



INSTRUCTIONS AND PARTS BOOK FOR

MITSUBISHI

**INDUSTRIAL EMBROIDERY
SEWING MACHINE**

MODEL: LZ-207

MITSUBISHI ELECTRIC CORPORATION

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INDEX

	Page	
Merits	2	
Specifications	3	
I. Preparation for sewing		
1. Location of the machine.....	4	
2. Mounting of machine head.....	4	
3. Mounting of motor.....	4	
4. Connection of motor lever and treadle.....	4	
5. Mounting of bobbin winder.....	4	
6. Mounting of spool stand.....	4	
7. Mounting and regulation of knee regulating mechanism.....	5	
8. Mounting of oil drop pan.....	5	
9. Note for the first operation.....	6	
II. Gist of operation		
1. Selection of thread.....	6	
2. Attaching of needle.....	6	
3. Wind thread on the bobbin.....	7	
4. Adjustment of bobbin winder.....	7	
5. Insertion of the bobbin into bobbin case.....	8	
6. Insertion and removal of the bobbin case into the shuttle race.....	8	
7. Threading of upper thread.....	9	
8. Changing of needle basic-line.....	9	
9. Adjustment of zig-zag amplitude.....	10	
10. To make stitches in a fixed width.....	10	
11. Operation of embroidery.....	10	
12. Adjustment of needle plate.....	11	
13. Tension of threads.....	11	
14. Tension of under thread.....	11	
15. Tension of upper thread.....	11	
16. Adjustment of auxiliary upper thread tension regulator.....	12	
III. Adjustment		
1. Timing of needle and shuttle race.....	13	
2. Adjustment of needle basic-line.....	14	
3. Adjustment of needle bar amplitude motion.....	14	
4. Removal of shuttle race.....	14	
5. Regulation of occurrence of amplitude in straight sewing.....	14	
IV. Maintenance		
1. Lubrication.....	15	
2. Cleaning.....	15	
V. Trouble and repairing		16
VI. Parts book		20

9. NOTE FOR THE FIRST OPERATION

Prior to the operation, fully lubricate to the parts requiring oil feeding in reference to the item concerning the lubrication on Page 15.

In order to ensure smooth operation of the machine for a long time, operate it at 1,000 stitches approx. one minute when first using a machine.

II. GIST OF OPERATION

1. SELECTION OF THREAD

Use thread of quality as good as possible. Thread of uneven thickness (thread with knots) is not suitable for sewing machine. Always use left-twisted thread for upper thread. In order to check if a thread is right-twisted or left-twisted, hold the thread with thumb and forefinger of both hands as shown in Fig. 3, and twist it toward you with the fingers of the right hand. If the twist is loosened, the thread is right-twisted, while if tightened, it is left-twisted.

Fig. 3

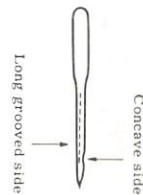


2. ATTACHING OF NEEDLE

Use type DP × 5 needle.

- (1) Raise the needle bar to its highest position and loosen needle clamp thumb screw.
- (2) Insert the needle into the clamp as far as it will go, keeping the long-grooved side toward you and then securely tighten the needle clamp screw.

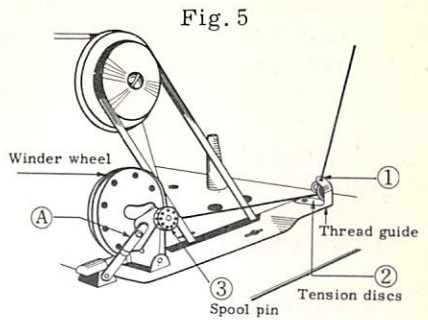
Fig. 4



(Note) In sewing with nylon or silk thread, loop formation may be poor due to twist of the thread, often causing skip of stitches. In such a case, the needle is attached somewhat twisted according to the condition of loop formation.

3. WIND THREAD ON THE BOBBIN

- (1) Pass the thread drawn from spool stand ① as shown in Fig. 5 and draw the thread between the tension discs ②. Then winding 5 or 6 times round the bobbin, insert the bobbin into the bobbin winder spindle ③ so that the bobbin winds the thread from beneath.
- (2) When the part A is pushed, the winder wheel comes onto contact with the belt. As the machine runs, the thread is wound round the bobbin.
- (3) When the winding is full performed, the winder wheel is automatically released from the contact with the belt and stops.
- (4) This operation is available while in sewing.



4. ADJUSTMENT OF BOBBIN WINDER

- (1) Proper winding of the bobbin is shown in Fig. 6 (a), where the winding is arranged in parallel with a pipe of the bobbin. If the winding is made one-sided as shown in (b) and (c), thread is not drawn out smoothly, causing unbalance in thread tension. In such a case, loosen screw B in Fig. 7 and move the thread guide from side to side in a manner that it is shifted in opposite direction of one-sided winding so as to make the winding uniform.
- (2) In winding the bobbin with thread, especially with nylon thread, too tight winding may result in cracking of the bobbin. Adjust it with nut C so that the thread is lightly drawn out from the thread guide.
- (3) Never wind the bobbin too full for smooth feeding. Proper quantity of thread is four fifths of the bobbin capacity. The winding quantity is adjusted by screw D in Fig. 7.

Fig. 6

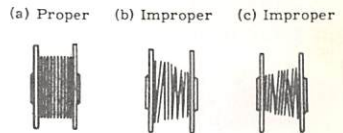
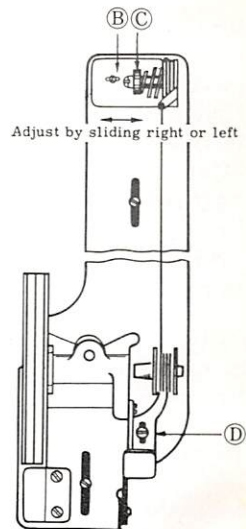


Fig. 7



When it winds too much, the screw should be turned counterclockwise, and vice versa.

