

Bally[®]

BIKINI

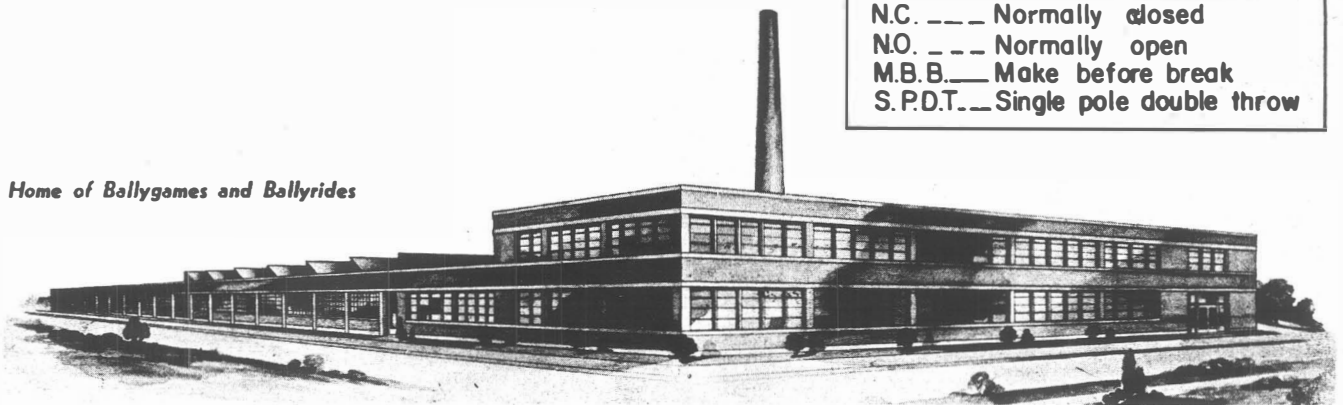
OPERATING INSTRUCTIONS AND PARTS CATALOG

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

Home of Ballygames and Ballyrides

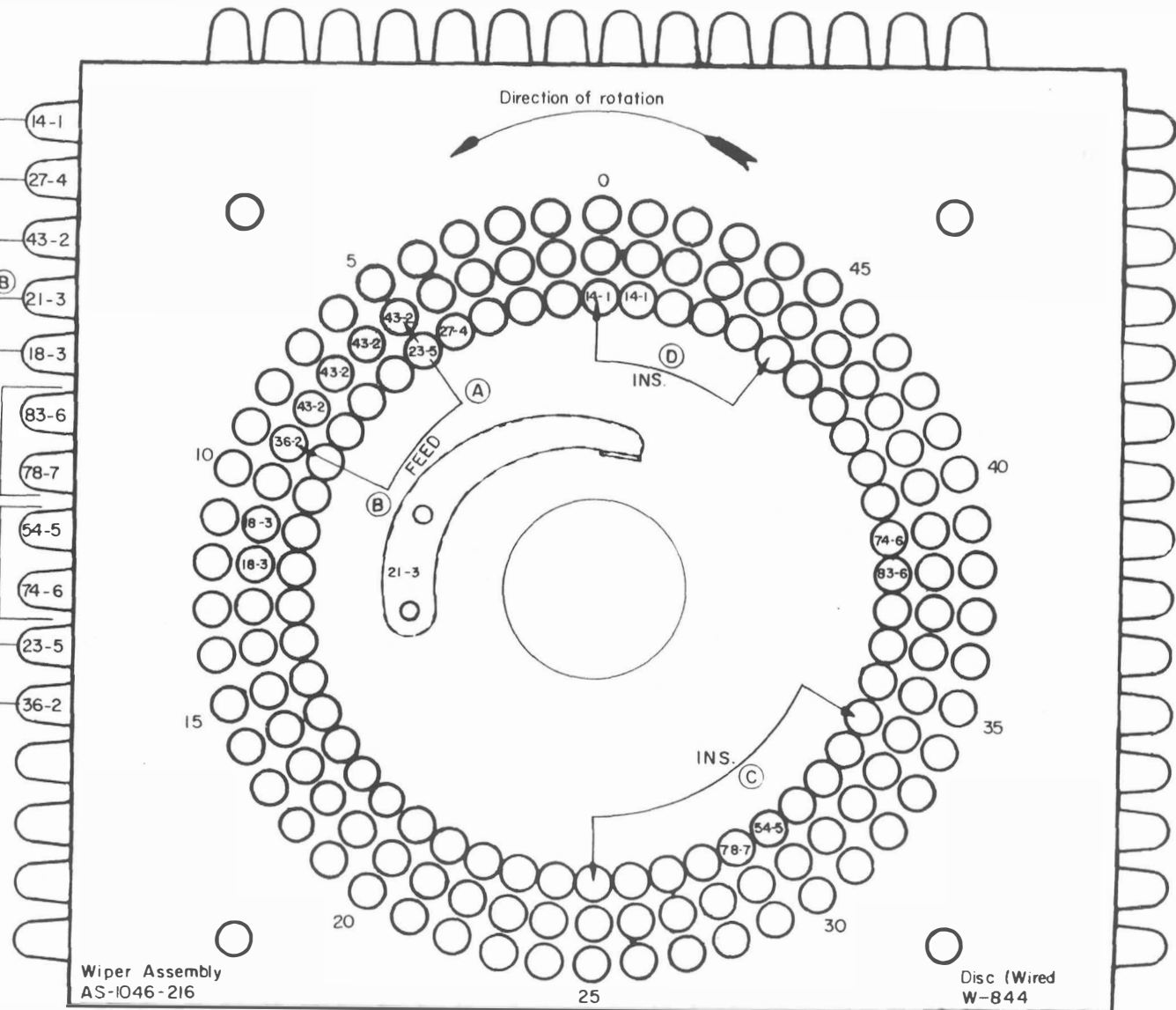




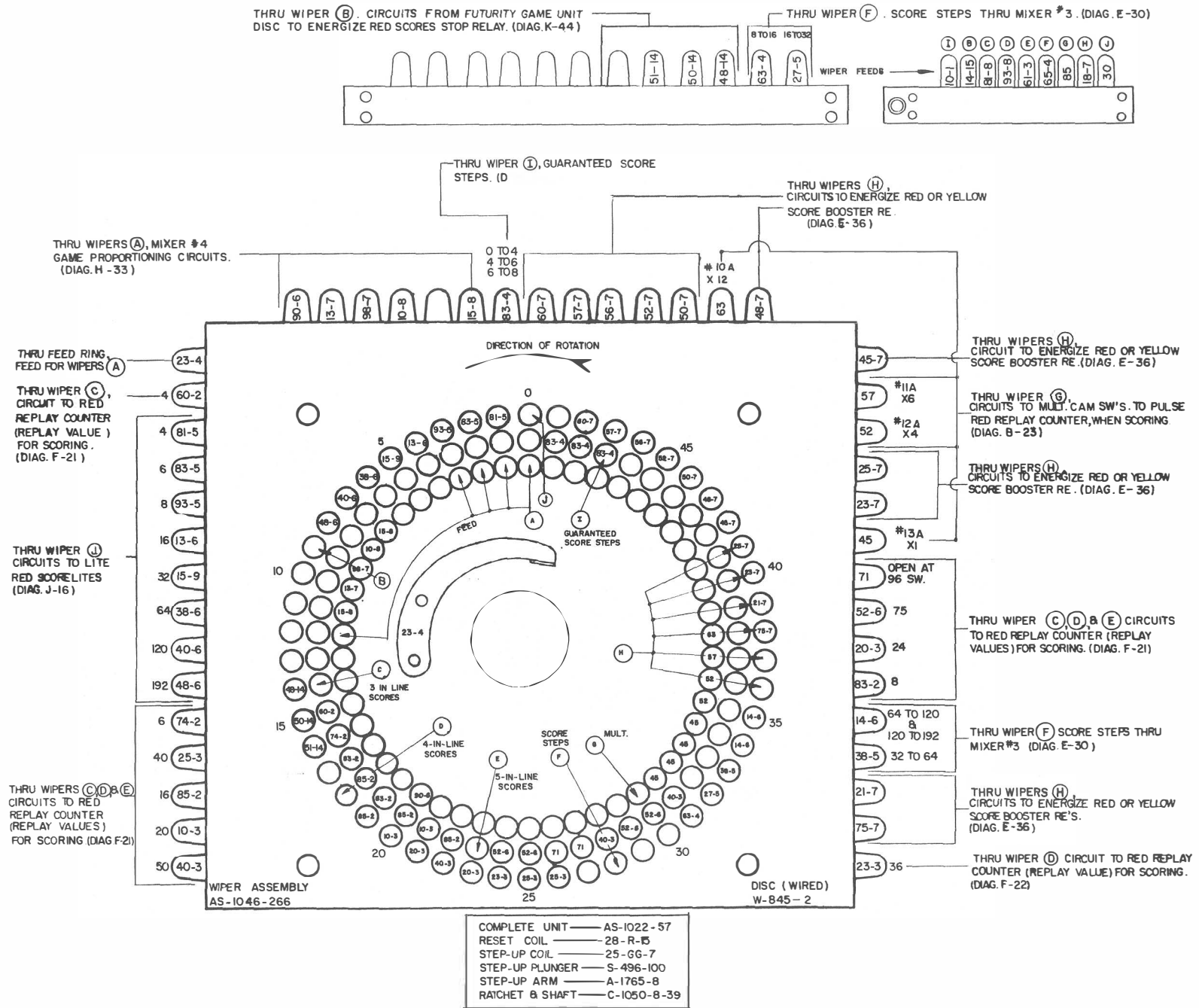
TIMER UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

- Feed for wipers (D) ——— 14-1
- Thru wipers (D), circuit to flash
"select-now" lite at 4th step (Diag. K-1) ——— 27-4
- Thru wiper (A), circuit to step this
unit 1st 4 steps. (Diag. H-8) ——— 43-2
- Thru feed ring, feed for wipers (A) & (B) ——— 21-3
- Thru wiper (B), circuit to close shutter
at 2nd step of unit. (Diag. H-8) ——— 18-3
- Thru wipers (C), circuit to energize
before 4th selector lock trip relay,
when 4th ball is shot. (Diag. C-11) ——— 83-6
78-7
- Thru wipers (C), circuit to energize
before 5th selector lock trip relay,
when 5th ball is shot. (Diag. C-11) ——— 54-5
74-6
- Thru wipers (D), circuit to flash
"select-now" lite at 5th step. (Diag. K-1) ——— 23-5
- Thru wiper (A), circuit to step unit
from 4th to 5th step. (Diag. H-8) ——— 36-2



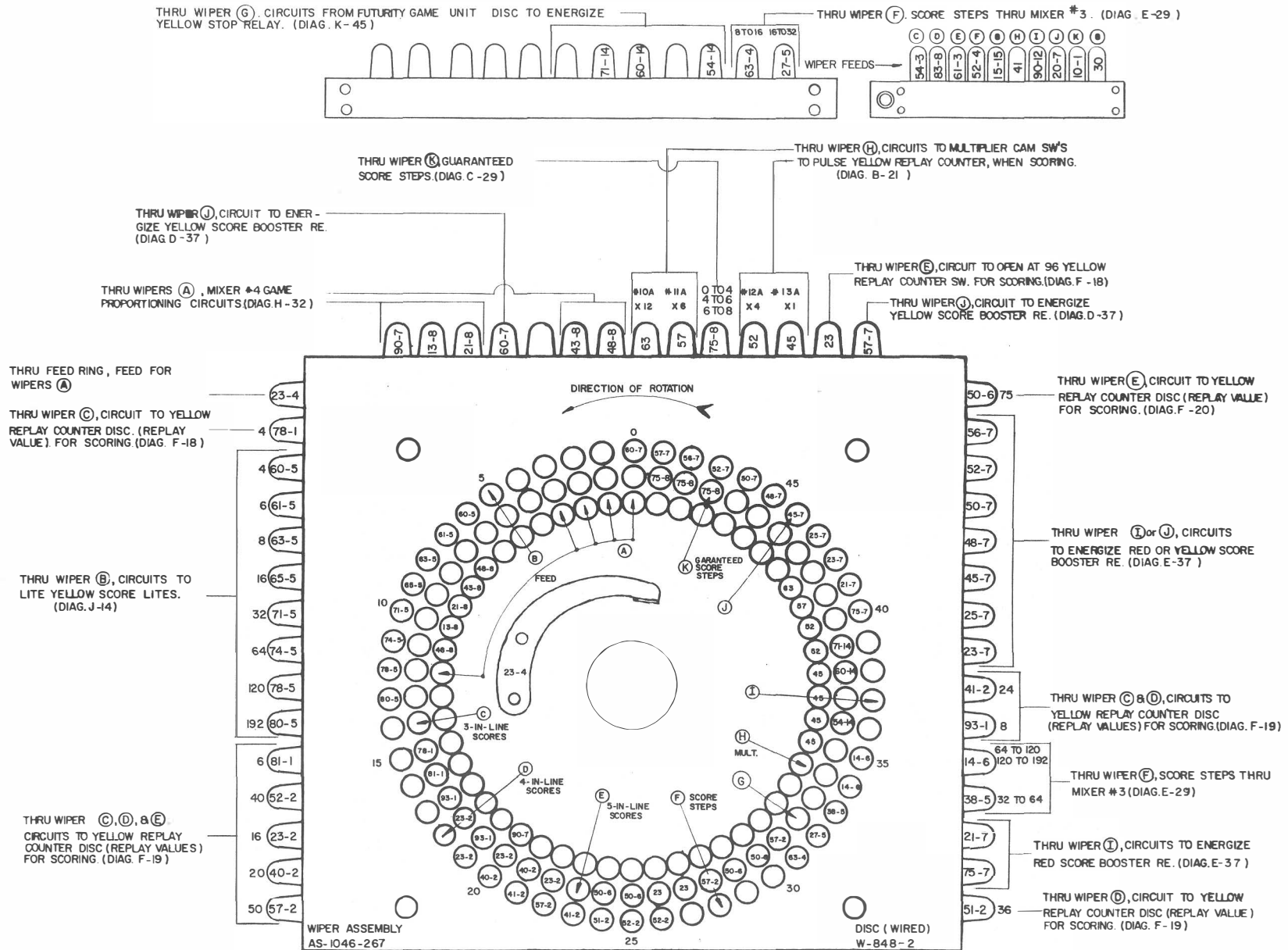
- Complete unit... AS-110-29
- Reset coil... 28-R-15
- Step-up coil... 25-GG-7
- Step-up plunger... S-496-100
- Step-up arm... A-1765-4
- Ratchet & shaft... C-1050-8-43



DIAG. C-31)

