

Bally[®]

LIDO

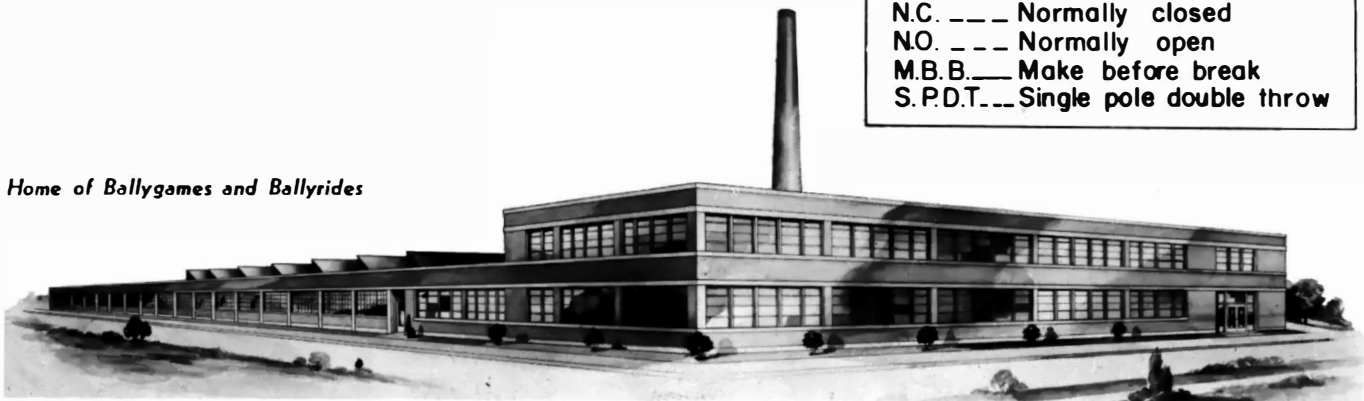
OPERATING INSTRUCTIONS AND PARTS CATALOG

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
NO. ___	Normally open
M.B.B. ___	Make before break
S.P.D.T. ___	Single pole double throw

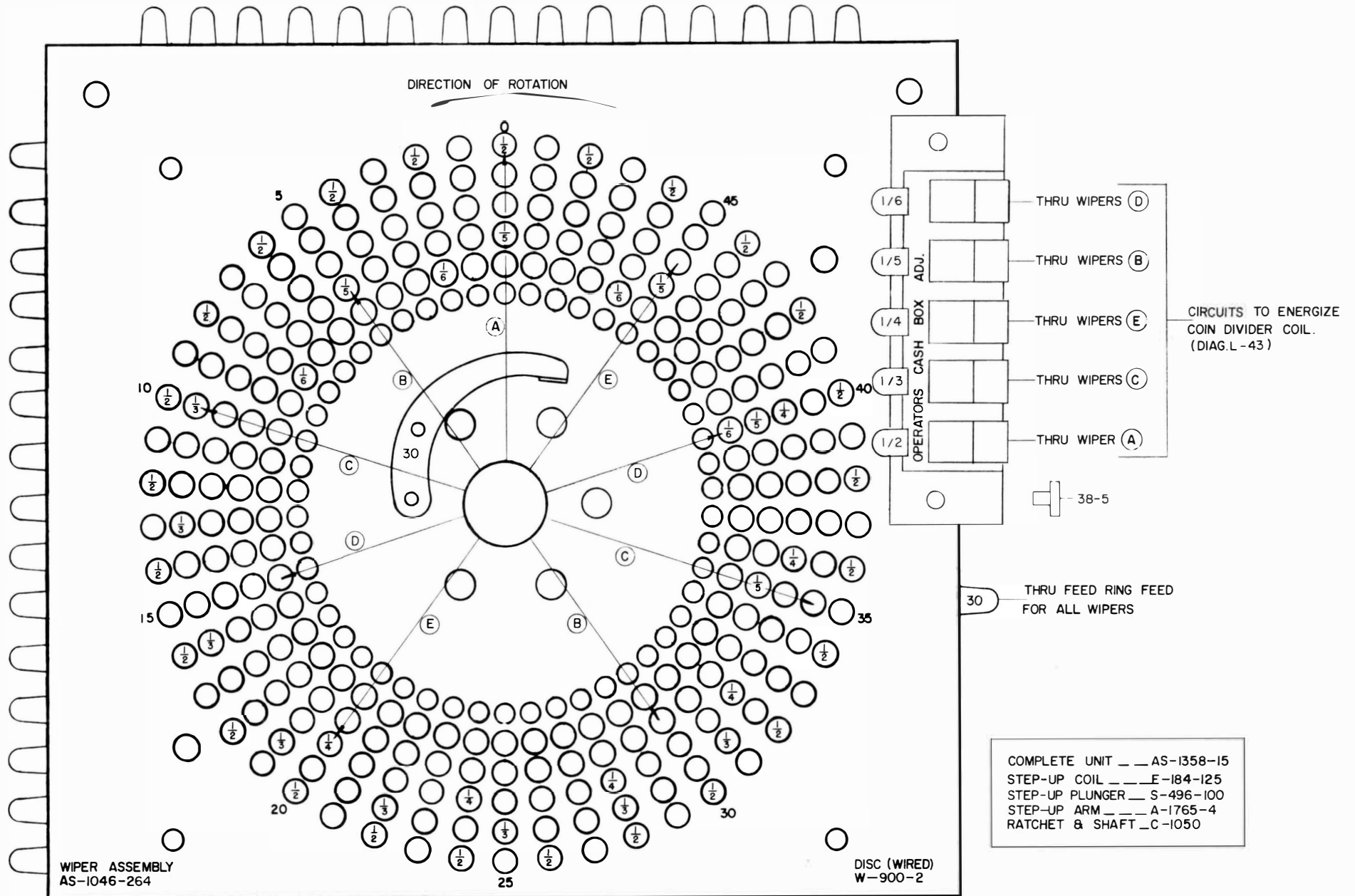
Home of Ballygames and Ballyrides





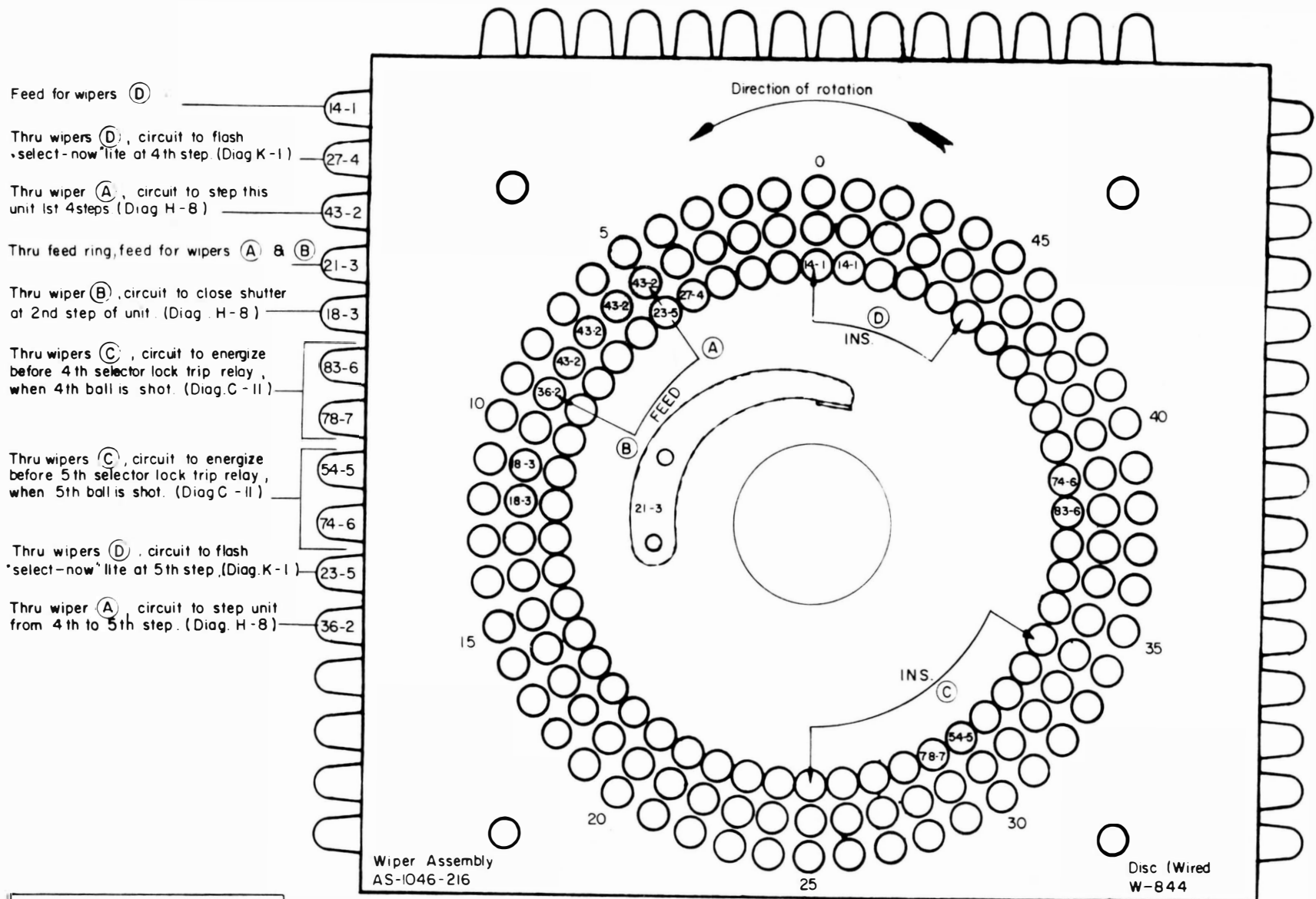
COIN UNIT viewed from **BUTTON** or **WIPER** side

Continuous step unit



TIMER UNIT viewed from BUTTON or WIPER side

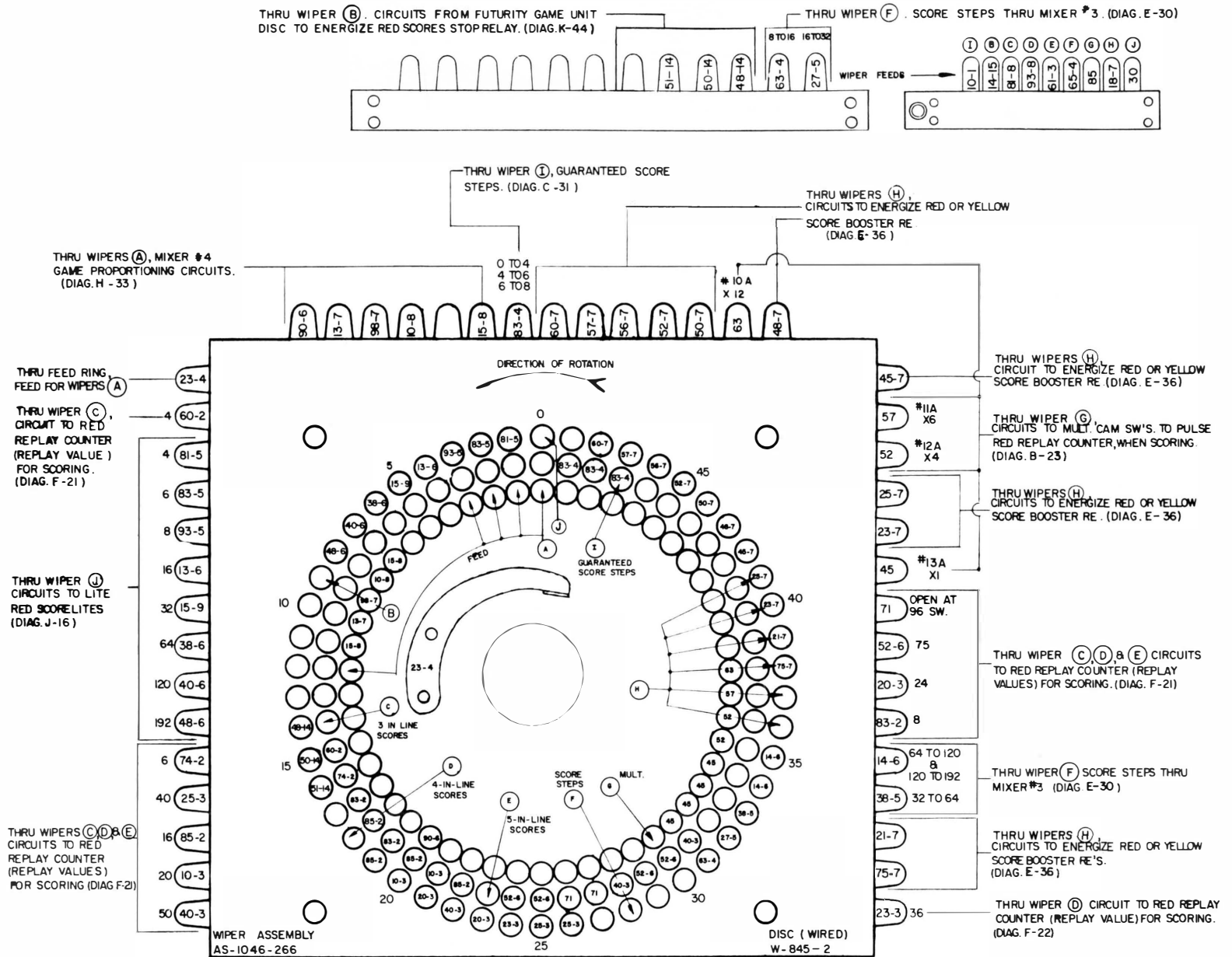
8 step unit. Wipers shown in zero or reset position



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

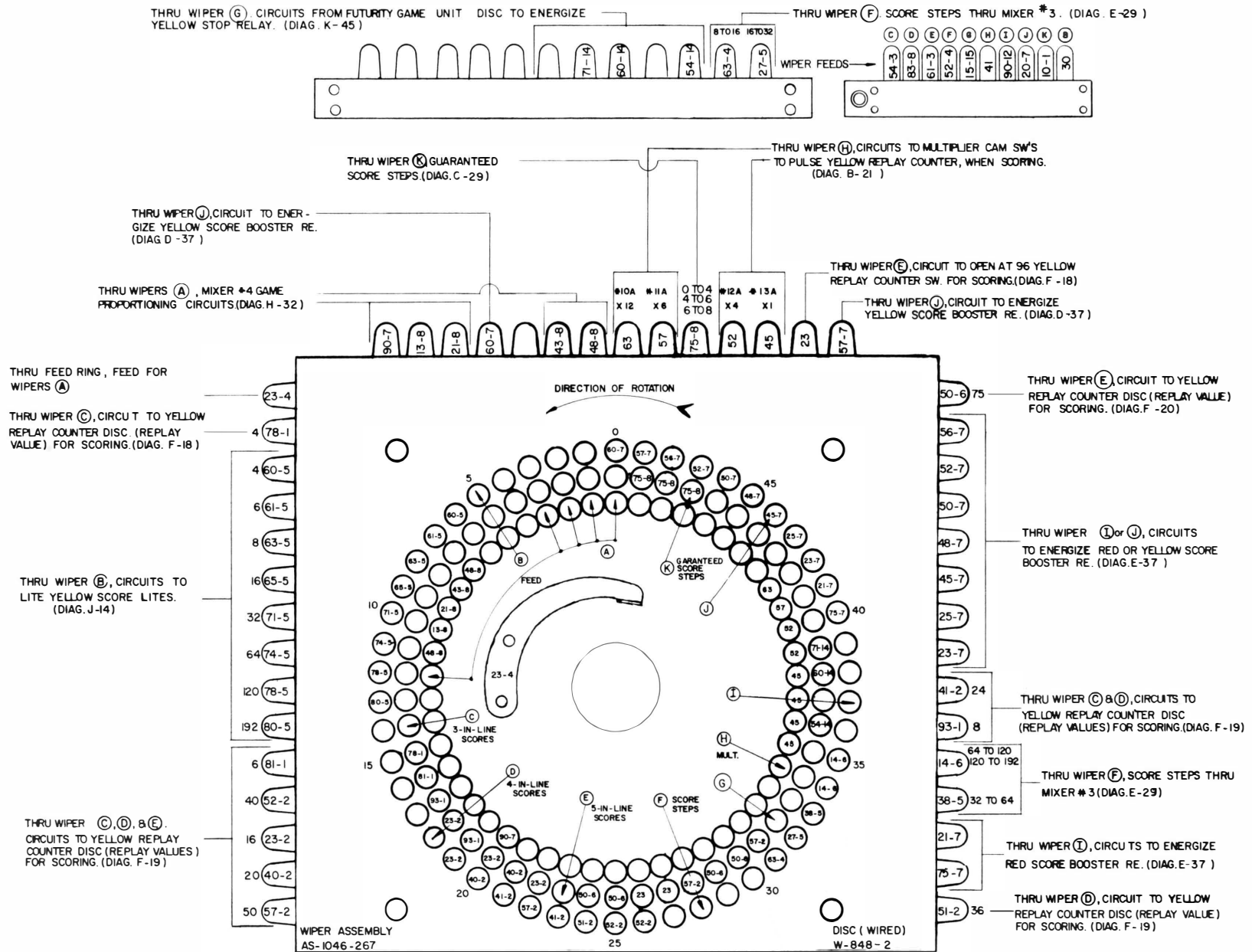
RED SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



