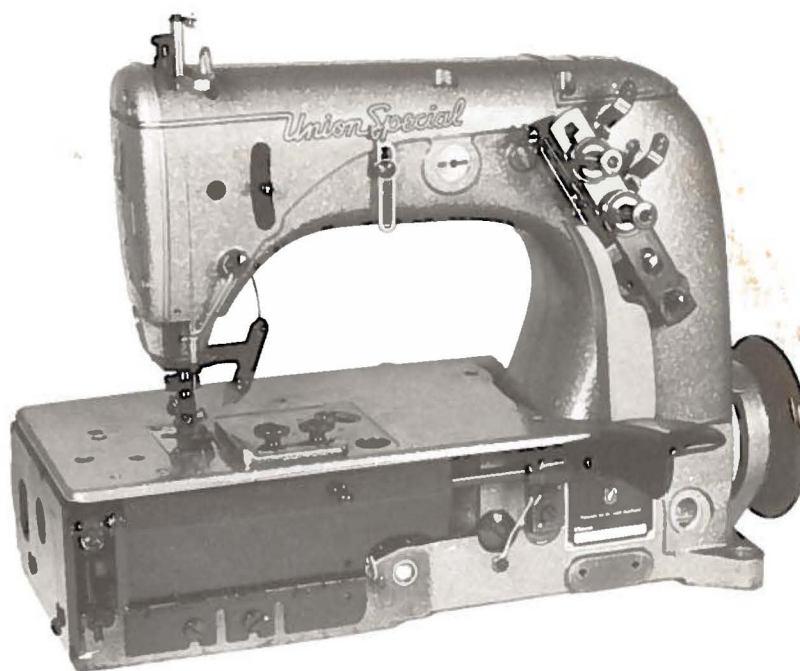


FINEST QUALITY

Union Special[®]
LEWIS • COLUMBIA

**INDUSTRIAL
SEWING
MACHINES**

**STYLES
51300 KK
51300 KL**



CLASS 51300

**STREAMLINED
DOUBLE LOCKED STITCH MACHINES
WITH
THREAD UNDERTRIMMER**

**CATALOG
NO. 266**

Union Special **MACHINE COMPANY**
CHICAGO

From the library of: Superior Sewing Machine & Supply LLC

Catalog No. 266
(Supplement to Catalog No. 249)

INSTRUCTIONS

FOR

ADJUSTING AND OPERATING

LIST OF PARTS

CLASS 51300

Streamlined Lockstitch

Styles

51300 KK

51300 KL

First Edition

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Union Special
MACHINE COMPANY
INDUSTRIAL SEWING MACHINES
CHICAGO

January 1970

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 51300 KK". 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 51300 KKZ".

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: "51300".

APPLICATION OF CATALOG

This catalog is a supplement to Catalog No. 249 and should be used in conjunction therewith. Only those parts which are used on Styles 51300 KK and KL but not used on Styles 51300 CC, CD are illustrated and listed at the back of this book. For clarity, certain 51300 CC, CD parts are shown in phantom to help locate the 51300 KK and KL parts.

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

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

Adjusting and operating instructions for Styles 51300 KK and KL are similar to those in Catalog No. 249 for Styles 51300 CC, CD respectively. The only instructions included in this catalog are the ones that are different from Styles 51300 CC, CD or are additional instructions that pertain specifically to Styles 51300 KK 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.

Adjusting Instructions

Description of Machines

Streamlined Flat Bed, Single Needle Medium Duty Machine with "KLIPP-IT" (under-trimmer) for use with Needle Positioner, Enclosed Oiling System, Reverse Feed and Back-Tacking Mechanism, Needle Bearing Needle Bar Drive, Light Weight Presser Bar and Light Weight Needle Bar Mechanism, Equipped with Light Weight Handwheel, Oil Pan Assembly and Head Oil Siphon Assembly.

51300 KK For seaming and hemming dresses, skirts, shirts, towels, sheets, curtains and similar operations on light to medium weight woven material where controlled back tacking is required.

51300 KL For seaming pants, dresses, skirts; for hemming shirts, towels, curtains and similar operations on medium weight woven materials where controlled back-tacking is required.

NEEDLE LEVER STUD

Check the location of the needle lever stud with respect to the oil groove. The head of the needle lever stud is marked with an arrow and the word "up". These studs are set correctly when the arrow points vertically up. Also, check the position of the oil tube inside the arm casting which lubricates the needle lever stud. Make sure that it is tilted downwards and that its delivery end contacts the wall of the bed casting just above the notch in the needle lever thrust collar.

Do not allow the oil tube to rest on the needle lever.

LUBRICATION

Clean the machine thoroughly. Fill oiling system to first red line of the oil sight gauge in front of the machine and oil all bearings. Run machine slowly for a minute to allow the oil wicks to carry the oil to the bearings. Then, repeat the oiling and run the machine at higher speed. Inspect oiling system for leaks. Wipe up surplus oil, particularly around the take-up. Oiling diagram No. PL616 is available.

CAUTION! Oil has been drained from the main reservoir before shipment, so the reservoir must be filled to the proper level as indicated on oil gauge before beginning to operate.

RECOMMENDED OIL

Use a straight mineral oil of a Saybolt viscosity of 200 to 250 seconds at 100° Fahrenheit in the main reservoir. This is equivalent to Union Special specification No. 83. Fill main oil reservoir at opening in upper crank chamber cover and check oil level at gauge. Oil is at maximum level between two red lines on sight gauge on front of machine.

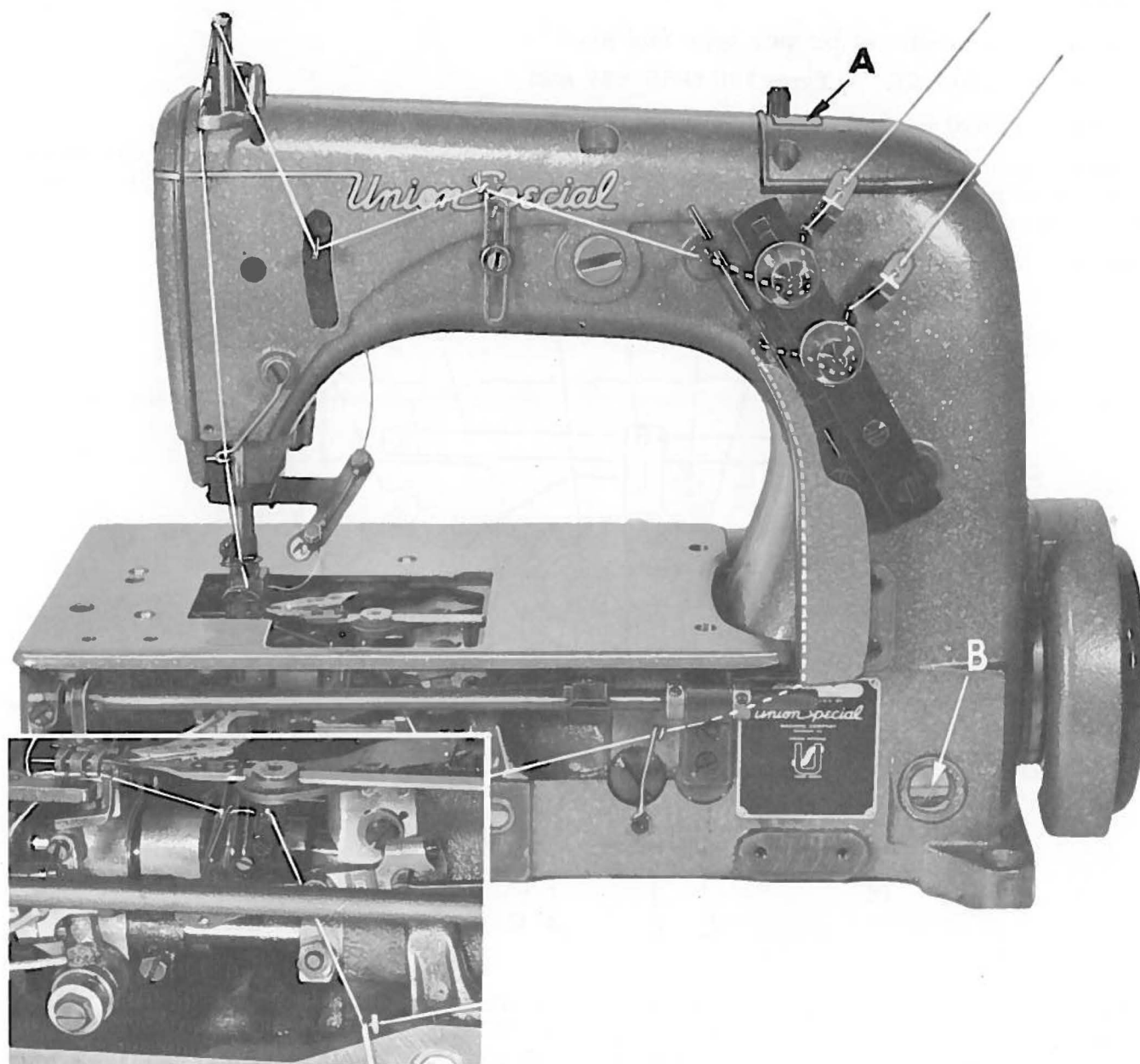
CAUTION! It is important that these machines not be over filled.

It is recommended that a new machine, or one that has been out of service for an extended period be lubricated as follows: Remove the head cover, clean out lint and directly oil the needle bar link and the needle bar.

Oil bearings, looper rocker, eccentrics and all other parts that have oil wicks touching them. Replace head cover as no further hand oiling will be required.

Run machine slowly for several minutes to distribute oil to the various parts. Oil may be drained from main reservoir by removing plug screw located below the handwheel in the main frame.

Adjusting Instructions



**THREADING AND OILING DIAGRAM FOR CLASS 51300 MACHINES
WITH "KLIPP-IT"**

Thread machine as indicated. The looper threading has been enlarged for clarity.

Oil has been drained from the machine before shipping, and the reservoir must be filled before beginning to operate. Oil is filled at spring cap (A) in top cover. Oil level is checked at sight gauge (B); maintain oil level between lines on gauge. Use a straight mineral oil with a Saybolt viscosity of 200 to 250 seconds at 100° Fahrenheit. Excessive oil in the main reservoir may be drained by removing plug screw located directly below the handwheel.

Adjusting Instructions

NEEDLE

Put in a new needle of proper type and size.

For Style 51300 KK Type 130 GHS-036 and

for Style 51300 KL Type 130 GHS-040

Place throat plate support and throat plate on the bed to check that the needle enters the throat plate slot in the middle. Then, remove these parts for adjusting the looper and mounting of gauge for setting the feed mechanism.

ADJUSTMENT OF THE FEED MECHANISM BY A GAUGE

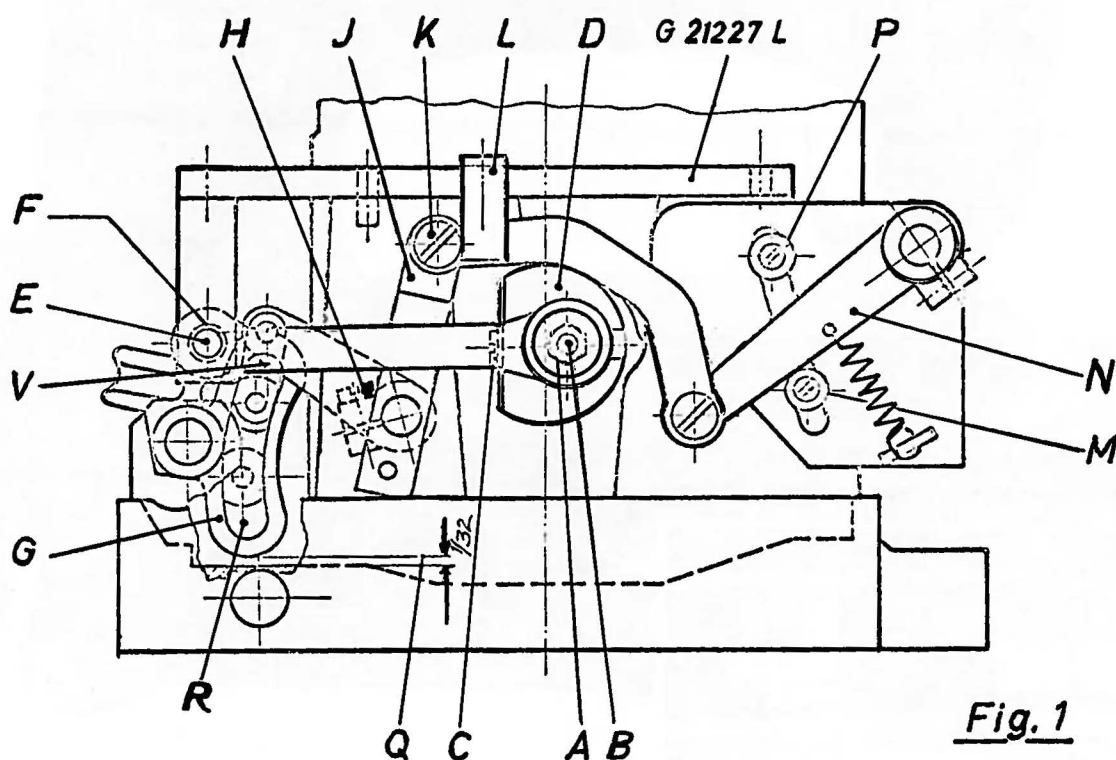


Fig. 1

The feed mechanism is set in the assembly department by using gauge G21227 L. To adjust rocker "G" loosen nut (A, Fig. 1) (CAUTION! NUT HAS LEFT THREAD). Place the feed crank stud (B) in the main shaft slot (D) and regulate screw (C) so that the pin (E) of the gauge fits into the hole (F) of the feed rocker shaft, when the upper part of the segment of the rocker (G) is in its end position to the needle. Tighten nut (A). Loosen screw (H), place distance gauge (V) in the segment of the rocker (G) and press the sliding block against the distance gauge (V). Move lever (J) until the head of screw (K) contacts the stop (L) of the gauge. Tighten screw (H). Then set stop ring (M) against lever (N).

For the adjustment of reverse feed place distance gauge (R) in the segment of the rocker (G). Move the sliding block with the knee press against the distance gauge (R) and set the stop ring (P) against the lever (N).

Adjusting Instructions

ADJUSTMENT OF THE FEED MECHANISM BY A GAUGE (Continued)

After this adjustment the stitch length should be about 8 1/2 stitches per inch in both directions. For correction reset stop ring (M).

CAUTION! BE SURE THAT THERE IS 1/32 INCH SPACE BETWEEN THE SEGMENT (G) AND THE BED AT THE LARGEST STITCH LENGTH (Q, Fig. 1).

If a larger stitch length than 8 1/2 stitches per inch is needed, re-adjust stop ring (M) downwards.

All other stitch length changes must be made by the stitch regulating screw (C) after loosening the nut (A) of the feed crank stud (B).

ADJUSTMENT OF THE FEED MECHANISM WITHOUT GAUGE

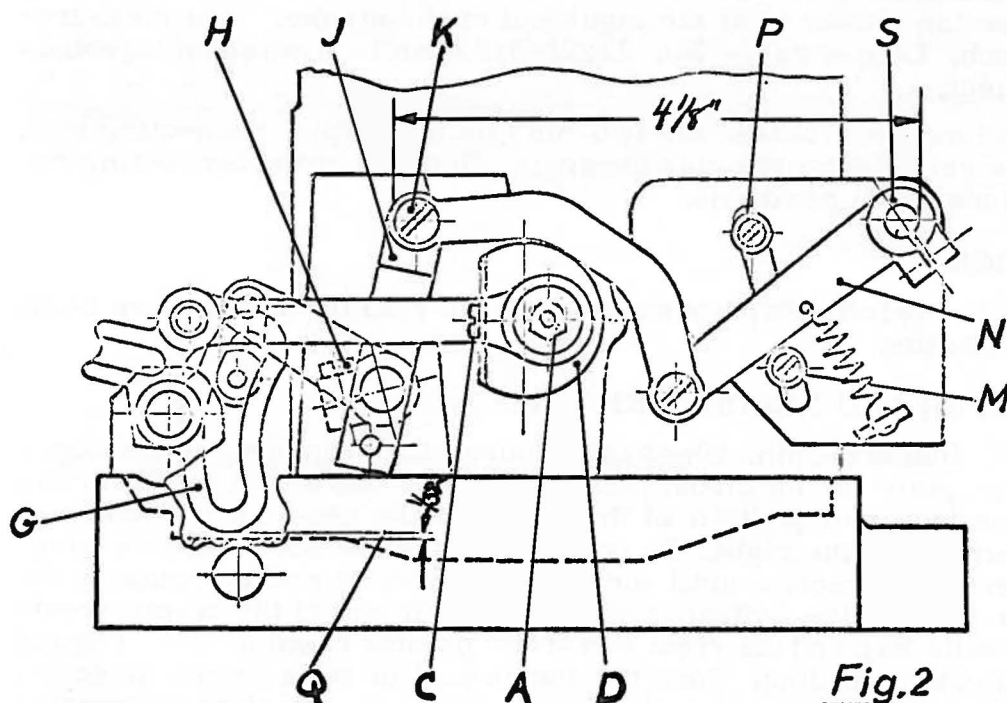


Fig.2

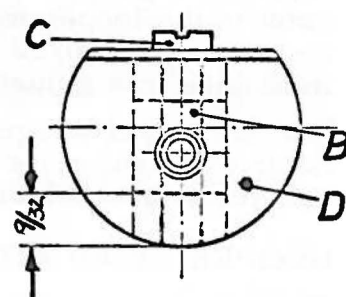


Fig.3

First adjust the feed rocker segment (G) to the largest movement by the regulating screw (C) after loosening nut (A, Fig. 2).