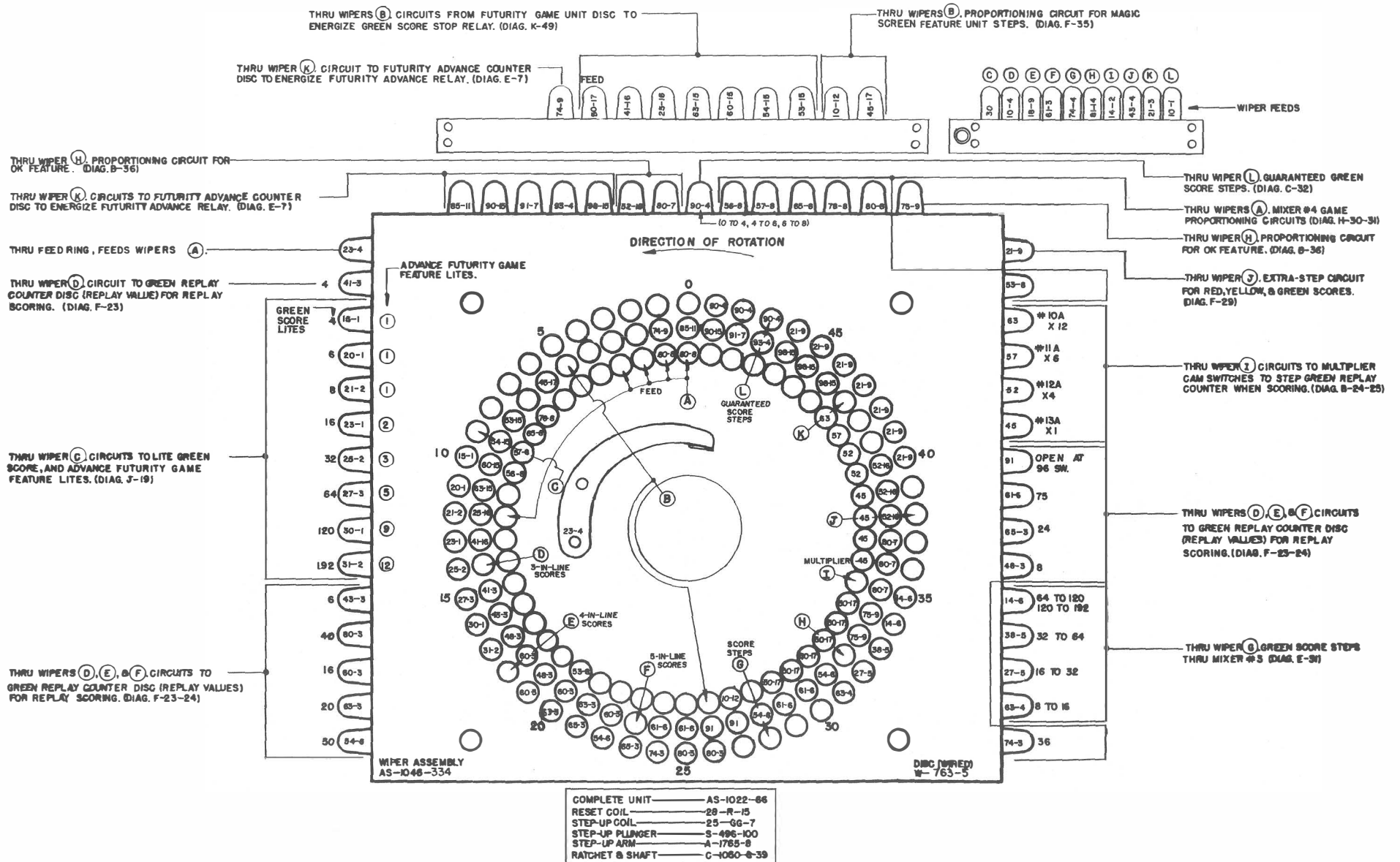
YELLOW SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



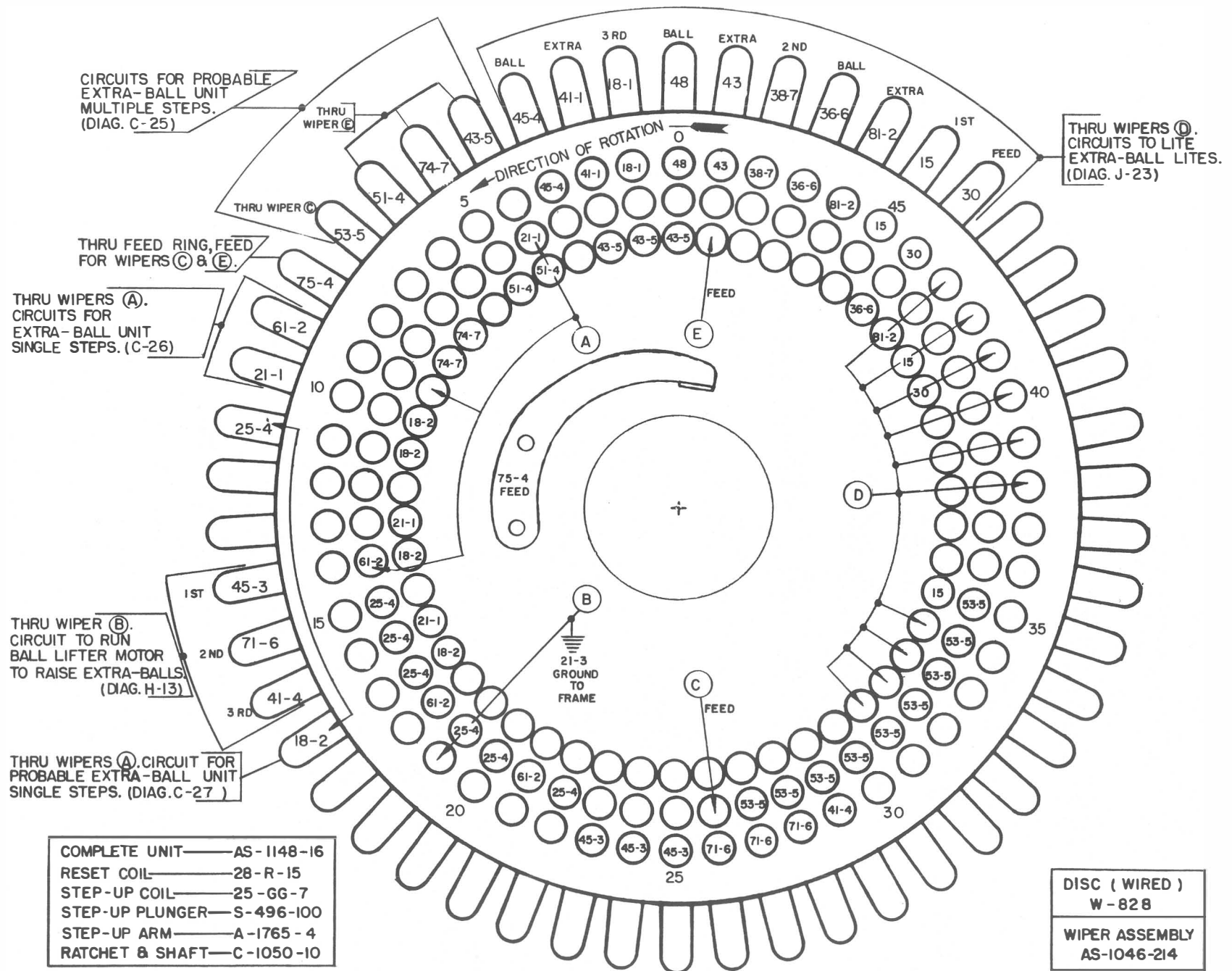
GREEN SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



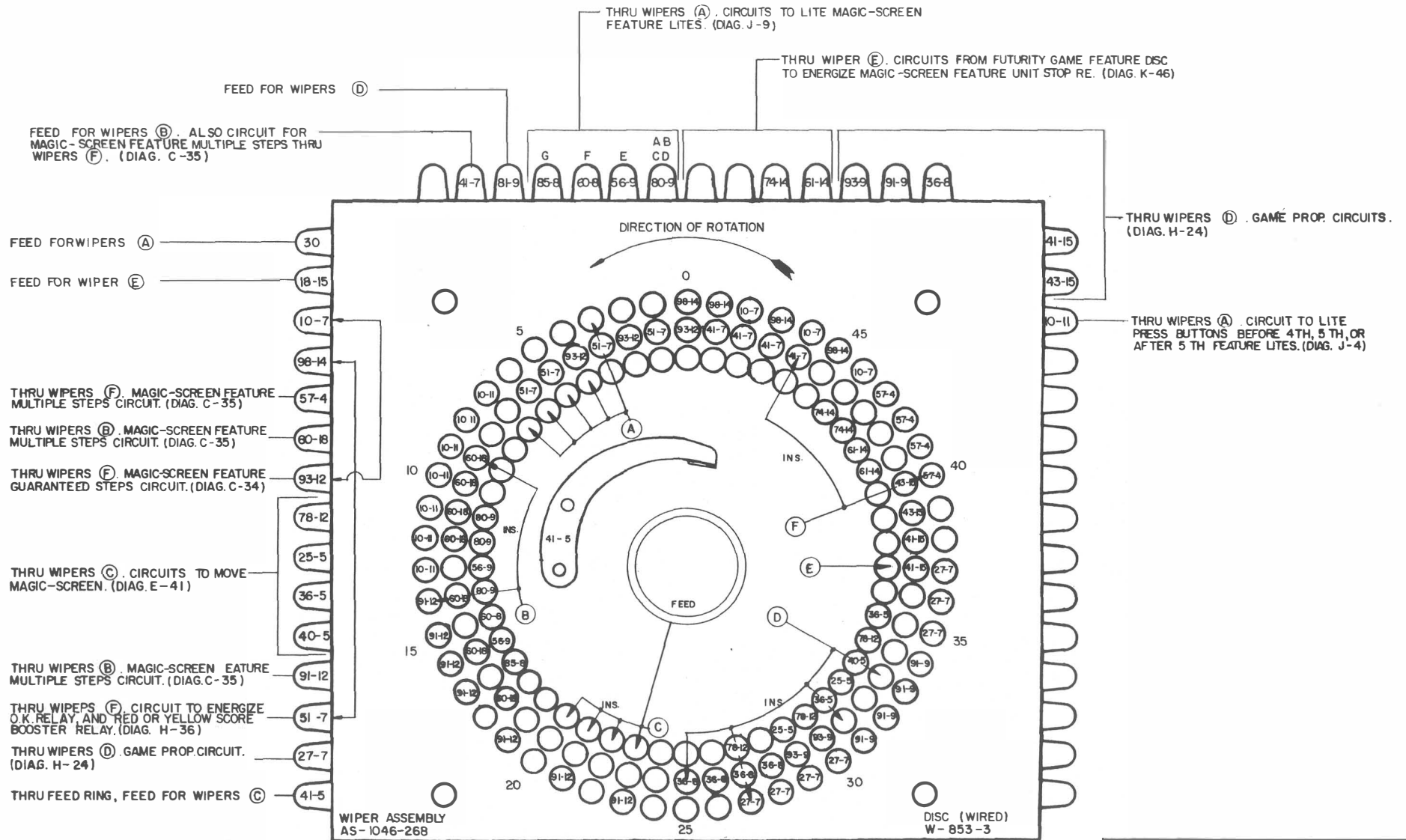
EXTRA BALL UNIT viewed from BUTTON or WIPER side

10 step unit. Wipers shown in zero or reset position

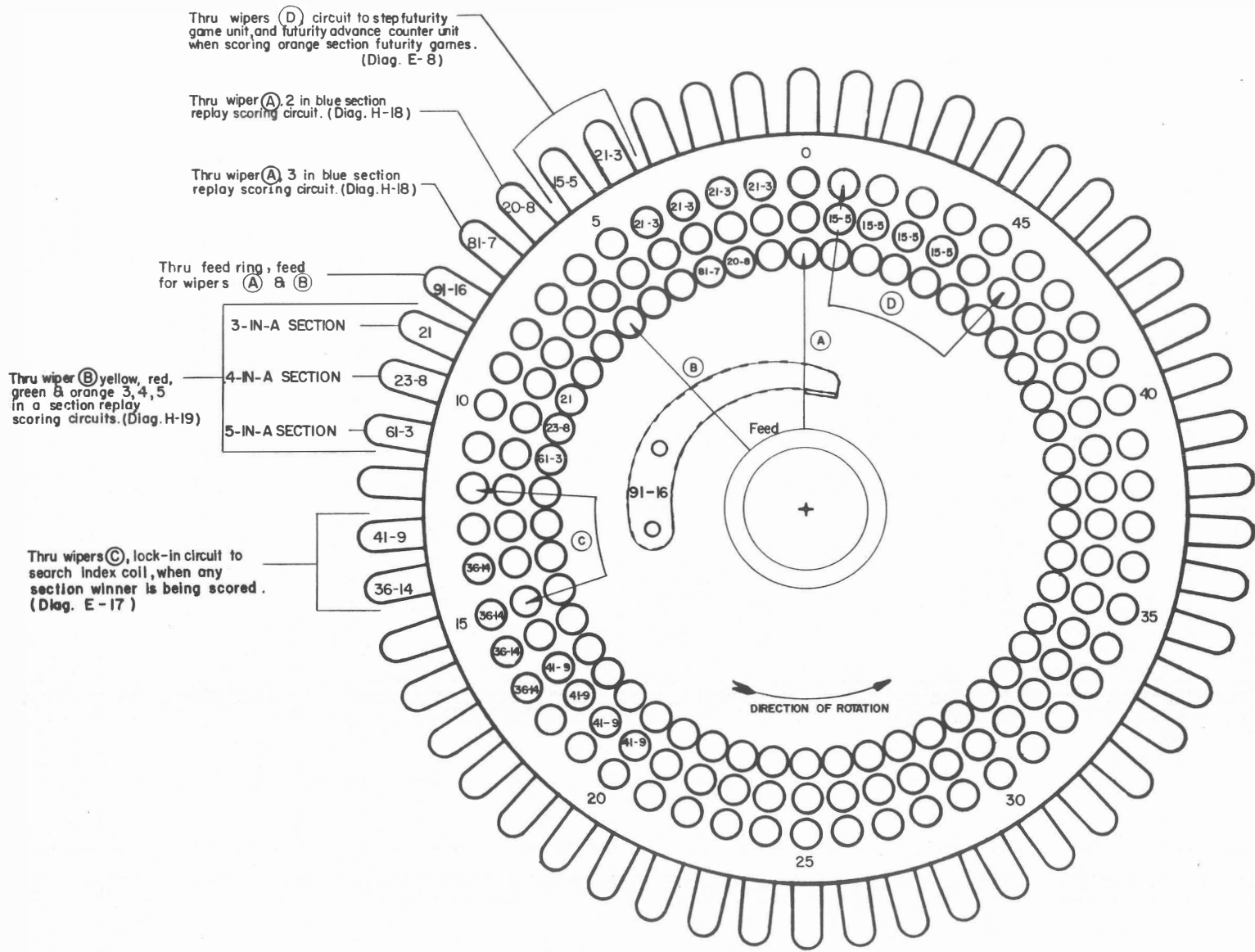


MAGIC SCREEN FEATURE UNIT viewed from BUTTON or WIPER side

12 step unit. Wipers shown in zero or reset position



COMPLETE UNIT.....	AS-827-95
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-1050-10-43



Thru wipers (D) circuit to step futurity game unit, and futurity advance counter unit when scoring orange section futurity games. (Diag. E-8)

Thru wiper (A) 2 in blue section replay scoring circuit. (Diag. H-18)

Thru wiper (A) 3 in blue section replay scoring circuit. (Diag. H-18)

Thru feed ring, feed for wipers (A) & (B)

3-IN-A SECTION

4-IN-A SECTION

5-IN-A SECTION

Thru wiper (B) yellow, red, green & orange 3, 4, 5 in a section replay scoring circuits. (Diag. H-19)

Thru wipers (C), lock-in circuit to search index coil, when any section winner is being scored. (Diag. E-17)

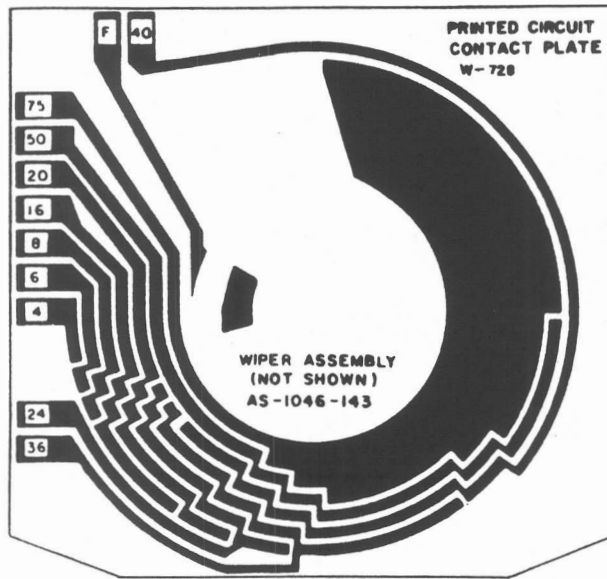
Complete unit... AS-827-94
 Reset coil 28-R-15
 Step-up coil.... 25-GG-7
 Step-up arm... A-1765-4
 Step-up plunger... S-496-100
 Ratchet & shaft... C-1050-5

