

INDEX MODEL 900A

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WARRANTY

GORMAN MACHINE TOROID WINDERS AND COMPONENTS THEREOF, EXCEPT COUNTERS, ARE WARRANTIED TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP. FOR SIX MONTHS FROM THE DATE OF INITIAL FACTORY SHIPMENT WE WILL FULLY REPAIR EQUIPMENT OF OUR MANUFACTURE COVERED BY THE WARRANTY TERMS ON A NO CHARGE BASIS, TO INCLUDE PARTS AND NINETY DAYS ON LABOR IF CUSTOMER PAYS SHIPPING CHARGES TO AND FROM THE FACTORY. COUNTER IS WARRANTIED BY THE COUNTER MANUFACTURER.

MISUSE AND ABUSE OF THE EQUIPMENT, OR UNAUTHORIZED REPAIRS WILL VOID THE WARRANTY AND OUR OBLIGATION TO PROVIDE NO-CHARGE SERVICES. GORMAN MACHINE CORPORATION IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES.

WE RECOMMEND THAT YOU READ THE MANUAL COMPLETELY. THE INDEX ON PAGE 1 INDICATES EACH STEP IN THE SUCCESSFUL OPERATION OF THE MACHINE. WE HAVE INCLUDED A WIRE STORAGE CHART, SCHEMATICS, AND TROUBLESHOOTING SUGGESTIONS TO ENABLE THE MACHINE OPERATOR TO GET MAXIMUM UTILITY FROM THE WINDING MACHINE.

INTRODUCTION

The **Model 900A GORMAN Toroid Winder** has been carefully designed for ease of operation and versatility. This manual has been written to help the operator fully understand the functions of the machine. Each section clearly outlines the recommended procedures and suggests the methods best recommended for the fast and efficient production of toroidal coils.

The **Model 900A** can be supplied with either a four or six inch standard winding head, or a four or six inch belt head or 8 inch belt or side slider head and a Quickly attached toroidal taping head. The four inch head operates with both **WIRE SLIDER SHUTTLES**, from .055" width to .135" width, and **SIDE SLIDER SHUTTLES** ranging from 3/16" to 3/8" in cross section. The six-inch head operates with the **SIDE SLIDER** and **BELT SHUTTLES**, which are 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8". They have the same cross section as the 4-inch shuttles, but carry 50% more wire.

The 8-inch Head will handle toroids up to 7 1/2" in diameter and up to 3 inches high. More on the 8" Head on page 29.

EFFECTIVE WINDING RANGE

HEADS	SIDE SLIDER SHUTTLES	WIRE SLIDER SHUTTLES	BELT SHUTTLES	CORE SIZES I.D., O.D., HEIGHT
4" Standard Head	22 - 44 AWG	30 - 44 AWG		.055 I.D., 2.5" O.D., 1" H.
6" Standard Head	21 - 38 AWG			3/16" I.D., 4" O.D., 2" H.
4" Belt Head	22 - 44 AWG	30 - 44 AWG	20 - 35 AWG	.055" I.D., 2.5" O.D., 1" H.
6" Belt Head	21 - 38 AWG		18 - 29 AWG	3/16" I.D., 4" O.D., 2" H.
8" Head	20 - 30 AWG		16 - 27 AWG	7 1/2" O.D., 3" H.

We recommend that you read the manual completely. The use of each function of the machine has been spelled out for easy understanding. The Index on Page 1 indicates each step in the successful operation of the machine. We have included a wire storage chart, schematics, and troubleshooting suggestions to enable the machine operator to get maximum utility from the winding machine.

COUNTERS

A dual pre-set Electronic turns **COUNTER** (B-5) is standard equipment in the **MODEL 900A** machine. This **COUNTER** can be used for loading the shuttle and for accurately counting turns on the core. Different **COUNTERS** for additional pre-set counts are available. When the **LOAD-WIND SWITCH** is placed in the **load** position, the shuttle load count is registered on the **COUNTER**. When the switch is in the **WIND** position, the **proximity switch** is activated, and the **COUNTER** registers the number of turns of wire on the core.

When using the **BELT HEAD**, you leave the **LOAD-WIND** switch always in the **WIND** position because the shuttle loads and winds in the same Top-Coming direction. To register the load of wire placed on the shuttle, you must put the **COUNT SELECT** pointer (B 18) in the **BELT LOAD** position. When ready to wind the wire on the toroid, you move the **COUNT SELECT** pointer (B18) to count 1, 2 or 3 etc. and the **COUNTER** will now automatically reset to zero and you are ready to wind wire on the toroid.

SECTOR WINDING

AUTOMATIC SECTOR WINDING is a standard feature. By setting the **SECTOR WIND** switch (C42) you may automatically wind wire over a desired section of the core. To perform **AUTOMATIC SECTOR WINDING**, select the arc you wish to wind on the core by adjusting the upper black cam (C43) over the round calibrated dial at the upper right corner of the machine and re-clamp firmly again. Turn **SECTOR WIND** switch just below it to the "ON" position and the core will continue to reverse back and forth over this sector.

Manual **SECTOR WINDING** may be done by turning the **SECTOR WIND** switch "OFF" and the operator manually switches the **CORE ROTATION ROCKER SWITCH** (B17) at the lower left corner of the console for any desired sector to be wound. If the **SECTOR WIND** switch is left in the "ON" position, the **ROCKER SWITCH** is inoperative.

For an initial setting of the upper black plastic cam, loosen the three lobe clamping knob which frees the upper cam. Now turn the whole dial counterclockwise by hand to its stop where it hits the lower switch. For larger sectors, swing the upper cam CCW to any number just short of the cam striking the upper switch lever. For smaller sectors, swing it CW to any lower number just short of striking the switch. Clamp the cam in position tightly and start the machine with the sector switch in the SECTOR Position. If the dial does not reverse automatically, loosen the clamping knob and move the upper cam a bit away from the switch.

When using the small and medium duty core rotator assemblies, the maximum dia. toroid that can be fully reversed 360 degrees, is 4 times the dia. of the rubber core rotators in use. When using the heavy-duty core rotator assembly which has 1.875" diameter rubber rotators, the maximum dia. that can be rotated 360 degrees is 6 inches in dia.

SHUTTLES

SHUTTLES come in 4 inch and 6 inch and also 8-inch diameters of varying cross sections. The 4-inch size comes in Wire Slider sizes which are of a rounded "U" shape cross section and Side Slider types which have a dove tail on one side to accommodate a Delrin or Metal Side Slider. The Side Slider type are the faster running, but require a larger minimum residual hole in the toroid (.200") than the Wire Slider type (.055") minimum.

DESCRIPTION OF MACHINE CONTROLS-900A

The **900A** and the **PRODUCTOR II** both have similar wiring and controls. The single exception being that the 900A has a core rotation clutching system which can give automatic core reversal or can be manually controlled for left or right core rotation by a rocker switch. The electrical controls on the machine console are two potentiometer speed controls. One for loading wire on the shuttle and the other for winding speeds.

There is a **START BUTTON** (B14) and a **STOP BUTTON** (B15) just below it for starting and stopping the machine. There is a second pair of start and stop buttons on the right side of the machine for right hand operation.

The Variable speed foot control or foot switch can also be used for starting and stopping the machine.

To the right of the start button is a black handled toggle switch (B16) for reversing the drive motor. The wire is loaded on the shuttle in the reverse position and wound on the toroid in the forward position. When the forward reverse switch is moved from one position to the other, the counter is reset to zero and the machine is stopped.

When the **START BUTTON** (B14) is pressed and the black toggle switch is in the reverse position, the machine will always operate at the speed setting of the right load speed potentiometer. When the loading operation is completed, move the toggle switch (B16) to the wind position and the machine counter is automatically reset to zero for the winding operation and the speed is now controlled by the left wind speed potentiometer until the preset count is reached and the machine has stopped.

To the right of the black toggle switch is a rotary **COUNTER SELECT** switch (B18) with the words BELT LOAD and five numbered positions for up to five different preset turns counts. The BELT LOAD position is used only for loading the shuttle when the Belt Head is in use. Then the switch is moved to one of the numbered positions for winding. The **FORWARD REVERSE** switch (B16) is always left in the Forward or Wind Position when using the Belt Head. Never in Reverse, unless you are unloading excess wire from the shuttle. The Belt Head Operation is described elsewhere on page 27.

The last switch to the right is a push button **COUNTER RESET** (B19) switch for resetting the counter to zero at any time.

Below this row of switches is the **ROCKER SWITCH** (B17) that manually controls the core rotation directions indicated by the two arrows.

At the upper right of the console, there is a **SECTOR WIND ON/OFF** switch (C42), which sets the clutching system for automatic core reversal for winding turns on sections of the coil. The on position sets the machine for automatic sector winding and the off position sets the machine for manual operation by the rocker switch. The width of the sections to be wound is determined by the position of the two arms just above the switch.

The remaining operator controls are the **CORE JOG LEVER** (C38) and the **CORE ROTATION SPEED** control knob (Vernier Dial-C36) just above the Jog lever.

The Jog Core Lever can be pressed left or right for Left or right core rotation at any time whether the machine is operating or standing still. It will overpower any other control settings in use. It has only one speed.

The **CORE ROTATION SPEED** control knob (C36) sets the core rotation speed in relation to the shuttle speed. A higher number gives more rotation per turns placed on the toroid. As the winding speed is increased the core rotation is increased the same amount. The numbers are for repeatability only and are not related to any wire size.

The foot control comes in two versions: a Variable Speed Foot Pedal or a foot ON/OFF switch. The Foot Switch operates like the push button switch. Removing the foot from the pedal stops the machine. The machine will operate at whatever speed is called for as with the start button and is determined by the position of the forward reverse toggle switch or the Belt Load position of the rotary switch.

On the Left vertical side of the chassis a circuit breaker (B4) disconnects all power from the machine. There are also two toggle switches, one for activating an optional taping head, which attaches with two bolts. The taping head is described on page 31. This switch reverses the motor direction for driving the taping head and also connects the internal reed switch for counting the load of tape on the magazine and then counting the number of turns while taping. This number of counts is relative only and for repeatability. There are approximately four counts per magazine revolution or turns on the coil.

The second toggle switch, also with lever guard, is for selecting and using the variable speed foot pedal or the foot switch.

Normally the "UP" position of the switch is for the foot switch and the "DOWN" position is for using the Variable Speed Pedal. In the "DOWN" position, the Variable Speed Foot Pedal is controlled by the potentiometer in the pedal and limited by the potentiometer on the left vertical side. In the "UP" position, the Variable Speed Foot Pedal acts exactly as the foot switch without a separate variable speed function.

These are all the operator-controlled functions of the 900A.

WINDING HEAD

FOR WIRE SLIDER SHUTTLES AND SIDE SLIDER SHUTTLES

The 4" **WINDING HEAD** is unique in that it utilizes four shuttle drive rollers with a lift-over arm. The lift-over arm opens the shuttle at its joint and pivots its upper part out of the way to permit removal and insertion of a new core.

When the lift-over arm is in its down and locked position, a steel plate (C29) on the bottom of the arm slides by, and is in contact with the right edge of the ball bearing below it to provide for proper alignment of the top shuttle rollers with the bottom ones. There are also adjusting screws in the steel plate (C29) to aid in this adjustment.

A clear plastic eye shield (A4) is standard equipment, which goes on top of the head and can be pivoted out of the way for loading wire. It should be in place over the shuttle when using the Side Slider and Wire Slider Shuttles.

For initial set-up the entire head can be adjusted forward, backward, or sideways by loosening and retightening two screws (A7). The head can be removed entirely by removing these two screws.

The top two and bottom two shuttle rollers may also be moved closer together for easy removal of the shuttle when desired by momentarily dropping lever (A2) on the left side of the head to a lower position, then returning it to its original detent position. (Do not push lever rearward beyond its detent position).

A quick adjustment for setting the distance apart of the bottom two and top two rollers to accommodate different shuttles is made simply by loosening and moving screw lever (A1). The Four, Six and Eight-Inch Winding Heads are basically the same in operation, the only difference being the over-all diameters.

The **1A and 2A SIDE PLATE** used with **WIRE SLIDER SHUTTLES** is set in proper position by use of the **SIDE PLATE SET UP JIG**. Photo E; page 15 or Line Drawing "N" on pages 25. You will notice that the rounded corner of the plate conforms and aligns with the top front roller. The Side Plate may be moved forward or backward slightly from this position in order to provide clearance of the rear of the shuttle. Loosen both of the screws beneath the shuttle which fasten the **SIDE PLATE HOLDING CASTING**, and adjust the plate forward or back just a little for adequate clearance of shuttle, and retighten.

Also, the plate can be bent outward a slight amount if it is rubbing on the shuttle, or bottom front roller.

Be sure the Side Plate is not rubbing on the Delrin Rollers. If rubbing slightly, the rollers may melt at the edge. This clearance is best tested for by tapping on the plate with your finger, just over each roller. If no rap is heard of the plate striking the roller, then the plate is either touching or too far out. Clearance should be paper thick at the first bottom roller.

At the end of the 3/4" shaft (D2, Page 15) on the left rear side of the winding head, there is an adjustment for moving the upper two shuttle roller shafts forwards and backwards in relation to the lower two shafts. Diagonally opposite shafts should be equidistant so that all four-shuttle rollers equally drive the shuttle. Loosen the clamping screw (D1, Page 15) just behind the shaft, and by means of the hole in the shaft end, the 3/4 inch shaft (D2) can be rocked slightly for this adjustment. This is set at the factory and normally needs no further adjustment. (See Photo "D" on Page 15.)

The **SIDE ARM** and brush (A5) should contact the plate flatly and can be adjusted forward and back along its round 3/8" holding shaft at the rear of the head. It also can be adjusted inward and outward with the same adjustable block. Tension on the **SIDE ARM** for heavy or fine wires is set by knob (J2) tightened by Allen Screw (J7) page 19. Normally use a light but firm touch.

