

Sears

**DIVISION 20**

**BASIC SERVICE MANUAL**

**SEARS KENMORE SEWING MACHINES**

**SOURCES 158 AND 159**

**SUPPLEMENT #6**

**JULY, 1978**



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## MODEL 19460

### New Model

1. Special stitch dial.
2. Stitch width control.
3. Stitch length control.
4. Two-step built-in buttonholer.
5. Reverse stitch control.
6. Built-in Stitches — straight, zigzag, blind, mending stitch, straight, rick-rack, overcast, smocking stretch and two-step buttonhole making.
7. Built-in motor.

## MODEL 19461

### Revision of Model 19460

1. New boot (U-shoe).
2. Nomenclature plate affixed to right side of base casting instead of bottom cover.

## MODEL 19471

### Revision of Model 19470

1. New boot (U-shoe).
2. Nomenclature plate affixed to right side of base casting instead of bottom cover.

## MODEL 12110

### New model based on 1231

1. Stitch modifier eliminated.
2. Built-in stitches — straight and zigzag stitches.

## MODEL 12310

### New model

1. Half-size F/F table.
2. Stitch length control — dial, lemon smoke #516 with charcoal brown ring.
3. Stitch width control and stitch modifier — lever, charcoal brown with lemon smoke #516 insert.
4. Reverse stitch control — lemon smoke #516 with charcoal brown insert.
5. New bobbin winder.
6. Built-in stitches — straight, zigzag stitch and straight, rick-rack stretch stitch.
7. Built-in motor YM-40.
8. 6812 foot control (6811 from Taiwan).

## MODEL 13250

### New model based on 1347

1. Special stitch dial — lemon smoke #516.
2. Stitch length control — lemon smoke #516 with charcoal brown ring.
3. Stitch width control — lemon smoke #516 with charcoal brown ring.
4. Reverse stitch control — lemon smoke #516 with charcoal brown insert.
5. Built-in stitches — straight, zigzag, blind, mending stitches, straight, rick-rack stretches and buttonhole making.
6. Built-in motor YM-40.
7. 6811 foot control.

## MODEL 13360

### New model

1. Extension table.
2. Stitch length control — dial, lemon smoke #516 with charcoal brown ring.
3. Stitch width and length controls — dial, lemon smoke #516 with charcoal brown ring.
4. Special stitch dial — lemon smoke #516.
5. Reverse stitch control — lemon smoke #516 with charcoal brown insert.
6. Built-in stitches — straight, zigzag, blind stitch, straight, rick-rack, overcast stretch stitch.
7. Built-in motor YM-40.
8. 6812 foot control (6811 from Taiwan).

## MODEL 15250

### New model based on 1946

1. Extension table with shuttle access cover.
2. Two-step built-in buttonholer and stitch modifier.
3. Built-in stitches — straight, zigzag, blind, mending, box, shell stitch and straight, rick-rack, overcast, smocking, elastic, serging stretch stitch.
4. 6811 foot control.

## MODEL 16250

### New model based on 1941

1. Extension table with shuttle access cover.
2. Built-in buttonholer.

## MODEL 16410

### Revision of Model 19412, changed to;

1. Extension table with shuttle access cover.

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<u>ITEM</u>	<u>2-23A</u>	<u>2-23B</u>	<u>2-23C</u>
1. Zigzag Mechanism	Disc Cam	Disc Cam	Disc Cam
2. Stitch Width Control	Knob	Knob	Knob
3. Needle Position Control	"C"	"C"	"C"
4. Stitch Length Control	Knob	Knob	Knob
5. Reverse Feed Control	Bar Type	Bar Type	Bar Type
6. Pattern Disc Numbers (P-pattern, S-super)	----	----	30 10P, 20S
7. Cam Shaft Cycle	1:12	1:12	1:24
8. Straight Stitch Position	"C"	"C"	"C"
9. Attachment Dimensions	Low Bar	Low Bar	Super High Bar
10. Needle Plate	Satellite Finish	Satellite Finish	Satellite Finish
11. Cover Plate	----	----	----
12. Shuttle	Fixed Race	Fixed Race	Fixed Race Double Needle
13. Stitch Regulator Mechanism	Slide Block	Slide Block	Slide Block
14. Buttonhole Feature	4-Step Built-in	AA Type Attachment	AA Type Attachment
15. Zigzag Bight (mm)	4.4	5.8	5.8 - 5.8
16. Bobbin Winder	Top of Arm Slide Clutch System	Top of Arm Slide Clutch System	Top of Arm Slide Clutch System
17. Bedplate Size	Portable Type	Free Arm Type	Free Arm Type
18. Motor Mounting	Built-in	Built-in	Built-in

## MODEL 16800

### New model

1. Same features as in Model 1780 but without drop-in cams.
2. 5.8 mm zigzag bite, center needle position.

## MODEL 17800

### New model

1. Full rotary drop-in bobbin system.
2. Built-in stitches — straight, zigzag, blind, mending, box, shell stitch and straight, rick-rack, overcast, smocking, elastic, serging stretch.
3. Drop-in cams — single track-10 cams, and double track-20 cams.
4. Motor YM-40.
5. 6816 foot control.
6. TT type buttonhole attachment with 3 templates.

## MODEL 18800

### Revision of Model 1980, changed to;

1. New combination of YC-175 triac foot control (6818) and YM-175 motor.
2. Electronic cycle control and braking for non-coasting eliminated.
3. One-touch built-in buttonholer, monogramming attachment eliminated.
4. Modification in end shape of bed and flip table.

<u>ITEM</u>	<u>2-25A</u>	<u>2-25B</u>	<u>2-25C</u>
1. Zigzag Mechanism	Disc Cam	Disc Cam	Disc Cam
2. Stitch Width Control	Knob	Knob	Knob
3. Needle Position Control	"C"	"S"	"S"
4. Stitch Length Control	Knob	Knob	Knob
5. Reverse Feed Control	Bar-type	Bar-type	Slide-type
6. Pattern Disc Numbers (P=pattern, S=super)	----	30 10P 20S	30 10P 20S
7. Cam Shaft Cycle	1 : 24	1 : 24	1 : 24
8. Straight Stitch Position	"C"	"S"	"S"
9. Attachment Dimensions	Low Bar	Super High Bar	Super High Bar
10. Needle Plate	Satelite Finish	Satelite Finish	Satelite Finish
11. Cover Plate	----	Snap-on	Snap-on
12. Shuttle	Fixed Race	Full Rotary Double Needle	Full Rotary Double Needle
13. Stitch Regulator Mechanism	Slide Block	Slide Block	Slide Block
14. Buttonhole Feature	2 Step Built-in	TT Type Attachment	TT Type Attachment
15. Zigzag Bight (mm)	5.8	7.0 – 7.0	7.0 – 7.0
16. Bobbin Winder	Top of Arm	Slide Clutch System Top of Arm	Slide Clutch System Top of Arm
17. Bedplate Size	Free Arm Type	Free Arm Type	Free Arm Type
18. Motor Mounting	Built-in	Built-in	Built-in

<u>ITEM</u>	<u>2-24A</u>	<u>2-24B</u>	<u>2-24C</u>
1. Zigzag Mechanism	Disc Cam	Disc Cam	Disc Cam
2. Stitch Width Control	Lever	Knob	Knob
3. Needle Position Control	"C"	"C"	"C"
4. Stitch Length Control	Knob	Knob	Knob
5. Reverse Feed Control	Bar-type	Bar-type	Bar-type
6. Pattern Disc Numbers (P=pattern, S=super)	----	----	----
7. Cam Shaft Cycle	1 : 12	1 : 12	1 : 12
8. Straight Stitch Position	"C"	"C"	"C"
9. Attachment Dimensions	Low Bar	Low Bar	Low Bar
10. Needle Plate	Satelite Finish	Satelite Finish	Satelite Finish
11. Cover Plate	----	Snap-on	----
12. Shuttle	Fixed Race	Fixed Race	Fixed Race
13. Stitch Regulator Mechanism	Slide Block	Slide Block	Slide Block
14. Buttonhole Feature	----	4 Step Built-in	----
15. Zigzag Bight (mm)	5.0	5.8	5.8
16. Bobbin Winder	Top of Arm	Top of Arm	Top of Arm
17. Bedplate Size	Free Arm Type	Large Square	Free Arm Type
18. Motor Mounting	Built-in	Built-in	Built-in

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SERVICE ADJUSTMENTS INDEX

	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cann and Cann Follower Mechanism	Stitch Width	Cann Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
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.121	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
.130	A-1	B-1	C-1	D-1	E-1	F-1	G-1 G-2 G-3 G-6	H-1	I-2				
.140	A-1	B-1	C-3	D-1	E-1	F-1	G-1 G-2 G-3 G-6	H-1 H-2	I-1	J-1	K-1		
.150	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.151	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.152	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.160	A-1	B-1	C-4	D-2	E-1	F-3	G-1 G-2	H-1			K-2	L-2	
.161	A-1	B-1	C-4	D-2	E-1	F-3	G-1 G-2	H-1			K-2	L-2	
.162	A-1	B-1	C-4	D-2	E-1	F-3	G-1 G-2 G-5	H-1			K-2	L-2	
.163	A-1	B-1	C-4	D-2	E-1	F-3	G-1 G-2 G-5	H-1			K-2	L-2	
.220	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
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.330	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-2				
.331	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-2				
.620	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3	H-1	I-1				



<u>ITEM</u>	<u>2-26A</u>
1. Zigzag Mechanism	Disc Cam
2. Stitch Width Control	Knob
3. Needle Position Control	"C"
4. Stitch Length Control	Knob
5. Reverse Feed Control	Bar-type
6. Pattern Disc Numbers (P=pattern, S=super)	---
7. Cam Shaft Cycle	1 : 24
8. Straight Stitch Position	"C"
9. Attachment Dimensions	Low Bar
10. Needle Plate	Satelite Finish
11. Cover Plate	Snap-on
12. Shuttle	Full Rotary
13. Stitch Regulator Mechanism	Slide Block
14. Buttonhole Feature	TT Type Attachment
15. Zigzag Bight (mm)	5.8
16. Bobbin Winder	Top of Arm Slide Clutch System
17. Bedplate Size	Free Arm Type
18. Motor Mounting	Built-in

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SERVICE ADJUSTMENTS INDEX

	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.10450	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.10500	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.10501	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.10600	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.12000	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
.12020	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
.12110	A-1	B-1	C-23	D-2	E-4	F-14	G-1 G-3	H-1					
.12250	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
.12260	A-1	B-1	C-1	D-1	E-1		G-1 G-2 G-3 G-6	H-1	I-1				
.12270	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7				
.12271	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7				
.12310	A-1	B-1	C-23	D-2	E-4	F-14	G-1 G-3	H-1		J-33			
.12370	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7	J-23			
.12470	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7	J-22 J-23			
.12471	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7	J-22 J-23			
.12472	A-1	B-1	C-16	D-5	E-1	F-11	G-1 G-2 G-3 G-6	H-1	I-7	J-22 J-23			

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	Preset Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Can and Can Follower Mechanism	Stitch Width	Can Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.650	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.680	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3	H-1		J-3	K-8 K-9		
.840	A-1	B-1	C-3	D-1	E-1	F-1	G-1 G-2 G-3 G-6	H-1 H-2	I-1	J-1	K-1		
.841	A-1	B-1	C-3	D-1	E-1	F-1	G-1 G-2 G-3 G-6	H-1 H-2	I-1	J-1	K-1		
.842	A-1	B-1	C-3	D-1	E-1	F-1	G-1 G-2 G-3	H-1 H-2	I-1	J-1	K-1		
.850	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.905	A-1	B-1	C-5	D-3	E-1	F-5	G-1 G-2	H-1	I-3		K-4 K-6 K-7		
.922	A-1	B-1	C-5	D-3	E-1	F-4	G-1 G-2	H-1	I-3		K-4 K-6 K-7		
.923	A-1	B-1	C-5	D-3	E-1	F-4	G-1 G-2	H-1	I-3		K-4 K-6 K-7		
.924	A-1	B-1	C-5	D-3	E-1	F-4	G-1 G-2	H-1	I-3		K-4 K-6 K-7		
.950	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3	H-1		J-2	K-3 K-5	L-1	
.960	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3	H-1			K-3 K-5	L-1	
.10010	A-2	B-1			E-2		G-7						
.10200	A-1	B-1	C-9	D-2	E-1	F-8	G-1,2 & 3	H-1					
.10300	A-1	B-1	C-9	D-2	E-1	F-8	G-1,2 & 3	H-1		J-9	K-12	L-4	M-2
.10301	A-1	B-1	C-9	D-2	E-1	F-8	G-1,2 & 3	H-1		J-9	K-12	L-4	M-2
.10302	A-1	B-1	C-9	D-2	E-1	F-8	G-1,2 & 3	H-1		J-9	K-12	L-4	M-2
.10304	A-1	B-1	C-9	D-2	E-1	F-8	G-1,2 & 3	H-1		J-9	K-12	L-4	M-2
.10400	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.10401	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2
.10402	A-1	B-1	C-12	D-2	E-1	F-8	G-1 G-2	H-1		J-9 J-11		L-4	M-2

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	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.13471	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-24	K-21		
.13570	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-25	K-21		
.13571	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-25	K-21		
.14000	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14001	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14002	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14003	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14100	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14101	A-1	B-1	C-8	D-4	E-1	F-7	G-1,2, & 3	H-1	I-4	J-8	K-11		M-1
.14300	A-1	B-1	C-14	D-2	E-1	F-10	G-1 G-2 G-3	H-4	I-8	J-17	K-16		M-1
.14301	A-1	B-1	C-14	D-2	E-1	F-10	G-1 G-2 G-3	H-4	I-8	J-17	K-16		M-1
.14310	A-1	B-1	C-18	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-17	K-18		M-6
.14311	A-1	B-1	C-18	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-17	K-18		M-6
.15000	A-1	B-1	C-3	D-2	E-1	F-1	G-1 G-2 G-3 G-6	H-1 H-2	I-1	J-1	K-1		
.15010	A-1	B-1	C-6	D-1	E-1		G-1 G-2 G-3 G-6	H-1					
.15030	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1			K-8		
.15040	A-1	B-1	C-13	D-2	E-1	F-7	G-1 G-2	H-1 H-3	I-6		K-14		
.15140	A-1	B-1	C-13	D-2	E-1	F-7	G-1 G-2	H-1 H-3	I-4	J-15			
.15150	A-1	B-1	C-17	D-2	E-1	F-10	G-1,2, & 3	H-1 H-3	I-8	J-15	K-20		
.15160	A-1	B-1	C-13	D-2	E-1	F-7	G-1 G-2	H-1 H-3	I-4	J-15			
.15250	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-3	H-1	I-8	J-25,29	K-21		

