SERVICE MANUAL

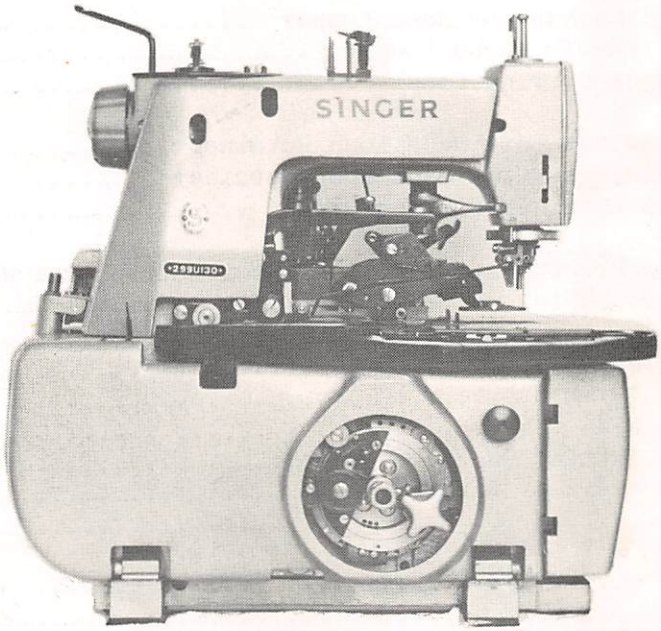
AND PARTS LIST

FOR

SINGER*

MACHINES

299U110, 299U123 and 299U130



Machine 299U130

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MACHINE 299U123

PARTS LIST

MACHINES

299U110 and 299U130

DESCRIPTION

299U110 LONG TRAVEL MACHINE

Machine 299U110 (long travel) has a capacity to sew 5/8" to 1-5/8" and cuts straight-end buttonholes or eyelet-end buttonholes with large or medium eye, without bar 5/8" to 1-9/16" and with taper bar 1/2" to 1-1/2", the bar being adjustable from 1/8" to 3/8" for 1/2" to 1-1/4" buttonholes, from 1/8" to 1/4" for 1-3/8" buttonhole and with 1/8" bar for 1-1/2" buttonhole. For coats, vests, trousers and clothing generally. Makes buttonholes with double chain stitch (SINGER Buttonhole Stitch), lays a reinforcing cord under the edge of the flat purl and automatically cuts the hole after stitching.

This machine can also be fitted with extra coarse feed and can handle "FF" silk or rayon looper thread to make a simulated hand stitched straight-end or eyelet-end buttonholes with or without bar, when specified on order.

A change in length and shape is made by adjusting the easily adjustable Pattern Wheel and substituting a quick detachable Cutting Block and Knife.

Unless otherwise ordered, this machine will be fitted to make a one inch eyelet-end buttonhole with medium size eye, with bar.

Extra Pattern Wheel Cam Blocks (for eye and bar), Cutting Blocks, Knives, Stitch Regulating Gears and Feed Driving Gear Differential can be furnished for use on this machine at an additional charge.

The following parts are made for use with this machine. (Unless otherwise specified, the parts marked with an asterisk will be furnished with the machine.)

Pattern Wheel Cam Block

Part No.	Part Name	Size of Eye
548826	Pattern Wheel Cam Block (eye)	.170 x .240
* 548389	" " " " (")	.140 x .190
548827	" " " " (")	.110 x .130

Pattern Wheel Cam Block (for taper bar)

Part No.	Part Name	Length of Bar
* 548801	Pattern Wheel Cam Block (1st side)	1/8" - 1/4"
548824	" " " " (")	1/4" - 3/8"
* 548394	" " " " (2nd side)	1/8" - 1/4"
548825	" " " " (")	1/4" - 3/8"

Note: When placing order for cam blocks #548801 and #548824, be sure to request for parts #548391, #549191 and two #545138 also.

When placing order for cam blocks #548394 and #548825, be sure to request for parts #545138, #545332, #548391, #548396 and #549191 also.

Buttonhole Cutting Block

Part No.	Part Name	Size
548752	Buttonhole Cutting Block (straight)	1/2"
* 548753	" " " (")	5/8"
548754	" " " (")	3/4"
548755	" " " (")	7/8"
548756	" " " (")	1"
548757	" " " (")	1-1/8"
548758	" " " (")	1-1/4"
548759	" " " (")	1-3/8"
548760	" " " (")	1-1/2"
548761	" " " (")	1-5/8"
548762	" " " (eye)	1/2"
548763	" " " (")	5/8"
548764	" " " (")	3/4"
* 548765	" " " (")	7/8"
* 548766	" " " (")	1"
* 548767	" " " (")	1-1/8"
548768	" " " (")	1-1/4"
548769	" " " (")	1-3/8"
548770	" " " (")	1-1/2"
548771	" " " (")	1-5/8"

Buttonhole Cutting Knife

Part No.	Part Name	Size of Eye
* 548066	Buttonhole Cutting Knife (straight)	-
256654	" " " (eye)	.135 x .228
* 548886	" " " (")	.120 x .180
548804	" " " (")	.100 x .125

Stitch Regulating Gear

Part No.	Part Name	No. of Teeth
* 548500	Stitch Regulating Gear	22
548501	" " "	26
* 548502	" " "	28
548503	" " "	30
* 548504	" " "	33
548505	" " "	34
* 548506	" " "	38
548507	" " "	42

Feed Driving Gear Differential

Part No.	Part Name	No. of Teeth
* 548714	Feed Driving Gear Differential	18
548715	" " " "	21
548716	" " " "	22
* 548717	" " " "	32
548718	" " " "	33
548719	" " " "	34
548720	" " " "	35
548721	" " " "	37
* 548722	" " " "	38 (2)

Note: To obtain a simulated hand stitched buttonhole, use feed driving gear differential #548716, #548718, #548719 and #548721.

Straight buttonholes with taper bar can be made by removing the eye cam block from the pattern wheel and fitting the bar cam blocks to the wheel rings.

When preferred, the eyelet-end buttonholes produced on Machine 299U110 can have a square bar made on Machine 269W39.

299U130 LONG TRAVEL MACHINE

Machine 299U130 (long travel) has a capacity to sew 5/8" to 1-5/8" and cuts straight-end buttonholes or eyelet-end buttonholes with large or medium eye, without bar 5/8" to 1-19/32" and with bar 1/2" to 1-1/2", the bar being adjustable from 1/8" to 3/8" for 1/2" to 1-1/4" buttonholes, from 1/8" to 1/4" for 1-3/8" buttonhole and with 1/8" bar for 1-1/2" buttonhole. For coats, vests, trousers and clothing generally.

The machine is intended for making buttonholes in closely woven fabrics, the buttonhole being automatically cut before stitching. Makes buttonholes with double chain stitch (SINGER Buttonhole Stitch) and lays a reinforcing cord under the edge of the flat purl.

This machine can also be fitted with extra coarse feed and can handle "FF" silk or rayon looper thread to make a simulated hand stitched straight-end or eyelet-end buttonholes with or without bar, when specified on order.

A change in length and shape is made by adjusting the easily adjustable Pattern Wheel and substituting a quick detachable Cutting Block and Knife.

Unless otherwise ordered, this machine will be fitted to make a one inch eyelet-end buttonhole without bar for sack coats.

Extra Pattern Wheel Cam Blocks (for eye and bar), Cutting Blocks, Knife, Stitch Regulating Gears and Feed Driving Gear Differential can be furnished for use on this machine at an additional charge.

The following parts are made for use with this machine. (Unless otherwise specified, the parts marked with an asterisk will be furnished with the machine.)

Pattern Wheel Cam Block

Part No.	Part Name	Size of Eye
548826	Pattern Wheel Cam Block (eye)	.170 x .240
* 548389	" " " " (")	.140 x .190
548887	" " " " (")	.126 x .160
548827	" " " " (")	.110 x .130

Pattern Wheel Cam Block (for taper bar)

Part No.	Part Name	Length of Bar
548392	Pattern Wheel Cam Block (1st side)	1/8" - 1/4"
548393	" " " " (")	1/4" - 3/8"
548802	" " " " (2nd side)	1/8" - 1/4"
548395	" " " " (")	1/4" - 3/8"

Note: When placing order for cam blocks #548392 and #548393, be sure to request for parts #548391, #549191 and two #545138 also.

When placing order for cam blocks #548802 and #548395, be sure to request for parts #545138, #545332, #548391, #548396 and #549191 also.

Buttonhole Cutting Block

Part No.	Part Name	Size
548752	Buttonhole Cutting Block (straight)	1/2"
* 548753	" " " (")	5/8"
548754	" " " (")	3/4"
548755	" " " (")	7/8"
548756	" " " (")	1"
548757	" " " (")	1-1/8"
548758	" " " (")	1-1/4"
548759	" " " (")	1-3/8"
548760	" " " (")	1-1/2"
548761	" " " (")	1-5/8"
548762	" " " (eye)	1/2"
548763	" " " (")	5/8"
548764	" " " (")	3/4"
* 548765	" " " (")	7/8"
* 548766	" " " (")	1"
* 548767	" " " (")	1-1/8"
548768	" " " (")	1-1/4"
548769	" " " (")	1-3/8"
548770	" " " (")	1-1/2"
548771	" " " (")	1-5/8"

Buttonhole Cutting Knife

Part No.	Part Name	Size of Eye
* 548066	Buttonhole Cutting Knife (straight)	-
548065	" " " (eye)	.140 x .260
* 256654	" " " (")	.135 x .228
548886	" " " (")	.120 x .180

Stitch Regulating Gear

Part No.	Part Name	No. of Teeth
* 548500	Stitch Regulating Gear	22
548501	" " "	26
* 548502	" " "	28
548503	" " "	30
* 548504	" " "	33
548505	" " "	34
* 548506	" " "	38
548507	" " "	42

Feed Driving Gear Differential

Part No.	Part Name	No. of Teeth
* 548714	Feed Driving Gear Differential	18
548715	" " " "	21
548716	" " " "	22
* 548717	" " " "	32
548718	" " " "	33
548719	" " " "	34
548720	" " " "	35
548721	" " " "	37
* 548722	" " " "	38 (2)

Note: To obtain a simulated hand stitched buttonhole, use feed driving gear differential #548716, #548718, #548719 and #548721.

Straight buttonholes with taper bar can be made by removing the eye cam block from the pattern wheel and fitting the bar cam blocks to the pattern wheel rings.

When preferred, the eyelet-end buttonholes produced on Machine 299U130 can have a square bar made on machine 269W39.

To Set Up the Machine

Spot and drill all bolt holes, oil hole and belt holes, as shown in Fig. 2.

Bolt the driving attachment to the underside of table, then fasten motor in position.

Fasten the two machine supports to the table as shown and set machine on the support.

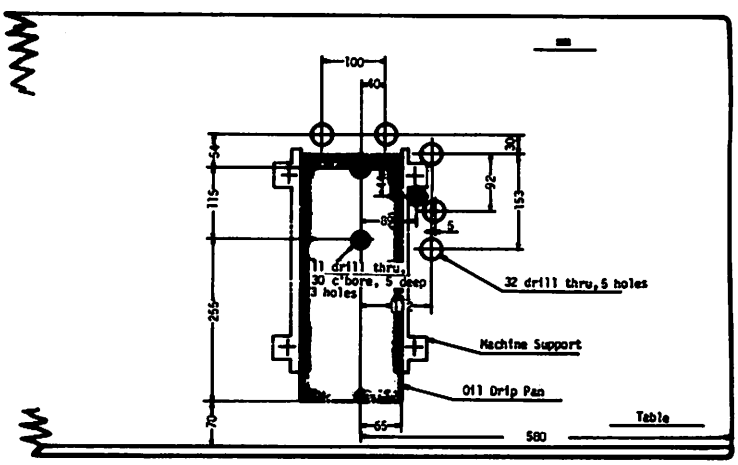

Fig. 2 Layout for Setting Up the Machine

Speed

The speeds recommended for the shafts in Machines 299U110 and 299U130 are as follows:

Buttonhole Cutting Shaft - 200 to 215 revolutions per minute.

Stop Motion Shaft - 950 to 1000 revolutions per minute. (This will drive the arm shaft at a speed of from 1900 to 2000 revolutions per minute.)

Care must therefore, be taken to see that the stop motion shaft (Fig. 13) is driven at a speed of 950 to 1000 revolutions per minute and the buttonhole cutting shaft (43, Fig. 11) at a speed of 200 to 215 revolutions per minute. The correct speed of the stop motion shaft should be ascertained by placing a speed indicator at the gear end of the rapid feed crank shaft. The speed of the rapid feed crank shaft should be about 1310 to 1380 revolutions per minute. See Fig. 13.

Safety Lock on Machine 299U110

To prevent accidental functioning of the cutter during sewing, the cutter is locked out of operation by means of having the end of the cutting safety lever (45, Fig. 26) follow the outside diameter of the safety cam (153, Fig. 26) provided on the pattern wheel shaft (148, Fig. 26) causing the latch on the other end to engage with the cutting starting lever arm (39, Fig. 10), thus preventing the cutter to function.

Safety Lock on Machine 299U130

To prevent accidental starting of the machine when threading, oiling or making adjustments, the machine can be locked out of operation by lifting up the end of the safety lever (45, Fig. 13) causing the safety latch (44, Fig. 13) to slip under the safety lever (45), thus holding up the starting lever trip (38, Fig. 13) so that it cannot engage with the starting lever arm (39, Fig. 13) to start the machine. When finished threading, oiling or making adjustments, it will be necessary to unlock the machine by swinging the safety latch out from under the starting lever before the machine can be started in operation.

Also, to prevent accidental functioning of the cutter during sewing, the cutter is locked out of operation the same as the 299U110 machine.

Needles

Needles for Machine 299U are of the following Class and Variety Nos.:

Catalog No.	Class and Variety	Description	Style of Point	Sizes
1411	142 x 1	for Cloth	M SET	13, 15, 17, 18, 19
1413	142 x 5	for Cloth	M SET	12, 14, 15, 16, 17, 18, 19, 20, 21, 22
1424	142 x 8	for Leather	DIA	17, 18, 19
1430	142 x 6	for Khaki	SP W	17, 18, 19, 21

The size of the needle to be used should be determined by the size of the thread which must pass freely through the eye of the needle. The successful use of the machine will be interfered with if rough or uneven thread is used, or if it passes with difficulty through the eye of the needle.

Orders for needles must specify the quantity required, the size, also the Catalog number ...

For example ...

"100 Size 17, Catalog #1413 (142X5) Needles."

The best stitching results will be obtained in using the needles sold by Singer Sewing Machine Company.

To Determine the Proper Materials to Use for Buttonholes which are Cut Before Sewing

Stitch a buttonhole in the material to be tested, using the same lining and materials in the same layers and positions that they will occupy in a garment. If the stitches (or purl) pulls off the edge of the slit it indicates that the material is not suitable for buttonholes which are cut before sewing. The thicker the material is, the wider the bight should be in the depth stitch from the buttonhole slit.

Thread and Cord

Either right or left twist thread may be used in the needle and looper.

When stitching buttonholes with silk thread, a heavier thread should be used in the looper than in the needle, for example: use B silk in the looper with A silk in the needle.

When stitching buttonholes with cotton thread, regular buttonhole thread is recommended. Harder finish thread should always be used in the looper than in the needle. This will facilitate the formation of perfect stitches in the buttonhole.

For the cord, medium size buttonhole cord will give the best results.

To Set the Needle

Loosen the set screw (154, Fig. 20) in the needle clamp and put the needle up into the clamp as far as it will go with its long groove to the rear and its eye parallel or in line with the bed of the machine, then firmly tighten the set screw (154).

To Thread the Needle
(See Fig. 3)

Pass the thread from the unwinder down through the hole (1), through the hole (2), from back to front and on right between the tension discs (3), from back to front through the holes (4), (5), (6) and (7), under the needle thread pull-off (8) and (9), down through the needle bar (10) (inserting the threading wire furnished with the machine up into the needle bar from below to pull the thread through), and pass the thread from back to front or toward you through the eye of the needle.

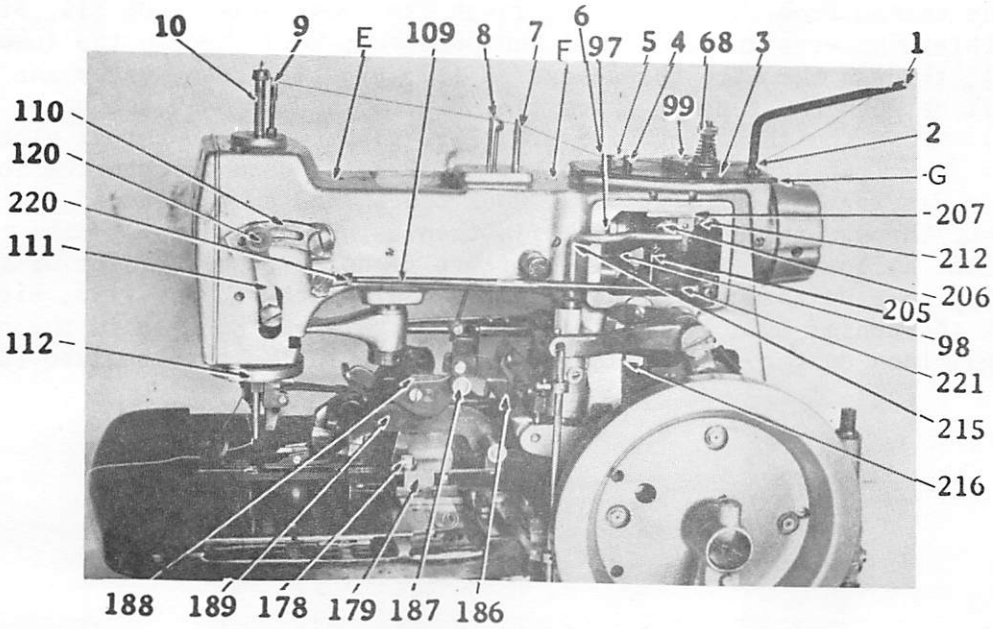

Fig. 3 Threading the Needle

To Thread the Looper

Unhook the two springs (11 and 12, Fig. 7) and spread out the two work clamp plates (13 and 14, Fig. 7), then draw the front bed cover toward you to open.

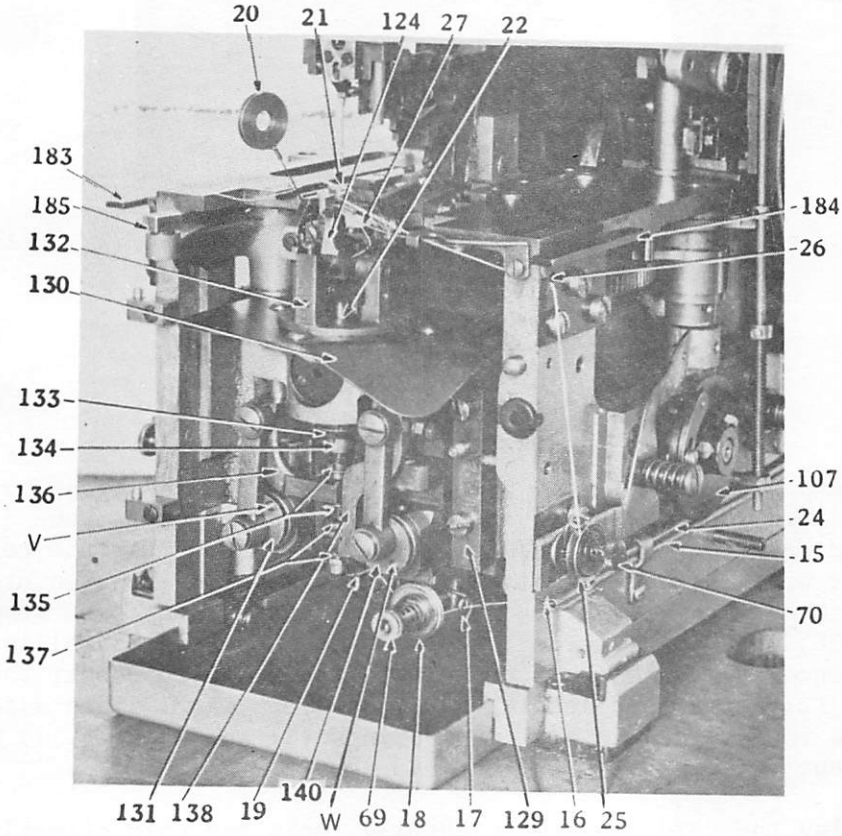

Fig. 4 Threading the Looper Also Showing Threading the Cord

Pass the thread from the unwinder through the lower brass tube (15, Fig. 4) (using the threading wire furnished for the purpose), then through the lower hole (16, Fig. 4), through the wire thread eyelet (17, Fig. 4), down, under and from right to left between the tension discs (18, Fig. 4) and up over the guide stud (19, Fig. 4). Pass the threading wire (20, Fig. 4) between the throat plate (21, Fig. 4) and right hand loop retainer (124, Fig. 4) down through the hollow loop retainer driving bar (22, Fig. 4). Hook the thread on the end of the wire and draw it up through the hollow bar (22), then using the tweezers, pass the thread from the hollow bar (22, Fig. 5) left to right through the slot of the plate (23, Fig. 5), up through the slot in the heel of the looper (123, Fig. 5), down through the center hole in the looper and up through the hole in the point of the looper, then up through the large needle hole in the throat plate (21).

