

Bally®

MAGIC RING

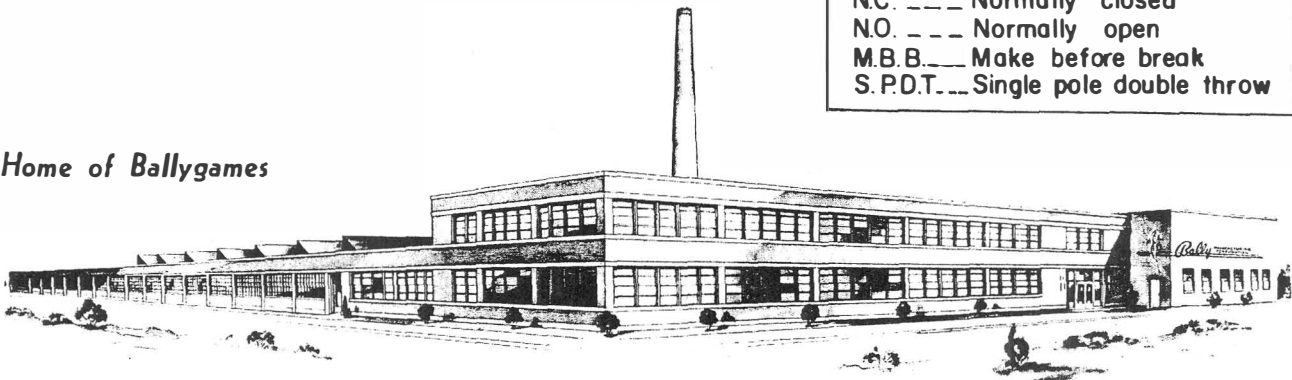
OPERATING INSTRUCTIONS AND PARTS CATALOG

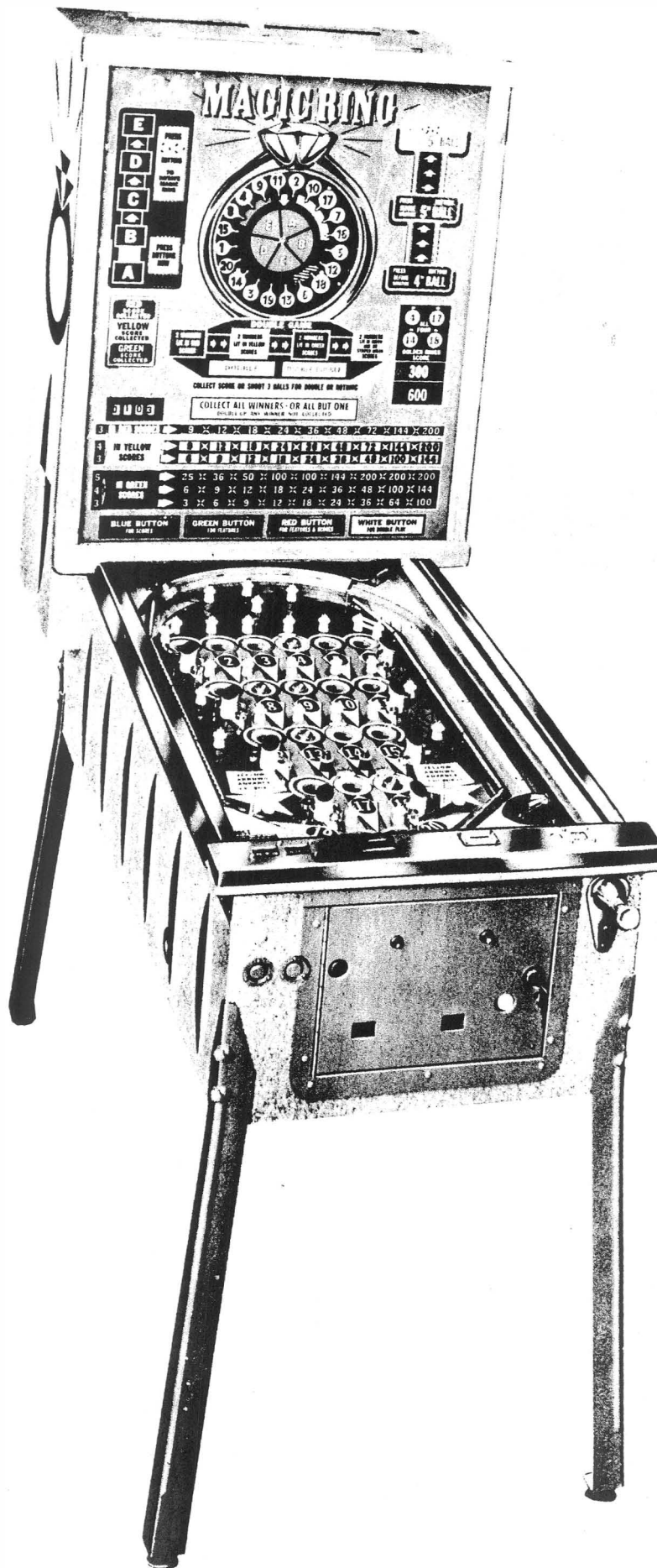
Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on page 22.