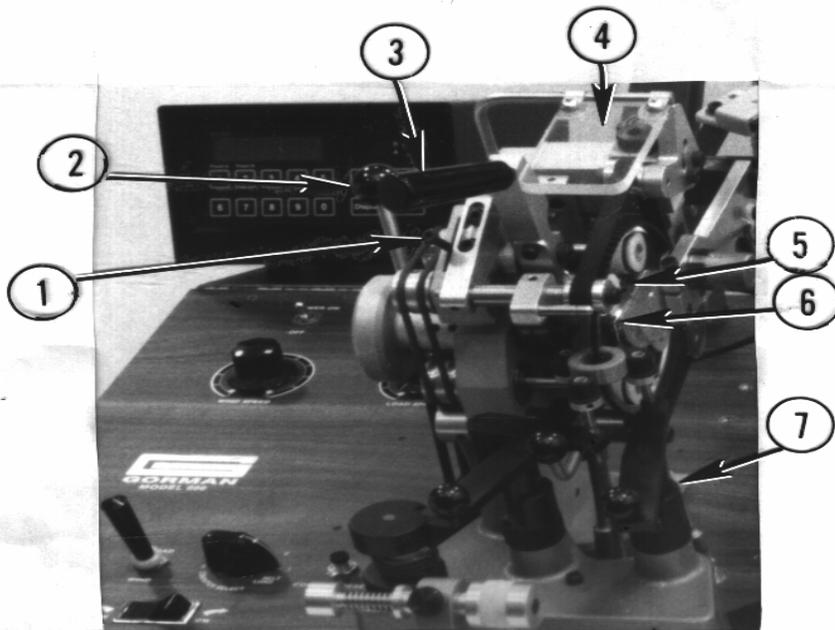


Photo A 4" Belt Winding Head

1. Screw LEVER for adjusting distance between upper and lower shuttle rollers. This adjustment accommodates different sizes of shuttles.
2. Lever for dropping upper rollers in order to quickly remove shuttle.
3. Lift over arm for opening shuttle for removal of core.
4. Clear plastic **EYE SHIELD**.
5. Mohair brush of plastic side arm. It should lie flat on plate, and the upper brush surface should be about even with top of core. Tip of brush should be at front edge of side plate or backing plate
6. Top front corner of **BACKING PLATE** should be even with the top of the core and close to it.
7. Hold down screws for fastening or moving position of winding head (in rear)

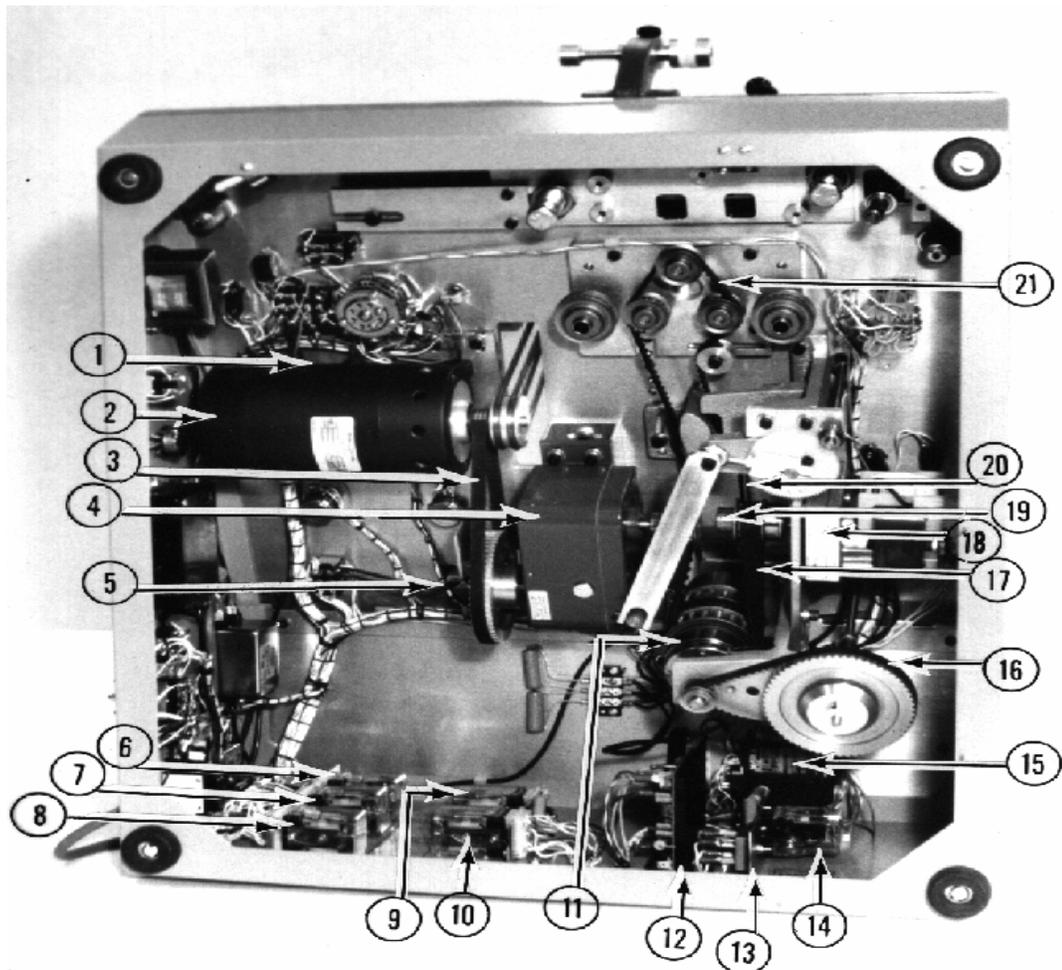
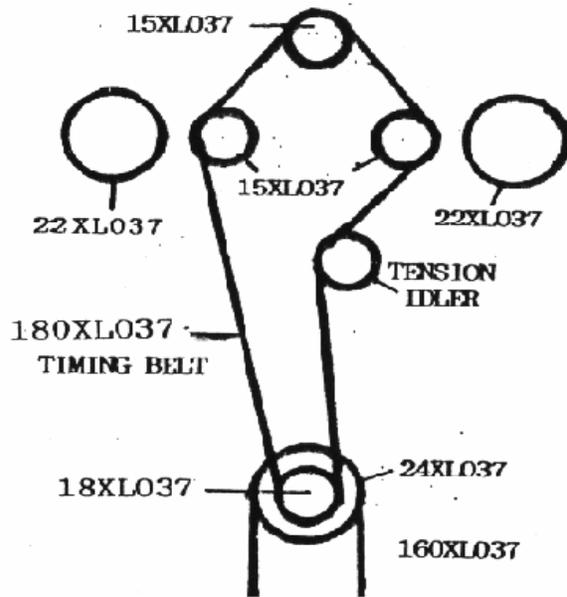
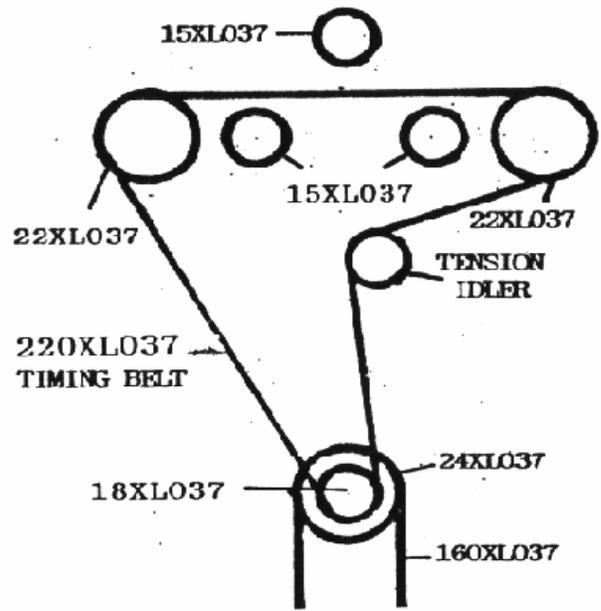


PHOTO Q UNDER MACHINE 900A



180XL037 BELT FOR LIGHT AND MEDIUM CORE ROTATORS



220XL037 BELT FOR HEAVY DUTY CORE ROTATORS

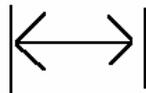
SHUTTLE IDENTIFICATION CHART

WIDTH OF GORMAN MACHINE SHUTTLES

SIDE SLIDER AND BELT HEAD TYPES



SIZE	SIDE SLIDER	BELT HEAD
3/16" - 4.7mm	.147" 3.67mm	.144" 3.60mm
1/4" - 6.3mm	.200" 5.0 mm	.190" 4.75mm
5/16" - 7.9mm	.230" 5.75mm	.240" 6.00mm
3/8" - 9.5mm	.282" 7.05mm	.283" 7.05mm
1/2" - 12.7mm	.400" 10.00mm	.400" 10.00mm
5/8" - 15.6mm	.523" 13.05mm	



**ROUND CROSS SECTION SHUTTLES
ARE MEASURED BY THEIR OUTSIDE
THICKNESS AS SHOWN**

SHUTTLE WIRE CAPACITY CHART (feet)
(For Meters, Multiply by .3048)

Wire Size HF	4 Inch Side Slider Shuttles						4 Inch Wire Slider Shuttles						4 Inch Belt Head Shuttles						6 Inch Side Slider & Belt Head Shuttles													
	TIMING BELT						TIMING BELT						TIMING BELT						TIMING BELT													
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
.048	9.5	7.9	6.3	4.7	3.4	.135	3.4	2.8	2.5	1.9	1.6	1.4	9.5	7.9	6.3	4.7	3.4	2.8	2.5	2.4	15.6	12.7	9.5	7.9	6.3	4.7	37	46	28	16		
.043													18	10																		
.0387													23	13																		
.0346													28	16	12	5	3															
.0310													35	20	14	7	4															
.0277													43	25	18	8	5															
.0249													54	30	22	10	6	4			207	138	81	46	33	15						
.0224													67	38	27	13	8	5	4		255	170	101	57	41	20						
.0201													83	47	34	16	10	7	5	4	316	211	125	71	51	24						
.0180													102	58	42	20	12	8	6	5	324	216	153	87	63	30						
.0160													127	72	52	24	15	10	7	6	486	324	191	108	78	36						
.0144													157	89	65	30	18	12	9	7	600	400	236	134	98	45						
.0130													195	111	80	37	23	15	11	10	744	496	293	167	120	56						
.0116													242	137	100	46	28	19	14	12	919	613	363	206	150	69						
.0105													300	170	124	57	35	24	18	14	1140	759	450	255	186	86						
.0095													372	212	153	71	44	29	22	18	1410	940	558	318	230	107						
.0085																					1745	1163	690	393	284	132						
.0075																					2160	1440	854	487	354	165						
.0067																					2673	1782	1057	602	438	204						
.0059																					3300	2205	1309	746	542	252						
.0055																					4000	2730	1620	923	671	312						
.0049																																
.0043																																
.0038																																
.0034																																
.0030																																
.0027																																
.0025																																



INDEX - PHOTO B

1. Lever for adjusting shuttle drive rollers
2. Factory set adjustment for forward-reverse movement of upper shuttle rollers in relation to lower rollers. (Also see Photo D2, Page 15)
3. Cover Hold down lock.
4. On-Off circuit breaker
5. Loading and Turns counter
6. Pilot light
7. AC plug
8. Connector for turns counter
9. Receptacle for variable speed foot pedal
10. Variable speed foot pedal speed limiter
11. Power on/off
12. Wind speed control
13. Load speed control
14. Motor Start Button
15. Motor Stop Button
16. Motor forward-reverse or load-wind switch
17. Rocker switch for direction of core rotation
18. Counter select pointer (switch)
19. Counter reset button
20. Collar for setting closing pressure of core rotators
21. Collar for locking front core rotation arms in fixed position
22. Collar for holding rotators apart at a fixed amount
23. Nylon wire guide when using front wire loader
24. Front loader wire guide assembly
25. Taping Head Switch

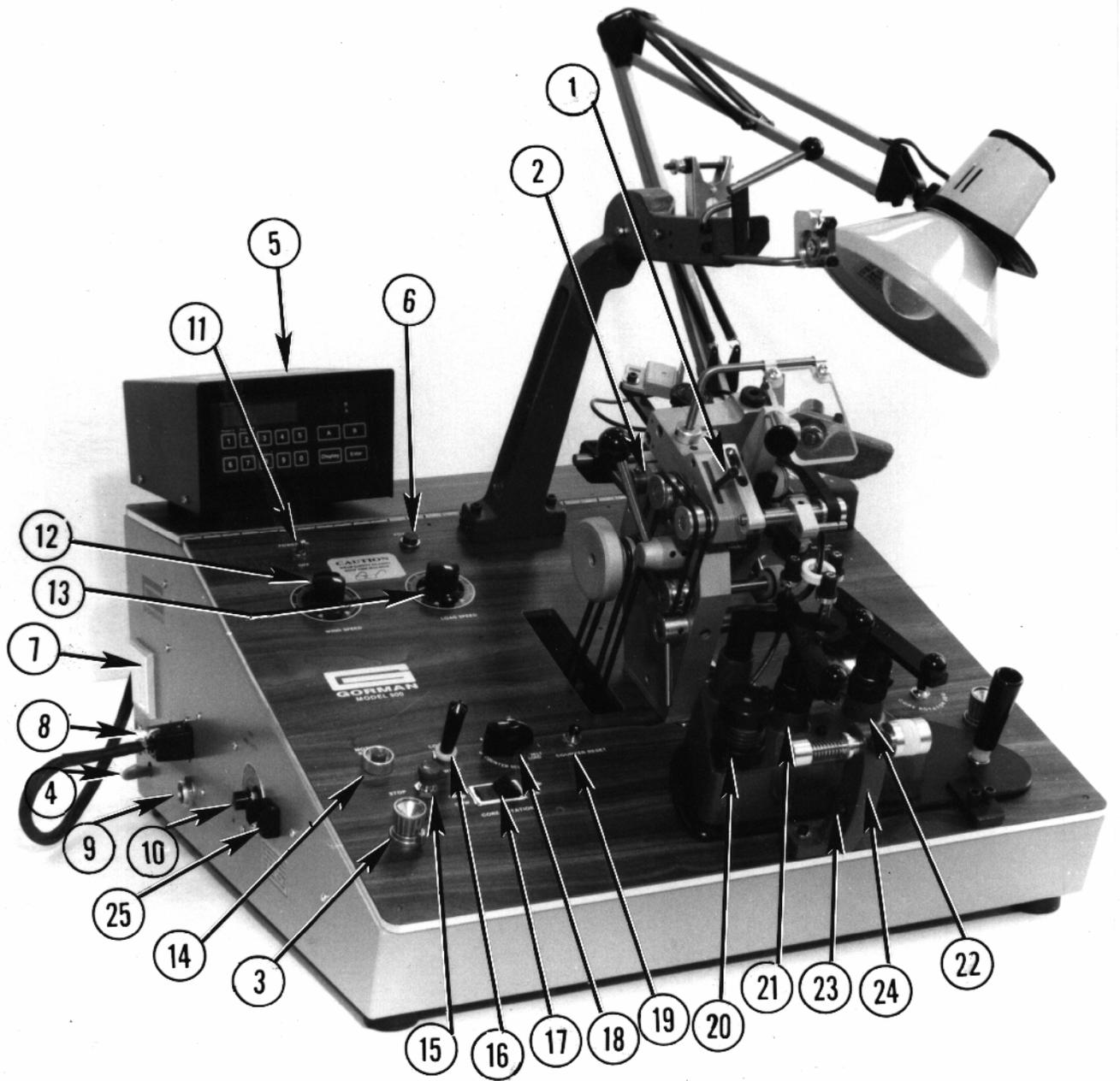


PHOTO B

LEFT VIEW

INDEX - PHOTO C

29. Adjustable steel plate at lower end of handle (50) for locking alignment of upper two rollers with lower two rollers
30. Hand wheel for manually rotating shuttle
31. Collar for adjusting closing pressure of felt guides
32. Thumb screw for horizontally adjusting front loader wire guide
33. Felt wire guides of front loader
34. Lever and knob for retracting rear core rotator
35. Plug for connecting Proximity Pick-up on side arm
36. Core rotation speed adjustment knob (Vernier Dial)
37. Jockey stick for positioning entire core holding assembly
38. Core rotation jog lever - clockwise or counter-clockwise
39. Lock down plate for jockey stick assembly
40. Turns counter-proximity pick up
41. Housing for core reversing micro switches
42. Automatic sector wind switch On-Off
43. Knob for clamping together reversing fingers for auto sector winding
44. Magnet for holding side arm
45. Ceramic wire guide lead-in for over head dereeler
46. Cutter lever arm
47. Adjustable felt wire clamp
48. Horizontally adjustable ball bearing wire guide
49. Swing away plastic eye shield
50. Lift-over arm for moving shuttle leftward at its joint
51. Handle to release and re-engage shuttle with its rollers

