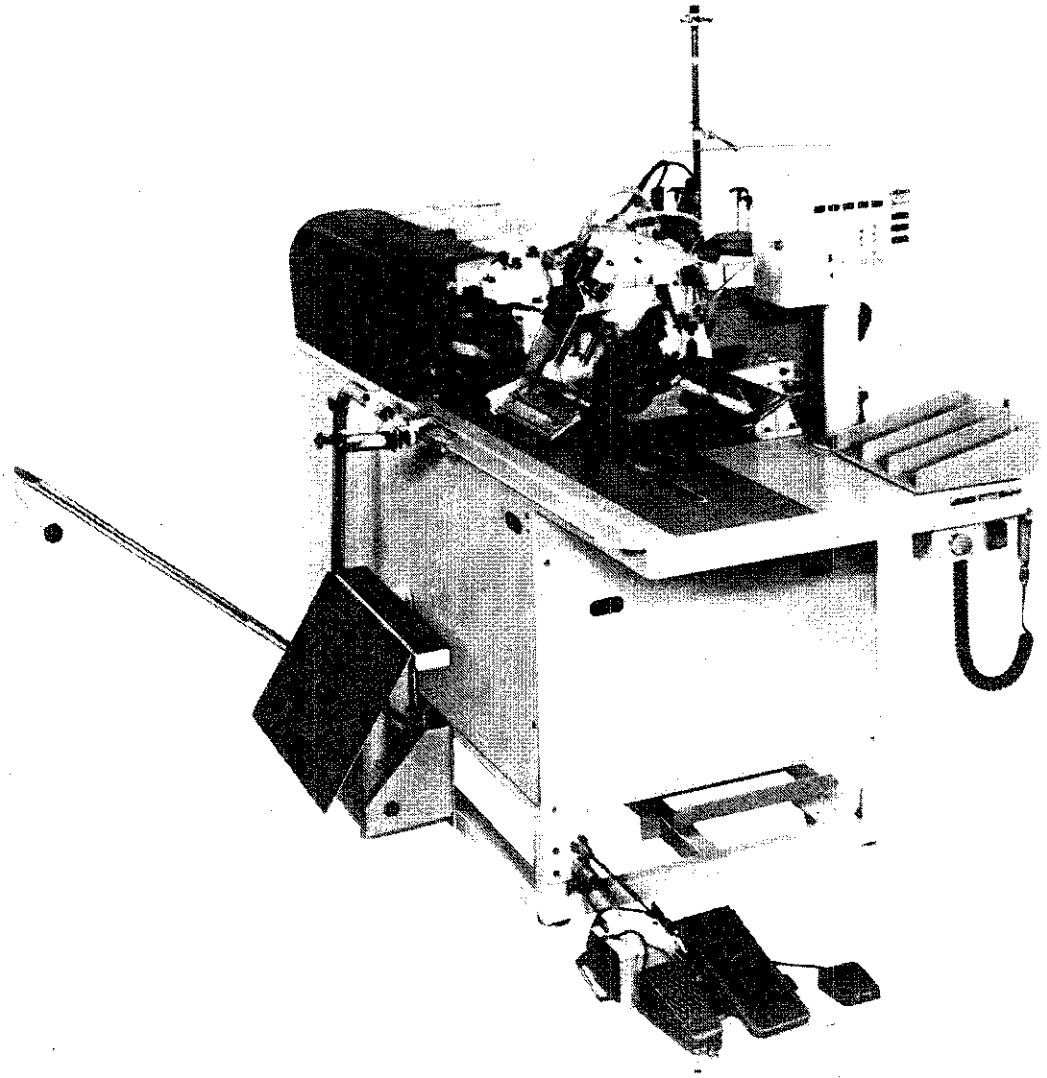
JUKI

AUTOMATIC WELTING MACHINE

APW-231 APW-232 APW-235
APW-236 APW-239 APW-240

ENGINEER'S MANUAL



NO. IV-29-1
1989.11

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.

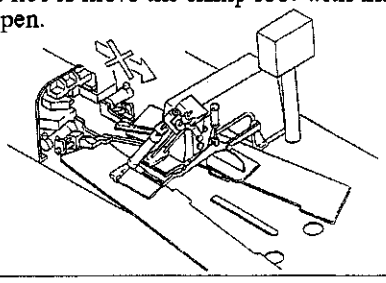
Programs

0 = 1 set knives straight Pockets

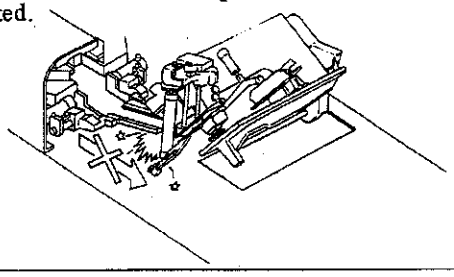
1 = 2 set knives
2 = 2 set knives
3 = 2 set knives

Angle Left Right Knives (splits)

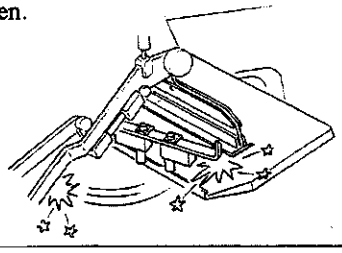
1. Be sure not to move the clamp foot with the sewing table open.



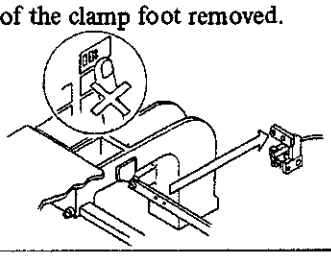
2. Be sure not to move the clamp foot with the machine head tilted.



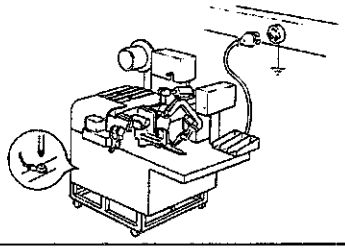
3. After having threaded the machine, do not raise or lower the binder with the photoelectric tube bracket device open.



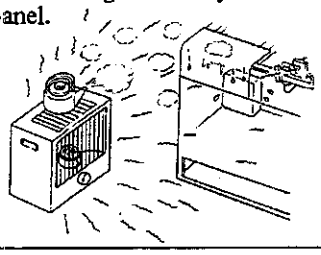
4. Be sure not to turn CLAMP FOOT TRAVEL switch ON, with the backside of the rear end detecting switch of the clamp foot removed.



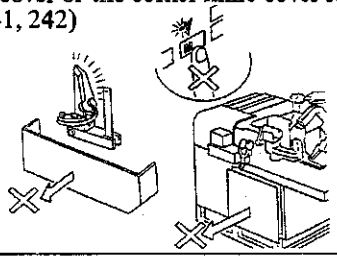
5. Be sure to connect FG wires of the power cables to an earth of the main power source.



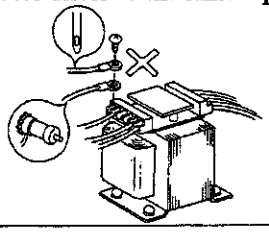
6. Do not place such things that might generate an intense heat or a high humidity around the electric control panel.



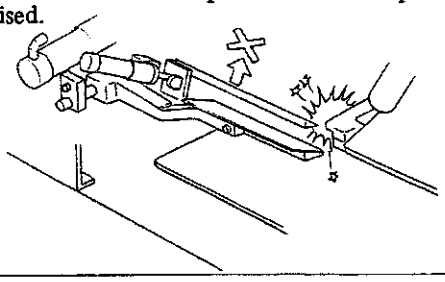
7. Be sure not to actuate the corner knife with the machine cover or the corner knife cover removed. (APW-241, 242)



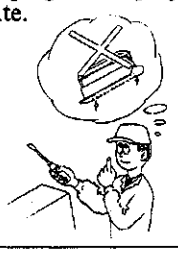
8. Do not connect the power cable of the needle control circuit board and the power cable (AC110V) of the stepping motor driver to the same tap of the transformer.



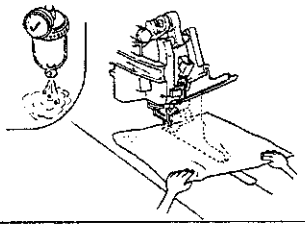
9. Be sure not to travel the clamp foot with the flap presser raised.



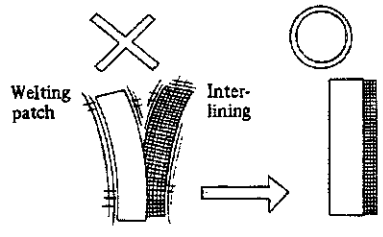
10. Be sure not to adjust or operate the machine with the welt patch grasping needle projected from the welting patch base plate.



11. After draining the air, be sure to pull the workpiece to the position where the binder comes down.



12. Attach adhesive interlinings to the welting patches used. (APW-232, 236, 240)



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1. SPECIFICATIONS OF APW-231, APW-232

(1) Mechanical Specifications

- Sewing machine: 2-Needle, Lockstitch Machine with center knife (exclusive use for APW)
  Model LH-570
- Sewing speed: 2,200 s.p.m. (standard)
- Stitch length:
  Lockstitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)
  Condensation stitch: 0.5 ~ 1.5 mm (standard : 1.0 mm)] Condensation/Back tack stitch selectable
  Back tack stitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)]
- Types of welts: Parallel double welt, parallel single welt, parallel variant double welt, combined single welt] Each without flap
- Pocket lip length : (welt length) Possible to set in 1 mm unit within the range of min. 35 mm ~ max. 180 mm (Needle gauge 8 ~ 12 mm)
  Possible to set in 1 mm unit within the range of min. 50 mm ~ max. 180 mm (Needle gauge 14 ~ 20 mm)
- Welting width : (needle gauge) Standard 10 mm (Optional parts 8, 12, 14, 16, 18, 20 mm)
- Needles: ORGAN Mt x 190 # 16 ~ # 18 (standard # 16) or
  SCHMETZ 190R # 100 ~ # 110 (standard # 100)
- Sewing thread: Special thread for the automatic machine
- Hook: 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 microcomputer
- Safety function: Machine operation is automatically stopped if the cloth feed mechanism detector, the needle thread detector or any of the various safety device is actuated.
- Lubricating oil: JUKI New Defrix Oil No. 2
- Operating air pressure: 5.0 kg/cm^2
- Air consumption: Approx. 40 Nℓ/min.
- Dimensions of the machine: 1,400(W) x 1,640(L) x 1,570(H) mm (including the thread stand)
- Weight: Approx. 380 kg

(2) Electrical Specifications

Three different welting lengths can be memorized by the built-in microcomputer and accessible through the control key-board as desired. The memorized data will not be erased even though the power supply is cut off, because the memory is operated on DC power supplied by the built-in batteries for 100 hours.

- Input power: 3 phase 200, 220, 230, 240, 250
  380, 415, 440] 50/60 Hz
  Single phase 200, 220, 230, 240, 250]
  (Voltage fluctuation must not exceed ± 10% of the rated voltage.)
- Consuming power: 810 W

SPECIFICATIONS OF APW-235, APW-236

(1) Mechanical Specifications

- Sewing machine: 2-Needle, Lockstitch Machine with center knife (exclusive use for APW)
  Model LH-570
- Sewing speed: 2,200 s.p.m. (standard)
- Stitch length:
  Lockstitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)
  Condensation stitch: 0.5 ~ 1.5 mm (standard : 1.0 mm)] Condensation/Back tack stitch selectable
  Back tack stitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)]
- Types of welts: Parallel double welt, parallel single welt, parallel variant double welt, combined single welt] Each with flap or without flap
- Pocket lip length : (welt length): Possible to set in 1 mm unit within the range of min. 35 mm ~ max. 180 mm (Needle gauge 8 ~ 12 mm)
  Possible to set in 1 mm unit within the range of min. 50 mm ~ max. 180 mm (Needle gauge 14 ~ 20 mm)
- Welting width : (needle gauge): Standard 10 mm (Optional parts 8, 12, 14, 16, 18, 20 mm)
- Needles: ORGAN Mt x 190 # 16 ~ # 18 (standard # 16) or
  SCHMETZ 190R # 100 ~ # 110 (standard # 100)
- Sewing thread: Special thread for the automatic machine
- Hook: 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 microcomputer
- Safety function: Machine operation is automatically stopped if the cloth feed mechanism detector, the needle thread detector or any of the various safety device is actuated.
- Lubricating oil: JUKI New Defrix Oil No. 2
- Operating air pressure: 5.0 kg/cm^2
- Air consumption: Approx. 40 Nℓ/min.
- Dimensions of the machine: 1,400(W) x 1,640(L) x 1,570(H) mm (including the thread stand)
- Weight: Approx. 380 kg

(2) Electrical Specifications

Five different welting lengths plus flap joining welt can be memorized by the built-in microcomputer and accessible through the control key-board as desired. The memorized data will not be erased even though the power supply is cut off, because the memory is operated on DC power supplied by the built-in batteries for 100 hours.

- Input power:
  3 phase 200, 220, 230, 240, 250
  380, 415, 440] 50/60 Hz
  Single phase 200, 220, 230, 240, 250]
  (Voltage fluctuation must not exceed ± 10% of the rated voltage.)
- Consuming power: 810 W

SPECIFICATIONS OF APW-239, APW-240

(1) Mechanical Specifications

- Sewing machine: 2-Needle, Lockstitch Machine with center knife and needle stopping device (exclusive use for APW) Model LH-571
- Sewing speed: 2,200 s.p.m. (standard)
- Stitch length:
  Lockstitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)
  Condensation stitch: 0.5 ~ 1.5 mm (standard : 1.0 mm)] Condensation/Back tack stitch selectable
  Back tack stitch: 2.0 ~ 3.0 mm (standard : 2.0 mm)]
- Types of welts: Parallel double welt. Parallel single welt. Parallel variant double welt. Slant double welt. Slant single welt. Slant variant double welt. Trapezoidal sewing.] Each with flap or without flap
- Pocket lip length : (welt length) Possible to set in 1 mm unit within the range of min. 35 mm ~ max. 180 mm (Needle gauge 8 ~ 12 mm)
  Possible to set in 1 mm unit within the range of min. 50 mm ~ max. 180 mm (Needle gauge 14 ~ 20 mm)
- Welting width : (needle gauge) Standard 10 mm (Optional parts 8, 12, 14, 16, 18, 20 mm)
- Needles: ORGAN DP x 17 # 16 ~ # 18 (standard # 16) or SCHMETZ SY3355
- Sewing thread: Special thread for the automatic machine
- Hook: Rotary, vertical-axis, self-lubrication hook
- Thread take-up lever: Slide thread take-up lever
- Needle bar stroke: 33.36 mm
- Cloth feed mechanism: Driven by servomotor
- Control: TTL control by a microcomputer
- Safety function: Machine operation is automatically stopped if the cloth feed mechanism detector, the needle thread detector or any of the various safety device is actuated.
- Lubricating oil: JUKI New Defrix Oil No. 2
- Operating air pressure: 5.0 kg/cm^2
- Air consumption: Approx. 40 Nℓ/min.
- Dimensions of the machine: 1,400(W) x 1,700(L) x 1,570(H) mm (including the thread stand)
- Weight: Approx. 380 kg

(2) Electrical Specifications

Five different welting lengths plus flap joining welt can be memorized by the built-in microcomputer and accessible through the control key-board as desired. The memorized data will not be erased even though the power supply is cut off, because the memory is operated on DC power supplied by the built-in batteries for 100 hours.

- Input power: 3 phase 200, 220, 230, 240, 250
  380, 415, 440] 50/60 Hz
  Single phase 200, 220, 230, 240, 250]
  (Voltage fluctuation must not exceed ± 10% of the rated voltage.)
- Consuming power: 810 W

2. LAYOUT OF APW-231, -232, -235, -236, -239 AND -240

The Automatic Welting Machines APW-231, -232, -235, -236, -239 and -240 consist mainly of eight units; mainly of eight 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)

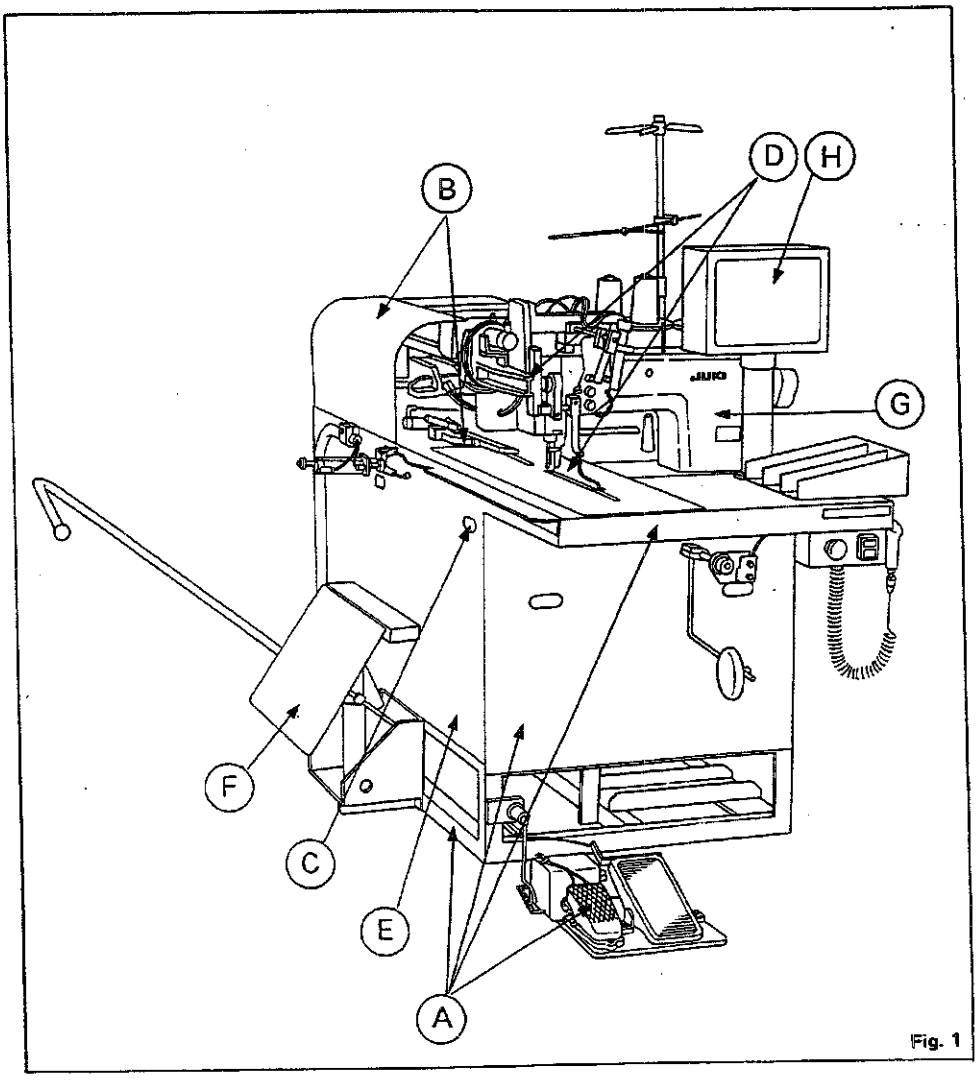


Fig. 1

With this Automatic Welting Machine, you can do desired welting work simply by setting materials (garment cloth, interlining piece, welt patch, flap, etc.) in place and operating the switches on the control panel.

(Note) Above illustrations are those of the APW-231, APW-235, APW-239 series models.

3. INSTALLATION

(1) Levelling the machine

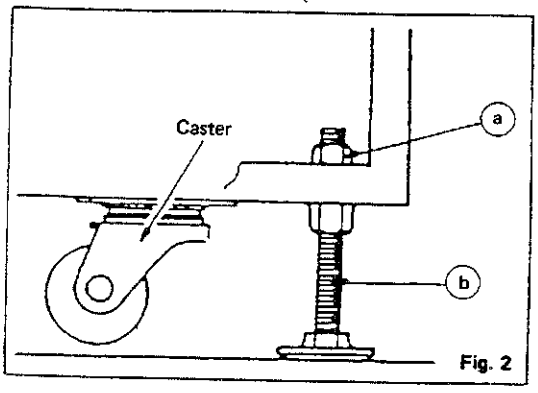


Fig. 2

Install the machine on a flat and vibration-free floor. Loosen four locknuts (a) of adjusting bolts (b) 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

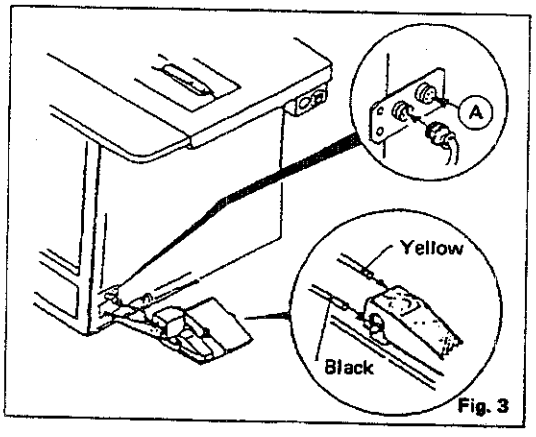


Fig. 3

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

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

   [(A) is a connector for the automatic flap feeder. Connect (A) to the connector of the foot switch used when the automatic flap feeder is installed.]

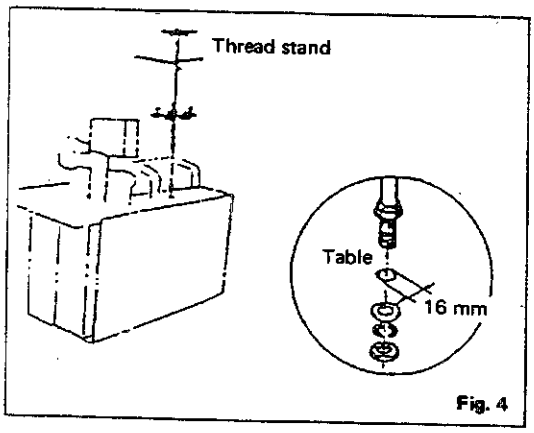


Fig. 4

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

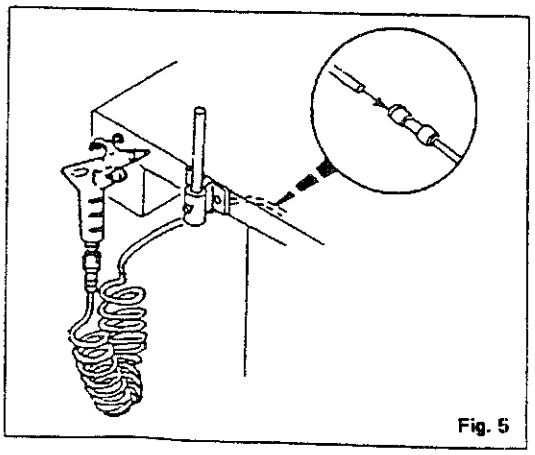


Fig. 5

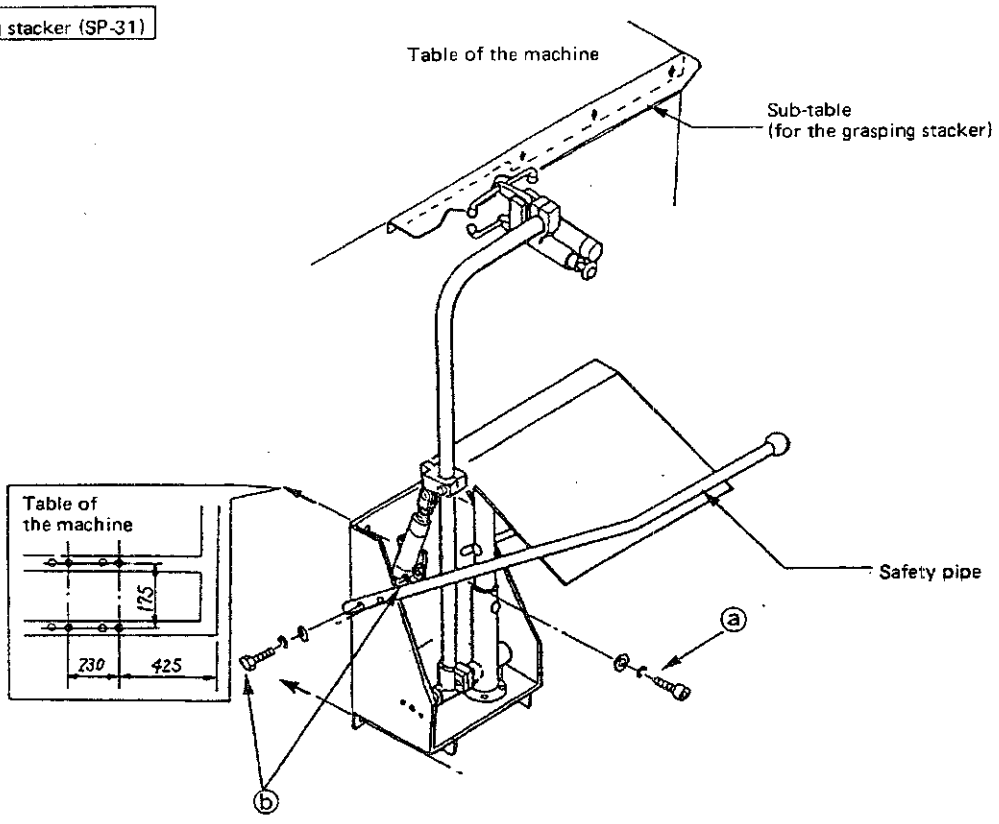
3. Install the air gun.
   Install the air gun as shown in Fig. 5 and connect it to the air tube of the machine.

(3) Installing the stacker

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 (a) (4 bolts).
2. Fix the stacker safety pipe to the fixed position with bolts and nuts (b) (2 ea.).
3. Attach the sub-table of the grasping stacker/bar stacker to the machine. Make sure that the sub-table is attached horizontally with the surface of the table of the machine.
4. Connect air tubes of each cylinder.

Grasping stacker (SP-31)



Bar stacker (SP-32)

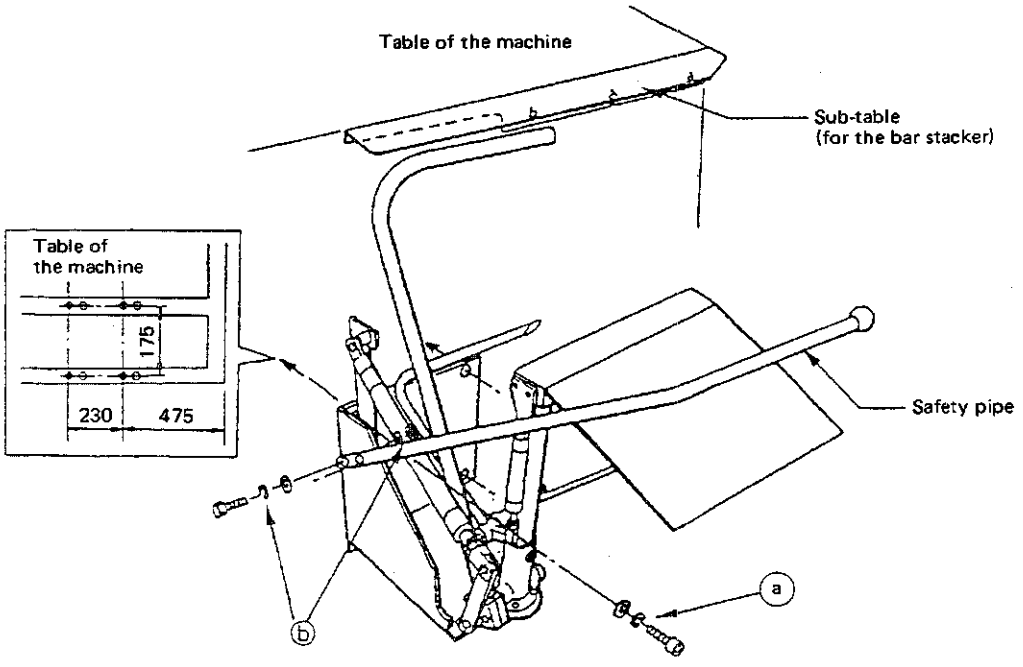
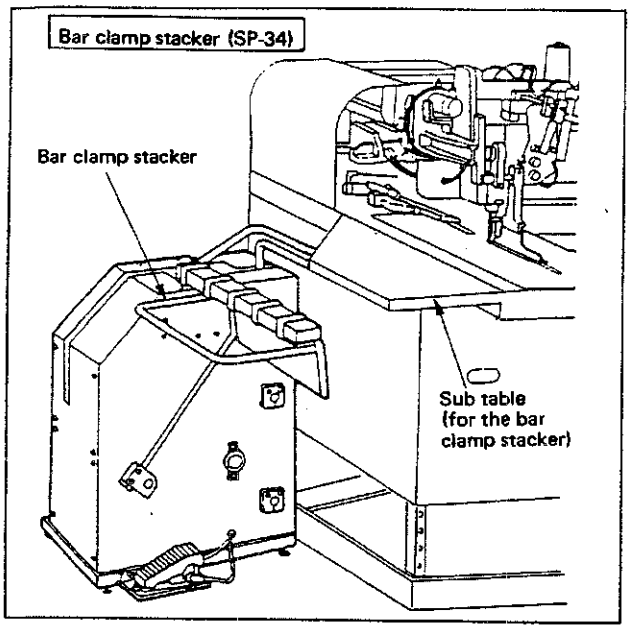


Fig. 6



Installing the bar clamp stacker (optional)

① Set the stacker to the position shown in the figure.
Connecting point . . .
- o Connect the power supply cord
- o Connect the air tube connector

② Fix the safety pipe to the fixed position with bolts and nuts (a) (by two points).

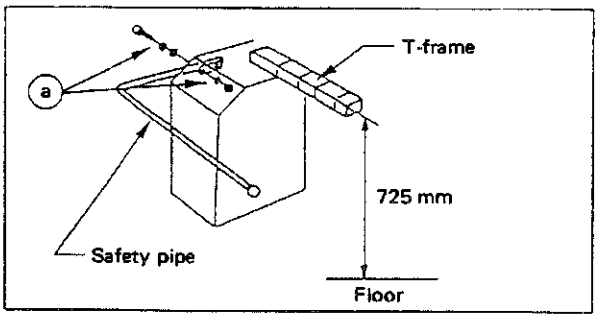


Fig. 7

③ Adjust the height of the T-frame so that the surface of the T-frame is 750 mm above from the floor at a level. Then insert the stacker positioning shaft to the positioning boss and fix with hexagonal bolts so that the distance from the side face of the machine to side face of the stacker is 100 mm.

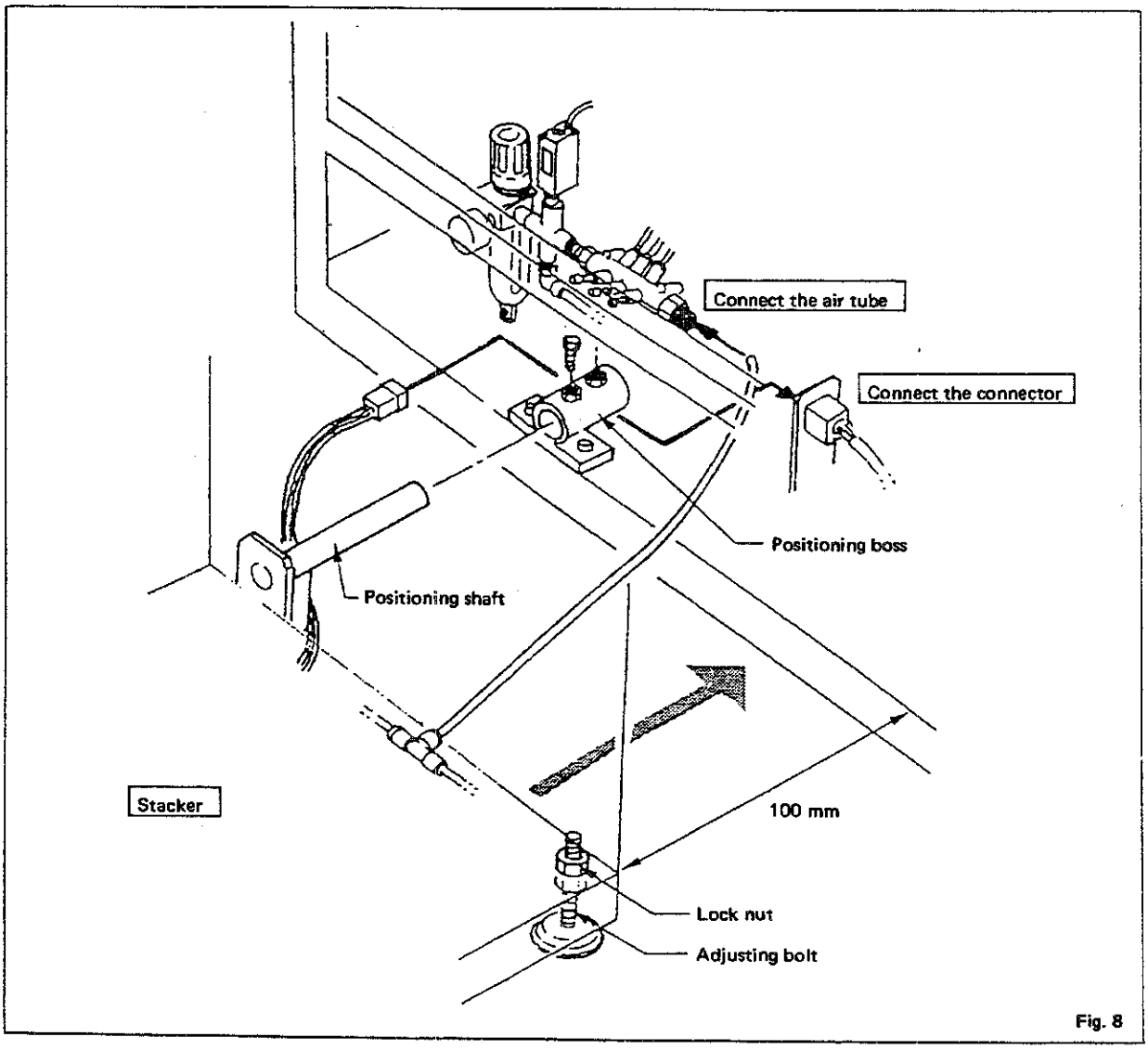


Fig. 8

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

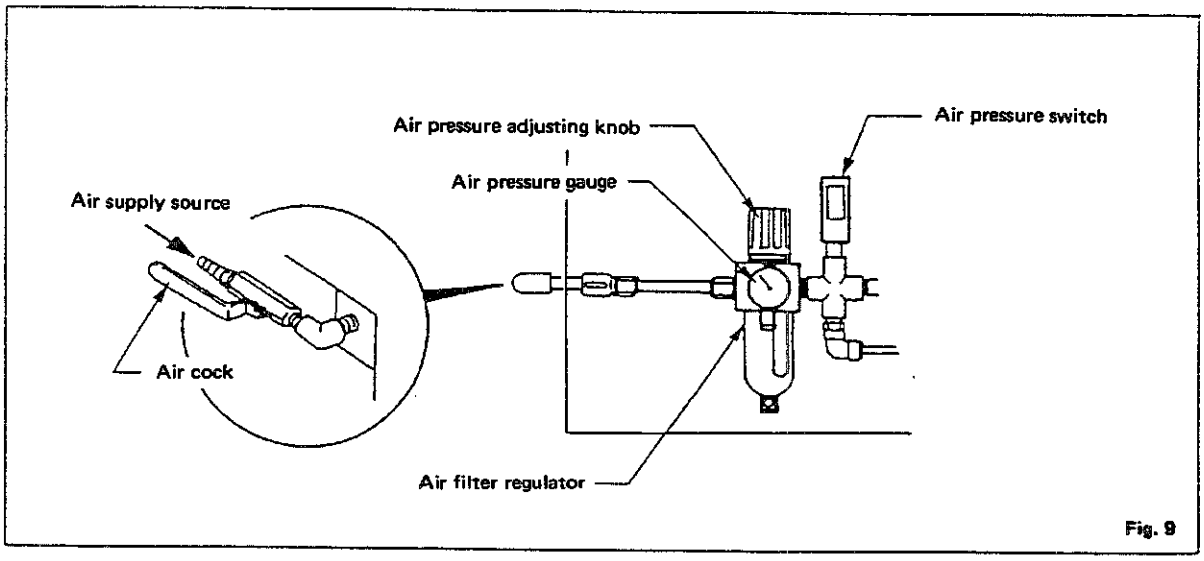


Fig. 9

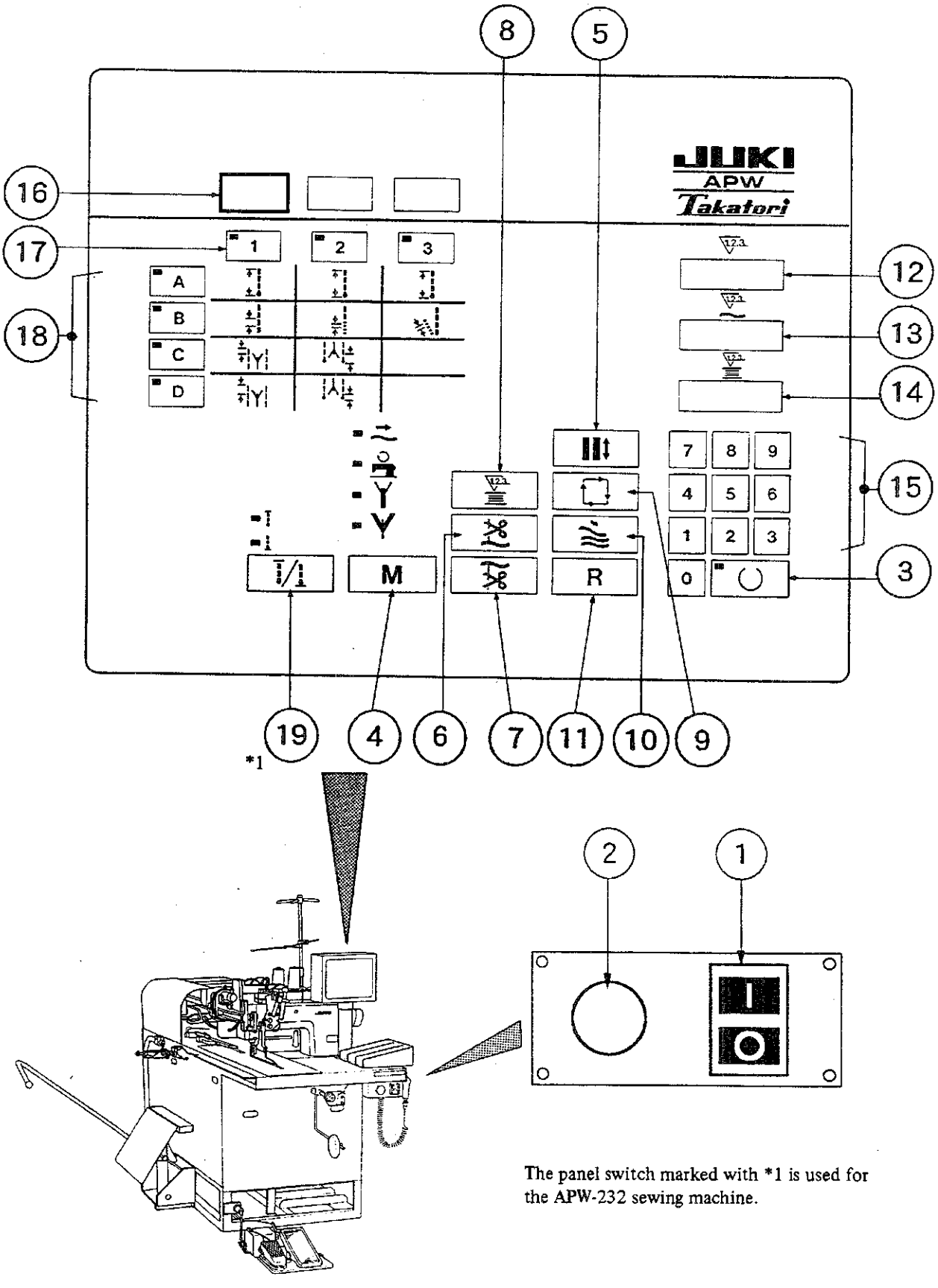
1. Securely connect the air supply hose (1/4") to the air cock located on the rear face of the machine.
2. Open the air cock and adjust the air pressure so that the air pressure gauge indicates 5kg/cm^2 by the air pressure adjusting knob.

[Precautions for the air supply source]

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

5. CONTROL PANEL SWITCHES

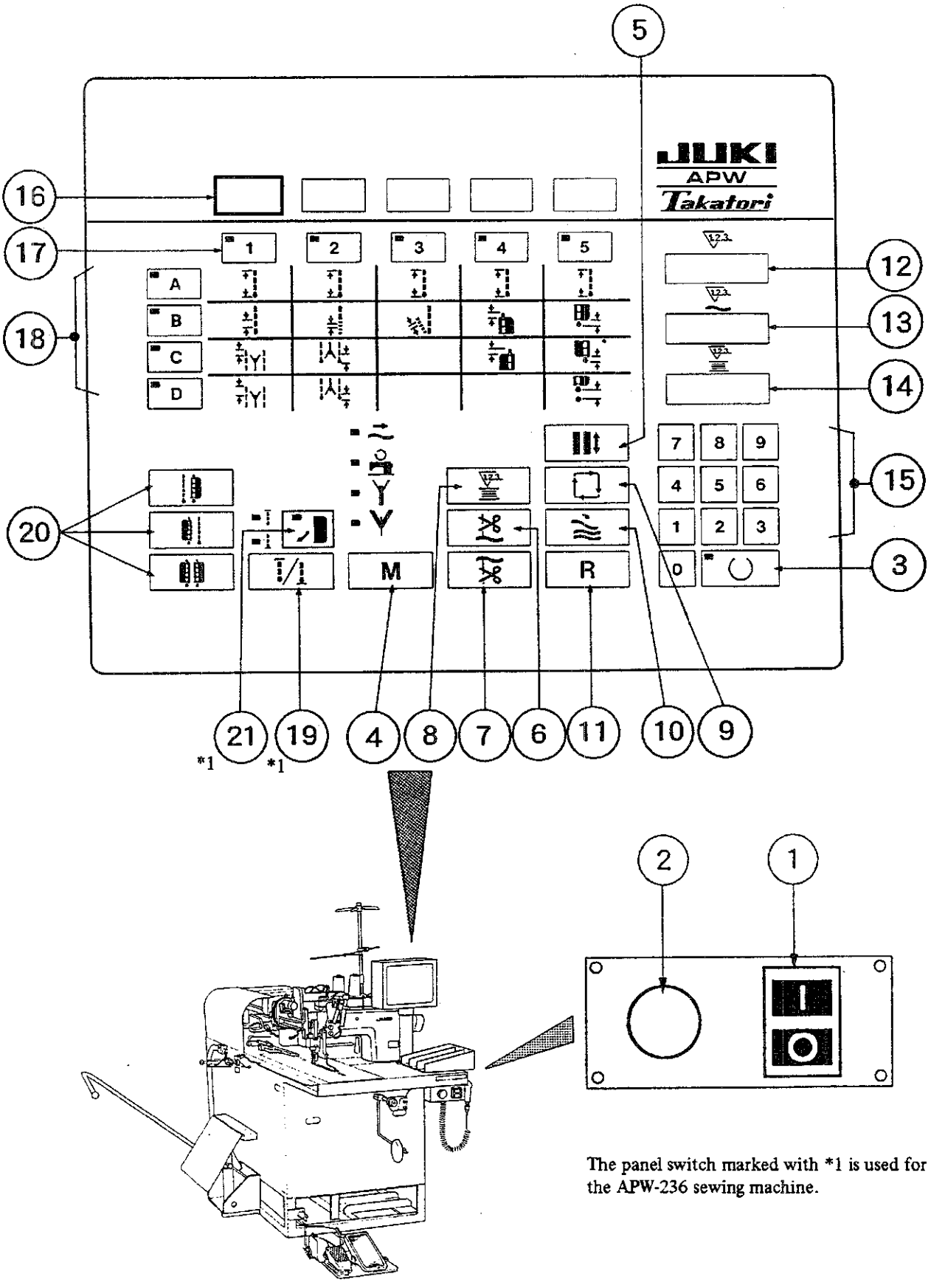
(1) Control panel switches of APW-231, APW-232



The panel switch marked with *1 is used for the APW-232 sewing machine.

(Note) Above illustrations are those of the APW-231, APW-235, APW-239 series models.

Control panel switches of APW-235, APW-236

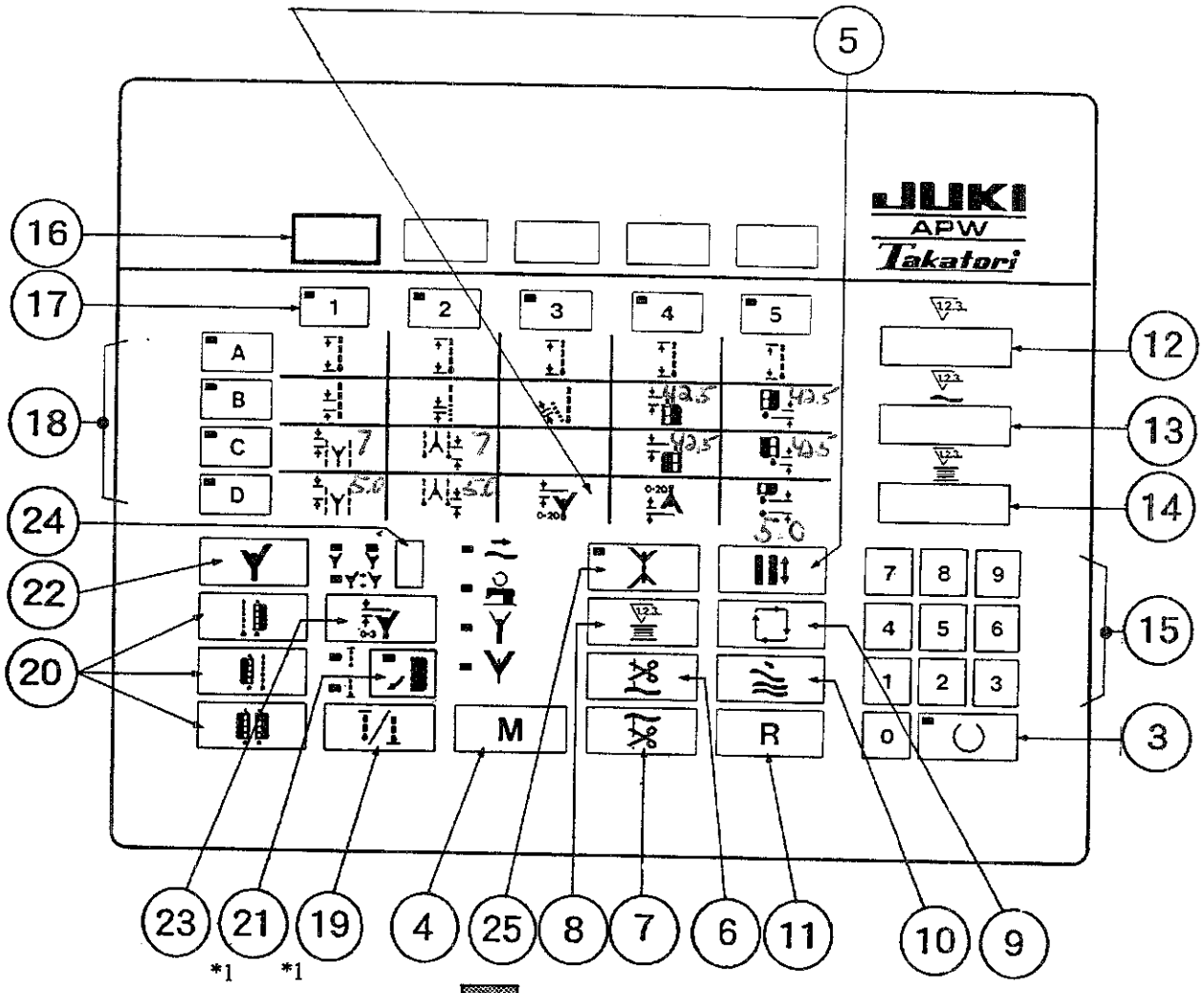


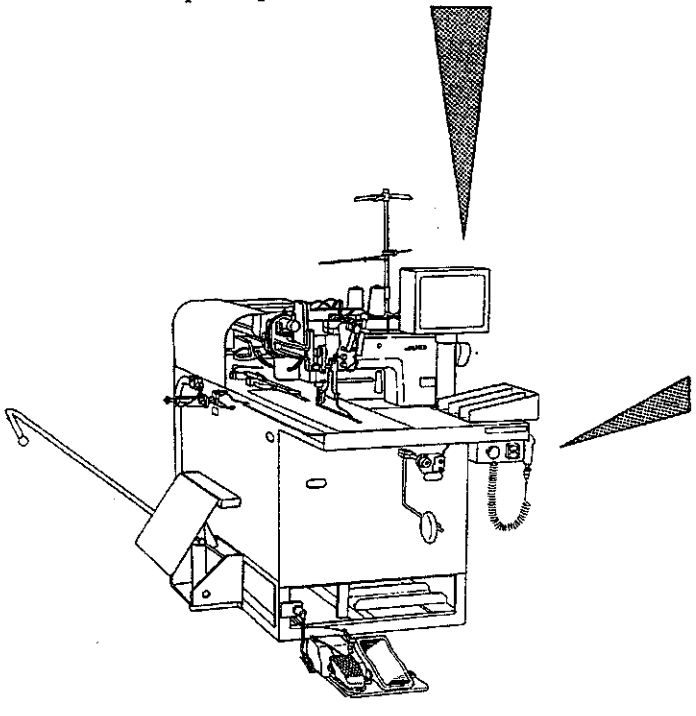
The panel switch marked with *1 is used for the APW-236 sewing machine.

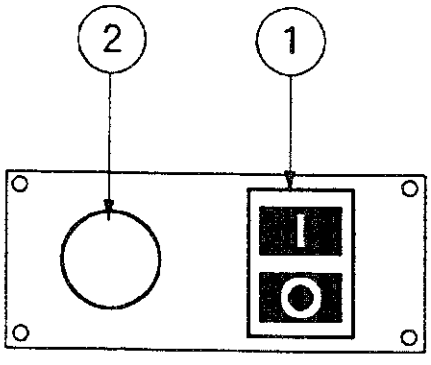
(Note) Above illustrations are those of the APW-231, APW-235, APW-239 series models.

Control panel switches of APW-239, APW-240

* Whether these two switches are valid or not depends on the type of P-ROM attached on the CPU circuit board.







The panel switch marked with *1 is used for the APW-240 sewing machine.

(Note) Above illustrations are those of the APW-231, APW-235, APW-239 series models.

① POWER SWITCH

Depress side | and display figures, indicator lamps, etc. on the operation panel light and the corner knife and the turret start turning, align with the start points and stop at the start positions.
In addition, the circuit of the equipment is turned ON and the machine motor rotates.

Depress side O , and power supply is all turned OFF.

CAUTION

If side O is depressed and power supply is turned OFF, electric current flows in some places inside the control box, so carefully adjust the volume on the print circuit board.

② EMERGENCY STOP switch

Depress this switch when you feel abnormal noise during operation or when you want to stop the machine urgently.

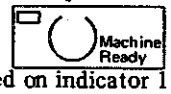
- The machine stops when the needle stops at "UP".
- The feed mechanism stops with the clamp foot lowered.
- Alarm "AL-01" is displayed on display 1 and 2.

In the above state this machine stops operating.

③ MACHINE READY indicator lamp and key

1. While this lamp is "off", the machine comes to the manual mode, and it becomes possible to input each manual key or setting key.

2. When key

is depressed, if setting data and mechanical conditions are all normal, this lamp lights, the machine comes to the automatic mode and is ready to start.
At this time, even when the clamp foot is not in the standby position (when the clamp is not in either standby position of front end or rear end), it travels automatically to the rear end.
When this lamp does not light, even if the foot switch is depressed, the clamp foot does not go down.
If key 

is depressed in the following state, this lamp does not light and alarm is displayed on indicator 1 and 2.

Main causes:

(1) The thread take-up lever is not in the highest position. ——→ Alarm "AL-12"

(2) When the sewing length has been set more than the performance. ——→ Error code "21 ~ 25"

When gauge size is under 12 mm: 35 mm ~ 180 mm
When gauge size is 14 mm to 20 mm: 50 mm ~ 180 mm

After removing these causes, reset key

, and MACHINE READY indicator lamp lights.

For the details and other error codes, refer to the list of error code.

Once key

is depressed after key input, the set value is locked, and all other than key

becomes ineffective.

Then, the machine comes to the automatic mode, and MACHINE READY indicator lamp lights to indicate that the machine is ready to start. When releasing the key lock, depress key

again. Then, MACHINE READY indicator lamp goes off and the machine comes to the manual mode.

(4) AUTO STEPS selector key

Every depressing key

the indicator lamps light in the following sequence, and it is possible to set the operation.

In the normal operation, set it to 4.

1. Only the cloth feed mechanism works. (At this time, the thread tension disc is close.)
   Start actuating the machine, it automatically stops at the beginning and the end of stitching for flap sewing.
   To release the machine from the halt, depress the pedal switch, at its 5th step the machine restarts sewing.
2. Cloth feed mechanism, sewing machine head and thread trimmer work.
3. Cloth feed mechanism, sewing machine head, thread trimmer and center knife work.
4. Cloth feed mechanism, sewing machine head, thread trimmer, center knife and corner knife work.

(5) CLAMP FOOT TRAVEL key

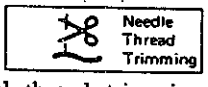
Every depressing key

, the clamp foot repeats forward and return alternately.

When the clamp foot is in the rear end ⟶ It travels to the front end.
When the clamp foot is in places except the rear end ⟶ It travels to the rear end.

This key is used to let the clamp foot travel to the rear end in threading.

(6) NEEDLE THREAD TRIMMING key

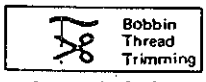
Only during depressing key 

, the needle thread knife goes down. However, in the following cases the manual thread trimming switch does not actuate.

1. The clamp foot is not in the rear end.
2. The dot LED of key

does not go off.

(7) BOBBIN THREAD TRIMMING key

Only during depressing key 

, the bobbin thread is released. However, in the following cases, the manual thread trimming switch does not actuate.

1. The clamp foot is not in the rear end.
2. The dot LED of key

does not go off.

(8) BOBBIN THREAD COUNTER key

The data of bobbin thread counter can be input by inputting numeric key after depressing the key once. In addition, total counter can be cleared to "0" by depressing the reset key at this time.

(9) CYCLE SEWING setting key

When the key is depressed, the present cycle sewing data are displayed. Afterwards, it is possible to set cycle sewing by depressing the NUMBER key.

In case of APW-235, APW-236, APW-239 and APW-240, max. 5 cycles.

In case of APW-231 and APW-232, max. 3 cycles.

⑩ STACKER setting key

The present sewing mode is displayed, and stacker operation ON/OFF is performed by the NUMBER key in the cycle sewing mode and by this key in the flap sewing mode.

⑪ RESET key

This key performs the following:

1. Resetting total counter
2. Resetting numbers of pieces counter
3. Releasing cloth setting
4. Releasing alarm

⑫ TOTAL COUNTER (Displayed by 4 figures)

This counter displays total numbers of pieces.
"0" is displayed by operating the bobbin counter key plus reset key.

⑬ NUMBERS OF PCS COUNTER (Displayed by 4 figures)

When the bobbin thread counter is set, the number of pieces counter displays "0". It counts the number of the sewn workpieces. Every one workpiece has been sewin, it adds one on the counter. Finally when the figures on the number of pieces counter become equal to the figures displayed on the bobbin thread counter, the number of pieces counter stops counting and the lamp flashes on and off.

⑭ BOBBIN THREAD COUNTER (Displayed by 4 figures)

After depressing the bobbin thread counter, the predetermined numbers of pieces input by TEN key is displayed.

⑮ NUMERIC key (TEN key)

Key for setting data

⑯ MODE and DATA indicator (Displayed by 3 figures)

Display 1 ~ 5 from the left in case of APW-235, APW-236, APW-239 and APW-240.
Display 1 ~ 3 from the left in case of APW-231 and APW-232.

1. When L size sewing data are input, the data of the mode selected by A line of alphabetical key and number key line are displayed.
2. When the cycle sewing data are input, the data are displayed in the order of cycle sewing from the indicator in the left end.
3. When alarm is raised, "AL-□□" is displayed.
4. In flap sewing, "FLP" is displayed. (APW-235, APW-236, APW-239 and APW-240)

⑰ NUMBER key

When NUMBER key is depressed, the indicator lamp lights, and the data corresponding to the lines of NUMBER key and ALPHABETICAL can be input.

⑱ ALPHABETICAL key

When ALPHABETICAL key is depressed, the indicator lamp lights, and the data corresponding to the lines of ALPHABETICAL key and NUMBER can be input.

⑲ FRONT/REAR REFERENCE selector key (APW-232, APW-236, APW-240)

Every depressing the key, the mode of sewing reference can be changed into FRONT, REAR, FRONT ⇄ REAR alternately and REAR ⇄ FRONT alternately in order.

⑳ FLAP SEWING setting key (APW-235, APW-236, APW-239, APW-240)

When the key is depressed once, "FLP" is displayed, and the priority is selected by each key.

㉑ FLAP AUTOMATIC FEED INDICATOR (APW-236, APW-240)

The indicator lamp lights in FLAP AUTOMATIC FEED ON and goes off in FLAP AUTOMATIC FEED OFF by operating the DIP switches on the back side of the control panel. (option)

㉒ RIGHT/LEFT/SLANT selector key (APW-239, APW-240)

Slant sewing mode can be changed every depressing this key in the order of RIGHT, LEFT, RIGHT ⇄ LEFT alternately and LEFT ⇄ RIGHT alternately.

㉓ SLANT SEWING setting key (APW-239, APW-240)

Slant sewing mode can be set using numeric key.
For the setting method, refer to [P. 18 2) SETTING SLANT SEWING].

㉔ SLANT SEWING MODE INDICATOR INDICATOR 6 (APW-239, APW-240)

Indicator–0 ⟶ Parallel sewing
Indicator–1 ⟶ Free 1 (0 mm ~ 20 mm)
Indicator–2 ⟶ Free 2 (0 mm ~ 20 mm)
Indicator–3 ⟶ Free (0 mm ~ 20 mm)

㉕ TRAPEZOIDAL SEWING key (APW-239, APW-240)

Depress this key once, and LED lights and the machine comes to the trapezoidal sewing mode.
Further depress this key, and LED lights and the slant sewing mode becomes effective.

