



OPERATION and MAINTENANCE MANUAL MODEL BH SERIES WIRE STITCHER HEADS

⚠ WARNING:

BEFORE OPERATING THIS TOOL, STUDY THIS MANUAL AND UNDERSTAND THE SAFETY WARNINGS AND INSTRUCTIONS. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR BOSTITCH REPRESENTATIVE OR DISTRIBUTOR. SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE.

⚠ WARNING:



Approved EYE PROTECTION should ALWAYS be worn by the operator and others in the work area when loading, operating, unloading or servicing this tool. Eye protection is required for protection from flying fasteners and debris, which could cause severe eye injury. The employer and/or user should ensure that the proper eye protection is worn. Safety eye protection equipment must conform to the requirements of ANSI Z87.1-1979, American National Standard Practice for Occupational and Educational Eye and Face Protection, classified in the referenced standard under Fig. 8 Selection Chart, as Type 1 Goggles; Types 5 & 6 Spectacles with side shields.

⚠ WARNING:

ALWAYS DISCONNECT STITCHER MACHINE POWER CORD FROM POWER OUTLET BEFORE DISASSEMBLING HEAD.

AFTER INSTALLING A NEW PART, TURN OVER MACHINE MANUALLY AND CHECK THAT HEAD OPERATES FREELY.

DO NOT OPERATE MACHINE UNDER POWER UNTIL CERTAIN THAT HEAD IS OPERATING FREELY.

FORWARD

This instruction book and parts catalog is provided for operators of single stitch wire stitching machines equipped with the following models of IDEAL STITCHER Bliss Wire Stitcher Heads:

<i>Model Symbol</i>	<i>Description of Model</i>
BH	Standard Wire draw — 7/8" (22.2mm) to 1-1/2" (38.1mm)
BHL	Long Wire draw — 15/16" (23.8mm) to 2-3/8" (60.3mm)
BHX	Extra Long Wire draw — 1-5/8" (41.3mm) to 3-1/2" (88.9mm)
BHM	Metal Stitcher — Standard Wire Draw
BHMB	Metal Stitcher (For Head Mounted Clincher) — Standard Wire Draw
BHML	Metal Stitcher — Long Wire Draw

In preparing this manual, the aim has been to give the essential details covering the operation and maintenance of the Stitcher Head, and to provide a complete breakdown of component parts of the head for the purpose of ordering repair parts.

Part I includes Description, Operating Adjustments, Maintenance Instructions, and Trouble Shooting. Part II includes illustrated parts lists with other pertinent information for ordering repair parts.

The first section of Part I gives a general description of the IDEAL STITCHER Bliss Stitcher Heads, and includes a table listing the full range of wire types and sizes handled by the heads.

The second section, Operating Adjustments, gives detailed instructions, with accompanying illustrations, for making the various required adjustments for the proper operation of the heads. These instructions include simple formulas for calculating the wire draw (length of wire to be fed) for any thickness of work within the stitching

capacity of the heads.

The third section of Part I, Maintenance, gives detailed instructions, with accompanying illustrations, covering procedures for properly maintaining the head. A Trouble Shooting Chart, which illustrates perfect and imperfect stitches, and lists the causes of imperfect stitching with instructions for remedying the imperfections, is also included in this section.

In order to expedite the ordering of repair parts, fully illustrated parts lists covering component parts of the above listed models of IDEAL STITCHER Bliss Stitcher Heads are provided in Part II of this book. Instructions on how to order a part, as well as complete instructions for disassembling and reassembling the head, are included in this section. In addition, a Numerical Index (all parts numbers listed in numerical order and cross referenced to the Parts List and illustrations) is provided at the back of the book.

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PART I — OPERATING AND MAINTENANCE INSTRUCTIONS DESCRIPTION

The stitching heads supplied with the many models of IDEAL STITCHER Bliss HeavyDuty Wire Stitchers are basically identical heads. Variations occur in some of the component parts due to the basic head being adapted to standard, long, and extra long wire draw operation. In addition, other variations occur in some of the parts due to the head being adapted to a particular model of Stitcher, such as the S13 and S25 Series Metal Stitchers.

The IDEAL STITCHER Bliss Heads are designed to accommodate a range of wire types and sizes, and staple crown sizes. Figure 1 lists the range of wire sizes, with obtainable crown sizes, handled by the full range of available models of single stitch IDEAL STITCHER Bliss Stitcher Heads. When work to be stitched requires a wire type or size, and/or size of staple crown, not within the capacity of the particular model of Stitcher Head to be used, it is possible to change-over the head to meet the

required specifications. If it is desired to change-over a particular model of Stitcher Head, consult your IDEAL STITCHER distributor, or IDEAL STITCHER factory, for list of necessary parts and/or cost to make the desired change.

Each of the many models of IDEAL STITCHER Bliss Wire Stitchers is so designed that the head can be easily removed, and another head, of different wire draw capacity, substituted for it, thereby increasing the work thickness range of the machine.

All heads, excepting the Model BHMB Head, are equipped with an adjustable finger guard.

Operating adjustments are similar on all heads, and are easily accomplished. Oil cups, ball oilers, and oil holes are provided on all of the IDEAL STITCHER Bliss Heads for easy lubrication of hidden moving parts. All parts are easily removed for service or replacement.

TYPE OF WIRE	WIRE GAUGE	WIRE SIZE AND TOLERANCE	TENSILE STRENGTH P.S.I.	OBTAINABLE CROWN SIZE
Ribbon	.020 (.51mm)	.103 $\pm$.002 — .008 x .020 $\pm$.0005 2.6mm $\pm$.051mm — .203mm x .51mm $\pm$.013mm	80,000 to 105,000	3/8 (11.1mm), 1 1/4 (31.8mm) (ARC)
	.017 (.43mm)	.099 $\pm$.004 x .017 $\pm$.0005 2.5mm $\pm$.101mm x .43mm $\pm$.013mm	80,000 to 105,000	3/8 (11.1mm), 3/8 (11.1mm) (ARC)
	.014 (.36mm)	.099 $\pm$.004 x .014 $\pm$.0005 2.5mm $\pm$.101mm x .36mm $\pm$.013mm	80,000 to 105,000	3/8 (11.1mm) (ARC)
Hybar	#2	.060 $\pm$.002 — .004 x .024 $\pm$.0005 1.5mm $\pm$.051mm — .101mm x .61mm $\pm$.013mm	80,000 to 105,000	1/4 (6.4mm), 3/8 (11.1mm)
	#1	.060 $\pm$.002 — .004 x .020 $\pm$.0005 1.5mm $\pm$.051mm — .101mm x .51mm $\pm$.013mm	80,000 to 105,000	3/8 (11.1mm)
Round—Metal Stitch	#18 (200)	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	190,000 to 219,000	3/8 (9.5mm)
	#18 (230)	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	220,000 to 249,000	3/8 (9.5mm)
	#18 (260)	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	250,000 to 289,000	3/8 (9.5mm)
	#18 (280) SS	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	250,000 to 280,000	3/8 (9.5mm)
	#18 (290)	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	290,000 to 319,000	3/8 (9.5mm)
	#18 (330)	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	320,000 to 360,000	3/8 (9.5mm)
	#18 Tenelon	.0475 $\pm$.001 (1.2mm $\pm$.025mm)	255,000 to 275,000	3/8 (9.5mm)
Flat — Box Stay	9040	.090 $\pm$.002 — .004 x .0375 $\pm$.0005 2.3mm $\pm$.051mm — .101mm x 9.5mm $\pm$.013mm	85,000 to 95,000	1 1/4 (31.8mm)
	7437	.076 $\pm$.002 — .004 x .0375 $\pm$.0005 1.9mm $\pm$.051mm — .101mm x 9.5mm $\pm$.013mm	95,000 to 105,000	1 1/4 (31.8mm)

Figure 1 — Table of recommended Wire Sizes, Tolerances and Tensile Strengths for best stitching performance
Note: Wires of tensile strength other than those listed may be available and used as required to suit the particular application.

The quality and quantity of work that can be produced by a IDEAL STITCHER Bliss Stitcher Head is dependent upon the operator making the various operating adjustments as accurately as possible. The following illustrated instructions are provided so that the operator will clearly understand how to make the various required operating adjustments.

1. HOW TO THREAD WIRE ON HEAD (See Fig. 2)

a. Raise oiler retainer (not shown) on spring wire guide and disengage wire feed gears by raising (to the left) the gear throwout handle (1) to its open position.

b. Draw wire from wire spool, and if end of wire is twisted or bent, cut off twisted or bent portion.

c. Straighten out end of wire (about 6" 152.4mm) by drawing wire through fingers. The end portion of wire to be threaded into the head must be as straight as possible.

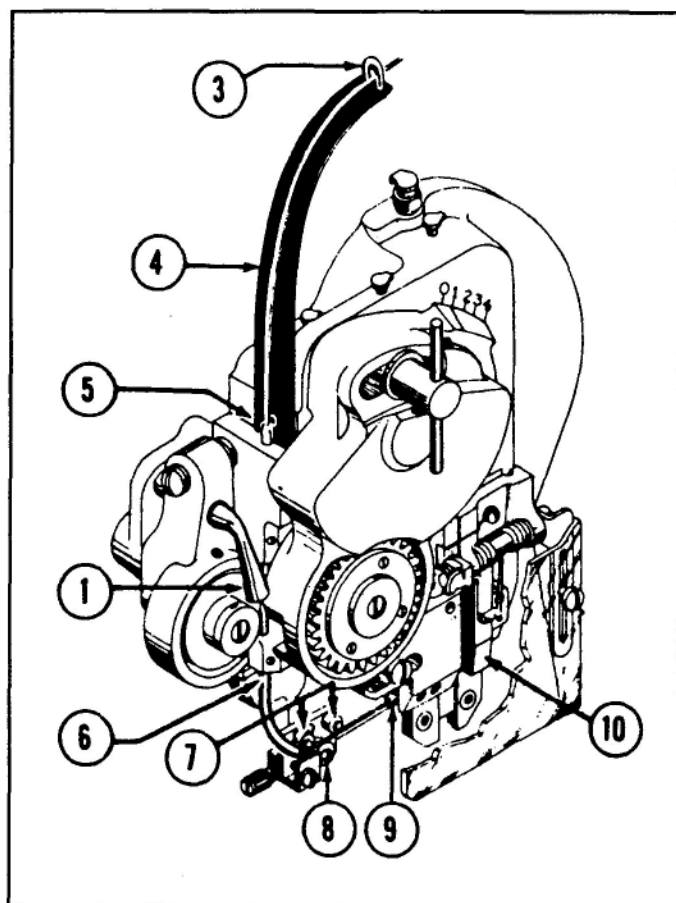


Figure 2 — Threading Wire on Head

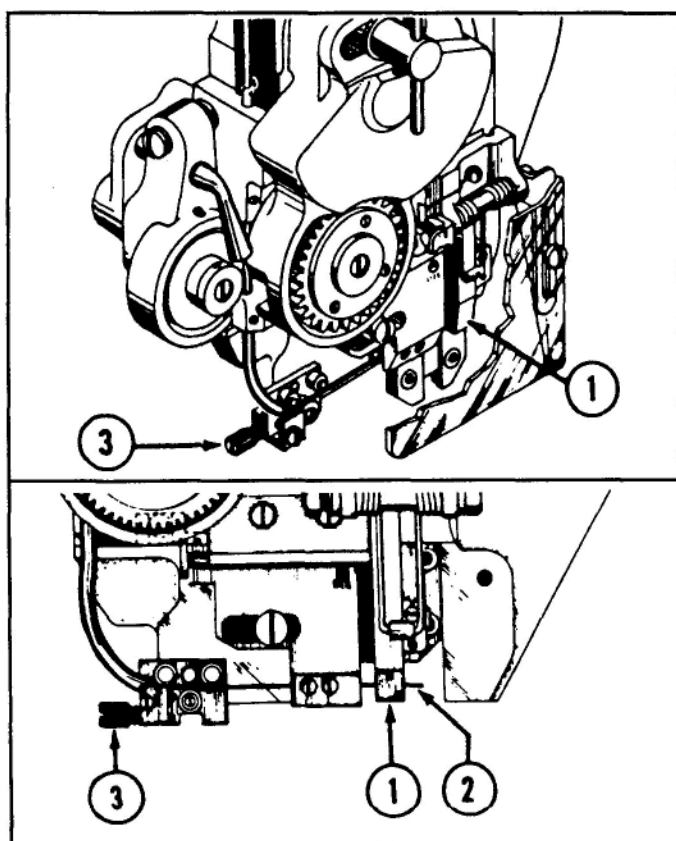


Figure 3 — Straightening Wire on Head

d. Thread the wire through the spring wire guide loop (3), down over the spring wire guide (4), through oiler felt in retainer and then insert end of wire into the upper wire tube (5).

e. Push the wire down through the upper wire tube, past the wire feed gears, and into and through the lower wire tube (6) until the wire appears at the bottom opening at the lower wire tube.

f. Thread the wire between the upper wire straightener rolls (7) and lower adjustable roll (8); then enter and push end of wire into the stationary cutter (9) in cutter block.

g. Lower oil retainer to position above end of upper wire tube. Reengage wire feed gears by lowering the gear throwout handle (1) to its locked position. Place a piece of work to be stitched into the machine; then turn over machine by hand, and observe that the wire is feeding freely and is being fed into the gripper (10) in a straight line. (Refer to para. 2, immediately following).

2. HOW TO STRAIGHTEN WIRE ON HEAD

(See Fig. 3)

In order to insure perfect stitching it is essential that the wire enters the gripper in as close to a straight line as possible. To check this condition and make the necessary adjustments proceed as follows:

a. After wire has been threaded into head, as directed in para. 1, immediately preceding, turn over machine by hand until wire has been cut and is being held by the gripper (1). Observe that the wire length being held by the gripper does not curl upward or downward; the cut wire length should be as close to a straight line as possible, as shown at (2) in insert in Fig. 3.

If wire tends to curl upward or downward, turn the wire straightener adjusting screw (3) clockwise or counter-clockwise, as required, until this condition is remedied.

3. HOW TO DETERMINE CORRECT WIRE DRAW AND MAKE NECESSARY ADJUSTMENTS

a. DETERMINING WIRE DRAW — The IDEAL STITCHER Bliss Stitcher Heads are divided into three types based upon the wire draw (amount of wire fed for each stitch) capacity of the head. The table in fig. 4 lists the three wire draw types of heads and gives the minimum and maximum wire draw for each type.

In order to insure perfect stitching it is essential that the wire draw be the correct length for the work to be stitched. The length of the wire draw is dependent upon the crown size of the staple to be used and the thickness of the work to be stitched.

As a general rule, stitches having a crown width size within the range of .175" (4.4mm) through 1/2" (12.7mm) should have sufficient wire draw so that the clinched legs of the staple just about meet, as shown in Fig. 5. For stitches in this range of crown

sizes the correct length of wire draw would be: Twice the crown size plus twice the thickness of work to be stitched; or, when reduced to a formula: Wire Draw = $2C + 2T$.

For example: If crown size of stitch is $7/16''$ (11.1mm) and thickness of work to be stitched is $3/16''$ (4.8mm), the correct wire draw would be: $2 \times 7/16''$ (50.8mm x 11.1mm), (or $7/8''$ (22.2mm)), plus $2 \times 3/16''$ (50.8mm x 4.8mm), (or $3/8''$ (9.5mm)), which equals $1-1/4''$ (31.8mm) wire draw.

Stitches having crown sizes greater than $1/2''$ (12.7mm) should have sufficient wire draw so that each clinched leg of the staple is $3/16''$ (4.8mm) in length, as shown in Fig. 6. For stitches in this range of crown sizes the correct wire draw would be: Crown size plus twice the thickness of work to be stitched plus $3/8''$ (9.5mm); or when reduced to a formula: Wire Draw $C + 2T + 3/8''$ (9.5mm).

