

FINEST QUALITY

Union Special[®]
LEWIS • COLUMBIA

**INDUSTRIAL
SEWING
MACHINES**

**STYLES
63400KE
63400KL**



CLASS 63400

**STREAMLINED
HIGH SPEED LOCKSTITCH MACHINES
WITH
INTERMITTENT DIFFERENTIAL FEED
"KLIPP-IT" AND THREAD WIPER**

Union Special **MACHINE COMPANY**
CHICAGO

From the library of: Superior Sewing Machine & Supply LLC

Catalog No. 121 KE
(Supplement to Catalog No. 121 E)

INSTRUCTIONS
FOR
ADJUSTING AND OPERATING
LIST OF PARTS

CLASS 63400

Streamlined Lockstitch

Styles

63400 KE

63400 KL

First Edition

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Union Special
MACHINE COMPANY
INDUSTRIAL SEWING MACHINES
CHICAGO

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IDENTIFICATION OF MACHINES

Each Union Special machine is identified by a Style number which is stamped into the nameplate on the machine. Style numbers are classified as standard and special. Standard Style numbers have one or more letters suffixed, but never contain the letter "Z". Example: "Style 63400 KE". Special Style numbers contain the letter "Z". When only minor changes are made in a standard machine, a "Z" is suffixed to the Standard Style number. Example: "Style 63400 KEZ".

Styles of machines similar in construction are grouped under a class number which differs from the style number, in that it contains no letters. Example: "Class 63400".

APPLICATION OF CATALOG

This catalog is a supplement to Catalog No. 121 E and should be used in conjunction therewith. Only those parts which are used on Styles 63400 KE and KL, but not used on Styles 63400 E or L are illustrated and listed at the back of this book. For clarity, certain 63400 E or L parts are shown in phantom to help locate the 63400 KE and KL parts.

Opposite the illustration pages, parts are identified by detail number, part number, description and amount required.

NOTE: When ordering repair parts always use the part number listed in the second column.

Adjusting and operating instructions for Styles 63400 KE and KL are similar to those in Catalog No. 121 E for Styles 63400 E and L respectively. The only instructions included in this catalog are the ones that are different from Styles 63400 E and L, or are additional instructions that pertain specifically to Styles 63400 KE and KL.

The catalog applies specifically to the Standard Styles of machines as listed herein. It can also be applied with discretion to some Special Styles of machines in this class. Reference to direction, such as right, left, front, back, etc., are given from the operator's position while seated at the machine. Operating direction of handwheel is toward the operator.

STYLES OF MACHINES

High Speed Streamlined Long Arm Lockstitch Machines, with Adjustable Intermittent Differential Feed for Reverse and Plain Differential with "Klipp-It" (Thread Under-trimmer), Thread Wiper and Prepared for Needle Positioner, One Needle, Light, Medium and Heavy Duty, Drop Feed, Rotary Hook, Horizontal Hook Shaft, Push Button Stitch Regulator, Stitch Length Indicator, One Reservoir Enclosed Automatic Lubricating System, Head Oil Siphon, Adjustable Hook Oil Control, Needle Bearing Adjustable Feed Eccentric, Needle Bearings for Take-up Lever and Needle Bar Driving Link, Feed Timing on Lower Main Shaft, Maximum Work Space to Right of Needle Bar 11 1/8 Inches.

63400 KE For simultaneously seaming and intermittently gathering woven cotton and knit dress material requiring up to a 5 to 1 gathering ratio, depending on stitch length. 1 13/64 inch needle bar travel. Seam Spec. 301-SSa-1. Maximum recommended speed 5500 R. P. M.

63400 KL Same as Style 63400 KE, except equipped to give more reverse feed for stretching material and with only a 3 to 1 gathering ratio, depending on stitch length.

NEEDLES

Each Union Special needle has both a type and a size number. The type number denotes the kind of shank, point, length, groove, finish and other details. The size number, stamped on the needle shank, denotes largest diameter of the blade, measured in thousandths of an inch across the eye. Collectively, the type number and the size number represent the complete symbol, which is given on the label of all needles packaged and sold by Union Special.

Needle Type 180 GXS or 180 GYS is recommended for Styles 63400 KE and KL. Their description and the sizes available are listed below.

<u>Type No.</u>	<u>Description and Sizes</u>
180 GXS	Round shank, round point, lockstitch, short length, ball eye, single groove, wide angle groove, struck groove, deep spot, ball point, chromium plated - sizes 028, 032, 036, 040, 044, 048, 054, 060
180 GYS	Round shank, round point, lockstitch, short length, ball eye, single groove, wide angle groove, struck groove, deep spot, chromium plated - sizes 028, 032, 036, 040, 044, 048, 054, 060

To have needle orders promptly and accurately filled, an empty package, a sample needle, or the type and size number should be forwarded. Use description on label. A complete order would read: "1000 Needles, Type 180 GXS, Size 036".

Selection of proper needle size should be determined by the size of the thread used. Thread should pass freely through the needle eye in order to produce a good stitch formation.

SELECTING THE SIZE OF THE NEEDLE

The strength requirement of the seam produced is largely dependent upon the size of the thread employed. The quality of the work desired is largely dependent upon the size of the needle employed.

The following table shows the preferred size of needle for a given size and kind of thread. The choice, however, should give consideration to factors referred to above, which may dictate the selection of a needle size slightly larger or smaller than the size specified.

<u>Cotton Thread Size</u>	<u>Mercerized Thread Size</u>	<u>Needle Size</u>
0	-	060
30	B	054 to 060
36	A	048 to 054
40	A	044 to 048
50	0	044 to 048
60	00	040 to 044
70	000	036 to 040
80	0000	032 to 036
90	0000	032 to 036
100	-	028 to 032

IDENTIFYING PARTS

Where the construction permits, each part is stamped with its part number. Parts too small for a complete catalog stamping are identified by letter symbols which distinguish one part from another that is similar in appearance.

Part numbers represent the same part, regardless of the catalog in which they appear.

IMPORTANT! ON ALL ORDERS, PLEASE INCLUDE PART NAME AND STYLE OF MACHINE FOR WHICH PART IS ORDERED.

ORDERING OF REPAIR PARTS

The arrangement of this catalog is to facilitate easy and accurate ordering of replacement parts for Styles 63400 KE and 63400 KL.

Two exploded view plates cover the differences between the Standard Styles listed in this catalog and Styles 63400 E and L covered in Catalog No. 121 E. Each plate presents a sector of the machine, parts being aligned as in their assembled position. On the page opposite the illustration will be found a listing of the parts with their part numbers, descriptions and the number of pieces required in the particular view being shown.

Numbers in the first column are reference numbers only, and merely indicate the position of the part in the illustration. Reference numbers should never be used in ordering parts. Always use the part number listed in the second column. Each exploded view plate carries a reference number for each part available for sale.

Sub-assemblies, which are sold complete, or by separate part, are in a bracket or a solid line box on the picture plate. Component parts of sub-assemblies, which can be furnished for repairs, are indicated by indenting their descriptions under the description of the main sub-assembly. Example:

37	29480 FM	Rotary Tension Release Solenoid Assembly-----	1
38	63458 E	Rotary Solenoid Cover -----	1
39	660-360	Rotary Solenoid -----	1
40	660-347	Solenoid Lead Cover-----	1
41	670 G-18	Female Connector Sleeve, green-----	2
42	670 G-23	Male Wire Terminal-----	2

In those cases where a part is common to all of the machines covered by this catalog, no specific usage will be mentioned in the description. However, when the parts for the various machines are not the same, the specific usage will be mentioned in the description, and, if necessary, the difference will be shown in the illustration.

USE GENUINE NEEDLES AND REPAIR PARTS

Success in the operation of these machines can be secured only with genuine Union Special Needles and Repair Parts as furnished by the Union Special Machine Company, its subsidiaries and authorized distributors. They are designed according to the most approved scientific principles, and are made with utmost precision. Maximum efficiency and durability are assured.

Genuine needles are packaged with labels marked *Union Special*. Genuine repair parts are stamped with the Union Special trade mark. Each trade mark is your guarantee of the highest quality in materials and workmanship.

TERMS

Prices are strictly net cash and subject to change without notice. All shipments are forwarded f. o. b. shipping point. Parcel Post shipments are insured unless otherwise directed. A charge is made to cover the postage and insurance.

INSTALLING

CAUTION! When unpacking, DO NOT lift machine out of box by placing one hand on handwheel. Using both hands on bed casting, lift gently.

Before leaving factory, each Union Special machine is sewed off, inspected and carefully packed. After the machine and accessories have been removed from the packing box, the following steps should be followed:

PREPARATION OF MACHINE FOR INSTALLATION

A bag of assembly parts, consisting of one frame thread eyelet, one eyelet attaching screw, one extra bobbin, two hinge studs, two screws for holding miscellaneous attachment to the bed plate, one synchronizer bracket, one synchronizer lead wire clamp, one screw for synchronizer lead wire clamp and three clamps for tension release solenoid lead wire.

Insert hinge studs in holes provided for them in rear of cloth plate. Assemble the upper frame eyelet (A, Fig. 2A) to top of arm.

Using Fig. 1A as a guide proceed as follows:

1. Attach the synchronizer bracket (63495 D) to the back of machine, using two (376 A) screws. The upper screw also to hold clamp (660-352) in position.
2. Attach synchronizer to adaptor of handwheel assembly using the two set screws.
3. Slide clamp (660-356) over synchronizer lead wire.
4. Attach clamp to synchronizer bracket using (J87 J) screw.

STANDARD ACCESSORIES

Included also with each machine is a box of STANDARD ACCESSORIES-containing one bobbin winder assembly, the machine mounting frame, one oil drain jar and its clamp spring, one knee lifter assembly and its rubber pad, bed positioning spring and screw, four isolator pads and clips, and one machine rest pin. These parts are essential when setting up the machine.