(CAUTION! NUT HAS LEFT THREAD). The distance from the main shaft head (D) to the head of the feed crank stud (B) should be 9/32 inch (Fig. 3). As the movement of the feed rocker segment is limited by the bed, make sure that the free space (Q) is not less than 1/32 inch (Fig. 2).

For adjusting the sliding block turn handwheel until the top part of the segment (G) is in its end position to the needle. Loosen screw (H), place a pin of 1/4 inch dia. (e. g. a drill of 1/4" dia.) between the sliding block and the upper end of the segment. When the sliding block is pressed against this pin, set the lever (J) so, that the distance between the head screw (K) and the shaft (S) is 4 1/8 inches. Tighten screw (H) and set the stop ring (M) against lever (N).

For adjusting the reverse feed place a pin of 5/16 inch dia. in the lower part of the segment (G). Move the sliding block with the kneepress against the pin of 5/16 inch dia. and set the stop ring (P) against the lever (N).

Adjusting Instructions

ADJUSTMENT OF THE FEED MECHANISM WITHOUT GAUGE (Continued)

After this adjustment the stitch length should be about 8 1/2 stitches per inch in both directions. For correction reset stop ring (M).

If a larger stitch length than 8 1/2 stitches per inch is needed, re-adjust stop ring (M) downwards.

All other stitch length changes must be made by the stitch regulating screw (C) after loosening the nut (A) of the feed crank stud (B).

LOOPER ADJUSTMENT

Insert the looper in the looper rocker. Notice that the screw rests on the looper flat. The looper gauge represents the measurement from the centerline of the needle to the point of the looper when the looper is at the right end of the stroke. This measurement should be 5/32 inch. Looper gauge No. 21225-5/32 can be used advantageously in making this adjustment.

For the looper gauge adjustment loosen the two nuts on the looper connecting rod. After the right gauge is set, tighten the nuts securely. Notice that the connecting rod ball joints have clearance in all positions.

LOOPER AVOID MOTION

When the looper moves to the left, its point should pass the rear of the needle as close as possible without contacting.

SYNCHRONIZING LOOPER AND NEEDLE MOTIONS

Use gauge No. 21227 R. Insert the pin, which is included with the gauge, in the looper rocker. Place the gauge plate on the throat plate seat using the throat plate screws for attaching. Place the indicator portion of the gauge in the needle thread take-up wire holder with the pointer to the right. Do not tighten the set screw at this time. Turn handwheel in operating direction until the pin in the looper rocker contacts the edge of the gauge plate and set the indicator so that the left end of the pointer rests against the top of the needle bar and the right end of the pointer rests at "0". Tighten set screw and note indicator reading. Turn the handwheel in the reverse direction until the pin again contacts the plate. If motions are in synchronization the pointer on the indicator will return to the same reading. A variation of one graduation on the scale is allowable. If the reading is higher on the scale when the handwheel is turned in operating direction, the looper drive lever rocker will have to be moved to the rear. If the reading is lower, this rocker will have to be moved to the front. Remove the oil reservoir top cover and drain the reservoir. Loosen the screws in the looper drive eccentric mechanism and move the eccentric as far to the right as it will go. Then drive the rear bushing to the front or the middle bushing to the rear. To avoid distorting the parts remove the plug screw in the rear bushing before driving to the front and place a horse shoe shape metal washer approximately 1/16 inch thick between the looper drive lever and the adjacent bushing when driving the bushing to the rear. Retighten all screws and seal the reservoir cover in position with Permatex Gasket Cement to prevent oil leakage. A convenient 1/2 pint can, including brush, is identified by the symbol "CE5C", and will be promptly furnished by Union Special.

Automobile supply shops carry it.

If the gauge is not available, synchronization may be checked as follows:

Insert the looper in the looper rocker and turn the pulley in the operating direction

Adjusting Instructions

SYNCHRONIZING LOOPER AND NEEDLE MOTIONS (Continued)

until the looper point moves to the left and is even with the needle. Note the height of the eye of the needle with respect to the looper point, then turn the pulley in the reverse direction until the looper point again moves to the left and is even with the needle. If the motions synchronize, the height of the eye of the needle with respect to the looper point will be the same. A variation of .005 inch is allowable. If the distance from the eye of the needle to the point of the looper is longest when the pulley is turned in operating direction, move the looper drive lever rocker to the rear. Moving it in the opposite direction acts the reverse.

NEEDLE BAR

Set the needle bar so that the top of the needle eye is less than $1/64$ inch below the looper, when point of looper moving to the left is even with left side of the needle. When tacking, skip stitches may occur if the needle is set too low.

RETAINING FINGER DRIVE

Adjust the retaining arm in or out of its slot so that the hook point at its furthest travel to the left is $1/8$ inch from center line of needle. Set the pivot bracket back or forth in its adjustment so that the hook point, when passing the back of the needle, has $1/32$ inch clearance back of the needle. No part of the hook should ever contact the needle.

TIMING THE RETAINER

To time the retainer drive remove access plug screw in casting just to the right of the looper drive lever, insert screw driver and loosen screws in the driven gear on the vertical shaft. Set the needle bar at the bottom of the stroke and turn the vertical crank shaft by hand (gripping the crank strap) until the timing mark on the face of the vertical crank check lines up with the timing mark on the top cover.

If the retainer gear drive is located properly and if it becomes necessary to remove the oil chamber top cover, the entire retainer drive will lift off with the top cover except the main shaft gear. When the cover is to be replaced, the machine should first be turned over so that the needle is at the bottom of its stroke, and the retainer drive should be positioned so the timing marks are in line. The top cover with the retainer drive set as above can then be put in place being careful that, when the main shaft drive gear and the driven gear mesh together the crank shaft does not turn. If the crank shaft does not turn, the cover screws can be inserted and tightened and the retainer timing will be correct. Check the timing to be sure it is correct.

FRONT NEEDLE GUARD

Set the front needle guard high enough so that its top surface is as high or slightly higher than the looper point, and so that the guarding surface just contacts the needle as the looper point comes up to the needle. Needle breakage will occur when back-tacking if the front guard is not as high as possible and the rear guard as low as possible. See paragraph for setting rear needle guard.

Adjusting Instructions

FEED DOG ADJUSTMENT

Set the feed dog so that the tips of the teeth are parallel with and $3/64$ inch above the throat plate at highest point of travel. Adjust the supporting screw, under the feed dog, to maintain this setting.

Check clearance between top of retainer hook and bottom of feed dog at closest approach.

REAR NEEDLE GUARD

The needle must barely contact the needle guard when the point of the looper - moving to the left - is .005 inch before the right edge of the needle.

THREADING THE MACHINE

Thread the machine according to threading diagram No. PL616 and start sewing tests.

LOOPER THREAD TAKE-UP

The looper thread take-up must be placed on the main shaft so that both discs have equal clearance on each side of the shield. The looper thread take-up is not spotted on the main shaft and consequently can be set to compensate for varying conditions. When the needle moves down and the looper starts its movement from left to right the discs must come out of the cast-off plate to take the slack from the looper thread. The looper thread must cast off from the highest lob of the take-up when the point of the needle has entered the triangle deep enough. The retaining finger controls the amount of slack thread in the system and must be set on the cast-off plate so that it has clearance between the two discs of the take-up and so that it releases the looper thread just after the eye of the needle comes up out of the material.

THREAD TENSION

The looper thread tension should be about $1/4$ of the needle thread tension. If the tension is too low, the take-up may lose control over the thread causing triangle skips. If the tension is too high the stitch may be pulled down.

NEEDLE THREAD NIPPER

It may not be necessary to use the needle thread nipper in front of the casting just above the needle if light thread, under 60-2 cord, is used. If heavy thread is used, 50-2 cord or heavier, the nipper spring helps to throw a needle loop when reverse feeding.

PRESSER FOOT

See that the presser foot hinges freely and that its under surface is in lateral alignment with the feed dog and the throat plate.

PRESSER FOOT PRESSURE

The presser spring adjusting screw is the knurled screw directly behind the needle bar. Turning it clockwise increases the pressure, counterclockwise acts the reverse. Set the pressure only high enough to feed properly.

Adjusting Instructions

NEEDLE THREAD TAKE-UP WIRE

Set the needle thread take-up wire (strike-off) located to the right of the needle bar, as low as possible.

Raise it only if needle loop skips occur and cannot be corrected any other way.

NEEDLE THREAD FRAME EYELET

Set the needle thread frame eyelet (No. 539) located to the left of the needle lever stud - in the middle of its slot. Raising it brings better needle thread pull up. Lowering is necessary if thread breakage occurs, at cross seams. The position of the thread frame eyelet influences the size of the needle thread loop. Raising causes a larger, lowering a smaller needle thread loop.

SEAM CONTROL

Check the seam produced for chafed or cut threads by unravelling the stitch. Apply a triangular oil stone for polishing the middle row of the feed dog teeth which may be too sharp.

Check that the machine chains off well without chafing the chain. Chaining will be worse if the teeth are too highly polished.

ADJUSTING "KLIPP-IT" MECHANISM

With all of the electrical plug-connections disconnected, adjustments should be made in the following sequence:

ADJUSTMENT OF CUTTING SOLENOID STROKE

The length of stroke of the armature shaft (A, Fig. 4) should be approximately $45/64$ inch (See Fig. 4). Since the armature of the solenoid is designed to operate in one direction only, when actuated, its only means of returning to its rest position is by the spring loaded shaft (B). Loosen nut (C), move head (D) to the right or left on shaft (B) to obtain desired dimension, retighten nut (C).

ADJUSTING LOOPER HEIGHT

The looper height should be set $5/32$ inch below the surface of the throat plate support (A, Fig. 5) when at its extreme left position (See Fig. 5).

ADJUSTING SEVERING DEVICE

With the needle in down-position, slowly depress the cutting solenoid armature shaft (A, Fig. 4) observing that the lower knife (A, Fig. 6) must pass to the rear of the needle (B) as close as possible without contacting. Should adjustment be required, loosen screws (C), reposition knife and retighten screws. With the lower

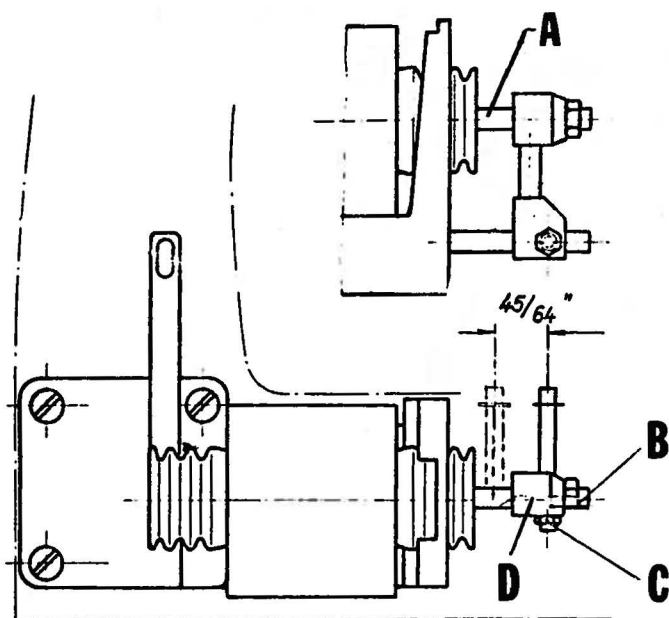


Fig. 4

Adjusting Instructions

ADJUSTING SEVERING DEVICE (Continued)

knife at its extreme left position, the cutting edge (D) for the needle thread must be $\frac{1}{8}$ inch to the left of the center of the needle (See Fig. 6). Should adjustment be required, loosen locknut (E) remove snap ring (F) and rotate connecting rod (G) as necessary to obtain required dimensions. Replace snap ring and retighten locknut.

With the needle in up-position and the lower knife swung-in, there should be approximately .012 inch clearance between the lower knife (A, Fig. 7), looper retainer (B) and looper (C). If adjustment is necessary, CAREFULLY BEND the knife carrier bracket at points (H, Fig. 6) to suit.

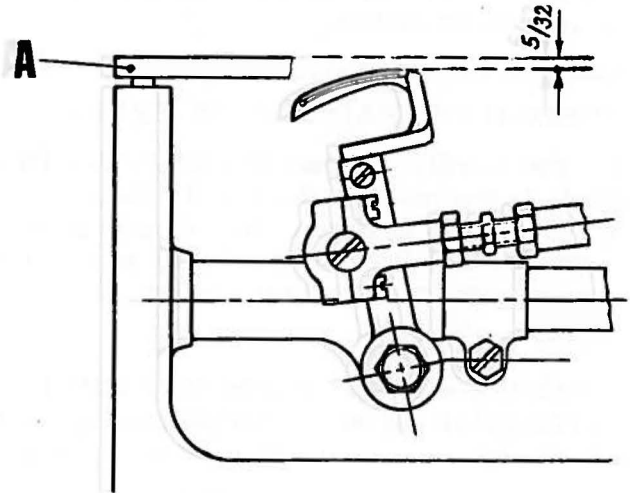


Fig. 5

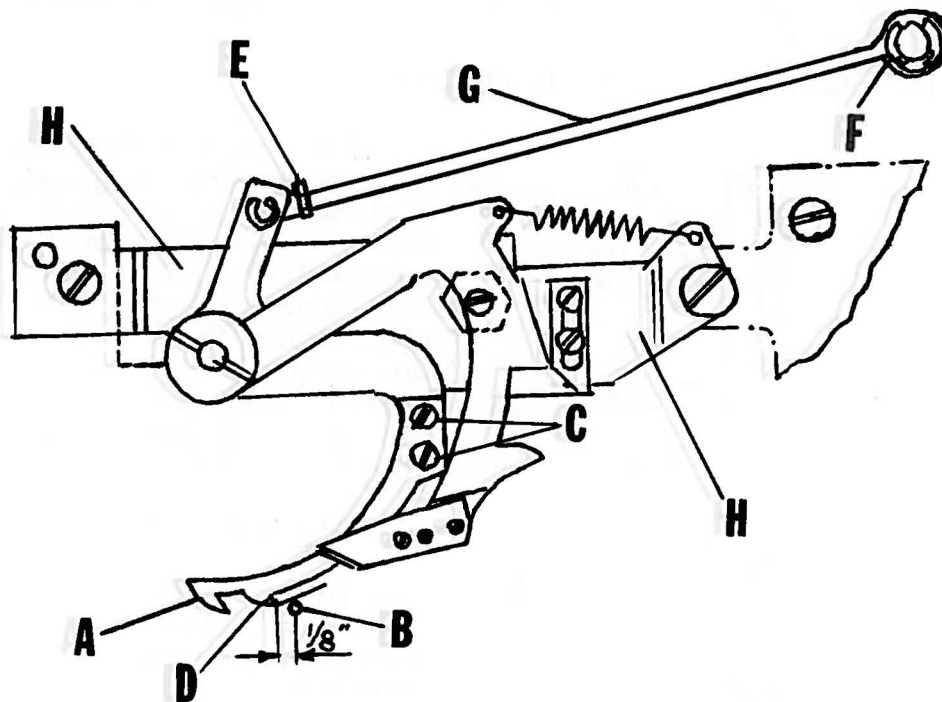


Fig. 6

ADJUSTING KNIVES

To avoid pinching the needle thread when the lower knife (A, Fig. 8) swings out, the edge of the lower knife and the cut-out on the looper thread retaining plate spring (B) must be in alignment as shown at point (C). To obtain this adjustment loosen screws (D), move the upper knife (E) and plate spring (B) as required, retighten screws (D)

Adjusting Instructions

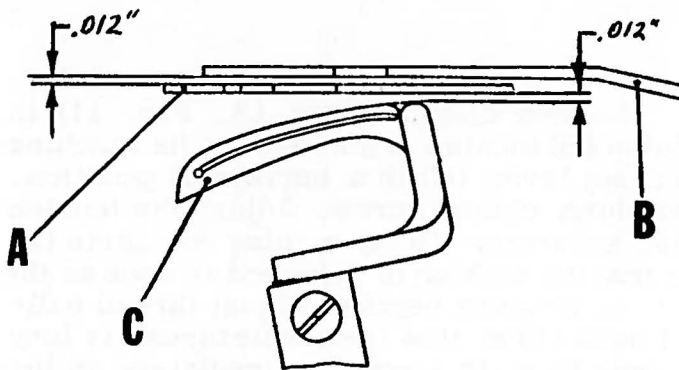


Fig. 7

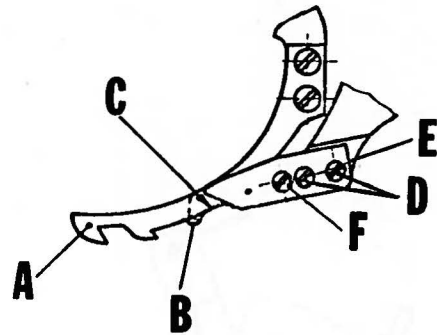


Fig. 8

ADJUSTING KNIVES (Continued)

With both knives in their resting position, the upper knife (A, Fig. 9) must overlap the lower knife (B) approximately .020 inch. Adjustment can be made by loos-

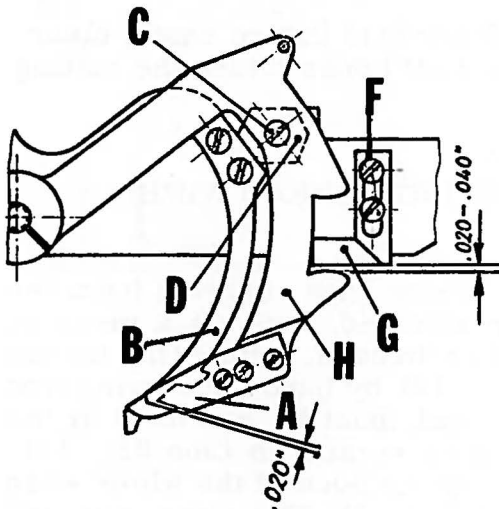


Fig. 9

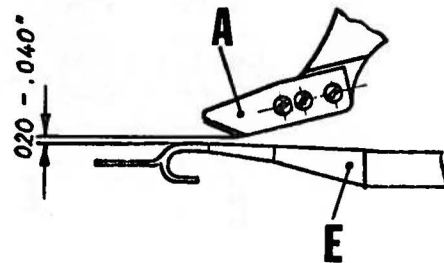


Fig. 9A

ing screw (C) and rotating the hexagonal stop plate (D). Retighten screw. With the needle in up-position and the lower knife swung-in, a clearance of .020 - .040 inch must be maintained between the upper knife (A, Fig. 9A) and loop retainer (E). Adjustment can be made by loosening screws (F, Fig. 9) and moving stop (G) forward or rearward. Care must be taken to also maintain .020 - .040 inch clearance between stop (G) and the corresponding edge of the upper knife carrier (H), with the cutting solenoid in its resting position. Retighten screws (F). The looper thread (A, Fig. 10) must be clamped between the plate spring (B) and lower knife (C) after being severed by the upper knife (D). Tension on the looper thread retaining plate spring can be adjusted by turning the tension regulating screw (F, Fig. 8).

