

technical manual
impact dot matrix printer
Model-3110

EPSON

EPSON AMERICA, INC.

INTRODUCTION

This Maintenance Manual has been prepared to provide the user of the EPSON Impact Dot Matrix Printer Model-3110 with technical information on the mechanism, operating principle, maintenance and repair of the printer.

Major technical modifications, if required in the future, will be described in SERVICE BULLETINS, which can be used in conjunction with this book.

The specifications, design guides for electrical circuits and casing, and instructions for daily use are described in the Technical Guide book for the Model-3110.

For detailed information on the printer's parts, refer to the PRICE LIST issued in a separate volume.

***The contents of this book are subject to change without prior notice.**

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CHAPTER 1

MECHANISMS AND OPERATING PRINCIPLES

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1.1 MECHANISMS

This machine is a dot matrix printer equipped with a dot head of the same model that has been very successfully used in the EPSON Dot Matrix Printers of the M-500 Series which are very compact, high-speed and high-reliability machines.

Photos 1.1 to 1.6 show exterior views of the Model-3110 Printer.

This printer consists principally of seven functional blocks (frame section plus six mechanisms). All these functional blocks will be outlined in Pars. 1.1.1 to 1.1.8 and the operating principles of the mechanisms, Par. 1.2.

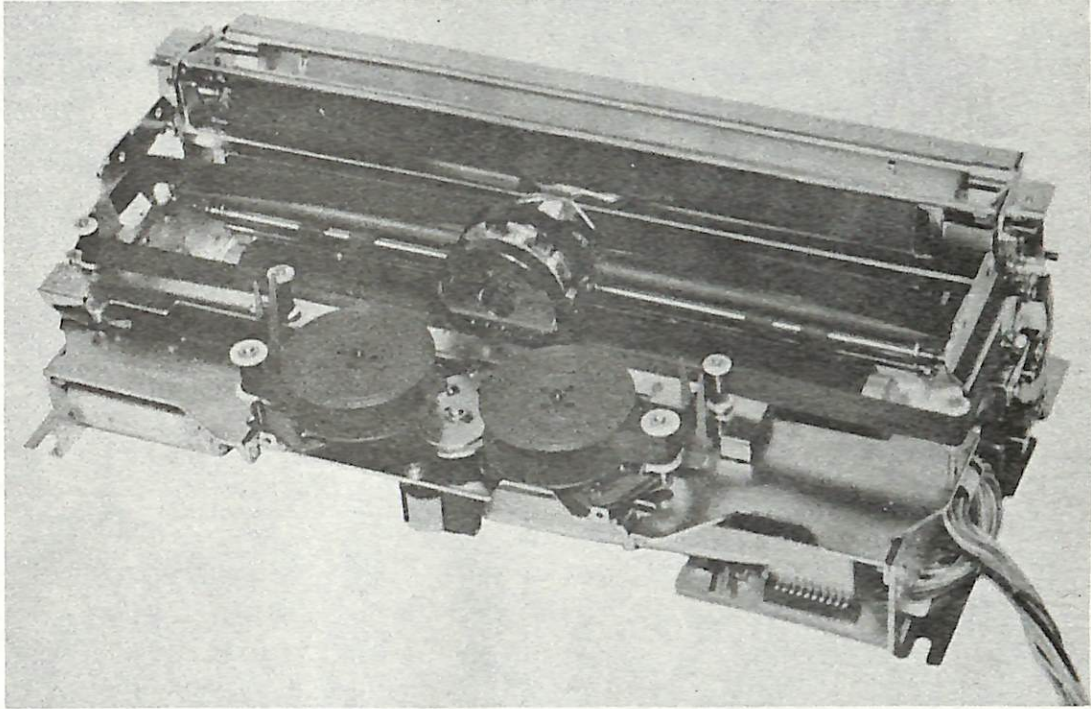
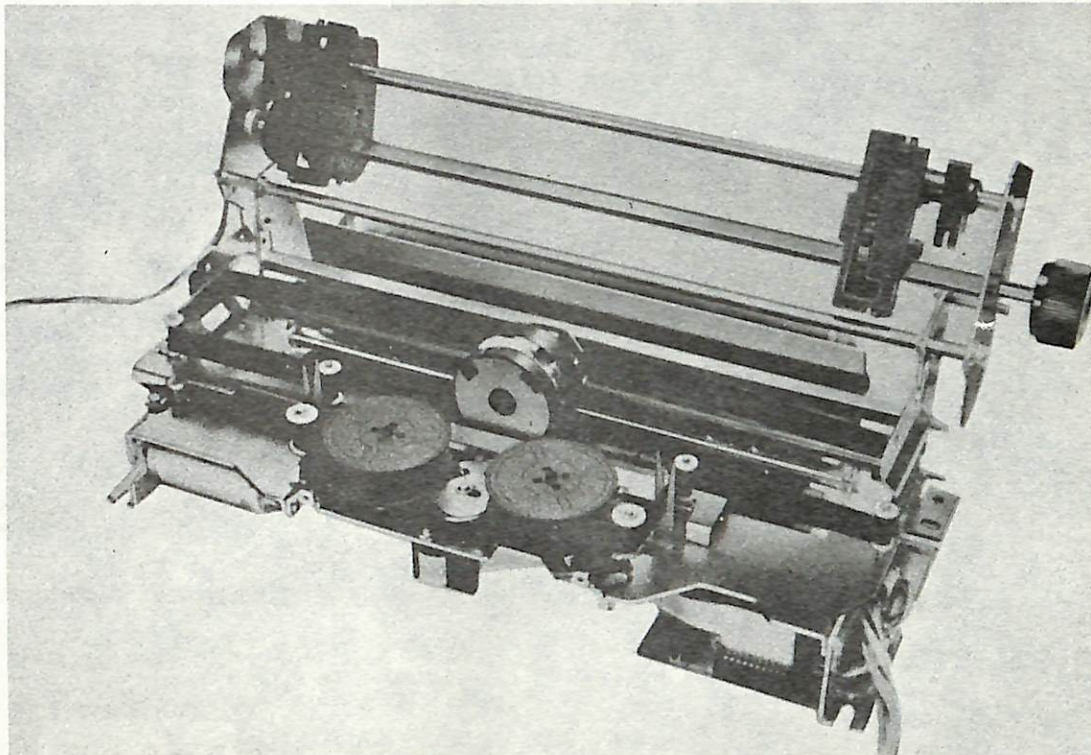
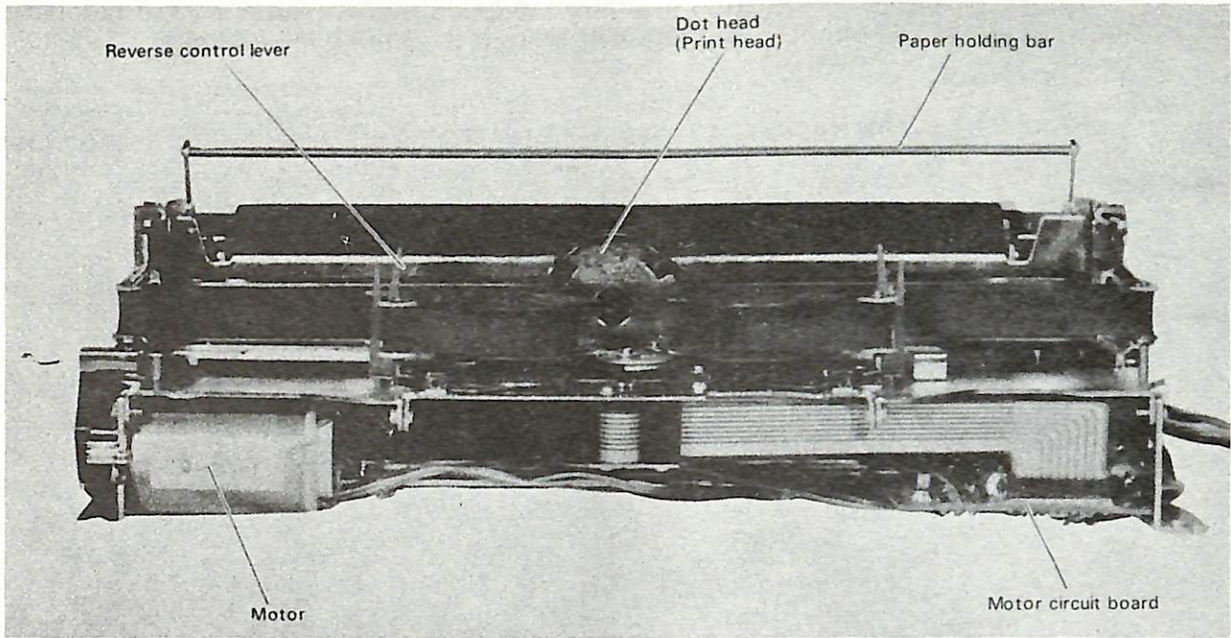


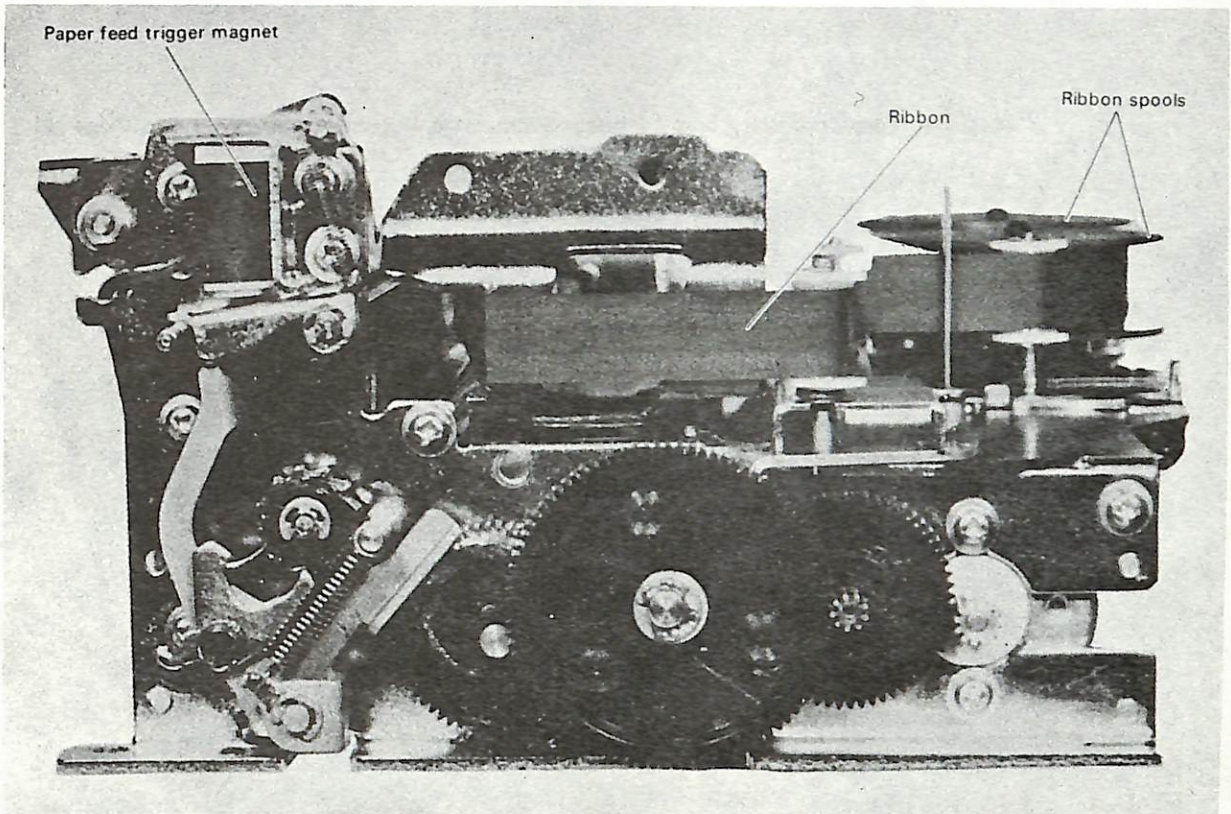
Photo 1.1 Model-3110 / Type F (as viewed obliquely from above on the front side)



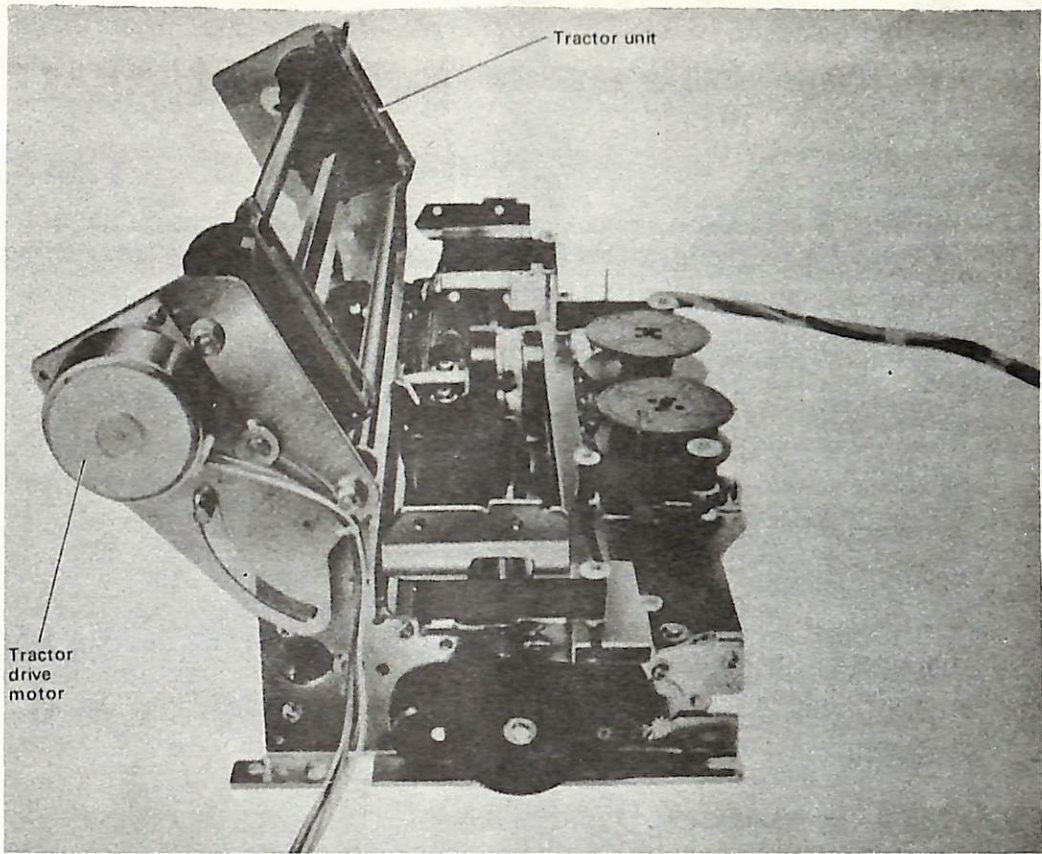
Phot 1.2 Model-3110 / Type T (as viewed obliquely from above on the front side)



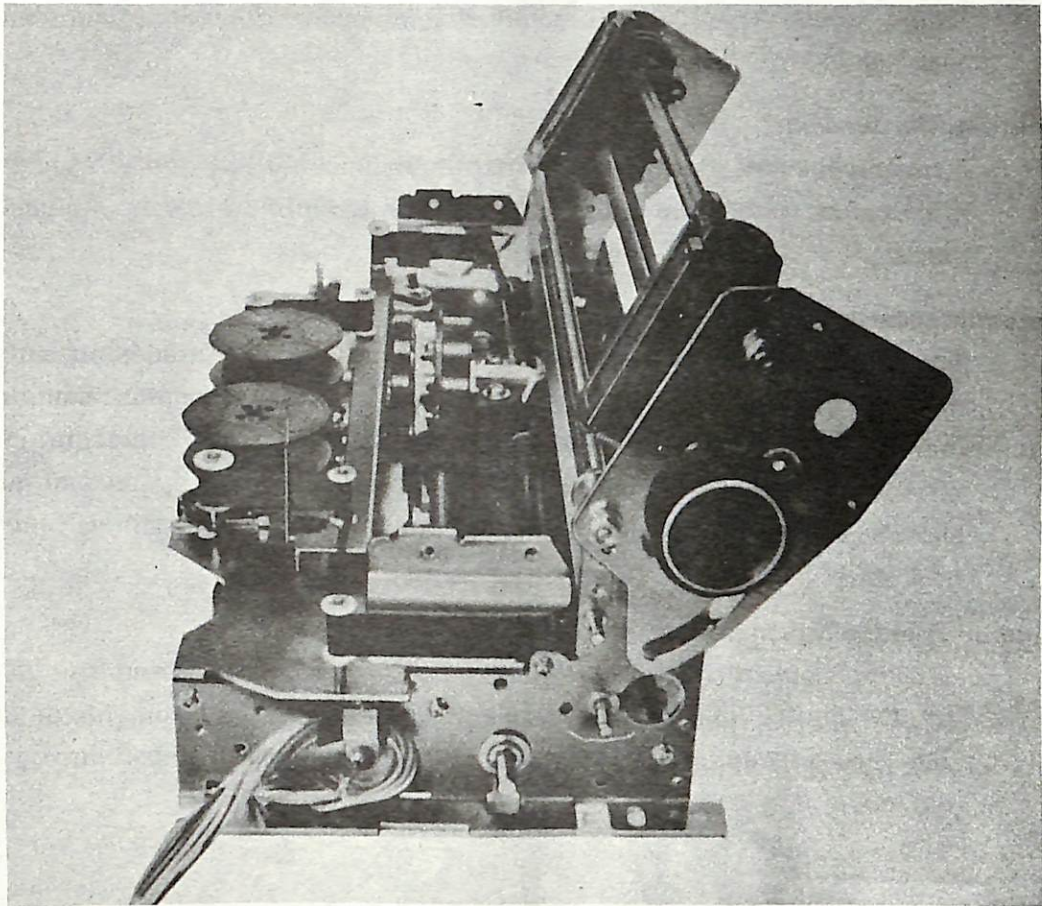
**Photo 1.3 Construction of Model-3110/Type F
(as viewed from the front side)**



**Photo 1.4 Construction of Model-3110/Type F
(as viewed from the frame A side)**



**Photo 1.5 Construction of Model-3110/Type T
(as viewed from the frame A side)**



**Photo 1.6 Construction of Model-3110/Type T
(as viewed from the frame B side)**

1.1.1 Frame Section

The frame section consists of two frame elements named frame A and frame B, respectively, which constitute the two side structural members of the body of the Model-3110 Printer.

1.1.2 Drive Mechanism

The drive mechanism consists of a DC motor and a motor circuit board disposed between frames A and B.

1.1.3 Power Transmission Mechanism

The power transmission mechanism consists of a first reduction gear, a transmission gear and a lead cam gear, all these being located outside the space limited by frames A and B. The entire mechanism operates synchronously with the operation of the drive motor.

1.1.4 Paper Feeding Mechanism (for Type F Printer)

The paper feeding mechanism feeds (advances) the paper having desired characters printed on it, at predetermined pitch. It consists principally of a paper guide unit, a paper feed trigger magnet and various levers associated therewith.

1.1.5 Paper Feeding Mechanism (for Type T Printer)

The Type T Printer of the Model-3110 can print on a continuous business form. After desired characters have been printed, the paper is fed forwardly by a tractor unit at predetermined pitch like in the Type F. Those levers which are provided in Type F Printer for paper feeding are therefore not necessary any longer to the Type T, which is thus of simpler construction as compared with the Type F.

1.1.6 Printing Mechanism

This mechanism, the most important mechanism of this printer, consists of a lead cam, a dot head unit, a head carrier assembly, a platen, and some other parts.

1.1.7 Detecting Mechanism

The detecting mechanism consists of a T (timing signal) detector and an R (rest signal) detector. The T detector consists of a tachometer generator incorporated in the DC motor mentioned above, and the R detector consists of a photocoupler. The two series of signals, i.e., timing signals and reset signals, are used to control various actions of the printer such as printing and paper feeding.

1.1.8 Ribbon Feeding Mechanism

This mechanism consists of a ribbon unit disposed on the front side of the printer, and an inked ribbon is rolled round two spools of this ribbon unit. The feed direction of the ribbon can be automatically reversed through detection of eyelets.

1.2 OPERATING PRINCIPLES

1.2.1 Drive Mechanism

In this mechanism, a high-performance DC micromotor is used. As shown in Fig. 1.1 (Block Diagram of Drive Mechanism), the mechanism consists of a motor block incorporating a tachometer generator (T.G.) which can take out power in proportion to the rotation of the motor armature, and a circuit board block. In the circuit board block, the following circuits are provided:

- Motor speed control circuit,
- START /STOP control circuit,
- Motor drive circuit, and
- Electric brake circuit.

While the printer is in standby state, the signal applied to the motor drive signal terminal is of HIGH level and consequently the drive transistor of the motor drive circuit is in ON state. Thus, power is not supplied to the motor, which keeps being in halted state.

When Print Command is given, a motor drive signal of HIGH to LOW level is applied to the START /STOP control circuit. Consequently, the drive transistor of the motor drive circuit passes to OFF state, causing the motor to start. Output of the tachometer generator incorporated in the motor is then applied to the motor speed control circuit to control the drive transistor of the motor drive circuit so that the motor rotates at constant speed.

On completion of the predetermined printing cycle, a motor drive signal of LOW to HIGH level is applied to the START /STOP control circuit, causing the drive transistor to return to ON state. Thus, power supply to the motor is cut and at the same time the brake circuit functions to short-circuit the motor at its terminals, causing the motor to be quickly stopped. One print cycle is thus completed.

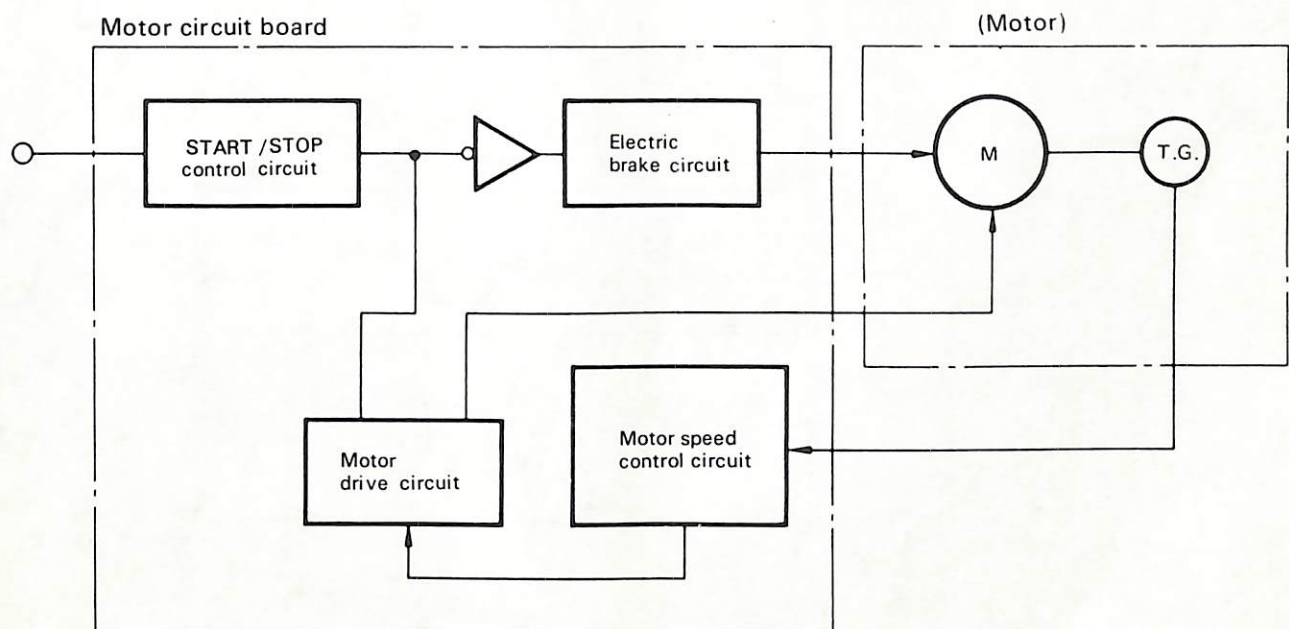


Fig. 1.1 Block Diagram of Drive Mechanism

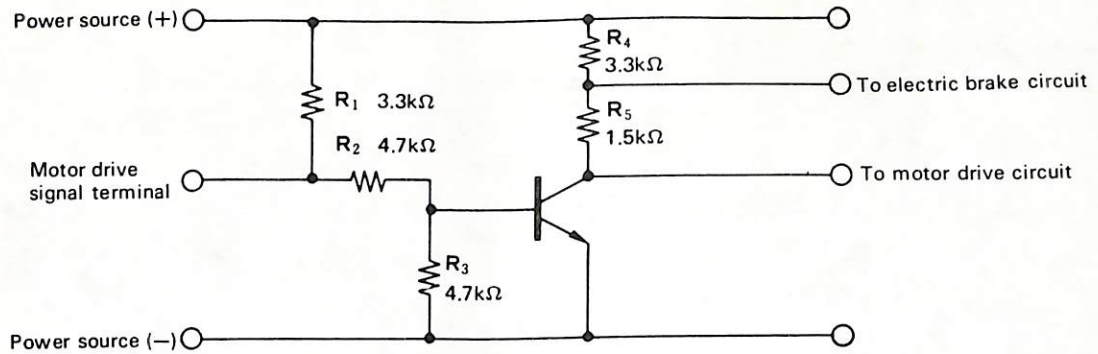


Fig. 1.2 START/STOP Control Circuit

1.2.2 Detecting Mechanism

The detecting mechanism consists of a T (Timing Signal) detector and an R (Reset Signal) detector.

(1) T Detector

The tachometer generator contained in the DC motor generates timing signals, which are outputted after having been shaped.

Timing signals T_n and T_n' ($n = \text{one of the integers of 1 to 600}$) are generated as the motor rotates. The timing of printing or paper feeding is determined according to which timing signal is selected.

(2) R Detector

The R detector of the Model-3110 Printer is provided on the motor circuit board mounting plate.

This R detector consists of a LED, a phototransistor and a waveform shaping circuit, and generates a reset signal R when the R detecting plate fixed to the head carrier passes between the LED and the phototransistor. Appearance of the falling edge of reset signal R means that printing is now possible.

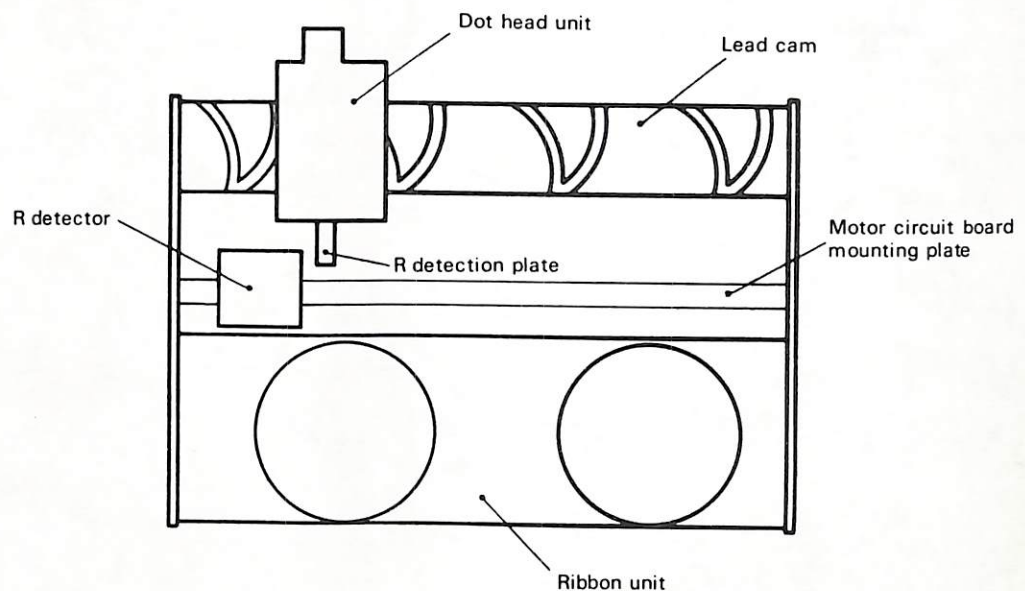


Fig. 1.3 R Detector and Related Elements

1.2.3 Power Transmission Mechanism

① The transmission gear train is disposed on the frame A side and consists of :

- First reduction gear placed on the motor shaft,
- Second reduction gear,
- Transmission gear,
- Lead cam gear, and
- Ribbon feed cam gear.

(See Fig. 1.4.)

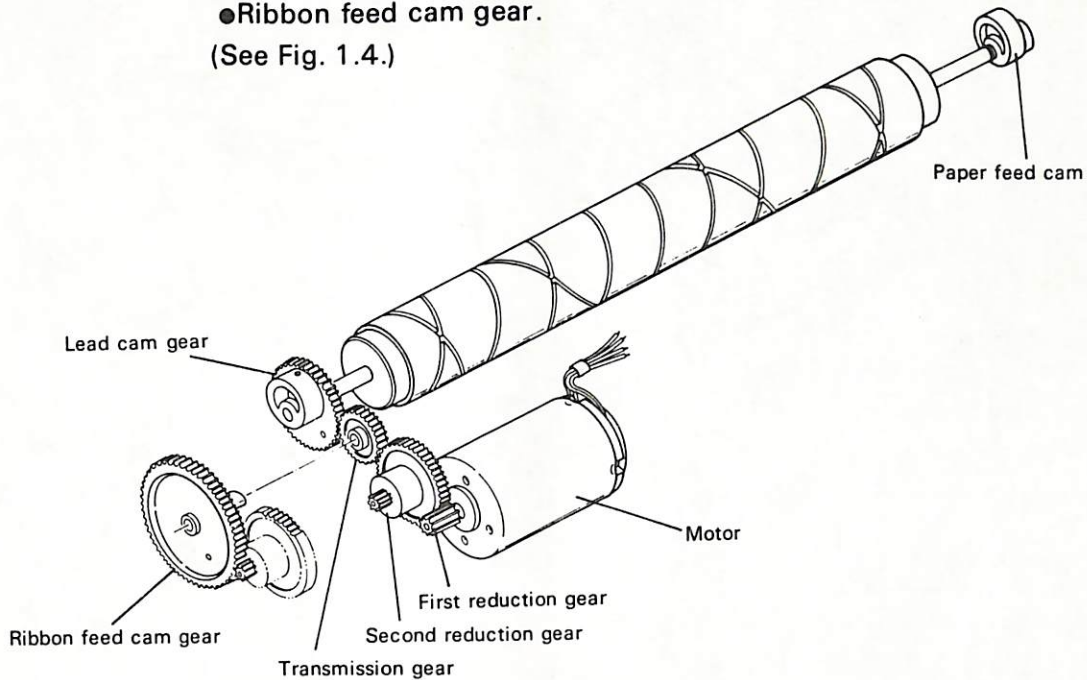


Fig. 1.4 Transmission Gear Train

② On the frame B side, the paper feed cam is securely placed on the lead cam shaft and it makes 13 turns per print cycle synchronously with the lead cam. (This paper feed cam is not provided in the Type T Printer.)

1.2.4 Printing Mechanism

The principal elements of the printing mechanism are a dot head, a lead cam and a platen. The dot head contains 7 drive coils, 7 actuator plates and 7 dot wires disposed in circular form.

The dot wires can be guided smoothly by two wire guides and a nose having a guide of hard material. The wires are precisely aligned at their tips.

The dot head is mounted on a head carrier smoothly guided on carrier shafts A and B in parallel with the platen.

In the Model-3110, printing is performed by energizing dot wire driving coils in time to timing pulses generated as the motor rotates. The drive coils thus energized drives the corresponding dot wires, which impact against the platen via ribbon and paper. (See Figs. 1.5 and 1.6.)

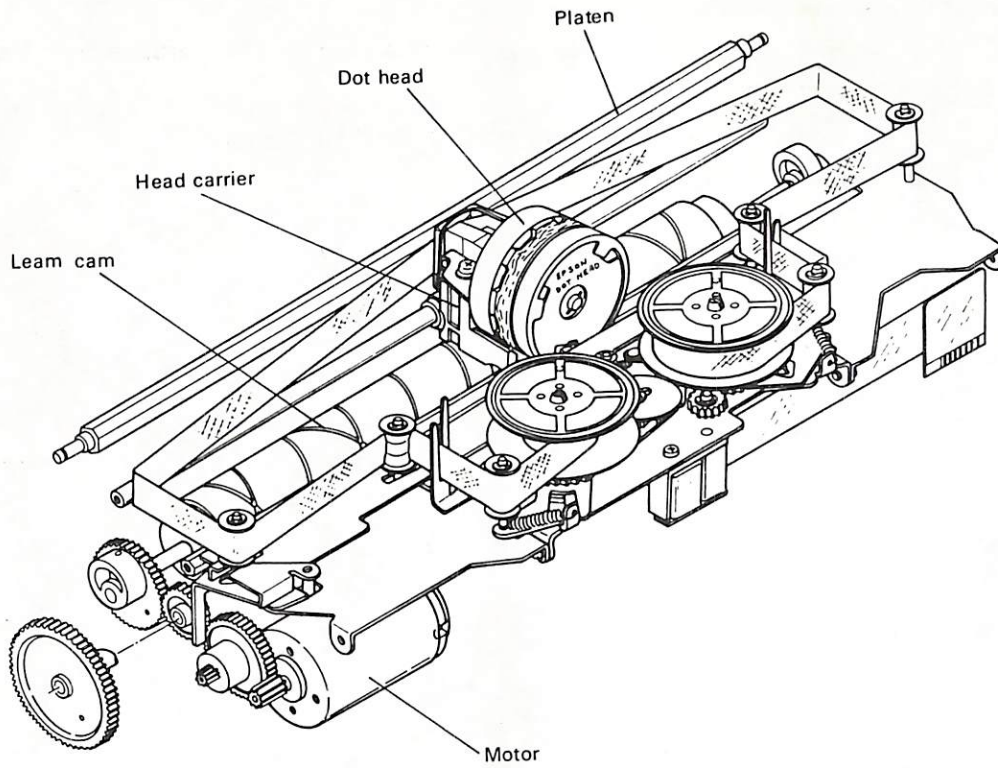


Fig. 1.5 Construction of Printing Mechanism

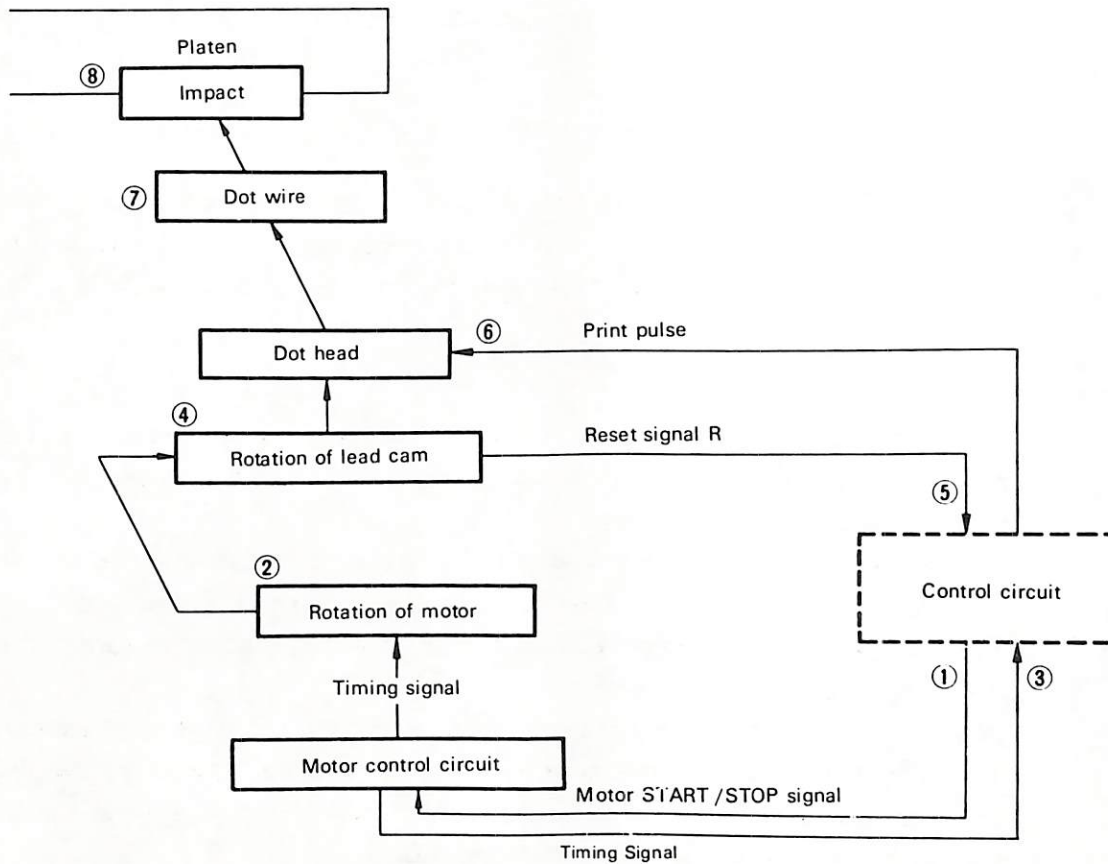


Fig.1.6 Block Diagram of Printing Mechanism

The operating principle of the printing mechanism is described below, referring to Figs. 1.7 to 1.11.

(1) Rotation of Lead Cam

- ① When a motor drive signal is applied to the motor, the latter begins to rotate and it drives the lead cam gear in direction (a) Fig. 1.7 via the gear train.

The rotation of the lead cam gear secured to the lead cam by spring pin causes the lead cam to rotate synchronously with the lead cam gear.

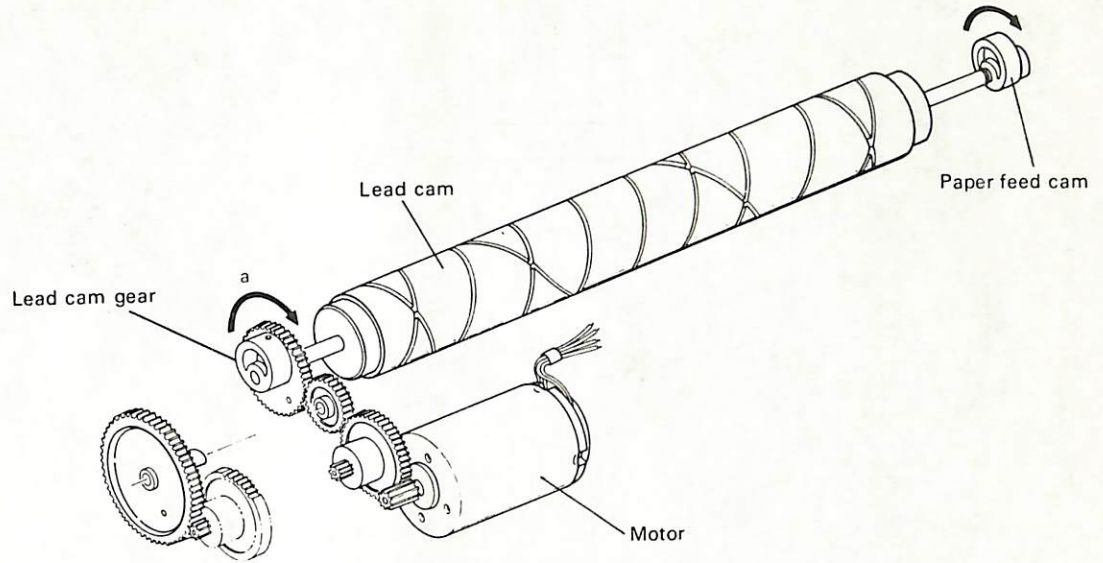


Fig. 1.7 Rotation of Lead Cam Gear and Lead Cam

- ② The lead cam has an endless spiral groove in its surface. The rotation of the lead cam causes a tracer engaged in this groove to move in direction (b) or (c) Fig. 1.8.

A complete displacement of the tracer in direction (b) which is the printing direction is performed through 8 turns of the lead cam and that in direction (c) which is the return direction, through 5 turns of the lead cam.

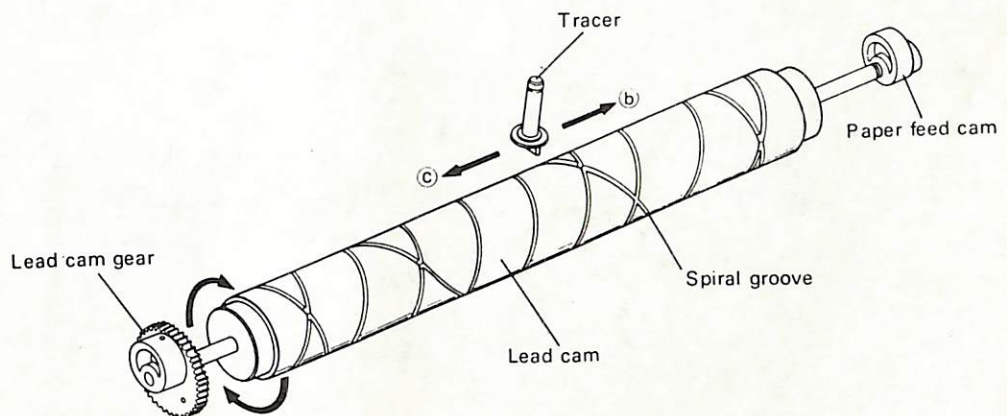


Fig. 1.8 Operation of Tracer

- ③ As shown in Fig. 1.9, the tracer is concave at its tip portion so as to be able to select the proper course as it passes each intersection of the groove lines on the lead cam. The concavity of the tip also serves to prevent the tracer from becoming unsteady when it passes the intersection.

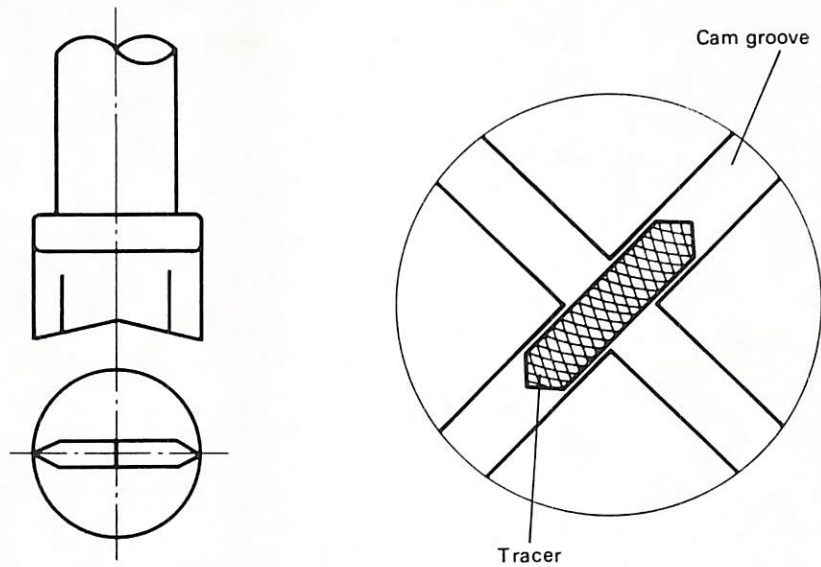


Fig. 1.9 Shape of Tracer

- ④ The tracer is freely rotatably assembled with the head carrier so that its movement causes the head carrier to move. (See Fig. 1.10.)

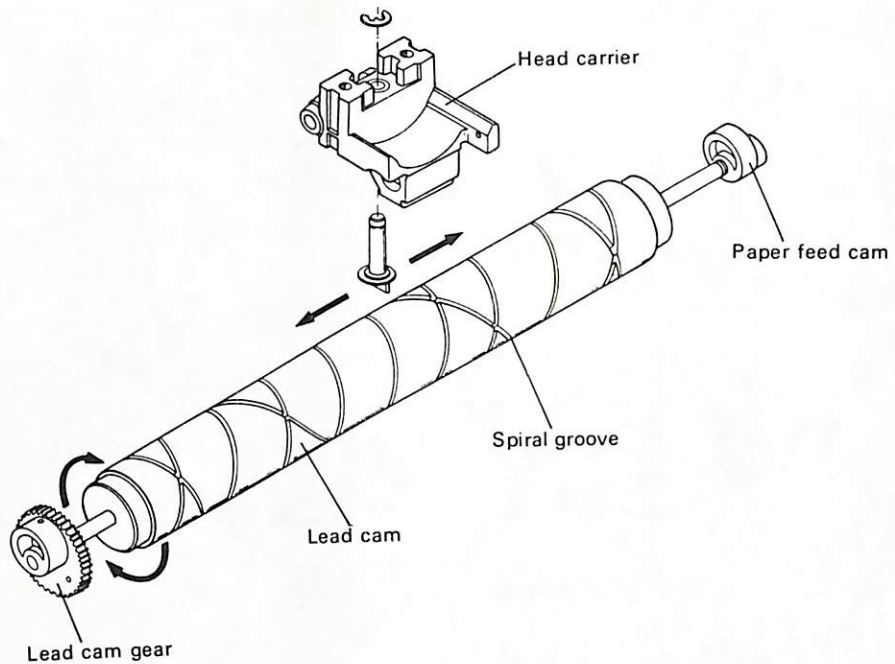


Fig. 1.10 Operation of Head Carrier

⑥ The dot head is mounted on the head carrier as shown in Fig. 1.11. It therefore goes without saying that movement of the head carrier causes the dot head to move.

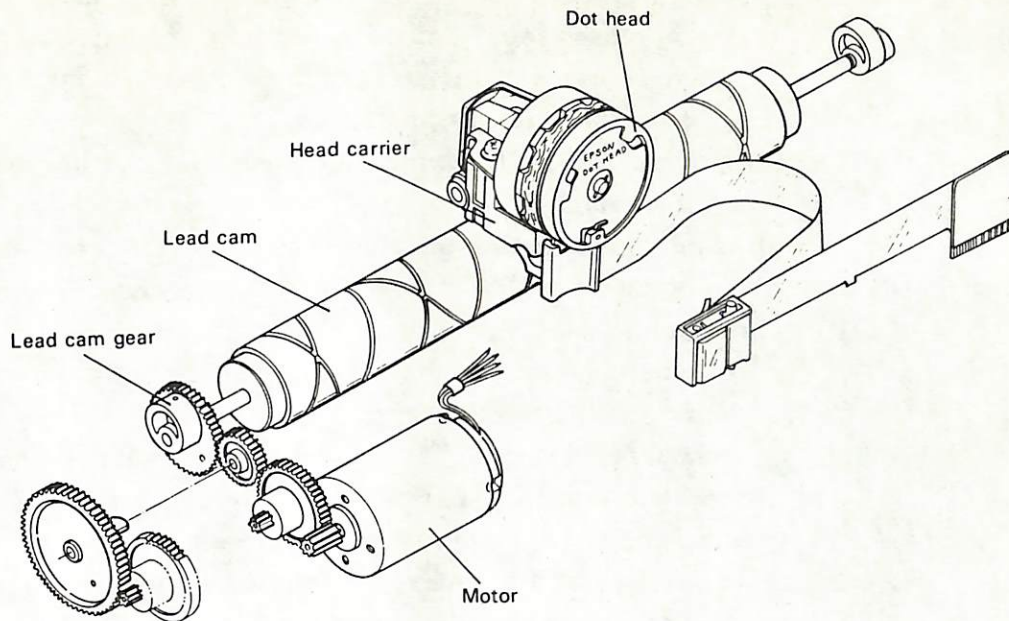


Fig. 1.11 Operation of Dot Head

(2) Printing Operation of Dot Head

A) The operation of a dot wire in printing one dot is described below.

- ① Upon energization of a drive coil (print solenoid), the actuator plate associated therewith is attracted by the iron core. In consequence of this, the dot wire in engagement with the actuator plate is driven toward the platen in the direction of arrow Fig. 1.12.

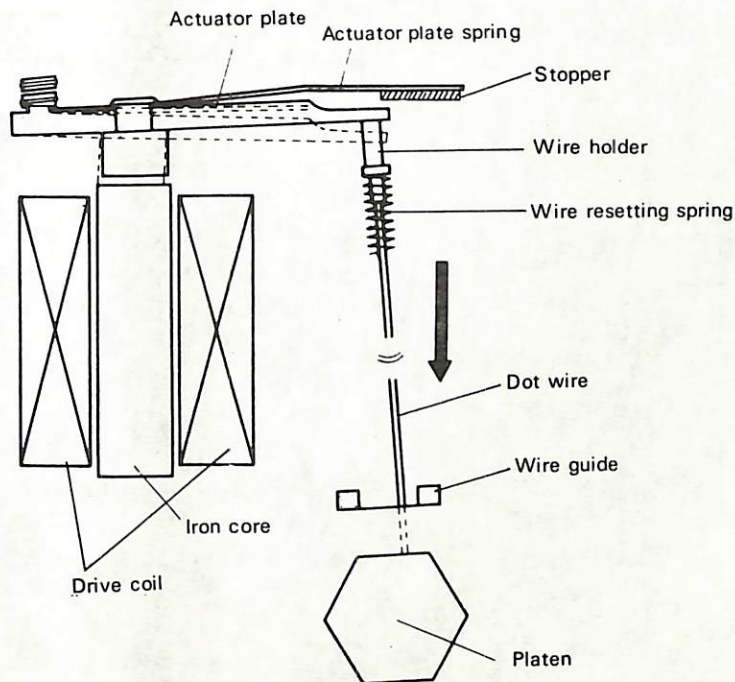


Fig. 1.12 Operation of Dot Wire

- ② The dot wire driven finally impacts against the platen via ribbon and paper, thus printing a dot in the paper.
- ③ When the drive coil has been de-energized, the actuator plate returns to the initial state by the action of the actuator plate spring. On the other hand, the dot wire, after having impacted against the platen, returns to the initial state under the reaction of impact and the action of the wire resetting spring.

B) Operation of the dot head in printing one character (for example, letter "X" with dot matrix of 5×7) :

- ① As the motor rotates, the tachometer generator contained in it generates timing pulses at time intervals of about 0.55msec. The rotation of the motor also causes the lead cam to rotate, which in turn causes the head carrier and therefore the dot head mounted on it to move (about 0.3mm during each lapse of 1.1msec).
When letter X is to be printed, drive coils (print solenoids) Nos. 1, 2, 6 and 7 are first energized in time to timing pulse T_n , then coils Nos. 3 and 5 in time to timing pulse T_{n+1} and so on.
- ② The surface of the lead cam is so grooved that printing in 80 columns in a line will be completed through 8 turns of the lead cam and the return of the dot head to line start position, through 5 turns.

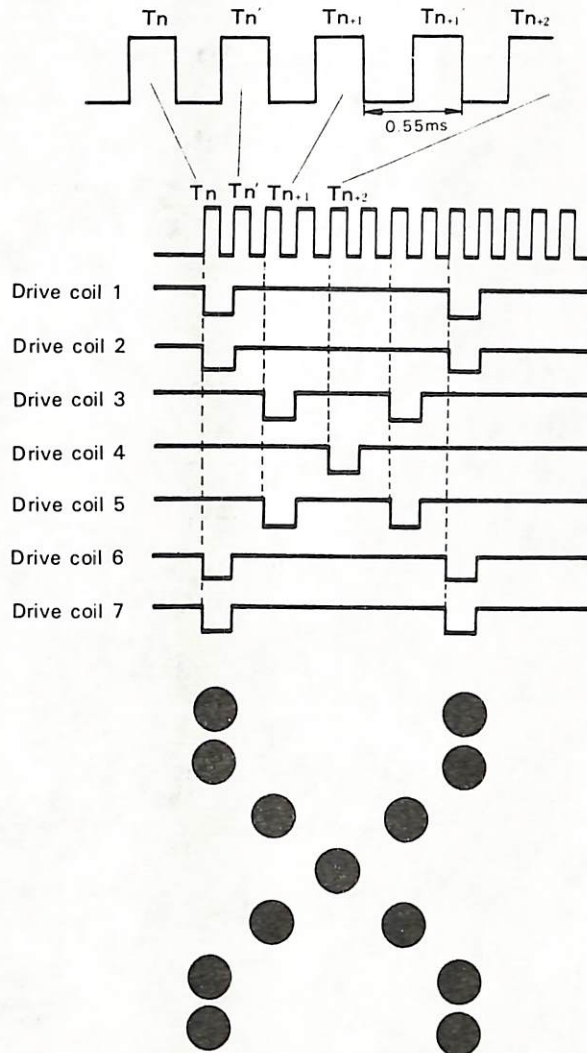


Fig. 1.13 Print Timing Chart

1.2.5 Paper Feeding Mechanism

1. General Description of Paper Feeding Mechanism

(1) Type F

The paper feeding mechanism of the Model-3110/Type F can perform normal feed, quick feed and paper release. In parallel with the platen, paper feeding rollers of hard rubber are disposed in a paper guide unit between frames A and B. A paper holding roller made of rubber is in engagement with each of these paper feeding rollers at a certain contact pressure. The paper holding rollers can rotate synchronously with the paper feeding rollers, which are driven through the operation of paper feed trigger magnet, paper feeding ratchet wheel, paper feed cam and paper feeding lever in response to a Paper Feed Command given after printing in a full line has been completed. This rotation of the paper feeding rollers permits the paper held between these rollers the paper holding rollers to be fed one line.

