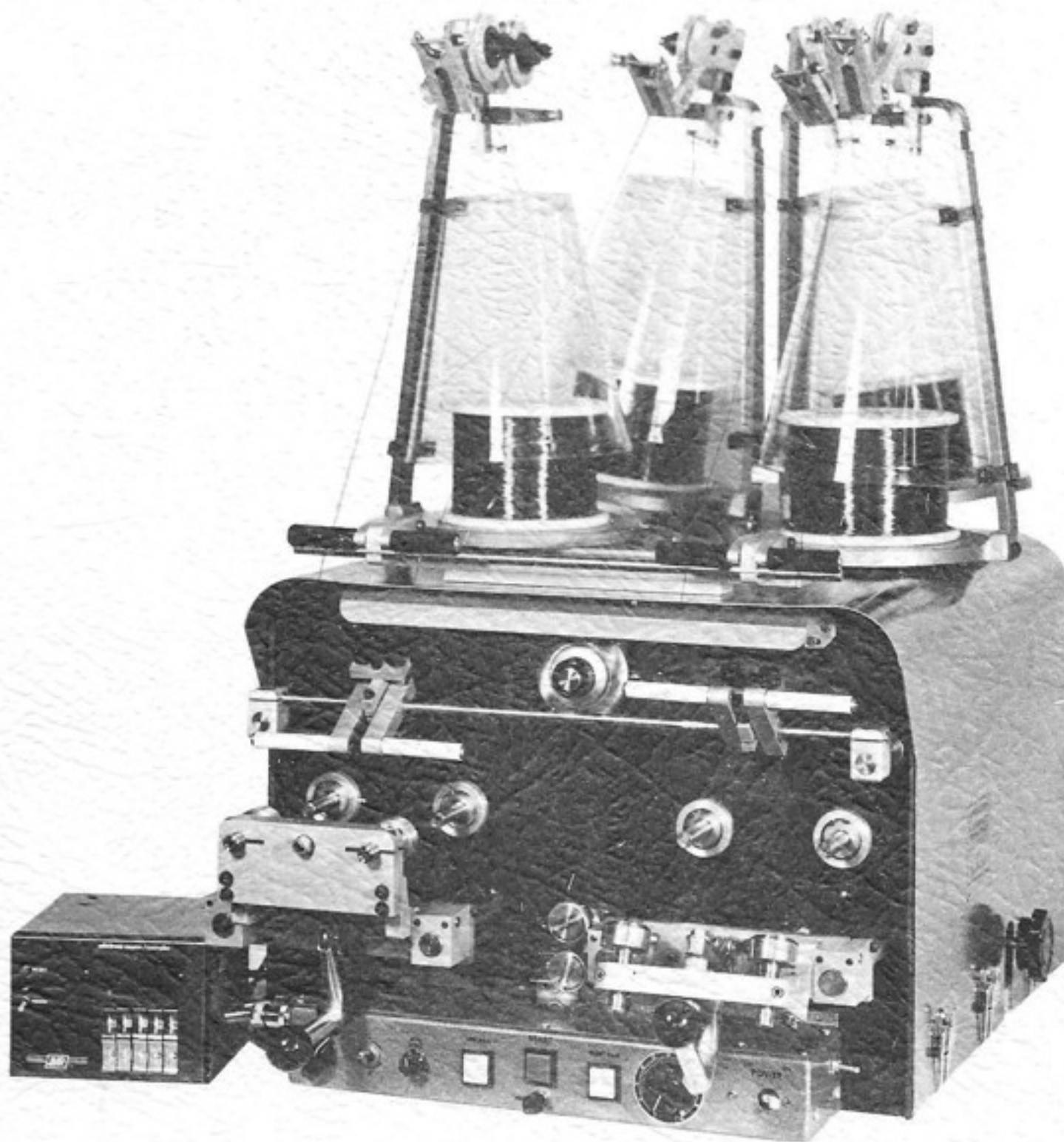




OPERATING INSTRUCTIONS

2 + 2 BOBBIN WINDER



GORMAN

WIRE WINDING MACHINES

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WESTERN SALES & SERVICE

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INTRODUCTION

The two plus two bobbin winder is an easy to set up production winding machine. It was designed to utilize fully the time of the operator and minimize waiting time while a coil is being wound, or eliminate tying up an expensive machine by using a spindle as a work station for attaching leads or taping, etc.

Basically, the machine is like four single spindle machines in one, or better, two pairs of single spindle machines run by one operator where the left pair is started together while the stopped right pair is being used for finishing and preparatory operations so as to be ready to go when the left pair is finished winding.

If the winding time of one pair can be balanced so that its time equals the finishing and preparatory time of the other pair, there is virtually no "down time" at all for the machine as a whole. One electronic counter is shared by both pairs which is a further saving in initial cost and maintenance.

There is a further "PLUS" for the machine in that all four spindles can be engaged so that all four spindles operate together. The advantage of this arrangement is that when the winding time is quite long, as when winding bobbins with a very high turns count, there is sufficient time for the operator to remove and start four more bobbins on another machine, giving more production than the two plus two arrangement.

Many companies using the two plus two machine have experienced considerable savings over multiple winding of bobbins on a single spindle machine. There are several reasons for this. When multiple winding on an arbor, on a single spindle machine, there is a cumulative error in stacking due to manufacturing tolerances of the bobbins and variations in end clamping. As the bobbins are stacked up further and further away from the spindle flange, the layering becomes less and less consistent.

In the case of the two plus two, each bobbin has its own individual stop. There is room to tape down taps, if any, and there is no lost time in assembling the stack with its bulky spacers all in their proper order.