For example: If crown size of stitch is $1-1/8''$ (28.6mm) and thickness of work to be stitched is $1/2''$ (12.7mm), the correct wire draw would be: $1-1/8''$ (28.6mm), plus $2 \times 1/2''$ (50.8mm x 12.7mm), (or $1''$ (25.4mm)), plus $3/8''$ (9.5mm) which equals $2-1/2''$ (63.5mm) wire draw.

The above formulas do not take into consideration the type of material to be stitched. Some materials might require staple leg lengths different than those shown in Figs. 5 and 6. However, as a general rule the formula given in Fig. 5 can be used for stitches having crown sizes within the range of $.175''$ (4.4mm) thru $1/2''$ (12.7 mm), while the formula given in Fig. 6 can be used for stitches having crown sizes greater than $1/2''$ (12.7mm).

b. WIRE DRAW ADJUSTMENTS—After determining the correct length of wire draw for the particular work to be stitched, as directed in para. a. immediately preceding, make head wire draw adjustments as follows:

1—Check that the wire feed guard lock screw (1) and cutter block holding screw (2), Fig. 7, are in the correct head plate holes for the desired wire draw. The standard, long, and extra long wire draw head plates have two tapped holes, (A) and (B), Fig. 7, for insertion of the wire feed guard lock screw. All head plates have two tapped holes, (D) and (E), for insertion of the cutter block holding screw. If the desired length of wire draw approaches the minimum or maximum limits for the head being operated (refer to Wire Draw Table, Fig. 4) it may be necessary to relocate the wire feed guard lock screw and cutter block holding screw.

The following table (Fig. 8) indicates the correct hole locations for the two screws to obtain the minimum or maximum wire draw for each type of head. The diagram in Fig. 7 shows the four holes and gives the obtainable wire draw range for each hole.

2—If it is found necessary to relocate the wire feed guard lock screw, (1) Fig. 9, and cutter block holding screw (2), remove both screws, and then shift the

wire feed guard casting (3), sufficiently to the left or right, as required, so that the wire feed guard lock screw (1) can be inserted into the alternate hole (A or B Fig. 7); do not tighten screw at this point.

TYPE OF HEAD	WIRE DRAW LIMITS	
	MINIMUM	MAXIMUM
Standard Wire Draw	(22.2mm) $7/8''$	(38.1mm) $1-1/2''$
Long Wire Draw	(23.8mm) $15/16''$	(60.3mm) $2-3/8''$
Extra Long Wire Draw	(41.3mm) $1-5/8''$	(88.9mm) $3-1/2''$

Figure 4—Wire Draw Table

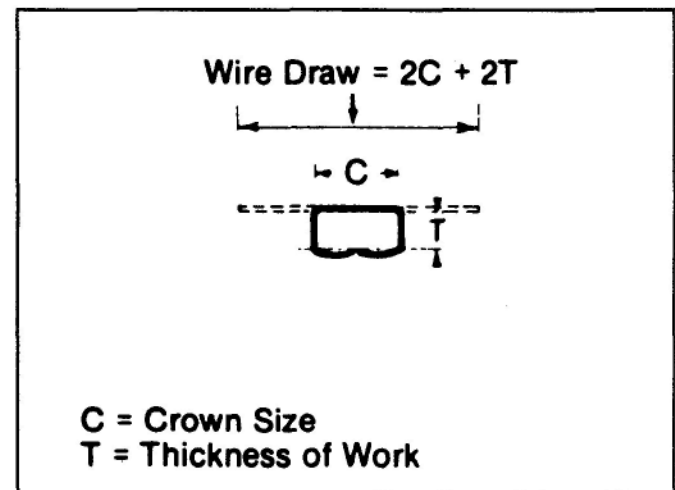


Figure 5—Wire Draw Dimensions and Formula for $.175$ thru $1/2''$ (12.7mm) Crowns

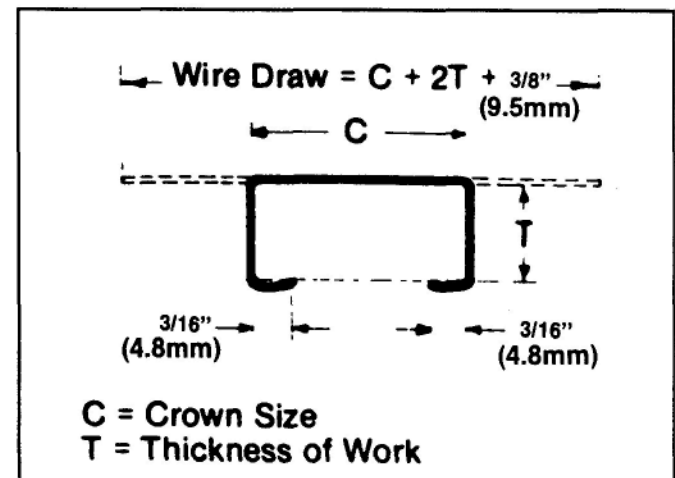


Figure 6—Wire Draw Dimensions and Formula for Crowns greater Than $1/2''$ (12.7mm)

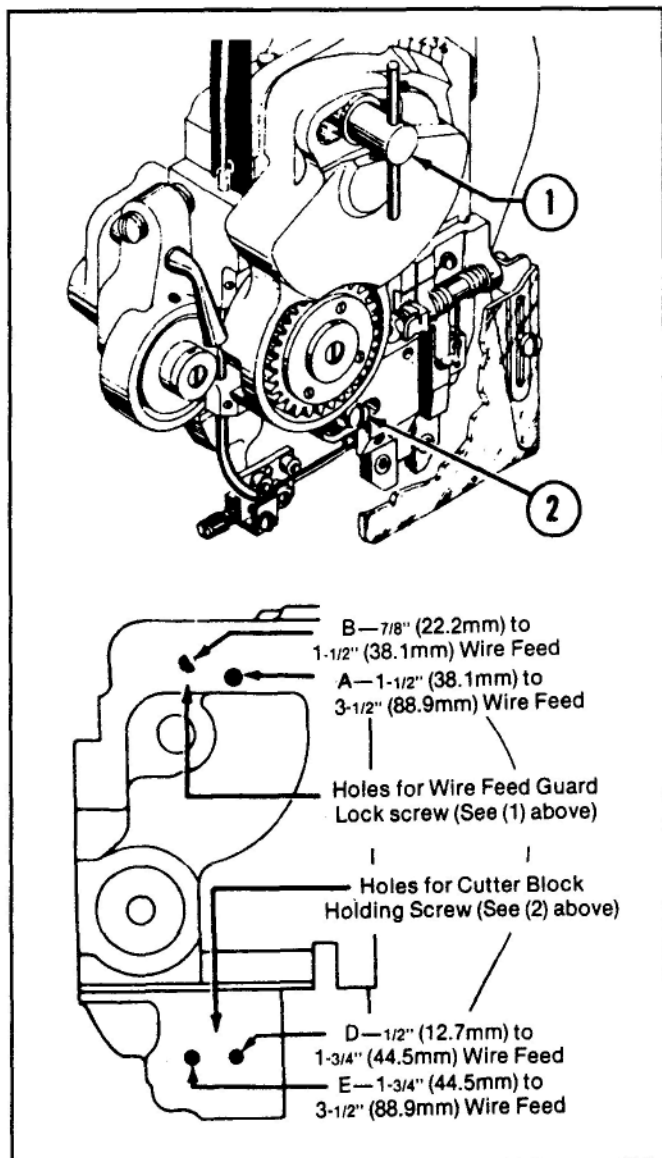


Figure 7 — Positioning Wire Feed Lock Screw and Cutter Block Holding Screw

3—The standard wire draw heads are so designed that the cutter block, (4) fig. 9, automatically shifts to the left or right when the wire feed guard is shifted. Relocate the cutter block holding screw (2) in its alternate hole (D, or E, Fig. 7). and tighten screw securely. If head is of the Metal Stitcher type (Model BHM or BHMB), relocate the cutter block holding screw (2) with washer, in its alternate hole (D or E, Fig. 7), but do not tighten. If head being operated is either the long or extra long draw type (Model BHL, BHX or BHML), the cutter block must be shifted manually. Move cutter block, as required, and relocate holding screw and washer (hex head screw and washer used on long and extra long draw heads only); do not tighten screw at this point.

4—If it is not found necessary to relocate the wire feed guard lock screw, (1) Fig. 9, and cutter block holding screw (2), and head being operated is the standard wire draw type, loosen (do not remove) only the wire feed guard lock screw (1); if head is either the metal stitcher type or long or extra long draw type, loosen (do not remove) both screws.

5—To increase or decrease the wire draw on the standard wire draw heads, shift the wire feed guard casting, (3) Fig. 9, to the right or left. As mentioned in step (3) above, any shifting of the wire feed guard automatically adjusts the position of the cutter block so that both legs of the staple are increased or decreased an equal amount.

The standard wire draw heads are equipped with a length of wire draw scale, (1) Fig. 10, on the head plate, and an alignment marker (2) on the wire feed guard. The scale and marker provide a means of setting the wire draw according to the desired length. On the short wire draw head the "O" scale marking represents 1/2" (12.7mm) of wire draw; on the standard draw head the "O" marking represents 1" (25.4mm) of wire draw. Each of the

TYPE OF HEAD	WIRE FEED GUARD LOCK SCREW		CUTTER BLOCK HOLDING SCREW	
	MIN. WIRE DRAW	MAX. WIRE DRAW	MIN. WIRE DRAW	MAX. WIRE DRAW
Standard Wire Draw	Hole B	Hole B	Hole D	Hole D
Long Wire Draw	Hole B	Hole A	Hole D	Hole E
Extra Long Wire Draw	Hole A	Hole A	Hole D	Hole E

Figure 8 — Table of Hole Locations for Wire Feed Guard Lock Screw and Cutter Block Holding Screw (See Fig. 7)

other graduations in the scale represent approximately $\frac{1}{8}$ " (3.2mm) additional wire draw. Thus, if the head being operated is a standard wire draw head, a setting on the "3" marking will result in a wire draw of $1\frac{3}{8}$ " (34.9mm).

After the setting has been made, tighten the wire feed guard lock screw, (1) Fig. 9. If head is of the metal stitcher type (Model BHM or BHMB), also tighten the cutter block holding screw, (2) Fig. 9.

6—On the long and extra long wire draw heads (BHL, BHX and BHML) wire draw is increased or decreased exactly the same as for the standard draw heads: by shifting the wire feed guard casting to the right or left. However, on these types of heads the cutter block is not linked to the wire feed guard, so that any increase or decrease of wire draw affects only the right leg of the staple. It is necessary therefore, when changing the wire draw setting on either of these heads, to manually move the cutter block to the left or right, thereby adjusting the length of the staple left leg.

A length of wire draw scale, similar to that on the standard wire draw heads, is provided on the long and extra long wire draw head plates. In addition, another scale corresponding to the wire draw scale is provided on the cutter block and its holding plate, (1) Fig. 11. This scale provides a means of adjusting the staple left leg (positioning the cutter block) according to the wire draw setting. On these two scales the extreme right hand mark represents the maximum length of wire draw — i.e., on long wire draw head $2\frac{3}{8}$ " (60.3mm), and on extra long wire draw head $3\frac{1}{2}$ " (88.9mm). The other graduations in the scale do not represent any definite length of wire draw, but are used for setting the cutter block to coincide with the setting of the wire feed guard. If the wire feed guard is set at maximum wire draw — extreme right hand marking — the cutter block must be set at the same marking, etc.

After setting the wire feed guard and cutter block, tighten the wire feed guard lock screw and cutter block holding screw, (1) and (2) Fig. 9.

7—After the above settings have been made, turn over the machine manually to the point where the new wire length has been cut off by the cutters and is being held by the gripper; check that wire is the desired length (wire draw setting). Then continue turning over machine manually until staple legs have been formed but not clinched; check that both legs of staple are of equal length.

If left leg is too short or too long, make left leg adjustment, as directed in para. 4, pg. 8

If head being operated is standard wire draw type, and right leg is not the correct length, make left leg the same length as the right one (refer to para. 4, pg. 8); then, increase or decrease the wire draw, as directed in step (5), pg. 6 until both legs are the correct length.

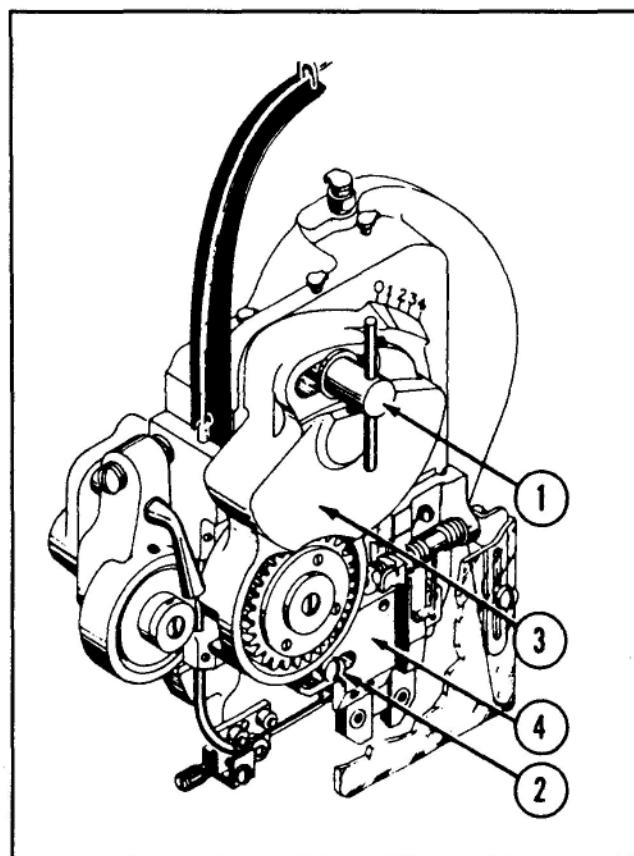


Figure 9 — Wire Draw Adjustments

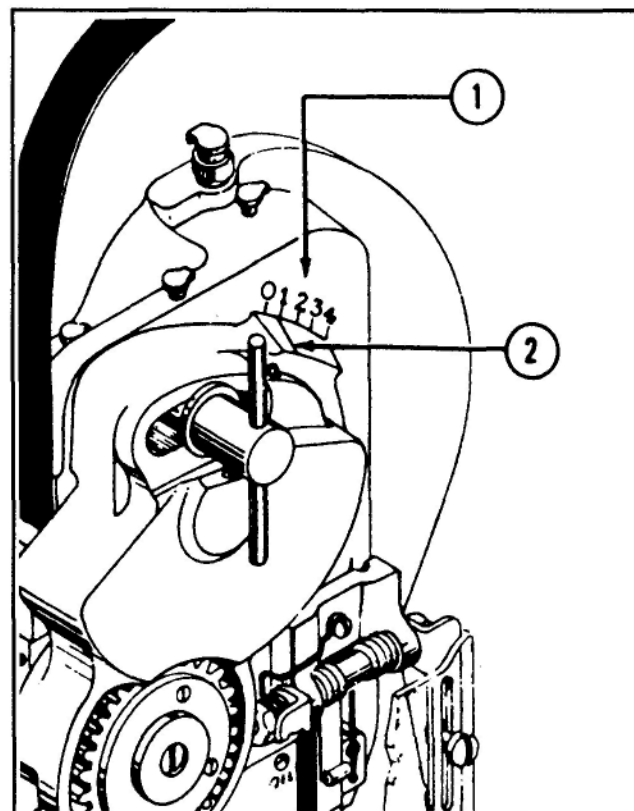
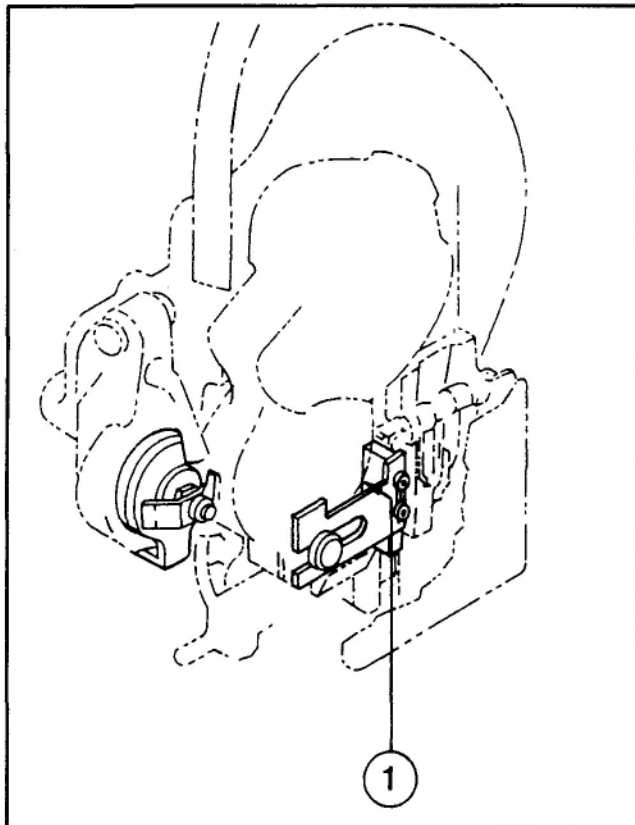


Figure 10 — Wire Draw Scale



**Figure 11 — Cutter Block Scale
Long and Extra Long Draw Heads**

If head being operated is either the long or extra long wire draw type, and right leg is not the correct length, increase or decrease the wire draw (shift wire feed guard) to approximate length of wire draw required. Shift cutter block to the point where the left leg of staple is the desired length; then, equalize both legs of staple by readjusting wire draw (shifting wire feed guard).