Wiper Assembly
 AS-1046-265

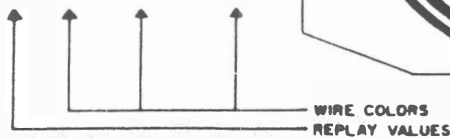
Disc (Wired)
 W-846-1

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

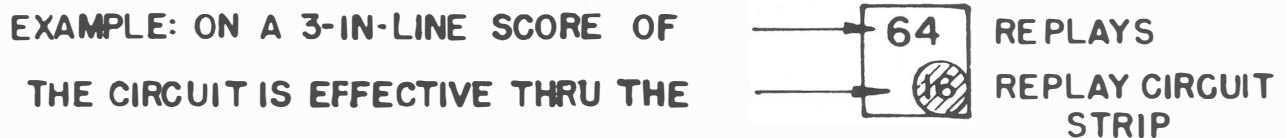


- Complete Unit - AS-797-36
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-116
- Step-up Arm - A-1765-4
- Ratchet & Shaft - C-100

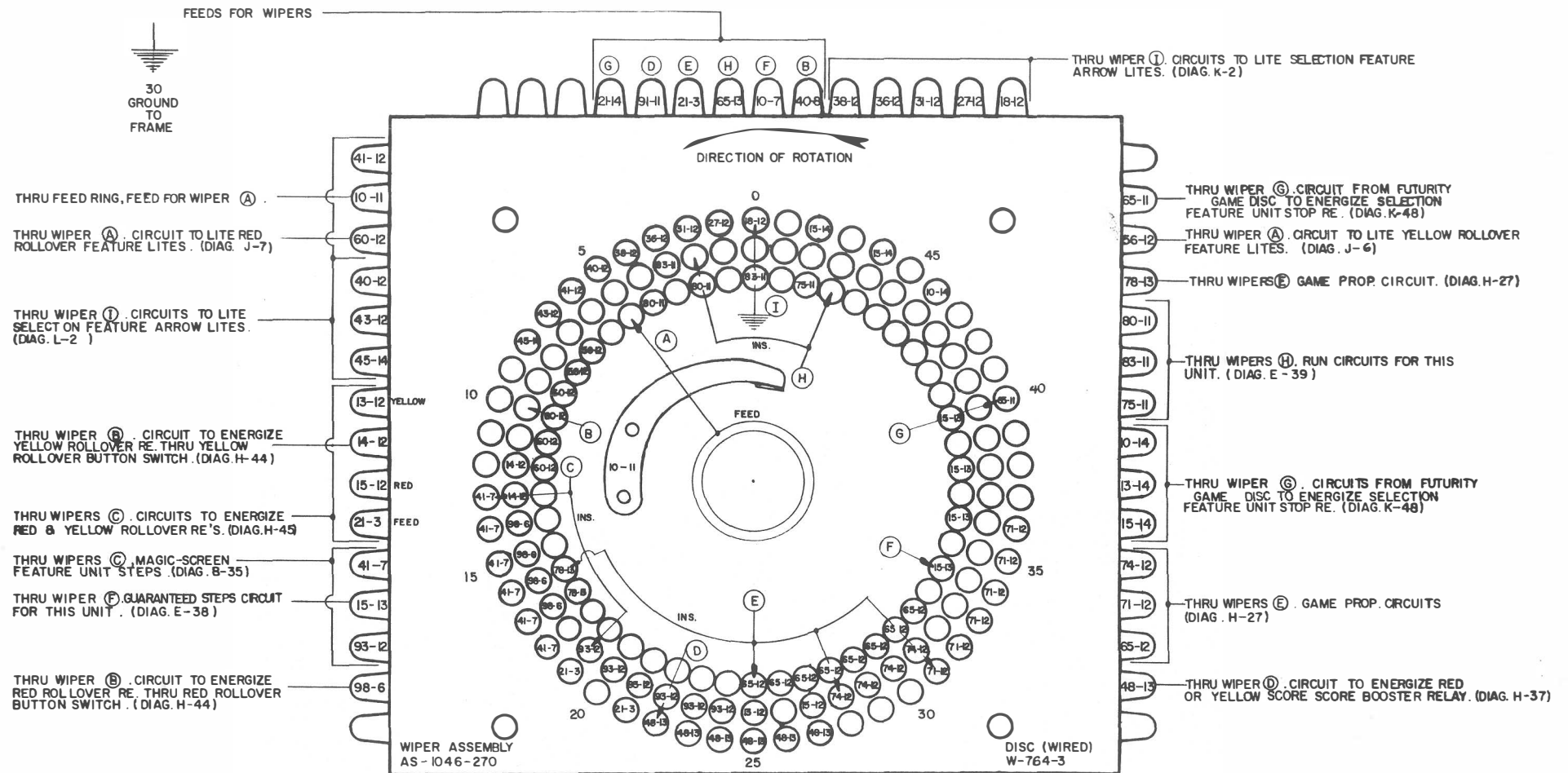


CAM SWITCHES THAT PULSE YELLOW, GREEN & RED REPLAY COUNTER STEP-UP COILS								
	sw.13A	sw.13A	sw.13A	sw.13A	sw.12A	sw.12A	sw.11A	sw.10A
5 IN LINE	75 	75 	96 	96 	200 	300 	450 	600
4 IN LINE	16 	20 	24 	50 	96 	144 	240 	480
3 IN LINE	4 	6 	8 	16 	32 	64 	120 	192

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.



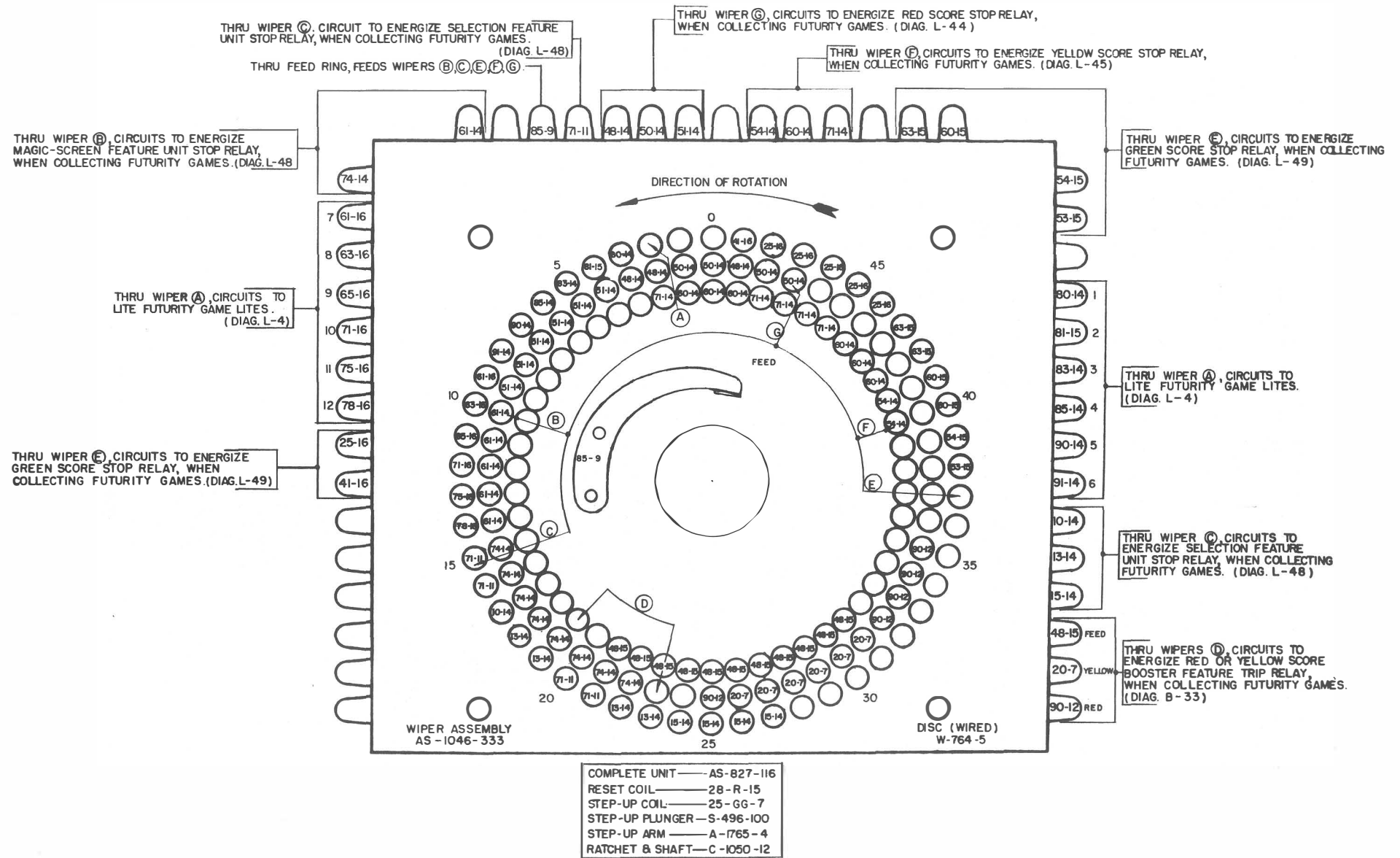
NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.



COMPLETE UNIT	AS-827-93
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-1050-8-41

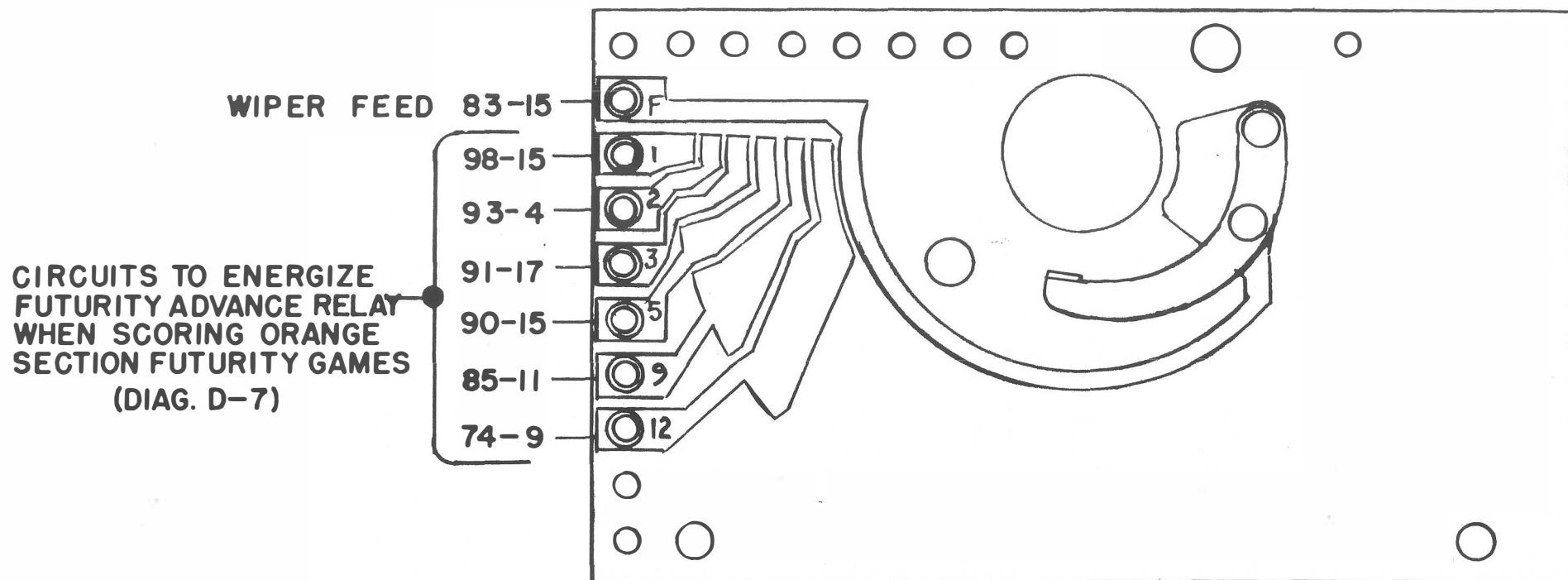
FUTURITY GAME UNIT viewed from BUTTON or WIPER side

12 step unit. Wipers shown in zero or reset position



FUTURITY ADVANCE COUNTER UNIT

viewed from BUTTON or WIPER side

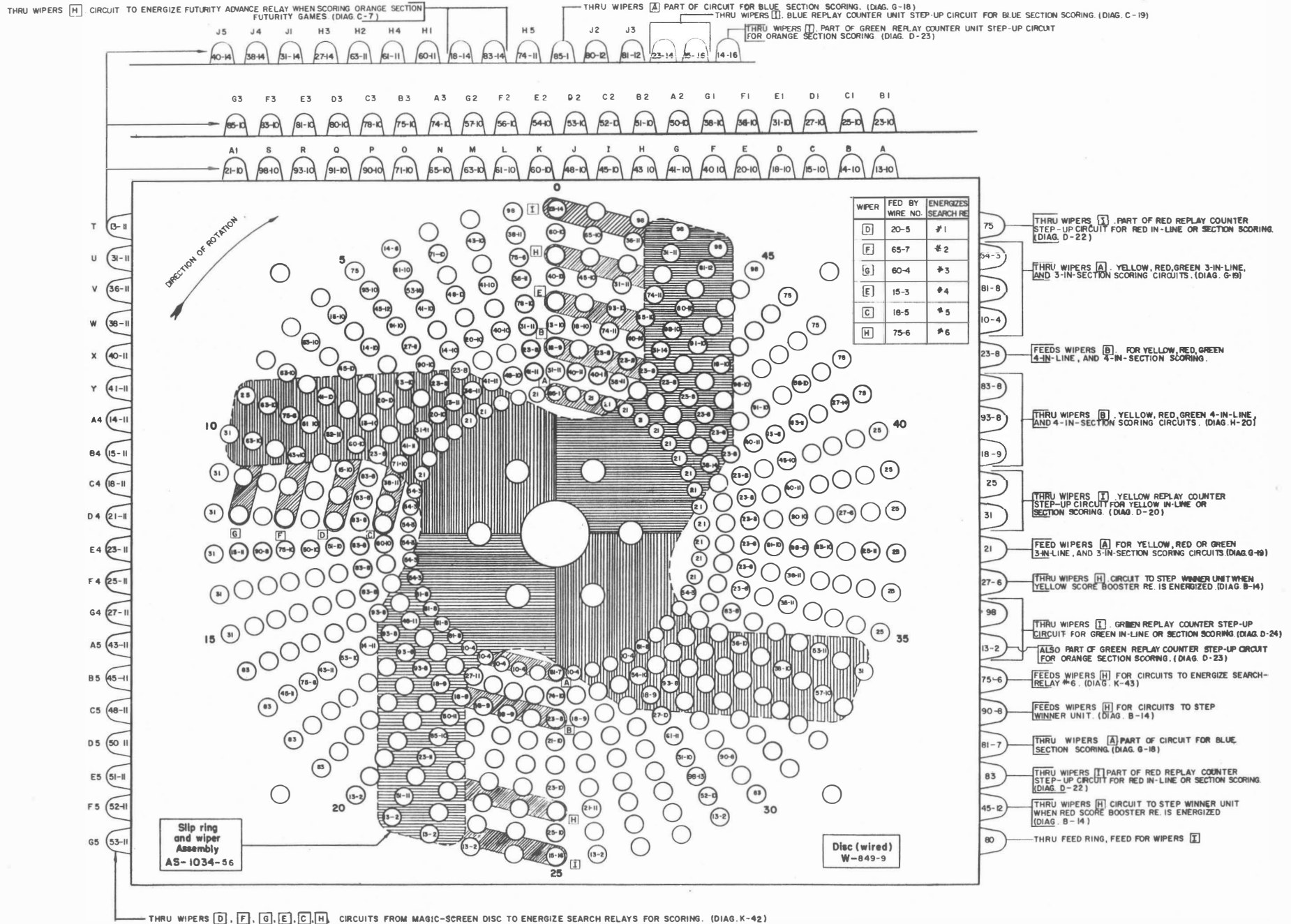


COMPLETE UNIT	AS-797-60
RESET COIL	28-R-15
STEP-UP COIL	25-GG-7
STEP-UP PLUNGER	S-496-116
STEP-UP ARM	A-1765-4
RATCHET & SHAFT	C-100-12

