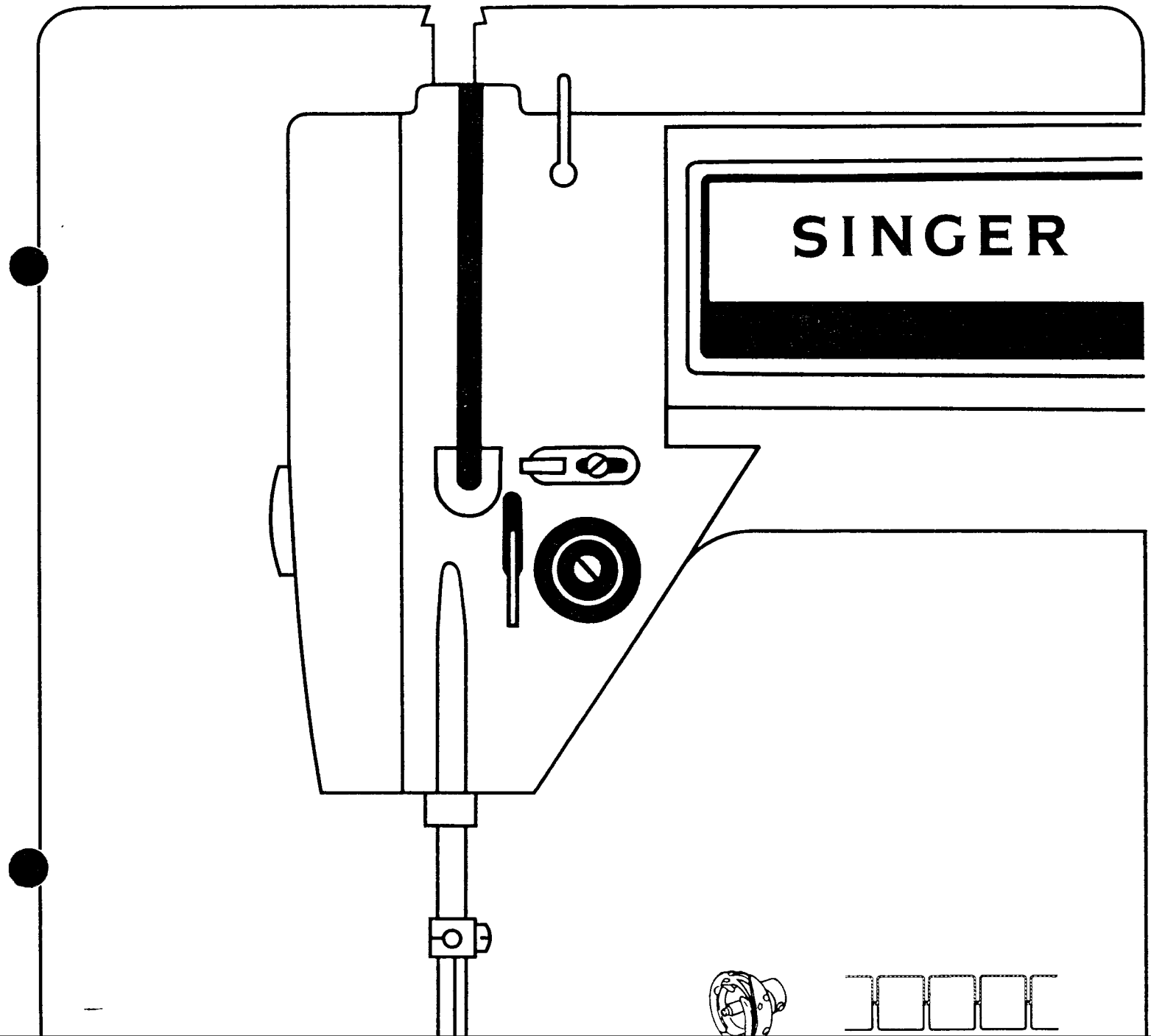
SINGER*

591/601 Service Manual



5. INSTRUCTIONS FOR UTT MACHINES

1) UNDERBED THREAD TRIMMER DEVICE

PRINCIPAL PARTS

DRIVE SYSTEM OF THREAD TRIMMER

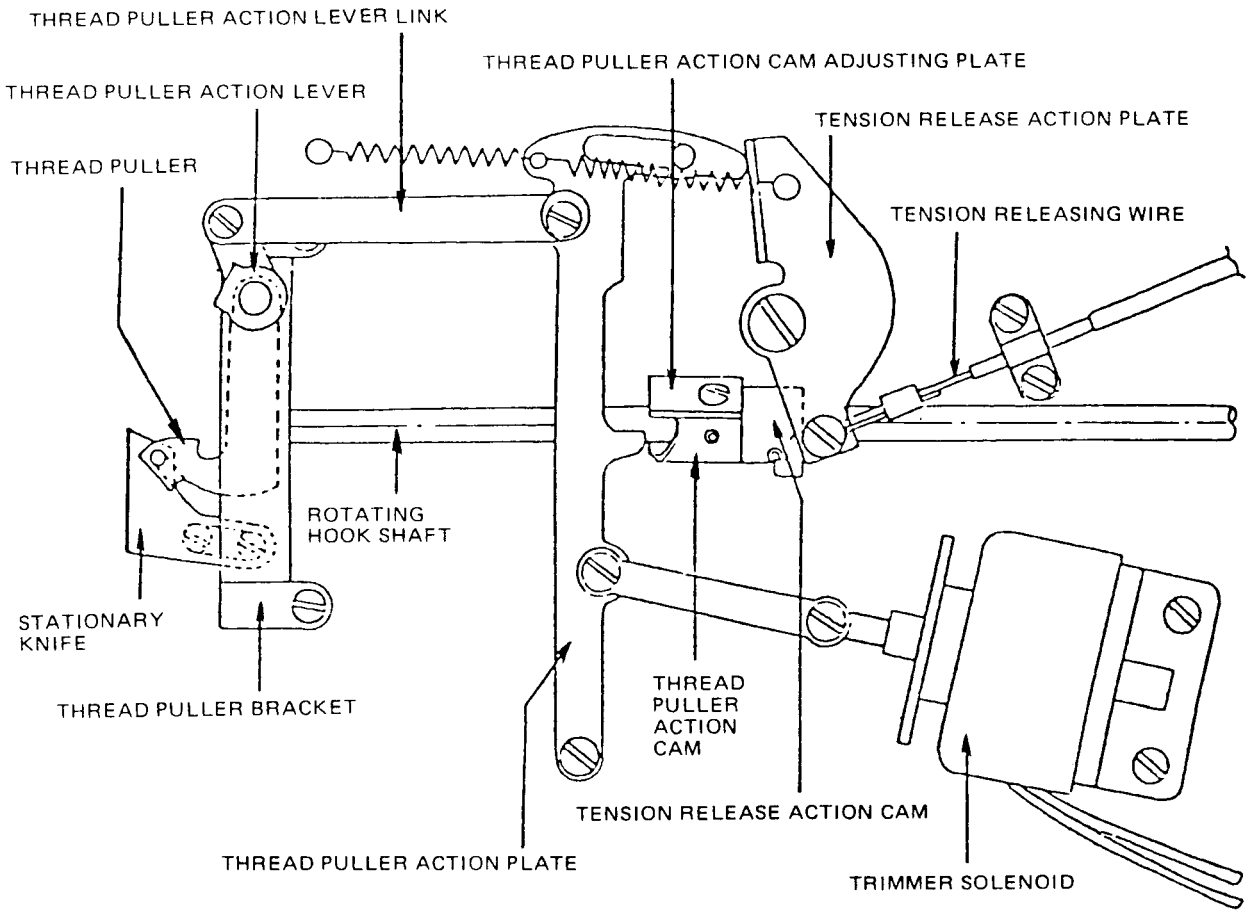


Fig. 52

PULLING AND TRIMMING UNIT

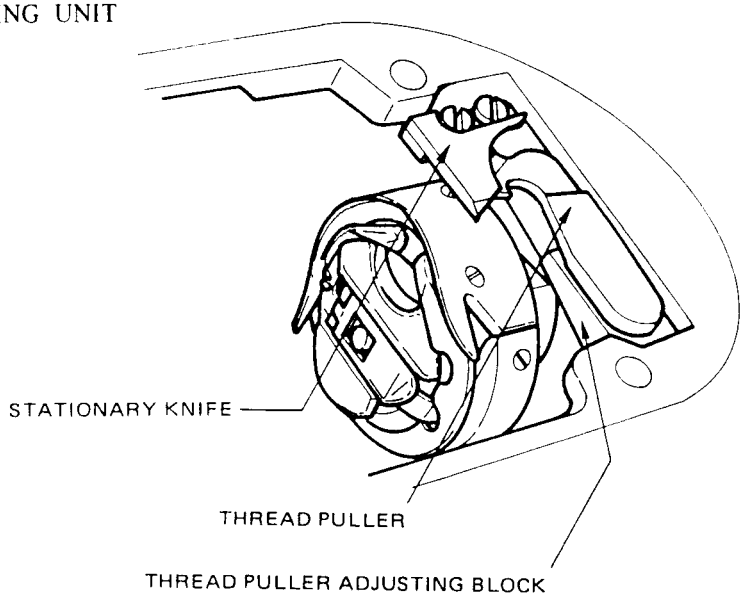


Fig. 53

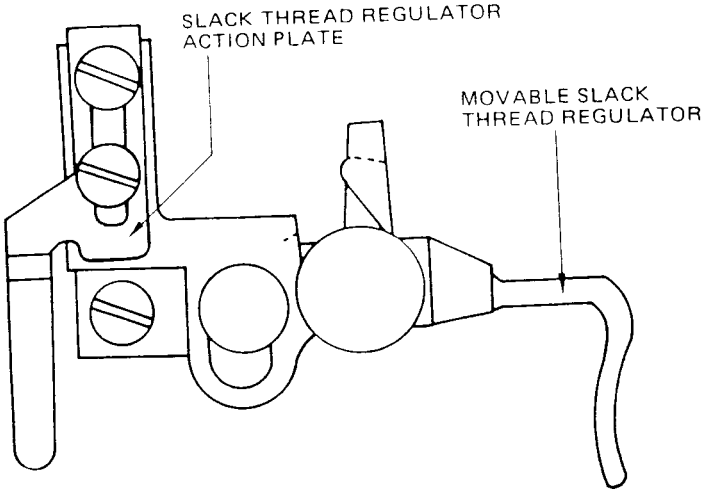


Fig. 54

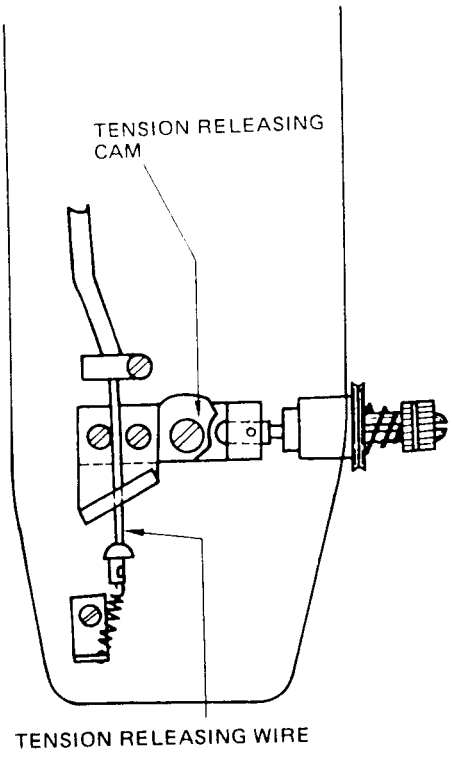


Fig. 55

TRIMMING OPERATION

1. When the foot treadle is returned to its neutral position upon completion of the sewing cycle, the needle bar stops approximately 3mm (.118") above the lower dead point on its upward stroke (Fig. 56, hook point in the loop of needle thread) when the sensor plate Ⓐ reaches a point shown in Fig. 57.

2. Heeling the foot treadle will start the machine to run at the trimming speed (200 r.p.m.).

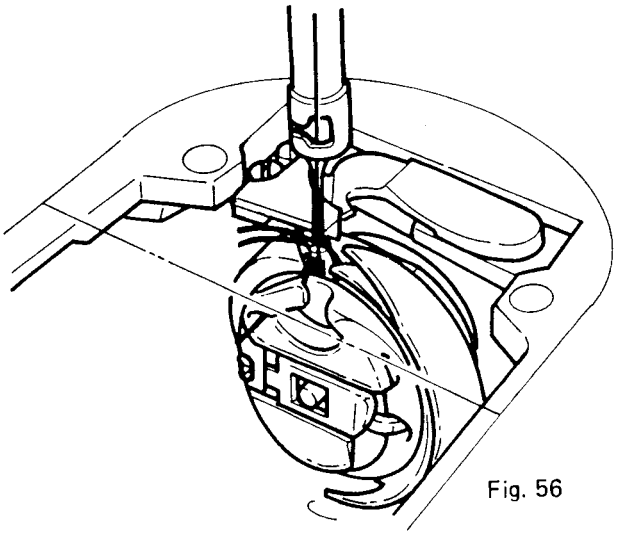


Fig. 56

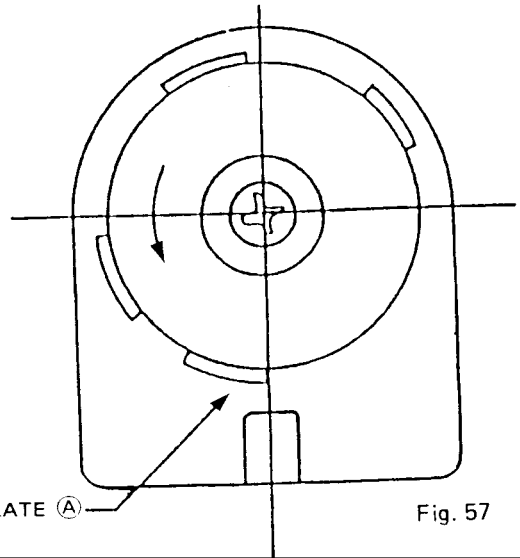