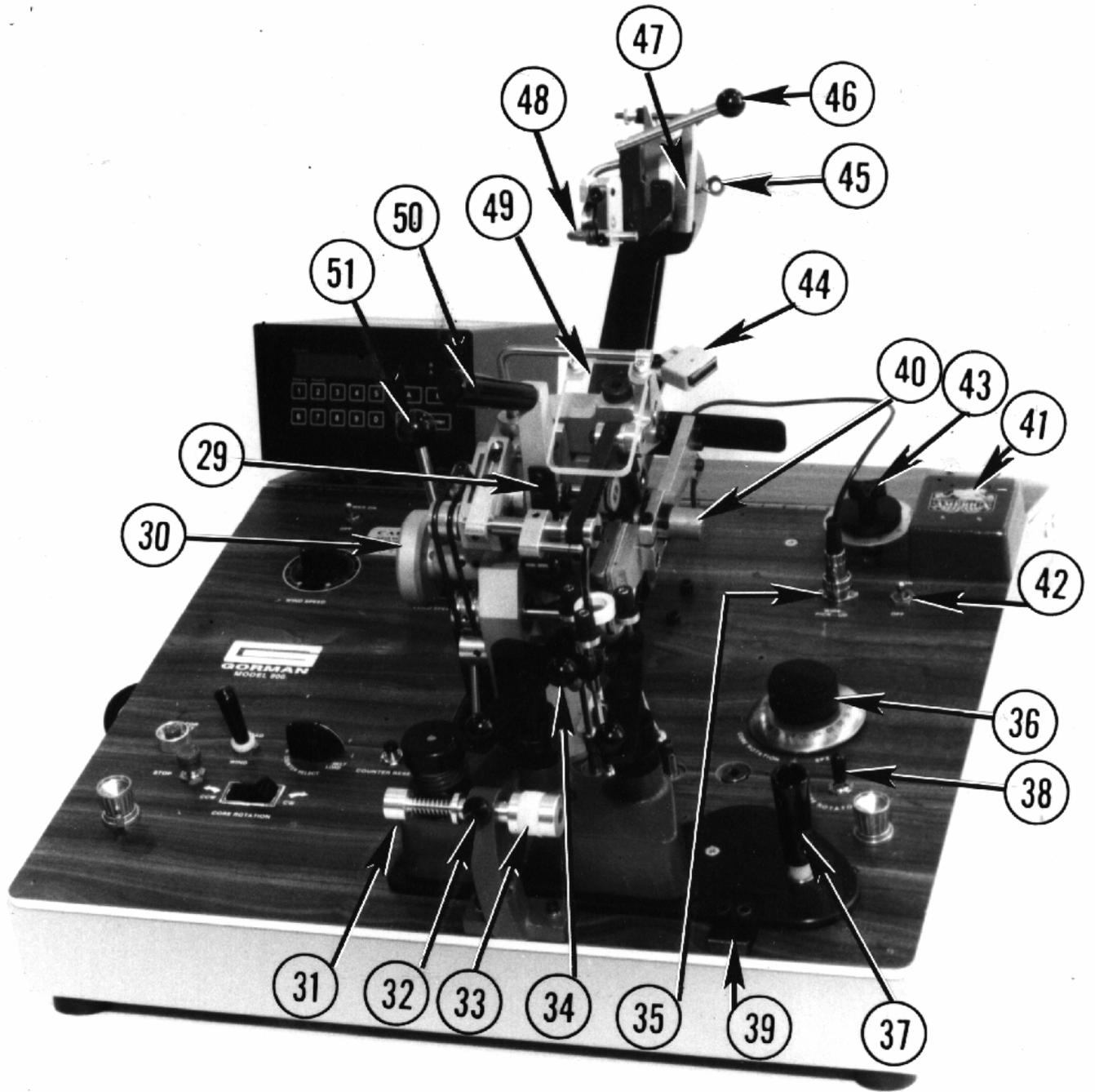


PHOTO C

RIGHT VIEW

GENERAL WINDING AND ACCESSORY INSTRUCTIONS

SHUTTLES

The Shuttle is the split ring that carries the magnet wire that is wound onto the toroidal core. Standard Head **SHUTTLES** come in six **WIRE SLIDER** sizes and four **SIDE SLIDER** sizes for the four inch head.

The 4-inch **BELT HEAD SHUTTLES** come in 9 sizes from .093" to 3/8" and the 6 inch **BELT HEAD SHUTTLES** come in 6 sizes from 3/16" to 1/2". The **WIRE SLIDER SHUTTLES** are the smaller shuttles and may be identified in size by measuring the cross section of the shuttle. This style uses a **WIRE SLIDER** which is shaped like a loop of spring steel wire with a small hook at one end to engage the magnet wire (L4, Page 22).

The third style of shuttle is the **SIDE SLIDER SHUTTLE**. This type has a grooved slot on one side of the ring in which the metal or Delrin side slider travels while pulling the wire from the shuttle. To identify the size of the **SIDE SLIDER SHUTTLE**, it is necessary to measure the cross section of both the shuttle and the slider together. This will give you the size of the shuttle and indicate the minimum core I.D. that may be achieved when winding. See Shuttle Identification Chart Page 35.

WIRE SLIDER SHUTTLE SIZES for 4" Head

	.055"	.062"	.075"	.100"	.115"	.135"
Wire Sizes AWG No.	41-46	38-46	36-46	34-46	31-46	30-46

SIDE SLIDER SHUTTLE SIZES for 4" Head

The 4" shuttles for **SIDE SLIDERS** are supplied in four sizes: 3/16", 1/4", 5/16", and 3/8". These sizes represent finished coil ID sizes through which these shuttles will pass with the sliders in position. **SIDE SLIDERS** come in different tensions set by the thickness of the wire tail of the slider.

	3/16"	1/4"	5/16"	3/8"
	4.9mm	6.3mm	7.9mm	9.5mm
Wire Sizes AWG No.	26-42	24-42	24-40	22-40

BELT HEAD SHUTTLE SIZES for 4" Head

	.093"	.100"	.115"	.125"	.135"	3/16"	1/4"	5/16"	3/8"
	2.4 mm	2.5 mm	2.9 mm	3.2 mm	3.4 mm	4.8 mm	6.3 mm	7.9 mm	9.5 mm
AWG NO.	25-30	25-33	25-33	22-33	20-33	20-33	20-33	20-32	20-32

SIDE SLIDER SHUTTLE SIZES for 6" Head

There are six different **SIDE SLIDER SHUTTLE** sizes available for use with the machine using the **SIX INCH HEAD**.

	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
	4.8 mm	6.3 mm	7.9 mm	9.5 mm	12.5 mm	15.6 mm
For Wire Sizes AWG No.	26-42	24-42	23-40	22-40	22-28	22-28

BELT HEAD SHUTTLE for 6" Head

	3/16"	1/4"	5/16"	3/8"	1/2"
	4.8 mm	6.3 mm	7.9 mm	9.5 mm	12.5 mm
For Wire Sizes AWG No.	22-33	20-33	18-33	23-30	18-28

The 8" Winding Head is available now. See more information at the end of the manual.

WIRE SLIDERS for 4" Heads

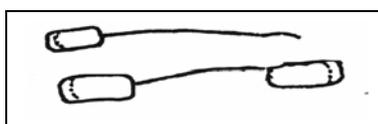
A general guide for **WIRE SLIDERS** when using Formvar magnet wire is as follows:
(You will need a micrometer to identify them.)

MAGNET WIRE TO BE WOUND

		A.W.G. No.	S.W.G. No.	Metric
.45 mm	.018" Slider	46 HF to 43 HF	48-46	.04-.06
.51 mm	.020" Slider	43 HF to 40 HF	46-44	.06-.08
.61 mm	.024" Slider	40 HF to 37 HF	44-41	.08-.12
.71 mm	.028" Slider	37 HF to 35 HF	41-38	.12-.15
.91 mm	.036" Slider	35 HF to 32 HF	38-35	.15-.20
1.00 mm	.040" Slider	32 HF to 30 HF	35-33	.20-.26
1.13 mm	.045" Slider	30 HF to 28 HF	33-29	.26-.33

When using Teflon, Litz, Bifilar or Trifilar wire, use the next heavier slider than shown in the table above.

SIDE SLIDERS



single end type

double end type

Smaller side sliders are for:
3/16" and 1/4" Shuttles

Larger side sliders are for:
5/16", 3/8", 1/2", and 5/8" Shuttles

The **SIDE SLIDER SHUTTLE** may be used with either Delrin or Metal Sliders. The **SLIDER** is made to fit on the grooved slot on the side of the shuttle. The **SLIDER** consists of a head with a wire tail that rides in the groove applying tension while winding.

The **SHUTTLES** for **SIDE SLIDERS** are supplied in six sizes: 3/16"; 1/4"; 5/16"; 3/8"; 1/2" and 5/8". These sizes represent finished coil I.D. sizes through which these **SHUTTLES** will pass with the **SLIDERS** in position. **SIDE SLIDERS** come in different tensions set by the thickness of the wire tail of the **SLIDER**.

SMALL SIDE SLIDERS for 3/16" and 1/4" Shuttles

	SLIDER TAIL SIZE	MAGNET WIRE SIZE
Light Side Slider	.45mm .018" tail	No. 38 to No. 42 .10mm to .070mm
Medium Side Slider	.61mm .024" tail	No. 30 to No. 38 .25mm to .10mm
Heavy Side Slider	.91mm .036" tail	No. 24 to No. 30 .40mm to .25mm

LARGE SIDE SLIDERS for 5/16", 3/8", 1/2" and 5/8" Shuttles

Light Side Slider	.45mm .018" tail	No. 38 to No. 42 .10mm to .070mm
Medium Side Slider	.61mm .024" tail	No. 30 to No. 38 .25mm to .10mm
Heavy Side Slider	.91mm .036" tail	No. 24 to No. 30 .40mm to .25mm
Extra Heavy Side Slider	1.00mm .040" tail	No. 22 to No. 26 .65mm to .50mm

All sizes are available in Delrin or Metal, the basic difference being that the Metal Side Sliders are for heavier duty than the Delrin. For winding wire finer than 39 AWG, the Delrin are needed in that they weigh less and have less coasting inertia riding along the shuttle groove. When winding wire on a Toroid, the Side Slider is being started and stopped on the shuttle for each turn of wire put on the core. When winding fine wires, the braking action to stop the Slider from coasting away and disengaging from the magnet wire in the Slider groove, is almost lacking, because of the very light tension supplied by the Slider tail. For this reason, the lighter Delrin is better for finer wires.

SHUTTLE ROLLERS

SHUTTLE ROLLERS come in five different sets of four each identified by sets of dots. (See chart below). Each set is reversible to accommodate two or three different sizes of shuttles. Each set is numbered by dots on the large end of the rollers only. **WIRE SLIDER SHUTTLE ROLLERS** No. 1 and No. 2 have two large and two smaller rollers per set. The large rollers of Sets No. 1 and No. 2 should go on the rear shafts, upper and lower. This makes replacing the shuttle on the roller easier, as these two rear rollers are hidden behind the **SIDE PLATE**.

SHUTTLE ROLLER CHART

SHUTTLE ROLLERS	ROLLER END OUT	SHUTTLE USED
1 DOT	NO DOTS	.055" .062" WIRE SLIDER SHUTTLE, 4" Dia.
	DOTTED END	.075" WIRE SLIDER SHUTTLE, 4" Dia.
2 DOTS	NO DOTS	.100", .115" WIRE SLIDER SHUTTLE, 4" Dia.
	DOTTED END	.135" WIRE SLIDER SHUTTLE, 4" Dia.
2B 2 PAIR OF DOTS	NO DOTS	.093", .100" BELT SHUTTLES, 4" Dia.
	DOTTED END	.115", .125", .135" BELT SHUTTLES, 4" Dia.
4 DOTS	NO DOTS	3/16" SIDE SLIDER SHUTTLES, 4" and 6" Dia.
	DOTTED END	1/4" SIDE SLIDER 4" and 6" Dia. 3/16", 1/4" BELT SHUTTLES 4" AND 6" Dia.
5 DOTS	NO DOTS	5/16" SIDE SLIDER AND 5/16" BELT 4" AND 6" Dia.
	DOTTED END	3/8" SIDE SLIDER SHUTTLE 4" and 6" Dia. 1/2", 5/8" SIDESLIDER 6" Dia. 3/8", 1/2" BELT SHUTTLE 6" Dia.

SHUTTLE ROLLERS should be pushed all the way onto their shafts and the set screws tightened only finger tight, with a wrench, to prevent marring the shafts, which makes removal difficult. Use **FLAT END** set screws only.

SIDE PLATES

SIDE PLATES USED WITH WIRE SLIDER SHUTTLES

The **SIDE PLATE** (see Line Drawing "N" page 25) is a rounded semi-triangular, thin, metal plate, rolled over on one edge, with a 1/4" shaft at the center. The plate is used to help lift the wire smoothly from the shuttle during each turn. The **SIDE PLATE** mounts in the holding casting.

There are two sizes of **SIDE PLATES** for use with **WIRE SLIDER SHUTTLES** only, and are numbered on the back of each plate. Both **SIDE PLATES** are used with the **FOUR-INCH HEAD**, and each is designed to operate with three different shuttles.

Plate No. 1A is for small cores up to 3/4" O.D., used with shuttles .055", .062" and .075". Plate No. 2A is for larger cores up to 1-1/8" diameter used with shuttles .100", .115", and .135".

The **SIDE PLATE** is held by its center shaft with its upper forward-facing corner conforming to the top front Shuttle Roller. The plate should be locked in place on its supporting casting, so that its inner surface is just clear of touching the Delrin shuttle rollers.

The clearance should be about the thickness of a piece of paper especially at the bottom front roller. If clearance is not found on all four rollers, move it in or out or remove the plate and bend it slightly in or out until this condition is met. Be especially careful to have the plate close to the lower front shuttle roller, but not touching. Other points are not as important as long as they have adequate clearance. Proper clearance can often be found and checked by tapping the plate over the position of each roller. If no rap is heard of the plate striking the roller beneath, the plate is either touching or is too far from the roller. The plate can be bent in or out slightly by hand without damage to achieve this proper clearance.

THE 2B SIDE PLATE USED WITH THE BELT HEAD (See Line Drawing "O" Page 26)

With the proper shuttle and belt installed on the machine, take the **SIDE PLATE** marked 2B and insert its 1/4" shaft into the hole (20) in the upper part of the holding bracket (12). Leave the screw (17) which tightens on the shaft, loose, so that the **SIDE PLATE** is free to turn. Now, loosen the two socket head screws (11) which position the lower part of the bracket so that now the **SIDE PLATE** is free to move in any direction. The rolled over edge (10) of the **SIDE PLATE** goes to the rear, (away from the operator) where it conforms with the belt around the shuttle. The bent-in part (15) should lie at the bottom, just forward of the bottom front roller (14) but not touching it.

Adjust the **SIDE PLATE** so that there is about 1/32" or about 1mm-clearance inwards between the belt and the **SIDE PLATE**. The plate just back of the bent-in section (15) should be close to but not touching the bottom front roller. The clearance should be about the thickness of a piece of paper. None of the other rollers should touch the plate. Also, the plate should not touch the shuttle. If it does, move it out just enough so that it will not.

An easy way to make all adjustments of the plate is as follows:

Push the plate backwards against the belt until it touches, and rotate the plate top coming until the bent-in part (15) touches the bottom front roller (14). Now tighten the two casting holding screws (11) lightly. Now just move the plate away from the belt (towards the operator), enough so that it is clear of the belt, then tighten the two screws (11) very securely.

There is now a new style **PLASTIC SIDE PLATE** available which can be used with the above belt shuttles .093, .100", .115", .125" and .135". It has its own shuttle set up jig. This Side Plate comes in two sizes: One for coils up to 1/2" O.D. and the other for coils up to 1". Larger sizes can be accommodated by filing or enlarging the area next to the toroid.

SIDE PLATE SET-UP JIGS (Photo E)

In order to make the set-up for using **WIRE SLIDER** and **BELT SHUTTLES** easier for the operator, there are four **SIDE PLATE SET-UP JIGS** marked 1A; 2A; 2B and PSP for Plastic Side Plate.