PRINTED CIRCUIT CONTACT PLATE W-945-6

WIPER ASSEMBLY AS-1046-143

SEARCH DISC viewed from BUTTON or WIPER side



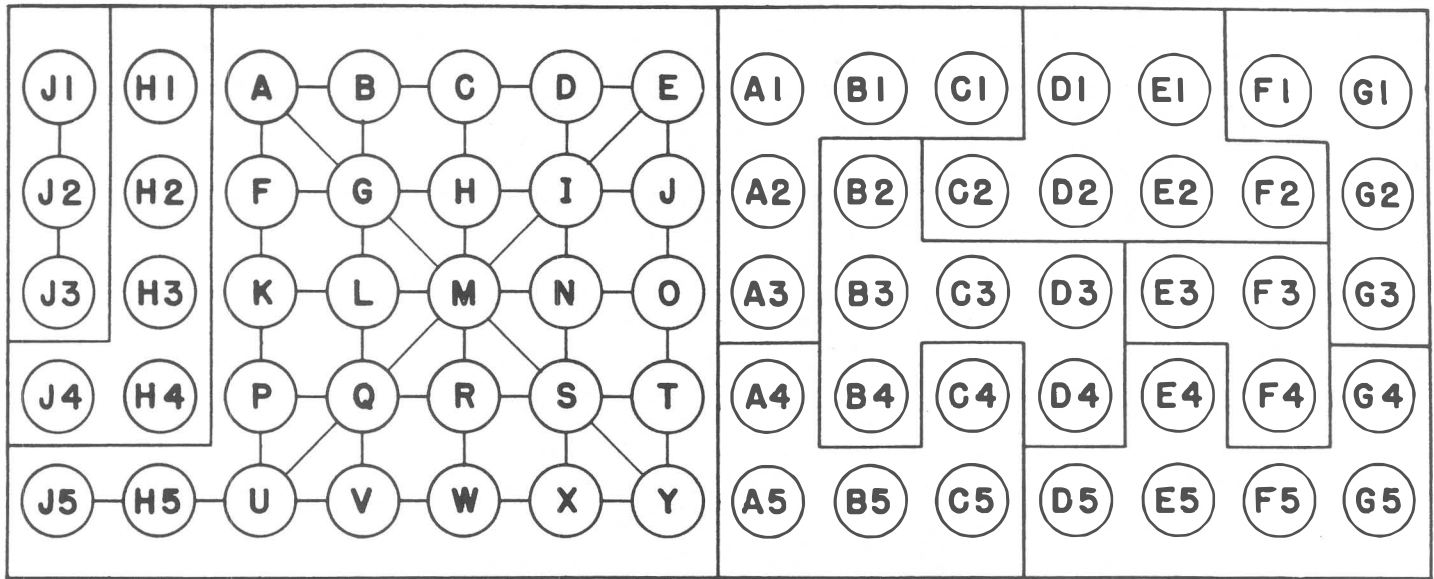
SEARCH POSITIONS CHART

	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
6 NO. GREEN SECTION	1	B2	B3	B4	C3	D3	D4
	2						
	3						
	4						
RED SUPER SECTION	5	A4	A5	B5	C4	C5	
	6						
	7						
YELLOW SECTION	8						
	9	D5	E4	E5	F5	G4	G5
	10						
	11						
YELLOW SUPER SECTION	12						
	13	A1	B1	C1	A2	A3	
	14						
	15						
RED SECTION	16						
	17	D1	E1	C2	D2	E2	F2
	18						
	19						
4 NO. GREEN SECTION	20						
	21	F1	G1	G2	G3		
	22						
	23						
BLUE SECTION	24						
	25	E3	F3	F4			
	26						
	27						
ORANGE SECTION	28						
	29	H1	H2	H3	H4	J4	
	30						
	31						
	32						
	33						
YELLOW	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	
RED	40	F	G	H	I	J	
	41	E	J	O	T	Y	
	42	B	G	L	Q	V	
	43	P	Q	R	S	T	
GREEN	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



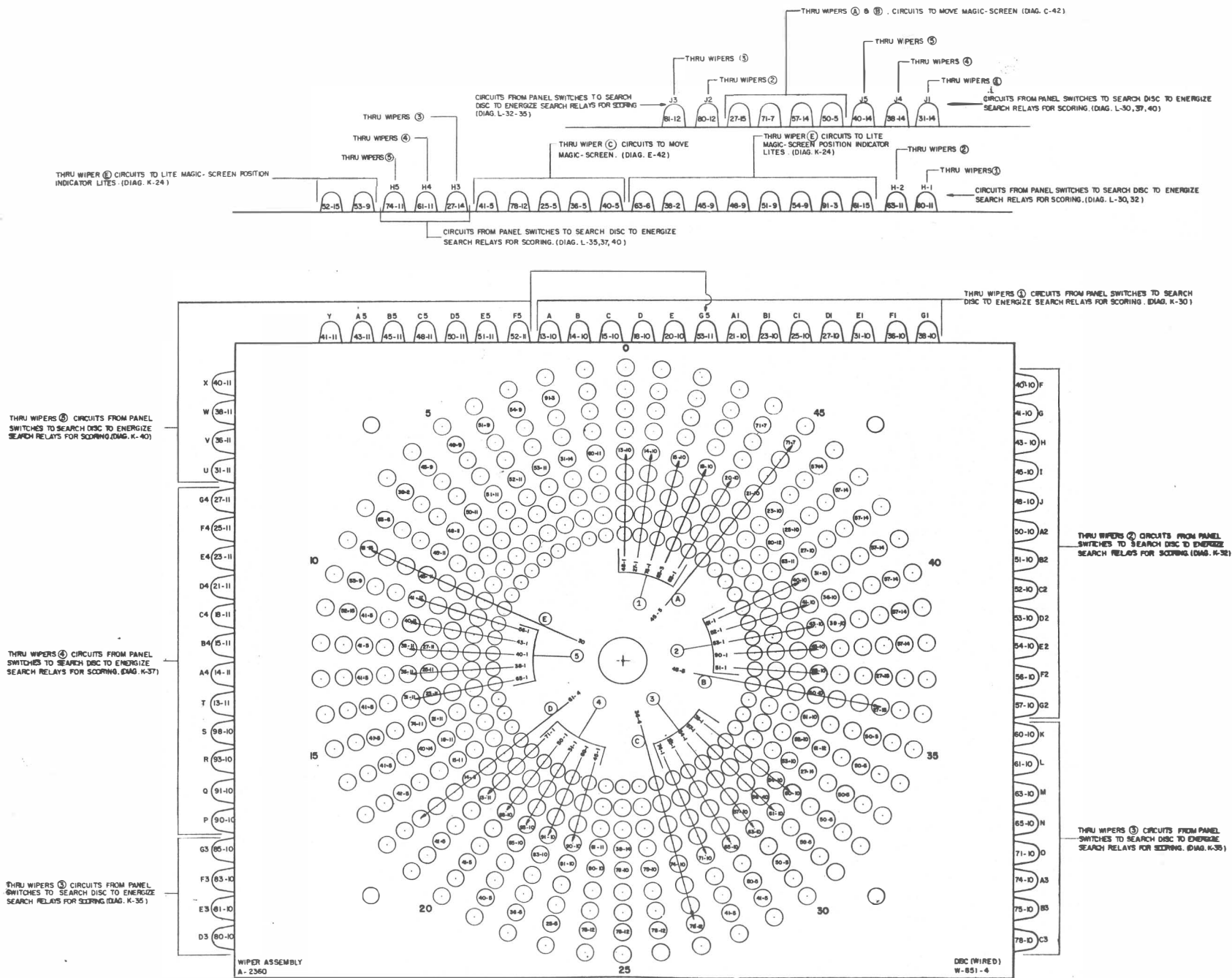
WHEN CHECKING OUT ANY "IN-LINE" OR "SECTION" REPLAY SCORING CIRCUIT, REFER TO SEARCH POSITIONS CHART FOR THE POSITION ON "SEARCH DISC" WHERE THAT "IN-LINE" OR "SECTION" REPLAY SCORING CIRCUIT IS SEARCHED.

EXAMPLE:

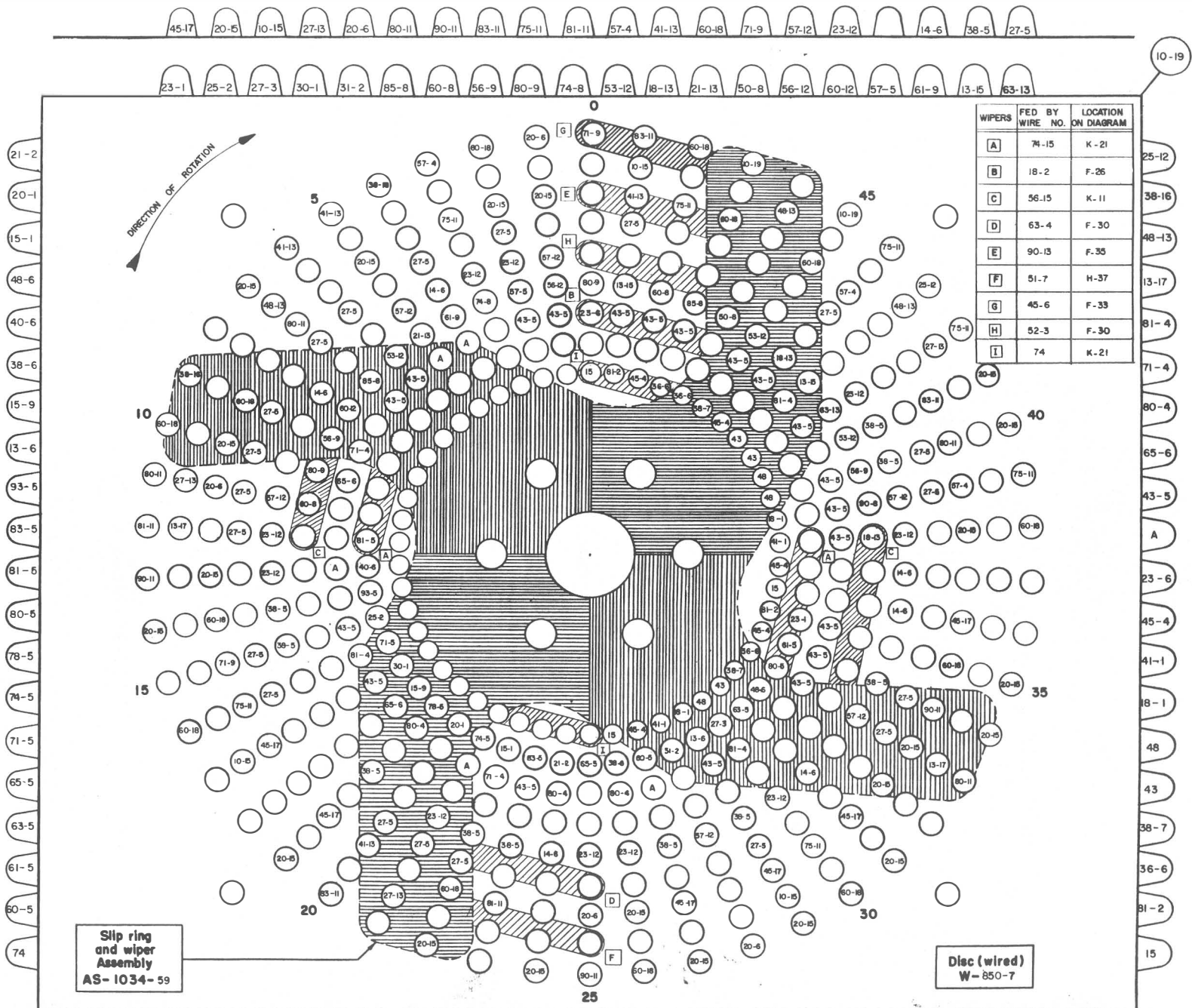
WITH BALLS IN PROPER HOLES ON PLAYFIELD CORRESPONDING TO

(J1) (J2) (J3) (SEE MAGIC-SCREEN LAYOUT ABOVE), REFER TO SEARCH POSITIONS CHART. THE CHART WILL SHOW THAT THIS YELLOW VERTICAL

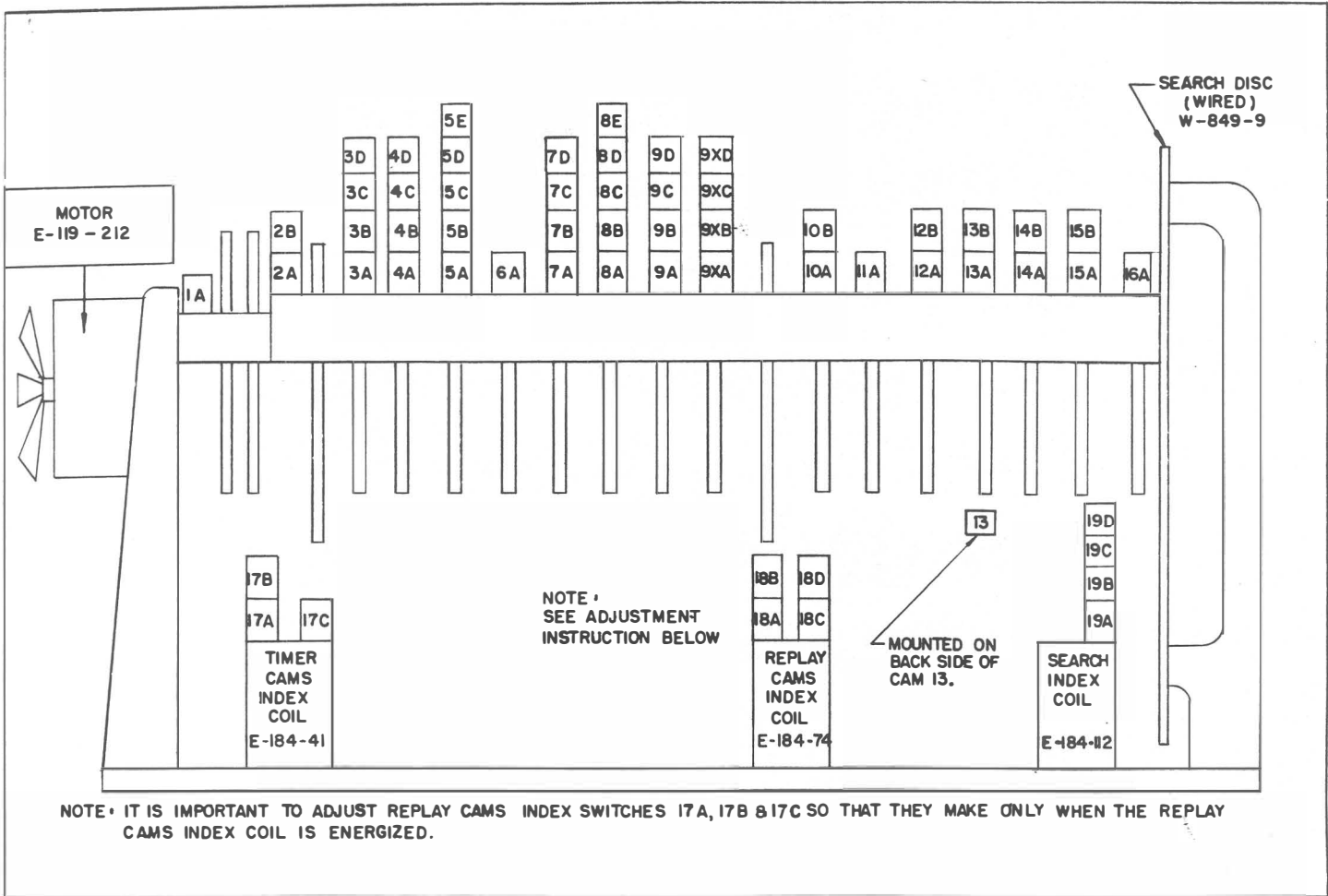
"3-IN-LINE" COMBINATION IS SEARCHED AT POSITION 34 ON THE "SEARCH DISC", THRU SEARCH DISC WIPERS [D] [F] & [G], AND SEARCH RELAYS #1 #2 #3 SHOULD BE ENERGIZED TO SCORE REPLAYS.