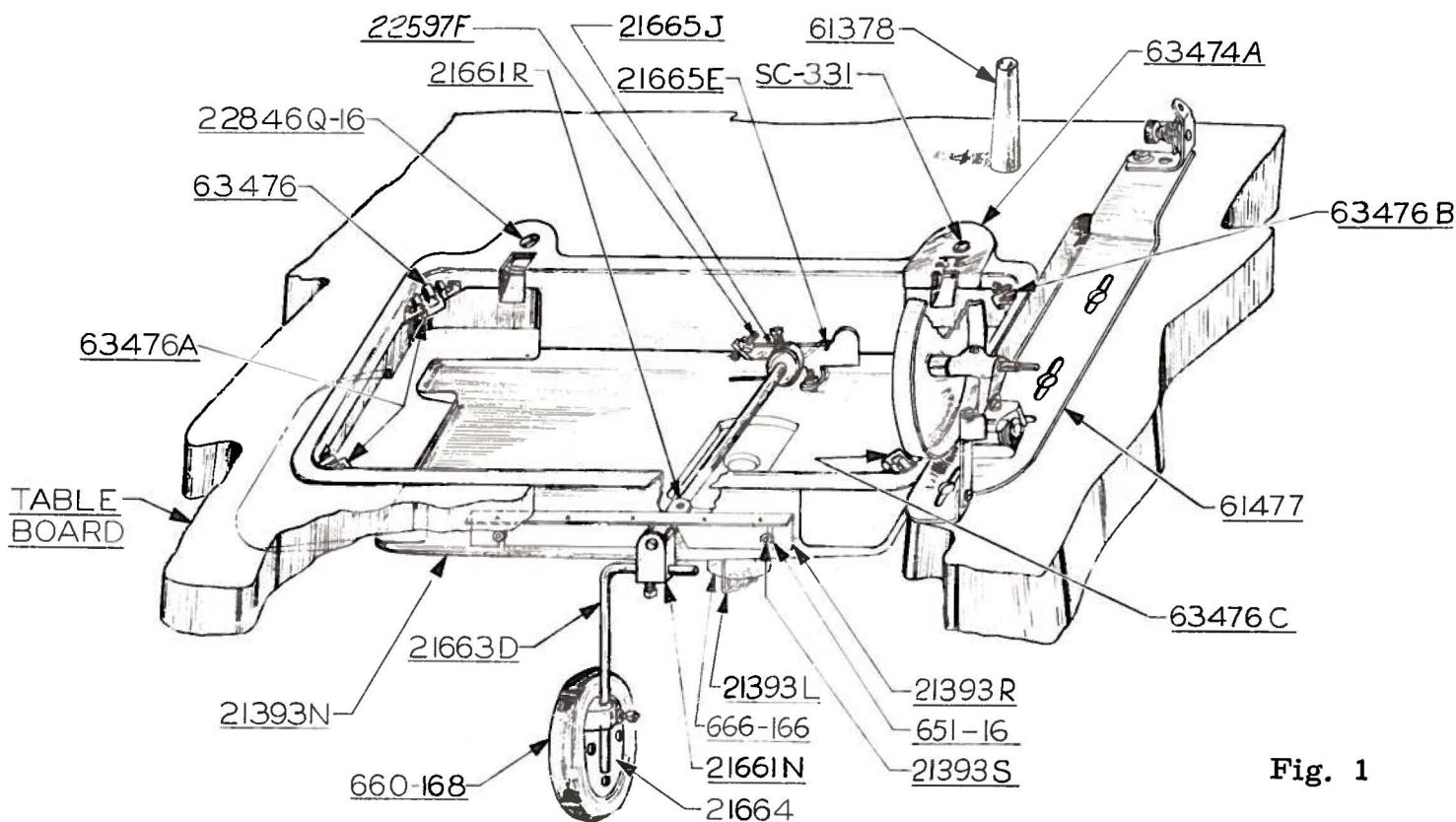


Fig. 1

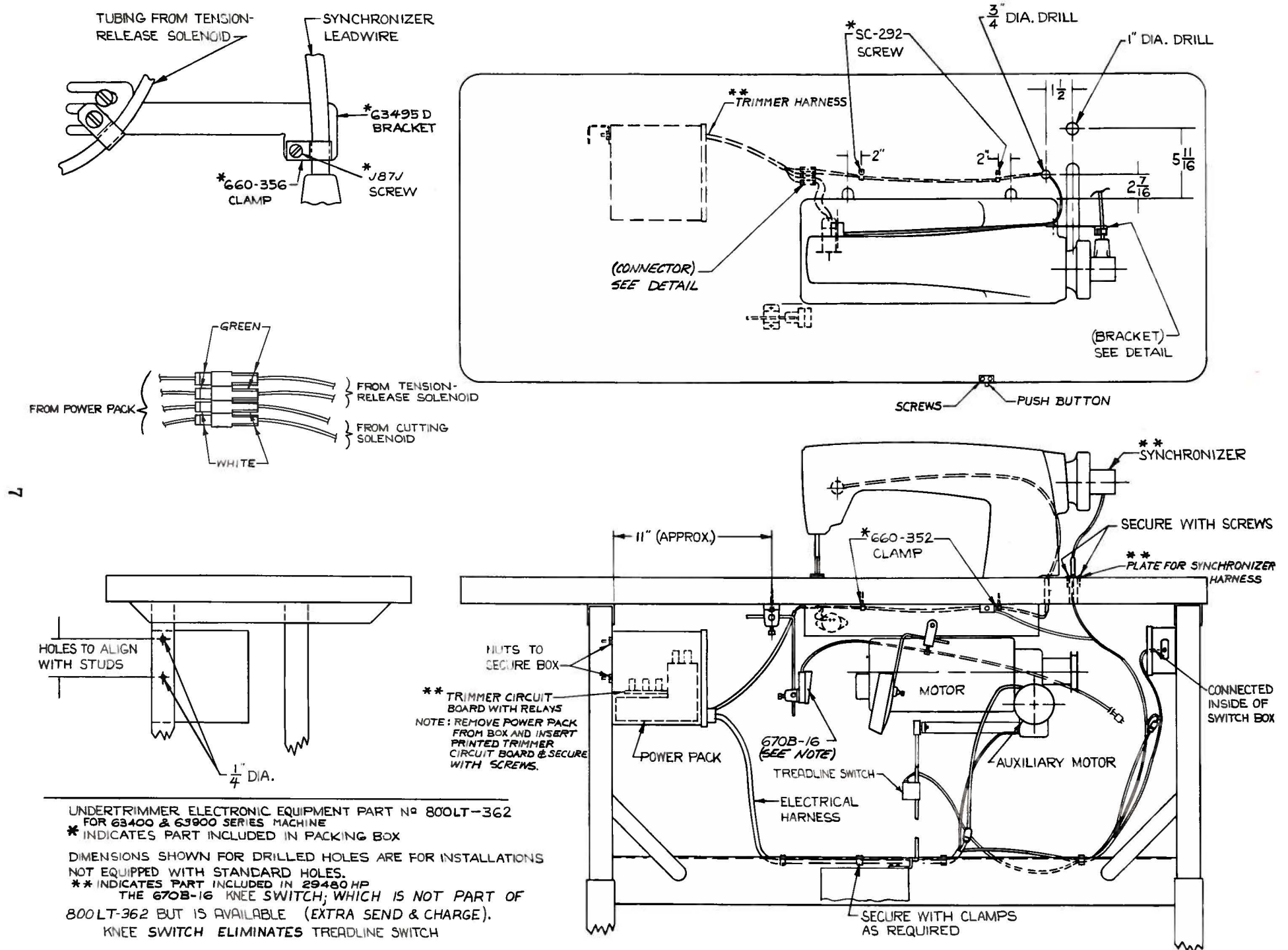


Fig. 1A

TABLE TOPS

Lockstitch machines are installed in table tops, prepared with cut-out, so that the bed plate is FLUSH with the top of the machine mounting frame.

MACHINE MOUNTING FRAME INSTALLATION

On a suitable tableboard, place machine mounting frame (21393 N) in the machine cut-out with the hinge lugs to the rear (Fig. 1). Insert the countersunk wood screw through left hinge pad and tighten securely. Assemble bed positioning spring (63474 A) over right hinge pad; insert round head wood screw and tighten securely. Assemble the retaining plate (21393 R) to outside front of pan section, as shown, and snug up nuts lightly.

Place sewing head in the frame mounting, and after being sure there is about 1/16 inch clearance between the cloth plate edge and the frame sides, rap the retaining plate smartly upward with a hammer to insure a good grip on the underside of the board and tighten locking nuts securely.

Tip the machine back against the rest pin, and assemble the knee press assembly as shown. All end play of the cross shaft should be taken up by the cone bearings, but must not bind.

Before the machine is put into production, the bell crank (21665 J) of the knee lifter rod should be adjusted. The left stop screw (22597 F) should be set so that the maximum lift of the presser bar and its parts do not interfere with moving parts within the head. This may be done by setting the stop screw so that the presser bar raises approximately 5/16 inch.

BOBBIN WINDER

The bobbin winder should be secured to the table top so that its pulley will be located directly in front of the sewing machine belt and will bear against the belt when in operation. The base of the winder has two elongated attaching holes, which allow the mechanism to be moved closer to or farther away from belt as needed. The pulley of the winder, when in operation, should exert only enough pressure against the belt to wind the bobbin. Regulation and operation of the bobbin winder is described under "Winding the Bobbin", under OPERATOR'S INSTRUCTIONS in Catalog No. 121 E.

BELTS

These machines are equipped to use either #1 "Vee" or round belts.

PREPARATION OF TABLE FRAME FOR INSTALLATION

Once again using Fig. 1A as a guide proceed as follows:

1. Wire leads with striped ends to switch box and attach switch box to right front leg of table frame.
2. Attach power pack to left rear leg of table frame using nuts and bolts provided. Drill holes in table leg if required.
3. Attach electro drive to underside of table board.
4. Secure electrical cable and leads to underside of tableboard and to table frame using clamps and screws provided. Connect cable to power pack, auxiliary drive, clutch arm switch and treadline or knee switch.
5. Connect leads from power pack to cutting solenoid (white leads) and tension release solenoid (green leads). Be sure to connect white to white and green to green.
6. Assemble relays as shown in Fig. 41, page 16.

THREADING

Thread machine as indicated in Fig. 2A. Threading at check spring has been enlarged for clarity. Needle is threaded from left to right.

OILING

CAUTION! Oil has been drained from the main reservoir before shipment and the reservoir must be filled before starting to operate.

Fill main reservoir at plug screw (B, Fig. 2A) and check oil level at gauge (C); oil is at maximum level when needle is in yellow band marked "FULL". Oil should be added when needle is in yellow band marked "LOW". Use a stainless water-white straight mineral oil of a Saybolt viscosity of 90 to 125 seconds at 100° Fahrenheit in the main reservoir. This is equivalent to Union Special specification No. 175.

Oil may be drained from main reservoir by removing plug screw (E, Fig. 2A).

The quantity of oil supplied to the hook is controlled by dial (D). Turning the dial in the direction of the arrow (counterclockwise) increases the oil flow and in a clockwise direction decreases the flow of oil.

It is recommended that a new machine, or one that has been out of service for a long period, be lubricated by removing the head cover and oiling all the moving parts. After oiling, replace head cover as no further hand oiling will be required. Run machine slowly for several minutes to distribute oil to the various parts. Full speed operation can then be expected without damage.

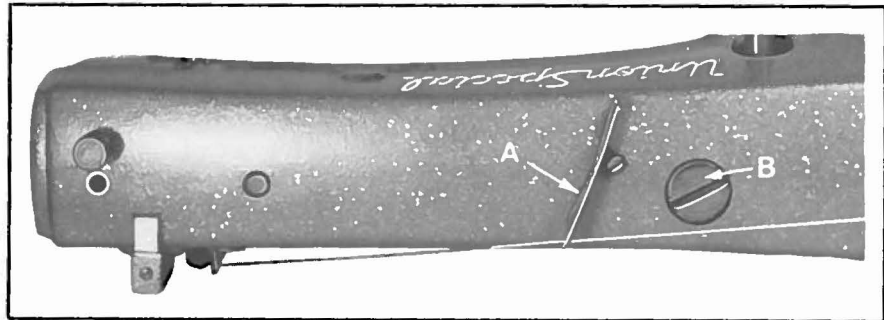
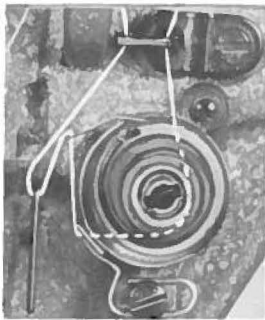


Fig. 2A

INSTRUCTIONS FOR MECHANICS

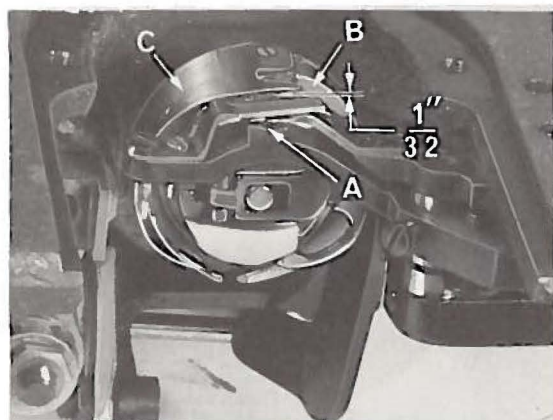


Fig. 12A

and relocating the stop screw (B) on the lifter lever bell crank (C). By turning the stop screw to the right or left, the proper setting of the presser bar connection is accomplished. Tighten the lock nut (A) to lock the stop screw in place.