5. INSERTION OF THE BOBBIN INTO BOBBIN CASE

- (1) Hold the bobbin as shown in Fig. 8.
- (2) The bobbin is inserted into the bobbin case which is held with tension spring in your side.
- (3) As shown in Fig. 9, draw the thread into a slot on the edge of the bobbin case, and while pulling the thread, pass it underneath the tension spring.
- (4) Then, draw it into holes (A) and (B) through slots of each.

Fig. 8

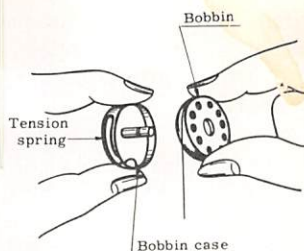
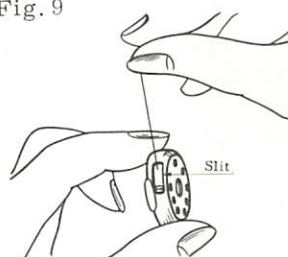


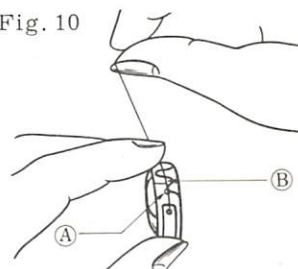
Fig. 9



6. INSERTION AND REMOVAL OF THE BOBBIN CASE INTO THE SHUTTLE RACE

- (1) Insertion
 - (a) Raise the needle bar to its highest position.
 - (b) Hold the latch lever of the bobbin case fully opened as shown in Fig. 11, and after aligning the pivot of the shuttle race and the hole of the bobbin case, the bobbin case is inserted into the shuttle race as far as it goes and the latch lever is closed.

Fig. 10

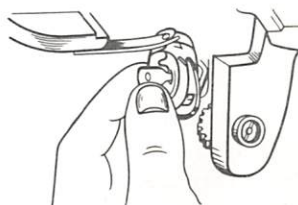


(Note) Unless the correct insertion, the bobbin case may fall out and the machine may be broken down.

(2) Removal

The bobbin case may be removed when the latch lever is full opened in contrary way to the insertion. The bobbin slips down when the latch lever is closed and the opening of the case is faced downward.

Fig. 11



7. THREADING OF UPPER THREAD

Turn the balance wheel to put the thread take-up lever to its highest position.

(1) Draw the thread from the spool and pass it through in the order given in Fig. 12.

(2) Thread is passed through the thread guard ① on face plate from the right to the left, the thread take-up lever cover thread guide ② from the left to the right, and passed under the thread take-up lever.

(3) The thread is passed between the two discs of the auxiliary upper-thread tension regulator ③ from the right to the left and between the two discs of upper-thread tension regulator ④ from the right to the left. The thread is pulled up to the left, then it is hooked in the forked part of the tension discs ⑤ and the thread take-up spring ⑥.

(4) The thread is passed through from the thread guide ⑦ to thread take-up lever ⑧, thread guide ⑦, auxiliary thread take-up lever ⑨, thread guides ⑩ and ⑪, then through the needle bar thread guide ⑫

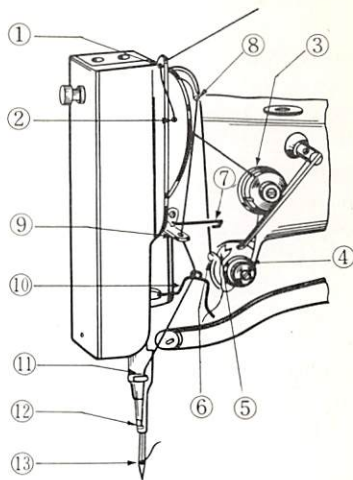
(5) Through the needle eye ⑬, the thread is passed from this side to the other.

The thread passed through the needle eye is required about 6 - 7 cm (2.5"~3") drawn.

8. CHANGING OF NEEDLE BASIC-LINE

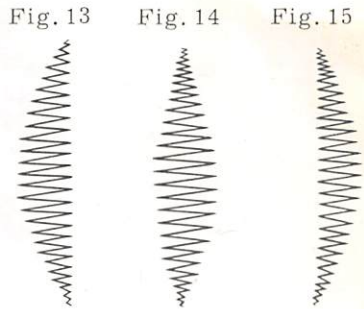
Three kinds of zig-zag stitches shown in Fig. 13, 14 & 15 can be done by adjusting needle basic-line and zig-zag amplitude. Fig. 13 shows right needle basic-line where zig-zag stitches are made on the left

Fig. 12



- ① Thread guide (face plate)
- ② Thread take-up lever cover thread guide
- ③ Auxiliary upper thread tension regulator
- ④ Upper thread tension regulator
- ⑤ Thread tension discs
- ⑥ Thread take-up spring
- ⑦ Thread guide (arm)
- ⑧ Thread take-up lever
- ⑨ Auxiliary thread take-up lever
- ⑩ Thread guide (needle bar support upper)
- ⑪ Thread guide (needle bar support lower)
- ⑫ Thread guide (needle bar)
- ⑬ Needle

side of the basic-line. Fig. 14 shows that zig-zag stitches are made in equal width on the both sides of the needle basic-line. Fig. 15 shows left needle basic-line where zig-zag stitches are made on the right side of the basic-line. To change the needle basic-line as shown above, a lever in Fig. 16 on the back of the machine is operated. To operate lever **A**, draw needle basic-line change knob **B** in Fig. 16, set the lever **A** to the proper position of the needle basic-line required, and set the needle basic-line change knob **B** to bracket hole **C**. Then, the lever **A** can be fixed on the adjusted position. When the lever **A** is set on the center hole, you can get the stitches as shown in Fig. 14. When it is set on the left hole (facing the machine), you can get the stitches as shown in Fig. 13. When it is set on the right hole (facing the machine), you can get the stitches as shown in Fig. 15.