## SERVICE ADJUSTMENTS INDEX

MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
.13010	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-2				
.13011	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-2				
.13030	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5				
.13031	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5				
.13032	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5	J-7			
.13033	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5	J-7			
.13040	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5				
.13041	A-1	B-1	C-2	D-1	E-1		G-1 G-2 G-3 G-6	H-1 H-2	I-5				
.13050	A-1	B-1	C-11	D-2	E-1	F-7	G-1 G-2	H-4	I-6	J-10			
.13150	A-1	B-1	C-11	D-2	E-1	F-7	G-1 G-2	H-4	I-6	J-10			
.13160	A-1	B-1	C-11	D-2	E-1	F-7	G-1 G-2	H-4	I-6	J-12			
.13170	A-1	B-1	C-11	D-2	E-1	F-7	G-1 G-2	H-4	I-6	J-10			
.13180	A-1	B-1	C-11	D-2	E-1	F-7	G-1 G-2	H-4	I-6	J-12			
.13190	A-1	B-1	C-11	D-2	E-1	F-10	G-1 G-2	H-4	I-8	J-18			
.13200	A-1	B-1	C-11	D-2	E-1	F-10	G-1 G-2	H-4	I-8	J-12			
.13201	A-1	B-1	C-11	D-2	E-1	F-10	G-1 G-2	H-4	I-8	J-12			
.13250	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-3	H-1	I-8	J-24	K-21		
.13360	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-3	H-1	I-8	J-24	K-21		
.13470	A-1	B-1	C-19	D-2	E-1	F-12	G-1 G-2 G-3	H-1	I-8	J-24	K-21		

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MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
.17010	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.17011	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-3 G-4 G-6	H-1	I-9	J-4 J-5	K-10	L-3	
.17012	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-3 G-4 G-6	H-1	I-9	J-4 J-5	K-10	L-3	
.17030	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.17031	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.17032	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.17033	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.17200	A-1	B-1	C-17	D-2	E-1	F-10	G-1,2, & 3	H-1 H-3	I-8	J-17	K-20		
.17300	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17310	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-27	K-18		M-6
.17490	A-1	B-1	C-4	D-2	E-1	F-3	G-1 G-2 G-5	H-1			K-2	L-2	
.17500	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3	H-1			K-8 K-9		
.17501	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3	H-1			K-8 K-9		
.17510	A-1	B-1	C-4	D-2	E-1	F-6 F-7	G-1 G-2 G-3 G-4	H-1		J-6	K-8 K-9		
.17511	A-1	B-1	C-4	D-2	E-1	F-6 F-7	G-1 G-2 G-3 G-4 G-8	H-1		J-6	K-8 K-9		
.17520	A-1	B-1	C-4	D-2	E-1	F-6 F-7	G-1,2, & 3	H-1		J-6	K-8 K-9		
.17530	A-1	B-1	C-7	D-2	E-1	F-7	G-1,2, & 3	H-1	I-4	J-6	K-10		
.17540	A-1	B-1	C-4	D-2	E-1	F-6 F-7	G-1 G-2 G-3 G-4 G-8	H-1		J-6	K-8 K-9		

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	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.16000	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16001	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16010	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-4 J-5	K-10	L-3	
.16011	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-4 J-5	K-10	L-3	
.16012	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-4 J-5	K-10	L-3	
.16013	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-4 J-5	K-10	L-3	
.16020	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-16			M-4
.16021	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3	H-1	I-9	J-16			M-4
.16030	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-16			M-4
.16031	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-16			M-4
.16210	A-1	B-1	C-20	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-17	K-20		
.16250	A-1	B-1	C-18	D-2	E-1	F-12	G-1 G-3	H-1	I-8	J-17 J-32	K-18		M-6
.16410	A-1	B-1	C-18	D-2	E-1	F-12	G-1 G-3	H-1	I-8	J-17	K-18		M-6
.16490	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2	H-1		J-2	K-2	L-1	
.16500	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16510	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16520	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16530	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-2	K-2	L-1	
.16600	A-1	B-1	C-19	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-25	K-21		
.16540	A-1	B-1	C-4	D-2	E-1	F-2	G-1,2, & 3	H-1		J-3	K-8 K-9		
.16800	A-1	B-2	C-24	D-6	E-3	F-15	G-9 G-10	H-1	I-8	J-34	K-23		M-8
.17000	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3 G-4	H-1			K-8 K-9		
.17001	A-1	B-1	C-4	D-2	E-1	F-2	G-1 G-2 G-3 G-4	H-1			K-8 K-9		

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	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Cam and Cam Follower Mechanism	Stitch Width	Cam Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.18032	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18033	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18034	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18130	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18131	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18140	A-1	B-1	C-15	D-2	E-1	F-10	G-1,2, 3 & 4	H-1	I-9	J-19 J-20	K-17		M-5
.18141	A-1	B-1	C-15	D-2	E-1	F-10	G-1,2, 3 & 4	H-1	I-9	J-19 J-20	K-17		M-5
.18150	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, 3 & 4	H-1	I-8	J-28	K-18 K-19		M-6
.18800	A-3	B-2	C-21 C-22	D-6	E-3	F-13	G-9 G-10		I-10	J-30 J-31	K-22		M-7
.19130	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, 3 & 4	H-1	I-8	J-28	K-18 K-19		M-6
.19131	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, 3 & 4	H-1	I-8	J-28	K-18 K-19		M-6
.19140	A-1	B-1	C-15	D-2	E-1	F-10	G-1,2, 3 & 4	H-1	I-9	J-19 J-21	K-17		M-5
.19141	A-1	B-1	C-15	D-2	E-1	F-12	G-1,2, 3 & 4	H-1	I-9	J-19 J-21	K-17		M-5
.19142	A-1	B-1	C-15	D-2	E-1	F-12	G-1,2, 3 & 4	H-1	I-9	J-19 J-21	K-17		M-5
.19310	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-27	K-18		M-6
.19311	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-27	K-18		M-6
.19400	A-1	B-1	C-18	D-2	E-1	F-10	G-1,2, & 3	H-1	I-8	J-17	K-18		M-6
.19410	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-17	K-18		M-6
.19411	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-17	K-18		M-6
.19412	A-1	B-1	C-18	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-17	K-18		M-6
.19460	A-1	B-1	C-19	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-24 J-29	K-21		
.19461	A-1	B-1	C-19	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-24 J-29	K-21		
.19470	A-1	B-1	C-19	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-25 J-26	K-21		
.19471	A-1	B-1	C-19	D-2	E-1	F-12	G-1,2, & 3	H-1	I-8	J-25 J-26	K-21		
.19800	A-3	B-2	C-21 C-22	D-6	E-3	F-13	G-9 G-10		I-10	J-30 J-31	K-22		M-7
.19801	A-3	B-2	C-21 C-22	D-6	E-3	F-13	G-9 G-10		I-10	J-30 J-31	K-22		M-7



## SERVICE ADJUSTMENTS INDEX

	Presser Foot Height	Needle Bar Height	Distribution of Needle Swing	Needle Position	Feed Dog Height	O-Feeding	Needle Timing to Shuttle	Zigzag Synchronization	Straight Stitching	Automatic Reverse Stitching	Can and Can Follower Mechanism	Stitch Width	Can Selector Guide Plate Setting
MODEL	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #	FIG. #
.17550	A-1	B-1	C-10	D-2	E-1	F-7	G-1,2 & 3	H-1	I-4	J-6	K-13		M-3
.17560	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17570	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17571	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17572	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17600	A-1	B-1	C-18	D-2	E-1	F-12	G-1 G-2 G-3	H-1	J-8	J-27	K-18		M-6
.17740	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17741	A-1	B-1	C-10	D-2	E-1	F-7	G-1 G-2	H-1	I-4	J-14	K-13		M-3
.17800	A-1	B-2	C-22 C-24	D-6	E-3	F-15	G-9 G-10	H-1	I-8	J-34	K-23		M-8
.18000	A-1	B-1	C-5	D-3	E-1	F-7	G-1 G-2	H-1	I-3		K-4 K-6 K-7		
.18010	A-1	B-1	C-5	D-3	E-1	F-4	G-1 G-2 G-3 G-5	H-1	I-3		K-4 K-6 K-7		
.18011	A-1	B-1	C-5	D-3	E-1	F-4	G-1 G-2 G-3 G-5	H-1	I-3		K-4 K-6 K-7		
.18020	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.18021	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.18022	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.18023	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.18024	A-1	B-1	C-7	D-2	E-1	F-6	G-1 G-2 G-3 G-4	H-1	I-9	J-4 J-5	K-10	L-3	
.18030	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4
.18031	A-1	B-1	C-7	D-2	E-1	F-9	G-1 G-2	H-1	I-6	J-13	K-15		M-4

Replaces Page 3B-1 dated July, 1971

## NEEDLE BAR HEIGHT

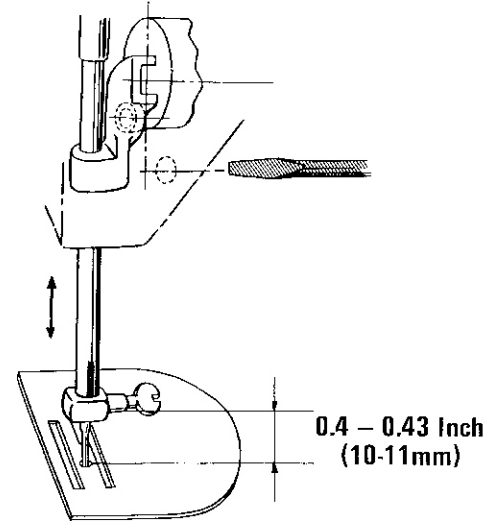
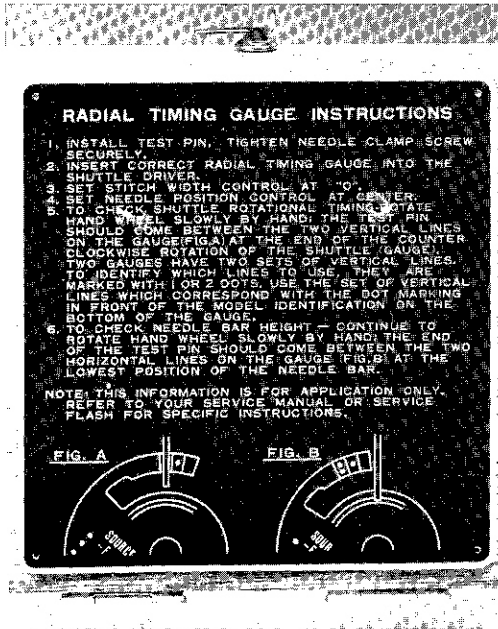


FIGURE 3B-1

Bring the needle bar to its lowest position by turning the handwheel toward you. Loosen the set screw on needle bar holder and adjust the height of needle bar, as illustrated. Tighten the screw after adjustment.




## DISTRIBUTION OF NEEDLE SWING

See Figure 3C-21

### 1. CHECKING DISTRIBUTION OF NEEDLE SWING

Check needle position at straight stitching (D-6) before checking distribution of needle swing.

- Set the machine as follows:
  - Special stitch selector — 
  - Stitch width control — 4
  - Stitch length control — any number
  - Special stitch modifier — red dot
- Use zigzag stitch needle plate.
- Turning handwheel, check to see if clearances between needle and edge of needle slot at left and right needle position (A and A') are nearly equal.

### 2. ADJUSTMENT

- Loosen screw (E) slightly.
- Insert eccentric tool (B) into hole (C).
- Shift zigzag guide bracket (D) to either direction by turning the eccentric tool (B) until you can obtain equal clearance between (A) and (A').
- Tighten screw (E) securely after adjustment.
- Check needle position for decorative stitching (3C-22) and clearance between cam and cam follower (3K-22) after adjustment.

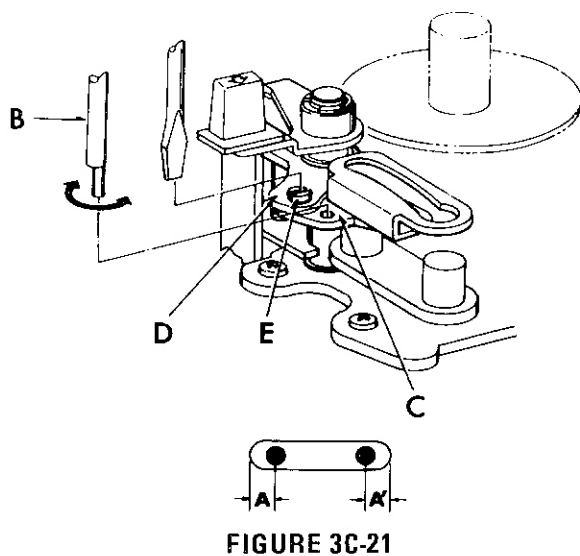


FIGURE 3C-21

See Figure 3C-22

### 1. CHECKING NEEDLE POSITION FOR DECORATIVE STITCHING

Check needle position at straight stitching before checking needle position for decorative stitching mentioned below. (3D-6)

- Set the machine as follows:
  - Special stitch selector — zigzag stitch position

Stitch width control — 4  
Stitch length control — 0  
Special stitch modifier — red dot

- Use zigzag stitch needle plate.
- Turning handwheel, check to see if clearances between the needle and edge of needle slot are equal at left and right side strokes of needle bar.
- Turn special stitch selector to cam position.
- With needle in right position, the needle should not touch the right edge of needle slot. The needle should be between right edge of needle slot and right needle position at zigzag stitching.
- With needle in left position, the needle should not touch the left edge of needle slot. The needle should be between left edge of needle slot and left needle position at zigzag stitching.