The adjusting instructions for Styles 63400 KE and KL are the same as for Styles 63400 E and L respectively, covered in Catalog No. 121 E, with the following exceptions and additions. The instructions that are different from the ones covered in Catalog No. 121 E, the headings will indicate the page it can be found in that catalog.

PRESSER BAR CONNECTION (Page 15)

The presser bar connection (A, Fig. 16A) should be set so that it is about $7/16$ inch above the lower presser bar bushing (Fig. 16A). This is accomplished by tipping the machine back against the rest pin, loosening the lock nut (A, Fig. 16) shown in Catalog No. 121 E

PRESSER BAR GUIDE (Page 16)

When locating the presser bar guide (B, Fig. 16A), the presser foot must rest directly against the throat plate with the feed dog in its lowest position. The guide is set properly when there is a $1/16$ inch space between guide (B) and presser bar connection (A, Fig. 16A).

To obtain this setting, remove the pressure from the presser spring (C), by turning spring regulator (J) counter-clockwise. Now, loosen set screw (D) and tap on presser foot to insure its being down on the throat plate. Set the guide to the $1/16$ inch dimension, center the foot by turning it so that the needle enters the middle of its slot and retighten screw (D) in guide. Now, apply pressure to the presser foot by turning the regulator (J, Fig. 16A) clockwise.

Set the needle thread take up wire (A, Fig. 16B) so that the underside of the wire is $4 \frac{3}{4}$ inches above the throat plate.

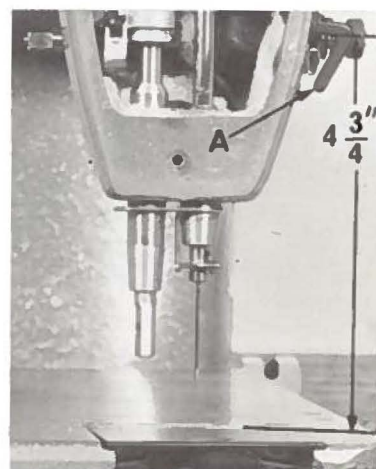


Fig. 16B

Fig. 16A

TENSION RELEASE (Page 17)

1. Set the tension assembly so that the tension discs are centered on the check spring eyelet (A, Fig. 18A).
2. Solenoid plunger pin (E, Fig. 16A) must touch tension release pin and the end of solenoid plunger pin must protrude a minimum of $1/32$ inch to a maximum of $1/16$ inch. If adjustment is required move tension post assembly in or out by loosening set screw located under machine arm and moving stop screw (B, Fig. 18A) as required.

3. Tension release solenoid is secured to flat of bushing (F, Fig. 16A) with a set screw in bracket. Solenoid plunger pin (E) is to have approximately .005 inch clearance between it and the tension release pin without thread between the tension discs.

This can be accomplished by placing a .005 inch spacer between the head of solenoid plunger pin and the end of tension release pin. The tension release solenoid should then be slipped onto bushing and moved in until it contacts the solenoid plunger pin. Care should be taken not to exert too much pressure thereby opening the tension disc. After tightening set screw remove spacer.

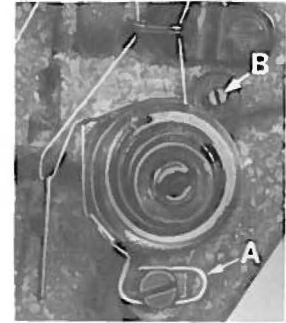


Fig. 18A

4. The manual tension release cam (G, Fig. 16A) should be set so that it will not release thread tension when the presser foot is raised for back tacking.

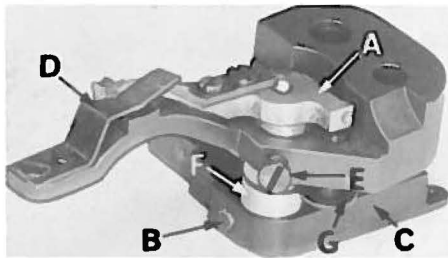


Fig. 31

The tension release cam can be positioned by loosening screw (H) and then raising or lowering to suit the sewing conditions. The average tension release point is between 1/4 to 5/16 inch of presser foot lift above the throat plate. Tighten screw securely.

NOTE: Head oiler bracket must locate the needle bar link oil wick in the center of the slot in the connecting rod. The wick must contact the needle bearings. Check the oil gauge to be sure it reads full and operates freely.

ADDITIONAL INSTRUCTIONS FOR 63400 KE and 63400 KL

TRIMMER ADJUSTMENTS

Remove the positioning finger and knife assembly from machine and proceed as follows:

1. There should be no bind or shake in lower knife pivot carrier (A, Fig. 31). This adjustment can be made by loosening screw (B) on the pivot release lever (C) and taking up the excessive end play or relieving the bind as the case may be.
2. Position upper knife (D) parallel with the left side of the arm of the positioning finger. Check to see that the lower knife is parallel with the upper knife. If this is not so, loosen the finger set screw (E) and turn the eccentric bushing (F) until the knives are parallel. A good starting point would be to have the pin hole in the eccentric bushing (F) located approx. 90° to the right side of the arm of the positioning finger (Fig. 33).

Adjust lower knife until it just contacts the upper knife. To adjust the lower knife turn flange screw (G) clockwise to lower knife and counterclockwise to raise it.

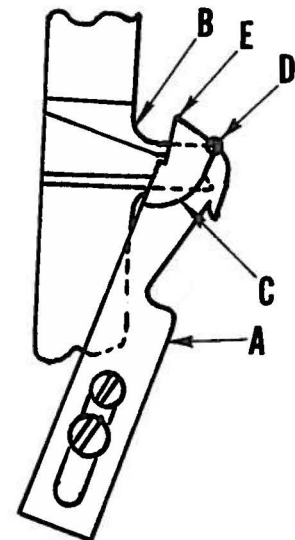


Fig. 32

CAUTION: Be sure bushing is not turned while making this adjustment or parallel adjustment will have to be checked.

TRIMMER ADJUSTMENTS (Continued)

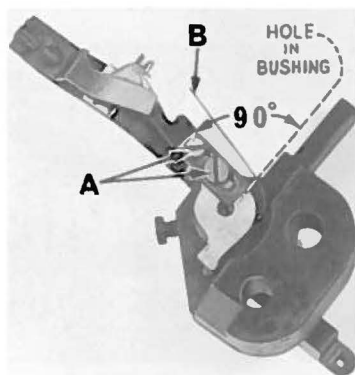


Fig. 33

The lower knife (A, Fig. 32) in its extreme left position should not extend beyond the left side of the arm of the positioning finger (B). As the lower knife moves to the right, the run out of the cutting edge (C) must coincide at a point of the positioning finger as indicated at point (D). To make these adjustments loosen screws (A, Fig. 33) and position knife.

3. Assemble positioning finger and knife assembly into machine. Adjust the bobbin case holder positioning finger and knife assembly by turning the bobbin case holder until the finger recess is at the top. Place the projection (A, Fig. 12A) on the positioning finger into the bobbin case holder recess (B) and tighten the finger and knife assembly attaching screws securely, allowing $1/32$ inch clearance between the outside edge of projection and the inside edge of bobbin case recess (Fig. 12A).
4. Locate the cutting solenoid bracket (A, Fig. 34) as far forward as possible and parallel with the line of feed. With the cutting solenoid lever (B) contacting the cutting solenoid plunger (C), adjust the pivot release lever (D), so that there is a $1/32$ inch clearance to be maintained when knife return spring (A, Fig. 35) is in position.
5. Adjust the lower knife stop screw (B, Fig. 35) so when the lower knife is in its extreme right hand position, the left corner (E, Fig. 32) is in line with the left side of the needle slot in the bobbin case holder.

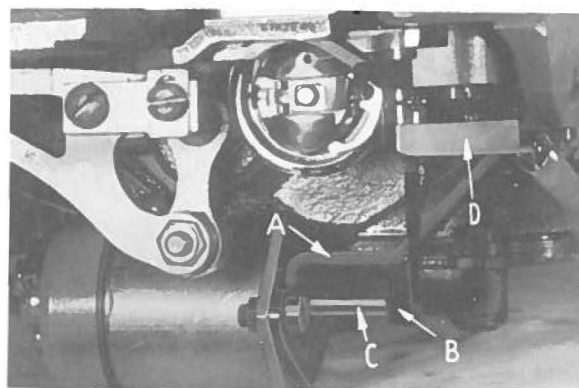


Fig. 34

CAUTION: Be sure cutting solenoid lever contacts the lower knife stop when making this adjustment. Also be sure knife does not hit the hook point.

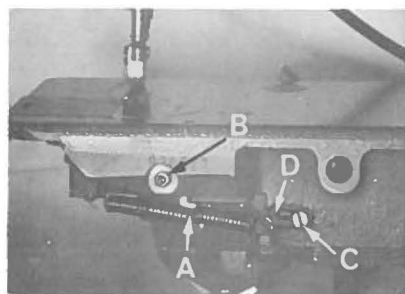


Fig. 35

6. Be sure the spring retainer wire (B, Fig. 33) contacts the bobbin case holder when the lower knife is in its extreme right hand position. If the spring wire does not make contact, bend retainer wire to suit.

NOTE: If positioning finger assembly or cutting solenoid bracket are removed from machine or position changed, check step 5.

7. Knife return spring (A, Fig. 35) to have proper tension to cut threads. To adjust tension of knife return spring loosen screw (C) and move tension spring bracket (D) to the right to increase tension or to the left to decrease the tension.

SYNCHRONIZER ADJUSTMENT

- (a) Rotate handwheel in operating direction until the needle clearance cut in the deflector plate (C, Fig. 12A) on the rotating hook assembly is in line with the needle on the up stroke of the needle bar.

SYNCHRONIZER ADJUSTMENT (Continued)

(b) At this time the brass contact of the left band (A, Fig. 36) should be flush with the front edge of the brush holder (B). To make this adjustment position needle bar and deflector plate as described in step (a), then loosen set screws (C) in synchronizer and move as required.

(c) The needle positioner should position needle at bottom of stroke. If not, with power off rotate handwheel until it is at bottom. Then loosen screw (D) at end of synchronizer and rotate third band from left (E) in operating direction until its brush is in the middle of the black plastic band.