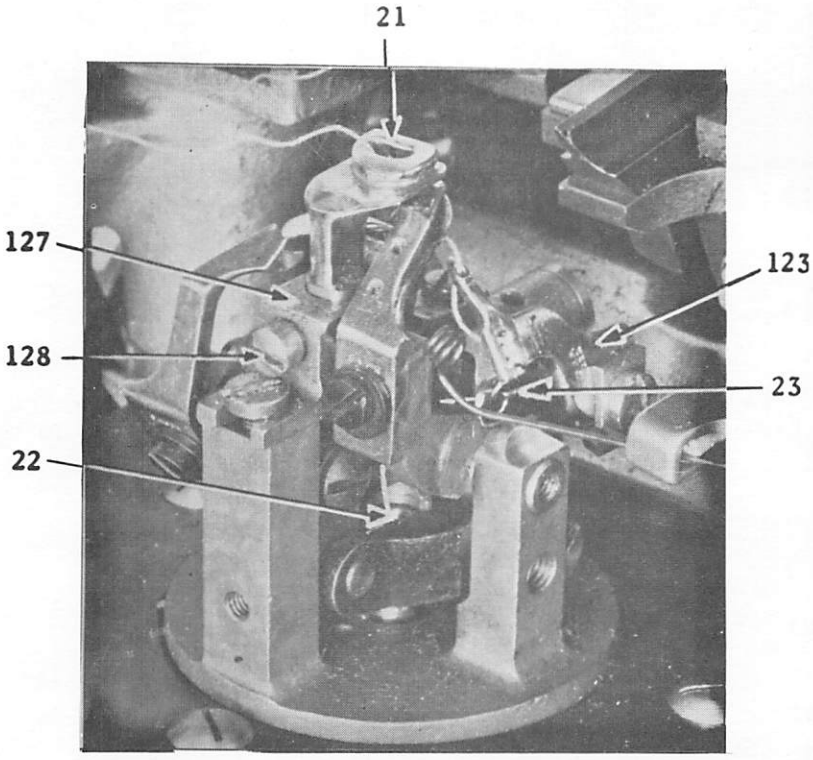

Fig. 5 Threading the Looper

To Thread the Cord

The work clamp plates having been spread outward and the front bed cover opened, pass the cord from the unwinder through the upper brass tube (24, Fig. 4) (using the threading wire furnished for the purpose), then pass the cord through the lower wire thread eyelet, under and between the tension discs (25, Fig. 4), through the upper wire thread eyelet adjacent to the cord tube, through the upper hole (26, Fig. 4), up through the hole in the cord controlling spring (27, Fig. 4), thence from back to front through the small hole near the center of the throat plate (21), the cord leading toward the operator. Then slide the work clamp plates back into place and hook the springs (11 and 12, Fig. 7) to hold the plates in position. Also close the front bed cover.

When threading the cord on Machine 299U110, pass the cord directly from the upper tube (24) to the upper hole (26) since no cord controlling lever is provided on this machine.

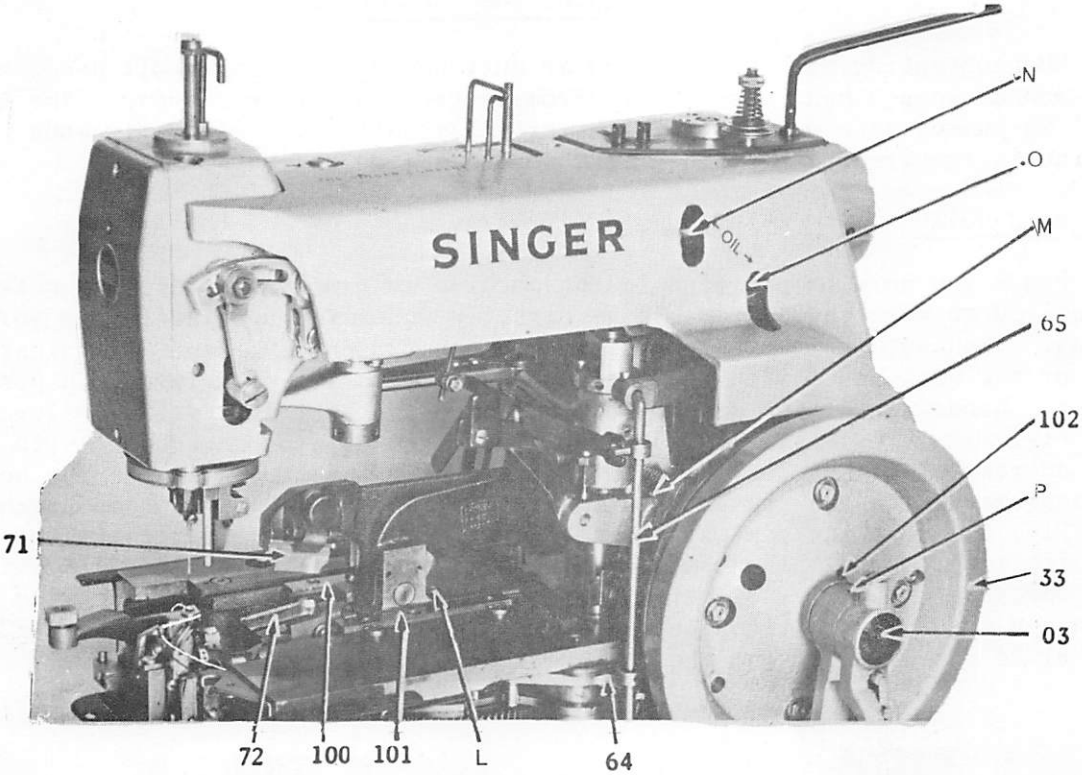

Fig. 6 Threading the Cord

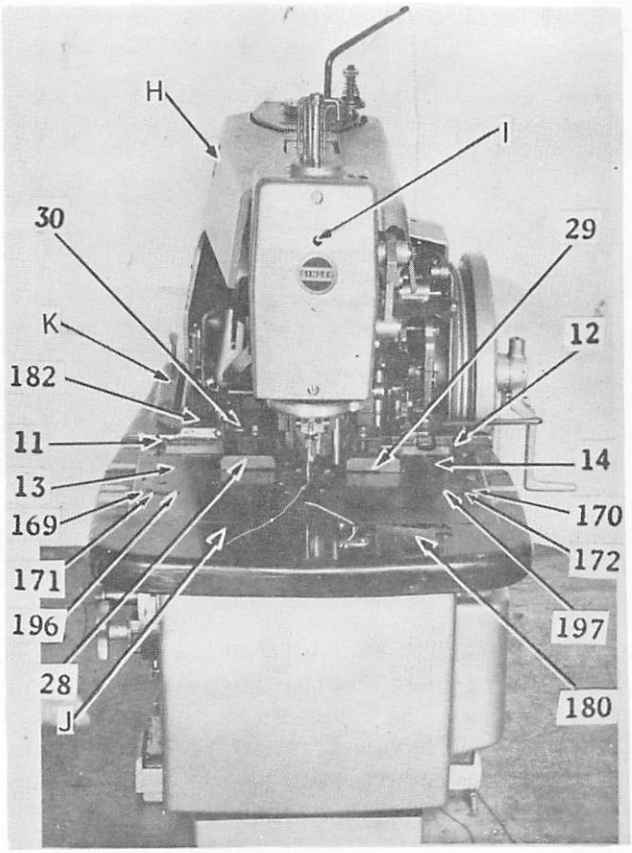

Fig. 7 Threading of Machine Completed

Operation of the Machine

When operating machine for regular buttonhole stitching, pull hand wheel back and disengage hand wheel shaft from vertical shaft bevel gear. The hand wheel is pushed into engagement with vertical shaft bevel gear only when machine is required to be turned by hand to make adjustments.

Machine 299U110

Place the work in position in the machine so that the portion in which it is desired to make the buttonhole is directly under the opening in the work clamps. Then set the two work position gauges (28 and 29, Fig. 7) against the edge of the work and fasten them in position. Hold the work firmly in position with the hands and at the same time press down on the finger starting lever (30, Fig. 7). This will trip the latch (31, Fig. 8) from engagement with locking head on rear of clamp closing stud (32, Fig. 8). The stud will then be held out of engagement with the cam path in the pulley (33, Fig. 8) by lug on latch (34, Fig. 8) until the cam path is in the correct position to receive the stud, at which time the tripping cam block on the inside face of pulley (33) will trip the lever (35, Fig. 8), lifting the latch (34) and allowing the stud (32) to engage the cam path in pulley (33), causing the clamp closing lever (228, Fig. 8) to be depressed and the work clamps to be lowered upon the work.

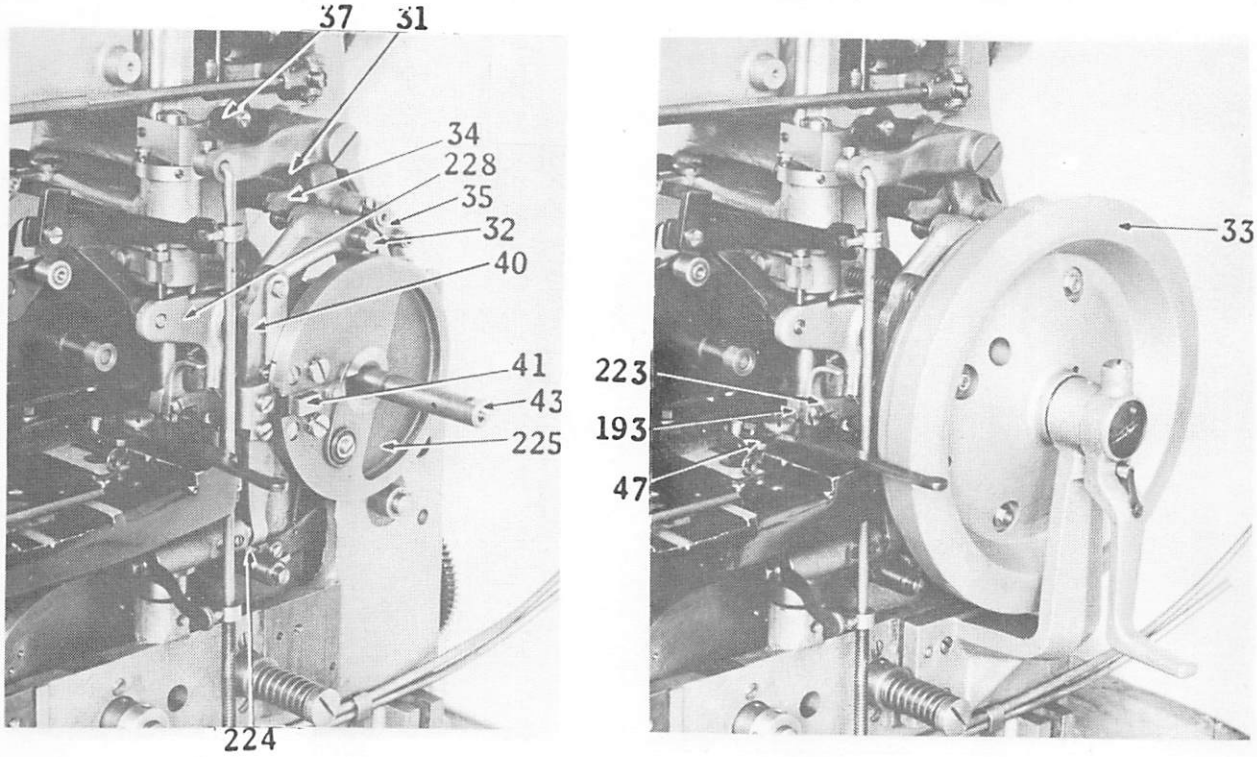

Fig. 8 View of Buttonhole Cutter Pulley Showing Buttonhole Cutter Engaging Stud and Latch

As the latch (223, Fig. 8) moves forward it engages the spreader plate (47, Fig. 8) pushing this lever forward to spread the work clamps, thus stretching the fabric taut under the clamps. The stud on the end of clamp closing lever (228) then engages the rapid feed starting latch (224, Fig. 8) causing the rapid feed to move the work clamp plates with the work to a stitching position and the stud (32) is forced inward, by the cam block mounted in the cam path of the pulley (33),

under the stud lock plate (37, Fig. 8) into locking position and held by the latch (31) in the locking notch.

When the work clamp plates are brought to the stitching position, the stitching mechanism is started in operation by the action of the operating plate (50, Fig. 9) riding on the segment (51, Fig. 9) on the pattern wheel ring, causing the stop lever (52, Fig. 10) to swing back out of engagement with the stop cam, this action causes the rapid feed to be disengaged by the trip lever (53, Fig. 9). At the same time the stop lever lock lever (55, Fig. 9) engages in the notch of the block (56, Fig. 9) on the stop lever link. The

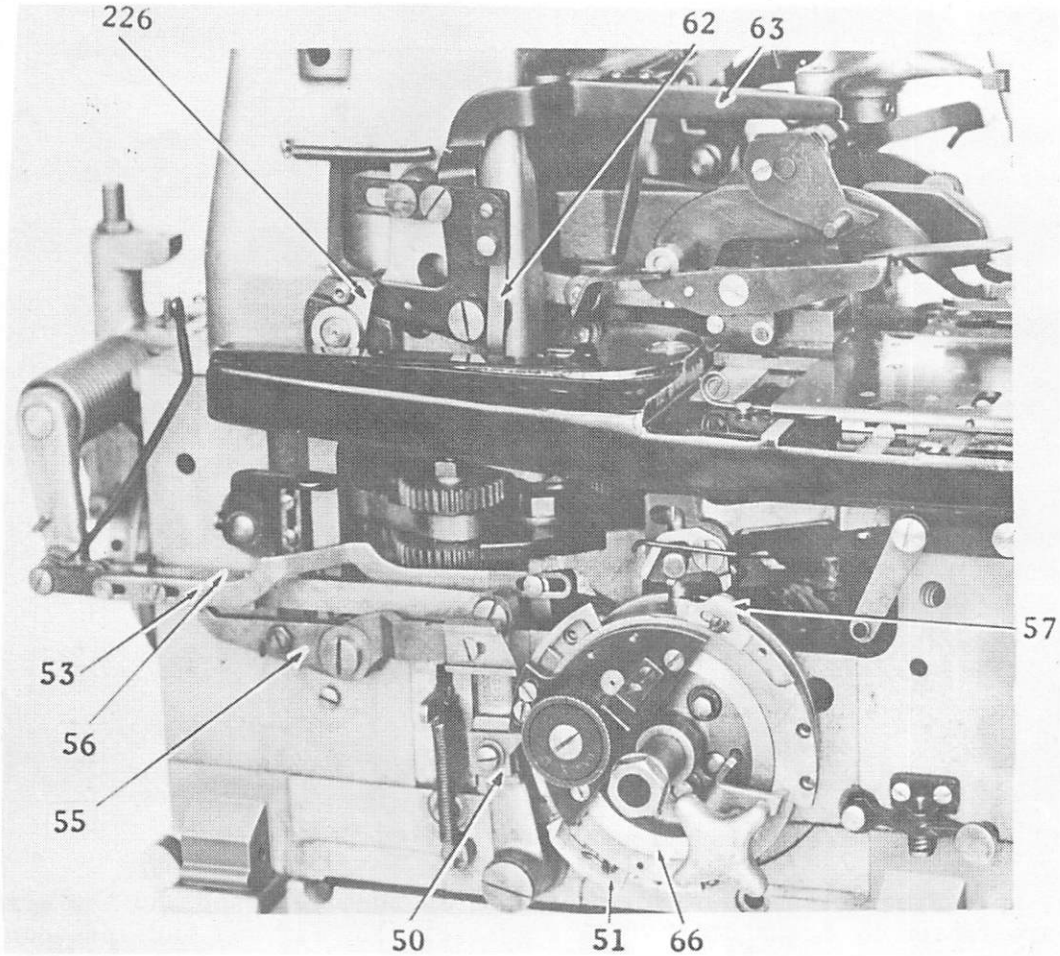

Fig. 9 View of Pattern Wheel and Sewing Mechanism

machine then stitches the buttonhole and at the completion of the stitching, the stop segment (57, Fig. 9) on the pattern wheel ring trips the stop lever lock lever (55) disengaging it from the notch of the block (56), causing the stop lever to swing in, ready to lock in the stop cam. As the interlocking slide (58, Fig. 10) is raised by the action of the stop cam (59, Fig. 10), the point of the latch (60, Fig. 10) is lowered fully 5/64 inch below the end of the second rapid feed starting lever (61, Fig. 10). As the interlocking slide (58) drops into the notch of the stop cam (59), it raises the latch (60) which in turn raises the second rapid feed starting lever (61) as it comes into contact with it, thereby starting the rapid feeding mechanism in operation to move the carrier back to a starting position for the next buttonhole. At the finish of the rapid feeding of work clamp plates, the rapid feed is disengaged by the tripping point on the inner side of the pattern wheel (66, Fig. 9) coming

into contact with the trip (67, Fig. 26). At the same time, the tripping point attached to the feed wheel actuates the buttonhole cutting starting lever (40, Fig. 8) causing the lock (41, Fig. 8) in the inner buttonhole cutting wheel engage the loose buttonhole cutting pulley and at the same time the starting rod lock (64, Fig. 6) is tripped, allowing the starting rod (65, Fig. 6) to spring up to the operating position. As the inner buttonhole cutting wheel (225, Fig. 8) is fastened in a rigid position on the buttonhole cutting shaft (43, Fig. 8), the shaft is rotated when the wheel and loose pulley are locked together by the lock (41). When the buttonhole cutting shaft starts to rotate, the buttonhole cutting levers are moved into action by the operating cams on the buttonhole cutting shaft, and the cutting block and knife are carried forward to cut the buttonhole.

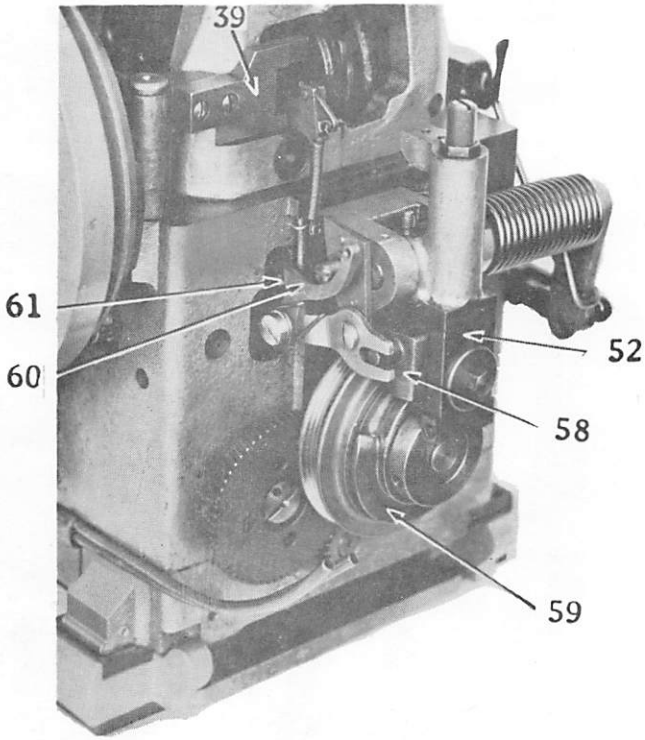

Fig. 10 View of Stop Motion Mechanism

The spreading action on the work clamps is then released and the work clamps are raised by means of the opening lever (63, Fig. 9) and spreader releaser (62, Fig. 9) which are actuated by the opening cam (226, Fig. 9) on the left end of the buttonhole cutting shaft, after which the lock (41) in the inner buttonhole cutting wheel is withdrawn from the loose buttonhole cutting pulley, releasing the wheel from the pulley and thus stopping the rotation of the buttonhole cutting shaft.