MACHINE WARRANTY

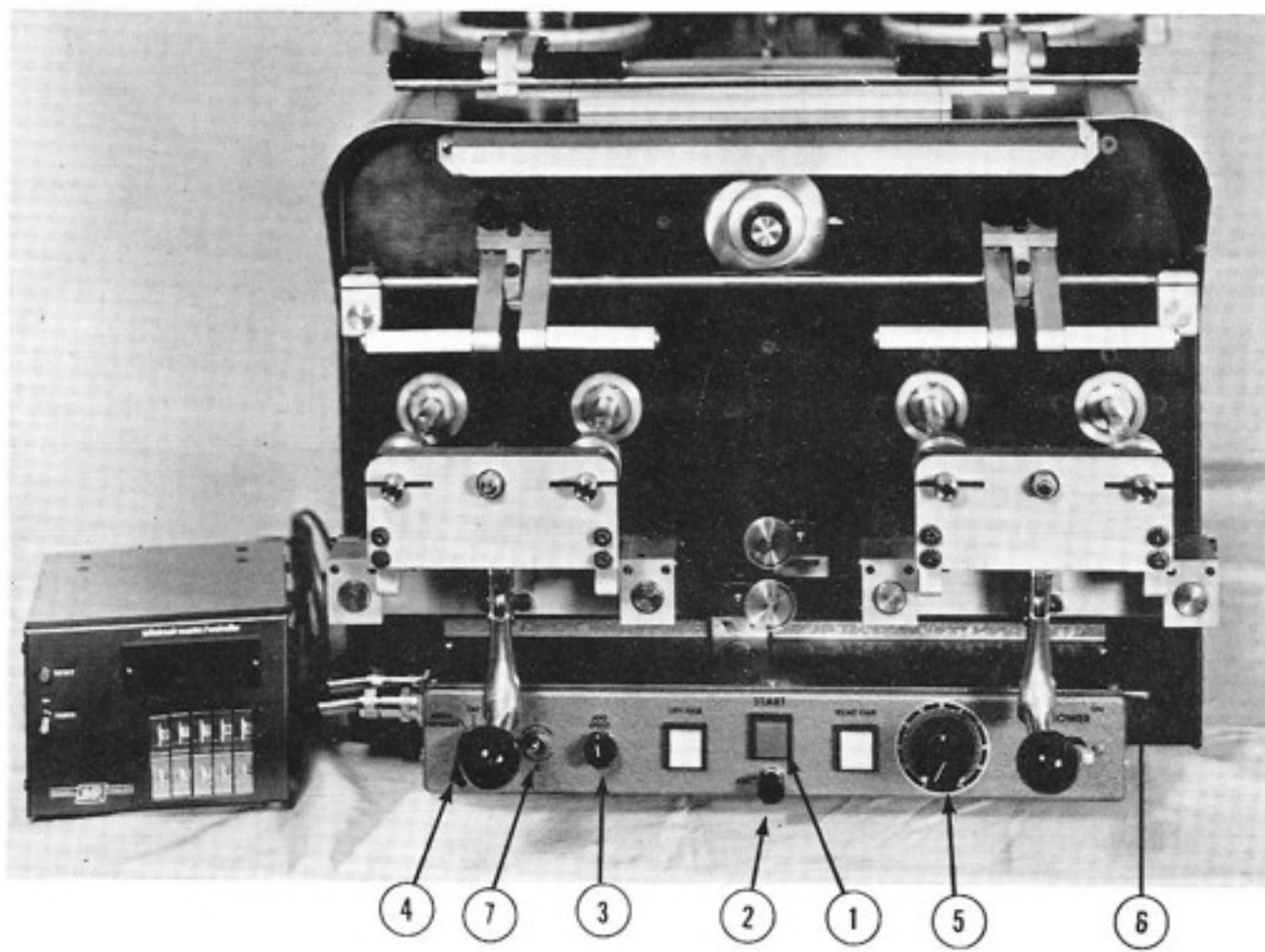
Gorman machines are covered by a six month warranty, the terms of which are stated below.

Gorman machines, and components thereof, except electronic counters are warranted 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 90 days on labor if machine is shipped prepaid to and from the factory. Electronic counter is warranted by the manufacturer.

Misuse and abuse of the equipment, or unauthorized repair will void this warranty and our obligation to provide no-charge services. Gorman Machine Corporation is not liable for consequential damages.

SETTING UP THE MACHINE

When the machine arrives, it will be ready for operation. All you need to do is remove it from the packing case and then attach the dereeler unit to the top of the cover. The electronic counter plugs into the left side of the control console with two plugs. Plug the machine and counter into grounded 115 v AC power outlet and it is ready to run.



CONTROLS AND OPERATION

PHOTO B

Operation of the 2 plus 2 machine is very simple. All the operator controls are conveniently located on the front panel and all are plainly labeled. The power on-off switch is at right -- and next to it is the main motor speed control -- in the center area are three square buttons for resetting the counter and starting the machine. Pressing the left square button resets the counter and engages the left pair of spindles for operation when the center green start button is pressed. Pressing the right square white button would prepare the right pair of spindles for operation.

Just below the Green start button B1 is a jog button B2 with its separate speed control knob B3. When the counter is reset and the start button is pressed, the machine will go through its complete cycle. The cycle is as follows: Start and wind at high speed until the slow-down signal is reached. The machine will slow down to its finish speed or jog speed until the finish count is reached and then be braked to a stop. The wire guides will then move forward or back to the limit-switch-stops automatically. This completes a cycle. To restart the cycle, just press the proper white button which resets the counter and then the green button for start. To stop the machine at any time, momentarily touch the jog button B2 and the machine will instantly stop. At any time, before, during, or after the cycle, the machine can be operated by pressing the jog button. The jog speed is set by the small plastic control knob B3 labeled JOG SPEED. Just to the left of the Jog speed control knob, is a toggle switch which has an "up" position for CCW rotation and a "down" position for CW rotation of the motor spindles. There is also a "center-off" position which would remove all power from the motors. It was put there for safety reasons. The machine should never be left there in this center position. Never switch the machine spindles from one direction to the other until the machine has come to a complete stop.

At the extreme left of the panel is a three position switch labeled INDEX FORWARD, TAP, or INDEX REAR (B4). When set at the INDEX FORWARD position, the wire guide will traverse forward after completion of the cycle. In the INDEX REAR position, the guide will travel to the rear position determined by the rear limit stop. When in the center TAP position, the machine will stop and the wire guide will remain where it is, but it will remember which way it was going when the machine stopped. This feature allows taps to be pulled out and the coil restarted without any double buildup at either end.

For set-up purposes, two large knobs (E5 Page 7) are provided at either side of the machine directly connected to the traverse mechanism to enable the operator to mechanically set or test the limit stops of the machine.

SPINDLES

The two plus two machine has four half inch diameter spindles facing the operator. The left pair are connected by a timing belt and operate as a unit the same as the right pair. To operate the left pair, press the left white button which resets the counter and engages this pair, and then press the center green button to start. When the green button is pressed, a slow start circuit is engaged, and when the green button is released, the machine will go into the desired speed for winding as is set by the speed control B5. The right pair is engaged by pressing the right white button and then the green start button. A jog button is provided just below the center green button with its own speed control knob B3.

If all four spindles are to be operated together, there is a toggle switch B6 on the right side of the control console for engaging them. In this case, press either white button to reset the counter and then press the center green start button.

The direction of spindle rotation is determined by switch B7 for clockwise or counter-clockwise rotation.

When all four spindles are operated in unison, there is a further bonus in that you can get the four spindles to stop in the same position each time, say with all the terminals in an upright position. This is done by running through one cycle, making sure that the machine has reached its full slow-down speed before stopping. The spindles can end up in any position the first time, but all will be the same if they were started in the same relative positions. Before touching the spindles, turn the power switch to the "off" position. Now rotate the left and right pairs of spindles to the desired position, and again turn on the power switch. As long as the power switch is left "on" and no other setting is changed, the four spindles will now end up in this same position for all subsequent coils wound. If the power is shut off, repeat the same procedure, but it only takes a moment. This only works when all four spindles are engaged to run together.

COUNTERS

The 2 plus 2 machine comes equipped with a dual presetting 4 or 5 digit electronic counter which is shared between the left and right pairs of spindles. When the left pair is to be operated, first press the left white button which resets the counter and then press the center green button for start. For the right pair, press the right white button first. When all four spindles are to be operated together, the counter is reset by pressing either white button before starting.

In order to prevent over-run of turns count, for each preset count, there is a pre-signal count at a lower number which activates a slower speed in the machine set by the jog speed control knob. The machine will operate at the full dial-set speed until the pre-signal is reached. At this point, which can be from a few counts up to two hundred counts before final count, the machine will coast down to jog speed until the final preset count has been reached and the machine will stop.

In the case of the JMR counter shown in the photos, there is a digital readout for the count, and below are two sets of thumb wheels. The lower is for the pre-signal to start the slow-down and the other, set at a higher number, will stop the machine at final count, with the machine running at jog speed. A Photo cell type pick-up is used with the JMR counter.

