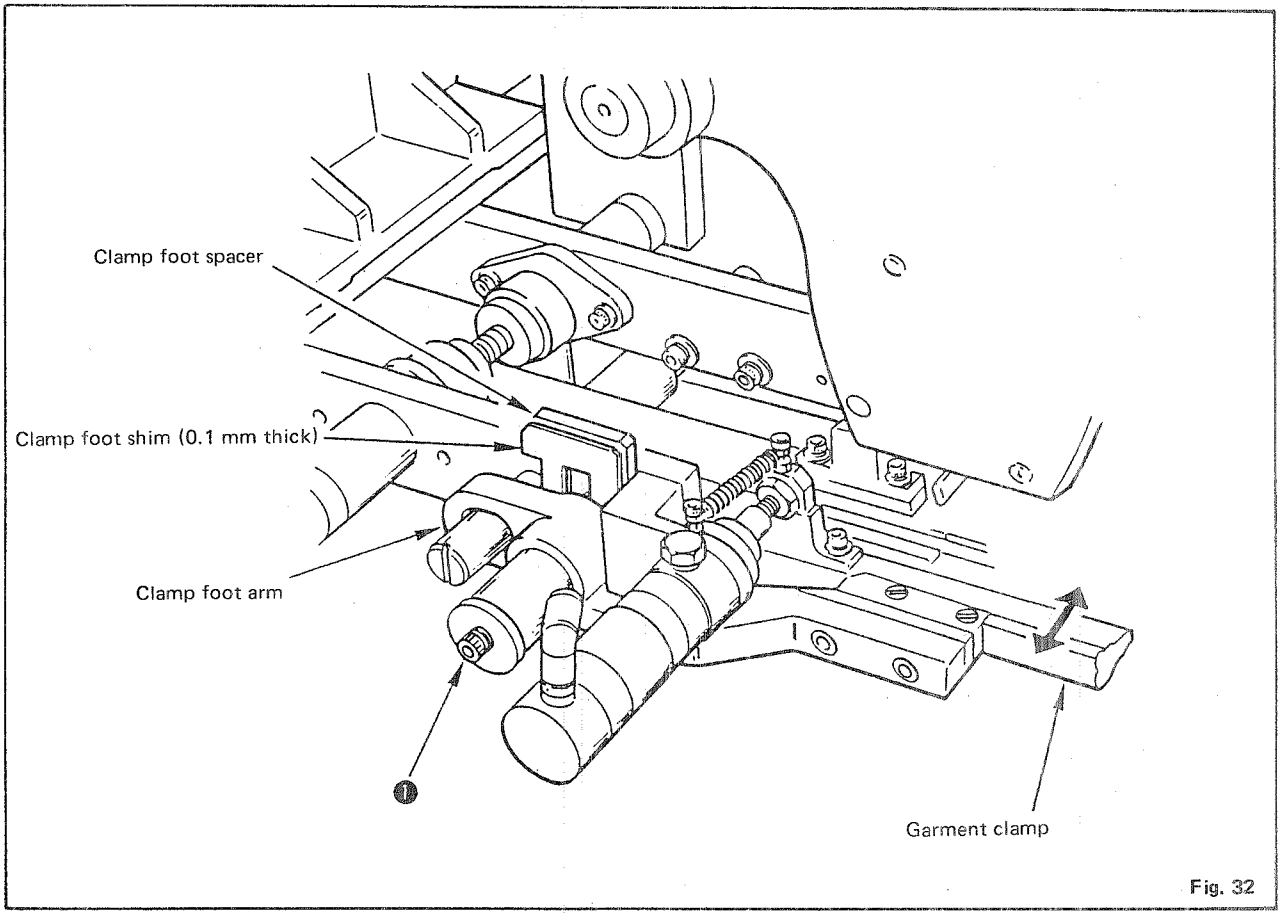


Fig. 32

The position of the garment clamp is adjusted by fitting the clamp foot spacer appropriate for the ruler size inside the clamp foot arm.

When changing the welt patch ruler, loosen screw ❶, pull the clamp foot arm toward you, and replace the spacer with the appropriate one. Then tighten screw ❶ to fix the clamp foot arm in position.

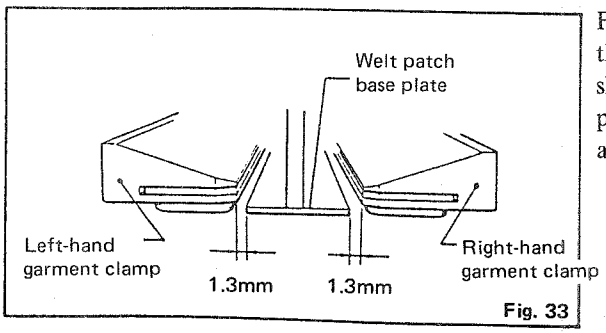


Fig. 33

Finely adjust the clearance between the garment clamp and the welt patch ruler should be carried out using the clamp foot shim. The clearance between the garment clamp and the welt patch base plate should be adjusted to approximately 1.3 mm as illustrated in Fig. 33.

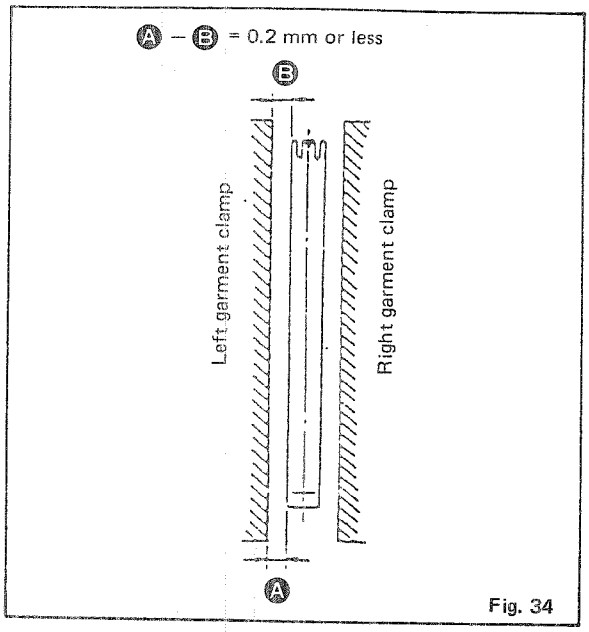


Fig. 34

The clearance must be kept in parallel to the welt patch base plate. Make sure that the difference between the front end and rear end of each garment clamp must not exceed 0.2 mm. If not, loosen screw ❷ (Fig. 35), and move the garment clamps in the direction of the arrow (Fig. 35) using the welt patch ruler as reference so that the garment clamps are positioned parallel with each other with respect to the clearance between them.

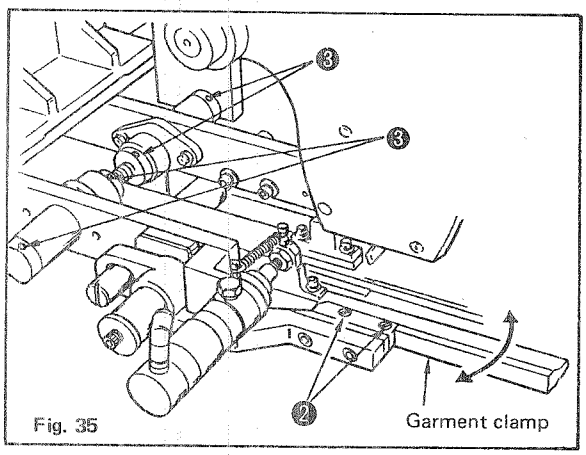


Fig. 35

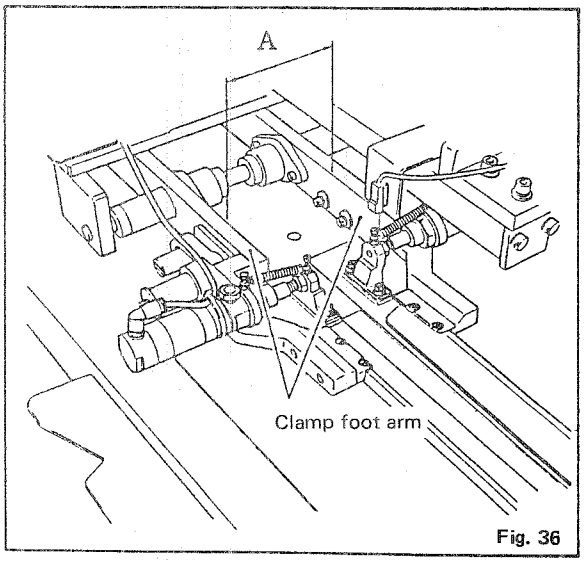


Fig. 36

When replacing the gauge, be sure to adjust the distance between the inner surfaces of the clamp arm (left) and the clamp arm (right) while referring to the table below.
Loosen screws ❸ in the collar (see Fig. 35) and adjust the clearance properly by extending the right- and left-hand clamp foot arms equidistantly.

Gauge size G (mm)	Distance between the inside of clamp foot arms A (mm)
8	91
10	93
12	95
14	97
16	99
18	101
20	103

(Caution) Tighten screw ❸ in the collar taking care not to provide a play in the clamp foot arm.

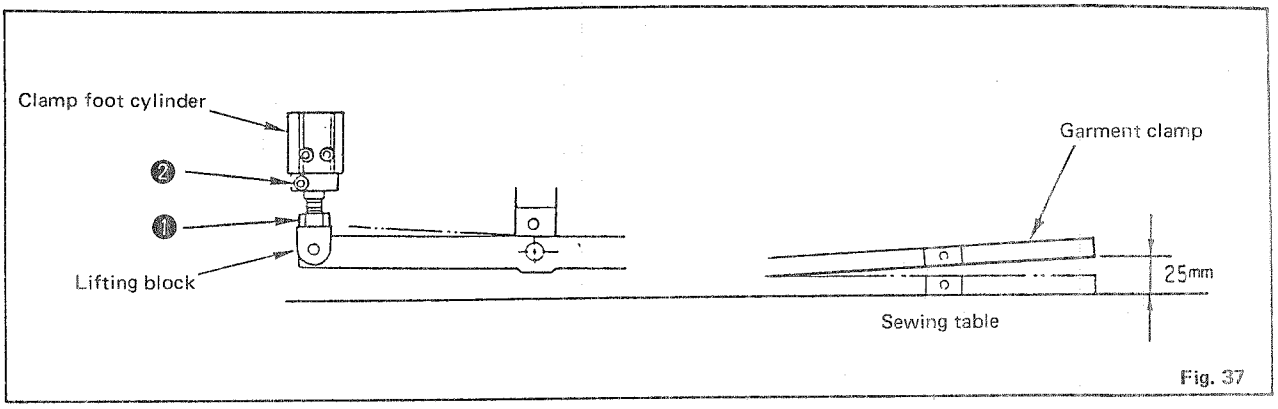


Fig. 37

The garment clamp always goes up at the time of emergency.
The standard lifting amount of the garment clamp at the time of emergency is obtained by providing a 25 mm distance between the surface of the sewing table and the top end of the garment clamp. If it is necessary to adjust the lifting amount of the garment clamp, loosen locknut ❶ located at the top end of the clamp foot cylinder rod and screw ❷ in the guide, and change the screwing depth of the locknut ❶ in the lifting block to adjust the lifting amount of the garment clamp as desired.
(Caution) When adjusting the lift, make sure that the garment clamp does not contact the sewing machine.

4) Welt patch folding plate

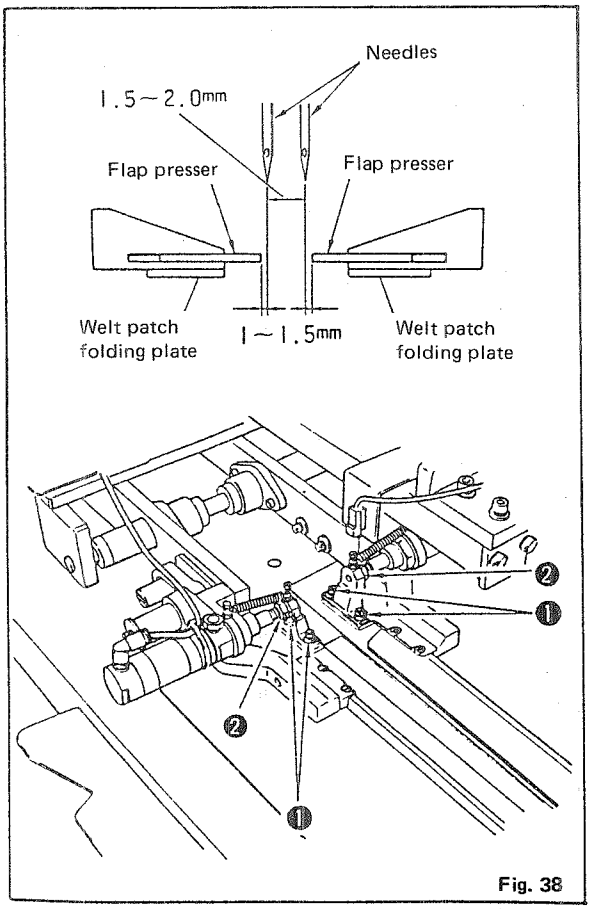


Fig. 38

When the clamp foot has reached its front end position, there must be a clearance of approx. 1 ~ 1.5 mm between the folding plate and the needle on each side and that the folding plate must travel parallel with the needle as shown in Fig. 38. Adjust the parallelism between the clamp foot and the needle while loosening fixing screw ❶ of the folding plate.
Loosen locknut ❷ and adjust the clearance at the front end and the rear end of the welt patch base plate by turning the cylinder rod. After adjusted, securely tighten lock nut ❷.

(4) Adjusting the clamp foot, welt patch folding plate and the flap presser mechanism of the SA-56 flap presser device (optional)

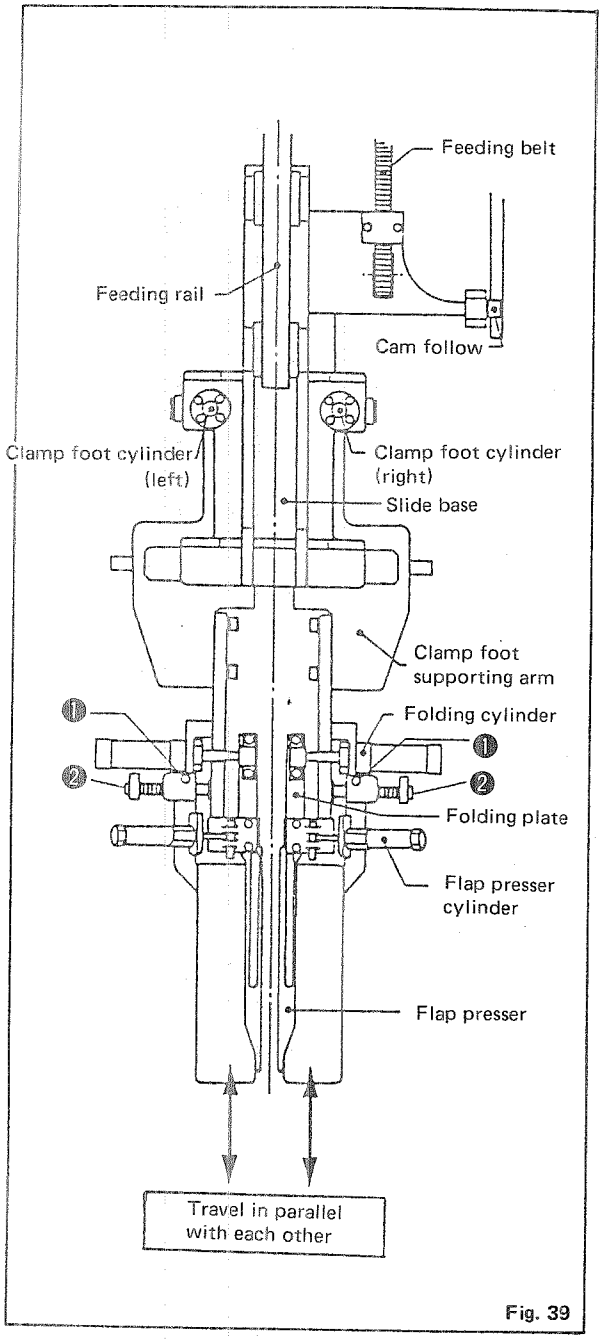


Fig. 39

1. When you depress the pedal switch to the first step, the right clamp foot cylinder is driven to lower the right clamp foot as well as the left clamp foot cylinder is driven to lower the left clamp foot. It is the completion of garment clamp operation.
   After a welt patch is fed and the binder is lowered, left and right side of the welt patch is folded by the welt patch folding cylinder.
2. When sewing flaps, set flap pieces on either left or right side (manually or automatically) and depress the pedal switch, and then the flap presser cylinder will be driven to press the flaps on the fixed position. (SA-56)

(Caution) **When attaching a flap using the APW-192 machine, the fixed distance stitching method should be taken since the machine is not equipped with a flap photoelectric tube.**

1) Parallelism of the clamp feet

The left and right clamp feet must travel in parallel with needles and the welt patch base plate while switches are made. The parallelism of the clamp foot has already been adjusted in factory before shipment.
If readjustment is necessary for operation; adjust refering to "(1) Binder mechanism 2) Concentricity between welt patch base plate and center of the needle."

accurately.

Position the garment clamps taking the welt patch base plate of the binder which has been adjusted beforehand as standard.

[How to travel the garment clamp]

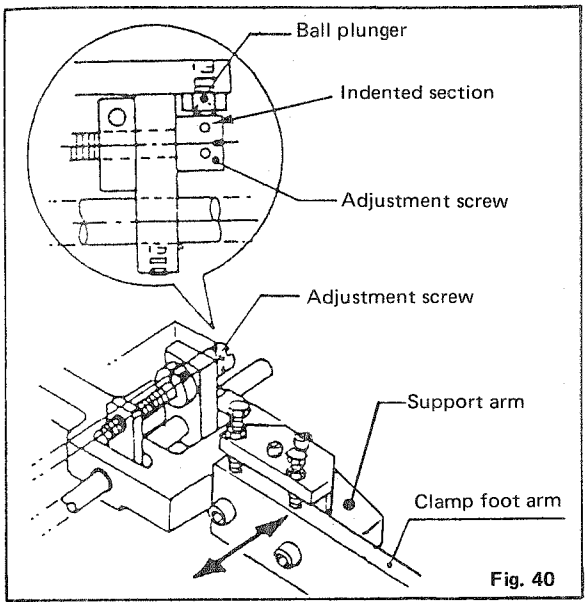


Fig. 40

1. Adjusting the position to clamp the body to be sewn when the needle gauge is changed.
   The garment clamps can be moved to the direction of the arrow by turning the adjusting screws in Fig. 40. Turn the adjusting screw to the right, and the distance between left/right garment clamps will be widened. Turn the adjusting screw to the left, and the distance between left/right garment clamps will be narrowed. The garment clamp travels 0.7 mm by one rotation of the adjusting screw.
   When adjusting, be sure to turn the adjusting screw until the ball of the ball plunger fits in the pit of the adjusting screw.

(Caution) After adjustment, the flap presser of the folding plate will be also moved.