### 2. ADJUSTMENT

- Use screw (A) for right side stroke and screw (B) for left side.
- Turn handwheel by hand until the eye of needle is under needle plate.
- Loosen nut (C) slightly.
- Adjust needle position by turning screw (A) or (B) so that needle will not touch either edge of needle slot and needle is slightly beyond maximum width at zigzag stitching.
- Tighten nut (C) securely.
- After adjustment, check following points:
  - Distribution of needle swing (3C-21)
  - Clearance between cam and cam follower (3K-22)

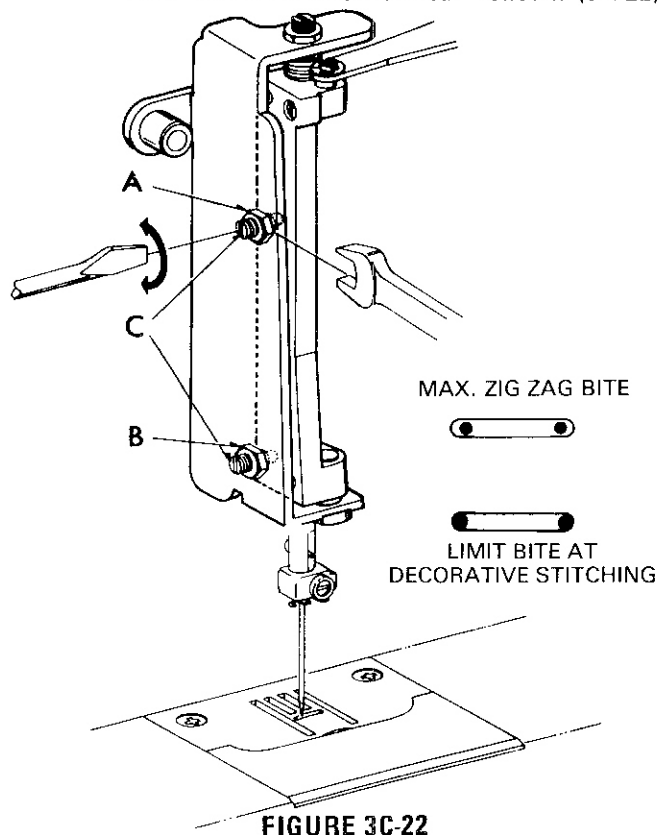


FIGURE 3C-22

See Figure 3B-2

1. CHECKING NEEDLE BAR HEIGHT

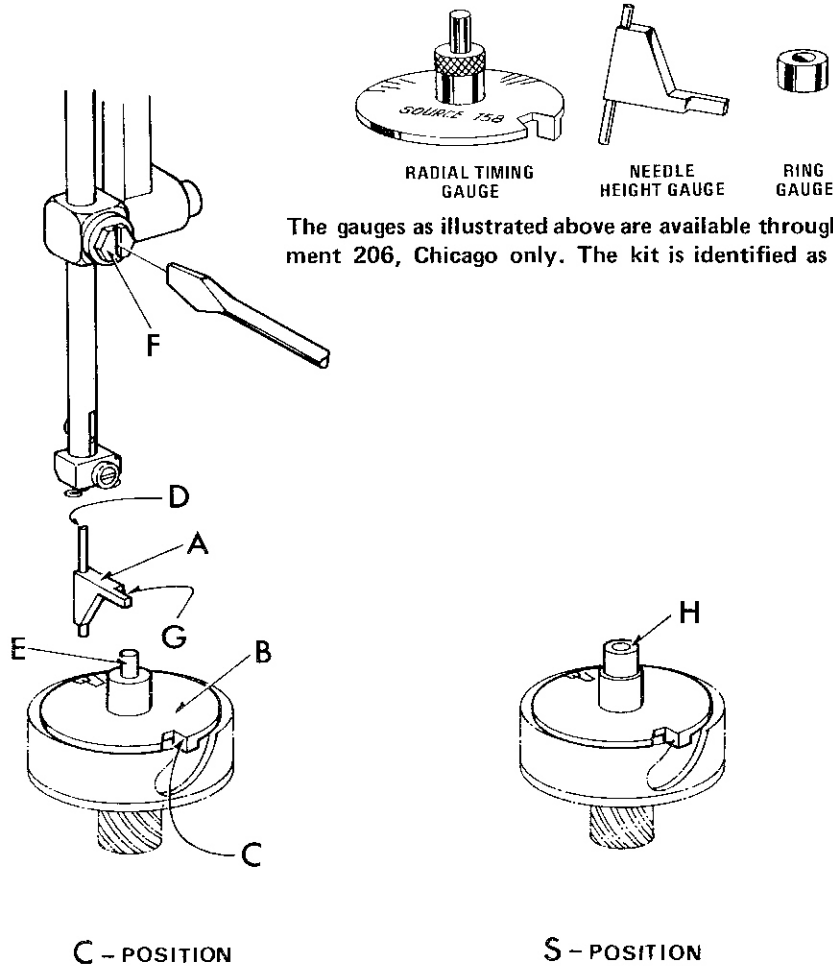
- Set the machine as follows:
  - Special stitch selector — straight stitch position
  - Stitch width control — 0 or red dot
  - Stitch length control — any number
  - Special stitch modifier — red dot
- Remove needle, presser foot, cover plate and needle plate.
- Remove bobbin case.
- Holding needle height gauge (A) with flat side (D) away from you, slip it all the way into the needle bar and tighten the needle clampscrew.
- Insert radial timing gauge (B) onto the shuttle, with needle height gauge at its highest position and pointed hook of shuttle rotated a little to the right as illustrated. In the case of S-needle position models, (refer to Section 2, Features and Specifications) set ring gauge (H) onto the radial timing gauge (B).
- Turn radial timing gauge (B) so that the ear (C) of the gauge touches the pointed hook of shuttle.
- Turning handwheel slowly, check to see if the arm (G) of gauge (A) slightly touches the center pin (E) of gauge (B) or ring gauge (H)

or ring gauge (H). A clearance within 0.1 mm (0.004 inch) between (G) and (E) or between (G) and (H) is acceptable.

- Continue to turn handwheel until needle bar comes to its lowest position, and check to see if the bottom of gauge (A) slightly touches radial timing gauge (B). A clearance within 0.15 mm (0.006 inch) between (A) and (B) is acceptable.
- Adjust the position of needle bar if the rotation of handwheel becomes heavy or handwheel cannot be turned due to contact of arm (G) with center pin (E) or ring gauge (H) or contact of bottom of gauge (A) with radial timing gauge (B).

2. ADJUSTMENT

- Loosen screw (F) on needle bar clamp.
- Adjust the position of needle bar so that arm (G) touches center pin (E) on gauge (B) or ring gauge (H) and the bottom of gauge (A) touches gauge (B).
- Tighten screw (F) securely.
- Check needle timing to shuttle after adjustment. (3G-9)



The gauges as illustrated above are available through Department 206, Chicago only. The kit is identified as #68173.

FIGURE 3B-2

## NEEDLE POSITION

See Figure 3D-6

### 1. CHECKING NEEDLE POSITION AT STRAIGHT STITCHING

Check needle side motion at straight stitching before checking needle position at straight stitching. (3I-10)

- Set the machine as follows:
  - Special stitch selector – straight stitch position
  - Stitch width control – 0 or red dot
  - Stitch length control – any number
  - Special stitch modifier – red dot
- Use straight stitch needle plate.
- Lower needle bar by turning handwheel by hand.
- Check to see if needle centers on the needle hole of needle plate.

### 2. ADJUSTMENT

- Loosen screw (A) on needle bar support (C) slightly.
- Turn eccentric screw (B) which connects zigzag guide bar (D) with needle bar support (C), so that needle centers on the needle hole of needle plate.

In adjusting eccentric screw (B), the front range as shown should be used. Don't turn around to the rear range.

- Tighten screw (B) securely.
- After adjustment, check following points:
  - Needle clearance to shuttle (3G-9)
  - Needle timing to shuttle (3G-10)
  - Distribution of needle swing (3C-21)
  - Clearance between cam and cam follower (3K-22)

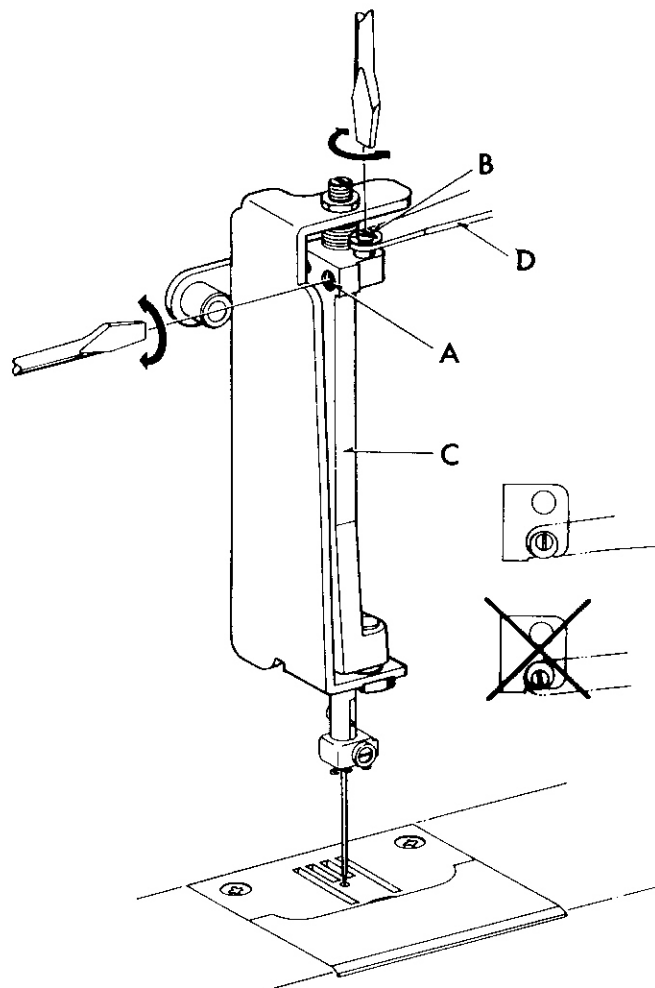


FIGURE 3D-6

## DISTRIBUTION OF NEEDLE SWING

## See Figure 3C-23

Bring the needle to its lowest position by turning the handwheel. Moving stitch width control from red dot to 4 and then 4 to red dot, check and note the distance needle travels from its center position to either side.

Turn the handwheel one complete turn and bring the needle to its lowest position again. Moving stitch width control from red dot to 4 and then 4 to red dot, the needle travels to the direction opposite to what was observed in the previous procedure. Note the distance needle swings.

If the needle travels uneven distance from its center position, loosen screws (1) and (2) and adjust the position of geared cam, as illustrated. Tighten the screws (1) and (2) securely after adjustment.

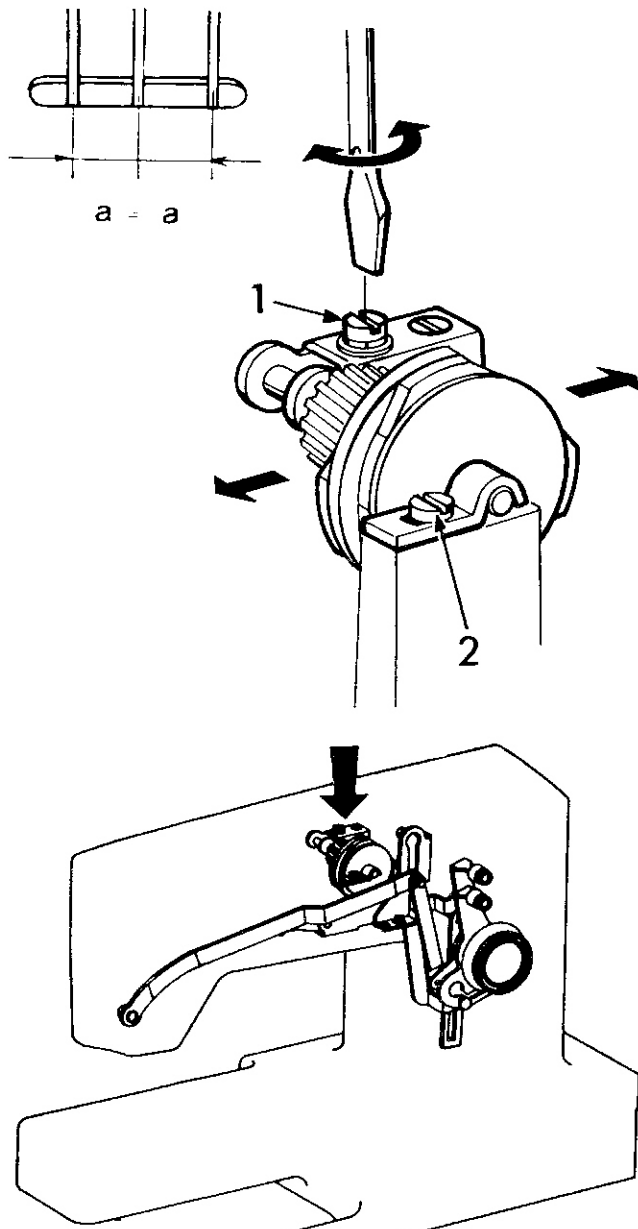


FIGURE 3C-23

## See Figure 3C-24

Set the special stitch dial at red dot and stitch width control at 4. Bring needle to the lowest position. Loosen screw (A) slightly, insert eccentric tool (B) into hole (C) and slide the zigzag width bracket (D) to either direction, by turning the eccentric tool, until you obtain equal clearance between the needle and the edge of needle slot at both left and right needle positions. Tighten screw securely after adjustment.