Fig. 57

3. The trimmer solenoid is energized when the sensor plate Ⓑ reaches a point shown in Fig. 58.

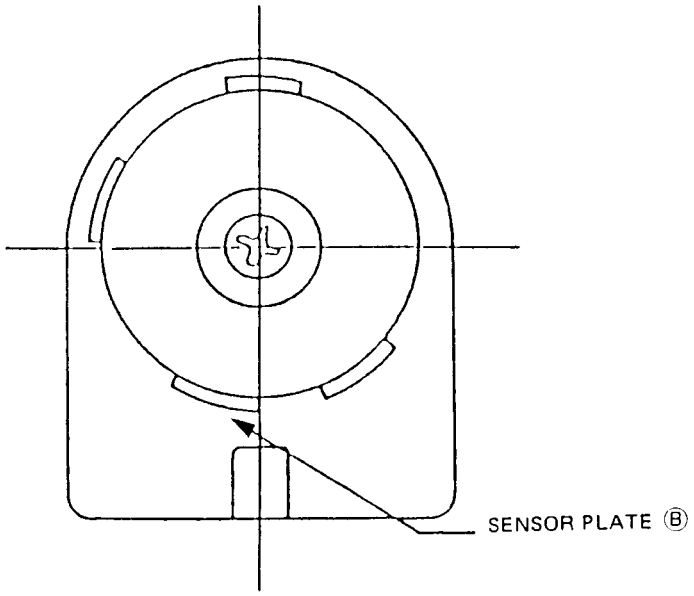


Fig. 58

4. When the cam follower on the thread puller action plate slips into the recessed portion of the thread puller action cam adjusting plate, the thread puller is activated to move through the loop (Fig. 59) to a point shown in solid line in Fig. 60, and the needle and bobbin threads are positioned as shown also in Fig. 60. Simultaneously, the thread puller action plate pushes the tension release action plate making its pin ride on the tension release action cam. Immediately when the pin rides on the tension release action cam, the electronic command relayed from the sensor plate Ⓒ (Fig. 61) cuts off the current supply to the trimmer solenoid. The above motion makes the tension releasing cam rotate until just before the tension discs are released.