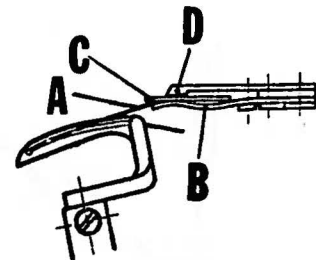


Fig. 10

Adjusting Instructions

THREAD PULL-OFF HOOKS AND TENSION RELEASE ADJUSTMENTS

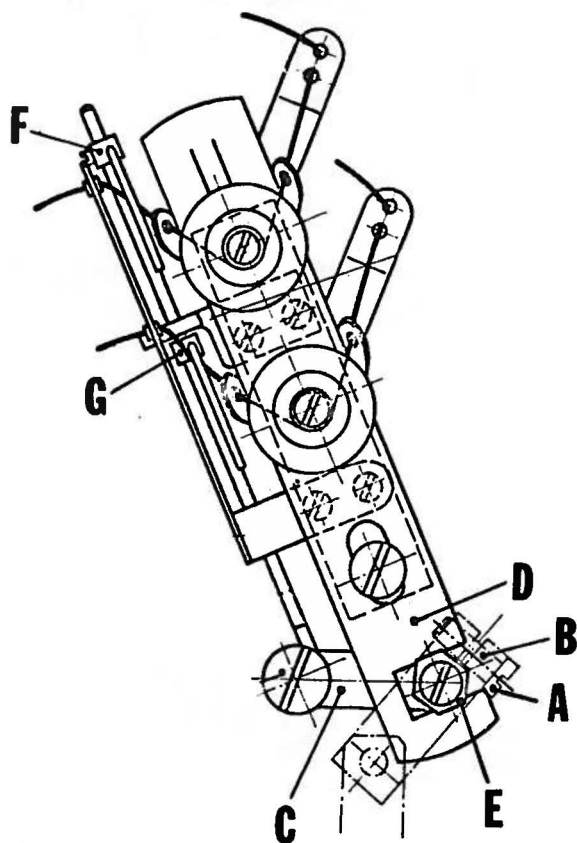


Fig. 11

Loosen clamp screw (A, Fig. 11) in clamp (B) located at the rear of the machine and set lever (C) in a horizontal position, retighten clamp screw. Adjust the tension disc separator (D) by turning eccentric (E) so that the tension is released as soon as the cutting process begins. Adjust thread pull-off hook (F) so that the needle thread is long enough to start sewing immediately on the next stitch. A needle thread tail of $1/16''$ - $1/8''$ on top of the material is permissible. Adjust thread pull-off hook (G) so that the looper thread is clamped securely after it has been severed.

CAUTION: Observe to insure ample clearance of the pull-off hooks during the cutting operation.

ADJUSTING THREAD WIPER

With the power lead removed from the thread wiper solenoid, sew on a piece of fabric and sever threads. Actuate the thread wiper (A, Fig. 12) by hand, observing that the needle thread must be deflected by the hook of the wiper coming in (See Fig. 12), and is caught by the hook of the wiper when returning (See Fig. 13). The wiper must not contact the needle or the presser foot during its arc of travel.

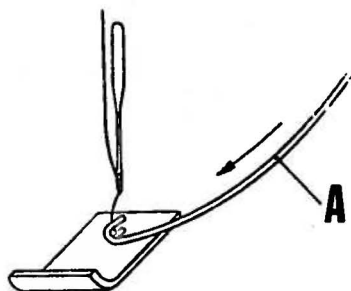


Fig. 12

This condition can be accomplished by loosening screws (A, B, C, Fig. 14), reposition as required, assuring that the wiper moves smoothly. Guard plate (D) must be positioned so the wiper will not hook into the fabric. Retighten screws.

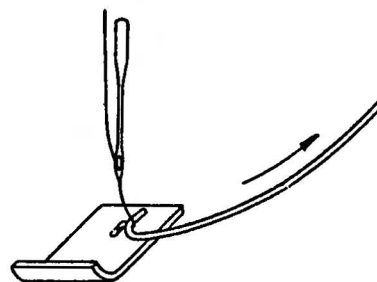


Fig. 13

Adjusting Instructions

ADJUSTING THREAD WIPER (Continued)

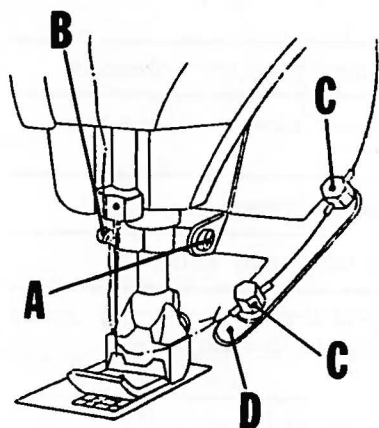


Fig. 14

When returning to rest position the thread wiper lever (A, Fig. 15) must be stopped by stop (B) slightly before the armature of the solenoid stops. This can be accomplished by loosening screw (C), reposition lever as required, re-tighten screw. Reconnect power lead for thread wiper assembly.

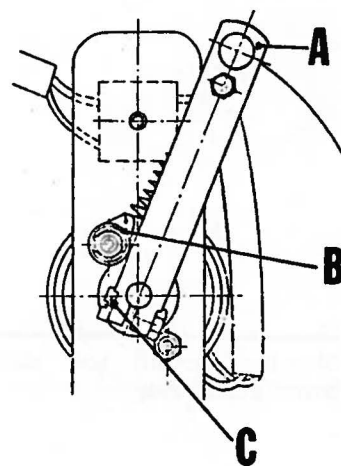
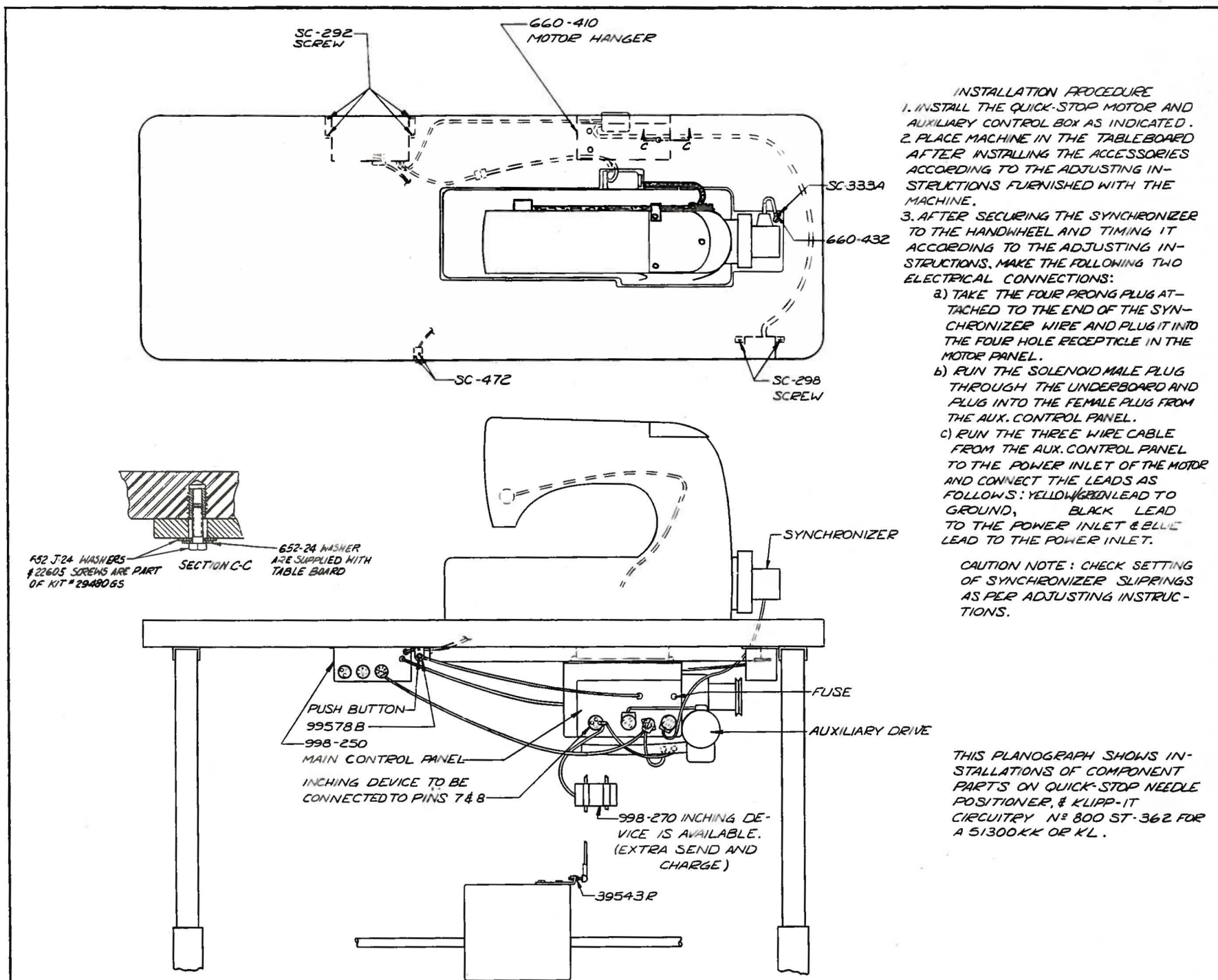


Fig. 15

TRIMMER TROUBLESHOOTING

Condition	Causes	Cures
Both threads not cut	Solenoid not working	Check fuse, check solenoid movement by hand
	Solenoid jammed by linkage of tension assembly	Re-adjust tension assembly linkage for free movement
	Improper synchronizer timing	Reset synchronizer
	Solenoid plug disconnected	Connect plug for solenoid
	Power lead to motor not connected	Connect motor power lead
	Bent relay contacts	Reshape relay contacts
	Loose lower knife	Tighten lower knife
Needle thread too short after trimming	Needle thread pull-off set too high on tension assembly	Adjust thread strike-off lower for more needle thread
	Lower knife trims both sides of needle loop around looper	Re-adjust lower knife
Needle thread pinched after trim cycle	Not enough spring tension between upper and lower knife	Adjust spring tension between upper and lower knife
	Lower knife and clearance cut in looper thread retaining spring not aligned properly	Re-adjust knives
	Dull knife	Replace knives
	Upper and lower knives do not overlap enough for proper shearing	Re-adjust knives
Machine does not start sewing after trimming	Thread tail too short, thread pull-offs set too high	Re-adjust pull-offs for sufficient needle thread and looper thread
	Looper thread control cam, and tension not adjusted properly	Re-adjust looper thread control cam, and tension
	Looper thread retaining spring does not retain looper thread	Remove lint from between knives and re-adjust knives
Needle thread cut but looper thread not caught	Lower knife does not move far enough to the left	Re-adjust knife assembly and connecting rod (see adjusting instructions)
	Lower knife not properly adjusted	Adjust lower knife
Too much needle thread on top side of garment when starting to sew	Needle thread pull-off set too low	Raise needle thread pull-off

INSTRUCTIONS
FOR
QUICK NEEDLE POSITIONER



Adjusting Instructions

MOTOR AND CLUTCH ARM ADJUSTMENTS

Before starting to operate, check the main supply voltage with the motor wiring. The terminal strip of the motor is designed to accommodate either Star connection for 380 volts or Delta connection for 220 volts three phase A. C. Details of both connections are included on the wiring diagram furnished with the motor (See Fig. 16).

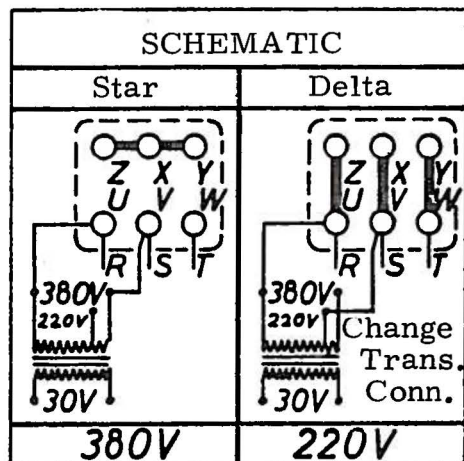


Fig. 16

The clutch arm should point in the direction of the pitman rod, when possible. This can be accomplished by loosening the three socket head screws on the motor plate, reposition the clutch arm as required, retighten screws. Adjustment of the micro-switch located on the right hand side of the clutch arm, which actuates the magnetic clutch should be made as follows:

- Turn the set screw located below the micro-switch in a clockwise direction until the switch closes and the auxiliary control starts running.
- Turn the set screw in a counterclockwise direction to the position where the auxiliary control stops running.
- Now, make one more complete turn on the set screw counterclockwise to obtain correct setting of the switch.

The synchronizer, clutch arm and auxiliary control plugs may now be inserted into the corresponding marked sockets on the control panel.

The QUICK-STOP motor should be cleaned about every two years. At this time the auxiliary drive should be removed, cleaned and refilled with grease. The auxiliary drive is belt driven off the main motor. Correct alignment of the idler rollers must be maintained to avoid excessive wear on the belt.

To replace the round belt, remove the fan cover from the motor. Loosen the two screws securing the belt guard and pivot it to the side. Remove the two cap-screws from the carbon brushholders of the magnetic brake and withdraw brushes. Remove the three screws which will allow removal of the complete magnetic brake. Replacement of round belt can now be accomplished. Reassemble magnetic brake, belt guard, fan cover and carbon brushes.

Clutch free play should normally be .020 - .028 inch but care must be taken to assure that the clutch is never engaged at any time with the brake. Adjustment can be accomplished by removing spacers as required, located between the motor and the clutch. Two .012 and one .020 inch spacers have been provided for this purpose.

If the clutch arm is in braking position, the "V" belt pulley must be braked firmly. When lifting the clutch arm, a position at which the "V" belt pulley can be rotated freely without the clutch or brake engaging must be obtained. If the clutch arm is lifted in excess of .020 inch, the clutch disc should engage the flywheel disc, which is clearly recognizable when turning the "V" belt pulley.

Adjusting Instructions

MOTOR AND CLUTCH ARM ADJUSTMENTS (Continued)

The synchronizer should be cleaned periodically with a clean cloth to remove carbon dust.

In case of trouble at the auxiliary control it will be useful to replace the entire auxiliary control. The following items require removal:

Remove the two caps of the carbon brush holder and remove the carbon brushes, remove the three screws securing the magnetic casing, the belt guard, the fan hood and the round belt.

On the rear of the control plate are installed: the rectifier, contactor, arc suppressor capacitor and a tuning capacitor; the control plate also contains a fuse for the auxiliary control. When the contactor fails to function, check the fuse. The contactor disposes of two change-over contacts, one for closing the magnet coil circuit and one for closing the brake coil circuit. IN CASE OF TROUBLE IN THE ELECTRICAL SYSTEM REPLACE THE CONTROL PLATE.

SYNCHRONIZER ADJUSTMENTS

Before the synchronizer is installed on the machine, the following basic adjustments should be made:

NOTE: Bands are to be rotated in the operating direction of the machine.