After correct staple leg length is obtained, securely tighten wire feed guard lock screw and cutter block holding screw.

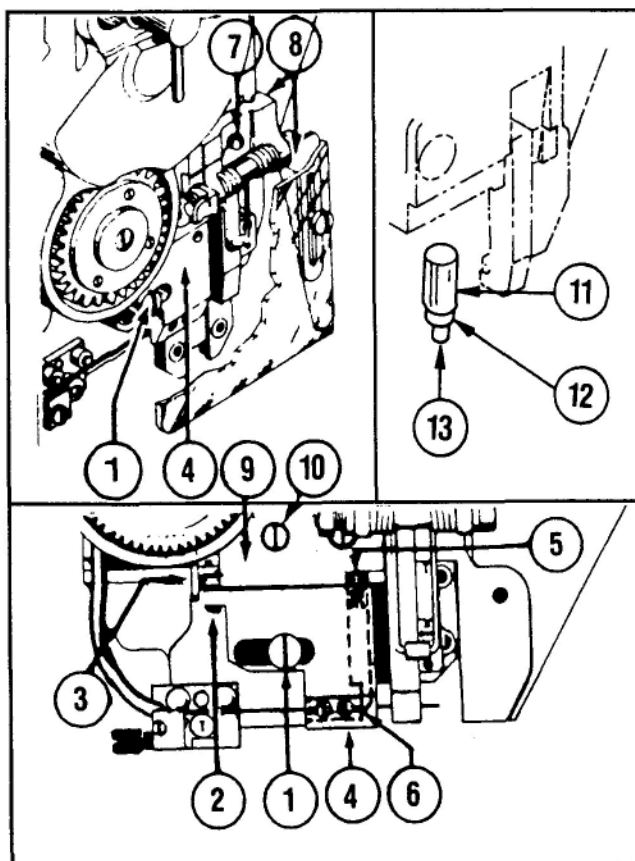
4. HOW TO ADJUST LENGTH OF STAPLE LEFT LEG

(See Fig. 12)

If staple is off center (one leg longer than the other) the length of the staple left leg can be changed as follows:

a. If head being operated is standard wire draw type, loosen (do not remove) cutter block holding screw (1) and adjusting screw lock screw (2). To lengthen leg, turn cutter block adjusting screw (3) clockwise, thereby moving cutter block away from gripper; to shorten leg, turn adjusting screw counter-clockwise, thereby moving cutter block toward gripper. After adjustment has been made, securely tighten adjusting screw lock screw (2) and holding screw (1).

b. If head being operated is either the long or extra long wire draw type, (Model BHL, BHX or BHML) loosen (do not remove) cutter block holding screw (1). To lengthen leg, manually move the cutter block (4) to the left (away from gripper); to shorten leg, move cutter block to the right (toward gripper). After adjustment has been made, securely tighten cutter block holding screw (1).



**Figure 12 — Staple Left Leg and
Movable Cutter Adjustments**

5. HOW TO SET MOVABLE CUTTER (See Fig. 12)

The cutter block movable cutter (5) is activated by an adjustable plunger in the head plate. The plunger adjustment should be such that when the movable cutter has reached the limit of its down stroke, the cutting edge of the cutter should be just below the wire opening in the stationary cutter (6). If the movable cutter continues down past that point, the cut off wire length may be bent downward by the continued downward movement of the cutter.

If it is found necessary to adjust the stroke of the cutter, proceed as follows:

a. Unscrew the gripper spring bracket screw (7), and remove the gripper spring and finger guard assembly (8).

b. Remove the cutter block holding screw (1), permitting the removal of the cutter block assembly (4) from its holding plate (9).

c. Remove the two screws (10) in the cutter block holding plate, allowing the holding plate and cutter block operating plunger (11) to be removed from the head plate.

d. Loosen the plunger adjusting screw nut (12), and then move the plunger adjusting screw (13) in or out, as required, to raise or lower the cutter stroke. After the adjustment has been made, tighten the adjusting screw nut (12) and replace the parts and assemblies removed.

6. HOW TO ALIGN GRIPPER BAR AND FORMERS

(See Fig. 13)

a. Turn over the machine manually and, as the formers (1) descend, check that the grooves in the formers are in exact alignment with the wire length being held by the gripper bar (2).

b. If they are not in alignment, (usually resulting in deformed crown surface), loosen the clamp block holding screw (3). Then turn gripper bar adjusting screw (4) in or out, as required, until alignment is correct. After adjustment has been made, tighten clamp block holding screw (3).

7. HOW TO ADJUST TENSION OF WIRE FEED GEARS

(See Fig. 14)

The wire feed idler gear (1) operates with the drive gear, located behind the wire feed guard (2), to feed the wire into the head. The tension of the two wire feed gears is adjustable by means of the tension adjustment screw (3).

The tension of the wire feed gears should be such that the wire feeds freely without slipping or binding. If tension is too loose, wire will slip, usually resulting in staples being off center. If tension is too tight, wire will bind and may be rolled out of shape, causing wire curvature and preventing proper handling in the gripper.

(Continued)

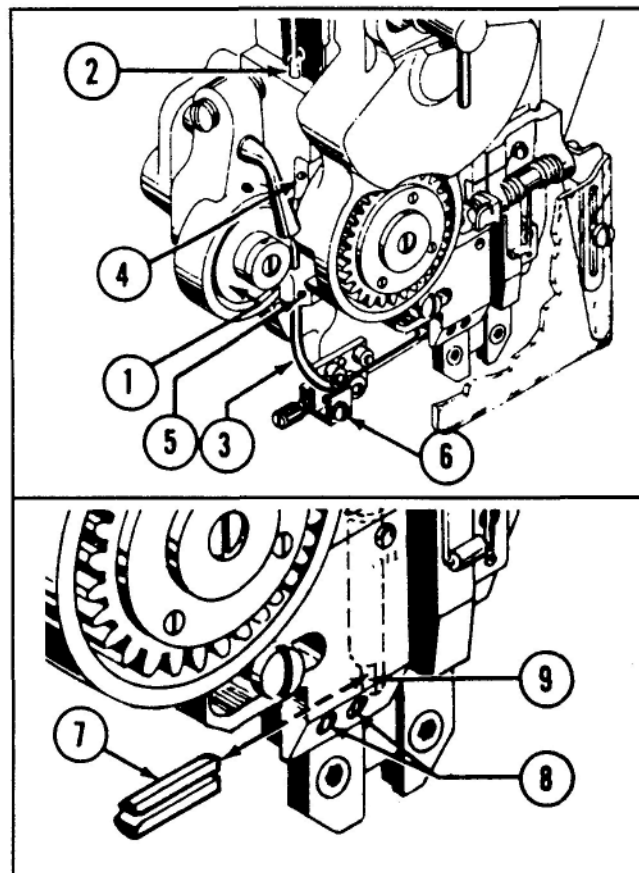


Figure 13 — Adjustments for Aligning Gripper Bar and Formers

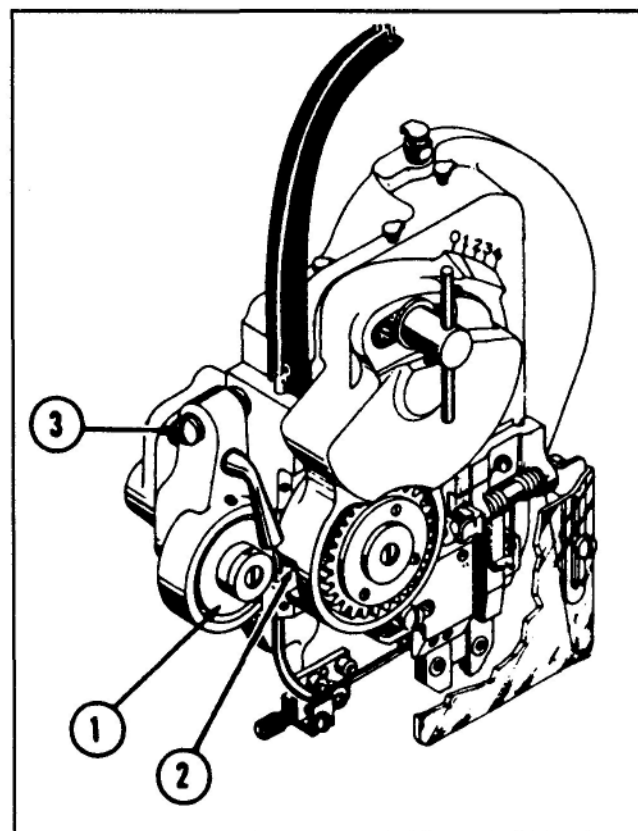


Figure 14 — Wire Feed Gear Tension Adjustment

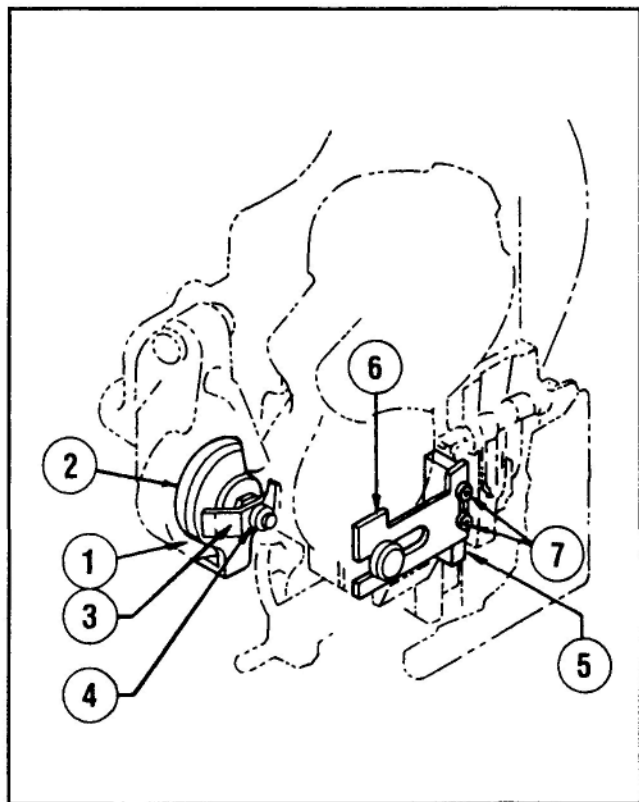


Figure 15 — Wire Feed Brake Tension and Wire Guide Adjustments (Long and Extra Long Draw Heads)

8. HOW TO ADJUST WIRE FEED BRAKE TENSION Models BHL, BHX and BHML

(See Fig. 15)

Models BHL, BHX and BHML are equipped with a friction braking device (1) to prevent wire feed overrun. Due to normal wear of the leather brake friction (2) it may be necessary to increase the tension of the friction spring (3). This is accomplished by means of the brake tension nut (4).

To check the spring tension, turn the brake friction spring (3) by hand; if spring turns too freely, tighten brake tension nut (4); if spring cannot be turned by hand, loosen tension nut.

9. HOW TO ADJUST WIRE GUIDE — Models BHL, BHX and BHML Only

(See Fig. 15)

Because of the wide gap between the cutter block and the gripper bar on the long and extra long wire draw heads, these heads are equipped with a wire guide (5). The guide serves to lead the wire into the gripper bar slot.

The wire guide plate (6), which supports the wire guide, is adjustable to the left or right for positioning the wire guide depending upon length of wire draw. The wire guide can also be adjusted up or down, by loosening the wire guide screws (7).

The wire guide should be so positioned that the wire is fed from the cutter block directly in to the gripper bar.

MAINTENANCE

To insure continuous operation of the IDEAL STITCHER Bliss Stitcher Head the operator should be sure that the head is regularly lubricated and carefully maintained. The operator should periodically inspect all moving parts for signs of wear, and, when required, replace any worn part.

The following instructions are provided so that the operator will clearly understand how to lubricate the head, and how to check and replace worn parts. Included in this section is a Trouble Shooting Chart which provides a quick means of remedying any troubles that may occur due to incorrect settings or adjustments, or normal wear of the head.

WARNING: AFTER REPLACING THE ABOVE MENTIONED PARTS, OR AFTER INSTALLING A NEW PART, TURN OVER MACHINE MANUALLY AND CHECK THAT HEAD OPERATES FREELY. DO NOT OPERATE MACHINE UNDER POWER UNTIL CERTAIN THAT HEAD IS OPERATING FREELY.

1. LUBRICATION

(See Fig. 16)

Use an S.A.E. No. 10 oil for lubricating the IDEAL STITCHER Bliss Stitcher Head. Machines that are in constant operation should be lubricated daily; machines that are operated periodically should be lubricated just prior to running a job.

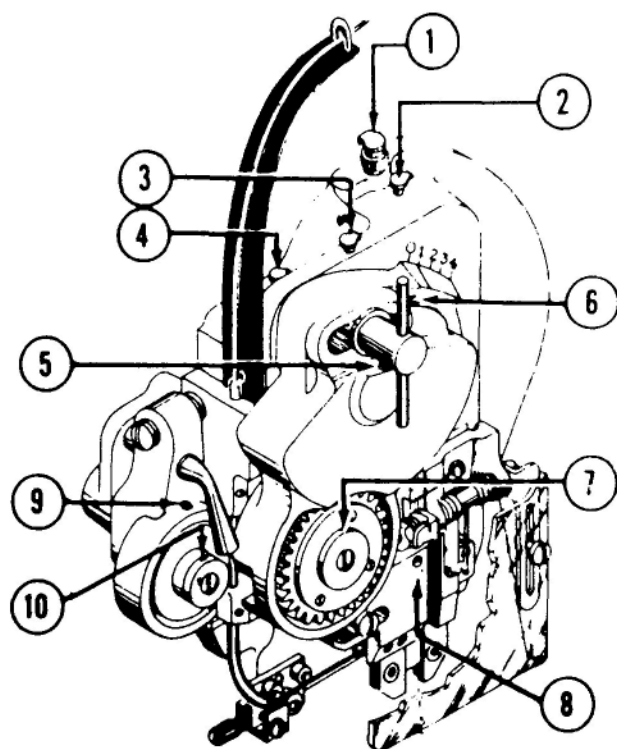
Except for Lubrication Point #1 on Models BHM, BHMB and BHML usually only a drop of oil is required at each point of lubrication. Lubrication Point #1 on Models BHM, BHMB and BHML is a wick type oil cup which requires a greater quantity of oil in order to keep the wick saturated.