The purpose of the paper guide unit is to ensure smooth and proper advance of the paper.

The printing paper can be released by raising up a paper holding bar to disengage the paper feeding rollers and the paper holding rollers.

Selection of normal feed or quick feed is conducted by controlling the energization of the paper feed trigger magnet. Note that as the power required for any function of the paper feeding mechanism is supplied by the DC motor, it is necessary to make the motor operate even when paper feeding operation is the only operation to be performed.

Paper edge guides are provided to permit selectively using 10" and 8.5" wide papers. When a 10" wide paper is to be used, pull the paper edge guides out of the corresponding slits of the paper guide unit. To use an 8.5" wide paper, insert them into these slits.

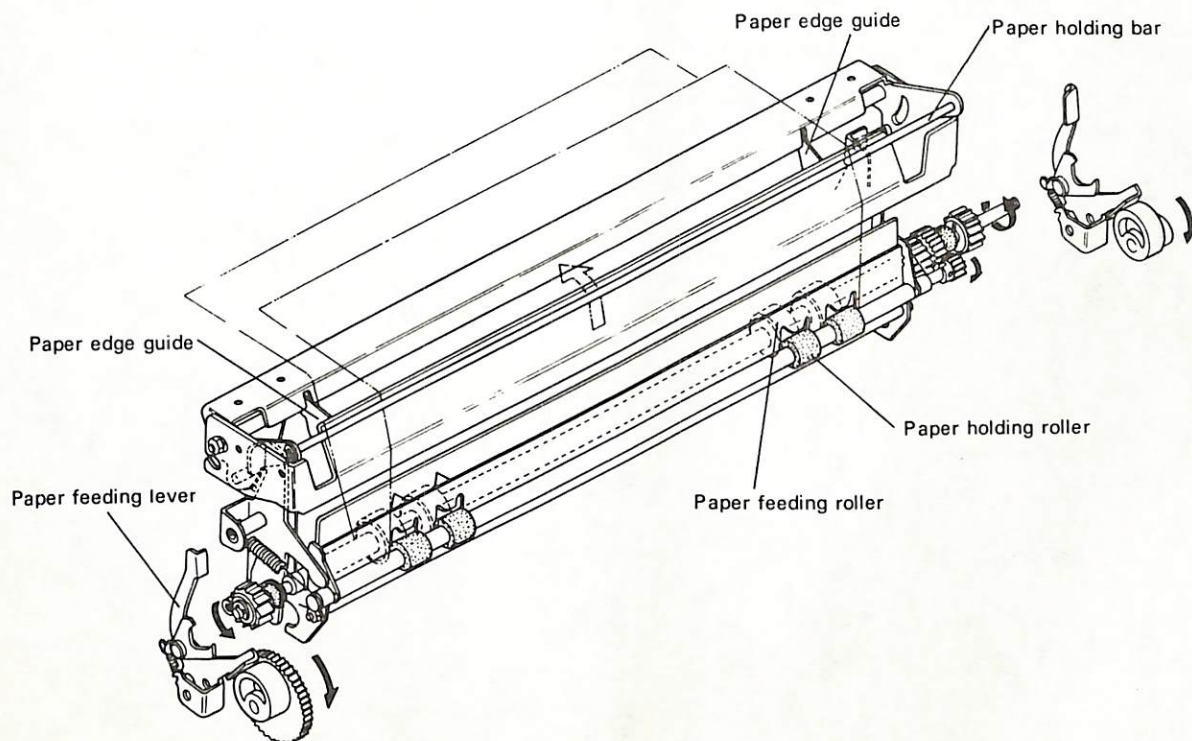


Fig. 1.14 Construction of Paper Feeding Mechanism (Type F)

(2) Type T

The paper feeding mechanism of the Model-3110 /Type T can perform normal feed and quick feed. The most important component of the paper feeding mechanism of the Type T Printer is a tractor unit which is provided with a pulse motor as the drive section. The pulse motor drives the tractor unit via a gear train to pull the printing paper upwardly of the printer's main section. Apart from this point, the paper feeding mechanism of the Type T is rather simplified as compared with the Type F. But as concerns the paper guide unit to ensure smooth and proper advance of the paper, it is the same as with the Type F.

Although the print position of the paper can be adjusted to some extent by operating the paper feed knob, the precision of adjustment is limited to about 0.7mm by the precision of the pulse motor.

In the Type T, paper feeding can be performed simply by supplying the pulse motor with electric current without necessity of making the main drive motor operate as in the Type F.

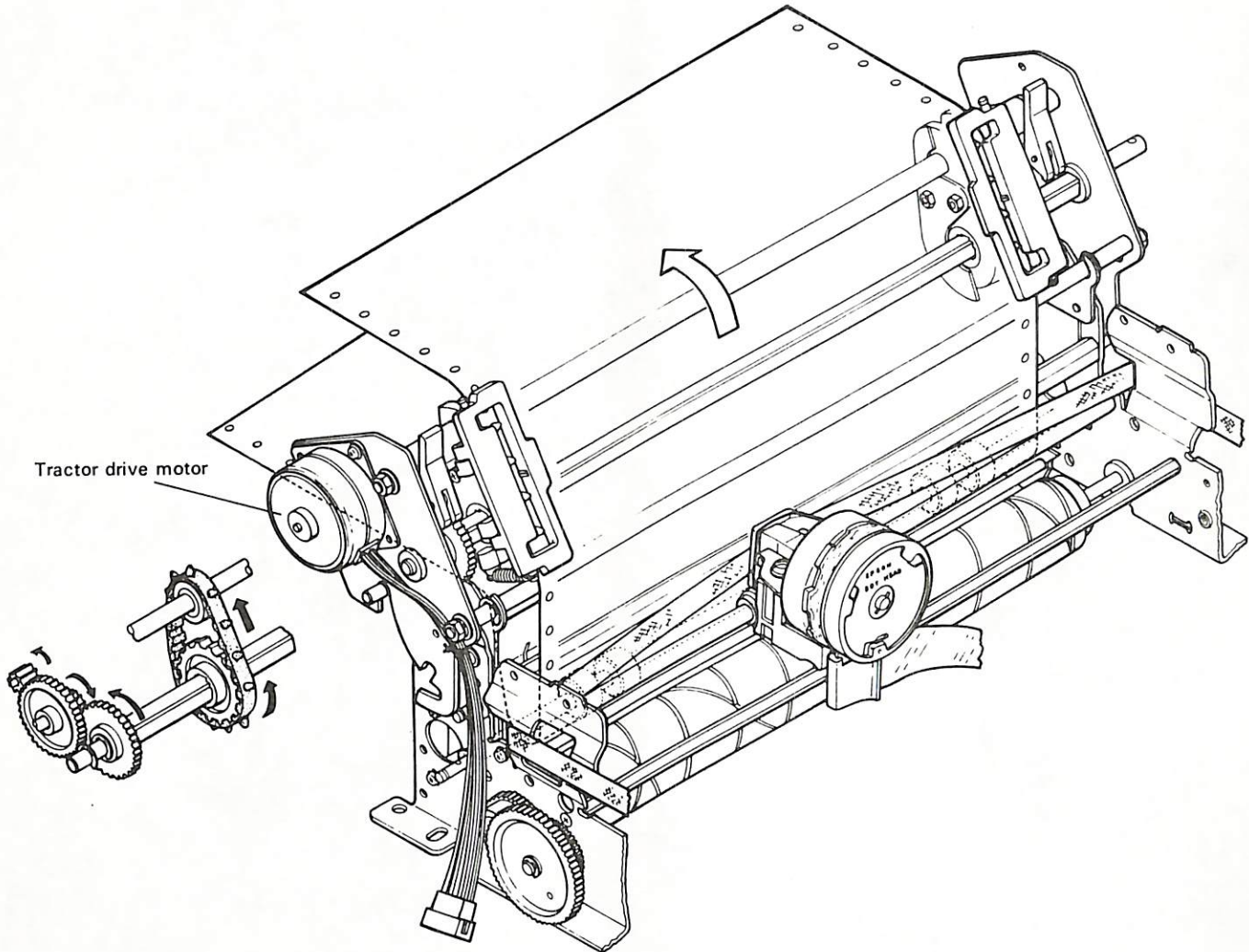


Fig. 1.15 Construction of Paper Feeding Mechanism (Type T)

2. Operating Principle of Paper Feeding Mechanism

(1) Paper Feeding Mechanism of Type F Printer

- ① Being put into rotation, the motor drives the lead cam gear located on the frame A side via the gear train. Since the lead cam gear is secured to lead cam shaft, its rotation causes the lead cam and the paper feed cam secured to the lead cam shaft on the frame B side to rotate in synchronism.
Both the lead cam gear and the paper feed cam move paper feeding levers which are in engagement with them on the frame A and B sides, respectively. As these two levers operate in the same manner, the operation of the frame B side lever only is described below.
- ② The paper feeding lever is always under a force acting so as to move this lever in direction (a) Fig. 1.16, which force being given by a paper feeding spring. At its nose portion, this lever is in engagement with a paper feeding control lever which serves as a stopper to hold the paper feeding lever in standby state until a Paper Feed Command is given.
- ③ When the paper feed cam pushes the paper feeding lever upward in direction (b), the paper feeding control lever moves in direction (c), making clearance (d) in the engagement part of paper feeding lever and paper feeding control lever. Consequently, frictional resistance between the paper feeding control lever and the paper feeding lever becomes zero, thus facilitating the attraction of the control lever by the paper feed trigger magnet when the latter is energized.

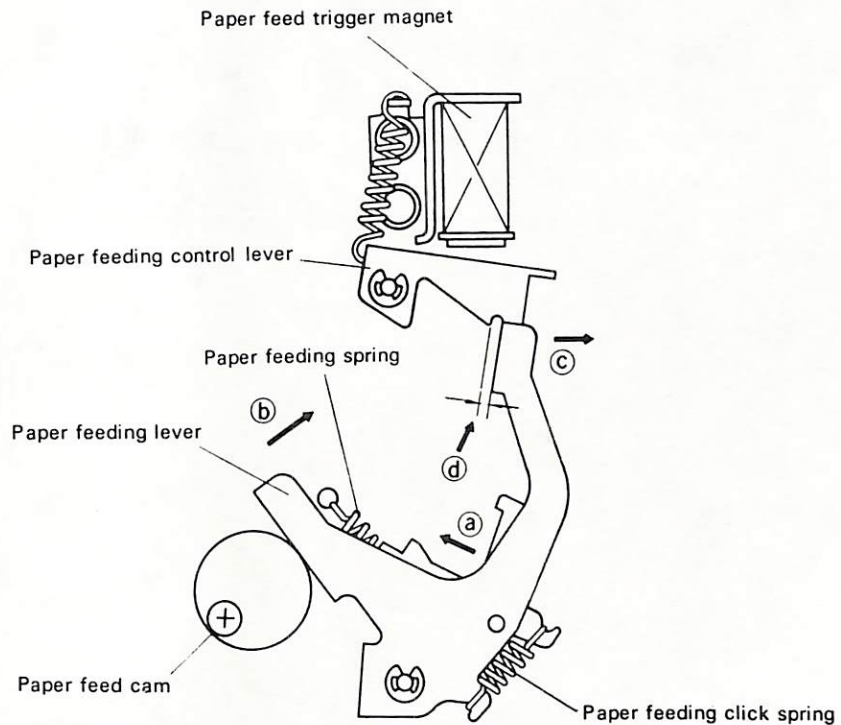


Fig. 1.16

- ④ When the paper feed trigger magnet is energized with the paper feeding lever being brought into the uppermost position by the paper feed cam, it attracts the paper feeding control lever as shown by broken line in Fig. 1.17.
- ⑤ As the paper feed cam continues to rotate, the paper feeding lever is disengaged from the paper feeding control lever and begins to leave its highest position. The paper feeding lever is then moved in direction ⑥ Fig. 1.17 by the action of the paper feeding spring.

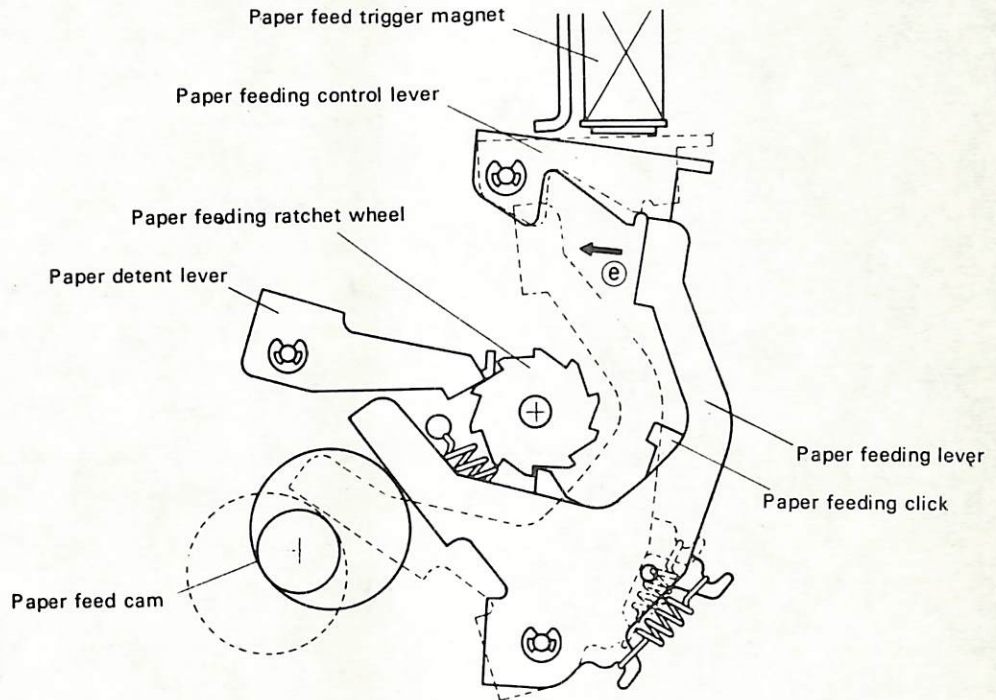


Fig. 1.17

- ⑥ A paper feeding click secured to the paper feeding lever so as to move synchronously with the lever comes into engagement with a paper feeding ratchet wheel, causing the latter to turn by one tooth. As the paper feeding ratchet wheel is secured to the same shaft as with the paper feeding rollers, the rotation of the ratchet wheel causes the rollers to rotate synchronously with the wheel. Paper feeding is thus performed. A one-tooth turn of ratchet wheel normally corresponds to a 1/6" feed of paper. (See Fig. 1.18.)

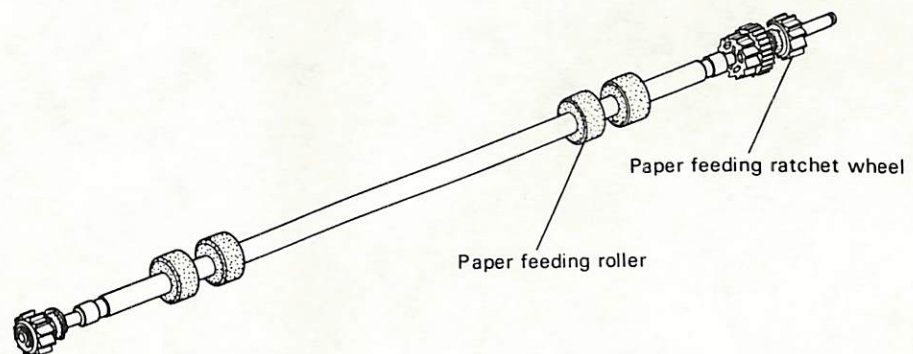


Fig. 1.18

⑦ On completion of paper feeding, the paper feed cam again pushes the paper feeding lever upward in direction ① Fig. 1.19 to return it to the initial position. Before this step is completed, the energization of the paper feed trigger magnet is already complete and the paper feeding control lever is returned to the initial position by the action of a paper feeding control lever spring. Therefore, the paper feeding lever and the paper feeding control lever can enter into engagement with each other to restore the standby state.

When the paper feeding lever returns to its initial position, the nose of a paper detent lever comes into engagement with the paper feeding ratchet wheel under the action of a paper detent lever spring to prevent the ratchet wheel from turning in the reverse direction.

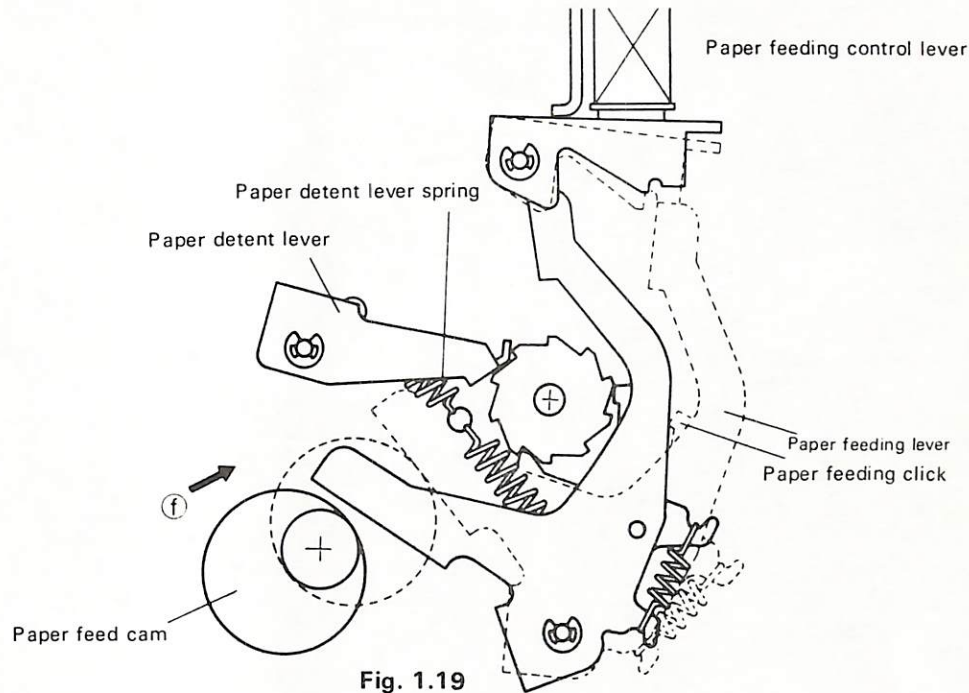


Fig. 1.19

(2) Paper Release Mechanism of Type F Printer

The Model-3110 /Type F Printer is provided with a mechanism to permit releasing the printing paper by manual operation. Raising up the paper holding bar in direction A Fig. 1.20 causes release levers to move so as to disengage the paper feeding rollers and the paper holding rollers, thus making it possible to manually pull out the paper from the printer.

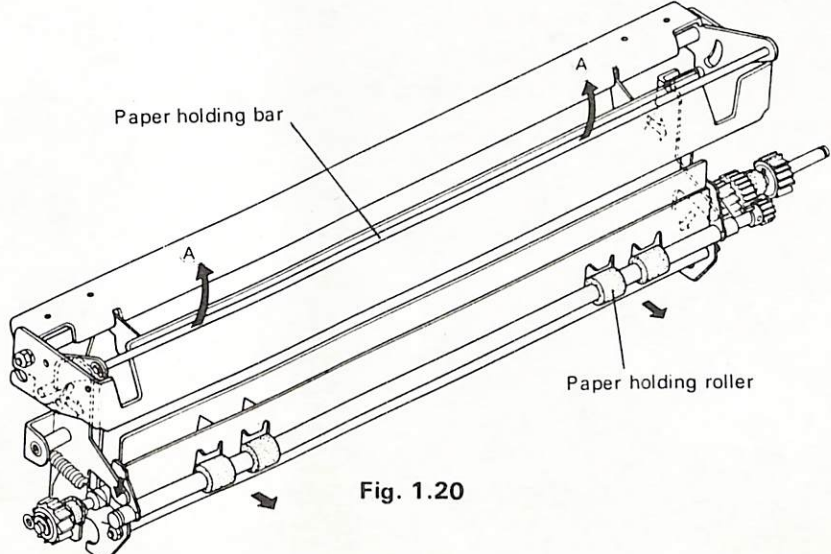


Fig. 1.20

- ① The release lever is in engagement with the paper holding roller shaft at its nose portion. When an actuating force is applied to part ① (Fig. 1.21) of the release lever, the nose of this lever moves to push the paper holding roller shaft in direction ②.
- ② The paper holding roller shaft being thus moved in direction ②, the paper holding rollers are disengaged from the paper feeding rollers. Now the paper is ready to be manually pulled out from the printer.
- ③ Bringing the paper holding bar back into the initial position causes the release lever to return to its initial position under the action of a release lever spring. At the same time, the paper holding roller shaft is made to return to the initial position by the action of the paper holding spring, the paper holding rollers again becoming engaged with the paper feeding rollers at certain contact pressure.

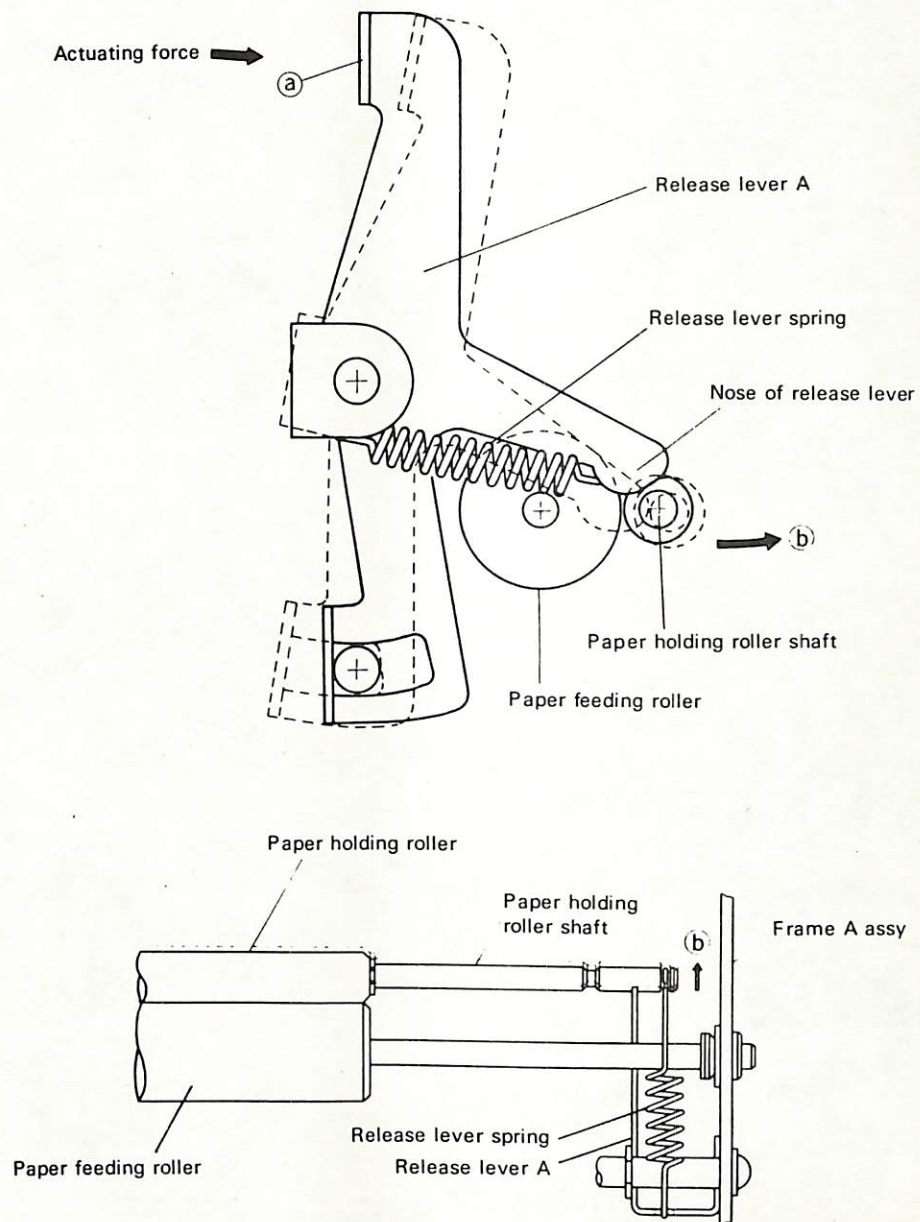


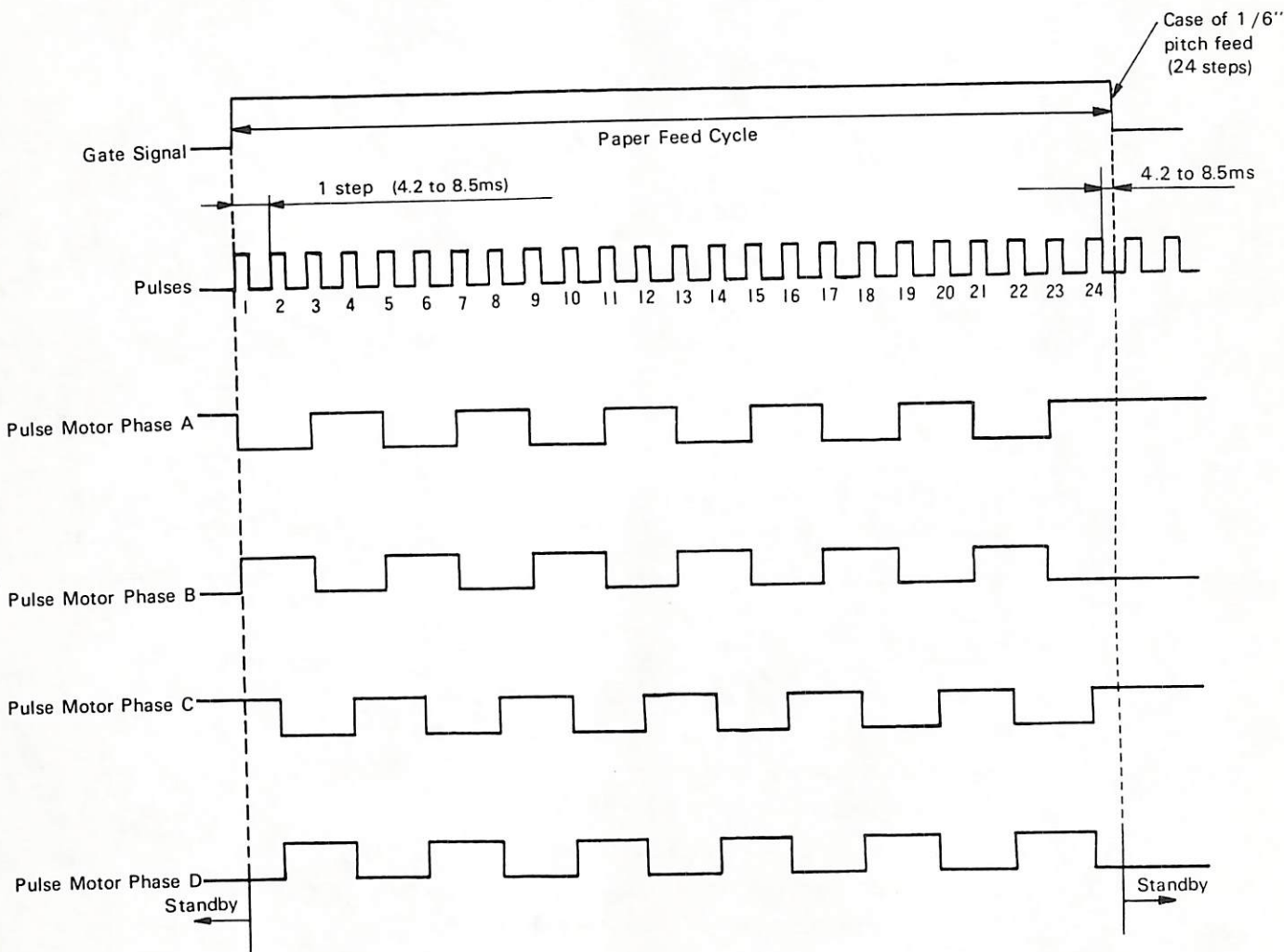
Fig. 1.21

(3) Paper Feeding Mechanism of Type T Printer

The operation of the paper feeding mechanism of the Type T Printer is not synchronous with that of the printer proper. This is the one of the points which distinguish the Type T from the Type F.

Paper feeding operation in the Type T is performed by applying timing signals to the pulse motor when paper feed is required.

Fig. 1.22 shows a pulse motor drive timing chart for one-line feeding of printing paper.



- NOTES :
1. Paper feed must not be performed while any print solenoid (dot wire drive coil) is energized.
 2. In its standby state, the pulse motor must not be supplied with holding current before 4.2 to 8.5ms have passed from Step 24.
 3. Duration of continuous feed must not exceed 2 minutes (corresponding to approx. 1,200 lines when 1 step = 4.2ms).

Fig. 1.22 Pulse Motor Drive Timing Chart

1.2.6 Ribbon Feeding Mechanism

As concerns ribbon feeding operation, there is no difference between the Type F and Type T versions of Model-3110 printers. An inked ribbon is fed by a ribbon feeding mechanism located on the printer's front side.

The reversing of the ribbon feeding direction is automatically performed through operation of reverse control levers which are actuated by eyelets provided at the end portions of the inked ribbon.

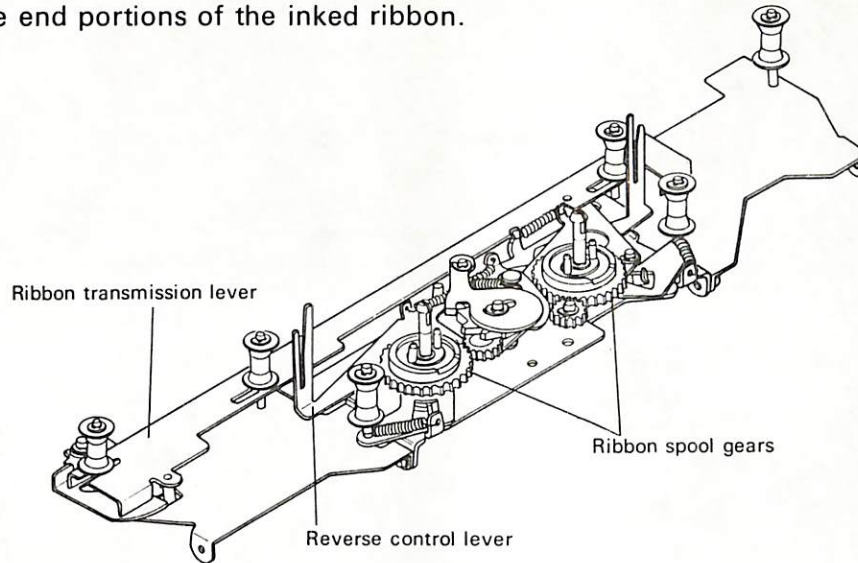


Fig. 1.23

(1) Ribbon Take-up Operation

The power required for taking up the ribbon is obtained from the DC motor, which drives a ribbon driving lever via gear train, ribbon feed cam gear, ribbon cam lever and ribbon transmission lever.

- ① Being put into rotation in response to a motor drive signal, the motor begins to drive the ribbon feed cam gear. The rotational motion of this gear is transformed into a reciprocating motion of the ribbon transmission lever through the action of the ribbon cam lever, and the ribbon transmission lever in turn pushes the ribbon driving lever. This cycle occurs twice per complete turn of the lead cam.
- ② The ribbon driving lever continues to be forced to turn around its axis (ribbon driving lever shaft) in direction **A** (Fig. 1.24).

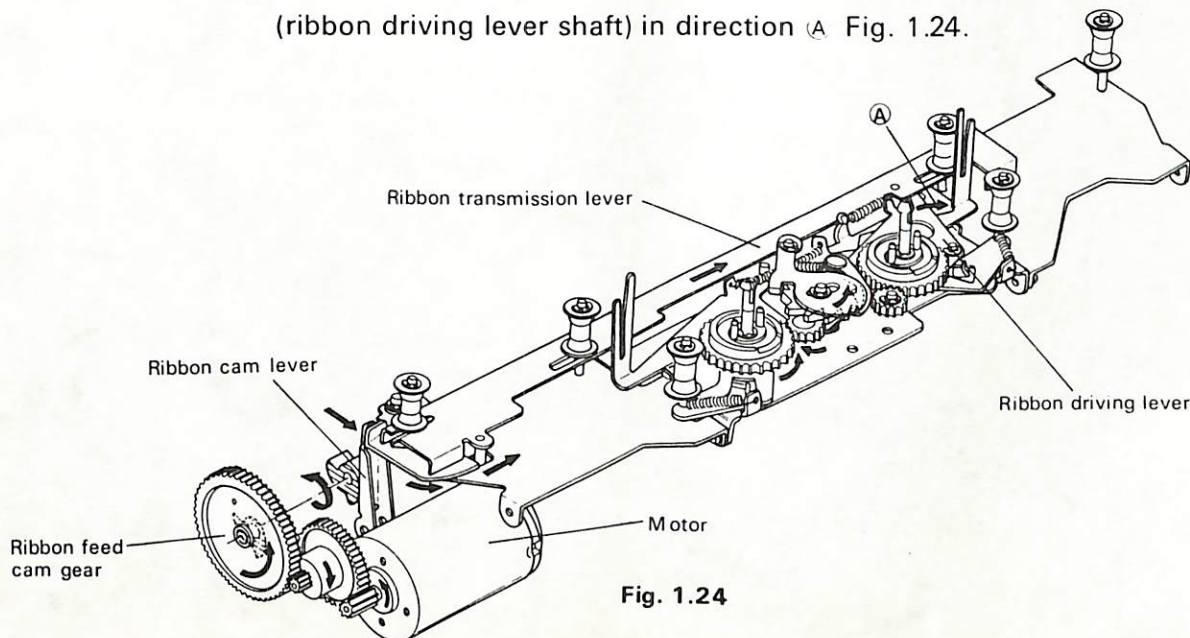


Fig. 1.24

- ③ To the nose of the ribbon driving lever, a ribbon feeding pawl is pivotally fixed. Movement of the ribbon driving lever in direction (a) Fig. 1.25 causes the ribbon feeding pawl to move in direction (b).
- ④ The ribbon feeding pawl is in engagement with a ribbon feeding ratchet gear as shown in Fig. 1.25. Thus, movement of the pawl in direction (c) causes the ratchet gear to turn by just one tooth in direction (d). Note that the ribbon feeding pawl is always pulled in direction (e) by the action of a paper feeding pawl spring so that it be kept engaged with the ribbon feeding ratchet gear at constant pressure.

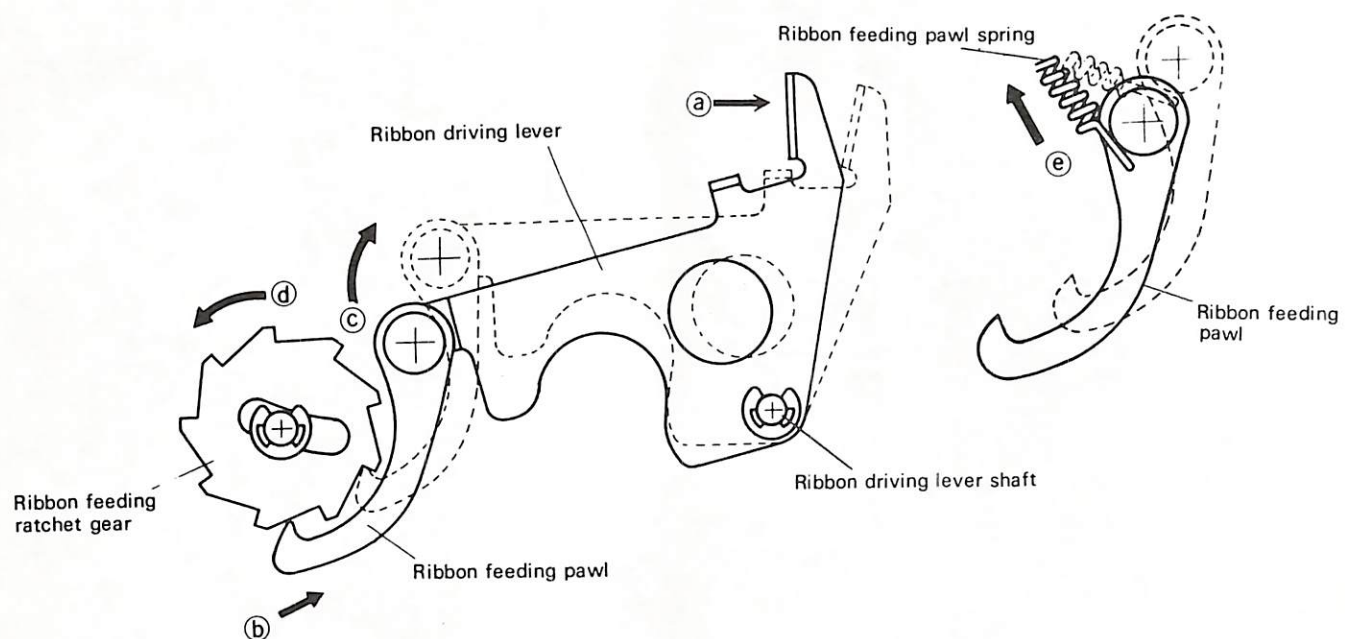


Fig. 1.25

- ⑤ A ribbon detent lever is operatively associated with the ribbon feeding ratchet wheel and the ribbon feeding pawl, and it turns in direction (f) Fig. 1.26 around the reverse control lever shaft on the ribbon frame as the ratchet gear turns. When the ribbon feeding pawl has made the ribbon feeding ratchet gear turn by one tooth, the detent lever enters the next tooth space of the ratchet gear under the action of the ribbon feeding spring, thus preventing the ratchet gear from reversing when the ribbon feeding pawl returns to its initial position.

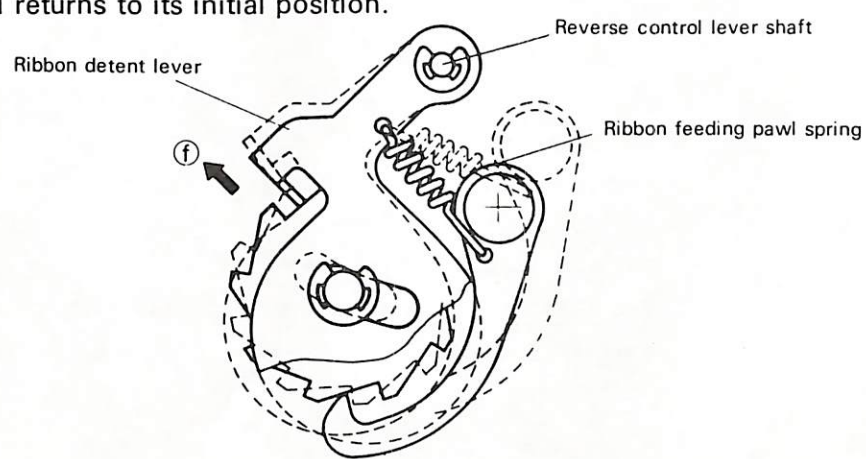


Fig. 1.26

- Ⓒ A ribbon feeding gear is securely placed on the same shaft as the ribbon feeding ratchet gear. This gear is in engagement with a planetary pinion, which in turn is in mesh with a ribbon spool gear. Therefore, the motion of the ribbon feeding gear is transmitted to the ribbon spool via the planetary pinion and the ribbon spool gear, the ribbon spool thus being rotated in direction Ⓓ Fig. 1.27.

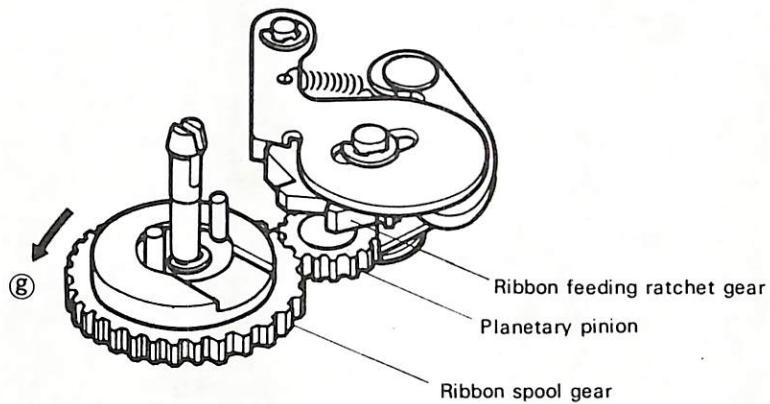
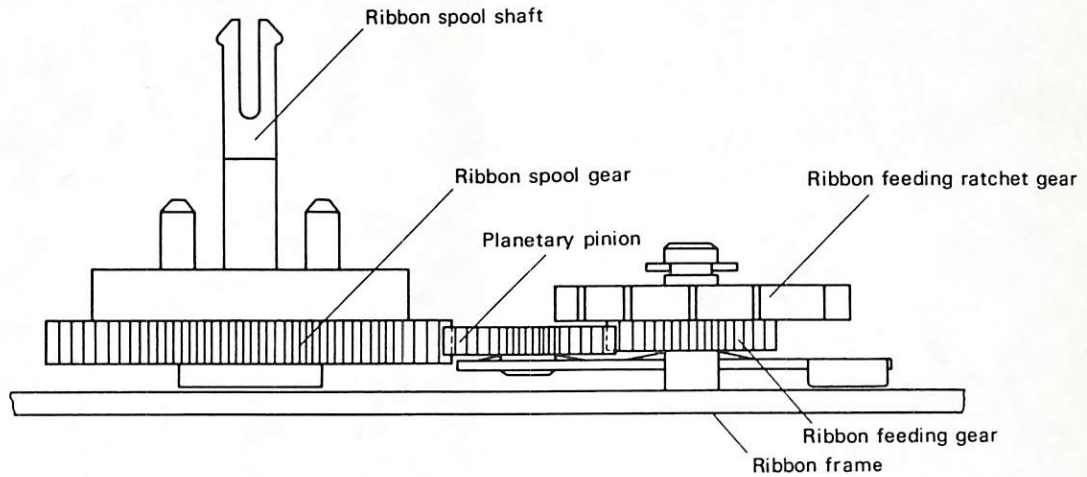


Fig. 1.27

(2) Reversing of Ribbon Take-up Direction

The reversing of ribbon take-up direction is automatically performed through operation of the reverse control levers by eyelets provided in the end portions of the inked ribbon.

The principle of automatic reversing is described below, referring to Figs. 1.28 to 1.31

① Fig. 1.28 illustrates the case where the ribbon is being taken up by the frame B side (right-hand) spool. (The ribbon feeding direction is indicated by arrow (a).) The roll of inked ribbon on the frame A side (left-hand) spool is about to end and the eyelet on this side is about to come into engagement with reverse control lever A.

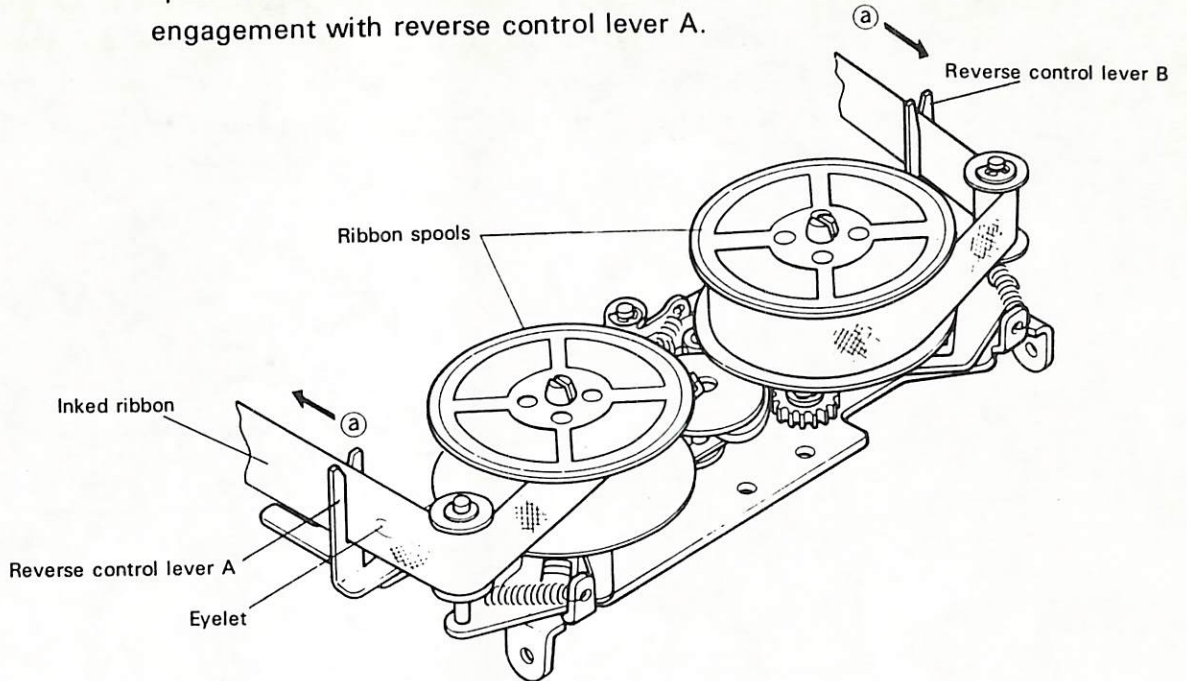


Fig. 1.28

- ② The frame B side (right-hand) spool continuing to take up the ribbon, the frame A side (left-hand) eyelet finally comes into engagement with reverse control lever A to push this lever in direction (b) Fig. 1.29. Consequently, reverse control lever A is made to turn around its shaft.
- ③ The reverse control lever is shaped as shown in Fig. 1.29, and it is in engagement with a planetary pinion holder at part (c). Continuing to be pushed in direction (b), it disengages from the planetary pinion holder assembly.

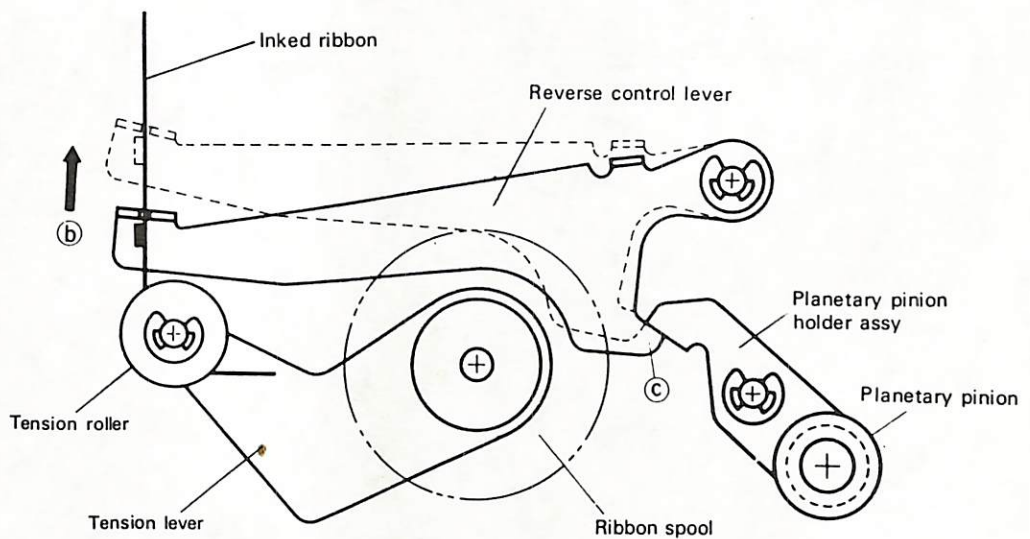


Fig. 1.29

- ④ The planetary pinion holder assy is placed on the same shaft as the ribbon feeding ratchet gear and pressed against it under the action of a leaf spring. Therefore, when disengaging from the reverse control lever, the planetary pinion holder assy begins to rotate in direction \odot Fig. 1.30. Consequently, the planetary pinion fixed to the end of the planetary pinion holder assy remote from reverse control lever A also begins to move to finally disengage from pinion P.

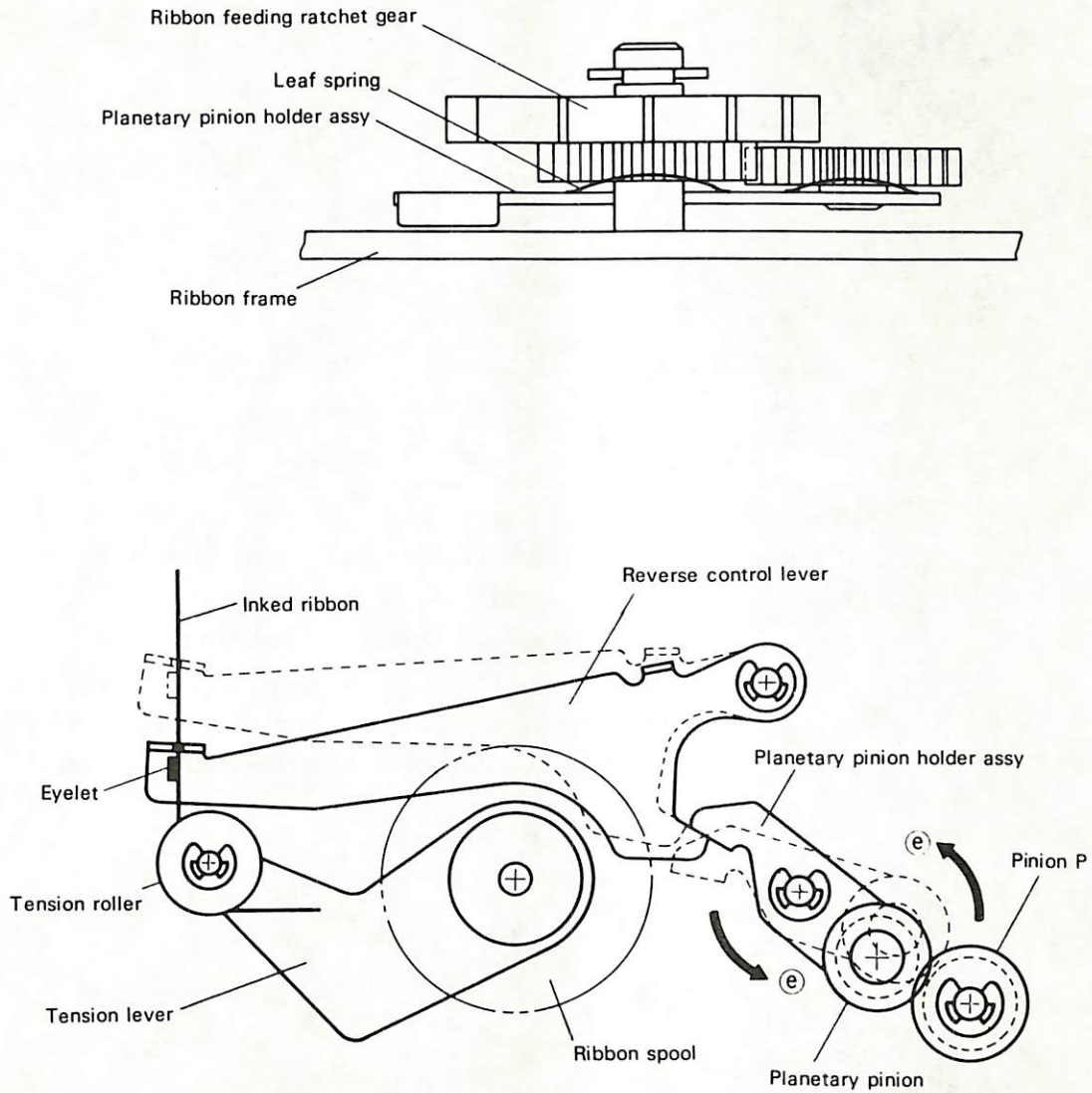


Fig. 1.30

⑤ When the ribbon feeding ratchet gear has rotated about 7 teeth, the planetary pinion holder enters into engagement with the frame B side (right-hand) reverse control lever, then stopping its motion. At the same time, the planetary pinion fixed to the planetary pinion holder comes into engagement with the frame A side (left-hand) spool gear to rotate it (in direction ① Fig. 1.31). Thus, the frame A side spool begins to take up the ribbon, which advances in direction ②.