The Set-Up Jig marked 1A is used for set-ups when using Wire Slider Shuttles .055"; .062"; and .075".

The Set-Up Jig marked 2A is used for set-ups when using Wire Slider Shuttles .100", .115"; and .135".

The Set-Up Jig marked 2B is used for set-ups when using Belt Shuttles .093"; .100"; .115"; .125"; and .135".

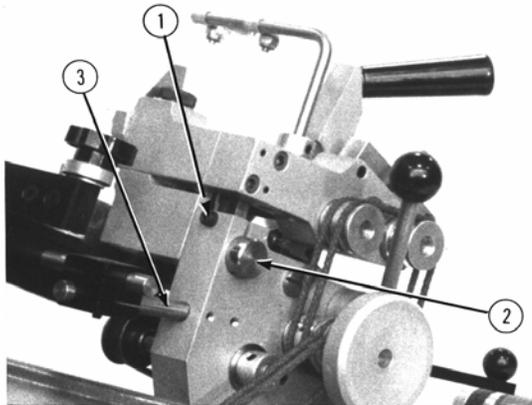


Photo D

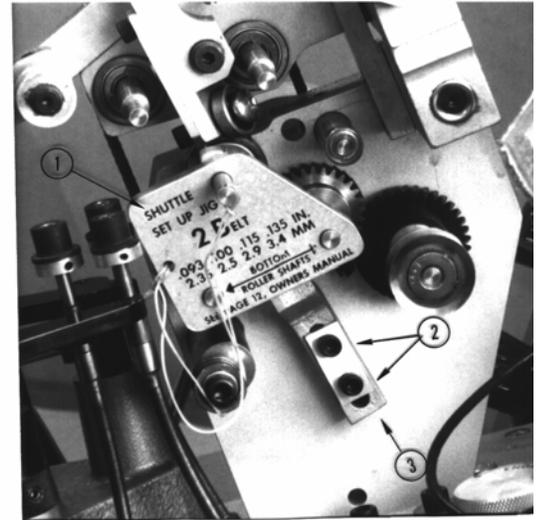


Photo E

To use the **SET-UP JIG**, remove the Shuttle Rollers from the shafts. Place the **JIG BLOCK** so that the two 1/4" holes, marked **BOTTOM ROLLERS**, go on the lower two shafts. The lettering should be on the outside. Loosen the Side Plate clamping screw of the Side Plate holder arm, which is behind the jig plate. Now take the short metal 1/4" round rod attached to a string and insert it into the upper 1/4" centerhole of the jig (E1).

Loosen the two Allen cap screws (E2) at the bottom of the Side Plate holder arm (E3) and align the arm so that the rod pushes into the Side Plate clamping hole. Now tighten the clamping screw on the rod securely and then re-tighten the two screws (E2). The **SIDE PLATE JIG** should be free to slide on the three shafts supporting it. If this is so, loosen the clamping screw on the rod, remove the **JIG BLOCK** and insert the shaft of the **SIDE PLATE**, see Line Drawing "N" (Page 25) No further adjustment is usually necessary unless the **SIDE PLATE** is rubbing against one of the Shuttle Rollers or the shuttle itself. In this case, bend the part of the plate, which is touching, out a little by hand to correct the situation.

BACKING PLATE (Drawing F, Page 16)

The **BACKING PLATE** for the four inch head is used with Side Slider shuttles and the larger Belt Head shuttles. It is shaped like a small thick metal shoe about 2" long and has a short 1/4" shaft protruding from the back. A set screw on top of the plate allows a forward and backward adjustment of the outer part of the plate for larger and smaller cores.

The **BACKING PLATE** for the six-inch head is similar but larger than the one for the 4-inch head and is mounted in the same manner.

The **BACKING PLATE** should be set in a horizontal position and locked in place so that the outer surface lines up with the outer surface of the shuttle being used. (See Photo M, Page 24). The Plastic Side Arm should then be aligned with the **BACKING PLATE**, making sure that the brush surface is flat on the plate.

If the wire appears loose coming from the slider during its path directly above the **BACKING PLATE**, RAISE THE POSITION OF THE **BACKING PLATE** a little to correct this, and tighten up the mohair brush, making sure that it is flat on the plate.

JOCKEY STICK

The **JOCKEY STICK** (C37) is unique with the **GORMAN TOROID WINDER**. It enables the 360-degree **CORE HOLDER ASSEMBLY** to be moved forward, sideways, and backward, by pushing the lever in the desired direction. This action is

desirable when placing the final turns of wire on a core when the finish hole is diminishing rapidly. It is especially useful where sections have been wound irregularly around the core, and the core is consequently moving eccentrically about during rotation by the three rotators.

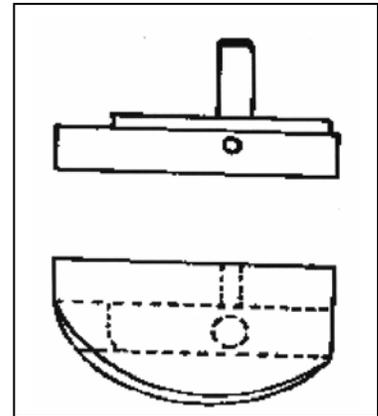
The **JOCKEY STICK** can be locked up when desired, by tightening the two screws which tighten the Lock-Down Clamp on the core Rotator Holding Plate see (C39). Also the moving tension of the core holding assembly can be adjusted by the two screws beneath the machine. Turning clockwise tightens and adds more friction.

WIRE DEREELERS

There are two types of **DEREELERS** which may be supplied with the **Model 900A**. The **FRONT LOADING** type which is standard, and the **OVERHEAD** type with wire cut-off. The **OVERHEAD** type is recommended especially for use with the Belt Head and all the larger Side Slider Shuttles.

The **OPTIONAL OVERHEAD DEREELER ASSEMBLY** consists of two parts. The plastic cone with wire spool which goes behind the machine and the Overhead Dereeler Assembly which is bolted on the top rear of the machine. The spool is placed to the rear of the machine and the wire is passed through the ceramic guide on top, and then through the rear Heanium eyelet on the overhead arm, through the felt clamp, and on through the slot in the cutter, and then over the front "V" groove roller, and down to the attachment point on the shuttle. The front "V" groove roller assembly is movable left or right for alignment with the center of the shuttle for loading.

Each time the wire is cut, the wire is grasped between the cutter and the felt clamp and led again through the cutter, etc.



4" BACKING PLATE
Drawing F

The **FRONT LOADER** type is a separate **DEREELER** which consists of two parts. The plastic cone and the Front Loading Dereeler which is attached to the near front edge of the machine. The Spool and plastic cone is placed on the floor or beside the machine to the left, and the wire is led from it through the eyelet (Photo B23) and up through the round felt clamp of the **FRONT LOADER**. The felt clamps can be adjusted sideways by a screw on top of the **FRONT LOADER**, and more tension can be applied by the collar at the end of the shaft.

CORE HOLDER ASSEMBLIES (Photo G, Page 18)

There are two styles of **CORE HOLDERS ASSEMBLIES** available with the **Model 900A** using the 4-inch and 6-inch heads. The light duty 360 degree rotation and the medium duty 360 degree rotation.

There is also a much larger core rotator assembly for use with the 8-inch winding head and the taping head. More information at the end of the manual.

With the advent of the **Model 900A** and **920B** winders, we have changed the designation of the previous heavy duty core rotators to medium duty in this manual, as we have added a new Heavy Duty Core Rotator Assembly.

The rubber coated **CORE ROTATORS** used with the 4-inch and 6 inch heads are held in position on their shafts by 6-32 set screws. The usual position of the Rotators is at the **TOPS OF THE SHAFTS**, unless a tall core is being wound. The set of three Rotators should be carefully aligned vertically to prevent initial cocking of the core while it is being wound. A certain amount of cocking or twisting of the core can be expected during winding, depending on the curvature of the core's outer edge, but this can be corrected by the operator by promptly pressing the high side down with a finger, being careful not to touch the slider.

CORE HOLDER ASSEMBLY - LIGHT DUTY

The three rubber covered drive rollers which are mounted on the **LIGHT DUTY CORE ASSEMBLY** are called **CORE ROTATORS** and come in sets of three, and in four different standard sizes mounted on 3/16" shafts.

SMALL:	7/16" Flange Dia. x 1/4" high	11 mm Flange Dia. x 6 mm high
MEDIUM:	5/8" Flange Dia. x 3/8" high	16 mm Flange Dia. x 9.5 mm high
LARGE:	5/8" Flange Dia. x 1/2" high	16 mm Flange Dia. x 13 mm high

The **LIGHT DUTY ROTATOR ASSEMBLY** (G1) has three arms, which close on the core with adjustable pressure. The pressure is adjustable by turning the bottom knurled collar (G4) below the spring, counter clockwise, and then tightening the holding screw.

The support arms holding the front two rotator shafts have locking collars around their bases. If both collars are loose, the three shafts will open and close at the same rate and the center of the toroid will remain in approximately the same position as the wire builds up. After a core is inserted in the Rotators, turn the right hand collar on the shaft clockwise until it stops and then tighten its setscrew in this position. This will keep the three arms from closing further inward but allow the arms to open up as the coil builds up in size.

If you find the core being pulled out of the Rotators by the pulling of heavy wire during winding, the front two Rotators can be locked in position by turning the left collar, hard to its stop in a clockwise direction, and lock it tightly in position.

In this locked condition, the finished coil can be removed by pulling the rear arm backwards.

The whole **ROTATOR ASSEMBLY** is movable by means of the Jockey Stick at right. The **ROTATOR ASSEMBLY** is also separately movable from original set-up by loosening Hold Down Screw (G2) moving the assembly through the casting which engages the assembly through a square hole below, and re-tightening again. Use the left square opening for the Light Duty Assembly and both openings for Medium and Heavy Duty Core Rotator Assemblies.

CORE HOLDER ASSEMBLY - MEDIUM DUTY

The **MEDIUM DUTY CORE ROTATORS** for this assembly come in two standard sizes and specials of any height, and are mounted on 3/8" shafts.

SMALL:	1" Flange Dia. x 1/2" high	29.4 mm Flange Dia. x 13 mm high
LARGE:	1" Flange Dia. x 3/4" high	29.4 mm Flange Dia. x 19 mm high

The **MEDIUM DUTY** Core Rotator Assembly, which takes cores up to 4" in diameter, fits into the same position as the **LIGHT DUTY** using three driving rotators. The closing distance of the front two arms and rollers is adjusted by the knurled knob (G3) on the left side of the assembly. The third rearward roller is spring loaded for ease of core removal.

The tightness of the rear arm can be adjusted by the lower collar adjustment screw (G4). Turning it in a counter-clockwise direction increases the holding power of the rear roller.

There is a further adjustment for the at-rest position of the rear arm, which is set by the adjustment screw (G5) of the upper collar on the same shaft. The **MEDIUM DUTY CORE ROTATOR ASSEMBLY** will firmly position and positively rotate cores as small as 5/8 of an inch O.D. up to 4-inch diameter. Special sets of rotators can easily be made.

HEAVY DUTY CORE ROTATOR ASSEMBLY

There is also a much larger core rotator assembly for use with the 8-inch head, which will handle cores up to 3" high and 6" O.D., and has three rubber core rotators 1-7/8" diameter and 2" high.

The rear rotator arm swings rearward completely out of the way for core loading and unloading. More on the Heavy Duty Core Rotator Assembly at the end of the manual.

CORE ROTATION SPEED

The pitch of winding on the toroid is controlled by the large VERNIER knob on the right side of the console (C36). The skirt of this knob is numbered from 1 to 150. Turning the knob to higher numbers causes a coarser pitch of the winding. The pitch will not vary when the winding speed is changed as long as the VERNIER knob setting is unchanged.

The standard light and medium duty **CORE HOLDERS** consist of three coordinated driving rollers for 360 degrees rotation, CCW or CW. With the variable pitch transmission, the speed of core rotation may be varied for any desired rotation speed.

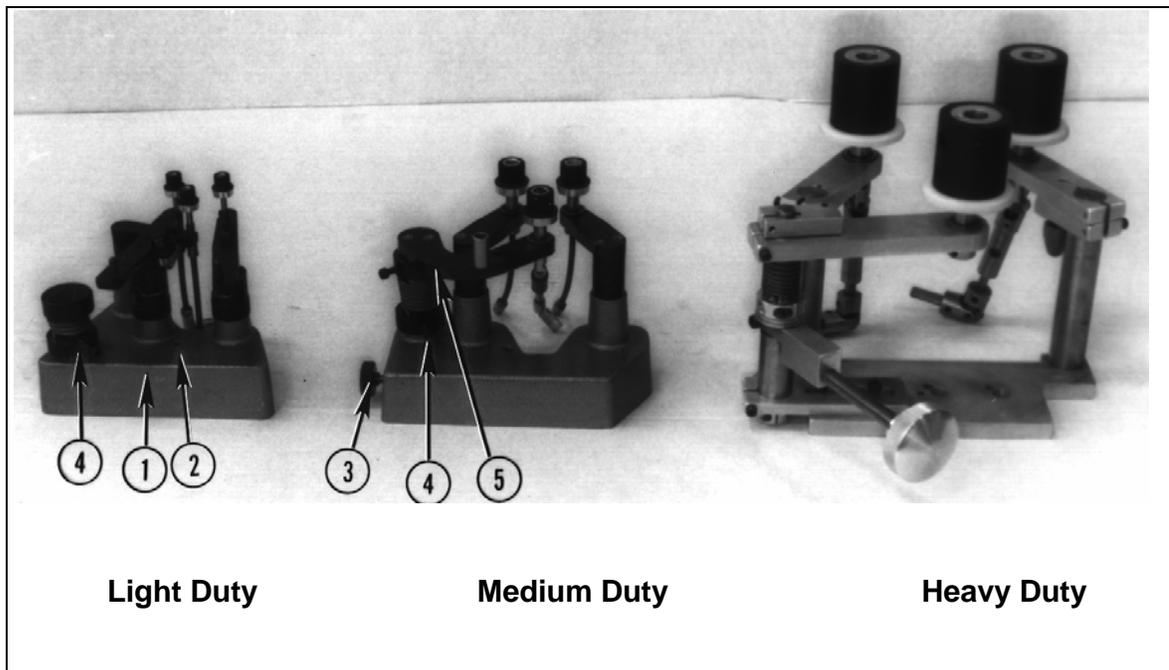


Photo G

CORE ROTATOR ASSEMBLIES

ADJUSTMENTS TO THE SIDE ARM

The **SIDE ARM** is for the purpose of controlling the loose loop of magnet wire coming from the slider during its path along the upper half of the shuttle. The pressure of the **SIDE ARM** on the plate has no effect on the tightness of the wire being wound on the core. However, more pressure is required when winding heavy wire to control kinking.

Very little pressure is used when winding fine wires to prevent the brush from "hanging up" loose turns of wire partially wound around the toroid.

The **SIDE ARM ASSEMBLY** is mounted on the round 3/8" stainless steel shaft protruding from the rear of the winding head (D3, Page 15). The position of the **SIDE ARM** is infinitely adjustable on this shaft by loosening block (J5) with an Allen Wrench (J3) and moving it forward, backward, in or out, and up or down in relation to the **SIDE PLATE** or **BACKING PLATE** (J1).

The correct position of the **SIDE ARM** is flat against the **BACKING PLATE** as shown in Photo (J1). The front of the plastic part of the arm should be close to the core and aligned with the front of the **BACKING PLATE**.