Depending upon the type of work being stitched, care must be taken that those parts of the head that contact the work are free of oil. Lubricate regularly instead of excessively. After lubricating the head, wipe off any excess oil.

2. INSPECTION AND REPLACEMENT OF WORN PARTS

Obviously, all moving parts may eventually require replacement due to normal wear of the parts. However, regular lubrication will aid in lengthening the life of the parts. Usually, those parts that are in actual contact with the wire during feeding, cutting, forming and clinching of the wire will be the first parts to show signs of wear. Imperfect stitching, not caused by incorrect machine settings or adjustments, is usually due to normal wear of wire feed gears, wire tubes, stationary and moving cutters, gripper parts, formers, driver, or supporter. These parts should be regularly inspected for signs of wear, and replaced when required, as directed in the following instructions.

- 1— Oil cup in top of head plate for former slide, driver bar, and other internal parts
- 2— Oil cup in top of head plate for wire feed operating link
- 3— Oil cup in top of head plate for wire feed operating lever and sliding head
- 4— Oil cup in top of head plate for wire feed operating lever pivot stud
- 5— Ball oiler in wire feed guard for wire feed guard crank stud
- 6— Ball oiler in wire feed guard for wire feed crank sector
- 7— Oil hole in retaining washer for wire feed drive gear stud
- 8— Oil hole in cutter block for movable cutter
- 9— Ball oiler in wire feed idler gear arm for wire feed idler gear
- 10— Oil hole in retaining washer for wire feed idler gear stud



In addition to the above lubricating points, apply a few drops of oil as required to wire oiler felt (not shown in illustration) to clean and lubricate stitching wire. Friction points of all sliding, rotating or oscillating parts, for which oil cups or holes are not provided, should be oil moistened just prior to running a job. It is recommended that a tooth pick, or matchstick, tipped with oil moistened cotton dressing be used to lubricate these parts.

Figure 16 — Lubrication Points

a. **WIRE FEED GEARS** (See Fig. 17)—The wire feed gears (Fig. 17 shows the left, or idler, gear (1), the right, or drive, gear being located behind the wire feed guard) should be checked for smooth and parallel wire gripping surface. Worn surfaces may result in wire slipping thereby not feeding properly; if surfaces are not parallel, wire may be rolled on one side causing wire curvature and resulting in imperfect stitches.

If head being checked is equipped with a grooved wire feed drive (right) gear, check that groove is clean (not clogged) and not worn.

For instructions on removing the wire feed gears, refer to How To Disassemble and Reassemble Head, para. 1, pg. 18.

b. **WIRE FEED TUBES** (See Fig. 17)—The upper and lower wire tubes, (2) and (3), should be checked for any obstructions in the tube passages which may interfere with free movement of wire. Slots may eventually appear in tube passages, due to normal wear, which will cause the wire to catch and bind, thereby resulting in improper feeding.

To remove worn tubes, loosen the upper and lower wire tube screws, (4) and (5). Remove the

lower wire tube clamp (6), and withdraw the tubes from the head plate.

c. **STATIONARY CUTTER** (See Fig. 17)—The stationary cutter (7) should be periodically checked for any obstructions in the wire passage which may interfere with free movement of wire. Check that cutting end is sharp; dull cutter may be resharpened, but eventually must be replaced.

To remove and replace the stationary cutter, proceed as follows:

1—Loosen stationary cutter screws (8) and withdraw cutter from cutter block.

2—When reinstalling cutter be sure that cutting end is inserted into cutter block. Opposite, or countersunk end is the end which protrudes from the cutter block. If installing a flat wire cutter, face flat side of cutter toward front of head.

3—With cutter positioned as directed above, slide cutter into cutter block until cutting end contacts and is parallel with flat cutting surface of movable cutter (9). Upon contact with stationary cutter, movable cutter cutting face will automatically align itself with cutting surface of stationary cutter.

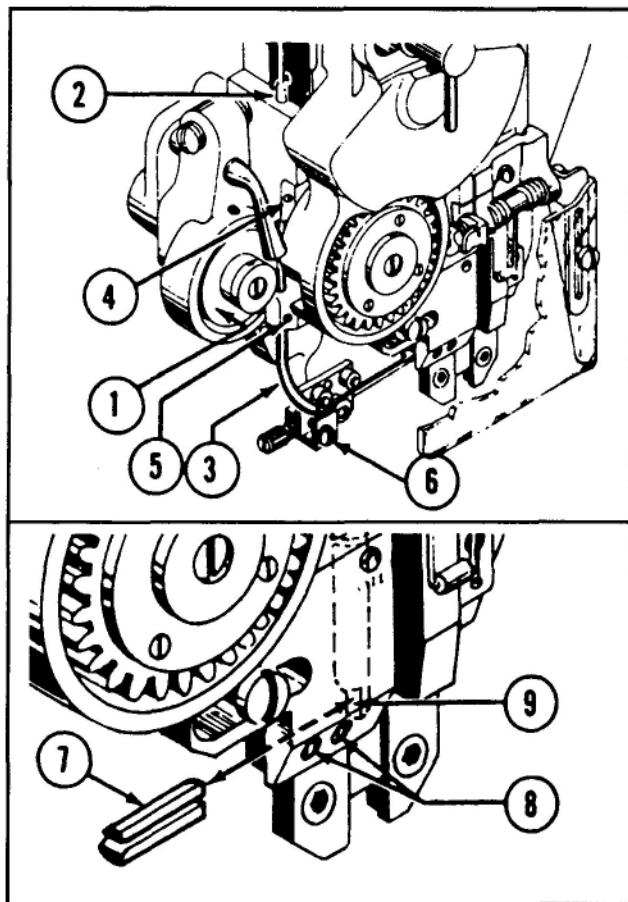


Figure 17 — Inspecting Wire Feed Gears, Tubes, and Stationary Cutter

4—With stationary cutter fully inserted in cutter block and aligned with movable cutter, tighten cutter holding screws (8). Then turn over machine by hand and check that movable cutter operates freely.

d. **MOVABLE CUTTER** (See Fig. 18)—The cutting edge of the movable cutter should be periodically checked for sharpness. A dull cutter can be resharpened but eventually must be replaced.

To remove and reinstall movable cutter for sharpening or replacing, proceed as follows:

1—Unscrew and remove cutter block holding screw, (1) and remove the cutter block (2) from its holding plate (3).

2—Manually holding cutter plunger (4) under spring tension, back-out cutter plunger holding screw (5) sufficiently to release plunger (4) and cutter (6) from cutter block.

3—To replace cutter into cutter block, first loosen stationary cutter holding screws (7) and back-out stationary cutter (8) slightly.

4—Fit top of movable cutter (6) into groove in plunger (4), with flat cutting surface of cutter turned toward plunger. Slide cutter and plunger into their holes in cutter block, and then compress plunger by hand until top of plunger is just below the top of

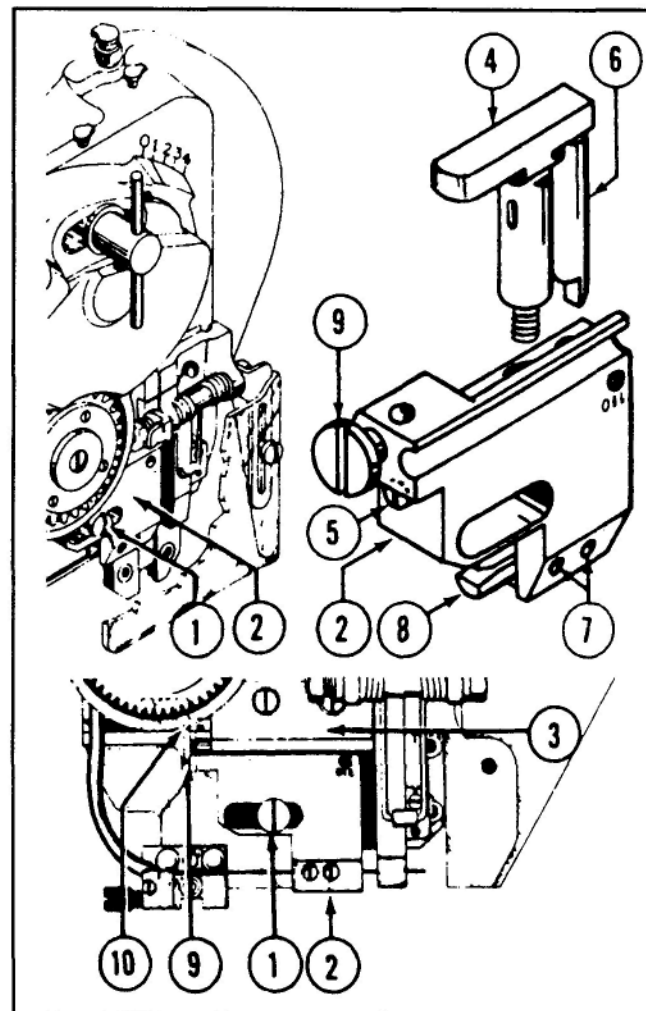


Figure 18 — Removing and Replacing Removable Cutter

cutter block body; then, tighten plunger holding screw (5) until it engages slot in side of plunger, thereby holding plunger in place. (If plunger holding screw (5) protrudes from its hole in cutter block body, it is not correctly engaged with slot in plunger.)

5—Slide stationary cutter (8) back into cutter block body until its cutting end surface contacts and is parallel with cutting surface of movable cutter. (Upon contact with stationary cutter, movable cutter will automatically align itself with stationary cutter). When cutters are correctly aligned, tighten stationary cutter holding screws (7).

6—Reinstall cutter block (2) onto its holding plate (3). On all heads other than Models BHL, BHX, and BHML be sure to position cutter block so that the cutter block adjusting screw head (9) engages in the first (left side) slot in the cutter block control slide (10). (Models BHL, BHX, and BHML are not equipped with this control slide). With cutter block correctly positioned, replace and tighten cutter block holding screw (1).

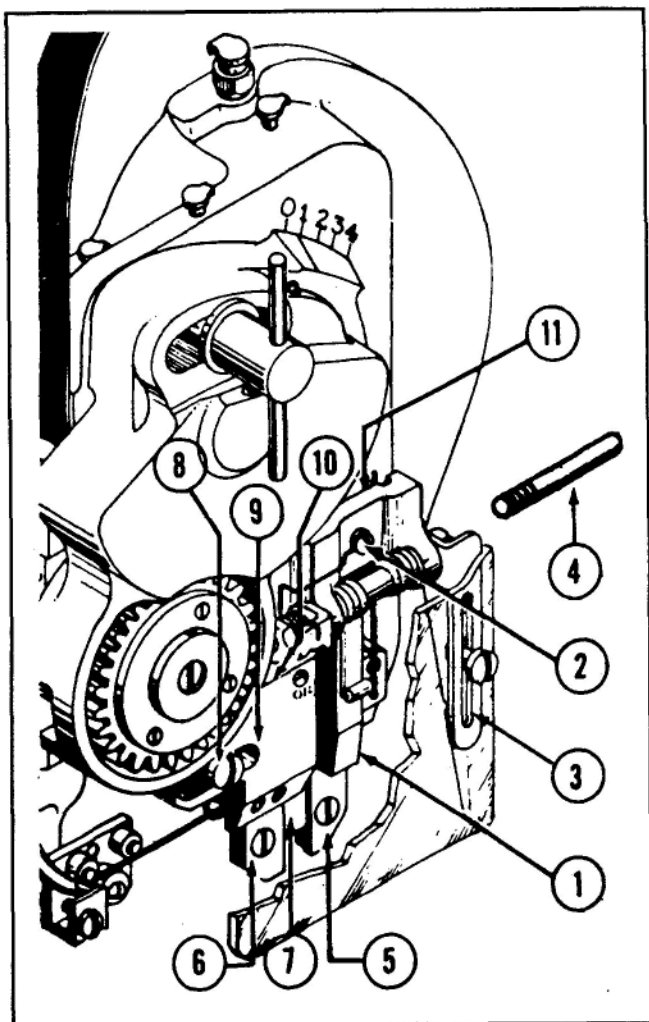


Figure 19 — Removing and Replacing Gripper, Formers and Driver

7—Turn over machine by hand and check that movable cutter operates freely; check that cutter stroke is correct. If cutter has been resharpened, or a new cutter has been installed, cutter stroke may need resetting. (Refer to para. 5, pg. 8)

e. **GRIPPER** (See Fig. 19)—Check for excessive wear at edges of gripper bar (1) anvil (surface upon which staples are formed), usually evidenced by rounded corners on formed staple.

Check for signs of wear on gripping surface of gripper bar clamp piece (see index No. 152 in Fig. 23); check for sufficient tension in gripper bar clamp piece spring. If clamp piece is overly worn, or spring tension is not sufficient, wire will slip while being held in the gripper usually resulting in a one-legged staple.

To remove and reinstall gripper assembly, proceed as follows:

1—Turn over machine to neutral (stop) position.

2—Remove gripper spring bracket screw (2), and gripper spring unit (11) from head.

3—Unscrew and remove gripper pivot screw (4), permitting gripper assembly to be removed from head.

4—When reinstalling gripper assembly in head, be sure that upper stud (153), Fig. 23, in gripper bar clamp piece engages in slot in gripper clamp piece control slide, (167), Fig. 23; then replace and tighten gripper pivot screw, (4), Fig. 19.

5—Check that gripper bar is in alignment with formers (refer to para. 6, pg. 9)

f. **FORMERS AND DRIVER** (See Fig. 19)—Check for wear in grooves of formers (5) and (6), usually evidenced by buckled staple legs. The formers supplied with Models BHM, BHMB and BHML are double-ended, thereby permitting these formers to be reversed when one end is worn.

The driver (7) should be checked for broken tips, or worn ends or sides. Some types of drivers are double-ended and can be reversed in the formers when one end is worn.

To remove and reinstall the formers and/or driver, proceed as follows:

1—Disconnect Stitcher machine power cord from power outlet.

2—Remove gripper spring bracket screw (2) and remove gripper spring unit (11).

3—Manually rotate Stitcher clutch pulley to the point where the formers (5) and (6) are at the lower end of their stroke. Remove gripper throwout cam block (See (175) Fig. 23).

4—Further rotate clutch pulley until clutch is disengaged. Remove screws from right former, (5) slide former down and off former slide. The driver (7) can now be removed by sliding driver to the right.

5—If it is desired to remove the left former (6), unscrew and remove the cutter block holding screw (8) and remove the cutter block (9) from its holding plate. (10). Remove the screws from the left former, slide former down and off former slide.

6—To replace the formers and driver, first check that clutch is disengaged and then reinstall left former (6) on former slide and securely tighten attaching screws. Reinstall cutter block, as directed in step (6) of para. d., on page 12.

7—Slide driver (7) into place on the driver bar, with driving boss of driver bar keyed into slot in rear face of driver, and left side of driver engaged in groove of left former.

8—Slide right former (5) up into position on former slide, making sure that driver is engaged in former groove; then replace and securely tighten right former screws.