9. ADJUSTMENT OF ZIG-ZAG AMPLITUDE

Zig-zag amplitude can be adjusted from 0 to 12.7 mm (0"~1/2"). It can be adjusted easy and free by operating the knee plate of the knee regulating mechanism. In case of sewing with a fixed zig-zag width, refer to the next item.

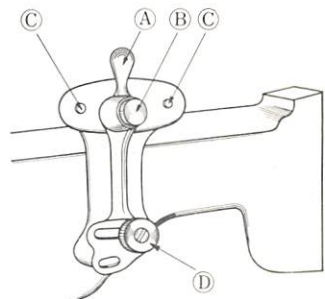
10. TO MAKE STITCHES IN A FIXED WIDTH

In order to get stitches in a fixed needle amplitude, loosen thumb nut **D** in Fig. 16, operate the knee plate until the needle amplitude to the necessary zig-zag width of stitch, and tighten the thumb nut **D**. Now, you can sew in the fixed zig-zag amplitude.

11. OPERATION OF EMBROIDERY

Put cloth into accessory embroidery frame, raise the needle at its highest position, put the embroidery frame underneath the needle. Holding lightly the upper thread end by the left hand, turn slowly the balance wheel toward you, and the upper

Fig. 16



thread comes out twined with the under thread. Then, you can start to sew holding the two threads. After 2 or 3 stitches, set the two threads free and embroider along the drawing on cloth by moving the embroidery frame and regulating zig-zag width by the knee plate mechanism. This operation requires some skilfulness and you had better have good practice to be good experienced with the machine.

12. ADJUSTMENT OF NEEDLE PLATE

Needle plate is attached on the head with a spring action so as to be removed easily. When the needle does not drop smoothly, adjust the needle position by sliding the needle plate (A) in Fig. 17 to the right or left.

13. TENSION OF THREADS

Usually, the less upper and under thread tensions are, the better zig-zag stitches are sewn. Proper tension does not be too loos of thread in stitch on the cloth. Tension of threads varies according to conditions of use, i. e. kind of materials, thread, zig-zag width, etc., so it is required to adjust it each situation.

14. TENSION OF UNDER THREAD

Tension of under thread should be 10 - 15 g (0.35 - 0.52 oz) for sewing thin materials and 15 - 20 g (0.52 - 0.70 oz) for sewing medium and thick materials. To increase the tension, turn the bobbin case tension regulating screw (A) in Fig. 18 clockwise and to decrease turn it counterclockwise.

15. TENSION OF UPPER THREAD

Tension of the upper thread is roughly regulated by adjusting the pressure of the tension discs in the upper-thread tension regulator and then fine regulation is to be made by adjusting the thread take-up spring action range and strength.

(1) Pressure of Tension Discs

In almost all cases, proper tension is available merely by adjusting pressure of the tension discs. To increase the

Fig. 17

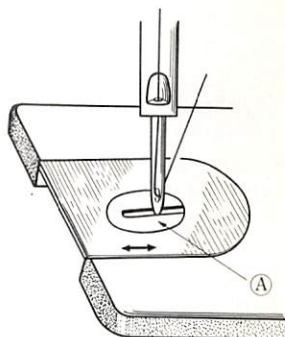
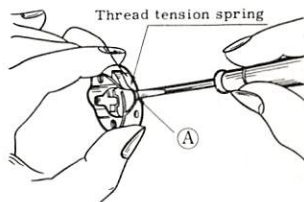


Fig. 18



tension, turn the tension regulating thumbnut **B** in Fig. 19 clockwise and to decrease, turn it counterclockwise.

(2) Thread Take-Up Spring Action Range
 Proper position is where the thread take-up spring starts the action when the upper thread hooked by the shuttle hook turns round 180 degrees. For adjustment, loosen screw **C** in Fig. 20 and turn the stopper **D** either to clockwise or counterclockwise. (Tighten fast the screw **C** after adjustment)

(3) Thread Take-Up Spring Strength
 Approximate 20 g (0.70 oz) is standard for the strength of thread take-up spring. Loosen screw **E** in Fig. 21 and insert a screw driver into the split of the tension stud. Turn it clockwise to decrease the strength and counterclockwise to increase it. (Tighten fast the screw **E** after adjustment)

16. ADJUSTMENT OF AUXILIARY UPPER-THREAD TENSION REGULATOR

In case that the auxiliary upper-thread tension regulator is duly adjusted, tension of it is released when the thread take-up lever gets near its highest position. This auxiliary upper-thread tension regulator begins to press the upper thread at the position of 3 mm - 6 mm ($1/8'' \sim 1/4''$) down from the highest position of the thread take-up lever. When release of the upper thread is too late, loosen locknut at the back of the tension discs in Fig. 22 and screw in a notched bush showed in Fig. 22. When release of the upper thread is too early, adjust it by loosening the notched bushing a little. After these correct adjustments, unlike usual adjustment of upper-thread tension regulator only, you can enjoy beautiful sewing with the lightest tension of thread. This is the most important in embroidering.

Fig. 19 (Pressure of tension discs)

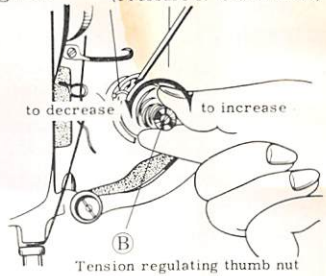


Fig. 20

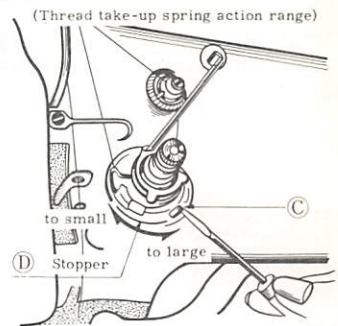


Fig. 21

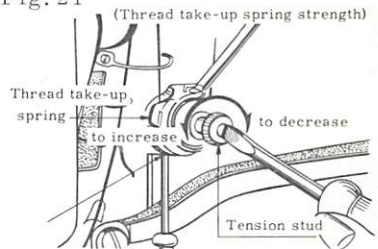
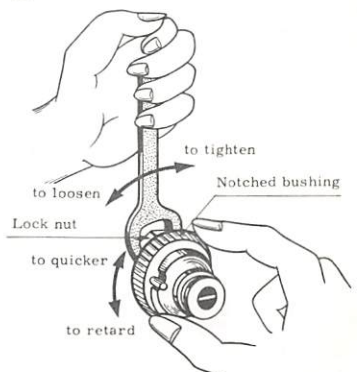