Machine 299U130

Place the work in position in the machine so that the portion in which it is desired to make the buttonhole is directly under the opening in the work clamps. Then set the two work position gauges (28 and 29, Fig. 7) against the edge of the work and fasten them in position. Hold the work firmly in position with the hands and at the same time press down on the finger starting lever (30, Fig. 7). This will trip the latch (31, Fig. 11) from engagement with locking head on rear of clamp closing stud (32, Fig. 11). The stud will then be held

out of engagement with the cam path in the pulley (33, Fig. 11) by lug on latch (34, Fig. 11) on the locking head of the stud (32) until the cam path is in the correct position to receive the stud, at which time the tripping cam block on the inside face of pulley (33) will trip the lever (35, Fig. 11), lifting the latch (34) and allowing the stud (32) to engage the cam path in pulley (33), causing the clamp closing lever (36, Fig. 11) to be depressed and the work clamps to be lowered upon the work. The stud (32) is forced inward, by the cam block mounted in the cam path of the pulley (33), under the stud lock plate (37, Fig. 11) into locking position and held by the latch (31) in the locking notch.

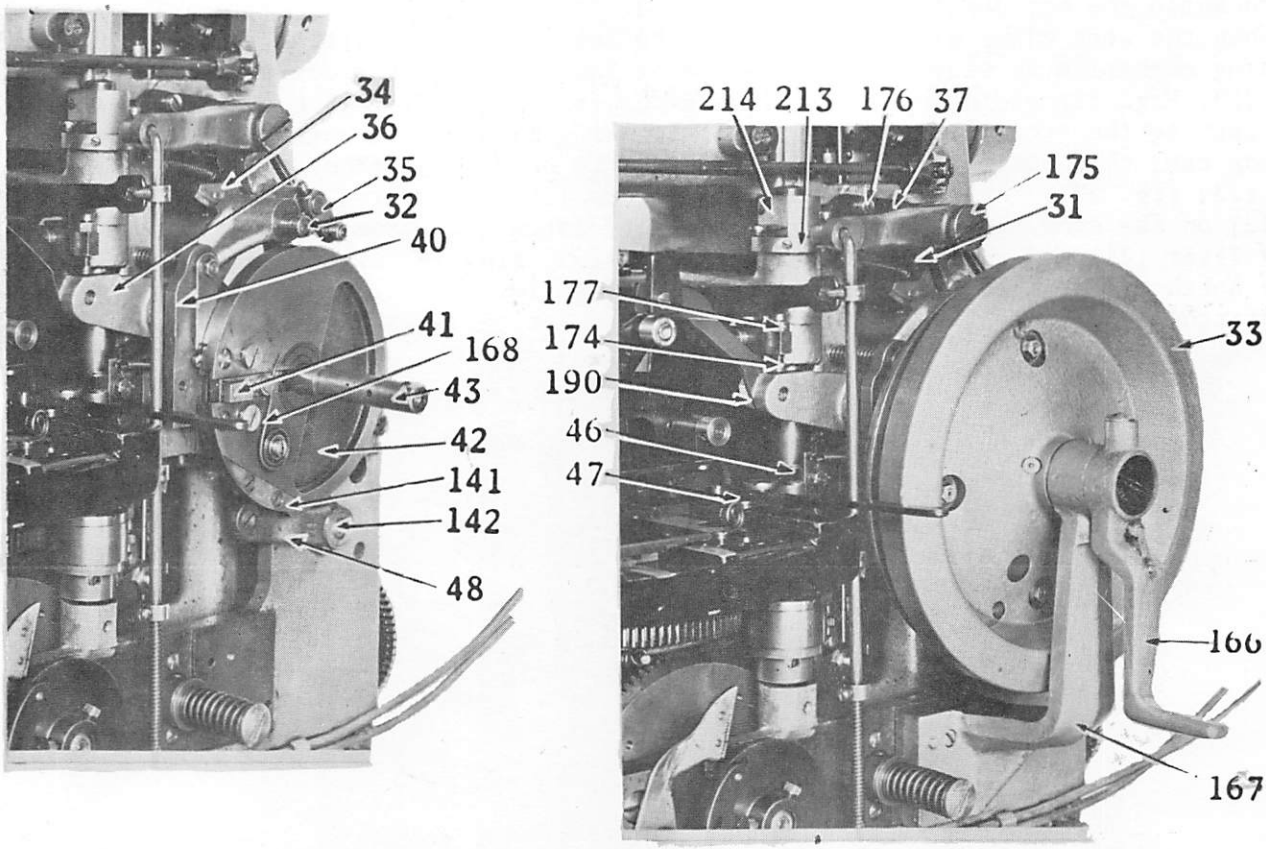

Fig. 11 View of Buttonhole Cutter Pulley Showing Buttonhole Cutter Engaging Stud and Latch

As the clamp closing lever returns to its starting position, the starting lever trip (38, Fig. 13) is forced against the cutting starting lever arm (39, Fig. 13), which in turn actuates the buttonhole cutting starting lever (40, Fig.11) causing the lock (41, Fig. 11) in the buttonhole cutting wheel to engage the loose buttonhole cutting pulley. As the buttonhole cutting wheel (42, Fig. 11) is fastened in a rigid position on the buttonhole cutting shaft (43, Fig. 11), the shaft is rotated when the wheel and loose pulley are locked together by the lock (41). When the buttonhole cutting shaft starts to rotate, the buttonhole cutting levers are moved into action by the operating cams on the buttonhole cutting shaft, and the cutting block and knife are carried forward to cut the buttonhole. After the buttonhole cutter has cut the buttonhole, the safety latch (44, Fig. 13) is moved beneath the safety lever (45, Fig. 13) and holds it out of engagement with the cutting starting lever arm (39). As the cutting levers return to their starting position, the spreader lever (46, Fig. 11) is pushed forward against the spreader plate (47, Fig. 11), thus spreading the work clamps

and stretching the fabric taut under the needle. During the last part of the rotation of the cutting shaft (43), the rapid feed starting lever (48, Fig. 11) is operated, causing the rapid feed to move the work clamp plates with the work to a stitching position, the lock (41) in the buttonhole cutting wheel is withdrawn from the loose buttonhole cutting pulley, releasing the wheel from the pulley and stopping the rotation of the buttonhole cutting shaft. At the same time, the cutting safety cam (153, Fig. 26) starts to rotate and the end of the cutting safety lever (45, Fig. 26) disengages from the notch of the cutting safety cam. This raises the safety lever latch (49, Fig. 13) and holds the cutting starting lever arm (39), thus locking the cutting mechanism so that it cannot operate while the buttonhole is being stitched.

When the work clamp plates are brought to the stitching position, the stitching mechanism is started in operation by the action of the operating plate (50, Fig. 12) riding up the start segment (51, Fig. 12) on the pattern wheel ring, causing the stop lever (52, Fig. 13) to swing back out of engagement with the stop cam, this action causes the rapid feed to be disengaged by the trip lever (53, Fig. 12). At the same time the safety latch unlocking plate (54, Fig. 13) on the stop lever (52) trips the safety latch (44) from beneath the safety lever (45) and the stop lever lock lever (55, Fig. 12) also engages in the notch of the block (56, Fig. 12) on the stop lever link. The machine then stitches the buttonhole and at the completion of the stitching, the stop

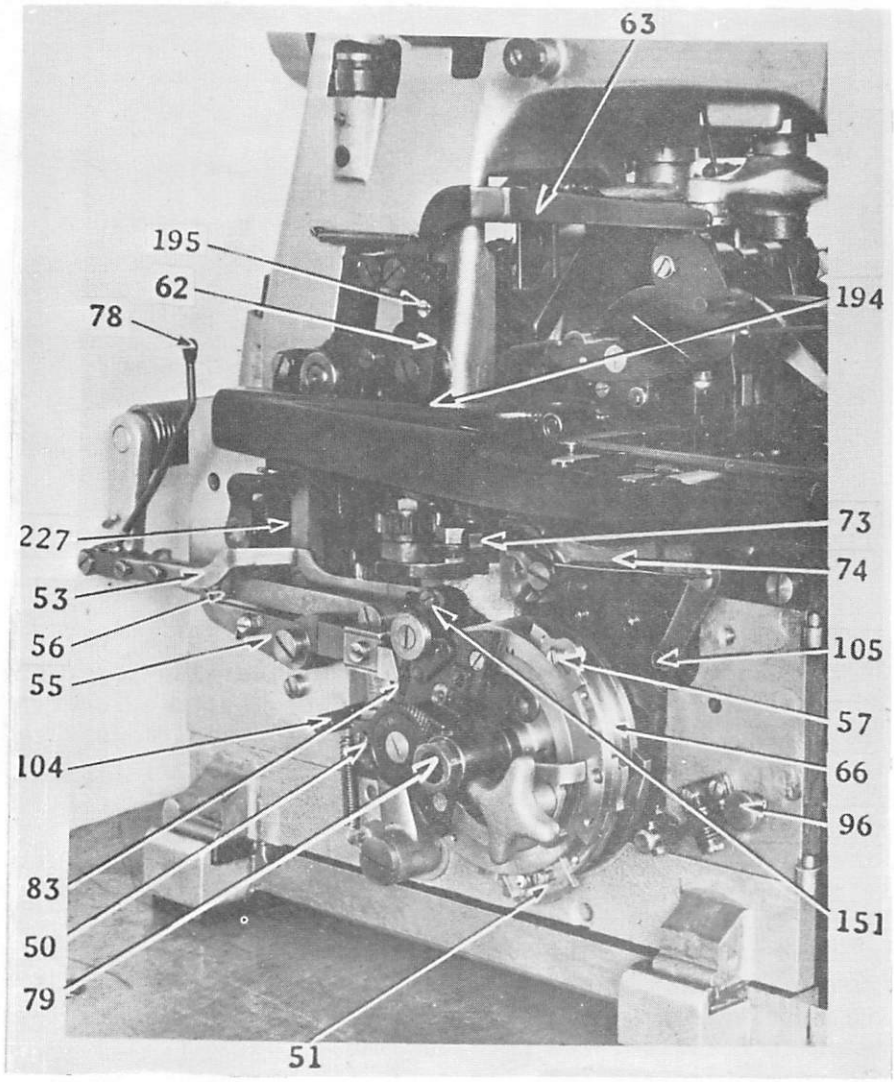

Fig. 12 View of Pattern Wheel and Sewing Mechanism

segment (57, Fig. 12) on the pattern wheel trips the stop lever lock lever (55) disengaging it from the notch of the block (56), causing the stop lever to swing in, ready to lock in the stop cam. As the interlocking slide (58, Fig. 13) is raised by the action of the stop cam (59, Fig. 13), the point of the latch (60, Fig. 13) is lowered fully 5/64 inch below the end of the second rapid feed starting lever (61, Fig. 13). As the interlocking slide (58) drops into the notch of the stop cam (59), it raises the latch (60) which in turn raises the second rapid feed starting lever (61) as it comes into contact with it, thereby starting the rapid feeding mechanism in operation to move the carrier back to a starting position for the next buttonhole.

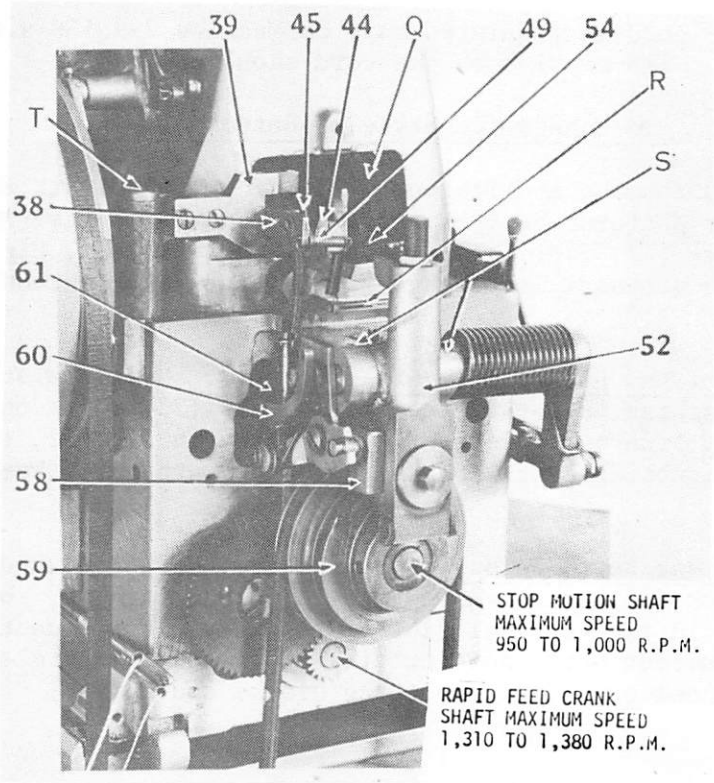

Fig. 13 View of Stop Motion Showing Shaft Speeds

The spreading action on the work clamps is then released and the work clamps are raised by means of the opening lever (63, Fig. 12) and spreader releaser (62, Fig. 12) which are actuated by the opening lever operating link (227, Fig. 12) at the left of the machine. Just before the finish of the rapid feed, the starting rod lock (64, Fig. 6) is tripped, allowing the starting rod (65, Fig. 6) to spring up to an operative position, thus bringing the cutting mechanism to a starting position for cutting the next buttonhole. At the finish of the rapid feeding of the carrier, the rapid feed is disengaged by the tripping point on the inner side of the pattern wheel (66, Fig. 12) coming into contact with the trip (67, Fig. 26).

To Remove the Work Clamp Plates

When it is desired to remove the work clamp plates (13 and 14, Fig. 7) from the machine, for the purpose of making adjustments, this can be done as follows: Unhook the two springs (11 and 12, Fig. 7) on the work clamp plates, then slide each plate outward and lift the plates from the machine.

To Regulate the Tensions

The tension on the needle thread is regulated by the tension regulating thumb nut (68, Fig. 3). The tension on the needle thread should be sufficiently heavy to set the purl of the buttonhole on the underside of the work.

The tension on the looper thread is regulated by the tension regulating thumb nut (69, Fig. 4). The tension on the looper thread should be sufficient to balance the tension of the needle thread and give the desired character to the formation of the stitch.

The tension on the cord is regulated only on Machine 299U130 with the thumb nut (70, Fig. 4). The tension on the cord should be light.

To Change the Style of Buttonhole

When it is desired to make a different style of buttonhole it will be necessary to change the pattern wheel cam blocks as shown in Figs. 14, 15 and 16, buttonhole cutting block (71, Fig. 6) and the cutting knife (72, Fig. 6). The following adjustment is necessary to change from one style of buttonhole to another.

For making Straight-end Buttonholes without a Bar. Having placed the pattern wheel in the machine, see that the locking pin (73) rests on the straight ledge of the work clamp side throw lever (74) as shown in Fig. 12, then place the correct buttonhole cutting block and knife in the machine. (See list of cutting blocks.)

For making Eyelet-end Buttonholes without a Bar. Having placed the pattern wheel with eye cam block (75) as shown in Fig. 14 in the machine, see that the locking pin (73) rests in the vertical slot of the work clamp side throw lever (74), then place the correct buttonhole cutting block and knife in the machine. (See list of pattern wheel cam blocks, cutting blocks and knife.)

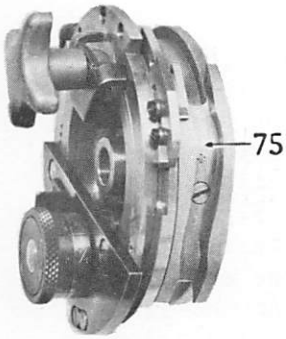

Fig. 14 Pattern Wheel

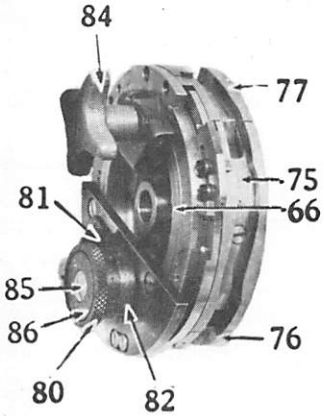

Fig. 15 Pattern Wheel

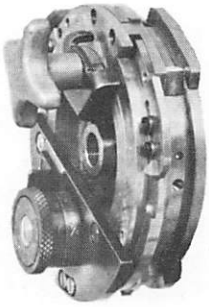

Fig. 16 Pattern Wheel

For making Eyelet-end Buttonholes with a Taper Bar. Having placed the pattern wheel with eye cam block (75) and two taper bar cam blocks (76 and 77) as shown in Fig. 15 in the machine, see that the locking pin (73, Fig. 12) rests in the vertical slot of the work clamp side throw lever (74), then place the correct buttonhole cutting block and knife in the machine. (See list of pattern wheel cam blocks, cutting blocks and knife.)

For making Straight-end Buttonholes with a Taper Bar. Having placed the pattern wheel with two taper bar cam blocks as shown in Fig. 16 in the machine, see that the locking pin (73) rests in the vertical slot of the work clamp side throw lever (74), then place the correct buttonhole cutting block and knife in the machine. (See list of pattern wheel cam blocks and cutting blocks.)

To Remove the Pattern Wheel, push the lever (78, Fig. 12) from you so as to swing the operating plate (50, Fig. 12) back out of range of the pattern wheel. Raise the locking pin (73) out of the vertical slot and swing it backward so that it rests on the straight ledge, then remove the nut (79, Fig. 12) and withdraw the pattern wheel.

To Replace the Pattern Wheel, push it on the shaft as far as it will go, having the position stud enter the small hole in the pattern wheel, then fasten it firmly in position with the nut (79).

To Change the Length of Buttonholes and Taper Bar

Different length of sewing for eyelet-end or straight buttonholes and different length of bars for taper bar buttonholes can be produced by adjustment of pattern wheel and its attachments as follows:

The start segment (51, Fig. 12) and stop segment (57, Fig. 12) should be adjusted so that the sewing length would conform with the figure indicated on the outer index disc (80, Fig. 15) as set to the index plate (81, Fig. 15). (The figures on the inner index disc (82, Fig. 15) and the outer index disc (80) should conform with each other.) The adjusting blocks (83, Fig. 12) should also be adjusted so that they will contact the ends of the segments (51 and 57) when the outer index disc (80) is set to 1-5/8 inches against the index plate (81).

To change the length of a buttonhole, loosen the clamping nut (84, Fig. 15), turn index disc (80) and set to desired length against the index plate (81), then retighten the clamping nut (84).

When making eyelet-end or straight buttonholes without a bar, be sure to use a cutting block the same size as indicated on the outer index disc (80) because the figure on the outer index disc represents the length of buttonhole or the sewing length.

To set the length of taper bar, loosen the screw (85, Fig. 15) fastening the index washer (86, Fig. 15), set the mark on the outer index disc (80) to desired length on the index washer (86), then retighten the screw (85). Loosen the screws fastening the start segment (51) and the stop segment (57), then adjust the segments (51 and 57) so that they will come in contact with the adjusting blocks (83) when the 1-5/8 inches graduation on the outer index disc (80) is set in line with the index plate (81).

To make eyelet-end or straight buttonholes with a bar, use a cutting block which conform with the figure indicated on the inner index disc (82) since the figure on the inner index disc represents the length of the buttonhole and the figure indicated on the outer index disc (80) represents the sewing length.

For instance, to produce a one inch eyelet-end buttonhole with 1/8 inch taper bar, fasten taper bar cams #548392 and #548802 to the pattern wheel (66, Fig. 15), set the mark on the outer index disc (80) to the 1/8 inch graduation for bar length on the index washer (86) and the 1-5/8 inches graduation on the outer index disc (80) in line with the index plate (81). Then in this position, adjust the segments (51 and 57) so that they will come in contact with the ends of the adjusting blocks (83). Next set the one inch graduation on the inner index disc (82) in line with the index plate and tighten the clamping nut (84). Buttonhole cutting block #548766 should be used.

To Change the Number of Stitches in the Buttonhole

The number of stitches in the buttonhole is controlled by the stitch regulating gear (87, Fig. 17) in the left side of the machine and also the differential gears (A,B,C and D, Fig. 18) near the bottom of the machine.

