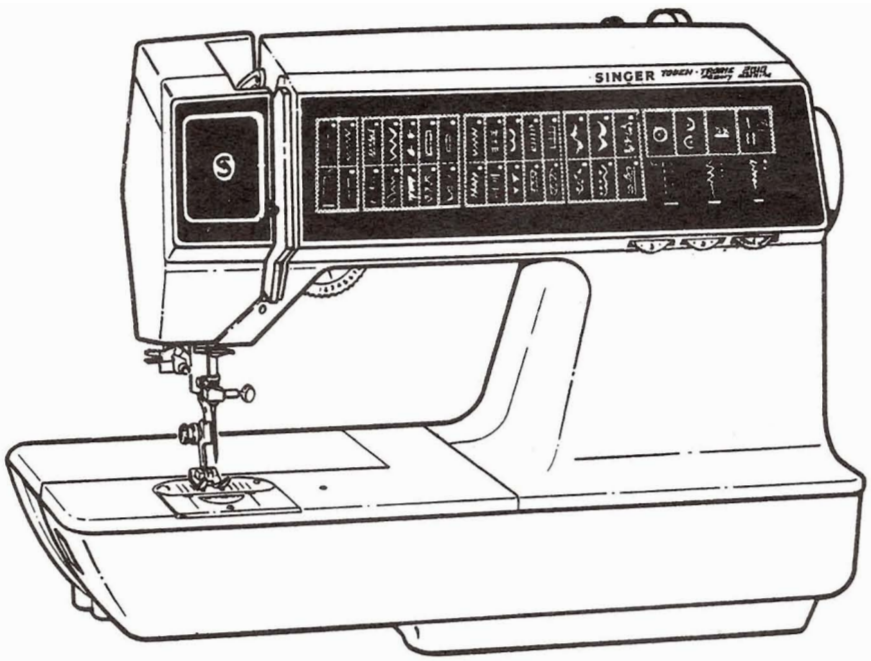
Service Manual

for the

TOUCH-TRONIC *

sewing machine model 2010A

by SINGER



SERVICE PARTS TRAINING SPG WORLDWIDE *

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This manual is designed for use by trained and qualified service persons.

The Singer Company will not be responsible for any parts requiring replacement owing to natural wear or to abuse or negligence of the user or in the event the machine is serviced by other than a trained and qualified service person, or if parts are substituted which do not meet applicable specifications.

TABLE OF CONTENTS

PAGE

SECTION 1. GENERAL INFORMATION 1
Scope of Manual . Meters . Machine Serial Number . Regulatory Agency Approvals

SECTION 2. ELECTRONIC TEST POINTS, SEQUENCE OF ELECTRONIC AND ELECTRO/MECHANICAL ADJUSTMENTS AND ELECTRONIC TROUBLESHOOTING PROCEDURE 3
Electronic Test Points 5
Sequence of Electronic and Electro/Mechanical Checks and Adjustments 11
Electronic Troubleshooting Procedure 25

SECTION 3. MECHANICAL ADJUSTMENT PROCEDURES 43
Sequential Checklist and Interlocking Adjustments Cross Reference .. 45
Arm Shaft and Arm Shaft Sprocket.- Refer to 2001 Service Manual ....
Thread Take-up Lever and Needle Bar Connecting Link - Refer to 2001 Service Manual .....
Needle Bar Vibrating Bracket Ball Joint - Refer to 2001 Service Manual .....
Needle Bar Vibrating Bracket Ball Stud - Refer to 2001 Service Manual .....
Setting Needle Location.- Refer to 2001 Service Manual .....
Needle Bar Height.- Refer to 2001 Service Manual .....
Safety Stops 48
Needle Bar Recoil Spring.- Refer to 2001 Service Manual .....
Needle Latch Carrier Eccentric - Refer to 2001 Service Manual .....
Needle Bar Release - Latch Kick-out Plate 51
Needle Threader - Refer to 2001 Service Manual .....
Presser Bar Height and Alignment - Refer to 2001 Service Manual ....
Timing Belt Tension 52
Motor Belt Tension and Motor Switch 52
Needle Crossover -- Timing the Shunt 55
Hook Drive Gear Mesh 56
Hook Timing - Refer to 2001 Service Manual .....
Feed Timing 59
Hook-to-Needle Relationship - Refer to 2001 Service Manual .....
Alpha Feed .....
. Alignment - Refer to 2001 Service Manual .....
. Centralization Refer to 2001 Service Manual 60
. Throw - Refer to 2001 Service Manual .....
. Height - Refer to 2001 Service Manual .....
. Zero Feed 63
. Brake 64
Bobbin Case Thread Clearances 67
Arm Top Thread Guide and Pretension - Refer to 2001 Service Manual .
Bobbin Winding Adjustments 71
Tension Module - Refer to 2001 Service Manual .....
Dial Tension . Thread Take-up Spring . Tension Release
Electrical System - Refer to 2001 Service Manual .....
Lubrication - Refer to 2001 Service Manual 121
Sew-In Test - Refer to 2001 Service Manual 124
Cleaning The Control Panel 72

SECTION 4. PARTS REMOVAL AND REPLACEMENT 73
Face Plate 74
Top Cover 74
Bottom Cover 74
Front Cover 77
Front Cover Segment 77
Buttonhole Switch 78
Head-End Assembly 81
Needle Bar 81
Presser Bar and Presser Bar Bushing 82
Tension Assembly 85
Thread Take-up Spring 85
Control Panel/Main Control Board Assembly 86
Control Panel/Main Control Board Disassembly 86
Take-up Lever Assembly 89
Hand Wheel 89
Motor Belt 90
Motor 90
Sewing Light Assembly 93
Arm Shaft Sprocket -- Timing Belt 94
Arm Shaft 97
Needle Bar Driving Arm 101
Linear Bight Motor 101
Fuse Assembly 102
Transformer and Transformer Housing 105
Linear Feed Motor 105
Bobbin Runout Alarm Board Assembly 106
Slide Plate 106
Bobbin Winder Actuating Lever and Driver Assemblies 109
Hook 110
Hook Drive Shaft . Hook Drive Gear . Feed Drive Gear 113
Feed Drive Shaft . Feed Timing Gear 114
Feed Regulator Shaft and Feed Regulator 117
Feed Bar Connecting Link 118
Feed Bar 122
Hinged Bed Plate 122

SECTION 1
GENERAL INFORMATION

SCOPE

The instructions appearing in the Service Manual for the 2001 Class machine generally apply to the 2010 Class machine.

Specific instructions which apply only to the 2010 Class machine appear in this supplement.

METERS

The Volt-Ohm Milliammeter (VOM) is designed to measure the characteristics of electrical and electronic circuits in a fashion similar to the way gauges are used to measure characteristics of mechanical mechanisms. The VOM is a required tool for the servicing of the 2001A machine. Proper testing and adjustments CANNOT BE MADE without this meter.

Although there are many good meters available, only those with the required degree of accuracy are acceptable. Most digital meters are acceptable. However, any meter fulfilling the following specifications can be used.

Ranges

DC Millivolts
0-250 MV minimum
Sensitivity: 20,000 ohms per volt minimum

DC Volts
0-1-2.5-10-50
Sensitivity: 20,000 ohms per volt minimum

OHMS
RX1 0-2000
RX100 0-200,000
RX10,000 0-20 megohms

AC Volts
0-2.5-10-50-250
Sensitivity: 5000 ohms per volt

DC Milliamperes
0-1-10
0-100
0-500

DC Amperes
0-10

Accuracy

DC Voltage
All ranges 2% or less of full scale

AC Voltages
All ranges 3% or less of full scale

DC Amperes
All Ranges 2% or less of full scale

Resistance Ranges

		Analog	Digital
RX1	0-2,000 ohms	2.5° of arc	1.0%
RX100	0-200,000 ohms.	2° of arc	1.0%
RX1000	0-20 megohms	2° of arc	1.0%

MACHINE SERIAL NUMBER

The serial number of the machine is located on the underside of the bed casting, at the head-end of the machine, and is visible through an opening in the bottom cover.

The serial numbering system uses a single letter prefix to identify the manufacturing source. The first numeral indicates the year built. The next three numerals indicate the calendar day of the year the machine was built. This is followed by a letter which identifies the individual assembly line. The last three numerals indicate the number of the machine built on the production line that day.

Example: A1061C027

- A - Manufacturing source (Anderson)
- 1 - Built in 1981
- 061 - 61st day of the year (i.e. March 2nd)
- C - Assembly line that produced the machine
- 027 - 27th machine built on assembly line C

Regulatory Agency Approvals

The appropriate regulatory agency approval stamp is located on the bed cover near the controller lead plug connector.

SECTION 2
ELECTRONIC TEST POINTS, SEQUENCE OF ELECTRONIC AND ELECTRO/MECHANICAL ADJUSTMENTS AND ELECTRONIC TROUBLESHOOTING PROCEDURE

ELECTRONIC TEST POINTS

The electronic test point chart provides a description of the test points in numerical sequence only and the readings to be expected if all electronic systems are functioning, under optimum conditions. Do not attempt to use the test point chart as a substitute for troubleshooting an electronic failure. It is provided only as a reference and to familiarize the technician with test point reading conditions and procedures. The troubleshooting procedure does not follow the numerical sequence of test points.

CAUTION:

Although there are other test point locations on the printed circuit board, only those listed in the following charts are to be used for service. Do not attempt, under any conditions, to take voltage readings from any other test point or component. These test points are used only with highly specialized test equipment in tightly controlled laboratory environments. Any attempt to probe these points with field meters may cause damage to the associated circuitry. It is important to note that when attaching probes to the service test points, the power must be off and the connection verified. If an accidental touching of a test point or component lead not designated for service occurs with the power on. severe and costly damage may result.

Printed circuit board layouts have been provided to assist in locating the test points and harness plugs.

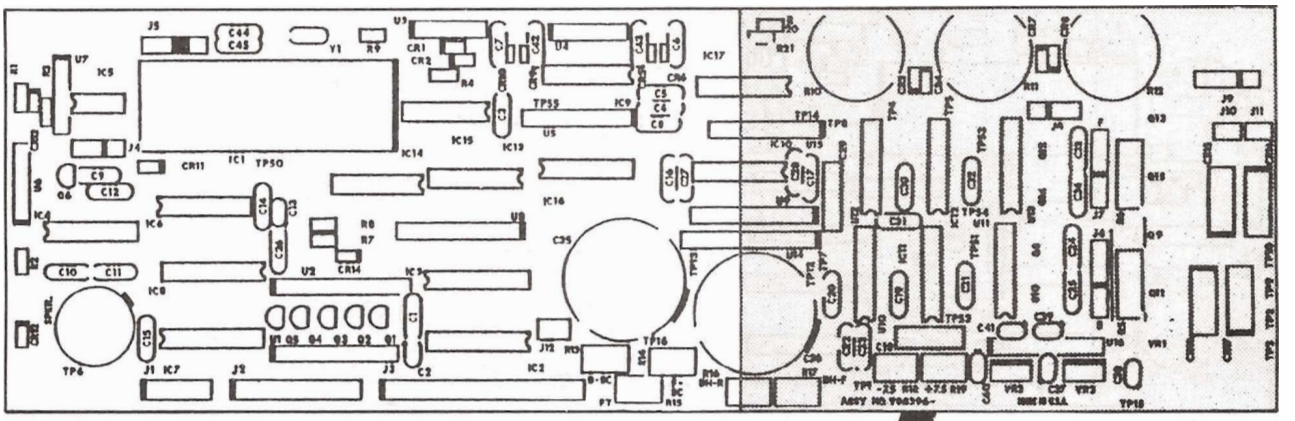
Never attempt to take voltage readings with anything other than approved meters.

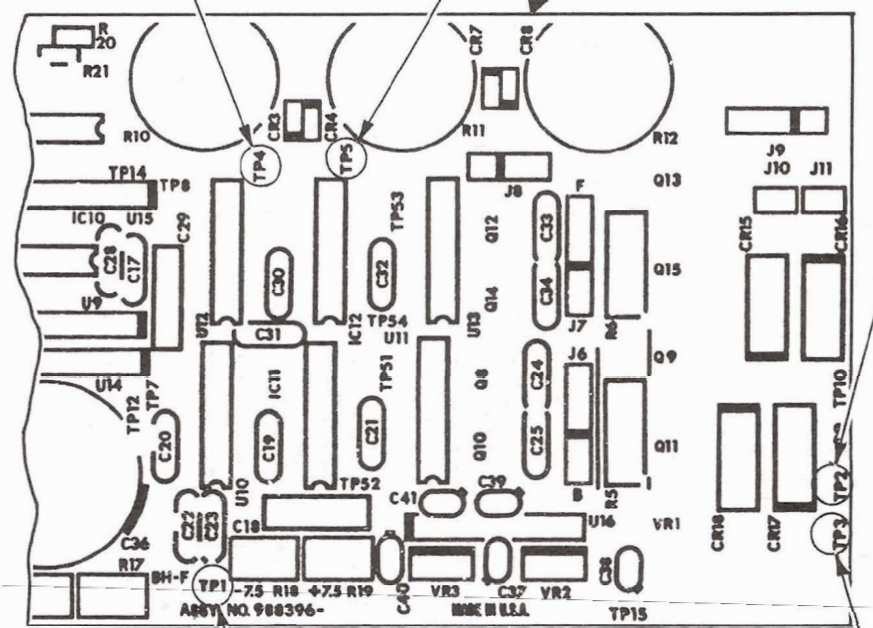
2010A—ELECTRONIC TEST POINTS—MAIN CONTROL BOARD

TEST POINT	DESCRIPTION	READING CONDITIONS	EXPECTED OUTPUT	ACCEPTABLE RANGE
TP-1	GROUND OR COMMON	USE FOR ALL V.D.C. TEST POINT MEASUREMENTS. CONNECT NEGATIVE LEAD FROM METER HERE.	0 VOLTS	
TP-2	POSITIVE D.C. CONTROL VOLTAGE-REGULATED SUPPLY.	PLACE MACHINE IN STRAIGHT STITCH, SINGLE PATTERN WITH PRESSER FOOT RAISED. RUN MACHINE FOR SEVERAL CYCLES. FACTORY PRESET. CAN ONLY BE ADJUSTED WITH DIGITAL METER TO OBTAIN REQUIRED ACCURACY.	+7.50VDC	+7.45VDC TO +7.55VDC
TP-3	NEGATIVE D.C. CONTROL VOLTAGE-REGULATED SUPPLY	PLACE MACHINE IN STRAIGHT STITCH, SINGLE PATTERN WITH PRESSER FOOT RAISED. RUN MACHINE FOR SEVERAL CYCLES. FACTORY PRESET. CAN ONLY BE ADJUSTED WITH DIGITAL METER TO OBTAIN REQUIRED ACCURACY.	-7.50VDC	-7.45VDC TO -7.55VDC
TP-4	POSITIVE D.C. POWER VOLTAGE- UNREGULATED SUPPLY	OUTPUT WILL VARY WITH LINE VOLTAGE.	+15VDC	+14.0VDC TO +15.5VDC*
TP-5	NEGATIVE D.C. POWER VOLTAGE- UNREGULATED SUPPLY	OUTPUT WILL VARY WITH LINE VOLTAGE.	-15VDC	-14.0VDC TO -15.5VDC*

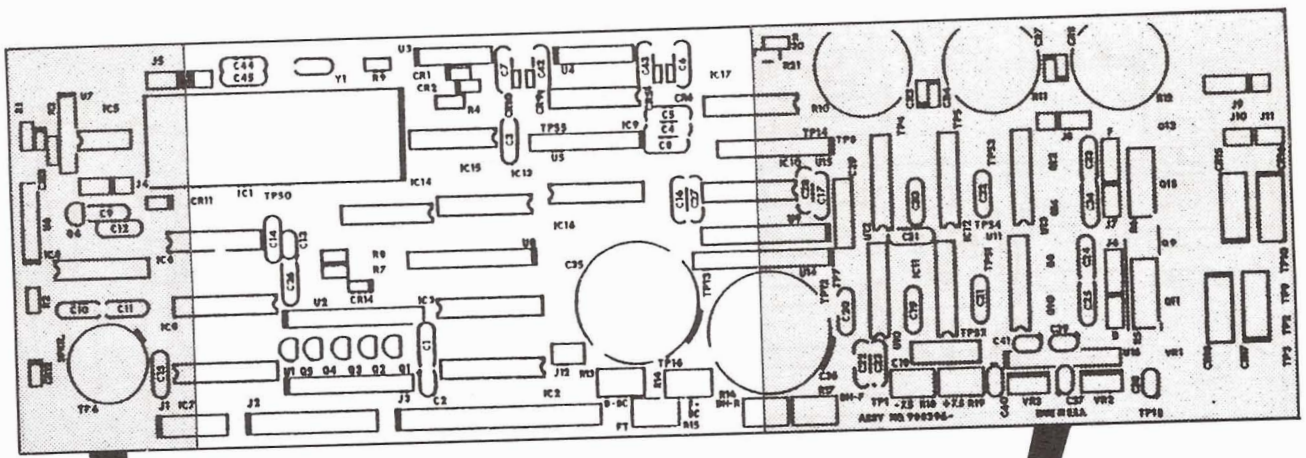
*ACCEPTABLE RANGE WILL VARY DEPENDENT ON ACTUAL LINE VOLTAGE. ACCEPTABLE RANGE GIVEN IS WITH LINE VOLTAGE AT ITS NOMINAL VALUE. READING IS TO BE CONSIDERED ACCEPTABLE IF ALL OTHER VOLTAGE READINGS ARE WITHIN ACCEPTABLE RANGE AND MACHINE FUNCTIONS ARE CORRECT.

MAIN CONTROL BOARD





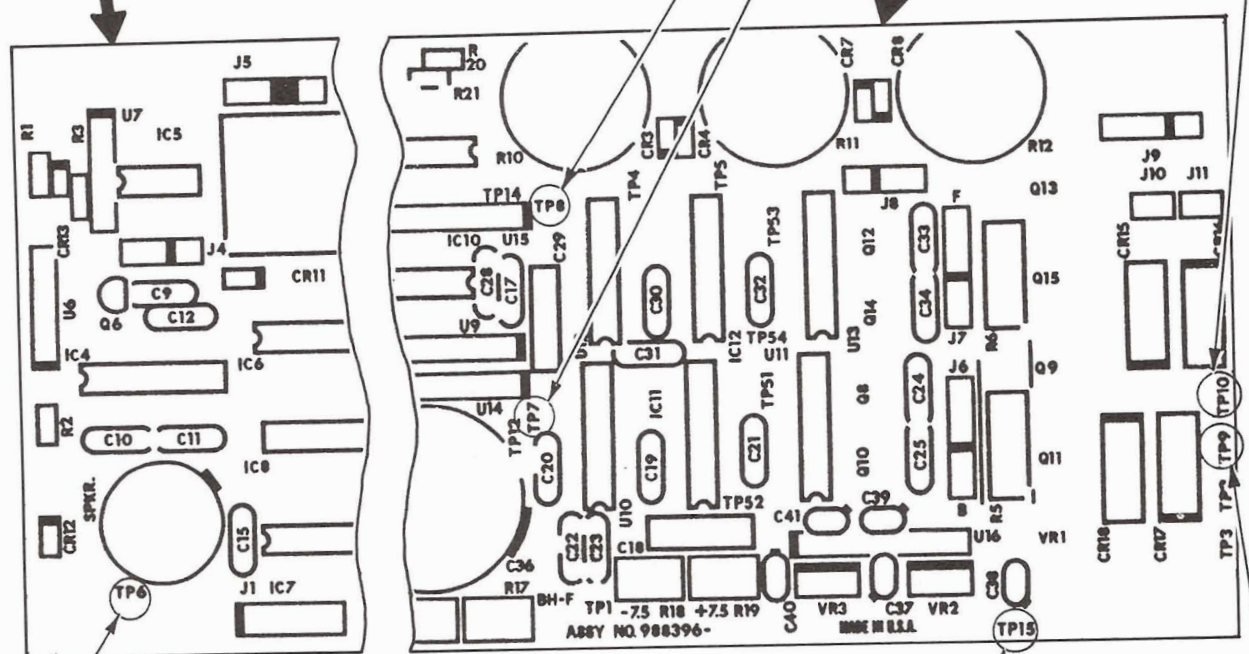
MAIN CONTROL BOARD



0 VDC ±.010VDC — +.960 ±.015VDC
STRAIGHT STITCH — RIC RAC
SINGLE PATTERN — LEFT NEEDLE

0 VDC ±.010VDC — +.920VDC ±.015VDC
RIC RAC — RIC RAC
SINGLE PATTERN — FORWARD FEED

±1.8VDC MAXIMUM
HONEYCOMB



0 VDC ±.5VDC — +5VDC ±.5VDC
SENSOR ON — SENSOR OFF

±5VDC ±.5VDC
POSITIVE DC VOLTAGE REGULATED

±1.8VDC MAXIMUM
HONEYCOMB

2010A—ELECTRONIC TEST POINTS—MAIN CONTROL BOARD

TEST POINT	DESCRIPTION	READING CONDITIONS	EXPECTED OUTPUT	ACCEPTABLE RANGE
TP-6	ARMSHAFT POSITION INDICATOR	ROTATE ARMSHAFT TO GET OUTPUT. SENSOR MUST CHANGE FROM POSITIVE TO ZERO OUTPUT ONCE PER REVOLUTION.	0VDC SENSOR ON +5VDC SENSOR OFF	±.5VDC +4.5VDC TO +5.5VDC
TP-7	BIGHT OUTPUT	PLACE MACHINE IN STRAIGHT STITCH AND SINGLE PATTERN. ROTATE ARMSHAFT THROUGH SEVERAL REVOLUTIONS. PLACE MACHINE IN RIC-RAC. ROTATE ARMSHAFT THROUGH SEVERAL REVOLUTIONS TO BRING NEEDLE TO LEFT NEEDLE POSITION.	0 VDC +.960VDC	±.010VDC +.975VDC TO +.945VDC
TP-8	FEED OUTPUT	PLACE MACHINE IN RIC-RAC AND SINGLE PATTERN. ROTATE ARMSHAFT THROUGH SEVERAL REVOLUTIONS. PLACE MACHINE IN RIC-RAC. ROTATE ARMSHAFT THROUGH SEVERAL REVOLUTIONS TO BRING FEED TO FORWARD FEED.	0 VDC +.920VDC	±.010VDC +.935VDC TO +.905VDC
TP-9	BIGHT POSITION ERROR VOLTAGE	PLACE MACHINE IN HONEYCOMB. ROTATE ARMSHAFT SIX TIMES BY HAND. OBSERVE VARIATION IN VOLTAGE WITH EACH REVOLUTION.	±1.8VDC MAXIMUM	±1.8VDC MAXIMUM. VALUES IN EXCESS OF ABOVE INDICATE MECHANICAL BINDS IN BIGHT SYSTEM OR FAILURE OF THE LINEAR MOTOR.
TP-10	FEED POSITION ERROR VOLTAGE	PLACE MACHINE IN HONEYCOMB, PRESSER FOOT UP. ROTATE ARMSHAFT SIX TIMES BY HAND. OBSERVE VARIATION IN VOLTAGE WITH EACH REVOLUTION.	±1.8VDC MAXIMUM	±1.8VDC MAXIMUM. VALUES IN EXCESS OF ABOVE INDICATE MECHANICAL BINDS IN FEED SYSTEM OR FAILURE OF THE LINEAR MOTOR.
TP-15	POSITIVE D.C. CONTROL VOLTAGE-REGULATED SUPPLY	OUTPUT WILL VARY WITH LINE VOLTAGE.	+5VDC	+4.5VDC TO +5.5VDC

Cleaning The Control Panel

In the event the control panel requires cleaning, the following solutions only are recommended:

5% soap solution, by volume, of Ivory Flakes
5% detergent solution, by volume, of Mr. Clean, Windex

Under no conditions should any chlorinated solvents or alcohols be used. This would include such solvents as methyl ethyl keytone, toluene, trichloroethane, trichloroethlene, or nail polish remover. Use of these or similar solvents will result in damage to the panel.

SEQUENCE OF ELECTRONIC AND ELECTRO/MECHANICAL ADJUSTMENTS

Since needle, feed and various other functions are controlled by the electronics, it is impossible to determine whether many of the mechanical adjustments are correct without first verifying the electronic control systems. Therefore, any machine received for service, must have the electronic systems verified as outlined in the "Sequence of Electronic and Electro/Mechanical Checks and Adjustments", before attempting any further adjustments.

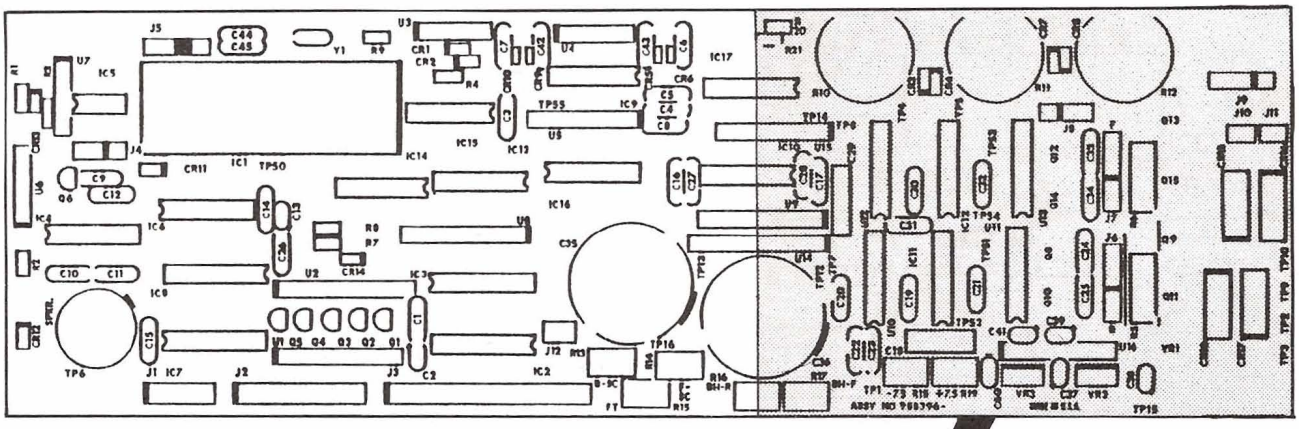
SEQUENCE OF ELECTRONIC AND ELECTRO/MECHANICAL CHECKS AND ADJUSTMENTS

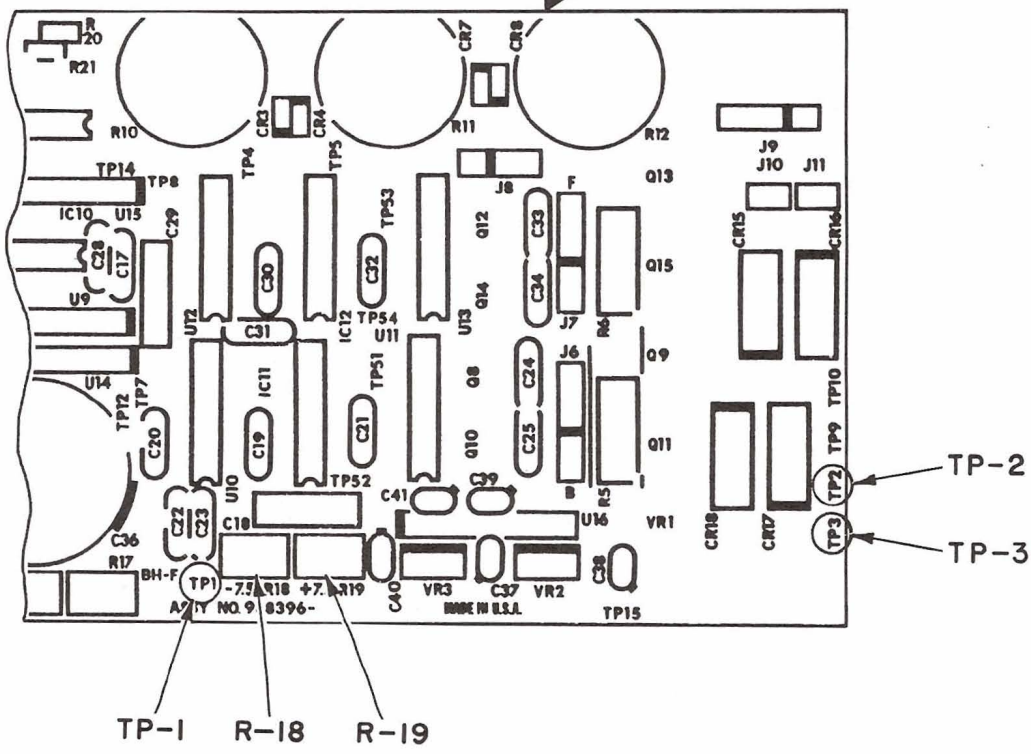
1. GROUND OR COMMON
   - 1.1 CONNECT NEGATIVE LEAD FROM METER TO (TP-1) ON THE MAIN CONTROL BOARD. USE FOR ALL TEST POINT MEASUREMENTS AND ADJUSTMENTS.

2. POSITIVE DC REGULATED VOLTAGE
   - 2.1 METER ON D.C.V. 10 VOLT RANGE.
   - 2.2 CONNECT POSITIVE LEAD TO (TP-2) ON THE MAIN CONTROL BOARD.
   - 2.3 READING: +7.50 V.D.C. $\pm$.05 V.D.C.
   - 2.4 ADJUST POTENTIOMETER (R-19) ON THE MAIN CONTROL BOARD.

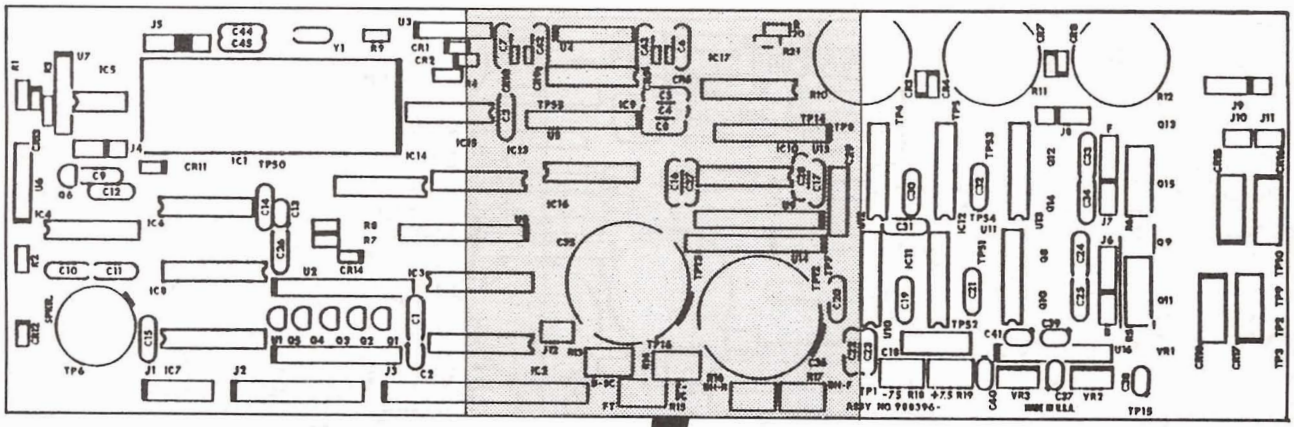
3. NEGATIVE DC REGULATED VOLTAGE
   - 3.1 METER ON D.C.V. 10 VOLT RANGE.
   - 3.2 CONNECT POSITIVE LEAD TO (TP-3) ON THE MAIN CONTROL BOARD.
   - 3.3 ADJUST POTENTIOMETER (R-18) ON THE MAIN CONTROL BOARD.

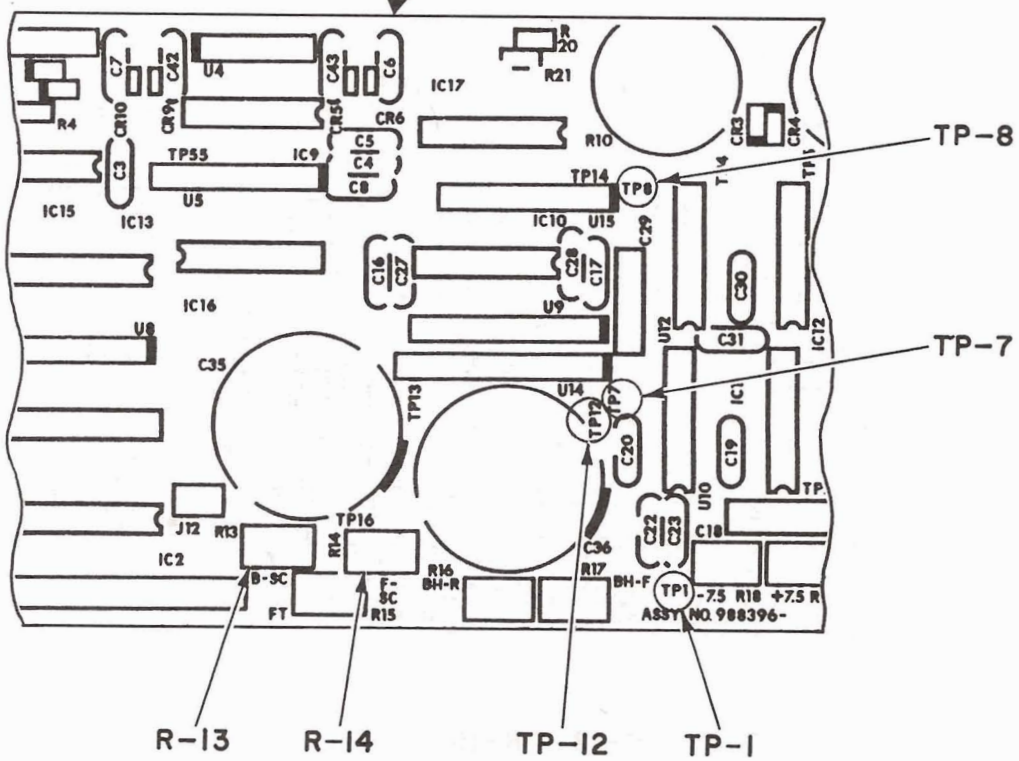
MAIN CONTROL BOARD





MAIN CONTROL BOARD





4. BIGHT OUTPUT

4.1 METER D.C.V. MILLIVOLT RANGE.
4.2 CONNECT POSITIVE LEAD TO (TP-7) ON THE MAIN CONTROL BOARD.
4.3 METER D.C.V. MILLIVOLT RANGE.
4.4 SELECT RIC-RAC PATTERN.
4.5 ROTATE ARM SHAFT SEVERAL TIMES TO BRING NEEDLE TO LEFT NEEDLE POSITION.
4.6 READING: +.960 V.D.C. ±.015 D.C.V.
4.7 ADJUST POTENTIOMETER ($\overline{R}$-13) ON THE MAIN CONTROL BOARD.

5. FEED OUTPUT

5.1 METER D.C.V. MILLIVOLT RANGE.
5.2 CONNECT POSITIVE LEAD TO (TP-8) ON THE MAIN CONTROL BOARD.
5.3 SELECT RIC-RAC PATTERN.
5.4 ROTATE ARMSHAFT SEVERAL TIMES TO BRING FEED TO FORWARD FEED.
5.5 READING: +.920 V.D.C. ±.010 V.D.C.
5.6 ADJUST POTENTIOMETER ($\overline{R}$-14) ON THE MAIN CONTROL BOARD.

6. MECHANICAL FEED REQUIREMENT

6.1 VERIFY FEED BRAKE ADJUSTMENT.
6.2 CONNECT JUMPER WIRE FROM (TP-1) TO (TP-12) ON THE MAIN CONTROL BOARD.
6.3 SELECT STRAIGHT STITCH AND SINGLE PATTERN.
6.4 PLACE A PIECE OF FABRIC UNDER THE FOOT AND RUN MACHINE AT TOP SPEED.
6.5 FABRIC MOVEMENT SHALL BE BETWEEN 0 AND 2" (51 MM) PER MINUTE IN REVERSE DIRECTION.
6.6 ADJUST FEED ECCENTRIC. SEE SECTION 3, ALPHA FEED, ALPHA FEED ZEROING.
6.7 REMOVE JUMPER WIRE.

7. BIGHT MECHANISM BIND TEST

7.1 METER D.C.V. 10 VOLT RANGE.

7.2 CONNECT POSITIVE LEAD TO (TP-9) ON THE MAIN CONTROL BOARD.

7.3 SELECT HONEYCOMB.

7.4 ROTATE ARMSHAFT AT LEAST SIX COMPLETE REVOLUTIONS WHILE OBSERVING METER.

7.5 READING: ±1.8 V.D.C. MAXIMUM. READING IN EXCESS OF ±1.8 V.D.C. INDICATES A BIND IN THE BIGHT SYSTEM AND MOVING PARTS. CHECK ALL FRICTIONAL SURFACES AND MOVING PARTS OF THE BIGHT MECHANISM FOR BINDING OR INTERFERENCES; SUCH AS BALL JOINT CONNECTION, NEEDLE BAR BEARINGS, NEEDLE BAR DRIVING ARM, ETC. CHECK LINEAR MOTOR ALONE WITH NO LOAD BY DISCONNECTING NEEDLE BAR DRIVING ARM. READING ±1.0 V.D.C. MAXIMUM. MOTORS READING OVER MAXIMUM ARE TO BE REPLACED.

8. FEED MECHANISM BIND TEST

8.1 METER D.C.V. 10 VOLT RANGE.

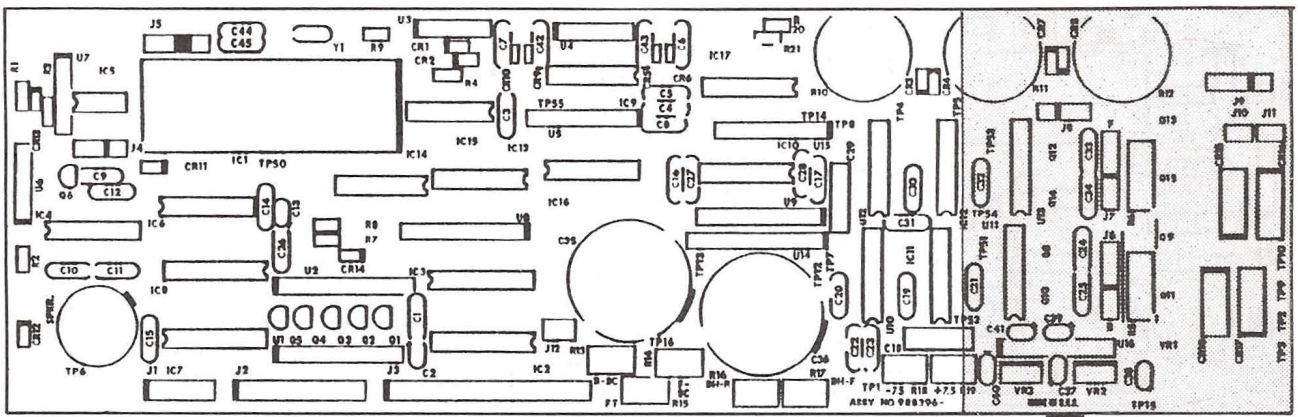
8.2 CONNECT POSITIVE LEAD TO (TP-10) ON THE MAIN CONTROL BOARD.