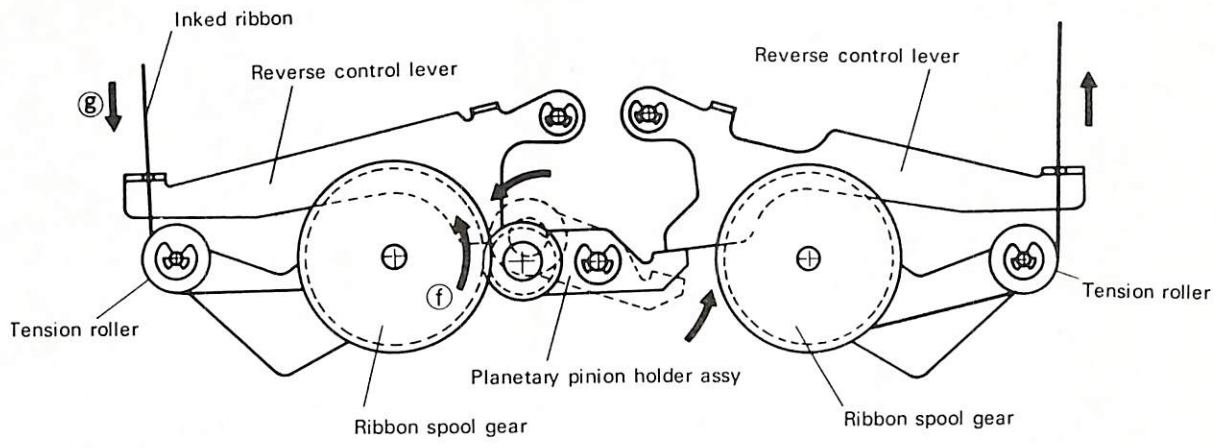


Fig. 1.31

⑥ On completion of the reversing of ribbon take-up direction, the reverse control lever on the frame A side (left side) returns to its initial position (standby state) by the action of reverse control lever spring. (See Fig. 1.32.)

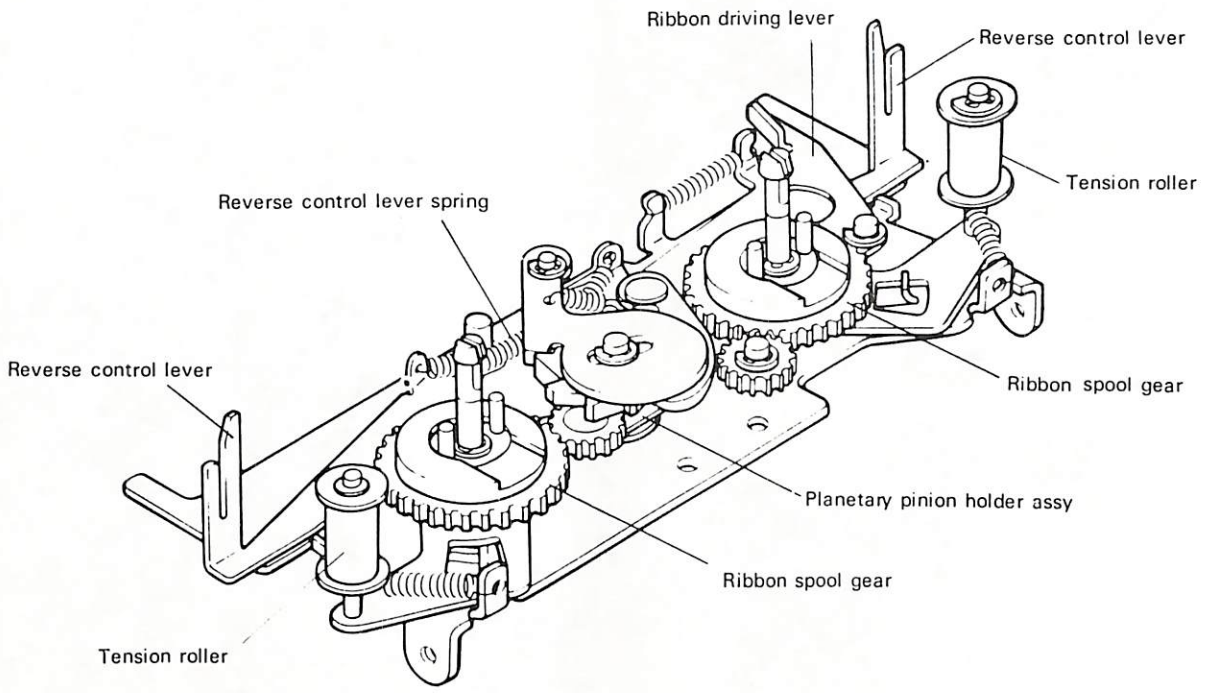


Fig. 1.32

CHAPTER 2

MAINTENANCE AND REPAIR

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2.1 MAINTENANCE

Proper maintenance is necessary to keep the designed performance of the EPSON Impact Dot Matrix Printer Model-3110 for the longest possible period and to prevent otherwise possible troubles. Perform maintenance according to the following instructions .

2.1.1 Cleaning

(1) Removal of dirt and stains :

Remove all dirt and stains by using alcohol or benzine.

NOTE : Never use thinner nor trichloroethylene or ketone-based solvents, which may deteriorate plastic parts.

(2) Removal of paper particles, dust and nap :

To remove all paper particles, dust and nap from the printer's inside, it is recommended that a vacuum cleaner be used.

NOTE : After cleaning, check lubrication points for lubricant quantity. If the removal of paper particles, dust and nap has resulted in insufficient quantity of lubricant, resupply the specified lubricant as required. (Refer to Paragraph 2.3.2 "Lubrication Requirements".)

2.1.2 Inspection

Inspection of the Model-3110 Printer is divided into the following two categories :

(1) Daily inspection :

This can easily be performed by the operator of the equipment in which the printer is incorporated. As part of his routine work, the operator should verify that the printer is properly used so that the printer may always serve in the best condition.

(2) Periodic inspection :

This can be performed only by those persons who have sufficient knowledge of the operating principle, construction and mechanism of the printer. Have the printer inspected and the necessary maintenance actions performed by such persons every 6 months or each time about 50 million characters have been printed, according to Table 2.1.

Table 2.1 Periodic Maintenance

No	Check item	Condition to be remedied	Action
1	Deposits of dust, dirt and /or nap	<ul style="list-style-type: none"> ● Excessive deposits of dust, dirt and /or nap. Presence of foreign matters inside the printer. ● Presence of torn pieces of paper and /or other foreign matters in and /or on paper guide unit. 	<ul style="list-style-type: none"> ● Such materials can effectively be removed with vacuum cleaner.
2	Condition of springs	<ul style="list-style-type: none"> ● Deformation 	<ul style="list-style-type: none"> ● Replace all deformed springs.
3	Lubrication	<ul style="list-style-type: none"> ● Refer to Par. 2.3.2 "Lubrication Requirements". 	
4	Setting of ribbon	<ul style="list-style-type: none"> ● Improper setting of ribbon spool shaft. ● Improper guiding of ribbon guide. ● Decreased or lost elasticity or unsmooth action of ribbon tension lever. 	<ul style="list-style-type: none"> ● Have the ribbon setting method fully understood by the printer operator. ● Adjustment ; replacement of parts. ● Adjustment ; replacement of parts.
5	Condition of ribbon	<ul style="list-style-type: none"> ● Use of a ribbon not conforming to the specification. ● Damaged ribbon and /or ribbon spools. ● In general, improper setting or use of ribbon. 	<ul style="list-style-type: none"> ● Have the ribbon specification fully known by the printer operator. ● Replace ribbon and /or ribbon spools, if so much damaged that print quality will be adversely affected. ● Correct all improprieties , have the proper mode of use fully understood by the printer operator.
6	Operation of mechanisms	<ul style="list-style-type: none"> ● Improper action of printing mechanism. ● Improper paper feeding. ● Improper ribbon feeding. ● Check all mechanisms for improper action due to worn, deformed or paper-clogged parts. 	<ul style="list-style-type: none"> ● Refer to Par. 2.2.3 "Troubleshooting Table". ● ditto ● ditto ● ditto
		<ul style="list-style-type: none"> ● Adjust, the platen dot wire clearance. ● Replace, if necessary, the nose assembly. 	<ul style="list-style-type: none"> ● Printing energy (impact force) may be increased by reducing the platen dot wire clearance (standard value : 0.6mm) by 0.1 to 0.15mm A good print quality may be maintained by this adjustment. ● Replace the nose assy if the dot wire end is found too shortened as a result of rupture, for example.

2.2 REPAIR

Repairs of the Model-3110 Printer are grouped into three classes (A, B and C as defined in Paragraph 2.2.1 below, according to the difficulty involved. Be sure to have the printer repaired by such persons as are qualified at least for the corresponding repair class.)

2.2.1 Repair Classification

Class A : General knowledge of the construction and operating principle of the printer, as well as basic repair technique is required. Neither special experience nor trained skill is required.

Class B : Advanced knowledge of the construction and operating principle of the printer is required. Technique for handling jigs and measuring instruments in disassembly and assembly as well as practical repair experience are required.

Class C : Highly specialized knowledge of the construction and operating principle of the printer is required. Highly developed skill and techniques for handling special jigs and measuring instruments in disassembly and assembly as well as thorough experience in repair are required.

2.2.2 Troubleshooting

Should a trouble occur, refer to the "Troubleshooting Table" given in Paragraph 2.2.3 to confirm the nature and condition of the trouble, determine the cause of trouble, then check the defective part(s) and perform the suggested remedy. The Troubleshooting Table is divided into the following 6 columns:

- 1) NATURE OF TROUBLE : Find the nature of the trouble in this column.
- 2) CONDITION OF TROUBLE : Compare the actual condition of the trouble with the description given in this column, then confirm whether or not they are identical.
- 3) POSSIBLE CAUSE : Possible causes of the trouble are listed in this column for the respective trouble conditions. Determine the cause.
- 4) REPAIR CLASSIFICATION : Refer to Paragraph 2.2.1.
- 5) CHECK POINT : Points on the mechanism most likely to cause the trouble are listed in this column. Check each item according to the instruction in the column and locate the defective part.
- 6) REMEDY : The remedy for the corresponding cause of trouble is suggested in this column. If the trouble persists after the implementation of the suggested remedy, check other items in "POSSIBLE CAUSE" column and perform the corresponding remedy.

Following the procedure described above will minimize misjudgement and ensure an efficient repair work.

When desiring to visually examine the condition of gears and the operation of the dot head, levers and parts operatively associated therewith, perform it while manually turning the first reduction gear counterclockwise.

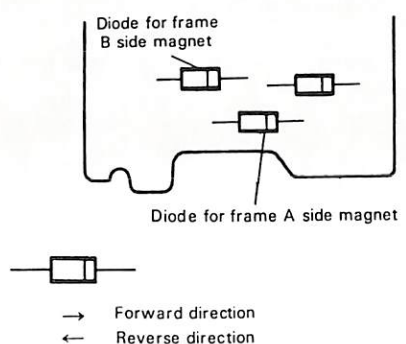
2.2.3 Troubleshooting Table

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBL CAUSE	REPAIR CLASSIFI-CATION	CHECK POINT	REMEDY
1. None of dots can be printed.	Motor rotates normally, but printing is not performed at all.	1. Disengagement of flexible printed cable from connector.	A	<ul style="list-style-type: none"> Verify if flexible printed cable is properly engaged in connector. 	<ul style="list-style-type: none"> Establish proper engagement.
		2. Breaking of common lead wire of flexible printed cable.	B	<ul style="list-style-type: none"> Verify electrical continuity between connector side terminals of common lead wires (Nos. 15, 16 and 17) and drive coil circuit board terminals. 	<ul style="list-style-type: none"> Discontinuity being confirmed, replace flexible printed cable (F301651030).
		3. Faulty contact on connector.	B	<ul style="list-style-type: none"> Verify electrical continuity between common lead terminals (Nos. 15, 16 and 17) of connector and the corresponding terminals of flexible printed cable. 	<ul style="list-style-type: none"> Discontinuity being confirmed, replace connector unit : For Type F : F301601000 For Type T : F302601000
		4. Defective T detector.	B	<ul style="list-style-type: none"> Using oscilloscope, verify if timing signals are generated and if output voltage is as specified. 	<ul style="list-style-type: none"> Timing signals not appearing or output voltage not being as specified, replace motor (F301053000).
		5. Improper relative position of platen and dot head.	B	<ul style="list-style-type: none"> Verify if clearance between platen and dot head nose is proper. 	<ul style="list-style-type: none"> Clearance being improper, correct such condition. (Refer to Par. 3.3.3.)
2. Regular omission of dots.	Printing is not performed at all for a certain dot position.	1. Faulty contact on flexible printed cable.	B	<ul style="list-style-type: none"> Verify electrical continuity between the corresponding flexible printer cable terminal and motor circuit board terminal. 	<ul style="list-style-type: none"> Discontinuity being confirmed, replace flexible printed cable (F301651030).
		2. Breaking of flexible printed cable conductor.	B	<ul style="list-style-type: none"> Verify electrical continuity between the corresponding printed cable terminal and motor circuit board terminal. 	<ul style="list-style-type: none"> Discontinuity being confirmed, replace flexible printed cable (F301651030).
		3. Disconnection of connector lead wire.	B	<ul style="list-style-type: none"> Verify electrical continuity between the corresponding connector terminal and motor circuit board terminal. 	<ul style="list-style-type: none"> Disconnection being confirmed, reestablish connection by soldering or replace broken lead wire. Connector unit For Type F ; F301601000 For Type T ; F302601000

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		4. Breaking of dot wire drive coil.	B	<ul style="list-style-type: none"> ● Measure coil resistance to verify if it is as specified. 	<ul style="list-style-type: none"> ● Resistance not being as specified, replace dot head assy (F301655000).
		5. Input print pulse being improper.	B	<ul style="list-style-type: none"> ● Using oscilloscope, verify if input print pulse for the corresponding column is as specified. Pulse : Refer to Chap. 1. Voltage : 21 to 29V Input pulse width : $600 \pm 20\mu s$ 	<ul style="list-style-type: none"> ● If input print pulse not appearing or not being as specified, modify control circuit.
		6. Improper relative position of platen and dot head.	B	<ul style="list-style-type: none"> ● Same as with POSSIBLE CAUSE 5, NATURE OF TROUBLE 1. 	
		7. Broken dot wire.	B	<ul style="list-style-type: none"> ● Check the condition of the corresponding dot wire. 	<ul style="list-style-type: none"> ● The dot wire being found broken, replace dot head unit (F301655000) or nose assy (C904666000).
3. Irregular omission of dots.	Omission of dots occurs from time to time in an irregular manner.	1. Faulty contact on flexible printed cable.	B	<ul style="list-style-type: none"> ● Same as with POSSIBLE CAUSE 1, NATURE OF TROUBLE 2. 	
		2. Improper operation of dot head unit.	B	<ul style="list-style-type: none"> ● Verify if : 1) the wire guide (of hard material) at nose tip is not clogged with so much paper dust as to prevent the dot wire from operating smoothly, 2) the drive coil current waveform is as specified (use oscilloscope). 	<ul style="list-style-type: none"> ● Unsmooth operation of dot wire being confirmed, clean the wire guide. ● Waveform not being as specified, replace dot head unit (F301655000)
		3. Input print pulse being improper.	B	<ul style="list-style-type: none"> ● Same as with POSSIBLE CAUSE 5, NATURE OF TROUBLE 2. 	
4. Irregular occurrence of improper character width.	Variation in the width of printed character occurs from time to time in an irregular manner	1. Worn or damaged gear.	A	<ul style="list-style-type: none"> ● Check bore hole and teeth of gears for wear and damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace the gear
		2. Improper operation of dot head.	B	<ul style="list-style-type: none"> ● Turning the lead cam, verify if head carrier moves smoothly. 	<ul style="list-style-type: none"> ● Unsmooth movement being confirmed, carry out lubrication. (Refer to Par 2.3.2 "Lubrication Requirements".)

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
				<ul style="list-style-type: none"> ● Check lead cam groove, carrier shafts A and B and head carrier for wear. 	<ul style="list-style-type: none"> ● Wear being found, replace the component. <ul style="list-style-type: none"> Lead cam : F301201000 Carrier shaft A : F301003010 Carrier shaft B : F301004010 Head carrier : C901204000
5. Motor does not rotate.	Application of Print Command does not cause the motor to rotate.	1. Input power to motor being improper.	B	<ul style="list-style-type: none"> ● Using tester or oscilloscope, verify if motor circuit terminal voltage is as specified (24V DC \pm 10%). 	<ul style="list-style-type: none"> ● Check power supply circuit and lead wire connection, and make repair, if necessary.
		2. Improper motor drive signal.	B	<ul style="list-style-type: none"> ● Using oscilloscope, verify if motor drive signal appears at the corresponding terminal of motor circuit board. <div data-bbox="1200 756 1804 1042" style="text-align: center;"> </div>	<ul style="list-style-type: none"> ● If signal not appearing, repair drive signal generating circuit.
		3. Motor circuit board assy being defective.	B	<ul style="list-style-type: none"> ● Check motor circuit board for the following phenomena : <ol style="list-style-type: none"> 1) Power input terminal voltage is as specified and drive signal is present, but nevertheless the motor does not rotate. 2) The motor does not rotate even if input drive signal level is reduced to LOW. 3) Direct application of 24V at motor power terminals causes the motor to rotate. 	<ul style="list-style-type: none"> ● One of these phenomena being observed, replace motor circuit board assy (C901054000).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		4. Defective motor.	B	<ul style="list-style-type: none"> Apply 24V at motor power terminals to verify if motor does not rotate. 	<ul style="list-style-type: none"> If the motor does not rotate, replace it (F301053000).
6. Motor does not stop.	Motor does not stop on completion of print cycle.	1. Motor circuit board assy being defective.	B	<ul style="list-style-type: none"> Cut off motor drive signal to verify if nevertheless the motor does not stop. 	<ul style="list-style-type: none"> The motor not stopping, replace motor circuit board assy (C901054000).
		2. Defective R detector assy.	B	<ul style="list-style-type: none"> Rotating the lead cam, verify if Reset Signal appears on output terminal of R detector assy (use oscilloscope). (To rotate lead cam, turn the first reduction gear counterclockwise.) 	<ul style="list-style-type: none"> The motor not stopping, replace R detector assy (C901151000).
7. Paper feeding is not performed. (Type F)	Paper feeding does not occur and therefore printing is repeated in the same line.	1. Use of improper paper, or improper condition of paper supply course.	A	<ul style="list-style-type: none"> Check the paper for width, thickness and roll diameter. <ul style="list-style-type: none"> Width: $254^{+1.5}_{-2.0}$ mm (10") or $216^{+1.5}_{-2.0}$ mm (8.5") Thickness: 0.07 mm (0.0027") to 0.09 mm (0.0035") Check paper supply course to confirm whether or not it is in such condition as to prevent smooth supply of paper. 	<ul style="list-style-type: none"> Always use such paper as specified. Correct improper condition so that paper may be supplied smoothly.
		2. Disengagement or damage of paper feeding click spring or paper feeding spring.	B	<ul style="list-style-type: none"> Check paper feeding click spring and paper feeding spring for disengagement or damage. 	<ul style="list-style-type: none"> Putting back into position or replacement. <ul style="list-style-type: none"> Paper feeding click spring: C901267010 Paper feeding spring: C903257010
		3. Wear or damage of cam part of lead cam gear.	B	<ul style="list-style-type: none"> Check lead cam gear for wear or damage of cam part. 	<ul style="list-style-type: none"> Wear or damage being found, replace lead cam gear (C901103010).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		4. Improper position of paper feed trigger magnet.	B	<ul style="list-style-type: none"> ● Check paper feed trigger magnet for position. 	<ul style="list-style-type: none"> ● The position being found improper, correct it. (Refer to Par. 3.2.6.)
		5. Coil of paper feed trigger magnet being broken.	B	<ul style="list-style-type: none"> ● Verify if coil resistance is as specified (approx. $110\Omega \pm 10\%$). 	<ul style="list-style-type: none"> ● Coil being found broken, replace magnet assy. Paper feed trigger magnet: Frame A side : F301257000 Frame B side : C901273000
		6. Short-circuiting of diode in paper feed trigger magnet.	B	<ul style="list-style-type: none"> ● Measure resistance between soldered terminals.  <p>The diagram shows two diodes for the frame B side magnet and one diode for the frame A side magnet. The diodes are connected in a circuit. A legend below the diagram indicates the forward and reverse directions for the diodes.</p>	<ul style="list-style-type: none"> ● Shortcircuited state being confirmed, replace diode (1S 953 (NEC) or equivalent). <p>Value of resistance :</p> <p>1) Normal state :</p> <p>a) Forward direct.: Approx. 14Ω b) Reverse direct.: Approx. 100Ω</p> <p>2) Short-circuit state :</p> <p>a) Forward direct.: 0Ω b) Reverse direct.: 0Ω</p>
		7. Proper pulse not being inputted to paper feed trigger magnet.	B	<ul style="list-style-type: none"> ● Verify if proper pulse is inputted to paper feed trigger magnet. 	<ul style="list-style-type: none"> ● Input pulse not appearing or not being as specified, modify the circuit.
		8. Wear or damage of cam part of paper feed cam.	B	<ul style="list-style-type: none"> ● Check paper feed cam for wear or damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace paper feed cam (C901015010).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		9. Wear or damage of toothed part of transmission gear.	B	<ul style="list-style-type: none"> ● Check transmission gear for wear or damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace transmission gear (C901102010).
		10. Wear or damage of paper feeding ratchet wheel.	B	<ul style="list-style-type: none"> ● Check paper feeding ratchet wheel for wear or damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace paper feeding ratchet wheel (C901258010).
		11. Wear of paper feeding rollers.	B	<ul style="list-style-type: none"> ● Check paper feeding rollers for wear. 	<ul style="list-style-type: none"> ● Wear being found, replace paper feeding rollers (F301252000).
		12. Wear or damage of second reduction gear.	B	<ul style="list-style-type: none"> ● Check second reduction gear for wear or damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace second reduction gear (C901101000).
		13. Deterioration of release lever spring due to permanent strain.	B	<ul style="list-style-type: none"> ● Check release lever spring for permanent strain. 	<ul style="list-style-type: none"> ● Replace the deteriorated spring (F301251050).
		14. Wear of paper holding rollers.	B	<ul style="list-style-type: none"> ● Check paper holding rollers for wear of surface. 	<ul style="list-style-type: none"> ● Replace paper holding rollers, if worn (F301254000).
8. Irregular feed pitch of printing paper. (Type F)	Characters are not printed at regular line spacing.	1. Use of improper paper, or improper condition of paper supply course.	A	<ul style="list-style-type: none"> ● Same as with POSSIBLE CAUSE 1, NATURE OF TROUBLE 7. 	
		2. Deterioration of release lever spring due to permanent strain.	B	<ul style="list-style-type: none"> ● Same as with POSSIBLE CAUSE 13, NATURE OF TROUBLE 7. 	
		3. Deterioration of paper feeding click spring due to permanent strain.	B	<ul style="list-style-type: none"> ● Check paper feeding click spring for permanent strain. 	<ul style="list-style-type: none"> ● Replace the spring, if deteriorated (C901267010).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		4. Disengagement or damage of paper feeding spring.	B	● Same as with POSSIBLE CAUSE 2, NATURE OF TROUBLE 7.	
		5. Wear or damage of paper feeding ratchet wheel.	B	● Same as with POSSIBLE CAUSE 10, NATURE OF TROUBLE 7.	
		6. Wear of paper feeding rollers.	B	● Same as with POSSIBLE CAUSE 11, NATURE OF TROUBLE 7.	
9. Quick feed of printing paper is impossible.	Quick feed is impossible, and paper insertion is difficult.	1. Use of improper paper, or improper condition of paper supply course.	A	● Same as with POSSIBLE CAUSE 1, NATURE OF TROUBLE 7.	
		2. Improper condition of paper feeding click spring.	B	● Same as with POSSIBLE CAUSE 3, NATURE OF TROUBLE 8.	
		3. Improper condition of paper feeding spring.	B	● Same as with POSSIBLE CAUSE 2, NATURE OF TROUBLE 7.	
		4. Improper drive voltage or input pulse width of paper feed trigger magnet.	B	● Check voltage between connector terminals Nos. 9 and 20. Voltage : $24V \pm 10\%$ Pulse width : Approx. 20msec	● Voltage or pulse not being as specified, modify power supply circuit.
10. Ribbon feeding mechanism does not function at all.	Printing mechanism functions properly, but ribbon feeding mechanism does not operate at all.	1. Ribbon driving lever spring being disengaged due to permanent strain.	B	● Check ribbon driving lever for disengagement or permanent strain.	● Putting back into position or replacement (C902351110).
		2. Ribbon feeding pawl spring being disengaged or deteriorated due to permanent strain.	B	● Check ribbon feeding pawl spring for disengagement or permanent strain.	● Putting back into position or replacement (C902351120).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		3. Improper operation of ribbon driving lever assy.	B	<ul style="list-style-type: none"> Manually operating the ribbon driving lever assy, confirm that it operates properly. 	<ul style="list-style-type: none"> The lever assy not operating properly, replace it (C902353000).
		4. Improper operation of ribbon cam lever A.	B	<ul style="list-style-type: none"> Manually turning the first reduction gear, verify if the lever operates properly. 	<ul style="list-style-type: none"> Ribbon cam lever A not operating properly, replace it (F301355010).
		5. Improper operation of ribbon cam lever B.	B	<ul style="list-style-type: none"> Manually turning the first reduction gear, verify if the lever operates properly. 	<ul style="list-style-type: none"> Ribbon cam lever B not operating properly, replace it (F301351010).
		6. Improper operation of ribbon transmission lever.	B	<ul style="list-style-type: none"> Manually operating the lever, verify if it operates properly. 	<ul style="list-style-type: none"> The ribbon transmission lever not operating properly, replace it (F301354000).
		7. Deterioration of ribbon feed cam gear.	B	<ul style="list-style-type: none"> Check both gear and cam parts of ribbon feed cam gear for wear or damage. 	<ul style="list-style-type: none"> Wear or damage being found, replace ribbon feed cam gear (C901104010).
11. Ribbon feeding is impossible.	Ribbon driving section operates properly, but nevertheless ribbon feeding is impossible.	1. Improper operation of ribbon detent lever.	B	<ul style="list-style-type: none"> Verify if the lever operates properly. 	<ul style="list-style-type: none"> Ribbon detent lever not operating properly, replace it (C902351100).
		2. Wear or damage of ribbon feeding ratchet gear.	B	<ul style="list-style-type: none"> Check the gear for wear or damage. 	<ul style="list-style-type: none"> Replace ribbon feeding ratchet gear, if worn or damaged (C902351130).
		3. Unsmooth rotation of ribbon feeding ratchet gear.	B	<ul style="list-style-type: none"> Check the gear for unsmooth rotation. 	<ul style="list-style-type: none"> Ribbon feeding ratchet gear not rotating smoothly, lubricate or replace it (C902351130).
		4. Unsmooth rotation of planetary pinion.	B	<ul style="list-style-type: none"> Check the pinion for unsmooth rotation. 	<ul style="list-style-type: none"> Planetary pinion not rotating smoothly, lubricate or replace it (C902354020).

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
12. Reversing of ribbon take-up direction is impossible.	Take-up of ribbon on frame A side spool is impossible.	1. Eyelet being missing.	B	<ul style="list-style-type: none"> ● Check the ribbon for missing eyelet. 	<ul style="list-style-type: none"> ● If eyelet being missing, replace the ribbon.
		2. Improper operation of reverse control levers.	B	<ul style="list-style-type: none"> ● Manually operating the reverse control levers, verify if they operate properly. 	<ul style="list-style-type: none"> ● The levers not operating smoothly, lubricate or replace them. Reverse control lever A : C902351070 Reverse control lever B : C902351080
		3. Improper operation of planetary pinion holder assy.	B	<ul style="list-style-type: none"> ● Manually operating the ribbon driving lever to reverse the ribbon take-up direction, check the planetary pinion holder assy for proper operation. 	<ul style="list-style-type: none"> ● If the planetary pinion holder assy (C902354000) does not operate, replace it or leaf spring.
		4. Setting of ribbon being improper.	B	<ul style="list-style-type: none"> ● Check the ribbon for improper setting. 	<ul style="list-style-type: none"> ● Set the ribbon properly.
13. Paper feeding is not performed properly. (Type T)	Neither normal feed nor quick feed is impossible. (Tractor unit does not operate at all.)	1. Improper condition of tractor drive motor connector.	A	<ul style="list-style-type: none"> ● Check the connector for disengagement or faulty contact. 	<ul style="list-style-type: none"> ● If the connector being disengaged, put it back into position. If faulty contact being found, repair or replace the connector.
		2. Motor drive circuit being faulty.	B	<ul style="list-style-type: none"> ● Check drive circuit and input signal. 	<ul style="list-style-type: none"> ● Modify drive circuit, if necessary.
		3. Wear or damage of tractor motor gear or transmission gear.	B	<ul style="list-style-type: none"> ● Check these gears for wear or damage. 	<ul style="list-style-type: none"> ● Wear or damage being found, replace tractor drive motor assy (F302255000) and/or tractor transmission gear (F302253020).
	Tractor unit operates, but paper feeding is impossible.	4. Improper condition of paper feed course.	A	<ul style="list-style-type: none"> ● Check paper feed course and paper guide course for paper jamming or abnormal back tension. 	<ul style="list-style-type: none"> ● If paper jamming or abnormal back tension being observed, correct such condition.
		Spacings of printed characters are irregular.	5. Tractor drive motor is not supplied with holding current.	B	<ul style="list-style-type: none"> ● Check drive circuit for supply of holding current.

NATURE OF TROUBLE	CONDITION OF TROUBLE	POSSIBLE CAUSE	REPAIR CLASSIFICATION	CHECK POINT	REMEDY
		6. Tractor drive motor being defective.	B	● Broken coil of drive motor.	● Replace tractor drive motor (F302255000).
		7. Wear or damage of tractor motor gear or tractor transmission gear.	B	● Same as with POSSIBLE CAUSE 3, NATURE OF TROUBLE 13.	
	Paper cannot be stopped at proper position but it continues to be fed on.	8. Drive circuit being faulty.	B	● Check drive circuit.	● Modify drive circuit, if necessary.
14. Become loose the cloth of inked ribbon.	In printing become loose the cloth of inked ribbon during the period of inking life.	1. Rupture or excessive wear of the dot wire ends.	B	<ul style="list-style-type: none"> ● Grind the wire ends. ● Print without inked ribbon and paper. Condition { <ul style="list-style-type: none"> Letter ; To print each letter on an average. Time ; 2 ~ 3 minutes. Column ; Full Column. Print speed ; To print in accordance with each specification. 	
		2. Improper operation of dot wire(s).	B	● Replace the dot wire resetting spring or the nose assy, if necessary.	

2.3 LUBRICATION

Proper lubrication is essential to maintain the designed performance of the Model-3110 printer for the longest possible period and to prevent various troubles. Perform lubrication according to the following instructions :

2.3.1 Lubricants

The properties of lubrications used have a great influence on the performance and durability of the printer. In particular, attention should be paid to the low temperature characteristics of the lubricants. It is strongly recommended to use only those lubricants that EPSON has selected after an extensive study of technical information and a series of tests on many types of lubricants. EPSON can supply such lubricants in a metallic can or a plastic container of 40cc (40gr), which is the minimum supply unit available.

REMARKS : The number of Model-3110 printers for which 40cc (i.e. minimum supply unit) of lubricant is sufficient varies as follows according to the type of lubricant:

<u>Lubricant</u>	<u>Number of printers</u>
G ₂	Approx. 100
O ₂	Approx. 300
G ₁₁	Approx. 100

2.3.2 Lubrication Requirements

The lubricants for the Model-3110 Printer are G₂, O₂ and G₁₁. The list of Lubrication Points specifies the points to be lubricated, the types of lubricants to be used and the classification of lubrication points by the time interval of lubrication (the Reference Numbers used in the list corresponds to those in Figs. 2.5.1 to 2.5.6). Prior to application of lubricant, be sure to thoroughly clean the parts concerned.

The lubrication points are classified into three groups according to the required frequency of lubrication :

Group A : Points to be lubricated every 6 months or 1,000,000 lines printed.

Group B : Points to be lubricated every 6 months or 2,500,000 lines printed.

Group C : Points to be lubricated on every occasion of overhaul of printer or every 5,000,000 lines printed.

Lubrication must also be performed when the quantity of lubricant on any point has become insufficient as a result of cleaning of the printer parts concerned and on the occasion of disassembly or replacement of the parts concerned.

In the following list, each mention of " Type F " indicates that the lubrication point concerned exists only in the Type F Printer. The lubrication points existing only in the Type T are grouped in an independent block.

1. List of Lubrication Points

(1) Parts associated with dot head (Figs. 2.5.1 and 2.5.2)

Ref. No	Lubrication point	Lubricant	Classification
1-1	Lead cam groove	G ₁₁	A
1-2	Lead cam shaft bearings (2 points : one on frame A side, the other, frame B side)	O ₂	A
1-3	Carrier shaft (A and B) dearing parts of head carrier (3 points)	O ₂	A
1-4	Tracer bearing part of head carrier (frame B side)	O ₂	C

(2) Parts located on frame A side (Figs. 2.5.1 and 2.5.2)

Ref No	Lubrication point	Lubricant	Classification
2-1	Teeth of transmission gear	G ₂	C
2-2	Teeth of second reduction gear	G ₂	C
2-3	Cam part and toothed part of ribbon feed cam gear, and part to come into contact with retaining ring TYPE-E	G ₂	A
2-4	Part of ribbon cam lever A to come into contact with retaining ring TYPE-E	G ₂	B
2-5	Contact part between ribbon cam levers A and B	G ₂	B
2-6	Cam part and toothed part of lead cam gear	G ₂	A
2-7	Hook portions of paper feeding control lever spring (2 points) (Type F)	G ₂	C
2-8	Contact parts between paper feeding control lever, platen shaft, and retaining ring TYPE-E (Type F)	G ₂	C
2-9	Contact part between paper feeding control lever and paper feeding lever (Type F)	G ₂	A
2-10	Circumference of paper feeding ratchet wheel (Type F)	G ₂	C
2-11	Hook portion of paper feeding spring (Type F)	G ₂	C
2-12	Hook portions of paper feeding click spring (2 points) (Type F)	G ₂	C
2-13	Contact parts between paper feeding lever, paper feeding shaft and retaining ring TYPE-E (Type F)	G ₂	C
2-14	Teeth of first reduction gear	G ₂	C

(3) Parts located on frame B side (Fig. 2.5.1)

Ref. No	Lubrication point	Lubricant	Classification
3-1	Hook portions of paper feeding control lever spring (2 points) (Type F)	G ₂	C
3-2	Contact parts between paper feeding control lever, its shaft, and retaining ring TYPE-E (Type F)	G ₂	C

Ref. No.	Lubrication point	Lubricant	Classification
3-3	Contact part between paper feeding control lever and paper feeding lever (Type F)	G ₂	A
3-4	Hook portions of paper detent lever spring (2 points) (Type F)	G ₂	C
3-5	Contact parts between paper detent lever, its shaft, and retaining ring TYPE-E (Type F)	G ₂	C
3-6	Circumference of paper feeding ratchet wheel (Type F)	G ₂	C
3-7	Cam part of paper feed cam (Type F)	G ₂	A
3-8	Contact parts between paper feeding lever, its shaft, and retaining ring TYPE-E (Type F)	G ₂	C
3-9	Hook portions of paper feeding spring (2 points) (Type F)	G ₂	C
3-10	Hook portions of paper feeding click spring (Type F)	G ₂	C

(4) Parts for paper guiding (Type F, Fig. 2.5.3)

Ref. No.	Lubrication point	Lubricant	Classification
Frame A side			
4-1	Contact parts between paper guide holding shaft A and release lever A (3 points)	G ₂	C
4-2	Contact parts between release lever spring and release lever A	G ₂	C
4-3	Contact part between release lever spring and paper holding roller shaft	G ₂	C
4-4	Contact part between release lever A and paper holding roller shaft	G ₂	C
4-5	Contact part between paper guide side plate and paper holding roller shaft	G ₂	C
4-6	Paper feeding roller shaft bearing (this part is also provided in the Type T.)	O ₂	C
Frame B side			
4-7	Contact parts between paper guide holding shaft A and release lever B (3 points)	G ₂	C
4-8	Contact part between release lever spring and release lever B	G ₂	C
4-9	Contact part between release lever spring and paper holding roller shaft	G ₂	C
4-10	Contact part between release lever B and paper holding roller shaft	G ₂	C
4-11	Teeth of paper holding gear	G ₂	C
4-12	Circumference of paper feeding ratchet wheel B	G ₂	C
4-13	Contact part between paper guide side plate and paper holding roller shaft	G ₂	C

Ref. No.	Lubrication point	Lubricant	Classification
4-14	Paper holding roller shaft bearing (this part is also provided in the Type T.)	O ₂	C
Writing ledge block (Fig. 2.5.1)			
4-15	Contact part between release lever pin and release lever	G ₂	C
4-16	Hook portions of paper edge guide spring (4 points)	G ₂	C

(5) Parts associated with tractor unit (Type T, Fig. 2.5.6)

Ref. No.	Lubrication point	Lubricant	Classification
5-1	Teeth of tractor motor gear	G ₂	C
5-2	Teeth of tractor transmission gear	G ₂	C
5-3	Teeth of sprocket reduction gear	G ₂	C

(6) Parts for ribbon feeding (Fig. 2.5.4)

Ref. No.	Lubrication point	Lubricant	Classification
6-1	Contact parts between ribbon cam lever, its shaft, and retaining ring TYPE-E	G ₂	B
6-2	Contact part between ribbon cam lever B and ribbon guide roller shaft B	G ₂	B
6-3	Contact parts between ribbon cam lever B and ribbon transmission lever (2 points)	G ₂	B
6-4	Contact parts between ribbon cam lever B and transmission lever pin	G ₂	B
6-5	Contact part between ribbon guide roller shaft B and ribbon transmission lever (3 points)	G ₂	B
6-6	Contact part between ribbon guide roller shaft B and ribbon tension roller (4 points)	G ₂	C
6-7	Contact part between ribbon transmission lever and ribbon assy mounting plate	G ₂	B
6-8	Contact part between ribbon driving lever and ribbon transmission lever pin	G ₂	B
6-9	Contact part between reverse control levers (A and B) and planetary pinion holder assy	G ₂	B
6-10	Hook portion of reverse control lever spring	G ₂	C
6-11	Contact part between reverse control levers (A and B) and retaining ring TYPE-E (2 points)	G ₂	C
6-12	Hook portion of ribbon driving lever spring	G ₂	C
6-13	Contact part between ribbon driving lever and ribbon spool gear	G ₂	B
6-14	Hook portion of ribbon feeding pawl spring (2 points)	G ₂	C

Ref. No.	Lubrication point	Lubricant	Classification
6-15	Contact part between ribbon detent lever and retaining ring TYPE-E	G ₂	B
6-16	Hook portions of ribbon tension lever spring (4 points)	G ₂	C
6-17	Contact parts between ribbon tension levers (A and B) and spool adjusting washers (2 points)	G ₂	B
6-18	Contact part between ribbon spool gear and spool adjusting washer	G ₂	B
6-19	Teeth of ribbon spool gear (2 points)	G ₂	C
6-20	Parts of ribbon spool gear to come into contact with retaining ring TYPE-E (2 points)	G ₂	B
6-21	Teeth of ribbon feeding ratchet gear	G ₂	B
6-22	Ribbon feeding pawl	G ₂	B
6-23	Part of planetary pinion to come into contact with retaining ring TYPE-E	G ₂	B
6-24	Contact part between ribbon tension lever and ribbon frame	G ₂	C
6-25	Contact part between reverse control levers (A and B) and ribbon frame	G ₂	C

2. Bonding Points (Figs. 2.5.1, 2.5.2 and 2.5.5)

Ref. No.	Bonding points	Adhesive
A	Set-screws of carrier shafts A and B (4 points)	Screw Lock
B	Set-screws of motor circuit board mounting plate (2 points)	Neji Lock #2 (G)
C	Insulating mica plate	Heat Sinker HSC-8
D	Set-screw of R detector plate	Neji Lock #2 (G)
E	Set-screws of head holder (2 points)	Screw Lock
F	Set-screws of nose assy (2 points)	Screw Lock
H	Set-screws of ribbon guide (2 points)	Screw Lock

2.4 TOOLS AND ADHESIVES

2.4.1 List of Tools

The list below covers the tools which are indispensable for the maintenance or repair of the Model-3110 Printer.

No.	Designation	Specification	Remarks *
T-1	Torque driver	26kg-cm max.	©
T-1-2	Plus (+) bit		©
T-2	Electric soldering iron		○
T-4	Round nose pliers	15cm long	○
T-5	Diagonal cutting nipper	15cm long	○
T-10	Tweezers		○
T-12	Whetstone	100 × 9.5 □	○
T-14	Brush for lubrication	#1	○
T-15	Brush for lubrication	#2	○
T-16	Brush for cleaning		○
T-8	Retaining plier	#2.5	○
T-24	Retaining plier	#4	○
T-35	Retaining plier	#3	○
T-40	Pliers No. 0		○
T-59	Plier for spring pin		ⓔ
T-60	Oilstone	100 × 9.5 □	○
T-61	Feeler gauges set		○

*○ : Commercially available

© : Commercially available but with metric standard

ⓔ : EPSON's special tool

2.4.2 List Lubricants and Adhesives

The list below covers the lubricants adhesive which are indispensable for maintenance and repair of the Model-3110 Printer.

Classification	Designation	Capacity of container	Remarks *
Oil	O ₂	40cc	ⓔ
Grease	G ₂	40gr	ⓔ
	G ₁₁	40gr	ⓔ
Adhesive	Neji Lock #2 (G)	1,000gr	○
	Screw Lock	1,000gr	○
Other	Heat Sink HSC-8	8gr	○

*○ : Commercially available

ⓔ : EPSON's special lubricant

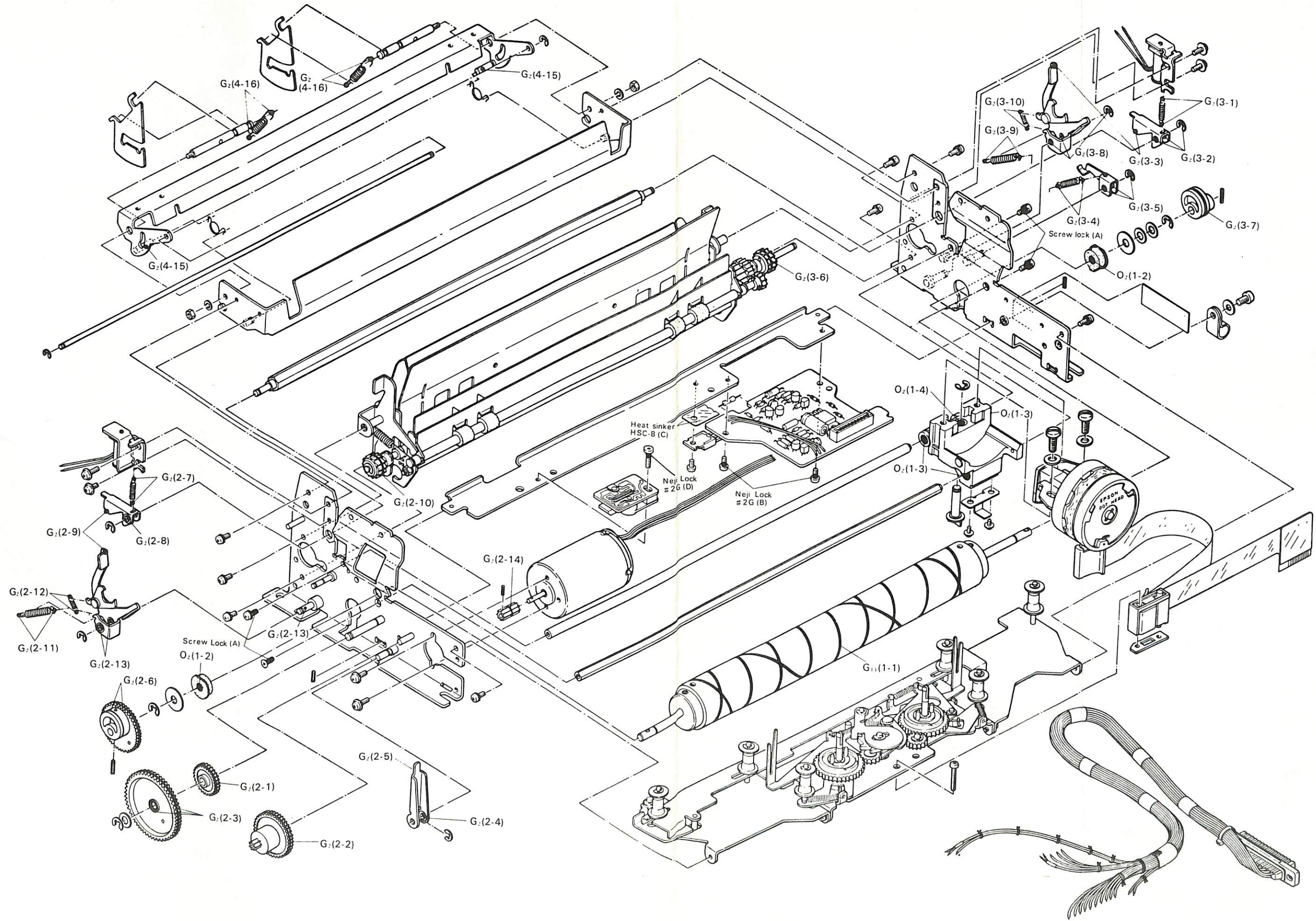


Fig. 2.5.1 Lubrication Points and Bonding Points (Type F)

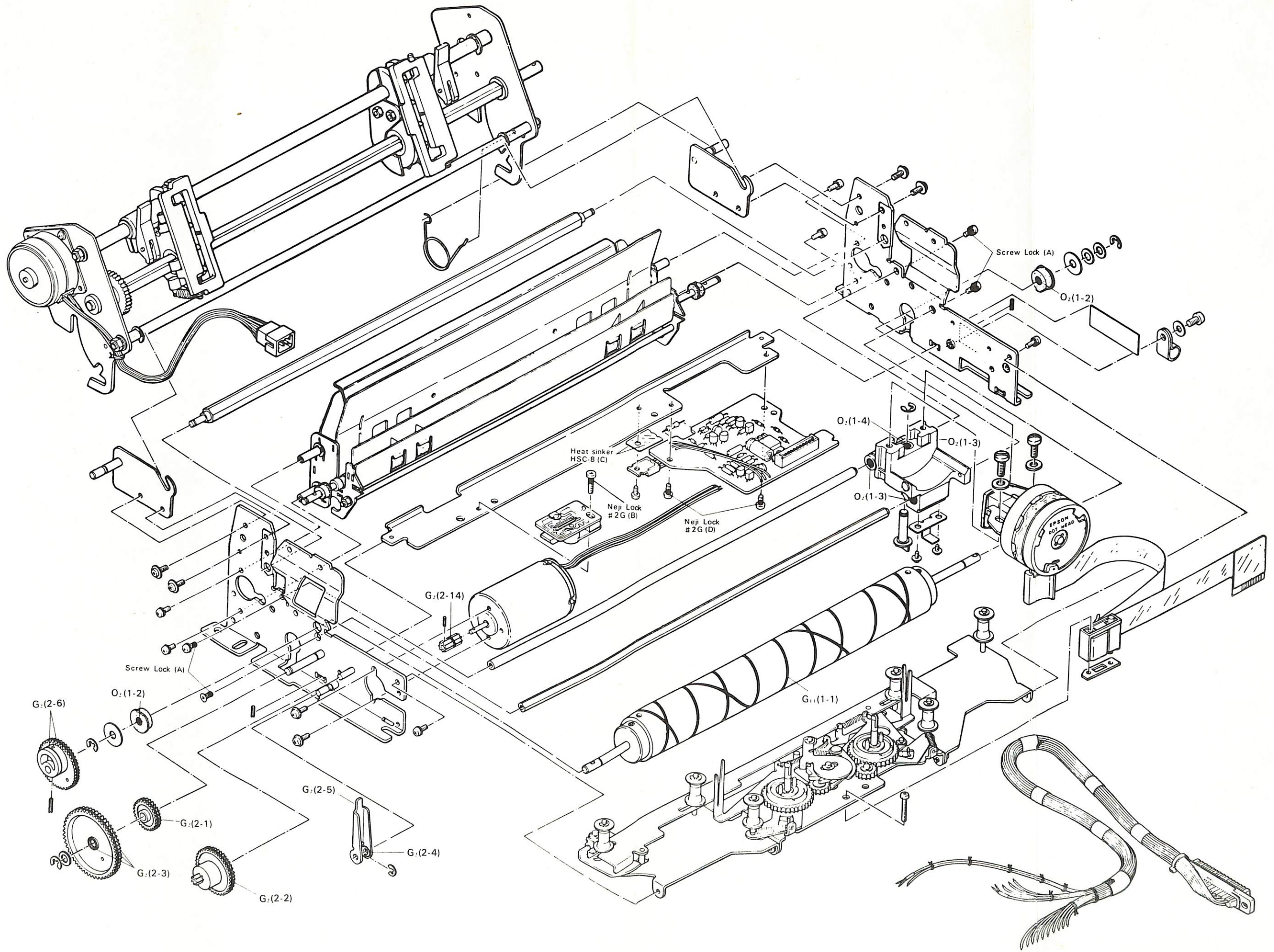


Fig. 2.5.2 Lubrication Points and Bonding Points (Type T)