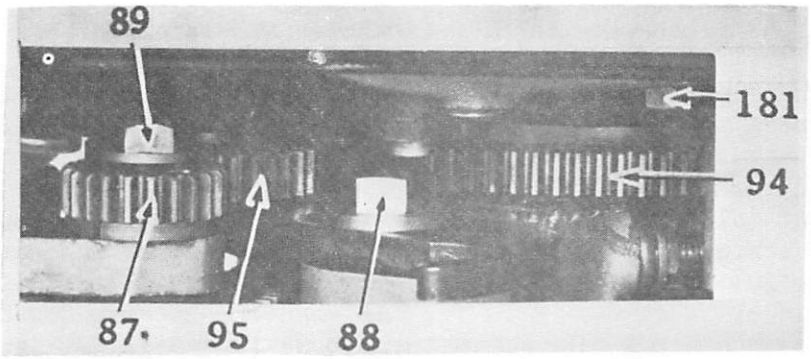

Fig. 17 Changing Stitch Regulating Gear

When it is desired to change the number of stitches in the buttonhole it will be necessary to change the stitch regulating gear or the differential gears.

To remove the stitch regulating gear (87), loosen the screw (88, Fig. 17) and push the slotted lever away from you, then remove the nut (89, Fig. 17) and lift off the gear. To remove the differential gears (A,B,C, and D), tip the machine over to the left onto the machine rest, remove the nut (90, Fig. 18) and take out the gear (D), loosen the screw (91, Fig. 18) fastening the shaft (92, Fig. 18) to the bracket with a wrench and pull out the shaft (92, Fig. 18) and gears (B and C); also remove the nut (93, Fig. 18) and take out the gear (A). The combination of differential gears and stitch regulating gear is as noted in the following chart.

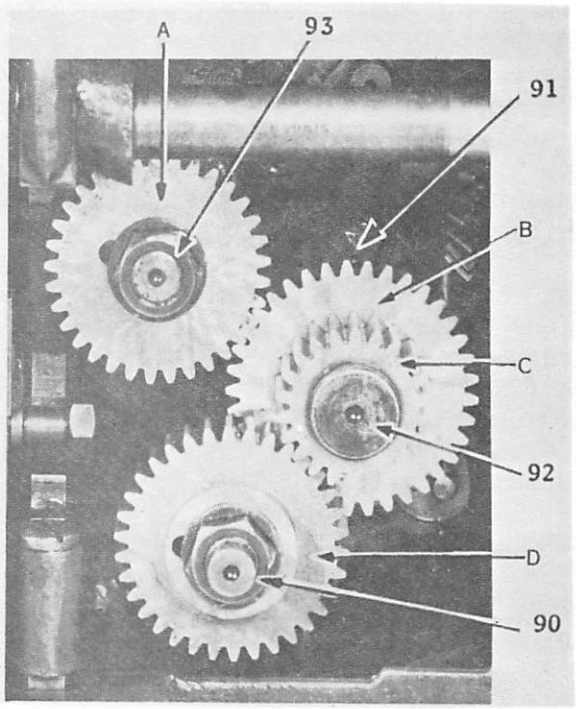

Fig. 18 Changing Differential Gears

Stitches per Inch and Stitches in Eye

Stitch Regulating Gears		Regular 313.5 Dips		Coarse 247.3 Dips		Extra Coarse 216.6 Dips	
		A - B	C - D	A - B	C - D	A - B	C - D
		32 - 38	18 - 38	32 - 38	21 - 35	33 - 37	22 - 34
Gear No.	Teeth	St./in.	St./Eye	St./in.	St./Eye	St./in.	St./Eye
548500	22	36.6	17.3	28.8	13.6	25.2	11.9
548501	26	30.9	14.6	24.4	11.5	21.4	10.1
548502	28	28.7	13.6	22.6	10.7	19.8	9.4
548503	30	26.8	12.7	21.1	10.0	18.5	8.8
548504	33	24.4	11.5	19.2	9.1	16.8	8.0
548505	34	23.6	11.2	18.6	8.8	16.3	7.7
548506	38	21.1	10.0	16.7	7.9	14.6	6.9
548507	42	19.1	9.0	15.1	7.1	13.2	6.3

Having selected the stitch regulating gear desired, place it in position and firmly fasten it with nut (89, Fig. 17). Then rotate the feed wheel ring (94, Fig. 17) and at the same time pull the end of slotted lever toward you until the adjusting gear (95, Fig. 17) is fully in mesh with the stitch regulating gear (87, Fig. 17). After the gears have been correctly set, tighten the screw (88, Fig. 17).

Having selected the differential gears desired, lock the differential gears (B and C) with the pin on the lock washer and insert the shaft (92, Fig. 18), then firmly fasten the shaft to the bracket with screw (91, Fig. 18) using a wrench. Then replace the gears (A and D) and securely tighten the nuts.

To Reduce the Number of Stitches at Eye End of Straight and Eyelet-end Buttonholes

When the stitches are too closely packed at the eye end of the buttonhole, this can be remedied by pulling the knob (96, Fig. 12) located near the front bottom at the left side of the bed outward, thus causing the machine to rapid feed at the eye end and reduce the number of stitches.

If a coarser stitch is desired for the eye end of the buttonhole, it can be obtained by increasing the eccentricity of the eccentric (97, Fig. 3) on the end of arm shaft gear. To increase the eccentricity, loosen the lock screw with a washer located opposite to the adjusting screw (98, Fig. 3), then turn the adjusting screw (98) counterclockwise. To decrease the eccentricity, turn the adjusting screw (98) clockwise. After adjusting the eccentric (97) as required, securely tighten the lock screw.

To Oil the Machine

To ensure easy running and prevent unnecessary wear to the machine, oil should be regularly applied at least once each day to all oil holes and all parts which are in movable contact.

Oil should be applied to the three oil holes (E, F and G, Fig. 3) located on the top of the arm, also to the bushing (99, Fig. 3).

The needle vibrating lever and the upper bearing for the vertical shaft should be oiled through the opening (H, Fig. 7) of the arm cover.

Oil should be applied to the needle vibrating connections on the right side of the arm and all parts connected to this mechanism located on the lower end of the needle bar; also applied through the oil hole (I, Fig. 7) in the face plate to the needle bar and its connections.

Oil should be applied to the movable parts on the work clamp plates (13 and 14, Fig. 7).

Oil should be applied to the oil holes (J and K, Fig. 7) for the slide blocks on the forward and rear side throw levers when in stop position.

All connections of the upper stitch rotating mechanism should have oil applied to all movable parts.

Remove the two work clamp plates and apply oil to the four oil holes for the bearing surface of work clamp carrier and bed, to the spreading mechanism, to the work clamp plate slides, to the looper mechanism, to the cutting lever bracket slides (100 and 101, Fig. 6) and to the oil hole (L, Fig. 6) for the feed wheel axis stud.

Oil should be applied to the oil hole (M, Fig. 6), to the engaging stud (32, Fig. 11) and latches connected to the operation of this mechanism as well as to all movable parts connected with the starting mechanism and to the needle vibrating connection bearing (rear) through the two openings (N and O, Fig. 6) for oiling; also to the auxiliary feed mechanism through the opening (N).

Oil should be applied to the two oil holes for the buttonhole cutting shaft, to the oil cup (102, Fig. 6) in the hub of the cutting shaft pulley (33, Fig. 6), to the oil hole (P, Fig. 6), to the hole in the head of the hand crank cap screw (103, Fig. 6), to all movable parts of the cutting starting mechanism and also to the clamp spreader.

At the back end of the machine, oil should be applied through the opening (Q, Fig. 13) to the rollerway of the cutter carrier cam and its connection, to the cutting lever cam seat, to the buttonhole cutting lever cams and to the lower bearing for the vertical shaft.

Oil should be applied to the oil groove (R, Fig. 13), to the two oil holes (S, Fig. 13) as well as to the stop cam (59, Fig. 13) and also sliding surfaces of the interlocking slide (58, Fig. 13).

Oil should be applied to the oil hole (T, Fig. 13) at the top of stud.

Open the left bed cover and through the opening in the left hand side of the bed, apply oil to the feed wheel cam paths, to the lower stitch rotating connections, to the hinge stud for the lower sector, to the oil holes for the bearings located on the left edge of the bed for the pattern wheel shaft and slide bar and also to the oil pad located immediately above the pawl (104, Fig. 12) inside the left edge of the bed.

The cam groove of the pattern wheel (66, Fig. 12) should be oiled; also the connections from it to the stop lever and to the side throw levers.

Oil should be applied to the oil tube (105, Fig. 12), also to all gears and movable parts.

After opening the front bed cover, oil should be applied to all movable parts of the looper mechanism.

Open the right bed cover, insert the tip of the oil can into the forward opening in the side of the bed and apply oil to the forward bearing (106, Fig. 41) of the rapid feed crank shaft, to the oil hole of the bushing for the pattern wheel shaft located behind the lower cord slacking disc (107, Fig. 4), to the oil hole of the bushing for the rapid feed slide bar and to all movable parts.

Disengage the driving belt from the cutting pulley and tilt the machine backward as shown in Fig. 19, then apply oil to the work clamp spreading mechanism, to all movable parts of the rapid feed tripping mechanism, to the oil holes (U, Fig. 19), to the rapid feed clutch mechanism, to the feed driving auxiliary clutch mechanism, to the slide blocks (108, Fig. 41), to the tension releasing mechanism and to the differential gears.

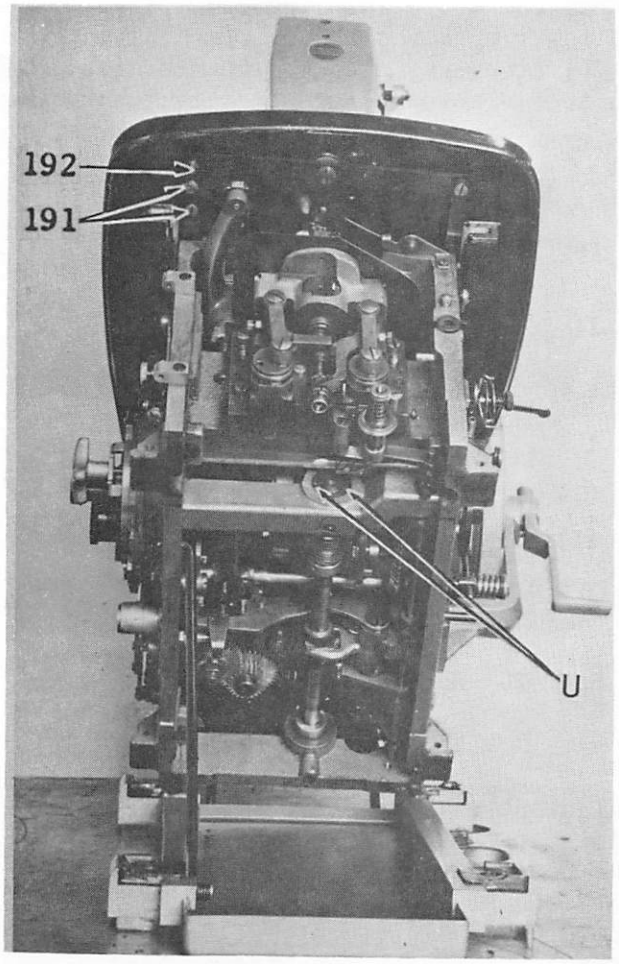

Fig. 19 Showing the Machine Tilting

It is extremely important that the oiling of the machine be carried out diligently each day, using TYPE B or TYPE D OIL sold only by Singer Sewing Machine Company. For description of oils, see inside front cover. This will be an investment that will yield exceptional returns as it will reduce the demand for service as well as reduce the cost of upkeep and will greatly increase the life of the machine.

INSTRUCTIONS

FOR

ADJUSTERS AND MACHINISTS

Needle Vibrating Mechanism

The needle vibrating mechanism is actuated by means of a cam on the upright shaft. When this shaft starts to rotate, the cam moves the connecting rod (109, Fig. 3) back and forth, causing it to rock the bell crank (110, Fig. 3) which in turn moves the link (111, Fig. 3) up and down, carrying with it the reciprocating rod which has the vibrating ring (112, Fig. 20) attached to its lower end. As the vibrating ring moves up and down, it vibrates the needle holder gauge (113, Fig. 20) sideways, causing the needle holder slide (114, Fig. 20) in the groove of the needle holder gauge to vibrate the needle fitted to the needle holder (115, Fig. 20) which is assembled to the needle holder slide (114).

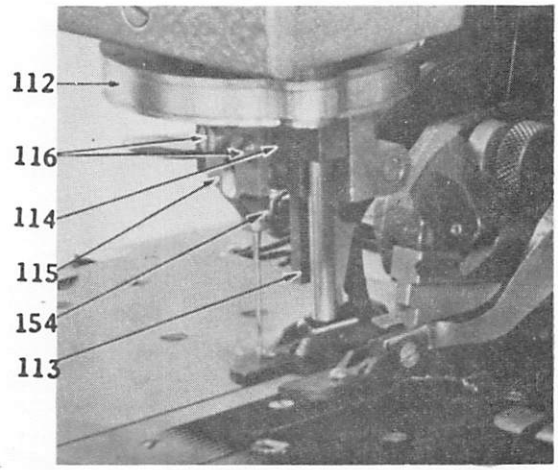

Fig. 20 Needle Vibrating Mechanism

To Align the Needle

To ascertain the alignment of the needle, loosen the screws (116, Fig. 20) and slide the needle holder so that the right hand edge is flush with the corresponding edge of the needle holder slide, as shown in Fig. 20, and tighten the screws. Now clamp a piece of light card under the clamp checks, raise the pin (73, Fig. 12) up and out of the pattern wheel (66, Fig. 12) onto the straight ledge of the lever and then with wrench on pattern wheel clamping nut, turn the machine up the first side of buttonhole, at the same time making a row of light punctures in the card with the needle on the slit or central vibration. Continue up and around the eye. The needle point, while coming down the second side of the buttonhole, should exactly enter the card in the first line of punctures. If the two lines do not coincide, it will be necessary to adjust the needle holder to the right or left as may be required.

After making the above adjustments, turn the machine with the wrench on the pattern wheel clamping nut (79, Fig. 12) to the starting position as referred to under "Caution" on page 46.

To Regulate the Cutting Space

Having followed the instruction for aligning the needle, again clamp a piece of light card under the clamp checks and turn the machine up the first side of the buttonhole, at the same time making a row of light punctures in the card with the needle on the slit or central vibration. Move machine to second side and when the needle holder gauge (113, Fig. 21) faces the front, loosen the eccentric screw (117, Fig. 21). Turn eccentric (118, Fig. 21) and move needle to the right side so that it will be positioned approximately .006 inch to the right of the first line of puncture. After making the adjustment, tighten screw (117) without moving the eccentric (118). This distance may have to be changed according to the thickness and textures of the material being sewn, as the heavier materials require more cutting space than the lighter fabrics and, therefore, a greater distance between the two parallel lines of needle punctures may be required.

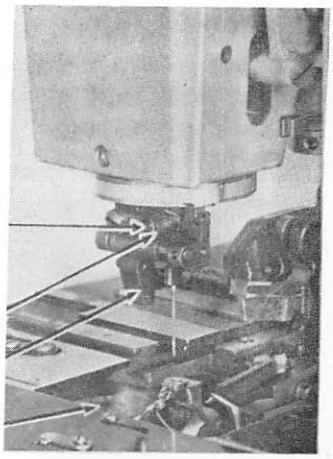

Fig. 21

Needle Vibrating Mechanism Showing Adjustments for Regulating Width of Bight and Cutting Space

Should the cutting space be changed, it will be necessary to adjust the left hand loop retainer (119, Fig. 22) to the left or the right as instructed on page 29.

To Regulate the Width of Bight. The width of bight or stitch is regulated by the adjusting link (111, Fig. 3). To increase the width of bight or stitch, loosen the nut (120, Fig. 3) and move the adjusting link toward you. To decrease the width of bight, move the adjusting link away from you. After making the above adjustment, securely tighten the nut (120).

When changing the width of bight or lateral throw of the needle, it will be necessary to adjust the left hand loop retainer (119) as instructed on page 29.

To Replace and Time Non-threaded Looper

When replacing loopers, first remove work clamp plates and throat plate (21, Fig. 5), then place wrench on pattern wheel clamping nut (79, Fig. 12) and

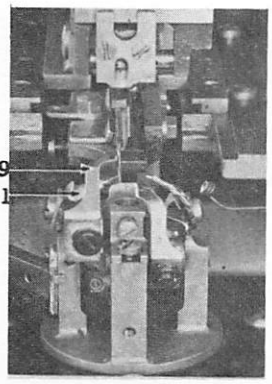

Fig. 22 Showing Correct Timing of Non-threaded Looper

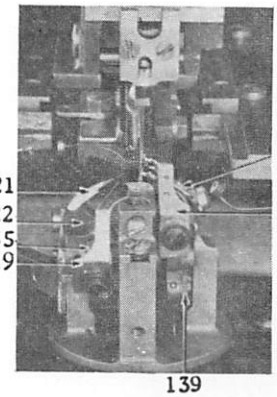

Fig. 23 Showing Correct Timing of Threaded Looper

turn until the operating plate (50, Fig. 12) rides on the start segment (51, Fig. 12), allowing the machine to be turned by hand. Place non-threaded looper (121, Fig. 22) on seat of looper carrier (122, Fig. 23) and turn machine until the needle bar, after descending to its lowest point, has risen so that the timing mark on needle bar is even with top of top needle bar bushing, and the point of the non-threaded looper has advanced to center of the needle. At this position, the point of the non-threaded looper should be adjusted to center of needle, as shown in Fig. 22, and adjusted sidewise so that it just clears the needle.

To Replace and Time Threaded Looper

Turn hand wheel over until looper (123, Fig. 23) can be inserted on looper carrier seat (122, Fig. 23), then turn machine until the needle bar, after descending to its lowest point has risen so that the timing mark on needle bar is even with top of top needle bar bushing and the point of the threaded looper has advanced to the center of the needle. At this position, the looper point should be adjusted to center of needle, as shown in Fig. 23, and adjusted sidewise so that it just clears the needle.

To Replace and Adjust Right Hand Loop Retainer

It is first advisable to adjust the right hand loop retainer (124, Fig. 25). The right hand loop retainer should be set in height so that it just clears the threaded and non-threaded loopers, or so that there is sufficient space between the top side of the looper and underside of the loop retainer for the thread being used to pass through. The loop retainer should also be adjusted sidewise so that, as the needle descends, the loop retainer just clears the needle on the side as shown in Fig. 25, which shows a side and top view of the loop retainer correctly adjusted. The right hand loop retainer should be adjusted forward or backward so that the needle in descending will penetrate the loop held suspended on its horn and also catch the closest thread of the loop on the non-threaded looper between its horn and stripper (125, Fig. 25).

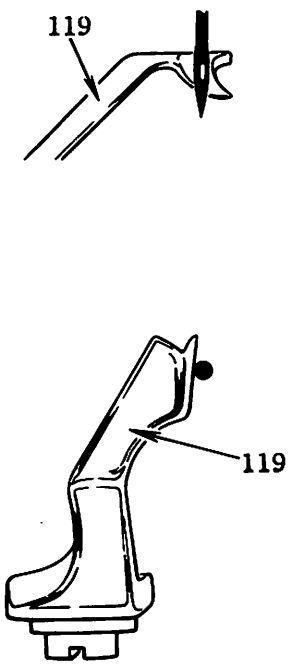

Fig. 24 Showing Correct Relative Positions of Left Hand Loop Retainer and Needle

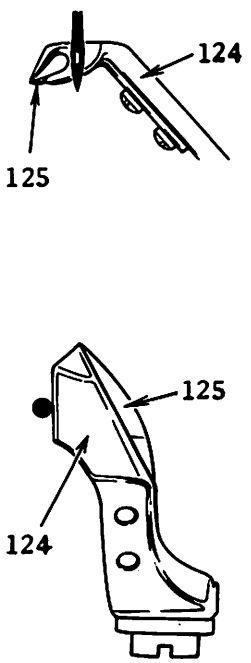

Fig. 25 Showing Correct Relative Positions of Right Hand Loop Retainer and Needle

To Replace and Adjust Left Hand Loop Retainer

To replace and adjust left hand loop retainer (119, Fig. 24), first obtain about the proper amount of bight required by the needle as instructed on page 27. This loop retainer should be set in height so that there is just sufficient space between the top side of the threaded looper and the underside of the loop retainer an amount equal to the thickness of thread being used. It should also be adjusted sidewise so that, as the needle descends, it just clears it on the side, as shown in Fig. 24, which shows a side and top view of the left hand loop retainer correctly adjusted. The left hand loop retainer should be adjusted forward or backward so that the needle in descending will penetrate the loop held suspended on its horn.

It may be necessary, in order to obtain correct setting for either the left or right loop retainer, to use shims which are made in different thicknesses, viz., 548228, .005 inch thick, 548229, .010 inch thick and 548230, .020 inch thick.

