

Bally®

BORDER BEAUTY

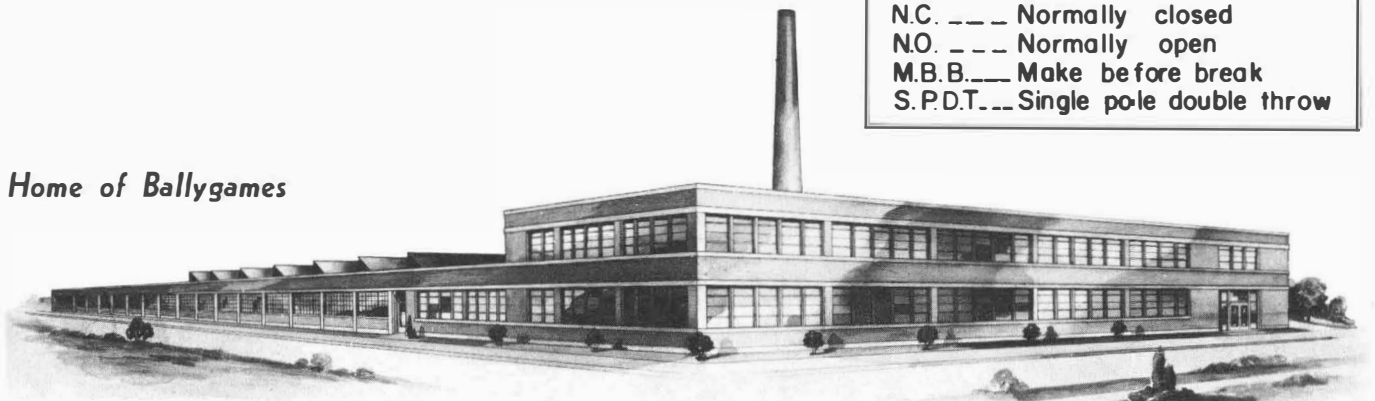
OPERATING INSTRUCTIONS AND PARTS CATALOG

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





CONNECTOR PLUGS CHART

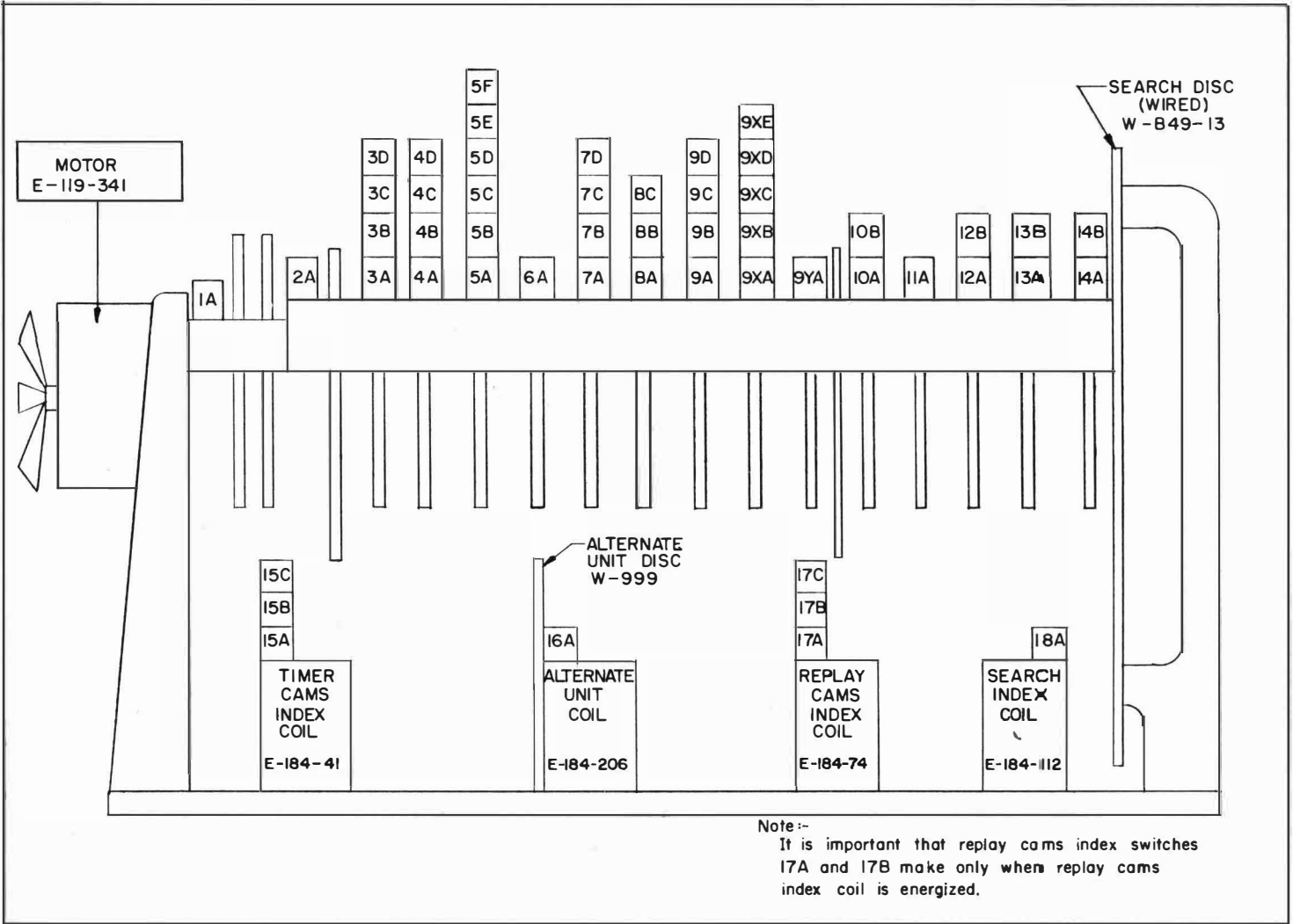
CABINET				PANEL							
18		20		22		24		22		20	
10-2	78-7	15-6	53-18	13-9	52-9	15-6	53-1	14-12	45-8	10-10	80-16
14-5	80-2	20-2	54-5	15-13	57-1	18-3	54-1	15-12	50-5	13-12	81
18-6	81-13	31-4	57-13	25-8	63-2	25-1	56-1	20	52-12	14-3	83-11
21-3	85-7	36-5	58-7	27-2	70	27-1	61-1	21-3	56-4	15-5	85-5
25-6	90-5	40-7	60-13	30	71-6	31-1	63-1	25-18	57-14	40-16	91-15
27-9	91-7	41-4	61-13	36-3	78-12	38-1	65-1	27-15	61	41-4	93-2
54-11	98-11	43-2	71-2	38-3	81	40-1	71-1	30	63-8	70	98-6
74-16	40P	45-3	85-15	41-14	85-17	43-1	74-1	31-4	65-2	71-14	20P
75-13	90P	50-2	90-2	45-5	91-1	45-1	75-1	36-3	71-8	75-13	52P
		52-3		48-5	93-7	48-1	85-3	40-8	85-12	78-3	70P
				50-16		51-1	90-9	41-8			
						52-1	91-11				

TRANSFORMER FRONT DOOR

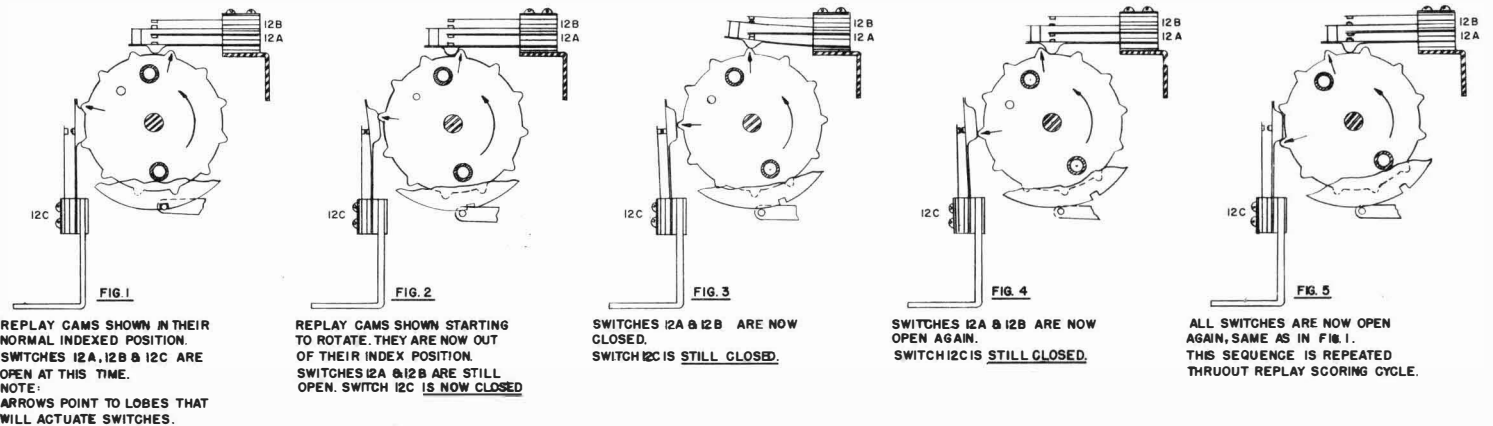
10		20	
20	81	10-2	50-2
30	20P	13-9	52-3
54-2	40P	14-5	63-2
70	50P	15-13	70
80-1	90P	18-16	71-2
		20-2	75-13
		21-3	80-13
		25-8	85-7
		27-9	90-2
		40-7	

DISCS COMMENCE ON PAGE 9

CONTROL UNIT PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 5



CORRECT ADJUSTMENT: CONTROL UNIT SWITCHES 12A, 12B & 12C NOTICE: IMPORTANT PART OF ILLUSTRATION IS TO SHOW THAT SWITCH 12C CLOSSES FIRST AND OPENS LAST. IF AN ADJUSTMENT IS NECESSARY, SWITCH 12C CAN BE MOVED UP OR DOWN. LOOSEN SCREWS THAT HOLD SWITCH, THEN MOVE UP OR DOWN.



CONTROL UNIT SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 4

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
DRAG ARM SWITCH N.O.	J-12	36-9 78-6	Yellow-Brown Orange-Black	(Not shown in pictorial view). In series with control unit cam switch 1A circuit to step timer unit.
1A N.O.	K-11	65-2 36-9	Brown-White Yellow-Brown	Pulses timer unit step-up coil after 5th ball is shot.
2A N.C.	M-11	30 25-9	Yellow Blue-White	Opens lock-in circuit to 25¢ relay.
3A N.C.	N-7	48-2 30	Green-Black Yellow	Opens start circuit.
3B S.P.D.T.	D-44	93-7 98-4 91-7 60-13	Gray-Yellow Gray-Black Gray-Red Brown	Directs circuit to replay meter and total play meter.
3C S.P.D.T.	G-60	57-13 21-3	White-Orange Blue-Red	Directs circuit to energize and lock-in play scores relay.
3D S.P.D.T.	F-59	74-16 81-13 21-3	Orange-Green Black-Red Blue Red	Directs circuit to energize and lock-in play features relay.
4A N.O.	H-61	30 98-1	Yellow Gray-Black	Pulses spotting cams index and score extra-step index coils.
4B N.O.	K-8	27-9 80-2	Blue-Orange Black	Pulses coin meter when coin meter is installed.
4C N.O.	H-16	52-3 14-5	White-Blue Red-Green	Pulses tilt relay coil thru 25¢ arm switch circuit (Anti-coin cheat circuit).
4D S.P.D.T.	L-7	10-5 13-9 14-5	Red Red-Yellow Red-Green	Directs circuit from start relay to tilt relay if 5¢ coin switch is closed too long. (Anti-coin cheat circuit)
5A N.O.	L-4	90-5 30	Gray Yellow	Pulses reflex play magnet, replay register unit reset coil and total play meter during play.
5B N.O.	J-12	65-2 83-1	Brown-White Black-Yellow	Pulses timer unit reset coil during extra ball play.
5C N.O.	C-31	23-7 38-4	Blue-Yellow Yellow-Black	Pulses extra ball unit step-up coil for single steps.
5D N.O.	D-32	91-6 78-4	Gray-Red Orange-Black	Pulses anti-cheat relay.
5E N.O.	I-36	85-4 10-7	Black-White Red	Pulses mystic lines feature unit and selection feature unit step-up coils for single steps.
5F N.C.	G-59	21-3 40-15	Blue-Red Green	Opens lock-in circuit to features lock relay and scores lock relay.
6A N.C.	N-35	51-5 75-5	White-Red Orange-White	Opens features and extra ball advance circuit during spin.
7A N.O.	K-33	54-12 10-17	White-Green Red	Pulses yellow, red, blue and green score unit step-up coils for single steps.
7B N.O.	J-58	21-3 43-14	Blue-Red Green-Yellow	Energizes features lock relay during green button play, or scores lock relay during blue button play.
7C N.O.	J-34	60-6 63-4	Brown Brown-Yellow	Pulses yellow, red, green and blue score unit step-up coils for single steps.
7D N.O.	C-13	56-9 71-9	White-Brown Orange-Red	Pulses score extra-step relay during yellow, red and green score steps.

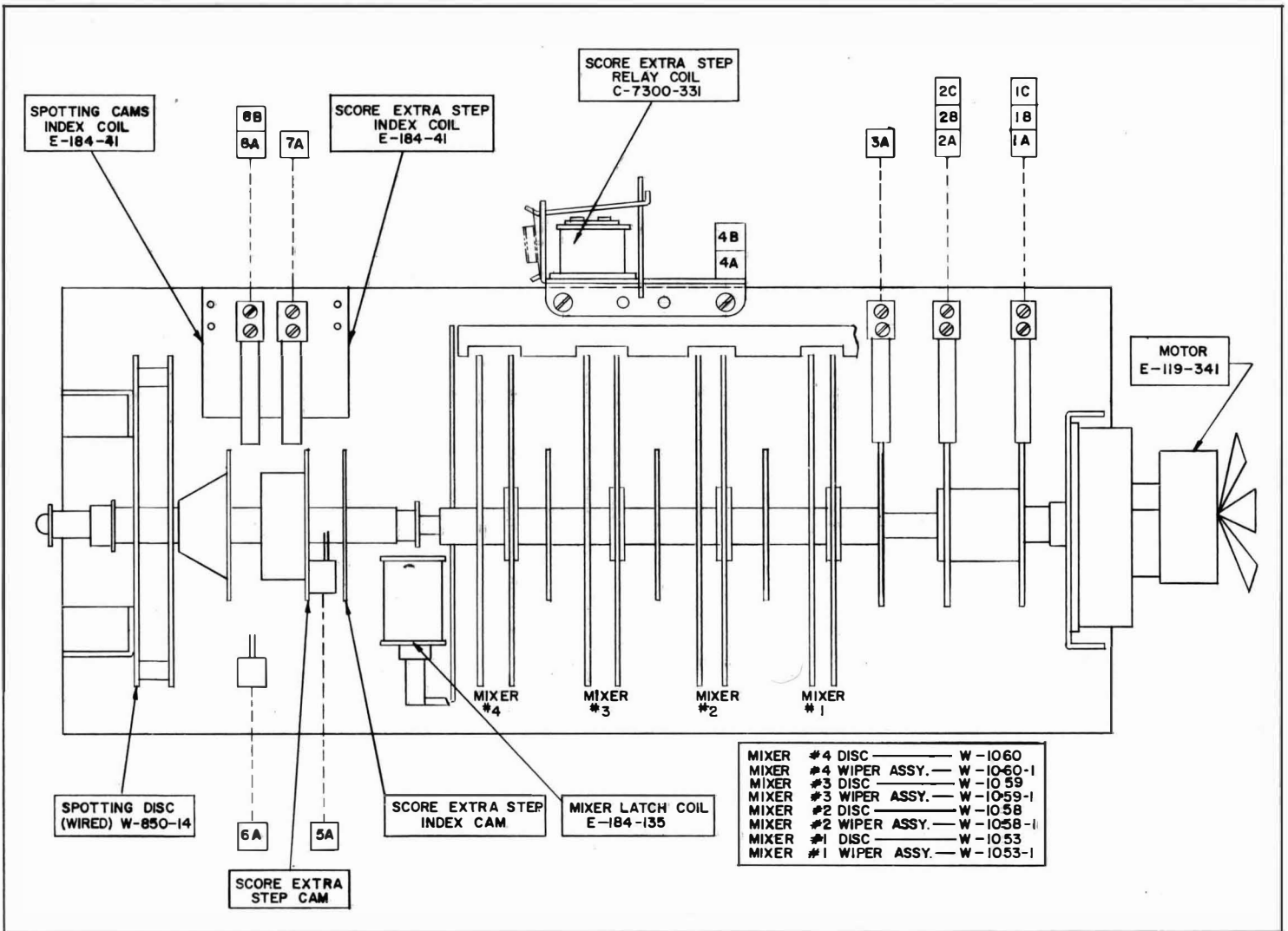
SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
8A N.O.	C-32	25-4 38-4	Blue-White Yellow-Black	Pulses extra ball unit step-up coil for single steps.
8B N.O.	J-35	56-11 63-4	White-Brown Brown-Yellow	Pulses yellow, red, green and blue score unit step-up coils for single steps only during blue button play.
8C N.O.	L-32	54-12 20-6	White-Green Blue	Same as switch 8B.
ALTERNATOR 9A	L-35	15-7 54-8	Red-White White-Green	Proportioning circuit for extra ball unit steps.
ALTERNATOR 9B	B-41	52-11 70	White-Blue Orange	Proportioning circuit for Big 4 300 and Big 4 600 features.
ALTERNATOR 9C	J-40	31-14 50-11	Yellow-Red White	Proportioning circuit for any 2 red letter feature.
ALTERNATOR 9D	E-26	63-9 71-10 85-9	Brown-Yellow Orange-Red Black-White	Proportioning circuits to mixer #4 relay.
ALTERNATOR 9XA	F-37	90-4 13-11	Gray Red-Yellow	Proportioning circuit for blue and green score unit steps.
ALTERNATOR 9XB	E-35	21-11 75-8	Blue-Red Orange-White	Proportioning circuit for yellow score unit steps.
ALTERNATOR 9XC	F-36	83-4 58-10	Black-Yellow White-Black	Proportioning circuit for red score unit steps.
ALTERNATOR 9XD	K-37	41-7 93-12	Green-Red Gray-Yellow	Proportioning circuit for mystic lines feature unit steps.
ALTERNATOR 9XE	F-31	43-5 74-7	Green-Yellow Orange-Green	Proportioning circuit for extra ball feature unit steps.
9YA N.O.	M-43	36-13 30	Yellow-Brown Yellow	Pulses replay register unit step-up coil during 25¢ play.
MULTIPLIER 12.1	D-49	63	Brown-Yellow	During yellow, red, blue and green winners, pulses corresponding replay counter unit step-up coil when score units are at 8th step.
10A N.O.		90-1	Gray	
MULTIPLIER 12.1	D-45	23-17	Blue-Yellow	During Big 4 600 winner, pulses Big 4 replay counter unit coil.
10B N.O.		27-17	Blue-Orange	
MULTIPLIER 6.1	D-49	57	White-Orange	During yellow, red, blue and green winners, pulses corresponding replay counter unit step-up coil when score units are at 7th step.
11A N.O.		90-1	Gray	
MULTIPLIER 1.1	D-48	45	Green-White	During yellow, red, blue and green winners, pulses corresponding replay counter unit step-up coil when score units are at 1st, 2nd, 3rd or 4th step.
12A N.O.		90-1	Gray	
12B N.O.	F-43	41-14 80	Green-Red Black	During all winners, pulses replay register unit step-up coil, reflex unit replay magnet coil and replay meter.
BACKSIDE 12C	K-43	21-3 27	Blue-Red Blue-Orange	(Not shown in pictorial view). During all winners, completes replay scoring lock-in circuit.
MULTIPLIER 4.1	D-48	52	White-Blue	During yellow, red, blue and green winners, pulses corresponding replay counter unit step-up coil when score units are at 5th and 6th step.
13A N.O.		90-1	Gray	
MULTIPLIER 4.1	E-45	10-16	Red	During Big 4 300 winner, pulses Big 4 replay counter unit coil.
13B N.O.		27-17	Blue-Orange	
14A N.C.	E-11	27-2 58-5	Blue-Orange White-Black	Opens timer unit step-up circuit when winners are scoring.
14B N.C.	L-46	31-11 21	Yellow-Red Blue-Red	Opens initial winner search circuit, winner circuit then closed thru replay cam index switch 17B.