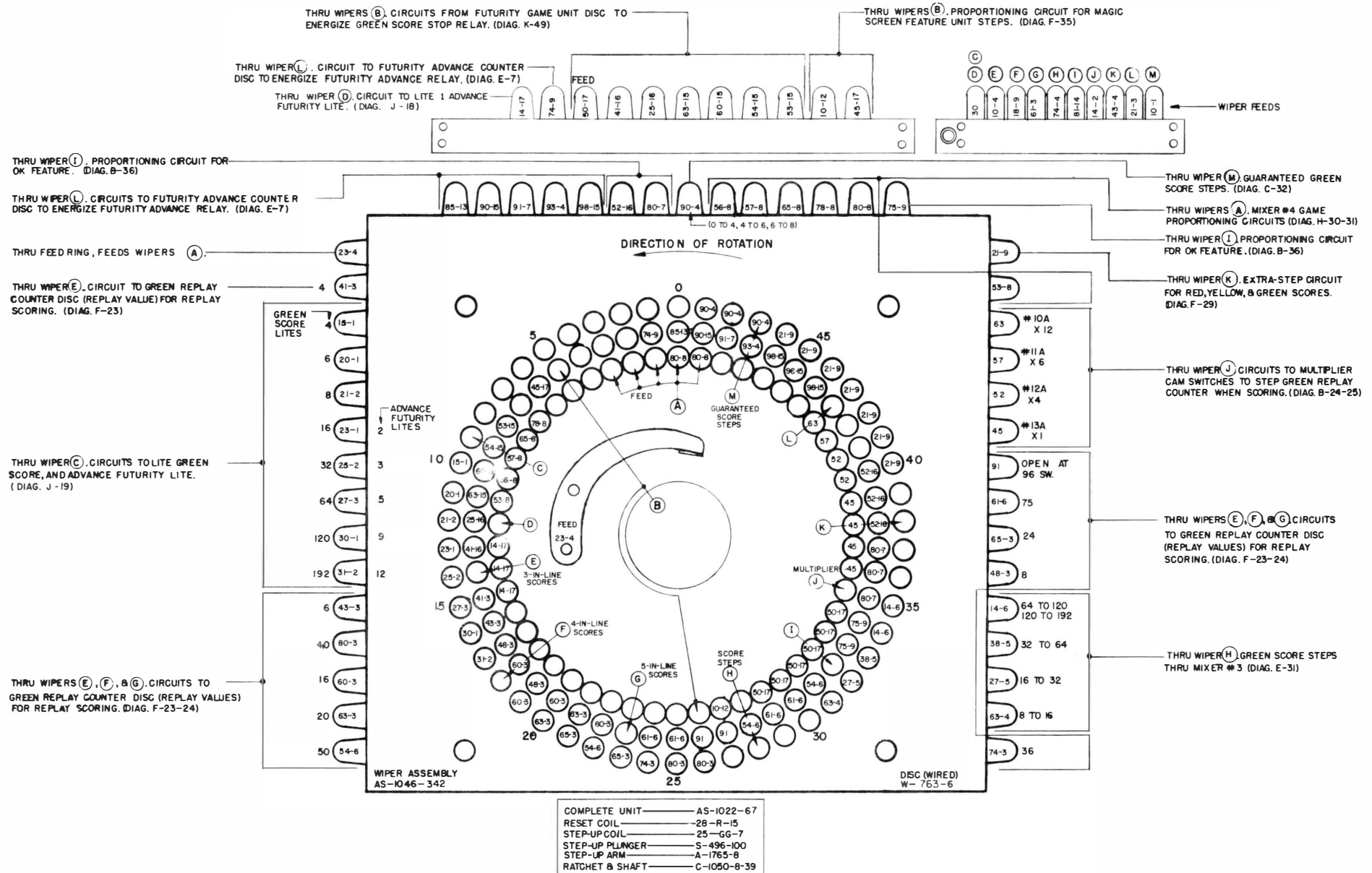
9 YELLOW SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



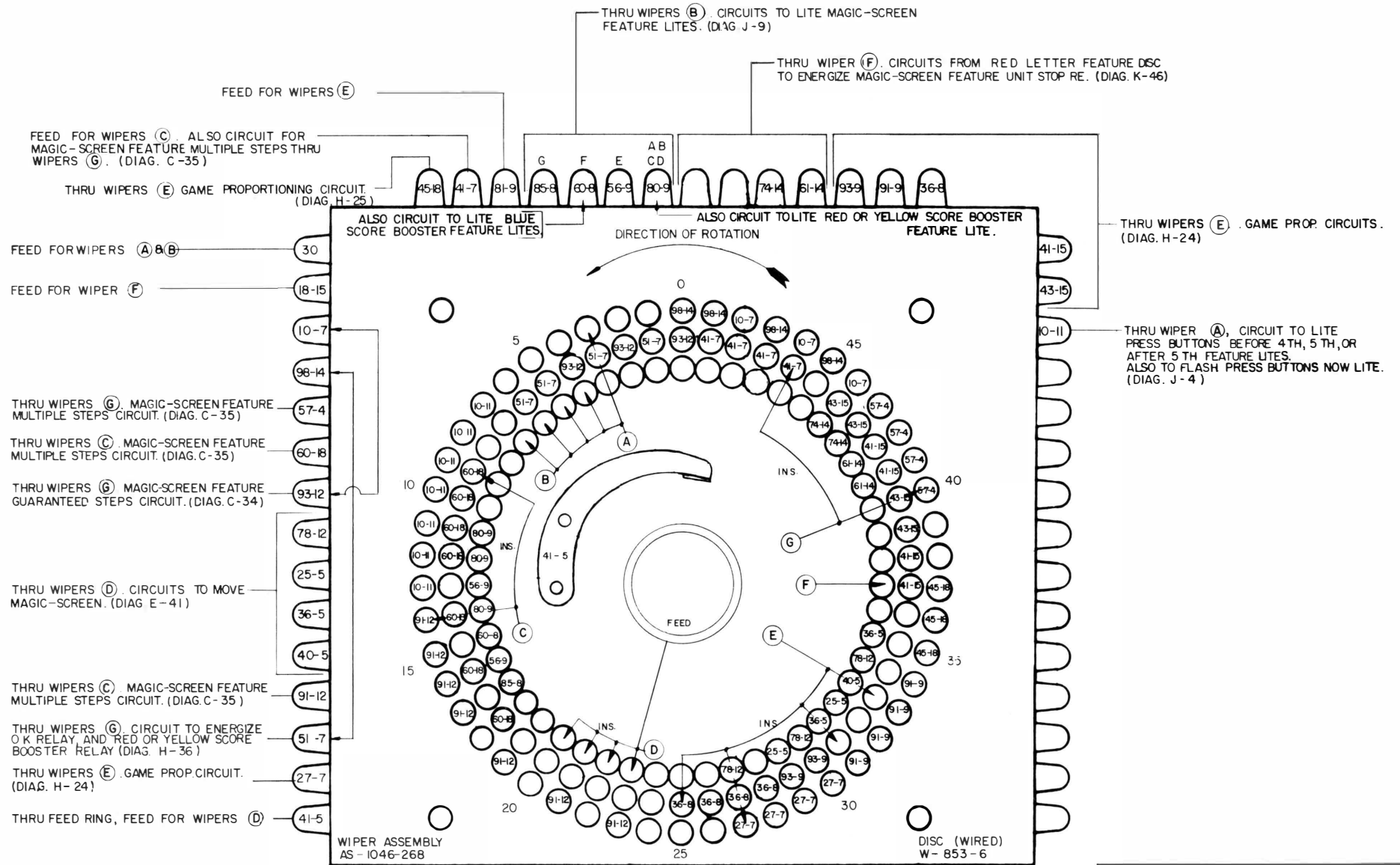
GREEN SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



MAGIC SCREEN FEATURE UNIT viewed from BUTTON or WIPER side

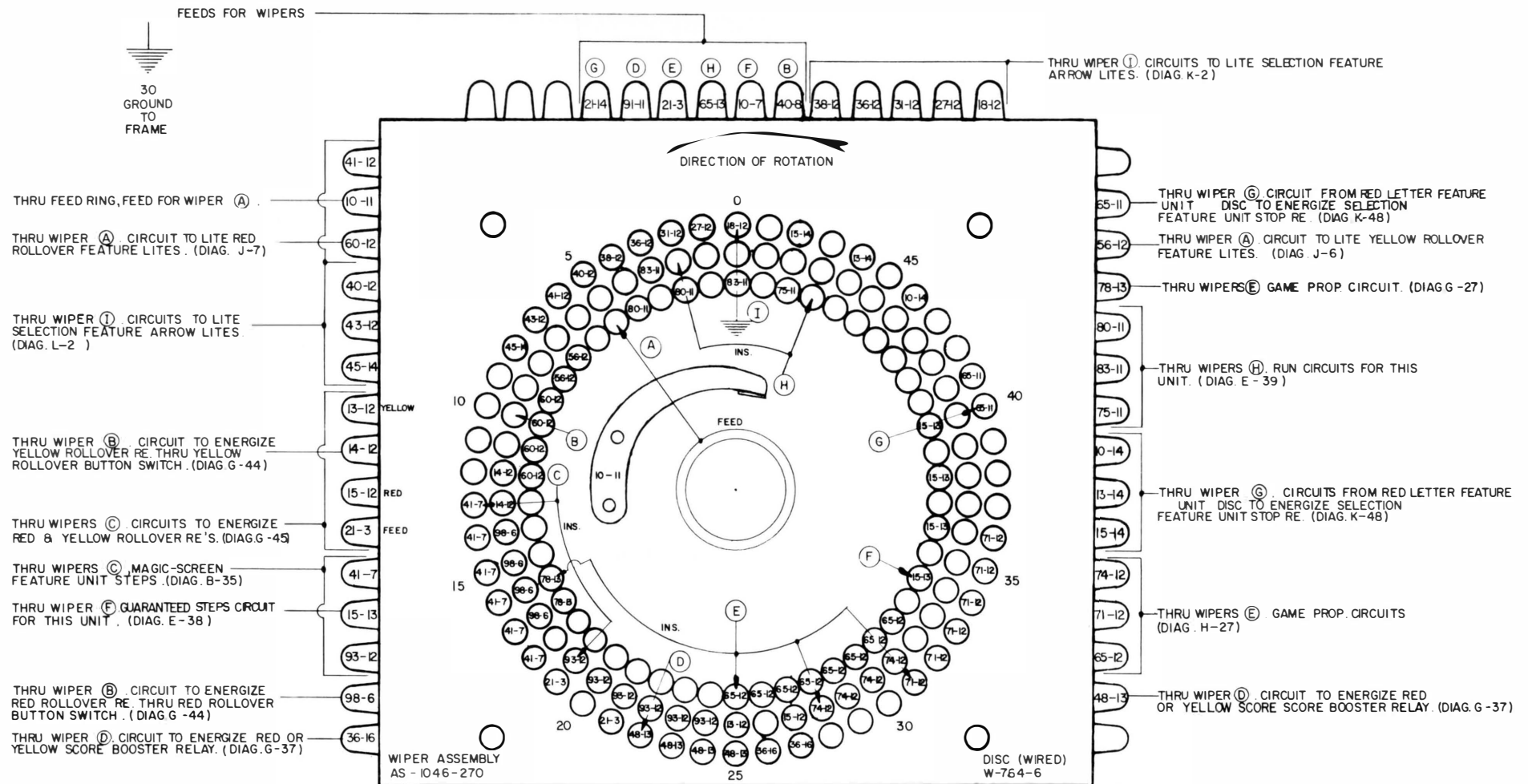
10 step unit. Wipers shown in zero or reset position



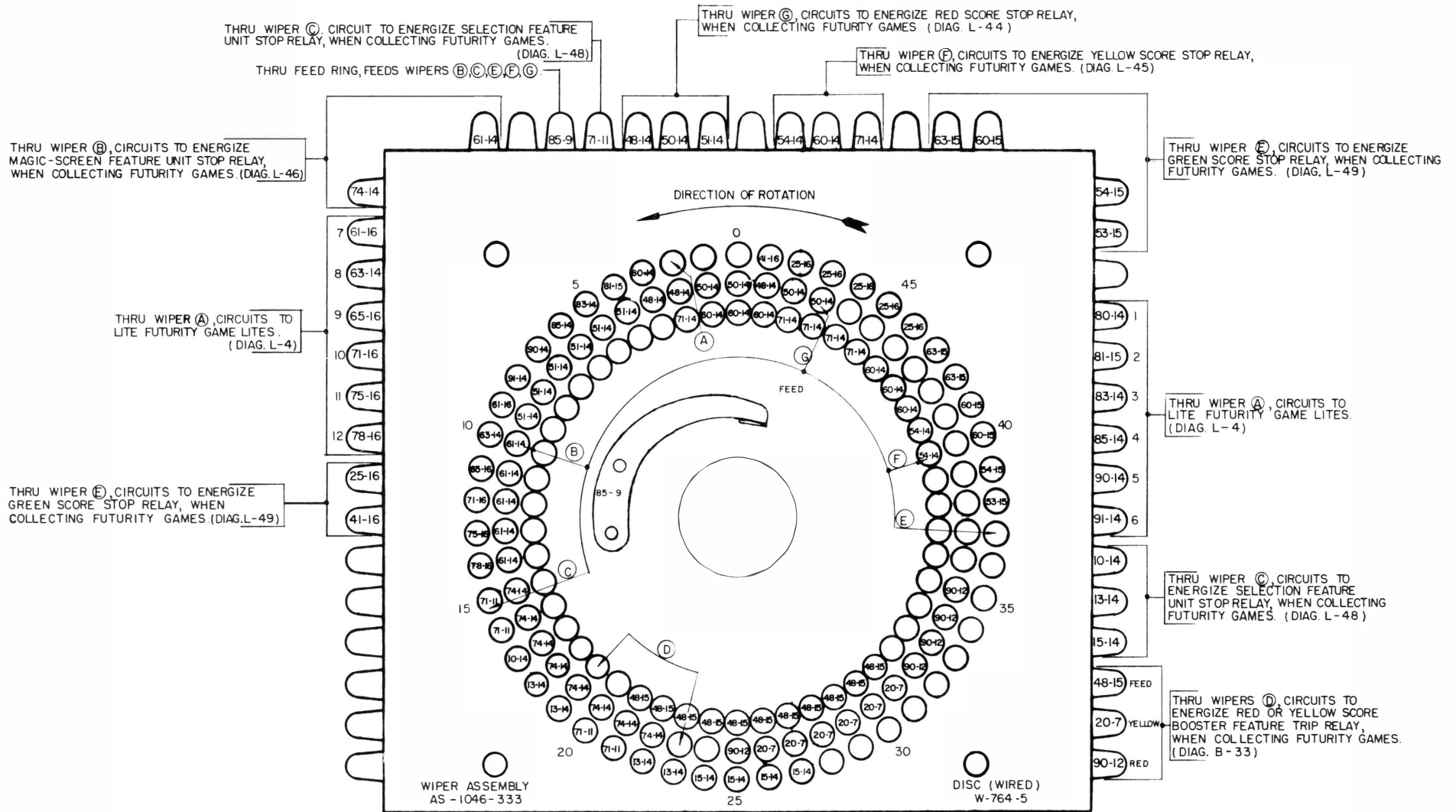
COMPLETE UNIT.....	AS-827-118
RESET COIL.....	28-R-15
STEP-UP COIL.....	25-GG-7
STEP-UP PLUNGER.....	S-496-100
STEP-UP ARM.....	A-1765-4
RATCHET & SHAFT.....	C-1050-10-43