Fig. 22



III. ADJUSTMENT

1. TIMING OF NEEDLE AND SHUTTLE RACE

Timing mark in the needle bar which shows the standard of proper timing of the needle and the shuttle race is adjusted to match with the lowest tip of the needle bar supporter when the needle basic-line is in the middle position and the zig-zag amplitude is at "0". So, in case of the needle DP × 5 used, the standard adjustment is as follows. When the needle bar goes to its lowest position, the lines on two timing mark are to match with the lowest tip of the needle bar supporter. Then, adjust by turning the balance wheel toward you so that the tip of the shuttle hook match with the center line of the needle when the needle raised 3.2 mm ($1/8''$) from its lowest position as shown in Fig. 23. In this case, a position of under line of the needle bar timing mark matches approximately to the lowest part of the needle bar supporter.

(Note) Adjustment varies according to the kind of materials, but the standard is above mentioned. Clearance between the tip of the shuttle hook and the needle side (Fig. 24) is to be adjusted as 0.05 mm approx. To make sure of timing of the needle and the shuttle race, it is necessary to confirm that the tip of the shuttle hook passes close to the upper part of the needle eye, even when the needle basic-line is set to the left or to the right, to catch a loop of the upper thread.

- (1) Height of the needle is adjusted by releasing screw **A** of needle bar connecting stud in Fig. 25 which is tighten after adjusted.
- (2) Timing of the shuttle race and the needle is adjusted by releasing adjusting screws in the timing belt wheel (under) in Fig. 26 and turning the shuttle race by hand. After adjustment, the screw should be tightened.

Fig. 23

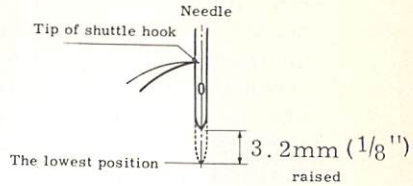


Fig. 24

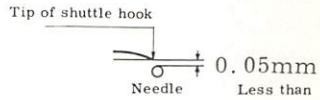


Fig. 25

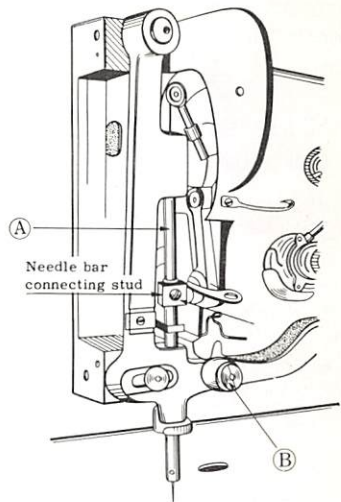
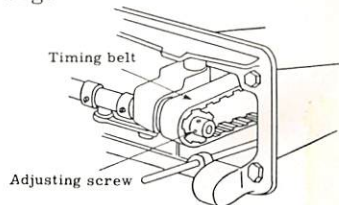
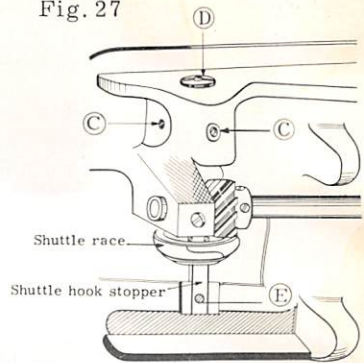


Fig. 26



(3) For adjustment of clearance between the tip of the shuttle hook and the needle side, release the shuttle race shaft bushing set screw ③ in Fig. 27. When the needle and the shuttle race are in touch with, push the screw part ④ and when the clearance is too large, pull the shuttle race toward you by hand for correction and tighten the screw ③

Fig. 27



2. ADJUSTMENT OF NEEDLE BASICLINE

To make uniform the needle dropping on the each needle basic-line, it is necessary to move slightly the needle bar to the right or to the left. For the adjustment, loosening the set screw of eccentric pin ⑥ of the needle bar support in Fig. 25 and turn the eccentric pin ⑥ to the clockwise or counterclockwise. After adjustment, the set screw must be tightened fast.

Fig. 28

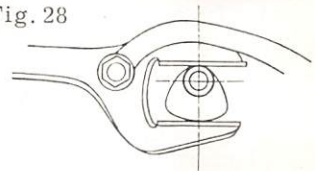
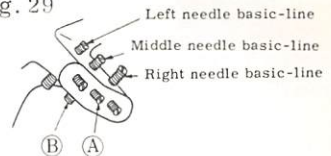


Fig. 29



3. ADJUSTMENT OF NEEDLE BAR AMPLITUDE MOTION

Amplitude motion of the needle bar should be adjusted so as to finish before the needle penetration into the cloth. Timing of this motion is so important, for it gives influence to the motion of the shuttle race in parallel with the needle motion. Adjustment is done by changing gearing of helical gear on the main shaft and helical gear on triangular cam. It is necessary to adjust the triangular cam to be in the position shown in Fig. 28 when the needle bar gets to its lowest position by releasing the zig-zag shaft helical gear set screw.

(Note) When the needle amplitude motion is too low, sometimes the cloth is harmed.

4. REMOVAL OF SHUTTLE RACE

- (1) Remove screw ⑤ of Fig. 27 and disconnect shuttle hook stopper.
- (2) When screw ④ is removed, the shuttle race can be drawn out forward. When it is too tight to be drawn out, lightly tap the head of screw ④ after screw ④ is loosened 2 or 3 times, then the shuttle race is loosened.