CONTROL UNIT SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 4

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TIMER CAMS INDEX COIL.	A-9	93-2 70	Gray-Yellow Orange	Energized thru start circuit when playing coins or replays and conditions game for play cycles by releasing timer cams.
15A N.O.	N-2	20P 60P	Blue (Plastic) Brown (Plastic)	Completes a circuit to run control unit and mixer spotting unit motors.
15B N.C.	N-8	27-9 71-2	Blue-Orange Orange-Red	Opens circuit to coin lock-out magnet coils (5¢ - 25¢ - 10¢)
15C N.C.	G-17	10-2 30	Red Yellow	Opens circuit to red button relay and extra ball relays.
ALTERNATE UNIT COIL	A-47	75-6 70	Orange-White Orange	Energized thru winner circuit when scoring yellow, red, blue and green double winners. Also thru homing circuit.
OPEN AT ZERO 16A N.O.	B-47	43-15 75-6	Green-Yellow Orange-White	Completes (reset) homing circuit for alternate unit.
REPLAY CAMS INDEX COIL.	A-42	41-13 70	Green-Red Orange	Energized thru winner search circuit when winners are found and releases replay cams to score winners.
17A N.O.	J-43	27 80	Blue-Orange Black	Completes replay scoring lock-in circuit.
17B N.O.	L-47	31-11 21	Yellow-Red Blue-Red	Completes winner circuit.
17C N.C.	C-42	23-13 15-2	Blue-Yellow Red-White	Opens initial 50 volt pull-in circuit to search index coil, coil then holds in thru 15 ohm 10 watt resistor.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SEARCH INDEX COIL.	A-41	15-2 70	Red-White Orange	Energized when any winner is found thru winner search circuit and stops search disc wipers to register each winner.
18A N.O.	E-42	60 41-13	Brown Green-Red	Completes circuit to replay cams index coil.
SEARCH INDEX LOCK MAGNET COIL.	A-20	23-16 70	Blue-Yellow Orange	(Not shown in pictorial view) Energized by front rail (R) button after 4th ball is shot and releases search disc wipers to search for winners.
19A N.C.	H-21	14-4 41-5	Red-Green Green-Red	(Not shown in pictorial view) Opens circuit to move mystic lines.
19B N.C.	D-7	83-5 13-16	Black-Yellow Red-Yellow	(Not shown in pictorial view) Opens circuit to start relay.
19C N.C.	G-20	52-9 23-16	White-Blue Blue-Yellow	(Not shown in pictorial view) Opens circuit to search index lock magnet coil.

MIXER AND SPOTTING PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART BELOW



MIXER AND SPOTTING SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
16 PULSE 1A N.O.	M-39	43-16 45-6	Green-Yellow Green-White	When circuit complete thru control factors and spotting disc, pulses mystic lines and selection feature units for multiple steps. Also energizes any 3, any 2, Big 4 600 and Big 4 300 feature relays.
16 PULSE 1B N.O.	Q-8	90 10-11	Gray Red	When mystic lines feature is in play, flashes press buttons now lite before 4th, 5th or 6th ball.
16 PULSE 1C N.O.	J-28	20-16 56-3	Blue White-Brown	During red letter game winners, pulses red letter unit, score and feature unit step-up coils, and feature relays corresponding to guaranteed red letter games.

CONTINUED ON NEXT PAGE

MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 7

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
16 PULSE 2A N.O.	G-5	75-2 53-7	Orange-White White-Yellow	When replay reset relay is energized, pulses replay register unit reset coil.
16 PULSE 2B N.O.	C-30	78 38-4	Orange-Black Yellow-Black	When circuit complete thru control factors and spotting disc, pulses extra ball unit step-up coil for multiple steps.
16 PULSE 2C N.O.	D-46	30 40-16	Yellow Green	Pulses Big 4 replay counter unit coil and alternate unit coil thru homing circuits to these units.
MIXER #3 3A N.O.	J-34	63-4 85-20	Brown-Yellow Black-White	Completes a control circuit from control unit cam switch 7C or 8B for yellow, red, green and blue score steps.
MIXER LATCH COIL	A-9	93-2 70	Gray-Yellow Orange	Energized thru start circuit when playing coins or replays and releases mixer disc wipers for cycle.
SCORE EXTRA STEP RELAY COIL	A-13	71-9 70	Orange-Red Orange	Energized by yellow, red, and green score unit step-up arm switches during play for scores and features.
4A N.O.	B-14	71-9 81-3	Orange-Red Black-Red	Completes lock-in circuit to this relay.
4B N.O.	K-34	50-4 51-6	White White-Red	Completes circuit for possible yellow, red, green and blue score unit multiple steps.
SCORE EXTRA STEP PULSE 5A N.O.	K-34	50-4 43-4	White Green-Yellow	Pulses yellow, red, green and blue score unit step-up coils when multiple step circuit is complete.
SQUARE PIN 6A N.C.	E-14	21-3 13-5	Blue-Red	Opens score extra step relay lock-in circuit.
SCORE EXTRA STEP INDEX COIL	H-62	98-1 70	Gray-Black Orange	Energized by control unit cam switch 4A during each play cycle.
7A N.O.	D-14	13-5 81-3	Red-Yellow Black-Red	Completes lock-in circuit to score extra step relay.
SPOTTING DISC INDEX COIL	H-62	98-1 70	Gray-Black Orange	Energized by control unit cam switch 4A during each play cycle and releases spotting disc wipers for cycle.
8A N.O.	P-36	30 13-4	Yellow Red-Yellow	Completes spotting disc flash circuit to yellow, red, green and blue score lites and scores doubled feature lites during red or blue button play. Completes spotting disc flash circuit to extra ball lites during yellow button play.
8B N.O.	P-12	81-6 30	Black-Red Yellow	Completes spotting disc flash circuit to selection feature any 3, any 2, Big 4 300, Big 4 600, and mystic lines feature lites during red or green button play.

**OTHER SWITCHES AND RELAYS
APPEAR ON PAGE 25
AND FOLLOWING PAGES**

TIMER UNIT DISC viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

THRU WIPERS (D). "PRESS BUTTONS NOW" LITE AT 4TH STEP. ON DIAG. S-8

THRU WIPER (A). TIMER UNIT STEP-UP 0 TO 4TH STEP. ON DIAG. M-II

FEED FOR WIPERS (A) & (B)

THRU WIPER (B). SHUTTER MOTOR TO CLOSE SHUTTER. ON DIAG. M-12

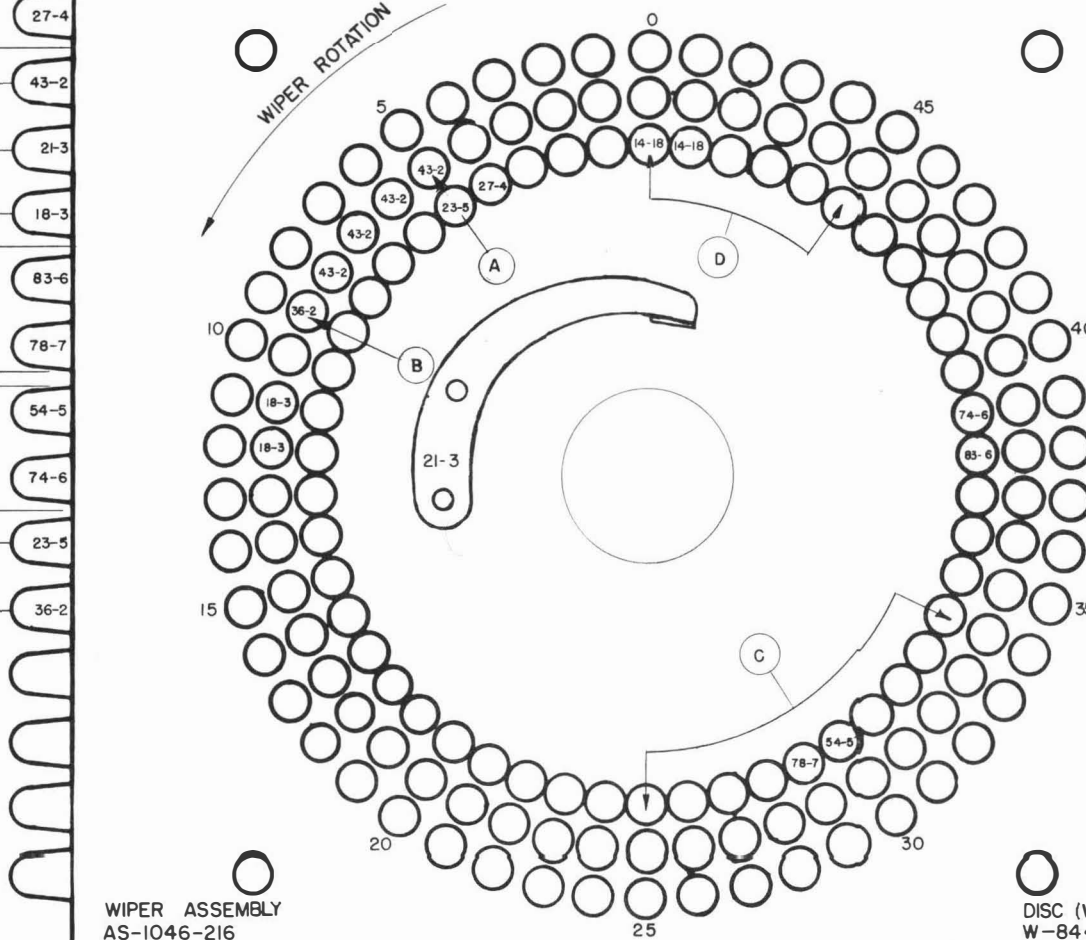
THRU WIPERS (C). SELECT BEFORE 4TH BALL LOCKOUT RELAY. ON DIAG. D-16

THRU WIPERS (C). SELECT BEFORE 5TH BALL LOCKOUT RELAY. ON DIAG. D-15

THRU WIPERS (D). "PRESS BUTTONS NOW" LITE AT 5TH STEP. ON DIAG. S-8

THRU WIPER (A). TIMER UNIT STEP-UP, 4TH TO 5TH STEP. ON DIAG. M-12

FEED 14-18



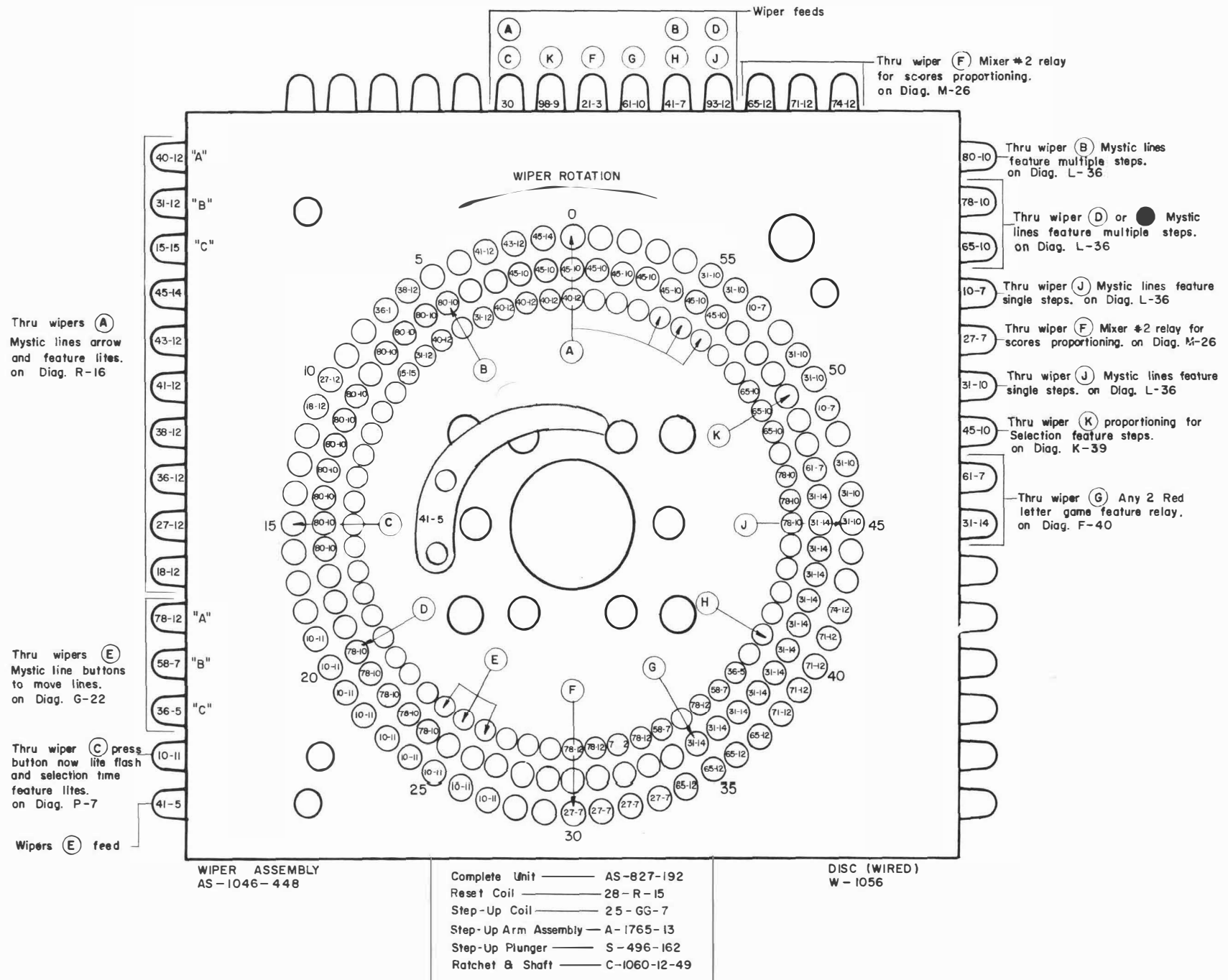
WIPER ASSEMBLY
AS-1046-216

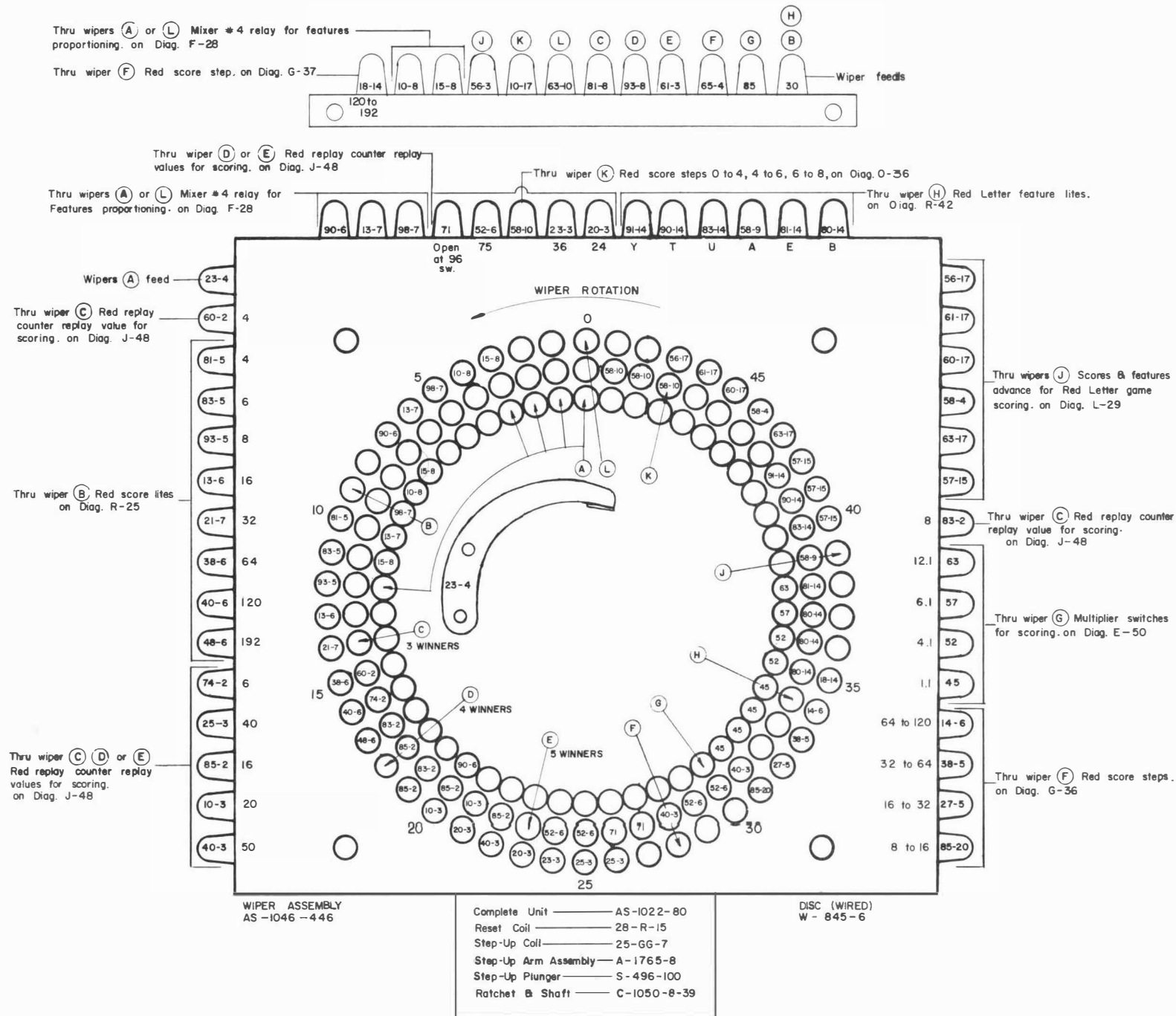
DISC (WIRED)
W-844

COMPLETE UNIT----- AS-1110-29
 RESET COIL ----- 28-R-15
 STEP-UP COIL ----- 25-GG-7
 STEP-UP PLUNGER---- S-496-100
 STEP-UP ARM ASSY-- A-1765-4
 RATCHET & SHAFT--- C-1050-8-43

MYSTIC LINES FEATURE UNIT DISC viewed from BUTTON or WIPER side

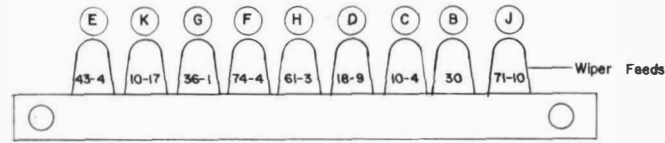
12 step unit. Wipers shown in zero or reset position