SELECTION FEATURE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

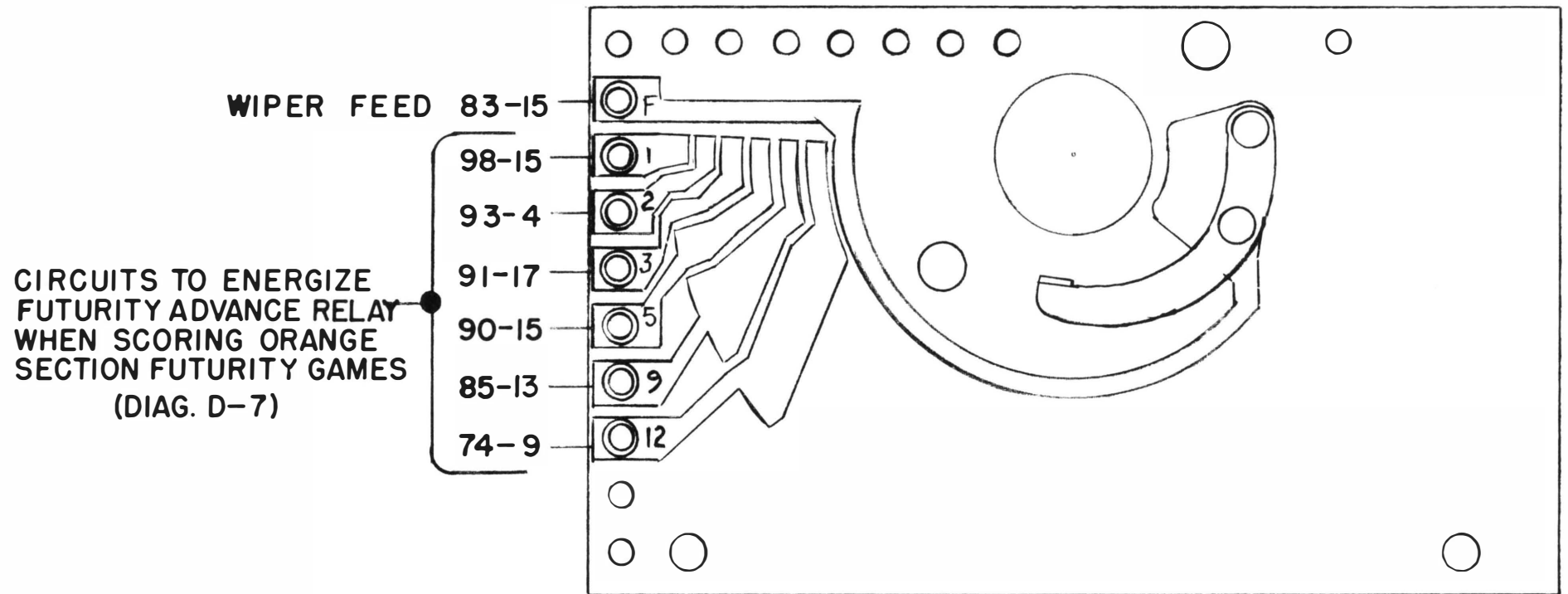


COMPLETE UNIT	AS-827-119
RESET COIL	28-R-15
STEP-UP COIL	25-GG-7
STEP-UP PLUNGER	S-496-100
STEP-UP ARM	A-1765-4
RATCHET & SHAFT	C-1050-8-41



- COMPLETE UNIT — AS-827-116
- 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-1050-12

FUTURITY ADVANCE COUNTER UNIT viewed from WIPER side



CIRCUITS TO ENERGIZE
FUTURITY ADVANCE RELAY
WHEN SCORING ORANGE
SECTION FUTURITY GAMES
(DIAG. D-7)

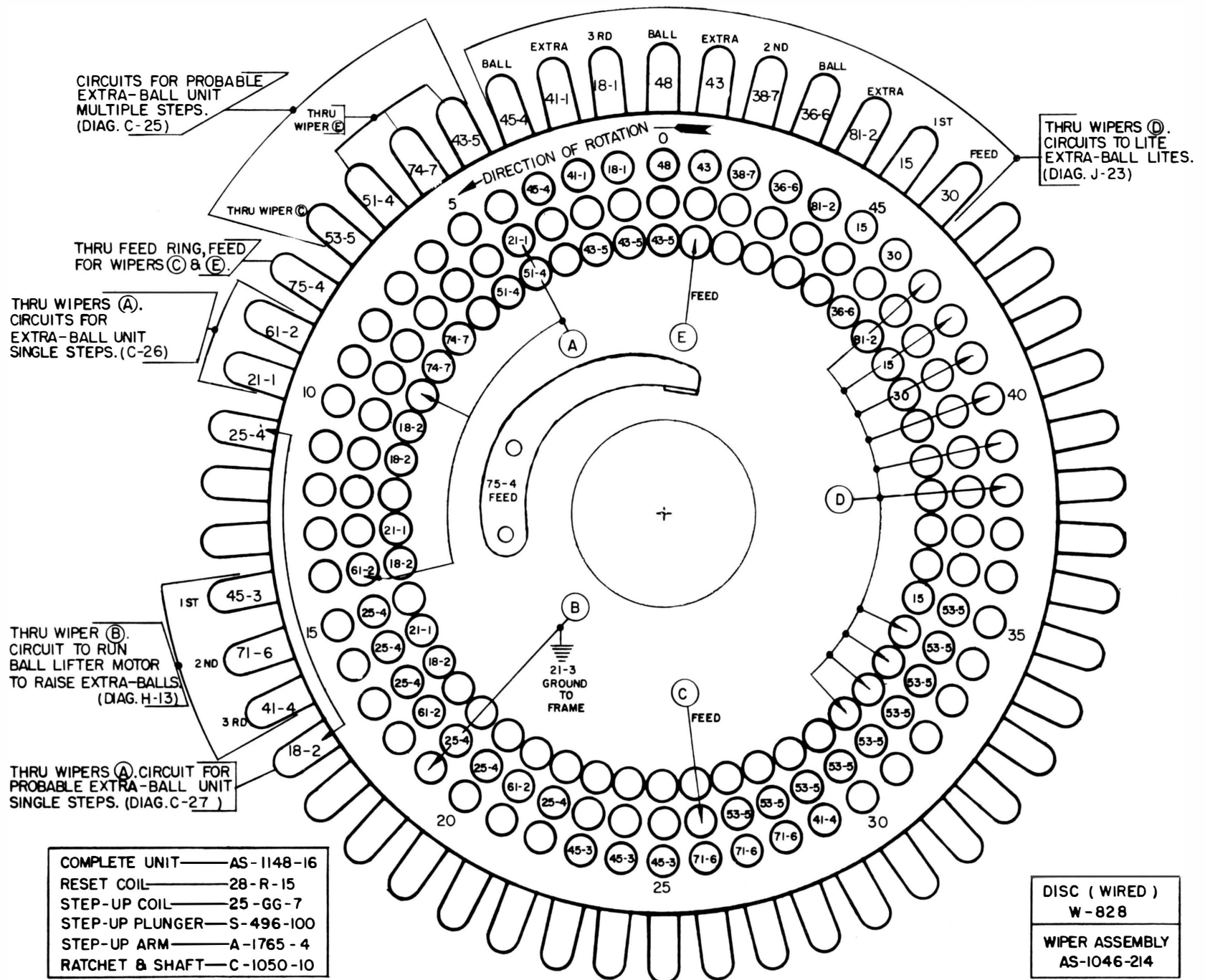
COMPLETE UNIT	AS-797-60
RESET COIL	28-R-15
STEP-UP COIL	25-GG-7
STEP-UP PLUNGER	S-496-116
STEP-UP ARM	A-1765-4
RATCHET & SHAFT	C-100-12

PRINTED CIRCUIT CONTACT PLATE W-945-6

WIPER ASSEMBLY AS-1046-143

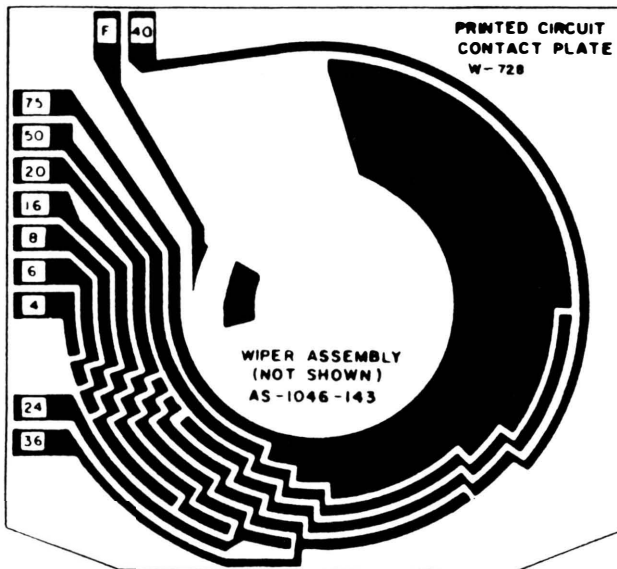
EXTRA BALL UNIT viewed from **BUTTON** or **WIPER** side

10 step unit. Wipers shown in zero or reset position

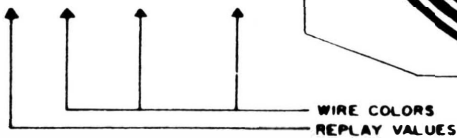


REPLAY COUNTER viewed from WIPER side 3 used (see code box at left)

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

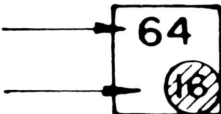


- Complete Unit - AS-797-36
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-116
- Step-up Arm - A-1765-4
- Ratchet & Shaft - C-100

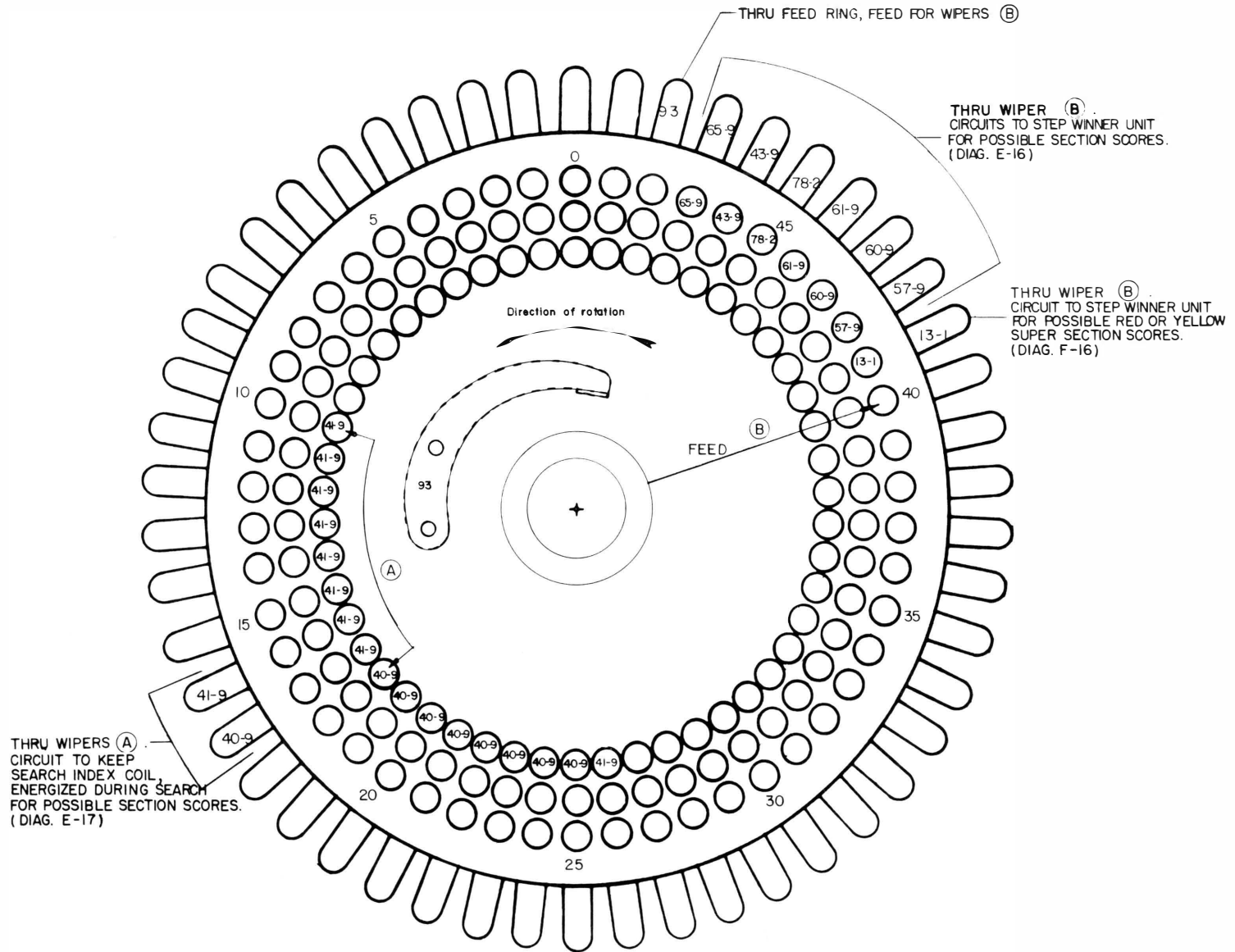


CAM SWITCHES THAT PULSE YELLOW, GREEN & RED REPLAY COUNTER STEP-UP COILS								
	sw 13A	sw 13A	sw 13A	sw 13A	sw 12A	sw 2 A	sw 11 A	sw 10A
5 IN LINE	75 	75 	96 	96 	200 	300 	450 	600
4 IN LINE	16 	20 	24 	50 	96 	144 	240 	480
3 IN LINE	4 	6 	8 	16 	32 	64 	120 	192

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.

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

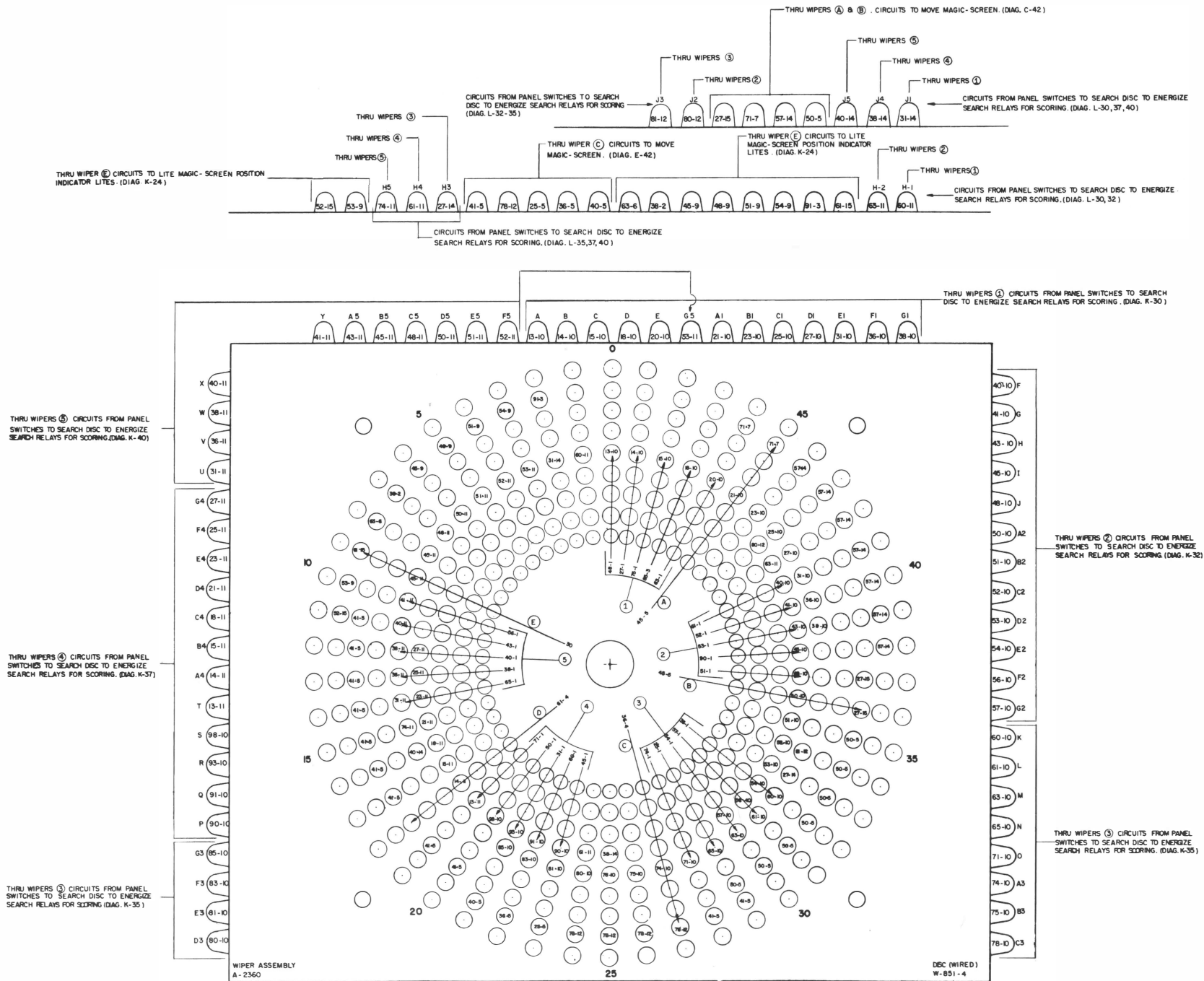
NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.