(2) How to set up and address the sewing program

1) Setting L Size

○ NUMBER key : Possible to set [1] ~ [3] (APW-231, APW-232)

○ NUMBER key : Possible to set [1] ~ [5] (APW-235, APW-236, APW-239, APW-240)

It is possible to have these NUMBER keys memorize sewing sizes comparatively often used. Memorized figures are stored in the memory (backup function) even after power source is cut.

[How to program]

① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key [Machine Ready].

- Welt length ..... 40 mm, 100 mm, 140 mm
- Number of workpieces ..... 123 pcs.

] When programming these

② Set 40 mm at No. 1

[A] [1] [4] [0] → Indicator 1 [4 0]

③ Set 100 mm at No. 2

([A]) [2] [1] [0] [0] → Indicator 2 [1 0 0]

Ommisible

④ Set 140 mm at No. 3

([A]) [3] [1] [4] [0] → Indicator 3 [1 4 0]

Ommisible

* When you have depressed a wrong size key in setting a sewing size, depress once again each NUMBER key to set correctly.

⑤ Set 123 ps. of numbers of workpieces at the BOBBIN THREAD COUNTER

[Bobbin Thread Counter] [1] [2] [3] → BOBBIN THREAD COUNTER [1 2 3]

[Setting L size mode]

① Unlock the keyboard when MACHINE READY indicator lamp is "on by depressing key [Machine Ready].

Addressing No. 2, L = 100 mm

② Depress keys in the order of [Cycle] [2] and LED of [2] lights up.

indicator 1 and the figure set at No. 2 is shown.

Operating the stacker

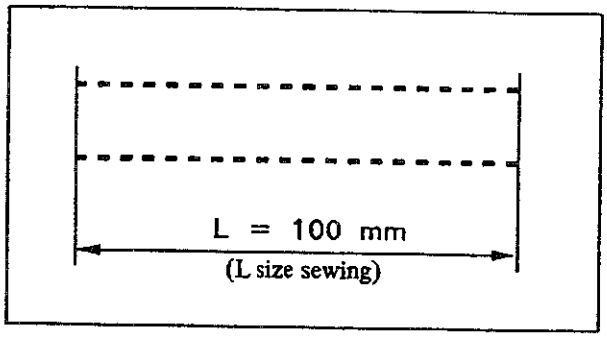
③ Depress keys in the order of [Stacker] [2] , and [1.0.0.] is displayed on indicator 1 and the machine comes to the stacker operation mode.

3 dots light

Then, depress key [2] , and the stacker operation mode repeats ON/OFF alternately.

④ Depress key [Machine Ready] to lock.

MACHINE READY indicator lamp lights and the preparation of 100 mm L size sewing has been completed.



2) Setting slant sewing (APW-239 and APW-240)

This machine can easily sew slant pockets by switching the slant sewing key and right/left slant selecting key.

2-1) Right slant sewing and left slant sewing

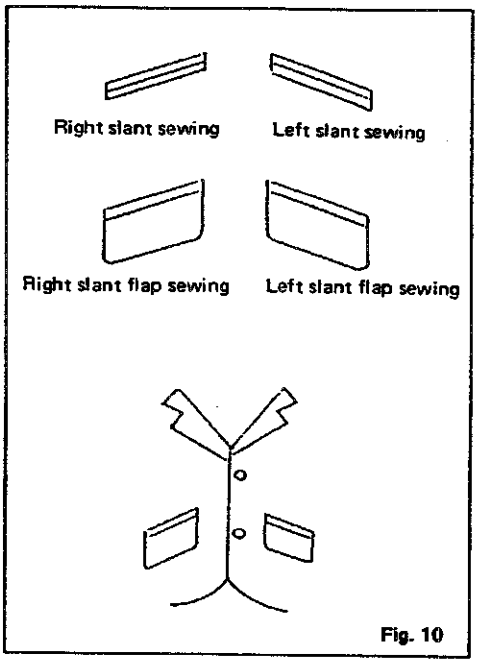


Fig. 10

When a pocket is observed from the front after sewing,

A pocket with its right end up .... Right slant sewing
A pocket with its left end up .... Left slant sewing

In addition, the above designation applies also to the flap sewing.

The degree of slant angle is switched by the slant sewing key, and the right slant sewing or the left slant sewing is switched by RIGHT/LEFT SLANT SELECT key.

2-2) Slant angle

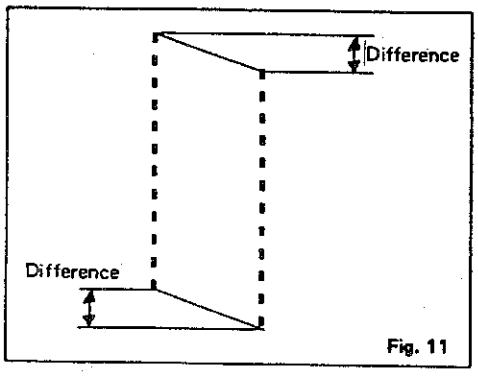


Fig. 11

The slant sewing key indicates the degree of slant angle with the slippage i.e. difference (mm) of right and left seams.

[Caution] The length of difference differs according to the revision number of P-ROM used.

○ When operating using a P-ROM of which revision number is APW-239 (027A to C) or APW-240 (019A to L), Indicator 6 on the control panel.

[Indicator –0 .... Parallel sewing
Indicator –1 .... 1 mm
Indicator –2 .... 2 mm
Indicator –3 .... Free (0 ~ 20 mm)]

Differences equal front or rear sewing length.

○ When operating using a P-ROM of which revision number is APW-239 (027D) or APW-240 (019M), Indicator 6 on the control panel will be as follows:

[Indicator –0 .... Parallel sewing
Indicator –1 .... Free (0 ~ 20 mm)
Indicator –2 .... Free (0 ~ 20 mm)
Indicator –3 .... Free (0 ~ 20 mm)]

The length of front difference and rear difference can be specified independently.

2-3) Slant sewing length and ┼ marking

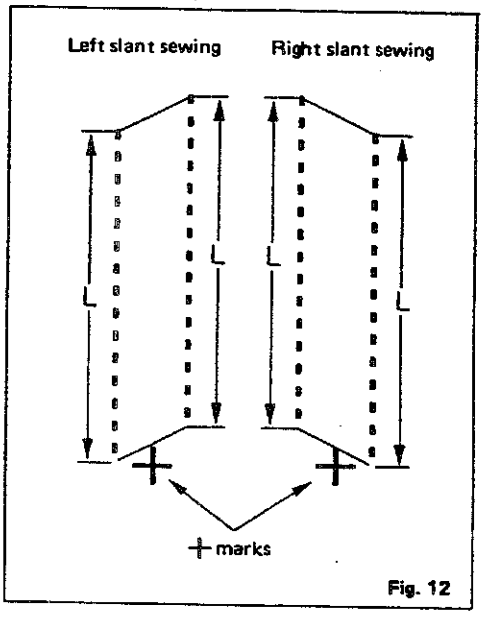


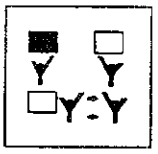
Fig. 12

The slant sewing length indicator L equals right or left sewing length.

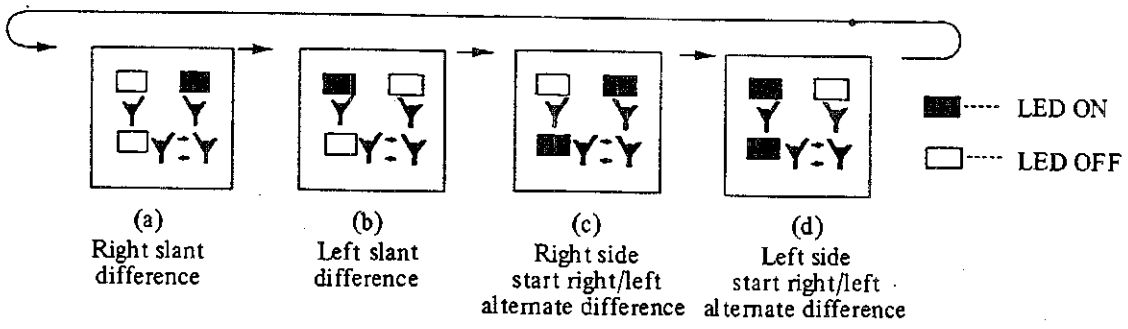
(Example 1) **Setting left slant difference 1 mm**

① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key [Machine Ready]

② [Slant Sewing] [1] → Indicator 6 → [1]

③ Depress key [Left/Right Slant Selector], and the right figure is displayed. →  (b)

[Caution] **A mode changes every depressing RIGHT/LEFT/SLANT SELECTOR key.**



(a) Right slant difference

(b) Left slant difference

(c) Right side start right/left alternate difference

(d) Left side start right/left alternate difference

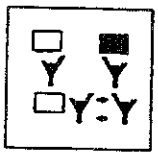
Depress key [Machine Ready] after setting, and MACHINE READY indicator lamp lights, and sewing becomes possible.

(Example 2) **Setting right slant difference 6 mm.**

① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key [Machine Ready]

② [Slant Sewing] [3] → Indicator 6 → [3]

③ [D] [4] [6] → Indicator 4 → [: 6]

④ Depress key [Left/Right Slant Selector], and the right figure is displayed. →  (a)

Depress key [Machine Ready], after setting, MACHINE READY indicator lamp lights, and sewing becomes possible.

3) Setting trapezoidal sewing

LED for trapezoidal sewing lights and the trapezoidal sewing mode is set by depressing key

after setting the slant sewing mode.

3-1) Slant angle in trapezoidal sewing

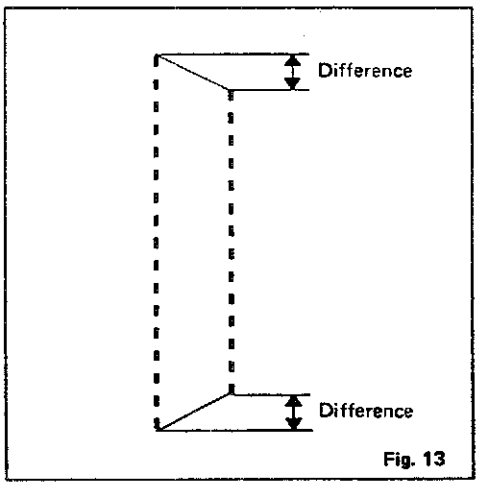


Fig. 13

Preset the length of difference by key

[Caution] The description for the slant angle in trapezoidal sewing are same as those for 2-2) Slant angle on page 18. Refer to it.

3-2) Sewing length of trapezoidal sewing and + marking

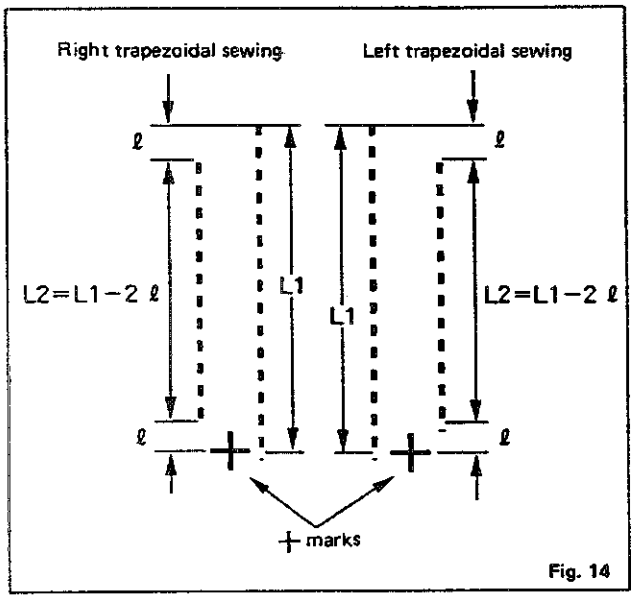


Fig. 14

Sewing sizes L1 and L2 in trapezoidal sewing are as illustrated.

The sewing distances correspond as follows;

Right slant ⟶ Right trapezoidal sewing
Left slant ⟶ Left trapezoidal sewing

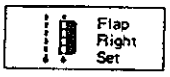
Depress key

once again, and LED for trapezoidal sewing goes off and the trapezoidal sewing mode is released.

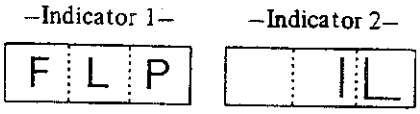
4) Setting flap sewing (APW-235, APW-236, APW-239 and APW-240)

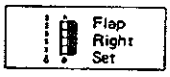
Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key

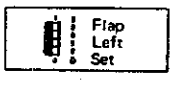
It is necessary to preset the slant sewing mode in setting flap sewing in APW-239 and APW-240.

① Setting right flap
The right side flap sewing becomes effective by depressing key 

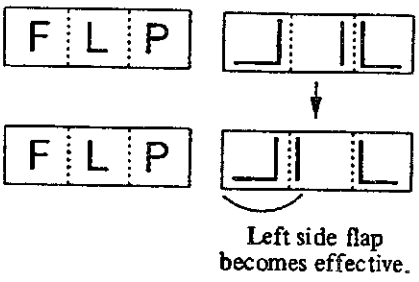
.



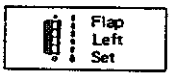
② Setting flap cycle
Right/left flap sewing cycle mode is set by depressing keys in the order of 

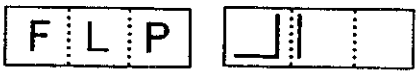
and 

.



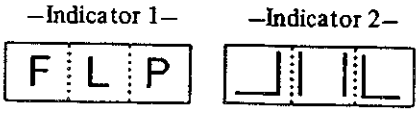
Left side flap
becomes effective.

③ Setting left flap
Left flap sewing is set by depressing key 

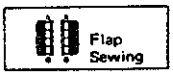


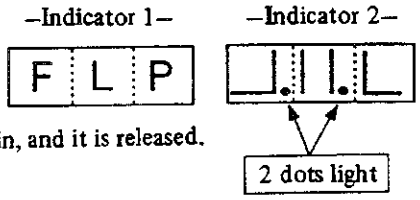
④ Setting right/left flap
The priority mode of flap sewing is set by depressing key

.
With this, either of right and left sensors detected at first becomes effective.



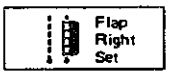
Operating the stacker

① Right/left flap
The stacker operation mode is set by depressing keys in the order of 

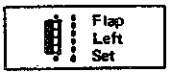


Depress key

, once again, and it is released.

② Right flap
Depress keys in the order of sewing is set. 

, and the stacker mode in right flap

③ Left flap
Depress keys in the order of sewing is set. 

, and the stacker mode in left flap

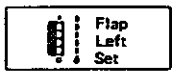
④ Flap cycle

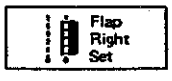
[Caution] The stacker is operated in different procedure according to the revision number of P-ROM used.

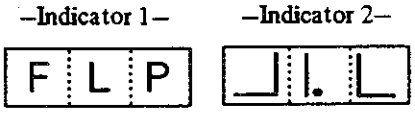
④-1 Operating procedure when using P-ROM of which revision number is APW-235 (026A to C), APW-239 (027A to C), APW-236 (018A to J), or APW-240 (019A to L).

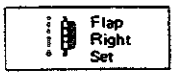
In setting the cycle mode of right/left flap sewing the stacker key mode depressed later becomes effective.
Depress key

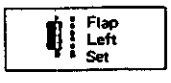
once again, and it is released.

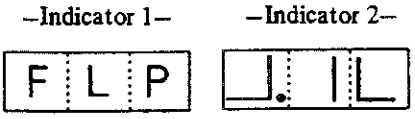
[Example]
When operating the stacker on the right side in right/left alternate flap sewing, depress keys in the order of 





When operating the stacker on the left side in right/left alternate flap sewing, depress keys in the order of 

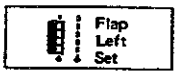




④-2 Operating procedure when using P-ROM of which revision number is APW-240 (019M or above), APW-236 (018K or above), APW-239 (027D or above), or APW-235 (026D or above).

[Example] Left/right alternate flap sewing mode and setting the stacker operation mode

① Depress keys in the order of

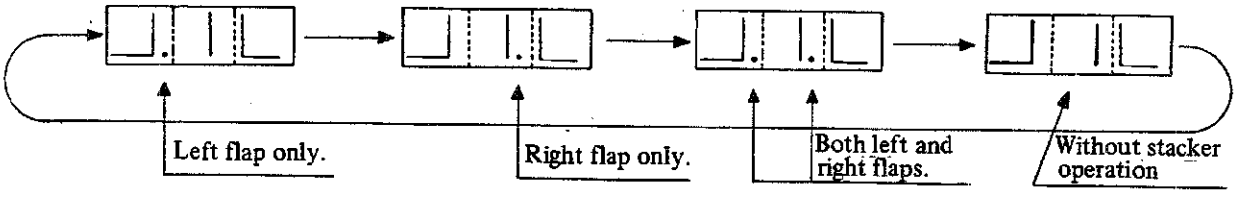
and 

Left/right alternate flap sewing mode is specified and the indicators 1 and 2 will display as illustrated.

–Indicator 1– –Indicator 2–

Depress key

Each time the key is depressed, the indication on the indicator will change as illustrated, and the stacker operation becomes possible at the position/positions where the marker dot/dots lights/light up.



Lock the keyboard by depressing key

.

With this, the preparation of flap sewing has been completed. The flap position is detected by the flap sensor (photo-sensor), and sewing start and sewing stop position of the machine is automatically controlled.

5) Setting slant flap sewing and concealed sewing (APW-239, APW-240)

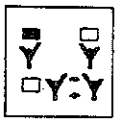
It is necessary to set flap sewing and slant sewing mode and instruct the selection of right or left flap in the case of slant flap sewing.

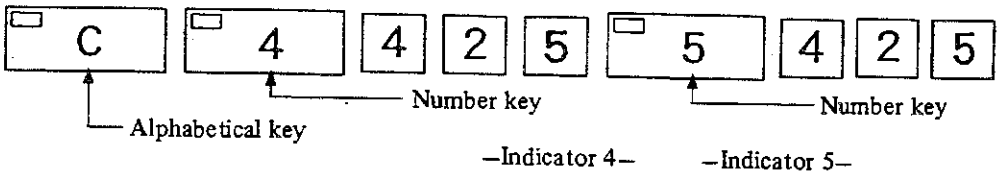
[Example] Input the data for slant concealed sewing. Setting the left slant different at 2 mm, set the sewing length of front and rear seams equally to 42.5 mm.

①

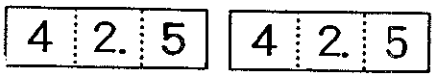
2 ——— Indicator 6 ———→ 2

② Depress key

, and the right figure is displayed. ——→ 

③ 

–Indicator 4– –Indicator 5–



Depress key

after setting, MACHINE READY indicator lamp lights, and sewing becomes possible.

Setting range of flap concealed stitching : 30.0 ~ 50.0 mm

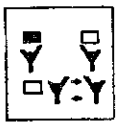
Setting flap concealed sewing when using the automatic flap supplying device (optional)
(Make sure that the automatic flap supplying DIP switch is turned ON. When flaps for the left and right pockets are supplied from the left side by means of the left side automatic flap supplying device, it is required to set the flap concealed sewing.)

[Example] Setting slant difference 2 mm, left/right alternate slant concealed sewing.
Input data for concealed sewing. For the left slant concealed sewing, set the sewing length of front and rear seams equally at 42.0 mm. For the right slant concealed sewing, set the sewing length of front and rear seams equally at 39.0 mm.

①

2 → Indicator 6 → 2

② Depress key

, and the right figure is displayed. → 

③ Set left slant (flap for the left pockets) concealed sewing.

C 4 4 2 5 5 4 2 5

C: Alphabetical key
4: Number key
5: Number key

–Indicator 4– –Indicator 5–

4 2.5 4 2.5

④ Depress key

, and the right figure is displayed. →

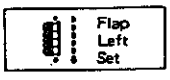
⑤ Right slant (flap for the right pockets) concealed sewing.

4 3 9 0 5 3 9 0

–Indicator 4– –Indicator 5–

3 9.0 3 9.0

[Caution] **At this time, do not set the data for the left slant concealed sewing using the keys for the right flap concealed sewing. If the data are set using these keys, sewing condition will not be changed at all.**

⑥ Depress key 

, and set left flap sewing mode.

–Indicator 1– –Indicator 2–

FLP

⑦ Select the left slant sewing to perform the concealed sewing suitable for the flaps for the left pockets.
Select the right slant sewing to perform the concealed sewing suitable for the flaps for the right pockets.

Depress key

after completing the setting, MACHINE READY indicator lamp lights up, and sewing becomes possible.

[Caution] **The same operation will be performed when slant sewing mode** 0 、 1 、or 3 **is selected.**

(Limited slant flap sewing when automatic flap supplying device is not effective.)

- Without automatic flap supplying device, right/left alternate difference slant sewing cannot be set.
- Unless flap sewing mode and slant sewing mode are set coincidentally, other modes, MACHINE READY key will not be effective to start sewing and an alarm will be indicated by depressing MACHINE READY key. (AL-38)

[Caution] **Error code indication differs according to the revision number of P-ROM used.**
When using P-ROM of which revision number is APW-240 (019M or above), APW-239 (027D or above), APW-236 (018K or above) or APW-235 (026D or above), AL-50 will be indicated if any error occurs.

- Setting or releasing automatic flap supplying after MACHINE READY key has light up, will not be effective.

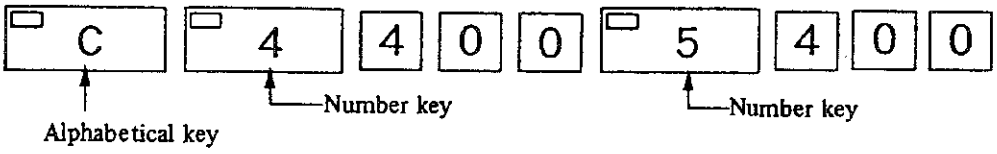
6) Setting flap concealed sewing mode (APW-235, APW-236)

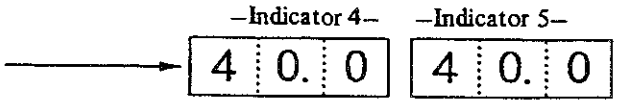
[Example] Set the sewing length of front and rear seams equally at 42.0 mm.

① Depress ALPHABETICAL key [C] .

② Depress NUMBER key [4] .

③ Set the figure of concealed sewing by depressing the numeric key.





Depress key [Machine Ready] after setting, MACHINE READY indicator lamp lights and sewing becomes possible.

Setting range of flap concealed sewing : 30.0 ~ 50.0 mm

7) Flap forced stop

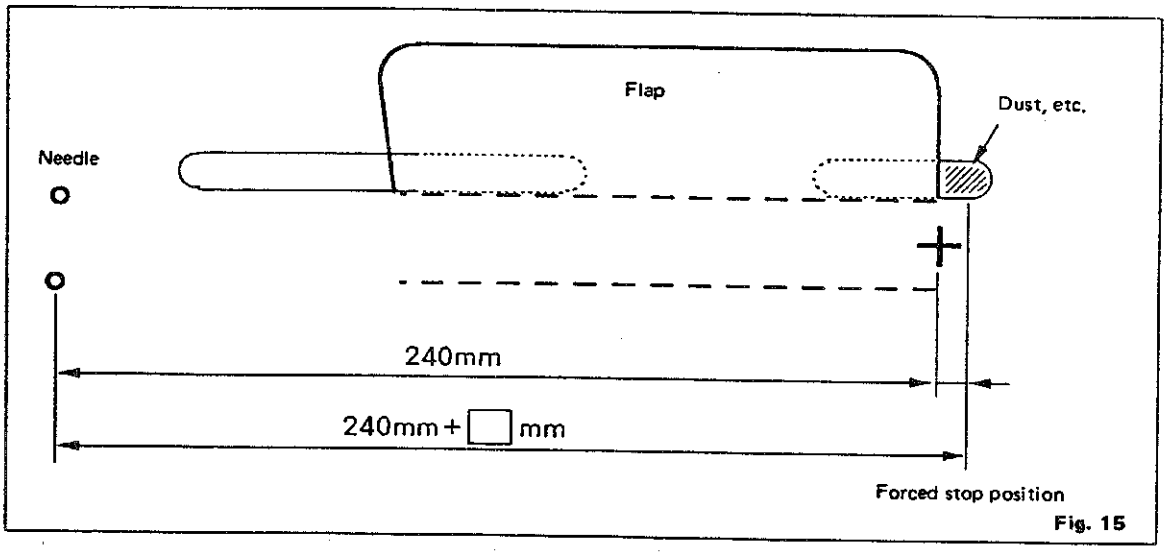


Fig. 15

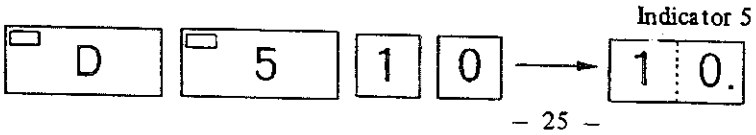
This is the setting switch to stop forcedly at a certain position after the start position in order to prevent workpieces from breakage by the corner knife. When after-detection has not been done due to dust, etc. as illustrated in flap sewing.
The setting range of switch is 0 ~ 10 mm, and the position passing from the start position (240 mm from the needle) is the forced stop position.

① Depress key [D] of alphabetical key.

② Depress key [5] of numeric key.

③ Set the figure of flap forced stop position.

[Example] Setting flap forced stop 10 mm.



Setting range of flap forced stop : 0 ~ 10 mm

[Caution]

① **When the stitching position does not change even after the setting of flap concealed sewing has been changed, confirm the figure of the flap forced stop because the flap forced stop has priority.**
② **If the flap forced stop is actuated when the action selection mode is set to mode 4, the corner knife will not be thrusted upward. And when the flap forced stop is actuated, flap indicators (see Tables 1 and 2) will flash on and off.**
③ **The flap forced stop action will be released by either releasing the Set Ready key or depressing the foot pedal switch.**

8) Setting the cycle sewing

When doing the cycle sewing of L size, APW-235, APW-236, APW-239 and APW-240 can set arbitrary five kinds of memorized figures of L size, APW-232 and APW-231 can do the arbitrary 3 kinds. In addition since ON/OFF operation of stacker is memorized in each memory as the same as sewing size, it can freely program to select ON/OFF operation of stacker according to the change of sewing size.
The following are the examples of the programming method and actual operation of cycle sewing.

[Caution] **Note that APW-235, APW-236, APW-239 and APW-240 are 5 cycle and APW-231 and APW-232 are 3 cycle.**

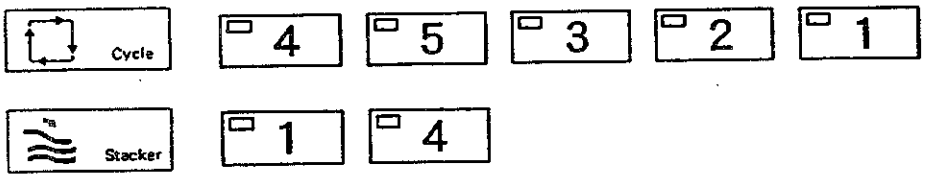
(Example 1) APW-235, 236, 239, 240

- Cycle No. 5
- Welt length ..... 150 mm, 170 mm, 100 mm, 80 mm, 60 mm
- Stacker ON/OFF ..... ON, OFF, OFF, ON, OFF

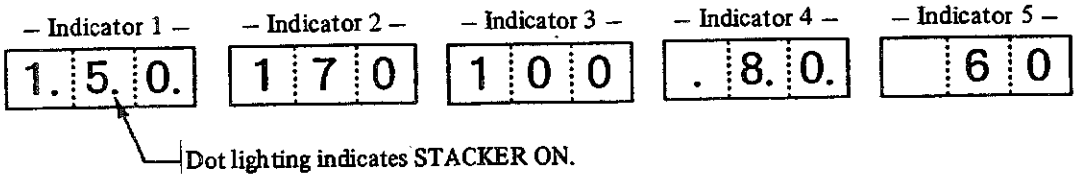
* The sewing length of L size shall have been preset in No. 1 to 5 in the following order.

- Sewing length of L size ..... 60 mm, 80 mm, 100 mm, 150 mm, 170 mm

[Key operation]



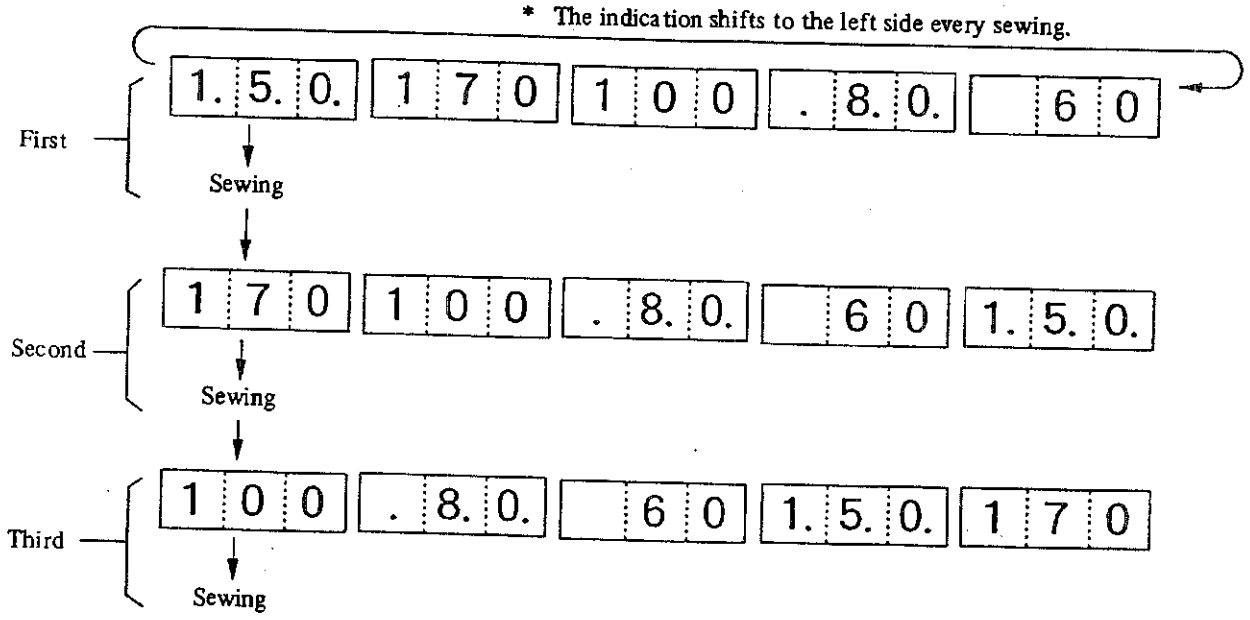
[Indicator]



Depress key

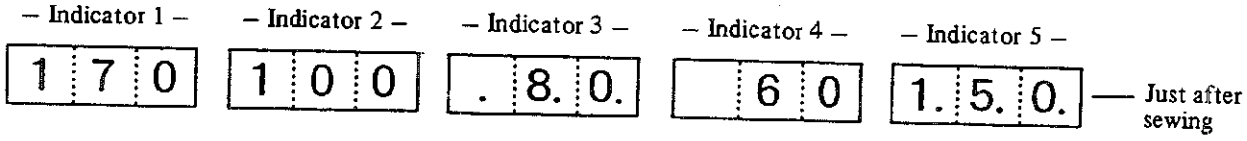
after setting, and MACHINE READY indicator lamp lights and sewing becomes possible.
Afterwards, display and operation are automatically renewed and change every sewing.

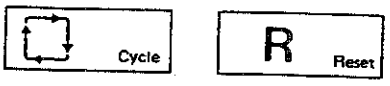
[Caution] **When the stacker key is depressed, figures are rearranged in the order instructed by the cycle, so depress keys 1 ~ 5 to rearranged figures.**

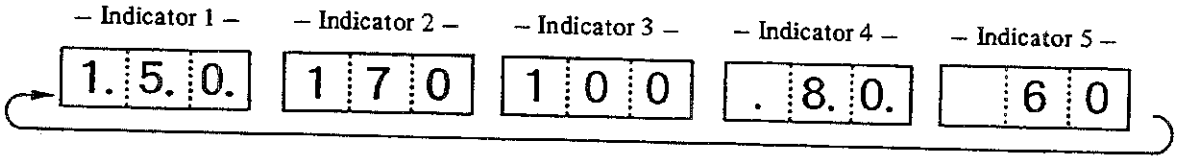


(Example 2)

During cycle sewing, when you want to sew again the L size you have sewn just before



Depress keys in the order of 



Depress key

after setting, and MACHINE READY indicator lamp lights and it is possible to sew a workpiece again with the same size.

(3) Setting lockstitch, condensation and back tack pitches

1) Setting the lockstitch pitch

Setting range: 2.0 mm ~ 3.0 mm
Standard value: 2.0 mm

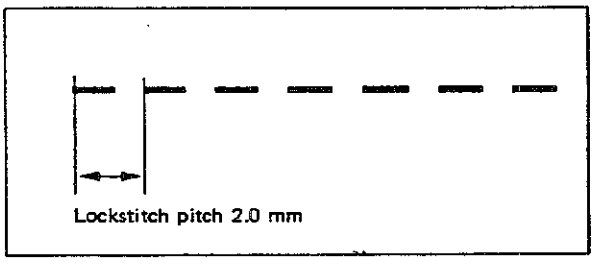
(Example 1) **Setting lockstitch pitch 2.0 mm**

① Unlock the machine when MACHINE READY indicator lamp is "on" by depressing key

② B 1 2 0 → Indicator 1 → 2. 0

Depress key

after setting, MACHINE READY indicator lamp lights and sewing becomes possible.



2) Setting the condensation pitch

Setting range: 0.5 mm ~ 1.5 mm
Standard value: 1.0 mm
When slant trapezoidal sewing, the condensation pitch is forced to be 1.0 mm.

(Example 2) **Setting condensation pitch 1.0 mm**

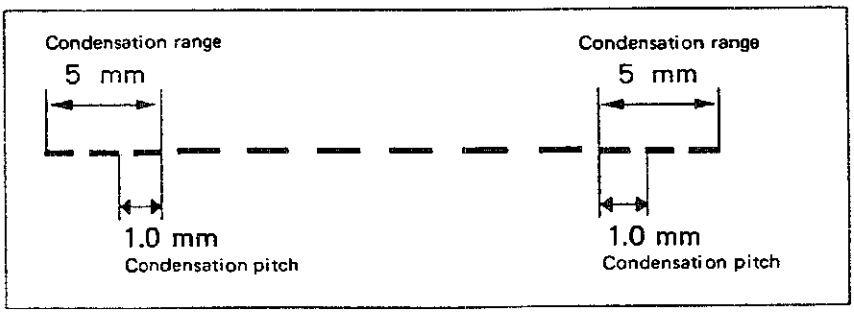
① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key

② B 2 1 0 → Indicator 2 → 1. 0

(Ommisible)

Depress key

after setting, and MACHINE READY indicator lamp lights and sewing becomes possible.

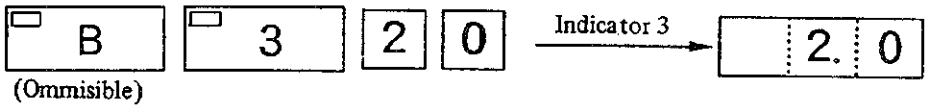


3) Setting the back tack stitching

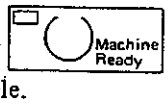
Setting range: 2.0 mm ~ 3.0 mm
Standard value: 2.0 mm

(Example 3) **Setting back tack pitch 2.6 mm when the lockstitch pitch is 2.0 mm**

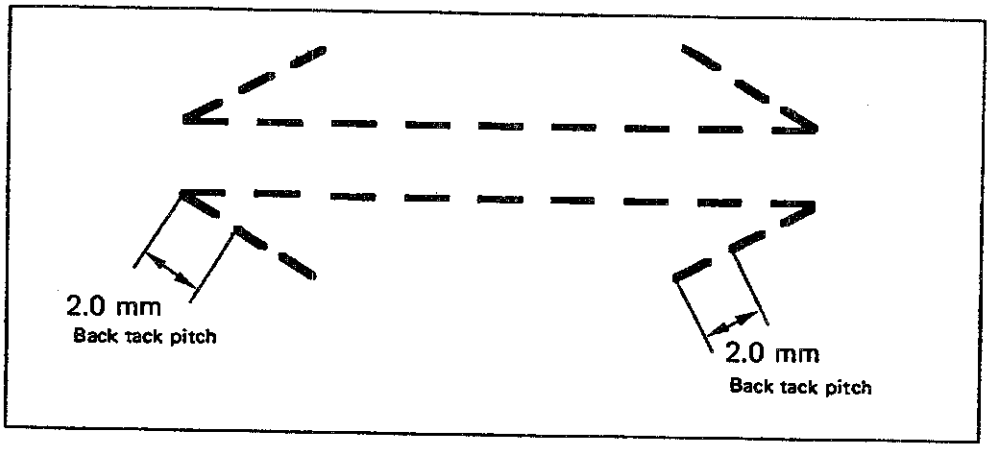
① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key

② 

(Ommisible)

Depress key 

after setting, and MACHINE READY indicator lamp lights and sewing becomes possible.



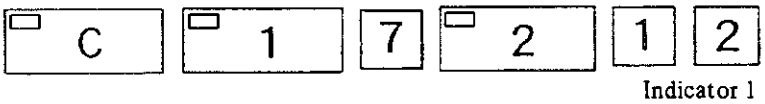
(Caution) **It is necessary to further change the setting switch on the back side of the control panel when you perform back tack stitch.**
At the time of slant sewing, the back tack pitch is automatically set to 2.0 mm.

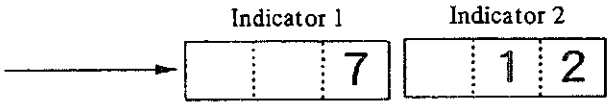
(4) Setting the travelling stroke of the center knife

Setting range Front side 5 mm ~ 15 mm
Rear side 7 mm ~ 15 mm
Standard value 7 mm

(Example 1) **Setting the front side of the center knife to 7 mm and the rear side to 12 mm.**

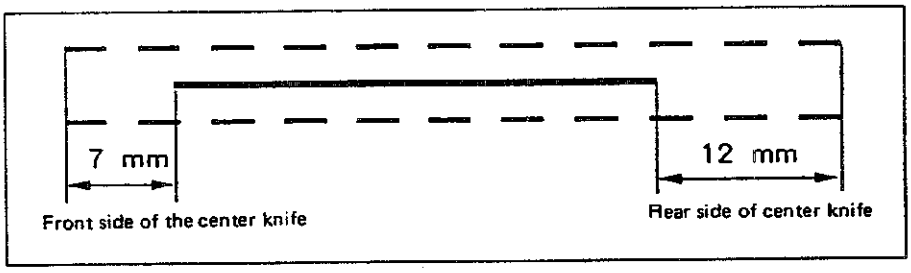
① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key

② 



Depress key

after setting, and MACHINE READY indicator lamp lights and sewing becomes possible.

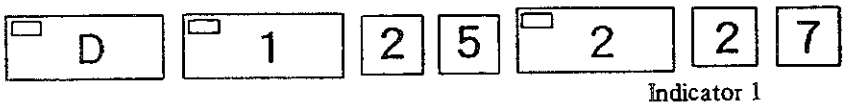


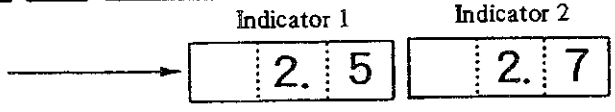
(5) Setting the travelling stroke of the corner knife

Setting range: 0 mm ~ 10.0 mm
Standard value: 5.0 mm

(Example 2) **Set the front side of the corner knife to 2.5 mm and the rear side to 2.7 mm.**

① Unlock the keyboard when MACHINE READY indicator lamp is "on" by depressing key

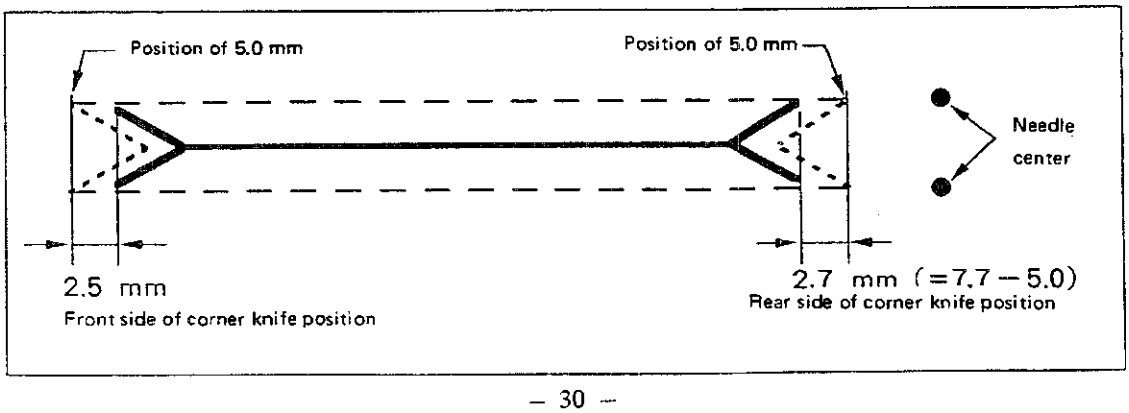
② 



Depress key

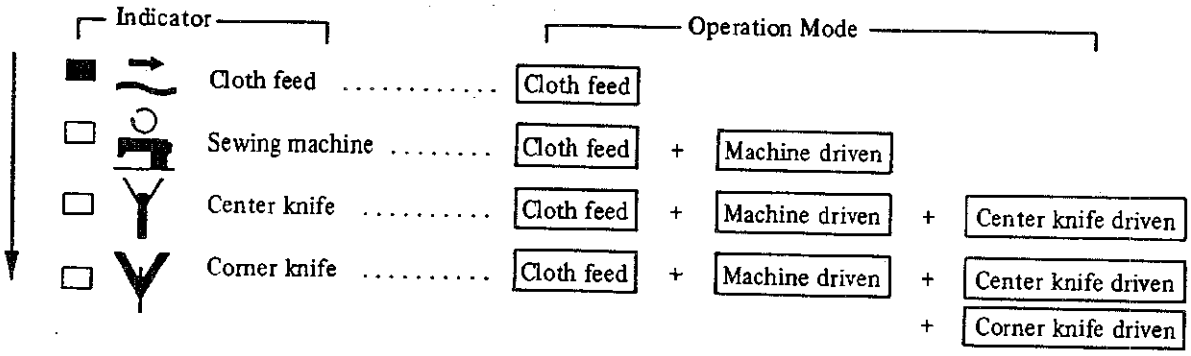
after setting, and MACHINE READY indicator lamp lights and sewing becomes possible.

When setting at standard value 5.0 mm, the tip of the corner knife aligns with the front position of the seams.
Reduce the set value on the front side to shift the corner knife to the inner side of the front stitch end.
Reduce the set value on the rear side to shift the corner knife to the inner side of the rear stitch end.



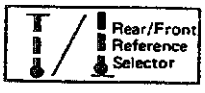
(6) Selection of operation mode

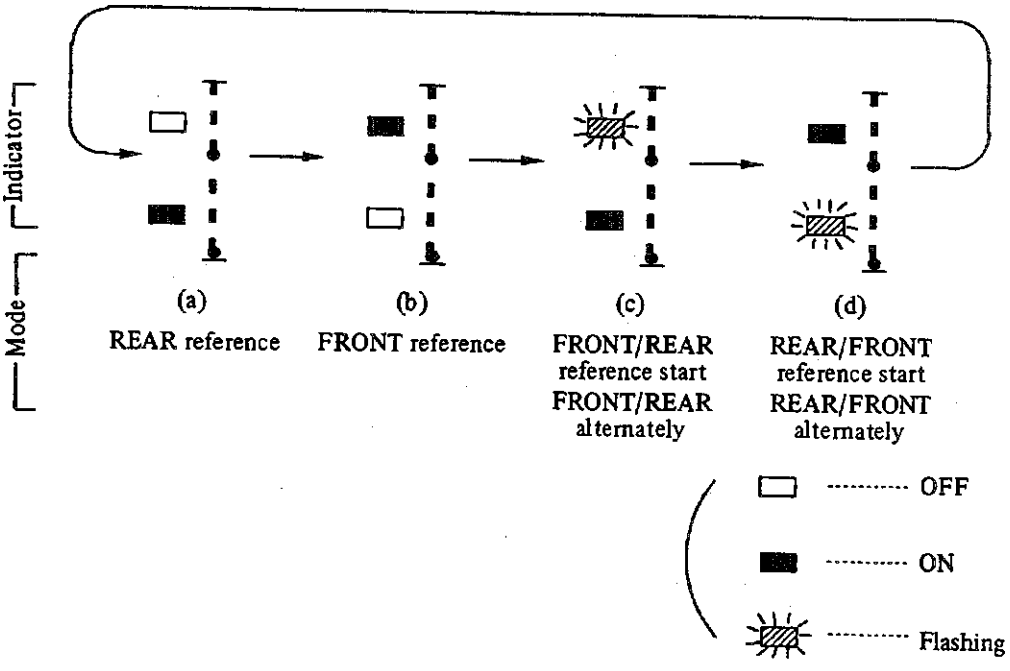
A mode changes as illustrated every depressing key



Four dots LED light succesively in the arrow order, and the mode returns to the first mode after all four dots have lit.
The mode of the part where the lowest dot LED lights becomes effective.
When the operation mode is set to the Cloth feed, thread tension disc is closed.

(7) Change of sewing reference (APW-232, APW-236, APW-240)

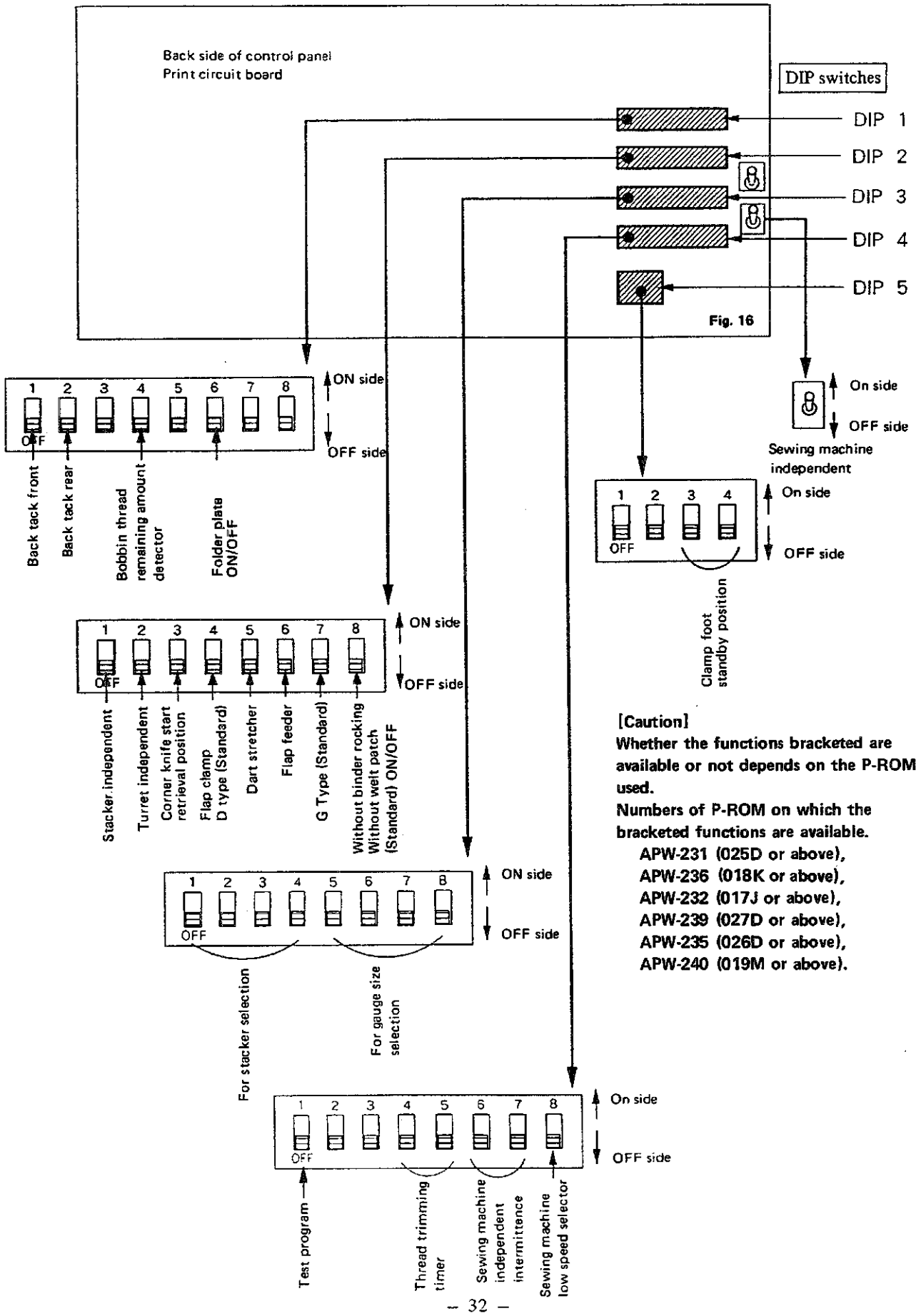
A mode changes as illustrated every depressing key 



(8) Setting switch on the back side of control panel

Operation setting by the DIP switches

(Caution) **Set DIP switches when the power supply is OFF.**
If they are changed when the power supply is ON, it is impossible to set.



[Caution]
Whether the functions bracketed are available or not depends on the P-ROM used.
Numbers of P-ROM on which the bracketed functions are available.
APW-231 (025D or above),
APW-236 (018K or above),
APW-232 (017J or above),
APW-239 (027D or above),
APW-235 (026D or above),
APW-240 (019M or above).

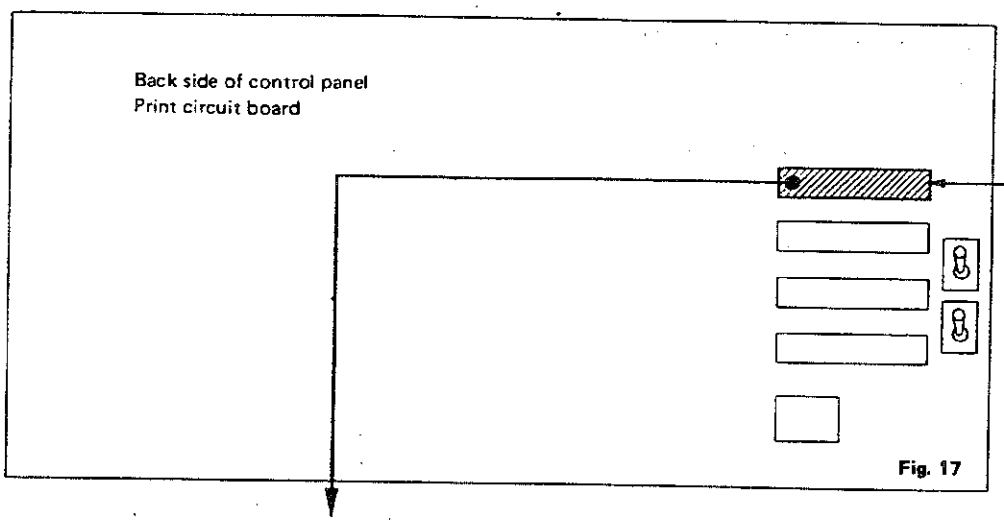
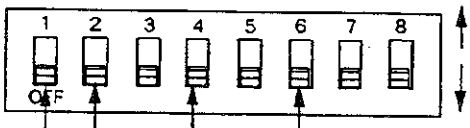


Fig. 17



ON .... Folding plate is opened while the corner knife goes up.

OFF .... Folding plate is closed while the corner knife goes up.

Folding plate: OFF

ON .... Needle thread breakage detector ON

OFF ... Needle thread breakage detector OFF

Setting the needle thread detector

ON .... Back tack rear side ON

ON .... Back tack front side ON

Setting back tack sewing

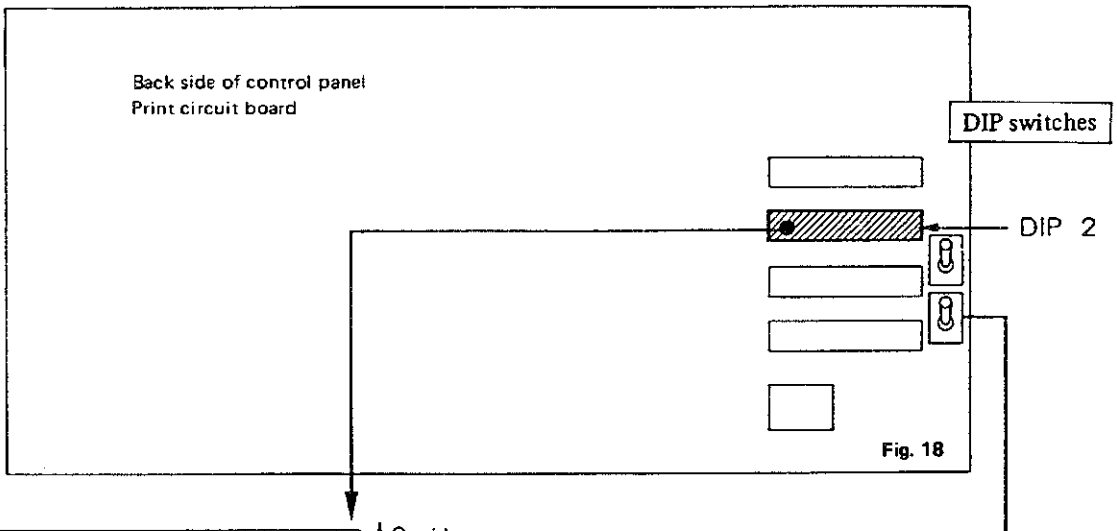
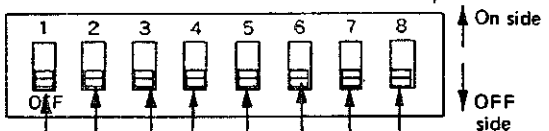


Fig. 18



Sewing machine independent

Depress this switch, and the machine rotates. At this time, if DIP 4–8th switch is depressed, it rotates at a low speed, and if it is released, it does at a high speed. This switch may be switched even during operation.

Automatic welt patch supply ON/OFF

G type for a sewing length of 250 mm.

Setting flap feed

Depress this switch, and automatic flap feed indicator lamp lights.
(This is set optionally so in case of no setting, this does not work.)

Automatic flap feed

Setting darts stretching

Depress this switch, and darts stretching operation becomes ON.
(Only when this is set optionally)

D type presser

When the switch is set to ON, folding plate actuation mode of the D type is selected.
When the switch is set to OFF, the standard folding plate actuation mode is selected.

Corner knife start position retrieval *

Depress this switch, and the corner knife performs start position retrieval. If it is released, it stops at the start position.

Turret independent operation (APW-239, -240) *

Depress this switch, and the corner knife turret performs start position retrieval. If it is released, it stops at the start position.

Stacker independent operation *

Depressed this switch, and the stacker operates. If it is released, it stops at the standby position.

[The above independent operations are effective only in case of manual mode.]

*1 : Be sure to turn ON/OFF this switch with the power switch turned ON.
If the DIP switch is set to its ON position before the power to the sewing machine is turned ON, the corner knife will not be actuated.