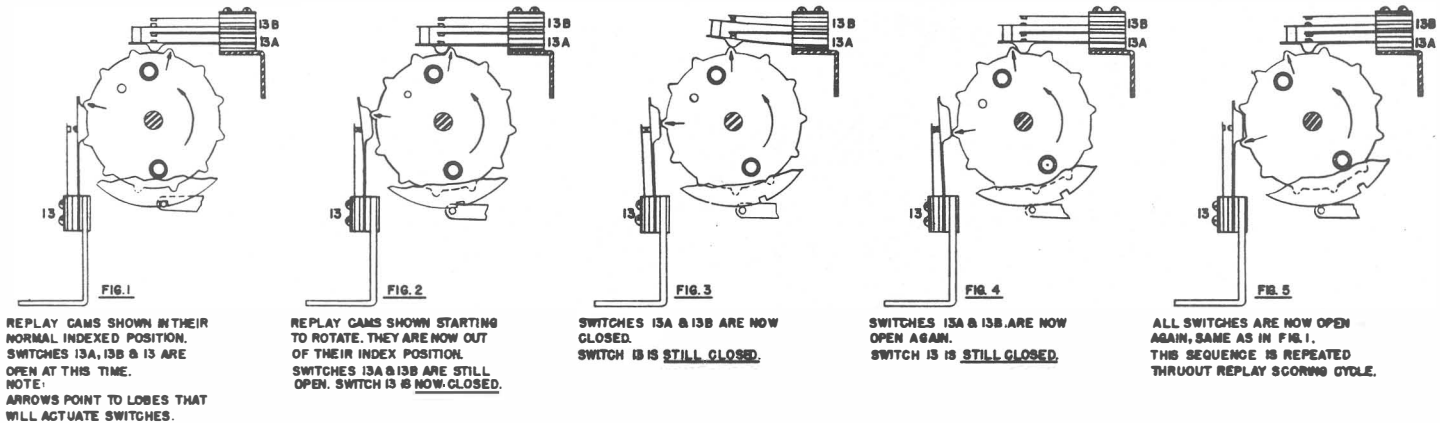
SPOTTING DISC viewed from BUTTON or WIPER side



CONTROL UNIT PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 21



CORRECT ADJUSTMENT: CONTROL UNIT SWITCHES 13, 13A, & 13B NOTICE: IMPORTANT PART OF ILLUSTRATION IS TO SHOW THAT SWITCH 13 CLOSSES FIRST AND OPENS LAST. IF AN ADJUSTMENT IS NECESSARY, SWITCH 13 CAN BE MOVED UP OR DOWN. LOOSEN SCREWS THAT HOLD SWITCH, THEN MOVE UP OR DOWN.



CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 20

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	G-8 36-9 65-2	Yellow-Brown Brown-White	In series with circuit to step timer unit after 5th ball is shot.
2A	N.O.	1-3 90-5 30	Gray Yellow	Pulses reflex play magnet coil, replay register unit reset coil, and total plays meter.
2B	N.O.	F-38 10-2 61-7	Red Brown-Red	Completes circuit to energize red or yellow score booster trip relay.
3A	N.C.	1-4 48-2 30	Green-Black Yellow	Opens start circuit.
3B	S.P.D.T.	B-18 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.	C-49 60-13 57-13 21-3	Brown White-Orange Blue-Red	Directs circuit to energize, and lock-in play scores relay.
3D	S.P.D.T.	C-47 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.	1-47 98-1 30	Gray-Black Yellow	Energizes spotting cams index coil.
4B	N.O.	E-46 56-5 30	White-Brown Yellow	Energizes score extra-step index coil.
4C	N.O.	D-5 27-9 80-2	Blue-Orange Black	Pulses coin meter (when coin meter is used).
4D	S.P.D.T.	G-5 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.	G-9 65-2 83-1	Brown-White Black-Yellow	Completes a circuit to reset timer when playing extra-balls.
5B	N.O.	B-26 21-1 38-4	Blue-Red Yellow-Black	Completes circuit for extra-ball unit single steps. (Guaranteed)
5C	N.O.	D-27 78-4 91-6	Orange-Black Gray-Red	Completes circuit to energize anti-cheat relay.
5D	N.O.	F-32 10-7 85-4	Red Black-White	Completes circuit for magic-screen feature unit, and selection feature unit single steps. (Guaranteed)
5E	N.C.	D-47 21-3 40-15	Blue-Red Green	Opens features lock relay, and score lock relay lock-in circuit.
6A	N.C.	1-29 51-5 75-5	White-Red Orange-White	Opens circuit for game advantages during spin.
7A	N.O.	D-28 10-1 54-12	Red White-Green	Completes circuit for yellow, red, and green score unit guaranteed single steps.
7B	N.O.	D-47 21-3 43-14	Blue-Red Green-Yellow	Completes circuit to energize features lock relay or scores lock relay when playing for scores or features.
7C	N.O.	F-28 60-6 63-4	Brown Brown-Yellow	Completes circuit for yellow, red, and green score unit steps.
7D	N.O.	F-29 52-3 60-6	White-Blue Brown	Same function as switch 7C above.
8A	N.O.	B-27 18-7 61-7	Red-Black Brown-Red	Completes circuit for extra-ball unit steps.
8B	N.O.	F-36 18-7 61-7	Red-Black Brown-Red	Completes circuit to energize red or yellow score booster trip relay.
8C	N.O.	G-36 20-6 27-13	Blue Blue-Orange	Completes circuit to energize OK feature trip relay.
8D	N.O.	F-30 56-11 63-4	White-Brown Brown-Yellow	Completes circuit for yellow, red, and green score unit steps when playing for scores only.
8E	N.O.	D-28 54-12 91-5	White-Green Gray-Red	Completes circuit for yellow, red and green score unit guaranteed steps when playing for scores only.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
9A	Alt.	D-26 43-5 74-7	Green-Yellow Orange-Green	Proportioning circuit for extra-ball unit steps.
9B	Alt.	C-37 90-12 10-2 20-7	Gray Red Blue	Proportioning circuit for red or yellow score booster feature.
9C	Alt.	1-28 15-7 54-8	Red-White White-Green	Proportioning circuit for score unit steps, and extra-ball unit steps.
9D	Alt.	C-34 41-7 93-12	Green-Red Gray-Yellow	Proportioning circuit for magic-screen feature unit steps.
9XA	Alt.	E-38 14-13 25-12	Red-Green Blue-White	Proportioning circuit for blue feature. (2 in blue section scores 600)
9XB	Alt.	C-39 15-13 65-13	Red-White Brown-White	Proportioning circuit for selection feature unit steps.
9XC	Alt.	H-38 48-13 91-11	Green-Black Gray-Red	Proportioning circuit for red or yellow score booster feature.
9XD	Alt.	E-36 20-6 52-16	Blue White-Blue	Proportioning circuit for OK feature.
MULT. X12 10A	N.O.	A-22 63 70	Brown-Yellow Orange	Pulses yellow, red and green replay counter unit step-up coil, when scoring with red, yellow and green scores at 8th step.
MULT. X12 10B	N.O.	B-19 23-17 27-17	Blue-Yellow Blue-Orange	Pulses blue replay counter coil, when scoring 600 for blue section score.
MULT. X6 11A	N.O.	A-22 57 70	White-Orange Orange	Pulses yellow, red, and green replay counter unit step-up coil, when scoring with yellow, red, and green scores at 7th step.
MULT. X4 12A	N.O.	A-21 52 70	White-Blue Orange	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 12B	N.O.	B-20 10-16 27-17	Red Blue-Orange	Pulses blue replay counter coil, when scoring 300 for blue section score.
MULT. X1 13A	N.O.	A-21 45 70	Green-White 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.	D-17 48-4 80	Green-Black Black	Pulses replay register unit step-up coil, reflex replay magnet coil, and replay meter when scoring.
BACKSIDE 13	N.O.	H-17 21-3 27	Blue-Red Blue-Orange	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 14 18	Red-Green Red-Black	In series with all in-line and section replay scoring circuits.
14B	N.C.	C-8 27-2 90-2	Blue-Orange Gray	Opens timer unit step-up circuit during replay scoring.
CHANGEOVER 15A	S.P.D.T.	H-17 56 18 54	White-Brown Red-Black White-Green	Directs circuit for in-line or section replay scoring.
CHANGEOVER 15B	S.P.D.T.	D-16 80 51-8 41-9	Black White-Red Green-Red	Directs circuit to energize search index coil for in-line or section replay scoring.
16A	N.O.	1-48 21-3 31-6	Blue-Red Yellow-Red	Completes circuit to reset sequence unit, and winner unit.
TIMER CAMS INDEX COIL	A-6	93-2 70	Gray-Yellow Orange	Energized when playing coins or replays. (Each time start relay is energized)
17A	N.O.	G-1 20P 60P	Blue (Plastic) Brown (Plastic)	Completes a circuit to run control unit, and mixer-spotting unit motors.
17B	N.C.	G-6 27-9 71-2	Blue-Orange Orange-Red	Opens circuit to coin lock-out magnet coil.
17C	N.C.	F-12 13 30	Red-Yellow Yellow	Opens circuit to red button relay, and extra-ball trip relays.

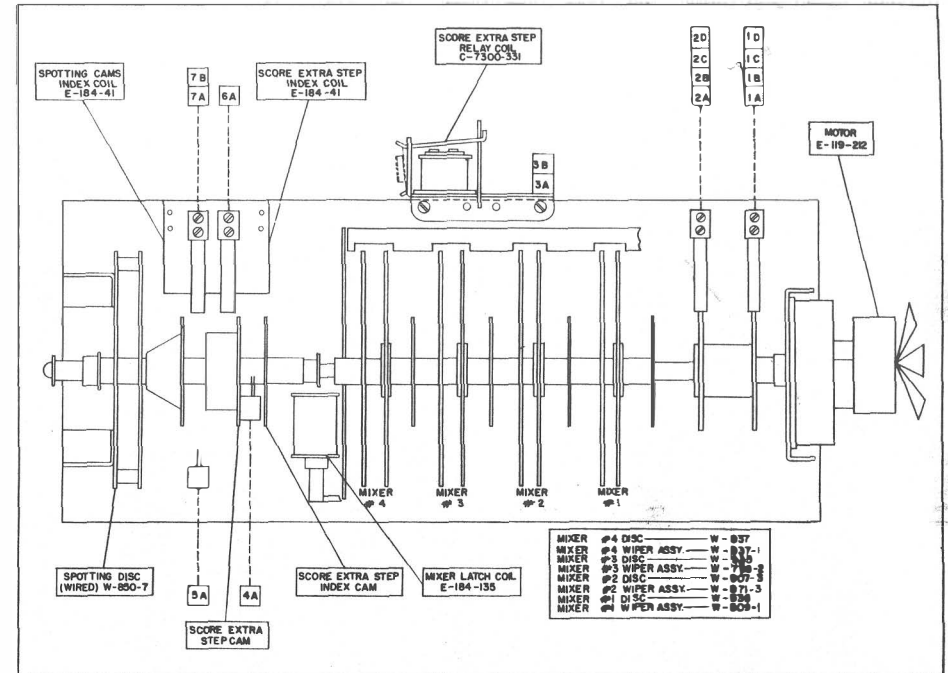
CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 20

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY CAMS INDEX COIL	A-16	40-4 70	Green Orange	Energized by search index switch #19C when scoring, and releases replay cams to register replays.
18A N.O.	G-18	27 80	Blue-Orange Black	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.	H-15	14 18	Red-Green Red-Black	Same function as switch 18A above.
18C N.O.	F-18	36-14 80	Yellow-Brown Black	In series with section replay scoring lock-in circuit.
18D N.C.	B-16	15-2 91-8	Red-White Gray-Red	Opens direct 50 volt circuit to search index coil. Coil then held in thru 15 ohm 10 watt resistor.
SEARCH INDEX COIL	A-16	15-2 70	Red-White Orange	Energized when scoring in-line or section scores, and stops search wipers at proper position to record scores.
19A N.C.	E-43	10-9 63-8	Red Brown-Yellow	Opens circuit to collect futurity game relay.
19B N.O.	H-18	54 91-16	White-Green Gray-Red	In series with section replay scoring circuit.
19C N.O.	C-16	40-4 60	Green Brown	Completes circuit to energize replay cams index coil.
19D N.O.	B-8	51-16 57-17	White-Red White-Orange	Completes circuit to step futurity game unit, and futurity advance counter unit, when scoring orange section futurity games.
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 20A N.C.	H-42	14-4 20-2	Red-Green Blue	(Not shown on pictorial view) Opens circuit to magic screen buttons during search for scores.
SEARCH WIPER CAM 20B N.C.	C-5	13-16 83-3	Red-Yellow Black-Yellow	(Not shown on pictorial view) Opens circuit to start relay during search for scores.
SEARCH WIPER CAM 20C N.C.	D-40	23-16 25-9	Blue-Yellow White-Blue	(Not shown on pictorial view) Opens circuit to search index lock magnet coil after it has been energized.

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 1A N.O.	G-34	45-6 98-14	Green-White Gray-Black	Completes circuit for game advantages when circuit complete thru spotting disc and other factors.
16 PULSE 1B N.O.	D-4	53-7 75-2	White-Yellow Orange-White	Completes replay register reset circuit when replay reset relay is energized.
16 PULSE 1C N.O.	J-2	10-11 90	Red Gray	Completes circuit to flash press buttons now lite for magic-screen feature.
16 PULSE 1D N.O.	C-8	51-16 56-14	White-Red White-Brown	Completes futurity game unit, and futurity advance counter unit step-up circuit.
16 PULSE 2A N.O.	G-15	52-8 93	White-Blue Gray-Yellow	Completes circuit to step sequence unit, and winner unit when searching for section scores.
16 PULSE 2B N.O.	B-26	38-4 78	Yellow-Black Orange-Black	Completes circuit for extra-ball unit multiple steps.
16 PULSE 2C N.O.	E-33	36-7 61-12	Yellow-Brown Brown-Red	Completes circuit for guaranteed game advantages when collecting futurity games.
16 PULSE 2D N.O.	B-18	40-16 80-16	Green Black	Completes circuit to put blue replay counter back to zero when starting new game.