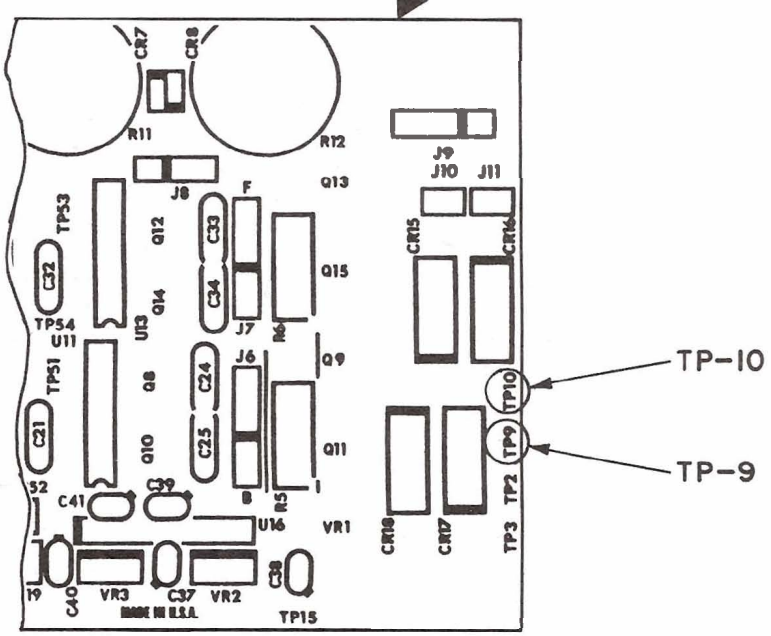
8.3 SELECT HONEYCOMB.

8.4 ROTATE ARM SHAFT AT LEAST SIX REVOLUTIONS WHILE OBSERVING METER.

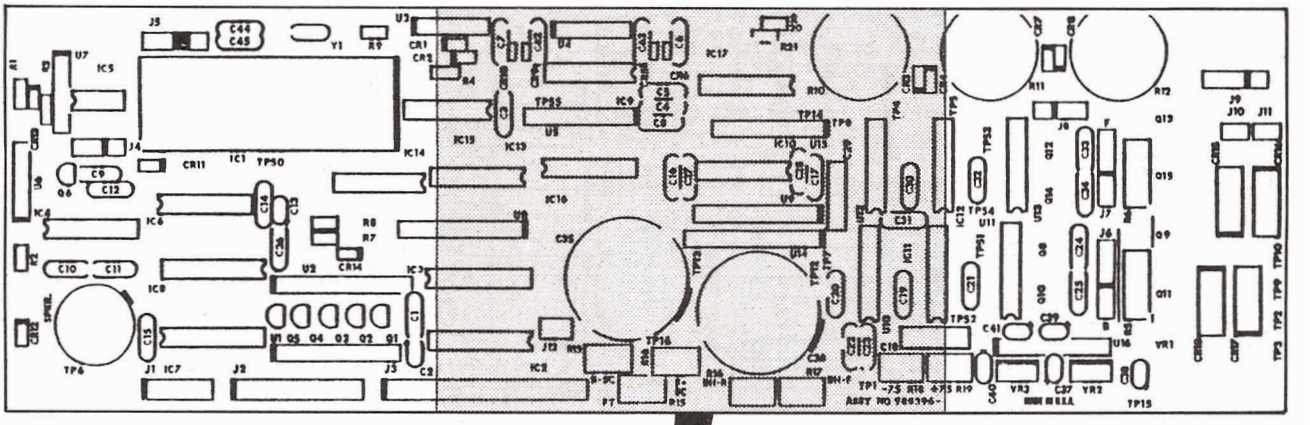
8.5 READING: ±1.8 V.D.C. MAXIMUM. READINGS IN EXCESS OF ±1.8 V.D.C. INDICATE A BIND IN THE FEED SYSTEM. CHECK ALL FRICTIONAL SURFACES AND MOVING PARTS OF THE FEED MECHANISM FOR BINDING OR INTERFERENCES; SUCH AS FEED REGULATOR AND SLIDE BLOCK, FEED BAR CONNECTING LINK, FEED BAR PIVOTS, ETC. CHECK LINEAR MOTOR ALONE WITH NO LOAD BY DISCONNECTING FEED REGULATOR SHAFT CONNECTING LINK. READING ±1.0 V.D.C. MAXIMUM. MOTORS READING OVER MAXIMUM ARE TO BE REPLACED.

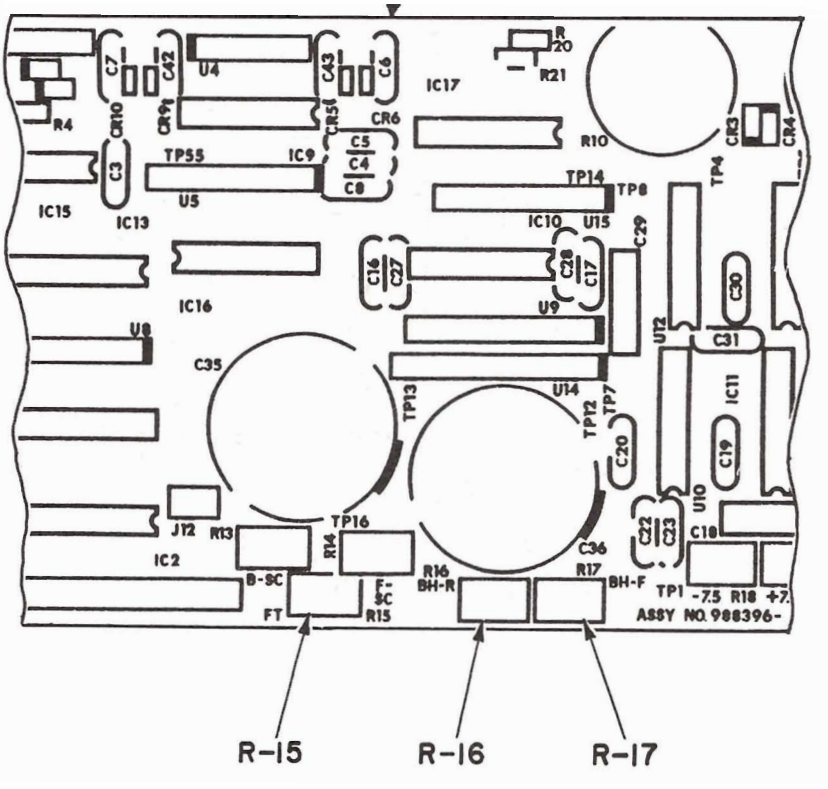
MAIN CONTROL BOARD





MAIN CONTROL BOARD



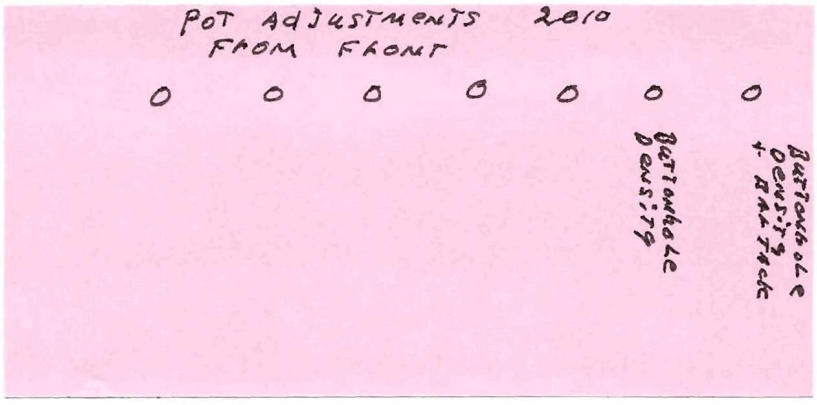


9. FEED TRIM

9.1 ATTACH SPECIAL PURPOSE PRESSER FOOT.
9.2 SET BALANCE CONTROL DIAL TO NEUTRAL POSITION. (INDICATOR LINE VERTICAL).
9.3 SEW TRAIN PATTERN; SINGLE PATTERN.
9.4 **THE COAL CAR SHOULD TOUCH OR BE UP TO BUT NOT EXCEED 1/16" (1,588 MM)** CLEAR OF THE ENGINE.
9.5 ADJUST (R-15) TO SATISFY THE CONDITION IN STEP 9.4.

10. BUTTONHOLE FORWARD AND REVERSE ADJUSTMENT

10.1 ATTACH ONE STEP BUTTONHOLE FOOT WITH UNDERPLATE.
10.2 SELECT LARGE BUTTONHOLE (PROGRAMMED).
10.3 SEW FORWARD LEG OF BUTTONHOLE. FORWARD LEG SHOULD CONTAIN 40 TO 60 S.P.I. (STITCHES PER INCH).
10.4 ADJUST (R-17) TO SATISFY THE CONDITION IN STEP 10.3.
10.5 SEW REVERSE LEG OF BUTTONHOLE. REVERSE LEG SHOULD CONTAIN 45 TO 65 S.P.I. (STITCHES PER INCH).
10.6 ADJUST (R-16) TO SATISFY THE CONDITION IN STEP 10.5.



11. BUTTONHOLE SWITCH ADJUSTMENT

11.1 USING ONE-STEP BUTTONHOLE FOOT WITH UNDERPLATE, BUTTONHOLE FOOT SET FOR ONE INCH BUTTON DIAMETER, SEW LEFT FORWARD LEG OF BUTTONHOLE. VERIFY BUTTONHOLE IS OF CORRECT LENGTH BETWEEN BAR TACKS, 1-1/8" ±1/16" (28,575 MM ±1,588MM).

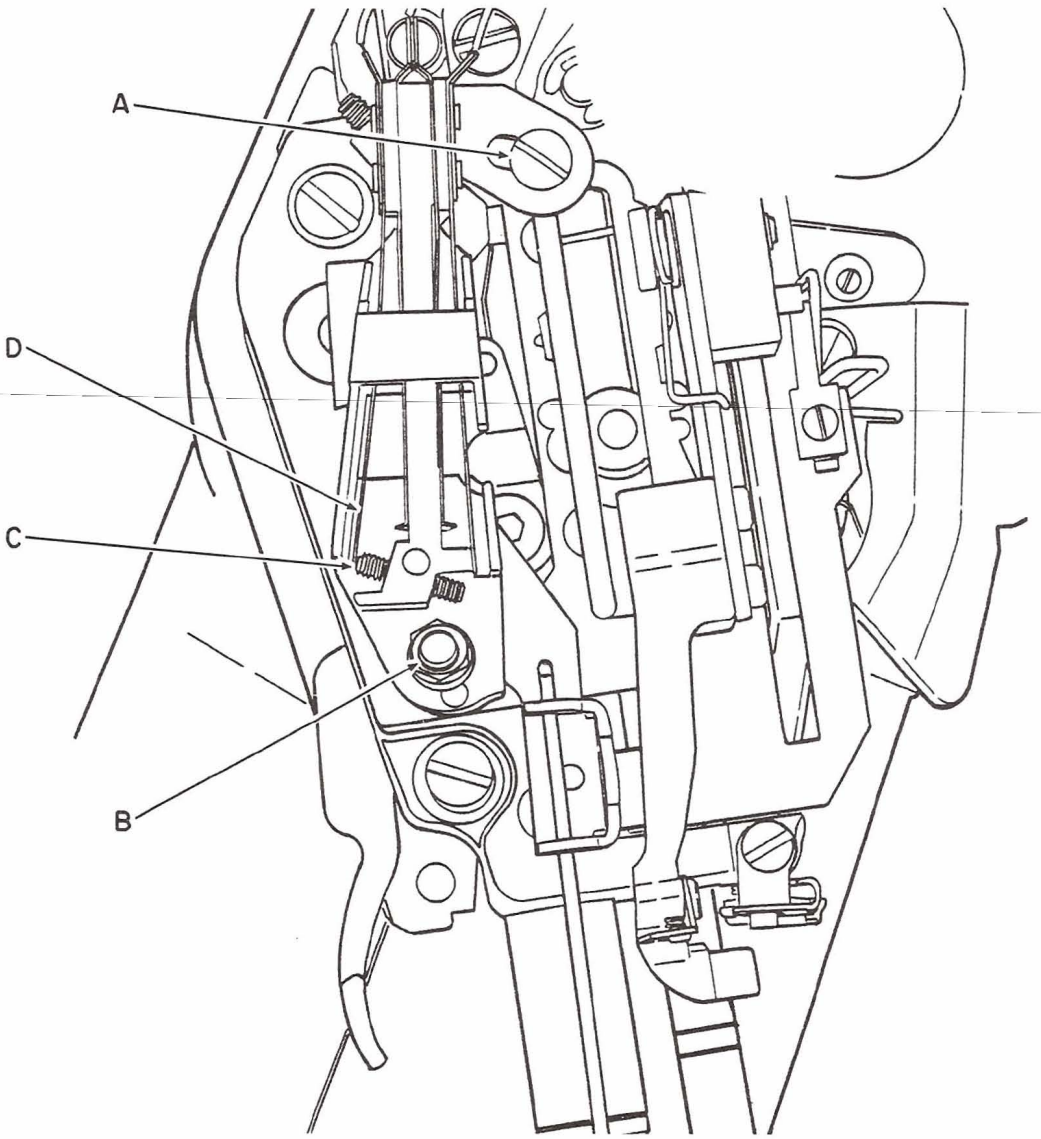
11.2 IF BUTTONHOLE LENGTH REQUIRES ADJUSTMENT LOOSEN SCREW (A) AND NUT (B) MAINTAINING A SLIGHT PINCH ON NUT (B) FOR CONTROL PURPOSES. IF BUTTONHOLE IS TOO LONG PIVOT THE TOP OF THE BUTTONHOLE SWITCH TOWARD THE REAR OF THE MACHINE. IF IT IS TOO SHORT, PIVOT TOWARD THE FRONT OF THE MACHINE. TIGHTEN NUT (B) AND SCREW (A).

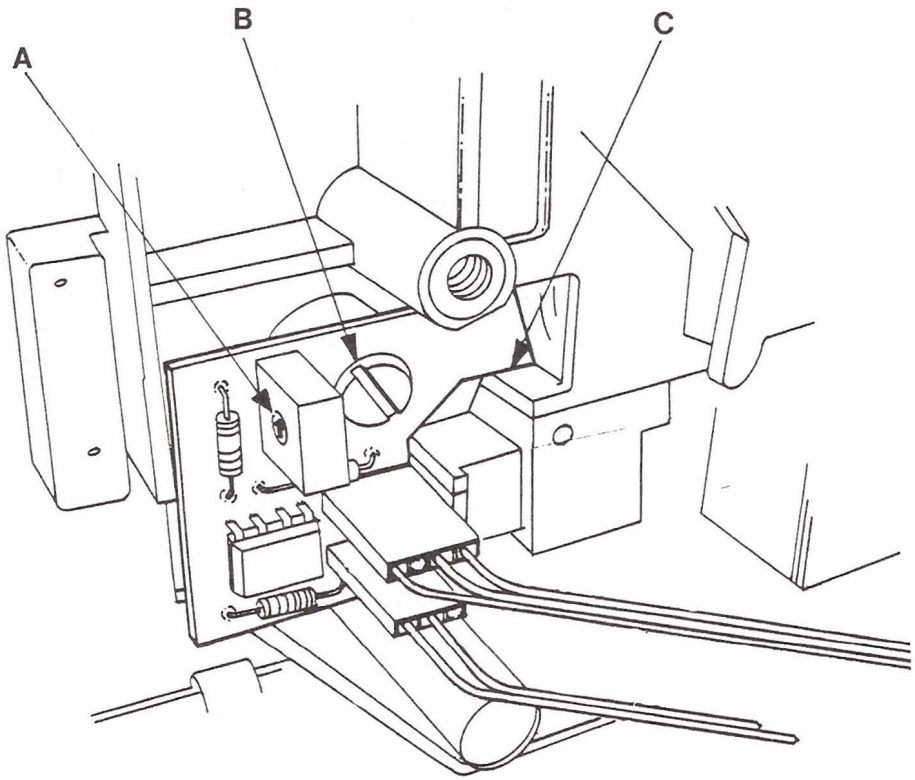
11.3 MAKING SURE THAT THE FEED DOG IS BELOW THE THROAT PLATE AND THE BUTTONHOLE FOOT IS COMPLETELY FORWARD AGAINST THE STOP, TURN SCREW (C) IN (CLOCKWISE) UNTIL THE SCREW TOUCHES THE OUTER CONTACT (D).

11.4 TURN ADJUSTING SCREW (C) OUT 1/2 OF A TURN.

11.5 SEW TEST SEVERAL BUTTONHOLES FOR PROPER REVERSE AND CLOSURE.

11.6 TO MAKE FINE ADJUSTMENT OF BUTTONHOLE CLOSURE, TURN ADJUSTING SCREW (C) IN (CLOCKWISE) TO RETARD THE CLOSURE OR OUT (COUNTERCLOCKWISE) TO ADVANCE THE CLOSURE.


A
D
C
B


A
B
C

12. LOW BOBBIN THREAD INDICATOR

12.1 CHECK THAT THE LOW BOBBIN THREAD INDICATOR P.C. BOARD IS FIRMLY BUTTED. AGAINST THE CASTING AT POINT (C). IF NECESSARY, LOOSEN MOUNTING SCREW (B) AND PROPERLY LOCATE THE BOARD. TIGHTEN SCREW (B).

12.2 SET MACHINE IN AN UPRIGHT POSITION AND INSERT AN EMPTY BOBBIN.

12.3 SET ADJUSTABLE POTENTIOMETER (A) APPROXIMATELY AT ITS MID-POINT OF THE ADJUSTMENT RANGE. THE BOBBIN RUNOUT ALARM L.E.D. SHOULD BE "ON".

12.4 SLOWLY FILL A BOBBIN WHILE COVERING THE LOW BOBBIN INDICATOR BOARD AND HOOK AREA UNDER THE BED WITH A PIECE OF OPAQUE MATERIAL TO PREVENT ANY AMBIENT (SURROUNDING) LIGHT FROM REACHING THE BOBBIN RUNNOUT ALARM SENSOR UNTIL THE BOBBIN RUNOUT ALARM L.E.D. GOES "OFF". STOP FILLING THE BOBBIN AND MEASURE THE AMOUNT OF THREAD ON THE BOBBIN. THERE SHOULD BE BETWEEN 1 AND 4 YARDS OF THREAD REMAINING.

12.5 **TO INCREASE THE AMOUNT OF THREAD ON THE BOBBIN, ROTATE TRIM POTENTIOMETER** (A) COUNTERCLOCKWISE. TO DECREASE THE AMOUNT OF THREAD, ROTATE CLOCKWISE.

ELECTRONIC TROUBLESHOOTING PROCEDURE

The following pages provide the electronic troubleshooting procedure. Because it has been found from experience that it is seldom more than one electronic system that fails at a time, each system has been broken apart separate from the others. For those systems which require verification of other systems covered earlier in the procedure, reference is made back to those systems rather than repeat the entire procedure.

Therefore, it would serve the service person well to memorize certain basic test procedures, such as the "Power Supply Verification" procedure which must be checked regardless of which systems may have failed.

When troubleshooting an electronic failure, it is essential that the sequential order of troubleshooting be followed. **Failure to do so may result in the replacement** of an incorrect electronic assembly and produce further costly failures.

The Functional Test must always precede any troubleshooting procedure. If the machine passes the Functional Test, procede directly to that system which has failed, i.e. Linear Feed or Bight Motor, Bobbin Runout Alarm System, etc.

Once an electronic failure has been diagnosed and the required assembly replaced, it cannot be assumed that all other adjustments, whether electronic, electro/mechanical or mechanical are correct. **It is mandatory that any 2010A machine received** for service or which has had parts replaced, mechanical or electronic, be checked according to the "Sequence of Electronic and Electro/Mechanical Adjustments" and the "Sequential Checklist and Interlocking Adjustments".

CAUTION:

When troubleshooting the electronics, the main control board must be firmly mounted to the machine casting to provide proper heat sinking. **Failure to do so will cause** overheating and a shutdown (loss of function) condition will occur. This may lead to an erroneous diagnosis. If a testing condition requires the main control board to be demounted from the machine casting, the power must be turned off between test procedures.

AC POWER SUPPLY VERIFICATION

TEST LOCATION	TEST POINTS	CORRECTION

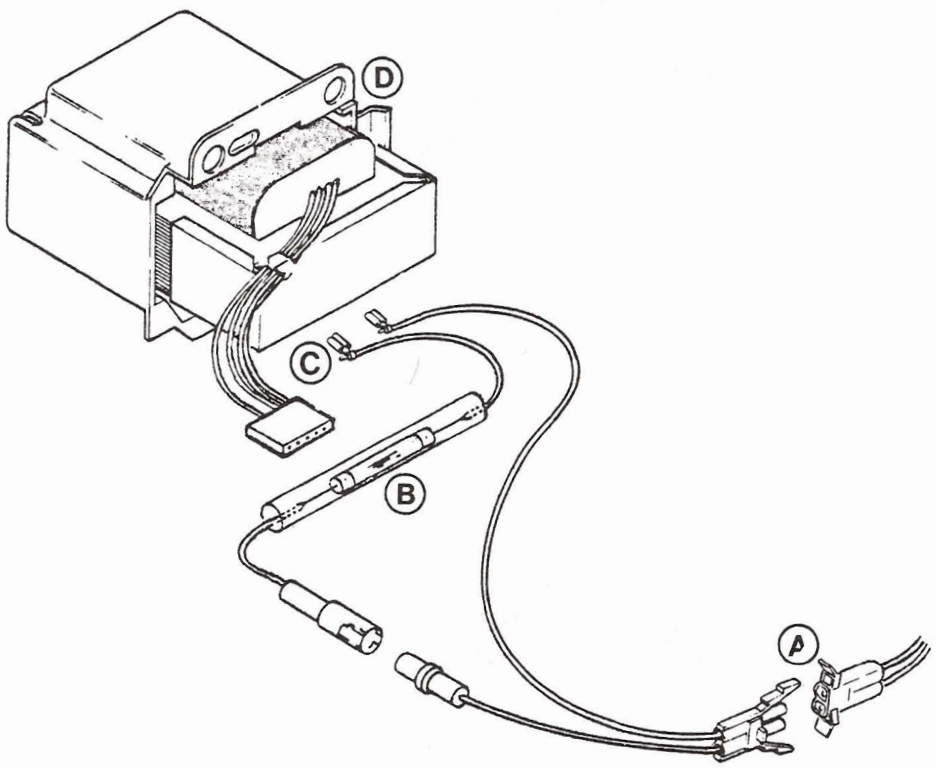
With the power switch on, if the motor runs but the sewing light does not come on and it is not possible to select patterns, check the following:

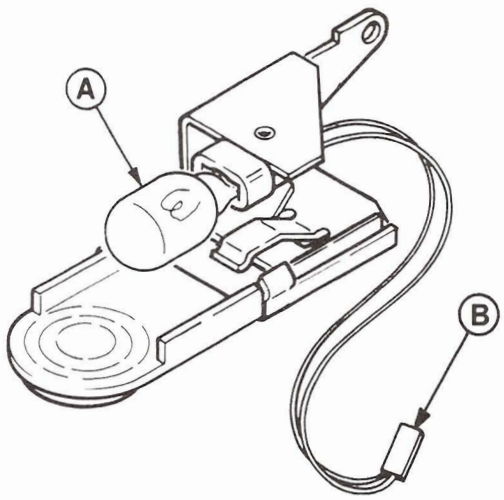
(A) Correct voltage output and proper connection of connectors.

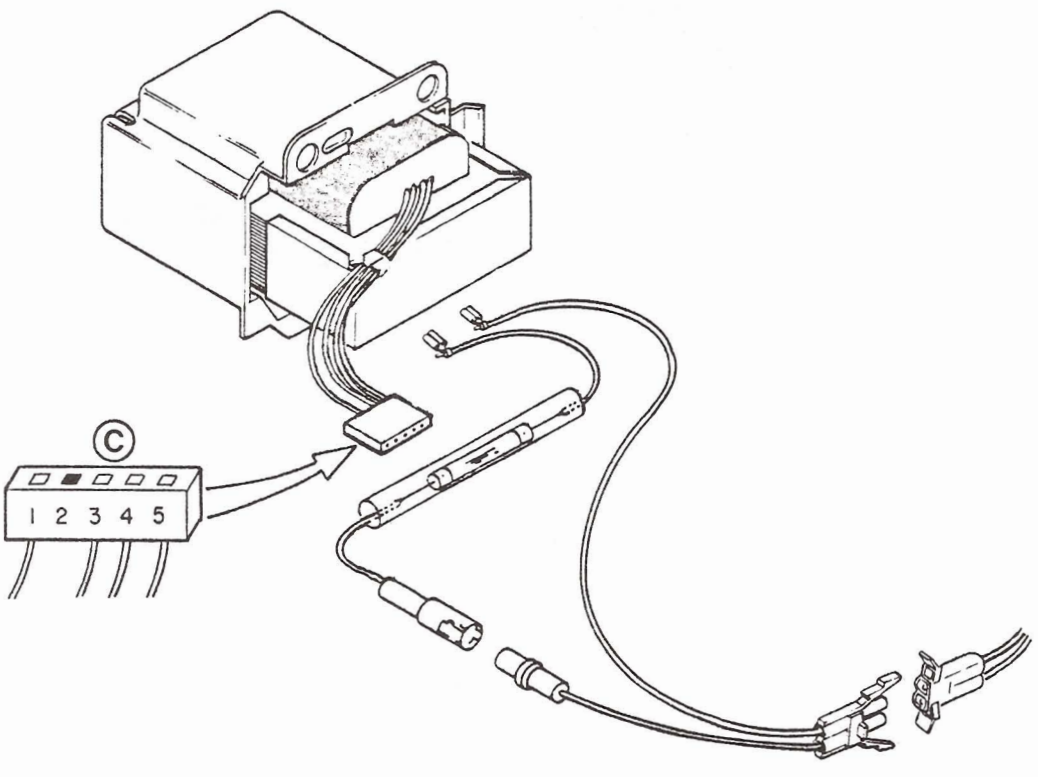
(B) Continuity of line fuse.

(C) Transformer primary harness connectors are properly connected to the transformer.

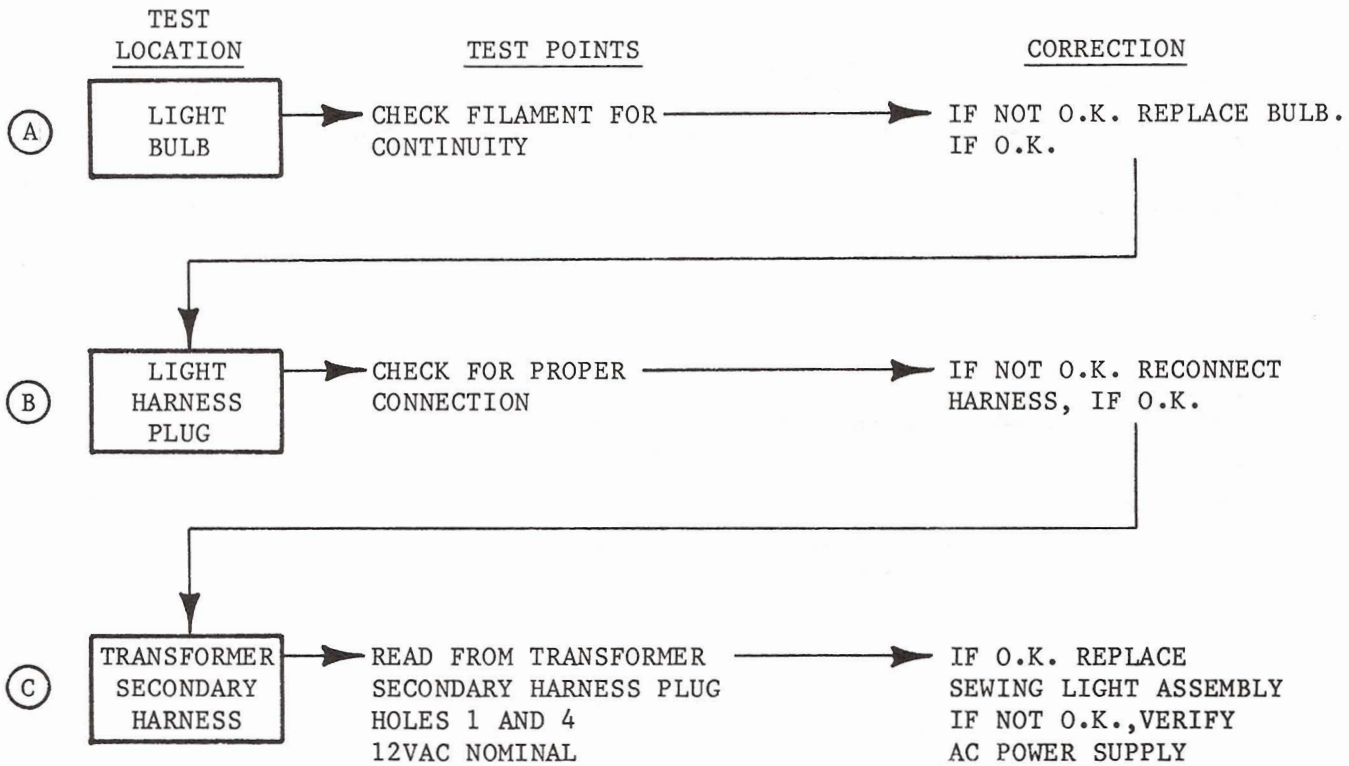
(D) Transformer primary and secondary continuity.


D
C
B
A

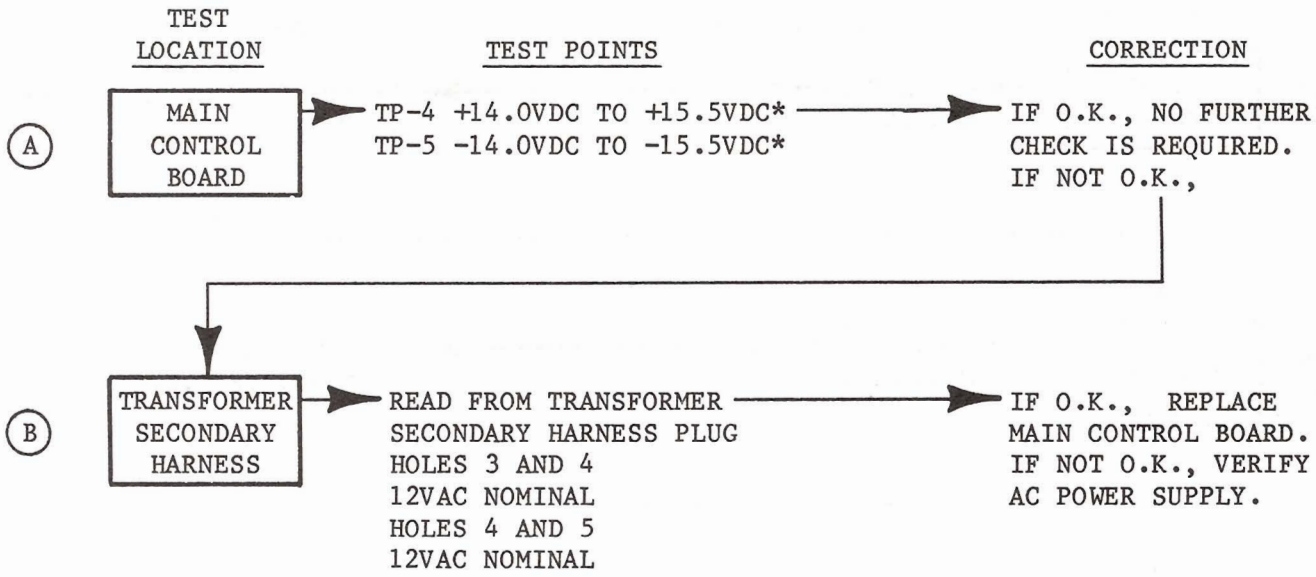

A
B


C
1 2 3 4 5

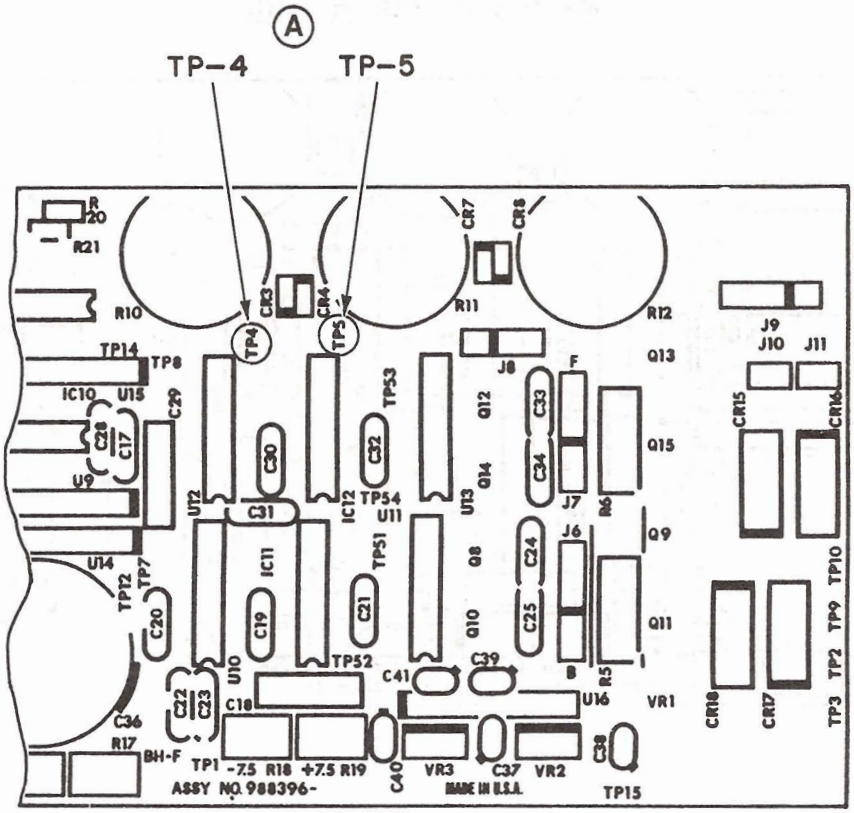
SEWING LIGHT

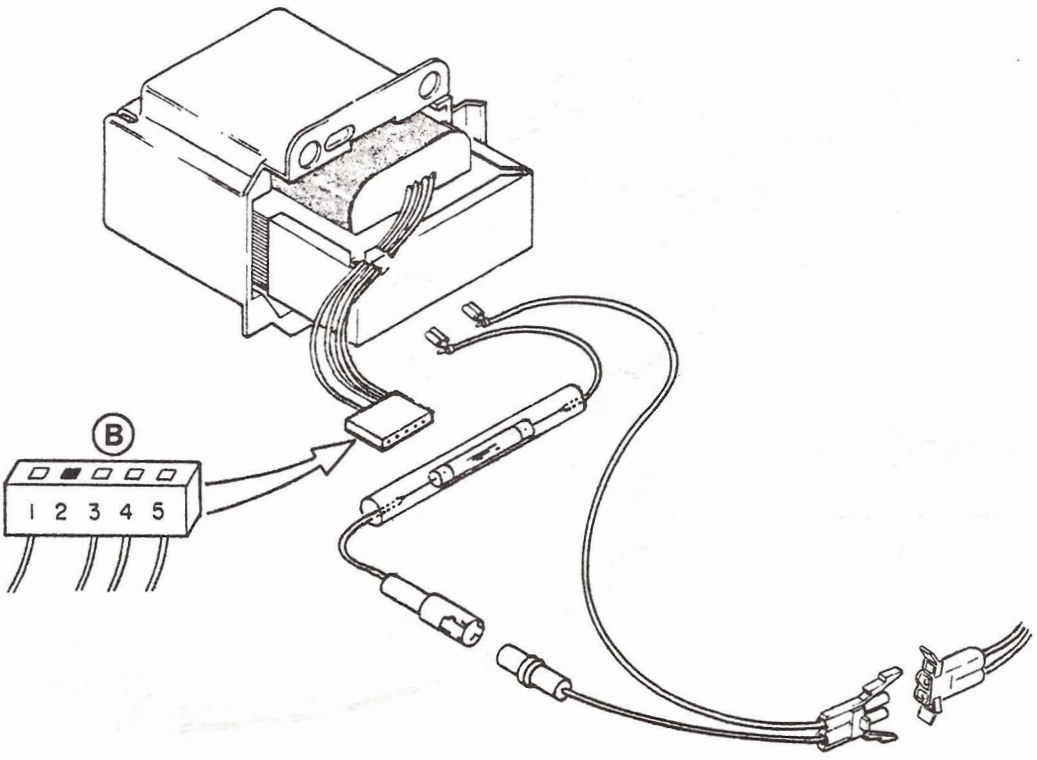


±15VDC UNREGULATED POWER SUPPLY VERIFICATION

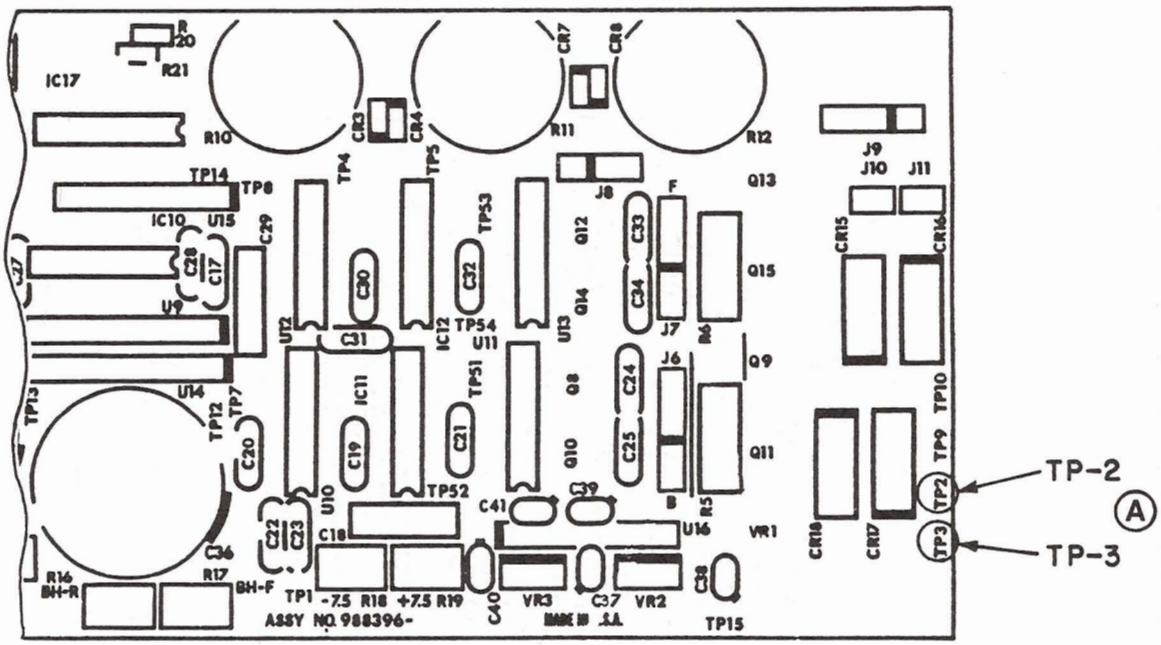


*ACCEPTABLE RANGE WILL VARY DEPENDENT ON ACTUAL LINE VOLTAGE. ACCEPTABLE RANGE GIVEN IS WITH LINE VOLTAGE AT ITS NOMINAL RATING. READING IS TO BE CONSIDERED ACCEPTABLE IF ALL OTHER VOLTAGES READINGS ARE WITHIN ACCEPTABLE RANGE AND MACHINE FUNCTIONS ARE CORRECT.