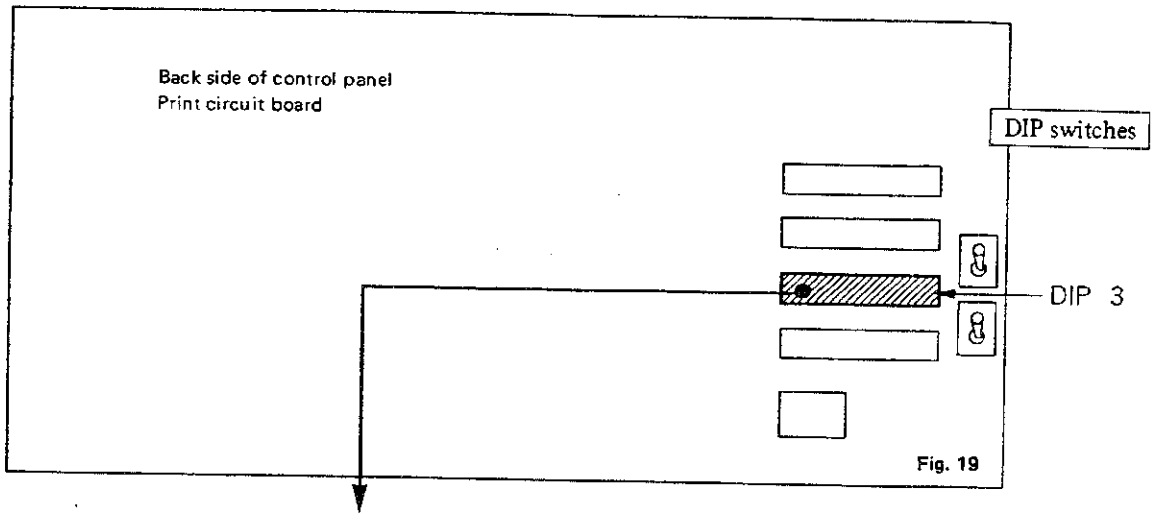
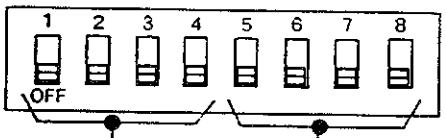
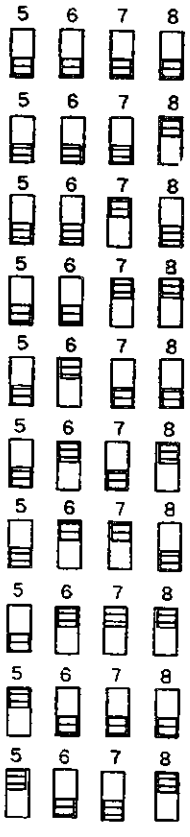


Fig. 19

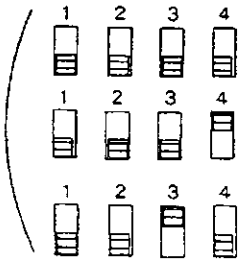


For selection of gauge sizes



..... Gauge size	8 mm
..... Gauge size	10 mm
..... Gauge size	12 mm
..... Gauge size	14 mm
..... Gauge size	16 mm
..... Gauge size	18 mm
..... Gauge size	20 mm
..... Gauge size	22 mm
..... Gauge size	24 mm
..... Gauge size	26 mm

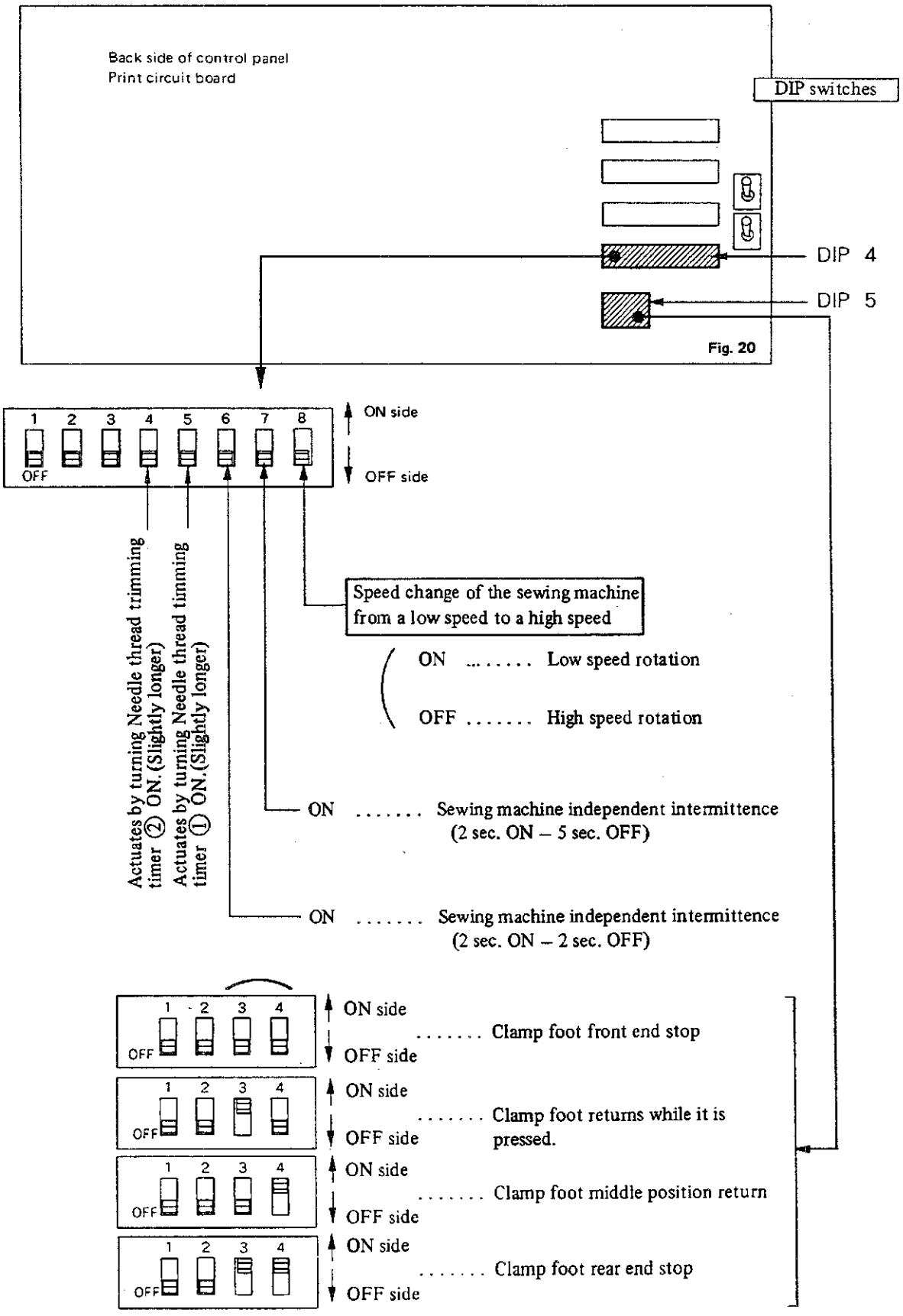
For selection of stackers



..... For bar clamp stacker

..... For roller stackers

..... For bar stacker and grasping stacker


Back side of control panel
Print circuit board
DIP switches
DIP 4
DIP 5
Fig. 20
1 2 3 4 5 6 7 8
OFF
ON side
OFF side
Actuates by turning Needle thread trimming timer ② ON. (Slightly longer)
Actuates by turning Needle thread timming timer ① ON. (Slightly longer)
Speed change of the sewing machine from a low speed to a high speed
ON ..... Low speed rotation
OFF ..... High speed rotation
ON ..... Sewing machine independent intermittence (2 sec. ON – 5 sec. OFF)
ON ..... Sewing machine independent intermittence (2 sec. ON – 2 sec. OFF)
1 2 3 4
OFF
ON side
OFF side
..... Clamp foot front end stop
..... Clamp foot returns while it is pressed.
..... Clamp foot middle position return
..... Clamp foot rear end stop

6. + MARK LAMPS

+ mark lamps for setting sewing reference

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

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

Adjust the + mark lamps irradiation point in the following orders.

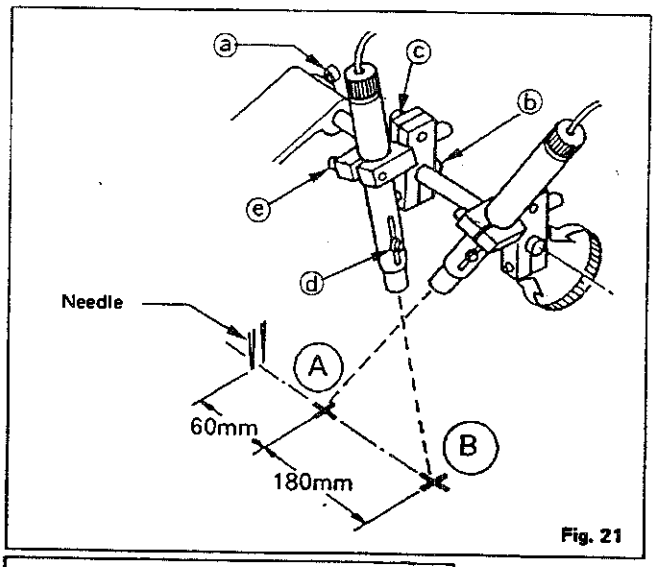


Fig. 21

1. Set the machine and turn the main switch "ON" and the + mark lamps will light.
2. At first, adjust the lateral irradiation point according to + mark lamp (A) on the far side which works to check the parallelism of the material to be sewn. Loosen setscrew (a) and slide the + mark lamp unit in the direction of the arrow so that + mark lamp (A) on the far side irradiates the middle point between two needles. Then tighten setscrew (a). When using the machine with the front reference (point where a seam starts), adjust the distance from the needle to 60 mm.

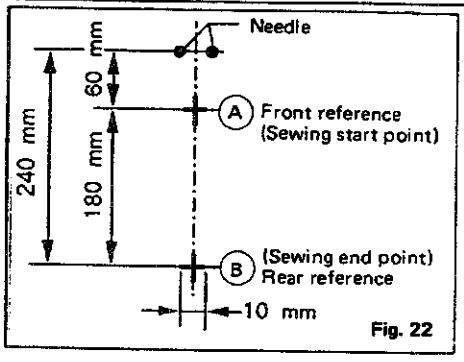


Fig. 22

3. Loosen setscrews (b) and (c) adjust the position of lamp (B) so that it irradiates point (B) as illustrated.
The distance from the needle is 240 mm.
4. Lastly, loosen lamp clamp screws (e) and setscrews (d) and adjust the height of the lamps to bring the + mark images into the sharpest focus having the width of 10 mm. Firmly tighten both screws (e) and (d) after the focus adjustment.

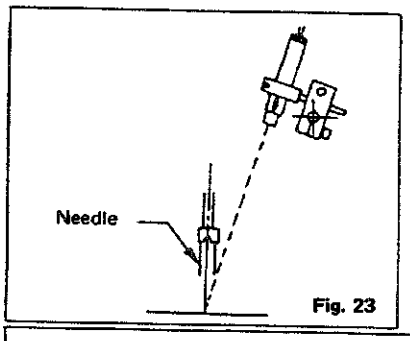


Fig. 23

5. After the + mark lamps have been positioned as mentioned above, make sure that the distance from lamp (B) to the needle is 240 mm and that the + mark images projected by lamps (A) and (B) are aligned with the middle point between the needles.

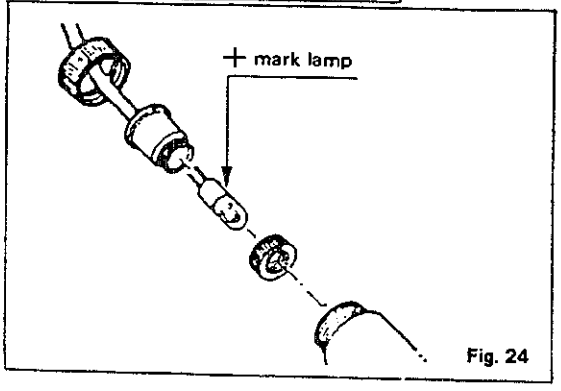


Fig. 24

(2) How to replace the + mark lamp

Disassemble the lamp housing as illustrated and replace the lamp.

7. AIR CONTROL SWITCHES

(1) Foot valve switch

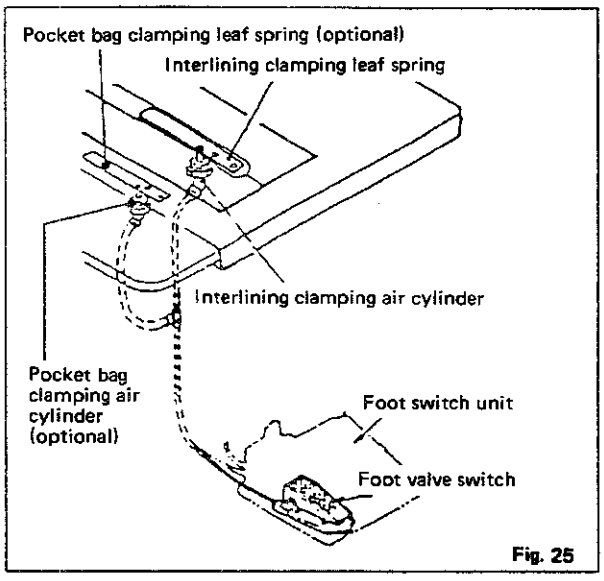


Fig. 25

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 as optional, it performs the same operation as interlining by the foot valve switch.

(2) How to independently operate each air cylinder (Manual operation of the solenoid valve)

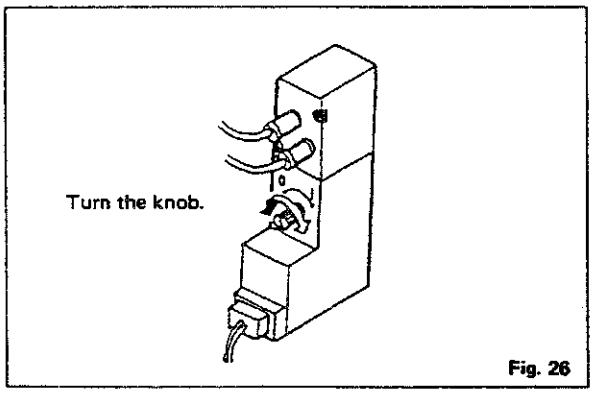


Fig. 26

Turn the knob on the solenoid valve (3 or 4 way valve) in the directions of arrow as shown in Fig. 26, each air cylinder can be manually operated and actuated independently.
Use each air cylinder independently to adjust the related components and to check for operation.
For the normal sewing operation, set the knob at 0.

(3) Pressure switch (for emergency stop)

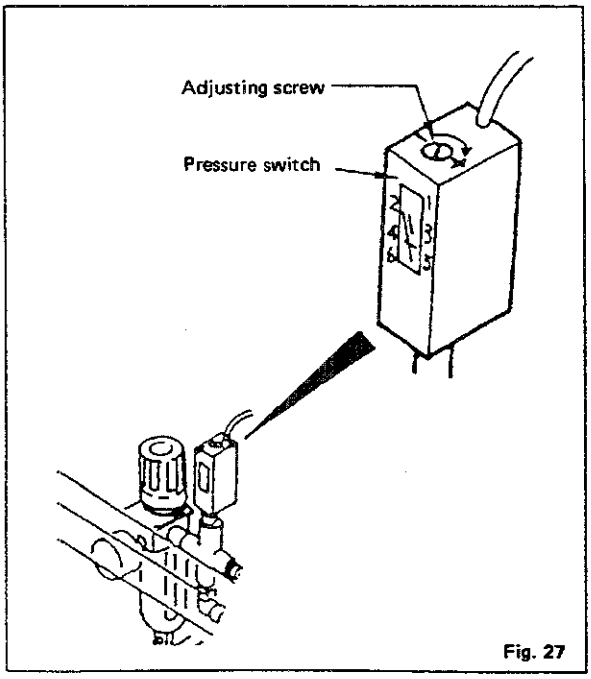


Fig. 27

In order to prevent the machine from malfunctioning due to the pressure drop of the compressed air supply, the pressure switch will operate to stop the machine and to indicate error code AL-03 when the pressure of the air supply drops below the given level of 4.0 kg/cm^2 (this pressure has been preset at the factory by the adjusting screw on it).
Raise the source pressure to 5.0 kg/cm^2 and depress the RESET switch on the control panel.

(4) Stacker foot valve switch (optional)

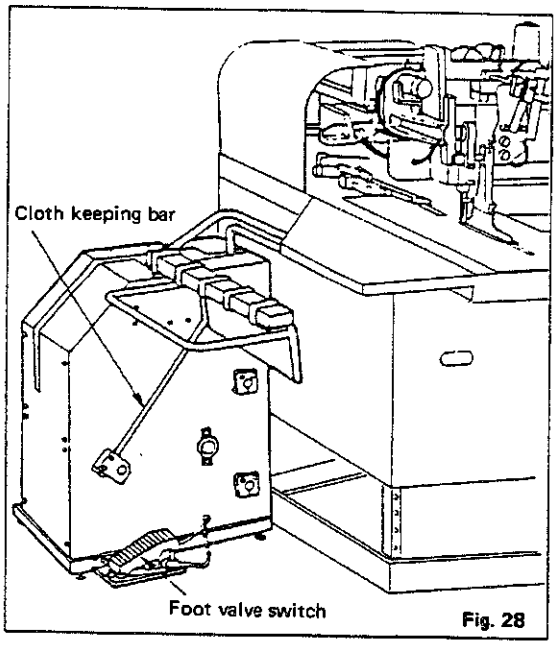


Fig. 28

The foot valve switch shown in Fig. 28 can actuate the cloth keeping bar independently.
Depress the stacker foot valve switch when you want to take out the cloths stacked.

8. PEDAL SWITCH AND KNEE SWITCH (APW-231)

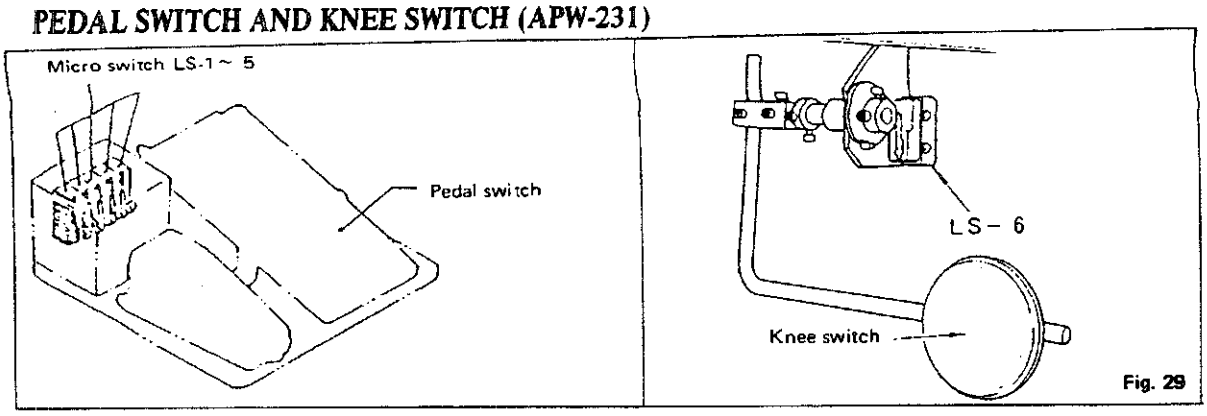


Fig. 29

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

[Standard specifications]

1st step (LS-1)----------→Clamp foot forward
↓
Clamp foot (right) comes down, thread tension disc open
2nd step (LS-2)---------→Clamp foot (left) comes down
3rd step (LS-3)---------→Binder comes down
↓
Welting patch is folded, thread released
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 above actions in sequence at constant intervals.

[When the darts stretcher is installed] (optional)

1st step (LS-1)---------→Clamp foot forwarding actuates
↓
Darts stretcher operates
2nd step (LS-2)---------→Clamp foot (right) comes down, thread tension disc open
3rd step (LS-3)---------→Clamp foot (left) comes down
Darts stretcher returns
4th step (LS-4)---------→Binder comes down
↓
Welting patch is folded, thread released
5th step (LS-5)---------→(No operation)
Knee switch (LS-6)------→Rapid feed

PEDAL SWITCH (APW-232)

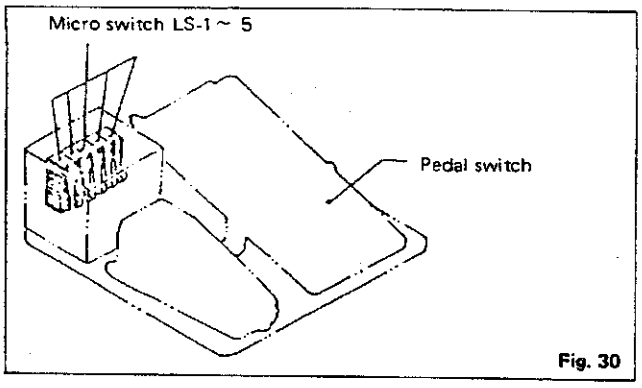


Fig. 30

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

[Standard specifications]

1st step (LS-1) ----------→ (No operation)

2nd step (LS-2) ----------→ Clamp foot forward, welt patch clamping actions.
Clamp foot (left) (right) comes down
Thread tension disc open
↓ ← Welting patch is fed.
Binder comes down.
↓ ← Micro switch to detect the binder being in the lowest position.
Welting patch is folded, thread released

3rd step (LS-3) ----------→ Rapid feed
Thread tension disc close
Thread releasing OFF

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

5th step (LS-5) ----------→ (Rapid feed)

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

[When the darts stretcher is installed] (optional)

1st step (LS-1) ----------→ Darts stretcher operates

2nd step (LS-2) ----------→ Clamp foot forwarding actuates, welt patch clamping actions.
Clamp foot (left) (right) come down
Thread tension disc open
Darts stretcher returns
Binder comes down
Welting patch is folded, thread released.

3rd step (LS-3) ----------→ Rapid feed
Thread tension disc close
Thread loosening OFF

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

5th step (LS-5) ----------→ (Rapid feed)

PEDAL SWITCH AND KNEE SWITCH (APW-235, APW-239)

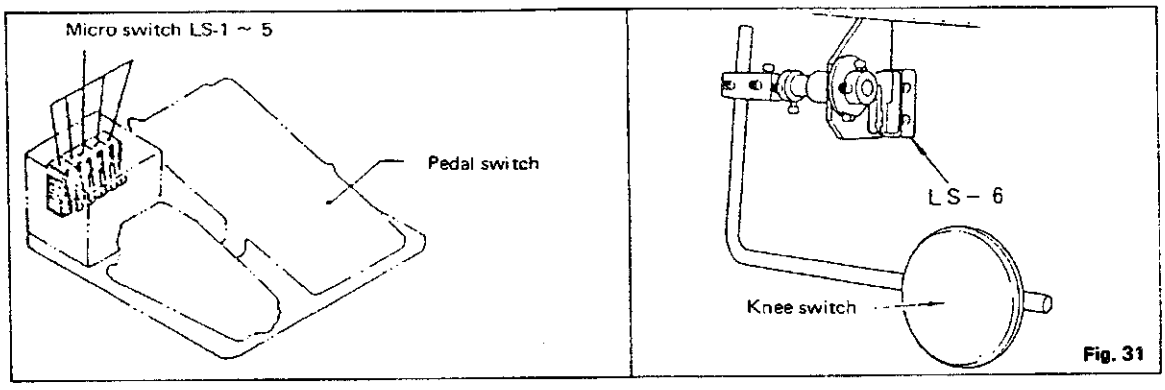


Fig. 31

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

[Standard specifications]

1st step (LS-1)----------→Clamp foot forward
↓
Clamp foot (right) comes down, thread tension disc open

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

3rd step (LS-3)----------→Binder comes down
↓
Welting patch is folded, thread released.

4th step (LS-4)----------→Flap clamp (right) comes down

5th step (LS-5)----------→Flap clamp (left) comes down
Thread tension disc close, thread loosening OFF

Knee switch (LS-6)----------→Rapid speed

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

[When the darts stretcher is installed] (optional)

1st step (LS-1)----------→Clamp foot forwarding actuates
↓
Darts stretcher operates.

2nd step (LS-2)----------→Clamp foot (right) comes down, thread tension disc open

3rd step (LS-3)----------→Clamp foot (left) comes down,
Darts stretcher returns

4th step (LS-4)----------→Binder comes down
↓
Welting patch is folded, thread released.

5th step (LS-5)----------→Flap clamp (left) (right) comes down
Thread tension disc close, thread loosening OFF

Knee switch (LS-6)----------→Rapid speed

PEDAL SWITCH (APW-236, APW-240)

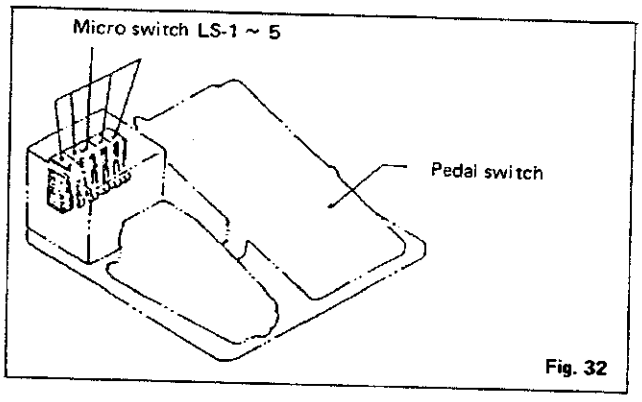


Fig. 32

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

[Standard specifications]

1st step (LS-1)----------→(No operation)

2nd step (LS-2)----------→Clamp foot forward, welt patch clamping actions.
Clamp foot (left) (right) comes down
Thread tension disc open

↓ ← Welting patch is fed.

Binder comes down.

↓ ← Micro switch to detect the binder being in the lowest position.

Welting patch is folded, thread released

↓ ← Flap is fed.

3rd step (LS-3)----------→Flap clamp (left) comes down.

4th step (LS-4)----------→Flap clamp (right) comes down.
Thread tension disc close
Thread releasing OFF

5th step (LS-5)----------→Rapid feed

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

[When the darts stretcher is installed] (optional)

1st step (LS-1)----------→Clamp foot forwarding actuates, darts stretcher operates, welting patch clamping actions.

2nd step (LS-2)----------→Clamp foot forwarding actuates, welt patch clamping actions.
Clamp foot (left) (right) come down.
Thread tension disc open
Darts stretcher returns
Binder comes down
Welting patch is folded, thread released

3rd step (LS-3)----------→Flap clamp (left) comes down

4th step (LS-4)----------→Flap clamp (right) comes down
Thread tension disc close
Thread loosening OFF

5th step (LS-5)----------→Rapid feed

9. POINTS TO BE NOTED BEFORE OPERATION

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) Make sure that the pressure switch has been set to 4.0 kg/cm^2.
   If not, adjust the switch to 4.0 kg/cm^2 by means of the screw on it.
4) Check for the lubrication.
   Fill the oil reservoir of the machine head with the lubricating oil.
5) Check that the remainings of the needle thread and bobbin thread are enough for the operation.
6) 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

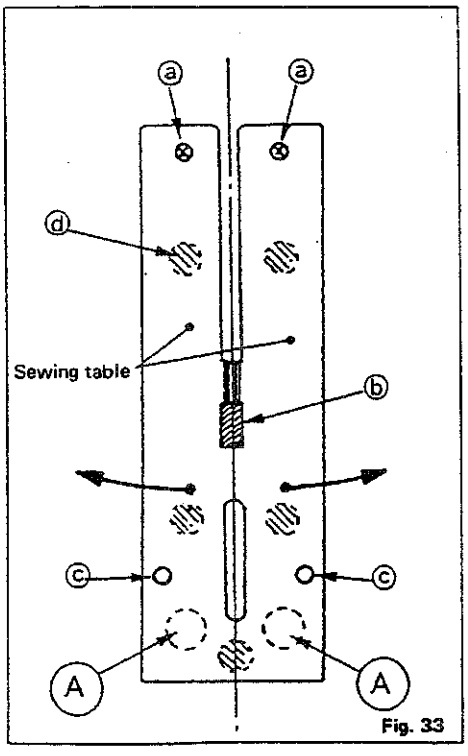


Fig. 33

1. Move the clamp foot to the rear end.
2. Insert your fingers in holes (A) 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 (b) and positioning pins (c) by following to the procedure for removing the sewing table inversely.
   The sewing table is attracted by magnets (d) at five points.

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 (APW-231)

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. Only with the optional dart stretcher installed, the dart stretcher will be actuated when the pedal switch is depressed to the first step. Then each of the following performances of the machine actuated by depressing the pedal switch to the second step and after, will correspond to the next step of the pedal switch compared to the standard pedal switch operation.

HOW TO SET WORKPIECES AND OPERATE SWITCHES FOR PRACTICAL OPERATION (APW-232)

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 paralellism of the garment material using the cross-mark light on the far side.

④ Set welt patches to the fixed position in the welt patch receiving plate to prepare for automatic welt patch feeding.

(Use the first step on the pedal switch when the darts stretcher is equipped as optional.)

⑤ Depress the pedal switch to the second step.

The clamp foot will travel forward and both left and right clamp feet will come down.
Then the binder will be lowered, a welt patch will be supplied, and the welt patch will be folded.

⑥ Depress the pedal switch to the third step.

Fast forwarding will start to function, and the clamp foot unit will travel to the sewing position.

⑦ Release the pedal switch after fast forwarding starts to function.

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

HOW TO SET WORKPIECES AND OPERATE SWITCHES FOR PRACTICAL OPERATION (APW-235, 239)

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

② Set an interlining piece .

Place an interlining pieces 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 interlining clamp leaf spring and the sewing table surface.

③ Set a 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 Set a flap piece. (When a flap is joined.)

Place a flap piece using the flap scale.

⑨ Depress the pedal switch down to the fourth step.

The right flap clamps will come down to securely hold the flap pieces.

⑩ Depress the pedal switch down to the fifth step.

The left flap clamps will come down to securely hold the flap piece.

⑪ Depress the knee switch.

The work clamp foot will travel to the sewing position.

⑫ 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) **With the optional dart stretcher installed, the dart stretcher will be actuated when the pedal switch is depressed to the first step. Then each of the following performances of the machine actuated by depressing the pedal switch to the second step and after, will correspond to the next step of the pedal switch compared to the standard pedal switch operation.**

HOW TO SET WORKPIECES AND OPERATE SWITCHES FOR PRACTICAL OPERATION (APW-236, 240)

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.
Remove wrinkles, if any, by hand from the clamped garment material.

④ Make preparation for the automatic welt patch feeding function properly by setting the welt patches on the predetermined position of the welt patch receiving plate

(Use the first step of the pedal switch only when the dart stretcher is installed as an optional device.)

⑤ Depress the pedal switch to the second step.

Both left and right clamp feet come down and then the binder comes down, a welt patch is fed, and the welt patch is folded.
When depressing the pedal switch to the first step, the corner knife turret will revolve to the set position. (APW-240)

⑥ Set a flap piece. (When a flap is joined.)

Place flap piece using the flap scale.
When the automatic flap feeder is installed as optional, the flap pieces will be automatically fed by setting the flap pieces on the predetermined position.

⑦ Depress the pedal switch down to the third step.

The left flap clamps will come down to securely hold the flap piece.

⑧ Depress the pedal switch down to the fourth step.

The right flap clamps will come down to securely hold the flap pieces.

⑨ Depress the pedal switch down to the fifth step.

The work clamp foot will travel to the sewing position.

⑩ 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.

11. EMERGENCY STOP

The machine will immediately stop with the related digital indicators on the control panel showing one of the error codes when the emergency stop system is actuated by one of the following reasons;

(1) Emergency stop by manual operation

Depress the EMERGENCY STOP switch located on the right side of the table, when you hear an extra-ordinary noise during sewing or want to stop the machine immediately.

- 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 error caused the emergency stop system actuate.
Then depress 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 "table of error codes"]

LIST OF ERROR CODE

ERROR CODE	DESCRIPTION	CORRECTIVE MEASURES	TIME OF DETECTION	REMARKS
AL-01	Emergency stop switch is turned ON.	Depress the reset key.	Any time	Momentary stop during operation
AL-02	Overload of servo motor	Remove the cause, and depress the reset key after checking that the servomotor is not abnormal.		
AL-03	Air pressure drops.	Increase air pressure and depress the reset key.		
AL-04	Thread breakage detected	Check the needle thread and the bobbin thread, and depress the reset key.	Automatic mode, while the machine rotates	
AL-05	Stepping out of the corner knife stepping motor	Remove the cause of the overload in the feed section of the corner knife, and depress the reset key.	When positioning the corner knife	
AL-06	Stepping out of the turret stepping motor	Remove the cause of overload in the rotating section of the turret, and depress the reset key.	When the turret operates	
AL-07	The lock pin cannot be set or removed.	Remove the cause, and depress the reset key.	When the turret operated When setting cloths	
AL-08	The corner knife cannot be locked or released.	Check the locked part of corner knife, and depress the reset key.	When positioning the turret While the corner knife rises	
AL-09	Failure in detection of corner knife being in the lower end position	Check the operation of corner knife, and depress the reset key.	When the clamp foot starts feeding action First step of pedal switch	
AL-10	Failure in detection of center knife being in the upper end position	Check the operation of center knife, and depress 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.	Depress the reset key.	When the clamp foot starts feeding action Power supply is "ON"	
AL-12	The thread take-up lever fails to reach at the top dead center.	Adjust the thread take-up lever to the top dead center.	When the clamp foot starts feeding action When operating the pedal switch When MACHINE READY key has been depressed	
AL-13	Dust gathering on the front end of the flap	Remove dust on the reflecting plate, and depress the reset key.	When the clamp foot starts feeding action	
AL-14	Failure of detection of the front end of a flap (A flap is not set correctly.)	Depress the reset key, and set a flap correctly.	When the clamp foot starts feeding action	
AL-15	The corner knife of flap sewing cannot be moved.	Depress the reset key, and set the flap cloth of normal length.	When having set a smaller flap than the minimum size of corner knife.	

LIST OF ERROR CODE

ERROR CODE	DESCRIPTION	CORRECTIVE MEASURES	TIME OF DETECTION	REMARKS
AL-16	The flap sensor fails to receive the light.	Remove dust on the reflecting plate and depress the reset key.	When the clamp foot starts feeding action after setting a cloth	
AL-17	The roller stacker is not detected to be in its upper end position.	Check the roller section, and depress the reset key.	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 is not detected to be in its upper end position.	Depress the reset key, then depress MACHINE READY key again.	When the binder lowers.	The detection is made only when the darts stretcher has been connected.
AL-19	Binder released	Set the binder to its home position and depress the reset key.	When depressing MACHINE READY key or when depressing the pedal switch.	
AL-20	The flap sensors are released.	Set the flap sensors at the standard positions, then depress the reset key.	When depressing MACHINE READY key or when depressing the pedal switch.	
AL-21	Size 1, outside the range of data	Depress the reset key, and input correct data again.	When assigning the cycle sewing	
AL-22	Size 2, outside the range of data			
AL-23	Size 3, outside the range of data			
AL-24	Size 4, outside the range of data			
AL-25	Size 5, outside the range of data			
AL-26	Lockstitch pitch, outside the range of data		When depressing MACHINE READY key	2.0 ~ 3.0 mm
AL-27	Condensation pitch, outside the range of data			0.5 ~ 1.5 mm
AL-28	Back tack pitch, outside the range of data			2.0 ~ 3.0 mm
AL-29	Flap concealed front right, outside the range of data			30.0 ~ 50.0 mm
AL-30	Flap concealed rear right, outside the range of data			30.0 ~ 50.0 mm
AL-31	Center knife front, outside the range of data			7 ~ 15 mm
AL-32	Center knife rear, outside the range of data			7 ~ 15 mm

LIST OF ERROR CODE

ERROR CODE	DESCRIPTION	CORRECTIVE MEASURES	TIME OF DETECTION	REMARKS
AL-33	(Empty)			
AL-34	Flap concealed front left, outside the range of data	Depress the reset key, and input correct data again.	When depressing MACHINE READY key	30.0 ~ 50.0 mm
AL-35	Flap concealed rear left, outside the range of data			30.0 ~ 50.0 mm
AL-36	Corner knife cutting depth front, outside the range of data			0 ~ 10.0 mm (Standard: 5 mm)
AL-37	Corner knife cutting depth rear, outside the range of data			0 ~ 10.0 mm (Standard: 5 mm)
AL-38	*1 Flap slant sewing mode setting error *2 Corner knife front slant position, outside the range of data	*1 The description of AL-38 differs according to the number of P-ROM used. So, be careful. If the number of P-ROM used is APW-239 (027A to C), or APW-240 (019A to L), AL-38 is indicated when the error described in *1 occurs. *2 The description of AL-38 differs according to the number of P-ROM used. So, be careful. If the number of P-ROM used is APW-239 (027D or above) or APW-240 (019M or above), AL-38 is indicated when the error described in *2 occurs.		When flap automatic feeder has not been used.
AL-39	Corner knife rear difference, outside the range of data			
AL-40	Flap forced stop, outside the range of data	Depress the reset key, and input correct data again.	When depressing MACHINE READY key	0 ~ 10 mm
AL-41	(Empty)			
AL-43	The gauge size is not set properly.	Turn the main power switch OFF and set the gauge size properly.	When power supply is "ON".	0 ~ 22 mm (APW-240) 0 ~ 26 mm(APW-236/232)
AL-44	RAM error check	Power supply OFF → ON → OFF	When power supply is "ON"	This error will not occur in ordinary sewing works. It is necessary to check CPU circuit board.
AL-45	The sewing speed decreasing end is not detected.	Depress the reset key and depress MACHINE READY key again	When forwarding the clamp foot.	
AL-50	Flap slant sewing mode setting error	Press the reset key and re-input the correct data.		

12. ADJUSTMENTS (APW-231, 235, 239)

(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

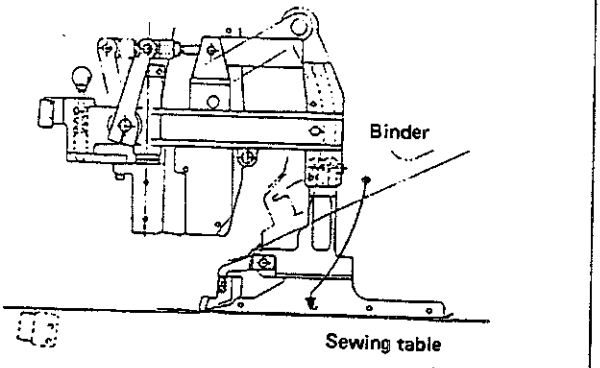
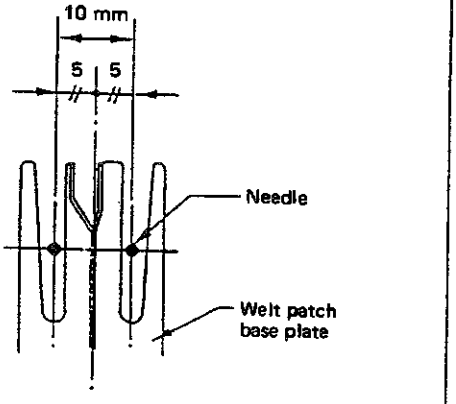


Fig. 34

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



[Needle gauge: 10 mm]

Fig. 35

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. 35.

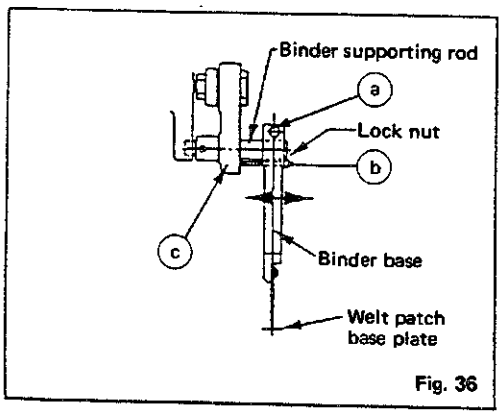


Fig. 36

3. When the binder will not be lowered to its lowest position shown in Fig. 35, loosen setscrew (a) 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 (b) securely on to the side face of the binder base and tighten with the lock nut.

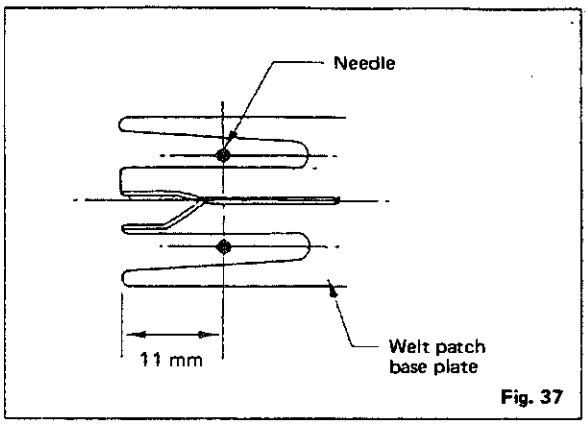


Fig. 37

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

5. When the above distances are not obtained, be sure to loosen groove cam setscrew (a) and travel the groove cam in the direction of the arrow to obtain the proper distances of the relevant parts.

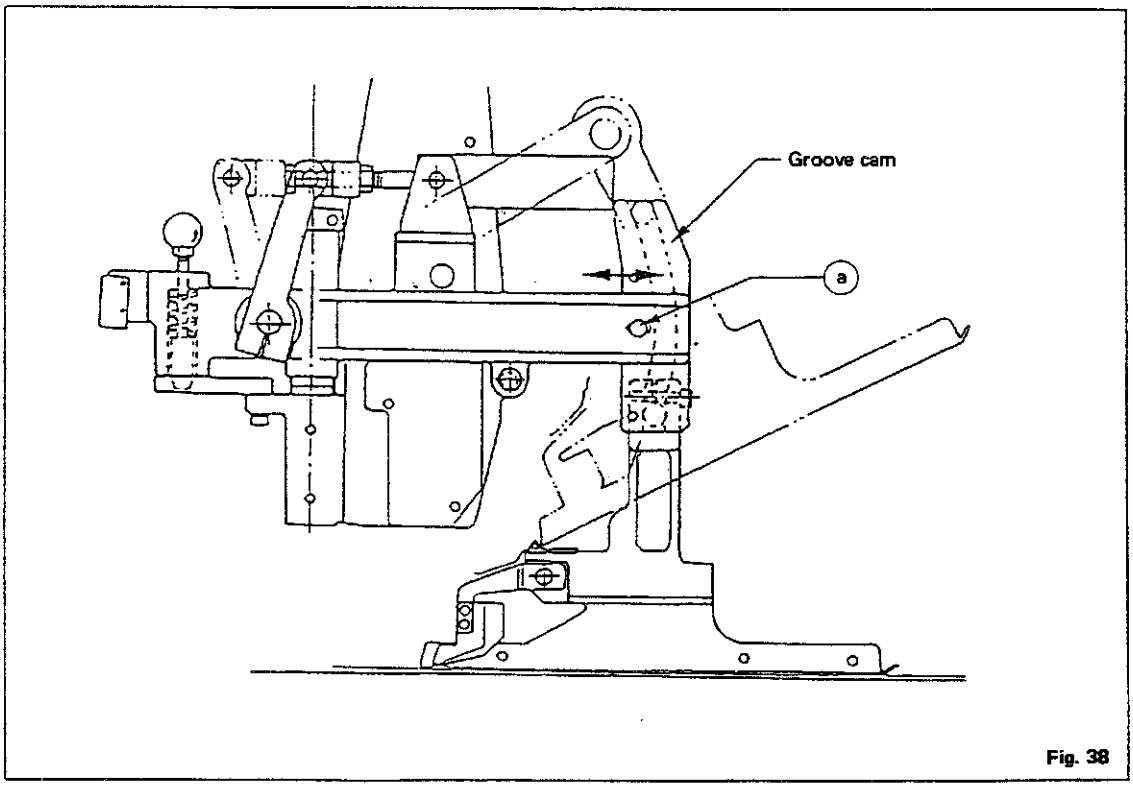


Fig. 38

[Note]
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

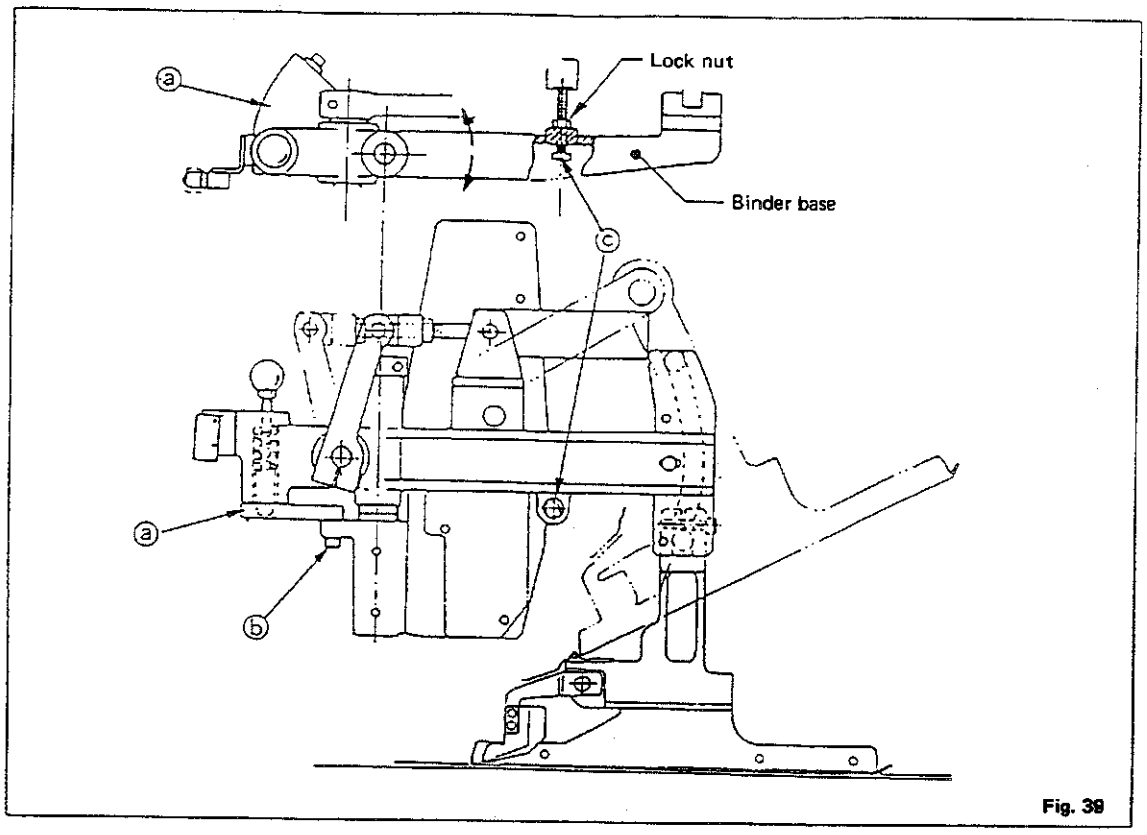


Fig. 39

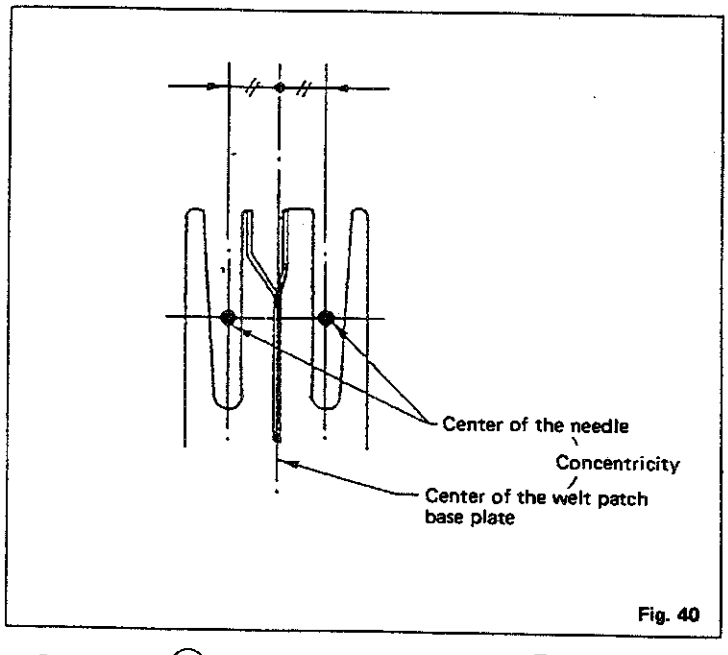


Fig. 40

1. Loosen bolt (b) which fixes positioning plate (a).
2. Slide base can be swung to each direction of the arrows by tightening/loosening adjusting bolt (c).
3. Provide proper concentric angles between welt patch base plate and the center of the needle and then tighten lock-nut of adjusting bolt (c) and securely fix positioning plate (a) with bolt (b).

3) Horizontal of the binder

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.

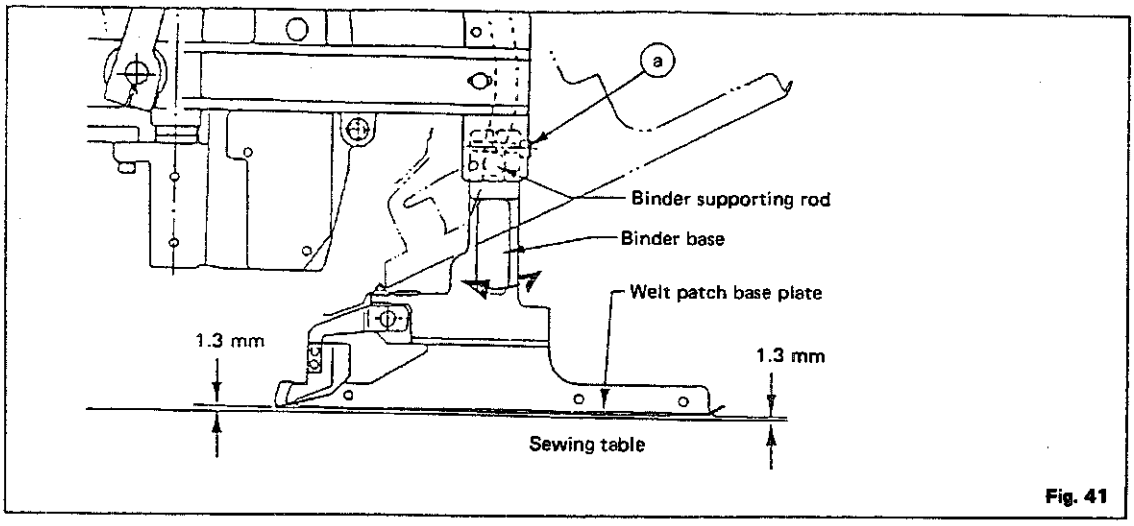


Fig. 41

1. Lower the binder manually in the same way as it is lowered when its lower position is adjusted.
2. Provide about a 1.3 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 horizontal positioning by swinging whole the binder assembly in the direction of the arrow making the binder supporting rod as the center of the swing motion to obtain the proper horizontal positioning after loosening binder installing base setscrew (a). After the adjustment, be sure to securely tighten setscrew (a).

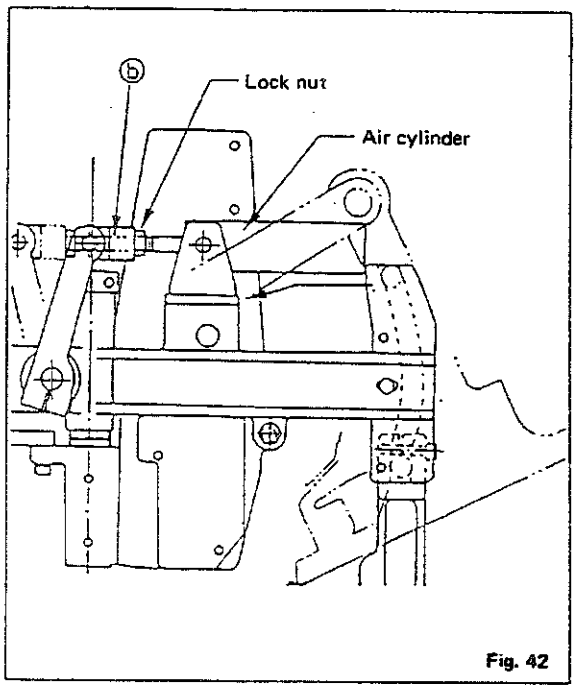


Fig. 42

4. Adjust to obtain a 1.3 mm clearance between the bottom face of the welt patch base plate and the surface side of the sewing table by turning cylinder joint (b) in Fig. 42.
   Loosen the locknut and turn cylinder joint (b) in the direction which tightens the air cylinder rod to lower the welt patch base plate, or in the direction which loosens the air cylinder rod to raise the welt patch base plate. After obtained a 1.3 mm clearance correctly, securely tighten the locknut.

ADJUSTMENTS (APW-232, 236, 240)

(1) Binder mechanism

When you depress the pedal switch to the second 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

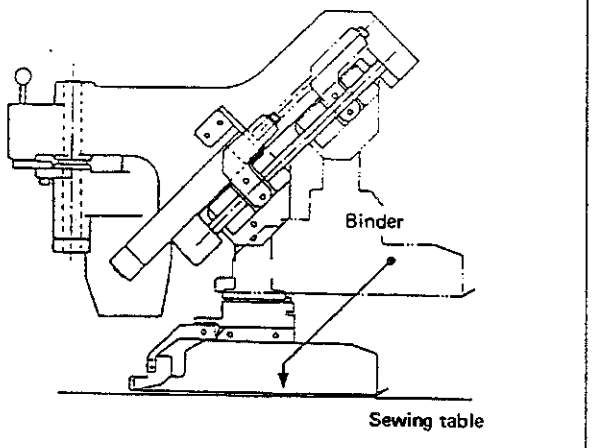


Fig. 43

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

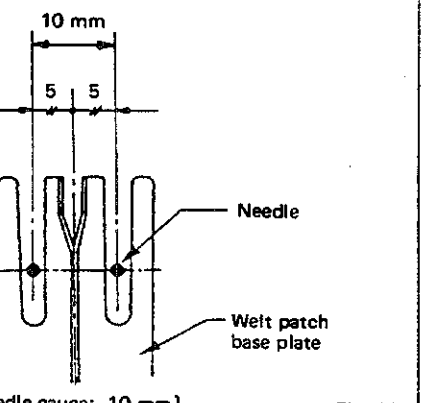


Fig. 44

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. 44.

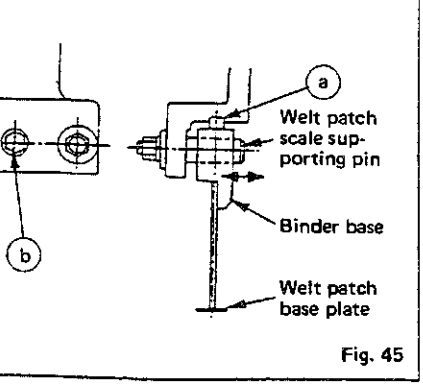


Fig. 45

3. When the binder will not be lowered to its lowest position shown in Fig. 44, loosen setscrew (a) 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 (b) securely on to the side face of the binder base and tighten with the lock nut.

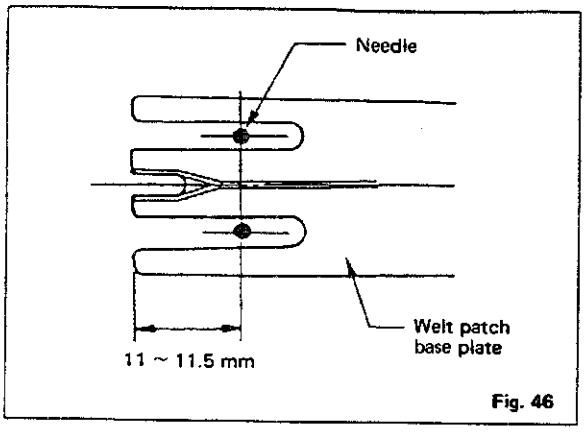


Fig. 46

4. Provide about 11 to 11.5 mm clearance between the needle entry point and the rear end of welt patch base plate.

5. When the above-mentioned clearance has not been provided, loosen lock nut shown in Fig. 46 and adjust by turning collar (c).
When turning the collar to the tightning direction toward the air cylinder, and the clearance will be increased. On the other hand, when turning the collar to the loosening direction, the clearance will be decreased.

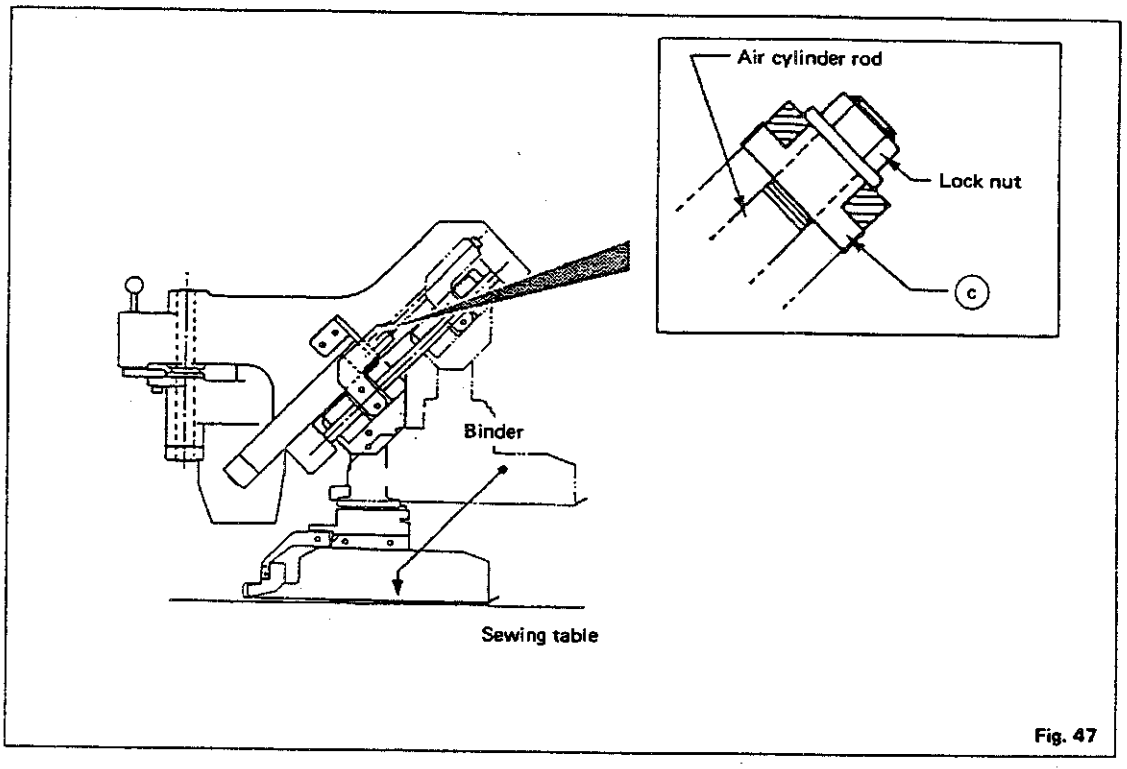


Fig. 47

[Note]
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

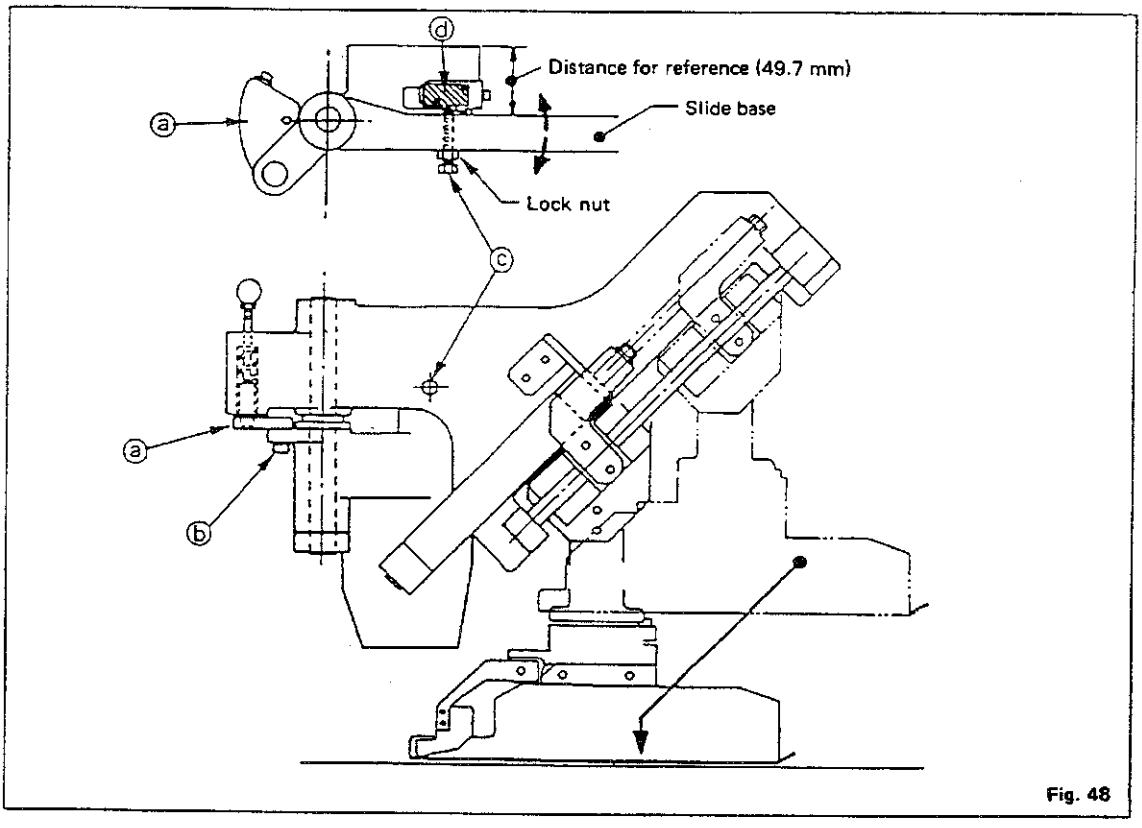


Fig. 48

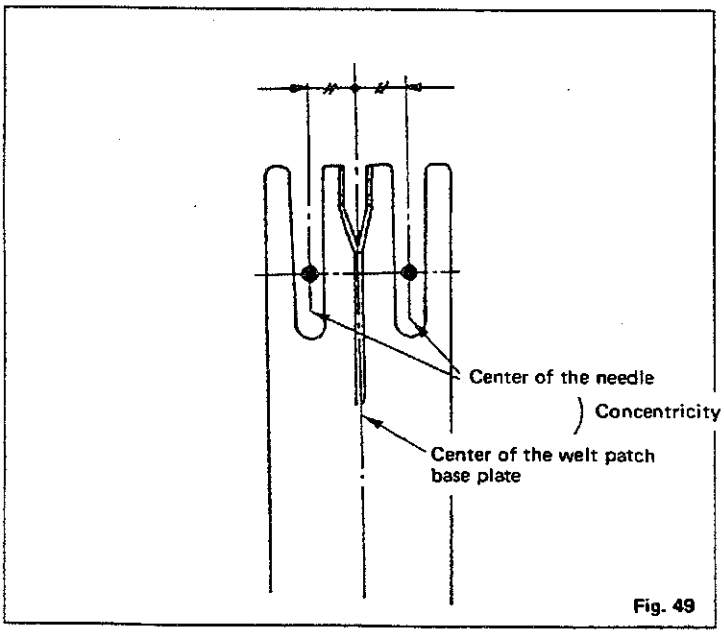


Fig. 49

1. Loosen bolt (b) which fixes positioning plate (a).
2. Slide base can be swung to each direction of the arrows by tightening/loosening adjusting bolt (c).
3. Microswitch (d) must be turned ON even when the slide base is swung to direction of the arrows. Be sure to keep the microswitch turned ON by adjusting its installation.
4. Provide proper concentric angles between welt patch base plate and the center of the needle and then tighten lock-nut of adjusting bolt (c) and securely fix positioning plate (a) with bolt (b).