In the case of the Side Plate used with Wire Sliders, the arm should be about mid-way up on the Side Plate, flat against it, and aligned with the forward edge of the plate. The top edge of the plastic section should be **EVEN WITH, OR ABOVE** the top of the core being wound.

The pressure of the Side Arm is adjusted by loosening Allen Screw (J7) and turning knob (J2). Do not press down on the knob before retightening as this will bind up the arm. A magnet (J6) holds the side arm back for removal of the shuttle.

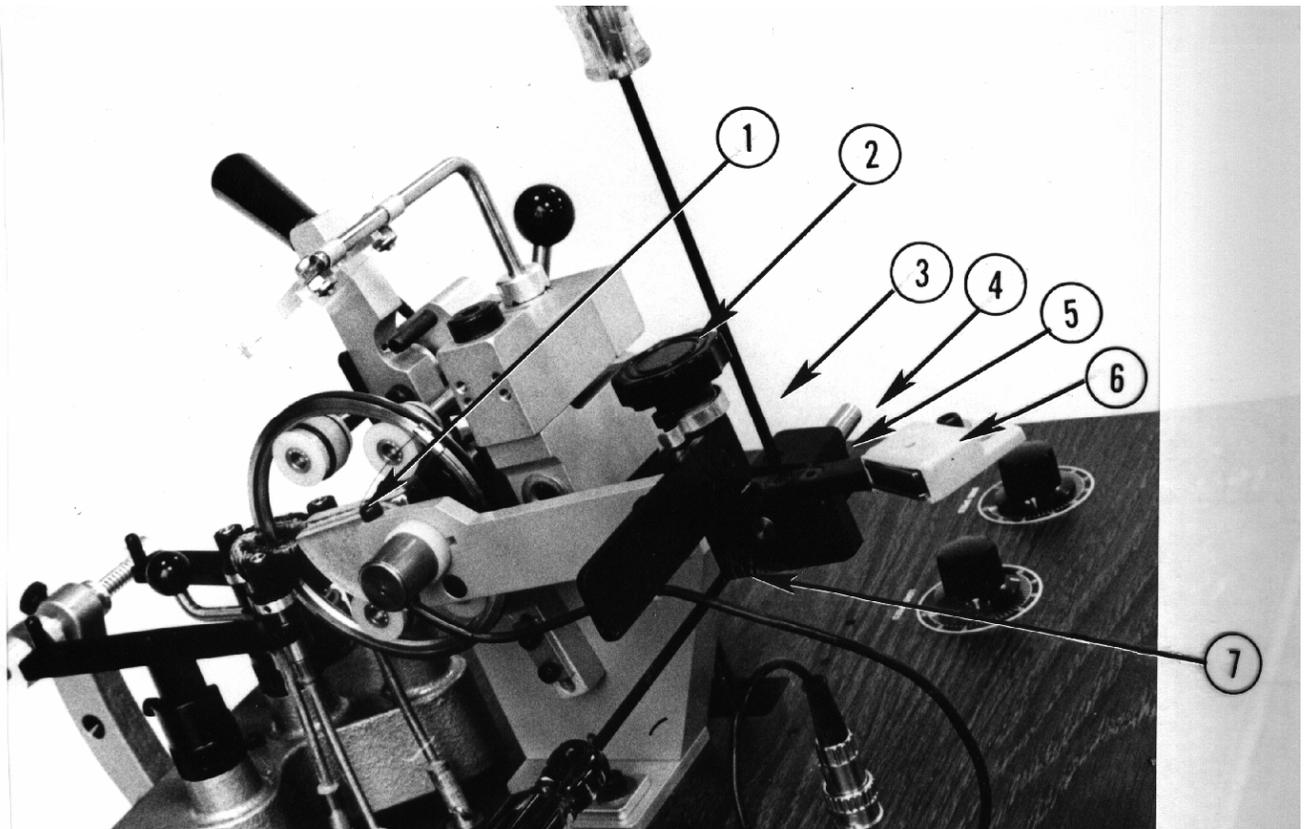


Photo J

ADJUSTMENTS FOR SIDE ARM

ELECTRONIC COUNTERS

There are several **ELECTRONIC PRE-DETERMINED COUNTERS** available for counting turns of wire on the toroid. The standard **COUNTER** and the most popular is the dual preset **COUNTER** where one preset count is for loading the shuttle, and the other is for counting turns by means of the Proximity Wire Pick-Up. When using the Side Slider or Wire Slider Shuttles, the load count is activated by putting the **LOAD WIND** switch in the **LOAD** position. A magnetically operated Reed Switch within the machine, connected to the motor, is activated for counting the amount of wire loaded on the shuttle. This is not footage of wire in feet, as the shuttles vary in size (6" and 4"). The count obtained when loading is a repeatable count for loading the same amount of wire each time. See note Page 33 about Reed Switch.

Move the **LOAD WIND** switch to the **WIND** position. Leave the **COUNT SELECT SWITCH** on (1) where it has been while loading. The **COUNTER** will reset itself to zero and you are now ready to wind the toroid and accurately count turns of wire. Start machine again with **START BUTTON** or foot pedal for the winding count.

If a second preset number of turns is needed and you have a multi-preset **COUNTER**, switch the **COUNTER SELECT SWITCH** to position 2 or 3, etc. When you switch to another preset count, the counter will reset to zero. At any **COUNT SELECT** position 2 or 3 etc., you can reload the shuttle by just moving the **LOAD-WIND SWITCH** to the **LOAD** position.

URNS COUNTER - PROXIMITY WIRE DETECTOR

The **PROXIMITY WIRE DETECTOR** counts turns of wire by detecting the passage of wire past the Pick-Up. The Detector or Pick-Up is a short closed tube mounted on the Side Arm inside a nylon bushing. It can be set so that the wire passes close by, or touches the polished end. The clearance adjustment should be zero to about .040" or 1mm. It will detect and register turns of wire from the finest to the heaviest wire the machine is capable of handling, regardless of winding speed. It will also detect and register as one turn, bifilar wires as long as they are not more than 3/8" apart. It should be generally aligned with the hole in the Side Plate or above the Backing Plate.

WINDING INSTRUCTIONS FOR 4" HEAD

The **GORMAN FOUR-INCH Toroidal Winding Heads** are capable of winding a wide selection of toroidal core forms with many sizes and types of wire. Set-ups are easily made by simple choice of each of these items of the complete winding set-up:

1. Shuttle - small enough to fit through the finished I.D. of core.
2. Shuttle rollers - determined by shuttle used, see chart page 13.
3. Shuttle sliders - determined by magnet wire winding capacity, see page 12.
4. Side or Backing Plate - determined by shuttle used, see pages 14,15.
5. Core rotators - determined by core size to be wound.

GENERAL MACHINE OPERATION

The following paragraphs describe the range of parts available for each of the above items, with information on the identification and use of each part. When making a new winding set-up, or rerunning a previous set-up, the above five items should be checked for proper choice of parts before beginning to wind.

To operate the machine with Wire Slider Shuttles, you will need the following: the proper size of Shuttle, Wire Slider, Side Plate, and Core Rotators, and the correct size Shuttle Rollers.

Choose the largest size shuttle that will hold your required footage of wire and still fit through the center of the finished coil. For the list of shuttle sizes, refer to the listing on pages 11,12 and the wire capacity chart on page 36.

The Wire Slider is a loop of wire, (approximately 3" in diameter) which has a hook at the end. These are measured by using a micrometer and measuring the thickness of the slider (i.e., .020", .036", etc.). There is a list of Wire Sliders we manufacture on page 12 of this instruction manual.

The Side Plates are numbered on the back of each plate with No. 1A; 2A; and 2B for use with the 4" Belt Head. The plate is a rounded, triangular piece of stainless sheet metal, approximately 4" in diameter with a rolled-over edge at one side, and is

polished to a mirror surface. On the back of the plate is a 1/4" stud shaft, which is used to mount the plate on the machine. The plate will be positioned just over the ends of the Shuttle Rollers (see line drawing "N" on page 25).

Please refer to the Chart of Shuttle Rollers that appears on page 13. You will note from this Chart that each shuttle must be operated with a certain set of shuttle rollers, and that the Shuttle Rollers are identified by one to five dots at the end. The end with dots always takes the larger of two shuttle sizes. The larger diameter rollers of the NO.1 and NO. 2 sets go on the rear two shafts, upper and lower.

To select the proper size of **Core Rotators**, we suggest that the **small** rotators be used for cores about 1/4" dia., and cores over this size use the **medium** or the **large** size rotators.

Select the proper size of **CORE ROTATORS** (set of 3) to accommodate your core. Install these 3 rotators on the **CORE ROTATOR SHAFTS** as shown in Photo G, page 18. The **CORE ROTATORS** should normally be in a position so that the tops of the **ROTATORS** are even with the tops of the shafts.

OPERATION USING WIRE SLIDER SHUTTLES

Select the proper shuttle to be used and put it on the machine as follows:

Pull lever (C51) on left side of head downward. This lowers the upper two shuttle rollers. Pass lower part of the shuttle around and behind the Side Plate and drop the shuttle on the upper two rollers just inside the plate. Return the lever (C51) to its detent upright position. Turn hand wheel (C30) until shuttle joint is at front of winding head even with tops of Core Rotator Shafts. Make sure that the wire start holes in shuttle will be on the left side.

If core is not already on shuttle, open shuttle with lever (C50) and move it to the left. Insert core in the 3 holding rotators and return lever (C50) to its operating position. The shuttle joint should close smoothly if proper adjustment of lever (B1) has been made. No clicking of the shuttle joint should be heard when running the shuttle empty at low speed. No visible gap at the joint should be seen. This screw lever (B1) on the head adjusts the Shuttle Rollers more or less apart to adjust for all the different sizes of shuttles available.

Magnet wire to be loaded is attached to the start hole or slot on the left wall of the shuttle by passing it through from inside to outside and then once again when using the hole. Cut off excess wire flush with top left edge of the shuttle. Do Not Cut Wire From Supply Spool at this time.

Set **COUNTER SELECT SWITCH** to "**ONE**" and put Black Switch (B16) in **LOAD** position. The load counter should be set for the length of wire you wish to put on the shuttle. The wind Counter should be set for the turns desired to be put on the toroid. See section on Counter setting on page 3.

Step on the **FOOT PEDAL** or press the **START BUTTON** (B14) to have the shuttle revolve in a reverse or top going direction until the desired footage of wire is loaded on the shuttle. Place **LOAD-WIND SWITCH** (B16) in the **WIND** position. It is suggested that you guide the wire onto the shuttle by finger while loading the smaller Wire Slider Shuttles in order to assure an even and level loading. This is important. If the wire is moved back and forth evenly on the shuttle while loading, there is less chance of the Wire Slider, which rides on top of the magnet wire, to cause a snarl while winding the toroid in the next operation.

If the wire is piled up on one side of the shuttle while loading, the slider may cause a few turns of wire on the higher side to fall to the lower side causing a snarl and wire breakage.

Next put the Wire Slider on the Shuttle. Select the proper Wire Slider from the list on page (12). There are two styles of Wire Sliders for each gauge slider. The difference is the height of the hook at the end. The low profile hook is used in the .055"; .062"; and .075" shuttles, and the high hook is used in the .100"; .115"; and .135" sizes.

Feed the straight end of the slider down through the core. Drop the hooked end of the slider (L4) held in the right hand, onto the shuttle. Now cut the end of the magnet wire from the supply spool and lead the wire through the hook of the slider from left to right, with the hook at the top.

Hold the end of the wire off to the right with the right hand and turn hand wheel (C30) until shuttle revolves, (top coming) and carries the hook of the slider down through the core. As the hook passes through the core, give the end of the magnet wire a little tug to slide some **WIRE** through the hook. This tests for proper tension and makes sure the slider is properly on the shuttle.

Continue to turn the shuttle by hand (top coming) until the magnet wire lays directly across the Side Plate below the pick-up and then stop. You are now ready to operate the machine under power.

Close Side Arm (L3). Step on foot pedal or press Start Button (B14) and adjust speed control knob (B12) to desired winding speed. When preset number of turns has been reached, the counter will shut off. **CAUTION:** If counter is pre-set to all zero's machine will not operate.

The direction of rotation of the core while winding is determined by **ROCKER SWITCH** (L1). Generally a counter-clockwise rotation is preferred for more even winding.

When toroid is wound, remove Wire Slider an excess wire from shuttle. To remove core and insert a new one, the core and shuttle may be removed entirely and simply by pulling lever (C51) down and taking off shuttle, or rotate the shuttle until the joint is at front just above Core Rotators, and using arm (L2), a separate shuttle to the left and remove coil. Immediately insert new core.

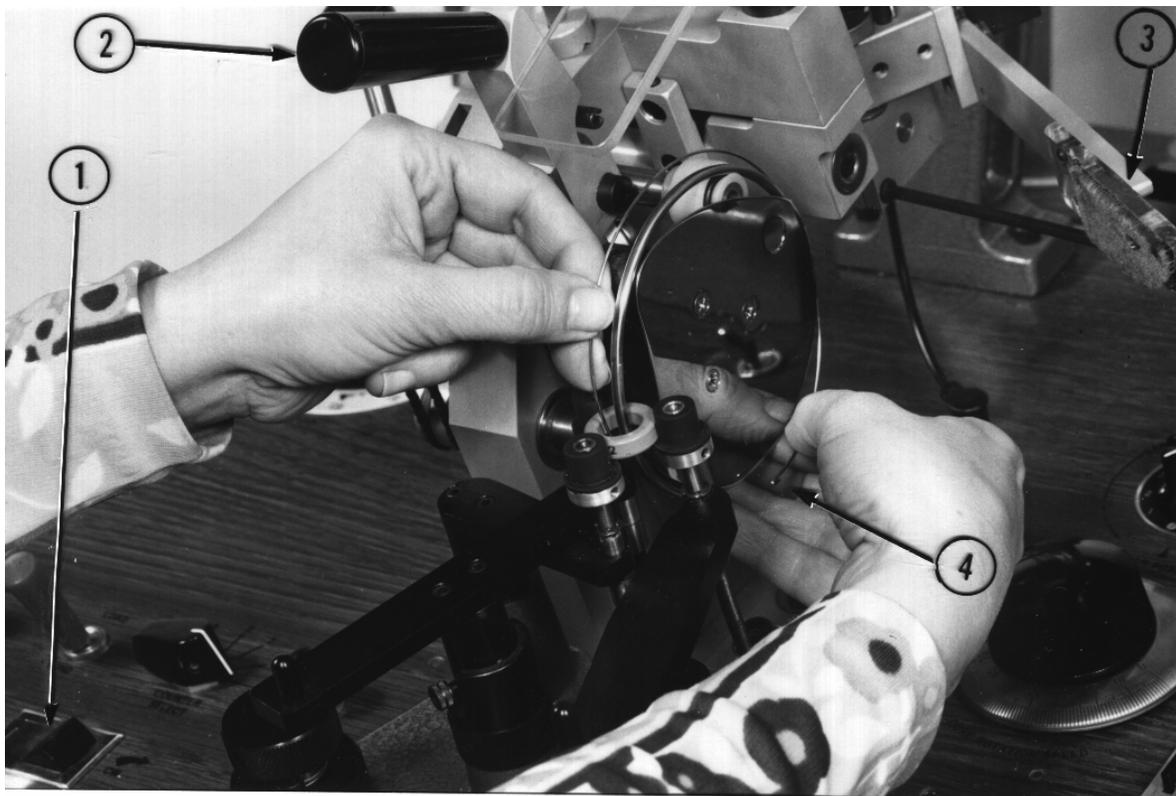


Photo L

WIRE SLIDER INSERTION

- L - 1 Rocker Switch for direction of core rotation
- L - 2 Shuttle Opening Lever
- L - 3 Side Arm - mohair covered
- L - 4 Hook End of Wire Slider

TROUBLE SHOOTING FOR WIRE SLIDER SHUTTLES

There is always a good reason for wire breakage and it should be correctable within the wire size limits of the machine. When using a Wire Slider riding on top of the magnet wire, there are several physical features which should be understood. This Wire Slider should conform with the circular shuttle as closely as possible at all points. If it humps up any place, remove

it and shape it judiciously at the right points until it does conform. The proper checking point of roundness would be about mid-way on a cone. Any tube or ring about 3-1/2" to 4" diameter can also be used for checking for roundness. This slider must offer enough drag on the magnet wire to overcome the bending friction of the magnet wire as it reverses direction through the hook at the end. If the slider is too light for the magnet wire being used, instead of the magnet wire flowing smoothly through the hook, it will lift a whole loop of wire off the shuttle.