A
TP-4
TP-5
R20
R21
R10
CR3
CR4
CR7
CR8
R11
R12
J9
J10
J11
TP14
TP8
IC10
U15
C29
C28
C17
U9
U12
C30
C31
TP4
TP5
IC12
TP54
TP53
U11
U13
Q12
Q14
J8
C33
C34
F
J7
Q13
Q15
R6
J6
Q9
Q11
R5
B
U14
TP12
TP7
C20
IC11
C19
U10
TP52
TP51
C21
Q8
Q10
C24
C25
C39
C41
U16
VR1
C22
C23
C18
C36
R17
BH-F
TP1
-7.5
R18
+7.5
R19
C40
VR3
C37
VR2
C38
TP15
ASSY NO. 988396-
MADE IN U.S.A.
CR15
CR16
CR18
CR17
TP10
TP9
TP2
TP3


B
1 2 3 4 5

MAIN CONTROL BOARD



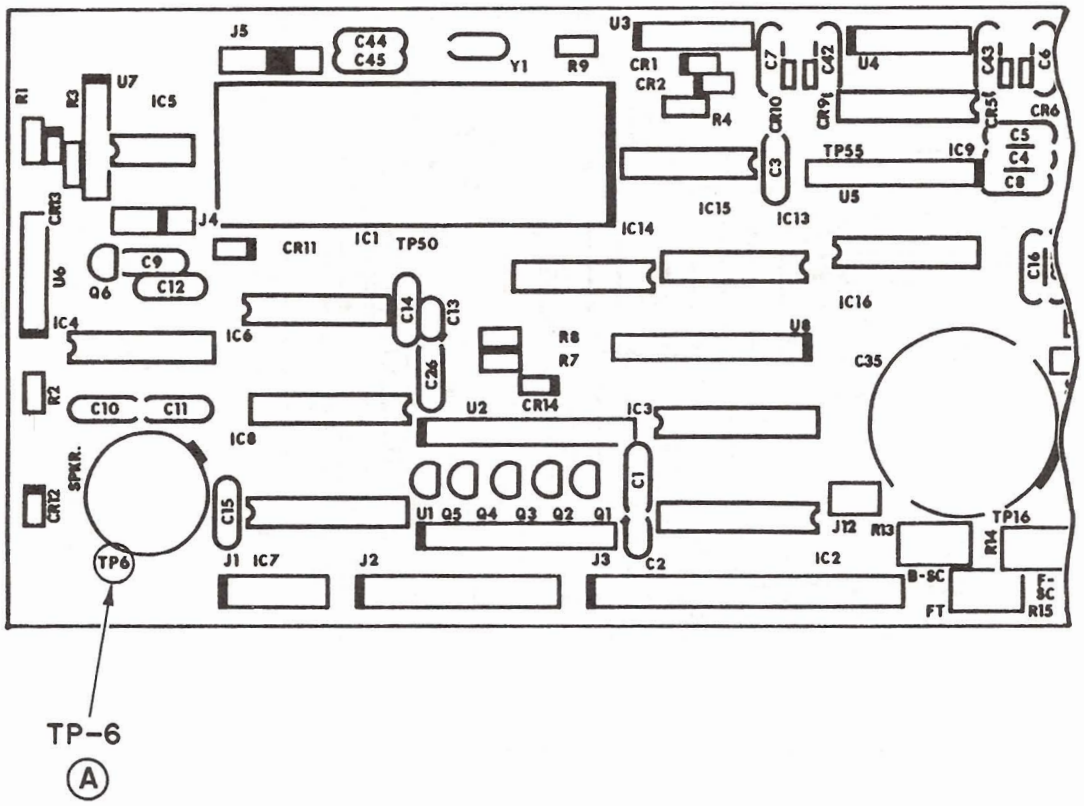
±7.50DC REGULATED VOLTAGE VERIFICATION AND ADJUSTMENT

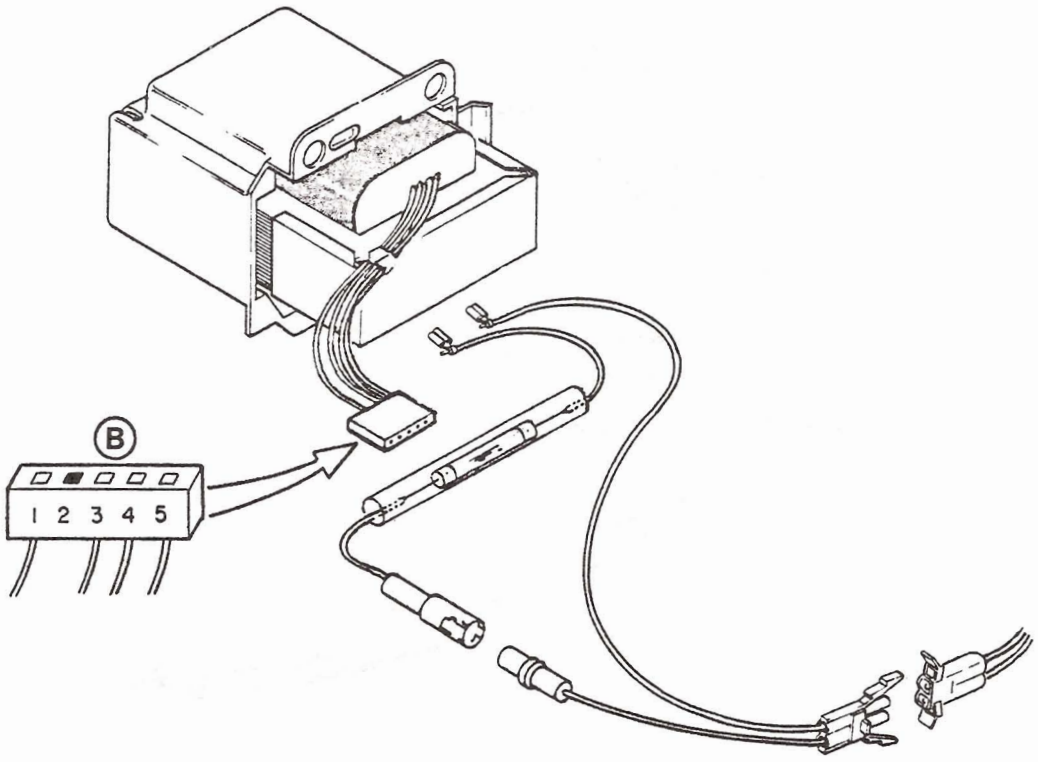
	TEST LOCATION	TEST POINTS	CORRECTION
(A)	MAIN CONTROL BOARD	TP-2 +7.50VDC ±.05VDC TP-3 -7.50VDC ±.05VDC	IF O.K., NO FURTHER CHECK IS REQUIRED. IF NOT O.K., ADJUST TRIM POTENTIOMETER (R-19) FOR THE +7.50VDC SETTING AND (R-18) FOR THE -7.50VDC SETTING. IF UNABLE TO ADJUST WITHIN SPECIFIED TOLERANCE, REPLACE THE MAIN CONTROL BOARD. IF VOLTAGE IS NOT PRESENT.
(B)	TRANSFORMER SECONDARY HARNESS	READ FROM TRANSFORMER SECONDARY HARNESS PLUG HOLES 3 AND 4 12VAC NOMINAL HOLES 4 AND 5 12VAC NOMINAL	IF O.K., REPLACE MAIN CONTROL BOARD. IF NOT O.K., VERIFY AC POWER SUPPLY.

SENSOR

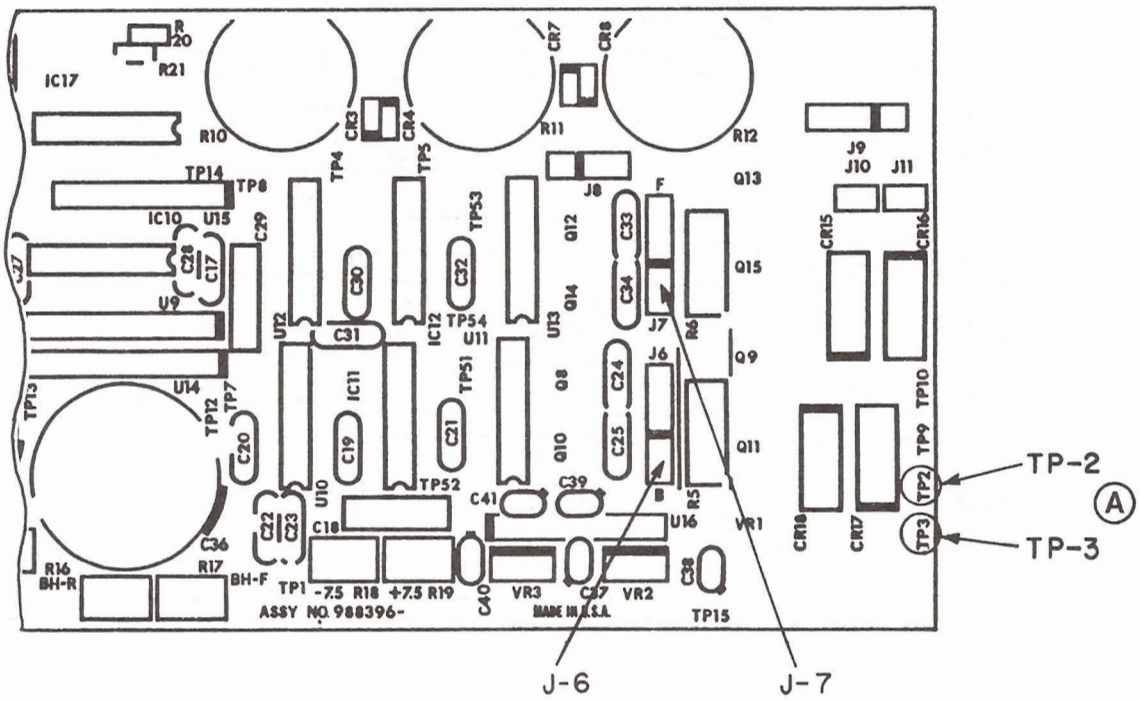
	TEST LOCATION	TEST POINTS	CORRECTION
(A)	MAIN CONTROL BOARD	TP-6, ROTATE HAND WHEEL 0VDC ±.5VDC SENSOR ON +5VDC ±.5VDC SENSOR OFF	IF VOLTAGE DOES NOT CHANGE, REPLACE SENSOR. IF NO VOLTAGE IS PRESENT,
(B)	TRANSFORMER SECONDARY HARNESS	READ FROM TRANSFORMER SECONDARY HARNESS PLUG HOLES 3 AND 4 12VAC NOMINAL HOLES 4 AND 5 12VAC NOMINAL	IF O.K., REPLACE MAIN CONTROL BOARD. IF NOT O.K., VERIFY AC POWER SUPPLY.

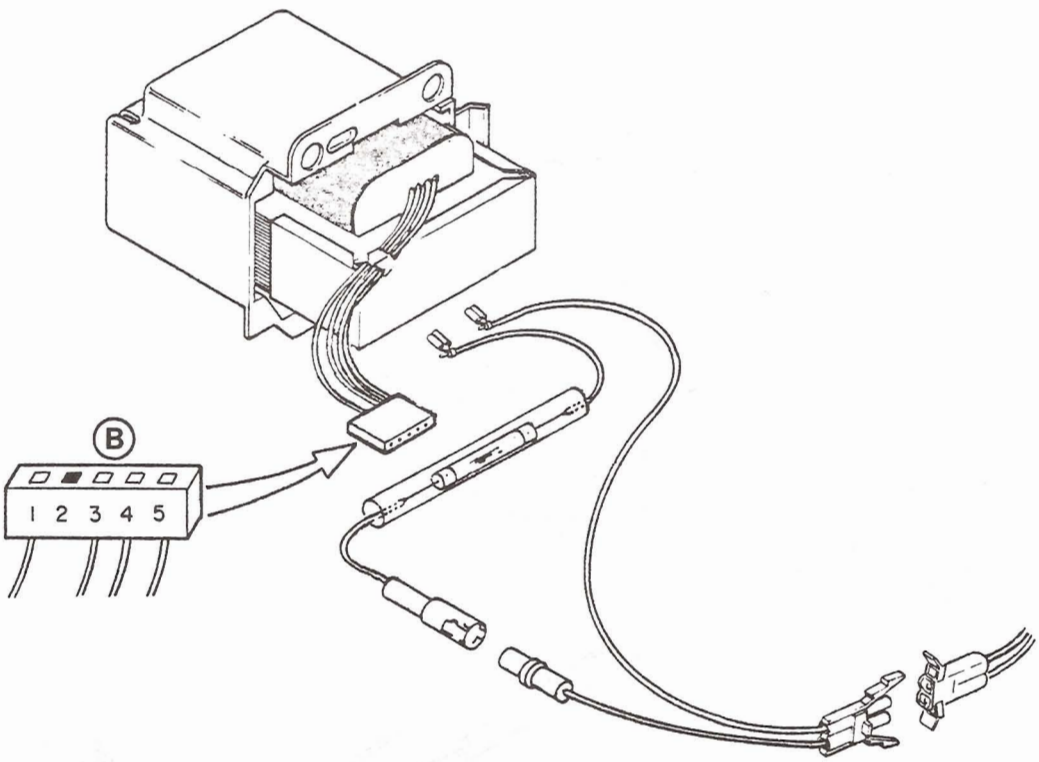
MAIN CONTROL BOARD





MAIN CONTROL BOARD

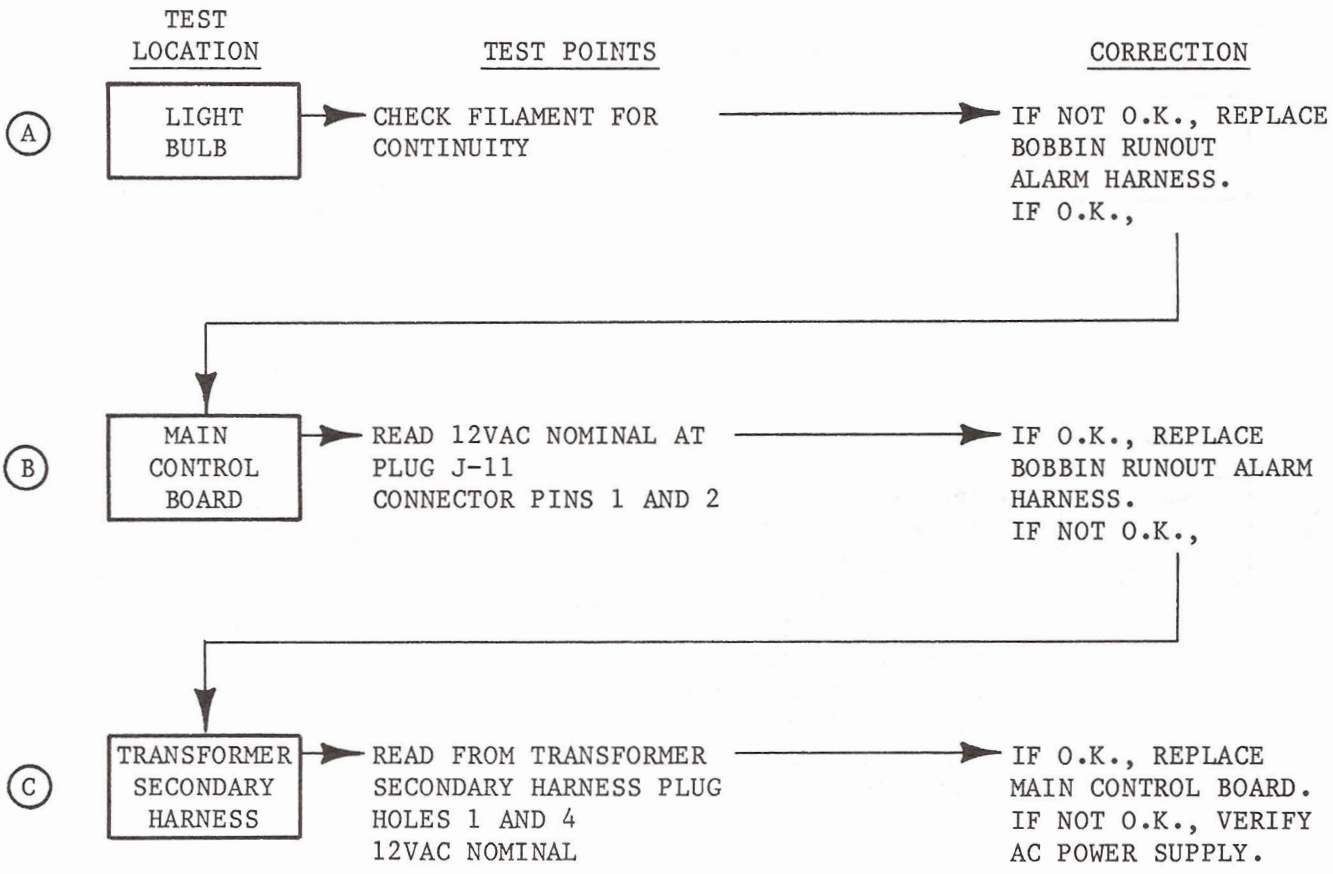


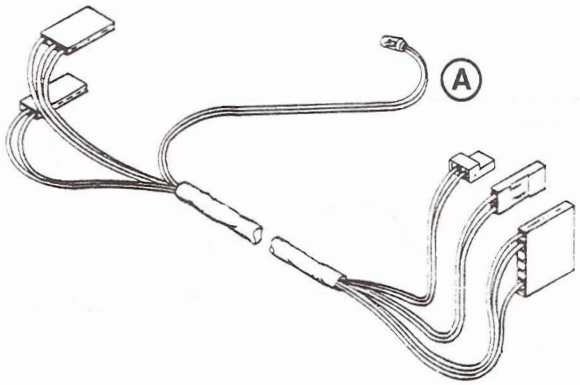


FEED AND BIGHT OUTPUT VERIFICATIONS AND ADJUSTMENTS -- LINEAR FEED AND BIGHT MOTORS

	TEST LOCATION	TEST POINTS	CORRECTION
(A)	MAIN CONTROL BOARD	TP-2 +7.50VDC ±.05VDC TP-3 -7.50VDC ±.05VDC	IF NOT O.K., REFER TO TROUBLESHOOTING SEQUENCE - DC CONTROL VOLTAGE VERIFICATION AND ADJUSTMENT. IF O.K.,
(B)	MAIN CONTROL BOARD	TP-7 BIGHT OUTPUT STRAIGHT STITCH, SINGLE PATTERN 0VDC ±.005VDC RIC-RAC, LEFT NEEDLE POSITION +.960VDC ±.015VDC TP-8 FEED OUTPUT RIC-RAC, SINGLE PATTERN 0VDC ±.005VDC RIC-RAC, FORWARD FEED +.920VDC ±.015VDC	ADJUST (R-13) TO OBTAIN BIGHT OUTPUTS AT TP-7. ADJUST (R-14) TO OBTAIN FEED OUTPUTS AT TP-8. IF ADJUSTMENT IS NOT POSSIBLE, REPLACE MAIN CONTROL BOARD. IF O.K.,
(C)	LINEAR MOTOR	RESISTANCE READINGS, LINEAR MOTOR HARNESS PLUGS J-8 AND J-9; HOLES 1 AND 2 R = 10 OHMS ±10% HOLES 4 AND 5 R = 10,000 OHMS ±20% SET CENTER BUMP ON PLASTIC BOBBIN OF LINEAR MOTOR EVEN WITH FRONT OF LINEAR MOTOR HOUSING. HOLES 3 AND 4 R = 5,000 OHMS ±20% HOLES 3 AND 5 R = 5,000 OHMS ±20%	IF NOT O.K., REPLACE APPROPRIATE LINEAR MOTOR. IF O.K., REPLACE MAIN CONTROL BOARD.

BOBBIN RUNOUT ALARM SYSTEM
A. LIGHT SOURCE (INCANDESCENT)

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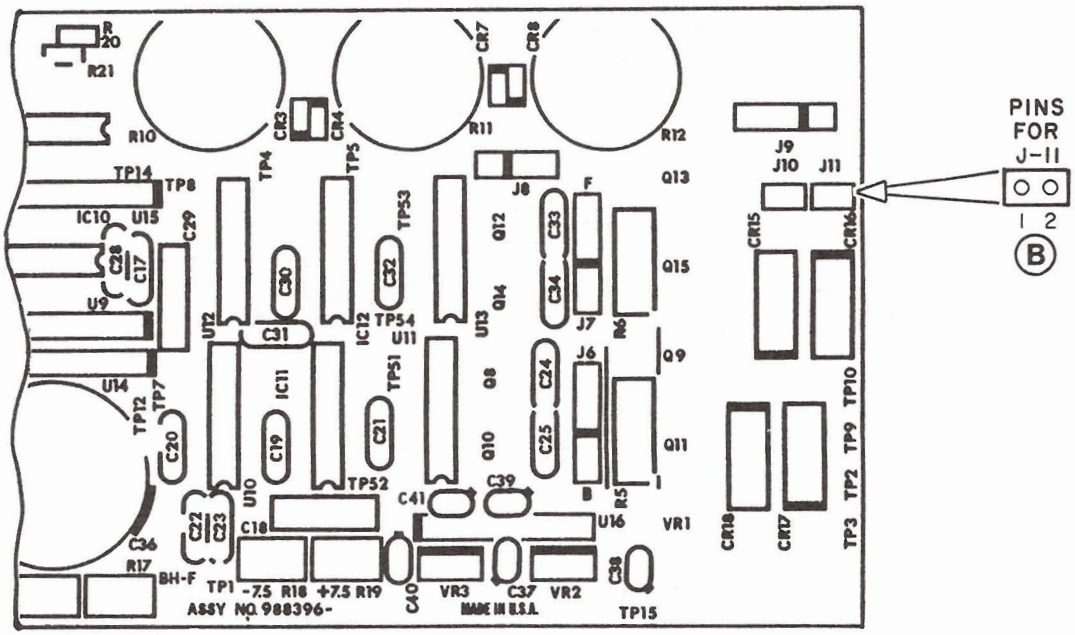
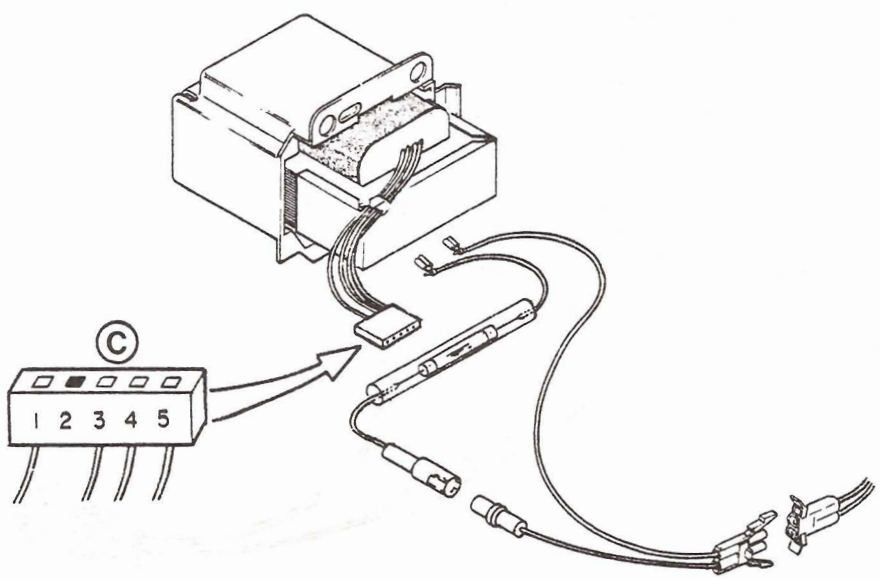
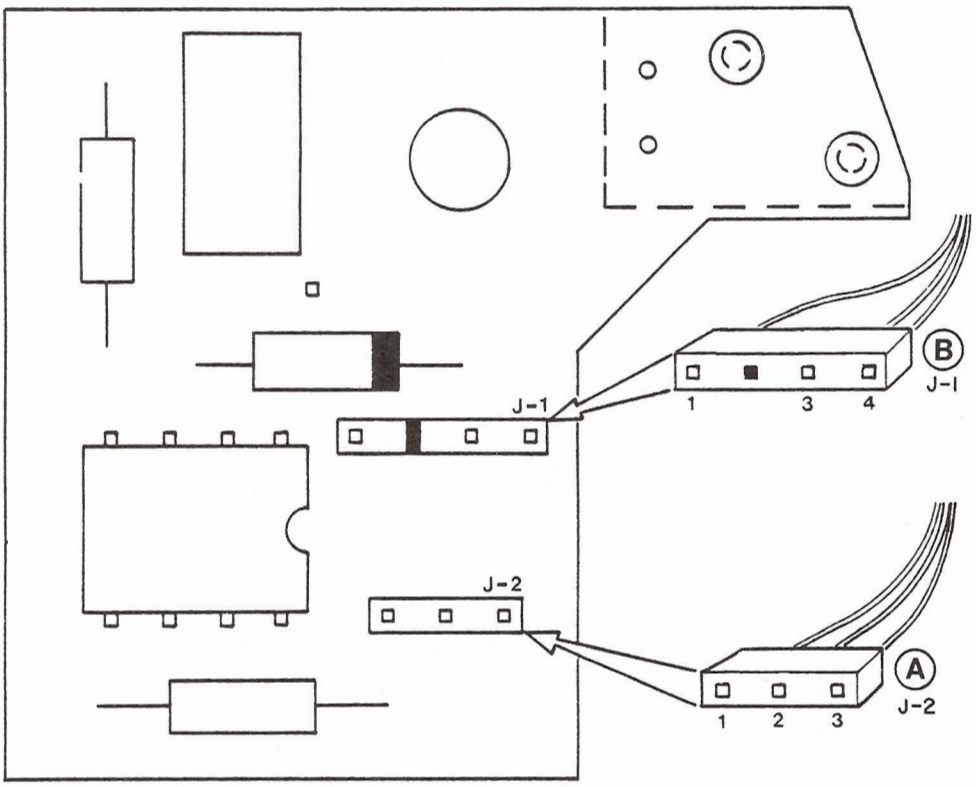
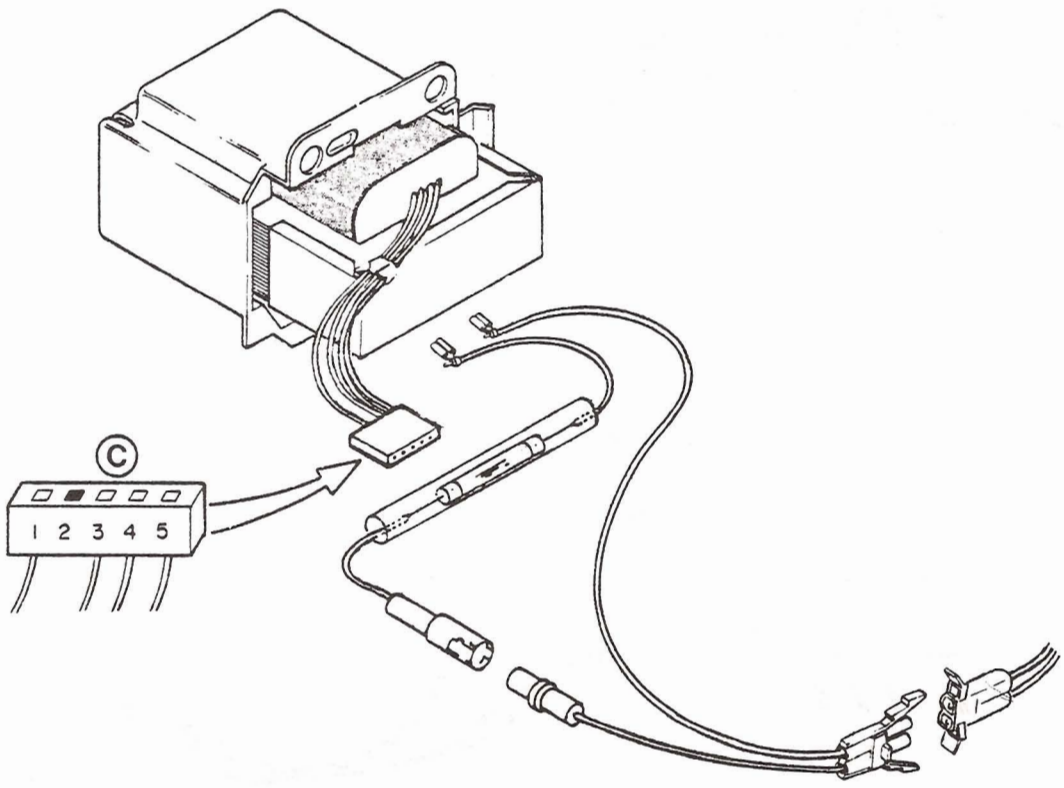

PINS
FOR
J-11
1 2
B
R20
R21
R10
CR3
CR4
CR7
CR8
R11
R12
J9
J10
J11
TP14
TP8
TP4
TP5
J8
Q13
F
IC10
U15
C29
C28
C17
TP3
Q12
C33
U9
C30
C32
TP54
U13
Q14
C34
J7
Q15
R6
U12
Q31
IC12
U11
J6
Q9
U14
TP7
TP12
IC11
TP51
Q8
C24
C20
C19
C21
C25
Q10
Q11
TP52
C39
B
R5
C22
C23
C41
U16
VR1
C36
C18
R17
BH-F
TP1 -7.5 R18 +7.5 R19
C40
VR3
C37
VR2
C38
TP15
ASSY NO. 988396-
MADE IN U.S.A.
CR15
CR16
CR18
CR17
TP10
TP9
TP2
TP3


C
1 2 3 4 5


J-1
J-2
B
J-1
1
3
4
A
J-2
1
2
3


C
1 2 3 4 5

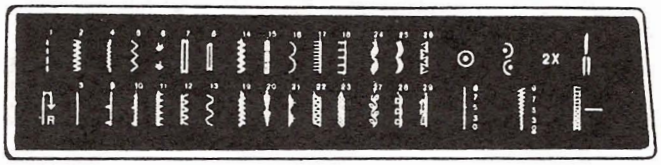
B. L.E.D. INDICATOR AND LOW BOBBIN INDICATOR BOARD

	TEST LOCATION	TEST POINTS	CORRECTION
(A)	INDICATOR BOARD	PLUG J-2. CONNECT POSITIVE LEAD OF 9VDC CURRENT LIMITED SOURCE TO HOLE 1 AND NEGATIVE LEAD TO HOLE 2.	IF L.E.D. DOES NOT LIGHT, REPLACE L.E.D. WITH HARNESS. IF O.K.
(B)	INDICATOR BOARD	PLUG J-1. READ FROM HOLES 1 AND 4 +15VDC $\pm$.5VDC* HOLES 1 AND 3 -15VDC $\mp$.5VDC*	IF O.K., REPLACE LOW BOBBIN INDICATOR BOARD. IF NOT O.K.,
(C)	TRANSFORMER SECONDARY HARNESS	READ FROM TRANSFORMER SECONDARY HARNESS PLUG HOLES 3 AND 4 12VAC NOMINAL HOLES 4 AND 5 12VAC NOMINAL	IF O.K., REPLACE MAIN CONTROL BOARD. IF NOT O.K., VERIFY AC POWER SUPPLY.

*ACCEPTABLE RANGE WILL VARY DEPENDENT ON ACTUAL LINE VOLTAGE. ACCEPTABLE RANGE GIVEN IS WITH LINE VOLTAGE AT ITS NOMINAL RATING. READING IS TO BE CONSIDERED ACCEPTABLE IF ALL OTHER VOLTAGE READINGS ARE WITHIN ACCEPTABLE RANGE AND MACHINE FUNCTIONS ARE CORRECT.

L.E.D. DISPLAY

	TEST LOCATION	TEST POINTS	CORRECTION
(A)	CONTROL PANEL	SELECT ALL PATTERNS AND FUNCTIONS.	IF ALL L.E.D.'S FAIL TO LIGHT, PROCEED TO TEST LOCATION (B). IF 1 to 4 L.E.D.'S FAIL TO LIGHT, REPLACE CONTROL PANEL IF 5 OR MORE, BUT NOT ALL, L.E.D.'S FAIL TO LIGHT
(A)	CONTROL PANEL	SELECT PATTERNS AND FUNCTIONS IN THE FOLLOWING GROUPS. GROUP 1, PATTERN NOS. 1, 2, 4, 12, 16, 22, 26 GROUP 2, PATTERN NOS. AND FUNCTIONS 3, 5, 13, 17, 23, REVERSE, MIRROR IMAGE GROUP 3, PATTERNS NOS. AND FUNCTION 6, 7, 9, 18, 19, 27, 2X GROUP 4, PATTERN NOS. 8, 10, 14, 20, 24, 28 GROUP 5, PATTERN NOS. AND FUNCTION 11, 15, 21, 25 SINGLE PATTERN	IF NONE OF THE PATTERNS IN ONE OR MORE, BUT NOT ALL, THE GROUPS FAIL TO LIGHT, REPLACE MAIN CONTROL BOARD. IF SOME, BUT NOT ALL L.E.D.'S FAIL TO LIGHT IN ONE OR MORE GROUPS, REPLACE CONTROL PANEL.


2X

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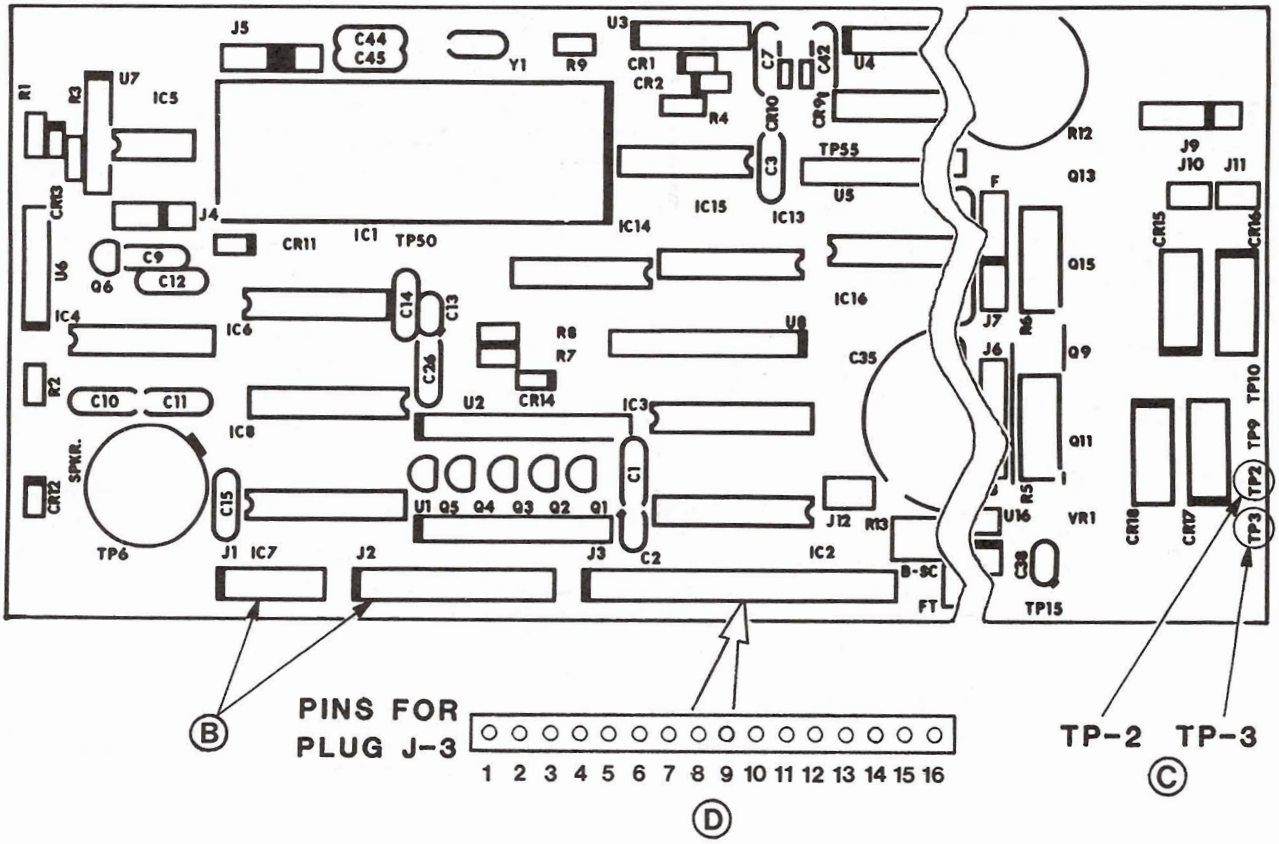
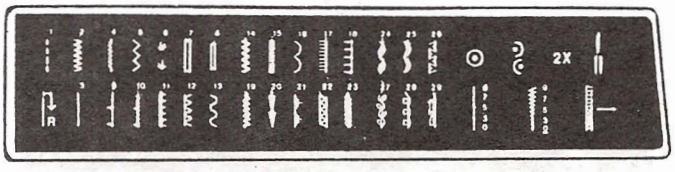
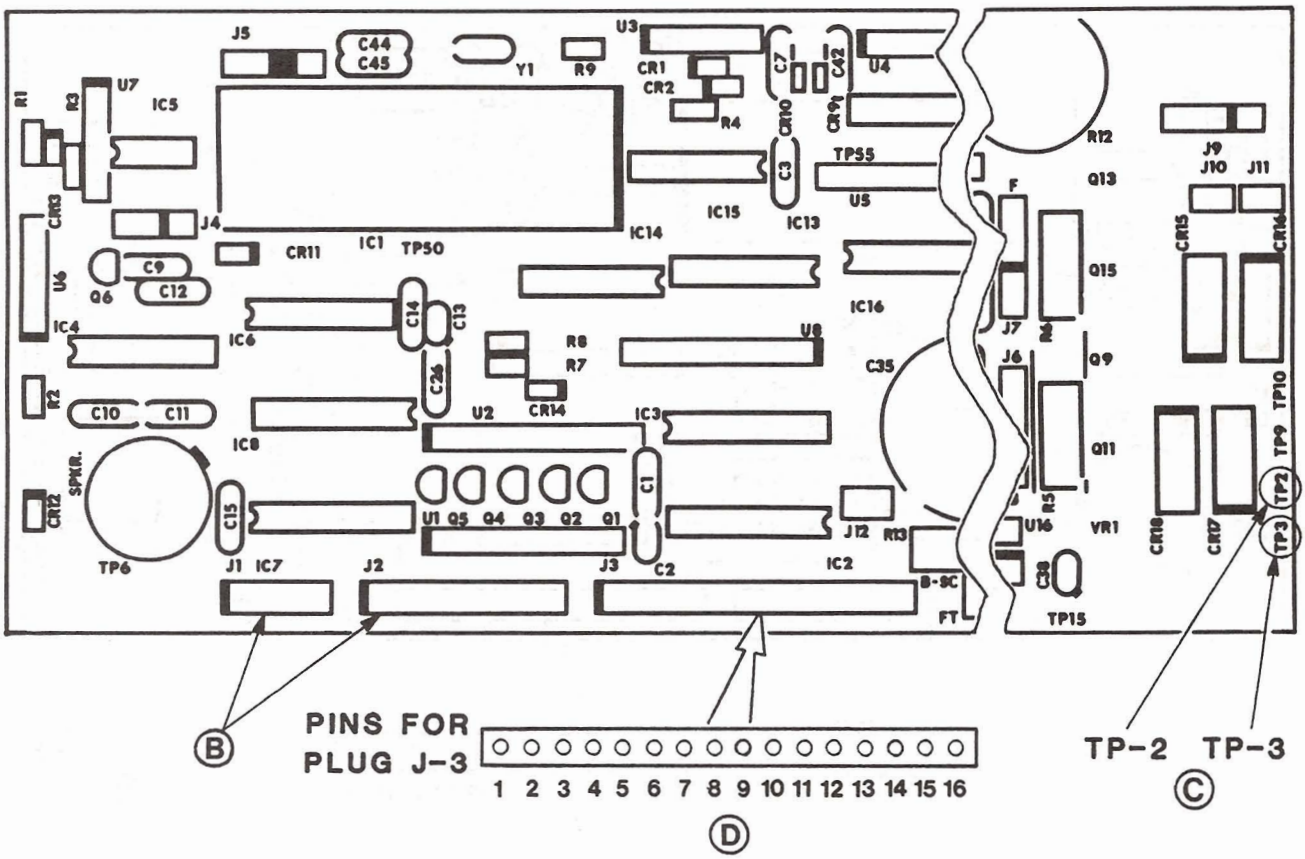

J5
C44
C45
Y1
R9
U3
CR1
CR2
R4
C7
C42
U4
R1
R3
U7
IC5
CR10
CR9
R12
J9
J10
J11
TP55
U5
Q13
F
CR13
J4
IC15
IC13
IC14
CR11
IC1
TP50
CR15
CR16
U6
C9
Q6
C12
IC16
Q15
IC4
C14
C13
IC6
R8
R7
U8
J7
R6
Q9
J6
C35
R2
C10
C11
C26
CR14
U2
IC3
TP9
TP10
IC8
Q11
SPKR.
CR12
C15
U1
Q5
Q4
Q3
Q2
Q1
C1
J12
R13
R5
U16
VR1
CR18
CR17
TP6
J1
IC7
J2
J3
C2
IC2
B-SC
FT
C38
TP15
TP2
TP3
PINS FOR
PLUG J-3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
TP-2
TP-3
Ⓑ
Ⓒ
Ⓓ

Ⓐ




J5
C44
C45
Y1
R9
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CR1
CR2
R4
C7
C42
U4
R1
R3
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C10
CR9
R12
J9
J10
J11
CR13
J4
CR11
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IC14
IC15
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TP55
U5
F
Q13
C9
Q6
C12
CR15
CR16
U6
IC4
IC6
C14
C13
IC16
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J7
J6
Q9
C35
R2
C10
C11
C26
CR14
U2
IC3
TP9
TP10
IC8
Q11
SPKR.
CR12
C15
U1
Q5
Q4
Q3
Q2
Q1
C1
J12
R13
R5
U16
VR1
CR18
CR17
TP2
TP3
TP6
J1
IC7
J2
J3
C2
IC2
B-SC
FT
TP15
PINS FOR
PLUG J-3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
TP-2
TP-3
Ⓑ
Ⓒ
Ⓓ

(REV.)