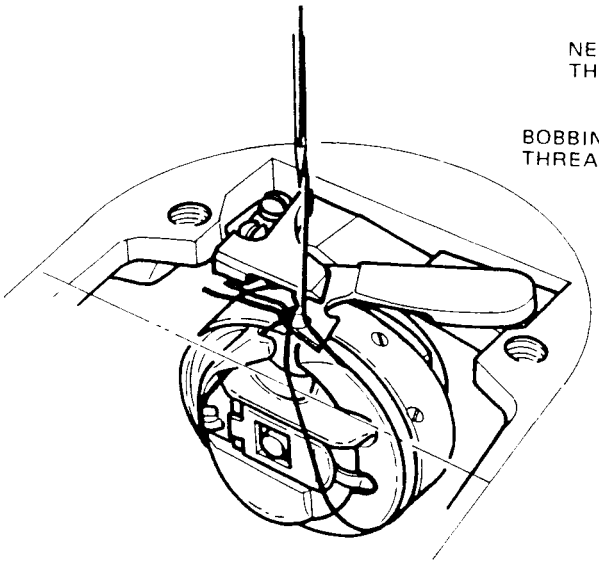


Fig. 59

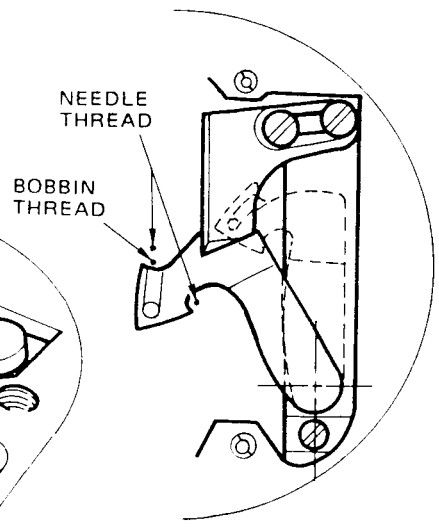


Fig. 60

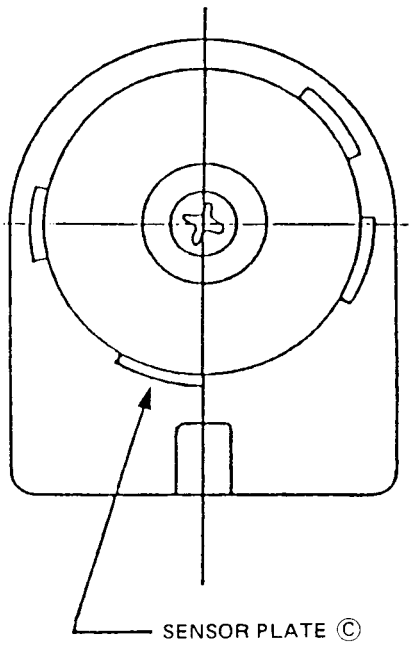


Fig. 61

5. As the needle thread is cast off the rotating hook, it catches on the hook portion of the thread puller. (Fig. 62)

6. The tension release action plate pin reaches the inclination on the tension release action cam and start releasing the tension discs immediately after the needle thread catches on the thread puller.

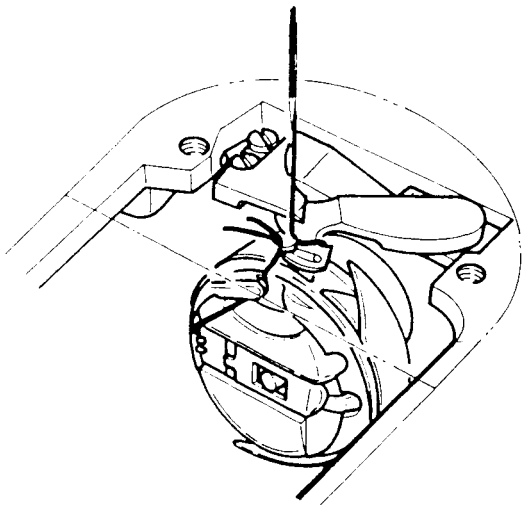


Fig. 62

7. While the above takes place, the cam follower on the thread puller action plate reaches the inclination on thread puller action cam and the thread puller begins to pull the bobbin and needle threads toward the stationary knife.

8. The bobbin and needle threads are severed when the cutting edge of the thread puller closes in against the cutting edge of the stationary knife. (Figs. 63 and 64)

9. When the threads are trimmed, the spring biased tension release action plate moves back to its rest position disengaging its pin from the tension release action cam and thus complete its function of releasing and holding the needle thread tension released.

10. The trimmer and tension releasing mechanisms return to their rest positions upon completion of the trimming operation and the machine stops in the upper needle position when the sensor plate Ⓓ reaches a point shown in Fig. 65.

11. Upon completion of the trimming operation, the thread wiper makes a swivelling movement to place the needle thread in proper position for starting the next sewing operation.

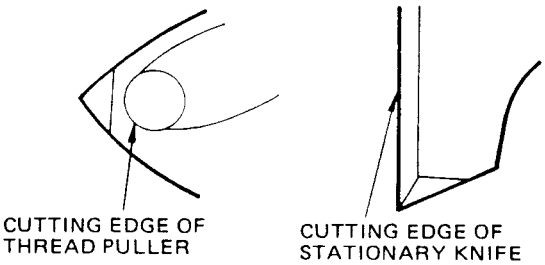


Fig 63

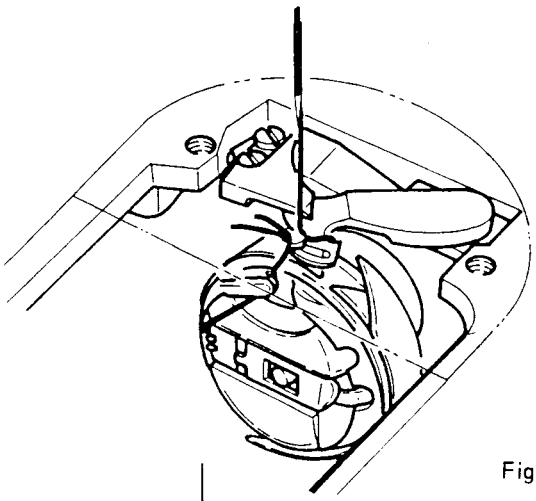
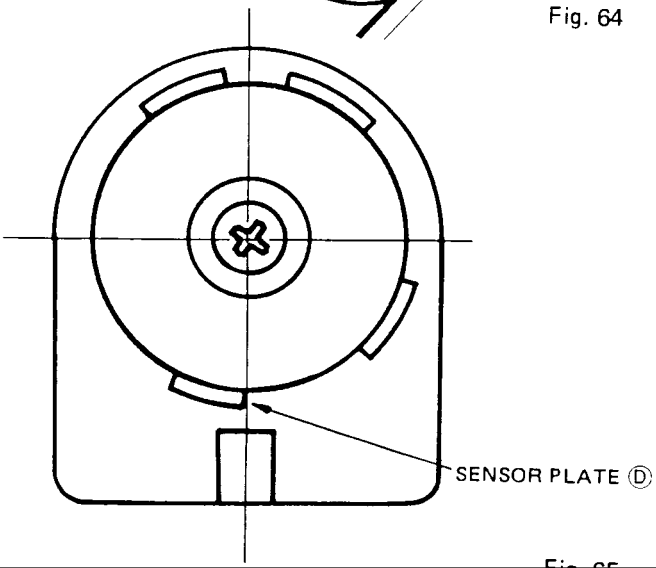


Fig. 64



SETTING AND TIMING

When checking the operation of the trimmer mechanism by manual actuation of the mechanisms.

a. Be sure to turn machine pulley over toward front of machine.

b. Push thread puller action plate toward cam when take-up lever is almost at its lower dead point.

NOTE: The thread puller may strike the needle and damage itself and the needle unless the thread puller action plate is pushed toward the cam as described above since the rotating hook shaft makes two revolutions against one cycle of the needle bar.

Be sure to check that the machine is correctly adjusted before making adjustments to the trimmer mechanism.

Check and adjust the trimmer mechanism in the order instructed in this manual since it is interlocked with many other area.

ADJUSTING NEEDLE STOP POSITION

When checking and making adjustment of needle stop positions, be sure to disconnect the trimmer and wiper connectors from the control box.

Needle Stop Positions

a. Lower Needle Position

The lower needle position is approximately 3mm (.118") above the lower dead point of the needle on its upward stroke. This 1st position does not call for absolute accuracy and minor adjustments may be made if the threads cannot be properly trimmed due to skip stitching.

b. Upper Needle Position

The upper needle position of "BD, BF, GD and GF" varieties 591D200/210/215/240, 591C200/210/240 and 601D100 machines is approximately 1mm (.039") before the take-up lever reaches its upper dead point and the upper needle position of "BD, BF, GD and GF" varieties 591D300/310/315 and 591D318BD/BF machines is when the take-up lever is at its upper dead point.

All sensors are correctly timed and set before leaving the factory. If, however, this timing or setting has been disturbed and retiming or resetting becomes necessary, adjust by correctly positioning the sensor plates.

1. The positions of the sensor plates (for upper and lower needle positions and for controlling the trimmer solenoid) in relation to the sensor set screw A should be as shown in Fig. 66. To adjust the position of a sensor plate, loosen screw on right end of the sensor and turn sensor plate as required, then tighten the screw.