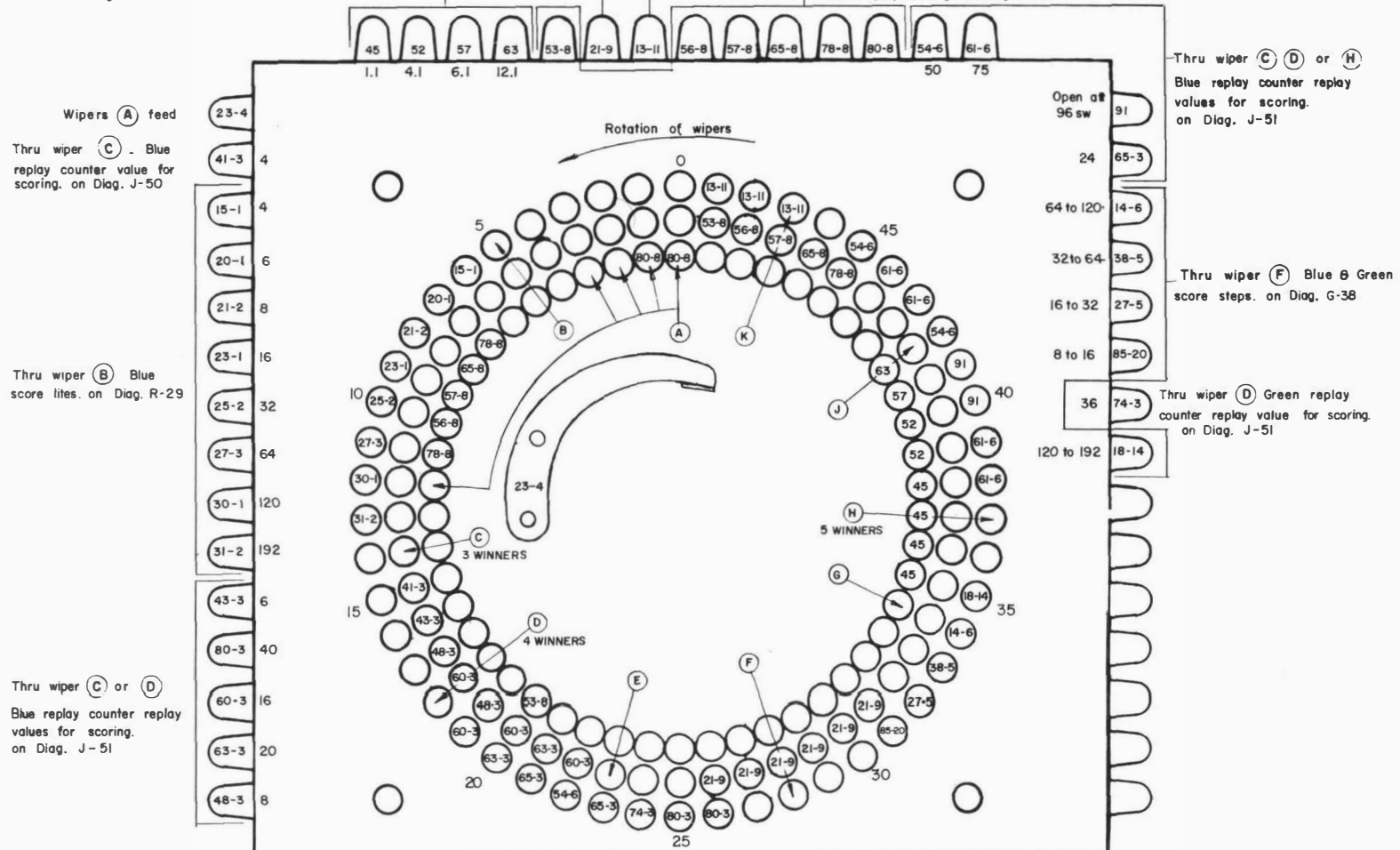


BLUE SCORE UNIT DISC viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



Thru wiper **E** Score Extra-steps proportioning. on Diag. L-34
 Thru wiper **K** Blue & Green score steps 0 to 4, 4 to 6, 6 to 8 on Diag. D-37
 Thru wiper **G** Multiplier switches for scoring. on Diag. E-52
 Thru wipers **A** or **J** Mixer #4 relay for feature proportioning. on Diag. F-26



Wipers **A** feed
 Thru wiper **C** - Blue replay counter value for scoring. on Diag. J-50

Thru wiper **B** Blue score lites. on Diag. R-29

Thru wiper **C** or **D**
 Blue replay counter replay values for scoring. on Diag. J-51

Thru wiper **C** **D** or **H**
 Blue replay counter replay values for scoring. on Diag. J-51

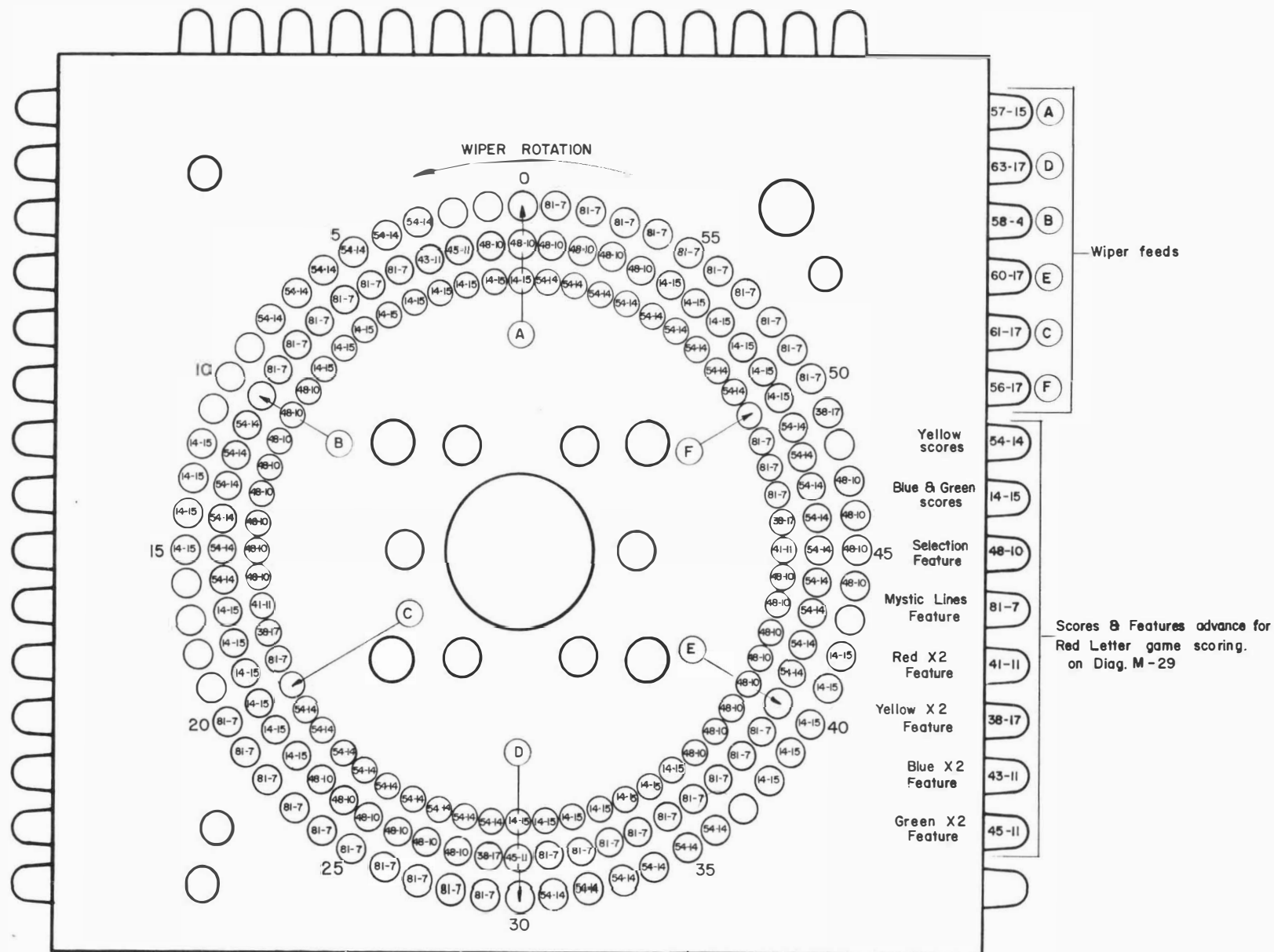
Thru wiper **F** Blue & Green score steps. on Diag. G-38

Thru wiper **D** Green replay counter replay value for scoring. on Diag. J-51

WIPER ASSEMBLY
 AS-1046-444

Complete Unit — AS-1022-84
 Reset Coil — 28-R-15
 Step-up Coil — 25-GG-7
 Step-up Arm Assembly — A-1765-4
 Step-up Plunger — S-496-100
 Ratchet & Shaft — C-1050-8

DISC (WIRED)
 W-1055



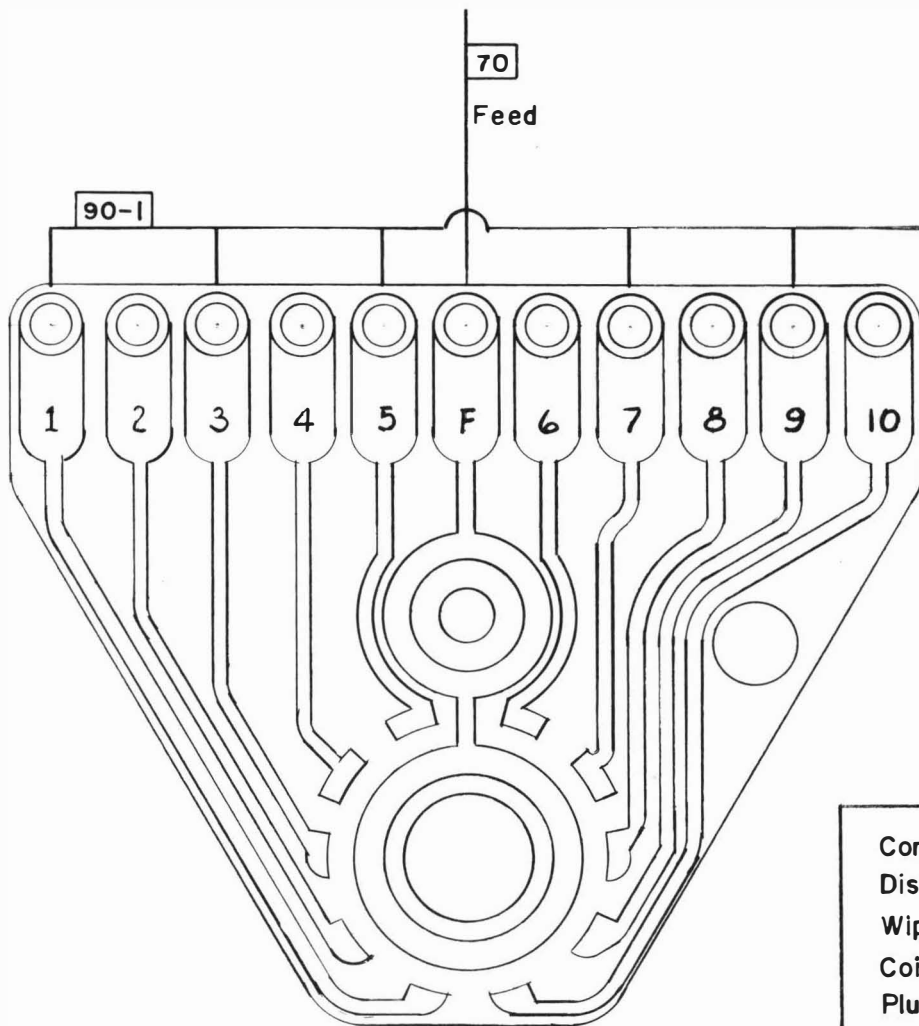
WIPER ASSEMBLY
AS-1046-443

Complete Unit — AS-1022-81
Reset Coil — 28-R-15
Step-Up Coil — 25-GG-7
Step-Up Arm Assembly — A-1765-13
Step-Up Plunger — S-496-162
Ratchet & Shaft — C-1060-29-5

DISC (WIRED)
W-933-2

Scores & Features advance for
Red Letter game scoring.
on Diag. M-29

ALTERNATOR UNIT DISC viewed from WIPER side



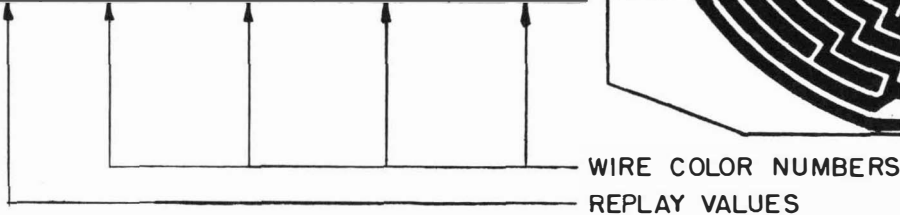
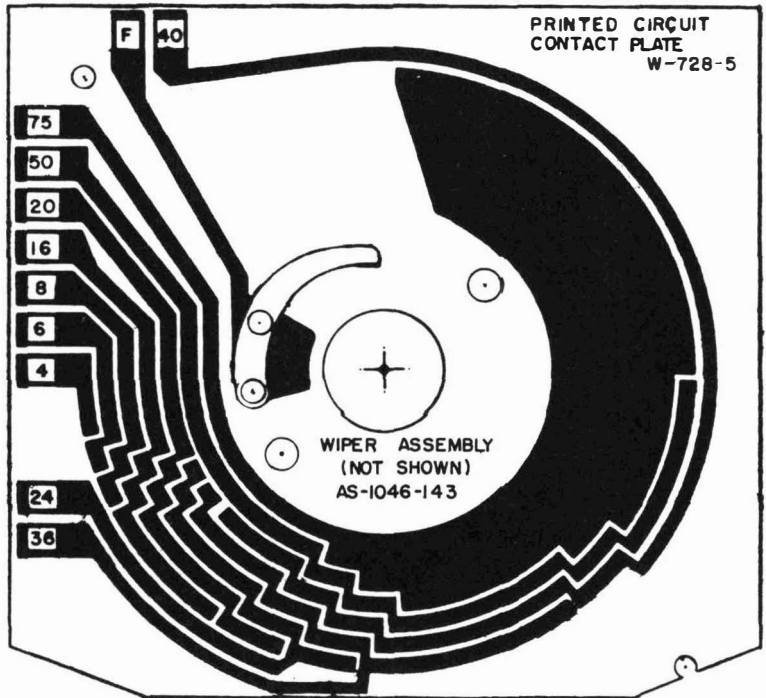
Replay counter units step-up circuit thru C.U. multiplier switches during double winners. on Diag. C-48.

Complete Unit	AS-1900-60
Disc (wired)	W-999-3
Wiper Assembly	A-1618
Coil	E-184-206
Plunger	S-496-160
Core Plug Assembly	A-613-68
Drive Pawl	C-435-1
Hold Pawl	P-4491
Ratchet	C-434-2

REPLAY COUNTER UNIT DISC viewed from WIPER side

4 used (see code box at left)

LUG No.	GREEN REPLAY COUNTER	RED REPLAY COUNTER	YELLOW REPLAY COUNTER	BLUE REPLAY COUNTER
F	54	71	23	91
75	61-9	52-6	50-6	61-6
50	60-9	40-3	57-2	54-6
40	57-9	25-3	52-2	80-3
36	90-8	23-3	51-2	74-3
24	13-1	20-3	41-2	65-3
20	27-6	10-3	40-2	63-3
16	45-12	85-2	23-2	60-3
8	40-9	83-2	93-1	48-3
6	36-14	74-2	81-1	43-3
4	41-9	60-2	78-1	41-3



- | | |
|-------------------|-----------|
| COMPLETE UNIT | AS-797-93 |
| RESET COIL | 28-R-15 |
| STEP-UP COIL | 25-GG-7 |
| STEP-UP PLUNGER | S-496-116 |
| STEP-UP ARM ASSY. | A-1765-8 |
| RATCHET & SHAFT | C-100 |

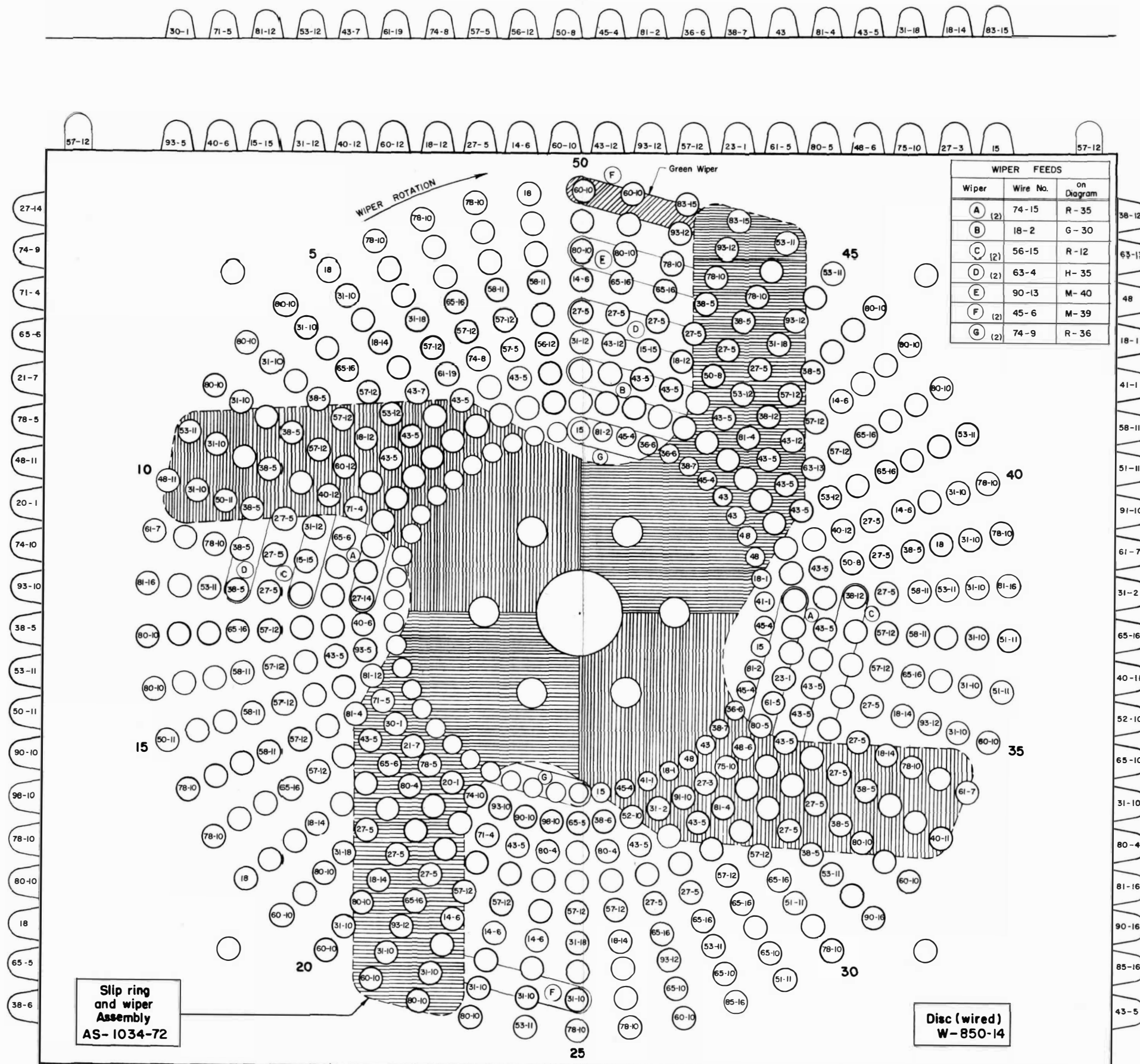
Control Unit Multiplier Cam Switches That Pulse Green, Red, Yellow And Blue Replay Counter Unit Step-Up Coils During 3-4-5 In A Zone Winners. During Double Winners, Switches Double Their Ratio Thru Alternator Unit Disc. 12A Operates At 2.1, 13A At 8.1 11A At 12.1 And 10A At 24.1

	12A-1.1	12A-1.1	12A-1.1	12A-1.1	13A-4.1	13A-4.1	11A-6.1	10A-12.1
5 In A Zone	75 (75)	75 (75)	96 (*)	96 (*)	200 (50)	300 (75)	450 (75)	600 (50)
4 In A Zone	16 (16)	20 (20)	24 (24)	50 (50)	96 (24)	144 (36)	240 (40)	280 (40)
3 In A Zone	4 (4)	6 (6)	8 (8)	16 (16)	32 (8)	64 (16)	120 (20)	192 (16)

Large numbers are Green, Red, Yellow and Blue Replay Scores shown on backglass. Numbers in circles indicate the replay counter disc value each score is effective thru during winners.