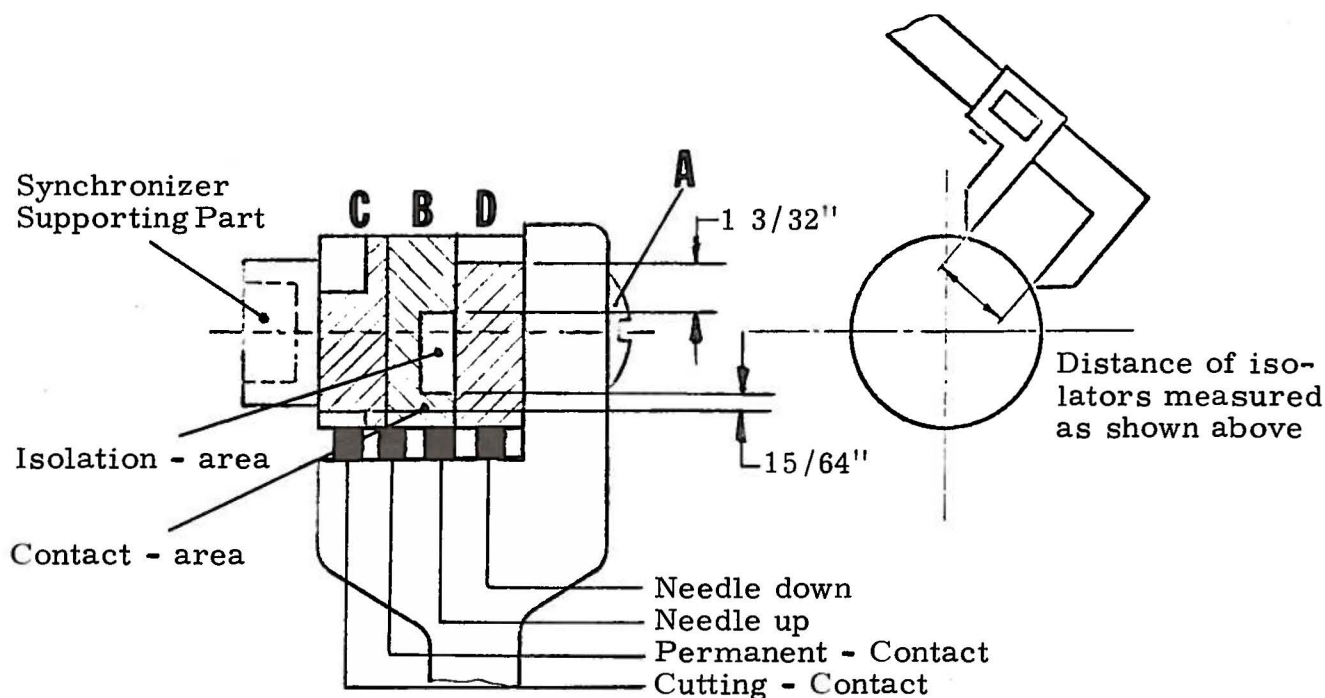


Fig. 17

1. Loosen screw (A, Fig. 17) and rotate band (B) to position the beginning of its insulated area $\frac{15}{64}$ inch from the end of the insulated area of band (C).
2. While retaining this position, rotate band (D) to position the beginning of its insulated area $1 \frac{3}{32}$ inch from the end of the insulated area of band (B).
3. Retighten screw (A) noting that these dimensions are to be set by cord measurements (See Fig. 17).

Adjusting Instructions

SYNCHRONIZER ADJUSTMENTS (Continued)

With the cutting solenoid disconnected, assemble the synchronizer to the machine pulley. Push the button switch for needle up-position. If the needle bar does not stop within .012 inch after its extreme uppermost travel in the operating direction, loosen the set screws on the synchronizer unit and advance or retard as required to obtain the aforementioned condition. Retighten set screws.

The needle bar should stop about .020 inch before reaching its lowest point of travel. If adjustment is required, loosen screw (A, Fig. 17) and while holding band (B) constant rotate band (D) slightly, to attain desired conditions, retighten screw (A).

DESCRIPTION OF WIRING DIAGRAM FOR QUICK-STOP-MOTOR FK 2/UNION

START SEWING

Treadle is pushed down forwardly and thereby micro switch Mh is closed by switch lever ZSH 118. Relay 1 is energized. Contact R11 disengages brake of positioner drive and engages solenoid clutch. (Micro switch Mh must be adjusted so that it closes by actuating the switch lever ZSH 118 before the mechanical motor clutch is slipping - see instruction).

END OF SEAM

Treadle in rest (starting) position. Micro switch Mh will be opened. Relay 1 is kept energized by its self-holding contact R12 and synchronizer ring "needle down" until the circuit is broken by slipping "needle down". (The flow of current through resistor and capacitor prevents de-energizing of relay 1 when circuit is broken by ring "needle down" until about 200 RPM are reached).

Machine stops with needle in down position.

NEEDLE UP AND CUTTING

Treadle is pushed down rearwardly and thereby micro switch Mp in ZSH is closed. Relays R2 and R4 are energized.

- 1) Way of current: Synchronizer slipring for "needle up" - plug connection 12 - contact R13 (relay R1 de-energized) - plug connection 0' - micro switch Mp - plug connection 0 - relay R2. Relay R2 is energized. As slipring "needle up" - contact R13 - are connected in series relay R2 is energized until the circuit is opened by slipping "needle up".

Energizing relay R2 changes over contact R21. Brake is disengaged and clutch is engaged (for 1/2 rotation from "needle down" to "needle up").

- 2) Way of current: Synchronizer slipring "needle up" - plug connection 12 - contact R13 (relay R1 de-energized) - plug connection 0' - micro switch Mp - plug connection 0 - plug connection 6 - relay R4 - (relay is energized).

Adjusting Instructions

NEEDLE UP AND CUTTING (Continued)

- 3) During raising the needle slipping "severing" gives an impulse.

Way of current: Slipping "severing" - plug connection 15 - push button ("needle up" without severing) - R22 - plug connection 4 - relay R3. Relay R3 is energized, R33 is closed and through plug connection severing solenoid is energized. When the needle reaches the "up" position R2 is de-energized. In turn R22 is opened and the severing circuit is broken. Delayed by capacitor K3 relay R3 is de-energized. Relay R3 is energized prematurely through a resistor W6 to guarantee energizing also for short impulses.

Wiper: When the needle raises relay R2, relay R3 and relay R4 are energized. Capacitor K2 is charged through R23. Relay R2 is de-energized and R23 changes. Relay R3 is de-energized delayed and closes R32. Wiper is actuated by current of capacitor K2.

Way of current: Capacitor K2 - plug connection 8 - R23 - plug connection 7 - contact R42 - R32 - plug connection 8. Wiper only can be actuated when relay R3 is de-energized and relay R4 is still energized.

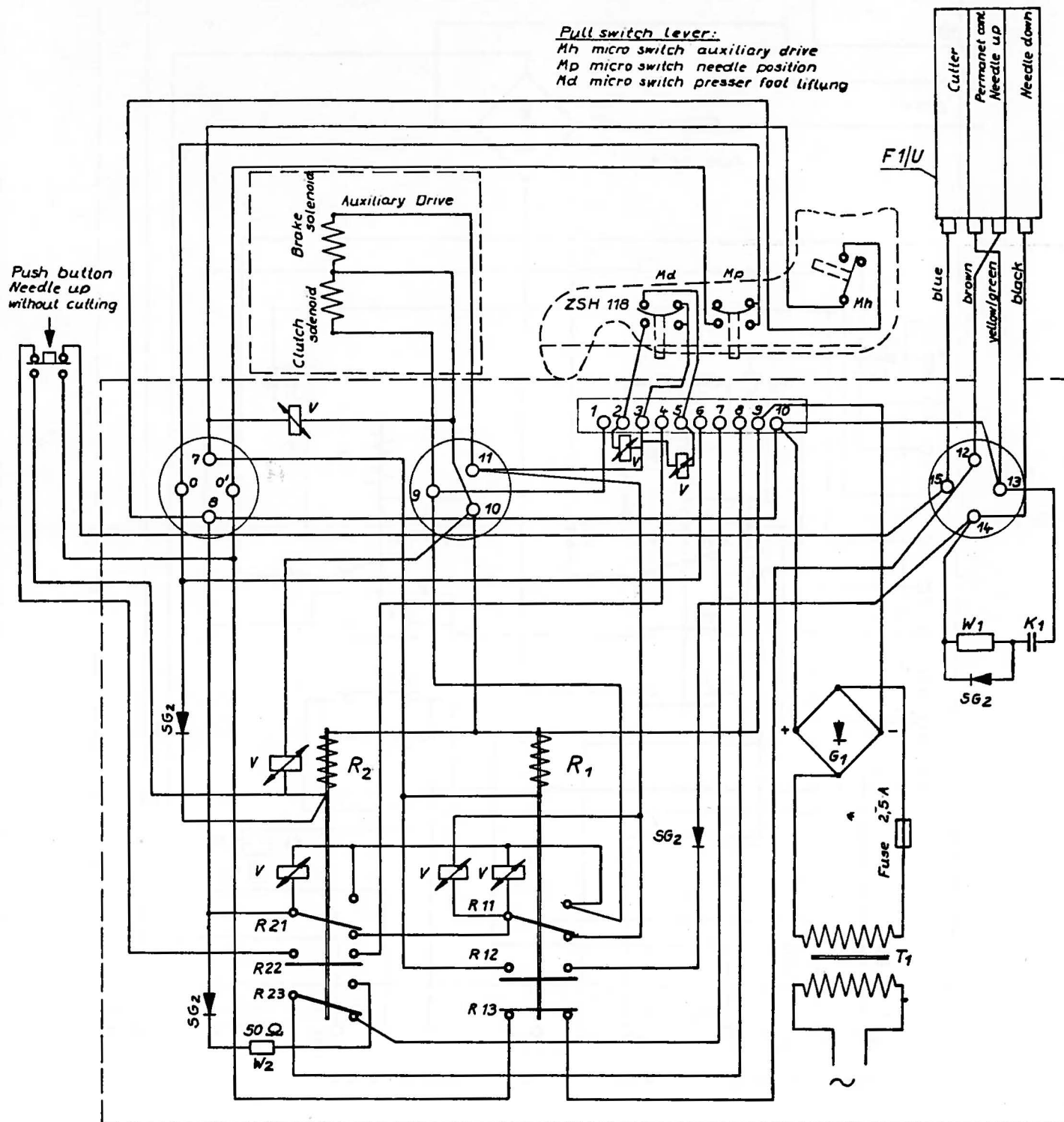
RAISING NEEDLE WITHOUT SEVERING

By pressing the push button micro switch Mp is bridged over and simultaneously the severing impulse is broken. Relay R2 is energized. A diode is blocking the current to relay R4. The needle raises.

Pressing the push button and simultaneously heeling the treadle raises needle without severing but the wiper is actuated. This should be prevented.

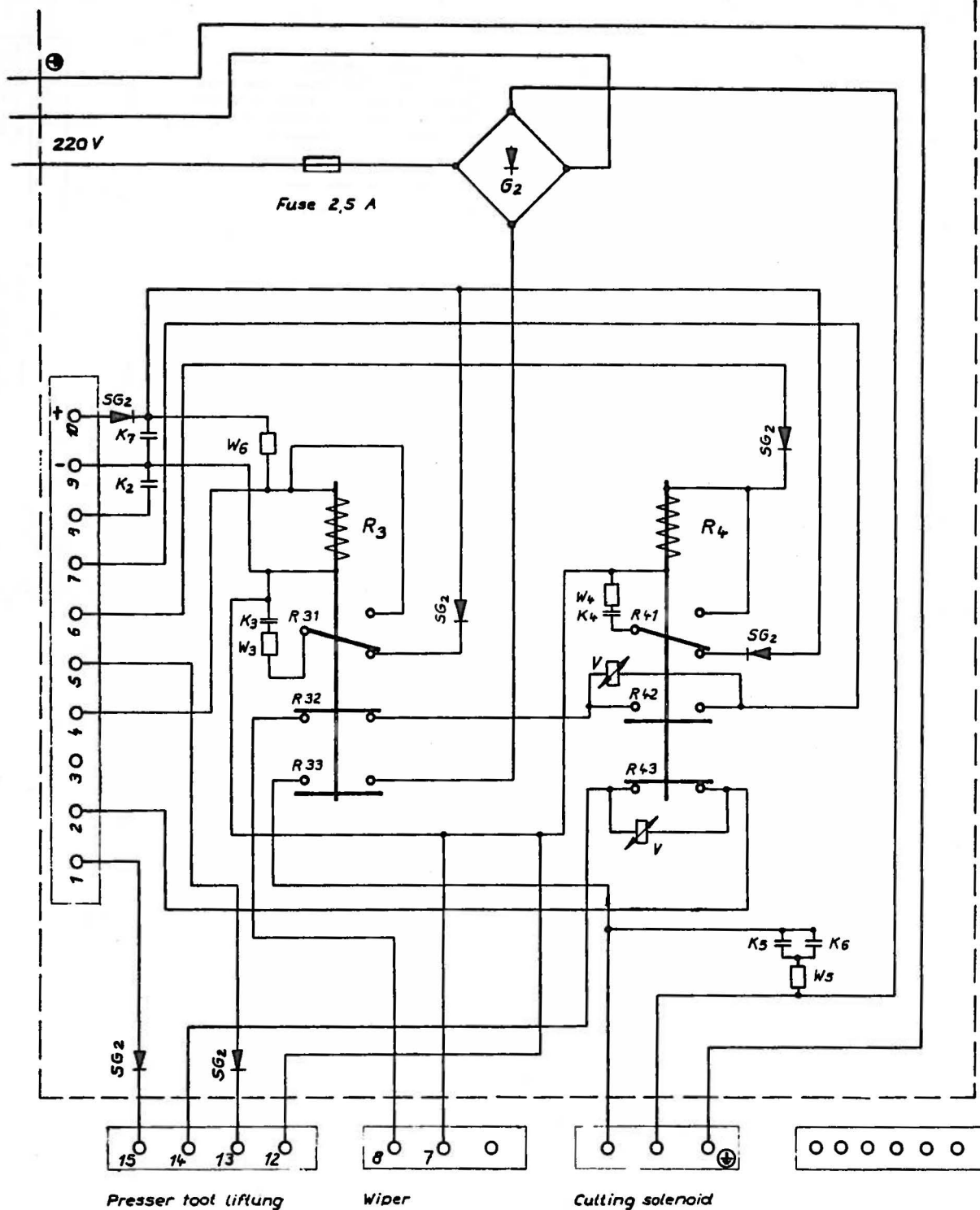
BLOCKING THE CONTROL IMPULSE FOR SEVERING

As relay R2 only is energizable after de-energizing relay R1, i. e. when reaching slow speed, severing at high speed is impossible.



Motor control panel F 2 U

- R1 = Relay (1 change over contact, 1 closing contact, 1 opening contact)
 R2 = Relay (2 change over contact, 1 closing contact)
 G1 = Rectifier 24 V, 15 A
 T1 = Transformer secondary 30 V, 35 VA
 SG2 = Diode (By 103)
 V = Ocelit - Varistor
 K1 = Capacitor 4,7 · 3,3 μ F (63 V)
 W1 = Resistor 22 K Ω / 0,25 W
 W2 = Resistor 50 Ω



Auxiliary control box FK 2U

- R₃ = Relay (1change over contact, 1opening contact, 1closing contact)
 R₄ = Relay (1change over contact, 1closing contact, 1opening contact)
 G₂ = Rectifier B 390 C170
 SG₂ = Diode (By 103)
 V = Ocelit - Varistor
 K₂ = Capacitor 1000 μ F
 K₃ = Capacitor 200 μ F
 K₄ = Capacitor 700 μ F
 K₅ = Capacitor 1 μ F
 K₆ = Capacitor 1 μ F
 K₇ = Capacitor 500 μ F, 40V
 W₃ = Resistor 63 Ω
 W₄ = Resistor 50 Ω
 W₅ = Resistor 82 Ω
 W₆ = Resistor 33 K Ω , 2W

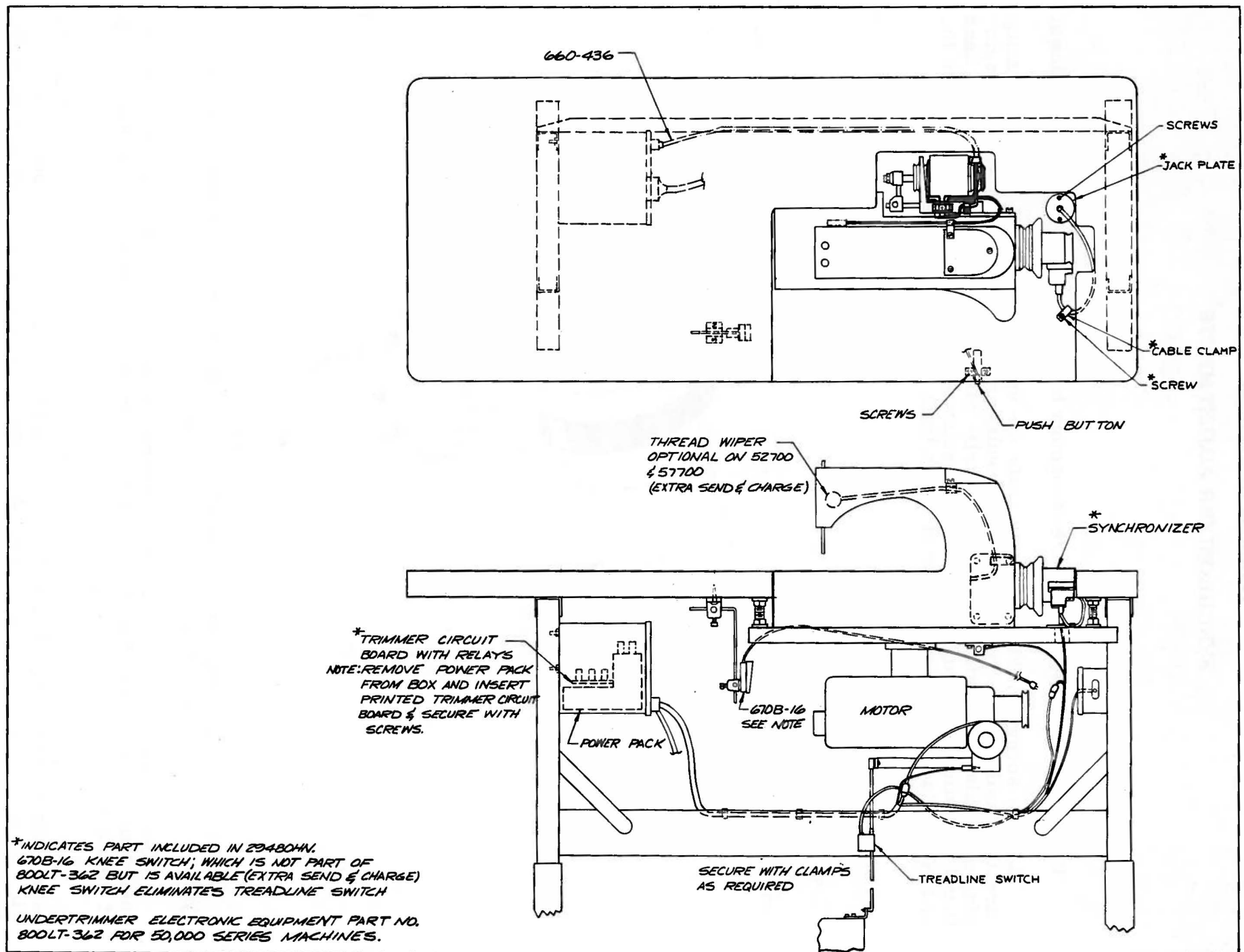
QUICK-STOP TROUBLESHOOTING

NOTE: If difficulties in needle positioning are encountered, check circuitry for the positioner on the motor control panel only.