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

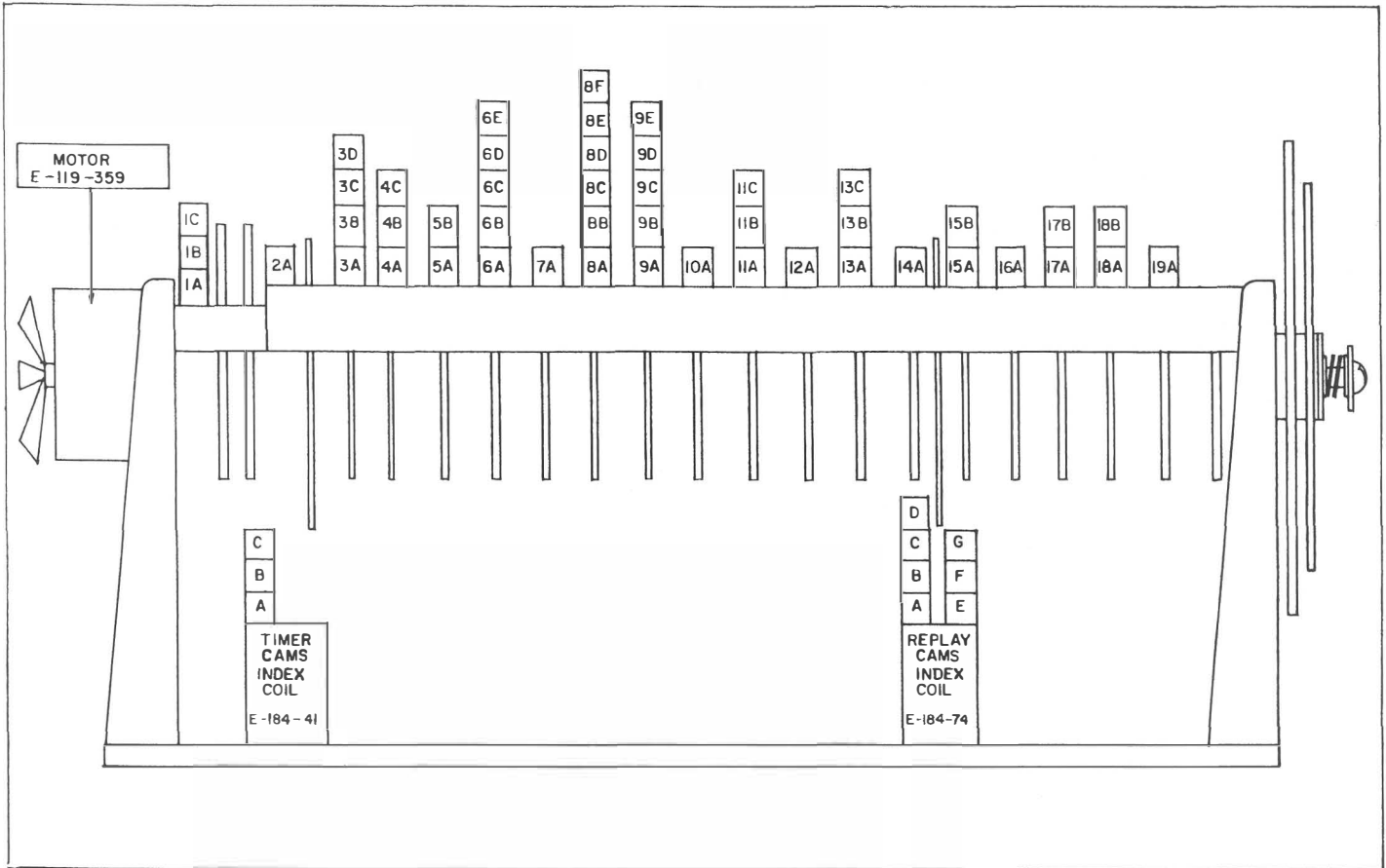
Code	
N.C. ___	Normally closed
N.O. ___	Normally open
M.B.B. ___	Make before break
S.P.D.T. ___	Single pole double throw

Home of Ballygames



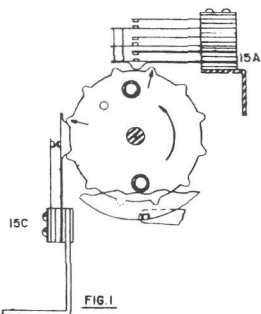


CONTROL UNIT PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 4

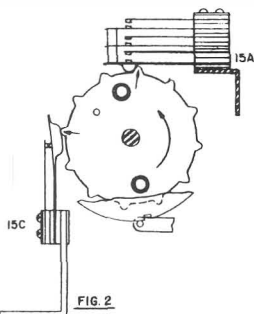


CORRECT ADJUSTMENT: CONTROL UNIT SWITCHES 15A & 15C.

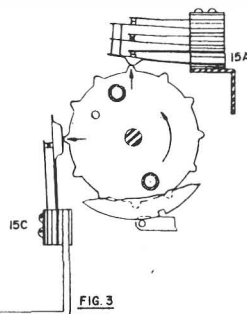
NOTICE: IMPORTANT PART OF ILLUSTRATION IS TO SHOW THAT SWITCH 15C CLOSES FIRST AND OPENS LAST. IF AN ADJUSTMENT IS NECESSARY, SWITCH 15C CAN BE MOVED UP OR DOWN. LOOSEN SCREWS THAT HOLD SWITCH, THEN MOVE UP OR DOWN.



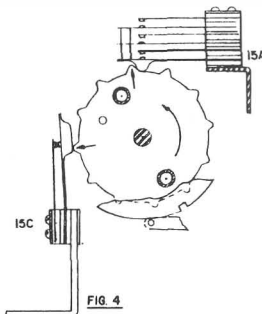
REPLAY CAMS SHOWN IN THEIR NORMAL INDEXED POSITION. SWITCHES 15A & 15C ARE OPEN AT THIS TIME.
NOTE: ARROWS POINT TO LOBES THAT WILL ACTUATE SWITCHES.



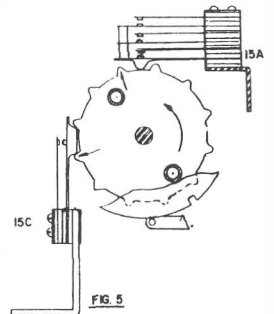
REPLAY CAMS SHOWN STARTING TO ROTATE. THEY ARE NOW OUT OF THEIR INDEX POSITION. SWITCH 15A IS STILL OPEN. SWITCH 15C IS NOW CLOSED.



SWITCH 15A IS NOW CLOSED. SWITCH 15C IS STILL CLOSED.



SWITCH 15A IS NOW OPEN AGAIN. SWITCH 15C IS STILL CLOSED.



BOTH SWITCHES ARE NOW OPEN AGAIN, SAME AS IN FIG. 1. THIS SEQUENCE IS REPEATED THRUOUT REPLAY SCORING CYCLE.