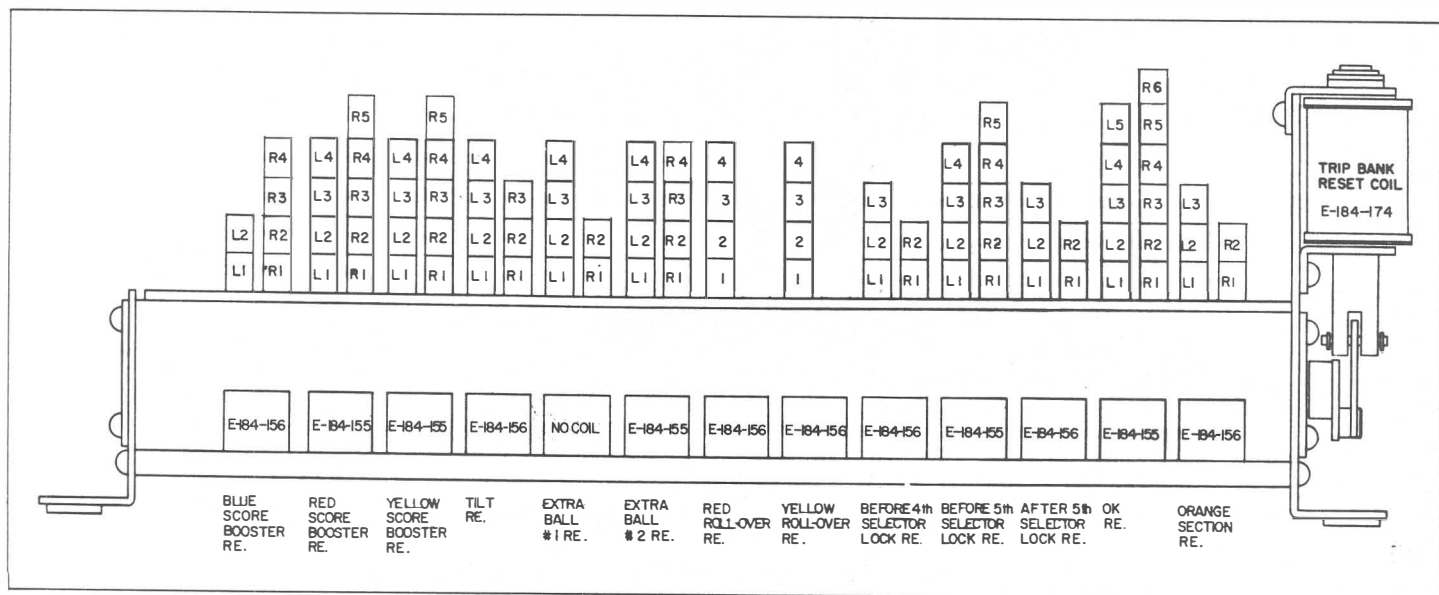
CONCLUDED ON NEXT PAGE

MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 22

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	51-6 50-4	White-Red White	In series with circuit for probable red, yellow, or green score unit multiple steps.
SCORE EXTRA STEP PULSE SWITCH	E-28	43-11 50-4	Green-Yellow White	Pulses yellow, red, and green score units for multiple steps when circuit complete thru all other factors.
4A N.O.				
SQUARE PIN SWITCH	D-10	13-5 21-3	Red-Yellow Blue-Red	Opens score extra-step relay lock-in circuit.
5A N.C.				
SCORE EXTRA STEP INDEX COIL	A-46	56-5 70	White-Brown Orange	Energized by control unit cam switch 4B.
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.
7A N.O.	J-11	81-6 30	Black-White Yellow	Flashes game advantage lites.
7B N.O.	J-21	13-4 30	Red-Yellow Yellow	Flashes score lites and advance futurity lites. Also flashes extra-ball lites during extra-ball play.

TRIP RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 24



TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 23

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BLUE SCORE BOOSTER RELAY COIL	A-38	14 70	Red-Green Orange	Energized thru spotting disc when circuit complete thru other factors.
L1 N.C.	A-38	51-19 14	White-Red Red-Green	Opens circuit to coil.
L2 S.P.D.T.	L-10	18-4 60-8 61-9	Red-Black Brown Brown-Red	Directs circuit to lite blue 3 scores 300, blue 3 scores 600, or blue 2 scores 600 feature lite.
R1 N.C.	F-34	71-9 74-19	Orange-Red Orange-Green	Proportioning circuit for magic-screen feature steps.
R2 N.C.	H-28	36-19 54-8	Yellow-Brown White-Green	Proportioning circuit for score steps or extra-ball steps.
R3 S.P.D.T.	D-19	75-14 85-1 83-13	Orange-White Black-White Black-Yellow	Directs circuit to step blue replay counter for scoring 300 or 600 blue section score.
R4 S.P.D.T.	B-19	10-16 15-16 23-17	Red Red-White Blue-Yellow	Directs circuit to step blue replay counter for scoring 300 or 600 blue section score.
RED SCORE BOOSTER RELAY COIL	B-38	10-5 90-12	Red Gray	Energized thru spotting disc when circuit complete thru other factors. Also energized thru futurity game disc as part of futurity game scoring.
L1 N.C.	E-35	41-13 93-13	Green-Red Gray-Yellow	Proportioning circuit for magic screen feature unit steps.
L2 N.O.	J-7	54-7 80-9	White-Green Black	Completes circuit to red super section feature lite.
L3 S.P.D.T.	C-30	83-4 25-14 75-8	Black-Yellow Blue-White Orange-White	Same function as switch L3.
R1 N.C.	H-24	27-7 78-11	Blue-Orange Orange-Black	Mixer #2 proportioning circuit.
R2 N.O.	B-14	13-1 45-12	Red-Yellow Green-White	Completes a circuit thru search disc to step winner unit, when searching for section scores.
R3 N.C.	A-37	10-5 53-6	Red White-Yellow	Opens circuit to this coil. Also opens circuit to yellow score booster trip relay coil.
R4 N.C.	D-39	15-13 36-13	Red-White Yellow-Brown	Proportioning circuit for selection feature unit steps.
R5 N.C.	L-8	21-13 43-7	Blue-Red Green-Yellow	Opens circuit for flashing yellow super section feature lite.
YELLOW SCORE BOOSTER RELAY COIL	B-37	10-5 20-7	Red Blue	Energized thru spotting disc when circuit complete thru other factors. Also energized thru futurity game disc as part of futurity game scoring.
L1 N.C.	D-35	91-12 93-13	Gray-Red Gray-Yellow	Proportioning circuit for magic screen feature unit steps.
L2 N.O.	K-8	43-7 80-9	Green-Yellow Black	Completes circuit to yellow super section feature lite.
L3 S.P.D.T.	D-30	52-4 31-9 65-4	White-Blue Yellow-Red Brown-White	Proportioning circuit for red or yellow score unit steps.
L4 S.P.D.T.	C-30	75-8 38-9 83-4	Orange-White Yellow-Black Black-Yellow	Same function as switch L3.
R1 N.C.	A-37	53-6 70	White-Yellow Orange	Opens circuit to this coil. Also opens circuit to red score booster trip relay coil.
R2 N.O.	B-15	13-1 27-6	Red-Yellow Blue-Orange	Completes a circuit thru search disc to step winner unit when searching for section scores.
R3 N.C.	D-39	36-13 65-13	Yellow-Brown Brown-White	Proportioning circuit for selection feature unit steps.
R4 N.C.	I-24	78-11 81-9	Orange-Black Black-Red	Mixer #2 proportioning circuit.
R5 N.C.	L-8	18-13 54-7	Red-Black White-Green	Opens circuit for flashing red super section.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TILT RELAY COIL	A-12	14-5 70	Red-Green Orange	Energized by any tilt switch. Also the control unit cam switch 4D if coin switch is closed too long.
L1 N.C.	H-38	40-8 93-3	Green Gray-Yellow	Opens circuits for moving magic-screen, and energizing search index lock magnet.
L2 N.C.	M-28	10 20-4	Red Blue	Opens 17 volt circuits.
L3 S.P.D.T.	I-7	21-3 30 45-8	Blue-Red Yellow Green-White	Opens circuit to this coil. Also opens game advantages, scoring, and playing circuits, and completes circuit to close abutter if tilt occurs with shutter open.
L4 S.P.D.T.	L-26	38 54-2 91-2	Yellow-Black White-Green Gray-Red	Opens 6 volt lite circuits, and completes circuit to tilt lite.
R1 N.C.	G-2	30P 60P	Yellow(Plastic) Brown(Plastic)	Opens circuit to control unit, and mixer sporting unit motors.
R2 N.O.	F-13	57-6 85-7	White-Orange Black-White	Completes a circuit to energize red button relay.
R3 N.O.	B-4	13-6 83-3	Red-Yellow Black-Yellow	Completes a circuit for starting new game if tilt occurred during search cycle.
EXTRA-BALL #1 RELAY				Trips with extra-ball #2 relay.
L1 N.C.	E-27	85-4 91-6	Black-White Gray-Red	In series with circuit to energize anti-cheat relay.
L2 N.O.	G-9	71-8 83-1	Orange-Red Black-Yellow	In series with circuit to reset timer unit while playing extra-balls.
L3 S.P.D.T.	E-26	85-4 30 61-2	Black-White Yellow Brown-Red	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.	G-28	60-6 56-6 18-2	Brown White-Brown Red-Black	Opens circuit for score steps, and completes circuit for extra-ball steps.
R1 N.C.	J-12	27-16 81-6	Blue-Orange Black-Red	Opens circuit for flashing other game feature lites.
R2 S.P.D.T.	I-28	75-5 15-7 45-2	Orange-White Red-White Green-White	In series with function of switch L4 above.
EXTRA BALL #2 RELAY COIL	A-13	J 70	Jumper Orange	Energized by yellow button switch when playing for extra-balls. (After 5 balls are shot)
L1 N.C.	A-13	10-6 J	Red Jumper	Opens circuit to coil.
L2 N.O.	D-14	38-3 91-1	Yellow-Black Gray-Red	In series with circuit to run ball lifter motor to raise extra-balls.
L3 S.P.D.T.	D-6	14-3 61 98-2	Red-Green Brown-Red Gray-Black	Opens circuit to run shutter motor when starting new game, and completes a circuit to energize mixer latch, and timer cam's index coils.
L4 S.P.D.T.	J-21	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Opens circuit to flash score lites, and completes circuit to flash extra-ball lites.
R1 N.C.	G-28	45-2 83-9	Green-White Black-Yellow	Opens other game feature circuits.
R2 N.C.	I-30	21-3 41-17	Blue-Red Green-Red	Mixer #4 game proportioning circuit.
R3 N.O.	J-26	21-4 50-9	Blue-Red White	Completes circuit to lite extra balls feature lite.
R4 N.O.	H-28	56-6 36-19	White-Brown Yellow-Brown	In series with circuit for extra ball steps.

CONTINUED ON NEXT PAGE

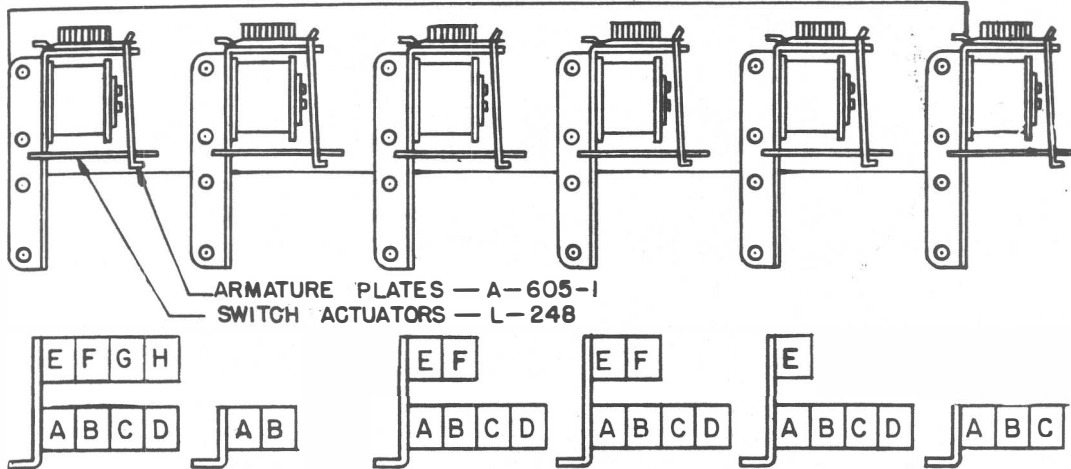
TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 23

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED ROLLOVER RELAY COIL	A-45	J 70	Jumper Orange	Energized directly thru selection feature disc, also by red rollover button switch, thru selection feature disc.
1 N.C.	A-45	25-13	Blue-White Jumper	Opens circuit to coil.
2 N.O.	H-40	21-12 93-3	Blue-Red Gray-Yellow	Completes a circuit to keep magic screen buttons (left & right) alive until 6th ball (1st extra ball) is shot.
3 S.P.D.T.	J-1	51-12 90 52-13	White-Red Gray White-Blue	Opens circuit to flash select-now lite before 4th, and before 5th ball, and completes circuit to flash select-now lite after 5th ball.
4 S.P.D.T.	J-5	31-8 10-11 53-12	Yellow-Red Red White-Yellow	Opens circuit to select before 4th, and select before 5th ball feature lites, and completes circuit to lite select after 5th ball feature lite.
YELLOW ROLLOVER RELAY COIL	A-44	J 70	Jumper Orange	Energized directly thru selection feature disc. Also by yellow rollover button switch, thru selection feature disc.
1 N.C.	B-44	38-13	Yellow-Black Jumper	Opens circuit to coil.
2 N.O.	G-40	93-3 98-3	Gray-Yellow Gray-Black	Completes circuit to keep magic screen buttons (left and right) alive until 5th ball is shot.
3 S.P.D.T.	J-1	50-12 51-12 23-5	White White-Red Blue-Yellow	Opens circuit to flash select-now lite before 4th ball, and completes circuit to flash select-now before 5th ball.
4 S.P.D.T.	K-5	57-5 31-8 74-8	White-Orange Yellow-Red Orange-Green	Opens circuit to select before 4th ball feature lite, and completes circuit to select before 5th ball feature lite.
BEFORE 4th SELECTOR LOCK RELAY COIL	A-11	J 70	Jumper Orange	Energized thru timer unit disc, when 4th ball is shot.
L1 N.C.	B-11	83-6	Black-Yellow Jumper	Opens circuit to coil.
L2 S.P.D.T.	G-40	98-3 93-3 53-18	Gray-Black Gray-Yellow White-Yellow	Opens circuit to magic screen buttons (left & right) and, completes circuit to collect scores (R) button.
L3 N.O.	H-8	36-2 43-2	Yellow-Brown Green-Yellow	Thru timer unit disc, completes a circuit to step timer unit from 4th to 5th step.
R1 N.C.	K-1	27-4 50-12	Blue-Orange White	Opens circuit to flash select-now lite at 4th step of timer unit.
R2 N.O.	D-16	23-13 51-8	Blue-Yellow White-Red	In series with circuit to energize search index coil for scoring.
BEFORE 5th SELECTOR LOCK RELAY COIL	A-11	J 70	Jumper Orange	Energized thru timer unit disc, when 5th ball is shot.
L1 N.C.	B-11	74-6	Orange-Green Jumper	Opens circuit to coil.
L2 N.O.	C-13	10-6 25-8	Red Blue-White	Completes circuit to energize extra-ball relays, during extra-ball play.
L3 N.O.	E-4	18-6 50-2	Red-Black White	Completes circuit to energize smart relays, during extra-ball play.
L4 S.P.D.T.	L-1	14-1 48-12 53-2	Red-Green Green-Black White-Yellow	Opens circuit to flash select-now lite before 5th ball, and completes circuit to flash it after 5th ball.
R1 N.C.	L-6	52-12 56-12	White-Blue White-Brown	Opens circuit to yellow rollover lite (on panel).
R2 N.C.	C-44	13-12 38-13	Red-Yellow Yellow-Black	Opens circuit to yellow rollover relay.
R3 N.O.	G-10	54-11 71-8	White-Green Orange-Red	Completes circuit to reset timer unit thru collect scores (R) button switch.
R4 N.O.	F-9	27-2 78-6	Blue-Orange Orange-Black	In series with circuit to step timer unit after 5th ball is shot.
R5 N.C.	G-41	21-12 98-3	Blue-Red Gray-Black	Opens circuit to magic-screen buttons (left and right).