5. REGULATION OF OCCURRENCE OF AMPLITUDE IN STRAIGHT SEWING

Putting a sheet of paper on the needle plate, turn the balance wheel toward you by hand to make needle traces on the paper. When the needle traces appears in double points, loosen screw ① in Fig. 29 in

a projection on the back of the arm and regulate so that the double pointed traces become single point by up and down movement of zig-zag adjusting arm tightening and loosening screw (B). The same regulation is given for the needle basic-line on the left or on the right.



IV. MAINTENANCE

For a long use of the machine in good condition, constant and good care is required.

1. LUBRICATION

The most important care of the machine is lubrication. If you neglect it, the life of the machine shortens with a heavy wear and tear. A plenty of oil is required always.

(1) Parts and Quantity of Lubrication

- (a) Lubricate in the arrowed parts in Fig. 30, 31, 32 & 33.
- (b) Lubricate 5 - 6 drops into the parts marked  and 1 - 2 drops into the parts marked .
- (c) Dust on parts where lubrication is required should be cleaned away, for the dust absorbs oil and the lubrication is not efficient on the dust.
- (d) After lubricating, operate the machine slightly for about 1 minute so as to soak into the motion parts. In case of lubricate into the shuttle race revolving groove, take the bobbin case out. Into the main shaft helical gear and each link in the arm, lubricate after taking off a lid on the top of the arm.

2. CLEANING

Clean away occasionally dust covering shuttle race parts and each thread path which will cause poor thread tension.

Fig. 30

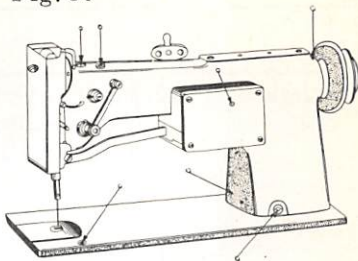


Fig. 31

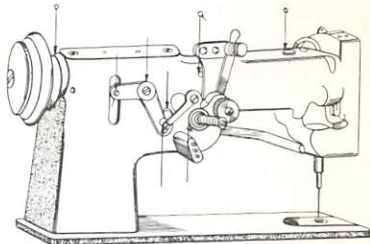


Fig. 32

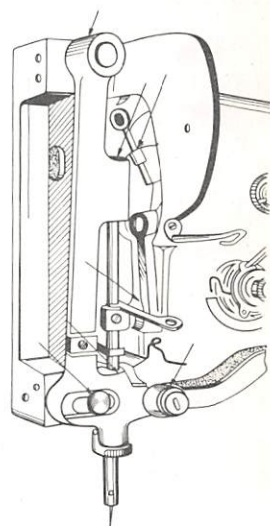
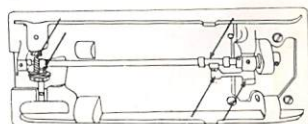









Fig. 33



V. Trouble and repairing

Faulty Condition	Causes	Remedy
1. Stitch Skipping	(1) Faulty needle a. Bent needle b. Poor quality (too soft) c. Needle not matching thread	Replace with new needle. Replace with needle of better quality. Replace with needle matching thread thickness.
	(2) Faulty needle mounting a. Not inserted sufficiently  Gap remains b. Needle is twisted  c. Faced in wrong direction 	Insert to the fullest depth.  Face the needle eye directly side-ways; twist slightly while observing loop condition in case of nylon or tetoron thread.  Mount needle so that long grooved side faces the left and concave side faces the right.
	(3) Point of shuttle hook tip is dull or broken. Faulty Proper 	Correct the tip with grindstone or replace with new one.
	(4) Clearance between point of shuttle hook tip and needle too large	Correct shuttle hook position so that the clearance will be 0.05mm (about hair thickness).
	(5) Position of needle too high or low	Adjust by regulating timing mark in needle bar. (See page 13)
	(6) Needle and shuttle race not meeting properly a. Shuttle race too advanced b. Shuttle race too delayed	Correct shuttle race position so that shuttle hook tip comes to center line of needle when needle is raised 3.2mm from lowest position. (See page 13)

Faulty Condition	Causes	Remedy
2. Loose Stitches	(1) Pressure of tension discs not enough	Adjust by turning tension regulating thumb nut to the right little by little in order to strengthen. (See page 12, item 15)
	(2) Weak thread take-up spring	Strengthen by gradually turning tension stud to the right. Strengthen when sewing thick fabrics (large stitches) (See page 12, item 15)
	(3) Small range of operation of thread take-up spring	Increase by turning stopper to the left. (See page 12, item 15)
	(4) Weak under-thread tension	Adjust while gradually tightening thread tension screw of bobbin case (See page 11, item 14)
	(5) Thread strength not uniform a. Non-uniform thread thickness b. Hand-wound spool is used c. Dust in tension discs d. Improper or excessive winding of thread on bobbin e. Dust in bobbin case f. Thread tension spring of bobbin case distorted or bent g. Bobbin inserted improperly	<p>Use quality machine thread.</p> <p>Use machine-wound spool. Hand-wound spool offers poor draw-out of thread.</p> <p>Disassemble upper-thread tension regulator by removing tension regulating thumb nut and polish thread-path of tension stud and inner surface of tension discs.</p> <p>Rewind bobbin up to 80% of winding capacity in parallel with bobbin pipe. (See page 7, item 3).</p> <p>Remove dust. </p> <p>Correct or replace with new one.</p> <p>Check bobbin insertion if correct. (See page 8, item 5)</p>