Condition	Causes	Cures
Unit does not position	Blown fuse	Replace fuse
	Synchronizer plug not connected	Plug in synchronizer plug into the right socket of main motor control panel
	Synchronizer leads not connected to plug	Check leads continuity between brush holder and plug
Machine stops in up position only with treadle in rest position	Microswitch in clutch arm not opening	Turn the setscrew which is located in the clutch arm to the rear of the motor, in a clockwise direction until the machine stops needle down after sewing
Machine will not stop after sewing and continues to rotate at inching speed	Microswitch on right side of clutch arm not adjusted properly	Adjust screw on right side of clutch arm in a counterclockwise direction until machine stops, and then make one more turn
	Microswitch defective	Replace microswitch
Unit does not trim but positions up	Microswitch in clutch arm not closing	Turn screw located in clutch arm closest to front of main motor control panel counterclockwise until unit trims when heeling back after sewing
Solenoid does not energize	Blown fuse in auxiliary control panel	Replace fuse
	Synchronizer not adjusted properly	Re-adjust synchronizer per instructions
	Relay 3 not energizing due to bent contacts	Reshape contacts of Relay 3

CAUTION: Auxiliary control panel contains 220 V circuit.

INSTRUCTIONS
FOR
AMCO NEEDLE POSITIONER



Adjusting Instructions

SYNCHRONIZER ADJUSTMENTS

Before attaching the synchronizer assembly to the handwheel proceed as follows:

Loosen screw (5, Fig. 18) and rotate the up band (band #1) in the operating direction until the beginning of the black insulating barrier coincides with the beginning of the black insulating barrier of the trim band (band #4). Rotate the down band (band #2) until the beginning of its black insulating barrier is 1 1/2 inches from the end of the black insulating barrier of the up band (band #1). Tighten screw.

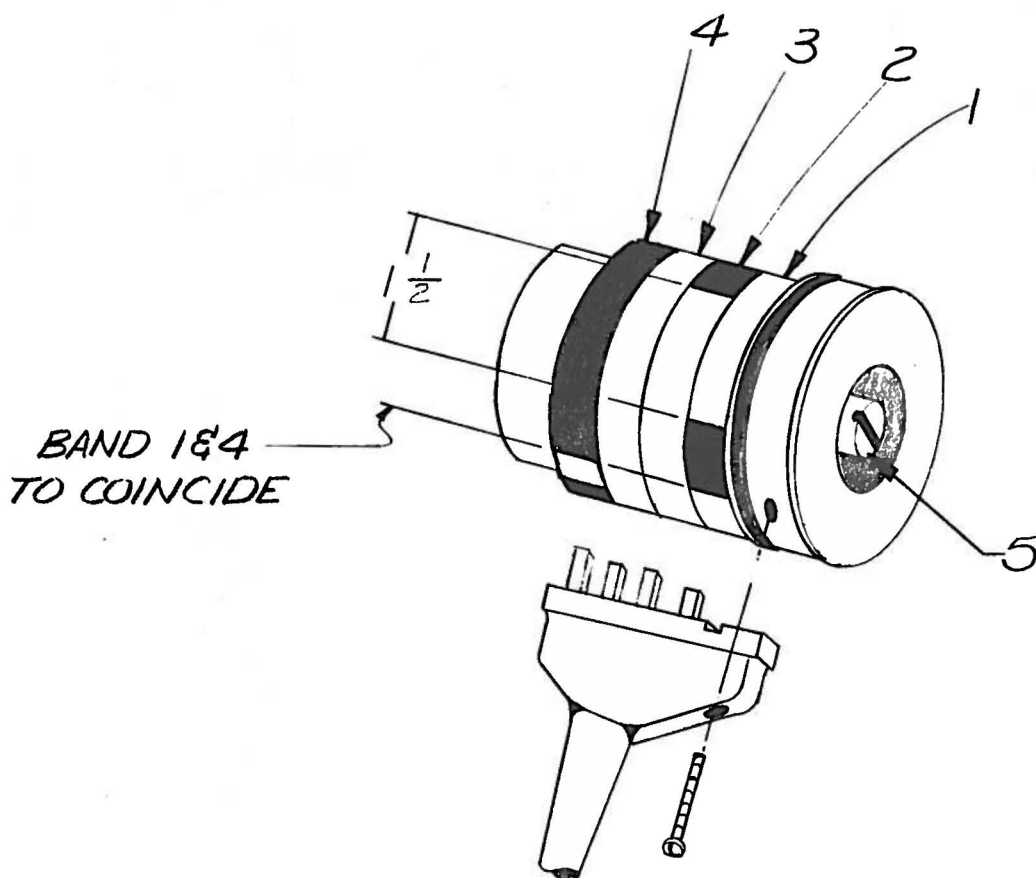


Fig. 18

CAUTION: Remove cutter solenoid plug from power pack when setting the synchronizer for correct up and down position.

Clamp synchronizer cord to table board and fasten synchronizer assembly to handwheel in such a way that with the treadle heeled the needle bar stops at the top of the stroke.

The first position (needle down) should position the needle 1/16 - 1/32 inch before its lowest point of travel. If this position is incorrect, loosen screw (5, Fig. 18) and rotate down band (band #2) in the desired direction, making sure the other bands do not rotate while making this adjustment.

Adjusting Instructions

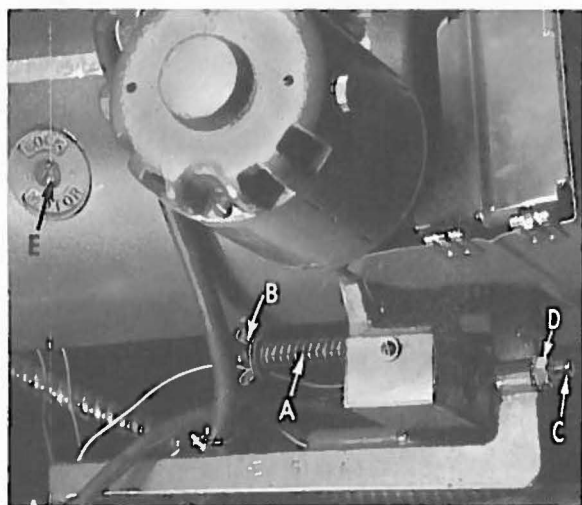


Fig. 19

ADJUSTING CLUTCH

- (a) Depress treadle unit until one click is heard, which indicates clutch arm switch is open.
- (b) Adjust clutch so that clutch arm has an additional $1/16$ to $1/8$ inch travel before clutch is engaged. Loosen lock screw (E, Fig. 19) 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 arm switch is closed or auxiliary motor running; one click must be heard before clutch is engaged.

TREADLINE SWITCH ADJUSTING

To adjust the length of the pitman rod (A, Fig. 20) 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.

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

CLUTCH ARM SWITCH ADJUSTMENT

- (a) Set needle in work.
- (b) Adjust clutch arm spring (A, Fig. 19) 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 by heeling back on treadle and loosen clutch arm switch adjusting screw (C), until there is no contact between it and the micro switch. Then tighten screw until needle positions up. Tighten nut (D) to maintain setting.

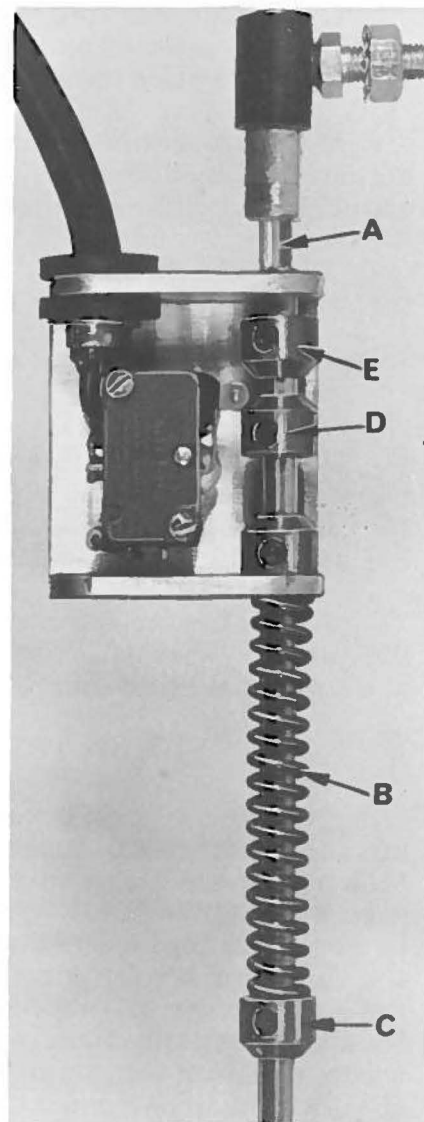


Fig. 20

Adjusting Instructions

TREADLINE SWITCH ADJUSTING (Continued)

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).

PUSHBUTTON FUNCTION

If the pushbutton, which is mounted to the table board, is depressed, the cutter circuit of the synchronizer is interrupted. Therefore, when treadle is heeled while the pushbutton is depressed, the needle will position up without trimming. This is a very important function.

EXAMPLE:

If the machine has stopped with the needle up after trimming and a new sewing operation is started and the needle entering the material should become unthreaded, this would require the operator to raise the needle to the up position for rethreading.

If the operator heels the treadle to obtain the needle up position, the knives actuate and by doing so lose the retained looper thread. This will result in a skipped stitch and requires rethreading of the looper.

To avoid this condition, depressing the pushbutton while heeling back on the treadle will position the needle up without actuating the knife mechanism.

INSTALLATION OF INCHING SWITCH

When installing inching switch, M 6665, be sure to remove jumper wire (A, Fig. 21) located between pin #2 and pin #3 on socket (B) before connecting the inching switch plug or it will not function properly.

Should the inching switch be removed at a later date, the jumper wire (A, Fig. 21) must be replaced or the needle positioning unit will not position up.

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 rated 5 AMP at 250 V. The 2 AMP fuse (A, Fig. 22) 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 cutter solenoid, thread wiper solenoid (30 VDC) and the relay coil control circuit (24 VDC).

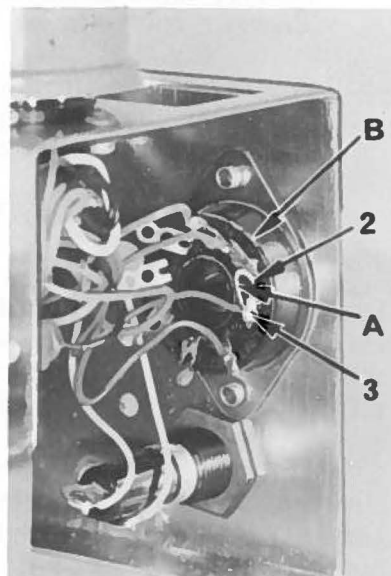


Fig. 21

Adjusting Instructions

POWER PACK CIRCUIT DESCRIPTION

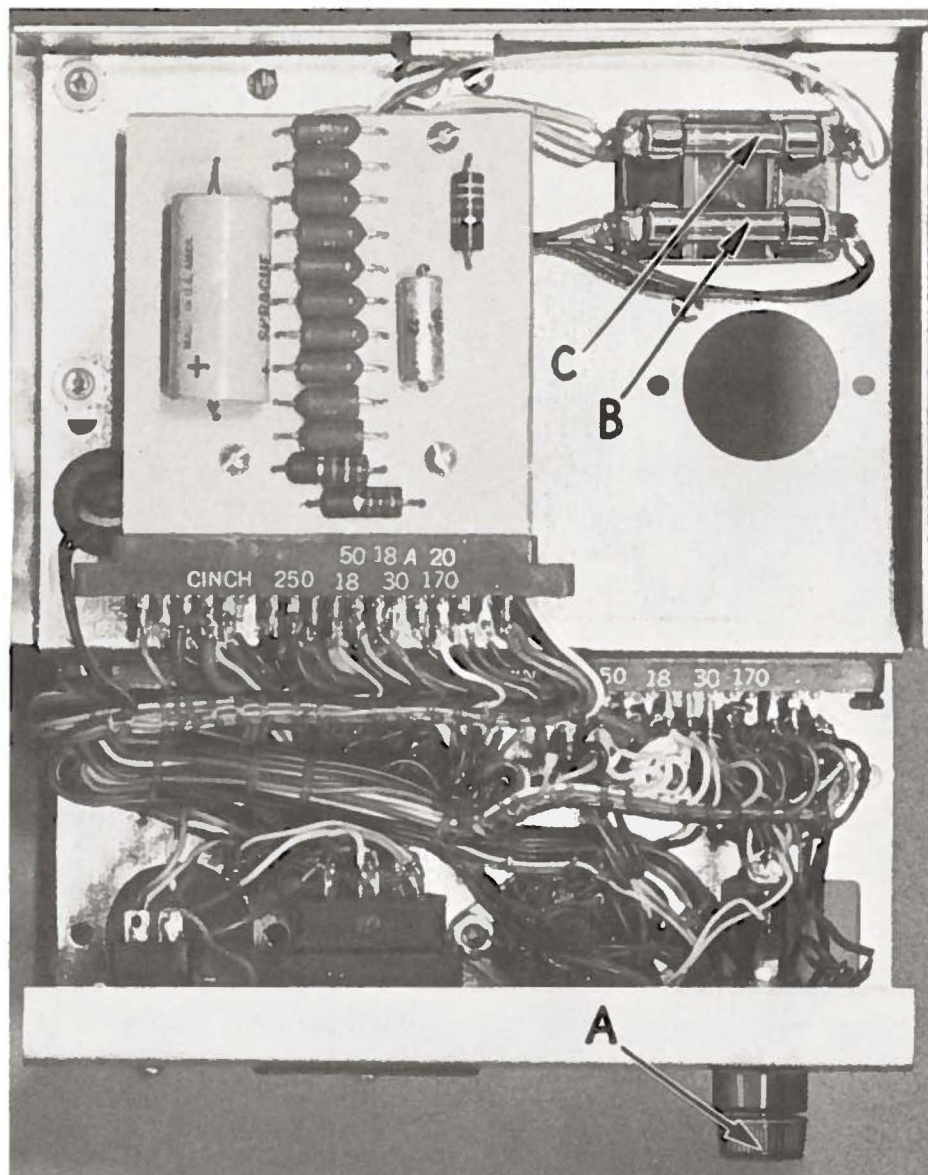


Fig. 22

If the clutch arm switch is closed, treadle in resting position, contacts #1 and #2 permit the 24 VDC to flow through the control circuit (indicated in red, Fig. 23). The current will flow from the two diodes of the 24 volt secondary of the transformer to contacts #1 and #2 of the clutch arm switch, to contacts #5 and #6 of Relay #3 to the synchronizer down band to the common band and coil of Relay #1 and Relay #6. When Relay #1 is energized, the green section of the control circuit (Fig. 23) is completed through contacts #5 and #4 of Relay #1, therefore, energizing Relay #2. As Relay #2 is energized, the auxiliary motor circuit supplying 220 VDC to the auxiliary positioning motor, indicated in yellow (Fig. 23), is completed. This rotates the machine in operating direction until the needle has reached its first stop-