The counter has two cables and plugs attached which plug into the left side of the control panel. Each has a different number of pins.

Resetting of the counter can be done by a lever on the counter or by pushing either of the square white buttons on the panel.

WIRE GUIDES

Each of the four spindles has its own separate wire guide rod C1. Although all four move forward and back together by the same mechanism, each are separately adjustable by turning the black plastic knobs arranged in pairs C2. The adjustment is limited and intended to accommodate only small variations in tooling and set up. If the limit of adjustment is reached, loosen the cap screw C3 just below and between the plastic knobs and readjust the assembly. The whole wire guide assembly should be set at approximately a 45 degree angle with the horizontal. The individual guide arms are free to be lifted up and out of the way (cover photo) if desired when the coils are completed, to facilitate additional operations. If these arms become too loose, there is a provision for tightening them. At the upper end of each square aluminum arm is a tapped hole holding a 1/4-20 set screw pressing on small pieces of leather which bind on the horizontal rod on which they pivot. There is also a provision for tensioning the threads beneath the adjusting plastic knobs. This is a similar arrangement of a set screw on leather. The long horizontal bar which holds all four guides can be positioned at either end by loosening the one cap screw in each end block. The two end blocks can be positioned in two positions. As shown in photo C, the blocks are shown in the upper position which would be used for larger diameter coils where more clearance is needed. You can see that the horizontal bar across the front is above the larger shafts extending into the machine at both ends. To reverse this position, loosen the cap screws which secure the end blocks to the larger shafts. Slide the blocks forward simultaneously, trying to avoid binding until they are free. Loosen the clamping screws which clamp the horizontal rod at both ends and remove the blocks. Turn the blocks upside-down and re-assemble before putting them back on the larger shafts.

Re-set the angle of the two assemblies so that they are parallel and at about a 45 degree angle again.

The wires from the four dereelers are held in a position convenient for the operator by passing the wire ends under the two felt rollers contacting the bar on top of the cover C4.

TAIL STOCKS

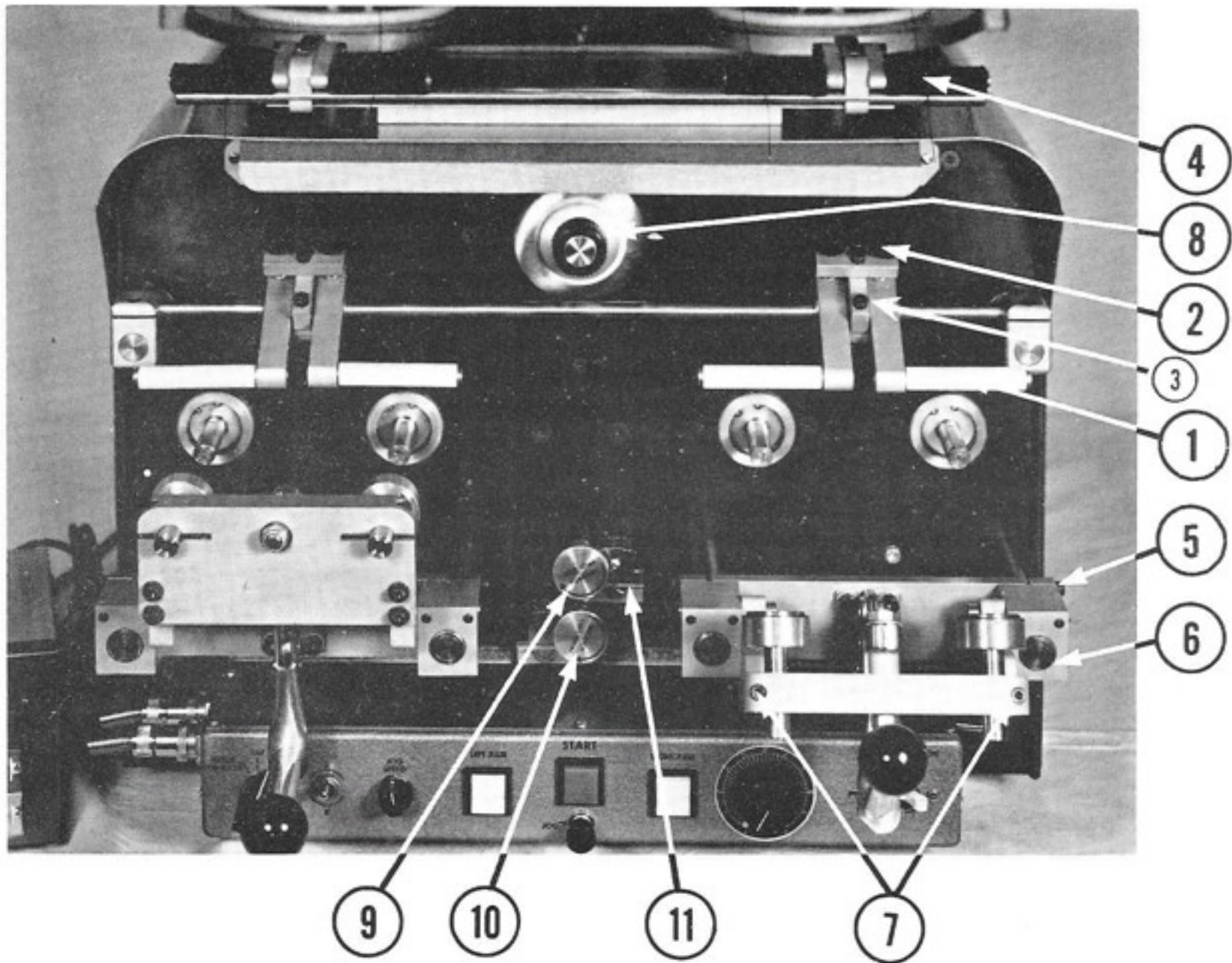
Toggle-action dual tail stocks are provided as an option for the 2 plus 2 machine where bobbin flange support is required. The dual tail stocks are clamped on four steel rods projecting from the front of the machine.

These four rods are adjustable forwards and back by an internal adjustment inside the machine. The clamp assemblies are also adjustable on the steel rods by clamping screws C5 on either side of blocks C6.

The toggle action swings the tail stocks completely out of the way for easy access to the bobbin for further finishing operations. It also allows extra long bobbins to be slid over long mounting mandrels for winding.

The two ball bearings in the tail stocks are deep-groove bearings designed to take thrust and are adjustable forward and back by loosening clamping screws C7. For best results, the front surface of the bearing mounted tail stocks should be directly over the pivot point of the assembly. With the bobbins on their mandrels, just slide the whole assembly forwards until either side touches a bobbin. Clamp the assembly by screws C5 and then adjust the bearing mounted flange supports until both are touching lightly, and then re-tighten screws C7. Do not clamp bobbins too tightly, as pressure can build up rapidly during winding and in time cause a premature bearing failure.

TRAVERSE AND TRAVERSE LIMIT STOPS



The two limit-stop control knobs C9 & 10 are located on the lower center of the face of the machine, and each has its own revolution counter C11 connected to its shaft. The revolution counters can count from 0000 up to 4000, looking at the last four digits on the right which gives you a reading in inches and thousandths of an inch traverse. If the rear stop was set at 0000 and the lower front stop was reading 2500, the total traverse would be 2 and $\frac{1}{2}$ inches. If the rear stop were set at 0250 and the front stop at 2750, the traverse would be exactly the same but both limits have been moved forward .250 inches or a quarter of an inch. Just subtract the low number from the higher number and you can repeat the traverse distance to a thousandths of an inch. The upper knob controls the rear stop position, and the lower knob controls the front limit stop. Each is connected to a threaded rod and turning either knob clockwise will bring its stop forwards towards the operator.