(*) Effective thru open at 96th step replay counter unit switches.

SPOTTING DISC viewed from WIPER side Wipers shown in zero position

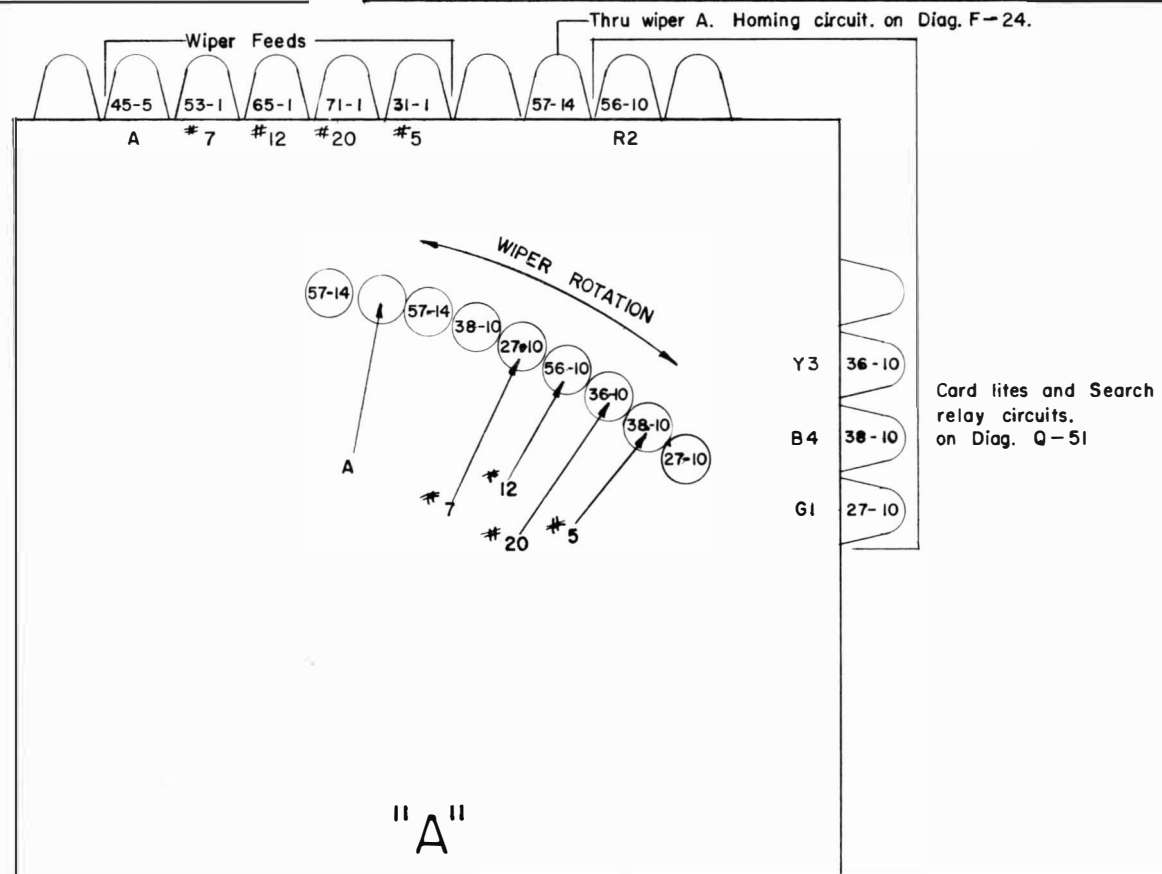
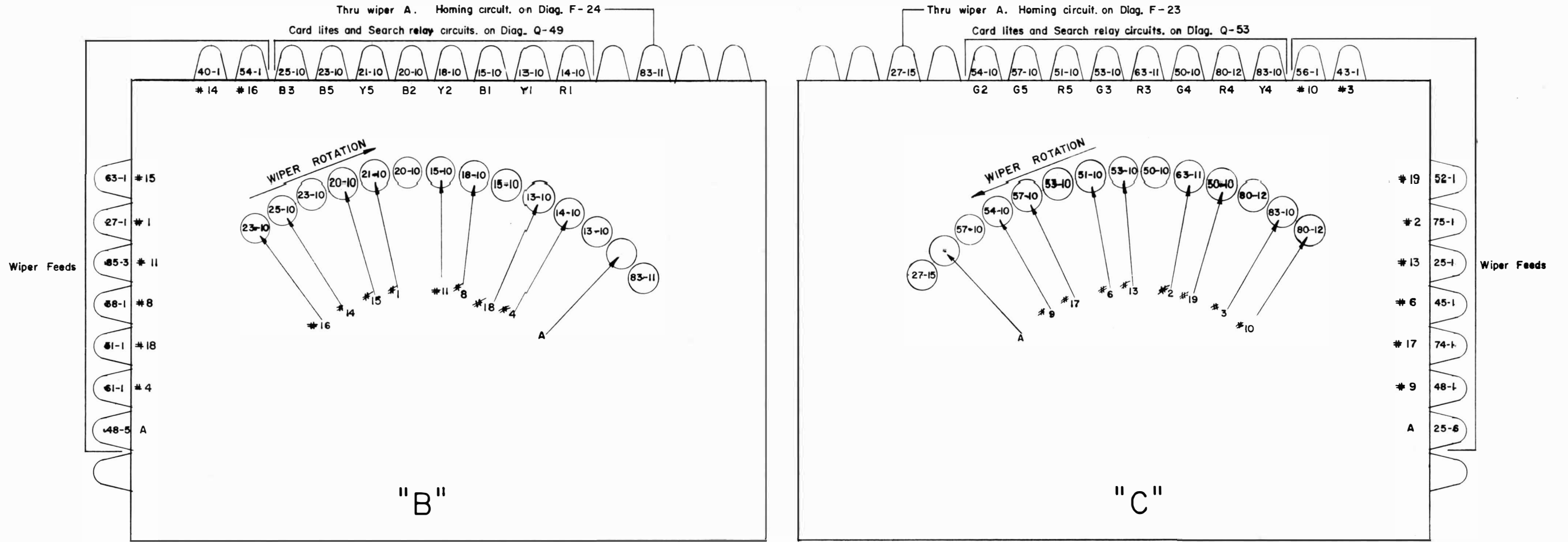


WIPER FEEDS		
Wiper	Wire No.	on Diagram
A (2)	74-15	R - 35
B	18-2	G - 30
C (2)	56-15	R - 12
D (2)	63-4	H - 35
E	90-13	M - 40
F (2)	45-6	M - 39
G (2)	74-9	R - 36

Slip ring
and wiper
Assembly
AS-1034-72

Disc (wired)
W-850-14

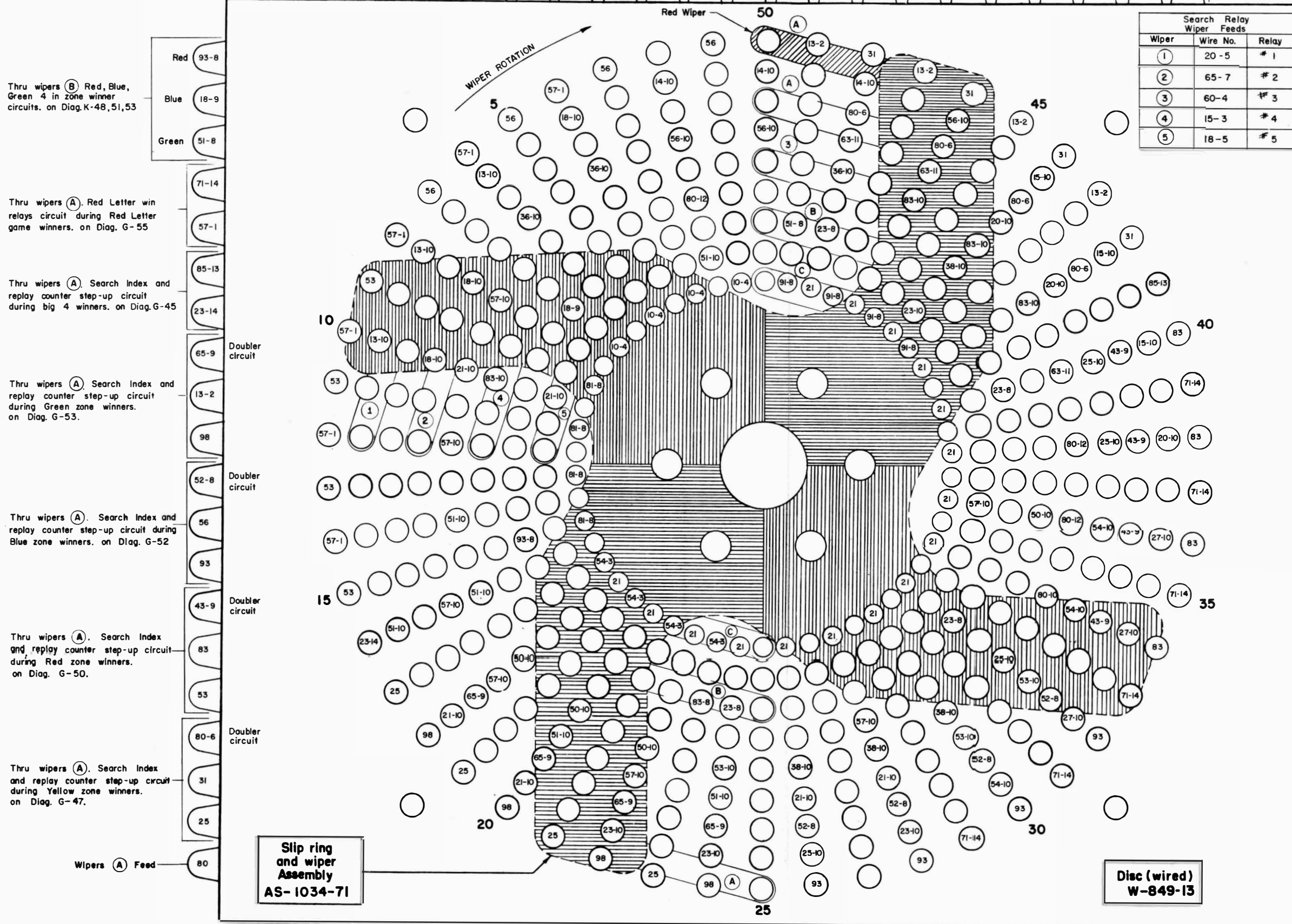
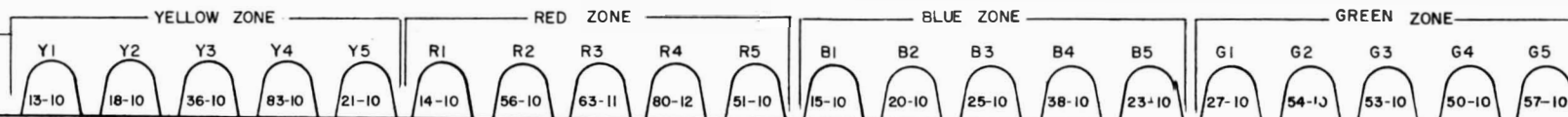
MYSTIC LINES MOTOR UNIT DISCS viewed from WIPER side Wipers shown in zero position



SPOTTING DISC
on other side
of this sheet

SEARCH DISC viewed from WIPER side Wipers shown in zero position

Thru wipers ①②③④⑤ Search Relay circuits from
Mystic Line Disc. on Diag. R-55



Search Relay Wiper Feeds		
Wiper	Wire No.	Relay
①	20 - 5	# 1
②	65 - 7	# 2
③	60 - 4	# 3
④	15 - 3	# 4
⑤	18 - 5	# 5

Thru wipers ② Red, Blue, Green 4 in zone winner circuits. on Diag. K-48, 51, 53

Thru wipers ① Red Letter win relays circuit during Red Letter game winners. on Diag. G-55

Thru wipers ① Search Index and replay counter step-up circuit during big 4 winners. on Diag. G-45

Thru wipers ① Search Index and replay counter step-up circuit during Green zone winners. on Diag. G-53.

Thru wipers ① Search Index and replay counter step-up circuit during Blue zone winners. on Diag. G-52

Thru wipers ① Search Index and replay counter step-up circuit during Red zone winners. on Diag. G-50.

Thru wipers ① Search Index and replay counter step-up circuit during Yellow zone winners. on Diag. G-47.

21 Thru wipers ③ Yellow, Red, Blue, Green 3 in zone winner feed. on Diag. K-46, 48, 50, 52.

54-3 Yellow

81-8 Red

10-4 Blue

91-8 Green

23-8 Thru wipers ② Yellow, Red, Blue Green 4 in zone winner feed. on Diag. K-46, 49, 51, 53.

83-8 Thru wipers ② Yellow. 4 in zone winner circuit. on Diag. K-46.

WINNER SEARCH POSITIONS CHART and MYSTIC LINES LAYOUT on other side of this sheet

WINNER SEARCH POSITIONS CHART

Red Wiper at Position	Wiper ① Search Relay # 1	Wiper ② Search Relay # 2	Wiper ③ Search Relay # 3	Wiper ④ Search Relay # 4	Wiper ⑤ Search Relay # 5
1					
2					
3					
4	R5	G5			
5	Y5	G5			
6	Y5	R5	G5		
7					
8	B5	G5	Y5		
9					
10	B5	R5	G5		
11					
12	B5	Y5	R5		
13					
14	B5	Y5	R5		
15					
16	B5	Y5	R5	G5	
17					
18	G2	G3	G4		
19					
20	G1	G3	G4		
21					
22	G1	G2	G4		
23					
24	G1	G2	G3	G4	G5
25					
26	B2	B3	B4		
27					
28	B1	B3	B4		
29					
30	B1	B2	B4		
31					
32	B1	B2	B3	B4	B5
33					
34	R2	R3	R4		
35					
36	R1	R3	R4		
37					
38	R1	R2	R4		
39					
40	R1	R2	R3	R4	R5
41					
42	Y2	Y3	Y4		
43					
44	Y1	Y3	Y4		
45					
46	Y1	Y2	Y4		
47					
48	Y1	Y2	Y3	Y4	Y5
49					
50					

Red Letter Game Winners

Big 4 Winners

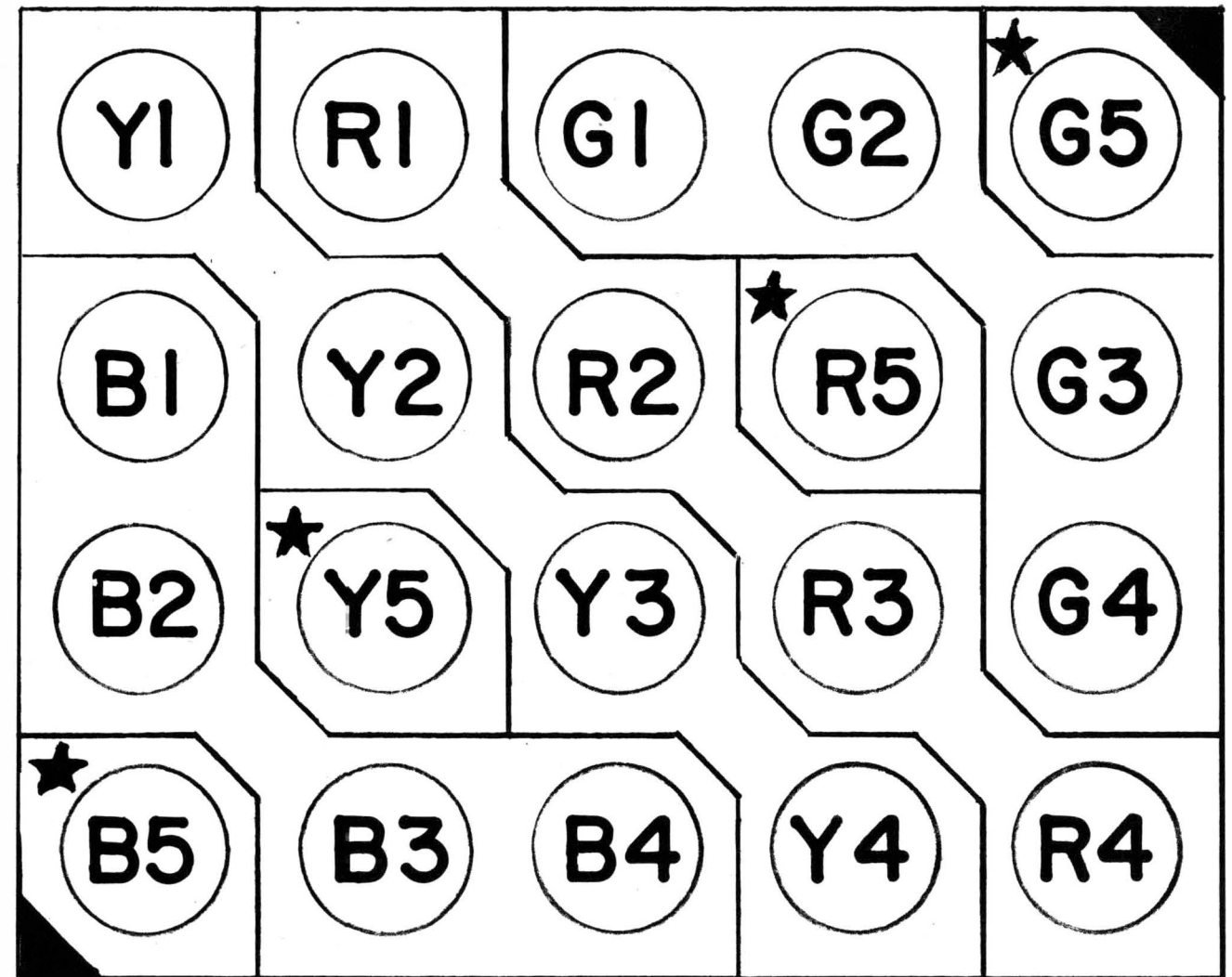
Green Zone Winners

Blue Zone Winners

Red Zone Winners

Yellow Zone Winners

MYSTIC LINES LAYOUT



When checking out any winner, refer to winner search positions chart to find position on search disc where that winner is scored.