9—Manually rotate Stitcher clutch pulley to the point where the formers are at the lower end of their stroke. Reinstall gripper throwout cam block, (175) Fig. 23, on former slide, making sure that attaching screw is securely tightened.

10—Reinstall gripper spring unit making sure that gripper spring bracket (11) fits squarely in slot in head plate; tighten attaching screw (2) securely.

11—Manually turn over machine and check that parts operate freely. If new formers have been installed, run machine for a short time using oiled wire, in order to wear-in former grooves, thereby preventing binding of wire.

g. **SUPPORTER** (See (196) Fig. 23)—If legs of staple buckle, it may be caused by a worn supporter, (196), Fig. 23. Examine supporter for signs of excessive wear on the surface that first contacts the wire. Due to the wire always striking the supporting surface at the same point, a slight groove may eventually develop at this point, causing the wire to jump when it contacts the groove, resulting in staple legs buckling.

The supporter should also be examined for worn (sharp) edges which may cause wire breakage.

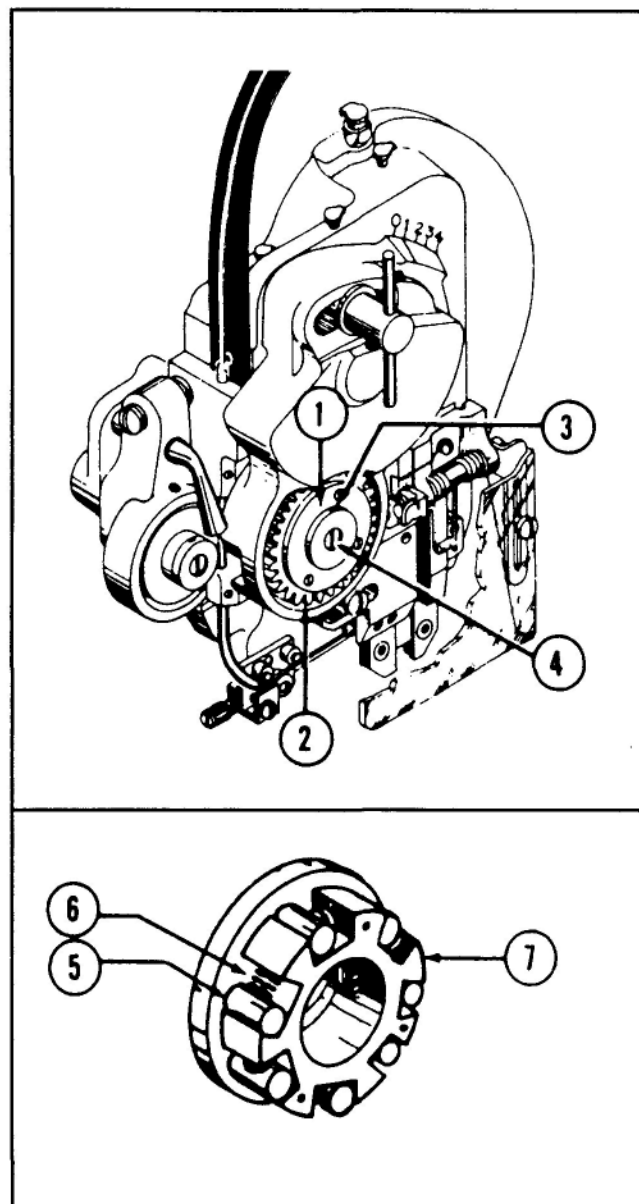
Staple crown buckling may be caused by supporter retracting too easily, due to insufficient tension in supporter spring, necessitating replacement of the spring.

For instructions on removing the supporter assembly, refer to para. b, steps (12) thru (15), pg. 20.

h. **WIRE FEED CLUTCH** (See Fig. 20)—The wire feed clutch (1) is a friction roller type of clutch that operates (grips) on the wire feed stroke (counterclockwise rotation of clutch ring gear (2)), and slips on the return stroke. If the clutch slips on the wire feed stroke, causing uneven wire feed, it is probably due to excessive clutch lubrication. (Clutch is lubricated at oil hole in retaining washer (3)). In this event, the clutch assembly should be removed and washed with gasoline. (Be sure to relubricate clutch after clutch is reassembled in head.)

To remove the clutch assembly, remove the retaining washer screw (4) and retaining washer (3) permitting the removal of the clutch assembly from the wire feed drive gear stud.

If clutch is disassembled, make sure that clutch rollers and springs, (5) and (6), are reassembled in the clutch spider (7) as shown in Fig. 20.



TROUBLE SHOOTING

The quality and quantity of work that can be produced with IDEAL STITCHER Bliss Wire Stitcher Heads are dependent upon the operator making all adjustments as accurately as possible, and carefully maintaining the heads. The cause of staple imperfections usually can be traced to inaccurate settings or adjustments, or normal wear of parts. In the event of trouble of this nature occurring, the operator can, by referring to the following Trouble Shooting Chart, quickly locate and remedy the cause, or causes, of the trouble, thereby reducing to a minimum the time the Stitcher is non-operative.

The first column of the chart illustrates perfect and

imperfect stitches; the second column describes the imperfections (troubles); the third column lists the probable cause, or causes, for the given trouble, while the fourth column lists the remedy, or remedies, for the troubles. Reference is also made in the fourth column to the paragraph in this book in which will be found detailed information for making the necessary remedial adjustments.

If stitching is defective, the operator can compare the staple produced with the stitches illustrated in the chart and, by carefully reading the information given for each type of imperfect stitch, remedy the cause of the imperfection.

TROUBLE SHOOTING CHART

FORMED STAPLES

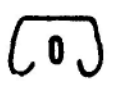
Staple	Trouble	Cause	Remedy
	Perfect staple		
	Right leg short	Wire spool dragging	Adjust wire spool tension
		Wire slipping in wire feed gears	Check tension setting of wire feed gears (refer to para. 7 page 9).
		Upper and/or lower wire tube clogged or worn	Check wire feed tubes (refer to para. b page 11)
		Cutter block not properly positioned with relation to gripper	Make adjustments as directed in step (7) of Wire Draw Adjustments on page 7
		Improper wire feed due to over lubricated or worn wire feed clutch	Check operation of wire feed clutch (refer to para. h page 14)
		Wire slipping in gripper due to normal wear of gripper bar clamp piece or insufficient tension in clamp piece spring	Check gripper bar clamp piece and spring (refer to para. e page 13).
	Left Leg short	Cutter block not properly positioned with relation to gripper	Adjust length of left leg (refer to para. 4 page 8)
		Wire slipping in gripper due to normal wear of gripper bar clamp piece or insufficient tension in clamp piece spring	Check gripper bar clamp piece and spring (refer to para. e page 13).
	Staple corner buckled	Chipped or broken driver	Check driver ends for signs of damage; reverse or replace driver (refer to para. f page 13)
	Either or both legs buckled	Wrong size wire being used for work being stitched	Check wire size for work being stitched
		Dull wire cutters	Check movable and stationary cutters; sharpen or replace cutters (refer to para. c and d page 11 and 12).
		Worn supporter, or supporter retracts too easily due to insufficient spring tension	Check for worn supporter and broken or weak supporter spring (refer to para. g page 14)

TROUBLE SHOOTING CHART (Cont'd)

FORMED STAPLES

Staple	Trouble	Cause	Remedy
	Bent crown	Wrong size wire being used for work being stitched	Check wire size for work being stitched
		Supporter retracts too easily	Check for weak supporter spring (refer to para. g page 14)
		Wrong setting of Stitcher adjustment for thickness of work being stitched	Check Stitcher adjustment for thickness of work being stitched
	Left leg missing	Wire slipping in gripper due to normal wear of gripper bar clamp piece or clamp piece spring	Check gripper bar clamp piece and clamp piece spring (refer to para. e page 13).
		Gripper out of alignment with formers	Check to see that formers and gripper are in proper alignment (refer to para. 6 page 9).
	Right leg missing	Wire slipping in wire feed gears	Check tension setting of wire feed gears (refer to para. 7 page 9); check for worn gears (refer to para. a page 11)
		Refer to Causes for "Left leg missing"	Refer to Remedies for "Left leg missing"
		Gripper not operating properly due to broken or weak gripper bar holding springs	Check for broken or weak gripper springs (see Index Nos. 140 and 141 in Fig. 22)
	Staple comes out in pieces	See causes for Left and Right leg missing	Refer to Remedies for Left and Right legs missing
		Supporter edges worn sharp	Check for worn supporter (refer to para. g page 14)
		Wire too hard	Check wire being used
	Corner of staple broken or nearly broken thru	Wire too hard	Check wire being used
		Supporter edges worn sharp	Check for worn supporter (refer to para. g page 14)
		Driver corners too sharp; or worn formers	Check for worn formers and driver (refer to para. f page 13)
	Corner of staple rounded	Worn anvil surface of gripper bar	Check for worn gripper bar (refer to para. e page 13)

DRIVEN AND CLINCHER STAPLES

Staple	Trouble	Cause	Remedy
 	Perfect Stitch (Crown Widths 1/2" (12.7mm) and less)		
	Perfect Stitch (Crown Widths greater than 1/2" (12.7mm))		
	Loose clinch	Wrong setting of Stitcher adjustment for thickness of work, and clinchers set too low	Check setting of Stitcher for thickness of work being stitched, and raise clinchers
	Legs spread	Worn wire cutters	Check movable and stationary cutters; sharpen or replace cutters; (refer to para. c and d, page 11 and 12)
		Former grooves worn	Check formers; replace if grooves are worn (refer to para. f page 13)
		Wire straightener not properly adjusted	Check setting of wire straightener (refer to para. 2 page 4)
		Thickness of work beyond capacity of machine	Check thickness capacity of Stitcher
	Staple legs contracted	Worn wire cutters	Check movable and stationary cutters; sharpen or replace (refer to para. c and d page 11 and 12)
		Wire straightener not properly adjusted	Check setting of wire straightener (refer to para. 2 page 4).
	Crown buckled, tearing work	Wrong setting of machine adjustment for thickness of work	Check setting of Stitcher for thickness of work being stitched
	Only one leg clinched in	Clincher not in alignment with driver	Align clincher and driver
	Short legs	Insufficient wire draw	Increase amount of wire draw (refer to para. 3 page 4)
	Legs cross	Wire draw too great	Decrease amount of wire draw (refer to para. 3 page 4)
	Uneven clinching	Clincher not level and parallel with formers	Adjust clincher setting

PART II — PARTS CATALOG

The instructions, illustrations and parts lists included in the following pages are provided to expedite the ordering of repair parts for the BOSTITCH Bliss Stitcher Heads.

1. HOW TO DISASSEMBLE AND REASSEMBLE STITCHER HEAD

(See Fig. 21)

NOTE

Figure 21 illustrates the disassembling and reassembling procedures only and is not intended to identify parts for purposes of ordering parts. For ordering parts see Fig. 22 and 23, and the accompanying Parts List.

WARNING: ALWAYS DISCONNECT STITCHER MACHINE POWER CORD FROM POWER OUTLET BEFORE DISASSEMBLING HEAD.

a. HOW TO REMOVE WIRE FEED, WIRE CUTTING, AND GRIPPER ASSEMBLIES (See Fig. 21).

1—Remove gripper spring bracket screw (1), and gripper spring unit (80).

2—Remove wire feed guard lock screw (3).

3—Remove wire feed clutch retaining washer screw (4) and retaining washer (5), permitting the removal of the wire feed guard (6) and wire feed clutch assembly (7).

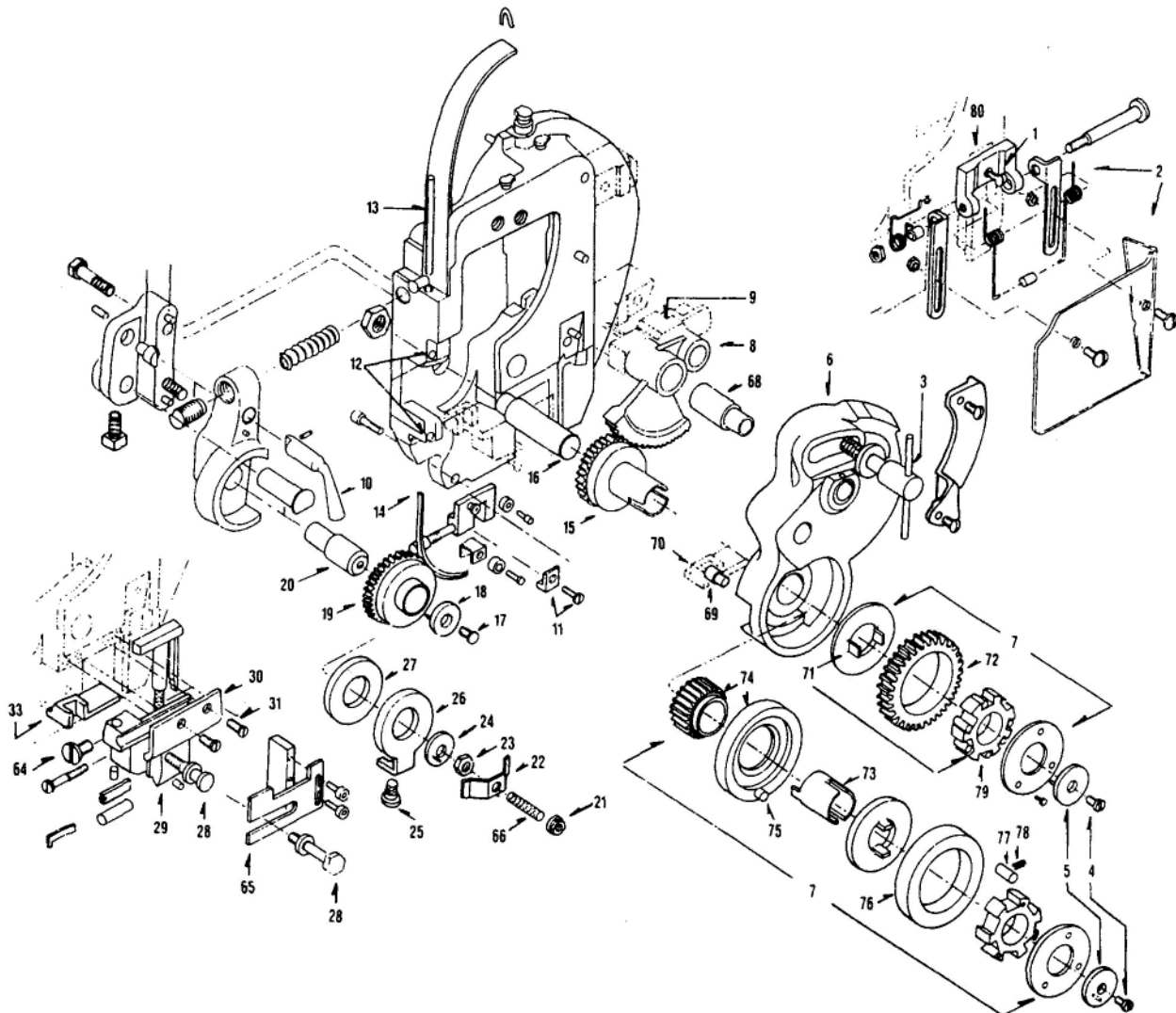


Figure 21 — Disassembling and Reassembling Stitcher Head

4—Remove the wire feed crank sector (8) and wire feed operating lever sliding head (9).

5—Disengage wire feed gears by raising the gear throwout handle (10) to its open position.

6—Remove lower wire tube clamp (11) and loosen the two wire tube screws (12).