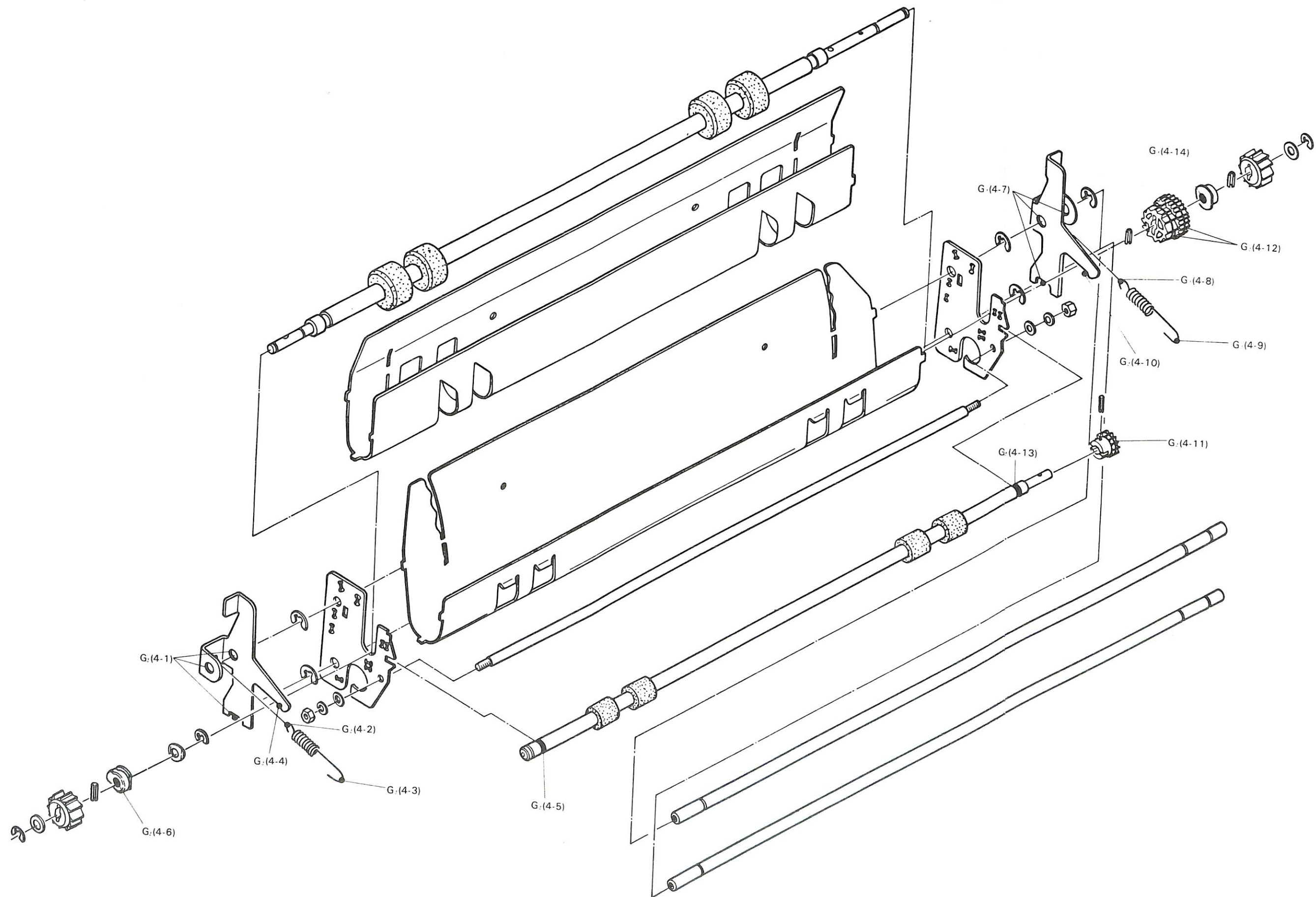


Fig. 2.5.3 Lubrication Points and Bonding Points (Paper Guide Unit)

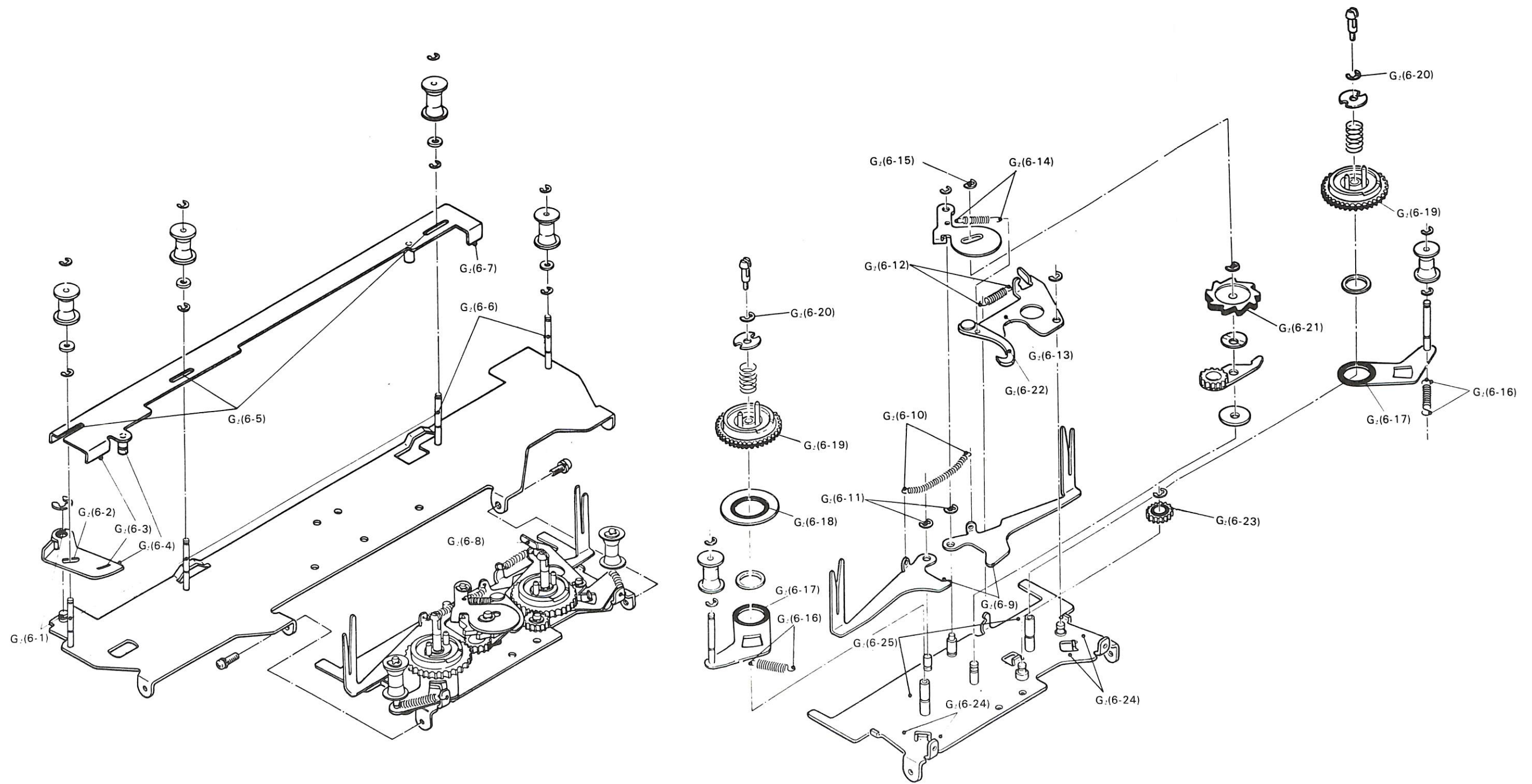


Fig. 2.5.4 Lubrication Points and Bonding Points (Ribbon Unit)

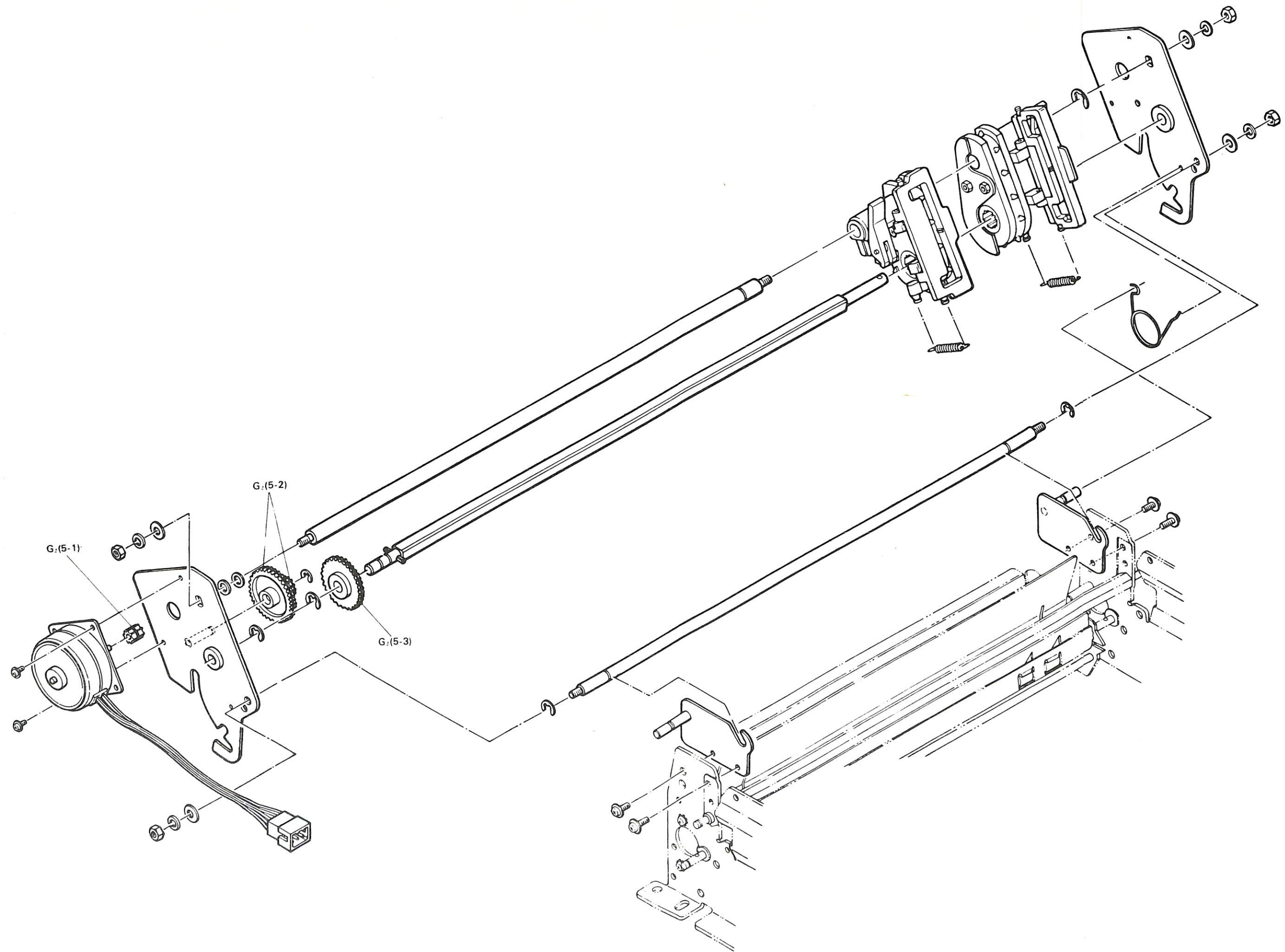


Fig. 2.5.6 Lubrication Points and Bonding Points (Tractor Unit)

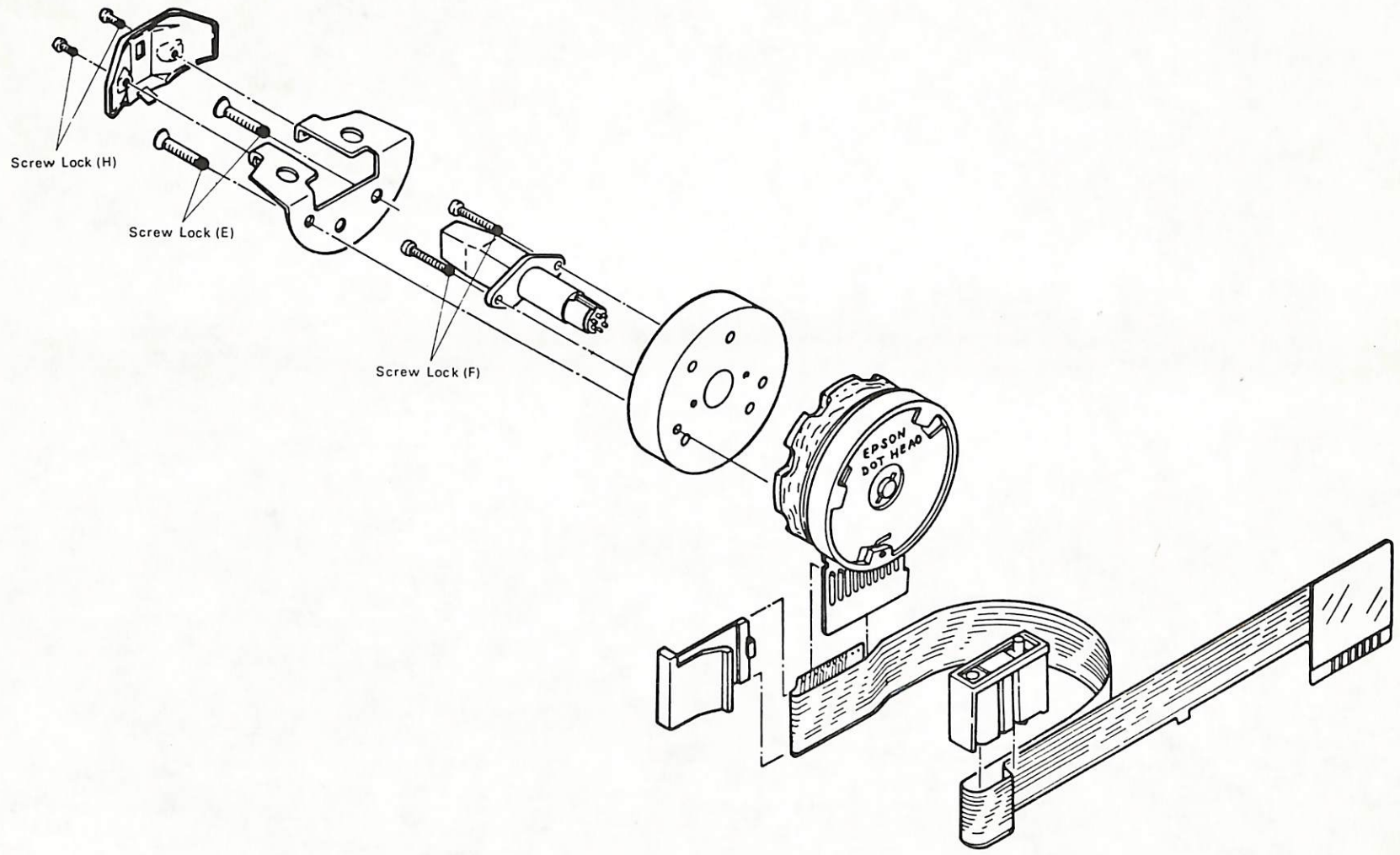


Fig. 2.5.5 Lubrication Points and Bonding Points (Dot Head Unit)

CHAPTER 3

DISASSEMBLY AND ASSEMBLY

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3. DISASSEMBLY AND ASSEMBLY

In their assembled state, the various mechanisms of the Model-3110 Printer take the form of substantially independent units. This means that disassembly and assembly of this printer are a relatively easy work.

- NOTES: 1. In the figures referring to which the following description is given, Part Nos. are added to the names of printer's parts. When placing your order for parts, please indicate the corresponding part names and Nos. It should be noted that the parts not given a part number cannot be supplied as an independent piece.
2. The procedures of disassembly, assembly and adjustment described in Paragraphs 3.1 to 3.3 are those for the Type F Printer. For the mechanisms provided only in the Type T, the procedures are described in Paragraph 3.4.
3. In disassembling the printer, be sure to keep all parts and small hardware elements (such as screws, washers, retaining rings, etc.) of the same assembly or unit in the same place. This will decrease much the risk of confusing the combination of parts and hardware elements in the reassembly work.
4. In the following description, the small hardware elements are indicated by their symbols shown below:
- CB : Cross-recessed head machine screw (Biding head)
 - CP : Cross-recessed head machine screw (Pan head)
 - CF : Cross-recessed head machine screw (Flat head)
 - CPO: C.P screw with outside toothed lock washer
 - CPP: C.P screw (polycarbonate)
 - CS : Cup screw
 - SP : Spring pin
 - RE : Retaining ring TYPE-E
 - PW: Plain washer
 - LS : Leaf spring
 - SW: Spring washer
 - HN : Hexagon nut
 - SLP: Slotted head machine screw (Pan head)
5. When placing your order for parts, please refer to the latest version of Model-3110 Printer Parts Price List.

3.1 DISASSEMBLY (The following description covers the disassembly of the Type F.
For the mechanisms provided only in the Type T, refer to Par.3.4.)

3.1.1 Ribbon Feeding Mechanism

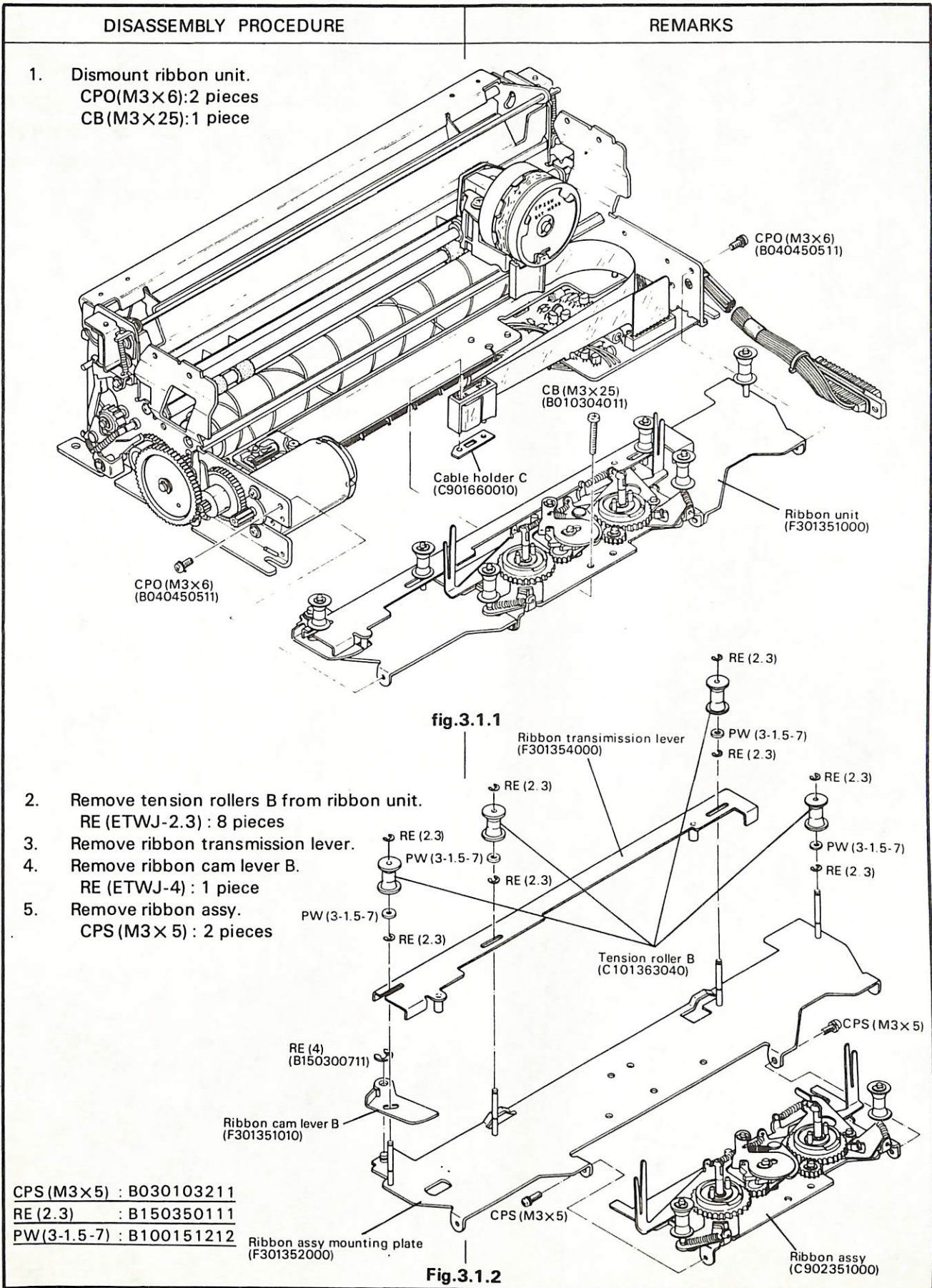
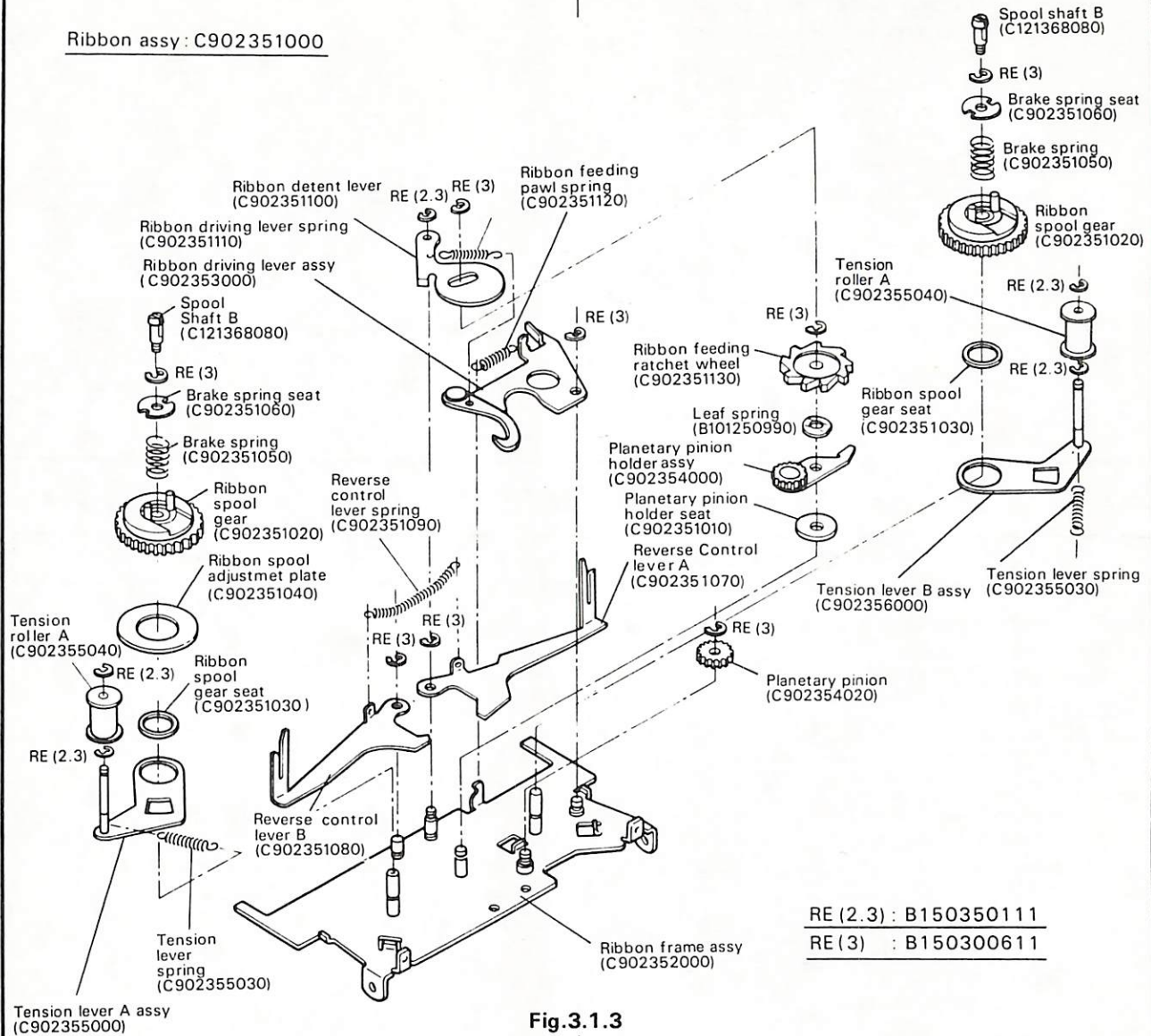


Fig.3.1.2

DISASSEMBLY PROCEDURE

REMARKS

Ribbon assy : C902351000



RE (2.3) : B150350111
 RE (3) : B150300611

Fig.3.1.3

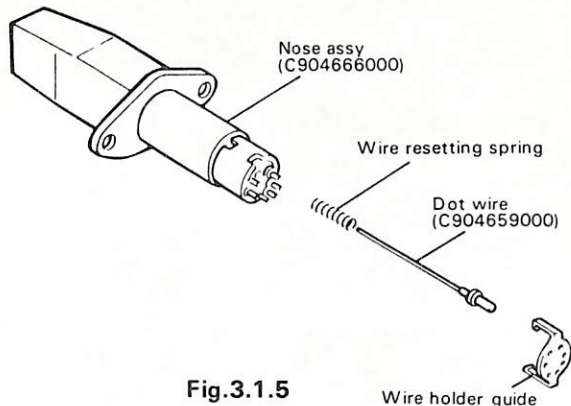
6. Disassemble ribbon assy as follows :
- (1) Take off ribbon driving lever spring.
 - (2) Take off ribbon feeding pawl spring.
 - (3) Remove planetary pinion.
 RE(ETWJ-3): 1 piece
 - (4) Take off tension lever spring from tension lever B assy.
 - (5) Remove ribbon spool gear on frame B side.
 RE(ETWJ-3): 1 piece
 - (6) Remove ribbon driving lever assy.
 RE(ETWJ-): 1 piece
 - (7) Remove tension lever B assy.
 - (8) Remove tension lever spring, ribbon spool gear and tension lever A assy on frame A side in the same manner as Steps (4),(5) and (7). Remove ribbon detent lever.
 RE(ETWJ-2.3): 1 piece
 RE(ETWJ-3): 1 piece
 - (10) Remove ribbon feeding ratchet wheel.
 RE(ETWJ-2): 1 piece

- Be careful not to stretch the spring too much.
- Be careful not to stretch the spring too much.

DISASSEMBLY PROCEDURE	REMARKS
<p>(11) Remove leaf spring (5-0.1-10), planetary pinion holder assy and planetary pinion holder seat.</p> <p>(12) Take off reverse control lever spring.</p> <p>(13) Remove reverse control lever A and B assemblies. RE(ETWJ-3): 1 piece</p> <p>7. Disassemble reverse control lever A and B assemblies: (1) Remove tension rollers A from tension levers A and B, respectively. RE(ETWJ-2.3): 2 pieces</p> <p>8. Remove spool shaft.</p>	<ul style="list-style-type: none"> ● As adhesive (Screw Lock) is applied to the threaded part of the spool shaft, be careful not to damage the shaft in removing it. Use of ⊖ screwdriver will facilitate removal of the spool shaft.

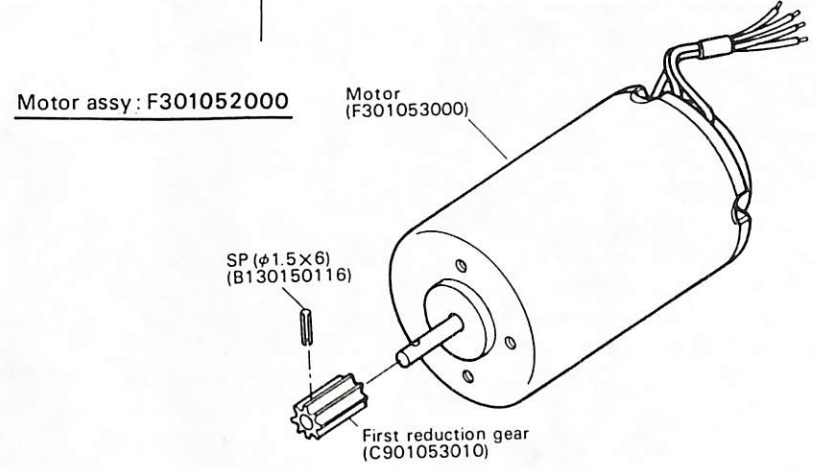
3.1.2 Printing Mechanism (Dot Head Unit)

DISASSEMBLY PROCEDURE	REMARKS
<p>1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1.)</p> <p>2. Dismount dot head unit as follows: (1) Pull out flexible printed cable from motor circuit board connector. (2) Separate dot head unit from head carrier assy. SLP (M4×8) : 2 pieces</p> <p>3. Disassemble dot head unit as follows: (1) Remove ribbon guide. CB (M2×4) : 2 pieces (2) Remove head holder. CF (M3×14) : 3 pieces (3) Remove nose assy. CP (M2×14) : 2 pieces</p>	<ul style="list-style-type: none"> ● Be careful not to bend or damage the cable. ● As adhesive (Screw Lock) is applied, exercise caution in taking off the CB screws. ● As adhesive (Screw Lock) is applied, exercise caution in taking off the CF screws. ● As adhesive (Screw Lock) is applied, exercise caution.
<p style="text-align: right;">Head unit: F301655000</p> <p style="text-align: center;">Fig. 3.1.4</p>	

DISASSEMBLY PROCEDURE	REMARKS
<p>4. Disassemble nose assy as follows.</p> <p>(1) Remove wire holder guide from nose.</p> <p>(2) Remove wire resetting spring from wire.</p> <p>5. Remove cord holder and cable holder B. (See Fig.3.1.4)</p> <p>6. Unsolder flexible printed cable from driving coil circuit board.</p>	 <p>The diagram shows a nose assembly (C904666000) with a wire resetting spring and a dot wire (C904659000) inserted into it. A wire holder guide is also shown. The caption is Fig.3.1.5.</p> <p>Fig.3.1.5</p> <ul style="list-style-type: none"> ● Use a soldering iron of 20 to 30 W. Avoid applying the soldering iron to the terminals for too long a time.

3.1.3 Drive Mechanism (Motor Assy and Motor Circuit Board Assy)

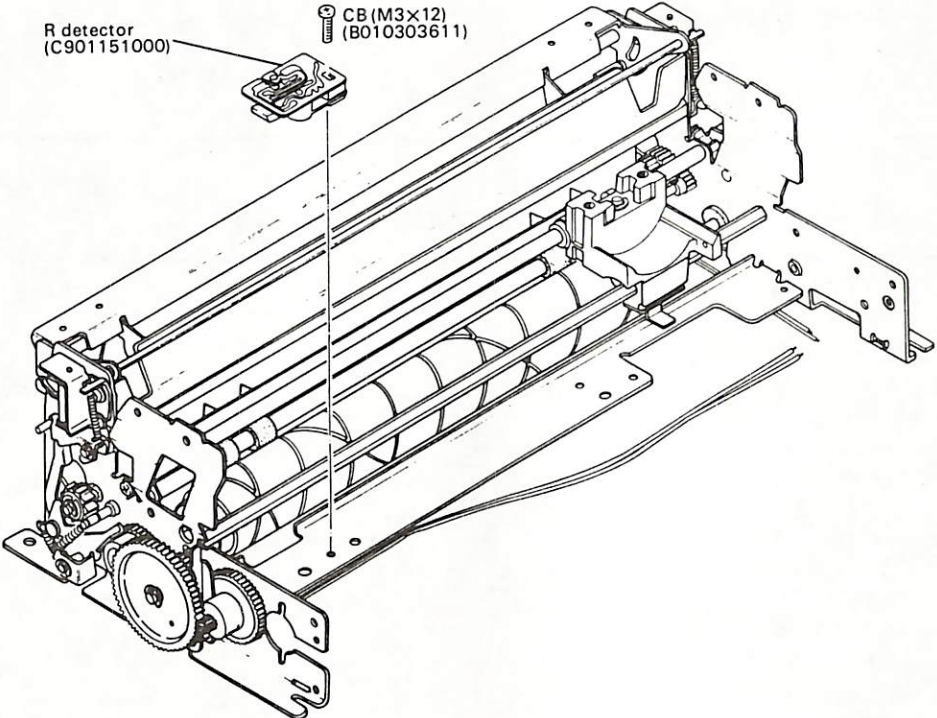
DISASSEMBLY PROCEDURE	REMARKS
<p>1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1)</p> <p>2. Remove connector unit as follows:</p> <p>(1) Unsolder the lead wires of respective mechanisms.</p> <p>(2) Cut wire ties.</p> <p>(3) Take off nylon clip. CS (M4×6) : 1 piece PW(4-0.8-10) : 1 piece</p> <p>3. Dismount motor circuit board assy as follows.</p> <p>(1) Remove the set-screw securing transistor. CPP (M3×5) : 1 piece</p> <p>(2) Remove motor circuit board assy. CB (M3×5) : 2 pieces</p> <p>4. Dismount motor assy. CS (M3×5) : 2 pieces</p> <p>5. Disassemble motor assy:</p> <p>(1) Remove spring pin from first reduction gear. SP (φ1.5 ×16) : 1 piece</p>	<ul style="list-style-type: none"> ● Use a soldering iron of 20 to 30 W. Avoid applying the soldering iron to the terminals for too long a time. ● Be careful not damage the lead wire. ● When replacing the motor assy or motor circuit board assy, unsoldering is the only operation required. ● Use pliers to remove the spring pin.



The diagram shows a motor assembly (F301052000) with a motor (F301053000) and a first reduction gear (C901053010). A spring pin (SP φ1.5×6, B130150116) is shown being removed from the gear. The caption is Fig. 3.1.6.

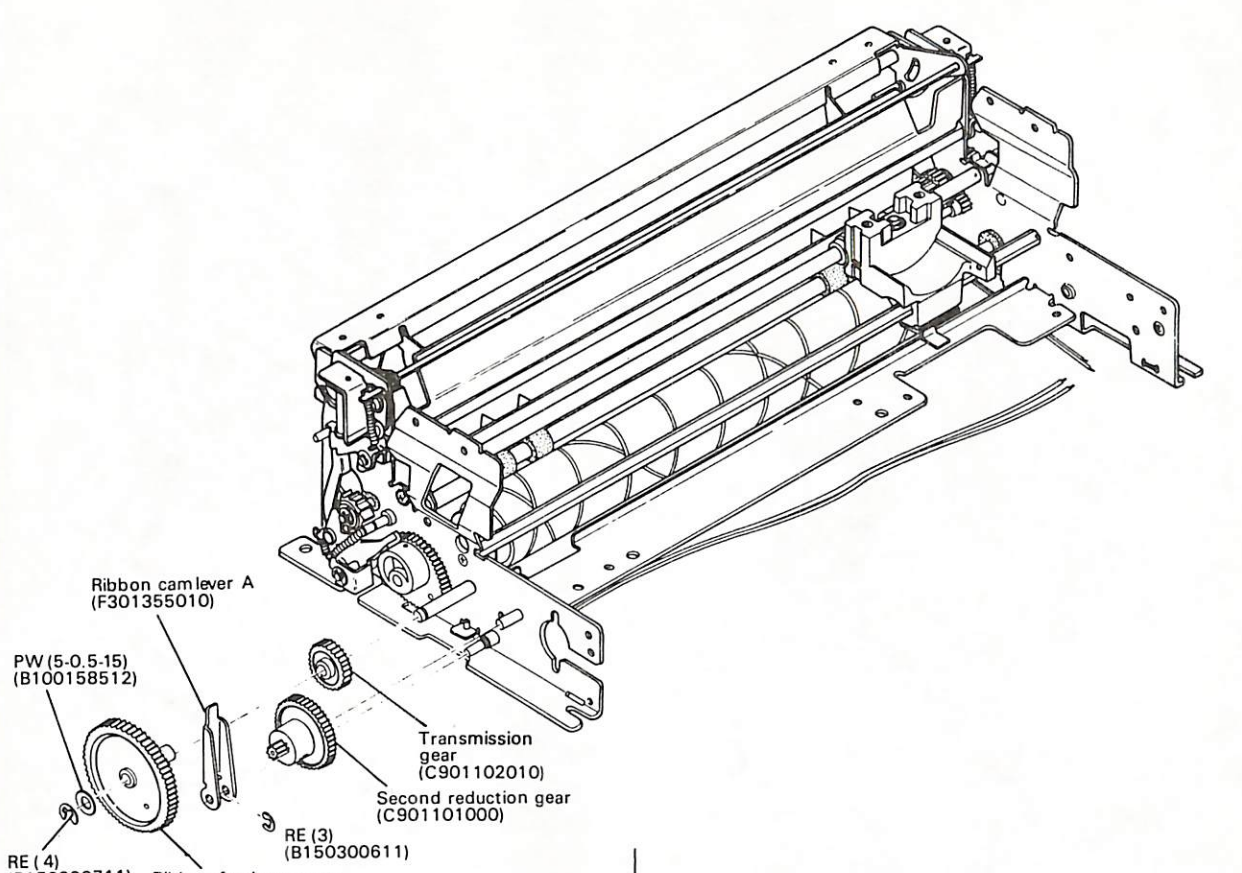
Fig. 3.1.6

3.1.4 Detecting Mechanism (R Detector)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1) 2. Dismount printing mechanism. (See Steps 1 and 2, Par. 3.1.2) 3. Dismount drive mechanism. (See Steps 1 to 4, Par. 3.1.3) 4. Unsolder the lead wires of R detector. 5. Remove R detector. CB (M3X12) : 1 piece 	<ul style="list-style-type: none"> ● When replacing R detector, Steps 1, 2 and 3 may be omitted. ● Use a soldering iron of 20 to 30W. Avoid applying the soldering iron to the terminals for too long a time.
 <p>The diagram shows a detailed exploded view of the detecting mechanism. A small component labeled 'R detector (C901151000)' is shown being separated from the main assembly. A screw labeled 'CB (M3X12) (B010303611)' is also shown being removed from the assembly. The main assembly includes various gears, rollers, and structural components.</p>	
<p>Fig. 3.1.7</p>	

3.1.5 Transmission Mechanism (Gear Train)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1) 2. Remove ribbon feed cam gear. RE (ETWJ-4) : 1 piece 3. Remove second reduction gear. 4. Remove transmission gear. 5. Remove ribbon cam lever. RE (ETWJ-3) : 1 piece 6. Remove first reduction gear. SP ($\phi 1.5 \times 6$) : 1 piece 	<ul style="list-style-type: none"> ● When replacing gear train only, this step may be omitted. ● This step may be omitted if the first reduction gear has been removed in accordance with Step 5, Par. 3.1.3. ● Use pliers to remove the spring pin.

DISASSEMBLY PROCEDURE	REMARKS
 <p>Ribbon cam lever A (F301355010)</p> <p>PW (5-0.5-15) (B100158512)</p> <p>RE (4) (B150300711) Ribbon feed cam gear (C901104010)</p> <p>RE (3) (B150300611)</p> <p>Transmission gear (C901102010)</p> <p>Second reduction gear (C901101000)</p>	<p style="text-align: center;">Fig. 3.1.8</p>

3.1.6 Paper Feeding Mechanism (Levers and Related Parts)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount paper feeding lever A assy as follows: <ol style="list-style-type: none"> (1) Disengage paper feeding lever A assy from paper feeding control lever. (2) Take off paper feeding lever spring. (3) Remove paper feeding lever A assy. RE (ETWJ-3) : 1 piece 2. Dismount paper feeding control lever as follows: <ol style="list-style-type: none"> (1) Take off paper feeding control lever spring. (2) Remove paper feeding control lever. RE (ETWJ-3) : 1 piece 3. Disconnect lead wires of paper feeding trigger magnet A assy from motor circuit board, and then cut wire ties. 4. Remove paper feeding trigger magnet A assy. 	<ul style="list-style-type: none"> ● Be careful not to stretch the spring too much. ● Be careful not to stretch the spring too much. ● This step is required only when replacing the trigger magnet assy.

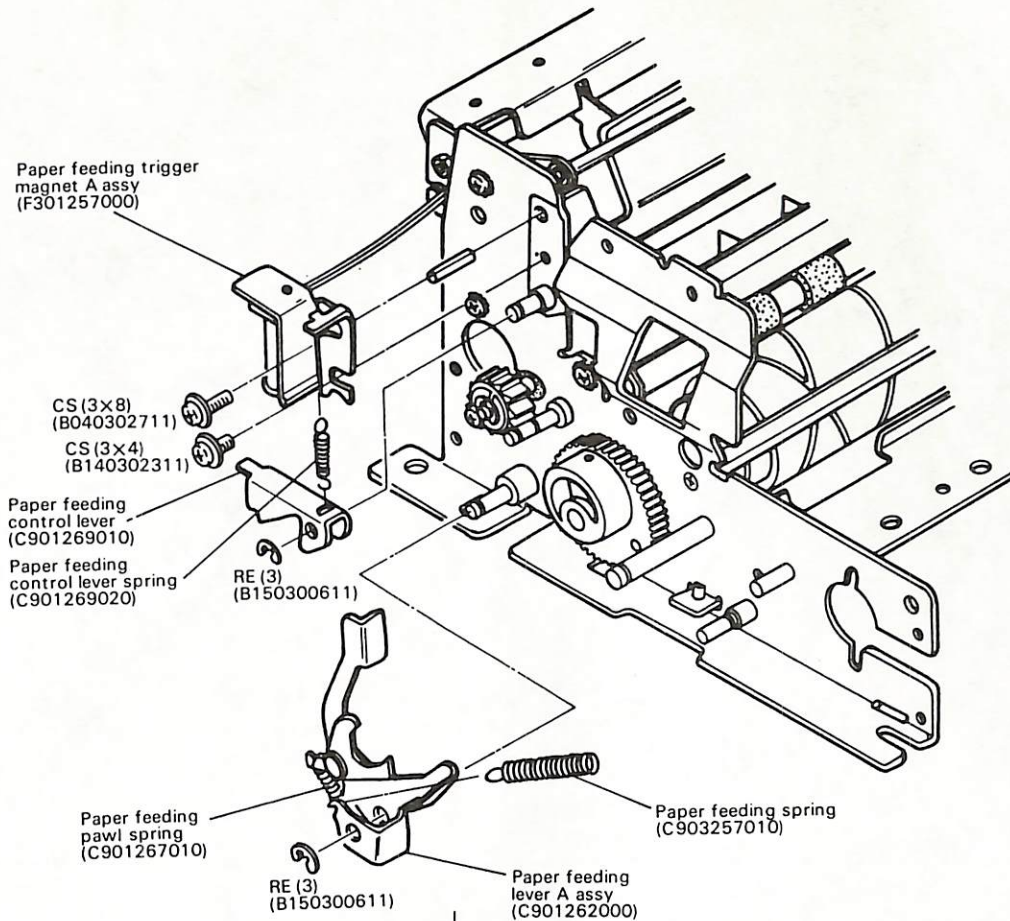
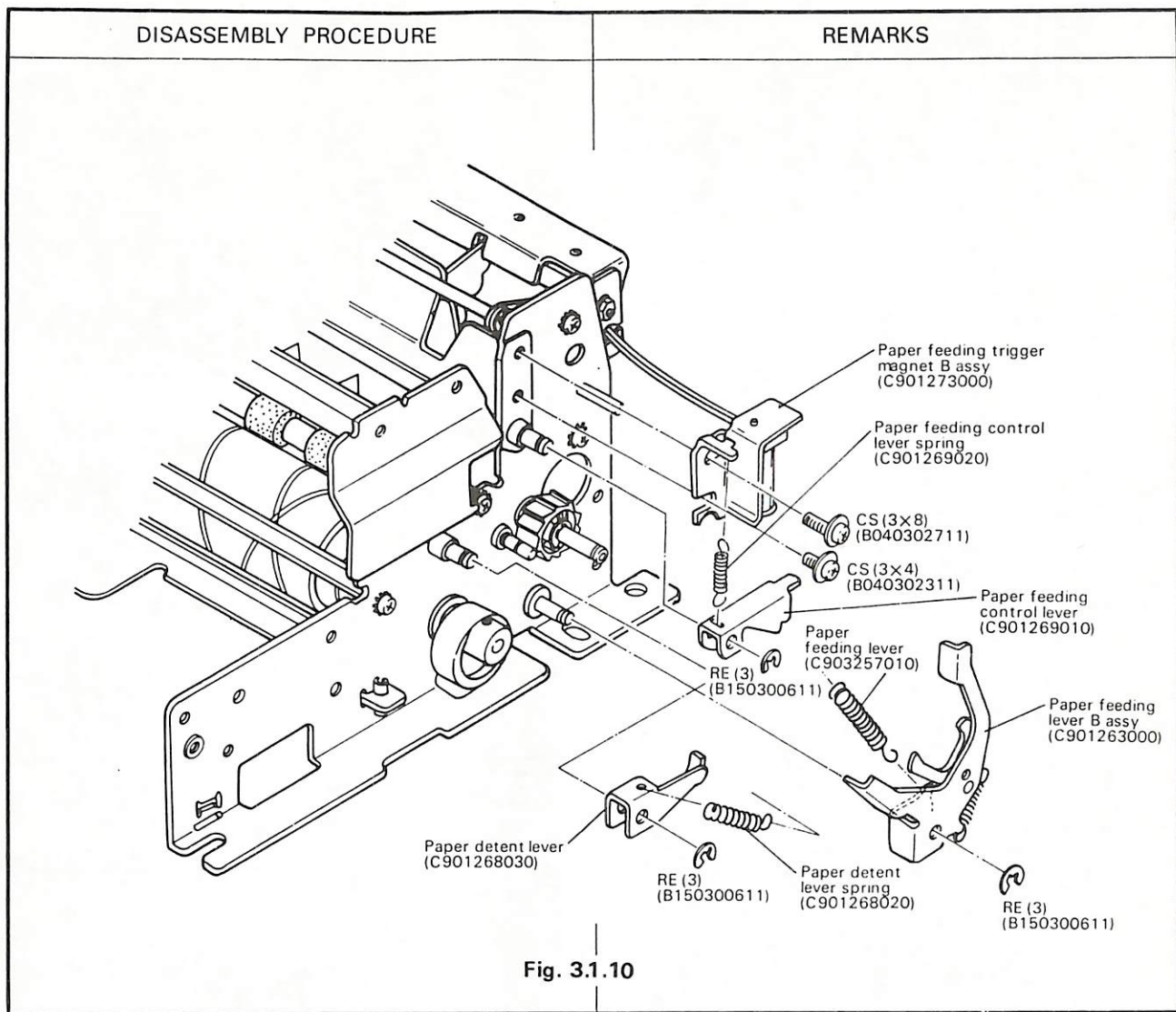


Fig. 3.1.9

5. Dismount paper feeding lever B assy as follows:
 - (1) Disengage paper feeding lever B assy from paper feeding control lever.
 - (2) Take off paper feeding lever spring.
 - (3) Remove paper feeding lever B assy.
RE (ETWJ-3) : 1 piece
6. Dismount paper feeding control lever as follows:
 - (1) Take off paper feeding control lever spring.
 - (2) Remove paper feeding control lever.
RE (ETWJ-3) : 1 piece
7. Disconnect lead wires of paper feeding trigger magnet B assy from motor circuit board, and then cut wire ties.
8. Remove paper feeding trigger magnet B assy.
CS (M3x4) : 1 piece
CS (M3x8) : 1 piece

- Be careful not to stretch the spring too much.
- Be careful not to stretch the spring too much.
- This step is required only when replacing the trigger magnet.



3.1.7 Printing Mechanism (Head Carrier, Carrier Shafts A and B)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1) 2. Dismount printing mechanism. (See Steps 1 and 2, Par. 3.1.2) 3. Dismount transmission mechanism. (See Pat. 3.1.5) 4. Dismount paper feeding mechanism. (See Step 1, Par. 3.1.6) 5. Turning lead cam, move head carrier assy towards frame B side. 6. Take off the set-screws securing carrier shaft A. CPO (M3×8) : 2 pieces 7. Take off the set-screws securing carrier shaft B. CF (M3×7) : 1 piece (on frame A side) CPO (M3×8) : 1 piece (on frame B side) 8. Remove head carrier unit and carrier shafts A and B. 	<ul style="list-style-type: none"> ● As adhesive (Screw Lock) is applied, exercise caution in taking off the screws. ● As adhesive (Screw Lock) is applied, exercise caution in taking off the screws.

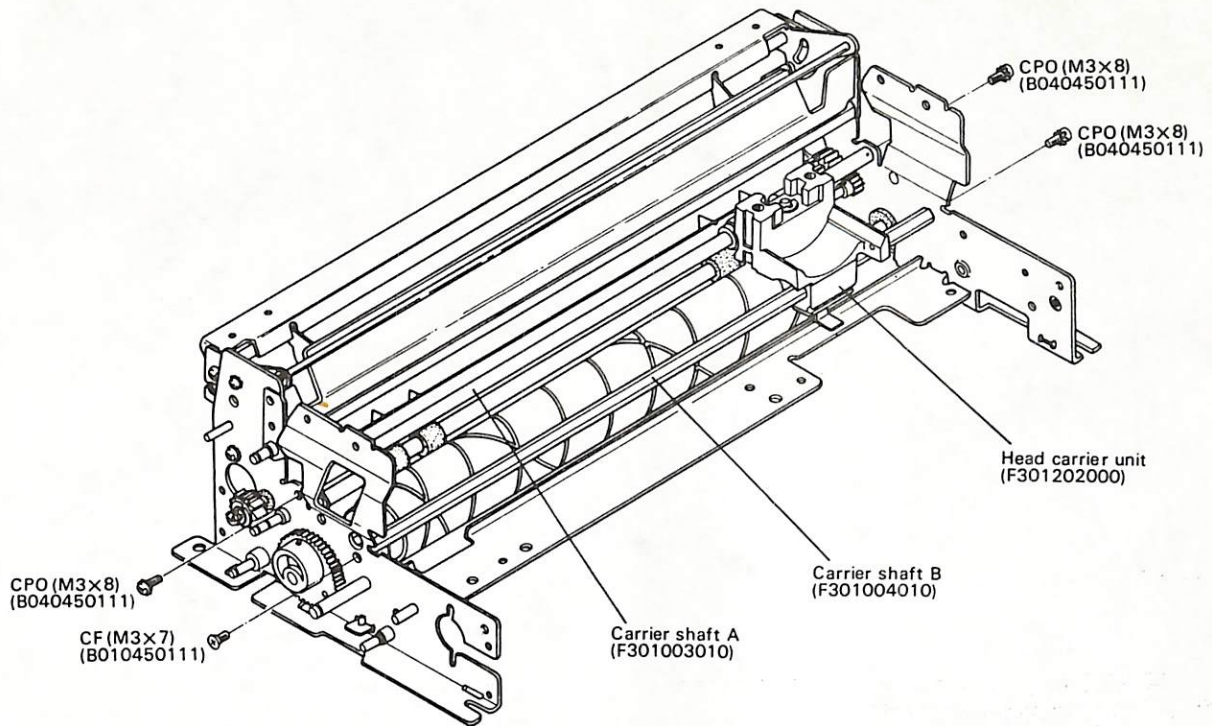


Fig. 3.1.11

9. Disassemble head carrier unit as follows:

- (1) Remove tracer.
 - RE (ETWJ-4) : 1 piece
- (2) Remove R detection plate.
 - CS (M2.5x4) : 2 pieces

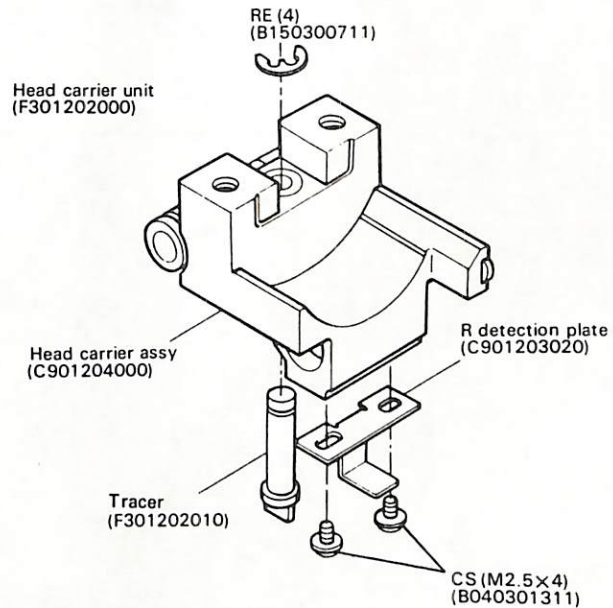


Fig. 3.1.12

3.1.8 Transmission Mechanism (Paper Feed Cam Gear and Paper Feed Cam)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount transmission mechanism. (See Par. 3.1.5) 2. Dismount paper feeding mechanism. (See Steps 1 and 6, Par. 3.1.6) 3. Remove paper feed cam gear. SP ($\phi 2 \times 10$) : 1 piece 4. Remove paper feed cam. SP ($\phi 2 \times 10$) : 1 piece 	<ul style="list-style-type: none"> ● Use pliers or round nose pincers to take off the spring pin. ● Use pliers or round nose pincers to take off the spring pin.
<p style="text-align: right;">Paper feed cam (C901105010)</p> <p style="text-align: right;">SP ($\phi 2 \times 10$) (B130103016)</p> <p style="text-align: left;">Paper feed cam gear (C901103010)</p> <p style="text-align: left;">SP ($\phi 2 \times 10$) (B130103016)</p> <p style="text-align: center;">Fig. 3.1.13</p>	

CHAP 3

3.1.9 Printing Mechanism (Lead Cam)

DISASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Dismount ribbon feeding mechanism. (See Step 1, Par. 3.1.1) 2. Dismount transmission mechanism. (See Par. 3.1.5) 3. Dismount paper feeding mechanism. (See Steps 1 and 5, Par. 3.1.6) 4. Dismount printing mechanism. (See Par. 3.1.2 and 3.1.7) 5. Dismount transmission mechanism. (See Par. 3.1.8) 6. Remove plane bearing for lead cam shaft on frame A side. RE (ETWJ-4) : 1 piece 7. Remove plane bearing for lead cam shaft on frame B side. RE (ETWJ-4) : 1 piece 8. Displacing lead cam towards frame B side, separate it from printer framing. 	