CONTROL UNIT SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 3

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	C-8	31-13 78-4 Yellow-Red Orange-Black	Completes timer unit step-up circuit after 5th ball is shot.
1B	N.C.	A-6	93-4 81-7 Gray-Yellow Black-Red	Opens mixer latch coils circuit.
1C	N.O.	E-44	54-9 60-15 White-Green Brown	Completes win search circuit to any win relay, gold (trip) relay, and collect relay.
Drag Arm SW. (Backside)		C-8	78-4 25-11 Orange-Black Blue-White	(Not shown in pictorial view) Pulses timer unit step-up coil when circuit thru switch 1A is complete.
2A	N.C.	F-6	30 25-3 Yellow Blue-White	Opens lock-in circuit to 25¢ relay.
3A	N.C.	G-4	30 48-2 Yellow Green-Black	Opens entire game start circuit.
3B	S.P.D.T.	D-17	75-10 53-5 50-4 Orange-White White-Yellow White	Directs pull-in and lock-in circuits to play features relay.
3C	S.P.D.T.	D-18	83-10 52-5 50-4 Black-Yellow White-Blue White	Directs pull-in and lock-in circuits to play scores relay.
3D	S.P.D.T.	B-41	63-8 71-8 65-8 Brown-Yellow Orange-Red Brown-White	Directs total out and total in meter circuits.
4A	N.O.	F-50	30 41-11 Yellow Green-Red	Completes spotting disc and score extra-step index coil circuits.
4B	N.O.	F-9	21-3 57-9 Blue-Red White-Orange	Completes 25¢ anti-cheat circuit to tilt trip relay.
4C	S.P.D.T.	D-4	10-5 13-9 14-4 Red Red-Yellow Red-Green	Directs 5¢ coin switch circuit to start relay and tilt trip relay.
5A	N.C.	C-18	50-4 60-5 White Brown	Opens lock-in circuit to features lock relay and scores lock relays.
5B	N.C.	G-15	21-3 40-11 Blue-Red Green	Opens lock-in circuit to mixer #4 and mixer #2 relays.
6A	N.O.	C-19	23-13 13-6 Blue-Yellow Red-Yellow	Completes ABCDE feature unit and selection control feature unit single step advance circuit.
6B	N.C.	D-9	30 78-5 Yellow Orange-Black	Completes anti-cheat relay circuit.
6C	S.P.D.T.	E-26	90-6 95-1 85-6 Gray Gray-White Black-White	Directs 1st double spin relay and double feature unit single step advance circuits.
6D	N.C.	B-28	18-16 60-6 Red-Black Brown	Opens lock-in circuit to "K" relay.
6E	N.C.	C-27	98-2 60-6 Gray-Black Brown	Opens lock-in circuit to "B" Relay.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
7A	N.C.	E-21	61-6 23-6 Brown-Red Blue-Yellow	Opens feature circuit during play cycle.
8A	N.O.	F-16	40-11 31-2 Green Yellow-Red	Completes mixer #2 relay circuits.
8B	N.O.	F-13	40-11 78 Green Orange-Black	Completes mixer #4 relay circuits.
8C	N.O.	D-28	75-2 91-12 Orange-Black Gray-Red	Completes "K" relay circuits.
8D	N.O.	E-53	21-3 10-11 Blue-Red Red	Completes "F" relay circuits.
8E	N.O.	D-18	50-4 57-5 White White-Orange	Completes play features relay circuit to features lock relay and play scores relay circuit to scores lock relays.
8F	N.O.	D-27	60-6 51-7 Brown White-Red	Completes "B" relay circuit.
9A	N.O.	D-19	23-13 15-6 Blue-Yellow Red-White	Completes ABCDE feature unit single step circuit.
9B	N.O.	D-3	90-5 14-10 Gray Red-Green	Completes reflex unit play magnet, relay register subwact, and total in meter circuit.
9C	N.O.	D-30	75-2 43-2 Orange-White Green-Yellow	Completes green, yellow, red score unit single step advance circuits.
9D	N.O.	B-33	18-15 61-7 Red-Black Brown-Red	Completes score extra-step relay circuit.
9E	N.O.	D-29	58-3 65-15 White-Black Brown-White	Same function as switch 9C.
10A	N.O.	E-27	90-6 48-8 Gray Green-Black	Completes 1st double spin relay circuits.
11A	N.O.	E-29	50-10 75-2 White Orange-White	Same function as switch 9C.
11B	N.O.	E-36	51-8 52-8 White-Red White-Blue	Completes 0 to 1st, 2nd and 2nd to 3rd 2nd half sequence unit advance circuit.
11C	N.O.	F-26	95-1 81-6 Gray-White Black-Red	Completes double feature unit single step advance circuit.