(d) The needle positioner should position needle thread take-up at top of its stroke or 1/8 inch from the top of its up stroke. If not, with power off rotate handwheel in operating direction until it is at the top of its stroke. Then loosen screw at end of synchronizer and rotate fourth band from left (F) until its brush is in the middle of the black plastic band. Turn on power and check the up and down positions of the needle bar.

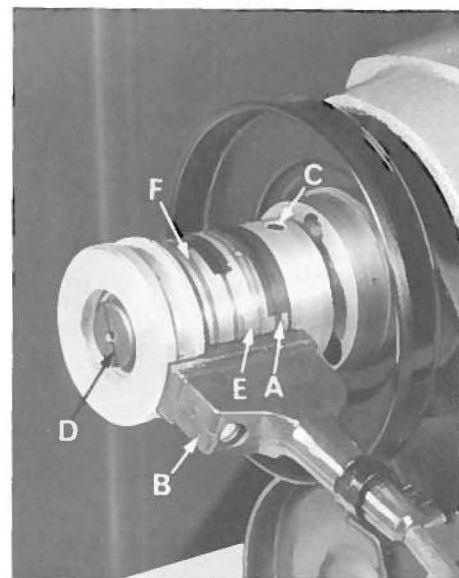


Fig. 36

CLUTCH ARM SWITCH ADJUSTMENT

(a) Set needle in work.

(b) Adjust clutch arm spring (A, Fig. 37) so that treadle will return to stop (wing nut washer (B) is to be approximately 1/2 inch from end of stud).

(c) Close treadline switch and loosen clutch lever switch adjusting screw (C), until there is no contact between it and the microswitch. Then tighten screw until needle positions up. Tighten nut (D) to maintain setting.

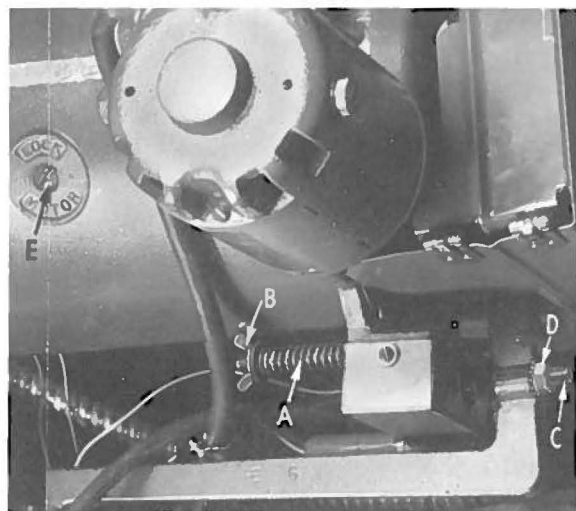


Fig. 37

ADJUSTING CLUTCH

(a) Depress treadle unit until one click is heard, which indicates switch is open.

(b) Adjust clutch so that clutch arm has approximately 1/16 to 1/8 inch travel before clutch is engaged. Loosen lock screw (E, Fig. 37) (where it says "Lock Motor") just enough to unlock it, which is approximately one full turn. Adjust screw located near the top on right end of motor, until clutch is engaged as described above. Tighten lock screw (E).

CAUTION! Clutch must not engage when clutch lever switch is closed or auxiliary motor running; one click must be heard before clutch is engaged.

THREAD WIPER ADJUSTMENTS

1. Rotate thread wiper mounting collar (63470 H) and adjust thread wiper guide (63470 M), so that the hook catches the needle thread when the take-up is at the top of its stroke.
2. Thread wiper lever (63470 E) must return with a snap when released.
3. Form thread wiper wire (63470 R) for free movement in thread wiper guide (63470 M).

CAUTION! Thread wiper hook must not prevent solenoid from returning to its stop. Move thread wiper guide (63470 M) so that hook does not stop against end of tube. Be sure to loosen set screws when adjusting thread wiper lever. Premature failure of solenoid will result if it is not allowed to return completely.

INSTALLATION OF INCHING SWITCH

When installing inching switch, (No. 670 B-21) be sure to remove jumper wire (A, Fig. 38) located between pin #2 and pin #3 on socket (B) before connecting the inching switch plug or it will not function properly.

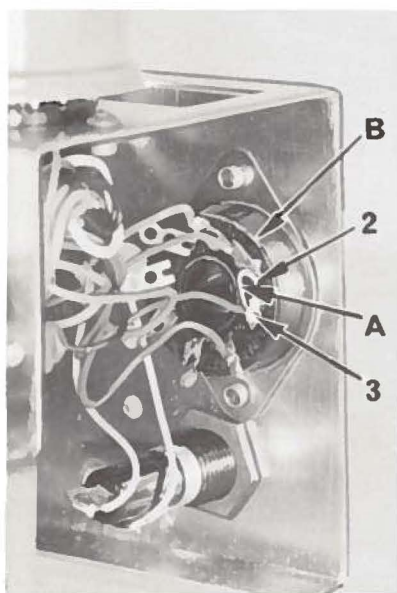


Fig. 38

Should the inching switch be removed at a later date, the jumper wire (A, Fig. 38) must be replaced or the needle positioning unit will not position up.

PUSHBUTTON FUNCTION

If the pushbutton, which is mounted on the front edge of the table board, is depressed, the cutter band of the synchronizer is interrupted. Therefore, when the

treadle is heeled while the pushbutton is depressed, the needle will position up without trimming. This enables the operator to readjust or realign the garment with the needle out of the work, but without having trimmed the threads.

TREADLINE SWITCH ADJUSTMENT

To adjust the length of the pitman rod (A, Fig. 39) loosen the two Allen set screws in the back panel. If more adjustment is necessary the cover must be removed and the three bushings inside the switch relocated to obtain the desired length.

If more or less pressure is required when heeling the treadle the spring (B) can be compressed more or less accordingly by moving the pitman rod spring tension bushing (C) up or down.

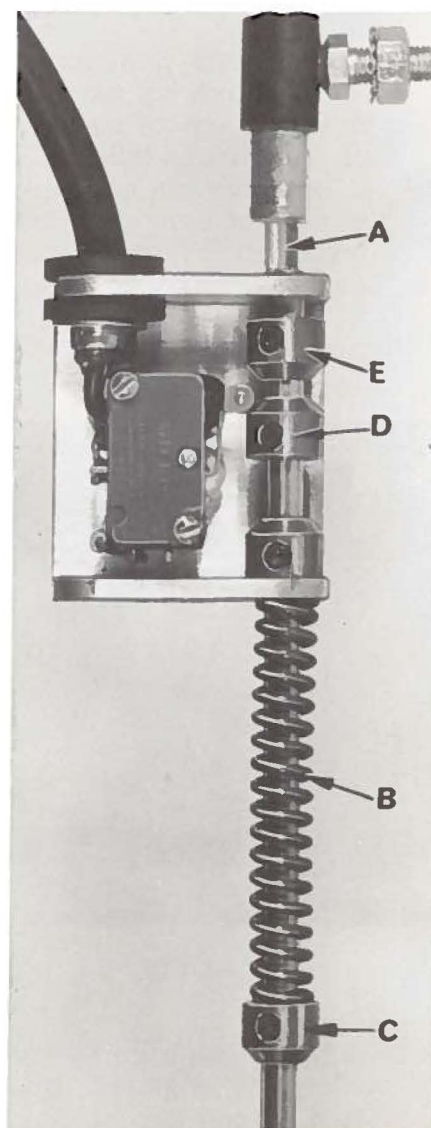


Fig. 39

TREADLINE SWITCH ADJUSTMENT (Continued)

If more travel is required in the treadle for actuating the trim cycle the two bushings, micro-switch actuator (D) and stop bushing (E), must be lowered. Care should be taken so that only enough travel is provided to actuate the micro-switch. The roller on the switch should not be allowed to ride over the level on the micro-switch actuator bushing (D). This is accomplished by adjustment of the stop bushing (E).

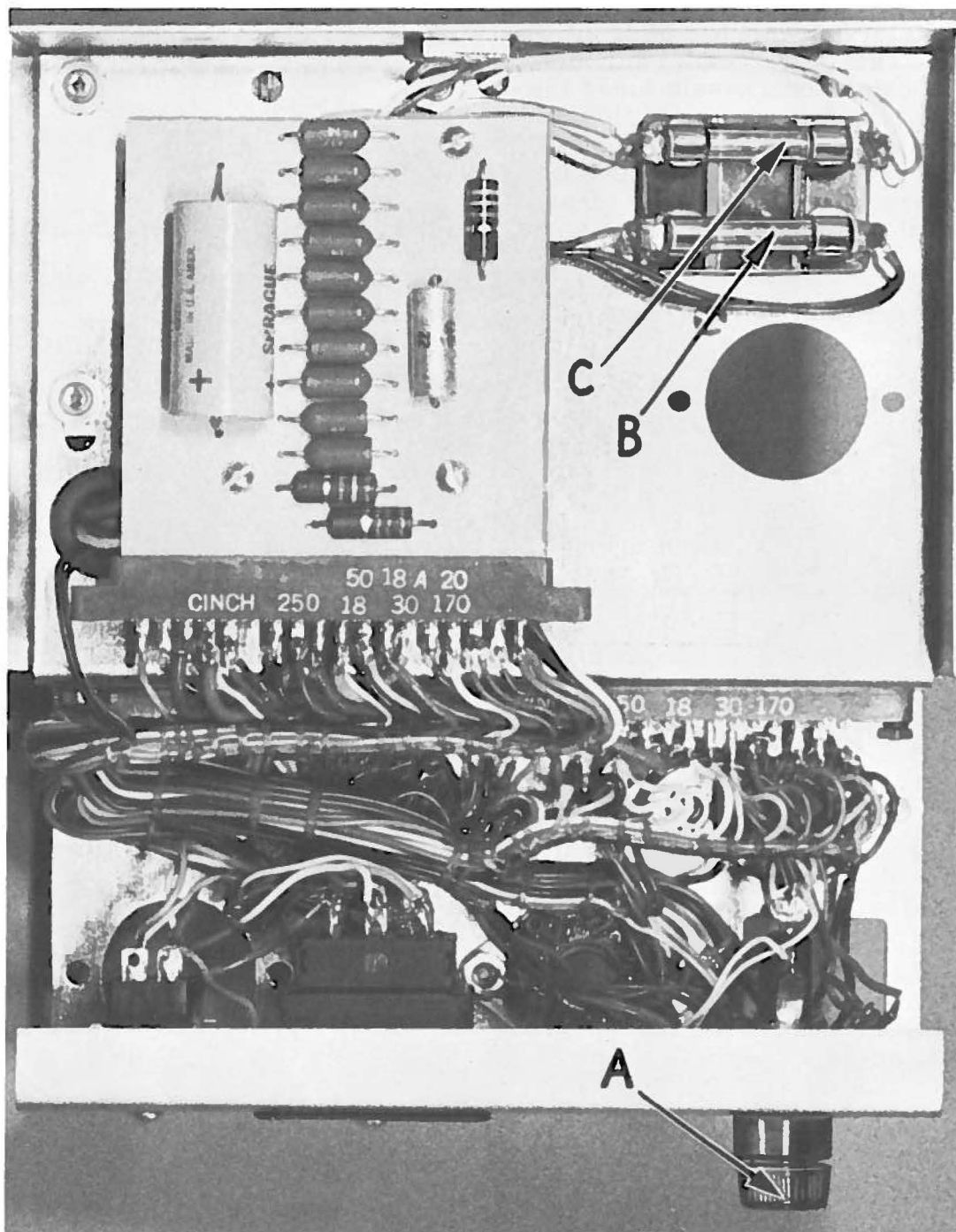


Fig. 40

FUSING THE POWER PACK

The power pack incorporates a safety feature consisting of three (3) fuses of which two are of the slow blowing type and are rated 2 AMP at 250 V and the third a straight blow fuse rated 5 AMP at 250 V. The 2 AMP fuse (A, Fig. 40) located in the front panel fuses the AC input for the primary winding of the transformer as well as the input to the full wave rectifier. The 2 AMP fuse (B) located under the chassis fuses the output side of the full wave rectifier for the auxiliary motor. The 5 AMP fuse (C) located under the chassis fuses the output side of the rectifier for the thread wiper solenoid, (30 VDC) cutter solenoid, and the relay coil control circuit (24 VDC) .