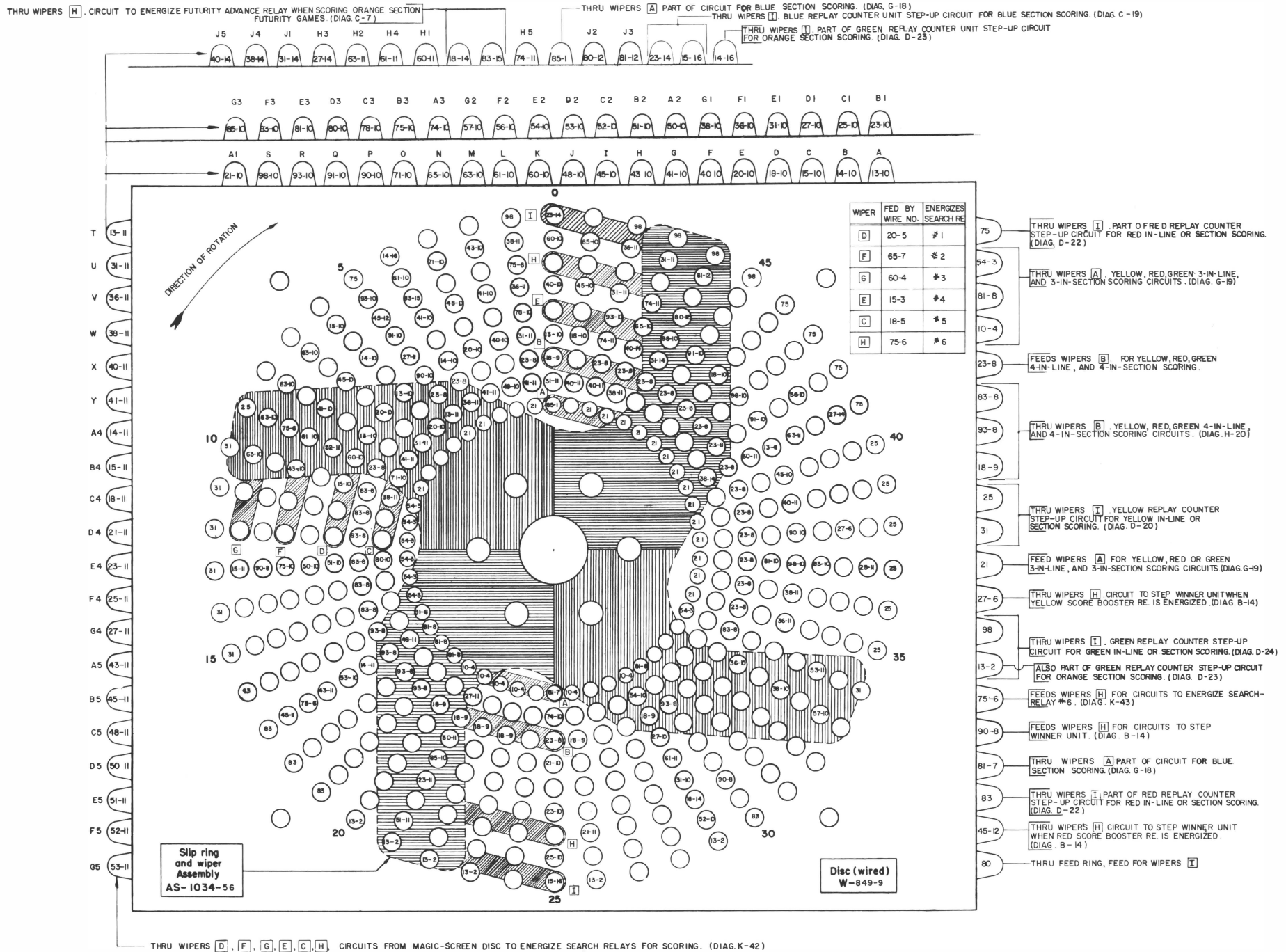
Complete unit___AS-827-71
 Reset coil_____28-R-15
 Step-up coil___E-184-160
 Step-up arm___A-1765-4
 Step-up plunger_S-496-92
 Ratchet & shaft-C-1050-9-43

Wiper Assembly
 AS-1046-224

Disc (Wired)
 W-847



SEARCH DISC viewed from BUTTON or WIPER side

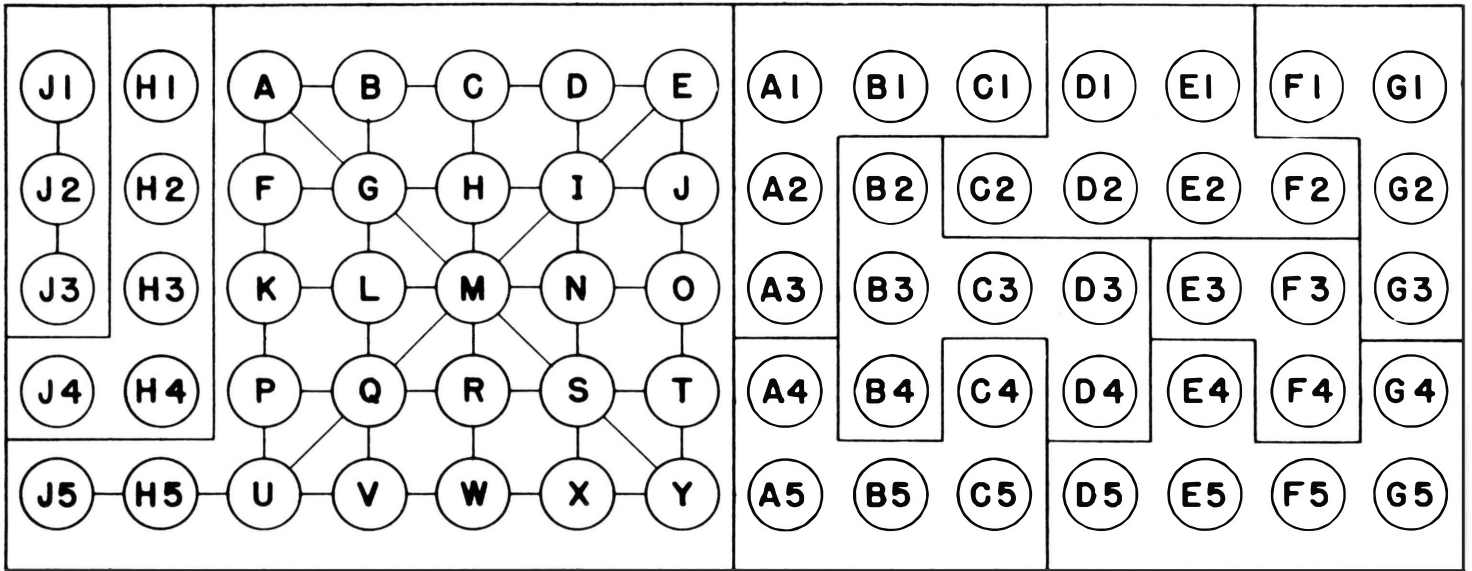


SEARCH POSITIONS CHART

	RED WIPER AT POSTION	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						
YELLOW	32						
	33						
	VERTICAL LINE	34	J1	J2	J3		
	HORIZONTAL LINE	35	J5	H5	U	V	W
	HORIZONTAL LINE	36	H5	U	V	W	X
	VERTICAL LINE	37	D	I	N	S	X
	VERTICAL LINE	38	A	F	K	P	U
	HORIZONTAL LINE	39	U	V	W	X	Y
RED	HORIZONTAL LINE	40	F	G	H	I	J
	VERTICAL LINE	41	E	J	O	T	Y
	VERTICAL LINE	42	B	G	L	Q	V
	HORIZONTAL LINE	43	P	Q	R	S	T
GREEN	HORIZONTAL LINE	44	A	B	C	D	E
	DIAGONAL LINE	45	E	I	M	Q	U
	DIAGONAL LINE	46	A	G	M	S	Y
	HORIZONTAL LINE	47	K	L	M	N	O
	VERTICAL LINE	48	C	H	M	R	W
	49						
	50						

ROTATION OF SEARCH DISC WIPERS FROM 50 TO 1

MAGIC - SCREEN LAYOUT

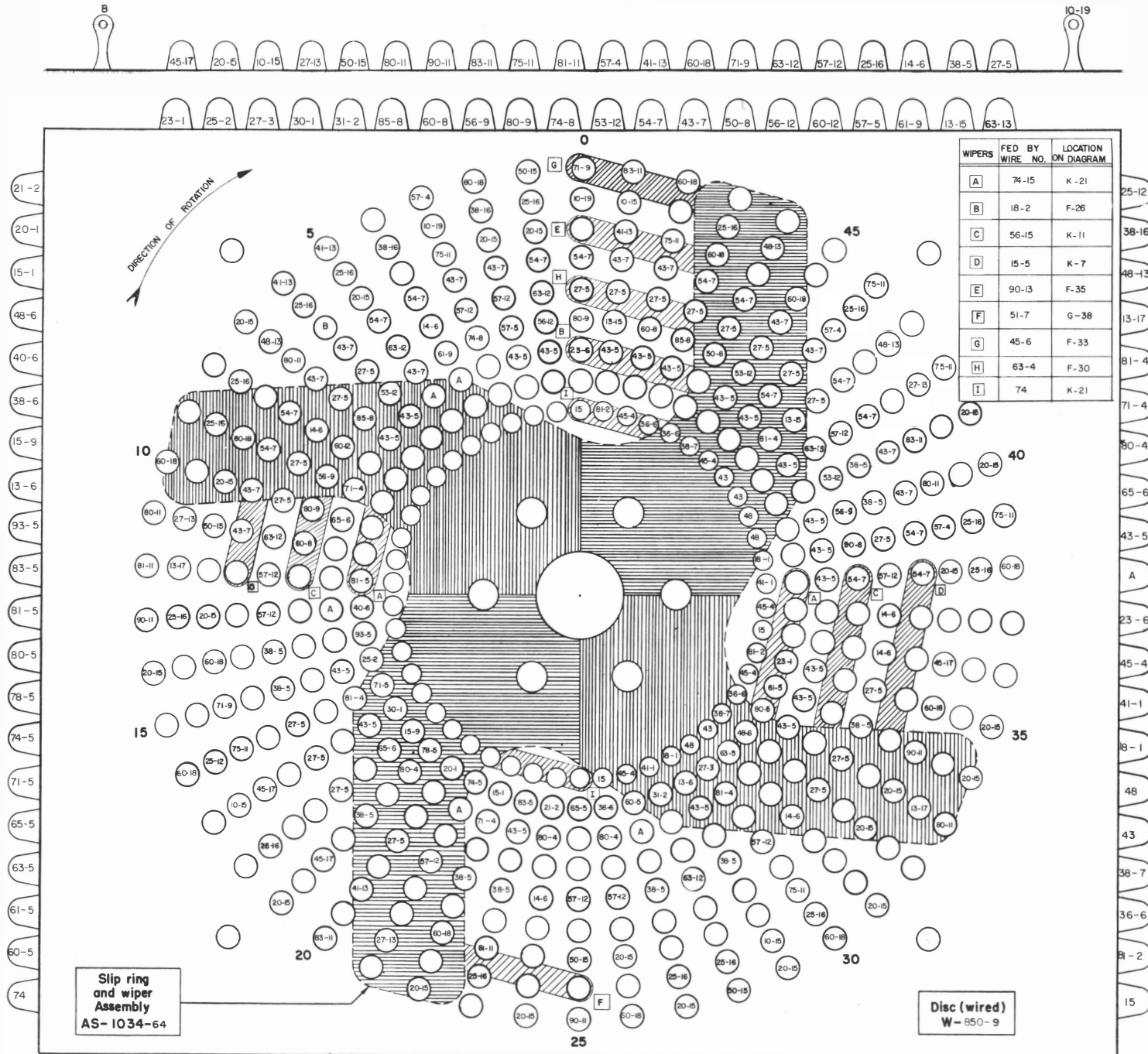


WHEN CHECKING OUT ANY "IN-LINE " OR "SECTION" REPLAY SCORING CIRCUIT, REFER TO SEARCH POSITIONS CHART FOR THE POSITION ON "SEARCH DISC " WHERE THAT "IN-LINE " OR "SECTION" REPLAY SCORING CIRCUIT IS SEARCHED.

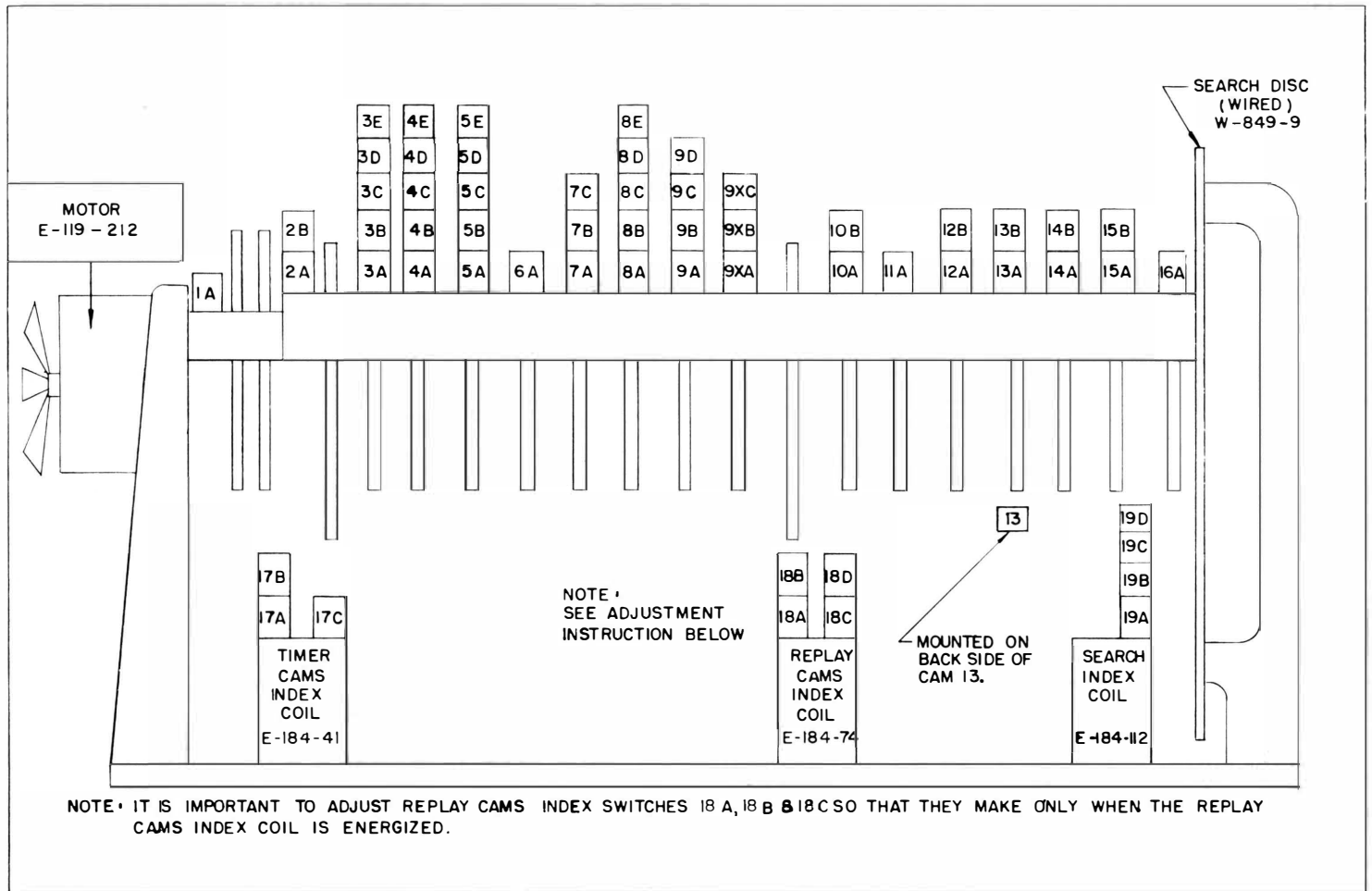
EXAMPLE :

WITH BALLS IN PROPER HOLES ON PLAYFIELD CORRESPONDING TO $\textcircled{J1} - \textcircled{J2} - \textcircled{J3}$ (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 \boxed{D} \boxed{F} & \boxed{G} , AND SEARCH RELAYS # 1 # 2 # 3 SHOULD BE ENERGIZED TO SCORE REPLAYS .