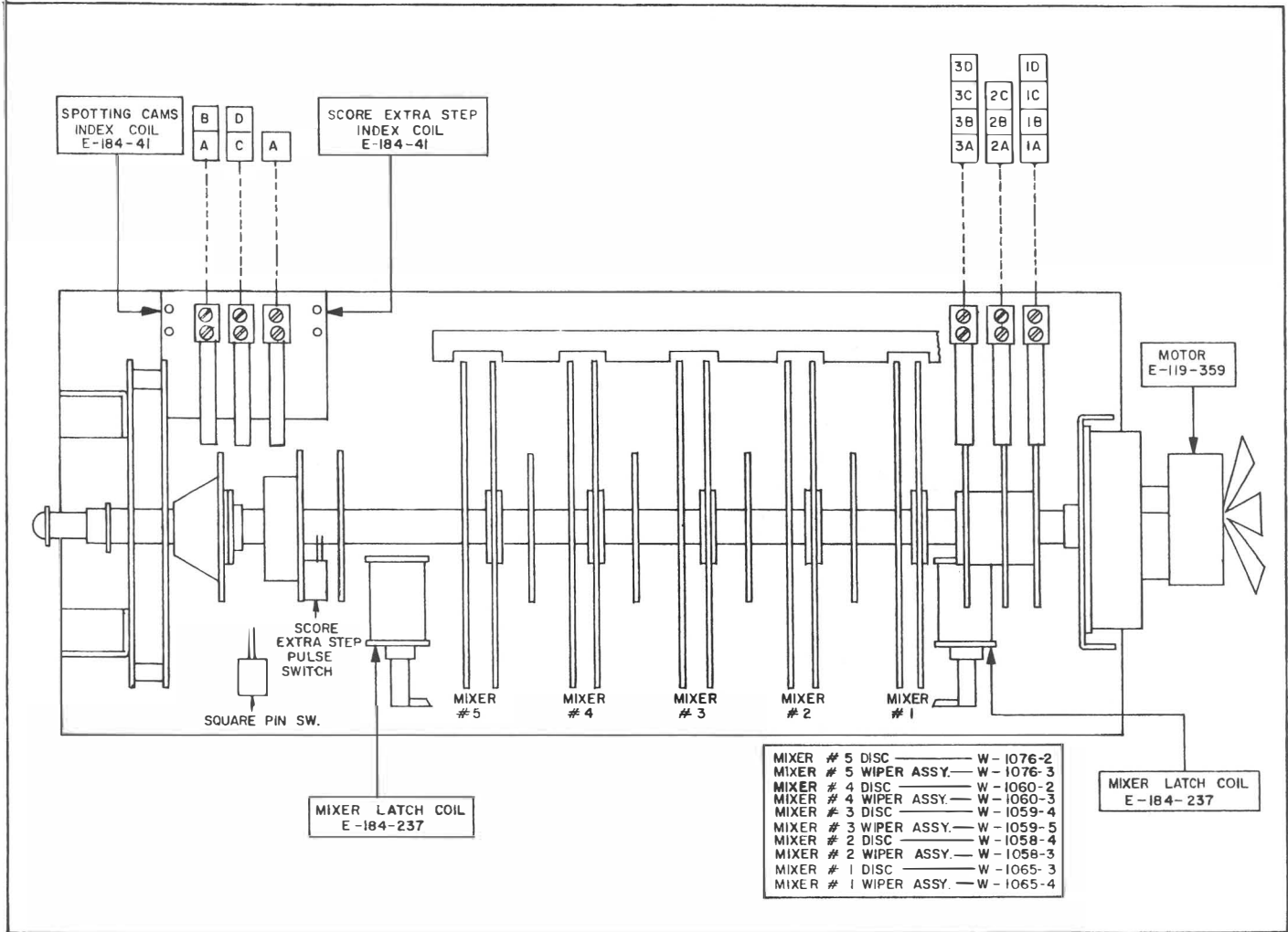
CONCLUDED ON NEXT PAGE

CONTROL UNIT SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 3

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
12A N.O.	C-22	63 80-5	Brown-Yellow Black	Completes selection control feature unit single step advance circuit.
13A (Alt.)N.O.	B-25	61-11 71	Brown-Red Orange-Red	600 Golden ring feature proportioning circuit.
13B (Alt.)N.O.	F-22	41-8 38-5	Green-Red Yellow-Black	Double feature unit advance proportioning circuit.
13C (Alt.)N.O.	E-31	23-2 53-10	Blue-Yellow White-Yellow	"M" relay green, yellow, red score advance proportioning circuits.
14A N.O.	E-40	30 54-8	Yellow White-Green	Completes 25¢ relay replay register unit advance circuit.
(X1 Multi.) 15A N.O.	C-39	60-8 57-8	Brown White-Orange	Advances green, yellow, red replay counter unit during winner scoring, see chart on replay counter disc page.
15B N.O.	C-31	60-8	Brown	Also reflex play magnet, replay register advance and total out meter advance circuit during winner scoring. Extra Switch.
(Backside) 15C N.O.	E-37	56-8 60-8	White-Brown Brown	(Not shown on pictorial view) completes replay scoring lock-in circuit. See important instructions on pictorial page.
(X2 Multi.) 16A N.O.	C-39	60-8 43-9	Brown Green-Yellow	Advances green, yellow, red replay counter unit during winner scoring, see chart in replay counter disc page.
(X4 Multi.) 17A N.O.	C-39	60-8 45-9	Brown Green-White	Same function as switch 16A.
17B N.O.	B-38	25-5 23-5	Blue-White Blue-Yellow	Advance golden ring replay counter unit during 300 golden ring feature winner scoring.
(X8 Multi.) 18A N.O.	C-38	60-8 48-9	Brown Green-Black	Same function as switch 16A.
18B N.O.	C-37	60-8 25-5	Brown Blue-White	Advances golden ring replay counter unit during 600 golden ring feature winner scoring.
(X16 Multi.) 19A N.O.	C-38	60-8 50-9	Brown White	Same function as switch 16A

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Timer Cams Index Coils	A-6	93-4 70	Gray-Yellow Orange	Energized thru start relay circuit and release timer cams for play cycle.
A N.O.	G-1	20 P. 60 P.	Blue Plastic Brown Plastic	Completes a circuit to control unit motor and mixer-spotting unit motor.
B N.C.	D-5	90-2 91-4	Gray Gray-Red	Opens circuit to 5¢ coin lockout magnet.
C N.C.	C-6	27-4 71-4	Blue-Orange Orange-Red	Opens circuit to 25¢ coin lockout magnet.
Replay Cams Index Coil	A-37	60-8 70	Brown Orange	Energized thru replay winner circuits and releases replay cams to score winners.
A N.O.	G-2	20 P. 60 P.	Blue Plastic Brown Plastic	Completes a circuit to control unit motor and mixer-spotting unit motor.
B N.O.	F-37	21-3 56-8	Blue-Red White-Brown	Completes replay scoring lock-in circuit.
C N.C.	B-7	25-11 58	Blue-White White-Black	Opens timer unit advance circuit.
D N.O.	A-42	21-3 57-7	Blue-Red White-Orange	Completes a circuit to win search top replay.
E N.O.	C-9	31-13 90-11	Yellow-Red Gray	Completes a circuit to reset timer unit.
F N.C.	C-4	75-14 13-4	Orange-White Red-Yellow	Opens coin and replay button circuit to start relay.
G N.C.	D-34	91-14 81-12	Gray-Red Black-Red	Opens circuits to move magic ring.

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 Cam 1A N.O.	A-20	98-6 90-13	Gray-Black Gray	ABCDE feature unit multiple step advance circuits.
1B N.O.	G-10	80-2 56-3	Black White-Brown	
1C N.O.	A-23	93-11 78-6	Gray-Yellow Orange-Black	
1D N.O.	B-43	21-3 45-7	Blue-Red Green-White	

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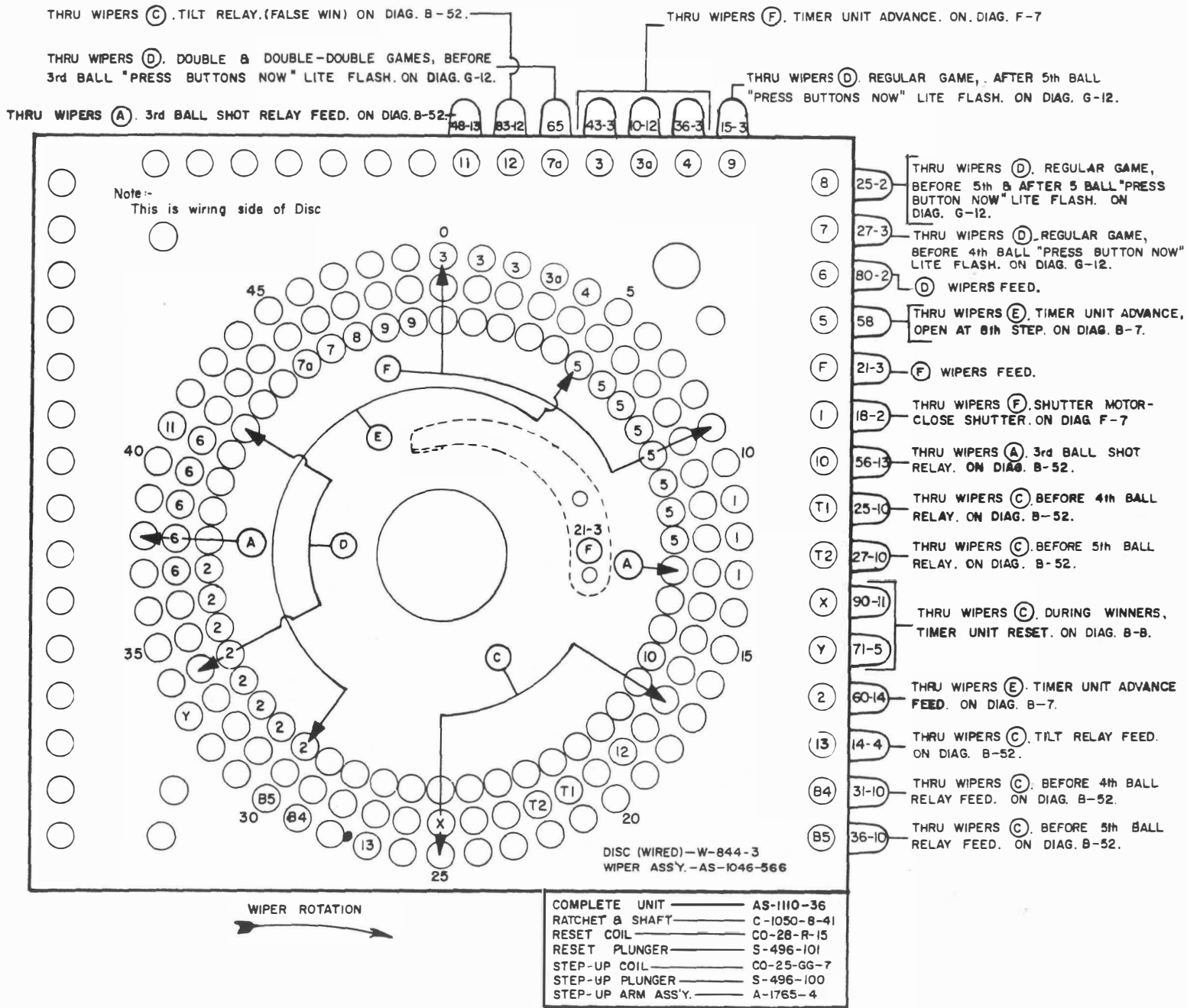
MIXER AND SPOTTING UNIT SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 6