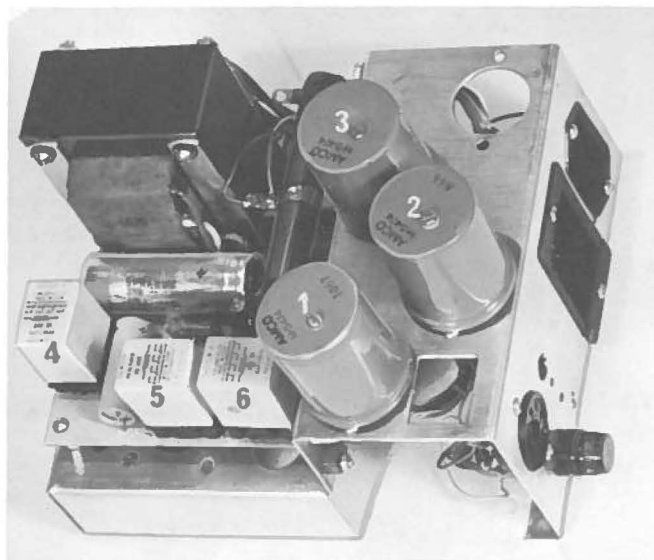


Fig. 41

Before this machine left the factory it was adjusted and inspected so as to give you the utmost satisfaction and durability at all times. If, however, the trimmer has been readjusted and is not trimming properly, see the chart below for suggestions which may prove beneficial to you.

TRIMMER TROUBLESHOOTING

Condition	Causes	Cures
Both threads not cut	Solenoid not working	Check lead connections Make continuity check
	Lower knife not moving far enough to the right	Reset stop screw
	Lower knife too far forward, wipes threads behind knife	Relocate knife. Check for nicks on radius
	Lower knife too far back, threads slip off when knife returns	Relocate knife
Needle thread not cut, but bobbin thread cut	Spring retainer wire not contacting bobbin case holder when in catching position	Bend spring retainer wire to suit.
	Lower knife does not move far enough to right	Adjust stop screw to standard setting. Check position of solenoid. Operate machine with belt off, to determine if solenoid pivot lever is contacting stop screw and then reposition solenoid if necessary
	Hook No. 29474 R or S used	Use only No. 29474 T hook
Bobbin thread not cut, but needle thread cut	Bobbin thread not threaded thru in bobbin case	Thread properly
	Needle hole in throat plate is too big or has been altered	Use throat plate with smaller needle hole, if available
Lower knife does not return all the way	Not enough tension on lower knife return spring. Dense material and rough thread will require more tension on knife return spring	Increase tension on lower knife return spring by moving bracket to the right
	Lower knife rubbing hook point	Raise lower knife
Needle thread tears and leaves random lengths of starting tail	Too much knife return spring tension and excessive friction in needle thread eyelets and in thread pull-off at cone	Unthread some of the eyelets to the right of the tension post. Decrease tension on knife return spring slightly. Check thread pull-off at cones.
	Tension disc not open	Check setting of tension release solenoid and electrical operation of this solenoid
Needle unthreads when starting	Needle thread take-up not positioned properly at top of stroke	Check position needle thread take-up. Must be within 1/8 inch of the top of its upstroke.
	Needle hole in throat plate is too big.	Use throat plate with smaller needle hole, if available.
	Bobbin thread too short	See bobbin thread breaks
Bobbin thread breaks	Overspin on bobbin thread	Check wind of bobbin and fit of bobbin in bobbin case holder
	Too much knife return spring tension	Decrease tension on knife return spring slightly, by moving bracket to the left
	Sharp edges on T. C. S. of lower knife. (Front, point and back edges are the T. C. S. of lower knife).	Stone sharp edges of T. C. S. of lower knife. (Front, point and back edges are the T. C. S. of lower knife).

Before this machine left the factory it was adjusted and inspected so as to give you the utmost satisfaction and durability at all times. If however, the needle positioner has been readjusted and is not positioning properly see the chart below for suggestions which may prove beneficial to you. NOTE: A. C. voltage 200-250 volts. Remove all relays before testing or checking any components on the printed circuit boards. If difficulty should be encountered with the needle positioner portion, check positioner circuit board 670 E-9, round relays #1, #2, #3 (Fig. 41) and square relay #6. All the trimmer circuitry is on the trimmer board 670 E-5 and square relay #4 and #5.

TYPICAL NEEDLE POSITIONER PROBLEMS

Condition	Causes	Cures
Unit does not position	Bad fuse	Replace fuse (A, Fig. 40)
	Synchronizer jack not plugged in properly or broken	Check connection of synchronizer jack or replace if necessary
	Dirty brushes	Clean or replace brushes
	Treadle jack not plugged in properly	Clean connection of treadle jack
	No input power (220 V)	Check input power
	Burnt or dirty brushes and armature	Clean armature or brushes or replace
	Tight fiber gear or broken teeth on fiber gear	Take fiber gear out of bell housing and remove excessive stock from hub, or replace
	Bad relays	Check relays (Nos. 1 & 2, Fig. 41) with tester
	Diodes shorted out	Replace diodes (220 V, A. C. circuit)
Unit positions up in second position, but does not position down	The treadle switch is not opening	The unit will position down the first time after the power is turned off and then back on again
Unit turns the fuse black or shatters the glass of the fuse	Diodes are shorted out	Replace diodes, preferably with 1000 PIV and fiber board
Unit blows the fuse every few hours or every few days	Grounded armature, tie bolt touching field	Insulate tie bolt and remove short
	Oil saturated armature	Clean armature
	Tight fiber gear	Take fiber gear out of bell housing and remove excessive stock from hub
	Low voltage	Use 2 amp. fusetrone
	Operator fluttering treadle excessively	Caution operator
Unit keeps on stitching at an inching speed	Bad relay	Check relay (No. 1, Fig. 41) with tester
	Synchronizer jack not plugged in properly	Check connection of synchronizer jack
	Damaged field coil in auxiliary motor	Replace auxiliary motor
	Synchronizer loose on handwheel	Tighten synchronizer on handwheel
	Very loose "V" belt	Reposition motor to suit

TYPICAL NEEDLE POSITIONER PROBLEMS (Continued)

Condition	Causes	Cures
Auxiliary motor runs while clutch is engaged with main motor	Clutch arm switch is not opening	Adjust clutch arm switch properly
	Clutch arm switch broken	Replace switch
Units positions slowly	Armature has poor commutation or is partly shorted and dirty	Dress armature with dressing stone
	Tight fiber gear	Take fiber gear out of bell housing and remove excessive stock from hub
	Bad relays	Check relays (Nos. 1 & 2, Fig. 41) with tester
Auxiliary motor runs very hot	Improper setting of clutch arm switch	Adjust clutch arm switch properly
	Operator fluttering clutch arm switch	Caution operator
	Grounded field coil	Check with tester and insulate tie bolt
	Bad relays	Check relays (Nos. 1 & 2, Fig. 41) with tester Check operation. Sometimes it is possible to remove the down position brush on two position units, thereby using the positioner to only raise the needle at the end of the operation. This will greatly prolong life and minimize maintenance
Unit blows fuse after positioning one time, not when fuse is first put in	Lead rubbing in armature	Isolate from armature
	Brush holders brush against armature	Remove end cap of auxiliary motor and relocate brush holder
	Bad relays	Check with tester and insulate tie bolt Check relays (Nos. 1 & 2, Fig. 41) with tester
Auxiliary motor will not turn over although you know power is feeding it	Bad armature brushes	Replace brushes on auxiliary motor
	Tight fiber gear	Take fiber gear out of bell housing and remove excessive stock from hub
Unit does not provide power to solenoids	Solenoids are not connected to power pack	Check connections on leads
	Bad relays	Check relays (Nos. 3, 4, 5, 6, Fig. 41) with tester
	Diodes shorted out	Replace diode on trimmer circuit board
	No voltage from trimmer secondary on transformer blue, gray and white leads	Check output of transformer, if defective - replace transformer

CIRCUITS AND SWITCHING SYSTEMS

On the following pages you will find a brief explanation of the various circuits and switch systems incorporated in the needle positioner and trimmer powerpack. These explanations will be followed by schematic drawings that will assist in tracing the circuits and switch systems.

The legend found in the lower left hand corner of the schematic drawings, together with the various electrical terms listed below, should prove beneficial.

1. DIODE

The diodes allow current to flow only one direction, thereby converting alternating current (A. C.) to direct current (D. C.).

2. RELAY

A relay is nothing more than an automatic switch. The small numbers indicate the eight (8) prongs at its base (which are numbered accordingly). The coil at the bottom, as shown in the legend, represents the relay coil which activates the switch. The relay coil and all of the switches directly above the coil are an integral part of that relay.

3. TRANSFORMER

The transformer reduces 220 volt A. C. (alternating current) to 24 volt A. C. and 30 volt A. C. as indicated on the schematic. Then through the use of the diodes this A. C. is converted to D. C. (direct current).

4. CAPACITOR

In most cases, the capacitor is used to suppress the arc which would appear as the relay switch is closed or opened. The capacitor also helps to extend the life of the relay. One other important function of the capacitor is its ability to hold an electrical charge as a battery does and then discharging at a specified time.

NOTE: The colors used in the schematic do not necessarily indicate the actual color of the wire used in the various circuits.

As the treadle is heeled, the treadle switch contacts #1 and #2 are closed permitting the 24 volt D. C. to flow through control circuit, (indicated in red, Fig. A), through the synchronizer brushes #2 and #3, and to relay coils #1 and #6. When relay #1 is energized, the green section of the control circuit (Fig. A) is completed through contacts within relay #1, energizing relay coil #2. As relay #2 is energized, the motor circuit supply 220 volts D. C. to the auxiliary positioning motor, indicated in yellow, (Fig. A) is completed. This rotates the machine in operating direction until the needle reaches the bottom of its stroke. At this time, the synchronizer brush #2 falls onto the insulated barrier opening the red control circuit which in turn opens the yellow motor circuit (Fig. A) causing the auxiliary motor to stop.