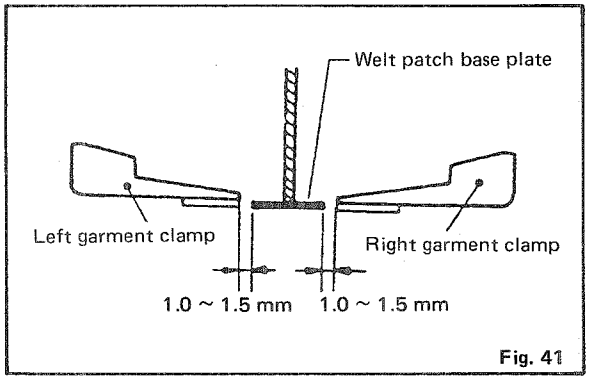


Fig. 41

2. Adjusting the clearance between the garment clamp and the welt patch base plate when changing the double-welt sewing mode to the single-welt sewing mode.
   Loosen screw ❶ and turn screw ❷ in Fig. 39, then only the garment clamps will be moved.
   Travel garment clamps to provide the clearance of 1.0 mm to 1.5 mm between each of the garment clamps and the welt patch base plate.
   Adjust the clearance between the garment clamp and the welt patch base plate when changing the double-welt sewing to the single-welt sewing.

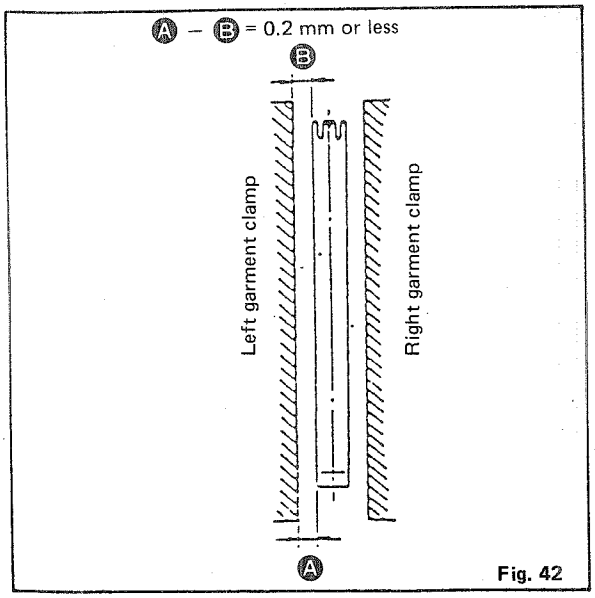


Fig. 42

3. The clearance must be kept in parallel to the welt patch base plate. Make sure that the difference between the front end and rear end of each garment clamp must not exceed 0.2 mm.

3) Garment clamp lift

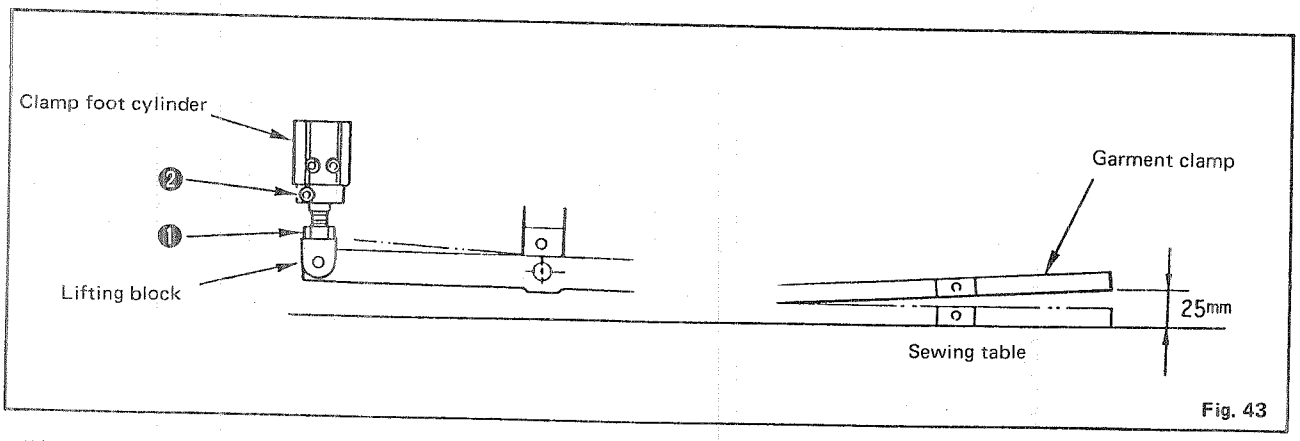


Fig. 43

The garment clamp is always kept in the upper resting position when it does not operate. The standard lifting amount of the top end of the garment clamp from the surface of the sewing table is 25 mm.
To adjust the lifting amount, loosen locknut ❶ at the top end of the clamp foot cylinder rod and screw ❷ in the guide, and change the screwing depth of the clamp foot cylinder into the lifting block.
After adjustment, be sure to tighten lock nut ❶ and screw ❷ securely.
(Note) When adjusting the lift, make sure that the garment clamp does not contact the sewing machine.

4) Welt patch folding plate

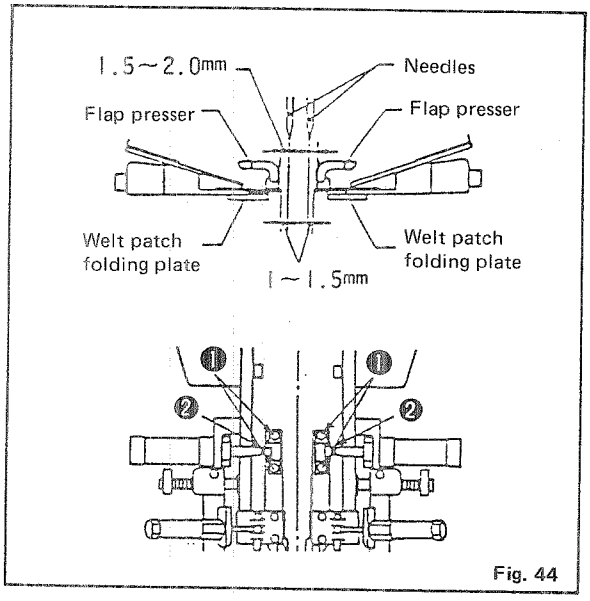


Fig. 44

When the clamp foot has reached its front end position, there must be a clearance of approx. 1 ~ 1.5 mm between the folding plate and the needle on each side and that the folding plate must travel parallel with the needle as shown in Fig. 44.
Adjust the parallelism between the clamp foot and the needle while loosening fixing screw ❶ of the folding plate.
Loosen locknut ❷ and adjust the clearance at the front end and the rear end of the welt patch base plate by turning the cylinder rod. After adjusted, securely tighten lock nut ❷.

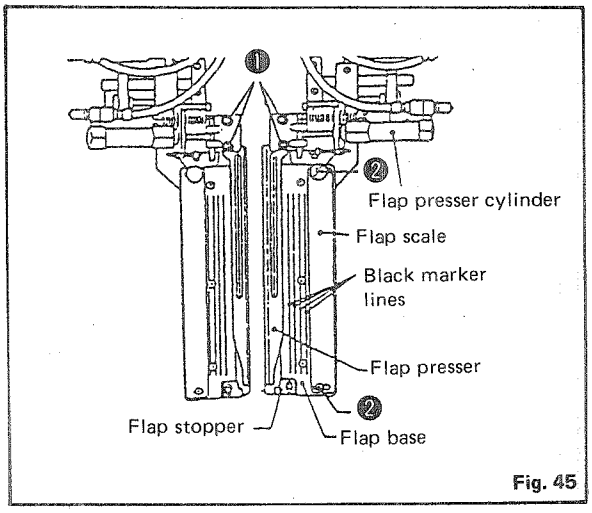


Fig. 45

Set the flap scale according to the length of flaps to be sewn after loosening flap scale setscrew ❷.
Use the black marker lines on the flap base as standard for the parallelism of the flap scale.
Provide a clearance of approx. 1.5 ~ 2.0 mm (Fig. 44) between the flap presser and the center of the needle using screw ❶.

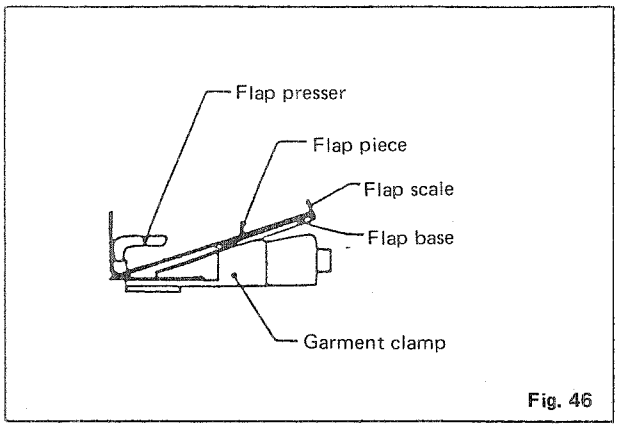


Fig. 46

Make sure that the flap presser is securely pressing a flap piece.

6) Flap stopper

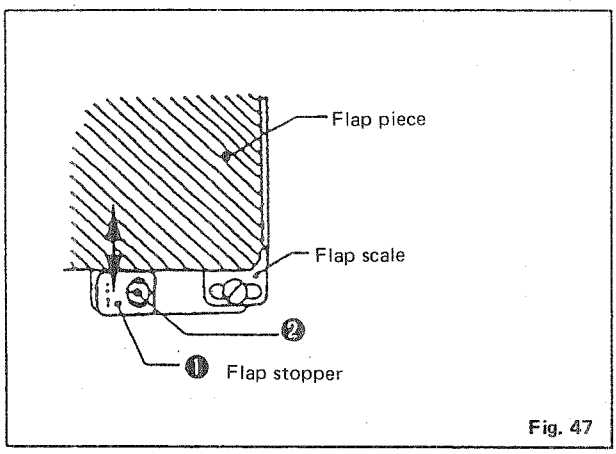


Fig. 47

Loosen screw ❷, and adjust flap stopper ❶ which is mounted on the top end of the flap base so that the flap end aligns with the sewing end position.

(5) Adjusting the corner knife

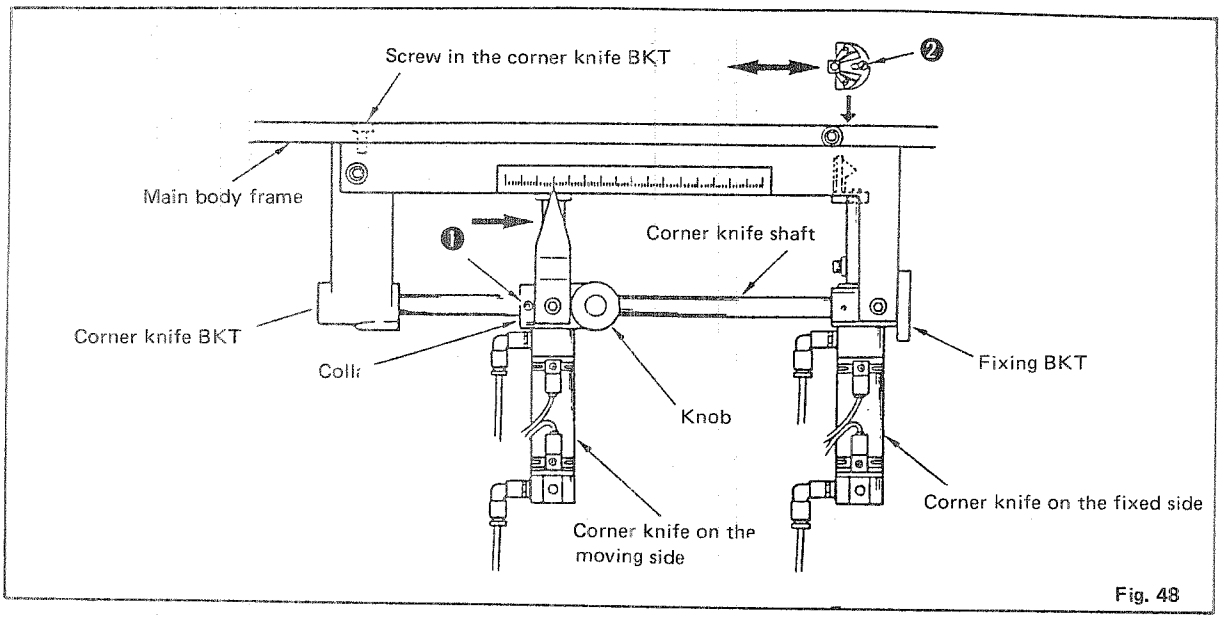


Fig. 48

Be sure to adjust the corner knife in accordance with the seam length following the procedure described below.

1. Loosen the knob, and move the corner knife on the moving side (using the scale as reference). A fine adjustment is necessary since the dropping position of the corner knife may change in accordance with the material of stitch shrinkage. **(Caution) Do not set the travelling amount of the corner knife to 180 mm or more.**
2. Loosen two screws ❶ in the collar, and press the collar against the corner knife fixed to the position in order to obtain the predetermined seam length. Then tighten two screws ❶ so as to fix the corner knife in place.
3. Make sure that the teeth of the corner knife are protruding or are indented, or change the angle of the corner knife after moving the corner knife on the moving side until the corner knife on the fixed side is reached. After making the adjustment, move the corner knife up to the collar, as described in step 2) above, and tighten the knob. (The position of the collar stated in step 2) is used to position the corner knife on the moving side.)
4. Loosen screw ❷, and move the screw in the direction of the arrow. Now finely adjust the position of the corner knife on the fixed side.

1) Positional relationship of the corner knife, + marking lamp, needle and garment clamp

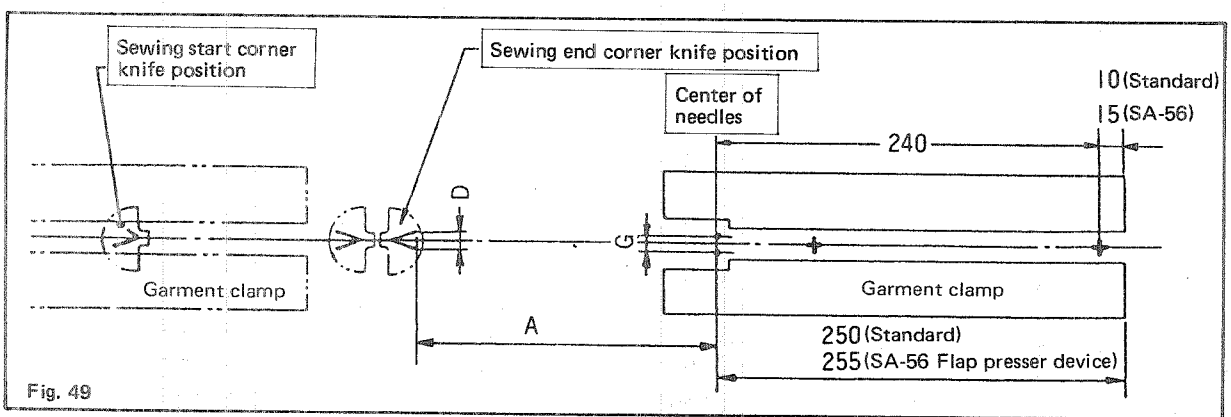


Fig. 49

G	Gauge width	8	10	12	14	16	18	20
A	Fabrication dimensions	134.5	135	133.5	131.5	130	(128)	(126.5)
D		7	9	11	13	15	17	19
Minimum seam length when inputting the L size		35 ~ 180			50 ~ 180			

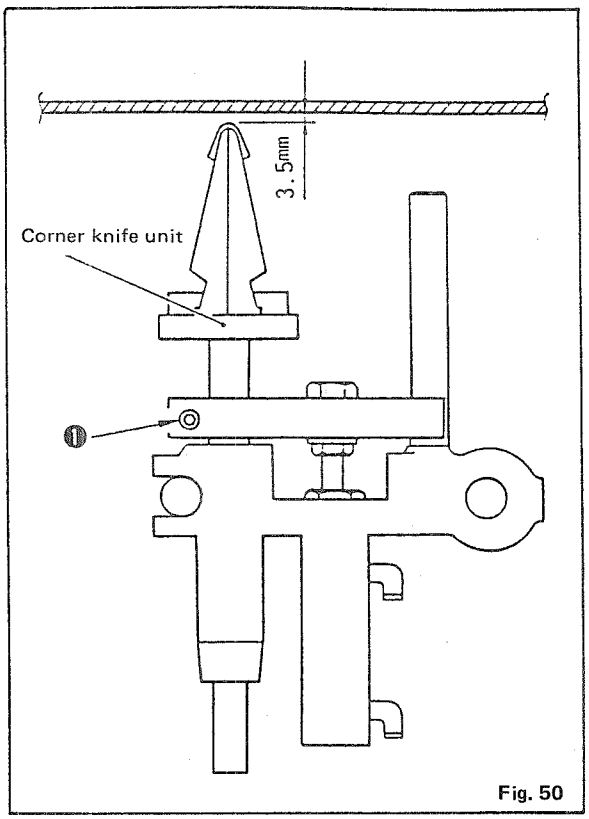


Fig. 50

When the corner knife lifting cylinder reaches its lowest position, there must be a clearance of approx. 3.5 mm between the top ends of both moving corner knife and fixed corner knife and the surface side of the table. This adjustment can be made by moving up and down whole of the corner knife unit after loosening setscrew ❶.

3) Center of the corner knife

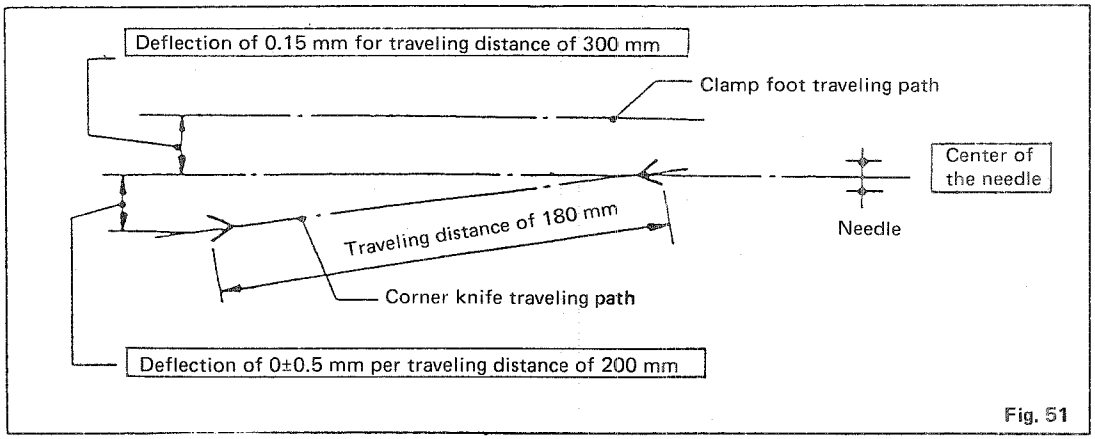


Fig. 51

The center of the corner knife should be aligned with the center of the needle when the corner knife moves. Although the alignment is correctly adjusted at the time of delivery, in the event that the corner knife bracket is moved due to an external impact, loosen the bolt fixing the corner knife frame in place, and shake the whole corner knife bracket so that the clearance between the moving corner knife and the center of the needle is 0±0.5 mm or less when the moving knife is moved by approximately 200 mm. Before adjusting the clearance by moving the corner knife bracket, be sure to loosen the screw in the fixed bracket supporting the opposite side of the shaft.