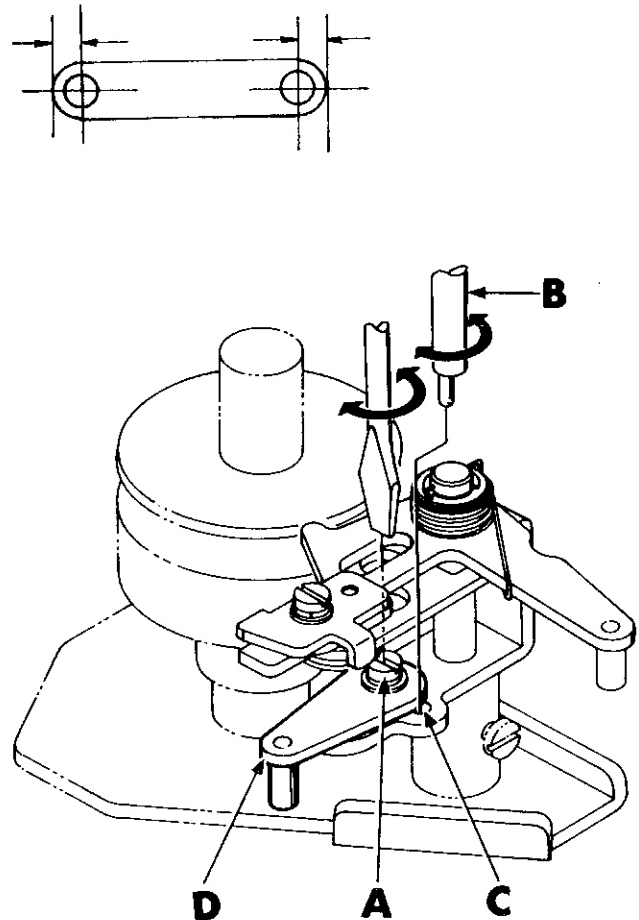


FIGURE 3C-24

Replaces Page 3E-1 dated June, 1976

### SEE FIGURE 3E-1

For front facing shuttle models, place the feed dog height gauge at the position as illustrated (2) with no-go side of the gauge facing needle plate. Turning the handwheel slowly by hand, check and see if the gauge is moved by the feed dog teeth. If not, feed dog teeth are too low. Then, place the gauge up-sid-down, with go-side facing the needle plate, and repeat same procedure. If the gauge is moved, the feed dog teeth are too high.

To make adjustments, loosen screw (1) on drop feed center block and adjust the feed dog height as specified. Tighten the screw securely after adjustment.

#### CAUTION:

For side facing shuttle models, be sure the gauge is placed on the surface of needle plate-not with one end resting on the handhole cover plate.

### FEED DOG HEIGHT

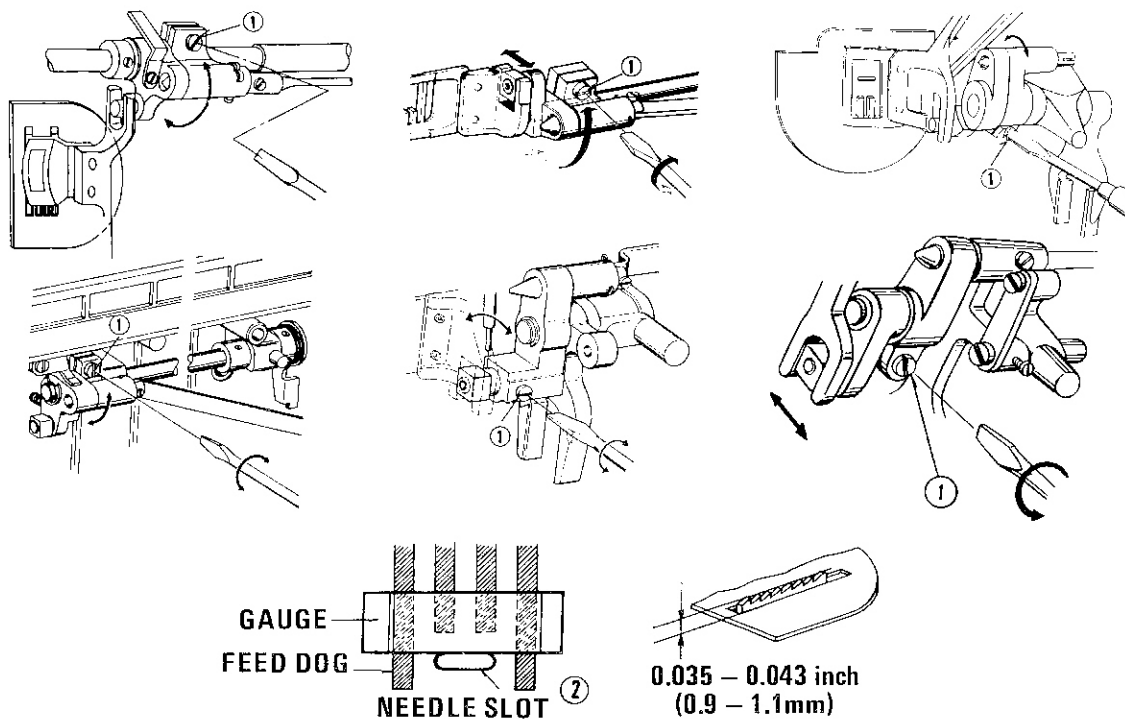


FIGURE 3E-1

### SEE FIGURE 3E-2

Check the feed dog height over the needle plate for specified dimensions (A). If an adjustment is needed, raise the needle to its highest position, and loosen the screw (1). Adjust the feed dog height as specified sliding the feed dog up and down along the screw hole. Tighten the screw securely after adjustment.

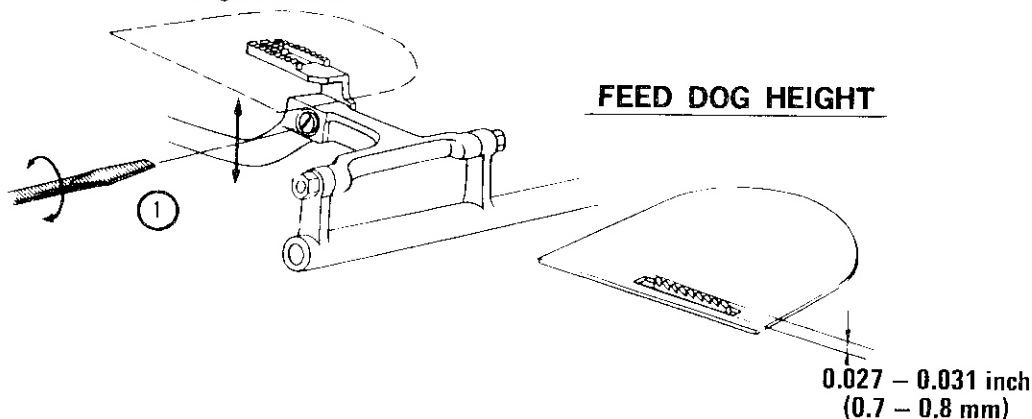


FIGURE 3E-2

(A)





## FEEDDOG HEIGHT

### See Figure 3E-4

Set stitch length control at 6 (maximum). Place the feeddog height gauge at the position illustrated, with no-go side of the gauge facing needle plate. Lower presser foot while turning the handwheel slowly by hand, the gauge should be moved by the feeddog teeth. If not, feeddog teeth are too low. Then, place the gauge up-side-down, with go side facing the needle plate, and repeat same procedure. The gauge should not be moved by the feeddog teeth. If the gauge is moved, the feeddog teeth are too high.

To make adjustment, loosen screw (2) on feed roller & bracket assembly and adjust the feeddog height as specified. Tighten the screw securely after adjustment.

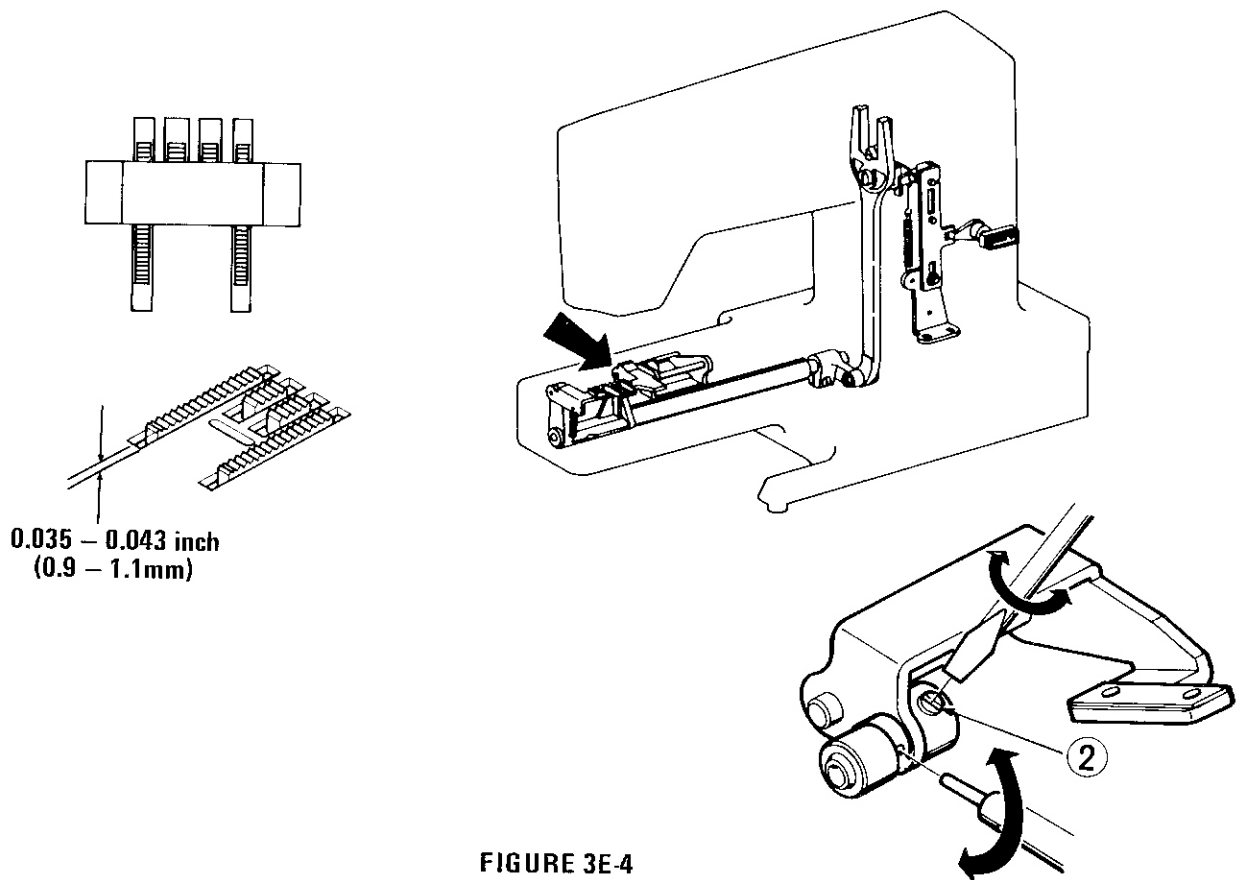


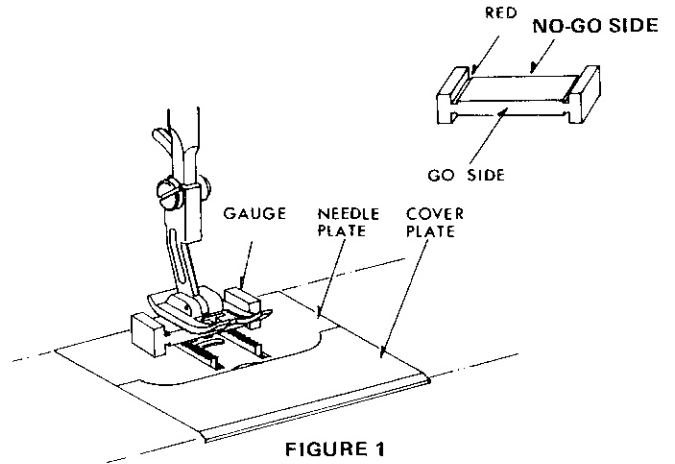
FIGURE 3E-4

## FEEDDOG HEIGHT

See Figure 3E-3

### 1. CHECKING FEEDDOG HEIGHT

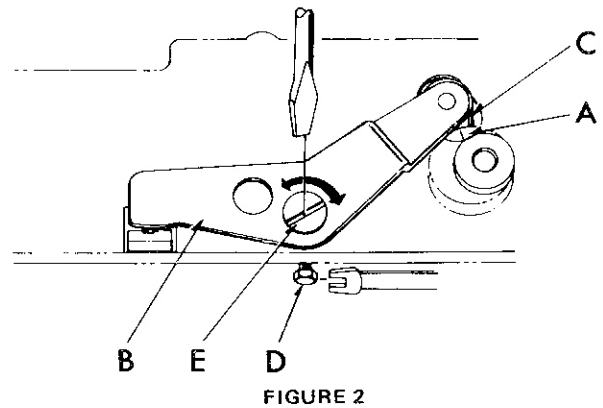
- Set the machine as follows:
  - Special stitch selector — straight stitch position
  - Stitch width control — 0 or red dot
  - Stitch length control — 6
  - Special stitch modifier — red dot
- Place feeddog height gauge at the back of needle plate as shown (Figure 1).
- Turning handwheel, check feeddog height.



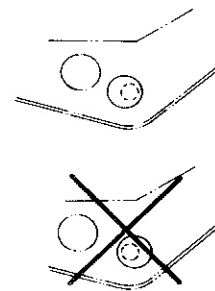
FEEDDOG HEIGHT GAUGE	GO SIDE (Facing needle plate)	NO-GO SIDE (Facing needle plate)
Correct	Not moving	Moving
Low	Not moving	Not moving
High	Moving	Moving

### 2. ADJUSTMENT

- Turning handwheel, align center of roller (C) on feed lifting link (B) with indicator line on feed lifting cam (A) (Figure 2).
- Place the feeddog height gauge with go-side facing needle plate (red on top) at the back of needle slot.



- Lower presser foot.
- Loosen screw (D) slightly.
- Turn eccentric screw (E) so that feeddog touches the gauge slightly.
- Tighten screw (D) securely.



### NOTE

When adjusting, turn eccentric screw (E) with eccentric portion facing to the feeddog (to the left) (Figure 3).