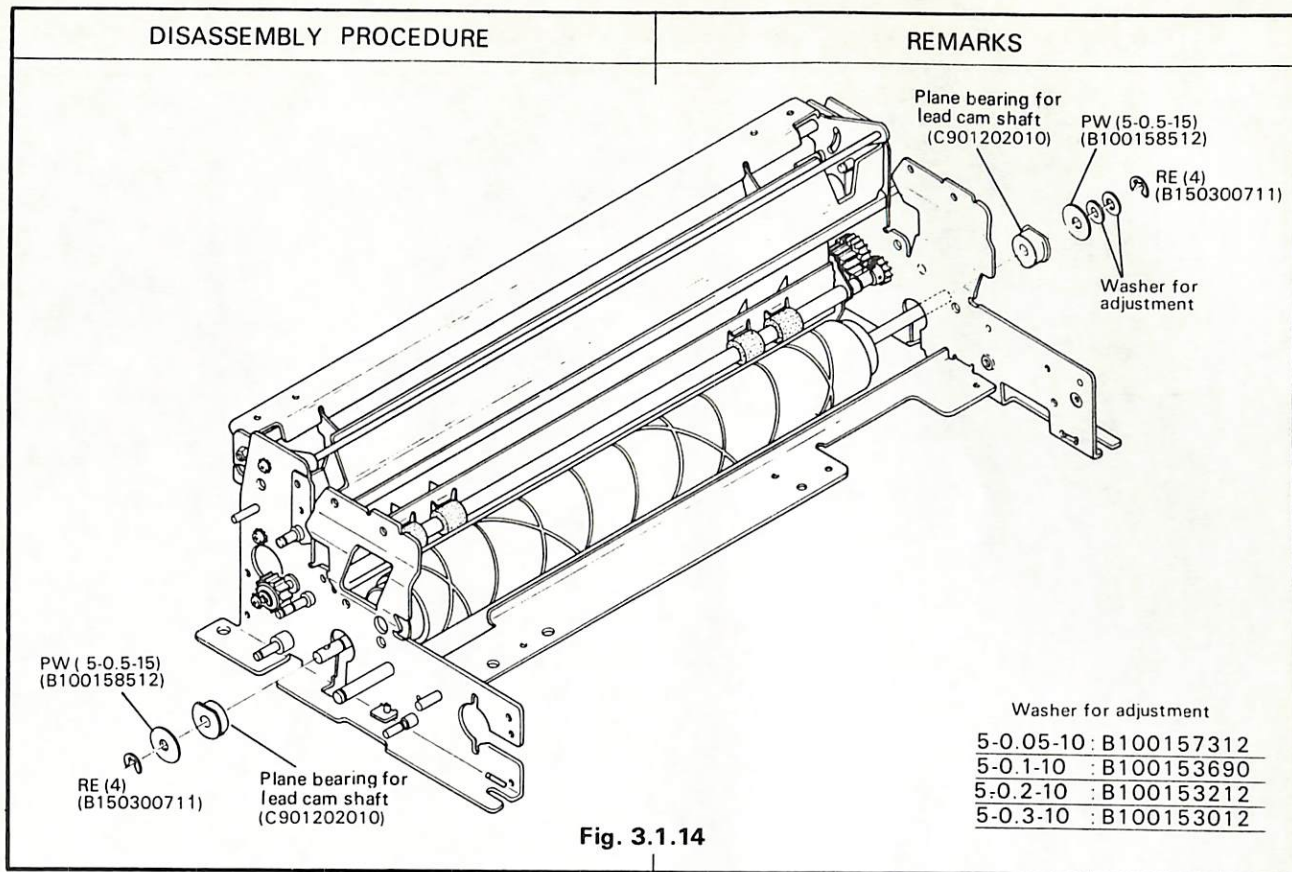


Fig. 3.1.14

3.1.10 Paper Feeding Mechanism (Writing Ledge Unit and Paper Guide Unit)

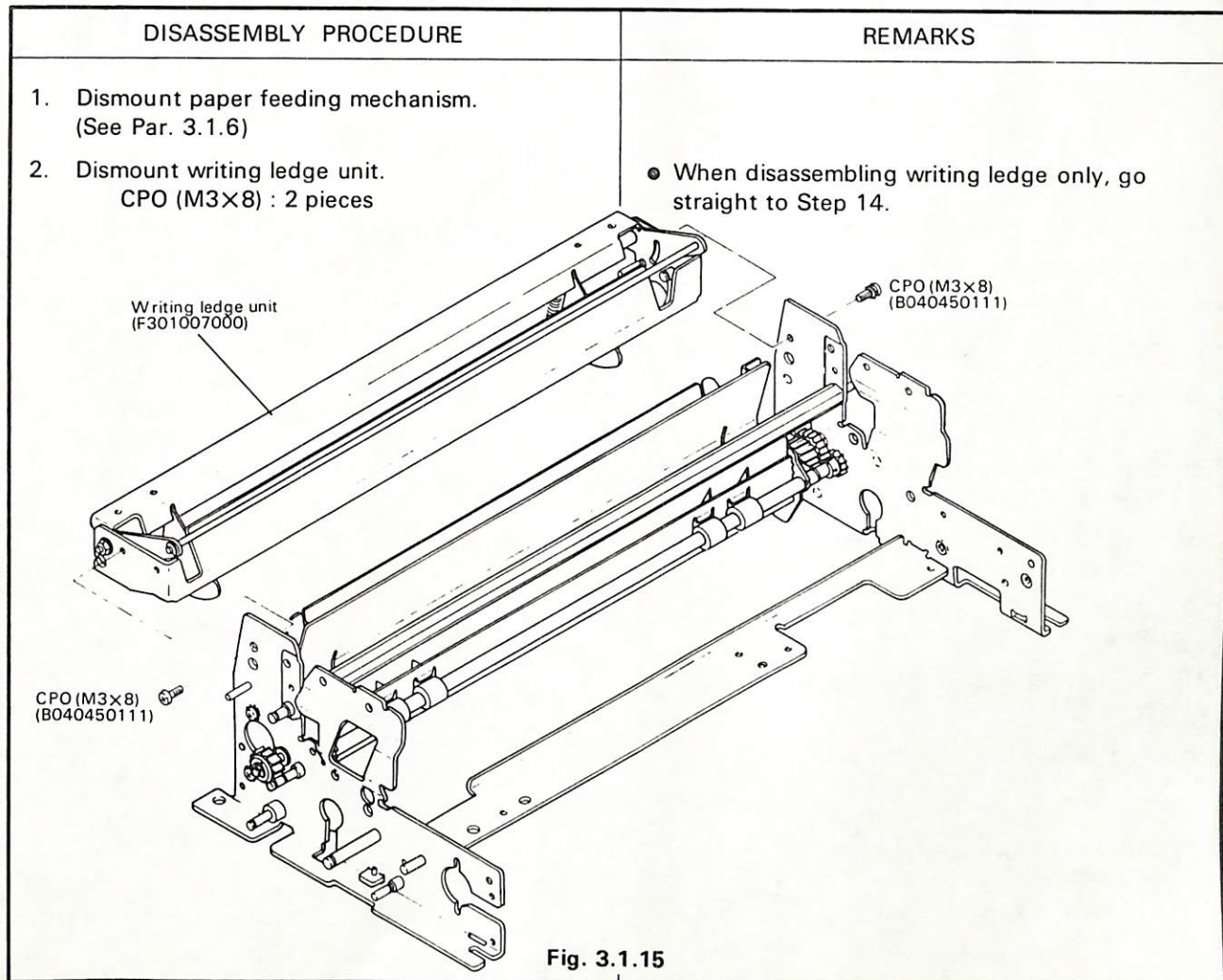
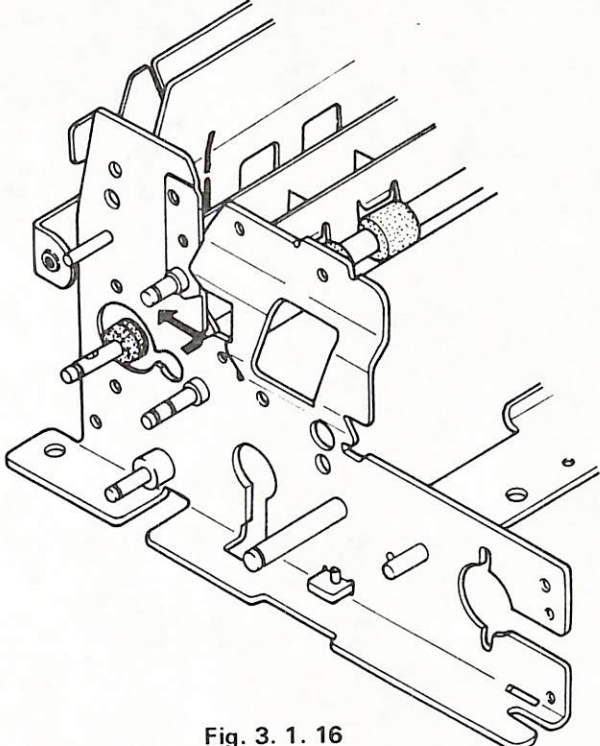


Fig. 3.1.15

DISASSEMBLY PROCEDURE	REMARKS
<p>3. Remove paper feeding ratchet wheels on frame A and B sides. RE (ETWJ-3) : 2 pieces</p> <p>4. Take off the set-screws securing paper guide holding shafts A on frame A and B sides. CPO (M3×8) : 4 pieces</p> <p>5. Displace plane bearing for paper feeding roller shaft on frame A and B sides in the direction of the arrow Fig. 3.1. 16.</p>	<ul style="list-style-type: none"> ● When disassembling the whole printer, this step may be omitted. In such case, the ratchet wheels need not be separated from the other parts of the paper guide unit.  <p style="text-align: center;">Fig. 3. 1. 16</p>
<p>6. Remove paper feed cam on frame B side. SP ($\phi 2 \times 10$) : 1 piece</p> <p>7. Take off the set-screw securing carrier shaft A on frame B side. CPO (M3×8) : 1 piece</p> <p>8. Take off the set-screw securing carrier shaft B on frame B side. CPO (M3×8) : 1 piece</p> <p>9. Take off the set-screw securing ribbon unit on frame B side. CPO (M3×6) : 1 piece</p> <p>10. Take off spring pin securing motor circuit board mounting plate on frame B side. SP ($\phi 2 \times 8$) : 1 piece</p> <p>11. Take off the set-screw securing nylon clip to connector unit. CP (M4×6) : 1 piece</p> <p>12. Separate frame B assy and remove paper guide unit.</p>	<ul style="list-style-type: none"> ● Needless to say, this operation is not necessary any longer if already completed in accordance with Par. 3. 1. 8. ● Use pliers or round nose pincers to remove the spring pin. ● This operation is not necessary any longer if already completed at Step 6, Par. 3. 1. 7. ● This operation is not necessary any longer if already completed at Step 7, Par. 3.1.7. ● This operation is not necessary any longer if already completed at Step 1, Par. 3.1.1. ● Use pliers or round nose pincers to take off the spring pin.

DISASSEMBLY PROCEDURE

REMARKS

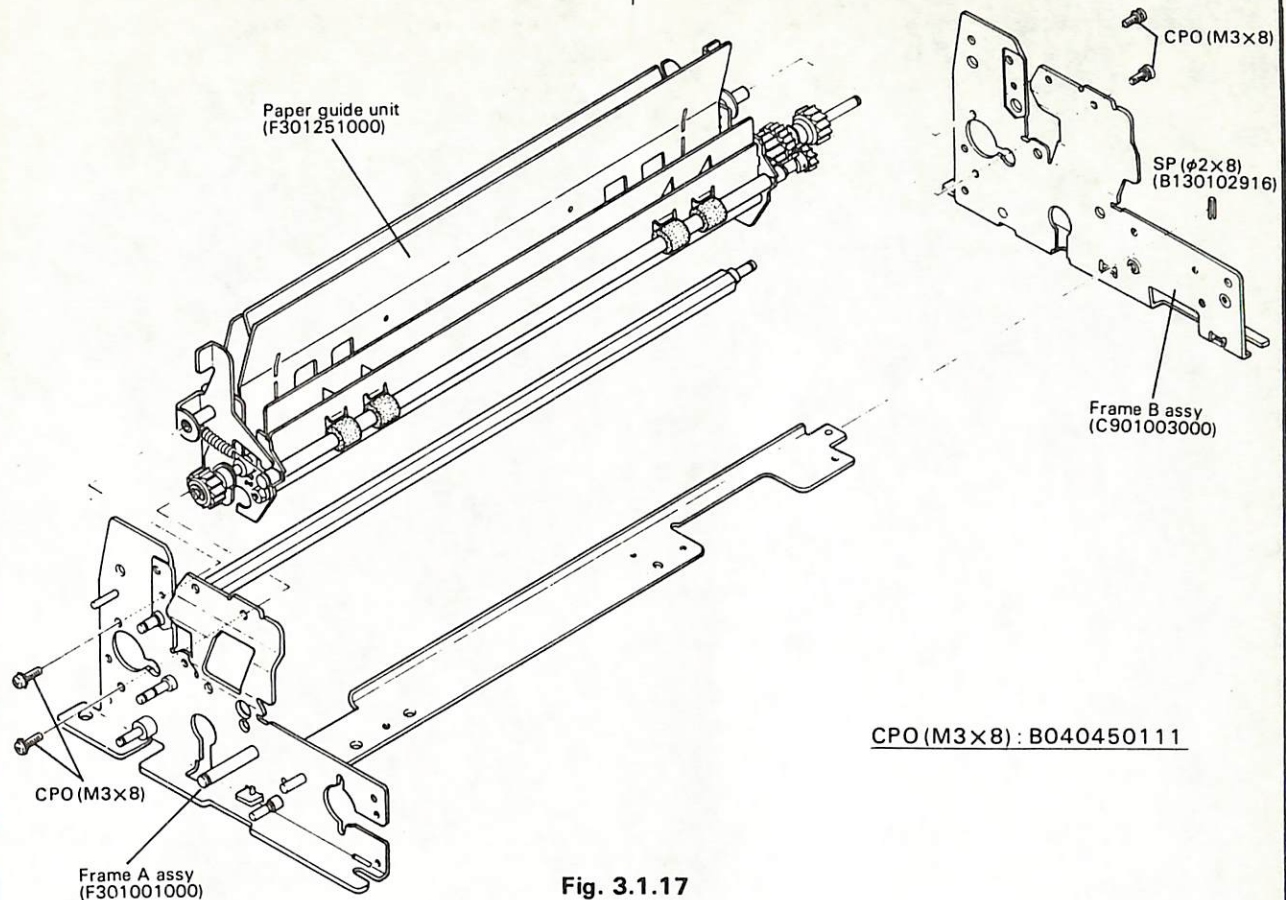


Fig. 3.1.17

13. Disassemble paper guide unit as follows:

- (1) Take off plane bearing for paper feeding roller shaft on both sides.
SP ($\phi 1.5 \times 8$) : 2 pieces
- (2) Take off release lever spring on both sides.
- (3) Remove paper feeding ratchet wheel B and take off spring pin.
SP ($\phi 1.5 \times 8$) : 1 piece
- (4) Remove release lever A, then take off the retaining rings TYPE-E securing paper guide holding shaft A.
RE (ETWJ-4) : 2 pieces
- (5) Remove release lever B, then take off the retaining rings TYPE-E securing paper guide holding shaft A.
RE (ETWJ-4) : 3 pieces
- (6) Take off the hexagon nuts securing paper guide holding shafts. B.
HN (3) : 2 pieces
SW (3) : 2 pieces
PW (3) : 2 pieces
- (7) Remove paper guide side plates.
- (8) Pull out paper guide holding shafts A.
- (9) Remove paper guide holding shafts B.
- (10) Remove paper holding roller.
- (11) Separate paper holding gear from paper holding roller.
SP ($\phi 1.5 \times 8$) : 1 piece
- (12) Remove outer paper guide.
- (13) Remove inner paper guide, then pull out paper feeding roller shaft.

- Use pliers or round nose pincers to take off the spring pin.

- Use pliers or round nose pincers to take off the spring pin.

Paper guide unit : F301251000
 Paper feeding roller assy: F301252000

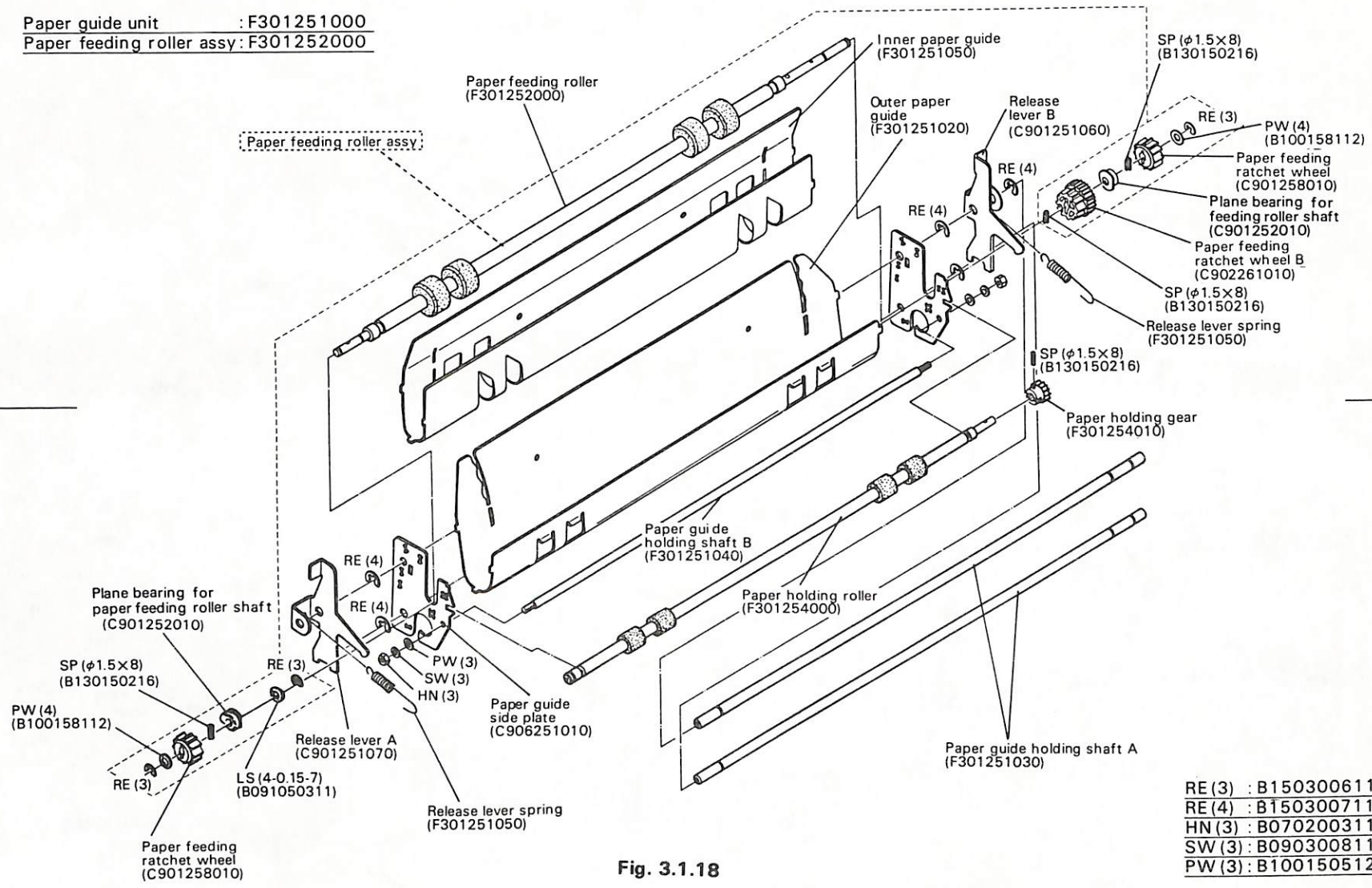


Fig. 3.1.18

- RE (3) : B150300611
- RE (4) : B150300711
- HN (3) : B070200311
- SW (3) : B090300811
- PW (3) : B100150512

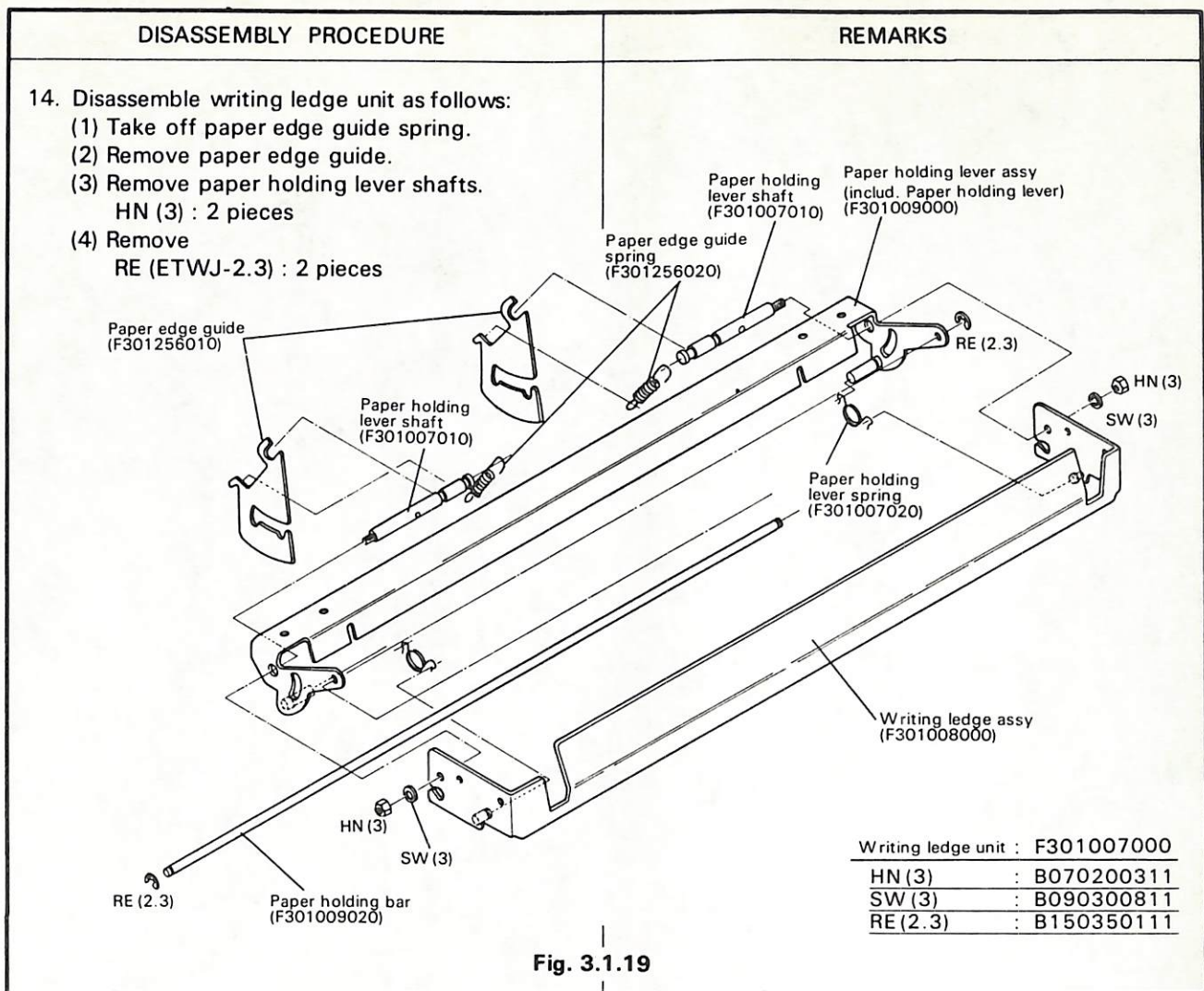


Fig. 3.1.19

3.1.11 Frame Section

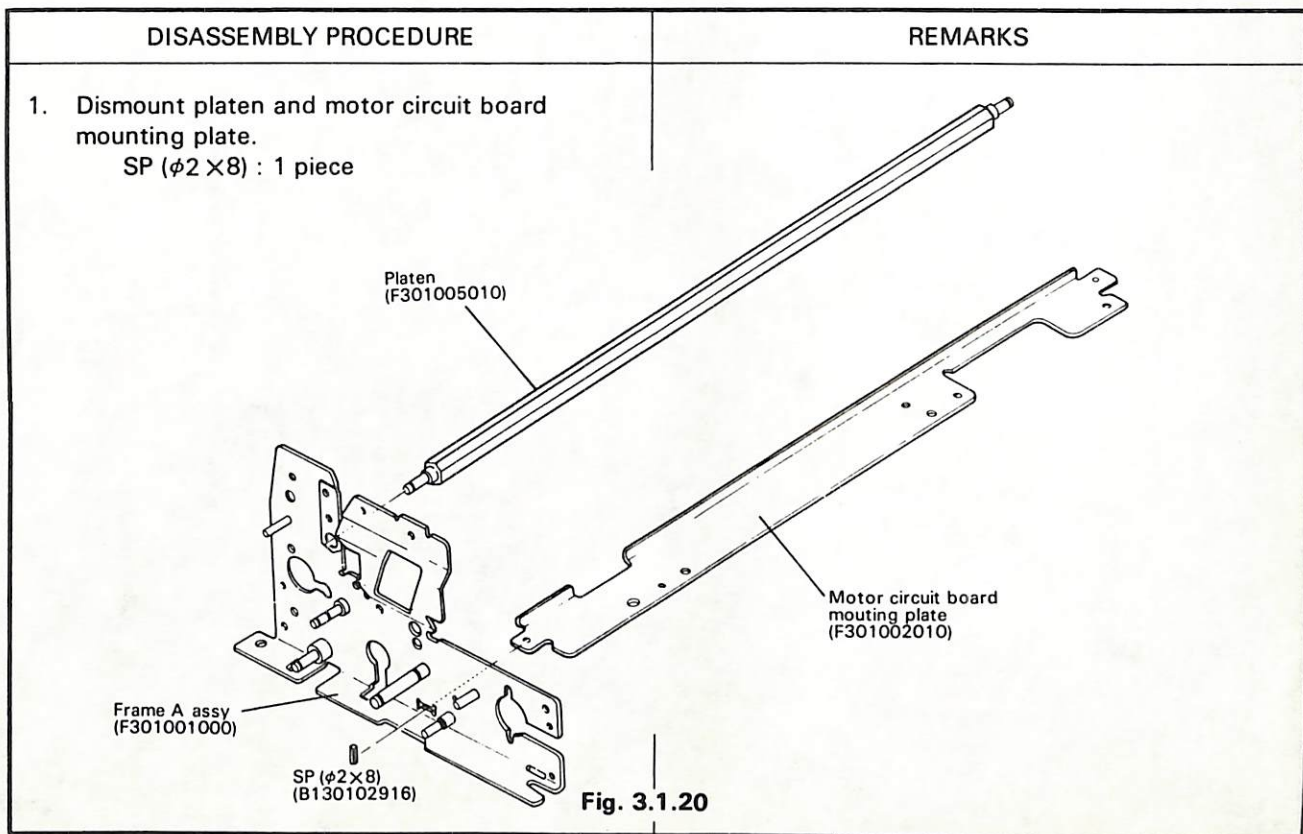
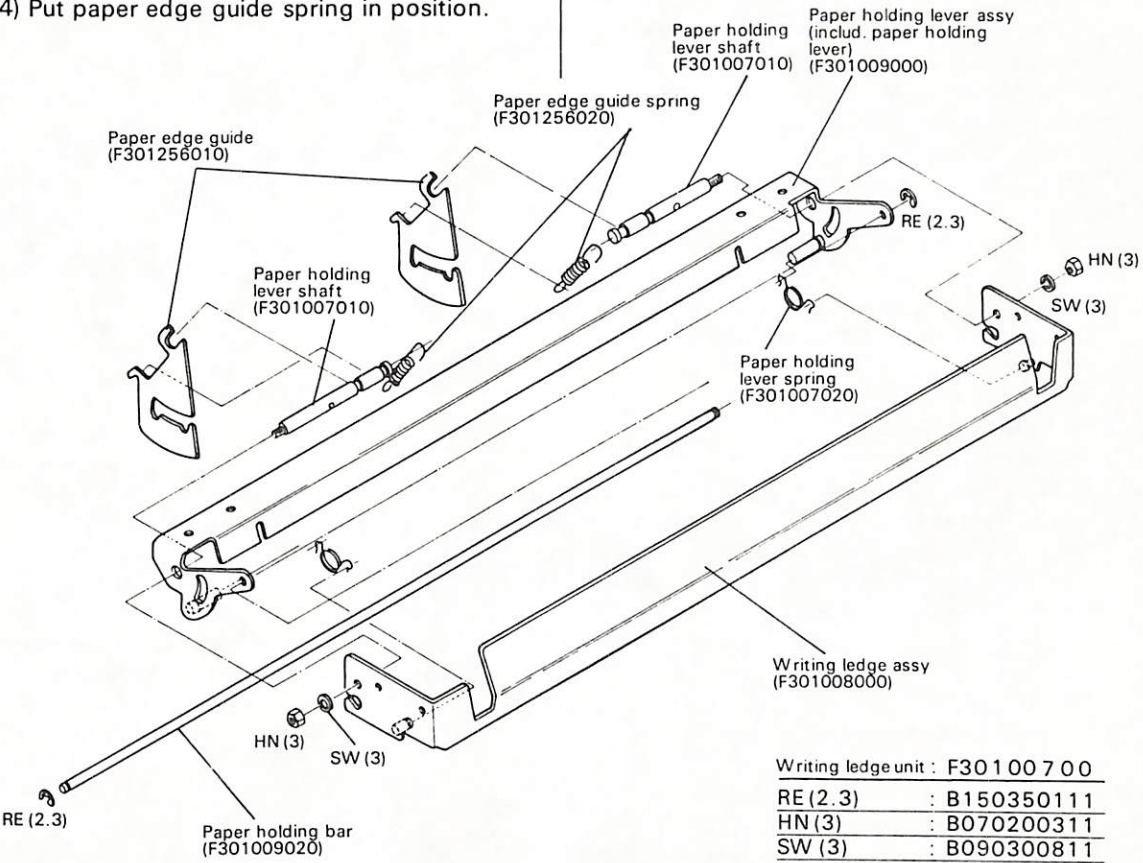


Fig. 3.1.20

3.2 ASSEMBLY (The following description covers the assembly of the Type F.

For the mechanisms provided only in Type T, refer to Par. 3.4.)

3.2.1 Paper Feeding Mechanism (Writing Ledge Unit and Paper Guide Unit)

ASSEMBLY PROCEDURE	REMARKS								
<p>1. Assemble writing ledge unit as follows:</p> <p>(1) Put paper holding bar on paper holding lever.</p> <p>RE (ETWJ-2.3) : 2 pieces</p> <p>(2) Secure paper holding lever shafts in position.</p> <p>HN(3) : 2 pieces SW (3) : 2 pieces</p> <p>(3) Put paper edge guide in position.</p> <p>(4) Put paper edge guide spring in position.</p>	 <table border="1" data-bbox="1047 1266 1388 1383"> <tr> <td>Writing ledge unit :</td> <td>F30100700</td> </tr> <tr> <td>RE (2.3) :</td> <td>B150350111</td> </tr> <tr> <td>HN (3) :</td> <td>B070200311</td> </tr> <tr> <td>SW (3) :</td> <td>B090300811</td> </tr> </table>	Writing ledge unit :	F30100700	RE (2.3) :	B150350111	HN (3) :	B070200311	SW (3) :	B090300811
Writing ledge unit :	F30100700								
RE (2.3) :	B150350111								
HN (3) :	B070200311								
SW (3) :	B090300811								
<p>2. Assemble paper feeding roller assy as follows:</p> <p>(1) Put plain washer, leaf spring and plane bearing for paper feeding roller shaft on frame A side end of paper feeding roller shaft.</p>	<ul style="list-style-type: none"> ● Note that the roller shaft end provided with only one hole corresponds to frame A side and the other end corresponds to frame B side. ● Pay attention to the direction in which the spring and the bearing should be put into position. 								

ASSEMBLY PROCEDURE	REMARKS
<p>(2) Put spring pin in the hole formed in frame A side end of paper feeding roller shaft, and secure paper feeding ratchet wheel in position. SP ($\phi 1.5 \times 8$) : 1 piece RE (ETWJ-3) : 1 piece</p> <p>(3) Put spring pin in the corresponding hole formed in frame B side end of paper feeding roller shaft, and place paper feeding ratchet wheel B in position.</p> <p>(4) Put paper feeding roller shaft bearing B on frame B side end of paper feeding roller shaft.</p> <p>(5) Put another spring pin in the corresponding hole formed in frame B side end of paper feeding roller shaft, and secure paper feeding ratchet wheel in position. SP ($\phi 1.5 \times 8$) : 1 piece RE (ETWJ-3) : 1 piece</p> <p>3. Assemble paper guide unit as follows:</p> <p>(1) Place paper feeding roller assy in inner paper guide.</p> <p>(2) Place inner and outer paper guides, together with paper guide holding shaft B, between two paper guide side plates. Then secure them in position. HN (3) : 2 pieces SW (3) : 2 pieces</p> <p>(3) Passing paper guide holding shafts A through the corresponding holes in paper guide side plate, put release lever B on those ends of the holding shafts to which paper feeding ratchet wheel B is secured.</p> <p>(4) Secure paper guide holding shafts A in position. RE (ETWJ-4) : 4 pieces</p> <p>(5) Secure release lever B in position. RE (ETWJ-4) : 1 piece</p> <p>(6) Put release lever A on the other ends of paper guide holding shafts A.</p> <p>(7) Secure paper holding gear on paper holding roller.</p> <p>(8) Put release lever springs on release levers A and B, and on the corresponding ends of paper holding roller.</p>	<ul style="list-style-type: none"> ● Be sure that the spring pin be put into the hole near to the midpoint of the shaft end. ● Pay attention to the direction in which the bearing should be put into position. ● Be sure to set the retaining rings in the grooves formed in those portions of the shafts which protrude from the side plate.

Paper guide unit . F301251000
 Paper feeding roller assy : F301252000

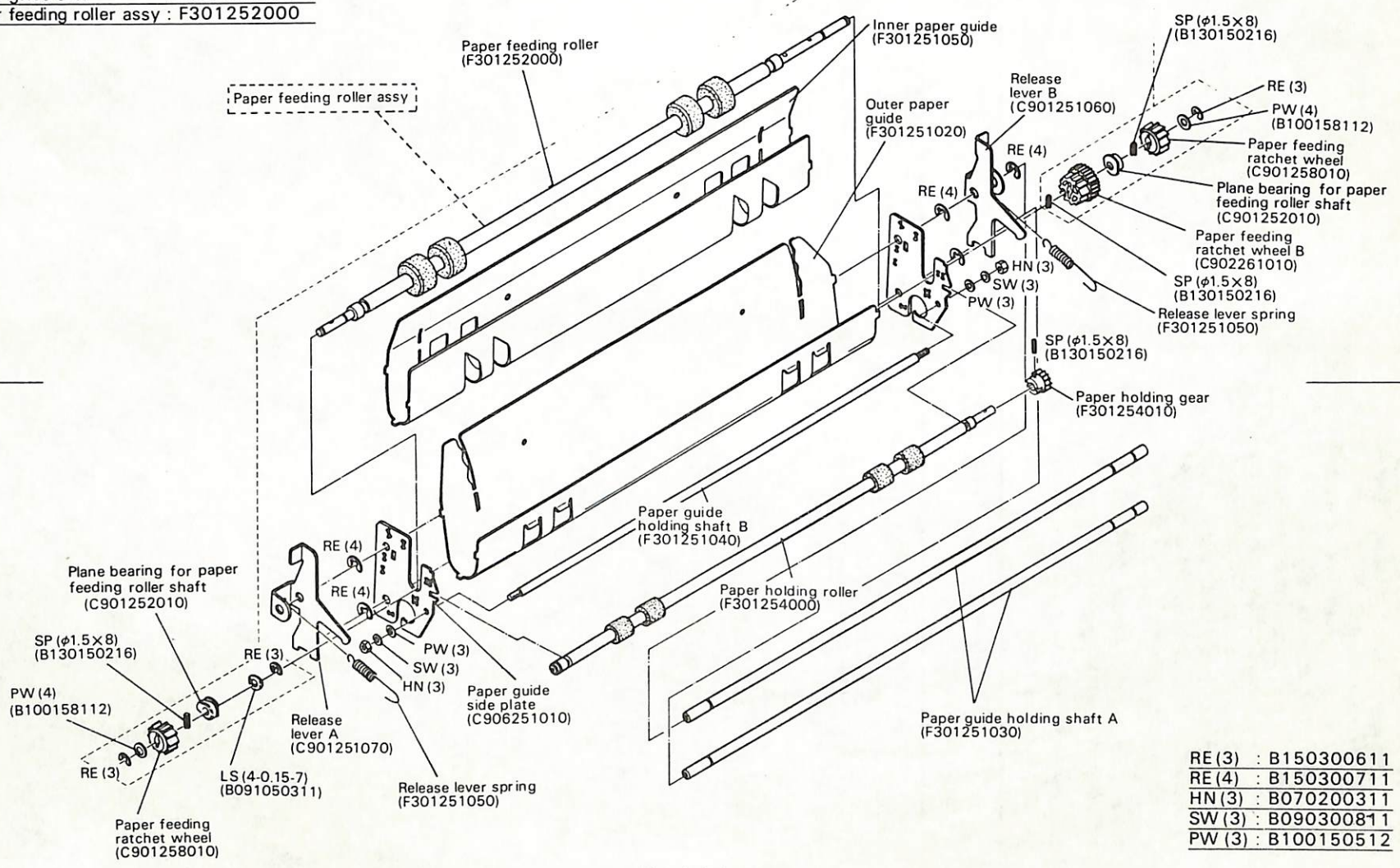


Fig. 3.2.2

- RE (3) : B150300611
- RE (4) : B150300711
- HN (3) : B070200311
- SW (3) : B090300811
- PW (3) : B100150512

ASSEMBLY PROCEDURE

REMARKS

ASSEMBLY PROCEDURE	REMARKS
<p>4. Apply lubricant to:</p> <ol style="list-style-type: none"> (1) Contacting part between release lever A and B and paper guide holding shaft A. (2) Contacting part between release levers A and B and release lever springs. (3) Contacting part between release lever springs and paper holding roller assy. (4) Contacting part between paper holding roller assy and paper guide side plates. (5) Contacting part between paper holding roller assy and release levers A and B. <p>5. Manually turning paper feeding ratchet wheel, confirm that it rotates smoothly.</p> <p>6. Manually pushing each release lever, confirm that it operates smoothly.</p>	<ul style="list-style-type: none"> ● Refer to "Lubrication Requirements".

3.2.2 Frame Section

ASSEMBLY PROCEDURE	REMARKS
<p>1. Put platen and motor circuit board mounting plate on frame A assy.</p>	<ul style="list-style-type: none"> ● Pay attention to the direction of the platen. ● In setting the mounting plate, be sure that its face be up.

Fig. 3.2.3

ASSEMBLY PROCEDURE

REMARKS

- Put paper guide unit on frame A assy, and fix paper guide holding shaft A with set-screws (but at this time the screws must not be fully tightened).

CPO (M3×8) : 4 pieces

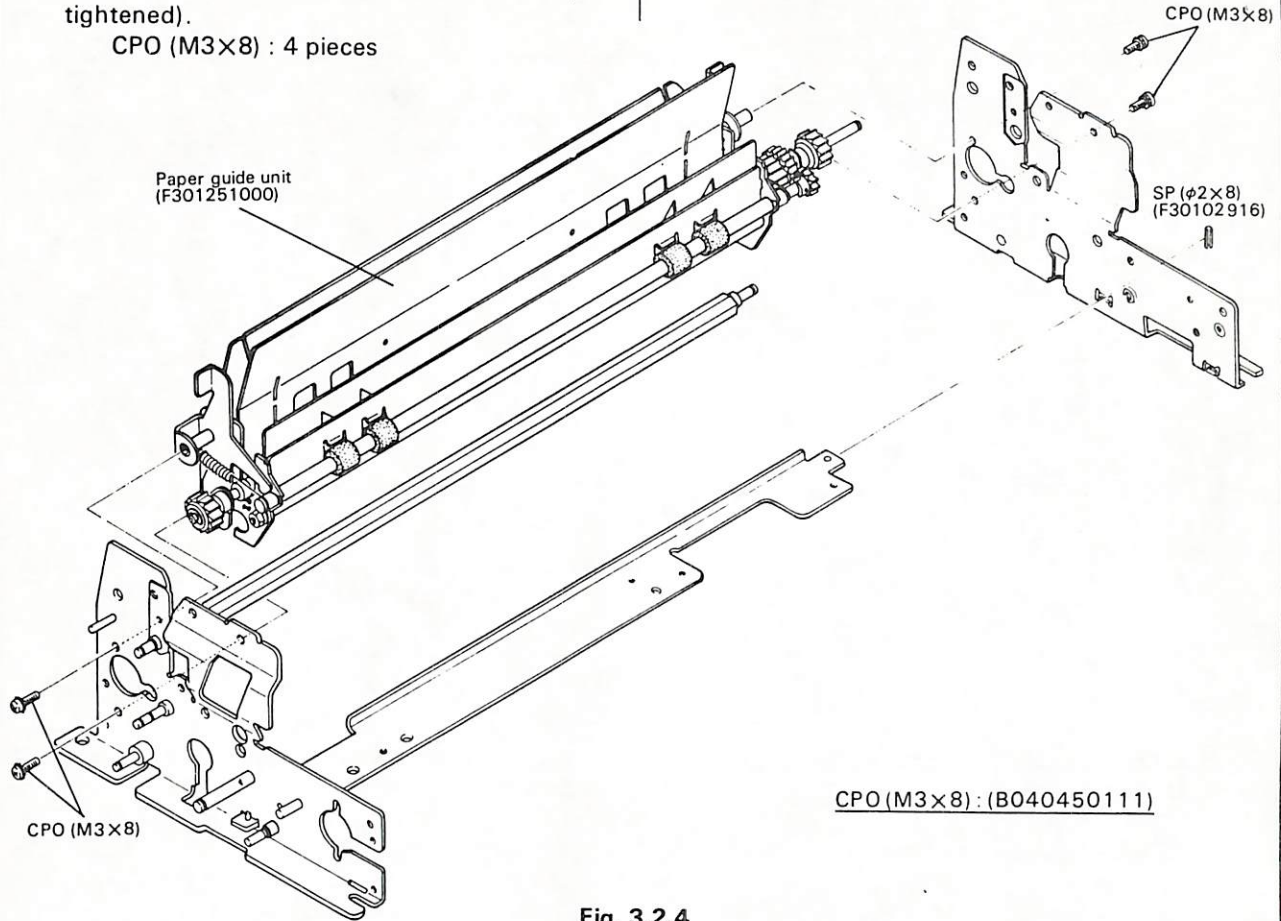


Fig. 3.2.4

- Displace plane bearings for paper feeding roller shaft on frame A and B sides in the direction of the arrow Fig. 3.2.5, then secure them in position.

RE (ETWJ-3) : 2 pieces

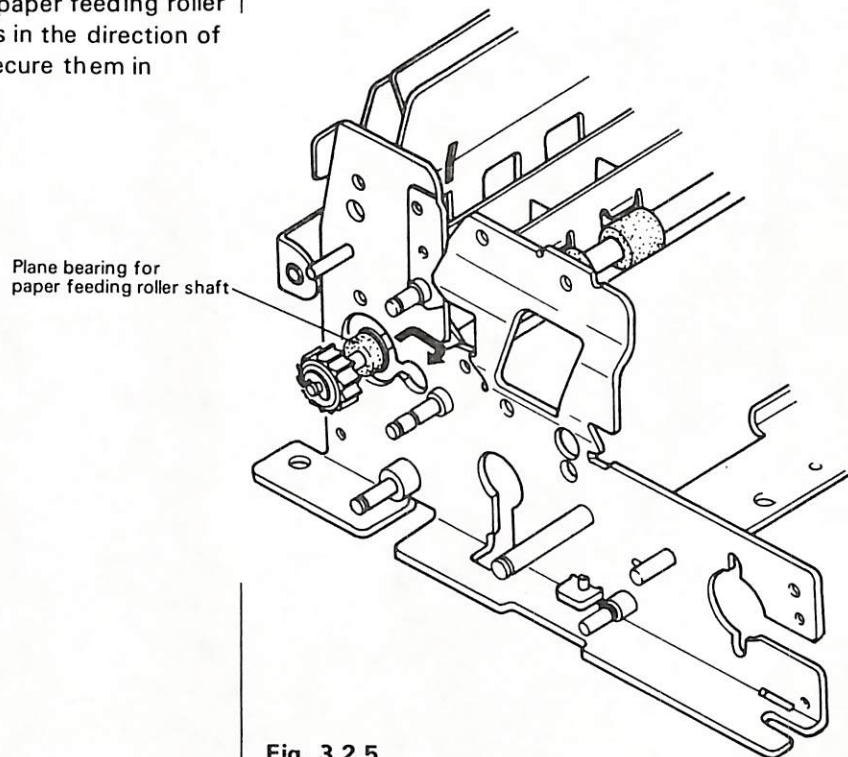


Fig. 3.2.5

ASSEMBLY PROCEDURE

REMARKS

4. Tighten completely the set-screws securing paper guide holding shafts A on its frame A and B side ends.

CPO (M3×8) : 2 pieces
Tightening torque : 10kg-cm

5. Secure motor circuit board mounting plate on its frame A and B side ends.

SP (φ2×8) : 2 pieces

6. Secure writing ledge unit on frame A and B assemblies.

CPO (M3×8) : 2 pieces
Tightening torque : 10kg-cm

- Confirm that platen and motor circuit board mounting plate have been put in the corresponding holes in each frame.
- When securing the shaft with the set-screws, it is recommended that tightening operation be carried out on a surface plate to prevent generation of play.
- Be sure to insert the spring pins so that their split runs parallel with the frame.

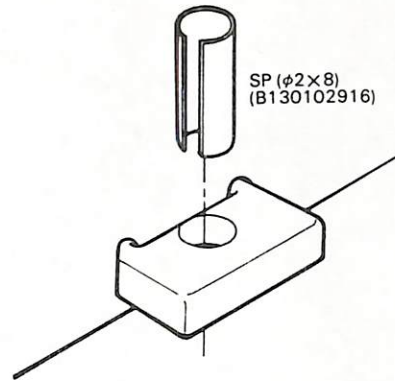


Fig. 3.2.6

- Be sure to set the writing ledge unit so that it does not get beyond the impact face of the platen.

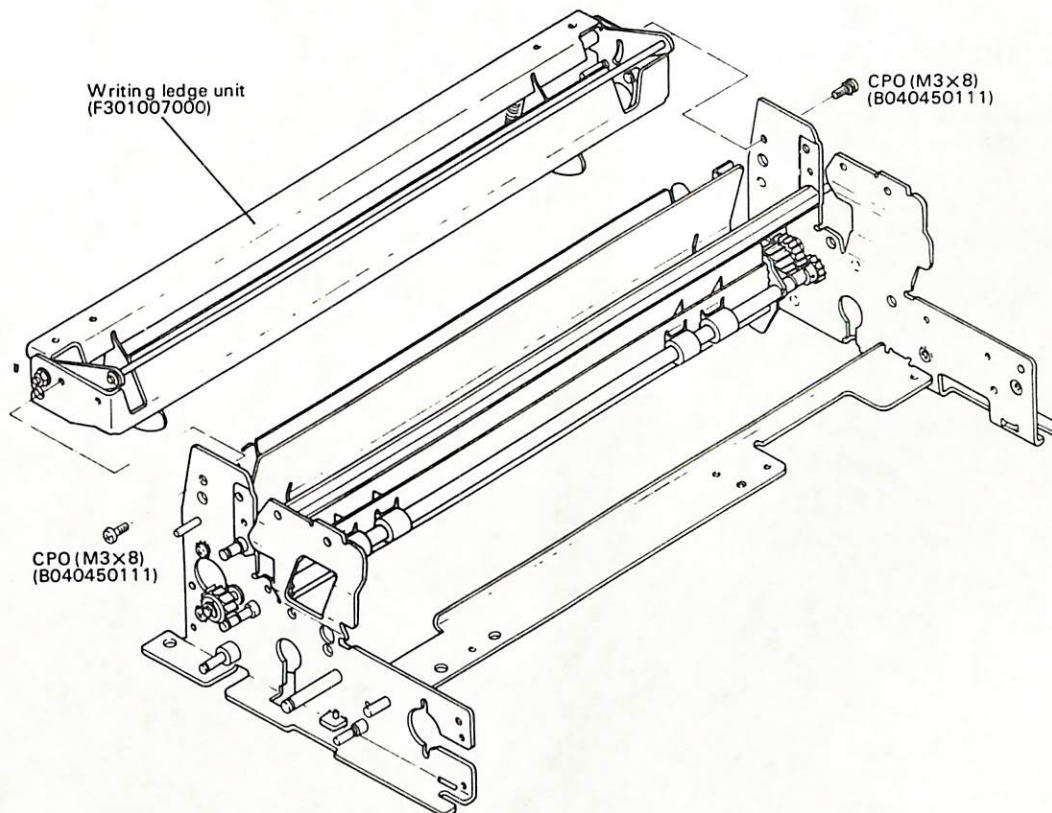
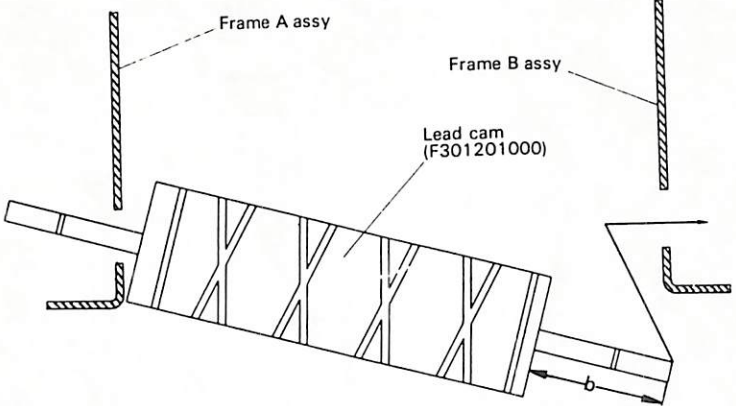
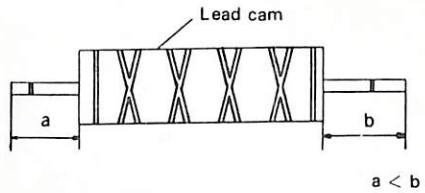
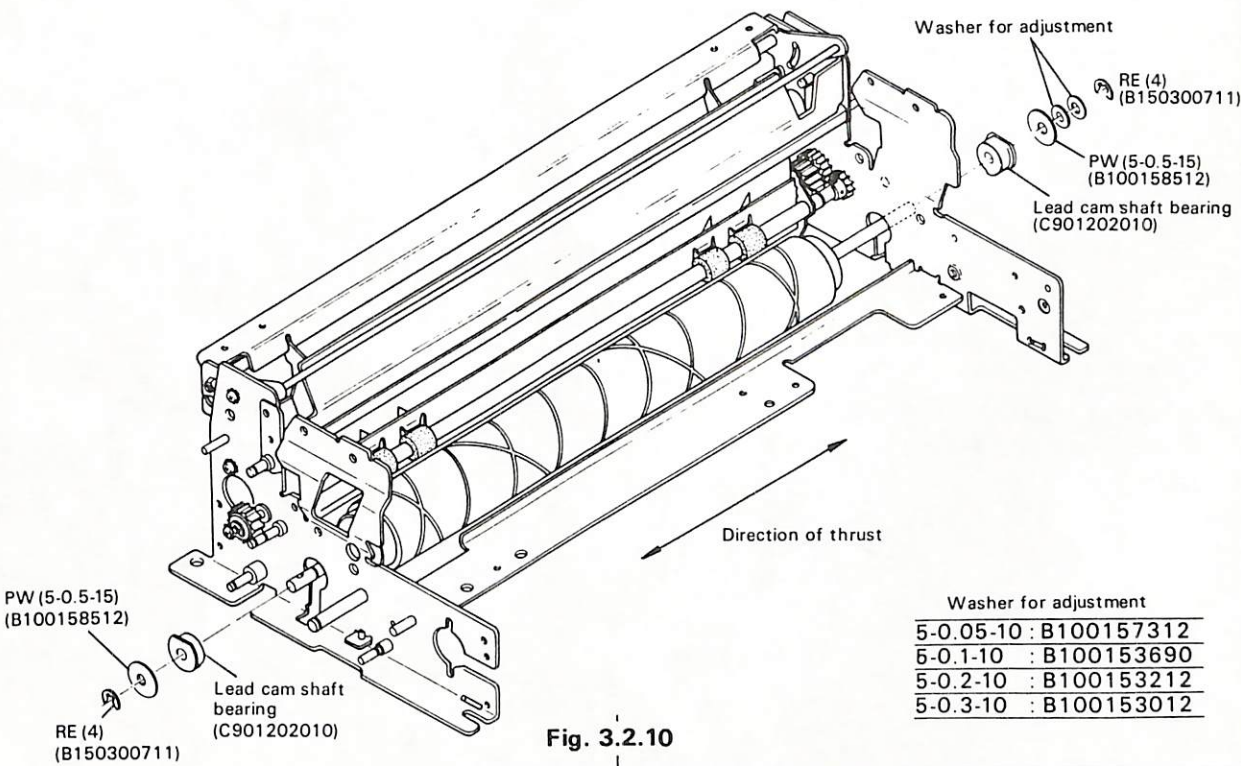


Fig. 3.2.7

3.2.3 Printing Mechanism (Lead Cam)

ASSEMBLY PROCEDURE	REMARKS										
<p>1. Put lead cam on frame A and B assemblies.</p>  <p style="text-align: center;">Fig. 3.2.9</p>	<p>● Pay attention to the direction of the lead cam.</p>  <p style="text-align: center;">Fig. 3.2.8</p>										
<p>2. Place lead cam shaft bearings in position:</p> <p>(1) On frame A side: PW (5-0.5-15) RE (ETWJ-4)</p> <p>(2) On frame B side: Plain washer for adjustment of play in direction of thrust. PW (5-0.5-15) RE (ETWJ-4)</p>	<p>● Using adjustment washers, make adjustment so that thrust-wise play of the lead cam shaft will not exceed 0.1mm. (0mm < play < 0.1mm)</p>										
 <p style="text-align: center;">Fig. 3.2.10</p>											
<table border="1" style="margin-left: auto;"> <thead> <tr> <th colspan="2">Washer for adjustment</th> </tr> </thead> <tbody> <tr> <td>5-0.05-10</td> <td>: B100157312</td> </tr> <tr> <td>5-0.1-10</td> <td>: B100153690</td> </tr> <tr> <td>5-0.2-10</td> <td>: B100153212</td> </tr> <tr> <td>5-0.3-10</td> <td>: B100153012</td> </tr> </tbody> </table>		Washer for adjustment		5-0.05-10	: B100157312	5-0.1-10	: B100153690	5-0.2-10	: B100153212	5-0.3-10	: B100153012
Washer for adjustment											
5-0.05-10	: B100157312										
5-0.1-10	: B100153690										
5-0.2-10	: B100153212										
5-0.3-10	: B100153012										

3.2.4 Transmission Mechanism (Paper Feed Cam Gear and Paper Feed Cam)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Secure lead cam gear and paper feed cam respectively on frame A side end and frame B side end of lead cam shaft. SP ($\phi 2 \times 10$) : 2 pieces</p>	<ul style="list-style-type: none"> ● For this, position the lead cam so that the intersecting points of the cam grooves face upwards in top view. Then put the lead cam gear on the frame A side end of lead cam shaft, and put the paper feed cam on the frame B side end of lead cam shaft so that the uppermost part of the paper feed cam faces in the direction of the paper feeding ratchet wheel. ● Use pliers or appropriate jig to insert the spring pins.
<p>2. Apply lubricant (G_{11}) to the entire circumference of lead cam groove.</p> <p>3. Apply lubricant (O_2) to lead cam shaft bearings A and B (2 points respectively).</p>	<ul style="list-style-type: none"> ● Refer to "Lubrication Requirements".