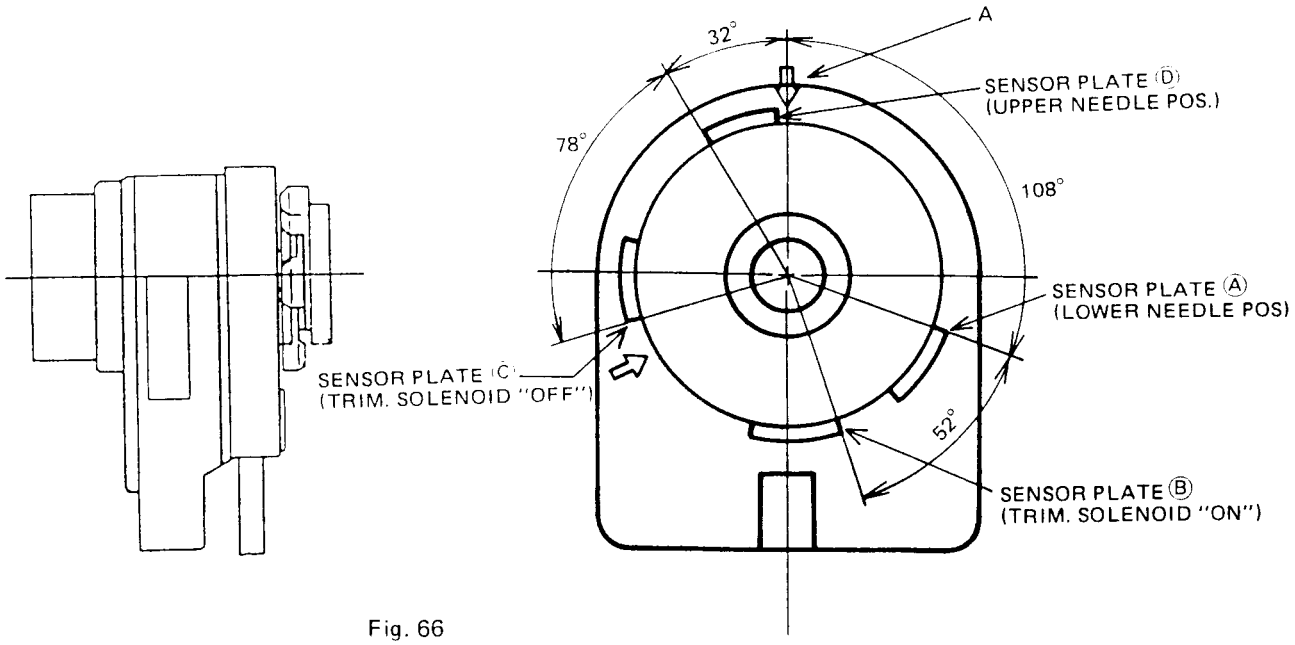


Fig. 66

2. Position sensor on hub of machine pulley so that its second set screw (set screw which appears immediately after the first set screw when sensor is rotated over toward the operator) is aligned with the second set screw of the machine pulley and firmly tighten the two set screws. (See Fig. 67)

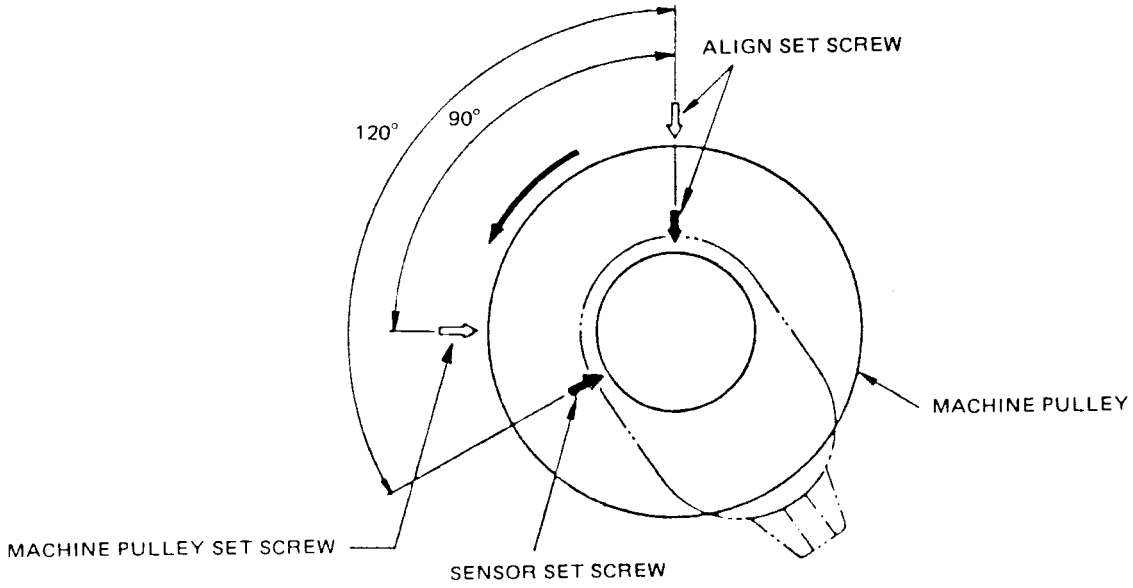


Fig. 67

3. Use sensor retainer supplied with the machine and be sure it is correctly secured in position.

NOTE: The sensor plate for upper needle position should not be reset in order to solve the problem of tension releasing mechanism not being released when needle stops in the upper needle position.
This adjustment should be made by resetting the sensor unit on the hub of machine pulley as instructed below.

a. Loosen the two set screws holding the sensor unit and while holding the sensor with one hand, turn machine pulley slightly over toward the front of machine.

b. Hold sensor in this position and temporarily tighten the first screw.

c. Run machine and check whether the tension releasing mechanism is released when the needle stops in the upper position. Repeat above, if necessary.

d. Firmly tighten both first and second set screws.

TIMING – ACTUATION OF TRIMMER SOLENOID

The trimmer solenoid is actuated when the take-up lever reaches a point 10mm (.394") before its lower dead point. The timing of this actuation is controlled by the sensor plate Ⓑ in the sensor unit. (Refer to item 3 under Description of Trimming Operation).

TIMING – COMPLETION OF ACTUATION OF TRIMMER SOLENOID

The current supply to the trimmer solenoid is cut off completing its actuation when the tension release action plate pin B is in the range ℓ shown in Fig. 68. This timing is controlled by the sensor plate Ⓒ and when adjustment is necessary, reset this sensor plate.

Turn machine pulley until the clearance between tension release action plate pin and tension release action cam C is approximately 1mm (0.39") (Fig. 68) and while holding the machine pulley in this position, set sensor plate Ⓒ as shown in Fig. 69.

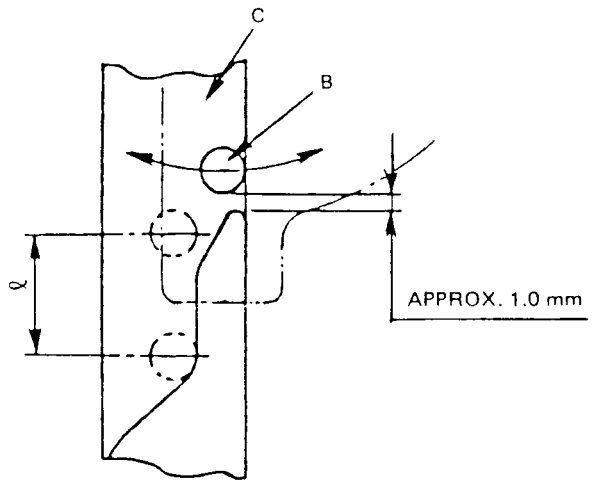


Fig. 68

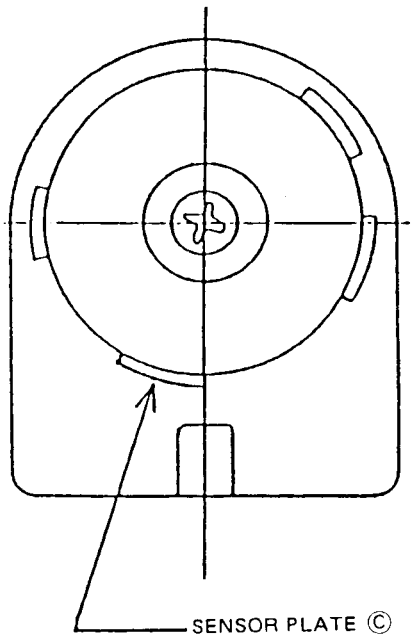


Fig. 69

NOTE: This timing must be adjusted as accurately as possible. If timing is too fast, the thread puller will not operate to trim the threads. If the timing is slow, it will cause the take-up lever to slow down on its upward stroke and stop anywhere before or beyond the correct upper stop position.

SETTING TRIMMER SOLENOID

The trimmer solenoid D is correctly set on the machine before the machine leaves the factory. If, however, this setting has been disturbed and resetting becomes necessary, adjust as instructed below. (Fig. 70)

To adjust setting, loosen the two screws E holding the trimmer solenoid bracket F and move bracket as required to set:

Angle – Plunger G on trimmer solenoid should be aligned with trimmer solenoid link H.

Stroke – Clearance between flange of plunger G and solenoid D should be 4.0 ~ 4.2mm (.157 ~ .165").

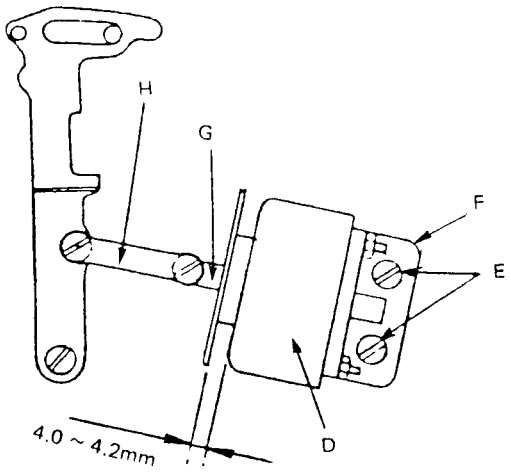


Fig. 70

SETTING STATIONARY KNIFE

The stationary knife J should be set so that the clearance between its cutting edge and the right side of the feed dog K is as shown in Fig. 71.