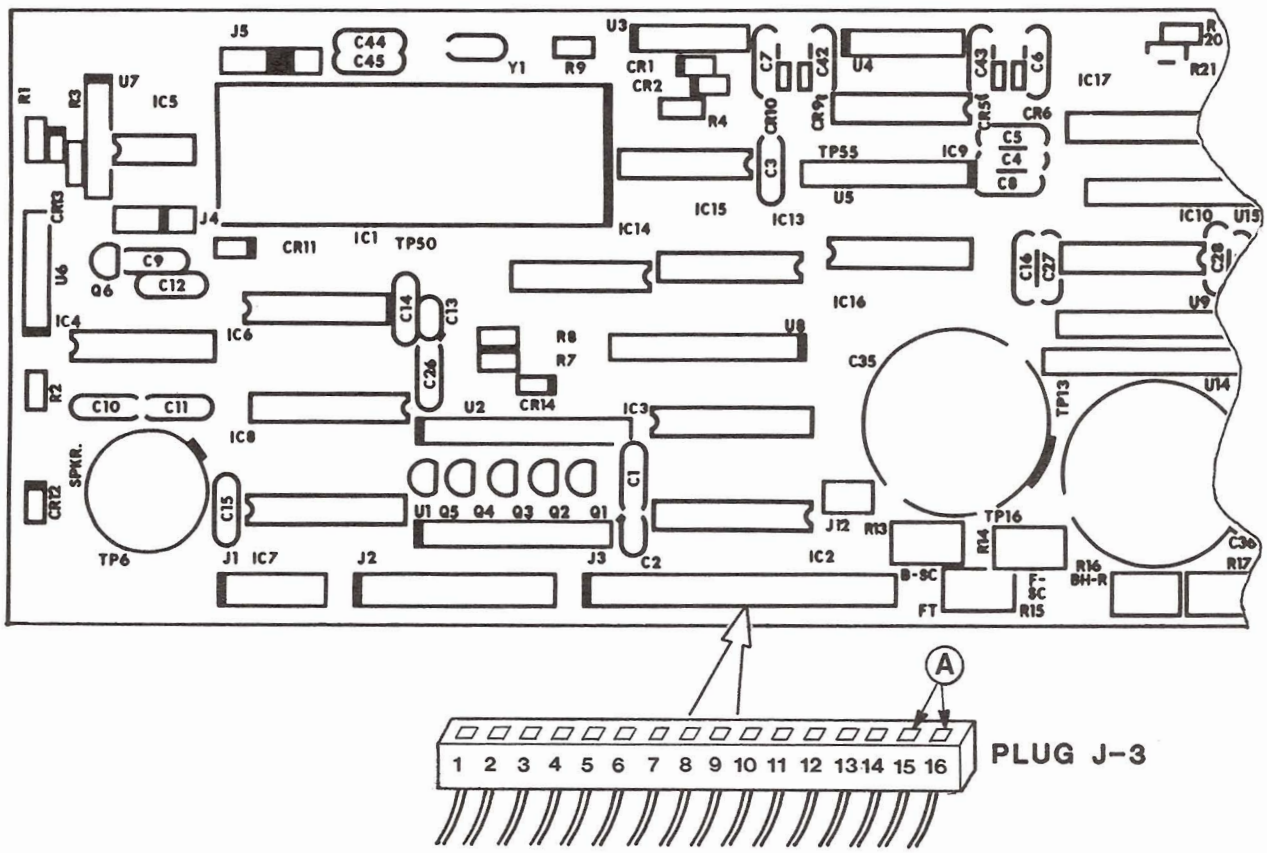
L.E.D. DISPLAY

	TEST LOCATION	TEST POINTS	CORRECTION
(B)	MAIN CONTROL BOARD	VERIFY RIBBON HARNESS IS IN PROPER CONTACT WITH CONNECTORS IN PLUGS J-1 AND J-2.	IF NOT O.K., MAKE PROPER CONNECTION AND RETEST. IF ALL L.E.D.'S STILL FAIL TO LIGHT.
(C)	MAIN CONTROL BOARD	TP-2 +7.50 VDC ±.05 VDC TP-3 -7.50 VDC ±.05 VDC	IF NOT O.K., REFER TO TROUBLESHOOTING SEQUENCE - DC CONTROL VOLTAGE VERIFICATION AND ADJUSTMENT. IF O.K.,
(D)	MAIN CONTROL BOARD	READ VOLTAGE FROM THE FOLLOWING PINS FOR PLUG J-3 PIN 13 AND 14 5.0 VDC ±.5 VDC PIN 1, SELECT GROUP 1 PATTERN NOS. 1, 2, 4, 12, 16, 22, 26 4.0 VDC ±.5 VDC PIN 2, SELECT GROUP 2 PATTERN NOS. AND FUNCTIONS 3, 5, 13, 17, 23, REVERSE, MIRROR IMAGE 4.0 VDC ±.5 VDC PIN 3, SELECT GROUP 3 PATTERN NOS. AND FUNCTION 6, 7, 9, 18, 19, 27, 2X 4.0 VDC ±.5 VDC PIN 4, SELECT GROUP 4 PATTERN NOS. 8, 10, 14, 20, 24, 28 4.0 VDC ±.5 VDC PIN 5, SELECT GROUP 5 PATTERN NOS. AND FUNCTION 11, 15, 21, 25, SINGLE PATTERN 4.0 VDC ±.5 VDC	IF O.K., REPLACE CONTROL PANEL. IF NOT O.K., REPLACE MAIN CONTROL BOARD.

TWIN NEEDLE SWITCH

NOTE: TESTING OF THE TWIN NEEDLE SWITCH REQUIRES THE USE OF AN ANALOG VOM METER SUCH AS A SIMPSON 260 OR EQUIVALENT. DIGITAL METERS CAN NOT BE USED TO PERFORM THIS TEST.

	TEST LOCATION	TEST POINTS	CORRECTION
(A)	CONTROL PANEL	READ RESISTANCE FROM PLUG J-3 HOLES 15 AND 16. SWITCH ON. TWIN NEEDLE POSITION. OHMS. SWITCH OFF. SINGLE NEEDLE POSITION. METER NEEDLE SHOULD APPROACH 0 OHMS.	IF O.K., REPLACE MAIN CONTROL BOARD. IF NOT O.K., REPLACE CONTROL PANEL.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C44
C45
Y1
R9
U3
CR1
CR2
R4
C7
C42
U4
C43
C6
R20
R21
IC17
CR6
C5
C4
C8
IC9
TP55
U5
IC15
IC13
C3
IC14
IC10
U15
J4
CR11
IC1
TP50
C9
Q6
C12
C16
C27
C28
U9
IC16
IC4
IC6
C14
C13
R8
R7
U8
C35
TP13
U14
R2
C10
C11
U2
CR14
IC3
IC8
SPKR.
CR12
C15
U1 Q5 Q4 Q3 Q2 Q1
C1
J12
R13
TP16
R14
C36
R17
TP6
J1
IC7
J2
J3
C2
IC2
B-SC
FT
F-SC
R15
R16
BH-R
A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
PLUG J-3

SECTION 3
MECHANICAL ADJUSTMENT PROCEDURES

INTERLOCKING ADJUSTMENTS

Many of the 2010A machine adjustments interlock with each other. The following pages provide a convenient cross-reference of sequential check-out procedure, the related adjustment procedure, and interlocking adjustments.

The first column provides a sequential checklist of tests or verifications for a complete mechanical check of a machine. The second column provides a list of adjustment procedures keyed to the sequential checklist. The third column provides a list of any interlocking adjustments that must be verified before performing an adjustment listed in the second column.

FAILURE TO FOLLOW THE SEQUENTIAL ORDER OF ADJUSTMENTS CAN RESULT IN SELF-DEFEATING EFFORT AND TIME-CONSUMING READJUSTMENTS.

NOTE:
REGARDLESS OF THE NATURE OF MECHANICAL ADJUSTMENTS TO BE MADE, NO ADJUSTMENT SHOULD BE MADE BEFORE PERFORMING THE "SEQUENCE OF ELECTRONIC AND ELECTRO/MECHANICAL CHECKS AND ADJUSTMENTS".

SEQUENTIAL CHECKLIST AND INTERLOCKING ADJUSTMENTS CROSS REFERENCE

SEQUENTIAL CHECKLIST	ADJUSTMENT PROCEDURE	PAGE	INTERLOCKING ADJUSTMENTS TO BE VERIFIED BEFORE ADJUSTMENT PROCEDURE
1. Verify Electronic and Electro/Mechanical Checks and Adjustments	1. Sequence of Electronic and Electo/Mechanical Checks and Adjustments	12	1. None
2. Arm Shaft a. End Play b. Rotative Play	2. Refer to 2001 Service Manual		2. None
3. Lost Motion a. Needle Bar b. Take-up Lever and Connecting Link	3. Refer to 2001 Service Manual		3. Adjustment 6 (Latch Carrier Eccentric Only)
4. Needle Bar Play Front to Rear	4. Refer to 2001 Service Manual		4. None
5. Needle Location in Straight Stitch (Round Hole) Needle Plate a. Front to Back b. Left to Right	5. Refer to 2001 Service Manual		5. a. Adjustment 1 b. Adjustment 3 c. Adjustment 4
6. Needle Bar a. Height b. Radial Position	6. Refer to 2001 Service Manual		6. a. Adjustment 3
7. Safety Stops	7. Needle Bar Stops	48	7. a. Adjustment 1 b. Adjustment 5
8. Basting a. Needle Bar Recoil Spring b. Needle Bar Latch Carrier Eccentric c. Double Latching Failure to Latch	8. Needle Bar Release a. Refer to 2001 Service Manual b. Refer to 2001 Service Manual c. Latch Kick Out Plate	51	8. a. Adjustment 1 b. Adjustment 5
9. Needle Threader a. Needle Threader Positioning Spring	9. Refer to 2001 Service Manual		9. None
10. Presser Bar Functions a. Height b. Alignment c. Pressure	10. Presser Bar Height and Alignment a. Refer to 2001 Service Manual b. Refer to 2001 Service Manual c. Not applicable. Pressure fixed.		10. None
11. Timing Belt	11. Timing Belt Tension	52	11. None

SEQUENTIAL CHECKLIST AND INTERLOCKING ADJUSTMENTS CROSS REFERENCE

SEQUENTIAL CHECKLIST	ADJUSTMENT PROCEDURE	PAGE	INTERLOCKING ADJUSTMENTS TO BE VERIFIED BEFORE ADJUSTMENT PROCEDURE
12. Motor Belt-Power Switch	12. Motor Belt Tension and Motor Switch	52	12. None
13. Crossover	13. Needle Crossover-Timing the Shunt	55	13. a. Adjustment 3 b. Adjustment 4 c. Adjustment 6
14. Gear Mesh	14. Hook Drive Gear Mesh	56	14. None
15. Timing	15. Hook and Feed Timing		15. a. Adjustment 3
a. Hook Time	a. Refer to 2001 Service Manual		b. Adjustment 4 c. Adjustment 11
b. Feed Time	b. Feed Timing	59	d. Adjustment 13
16. Hook to Needle Relationship	16. Refer to 2001 Service Manual		16. a. Adjustment 3 b. Adjustment 4 c. Adjustment 5
17. Alpha Feed System Feed Dog	17. Alpha Feed System		17. None
a. Alignment	a. Refer to 2001 Service Manual		
b. Centralization	b. Refer to 2001 Service Manual		
c. Throw	c. Refer to 2001 Service Manual		
d. Height	d. Refer to 2001 Service Manual		
e. Zero Feed	e. Zero Feed	63	
f. Brake	f. Feed Brake	64	
18. Thread Clearances	18. Bobbin Case Thread Clearances	67	18. a. Adjustment 15 b. Adjustment 16
19. Ease of Threading Arm Top Thread Guide	19. Refer to 2001 Service Manual		19. None
20. Bobbin Winding	20. Bobbin Winding Adjustments	71	20. a. Adjustment 19
21. Needle Thread Tension a. Dial Tension b. Thread Take-up c. Tension Release	21. Refer to 2001 Service Manual		21. a. Adjustment 13
22. Chainstitching	22. Refer to Interlocking Adjustments		22. a. Adjustment 5 b. Adjustment 6 c. Adjustment 15 d. Adjustment 16 e. Adjustment 17 f. Adjustment 18 g. Adjustment 20

SEQUENTIAL CHECKLIST AND INTERLOCKING ADJUSTMENTS CROSS REFERENCE

SEQUENTIAL CHECKLIST	ADJUSTMENT PROCEDURE	PAGE	INTERLOCKING ADJUSTMENTS TO BE VERIFIED BEFORE ADJUSTMENT PROCEDURE
23. Electrical	23. Refer to 2001 Service Manual		23. None
24. Lubrication	24. Refer to 2001 Service Manual		24. None
25. Final Sew In	25. Refer to 2001 Service Manual		25. None
26. Cleaning the Control Panel	26. Cleaning the Control Panel	72	26. None

NEEDLE BAR STOPS

Machine Settings:

1. Stitch Selection: Zig-Zag.

Check:

1. Insert size 18 needle or plug gauge.
2. Rotate handwheel to bring the point of the needle just above the throat plate in right needle position.
3. While forcing the needle bar to the right by hand, slowly rotate the handwheel to bring the needle into the needle hole.
4. The point of the needle must not strike the throat plate.
5. Repeat the above procedure for left needle position.

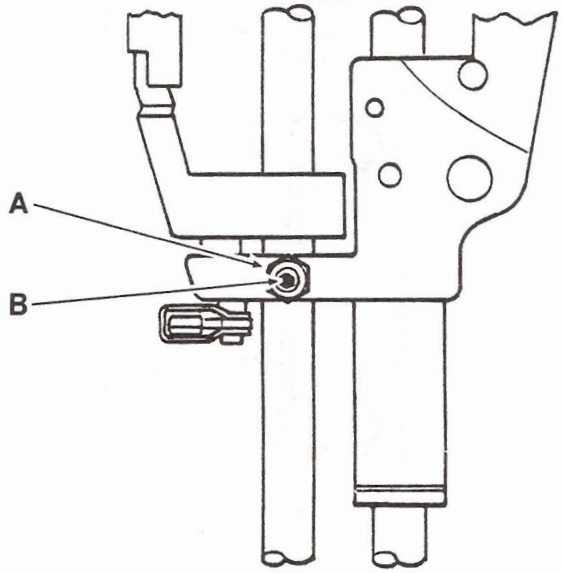
Adjustment:

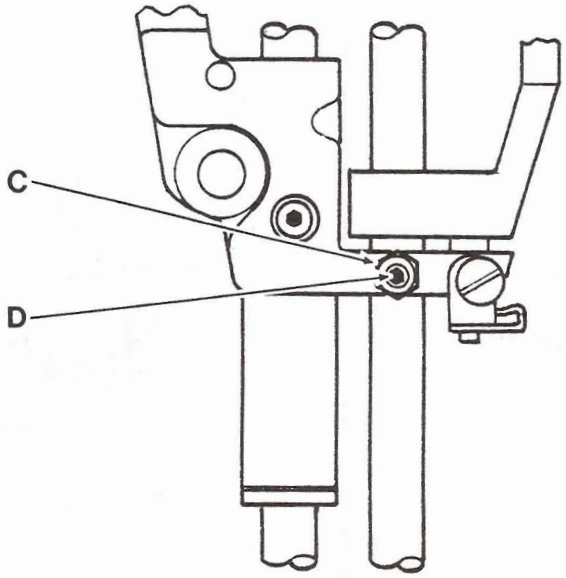
1. Remove face plate and front cover segment.

CAUTION: With the cover segment removed, there is the possibility of the shunt interfering with the shunt shield.

2. Loosen right needle stop clamping nut (A) and loosen stop screw (B) one or two turns.
3. Bring needle bar to its lowest point in right needle position.
4. Turn stop screw (B) in until it just touches the needle bar. A slight movement of the needle bar to the left should be noticed.
5. Back out stop screw (B) one half (1/2) turn.
6. While maintaining the position of stop screw (B), tighten clamping nut (A).
7. Repeat above procedure with needle bar in left needle position, resetting left needle stop screw (D) and locking nut (C).
8. Recheck for point of size 18 needle or plug gauge striking throat plate.
9. Perform bind test for bight mechanism.
10. Readjust if necessary.

NOTE: Head end assembly shown partially disassembled for clarity.


A
B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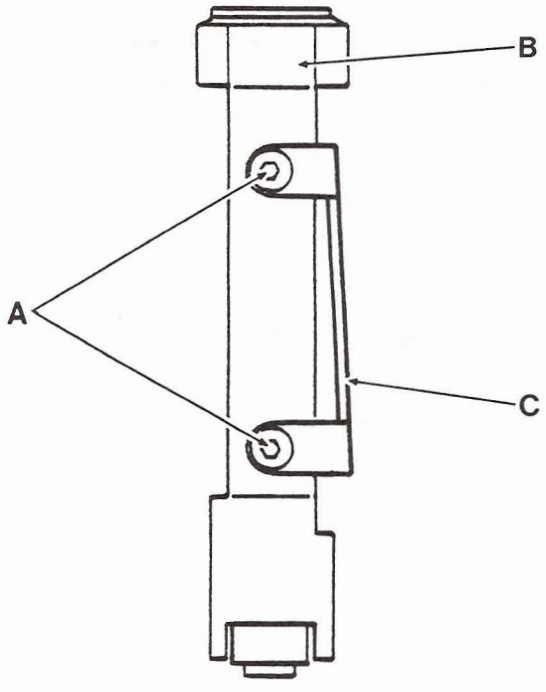
D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A
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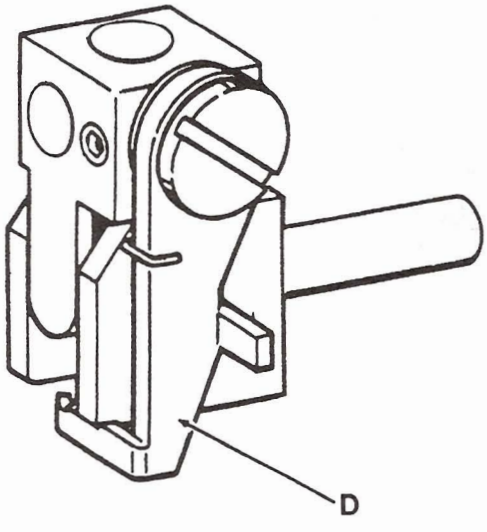
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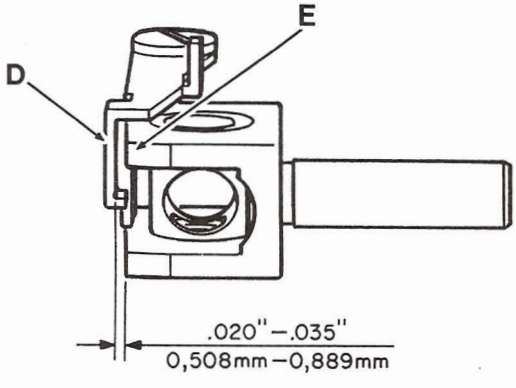

E
D
.020"–.035"
0,508mm–0,889mm

NEEDLE BAR RELEASE - LATCH KICK OUT PLATE

Check:

1. The needle bar release system must function smoothly and quietly through the full range of the machine speed when the machine is set for basting.

2. The needle bar latch kick out plate must not disengage the latch while sewing any patterns which contain a right needle position. Test by sewing multi zig-zag, 2X.

3. The latching mechanism must function at ±10% of the rated voltage on the machine nameplate.

Adjustment:

1. Remove face plate and arm top cover.

2. Needle bar vibrating bracket (B) must have zero end play but must be free falling. Adjust if necessary and check by performing bind test on the bight system. (Refer to 2001 Service Manual).

3. Verify the settings of the needle bar recoil spring and the needle bar latch carrier eccentric. (Refer to 2001 Service Manual).

4. Loosen kick out plate clamping screws (A).

5. Move the bottom of kick out plate (C) to the right as far as possible and tighten lower clamping screw (A) pinch tight to maintain control of kick out plate (C).

6. Select zig-zag and turn hand wheel to bring the needle bar to the right needle position with the needle bar at the very top of its stroke.

7. Move the top of the kick out plate to the left until a barely perceptible opening of latch (D) is observed. Tighten upper and lower clamping screws (A).

8. Select multi zig-zag, 2X and turn hand wheel until the latch is open. Carefully align the bottom of the latch stud (E) with the bottom of the latch (D). There should be between .020" and .035" (0,508 mm - 0,889 mm) clearance between the two. If clearance is less than .020" (0,508 mm), loosen upper clamping screw (A) and move kick out plate (C) to the left to obtain the proper clearance.

9. Test by sewing multi zig-zag, 2X with machine powered at 10% below its rated voltage. If double latching occurs, move top of kick out plate (C) slightly to the left in small increments until machine functions properly. With the latch open and the bottom of the latch (D) aligned with the bottom of the latch stud (E), clearance between the two must not exceed .035" (0,889 mm).

TIMING BELT TENSION

Machine Settings:

1. Stitch Selection: Straight Stitch -- Single Pattern
2. Speed Selector Switch: MAX.

Preparation:

1. Remove front cover.
2. Remove needle.
3. Presser foot raised.

Adjustment:

1. Carefully loosen set screw (A) that holds idler pulley eccentric (B). Maintain a pinch on screw (A) for control.
2. Run the machine at high speed and turn idler pulley eccentric (B) toward the rear of the machine (this will slow down the machine).
3. Slowly turn eccentric (B) toward the front of the machine to attain the highest speed. Hold eccentric in this position and tighten set screw (A).
4. Check hook and feed timing.

MOTOR BELT TENSION AND MOTOR SWITCH

Machine Settings

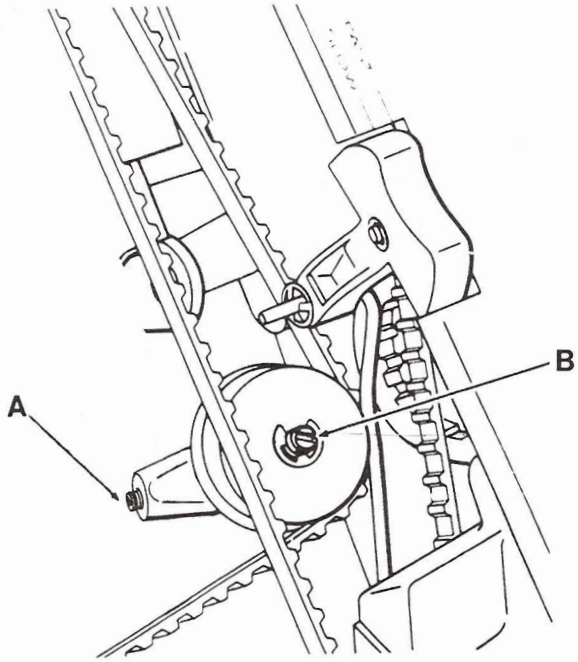
1. Stitch Selection: Straight Stitch -- Single Pattern
2. Speed Selector Switch: MAX.

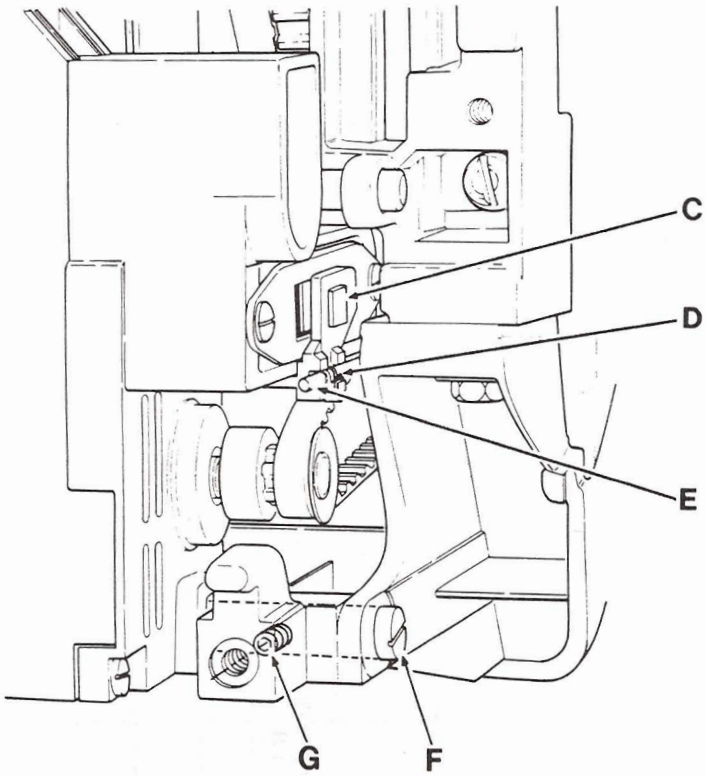
Preparation:

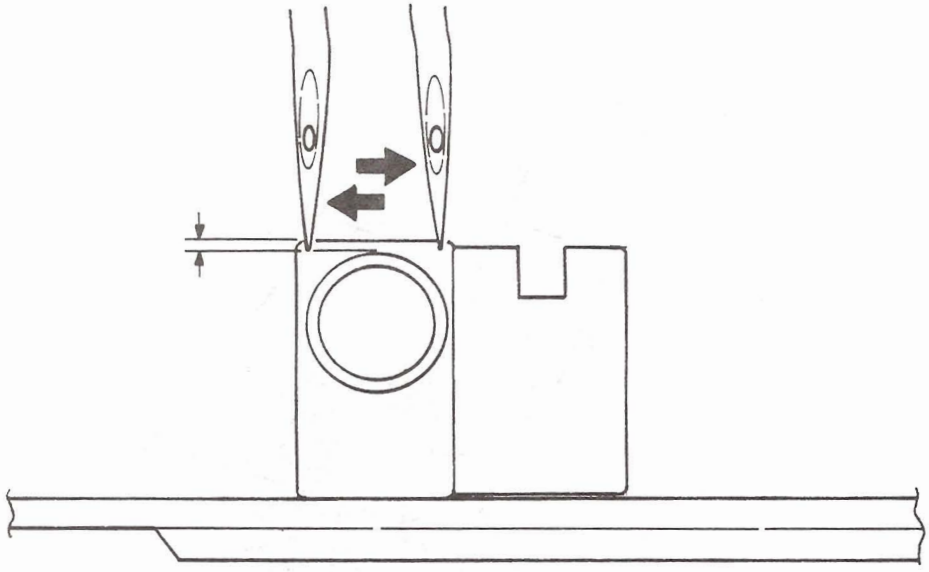
1. Remove needle.
2. Presser foot raised.
3. Remove bottom cover.
4. Lay machine on its back.

Adjustment:

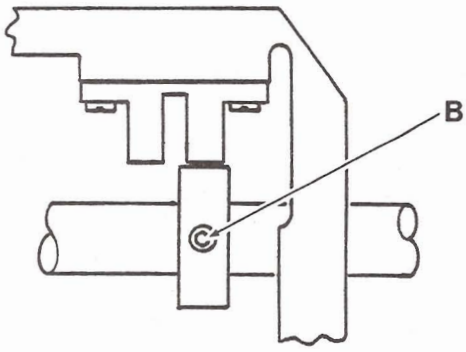
1. Loosen hex set screw (G).
2. Turn eccentric stud (F) left or right to tighten belt (this will slow down the machine). Be sure the extension of stud (F) is fully seated in the plastic sleeve.
3. Turn eccentric stud (F) left or right to loosen belt until machine attains highest speed. Then tighten hex set screw (G).
4. Set motor switch (C) to center (slow) position.
5. Verify correct position of rocker switch.
6. Compress the prongs on retaining clip (D) and move connecting rod (E) up or down as required.

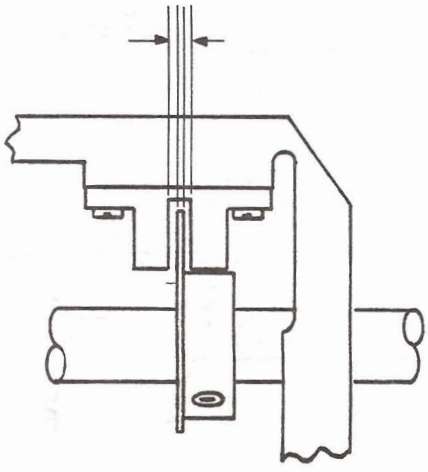

A
B


C
D
E
G
F



A





C

NEEDLE CROSSOVER - TIMING THE SHUNT

Preparation:

1. Remove presser foot with shank.
2. Insert a size 14 needle in the machine.

Machine Settings:

1. Stitch Selection: Zig-Zag.

Check:

1. Using a needle clamp body from a 2001 or 2010 machine as a gauge placed on the throat plate as indicated in Illustration (A), turn the machine slowly by hand.
2. Needle crossover should occur between the time the point of the needle clears the hub for the needle clamp screw and the edge of the needle clamp body or .355" - .380" (9,017 mm - 9,652 mm) above the throat plate.

Adjustment:

1. Remove arm top cover.
2. Loosen set screw (B).
3. Rotate shunt by means of the wrench toward the rear of the machine to retard needle crossover and toward the front of the machine to advance needle crossover.
4. Tighten screw (B), being careful not to disturb the shunt location laterally. There should be equal distance between both sides of the shunt blade and the interrupter assembly. Illustration (C).
5. Recheck needle crossover and readjust if necessary.

HOOK DRIVE GEAR MESH

Important: Proper setting of the hook drive gear mesh is achieved by the pressure of a wave washer between the hook drive gear and the hook drive shaft bushing. The correct amount of pressure is critical to the smooth and quite operation of the hook and hook drive gears.

To properly set the hook drive gear mesh requires the use of several special items as listed.

1- 8 oz. (248.8 gram) weight. A lead bell fishing weight is suggested. As a substitute the arm top cover from a 2001 or 2010 model machine may be used.

1- Paper clip formed in the shape of a S hook.

1- Head end (upper) mounting screw from a 2001 or 2010 model machine.

1- Spacer to be made from the metal insert of the Alpha feed helical feed drive shaft driving gear. Illustration (A). Cut the gear lengthwise with a hacksaw. Illustration (B). Remove the remaining portion of the plastic gear teeth and polish any rough edges with a file or grinder. Illustration (C).

Adjustment:

1. Remove the set screw from helical gear (F) and replace with head end module mounting screw (G). Do not tighten screw (G) against the shaft.

2. Loosen hook drive shaft bushing set screw (D).

3. Insert spacer (H) between helical gear (F) and hook drive shaft bushing (E).

4. Press down on helcal gear (F) and release several times to ensure hook drive gear (J) and hook gear (K) are properly meshed.

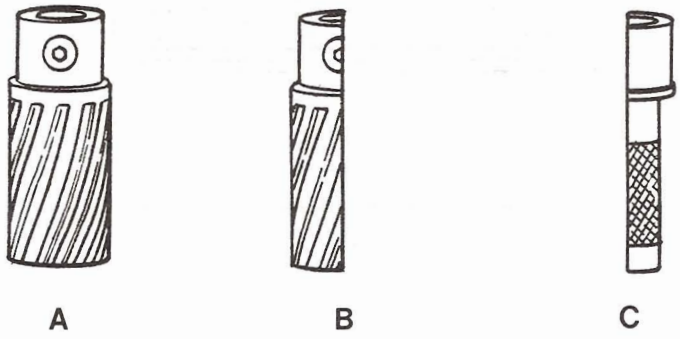
5. With pressure released from helical gear (F), place an 8 oz. (248.8 gram) weight on screw (G).