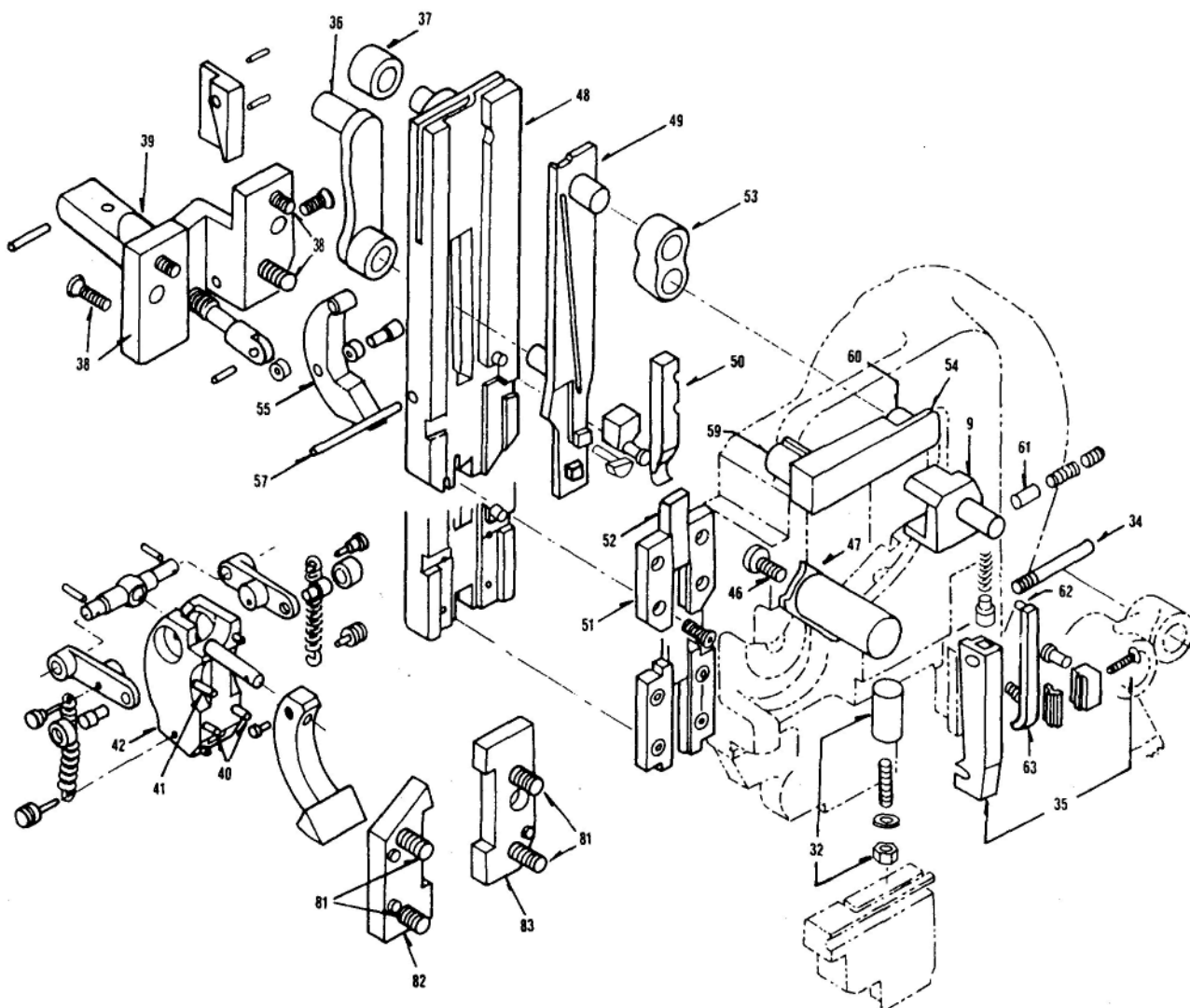
7—Withdraw upper and lower wire tubes, (13) and (14), sufficiently so that the wire feed drive gear (15) can be slipped off from its stud (16).

8—Remove wire feed idler gear retaining washer screws (17) and retaining washer (18), permitting

the removal of the wire feed idler gear (19) from its stud (20).

If head being disassembled is either a long or extra long draw type of head (Models BHL, BHX or BHML), remove the brake tension nut (21), brake friction spring (22), and idler gear stud nut and retaining washer (23) and (24); then loosen brake friction plate screw (25), and remove the brake friction plate (26) and brake friction (27); the idler gear (19) can now be removed from its stud.

9—Remove the cutter block holding screw (28), permitting the removal of the cutter block assembly (29) from its holding plate (30).



10—Remove the two screws (31) from the cutter block holding plate (30) permitting the holding plate to be removed from the head plate; the removal of the cutter block holding plate (30) releases the cutter block operating plunger (32) and control slide (33). (The long and extra long wire draw heads (Models BHL, BHX and BHML) are not equipped with the control slide).

11—Unscrew and withdraw the gripper pivot screw (34), permitting the removal of the gripper assembly (35) from the head plate.

The preceding steps outline the procedure for removing wire feed, wire cutting, and gripper assemblies. For removal of wire forming and driving assemblies, proceed as per the following instructions.

b. HOW TO REMOVE WIRE FORMING AND DRIVING ASSEMBLIES (See Fig. 21).

12—Remove the three screws securing the head to the machine frame, and carefully remove head from frame; remove driver bar link (36) and former slide roller (37).

13—Remove supporter spring bracket screws (38), and remove supporter spring bracket (39) from head plate.

If head being disassembled is equipped with wide crown type of supporter unit, remove screws (81) and remove former slide plates (82) and (83) from head plate.

14—Remove cutter block trip crank holding screw (46), and withdraw trip crank (47) from head plate.

15—The former slide (48), driver bar (49), and gripper clamp piece control slide (50), can now be removed from the head plate. The supporter (55), is removed from the former slide (48) by driving out the supporter pivot pin (57).

If head is equipped with the wide crown supporter unit, remove the attaching screws (40) and (41), and remove supporter box (42) from the former slide.

16—To remove the driver bar (49) from the former slide (48), remove the left hand former (51) and driver (52), permitting the driver bar to be separated from the former slide.

17—Remove the wire feed operating link (53) from the operating lever (54); swing the wire feed operating lever (54) to its vertical position and remove the lever from the front of the head plate.

c. HOW TO REINSTALL WIRE FORMING AND DRIVING ASSEMBLIES (See Fig. 21).

1—Replace wire feed operating lever (54) thru front opening of head plate with pivot stud (59) inserted in hole in head plate; swing operating lever to horizontal position and replace operating link (53) on operating lever crank stud (60).

2—Insert gripper clamp piece control slide (50) into its slot in rear of head plate with slide upper notch engaged with friction bolt (61).

3—If driver bar has been removed from former slide, reassemble driver bar (49), formers (51), and driver (52) on former slide (48); if supporter, (55), has been removed from former slide (48), reinstall supporter and its pivot pin, (57), in former slide, or if head is for a wide crown staple, assemble supporter box (42) to former slide (48) with screws (40) and (41); install the assembled unit in rear of head plate, with drive bar (49) upper stud engaged in wire feed operating link (53).

4—Insert cutter block trip crank (47) into its hole in rear of head plate, and then replace and tighten trip crank holding screw (46).

5—Install supporter spring bracket (39) or former slide plates (82) and (83), (depending upon type of head being assembled), on rear of head plate; tighten the four attaching screws securely.

6—Place former slide roller (37) on former slide (48) stud, and driver bar link (36) on driver bar (49) lower stud. With stitcher machine in stop position, position head on machine frame so that driver bar link (36) enters hole in stitcher machine drive cam, and former slide roller (37) enters groove in drive cam. Make sure that head locating dowels are engaged in corresponding holes in machine frame, and then replace and securely tighten the three attaching screws.

If the wire feed, wire cutting, and gripper assemblies have been removed from the head, reinstall those parts as follows:

d. HOW TO REINSTALL WIRE FEED, WIRE CUTTING, AND GRIPPER ASSEMBLIES (See Fig. 21).

7—Position gripper assembly (35) in its opening in front of head plate, making sure that upper stud (62) of gripper clamp piece (63) engages in slot in clamp piece control slide (50); then, insert and tighten gripper pivot screw (34).

8—Insert cutter block operating plunger (32) into its hole in head plate, and, if head being assembled is the standard wire draw head, place cutter block control slide (33) into its slot in head plate, then replace the cutter block holding plate (30) onto the head plate, and replace and tighten the two holding screws (31).

9—Install the cutter block assembly (29) onto its holding plate (30). If head being assembled is the standard wire draw head, position the cutter block assembly so that the head of the cutter block adjusting screw (64) engages in the first (left) slot in the cutter block control slide (33). Replace and tighten cutter block holding screw (28). If head being assembled is either the long or extra long wire draw type (Model BHL, BHX or BHML), place the wire guide unit (65) into position on the cutter block and then replace its holding screw and washer.

10—Slip wire feed idler gear (19) onto its stud (20), and replace retaining washer (18) and screw (17). If head being assembled is either the long or extra long

wire draw type (Model BHL, BHX or BHML), slip wire feed idler gear (19) onto its stud (20). If idler gear stud screw (66) has been removed, replace and tighten screw. Then, slip brake friction (27) and friction plate (26) onto idler gear hub, and tighten friction plate screw (25). Replace retaining washer (24) and nut (23), and tighten nut securely. Slip brake friction spring (22) onto idler gear stud screw, and replace and tighten brake tension nut (21). (After head has been completely assembled, adjust brake tension as directed in para. 8 on page 10).

11—Slip wire feed drive gear (15) onto its stud (16), making sure that gear is in complete engagement with idler gear (19).

12—Push the upper and lower wire tubes, (13) and (14), into operating position, and then tighten the two wire tube screws (12).

13—Replace the lower wire tube clamp (11) on wire straightener, and tighten its holding screw.

14—Place wire feed operating lever sliding head (9) onto the operating lever (54); install wire feed crank sector (8), with sliding head pin engaged in crank hole of wire feed crank sector.

15—Slip wire feed guard (6) onto wire feed drive gear (15) hub, with guard stud (68) inserted into wire feed crank sector (8). If head is the standard draw, make sure that guard stop stud (69) engages in cutter block control slide (33), as shown at (70).

16—Slip wire feed assembly (7) onto drive gear (15) hub, with clutch spider (71) keying into notch in hub of drive gear (15), and clutch ring gear (72) meshing with crank sector (8). Then, replace retaining washer and screw (5) and (4).

If head being assembled is either the long or extra long draw type (Model BHL, BHX or BHML), slip wire feed clutch connecting sleeve (73) onto drive gear stud (16), making sure that it keys into notch in hub of drive gear (15). Slip wire feed clutch flange and gear (74) onto connecting sleeve (73) and hub of drive gear (15), so that gear meshes with crank sector (8). Then slip remaining parts of wire feed clutch assembly (7) onto wire feed clutch connecting sleeve (73), with clutch spider keying into notch in connecting sleeve, and clutch flange stud (75) engaged in hole in clutch ring (76). Replace retaining washer and screw (5) and (4).

NOTE

If clutch assembly (7) has been disassembled, make sure that clutch rollers and springs (77) and (78) are reassembled in spider as shown in illustration at (79).

17—Replace and tighten wire feed guard lock screw and washer (3).

18—Replace gripper spring unit making sure that bracket (80) keys into slot in head plate; tighten holding screw (1) securely.

19—After the head has been completely reassembled, as directed in the above instructions, turn over machine by hand and check that all parts operate freely. After making certain that parts operate freely, connect stitcher power cord, thread wire on head, and make a check run of the stitcher head.

2. COMPONENT PARTS

The Parts List and accompanying exploded views of the head, Fig. 22 and 23, identify all component parts of the following models of IDEAL STITCHER Bliss Stitcher Heads:

Model Symbol	Description of Model
BH	Standard Wire Draw — $7/8"$ (22.2mm) to $1-1/2"$ (38.1mm)
BHL	Long Wire Draw — $15/16"$ (23.8mm) to $2-3/8"$ (60.3mm)
BHX	Extra Long Wire Draw — $1-5/8"$ (41.3mm) to $3-1/2"$ (88.5mm)
BHM	Metal Stitcher—Standard Wire Draw
BHMB	Metal Stitcher (For Head Mounted Clincher)—Standard Wire Draw
BHML	Metal Stitcher—Long Wire Draw

As previously explained in the Description section of this book, all IDEAL STITCHER Bliss Stitcher Heads are basically similar. However, variations do occur in some of the component parts, due to adapting the basic head to the different wire draw types of heads, as well as adapting the head for use on particular models of Stitchers.

All parts listed are common to all of the above models of heads except where otherwise noted in the Parts List and accompanying illustrations. Those parts illustrated in line drawing in the accompanying illustrations, Fig. 22 and 23, are parts or assemblies used in heads other than the Standard Wire Draw head.

The component parts illustrated in the exploded views, Fig. 22 and 23, are identified by "Index Numbers" (circled numbers); these numbers are listed numerically in the first column of the accompanying Parts List.

NOTE

The Index Numbers are not to be confused with the Parts Numbers, and serve only as a means of keying the illustrations to the Parts List. When ordering parts, order the required part by Part Number and not by Index Number.

The second column of the Parts List gives the Name and description of the parts. Where there is more than one Part Number listed for a given Index Number, the description (wire draw, type or size of wire, width of crown, or other identifying characteristics) serves to locate the required part number.

It will be noted that in the Name and Description column (second column) of the parts list, certain parts are designated as an Assembly, as for instance, "Wire Feed Clutch Assembly" (Refer to Index Number 89 in the Parts List). All those parts

immediately following the part designated as an assembly, and indented in the Name and Description column, make up the assembly; if the Assembly part number is ordered, all of those parts will be shipped and assembled. In the case of this assembly, all those parts listed from Index No. 90 to 95 would be shipped assembled if the Assembly part number, 75H2, were ordered. However, any one of the individual parts of the assembly may be purchased separately, if desired.

Some parts, while not designated as assemblies, are made up of two or more parts, as in the case of the "Gear Arm Holding Plate," Index No. 101. If the "Gear Arm Holding Plate" part number were ordered (Part No. 58H), those parts immediately following and indented in the Name and Description column (Index Nos. 102 to 104), would be shipped attached to the Gear Arm Holding Plate. However, anyone of the individual parts may be purchased separately, if desired.