To adjust, loosen the two screws L holding the stationary knife J and move knife to the left or right as required, then firmly tighten the screws L.

When replacing the feed dog, be sure this clearance is provided as instructed above.

NOTE: If the clearance mentioned above is too large, the length of thread end under the fabric will become longer.

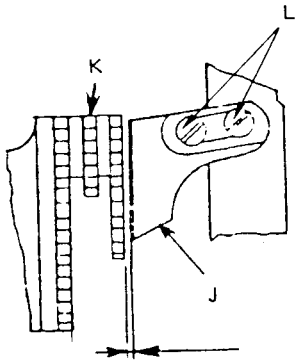


Fig. 71

SETTING THREAD PULLER

When the thread puller M is in its rest position, its right edge should be parallel with the edge of bed N as shown in Fig. 72.

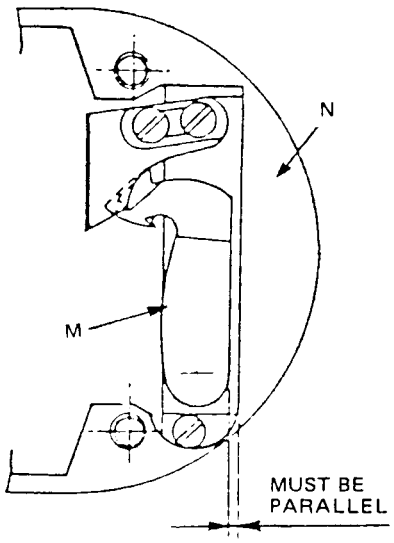


Fig. 72

To make this adjustment, loosen the set screw P and turn eccentric bushing Q, as required, then tighten the set screw. (Fig. 73)

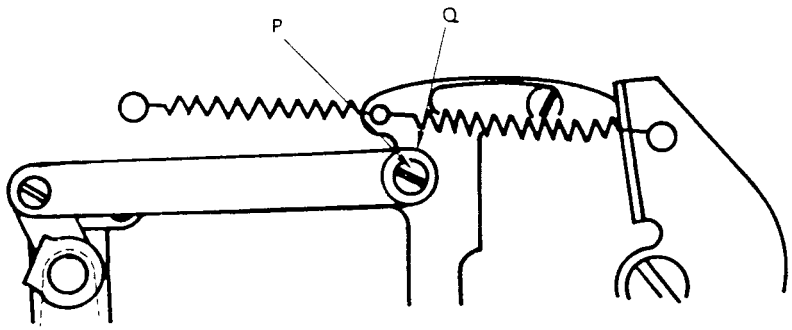
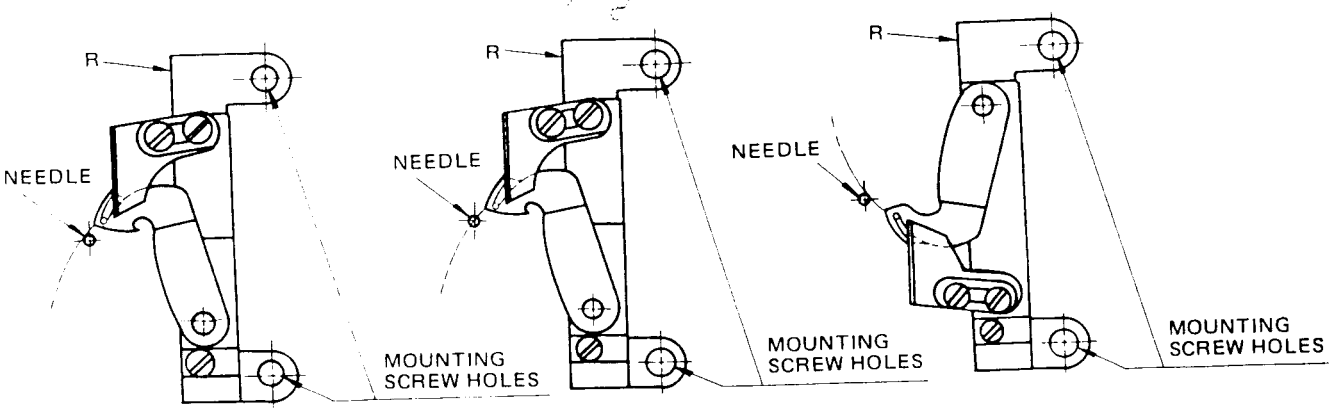


Fig. 73

The thread puller bracket R should be set as shown in Fig. 74.

To adjust, loosen the two mounting screws holding the thread puller bracket R and move bracket as required, then firmly tighten the two mounting screws.



591D200BD/BF/GD/GF
591D210BD/BF/GD/GF
591D240BD/BF/GD/GF
591D300BD/BF/GD/GF
591D310BD/BF/GD/GF
591D318BD/BF
601D100BD/BF/GD/GF

591C200BD/BF/GD/GF
591C210BD/BF/GD/GF
591C240BD/BF/GD/GF
591C300BD/BF/GD/GF
591C310BD/BF/GD/GF
591C318BD/BF

591D215BD/BF/GD/GF
591D315BD/BF/GD/GF

Fig. 74

NOTE: When replacing the feed dog with a new one, use only Singer part. Further, the feed dog should not be set lower than the standard height because it may cause the thread puller to interfere with the underside of the feed dog.

ADJUSTING PRESSURE OF THREAD PULLER AGAINST STATIONARY KNIFE

The pressure of thread puller against stationary knife should be held as light as possible and never be greater than actually required. (The force required to actuate the thread puller when applied to point a, Fig. 75 should be approximately 1kg.)

To adjsut the pressure, loosen set screws S and T holding the eccentric stud U and thread puller action lever V and move pressure adjusting block W as required by turning the eccentric stud. Tighten set screws S and T.

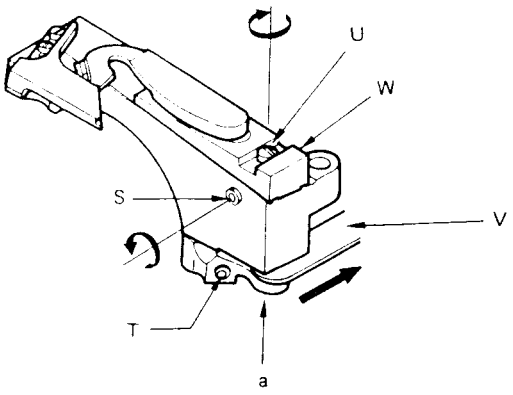


Fig. 75

SETTING AND TIMING THREAD PULLER ACTION CAM

The clearance between the highest point of thread puller action cam X and follower portion of thread puller action plate Y should be 0.5mm (.020") (Fig. 76)

To make this adjustment, follow the adjustment procedure noted hereunder.

1. Loosen the two set screws Z holding the thread puller action cam X and the two tension release action cam set screws A2.

2. Turn thread puller action cam X until its highest point is located opposite the follower on thread puller action plate and slide thread puller action cam X to the left or right as required to provide the 0.5mm (.020") clearance specified above, then temporarily tighten the set screws Z.

3. Push tension release action cam B2 lightly against the right end of thread puller action cam X and temporarily tighten the set screws A2.

4. Firmly tighten the set screws Z and A2 when thread puller action cam has been correctly timed as instructed in the following paragraph.