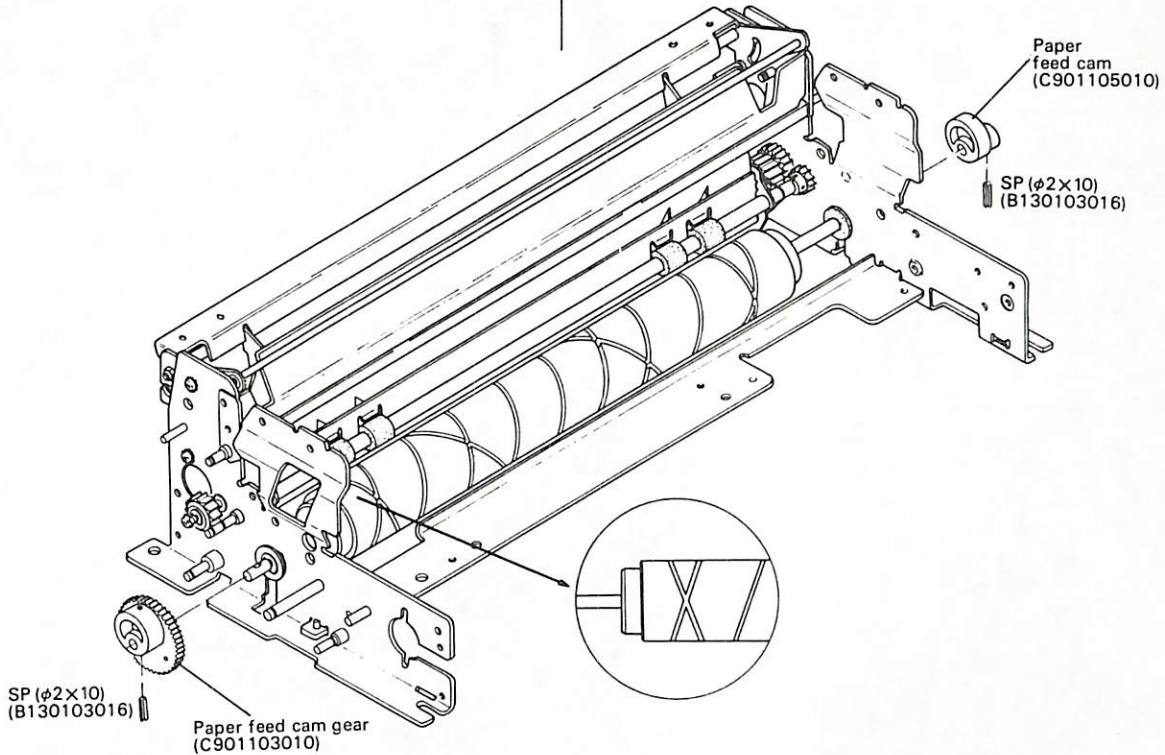
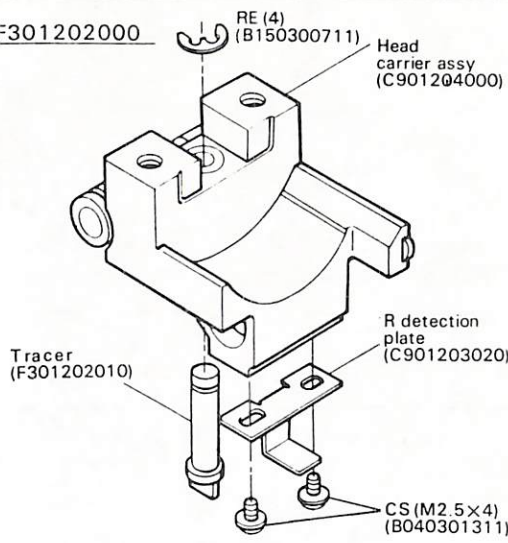
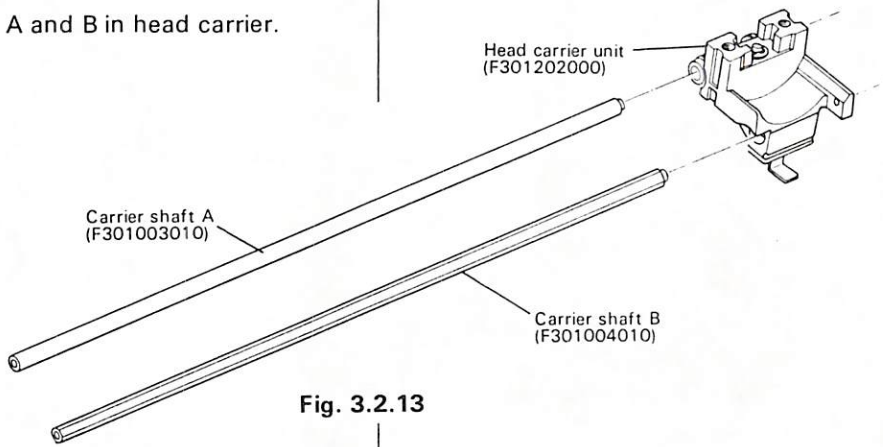
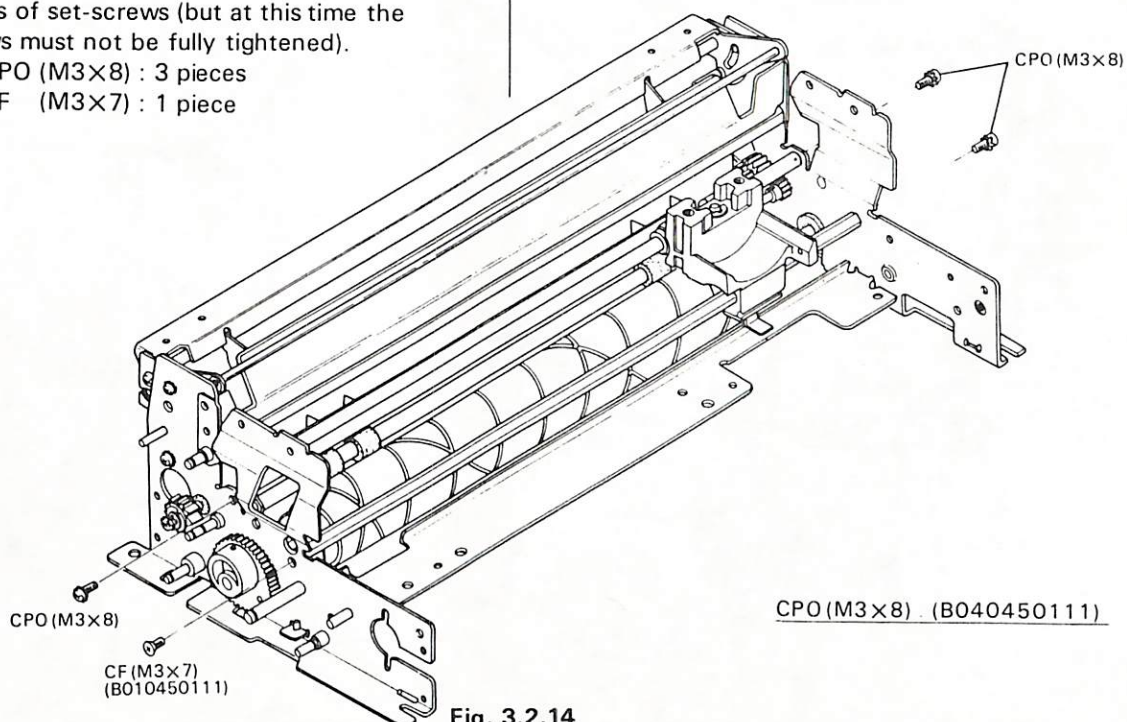


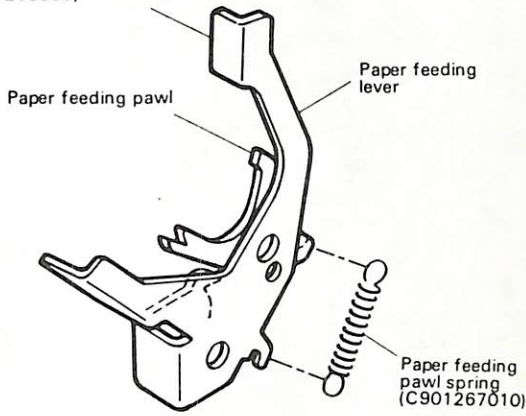
Fig. 3.2.11

3.2.5 Printing Mechanism (Head Carrier, Carrier Shafts A and B)

ASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> Put tracer in position. RE (ETWJ-4) : 1 piece Apply lubricant (O₂) to tracer bearing part (1 point). Secure R detection plate in position. CS (M2.5×4) : 2 pieces Tightening torque: Approx. 8kg-cm 	 <p>Head carrier unit : F301202000</p> <p>RE (4) (B150300711)</p> <p>Head carrier assy (C901204000)</p> <p>Tracer (F301202010)</p> <p>R detection plate (C901203020)</p> <p>CS (M2.5×4) (B040301311)</p> <p>Fig. 3.2.12</p>
<ol style="list-style-type: none"> Put carrier shafts A and B in head carrier. 	 <p>Head carrier unit (F301202000)</p> <p>Carrier shaft A (F301003010)</p> <p>Carrier shaft B (F301004010)</p> <p>Fig. 3.2.13</p>
<ol style="list-style-type: none"> Engaging tracer tip in lead cam groove, fix carrier shafts A and B on frame section by means of set-screws (but at this time the screws must not be fully tightened). CPO (M3×8) : 3 pieces CF (M3×7) : 1 piece 	<p>● Be sure to use CF screw (M3×7) for the frame A side end of carrier shaft B.</p>  <p>CPO (M3×8)</p> <p>CPO (M3×8)</p> <p>CPO (M3×8) (B040450111)</p> <p>CF (M3×7) (B010450111)</p> <p>Fig. 3.2.14</p>

ASSEMBLY PROCEDURE	REMARKS
<p>6. Turning lead cam, adjust the positions of carrier shafts A and B so that head carrier operates smoothly.</p> <p>7. Tighten completely the set-screws securing carrier shafts A and B. Tightening torque : 10kg-cm</p> <p>8. Apply Lubricant (O₂) to carrier shaft bearings from both sides (2 point respectively).</p>	<ul style="list-style-type: none"> ● Apply adhesive (Screw Lock) to the screws to be tightened. ● Be sure to tighten the screws with two screw-drivers from frame A and B side simultaneously. ● Refer to "Lubrication Requirements"

3.2.6 Paper Feeding Mechanism (Levers and Related Parts)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Put paper feeding pawl spring on paper feeding lever B assy.</p> <p>2. Apply lubricant (G₂) to : (1) Hooked portions of paper feeding pawl spring. (2) Paper feeding pawl shaft.</p> <p>3. Put paper feeding spring on frame B assy.</p> <p>4. With paper feeding spring put in position, secure paper feeding lever B assy on paper feeding lever shaft. RE (ETWJ-3) : 1 piece</p> <p>5. Secure paper detent lever on frame B assy. RE (ETWJ-3) : 1 piece</p> <p>6. Set paper feeding control lever on frame B assy. RE (ETWJ-3) : 1 piece</p> <p>7. Attach paper feeding trigger magnet B assy on frame B assy by means of set-screws (but at this time the screws must not be fully tightened). CS (3×8) : 1 piece CS (3×4) : 1 piece</p> <p>8. Set respective springs as follows: (1) Put paper detent lever spring on paper detent lever and spring hanger pin. (2) Put paper feeding control lever on paper feeding control lever and yoke of paper feeding trigger magnet.</p>	<p>Paper feeding lever B assy (C901263000)</p>  <p>Paper feeding pawl</p> <p>Paper feeding lever</p> <p>Paper feeding pawl spring (C901267010)</p> <p>Fig. 3.2.15</p>

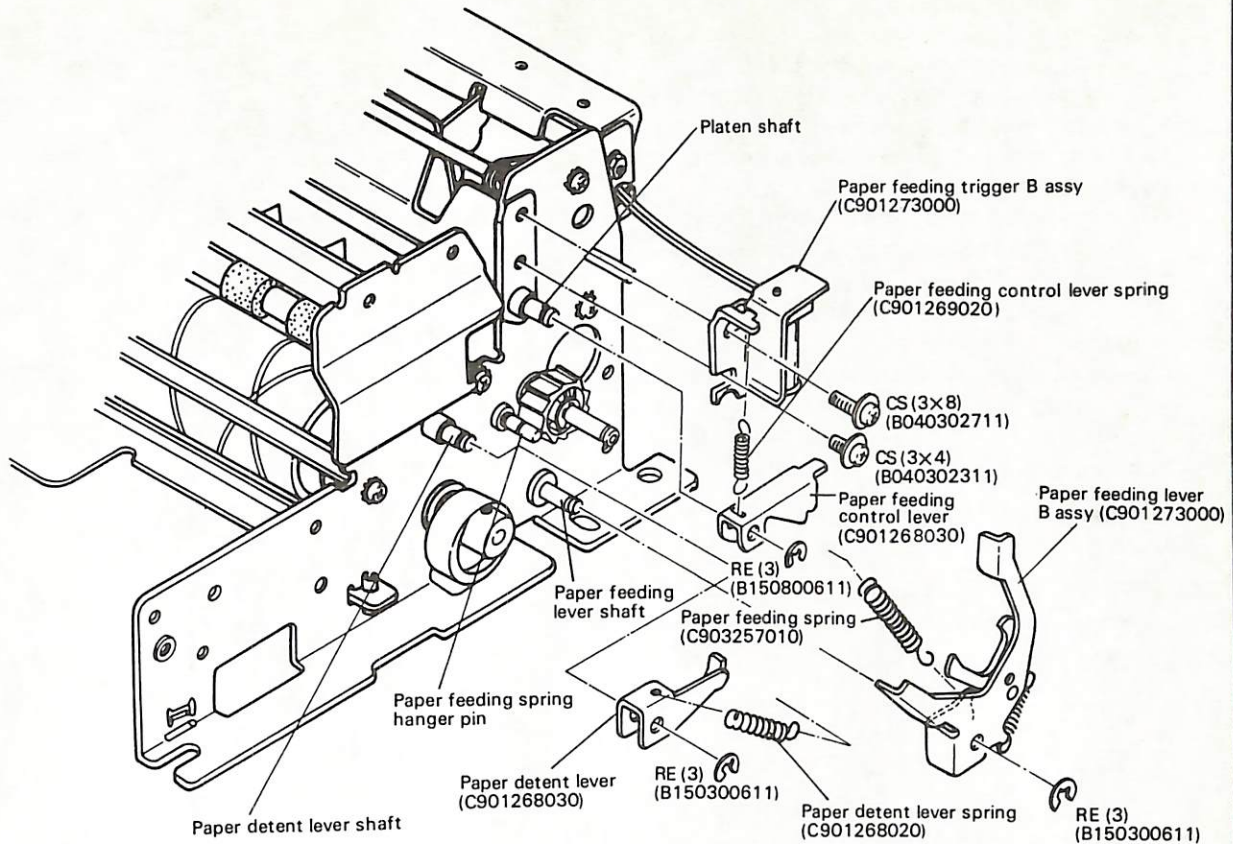


Fig. 3.2.16

9. Adjust the position of paper feeding trigger magnet B assembly as follows :
- (1) With paper feeding lever riding on the uppermost part of paper feed cam, confirm that a proper clearance (a Fig.3.2.17) exists between paper feeding lever and paper feeding control lever.
 - (2) With paper feeding control lever attached to paper feeding trigger magnet B assembly, position the trigger magnet B assembly so that a clearance of approx. 0.4mm (b Fig. 3.2.17) is established between paper feeding lever and paper feeding control lever.
 - (3) After positioning, tighten completely the set-screws securing the trigger magnet B assembly.
Tightening torque : Approx. 10kg-cm

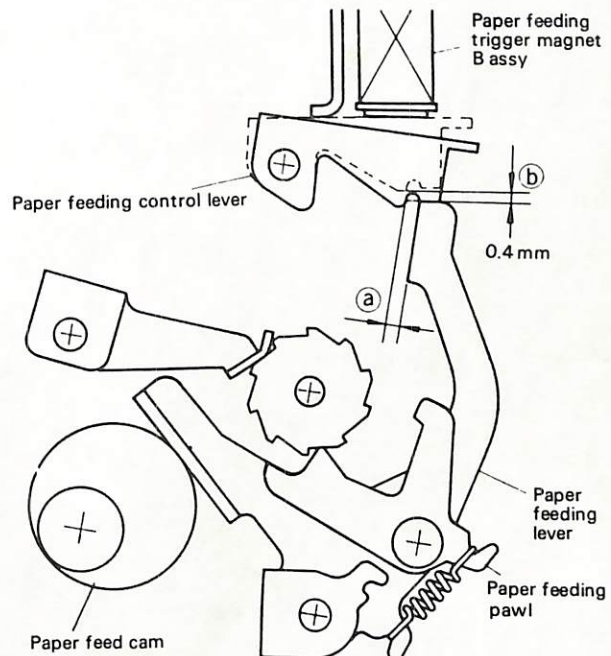
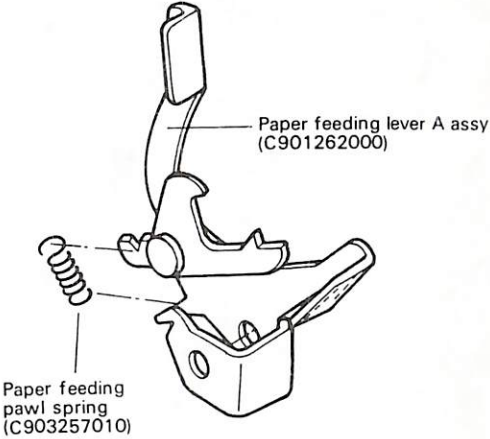
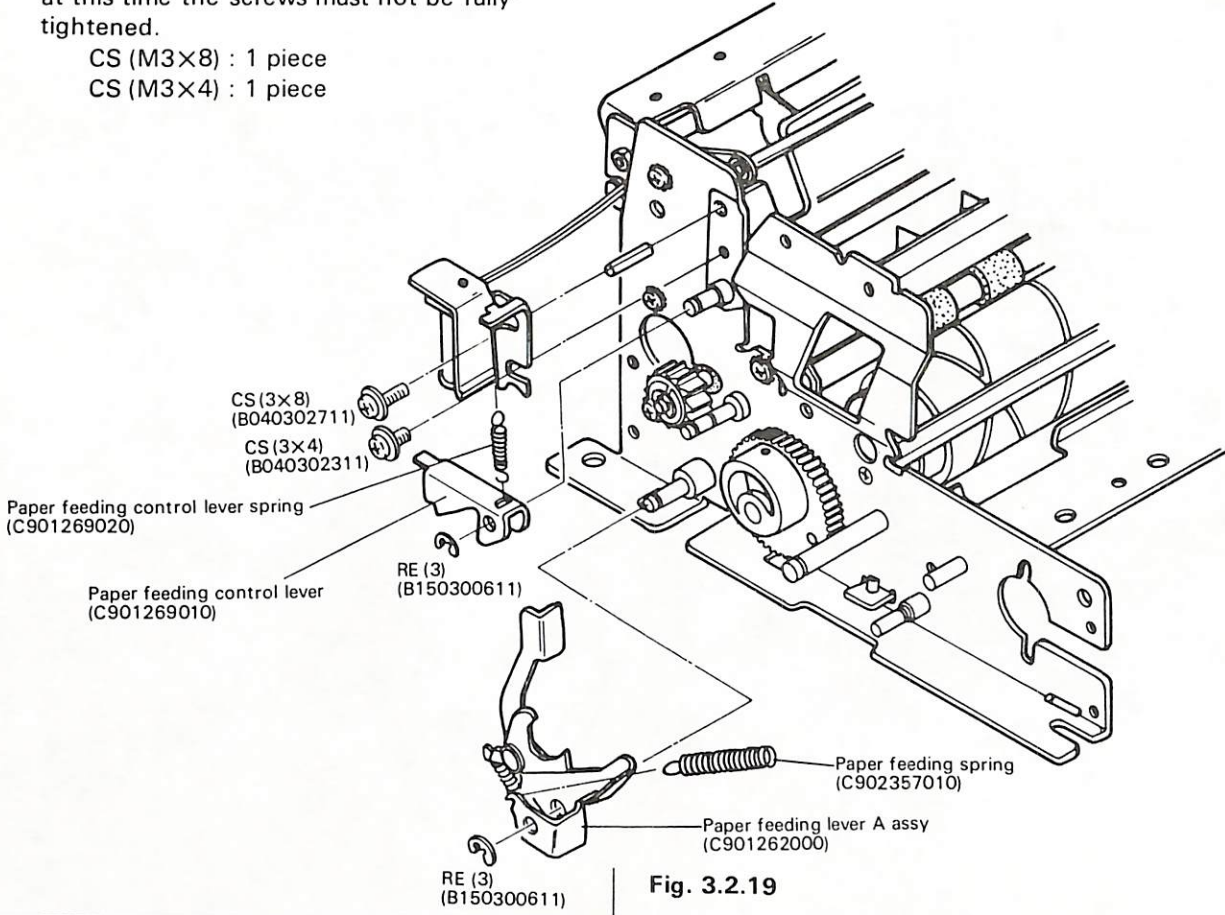
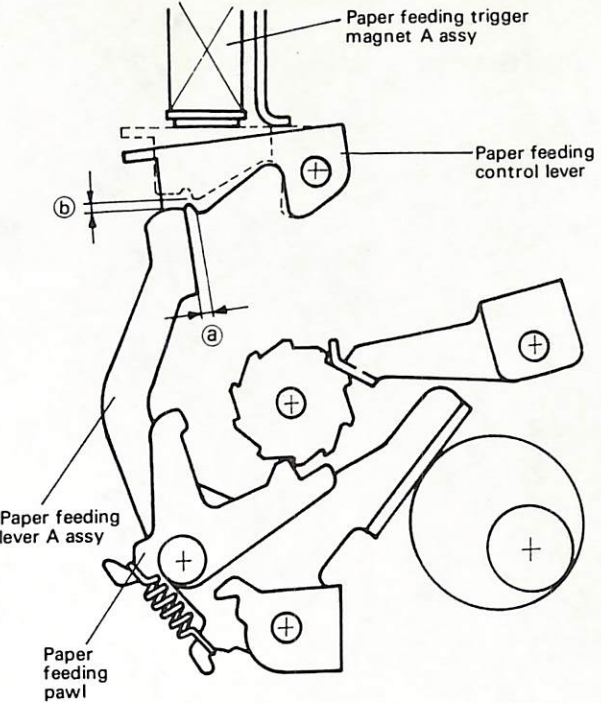


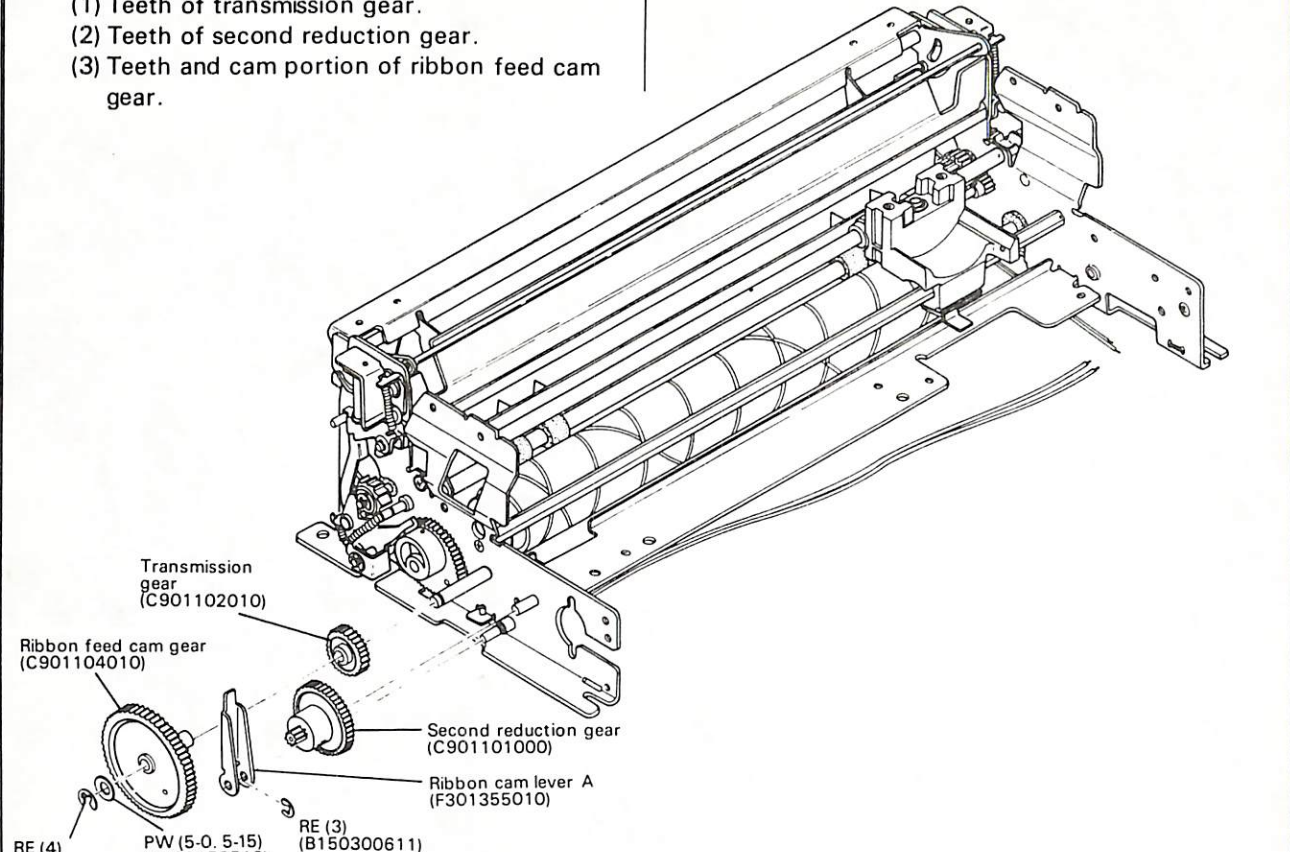
Fig. 3.2.17

ASSEMBLY PROCEDURE	REMARKS
<p>10. Apply lubricant (G₂) to :</p> <ul style="list-style-type: none"> (1) Contacting part between paper feeding lever A and paper feeding lever shaft. (2) Contacting part between paper detent lever and paper detent lever shaft (3) Contacting part between paper feeding control levers. (4) Contacting part between paper feeding lever A assy and paper feeding control lever. (5) Entire circumference of paper feed cam. (6) Entire circumference of paper feeding ratchet wheel. (7) Hooked portions of paper feeding spring. (8) Hooked portions of paper detent lever spring. (9) Hooked portions of paper feeding control lever spring. <p>11. Put paper feeding pawl spring on paper feeding lever A assy.</p> <p>12. Apply lubricant (G₂) to :</p> <ul style="list-style-type: none"> (1) Hooked portions of paper feeding pawl spring. (2) Paper feeding pawl shaft . <p>13. Secure paper feeding lever A assy on fram A assy.</p> <p style="padding-left: 40px;">RE (ETWJ-3) : 1 piece</p> <p>14. Secure paper detent lever on frame A assy.</p> <p style="padding-left: 40px;">RE (ETWJ-3) : 1 piece</p> <p>15. Attach paper feeding trigger magnet A assy on frame A assy by means of set-screws (but at this time the screws must not be fully tightened).</p> <p style="padding-left: 40px;">CS (M3×8) : 1 piece</p> <p style="padding-left: 40px;">CS (M3×4) : 1 piece</p>	<div style="text-align: center;">  <p>Paper feeding lever A assy (C901262000)</p> <p>Paper feeding pawl spring (C903257010)</p> </div> <p style="text-align: center;">Fig. 3.2.18</p>
<div style="text-align: center;">  <p>CS (3×8) (B040302711)</p> <p>CS (3×4) (B040302311)</p> <p>Paper feeding control lever spring (C901269020)</p> <p>Paper feeding control lever (C901269010)</p> <p>RE (3) (B150300611)</p> <p>Paper feeding spring (C902357010)</p> <p>Paper feeding lever A assy (C901262000)</p> <p>RE (3) (B150300611)</p> </div> <p style="text-align: center;">Fig. 3.2.19</p>	

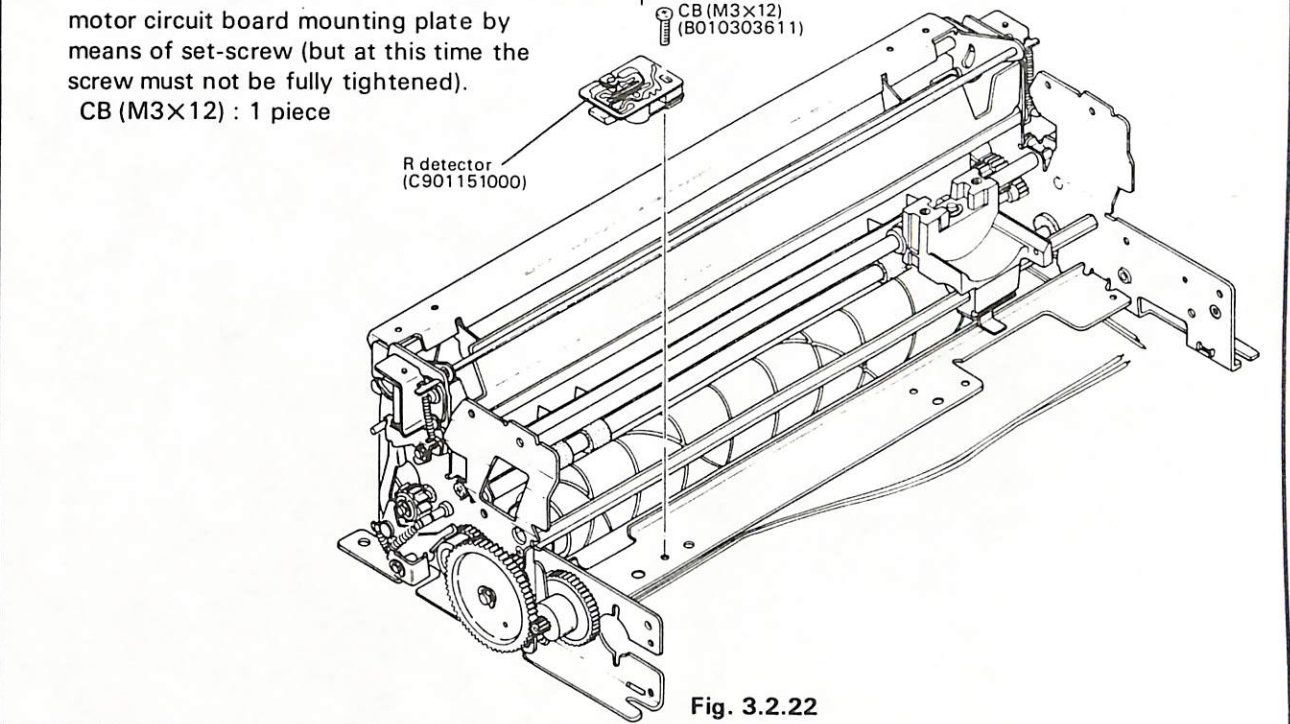
ASSEMBLY PROCEDURE	REMARKS
<p>16. Set respective springs as follows :</p> <ol style="list-style-type: none"> (1) Put paper feeding spring on paper feeding lever A assy and spring hanger pin. (2) Put paper feedig control lever spring on paper feeding control lever and yoke of paper feeding trigger magent . <p>17. Adjust the position of trigger magnet A assy as follows :</p> <ol style="list-style-type: none"> (1) With paper feeding lever A assy riding on the uppermost part of paper feed cam, confirm that a proper clearance (a) Fig. 3.2.20) exists between paper feeding lever and paper feeding control lever. (2) With paper feeding control lever attached to paper feeding trigger magnet, position the trigger magnet A assy so that a clearance of approx. 0.4mm (b) Fig. 3.2.20) is established between paper feeding control lever and paper feeding lever. (3) After positioning, tighten completely the set-screw securing paper feeding trigger magnet B assy. Tightening torque : 10kg-cm <p>18. Apply lubricant (G₂) to :</p> <ol style="list-style-type: none"> (1) Contacting part between paper feeding lever B and paper feeding lever shaft. (2) Contacting part between paper feeding control lever and platen shaft. (3) Hooked portions of paper feeding control lever spring. (4) Hooked portions of paper feeding spring. (5) Entire circumference of paper feeding ratchet wheel . 	 <p>The diagram illustrates the paper feeding mechanism. It shows a paper feeding trigger magnet A assy at the top, connected to a paper feeding control lever. Below this is the paper feeding lever A assy, which is in contact with a paper feeding pawl. A gear is visible in the center, and a circular component is on the right. Two clearances are marked: 'a' is the clearance between the paper feeding lever and the paper feeding control lever, and 'b' is the clearance between the paper feeding control lever and the paper feeding lever. The diagram is labeled Fig. 3.2.20.</p> <p style="text-align: center;">Fig. 3.2.20</p>

3.2.7 Transmission Mechanism (Gear Train)

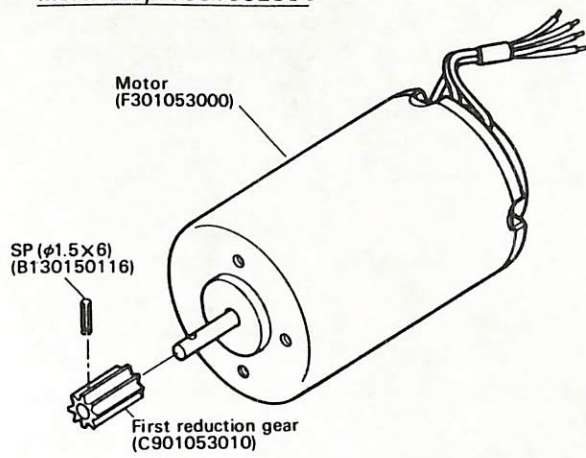
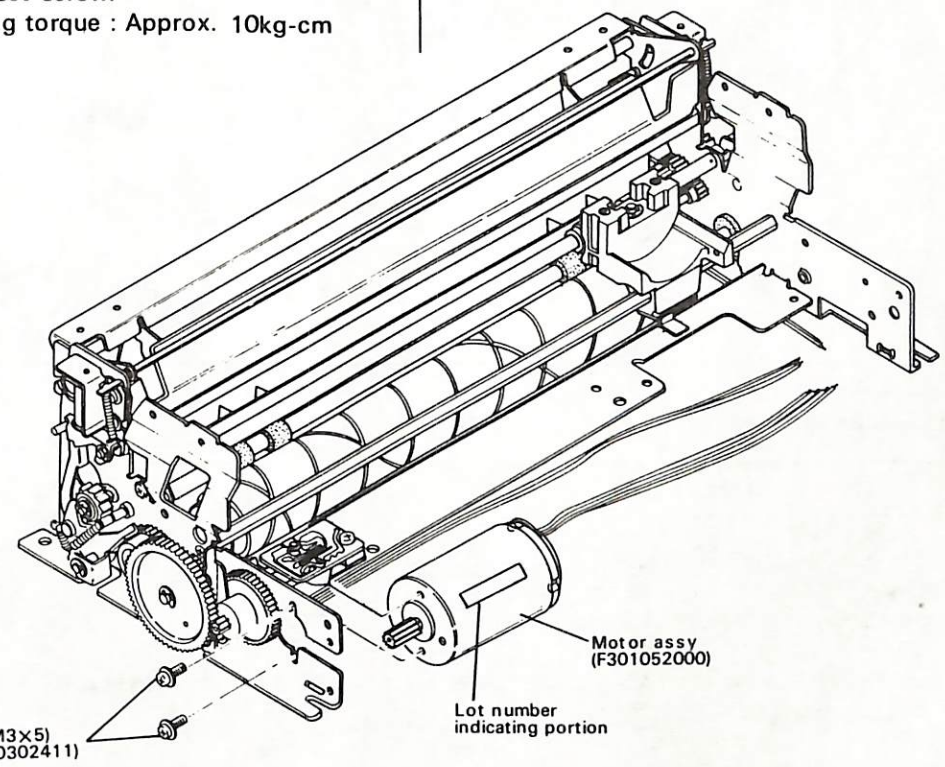
ASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Set transmission gear on frame A assy. 2. Set second reduction gear on frame A assy. 3. Secure ribbon cam lever A in position. RE (ETWJ-3) : 1 piece 4. Secure ribbon feed cam gear in position. RE (ETWJ-4) : 1 piece 	<ul style="list-style-type: none"> ● Apply lubricant (G₂) to the transmission gear shaft. ● Apply lubricant (G₂) to the second reduction gear shaft.

ASSEMBLY PROCEDURE	REMARKS
<p>5. Apply lubricant (G₂) to :</p> <ol style="list-style-type: none"> (1) Teeth of transmission gear. (2) Teeth of second reduction gear. (3) Teeth and cam portion of ribbon feed cam gear.  <p>Transmission gear (C901102010)</p> <p>Ribbon feed cam gear (C901104010)</p> <p>Second reduction gear (C901101000)</p> <p>Ribbon cam lever A (F301355010)</p> <p>RE (4) (B150300711)</p> <p>PW (5-0, 5-15) (B100158512)</p> <p>RE (3) (B150300611)</p>	<p style="text-align: center;">Fig. 3.2.21</p>

3.2.8 Detecting Mechanism (R Detector)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Attach R detector on frame A side face of motor circuit board mounting plate by means of set-screw (but at this time the screw must not be fully tightened).</p> <p>CB (M3×12) : 1 piece</p>  <p>R detector (C901151000)</p> <p>CB (M3×12) (B010303611)</p>	<p style="text-align: center;">Fig. 3.2.22</p>

3.2.9 Drive Mechanism (Motor and Motor Circuit Board)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Put first reduction gear on motor shaft and secure it with spring pin. SP ($\phi 1.5 \times 6$) : 1 piece</p> <p>2. Set motor assy on frame A assy as follows :</p> <p>(1) Put motor assy on frame A assy, and engage first reduction gear with second reduction gear. Then secure the motor assy on frame A assy by means of set-screws. CS (M3\times5) : 2 pieces</p> <p>(2) Position motor assy so that first reduction gear engages with second reduction gear at a little backlash, then secure the motor assy with set-screw. Tightening torque : Approx. 10kg-cm</p>	<p>Motor assy : F301052000</p>  <p>Motor (F301053000)</p> <p>SP ($\phi 1.5 \times 6$) (B130150116)</p> <p>First reduction gear (C901053010)</p> <p>Fig. 3.2.23</p> <ul style="list-style-type: none"> ● Be sure to set the motor with its lot number indicating portion faced toward you.
	 <p>Motor assy (F301052000)</p> <p>Lot number indicating portion</p> <p>CS (M3\times5) (B040302411)</p> <p>Fig. 3.2.24</p>

ASSEMBLY PROCEDURE	REMARKS
<p>3. Set motor circuit board assy on motor circuit board mounting plate as follows :</p> <p>(1) Put the edge of motor circuit board assy into the corresponding recess in frame B assy, and secure the motor circuit board assy on motor circuit board mounting plate by means of set-screws. CB (M3×5) : 2 pieces Tightening torque : Approx. 10kg-cm</p> <p>(2) Apply heat sinker to insulating mica plate, then insert the mica plate between transistor and motor circuit board mounting plate and secure them with set-screw. CPP (M3×5) : 1 piece Tightening torque : Approx. 1kg-cm</p>	
<p style="text-align: center;">Fig. 3.2.25</p>	

3.2.10 Printing Mechanism (Dot Head Unit)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Assemble dot head unit as follows :</p> <p>(1) Put wire resetting springs on dot wires, insert them into nose, then set wire holder guide on nose.</p> <p>(2) Secure nose assy on head assy by means of set-screws. CP (M2×14) : 2 pieces Tightening torque : 8kg-cm</p> <p>(3) Secure head holder on head assy by means of set-screws. CF (M3×14) : 2 pieces</p> <p>(4) Secure ribbon guide on head holder by means of set-screws.</p>	<ul style="list-style-type: none"> ● Apply adhesive (Screw Lock) to the screws. ● Apply adhesive (Screw Lock) to the screws. ● Apply adhesive (Screw Lock) to the screws.

ASSEMBLY PROCEDURE

REMARKS

CB (M2×4) : 2 pieces
Tightening torque : 8kg-cm

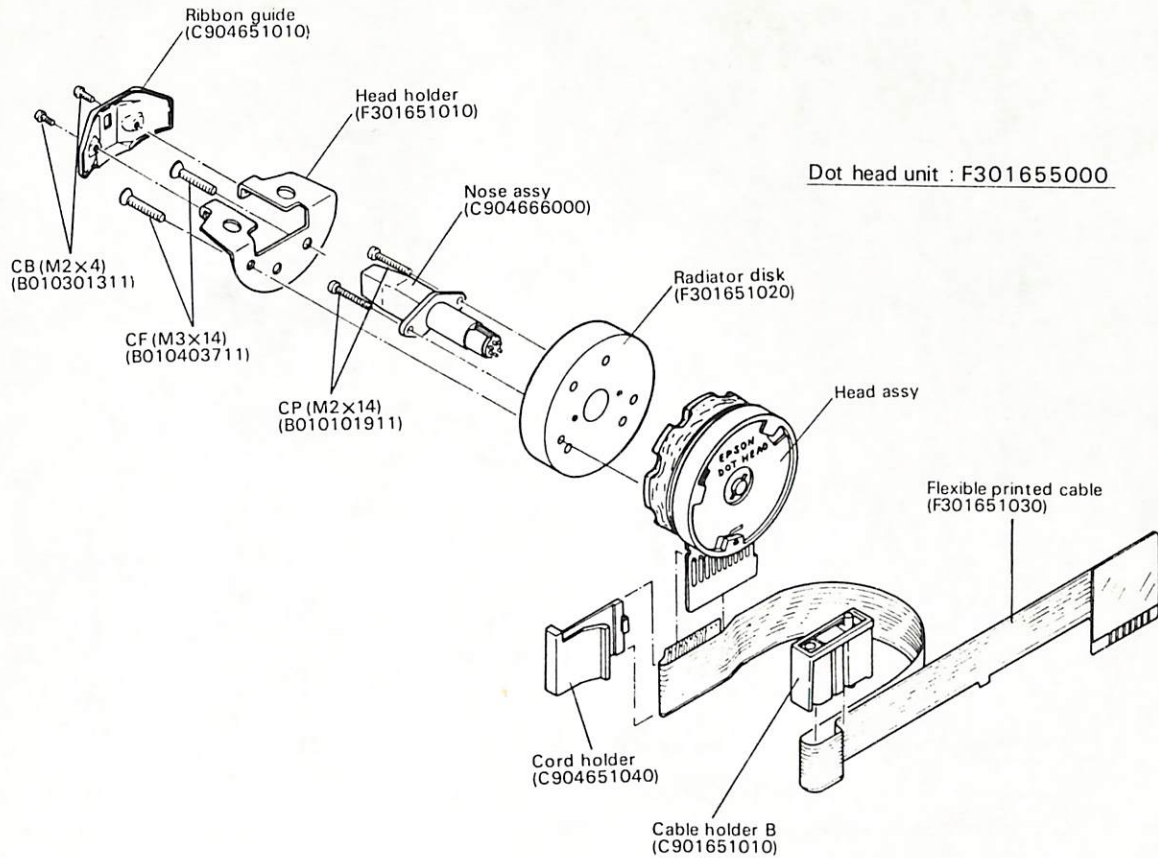


Fig. 3.2.26

2. Adjust the length of dot wires as follows :
 - (1) Using a cutting nipper, cut the dot wires at the point of about 1 mm from the end face of nose assy.
 - (2) Grind the dot wire end face and ribbon guide end face until they become flush with each other.

- For this, be sure to use oil-stone.
- Be sure to grind the end faces in the directions of arrow Fig. 3.2.27

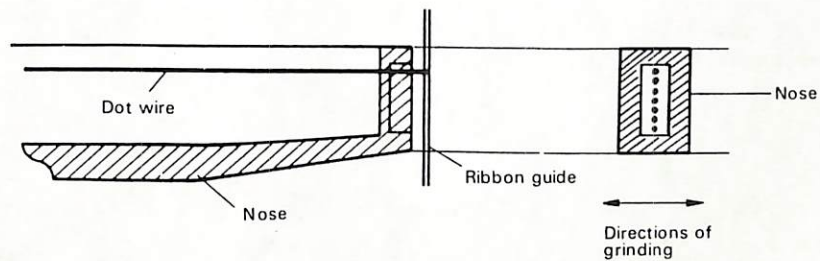


Fig. 3.2.27

ASSEMBLY PROCEDURE

REMARKS

3. Put flexible printed cable on contactor of driving coil circuit board, and solder them together.
4. Put cord holder on driving coil circuit board.
5. Put cable holder B on flexible printed cable.

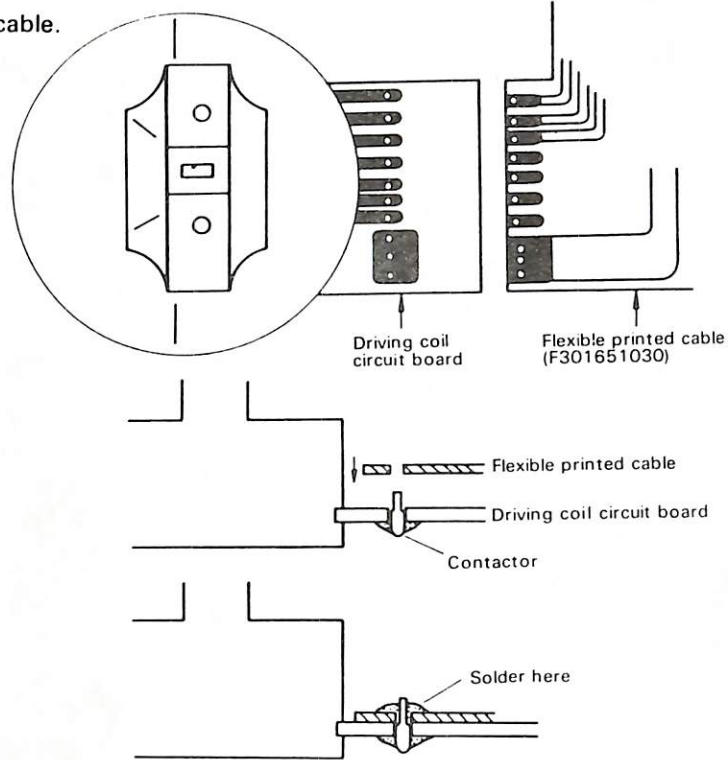


Fig. 3.2.28

6. Set dot head unit on printer as follows :
 - (1) Attach dot head unit on head carrier by means of set-screws (but at this time the screws must not be fully tightened).
 SLP (M4×8) : 2 pieces
 PW (4-0.8-10) : 2 pieces
 - (2) Adjust the position of dot head unit :
 Put a clearance gauge between the platen and the ribbon guide end face, then position the dot head unit so that a clearance of 0.6mm is established between the platen and the ribbon guide end face.
 - (3) Tighten completely the set-screws securing dot head unit.
 Tightening torque : 10kg-cm
 - (4) Put flexible printed cable in the connector of motor circuit board.

- Be sure to use a clearance gauge for this adjustment.