FIGURE 3E-3

## O-FEEDING

See Figure 3F-13

### 1. CHECKING O-FEEDING

- Set the machine as follows:

Special stitch selector —   
Stitch width control — 0  
Stitch length control — 0  
Special stitch modifier — red dot

- Place paper on needle plate, lower presser foot and turn handwheel several times by hand (with needle, without thread). The needle hole left on the paper should be a single round hole.

If not, adjust O-feeding.

### 2. ADJUSTMENT

- Using screw driver through window (B) provided on base plate (A), loosen screw (D) for feed link (C).
- Insert gauge pin (E) — 3 mm diameter — into round hole (F).
- While lightly depressing gauge pin (E) with finger, slowly and carefully move feed link (C) with screwdriver toward the left as indicated by the arrow.
- Finger on gauge pin may feel pin going further into the machine, and feed link (C) will not move further toward the left. Tighten screw (D) at this position of feed link (C). Remove gauge pin.

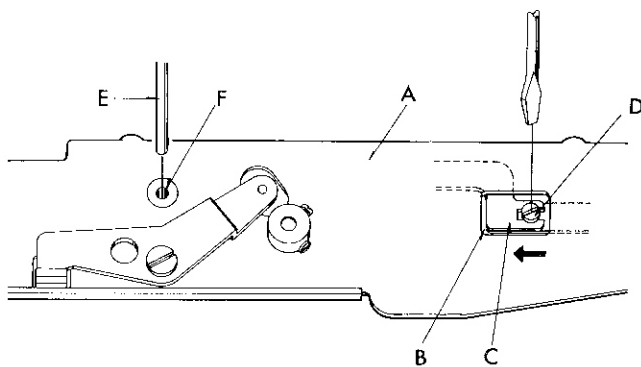


FIGURE 3F-13

See Figure 3F-14

Set stitch length control at "O." When turning handwheel, the feeddog should not move horizontally. If adjustment is needed, loosen screw (1) on feed regulator assembly and turn eccentric screw (2) in either direction to eliminate movement of feeddog. Tighten screw (1) securely after adjustment.

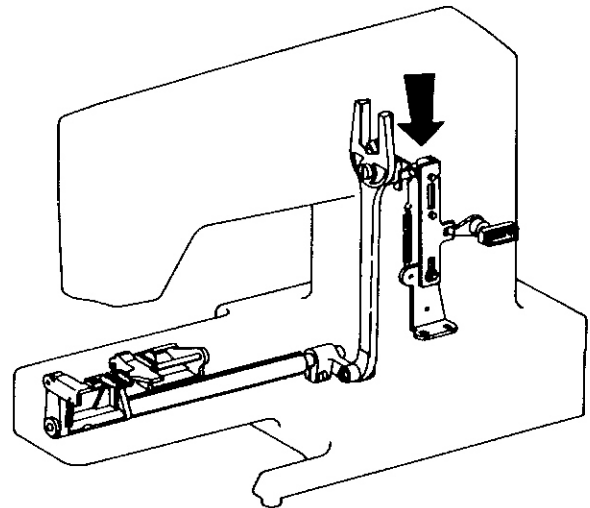
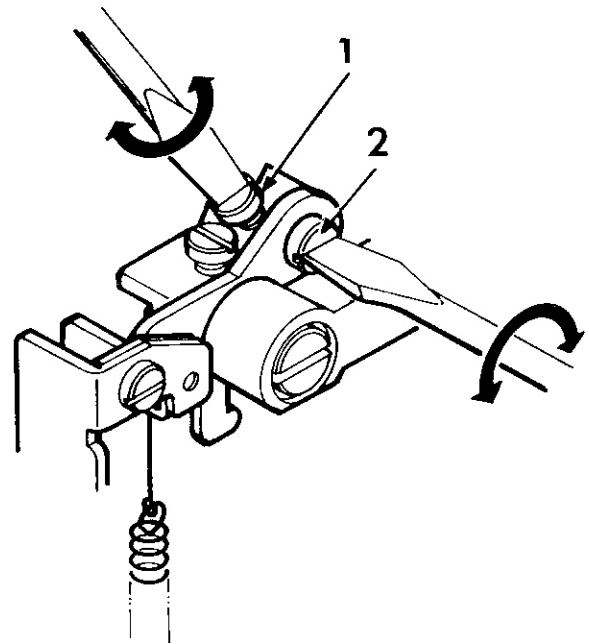


FIGURE 3F-14

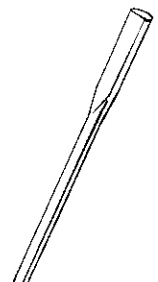
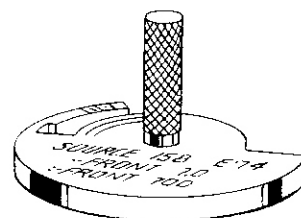
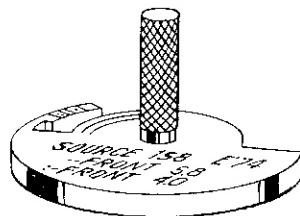
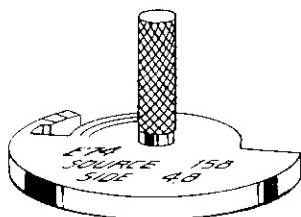


Replaces Page 3G-1 dated July, 1977

NEEDLE TIMING TO SHUTTLE  
FIGURE 3G-1  
(INSTRUCTION FOR RADIAL TIMING GAUGE)

USE GAUGE	SOURCE 158 • FRONT 7.0 • FRONT 7.0D			SOURCE 158 • FRONT 5.8 • FRONT 4.0			SOURCE 158 SIDE 4.8	
USE MARK	• FRONT 7.0	• FRONT 7.0D		• FRONT 5.8		• FRONT 4.0		
MACHINE BITE	7.0	7.0	5.8	5.8	4.0	4.0	4.8	
160	925	18141	17530	150	15250	650	340	All Side Face Shuttle Models
161	16030	18150	17550	151	16000	10200	341	
162	16031	19130	17560	152	16001	10300	342	
163	17010	19131	17570	680	16010	10301	520	
920	17011	19140	17571	850	16011	10302	521	
921	17012	19141	17572	950	16012	10304	522	
922	17030	19142	17740	960	16020	10304	522	
923	17031		17741	12110	16021	10400	523	
924	17032			12310	16210	10401	540	
17000	17033			13050	16250	10402	541	
17001	17511			13150	16410	10450	542	
17490	17540			13160	16490	10500	880	
17510	18011			13170	16500	10501	881	
18010	18020			13180	16510	10600	882	
	18021			13190	16520	16530	900	
	18022			13200	16540		901	
	18023			13201	16600		902	
	18024			13250	17200		903	
	18030			13360	17300		904	
	18031			13470	17310		905	
	18032			13471	17500		18000	
	18033			13570	17501			
	18034			13571	17520			
	18130			14000	17600			
	18131			14001	19310			
	18140			14002	19311			
				14003	19400			
				14100	19410			
				14101	19411			
				14300	19412			
				14301	19460			
				14310	19461			
				14311	19470			
				15140	19471			
				15150				
				15160				

The radial timing gauges and test pins, as illustrated below, are available through Department 206, Chicago only. The kit is identified as #69659.



## See Figure 3F-15

Set stitch length control at "O." When turning handwheel, the feeddog should not move horizontally. If adjustment is needed, turn screw (A) in either direction to eliminate movement of the feeddog.

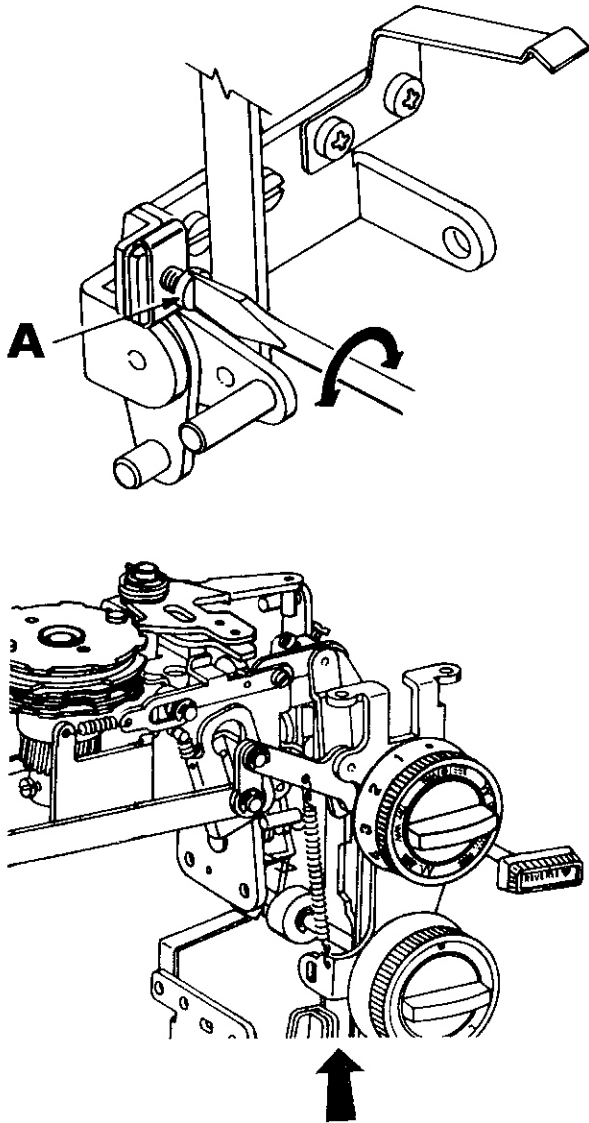


FIGURE 3F-15

Replaces Page 3G-3 dated July, 1971

### See Figure 3G-4

Models which do not have a center needle position for straight stitching must be set to the center position before using the radial timing gauge. If the Low Bar Alignment Gauge is available, the following method may be used.

First, insert test pin with blunt tip and tighten needle clamp screw securely. Place pattern disc number 1081 1B, or number 26842 (according to the model) onto the cam driver shaft and turn it by hand until the cam follower (2) touches the cam surface at the maximum diameter of the disc. On models that have the standard cam built in, set the special stitch dial to the "S" position.

Remove the presser foot and attach the Low Bar Alignment Gauge onto the presser bar. Locate center needle position by rotating stitch width control until the test pin comes to the C hole on the gauge as shown. Confirm test pin is in C hole, raise the needle bar by rotating hand-wheel, remove the gauge.

Check the radial timing and needle bar height following the instructions under 3G-3.

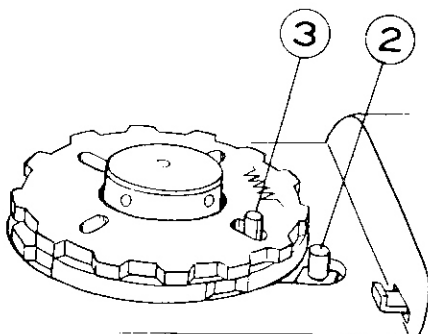
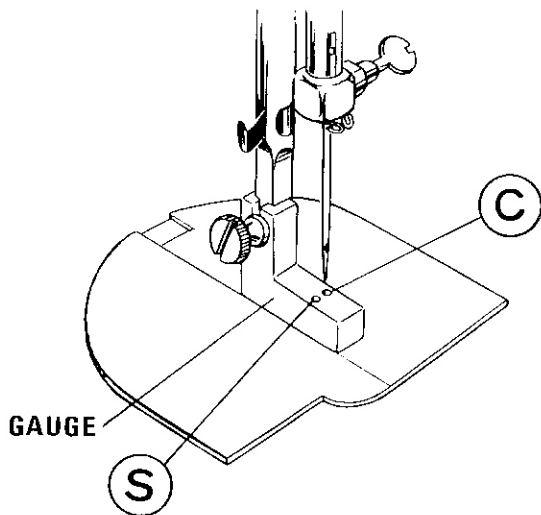


FIGURE 3G-4

### See Figure 3G-5

Model 18010 (924) has "S" needle position for straight stitching. It must be set to the center position before using the radial timing gauge. Center the needle by using the stitch width control. If the Low Bar Alignment Gauge is available the method as described in 3G-4 may be used.

Check the radial timing and needle bar height following the instructions under 3G-3.

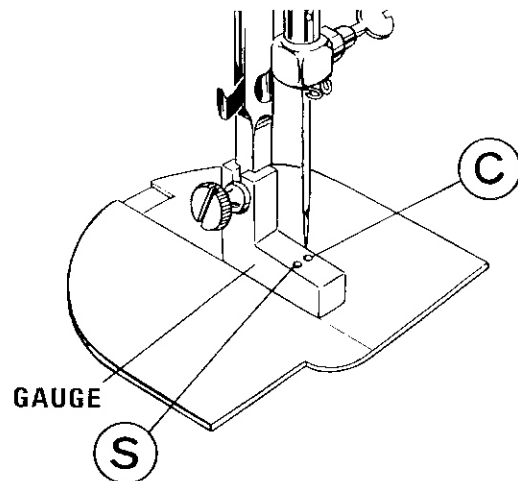


FIGURE 3G-5



### 3G-2

#### See Figure 3G-2

The clearance "a," "b," "c," and the angle "d" are very critical points in relation to the needle timing to shuttle. However, these points are visually determined by using the Radial Timing Gauges.

#### NOTE:

No adjustment is allowed for "Dimension C" for the front-facing shuttle models. For adjustment for side-shuttle models, please refer to Figure 3G-3.

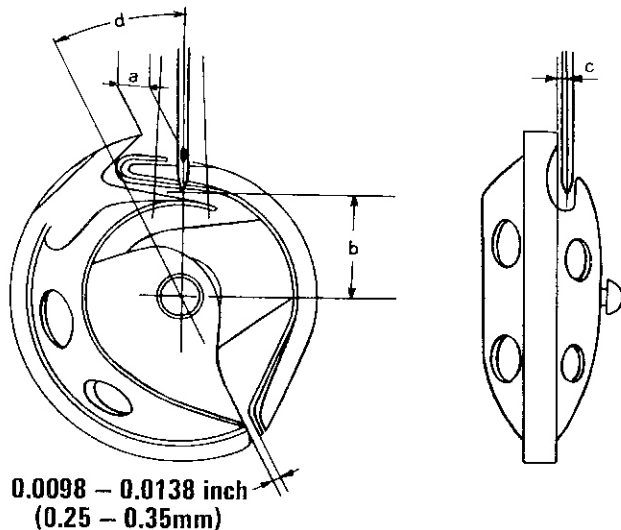


FIGURE 3G-2

#### See Figure 3G-3

Do not attempt adjustments other than those specified in this manual. If, by following the prescribed procedures, it is determined that a machine is out of radial time, handle per Bulletin S-820.