4) Deflection of the corner knife

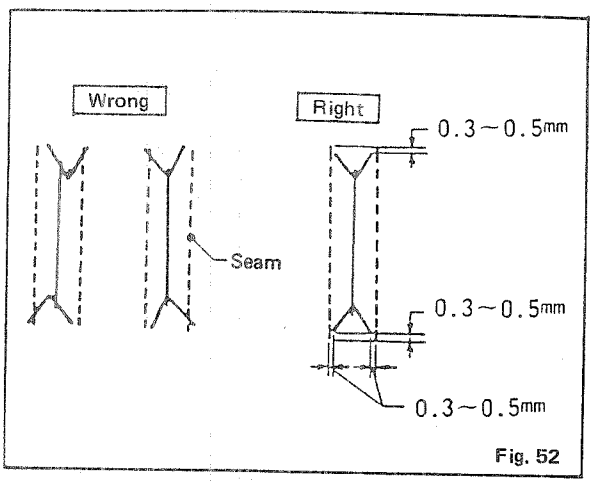


Fig. 52

If the corner knife is set deflected to right or left, or distorted, defective tab cuts as shown in Fig. 52 will result. The corner knife must always cut just in the middle of the seams without cutting the thread in the seam. When the center of the corner knife has been correctly adjusted, only a fine-adjustment will be required to attach a corner knife blade.

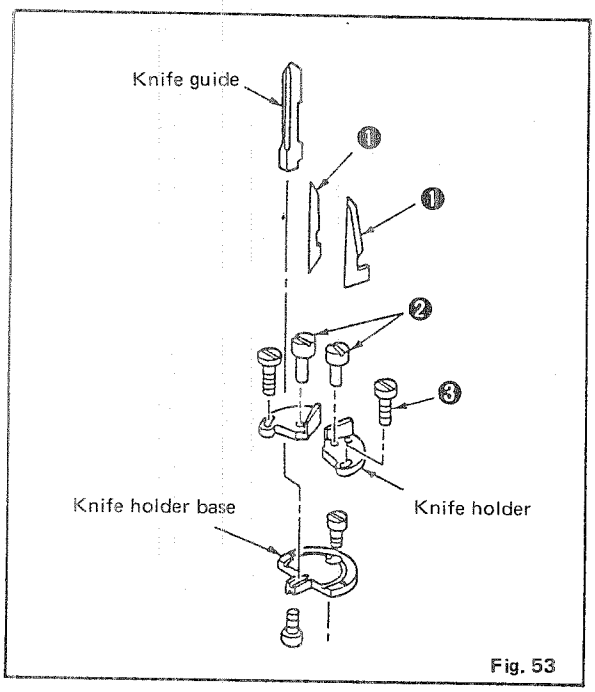


Fig. 53

Corner knife blade ❶ can be adjusted by loosening knife fixing eccentric pin ❷. Knife holder can be adjusted by loosening setscrew ❸.

When you make a fine-adjustment, be sure to set a workpiece to be sewn and operate the machine practically.

(Note) It might be dangerous to lift or lower the corner knife. So take enough care when you replace the corner knife blade.

Turn eccentric pin ❷ for fixing the knife in the direction of the arrow so that the knife is fixed in position.

5) How to replace the corner knife blade

When the corner knife blade is replaced, travel the clamp foot to its rear end position by the clamp foot travel key on the control panel, remove the sewing table and operate the corner knife lifting solenoid valve manually to raise the corner knife. Then the corner knife blade will be replaced easily. Loosen knife fixing eccentric pin ❷ and replace the corner knife blade ❶. Turn eccentric pin ❷ for fixing the knife in the direction of the arrow so that the knife is fixed in position. Upon completion of the replacement work, be sure to perform sufficient trial cutting to prevent a defective cutting result ahead of the actual operation.

1) How to adjust the grasping stacker (SP-25)

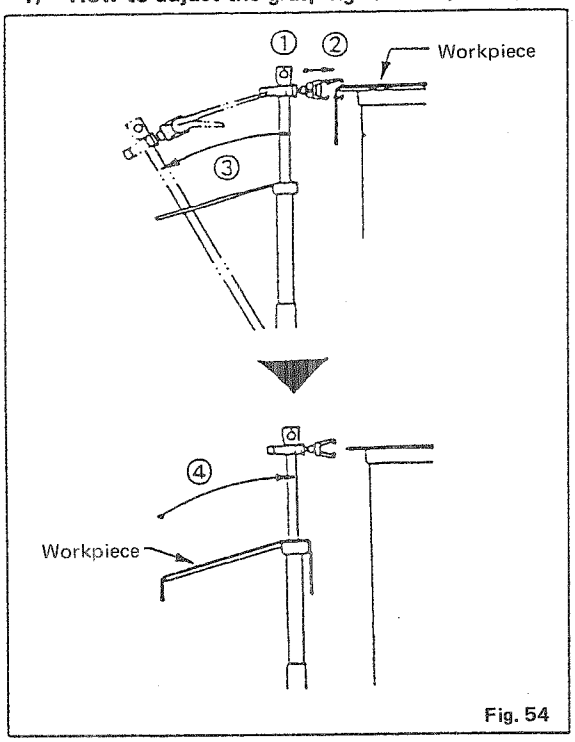


Fig. 54

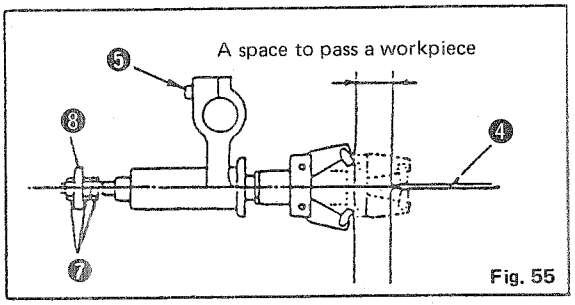


Fig. 55

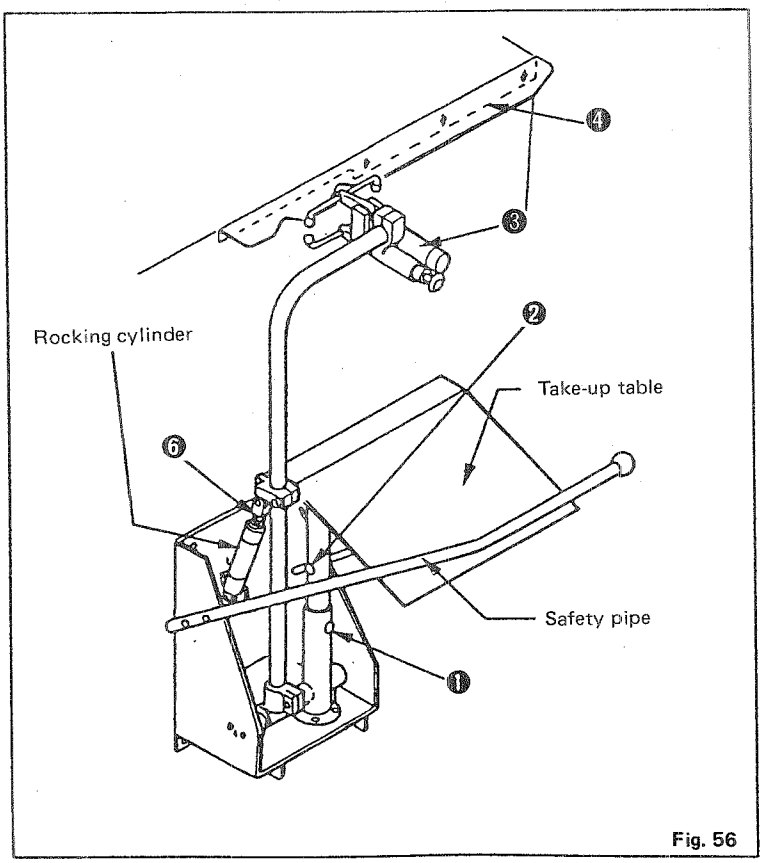


Fig. 56

The grasping stacker operates in the following order;

① The corner knife comes down. Then the material clamp cylinder actuates.

② The grasping stacker catches the material when the front travel end of the material clamp cylinder is reached.

③ The rocking cylinder actuates and carries a workpiece on to the take-up table.

④ The material grasping mechanism is released, and the binder returns to the start position of its oscillating action.

1. Position of the take-up table
   Loosen set bolt ❶ and adjust the height of the table. Loosen set bolt ❷ and adjust the inclination of the table. Adjust the height and inclination of the take-up table according to the size of the workpiece to be stacked. (See Fig. 56.)
2. Adjusting the position to catch the material
   Adjust so that material clamp cylinder ❸ goes forward and the stacker clamps sub-table ❹ at its center using fixing bolt ❺. When the relevant components are in the respective predetermined positions, loosen locknut ❻ and adjust so that an appropriate clearance allowing the material to go through there is provided between the top end of the material clamp unit and the top end of sub-table ❹ by changing the screwing depth of the cylinder rod. (Figures -55 and -56)
3. Adjusting the material clamping force
   Loosen locknut ❼, and adjust the position on chuck limiter ❽ so that the material clamp unit clamps the material with a pressure enough to draw the material from the sub-table when material clamp cylinder ❸ is brought to its front end. (Figures -55 and -56)
   After the above-stated adjustment, be sure to confirm the result of the adjustment using an actual material.

2) Bar stacker (SP-26)

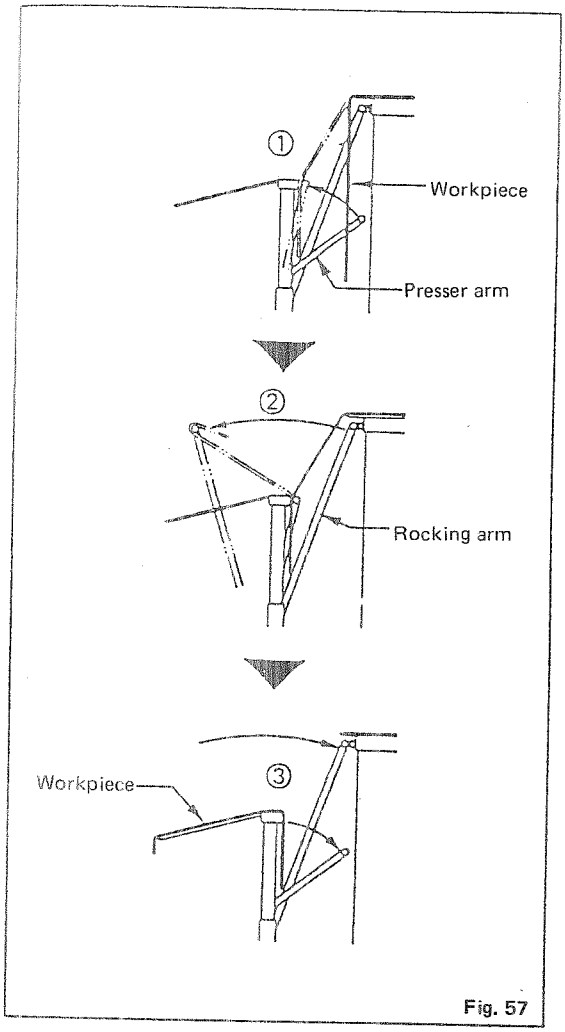


Fig. 57

The bar stacker operates in the following order:

① The pressing cylinder actuates the presser arm to press a workpiece after the corner knife has been lowered.

② The rocking cylinder actuates to place the workpiece on the take-up table.

③ The presser arm and rocking arm return to their resting positions.

1. Position of the take-up table
   Loosen set bolt ❶ and adjust the height of the table. Loosen set bolt ❷ and adjust the inclination of the table. Adjust the height and inclination of the take-up table according to the size of the workpiece to be stacked. See Fig. 58.
2. Pressing force
   Loosen locknut ❸ and adjust the end of the pressing cylinder to provide the proper pressure on the workpiece between the presser arm and the take-up table. See Fig. 58.

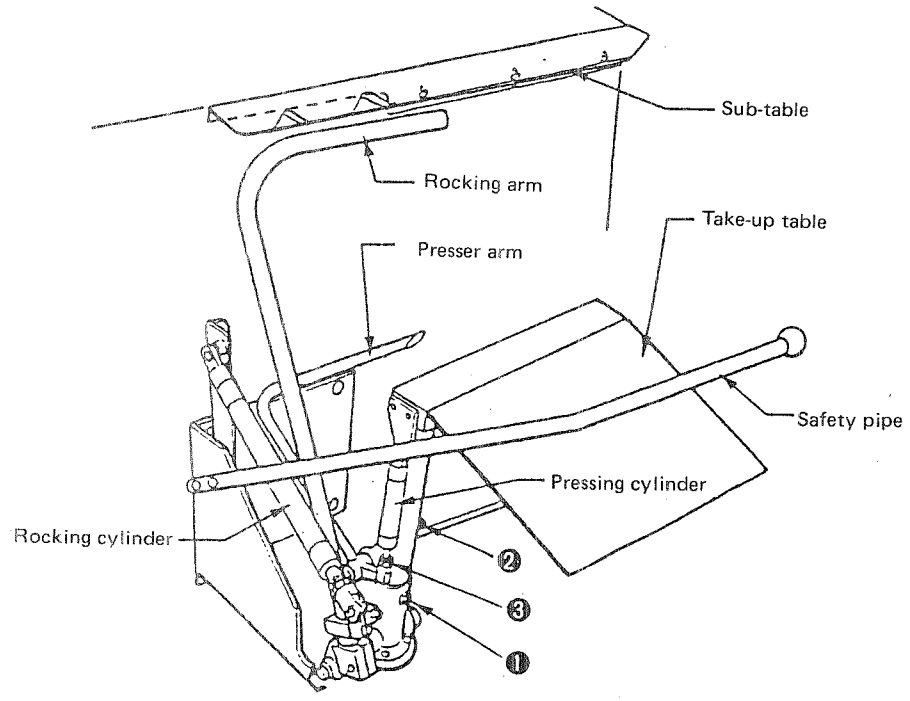


Fig. 58

3) Adjusting the position of the roller stacker (SP-33)

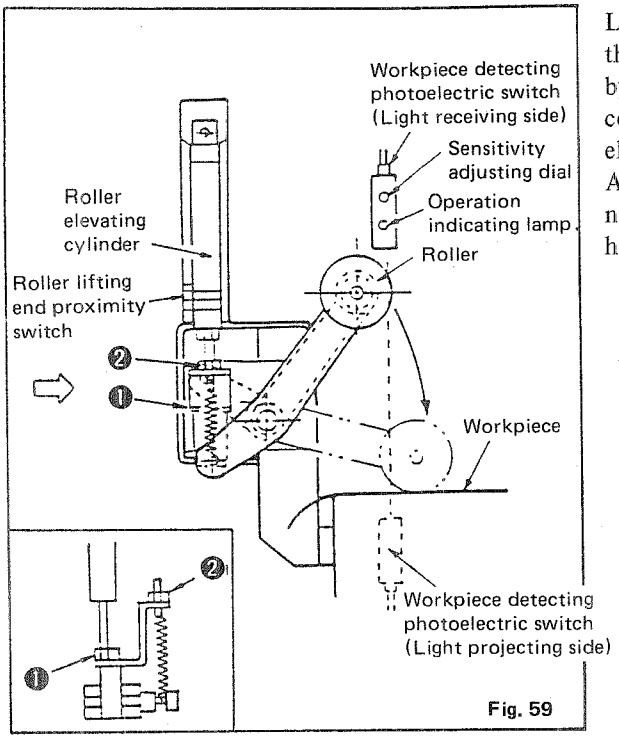


Fig. 59

Loosen locknut ❶ and adjust the position of the roller so that the materials on the sewing table can be rolled down with ease by turning the cylinder rod. The roller should slightly come in contact with the sewing table at the pulling end of the roller elevating cylinder.

Adjust the pressure of the roller in accordance with the thickness of the material. Loosen locknut ❷, and move the spring hook up and down to obtain an appropriate spring pressure.

13. INSPECTION AND MAINTENANCE

In order to maintain the machine in good operating conditions at all times, inspect your machine regularly and maintain it in the following ways.

(1) Pneumatic systems

- Drain the air filter every day.

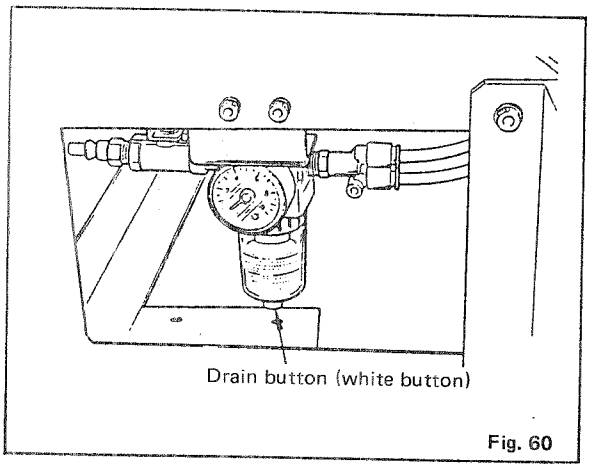


Fig. 60

Press the drain button (white button) on the bottom of the air filter, and water gathered in it will come out.

(2) Sewing machine head

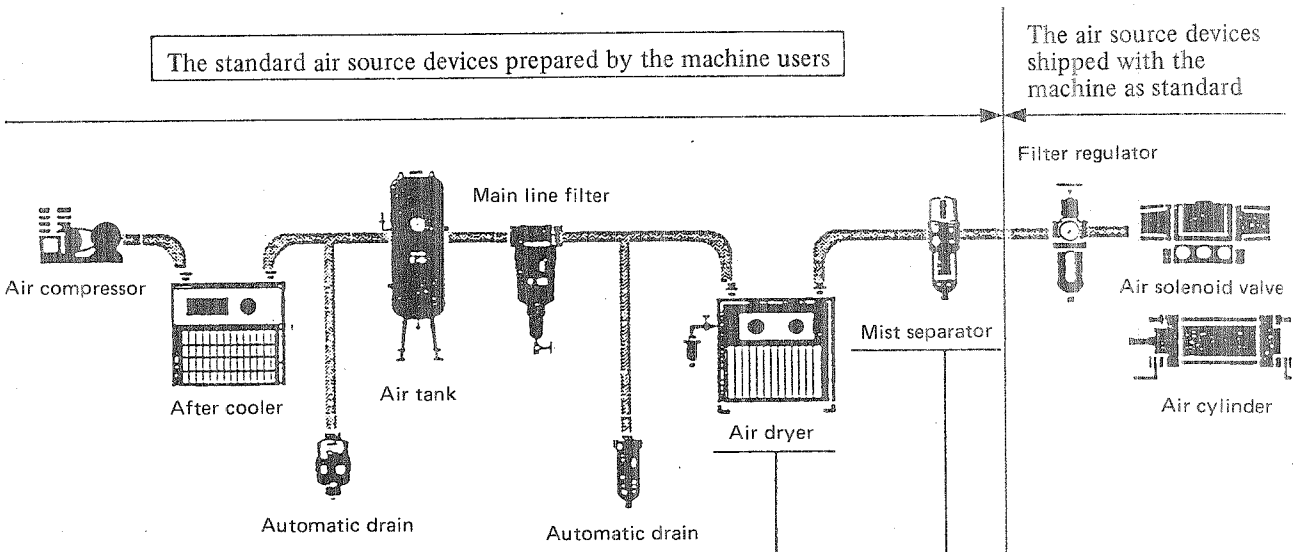
- Clean up the sewing components including the clamp foot every day before the operation. Remove dust and wastes from the oil reservoir at least once every week.
- Before you start welting, check if the center and corner knives sharply cut the material. Replace the dull knife even if it is still serviceable.
- Inspect the oil level in the oil reservoir regularly once every month.

(3) Electrical system

- Inspect the connection of plugs, lead wires and connectors regulary once every month, because some of them may come loose due to the mechanical vibration transmitted from the machine head.
- Be sure to turn the power switch OFF, whenever you install or remove the printed circuit board.
- Never touch the connecting point of the printed circuit board.

90% of the troubles of the pneumatic equipments are caused by "the polluted air". The compressed air is polluted by various kinds of the impurities as water, dust, inferior oil, or carbon particles. Therefore using this "polluted air" might cause various troubles and result in a disorder of your machine. It will reduce the working ratio and then reduce productivity.