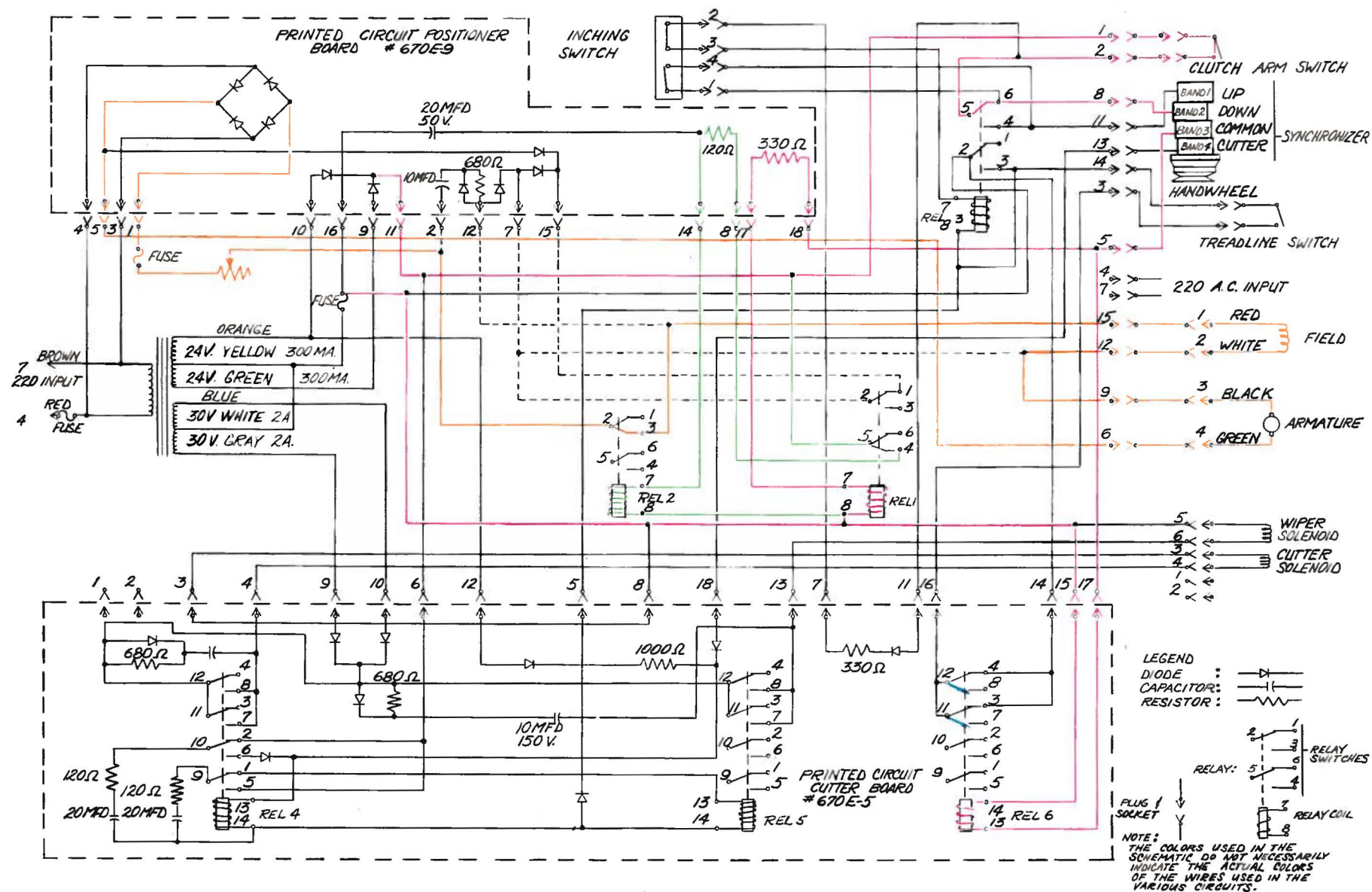


Fig.23

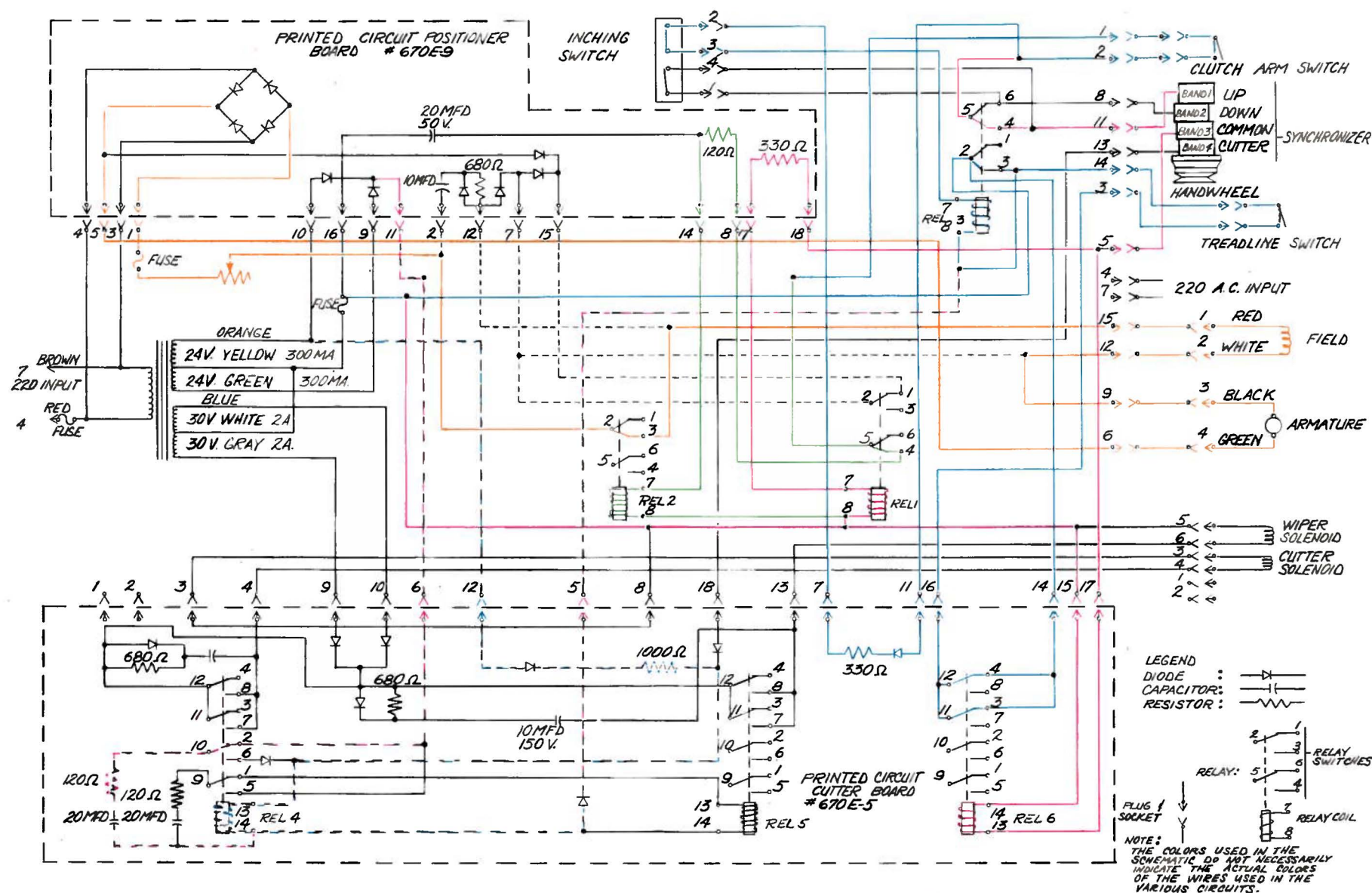


Fig. 24

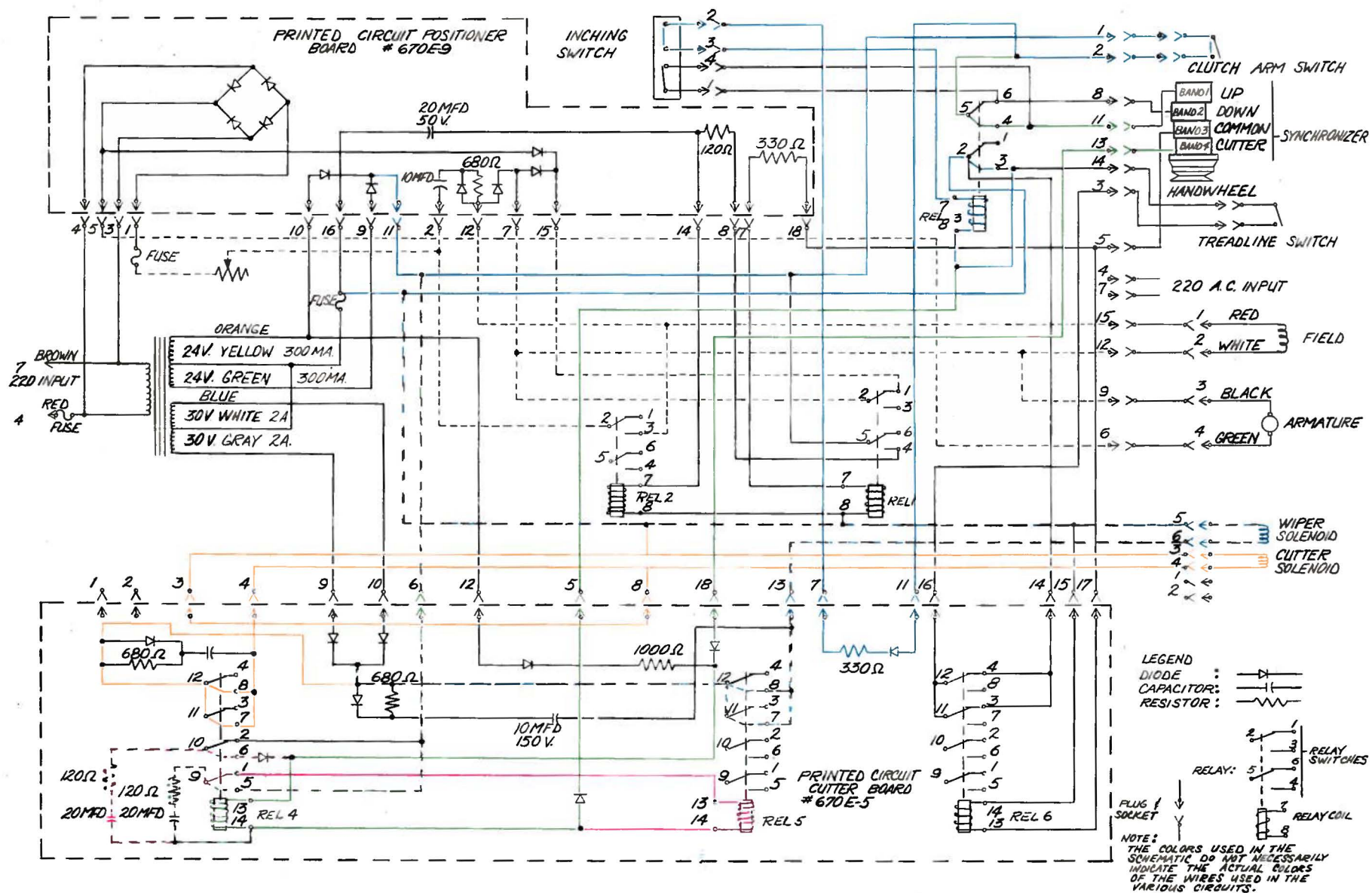
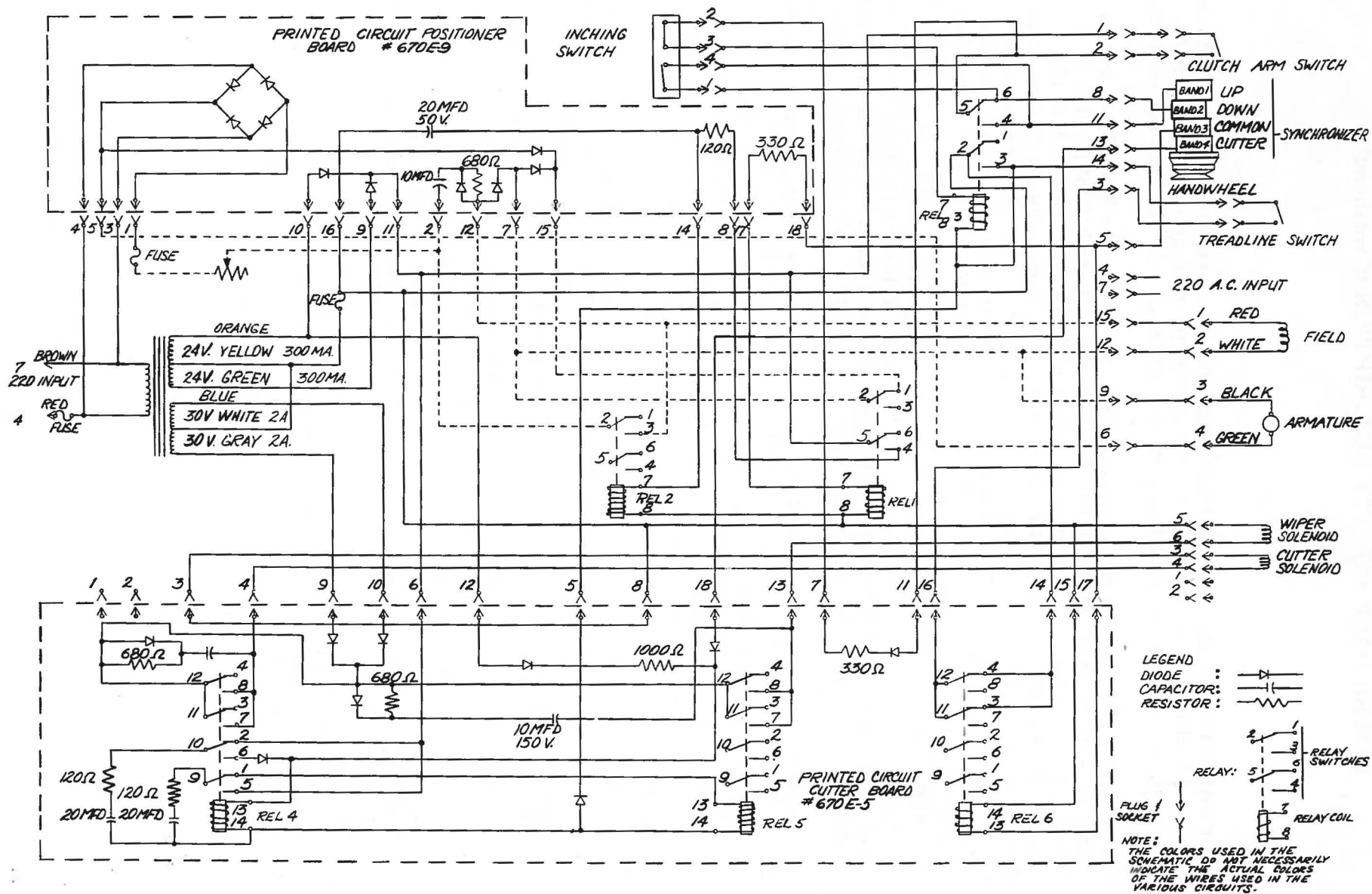


Fig. 25



Adjusting Instructions

POWER PACK CIRCUIT DESCRIPTION (Continued)

ping position (bottom of stroke). At this time, the synchronizer brush #2 (down band) contacts the insulating black barrier and opens the red and green control circuit. This, in turn, will open the auxiliary motor control circuit and cause it to stop.

When the treadle is heeled, contacts #14 and #3 on the treadline switch close permitting 24 VDC to flow through the control circuit indicated in blue (Fig. 24) to coil of Relay #3 and through the contacts #12 and #11 to #4 and #3 of the de-energized Relay #6. As the coil of Relay #3 is energized, the contacts #2 and #3 of Relay #3 supply the coil with 24 VDC even though the treadline switch is now opened. Therefore, Relay #3 stays energized until the contacts #1 and #2 of the clutch arm switch are opened. (Relay #3 is "self-locking"). Due to the self-locking feature of the Relay #3, a path to ground is obtained. The 20 MFD capacitor connected to contacts #2, #10, and #14 of Relay #4 is now charging (red dotted line, Fig. 24). A continuous flow of low current through the coil of Relay #4 is also obtained (blue dotted line, Fig. 24). This low current will aid the pull-in of Relay #4 when the trim band on the synchronizer is reached. Through a second set of points, contacts #5 and #4, in Relay #3 the current is supplied through the red control circuit (Fig. 24) to synchronizer brushes #1 (up) and #3 (common), thus energizing Relay coils #1 and #6. When Relay #1 is energized, the green control circuit (Fig. 24) is completed which, in turn, energizes Relay coil #2. Contacts within Relay #2 close supplying 220 VDC to drive the positioning motor (yellow circuit) until the needle bar is at its highest position. At this point, contact brush #1 of the synchronizer reaches the black insulating barrier and opens the auxiliary motor control circuit by opening the red control circuit which stops the positioning motor.