When you are winding a toroid in the normal manner, the Wire Slider is being dragged in a steady series of yanks over the surface of the magnet wire in the shuttle. Several noteworthy things are happening.

1. If the winding speed is too fast, centrifugal force will open the wire slider and it will suddenly lose all tension causing a snarl.
2. As the slider is progressing around the shuttle, it will constantly try to push any slack wire ahead of it and also push wire from any high spot on one side of the shuttle down into a low spot causing more slack to accumulate and it will eventually cause a tangle around the hook and break. This second occurrence is why it is so important to wind up your shuttle so that the surface of the wire in the shuttle is level at all times while loading up the shuttle. If the wire tangles around the hook and breaks while winding a coil, look at the surface of the remaining wire in the shuttle and you will probably find that it is higher on one side than the other.
3. If the wire breaks off flush with the hook of the slider, without any snarl, then the slider tension is too great. Either open up the slider with your hands to lessen the tension or use a lighter gauge slider. (See Slider Chart Page 12).
4. If the wire breaks off leaving a few inches of wire dangling from the hook, then the wire has probably run under the Side Plate which indicates improper plate positioning or roughness of plate at bottom. Check to see if the side arm brush is in proper position and has enough pressure against the Side Plate. Try increasing the closing pressure of the Side Arm. Check the critical points illustrated in the Line Drawing "N" on Page 25.
5. If the wire slider is being pulled off the shuttle at the top, the slider is either too loose at the hook end, (bend it in tighter) or the slider is too light for the wire being used.
 - a. Check to see if Side Plate is in proper position. Note particularly the bottom of the Side Plate. It should conform to the shuttle, and be on an even level with the out side of the shuttle at this point. (See Line Drawing "N" on Page 25)
 - b. Are you using the right Delrin rollers for this shuttle? (See Chart, Page 13)
 - c. Are there nicks on the side plate or on the shuttle? Buff smooth.
 - d. Did you load the shuttle correctly? (See above)
 - e. Try a heavier or lighter slider.
 - f. Buff the Side Plate to a mirror finish along the outer edge.

OPERATING INSTRUCTIONS USING 4" SIDE SLIDER SHUTTLES

Four inch Side Slider Shuttles are supplied in four sizes: 3/16"; 1/4"; 5/16" and 3/8". These are finished core I.D. sizes through which the shuttles will pass including the sliders. Side Sliders come in two sizes. The smaller size fits the 3/16" and 1/4" shuttles and come in three basic tensions: light, medium and heavy. The Larger Side Sliders fit the 5/16", 3/8", 1/2", and 5/8" shuttles and come in four basic tensions: light, medium, heavy, and extra heavy. See Side Slider lists page 12.

To change the machine over from Wire Slider to Side Slider operation, the operator needs only to remove the **SIDE PLATE**, and replace it with the **BACKING PLATE** which is a small shoe-like object, Drawing F page 16, with an adjustable outer section, about 2" long.

Its protruding shaft fits into the same hole as did that of the Side Plate and its outer surface should be on the same plane as the outside edge of the shuttle. The front top of the plastic Side Arm should always be aligned with the front of this backing Plate (M2, page 24).

Select the proper shuttles, and its set of rollers, adjust lever (M1) for proper shuttle drive tension.

Set shuttle on rollers with dovetail and slider to right. Put **LOAD-WIND** switch (B16) in **LOAD** position and load shuttle the same as for Wire Slider Shuttles.

Slip a short length of the wire through the hole or into the bottom of the tapered groove on the left shuttle wall and load the shuttle (top going) just as with the Wire Slider Shuttles.

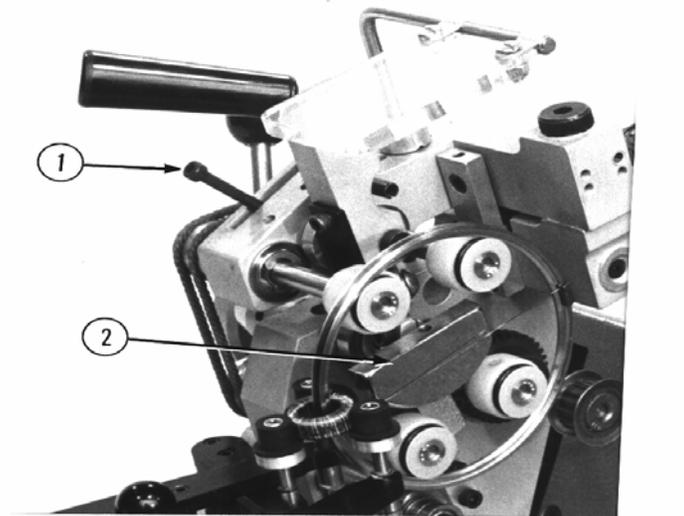
Put the **LOAD-WIND** switch (B16) in **WIND** position, cut magnet wire from supply spool, and put the wire into the wire slot at the front of the slider and give a tug backwards for test of tension.

There is basically no difference in operating the six-inch shuttle head from the four-inch head, other than size and capacity of shuttle.

The same Side Sliders fit either 4" or 6" shuttles interchangeably.

The footage is counted in the same manner without change. The 6" shuttles have 50% more storage capacity.

Shuttles available for the 6" head are 3/16"; 1/4"; 5/16"; 3/8"; 1/2" and 5/8".



HEAD WITH SIDE SLIDER SHUTTLE Photo M

TROUBLE SHOOTING WHEN USING SIDE SLIDER SHUTTLES

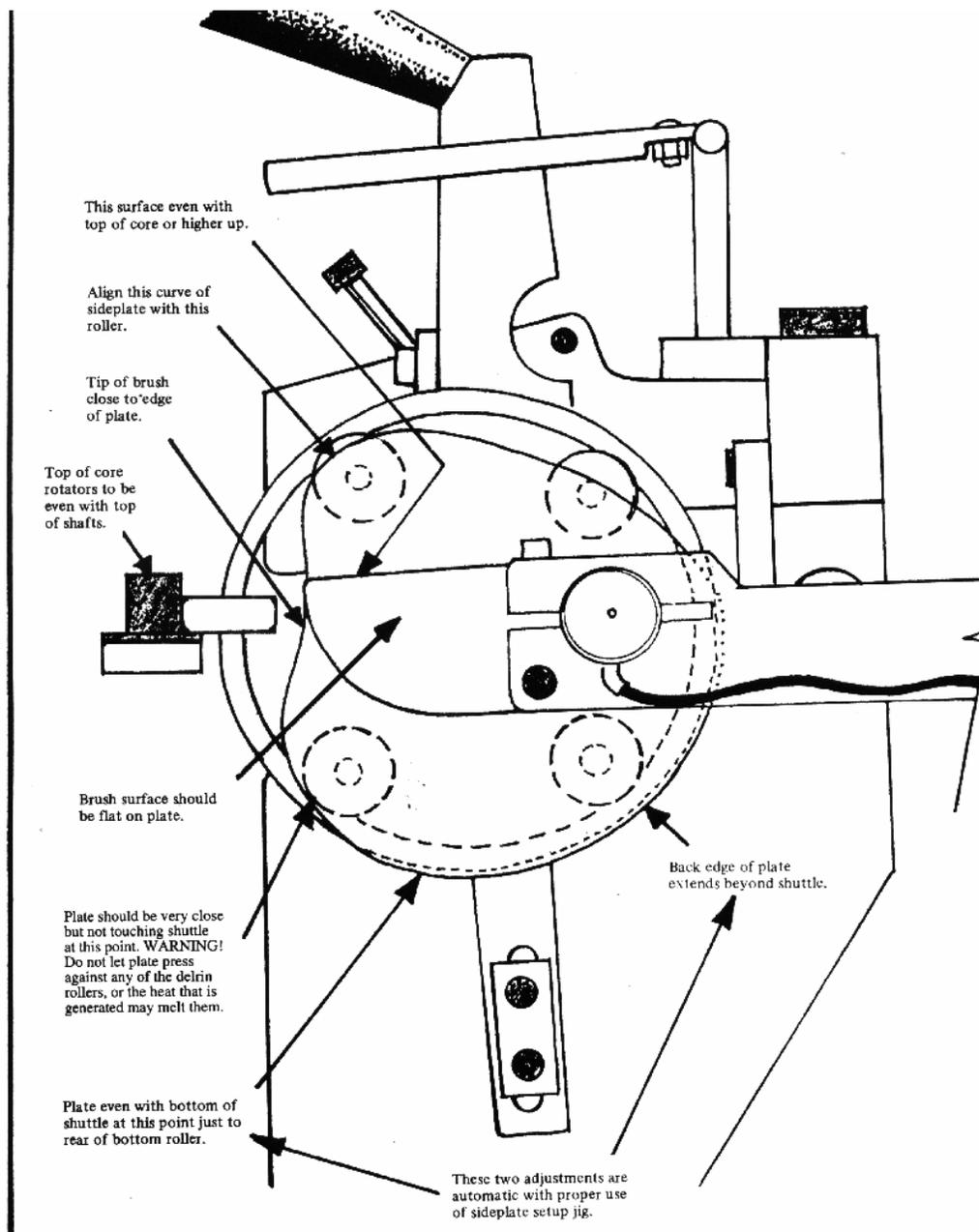
Generally there is very little wire breakage when using Side Slider Shuttles. The usual cause is excess speed when using fine wires. Care should be taken to select the proper slider and see that the wire tail is set for the proper tension. When winding wire finer than AWG 40, take care not to have too little or too much tension.

Too much tension will snap the wire, but usually will not cause an immediate snarl. But, too little tension will allow the slider to disengage from the magnet wire with a resulting immediate snarl around the toroid and the mohair pad.

When winding fine wire using the Delrin sliders, and for no apparent reason the wire starts to break after considerable running without trouble, clean the dovetails of the Delrin slider with a business card or a fingernail. Dirt collects in the grooves and increases the tension. Sometimes a slot is worn into the Delrin slider which will bind the wire. The slider should be discarded.

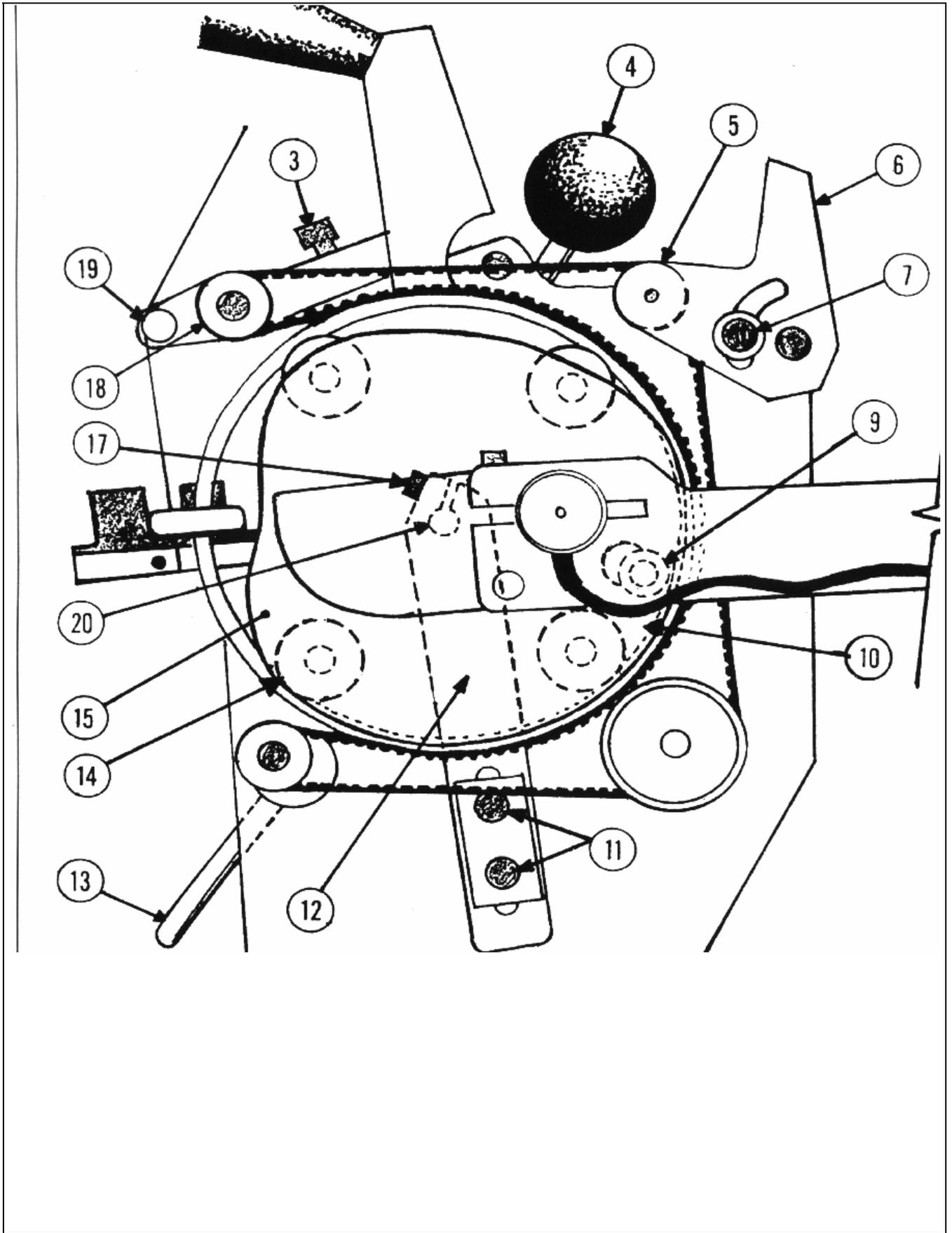
Take care when winding, not to let the slider strike the coil I.D. or let a piece of wire come across the front edge of the shuttle, so as to hook the slider.

Keep plastic **EYE GUARD** in position.



SIDE PLATE ADJUSTMENTS

LINE DRAWING "N"



LINE DRAWING "O"

BELT HEAD

THE BELT HEAD

The **BELT HEAD** for the **Model 900A, 920B** and the **PRODUCTOR II Toroid Winders** makes it possible to wind relatively heavy wire through a small hole. The tension principle is entirely different in concept from the familiar Wire Sliders and Side Sliders.

A shuttle is used which is very similar to the Wire Slider and Side Slider type, but with a heavier wall thickness. A flat toothed belt is used in conjunction with the shuttle with the smooth side in contact with the shuttle for a little more than half of the circumference. Four internal rollers drive the shuttle in the usual manner and a toothed pulley drives the toothed belt so that its motion will coincide with that of the shuttle.

The magnet wire being pulled from the shuttle, down through the toroid, is pulled tightly about the toroid by its sliding between the shuttle and the tensioning belt riding on top of the shuttle. The shuttle loads and winds the toroid in the same direction. The wire size range of the 4 inch Belt Head is normally from No. 20 to No. 35 AWG with shuttles as small as .093" cross section.