MISCELLANEOUS SWITCHES

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED BUTTON SWITCH N.O.	E-17	10-2 85-7	Red Black-White	Completes a circuit to red button relay.
RED BUTTON SWITCH N.O.	K-6	50-2 63-2	White Brown-Yellow	Completes a circuit to start relay.
RED BUTTON SWITCH N.C.	J-59	75-13 80-13	Orange-White Black	Opens pull-in and lock-in circuit to play scores relay and play features relay.
BLUE BUTTON SWITCH N.C.	G-59	80-13 81-13	Black Black-Red	Opens pull-in and lock-in circuit to play features relay.
BLUE BUTTON SWITCH N.O.	D-60	60-13 85-15	Brown Black-White	Completes pull-in circuit to play scores relay.
BLUE BUTTON SWITCH N.O.	K-5	50-2 63-2	White Brown-Yellow	Completes a circuit to start relay.
GREEN BUTTON SWITCH N.C.	H-60	80-13 57-13	Black White-Orange	Opens pull-in and lock-in circuit to play scores relay.
GREEN BUTTON SWITCH N.O.	D-59	74-16 61-13	Orange-Green Brown-Red	Completes pull-in circuit to play features relay.
GREEN BUTTON SWITCH N.O.	L-5	50-2 63-2	White Brown-Yellow	Completes a circuit to start relay.
YELLOW BUTTON SWITCH N.O.	E-18	10-2 25-8	Red Blue-White	Completes circuit to extra ball trip relays.
YELLOW BUTTON SWITCH N.O.	K-7	18-6 63-2	Red-Black Brown-Yellow	Completes a circuit to start relay.
YELLOW BUTTON SWITCH N.C.	D-17	20-2 85-7	Blue Black-White	Opens lock-in circuit to red button relay.
"A" BUTTON SWITCH N.O.	G-21	78-12 10-20	Orange-Black Red	Completes circuit to mystic line "A" motor.
"A" BUTTON SWITCH N.C.	F-23	30-20 25-6	Yellow Blue-White	Opens circuit to mystic line "C" motor.
"B" BUTTON SWITCH N.O.	G-22	58-7 80-20	White-Black Black	Completes circuit to mystic line "B" motor.
"B" BUTTON SWITCH N.C.	F-21	10-20 45-5	Red Green-White	Opens circuit to mystic line "A" motor.
"C" BUTTON SWITCH N.O.	G-23	36-5 30-20	Yellow-Brown Yellow	Completes circuit to mystic line "C" motor.
"C" BUTTON SWITCH N.C.	F-22	80-20 48-5	Black Green-Black	Opens circuit to mystic line "B" motor.
"R" BUTTON SWITCH N.O.	N-14	54-11 21-3	White-Green Blue-Red	Completes a circuit to timer unit reset coil.
"R" BUTTON SWITCH N.O.	J-20	53-18 52-9	White-Yellow White-Blue	Completes circuit to search index lock magnet coil.
"R" BUTTON SWITCH N.O.	J-54	50-16 57-1	White White-Orange	Completes winner search circuit to red letter win relays.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
"A" MOTOR CAM SWITCH N.O.	F-21	21-3 45-5	Blue-Red Green-White	Completes mystic line "A" motor carry-over circuit.
"A" MOTOR CAM SWITCH N.C.	T-50	50-14 10-1	White Red	Opens circuit to mystic line "A" card lites.
"B" MOTOR CAM SWITCH N.O.	F-22	21-3 48-5	Blue-Red Green-Black	Completes mystic line "B" motor carry-over circuit.
"B" MOTOR CAM SWITCH N.C.	T-49	45-13 10-1	Green-White Red	Opens circuit to mystic line "B" card lites.
"C" MOTOR CAM SWITCH N.O.	F-22	21-3 25-6	Blue-Red Blue-White	Completes mystic line "C" motor carry-over circuit.
"C" MOTOR CAM SWITCH N.C.	T-53	58-14 10-1	White-Black Red	Opens circuit to mystic line "C" card lites.
YELLOW ROLLOVER PANEL SWITCH N.O.	K-56	14-12 13-12	Red-Green Red-Yellow	Completes a circuit to yellow rollover relay.
RED ROLL-OVER PANEL SWITCH N.O.	H-56	98-6 15-12	Gray-Black Red-White	Completes a circuit to red rollover relay.
SHUTTER SWITCH CLOSED WHEN OPEN	H-24	21-3 27-15	Blue-Red Blue-Orange	Completes homing circuit for "C" mystic line.
SHUTTER SWITCH CLOSED WHEN OPEN	H-24	21-3 83-11	Blue-Red Black-Yellow	Completes homing circuit for "B" mystic line.
SHUTTER SWITCH CLOSED WHEN OPEN	H-24	21-3 57-14	Blue-Red White-Orange	Completes homing circuit for "A" mystic line.
SHUTTER SWITCH CLOSED WHEN CLOSED	F-55	56-4 71-14	White-Brown Orange-Red	Opens winner search circuit to red letter win relays.
SHUTTER SWITCH CLOSED WHEN OPEN	K-59	21-3 75-13	Blue-Red Orange-White	Completes pull-in and lock-in circuits to play features relay and play scores relay.
SHUTTER SWITCH CLOSED WHEN CLOSED	D-11	91-11 14-3	Gray-Red Red-Green	Opens red letter winner circuit to shutter motor.
SHUTTER SWITCH CLOSED WHEN OPEN	L-28	90-3 25-18	Gray Blue-White	Completes red letter winner circuit to advance red letter unit, scores and features.

MISCELLANEOUS SWITCHES (CONCLUDED)

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TROUGH SWITCH #1 N.O.	L-18	71-6 41-4	Orange-Red Green-Red	Opens ball lifter circuit after 7 balls are raised.
TROUGH SWITCH #2 N.O.	L-18	45-3 71-6	Green-White Orange-Red	Opens ball lifter circuit after 6 balls are raised.
TROUGH SWITCH #2 N.C.	E-15	85-6 98-11	Black-White Gray-Black	Completes circuit to select after 5th ball lock-out relay when 6th ball is shot.
TROUGH SWITCH #3 N.O.	M-18	21-3 45-3	Blue-Red Green-White	Opens ball lifter circuit after 5 balls are raised.
TROUGH SWITCH #3 N.C.	F-15	85-6 54-5	Black-White White-Green	Completes circuit to select before 5th ball lock-out relay when 5th ball is shot.
TROUGH SWITCH #4 N.C.	H-16	83-7 78-7	Black-Yellow Orange-Black	Completes circuit to select before 4th ball lock-out relay when 4th ball is shot.
TROUGH SWITCH #8 N.O.	D-20	91-1 38-3	Gray-Red Yellow-Black	Opens ball lifter circuit after 1 ball is raised.
LIFTER START RELAY COIL A N.C.	A-57	38-8 70	Yellow-Black Orange	Energized by ball runway switch. Drops out thru ball gate switch.
B N.C.	L-15	10-13 15-6	Red Red-White	Completes circuit to select before 5th and select after 5th lock-out relays.
C N.O.	J-19	41-4 31-3	Green-Red Yellow-Red	Completes ball lifter motor circuit.
BALL LIFTER SWITCH N.O.	H-57	36 38-8	Yellow-Brown Yellow-Black	Completes lock-in circuit for this relay.
BALL LIFTER SWITCH N.O.	E-19	91-1 36-3	Gray-Red Yellow-Brown	Completes ball lifter motor circuit.
MANUAL LIFT BUTTON SWITCH N.O.	F-19	91-1 36-3	Gray-Red Yellow-Brown	(Safety circuit) completes ball lifter motor circuit if automatic lifter circuit fails.
MANUAL LIFT BUTTON SWITCH N.C.	K-57	31-4 30	Yellow-Red Yellow	(Safety circuit) opens lifter start relay lock-in circuit.
BALL GATE SWITCH N.C.	J-57	31-4 36	Yellow-Red Yellow-Brown	Opens lock-in circuit to lifter start relay.
BALL RUNWAY SWITCH N.O.	J-58	38-8 30	Yellow-Black Yellow	Completes circuit to lifter start relay.

UNIT COIL & SWITCH CHART

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED SCORE UNIT STEP-UP COIL	B-36	71-13 52-19J	Orange-Red White-Blue	Energized thru control circuit during red or blue button play.
RESET COIL	A-62	70 15-4	Orange Red-White	Energized by shutter motor cam switch 3B.
STEP-UP ARM N.O.	E-13	21-3 56-9	Blue-Red White-Brown	Thru control unit cam switch 7D, completes a circuit to score extra step relay.
CLOSED AT ZERO N.C.	J-19	57-6 85-7	White-Orange Black-White	Completes a circuit to red button relay.
OPEN AT TOP N.C.	C-36	52-19 52-19J	White-Blue White-Blue	Opens circuit to red score unit step-up coil.
YELLOW SCORE UNIT STEP-UP COIL	B-35	71-13 54-14J	Orange-Red White-Green	Energized thru control circuit during red or blue button play. Also thru red letter game winner circuit.
RESET COIL	E-62	70 78-3	Orange Orange-Black	Energized by shutter motor cam switch 6B.
STEP-UP ARM N.O.	E-13	21-3 56-9	Blue-Red White-Brown	Thru control unit cam switch 7D, completes a circuit to score extra step relay.
OPEN AT ZERO N.O.	A-60	31-15 70	Yellow-Red Orange	Completes circuit to features lock, scores lock, play features and play scores relays during green and blue button play.
OPEN AT ZERO N.O.	N-10	14-14 45-8	Red-Green Green-White	Completes circuit to close shutter when anti-cheat relay drops out when shutter is open.
OPEN AT TOP N.C.	C-35	54-14 54-14J	White-Green White-Green	Opens circuit to yellow score unit step-up coil.
GREEN SCORE UNIT STEP-UP COIL	B-38	71-13 63-14	Orange-Red Brown-Yellow	Energized thru control circuit during red or blue button play. Also thru red letter game winner circuit.
RESET COIL	F-62	70 78-3	Orange Orange-Black	Energized by shutter motor cam switch 6B.
STEP-UP ARM N.O.	E-13	21-3 56-9	Blue-Red White-Brown	Thru control unit cam switch 7D, completes a circuit to score extra step relay.
OPEN AT TOP N.C.	C-37	14-15 63-14	Red-Green Brown-Yellow	Opens circuit to green and blue score unit step-up coils.
BLUE SCORE UNIT STEP-UP COIL	B-37	63-14 71-13	Brown-Yellow Orange-Red	Energized thru control circuit during red or blue button play. Also thru red letter game winner circuit.
RESET COIL	F-62	70 78-3	Orange Orange-Black	Energized by shutter motor cam switch 6B.
TIMER UNIT STEP-UP COIL	A-11	70 58-5J	Orange White-Black	Energized thru timer disc count circuit by ball lifter cam switch 2A for first 5 steps, then by control unit cam switch 1A for last 3 steps.
RESET COIL	A-12	70 71-8J	Orange Orange-Red	Energized by control unit cam switch 5B during extra ball play, shutter motor cam switch 6A when starting new game, "R" button when searching for winners.

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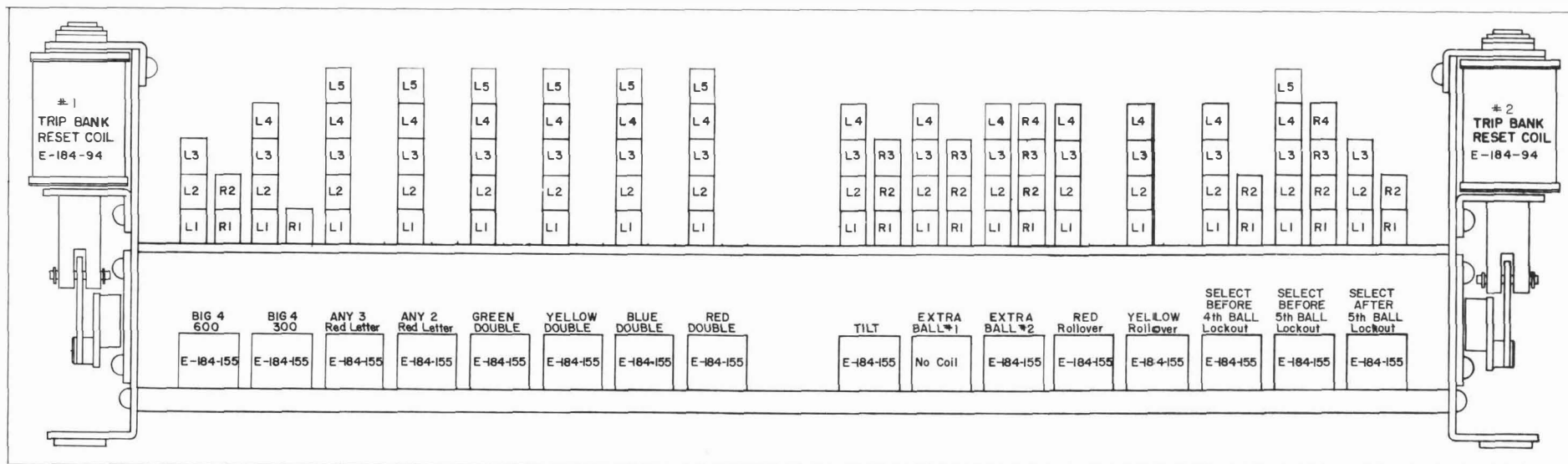
UNIT COIL & SWITCH CHART

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
OPEN AT ZERO N.O.	F-12	71-8 71-8J	Orange-Red Orange-Red	Completes circuit to timer unit reset coil.
OPEN AT ZERO N.O.	D-19	91-1 38-3	Gray-Red Yellow-Black	Completes circuit to ball lifter motor to raise 2nd thru 5th balls.
OPEN AT ZERO N.O.	N-57	90-9 30	Gray Yellow	Opens circuit to lifter start relay.
OPEN AT TOP N.C.	N-3	20P 30P	Blue (Plastic) Yellow (Plastic)	Opens circuit to control unit and mixer-spotting unit motors.
OPEN AT TOP N.C.	B-11	58-5 58-5J	White-Black White-Black	Opens circuit to timer unit step-up coil.
BIG 4 REPLAY COUNTER UNIT COIL	A-45	27-17 70	Blue-Orange Orange	Energized thru winner search circuit during Big 4 300 and 600 winners. Also thru homing circuit when shutter opens.
HOMING OPEN AT ZERO N.O.	C-45	80-16 27-17	Black Blue-Orange	Completes homing circuit to Big 4 replay counter unit coil.
OPEN AT 50 N.C.	H-44	83-13 23-14	Black-Yellow Blue-Yellow	Opens Big 4 300 winner circuit when 300 has been registered.
OPEN AT 75 N.C.	H-45	75-14 23-14	Orange-White Blue-Yellow	Opens Big 4 600 winner circuit when 600 has been registered.
YELLOW REPLAY COUNTER UNIT STEP-UP COIL	F-48	31 41	Yellow-Red Green-Red	Energized thru winner circuit during yellow 3-4-5 in a zone winners.
RESET COIL	B-62	85-5 70	Black-White Orange	Energized by shutter motor cam switch 3B.
OPEN AT 96 N.C.	G-47	23 25	Blue-Yellow Blue-White	Opens yellow replay scoring circuit.
STEP-UP ARM N.O.	F-47	78-9 75-6	Orange-Black Orange-White	Completes circuit to alternate unit coil during yellow double winners.
RED REPLAY COUNTER UNIT STEP-UP COIL	F-50	83 85	Black-Yellow Black-White	Energized thru winner circuit during red 3-4-5 in a zone winners.
RESET COIL	D-62	85-5 70	Black-White Orange	Energized by shutter motor cam switch 3B.
OPEN AT 96 N.C.	G-49	71 53	Orange-Red White-Yellow	Opens red replay scoring circuit.
STEP-UP ARM N.O.	F-49	78-9 75-6	Orange-Black Orange-White	Completes circuit to alternate unit coil during red double winners.
GREEN REPLAY COUNTER UNIT STEP-UP COIL	F-54	13-2 14-2	Red-Yellow Red-Green	Energized thru winner circuit during green 3-4-5 in a zone winners.
RESET COIL	C-62	85-5 70	Black-White Orange	Energized by shutter motor cam switch 3B.
OPEN AT 96 N.C.	G-53	54 98	White-Green Gray-Black	Opens green replay scoring circuit.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
STEP-UP ARM N.O.	F-53	78-9 75-6	Orange-Black Orange-White	Completes circuit to alternate unit coil during green double winners.
BLUE REPLAY COUNTER UNIT STEP-UP COIL	F-52	56 36-1	White-Brown Yellow-Brown	Energized thru winner circuit during blue 3-4-5 in a zone winners.
RESET COIL	C-62	85-5 70	Black-White Orange	Energized by shutter motor cam switch 3B.
OPEN AT 96 N.C.	G-51	91 93	Gray-Red Gray-Yellow	Opens blue replay scoring circuit.
STEP-UP ARM N.O.	F-51	78-9 75-6	Orange-Black Orange-White	Completes circuit to alternate unit coil during blue double winners.
SELECTION FEATURE UNIT STEP-UP COIL	A-39	48-10 70	Green-Black Orange	Energized thru control circuit during red or green button play. Also thru red letter game winner circuit.
RESET COIL	D-62	85-5 70	Black-White Orange	Energized by shutter motor cam switch 3B.
MYSTIC LINES FEATURE UNIT STEP-UP COIL	A-38	81-7J 70	Black-Red Orange	Energized thru control circuit during red or green button play. Also thru red letter game winner circuit.
RESET COIL	G-62	78-3 70	Orange-Black Orange	Energized by shutter motor cam switch 6B.
OPEN AT TOP N.C.	C-38	81-7 81-7J	Black-Red Black-Red	Open circuit to mystic lines feature unit step-up coil.
RED LETTER UNIT STEP-UP COIL	A-29	56-3J 70	White-Brown Orange	Energized by mixer-spotting 16 pulse switch 1C during red letter game winners.
RESET COIL	G-62	78-3 70	Orange-Black Orange	Energized by shutter motor cam switch 6B.
OPEN AT 29 N.C.	B-29	56-3 56-3J	White-Brown White-Brown	Opens circuit to red letter unit step-up coil.
EXTRA BALLS FEATURE UNIT STEP-UP COIL	A-30	38-4 70	Yellow-Black Orange	Energized thru control circuit during yellow button play.
RESET COIL	E-62	78-3 70	Orange-Black Orange	Energized by shutter motor cam switch 6B.
REPLAY REGISTER UNIT STEP-UP COIL	A-42	75-9 70	Orange-White Orange	Energized thru replay winner circuit by control unit cam switch 12B. Also thru 25¢ credit circuit by control unit cam switch 9YA.
ESCAPEMENT COIL	A-5	45-9 70	Green-White Orange	Energized by mixer-spotting 16 pulse switch 2A when anti-cheat relay drops out with replays on register. Energized by control unit cam switch 5A when playing replays.
S.P.D.T.	N-7	27-9 48-2 56-2	Blue-Orange Green-Black White-Brown	Directs play circuit thru coil switches when unit is at zero, thru red, blue, green and yellow replay buttons when unit is not at zero.
OPEN AT ZERO N.O.	J-7	63-2 13-9	Brown-Yellow Red-Yellow	Completes circuit to start relay when playing replays.
REFLEX UNIT PLAY MAG-NET COIL	A-4	70 90-5	Orange Gray	Energized during each play cycle from coin or replay by control unit cam switch 5A.
REPLAY MAG-NET COIL	A-43	70 41-14	Orange Green-Red	Energized thru replay winner circuit by control unit cam switch 12B.