When you install pneumatic equipments to your factory, be sure to apply standard air source supplying devices for them as follows;



The quality of the air source

When the watery air is supplied

The environment of the machine

When you install the machine in the place where the temperature is not constant within a day, or the temperature often drops to freezing cold.
Be sure to install the air dryer.

When the compressed air is polluted by a large amount of carbon particles or dust. (Most of the troubles of the air solenoid valve are caused by carbon.)
Be sure to install the mist separator.

Precaution: Main piping work

- Be sure to provide a 1 cm descending inclination for every 1 m of the air pipe to the direction of the air flow.
- When the main pipe is devided into some branch pipes, equip a tee for the outlet of the compressed air from the main pipe so that the water in the main pipe does not come out with the air to the branch pipes.
- Install the automatic drain devices to all the lower parts or dead end of the pipe to prevent water gathering.

14. SEWING MACHINE HEAD

Maintain and adjust the sewing machine head in the following order:

(1) Removing the sub-table

Do not remove the sub-table except when replacing the gauges or carrying out maintenance work on the machine bed. On these occasions, remove the sub-table following the procedure described below.

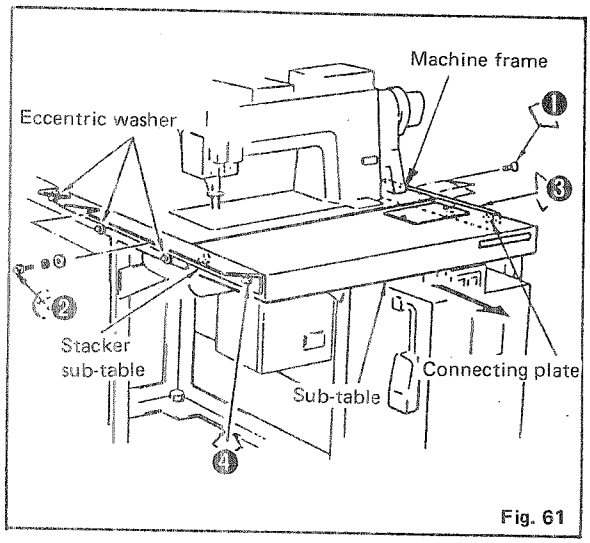


Fig. 61

Loosen three screws (flat-head screws) ❶ and two screws ❷. The remove the sub-table. When installing the sub-table, take care to set it so that the auxiliary table is pushed against the eccentric washer on the machine frame side.

After installing the sub-table, make sure that the sub-table is parallel with the machine frame.

* Do not loosen screws ❸ and ❹ on the sub-table side. (Do not remove the stacker sub-table and connecting plate from the sub-table.)

(Caution) Be careful not to lift the sub-table when carrying the machine.

(2) Removing the oil pan

Remove the oil pan before replacing the gauges or carrying out maintenance work on the machine bed. Remove the oil pan following the procedure described below.

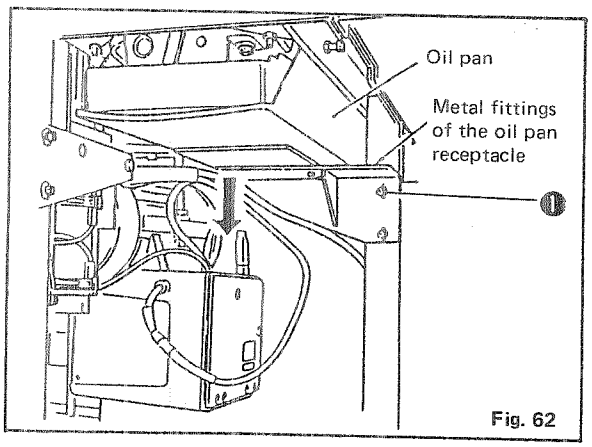
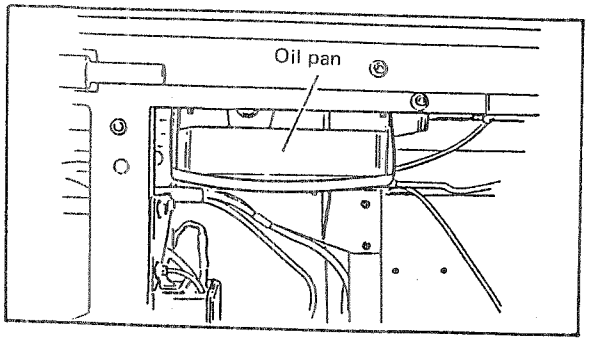


Fig. 62

Loosen screw ❶ fixing the metal fittings of the oil pan receptacle to the machine frame and remove the metal fittings together with the oil pan in the direction of the arrow.

(Caution) 1. Remove/install the oil pan taking care not to spill any oil from the oil pan.

2. Raise the oil pan until both ends are fitted inside the frame. Then fix the oil pan in position.



1) Lubrication of the oil reservoir inside the face plate

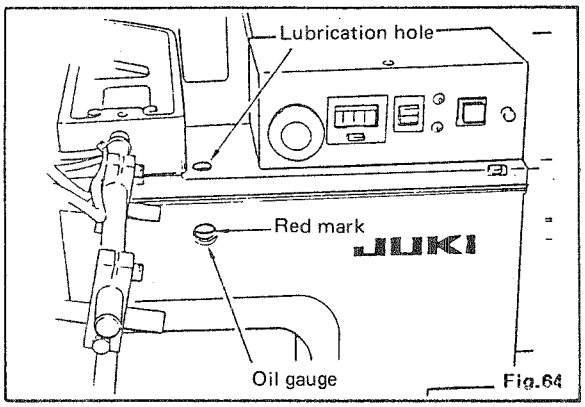


Fig. 64

Pour the lubricating oil in the oil reservoir through the oil hole up to the red mark of the oil gauge. Use the industrial machine oil (JUKI New Defrix Oil No. 2).

(Caution) When you operate the machine which is newly set up or has not been used for a long period of time, apply a few drops of oil through the oil hole.

2) Lubrication of the hooks

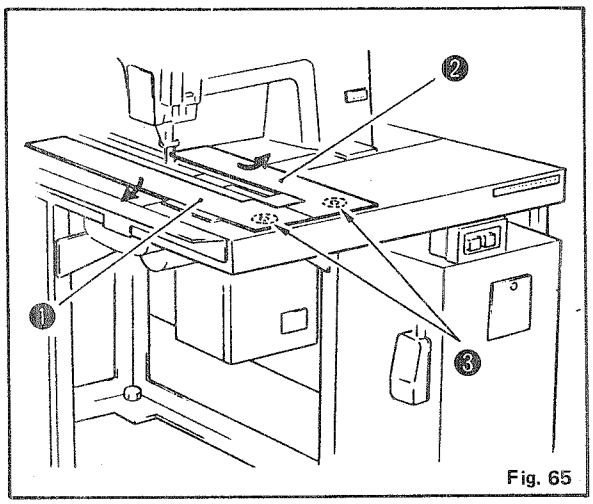


Fig. 65

1. Set the AUTO STEPS selector switch on the operation panel to "cloth feeding" operation.
2. Depress the clamp foot travel key and travel the clamp foot to its rear end position.
3. Insert you finger into openings ❸ in the bottom of the sewing table ❶, ❷ and push up the sewing tables. Then open each sewing tables in each direction of the arrows and remove them.

(Caution) Only the oil reservoir and the hooks need to be lubricated. The oil pan does not need to be lubricated.

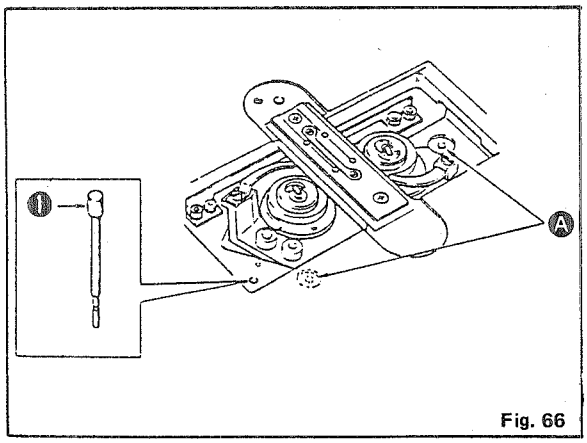


Fig. 66

Supply the lubricating oil through lubrication holes Ⓐ with the oil feeder as shown in Fig. 66.

* Confirm the amount of oil in the hook by checking hook oil gauge ❶.

(Caution) If the oil is too low to be seen on the oil gauge, stop operating the sewing machine, and supply the machine with an appropriate amount of oil.

3) Adjusting the amount of oil in the hooks

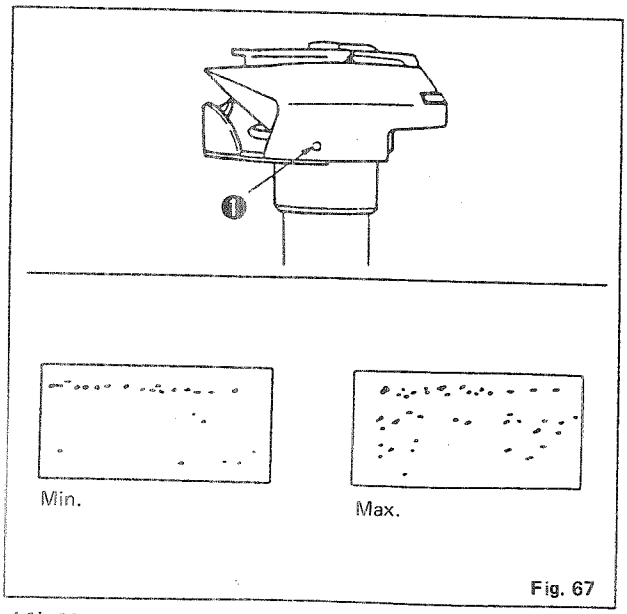


Fig. 67

The hooks are automatically lubricated. Adjust the amount of oil lubricated by screw ❶ located outside of the hooks. Turning the screw to the clockwise will reduce and to the counterclockwise will increase the amount of oil. Hold a piece of paper about 1 cm away from the hook and operate the machine for about 10 seconds, and the splash of oil will gather on the paper as shown in Fig. 67 if the adequate amount of oil is lubricated to the hooks.

(4) Needles

Use Mtx190 needle for the APW-192 sewing machine.
Choose a suitable size of the needles for the thickness of the threads or the types of material to be sewn.

1) How to attach the needles

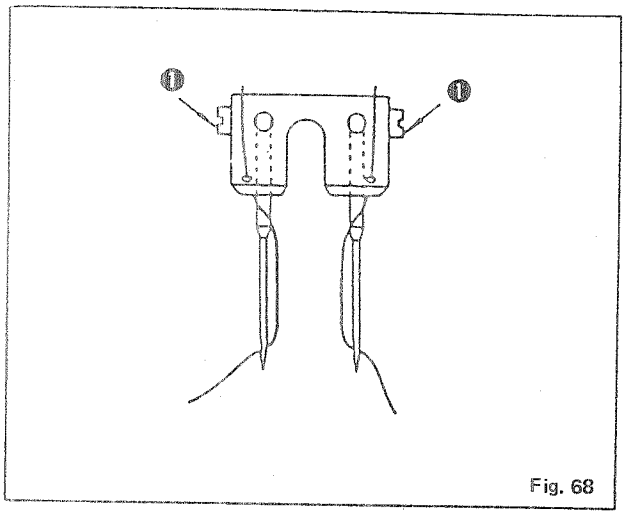
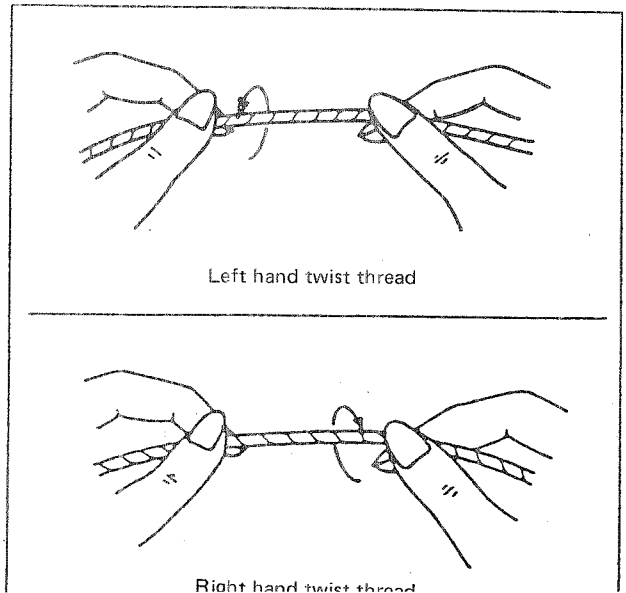


Fig. 68

Insert the left and right needles as far as they will go pointing their long grooves at each other and tighten screws ❶.

(5) Types of thread and how to thread the machine

1) Type of threads



Use a new thread of even thickness. If not, it may fail to make fine stitches or may be broken while being stitched. Use the right hand twist thread (Z twist) for the needle but either twist will do for the bobbin.

Thread the machine in the illustrated order.

Thread Ⓐ : Left needle thread viewed from the operator's side.

Thread Ⓑ : Right needle thread viewed from the operator's side.

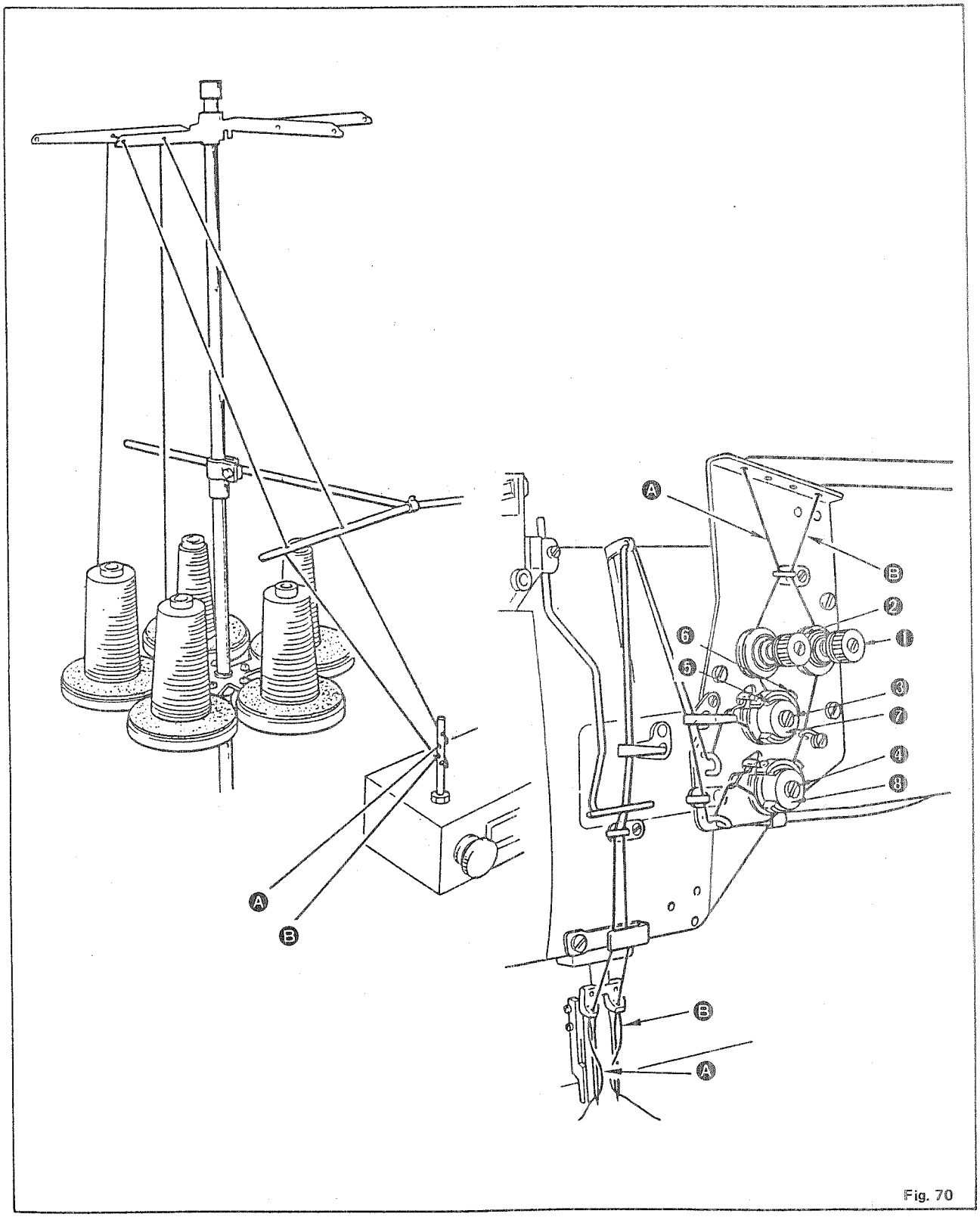


Fig. 70

3) Winding the bobbins

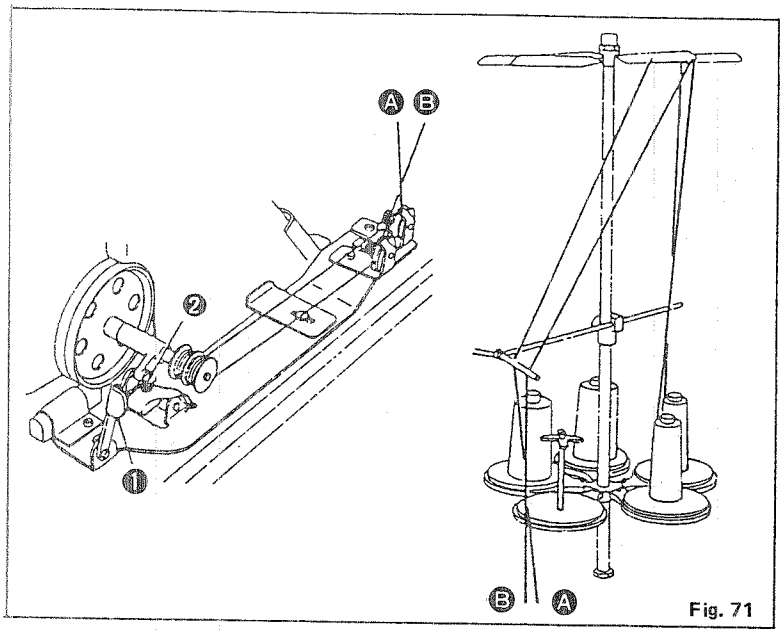


Fig. 71

You can wind two bobbins at a time.

1. Put two bobbins into the thread winder shaft as far as they will go.
2. Thread the winder in the order as illustrated and wind by hand the thread on to each bobbin four or five turns.
3. Push in winder thread guide ❶.
4. The thread winder will automatically stop as soon as it has wound up the bobbins to a predetermined amount.

4) Adjusting the thread winder

It is recommendable to wind the bobbin about 80% of its full capacity with the cotton thread or 60 to 70% with the synthetic thread. This can be adjusted by tightening screw ❷ (Fig. 71) to increase or loosening to reduce the amount of thread to be wound.