The two large knobs (E5 Page 7) on the sides of the machine are directly connected to the traverse mechanism and aid in setting up the traverse settings.



PHOTO D

DEREELERS

The dereeler assembly on the 2 plus 2 machine is an assembly of four separate dereelers which attaches onto the top of the machine cover. The front two which are further apart supply the outside two spindles and the rear two supply the two center spindles. The wire in each case goes directly from the foremost felt clamp on the dereelers D1 directly to and beneath the rolled felt pad mounted on the front of the machine cover C4, and from there over the white ceramic guide bars C1 which guide the layering of the wire onto the coil form.

When the wire is cut to remove the finished coil, cut the wire between the coil and the felt roll, which leaves a remaining piece of wire protruding for ease of grasping when starting the next coil.

LOADING THE WIRE

The 2 plus 2 dereelers can be used for wires ranging from 22 AWG to 50 AWG magnet wires.

1. Place the wire spool in the dereeler and lead the wire out the top of the plastic cone.
2. Thread the wire up through the wire guide D2 and up through the felt clamp directly above it D3.
3. Route the wire appropriately as follows: Directly up between the two pulleys as follows:
 - a) For heavy wire (22 to 28) wrap one or two turns around the rear pulley D4 with the rubber "O" ring and then over the top of the front pulley D5 with one or more turns around and then down through the front felt clamp D1 and out. Adjust the tensions of the two pulleys by knobs D6 as required, but never lock up a pulley so tightly, that it will not rotate.
 - b) For intermediate size wire (29 to 40 AWG) wrap one or two turns over the top and around the front pulley only and then down through the front felt clamp. In this case, the clamping pressure of the felt clamps becomes important, and they can be adjusted by turning the knurled nut on the handle of the clamp. Tension adjustment on the pulley is made by adjusting knurled nut D6. Again, never tighten so as to lock up the pulley.

- c) For fine wires up to 50 AWG, the felt pads alone supply enough tension. Again, pass the wire up between the two pulleys and directly through the red ceramic guide at top center D7. Then pass the wire over the top of the front pulley and through the front felt clamp. For the finest wires, remove the front pulley completely so that the wire does not even touch the front pulley when passing from the ceramic guide to the front felt clamp. When winding fine wires, using this tension, care must be taken to keep the felt clamps clean. Frequently, remove any accumulated dirt from the pads and shift the wire to slightly different locations in the pads.
4. Pass the wire from the front felt clamp on the dereeler directly to and under the felt roll at the front top of the machine so that the wire is always held there for easy finding.

MAINTENANCE

The 2 plus 2 Winder is designed to operate trouble free over long periods of time. There are no regular lubricating requirements since bearings are of long life and self lubricating type.

Motor maintenance is reduced to checking the brushes every two months initially and less frequently as needed after this. Initial brush length is 5/8 of an inch.

While checking the brushes, check the brakes for proper operation by pushing the Jog Switch. Also look for belt wear and for any timing belt pulley looseness on the shafts.

Most of the machine's circuitry is in the form of plug-in modules at the rear of the unit for ease of maintenance. Page 8 explains in more detail.

Check the wire guides (1 photo C) for looseness which may develop in time. These can be retightened easily. Refer to Wire Guides, page 4. Dereeler felt pads should be cleaned frequently, especially when winding fine wire. Dirt from the wire collects at these pads where the wire passes through. A drop of oil on the moving parts of the tail stock (except the bearings) will prevent wear and hard action. Do not let chips of wire and other debris collect under the machine as it will be blown upward into the machine.

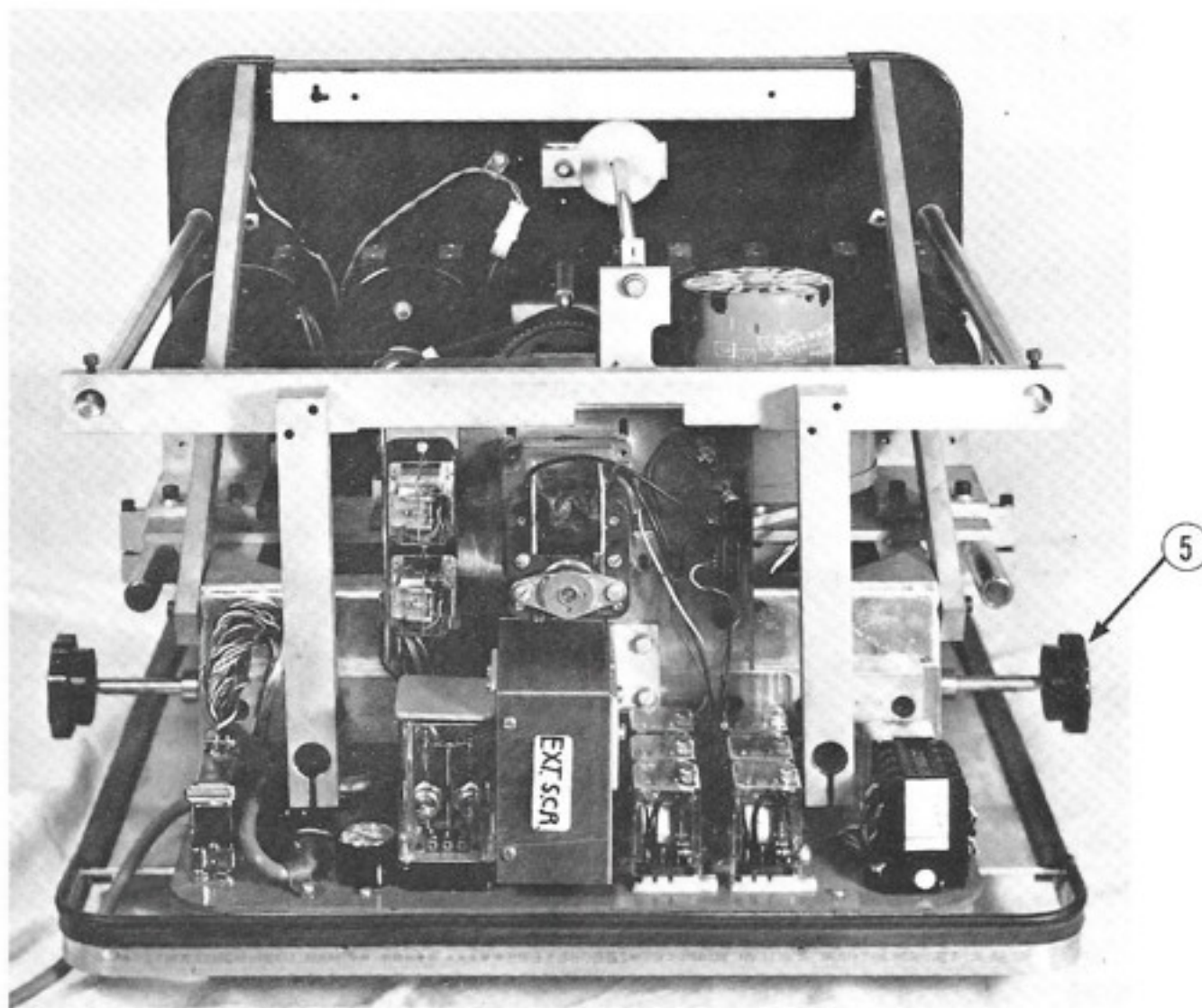
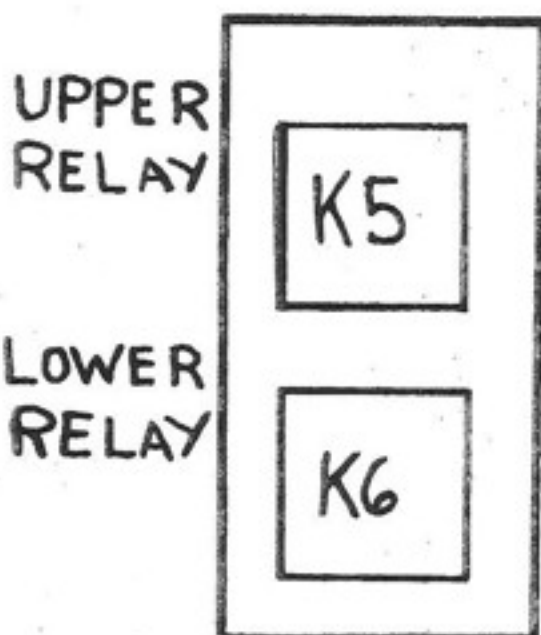