6. Tighten bushing set screw (D).

7. Remove screw (G) and spacer (H) and relocate helical gear (F).

8. Check feed timing and adjust if necessary.

NOTE: Machine must be positioned standing on its head end and securely blocked to maintain its stability.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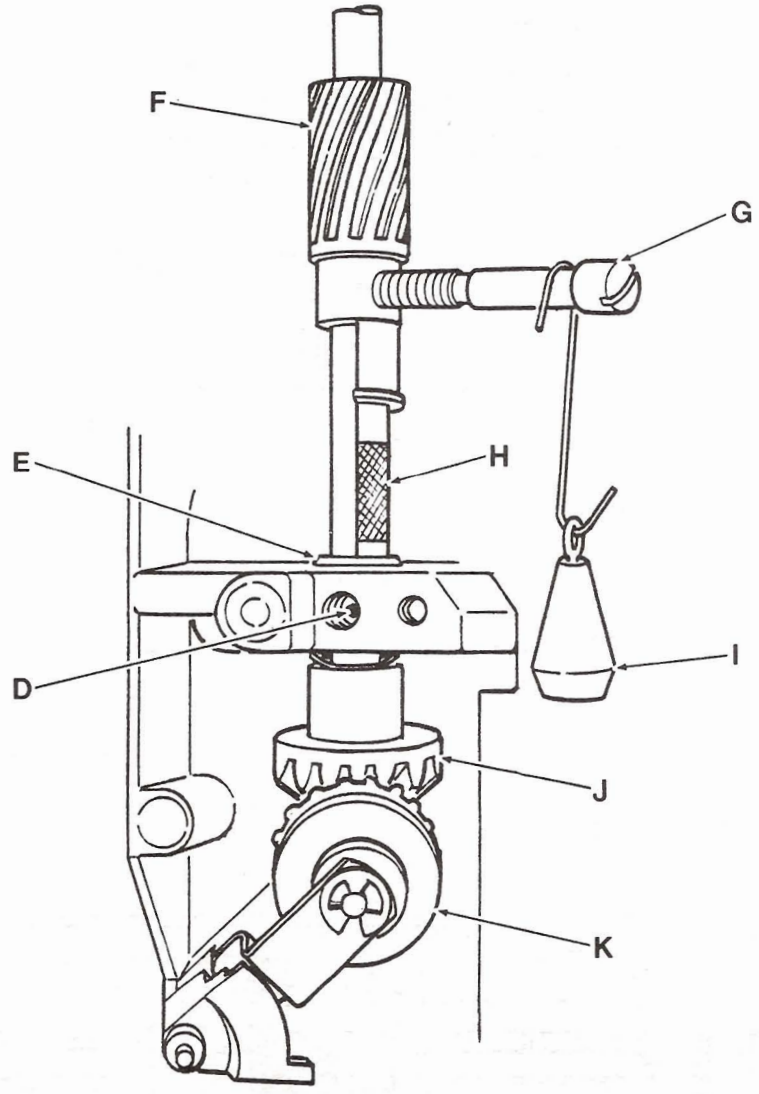
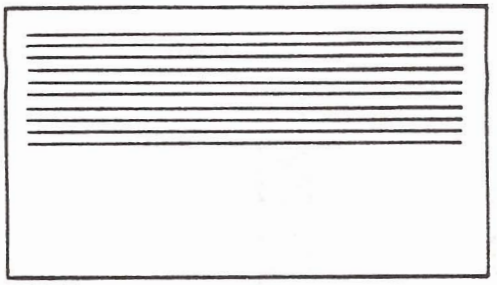
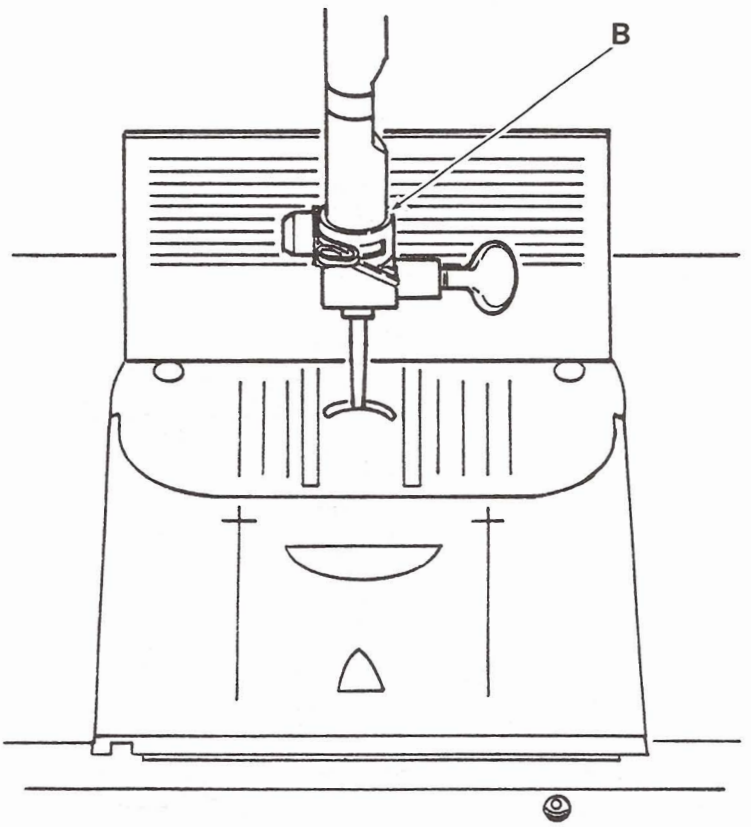
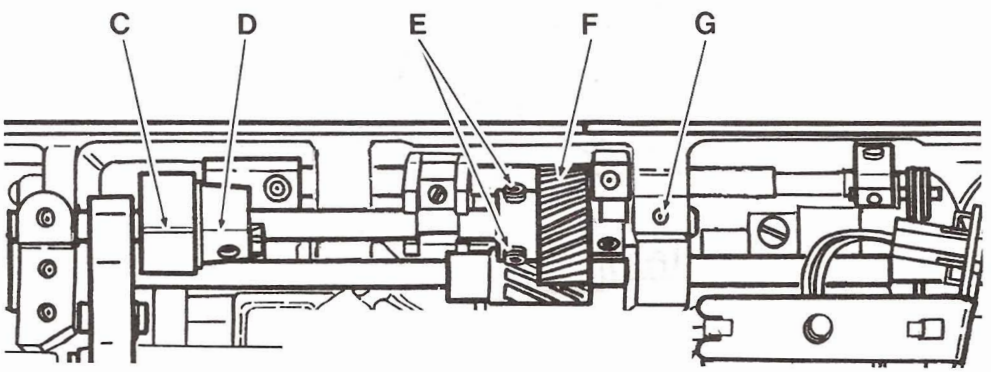
B
C


F
G
E
H
D
I
J
K



A





FEED TIMING

Preparation:

1. Cut a piece of light colored cardboard approximately 2-1/2" x 1-1/2" (63,5 mm - 38,1 mm) to be used as a gauge. Draw parallel lines lengthwise 1/16" (1,588 mm) apart. Illustration (A).

2. Remove presser foot with shank and bottom cover.

Check:

1. Bring needle to its lowest point.

2. Hold gauge vertically on throat plate behind needle bar.

3. Observe position of top of needle clamp (B) in relation to any one line on the gauge.

4. Turn handwheel slowly toward the front of the machine until the top of the needle clamp rises to the next line on the gauge, i.e. 1/16" (1,588 mm).

5. The timing mark on the feed lifting cam (D) should be aligned with the timing mark on the feed regulator slide block connection (C).

Adjustment:

1. Loosen both set screws (E) in gear (F).

2. Turn feed lifting cam (D) until timing mark on cam is aligned with timing mark on feed regulator slide block drive connection (C).

3. Tighten both set screws (E) in gear (F).

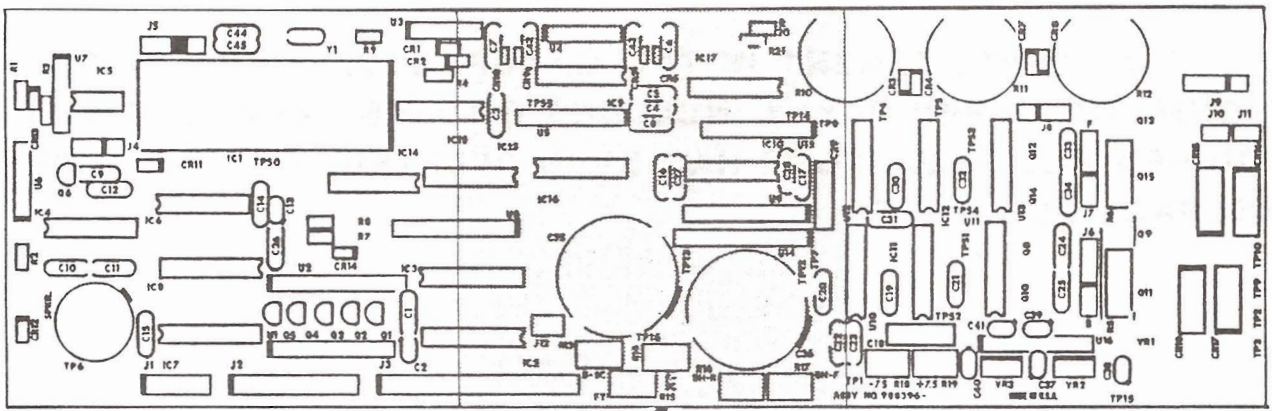
4. Check for binding between feed drive eccentric and connecting link (C). If necessary, loosen set screw (G) and move bushing with feed drive shaft left or right to eliminate binding. Tighten set screw (G).

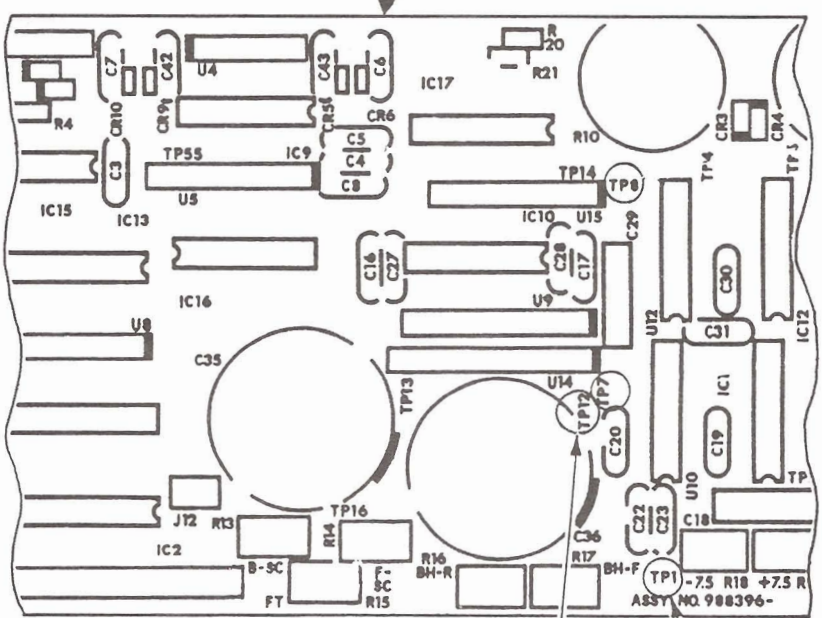
5. Perform bind test for feed mechanism and readjust if necessary.

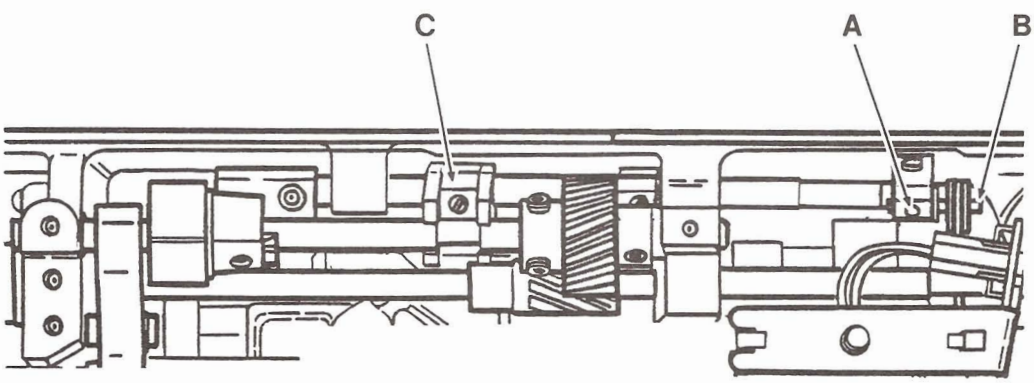
DUE TO AN IMPROVEMENT IN THE MANUFACTURING PROCESS, IMFORMATION PREVIOUSLY INCLUDED ON THIS PAGE WAS NOT REQUIRED AND THEREFORE HAS BEEN DELETED. YOU MAY USE THIS PAGE FOR NOTES.

DUE TO AN IMPROVEMENT IN THE MANUFACTURING PROCESS, IMFORMATION PREVIOUSLY INCLUDED ON THIS PAGE WAS NOT REQUIRED AND THEREFORE HAS BEEN DELETED. YOU MAY USE THIS PAGE FOR NOTES.

MAIN CONTROL BOARD







ALPHA FEED ZEROING

Preparation:

1. Remove arm top cover and bottom cover.
2. Verify feed zero and scale voltages.
3. Loosen feed brake adjustment screw (C) until feed brake is disengaged.

Machine Settings:

1. Pattern Selection: Straight Stitch, Single Pattern.

Check:

1. Connect a jumper between (TP-1) and (TP-12) on the main control board.
2. Place a piece of fabric under the presser foot.
3. Run machine at top speed.
4. Fabric movement shall be between 0 and 2" (51 mm) per minute in reverse direction.
5. If Alpha feed requires no adjustment, adjust feed brake.

Adjustment:

1. Select Straight Stitch, single pattern.
2. Connect a jumper between (TP-1) and (TP-12) on the main control board.
3. Place a piece of fabric under the presser foot.
4. Loosen set screw (A).
5. While running the machine at top speed, turn feed regulator eccentric (B) to obtain zero feed. The throw of eccentric (B) must be toward the bottom of the machine.
6. Tighten set screw (A) and recheck.
7. Adjust feed brake.
8. Perform bind test for feed mechanism.

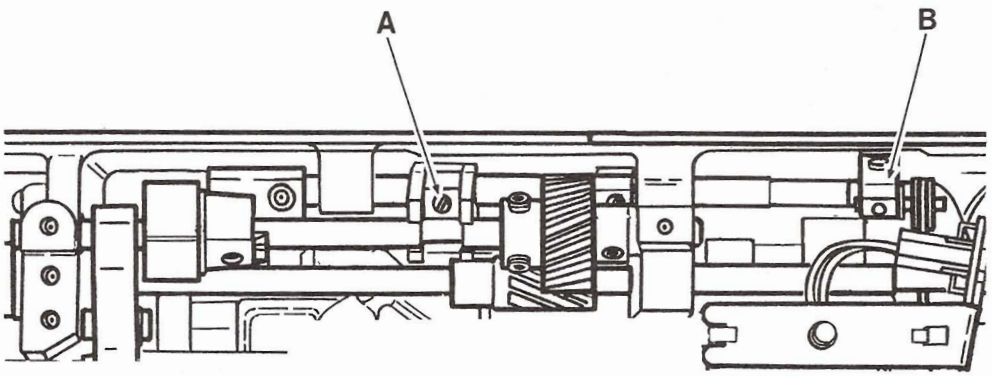
FEED BRAKE

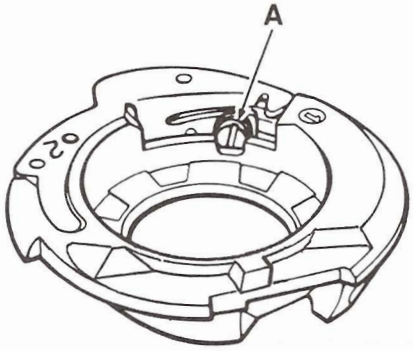
Check:

1. Select straight stitch and cycle machine several times.
2. Bring feed dog to its highest position above the throat plate.
3. Move stitch length override dial back and forth from "0" to "4" while observing the feed dog.
4. There should be no movement of the feed dog.

Adjustment:

1. Remove bottom cover.
2. Bring feed dog to its highest position above the throat plate.
3. While moving the stitch length override dial back and forth from "0" to "4", slowly tighten feed brake adjustment screw (A) until there is a barely perceptible movement of feed regulator shaft crank (B).
4. Perform bind test for feed mechanism.


A
B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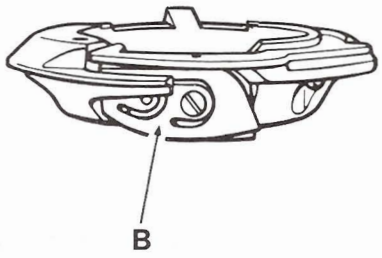
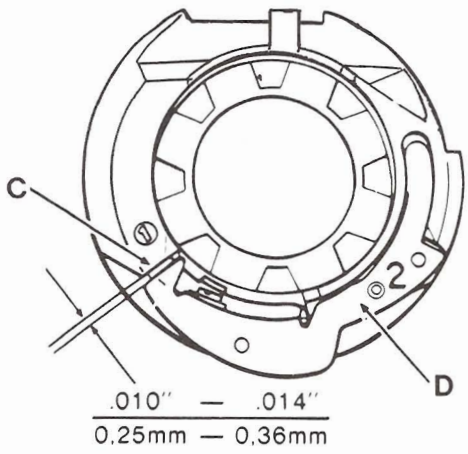
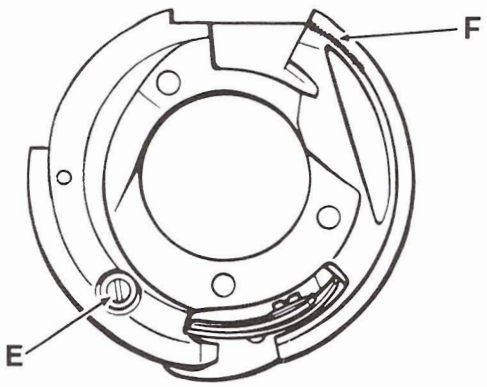

B


C
D
.010" — .014"
0,25mm — 0,36mm


F
E

BOBBIN CASE INSPECTION

Check: Bobbin case inspection. Check bobbin case for -

1. Grooving at hook entry area (loop separator point (F) on underside.

2. Distorted tension springs (B).

3. Insufficient clearance between tension bracket (D) and vertical wall (C).

4. Tightness of tension bracket screw (E).

Operating quality tests -

Thread should enter tension springs smoothly without snagging.

With bobbin case correctly mounted in machine, test for ability to thread bobbin case from "1" to "2" using a loaded bobbin.

Test for uniformity of tension, with bobbin case in machine, by drawing thread slowly through tension. There should be no change in "feel" of pull.

Test for cogging of bobbin, when bobbin case is in machine, by drawing thread through tension from a bobbin loaded with only 2 or 3 yards of thread.

Check all areas of bobbin case, where thread loop passes, to be sure there are no sharp corners to snag the thread loop.

Check to be sure a rubber friction washer is on tension adjustment screw (A).

Check for sufficient clearance, .010" - 0.14" (0,25 mm - 0,36 mm), between tension bracket (D) and vertical wall (C) of bobbin case.

Mandatory replacement of damaged parts -

If damage is observed or operating quality is incorrect, it is not only a matter of good service but it is MANDATORY that the bobbin case be replaced.

Check:

1. There must be no radial play of hold down lever (G).

2. There must be no vertical play of position plate (C) at the left end. Check for presence of two rubber friction washers on screw (B) under position plate (C). Replace if missing.

3. Clearance between underside of hold down lever (G) and bobbin case tension bracket (J) should be .010" - .014" (0,25 mm - 0,36 mm).

4. Clearance between bobbin case (D) and position plate (C) with the hook point between the 11 and 1 o'clock position should be .010" - .014" (0,25 mm - 0,36 mm).

Adjustment:

1. Loosen hold down lever shaft set screw (I).

2. Insert .050" hex wrench in hold down lever jack screw (H).

3. Using the wrench as a handle, rotate hold down lever (G) counterclockwise until the tip (F) of lever (G) touches the machine casting and there is no radial play in the lever.

4. While maintaining this position and being sure lever (G) is fully seated, turn jack screw (H) up or down as required to obtain .010" - .014" (0,25 mm - 0,36 mm) between the underside of hold down lever (G) and the bobbin case tension bracket (J).

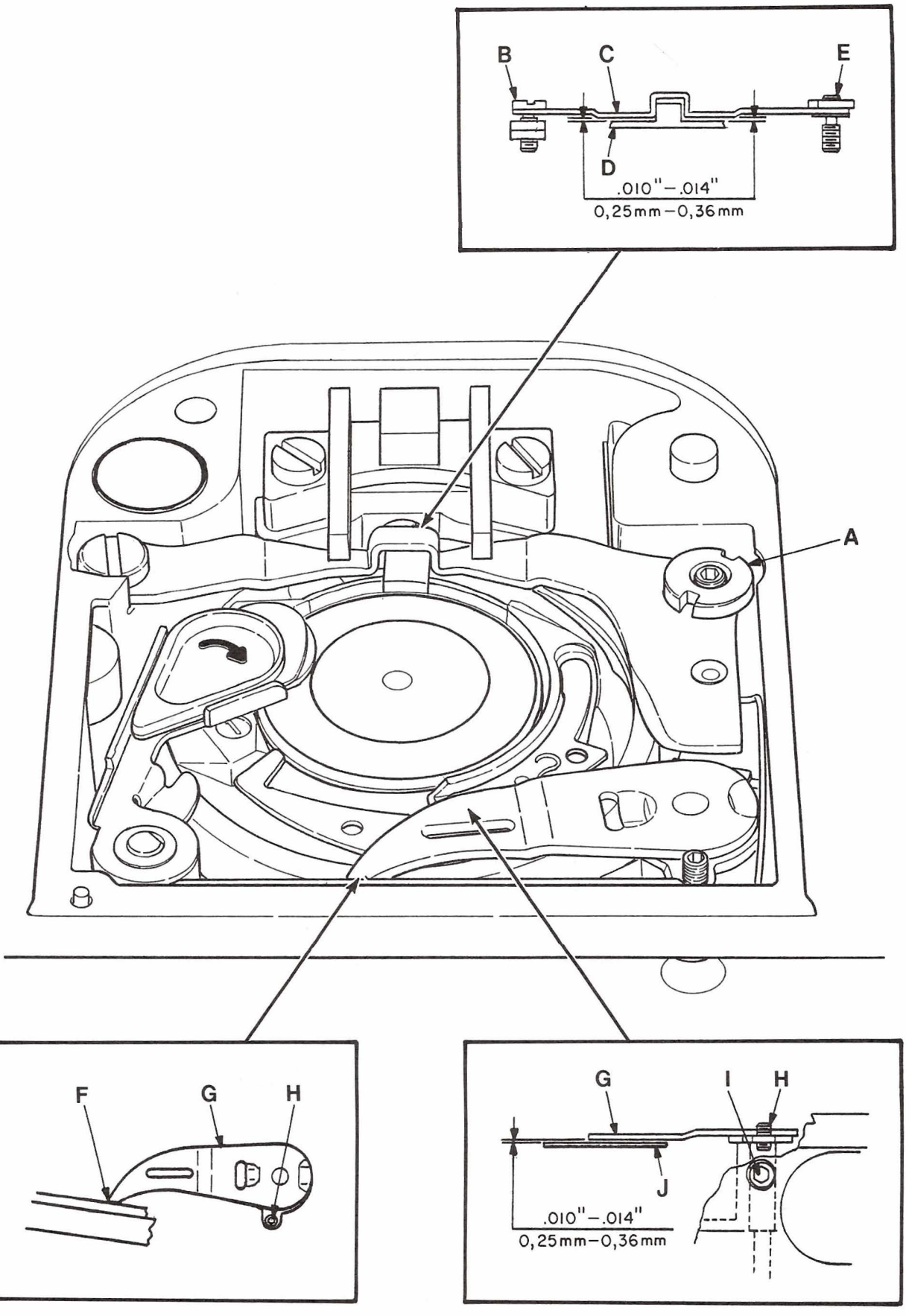
5. Tighten set screw (I) and recheck.

6. Position the hook point between the 11 and 1 o'clock position.

7. Loosen locking nut (A).

8. Raise or lower jacking screws (B) (left hand thread) and (E) as required to obtain .010" - .014" (0,25 mm - 0,36 mm) between the underside of the position plate (C) and the bobbin case (D).

9. Tighten locking nut (A) and recheck.


B
C
E
D
.010"–.014"
0,25mm–0,36mm
A
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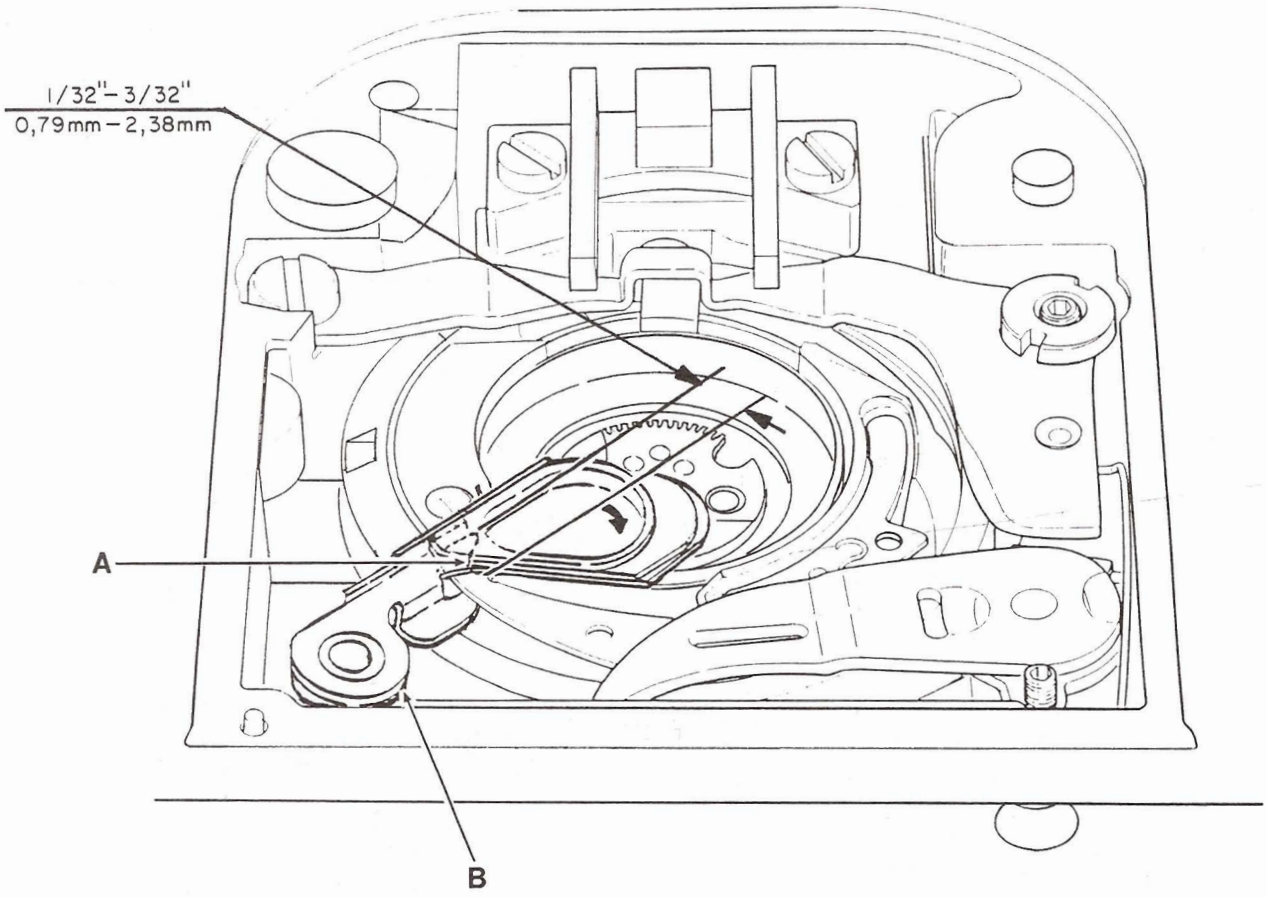
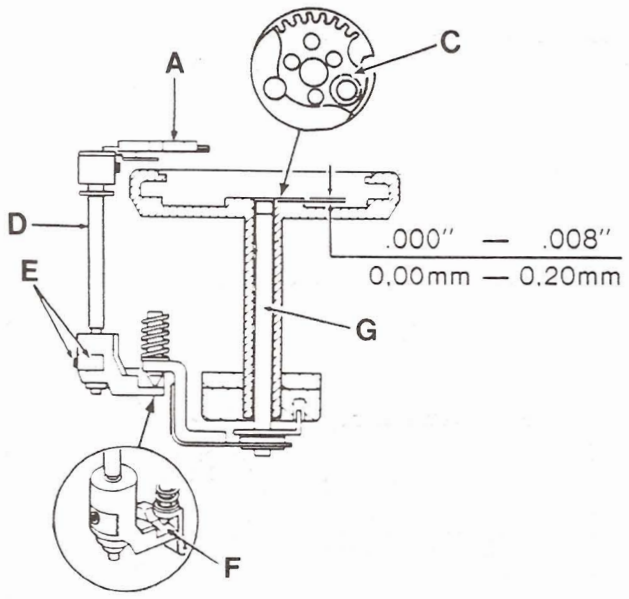
J
.010"–.014"
0,25mm–0,36mm


1/32"–3/32"
0,79mm–2,38mm
A
B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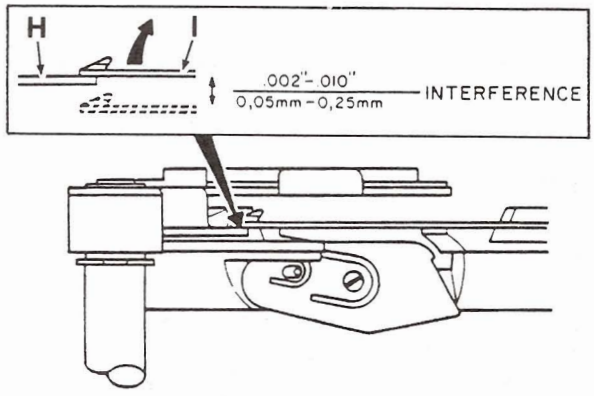
.000" — .008"
0.00mm — 0.20mm


H
I
.002"–.010"
0,05mm–0,25mm
INTERFERENCE

BOBBIN WINDING ADJUSTMENTS

Preparation:

1. Remove bottom cover, throat plate, bed slide and bobbin.

Adjustment:

Actuating Lever Radial Position and Bobbin Driver Height Setting.

1. Place actuating lever (A) in wind position.

2. Loosen two hex head screws (E) in bobbin driver lifting cam (F).

3. Being sure that bobbin driver lifting cam (F) remains in wind position, rotate actuating lever (A) so the left edge of the actuating lever pawl is 1/32" - 3/32" (0,79 mm - 2,38 mm) to the right of the winding slot.

4. While maintaining the position of the actuating lever, slide the lifting cam (F) up or down on actuating lever shaft (D) until end of the bobbin driver (G) is flush to .008" (0,20 mm) below the hook cam face (C).

5. Tighten both hex head screws (E) and recheck.

Actuating Lever Height Setting

1. Place actuating lever (A) in wind position.

2. Loosen hex head screw (B) in the collar of actuating lever (A).

3. Raise actuating lever (A) to provide a .002" - .010" (0,05 mm - 0,25 mm) interference between the actuating lever pawl (H) and the underside of the bobbin case tension bracket (I).

4. Tighten hex head screw (B) and recheck.

Cleaning The Control Panel

In the event the control panel requires cleaning, the following solutions only are recommended:

5% soap solution, by volume, of Ivory Flakes
5% detergent solution, by volume, of Mr. Clean, Windex

Under no conditions should any chlorinated solvents or alcohols be used. This would include such solvents as methyl ethyl keytone, toluene, trichloroethane, trichloroethlene, or nail polish remover. Use of these or similar solvents will result in damage to the panel.

SECTION 4
PARTS REMOVAL & REPLACEMENT

GENERAL

This section covers the procedure for the removal of covers, major components and modules.

The sequence of the steps of procedure is arranged to save time in removal and replacement work, and to avoid, as much as possible, upsetting critical adjustments.

The removal and replacement of major components or modules unavoidably upsets some adjustments. Before proceeding to the final adjustments:

1. Verify all interlocking adjustments.
2. Proper sequence of adjustments must be observed, as referenced in the replacement procedure.

Failure to use the sequential checklist may:

1. Upset previous adjustments.
2. Create new functional faults.
3. Increase the number of readjustments required to put the machine in proper working order.

IMPORTANT

FAILURE TO FOLLOW THE SEQUENTIAL ORDER OF ADJUSTMENTS CAN RESULT IN SELF-DEFEATING EFFORT AND TIME-CONSUMING READJUSTMENTS.

FACE PLATE

Removal:

1. Loosen hex socket screw (B).
2. Remove screw (A) at bottom of face plate.
3. Ease face plate off locating pin at top of arm.

Replacement:

1. Guide face plate on to locating pin.
2. Align screw hole in place with hole in arm. Thread screw (A) into arm. Seat face plate correctly before tightening screw (A) first and set screw (B) last.

TOP COVER

Removal:

1. Loosen screw (D) at right rear of top cover 10 or 12 turns.
2. Slightly raise right rear corner of top cover (C).
3. Place thumb into take-up lever well and press top cover to the right.
4. Lift right end of cover and remove from machine.

Replacement:

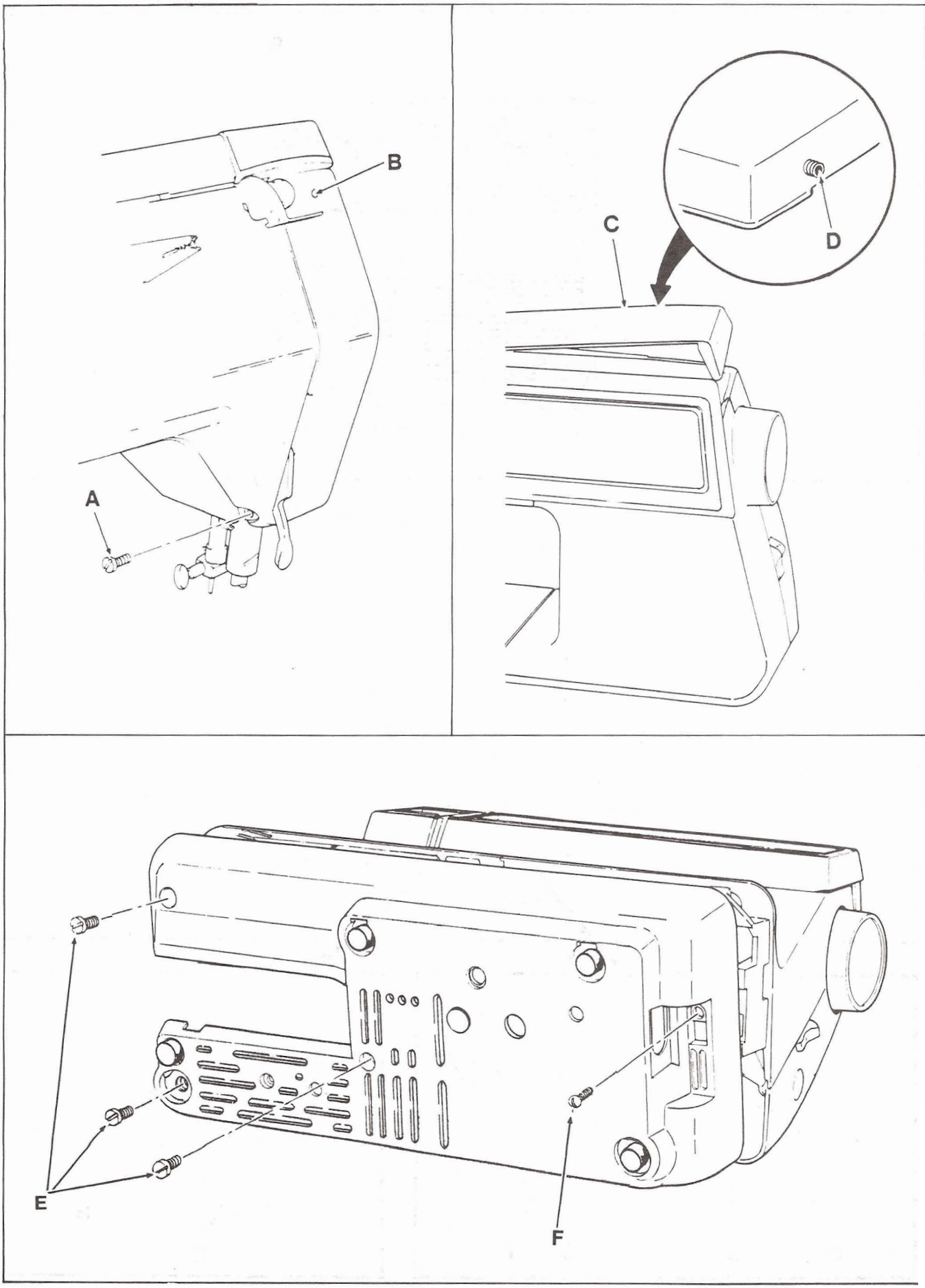
1. Place cover flat on top of the machine arm with the hold-down clamps to the right of the hold-down screw studs.
2. Press cover to the left being sure the hold-down clamps are properly located under the hold-down screw studs.
3. Tighten screw (D) until the head of the screw is flush with the top cover.

BOTTOM COVER

Removal:

1. Lay machine on its back on a soft cloth and remove three slotted screws (E), and slotted self-tapping screw (F).
2. Draw bottom cover off the machine.

Replacement: Replacement is the same as removal in reverse order.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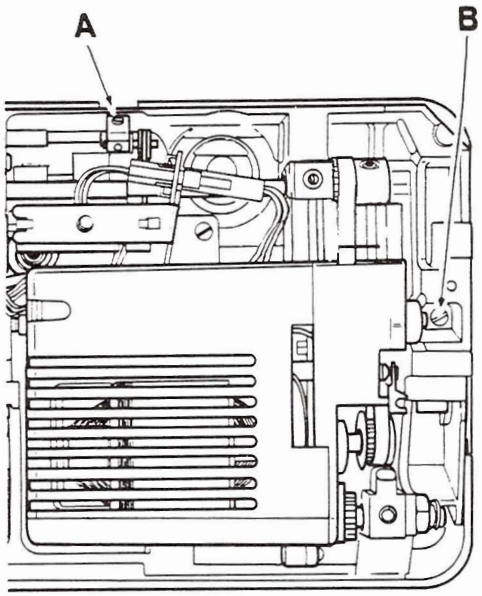
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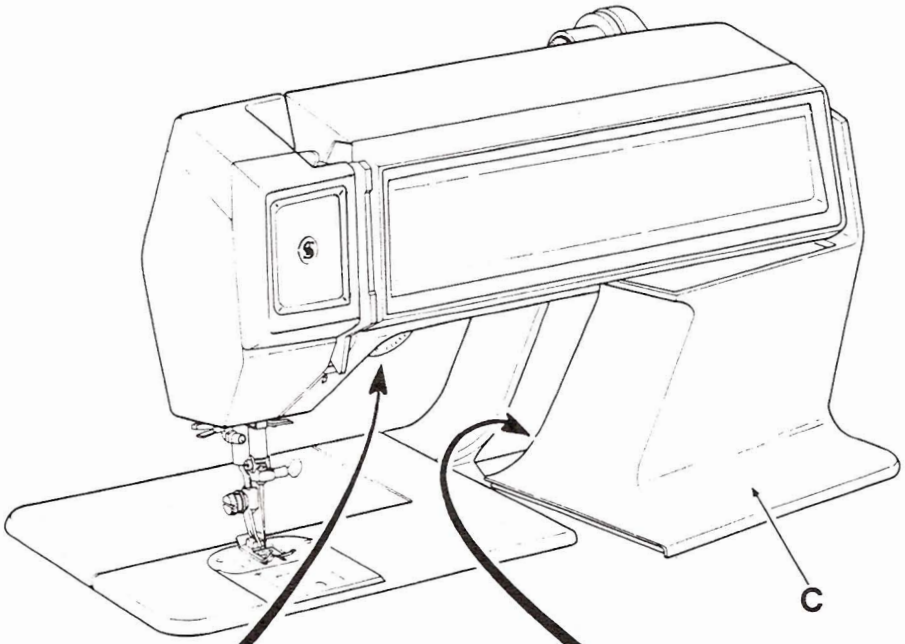
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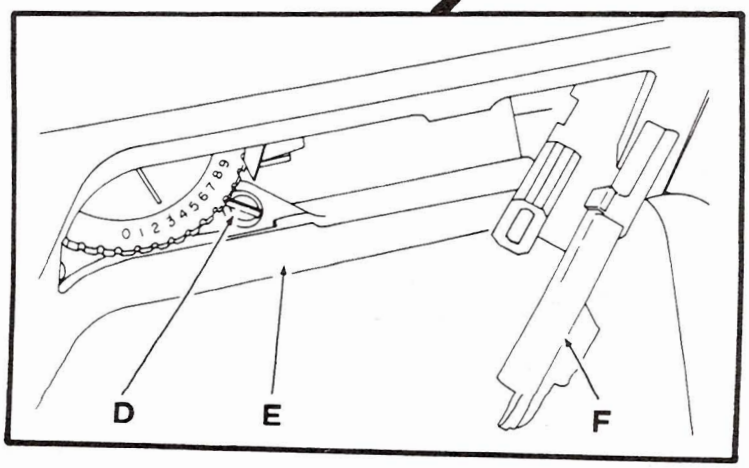
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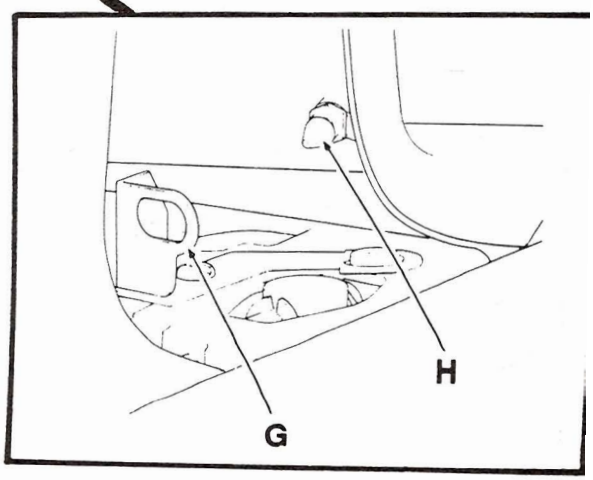
G
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FRONT COVER

Removal:

1. Remove arm top cover and bottom cover.
2. Loosen control panel mounting screws but do not remove.
3. Lay machine on its back and remove front cover screw (B).
4. While lifting lower edge of control panel assembly away from the front cover, insert a screwdriver in the cutout area (A) of the front cover and carefully levering the screwdriver against the skirt of the machine bring the front cover forward until locking stud (H) is released from retaining bracket (G).
5. While continuing to lift the lower edge of the control panel slightly upward, grasp lower left corner of the front cover (C), pivoting it on the right end bringing the cover forward and away from the machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Be sure locking stud (H) is securely locked in retaining bracket (G).