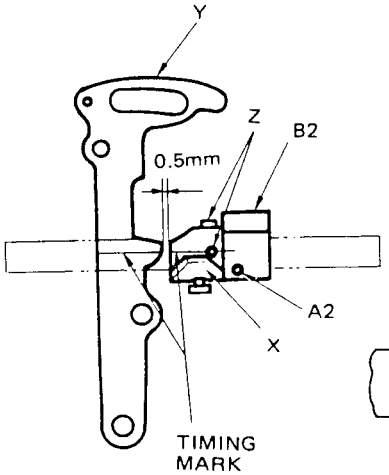


Fig. 76

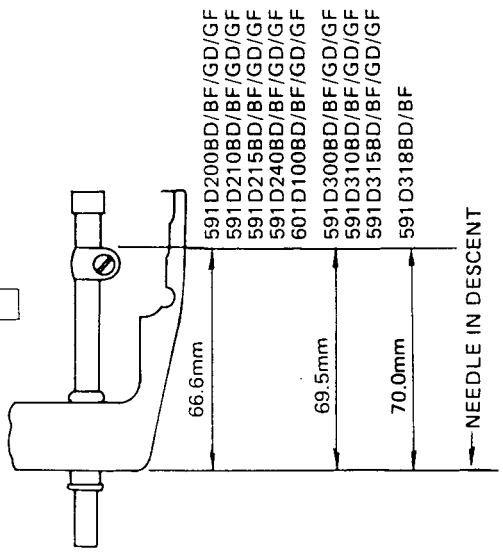


Fig. 77

(FOR DROP FEED MACHINE)

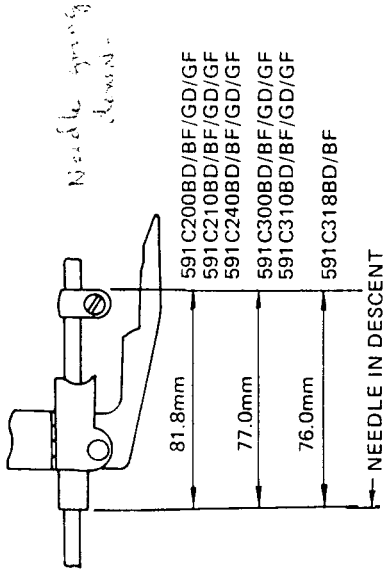


Fig. 78

(FOR COMPOUND FEED MACHINE)

The timing mark on the thread puller action cam X must align with the timing mark on the thread puller action plate Y when distance from top of needle bar connecting stud, needle bar on its downward stroke, to underside of arm at needle end is 66.6mm (2.622") in "BD, BF, GD and GF" varieties of 591D200/210/215/240 and 601D machines, 69.5mm (2.736") in "BD, BF, GD and GF" varieties of 591D300/310/315 machines and 70.0mm (2.755") in 591D318BD/BF machines. (Figs. 76 and 77)

On compound feed machines, the timing mark on the thread puller action cam X must align with the timing mark on the thread puller action plate Y when distance from top of needle bar connecting stud, needle bar on its down stroke, to lower end of needl bar frame is 81.8mm (3.220") in "BD, BF, GD and GF" varieties of 591C200/210/240 machines, 77.0mm (3.031") in "BD, BF, GD and GF" varieties of 591C300/310 machines and 76.0mm (2.992") in 591C318BD/BF machines. (Figs. 76 and 78)

Adjust timing as instructed below.

1. Loosen the two set screws Z holding the thread puller action cam X.

2. Turn machine pulley over toward front of machine until the needle bar go beyond its upper deal point and descend to the point shown in Fig. 75.

3. Turn thread puller action cam X until its timing mark is aligned with the timing mark on the thread puller action plate Y and while holding the thread puller action cam X pressed lightly against the tension release action cam B2, firmly tighten the two set screws A2.

TIMING TENSION RELEASE ACTION CAM

The tension release action cam C2 must be set so that the tension release action plate pin D2 is disengaged from the tension release action cam C2 immediately after thread trimming is completed. (Fig. 79)

To make this adjustment, follow the instructions noted below.

1. Loosen two set screws A2, Fig. 76 and turn the tension release action cam C2 as required.

2. When correct position has been located, firmly tighten the two set screws A2, Fig. 76 while holding the tension release action cam C2 pressed lightly against the thread puller action cam X.

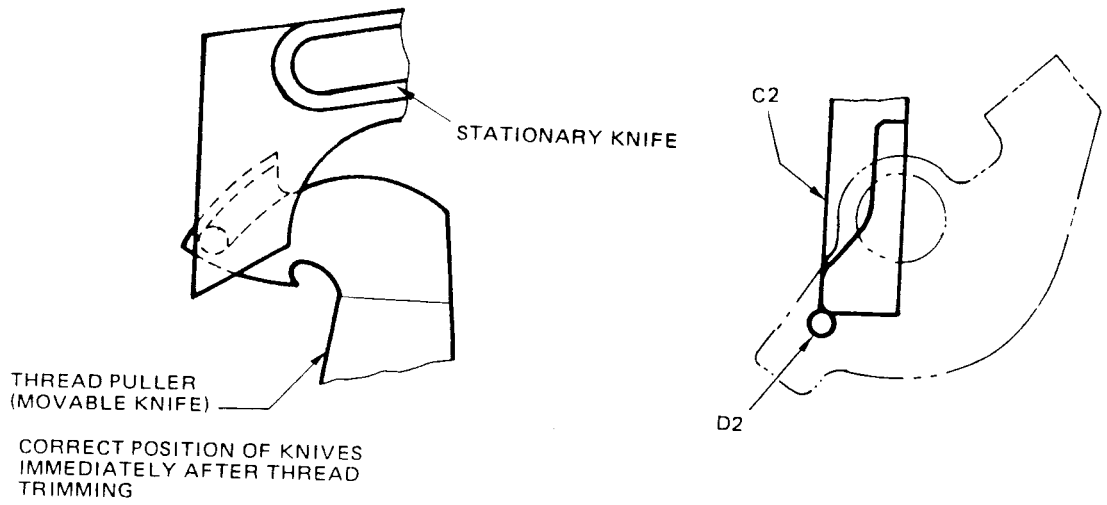


Fig. 79

NOTE: When replacing the feed dog with a new one, be sure to check the timing of tension release action cam and readjust if necessary.

SETTING THREAD PULLER ACTION CAM ADJUSTING PLATE

The thread puller action cam adjusting plate E2 should be set so that its step portion will align with the follower on the thread puller action plate F2 when distance from top of needle bar connecting stud to underside of arm at needle end, needle bar in ascent, is 69.7mm (2.744") in "BD, BF, GD and GF" varieties of 591D200/210/240 and 601D machines, 72.4mm (2.850") in "BD, BF, GD and GF" varieties of 591D300/310 and 591D318BD/BF machines, 68.8mm (2.708") in 591D215BD/BF/GD/GF machines and 71.2mm (2.803") in 591D315BD/BF/GD/GF machines. (Figs. 80 and 81)

On compound feed machines, the thread puller action cam adjusting plate should be set so that its step portoin will align with the follower on the thread puller action plate when distance from top of needle bar connecting stud to lower end of needle bar frame, needle bar in ascent, is 83.2mm (3.276") in "BD, BF, GD and GF" varieties of 591C200/210/240 machines, 78.3mm (3.083") in "BD, BF, GD and GF" varieties of 591C300/310 machines and 79.5mm (3.129") in 591C318BD/BF machines. (Figs. 80 and 82)

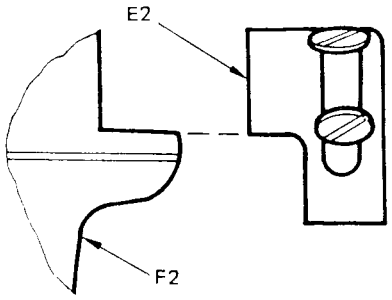


Fig. 80

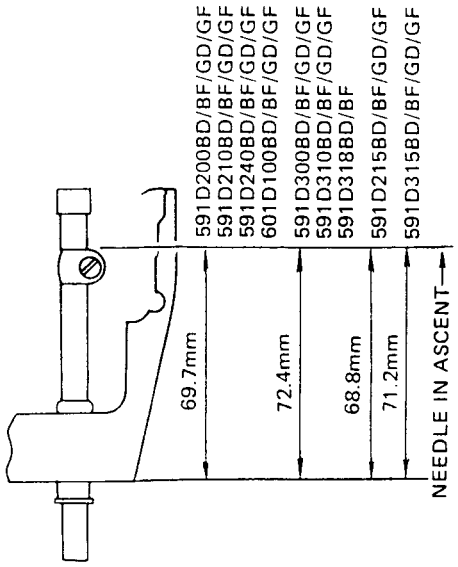


Fig. 81

(FOR DROP FEED MACHINE)

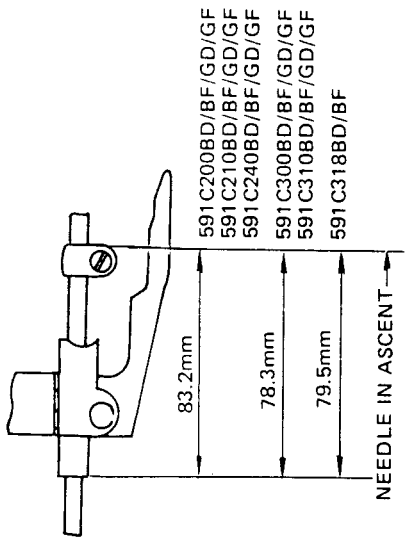


Fig. 82

(FOR COMPOUND FEED MACHINE)

ADJUSTING GAP BETWEEN TENSION DISCS

The gap between the two tension discs should be 0.8 – 1.0mm (.032 – .039") while the tension is released. This gap will not increase even if the presser bar is pushed up as far as it will go.

Adjust gap as instructed below. (Figs 83 and 84)

1. Check that the tension (complete) is correctly set in position.
2. Loosen the set screw H2 holding the tension releasing cam bracket G2 and move bracket to the left or right as required until desired gap has been achieved.
3. Hold bracket G2 in this position and firmly tighten the set screw H2.