To Adjust Needle Guard and Throat Plate

The needle guard (127, Fig. 5) should be set as close as possible to the needle without deflecting it. The throat plate (21, Fig. 5) should be adjusted sidewise by moving the needle guard to the left or to the right as required so that the needle just clears the gimp in the opening of the throat plate at depth stitch and also should be set about .025 inch below the top of the work clamp plates (13 and 14, Fig. 7).

To correctly position the needle guard (127), loosen the two screws holding the needle guard, move the needle guard forward or backward and also sidewise as required, then firmly tighten the two screws. For correct position of the throat plate (21), loosen the throat plate screw (128, Fig. 5), move the throat plate upward or downward as required, then securely tighten the screw.

To Remove and Replace the Looper Frame

Pull open the front bed cover and lift it off the hinge to remove from the machine. See that the sewing mechanism is in stopping position with the interlocking slide (58, Fig. 13) locked in the notch of the stop cam (59, Fig. 13). Follow the instructions under the head "Caution", page 46 and ratchet the machine about half way up the first side of the buttonhole, remove the four looper frame screws, and carefully withdraw the looper frame (129, Fig. 4) from the machine.

To replace the looper frame, make sure that the machine is in the same position as referred to in the preceding paragraph with the needle holder gauge (113, Fig. 20) turned towards the rear of the machine. Turn the stitch forming mechanism in the looper frame (129) so that the post for the throat plate is to the front, set the looper driving crank with the 3/16 inch hole (V, Fig. 4) in the flange of crank to the left and slightly below the horizontal position. Carefully guide the rear edge of the chip guard (130, Fig. 4) between the underside of the lower cutting lever and the top face of the feed wheel, and as the looper frame (129) is gently pushed to the rear, guide it so that the two slots at the rear edge of the chip guard (130) will fit in the neck portion of the two chip guard studs provided on the inside of the bed and the position pins enter the pin holes in the bed. At the same time slightly turn the looper driving crank (131, Fig. 4) back and forth until the driving rollers on the forward end of the bed shaft enter the intermittent wheel which is attached to

the rear side of the looper frame (129) and at the same time rotate the looper bracket back and forth a slight amount so that the rotating gear on looper bracket will go into proper mesh with the lower stitch rotating sector and bring the looper mechanism in alignment with the needle bar. Push the looper frame snug against its seat on the machine, then replace the four looper frame screws. Make sure that the looper frame is snug and square against its seat and securely tighten the screws. Then ratchet the machine to starting position as instructed on page 46.

Alignment of the Needle and Looper Frame

The looper frame (129, Fig. 4) and the needle are aligned before the machine is shipped so that the looper mechanism and the needle, at all points of rotation, are in perfect alignment; that is, the looper frame seat on the frame itself and the machine bed are filed and scraped to adjust the looper mechanism just the right amount in the direction of longitudinal travel and revolved on its seat to adjust it at right angles to the travel of the machine, so that when the machine is in the position where the needle is alongside of either of the loopers or the loop retainers, there will be no change in their relative position during this rotation. When the looper frame is so located, it is doweled in this position and with ordinary care in the handling of the machine, this position should be maintained. For this reason the looper frame should always be replaced upon its own machine according to the identification number. If a new looper frame should be fitted to the bed of the machine, it will be necessary that the looper frame be fitted very carefully and in a like manner. Should the bed shaft, the loop retainer driving crank or the looper driving crank be replaced, retiming of the looper mechanism will be necessary; but before this can be correctly done a check should be made as to the alignment of the needle and the looper frame, during the rotation of the looper mechanism and needle bar.

The straightness of the needle bar should be ascertained and corrected if necessary. Remove the upper rear hinge screw for the stitch rotating connection so that the needle mechanism can be manually rotated. Then select a new needle and inspect the trueness of its point by rolling it on its shank on a flat surface. Remove the needle holder and clean off any burrs or dirt which would tip the needle holder on its seat, then replace the needle holder in position, as shown in Fig. 20 (see description "To Align the Needle", page 26) and insert the inspected needle. Now firmly hold a piece of paper under the point of the needle and make a slight impression with the needle point, then revolve the needle bar and note whether the point revolves without describing a circle. Should the needle point describe a circle, it will indicate that either the needle is still bent or that the seat of the needle holder is throwing the needle point. This incorrect condition should be thoroughly corrected as the needle point will be the foundation upon which the looper mechanism will be aligned and timed. After correcting the alignment of the needle point, assemble the upper rotating sector so that when the machine is on the second side of the buttonhole, the needle holder gauge (113, Fig. 21) is exactly positioned squarely to the front and the screw hole on the rear end of the upper stitch rotating connection is directly over the hole on the end of the upper stitch rotating lever, then assemble the hinge screw. Note that the identification number on the looper frame (129) agrees with the number on the front edge of the machine bed, then turn the hand wheel until the needle moves down alongside of the non-threaded looper and adjust so that it just touches the blade of the needle. Ratchet the machine to the eye end of the buttonhole and note the relation between the needle and side of the non-threaded looper as they both revolve. The relative position of each should be

maintained during the rotation but should they crowd together or gap open, it will indicate that the looper frame is not correctly seated upon the machine. This condition should be corrected by removing all burrs and dirt from the seats and the dowel pin holes of the looper frame and the machine bed until no further crawl is noted between the non-threaded looper and the needle.
As the machine is on either the first or second side of the buttonhole a greater percentage of time, the looper frame position is vital to the loopers longitudinally and to the loop retainers laterally.

To Assemble Looper Bracket

The removal of the looper bracket (132, Fig. 4) with its assembly from the looper frame (129, Fig. 4) will destroy the adjustment of the loopers and loop retainers with respect to the needle. This condition will require that the correct adjustment be restored when reassembling. After replacing and adjusting nuts (133, Fig. 4) so that the looper bracket assembly has a free running fit without any end play, replace on the looper driving bar (134, Fig. 4) the four adjusting nuts (135, Fig. 4) with their two washers between the two nuts of each pair and with the looper driving connection (136, Fig. 4) between the pairs, then assemble the looper driving connection slide rod and its link to the driving crank. Position the lower face of the bottom adjusting nut flush with the lower end of the looper driving bar (134) and lock it in position with the second nut. Adjust and lock the upper pair of adjusting nuts (135) in position so that the looper bracket (132) will turn freely without the looper driving connection (136) having any shake between the adjusting nuts (135). Now replace on the loop retainer driving bar (22, Fig. 4) the four adjusting nuts (137, Fig. 4) with their two washers between the two nuts of each pair with the loop retainer driving connection (138, Fig. 4) between the pairs. Position the lower face of the largest adjusting nut (137) 5/64 inch below the extreme end of the driving bar (22) and lock it in position with the second nut. Adjust and lock the upper pair of adjusting nuts (137) in position so that the looper bracket (132) will turn freely without the loop retainer driving connection (138) having any shake between the adjusting nuts (137). Now place the looper frame (129) on the machine as instructed on pages 29 and 30.

The above adjustment of the adjusting nuts (135) on the looper driving bar (134) should position the loopers correctly so that the point of the threaded looper (123, Fig. 23) and non-threaded looper (121, Fig. 22) will be at the center of the needle on their respective strokes when the needle bar has risen, so that the timing mark on needle bar is even with the top of needle bar bushing. It may be found that the point of one of the loopers is ahead or back of the center of the needle. If such is the case, make sure that the distance between the points of the loopers is 9/32 inch on the 299U130 machine and 5/16 inch on the 299U110 machine. Then readjust the adjusting nuts (135) for the looper driving bar (134) up or down, as the case may be, to bring the point of the looper to the center of the needle. Any adjustment of the looper driving bar moving the looper to or from the center of needle will throw the other looper in the opposite direction, therefore each looper should be checked with respect to its own dip of the needle.

The loop retainer driving bar adjusting nuts (137) should now be positioned to raise or lower the driving bar (22), thus positioning the left hand loop retainer seat on the carrier (255, Fig. 23) in a vertical position when loop retainer driving bar (22) is at its uppermost throw. When the correct position of loop retainer driving bar is obtained, turn hand wheel until the loop retainer driving bar is at its lowest point and check if the right hand loop retainer seat on the carrier is in a vertical position or not. Should the loop retainer seat

be out of vertical position, it should be corrected by adjusting the eccentric bushing (139, Fig. 23). This should bring the needle down through the center of the loop made by the horn of the respective loop retainers. Should the needle not penetrate the center of the loop, it will be necessary to adjust the loop retainer by removing or adding shims as referred to on pages 28 and 29. After making the adjustments to the looper driving bar (134) and the loop retainer driving bar (22), ratchet the machine as referred to on page 46 to see that there is no bind to the adjusting nuts as the looper bracket (132) is rotated.

To Time the Looper Driving Crank

When replacing a looper driving crank (131, Fig. 4) to the looper frame (129, Fig. 4), position the looper driving crank gear in proper mesh with the looper driving gear so that the timing marks on each gear are in line with each other. Turn the looper driving crank until the set screw on the crank gear is downward and holding the driving gear and crank gear in this position, turn the looper driving crank (131) so that the 3/16 inch hole (V, Fig. 4) in its flange is to the left and the lower edge of hole is over and exactly in line with the top edge of the left hand counterbored screw hole in the flange of the looper driving crank bushing which is directly under the flange of the looper driving crank (131) when looper frame is in an upright position, then slightly tighten set screw. Now place looper frame on the machine as instructed on pages 29 and 30. After making sure that the looper driving bar (134, Fig. 4) is assembled with the lower adjusting nut (135, Fig. 4) flush with the lower end of the looper driving bar (134), as instructed on page 31, set the non-threaded looper (121, Fig. 23) so that the forward edge of the non-threaded looper (121) seat is flush with the forward edge of the seat on the looper carrier (122, Fig. 23). Turn the hand wheel until the needle bar, after descending to its lowest point on the depth stitch, has risen so that the timing mark on needle bar is even with the top of top needle bar bushing and advance or retard the looper driving crank (131) a very slight amount until the point of the non-threaded looper (121) is opposite the center line of the needle. (This may be done by turning the hand wheel over until it is noted that the looper driving crank remains stationary and holding the hand wheel in this position and with a punch striking the 3/16 inch hole (V, Fig. 4) in the flange of the looper driving crank.) Now turn the hand wheel over until the needle bar, after descending to its lowest point on the slit stitch, has risen so that the timing mark on needle bar is even with the top of top needle bar bushing, then position the point of the threaded looper (123, Fig. 23) so it is opposite the center line of the needle. Carefully measure the distance between the points of the non-threaded looper (121, Fig. 23) and the threaded looper (123). Should the distance be greater than 9/32 inch on the 299U130 machine (5/16 inch on the 299U110), turn the looper driving crank (131) a slight amount in a counterclockwise direction while holding the hand wheel or should the distance be less than 9/32 inch (5/16 inch), turn the looper driving crank (131) a slight amount in a clockwise direction. Now proceed as before to bring the needle bar to the timing mark on the depth stitch and reposition the non-threaded looper (121) to the center of the needle and then bring the needle bar to the timing mark on the slit stitch and reposition the threaded looper (123) to the center of the needle. Great care must be taken in positioning the looper driving crank and the two loopers so that the distance between their points is exactly 9/32 inch (5/16 inch) and their points are exactly at the center of the needle on its respective vibration when the needle bar has risen to the timing mark on the needle bar. Now make sure there is no end play in the bearing of the looper driving crank (131) after which the pin hole for the looper driving crank may be drilled and reamed.

To drill and ream the pin hole for the looper driving crank gear, remove the looper frame from the machine and proceed to drill each side of the hub of the looper driving crank gear half way into the shaft. After reaming hole to the proper depth, remove the gear from the shaft end of the looper driving crank and thoroughly clean out all chips and burr the shaft where the pin hole breaks through and reassemble the parts onto the looper frame with the timing marks of the two gears in line with each other.

To Time the Loop Retainer Driving Crank

When replacing a loop retainer driving crank (140, Fig. 4) to the looper frame (129, Fig. 4), position the looper driving crank gear in proper mesh with the looper driving gear so that the timing marks on each gear are in line with each other. Hold the driving gear and crank gear in this position, turn the loop retainer driving crank (140) so that the 3/16 inch hole (W, Fig. 4) in its flange is to the right, exactly in line with the right hand counterbored screw hole in the flange of loop retainer driving crank bushing which is directly under the flange of the loop retainer driving crank (140) when looper frame is in an upright position, then slightly tighten set screw. Now place looper frame on the machine as instructed on pages 29 and 30. After making sure that the loop retainer driving bar (22, Fig. 4) is assembled with the lower adjusting nut (137, Fig. 4) 5/64 inch below the extreme end of the driving bar (22) as instructed on page 31, assemble the right hand loop retainer (124, Fig. 23) to the loop retainer carrier seat in relation with the loopers as instructed on page 28. The right hand loop retainer (124) should be set so that it will be stationary at its extreme advance throw when the needle is descending on the slit stitch and also should be adjusted so that the horn of the right hand loop retainer will catch the loop held on the non-threaded looper (121, Fig. 23) as explained on page 28. This may be done by turning the hand wheel over until it is noted that the loop retainer driving crank (140) remains stationary and holding the hand wheel in this position, turn the loop retainer driving crank (140) clockwise or counterclockwise as required by striking the 3/16 inch hole (W) in the flange of loop retainer driving crank with the use of a punch. When above adjustment is made, the left hand loop retainer will also be correctly positioned. After correct position is obtained, remove the looper frame from machine and securely tighten the loop retainer driving gear set screw. Now make sure there is no end play in the bearing of the loop retainer driving crank (140) then proceed to drill each side of the hub of the loop retainer driving crank gear half way into the shaft. After reaming the hole to proper depth, remove the gear from the shaft end of the loop retainer driving crank and thoroughly clean out all chips and burr the shaft where the pin hole breaks through and reassemble the parts onto the looper frame with the timing marks of the two gears in line with each other.

Rapid Feed Mechanism

The purpose of the rapid feed is to move the work quickly from starting position to sewing position and at the completion of the stitching of the buttonhole to quickly move the work from sewing position to starting position for the next buttonhole.

The rapid feed mechanism is entirely automatic in operation and is actuated by driving means independent of that which operates the stitch forming mechanism.

When the machine is started in operation, the rapid feed is actuated first by the action of the rapid feed tripping point (141, Fig. 11) on the roller of the rapid feed starting lever (48, Fig. 11) (on the 299U110 machine, the

rapid feed is actuated first by the action of the stud on the end of clamp closing lever (228, Fig. 8) riding up the incline of the rapid feed starting latch (224, Fig. 8)), causing it to rock the shaft (142, Fig. 11) which in turn trips the latch (143, Fig. 26) and allows the rapid feed starting pawl (104, Fig. 26) to engage the stud (144, Fig. 26). As the pawl engages the stud, it causes the fork (145, Fig. 26) to withdraw the sleeve (146, Fig. 26) from the clutch levers, thereby engaging the clutch disc (147, Fig. 26) which rotates the shaft (148, Fig. 26), causing the carrier to be moved to a sewing position. The rapid feed clutch is held in engagement by the fork extension plate (149, Fig. 26) as it drops into the notch in the rapid feed slide bar lock (150, Fig. 26). When the work clamps reach the sewing position, the rapid feed movement is suspended by the start segment (51, Fig. 12) pushing the stop lever (52, Fig. 13) back and starting the stitch movement and at the same time causing the lock trip extension lever (53, Fig. 12) to pull back the lock trip extension (151, Fig. 12) disengaging the rapid feed slide bar lock (150) from the fork extension plate (149) allowing the fork (145) to move the sleeve (146) into contact with the clutch levers (152, Fig. 26), thereby disengaging the clutch disc (147) and stopping the rapid feed movement.

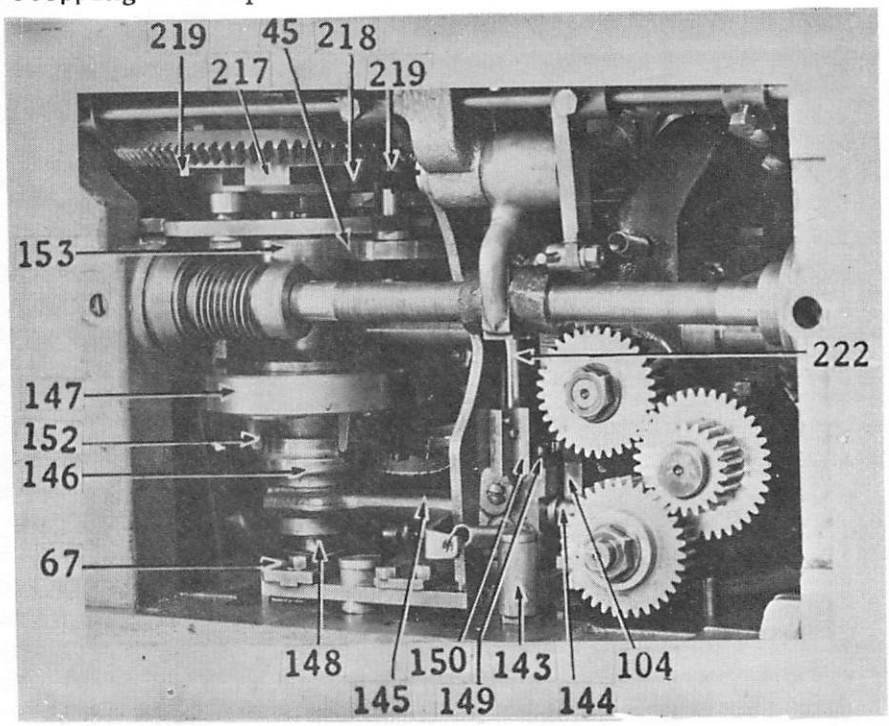

Fig. 26 Rapid Feed in Operation

At the completion of the stitching of the buttonhole, the rapid feed is actuated a second time by the downward action of the interlocking slide (58, Fig. 13) raising the end of the rapid feed starting lever (61, Fig. 13), causing it to rock the shaft (142, Fig. 11) which in turn trips the latch (143) and allows the rapid feed starting pawl (104) to engage the stud (144). As the pawl engages the stud, it causes the fork (145) to withdraw the sleeve (146) from the clutch levers, thereby engaging the clutch disc (147) which rotates the shaft (148) causing the carrier to be returned to a starting position. The rapid feed movement is finally suspended by the tripping point on the inner side of the pattern wheel coming into contact with the adjustable trip (67, Fig. 26) which rocks the rapid feed slide bar lock (150) out of contact with the fork extension plate (149). This allows the fork (145) to move the sleeve (146) into contact with the clutch levers, thereby disengaging the clutch disc (147) and stopping the rapid feed movement.

To Remove the Clutch Rollers. It is important that the clutch rollers (155, Fig. 28) be absolutely true and of equal diameter so that they will all grip against the rim of the rapid feed driving disc. The clutch rollers may become so worn as to interfere with the perfect operation of the clutch, allowing the clutch to slip. When this occurs, the worn clutch rollers should be removed and new rollers inserted in their place as follows:

Remove the pattern wheel. This will give access to the clutch rollers through the opening in the left side of the machine. Then slightly loosen the screw (156, Fig. 27) which holds the retainer plate (157, Fig. 27) in position and remove the plate. Do not take out the screw (156).

Using the tweezers, carefully draw out the clutch roller (155), at the same time inserting a thin piece of sheet metal between the roller and the plunger (158, Fig. 28) to keep the spring and plunger from dropping out of the retainer. In case the spring and plunger should drop out of the retainer, dip them in heavy grease which will help to hold them when they are replaced.