FRONT COVER SEGMENT

Removal:

1. Loosen control panel mounting screws but do not remove.
2. Lower light assembly (F).
3. Remove cover segment screw (D).
4. Pull front cover segment (E) straight down.
5. Disconnect L.E.D. harness connector and remove cover segment.

Replacement:

1. Replacement is the same as removal in reverse order.

BUTTONHOLE SWITCH

Removal:

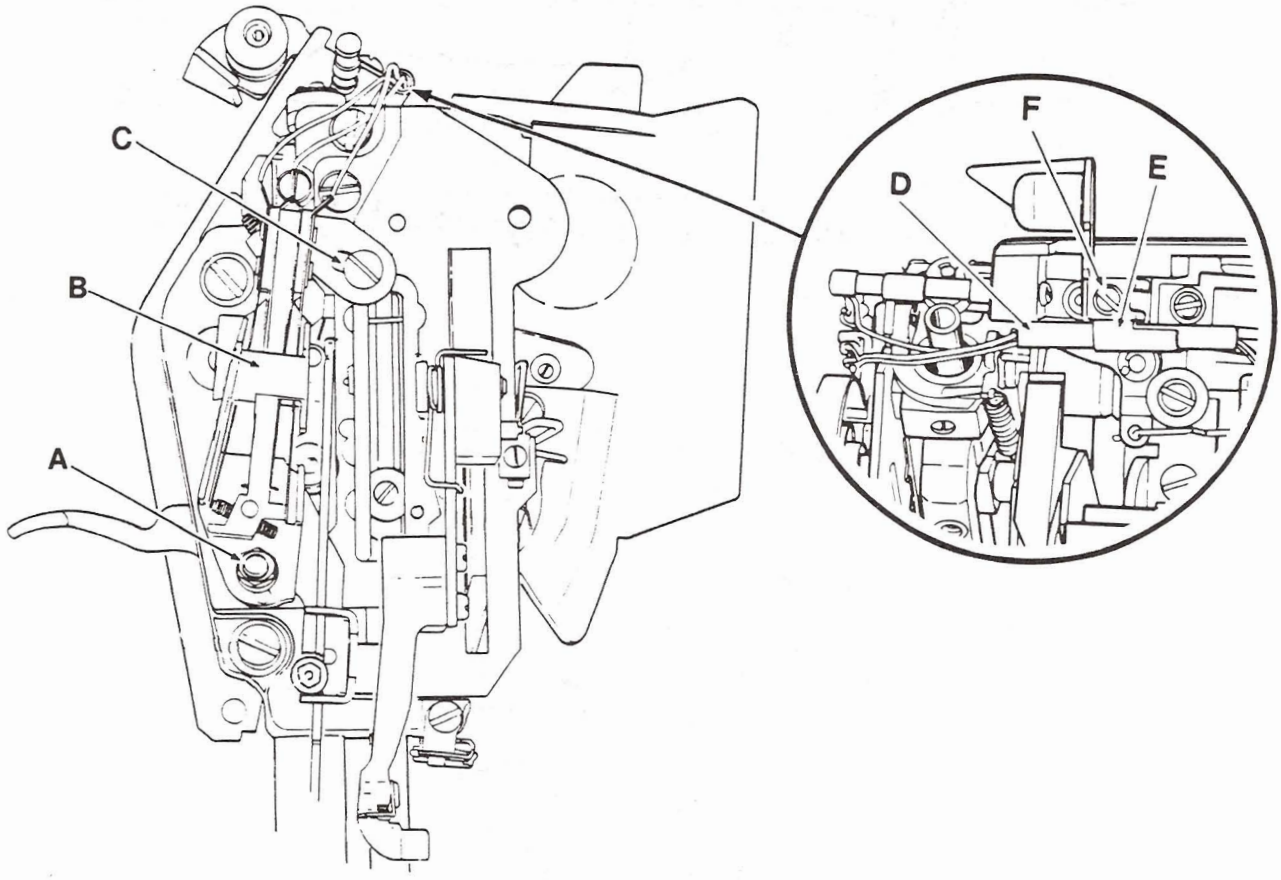
1. Remove face plate arm top cover and control panel assembly.
2. Remove plug J-5 from main control board.
3. Snap harness grommet (D) out of retaining clip (E).

NOTE: It may be necessary to loosen screw (F) and shift retaining clip (E) toward the front of the machine to gain clearance to remove grommet (D).

4. Remove buttonhole switch mounting nut with washer (A) and screw (C).
5. Remove buttonhole switch (B) from head end.

Replacement:

1. Be sure hole in buttonhole tripping rod lever is properly mounted on stud of buttonhole switch assembly and that the stud on the buttonhole rod tripping lever is properly located between the two inner leaf contacts.
2. Replacement is the same as removal in reverse order.
3. Do not overtighten. Buttonhole rod tripping lever should move easily without any bind.
4. Adjust buttonhole switch.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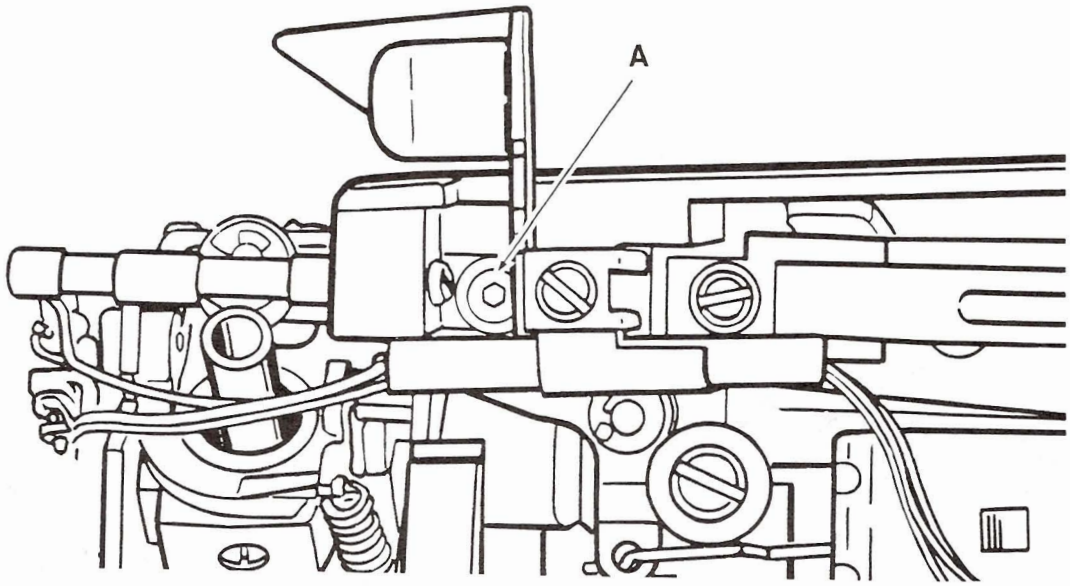
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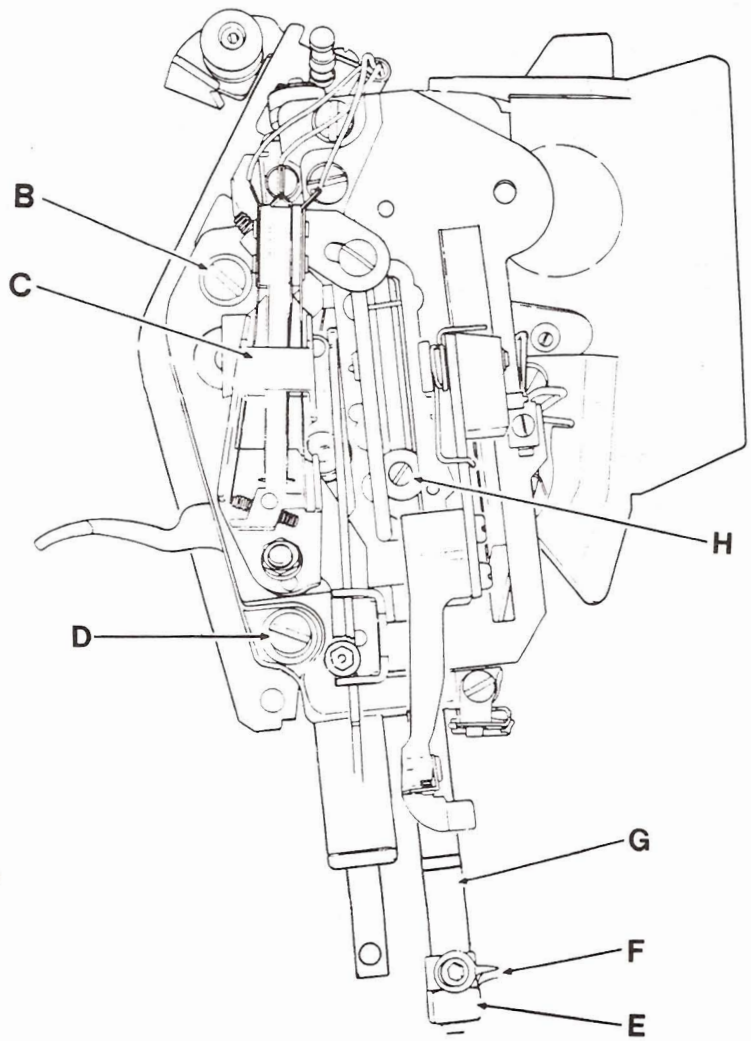
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HEAD-END ASSEMBLY

Removal:

1. Remove face plate and arm top cover.
2. Remove presser foot with presser foot shank.
3. Set presser bar to down position.
4. Remove needle.
5. Remove screw (A) with washer, connecting needle bar ball joint and needle bar driving arm.
6. Remove buttonhole switch (C) and place it to the rear of the machine.
7. Turn hand wheel toward front of machine to bring needle bar to its highest point.
8. Remove lower positioning screw (D) and upper pivot screw (B) with flat washers.
9. Remove head-end assembly by drawing straight out from casting.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust needle location.
3. Adjust basting mechanism.
4. Adjust buttonhole switch.

NEEDLE BAR

Removal:

1. Remove face plate, arm top cover and head-end assembly.
2. Remove needle clamp thread guide (F) and needle clamp (E).
3. Loosen needle bar clamping screw (H).
4. Pull needle bar (G) up and out of head-end assembly.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Replace needle bar in head-end assembly and tighten clamping screw (H) to pinch tightness.
3. Adjust needle bar location and height.
4. Check that needle bar latch engages properly.
5. Adjust basting mechanism.
6. Adjust buttonhole switch.

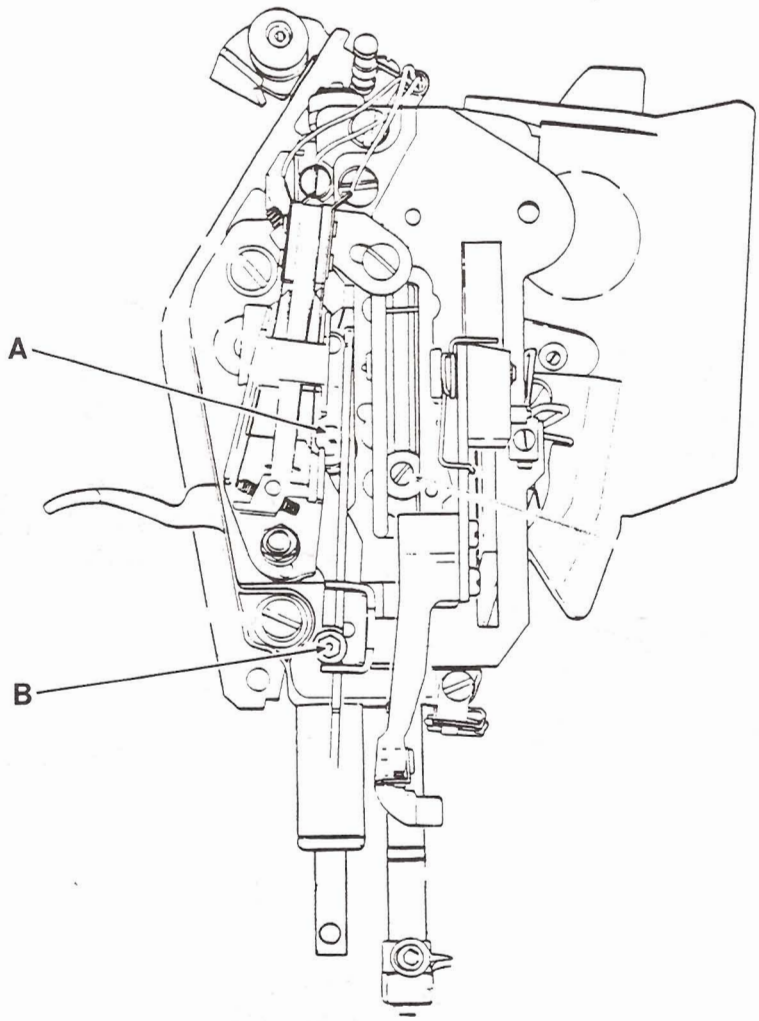
PRESSER BAR - PRESSER BAR BUSHING

Removal:

1. Remove face plate, arm top cover and head end.
2. Loosen presser bar clamping screw (A), and remove presser bar (F).
3. Loosen presser bar bushing clamping screw (B).
4. Use the blade of a screwdriver to push against the end of presser bar spring (D) while rotating presser bar bushing (E) until the spring is unthreaded off presser bar guide bracket (C).
5. Repeat this procedure to unthread the presser bar spring off presser bar bushing (E).
6. Remove presser bar bushing (E).

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust needle location.
3. Adjust presser bar height.
4. Check basting stitch and adjust if necessary.
5. Adjust buttonhole switch.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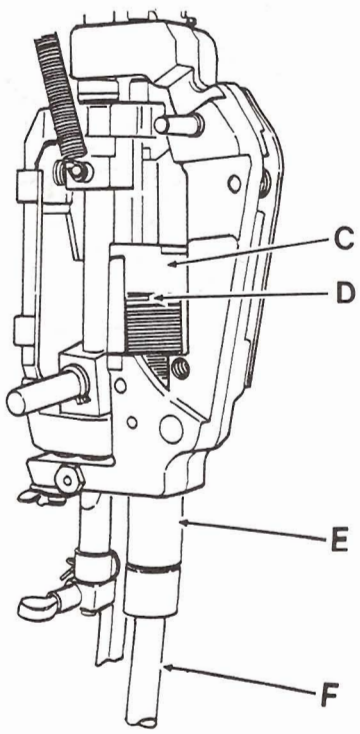
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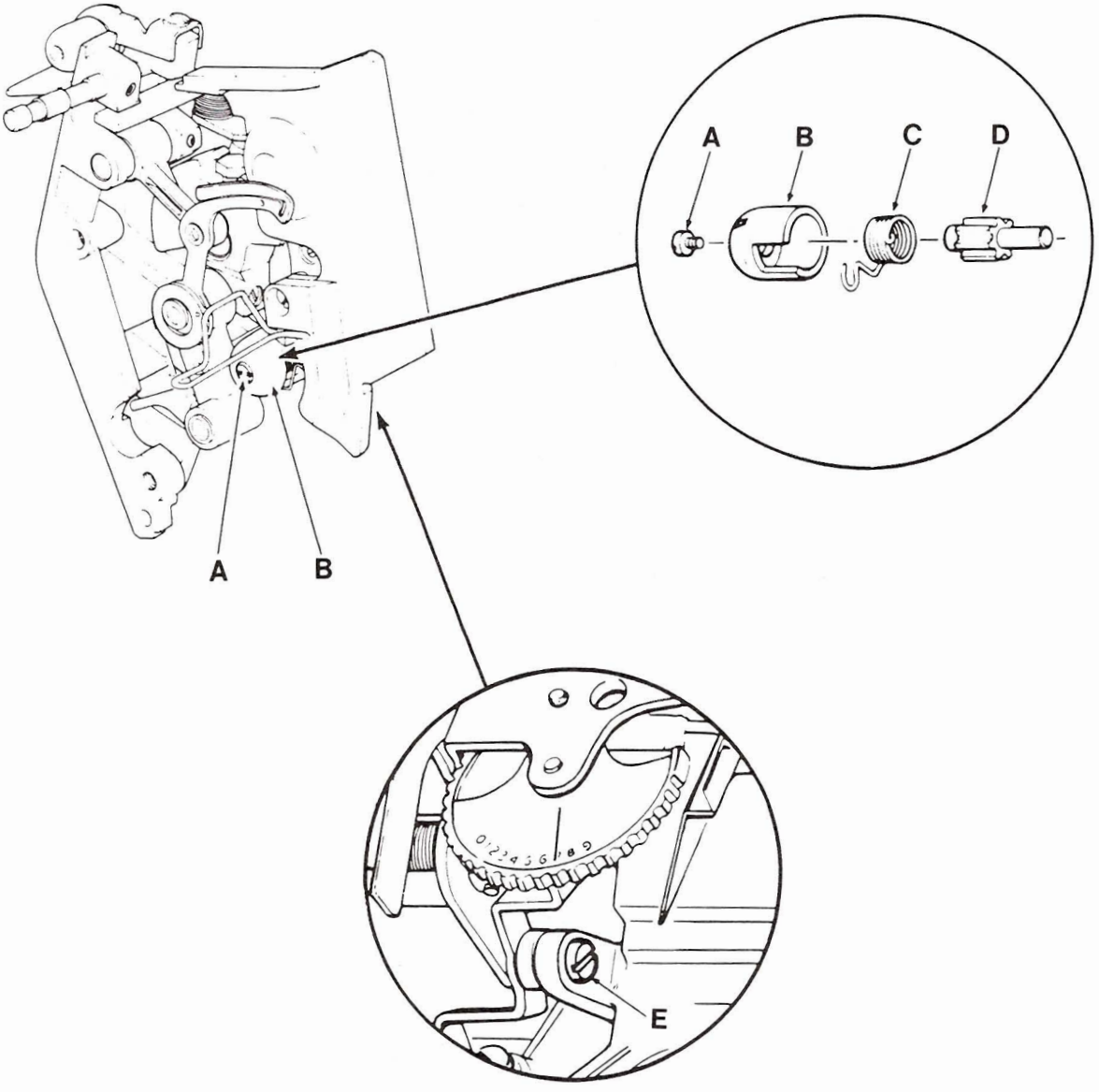
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TENSION ASSEMBLY

Removal:

1. Remove face plate, arm top cover and control panel/main control board assembly.
2. Remove screw (E) under arm at head end.
3. Remove tension assembly from machine.

Replacement:

1. Replacement is the same as removal in reverse order.

THREAD TAKE-UP SPRING

Removal:

1. Remove tension assembly.
2. Remove screw (A), cap (B) and take-up spring (C) from stud (D).

Replacement:

1. Replace take-up spring (C) on stud (D) with inside tail of spring into groove of stud at approximately 8:00-8:30 clock hand position.
2. Replace cap (B) and screw (A).
3. Replace tension assembly, and control panel/main control board assembly.
4. Adjust take-up spring stroke.

CONTROL PANEL/MAIN CONTROL BOARD ASSEMBLY

Removal:

1. Remove arm top cover.
2. Remove arm top cover clamping studs (A) and assembly mounting screws (B).
3. Lift assembly from machine and disconnect all harnesses.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Perform Sequence of Electronic and Electromechanical Checks and Adjustments.

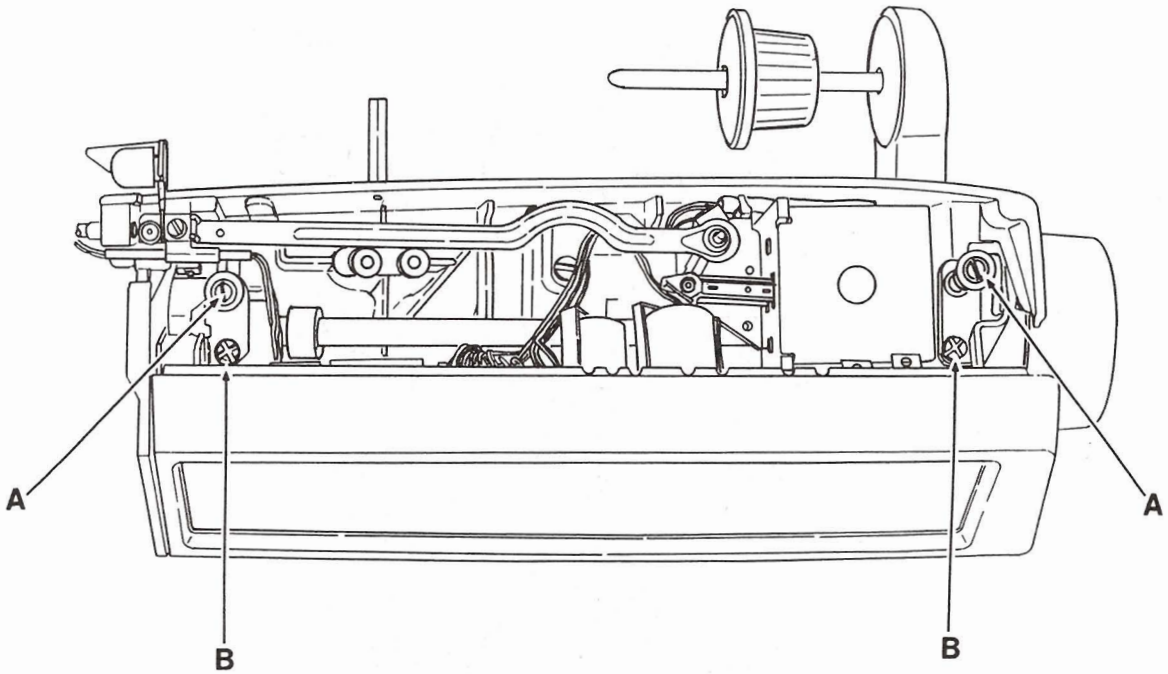
CONTROL PANEL/MAIN CONTROL BOARD DISASSEMBLY

Removal:

1. Remove arm top cover and control panel/main control board assembly.
2. Disconnect ribbon harnesses (D) by pulling out from their connector.
3. Disconnect plug (E).
4. Remove six mounting screws (C) and lift the main control board from the pattern selector carrier.
5. Remove the control panel from the pattern selector carrier.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Perform Sequence of Electronic and Electromechanical Checks and Adjustments.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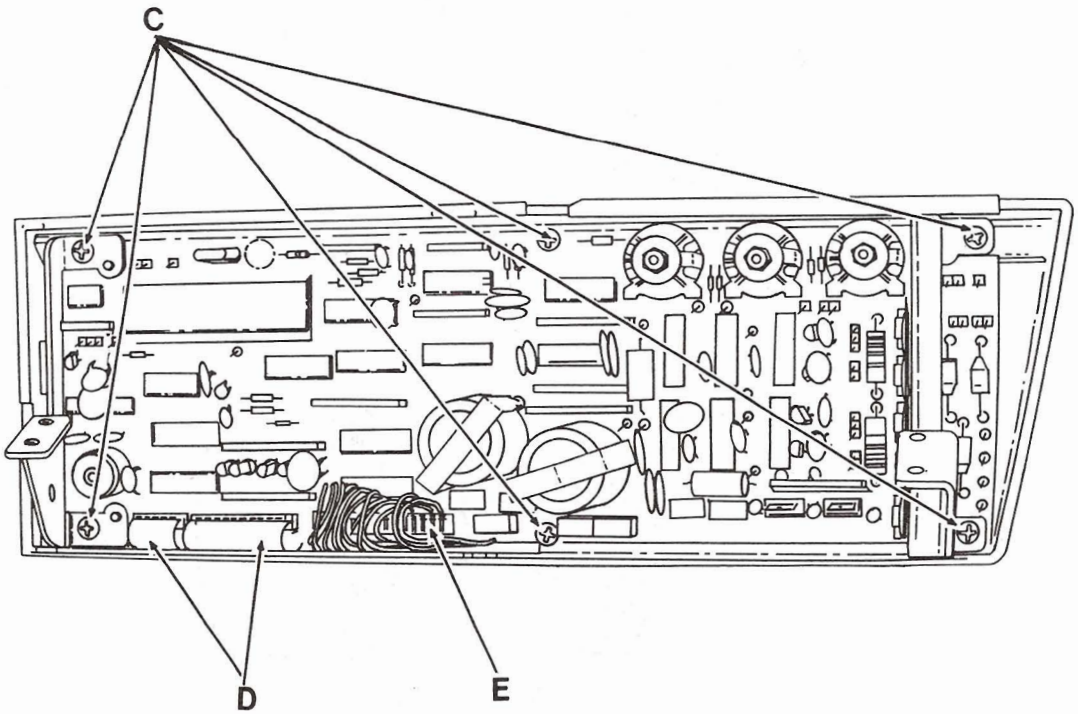
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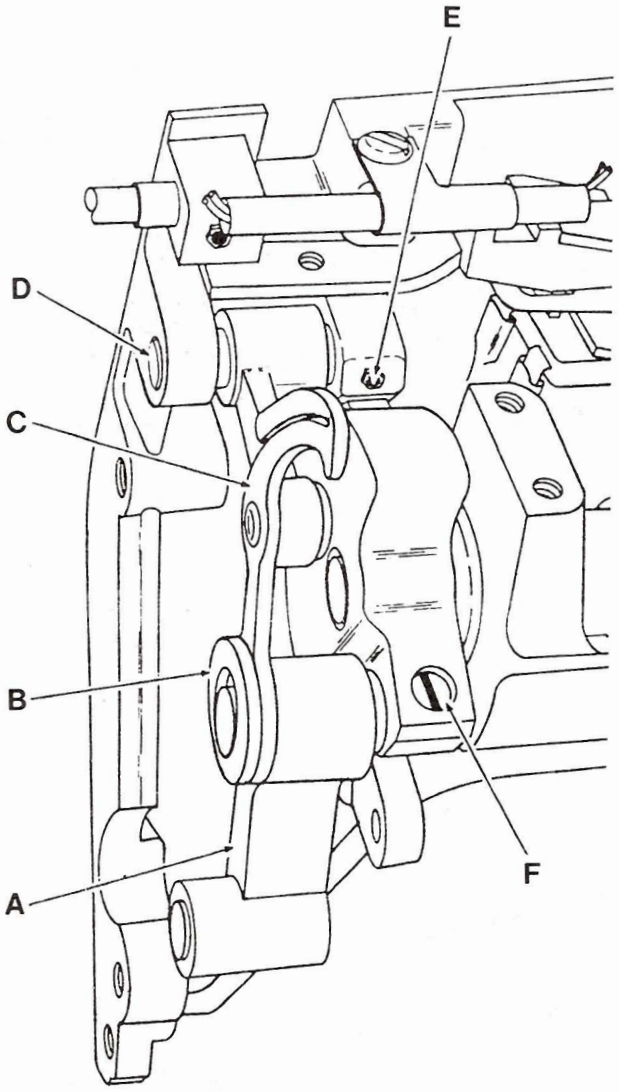
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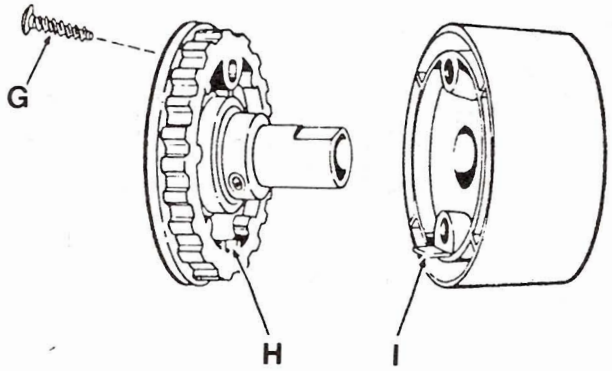
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TAKE-UP LEVER ASSEMBLY

Removal:

1. Remove face plate, arm top cover and head-end assembly.
2. Loosen take-up lever hinge stud set screw (E).
3. Loosen thread take-up crank set screw (F).
4. Push take-up lever hinge stud (D) toward the left and pull it out.
5. Hold needle bar connecting link (A) and ease out thread take-up crank (B) and thread take-up lever (C).

Replacement:

1. Replacement is the same as removal in reverse order.
2. Be sure set screw (F) is properly located on the flat of crank (B) and that crank (B) is firmly seated in connecting link (A).
3. Hinge stud (D) should be flush with the left side of the casting.
4. Perform "Sequence of Electronic and Electro/Mechanical Checks and Adjustments".
5. Check needle location and basting function.

HAND WHEEL

Removal:

1. Remove arm top cover and control panel/main control board.
2. Rotate hand wheel to bring Phillips head screw (G) in view.
3. Remove Phillips head screw (G) from hand wheel.
4. Pull hand wheel straight out.

Replacement:

1. Insert hand wheel key (I) in sprocket keyway (H).
2. Replace and tighten screw (G). Do not overtighten screw as this may cause runout in the hand wheel.
3. Replace control panel/main control board assembly.
4. Perform "Sequence of Electronic and Electro/Mechanical Checks and Adjustments".

MOTOR BELT

Removal:

1. Remove arm top cover, control panel/main control board assembly and hand wheel.
2. Loosen eccentric stud set screw (A).
3. Turn eccentric stud (B) for maximum looseness of belt.
4. Ease belt off arm shaft sprocket and draw it out through bottom of machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust motor belt tension.
3. Perform "Sequence of Electronic and Electro/Mechanical Checks and Adjustments".

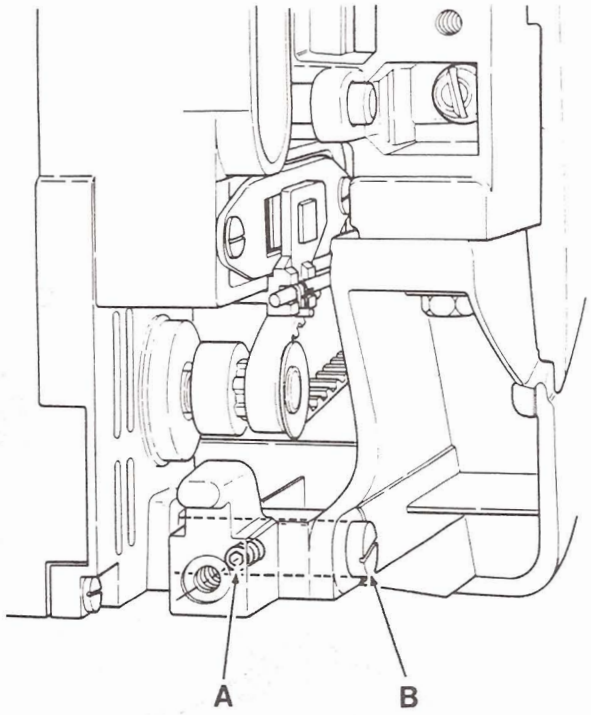
MOTOR

Removal:

1. Remove bottom cover.
2. Loosen eccentric stud set screw (A) and slide stud (B) away from the motor.
3. Remove retaining rings (C) and (F).
4. Disengage switch actuating rod from switch actuating bracket (H).
5. Pull out hinge pins (D) and (G).
6. Remove motor from machine and disconnect Mate-N-Lock connector (E).

Replacement:

1. Replacement is the same as removal in reverse order.
2. When replacing retaining ring (C) note there are two slots in hinge pin (D). After the motor is replaced, push hinge pin (D) firmly to the right and insert retaining ring (C) into the slot closest to the casting.
3. Adjust motor belt tension.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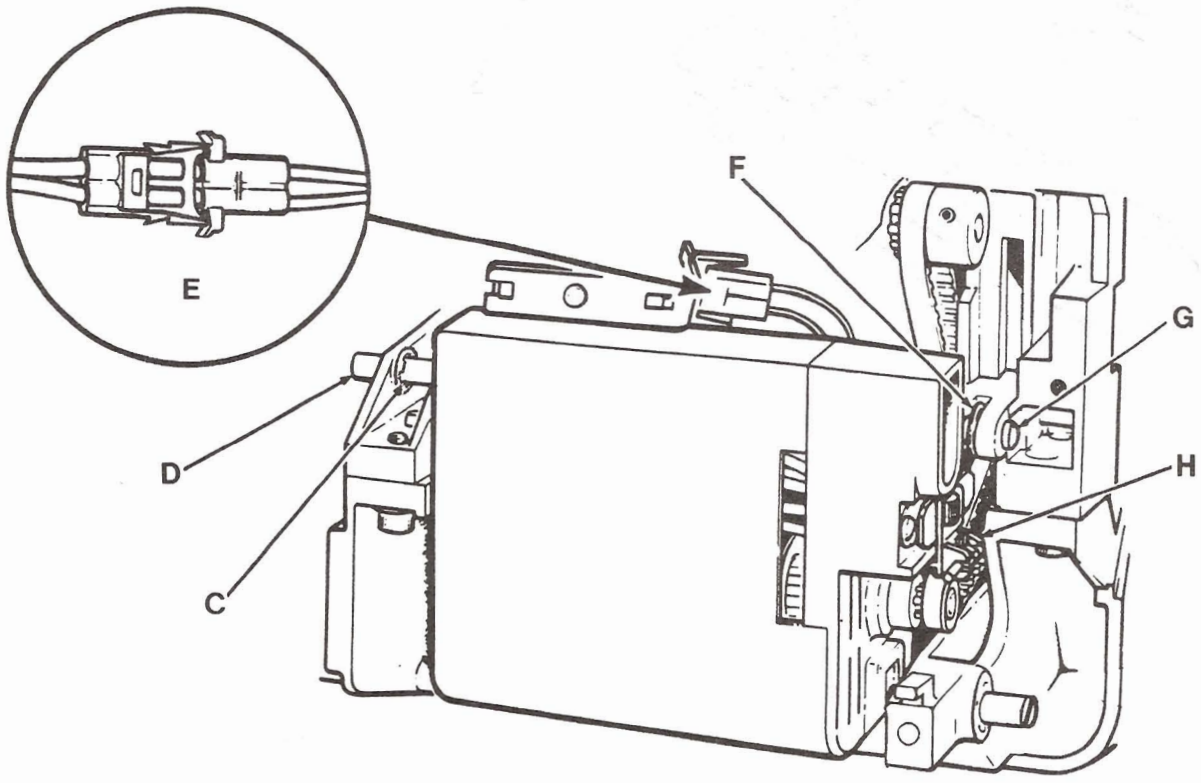
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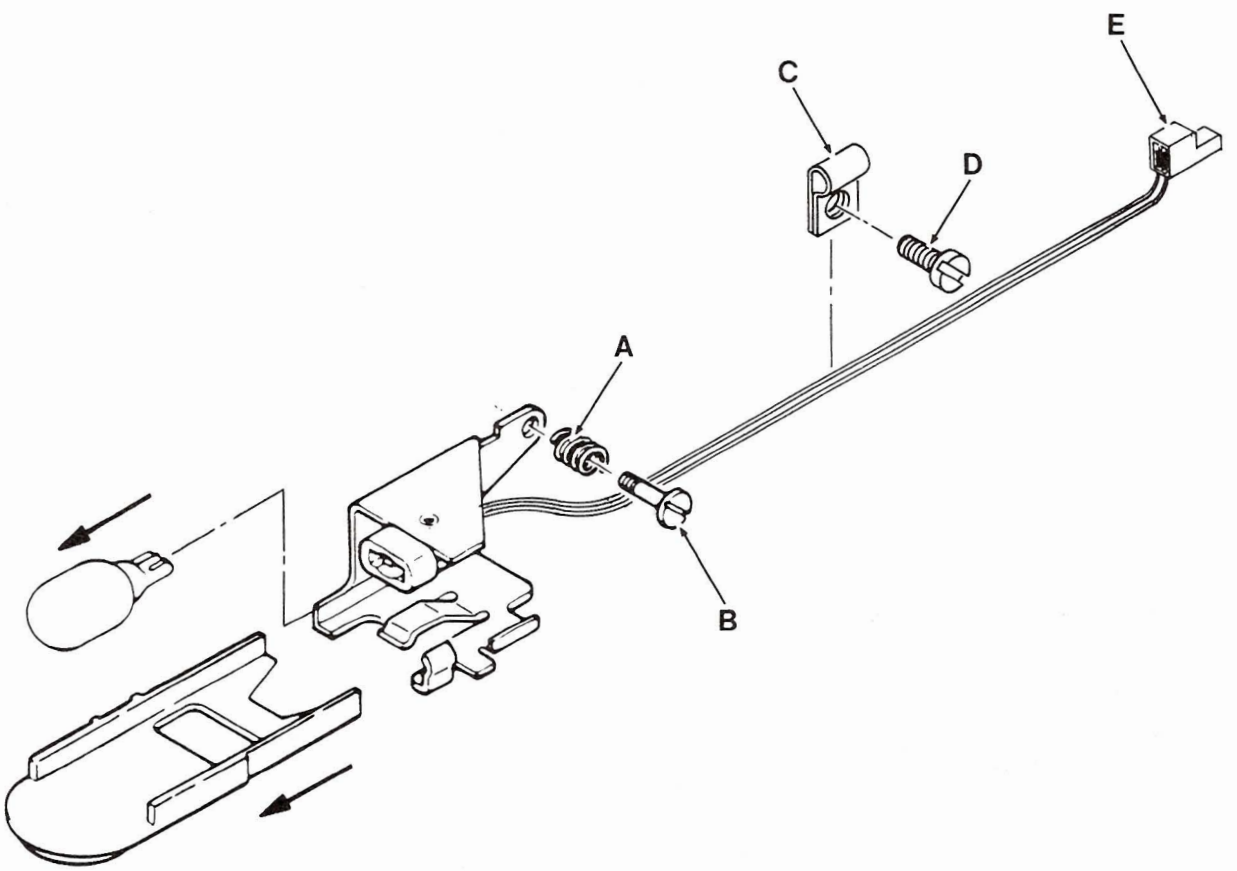
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SEWING LIGHT ASSEMBLY

Removal:

1. Remove arm top cover and front cover.
2. Remove control panel/main control board assembly and disconnect sewing light harness (E) only.
3. Lay the machine on its back and carefully support the control panel/main control board assembly.
4. Remove retainer screw (D) and retainer (C).
5. Remove light bracket hinge screw (B) with coiled spring (A).
6. Remove sewing light assembly.

