

Bally®

CIRCUS QUEEN

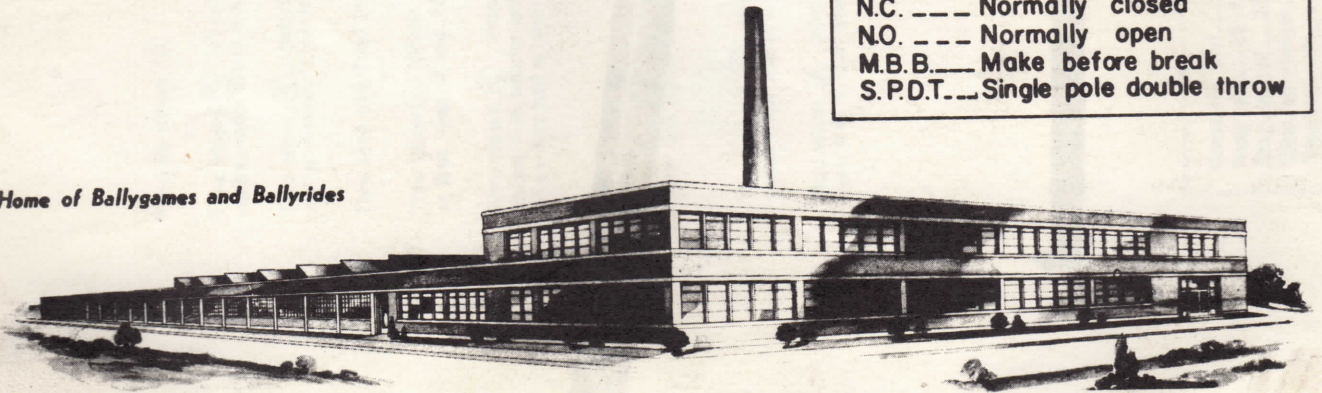
OPERATING INSTRUCTIONS AND PARTS CATALOG

Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on back cover.

**FOR QUICKEST SERVICE
STATE CORRECT PART NUMBER
WHEN ORDERING PARTS**

Code	
N.C. ---	Normally closed
N.O. ---	Normally open
M.B.B. ---	Make before break
S.P.D.T. ---	Single pole double throw

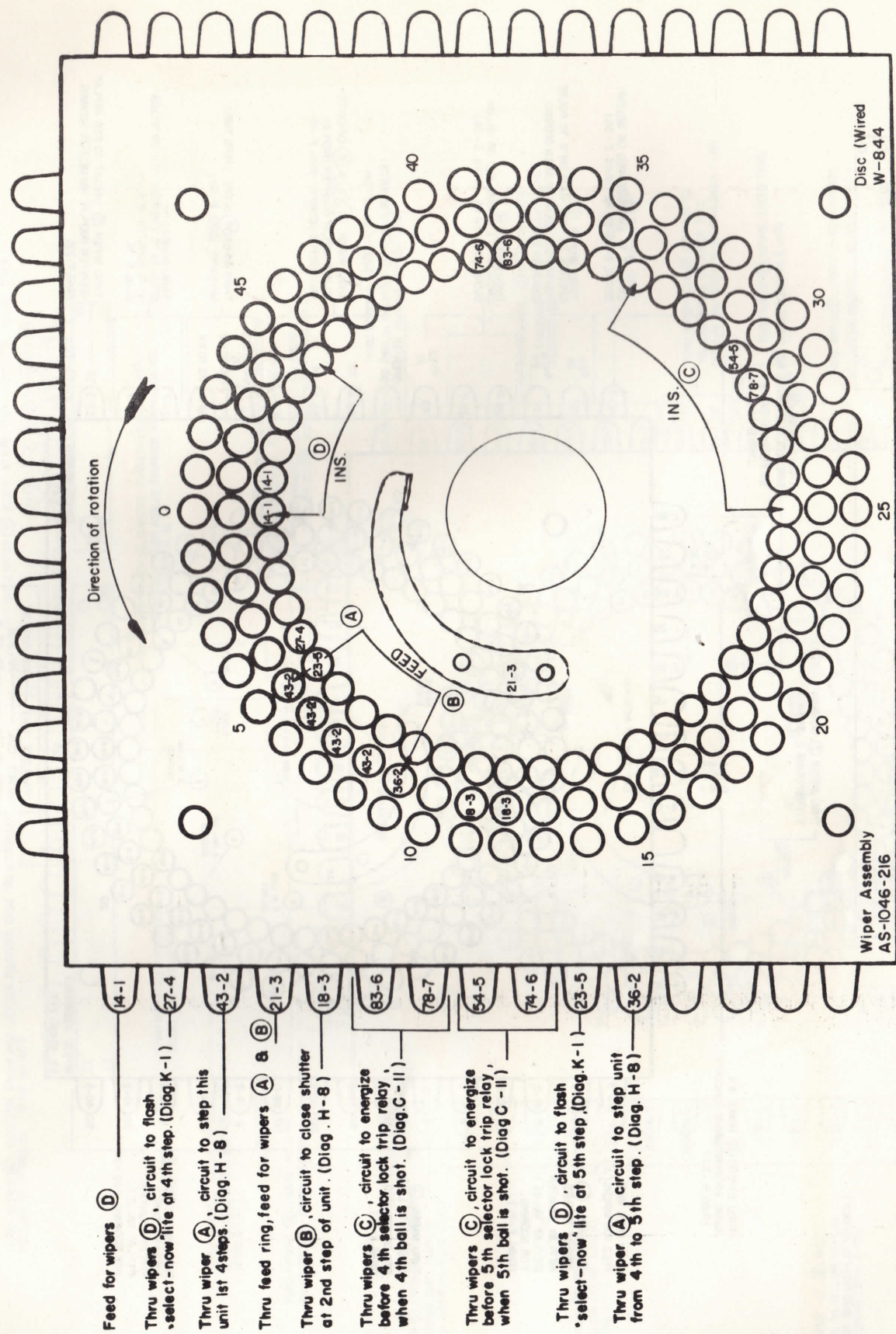
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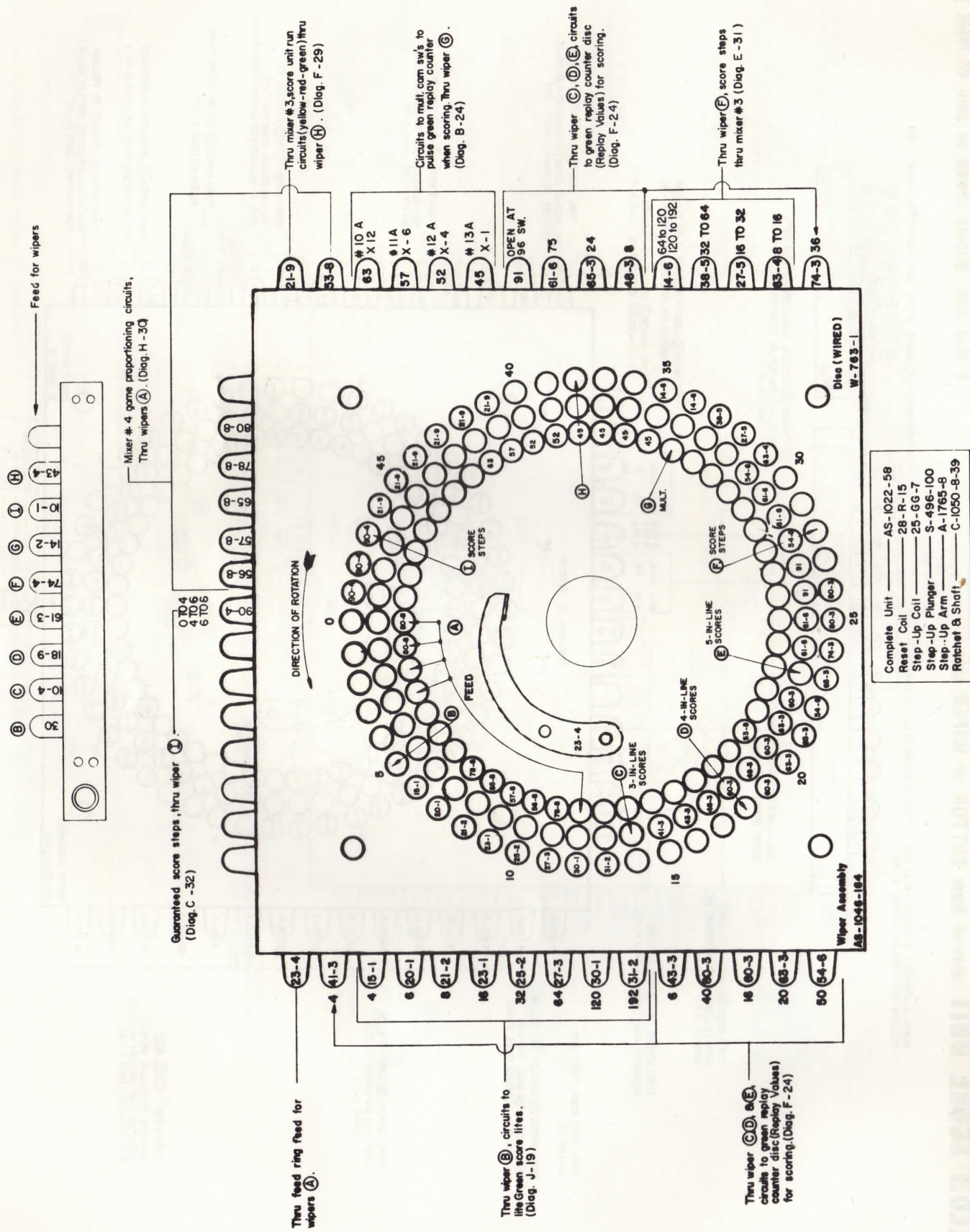


TIMER UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

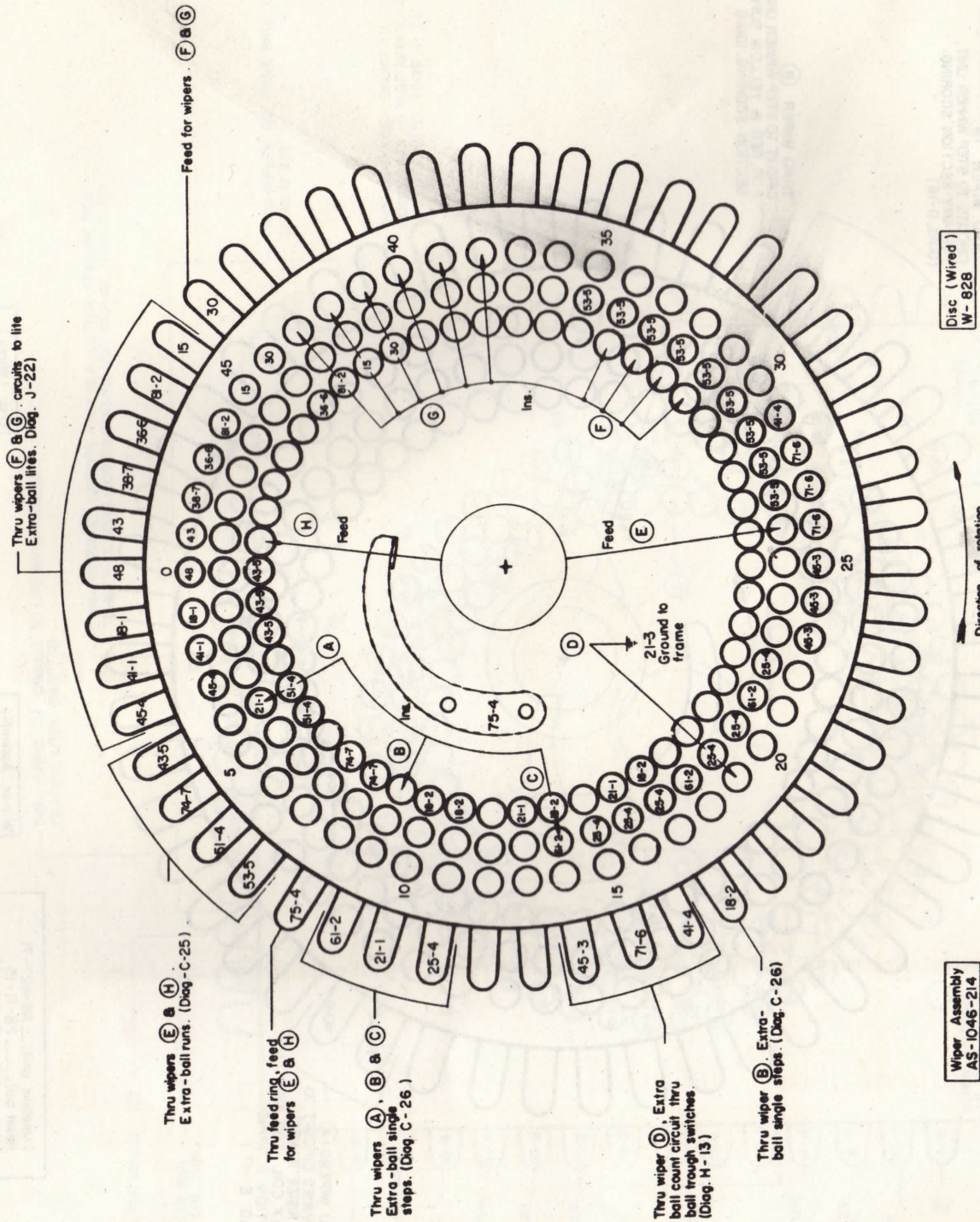


Complete unit... AS-110-29
 Reset coil... 28-R-15
 Step-up coil... 25-GG-7
 Step-up plunger... S-496-100
 Step-up arm... A-1765-4
 Ratchet & shaft... C-1050-8-43