While the machine is rotating to the second position (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. 25) supplying 24 VDC to coil of Relay #4. As the coil of Relay #4 is energized, the power circuit for supplying 30 VDC to the cutting solenoid (yellow line, Fig. 25) is completed through contacts #12, #11, #8 and #7 within Relay #4. At the same time, the 20 MFD capacitor which was previously charged is connected across the coil of Relay #4 (red dotted line, Fig. 25). The other 20 MFD capacitor is now charging through contacts #5 and #9 of Relay #4 (green dotted line, Fig. 25). As soon as the brush #4 of the synchronizer contacts the black insulating barrier of the trimmer band, the green control circuit is opened and, thereby, removing the 24 VDC from Relay #4, but, at the same instance, the 20 MFD capacitor across the coil of Relay #4 begins to discharge through the coil holding it energized until the capacitor has discharged. After the capacitor has discharged, Relay #4 is de-energized and opens the yellow (cutter solenoid) control circuit and connects the 20 MFD capacitor which was charging while Relay #4 was energized across the coil of Relay #5 (red circuit, Fig. 25). Relay #5 becomes energized and connects the thread wiper solenoid power 30 VDC (blue dotted line, Fig. 25) until the capacitor has discharged through the coil of Relay #5 (red circuit, Fig. 25). After the capacitor has discharged, Relay #5 opens the blue dotted circuit and the thread wiper returns.

If the treadline switch should be closed before the contacts #1 and #2 on the clutch arm switch are closed, Relay #6 will prevent the unit from stopping up without trimming. As the treadle is heeled, contacts #1 and #2 of the clutch arm switch close energizing Relay coil #6 directly. There is no restriction to current flowing to coil of Relay #6. This will open the blue circuit (Fig. 23 and Fig. 24) within con-

Adjusting Instructions

POWER PACK CIRCUIT DESCRIPTION (Continued)

tacts #12 and #11 to #4 and #3 of Relay #6 thus preventing the Relay coil #3 from being energized. The reason for the slower pull-in of Relay #3 is the 330 OHM resistor added in series with the relay coil (blue circuit, Fig. 24). This resistor results in a decreased current flow (restricted).

After the machine has positioned down and synchronizer brush #2 has contacted the black insulation barrier, Relay #6 is de-energized closing the blue circuit of Relay #3 (Fig. 24). If the treadline switch is now closed the machine will position up and trim.

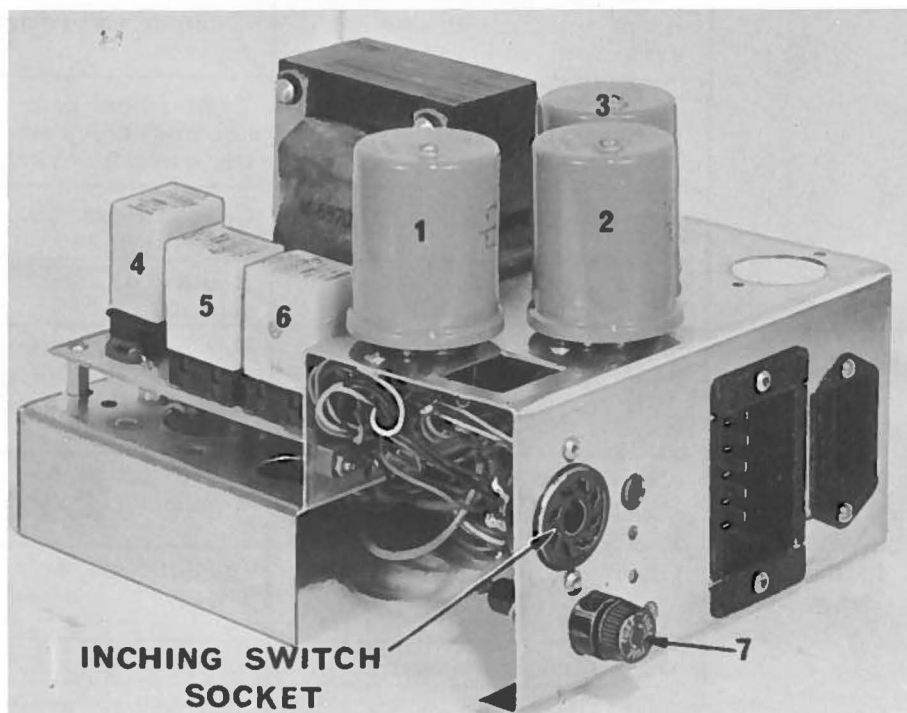


Fig. 26

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. 26) and square relay #6. All the trimmer circuitry is on the trimmer board 670 E-5 and square relay #4 and #5.

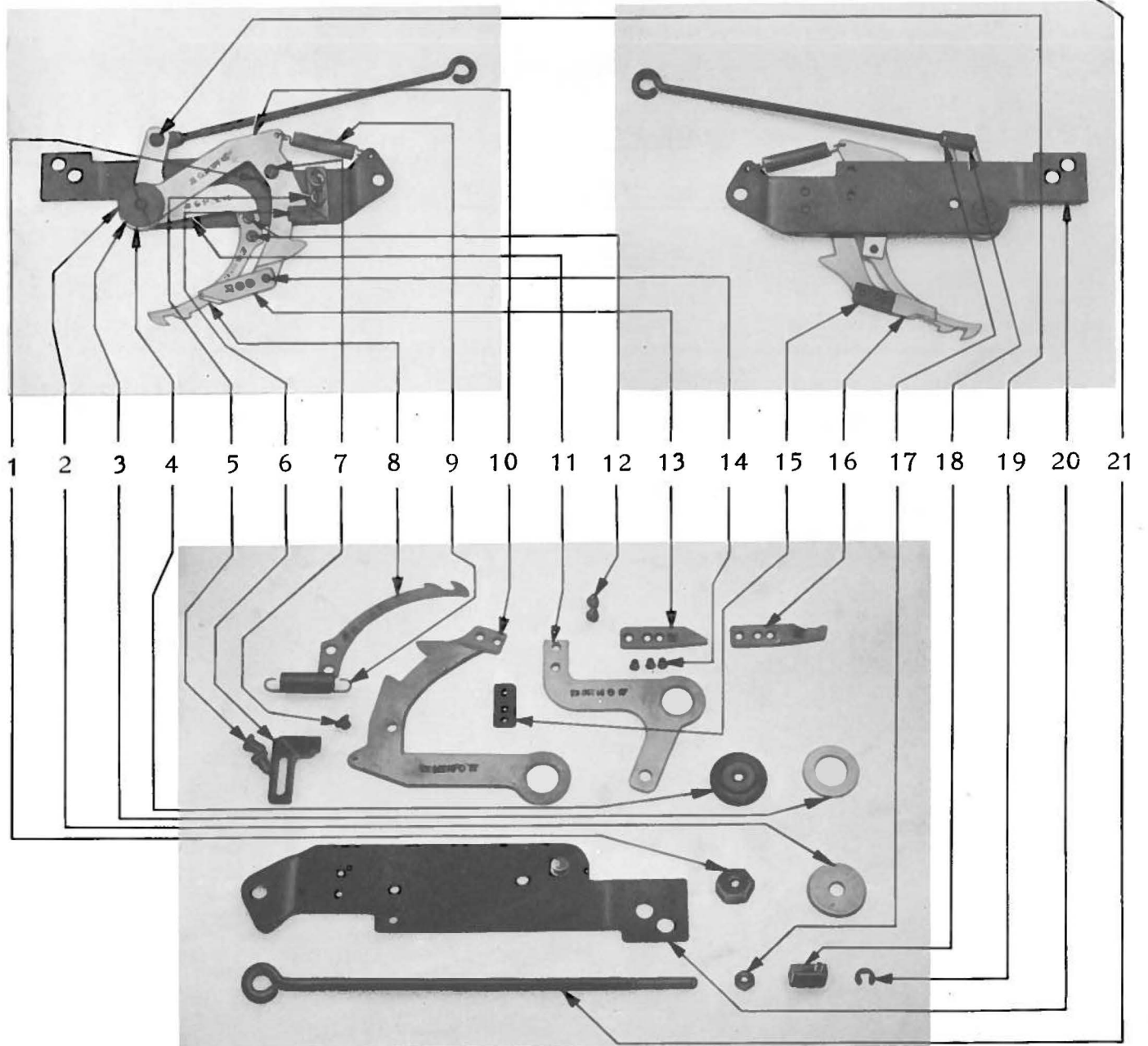
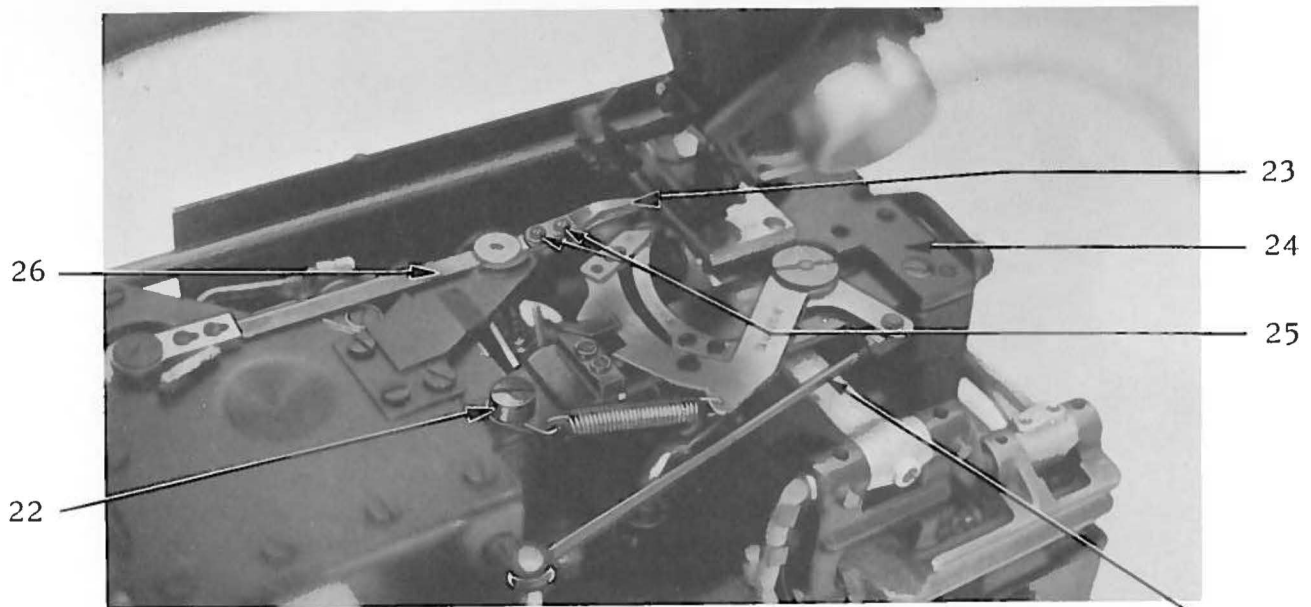
TYPICAL NEEDLE POSITIONER PROBLEMS

Condition	Causes	Cures
Unit does not position	Bad fuse	Replace fuse (No. 7 Fig. 26)
	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
	Bad relays	Check relays (Nos. 1 & 2, Fig. 26) 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. fusetron
	Operator fluttering treadle excessively	Caution operator
Unit keeps on stitching at an inching speed	Bad relay	Check relay (No. 1, Fig. 26) 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 hand-wheel	Tighten synchronizer on hand-wheel
	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
Unit 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. 26) 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. 26) 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. 26) 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. 26) 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

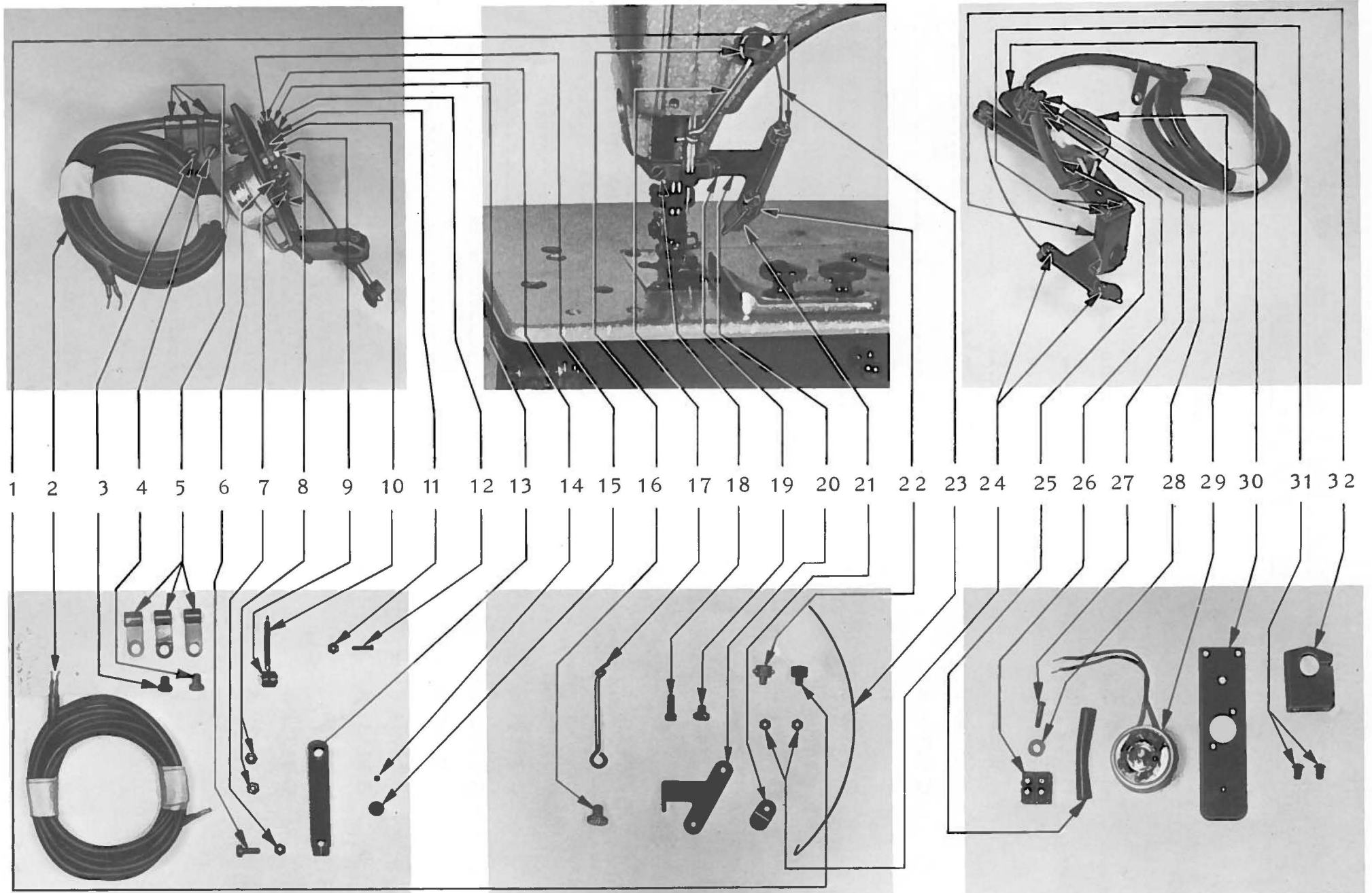
PICTURES AND DESCRIPTION
OF PARTS
FOR MACHINES WITH
" KLIPP-IT "