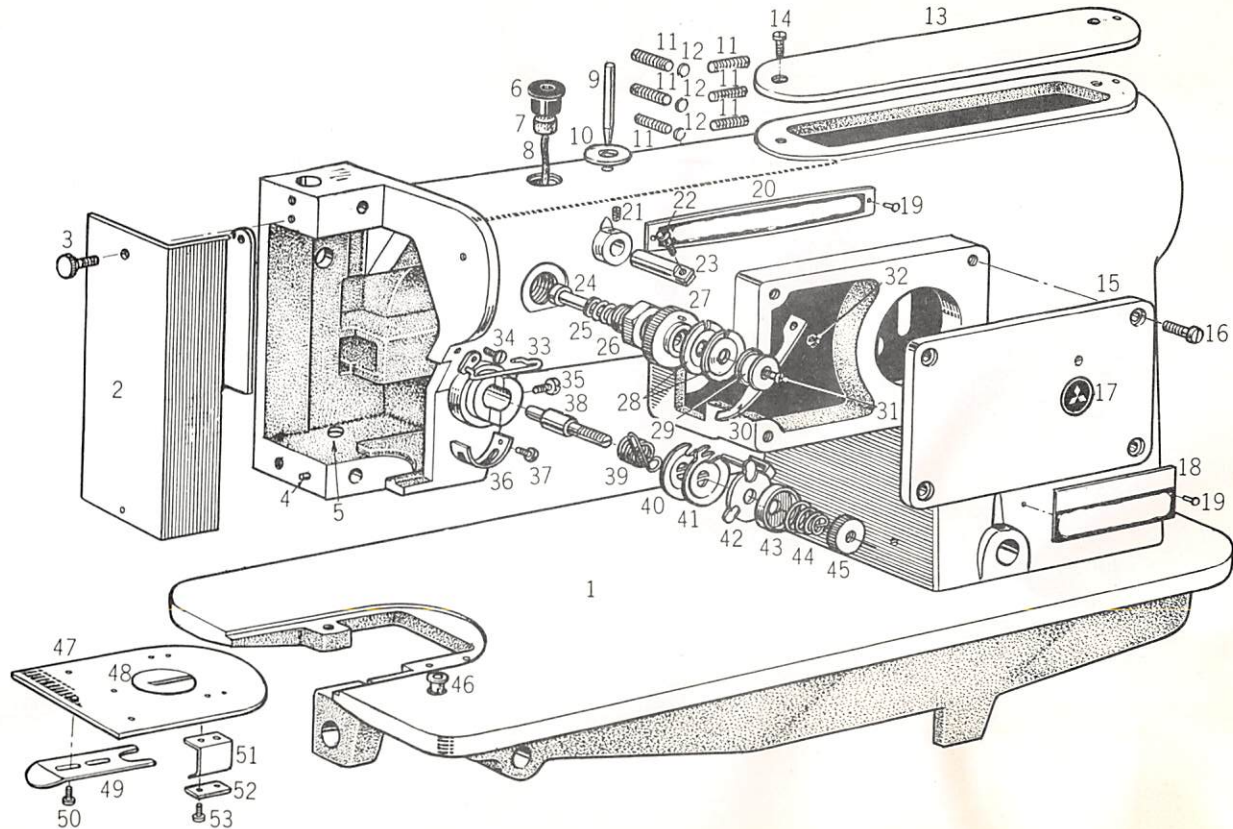
Faulty Condition	Causes	Remedy
3. Break of thread	(1) Improper thread a. Poor quality b. Use of right-twisted upper-thread c. Thread too large for needle	Replace with machine thread of good quality. Thread in ununiform thickness or knotty cannot be used. Change with left-twisted thread. Replace with thread in proper thickness.
	(2) Improper needle a. Bent needle b. Poor finish of needle groove or eye c. Needle mounted improperly d. Needle too thin for thread	Replace with new needle. Replace with needle of better quality. Refer to Skipped stitches, item (2), page 17. Replace with suitable needle.
	(3) Upper-thread tension too strong	Weaken tension by turning tension regulating thumb nut to the left (If strong tension is used to prevent loose stitches, recheck the causes of loose stitches) (See page, 12 item 15)
	(4) Action of thread take-up spring too quick	Delay the action by turning the stopper to the left (See page 12, item 15)
	(5) Thread take-up spring too strong	Weaken by turning tension stud to the left (If strong tension is used to prevent loose stitches, recheck the cause of loose stitches) (See page 12, item 15)

Faulty Condition	Causes	Remedy
Break of thread	(6) Shuttle race or bobbin case injured	Correct with grindstone.
	(7) Needle hole on needle plate injured	Polish hole or replace with new needle plate. (Injury may be caused if material is forcibly moved during sewing operation, or if bent needle is used.)
	(8) Ununiform thread strength	Refer to Loose stitches, item (5), page 17.
	(9) Needle and shuttle race not meeting properly	Correct the position of shuttle race mounting (See page 13, item 1)