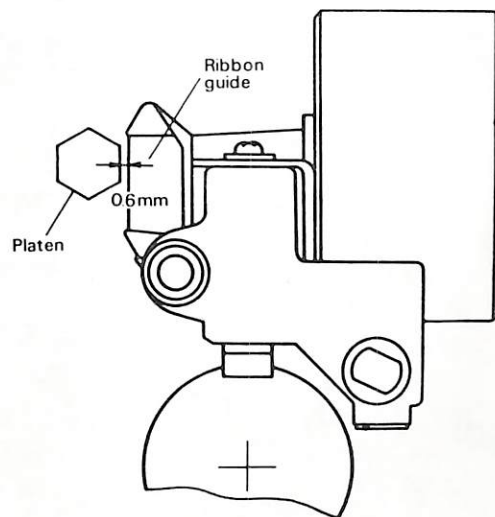
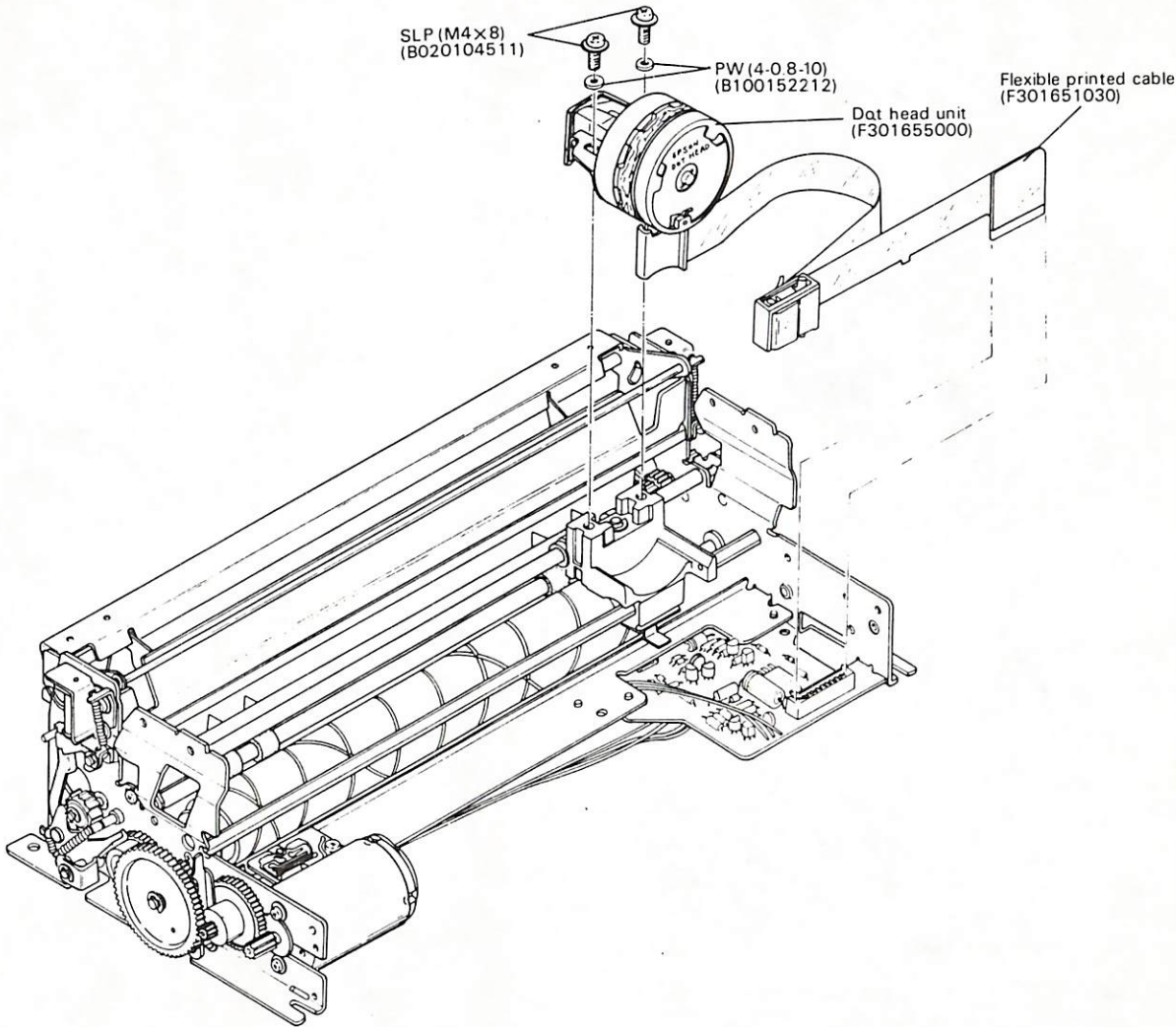


Fig. 3.2.29

ASSEMBLY PROCEDURE	REMARKS
 <p style="text-align: center;">Fig. 3.2.30</p>	

CHAP 3

3.2.11 Connector Unit

ASSEMBLY PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Put nylon clip on connector unit. 2. Pass connector unit through frame B assy, then secure nylon clip with set-screw. CS (M4×6) : 1 piece PW (4-0.8-10) : 1 piece Tightening torque : 12kg-cm 	

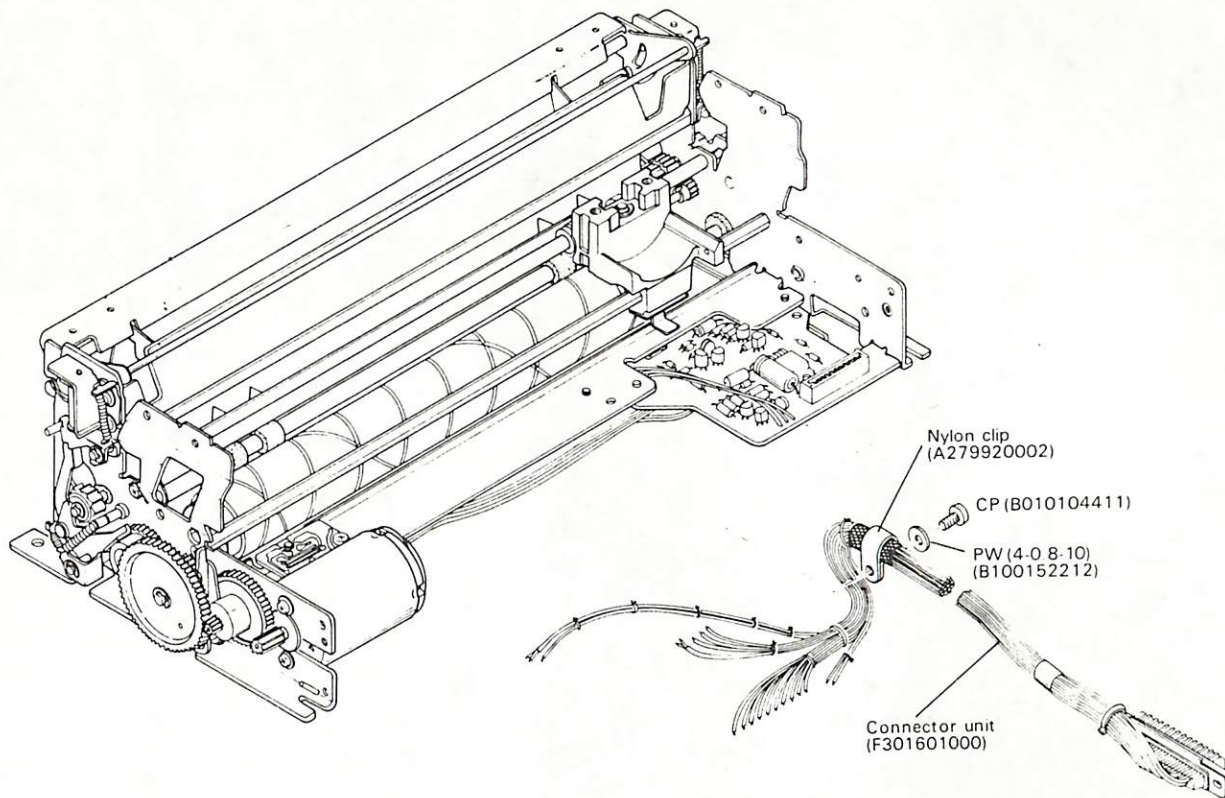


Fig. 3.2.31

3. Distribute lead wires to respective terminals.
4. Solder the lead wires for dot head (wire group A) to motor circuit board.
5. Solder the lead wires for motor (wire group D) to motor circuit board.

- Wire group A consists of the following lead wires :

(1) Common	Red	(3 wires)
(2) Head driving magnet	Brown	(No.1)
	Orange	(No.2)
	Yellow	(No.3)
	Blue	(No.4)
	Purple	(No.5)
	Grey	(No.6)
	White	(No.7)

- The wire group D consists of the following lead wires :

(1) Motor ⊕	Red with white spirals
(2) Motor GND	Black
(3) Motor drive signal	Blue
(4) Timing signal	Grey, shielded (core wire)
(5) Timing GND	Grey, shielded (shielded wire)

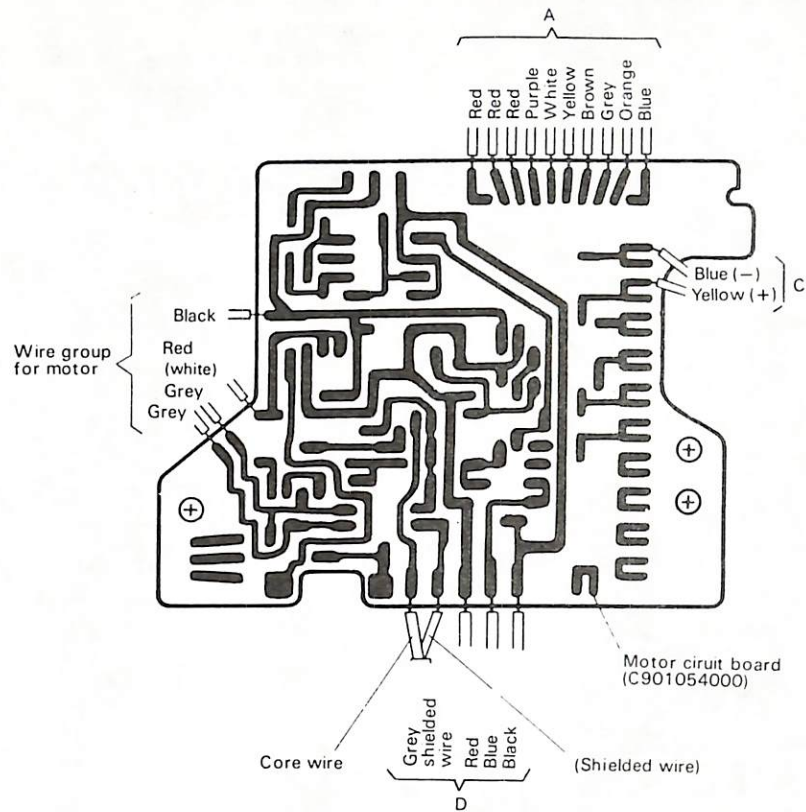


Fig. 3.2.32

6. Solder the lead wires for R detector (wire group B) to R detector circuit board.

- The wire group B consists of the following lead wires :

(1) Power source ⊕	Red
(2) Reset signal	Brown, shielded (core wire)
(3) GND ⊖	Brown, shielded (shielded wire)

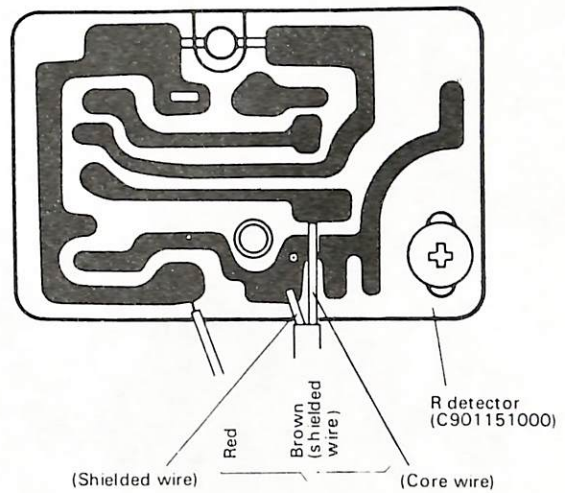


Fig 3.2.33

ASSEMBLY PROCEDURE

REMARKS

7. Solder the lead wires for paper feeding trigger magnet assy (wire group C) to motor circuit board.

- The wire group C consists of the following lead wires :
 PF trigger magnet ⊕ Yellow
 PF trigger magnet ⊖ Blue

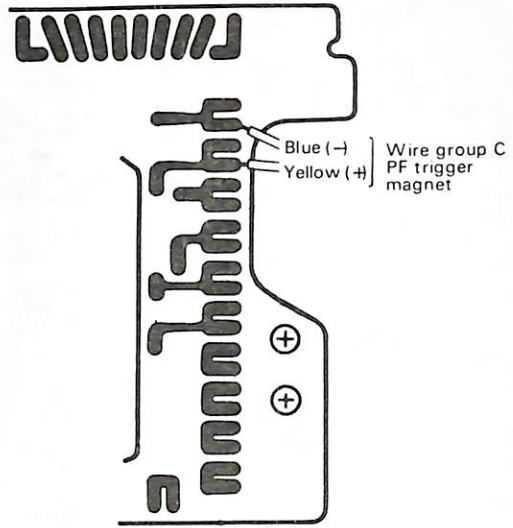


Fig. 3.2.34

8. Solder each of the lead wires (blue) of paper feeding trigger magnet from frame A and B assemblies, to the corresponding portion (A) Fig. 3.2.34.

- Be sure to pass the lead wires for paper feeding trigger magnet assy through the corresponding hole in frame B assy.

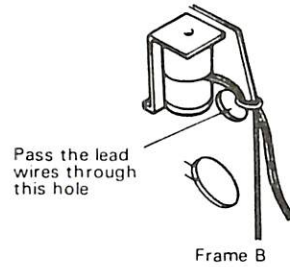


Fig. 3.2.35

9. Using wire ties, tie together the lead wires distributed to respective mechanisms.

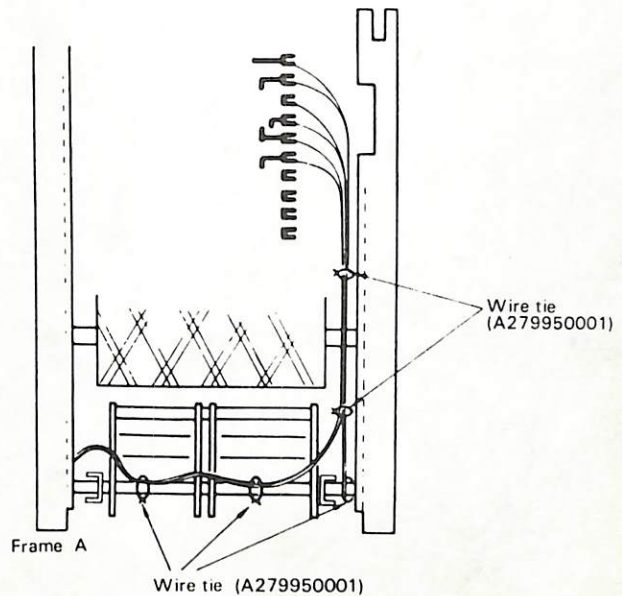


Fig. 3.2.36

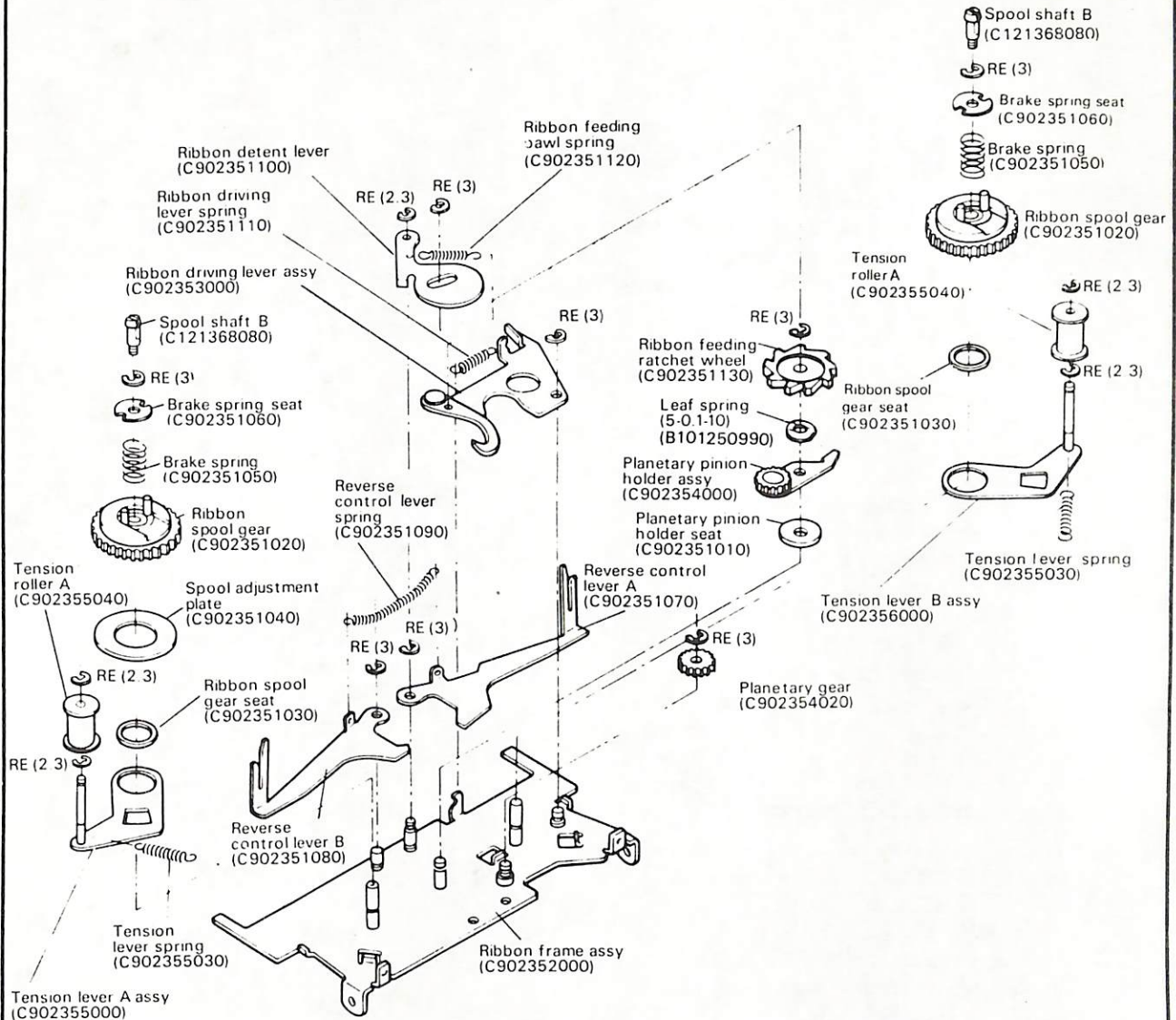
3.2.12 Ribbon Feeding Mechanism (Ribbon Unit)

ASSEMBLY PROCEDURE	REMARKS
<p>1. Assemble ribbon unit as follows :</p> <p>(1) Put reverse control levers A and B on their shafts, respectively. RE (ETWJ-3) : 2 pieces</p> <p>(2) Put reverse control lever spring on reverse control levers A and B.</p> <p>(3) Put planetary pinion holder seat, planetary pinion lever assy, leaf spring ($\phi 5 \times 0.1 \times 10$) and ribbon feeding ratchet wheel on ribbon feeding ratchet wheel shaft. RE (ETWJ-3) : 1 piece</p> <p>(4) Put ribbon detent lever on reverse control lever shaft and on ribbon feeding ratchet wheel shaft, then secure it with respective retaining rings. RE (ETWJ-2) : 1 piece RE (ETWJ-3) : 1 piece</p> <p>(5) Put tension rollers A on tension levers A and B. RE (ETWJ-2.3) : 4 pieces</p> <p>(6) Put tension lever A assy, ribbon spool gear seat, spool adjustment plate, ribbon spool gear, brake spring and brake spring seat on ribbon spool gear shaft on frame A side. RE (ETWJ-3) : 1 piece</p> <p>(7) Apply adhesive (Screw Lock) to the threaded part of spool shaft, then screw the spool shaft into ribbon spool gear shaft.</p> <p>(8) Put tension lever spring on tension lever A assy and the corresponding pin of ribbon frame.</p> <p>(9) Put tension lever B assy and spool gear seat on ribbon spool gear shaft.</p> <p>(10) Put ribbon driving lever assy on ribbon spool gear shaft and on ribbon driving lever shaft. RE (ETWJ-3) : 1 piece</p> <p>(11) Put ribbon spool gear, brake spring and brake spring seat on ribbon spool gear shaft. RE (ETWJ-3) : 1 piece</p> <p>(12) Apply adhesive (Screw Lock) to the threaded part of spool shaft, then screw the spool shaft into ribbon spool gear shaft.</p> <p>(13) Put tension lever spring on tension lever A assy and the corresponding pin of ribbon frame.</p> <p>(14) Put planetary pinion on its shaft. RE (ETWJ-3) : 1 piece</p> <p>(15) Put ribbon feeding pawl spring and ribbon driving lever spring in position.</p>	

ASSEMBLY PROCEDURE

REMARKS

Ribbon assy : C902351000



RE (2,3) : B150350111
 RE (3) : B150300611

Fig. 3.2.37

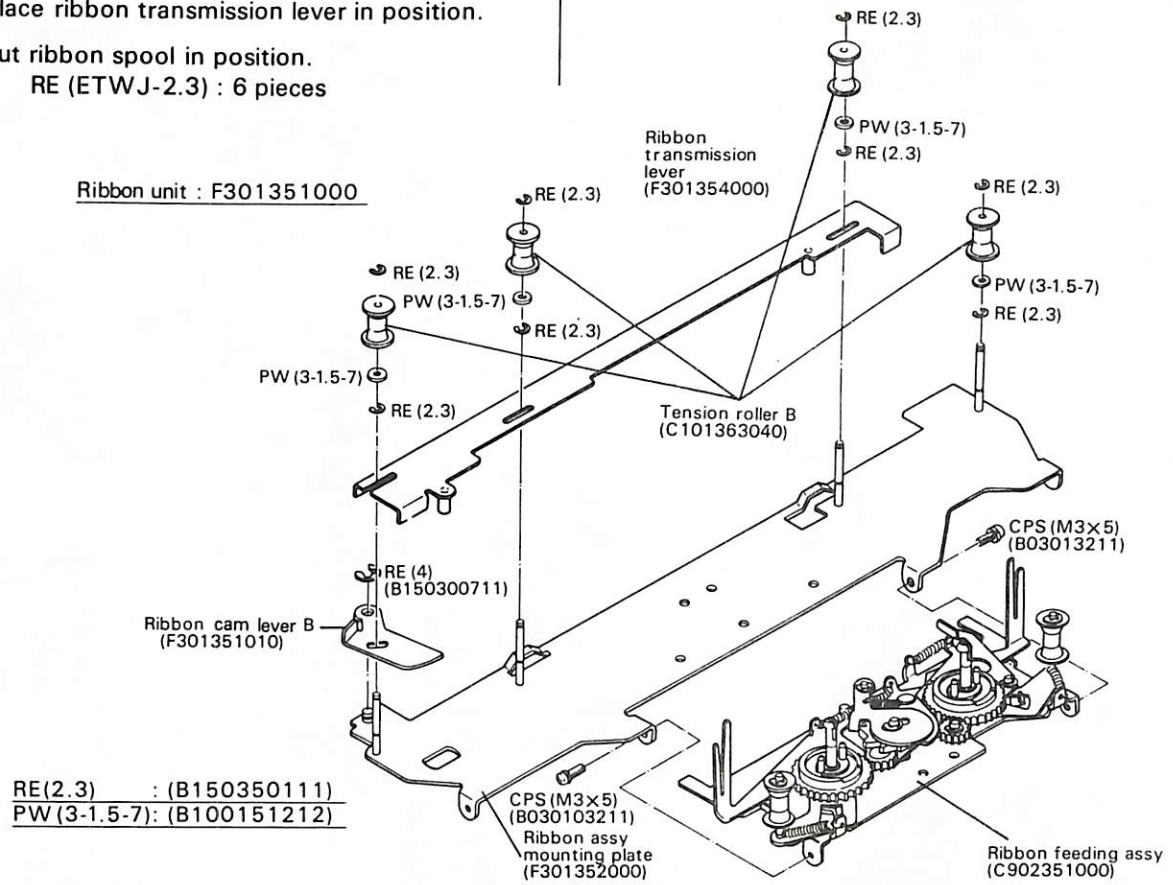
2. Apply lubricant (G₂) to :
 - (1) Contacting part between tension lever A assy and spool shaft adjustment plate (1 point)
 - (2) Contacting part between reverse control lever A and spool shaft adjustment plate (1 point)

ASSEMBLY PROCEDURE	REMARKS
<p>(3) Contacting parts between tension lever A and B assemblies and ribbon frame (2 points)</p> <p>(4) Hooked portion of tension lever spring and the corresponding pin provided on ribbon frame (2 points)</p> <p>(5) Contacting parts between reverse control levers A and B and ribbon frame (2 points)</p> <p>(6) Contacting parts between reverse control levers A and B and reverse control lever shaft (2 points)</p> <p>(7) Contacting parts between reverse control levers A and B and reverse control lever spring (2 points)</p> <p>(8) Contacting part between reverse control lever B and ribbon driving lever (1 point)</p> <p>(9) Hooked portions of ribbon driving lever spring (2 points)</p> <p>(10) Contacting part between ribbon driving lever tension lever assy (1 point)</p> <p>(11) Contacting part between ribbon driving levers (1 point)</p> <p>(12) Contacting part between ribbon driving lever and spool gear (1 point)</p> <p>(13) Contacting part between spool shaft adjustment plate and ribbon spool gear (1 point)</p> <p>(14) Contacting part between planetary pinion and planetary pinion shaft (1 point)</p> <p>(15) Hooked portions of ribbon feeding pawl spring (2 points)</p> <p>(16) Contacting part between ribbon detent lever and ribbon detecting lever shaft B (1 point)</p> <p>(17) Contacting part between ribbon detent lever and ribbon feeding ratchet wheel (1 point)</p> <p>(18) Contacting part between ribbon detent lever and ribbon feeding ratchet wheel shaft</p> <p>(19) Entire circumference of ribbon feeding ratchet wheel</p> <p>(20) Entire circumference of ribbon spool gear</p> <p>(21) Contacting part between reverse control lever A and planetary lever assy (1 point)</p> <p>(22) Contacting part between reverse control lever B and planetary lever assy (1 point)</p> <p>(23) Parts of tension lever and ribbon frame to come into contact with each other (4 points)</p> <p>(24) Parts of reverse control levers A and B and ribbon frame to come into contact with each other (2 points)</p> <p>3. Mount ribbon assy on mounting plate. CPS (M3×5) : 2 pieces Tightening torque : Approx. 10kg-cm</p> <p>4. Place ribbon cam lever B in position. RE (ETWJ-4) : 1 piece</p>	

ASSEMBLY PROCEDURE	REMARKS
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5. Place ribbon transmission lever in position.
6. Put ribbon spool in position.
RE (ETWJ-2.3) : 6 pieces

Ribbon unit : F301351000



RE (2.3) : (B150350111)
PW (3-1.5-7): (B100151212)

Fig. 3.2.38

7. Secure ribbon unit in position.
CPO (M3x6) : 2 pieces

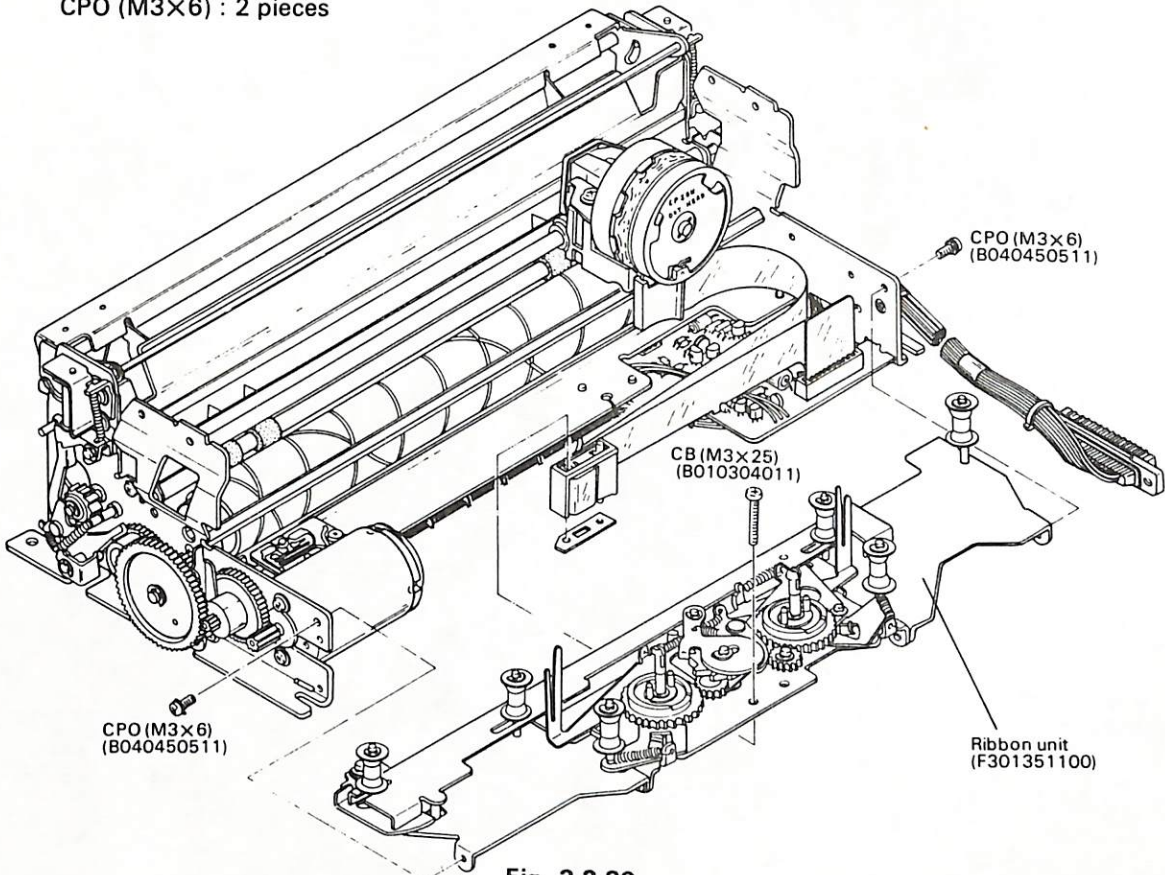


Fig. 3.2.39

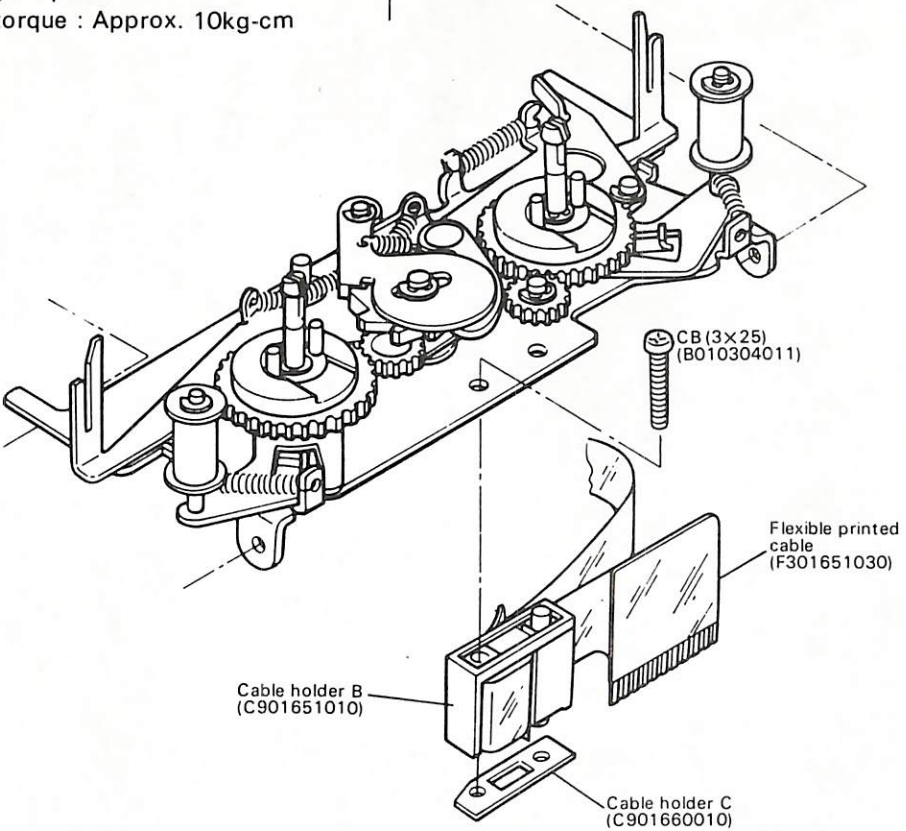
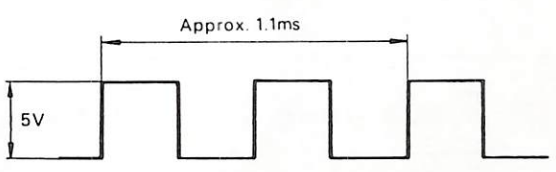
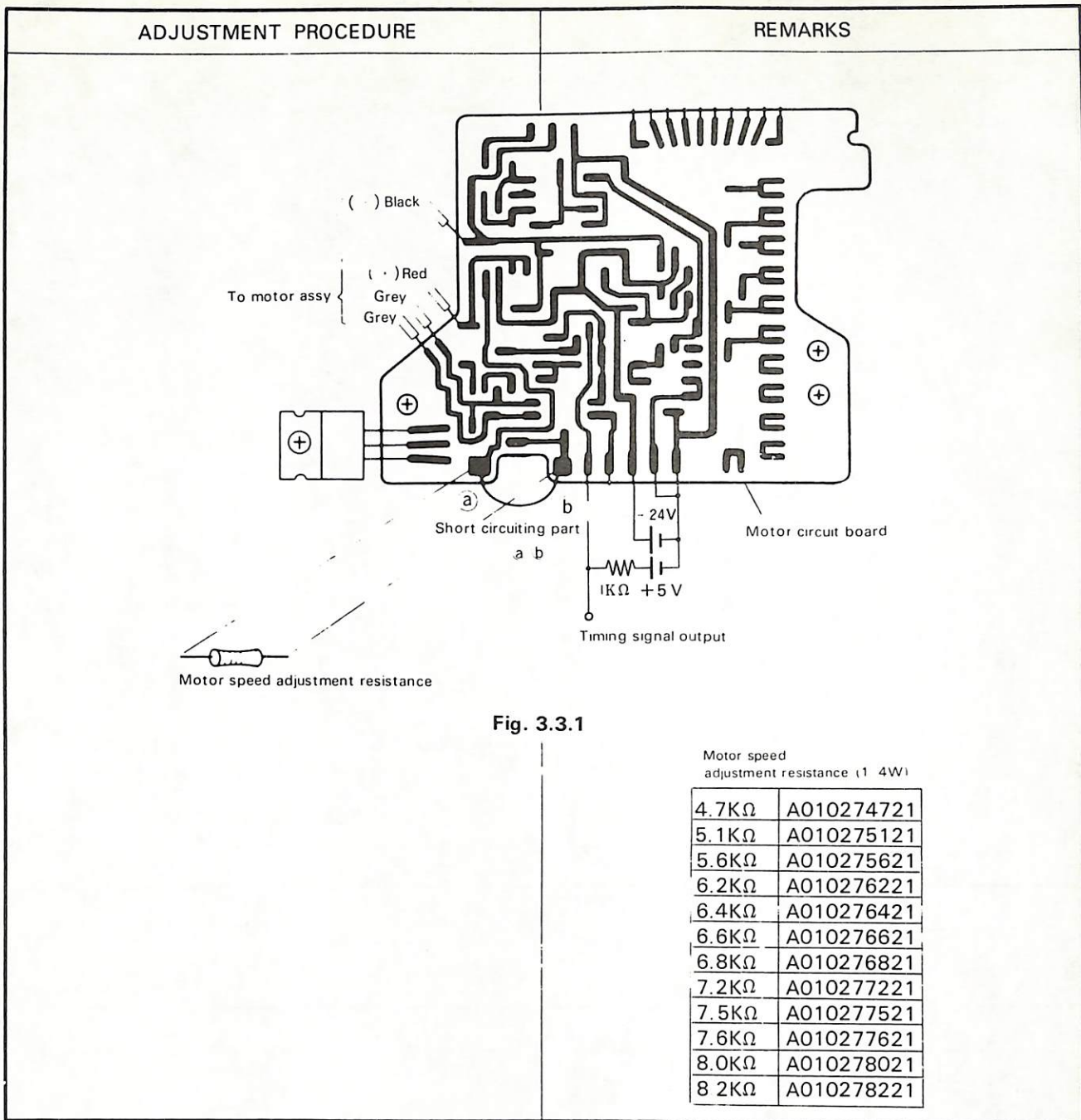
ASSEMBLY PROCEDURE	REMARKS
<p>8. Secure cable holder C on ribbon unit together with cable holder B.</p> <p>CB (M3×25) : 1 piece Tightening torque : Approx. 10kg-cm</p>	<p>● Be sure that the obliquely cut edge of the holder C faces the motor.</p>  <p>The diagram shows an exploded view of a motor assembly. At the top, a screw labeled 'CB (3×25) (B010304011)' is shown. Below it, a 'Flexible printed cable (F301651030)' is shown. At the bottom, two cable holders are shown: 'Cable holder B (C901651010)' and 'Cable holder C (C901660010)'. The main assembly shows a motor with gears and a cable holder C mounted on a ribbon unit.</p>

Fig. 3.2.40

3.3 ADJUSTMENT

3.3.1 Motor Speed Adjustment

ADJUSTMENT PROCEDURE	REMARKS
<ol style="list-style-type: none"> 1. Apply 24V DC to motor circuit board. (Red ⊕, Black ⊖) 2. Short-circuit the parts (a) and (b) of motor circuit board to rotate the motor. 3. Using an oscilloscope, check tachometer generator voltage on motor circuit board. (Grey shielded wire) 4. Observing the waveform, make adjustment so that its cycle time will be 1.1msec. (For this, the short-circuiting wire between parts (a) and (b) is replaced by resistor for motor speed adjustment.) 	 <p>The diagram shows a square wave waveform. The vertical axis is labeled '5V' and the horizontal axis is labeled 'Approx. 1.1ms'. The waveform consists of three pulses. Below the diagram is the text 'Wave form of timing signal output'.</p> <p>● Applying 5V to the timing signal output through 1kΩ, make adjustment so that the above waveform may be obtained.</p>



3.3.2 Adjustment of R Detector Assy

ADJUSTMENT PROCEDURE	REMARKS						
<ol style="list-style-type: none"> 1 Make the ribbon and paper (10 in. wide) ready for printing. 2 Perform trial printing and adjust the position of R detector so that the standard line start position can be attained. Standard line start position 44 · 0.5mm from frame A 3. Secure R detector in the proper position 	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="padding: 5px;">R detector displacement direction</td> <td style="padding: 5px;">Line start position displacement direction</td> </tr> <tr> <td style="padding: 5px;">Left</td> <td style="padding: 5px;">Direction α</td> </tr> <tr> <td style="padding: 5px;">Right</td> <td style="padding: 5px;">Direction β</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● Be careful that R detector is in parallel with the frame 	R detector displacement direction	Line start position displacement direction	Left	Direction α	Right	Direction β
R detector displacement direction	Line start position displacement direction						
Left	Direction α						
Right	Direction β						

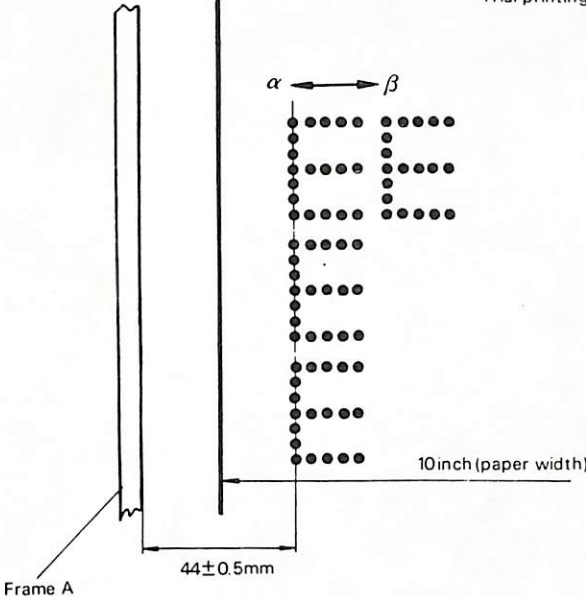
ADJUSTMENT PROCEDURE	REMARKS
 <p style="text-align: right;">Trial printing of character E</p> <p style="text-align: center;">α ← → β</p> <p style="text-align: right;">10 inch (paper width)</p> <p style="text-align: center;">$44 \pm 0.5\text{mm}$</p> <p>Frame A</p>	

Fig. 3.3.2

3.3.3 Adjustment of Dot Head Unit

(The following description covers the case of a dot head having been used for a relatively long period. For a new head, refer to Par. 3.2.10.)

ADJUSTMENT PROCEDURE	REMARKS
<p>When the quality of print decreases due to a long period use of printer, adjust the mounting position of dot head unit as follows :</p> <ol style="list-style-type: none"> 1. Loosen the set-screws securing dot head unit. 2. Displace dot head unit so as to reduce the platen/ribbon guide clearance to 0.4-0.5mm 3. Tighten the set-screws. Tightening torque : 10kg-cm 	<ul style="list-style-type: none"> ● This adjustment will increase printing energy, thus providing improved printing quality. ● When the dot head unit is replaced by a new one, the clearance should be 0.6mm (See Fig. 3.2.29).

3.4 DISASSEMBLY AND ASSEMBLY OF TYPE T PRINTER

3.4.1 Disassembly

DISSASSEMBLY PROCEDURE	REMARKS
<p>1. Dismount tractor unit. (1) Remove tractor holding spring.</p>	<p>● Refer to the instructions given in the Technical Guide or in the package of Model-3110 Printer.</p>
<p>2. Disassemble ribbon feeding mechanism.</p> <p>3. Disassemble printing mechanism.</p> <p>4. Disassemble drive mechanism.</p> <p>5. Disassemble detecting mechanism.</p> <p>6. Disassemble transmission mechanism (gear train).</p> <p>7. Disassemble printing mechanism(head carrier, carrier shafts A and B).</p> <p>8. Disassemble printing mechanism (lead cam).</p> <p>9. Disassemble paper feeding mechanism (paper guide unit) as follows: (1) Remove tractor holding plates A and B. CPO (M3x8) 2 pieces</p>	<p>Fig. 3.4.1</p> <p>● Refer to Par. 3.1.1 (Type F).</p> <p>● Refer to Par. 3.1.2 (Type F).</p> <p>● Refer to Par. 3.1.3 (Type F).</p> <p>● Refer to Par. 3.1.4 (Type F)</p> <p>● Refer to Par. 3.1.5 (Type F).</p> <p>● Refer to Par. 3.1.7 (Type F). (Note that the Type T is not provided with paper feed cam.)</p> <p>● Refer to Par. 3.1.9 (Type F).</p> <p>● See Fig. 3.4.1.</p>

DISASSEMBLY PROCEDURE

REMARKS

(2) Remove paper guide unit :

① Take off the set-screws securing paper guide holding shaft A on frame A and B sides.

CPO (M3×8) : 4 pieces

② Take off the spring pin securing motor circuit board on frame B side.

SP (φ2×8) : 1 piece

③ Take off the set-screw securing nylon clip on connector unit.

CP (M4×6) : 1 piece

④ Remove frame and paper guide unit

● Use pliers or pincers to take off the spring pin.

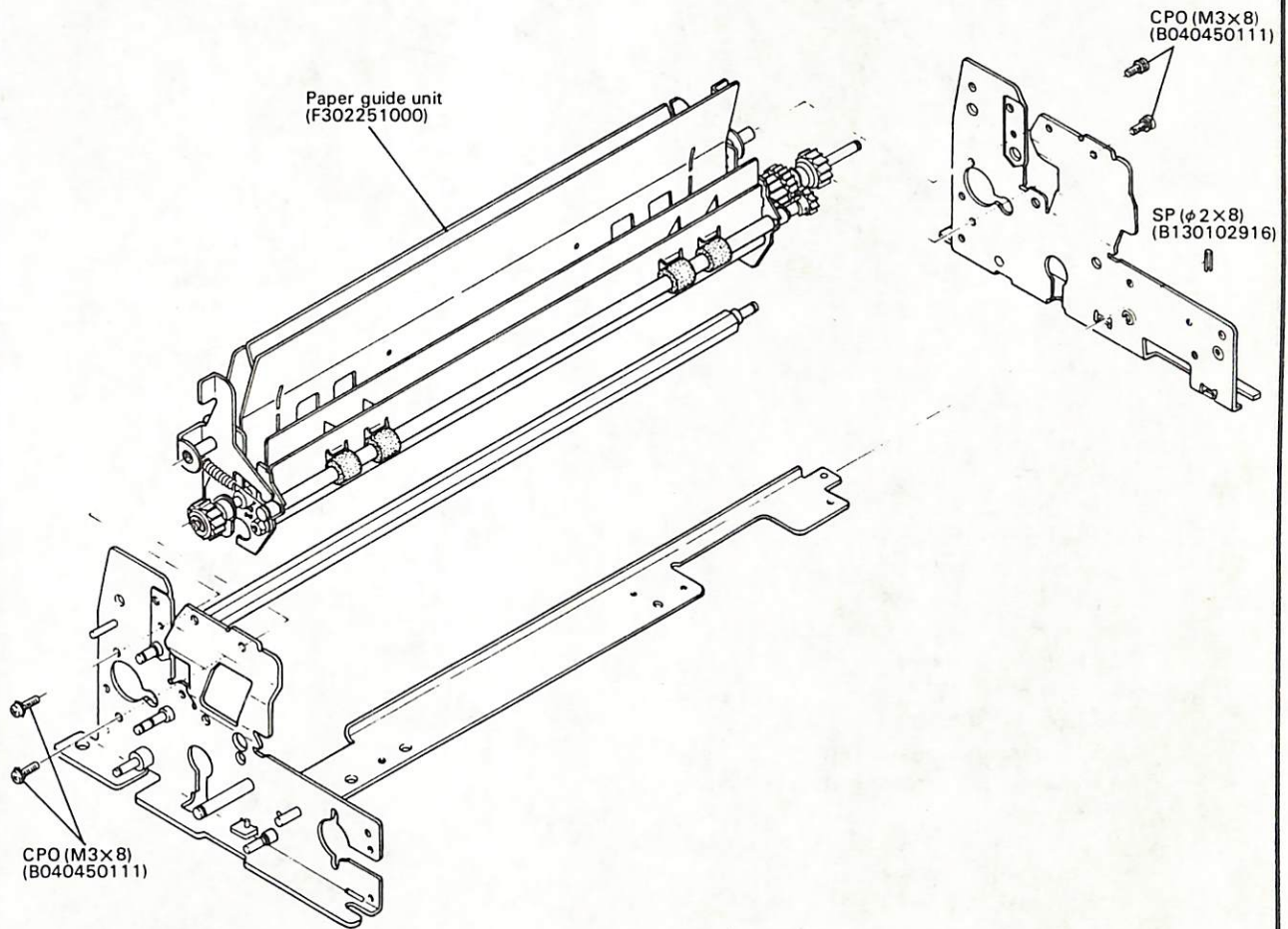


Fig. 3.4.2

(3) Disassemble paper guide unit :

① Take off the nuts securing paper guide holding shaft B.

HN (3) : 2 pieces

② Remove paper guide side plate.

③ Pull out paper guide holding shaft A.

④ Pull out paper guide holding shaft B.

⑤ Remove outer paper guide.

⑥ Remove inner paper guide and pull out paper feeding roller shaft.

DISASSEMBLY PROCEDURE

REMARKS

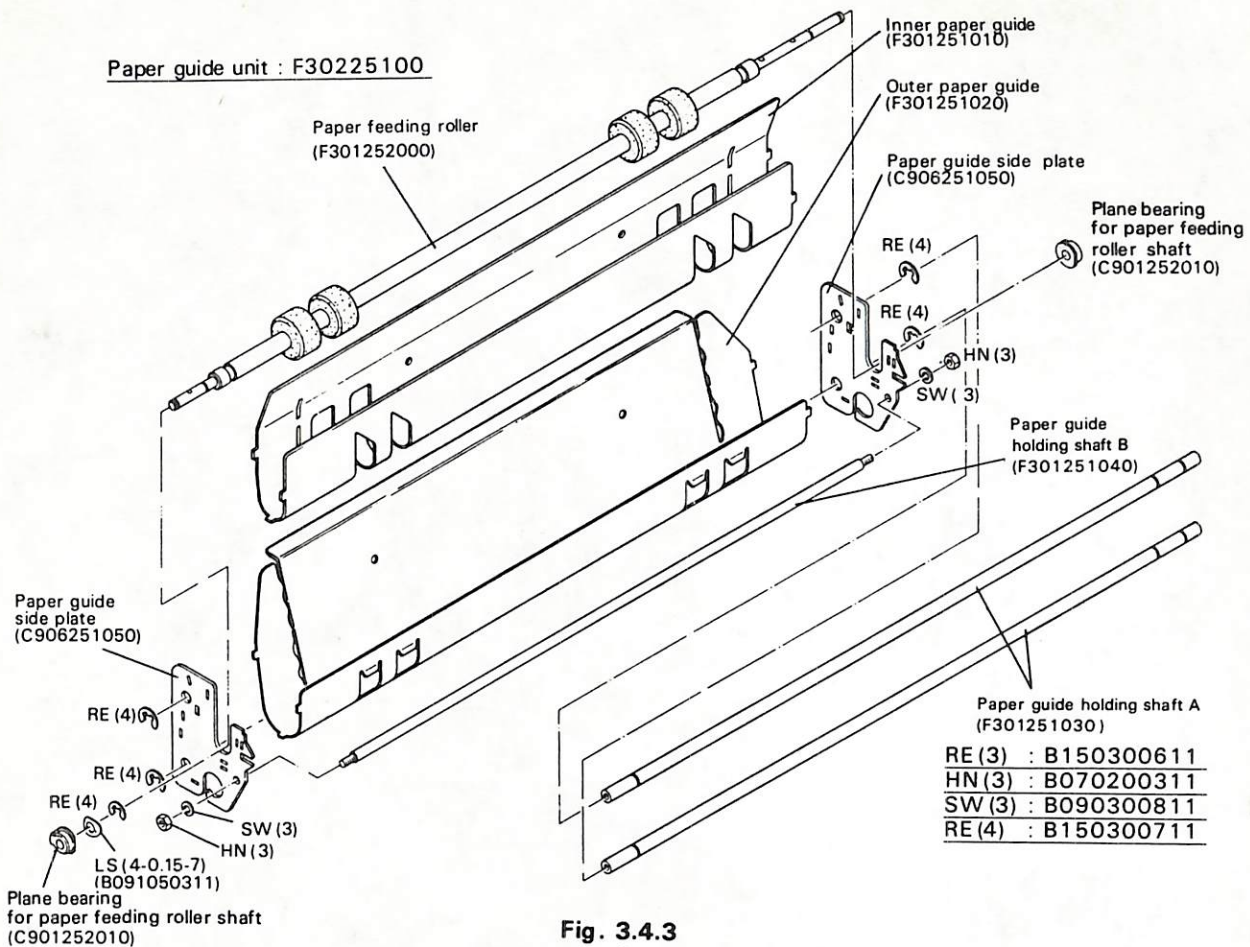


Fig. 3.4.3

10. Disassemble tractor unit as follows :

- (1) Remove tractor holding plate A.
CPO (M3×8) : 2 pieces
- (2) Remove tractor holding plate B.
CPO (M3×8) : 2 pieces
- (3) Dismount motor assy.
CS (M2.5×4) : 2 pieces
- (4) Dismount tractor frame B assy.
 - ① Take off the nut securing tractor frame stay rod.
HN (for M4) : 1 piece
SW (for M4) : 1 piece
PW (for M4) : 1 piece
 - ② Take off the nut securing tractor guide plate.
HN (for M4) : 1 piece
SW (for M4) : 1 piece
PW (for M4) : 1 piece
- (5) Take off the retaining ring TYPE-E securing tractor guide shaft.
RE (ETWJ-4) : 1 piece
- (6) Separate tractor B assy
- (7) Separate tractor A assy.
- (8) Perform disassembly on frame A side :
 - ① Take off the nut securing tractor frame stay rod on frame A side.
HN (for M4) : 1 piece
SW (for M4) : 1 piece
PW (for M4) : 1 piece
 - ② Separate tractor frame stay rod from frame assy A.