EXTRA BALL UNIT viewed from BUTTON or WIPER side

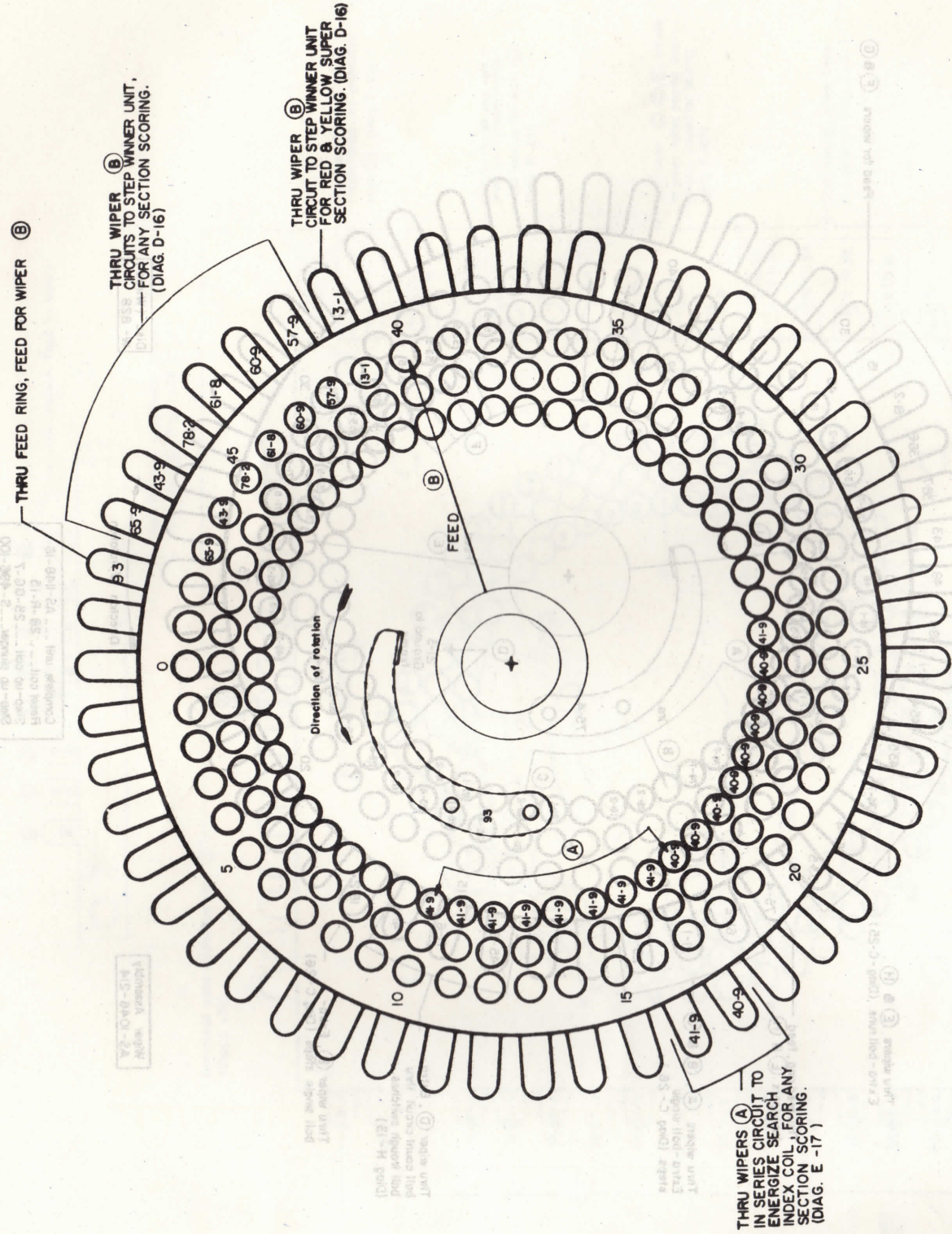
10 step unit. Wipers shown in zero or reset position



12 SEQUENCE UNIT

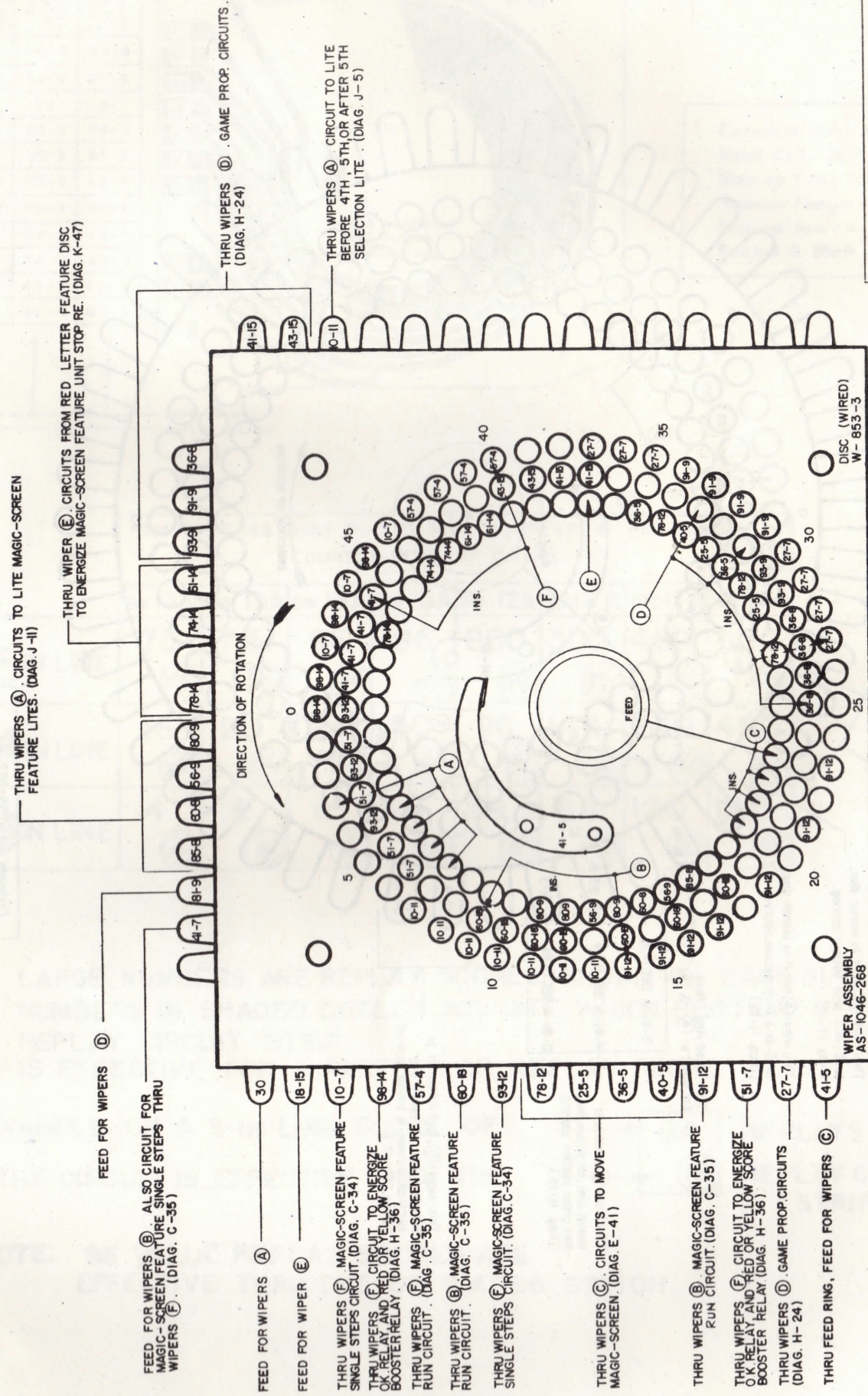
viewed from BUTTON or WIPER side

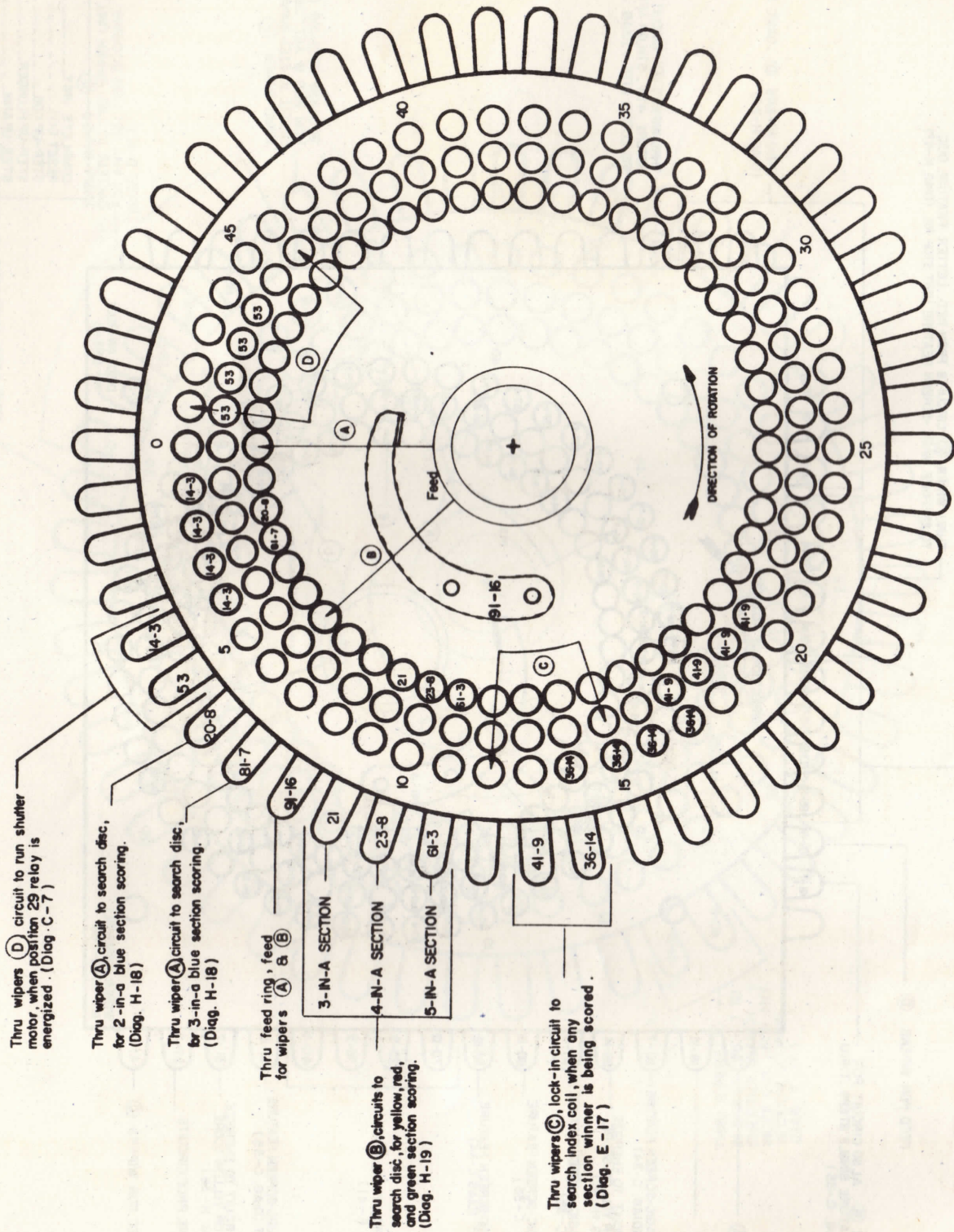
9 step unit. Wipers shown in zero or reset position



MAGIC SCREEN FEATURE UNIT viewed from BUTTON or WIPER side

12 step unit. Wipers shown in zero or reset position





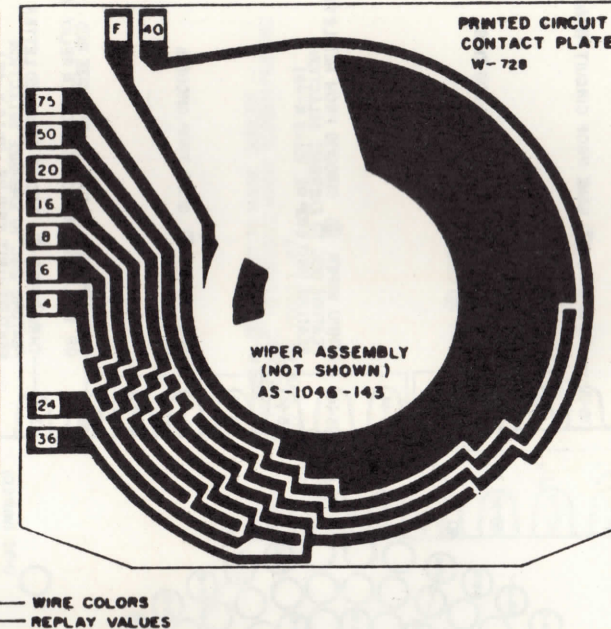
Complete unit - AS-827-94
Reset coil - 28-R-15
Step-up coil - 25-GG-7
Step-up arm - A-1765-4
Step-up plunger - S-496-100
Ratchet & shaft - C-100-5

Wiper Assembly
AS-1046-265

Disc (Wired)
W-846-1

REPLAY COUNTER viewed from WIPER side 3 used (see code box at left)

LUG	YELLOW REPLAY COUNTER	RED REPLAY COUNTER	GREEN REPLAY COUNTER
50	57-2	40-3	54-6
75	50-6	52-6	61-6
F	23	71	91
36	51-2	23-3	74-3
24	41-2	20-3	65-3
20	40-2	10-3	63-3
16	23-2	85-2	60-3
8	93-1	83-2	48-3
6	81-1	74-2	43-3
4	78-1	60-2	41-3
40	52-2	25-3	80-3



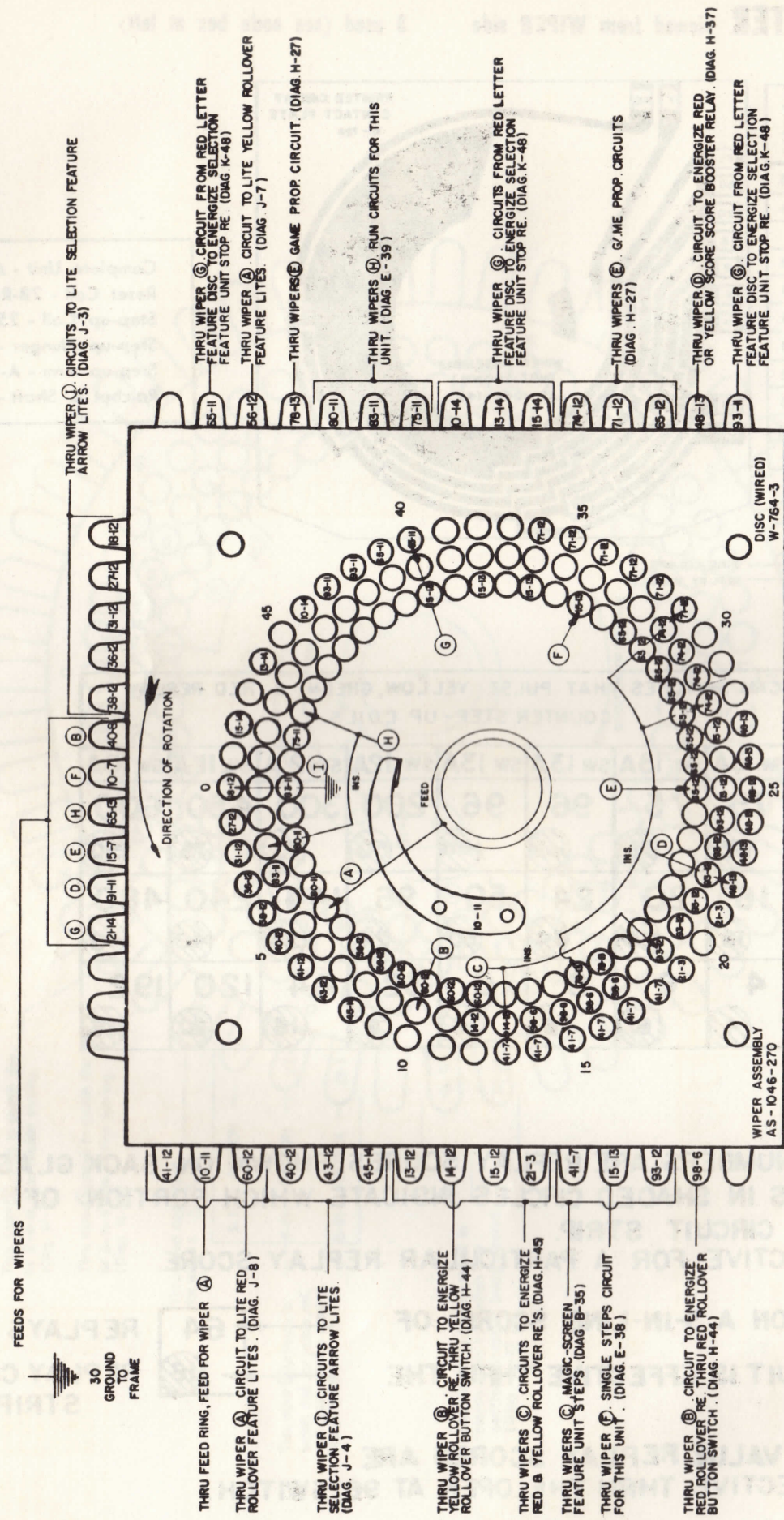
Complete Unit - AS-797-36
Reset Coil - 28-R-15
Step-up Coil - 25-GG-7
Step-up Plunger - S-496-116
Step-up Arm - A-1765-4
Ratchet & Shaft - C-100