TRIP RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART BELOW



TRIP RELAY BANK CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BIG 4 600 RELAY COIL	E-40	48-11J 52-11	Green-Black White-Blue	Energized thru spotting disc control circuit during red or green button play.
L1	N.C.	E-40	48-11 48-11J Green-Black Green-Black	Opens circuit to this relay coil.
L2	S.P.D.T.	Q-14	71-15 30 63-13 Orange-Red Yellow Brown-Yellow	Directs circuit to Big 4 300 or Big 4 600 Feature Lite.
L3	N.O.	I-41	80-9 40-11 Black Green	Completes a circuit to Big 4 300 relay.
R1	S.P.D.T.	E-45	10-16 85-13 23-17 Red Black-White Blue-Yellow	Directs Big 4 replay counter step-up circuit during Big 4 300 or 600 winners.
R2	S.P.D.T.	K-44	75-14 91-3 83-13 Orange-White Gray-Red Black-Yellow	In series with above, also completes Big 4 300 or 600 winner search circuit to register and record winner.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BIG 4 300 RELAY COIL	E-41	40-11J 52-11	Green White-Blue	Energized thru spotting disc control circuit during red or green button play. Also when Big 4 600 relay is energized first.
L1	N.C.	E-41	40-11 40-11J Green Green	Opens circuit to this relay coil.
L2	N.C.	L-34	54-8 36-19 White-Green Yellow-Brown	Proportioning circuit for score steps and scores doubled feature.
L3	N.O.	R-14	61-19 71-15 Brown-Red Orange-Red	Completes circuit to Big 4 300 feature lite.
L4	N.O.	K-45	91-3 23-8 Gray-Red Blue-Yellow	Completes Big 4 300 or 600 winner search circuit to register and record winner.
R1	N.C.	N-41	80-9 30 Black Yellow	Opens the Big 4 600 relay circuit to Big 4 300 relay.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
ANY 3 RED LETTER RELAY COIL	A-39	51-11J 70	White-Red Orange	Energized thru spotting disc control circuit during red or green button play. Also when any 2 red letter relay is energized first.
L1 N.C.	A-39	51-11 51-11J	White-Red White-Red	Opens circuit to this relay coil.
L2 N.C.	F-37	85-10 91-17	Black-White Gray-Red	Proportioning circuit for red score steps.
L3 N.O.	R-13	50-8 58-3	White White-Black	Completes circuit to any 3 red letter game feature lite.
L4 N.O.	L-55	74-11 60-1	Orange-Green Brown	Completes winner search circuit to red letter win relays to score winner.
L5 N.C.	M-42	38-2 30	Yellow-Black Yellow	Opens any 2 relay circuit to any 3 relay.
ANY 2 RED LETTER RELAY COIL	A-40	61-10J 70	Brown-Red Orange	Energized thru spotting disc control circuit during red or green button play.
L1 N.C.	A-40	61-10 61-10J	Brown-Red Brown-Red	Opens circuit to this relay coil.
L2 N.O.	L-42	38-2 51-11	Yellow-Black White-Red	Completes a circuit to any 3 red letter relay.
L3 S.P.D.T.	Q-13	58-3 30 43-7	White-Black Yellow Green-Yellow	Directs circuit to any 3 or any 2 red letter game feature lite.
L4 S.P.D.T.	M-54	31-11 74-11 36-11	Yellow-Red Orange-Green Yellow-Brown	Directs winner search circuit to red letter win relays for any 3 or any 2 red letter game winners.
L5 N.C.	E-36	83-4 85-10	Black-Yellow Black-White	Proportioning circuit for red score steps.
GREEN DOUBLE RELAY COIL	A-34	45-11J 71-13	Green-White Orange-Red	Energized thru spotting disc control circuit during red or blue button play.
L1 N.C.	A-34	45-11 45-11J	Green-White Green-White	Opens circuit to this relay coil.
L2 N.C.	E-38	31-7 13-11	Yellow-Red Red-Yellow	Proportioning circuit for blue and green score steps.
L3 N.O.	D-26	23-4 63-9	Blue-Yellow Brown-Yellow	Completes a circuit to mixer #4 relay.
L4 N.O.	Q-35	27-14 30	Blue-Orange Yellow	Completes circuit to green scores doubled feature lite.
L5 N.O.	F-53	78-9 65-9	Orange-Black Brown-White	Completes circuit to doubler relays and alternate unit during green scores double winners.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW DOUBLE RELAY COIL	A-33	38-17J 71-13	Yellow-Black Orange-Red	Energized thru spotting disc control circuit during red or blue button play.
L1 N.C.	A-33	38-17 38-17J	Yellow-Black Yellow-Black	Opens circuit to this relay coil.
L2 N.C.	E-36	21-11 75-8	Blue-Red Orange-White	Proportioning circuit for yellow score steps.
L3 N.O.	E-27	23-4 14-11	Blue-Yellow Red-Green	Completes a circuit to mixer #4 relay.
L4 N.O.	Q-23	52-10 30	White-Blue Yellow	Completes circuit to yellow scores doubled feature lite.
L5 N.O.	F-47	80-6 78-9	Black Orange-Black	Completes circuit to doubler relays and alternate unit during yellow scores double winners.
BLUE DOUBLE RELAY COIL	A-34	43-11J 71-13	Green-Yellow Orange-Red	Energized thru spotting disc control circuit during red or blue button play.
L1 N.C.	A-34	43-11 43-11J	Green-Yellow Green-Yellow	Opens circuit to this relay coil.
L2 N.C.	F-38	90-4 31-7	Gray Yellow-Red	Proportioning circuit for blue and green score steps.
L3 N.O.	D-26	23-4 85-9	Blue-Yellow Black-White	Completes a circuit to mixer #4 relay.
L4 N.O.	Q-31	74-10 30	Orange-Green Yellow	Completes circuit to blue scores doubled feature lite.
L5 N.O.	F-51	52-8 78-9	White-Blue Orange-Black	Completes circuit to doubler relays and alternate unit during blue scores double winners.
RED DOUBLE RELAY COIL	A-33	41-11J 71-13	Green-Red Orange-Red	Energized thru spotting disc control circuit during red or blue button play.
L1 N.C.	A-33	41-11 41-11J	Green-Red Green-Red	Opens circuit to this relay coil.
L2 N.C.	E-37	83-4 58-10	Black-Yellow White-Black	Proportioning circuit for red score steps.
L3 N.O.	E-28	23-4 63-10	Blue-Yellow Brown-Yellow	Completes a circuit to mixer #4 relay.
L4 N.O.	Q-27	75-10 30	Orange-White Yellow	Completes circuit to red scores doubled feature lite.
L5 N.O.	F-49	43-9 78-9	Green-Yellow Orange-Black	Completes circuit to doubler relays and alternate unit during red scores double winners.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TIILT RELAY COIL	A-16	14-5 70	Red-Green Orange	Energized by inertia tilt switches, plumb-bob tilt or anti-cheat coin tilt circuit.
L1 N.C.	M-20	40-8 93-3	Green Gray-Yellow	Opens circuit to search index lock magnet and mystic line motors.
L2 N.C.	S-47	10-1 20-4	Red Blue	Opens 17 volt circuit.
L3 S.P.D.T.	P-10	21-3 30 45-8	Blue-Red Yellow Green-White	Opens circuit to this relay coil, also opens scores and features circuit, winner circuit, game playing circuit and completes a circuit to close shutter.
L4 S.P.D.T.	T-46	36-17 54-2 91-2	Yellow-Brown White-Green Gray-Red	Opens 6 volt circuit to score and feature lites and completes circuit to tilt lite.
R1 N.C.	M-2	60P 30P	Brown (Plastic) Yellow (Plastic)	Opens circuit to control unit and mixer-spotting unit motors.
R2 N.O.	H-18	57-6 85-7	White-Orange Black-White	Completes a circuit to red button relay.
R3 N.O.	D-6	83-3 13-16	Black-Yellow Red-Yellow	Completes a circuit to start relay.
EXTRA BALL #1 RELAY				
L1 N.C.	E-32	91-6 85-4	Gray-Red Black-White	Opens pull-in circuit to anti-cheat relay.
L2 N.O.	J-12	83-1 71-8	Black-Yellow Orange-Red	Completes timer unit reset circuit.
L3 S.P.D.T.	N-33	85-4 30 61-2	Black-White Yellow Brown-Red	Opens pull-in circuit to anti-cheat relay, score units step-up, and double feature circuit and completes extra ball unit step-up circuit.
L4 S.P.D.T.	K-34	60-6 56-6 18-2	Brown White-Brown Red-Black	Opens score units step-up and double feature circuit and completes extra ball unit step-up circuit.
R1 N.C.	M-25	21-3 41-17	Blue-Red Green-Red	Opens a circuit to mixer #4 relay.
R2 S.P.D.T.	M-34	75-5 15-7 45-2	Orange-White Red-White Green-White	Opens score units step-up and double feature circuit and completes extra ball unit step-up circuit.
R3 N.O.	Q-46	50-9 23-6	White Blue-Yellow	Completes circuit to extra-balls feature lite.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL #2 RELAY COIL	A-18	10-6J 70	Red Orange	Energized by yellow button play after shooting 5th ball.
L1 N.C.	A-18	10-6 10-6J	Red Red	Opens circuit to this relay coil.
L2 N.O.	D-19	91-3 38-3	Gray-Red Yellow-Black	Completes extra ball circuit to ball lifter motor.
L3 S.P.D.T.	H-10	14-3 61 98-2	Red-Green Brown-Red Gray-Black	Directs circuit from shutter motor to mixer latch and timer cams index coils.
L4 N.C.	E-17	20-2 85-7	Blue Black-White	Opens lock-in circuit to red button relay.
R1 N.C.	Q-12	31-16 81-6	Yellow-Red Black-Red	Opens spotting disc features flash circuit.
R2 N.O.	K-34	36-19 56-6	Yellow-Brown White-Brown	Completes extra ball unit step-up circuit.
R3 S.P.D.T.	Q-35	15-17 13-4 74-9	Red-White Red-Yellow Orange-Green	Opens spotting disc flash circuit to score and double feature lites, and completes circuit to flash extra ball lites.
R4 N.C.	M-36	45-2 83-9	Green-White Black-Yellow	Safety, opens features circuit.
RED ROLL-OVER RELAY COIL				
L1 N.C.	A-57	25-13J 70	Blue-White Orange	Energized thru selection feature disc and red rollover button on panel, or direct thru selection feature disc.
L2 N.O.	L-21	25-13 25-13J	Blue-White Blue-White	Opens circuit to this relay coil.
L3 S.P.D.T.	R-8	93-3 21-12	Gray-Yellow Blue-Red	Completes circuit to move mystic lines until 6th ball is shot.
L4 S.P.D.T.	R-10	51-12 90 52-13	White-Red Gray White-Blue	Directs circuit to flash press buttons now lite before 4th ball, before 5th ball or after 5th ball.
YELLOW ROLLOVER RELAY COIL	A-56	38-13J 70	Yellow-Black Orange	Energized thru selection feature disc and yellow rollover button on panel, or direct thru selection feature disc.
L1 N.C.	A-56	38-13 38-13J	Yellow-Black Yellow-Black	Opens circuit to this relay coil.
L2 N.O.	L-21	93-3 98-3	Gray-Yellow Gray-Black	Completes circuit to move mystic lines until 5th ball is shot.
L3 S.P.D.T.	R-8	48-13 51-12 23-5	Green-Black White-Red Blue-Yellow	Directs circuit to flash press buttons now lite before 4th ball or before 5th ball.
L4 S.P.D.T.	R-10	57-5 31-8 74-8	White-Orange Yellow-Red Orange-Green	Directs circuit to press buttons before 4th ball or before 5th ball feature lites.

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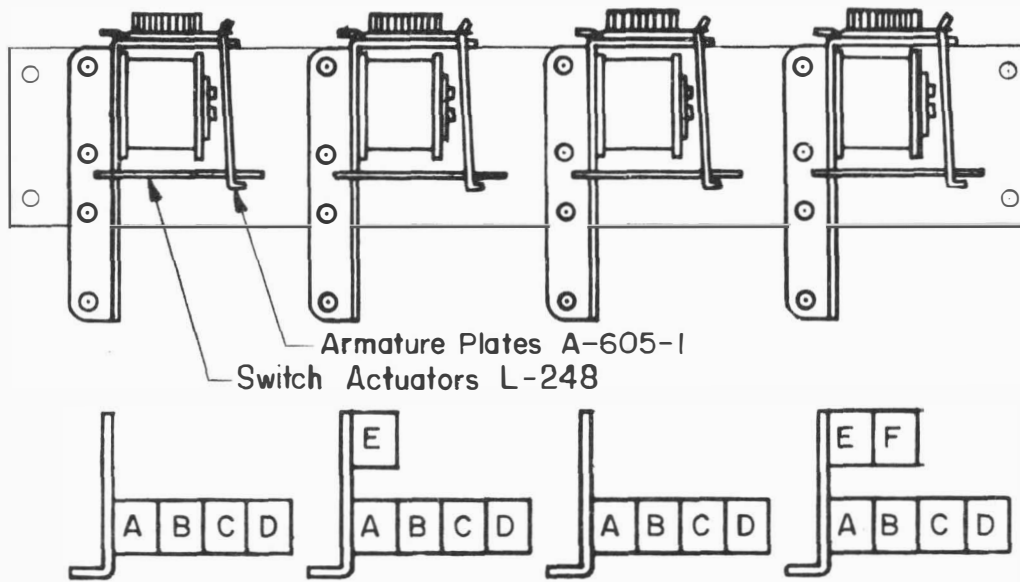
TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECT BEFORE 4th BALL LOCK-OUT RELAY COIL	A-16	83-6J 70	Black-Yellow Orange	Energized thru timer disc ball count circuit when 4th ball is shot.
L1 N.C.	A-16	83-6 83-6J	Black-Yellow Black-Yellow	Opens circuit to this relay coil.
L2 N.O.	L-12	36-2 43-2	Yellow-Brown Green-Yellow	Completes timer unit step-up circuit from 4th to 5th step.
L3 S.P.D.T.	L-20	98-3 93-3 53-18	Gray-Black Gray-Yellow White-Yellow	Opens before 4th ball circuit to move mystic lines and completes circuit to "R" button to search for winners.
L4 N.C.	R-8	27-4 48-13	Blue-Orange Green-Black	Opens before 4th ball circuit to flash press buttons now lite.
R1 N.O.	F-42	80 23-13	Black Blue-Yellow	Completes winner search circuit to search index coil.
R2 N.O.	K-54	60-1 50-16	Brown White	Completes winner search circuit to red letter win relays.
SELECT BEFORE 5th BALL LOCK-OUT RELAY COIL	A-15	74-6J 70	Orange-Green Orange	Energized thru timer disc ball count circuit when 5th ball is shot.
L1 N.C.	S-11	52-12 56-12	White-Blue White-Brown	Opens circuit to yellow rollover button panel lite.
L2 N.C.	G-56	13-12 38-13	Red-Yellow Yellow-Black	Opens circuit to yellow rollover relay.
L3 N.O.	K-14	54-11 71-8	White-Green Orange-Red	Completes circuit to reset timer unit thru "R" button.
L4 N.O.	K-14	78-6 27-2	Orange-Black Blue-Orange	Completes timer unit step-up circuit from 5th to 8th step.
L5 N.C.	K-20	98-3 21-12	Gray-Black Blue-Red	Opens before 5th ball circuit to move mystic lines.
R1 N.C.	A-15	74-6 74-6J	Orange-Green Orange-Green	Opens circuit to this relay coil.
R2 N.O.	D-18	10-6 25-8	Red Blue-White	Completes yellow button circuit to extra ball trip relays.
R3 N.O.	L-7	50-2 18-6 14-18	White Red-Black Red-Green	Completes yellow button extra ball play circuit to start relay when playing replays.
R4 S.P.D.T.	S-8	48-12 53-2	Green-Black White-Yellow	Directs circuit to flash press buttons now lite before 4th, before 5th or after 5th ball.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECT AFTER 5th BALL LOCKOUT RELAY COIL	A-15	98-11J 70	Gray-Black Orange	Energized thru ball count circuit when 6th ball (1st extra ball) is shot.
L1 N.C.	J-20	21-12 14-4	Blue-Red Red-Green	Opens after 5th ball circuit to move mystic lines.
L2 N.C.	F-57	15-12 25-13	Red-White Blue-White	Opens circuit to red rollover relay.
L3 N.C.	R-9	53-2 52-13	White-Yellow White-Blue	Opens after 5th ball flash circuit to press buttons now lite.
R1 N.C.	A-15	98-11 98-11J	Gray-Black Gray-Black	Opens circuit to this relay coil.
R2 N.C.	S-12	41-8 60-12	Gray-Red Brown	Opens circuit to red rollover panel lite.