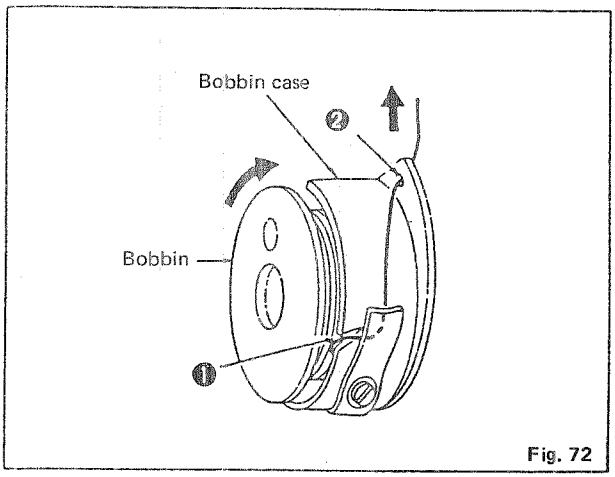


Fig. 72

5) Threading the bobbin case

1. Hold in hand a bobbin in the way that it spins clockwise and put it into the bobbin case.
2. Pass the thread through slot ❶ in the bobbin case.
3. Pull the thread to pass it under the tension spring.
4. Pass it through hole ❷ in the bobbin case.

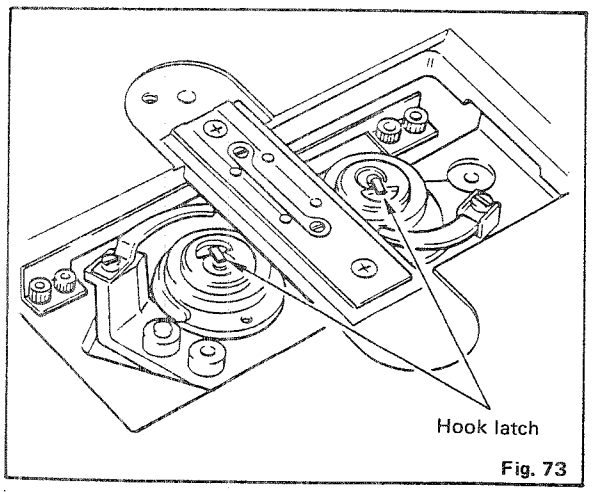


Fig. 73

6) Setting the bobbin case in the hook

Put each bobbin case trailing the end of the thread into the vertical-axis hook and push down the hook latch.

1) **Needle thread tension**

Adjust the right/left bobbin thread tension first. (The standard thread tension is 30 ~ 35 g)

1. Adjust the right needle thread tension by nut ❶ and the left needle thread tension by nut ❷ respectively. Turn the nut clockwise to increase or counterclockwise to reduce the tension.
2. Setting the AUTO STEPS selector key to "cloth feed" will close the thread tension disc. (See Fig. 70)

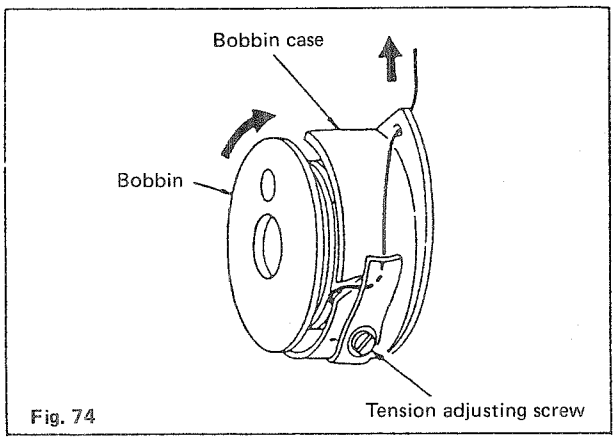


Fig. 74

2) **Bobbin thread tension**

The thread tension increases when the adjusting screw is turned clockwise and decreases when it is turned counterclockwise.

The standard bobbin thread tension is 30 to 35 g.

3) **Adjusting the tension of the thread take-up spring**

For adjusting the tension of the left needle thread take-up spring, loosen screw ❸ and turn thread take-up spring knob ❼. Turning knob ❼ clockwise will increase and turning counterclockwise will decrease the tension of the left needle thread take-up spring. For adjusting the tension of the right needle thread take-up spring, loosen screw ❹ and turn thread take-up spring knob ❽. Turning knob ❽ clockwise will increase and turning counterclockwise will decrease the tension of the right needle thread take-up spring. For adjusting the stroke of the left needle thread take-up spring, loosen screw ❸ and turn needle thread take-up spring plate ❺. Turning plate ❺ clockwise will increase and turning counterclockwise will decrease the stroke of the left needle thread take-up spring. Similarly, the stroke of the right needle thread take-up spring will be adjusted as shown in Fig. 70.

(7) Adjusting the position of the needle bar frame

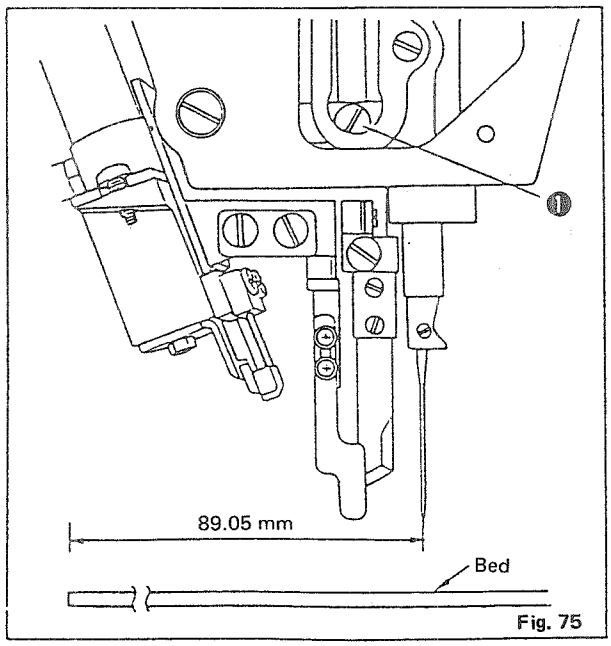


Fig. 75

Loosen screw ❶, and adjust the longitudinal position of the needle bar frame to allow the needle to enter the center of the needle hole in the throat plate. Then secure the needle bar frame tightening the screw.

(8) Relation of the hook to the needle

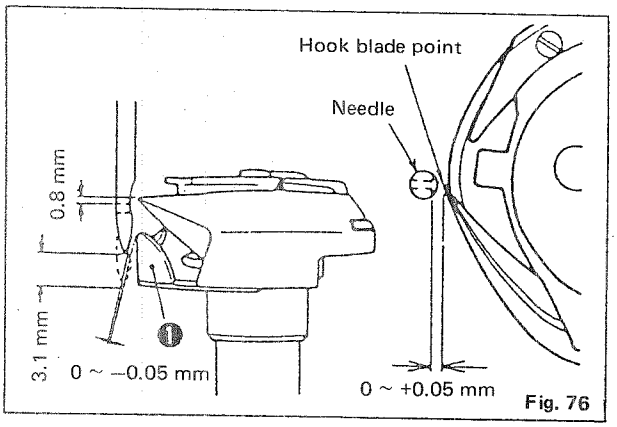


Fig. 76

1) Adjusting the hook to the needle

1. Remove the throat plate.
2. When the needle has gone up 3.1 mm from its lowest point, adjust the position of the hook so that its blade point is in line with the center of the needle with a clearance of +0.05 mm or less, that its needle guard (❶ provides a clearance of −0.05 mm or less at the needle and that its blade point is located 0.8 mm above the level of the top end of the needle eye.

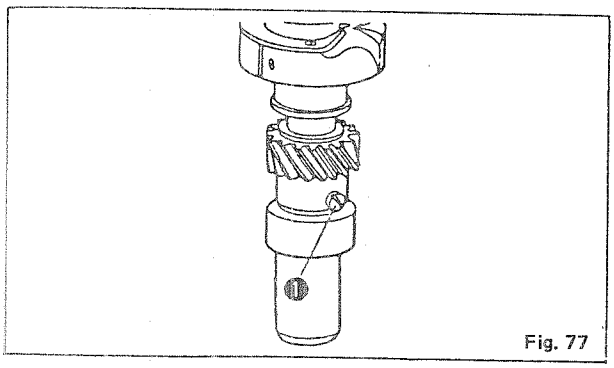


Fig. 77

2) How to adjust the timing of the hook

Loosen three setscrews ❶ in the small gear of the hook shaft. Manually turn the hook to make the hook blade point align with the center of the needle. Then tighten setscrews ❶ while pressing the hook downwards and the gear upwards in order to eliminate a vertical play of the hook shaft.

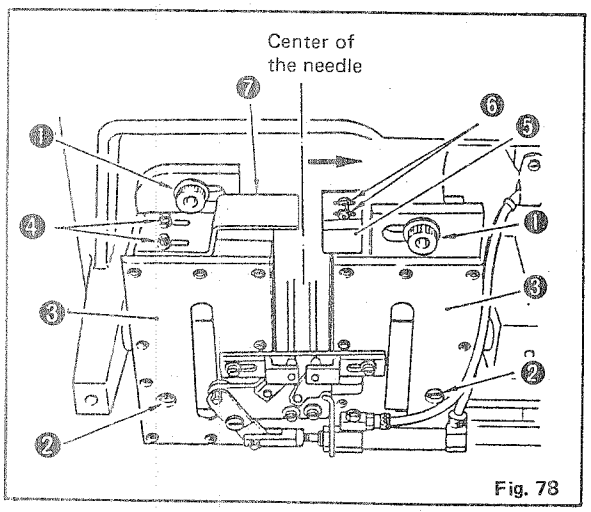


Fig. 78

3) How to adjust the clearance between the needle and the hook blade point

1. Remove the oil pan.
2. Remove the throat plate.
3. Loosen screws ❶ and ❷ in the hook driving shaft located on the machine side to be adjusted.
4. Lightly tap hook driving shaft saddle ❸, and move it to the left or right until the clearance between the needle and the blade point of the hook is adjusted to between 0 and 0.05 mm. Then firmly tighten screws ❶ and ❷.

(Caution) When the hook driving shaft saddle is moved in order to replace the gauges etc., the position of oil spillage prevention plate ❼ (left) and ❺ (right) need to be adjusted.

Loosen screw ❹ in oil spillage prevention plate ❼ (left), and adjust so that the end face of the plate is aligned with the center of the gauge.

Loosen screw ❻ in oil spillage prevention plate ❺ (right), and move it in the direction of the arrow until it will go no further. Then fix the plate in that position by tightening the screw.

4) Removing and installing the hooks

- How to remove the hooks
  1. Remove the throat plate.
  2. Remove the opener.
  3. Loosen three of the hook setscrews ❶ as shown in Fig. 77.
  4. Turn the handwheel until the needle bar is raised to its highest position and take out the hooks.
- Attaching the hook
  1. Reverse the above procedures.
  2. Turn by hand the bobbin case holder until its projection rests in the groove on the throat plate and fix the throat plate.

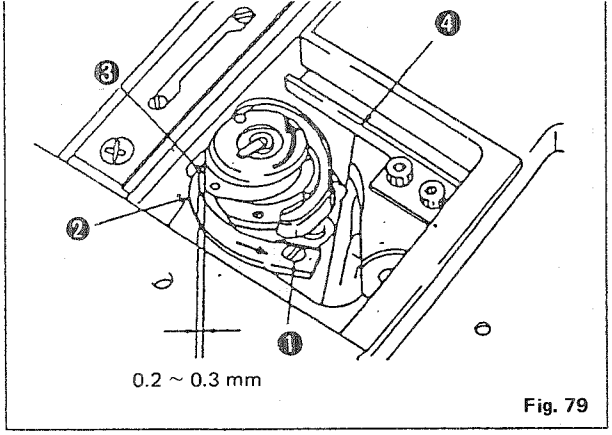


Fig. 79

Turn by hand the handwheel in the regular direction to let bobbin case opening lever ❷ withdraw to the end of its stroke (as arrow shows) and make sure that there is a clearance of 0.2 to 0.3 mm between the bobbin case opening lever and projection ❸ of the bobbin case (turn the bobbin case in the arrow direction and hold it in place by your hand). This can be adjusted by loosening screw ❶.

(9) Adjusting the needle thread knife, center knife and bobbin thread knife

These cutting devices are operated by the air cylinders. When you make adjustment, reduce the air pressure to apply.

1) Attaching and removing the needle thread knife

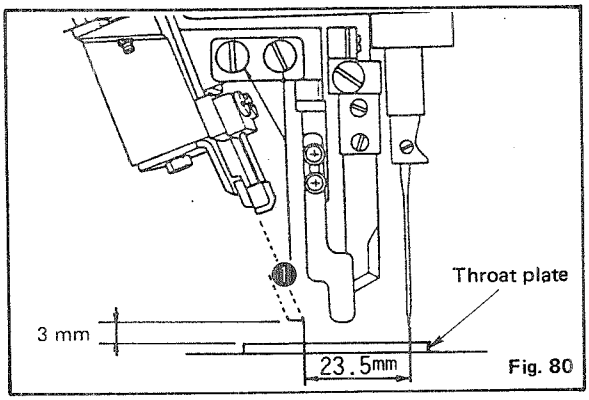


Fig. 80

1. Remove setscrew ❶ and remove the needle thread knife unit.
2. Loosen screw ❷ and pull out pin ❸. (As the pin has a spiral ridge, turn the pin to pull out.)
3. Replace the needle thread knife with a new one. Make sure that unchamfered face of the Ⓐ portion (Fig. 81) contacts the fixed knife.

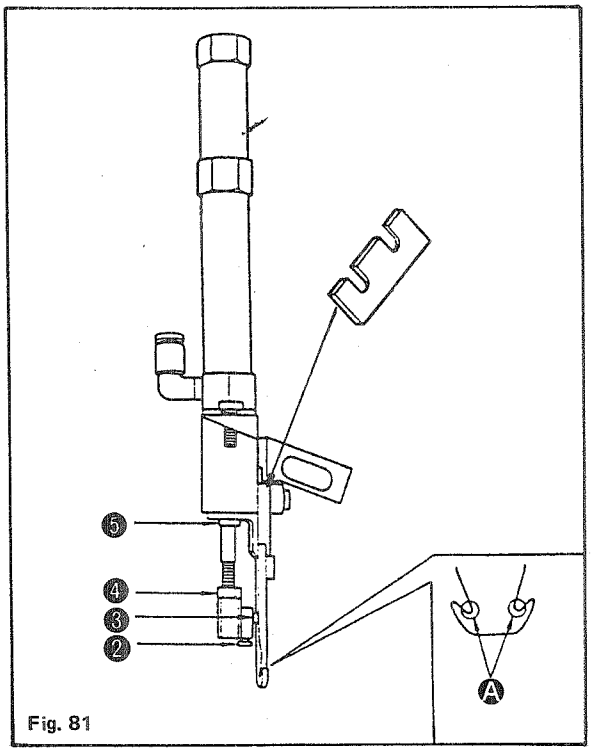


Fig. 81

2) Height of the needle thread knife

Provide a 3 mm clearance between the bottom face of the needle thread knife and the throat plate when the needle thread trimming cylinder comes to its stroke end. Loosen nut ❹ and adjust the height of the needle thread knife by raising or lowering it.

Loosen screw ❶, and adjust the distance from the center of the needle to the bottom face of the needle thread knife to 23.5 mm.

3) Sharpness of the needle thread knife

The sharpness of the needle thread knife depends on how it interlocks with the counter knife. Loosen counter knife setscrew ❺ and adjust the position of the counter knife so that both the left and right blades even interlock 1 mm with the blade of the needle thread knife. Ensure that the needle thread knife completely cut the thread when the needle thread trimming cylinder is operated by pressure under 1.9 kg (when the air pressure is 0 kg/cm^2). Choose an appropriate spacer and assemble it in position so that the right- and left-hand side needle thread nippers hold the needle thread with a pressure of 300 g or higher after the thread has been cut.

(10) Adjusting the center knife

1) Stroke of the center knife

1. Actuate the center knife driving cylinder coming to its stroke end.
2. Remove the center knife selector switch cover.

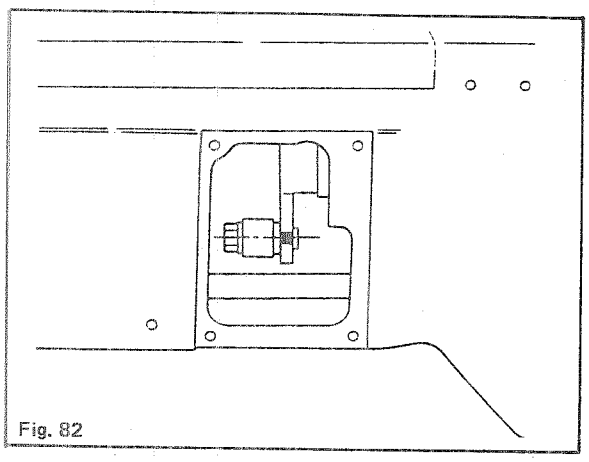


Fig. 82

3. Align the center of the hingescrew with the white marker line (The stroke of the center knife is 5.5 mm)
4. Turn the handwheel by hand until the center knife reaches its highest position and adjust the height of the center knife to obtain the relevant distances showed in Fig. 83.

(Caution) **1. Make sure that the center knife stops at the position 13±0.5 mm above the surface side of the throat plate.**

2. When the center knife is in its lowest dead point, the center knife and the counter knife should be engaged with each other by a depth of 0.5 mm.

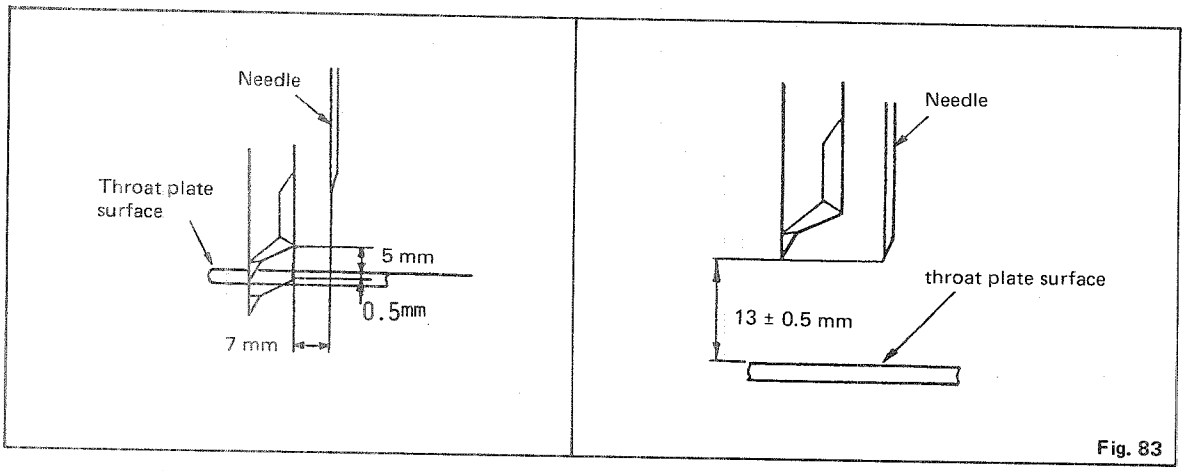


Fig. 83

Loosen screw ❶ and correctly adjust the position of the center knife by moving it forward or backward.