SET-UP AND OPERATION - BELT HEAD (Line Drawing O, Page 26)

For a brand new set-up on the **BELT HEAD**, first remove the timing belt using the belt release lever (13) located at the lower left hand side of the head by pushing it toward the rear. This will remove the tension on the belt allowing it to be removed from the aluminum idlers (18, 5, etc.). Next, remove the shuttle (16) by pulling the shuttle release handle (4) located to the left-hand-center of the head (Round Black Knob) forward until the shuttle can be removed from the rollers. Remove the four Delrin shuttle rollers (14) by loosening the setscrew in each one. Select the shuttle and proper shuttle rollers to be used (Page 11 and 13). Place the rollers on the drive shafts and tighten the setscrews

These setscrews should be lightly tightened; only enough so that the rollers are firmly in place. Place the shuttle over the rollers with hole or slot in shuttle inward toward the head and move the shuttle release handle (4) back until it reaches its detent position. You can make sure of this position by moving the handle slightly forward and backward, feeling the point of resistance. Next, adjust the roller pressure against the shuttle by loosening the fine adjustment screw (3) located in the slot directly on top of the head, moving it forward to loosen roller pressure, and rearward to increase roller pressure. Make sure that the rollers are hitting the shuttle evenly at all contact points.

Now adjust the strain ball bearing (9) located between the two rear rollers by first loosening the locking hex screw, located under the hole directly behind the fine adjust slot. Adjust this bearing downward (CCW) until just touching against the inside of the shuttle. It is important that this adjustment be made downward, because of the strain placed on the top rear roller when the shuttle is opened, (if adjusted in the upward position). The bearing should not protrude into the wire path.

Replace the belt on the head by placing it over the front aluminum idler (18), and up and over the belt tensioning aluminum idler (5). The flat side of the belt rides on the shuttle. Loosen the belt tensioning pulley bracket (6) by loosening the locking screw (7) in the slot and pulling the bracket forward. Pull the belt release lever (13) forward until you feel it hit the detent. Adjust the belt tension by moving the belt tension bracket (6) rearward while feeling the top of the belt. Medium tension is needed for anything other than heavy sizes of wire. After adjusting belt tension, run the shuttle slowly without wire. If you hear a clicking sound caused by the joint of the shuttle separating and closing while going over the rollers, you have too much belt tension. This is especially noticeable with the smaller shuttles used with the Side Plate.

Both the 2B Side Plate and the Backing Plate are used with the Belt Head, depending on which shuttle is used. The small 4" shuttles, up to .135" cross section use the stainless steel, sheet metal side plate. Larger shuttles require the solid metal backing plate (Drawing F Page 16).

OPERATION: LOADING OF THE SHUTTLE

The **BELT HEAD** loads differently than most toroid winders, in that it loads "**Top Coming**," in the same direction as you will be winding, thus the **LOAD/WIND** switch is kept in the **WIND** position during both loading and winding operations. Put the **COUNTER SELECT** switch (B18) in Belt Load position.

Your **BELT HEAD** was supplied with a shuttle that has either a slot or a hole on the inside wall, or both. The slot can be used with any wire that is heavy enough to be bent at the end and will remain hooked in the slot. If the wire is not heavy enough to do this, the hole must be used. It is important that this end of the wire does not come loose from the shuttle while winding.

To use the shuttle slot which is just below the joint, snag the wire about 1" from its end in the slot and press the **VARIABLE SPEED FOOT PEDAL** to slowly rotate the shuttle joint in a downward direction. Keep a little tension on the end of the wire coming from the dereeler, until part of a turn has been placed on the shuttle. Continue loading the shuttle, guiding it into the center by means of the groove in the guide rod (Drawing O-19, Page 26) until the preset number of feet has been reached.

WINDING THE CORE

The machine is now stopped. Switch the Counter Select knob (B18) from the **BELT LOAD** position to the number one position for turns-count per winding. Turn the hand wheel (C30) on the left side of the head, "**Top Coming**," and at the same time remove the wire from the groove in the loading guide (Drawing O-19, Page 26) and hold the wire to the right and away from you. Give it a pull.

The wire will snap into a position between the shuttle and the belt where it will stop about half way up the back of the shuttle. Now, cut the wire from the Dereeler, and pass it behind the shuttle and hold it lightly while you start to wind the core. Do not pull on the wire while putting on the first turn or the following turns of wire will hang up in the mohair brush behind the shuttle.

Start winding your core. After the first few turns you can determine whether the spacing is satisfactory. If the spacing is too wide, use the Core Rotation Speed Control on your machine to slow the Core Rotation.

When you have completed winding the coil, unload the shuttle by turning the hand wheel at the left of the head until the wire comes up past the top of the Side Arm. Hook this wire with your finger and pull it forward until it is out from under the belt. Then either by hand or by putting the machine in the reverse position (on the **LOAD/WIND** switch) pull and feed the wire off the shuttle. Next, position the joint of the shuttle just above the core you have wound and open the shuttle by moving the large handle (C50) on the front of the head, up and to the left and then down until it stops. Remove the core. These same instructions apply whether winding single wire or bifilar.

TROUBLE SHOOTING THE BELT HEAD FOR WIRE BREAKAGE

If the wire breaks continuously at the start of each core before even a few turns have been wound, it would be one of three things.

1. Either the wire is going behind the **SIDE PLATE**, or it is hooking on a roller when using the **BACKING PLATE**. Try putting a few turns on the core before passing the wire behind the shuttle.
2. The belt tension is too tight.
3. The operator may be pulling the start lead on the first turn. A quick check can be made on the first two by turning the head slowly by hand and observing the wire as it comes off the shuttle.

If the wire is going behind the Side Plate, check the position of the plate. It may be away from the bottom front roller too much. It should be almost, but not quite, touching this roller (the thickness of a piece of paper only). If the wire breaks further along in the winding, the belt tension is probably too tight, especially if the break occurs near the end of the winding. Make sure the shuttle is not rubbing against the coil I.D. at the right hand side.

Another cause for wire breaking with finer wire or stalling the shuttle with heavy wire is caused by trying to wind too large a core. This is especially noticeable when using the 5/16, 3/8 and 1/2-inch shuttles and winding heavy wire. The winding will proceed normally until the load of wire in the shuttle is getting low and the wire is pulled tight on the shuttle at the forward bottom roller. There it will sometimes stall the shuttle or you will hear a thumping sound at that point while winding.

What is happening, is that the magnet wire is trying, at this point to rewrap itself back on the shuttle instead of sliding off the side as it had earlier in the wind. There is no remedy, other than the fact that you have found the point where the core is too large for the shuttle being used. Using the 6-inch shuttle instead of the 4-inch is the only way to go.

WIRE HANG-UP IN SIDE ARM using the Belt Head.

This problem can be caused by a variety of things: Not enough tension in the belt; Too much tension on the Side Arm closure; Side Arm too high; or the wire might be falling off the shuttle the moment it comes from under the belt, which is a sign of too fine wire being wound (No. 35 AWG is the finest), and this size is marginal with the 4" shuttle, and impossible with the 6" shuttle

It is important to load the shuttle evenly. If the wire builds up on one side of the shuttle while loading, when you start winding, these build-ups fall down to the middle of the shuttle causing loose winds on the shuttle which may hang-up in the Side Arm during the winding.

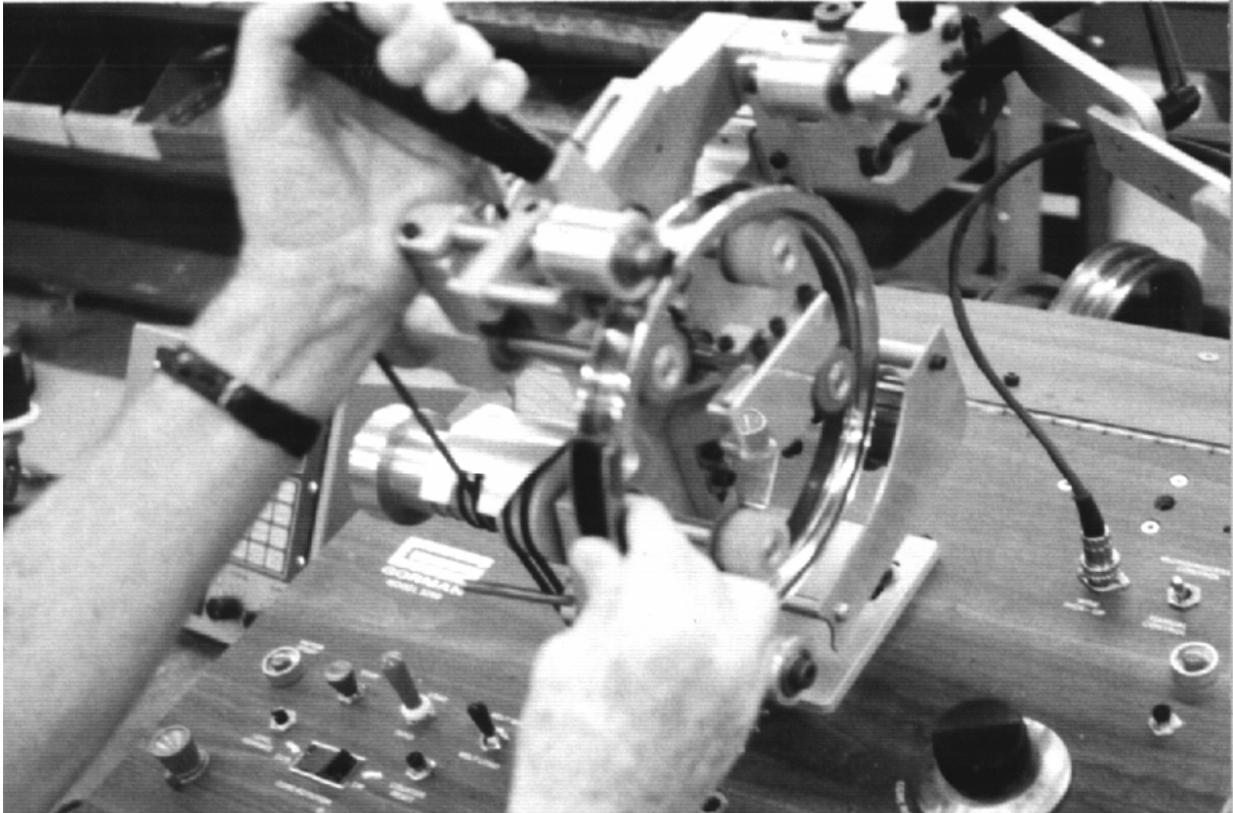
WINDING TIPS FOR BELT HEAD

Keep the Side Arm Mohair flat on the plate with only a moderate amount of side tension, just enough to keep the wire from kinking and to ensure proper contact on the plate. Side Arm pressure has nothing to do with the tightness or looseness of the wire being wound on the toroid. The timing belt tension regulates the tightness of wind.

Make sure that the Side Plate is very close to the bottom front roller but not touching. If the Side Plate touches the Delrin rollers, melting of the Delrin may occur in a short time of running.

Keep the toroid being wound up near the tops of the Core Rotator Shafts. The three Core Rotators are set screwed on the shafts always near the tops. If the wire gets under the bottom of the plate while winding, first check for proper position of the Side Plate, and then try raising the Rotators to a higher position on the shafts. One or the other, or both will always cure this problem. There should be no nicks on the plate edges. Buff the plate as needed.

When winding bifilar wire, loading the shuttle is important. Make sure that both wires go on close together, and load the shuttle evenly. If the wire is loaded on a slant on the shuttle, there is a chance that one wire will be on the high side and the other will be on the low side. This will cause one wire to get ahead of the other, which will cause miscounting and also a snarl. Make sure both wires are close together across the side plate before starting the first turn. **VERY IMPORTANT!** If loaded properly and started properly, both wires will stay together during the wind.



8-INCH WINDING HEAD

The Eight-Inch Winding Head operates more or less like the four and six-inch winding heads previously described. The 8" Head is mounted by two 1/4-20 Bolts in tapped holes as shown in Line Drawing P, Page 35. The head can be adjusted forward or backward about 1/2" by these two bolts.

Shuttles for the 8-inch head come in three sizes at present, for a 1", 3/4" or 5/8" hole clearance. More sizes down to 3/8" will be available in belt or side slider types soon. The 1", 3/4", and 5/8" shuttles have a removable section. The smaller sizes down to 3/8" have a single joint.

The Belt Shuttles with the removable section have a much thicker rounded section on one side of the perimeter of the shuttle. This rounded section sets on to the shuttle rollers so it is away from the head.

To open the one-joint shuttles for core removal, push the long black arm at the top front of the head away from the operator and then swing it to the left. The finished coil can then be removed through the opening usually with a little finger pressure to enlarge the opening without scratching the coil insulation.

In the case of the larger shuttles which are so rigid that they cannot be bent sideways, there is a removable section of the shuttle about 3 inches long. For removing this three inch long section, with the head in the winding position, the upper two shuttle rollers are aligned with the lower two rollers and are locked in this position but are free to be lifted upward which separates the section for removal. This lifting action is achieved by pulling the long black handle on the upper arm towards the operator. This action is made easier by squeezing together the black handle towards the vertical 1-inch square block in front of it with the left hand while holding the section to be removed with the right hand.(Refer to the photo above). Pull the upper part of the removable section outward to remove.

For squeezing the large black handle towards the operator, there is an adjustable stop for adjusting the amount that the shuttle will open for removal and insertion of the sector of the shuttle. The adjustable stop which is mounted with one bolt just in front of the LIFT ARM has a 1-1/4 inch long roll pin protruding upwards for positioning the angle of the stop against the LIFT ARM. Loosening the holding bolt slightly and moving the roll pin forwards will increase the amount of shuttle opening. Retighten the bolt firmly in its new position so that the removable sector of the shuttle just slips into position. **KEEP FINGERS AWAY FROM JOINT.**

To reinsert place the lower v-notch of the insert into the lower shuttle opening and hold the upper section against and aligned with the upper open end of the shuttle. Again squeeze the black handle and the square block together, which opens the shuttle and the upper part of the removable section can be pressed into position. Release your left hand, which closes the shuttle on the insert. The whole removal or reinsertion of the section should take only a few seconds with practice. Again, keep your fingers away from the closing joints.

The entire shuttle can be removed at any time when the shuttle is stopped by moving the round black knob on its steel rod, on the left side of the winding head towards the operator. This drops the top two shuttle rollers to a lower position and the shuttle can be removed from the grooves in the rollers.

To put a shuttle back on the rollers, put the round black knob in the rear raised position and hang the shuttle on the outer grooves in the upper two rollers. The grooves at both ends of the shuttle rollers are identical. The lower part of the shuttle will be against the lower two rollers. Now drop the round black knob forward and down to lower the top rollers and fit the shuttle on the lower roller grooves. The shuttle is now on all four grooves. Raise the knob again to its detent position. **To adjust the driving tension of the shuttle rollers against the shuttle, the shuttle insert must be in position.**

To the left of the base of the long black plastic handle, there is a vertical tapered lever with an Allen screw in the center protruding upward from the head. This lever can be moved forward and back in its groove in the upper roller arm by loosening the Allen screw. Moving it away from you will increase the driving pressure. A snug fit is all that is required.

The Belt-Drive timing belt for the Belt Head has a tensioning lever at the upper rear. The tightening is done by either one or two adjustments of the upper two belt idler pulleys at the top front and rear. The front roller can be moved rearwards by loosening two screws holding the slide in position. Rearwards is the usual operating position with the largest shuttles. The other belt adjustment is with a swing-arm lever which pivots the rear idler up or down for tightness adjustment for different sizes of magnet wire being used. The normal adjustment is firm tension but not too tight.