3) Horizontal of the binder

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.

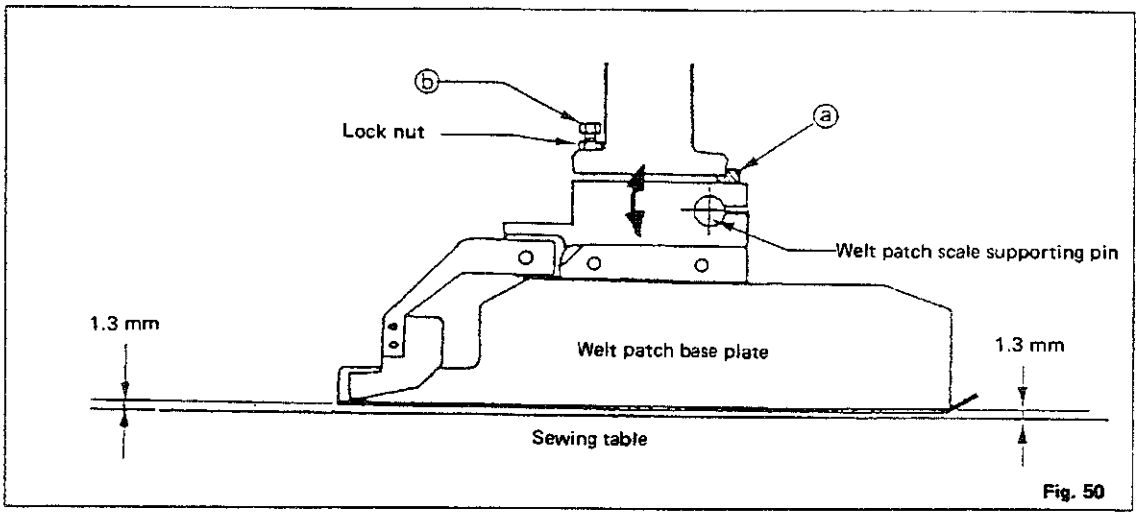


Fig. 50

1. Lower the binder manually in the same way as it is lowered when its lower position is adjusted.
2. Provide about a 1.3 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. Loosen binder base fixing screw ⓐ. Adjust the position of the binder using horizontal adjusting screw ⓑ and swinging the binder unit to and fro in the direction of the arrow so that the binder is in parallel to the table. After adjusted, tighten lock not of screw ⓑ and securely tighten setscrew ⓐ.

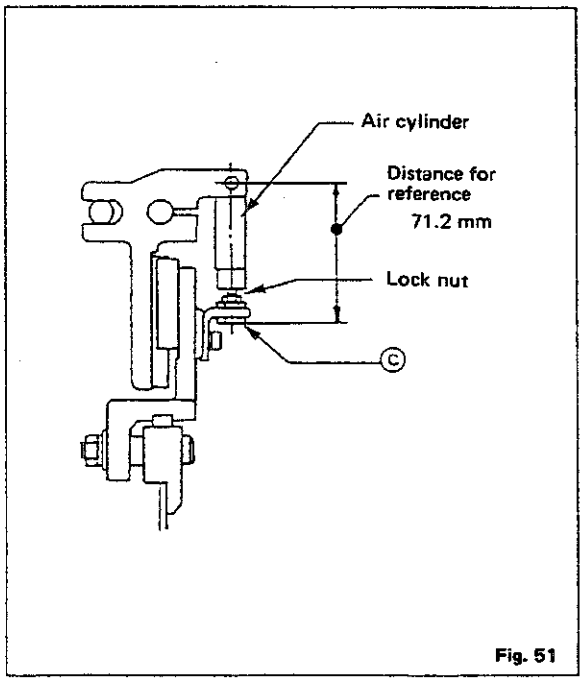


Fig. 51

4. Adjust the welt patch base plate so that the clearance between the reverse side of the welt patch base plate and the surface side of the table is 1.3 mm by turning collar ⓒ in Fig. 51.
   Loosen the lock nut and turn collar ⓒ to the tightening direction toward the air cylinder shaft, and the welt patch base plate will be raised. Loosen the lock nut and turn collar ⓒ to the loosening direction, and the welt patch base plate will be lowered.
   After provided 1.3 mm clearance, tighten the lock nut securely.

4) Cloth guide finger

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

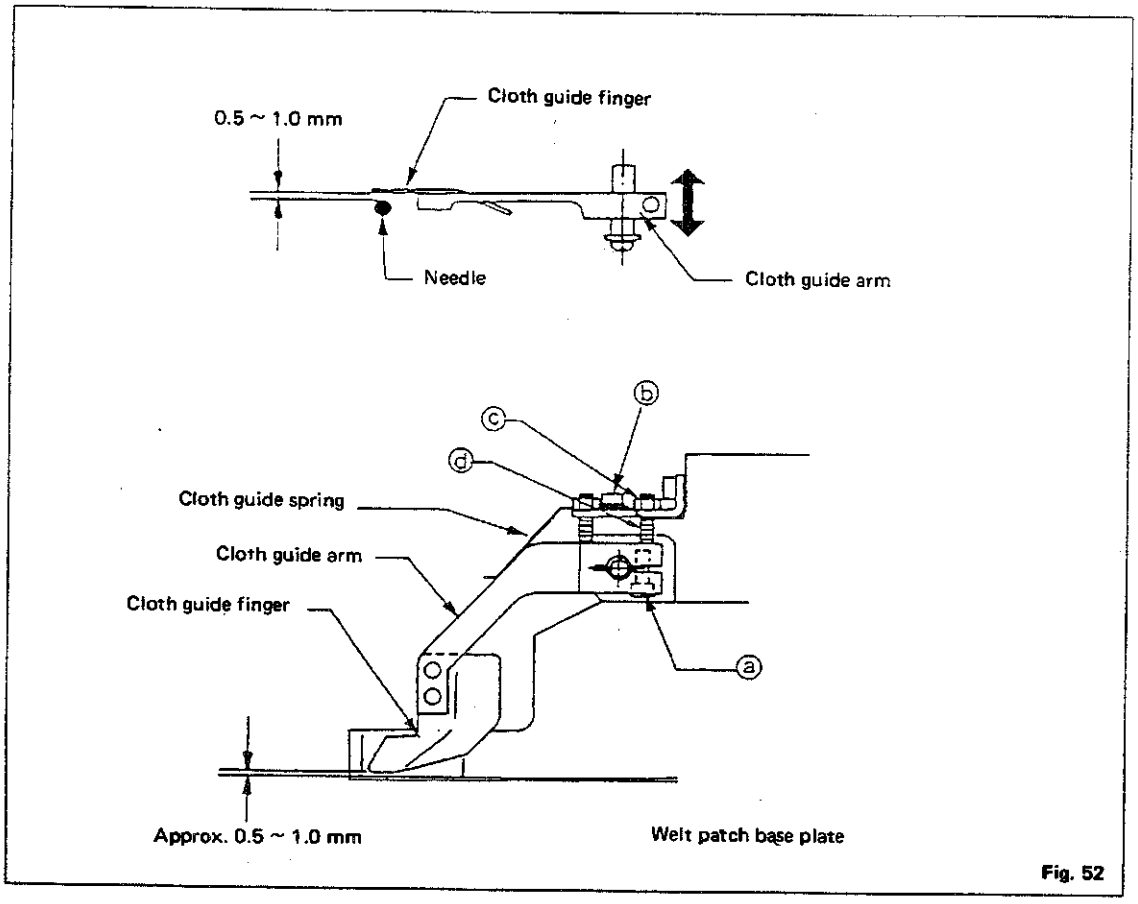


Fig. 52

Be sure to readjust the cloth guide finger when a different needle gauge is used.

1. Loosen cloth guide arm setscrew ⓐ 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 give an excessive pressure on the workpiece while being fed.
   The pressing pressure of the cloth guide spring can be adjusted by screw ⓑ.
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 ⓒ and provide a proper clearance with screw ⓓ.
   After adjusted, securely tighten lock nut ⓒ.

(Note) Pull the lever to the direction of the arrow, and the lock will be released. Then the binder unit can be swung to the position of the stopper where it does not any further.
Be sure to swing the binder unit when adjusting the machine or replacing the welt patch base plate. Upon completion of the adjustment, be sure to return the binder where it has been fixed, and set the fixed position micro-switch to "ON".

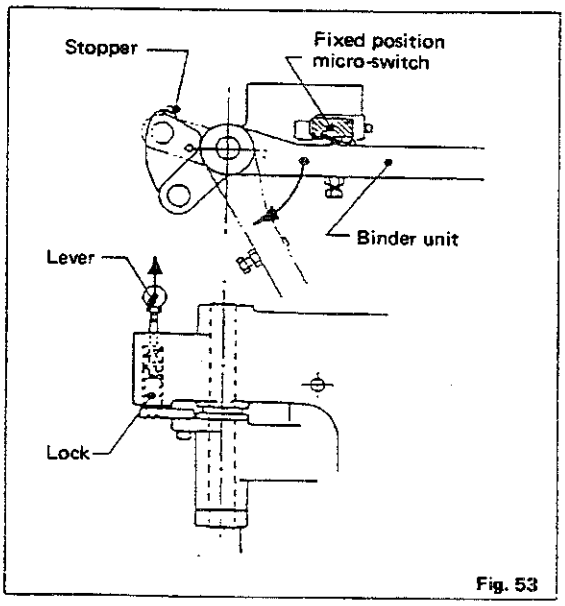


Fig. 53

(2) Adjusting automatic welt patch supplying mechanism

An operator needs only to set welt patches on the fixed place of the welt patch receiver plate. Then the welt patches are to be fed automatically.
Two types of the welt patch supplying mechanism;

- ○ Right type (Welt patches are set on the right side of the machine observed by an operator.)
- ○ Left type (Welt patches are set on the left side of the machine observed by an operator.)

1) Oscillating amount of the binder

Adjust the oscillating amount of the binder so that the center of the bottom face of welt patch base plate is 131 mm ± 2 mm away from the surface side of the sewing table.
This adjustment depends on the type of the binder, left/right.

For the right type binder (Welt patches are set on the right side of the machine observed by an operator.)

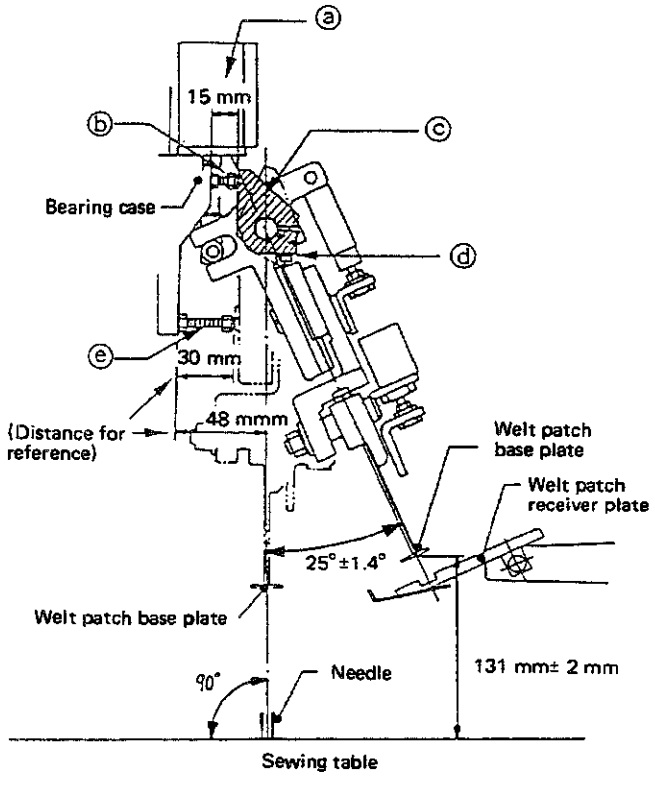


Fig. 54

Adjust so that the relevant parts are positioned as illustrated in Fig. 54 at both ends of oscillating action of the binder oscillating cylinder ⓐ.

1. Adjust the oscillating end position (welt patch grasping point) by bolt ⓑ and stopper ⓒ.
   Jut out adjusting bolt ⓑ from the bearing case by approx. 15 mm. Then loosen set bolt ⓓ and adjust so that stopper ⓒ lightly contacts the tip of the adjusting bolt and is positioned as illustrated in Fig. 54.
   After adjusted, securely tighten the lock nuts of set bolt ⓓ and adjusting bolt ⓑ.

2. The center line of welt patch base plate is at right angles to the sewing table and aligns with the center of the needle at the oscillating return end position.
   Adjust by adjusting bolt ⓔ.
   This adjustment also works as adjusting the parallel of welt patch base plate.

For the left type binder (Welt patches are to be set on the left side of the machine observed by an operator.)

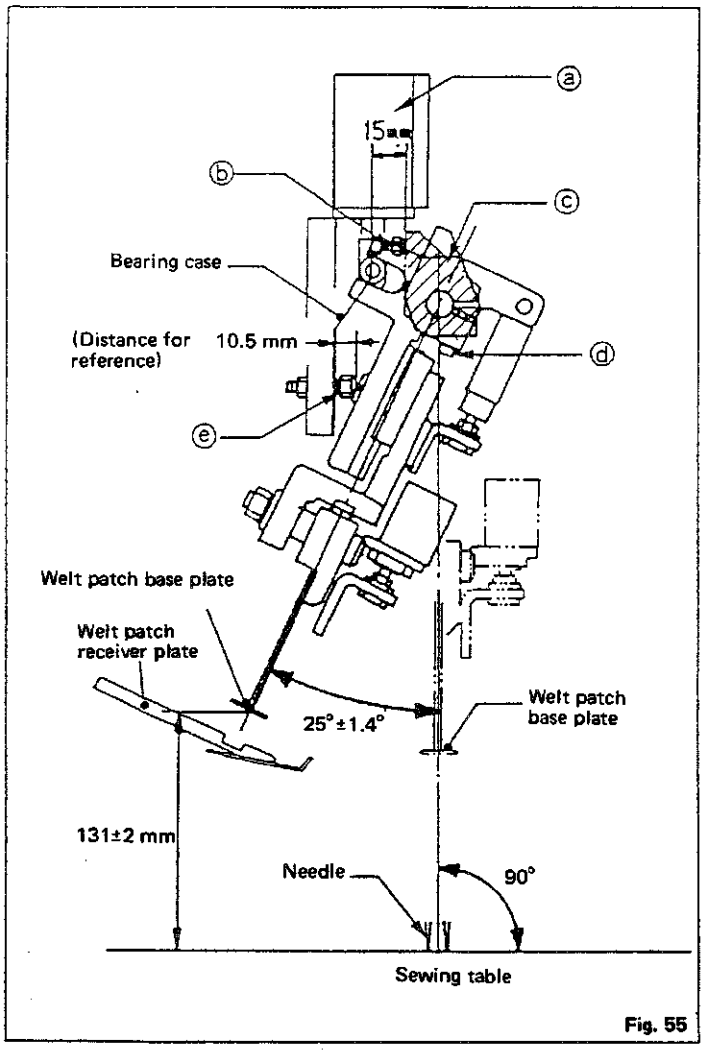


Fig. 55

Adjust so that the relevant parts are positioned as illustrated in Fig. 55 at both ends of oscillating action of the binder oscillating cylinder ⓐ.

1. Adjust the oscillating end position (welt patch grasping point) by bolt ⓔ. Determine the jutting out amount of adjusting bolt ⓔ so that the distances and positionings of the related parts are obtained as illustrated in Fig. 55. Then tighten the lock nut.

2. The center line of welt patch base plate is at right angles to the sewing table and aligns with the center of the needle at the oscillating return end position.
   Jut out adjusting bolt ⓑ from the bearing case by approx. 15 mm. Then loosen set bolt ⓓ and adjust so that stopper ⓒ lightly contacts the tip of the adjusting bolt and is positioned as illustrated in Fig. 55.
   After adjusted, securely tighten the lock nuts of set bolt ⓓ and adjusting bolt ⓑ.
   This adjustment also works to adjust the parallel of welt patch base plate.

2) Jutting out amount of welt patch grasping needle

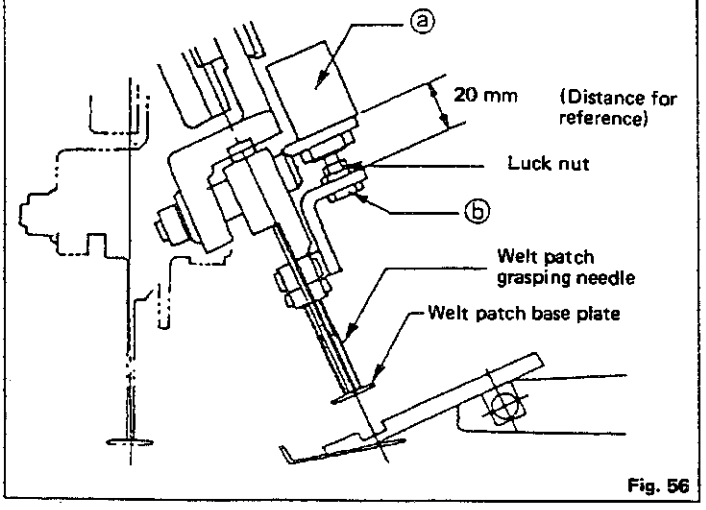


Fig. 56

When welt patch grasping needle cylinder ⓐ (needle stroke 5 mm) does not works, set the welt patch grasping needle so that the tip of the needle stays approx. 0.5 mm back from the bottom face of the welt patch base plate.
Adjust by collar ⓑ on the cylinder head.
After adjusted, be sure to tighten lock nut.

3) Welt patch receiver plate and welt patch stopper

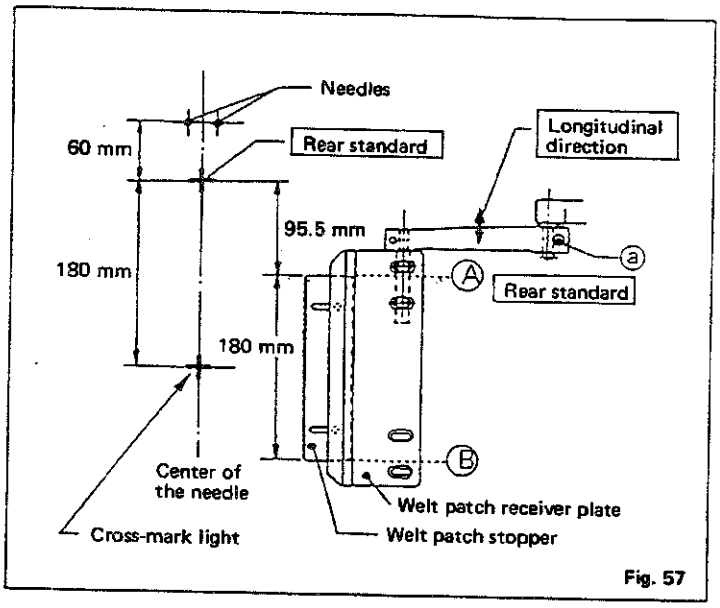


Fig. 57

1. Loosen bolt (a) and adjust the longitudinal direction of the welt patch receiver plate and welt patch base plate so that the relevant parts are positioned as illustrated in Fig. 57. Welt patch stopper end point (B) corresponds to the rear standard position of the binder when it comes down after having fed a welt patch. Therefore, welt patch stopper front end observed by an operator (B) corresponds the sewing end point when the sewing length is set to 180 mm. Set a workpiece using either end as a standard.

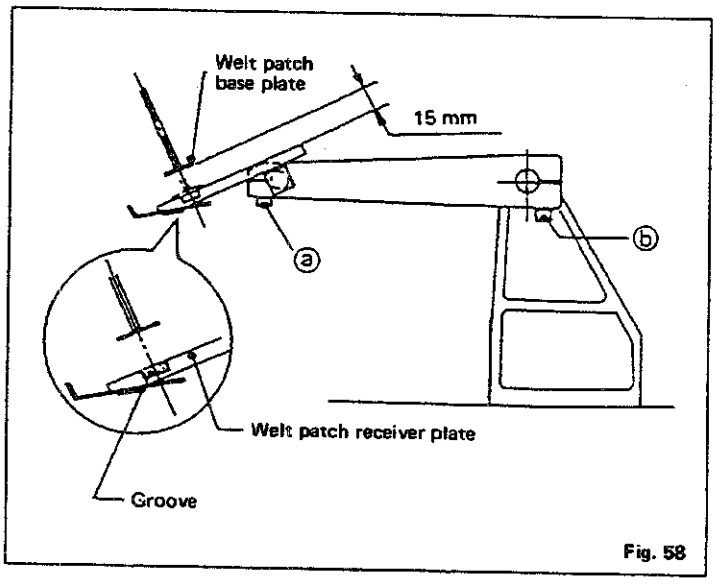


Fig. 58

2. Loosen bolts (a) and (b) to adjust the position of the welt patch receiver plate so that the relevant parts are positioned as illustrated in Fig. 58.
   - Provide 15 mm distance between the bottom face of the welt patch base plate and surface of the receiver.
   - The center of the welt patch base plate is in parallel to and aligns the center of the groove of the receiver.

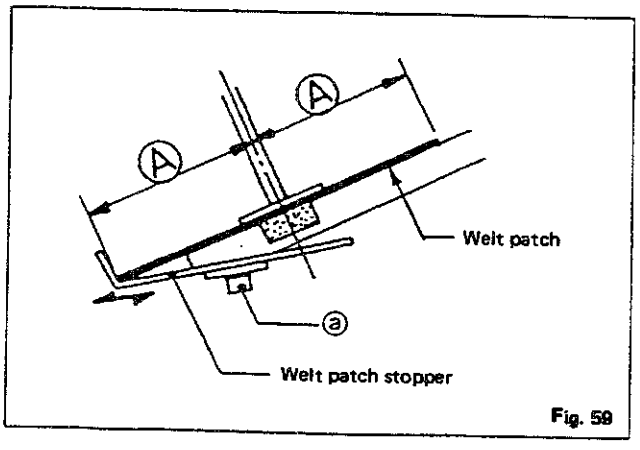


Fig. 59

3. Distance (A) of the welt patch stopper should be adjusted to be half of the welt patch width.
   Loosen bolt (a) and slide the welt patch stopper to obtain the desired distance.

(For example) When 60 mm wide welt patches are used;
Distance (A) is 30 mm.
Distance (A) can be adjusted within the range of 20 mm to 50 mm.

(3) Adjusting clamp foot traveling mechanism

1) Support rod assy. standard dimensions

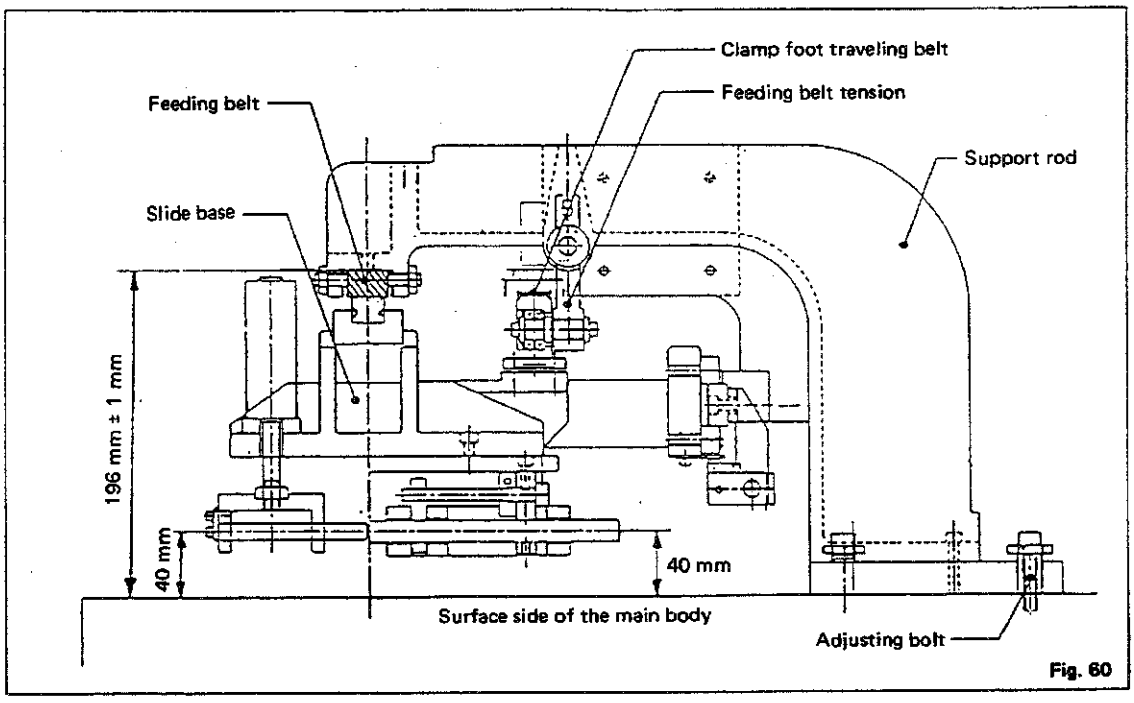


Fig. 60

Hight of the feeding rail fitting groove 196±1 mm of support rods (one ea. for front and rear) can be adjusted by the adjusting bolts (four bolts). Be sure to adjust the height considering the horizontality.

2) Parallelism of clamp foot travel

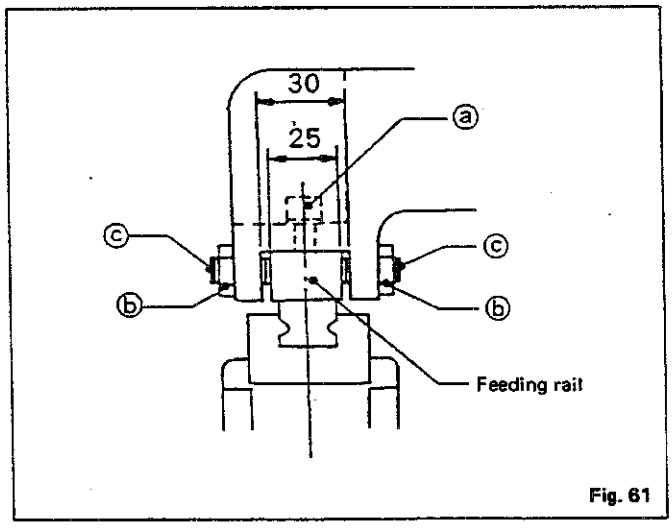


Fig. 61

Adjust the feeding rail fitting points (one ea. for front and rear) so that the slide base travels in parallel (clamp foot travels in parallel).
The tolerance allowed to the parallelism of the clamp foot travel is within 0.15 mm for traveling distance of 300 mm.

Loosen set bolt (a) and lock nut (b), and adjust the position of the feeding rail by adjusting bolts (c) on both sides.

3) Tension of the clamp foot traveling belt

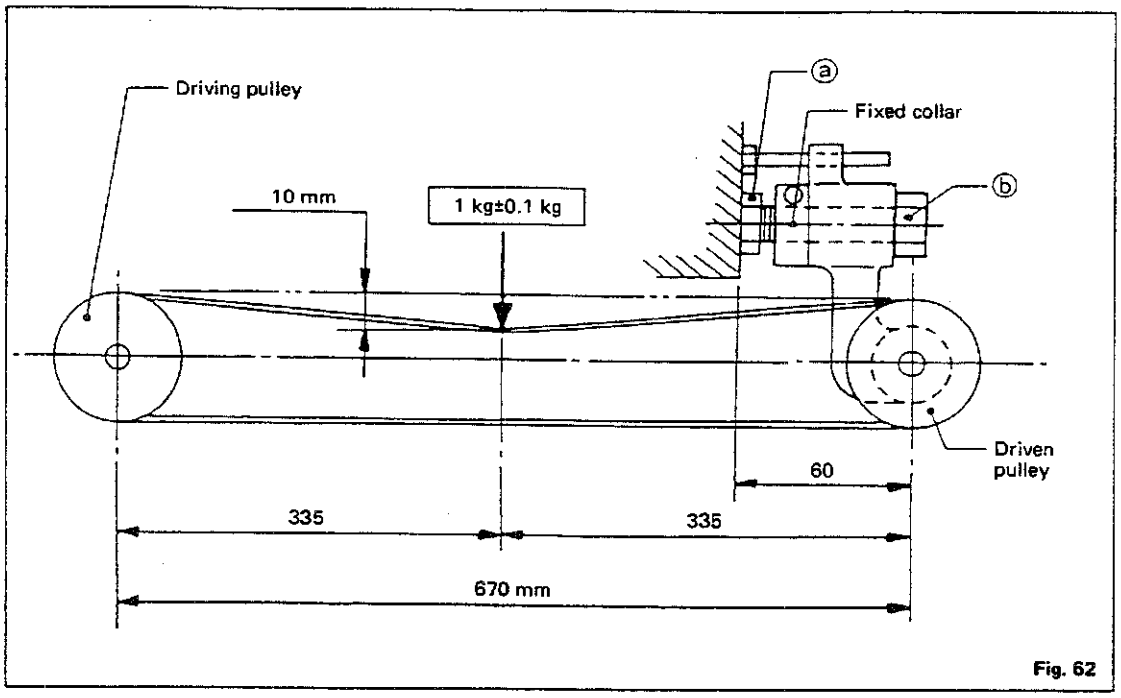


Fig. 62

Loosen lock nut (a), and the tension of the clamp foot traveling belt can be adjusted by tension screw (b). If the belt tension is proper, when 1±0.1 kg pressure is pressed on the belt at the middle of the pulleys, the blet will bend down approx. 10 mm.
After adjusted, be sure to tighten lock nut (a) securely.

4) Tension of the clamp foot driving belt

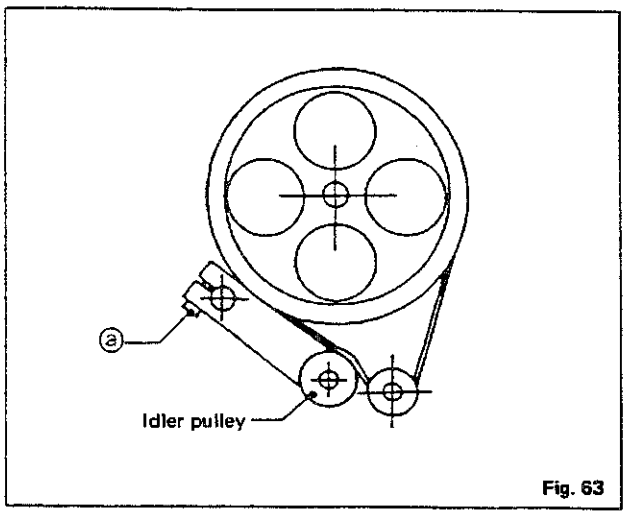


Fig. 63

Loosen set bolt (a), 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 (a) securely.

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

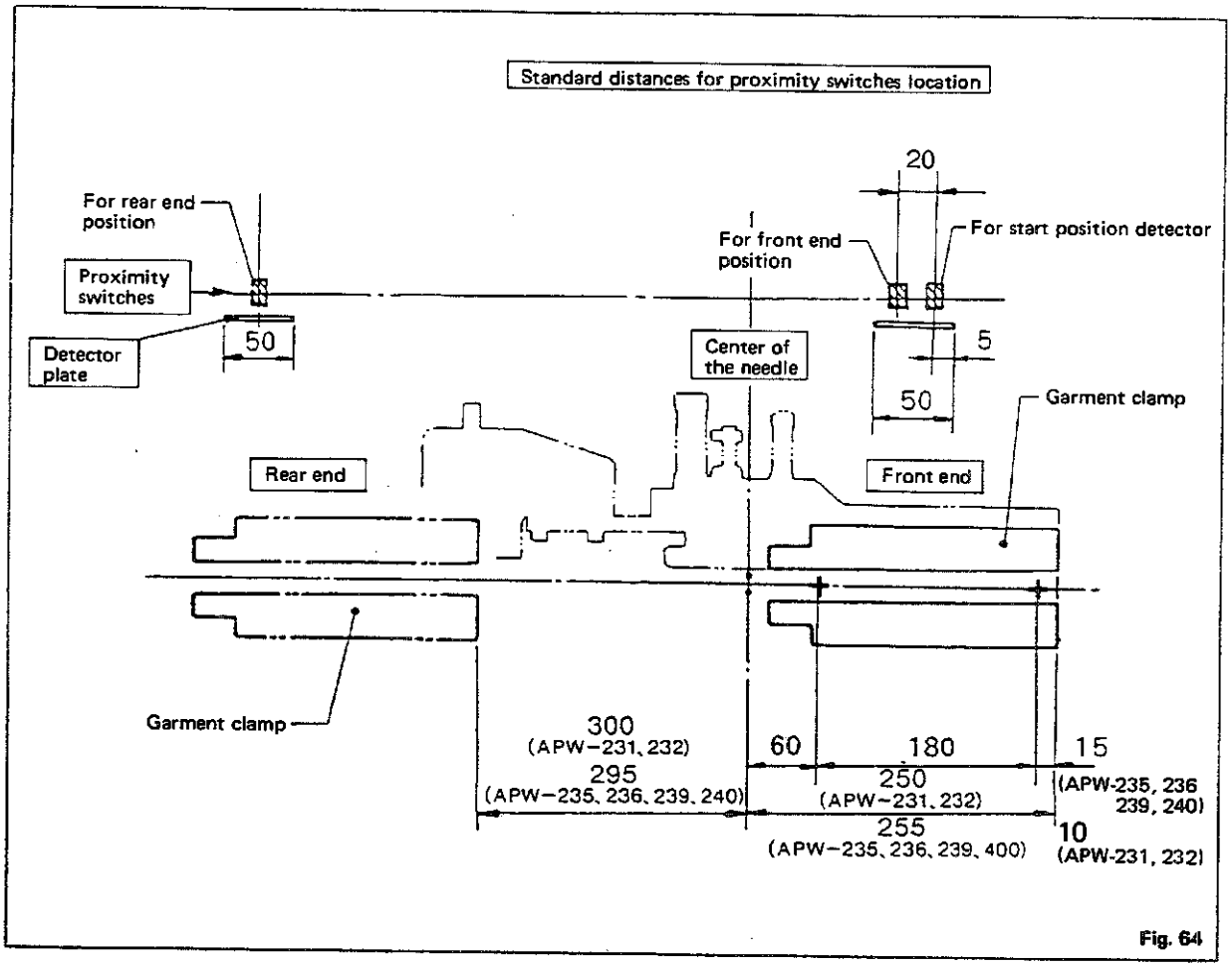
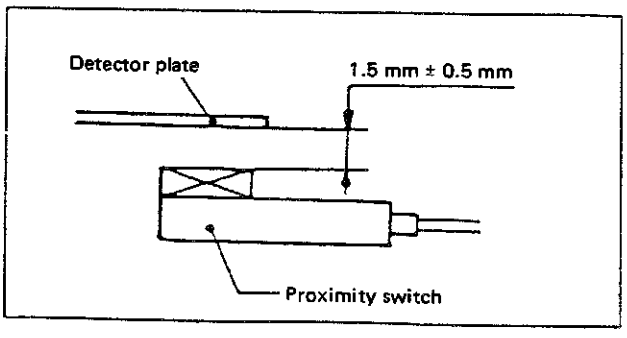


Fig. 64

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. 64 refering to the standard distance for proximity switches.

- Clamp foot front end is where tip of the garment clamp is 255 mm (APW-235, 236, 239 and 240) or 250 mm (APW-231 and 232) away from the center of the needle.
- Clamp foot rear end is where tip of the garment clamp is 295 mm (APW-235, 236, 239 and 240) or 300 mm (APW-231 and 232) away from the center of the needle.

The clamp foot will travel further by 25 mm and stop when the stop proximity switch is turned ON.



Provide the clearance of 1.5±0.5 mm between the proximity switch and the detector plate.

Fig. 65

(4) Clamp foot, welting patch folding plate and flap presser mechanism

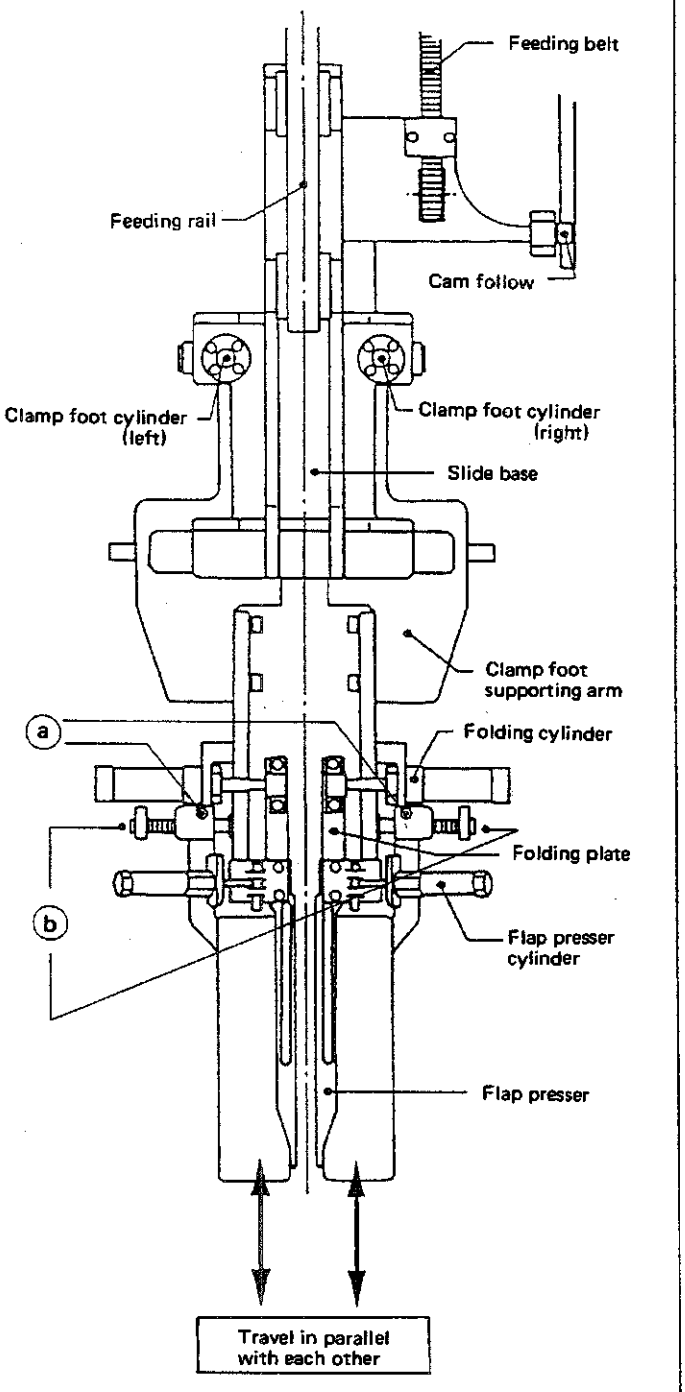


Fig. 66

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.
   (APW-235, 236, 239, 240)

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 "(3) Adjusting clamp foot traveling mechanism 2) Parallelism of clamp foot travel."

Be sure to lower the welt patch base plate of the binder which has been properly adjusted beforehand and perform the adjustment of the parallelism of the clamp foot taking the welt patch base plate as standard.

2) Garment clamp positioning

This adjustment determines the finish of welt patch folding. Be sure to adjust the position of the garment clamps 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]

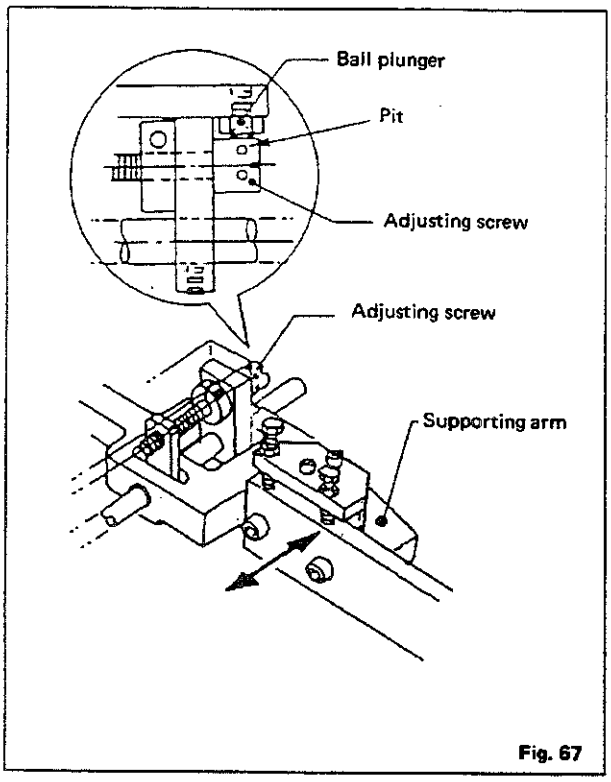


Fig. 67

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. 67. 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.

2. Adjusting the clearance between the garment clamps and welt patch base plate.

Loosen screw (a) and turn screw (b) in Fig. 66, then only the garment clamps will be moved.

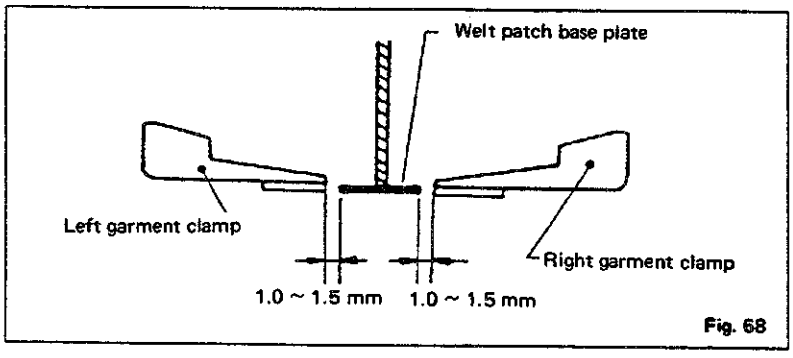


Fig. 68

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.

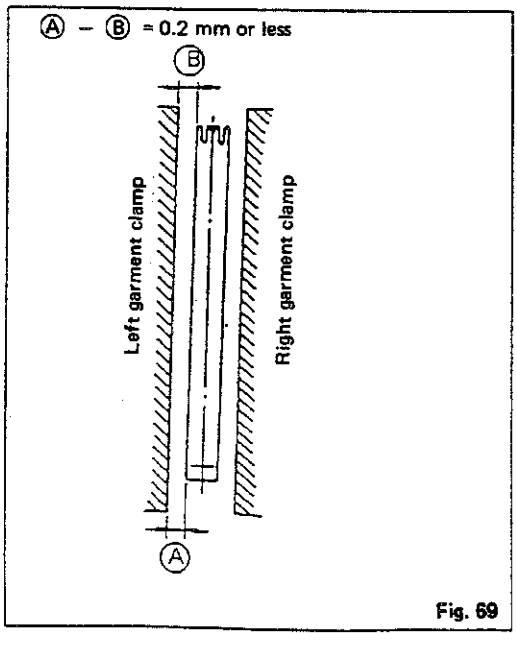


Fig. 69

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

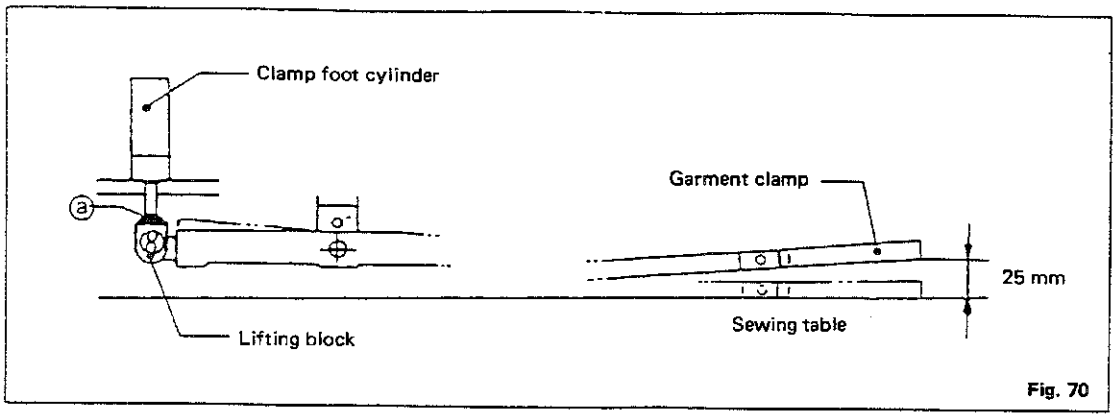


Fig. 70

The garment clamp is always kept in the upper resting position when it does not operate. The standard garment clamp lift is 25 mm from the surface side of the sewing table measured at the tip of it. Adjust the lift by changing the depth of the clamp foot cylinder rod within the lifting block after loosening lock nut (a) on the tip of the clamp foot cylinder rod. After adjustment, be sure to tighten lock nut (a) securely.

(Note) When adjusting the lift, make sure that the garment clamp does not contact the sewing machine.

4) Welt patch folding plate (APW-232, 236, 240)

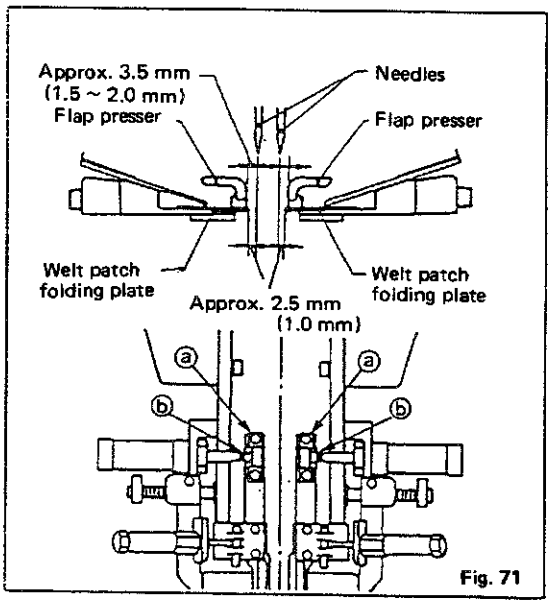


Fig. 71

Adjustment for the APW-232, -236, and -240

When the clamp foot has reached its front end position, there must be a clearance of approx. 2.5 mm (1.0 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. 71. Adjust the parallelism between the clamp foot and the needle while loosening fixing screw (a) of the folding plate.

Loosen locknut (b) 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 (b).

[Caution] The values bracketed show the adjustment values for APW-231, -232, -235, and -239.

5) Flap scale and flap presser (APW-235, 236, 239, 240)

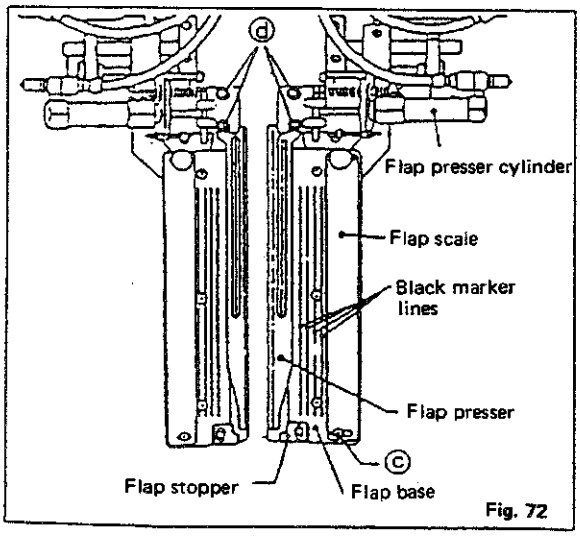


Fig. 72

Set the flap scale according to the length of flaps to be sewn after loosening flap scale setscrew (c).

Use the black marker lines on the flap base as standard for the parallelism of the flap scale.

Provide a clearance of approx. 3.5 mm (see Fig. 60) between the flap presser and the center of the needle using screw (d).

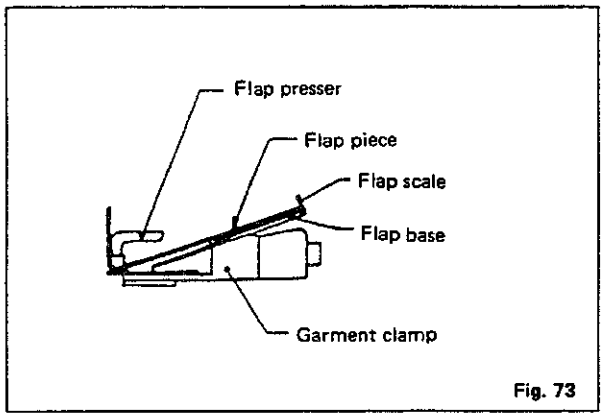


Fig. 73

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

6) Flap stopper (APW-235, 236, 239, 240)

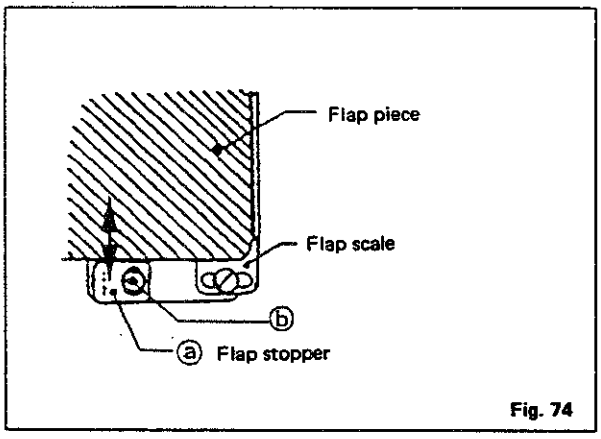


Fig. 74

Flap stopper (a) which is located on the flap on the flap base head is mainly used when the patterns such as stripes and check of the flap piece must be in line with those of the garment material.
Loosen setscrew (b) and adjust the flap stopper to obtain a position suitable for the patterns of the material.

(5) Corner knife mechanism (APW-231, 232, 235, 236)

[Operation of the corner knife]

Turn corner knife travel motor (a) ON, and moving corner knife (b) (sewing start position) will travel to the position which has been predetermined in accordance with the length to be sewn.

At the travel end position, the moving corner knife and fixed corner knife (c) (sewing end position) will be raised by each exclusive lifting air cylinder (d) and (e) and cut a material.

The corner knife mechanism has been factory-adjusted properly before shipment so that it can be applied to every sewing program. You need not adjust the mechanism when sewing a different length of welt or sewing a flap.

When a fine-adjustment is required after a corner knife blade is replaced, be sure to adjust it in the following way.

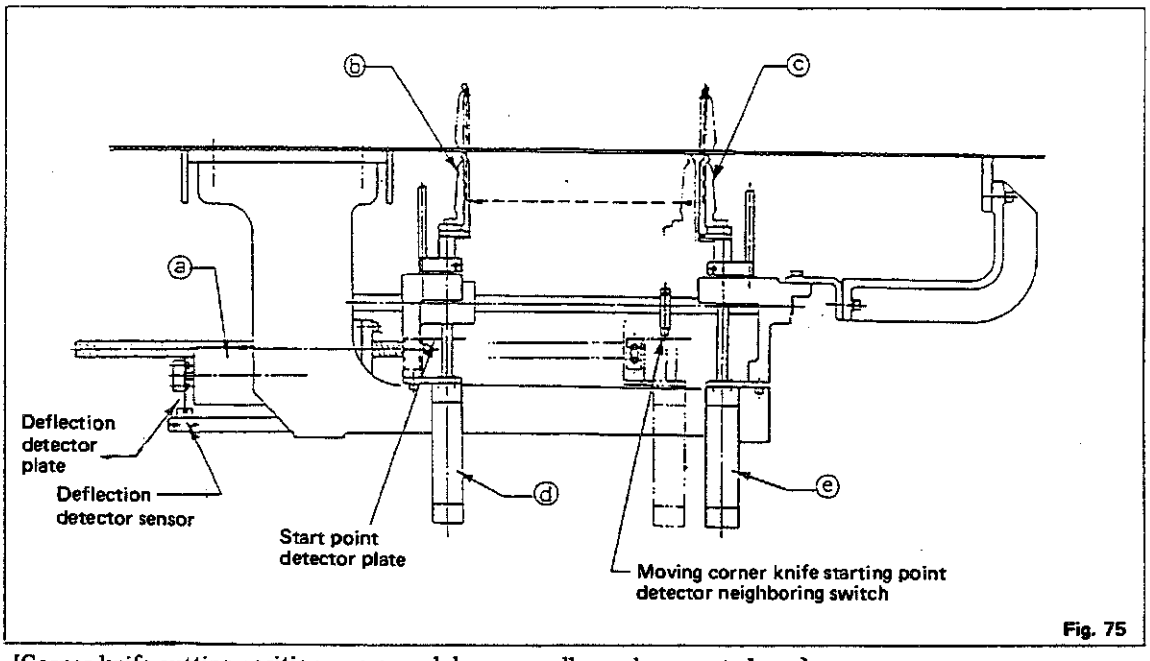


Fig. 75

[Corner knife cutting position, cross-mark lamp, needles and garment clamp]

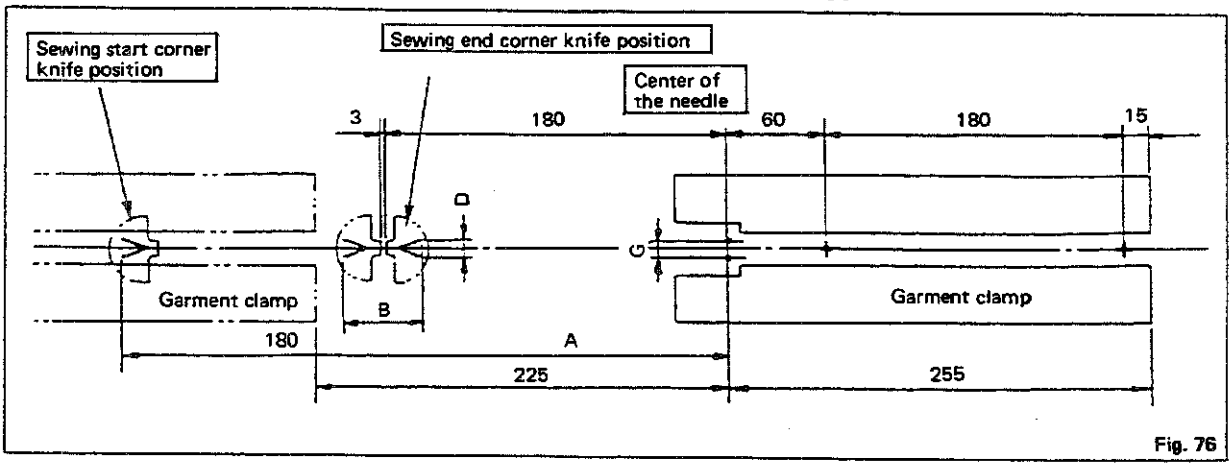


Fig. 76

		APW-232, 236						
G	Gauge	8	10	12	14	16	18	20
A	Dimensions after assembled	165.5	166	164.5	162.5	161	159	157.5
B	Dimensions after assembled	32	31	34	38	41	45	48
	D	7	9	11	13	15	17	19
Minimum sewing length for L-size dimensions proprammed		35 ~ 180			50 ~ 180			
Minimum sewing length for flap detector		80 ~ 180						

1) Clearance between fixed corner knife and moving corner knife

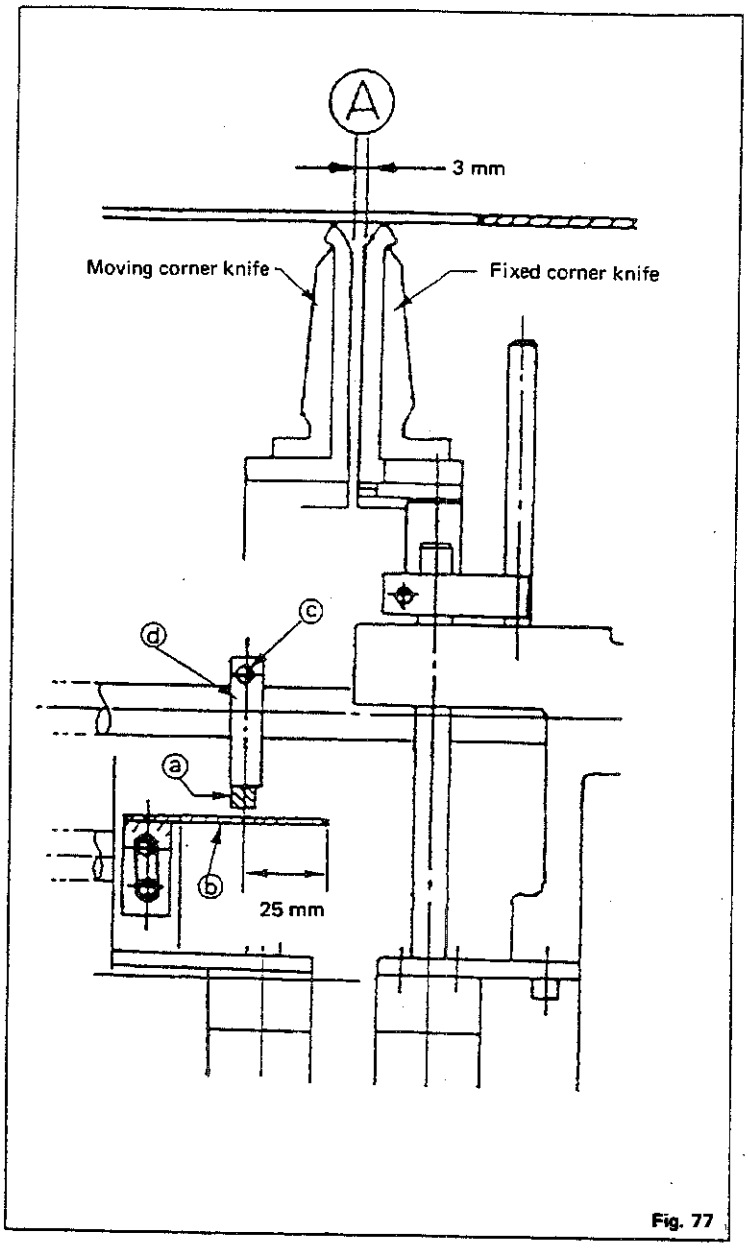


Fig. 77

Provide a clearance (A) of 3 mm between the fixed corner knife and moving corner knife at the sewing start point as shown in Fig. 77.
The start position of the moving corner knife is detected at the moment when the corner knife returns to its start position after having traveled. The corner knife stops after having traveled additionally 25 mm from the point where proximity switch (a) detected detector plate (b).
Clearance (A) is measured at the position. Make sure that the clearance is 3 mm. Adjust the moving corner knife by sliding switch attaching bracket (d) after loosening setscrew (c).