CAM SWITCHES THAT PULSE YELLOW, GREEN & RED REPLAY COUNTER STEP-UP COILS							
	SW 13A	SW 13A	SW 13A	SW 13A	SW 12A	SW 11 A	SW 10A
5 IN LINE	75	75	96	96	200	300	450
4 IN LINE	16	20	24	50	96	144	240
3 IN LINE	4	6	8	16	32	64	120

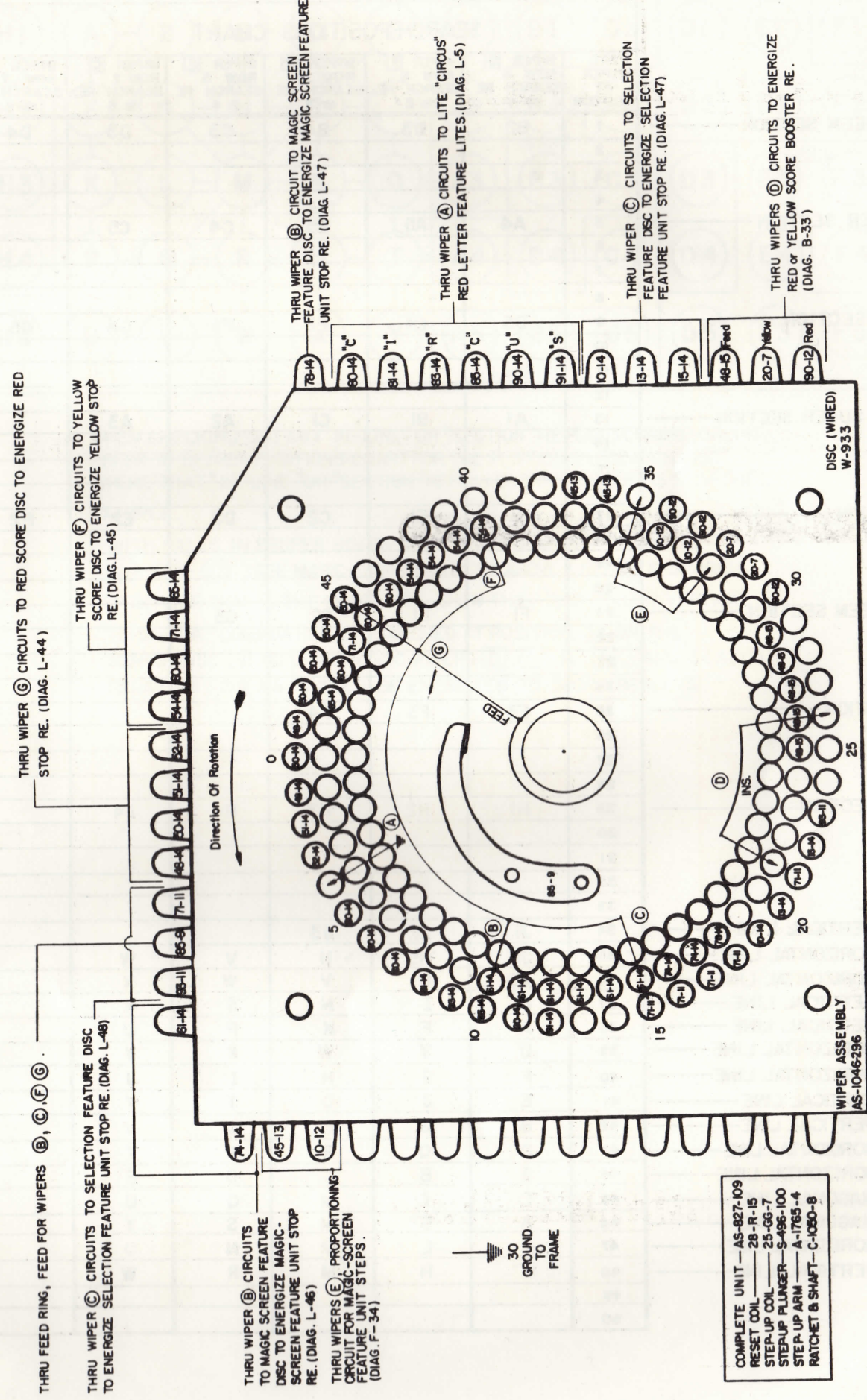
LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS.
NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF
REPLAY CIRCUIT STRIP
IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

EXAMPLE: ON A 3-IN-LINE SCORE OF 64 REPLAYS
THE CIRCUIT IS EFFECTIVE THRU THE 16 REPLAY CIRCUIT STRIP

NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.



RED LETTER FEATURE UNIT viewed from BUTTON or WIPER side



6 NO. GREEN SECTION

RED SUPER SECTION

YELLOW SECTION

YELLOW SUPER SECTION

RED SECTION

4 NO. GREEN SECTION

BLUE SECTION

ORANGE SECTION

YELLOW

RED

GREEN

VERTICAL LINE

HORIZONTAL LINE

HORIZONTAL LINE

VERTICAL LINE

VERTICAL LINE

HORIZONTAL LINE

HORIZONTAL LINE

VERTICAL LINE

VERTICAL LINE

HORIZONTAL LINE

HORIZONTAL LINE

DIAGONAL LINE

DIAGONAL LINE

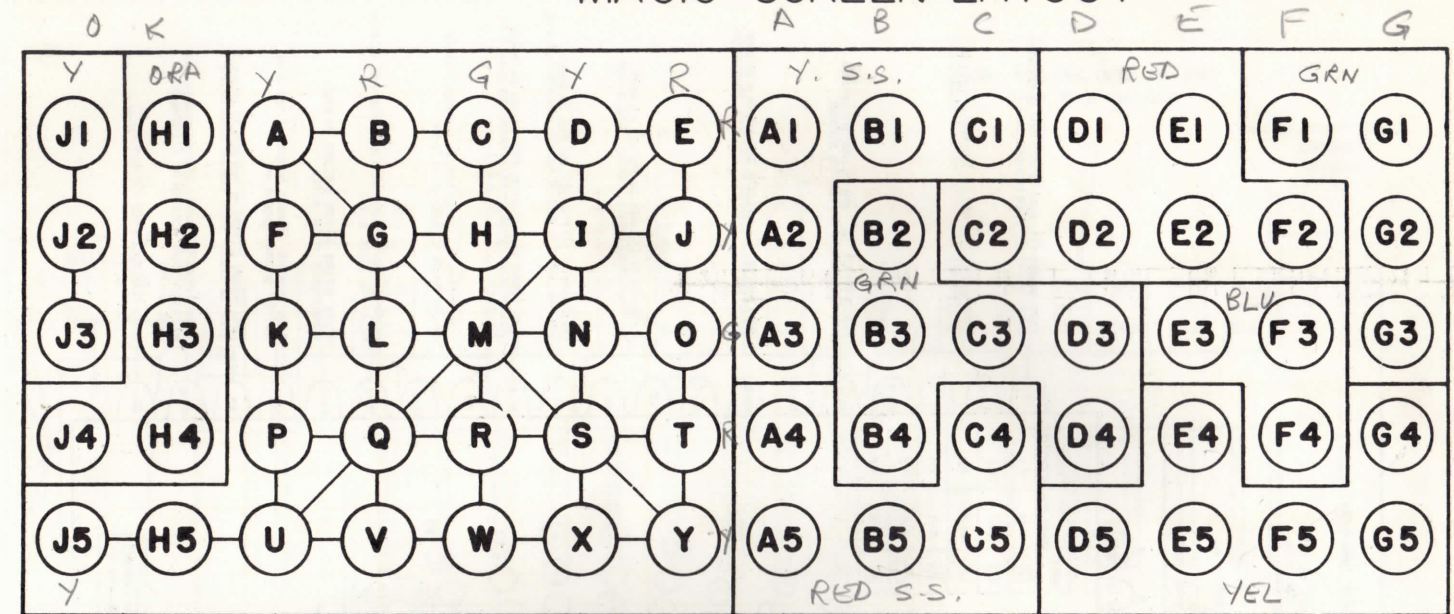
HORIZONTAL LINE

VERTICAL LINE

SEARCH POSITIONS CHART						
RED WIPER AT POSITION	WIPER D ROW 4 SEARCH RE. # 1	WIPER F ROW 6 SEARCH RE. # 2	WIPER G ROW 8 SEARCH RE. # 3	WIPER E ROW 5 SEARCH RE. # 4	WIPER C ROW 2 SEARCH RE. # 5	WIPER H ROW 7 SEARCH RE. # 6
1	B2	B3	B4	C3	D3	D4
2						
3						
4						
5	A4	A5	B5	C4	C5	
6						
7						
8						
9	D5	E4	E5	F5	G4	G5
10						
11						
12						
13	A1	B1	C1	A2	A3	
14						
15						
16						
17	D1	E1	C2	D2	E2	F2
18						
19						
20						
21	F1	G1	G2	G3		
22						
23						
24						
25	E3	F3	F4			
26						
27						
28						
29	H1	H2	H3	H4	J4	
30						
31						
32						
33						
34	J1	J2	J3			
35	J5	H5	U	V	W	
36	H5	U	V	W	X	
37	D	I	N	S	X	
38	A	F	K	P	U	
39	U	V	W	X	Y	
40	F	G	H	I	J	
41	E	J	O	T	Y	
42	B	G	L	Q	V	
43	P	Q	R	S	T	
44	A	B	C	D	E	
45	E	I	M	Q	U	
46	A	G	M	S	Y	
47	K	L	M	N	O	
48	C	H	M	R	W	
49						
50						