NOTE

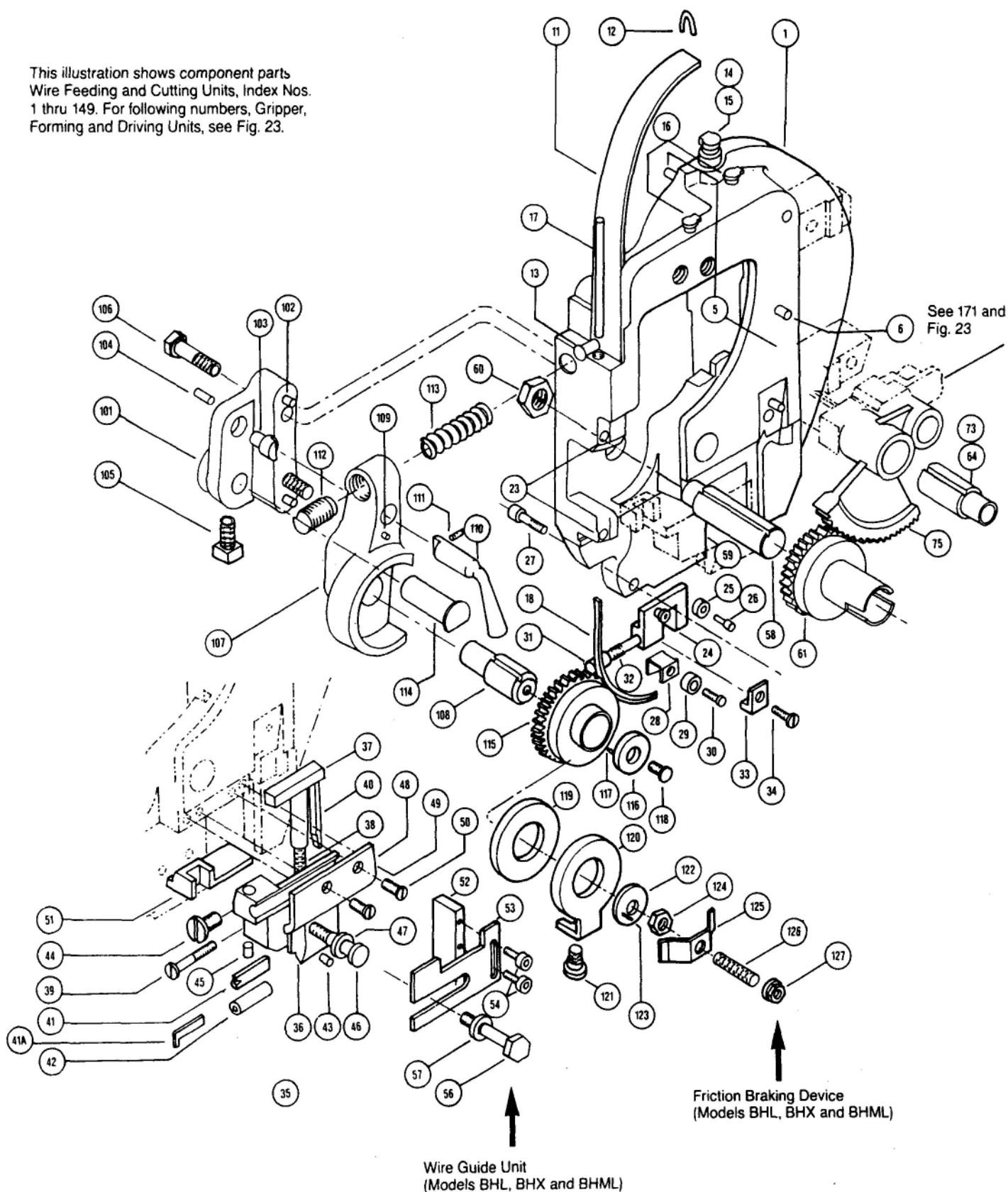
Those parts designated by an asterisk (*) preceding the name of the part are parts that, due to their nature or setting requirements, should be installed by a IDEAL STITCHER service man.

The third column of the Parts List gives the Part Numbers of all procurable parts, and it is this number that must be specified when ordering a required part.

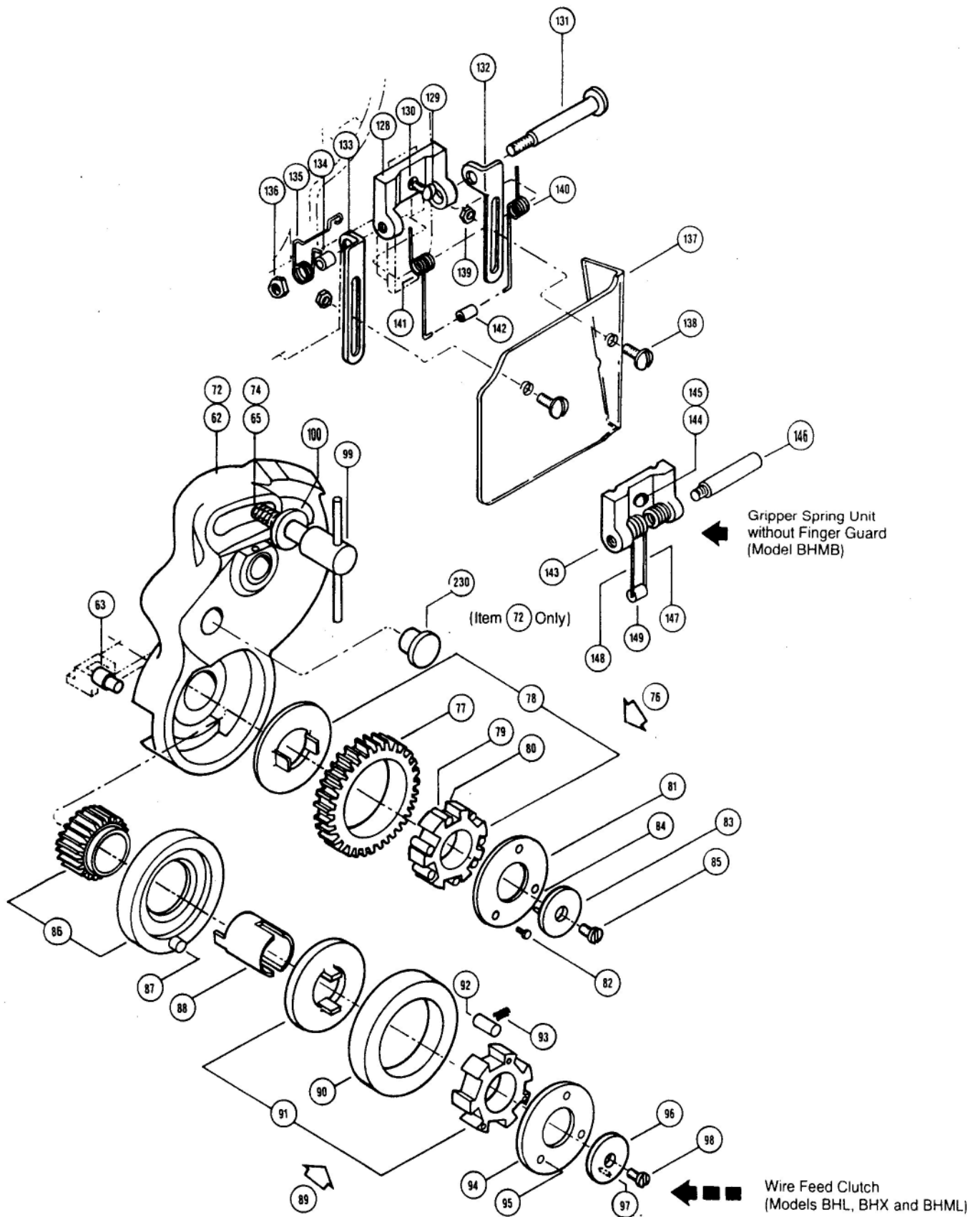
3. HOW TO IDENTIFY AND ORDER A PART

- Locate the required part in the exploded views of the head, Fig. 22 and 23, and note the Index No. (circled number) identifying the part in the illustration.
- Locate the part Index No. in the first column of the Parts List.
- Copy the Part Number listed for that particular part as given in the Part No. column (third column) of the Parts List.
- When more than one Part Number is listed for a given Index Number, locate the part description, in the Name and Description (second) column of the Parts List, that conforms with the specifications of the required part; then copy the Part No. given for that particular part description.
- Order the required part, or assembly, by specifying the Part Number exactly as given in the Parts List.

This illustration shows component parts
Wire Feeding and Cutting Units, Index Nos.
1 thru 149. For following numbers, Gripper,
Forming and Driving Units, see Fig. 23.



**Figure 22 — Stitcher Head Component Parts —
Wire Feeding and Cutting Assemblies**



PARTS LIST

For parts identified by Index Nos. 1 to 149 inclusive
see Fig. 22 on pages 23 and 24

Index No.	Name and Description	Part Number
1	Head Plate	
	Models BH & BHM	50H
	Models BHL & BHML	50H16
	Model BHX	
	1 1/4 (31.8mm) Crown	50H9
	Model BHMB	50H15
5	Head Locating Dowel	BD350
6	Wire Feed Guard Stop Pin	184-291
11	Spring Wire Guide	88H
12	Spring Wire Guide Loop	BF50
13	Spring Wire Guide Screw	UA3308.2
*13A	Oiler Felt Retainer	2166
*13B	Oiler Felt	2167
14	Oiler	85220
15	Oiler	
	Models BHM, BHMB & BHML	85216
16	Oiler	85202
17	Upper Wire Tube	
	Ribbon and 9040 Wire	87H
	Hybar	
	and Round Wire	87H2
18	Lower Wire Tube	
	Ribbon and 9040 Wire	85H8
	Hybar	
	and Round Wire	85H9
23	Wire Tube Screw	SB401
24	Wire Straightener Plate	931H3
25	Wire Straightener Roll	
	Upper Stationary	935H3
26	Wire Straightener Upper	
	Roll Stud	938H2
27	Wire Straightener Plate	
	Screw	UA4812.2
28	Wire Straightener Slide	
	Block	947H
29	Wire Straightener Roll	
	Lower Adjustable	
	Ribbon, 9040 & Hybar	
	Wire	936H3
	Round Wire	936H4
30	Wire Straightener Roll Screw	UA2308.2
31	Wire Straightener Adjusting	
	Screw	UA4016.2
32	Wire Straightener Adjusting	
	Screw Friction Spring	9069
33	Lower Wire Tube Clamp	946H2

*Not shown on Fig. 21 & 22

When ordering part specify Part Number

Index No.	Name and Description	Part Number
34	Lower Wire Tube Clamp	
	Screw.....	UA2210.1
35	Cutter Block Assembly—	
	Ribbon Wire	
	(.020 (.51mm) thick and under)	
	Square Cut Off	
	Models BH & BHL	100H44
	9040 Wire	
	Square Cut Off	
	Model BHX.....	100H80
	Hybar Wire	
	Square Cut Off	
	Models BH	100H47
	Round Wire	
	#18 (.0475 (1.2mm))	
	Square Cut Off	
	Models BHM, BHMB & BHML	100H41
		
		
		
		
36	Cutter Block Body	101H25
37	Cutter Plunger	102H25
38	Cutter Plunger Spring	103H2
39	Cutter Plunger Holding	
	Screw.....	UA4021
40	Movable Cutter	
	#18 (.0475 (1.2mm)) Round Wire	104H23
	Ribbon, 9040 and Hybar Wire	104H25
41	Stationary Cutter (Ribbon,	
	9040 and Hybar Wire)	
	Ribbon Wire—	
	(.020 (.51mm) thick and under)	
	Square Cut Off	
	Models BH & BHL	105H44

When ordering part specify Part Number

Index No.	Name and Description	Part Number
41	9040 Wire Square Cut Off Model BHX.....	105H80
	Hybar Wire Square Cut Off Model BH	105H47
		
		
		
41A	Stationary Knife Plate Ribbon, 9040 and Hybar Wire	108H32
42	Stationary Cutter (Round Wire) #18 (.0475 (1.2mm)) Round Wire Square Cut Off Models BHM, BHMB & BHML	105H41
		
		
		
43	Stationary Cutter Screw.....	SB403
44	Cutter Block Adjusting Screw.....	SB601
45	Cutter Block Adjusting Screw Lock screw	SB401
46	Cutter Block Holding Screw All Models Except BHL, BHML & BHX	SB407
47	Cutter Block Holding Screw Washer Models BHM & BHMB	228-69
48	Cutter Block Holding Plate All Models except BHL, BHML & BHX	106H
	Models BHL, BHML & BHX	106H2
49	Cutter Block Holding Plate Dowel	BD301
50	Cutter Block Holding Plate Screw.....	UA3808.9
51	Cutter Block Control Slide Models BH, BHM & BHMB	107H3
52	Wire Guide.....	45H3
53	Wire Guide Plate	44H
54	Wire Guide Screw	UA2808.1

Used only on Models
BHL, BHML & BHX

When ordering part specify Part Number

Used only on Models BHL, BHML & BHX	Index No.	Name and Description	Part Number
	56	Cutter Block Holding Screw	UA4024.1
	57	Cutter Block Holding Screw Washer	C496
	58	Wire Feed Drive Gear Stud Models BH, BHM & BHMB	78H
		Models BHL, BHML & BHX	78HS2
	59	Wire Feed Drive Gear Stud Pin	UB2104.6
	60	Wire Feed Drive Gear Stud Nut	HN1213.2
	61	Wire Feed Drive Gear Model BH Ribbon & Hybar Wire	80H
		Models BHL & BHX Ribbon and 9040 Wire	80H3
		Models BHM & BHMB Round Wire #18 (.0475 (1.2mm))	80H2
		Model BHML Round Wire #18 (.0475 (1.2mm))	80H4
			
			
			
			
	62	Wire Feed Guard Models BH, BHM & BHMB	51H6
	63	Wire Feed Guard Stop Stud	BF402
	64	Wire Feed Guard Crank Stud	BF902
	65	Oiler	85225
	72	Wire Feed Guard Models BHL, BHML & BHX	51HS3
	73	Wire Feed Guard Crank Stud	BF902
	74	Oiler	85225

When ordering part specify Part Number

Index No.	Name and Description	Part Number
75	Wire Feed Crank Sector	
	Model BH	53H
	Model BHL	53HS2
	Models BHM & BHMB	53H3
	Model BHML	53HS4
	Model BHX	53HS5
76	Wire Feed Clutch Assembly	
	Model BH	75H
	Models BHM & BHMB	75H3
77	Clutch Ring Gear	
	Model BH	71H
	Models BHM & BHMB	71H3
78	Clutch Spider	72H
79	Clutch Roller	73H
80	Clutch Roller Spring	74H
81	Clutch Front Plate	76H
82	Clutch Front Plate Screw	UA1404.1
83	Wire Feed Clutch	
	Retainer Washer	77H
84	Wire Feed Clutch	
	Retainer Washer Pin	UB2104.6
85	Wire Feed Clutch	
	Retainer Washer Screw	UA3808.9
86	Wire Feed Clutch	
	Flange and Gear	
	Model BHL	49HS
	Model BHML	49HS3
	Model BHX	49HS2
87	Wire Feed Clutch	
	Flange Stud	BF218
88	Wire Feed Clutch	
	Connecting Sleeve	
	Models BHL, BHML & BHX	47HS2
89	Wire Feed Clutch Assembly	
	Models BHL, BHML & BHX	75H2
90	Clutch Ring	71HS
91	Clutch Spider	72H
92	Clutch Roller	73H
93	Clutch Roller Spring	74H
94	Clutch Front Plate	76H
95	Clutch Front Plate Screw	UA1404.1
96	Wire Feed Clutch	
	Retainer Washer	77H
97	Wire Feed Clutch	
	Retainer Washer Pin	UB2104.6
98	Wire Feed Clutch	
	Retainer Washer Screw	UA3808.9
99	Wire Feed Guard	
	Lock Screw	52H

When ordering part specify Part Number

Index No.	Name and Description	Part Number
100	Wire Feed Guard	
	Lock Screw Washer.....	BG1114
101	Gear Arm Holding Plate.....	58H
102	*Gear Arm Holding Plate	
	Locating Pin	BD300
103	*Gear Arm Holding	
	Plate Rod	BF602
104	*Gear Arm Holding	
	Plate Rod Pin	UB3104 1
105	Gear Arm Pivot Lock Screw	UA6510 1
106	Gear Arm Holding Plate Screw	UA6120 1
107	Wire Feed Idler Gear Arm	
	Models BH, BHM & BHMB	54H
	Models BHL, BHML	
	& BHX	54H2
108	Wire Feed Idler Gear	
	Arm Stud	
	Models BH, BHM & BHMB	56H
	Models BHL, BHML	
	& BHX	56H2
109	Oiler	85225
110	*Wire Feed Idler Gear Throwout Handle.....	55H
111	Throwout Handle Stop Pin	BD150
112	Wire Feed Pressure	
	Adjusting Screw	59H
113	Wire Feed Pressure	
	Tension Spring	60H
114	Wire Feed Idler Gear	
	Arm Pivot	57H
115	Wire Feed Idler Gear.....	81H2
116	Wire Feed Idler Gear	
	Retaining Washer	
	Models BH, BHM & BHMB	82H
117	Gear Retaining Washer Pin.....	UB2104 6
118	Wire Feed Idler Gear	
	Retaining Washer Screw	UA3808.9
119	Brake Friction	1005H
120	Brake Friction Plate.	1006H
121	Brake Friction Plate Screw ..	1008H
122	Wire Feed Idler Gear	
	Retaining Washer	82H2
123	Gear Retaining Washer Pin.....	UB2104.6
124	Wire Feed Idler Gear	
	Stud Screw Nut	HN1428 2
125	Brake Friction Spring	1007H
126	Wire Feed Idler Gear	
	Stud Screw.....	UA4820.4
127	Brake Tension Nut.....	HN1428.3

*Part should be installed by BOSTITCH serviceman.