SEVERING DEVICE COMPLETE NO. G 29480 KE

FROM REF. No. 1 TO 22

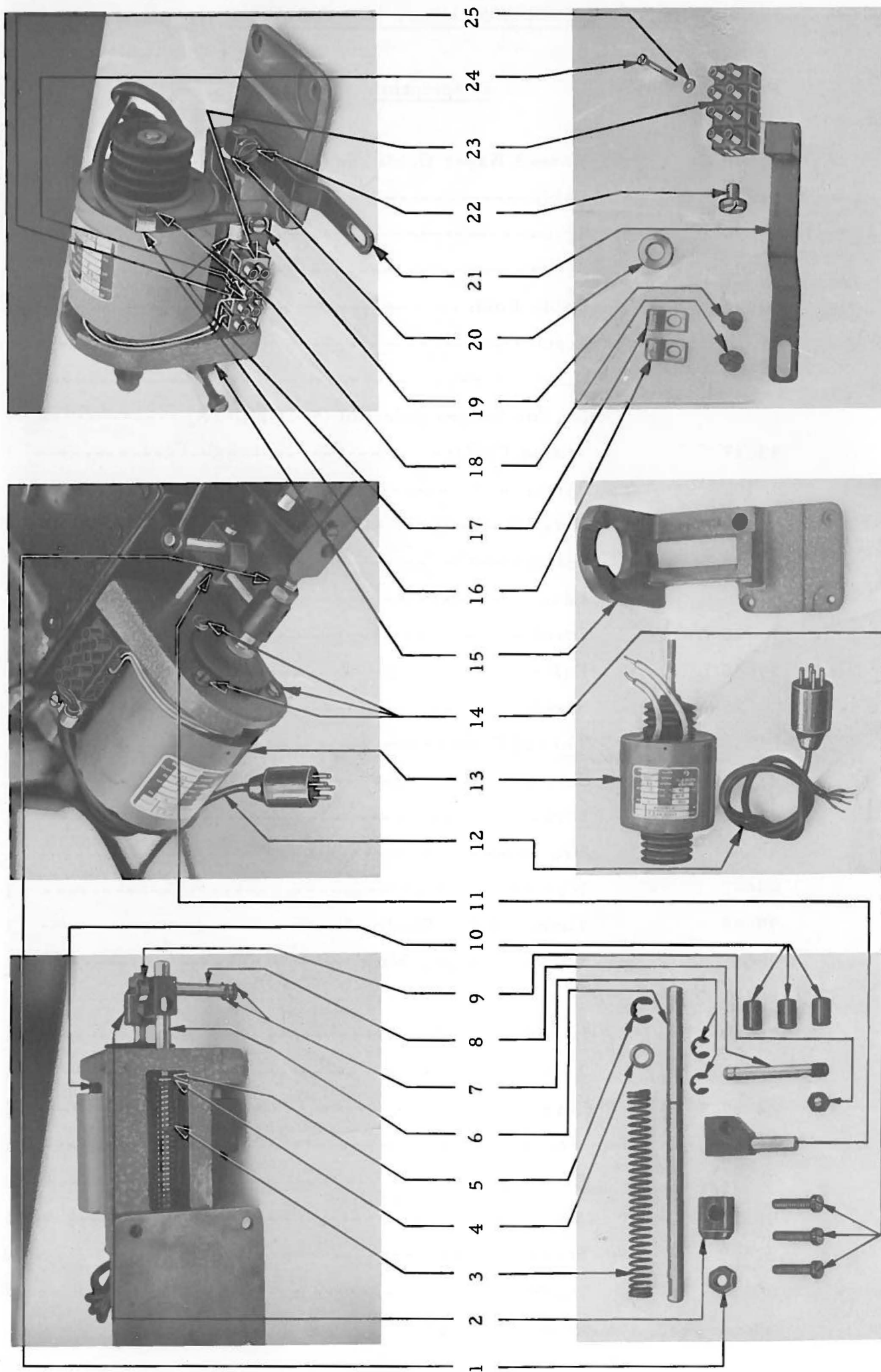
<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Amt. Req.</u>
1	G 51373 KE	Hexagonal stop plate -----	1
2	G 51368 KE	Washer -----	1
3	G 51367 KE	Washer -----	1
4	99314	Nut -----	1
5	87 U	Screw -----	2
6	G 51374 KE	Stop -----	1
7	187 B	Screw -----	1
8	G 51349 KE	Lower Knife -----	1
9	96705	Spring -----	1
10	G 51371 KE	Upper Knife Carrier -----	1
11	G 51350 KE	Lower Knife Carrier -----	1
12	G 22561 A	Screw -----	2
13	G 51370 KE	Upper Knife -----	1
14	99316	Screw -----	3
15	G 51351 KE	Counter Part -----	1
16	G 51363 KD	Plate Spring -----	1
17	43443 Q	Nut -----	1
18	G 51352 KE	Connecting Part -----	1
19	G 660-210	Locking Ring -----	1
20	G 51372 KE	Support Plate -----	1
21	G 51337 KE	Connecting Rod -----	1
22	22839	Screw -----	1
23	G 51351 S	Loop Retainer -----	1
24	G 51280 A	Throat Plate Support -----	1
25	604	Screw -----	2
26	G 51351 EA	Support, for Loop Retainer -----	1



THREAD WIPER ASSEMBLY NO. G 29906 E

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Amt. Req.</u>
1	99648 C	Thread Wiper Guide, upper -----	1
2	G 21233 HE	Cable-----	1
3	94	Screw-----	1
4	92 A	Screw-----	1
5	99654	Cable Holder -----	3
6	99318	Screw-----	1
7	43443 Q	Nut-----	1
8		Nut for Rotary Solenoid (5-40 NC-2A) -----	1
9	99647	Thrust Collar-----	1
10	96707	Spring-----	1
11	60078 Z	Nut-----	1
12	22738 D	Screw-----	1
13	99646 A	Lever-----	1
14	28 B	Screw-----	1
15	99646 B	Ball-----	1
16 x	25 S	Screw-----	1
17 x	G 51358 KA	Thread Guide-----	1
18	22729	Screw-----	1
19	22585 C	Screw-----	1
20	99651	Bracket-----	1
21	99652	Washer-----	1
22	99648	Thread Wiper Guide, lower -----	1
23	99653	Thread Wiper Wire-----	1
24	43443 Q	Nut-----	2
25	1310109	Isulating-Tube-----	1
26	998-59	Terminal -----	1
27	22767 A	Screw-----	1
28	96150	Washer-----	1
29	998-243	Rotating Solenoid-----	1
30	99650	Mounting Bracket-----	1
31	22849 A	Screw-----	2
32	99649	Holder-----	1

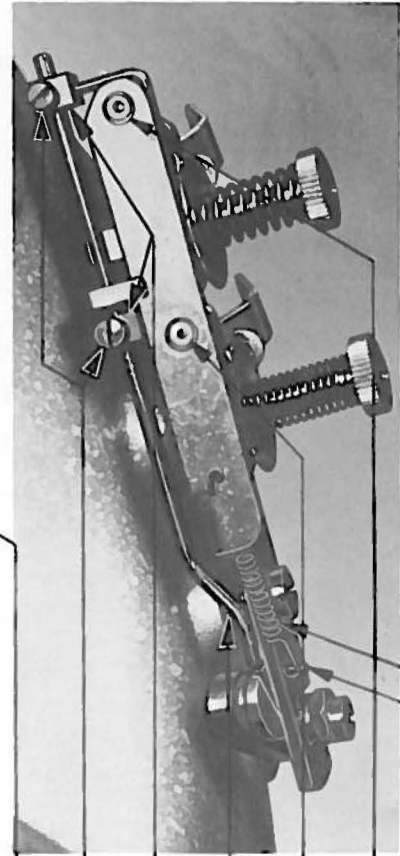
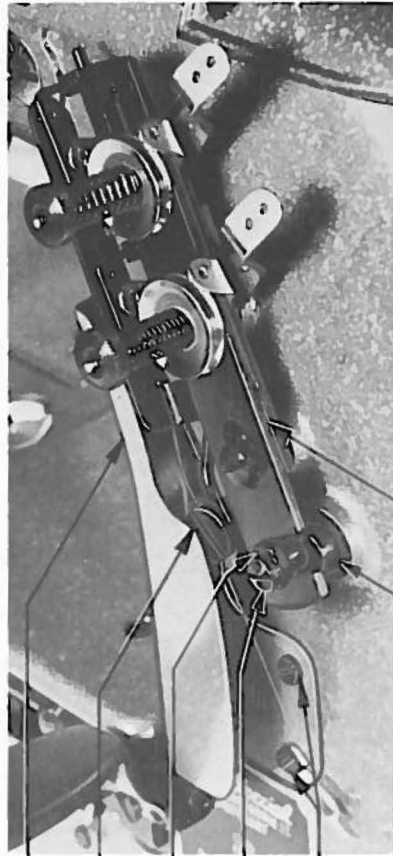
x These parts are not included in No. G 29906 E



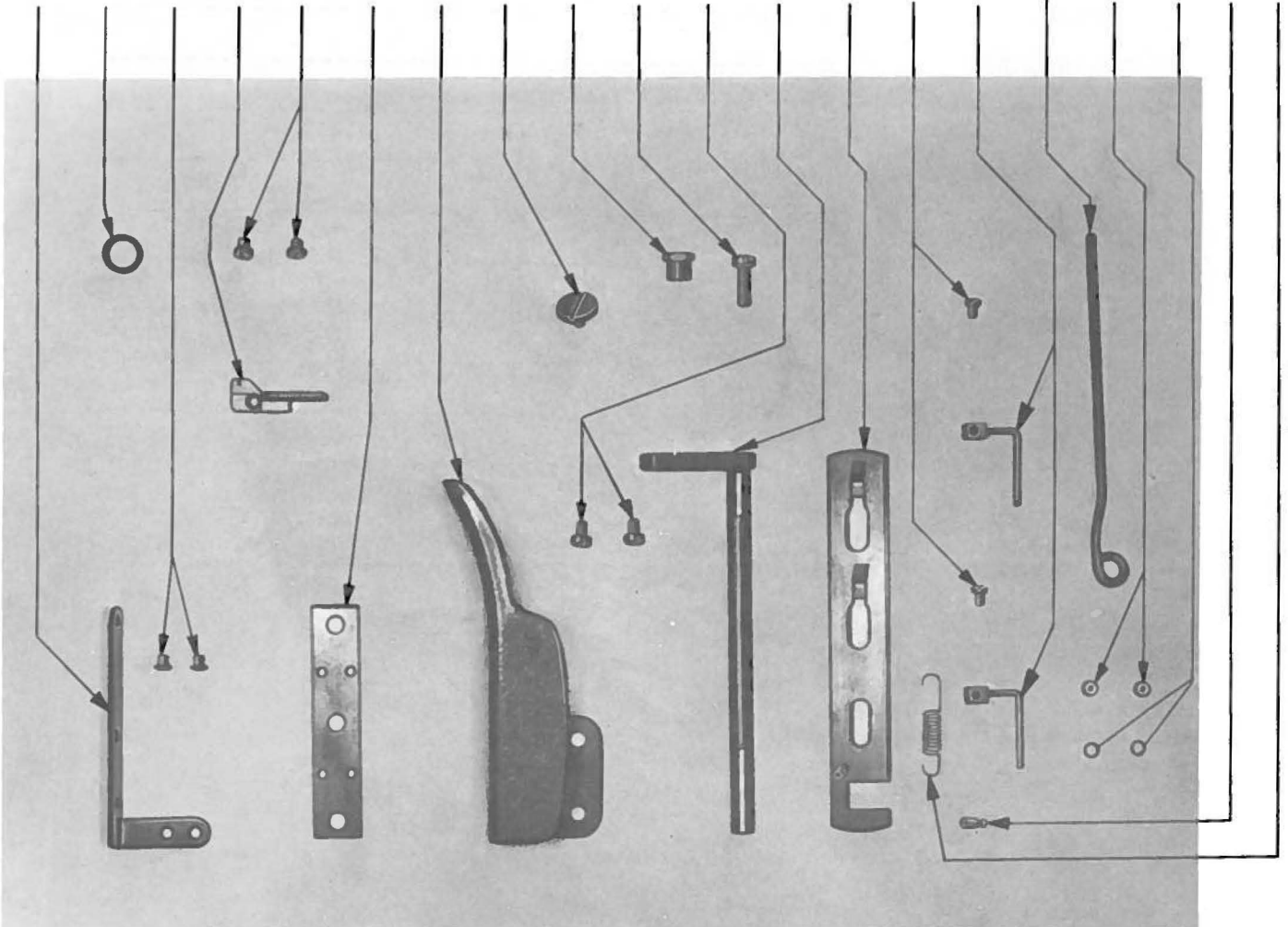
SOLENOID DRIVE COMPLETE NO. G 21233 BL

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Amt. Req.</u>
1		Nut M 8-----	1
2	99616	Connecting -----	1
3	97005	Presser Spring-----	1
4	41332 J	Washer-----	1
5	96276	Retaining Ring-----	1
6	99613	Shaft-----	1
7	96275	Retaining Ring-----	2
8	99619	Span Screw-----	1
9	55235 E	Nut-----	1
10	99617	Bushing-----	3
11	99614	Rock Shaft Connecting-----	1
12 x	660-436	Solenoid Harness-----	1
13	998-306	Solenoid-----	1
14	95168	Screw-----	3
15	G 52882 KE	Base-----	1
16 x	G 21233 BG	Cable Holder-----	1
17 x	G 21233 D-4	Cable Holder-----	1
18 x	95169	Screw-----	1
19 x	90	Screw-----	1
20	99615	Washer-----	1
21	99621	Lever-----	1
22	25 S	Screw-----	1
23	22734 A	Screw-----	1
24	96150	Washer-----	1
25	998-304	Terminal-----	1

x These parts are not included in No. G 21233 BL.

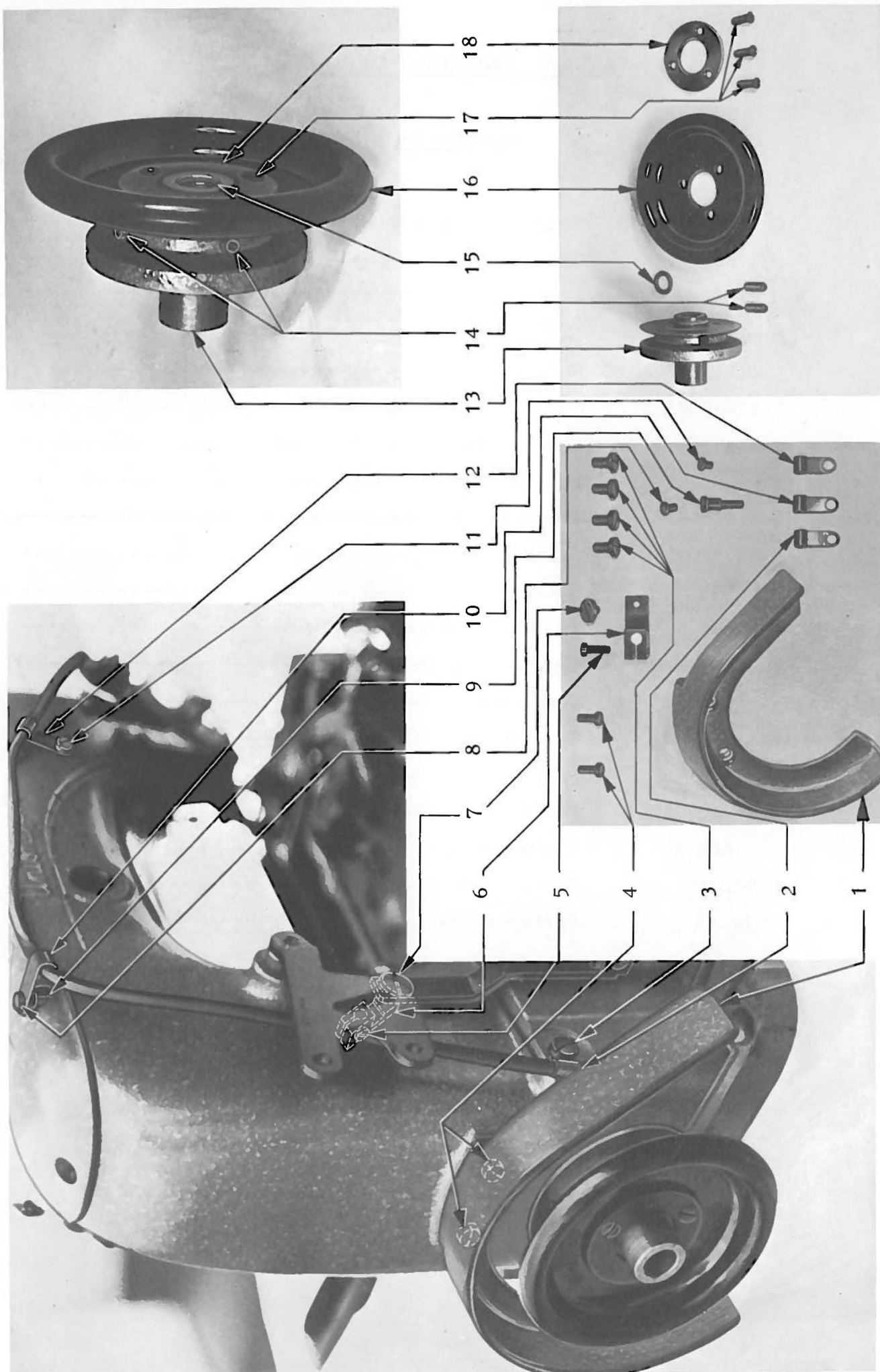


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



THREAD TENSION PARTS

<u>Ref.</u> <u>No.</u>	<u>Part</u> <u>No.</u>	<u>Description</u>	<u>Amt.</u> <u>Req.</u>
1	G 51292 KE	Tension Thread Eyelet -----	1
2	99622	Collar-----	1
3	222 D	Screw-----	2
4	G 51335 KE	Guide-----	1
5	22513	Screw-----	2
6	G 52892 KE	Tension Post Support-----	1
7	G 51291 A	Looper Thread Guard-----	1
8	99296	Screw-----	1
9	G 51346 KE	Eccentric-----	1
10	22757	Screw-----	1
11	98 A	Screw-----	2
12	G 21657 W	Tension Release and Lifter-----	1
13	G 21657 KA-3	Tension Disc Separator-----	1
14	77 A	Screw-----	2
15	G 51358 KE	Thread Pull-off Hook-----	2
16	G 51392 KE	Pull-off Rod-----	1
17	668-25	Eyelet-----	2
18	668-28	Locking Ring-----	2
19	96826	Pin-----	1
20	96711	Spring-----	1



HANDWHEEL, BELT GUARD, PULLEY HUB AND MISCELLANEOUS PARTS

<u>Ref.</u> <u>No.</u>	<u>Part</u> <u>No.</u>	<u>Description</u>	<u>Amt.</u> <u>Req.</u>
1	B 21375 AH	Belt Guard-----	1
2	99654	Cable Holder-----	1
3	22548	Screw-----	4
4	93	Screw-----	2
5	22596	Screw -----	1
6	99620	Lever-----	1
7	99296	Screw-----	1
8	22570	Screw -----	1
9	52782 C	Screw-----	1
10	99654	Cable Holder-----	1
11	92 A	Screw -----	1
12	99654	Cable Holder-----	1
13	31121 A	Pulley Hub-----	1
14	22894 G	Screw-----	2
15	660-202	Seal-Ring-----	1
16	61321 J	Handwheel -----	1
17	22574	Screw-----	3
18	61321 L	Washer -----	1

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