### RADIAL TIMING GAUGE INSTRUCTIONS

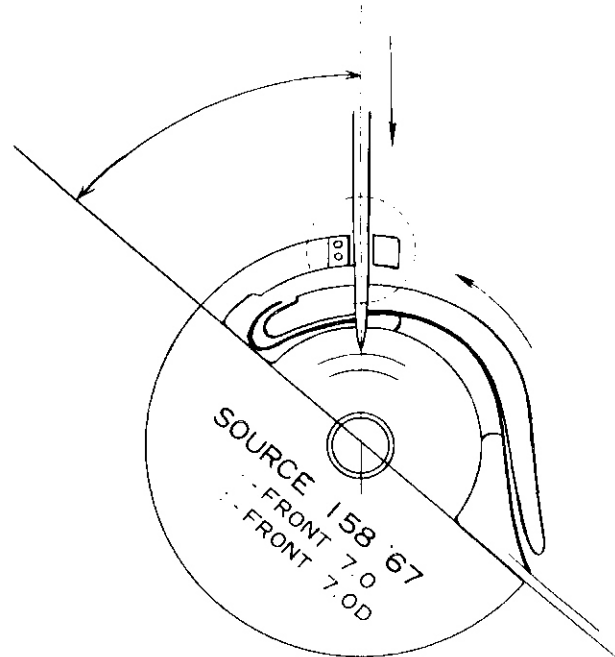
1. Remove needle and replace it with test pin which has a blunt tip.
2. Insert correct radial timing into shuttle driver. Refer to Figure 3G-1.
3. Set stitch width control at "O" or "S" (depending on model involved).

On machines with 7.0 zigzag bite which have a left needle straight stitch position, center the needle by means of the stitch width control. Use center strip between rear feeddogs as a guide for centering the needle.

4. Set needle position control at center for models which have this control.
5. Rotate handwheel slowly by hand. (See Figure 3G-3a.) The test pin should come between the correct two vertical lines at the end of the counterclockwise rotation of the gauge. (Refer to Figure 3G-1 to determine correct vertical lines.)

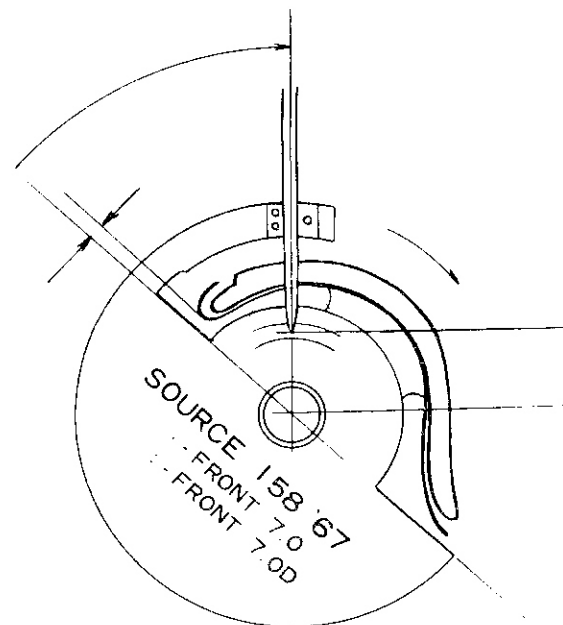
6. To check needle bar height, continue to rotate handwheel slowly by hand. (See Figure 3G-3b.) At the lowest position of the needle bar, the end of the test pin should come between two horizontal lines on the gauge.

If necessary, adjust needle bar height. Loosen screw on needle bar holder and adjust height on the test pin.



Dimension "a"

FIGURE 3G-3a



Dimension "b"

FIGURE 3G-3b

## NEEDLE TIMING TO SHUTTLE

See Figure 3G-8

Set the selector dial at blind stitch position and the stitch width control at 4. Turning the handwheel toward you, observe the movement of the needle. It takes one zigzag stitch after every 4 straight stitches. Stop rotation of the handwheel immediately after the needle has swung to the left and **returned to the right position**.

Insert test pin with blunt tip and tighten the needle clamp screw securely. If the Super High Bar Alignment Gauge is available, the following method may be used. Remove presser foot and attach gauge. Locate center needle position, by adjusting the stitch width control. At the center needle position, the test pin must go into the hole provided in the alignment gauge. After locating the center position bring the test pin to its highest position, and remove the gauge.

Check the radial timing and needle bar height following the instructions under 3G-3.

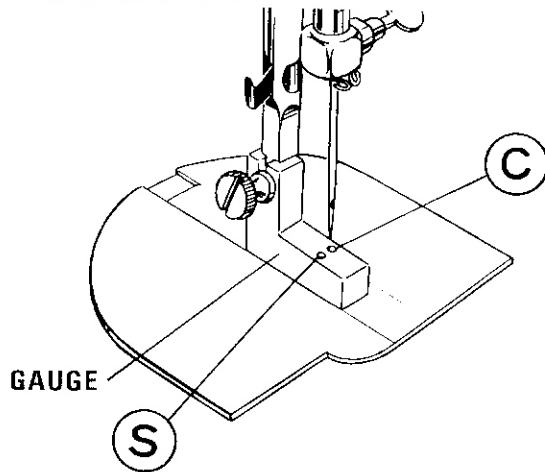


FIGURE 3G-8

See Figure 3G-9

Check needle bar height (3B-2) and needle position at straight stitching (3D-6) before checking needle timing to shuttle.

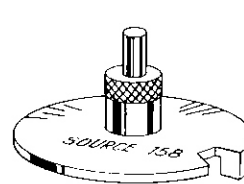
### CHECKING NEEDLE TIMING TO SHUTTLE

- Set the machine as follows:

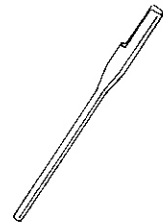
Special stitch selector — straight stitch position  
Stitch width control — 0 or red dot  
Stitch length control — any number  
Special stitch modifier — red dot

- Remove needle, presser foot, cover plate and needle plate.
- Remove bobbin case.
- Holding test pin (A) with flat side away from you, slip it into the needle bar and tighten the needle clamp screw.

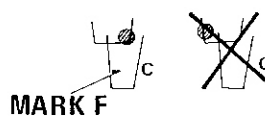
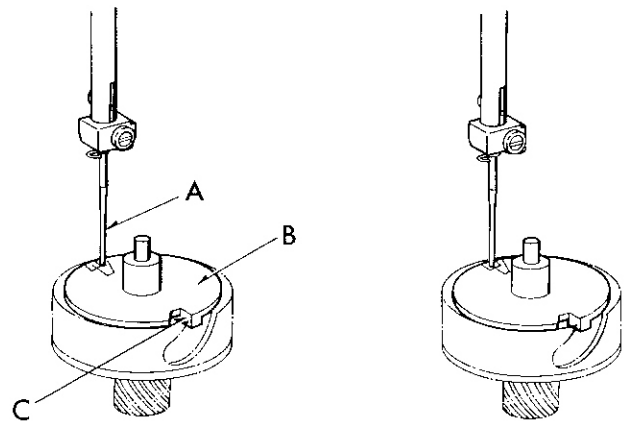
- Insert radial timing gauge (B) into the shuttle.
- Turn gauge so that the ear (C) of the gauge touches the pointed hook of shuttle.
- Turn handwheel slowly until test pin touches the surface of radial timing gauge.
- Check to see if the point of test pin is within Mark (F) or (G).
- If this check indicates machine is out of time, contact
- If this check indicates machine is out of time, handle per Bulletin S-820.



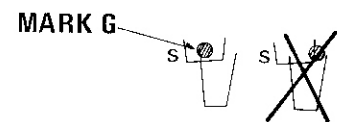
RADIAL  
TIMING  
GAUGE



TEST PIN



C-POSITION  
FIGURE 1



S-POSITION  
FIGURE 2

FIGURE 3G-9

3G-4

## NEEDLE CLEARANCE TO SHUTTLE

See Figure 3G-6

The following adjustment is allowed only for the side-facing shuttle models.

Insert needle and tighten the needle clamp screw securely. Bring the needle to its lowest position by turning the hand-wheel. Check to see if the clearance between the needle and the shuttle is within the specified limit. If not, loosen screw (2) on the shuttle guide bracket and adjust the position of shuttle by sliding it either toward the left or right until the proper clearance is obtained. Tighten the screw securely after adjustment.

**CAUTION:** Be sure that shuttle assembly does not rotate during adjustment.

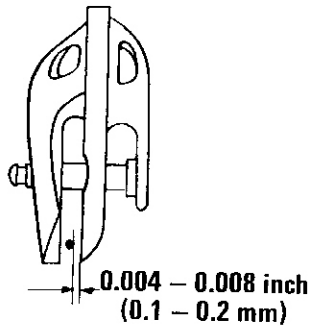
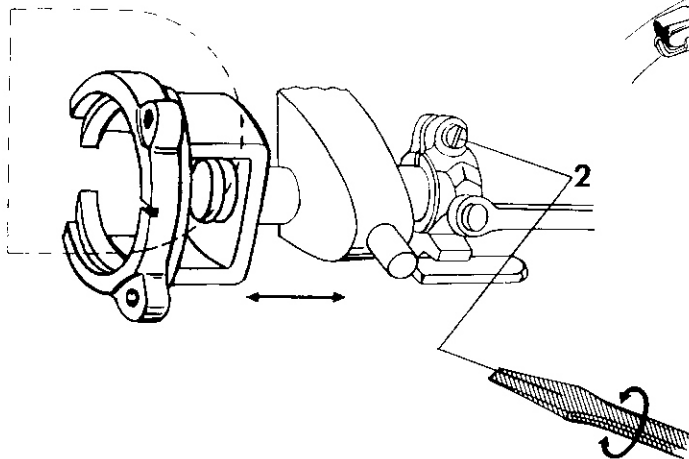


FIGURE 3G-6

## NEEDLE TIMING TO SHUTTLE

See Figure 3G-7

Bring the needle to its lowest position by turning hand-wheel. The long shuttle will be located at the extreme left side on the machine, as illustrated. Loosen the nut and turn the eccentric screw (1) to either direction to adjust the distance between the needle and the point of long shuttle as specified. Tighten the nut after adjustment without moving the eccentric screw.

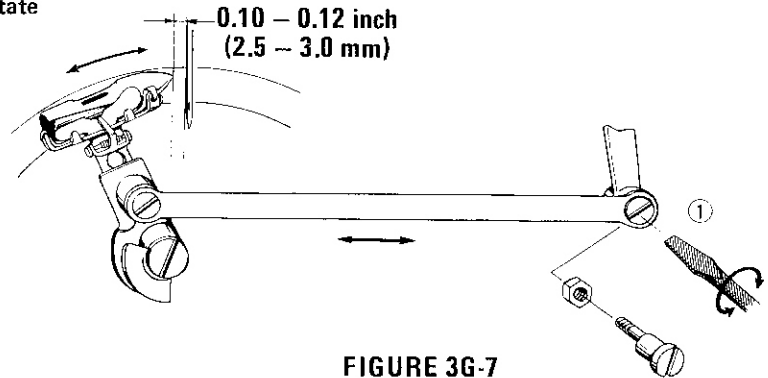
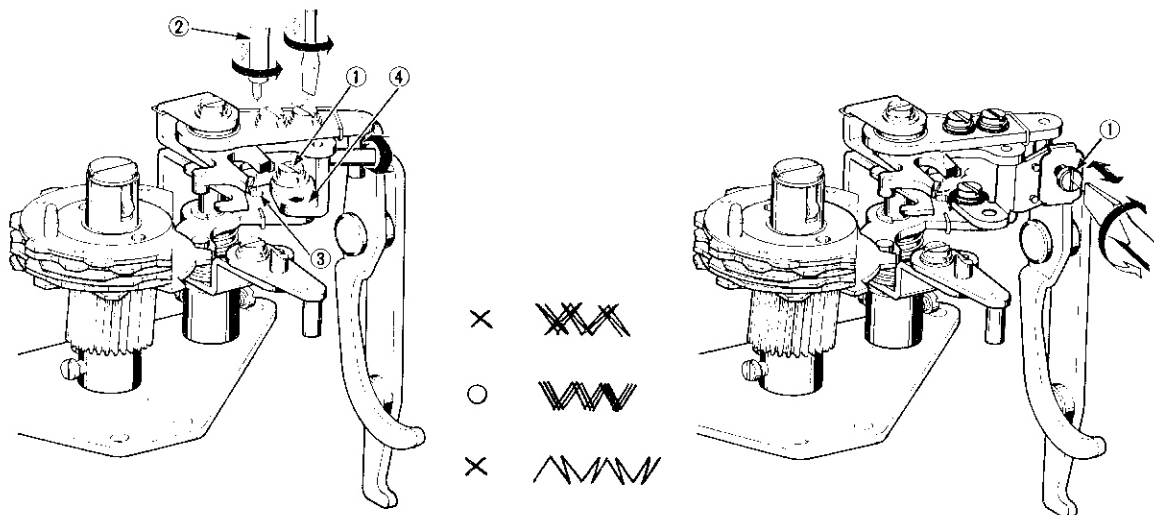


FIGURE 3G-7

Replaces 3J-11 dated November, 1976

**AUTOMATIC REVERSE STITCH** (STRETCH STITCH)

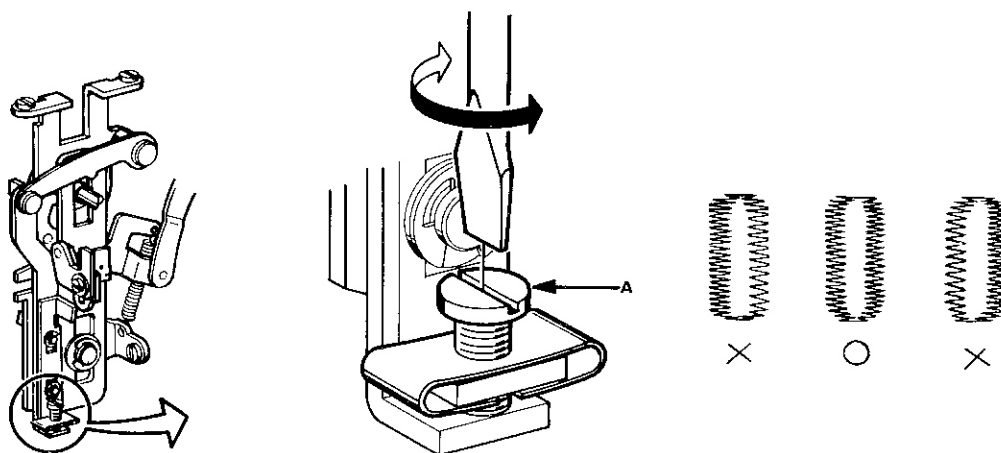


**FIGURE 3J-28**

**SEE FIGURE 3J-29**

If the length of reverse stitches is shorter or longer than that of forward stitches, turn screw (A) either way until you can obtain the correct balance.