Replacement:

1. Replacement is the same as removal in reverse order.

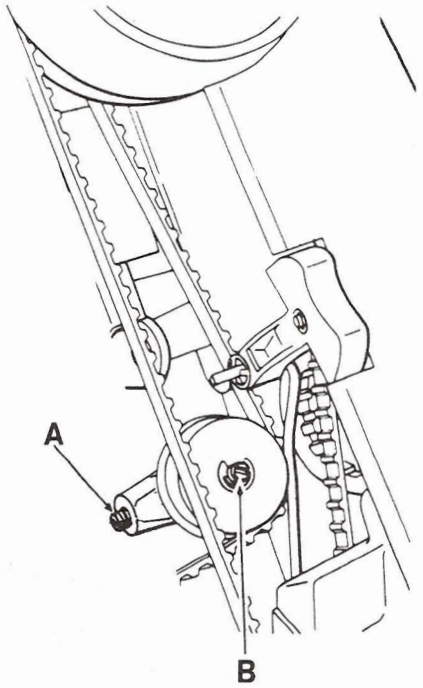
ARM SHAFT SPROCKET -- TIMING BELT

Removal:

1. Remove arm top cover, control panel/main control board assembly, hand wheel, front cover and bottom cover.
2. Loosen idler pulley eccentric set screw (A).
3. Turn eccentric (B) for maximum degree of looseness.
4. Loosen arm shaft sprocket set screw (D).
5. Remove arm shaft sprocket (C) from arm shaft.
6. Remove timing belt (F) from lower cogged pulley (E) and draw it out from bottom of machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust radial and lateral position of arm shaft sprocket (C).
3. Adjust timing belt tension.
4. Perform "Sequence of Electronic and Electro/Mechanical Checks and Adjustments".
5. Adjust hook and feed time.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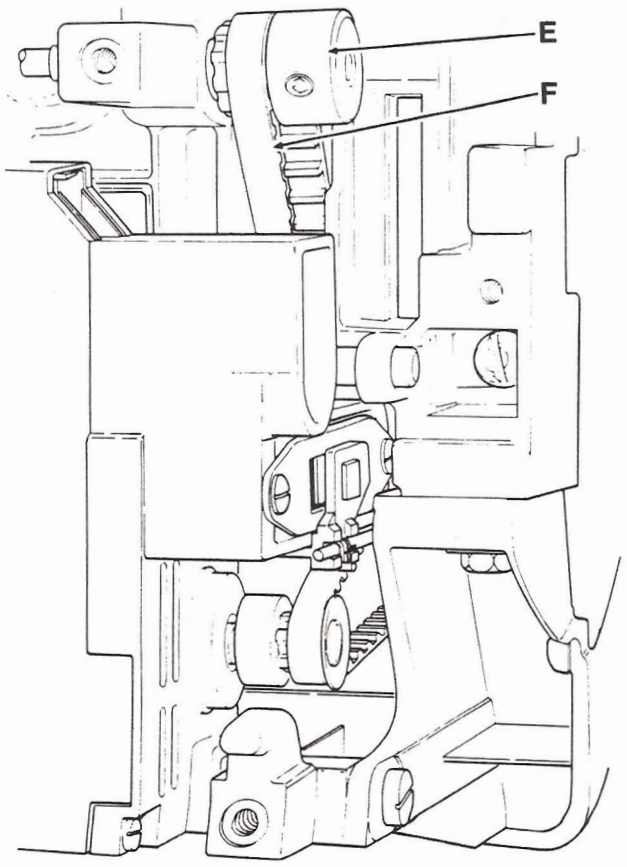
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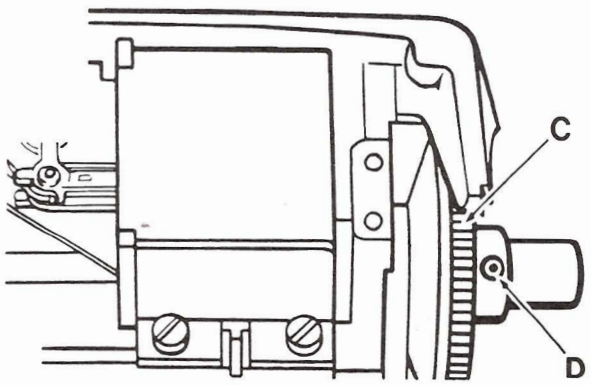
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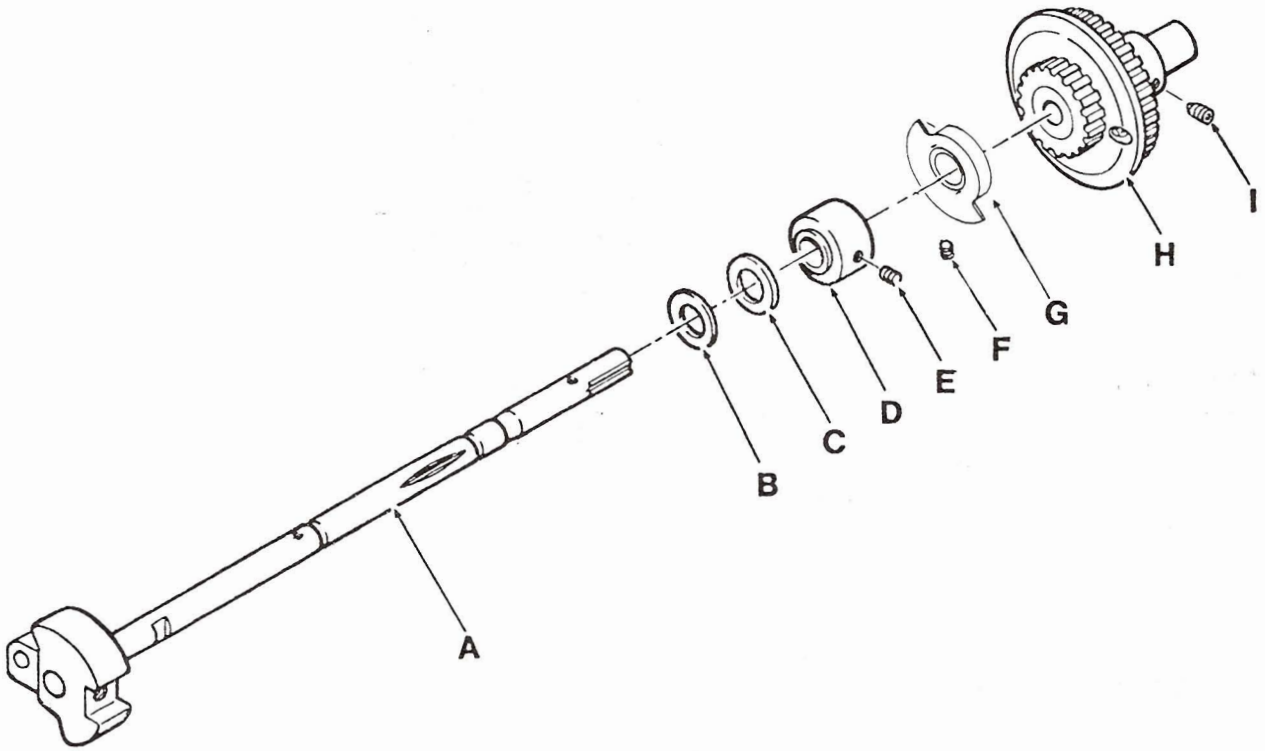
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ARM SHAFT

Removal:

1. Remove face plate, arm top cover, head-end assembly, control panel/main control board assembly, take-up lever assembly and hand wheel.
2. Remove motor belt from arm shaft sprocket.
3. Loosen arm shaft collar set screw (E).
4. Loosen set screw (F) in timing shunt (G).
5. Loosen set screw (I) in arm shaft sprocket but do not remove sprocket (H). Using an old arm shaft or 3/8" drill rod as a threading tool, gradually pull the arm shaft (A) out of the sprocket hub while inserting the threading tool into the hub. Continue to withdraw the arm shaft through the arm shaft bushing following it with the threading tool. By carefully maintaining timing belt mesh on the arm shaft sprocket, hook and feed timing will not be upset.
6. Continue to remove arm shaft out of machine, removing timing shunt, arm shaft collar and washers from the arm shaft as the arm shaft is withdrawn.

Replacement:

1. Thread nylon washer (B) on to arm shaft.
2. Push arm shaft through its bearing at head end.
3. Thread nylon washer (C) on to arm shaft.
4. Replace arm shaft collar (D).
5. Locate the shunt (G) assembly with its blade between the extensions of the interrupter assembly and thread the arm shaft through the shunt assembly.
6. Thread the arm shaft through its arm casting bearing, holding the sprocket (H) firmly against the arm casting to prevent timing belt slippage off sprocket.
7. Thread screw (I) into sprocket hub and temporarily secure screw to prevent lateral movement of sprocket.
8. Adjust arm shaft and arm shaft sprocket radial and end play as outlined in arm shaft adjustment procedure.
9. Replace motor belt and hand wheel.
10. Replace take-up lever assembly control panel/main control board assembly and head-end assembly.
11. Temporarily secure timing shunt set screw (E) to prevent lateral movement.
12. Adjust motor belt tension.

ARM SHAFT (CONT.)

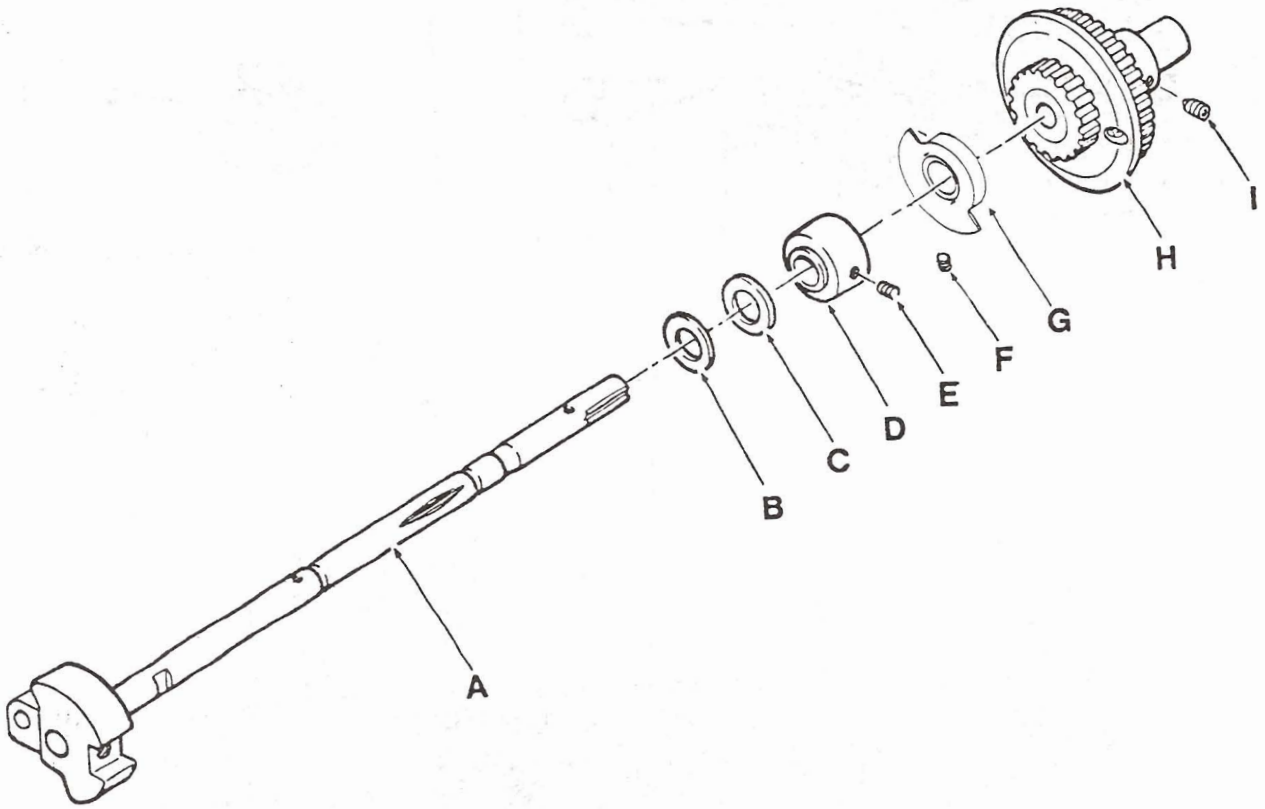
13. Perform " Sequence of Electronic and Electro/Mechanical Checks and Adjustments".

14. Reset needle location.

15. Reset needle crossover.

16. Check hook and feed timing.

17. Perform bind test for bight mechanism.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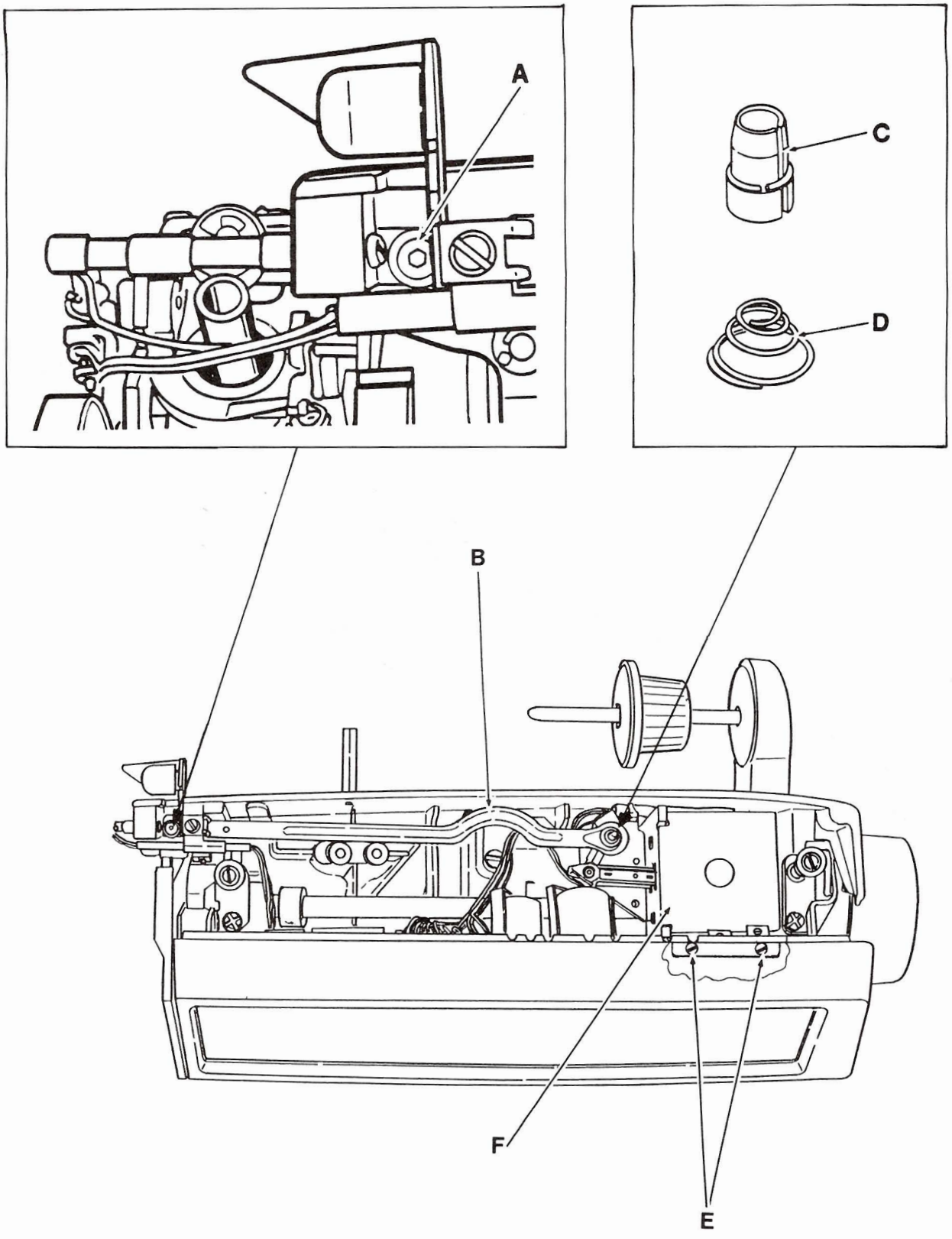
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NEEDLE BAR DRIVING ARM

Removal:

1. Remove face plate and arm top cover.
2. Remove screw (A) with washer, connecting needle bar ball joint and needle bar driving arm.
3. Remove needle bar driving retaining sleeve (C) and beehive spring (D).
4. Lift needle bar driving arm (B) off linear bight motor link and remove from arm of machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust needle location.
3. Perform bind test for bight mmechanism.

LINEAR BIGHT MOTOR

Removal:

1. Remove arm top cover and control panel/main control board assembly.
2. Remove needle bar driving arm retaining clip (C) and spring (D) and carefully lift needle bar driving arm off linear bight motor link.
3. Remove linear bight motor mounting screws (E).
4. Lift linear bight motor (F) out of machine.
5. Disconnect linear bight motor harness from the main control board assembly.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Perform " Sequence of Electronic and Electro/Mechanical Checks and Adjustments".
3. Check needle location.

FUSE ASSEMBLY

Removal:

1. Remove arm top cover, control panel/main control board assembly and front cover.

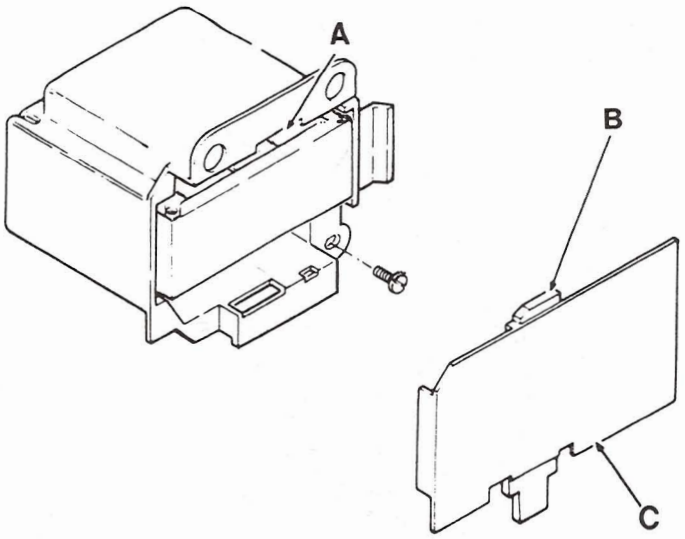
2. Remove transformer cover by pressing down on cover (C) while lifting up on the transformer housing until tab (B) clears slot (A) and the cover can be removed.

3. Withdraw the fuse assembly (E) from the lower right corner of the transformer housing and remove the insulating tubing from the fuse.

4. Disconnect harness terminal (D) from the transformer and connector (F) from the line cord.

Replacement:

1. Replacement is the same as removal in reverse order.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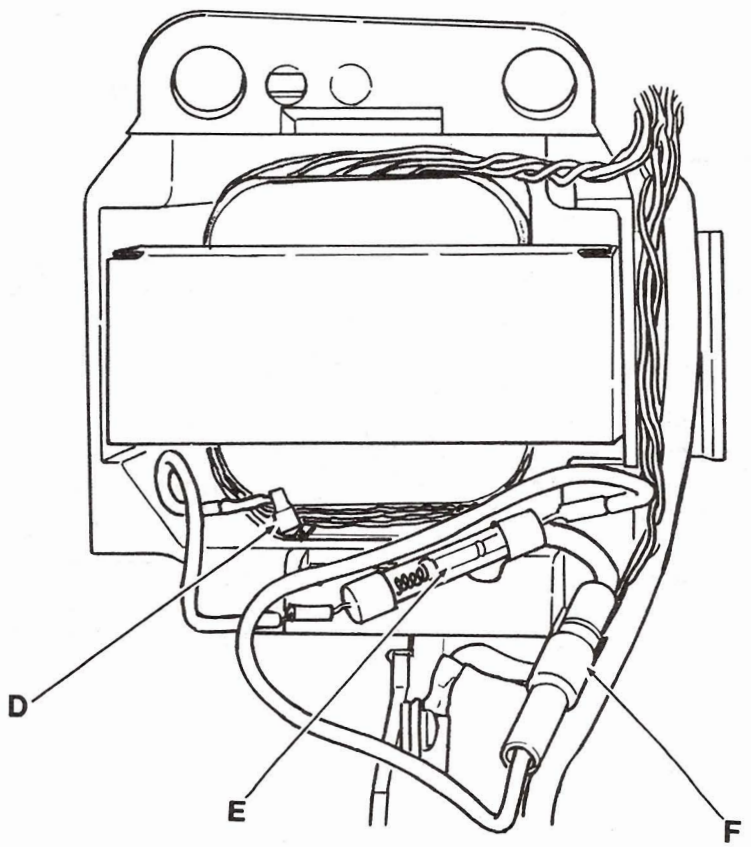
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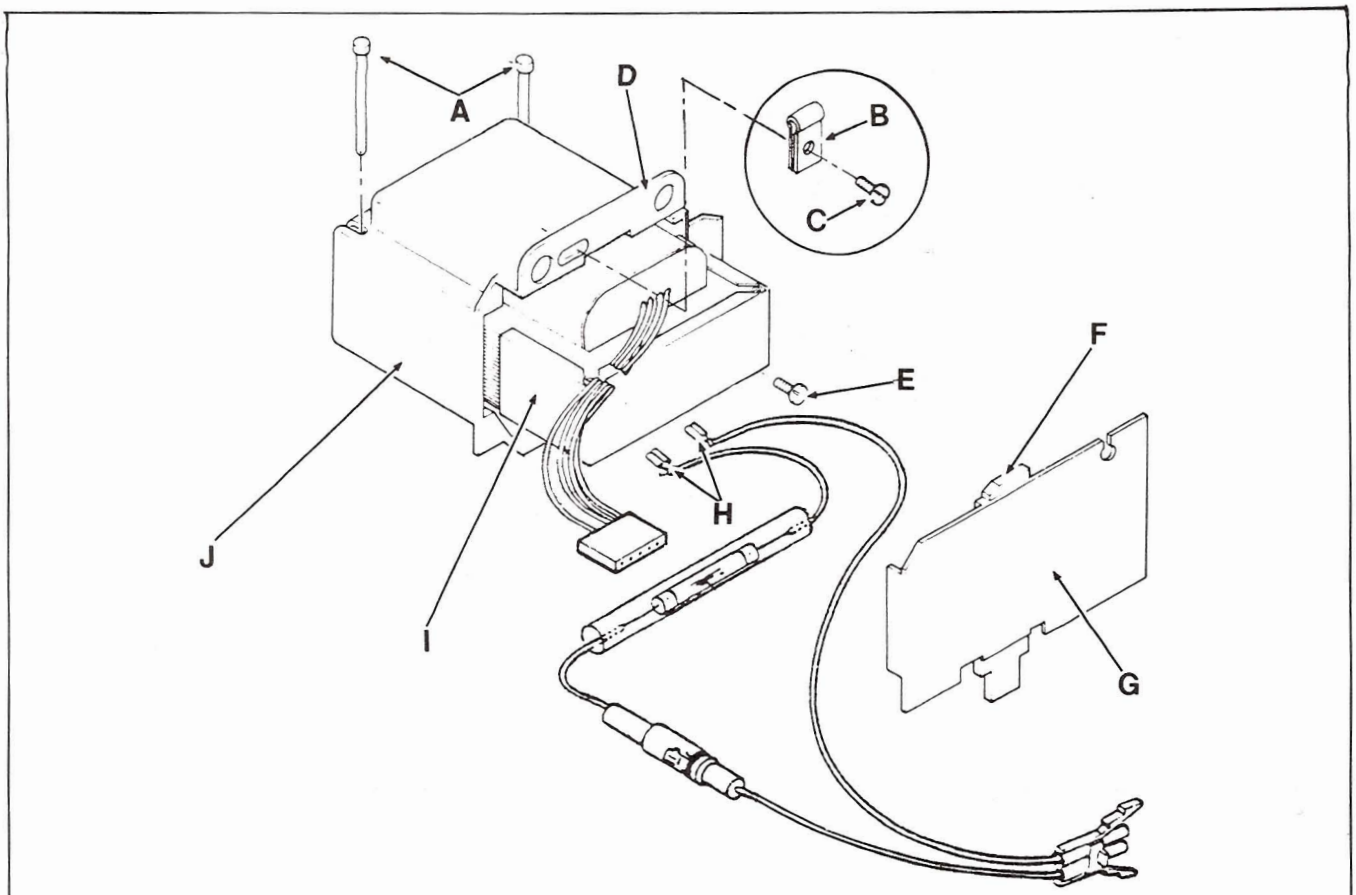
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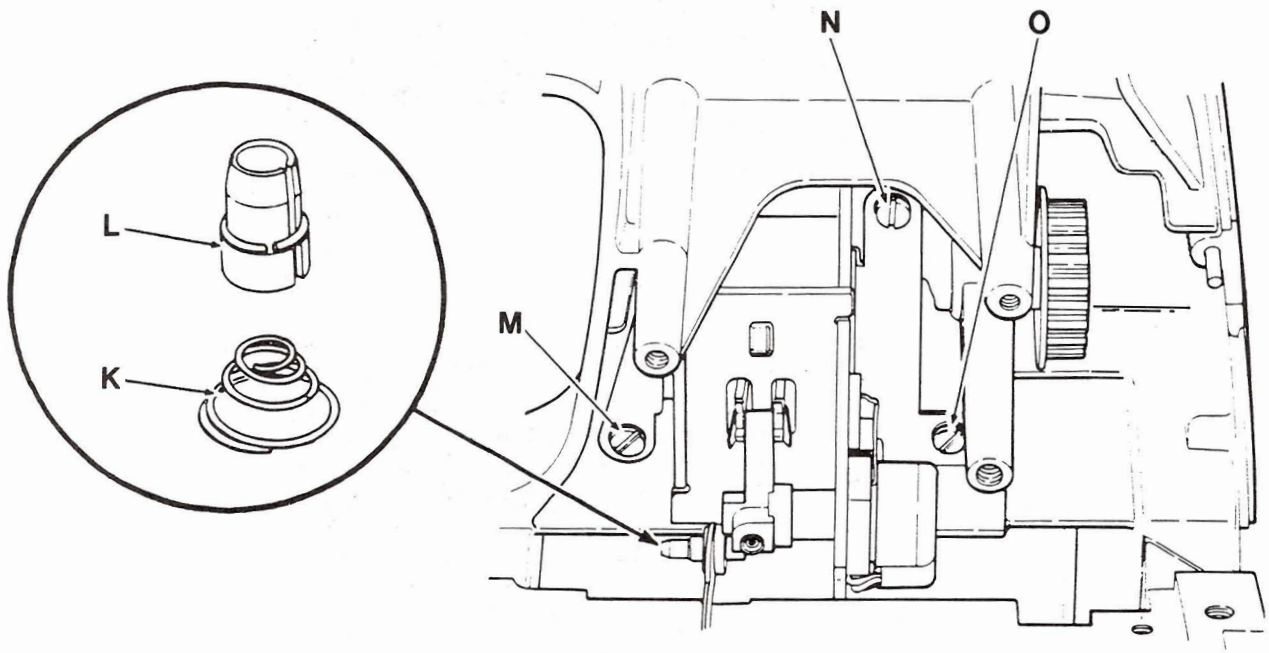
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TRANSFORMER AND TRANSFORMER HOUSING

Removal:

1. Remove arm top cover, control panel/main control board assembly and front cover.
2. Remove transformer cover by pressing down on cover (G) while lifting up on the transformer housing until tab (F) clears the slot in transformer housing and the cover can be removed.
3. Disconnect terminals (H) from the transformer.
4. Remove transformer housing mounting screw (C) with tab (B) and screw (E).
5. Lift transformer housing (J) with transformer out of the machine.
6. Remove two pins (A) and lift transformer (I) out of the machine.

Replacement:

1. Replacement is the same as removal in reverse order.

LINEAR FEED MOTOR

Removal:

1. Remove arm top cover, control panel/main control board assembly, front cover and transformer with the transformer housing.
2. Remove connecting link retaining clip (L) and spring (K).
3. Remove linear feed motor mounting screws (M), (N) and (O).
4. Lift connecting link off motor link and remove linear feed motor from machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Perform "Sequence of Electronic and Electro/Mechanical Checks and Adjustments".

BOBBIN RUNOUT ALARM BOARD ASSEMBLY

Removal:

1. Remove bottom cover.
2. Remove harness plugs from the bobbin runout alarm board.
3. Remove mounting screw (A) and remove the bobbin runout alarm board.

Replacement:

1. Replacement is the same as removal in reverse order.
2. When replacing the bobbin runout alarm board, be sure it is firmly butted against the casting at point (B).
3. Check for proper function and adjust if necessary.

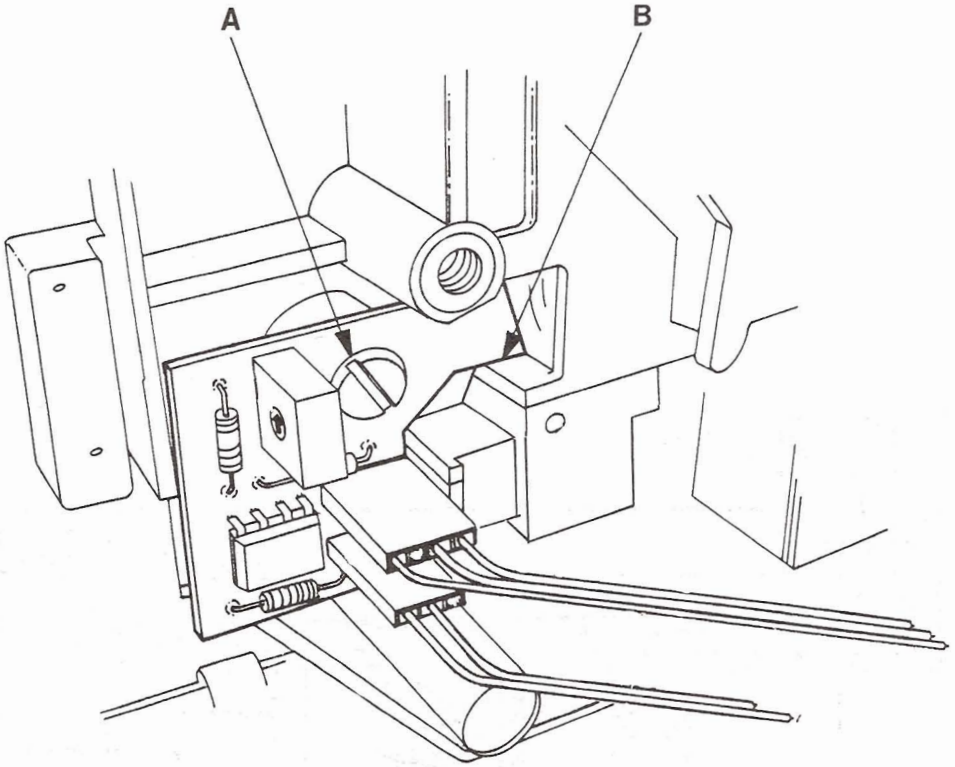
SLIDE PLATE

Removal:

1. Loosen bottom cover screw (F).
2. Pull bottom cover (E) approximately 1/4" (6,35 mm) away from the machine bed.
3. Press a screwdriver between the bed skirt and spring (G) and turn screwdriver (D) enough to depress the spring.
4. Pull the slide plate (C) forward and off the machine.

Replacement:

1. Replacement is the same as removal in reverse order.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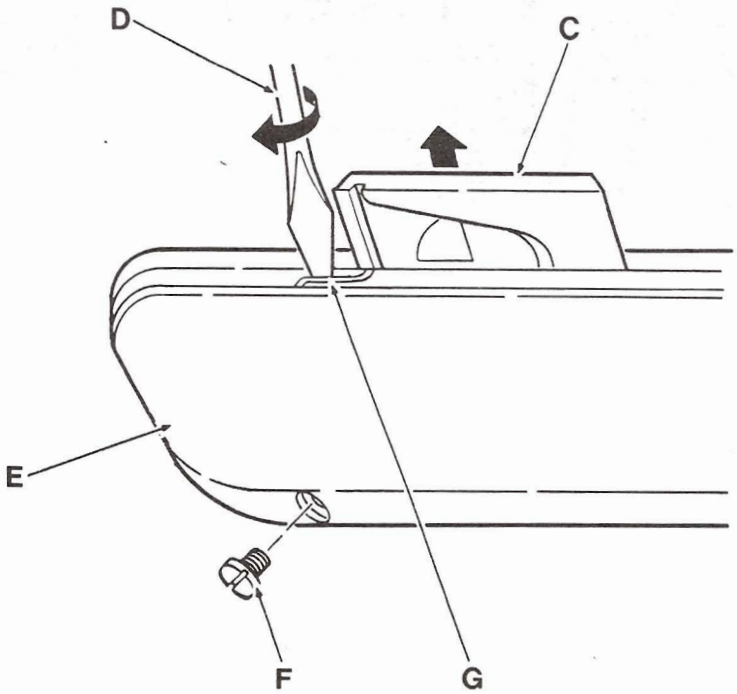
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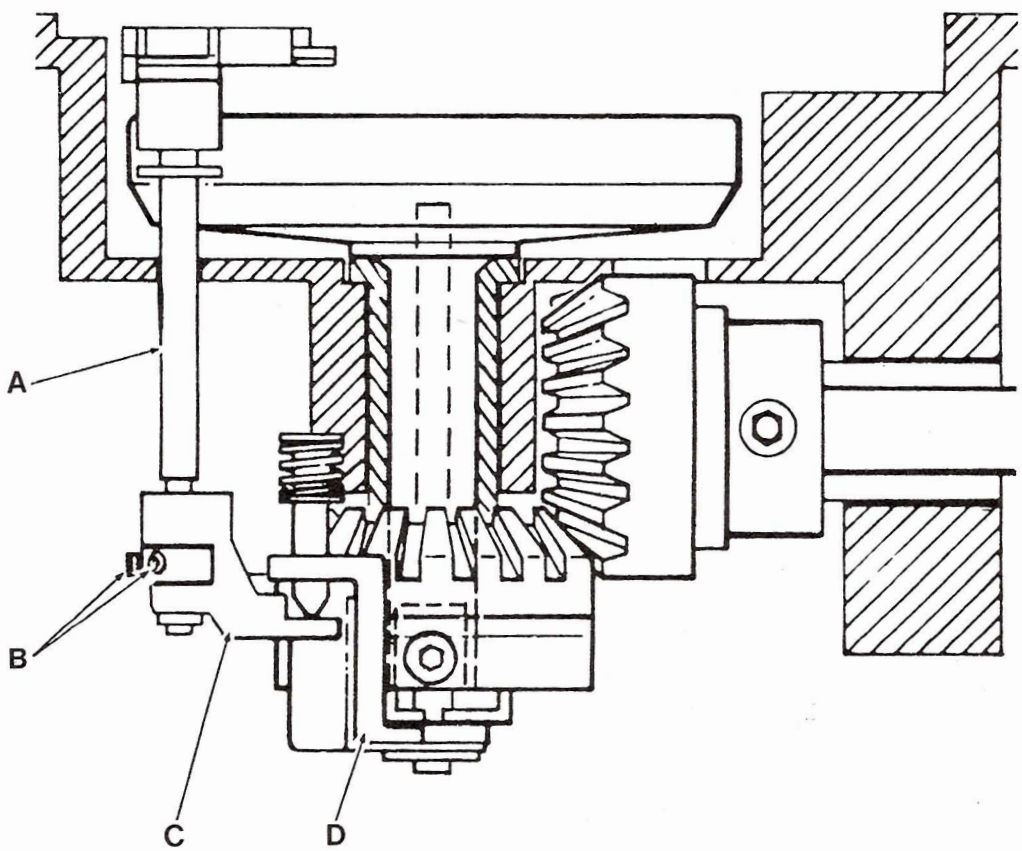
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BOBBIN WINDER ACTUATING LEVER AND DRIVER ASSEMBLIES

Removal:

1. Remove bottom cover.
2. Remove slide plate.
3. Loosen actuating lever cam set screws (B).
4. Remove actuating lever cam (C).
5. Remove bobbin winder driver assembly (D) by drawing out of hook shaft.
6. Remove bobbin winder actuating lever assembly (A) from top of bed.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Adjust bobbin winder actuating lever radial, height settings and bobbin driver height setting as outlined in Bobbin Case Thread Clearances.
3. Replace slide plate and bottom cover.

HOOK

Removal:

1. Remove bottom cover, slide plate, throat plate and bobbin case.

2. Remove feed dog screws (D) and (F) and feed dog (E).

3. Loosen hold down plate shaft set screw (I) and lift hold down plate (H) straight up out of the machine.

4. Remove locking nut (G).

5. Remove left hand threaded jack screw (B) with position plate (C). The left end of position plate (C) is forked to fit into a slot in jacking screw (B).

6. Loosen actuating lever screw (J) and remove actuating lever (A).

7. Move actuating lever cam (R) clear of driver assembly (Q) and remove the driver assembly.

8. Loosen hook gear set screw (P) and remove hook gear (O).

9. Remove hook (N) from the machine.

Replacement:

1. Loosen hook drive gear set screw (L) and move hook drive gear (M) to the right as far as possible.

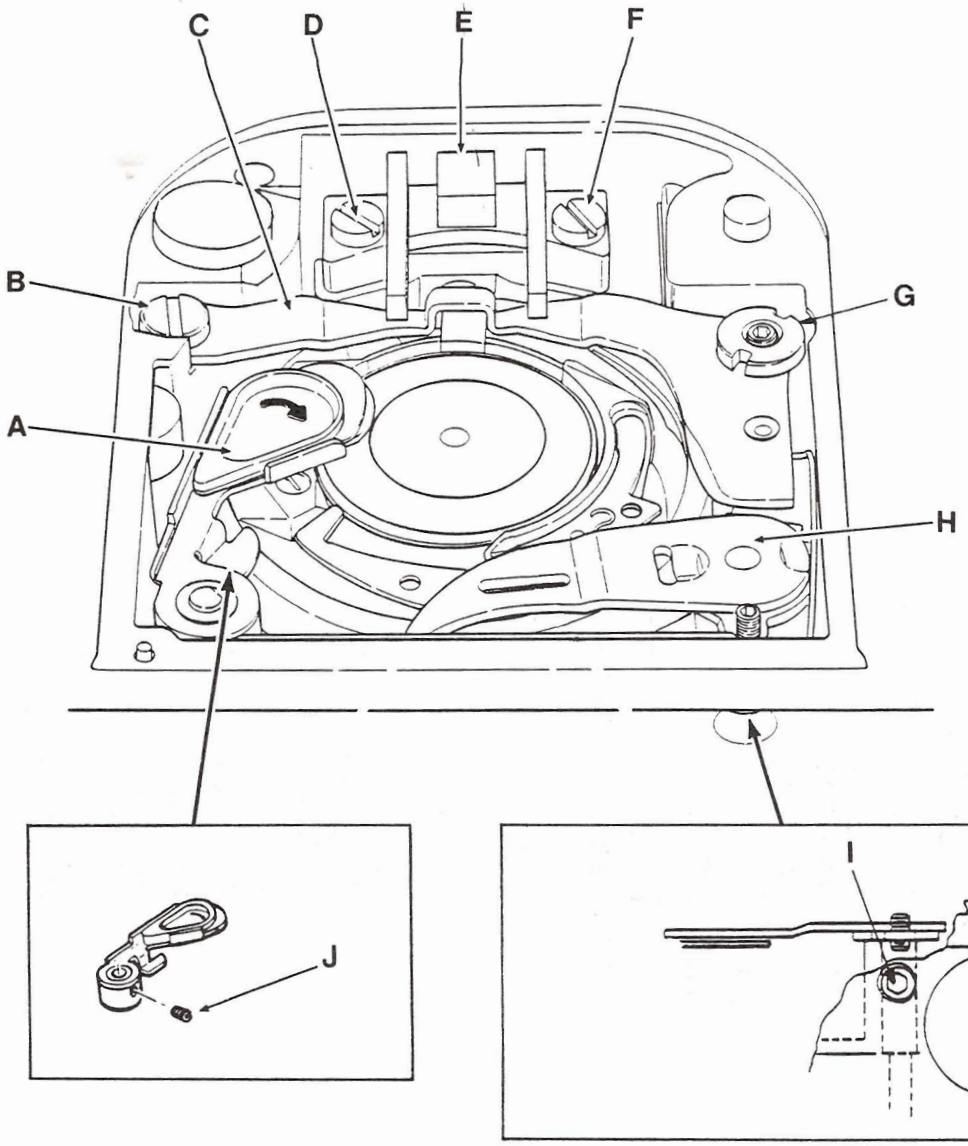
2. Replace hook (N).