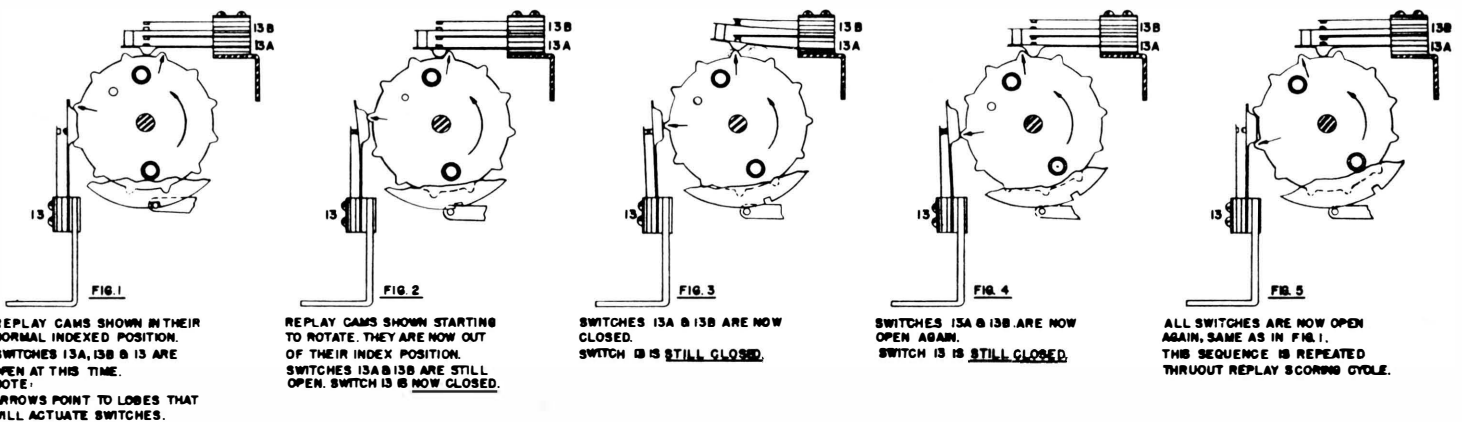
SPOTTING DISC viewed from **BUTTON** or **WIPER** side



CONTROL UNIT PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 22



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 21

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.	I-3	90-5 30	Gray Yellow	Pulses reflex play magnet coil, replay register unit reset coil, and total plays meter.
2B N.O.	E-38	10-2 61-7	Red Brown-Red	Completes circuit to energize red or yellow score booster trip relay.
3A N.C.	I-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-47	74-16 81-13 21-3	Orange-Green Black-Red Blue-Red	Completes circuit to energize and lock-in play features relay.
3D S.P.D.T.	C-48	60-13 54-16 21-3	Brown White-Green Blue-Red	Directs circuit to energize, and lock-in play score relay.
3E S.P.D.T.	C-49	58-4 56-16 21-3	White-Black White-Brown Blue-Red	Completes circuit to energize, and lock-in play white super scores relay.
4A N.O.	I-47	98-1 30	Gray-Black Yellow	Energizes spotting cams index coil.
4B N.O.	F-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) open start circuit, and completes a circuit to energize tilt relay if coin switch closed too long.
4E N.O.	B-10	14-8 27-9	Red-Green Blue-Orange	Completes circuit to step coin unit.
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.	G-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, scores lock relay, and white super scores lock relay lock-in circuits.
6A N.C.	I-29	51-5 75-5	White-Red Orange-White	Opens circuit for game advantages during spin.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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.	G-47	21-3 43-14	Blue-Red Green-Yellow	Completes circuit to energize white super-scores lock relay, features lock relay, or scores lock relay when playing for white super-score features, or scores.
7C N.O.	F-29	60-6 63-4	Brown Brown-Yellow	Completes circuit for yellow, red and green score unit steps.
8A N.O.	B-27	25-4 38-4	Blue-White Yellow-Black	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	50-15 27-13	White Blue-Orange	Completes circuit to energize OK feature trip relay.
8D N.O.	G-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.	E-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.
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.	H-28	15-7 54-8	Red-White White-Green	Proportioning circuit for 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 super 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.	D-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	Pulse 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)

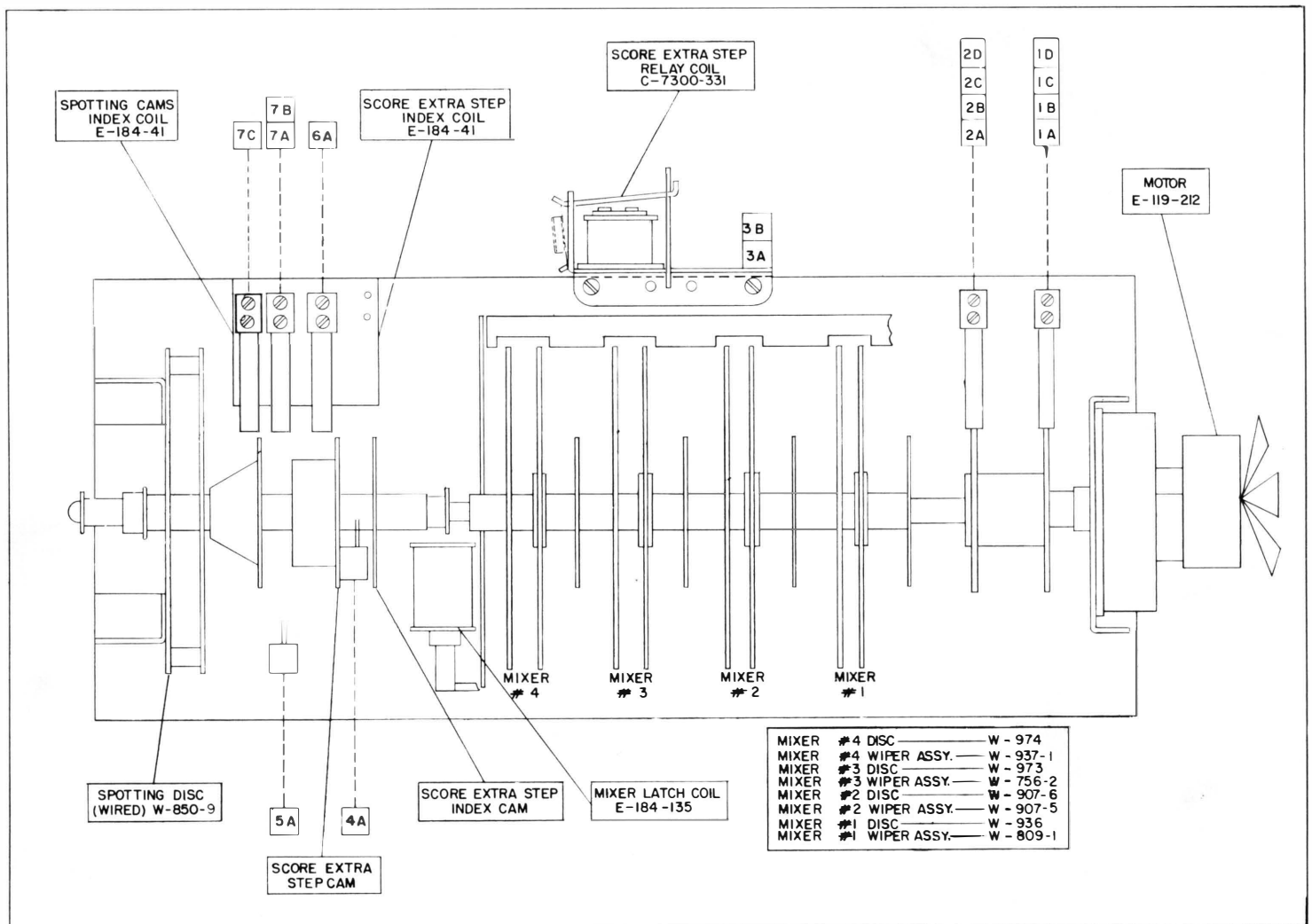
CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 21

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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.	H-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.
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 functions 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.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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.	C-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.

MIXING 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 43-16	Green-White Green-Yellow	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-1	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 2C N.O.	F-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 27-17	Green Blue-Orange	Completes circuit to put blue replay counter back to zero when starting a new game.

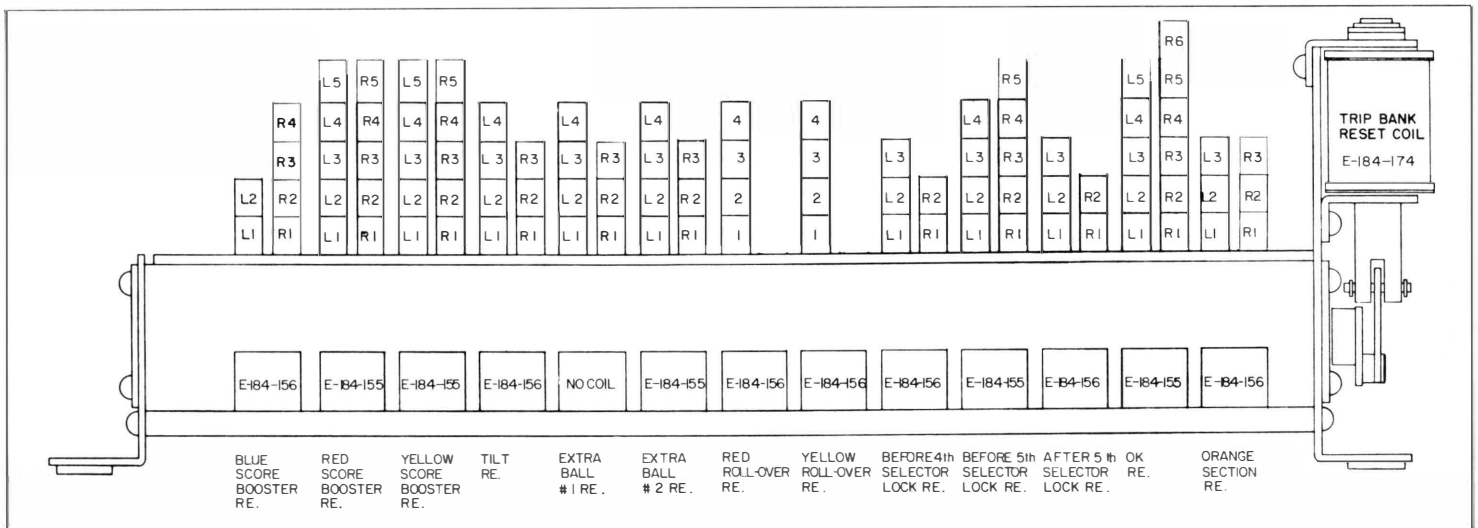
CONCLUDED ON NEXT PAGE

MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 24

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 red, yellow or green score unit multiple steps.
SCORE EXTRA STEP PULSE SWITCH 4A N.O.	F-28	43-4 50-4	Green-Yellow White	Pulses yellow, red, and green score units for multiple steps when circuit complete thru all other factors.
SQUARE PIN SWITCH 5A N.C.	D-10	13-5 21-3	Red-Yellow Blue-Red	Opens score extra-step relay lock-in circuit.
SCORE EXTRA STEP INDEX COIL	E-50	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-21	13-4 30	Red-Yellow Yellow	Flashes score lites during red or blue button play. Also flashes extra-ball lites during yellow button play.
7B N.O.	J-11	81-6 85-11	Black-Red Black-White	Flashes all feature lites during red or green button play.
7C N.O.	J-8	15-5 18-17	Red-White Red-Black	Flashes red and yellow super-section feature lites during white button play.

TRIP RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 26



TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 25

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BLUE SCORE BOOSTER RELAY COIL	A-38	J 70	Jumper Orange	Energized thru spotting disc when circuit complete thru other factors. Also energized by switch on super blue relay.
L1	N.C.	A-38 51-19 J	White-Red Jumper	Opens circuit to coil.
L2	S.P.D.T.	L-11 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 unit steps.
R2	N.C.	H-28 54-8 36-19	White-Green Yellow-Brown	Proportioning circuit for extra-ball unit 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 300 or 600 blue section scoring.
R4	S.P.D.T.	B-19 10-16 15-16 23-17	Red Red-White Blue-Yellow	Same function as switch R3.
RED SCORE BOOSTER RELAY COIL	A-37	J 70	Jumper Orange	Energized thru spotting disc when circuit complete thru other factors. Also energized thru futurity game disc as part of futurity game scoring.
L1	N.O.	J-7 54-7 80-9	White-Green Black	Completes circuit to lite red super-section feature lite.
L2	N.C.	E-35 41-13 93-13	Green-Red Gray-Yellow	Proportioning circuit for magic-screen feature unit steps.
L3	S.P.D.T.	D-30 65-4 63-7 52-4	Brown-White Brown-Yellow White-Blue	Proportioning circuit for red or yellow score unit steps.
L4	S.P.D.T.	C-30 83-4 25-14 75-8	Black-Yellow Blue-White Orange-White	Same function as switch L3.
L5	N.C.	H-24 41-15 48-17	Green-Red Green-Black	Proportioning circuit. (Mixer #2 relay).
R1	N.C.	H-24 78-11 27-7	Orange-Black Blue-Orange	Same function as switch L5.
R2	N.O.	C-14 13-1 45-12	Red-Yellow Green-White	Completes a circuit thru search disc to step winner unit, when searching for red super section scores.
R3	N.C.	B-37 10-5 J	Red Jumper	Opens circuit to coil.
R4	N.C.	D-39 36-13 15-13	Yellow-Brown Red-White	Proportioning circuit for selection feature unit steps.
R5	N.C.	C-37 53-6 20-7	White-Yellow Blue	Proportioning circuit for yellow score booster trip relay.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW SCORE BOOSTER RELAY COIL	A-37	J 70	Jumper Orange	Energized thru spotting disc when circuit complete thru other factors. Also energized thru futurity game disc as part of futurity game scoring.
L1	N.O.	J-8 43-7 80-9	Green-Yellow Black	Completes circuit to lite yellow super-section feature lite.
L2	N.C.	D-35 93-12 91-12	Gray-Yellow Gray-Red	Proportioning circuit for magic-screen feature unit steps.
L3	S.P.D.T.	D-30 52-4 31-9 65-4	White-Blue Yellow-Red Brown-White	Proportioning circuit for yellow or red 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.
L5	N.C.	H-24 41-15 48-17	Green-Red Green-Black	Proportioning circuit (Mixer #2 relay)
R1	N.C.	A-37 53-6 J	White-Yellow Jumper	Opens circuit to coil.
R2	N.O.	C-15 13-1 27-6	Red-Yellow Blue-Orange	Completes a circuit thru search disc to step winner unit when searching for yellow super section scores.
R3	N.C.	D-39 65-13 36-13	Brown-White Yellow-Brown	Proportioning circuit for selection feature unit steps.
R4	N.C.	I-24 81-9 78-11	Black-Red Orange-Black	Same function as switch L5.
R5	N.C.	B-37 10-5 90-12	Red Gray	Proportioning circuit for red score booster feature trip relay.
TIPT RELAY COIL	A-12	14-5 70	Red-Green Orange	Energized by any tilt switch. Also by control unit cam switch 4D if coin switch is closed too long.
L1	N.C.	H-39 40-8 93-3	Green Gray-Yellow	Opens circuits for moving magic-screen, and energizing search index lock magnet.
L2	N.C.	M-28 50-17 20-4	White 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 shutter if tilt occurs with shutter open.
L4	S.P.D.T.	I-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 spotting 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 13-16 83-3	Red-Yellow Black-Yellow	Completes a circuit for starting new game if tilt occurred during search cycle.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 25

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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 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	(Guaranteed steps) Opens circuit for score steps, and completes circuit for extra-ball steps.
R1 N.C.	I-30	21-3 41-17	Blue-Red Green-Red	Proportioning circuit. (Mixer #4 relay)
R2 N.C.	J-11	27-16 81-6	Blue-Orange Black-Red	Opens circuit for flashing other game feature lites.
R3 S.P.D.T.	I-28	75-5 15-7 45-2	Orange-White Red-White Green-White	Opens circuit for score steps, and completes circuit for extra-ball steps.
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	Directs circuit to run shutter motor, or energize mixer latch, and timer cams index coils.
L4 S.P.D.T.	J-21	25-17 13-4 74	Blue-White 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.O.	J-26	21-4 50-9	Blue-Red White	Completes circuit to lite extra balls feature lite.
R3 N.O.	H-28	56-6 36-19	White-Brown Yellow-Brown	In series with circuit for extra-ball steps.
RED ROLL-OVER RELAY COIL	A-45	J 70	Jumper Orange	Energized directly thru selection feature disc, also by red roll-over button switch, thru selection feature disc.
1 N.C.	A-45	25-13 J	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 and 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.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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 J	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 J	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 and 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 J	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 start relay, 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 trip 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).