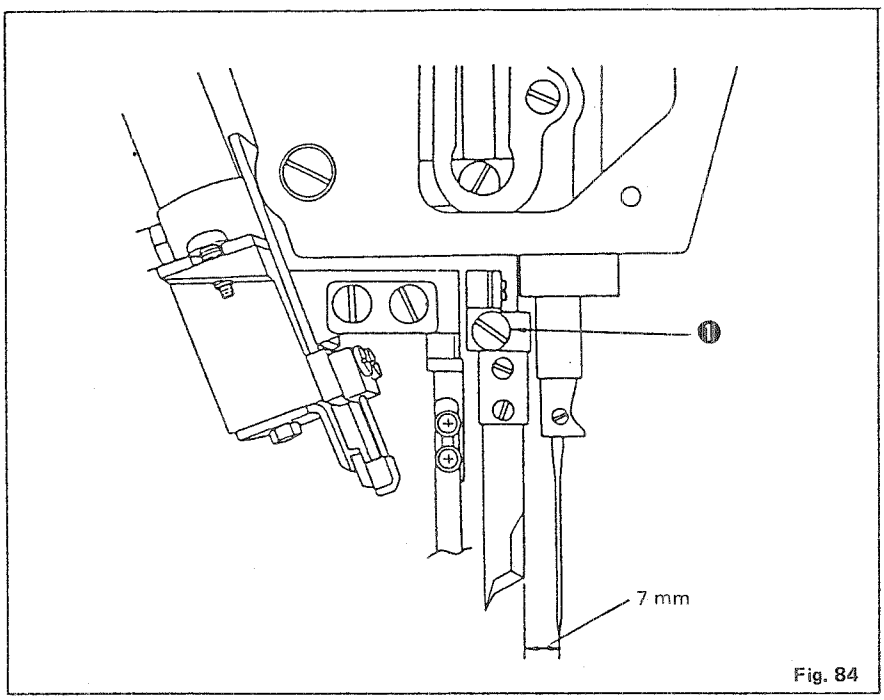


Fig. 84

4) **Sharpness of the center knife**

The sharpness of the center knife is adjusted by pressing the side face of the center knife to the blade section of the corner knife of the throat plate.

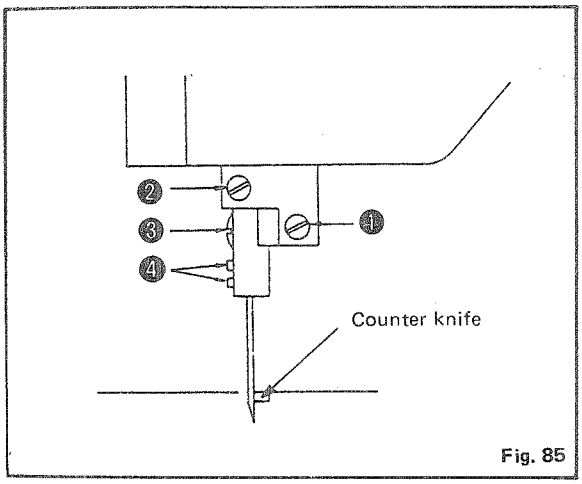


Fig. 85

Move the center knife laterally by screw ❶ or rotate it by screw ❷ to obtain the suitable pressing force.
Be sure to adjust the pressing force as light as possible so that the center knife completely cuts the two plies of the fabric.

5) **Attaching and removing the center knife**

- How to remove the center knife
  Loosen screw ❹ in Fig. 85 and remove the center knife.
- How to attach the center knife
  Loosen screw ❹ in Fig. 85 and attach the center knife.
  Insert the center knife until it will go no further and fix it.

(11) Position of the thread tension release rod

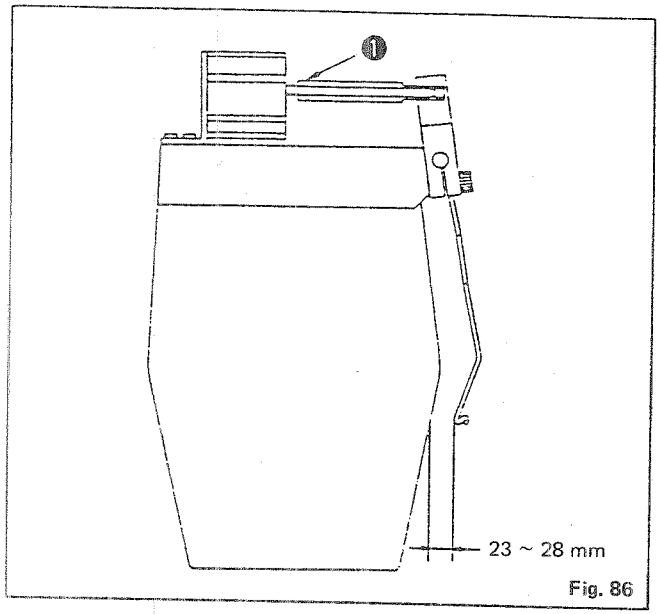


Fig. 86

Loosen nut ❶ and adjust to obtain a 23 mm to 28 mm clearance between the bottom end face of the wiper and the face plate of the machine head when the cylinder actuates.

(12) Adjusting the bobbin thread knife

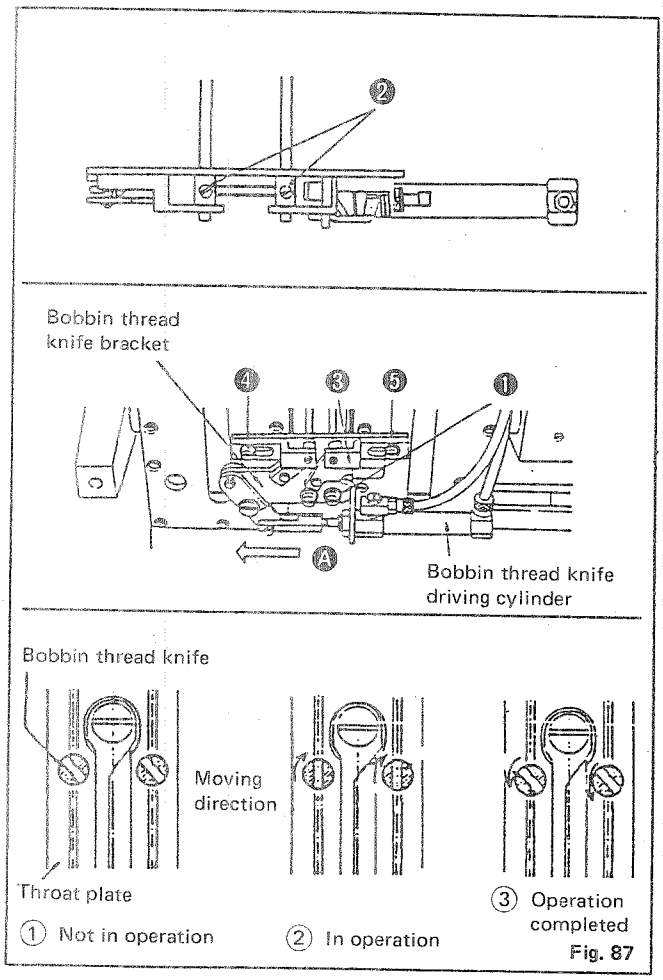


Fig. 87

1) Position of the bobbin thread knife to the throat plate

In order to prevent the bobbin thread knife from being pinched in the throat plate while cutting the thread, it is important to set the knife perpendicular to the throat plate.

1. Loosen screws ❶ and operate the bobbin thread knife driving cylinder.
2. Set the bobbin thread knife bracket so that the knife is not pinched in the throat plate and firmly tighten screw ❶.

2) Position and height of the bobbin thread knife

The top ends of both left and right knives must be even with the throat plate surface, and the grooves in the knives must be parallel to the grooves the throat plate when the knives actuate.

1. Loosen setscrew ❷ and adjust so that the top end of the knives are even with the throat plate surface. Securely tighten setscrews ❷ after the adjustment.
2. Press bobbin thread knife driving cylinder toward Ⓐ and adjust so that the grooves in the knives are parallel to the grooves in the throat plate.
3. Securely tighten setscrew ❷.

3) How to adjust the position of the bobbin thread knife in replacing gauges

Loosen setscrews ❹, ❺ of bobbin thread knife presser plate ❸, and the bobbin thread knife moves to the right or left together with the bobbin thread knife presser plate.

4) **How to replace the bobbin thread knife**

Loosen setscrews ❷, and you can pull out the knife downward. You can use both blade edges on a knife. When a knife is replaced, it must adjusted according to the above procedures.

5) **Adjustment of cutting of bobbin thread knife**

Adjust cutting of the bobbin thread knife by appropriately pressing the thread nipper spring ❹ against the needle thread knife. It is desirable to press the thread nipper spring as lightly as possible for longer life of the knife, provided that thread is cut without fail. (Fig. 79)

(13) Position of the synchronizer

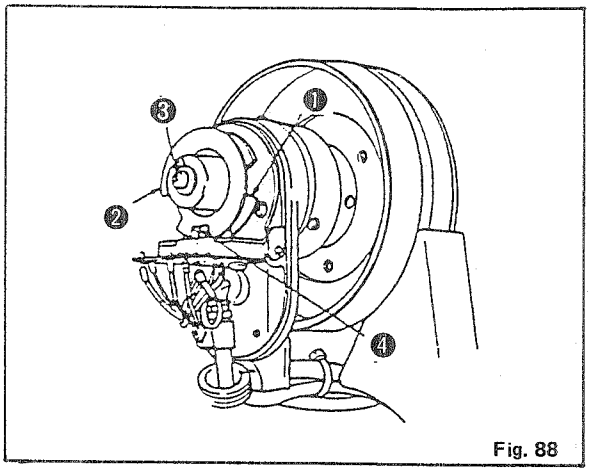


Fig. 88

1. Loosen setscrew ❸ and align the notch of synchronizer ❷ with point ❹ at the upper dead point of the thread take-up lever.
2. Turn the handwheel in the normal direction to bring the needle to its lowest dead point. At this time align the notched part of synchronizer ❶ with section ❹.

(14) Timing of the thread tension disc to start "floating"

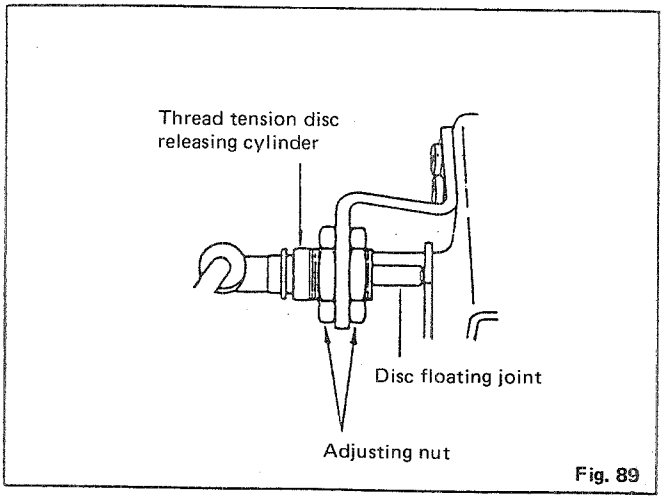


Fig. 89

Adjust the disc floating joint so that both the left and the right tension discs start to float simultaneously when the thread tension disc releasing cylinder has actuated.
Adjust the floating distance within the range from 1.0 mm to 1.5 mm.

(15) Adjusting the height of the needle bar (LH-570)

When you want to adjust the height of the needle bar, loosen the needle bar guide setscrew as well as the needle bar holding screw. Remove the rubber packing attached on the rear side of the arm and loosen the needle bar guide setscrew at the lower dead point of the needle bar stroke.

When retighten the needle bar guide setscrew, turn the handwheel to check for its smooth rotation after the setscrew has been slightly tightened. Then securely tighten the setscrew.

Provide an approximately 1 mm clearance between the needle bar holder and the needle bar guide.

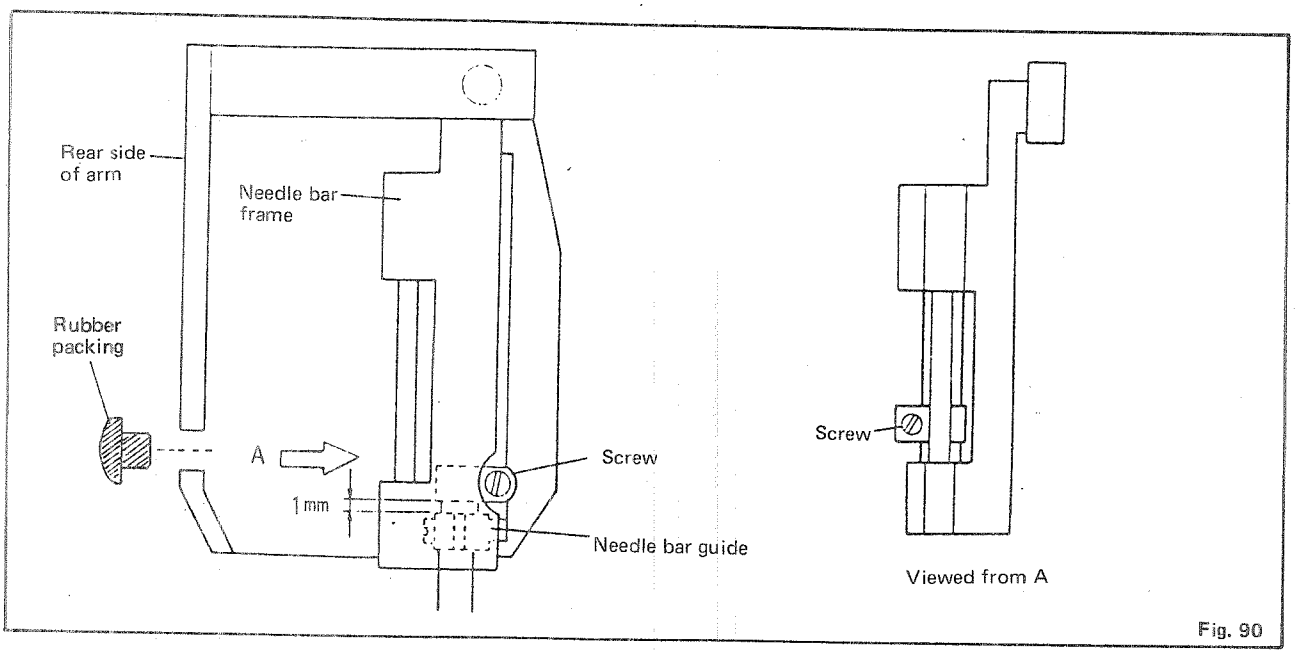


Fig. 90

(16) Single welting

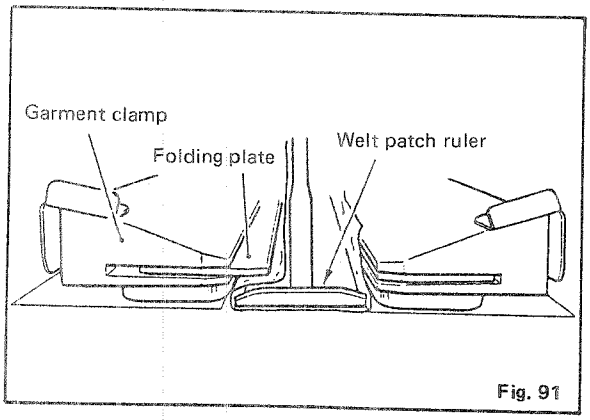


Fig. 91

In case of single welting without using the folding plates as shown in Fig. 91, switch mechanical valve ❶. (Fig. 92)

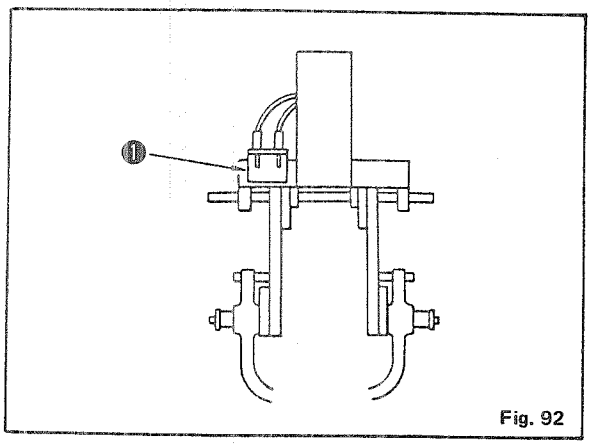


Fig. 92

(1) Circuit boards and maintenance panel (Safety precautions)

1. Be sure to turn the power switch OFF before connecting or disconnecting a printed circuit board.
2. Do not touch the connection of a printed circuit board.
3. When you open the power supply box, be sure to pull out the power supply plug.

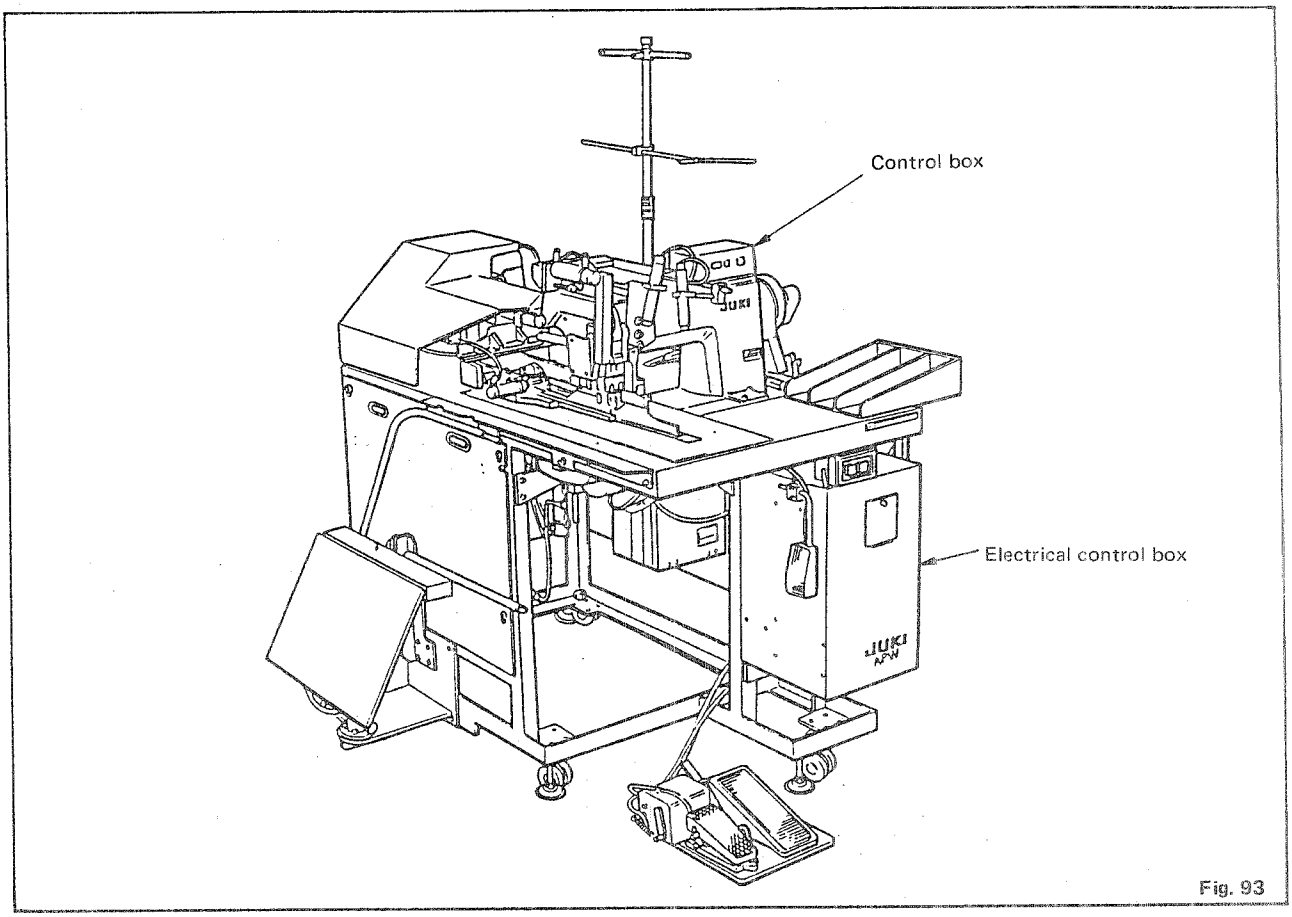


Fig. 93

1) Electrical control box layout

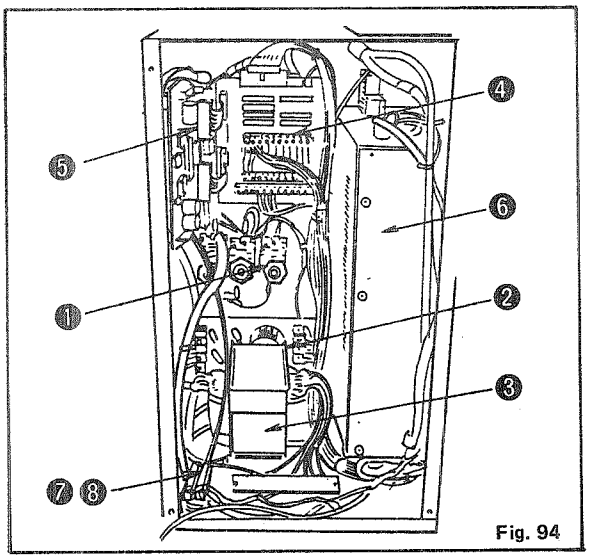
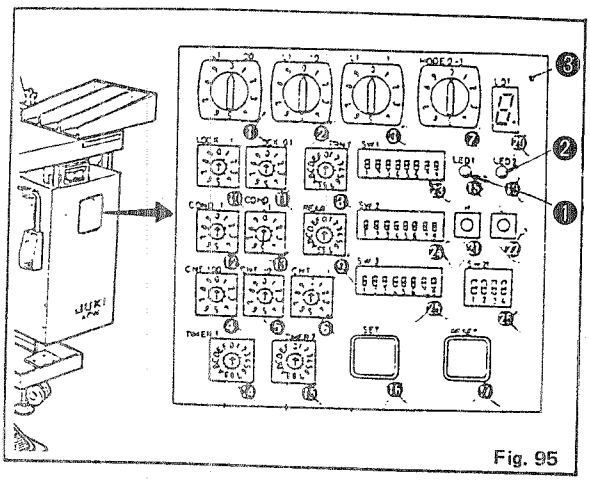