3. Replace hook drive gear (O) locating set screw (P) on the flat of the hook shaft.

4. While hold hook (N) down, bring hook gear (O) up with light finger pressure. Tighten hook gear set screw (P). There should be no end play or binding of hook (N).

5. Replace position bracket (C), hold down plate (H), bobbin driver assembly (Q), actuating lever (A), and feed dog (E).

6. Adjust hook drive gear mesh, hook and feed time bobbin case thread clearances and bobbin winder settings.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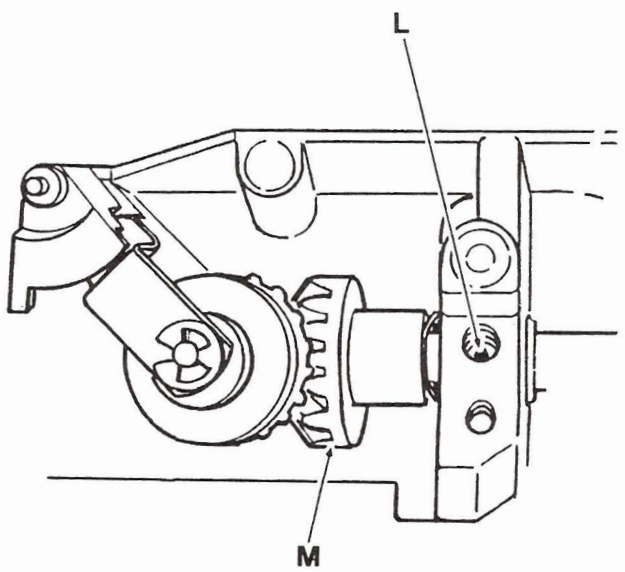
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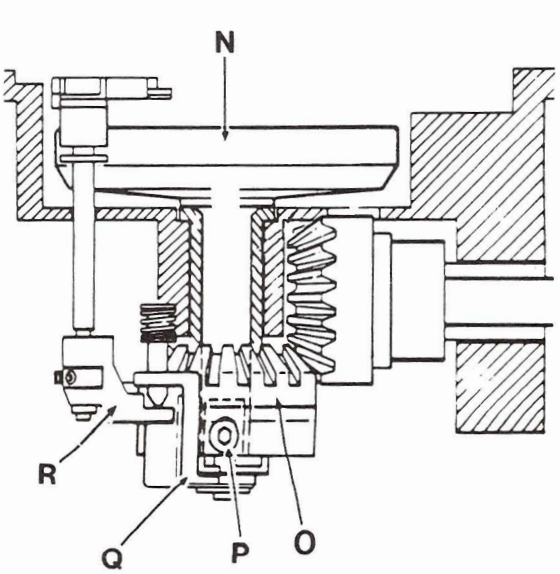
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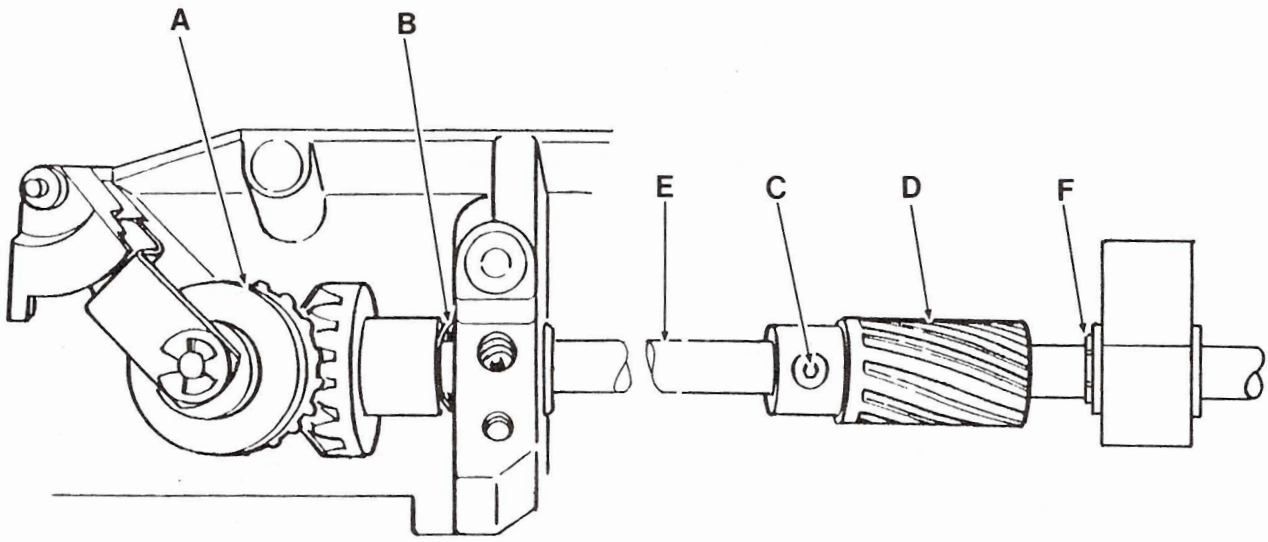
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HOOK DRIVE SHAFT - HOOK DRIVE GEAR - FEED DRIVE GEAR

Removal:

1. Remove retaining ring (F).
2. Loosen set screw (C) in feed drive gear (D) making sure it is clear of the recess on the hook drive shaft (E).
3. Draw hook drive shaft (E) to the right and out of the machine.

NOTE: If hook drive gear (A) only is to be removed slide hook drive shaft (E) to the right until it is just clear of hook drive gear (A). The gear may be removed by dropping it toward the rear of the machine.

Replacement:

1. Replacement is the same as removal in reverse order.
2. Be sure washer (B) is properly in place with the concave side facing the casting.
3. Locate feed drive fear (D) so the feed shaft gear is positioned midway on the feed drive gear, being sure the set screw (C) is located on the flat of shaft (E).
4. Adjust hook drive gear mesh.
5. Adjust hook and feed timing.

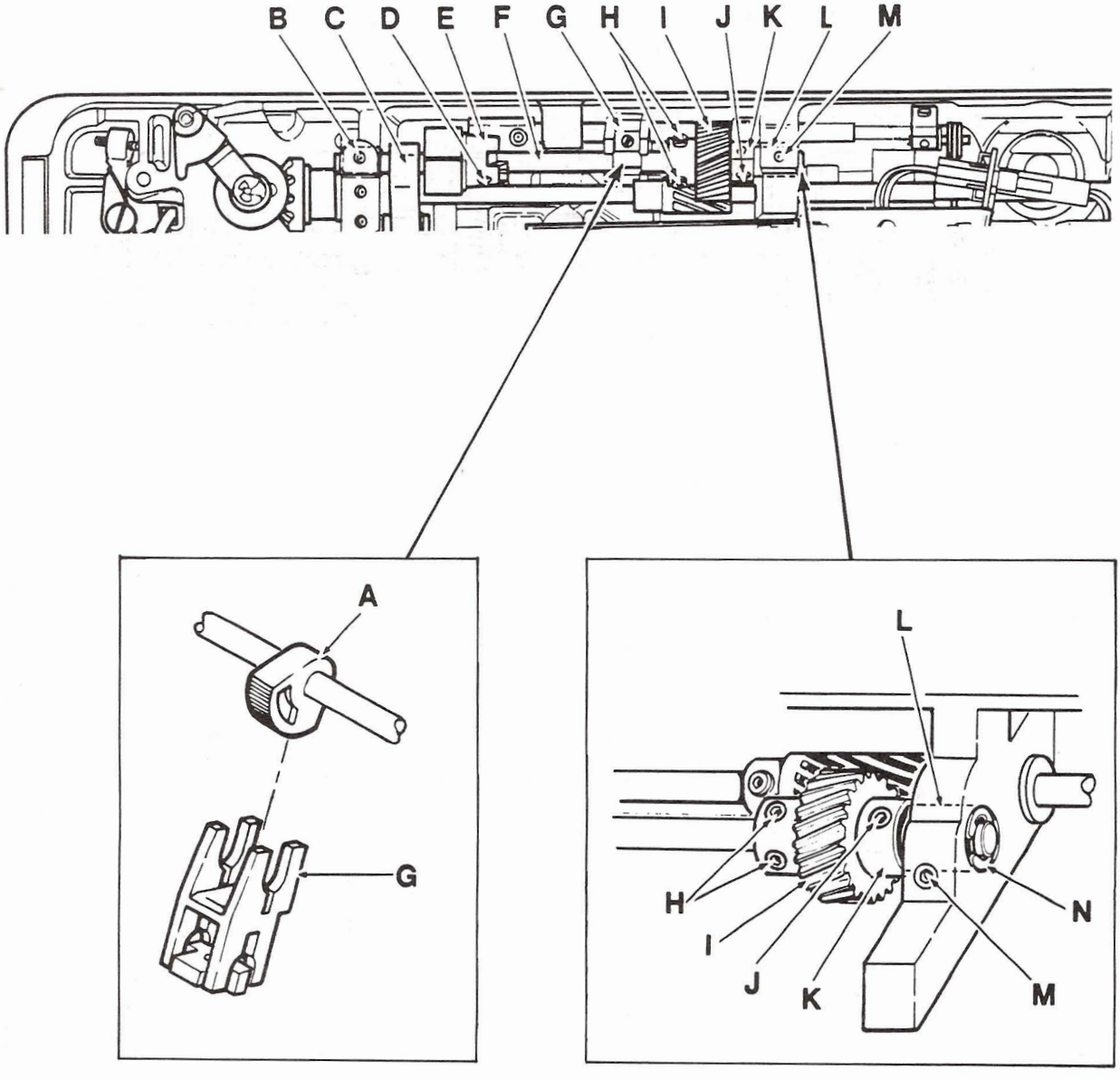
FEED DRIVE SHAFT -- FEED TIMING GEAR

Removal:

1. Remove bottom cover.
2. Loosen set screw (D) on eccentric (E) being sure it is clear of the flat on feed shaft (F).
3. Loosen two set screws (H) in feed timing gear (I).
4. Loosen collar set screw (J) and bushing set screw (M).
5. Slide bushing (L) to the right out of boss in casting.
6. Tilt right end of feed drive shaft (F) up and remove with retaining clip (N) by sliding to the right.

Replacement:

1. Thread bushing (L) on feed drive shaft with retaining clip.
2. Thread feed shaft through bushing hole in boss of casting.
3. Thread collar (K) and gear (I) on feed shaft.
4. Place feed brake guide (G) in alignment with feed brake (A) being sure adjusting block is properly in place.
5. Thread feed shaft through legs of feed brake guide, feed bar connecting assembly (E) and bushing (B).
6. Locate feed shaft (F) left to right so feed brake guide legs are on eccentric portion of the shaft and straddling cut out portion.
7. While maintaining position of the shaft bring bushing (L) against retaining clip (N) and tighten bushing set screw (M).
8. With retaining clip (N) against bushing (L), locate collar (K) against bushing (L) with light finger pressure and tighten collar set screw (J).
9. Bring feed eccentric (E) against feed drive connecting link (C) with finger pressure and tighten eccentric set screw (D) being sure it is properly located on the flat of feed shaft (F).
10. Check feed shaft (F) for smooth rotation with feed brake off. There should be no binds or end play.
11. Retime feed.
12. Adjust feed brake.
13. Perform bind test for feed mechanism.
14. Replace bottom cover.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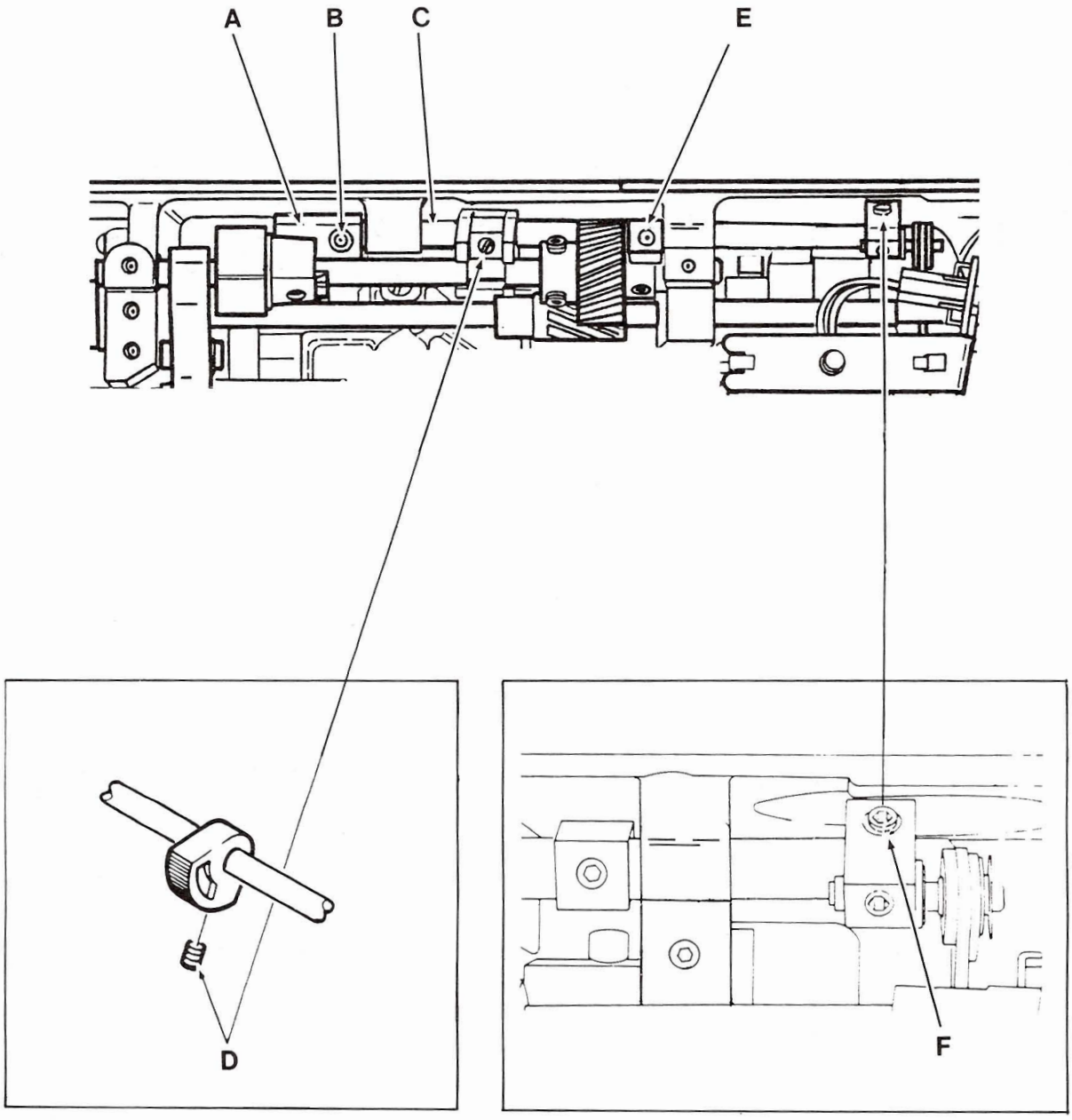
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FEED REGULATOR SHAFT AND FEED REGULATOR BLOCK

Removal:

1. Remove bottom cover and feed drive shaft.
2. Loosen regulator block set screw (B), feed brake set screw (D), collar set screw (E) and crank set screw (F) being sure screws (B) and (D) are clear of the recessed flats on feed regulator shaft (C).
3. Slide feed regulator shaft (C) to the right and out of the machine.
4. Remove feed regulator block (A).

Replacement:

1. Replacement is the same as removal in reverse order.
2. Allow end play in feed regulator shaft (C) of .001" - .020" (0,025 mm - 0,508 mm).
3. Retime feed.
4. Adjust zero feed and feed brake.
5. Perform bind test for feed mechanism.

FEED BAR CONNECTING LINK

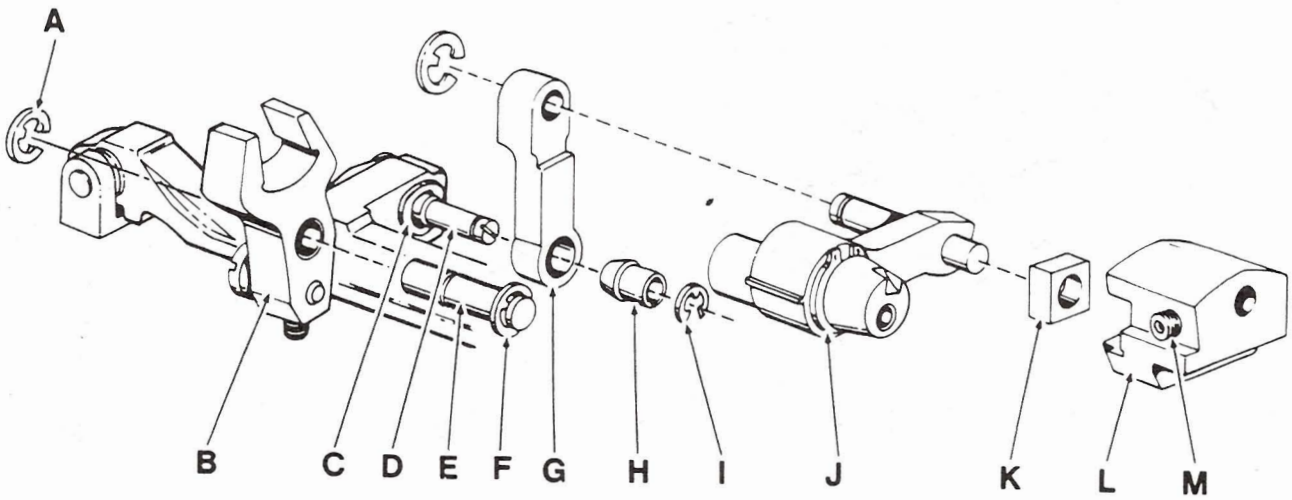
Removal:

1. Remove bottom cover.
2. Remove hook and feed drive shaft to right until they are clear of drive connection assembly (J).
3. Loosen set screw (N) and remove retaining clips (A) and (F) and hinge stud (E).
4. Remove retaining clip (I).
5. Slide ball bushing (H) off eccentric stud (D).
6. Lift drive connection assembly (J) out of feed lifting fork (B).
7. Rotate feed regulator shaft counterclockwise to its maximum position and remove slide block (K) from feed regulator (L).
8. Tilt lower end of drive connection assembly (J) to right to remove it from eccentric stud (D).
9. Lift drive connection assembly (J) up and to the left to remove it and feed bar connecting link (G) from machine. Be careful not to lose wave washer (C).

NOTE: If necessary, feed regulator (L) may now be removed by loosening set screw (M) and sliding feed regulator off feed regulator shaft.

Replacement:

1. If feed regulator (L) has been removed, replace it on feed regulator shaft. Do not tighten set screw (M) at this time.
2. Be sure wave washer (C) is in place. Insert drive connection assembly (J) at a 45 degree angle to bring lower end of feed bar connecting link (G) over eccentric stud (D).
3. Insert slide block (K) onto upper end of drive connection assembly, and then into slide of feed regulator (L).
4. Replace ball bushing (H) and retaining clip (I).
5. Locate regulator set screw (M) on flat of feed regulator shaft.
6. Locate feed regulator (L) so there is .001" - .020" (0,025 mm - 0,508 mm) between it and slide block (K). Tighten feed regulator set screw (M).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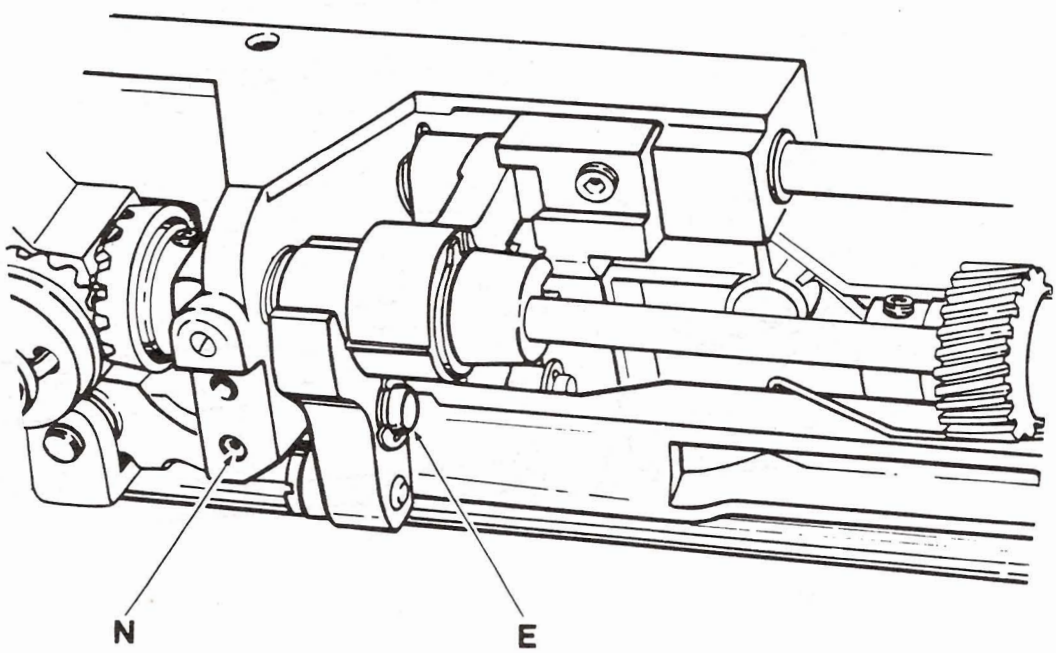
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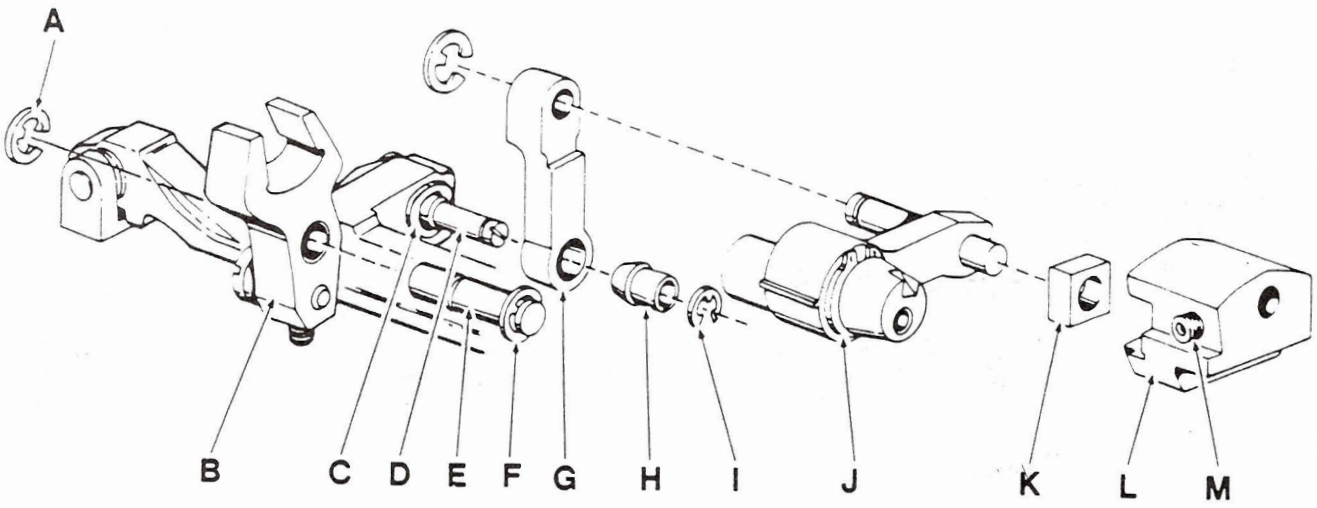
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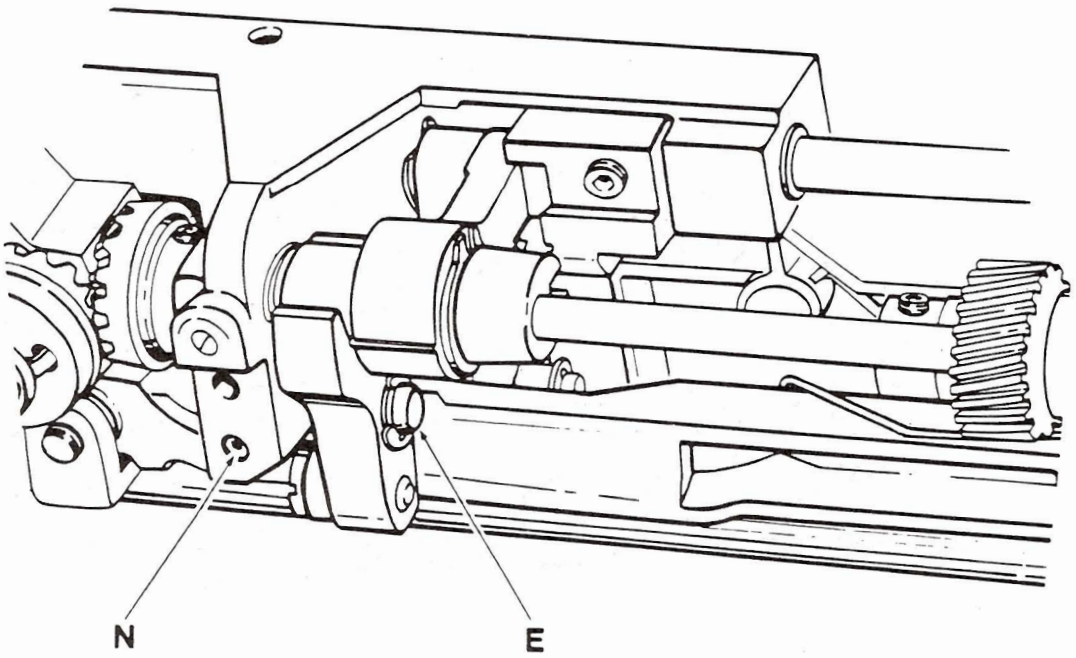
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7. Replace hinge stud (E), retaining clips (A) and (F) and tighten set screw (N) being sure that the left end of stud (E) is flush with the left surface of the casting boss.

8. Position drive connection assembly (J) into feed lifting fork (B).

9. Replace hook drive shaft.

10. Replace feed drive shaft.

11. Retime hook and feed as described in Adjustment Procedures under Hook and Feed Timing.

12. Check Alpha feed zero.

13. Perform bind test for feed mechanism.

14. Replace bottom cover.

FEED BAR

Removal:

1. Remove feed dog, bottom cover, and feed bar connecting link assembly.
2. Disconnect spring (C) from feed bar.
3. Loosen set screw (A) and remove cone point bearing (E).
4. Remove feed bar assembly (B).

Replacement:

1. Position feed bar assembly (B) with lower feed bar pivot stud (F) seated on lower cone pointed bearing (G). Be sure spring (C) is properly located over pivot stud (D).
2. Replace the upper cone pointed bearing (E). Make sure it is properly seated into the feed bar upper pivot stud (D).
3. Applying finger pressure to the upper cone point bearing (E) tighten set screw (A).
4. Engage spring (C) over top of feed bar (B).
5. Check for any binding or looseness of the feed bar between the cone point bearings. There must be a "perfect fit." If necessary, reset by adjusting the upper cone pointed bearing (E).
6. Replace feed bar connecting link assembly, and feed dog.
7. Adjust feed mechanism as described in Adjustment Procedures under Alpha Feed.
8. Perform bind test for feed mechanism.
9. Replace bottom cover.

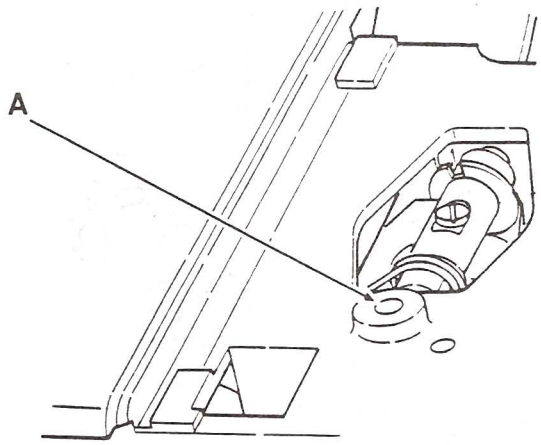
HINGED BED PLATE

Removal:

1. Remove bottom cover.
2. Loosen one turn, two screws (K) and (L) holding plate hinges to bed casting.
3. Remove hinged bed plate assembly by pulling it away from the machine bed.

Replacement:

1. Slide hinge bracket screws (K) and (L) into their corresponding grooves in the bed of the machine. Tighten both screws pinch tight.
2. Insert .015" thickness gauges at three points, (H), (I) and (J).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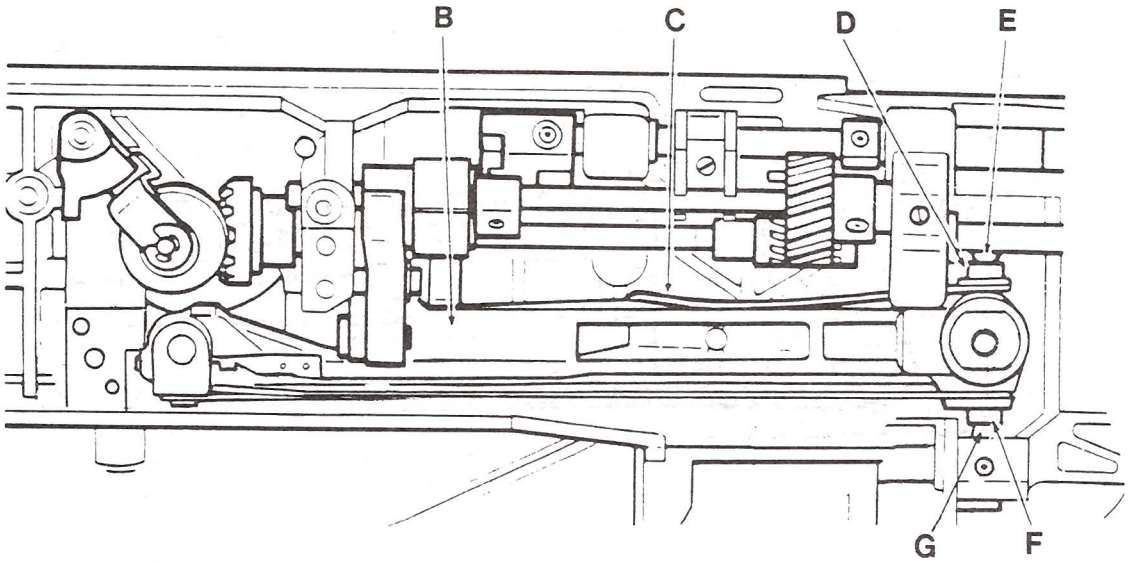
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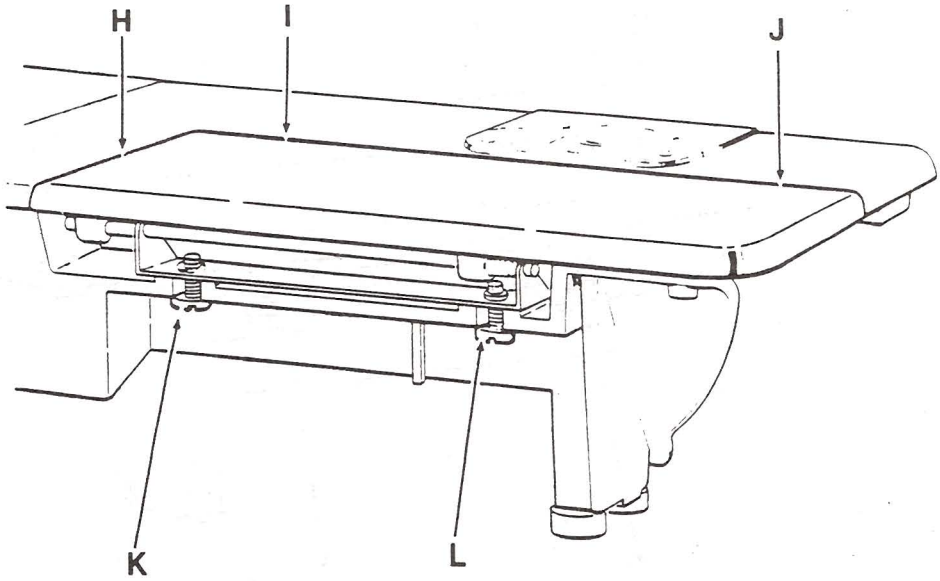
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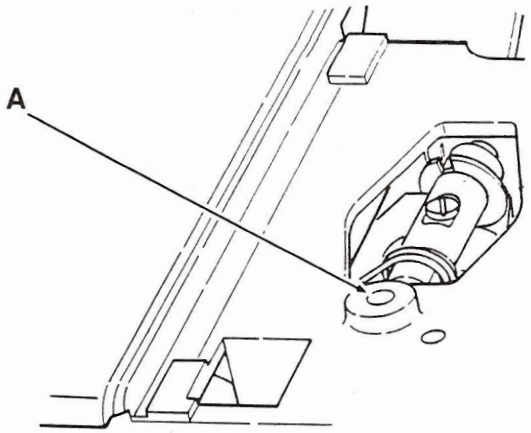
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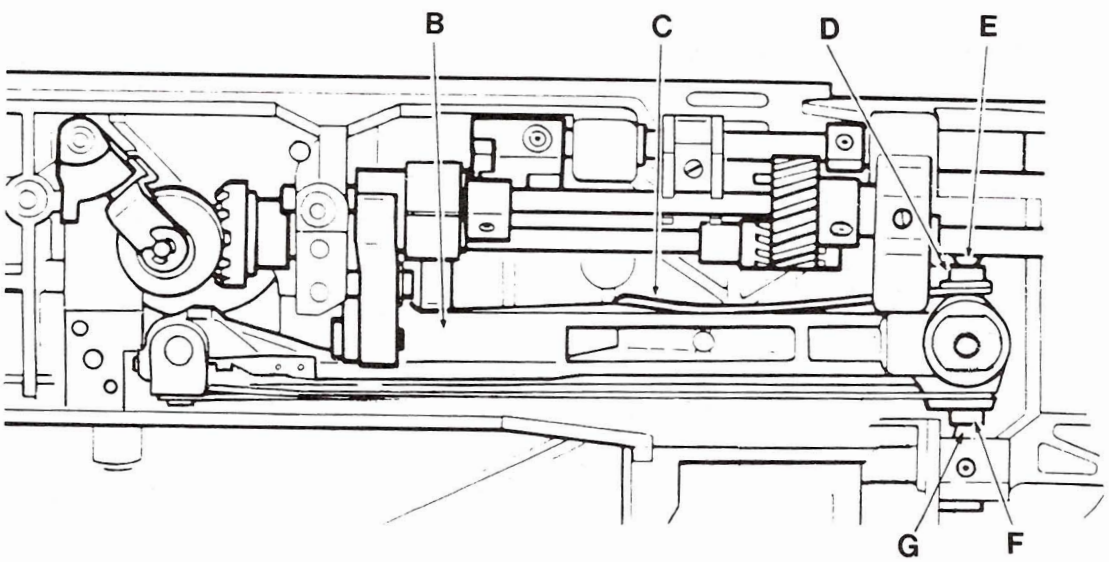
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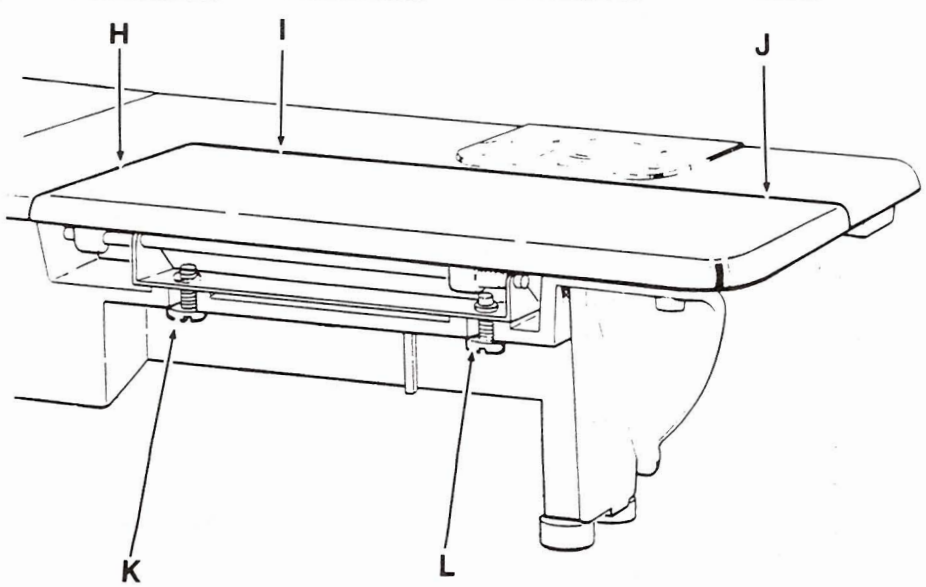
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3. Adjust the plate to .015" clearance at the three points (H), (I) and (J).

4. Remove thickness gauges and test hinged bed plate for proper latching.