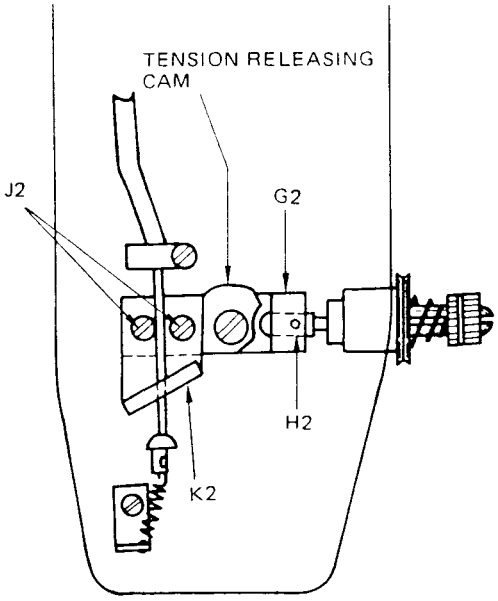


Fig. 83

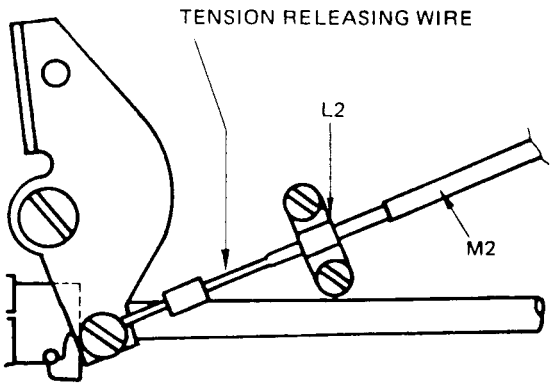


Fig. 84

TIMING TENSION RELEASE

To adjust the timing of releasing the tension when presser bar is raised by hand or by knee operation, loosen the two tension releasing wire connecting plate screws J2 and move connecting plate K2 up or down as required. (Fig. 83)

If timing is late, move connecting plate K2 downward.

If timing is fast, move connecting plate K2 upward.

Firmly tighten the two screws J2 when correct timing has been achieved.

The tension discs should begin to separate, or release the needle thread tension, just before the thread puller begins to make its return stroke to trim the threads.

When adjusting this timing:

1. Check timing of tension release action cam. (Refer to TIMING TENSION RELEASE ACTION CAM adjustment procedure on page 43.)

2. Loosen the two screws holding the tension releasing wire guide tube clamping plate L2 and move guide tube M2 to the left or right as required and firmly tighten the screws. (Fig. 84)

(To advance timing, move guide tube M2 to the right and to retard the timing, move guide tube M2 to the left.)

ADJUSTING LENGTH OF NEEDLE THREAD END

To adjust the starting length of needle thread end with movable slack thread regulator, loosen the two set screws holding the slack thread regulator action plate N2 and move action plate up or down as required, then firmly tighten the set screws. (Fig. 85)

(Move the slack thread regulator action plate N2 up to shorten and down to lengthen the needle thread end)

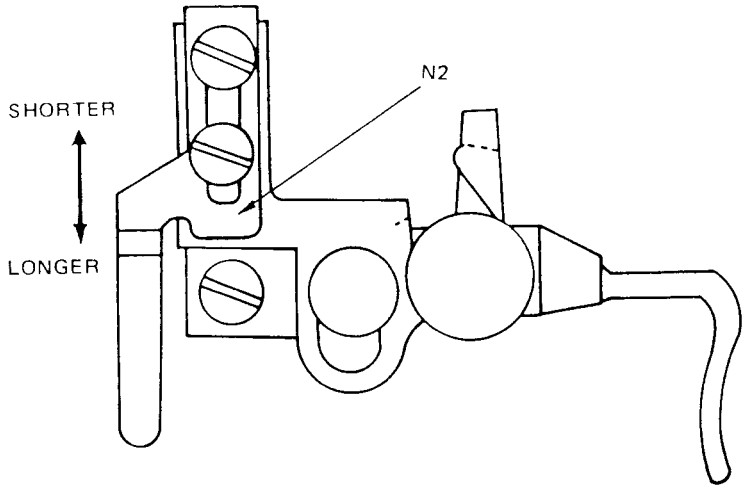


Fig. 85

ADJUSTING THREAD WIPER

The thread wiper does not require minute adjustment however care should be taken so that —

1. The wiper will not interfere with the right hand side of the presser foot when presser foot is raised.

2. There is at least 1.0mm (.039") clearance between wiper and point of needle when wiper is operated with needle in its upper stop position.