CONCLUDED ON NEXT PAGE

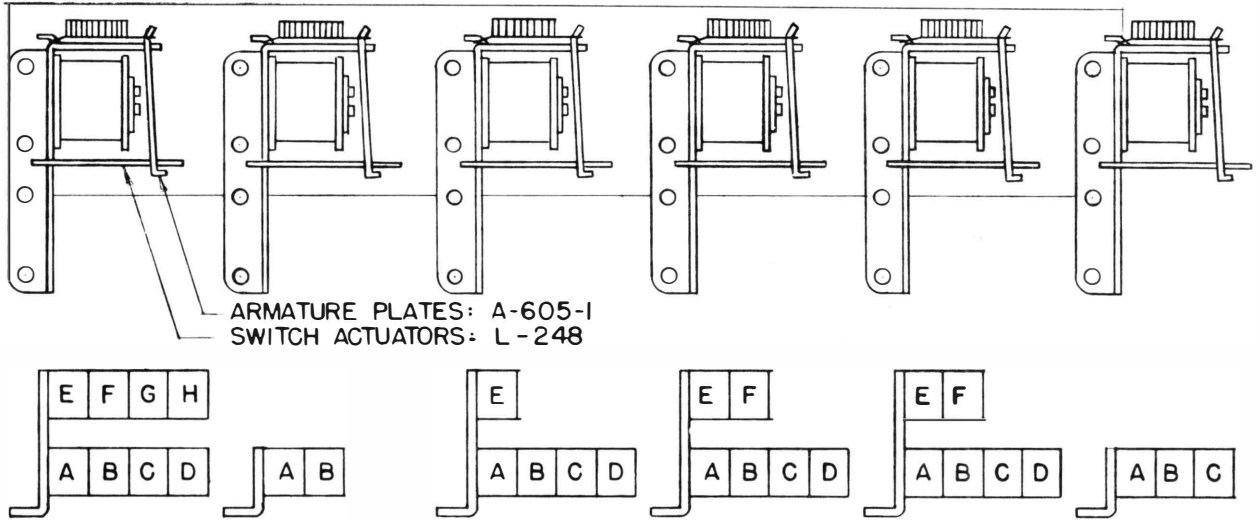
TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 25

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-42	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 trip relay.
L3	N.C.	A-11	98-11 J 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 after 6th ball.
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	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
L1	N.C.	B-36	81-14 J Black-Red Jumper	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	Completes a circuit to magic screen unit index coil.
L4	N.O.	C-43	27-15 98-12 Blue-Orange Gray-Black	Completes a circuit to move right winding of magic screen motor, and circuit to energize move right button relay.
L5	N.O.	F-34	20-15 21-16 Blue Blue-Red	In series with circuit to energize orange section feature trip relay.
R1	N.C.	G-27	53-13 74-12 White-Yellow Orange-Green	Proportioning circuit (Mixer #2 relay).
R2	N.O.	J-6	10-11 30 Red Yellow	In series with a circuit to flash select-now lite. Also in series with circuit to lite before 4th, before 5th, after 5th, yellow or red rollover feature lites.
R3	N.C.	H-27	54-13 65-12 White-Green Brown-White	Proportioning circuit (Mixer #2 relay).
R4	N.C.	I-25	21-3 56-13 Blue-Red White-Brown	Proportioning circuit (Mixer #2 relay).
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 relay circuit.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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 J Blue-Red Jumper	Opens circuit to coil.
L2	N.O.	J-8	13-15 30 Red-Yellow Yellow	Completes circuit to lite orange section feature lite.
L3	N.O.	D-17	80 60 Black Brown	Completes a circuit to energize replay cams index coil for orange section replay scoring.
R1	N.C.	H-26	43-13 65-12 Green-Yellow Brown-White	Proportioning circuit (Mixer #2 relay).
R2	N.C.	H-25	45-13 71-12 Green-White Orange-Red	Proportioning circuit (Mixer #2 relay).
R3	N.O.	D-23	14-16 98 Red-Green Gray-Black	In series with green replay scoring circuit for orange section scores.

6 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 30



Name	Position 29 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				Thermalzeze wire or equivalent. No wrap on coil.		Thermalzeze wire or equivalent. 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

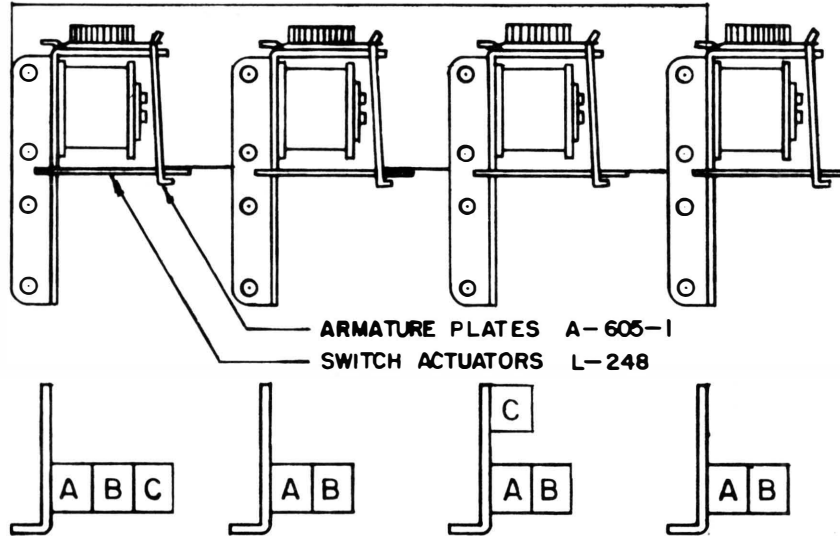
6 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 29

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.	G-29	18-16 83-9	Red-Black Black-Yellow	Opens regular game features circuit.
B N.C.	H-48	14-9 36-16	Red-Green Yellow-Black	Completes circuit to reset futurity game unit.
C N.O.	F-33	58 61-12	White-Black Brown-Red	Completes circuit to step scores and features to guaranteed level of futurity games.
D N.O.	D-44	10-9 23-9	Red Blue-Yellow	Lock-in circuit for this relay.
E N.C.	B-32	15-4 74-13	Red-White Orange-Green	Opens regular green score unit step-up circuit.
F N.O.	D-27	78-4 81-16	Orange-Black Black-Red	In series with anti-cheat relay safety circuit.
G 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.
H N.O.	C-6	14-3 31-7	Red-Green Yellow-Red	Completes a circuit to run shutter motor (opens shutter to dump balls).
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	Opens circuit to move left winding off 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 RE-SET 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.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.	I-47	36-17 30	Yellow-Brown Yellow	(Safety circuit) completes a circuit to reset futurity game unit when collect futurity game relay is energized.
F N.C.	G-33	25-18 58	Blue-White White-Black	Opens futurity game guaranteed scores and features step-up circuit.
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 32



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

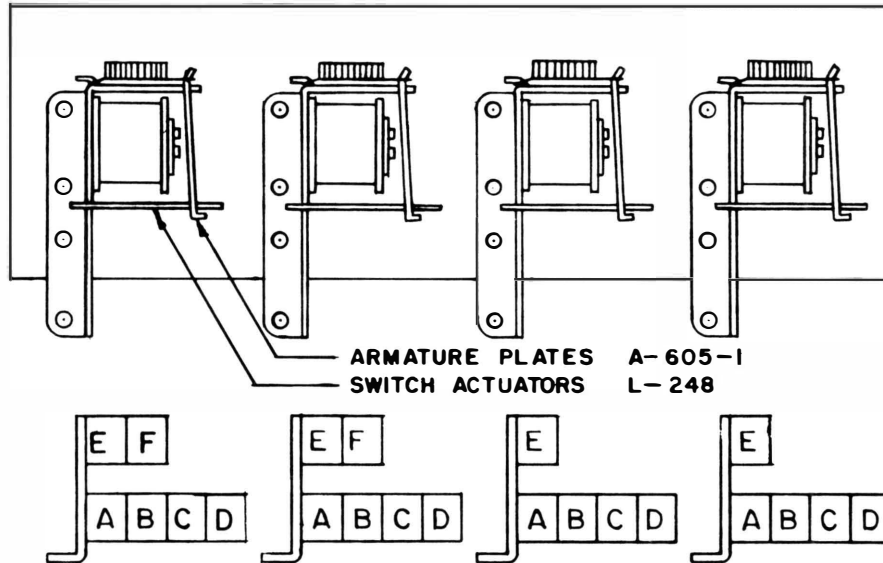
(VERTICAL) 4 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 31

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.	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 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.	L-48	65-11 71-11	Brown-White Orange-Red	Completes a circuit to energize selection feature units. 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.	E-33	56-3 40-13 85-2	White-Brown Green Black-White	Opens circuit for 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.
C N.C.	B-36	53-6 60-5	White-Yellow Brown	Opens circuit to either the yellow or red score booster trip relay.
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.	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 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 34



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

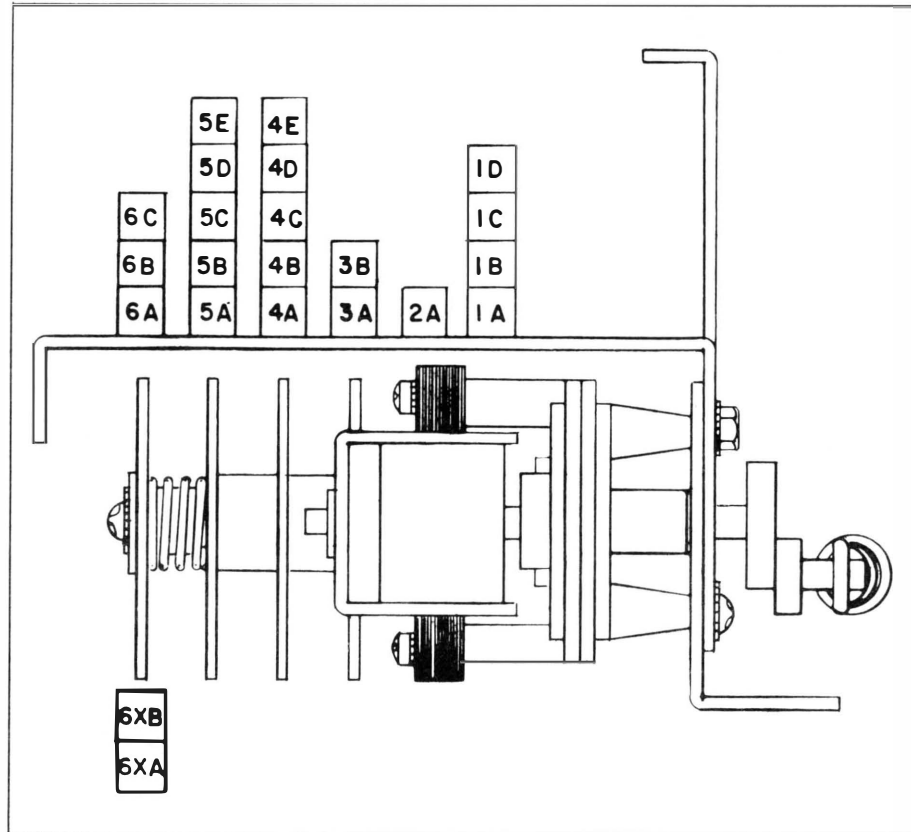
(HORIZONTAL) 4 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 33

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.
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 game features.
D N.O.	H-38	13-17 48-13	Red-Yellow Green-Black	In series with circuit for red or yellow score booster feature.
E N.O.	H-30	23-4 78-8	Blue-Yellow Orange-Black	Proportioning circuit. (Mixer #4 relay).
F N.C.	I-30	41-17 52-17	Green-Red White-Blue	Proportioning circuit. (Mixer #4 relay).
PLAY FEATURES RELAY COIL	B-47	31-15 61-13	Yellow-Red Brown-Red	Energized by green play features button switch when playing for features only.
A S.P.D.T.	J-12	36-15 90-16 23-15	Yellow-Brown Gray Blue-Yellow	Directs circuit for yellow button play lite, red button play lite, blue button play lite, or green button play lite.
B N.O.	C-46	43-14 53-14	Green-Yellow White-Yellow	Completes 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-29	71-13 41-16	Orange-Red Green-Red	Opens yellow, red, and green score unit step-up circuit. Also red letter feature unit step-up circuit.
F N.C.	K-21	15-17 74-15	Red-White Orange-Green	Opens yellow, red, and green score 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.
A N.O.	G-29	56-11 60-6	White-Brown Brown	In series with circuit for yellow, red, and green score steps.
B N.O.	B-47	40-15 93-14	Green Gray-Yellow	Lock-in circuit for this relay.
C N.O.	F-30	57-12 27-5	White-Orange Blue-Orange	In series with circuit for yellow, red, and green score steps.
D N.O.	F-30	38-5 63-12	Yellow-Black Brown-Yellow	Same function as switch D.
E N.C.	G-33	91-13 98-14	Gray-Red Gray-Black	Opens features circuit.
PLAY SCORES RELAY COIL	B-49	31-15 65-15	Yellow-Red Brown-White	Energized by blue play scores button switch 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 for yellow button play lite, red button play lite, or blue button play lite.
B N.O.	D-28	10-1 91-5	Red Gray-Red	In series with guaranteed yellow, red, and green score steps.
C N.O.	C-47	43-14 93-14	Green-Yellow Gray-Yellow	Completes circuit to energize scores lock relay.
D N.O.	C-49	54-16 65-15	White-Green 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



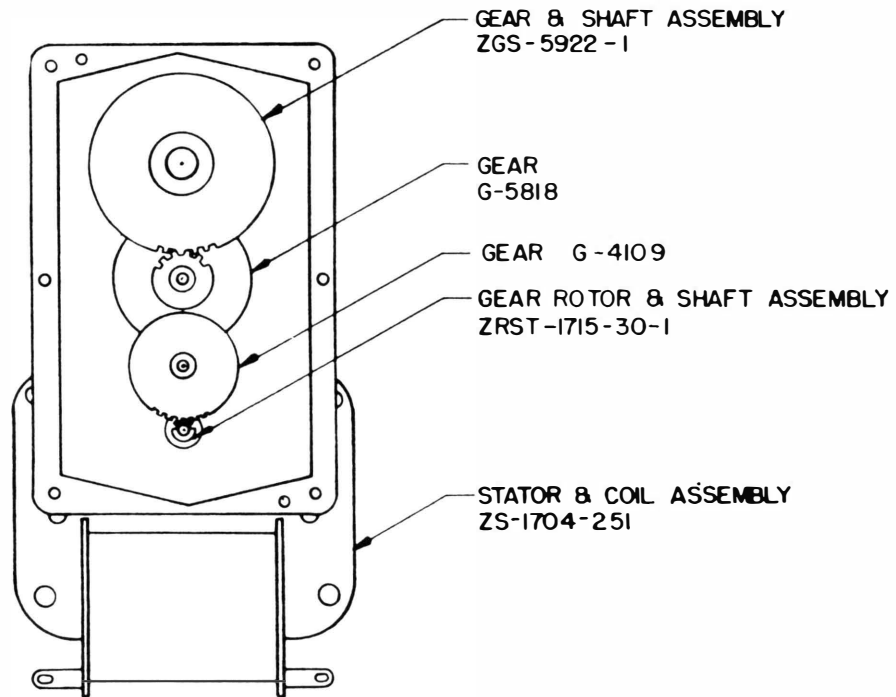
SHUTTER MOTOR CAM SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW AT LEFT

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	1-15 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.	H-7 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.	G-31 91-13 91-13	Gray-Red Gray-Red	Opens regular game advantages circuit while shutter opens 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.	G-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 a new game.
3B	N.O.	H-12 20P 70P	Blue (Plastic) Orange (Plastic)	Resets trip relay bank when starting a 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 ulted while shutter is open.
4B	N.C.	1-38 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.	1-11 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 85-12 91-13	Black-White 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.
6A	N.O.	H-9 71-8 30	Orange-Red Yellow	Resets timer unit when starting new game.
6B	N.O.	H-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.	F-27 81-16 30	Black-Red Yellow	In series with anti-cheat relay safety circuit when collecting futurity game.
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 36-17 30	Yellow-Brown Yellow	NOTE: This switch mounted on bracket under cam 6. Completes circuit to reset futurity game unit, when collecting futurity games.

SHUTTER MOTOR

(MOTOR PART NO. E-119-99)



NOTE:

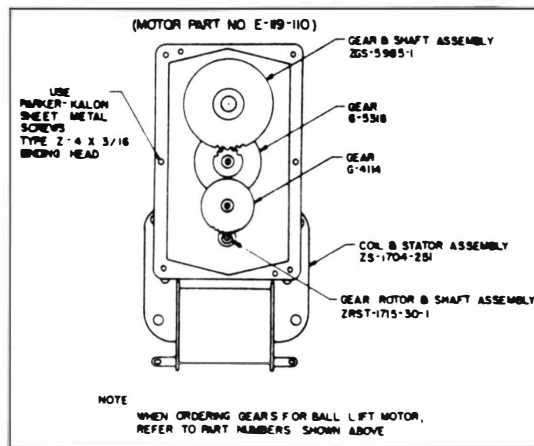
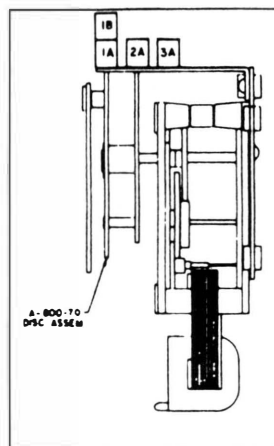
WHEN ORDERING GEARS FOR SHUTTER MOTOR,
REFER TO PART NUMBERS SHOWN ABOVE.

ANTI-CHEAT COIN SWITCH CIRCUIT

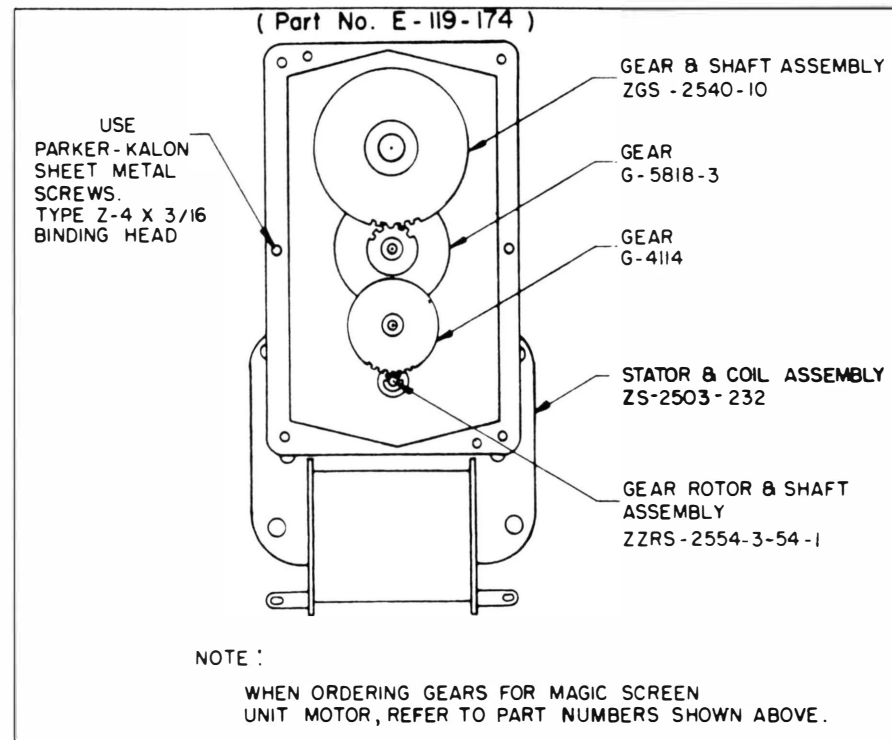
The coin switch gives a very short pulse, when operated by a coin. With this circuit, the game will tilt if the pulse is not as short as from a coin, so that operating the coin switch with wire, strings, etc., usually results in a tilt.