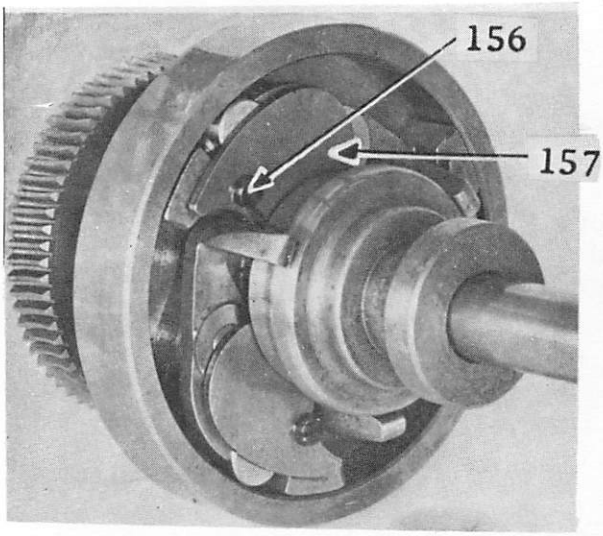

Fig. 27 Rapid Feed Clutch Showing Position of Sleeve when Clutch is Disengaged

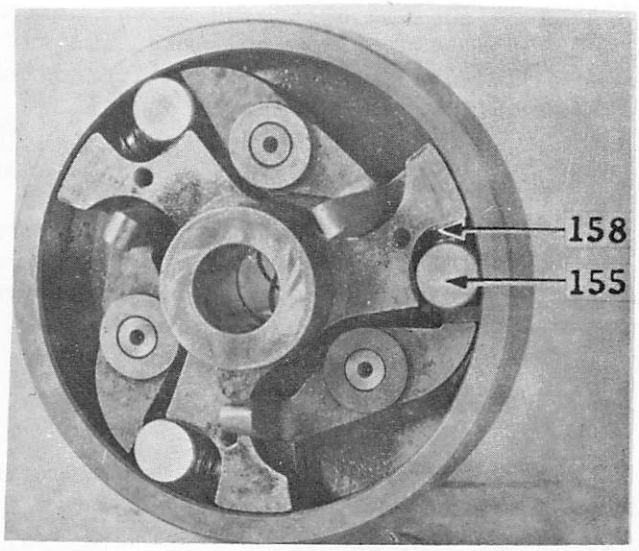

Fig. 28 Rapid Feed Clutch Disc Showing Clutch Rollers, Springs, Levers and Carrier Assembled

To Replace the Clutch Roller, hold the roller with the tweezers and place it into position in the clutch, at the same time holding the spring and plunger in the retainer with the thin piece of sheet metal and after the roller has been replaced, withdraw the piece of sheet metal. Then replace the retainer plate (157) using the tweezers, and tighten the screw (156).

Buttonhole Cutting Mechanism

As the buttonhole is cut before sewing on the 299U130 machine, the buttonhole cutter must cut the material cleanly and draw out the cut eye (or slug) free from the material, for, if not cleanly cut and the slit should contain a strand of the material not cut, it will interfere with the proper spreading of the material after the cutting operation is completed, or, if the eye slug is not cleanly cut and removed by the action of the cutter, it is liable to be sewed in at the eye, or the needle deflected and produce imperfect sewing. It is, therefore, necessary that the buttonhole cutter be smooth and sharp without nicks or flaws and the cutting block should bear evenly on the cutter, making an

even impression of equal depth on the cutting surface of the block.

As the buttonhole cutter cuts the hole after stitching on the 299U110 machine, it is necessary to have the cutter in perfect alignment so that it will cut exactly in the center of the buttonhole without cutting the stitches.

Buttonhole Cutting Knife. The buttonhole cutting knife (72, Fig. 29) is made in two styles: for eyelet-end buttonholes and for straight buttonholes. The cutting knife used must conform with the cutting block (71, Fig. 29) which is set in the machine. For example, in Machine 299U130, for cutting a one inch eyelet-end buttonholes with medium size eye, without bar, cutting knife 256654 must be used with cutting block 548766 and for cutting 3/4 inch straight buttonhole, cutting knife 548066 must be used with cutting block 548754.

The knife is held in position on the lower cutting lever and can be adjusted sidewise or endwise as may be necessary to align the knife with the center of the stitching of the buttonhole. The adjustable stop (159, Fig. 29) is provided to correctly locate the knife endwise so that the eyelet end of the knife will cut exactly in the eye of the buttonhole. When this stop is once set in position, it is unnecessary to change it as the knife can be removed and replaced or a new knife substituted, the correct alignment of the knife endwise being determined by having the projection on the stop (159) enter the notch in the right side of the knife. The buttonhole cutting knives are made interchangeable, having the same relative position in the machine.

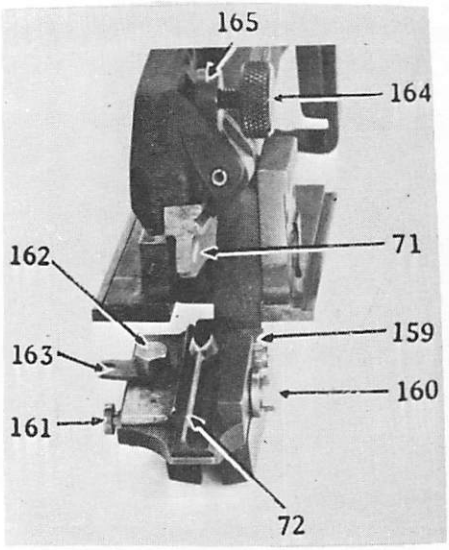

Fig. 29 Showing the Cutter

In case the knife is not cutting in the center of the buttonhole, it can be adjusted sidewise by means of the screw (160, Fig. 29) at the right of the knife and a screw (161, Fig. 29) at the left of the knife, after loosening the clamping screw underneath the knife in the knife holder. To move the knife to the right, take out the knife as instructed, loosen the clamping screw underneath the knife in the knife holder, then loosen the screw (161) at the left of the knife and tighten the screw (160) at the right of the knife. To move the knife to the left, loosen the screw at the right of the knife and tighten the screw at the left of the knife. When the correct position of the knife is obtained, firmly tighten the three screws.

To remove the knife (72) loosen the hexagon screw (162, Fig. 29) only enough to loosen the eccentric lever (163, Fig. 29) and insert the end of the screwdriver in the hole in the eccentric lever (163), then turn the lever to the front and lift out the knife. To replace the knife, slide the knife into position from the left so that the projection on the stop (159) will enter the notch on the right side of the knife. Then with the screwdriver, turn the eccentric lever (163) as far to the rear as it will go and tighten the hexagon screw (162).

The cutting edge of the knife is made parallel with the base (see Fig. 30) A to A, and the knife serves as a master foundation for cutting, while the cutting block is fitted to have the cutting edge of the knife bear evenly the whole length of the block.

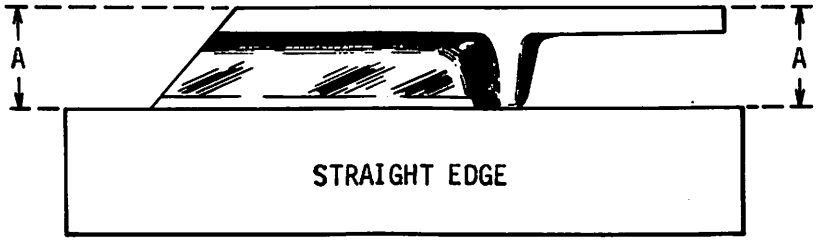

Fig. 30 Perfect Knife Edge

It is very important that the buttonhole cutting knives and cutting blocks are fitted and adjusted with great care, in order to ensure successful results.

Buttonhole Cutting Knives

Machine Class	Part No.	Size of Eye	Shape of Eye
299U130	548065	.140 x .260	
299U110 - 130	256654	.135 x .228	
299U110 - 130	548886	.120 x .180	
299U110	548804	.100 x .125	
299U110 - 130	548066	Straight	—

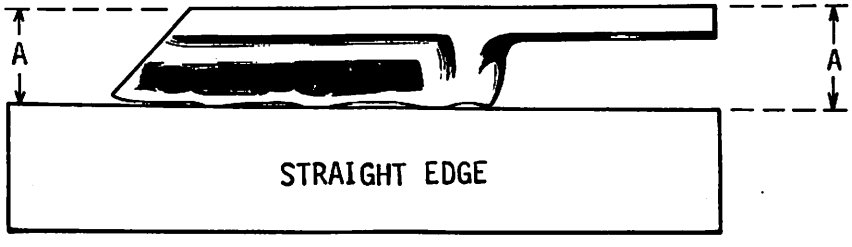

Fig. 31

Never attempt to grind the knife by hand. It is quite impractical to grind the cutting blade and eye portion by holding the knife against an emery wheel. The result of grinding by hand is illustrated by Fig. 31.

The only practical way to re-dress a knife is to lap the cutting surface parallel with its base, as shown in Fig. 30, until the nick or unevenness is removed. But this is a slow and tedious undertaking. It is much cheaper to put in a new knife.

Buttonhole Cutting Block. The buttonhole cutting block (71, Fig. 29) is made in various sizes for different lengths and styles of buttonholes. For example, in Machine 299U130, for cutting a one inch eyelet-end buttonhole without bar, cutting block 548766 must be used, and for cutting 3/4 inch straight buttonhole, cutting block 548754 must be used.

The buttonhole cutting block is fastened to the upper cutting lever by means of the thumb screw (164, Fig. 29) on the clamping plate (165, Fig. 29). The cutting block must be pushed back against the stop in the cutting lever, so that when it

descends upon the knife, the impression of the knife will be central in the cutting face of the block. All cutting blocks are made interchangeable, having the same relative position in the machine.

To remove the cutting block from the machine, loosen the thumb screw (164) and draw the cutting block toward you. When replacing the cutting block, push it as far back as it will go in the upper cutting lever until it is against the stop, then retighten the thumb screw (164).

To Reface Steel Cutting Block. When a new knife is placed in the machine and it is desired to use a block that has previously been in use (see Fig. 32) with another knife, or when the cutting block is so worn that it prevents clean cutting of the buttonholes, it is necessary to file the marks made in the cutting block until the impression of the knife is nearly removed, and only a faint line of impression remains (see Fig. 33). Care should be taken in filing not to entirely remove the mark of the knife at any point.

Fig. 32

Fig. 33

After filing, insert the cutting block in position on the cutting lever; then slowly turn the cutting shaft by hand, bringing the knife into contact with the cutting block, with only enough pressure to ensure cleanly cut buttonholes. After the impression is made on the block by the knife, back up the knife out of contact with the cutting block and remove the cutting block from the machine and examine the mark to ascertain if the knife registers accurately with the old marks of the former knife.

The correct registration of the knife and cutting block is illustrated by Figs. 34 and 37. Should knife not accurately register in the old marking (see Figs. 35 and 36) the cutting block should be filed until nothing but a faint line

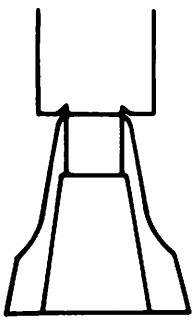

Fig. 34

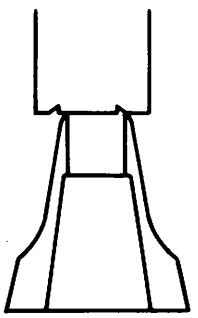

Fig. 35

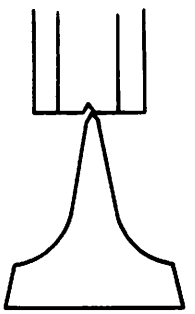

Fig. 36

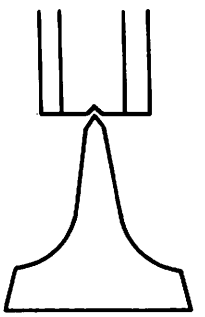

Fig. 37

(Illustrations Double Size)

of the knife remains. When this is done, place the block in position in the machine again and turn the cutting shaft to again bring the knife and block into contact, after which remove the block and see if the knife has made an even mark of equal depth in the cutting block. If the whole complete outline of the knife is not shown it will not cut the buttonhole properly and must be filed until a perfect impression is shown.

Proper Use of Cutting Blocks

To obtain the best results, a cutting block for each different size buttonhole should be used. For example: a cutting block that has been indented by a knife should not be used in connection with a different size or shape knife, as the lines made by the two different knives would cross at the apex of the eye and strands of the material would be forced into the depression made by the first used knife, resulting in improper cutting of the threads of the fabric where the lines of indentation meet.

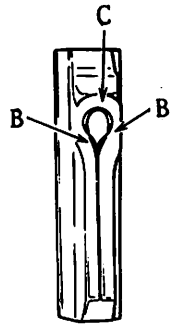

Fig. 38 Result of Two Knives Used on One Block

Fig. 38 illustrates a cutting block that has been used to cut a buttonhole with both a large and a medium size buttonhole cutting knife. It will be noted that the markings made by the two different knives cross each other at the apex B B, also the circular eye markings meet at C. Continued use of this cutting block, under these circumstances, would not improve this condition. In fact, the cutting would become more ragged as the indentation becomes deeper. Use a different cutting block for each size and shape buttonhole.

To Regulate the Pressure on the Cutting Knife. The pressure on the cutting knife (72, Fig.6) is regulated by means of the screw in the wedge shaped device located at the rear end of the upper cutting lever. This screw is accessible through the opening in the upright part of the arm and is located on the left side of the upper cutting lever with its slotted end toward the front of the machine. To increase the pressure on the cutting knife, turn this screw over to the right. To decrease the pressure, turn this screw over to the left. The pressure on the cutting knife should be only heavy enough to ensure clean cut buttonholes. This is particularly important when using a steel cutting block, as too much pressure will ruin the knife.

The correct amount of pressure required for the material being sewn can be ascertained by removing the belt from the cutting pulley and turning the cutting shaft over towards you by means of the hand crank. When the final pressure is exerted on the cutting knife a slight click should be heard as the knife comes into contact with the cutting block after passing through the material.

Never Use Excessive Pressure on the Cutting Knife

After continuous use, should the buttonhole cutting knife appear to require more pressure by adjusting the cutting wedge, do not increase the pressure until you have carefully examined the cutting knife to make sure that there is not a nick or dull spot in the cutting edge. Remove the cutting block and examine it, and if the indentations of the cutting knife are quite deep, the block should be re-dressed by filing the cutting surface until satisfactory cutting results are obtained.

When the slit and eye are cut clean, no change of adjustment of the cutting mechanism should be necessary until after thousands of buttonholes have been cut. Then, if the knife appears dull, it should be removed and resharpened or a new knife substituted for it.

Only a slight increase of the pressure is necessary by the adjustment of the cutting wedge to further increase the use of the cutting knife.

Should the buttonhole cutting block (71, Fig. 6) descend upon the work and stop, the cutting of the buttonhole can be completed by turning the hand crank at the right of the machine over toward you, care being taken to bring the hand crank to a full stop. The stopping of the buttonhole cutting block upon the work may be caused by the cutter driving belt being too loose or too much pressure on the cutting block. When this occurs, the belt should be tightened to the required tension or the pressure on the cutting block should be decreased, as the case may be.

To Replace the Buttonhole Cutting Driving Lock 548059
(See Fig. 11)

Remove the cutting shaft hand crank (166), the cutting shaft support bracket (167) and the cutting pulley (33), then unhook the spring (168).

With machine in starting position, trip the buttonhole cutting mechanism by swinging the cutting starting lever (40) to the left. Unscrew the four stop plate screws (two long and two short) and with the tweezers extract the stop plate. Now remove the cutting driving wheel lock (41).

To reassemble the mechanism, insert the cutting driving wheel lock (41) in the slot on the driving wheel (42) and make sure that it is a free sliding fit. With the tweezers, insert the driving wheel lock stop plate with the circular mill cut towards the hub and the square mill cut towards the rim of the driving wheel and insert the two long screws with lock washers and the two short screws tightly in place. It is imperative that these four screws are especially tight, as the continual shock which they receive each time the buttonhole cutting mechanism is operated is liable to loosen them. Now replace the end of the lock spring (168), swing the cutting starting lever to the right while holding the driving wheel lock against the stop plate and reassemble the pulley, washer, shaft support, hand crank and cap screw to the end of cutting shaft.

To Regulate the Amount of Stretch of the Material Held in the Work Clamps

Machine 299U110

After the work clamps descend upon the work, they automatically spread the fabric, stretching it taut under the clamps. The spread of the work clamps should be regulated to stretch the fabric sufficiently to keep the fabric from rising with the needle and to prevent the loss of the needle loop below the work, resulting in the skipping of stitches.

To increase the amount of stretch of the fabric, increase the spread of the work clamp plates by loosening the lock screws (169 and 170, Fig. 7) and turning the adjusting screws (171 and 172, Fig. 7) clockwise. The adjusting screw should not be turned in so far as to prevent the work clamp plates coming into contact with the stop (173, Fig. 21). To decrease the amount of stretch, decrease the spread of the work clamp plates by turning the adjusting screw counterclockwise. In adjusting the adjusting screws (171 and 172) be sure that the left and right work clamp plates spread open equally. When the required amount of stretch of the fabric is obtained, firmly tighten the lock screws (169 and 170).

To Regulate the Amount of Spread of the Material Held in the Work Clamps

Machine 299U130

The spreading apart of the cut buttonhole is important. The amount that the cut buttonhole should be spread is determined by the thickness and texture of the material. Thick or hard material requires more spread than thin material. The buttonhole slit should be spread sufficiently to allow the needle in descending through the slit to clear the edges of the material.

The letter A in Fig. 39 indicates the needle puncture through the material called the "depth stitch". The letter B in Fig. 39 indicates the center of slit of the buttonhole. The distance between the needle puncture A and the buttonhole slit B represents the bight. The letters C and D in Fig. 40

Fig. 39 Showing Slit of Buttonhole Before Spreading

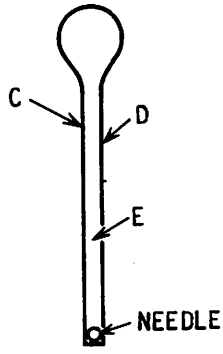

Fig. 40 Showing Slit of Buttonhole After Spreading

indicate the cut edges of the slit. The letter E in Fig. 40 indicates the distance the slit is spread. The correct position for the needle in the spread slit is indicated in Fig. 40, showing that the needle should clear the edges of the material when in a spread condition ready for sewing. If the needle should strike the cut edges of the material, it would be likely to fray the slit, leaving loose ends of the fabric to protrude between the overseaming stitches and present an untidy appearance.

To increase the amount of spread of the buttonhole slit, increase the spread of the work clamp plates by loosening the lock screws (169 and 170, Fig. 7) and turning the adjusting screws (171 and 172, Fig. 7) clockwise. The adjusting screw should not be turned in so far as to prevent the work clamp plates coming into contact with the stop (173, Fig. 21). To decrease the amount of spread of the buttonhole, decrease the spread of work clamp plates by turning the adjusting screw counterclockwise. In adjusting the adjusting screws (171 and 172) be sure that the left and right work clamp plates spread open equally. When the required amount of spread of the buttonhole slit is obtained, firmly tighten the lock screws (169 and 170).

To Adjust Clamp Closing Mechanism
(See Fig. 11)

To adjust the clamp closing stud (32) and stud locking plate (37), back off the adjusting screw (174) and slightly loosen the screw stud (175) and the screw (176), push up the locking plate (37) and slightly tighten both screws (175 and 176), press down the finger starting lever (30, Fig. 7) and turn the

pulley (33) by hand until the lever (35) lifts the latch (34), releasing the stud (32) into engagement with the cam path in the pulley (33), continue to turn the pulley until the stud (32) has climbed half way up the disengaging block in the cam path. Then turn the adjusting screw (174) until it almost touches the stopping surface of the closing lever (36); that is, so there is very slight play between the closing lever (36) and the adjusting screw (174) and tighten the lock nut (177). Then continue the rotation of the pulley (33) until the stud (32) is locked out of engagement with the cam path of the pulley by the latch (31), tap the locking plate (37) downward until the closing lever (36) has a very slight play as it floats between the adjusting screw (174) and the locking plate (37) and securely tighten both screws (175 and 176).

If this adjustment is properly made, the stud (32) should enter or leave the cam path in the pulley (33) without the end of the stud dragging on either wall of the cam path.

Adjustment of Clamping Pressure

To adjust the clamping pressure, loosen screw (178, Fig. 3) and move the pressure block (179, Fig. 3) forward or backward as required. To increase the pressure, move the pressure block away from you. To decrease the pressure, move the pressure block toward you. For more pressure, interchange the left and right pressure blocks so that the open end of the slot will face you, then move them away from you as required and securely tighten screw (178).

To Remove and Replace the Work Clamp Carrier

To remove the carrier (180, Fig. 7) from the machine, ratchet the machine to the starting position, open the left bed cover and while holding the nut (181, Fig. 17) with a wrench through the opening in the left side of the bed, remove the lever link screw (182, Fig. 7) with a screwdriver, then draw the carrier (180) toward you to remove it from the machine.

To replace the carrier (180), guide the grooves on the underside of the carrier to the gibs (183 and 184, Fig. 4) provided on each side of the bed, fit the rear side throw lever block to the rear slide groove of the carrier (180) and the front side throw lever block (185, Fig. 4) to the front slide groove, align the screw hole of the carrier (180) with the hole in the lever link, then screw in the lever link screw (182) and securely tighten the nut (181) with a wrench while holding the lever link screw with a screwdriver to connect the carrier and the lever link.