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Mixer Cam 2A N.O.	D-29	50-10 83-11	White Black-Yellow	Proportioning circuit for green, yellow, red score unit advance.
2B N.C.	E-26	81-6 95-4	Black-Red Gray-White	Proportioning circuit for double feature unit advance.
2C N.C.	C-19	15-6 18-6	Red-White Red-Black	Proportioning circuit for ABCDE feature unit advance.
16 Pulse Cam 3A N.O.	C-3	74-15 53-3	Orange-Green White-Yellow	Replay register total reset circuit.
3B N.O.	D-26	58-4 27-11	White-Black Blue-Orange	Double feature unit multiple step advance circuit.
3C N.O.	G-3	30 13-11	Yellow Red-Yellow	"Collect winners or shoot for double or nothing" lite flash circuit.
3D N.O.	B-37	75-8 85	Orange-White Black-White	Golden rings replay counter "Homing" circuit.
Score extra- step relay coil	A-33	61-7 70	Brown-Red Orange	(Not shown in pictorial view) energized by C.U. Cam switch 9D during green, red, yellow score advance.
A N.O.	A-33	50-2 61-7	White Brown-Red	Completes lock-in circuit to this relay.
B S.P.D.T.	C-28	63-13 83-14 58-7	Brown-Yellow Black-Yellow White-Black	Directs green, yellow, red score multiple step advance circuit.
Score extra- step index coil	A-51	41-11 70	Green-Red Orange	Energized by C.U. Cam switch 4A during play cycle.
A N.O.	C-33	74-2 50-2	Orange-Green White	Completes score extra-step relay lock-in circuit.
Spotting cams index coil	A-50	41-11 70	Green-Red Orange	Energized by C.U. Cam switch 4A during play cycle and releases spotting disc wipers.
A N.O.	H-26	15-1 14-2	Red-White Red-Green	Completes green, yellow, red score lites flash circuit.
B N.O.	H-8	98-1 91-10	Gray-Black Gray-Red	Completes ABCDE feature lites flash circuit.
C N.O.	H-9	57-2 78-2	White-Orange Orange-Black	Completes selection feature lites and golden rings feature lites flash circuit.
D N.O.	J-21	13 38-7	Red-Yellow Yellow-Black	Completes double feature lites flash circuit.
Square Pin Switch N.C.	D-33	21-3 74-4	Blue-Red Orange-Green	Opens score extra-step relay lock-in circuit.
Score extra- step pulse switch N.O.	D-28	58-7 75-2	White-Black Orange-White	Completes green, yellow, red score multiple step advance circuits.
Mixer Latch Coils (2)	A-6	81-7 70	Black-Red Orange	Energized thru start relay circuit and releases mixer disc wipers.