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



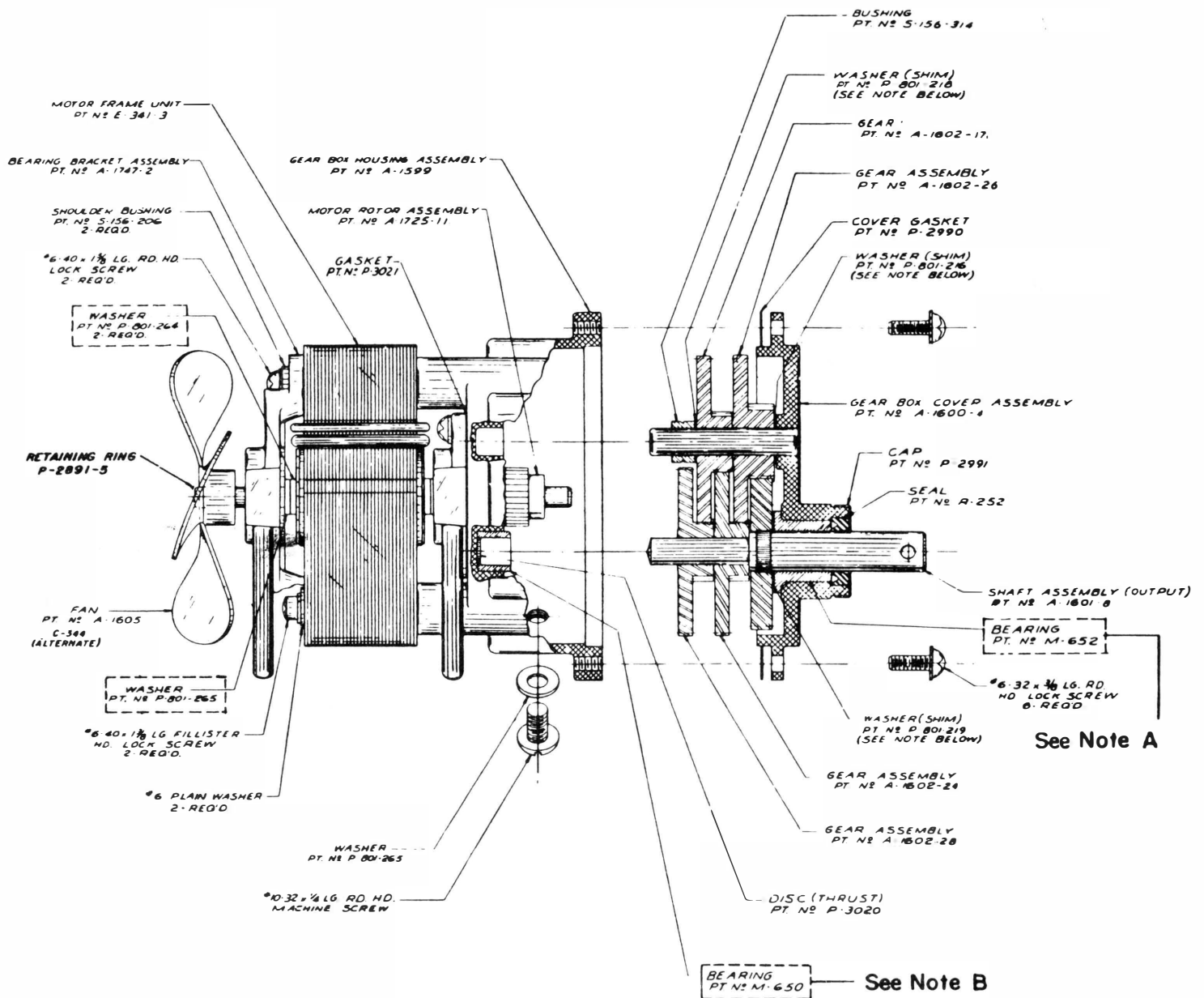
BALL LIFT MOTOR CAM SWITCH CHART FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	G-11 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-1809-3	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

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



See Note A

See Note B

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

FRONT DOOR TRANSFORMER

24	
20-2	57-14
25-8	71-2
27-8	78-7
30	80-2
31-16	81
40-7	85-20
45-16	90-5
48-4	91-7
51-13	93-7
52-9	98-11
53-18	40 P
54-11	90 P

22	
13	45-3
14-5	48-2
15-6	50-2
18-6	54-5
21-3	63-2
27-2	70
31-4	71-6
36-3	80-6
38-3	85-7
41-4	90-9
43-2	91-1

12	
14-8	61-13
23-9	63-16
54-16	65-15
56-16	74-16
58-4	75-13
60-13	81-13

18	
13	50-2
14-5	63-2
18-6	70
21-3	71-2
25-8	75-13
27-8	80-13
36-18	85-7
40-7	90-9
48-2	

10	
20	81
30	20 P
54-2	40 P
70	50 P
80-1	90 P

PANEL

24	
14-3	61
25-1	71-1
31-1	74-1
36-3	75-13
40-8	78-3
41-5	80-16
43-1	81
45-8	85-3
51-1	90-1
53-1	91-15
54-1	93-2
60-1	98-12

22	
10-10	50-1
14	52-12
15-6	57-1
18-3	61-4
21-3	63-1
25-18	65-1
30	70
36-1	71-8
40-1	75-1
41-4	80-6
45-1	85-5

20	
13-12	50-5
14-12	52-1
15-12	56-1
20	61-1
27-1	63-8
31-4	65-2
38-1	85-12
41-8	91-4
45-16	20 P
48-1	70 P

6	
31-7	81-16
36-17	91-13
51-13	98-6

PLUG SHEET FOR LIDO # 680.

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.	H-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.	F-17	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	B-28	27-7 41-16	Blue-Orange Green-Red	Energized thru mixer #2 disc when circuit complete thru other factors. This relay proportions score, and extra-ball steps, and blue score feature.
A N.O.	E-28	54-12 85-4	White-Green Black-White	In series with guaranteed score steps circuit.
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 relay. (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 trip relay. (3 in blue scores 600).
GREEN SCORES STOP RELAY COIL	J-49	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	45-2 51-5	Green-White White-Red	Opens features circuit.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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 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.
PLAY SUPER SCORES RE-LAY COIL	B-49	53-16 31-15	White-Yellow Yellow-Red	Energized by white play super scores button when playing for super score features only.
A S.P.D.T.	J-12	90-16 30 71-15	Gray Yellow Orange-Red	Directs circuit for yellow button play lite, red button play lite, blue button play lite, green button play lite, or white button play lite.
B N.C.	K-21	15-17 25-17	Red-White Blue-White	Opens yellow, red, and green score lites, and advance futurity lites flash circuit.
C N.O.	C-46	43-14 51-17	Green-Yellow White-Red	Completes circuit to energize super scores lock relay.
D N.O.	C-50	56-16 53-16	White-Brown White-Yellow	Lock-in circuit for this relay.
E S.P.D.T.	J-11	85-11 30 18-17	Black-White Yellow Red-Black	Opens other feature lites flash circuit, and completes circuit to flash only super-score feature lites.
F N.C.	A-28	41-16 70	Green-Red Orange	Opens circuit for energizing mixer #2 relay, and stepping yellow, red, green score units.
SUPER SCORE LOCK RELAY COIL	B-16	51-17 31-15	White-Red Yellow-Red	Energized by control unit cam switch 7B when play super-scores relay is energized.
A N.C.	G-34	98-14 43-16	Gray-Black Green-Yellow	Opens circuit for magic-screen feature OK feature, selection-feature, and orange section feature.
B N.C.	H-38	48-13 36-16	Green-Black Yellow-Brown	Proportioning circuit for red and yellow super-section feature.
C N.O.	I-37	25-16 48-13	Blue-White Green-Black	In series with circuit for red and yellow super-section feature.
D N.O.	H-31	78-8 23-4	Orange-Black Blue-Yellow	Proportioning circuit. (Mixer #4 relay).
E N.C.	E-36	50-15 20-6	White Blue	Opens circuit for OK feature.
F N.C.	H-30	52-17 80-8	White-Blue Black	Proportioning circuit. (Mixer #4 relay).
G N.O.	C-46	40-15 51-17	Green White-Red	Lock-in circuit for this relay.

NOTES

NOTES

NOTES

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-292-15	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-711-1	Cigarette holder
P-1900-62	Coin box (side)
P-1900-61	Coin box (front)
E-130-10	Counter—48 volts
A-2618	Legs
M-106-1	Leg bolt
M-163-4	Leg adjuster
M-281-22	Lock and keys—side door
A-1729-6	Push button
P-2768-15	Ring—blue
P-2768-16	Ring—green
P-2768-23	Ring—white
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¢

Front Door Assembly (Continued):

Part No.	Name of Part
CA-567-128	Front door only
AS-2041-7	Front door assembly (Specify 5¢ or 10¢)
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
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
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
P-2210-97	Plate—Moulding
CA-1089-2	Front moulding only

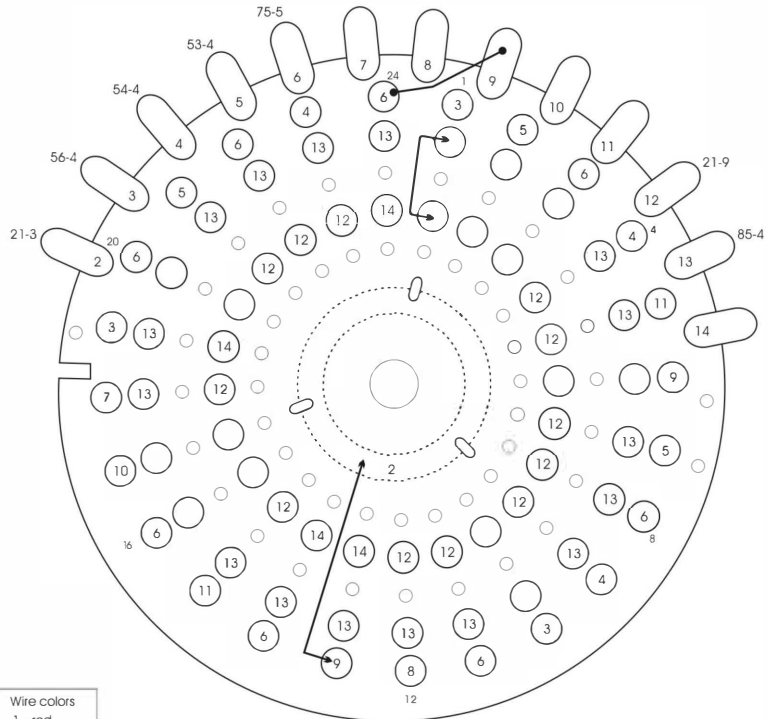
Panel Assembly:

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.

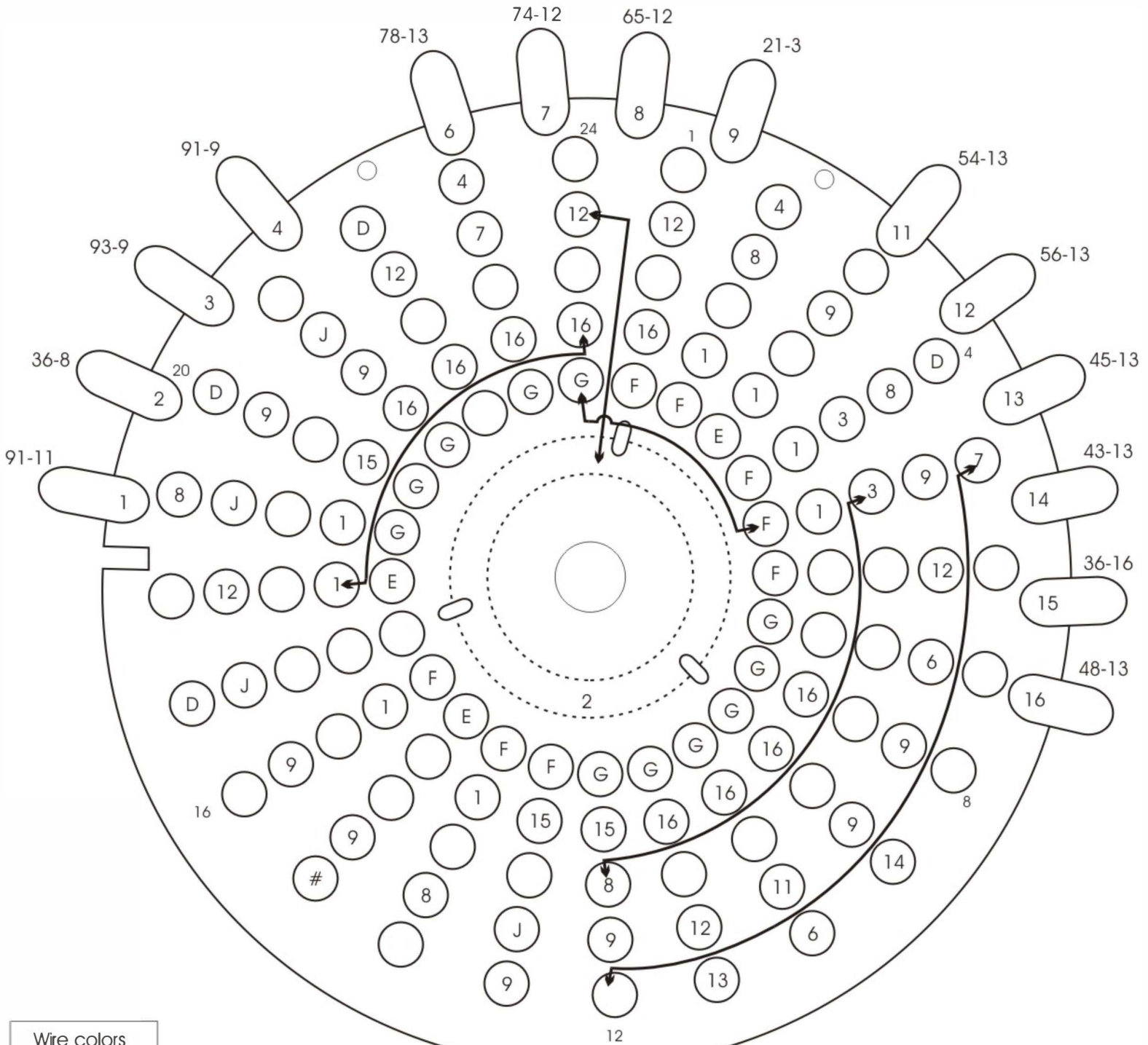
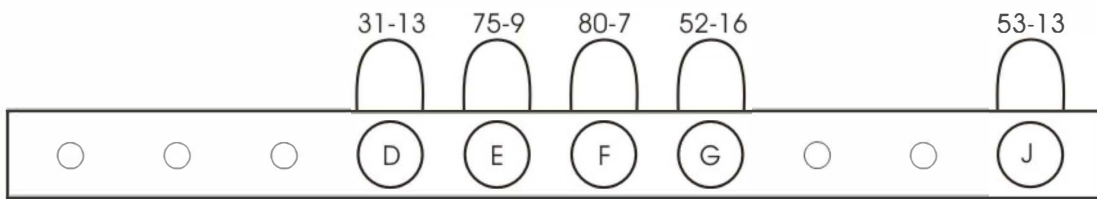


Note: wires lugs 6 and 9 jumpered together



- Wire colors
- 1 - red
 - 2 - blue
 - 3 - yellow
 - 4 - green
 - 5 - white
 - 6 - brown
 - 7 - orange
 - 8 - black
 - 9 - grey
 - 0 - no tracer