ROTATION OF SEARCH DISC WIPERS FROM 50 TO 1

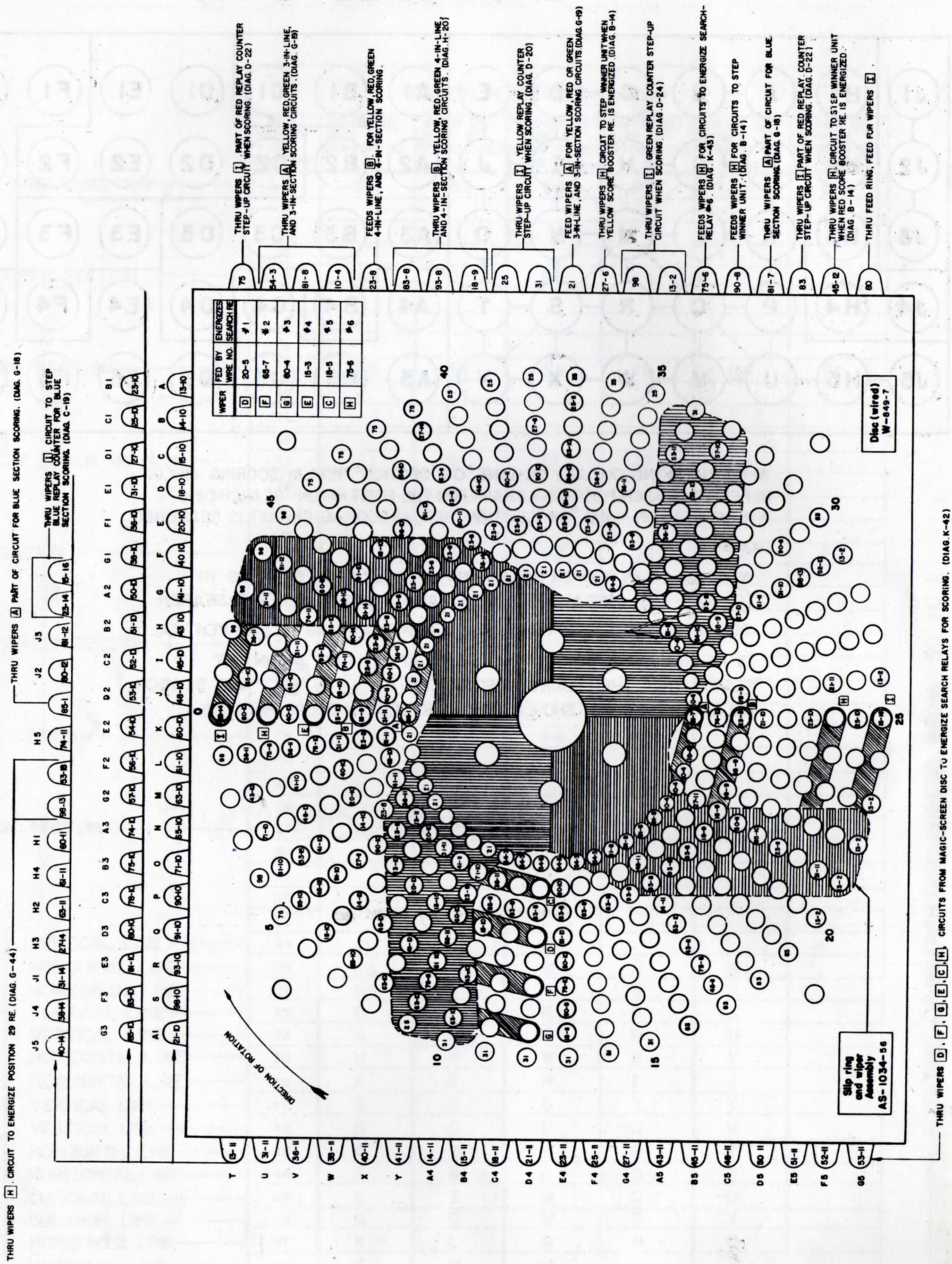
MAGIC-SCREEN LAYOUT



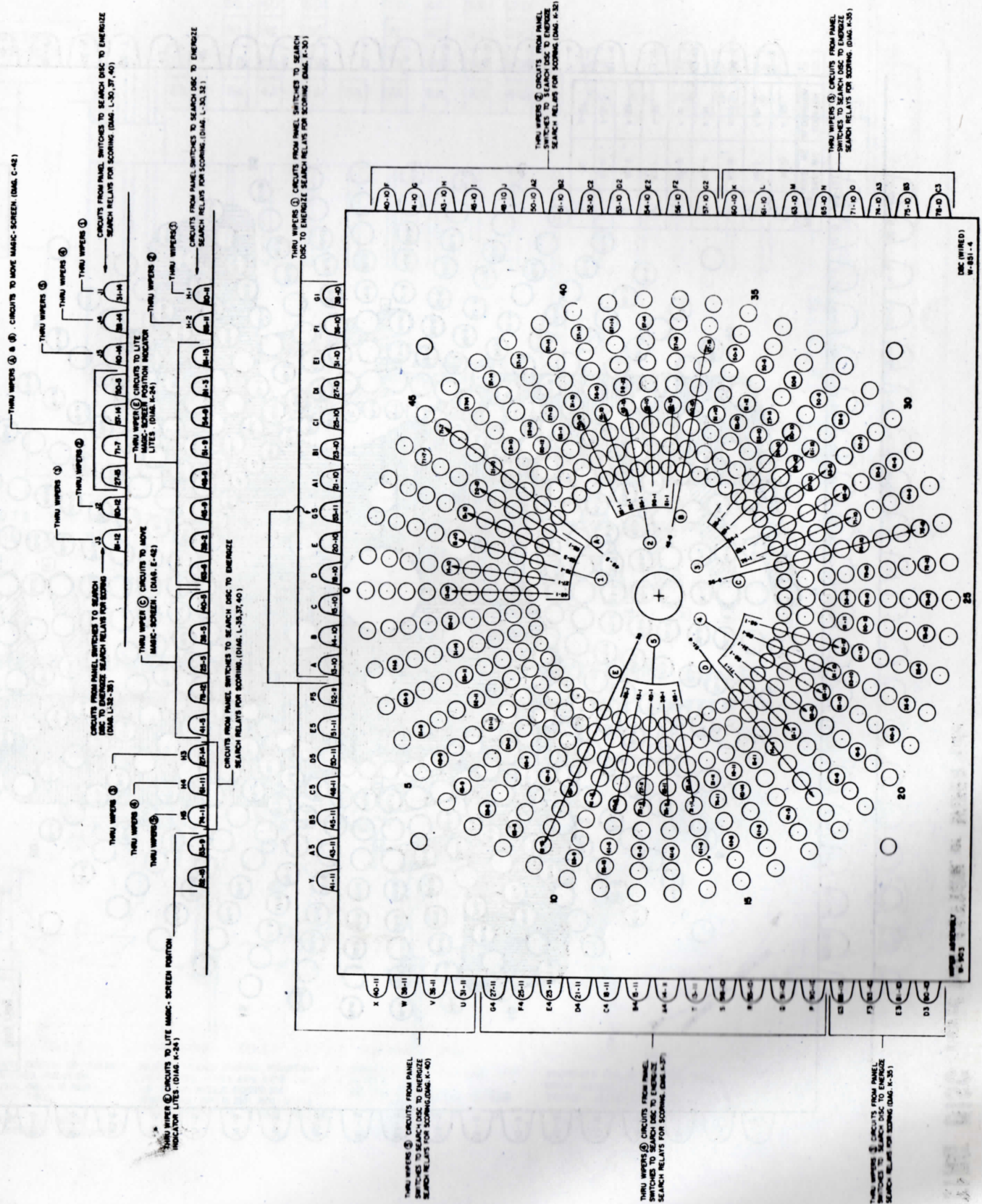
WHEN CHECKING OUT ANY "IN-LINE" OR "SECTION" REPLAY SCORING CIRCUIT, REFER TO SEARCH POSITIONS CHART FOR THE POSITION ON "SEARCH DISC" WHERE THAT "IN-LINE" OR "SECTION" REPLAY SCORING CIRCUIT IS SEARCHED.

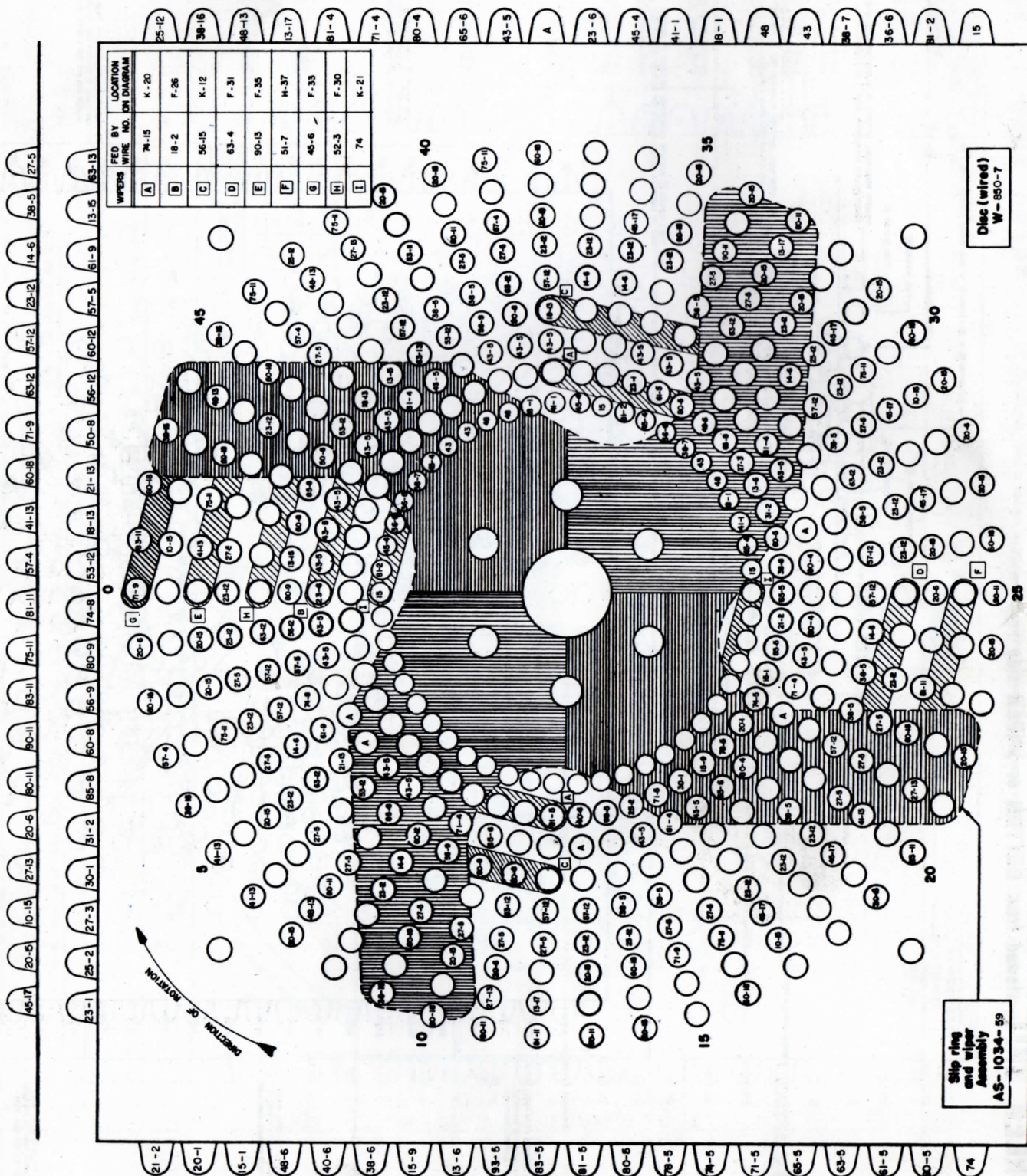
EXAMPLE:

WITH BALLS IN PROPER HOLES ON PLAYFIELD CORRESPONDING TO J1-J2-J3 (SEE MAGIC-SCREEN LAYOUT ABOVE), REFER TO SEARCH POSITIONS CHART. THE CHART WILL SHOW THAT THIS YELLOW VERTICAL "3-IN-LINE" COMBINATION IS SEARCHED AT POSITION 34 ON THE "SEARCH DISC", THRU SEARCH DISC WIPERS D F & G, AND SEARCH RELAYS #1 #2 #3 SHOULD BE ENERGIZED TO SCORE REPLAYS.

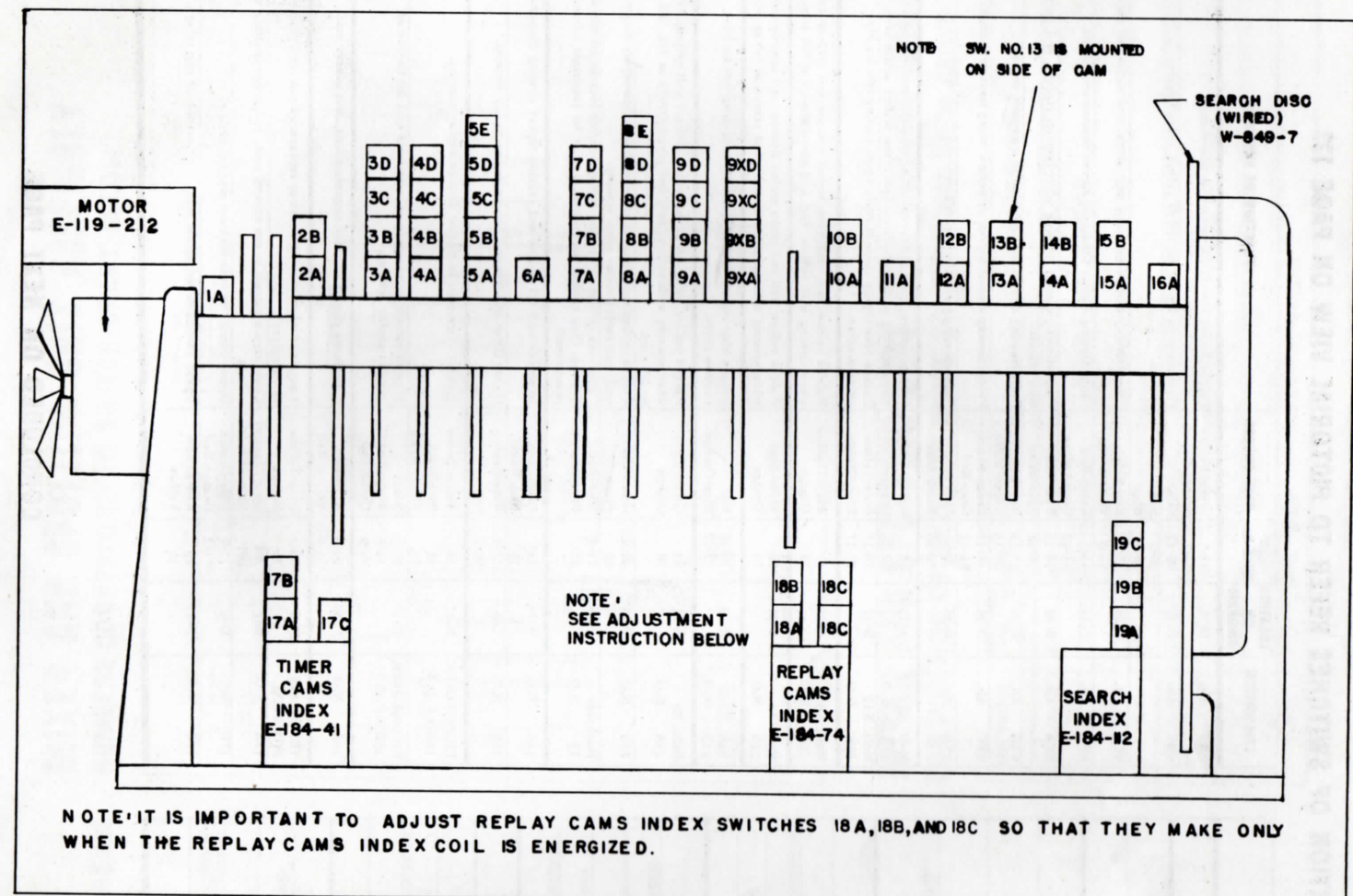


MAGIC SCREEN UNIT viewed from BUTTON or WIPER side





CONTROL UNIT PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 134



CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 133

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	36-9 65-2	Yellow-Brown Brown-White	In series with circuit to step timer unit after 5th ball is shot.
2A	N.O.	30-5	Gray	Pulses reflex play magnet coil, replay register unit reset coil, and total plays meter.
2B	N.O.	10-2 61-7	Red Brown-Red	Completes circuit to energize red or yellow score booster trip relay.
3A	N.C.	48-2	Green-Black	Opens start circuit.
3B	S.P.D.T.	93-7 98-4 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit from replay meter to total plays meter.
3C	S.P.D.T.	60-13 57-13	Brown White-Orange	Directs circuit to energize, and lock-in play scores relay.
3D	S.P.D.T.	71-16 81-13 21-3	Orange-Red Black-Red Blue-Red	Completes circuit to energize, and lock-in play features relay.
4A	N.O.	98-1	Gray-Black	Energizes spotting cams index coil.
4B	N.O.	56-5	White-Brown	Energizes score extra-step index coil.
4C	N.O.	27-9	White-Orange	Pulses coin meter (when coin meter is used).
4D	S.P.D.T.	13-9 90-9 14-5	Red-Yellow Gray Red-Green	(Safety circuit) opens start circuit, and completes a circuit to energize tilt relay if coin switch closed too long.
5A	N.O.	65-2	Brown-White	Completes a circuit to reset timer unit when playing extra-balls.
5B	N.O.	83-1	Black-Yellow	Completes circuit for extra-ball unit single steps. (Guaranteed)
5C	N.O.	21-1 38-4	Blue-Red Yellow-Black	Completes circuit to energize anti-cheat relay.
5D	N.O.	78-4 91-6	Orange-Black Gray-Red	Completes circuit for magic-screen feature unit, and selection feature unit single steps. (Guaranteed)
5E	N.C.	10-7 85-4 21-3 40-15	Red Black-White Blue-Red Green	Opens features lock relay, and scores lock relay lock-in circuit.
6A	N.C.	21-3	Blue-Red	Opens circuit for features and scores during spin.
7A	N.O.	10-1	Red	Completes circuit for yellow, red, and green score unit guaranteed single steps.
7B	N.O.	54-12 21-3	White-Green Blue-Red	Completes circuit to energize features lock relay or scores lock relay when playing for scores or features.
7C	N.O.	43-14	Green-Yellow	Completes circuit for yellow, red, and green score unit steps.
7D	N.O.	60-6	Brown	Same function as switch 7C above.
8A	N.O.	32-3 60-6	White-Yellow Brown	Completes circuit for extra-ball unit steps.
8B	N.O.	25-4 38-4	Blue-White Yellow-Black	Completes circuit to energize red or yellow score booster trip relay.
8C	N.O.	18-7 61-7	Red-Black Brown-Red	Completes circuit to energize OK feature trip relay.
8D	N.O.	20-6 27-13	Blue Blue-Orange	Completes circuit for yellow, red, and green score unit steps when playing for scores only.
8E	N.O.	36-11 65-4 54-12 91-5	White-Brown Brown-Yellow White-Green Gray-Red	Completes circuit for scores only.

CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 133

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
9A	Alt.	D-26	Green-Yellow	Proportioning circuit for extra-ball unit steps.
9B	Alt.	C-37	Gray	Proportioning circuit for red or yellow score booster feature.
9C	Alt.	I-28	Red	Proportioning circuit for score unit steps, and extra-ball unit steps.
9D	Alt.	C-34	White-White	Proportioning circuit for magic-screen feature unit steps.
9XA	Alt.	D-38	Gray-Yellow	Proportioning circuit for blue score booster feature, and super blue feature.
9XB	Alt.	C-39	Blue-White	Proportioning circuit for selection feature unit steps.
9XC	Alt.	H-38	Brown-White	Proportioning circuit for red or yellow score booster feature.
9XD	Alt.	C-36	Gray-Black	Proportioning circuit for OK feature.
Mult. X12	N.O.	63	White-Blue	Pulses yellow, red, and green replay counter unit step-up coil, when scoring with red, yellow and green scores at 8th step.
Mult. X12	N.O.	70	Orange	Pulses blue replay counter coil, when scoring 600 for blue section score.
Mult. X6	N.O.	23-17	Blue-Yellow	Pulses yellow, red, and green replay counter unit step-up coil, when scoring with yellow, red, and green scores at 7th step.
Mult. X4	N.O.	52	White-Blue	Pulses yellow, red, and green replay counter unit step-up coil, when scoring with yellow, red and green scores at 5th or 6th step.
Mult. X4	N.O.	10-16	Red	Pulses blue replay counter coil, when scoring 300 for blue section score.
Mult. X1	N.O.	27-17	Blue-Orange	Pulses yellow, red, and green replay counter unit step-up coil, when scoring with yellow, red, and green scores at 1st, 2nd, 3rd or 4th step.
13B	N.O.	45	Green-White	Pulses replay register unit step-up coil, reflex replay magnet coil, and replay meter when scoring.
Backside	N.O.	48-4	Green-Black	Completes in-line or section replay scoring lock-in circuit when scoring. (See control unit pictorial view for important adjustment instruction)
14A	N.C.	H-15	Red-Green	In series with all in-line and section replay scoring circuits.
14B	N.C.	18	Red-Black	Opens timer unit step-up circuit during replay scoring.
CHANGE OVER	N.O.	27-2	Blue-Orange	Directs circuit for in-line or section replay scoring.
15A S.P.D.T.	N.O.	56	White-Brown	Directs circuit to energize search index coil for in-line or section replay scoring.
15B S.P.D.T.	N.O.	18	Red-Black	Directs circuit to energize search index coil for in-line or section replay scoring.
16A	N.O.	80	Black	Completes circuit to reset sequence unit, and winner unit.
17A	N.O.	21-3	Blue-Red	Energized when playing coins or replays. (Each time start relay is energized)
17B	N.C.	31-6	Yellow-Red	Completes a circuit to run control unit, and mixer-spotting unit motors.
17C	N.C.	92-2	Gray-Yellow	Opens circuit to coin lock-out magnet coil.
		70	Orange	Opens circuit to red button relay, and extra-ball trip relay.
		20P	Blue(Plastic)	
		60P	Brown(Plastic)	
		27-9	Blue-Orange	
		71-2	Orange-Red	
		13	Red-Yellow	
		30	Yellow	

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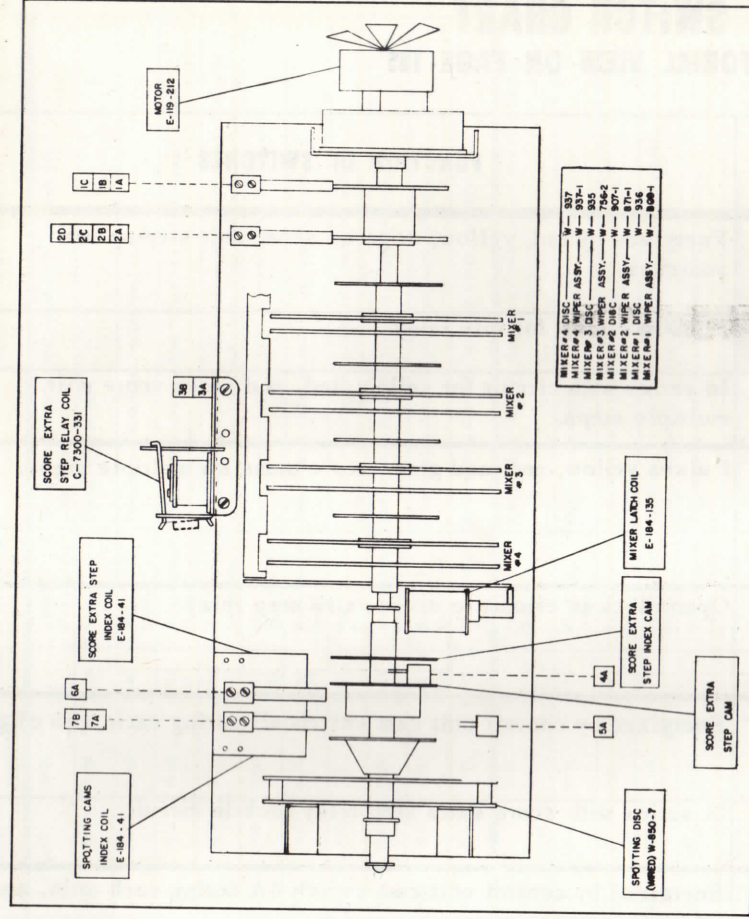
CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 133

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY CAMS INDEX COIL	A-16	40-4	Green	Energized by search index switch #19C when scoring, and releases replay cams to register replays.
18A	N.O.	70	Blue-Orange	In series with in-line or section replay scoring lock-in circuit when scoring. (See control unit pictorial view for important adjustment instruction of switches 18A, 18B, 18C.)
18B	N.O.	14	Red-Green	Same function as switch 18A above.
18C	N.O.	18	Red-Black	In series with section replay scoring lock-in circuit.
18D	N.C.	36-14	Yellow-Brown	Opens direct 50 volt circuit to search index coil.
SEARCH INDEX COIL	A-16	15-2	Red-White	Energized when scoring in-line or section scores, and stops search wipers at proper position to record scores.
19A	N.O.	10-9	Red	Completes circuit to energize position 29 relay for scoring a red letter game.
19B	N.O.	98-13	Gray-Black	In series with section replay scoring circuit.
19C	N.O.	54	White-Green	Completes circuit to energize replay cams index coil.
SEARCH INDEX LOCK MAGNET COIL	A-40	23-16 70	Blue-Yellow Orange	(Not shown on pictorial view) Energized by front rail collect scores button switch, and releases search wipers to search for scores.
SEARCH WIPER CAM	H-42	14-4	Red-Green	(Not shown on pictorial view) Opens circuit to magic screen buttons during search for scores.
20A	N.C.	20-2	Blue	(Not shown on pictorial view) Opens circuit to start relay during search for scores.
SEARCH WIPER CAM	C-5	13-16 83-3	Red-Yellow Black-Yellow	(Not shown on pictorial view) Opens circuit to search index lock magnet coil after it has been energized.
20C	N.C.	23-16 52-9	Blue-Yellow White-Blue	

MIXER AND SPOTTING UNIT ASSEMBLY

NUMBERS CORRESPOND TO SWITCH CHART BELOW



MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

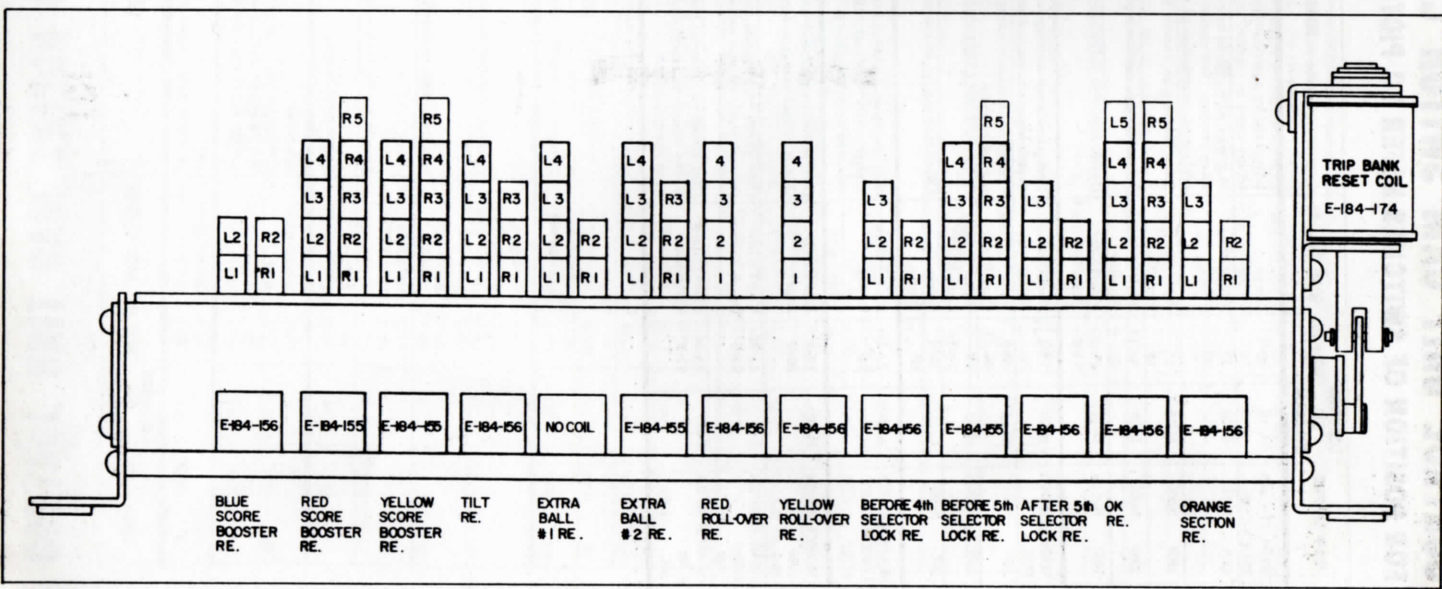
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
16 PULSE	G-34	45-6	Green-White	Completes circuit for game advantages when circuit complete thru spotting disc and other factors.
1A	N.O.	98-14	Gray-Black	Completes replay register reset circuit when replay reset relay is energized.
1B	N.O.	53-7	White-Yellow	Completes circuit to flash press buttons now life for magic-screen feature.
1C	N.O.	10-11	Red	Completes circuit to step sequence unit, and winner unit when searching for section scores.
16 PULSE	G-15	52-8	White-Blue	Completes circuit for extra-ball unit multiple steps.
2A	N.O.	93	Gray-Yellow	Completes circuit for guaranteed game advantages when scoring red letter games.
2B	N.O.	38-4	Yellow-Black	Completes circuit to put blue replay counter back to zero when starting new game.
2C	N.O.	36-7	Yellow-Brown	
16 PULSE	B-18	40-16	Green	
2D	N.O.	80-16	Black	

CONCLUDED ON NEXT PAGE

MIXER AND SPOTTING UNIT CAM SWITCH CHART
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 135

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SCORE EXTRA STEP RELAY COIL	A-9	43-6 70	Green-Yellow Orange	Energized by red, yellow, or green score unit step-up arm switches.
3A N.O.	C-10	43-6 81-3	Green-Yellow Black-Red	Lock-in circuit for this relay.
3B N.O.	D-28	50-4 51-6	White White-Red	In series with circuit for yellow, red, and green score unit multiple steps.
SCORE EXTRA STEP PULSE SWITCH 4A N.O.	E-28	43-4 50-4	Green-Yellow White	Pulses yellow, red, and green score units for multiple steps.
SQUARE PIN SWITCH 5A N.C.	D-10	13-5 21-3	Red-Yellow Blue-Red	Opens lock-in circuit to score extra step relay.
SCORE EXTRA STEP INDEX COIL	A-46	56-5 70	White-Brown Orange	Energized by control unit cam switch 4B during each spin of game.
6A N.O.	C-10	13-5 81-3	Red-Yellow Black-Red	In series with score extra step relay lock-in circuit.
SPOTTING CAMS INDEX COIL	I-50	98-1 70	Gray-Black Orange	Energized by control unit cam switch 4A during each spin, and releases spotting wipers for cycle.
7A N.O.	J-21	13-4 30	Red-Yellow Yellow	Completes circuit to flash score lites or extra-ball lites.
7B N.O.	J-12	81-6 30	Black-Red Yellow	Completes circuit to flash game advantage lites.

TRIP RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 137



TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 136

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BLUE SCORE BOOSTER RELAY COIL L1 N.C.	A-38	J 70	Jumper Orange	Energized thru spotting disc when circuit complete thru other factors.
L2 S.P.D.T.	A-38	38-16 J	Yellow-Black Jumper	Opens circuit to coil.
R1 S.P.D.T.	L-12	18-4 60-8	Red-Black Brown	Directs circuit to lite blue 3 scores 300, blue 3 scores 600, or blue 2 scores 600 feature lite.
R2 S.P.D.T.	B-19	61-9 10-16	Brown-Red Red	Directs circuit to step blue replay counter for scoring 300 or 600 for blue section score.
	D-19	15-16 23-17	Red-White Blue-Yellow	In series with function of switch R1 above.
RED SCORE BOOSTER RELAY COIL L1 N.C.	C-38	75-14 85-1	Orange-White Black-White	Energized thru spotting disc when circuit complete thru other factors. Also energized thru red letter feature disc as part of red letter game scoring.
L2 N.O.	E-35	83-13	Black-Yellow	Proportioning circuit for magic screen feature unit steps.
L3 S.P.D.T.	J-8	41-13 93-13	Green-Red Gray-Yellow	Completes circuit to red score booster feature lite.
L4 S.P.D.T.	D-30	54-7 80-9	Black Black	Proportioning circuit for red or yellow score unit steps.
R1 N.C.	H-24	65-4 63-7	Brown-White Brown-Yellow	Same function as switch L3.
R2 N.O.	B-14	52-4	White-Blue	Open circuit to mixer #2 relay.
R3 N.C.	B-37	13-1 45-12	Red-Yellow Green-White	Completes a circuit thru search disc to step winner unit when searching for section scores.
R4 N.C.	D-39	10-5 15-13	Red Red-White	Opens circuit to this coil. Also opens circuit to yellow score booster trip relay coil.
R5 N.C.	L-9	36-13 21-13	Yellow-Brown Blue-Red	Proportioning circuit for selection feature unit steps.
		43-7	Green-Yellow	Opens circuit for flashing yellow score booster feature lite.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW SCORE BOOSTER RELAY COIL L1 N.C.	C-36	10-5 20-7	Red Blue	Energized thru spotting disc when circuit complete thru other factors. Also energized thru red letter feature disc as part of red letter game scoring.
L2 N.O.	D-35	91-12 93-13	Gray-Red Gray-Yellow	Proportioning circuit for magic screen feature unit steps.
L3 S.P.D.T.	K-9	43-7 80-9	Gray-Yellow Black	Completes circuit to yellow score booster feature lite.
L4 S.P.D.T.	D-30	52-4 31-9	White-Blue Yellow-Red	Proportioning circuit for red or yellow score unit steps.
R1 N.C.	C-30	65-4 75-8	Brown-White Orange-White	Same function as switch L3.
R2 N.O.	A-37	38-9 83-4	Yellow-Black Black-Yellow	Opens circuit to this coil. Also opens circuit to red score booster trip relay coil.
R3 N.C.	B-15	53-6 70	White-Yellow Orange	Completes a circuit thru search disc to step winner unit when searching for section scores.
R4 N.C.	D-39	27-6 36-13	Blue-Orange Yellow-Brown	Proportioning circuit for selection feature unit steps.
R5 N.C.	I-24	65-13 78-11	Brown-White Orange-Black	Opens circuit to mixer #2 relay.
	L-9	81-9 18-13	Black-Red Red-Black	Opens circuit for flashing red score booster lite.
TILT RELAY COIL L1 N.C.	A-12	14-5 70	Red-Green Orange	Energized by any tilt switch. Also thru control unit cam switch 4D if coin switch is closed too long.
L2 N.C.	H-38	40-8 93-3	Green Gray-Yellow	Opens circuits for moving magic-screen, and energizing search index lock magnet.
L3 S.P.D.T.	M-27	10 20-4	Red Blue	Opens 17 volt circuits.
L4 S.P.D.T.	I-7	21-3 30	Blue-Red Yellow	Opens circuit to this coil. Also opens game advantages, scoring, and playing circuits, and completes circuit to close shutter if tilt occurs with shutter open.
R1 N.C.	L-25	45-8 54-2	Green-White White-Green	Opens 6 volt lite circuits, and completes circuit to tilt lite.
R2 N.O.	G-2	91-2 30P	Gray-Red Yellow(Plastic)	Opens circuit to control unit, and mixer-spotting unit motors.
R3 N.O.	F-13	57-6 85-7	White-Orange Black-White	Completes a circuit to energize red button relay.
	B-4	13-6 83-3	Red-Yellow Black-Yellow	Completes a circuit for starting new game if tilt occurred during search cycle.