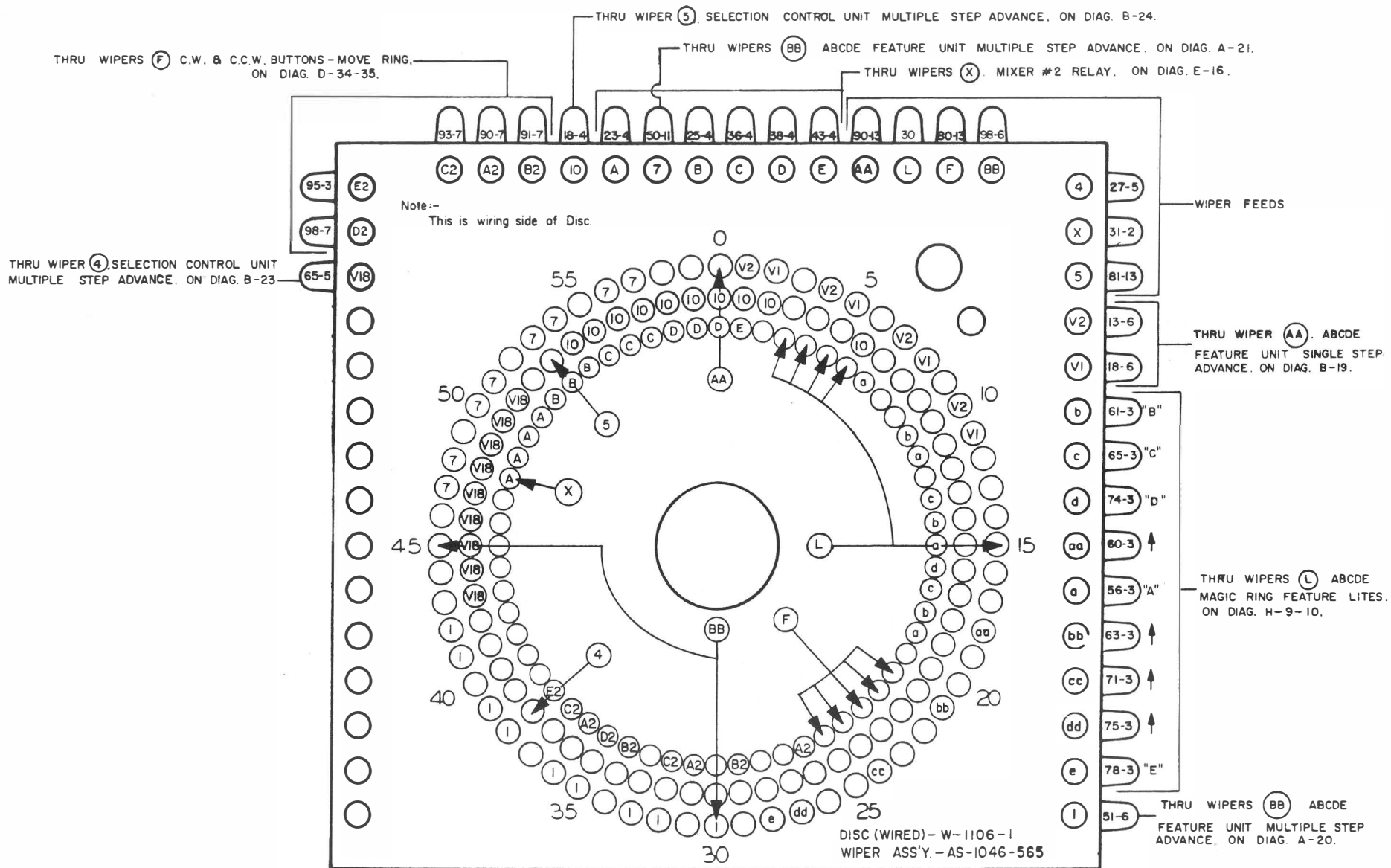
TIMER UNIT DISC viewed from WIRING side

8 step unit. Wipers shown in zero or reset position



ABCDE FEATURE UNIT DISC viewed from WIRING side

13 step unit. Wipers shown in zero or reset position



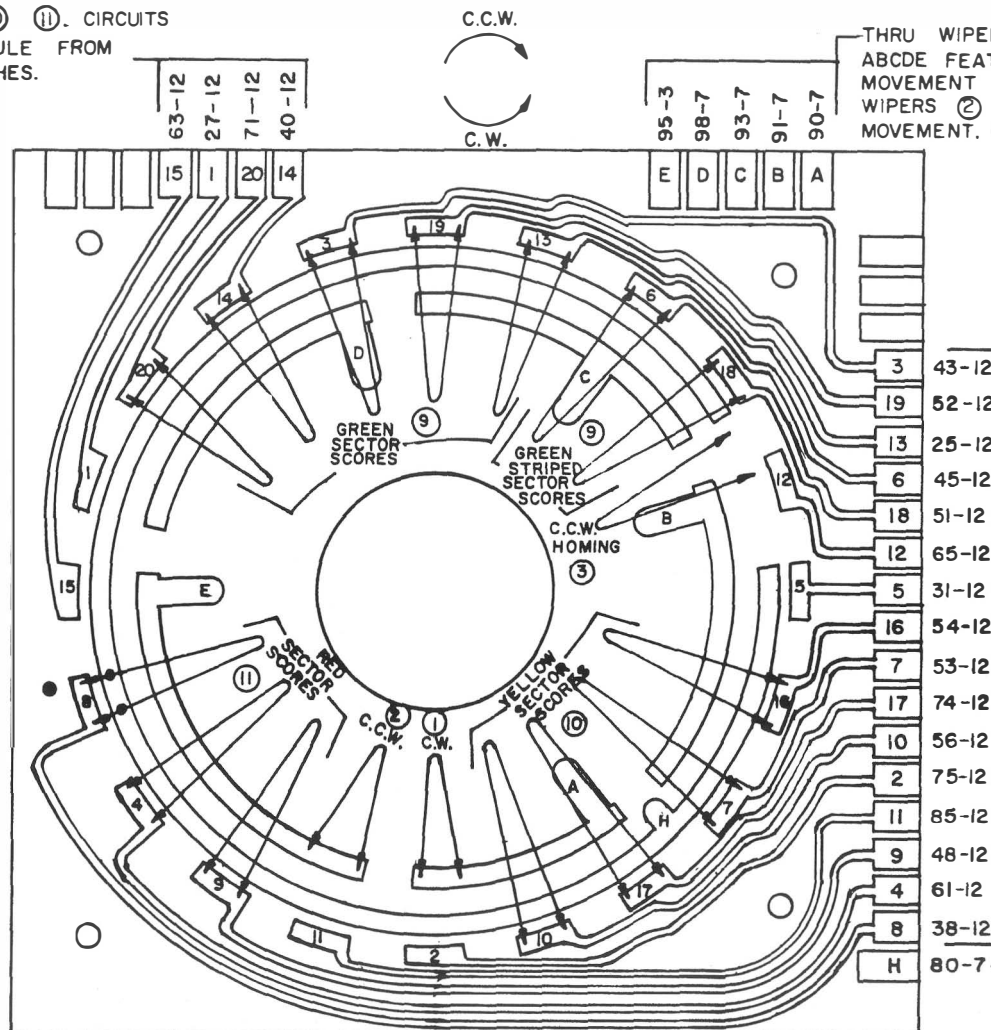
COMPLETE UNIT	AS-827-331
RATCHET & SHAFT	C-1060-13-53
RESET COIL	CO-28-R-15
RESET PLUNGER	S-496-101
STEP-UP COIL	CO-25-GG-7
STEP-UP PLUNGER	S-496-162
STEP-UP ARM ASS'Y.	A-1765-14

10 MAGIC RING UNIT DISC viewed from WIPER side

THRU WIPERS ⑨ ⑩ ⑪. CIRCUITS
TO DETECTOR MODULE FROM
PANEL HOLE SWITCHES.
(ON DIAG. J-18)

WIPER FEEDS THRU SLIP RING	
WIPERS	WIRE No.
①	85-7
②	83-7
③	15-8
⑨	45-11
⑩	31-11
⑪	21-1

● RED PAINT
WIPER "0"
KEY.



THRU WIPER ①. CIRCUITS FROM
ABCDE FEATURE DISC FOR CLOCKWISE
MOVEMENT OF MAGIC RING. THRU
WIPERS ②. FOR COUNTER-CLOCKWISE
MOVEMENT. (ON DIAG. C-35).

THRU WIPERS ⑨ ⑩ ⑪.
CIRCUITS TO DETECTOR
MODULE FROM PANEL HOLE
SWITCHES. (ON DIAG. J-18).

THRU WIPER ③. HOMING
CIRCUIT TO C.C.W. BUTTON
RELAY. (ON DIAG. C-34).