Fig. 94

No.	Description	Part No.
❶	Fuse 600V 10A	HF006401000
❷	Noise filter asm.	G60071920A0
❸	Power trans A	G6000192000
❹	Input/output circuit board asm.	G60031920A0
❺	Control circuit board asm.	G60021920A0
❻	Servo motor driver	16567208
❼	Fuse 3A	E9672452000
❽	Fuse 5A	E9672454000

2) Needle thread breakage detector circuit indicator

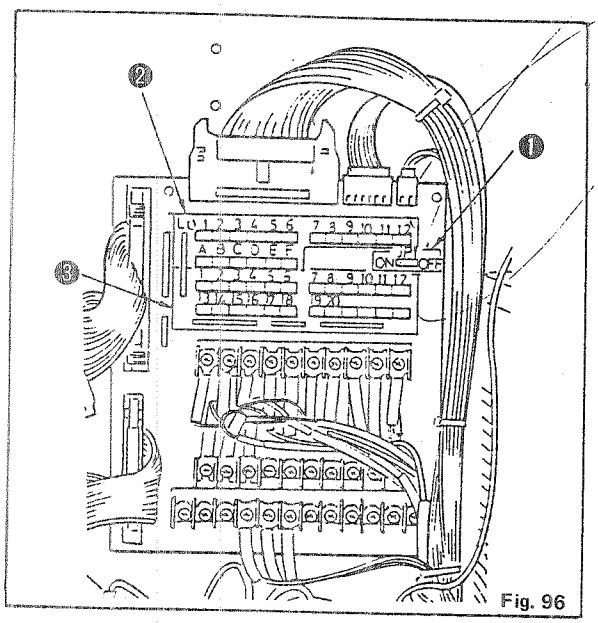


The LED ❸ in the CPU circuit board is indicates the operation of the needle thread breakage detector.

❷ Left needle thread breakage detector

❶ Right needle thread breakage detector

3) Input/output terminal board



❶ JP1

- When JP1 is set to its OFF side, the foot pedal passing sequence is selected.
- When JP1 is set to its ON side, the machine starts sewing when the foot pedal is depressed. In other words, the machine starts sewing without using the START switch.

❶ LD1-	1	2	3	4	5	6	7	8	9	10	11	12	A	B	C	D	E	F			
	Front end detection	Rear end detection	Binder lower detection	Corner knife lower detection (fixed)	Corner knife lower detection (moving)	Center knife lower detection	Corner knife upper detection (fixed)	Corner knife upper detection (moving)	(Roller stacker upper detection)	(Dart upper detection)	(Binder upper detection)	(Roller stacker material detection)	Pedal 1	Pedal 2	Pedal 3	Pedal 4	Pedal 5	Start			
❷ LD0-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Binder goes up	Binder comes down	Clamp foot goes up (right)	Clamp foot comes down (right)	Clamp foot goes up (left)	Clamp foot comes down (left)	Center knife	Folding plate	Bobbin thread trimming	Needle thread trimming 2	Needle thread trimming 1	Thread tension	Corner knife goes up	(Flap presser, right)	(Flap presser, left)	Dart stretcher	(Stacker 1)	(Stacker 2)	Blank	Blank	

The function or component in parentheses indicates the optional function or component.

1) Adjusting the timing of the clamping stacker/bar stacker

○ The relationship between the set value on the timer and the actual operating time is as follows:

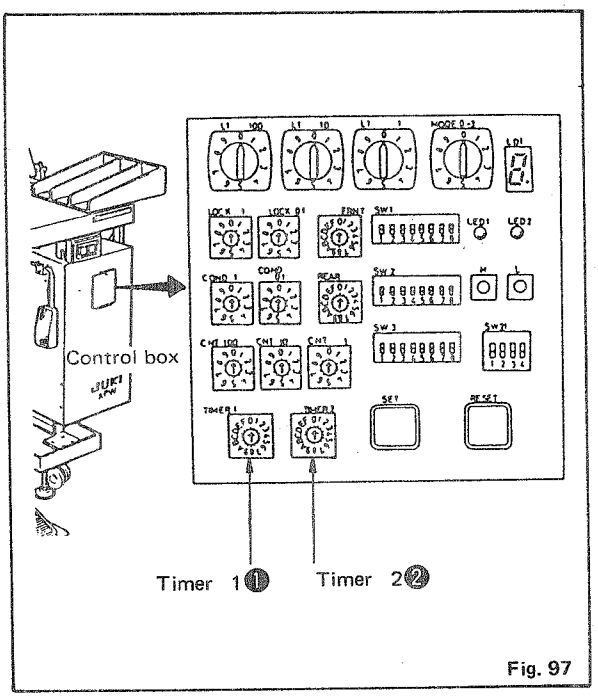


Fig. 97

Scale value		Time	Scale value		Time
0	→	0.5 sec.	8	→	4.5 sec.
1	→	1.0 sec.	9	→	5.0 sec.
2	→	1.5 sec.	A	→	5.5 sec.
3	→	2.0 sec.	B	→	6.0 sec.
4	→	2.5 sec.	C	→	6.5 sec.
5	→	3.0 sec.	D	→	7.0 sec.
6	→	3.5 sec.	E	→	7.5 sec.
7	→	4.0 sec.	F	→	8.0 sec.

○ The operating time of the stacker is determined in the following way.

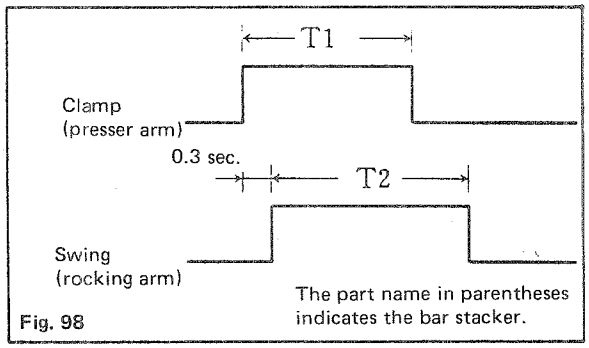


Fig. 98

The part name in parentheses indicates the bar stacker.

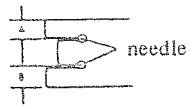
The operating time can be specified as desired using timer dials ❶ and ❷, as shown in Fig. 97.

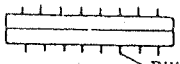
16. TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Corrective measures
1. Thread breakage (needle thread)	1-1) The surface of the thread path burrs or scratches.		Smooth the thread path (using a fine sandpaper and buff).
	1-2) Needle thread tension is too high.	2)-A The tension of the thread tension discs is too high.	Decrease the tension. (See item "Needle thread tension.")
		2)-B The tension of the thread take-up spring is too high.	Decrease the tension. (See item "Adjusting the tension of the thread take-up spring.")
		2)-C The stroke of the thread take-up spring is too large or small.	Correct the stroke. (See item "Adjusting the tension of the thread take-up spring.")
	1-3) The clearance between the bobbin case opening lever and the projection of the bobbin case is not correct.		Provide a clearance of 0.2 to 0.3 mm (0.008" ~ 0.012") between them. (See item "Adjusting the bobbin case opening lever.")
	1-4) The hooks have been improperly installed.	4)-A The needle hits the hook blade.	Correct the clearance between them. (See item "How to adjust the clearance between the needle and the hook blade point.")
		4)-B The timing between the needle and hook is bad.	Correct the timing. (See item "Adjusting the hook to the needle.")
	1-5) The hooks are lubricated insufficiently.		Adjust the amount of oil. (See item "Adjusting the amount of oil in the hooks")
2. Thread breakage (bobbin thread)	2-1) The bobbin thread is subjected to excessive tension.	1)-A The bobbin thread tension is too high.	Decrease the bobbin thread tension. (See item "Bobbin thread tension.")
		1)-B The bobbin case bites waste thread or dust.	Take out the bobbin and clean up the bobbin case.
		1)-C The bobbin is defective in configuration and fails to spin smoothly.	Replace the bobbin.
3. Stitch skipping	3-1) The hooks have been positioned improperly.	1)-A The clearance between the needle and hook is too large.	Correct the clearance. (See item "How to adjust the clearance between the needle and the hook blade point.")
		1)-B The timing between the needle and hook is bad.	Correct the timing. (See item "Adjusting the hook to the needle.")

Trouble	Cause (1)	Cause (2)	Corrective measures
		1)-C The pointed end of the hook blade is not sharp enough.	Take out the hook and sharpen the blade point.
	3-2) The needle guard has been positioned improperly.	2)-A The clearance between the needle and needle guard is too large.	Correct the clearance. (See item "Adjusting the hook to the needle.")
		2)-B The needle and needle guard are in excessive contact.	Correct the clearance between them. (See item "Adjusting the hook to the needle.")
	3-3) The needle bar frame has been positioned improperly.		Correct its position. (See item "Adjusting the position of the needle bar frame.")
	3-4) The needle is defective.	4)-A The needle is bent or has blunt point.	Replace the needle.
		4)-B The needle No. is not proper.	Replace the needle with a thicker one.
	3-5) The clearance between the sewing plate and the binder is not correct.		Correct the height of the binder. (See item "Horizontal of the binder.")
	3-6) The work clamp feet do not clamp the garment properly.	6)-A The clamping pressure is not high enough.	Adjust the compressed air pressure to 5.0 kg/cm^2.
	3-7) The lockstitching speed is not correct.		Set stitch length to 2.0 mm.
4. Loose stitches	4-1) The needle thread tension is not high enough.		Increase the tension. (See item "Needle thread tension.")
	4-2) The thread take-up spring has been maladjusted.	2)-A The thread take-up spring tension is not high enough.	Increase the tension. (See item "Adjusting the tension of the thread take-up spring.")
		2)-B The stroke of the thread take-up spring is too small.	Correct the stroke. (See item "Adjusting the tension of the thread take-up spring.")
	4-3) The clearance between the bobbin case opening lever and the projection of the bobbin case is not correct.		Provide a clearance of 0.2 to 0.3 mm (0.008" ~ 0.012") between them. (See item "Adjusting the bobbin case opening lever.")
	4-4) The clearance between the sewing plate and the binder is too large.		Correct the height of the binder. (See item "Horizontal of the binder.")

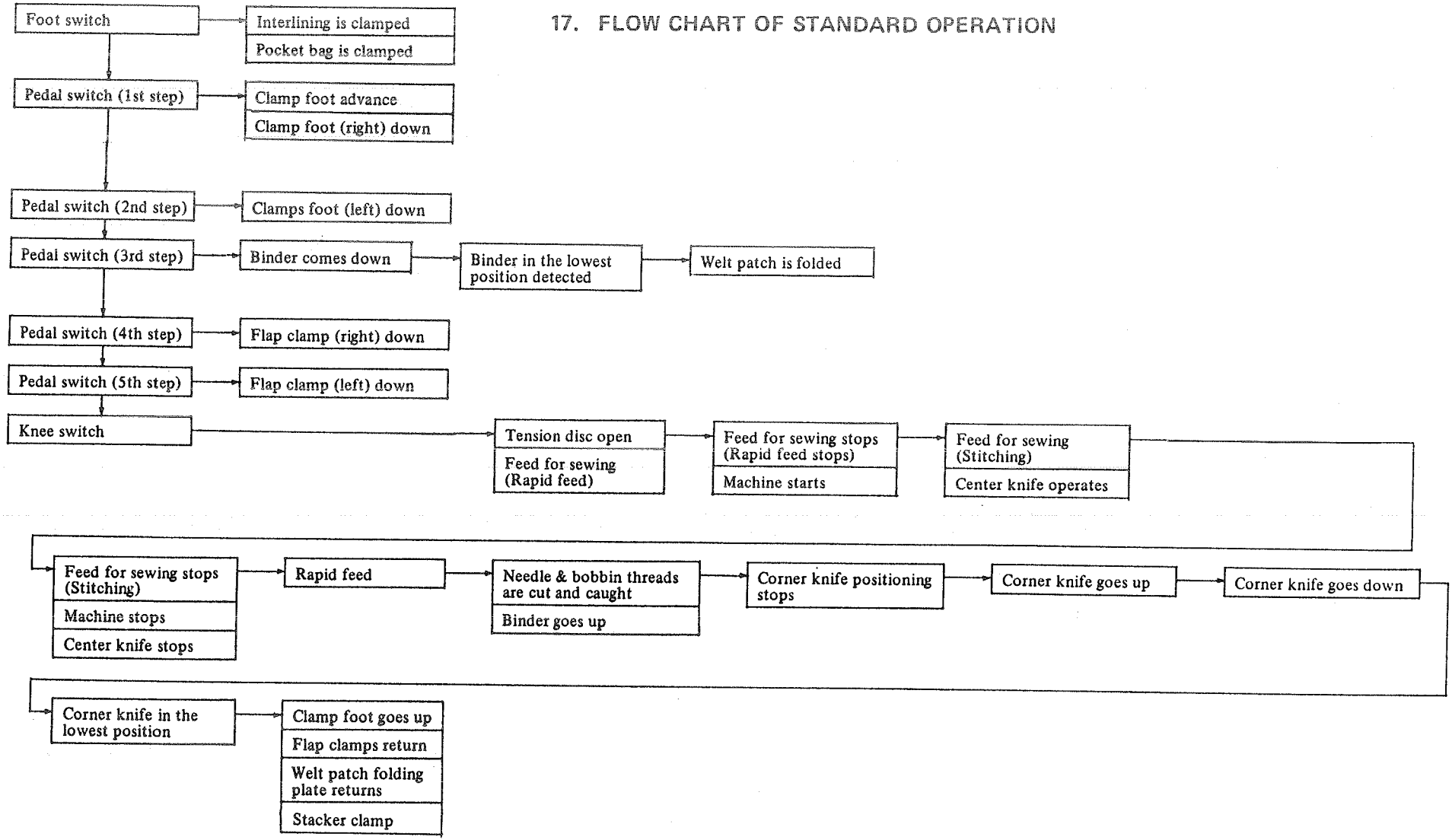
Trouble	Cause (1)	Cause (2)	Corrective measures
5. Needle breakage	5-1) The needle strikes the hook blade point.		Correct the clearance between them. (See item "How to adjust the clearance between the needle and the hook blade point.")
	5-2) The needle strikes the needle guard.		Correct the clearance between them. (See item "Adjusting the hook to the needle.")
	5-3) The needle fails to enter the needle hole in the throat plate and hits the vicinity.		Correct the position of the needle bar frame. (See item "Adjusting the position of the needle bar frame.")
	5-4) The needle strikes a component.	4)-A The needle strikes the binder.	Correct the position of the binder. (See item "Position of the binder when lowered.")
		4)-B The needle strikes the welt patch folding plate.	Correct the position of the welt patch folding plate. (See item "Welt patch folding plate.")
	5-5) The lockstitching speed is too high.		Set the stitch length to 2.0 mm.
	5-6) The needle is too thin for the material.		Replace it with a thicker needle.
6. Irregular stitch	6-1) Threading is wrong.	1)-A The threading route of the needle thread is wrong.	Correct the threading. (See item "Threading the machine.")
		1)-B The threading route of the bobbin thread is wrong.	Correct the threading. (See item "Threading the bobbin case.")
	6-2) The needle or bobbin thread tension is not correct.		Correct the needle or bobbin thread tension.
	6-3) The tension or stroke of the thread take-up spring is not correct.		Properly adjust the thread take-up spring. (See item "Adjusting the tension of the thread take-up spring.")
	6-4) The bobbin is wound up too tight.		Rewind the bobbin under proper tension.
	6-5) The bobbin thread feeding tension varies.	5)-A Waste thread exists between the bobbin and the bobbin case.	Remove the waste thread.
		5)-B The bobbin has been deformed and does not spin smoothly.	Replace the bobbin.