PHOTO E

ELECTRICAL COMPONENT TROUBLE SHOOTING

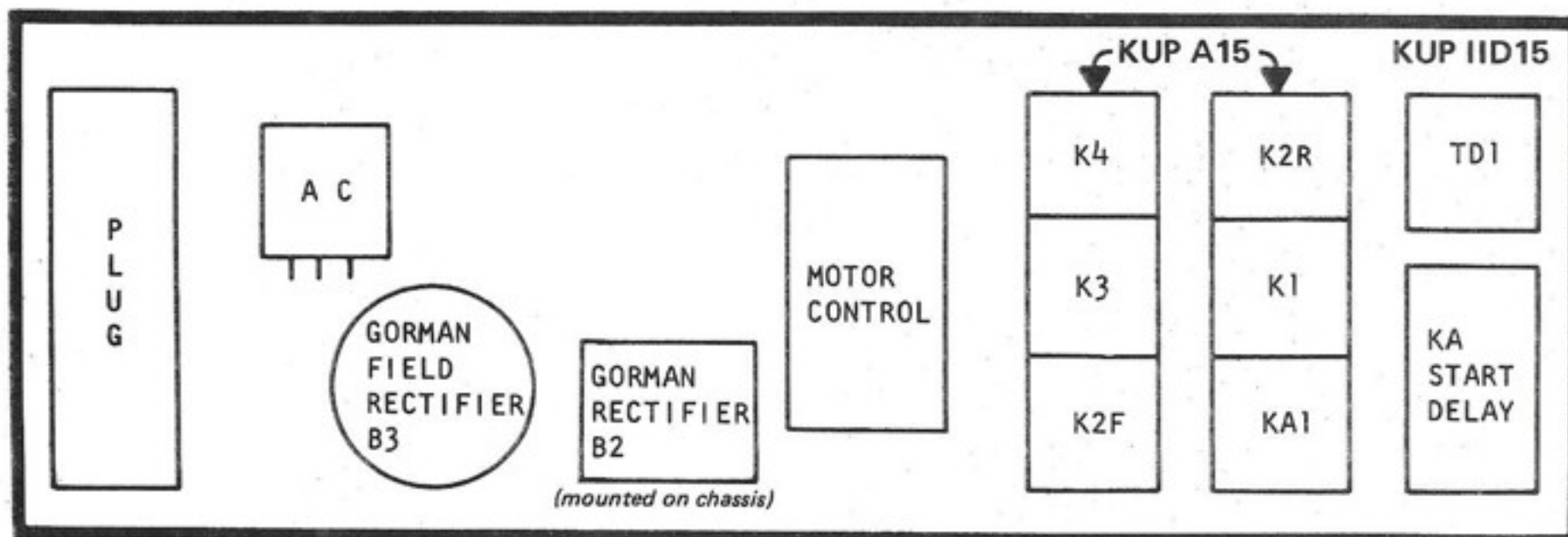
The 2 plus 2 bobbin winder will normally operate in a trouble free manner with a minimum of maintenance over long periods of time. However, electrical components, no matter how carefully selected for the job, do occasionally fail. The following paragraphs explain the various symptoms and where to find the malfunctioning component.

1. **LEFT PAIR WILL NOT RUN**
Check Relay K5 = Also Check Left Pair Selector Switch.
2. **RIGHT PAIR WILL NOT RUN**
Check Relay K6 - Also Check Right Pair Selector Switch.
3. **BOTH LEFT AND RIGHT PAIR WILL NOT RUN TOGETHER WHEN FUNCTION SWITCH (Photo B6) IS ENERGIZED ON RIGHT SIDE OF MACHINE - Check Switch itself.**
4. **MACHINE WILL COAST INSTEAD OF STOPPING INSTANTLY WHEN PRESENT COUNT IS REACHED**
Check Relay TD1 and also check Brake Adjustment.



5. **MACHINE DOES NOT TRAVERSE BUT MOTORS OPERATE NORMALLY**
Check Relay KA1 which brings power to both Traversing Clutches. (See also item 7).
6. **WINDER OPERATES ONLY AT MAXIMUM SPEED AND CANNOT BE SLOWED WITH HIGH SPEED CONTROL. ALSO IT WINDS AT MAXIMUM SPEED WITH JOG BUTTON.**
Check Motor Control S.C.R.
7. **OPERATES NORMALLY IN BOTH JOG AND HIGH SPEED BUT WILL NOT TRAVERSE**
Check Relays K2R and K2F. Also make sure Micro Switches are being actuated. Check that Tap Switch (Photo B4) is not between positions.
8. **MACHINE WILL NOT INDEX FORWARD OR REARWARD AT END OF COUNT AND SWITCH IS NOT AT "TAP" SETTING**
Check Relay K3 and that "Tap" Switch (Photo B4) is not between positions.
9. **MACHINE WILL NOT WIND AT ALL WITH START BUTTON BUT OPERATES NORMALLY WITH JOG BUTTON.**
Check Relay K4. Also check the Stop Contacts Inside Counter. They should close at end of cycle.
10. **WINDER WILL NOT OPERATE WHEN EITHER START OR JOG BUTTON IS USED, BUT ALL RELAYS SEEM TO OPERATE NORMALLY AND BRAKES ON BACK OF MOTORS BRIEFLY ENGAGE UPON PRESSING AND RELEASING JOG BUTTON.**
Check Spindle Reverse Switch (Photo B7). It should not be in center OFF position. Bridge B3 or B2 may be open. Check Motor Control. The Power Relay operates directly from the start or jog switch.

11. **IF CIRCUIT BREAKER KEEPS POPPING INSTANTLY.**
Check Rectifier Bridge B3, or for a short circuit anywhere. A continual overload will also actuate the breaker. In this case, a cooling off period is required.
12. **MACHINE WILL NOT RUN AT HIGH SPEED.**
Check Relay K1.