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
AFTER 5th SELECTOR LOCK RELAY COIL	A-11	J 70	Jumper Orange	Energized when 6th ball (1st extra-ball) is shot.
L1 N.C.	G-41	14-4 21-12	Red-Green Blue-Red	Opens circuit to magic screen buttons (left and right).
L2 N.C.	C-45	15-12 25-13	Red-White Blue-White	Opens circuit to red rollover relay.
L3 N.C.	A-11	98-11	Gray-Black Jumper	Opens circuit to coil.
R1 N.C.	K-1	52-13 53-2	White-Blue White-Yellow	Opens circuit to flash select-now lite.
R2 N.C.	L-7	41-8 60-12	Green-Red Brown	Opens circuit to red rollover lite (on panel).
OK RELAY COIL	A-36	20 70	Blue Orange	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	B-36	20 81-14	Blue Black-Red	Opens circuit to coil.
L2 N.O.	L-8	50-8 30	White Yellow	Completes circuit to OK feature lite.
L3 N.O.	B-42	57-14 71-7	White-Orange Orange-Red	Thru magic screen unit disc, completes a circuit to magic screen unit index coil.
L4 N.O.	C-43	27-15 98-12	Blue-Orange Gray-Black	Thru magic screen unit disc, completes a circuit to move right winding of magic screen motor, and circuit to energize move right button relay.
L5 N.O.	E-34	20-15 21-16	Blue Blue-Red	In series with circuit to energize orange section feature relay.
R1 N.C.	H-26	53-13 74-12	White-Yellow Orange-Green	Mixer #2 proportioning circuit.
R2 N.O.	J-6	10-11 30	Red Yellow	In series with a circuit to flash select-now lite, and thru selection feature disc lite red or yellow rollover lite.
R3 N.C.	H-26	54-13 65-12	White-Green Brown-White	Mixer #2 proportioning circuit.
R4 N.C.	I-25	21-3 56-13	Blue-Red White-Brown	Mixer #2 proportioning circuit.
R5 N.C.	F-39	83-11 90-11	Black-Yellow Gray	Proportioning circuit for selection feature unit steps.
R6 N.O.	C-7	18-14 75-12	Red-Black Orange-White	In series with futurity advance scoring circuit.
ORANGE SECTION RELAY COIL	A-34	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	B-34	21-16	Blue-Red Jumper	Opens circuit to coil.
L2 N.O.	J-9	13-15 30	Red-Yellow Yellow	Completes circuit to orange section feature lite.
L3 N.O.	D-23	14-16 98	Red-Green Gray-Black	In series with replay scoring circuit for orange section scores.
R1 N.C.	H-26	43-13 65-12	Green-Yellow Brown-White	Mixer #2 proportioning circuit.
R2 N.C.	H-25	45-13 71-12	Green-White Orange-Red	Mixer #2 proportioning circuit.

6 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 27



NAME	COLLECT FUTURITY GAME RE.	RIGHT BUTTON RE.	REPLAY RESET RE.	ANTI-CHEAT RE.	START RE.	RED BUTTON RE.
COIL TURNS & WIRE GAUGE	1800 [#] 33	2300 [#] 33	2300 [#] 33	2300 [#] 33	1800 [#] 33	2000 [#] 33
COIL RESISTANCE / NOMINAL %	65 Ω	85 Ω	85 Ω	85 Ω	65 Ω	75 Ω
OPERATING VOLTAGE	50 V.	50 V.	50 V.	50 V.	50 V.	50 V.
TEST VOLTAGE	37 V.	37 V.	37 V.	39 V.	32 V.	32 V.
EXTENSION SPRING LOAD	GREEN	CLEAR	YELLOW	YELLOW	YELLOW	CLEAR
SW. ACTUATOR STROKE	3/32	3/32	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-7300-334	C-7300-331	C-7300-331	C-7300-336	C-7300-334	C-7300-3310

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

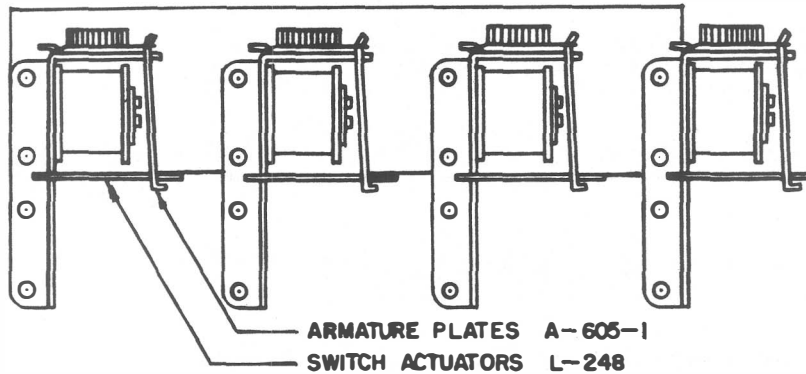
6 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 26

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
COLLECT FUTURITY GAME RELAY COIL	A-44	10-9 70	Red Orange	Energized by orange button switch (front rail) when collecting futurity games.
A N.C.	B-32	15-4 74-13	Red-White Orange-Green	Opens regular green score unit step-up circuit.
B N.C.	G-29	18-16 83-9	Red-Black Black-Yellow	Opens regular game features circuit.
C N.O.	M-44	85-9 30	Black-White Yellow	Completes circuit to energize stop relays as scores and features step to guaranteed level of futurity games.
D N.O.	C-6	14-3 31-7	Red-Green Yellow-Red	Completes a circuit to run shutter motor (opens shutter to dump balls).
E N.O.	D-27	78-4 81-16	Orange-Black Black-Red	In series with anti-cheat relay safety circuit.
F N.C.	H-48	14-9 36-16	Red-Green Yellow-Black	Completes circuit to reset futurity game unit.
G N.O.	F-33	25-18 61-12	Blue-White Brown-Red	Completes circuit to step scores and features to guaranteed level of futurity games.
H N.O.	D-44	10-9 23-9	Red Blue-Yellow	Lock-in circuit for this relay.
RIGHT BUTTON RELAY COIL	A-43	45-5 70	Green-White Orange	Energized by right button switch on front rail when moving magic-screen right.
A S.P.D.T.	B-43	48-5 25-6 45-5	Green-Black Blue-White Green-White	Open circuit to move left winding of magic-screen motor, and completes lock-in circuit for this relay.
B N.C.	F-42	31-16 36-4	Yellow-Red Yellow-Brown	Opens move left magic-screen circuit.
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energized when anti-cheat relay drops out.
A S.P.D.T.	C-4	90-5 41-6 53-7	Gray Green-Red White-Yellow	Directs replay register reset circuit thru control unit cam switch 2A, or thru mixer-spotting 16 pulse switch 1B.
B N.O.	G-1	20P 60P	Blue (Plastic) Brown (Plastic)	Completes circuit to run control unit, and mixer-spotting unit motors.
C N.O.	C-4	56-2 75-2	White-Brown Orange-White	Lock-in circuit for this relay.
D N.C.	C-4	13-9 83-3	Red-Yellow Black-Yellow	Opens start circuit.
E N.O.				Not used.
F N.C.	E-40	25-9 52-9	Blue-White White-Blue	Opens circuit to search index lock magnet coil.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
ANTI-CHEAT RELAY COIL	A-27	78-4 70	Orange-Black Orange	Energized by control unit cam switch 5C. Also by shutter motor cam switch 6C. Switches on this relay protect scoring, game advantage, and lite circuits.
A S.P.D.T.	G-4	75-2 56-2 50-2	Orange-White White-Orange White	Opens start circuit, and completes circuit to replay reset relay when this relay drops out.
B N.O.	M-28	20-4 80-1	Blue Black	Opens 17 volt circuit when this relay drops out.
C N.O.	D-27	78-4 30	Orange-Black Yellow	Completes lock-in circuit for this relay when energized.
D N.C.	I-7	14-4 30	Red-Green Yellow	(Safety circuit) in series with circuit to close shutter if this relay drops out while shutter is open.
E S.P.D.T.	L-26	91-2 38 40	Gray-Red Yellow-Black Green	Opens 6 volt circuit to score and advance futurity lites, and completes circuit to tilt lite when this relay drops out.
F N.C.	F-13	57-6 85-7	White-Orange Black-White	(Safety circuit) completes a circuit to energize red button relay when this relay drops out.
START RELAY COIL	A-5	13-16 70	Red-Yellow Orange	Energized when playing coins or replays.
A N.C.	B-26	75-4 78	Orange-White Orange-Black	Opens extra-ball step-up circuit during spin.
B N.C.	G-29	18-16 90-16	Red-Black Gray	Opens features circuit during spin.
C N.O.	F-6	13-16 48-2	Red-Yellow Green-Black	Lock-in circuit for this relay. Also in series with function of switch D.
D N.O.	F-6	10-10 13-16	Red Red-Yellow	Completes circuits to shutter motor, mixer latch, and timer cams index coils.
E N.O.	H-46	36-16 30	Yellow-Brown Yellow	(Safety circuit) completes a circuit to reset futurity game unit when collect futurity game relay is energized.
RED BUTTON RELAY COIL	B-12	85-7 91-12	Black-White Gray-Red	Energized by red button switch on front door. Also when game is tilted, or anti-cheat relay drops out.
A S.P.D.T.	B-6	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit to mixer latch and timer cams index coils during extra-ball play, or to motor when starting new game after extra-ball play.
B S.P.D.T.	L-12	21-4 51-15 25-15	Blue-Red White-Red Blue-White	Directs circuit for extra-ball feature lite during yellow button play, or red button scores and features lite during red button play.
C N.O.	D-12	27-8 57-6	Blue-Orange White-Orange	Lock-in circuit for this relay.

(VERTICAL) 4 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 29



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

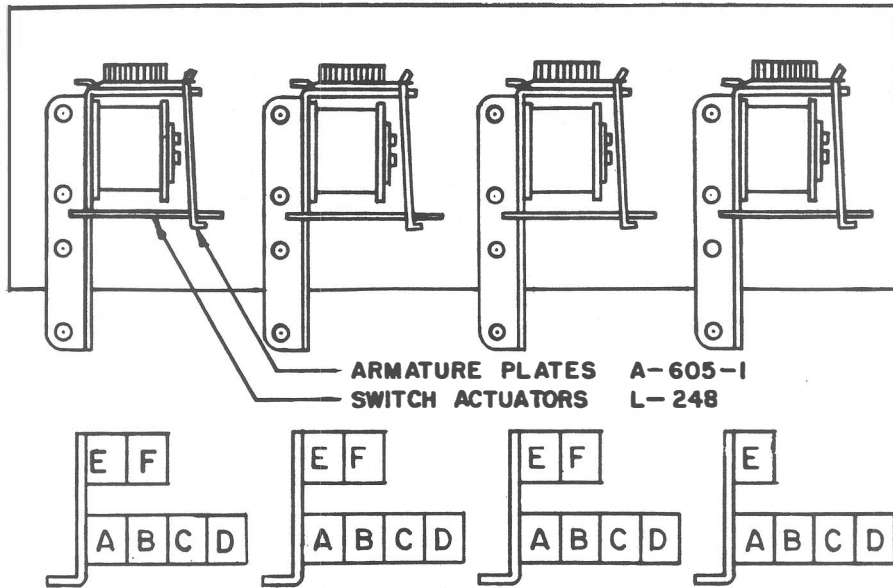
(VERTICAL) 4 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

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 futurity game disc, and magic-screen feature disc, when collecting futurity games.
A S.P.D.T.	C-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 futurity games.
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-48	65-11 71-11	Brown-White Orange-Red	Completes a circuit to energize selection feature unit. Stop relay to keep selection feature unit from stepping when collecting futurity games 1, 5 and 6.
YELLOW SCORE STOP RELAY COIL	J-45	15-15 70	Red-White Orange	Energized thru futurity game disc, and yellow score disc when collecting futurity games.
A S.P.D.T.	D-33	56-3 40-13 85-2	White-Brown Green Black-White	Opens circuit from stepping yellow score unit, and completes circuit for other guaranteed features of futurity games.
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 futurity game disc, and red score disc when collecting futurity games.
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 futurity games.
B N.C.	B-31	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 futurity game disc, and selection feature disc when collecting futurity games.
A S.P.D.T.	B-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 feature of futurity games.
B N.C.	G-37	61-7 91-11	Brown-Red Gray-Red	Opens regular circuit for energizing red or yellow score booster relay.

(HORIZONTAL) 4 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 31



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	38 V.	37 V.	37 V.	37 V.
Extension spring load	YELLOW	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

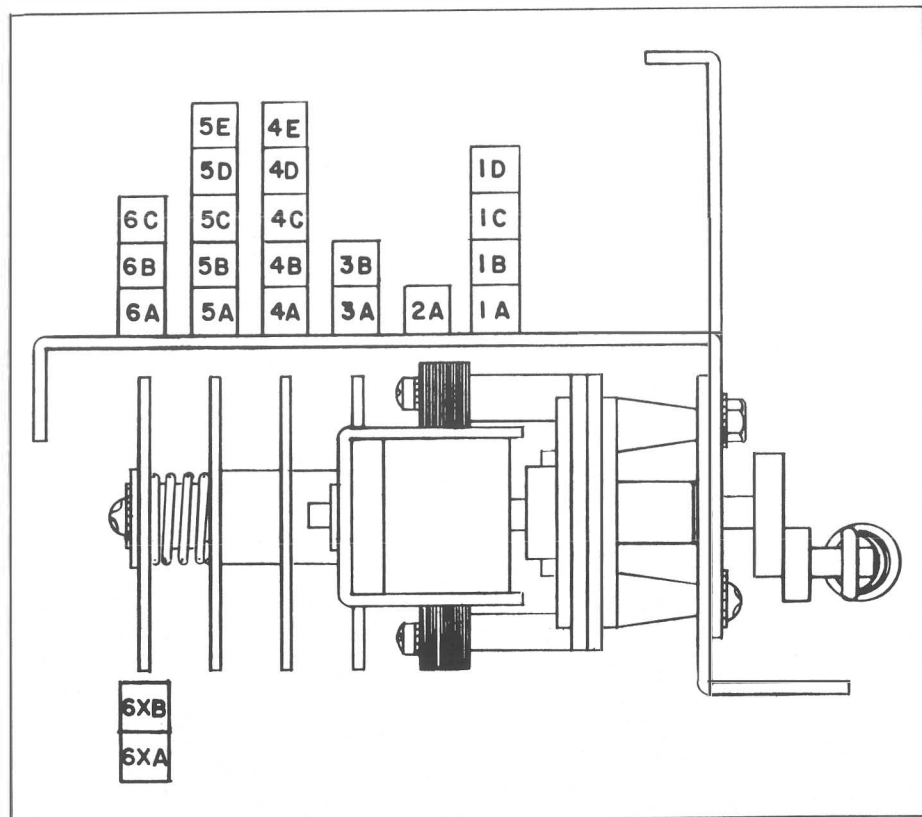
(HORIZONTAL) 4 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 30

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
FEATURES LOCK RELAY COIL	B-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 74-19	White Orange-Green	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 features.
D N.O.	H-30	23-4 78-8	Blue-Yellow Orange-Black	Mixer #4 relay game proportioning circuit.
E N.O.	H-38	13-17 48-13	Red-Yellow Green-Black	In series with circuit for red or yellow score booster feature.
F N.C.	H-29	41-17 80-8	Green-Red Black	Mixer #4 game proportioning circuit.
PLAY FEATURES RELAY COIL	B-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-12	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-21	31-5 74-15	Yellow-Red Orange-Green	Opens score and advance futurity lites flash circuit.
SCORES LOCK RELAY COIL	B-47	31-15 93-14	Yellow-Red Gray-Yellow	Energized by control unit cam switch 7B when play scores relay is energized. (Play for scores only)
A N.O.	E-30	23-12 27-5	Blue-Yellow Blue-Orange	In series with circuit for yellow, red, and green score steps.
B N.O.	E-30	38-5 57-12	Yellow-Black White-Orange	In series with circuit for yellow, red, and green score steps.
C N.O.	E-30	14-6 63-12	Red-Green Brown-Yellow	In series with circuit for yellow, red, and green score steps.
D N.O.	F-29	56-11 60-6	White-Brown Brown	In series with circuit for yellow, red, and green score steps.
E N.C.	F-32	91-13 98-14	Gray-Red Gray-Black	Opens features circuit.
F N.O.	B-47	40-15 93-14	Green Gray-Yellow	Lock-in circuit for this relay.
PLAY SCORES RELAY COIL	B-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-12	51-15 36-15 21-15	White-Red Yellow-Brown Blue-Red	Directs circuit from extra-ball feature, and 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. (Guaranteed)
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 65-15	White-Orange Brown-White	Lock-in circuit for this relay.
E N.C.	K-11	27-16 56-15	Blue-Orange White-Brown	Opens feature lites flash circuit.

SHUTTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART BELOW



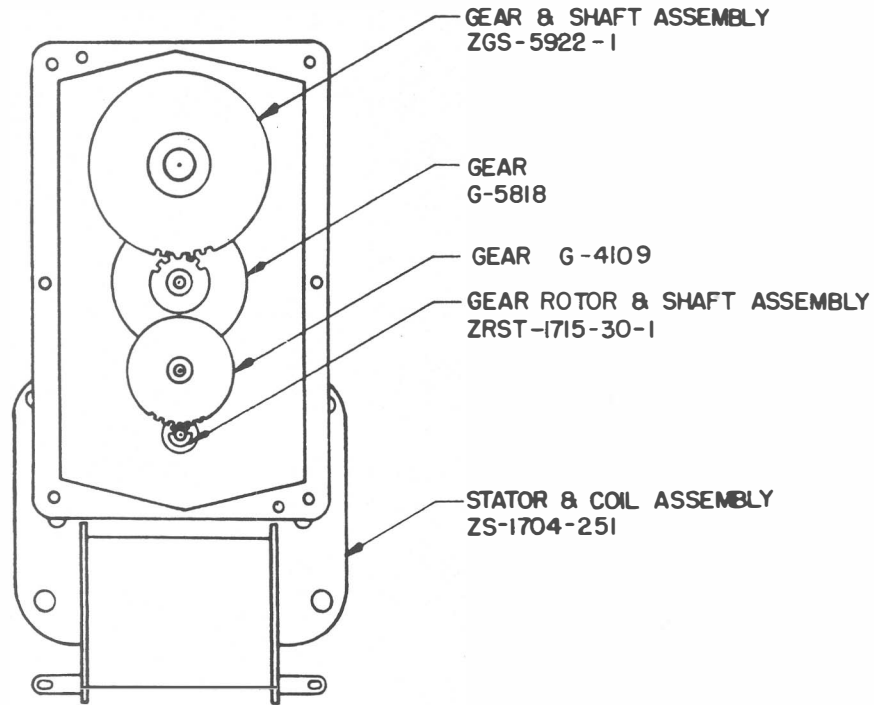
SHUTTER MOTOR CAM SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW AT LEFT

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	H-14 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.	G-6 14-3 30	Red-Green Yellow	Completes shutter motor carry-over circuit.
1C	N.C.	I-9 21-3 98-8	Blue-Red Gray-Black	(Closed when shutter is closed) In series with circuit to step timer unit after 5th ball is shot. Also in series with circuit to reset timer unit when playing extra-balls.
1D	N.C.	I-35 21-3 90-3	Blue-Red Gray	(Closed when shutter closed) In series with circuit to advance scores and features when collecting futurity games.
2A	N.C.	F-14 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.	F-46 85-5 30	Black-White Yellow	Resets selection feature unit, green, red and yellow replay counter units, extra-ball unit, and futurity advance counter unit when starting new game.
3B	N.O.	H-2 20P 70P	Blue (Plastic) Orange(Plastic)	Resets trip relay bank when starting new game.
4A	N.O.	F-7 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.	I-38 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.	H-7 18-3 45-8	Red-Black Green-White	(Closed when shutter is open) In series with function of switch 4A.
4D	N.C.	I-11 10-13 40-8	Red Green	(Closed when shutter is closed) In series with circuit to energize before 5th and after 5th selector lock relays.
4E	N.C.	F-43 63-8 51-13	Brown-Yellow Yellow	(Closed when shutter is closed) In series with circuit to energize collect futurity game relay.
5A	N.C.	H-9 65-2 98-8	Brown-White Gray-Black	(Closed when shutter is closed) Same function as switch 1C.
5B	N.O.	G-45 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.	G-31 90-16 91-13	Gray Gray-Red	(Closed when shutter is open) In series with circuit for game advantages.
5D	N.O.	B-18 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.	E-6 61 10-10 93-2	Brown-Red Red Gray-Yellow	Directs circuits to open shutter, and energize mixer latch, and timer cams index coils.
6XA	N.C.	A-12 91-15 70	Gray-Red Orange	NOTE: This switch is mounted on bracket under cam 6. Completes circuit to energize red button relay.
6XB	N.O.	H-46 36-16 30	Yellow-Brown Yellow	NOTE: This switch mounted on bracket under cam 6. Completes circuit to reset futurity game unit.
6A	N.O.	H-9 71-8 30	Orange-Red Yellow	Resets timer unit when starting new game.
6B	N.O.	G-47 78-3 30	Orange-Black Yellow	Resets green, red and yellow score units, and magic screen feature unit when starting new game.
6C	N.O.	D-27 81-16 30	Black-Red Yellow	In series with anti-cheat relay safety circuit when collecting futurity game.

SHUTTER MOTOR

(MOTOR PART NO. E-119-99)



NOTE:

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

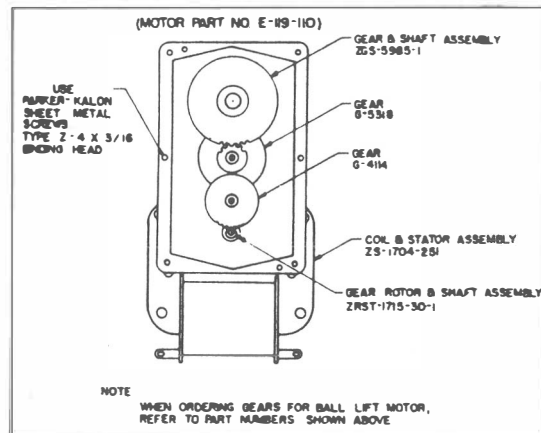
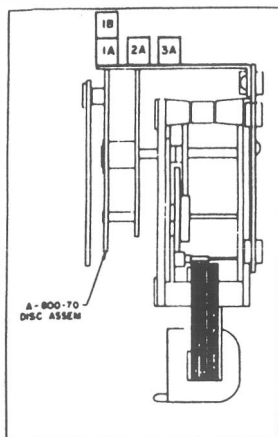
ANTI-CHEAT COIN SWITCH CIRCUIT

The coin switch gives a very short pulse, when operated by a coin. With this 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.

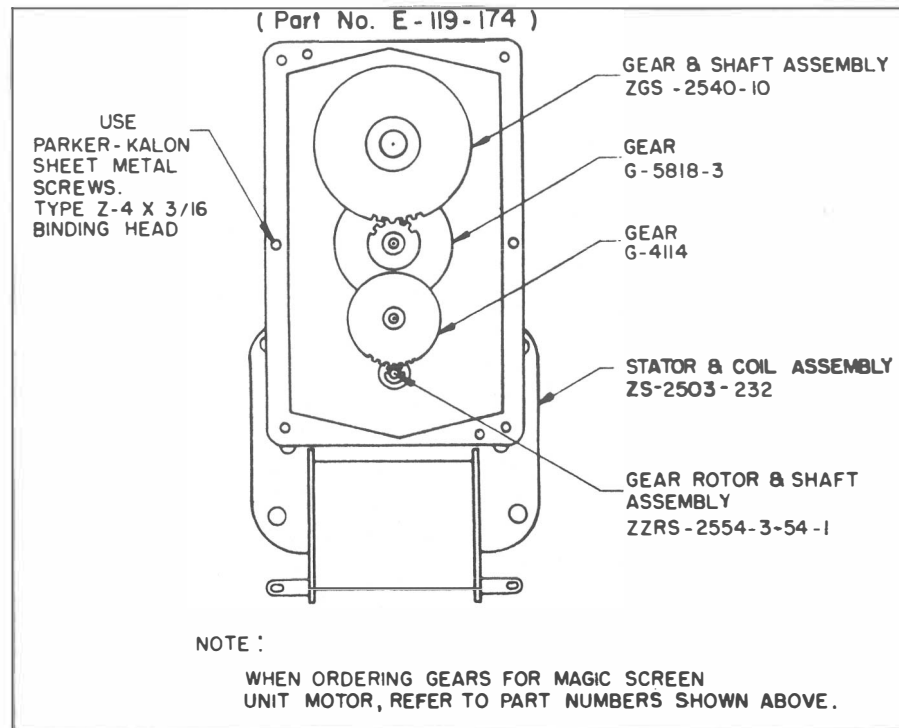
The circuit is completed thru control unit cam switch

#4D (on wiring diagram at G-5).

BALL LIFT MOTOR PICTORIAL VIEW



MAGIC SCREEN UNIT MOTOR



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	N.C.	G-11 15-6 85-6	Red-White Black-White	(Safety circuit) for before 5th selector lock trip relay.
1B	N.O.	G-14 91-1 30	Gray-Red Yellow	Completes carry-over circuit to ball lift motor.
2A	N.O.	F-8 27-2 43-2	Blue-Orange Green-Yellow	Completes circuit to energize timer unit step-up coil.
3A	N.O.	H-11 21-3 83-7	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

CABINET				PANEL					
24		22		8		24		22	
20-2	57-14	13	45-3	23-9	65-15	14-3	61	10-10	50-1
25-8	71-2	14-5	48-2	57-13	74-16	25-1	71-1	14	52-12
27-8	78-7	15-6	50-2	60-13	75-13	31-1	74-1	15-6	57-1
30	80-2	18-6	54-5	61-13	81-13	36-3	75-13	18-3	61-4
31-16	81	21-3	63-2			40-8	78-3	21-3	63-1
40-7	85-13	27-2	70			41-5	80-16	25-18	65-1
45-16	90-5	31-4	71-6			43-1	81	30	70
48-4	91-7	36-3	80-6			45-8	85-3	36-1	71-8
51-13	93-7	38-3	85-7			51-1	90-1	40-1	75-1
52-9	98-11	41-4	90-9			53-1	91-15	41-4	80-6
53-18	40 P	43-2	91-1			54-1	93-2	45-1	85-5
54-11	90 P					60-1	98-12		

PANEL		TRANSFORMER		FRONT DOOR			
20		8		10		20	
13-12	50-5	31-7	90-16	20	81	13	61-13
14-12	52-1	36-16	91-13	30	20 P	14-5	63-2
15-12	56-1	51-13	98-6	54-2	40 P	18-6	70
20	61-1	81-16		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	91-4					40-7	80-13
41-8	20 P					48-2	85-7
45-16	70 P					50-2	90-9
48-1						57-13	

PLUG SHEET FOR "BIKINI"

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	38-16 45-19	Yellow-Black Green-White	Completes a circuit to energize blue score booster trip relay.
B M.B.B.	B-38	21-3 31-15 45-19	Blue-Red Yellow-Red Green-White	Completes lock-in circuit, and opens pull-in circuit for this relay.
C S.P.D.T.	L-11	13-13 61-9 63-13	Red-Yellow Brown-Red Brown-Yellow	Directs circuit from blue 3 scores 600 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.
FUTURITY ADVANCE RELAY COIL	A-7	75-12 70	Orange-White Orange	Energized at 29th position of search disc when scoring orange section futurity games.
A N.O.		36-14 40-9	Yellow-Brown Green	In series with search index lock-in circuit.
B N.O.	D-8	15-5 56-14	Red-White White-Brown	In series with circuit to step futurity game unit, and futurity advance counter unit.
C N.C.	C-16	60 80	Brown Black	Opens circuit to replay cams index coil.
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 proportions score, and extra-ball steps.
A N.O.	E-28	54-12 85-4	White-Green Black-White	In series with guaranteed score steps circuit when playing for scores only (blue button).
B N.O.	H-27	15-7 56-6	Red-White White-Brown	In series with circuit for score steps. Also for extra-ball steps when playing for extra-balls (yellow button).
C N.O.	D-38	14-13 45-19	Red-Green Green-White	In series with circuit for super blue feature. (2 in blue scores 600)
D N.O.	C-38	38-16 51-19	Yellow-Black White-Red	In series with circuit for blue score booster.
GREEN SCORES STOP RELAY COIL	J-48	50-17 70	White Orange	Energized thru futurity game disc, and green score disc when collecting futurity games.
A S.P.D.T.	D-33	15-4 85-2 41-14	Red-White Black-White Green-Red	Opens circuit for stepping green score unit, and complete circuit for other guaranteed features of futurity games.
MIXER #4 RELAY COIL	A-32	23-4 70	Blue-Yellow Orange	Energized thru mixer #4 disc when circuit complete thru other factors. This relay proportions all features. Also extra-balls, when playing extra-balls.
A N.C.	I-28	41-2 51-5	Green-Red White-Red	Opens features 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-10	10-13 15-6	Red Red-White	In series with circuit to energize before 5th, and after 5th selector lock relays.
B N.C.	F-14	31-3 41-4	Yellow-Red Green-Red	In series with circuit to run ball lifter motor to raise balls.
C N.O.	D-45	36 38-8	Yellow-Brown Yellow-Black	Lock-in circuit for this relay.

NOTES

NOTES

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-292-13	Back glass
M-281-31	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-1900-47	Coin box
A-2304-2	Coin box cover
E-130-10	Counter—48 volt
A-2618	Leg
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-567-123	Front door only

Front Door Assembly (Continued):

Part No.	Name of Part
AS-2041-5	Front door assembly
A-254-33	Hinge and bracket
M-281-6	Lock and keys
E-108-14	Micro switch for coin switch assembly 5¢ and 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-2359-1	Coin slide 5¢ or 10¢
AS-1305-21	Front moulding assembly complete
P-2210-97	Front moulding top plate
A-1272-29	“R” Button
A-1272-30	Right Button
A-1272-31	Left Button
A-1272-41	Orange Button
P-2210-8	5¢ plate
P-2210-9	10¢ plate
CA-1053-5	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.