CONTINUED ON NEXT PAGE

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA-BALL #1 RELAY				
L1	N.C.	E-27	85-4 91-6	Trips with extra-ball #2 relay.
L2	N.O.	G-9	71-8 83-1	In series with circuit to energize anti-cheat relay.
L3	S.P.D.T.	E-26	85-4 30 61-2	In series with circuit to reset timer unit while playing extra-balls. In series with circuits to energize anti-cheat relay, and score units guaranteed steps when relay is latched. In series with extra ball step-up circuit when relay is tripped.
L4	S.P.D.T.	H-28	60-6 56-6 18-2	Opens circuit for score steps, and completes circuit for extra-ball steps.
R1	N.C.	J-12	27-16 81-6	Opens circuit for flashing other game feature lites.
R2	S.P.D.T.	I-28	75-5 15-7 45-2	In series with function of switch L4 above.
EXTRA-BALL #2 RELAY COIL				
L1	N.C.	A-13	J 70	Energized by yellow button switch when playing for extra-balls. (After 5 balls are shot)
L2	N.O.	D-14	38-3 91-1	Opens circuit to coil.
L3	S.P.D.T.	D-6	14-3 61 98-2	In series with circuit to run ball lifter motor to raise extra-balls.
L4	S.P.D.T.	J-21	31-5 13-4 74	Opens circuit to run shutter motor when starting new game, and completes a circuit to energize mixer latch, and timer cams index coils.
R1	N.C.	H-28	45-2 83-9	Opens circuit to flash score lites, and completes circuit to flash extra-ball lites.
R2	N.O.	K-25	21-4 50-9	Opens other game feature circuits.
R3	N.O.	H-28	56-6 54-8	Completes circuit to lite extra balls feature lite.
RED ROLLOVER RELAY COIL				
1	N.C.	B-45	J 70	In series with circuit for extra ball steps.
2	N.O.	H-40	21-12 53-5	Energized directly thru selection feature disc, also by red rollover button switch, thru selection feature disc.
3	S.P.D.T.	J-1	51-12 90	Opens circuit to coil.
4	S.P.D.T.	J-6	31-8 10-11 53-12	Completes a circuit to keep magic screen buttons (left & right) alive until 6th ball (1st extra ball) is shot.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW ROLLOVER RELAY COIL				
1	N.C.	B-44	38-13 J	Energized directly thru selection feature disc. Also by yellow rollover button switch, thru selection feature disc.
2	N.O.	G-40	93-3 98-3	Opens circuit to coil.
3	S.P.D.T.	J-1	50-12 51-12 23-5	Completes circuit to keep magic screen buttons (left & right) alive until 5th ball is shot.
4	S.P.D.T.	K-6	37-5 31-8 74-8	Opens circuit to flash select-now lite before 4th ball, and completes circuit to flash select-now before 5th ball.
BEFORE 4th SELECTOR LOCK RELAY COIL				
A-11		J 70	Yellow-Black Orange	Opens circuit to select before 4th ball feature lite, and completes circuit to select before 5th ball feature lite.
L1	N.C.	B-11	83-6 Jumper	Energized thru timer unit disc, when 4th ball is shot.
L2	S.P.D.T.	G-40	93-3 93-3 53-18	Opens circuit to coil.
L3	N.O.	H-8	36-2 43-2	Opens circuit to magic screen buttons (left & right) and, completes circuit to collect scores (R) button.
R1	N.C.	K-1	27-4 50-12	Thru timer unit disc, completes a circuit to step timer unit from 4th to 5th step.
R2	N.O.	C-17	23-13 51-8	Opens circuit to flash select-now lite at 4th step of timer unit.
BEFORE 5th SELECTOR LOCK RELAY COIL				
A-11		J 70	Blue-Yellow White-Red Orange	In series with circuit to energize search index coil for scoring.
L1	N.C.	B-11	74-6 Jumper	Energized thru timer unit disc, when 5th ball is shot.
L2	N.O.	C-13	10-6 25-8	Opens circuit to coil.
L3	N.O.	E-4	18-6 50-2	Completes circuit to energize extra-ball relays, during extra-ball play.
L4	S.P.D.T.	L-1	14-1 48-12 53-2	Completes circuit to energize start relay, during extra-ball play.
R1	N.C.	L-7	52-12 56-12	Opens circuit to flash select-now lite before 5th ball, and completes circuit to flash it after 5th ball.
R2	N.C.	C-44	13-12 38-13	Opens circuit to yellow rollover lite (on panel)
R3	N.O.	G-10	54-11 71-8	Opens circuit to yellow rollover relay.
R4	N.O.	F-9	27-2 78-6	Completes circuit to reset timer unit thru collect scores (R) button switch.
R5	N.C.	G-41	21-12 98-3	In series with circuit to step timer unit after 5th ball is shot.

CONCLUDED ON NEXT PAGE

TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 136

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
AFTER 5th SELECTOR RELAY COIL				
L1	N.C.	G-41	14-4 21-12	Energized when 6th ball (1st extra-ball) is shot.
L2	N.C.	C-45	15-12 25-13	Opens circuit to magic screen buttons (left and right).
L3	N.C.	A-11	98-11 J	Opens circuit to red rollover relay.
R1	N.C.	K-2	52-13 53-2	Opens circuit to coil.
R2	N.C.	L-8	41-8 60-12	Opens circuit to flash select-now lite.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
OK RELAY COIL				
L1	N.C.	B-36	J 70	Energized thru spotting disc, when circuit complete thru other factors.
L2	N.O.	L-10	30-8 30	Opens circuit to coil.
L3	N.O.	B-42	57-14 71-7	Completes circuit to OK feature lite.
L4	N.O.	C-43	27-15 98-12	Thru magic screen unit disc, completes a circuit to magic screen unit index coil.
L5	N.O.	E-34	20-15 Blue Blue-Red	Thru magic screen unit disc, completes a circuit to move right winding of magic screen motor, and circuit to energize move right button relay.
R1	N.C.	H-26	53-13 74-12	In series with circuit to energize orange section feature relay.
R2	N.O.	J-6	10-11 30	Proportioning circuit for scores, and extra-ball steps.
R3	N.C.	H-26	54-13 65-12	In series with a circuit to flash select-now lite, and thru selection feature disc lite red or yellow rollover lite.
R4	N.C.	I-25	21-3 56-13	Proportioning circuit for scores, and extra ball steps.
R5	N.C.	F-39	83-11 90-11	Proportioning circuit for selection feature unit steps.
ORANGE SECTION RELAY COIL				
L1	N.C.	B-34	21-16 J	Energized thru spotting disc, when circuit complete thru other factors.
L2	N.O.	J-9	13-15 30	Opens circuit to coil.
L3	N.O.	C-18	60 80	Completes circuit to orange section feature lite.
R1	N.C.	H-26	43-13 65-12	Completes a circuit to energize replay cams index coil for orange section replay scoring.
R2	N.C.	H-25	45-13 72-12	Proportioning circuit for scores, and extra-ball steps.

6 RELAY BANK PICTORIAL VIEW
LETTERS CORRESPOND TO SWITCH CHART ON PAGE 141

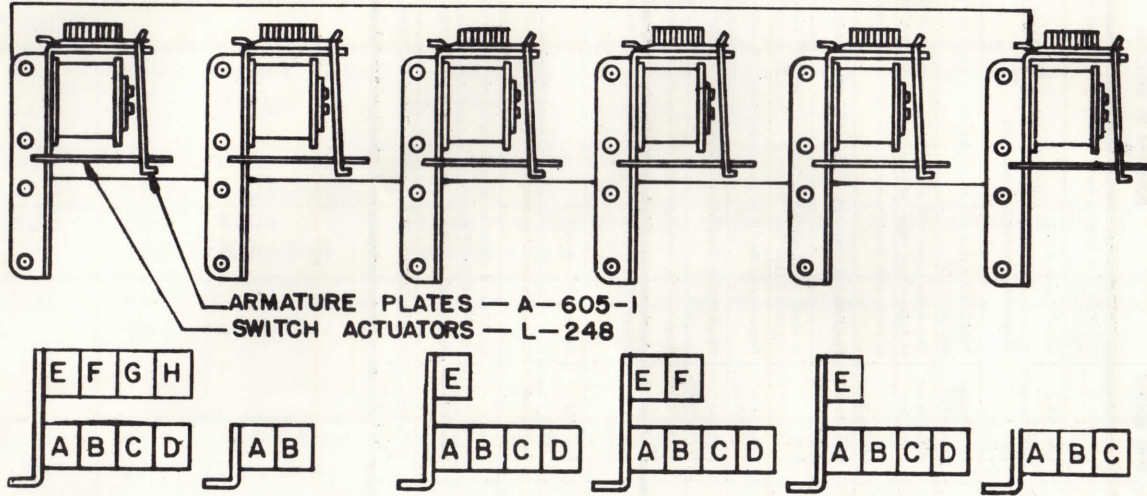


Table with 7 columns: NAME, POSITION #29 RE., RIGHT BUTTON RE., REPLAY RESET RE., ANTI-CHEAT RE., START RE., RED BUTTON RE. Rows include COIL TURNS & WIRE GAUGE, COIL RESISTANCE, OPERATING VOLTAGE, TEST VOLTAGE, EXTENSION SPRING LOAD, SW. ACTUATOR STROKE, and COIL PART NO.

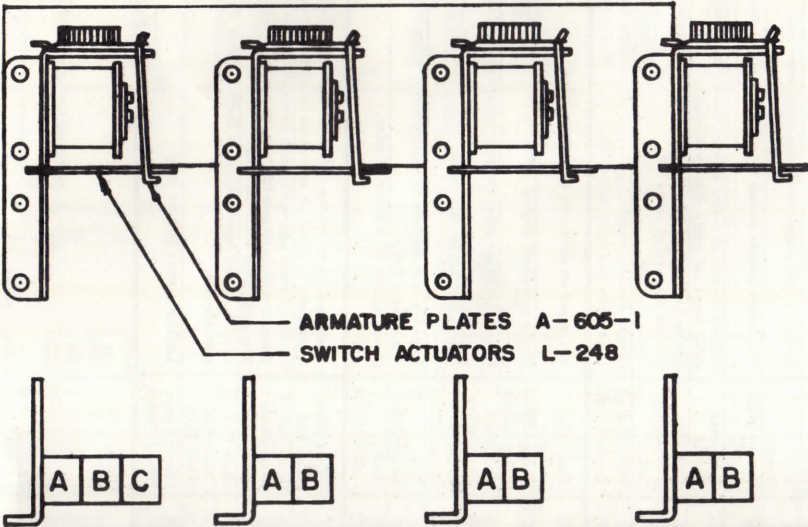
Table with 3 columns: COLOR, PART NO., LOAD. Rows include CLEAR, BLUE, YELLOW, RED, GREEN with corresponding part numbers and loads.

6 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 140

Table with 4 columns: RELAY SWITCH, LOCATION ON DIAGRAM, WIRE NO., WIRE COLORS. Rows include POSITION 29 RELAY COIL, RIGHT BUTTON RELAY COIL, REPLAY RESET RELAY COIL, and various relay contacts (A, B, C, D, E, F, G, H).

Table with 4 columns: RELAY SWITCH, LOCATION ON DIAGRAM, WIRE NO., WIRE COLORS. Rows include ANTI-CHEAT RELAY COIL, START RELAY COIL, RED BUTTON RELAY COIL, and various relay contacts (A, B, C, D, E, F, G, H).