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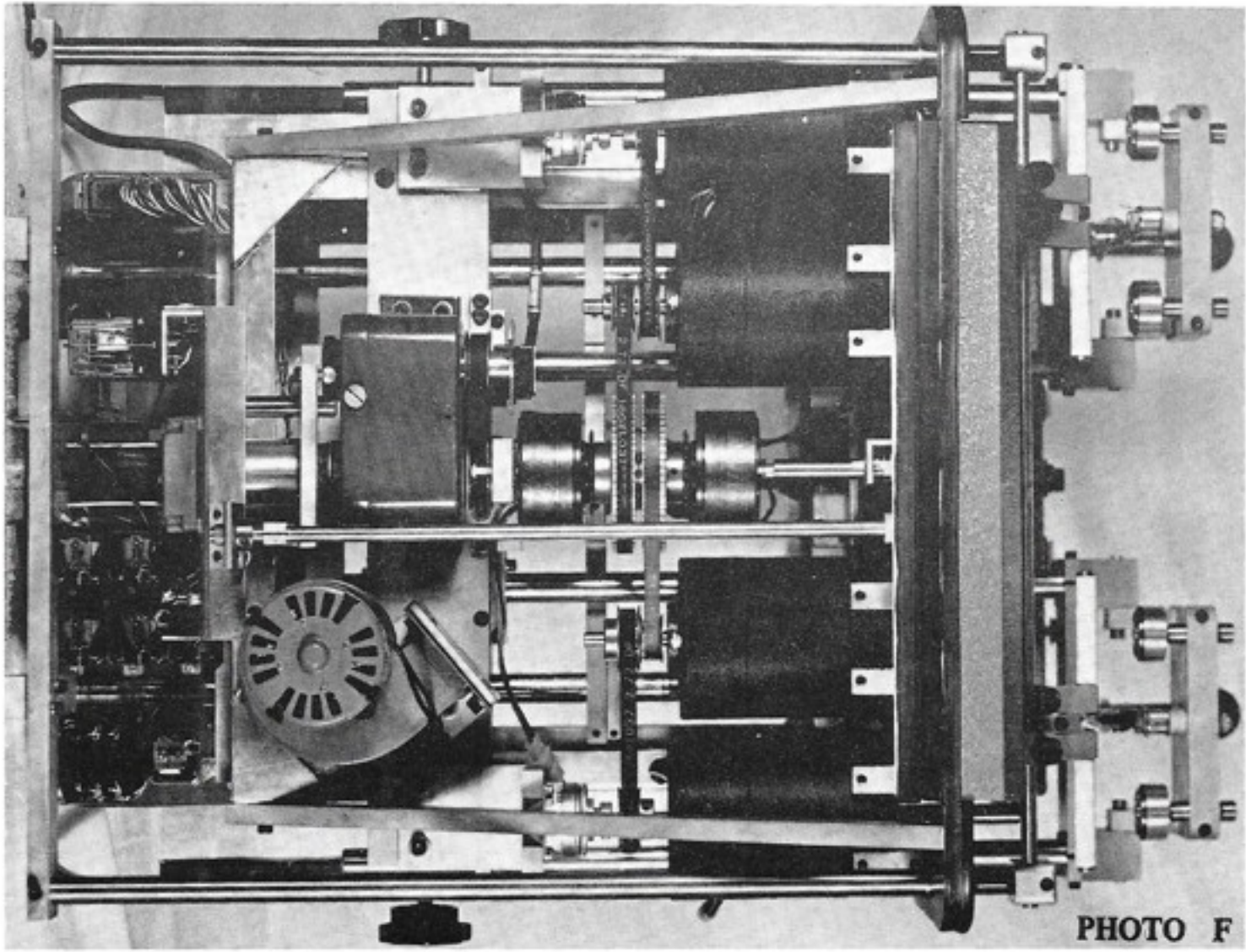