DISASSEMBLY PROCEDURE

REMARKS

- ③ Pull tractor drive shaft.
- ④ Take off the nut securing tractor guide shaft.
 - HN (for M4) : 1 piece
 - SW (for M4) : 1 piece
 - PW (for M4) : 1 piece
- ⑤ Pull out tractor guide shaft.

- (9) Remove tractor transmission gear.
 - RE (ETWJ-3) : 1 piece
- (10) Remove tractor reduction gear.
 - RE (ETWJ-4) : 1 piece
- (11) Take off the retaining rings TYPE-E securing tractor frame stay rod.
 - RE (ETWJ-3) : 2 pieces

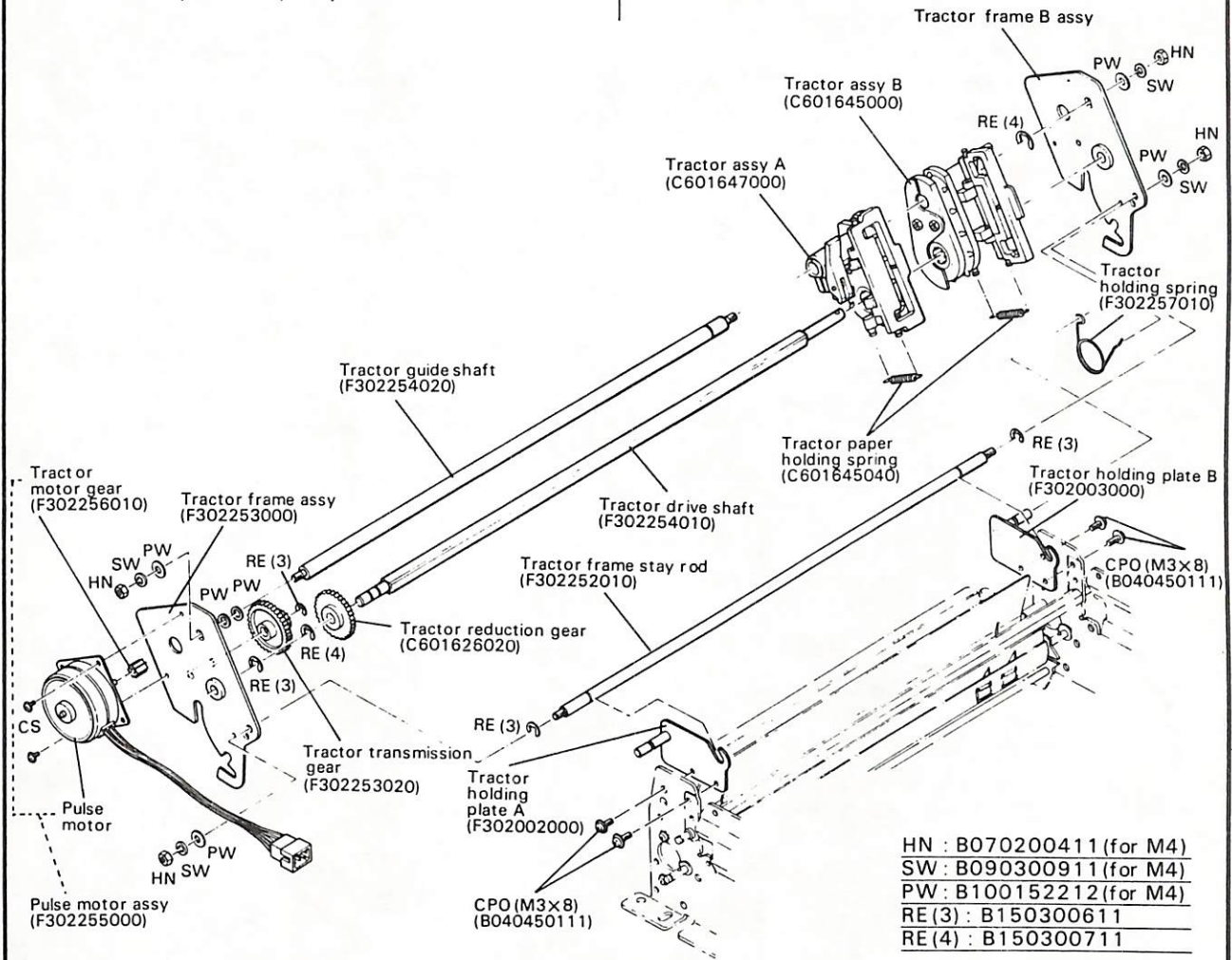


Fig. 3.4.4

11. Frame section.

● Refer to Par. 3.1.11 (Type F).

3.4.2 Assembly

ASSEMBLY PROCEDURE	REMARKS
<p>1. Assemble tractor unit as follows :</p> <p>(1) Put spring pin on tractor drive shaft, then place tractor reduction gear in position. SP ($\phi 2 \times 18$) : 1 piece RE (ETWJ-4) : 1 piece</p> <p>(2) Place tractor transmission gear in position. RE (ETWJ-3) : 1 piece</p> <p>(3) Put tractor A and B assemblies on tractor guide shaft and tractor drive shaft.</p> <p>(4) Put tractor drive shaft and tractor guide shaft on tractor frame A assy :</p> <p>① Secure tractor guide shaft in position. HN (for M4) : 1 piece SW (for M4) : 1 piece PW (4-0.8-10) : 3 pieces</p> <p>② Secure tractor drive shaft in position. RE (ETWJ-3) : 1 piece</p> <p>(5) Put tractor frame stay rod in position. HN (for M4) : 1 piece SW (for M4) : 1 piece PW (4-0.8-10) : 1 piece</p> <p>(6) Put tractor frame B assy in position :</p> <p>① Secure tractor guide shaft in position. HN (for M4) : 1 piece SW (for M4) : 1 piece PW (4-0.8-10) : 1 piece</p> <p>② Secure tractor frame stay rod in position. HN (for M4) : 1 piece SW (for M4) : 1 piece PW (4-0.8-10) : 1 piece</p> <p>(7) Displace tractor assemblies to the left side and put a retaining ring TYPE-E on tractor guide shaft. RE (ETWJ-4) : 1 piece</p> <p>(8) Confirm that tractor assemblies can move smoothly in both directions.</p> <p>(9) Put tractor drive motor assy in position. CS (M2.5\times4) : 2 pieces</p> <p>(10) Put retaining rings TYPE-E on tractor frame stay rod. RE (ETWJ-3) : 2 pieces</p> <p>(11) Put tractor holding plate B in position. CPO (M3\times8) : 2 pieces</p> <p>(12) Put tractor holding plate A in position. CPO (M3\times8) : 2 pieces</p>	<ul style="list-style-type: none"> ● Place the tractor assemblies A and B on the shafts by the ends thereof remote from the tractor reduction gear. ● Concerning the positions of tractor A and B assemblies, be sure that the lock lever of A assy be on the frame A side and that of B assy on the frame B side. ● These shafts should be put on the frame A assy from the shaft side on which tractor reduction gear is set. ● Be sure to set the frame A assy so that the tractor transmission gear faces inwardly of the tractor framing. ● Be sure to set the frame B assy so that the collar of the bearing faces inwardly of tractor framing. ● The plate should be so positioned that its side from which the pin protrudes will face outwardly with respect to the printer's central part. ● Ditto

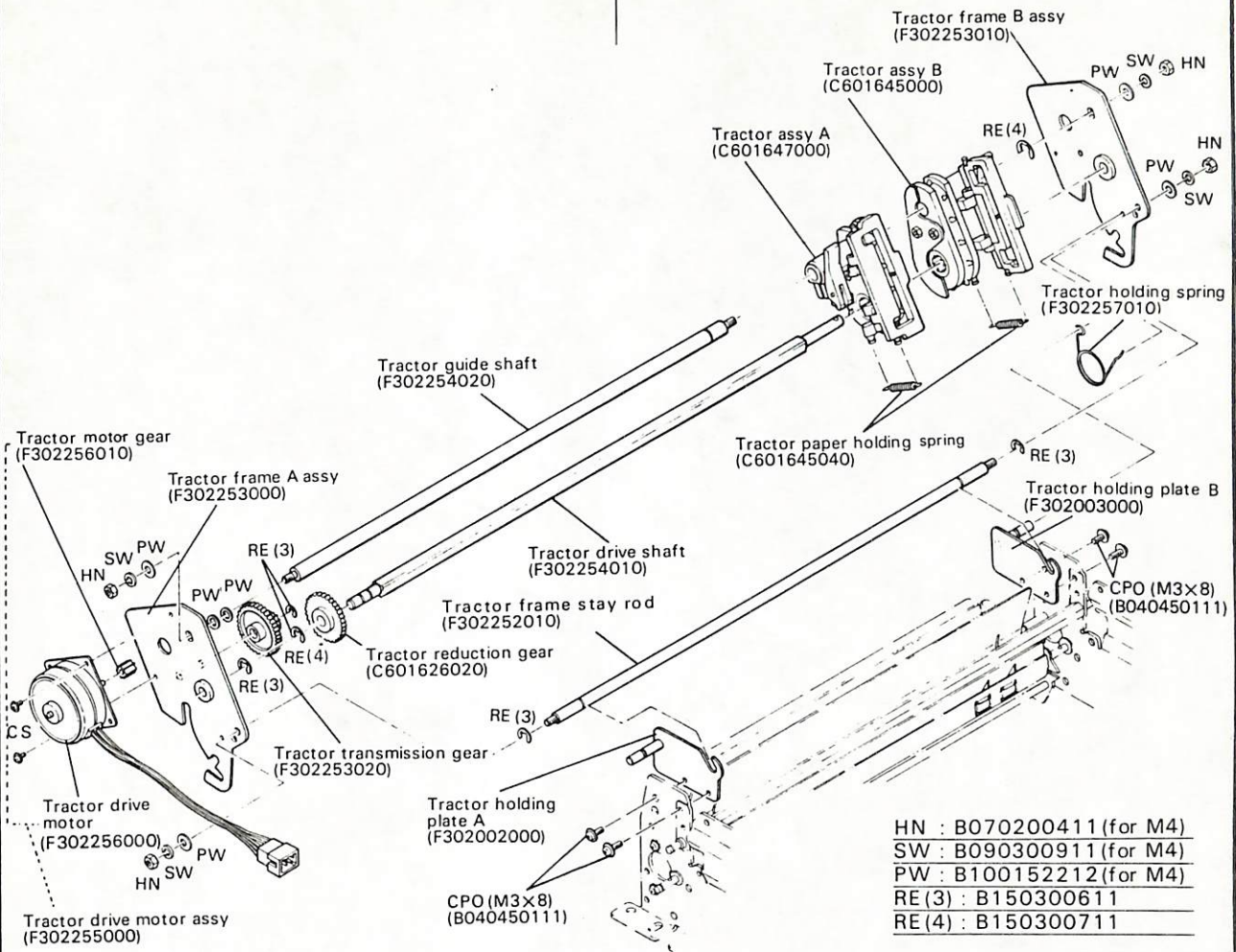


Fig. 3.4.5

2. Assemble paper feeding mechanism (paper guide unit) as follows :
 - (1) Put outer paper guide on inner paper guide.
 - (2) Put paper feeding roller in position.
 - (3) Put paper guide side plates on inner and outer paper guides and on paper guide holding shaft B.
 - (4) Secure paper guide holding shaft B in position.
 - HN (for M3) : 2 pieces
 - SW (for M3) : 2 pieces
 - (5) Put paper guide holding shaft A in position.
 - (6) Put plane bearings for paper feeding roller shaft on paper feeding roller.
 - RE (ETWJ-4) : 1 piece
 - LS (4-0.15-7) : 1 piece

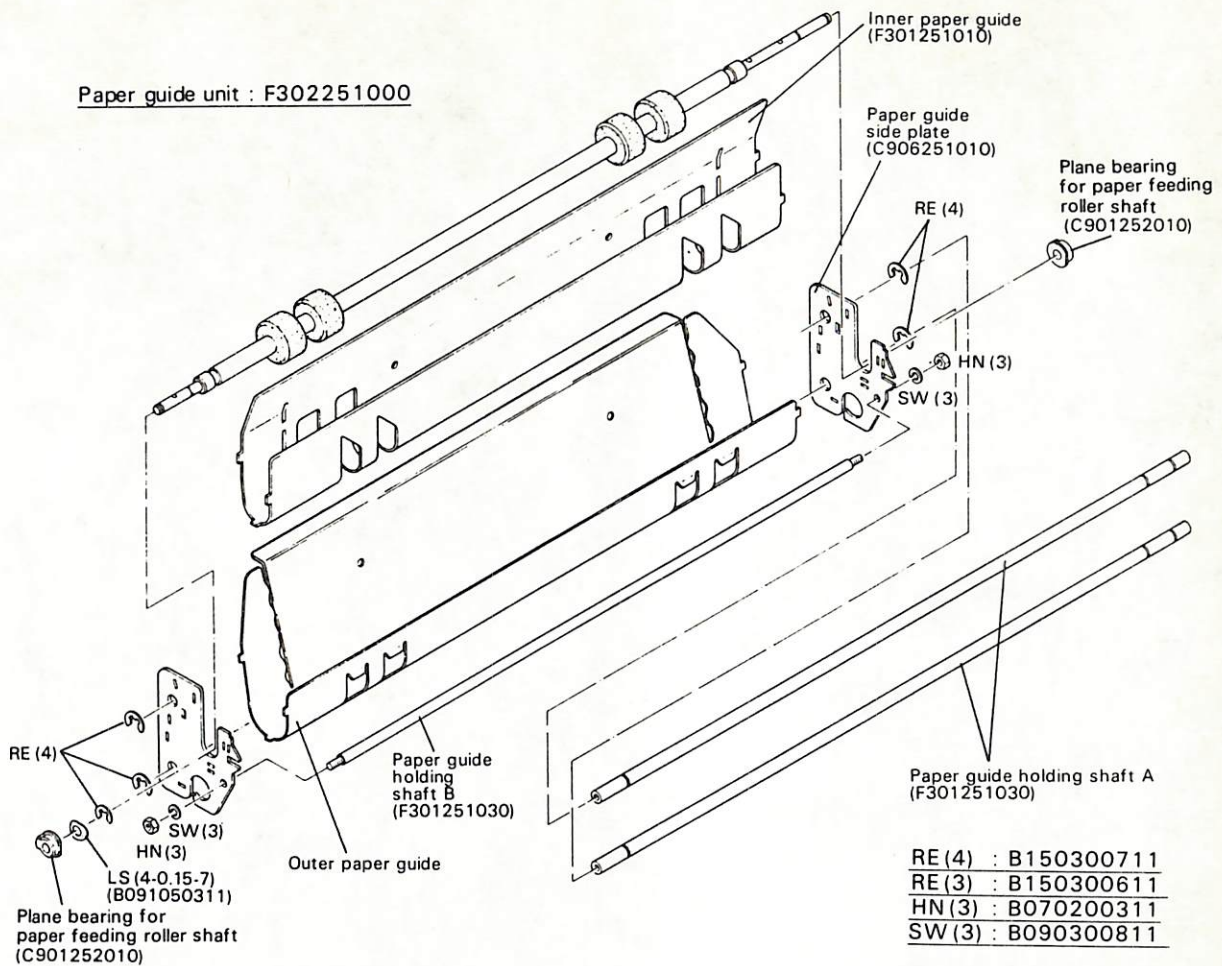


Fig. 3.4.6

3. Assemble frame section as follows :

- (1) Put platen and motor circuit board mounting plate on frame A assy.
- (2) Put paper guide unit on frame A assy, and fix paper guide holding shaft A with set-screws (but at this time the screws must not be fully tightened).
CPO (M3×8) : 2 pieces
- (3) Put frame B assy in position, and fix paper guide holding shaft B with set-screws (but at this time the screws must not be fully tightened).
CPO (M3×8) : 2 pieces
- (4) Tighten completely the set-screws securing paper guide holding shafts.
Tightening torque : 10kg-cm
- (5) Secure motor circuit board mounting plate in its frame A and B side ends.

- Refer to Step 1, Par. 3.2.2 (Type F).

- Refer to Step 5, Par. 3.2.5 (Type F).

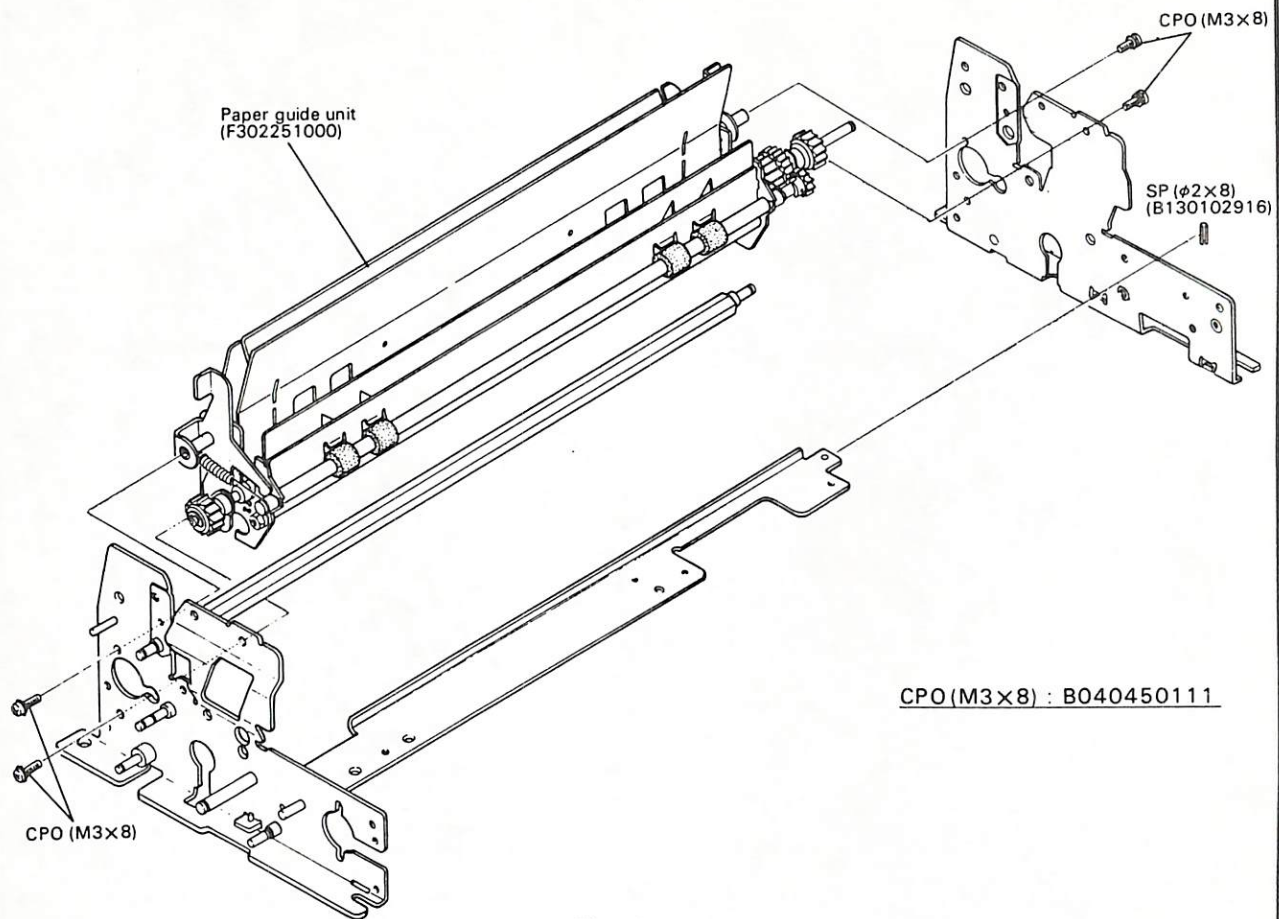


Fig. 3.4.7

4. Assemble printing mechanism (lead cam).
5. Assemble transmission mechanism (lead cam gear).
6. Assemble printing mechanism (head carrier, carrier shafts A and B).
7. Assemble transmission mechanism (gear train).
8. Assemble detecting mechanism (R detector).
9. Assemble drive mechanism (motor and motor circuit board).
10. Assemble printing mechanism (dot head unit).
11. Assemble connector with wires.
12. Assemble ribbon feeding mechanism (ribbon unit).
13. Perform adjustment.
14. Put tractor unit in position.

- Refer to Par. 3.2.3 (Type F).
- Refer to Par. 3.2.4 (Type F).
(Note that Type T is not provided with paper feed cam.)
- Refer to Par. 3.2.5 (Type F).
- Refer to Par. 3.2.7 (Type F).
- Refer to Par. 3.2.8 (Type F).
- Refer to Par. 3.2.9 (Type F).
- Refer to Par. 3.2.10 (Type F).
- Refer to Steps 1 to 6 and Step 9, Par. 3.2.11 (Type F).
(Type T is provided with no terminal for paper feeding mechanism).
- Refer to Par. 3.2.12 (Type F).
- Refer to Par. 3.3.
- Refer to the instructions given in the Technical Guide or in the package of Model-3110 Printer.

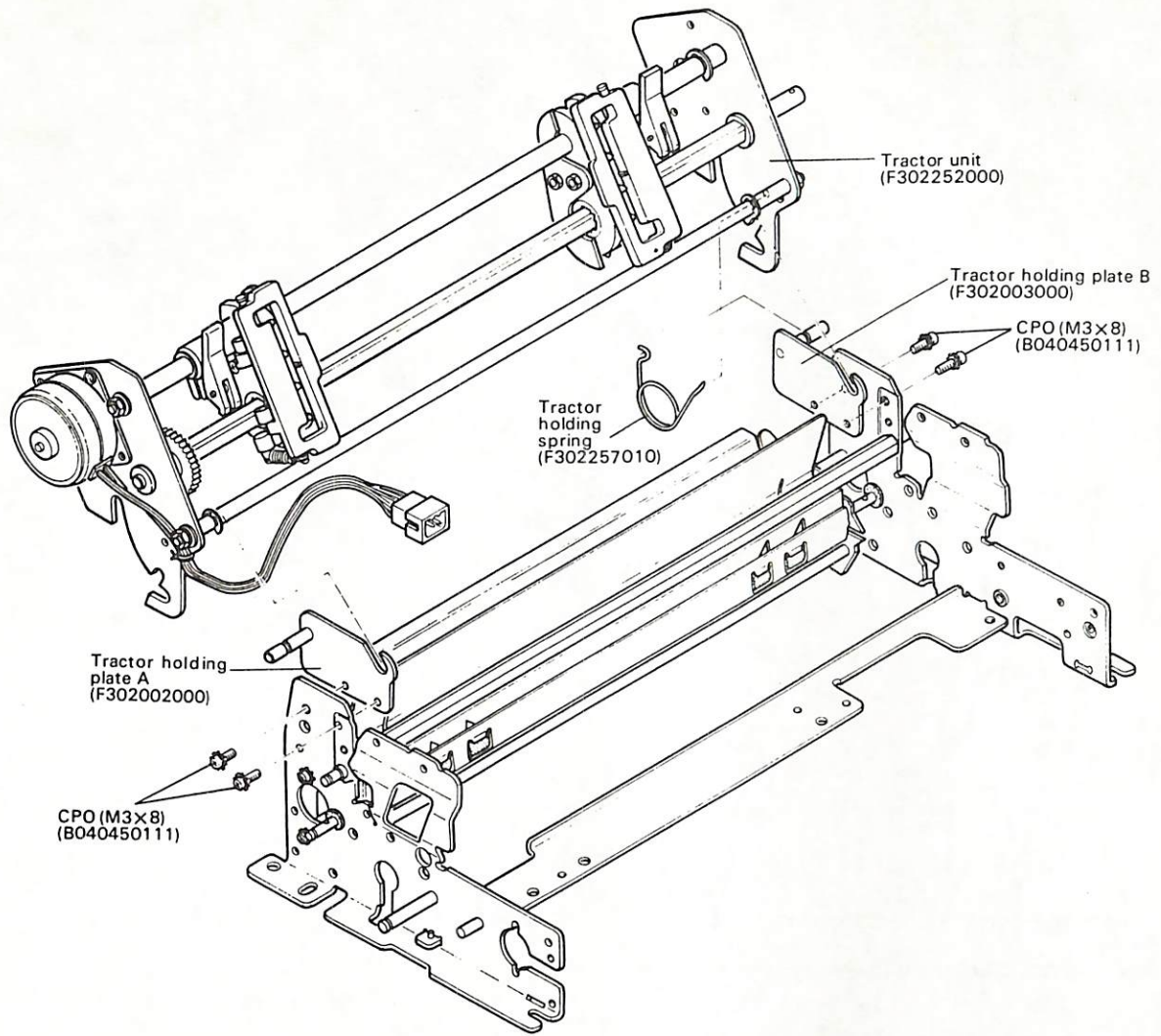


Fig. 3.4.8

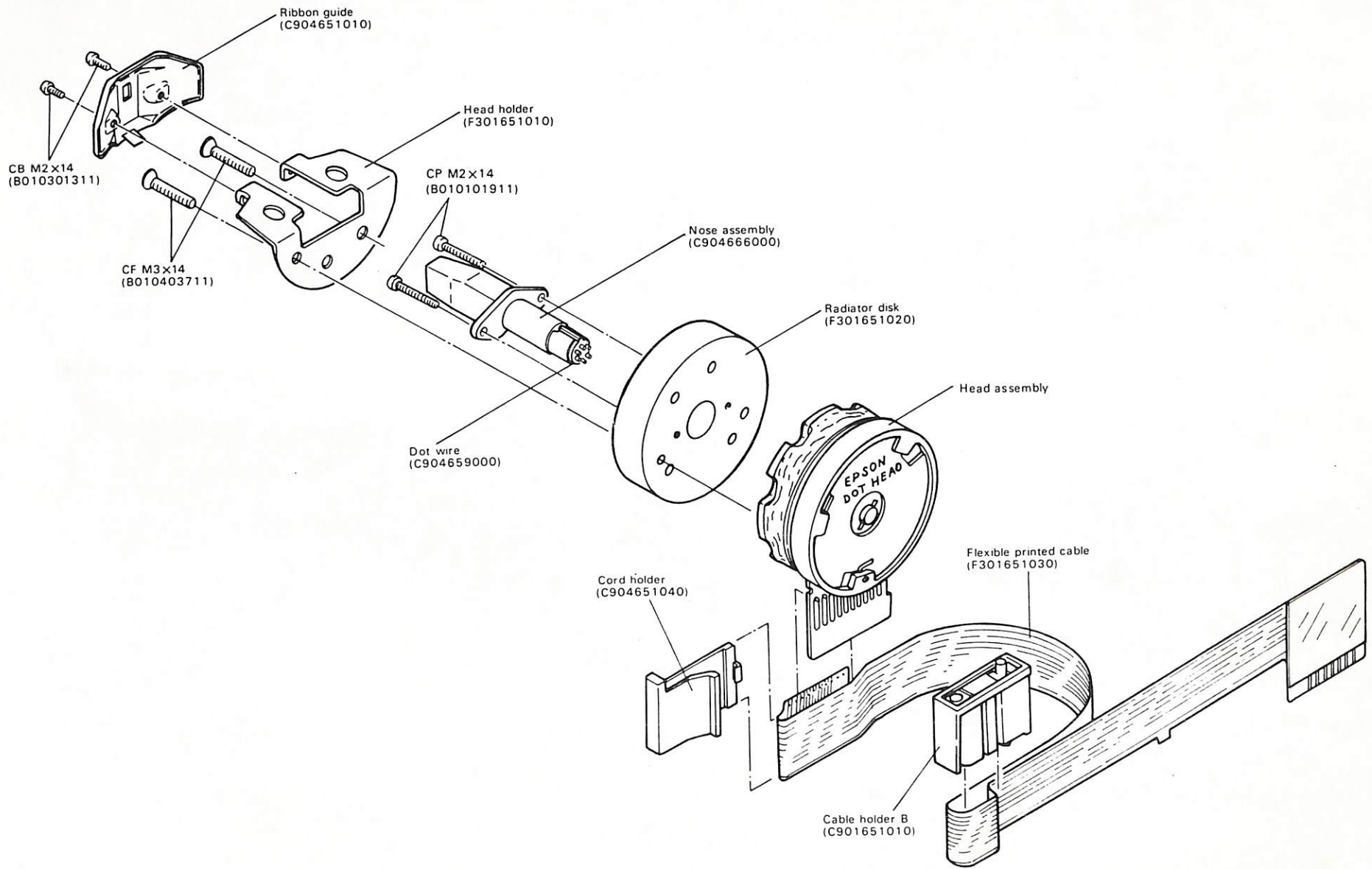


Fig. 3.5.6 Exploded View of Dot Head Unit

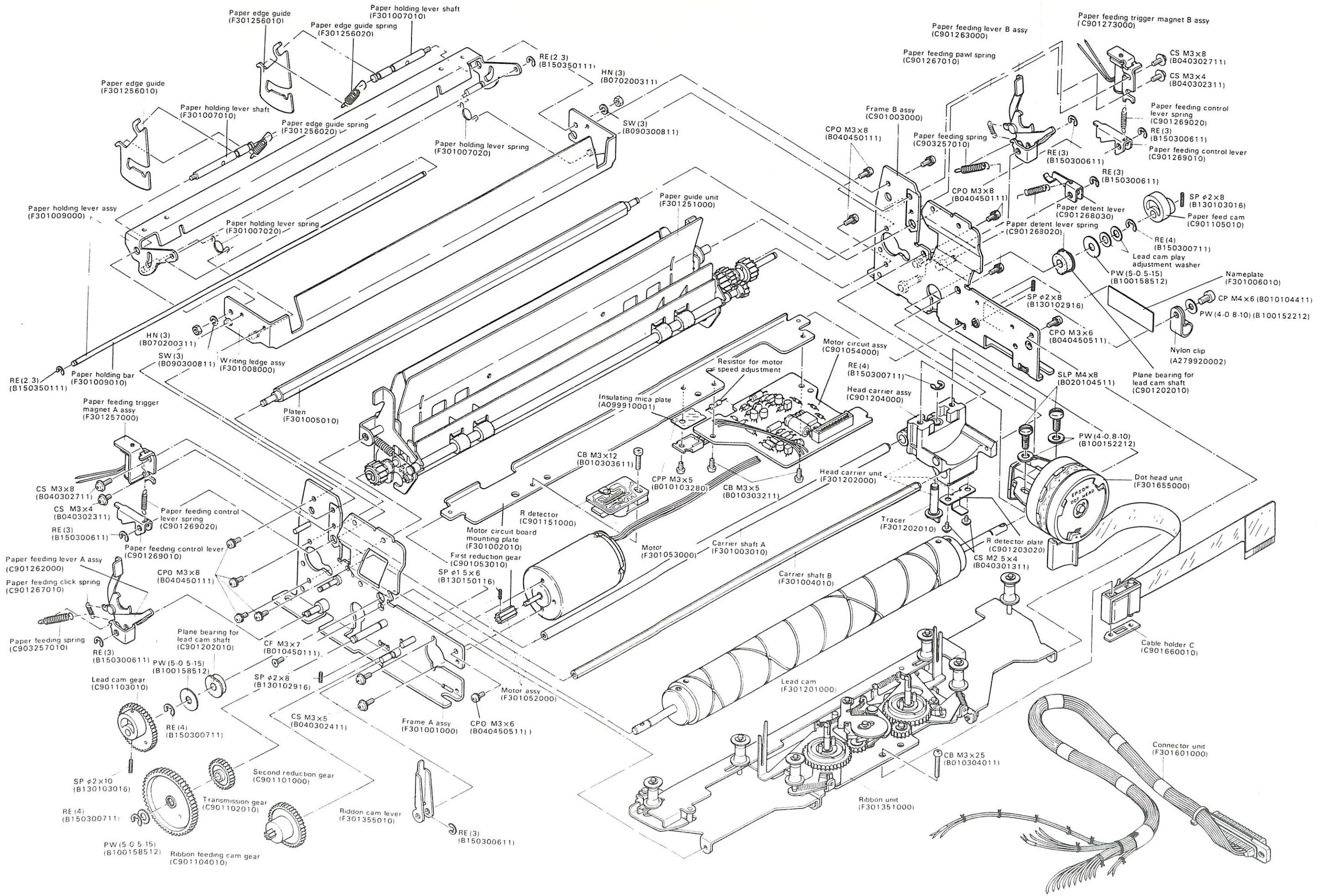


Fig. 3.5.1 General Exploded View of Type F

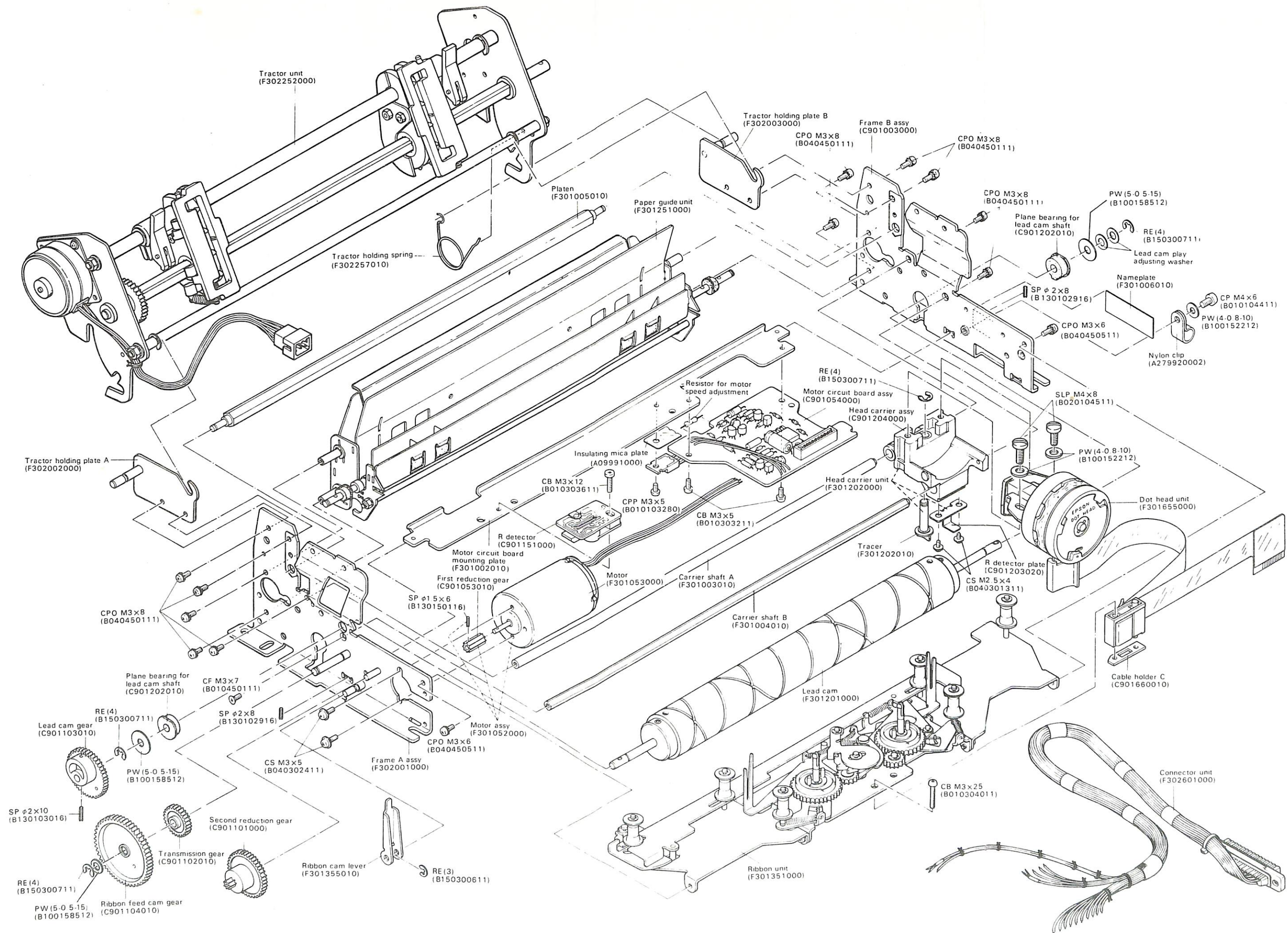


Fig. 3.5.2 General Exploded View of Type T

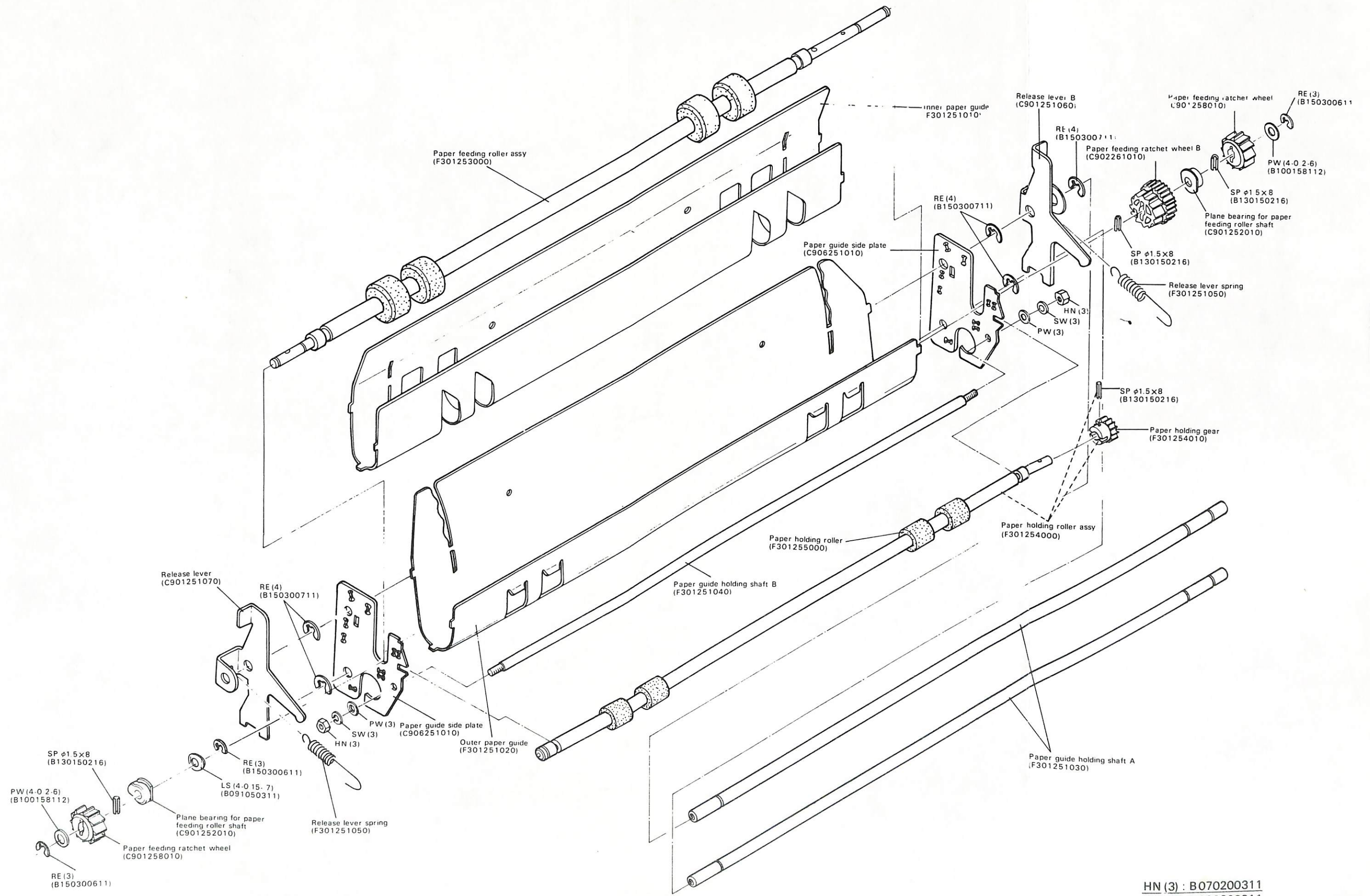
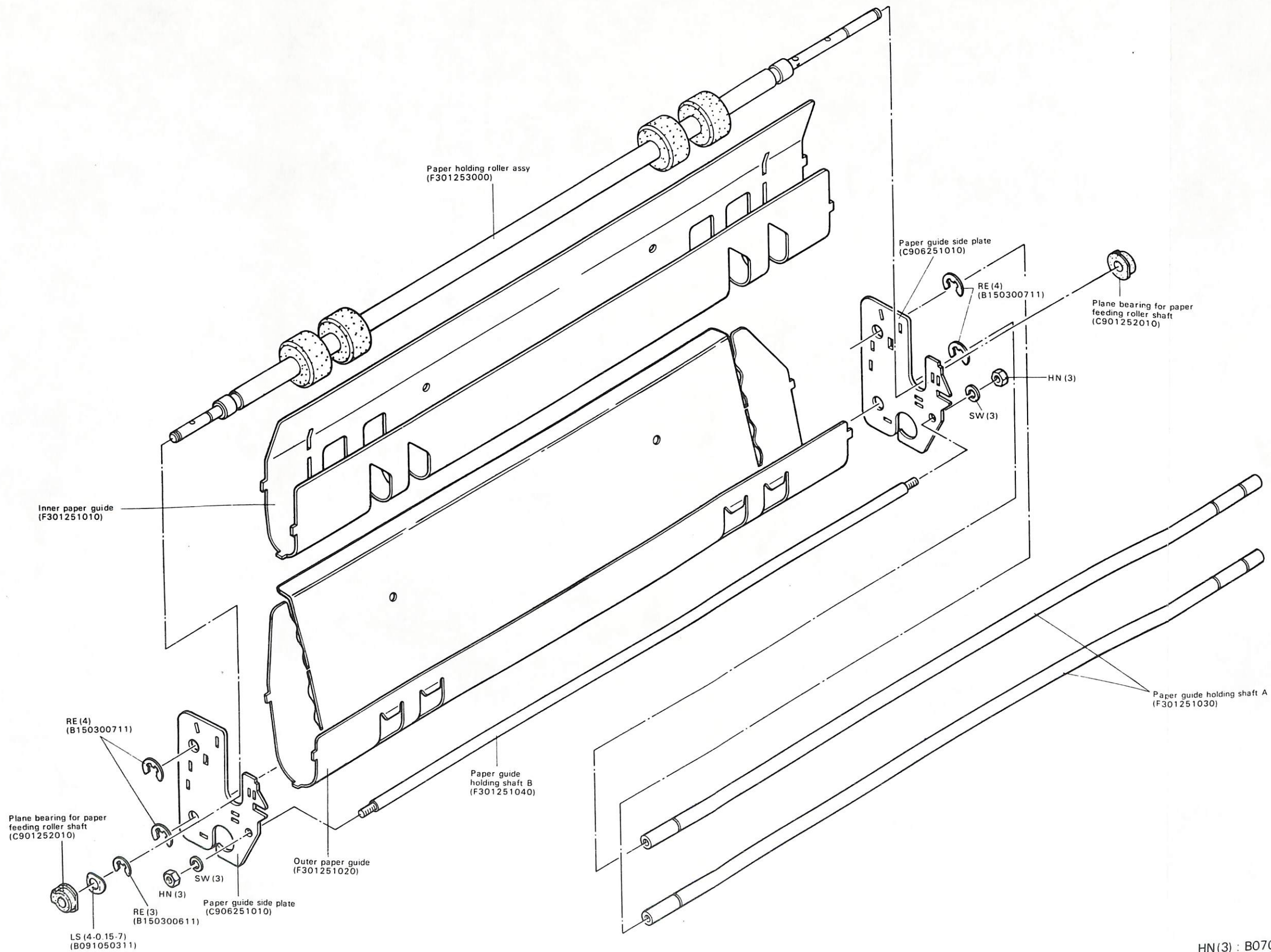


Fig. 3.5.3 Exploded View of Paper Guide Unit (Type F)

HN (3) : B070200311
 SW (3) : B090300811
 PW (3) : B100157412



HN(3) : B070200311
SW(3) : B090300811

Fig. 3.5.4 Exploded View of Paper Guide Unit (Type T)

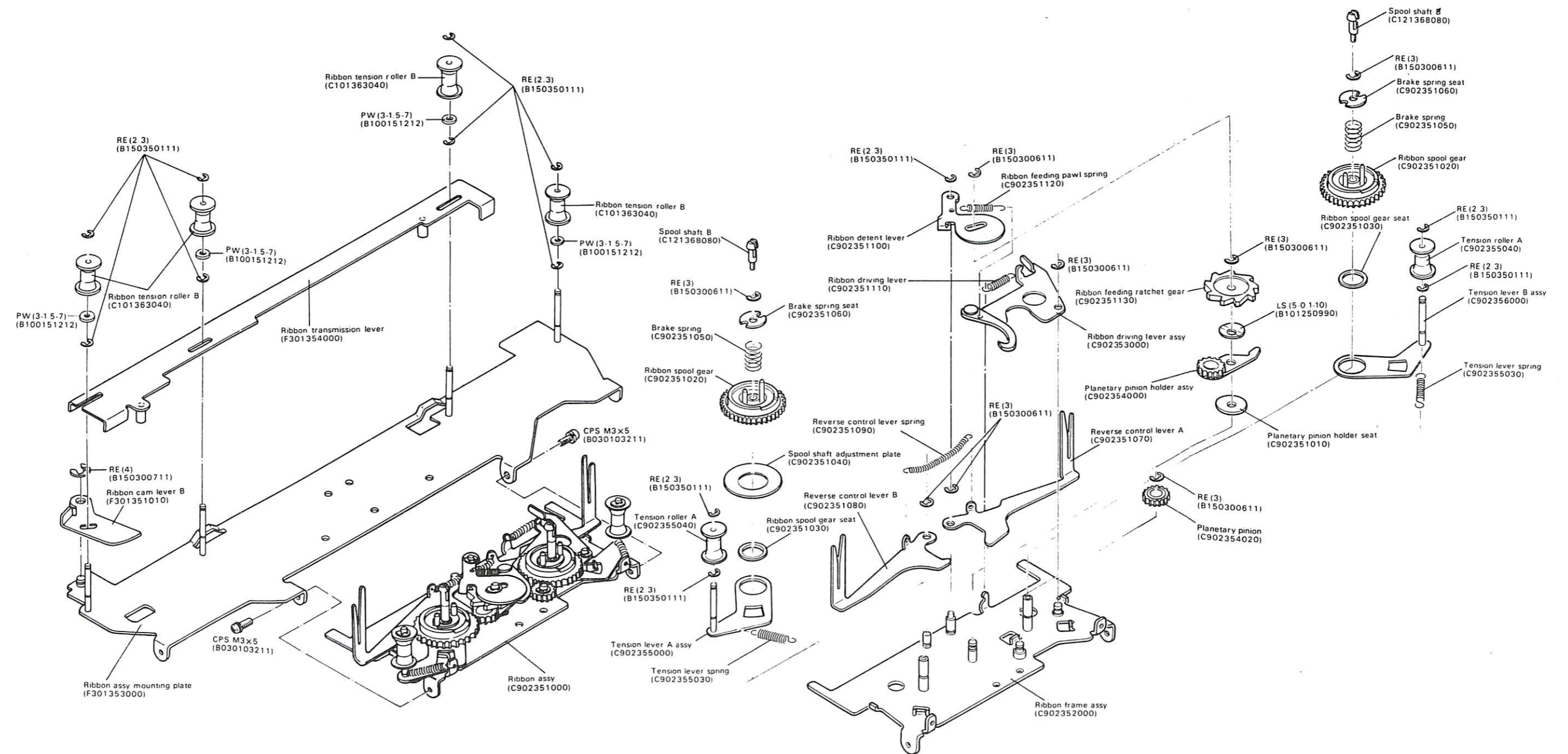
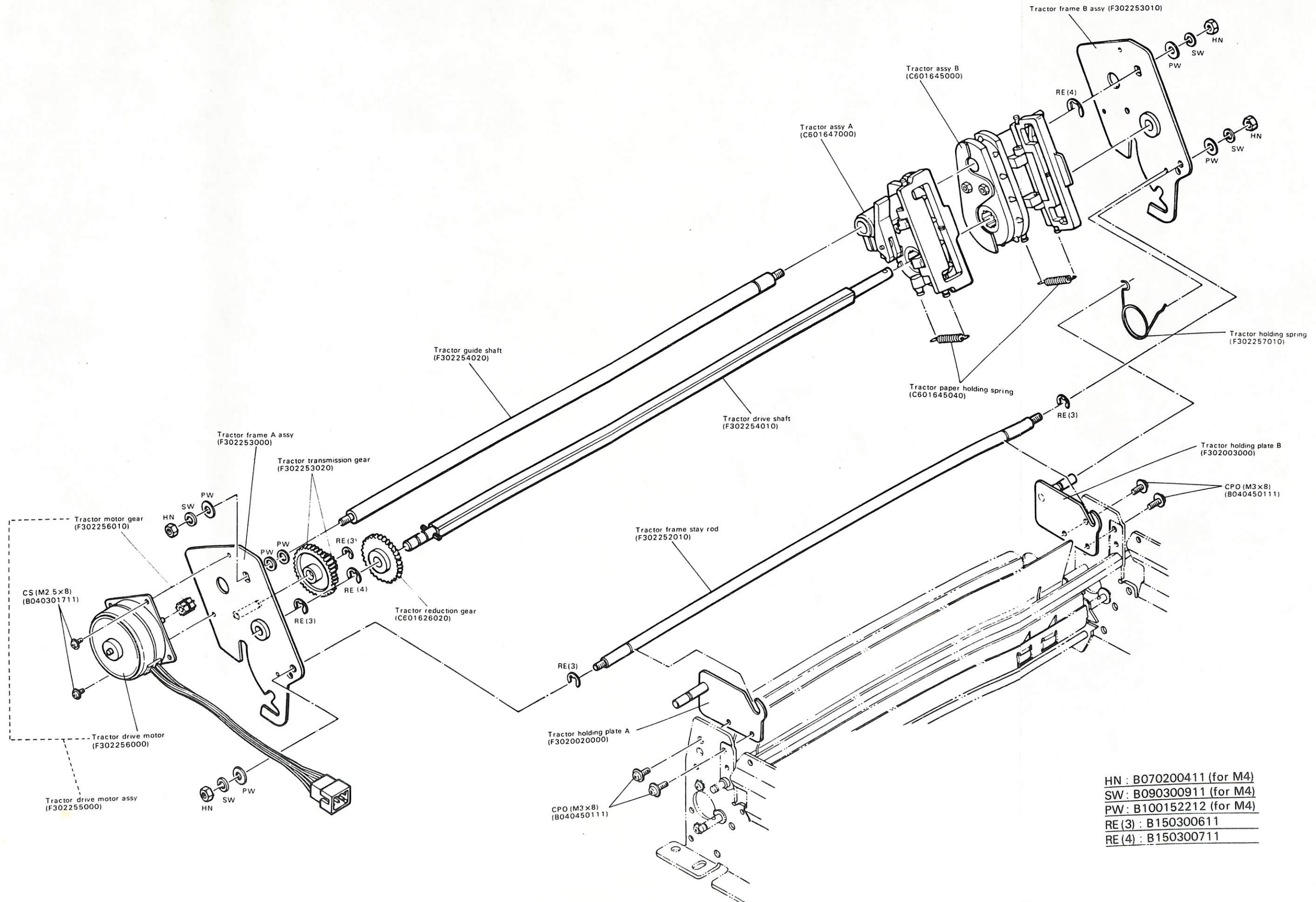


Fig. 3.5.5 Exploded View of Ribbon Unit



- HN : B070200411 (for M4)
- SW : B090300911 (for M4)
- PW : B100152212 (for M4)
- RE (3) : B150300611
- RE (4) : B150300711

Fig. 3.5.7 Exploded View of Tractor Unit