Provide a 1.5±0.5 mm clearance between the proximity switch and the detector plate. Adjust it by sliding the detector after loosening setscrew (e).

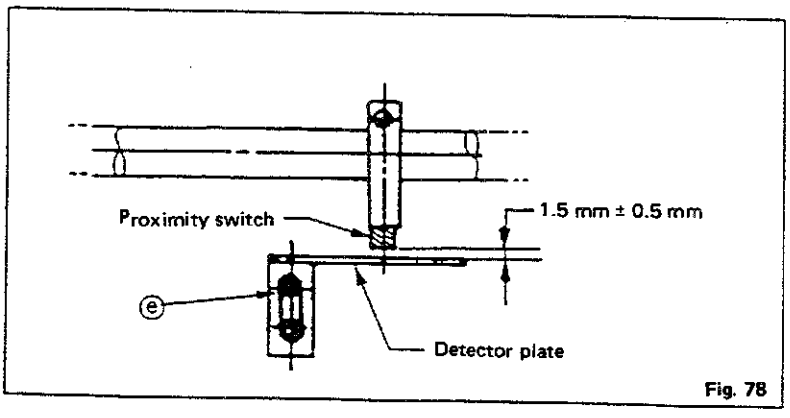


Fig. 78

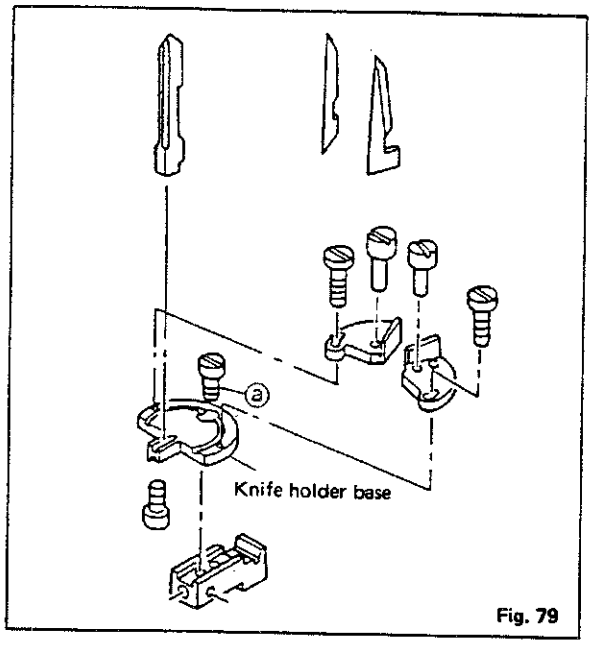


Fig. 79

Fine-adjustment of the fixed corner knife and moving knife is performed by moving the knife holder base to the direction of the arrow after loosening setscrew (a) in Fig. 79.

2) Height of the corner knife

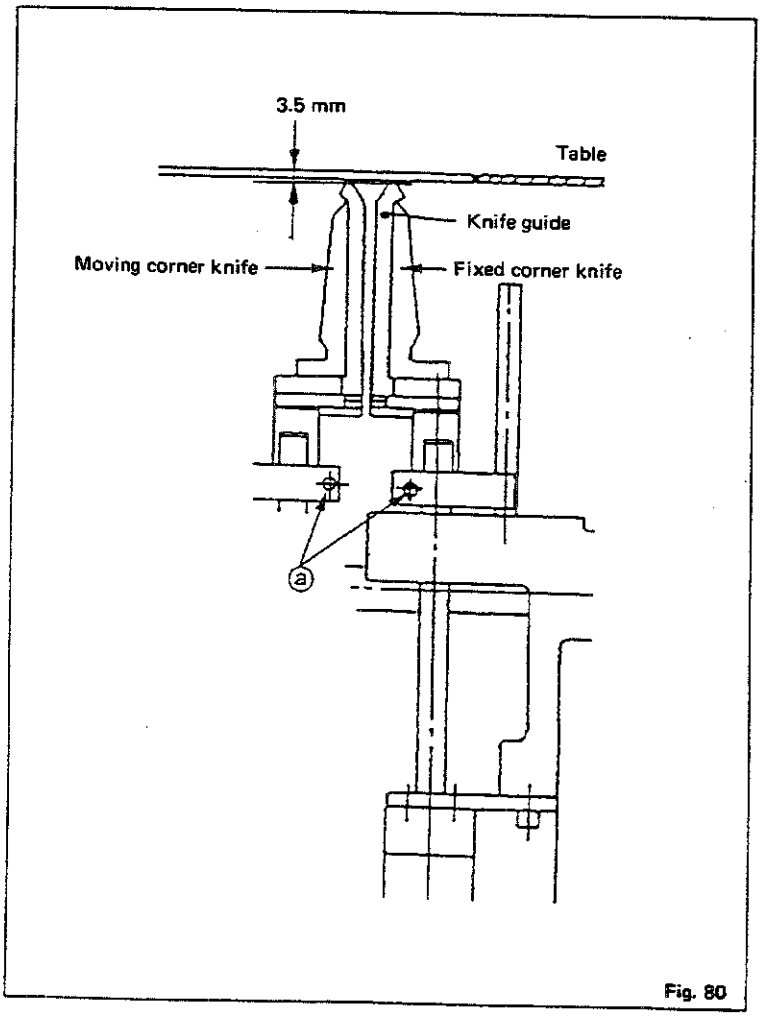


Fig. 80

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 (a).

3) Center of the corner knife

When the corner knife is traveling, the center of the corner knife must align with the center of the needle.
Loosen the corner knife attaching bolt and shake whole of the frame assembly, and adjust to make the deflection between the center of the corner knife and the center of the needle below 0±0.5 mm when the moving corner knife is moved about 200 mm.

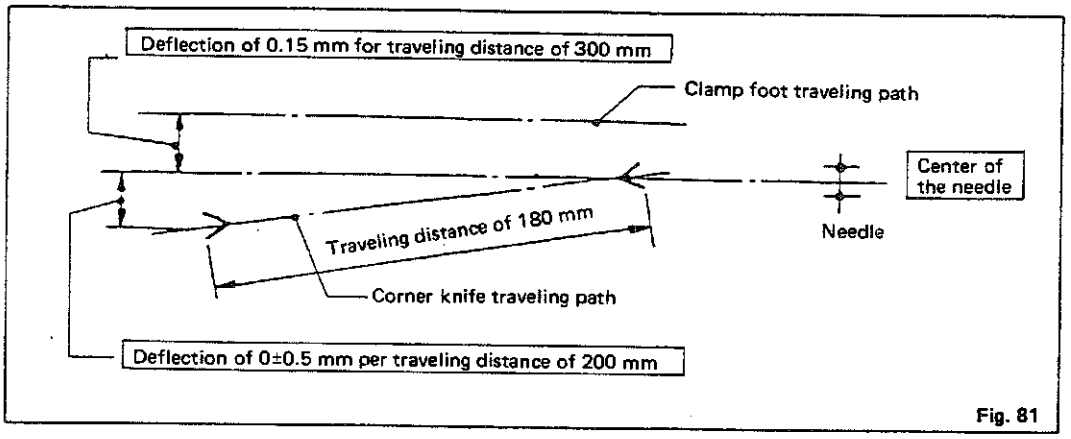


Fig. 81

4) Deflection of the corner knife

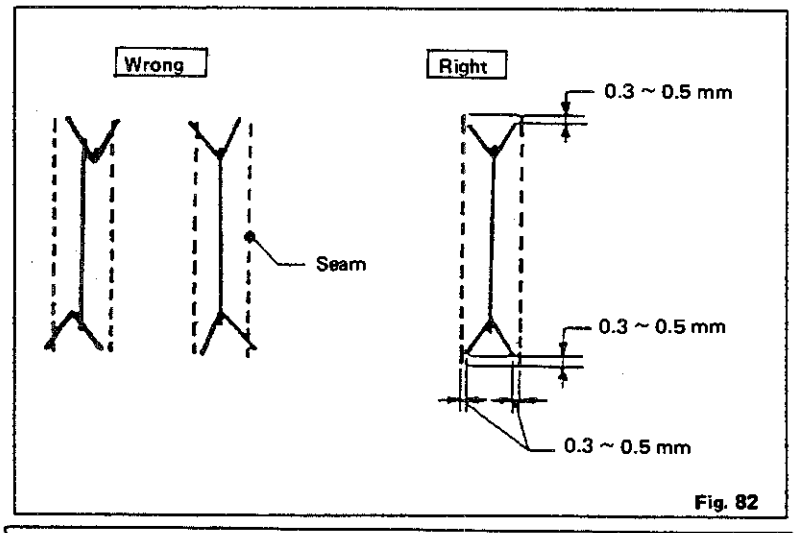


Fig. 82

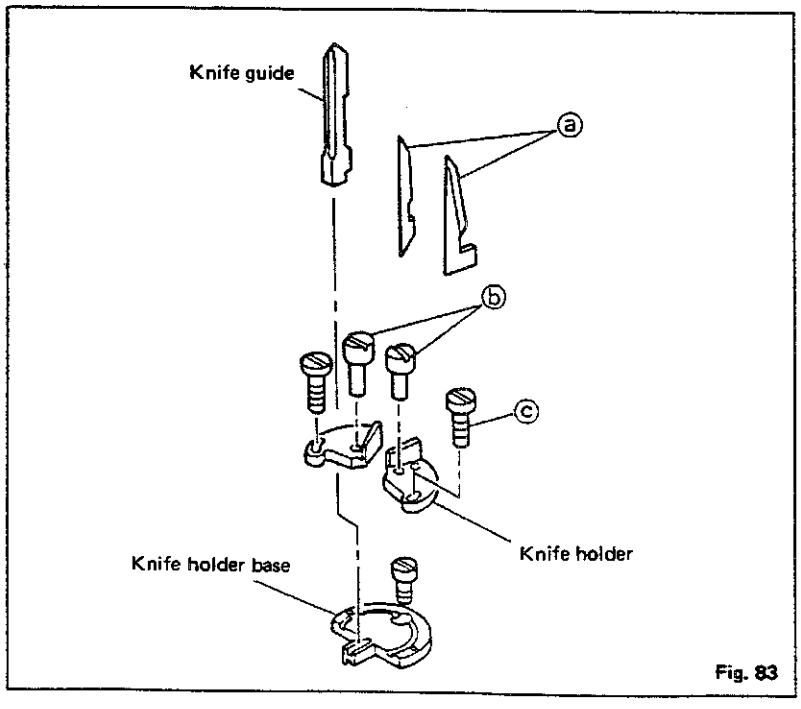


Fig. 83

If the corner knife is set deflected to right or left, or distorted, defective tab cuts as shown in Fig. 82 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.

Corner knife blade (a) can be adjusted by loosening knife fixing eccentric pin (b). Knife holder can be adjusted by loosening setscrew (c).
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.**

5) Deflection detector sensor

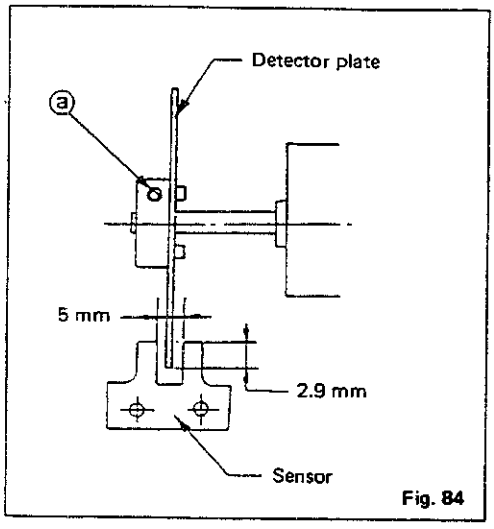


Fig. 84

Loosen setscrew (a) and set the detector plate so that it comes almost in the middle of the sensor groove.
And, adjust the detector sensor so that it is inserted into the sensor groove by 2.9 mm or more from the sensor head.

6) 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 (b) and replace the corner knife blade (a).
Upon completion of the replacement work, be sure to perform suficient trial cutting to prevent a defective cutting result ahead of the actual operation.

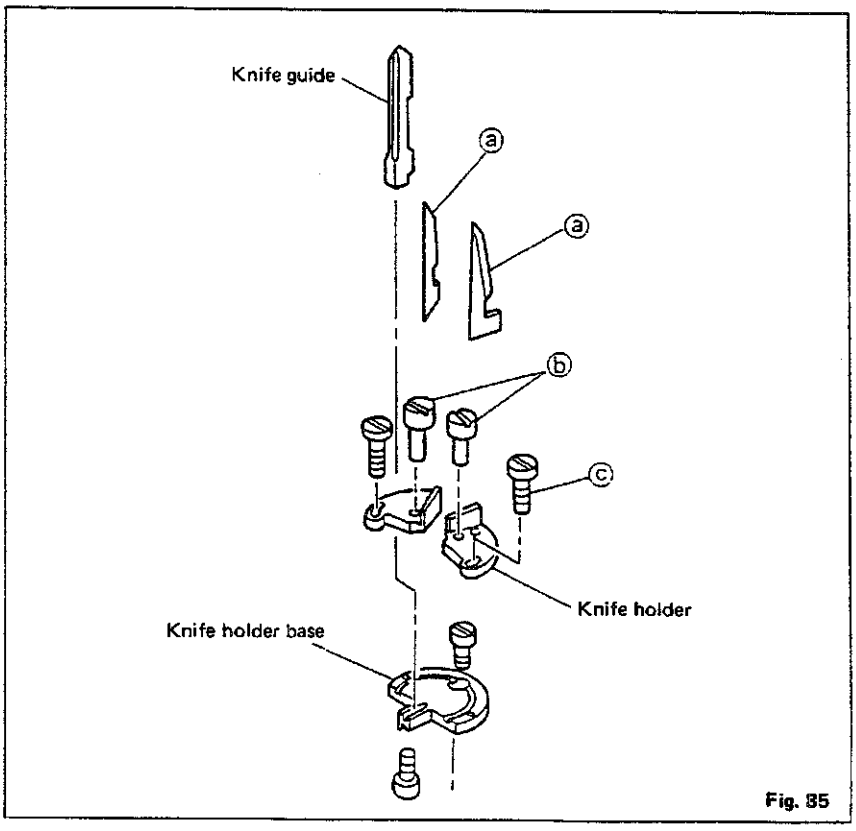


Fig. 85

(6) Corner knife mechanism (APW-239, 240)

[Operation of the corner knife]

Turn corner knife travel motor (a) ON, and moving corner knife (b) (sewing start position) will travel to the position which has been predetermined in accordance with the length to be sewn.
At the travel end position, the moving corner knife and fixed corner knife (c) (sewing end position) will be raised by each exclusive lifting air cylinder (d) and (e) and cut a material.
The corner knife mechanism has been factory-adjusted properly before shipment so that it can be applied to every sewing program. You need not adjust the mechanism when sewing a different length of welt or sewing a flap.
When a fine-adjustment is required after a corner knife blade is replaced, be sure to adjust it in the following way.

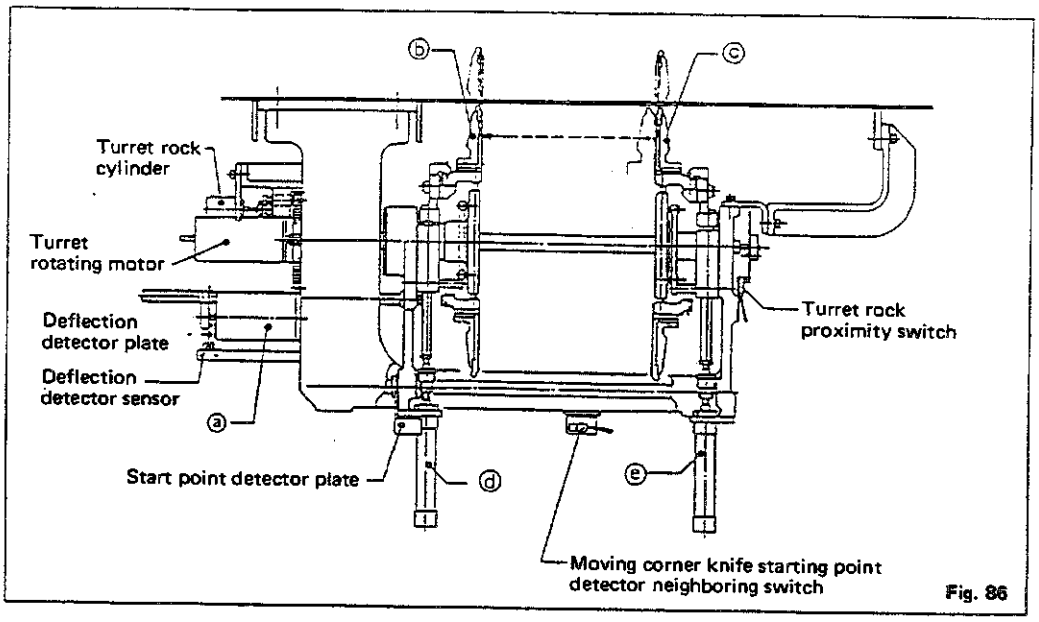


Fig. 86

[Corner knife cutting position, cross-mark lamp, needles, and garment clamp]

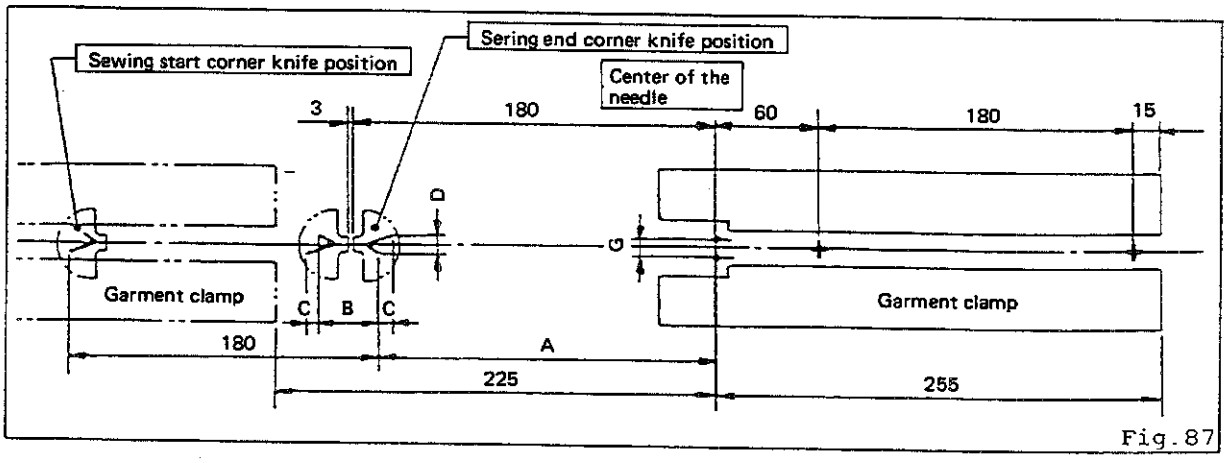


Fig.87

		APW-240						
G	Gauge	8	10	12	14	16	18	20
A	Dimensions after assembled	165.5	166	164.5	162.5	161	159	157.5
B	Dimensions after assembled	32	31	34	38	41	45	48
	D	7	9	11	13	15	17	19
	C	0 ~ 10			0 ~ 20			
Minimum sewing length for L-size dimensions proprammed		35 ~ 180			50 ~ 180			
Minimum sewing length for flap detector		80 ~ 180						

1) Clearance between fixed corner knife and moving corner knife

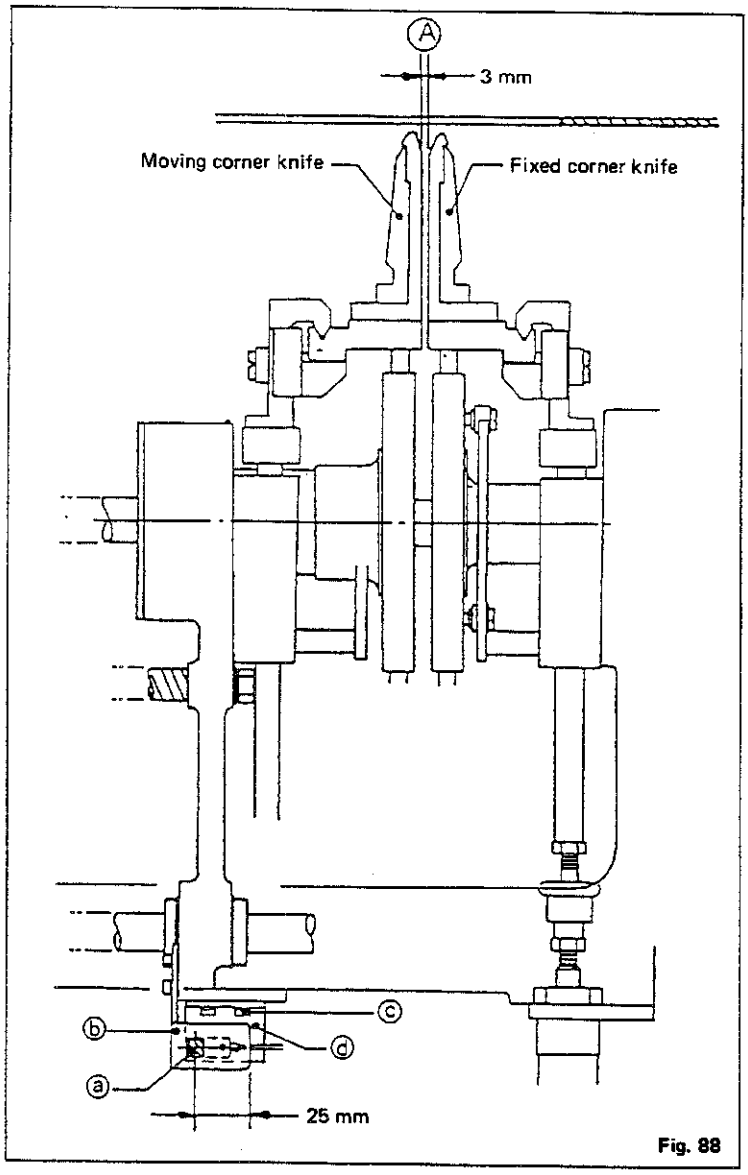


Fig. 88

Provide a clearance (A) of 3 mm between the fixed corner knife and moving corner knife at the sewing start point as shown in Fig. 88.

The start position of the moving corner knife is detected at the moment when the corner knife returns to its start position after having traveled. The corner knife stops after having traveled additionally 25 mm from the point where proximity switch (a) detected detector plate (b).

Clearance (A) is measured at the position. Make sure that the clearance is 3 mm. Adjust the moving corner knife by sliding switch attaching bracket (d) after loosening setscrew (c).

Provide a 1.5±0.5 mm clearance between the proximity switch and the detector plate. Adjust it by sliding the detector after loosening setscrew (e).

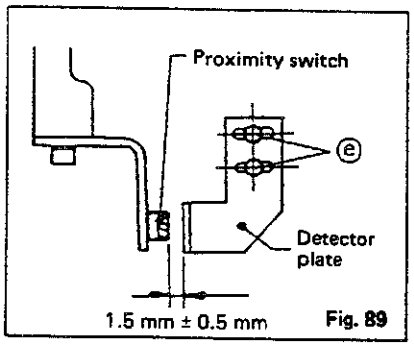


Fig. 89

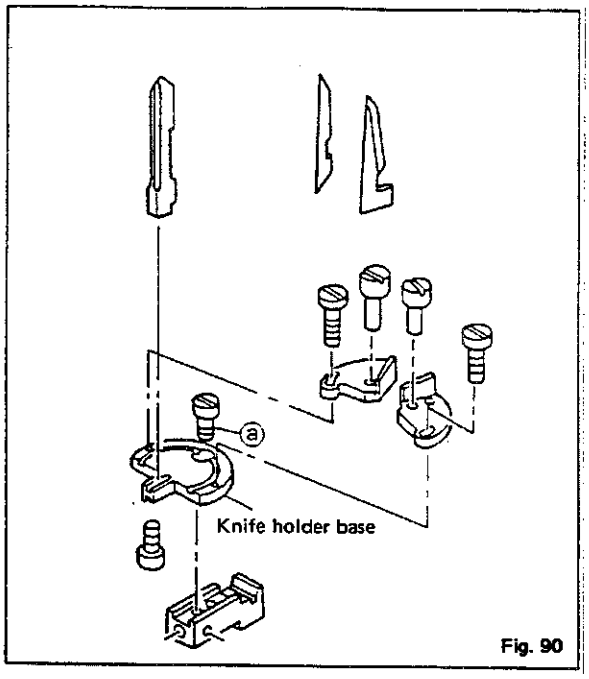


Fig. 90

Fine-adjustment of the fixed corner knife and moving knife is performed by moving the knife holder base to the direction of the arrow after loosening setscrew (a) in Fig. 90.

2) Height of the corner knife

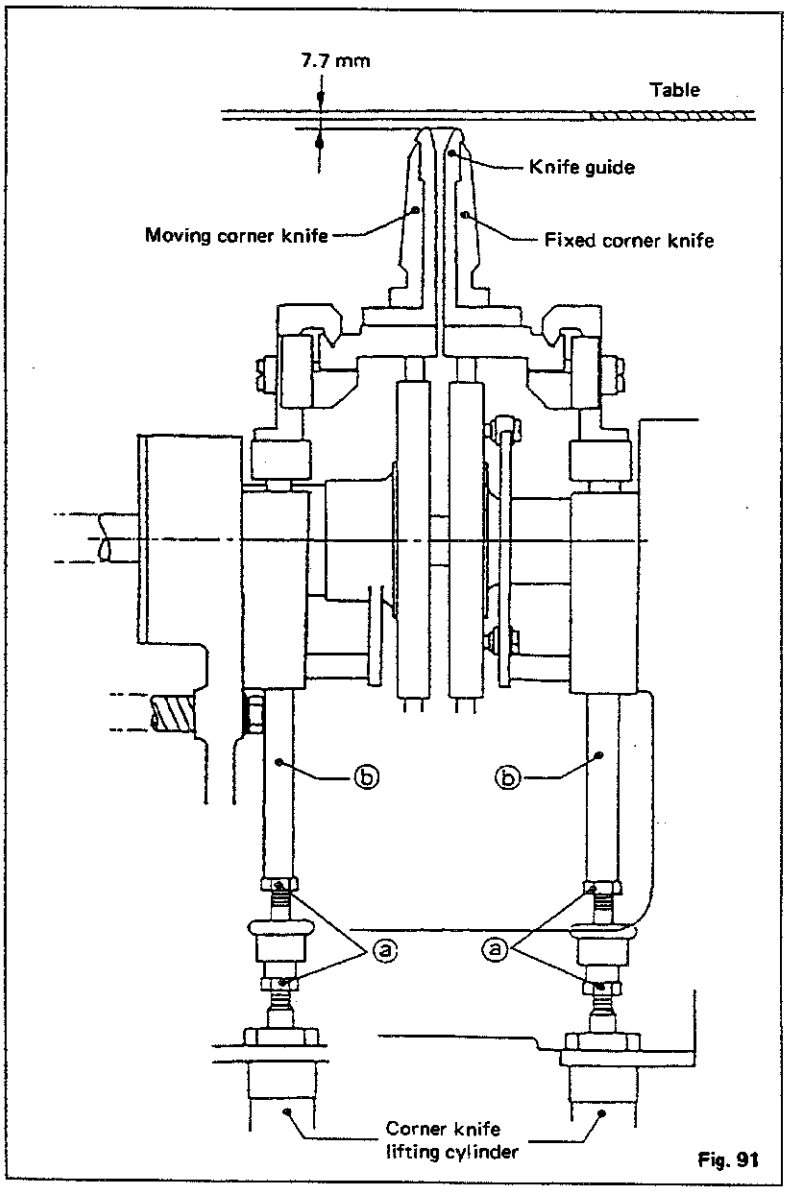


Fig. 91

When the corner knife lifting cylinder reaches its lower dead end, there must be an approx. 7.7 mm clearance between the top end of the corner knife guides of both moving corner knife and the fixed corner knife and the surface side of the sewing table as shown in the figure. Loosen locknut (a), adjust the screw-in amount by moving lifting rod units (b) up and down.

3) Center of the corner knife

When the corner knife is traveling, the center of the corner knife must align with the center of the needle. Loosen the corner knife attaching bolt and shake whole of the frame assembly, and adjust to make the deflection between the center of the corner knife and the center of the needle below 0±0.5 mm when the moving corner knife is moved about 200 mm.

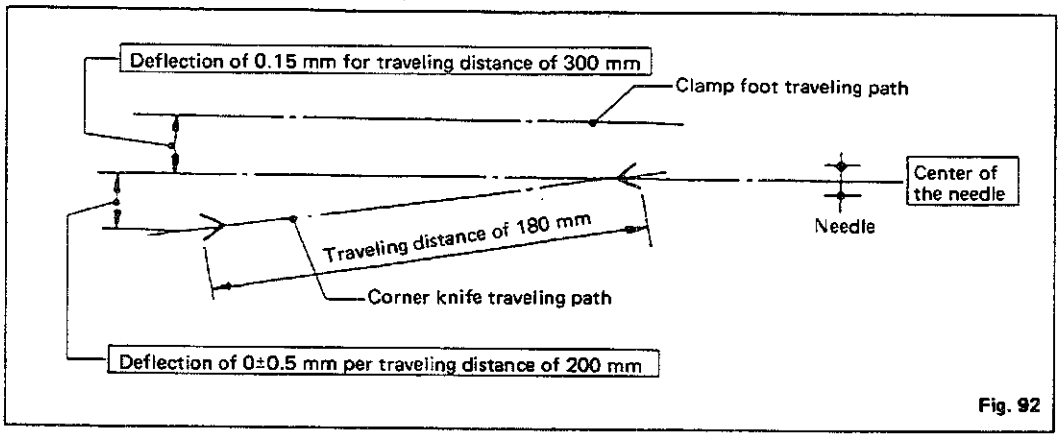


Fig. 92

4) Deflection of the corner knife

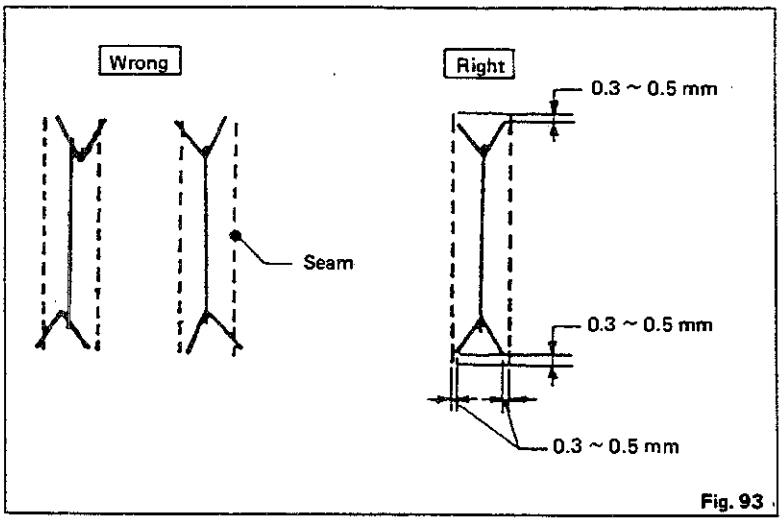


Fig. 93

If the corner knife is set deflected to right or left, or distorted, defective tab cuts as shown in Fig. 93 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.

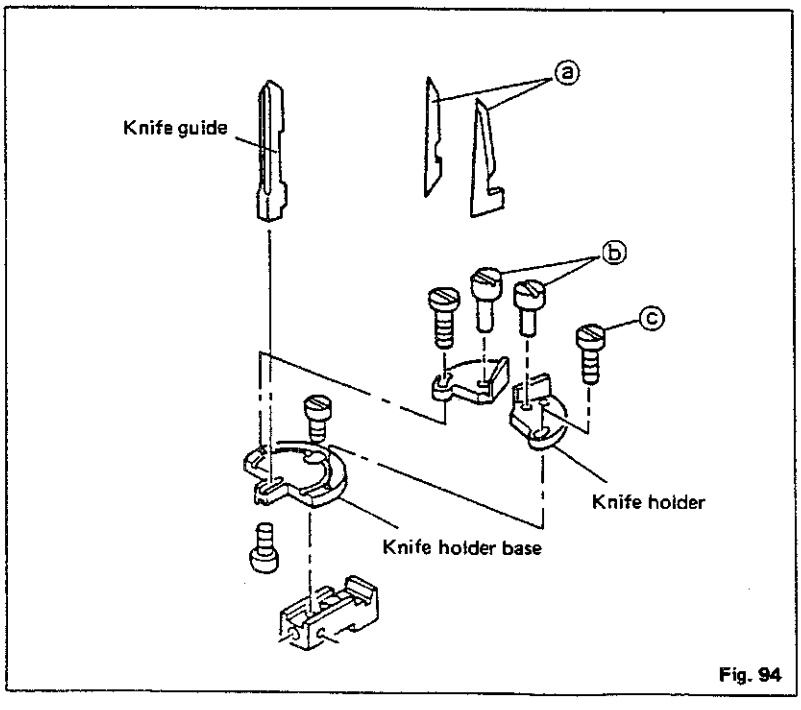


Fig. 94

Corner knife blade (a) can be adjusted by loosening knife fixing eccentric pin (b). Knife holder can be adjusted by loosening setscrew (c).
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.**

5) Deflection detector sensor

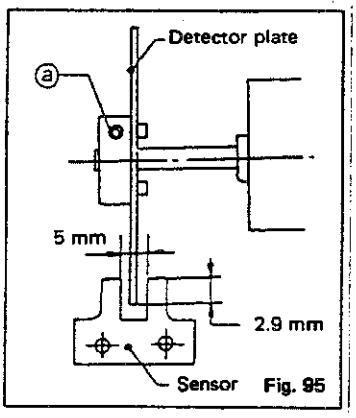


Fig. 95

Loosen setscrew (a) and set the detector plate so that it comes almost in the middle of the sensor groove.
And, adjust the detector sensor so that it is inserted into the sensor groove by 2.9 mm or more from the sensor head.

6) How to set the corner knife on the knife base wheel

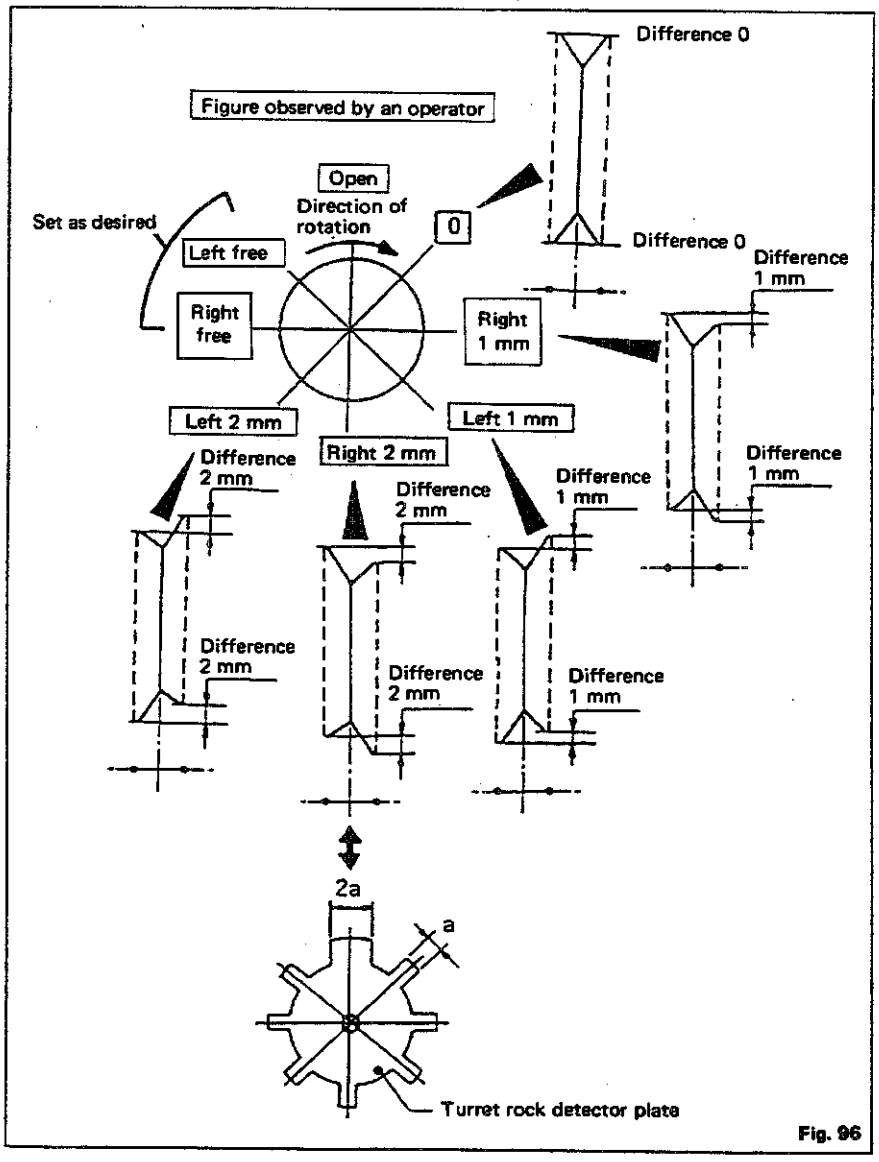


Fig. 96

Be sure to set the corner knife to the corner knife base wheel (both moving knife and fixed knife) as illustrated in Fig. 96.
Make sure that the turret lock detector plate is set as illustrated in Fig. 96.

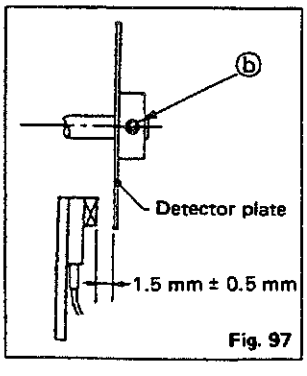


Fig. 97

Provide a 1.5±0.5 mm clearance between the turret lock proximity switch and the detector plate by loosening setscrew (b).

7) 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 (b) and replace the corner knife blade (a).

Upon completion of the replacement work, be sure to perform sufficient trial cutting to prevent a defective cutting result ahead of the actual operation.

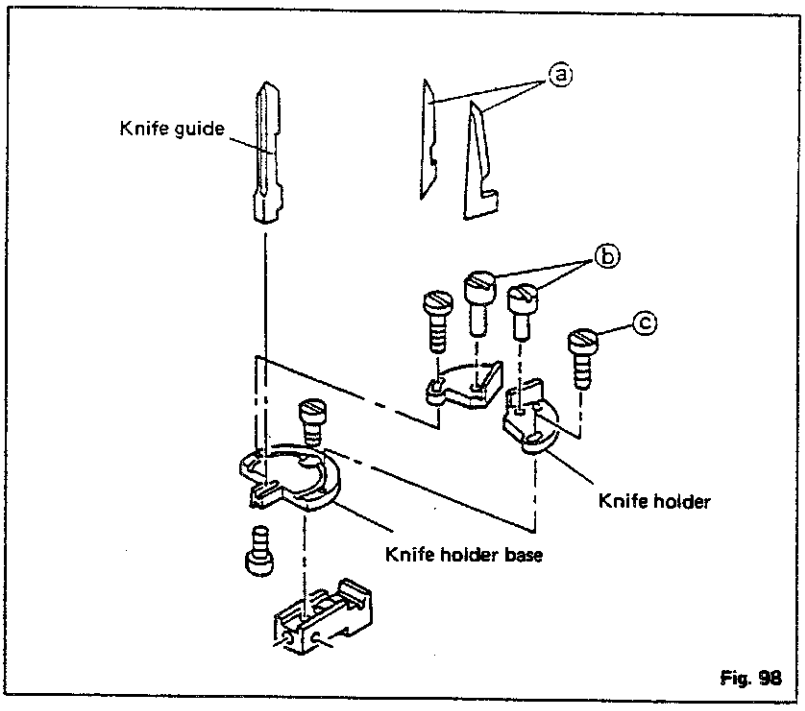
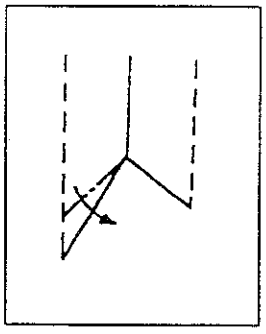


Fig. 98



8) How to adjust the slant angle of the corner knife

For the slant sewing, the angle of the corner knife is adjusted by loosening setscrew (c) which fixes the knife holder. Then loosen eccentric pin (b) and move the knife so that the longer cutting length is obtained. Adjust the position of the corner knife properly and fix it

(7) Stacker mechanism

1) How to adjust the grasping stacker

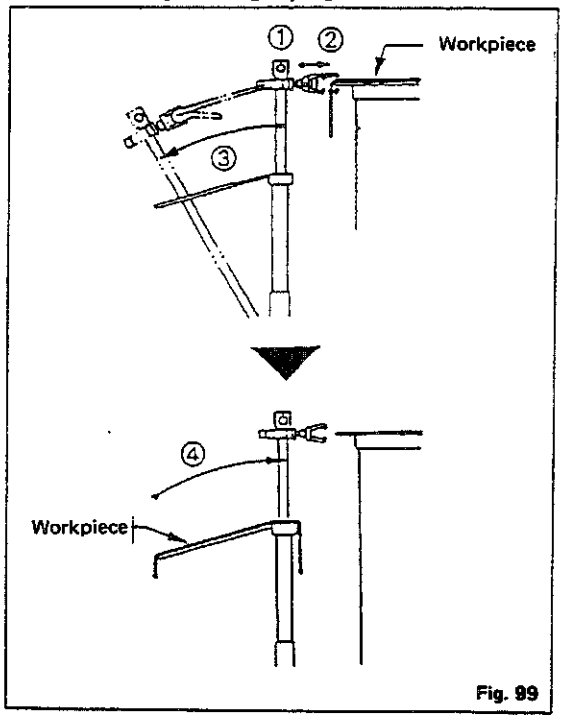


Fig. 99

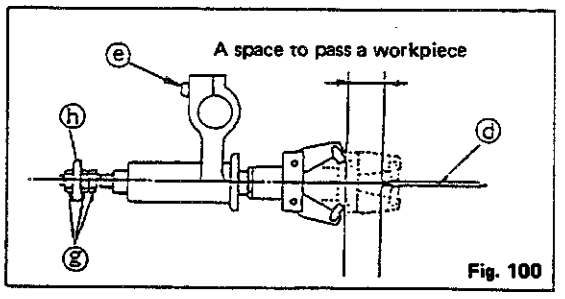


Fig. 100

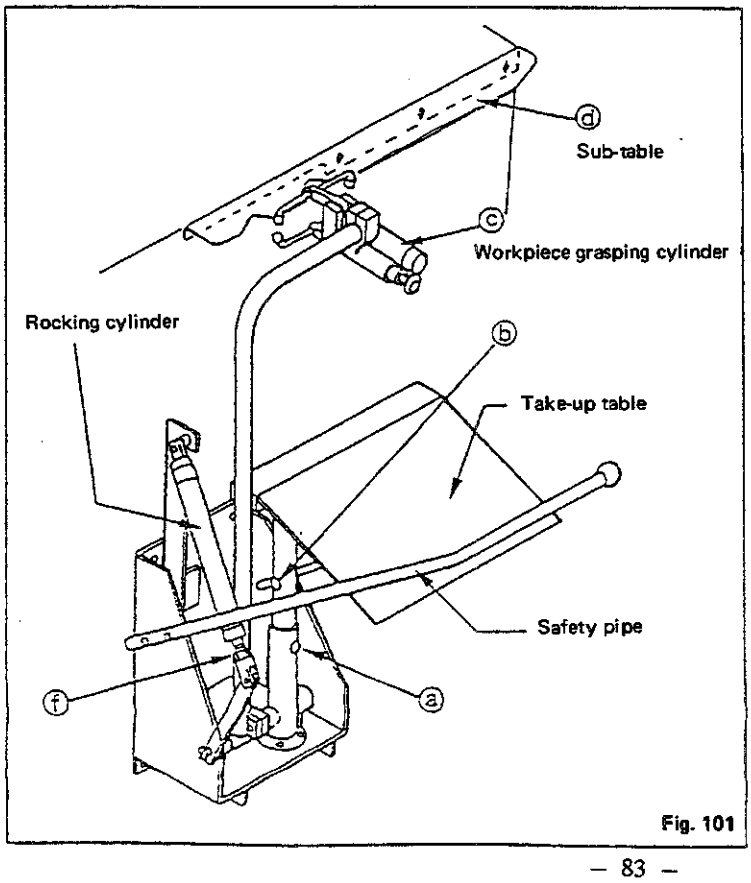


Fig. 101

The grasping stacker operates in the following order;

① The workpiece grasping cylinder operates after the corner knife has been lowered.

② The workpiece grasping cylinder grasps a workpiece at the front end of its stroke.

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

④ The workpiece is released from the grasping cylinder, and the rocking cylinder returns.

1. Position of the take-up table
   Loosen set bolt (a) and adjust the height of the table. Loosen set bolt (b) 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. 101.

2. Workpiece grasping position
   Loosen set bolt (e) and adjust the position of the grasping hand so that its axis aligns with the center of sub-table (d) when the workpiece grasping cylinder (c) reaches the front end of its stroke. Loosen cylinder lock nut (f) and adjust the cylinder rod to provide an adequate clearance between the head of the workpiece grasping hand and the end face of sub-table (d) to permit the workpiece to freely pass through when the workpiece grasping cylinder stays in its resting position as shown in Fig. 100 and 101.

3. Grasping force
   The grasping hand must have a suitable force to grasp a workpiece on the take-up table and to take it out from the sub-table when workpiece grasping cylinder (c) reaches the front end of its stroke. Loosen locknut (g) and adjust the position on chuck limiter (h).
   Make it sure by placing a workpiece on the table.

2) Bar stacker

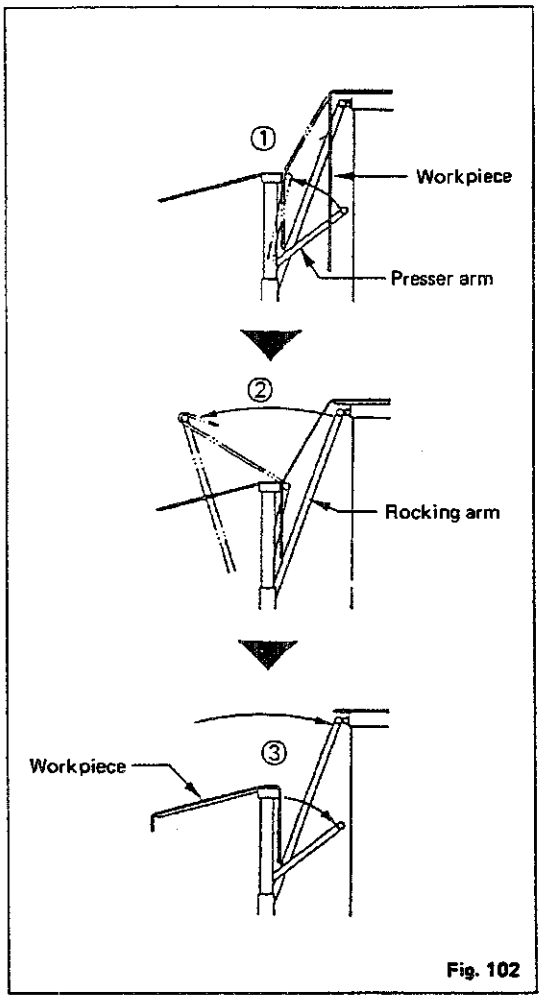


Fig. 102

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 (a) and adjust the height of the table. Loosen set bolt (b) 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. 103.

2. Pressing force
   Loosen locknut (c) 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. 103.

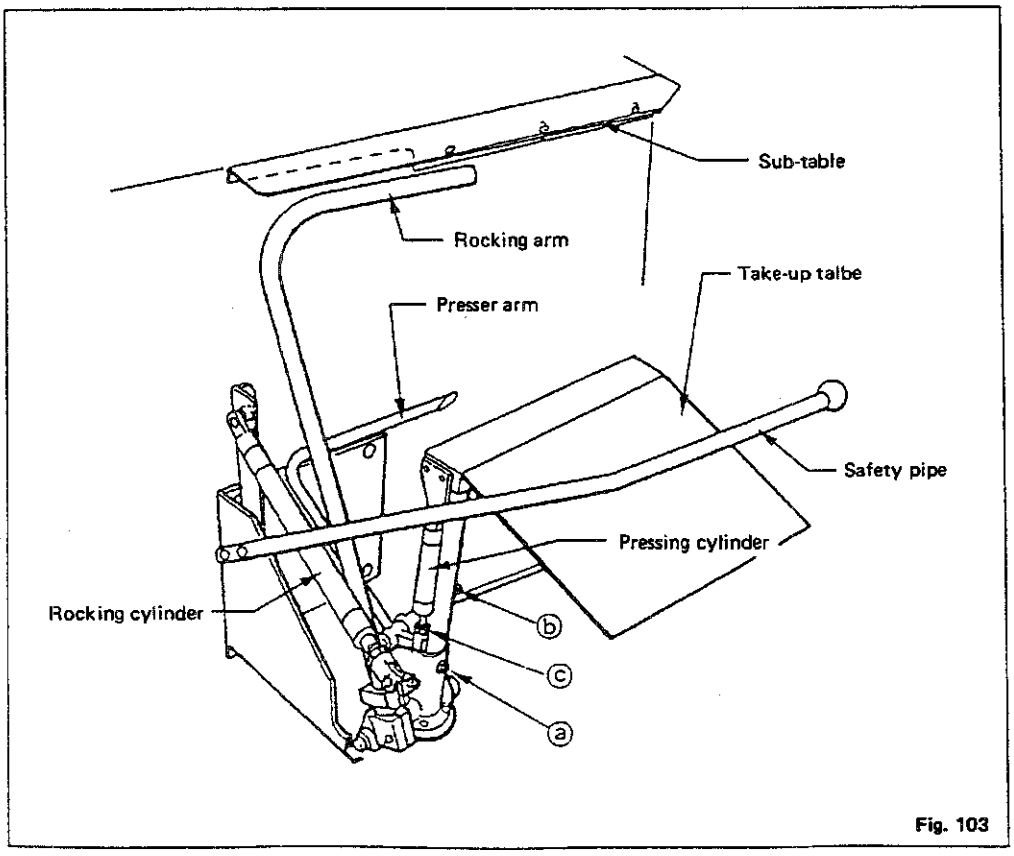


Fig. 103

3) Bar clamp stacker

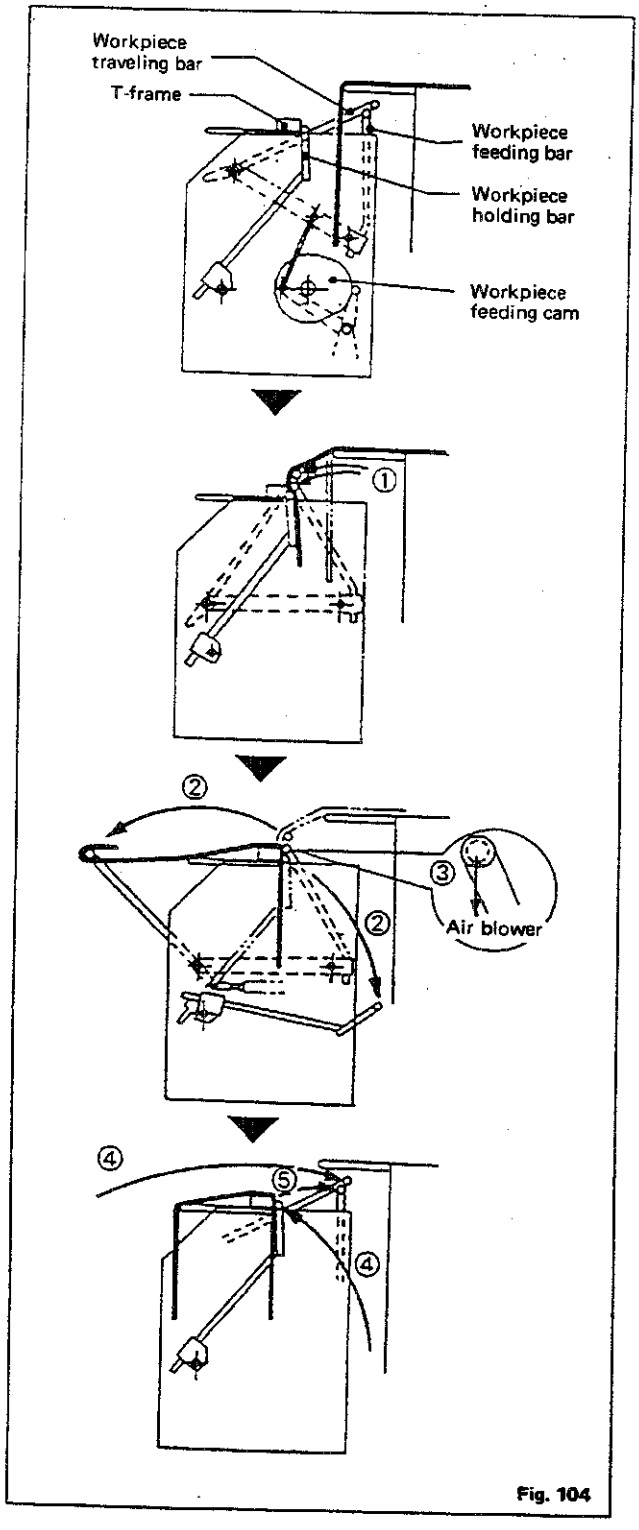


Fig. 104

The bar clamp stacker operates in the following order;

① After the corner knife has been lowered, it actuates the workpiece feeding cam. The workpiece feeding cam actuates the workpiece traveling bar and workpiece feeding bar, then the workpiece feeding bar will clamp a workpiece between the T-frame and itself

② The workpiece traveling bar and workpiece holding bar driven by each cylinder, will wipe the workpiece.

③ The workpiece will be pressed by the air blown out from the air blowing hole inside the workpiece feeding bar.

④ The workpiece holding bar and workpiece traveling bar returns to each resting position, then the workpiece holding bar will clamp a workpiece between the T-frame and itself.

⑤ The workpiece feeding bar and workpiece traveling bar returns to each resting position.

The stacker operation is completed.

First of all, adjust the starting positions of the workpiece traveling bar, workpiece feeding bar, and workpiece holding bar.

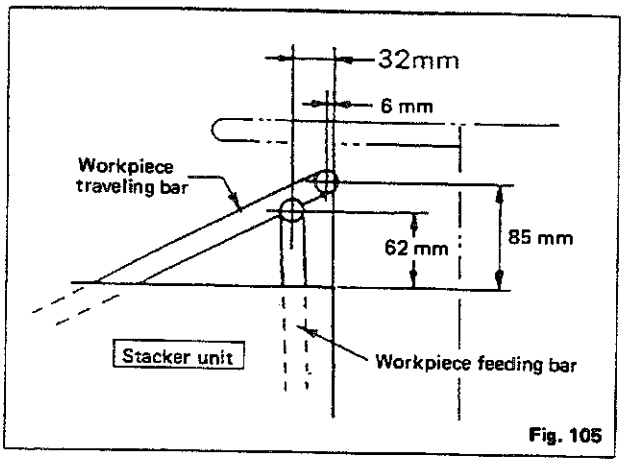


Fig. 105

1. Workpiece traveling bar
   Adjust the position of the workpiece traveling bar by cylinder connecting point (b) and rod end point (c), so that the top end of the workpiece traveling bar is located as shown in Fig. 105 when the workpiece cam is in the starting position (where standard hole $\phi 6$ (a) comes just on the left side of the cam). See Fig. 106.
2. Workpiece feeding bar
   Adjust the position of the workpiece feeding bar by fixing point (d) and rod end point (c), so that the top end of the workpiece feeding bar is located as shown in Fig. 105, like the workpiece traveling bar.