PHOTO F

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B

C

D

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F

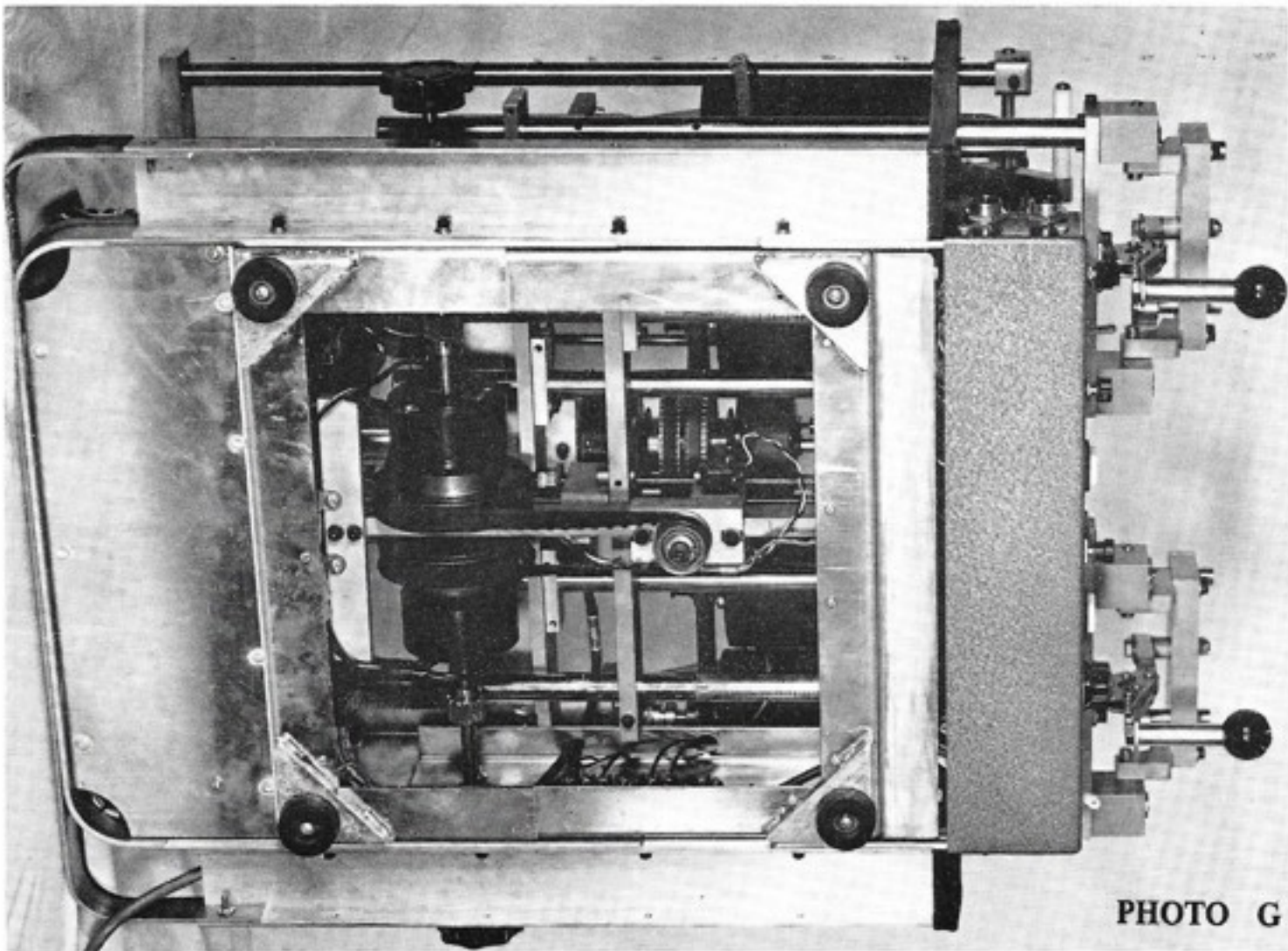


PHOTO G

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K

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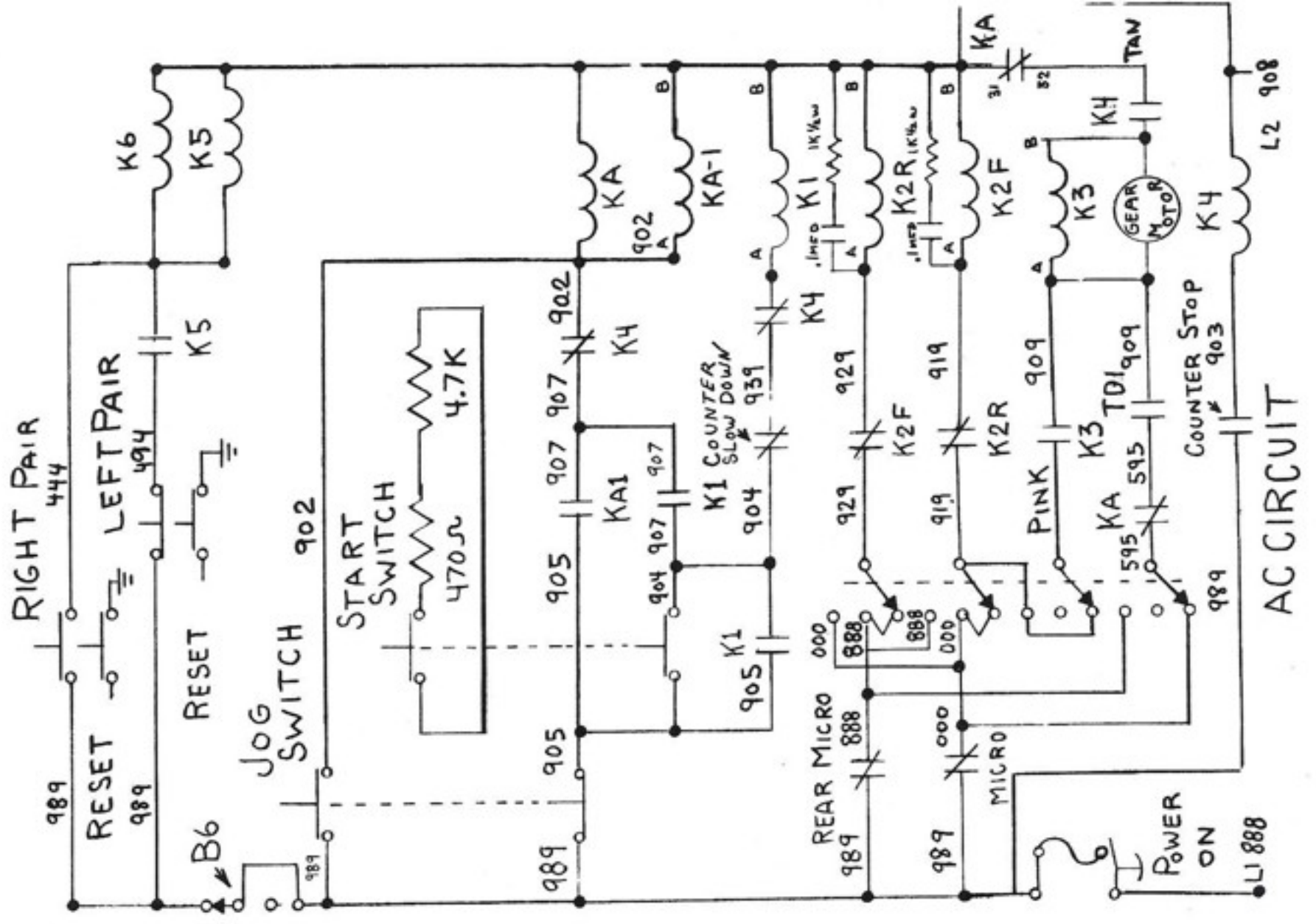
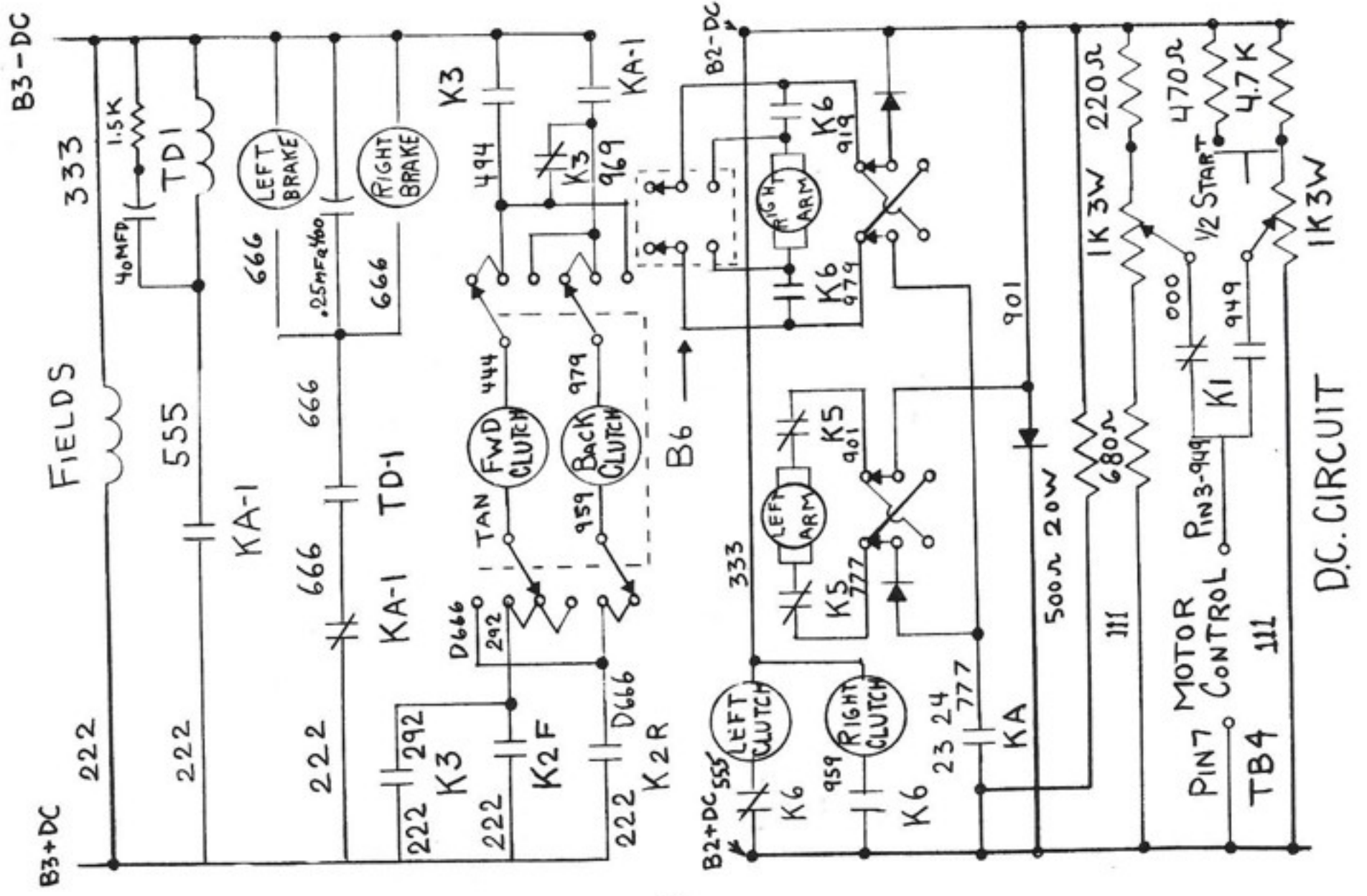
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GORMAN MACHINE CORP
 7 BURKE DRIVE
 BROCKTON, MA 02301
 TEL: 508-588-2900
 Fax: 508-588-9560