When ordering part specify Part Number

	Index No.	Name and Description	Part Number
All Models except BHMB	128	Gripper Spring Bracket	129H4
	129	Gripper Spring Bracket Screw	UA3314.1
	130	Gripper Spring Bracket Screw Washer	LW10.4
	131	Gripper Spring Pivot	UA4041.1
	132	Finger Guard Bracket — R.H.	1000HR
	133	Finger Guard Bracket — L.H.	1000HL
	134	Gripper Spring Pivot Bushing	7242
	135	Finger Guard Spring	1002H
	136	Gripper Spring Pivot Nut	HN1420.2
	137	Finger Guard	1001H
	138	Finger Guard Screw	UA3008.4
	139	Finger Guard Screw Nut	HN1032
	140	Gripper Spring — R.H.	129H3R
	141	Gripper Spring — L.H.	129H3L
	142	Gripper Spring Roll	129H6
Model BHMB	143	Gripper Spring Bracket	129H4
	144	Gripper Spring Bracket Screw	UA3314.1
	145	Gripper Spring Bracket Screw Washer	LW10.4
	146	Gripper Spring Pivot	129H5
	147	Gripper Spring — R.H.	129H3R
	148	Gripper Spring — L.H.	129H3L
	149	Gripper Spring Roll	129H6

**The following parts, Index No.'s 150-229, inclusive
are shown in Fig. 23, Page 32**

150 Gripper Assembly

All wires except

#18 (.0475-1.2mm)	
7/16 (11.1mm) Crown	119H
1 1/4 (31.8mm) Crown	119H15B
.....	
#18 (.0475-1.2mm) Round Wire	
3/8 (9.5mm) Crown	119H2B
.....	

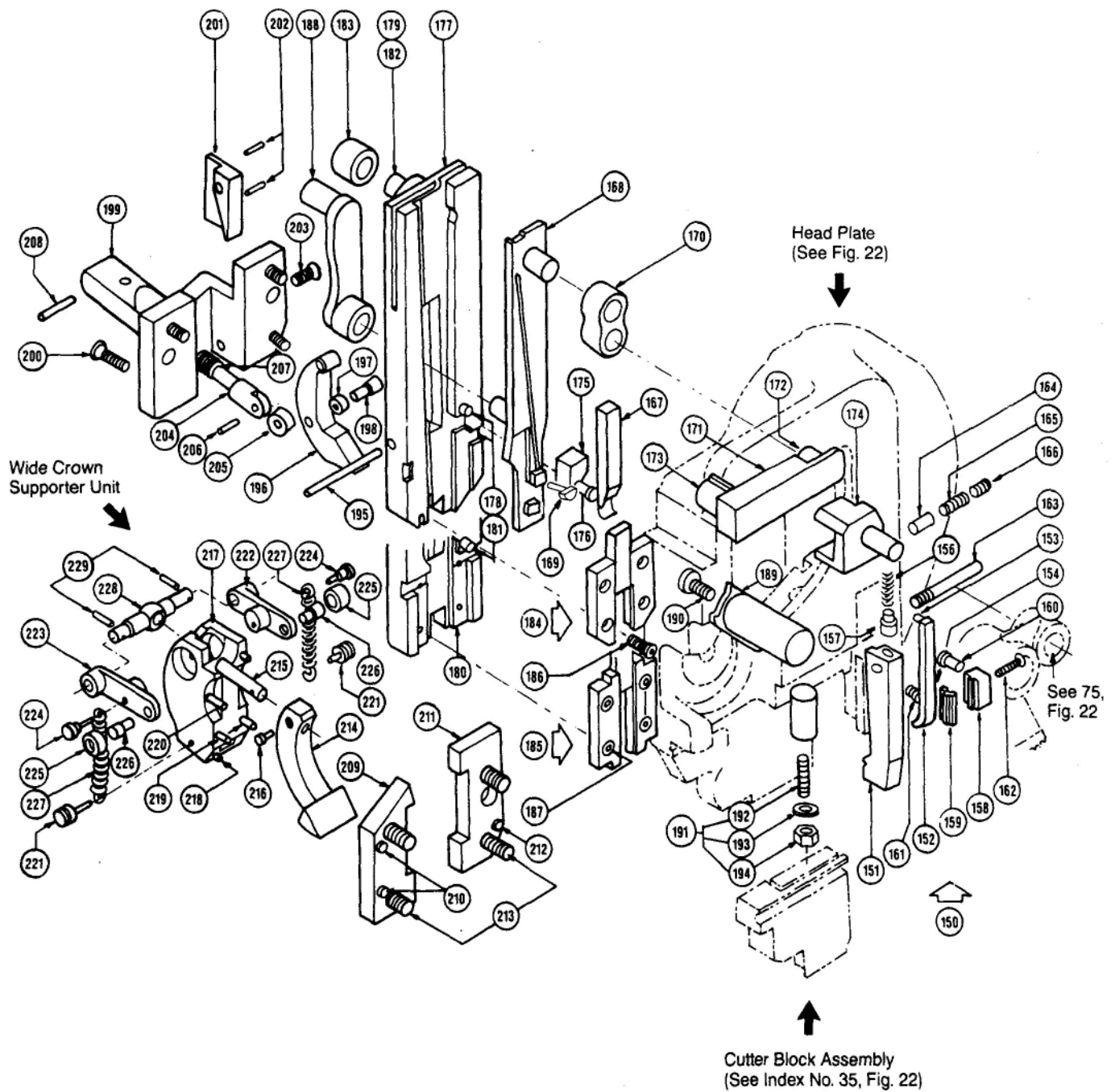
151 Gripper Bar

All wires except

#18 (.0475-1.2mm) Rd.	
7/16 (11.1mm) Crown	120H
1 1/4 (31.8mm) Crown	120H15B

Model BHMB

#18 (.0475-1.2mm) Round Wire	
3/8 (9.5mm) Crown	120H2B



This illustration shows component parts of Gripper, Forming, and Driving Units. Index Nos. 150 thru 229. For preceding numbers. Wire Feeding and Cutting Units, see Fig. 22.

**Figure 23 — Stitcher Head Component Parts
Gripper Wire Forming, and Driving Assemblies**

Index No.	Name and Description	Part Number
152	Gripper Bar Clamp Piece All wires except #18 (.0475-1.2mm) Rd. 7/16 (11.1mm) Crown & under 1 1/4 (31.8mm) Crown #18 (.0475-1.2mm) Round Wire 3/8 (9.5mm) Crown	121H 121M 121H2B
153	Gripper Bar Clamp Piece Stud	BF53
154	Gripper Bar Clamp Piece Stud	BF51
156	Gripper Bar Clamp Piece Spring	122X1H
157	Gripper Bar Clamp Piece Spring Plug	BG150
158	Gripper Bar Adjusting Screw Clamp Block	125H
159	Gripper Bar Adjusting Screw Clamp Block Spacer (For 1 1/4 (31.8mm) Crown)	125H2
160	Gripper Bar Adjusting Screw	124H
161	Gripper Bar Clamp Piece Spring Retaining Screw	SB301
162	Gripper Clamp Block Holding Screw (For Crowns other than 1 1/4 (31.8mm)) (For 1 1/4 (31.8mm) Crown)	SB315 UA3014.1
163	Gripper Pivot Screw	SB406
164	Gripper Clamp Piece Control Slide Friction Bolt	127H
165	Gripper Clamp Piece Control Slide Friction Spring	128H
166	Gripper Clamp Piece Control Slide Friction Adjusting Screw	SB602
167	Gripper Clamp Piece Control Slide	126H2

When ordering parts specify Part Number

Index No.	Name and Description	Part Number
168	Driver Bar	
	All Models except BHM, BHMB & BHML	
	7/16 (11.1mm) thru 1 1/4 (31.8mm) Crowns	113H21B
		
		
	Models BHM, BHMB & BHML	113H21C
169	Driver Bar Lock Stud	BF311
170	Wire Feed Operating Link	
	All Models except BHL, BHML & BHX	66H
	Models BHL, BHML & BHX	66H2
171	Wire Feed Operating Lever	67H
172	Wire Feed Operating Lever Crank Stud	BF702
173	Wire Feed Operating Lever Pivot Stud	BF903
174	Wire Feed Operating Lever Sliding Head	68H
175	Gripper Throwout Cam Block	
	7/16 (11.1mm) Crown & under	123H10
	1 1/4 (31.8mm) Crown	123H13
		
		
176	Gripper Throwout Cam Block Screw	
	7/16 (11.1mm) Crown & under	UA3806.3
	1 1/4 (31.8mm) Crown	UA2806.1
		
		
177	Former Slide	
	All Models except Models BHM, BHMB & BHML	
	7/16 (11.1mm) Crown	110H13
		
		
178	Former Slide Dowel	BD250
179	Former Slide Driving Stud	BF1102
180	Former Slide	
	Model BHX	
	1 1/4 (31.8mm) Crown	110H25
	Models BHM, BHMB & BHML	110H21
181	Former Slide Dowel	BD250
182	Former Slide Driving Stud	BF1102
183	Former Slide Roller	111H2B

When ordering part specify Part Number

Index No.	Name and Description	L.H. Former	Part Number Driver	R.H. Former
--------------	-------------------------	-------------	--------------------------	-------------

184 Formers and Driver

All Models except BHM, BHMB
& BHML

Ribbon Wire

.103 x .020 (2.6mm x .51mm)

7/16 (11.1mm) Crown116H34 117H150 115H34

.103 x .017 (2.6mm x .43mm)

7/16 (11.1mm) Crown116H34 117H150 115H34

Flat Wire

9040 and 7437

11/4 (31.8mm) Crown.....116H216 117H216C 115H216

Hybar Wire

#2 (.060 x .024 (1.5mm x .61mm))

7/16 (11.1mm) Crown116H62 117H138 115H62

#1 (.060 x .020 (1.5mm x .51mm))

7/16 (11.1mm) Crown116H33 117139 115H33

185

Formers and Driver

Models BHM, BHMB & BHML

Round Wire

#18 (.0475 (1.2mm))

3/8 (9.5mm) Crown115H183 117H183 115H183
(Standard)
117H184
(Short)

When ordering part specify Part Number

Index No.	Name and Description	Part Number
186	Former Screw For use with Former Slides 110H13 and 110H25	UA3410.4
187	Former Screw For use with Former Slide 110H21	UA3808.1
188	Driver Bar Link	114H
189	Cutter Block Trip Crank	97H
190	Cutter Block Trip Crank Holding Screw	SB405
191	Cutter Block Adjusting Plunger	98H2
192	Plunger Adjusting Screw	SB416
193	Adjusting Screw Lock Washer	LW14
194	Adjusting Screw Nut	BG612
195	Supporter Pivot Pin	BD342
196	Supporter 3/8" (9.5mm) Crown	64H2
	7/16" (11.1mm) Crown	64H
197	Supporter Roll	BG408
198	Supporter Roll Stud	BF222
199	Supporter Spring Bracket	61H2
200	Supporter Spring Bracket Screw	UA4412.1
201	Supporter Cam	63H2
202	Supporter Cam Dowel	184-557
203	Supporter Cam Screw	UA3808.9
204	Supporter Plunger	65H2
205	Supporter Plunger Roll	BG653
206	Supporter Plunger Roll Pin	BD341
207	Supporter Plunger Spring Standard	141H3
	Heavy	141H6
208	Supporter Plunger Cross Pin	184-573
209	Former Slide Plate	95H
210	Former Slide Plate Dowel	UB3108.3
211	Former Slide Plate	96H
212	Former Slide Plate Dowel	UB3108.3
213	Former Slide Plate Screw	UA4412.1

When ordering part specify Part Number

Index No.	Name and Description	Part Number
214	Supporter 1 1/4 (31.8mm) Crown	136H16
215	Supporter Pin	137H
216	Supporter Pin Holding Screw	SB107
217	Supporter Box	135H14
218	Supporter Box Locating Dowel	BD200
219	Supporter Box Screw — Short	SB305
220	Supporter Box Screw — Long	SB314
221	Supporter Box Spring End Stud	BF401
222	Supporter Spring Lever — R.H.	139H
223	Supporter Spring Lever — L.H.	140H
224	Supporter Spring Lever Spring End Stud	BF300
225	Supporter Spring Lever Roller	139X2H
226	Supporter Spring Lever Roller Stud	BF200
227	Supporter Spring For all except 9040 wire	141H
	For 9040 wire	141H2
228	Supporter Pin Cross Bar	138H
229	Supporter Pin Cross Bar Cotter Pin	UB2908.1
230	Nylon Hole Plug	850945

When ordering part specify Part Number

Part Number	Index No.	Part Number	Index No.	Part Number	Index No.	Part Number	Index No.
44H	53	80H4	61	117H216C	184	7242	134
45H3	52	81H2	115	119H	150	9060	32
47HS2	88	82H	116	119H15B	150	85202	16
49HS	86	82H2	122	119H2B	150	85216	15
49HS2	86	85H8	18	120H	151	85220	14
49HS3	86	85H9	18	120H2B	151	85225	65
50H	1	87H	17	120H15B	151	85225	74, 109
50H9	1	87H2	17	121H	152	184-291	6
50H15	1	88H	11	121H2B	152	184-557	202
50H16	1	95H	209	121M	152	184-573	208
51H6	62	96H	211	122X1H	156	228-69	47
51HS3	72	97H	189	123H10	175	UB2104.6	59, 84, 97
52H	99	98H2	191	123H13	175	UB2104.6	117, 123
53H	75	100H41	35	124H	160	BD150	111
53H3	75	100H44	35	125H	158	BD200	218
53HS2	75	100H47	35	125H2	159	BD250	178, 181
53HS4	75	100H80	35	126H2	167	BD300	102
53HS5	75	101H25	36	127H	164	BD301	49
54H	107	102H25	37	128H	165	BD341	206
54H2	107	103H2	38	129H3L	141, 148	BD342	195
55H	110	104H23	40	129H3R	140, 147	BD350	5
56H	108	104H25	40	129H4	128, 143	BF50	12
56H2	108	105H41	42	129H5	146	BF51	154
57H	114	105H44	41	129H6	142	BF53	153
58H	101	105H47	41	135H14	217	BF200	226
59H	112	105H80	41	136H16	214	BF218	87
60H	113	106H	48	137H	215	BF222	198
61H2	199	106H2	48	138H	228	BF300	224
63H2	201	107H3	51	139H	222	BF311	169
64H	196	108H32	41A	139X2H	225	BF401	221
64H2	196	110H13	177	140H	223	BF402	63
65H2	204	110H21	180	141H	227	BF602	103
66H	170	110H25	180	141H2	227	BF702	172
66H2	170	111H2B	183	141H3	207	BF902	64, 73
67H	171	113H21B	168	141H6	207	BF903	173
68H	174	113H21C	168	931H3	24	BF1102	179, 182
71H	77	114H	188	935H3	25	BG150	157
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