The wire pick up unit on the side arm has a swingable mount for fore and aft adjustment for different positions of the backing plate. The pick up unit should not be over a shuttle roller or the metal backing plate as the rotation of the roller can generate false counts. As the side arm and backing plate are moved rearward to accommodate the larger toroids the pick up swing-arm should be swung forward a little to avoid the rear shuttle roller.

There are two different sizes of round polyurethane drive belts for the 8-inch head. All are 3/16" thick; there are five belt grooves for these belts on the main hand wheel shaft on the left side of the head. Two belts come from the drive motor up through the console slot to the inner two grooves next to the winding head. The next groove is for a single belt of the same diameter, which goes around the four shuttle drive pulleys.

The next two grooves are for the timing belt drive pulley to the rear of the main hand wheel shaft. These last two belts are approximately 4-1/2" I.D. when new. The first three belts are approximately 5-1/2" I.D. when new. All the belts stretch about 1/2" I.D. with use in a few days. The outer two drive belts next to the hand wheel which go to the timing belt drive pulley can be removed when using the side slider shuttles. To remove or install any of these belts, the sheet metal belt guards on the left side can be removed for easier access. It is not necessary to completely remove these guard-holding screws.

There are five sheet metal belt guards covering the drive and timing belts to protect the operator. These are easily removable for replacement of drive belts. The timing belt can be removed easily without removing the lower right guard. The upper right timing belt guard just lifts off and is held in position by friction.

At the lower front left side of the head, there is a bent 1/4-inch steel rod, which is normally in the upper detent position. This positions the lower front timing belt idler in its running position. To remove the timing belt, lower the steel rod all the way down and the front belt idler pulley will loosen the belt for removal from around the perimeter of the shuttle. Then the shuttle can be removed and replaced.

All three types of core rotator assemblies are mounted on a large movable rounded black plate. When winding the heavier wires on the 8-inch head there are two plate-clamping blocks for firmly positioning the rounded black plate. One tightening block is at the lower right edge of the black plate and the other is at a slant at the upper left center of the same plate. When both are firmly tightened, the core rotator assembly attached to the black plate will not move forward or backwards while winding. Loosening both will restore the Jockey Stick Control.

When not using the belt, you can disconnect the drive to the belt head drive pulley. When loading the 8-inch Side Slider Shuttle and the Load Wind Switch is in reverse in the Load position, an internal counting mechanism is engaged and it will take 3 counts per foot of wire loaded on the shuttle. The side Slider Shuttles use much larger steel side sliders.

All the other functions of the **8-inch head** are about the same as with the 4 and 6-inch heads

HEAVY DUTY CORE ROTATORS

Used with the 8-INCH HEAD and also with the TAPING HEAD.

The core is positioned by three core rotators. Two of them are driven and are positioned inward or outward by turning the two separate adjusting knobs. The rear idler core rotator can be swung rearward and out of the way for core removal, by loosening the large knurled knob on its extended mounting shaft. Positioning of the rear rotator is done by swinging it in against the core and then pushing the knurled knob about one inch further towards the core for tensioning pressure against the core. Tighten the knurled knob in this position.

The initial pressure of this rear swing arm is presettable and is adjustable by swinging a collar mounted lever mounted on the left vertical shaft holding the rear idler roller. Loosening the collar and swinging the attached lever towards you or counter clockwise will set in more initial pressure on the rear idler arm. There is a hole drilled in the end of the protruding handle on the collar, so that a rod or Allen wrench can be inserted for more leverage. The large knurled knob must be tightened during this adjustment.

The knurled knob on its shaft which is screwed into its holding block is normally set at a 45 degree angle with the idler holding arm. This angle can be reset or adjusted by loosening the clamping screw which holds the knurled knob holding block just below the collar. Loosen the holding block clamping screw and swing it to its new position, then retighten the clamping screw firmly at this new position.

The entire core rotator assembly is held in position by two bolts in the flat base of the core rotator assembly. These bolts can be set in a choice of three pairs of holes in two rows, one above the other, for additional positioning of the core rotator assembly. By loosening and retightening these two bolts, the whole assembly can be adjusted left or right and forward and rearward about 5/8 of an inch for final positioning. The three rubber covered core rotators which drive the core can be moved up and down by loosening a cap screw embedded in the rubber. This cap screw tightens on the flat on the side of the vertical shafts. The ideal position of the coil to be wrapped is at the mid-height of the magazine.

TAPING HEAD

The **TAPING HEAD ATTACHMENT** for the **MODEL 900A** and **MODEL 920B** attaches to the machine console with just two 1/4-20 bolts. These are the furthest two bolt holes. (See Line Drawing P, Page 32– Hold down bolt hole positions) The **TAPING HEAD** operates with the existing controls on the basic machine. On the left vertical side of both the 900A and 920B, there is a guarded toggle switch which has two positions “UP” or “DOWN”. The “UP” position is for use with the TAPING HEAD ONLY. The “Down” position is for all coil winding operations. As the motor runs in reverse to operate the Taping Head, the Taping Head Switch in the “UP” position reverses the connections on the LOAD WIND or the REVERSE FORWARD SWITCH so that in the FORWARD or WIND POSITION the tape magazine operates in the normal “Top Coming” direction.

Put the **SELECTOR SWITCH (B18)** in the **BELT LOAD POSITION** for putting the initial Tape Load on the Shuttle which could be only a few turns of the shuttle. The Tape to be used should be in position and held between the rod and felt holding piece just to the rear of the scissors. Put the Tape towards the top of the front upper magazine roller and pass the tape through between any two tape rollers, preferably opposite the gate, because of the greater rigidity and strength there. To start the loading operation, hold the tape near the back side of the magazine and load to the stop. **CAUTION:** - Do not load too much tape initially. Each revolution of the shuttle is almost 2 feet of tape.

Switch to **BELT WIND POSITION ONE** Cut the tape with the attached scissors while holding the loose end, and start the machine again with the foot pedal or the start switch. The tape will pull out of your fingers and the taping will begin with a turn of tape for each turn of the tape magazine. The **TOGGLE SWITCH** should be in the “up” position and you will have core rotation in either direction determined by the rocker switch.

For inserting a core into the magazine, there is a swing out section hinged at the lower end. The swing out section leaves an opening a little larger than 3 inches. To open, use the special flat tool supplied or a screw driver. With the opening clear of the front two shuttle rollers, insert the small flat end between the steel block and the tape roller just above it. Lift up, and the gate will open. The steel block mentioned is at the upper end of the gate. Insert the core and close the gate by hand, being very careful not to pinch yourself between the hinging or closing parts.

The machine, with different magazines, will handle tapes from 3/8” (9.525mm) to 3/4” (20mm) wide, and will pass through toroid holes from 5/8” to 1”. The magazines will hold plastic tape up to 40 feet long, which should tape most coils. Diameters up to 7 inches can be taped, and with heights to 3 inches. The Heavy duty core rotators are normally used. The forward two rollers are driven and the rear rotators can be tensioned or swing completely out of the way for easy removal and insertion.

Taping magazines are friction driven by the back side of a one inch wide timing belt. They all have the same outside diameter and are tensioned against the timing belt by the closing pressure of the top front roller. Changing of the shuttles is made by raising the top front drive roller and lowering the bottom front roller. An unusual feature used on this taper is the mechanism for controlling the loop of tape as it comes “over the top” during half of each revolution. This loosening causes the slippery tape to loosen considerably and then try to re-tighten itself on the next magazine revolution leaving an uneven wrap.

The solution to this problem is to use two mohair covered pads on each side of the tape edges which supplies just enough pressure on the tape edges to control the loop right up to where it is deposited on the toroid. The two pads are adjustable forwards and backwards and from side to side to adapt to any width tape and toroid diameter up to 7 inches O.D. There is a very noticeable difference in the layering when using and not using this mechanism.

TAPE DESPOOLER

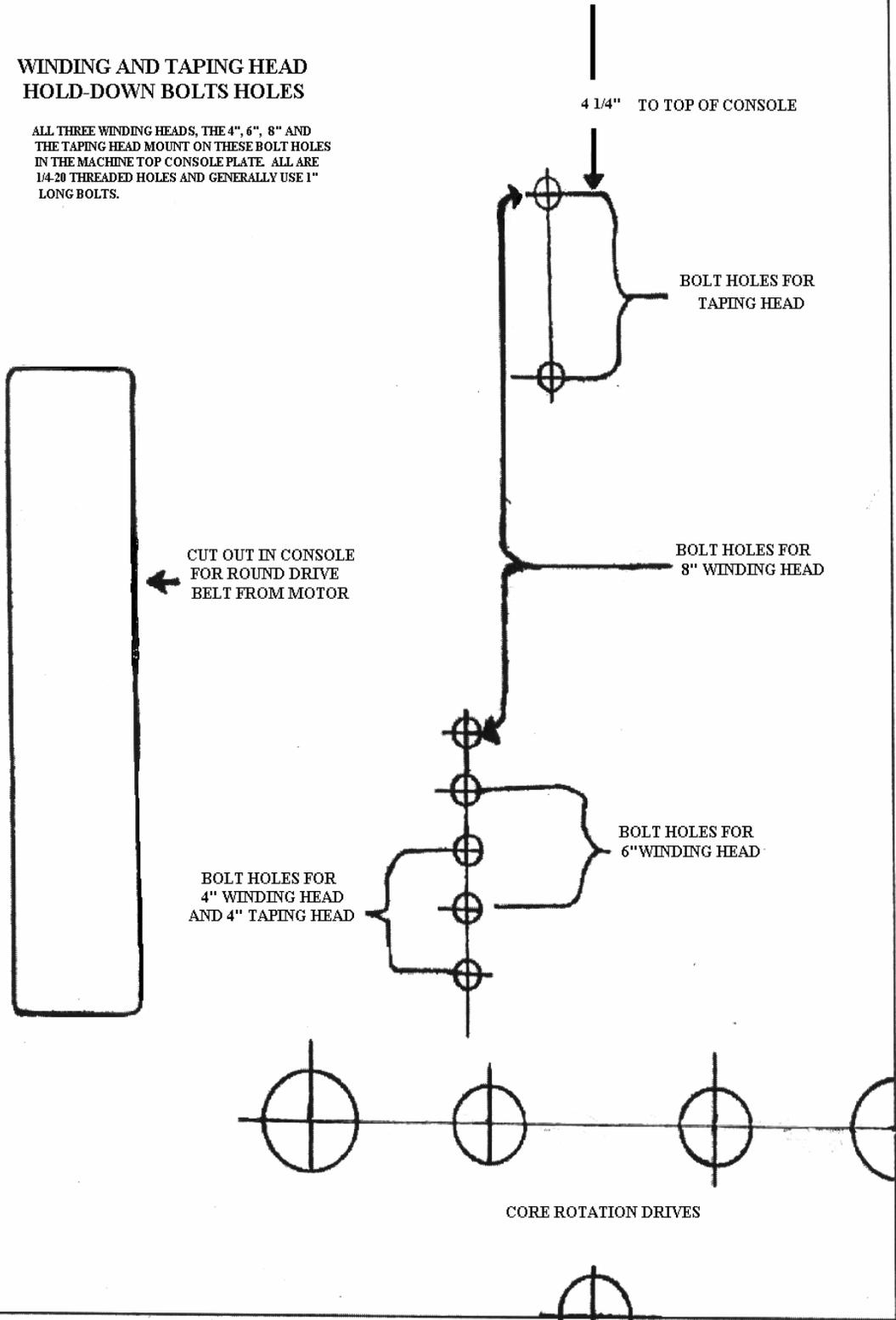
The Gorman **TAPE DESPOOLER** is an open-top tape spool holder, which sits behind the machine on its “T” BAR with rubber feet. The front is supported by a chin like shape on the front which rests on the rear upper surface of the machine and is aligned with the magazine of the **TAPING HEAD**.

The tape does not have to be mounted on a spindle with a brake attachment. The tape is quickly lowered into place between the steel plate and the clear plastic plate, both of which are the vertical sides of the hopper.

No brake is needed as the roll of tape sits on itself and is self-braking. The tape is pulled off the roll with the tape coming up vertically along the inside of the side of the hopper nearest the winding machine. The tape is passed out from the hopper between a felt pad at the exit point and goes directly to the felt holding pad described above behind the scissors on the head.

**WINDING AND TAPING HEAD
HOLD-DOWN BOLTS HOLES**

ALL THREE WINDING HEADS, THE 4", 6", 8" AND THE TAPING HEAD MOUNT ON THESE BOLT HOLES IN THE MACHINE TOP CONSOLE PLATE. ALL ARE 1/4-20 THREADED HOLES AND GENERALLY USE 1" LONG BOLTS.



LINE DRAWING P

HOLD DOWN BOLT HOLES

TAPING HEAD SWITCH

When the machine is in the **LOAD POSITION**, the core rotation is normally electrically disconnected to prevent coil movement when loading for a second winding.

There is a **TAPING ATTACHMENT** for this machine, which always operates with the motor in the **REVERSE** or "**LOAD**" position. For this special case, the core rotation has to be activated when in **REVERSE**. For this purpose, there is a toggle switch on the left vertical side of the chassis. Put this switch in the "**UP**" position when using the Taping Attachment for core rotation. The normal position in all other cases when not using the Taping Head is in the "**DOWN**" position.

INDEX PHOTO Q – 900A

1. **Motor Brushes (Check every 6 months) Original length 5/8"**
2. **12584 Permanent magnet motor**
3. **Timing Belt 190XL037**
4. **Zero-Max Transmission E-2**
5. **Reed Switch DRR-1 (see note below)**
6. **Relay KUP14A15 (see Relay Index and schematic Relay 6)**
7. **Relay KUP14A15 (see Relay Index and schematic Relay 5)**
8. **Relay KUP14A15 (see Relay Index and schematic Relay 1)**
9. **Relay KUP11D15 (see Relay Index and schematic Relay 4)**
10. **Relay KUP14A15 (see Relay Index and schematic Relay 3)**
11. **Electric Clutches**
12. **Motor Control KBIC125**
13. **Clutch Voltage Bridge 35MB6A**
14. **Core Rotation Jog Relay KRPA11AG (See Relay Index and schematic Relay 7)**
15. **Motor Start DILR22 with extension 22DL (See Relay Index and Schematic Relay 2)**
16. **Timing Belt 150XL037**
17. **Timing Belt 285L050**
18. **Von Weiss Gear Motor for Core Jog**
19. **Formsprag Clutch**
20. **Timing Belt 160XL037**
21. **Timing Belt 180XL037 (do not over tighten)**

RELAY INDEX (see schematic)

RELAY 1 - KUP14A15	Selects load wind pots and load wind presets.
RELAY 2 - DILR22	Energizes motor, provides holding contact for start.
RELAY 3 - KUP14A15	Foot pedal relay, switches P1 and P2 from motor control.
RELAY 4 - KUP11D15	Stops armature relay from latching when foot pedal is used.
RELAY 5 - KUP14A15	Selects load wind relay, reed switch or proximity pick-up for counter.
RELAY 6 - KUP14A15	Selects core rotation for sector winding in conjunction with right and left micro switches.
RELAY 7 - KRPA11AG	Powers up jog motor for core rotation jog.

REED SWITCH There are two magnets which operate the reed switch. The nearest side of the glass reed switch should be 3/16 of an inch away from the faces of each of the magnets as they rotate by the reed switch. Each magnet will have an opposite polarity as it goes by the reed and the poles of each magnet should be aligned with the length of the reed switch. The center of the reed switch should be centered with the two poles. The flats of the two blades inside the reed should be flat with the faces of the magnet.