Should the carrier slide heavily or have any vertical play, it is liable to cause unnecessary wear on the carrier and also distort the shape of the eye of the buttonhole. Therefore, in such case, the gibs (183 and 184) should be adjusted upward or downward by loosening the gib screws. After correctly positioning the gibs, securely tighten the gib screws.

Adjustment of Clamp Locking Mechanism

The clamp closing lever arm (186, Fig. 3) should be set so that it presses down the clamp closing lever (hand) roller (187, Fig. 3) causing the clamp closing cam (188, Fig. 3) to lower and lock the clamping arm (189, Fig. 3) to prevent the clamping arm (189) from being released when sewing. To make this adjustment, loosen the hexagon screw (190, Fig. 11) and move the clamp closing lever arm (186) up or down as required, then securely tighten the hexagon screw.

Adjustment of Work Clamp Spreading Mechanism

The purpose of the work clamp spreading mechanism is to allow the work clamp mechanism to spread the work.

Machine 299U110

To adjust the work clamp spreading mechanism, see that the machine is in stop position, then make adjustments so that the spreader lever adjusting plate (193, Fig. 8) on the end of spreader lever will push the spreader plate (47, Fig. 8) sufficiently but not any more than required to move the spreader plate (47) to its extreme forward position. The left and right work clamp plates (13 and 14, Fig. 7) should also be adjusted so that they will spread the same amount at the same time. If the left and right work clamp plates (13 and 14) do not spread the same amount at the same time after making the above adjustment, loosen the two screws (191, Fig. 19) fastening the slide extension (192, Fig. 19) and move the slide extension forward or backward as required, then firmly tighten the two screws (191).

Machine 299U130

To adjust the work clamp spreading mechanism, see that the machine is in stop position, then make adjustments so that the spreader lever adjusting plate (46, Fig. 11) on the end of the spreader lever will push the spreader plate (47, Fig. 11) sufficiently but not any more than required to move the spreader plate (47) to its extreme forward position. The left and right work clamp plates (13 and 14, Fig. 7) should also be adjusted so that they will spread the same amount at the same time. (See page 41 in regard to adjusting the amount of spread.) If the left and right work clamp plates (13 and 14) do not spread the same amount at the same time after making the above adjustment, loosen the two screws (191, Fig. 19) fastening the slide extension (192, Fig. 19) and move the slide extension forward or backward as required, then firmly tighten the two screws (191).

Adjustment of Clamp Opening and Spreader Releasing Mechanism

The purpose of the clamp opening and spreader releasing mechanism is to open the work clamping mechanism automatically and close the spread of work clamp plates to be ready for the next buttonhole.

To make adjustments so as the spreading action on the work clamp plates (13 and 14, Fig. 7) will be released automatically, set the spreader releaser lever (62, Fig. 12) so that it pushes the back end of the spreader operating slide (194, Fig. 12) on the left hand side of the machine and closes the spread of the work clamp plates (13 and 14) when the spreader releaser lever (62) is moved to its extreme forward position. That is, loosen the spreader releaser lever screw (195, Fig. 12) and adjust the spreader releaser lever (62) by swinging it forward or backward as required so that there will be sufficient clearance between the stud on the toggle sliding links (196 and 197, Fig. 7) and the heads of the adjusting screws (171 and 172, Fig. 7) in the slot near the outer edge of the work clamp plates when the work clamp plates are in closed position. After making the above adjustments, securely tighten the screw (195, Fig. 12). When making the adjustments, care must be taken to set the spreader releaser lever (62) so that it will not push the spreader operating slide (194) any more than necessary.

To Adjust the Automatic Looper Thread Tension Releaser
(See Fig. 41)

The looper thread tension releaser lever (198) should be adjusted to release the tension on the looper thread when the interlocking slide is in the notch of the stop cam. To make this adjustment, set the releaser lever (198) so that the lock pin (199) will be located on the upper slope of the releaser lever (198) when the rapid feed slide bar collar (200) swings the operating lever (201) inward

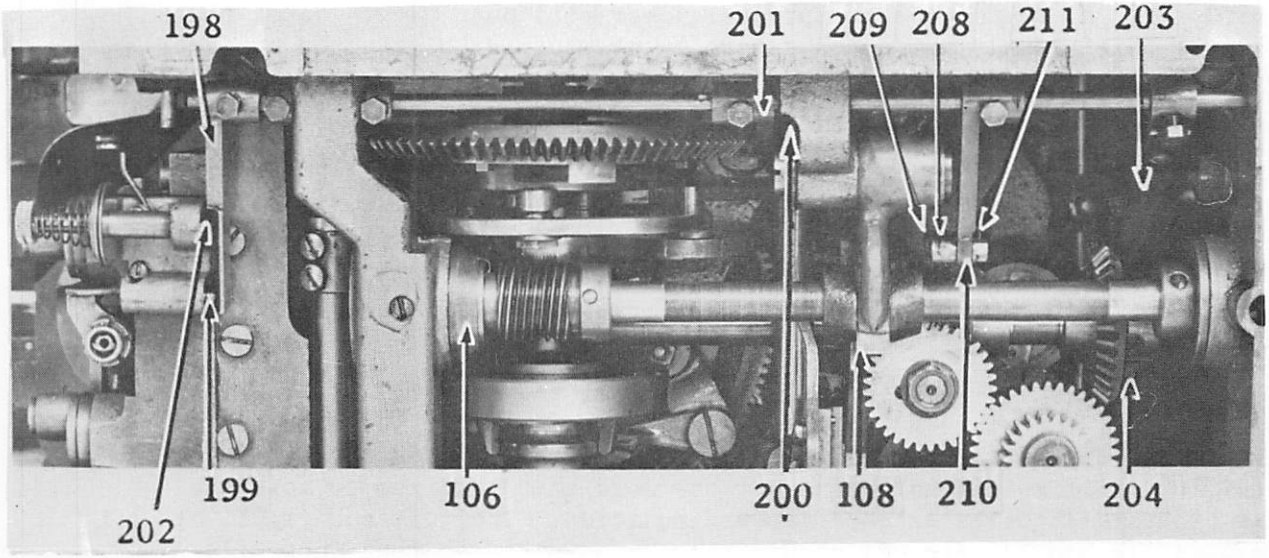

Fig. 41 Adjustment of the Automatic Thread Tension

causing the releaser lever (198) to push the pin (202) and releases the thread tension. The restoring lever plate (203) should be adjusted so that it will be tripped by the restoring cam block (204) on the bed shaft gear just as the machine starts to sew and cause the lock pin (199) to change its position from the upper slope to the lower slope of the releaser lever (198), thereby releasing the pin (202) and giving tension to the looper thread.

To Adjust the Automatic Needle Thread Tension Release Delaying Mechanism

The purpose of the needle thread tension release delaying mechanism is to break the needle thread automatically at the completion of each buttonhole to improve productivity.

To set the needle thread tension release delaying mechanism, push the releaser rod (205, Fig. 3) upward so that the retaining stud (206, Fig. 3) is pressed against the bottom surface of the upper releaser lever bracket (207, Fig. 3). Set upper collar (208, Fig. 41) maintaining a 5/32 inch clearance between collar and intermittent feed driving wheel bracket (209, Fig. 41). Also set the lower collar a distance of 1-1/8 inches below the upper collar (208).

Now pass the releaser rod (205) through the hole provided on the lower releaser lever (210, Fig. 41), then hook one end of spring (211, Fig. 41) to upper collar set screw and the other end to the lower releaser lever (210).

Adjust lower releaser lever (210) so that the upper lever (212, Fig. 3) will push the needle thread tension releaser pin upward when the rapid feed slide bar

collar (200, Fig. 41) swings the operating lever (201, Fig. 41) inward. Also set the actuating plate (213, Fig. 11) so that the two flat sides on the retaining rod block (214, Fig. 11) is square to the arm shaft when the machine is moved to the second side of the buttonhole, or when the stitch rotating lever is swung forward toward you.

Now move the machine to the first side of the buttonhole and when the stitch rotating lever swings backward, or away from you, push the retaining stud (206) downward to release the needle thread tension. Then set the retaining rod (215, Fig. 3) so that it has a 1/16 inch clearance from the end of the retaining stud (206). Also ensure that the top surface of the retaining rod (215) is positioned between the center line and the upper surface of the retaining stud. That is, the adjustment should be made so that the needle thread tension will not be completely released when the retaining stud (206) rides on top of the retaining rod (215).

To prevent the end of a fine thread from pulling out of the needle eye, move the retaining rod upward or downward as required to give slight slackness to the tension discs.

Auxiliary Feed Mechanism

The purpose of the auxiliary feed is to move the work quickly at the eye end of buttonhole.

The auxiliary feed mechanism is actuated by the auxiliary feed clutch which is rotated by the auxiliary feed eccentric (97, Fig. 3) through the connecting rod (216, Fig. 3).

By pulling the knob (96, Fig. 12) provided on the lower corner of the left side of bed outward, the roller on the auxiliary feed clutch releaser lever slides onto the cam lift of cam (217, Fig. 26) fastened to the pattern wheel shaft bevel gear when the machine comes to the eye end of the buttonhole. This rotates the cam carrier on which the auxiliary feed clutch releaser lever cam is provided, causing the auxiliary feed clutch releaser to disengage from the releaser lever cam and engage the clutch disc (218, Fig. 26) which rotates the shaft (148, Fig. 26).

When the knob (96) is pushed inward, the roller on the auxiliary feed clutch releaser lever disengages from the cam (217) and rides on the clutch disc (218) holding the clutch out of engagement.

Should it be necessary to adjust the position of the rapid feed, tip the machine over to the left onto the machine rest, ratchet the machine until the cam (217) fastened to the pattern wheel shaft bevel gear with two hexagon screws (219, Fig. 26) is positioned at the bottom of the machine, then loosen the hexagon screws (219) by means of a wrench and adjust the position of cam (217) by moving it forward or backward. When the correct position of the cam is obtained, firmly tighten the two hexagon screws (219).

Caution

Never, under any circumstances, should the looper frame be interchanged from one machine to another. The identification number stamped upon the front face of the frame should always agree with the number stamped upon the front edge of the bed of machine. As each frame is individually fitted and adjusted to its own machine, this ensures that in rotating, the needle bar and the

looper mechanism will register with each other at all points of its rotation, thus making the adjustment of the looper mechanism reliable.

This same precaution should also be taken in regard to the bed extension which has the same identification number stamped upon it as is on the front end of the bed of machine.

Whenever the looper frame is removed from the machine, great care should be taken to prevent any damage to the seat either on the machine or the looper frame and before replacement a close inspection of the seats should be made to see that there are no burrs or dirt that would prevent the seats from squarely repositioning themselves, for this would have a tendency to throw the looper mechanism out of line with the needle bar mechanism.

Never should the needle vibrating bell crank connection (109, Fig. 3) be moved. If it is set in position improperly the needle would interfere with the loop retainer and would either cause the needle to break or damage the loop retainer.

Should the connection (109) require proper adjustment, loosen check nuts (220 and 221, Fig. 3) with a wrench, turn hand wheel until the needle vibrating ring (112, Fig. 3) is at its highest position and loosen adjusting nut (120, Fig. 3), then with a wrench adjust connection (109) until there is no movement of the needle vibrating ring (112) when the adjusting link (111, Fig. 3) is oscillated back and forth in the slot of bell crank (110, Fig. 3). After determining that there is no movement of the needle vibrating ring (112), firmly tighten check nuts (220 and 221) while holding the connection (109) with a wrench.

Never under any circumstances should the buttonhole cutting starting lever (40, Fig. 11) be tripped by the operator while the cutting pulley is in motion.

Before ratcheting the machine with a wrench on the end of the pattern wheel nut (79, Fig. 12) for the purpose of making adjustments, always push the lever (78, Fig. 12) from you, to prevent the operating plate (50, Fig. 12) riding on the pattern wheel ring start segment (51, Fig. 12). After making the adjustments, ratchet the machine with a wrench until it is in stop position.

When the machine has been ratcheted by hand, great care must be taken to see that the needle holder (115, Fig. 20) is at the front in its regular starting position before the machine is started in operation. Also see that the interlocking slide (58, Fig. 13) is in the notch of the stop cam (59, Fig. 13) at the back of the machine, thus locking the sewing mechanism and placing the looper mechanism in the correct position for cutting. When the interlocking slide is in the notch of the stop cam, push up the rapid feed starting pawl (104, Fig. 12) as far as it will go to suspend the rapid feed. If these precautions are not carefully observed and the machine is started, the buttonhole cutter will come into contact with the throat plate, looper bracket or the looper, breaking any one or all of these parts.

As the sewing mechanism and buttonhole cutting mechanism are driven separately, the relative timing of either must not be disturbed, or damage to the machine will result. Always see that the mechanism is in the correct starting position after making adjustments and before starting the machine by power.

Should it be necessary to remove the needle bar or disconnect any part of the needle vibrating mechanism, it is important that the machine is reassembled so that the needle will not strike the looper mechanism.

Each pair of bevel gears as well as the looper gears have timing marks which when put together will bring the various mechanisms into proper relation with each other. It is very essential in the reassembling of the machine that particular care should be taken and the gears checked to see that their timing marks register with each other. Failure to have the feed wheel bevel gear and pattern wheel shaft gear in proper time will cause a distorted shape to the buttonhole and throw the stopping position out of time with either the movement of the work clamp carrier or the stitch rotating mechanism. Failure to have all other gears in proper time will cause the looper mechanism to be thrown out of time with the needle, causing the machine to fail to stitch and possible serious and expensive damage to the looper and needle driving mechanisms.

To avoid springing or breaking parts in machine, it is essential, when machine has once been started, to allow it to complete its cycle automatically.

If it fails to do this at beginning of stitching, it is quite possible that lock trip extension lever (53, Fig. 12) needs slight adjustment forward or backward.

If stitching is completed and machine fails to complete its cycle from this point, it may be caused by a loose belt or tight spring in stop lever (52, Fig. 13), causing machine to stop before it has reached locking point in stop cam. In this case, the hand wheel should be turned until it reaches locking point; this starts the rapid feed again, causing machine to complete its cycle.

If the machine fails to start after pressing down the starting lever, the engaging stud (32, Fig. 11) in the clamp closing lever (36, Fig. 11) may be prevented from engaging in cam path in buttonhole cutting shaft pulley. If stud (32) is free and it still fails to engage, make adjustments as described on pages 41 and 42. If cutting mechanism fails to start even when the clamp closing mechanism is capable of functioning, it is possible that the cutting safety latch (44, Fig. 13) at the rear end of the machine is still engaged under the cutting safety lever (45, Fig. 13).

If machine "repeats" by rapid feeding beyond the cutting or stopping position, the trouble may be caused by the tension on the interlocking slide spring within the stop lever (52, Fig. 13) being too light, thus allowing the latch (60, Fig. 13) to hold up the starting lever (61, Fig. 13) instead of passing up and beyond to its normal stopping position. This condition may be remedied by increasing the spring tension. Another cause of the rapid feed continuing beyond the cutting position is the failure of the tripping point on pattern wheel and the adjusting trip (67, Fig. 26) not moving enough to trip off the rapid feed as related in the following paragraph. The location of the tripping point on the pattern wheel (66, Fig. 12) is important as it positively determines where the machine comes to a stop for the cutting of the buttonhole. The tripping point should be so located that the rapid feed is tripped and the machine stopped immediately after the safety lever (45, Fig. 13) drops downward or the lower end of safety lever (45, Fig. 26) drops into the notch of the safety cam (153, Fig. 26).

If machine "repeats" and rapid feeds all the way round the buttonhole, the trouble may be caused by lock trip extension lever (53, Fig. 12) and the lock trip extension (151, Fig. 12) that engages the lock trip extension lever

(53) not moving enough to trip the rapid feed slide bar lock (150, Fig. 26) and release the slide bar (222, Fig. 26), thus causing the rapid feed to continue.

For correct position of the parts so that the machine will not fail to trip off the rapid feed, see that the lock (150) is tripped off from the lower edge of the locking surface of the fork extension plate (149, Fig. 26) just before the operating plate (50, Fig. 12) reaches the highest point of the start segment (51, Fig. 12) or when sewing is started. Every care must be taken in making the adjustment because the machine will stop should the lock (150) trip off too early. Also see that the lock (150) is moved downward not more than .005 inch below the lower edge of the locking surface of the fork extension plate (149) when the point of the adjustable trip (67, Fig. 26) is on top of the tripping point on the pattern wheel (66, Fig. 12). Should the lock (150) fail to pass below the fork extension plate (149), loosen the adjustable trip screw and move the adjustable trip upward or downward as required, then securely tighten the screw.

If machine finishes buttonhole but fails to trip into return rapid feed, it may be found that the stop lever spring, the stop lever interlocking slide spring or the tripping latch spring are not of sufficient strength or that the hinge screw for the rapid feed tripping latch (60, Fig. 13) has loosened so that latch fails to work. For correct position of parts so that machine will not fail to trip into return rapid feed, see that the latch (60) moves beyond the rapid feed starting lever (61, Fig. 13) so that it will be about 5/64 inch below and 1/16 inch back under the starting lever (61), as shown in Fig. 13, when actuated by stop motion.

Thread Breaking or Skipping of Stitches

This may be due to any one of the following reasons:

The thread stand may not be properly adjusted. The thread stand must always be set so that each thread will pull off the spool or cone in a direct line with its threading point on the stand or machine so that the thread will not be obstructed by dragging or catching on the side of the spool or cone. The threads must always unwind freely from the spools or cones to ensure satisfactory operation of the machine.

The needle may not be pushed up as far as it will go into the needle holder. When placing the needle in the needle holder be sure that the needle is striking the end of its seat in the holder, then securely tighten the set screw with a small screwdriver. Never use a large screwdriver on the needle set screw as it may damage the head of the screw so that it cannot be tightened sufficiently to hold the needle.

The needle may be blunt or bent. Roll the needle on its shank on the work clamp plate of the machine to determine whether it is straight.

The needle may be turned slightly so that the loop of needle thread would be cast sideways away from or towards the looper points. The needle must always be set into the holder with its eye and short groove with the slab above the eye facing directly toward the front end of the machine so that the loop will be cast at right angles to the travel of the loopers, with machine in stopping position.

Note: Needle Driving Bar Cap 545434 is available to place on the top end of the needle bar if it should become nicked or thread cut.

The loop retainers (119 and 124, Fig. 23) may not be correctly set as instructed on pages 28 and 29.

The throat plate (21, Fig. 4) may not be correctly set as instructed on page 29. The throat plate may be incorrectly set so that the needle comes into contact with the walls of the opening in the throat plate, causing the needle to be deflected away from or into the path of the loopers.

The throat plate may be set too low, allowing the material to be forced downward by the needle and then lifted by the needle, resulting in a poor cast of a loop. For heavy materials, the top of the throat plate should be set about .025 inch below the top surface of the work clamp plates.

Improper spreading of the work clamps may cause the needle to strike or glance on the clamps and be deflected out of the path of the loopers or thread retainers, resulting in the skipping of stitches.

MACHINE

299U123

DESCRIPTION

Machine 299U123 (short travel) is intended for making high grade taper bar buttonholes in pant flies, pocket flaps, overalls, work clothes, etc. Has a capacity to sew 3/4" to 1" and cuts eyelet-end buttonholes or straight-end buttonholes with taper bar, with large or medium eye, 1/2" to 7/8", the bar being adjustable 1/4" for 1/2" buttonhole, from 1/8" to 1/4" for 5/8" to 3/4" buttonholes and with 1/8" bar for 7/8" buttonhole.

Makes buttonholes with double chain stitch (SINGER Buttonhole Stitch), lays a reinforcing cord under the edge of the flat purl and automatically cuts the hole after stitching.

This machine is fitted with an improved automatic thread and cord trimmer located below the work clamp plates for cutting the needle and looper threads and lower cord at the completion of a buttonhole, with means which prohibit damage by trimmer blades to garments being buttonholed regardless of nature of material from which they are made.

A change in length and shape is made by adjusting the easily adjustable Pattern Wheel and substituting a quick detachable Cutting Block and Knife.

Unless otherwise ordered, this machine will be fitted to make a 3/4 inch taper bar buttonhole with medium eye and .025 inch cutting space and trimmer set for 1/4 inch taper bar.

Extra Pattern Wheel Cam Block (for eye), Cutting Blocks, Knives and Stitch Regulating Gears can be furnished for use on this machine at an additional charge.

The following parts are made for use with this machine. (Unless otherwise specified, the parts marked with an asterisk will be furnished with the machine.)