4 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 33



Name	Replay Reset	Start	25¢	Anti-cheat
Coil turns & wire gauge	2300 #33	1800 #33	1800 #33	2300 #33
Coil resistance (nominal)	85 ohms	65 ohms	65 ohms	85 ohms
Operating voltage	50 volts	50 volts	50 volts	50 volts
Test voltage	37 volts	32 volts	32 volts	39 volts
Extension spring load	Clear	Red	Clear	Red
Sw actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional information				Thermalzeze wire or equivalent. No wrap on coil.
Coil No.	C-7800-331	C-7800-334	C-7800-334	C-7300-336

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

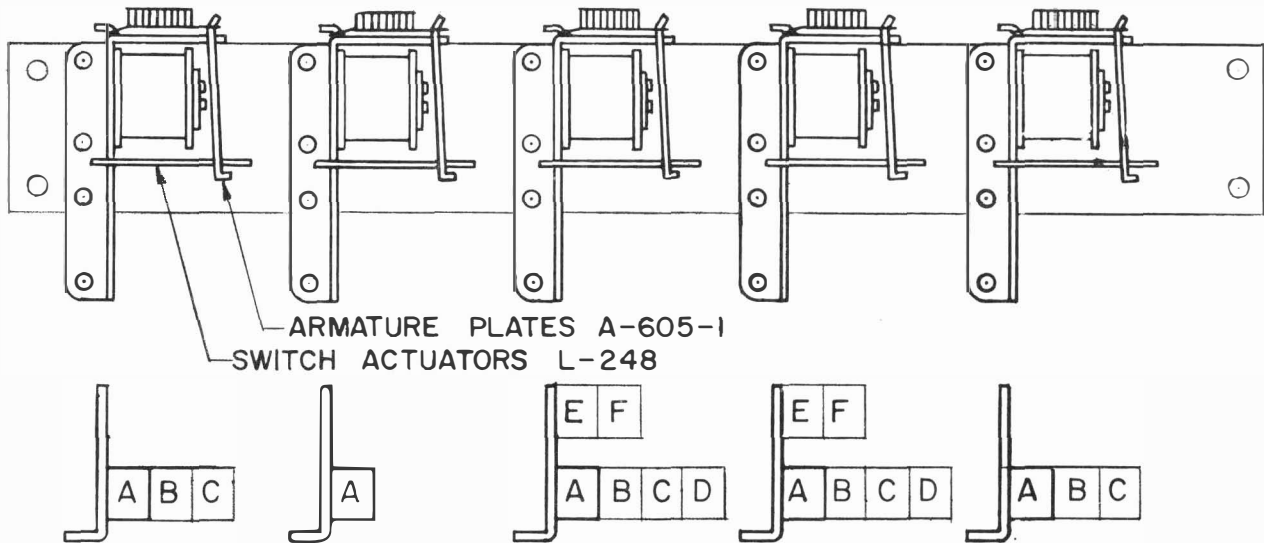
4 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 32

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY RESET RELAY COIL	A-5	75-2 70	Orange-White Orange	Energized by anti-cheat relay circuit thru replay register zero switch.
A S.P.D.T.	E-5	90-5 98-5 53-7	Gray Gray-Black White-Yellow	Directs single replay register unit reset circuit thru control unit cam switch 5A, or multiple reset circuit thru mixer-spotting cam switch 2A.
B N.O.	N-1	20P 60P	Blue (Plastic) Brown (Plastic)	Completes a circuit to control unit and mixer-spotting unit motors.
C N.O.	M-5	75-2 56-2	Orange-White White-Brown	Completes lock-in circuit for this relay. Also completes multiple replay register unit reset circuit.
D N.C.	F-7	10-5 83-3	Red Black-Yellow	Opens circuit to start relay.
START RELAY COIL	A-7	13-16 70	Red-Yellow Orange	Energized by coin switch circuit, or by replay button (red, blue, green, yellow) switch circuit when replays are on register.
A N.C.	C-30	75-4 78	Orange-White Orange-Black	Opens multiple step extra ball unit step-up circuit.
B N.C.	M-38	18-16 85-12	Red-Black Black-White	Opens game feature circuit.
C N.O.	K-9	48-2 13-16	Green-Black Red-Yellow	Completes lock-in circuit for this relay. Also in series with function of switch (D) below.
D N.O.	K-9	13-16 10-10	Red-Yellow Red	Completes circuit to shutter motor to open shutter, then to mixer latch and timer cam index coils.
E N.C.	C-55	56-4 38-15	White-Brown Yellow-Black	Opens circuit to red letter win relays.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
25¢ RELAY COIL	A-11	15-13 70	Red-White Orange	Energized by 25¢ coin switch circuit.
A S.P.D.T.	D-43	41-14 75-9 36-13	Green-Red Orange-White Yellow-Brown	Opens winner replay register unit step-up circuit and completes credit replay register unit step-up circuit.
B N.O.	K-11	25-9 15-13	Blue-White Red-White	Completes lock-in circuit for this relay.
C N.O.	M-9	10-5 48-2	Red Green-Black	Completes 25¢ coin switch circuit to start relay.
D N.C.	D-5	45-9 98-5	Green-White Gray-Black	Opens replay register unit reset circuit.
ANTI-CHEAT RELAY COIL	A-32	78-4 70	Orange-Black Orange	Energized by circuit thru control unit cam switch 5D. Stays energized unless power is interrupted.
A S.P.D.T.	M-7	75-2 56-2 50-2	Orange-White White-Brown White	Opens circuit to start relay and completes circuit to replay reset relay when relay drops out.
B N.O.	S-47	20-4 80-1	Blue Black	Opens 17 volt circuit when relay drops out.
C N.O.	F-32	30 78-4	Yellow Orange-Black	Completes lock-in circuit for this relay when energized.
D N.C.	P-10	30 14-14	Yellow Red-Green	Completes circuit to shutter motor to close shutter when relay drops out while shutter is open.
E S.P.D.T.	T-45	91-2 36-17 40	Gray-Red Yellow-Brown Green	Opens 6 volt scores and features lite circuit and completes circuit to tilt lite when this relay drops out.
F N.C.	J-18	57-6 85-7	White-Orange Black-White	Completes circuit to red button relay when this relay drops out.

5 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 35



Name	Doubler # 1	Doubler # 2	Red Letter # 1	Red Letter # 2	Red Button
Coil turns & wire gauge	2300 #33	2300 #33	1800 #33	1800 #33	2000 #33
Coil resistance (nominal)	85 Ohms	85 Ohms	65 Ohms	65 Ohms	75 Ohms
Operating voltage	50 Volts	50 Volts	50 Volts	50 Volts	50 Volts
Test voltage	37 Volts	37 Volts	37 Volts	37 Volts	37 Volts
Extension spring load	Clear	Red	Red	Red	Red
Sw. actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional information					Thermaleze wire or equivalent. No wrap on coil
Coil No.	C-7800-331	C-7300-331	C-7300-334	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

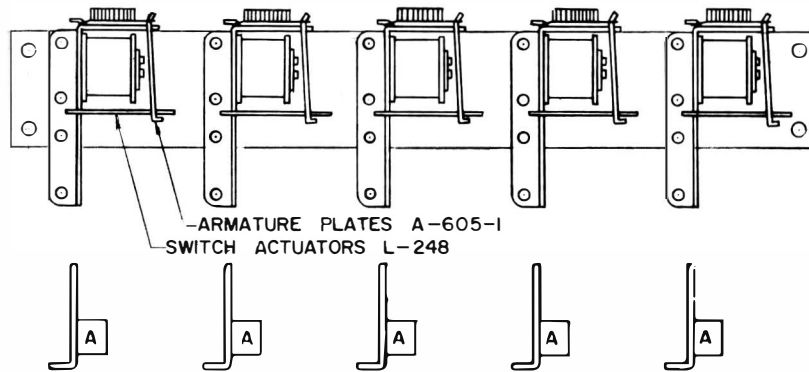
5 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 34

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
DOUBLER #1 RELAY COIL	A-46	78-9 70	Orange-Black Orange	Energized thru winner search circuit to score yellow, red, green and blue doubled winners.
A N.C.	C-46	40-16 43-15	Green Green-Yellow	Opens alternate unit homing circuit.
B N.C.	B-50	90-1 70	Gray Orange	Opens regular multiplier step-up circuit to yellow, red, green and blue replay counters.
C N.C.	B-50	90-1 70	Gray Orange	Same as (B) above
DOUBLER #2 RELAY COIL	A-49	90-1 70	Gray Orange	Pulses thru control unit multiplier switches during yellow, red, green and blue double winners.
A N.O.	F-47	75-6 78-9	Orange-White Orange-Black	Completes a circuit to alternate unit coil.
RED LETTER WIN #1 RELAY COIL	A-55	38-15 70	Yellow-Black Orange	Energized thru winner search circuit to score any 2 and any 3 red letter game winners.
A N.O.	P-10	10-11 30	Red Yellow	Completes circuit to selection feature lites.
B N.O.	K-28	25-18 20-16	Blue-White Blue	Completes circuit to step red letter unit and advance scores and features to guaranteed level.
C N.C.	D-35	54-14 21-11	White-Green Blue-Red	Opens regular yellow score unit step-up circuit.
D N.C.	D-37	14-15 13-11	Red-Green Red-Yellow	Opens regular blue and green score unit step-up circuit.
E N.C.	M-37	83-9 18-16	Black-Yellow Red-Black	Opens entire feature circuit.
F N.C.	F-38	93-12 81-7	Gray-Yellow Black-Red	Opens regular mystic lines feature unit step-up circuit.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED LETTER WIN #2 RELAY COIL	A-55	38-15 70	Yellow-Black Orange	Energized thru winner search circuit to score any 2 and any 3 red letter game winners.
A N.O.	F-11	21-3 91-11	Blue-Red Gray-Red	Completes a circuit to shutter motor to open shutter.
B N.O.	M-55	56-4 63-8	White-Brown Brown-Yellow	Completes lock-in circuit for this relay and red letter win relay #1.
C N.C.	B-61	85-5 15-4	Black-White Red-White	Opens red score unit reset circuit.
D N.C.	D-36	58-10 52-19	White-Black White-Blue	Opens regular red score unit step-up circuit.
E N.C.	F-42	80 60	Black Brown	Opens circuit to replay cams index coil.
F N.C.	F-39	48-10 98-9	Green-Black Gray-Black	Opens regular selection feature unit step-up circuit.
RED BUTTON RELAY COIL	B-17	85-7 91-15	Black-White Gray-Red	Energized by circuit from anti-cheat relay switch, tilt relay switch, red score unit zero switch or red button switch.
A S.P.D.T.	D-10	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit to mixer latch and timer cams index coil during extra ball play or to shutter motor when starting new game after extra ball play.
B S.P.D.T.	Q-44	23-6 30 36-15	Blue-Yellow Yellow Yellow-Brown	Directs circuit to extra ball feature lite during extra ball play or to red, blue or green button feature lites during all, scores or features play.
C N.O.	J-17	57-6 20-2	White-Orange Blue	Completes lock-in circuit for this relay.

5 (SEARCH) RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART BELOW



Name	Search # 5	Search # 4	Search # 3	Search # 2	Search # 1
Coil turns & wire gauge	850 # 29	850 # 29	850 # 29	850 # 29	850 # 29
Coil resistance (nominal)	12 Ohms	12 Ohms	12 Ohms	12 Ohms	12 Ohms
Operating voltage	18 Volts	18 Volts	18 Volts	18 Volts	18 Volts
Test voltage	Under 12 Over 9 volts	Under 12 volts Over 9 volts	Under 12 volts Over 9 volts	Under 12 volts Over 9 volts	Under 12 volts Over 9 volts
Extension spring load	Clear	Clear	Clear	Clear	Clear
Sw actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional information	Note: .0005 durochrome on armature	See note	See note	See note	See note
Coil No.	C-7800-291	C-7800-291	C-7800-291	C-7800-291	C-7800-291

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

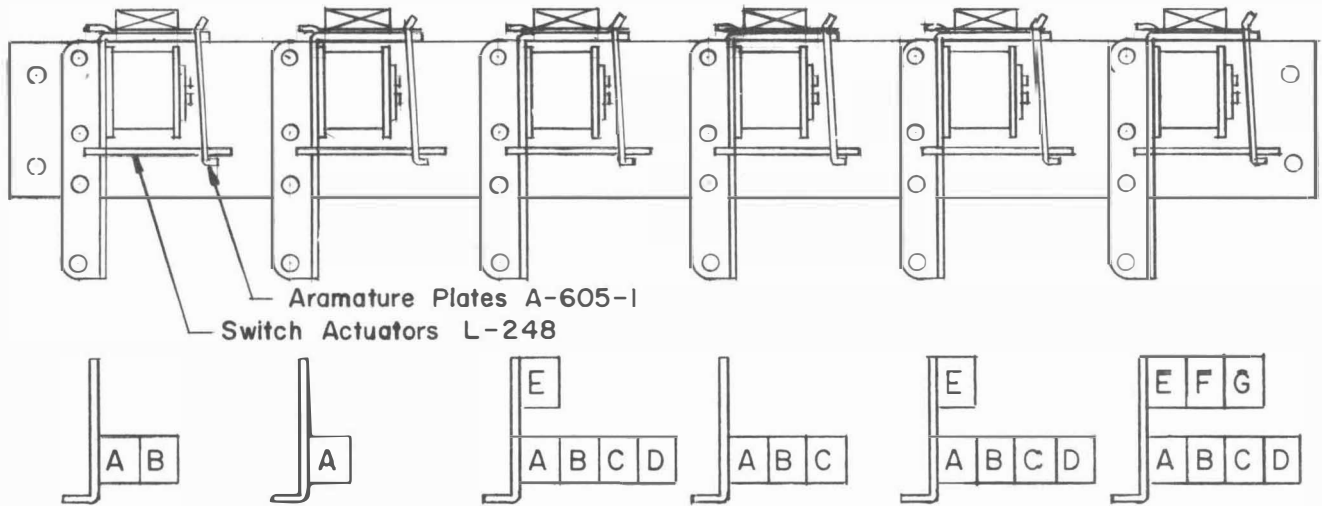
5 (SEARCH) RELAY BANK SWITCH CHART

LETTERS CORRESPOND TO SWITCH CHART ABOVE

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
#5 SEARCH RELAY COIL	S-56	10-1 18-5	Red Red-Black	Energized thru search disc by circuit from (A-B-C) mystic lines motor discs.
A N.O.	K-47	61-3 23-8	Brown-Red Blue-Yellow	Completes yellow, red, blue, green 5-in-a zone winner circuits.
#4 SEARCH RELAY COIL	S-55	10-1 15-3	Red Red-White	Energized thru search disc by circuit from (A-B-C) mystic lines motor discs.
A N.O.	L-47	21 23-8	Blue-Red Blue-Yellow	Completes Big 4, yellow, red, blue, green 4-5 in a zone winner circuits.
#3 SEARCH RELAY COIL	S-55	10-1 60-4	Red Brown	Energized thru search disc by circuit from (A-B-C) mystic lines motor discs.
A N.O.	M-47	31-1 36-1	Yellow-Red Yellow-Brown	Completes Big 4, yellow, red, blue, green 3-4-5 in a zone, and any 3 winner circuits.
#2 SEARCH RELAY COIL	S-54	10-1 65-7	Red Brown-White	Energized thru search disc by circuit from (A-B-C) mystic lines motor discs.
A N.O.	M-47	38-11 36-11	Yellow-Black Yellow-Brown	Completes Big 4, yellow, red, blue, green 3-4-5 in a zone, and any 2, any 3 winner circuits.
#1 SEARCH RELAY COIL	S-54	10-1 20-5	Red Blue	Energized thru search disc by circuit from (A-B-C) mystic lines motor discs.
A N.O.	N-47	15-5 38-11	Red-White Yellow-Black	Completes Big 4, yellow, red, blue, green 3-4-5 in a zone, and any 2, any 3 winner circuits.

6 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 38



Name	MIXER # 2	MIXER # 4	PLAY FEATURES	FEATURES LOCK	PLAY SCORES	SCORES LOCK
Coil turns & wire gauge	2800 # 33	2800 # 33	2300 #33	2300 # 33	2300 #33	2300 # 33
Coil resistance (nominal)	116 Ohms	116 Ohms	85 Ohms	85 Ohms	85 Ohms	85 Ohms
Operating voltage	50 Volts	50 Volts	50 Volts	50 Volts	50 Volts	50 Volts
Test voltage	37 Volts	37 Volts	37 Volts	37 Volts	37 Volts	37 Volts
Extension spring load	RED	RED	RED	CLEAR	RED	RED
Sw actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional information	Note:- Thermalize wire or equivalent No wrap on coil.	See note				
Coil No.	C-7300-3312	C-7300-3312	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

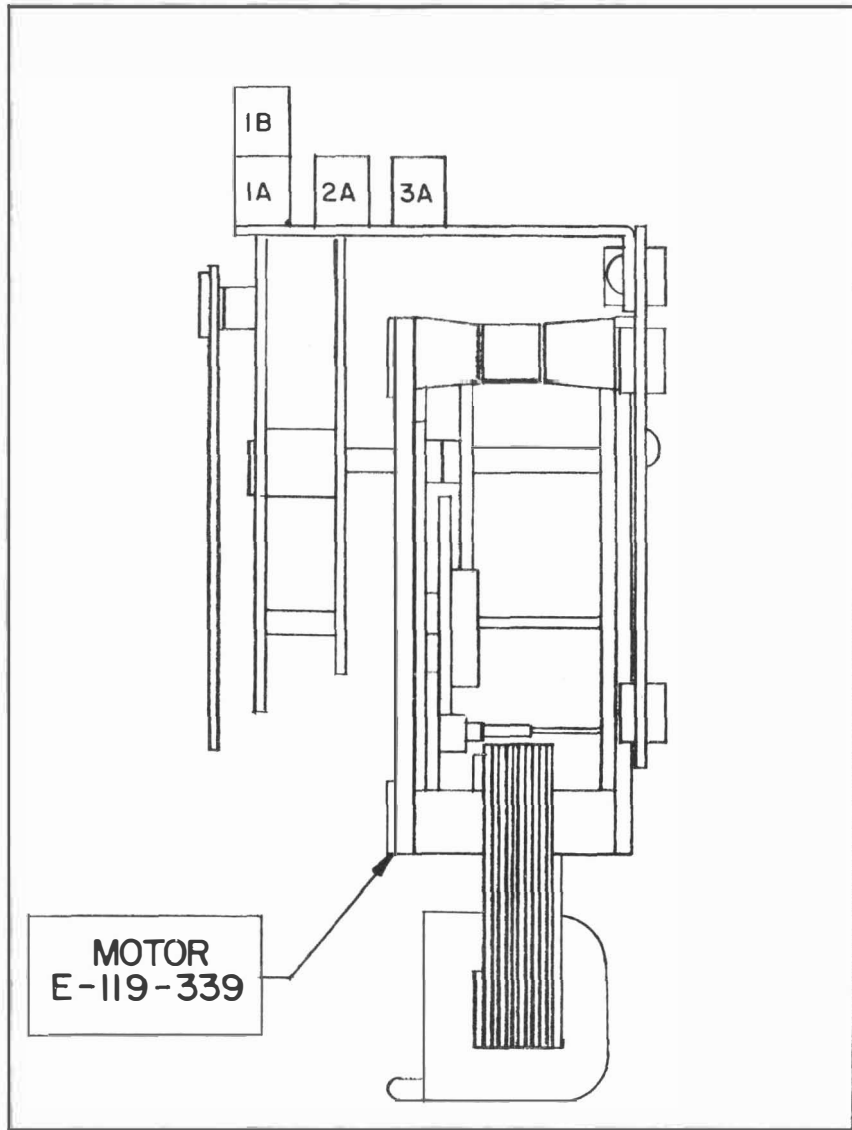
6 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 37

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
MIXER #2 RELAY COIL	A-29	27-7 70	Blue-Orange Orange	Energized thru mixer #2 disc control circuit.
A N.O.	M-33	85-4 54-12	Black-White White-Green	Completes circuit for yellow, red, green and blue score steps thru control unit cam switch 7A or 8C control circuits.
B N.O.	L-35	56-6 15-7	White-Brown Red-White	Completes circuit for yellow, red, green and blue score steps and scores doubled feature thru control unit cam switch 7C or 8B control circuits. Also completes control circuit for extra ball steps during extra ball play.
MIXER #4 RELAY COIL	A-27	23-4 70	Blue-Yellow Orange	Energized thru mixer #4 disc control circuit.
A N.C.	M-35	45-2 51-5	Green-White White-Red	Opens features and extra balls circuit.
PLAY FEATURES RELAY COIL	B-59	31-15 61-13	Yellow-Red Brown-Red	Energized during green button (features) play.
A N.O.	E-58	43-14 53-14	Green-Yellow White-Yellow	Completes circuit to features lock relay.
B N.O.	E-59	81-13 61-13	Black-Red Brown-Red	Completes lock-in circuit for this relay.
C N.C.	Q-35	74-15 15-17	Orange-Green Red-White	Opens yellow, red, green and blue score lites and scores doubled lites flash circuit.
D N.C.	A-36	70 71-13	Orange Orange-Red	Opens yellow, red, green and blue score unit step-up and scores doubled feature circuit.
E S.P.D.T.	Q-44	51-15 36-15 23-15	White-Red Yellow-Brown Blue-Yellow	Directs circuit to red button play, blue button or green button play lite.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
FEATURES LOCK RELAY COIL	B-58	31-15 53-14	Yellow-Red White-Yellow	Energized by control unit cam switch 7B when play features relay is energized.
A N.O.	D-58	40-15 53-14	Green White-Yellow	Completes lock-in circuit for this relay.
B N.O.	M-40	45-6 90-13	Green-White Gray	Completes spotting disc control circuit for mystic lines feature steps, selection feature steps, any 3, any 2 feature and Big 300, Big 4 600 feature.
C N.C.	L-25	52-17 41-17	White-Blue Green-Red	Opens a circuit to mixer #4 relay for features proportioning.
PLAYSCORES RELAY COIL	B-60	31-15 85-15	Yellow-Red Black-White	Energized during blue button (scores) play.
A N.O.	K-33	10-17 20-6	Red Blue	Completes control circuit from control unit cam switch 8C for yellow, red, green and blue score steps.
B N.O.	E-58	43-14 93-14	Green-Yellow Gray-Yellow	Completes circuit to scores lock relay.
C N.O.	F-60	57-13 85-15	White-Orange Black-White	Completes lock-in circuit to this relay.
D S.P.D.T.	R-44	25-15 51-15 21-15	Blue-White White-Red Blue-Red	Directs circuit to red button play lite or blue button play lite.
E N.C.	R-12	56-15 31-16	White-Brown Yellow-Red	Opens feature lites flash circuit.
SCORES LOCK RELAY COIL	B-58	31-15 93-14	Yellow-Red Gray-Yellow	Energized by control unit cam switch 7B when play scores relay is energized.
A N.O.	D-59	40-15 93-14	Green Gray-Yellow	Completes lock-in circuit to this relay.
B N.O.	J-35	60-6 56-11	Brown White-Brown	Completes control circuit thru control unit cam switch 8B for yellow, red, green and blue score steps and yellow, red, green and blue scores doubled feature.
C N.O.	H-36	38-5 65-16	Yellow-Black Brown-White	Same function (B) above thru control unit cam switch 7C or 8B.
D N.O.	H-35	57-12 27-5	White-Orange Blue-Orange	Same function as (C) above.
E N.O.	H-37	58-11 14-6	White-Black Red-Green	Same function as (D & C) above.
F N.C.	M-39	50-5 43-16	White Green-Yellow	Opens features circuit.
G N.O.	G-38	18-14 31-18	Red-Black Yellow-Red	Same function as (C, D & E) above.