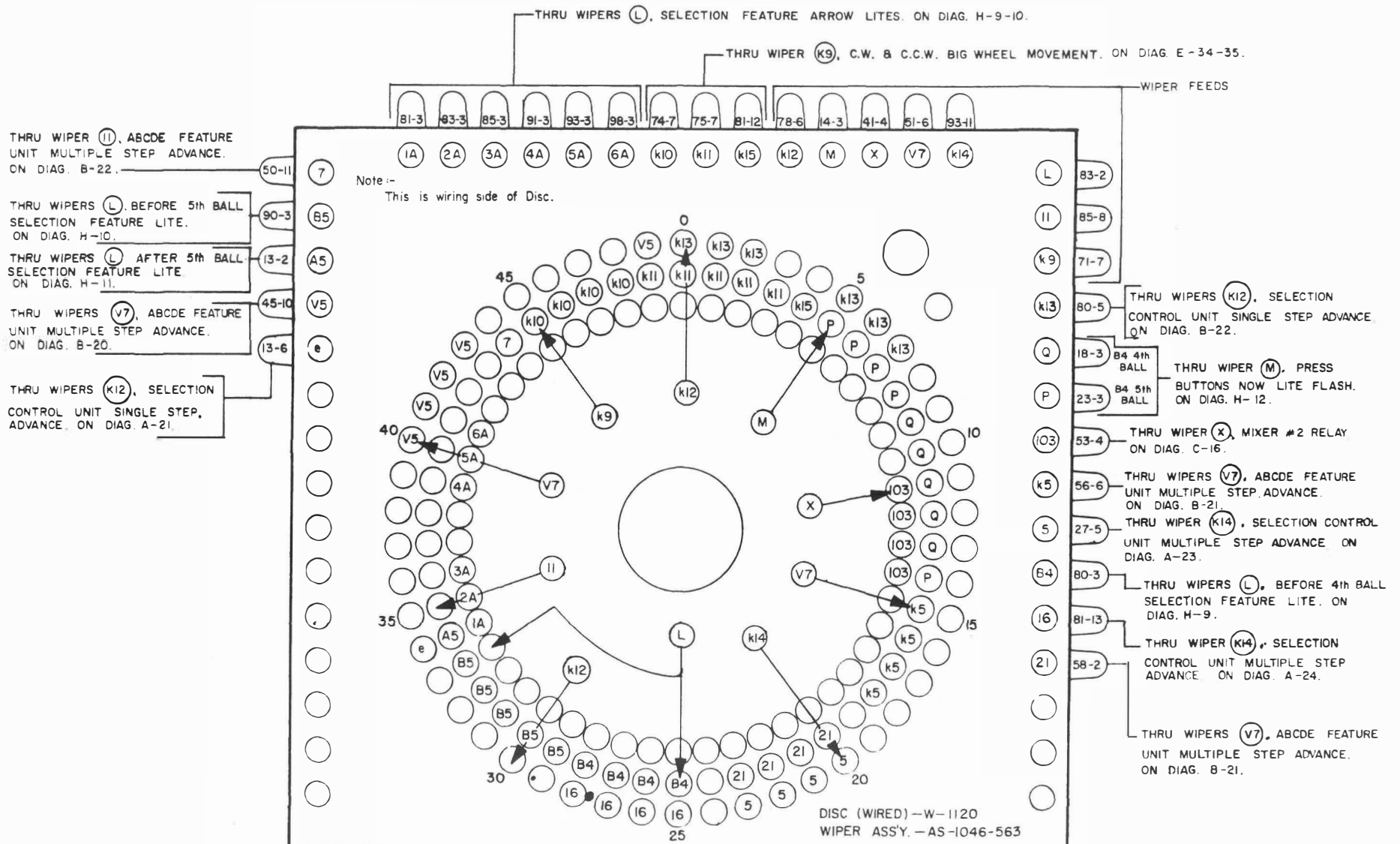
DISC (WIRED)
W-923-123

COMPLETE UNIT	AS-1809-8
WIPER SLIP RING ASS'Y.	AS-579-36
ROTOR ASS'Y.	AS-2512
DRIVE MOTOR	E-119-373
INDEX COIL	E-184-249
INDEX PLUNGER	S-496-183
INDEX ARM ASS'Y.	A-1138-15
INDEX RELAY COIL	C-7800-332
LADDER CHAIN	M-943-6
NUMBERED PLASTIC DISC	M-1476-2
LETTERED PLASTIC DISC	M-1477-1

WIPER ASS'Y.
(COMPLETE)-AS-2516

SELECTION CONTROL UNIT DISC viewed from WIRING side

9 step unit. Wipers shown in zero or reset position

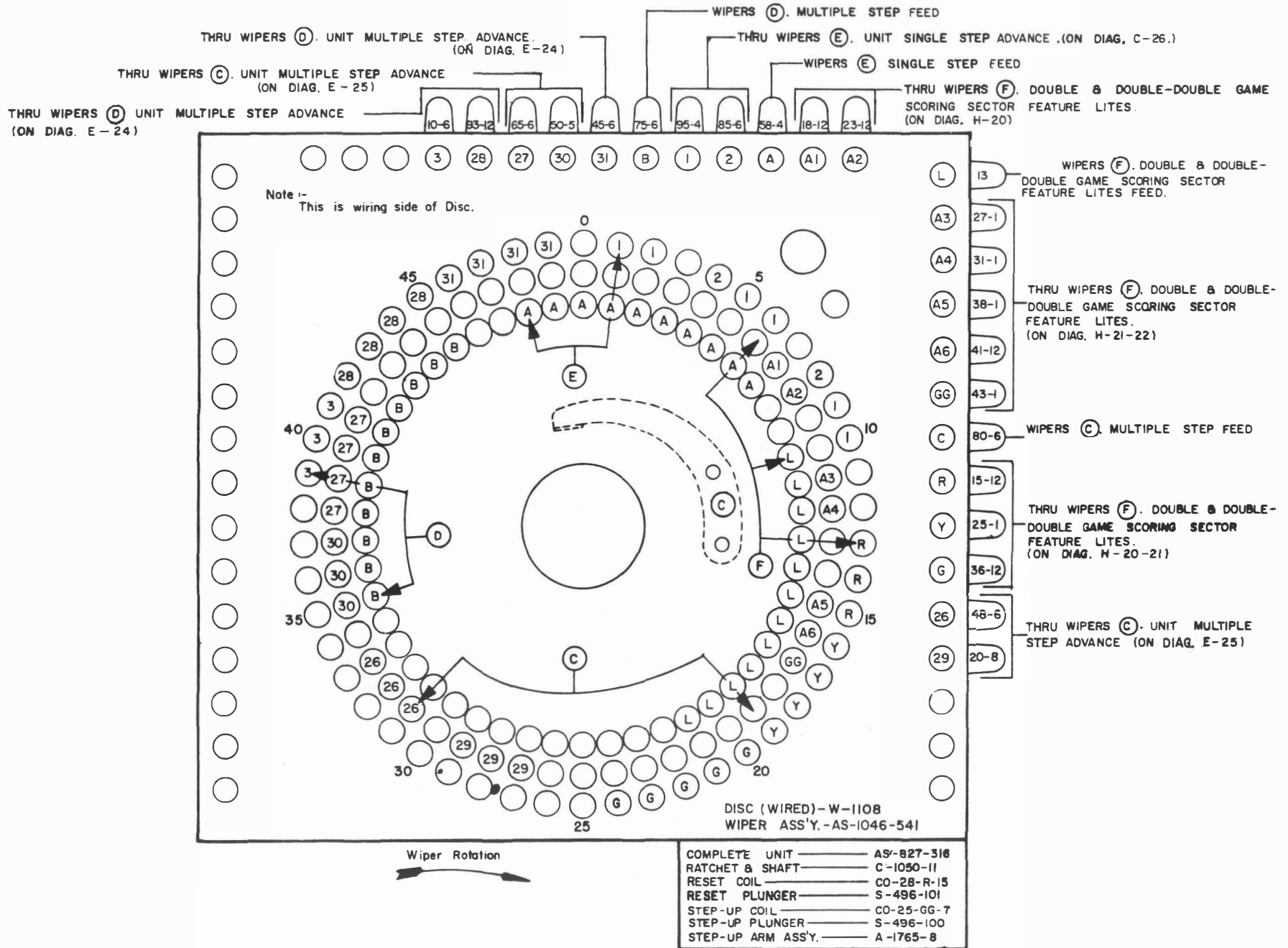


Wiper Rotation
←→

COMPLETE UNIT	AS-827-333
RATCHET & SHAFT	C-1050-9-41
RESET COIL	CO-28-R-15
RESET PLUNGER	S-496-101
STEP-UP COIL	CO-25-GG-7
STEP-UP PLUNGER	S-496-100
STEP-UP ARM ASS'Y.	A-1765-8