PARTS FOR THE 2 PLUS 2

BELTS:

Part#	Description	Ref#
B100X	Top Clutch to transmission	100XL037
B130X	Motor to idler	130XL037
B160X	Idler to top clutch	160XL037
B345L	Gear motor to clutches	345LO50

RELAYS:

AR400	AC Relay	KUP14A15
AR401	DC Relay	KUP11D15
AR414	Motor start power relay	DIL-R22 115VAC
AR429	Relay in Durant 5-2 Counter	38133202
FR420	High speed time delay relay	R10-E1-42V15

SWITCHES:

AS708	Toggle switch (Photo B6)	4P2T
AS730	Jog button (Photo B2) (stop switch)	116-P-CRD-4
AS732	CW/CCW Direction Switch (Photo B7)	4P3T, 7693K2
AS762	Circuit breaker	JA1-A3
BS760	Auto Index Forward/Reverse tap (Photo B4)	PA600
BS761	Micro Switch	BZ2RD
FS742	Start Switch (green cap) (Photo B1)	PL-1062-03
FS743	Left/Right Selector switch (White cap) (Also counter Reset)	PL-1062-05

ELECTRICAL:

AE318	Socket - foot pedal-6 pin	P1PC6F
AE319	Plug - foot pedal- 6 pin	91MC6M
AE331	Bridge-plug in	B3
AE336	Socket - counter - 4 pin	91PC4F
AE337	Plug - counter - 4 pin	91MC4M
AE423	Line Cord	
BE340	Back Panels - Wired (No plug ins or relays)	
BE341	Back Panels - Wired (With plug ins and relays, motor control)	
BE342	Clairex pick-up (photocell pickup)	CLI355
BE352	High Speed Control Potentiometer (Dual)	I.5-10 K
BE357	4 Pin Vane Sprocket used with pick-up	
BE369	Capacitor 50V 25MFD	
BE370	Capacitor 30 MFD or 40 MFD	
BE371	Clarostat potentiometer (JOG SPEED CONTROL 1K)	
BE372	Zener Diode	5227B
BE373	Transient Diode in B2 Bridge (takes 4)	40HF60
BE377	Transistor for motor control	2N1671
BE378	Transistor for inside motor control	2N697
BE379	Transformer	G29-104
FE360	32 pin back panel connector (Male)	26-4100-32P
FE361	32 pin back panel connector (Female)	26-4301-32S

(Cont'd)

Part#	Description	Ref#
ELECTRICAL (Cont'd)		
FE362	Fluorescent lamp fixture	Robert MR8
FE363	Fluorescent lamp	F8T5CW
FE364	Fluorescent starter	F8-5
 <u>CLUTCHES:</u>		
ACL280	Zero Max Transmission	E1
ACL281	Zero Max Transmission	E2
BCL253	Bottom Clutch-traverse with 90V Armature	C25SBEC22C66
BCL276	One Way Clutch-CCW	D93CRH
FCL259	Ball bearing clutch with armatures (Top)	SL26-18009
FCL260	Ball bearing clutch with armature, clutches & shaft assy.	
FCL261	Ball bearing clutch replacement shaft (Top)	
FCL266	2 Bottom Clutch Assemblies with shaft (Complete)	
 <u>COUNTERS:</u>		
AB132	Input board for counter	PB132
BC01	Cable set for counter	
BCD52	Durant 5 Digit, 2 Preset	58830403
FC200	Small mechanical counter (Right hand top going)	
 <u>DEREELERS:</u>		
AD430	Eyelet with steel shank (Photo D7)	EG430
AD703	Single dereeler assembly without base place	
AD705	Dereeler cones	
AD706	Extension Arms	
AD707	Dereeler Assembly (Top)	
AD709	1/4" Round Felt	
AD710	1/8" Round Felt	
AD711	Clamp With Felt (Photo D1)	
AD712	Felt for Clamp (1/2" X 9/16" X 1-5/8")	
AD713	"O" Ring (rubber-heavy)	2-136
AD714	Spring (Heavy Tension)	9A-11B
AD715	Spring (Light Tension)	8A-11A
AD716	Pigtail 5A2 or 92-6	
AD719	Pulley (Plastic wire tension) (Photo D4)	DWG9002
FD700	4 Spool Dereeler Assembly	
FD718	Brown rolled felts (Photo C4)	
FD725	Stainless Steel Shaft for Top Wire Guide	
 <u>MOTORS:</u>		
AM813	SCR	2N689
BM809	Gear Motor (Von Weiss)	VW1A60
BM812	Motor brake Complete with armature	75EC-17B-6
BM814	External Motor Control	

(Cont'd)

Part#	Description	Ref#
FM803	Permanent magnet DC motor	7136J
FM804	Idler or Dummy Motor - No brushes	4692
FM810	Fan & Blower motor complete (Dayton)	4C012-A
MB3	Brushes for DC Motor	

BALL BEARINGS:

BB161	Support Bearing for top clutch (2)	S3PPB5
BB902	Tailstock bearing	200KDDG

TAIL STOCK:

FTS900	Dual Tail Stock Assembly (Quick Acting)	
FTS901	Clamp	225TSS
FTS903	Round knob	D-6
FTS904	Adjustment Spring	06T10
FTS905	Disc	

PULLEYS:

BP10	Tension pulley (Modified)	10L050
FP12	Back of Transmission (Hub removed)	12L050
FP15	Idler Motors (3) Bored and Hub removed	15XL037
FP22	Idler & Motor (4) 3 Bored, 1 Hub removed	22XL037
FP24	Top clutch to transmission (2) Hubs removed	24XL037

WIRE GUIDES: (Photo C page 5)

FWG15	Smith Knobs (4)	2242
FWG16	Diomite Tubes (4)	500-125-25B890-2

TRAVERSE:

AMI581	Vernier dial assembly	AM6
FT955	Vernier dial knob (Photo C8)	PC900SK7R
FT956	Vernier dial plate	J490-3

MISCELLANEOUS:

AMI587	Machine Rubber Feet (each)	
AMI594	Dust Cover	
BM131	Gear Rack	L2020
BT354	Knob (traverse drive limit) (Photo C9/C10)	
FMI585	Machine side knobs (Photo E5)	4103M
FMI586	Split nylon bushings 7/8" (Photo-C10)	
SM825	Gear for rack	YA18
SM826	Fan Motor	
SM832	Fan Blade	