(VERTICAL) 4 RELAY BANK PICTORIAL VIEW
LETTERS CORRESPOND TO SWITCH CHART ON PAGE 143



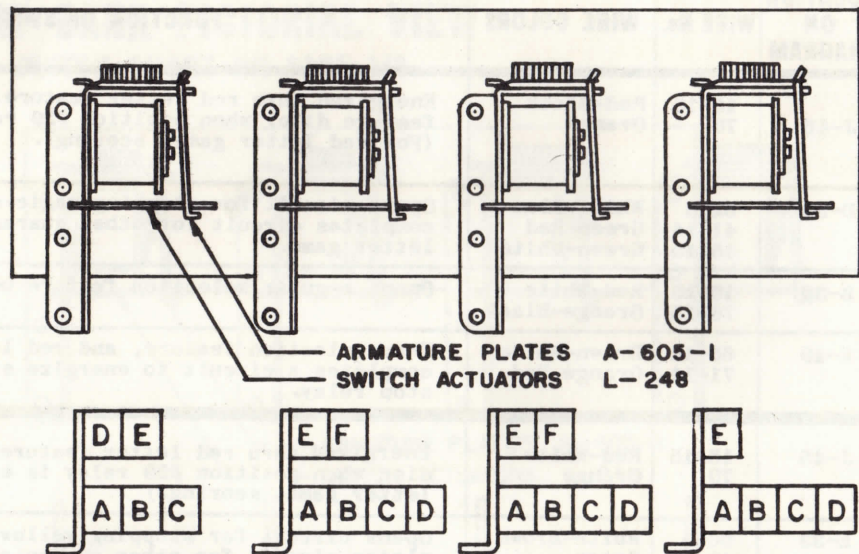
Name	MAGIC - SCREEN FEATURE UNIT STOP RE.	YELLOW SCORE STOP RE.	RED SCORE STOP RE.	SELECTION FEATURE UNIT STOP RE.
Coil turns & wire gauge	2300 # 33	2300 # 33	2300 # 33	2300 # 33
Coil resistance (nominal)	85 Ω	85 Ω	85 Ω	85 Ω
Operating voltage	50 V.	50 V.	50 V.	50 V.
Test voltage	37 V.	37 V.	37 V.	37 V.
Extension spring load	CLEAR	CLEAR	CLEAR	CLEAR
Sw actuator stroke	3/32	3/32	3/32	3/32
Additional information				
COIL PART NO.	C-7300-331	C-7300-331	C-7300-331	C-7300-331

SPRING CODE		
COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 OZ. AT 15/16
BLUE	SP-199-14	21 OZ. AT 15/16
YELLOW	SP-199-15	15 OZ. AT 15/16
RED	SP-199-16	9 OZ. AT 15/16
GREEN	SP-199-17	17 OZ. AT 15/16

(VERTICAL) 4 RELAY BANK SWITCH CHART
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 142

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
MAGIC SCREEN FEATURE UNIT STOP RELAY COIL	J-46	18-15 70	Red-Black Orange	Energized thru red letter feature disc, and magic-screen feature disc, when position #29 relay is energized. (For red letter games scoring).
A S.P.D.T	D-33	52-5 41-14 45-15	White-Blue Green-Red Green-White	Opens circuit for stepping magic-screen feature unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-39	15-13 78-15	Red-White Orange-Black	Opens regular selection feature unit step-up circuit.
C N.O.	K-49	65-11 71-11	Brown-White Orange-Red	Thru selection feature, and red letter feature discs, completes a circuit to energize selection feature unit stop relay.
YELLOW SCORE STOP RELAY COIL	J-45	15-15 70	Red-White Orange	Energized thru red letter feature disc, and yellow score disc when position #29 relay is energized. (For red letter games scoring.)
A S.P.D.T	E-33	56-3 40-13 41-14	White-Brown Green Green-Red	Opens circuit for stepping yellow score unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-34	52-5 93-12	White-Blue Gray-Yellow	Opens regular magic-screen feature unit step-up circuit.
RED SCORE STOP RELAY COIL	J-44	14-15 70	Red-Green Orange	Energized thru red letter feature disc, and red score disc when position #29 relay is energized. (For red letter game scoring.)
A S.P.D.T	E-33	85-15 36-7 40-13	Black-White Yellow-Brown Green	Opens circuit for stepping red score unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	B-30	13-3 85-15	Red-Yellow Black-White	Opens regular red score unit step-up circuit.
SELECTION FEATURE UNIT STOP RELAY COIL	J-47	21-14 70	Blue-Red Orange	Energized thru red letter feature disc, and selection feature disc when position #29 relay is energized. (For red letter game scoring.)
A S.P.D.T	C-33	78-15 45-15 48-15	Orange-Black Green-White Green-Black	Opens circuit for stepping selection feature unit, and completes circuit for other guaranteed features of a red letter game.
B N.C.	G-37	61-7 91-11	Brown-Red Gray-Red	(Safety circuit) opens regular circuit for energizing red or yellow score booster relay.

(HORIZONTAL) 4 RELAY BANK PICTORIAL VIEW
LETTERS CORRESPOND TO SWITCH CHART ON PAGE 145



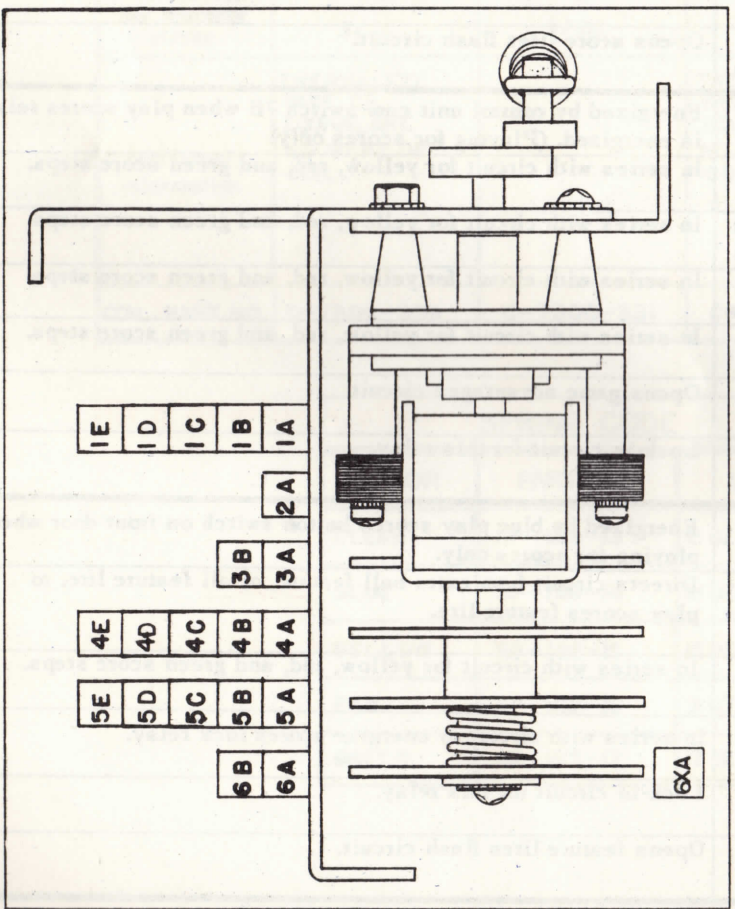
Name	FEATURES LOCK RE.	PLAY FEATURES RE.	SCORES LOCK RE.	PLAY SCORES RE.
Coil turns & wire gauge	2300 #33	2300 #33	2300 #33	2300 #33
Coil resistance (nominal)	85 Ω	85 Ω	85 Ω	85 Ω
Operating voltage	50 V.	50 V.	50 V.	50 V.
Test voltage	37 V.	37 V.	37 V.	37 V.
Extension spring load	CLEAR	CLEAR	CLEAR	CLEAR
Sw actuator stroke	3 / 32	3 / 32	3 / 32	3 / 32
Additional information	THERMALEZE WIRE OR EQUIVALANT. NO WRAP ON COIL.		THERMALEZE WIRE OR EQUIVALANT. NO WRAP ON COIL.	
COIL PART NO.	C-7300-336	C-7300-331	C-7300-336	C-7300-331

SPRING CODE		
COLOR	PART NO.	LOAD
CLEAR	SP-199-13	13 OZ AT 15/16
BLUE	SP-199-14	21 OZ AT 15/16
YELLOW	SP-199-15	15 OZ AT 15/16
RED	SP-199-16	9 OZ AT 15/16
GREEN	SP-199-17	17 OZ AT 15/16

(HORIZONTAL) 4 RELAY BANK SWITCH CHART
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 144

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
FEATURES LOCK RELAY COIL	A-46	31-15 53-14	Yellow-Red White-Yellow	Energized by control unit cam switch 7B, when play feature relay is energized. (Playing for features only)
A N.O.	B-46	40-15 53-14	Green White-Yellow	Lock-in circuit for this relay.
B N.O.	E-34	50-13 71-9	White Orange-Red	In series with circuit for magic-screen feature unit steps.
C N.O.	G-35	45-6 90-13	Green-White Gray	In series with circuit for all game advantages.
D N.C.	I-29	21-3 80-8	Blue-Red Black	Opens a circuit to mixer #4 relay.
E N.O.	H-38	13-17 48-13	Red-Yellow Green-Black	In series with circuit for red or yellow score booster feature.
PLAY FEATURES RELAY COIL	A-47	31-15 61-13	Yellow-Red Brown-Red	Energized by green play features button switch on front door when playing for features only.
A S.P.D.T.	J-13	36-15 30 23-15	Yellow-Brown Yellow Blue-Yellow	Directs circuit from extra-balls, all features, and play scores feature lites, to play feature lite.
B N.O.	C-46	43-14 53-14	Green-Yellow White-Yellow	In series with circuit to energize features lock relay.
C N.O.	G-36	10-15 27-13	Red Blue-Orange	In series with circuit for OK feature.
D N.O.	B-48	61-13 81-13	Brown-Red Black-Red	Lock-in circuit for this relay.
E N.C.	A-31	71-13 70	Orange-Red Orange	Opens yellow, red, and green score unit step-up circuit.
F N.C.	K-20	31-5 74-15	Yellow-Red Orange-Green	Opens score lites flash circuit.
SCORES LOCK RELAY COIL	A-47	31-15 93-14	Yellow-Red Gray-Yellow	Energized by control unit cam switch 7B when play scores relay is energized. (Playing for scores only)
A N.O.	F-30	23-12 27-5	Blue-Yellow Blue-Orange	In series with circuit for yellow, red, and green score steps.
B N.O.	F-30	38-5 57-12	Yellow-Black White-Orange	In series with circuit for yellow, red, and green score steps.
C N.O.	F-30	14-6 63-12	Red-Green Brown-Yellow	In series with circuit for yellow, red, and green score steps.
D N.O.	G-29	56-11 60-6	White-Brown Brown	In series with circuit for yellow, red, and green score steps.
E N.C.	G-33	91-13 98-14	Gray-Red Gray-Black	Opens game advantages circuit.
F N.O.	B-47	40-15 93-14	Green Gray-Yellow	Lock-in circuit for this relay.
PLAY SCORES RELAY COIL	A-49	31-15 65-15	Yellow-Red Brown-White	Energized by blue play scores button switch on front door when playing for scores only.
A S.P.D.T.	K-13	51-15 36-15 21-15	White-Red Yellow-Brown Blue-Red	Directs circuit from extra-ball feature, or all feature lite, to play scores feature lite.
B N.O.	D-28	10-1 91-5	Red Gray-Red	In series with circuit for yellow, red, and green score steps.
C N.O.	C-47	43-14 93-14	Green-Yellow Gray-Yellow	In series with circuit to energize scores lock relay.
D N.O.	B-49	57-13 65-13	White-Orange Brown-White	Lock-in circuit for this relay.
E N.C.	K-12	27-16 56-15	Blue-Orange White-Brown	Opens feature lites flash circuit.

SHUTTER MOTOR PICTORIAL VIEW
LETTERS CORRESPOND TO SWITCH CHART BELOW

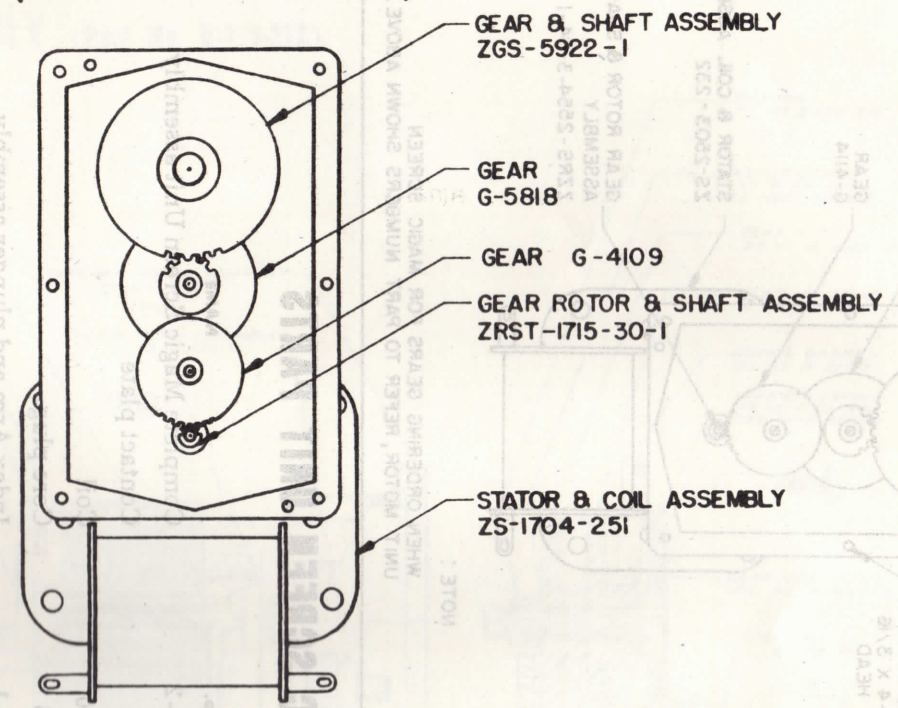


SHUTTER MOTOR CAM SWITCH CHART
FOR POSITION OF SWITCHES SEE PICTORIAL VIEW AT LEFT

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	14 21-3	Red-Green Blue-Red	(Closed when shutter is closed) In series with in-line or section replay scoring circuits thru control unit change-over cam switch 15A.
1B	N.O.	14-3 30	Red-Green Yellow	Completes shutter motor carry-over circuit.
1C	N.C.	21-3 98-8	Blue-Red Gray-Black	(Closed when shutter is closed) In series with circuit to stop timer unit after 5th ball is shot. Also in series with circuit to reset timer unit when playing extra-balls.
1D	N.O.	63-8 30	Brown-Yellow Yellow	Starts lock-in circuit for position 29 relay.
1E	N.C.	21-3 90-3	Blue-Red Gray	(Closed when shutter closed) In series with circuit to give advantages for red letter game scoring.
2A	N.C.	31-3 36-3	Yellow-Red Yellow-Brown	(Closed when shutter is closed) In series with circuit to run ball lifter motor.
3A	N.O.	85-5 30	Black-White Yellow	Resets selection feature unit, green, red, and yellow replay counter units, and extra-ball unit when starting new game.
3B	N.O.	20P 70P	Blue(Plastic) Orange(Plastic)	Resets trip relay bank when starting new game.
4A	N.O.	14-3 18-3	Red-Green Red-Black	(Closed when shutter is open) In series with circuit to close shutter if game is tilted while shutter is open.
4B	N.C.	21-3 40-8	Blue-Red Green	(Closed when shutter is closed) In series with circuits to move magic-screen, collect scores, energize selector lock relays, and energize red, or yellow roll-over trip relays.
4C	N.O.	18-3 45-8	Red-Black Green-White	(Closed when shutter is open) In series with function of switch 4A.
4D	N.C.	10-13 40-8	Red Green	(Closed when shutter is closed) In series with circuit to energize before 5th or after 5th selector lock relays.
4E	N.O.	63-8 30	Brown-Yellow Yellow	Completes lock-in circuit for position 29 relay.
5A	N.C.	65-2 98-8	Brown-White Gray-Black	(Closed when shutter is closed) Same function as switch 1C.
5B	N.O.	31-4 91-4	Yellow-Red Gray-Red	(Closed when shutter is open) In series with lock-in circuit for lifter start relay.
5C	N.O.	85-2 91-13	Black-White Gray-Red	(Closed when shutter is open) In series with circuit for game advantages.
5D	N.O.	80-16 30	Black Yellow	(Closed when shutter is open) In series with circuit to put blue replay counter back to zero when starting new game.
5E S.P.D.T.		61 10-10 93-2	Brown-Red Red Gray-Yellow	Directs circuits to open shutter, and energize mixer latch, and timer cams index coils.
6A	N.C.	91-15 70	Gray-Red Orange	NOTE: This switch is mounted on bracket under cam 6. (Open only during shutter cycle) Completes circuit to energize red button relay.
6A	N.O.	71-8 30	Orange-Red Yellow	Resets timer unit when starting new game.
6B	N.O.	78-3 30	Orange-Black Yellow	Resets red letter feature unit, green, red and yellow score units, and magic screen feature unit when starting new game.