W- 936b	
Game : Lido	
Mixer #: 1	
Date: 1/22/06	By: Phil

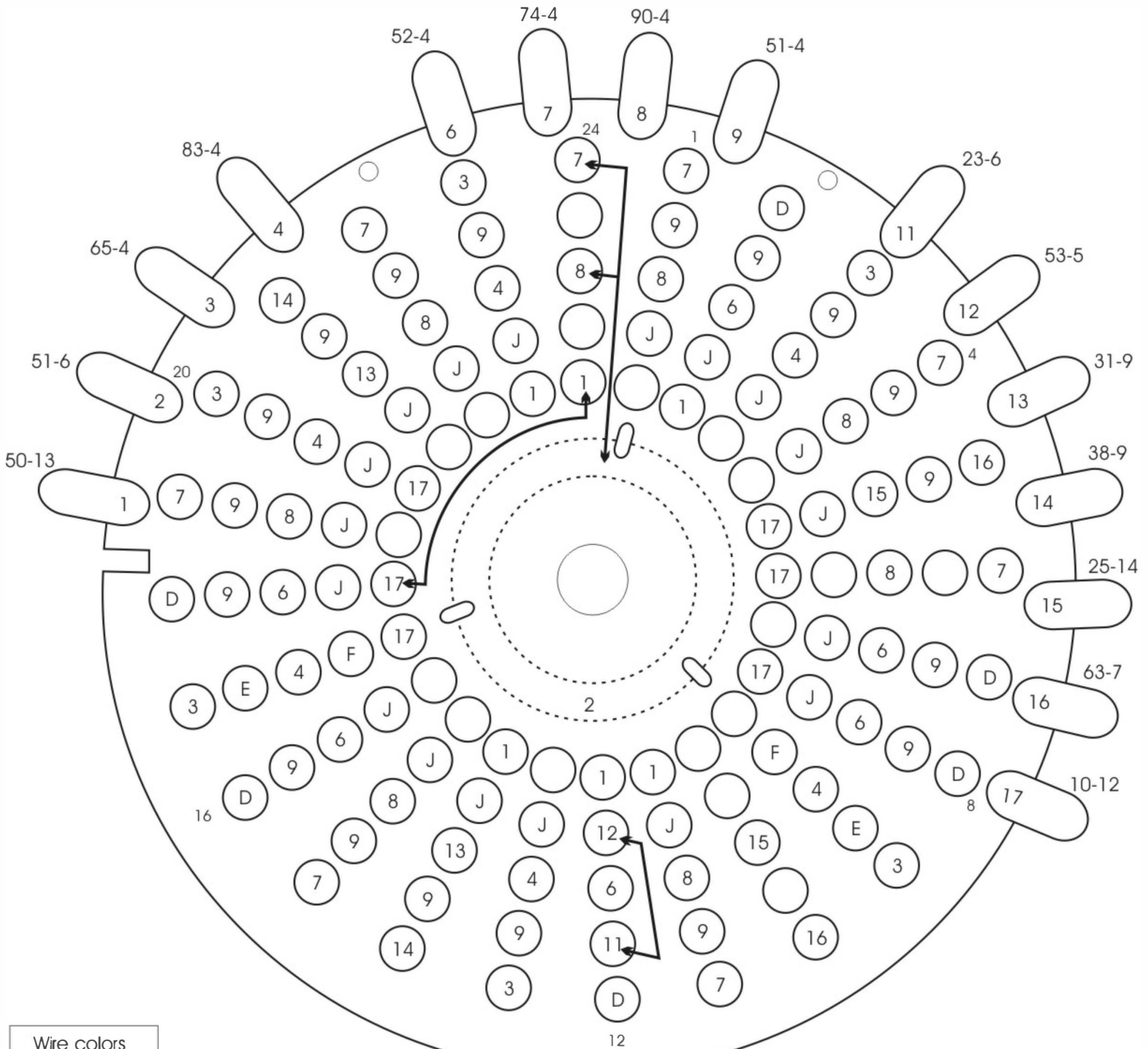
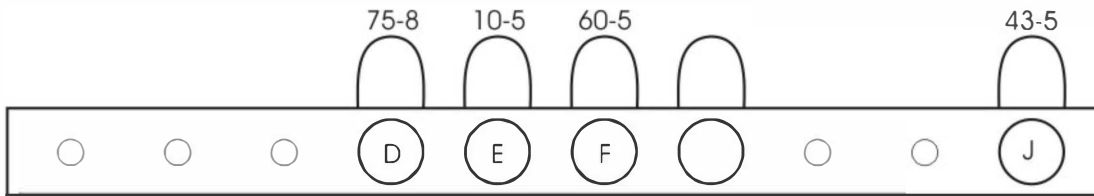


Wiring side

Wire colors

- 1 - red
- 2 - blue
- 3 - yellow
- 4 - green
- 5 - white
- 6 - brown
- 7 - orange
- 8 - black
- 9 - grey
- 0 - no tracer

W- 907-6b	
Game : Lido	
Mixer #: 2	
Date: 1/13/04	By: Phil



Wire colors

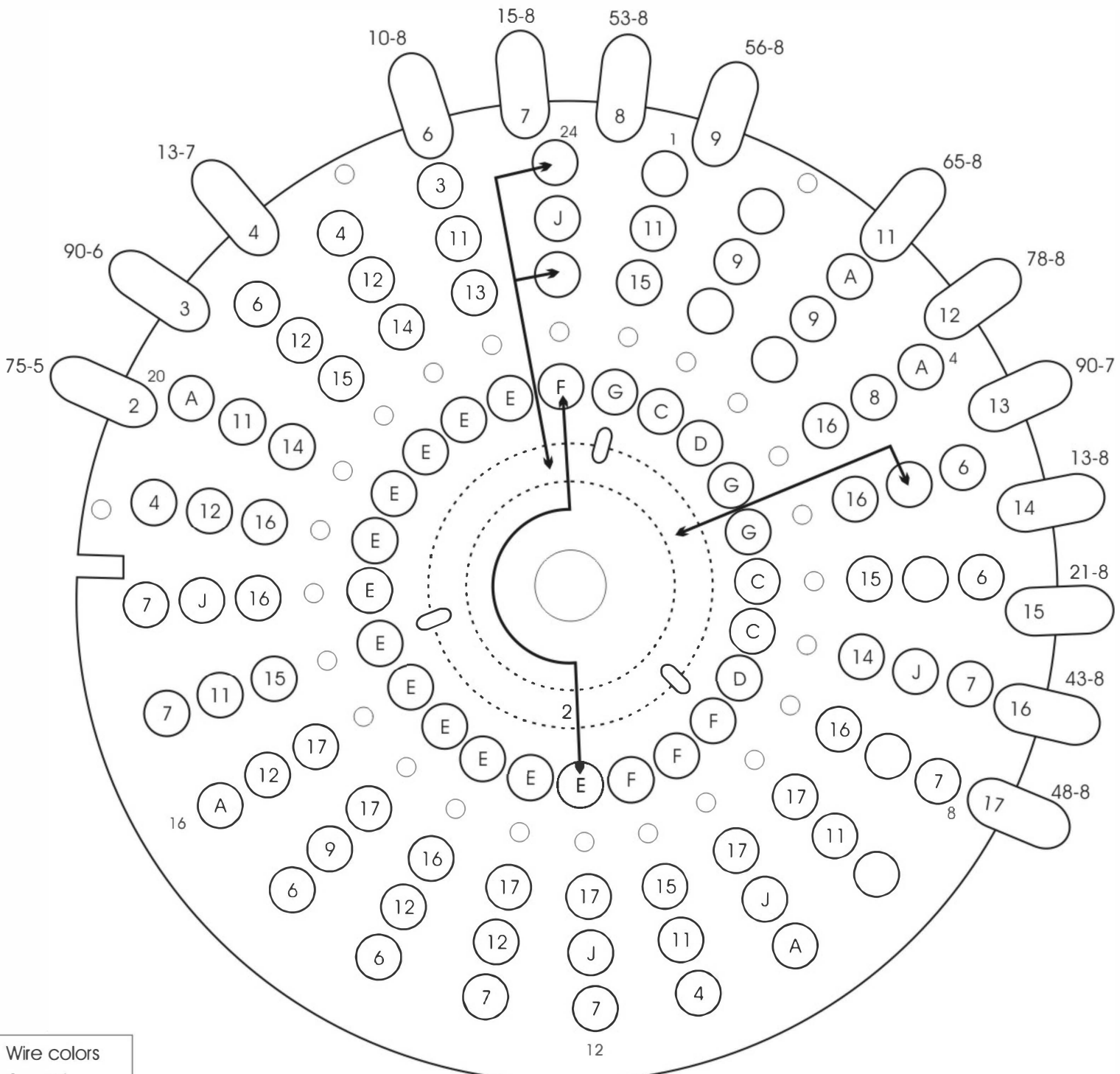
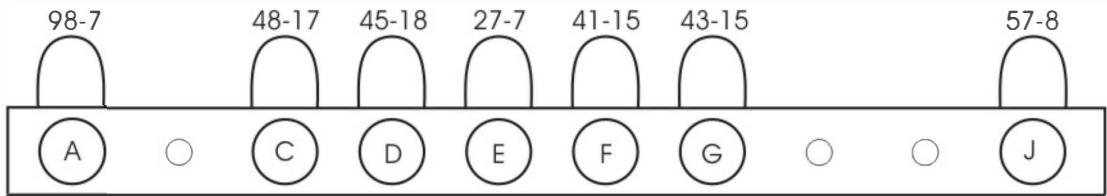
- 1 - red
- 2 - blue
- 3 - yellow
- 4 - green
- 5 - white
- 6 - brown
- 7 - orange
- 8 - black
- 9 - grey
- 0 - no tracer

W- 973b

Game : Lido

Mixer #: 3

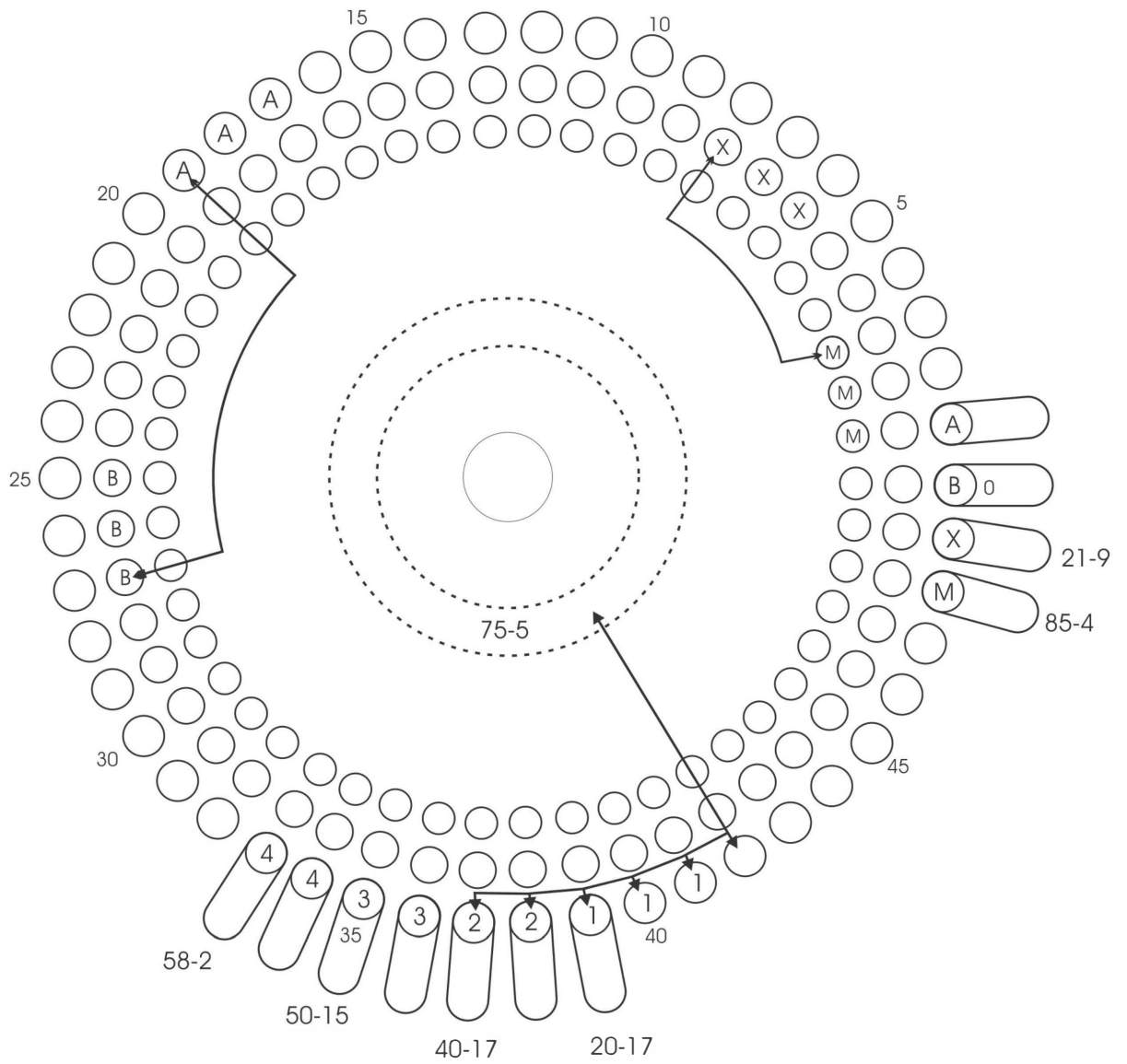
Date: 12/22/05 By: Phil



Wiring side

- Wire colors
- 1 - red
 - 2 - blue
 - 3 - yellow
 - 4 - green
 - 5 - white
 - 6 - brown
 - 7 - orange
 - 8 - black
 - 9 - grey
 - 0 - no tracer

W- 974b	
Game : Lido	
Mixer #: 4	
Date: 2/9/06	By: Phil / Mike



Wiper side

Wire colors

- 1 - red
- 2 - blue
- 3 - yellow
- 4 - green
- 5 - white
- 6 - brown
- 7 - orange
- 8 - black
- 9 - grey
- 0 - no tracer

W- 770b

Game : Lido

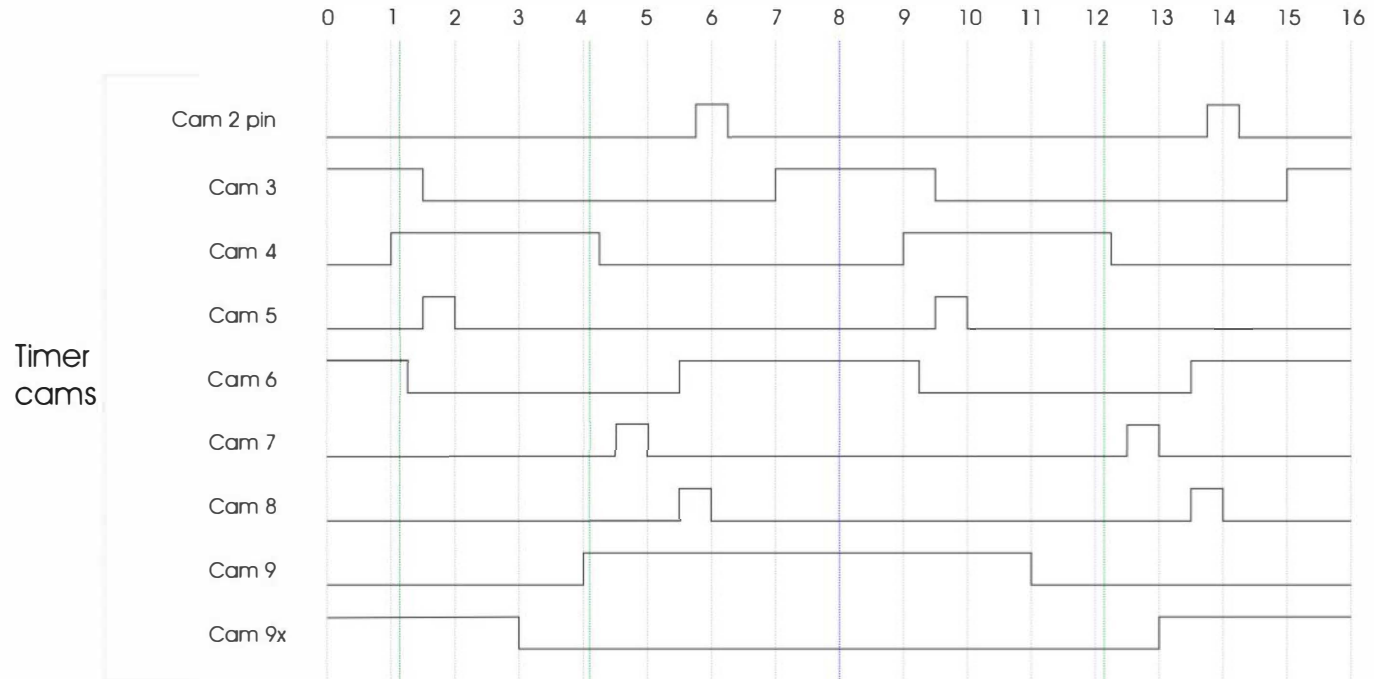
Reflex : Main

Date: 3/6/17

By: Phil

Lido

The first spin cycle is from time 0-8, the second is time 8-16 (the cams rotate 180 degrees for each coin/credit played)



At these times, the drag arm stops can pause the cam rotation temporarily. This stretches the amount of time things like the mixers and spotting wipers spin.

Lido

Replay
cams