Pattern Wheel Cam Block

Part No.	Part Name	Size of Eye
* 548857	Pattern Wheel Cam Block (eye)	.140 x .190
548858	" " " " (")	.110 x .130

Buttonhole Cutting Block

Part No.	Part Name	Size
548835	Buttonhole Cutting Block (eye)	1/2"
* 548836	" " " (")	5/8"
* 548837	" " " (")	3/4"
548838	" " " (")	7/8"
548991	" " " (")	1"
548839	" " " (straight)..	1/2"

Part No.	Part Name	Size
548840	Buttonhole Cutting Block (straight)	5/8"
548841	" " " (")	3/4"
548842	" " " (")	7/8"

Buttonhole Cutting Knife

Part No.	Part Name	Size of Eye
* 548935	Buttonhole Cutting Knife (eye)	.126 x .180
548936	" " " (")	.100 x .157
548992	" " " (")	.126 x .180
255344	" " " (straight)	-

Stitch Regulating Gear

Part No.	Part Name	No. of Teeth	No. of Stitches St./in.	No. of Stitches St./Eye
* 548500	Stitch Regulating Gear	22	33	15
548501	" " "	26	28	13
* 548502	" " "	28	26	12
548503	" " "	30	24	11
* 548504	" " "	33	22	10
549505	" " "	34	21	10
* 548506	" " "	38	19	9
548507	" " "	42	17	8

Speed

The maximum speeds recommended for the shafts in Machine 299U123 are as follows:

Buttonhole cutting shaft - 200 to 215 revolutions per minute. Stop motion shaft - 950 to 1,000 revolutions per minute. (This will drive the arm shaft at a speed of 1,900 to 2,000 revolutions per minute.)

The correct speed of stop motion shaft should be ascertained by placing a speed indicator at the gear end of rapid feed crank shaft. The speed of rapid feed crank shaft should be about 950 to 1,000 revolutions per minute.

Needles

For Machine 299U123, use needles Catalog No. 1413 (142X5), sizes 15 to 19. This machine is regularly fitted with needle, size 19.

Thread and Cord

Either right or left twist thread may be used in the needle and looper. For the cord, a right twist cord will give the best results.

To Thread the Needle
(See Fig. 42)

Pass the thread from the unwinder down through the hole (1), through the hole (2), from back to front and on right between the tension discs (3), from back to front through the holes (4), (5), (6) and (7), turn the needle thread nipper lever (229) to force the nipper out of the path of the thread hole in the

guide stud (230), then pass the thread from back to front under the needle thread pull-off (8), through the thread hole in the guide stud (230), under the needle thread pull-off (9), and down through the needle bar (10) (inserting the threading wire furnished with the machine up into the needle bar from below to pull the thread through), pass the thread downward between the needle thread retainer arm (231, Fig. 43) and the face of the needle holder (115, Fig. 43), then pass the thread from back to front or toward you through the eye of the needle.

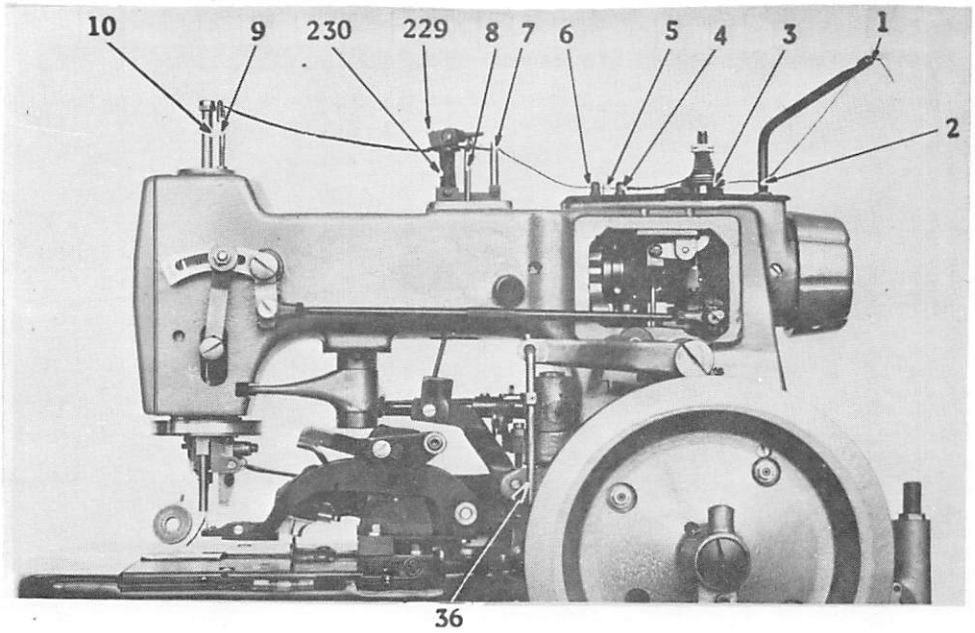

Fig. 42 Threading the Needle

To Thread the Cord
(See Fig. 43)

The work clamp plates having been spread outward and the front bed cover opened, pass the cord from the spool through the upper hole (26) being careful to avoid unnecessary tension as much as possible, up through the hole at the end of cord controlling spring bracket (232), from right to left between the cord controlling spring (233) and bracket (232), thence from back to front through the cord hole near the center of the throat plate (21) the cord leading toward the operator. Then slide the work clamp plates back into place and hook the springs to hold the plates in position. Also close the front bed cover.

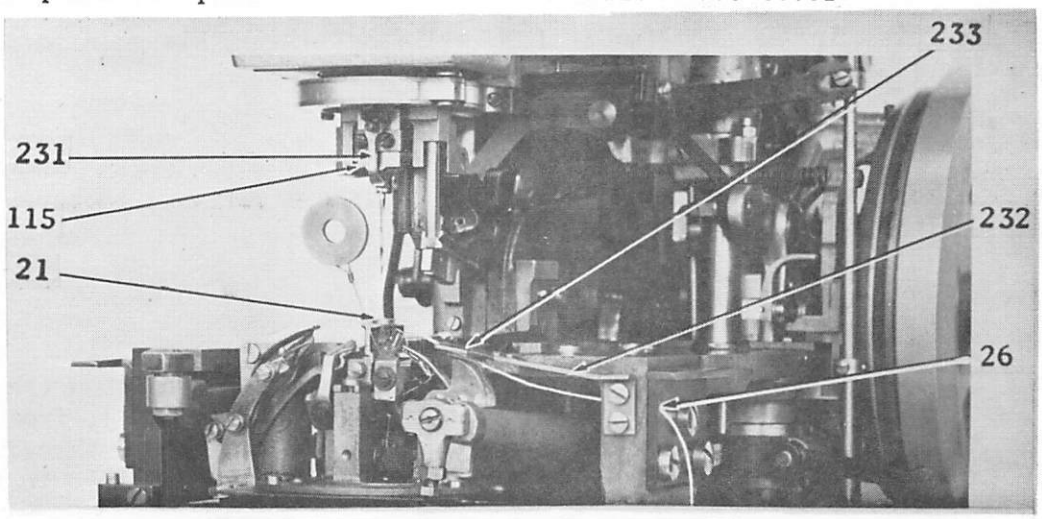

Fig. 43 Threading the Cord

The under thread and cord trimmer is used for the purpose of making a clean trim without the danger of injuring the fabric being buttonholed. The device consists of three elements; namely, the thread and cord cutting, the needle thread end removing and the work guard. These elements operate in conjunction with each other and have their individual limits of adjustment which must be maintained according to the following paragraphs:

Lower Trimmer Adjustment
(See Fig. 44)

The proper setting of the trimmer is based upon the height of the throat plate and the under side of the work clamp plate cover. The clearances between the cutting blade guard (234) and the throat plate (21), and between the work clamp plate cover must be constant while the trimmer is in motion and also must have sufficient clearance so that the cord on the throat plate will not be pushed away from the trimming position by the cutting blade guard (234). This can be accomplished through the adjustment of the cutting blade bracket (235) by moving the wedge (236) and at the same time adjusting the cutting blade screw (237).

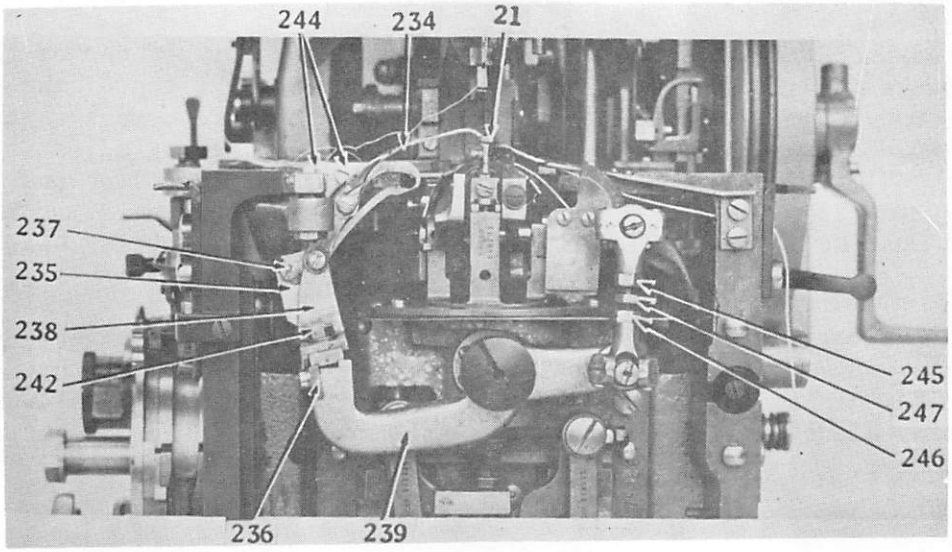

Fig. 44 Adjustments on Under Thread and Cord Trimming Mechanism

The cutting blade bracket (235) along with the needle thread waste loop remover bracket (238) should be tipped as a unit on its seat on the offset end of the thread and cord cutting lever (239).

To Adjust the Under Thread and Cord Trimmer

The movable cutting blade (240, Fig. 45) and the stationary cutting blade (241, Fig. 45) should be set longitudinally to trim close to the end of sewing. These cutting blades are mounted on the cutting blade bracket (235, Fig. 45) and are adjustable longitudinally to the extent that the rear edge of the cutting blade guard (234, Fig. 45) does not lie beyond the rear edge of the opening in the work clamp plate and in its adjustment to the front of the machine, the stationary cutting blade (241) does not strike the throat plate (21, Fig. 44).

The cutting blade bracket is adjustable up to 1/4 inch if the above adjustments are made. This adjustment is made as follows:

Place machine with cutting blades in cutting position and slide the cutting blade bracket (235) in or out, as required, and securely tighten screw (242, Fig. 44). This foregoing adjustment may be made at will if cutting blade cam (243, Fig. 45) remains at its basic setting as made at the factory. Should this setting be disturbed, adjust the cutting blades to longest trimming position and then ascertain that the stud in the heel of the movable cutting blade projects no more nor less than the full depth through the slot of the cutting blade cam (243).

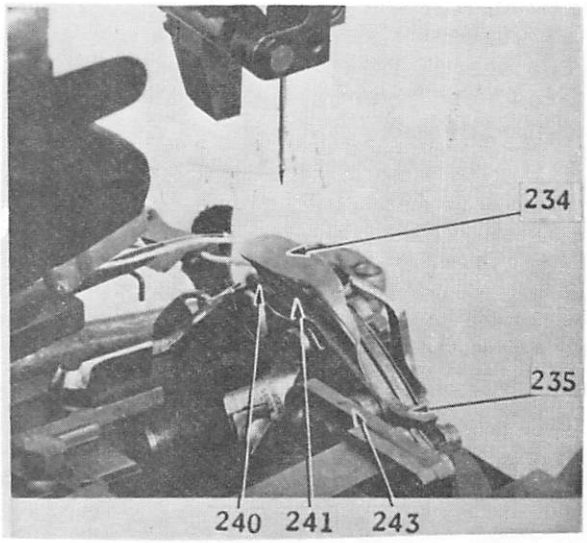

Fig. 45 Showing Under Thread and Cord Trimmer

To set the height of trimmer. The cutting blades and cutting blade guard (234) are so arranged that they swing on the same hinge screw. The proper setting for this unit is, when the trimmer is advanced to sever the threads and cord, the forward end of the cutting blade guard (234) must have an equal clearance over the top of the throat plate (21), and under the lower surface of the work clamp plate covers that are mounted on the work clamp plates. This setting can be obtained by adjusting the screw (237, Fig. 44), raise or lower point of stationary cutting blade and cutting blade guard (234) as required and securely refasten screw (237). This same adjustment must be followed when replacing the stationary cutting blade (241).

The thread and cord cutting blades should be adjusted so that when they close, the cutting edges fully pass each other to ensure severing the threads and cord. To make this adjustment, loosen the two screws (244, Fig. 44) which fasten the cutting blade cam (243) and swing cam downward to cause the cutting blades to close more, or upward to close less, then securely tighten two screws (244).

To adjust the trimmer to move further forward across the path of the threads and cord, loosen the two nuts (245 and 246, Fig. 44) and turn the adjusting screw (247, Fig. 44) to the right. To adjust the trimmer to move further backward away from the path of the threads and cord, turn the adjusting screw (247) to the left. Care must be taken to see that the thread cutting blades are not thrown so far forward as to cause the stud in the heel of movable blade to strike the end of the slot in the cutting blade cam (243). Then securely tighten the two nuts (245 and 246).

CAUTION: Special attention must be given to the closing of the movable blade, which must be adjusted so that the point crosses the cutting edge of the stationary cutting blade far enough to just contact the underside of the cutting blade guard. The extreme point of the stationary cutting blade must always fit tightly against the underside of the cutting blade guard to ensure that the threads and cord lead into the opening between the cutting blades.

To Adjust the Needle Thread Waste Loop Remover
(See Fig. 46)

The needle thread waste loop remover (248) is non-adjustable longitudinally and the front point lies within the range of the needle thread loop held upon the horn of the right hand loop retainer (124). The purpose of the needle thread waste loop remover (248) is to pull out the loose end of the needle thread remaining around the horn of the right hand loop retainer at the completion of each buttonhole. This waste loop remover is mounted on its own waste loop remover bracket (238) immediately above the cutting blade bracket (235). The height of the waste loop remover is adjusted by loosening the screw (249) and changing the inclination of the waste loop remover (248). When adjusting, keep the clearance between the underside of the waste loop remover and top of the right hand loop retainer (124) as small as possible and sufficient clearance between top of the waste loop remover (248) and underside of the throat plate (21).

CAUTION: Care must be taken to provide a proper clearance between the needle thread waste loop remover bracket and non-threaded looper.

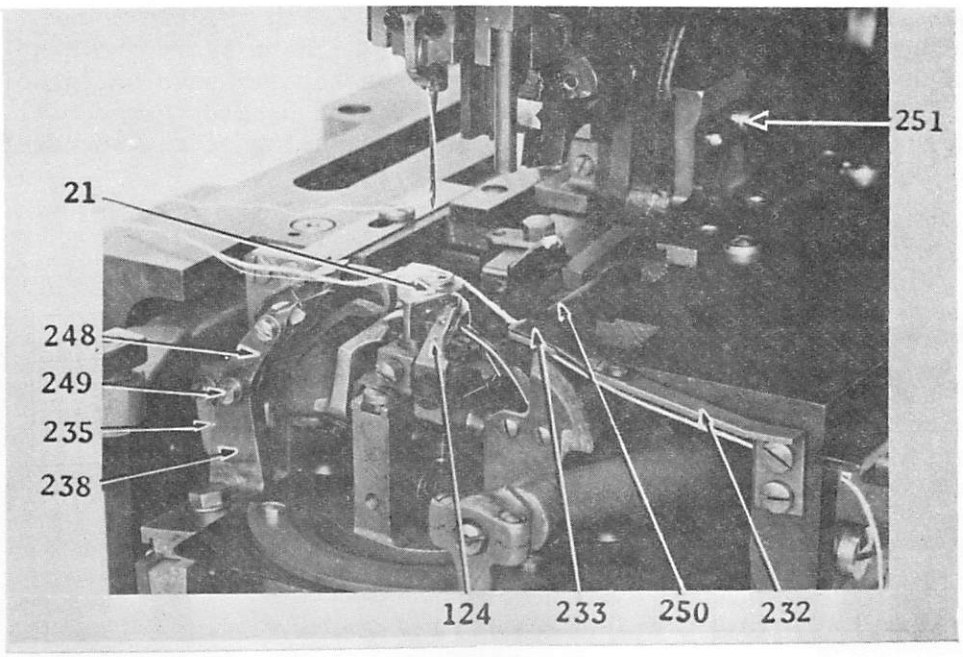

Fig. 46 Showing the Needle Thread Waste Loop Remover and the Cord Pull-back Device

To Adjust the Cord Pull-back
(See Fig. 46)

After the trimming of the cord, the buttonhole cutting mechanism moves forward to a cutting position, and at the same time actuates the cord controlling arm (250), causing it to press down on the spring (233) and nip the cord between the spring (233) and spring bracket (232), then pull the cord back through the cord hole in the throat plate (21). The cord controlling arm (250) should draw back just enough cord to permit the cut end to extend through the hole in the throat plate (21) to the opposite side of needle opening. This will leave sufficient cord with which to commence the sewing of the next buttonhole. To adjust the cord controlling arm (250) to pull more or less cord, loosen the screw (251) and move the cord controlling arm (250) forward or

backward on the buttonhole cutting lever bracket, as required, then securely tighten the screw (251).

To Adjust the Needle Thread Pull-off
(See Fig. 42)

The lower end of the needle thread pull-off (8) is adjustable up and down to bring the offset upper end in position for pulling off slack needle thread on the downward movement of the work clamp closing lever (36). When machine is in normal running position, the needle thread pull-off should be adjusted so that the offset end of the needle thread pull-off (8) is immediately above the needle thread. This position will produce the maximum amount of pull-off for the needle thread. To reduce the amount of slack in the needle thread, adjust the needle thread pull-off (8) upwards. The thread nipper may be manually released by lifting the lever (229) upwards. This will facilitate the threading of the needle thread through the thread hole in the guide stud (230).

A light tension on the needle thread retainer arm (231, Fig. 43) will produce a reasonable length of needle thread end on the top side of the work. An increase in this tension will diminish the length of this thread end, therefore, care must be exercised to obtain the desired results. With the two above adjustments, enough needle thread will be left with which to start the next buttonhole without an excessive thread end showing on the finished buttonhole and sufficient slack will be produced so that the end of needle thread will not pull out of the eye of the needle in starting the sewing of the succeeding buttonhole.

To Adjust Looper Thread Pull-off
(See Fig. 47)

The looper thread pull-off (252) is operated by cam surface on looper thread pull-off cam plate (253). Its action is timed to draw the looper thread as the stitch rotating mechanism is returned to initial position so that sufficient thread will be drawn through eye in looper to begin sewing of the next buttonhole. To adjust looper thread pull-off (252) to pull more thread, loosen screw (254) and move adjustable arm of the looper thread pull-off (252) from you. To pull less thread, move arm toward you and securely tighten screw (254).

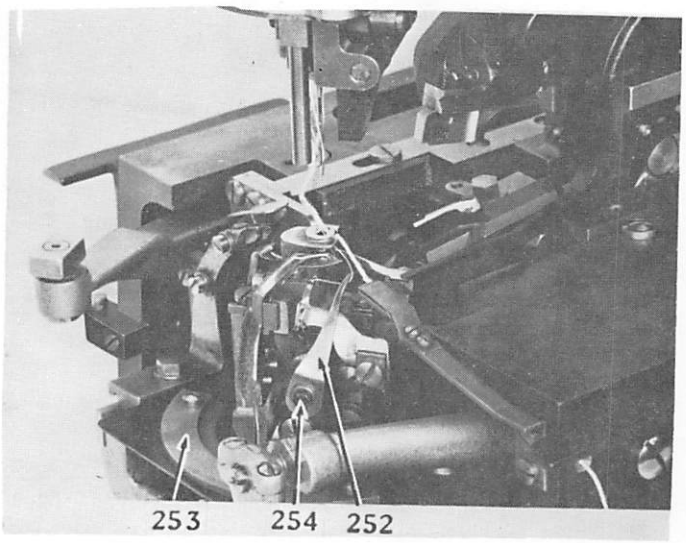

Fig. 47 Showing the Looper Thread Pull-off

CAUTION: In adjusting the looper thread pull-off to pull more thread, note that in recovered position, the notched end of pull-off finger does not come close enough to eye of looper to interfere with the stitch operation.