SHUTTER MOTOR

(MOTOR PART NO. E-119-99)

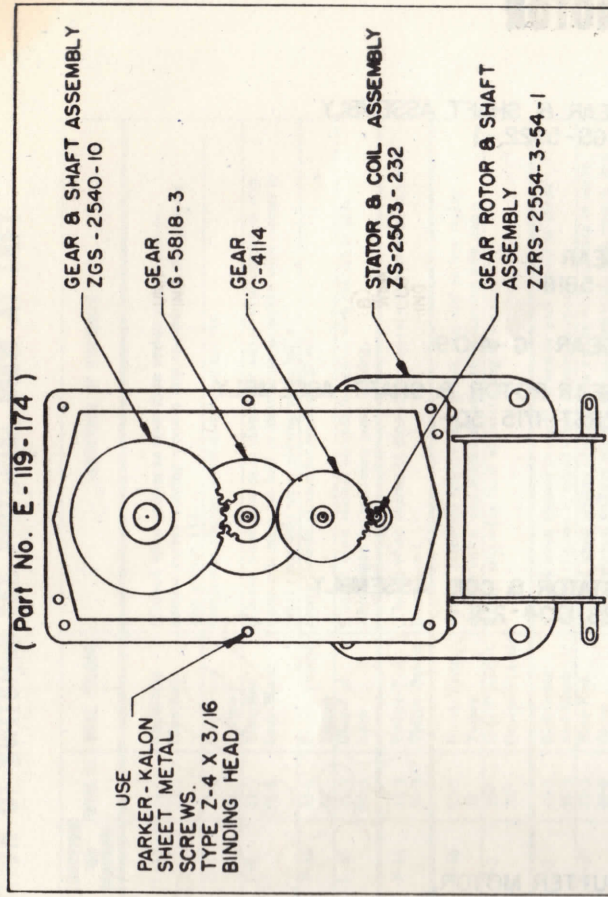
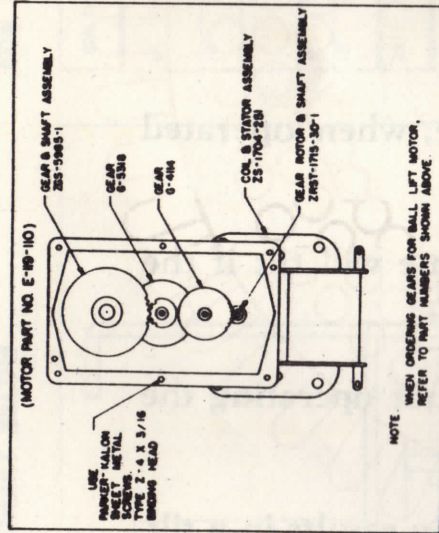
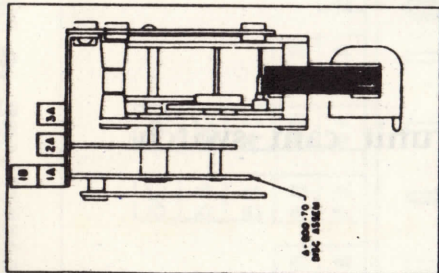


NOTE:
WHEN ORDERING GEARS FOR SHUTTER MOTOR, REFER TO PART NUMBERS SHOWN ABOVE.

NEW ANTI-CHEAT COIN SWITCH CIRCUIT

The coin switch gives a very short pulse, when operated by a coin. With this new circuit, the game will tilt if the pulse is not as short as from a coin, so that operating the coin switch with wire, strings, etc., usually results in a tilt.

The circuit is completed thru control unit cam switch #4D (on wiring diagram at G-5).



BALL LIFT MOTOR CAM SWITCH CHART
FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

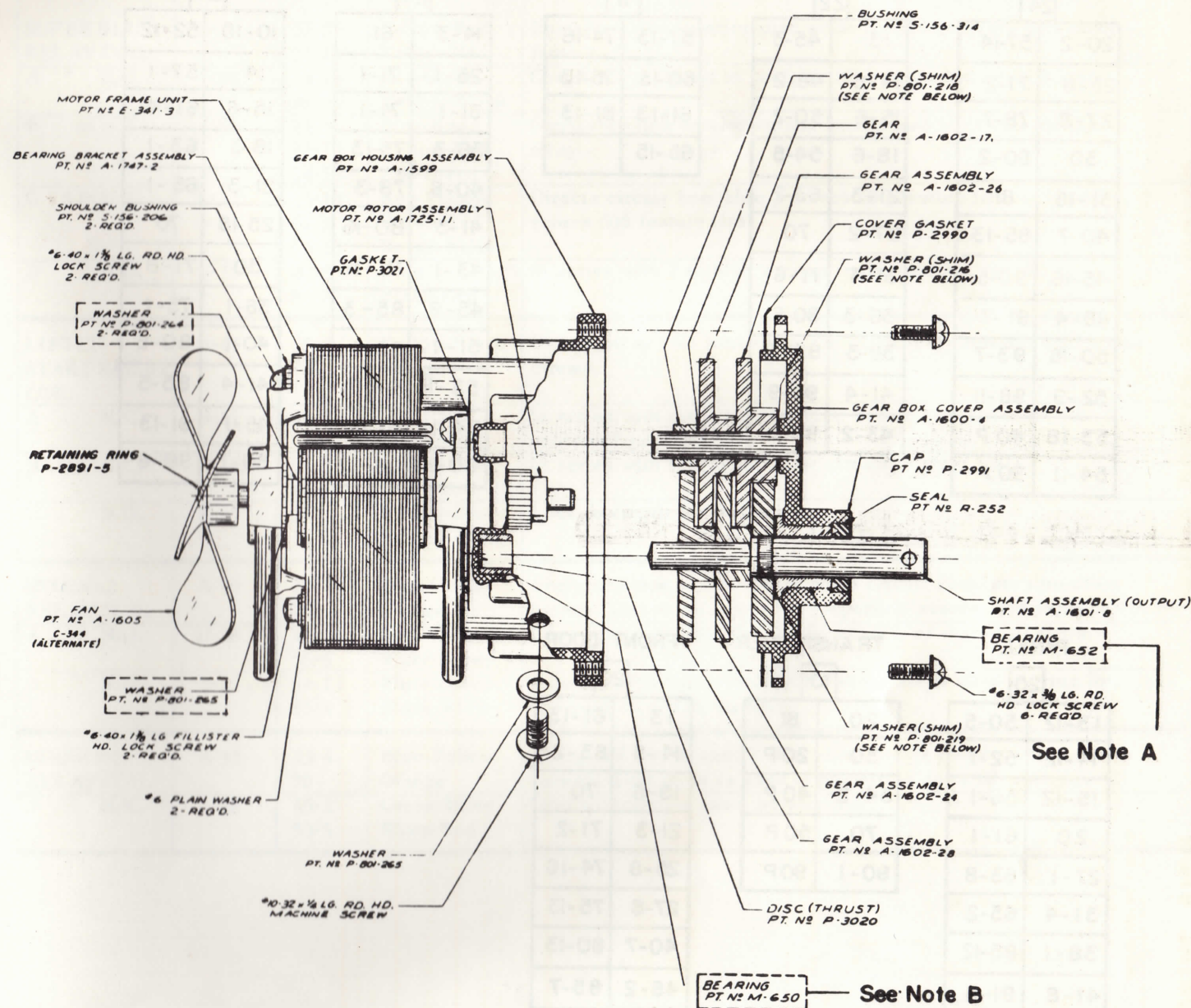
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	H.C.	0-11	Red-White Black-White	(Safety circuit) for before 8th selector lock trip relay.
1B	H.O.	0-14 30	Gray-Red Yellow	Completes carry-over circuit to ball lift motor.
2A	H.O.	27-2 49-2	Blue-Orange Green-Yellow	Completes circuit to energize timer unit step-up coil.
3A	H.O.	31-3 89-7	Blue-Red Black-Yellow	Completes circuit to energize before 4th selector lock relay, thru timer unit disc.

MAGIC SCREEN UNIT PARTS

PART No.	NAME
AS-1809-2	Complete Magic Screen Unit assembly
W-851-4	Contact plate
26-GG-10	Coil
A-613-55	Core plug
AS-1846-1	Index Arm and plunger assembly
P-163-32	Key Washer
M-943	Ladder Chain
P-801-310	Leather Washer
E-119-174	Motor
S-496-152	Plunger only for AS-1846-1

NOTE :
WHEN ORDERING GEARS FOR MAGIC SCREEN UNIT MOTOR, REFER TO PART NUMBERS SHOWN ABOVE.

MOTOR ASSEMBLY (Part No. E-119-212)



NOTE
IN ORDER TO MAINTAIN PROPER CLEARANCES BETWEEN GEARS IT IS MOST IMPORTANT THAT WHEN REASSEMBLING GEAR TRAIN:
1. SHIMS BE REPLACED IN THEIR RESPECTIVE LOCATIONS.
2. SAME NUMBER OF SHIMS BE REPLACED IN EACH RESPECTIVE LOCATION.

NOTE A: Bearing M-652 is part of Gear Box Cover Assembly A-1600-4 and cannot be ordered separately.
NOTE B: Bearing M-650 is part of Gear Box Housing Assembly A-1599 and cannot be ordered separately.

CABINET				PANEL			
24		22		8		24	
20-2	57-14	13	45-3	57-13	74-16	14-3	61
25-8	71-2	14-5	48-2	60-13	75-13	25-1	71-1
27-8	78-7	15-6	50-2	61-13	81-13	31-1	74-1
30	80-2	18-6	54-5	65-15		36-3	75-13
31-16	81	21-3	63-2			40-8	78-3
40-7	85-13	27-2	70			41-5	80-16
45-16	90-5	31-4	71-6			43-1	81-16
48-4	91-7	36-3	80-6			45-8	85-3
50-16	93-7	38-3	85-7			51-1	90-1
52-9	98-11	41-4	90-9			53-1	91-15
53-18	40 P	43-2	91-1			54-1	93-2
54-11	90 P					60-1	98-12

PANEL		TRANSFORMER		FRONT DOOR	
20		10		20	
13-12	50-5	20	81	13	61-13
14-12	52-1	30	20 P	14-5	63-2
15-12	56-1	54-2	40 P	18-6	70
20	61-1	70	50 P	21-3	71-2
27-1	63-8	80-1	90 P	25-8	74-16
31-4	65-2			27-8	75-13
38-1	85-12			40-7	80-13
41-8	91-4			48-2	85-7
45-16	20 P			50-2	90-9
48-1	70 P			57-13	

PLUG SHEET FOR CIRCUS QUEEN

MISCELLANEOUS RELAYS SWITCH CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SUPER BLUE RELAY COIL	A-38	31-15 31-15	Yellow-Red Yellow-Red	Energized thru spotting disc when circuit complete thru other factors.
A N.O.	C-38	14-13 38-16	Red-Green Yellow-Black	Completes a circuit to energize blue score booster trip relay.
B M.B.B.	B-38	21-3 31-15 14-13	Blue-Red Yellow-Red Red-Green	Completes lock-in circuit, and breaks pull in circuit for this relay.
C S.P.D.T.	L-12	13-13 61-9 63-13	Red-Yellow Brown-Red Brown-Yellow	Directs circuit from blue 3 scores 600 feature lite, to blue 2 scores 600 feature lite.
D N.O.	G-18	20-8 81-7	Blue Black-Red	In series with 2 in blue section replay scoring circuit.
LIFTER START RELAY COIL	A-45	38-8 70	Yellow-Black Orange	Energized by ball runway switch. This relay controls ball count circuit.
A N.C.	H-11	10-13 15-6	Red Red-White	In series with circuit to energize before 5th, and after 5th selector lock relays.
B N.C.	G-14	31-3 41-4	Yellow-Red Green-Red	In series with ball lifter motor circuit to raise balls.
C N.O.	E-45	36 38-8	Yellow-Brown Yellow-Black	Lock-in circuit for this relay.
MIXER #2 RELAY COIL	A-28	27-7 70	Blue-Orange Orange	Energized thru mixer #2 disc when circuit complete thru other factors. This relay is used to proportion scores, and extra-ball steps.
A N.O.	H-28	15-7 56-6	Red-White White-Brown	Completes probable circuits for scores, or extra ball steps.
B N.O.	E-28	54-12 85-4	White-Green Black-White	Completes probable circuits for score steps when playing for scores only. (Blue Button)
MIXER #4 RELAY COIL	A-33	23-4 70	Blue-Yellow Orange	Energized thru mixer #4 disc when circuit complete thru other factors. This relay is used to proportion game advantages.
A N.C.	I-28	45-2 51-5	Green-White White-Red	Opens circuit for game advantages.

NOTES

NOTES

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-292-11	Back glass
M-281-14	Lock and keys (2) keyed alike
E-122-19	Transformer

Back Door Assembly:

M-281-24	Lock and keys (2) keyed alike
SW-100-106	Lock switch
E-300-115	Search relay bank assembly

Front Cabinet Assembly:

M-168-15	Ball
AS-187-17	Ball shooter assembly
AS-1835	Ball shooter housing
A-100-7	Ball shooter rod
SP-200-24	Ball shooter spring (long)
SP-243	Ball shooter spring (short)
R-108-3	Ball shooter tip
P-711-1	Cigarette holder
P-1900-47	Coin box
A-2304-2	Coin box cover
E-130-10	Counter—48 volt
P-4052	Legs
M-106-1	Leg bolt
M-163-4	Leg adjuster
P-2768-15	Ring—blue
E-108-57	Toggle switch

Front Door Assembly:

A-1538-2	Armature plate (AS-277-50)
A-1729-6	Button—metal
E-101-45	Coil for coin lock out
AS-277-50	Coin switch assembly 5¢ or 10¢
CA-567-116	Front door only
AS-2041-3	Front door assembly 5¢

Front Door Assembly (Continued):

Part No.	Name of Part
A-254-33	Hinge and bracket
M-281-6	Lock and keys
E-108-14	Micro switch for coin switch assembly 5¢ or 10¢
P-2768-5	Ring—red
P-2768-6	Ring—yellow
P-2768-7	Ring for M-281-6 lock
P-2768-16	Ring—green
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

Front Moulding Assembly:

A-2359	Coin slide 5¢ or 10¢
AS-1305-16	Front moulding assembly complete
A-1272-29	"R" Button
A-1272-30	Right button
A-1272-21	Left button
P-2210-81	5¢ plate
P-2210-80	10¢ Plate
P-2210-84	Plate—Red letter game
P-2210-85	Plate—Register all replays
P-2210-63	Plate for left & right button
P-2210-38	Plate for "R" button
CA-1053-2	Front moulding only

Panel Assembly:

AS-1315	Ball gate and switch assembly
C-326-9	Light shield post
R-115-4	Rebound rubber
M-170	Rebound spring—double post
C-387-1	Roll over button—red
C-387-2	Roll over button—yellow
R-243	Rubber ring for yellow post
R-243-2	Rubber ring for red post

Bally pin game lubricant now available in one half-pint
(8 Oz.) containers with plastic spout and screw cap.