When the treadline switch is closed, contacts #3 and #14 are closed permitting 24 volt D. C. to flow through the control circuit (indicated in blue, Fig. B) to relay coil #3 and through the contacts of the de-energized relay #6. As coil #3 is energized, the contact points complete the self-locking feature of the blue control circuit, thus continuing to supply 24 volt D. C. to relay coil #3. Through a second set of points in relay #3, current is again supplied through the red control circuit, (Fig. B) through synchronizer brushes #1 and #3, thus energizing relay coils #1 and #6. When relay #1 is energized, the green portion of the control circuit (Fig. B) is completed which in turn energizes relay coil #2. Contacts within relay #2 close, supplying 220 volt D. C. to drive the positioning motor, until the take-up lever reaches the top of its stroke. At this point, the synchronizer brush #1 falls onto the insulated barrier opening the control circuit which in turn opens the motor circuit and the up positioning cycle is stopped.

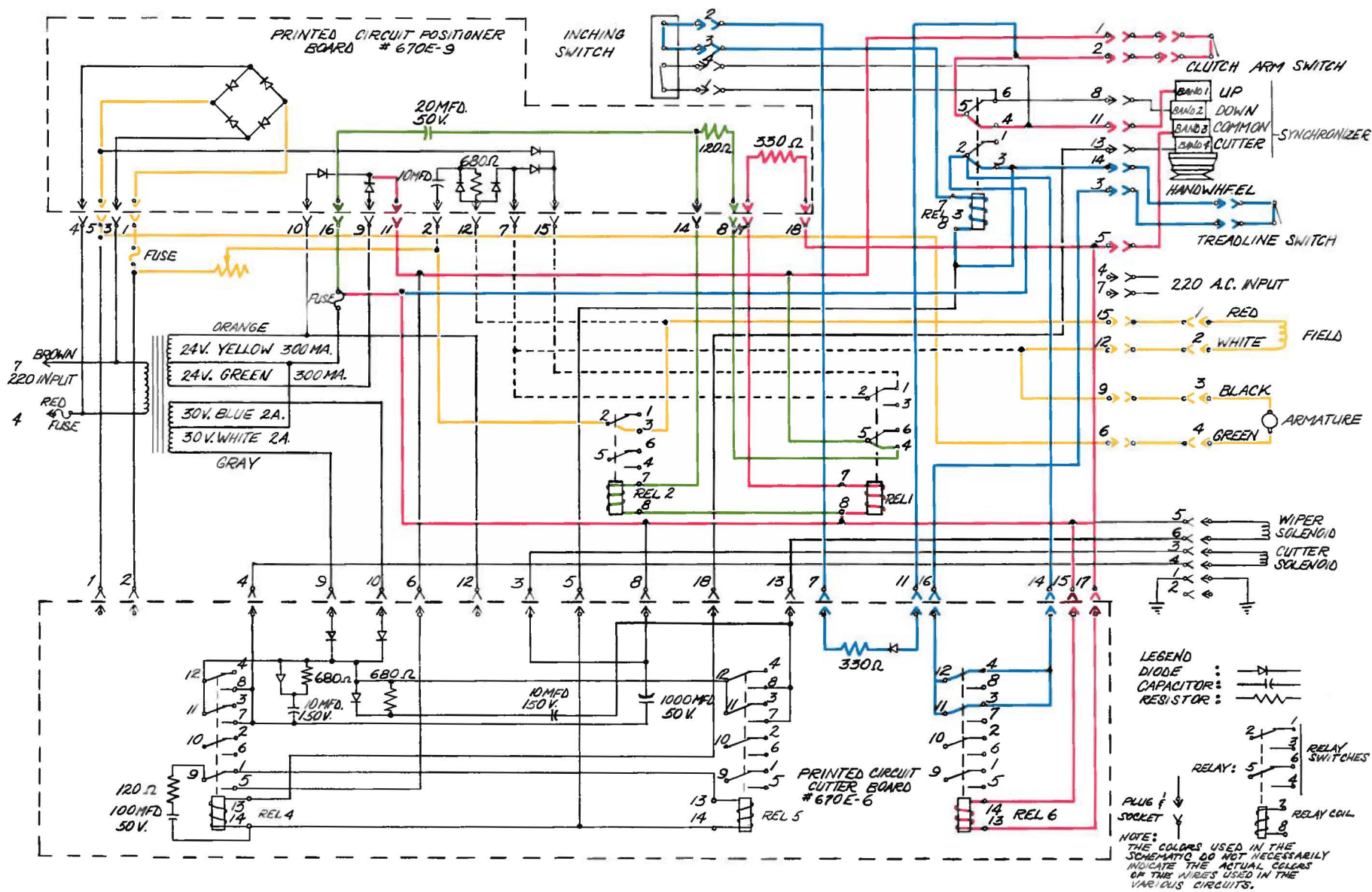


Fig. B

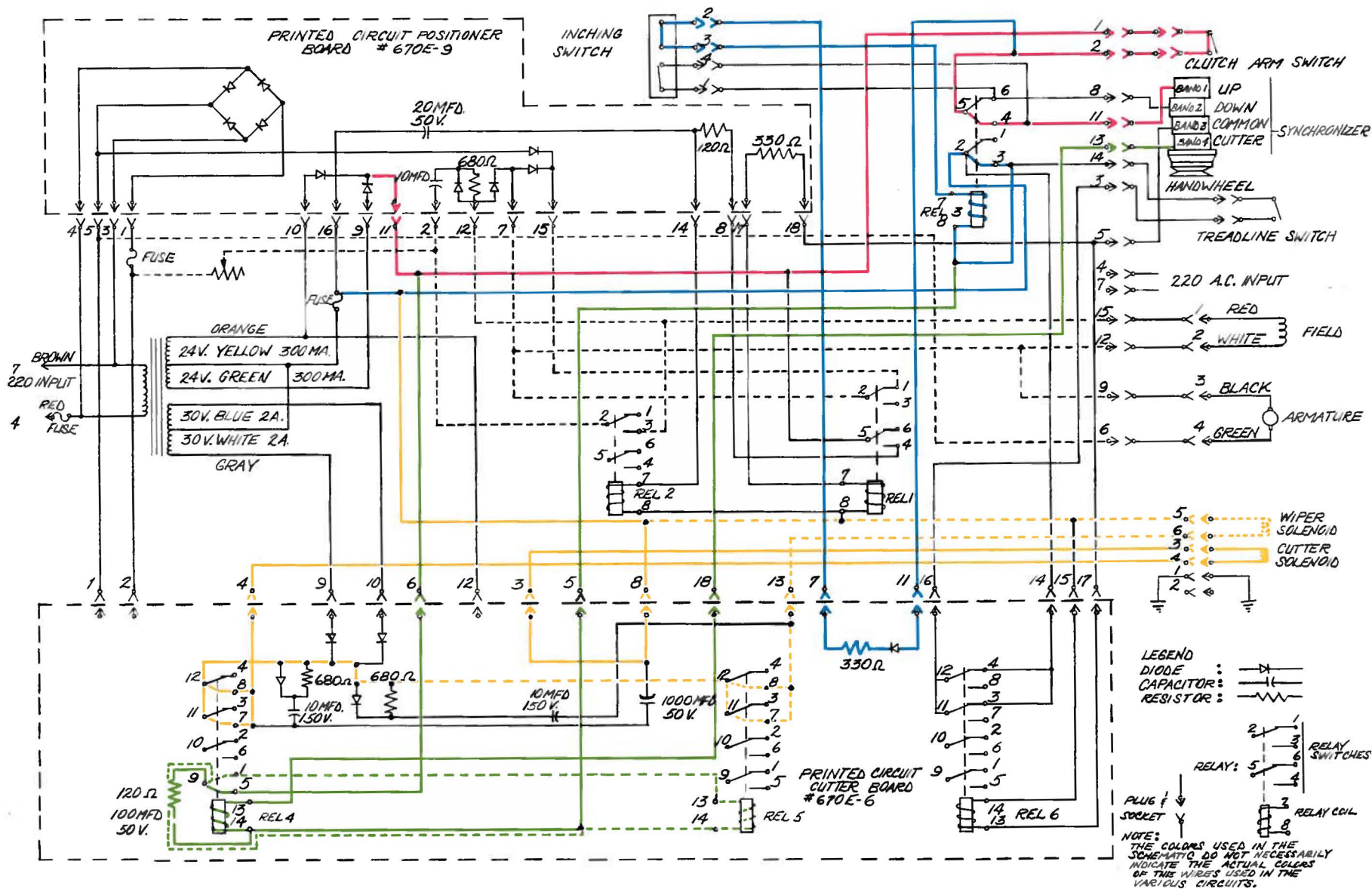
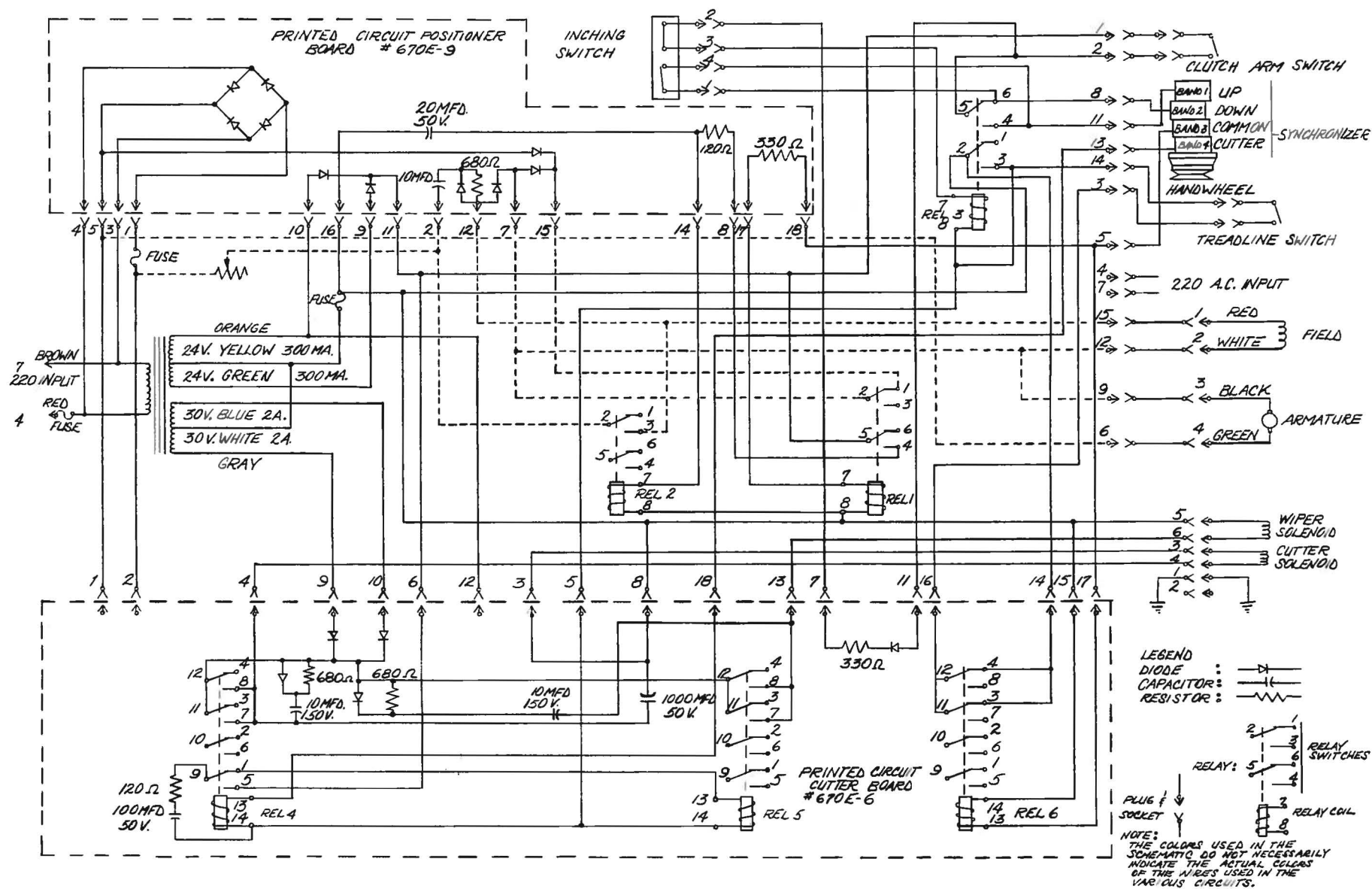