**AUTOMATIC REVERSE STITCH** (BUTTONHOLE)



**FIGURE 3J-29**

## See Figure 3G-10

Check needle position at straight stitching (3D-6) before checking needle clearance to shuttle.

### CHECKING NEEDLE CLEARANCE TO SHUTTLE

- Set the machine as follows:

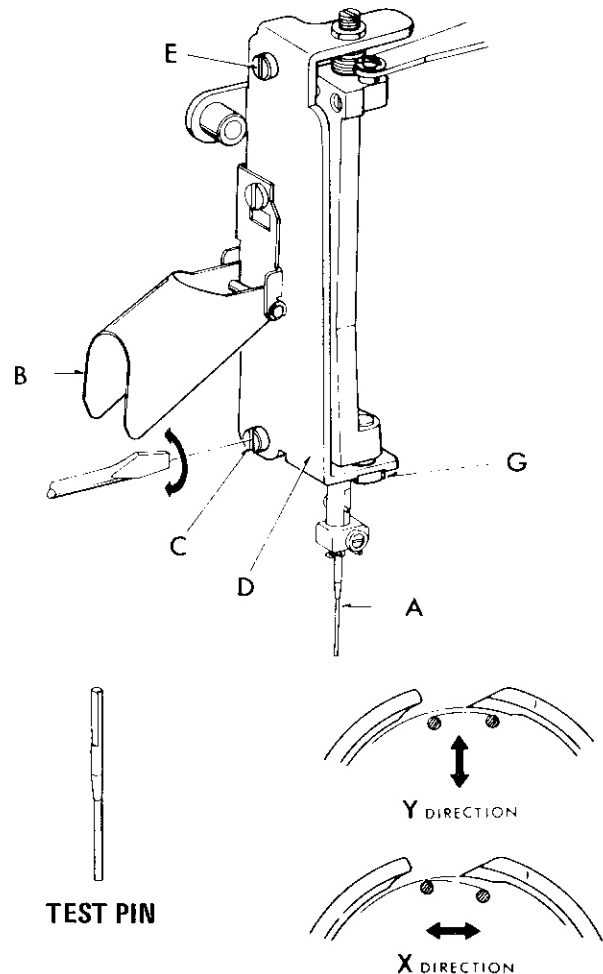
Special stitch selector — zigzag stitch position  
 Stitch width control — 4  
 Stitch length control — any number  
 Special stitch modifier — red dot

- Release clutch by pulling handwheel to the right.
- Remove needle, presser foot, cover plate and needle plate.
- Remove bobbin case.
- Holding test pin with flat side away from you, slip it into the needle bar and tighten the needle clamp screw.

Minimum clearance — pointed hook doesn't contact with #14 needle but contacts slightly with test pin.

Maximum clearance — up to 0.05 mm (0.002 inch)

**NOTE:** At the first stroke of needle bar, carefully observe test pin clearance to pointed hook of shuttle, turning handwheel very slowly. If the test pin should contact tightly with the pointed hook, proceed to adjustment step. Tight contact will result in damage to the test pin and pointed hook. At the factory, this timing is closely controlled to the extent that you may hear a feasible clicking sound, when handwheel is turned quickly back and forth. This is the maximum. Do not over-do.



**FIGURE 3G-10**

### ADJUSTMENT

To adjust clearance in X direction:

- To balance clearance between right and left side strokes of needle bar, turn triangular cam (G) on the bottom of support holder (D) with wrench. This adjustment shifts the needle in X direction.



To adjust clearance in Y direction:

- Raise lamp holder (B), remove bulb and loosen screw (C) slightly.
- Tap front or back edge of support holder with grip of screw driver to shift it Y direction. (See Figure.)
- X and Y direction adjustments should be made so that pointed hook may hit test pin with feather touch at both strokes of needle bar.
- Tighten screws (C) and (E) securely.
- Remove test pin and insert #14 needle. If pointed hook hits #14 needle, the Y direction adjustment is too close and further adjustment must be made to achieve the proper clearance.

See Figure 3J-31

## AUTOMATIC REVERSE STITCH (Buttonhole)

### 1. CHECKING BALANCE OF STITCHES

- Check O-feeding, following Section F-13.
- Set the machine as follows:
  - Special stitch selector — 
  - Stitch width control — 1 to 1-1/2
  - Stitch length control — red zone
  - Special stitch modifier — 
- Sew a buttonhole and check to see if pitches of forward and reverse stitches are balanced. If not balanced, adjust.

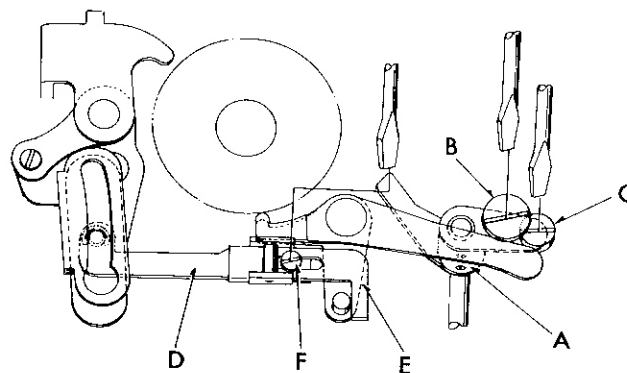


FIGURE 1

### 2. ADJUSTMENT



- Loosen screw (B) on buttonhole crank (A).
- Adjust the balance of forward and reverse stitches by turning eccentric screw (C). Turn eccentric screw (C) with eccentric portion away from buttonhole crank (A).
- Tighten screw (B) securely.



FIGURE 2

### 3. CHECKING BUTTONHOLE POSITIONING

Check needle position at straight stitching (D-5) before checking buttonhole positioning.

- Set the machine as follows:
  - Special stitch selector — 
  - Stitch width control — 1 to 1-1/2
  - Stitch length control — red zone
  - Special stitch modifier — 

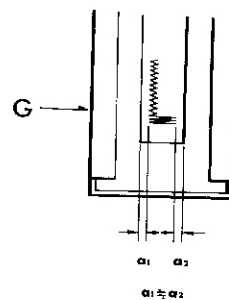


FIGURE 3

- Use built-in buttonhole foot
- Sew a buttonhole and check to see if bartack is placed in the center of buttonhole foot (Figure 3).

If not, adjust.

FIGURE 3J-31

### 4. ADJUSTMENT

- Loosen screw (F) and shift link (E) until the bartack is placed in the center of buttonhole foot.
- Tighten screw (F) securely.

## AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-30

### 1. CHECKING STRETCH STITCHES

Adjust automatic reverse stitch by turning stitch modifier between S and L. If the adjustment is beyond this control range, adjust using the following procedure.

- Set the machine as follows:
  - Special stitch selector – zigzag stitch position
  - Stitch width control – 4
  - Stitch length control – 6
  - Special stitch modifier – middle position between S and L (intermediate notched position)
- Use zigzag stitch needle plate.
- Place paper on the needle plate and lower presser foot.
- Turning handwheel, check to see if needle penetrates into the same hole (A1, A2, A3).

If not, adjust as necessary.

### 2. ADJUSTMENT FOR FIGURE 1A

- Loosen screw (B) slightly.
- Insert eccentric tool (D) into hole (C) on lever (E). Adjust the position of lever (E) and (F) by turning the eccentric tool (D), until needle penetrates into the same hole (A1, A2, A3).
- Tighten screw (B) securely.

### ADJUSTMENT FOR FIGURE 1B

- Adjust the position of levers (E) and (F) by turning screw (G), until needle penetrates into the same hole.

**NOTE:** At factory, this setting (feed balance) is fixed at the notch located at the center of modifier zone. In the owner's manual a fine adjustment by the modifier only for decorative stitching is suggested. Actually, this control range can be used on built-in utility stitches as well.

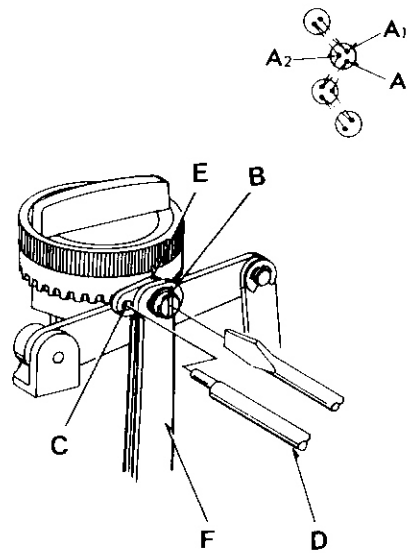


FIGURE 1A

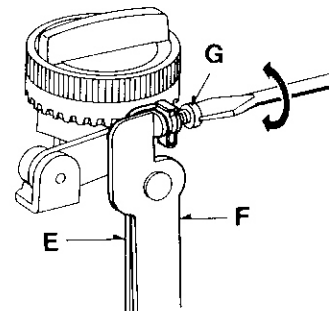


FIGURE 1B

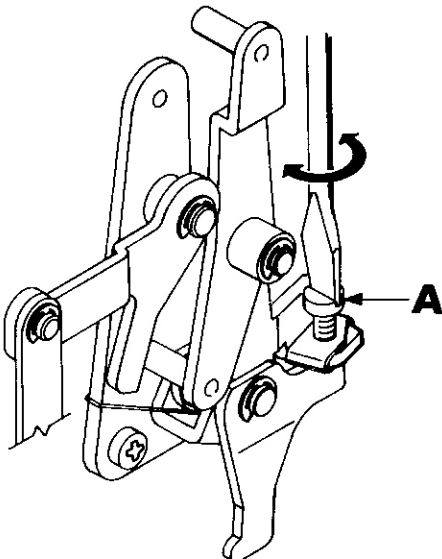
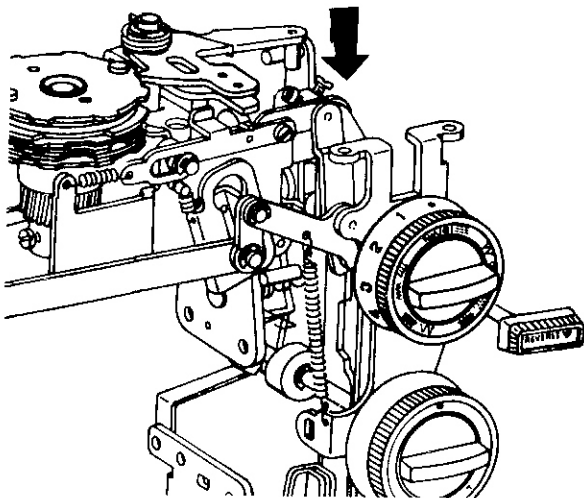
FIGURE 3J-30

## AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-34

Set stitch length control at 6, stitch width control at 4, special stitch dial at red dot and special stitch modifier at middle position between S and L. Place a piece of paper (folded in two) over the feeddogs. Check and see if needle penetrates same hole during forward and reverse stitches. If not, turn screw (A) in either direction (counterclockwise or clockwise), until both stitches are equal in length.

**EXAMPLE OF  
FORWARD AND  
REVERSE STITCHES  
EQUAL IN LENGTH**



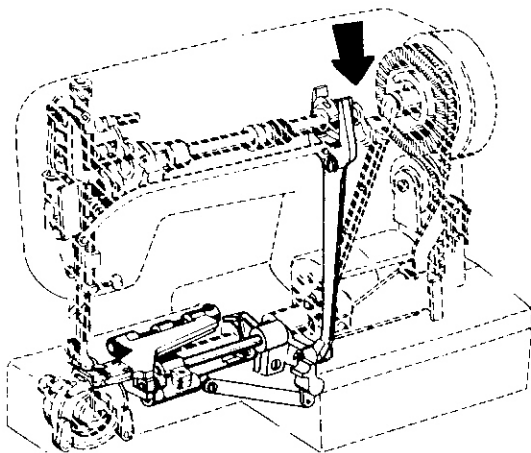
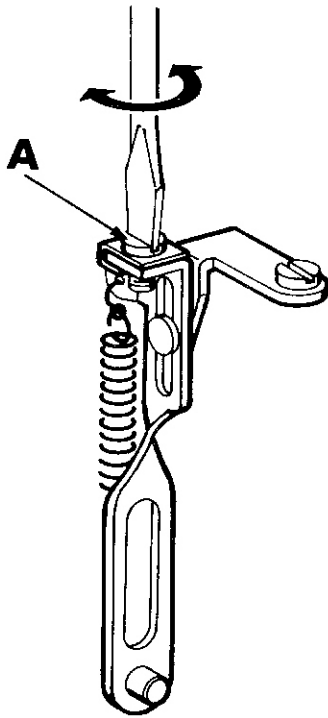
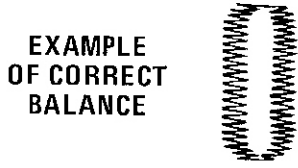
**FIGURE 3J-34**



## AUTOMATIC REVERSE STITCH (Buttonhole)

See Figure 3J-32

If the length of reverse stitches is shorter or longer than that of forward stitches, turn screw (A) clockwise or counterclockwise, until you obtain the correct balance.