Trouble	Cause (1)	Cause (2)	Corrective measures
7. Frequent puckering	7-1) Both the needle and bobbin thread tensions are too high.		Decrease the thread tensions.
	7-2) The needle is too thick for the material.		Replace the needle with a thinner one.
	7-3) The clearance between the welt patch base plate and the sewing plate is not proper.		Properly adjust the clearance according to the material thickness. (See item "Horizontal of the binder.")
8. The thread slips off the needle at welting start.	8-1) The thread tension release rod has been improperly positioned.		Correct its position. (See item"Position of the thread tension release rod.")
	8-2) The needle thread is not held properly.		Correct the position.
9. Several stitches are skipped at welting start.	9-1) The bobbin thread is too short.	1)-A The bobbin runs idle.	Increase the bobbin thread tension. Place a cloth under the bobbin to prevent it from running idle.
		1)-B The thread tension release rod has been improperly positioned.	Position it properly. (See item "Position of the thread tension release rod.")
10. Welt widths on the right and left are not the same.	10-1) The clearance between the binder and garment clamp plate is not correct.		Correct the clearance. (See item "Garment clamps positioning.")
	10-2) The clearance between the needle and the welt patch folding plate is not correct.		Correct the clearance. (See item "Welt patch folding plate.")
	10-3) The binder has been improperly positioned laterally.	3)-A The position of the binder with respect to the needles has been maladjusted.	 The needles shall enter the centers of the needle entry holes in the binder, and A = B
11. Welt widths at start and end are not the same.	11-1) The work clamp feet fail to travel in parallel to the needles.		Correct the parallelism of the work clamp feet. (See item "Parallelism of the work clamp feet")

Trouble	Cause (1)	Cause (2)	Corrective measures
12. The machine fails to welt to the garment point. (This failure occurs in every welting.)	12-1) The position of the crossmark lamps is wrong.		Space them 240 mm (9.449") from the needle entry point. (See item "How to adjust the position of the crossmark lamps.")
	12-2) The garment gets out of position during welting.	2)-A The work clamp foot pressure is not high enough.	Set the pressure to 5.0 kg/cm².
		2)-B The clearance between the welt patch base plate and the sewing plate is not proper.	Correct the clearance according to the material. (See item "Horizontal of the binder.")
13. Pillings are produced on garment or welting patch. (throughout the welting seam) 	13-1) The center knife is dull.	1)-A The center knife is defective.	Replace the center knife.
		1)-B The center knife has been installed improperly.	Install it correctly. (See item "Sharpness of the center knife.")
	13-2) The needle is too thick or the needle point is blunt.		Use a thinner needle or replace the needle.
14. Needle threads are not trimmed.	14-1) The "UP" stop position of the synchronizer is not correct.		Correct the installation of the synchronizer. (See item "Position of the synchronizer.")
	14-2) The needle thread knife fails to work properly.	2)-A The needle thread knife has not been installed properly.	Correctly install the needle thread knife. (See item "Height of the needle thread knife.")
		2)-B The thread trimming cylinder fails to work properly.	• Expel the compressed air from the cylinder to check whether the cylinder works under approx. 1.9 kg or not. If the cylinder does not work smoothly, replace the cylinder. (Check the drain)
15. Bobbin threads are not trimmed.	15-1) The bobbin thread knife is faulty.	1)-A The pressure of the bobbin thread spring is not high enough.	Increase the spring pressure. (See item "Adjusting the bobbin thread knife.")
		1)-B The bobbin thread knife blade is not sharp enough.	Replace the knife.
	15-2) The bobbin thread knife driving cylinder fails to work properly.		Check the drain within the cylinder or replace the cylinder if necessary.

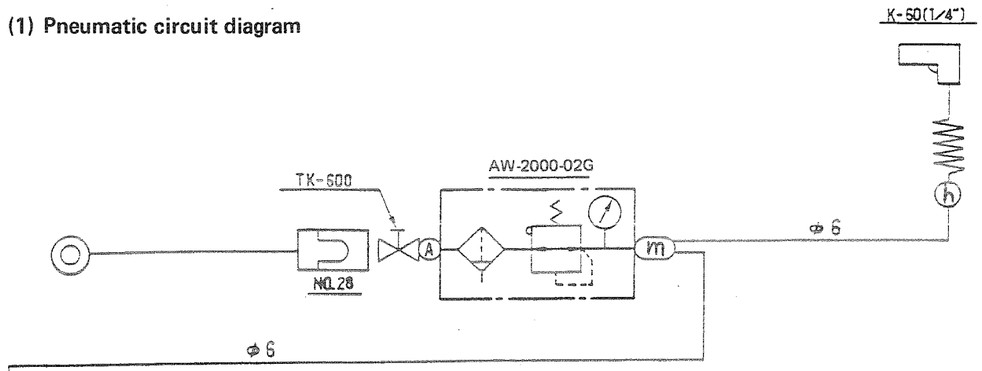
Trouble	Cause (1)	Cause (2)	Corrective measures
16. No power is supplied to the machine even when the main switch is turned on.	16-1) No power appears at F1, F2, F3 in the fuse holder.	1)-A Fuse F1 has blown.	Replace Fuse F1.
		1)-B Fuse F2 has blown.	Replace Fuse F2.
		1)-C Fuse F3 has blown.	Replace Fuse F3.
17. The cross-mark lamps do not light.	17-1) The lamp bulb connection is loose.		Screw in the bulbs securely.
	17-2) The lamps are disconnected.		Replace them.
18. The 100Vac line voltage for the servo motor does not appear.	18-1) The 100Vac output is not being supplied from the power transformer secondary.	1) Transformer is faulty.	Replace transformer.
19. The cylinders do not work.	19-1) The power transformer is supplying 100Vac, but the cylinders do not work.	1) The dc power supply unit is faulty.	Replace the dc power supply unit.
	19-2) The power transformer is not supplying 19Vac.	2) Transformer is faulty.	Replace transformer.
20. The machine fails to do normal material feed during operation. 20-1. The feeding speed is not normal.	20-1) The servomotor driver is defective.		Replace the servomotor driver.
	20-2) The servomotor is defective.		Replace the servomotor.

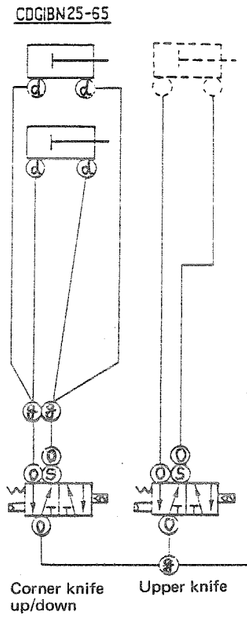
17. FLOW CHART OF STANDARD OPERATION



18. CIRCUIT DIAGRAM

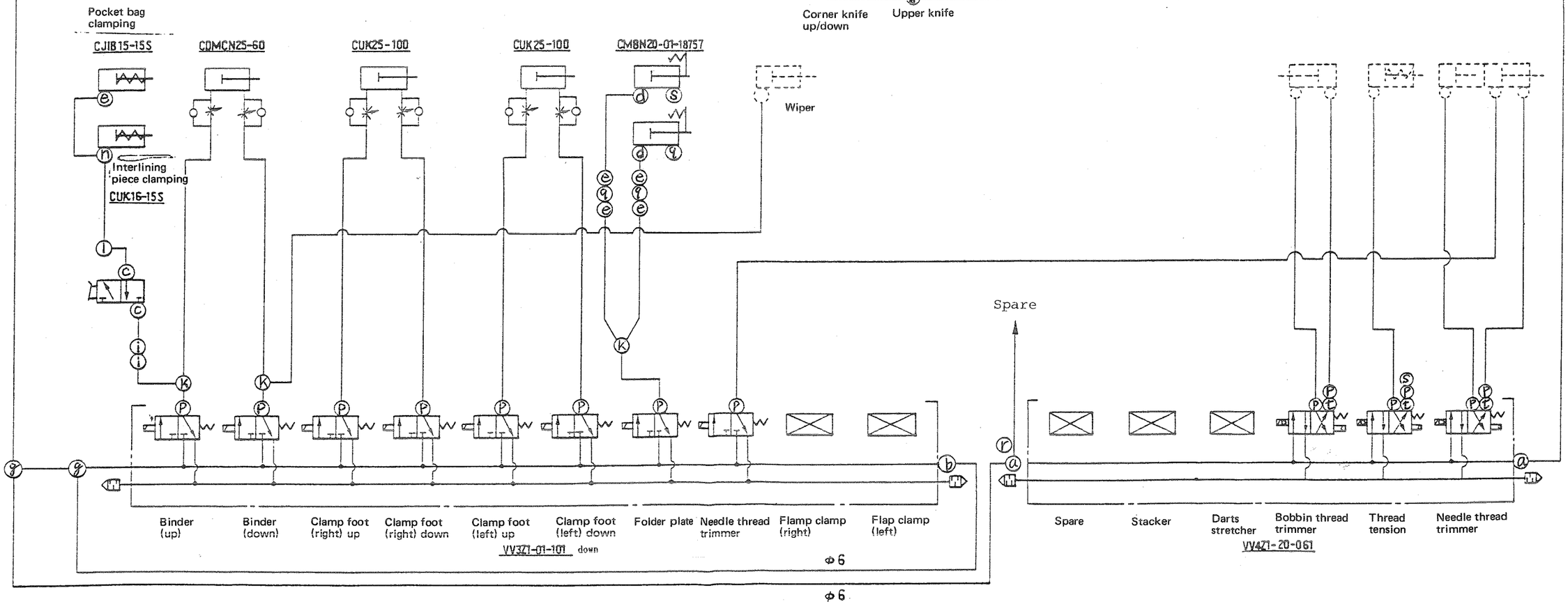
(1) Pneumatic circuit diagram



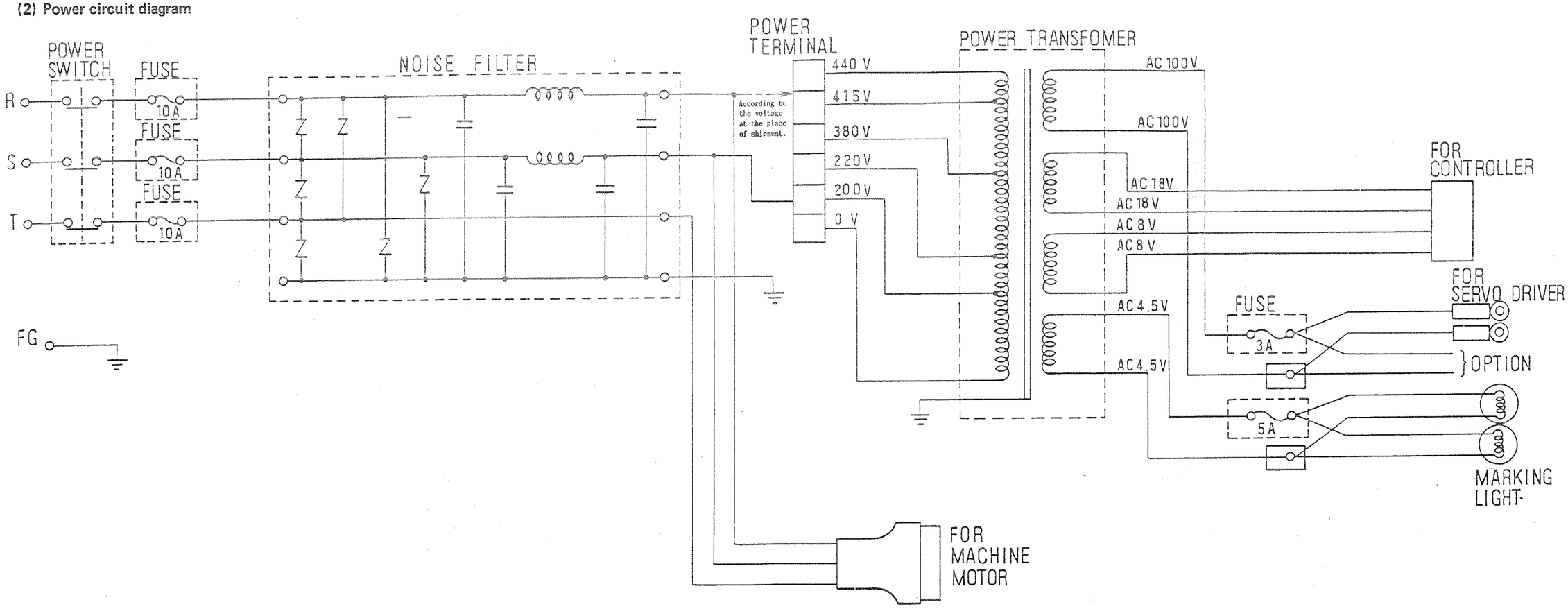


Part Name	Model No.	Symbol	Part Name	Model No.	Symbol
Elbow union	KQL06-01	a	Branch	KQU06-02S	m
	KQL06-M5	b	Tee union	KQT04-M5	n
	KQL04-02	c	Half union	KQH06-M5	o
	KQL04-01	d		KQH04-M5	p
	KQL04-M5	e	Element attached nipple	CM20-30-116	q
Service tee union	KQY06-01	f	Blind cock	KQP06	r
	KQY06-M5	g		KQP04	s
Straight	KQH06-00	h	Extension joint	M-5J	t
	KQH04-00	i	Mechanical valve	XT34-133	u
Union Y	KQU06-00	j			
	KQU04-00	k	Nipple	1/4"	A
Tube coupler	KCH04-00	l			

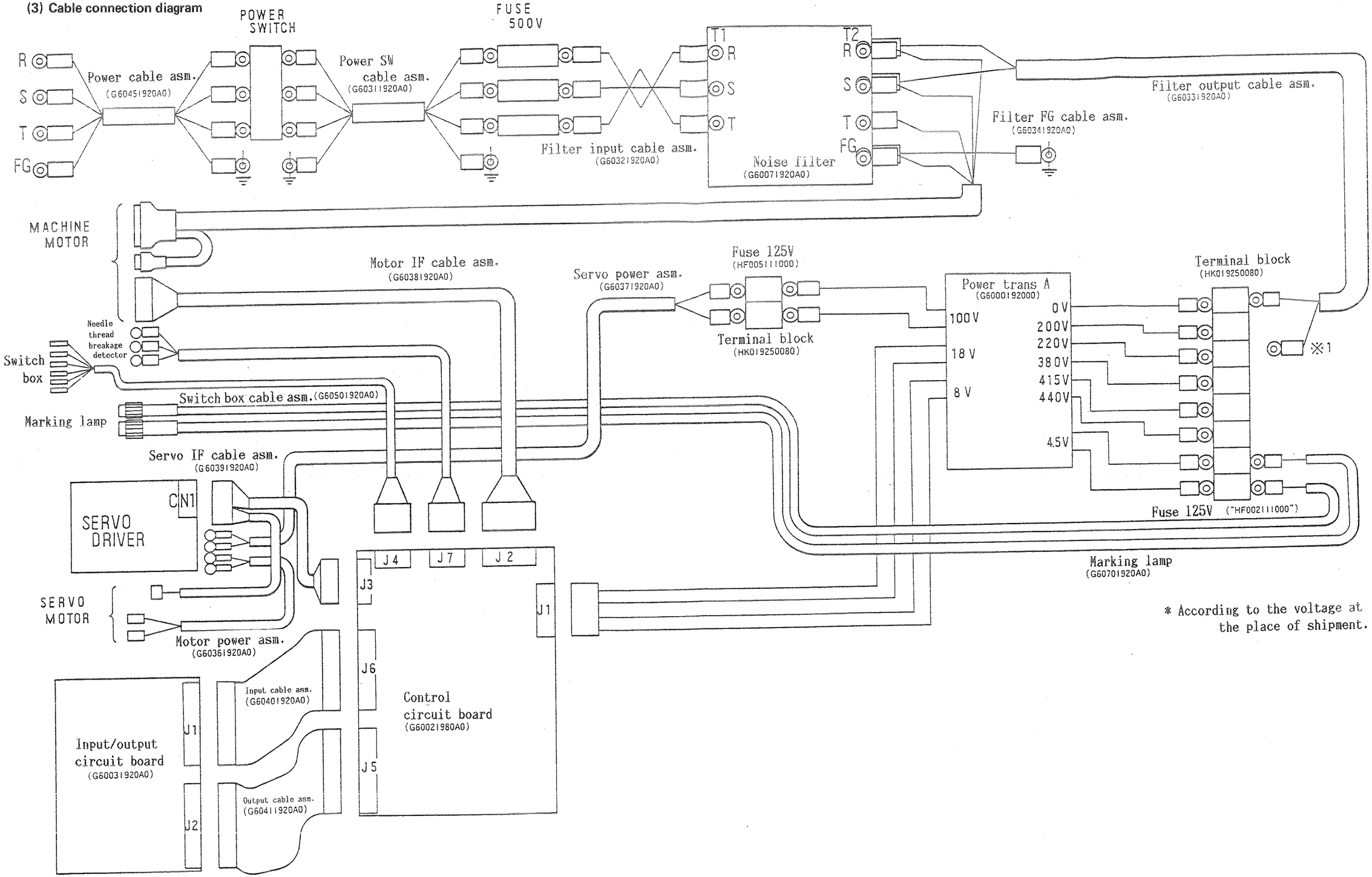
(Note) Use the hoses whose diameter are $\phi 4$ if not specified.



(2) Power circuit diagram

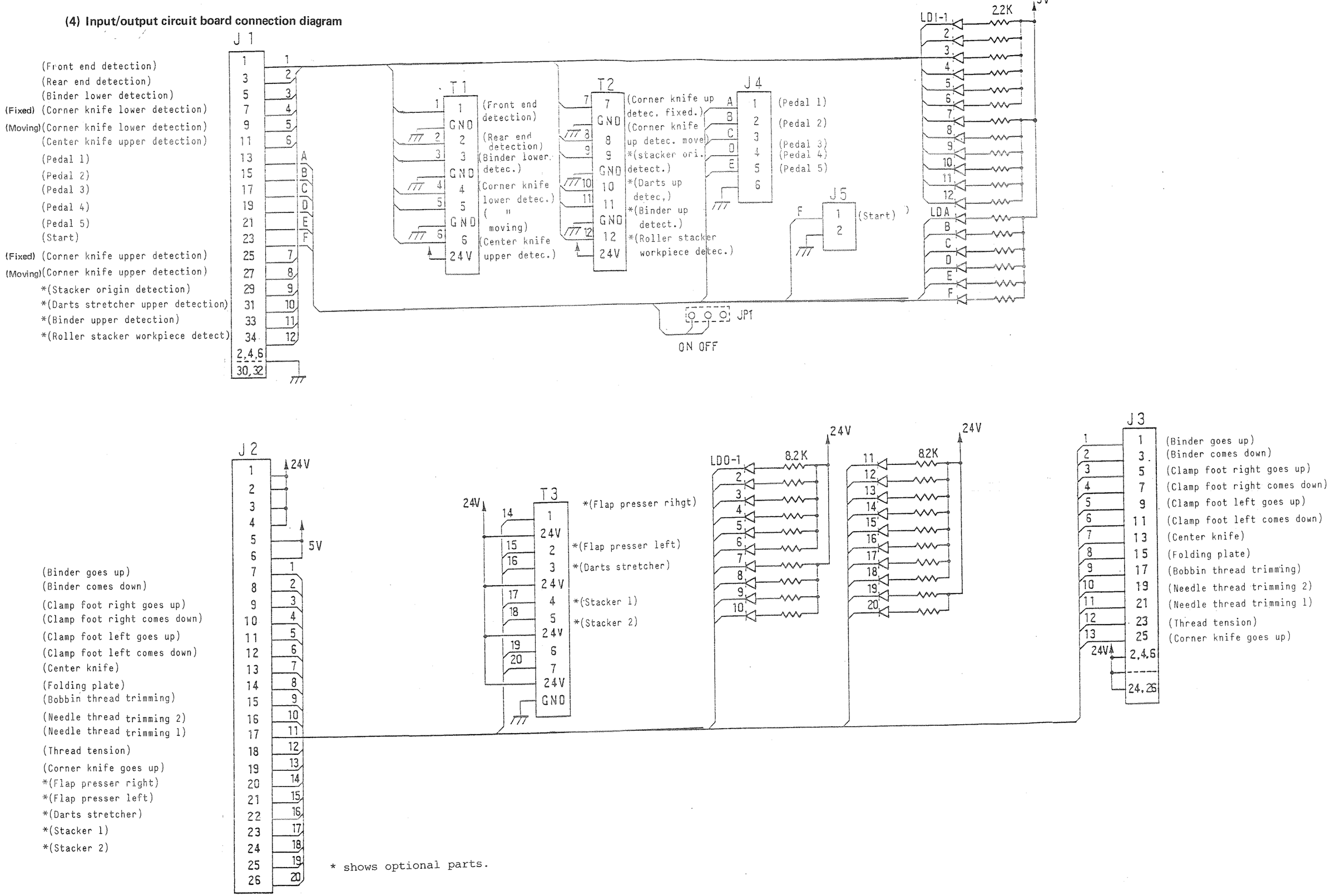


(3) Cable connection diagram



* According to the voltage at the place of shipment.

(4) Input/output circuit board connection diagram



* shows optional parts.

(5) Cable connection diagram