VI PARTS BOOK

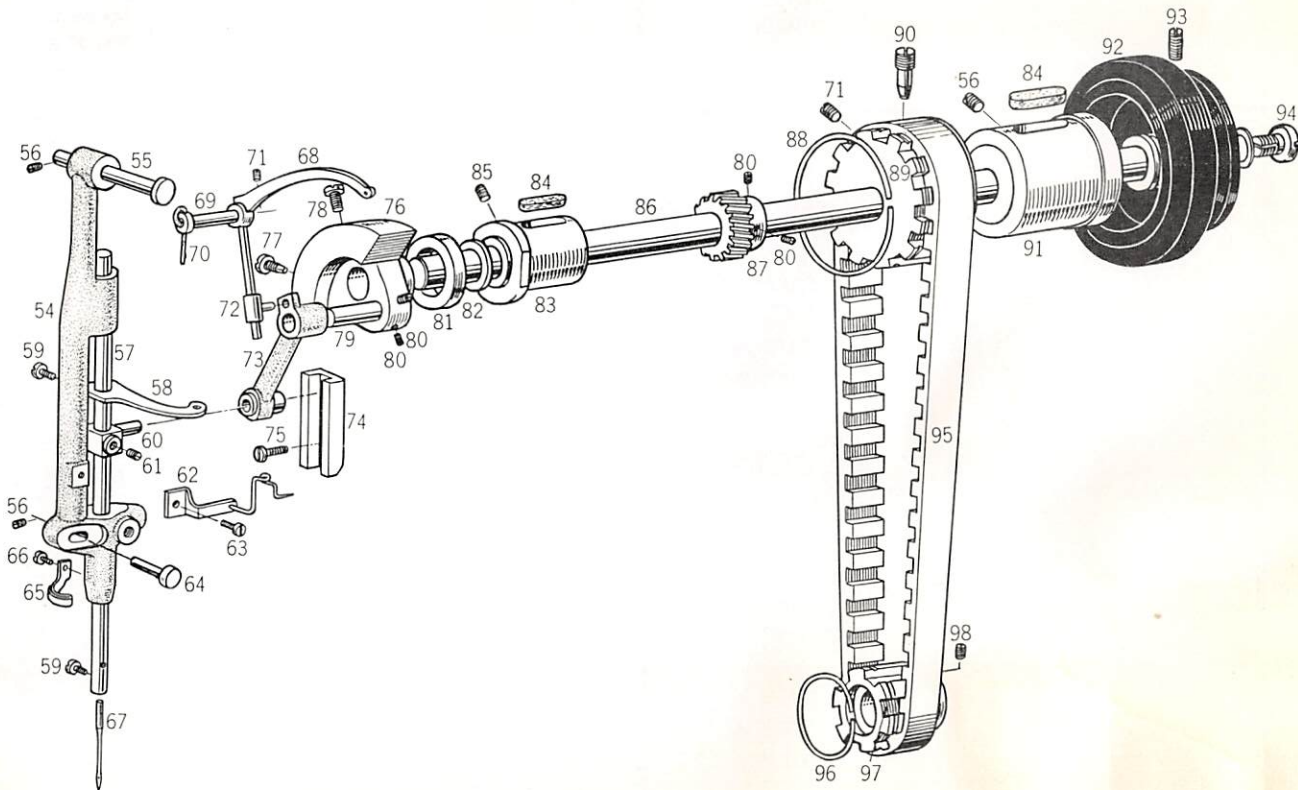
Industrial ZIG-ZAG Sewing Machine

Remarks : When ordering parts, be sure to include model number, parts number and its figure number.



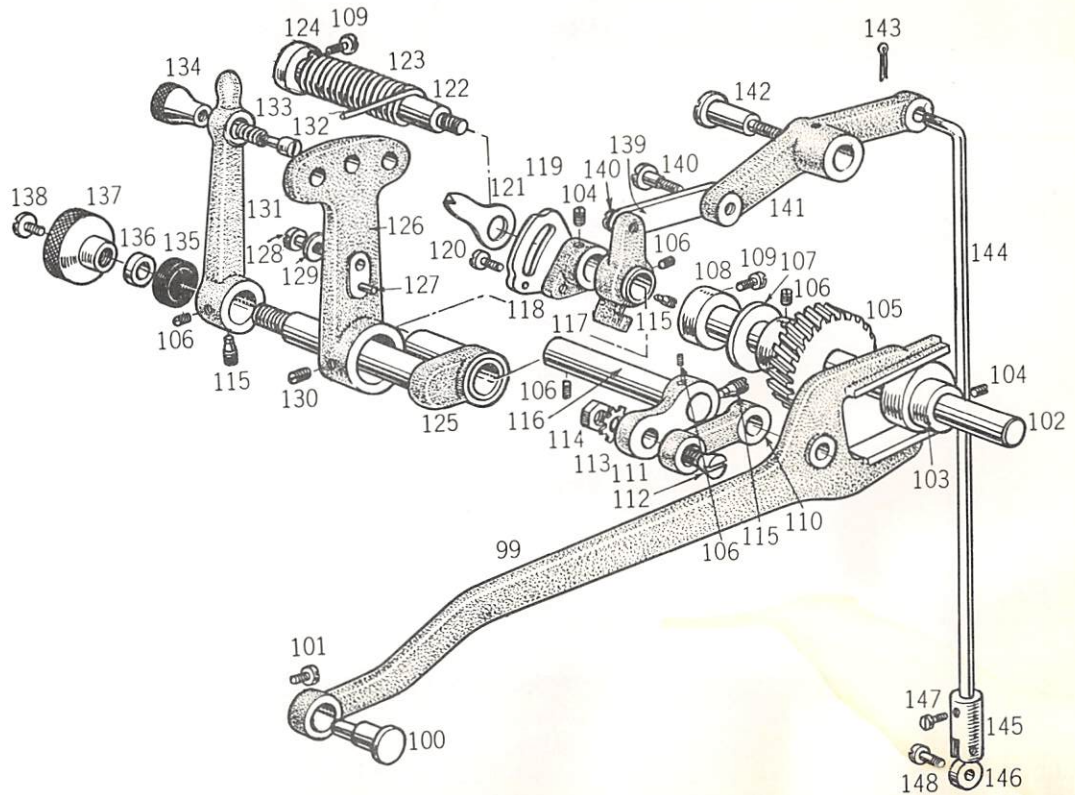
■ Arm bed and its accessories

Fig No	Parts No		Fig No	Parts No	
1	W110516		28	W445933	
2	W322326		29	W502367	
3	B509091		30	W452914	
4	W500211				
5	W448583		31	W500655	
			32	W500307	
6	W445617		33	W452909	
7	W500906		34	W500994	
8	W444138		35	B509264	
9	415206				
10	B422836		36	W445942	
			37	W501391	
11	W501728		38	W446986	
12	W500149		39	W447016	
13	W453519		40	W445933	
14	W501925				
15	W452939		41	W447017	
			42	W446985	
16	B509179		43	W501296	
17	B659592		44	W444076	
18	W451064		45	W501297	
19	Na 0 × 5				
20	W450620		46	Na15	
			47	W452917	
21	B503846		48	W452918	
22	W502386		49	W452919	
23	W452915		50	W500591	
24	W452912				
25	W502365		51	W452920	
			52	W502368	
26	W502366		53	W500370	
27	W452913				