Fig. C



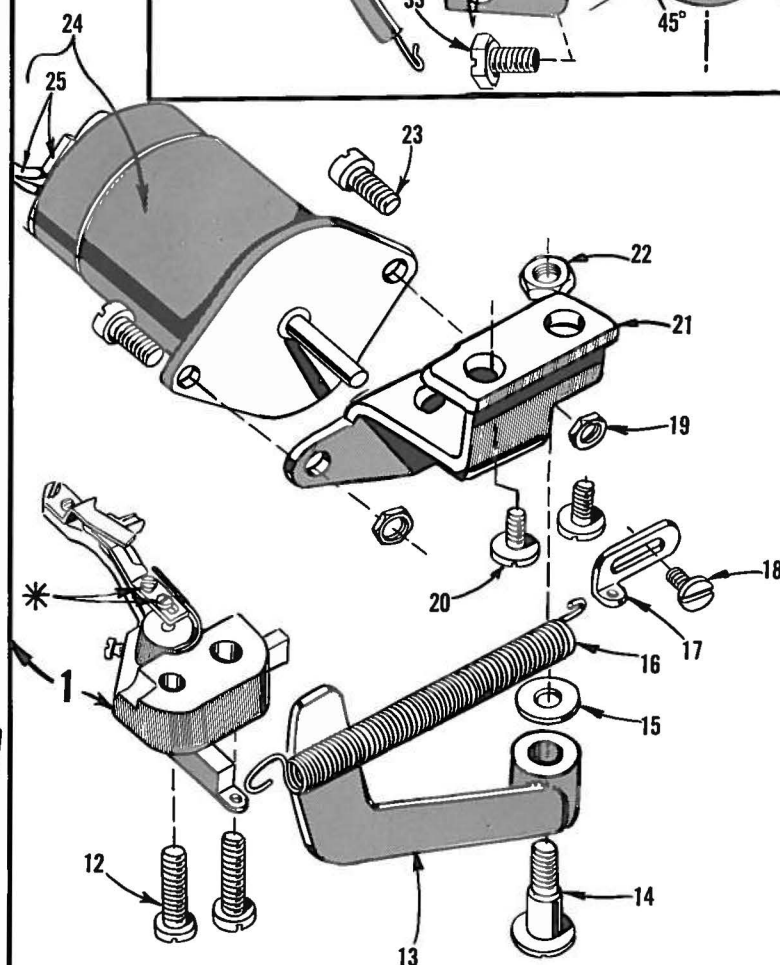
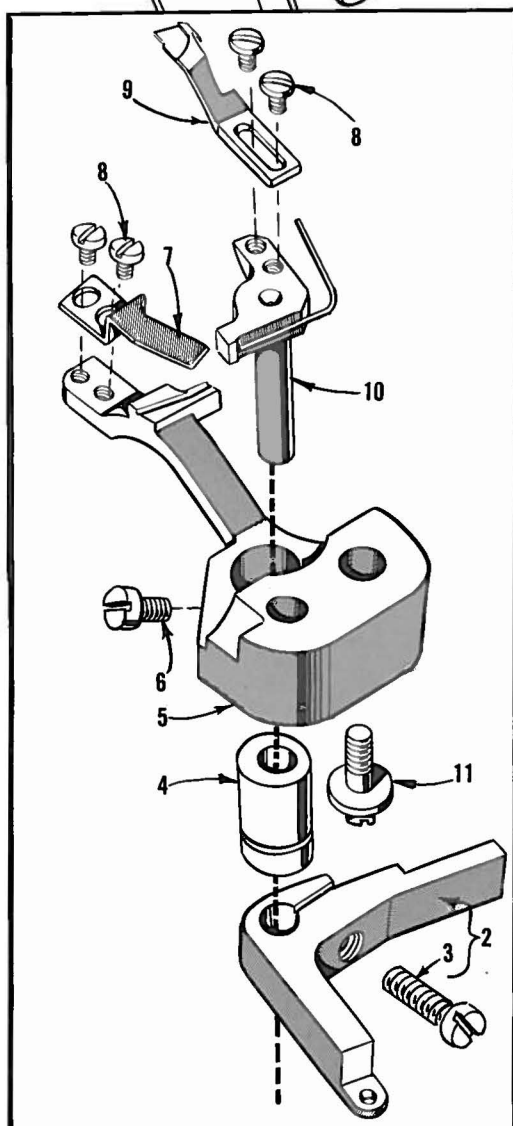
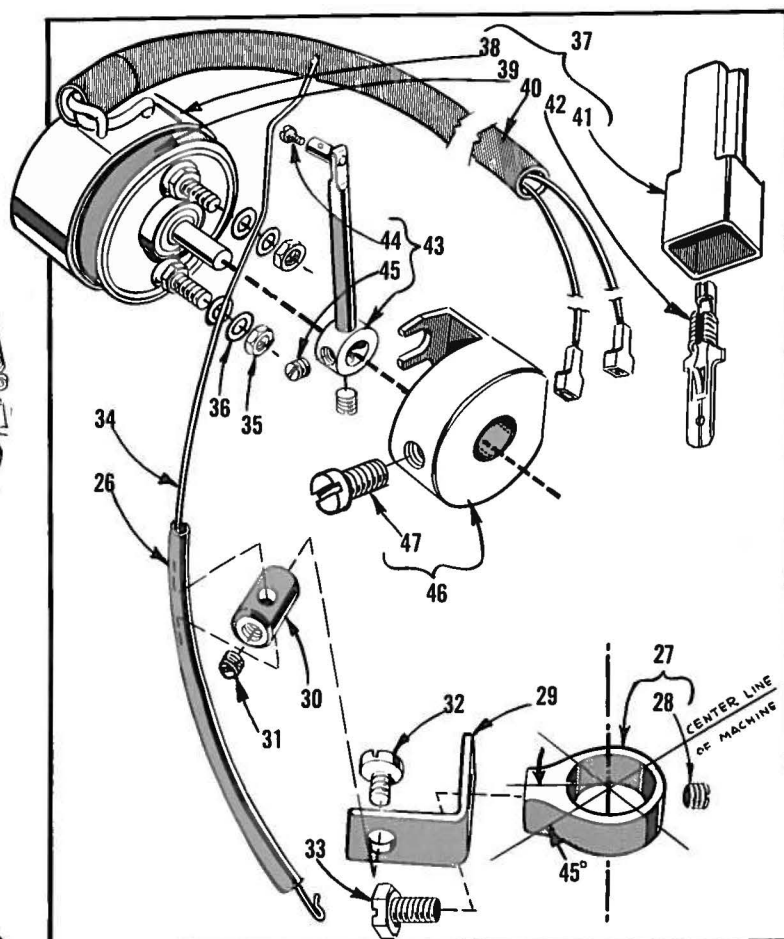
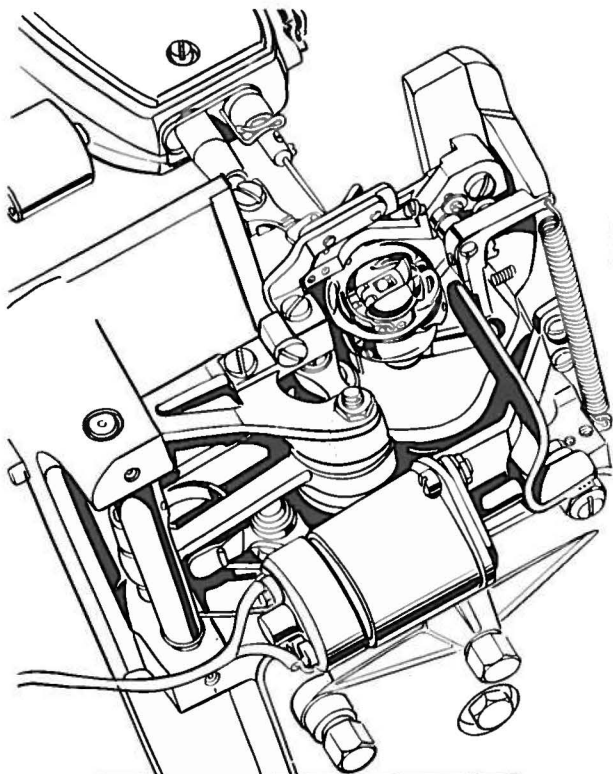
CIRCUITS AND SWITCHING SYSTEMS (Continued)

As the machine is rotating to the up position, band #4 on the synchronizer is contacted. This completes the cutting control circuit, through the synchronizer brushes #1 and #4. (indicated in green, Fig. C) supplying 24 volt D.C. to relay coil #4. As relay coil #4 is energized, the power circuit for supplying 30 volt D.C. to the cutting solenoid, (indicated in yellow, Fig. C) is completed through contacts within relay #4. The cutting solenoid system then carries the knife cutting mechanism to the loop catching position. At the same time a second set of points in relay #4 close which charges a capacitor. During the completion of the up position cycle, brush #4 on the synchronizer engages an insulated barrier. At this point, the cutting control circuit, (indicated in green, Fig. C) is opened de-energizing relay coil #4. This opens the cutting solenoid circuit allowing the cutter to complete its cutting cycle through a spring return system. Simultaneously, the second set of points within the relay #4 close, discharging the previously charged capacitor, through the tension release circuit (dotted green, Fig. C) energizing relay coil #5. As relay coil #5 is energized, the power circuit for supplying 30 volt D.C. to the tension disc and thread wiper solenoid (indicated in dotted yellow, Fig. C) is completed through contacts within relay #5. This causes the tension disc to open and thread wiper to operate.

If the treadline switch should be closed before closing contacts #1 and #2 of the treadle switch, relay #6 will prevent the unit from stopping up without trimming.

As the treadle is heeled, contacts #1 and #2 of the treadle switch close which energizes relay coil #6 (red circuit Fig. A). Through the contacts within relay #6 the blue circuit (Fig. A & B) is opened preventing the self-locking feature of relay #3 from activating and causing the machine to stop in the up position before trimming.