2) BACK TACK DEVICE

PRINCIPAL PARTS

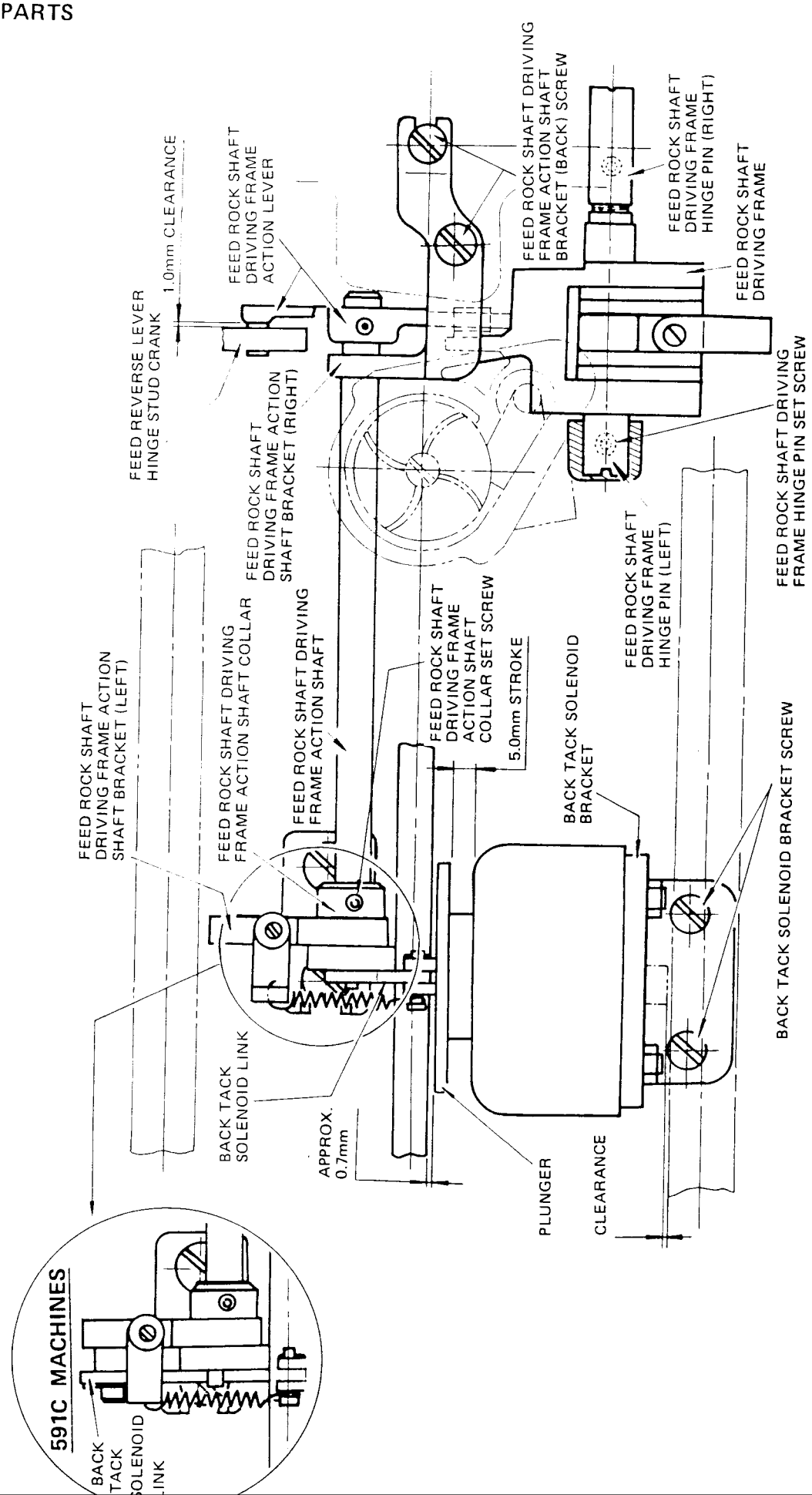


Fig. 86

591D AND 601D MACHINES

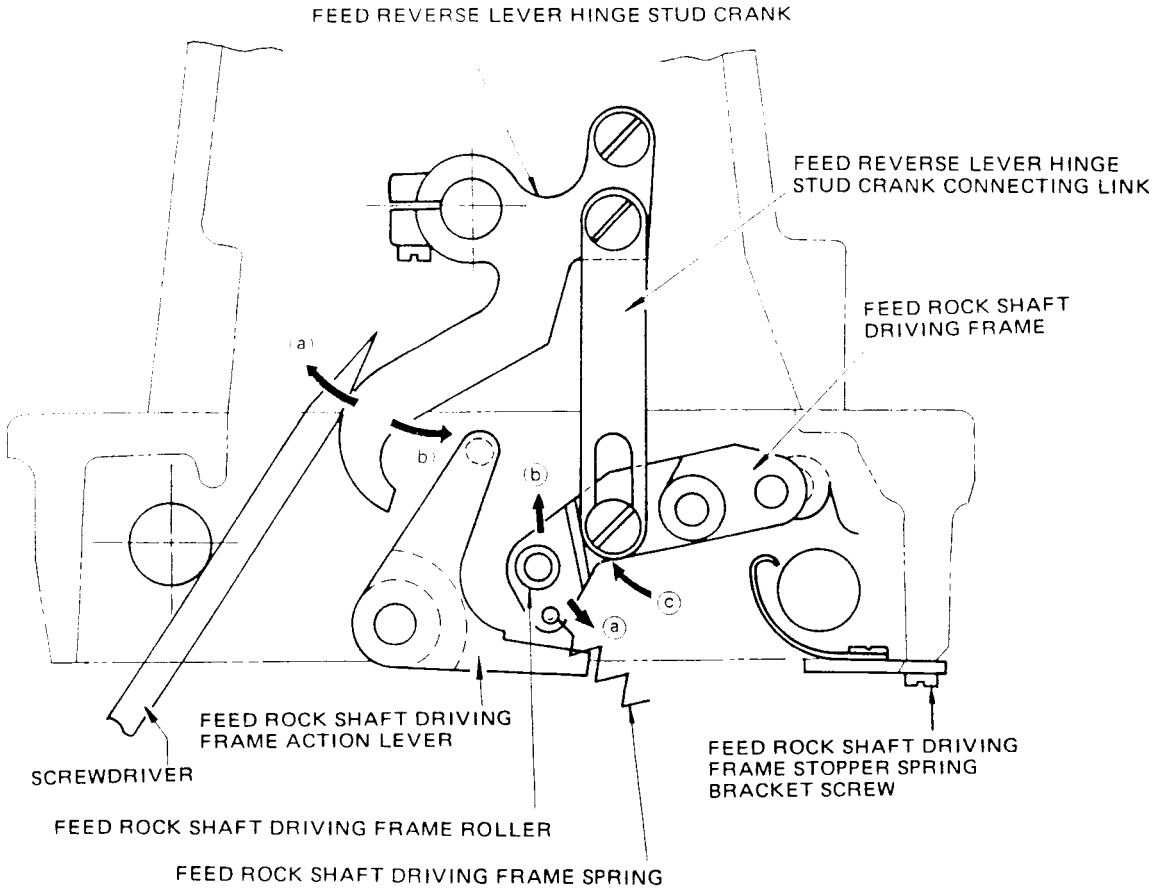


Fig. 87

591C MACHINES

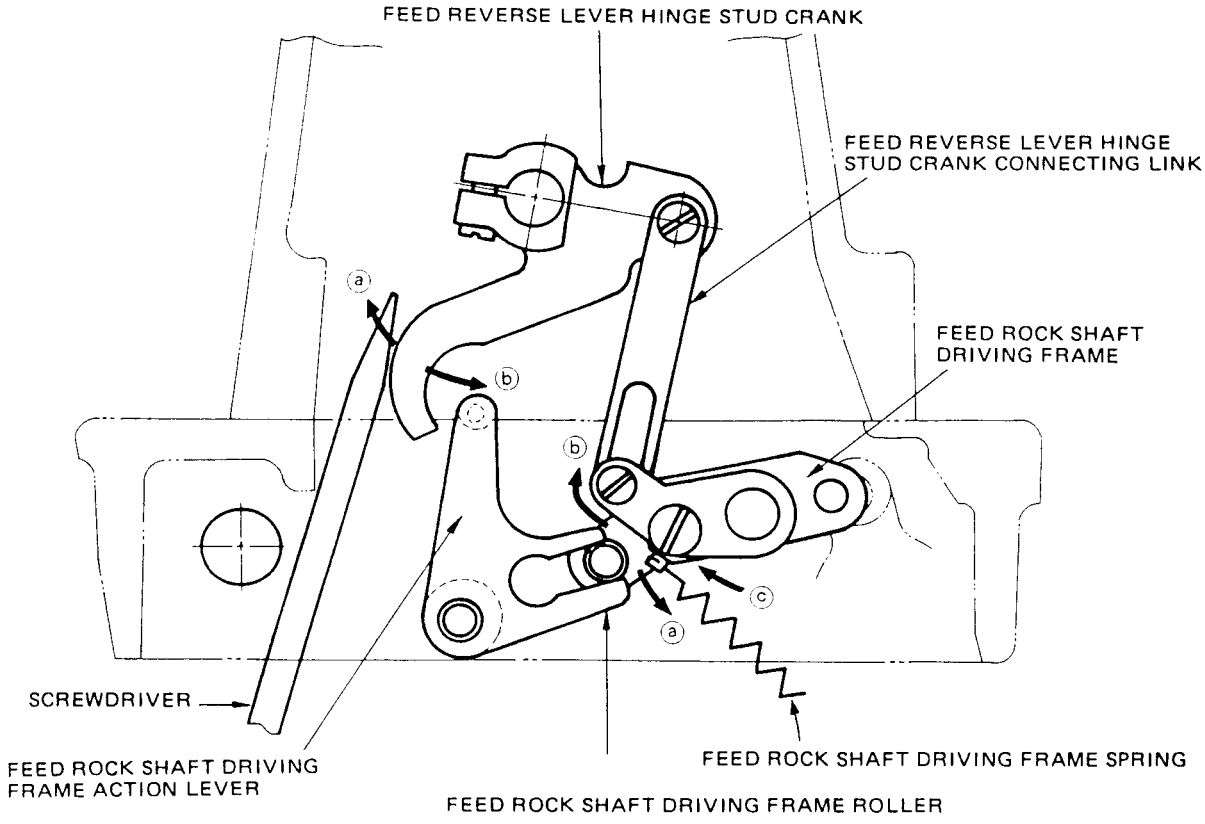


Fig. 88

DESCRIPTION OF BACK TACKING OPERATION

Back tacking with the back tack device is done by means of a built-in back tack solenoid.

When an electronic command from the control box (for automatic back tacking) and/or the push button switch is relayed to the back tack solenoid, the solenoid causes the feed rock shaft driving frame action lever fastened to the right end of driving frame action shaft to rotate and push the feed rock shaft driving frame upward and hold it in this position until back tacking is completed. While the above takes place, the feed reverse lever remains immovable due to the slot provided on the joint portion of the feed reverse lever hinge stud crank connecting link which is connected to the feed rock shaft driving frame.

The feed rock shaft driving frame stopper lever provided on the feed reverse lever hinge stud crank has been designed to control the reverse stitch length to same stitch length as set for forward stitch with the feed regulating dial on the feed reverse lever.

The automatic back tack switch connected to the control box permits automatic back tacking at start and at end of stitching independently. The number of stitches in reverse is controlled by the control box.

Back tacking can be done at any desired position during the sewing operation by depressing the push button switch provided adjacent to the needle bar. The machine will continue to sew in reverse while the push button is depressed, however, when the machine is stopped, the protective circuit automatically cuts off the current supply to the solenoid after 12 seconds even when the push button is continuously depressed.

SETTING AND ADJUSTING BACK TACK DEVICE

SETTING BACK TACK SOLENOID

The back tack solenoid is correctly set in the machine before the machine leaves the factory. If, however, this setting has been disturbed and resetting becomes necessary, reset as instructed below.

Setting (Fig. 86):

Set the back tack solenoid so that there is a clearance of about 0.7mm (.03″) between the flange of its plunger and the rotating hook shaft when plunger is pushed toward the shaft.

When assembling the back tack solenoid link to the solenoid, be sure the solenoid is correctly positioned laterally and correctly angled so that the link can operate smoothly and without any binding in the groove provided on the plunger.

Adjustment (Fig. 86):

Loosen the two screws holding the back tack solenoid bracket and adjust position of solenoid as required and re-tighten the screws.

SETTING AND ADJUSTING FEED ROCK SHAFT DRIVING FRAME

Setting:

Set the feed rock shaft driving frame A so that there is a clearance of 1.5mm (.06″) in 591D machines and 0.5mm (.02″) in 591C and 601D machines between its left end and the boss on the bed as shown in Fig. 89.

The feed rock shaft driving frame hinge pins B, the feed and feed lifting eccentric and the feed reverse lever hinge stud crank C must be correctly set in relation with the feed rock shaft driving frame A so that it can rotate freely when operated manually.