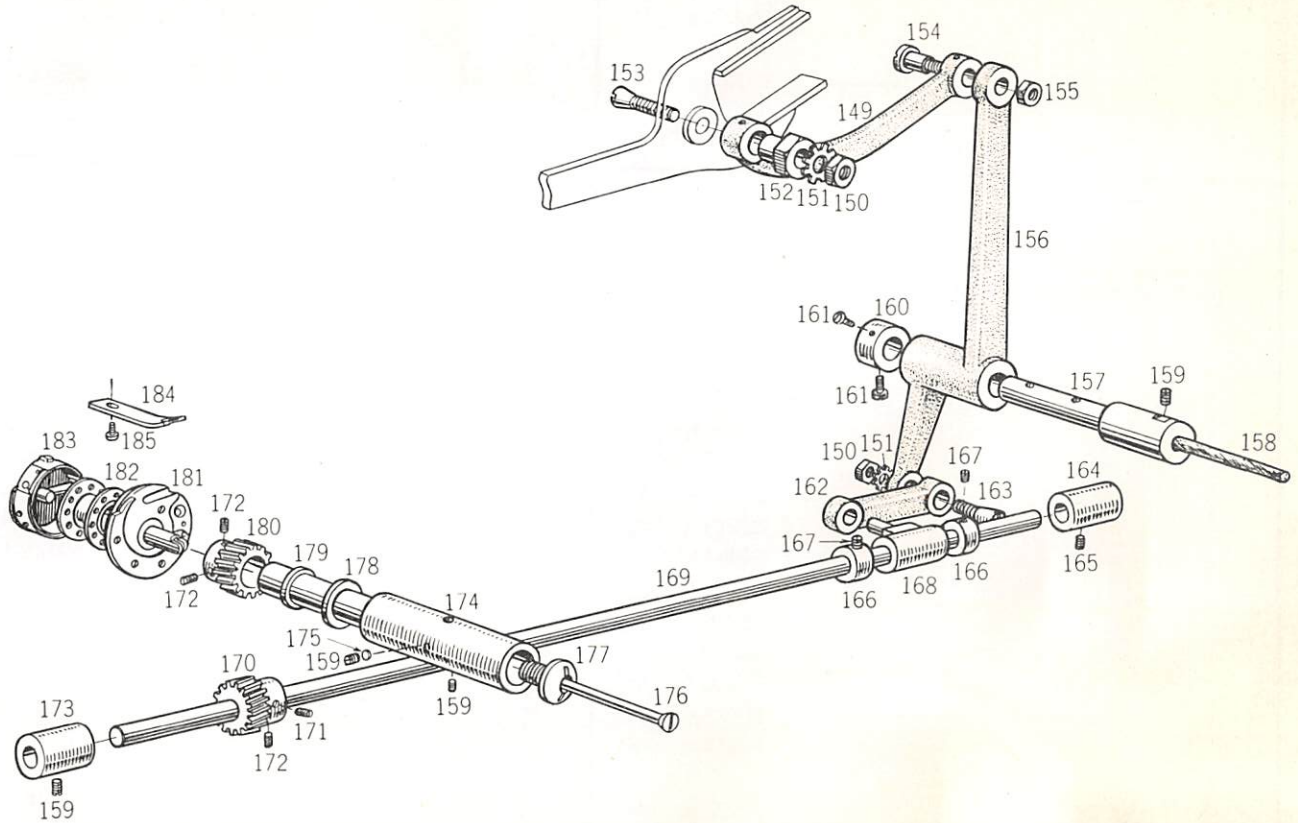
■ Main shaft and its accessories

Fig No	Parts No		Fig No	Parts No	
54	W322327		77	B 503851	
55	W446384		78	W500306	
			79	W502371	
56	W500006		80	W500036	
57	W452922				
58	W452925		81	W502372	
59	W501391		82	W501167	
60	W452924		83	W446397	
			84	W501168	
61	B 508971		85	W501017	
62	W452921				
63	W500076		86	W322328	
64	W446385		87	W446457	
65	W446386		88	B 411094	
			89	W446560	
66	W500833		90	B 509256	
67	D P × 5				
68	W452927		91	W447023	
69	W445883		92	W320112	
70	W444138		93	B 509060	
			94	B 509054	
71	B 509087		95		
72	W445881				
73	W452923		96	W501177	
74	W452926		97	W452932	
75	W500294		98	B 504016	
76	W452928				



■ Zig-zag motion mechanism

Fig No	Parts Na		Fig No	Parts Na	
99	W322330		124	W502378	
100	W446387		125	W452952	
101	W500089		126	W452954	
102	W452940		127	W501845	
103	W452941		128	W501009	
104	B 504016		129	W500102	
105	W446456		130	B 504016	
106	W500036		131	W452955	
107	W501167		132	W502382	
108	W448092		133	W502383	
109	B 503842		134	W502384	
110	W452942		135	W501758	
111	W452943		136	W501031	
112	B 509069		137	W502379	
113	B 8 S		138	B 509064	
114	B 508961		139	W502380	
115	W502374		140	W501550	
116	W452944		141	W452949	
117	W452945		142	W501540	
118	W452946		143	W500245	
119	W452947		144	W452950	
120	B 509289		145	W445925	
121	W452948		146	W445940	
122	W502377		147	W500092	
123	W502376		148	W501022	



■ Lower shaft & Rotating hook mechanism

Fig No.	Parts No.		Fig No.	Parts No.
149	W452956		171	W501385
150	B508961		172	W500996
			173	W452935
151	B 8 S		174	W447004
152	W502373		175	W500149
153	B508959			
154	W502385		176	W446376
155	B509177		177	W501176
			178	W501183
156	W322331		179	W446420
157	W452957		180	W452937
158	W444138			
159	B509060		181	
160	W446142		182	
			183	
161	W500509		184	W452938
162	W452929		185	B508852
163	B509069			
164	W452930			
165	B509088			
166	W446142			
167	B509087			
168	W452933			
169	W452931			
170	W452937			

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