**FIGURE 3J-32**

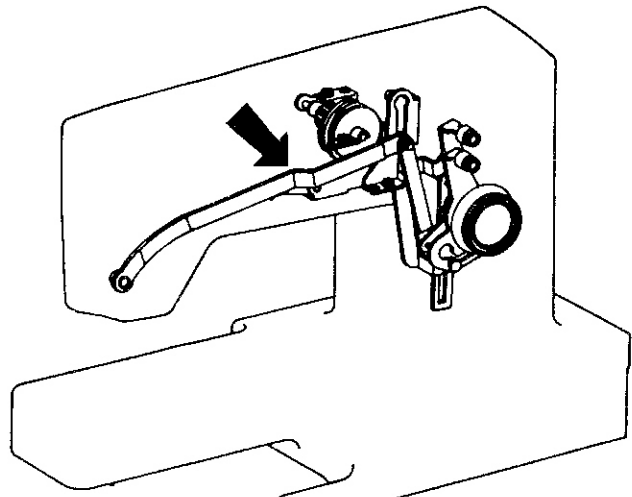
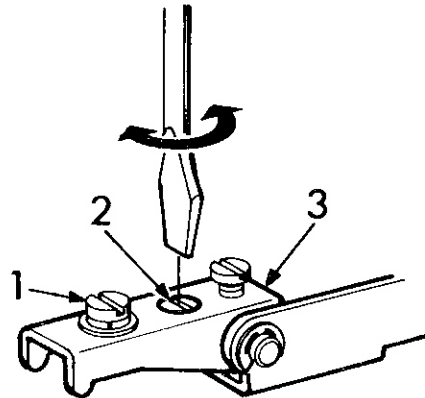
## AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-33

Set stitch length control at 6, stretch stitch control at S and stitch width control at 4. Place a piece of paper (folded in two) over the feeddogs. Sliding stretch stitch control slightly toward red dot, check and see if needle penetrates same hole during forward and reverse stitches. If not, loosen screw (1) on super follower operating plate assembly (3) and turn screw (2) in either direction (counterclockwise or clockwise), until both stitches are equal in length. Tighten screw (2) after adjustment.



**EXAMPLE OF  
FORWARD AND  
REVERSE STITCHES  
EQUAL IN LENGTH**



**FIGURE 3J-33**

## AUTOMATIC MECHANISM (Clearance Between Cam & Cam Follower)

See Figure 3K-21

If the special stitch dial cannot be turned, it may be due to insufficient clearance between cam (A) and cam follower (B). Excessive clearance will result in an irregular pattern.

To adjust the mechanism, set the stitch width control at 4, and special stitch dial between any two settings, as illustrated. Loosen screw (C) and turn the eccentric collar (D) in either direction as shown, until you can get the correct clearance (0.006 inch) between the highest point of cam (A) and cam follower (B). Tighten screw (C) after adjustment.

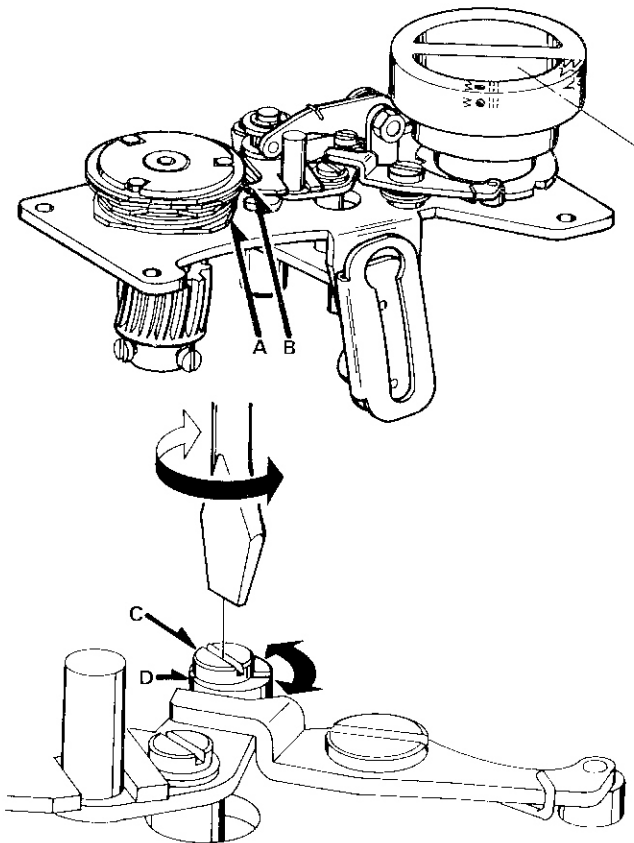


FIGURE 3K-21

See Figure 3K-22

Check the following points before checking clearance between cam and cam follower.

- Needle position for decorative stitching (C-22)
- Needle position at straight stitching (D-6)
- Cam selector guide plate setting (M-7)


### 1. CHECKING CLEARANCE BETWEEN CAM AND CAM FOLLOWER

- Set the machine as follows:

- Stitch width control — 4
- Stitch length control — any number
- Special stitch modifier — red dot

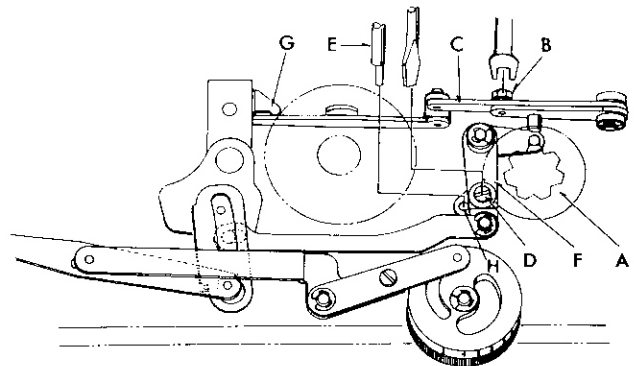
- Special stitch selector should turn smoothly.
- Turning special stitch selector, check if each pattern of stitches selected can be sewn.
- If not, adjust as necessary.

### 2. ADJUSTMENT

- Set special stitch selector at 
- Loosen screw (D) slightly.
- Insert eccentric tool (E) into hole (H). Shift link (F) by turning eccentric tool (E), until you obtain about 0.2 mm (0.008 inch) clearance between cam follower (G) and the camming surface on the maximum diameter of the cam, when moving cam follower (G) away from the cam by turning special stitch selector slightly.
- Tighten screw (D) securely.

### NOTE

If the above clearance is too wide, needle bar support will hit the screw which controls left side stroke of needle bar, when turning special stitch selector, and stitch selector will not turn or will not turn smoothly.



0.008 inch  
(0.2mm)

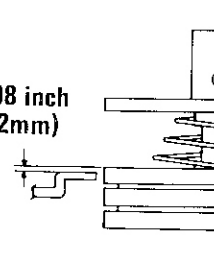


FIGURE 3K-22



Replaces Page 3M-3 dated November, 1976

## CAM SELECTOR GUIDE PLATE SETTING

### See Figure 3M-5

Set stitch length dial at 6 and special stitch dial at "S" or red dot. The cam follower should align with a cam as shown. If not, loosen nut (A), and turn eccentric screw (B) slightly to either direction (counterclockwise or clockwise) so that the follower aligns with a cam. Tighten nut (A) securely after adjustment.

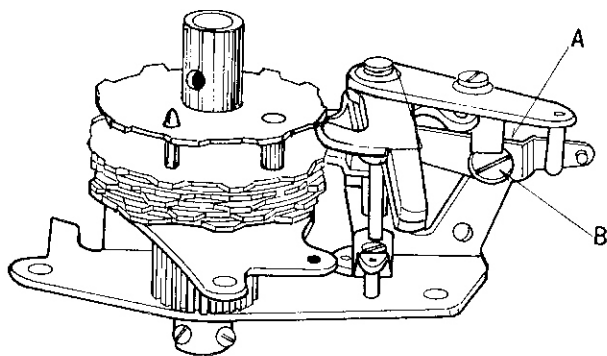


FIGURE 3M-5

### See Figure 3M-6

If the cam follower (A) does not align with the cam, adjust in the following manner:

Models 1431, 1625, 1641, 1940 & 1941 — Set special stitch dial at red dot.

Models 1731, 1760, 1815, 1913 & 1931 — Set special stitch dial at mending stitch setting.

Set stitch width control at 4. Loosen screws (B) and align the cam follower (A) with the lowest cam, except Models 1815 and 1913. For these two models, cam follower (A) should be aligned with the second cam from the bottom. After obtaining the proper position, tighten screw (B). Be sure cam follower is aligned with each built-in cam.

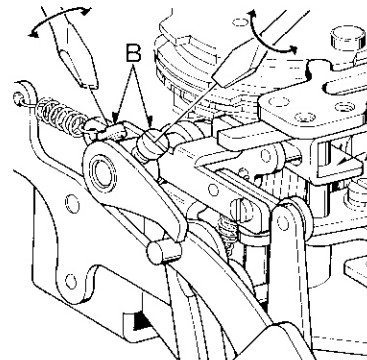


FIGURE 3M-6

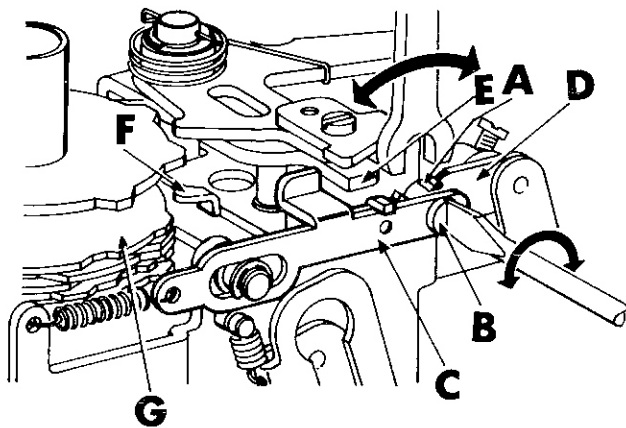
**AUTOMATIC MECHANISM (Clearance Between Cam & Cam Follower)**

See Figure 3K-23

Set special stitch dial between any two settings and stitch width control at 4. Loosen nut (A) and screw (B). Pushing claw opening plate (C) to operating plate (E), move operating plate (D) to the left and tighten nut (A) and screw (B).

Set special stitch dial at one of six settings and stitch width control at 4. Lower needle to its lowest position. Check if needle moves to the right when special stitch dial is set between each setting, and if it almost touches the right edge of the needle plate. If needle hits the needle plate, refer to 3C-22.

Check if zigzag cam follower (F) moves without touching each built-in cam (G) when special stitch dial is turned clockwise or counterclockwise. If it does not move properly, refer to 3M-8.



**FIGURE 3K-23**


## CAM SELECTOR GUIDE PLATE SETTING

See Figure 3M-7

## 1. CHECKING ALIGNMENT OF CAM FOLLOWER TO CAMS

- Set the machine as follows:  
     Stitch width control – 4  
     Stitch length control – any number  
     Special stitch modifier – red dot
- Check if each pattern of stitches selected can be sewn.

## 2. ADJUSTMENT

- Set special stitch selector at 
- Loosen screw (B) slightly and align cam follower with the highest zigzag cam below super cam by moving link (C) up and down.
- Tighten screw (B) securely.
- Check distribution of needle swing (3C-21) after adjustment.

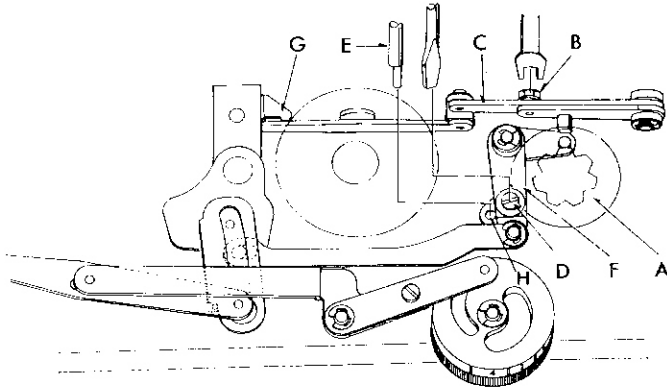


FIGURE 3M-7

See Figure 3M-8

Set stitch width control at 4, stitch length control at any number and special stitch modifier at red dot. Check to see if each pattern of stitches selected can be sewn. If not, set special stitch dial at red dot, loosen screws (B) and align cam follower (A) with the lowest cam. After obtaining the proper position, tighten screws (B) securely. Be sure cam follower (A) is aligned with each cam.

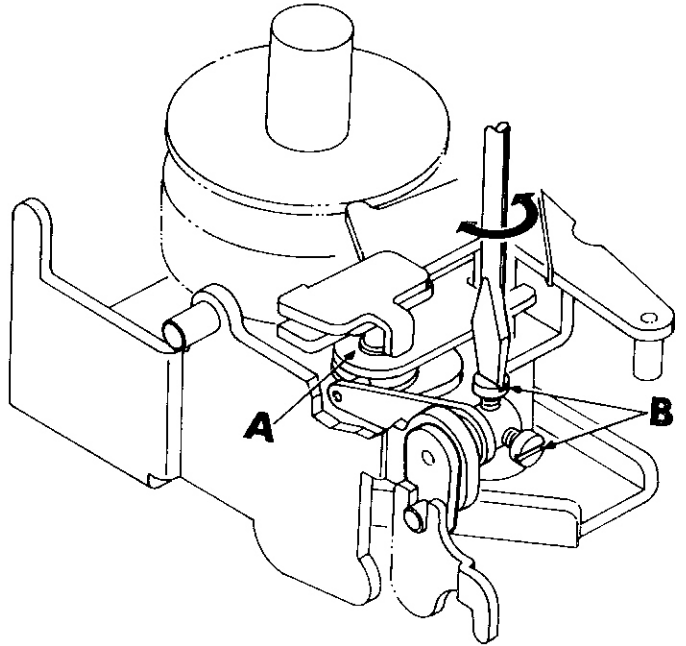


FIGURE 3M-8