BALL LIFTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART BELOW



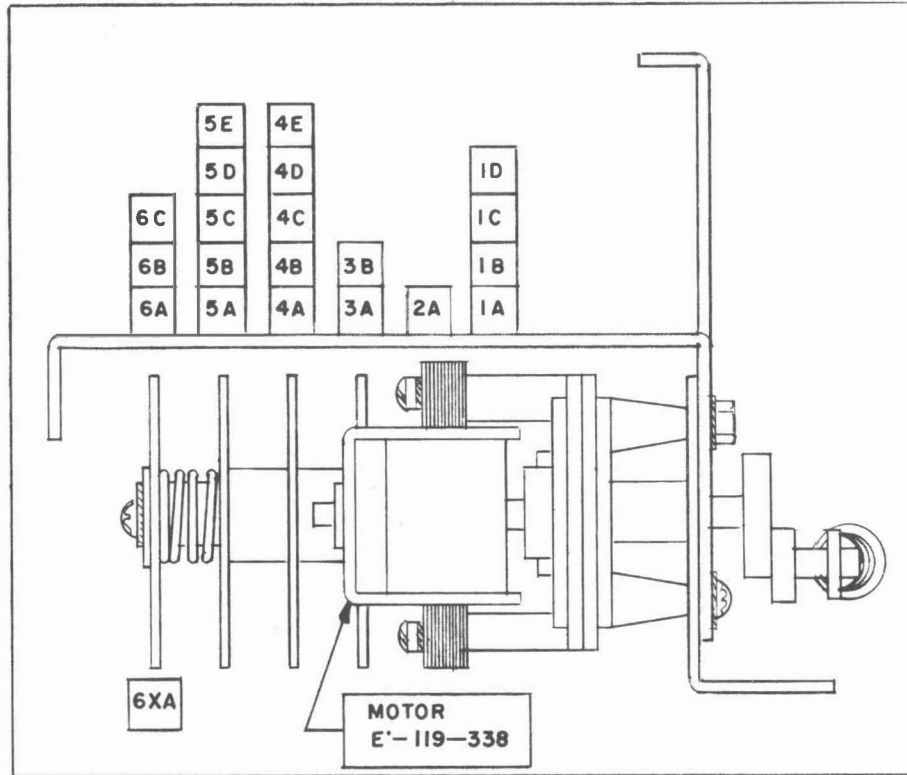
BALL LIFTER MOTOR SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW ABOVE

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	J-15	15-6 85-6 Red-White Black-White	(Safety circuit) opens the circuit to select before 5th and after 5th lock-out relays during ball lift cycle.
1B	N.O.	F-19	91-1 30 Gray-Red Yellow	Completes ball lifter motor carry-over circuit.
2A	N.O.	J-11	43-2 27-2 Green-Yellow Blue-Orange	Completes timer unit step-up circuit (0 to 5th step)
3A	N.O.	M-16	21-3 83-7 Blue-Red Black-Yellow	Completes circuit to select before 4th ball lockout relay when 4th ball is shot.

SHUTTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART AT RIGHT

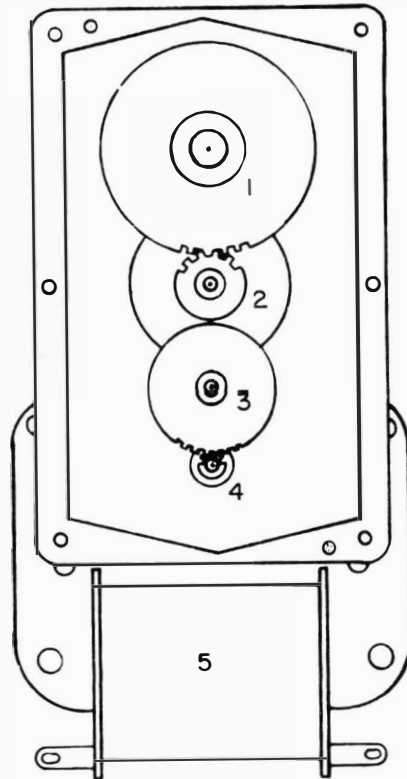


SHUTTER MOTOR SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW AT LEFT

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
1A	N.C.	N-13	98-8 21-3	Gray-Black Blue-Red	When shutter is closed, completes timer unit step-up circuit when 5th ball is shot. Also completes timer unit reset circuit during extra ball play.
1B	N.O.	N-9	14-3 30	Red-Green Yellow	During shutter cycle, completes shutter motor carry-over circuit.
1C	N.C.	M-28	90-3 21-3	Gray Blue-Red	When shutter is open, completes red letter unit step-up circuit and guaranteed scores and feature circuit for red letter game winners.
1D	M.B.B.	N-47	21-3 15-5 63-8	Blue-Red Red-White Brown-Yellow	When shutter opens, starts red letter win relays lock-in circuit before breaking winner search circuit.
2A	N.C.	H-19	31-3 36-3	Yellow-Red Yellow-Brown	When shutter is closed, completes circuit to ball lifter motor.
3A	N.O.	L-3	70P 20P	Orange(Plastic) Blue(Plastic)	When shutter opens, completes circuit to trip bank reset coil #2.
3B	N.O.	D-61	85-5 30	Black-White Yellow	When shutter opens, completes reset circuit to red score unit, yellow, blue, green and red replay counter units and selection feature unit.
4A	N.O.	K-10	18-3 14-3	Red-Black Red-Green	When shutter is open, completes tilt circuit to run shutter motor to close shutter.
4B	N.C.	N-20	21-3 40-8	Blue-Red Green	When shutter is closed, completes circuit to move mystic lines, search for winners, energize yellow and red rollover relays thru rollover buttons and energize selection lock-out relays.
4C	N.O.	M-10	18-3 45-8	Red-Black Green-White	When shutter is open, completes tilt circuit to run shutter motor to close shutter.
4D	N.C.	N-15	10-13 40-8	Red Green	When shutter is closed, completes circuit to before 5th and after 5th selection lock-out relays.
4E	N.O.	N-54	63-8 21-3	Brown-Yellow Blue-Red	When shutter opens, completes lock-in circuit to red letter win relays.
5A	N.C.	M-13	98-8 65-2	Gray-Black Brown-White	When shutter is closed, completes timer unit step-up circuit when 5th ball is shot. Also completes timer unit reset circuit during extra-ball play.
5B	N.O.	L-57	31-4 90-9	Yellow-Red Gray	When shutter is open, completes lock-in circuit to lifter start relay.
5C	N.O.	M-38	85-12 50-5	Black-White White	When shutter is open, completes circuit for features during red or green button play.
5D	N.O.	C-45	40-16 80-16	Green Black	When shutter is open, completes Big 4 replay counter unit homing circuit.
5E	S.P.D.T.	J-9	61 10-10 93-2	Brown-Red Red Gray-Yellow	Directs start relay circuit to shutter motor when shutter closed, and to mixer latch and timer cams index when shutter opens.
6XA	N.C.	B-17	91-15 70	Gray-Red Orange	Open only during shutter cycle, completes circuit to red button relay when shutter open or closed.
6A	N.O.	M-14	71-8 30	Orange-Red Yellow	When shutter opens, completes timer unit reset circuit.
6B	N.O.	G-61	78-3 30	Orange-Black Yellow	When shutter opens, completes reset circuit to extra ball unit, yellow, blue and green score units, mystic lines feature unit and red letter unit.
6C	N.O.	L-2	52P 20P	White-Blue(Plastic) Blue(Plastic)	When shutter opens, completes circuit to trip bank reset coil #1.

MOTOR PARTS GUIDE



SHUTTER MOTOR (E-119-338)

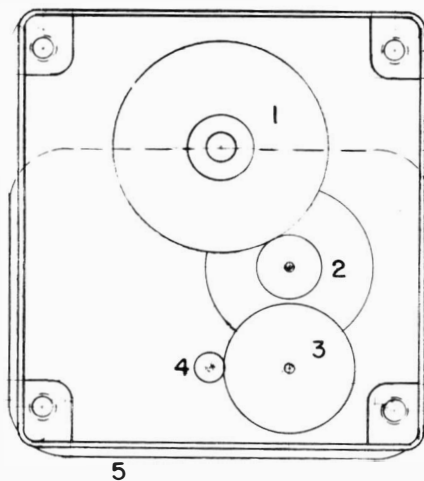
- 1 ZGS-1725-15
- 2 G-5818-1
- 3 G-4109-1
- 4 ZRST-1715-30-1
- 5 ZS-1708-2519

BALL LIFTER MOTOR (E-119-339)

- 1 ZGS-1745-12
- 2 G-5318-1
- 3 G-4114-1
- 4 ZRST-1715-30-1
- 5 ZS-1708-2519

CODE

- 1 GEAR & SHAFT ASSEMBLY.
- 2 GEAR.
- 3 GEAR.
- 4 GEAR ROTOR & SHAFT ASSEMBLY.
- 5 STATOR & COIL ASSEMBLY.



MYSTIC LINE "A" MOTOR (E-119-352)

- 1 HGS-1726-1
- 2 G-5818-1
- 3 G-4109-1
- 4 ZRST-1415-32-8
- 5 ZS-1704-2521

MYSTIC LINES "B" & "C" MOTOR (E-119-353)

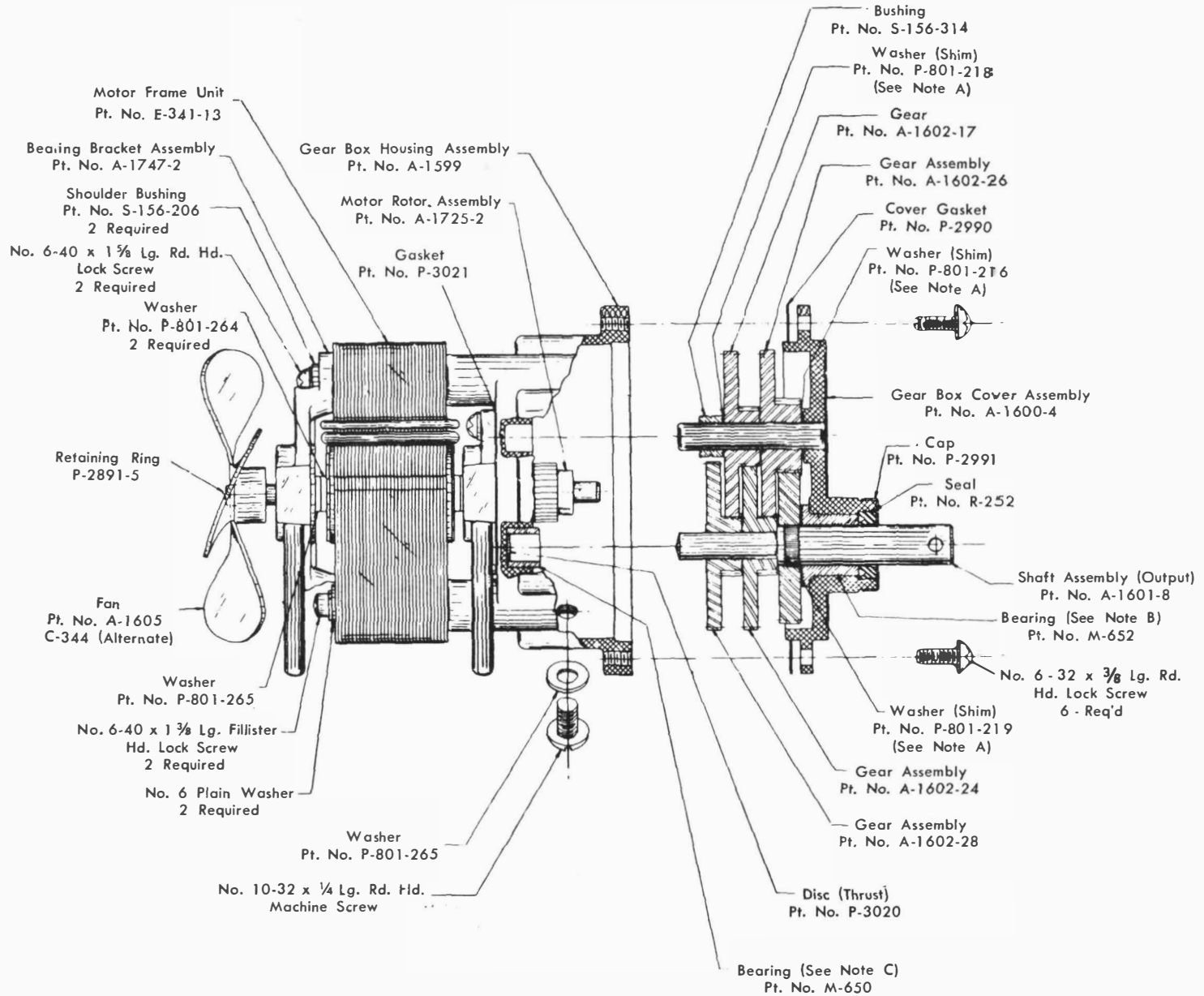
- 1 HGS-1744-1
- 2 G-5318-1
- 3 G-4114-1
- 4 ZRST-1415-32-9
- 5 ZS-1703-2522

CODE

- 1 GEAR & SHAFT ASSEMBLY.
- 2 GEAR.
- 3 GEAR.
- 4 GEAR ROTOR & SHAFT ASSEMBLY.
- 5 STATOR & COIL ASSEMBLY.

MOTOR FOR CONTROL UNIT AND MIXER & SPOTTING UNIT

E-119-341



NOTE A: In order to maintain proper clearances between gears it is most important that when re-assembling gear train that the same number of shims be replaced in each of their respective locations.

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

NOTE C: Bearing M-650 is part of Gear Box Housing Assembly A-1599 and cannot be ordered separately.

ADJUSTMENT PLUGS

REFLEX ADJUSTMENT:

This adjustment functions in series with mixer #1 disc and reflex unit disc to proportion scores and features. Plug positions are numbered 1 to 7 from post, denoting most liberal position (1), most conservative position (7).

EXTRA BALLS ADJUSTMENT:

This adjustment functions in series with spotting disc, mixer #4 disc and extra ball unit disc to proportion extra balls. Plug positions are numbered 1 to 5 from post, denoting most liberal position (1), most conservative position (5).

BIG 4 300 ADJUSTMENT:

This adjustment functions in series with control circuit and spotting disc to proportion Big 4 300 feature. Plug positions are numbered 1 to 4 from post, denoting most liberal position (1), most conservative position (4).

BIG 4 600 ADJUSTMENT:

This adjustment functions in series with control circuit and spotting disc to proportion Big 4 600 feature. Plug positions are numbered 1 and 2 from post, denoting liberal position (1), conservative position (2).

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-292-22	Backglass
M-1424	Backglass (Plexiglass)
M-281-31	Lock & Keys (2 Keyed alike)
E-122-103	Transformer

Back Door Assembly:

M-281-24	Lock & Keys (2 keyed alike)
SW-100-106	Lock Switch
E-105-6	Resistor (8200 ohm ½ watt)
E-105-64	Resistor (100 ohm 2 watt)

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
A-2790-16	Coin Box
P-3089-28	Coin Box Cover
E-130-10	Counter (Total play-replay)
A-2618	Legs
M-106-1	Leg Bolt
M-163-4	Leg Adjuster
A-1729-13	Push Button (Blue)
A-1729-14	Push Button (Green)
E-138-3	Plumb Bob Tilt
G-213	Top Glass
E-108-57	Toggle Switch

Front Door Assembly:

AS-277-83	Coin Switch & Rejector Mount Assembly
E-101-58	Coin Lockout Magnet Coil
A-2958	Coin Lockout Magnet Armature Plate

Front Door Assembly (Continued):

Part No.	Name of Part
E-108-86	Coin Switch
	Coin Guide Assembly*
	Coin Slide Assembly*
AS-2041-26	Front Door Assembly (Single Coin)
AS-2041-27	Front Door Assembly (Double Coin)
CA-567-153	Front Door Only (Single Coin)
CA-567-154	Front Door Only (Double Coin)
A-254-63	Hinge & Bracket Assembly
M-281-6	Lock & Keys
S-490-18	Push Button (Reject)
A-1729-15	Push Button (Yellow)
A-1729-16	Push Button (Red)
	Slug Rejector*

Front Moulding Assembly:

A-1272-17	Button (A)
A-1272-18	Button (B)
A-1272-19	Button (C)
A-1272-29	Button (R)
A-2359-6	Coin Plate Assembly
	Coin Entry Plate*
AS-1305-40	Front Moulding Assembly
CA-1119-11	Front Moulding Only

Panel Assembly:

AS-1315	Ball Gate & Switch Assembly
AS-493-2	Ball Rebound Assembly
R-115-4	Ball Rebound Rubber (Only)
C-119-4	Bumper Post (Yellow)
C-119-5	Bumper Post (Red)
R-243	Rubber Ring (White Post)
R-243-2	Rubber Ring (Red Post)
M-170	Rebound Spring
E-146-439	Relay (Lifter start)
C-7800-335	Relay (Coil Only)
C-387-1	Rollover Button (Red)
C-387-2	Rollover Button (Yellow)

*When ordering part, specify full name of game, part name and type of coin(s) used.

Bally Pin Game Lubricant Available in 8 oz. containers with plastic spout and screw cap.

MR. OPERATOR:

When you first play **BORDER BEAUTY** in your shop, you will think the game is spotting features like a drunken sailor. You will swear the player will receive three replays for every coin deposited.

Relax! You are comparing **BORDER BEAUTY** with previous bingo games. But remember: **BORDER BEAUTY** has a 20-BOLE playfield, a 20-NUMBER card and a different card mechanism than other bingo games.

Please put **BORDER BEAUTY** on location exactly as received from the factory. Field-tested balance is built into the game. Both you and the players will be happy with **BORDER BEAUTY** --- if you follow the advice in this note.

BALLY MANUFACTURING COMPANY