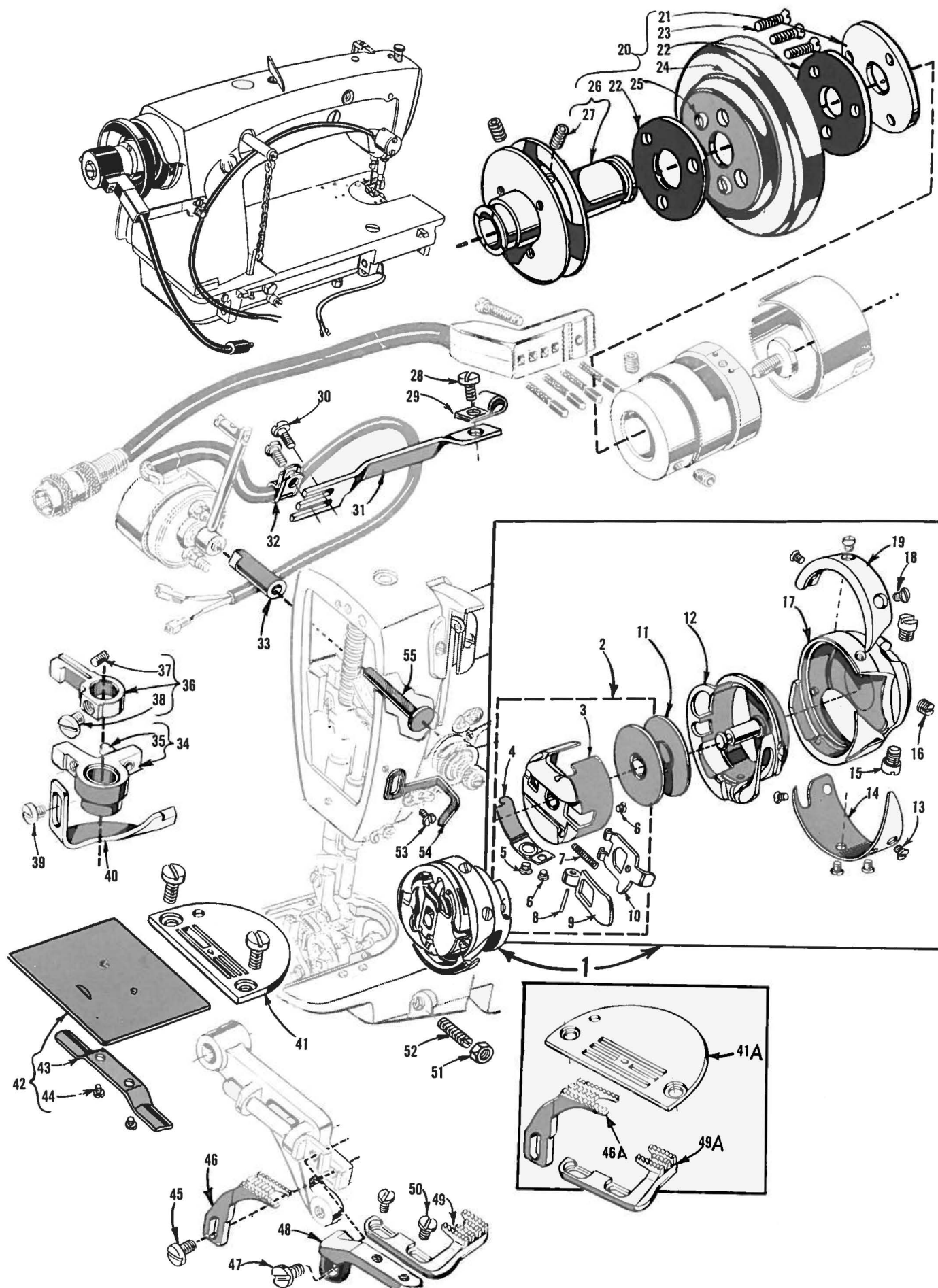
After the machine has positioned down and synchronizer brush #2 has contacted the insulated barrier, relay #6 is de-energized closing the blue circuit of relay #3 (Fig. B). If the knee switch is closed, the machine will now position up and trim due to the closed blue circuit (Fig. B).



* Remove projecting end of screws so as not to interfere with movement of lower knife.

**THREAD WIPER, CUTTING SOLENOID, TENSION RELEASE
SOLENOID, MOUNTING BRACKET, BOBBIN CASE HOLDER
POSITIONING FINGER AND KNIFE ASSEMBLY
FOR STYLES 63400 KE AND KL UNLESS OTHERWISE SPECIFIED**

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Amt. Req.</u>
1	29475 BG	Bobbin Case Holder Positioning Finger and Knife Assembly -----	1
2	63495 C	Pivot Release Lever -----	1
3	22585 R	Screw -----	1
4	G61441 KX	Eccentric Bushing -----	1
5	G61414 KX	Positioning Finger, marked "A" -----	1
6	77	Screw -----	1
7	G61470 KX	Upper Knife, marked "GB" -----	1
8	73 A	Screw, for knives -----	4
9	G61449 KX	Lower Knife and Thread Holder, marked "GA" ----	1
10	G61471 KX	Lower Knife Carrier, marked "ME"-----	1
11	22863 B	Screw, for adjusting eccentric bushing -----	1
12	22874	Screw, for positioning finger and knife assembly -----	2
13	63495 G	Cutting Solenoid Lever -----	1
14	22777 C	Screw, for cutting solenoid lever -----	1
15	61434 G	Washer-----	1
16	63495 B	Knife Return Spring -----	1
17	63495 E	Return Spring Positioner -----	1
18	22585 A	Screw, for return spring positioner -----	1
19	12982	Nut -----	2
20	22585 B	Screw, for cutting solenoid mounting bracket -----	2
21	63495 H	Mounting Bracket, for cutting solenoid-----	1
22	18	Nut, for cutting solenoid lever screw -----	1
23	22517	Screw, for cutting solenoid -----	2
24	660-354	Cutting Solenoid -----	1
25	670 E-8	Hook-up Wire, for cutting solenoid -----	2
26	63470 M	Needle Thread Wiper Guide -----	1
27	63470 H	Thread Wiper Mounting Collar -----	1
28	22743	Set Screw-----	1
29	63470 L	Needle Thread Wiper Bracket-----	1
30	63470 N	Needle Thread Wiper Guide Holder -----	1
31	22743	Screw, for needle thread wiper guide -----	1
32	22513	Screw, for needle thread wiper guide holder -----	1
33	79048	Screw, for needle thread wiper bracket -----	1
34	63470 R	Needle Thread Wiper Wire -----	1
35	651 J-12	Nut-----	4
36	660-113	Washer, brass -----	4
37	29480 FM	Rotary Tension Release Solenoid Assembly-----	1
38	63458 E	Rotary Solenoid Cover -----	1
39	660-360	Rotary Solenoid -----	1
40	660-347	Solenoid Lead Cover -----	1
41	670 G-18	Female Connector Sleeve, green -----	2
42	670 G-23	Male Wire Terminal -----	2
43	63470 E	Thread Wiper Lever -----	1
44	22738	Screw -----	1
45	22894 Y	Set Screw-----	2
46	63470 J	Thread Wiper Solenoid Mounting Bracket-----	1
47	22596 D	Set Screw-----	1



ROTATING HOOK ASSEMBLY, NEEDLE POSITIONER ASSEMBLY,
HANDWHEEL ASSEMBLY AND MISCELLANEOUS PARTS
FOR STYLES 63400 KE AND KL UNLESS OTHERWISE SPECIFIED

Ref. No.	Part No.	Description	Amt. Req.
1	29474 T	Rotating Hook Assembly -----	1
2	63913 A	Bobbin Case Assembly -----	1
3	63913	Bobbin Case -----	1
4	61414 C	Bobbin Case Tension Spring -----	1
5	22716 B	Tension Regulating Screw -----	1
6	22564 E	Screw -----	2
7	61216 N	Bobbin Case Latch Spring -----	1
8	61216	Bobbin Case Latch Hinge Pin -----	1
9	61415 A	Bobbin Case Latch Lever -----	1
10	61415	Bobbin Case Latch -----	1
11	61212	Bobbin -----	1
12	63414	Bobbin Case Holder -----	1
13	22716 A	Screw -----	4
14	63410	Hook Thread Deflector -----	1
15	22569 H	Screw -----	2
16	22565 M	Set Screw -----	1
17	63408	Hook -----	1
18	22716 H	Screw -----	3
19	61411 A	Hook Thread Retainer -----	1
20	63421 A	Handwheel Assembly -----	1
21	61321 L	Retainer Plate -----	1
22	61421 E	Handwheel Isolator -----	2
23	22574 C	Screw -----	3
24	61421 C	Handwheel -----	1
25	660-254 D	Isolator Washer -----	3
26	63421 C	Pulley -----	1
27	22894 V	Set Screw -----	2
28	J87 J	Screw, for synchronizer lead wire clamp -----	1
29	660-356	Synchronizer Lead Wire Clamp -----	1
30	376 A	Screw, for synchronizer bracket -----	2
31	63495 D	Synchronizer Bracket -----	1
32	660-352	Tension Release Solenoid Lead Clamp -----	3
33	63492 E	Bushing, for tension release plunger pin -----	1
34	63458 B	Tension Release Bushing and Guide -----	1
35	660-219 B	Roll Pin -----	1
36	63459 A	Presser Bar Guide -----	1
37	73 C	Set Screw -----	1
38	22570	Screw -----	1
39	22513	Screw -----	1
40	63458 D	Tension Release Cam -----	1
41	63424-073	Throat Plate, .073 inch diameter needle hole for Styles 63400 E, KE -----	1
† -	63424-063	Throat Plate, .063 inch diameter needle hole for Styles 63400 E, KE -----	1
† -	63424-043	Throat Plate, .043 inch diameter needle hole for Styles 63400 E, KE -----	1
41A	63424 R-073	Throat Plate, .073 inch diameter needle hole for Styles 63400 L, KL -----	1
† -	63424 R-053	Throat Plate, .053 inch diameter needle hole for Styles 63400 L, KL -----	1
42	63402 B	Bed Slide Assembly -----	1
43	61273	Bed Slide Spring -----	1
44	91 A	Screw, for bed slide spring -----	2
45	22528	Screw, for main feed dog -----	1
46	63405 A	Main Feed Dog, 16 teeth per inch, for Styles 63400 E, KE -----	1
† -	63405 B	Main Feed Dog, 22 teeth per inch, for Styles 63400 E, KE -----	1
46A	63405 R	Main Feed Dog, 22 teeth per inch, for Styles 63400 L, KL -----	1
47	93	Screw, for differential feed dog holder -----	1
48	63439 AJ	Differential Feed Dog Holder -----	1
49	63426 D	Differential Feed Dog, marked "EM", 16 teeth per inch, for Style 63400 KE -----	1
† -	63426 E	Differential Feed Dog, marked "EN", 22 teeth per inch, for Style 63400 KE -----	1
49A	63426 F	Differential Feed Dog, marked "EP", 22 teeth per inch, for Style 63400 KL -----	1
50	22768	Screw, for differential feed dog -----	2
51	41071 G	Nut -----	1
52	HS82	Screw -----	1
53	22766	Screw -----	1
54	63970 A	Needle Thread Pull-up Bracket -----	1
55	63492 D	Tension Release Plunger Pin -----	1
*	800 LT-362	Needle Positioner Assembly, complete, although only the synchronizer is shown -----	1

* Refer to needle positioner catalog for repair parts and order under the Union Special number, if available.

† Available as extra send and charge item.



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