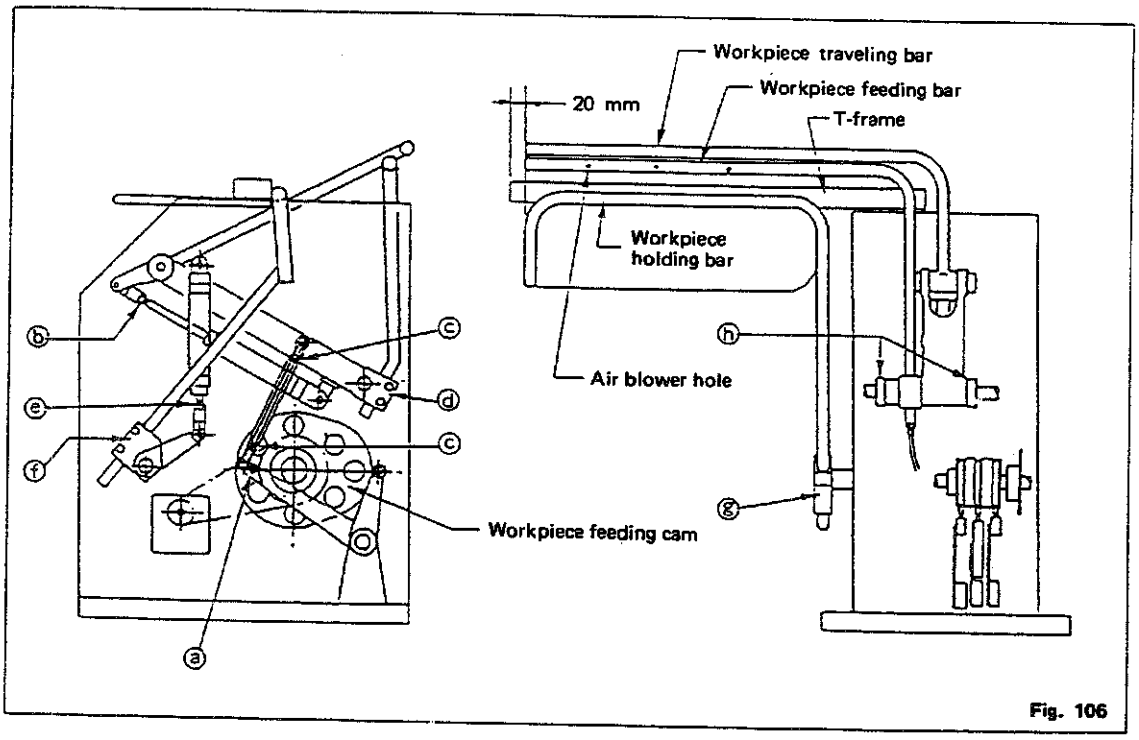


Fig. 106

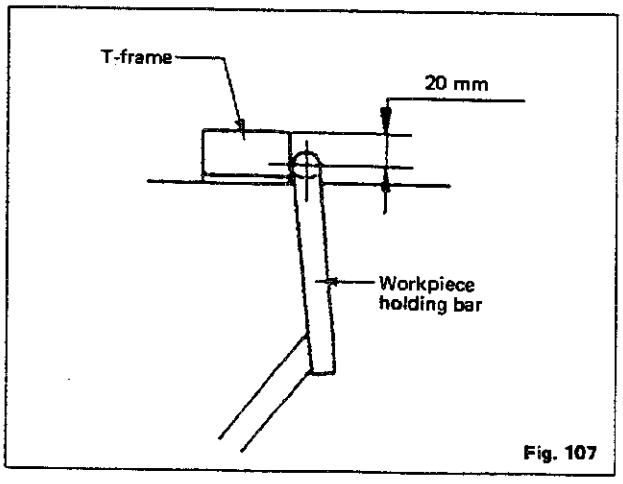


Fig. 107

3. Workpiece holding bar
   Adjust the position of the workpiece holding bar by cylinder connecting point (e) and fixing point (f) so that the top head of the workpiece holding bar is located as shown in Fig. 107 and a narrow clearance is provided between the side face of the T-frame. See Fig. 106.
4. Adjust the position of the workpiece traveling bar, workpiece feeding bar, and workpiece holding bar by fixing points (g) and (h), so that a 20 mm distance is provided longitudinally between each top end and the top end of the T-frame as shown in Fig. 107. See Fig. 106.

5. Controller drum

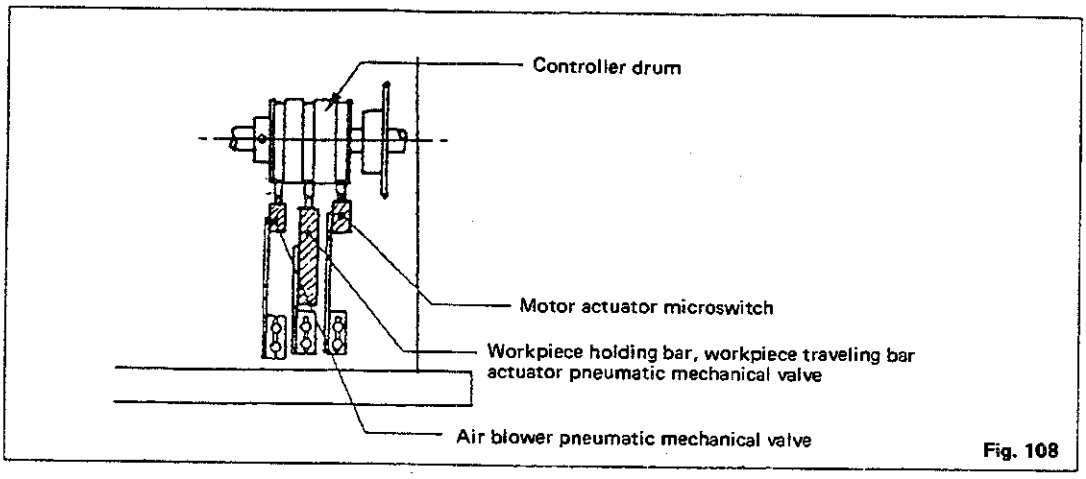


Fig. 108

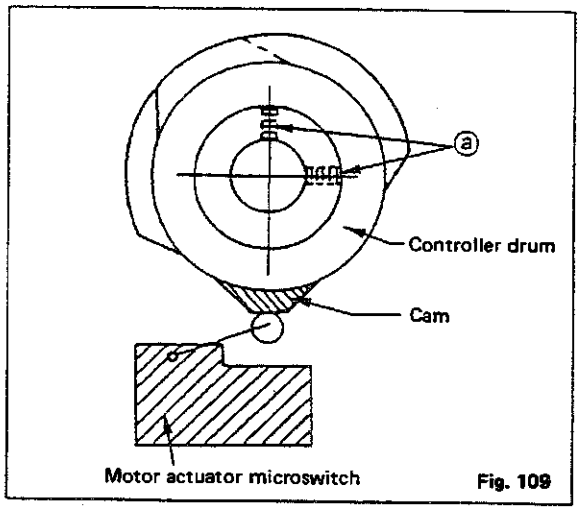


Fig. 109

When the workpiece feeding cam of the controller drum is in its starting position, the motor actuator microswitch must contact the cam and must be turned ON as shown in the figure.
Otherwise, be sure to adjust it by rotating the controller drum after loosening setscrew (ⓐ).

When the microswitch and pneumatic mechanical valve are turned On by the cam of the controller drum, make sure that they are positioned as shown in Fig. 110. Adjust the positions by raising or lowering each attaching bracket.

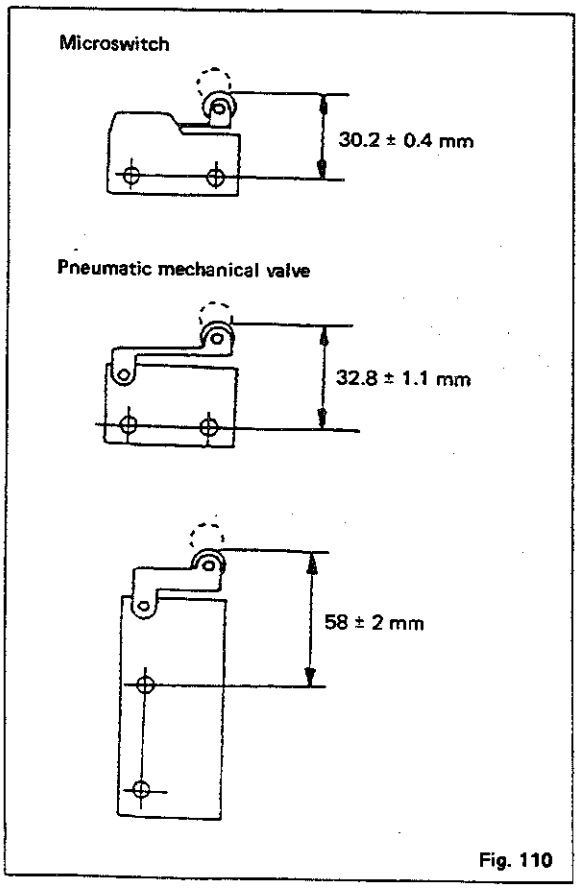


Fig. 110

4) The roller stacker bundle unit work as follows:

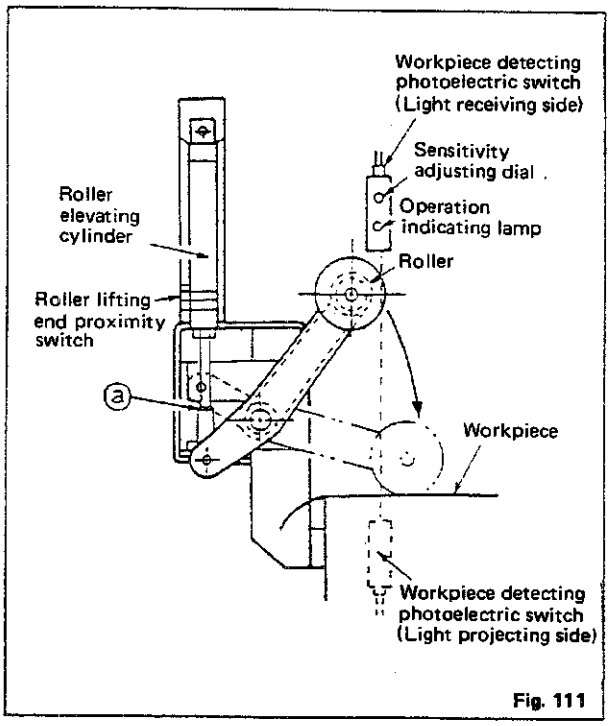


Fig. 111

① At first, depress the foot pedal switch so that the cloth presser bar is raised. Then all workpieces are bundled together and stacked on the take-up table.

② Workpieces are set on the sewing position one by one, upon completion of sewing the roller comes down while rotating, and the workpieces on the sewing table are rolled down by the roller.

1. Adjusting the position of the roller
Loosen locknut (a) 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.

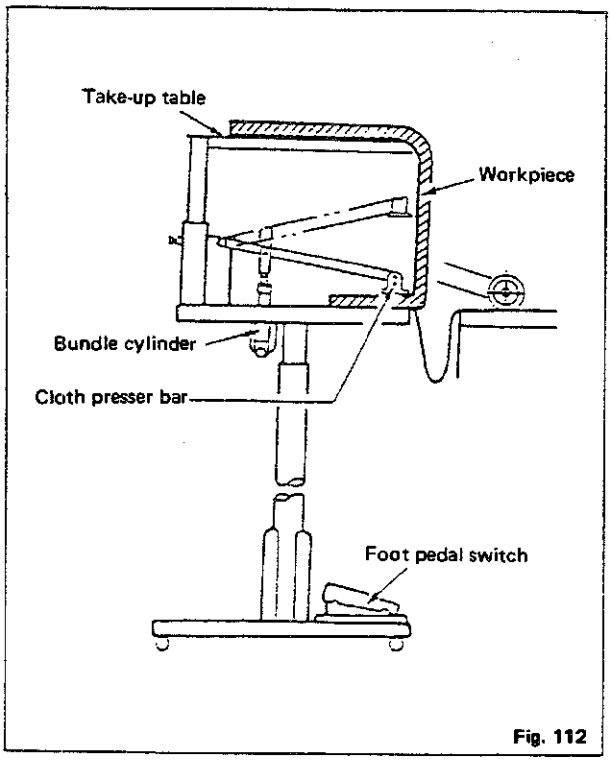


Fig. 112

2. Adjusting the photoelectronic switch (combination switch of light projector and light receiver)
The photoelectronic switch detects the workpiece on the sewing table and outputs a command to descend the roller. After the workpiece has been rolled down, the switch detects that there is no workpiece on the table and outputs a command to stop and ascend the roller. Adjust the sensitivity adjusting dial so that the operation indicating lamp lights up with no workpiece on the sewing table and the lamp goes out with a workpiece which shields the light emitted from the projecting side.

3. Precautions to be taken when installing the SP-33 roller stacker on the machine.

① When tilting the machine head of the APW-236 or -240 model which is equipped with the SA-26 automatic flap feeder (left), roller ① may come in contact with flap receiving arm (left) ②. So, be sure to turn the knob on the solenoid valve ③ clockwise through the long hole in the side cover so that roller ① is lowered.

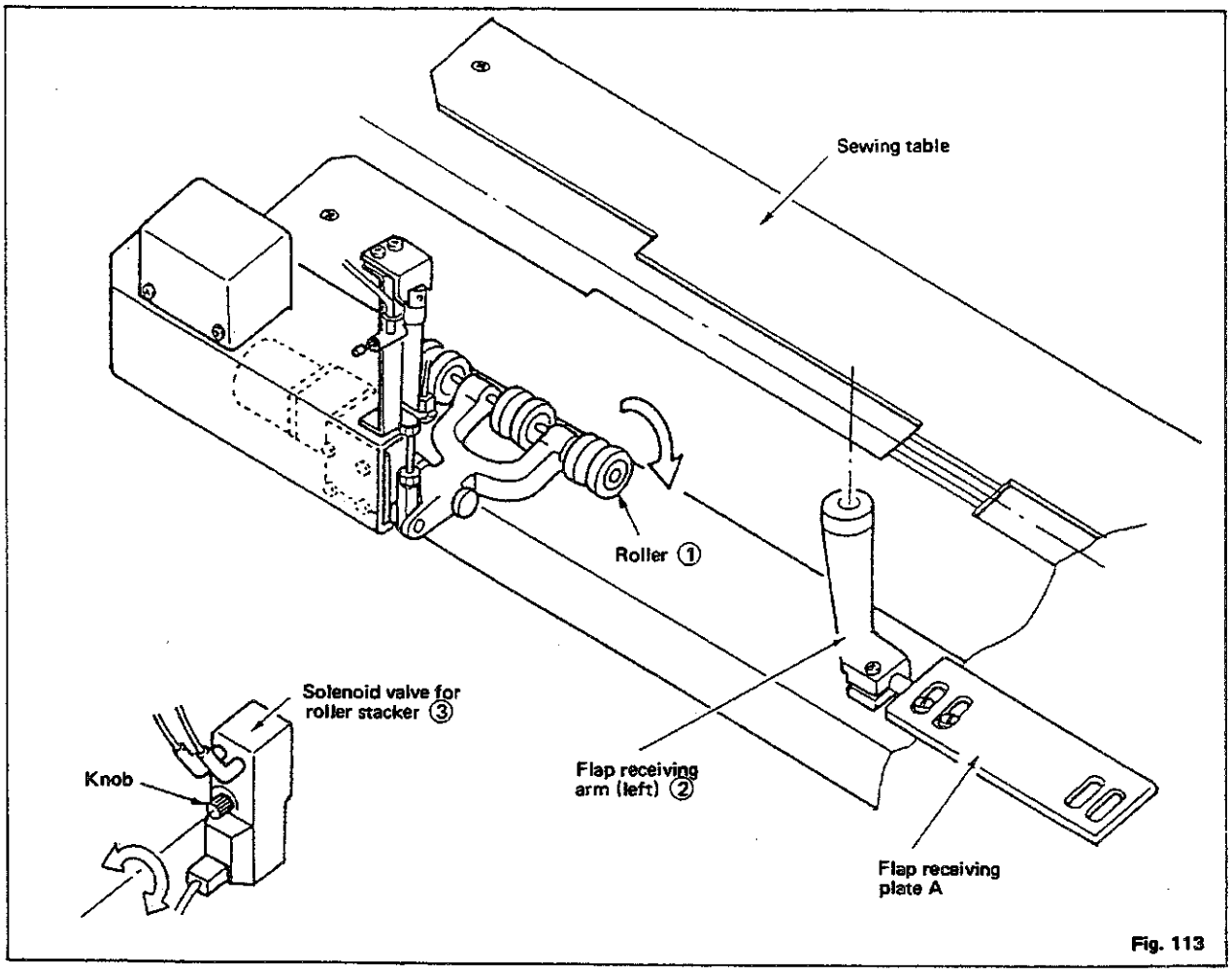


Fig. 113

② SP-33 roller stacker cannot be applied to the models equipped with the SA-34 (Clamp foot unit A), SA-35 (Clamp foot unit B) or SA-36 (Clamp foot unit C), because "the roller comes in contact with the clamp foot unit".

(8) Adjusting automatic flap feeding mechanism (optional equipment for APW-236 and 240)

Two types of the flap feeding mechanism;
- Right type . . . . . Flap pieces are set on the right side of the machine observed by an operator.
- Left type . . . . . Flap pieces are set on the left side of the machine observed by an operator.

[Note] When the flap feeding mechanism is the right type, the welt patch feeding mechanism is the left type. When the flap feeding mechanism is the left type, the welt patch feeding mechanism is the right type. These combinations are automatically made up.

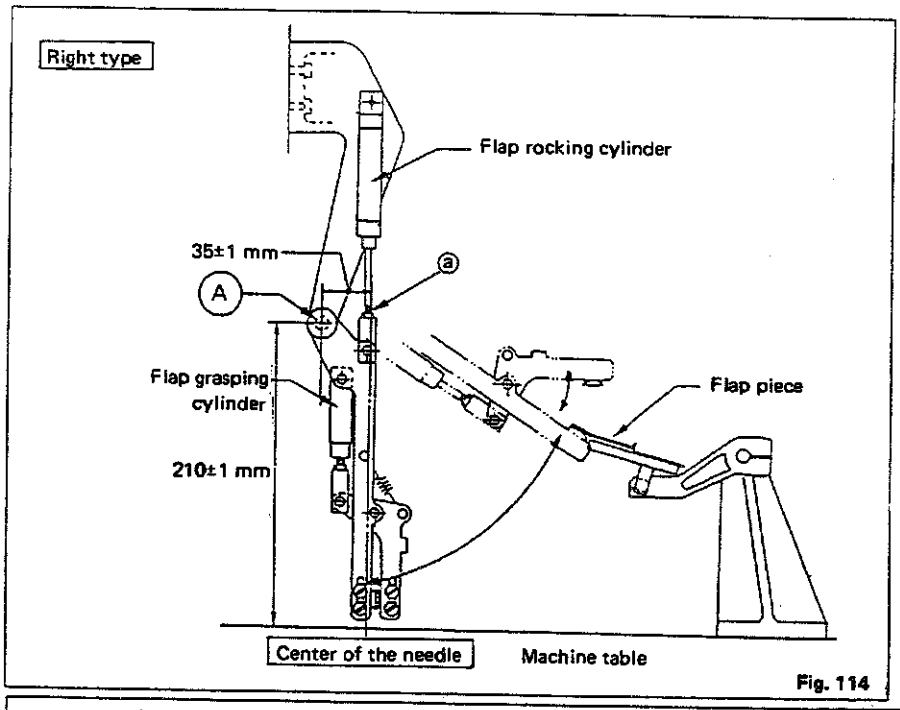


Fig. 114

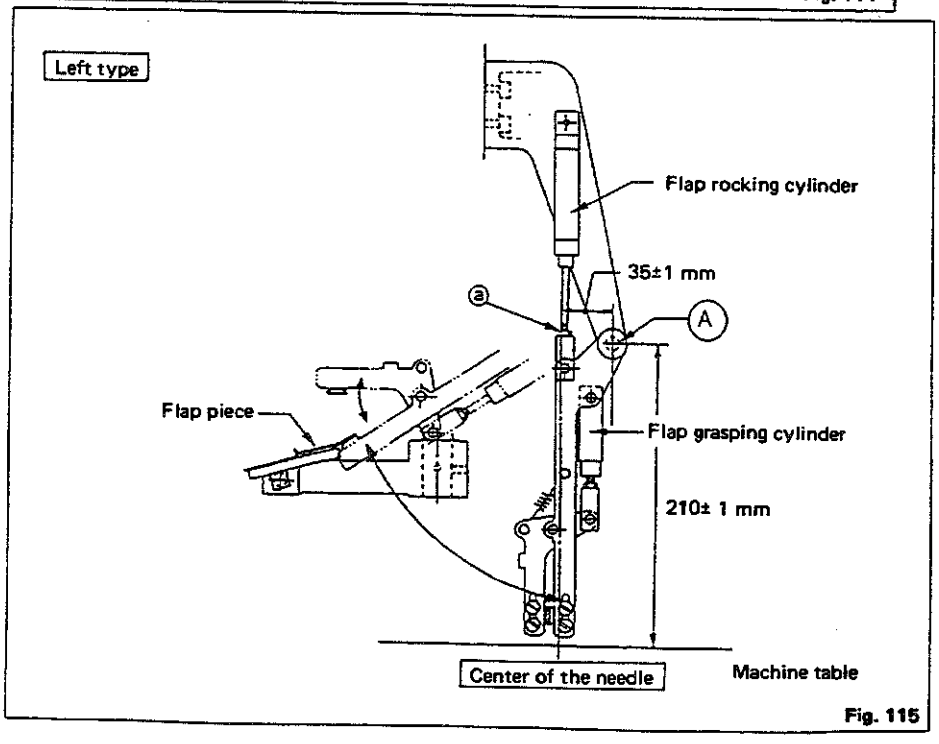


Fig. 115

Support pin (A) must be positioned 35±1 mm away from the center of the needle, as well as 210±1 mm away from the surface side of the machine table.

1) Flap clamp

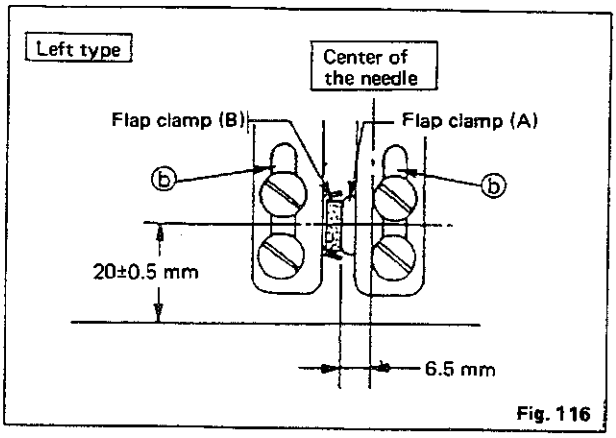


Fig. 116

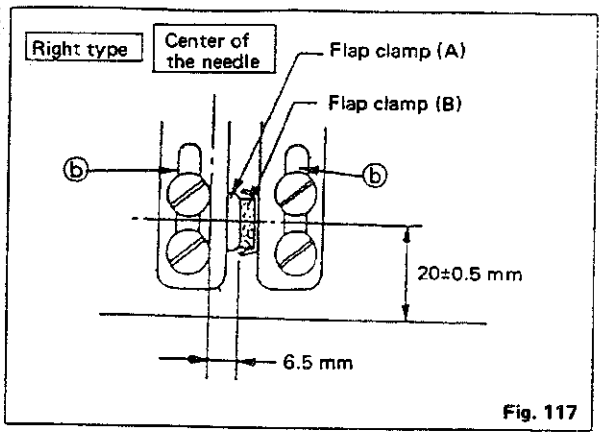


Fig. 117

1. Adjust the position of flap clamps (A) and (B) as shown in Fig. 111, so that the distance between the center of the needle and the contact point of flap clamps (A) and (B) is 6.5 mm (adjust by loosening locknut (a) at the connector point of the flap rocking cylinder illustrated in Fig. 115 and the height of the center of flap clamps (A) and (B) is 20±0.5 mm (adjust by the fixing oval hole (b)) from the surface side of the machine table.
   The height of flap clamps (A) and (B) is determined by the thickness of the material or needle gauge.
   Correctly adjust the height according to them ranging from 17.5 mm to 28.5 mm.

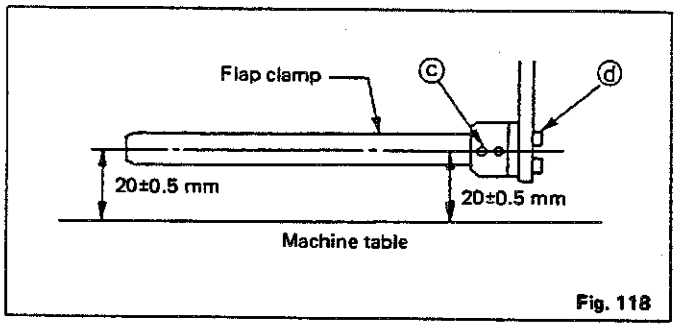


Fig. 118

2. Adjust the parallelism between the flap clamps and the machine table by loosening setscrew (c). Make sure that the difference of height between the front end and rear end of each flap clamp from the machine table does not exceed 1 mm. Loosen setscrew (d) and adjust each of the clamps to smoothly bite and closely contact with each other.

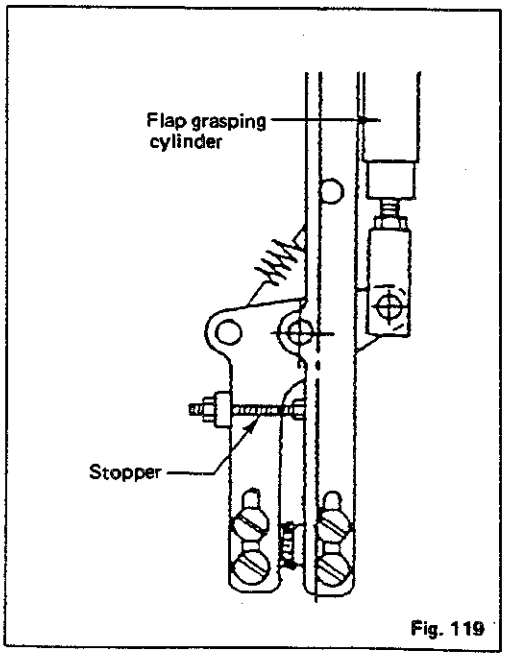


Fig. 119

3. Clamp stopper
   Adjust the clamp stopper so that it works properly when the clamp is closed completely by the flap grasping cylinder. Make sure that the point where the stopper works is not the stroke end of the cylinder but sightly short of it.

2) Positioning the flap receiver plate

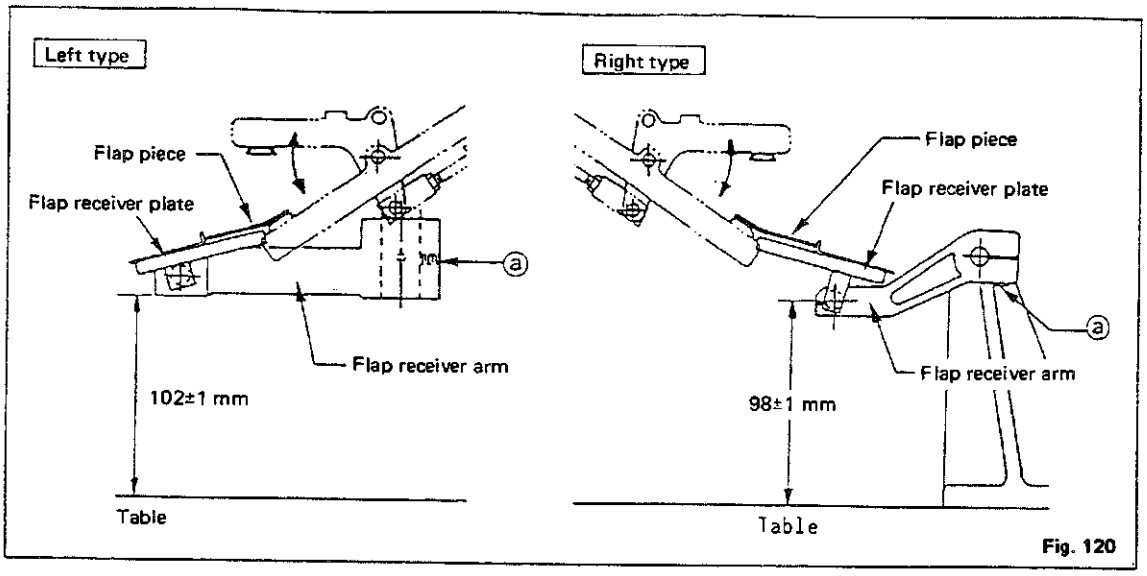


Fig. 120

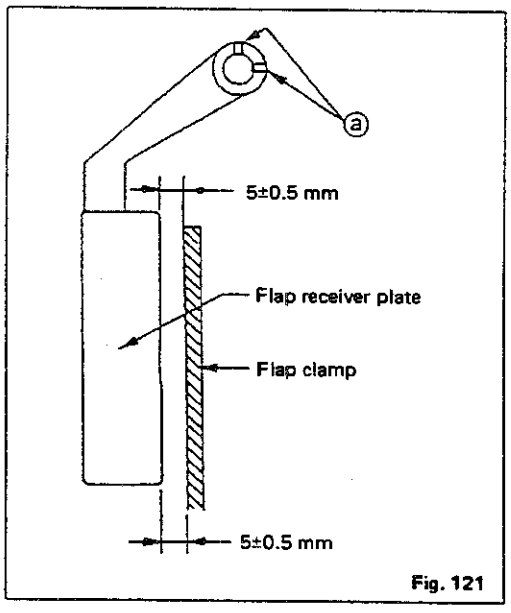


Fig. 121

Adjust the position of the flap receiver arm by loosening setscrew (a) as shown in Fig. 120.

Provide a 5 mm clearance between the flap clamp and the receiver plate. Make sure that the longitudinal difference of clearance (parallelism between the flap clamp and the receiver plate) does not exceed 1 mm.

3) Flap pieces setting position

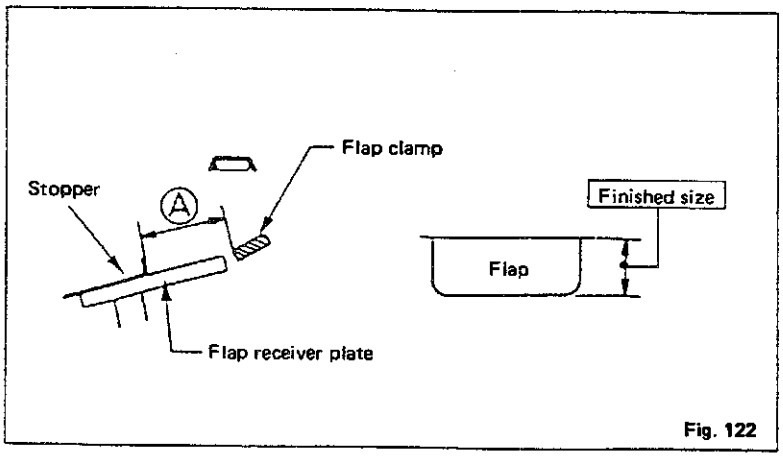


Fig. 122

(A)	Finished size
45 mm	50 mm
50 mm	55 mm
55 mm	60 mm

(A) indicates the distance between the end surface of the stopper and the end surface of the flap clamp. The size of the finished clamp corresponds to (A) will be as shown in the table. (A) is adjustable within the range approximately from 25 mm to 60 mm.
You can get the above-mentioned results only when the flap clamps have been correctly adjusted according to 1) Flap clamp.

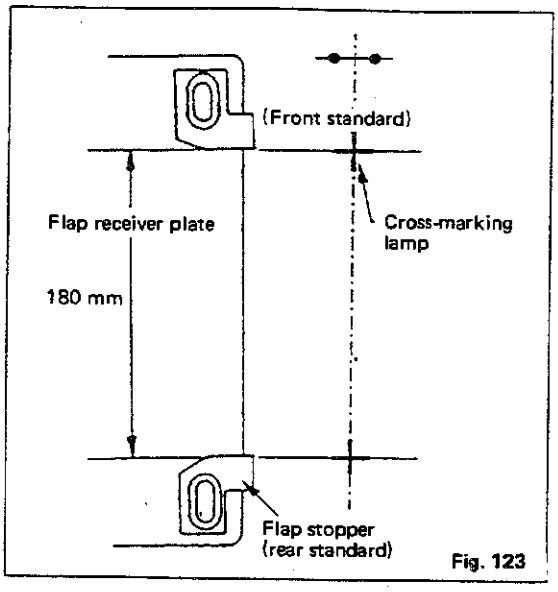


Fig. 123

This flap setting position in the longitudinal direction is to be determined according to the position of the stopper.

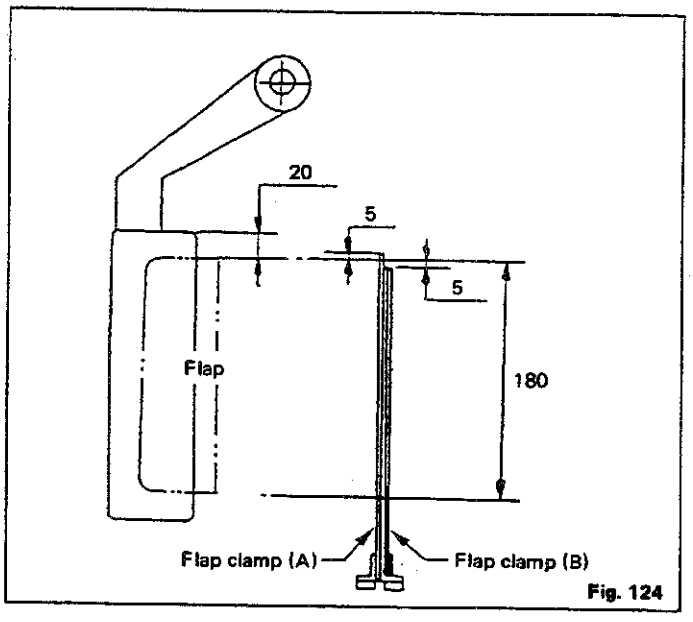


Fig. 124

The positions of the flap clamps (A) and (B) are as shown in Fig. 124.

Flap setting position when sewing slant flaps (APW-240)

It is required to tilt the flap stopper by the slant angle of the flap to be sewn so that the flap sewing end aligns the cross-marking lamp.

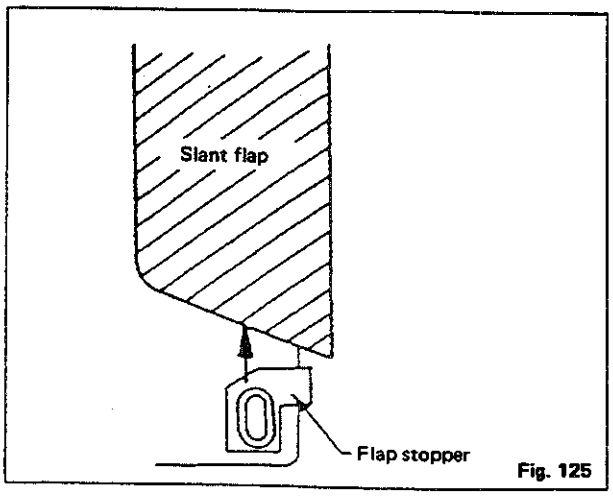


Fig. 125

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.

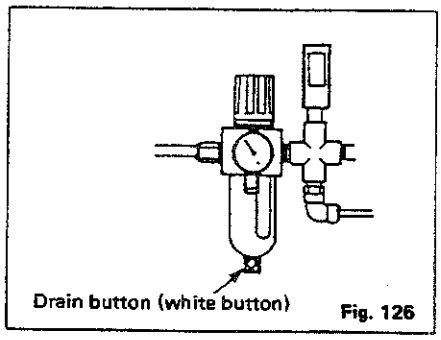


Fig. 126

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

(2) Sewing machine head

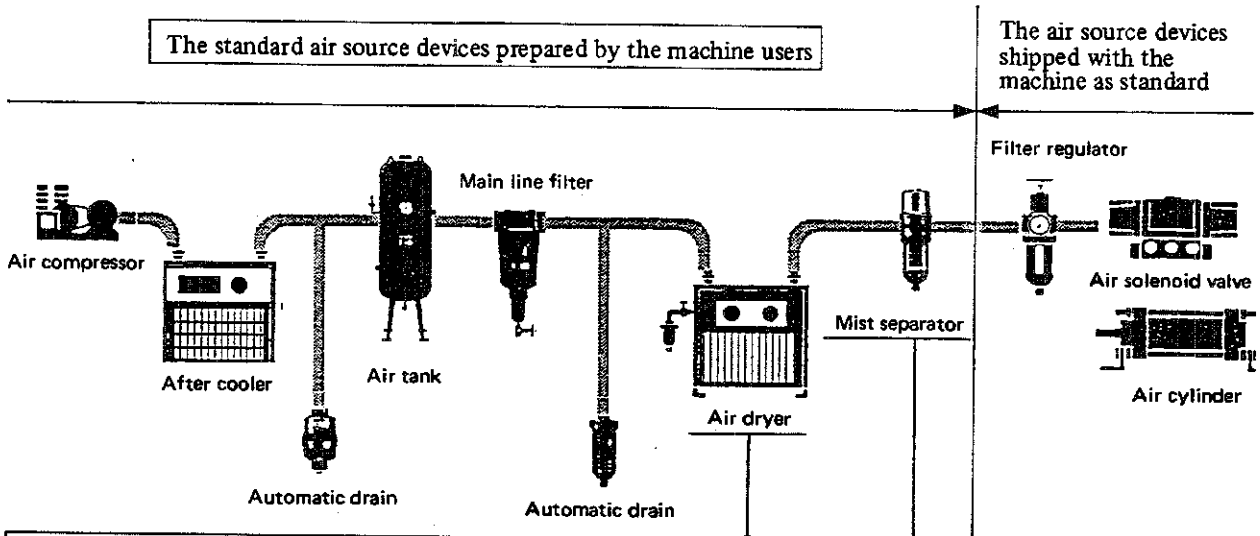
- Clean up the sewing components including the clamp foot every day before the operation. Remove dust and wastes from the oil reservoir at least once every week.
- Dust or strains on the relfecting sheet of optical sensing system may lead to malfunctioning or the photoelectric switches, so clean up the reflecting sheet with soft waste cloth.
- 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.

Precautions for the compressed air supplying (the air supply source) devices

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) Lubrication and the timing belt

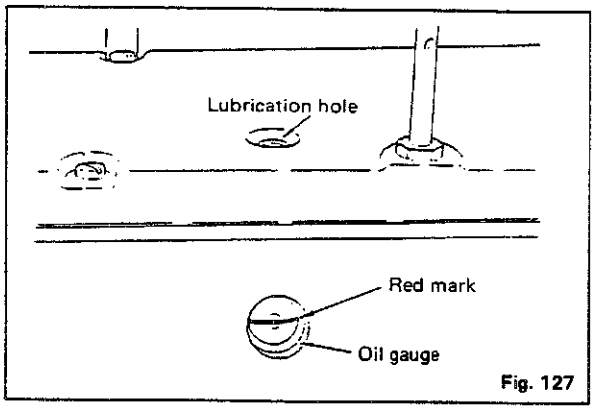


Fig. 127

1) Lubrication of the oil reservoir inside the face plate

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.

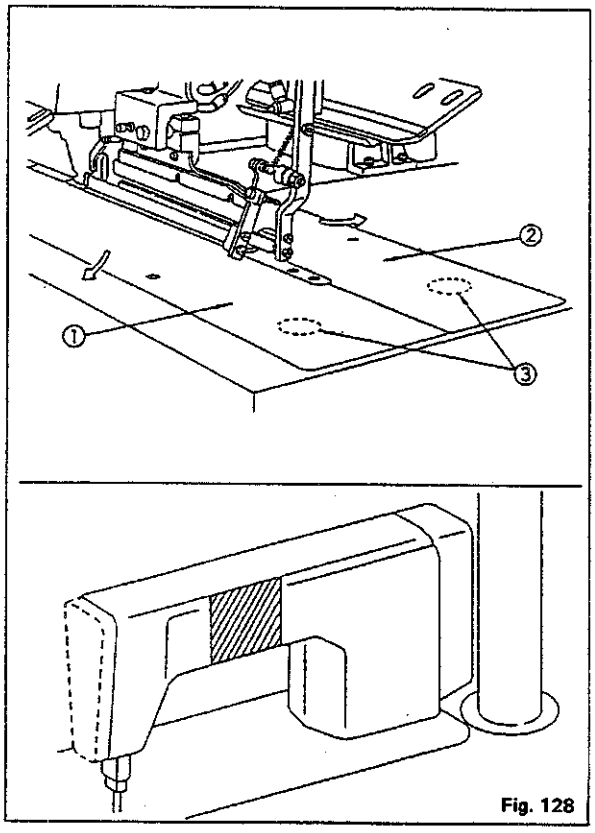


Fig. 128

2) Lubrication of the hooks

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 your finger into openings ③ in the bottom of the sewing table ① , ② and push up the sewing tables. Then open each sewing tables in each direction of the arrows and remove them.
④ Tilt the machine head away from you. (Push the slanted part of the machine head and tilt it.)

(Caution)

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

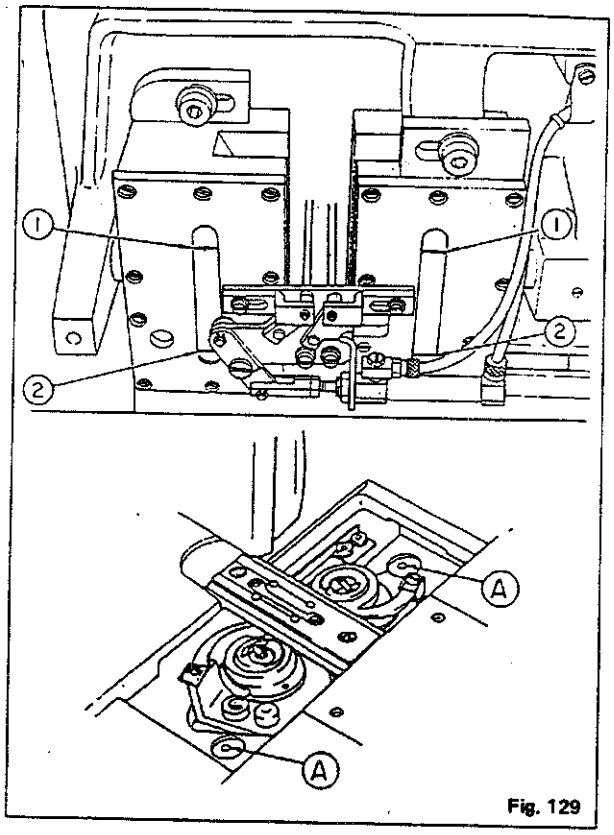


Fig. 129

Supply the lubricating oil through lubrication holes (A) with the oil feeder as shown in Fig. 129.
Fill the oil up to marker line (1).

* Lubricate both right and left hooks with the same method. However, when the marker line on the right hook is not easy to see, confirm it moving the bobbin thread trimmer in the direction of the arrow after stopping air supply.

(Caution)

When the oil level goes down under marker line (2), stop operation and refill the lubricating oil up to the proper level.

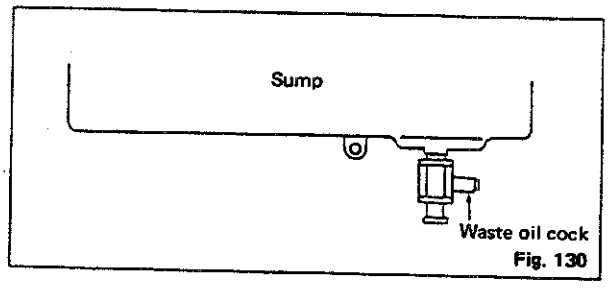


Fig. 130

3) Waste oil in the hooks

Discharge the waste oil in the sump of the hooks through the waste oil cock as shown in Fig. 130.

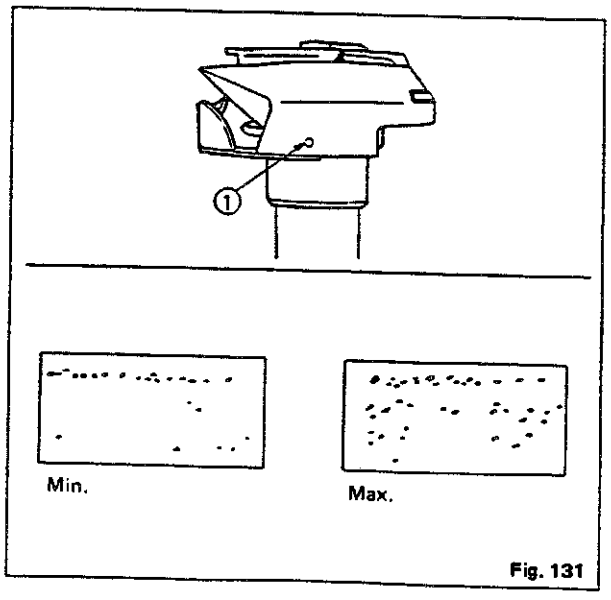


Fig. 131

4) Adjusting the amount of oil in the hooks

The hooks are automatically lubricated. Adjust the amount of oil lubricated by screw (1) 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. 131 if the adequate amount of oil is lubricated to the hooks.

(2) Needles

Use Mt x 190 for the APW-231, 232, 235 and 236 sewing machines, and DP x 17 needles for the APW-239 and 240 sewing machines.
Choose a suitable size of the needles for the thickness of the threads or the types of material to be sewn.

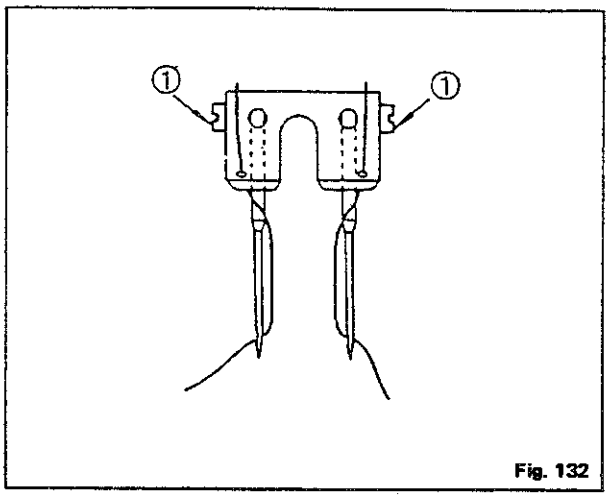


Fig. 132

1) How to attach the needles

Insert the left and right needles as far as they will go pointing their long grooves at each other and tighten screws ① .

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

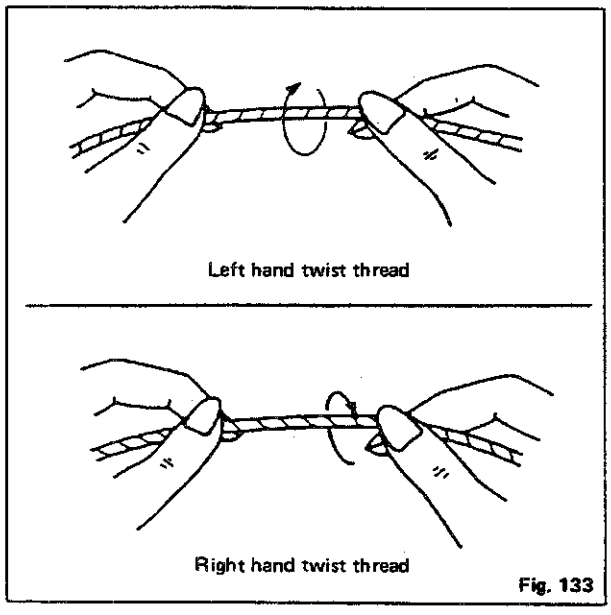


Fig. 133

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.

2) Threading the machine

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.

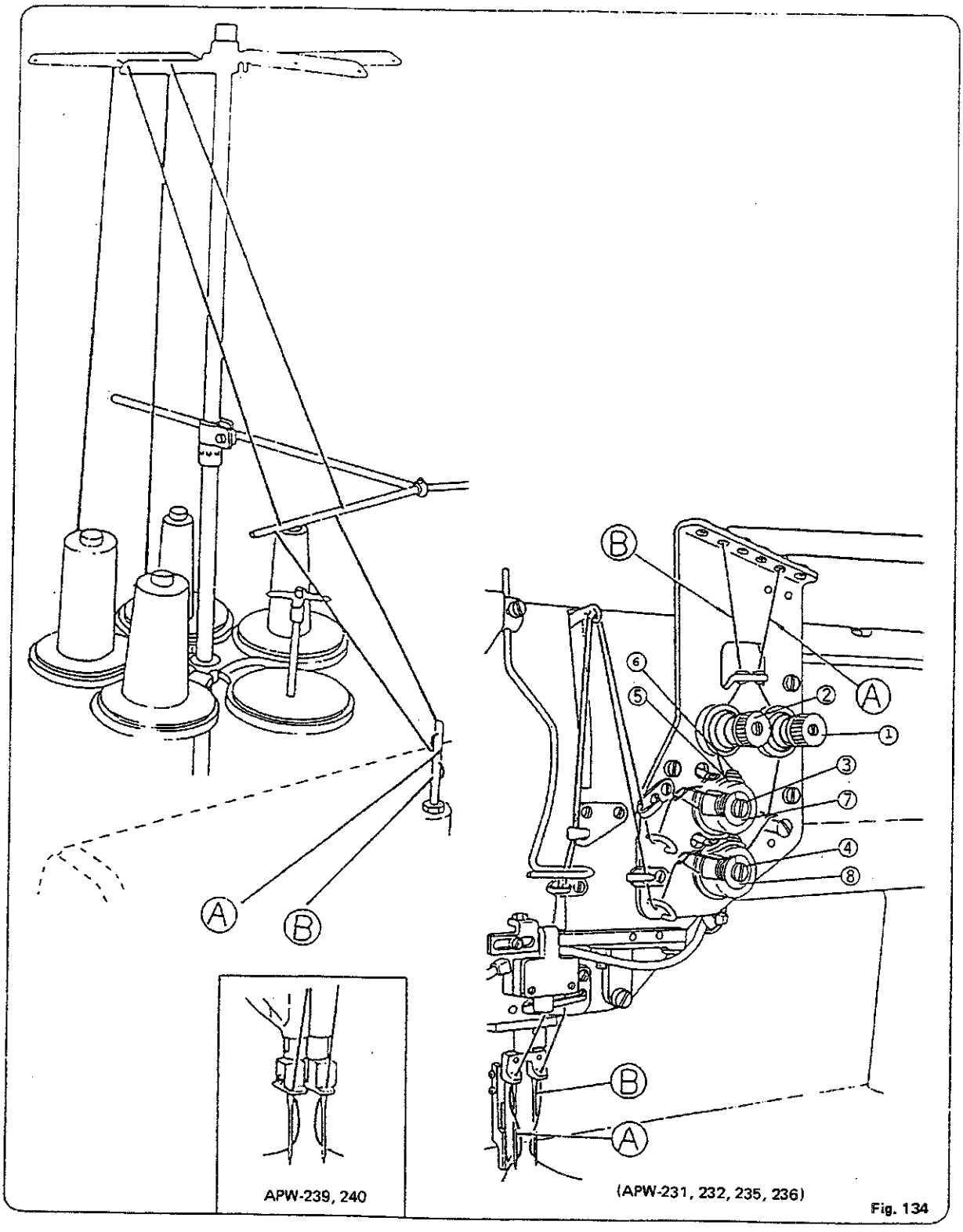


Fig. 134

3) Winding the bobbins

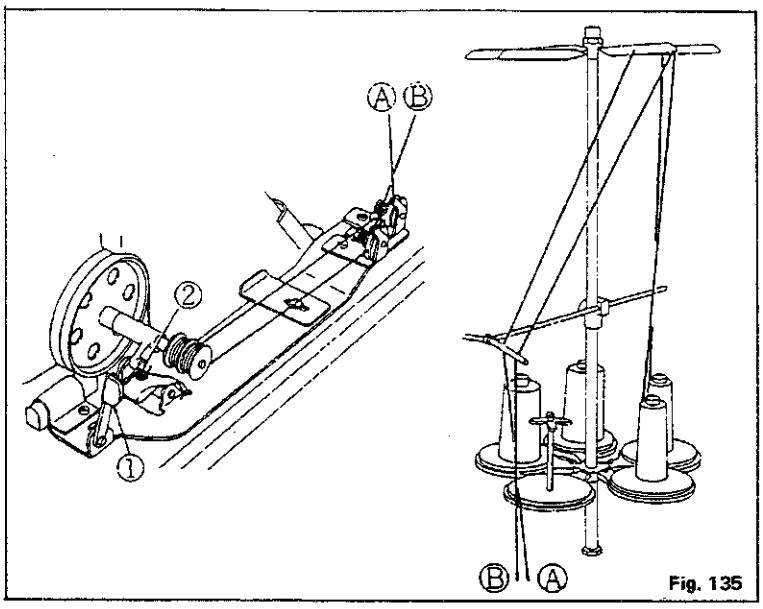


Fig. 135

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 ① .
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 ② (Fig. 135) to increase or loosening to reduce the amount of thread to be wound.

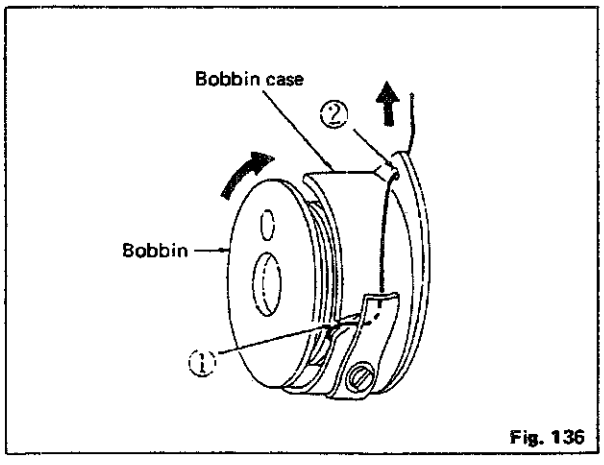


Fig. 136

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 ① in the bobbin case.
③ Pull the thread to pass it under the tension spring.
④ Pass it through hole ② in the bobbin case.

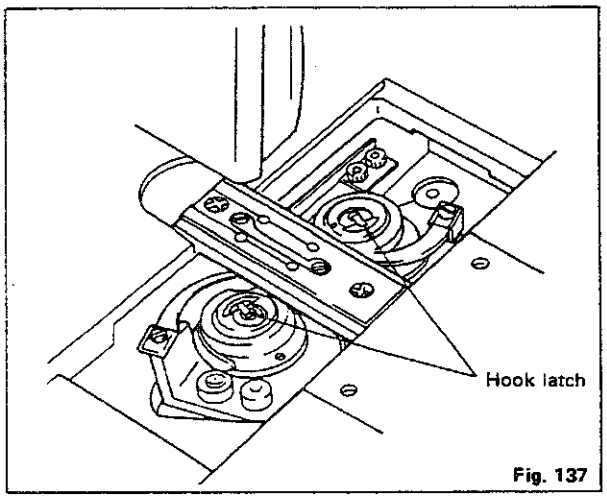


Fig. 137

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.

(4) Thread tension

1) Needle thread tension

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

- Adjust the right needle thread tension by nut (1) and the left needle thread tension by nut (2) respectively. Turn the nut clockwise to increase or counterclockwise to reduce the tension.
- Setting the AUTO STEPS selector key to "cloth feed" will close the thread tension disc. (See Fig. 134)

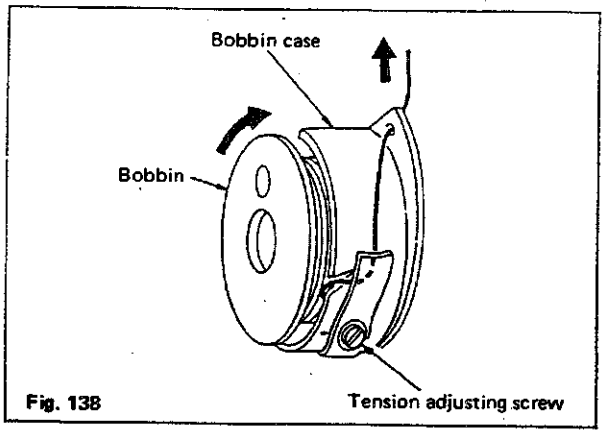


Fig. 138

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 (3) and turn thread take-up spring knob (7). Turning knob (7) 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 (4) and turn thread take-up spring knob (8). Turning knob (8) 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 (3) and turn needle thread take-up spring plate (5). Turning plate (5) 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. 134.

(5) Adjusting the position of the needle bar frame

The distance from the center of the needle to the rear end of the bed is 89.05 ± 0.1 mm.

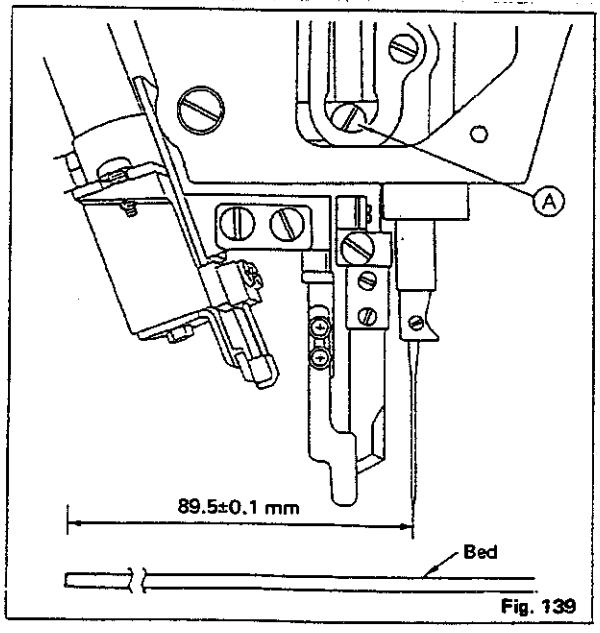


Fig. 139

Loosen screw (A) and adjust the position of the needle bar frame. Upon completion of the adjustment, securely tighten screw (A).

(6) Relation of the hook to the needle

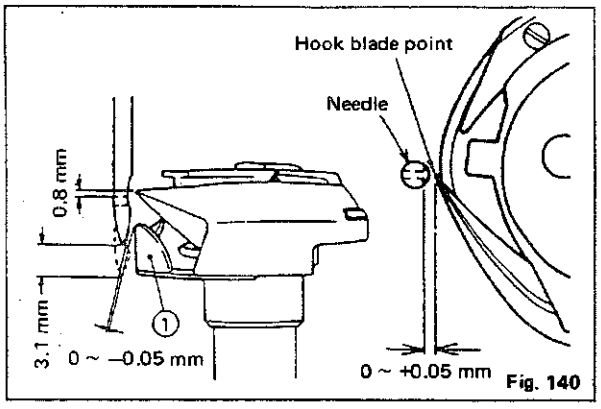


Fig. 140

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 (1) 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 as shown in Fig. 140.

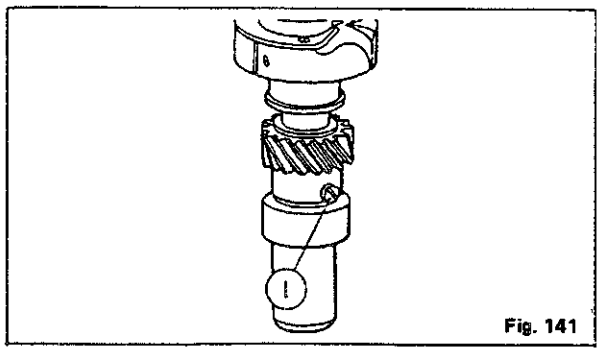


Fig. 141

2) How to adjust the timing of the hook

Loosen setscrew (1) to set free the hook shaft gear (small gear). Turn by hand the hook and align the hook blade point with the center of the needle. Tighten setscrew (1) using care not to let the hook shaft play up and down; tighten the screw as you press the hook downwards and the gear upwards.

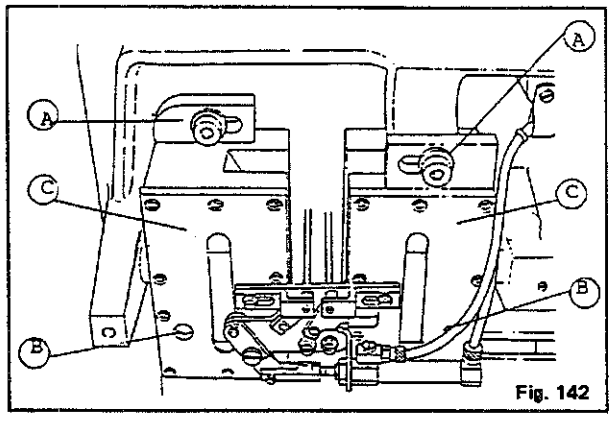


Fig. 142

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

(1) Remove the throat plate and tilt the machine head back.
(2) Loosen screws (A) and (B) which fasten the hook shaft saddle in place.
(3) Gently tap the hook shaft saddle (C) until a clearance of +0.05 mm or less is provided between the needle and the hook blade point. Firmly tighten screws (A) and (B) .

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 as shown in Fig. 141.
(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.

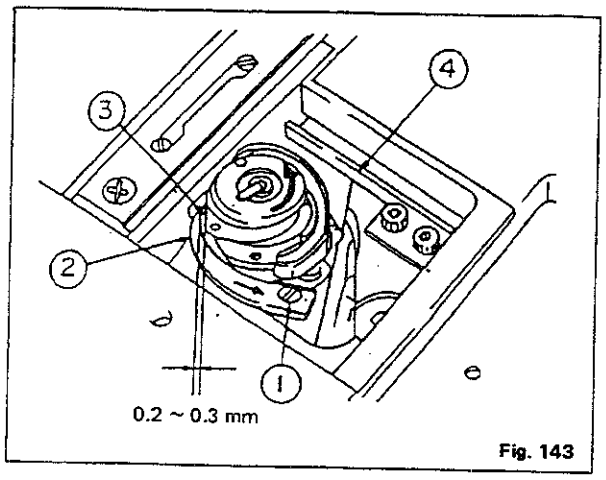


Fig. 143

5) Adjusting the bobbin case opening lever

Turn by hand the handwheel in the regular direction to let bobbin case opening lever (2) 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 (3) 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 (1) .

(7) Adjusting the needle 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

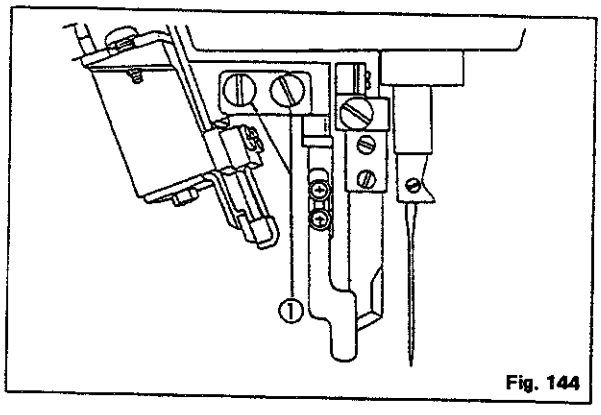


Fig. 144

1 Remove setscrew (1) and remove the needle thread knife unit.
2 Loosen screw (2) and pull out pin (3) . (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 (A) portion contacts the fixed knife.

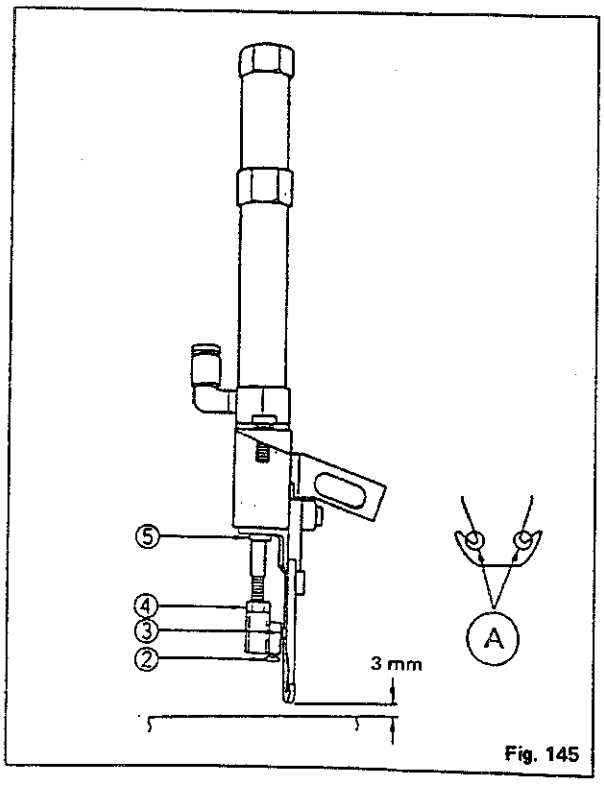


Fig. 145

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 (4) and adjust the height of the needle thread knife by raising or lowering it.

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 (5) 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). Adjust the needle thread nippers so that they securely hold the thread by pressure of 300 g or higher after the threads have been cut.

(8) 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.

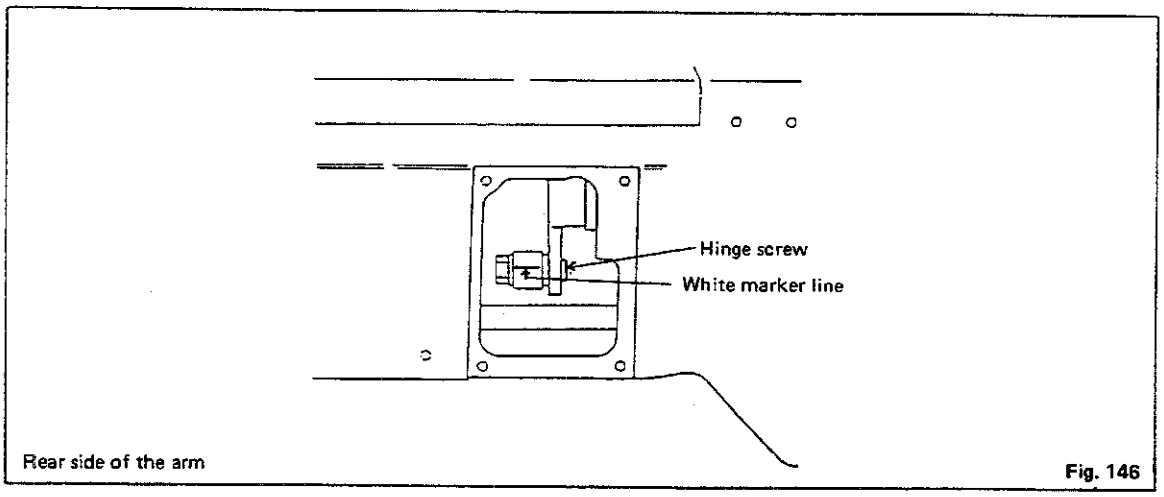


Fig. 146

(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. 147.

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

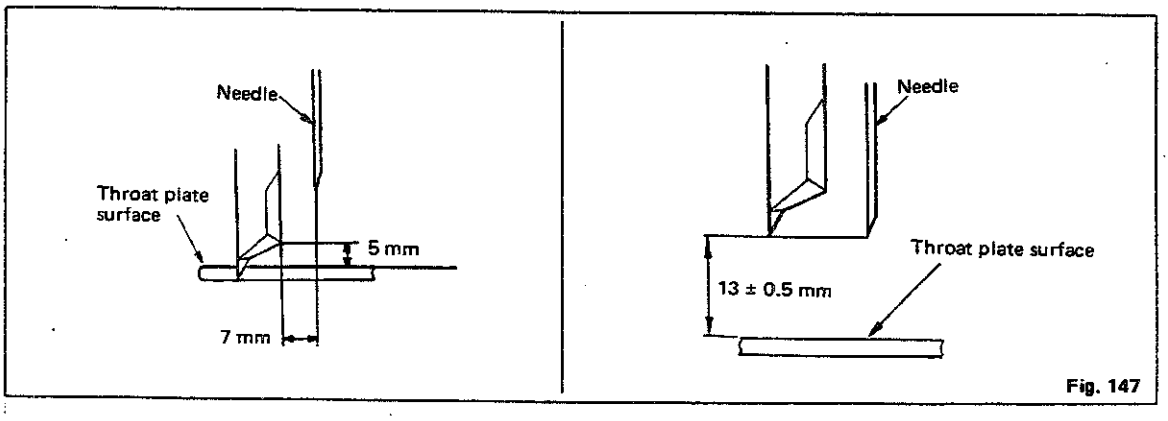


Fig. 147

2) How to adjust the height of the center knife

Loosen screw (A) and adjust so that a 5 mm clearance is obtained when the center knife comes to its stroke dead end point by raising or lowering the center knife.
Tighten the screw so that the center knife is attached horizontally.

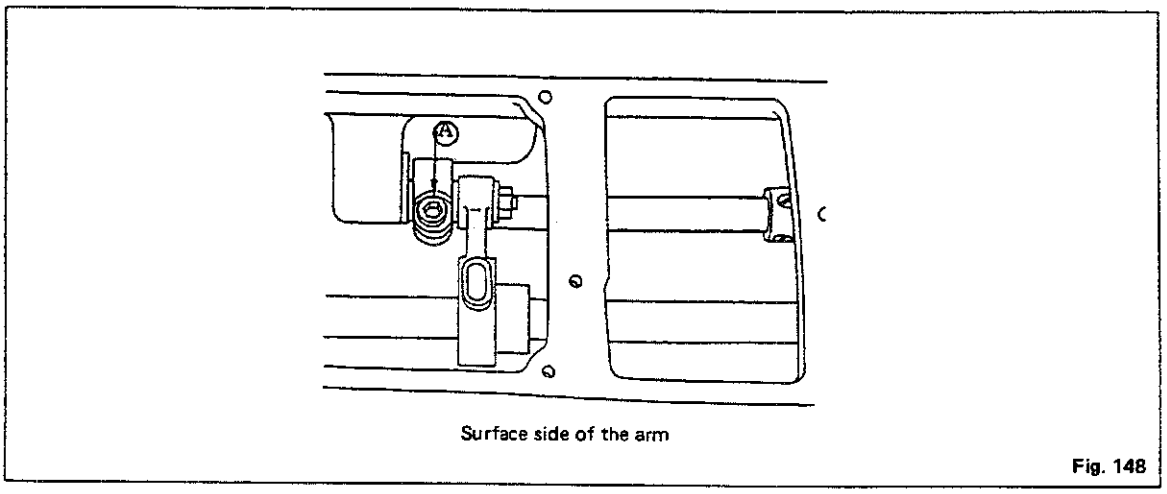


Fig. 148

3) How to adjust the distance from the needle to the center knife

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

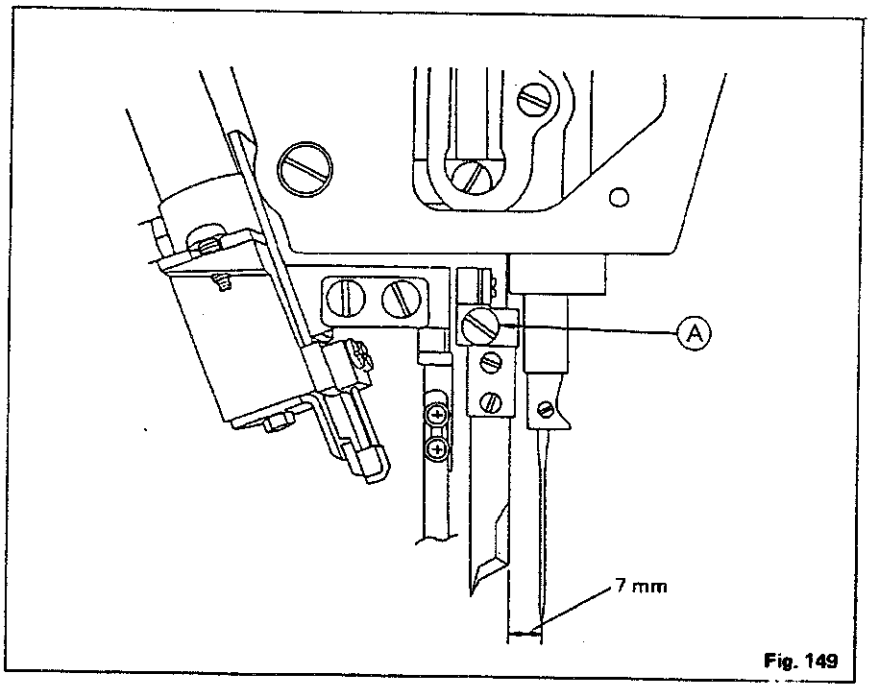


Fig. 149

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.

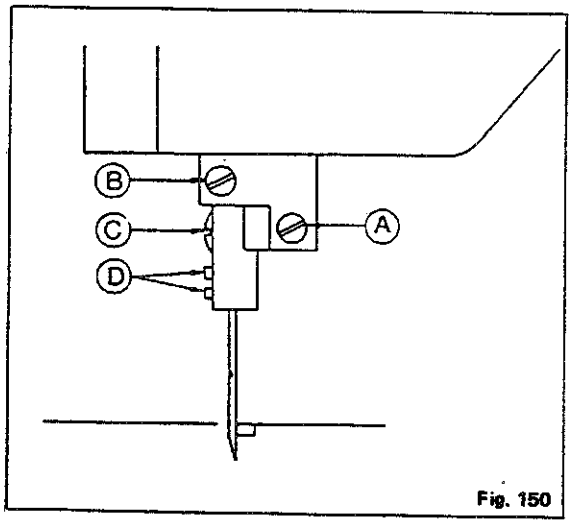


Fig. 150

Move the center knife laterally by screw (A) or rotate it by screw (B) 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 (D) in Fig. 150 and remove the center knife.
- How to attach the center knife
  Loosen screw (D) in Fig. 150 and attach the center knife.
  Insert the center knife until it will go no further and fix it.

(9) Position of the thread tension release rod

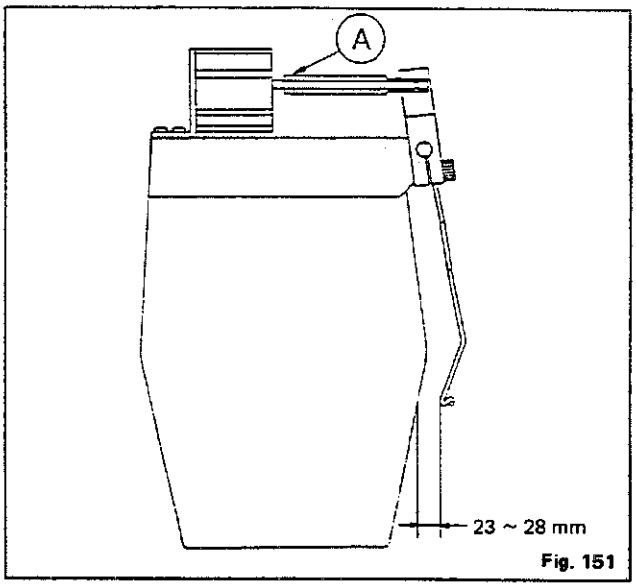


Fig. 151

Loosen nut (A) 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.

(10) Adjusting the bobbin thread knife

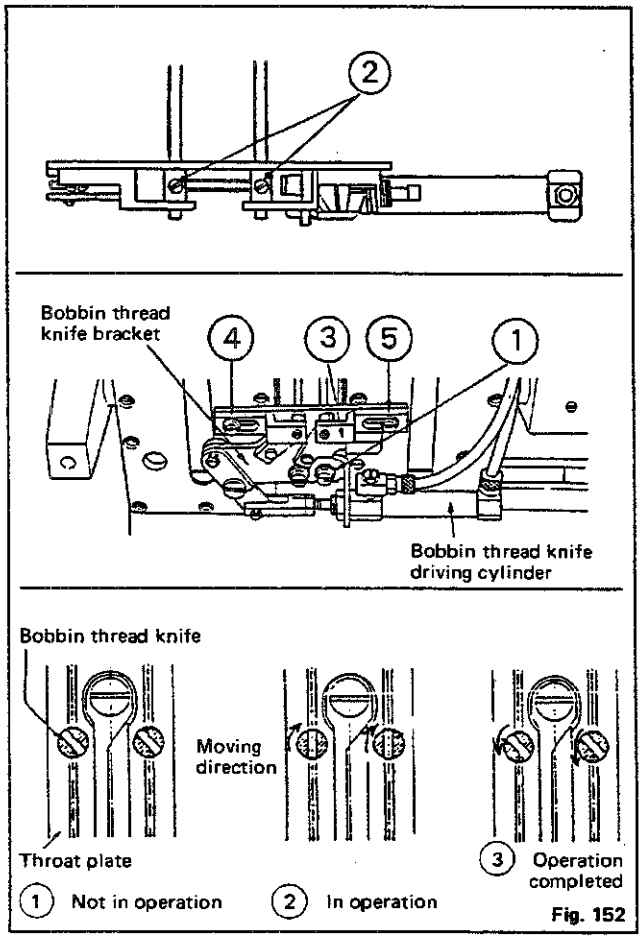


Fig. 152

- 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 (1) 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 (1).
- Position and hight 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 then the knives actuate.
  (1) Loosen setscrew (2) and adjust so that the top end of the knives are even with the throat plate surface. Securely tighten setscrews (2) after the adjustment.
  (2) Press bobbin thread knife driving cylinder toward (A) and adjust so that the grooves in the knives are parallel to the grooves in the throat plate.
  (3) Securely tighten setscrew (2).
- How to adjust the position of the bobbin thread knife in replacing gauges
  Loosen setscrews (4), (5) of bobbin thread knife presser plate (3), and the bobbin thread knife moves to the right or left together with the bobbin thread knife presser plate.

- How to replace the bobbin thread knife
  Loosen setscrews (2), 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.
- Adjustment of cutting of bobbin thread knife
  Adjust cutting of the bobbin thread knife by appropriately pressing the thread nipper spring (4) (Fig. 143) 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.

(11) Position of the synchronizer

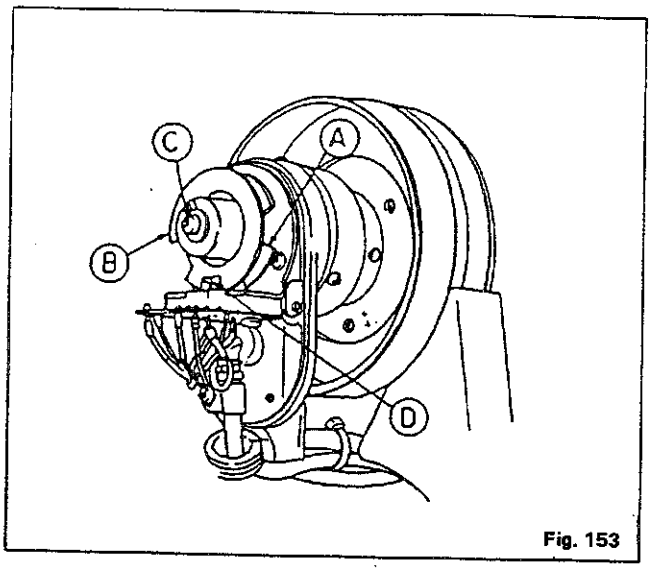


Fig. 153

- Loosen setscrew (C) and align the notch of synchronizer (B) with point (D) at the upper dead point of the thread take-up lever.
- Turn the handwheel clockwise until the tip of the needle is raised 3 mm above the throat plate surface and align the notch of synchronizer (A) with (D) at that point.

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

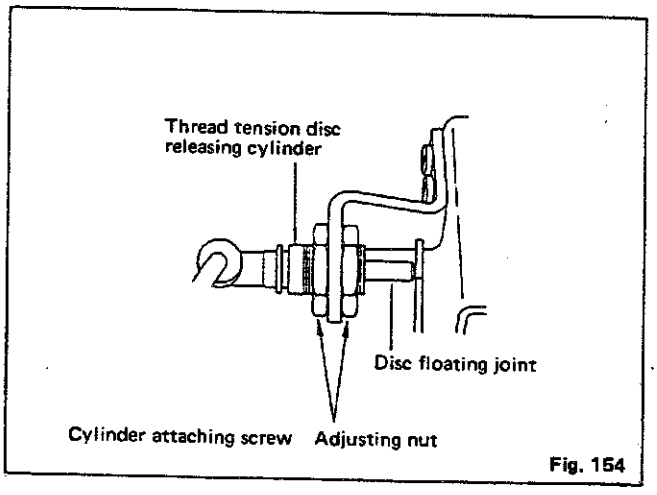


Fig. 154

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.

(13) Single welting

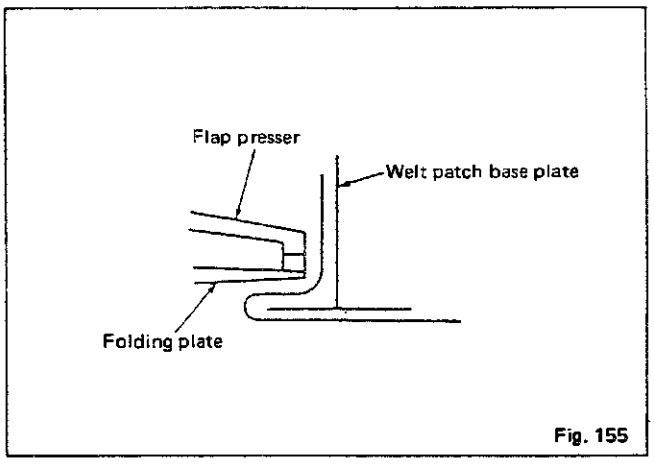


Fig. 155

In case of sewing single welts with neither the flap presser nor the folding plate, remove the air tube from instant joint (A) fitted with a checking valve. When the air tube is being removed, the flap presser and the folding plate will not actuate.
(The air will not come out.)

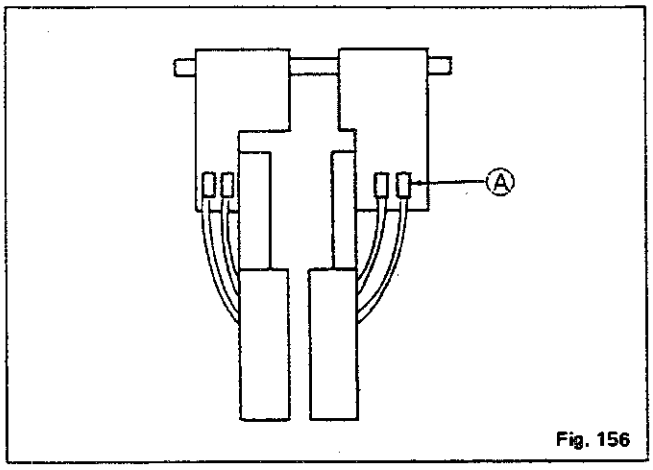


Fig. 156

(14) 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.

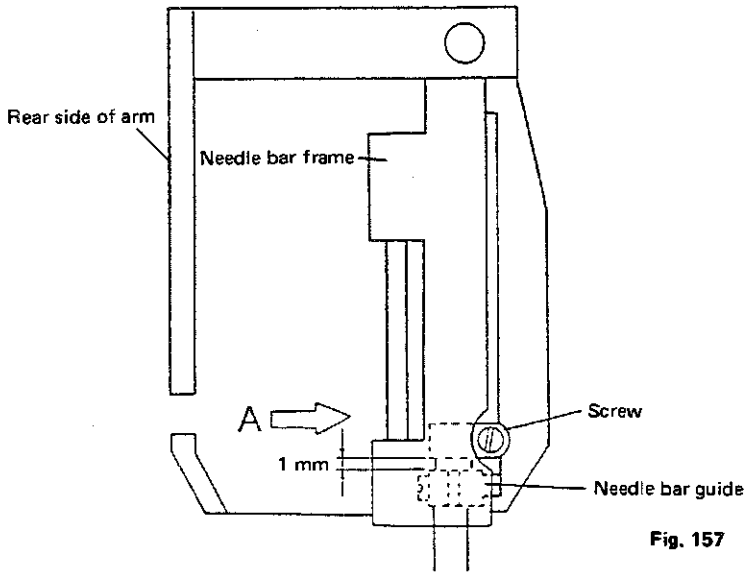


Fig. 157

15. ELECTRICAL CONTROL SYSTEM

(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.
4. Be sure not to connect the input terminal cable and the out terminal cable in the input terminal box conversely.
5. Be sure not to connect the cables J3 and J4 in the CPU circuit board conversely.

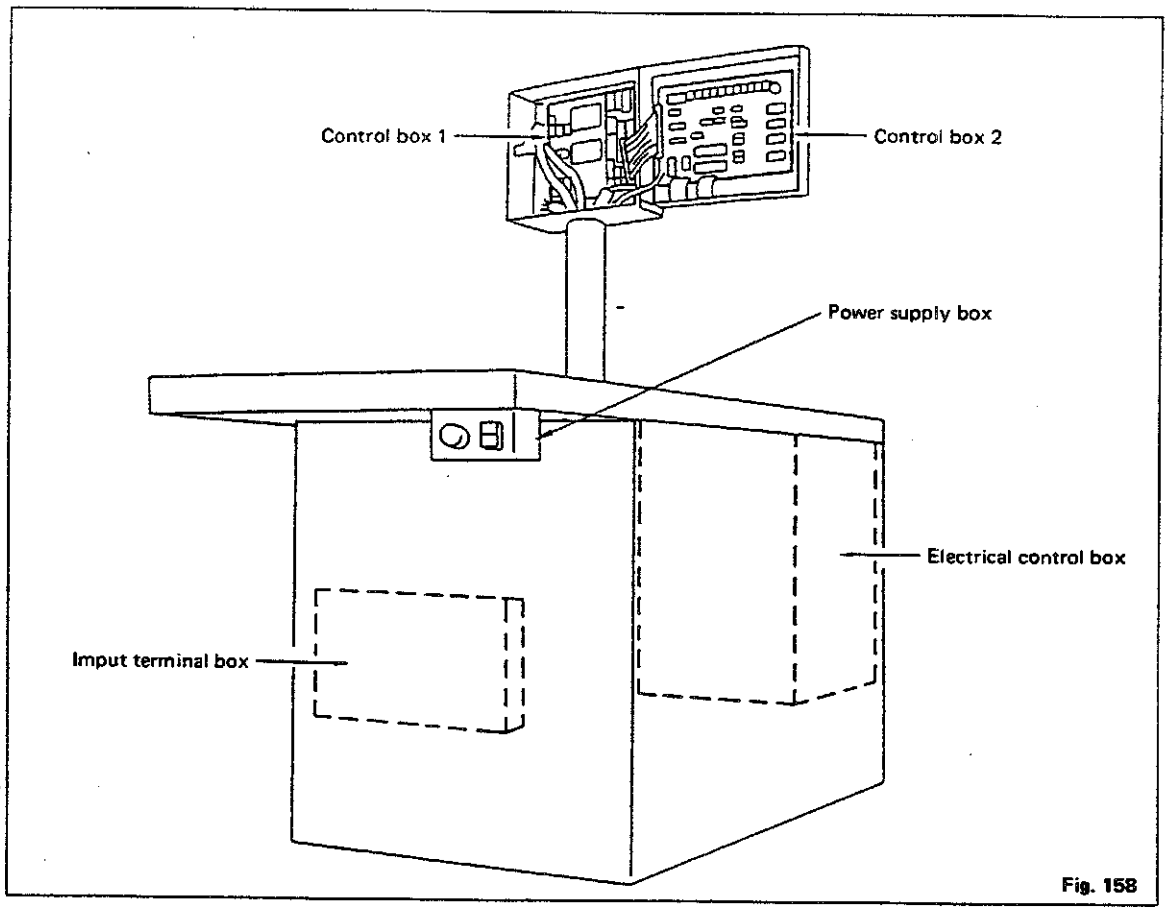


Fig. 158

1) Electrical control box layout

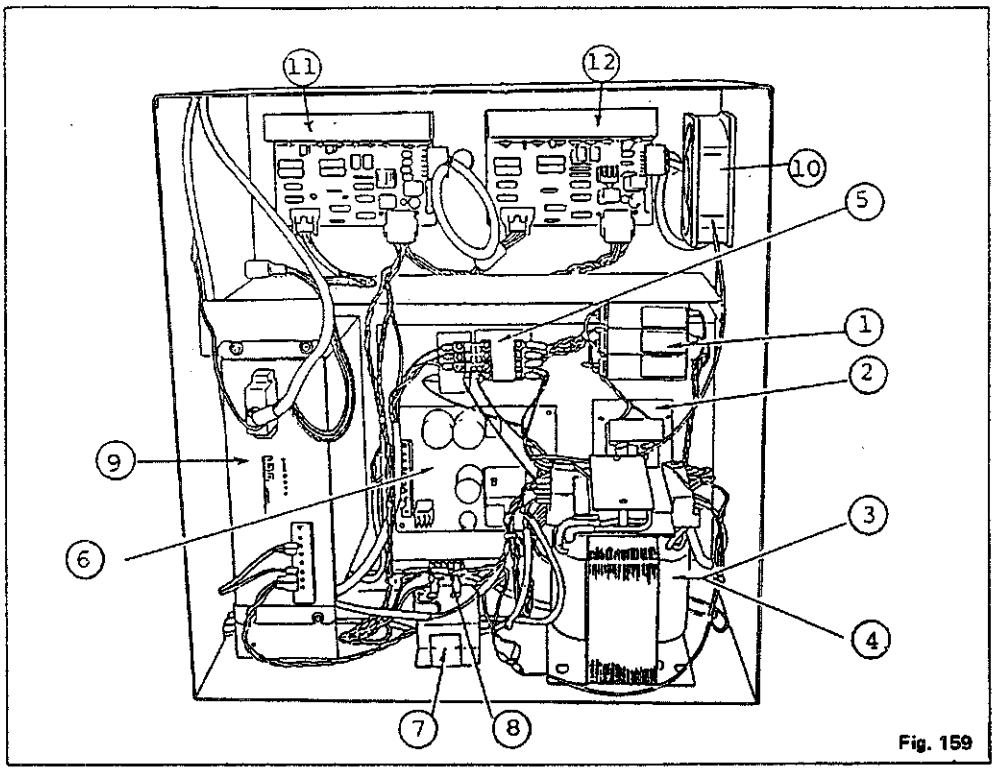


Fig. 159

No.	Description	Part No.
1	Fuse 600V 10A	HF001801000
2	Noise filter assy.	16459059
3	Power trans A	16455800
4	Power trans B	16455909
5	Magnetic switch	HA00138000A
6	DC power circuit board assy.	16450256
7	Motor relay assy.	16460651
8	Switching regulator	HX002240000
9	Servo motor driver	16567208
10	Fan motor	16459356
11	Corner knife stepping motor circuit board	16450553
12	Turret stepping motor circuit board (APW-239, 240)	16450553

2) **Operation box 1 layout**

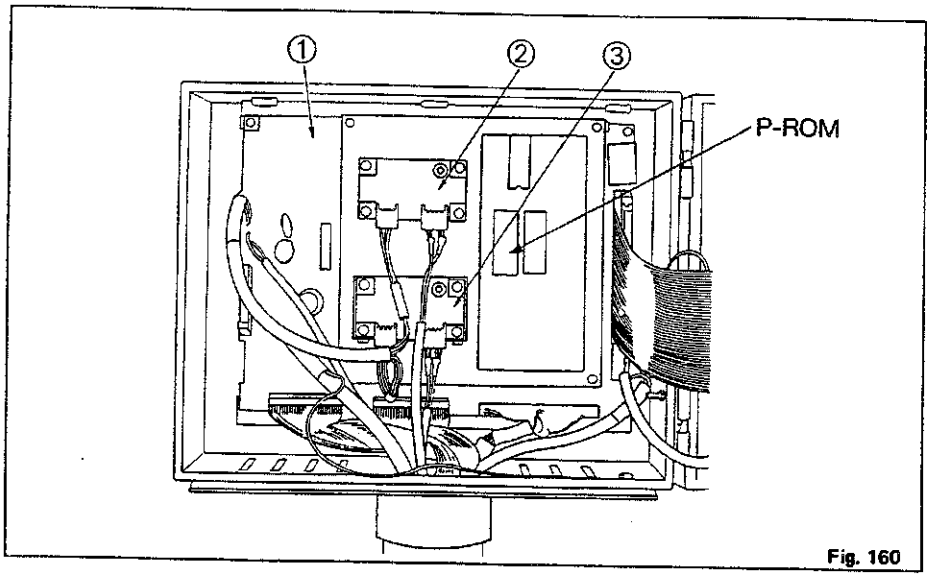


Fig. 160

①	CPU circuit board assy.	(16450058)	
②	Right flap sensor amplifier	(16450801)	(APW-235, 236, 239, 240)
③	Left flap sensor amplifier	(16450801)	(APW-235, 236, 239, 240)

① Adjusting the CPU circuit board

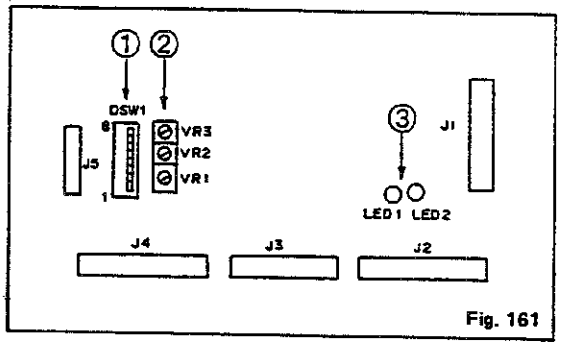


Fig. 161

a) Rotation of the sewing machine motor
Adjust the rotating speed of the sewing machine motor by turning the variable resistance knob VR1 ~ VR3 of ② in Fig. 161.
The standard rotation speed is;
High speed rotation 2,200 rpm (adjusted by VR2)
Low speed rotation 1,500 rpm (adjusted by VR3)

Turn each variable resistance knob clockwise to increase the roating speed.
Turn fully counterclockwise the variable resistance knob VR1 which is not used.
Set DSW1 of ① on the CPU circuit board so that only switches 1, 3 and 7 are turned ON as shown in the table below.

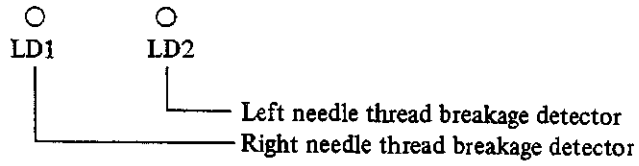
	1	2	3	4	5	6	7	8
Setting	ON	OFF	ON	OFF	OFF	OFF	ON	OFF

Note 1) When the DSW1 is not set as above, the rotating speed will not increased more than 200 rpm after adjusted.

Note 2) The CPU circuit board has been factory-adjusted. Readjustment of the CPU circuit board will be required only when the sewing machine motor, controller, or CPU circuit board is replaced, or the frequency of input power supply is changed.

Note 3) Be sure not to adjust the high speed rotating at 2,200 rpm + 50 rpm or more.
It might cause a trouble with the sewing machine.

② Needle thread breakage detector circuit indicator
The LED of ③ in the CPU circuit board is indicates the operation of the needle thread breakage detector.



③ Adjusting the flap sensor amplifier (APW-235, 236, 239, 240)

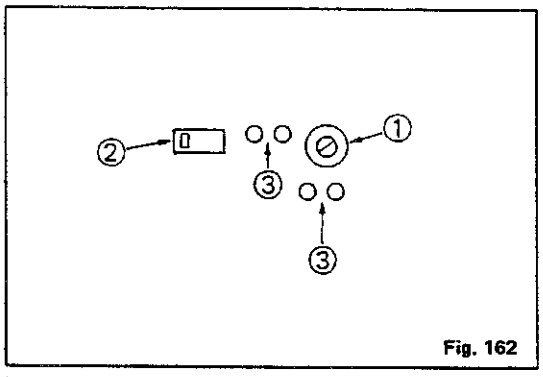


Fig. 162

Adjust so that the light beams emitted from the flap sensor are correctly reflected on the surface of the flap folder plate and the reflection tape in the following procedure.

1) Turn counterclockwise the variable resistance knob of ① by 4 rotations or more.
2) Turn the variable resistance knob clockwise until "only the green lamp" of LED of ③ in Fig. 162 lights up.
3) From the point where "the green lamp" lights up, turn further the variable resistance knob clockwise by 3/4 rotation. Make sure that "only the green lamp" keep lighting.

Notes) The four rotations are the maximum rotating range (maximum range for adjustment) of variable resistance knob ①.
When the green lamp does not light up after the variable resistance knob has been turned by four rotations or more, ensure the followings;

- **The light beams (both the emitted light and reflected light) are not interfered with other mechanical components.**
- **There is nothing which will defect the reflected light beams such as dust or wastes or scratches on the reflection tape.**
- **The flap sensor is connected to the flap sensor amplifier.**
- **The lens of the flap sensor is not cracked.**
- **Switch ② is set to DARK side.**

3) Operation box 2 layout

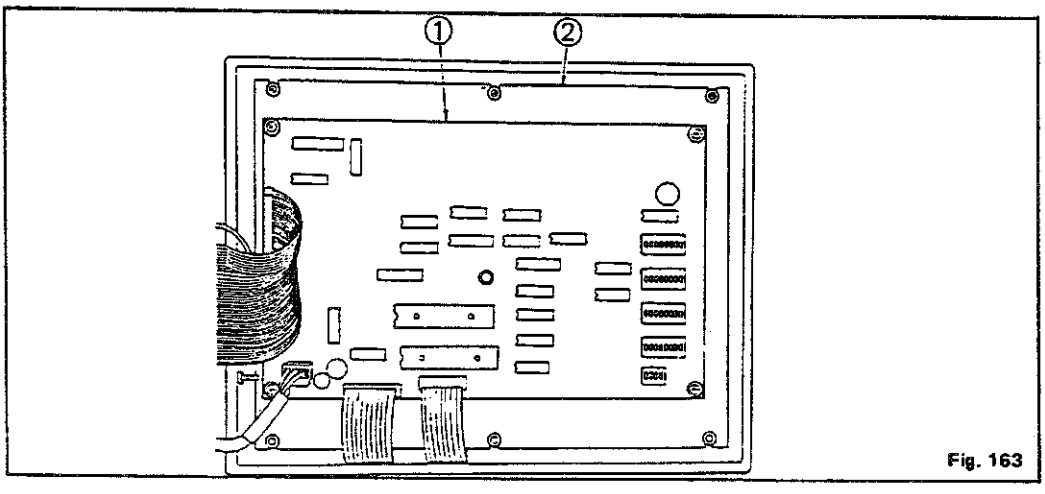


Fig. 163

① Operation panel circuit board assy. (16450157)
② Panel sheet

4) Input/output terminal board layout

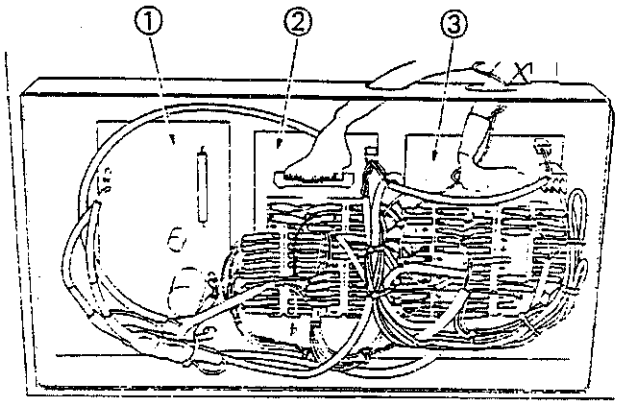


Fig. 164

① Needle control cable assy. (APW-239, 240)
② Output terminal board assy. (16450355)
③ Input terminal board assy. (16450454)

① Input terminal board

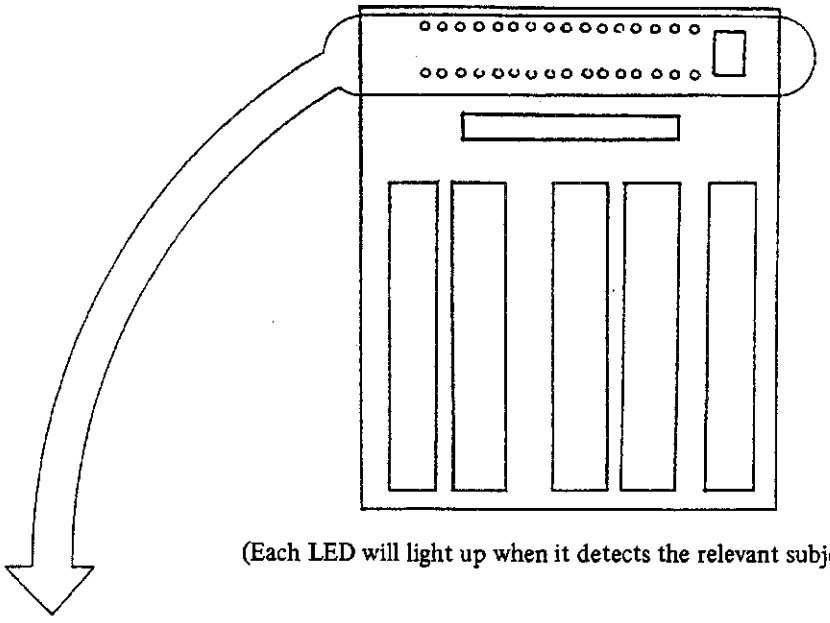


Fig. 165

(Each LED will light up when it detects the relevant subject.)

LD 1 Emergency stop
LD 2 Corner knife lowest position detector (fixed corner knife side)
LD 3 Sensor fixed position detector (APW-235, 236, 239, 240)
LD 4 (Automatic flap supply lowest end detect) optional
LD 5 Corner knife lowest position detector (moving corner knife side)
LD 6 Turret position detector (APW-239, 240)
LD 7 Knife rocking detector (fixed corner knife side) (APW-239, 240)
LD 8 Turret rocking (APW-239, 240)
LD 9 Corner knife starting position detector
LD10 Knife rocking detector (moving corner knife side) (APW-239, 240)
LD11 Binder down position detector
LD12 Binder upper position detector
LD13 Binder rocking end detector (APW-232, 236, 240)
LD14 Binder feeding end detector (APW-232, 236, 240)
LD15 Binder lowest position detector (APW-232, 236, 240)
LD16 Center knife upper position detector
LD17 Foot pedal fifth step
LD18 Clamp foot deceleration end detector
LD19 Clamp foot front end detector
LD20 Clamp foot rear end detector
LD21 (Flap pedal) optional
LD22 Foot pedal fourth step
LD23 Foot pedal third step
LD24 Foot pedal second step
LD25 (Blank)
LD26 Knee start switch (APW-231, 235, 239)
LD27 Foot pedal first step
LD28 Binder rotation detector
LD29 (Dart stretcher upper detect) optional
LD30 Stacker workpiece detector
LD31 (Roller stacker home position) optional
LD32 Air pressure detector

② Output terminal board

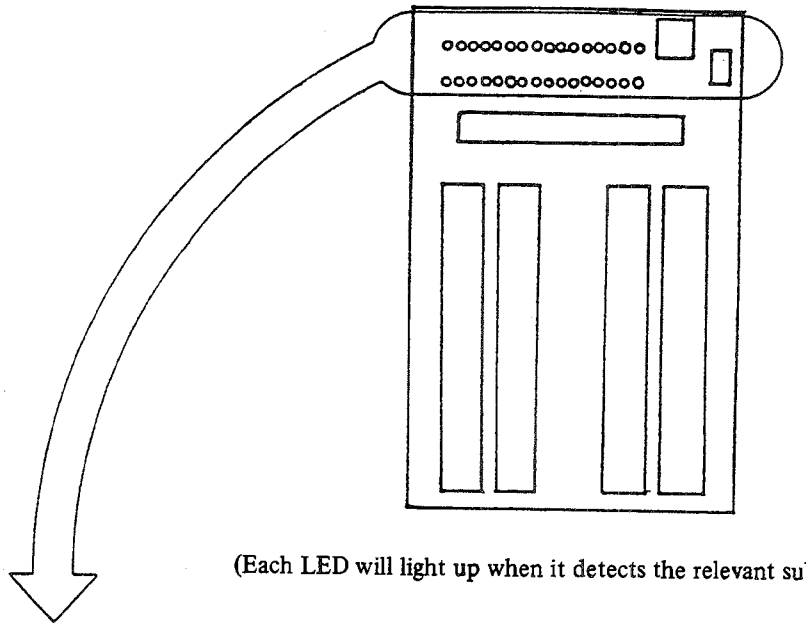


Fig. 166

(Each LED will light up when it detects the relevant subject.)

LD 1 Stepping motor power ON
LD 2 (Dart stretcher comes down) optional
LD 3 Folder plate
LD 4 Flap presser right
LD 5 Flap presser left
LD 6 (Flap clamp down) optional
LD 7 (Flap clamp up) optional
LD 8 (Flap rocking) optional
LD 9 Corner knife goes up
LD10 Thread tension releaser
LD11 Needle thread trimmer 3
LD12 Needle thread trimmer 2
LD13 Needle thread trimmer 1
LD14 Bobbin thread trimmer
LD15 Center knife
LD16 Thread tension
LD17 Binder comes down
LD18 Binder goes up
LD19 Welt patch grasping needle (APW-232, 236, 240)
LD20 Binder rocking (APW-232, 236, 240)
LD21 Binder goes up (APW-232, 236, 240)
LD22 Binder comes down (APW-232, 236, 240)
LD23 Work clamp goes up (APW-232, 236, 240), Work clamp left (APW-231, 235, 239)
LD24 Work clamp come down (APW-232, 236, 240), Work clamp right (APW-231, 235, 239)
LD25 Clamp foot actuation (APW-231, 235, 239)
LD26 Stacker swings
LD27 Grasping stacker
LD28 (Roller stacker motor) optional
LD29 Needle control (Needle bar left) (APW-239, 240)
LD30 Needle control (Needle bar right) (APW-239, 240)
LD31 Knife rocking (APW-239, 240)
LD32 Turret rocking (APW-239, 240)

(2) Adjusting the stacker

1) Stacker workpiece detector

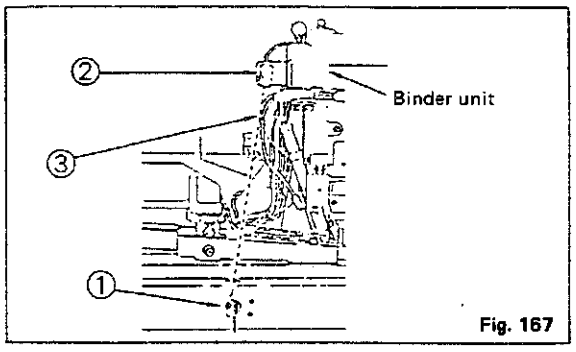


Fig. 167

Adjust the followings after having ensured the "red" LED lamp of the sensor of ① in Fig. 167 on the light beams emitter side lighted up (actuated).
Make sure that the light beams are not interfered between ① and ② of ③ in Fig. 167, and both the "green" and "red" LED lamps of sensor have lighted up.

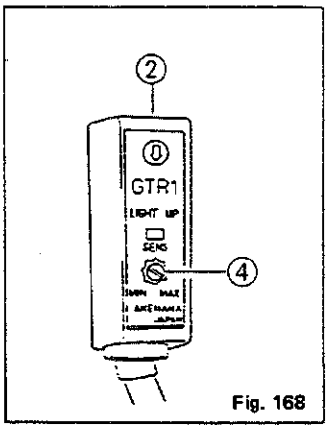


Fig. 168

1) Interfere the light beams between ① and ② in Fig. 167 with a piece of georgette fabric and turn volume knob ④ in Fig. 168 counterclockwise to set at "Minimum". At this moment both the "green and red" LED lamps go off.
2) Turn the volume knob clockwise until the "red" LED lamp lights up.
3) From the point where the "red" LED lamp lights up, turn the volume knob counterclockwise until the "red" LED lamp goes off.
4) Remove the piece of georgette fabric which has been interfered the light beams and ensure that both the "green and red" LED lamps light up.

2) Grasping stacker

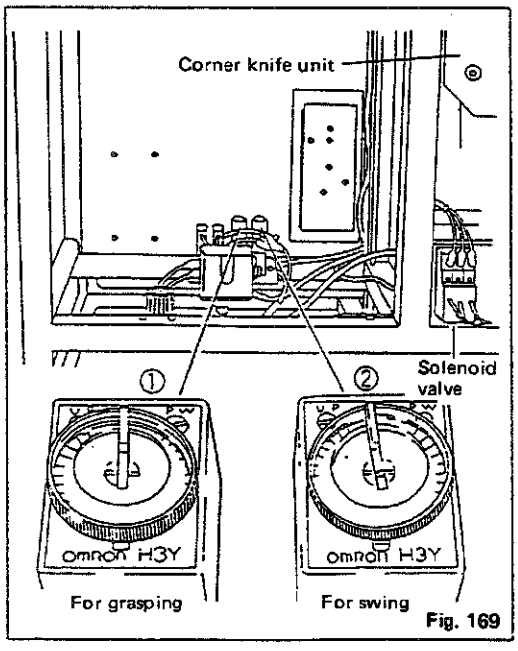
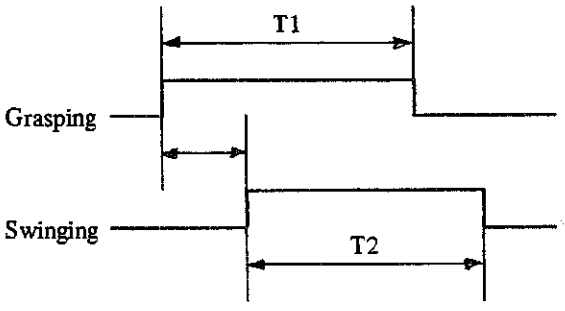


Fig. 169

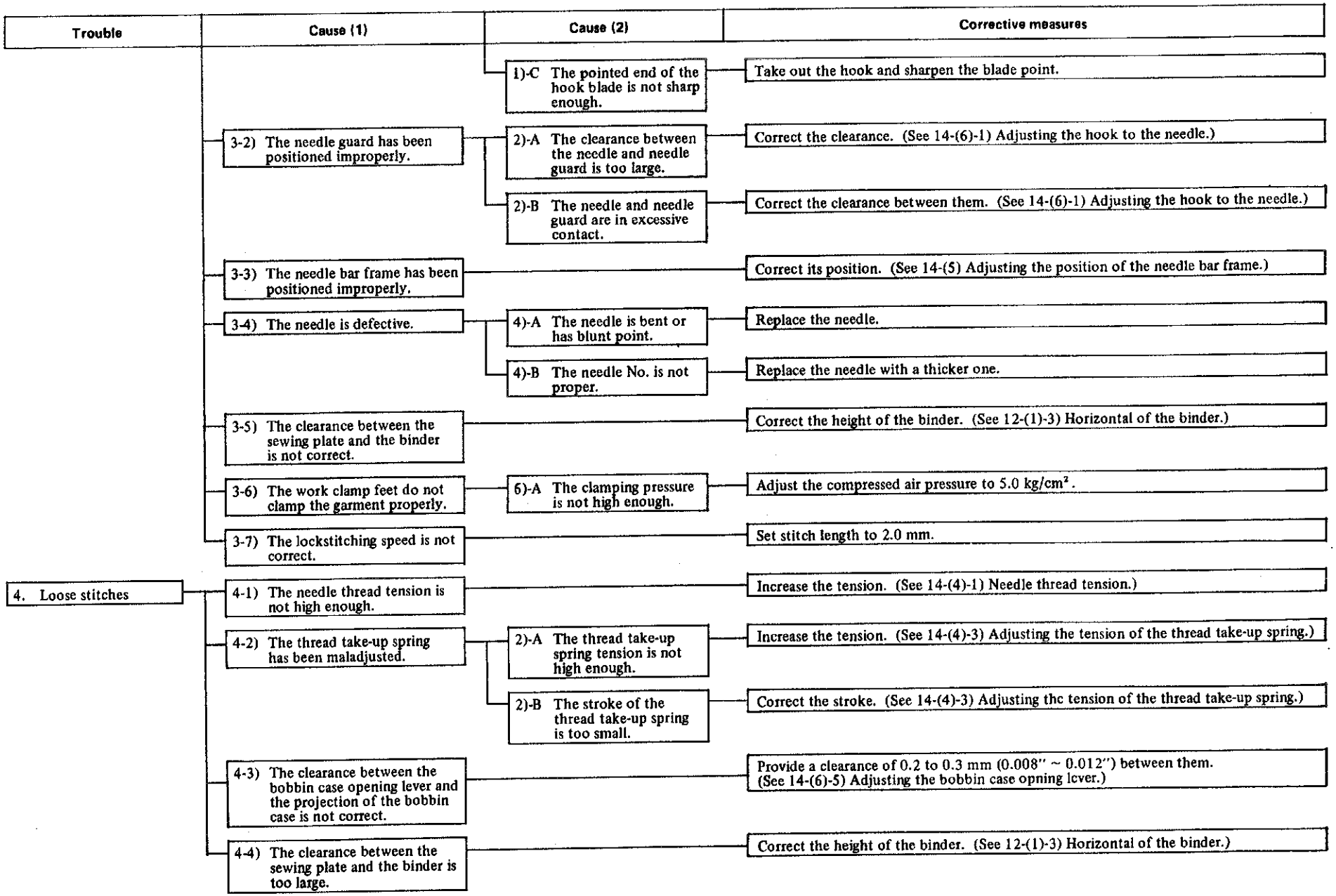
The time required to each step of the grasping stacker operation is determined as follows;

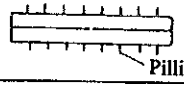


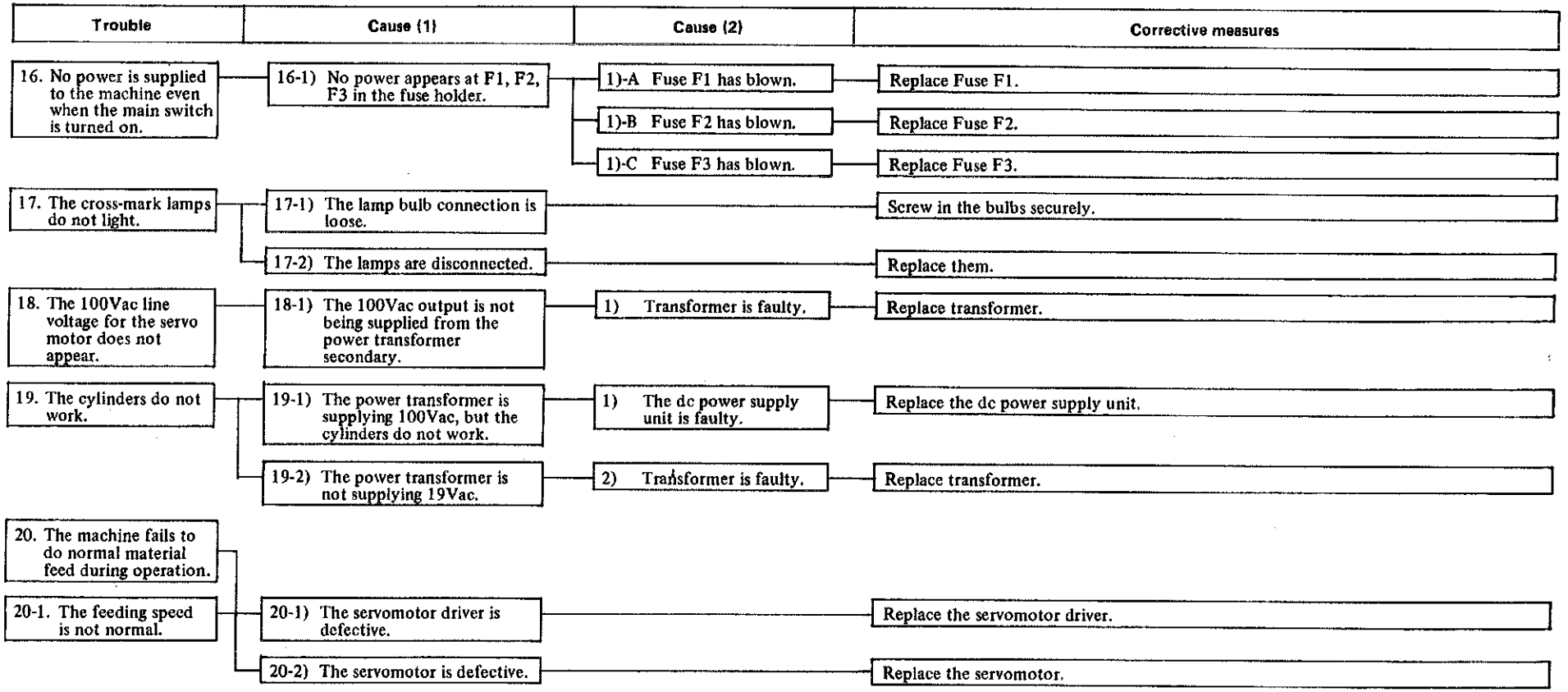
Desired operation time can be obtained by timer volume knobs ①, ② in Fig. 166
Grasping time (T1): Set by volume knob ①
(within 0.2 seconds to 5 seconds)
Swinging time (T2): Set by volume knob ②
(within 0.2 seconds to 5 seconds)
Turning each volume knob clockwise will increase the time.

16. TROUBLES AND CORRECTIVE MEASURES

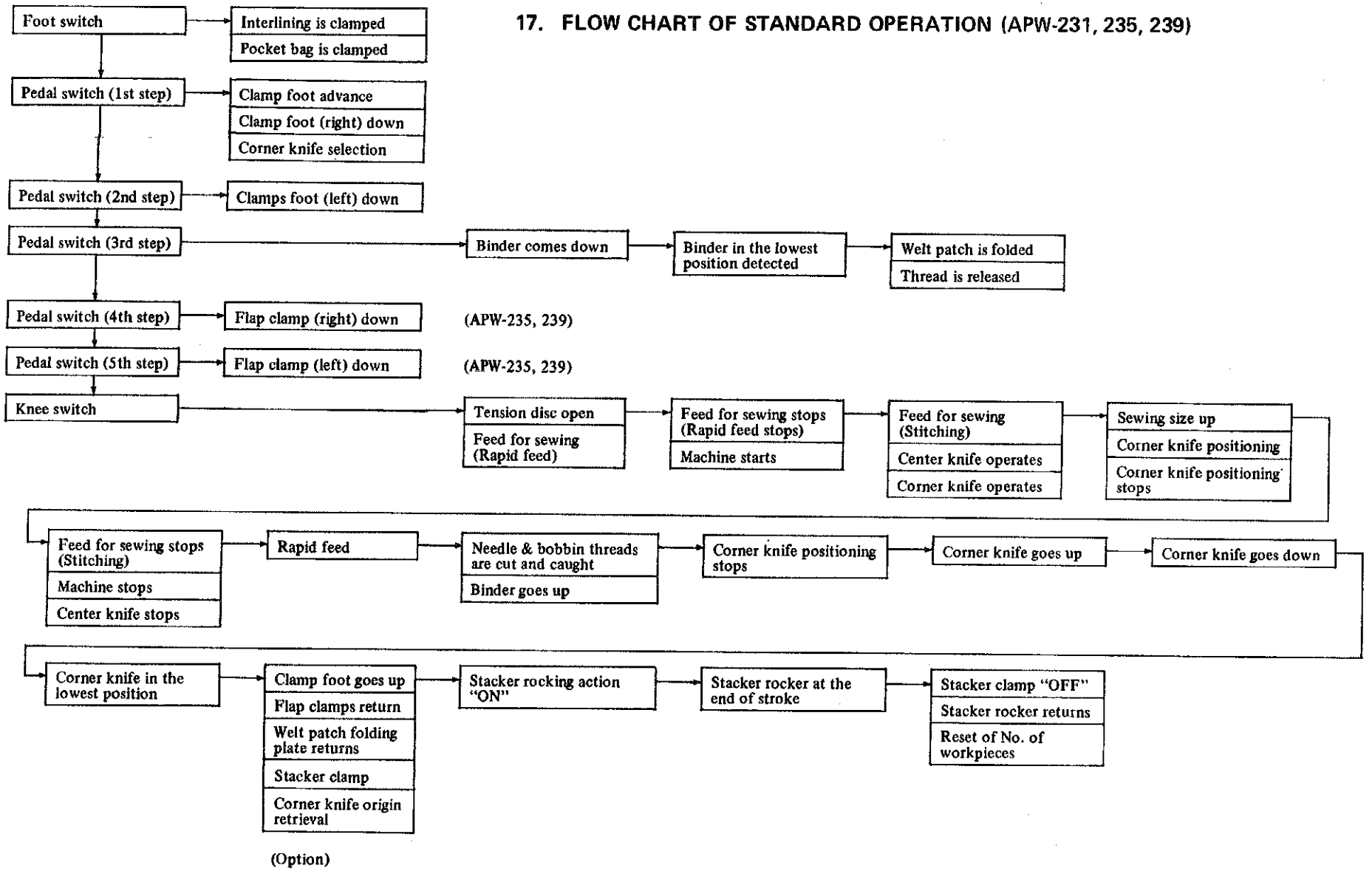
Trouble	Cause (1)	Cause (2)	Corrective measures
1. Thread breakage (needle thread)	1-1) The surface of the thread path burrs or scratches.		Smooth the thread path (using a fine sandpaper and buff).
	1-2) Needle thread tension is too high.	2)-A The tension of the thread tension discs is too high.	Decrease the tension. (See 14-(4)-1) Needle thread tension.)
		2)-B The tension of the thread take-up spring is too high.	Decrease the tension. (See 14-(4)-3) 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 14-(4)-3) 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 14-(6)-5) 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 14-(6)-3) 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 14-(6)-1) Adjusting the hook to the needle.)
	1-5) The hook are lubricated insufficiently.		Adjust the amount of oil. (Refer to 14-(1)-4) 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 14-(4)-2) 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 14-(6)-3) 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 14-(6)-1) 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 14-(6)-1) Adjusting the hook to the needle.)
2)-B The needle and needle guard are in excessive contact.
Correct the clearance between them. (See 14-(6)-1) Adjusting the hook to the needle.)
3-3) The needle bar frame has been positioned improperly.
Correct its position. (See 14-(5) 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 12-(1)-3) 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/cm².
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 14-(4)-1) 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 14-(4)-3) 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 14-(4)-3) Adjusting thc 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 14-(6)-5) Adjusting the bobbin case opning lcver.)
4-4) The clearance between the sewing plate and the binder is too large.
Correct the height of the binder. (See 12-(1)-3) Horizontal of the binder.)

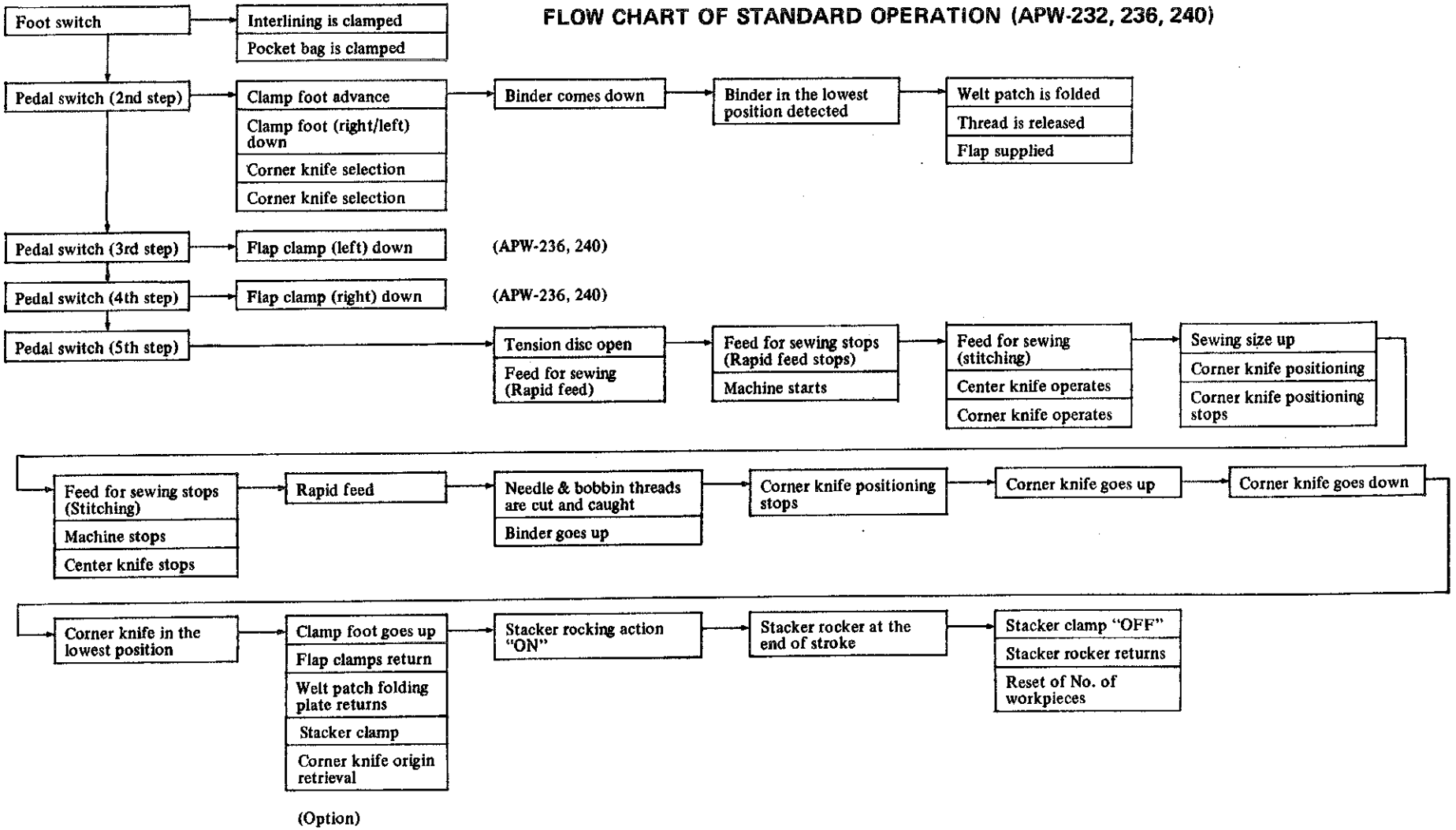
Trouble	Cause (1)	Cause (2)	Corrective measures
12. The machine fails to welt to the garment point. (This failure occurs in every welting.)	12-1) The position of the crossmark lamps is wrong.		Space them 240 mm (9.449") from the needle entry point. (See 6-(1) How to adjust the position of the crossmark 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 12-(1)-3) 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 14-(8)-4) 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 14-(11) 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 14-(7)-2) 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 14-(10) 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.

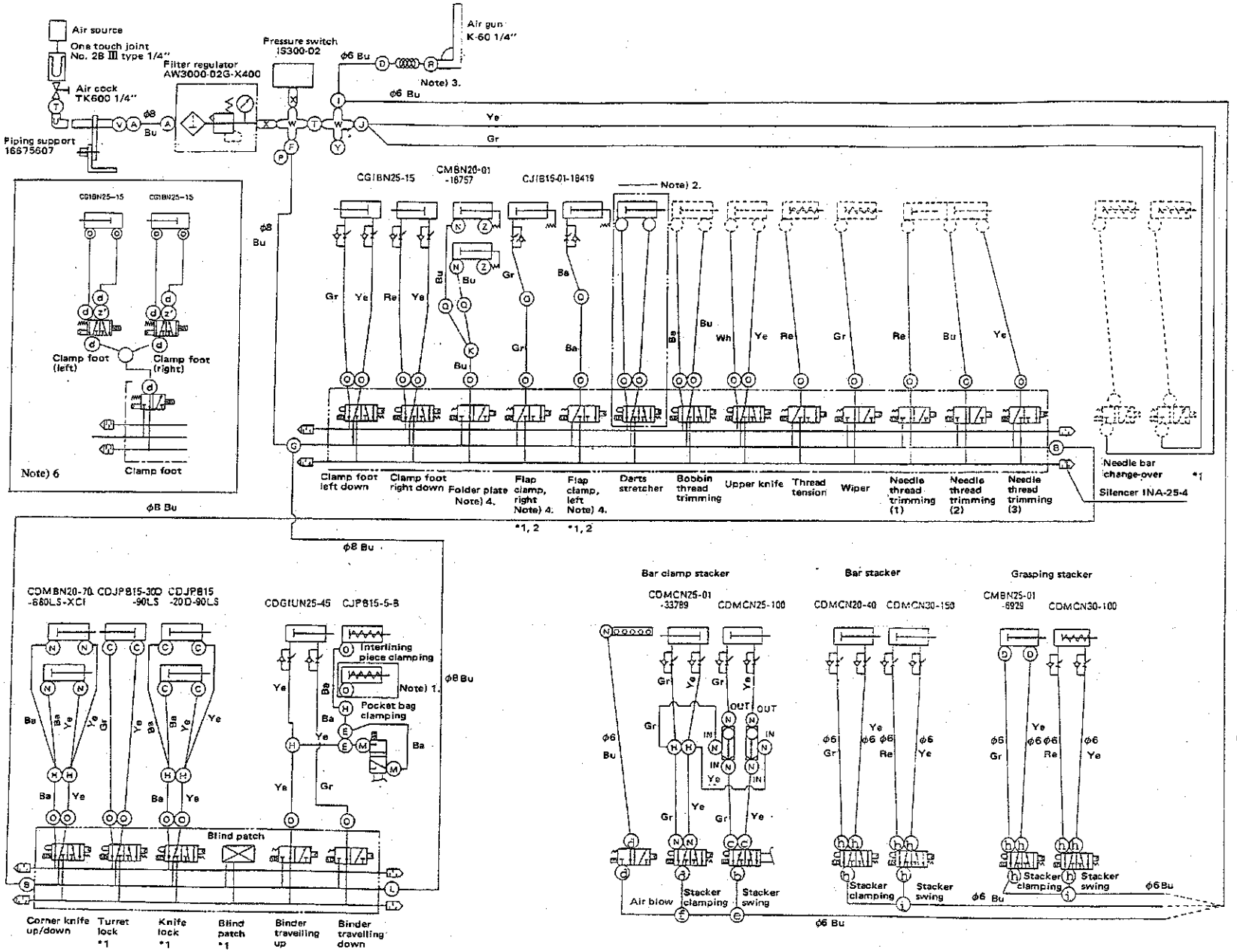
17. FLOW CHART OF STANDARD OPERATION (APW-231, 235, 239)



FLOW CHART OF STANDARD OPERATION (APW-232, 236, 240)



18. CIRCUIT DIAGRAM/PNEUMATIC CIRCUIT DIAGRAM (APW-231, 235, 239)



Description	Type	Symbol
Half union	KQH08-02	A
Half union	KQH08-01	B
Half union	KQH04-M5	C
Straight	KQH06-00	D
Straight	KQH04-00	E
Service tee union	KQY08-02	F
Service tee union	KQY08-01	G
Tee union	KQT04-00	H
Branch	KQU06-02	I
Branch	KQU04-02	J
Union Y	KQU04-00	K
Elbow union	KQL08-01	L
Elbow union	KQL04-02	M
Elbow union	KQL04-01	N
Elbow union	KQL04-M5	O
Blind cock	KQP-08	P
Tube coupler	KCH04-00	Q
Knife union for the partition	KQE06-02	R
		S
Nipple	1/4"	T
Elbow	1/4"	U
Socket	1/4"	V
Cross socket	1/4"	W
Long nipple	ℓ=50 1/4"	X
Plug	1/4"	Y
Element attached nipple	CM20-30-116	Z
Extension joint	M-SJ	Z'

Bar clamp stacker

Description	Type	Symbol
Half union	KQH06-02	a
Half union	KQH06-01	b
Half union	KQH04-01	c
Elbow union	KQL06-01	d
Elbow union	KQL04-01	N
Tee	KQT06-00	e
Tee	KQT04-00	H
Union Y	KQU06-00	f

Grasping stacker

Description	Type	Symbol
Elbow union	KQL06-01	g
Elbow union	KQL06-M5	h
Union Y	KQU06-00	i
		j

Bar stacker

Description	Type	Symbol
Elbow union	KQL06-M5	h
Union Y	KQU06-00	i

*1 is for the APW-240.
*2 is for the APW-236.

ABI
Bu
Ba
Gr
Re
Sb
Wh
Ye

Note) 1. When the pockets pieces fixing device (optional) is installed, be sure to attach the KQT04-00 to the interlining cloth fixing air hose and supply air to the pocket piece fixing device driving cylinder.

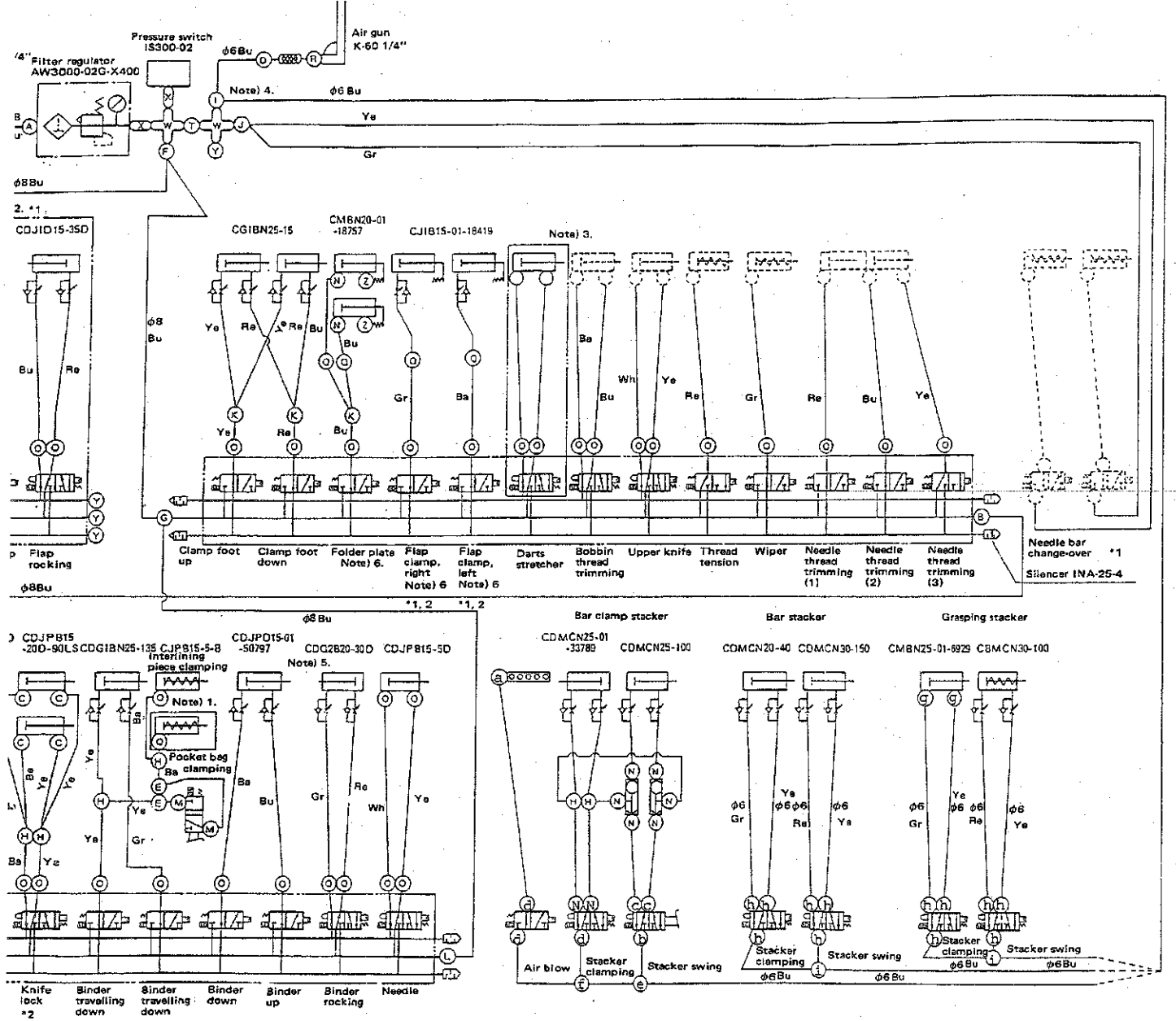
Note) 2. When the dart stretcher is installed, be sure to remove the blind plate from the manifold and attach the solenoid valve (with five ports) there.

Note) 3. Three types of the stackers are available. Be sure to supply air to the stacker whichever is used, from the KQU06-02 on the cross-mark of the sewing machine. When a stacker is not installed, be sure to fit the stopcock (KQP-06) to the KQU06-02.

Note) 4. When the optional clamp foot is installed, be sure to replace the solenoid valves of the left and right flap clamps from the N.O. to N.C. And replace the folding cylinder from the CMBN20-01-18757 to the CJB12-01-25318 and the flap clamp from the CJIB15-01-18419 to the CJB14-01-25319.

Note) 5. Use the hoses whose diameter are $\phi 4$ if not specified.

Note) 6. The pneumatic diagram of the clamp foot has been modified. The modification will be applied to the sewing machine of which serial number is 1035.



Description	Type	Symbol
Half union	KQH08-02	A
Half union	KQH08-01	B
Half union	KQH04-M5	C
Straight	KQH06-00	D
Straight	KQH04-00	E
Service tee union	KQY08-02	F
Service tee union	KQY08-01	G
Tee union	KQT04-00	H
Branch	KQU06-02	I
Branch	KQU04-02	J
Union Y	KQU04-00	K
Elbow union	KQL08-01	L
Elbow union	KQL04-02	M
Elbow union	KQL04-01	N
Elbow union	KQL04-M5	O
Blind cock	KQP-08	P
Tube coupler	KCH04-00	Q
Knife union for the partition	KQE06-02	R
		S
Nipple	1/4"	T
Elbow	1/4"	U
Socket	1/4"	V
Cross socket	1/4"	W
Long nipple	ℓ=50 1/4"	X
Plug	1/4"	Y
Element attached nipple	CM20-30-116	Z

Bar clamp stacker

Description	Type	Symbol
Half union	KQH06-02	a
Half union	KQH06-01	b
Half union	KQH04-01	c
Elbow union	KQL06-01	d
Elbow union	KQL04-01	N
Tee	KQT06-00	e
Tee	KQT04-00	H
Union Y	KQU06-00	f

Grasping stacker

Description	Type	Symbol
Elbow union	KQL06-01	g
Elbow union	KQL06-M5	h
Union Y	KQU06-00	i
		j

Bar stacker

Description	Type	Symbol
Elbow union	KQL06-M5	h
Union Y	KQU06-00	i

*1 is for the APW-239.
*2 is for the APW-235.

pieces fixing device (optional) is installed be sure to attach the KQT04-00 to the
ixing air hose and supply air to the pocket pieces fixing device driving cylinder.
tic flap feeder is installed, be sure to attach the feeder to the KQT-08-02 on the
sewing machine. And the feeder is not installed, be sure to fit the stopcock
(QT08-02.
etcher is installed, be sure to remove the bloind plate from the manifold and
d valve (with five ports) there.

Note) 4. Three types of the stackers are available. Be sure to supply air to the stacker whichever is used, from the KQU06-02 on the cross-mark of the sewing machine. When a stacker is not installed, be sure to fit the stopcock (KQP-06) to the KQU06-02.

Note) 5. There are two types of the air supplying methods to rock the binder in accordance with the types of the automatic flap feeder. When the automatic flap feeder is the right side type, pipe so that the green hose is onto the A port, and the red hose is onto the B port. When the automatic flap feeder is the left side type, pipe the hoses conversely.

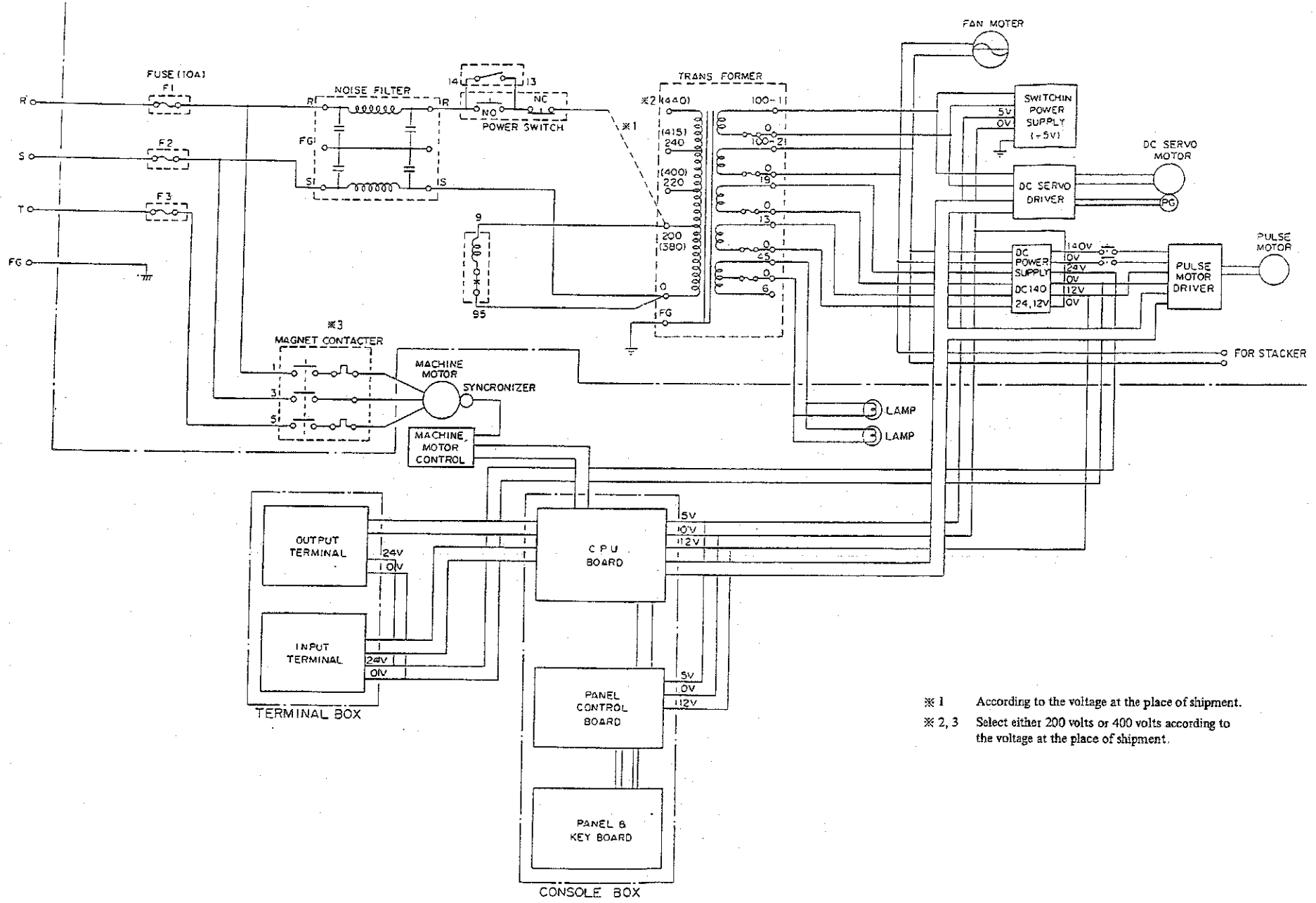
Note) 6. Replace the folding cylinder from the CMBN20-01-18757 to the CTB12-01-25318 and flap clamp cylinder from the CJIB15-01-18419 to the CJB14-01-25319.

Note) 7. Use the hoses whose diameter are φ4 if not specified.

ABBREVIATIONS

Bu ..... Blue
Ba ..... Black
Gr ..... Green
Re ..... Red
Sb ..... Sky blue
Wh ..... White
Ye ..... Yellow

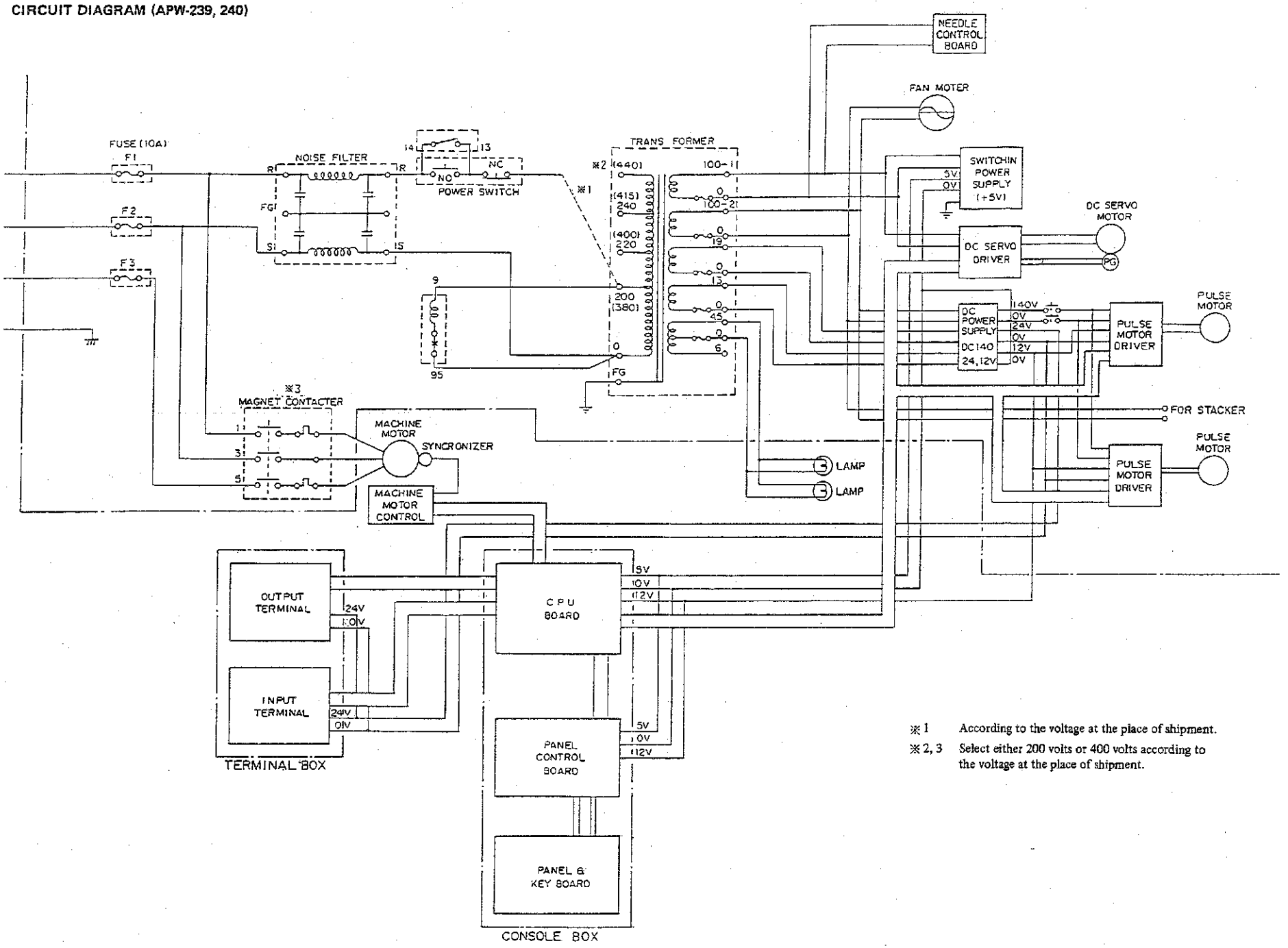
POWER CIRCUIT DIAGRAM (APW-231, 232, 235, 236)



※1 According to the voltage at the place of shipment.

※2, 3 Select either 200 volts or 400 volts according to the voltage at the place of shipment.

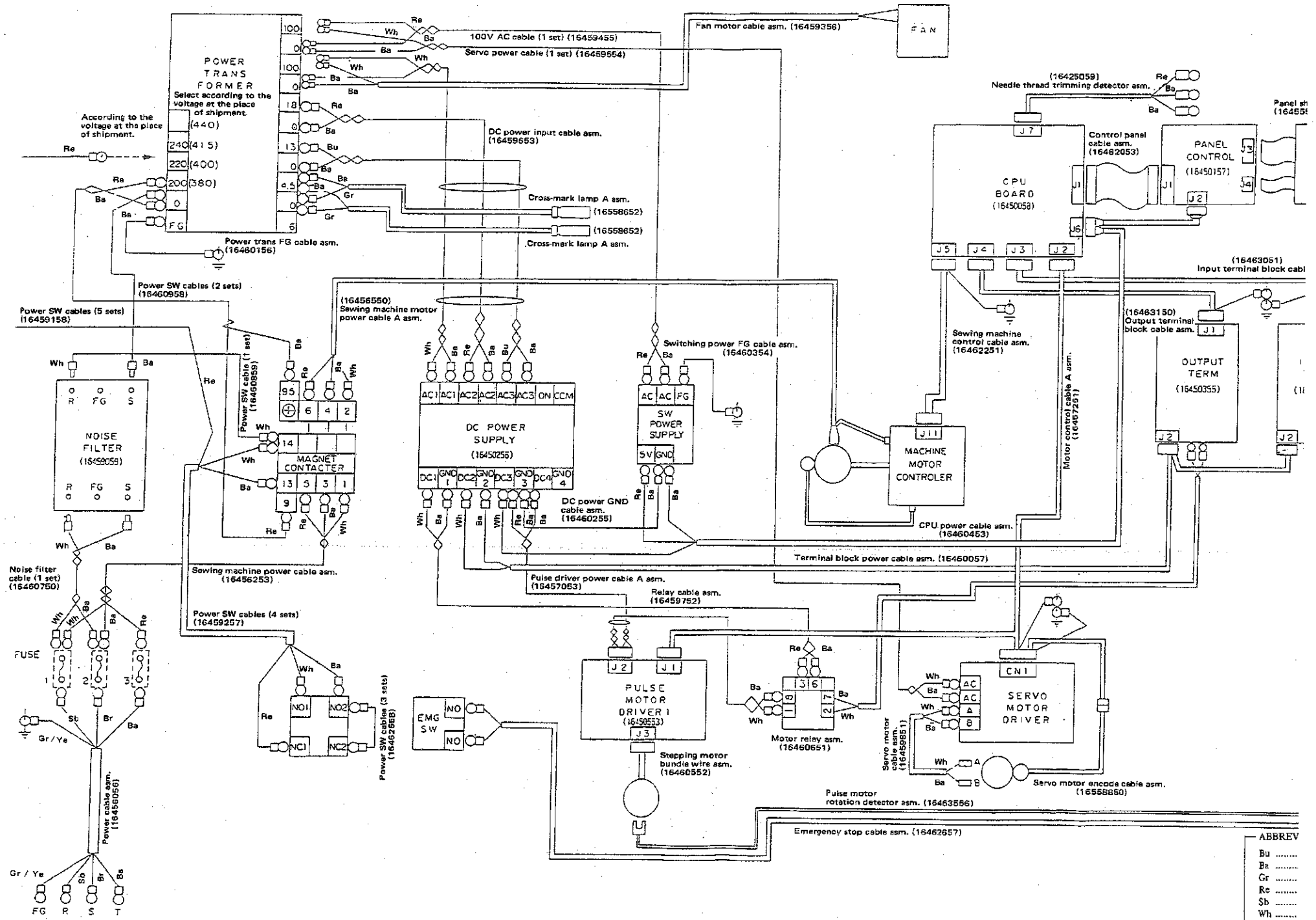
CIRCUIT DIAGRAM (APW-239, 240)

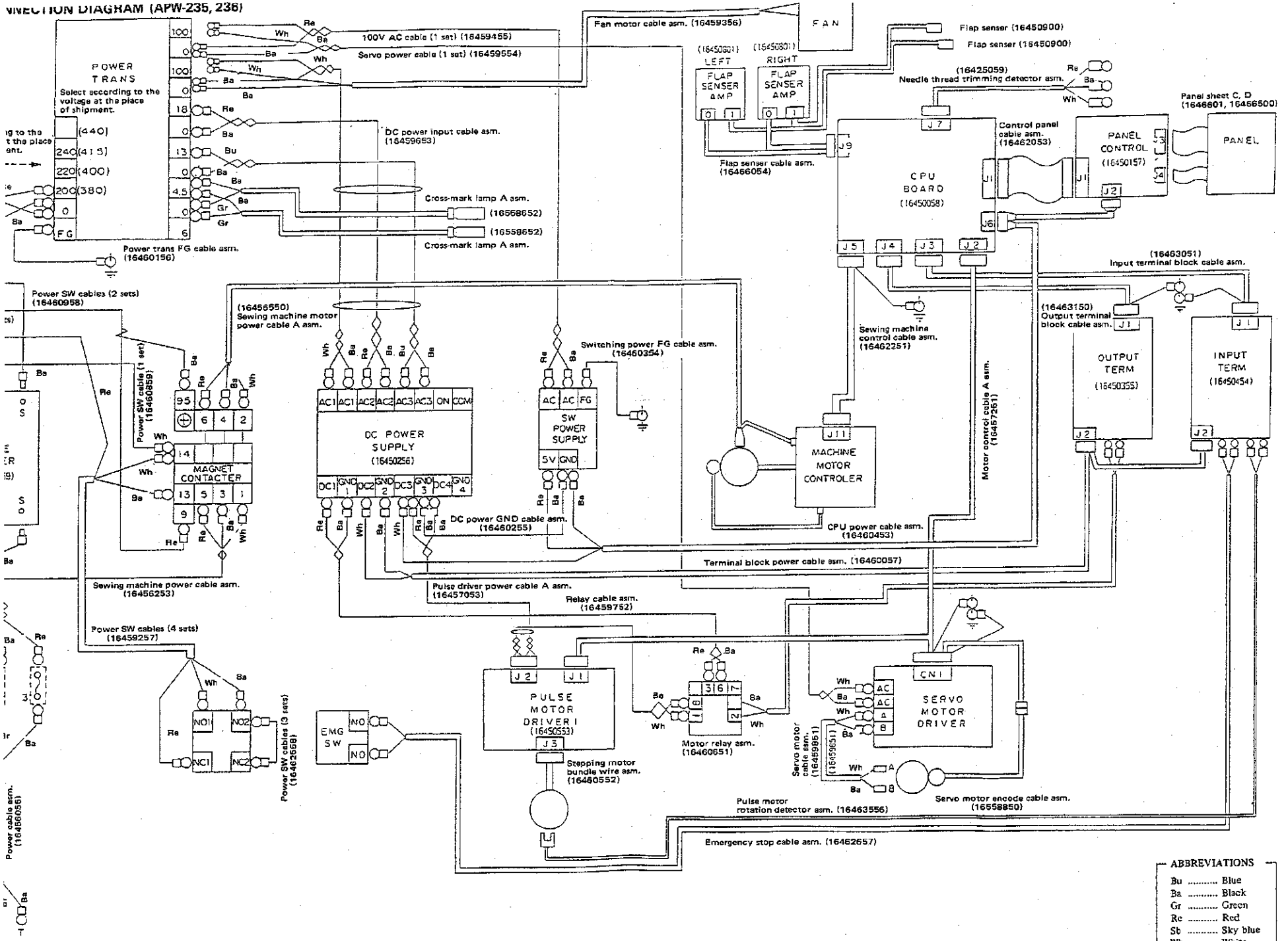


※1 According to the voltage at the place of shipment.

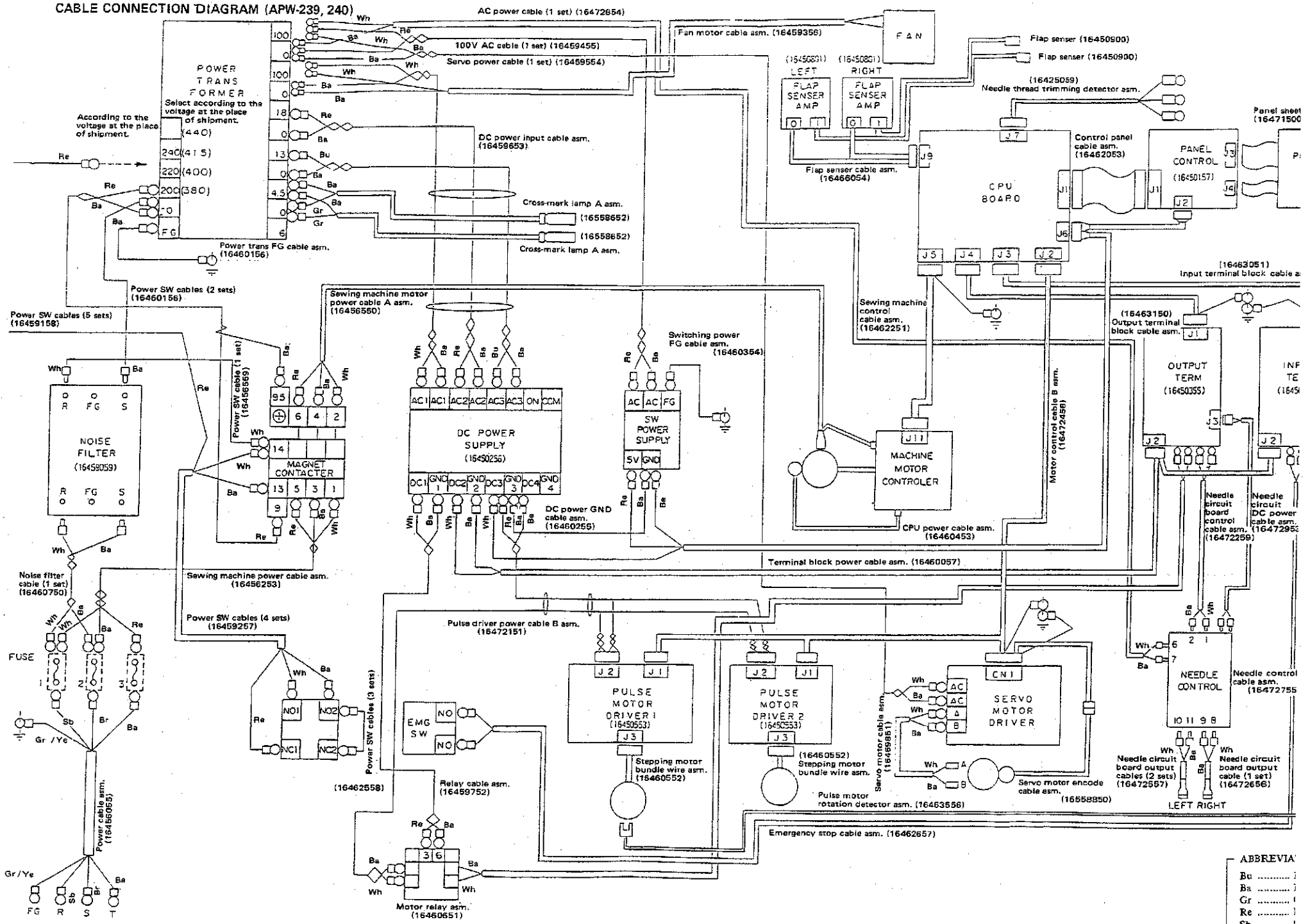
※2, 3 Select either 200 volts or 400 volts according to the voltage at the place of shipment.

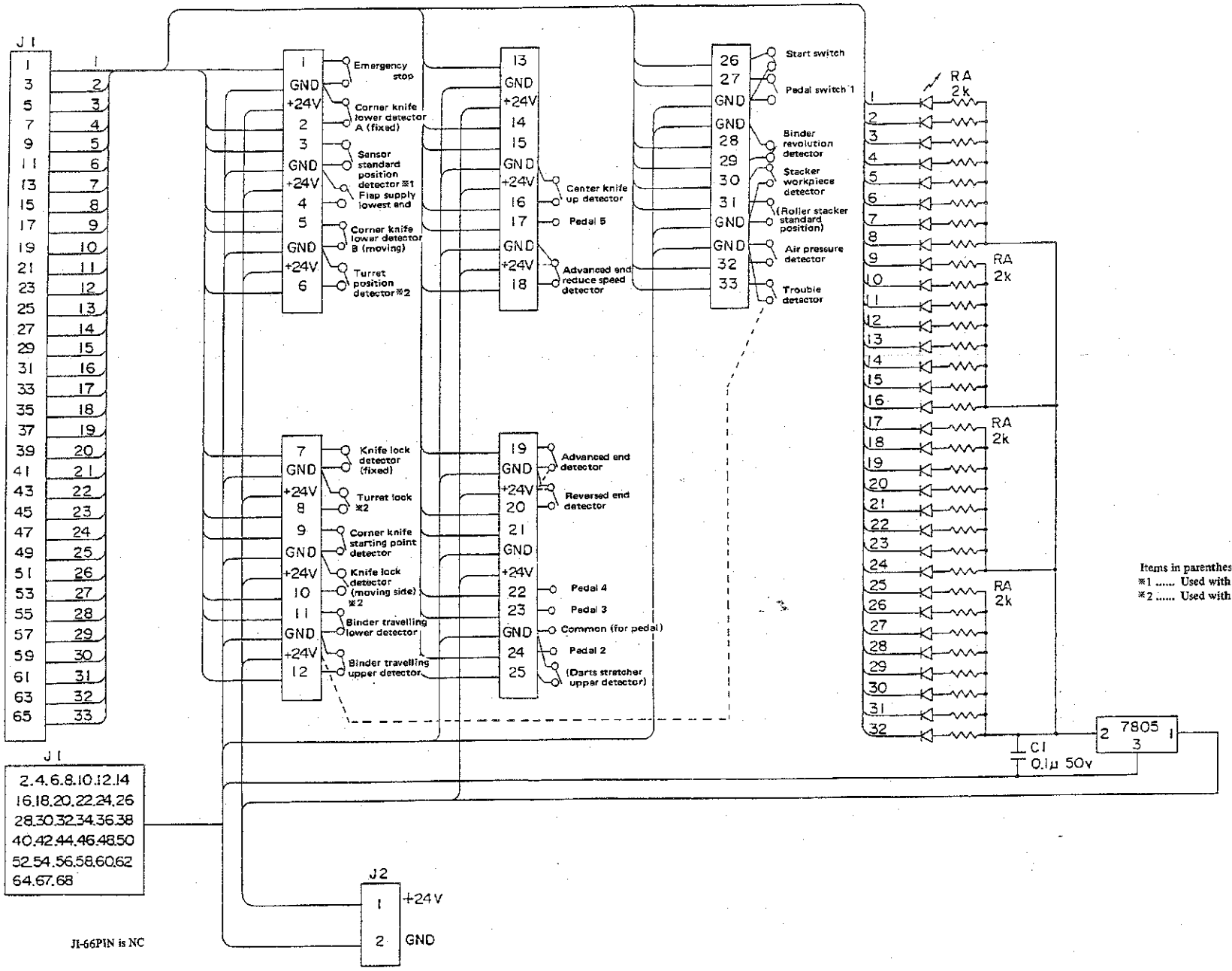
CABLE CONNECTION DIAGRAM (APW-231, 232)

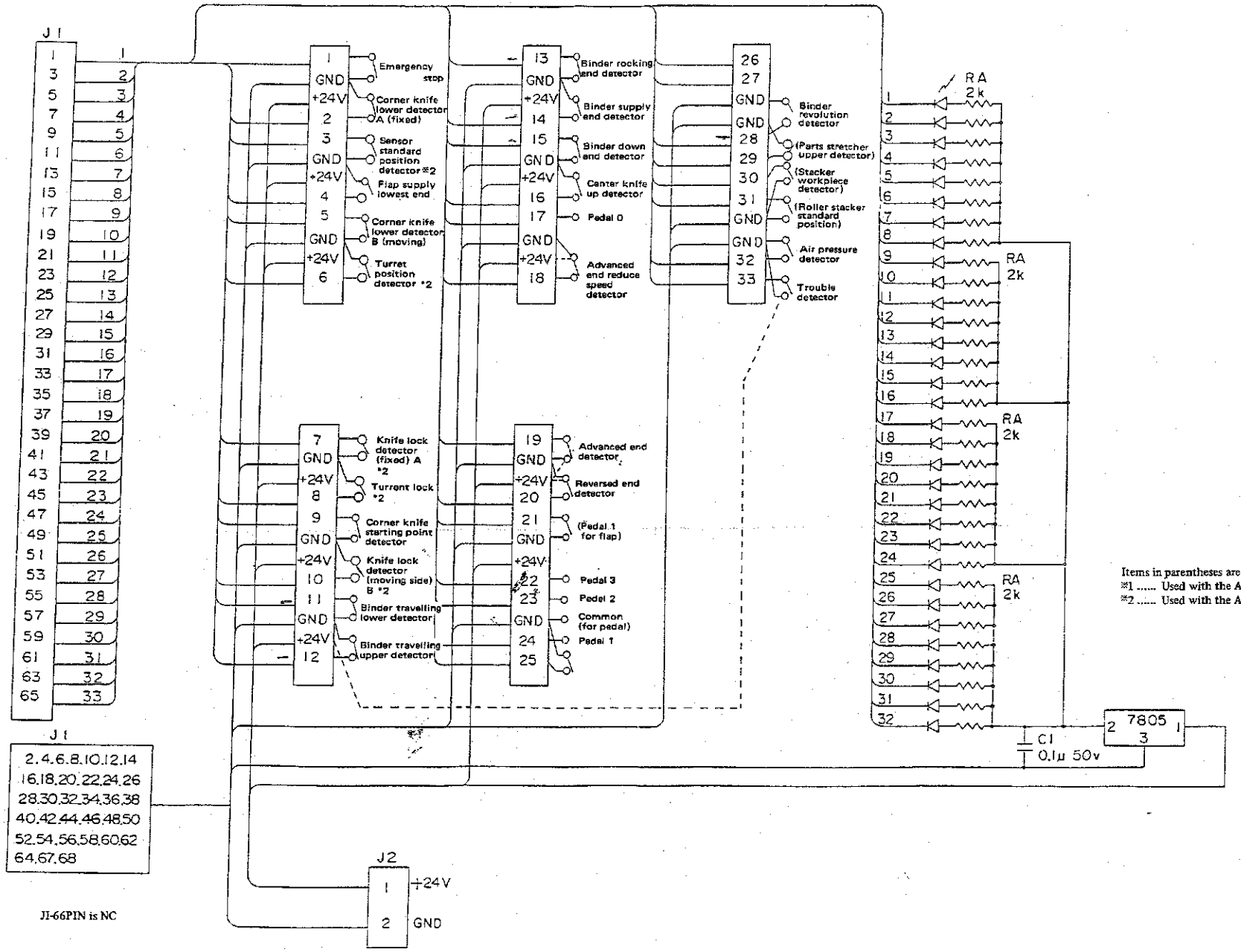



NJECTION DIAGRAM (APW-235, 236)
POWER TRANS
Select according to the voltage at the place of shipment.
100V AC cable (1 set) (16459455)
Servo power cable (1 set) (16459554)
DC power input cable asm. (16459683)
Cross-mark lamp A asm. (16558652)
Cross-mark lamp A asm. (16558652)
Power trans FG cable asm. (16460156)
Fan motor cable asm. (16459356)
FAN
Flap senser (16450900)
Flap senser (16450900)
LEFT
RIGHT
FLAP SENSER AMP
FLAP SENSER AMP
Needle thread trimming detector asm. (16425059)
Panel sheet C, D (16466501, 16466500)
Control panel cable asm. (16462053)
PANEL CONTROL (16450157)
PANEL
Flap senser cable asm. (16466054)
CPU BOARD (16450058)
(16463051) Input terminal block cable asm.
Power SW cables (2 sets) (16460958)
(16456550) Sewing machine motor power cable A asm.
Switching power FG cable asm. (16460354)
Sewing machine control cable asm. (16462251)
(16463150) Output terminal block cable asm.
OUTPUT TERM (16450355)
INPUT TERM (16450454)
Power SW cable (1 set) (16460859)
MAGNET CONTACTER
DC POWER SUPPLY (16450256)
SW POWER SUPPLY
MACHINE MOTOR CONTROLER
Motor control cable A asm. (16457261)
CPU power cable asm. (16460453)
DC power GND cable asm. (16460255)
Terminal block power cable asm. (16460057)
Sewing machine power cable asm. (16456253)
Pulse driver power cable A asm. (16457053)
Relay cable asm. (16459752)
Power SW cables (4 sets) (16459257)
EMG SW
PULSE MOTOR DRIVER I (16450553)
Stepping motor bundle wire asm. (16460552)
Motor relay asm. (16460651)
SERVO MOTOR DRIVER
Servo motor cable asm. (16459851)
Servo motor encode cable asm. (16558850)
Pulse motor rotation detector asm. (16463556)
Emergency stop cable asm. (16462657)
Power SW cables (3 sets) (16462568)
Power cable asm. (16460056)
ABBREVIATIONS
Bu ..... Blue
Ba ..... Black
Gr ..... Green
Re ..... Red
Sb ..... Sky blue
Wh ..... White
Ye ..... Yellow
Br ..... Brown

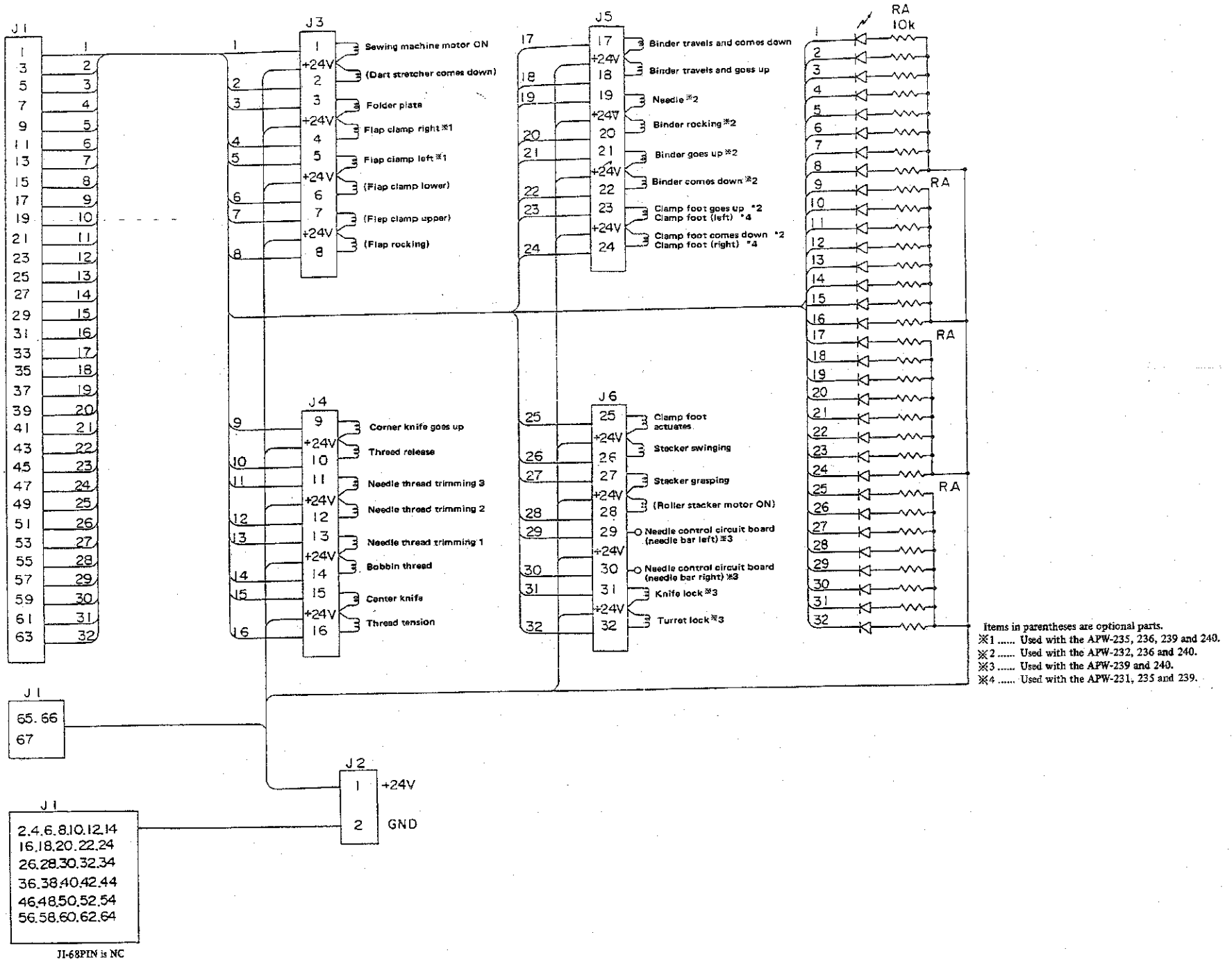
CABLE CONNECTION DIAGRAM (APW-239, 240)




J1
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
1 GND +24V 2 3 GND +24V 4 5 GND +24V 6
Emergency stop
Corner knife lower detector A (fixed)
Sensor standard position detector ※1
Flap supply lowest end
Corner knife lower detector B (moving)
Turret position detector ※2
13 GND +24V 14 15 GND +24V 16 17 GND +24V 18
Center knife up detector
Pedal 5
Advanced end reduce speed detector
26 27 GND GND 28 29 30 31 GND GND 32 33
Start switch
Pedal switch 1
Binder revolution detector
Stacker workpiece detector
(Roller stacker standard position)
Air pressure detector
Trouble detector
RA 2k
7 GND +24V 8 9 GND +24V 10 11 GND +24V 12
Knife lock detector (fixed)
Turret lock ※2
Corner knife starting point detector
Knife lock detector (moving side) ※2
Binder travelling lower detector
Binder travelling upper detector
19 GND +24V 20 21 GND +24V 22 23 GND 24 25
Advanced end detector
Reversed end detector
Pedal 4
Pedal 3
Common (for pedal)
Pedal 2
(Darts stretcher upper detector)
C1 0.1μ 50v
2 7805 3 1
J1
2.4.6.8.10.12.14
16.18.20.22.24.26
28.30.32.34.36.38
40.42.44.46.48.50
52.54.56.58.60.62
64.67.68
J1-66PIN is NC
J2
1 +24V
2 GND
Items in parentheses are optional parts.
※1 ..... Used with the APW-235 and 239.
※2 ..... Used with the APW-239.



Items in parentheses are optional parts.
※1 ..... Used with the APW-236 and 240.
※2 ..... Used with the APW-240.



Items in parentheses are optional parts.
※1 ..... Used with the APW-235, 236, 239 and 240.
※2 ..... Used with the APW-232, 236 and 240.
※3 ..... Used with the APW-239 and 240.
※4 ..... Used with the APW-231, 235 and 239.

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Please do not hesitate to contact our distributors or agents in your area for further informations necessary.