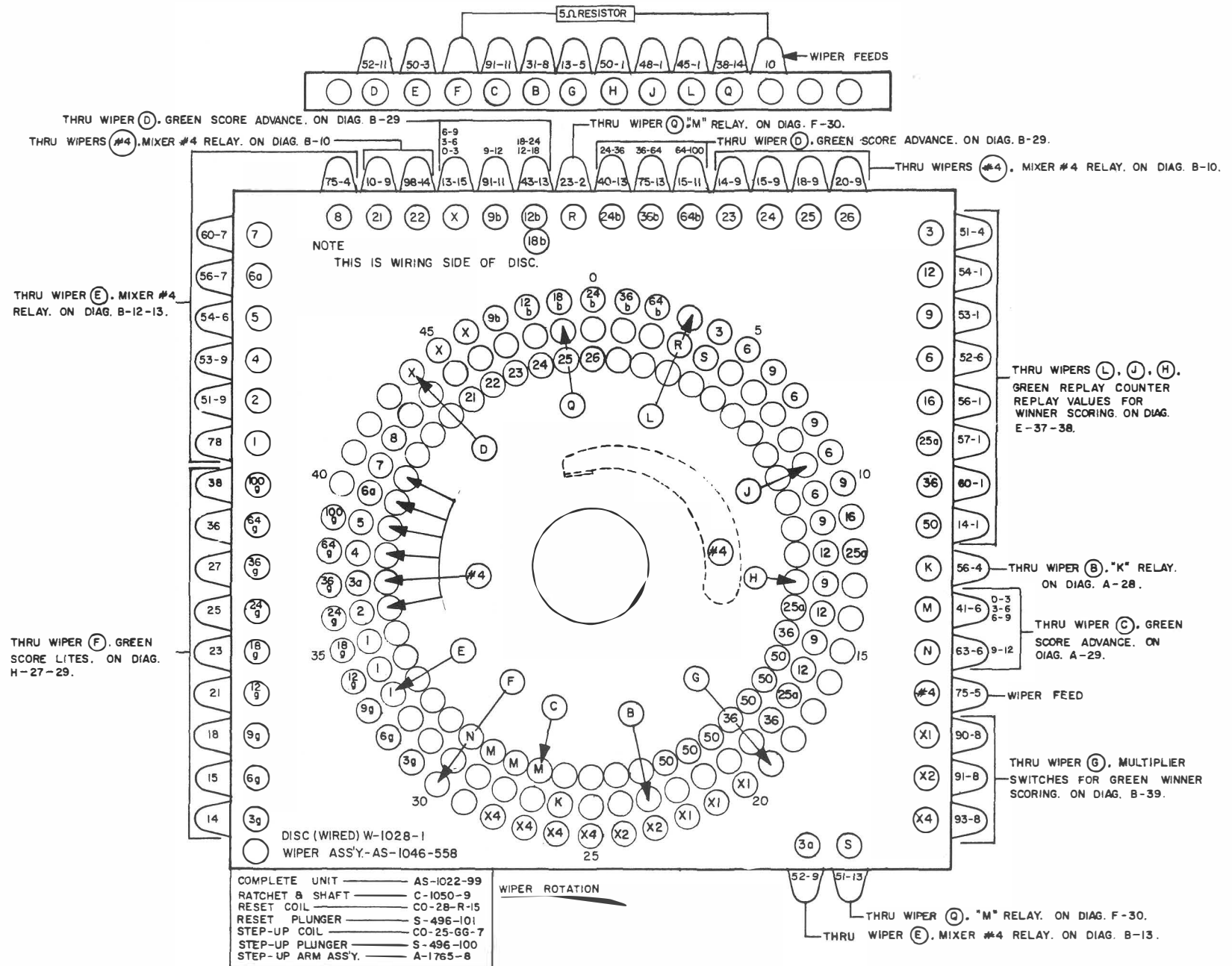
DOUBLE FEATURE UNIT DISC viewed from WIRING side

11 step unit. Wipers shown in zero or reset position



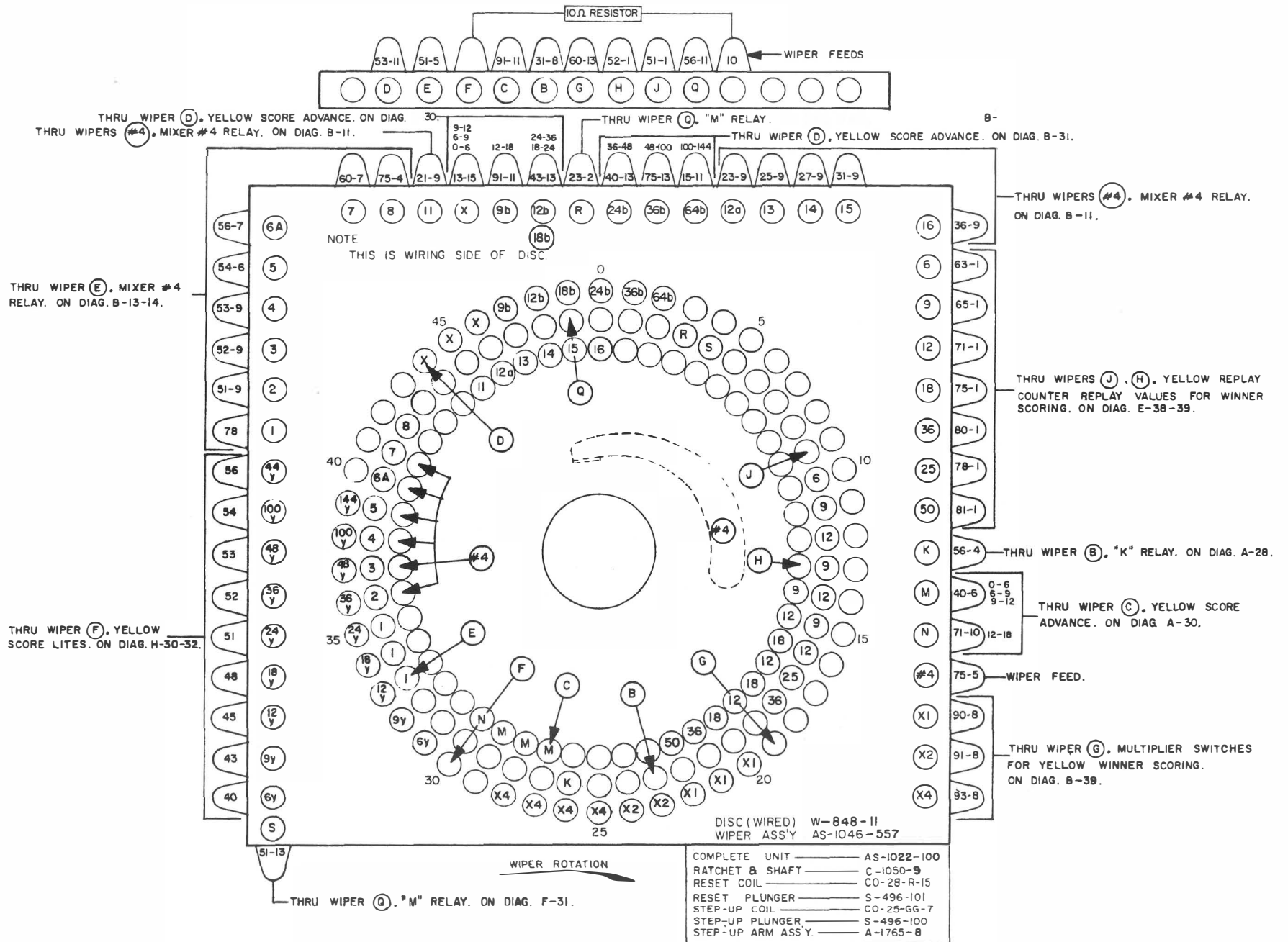
GREEN SCORE UNIT DISC viewed from WIRING side

9 step unit. Wipers shown in zero or reset position



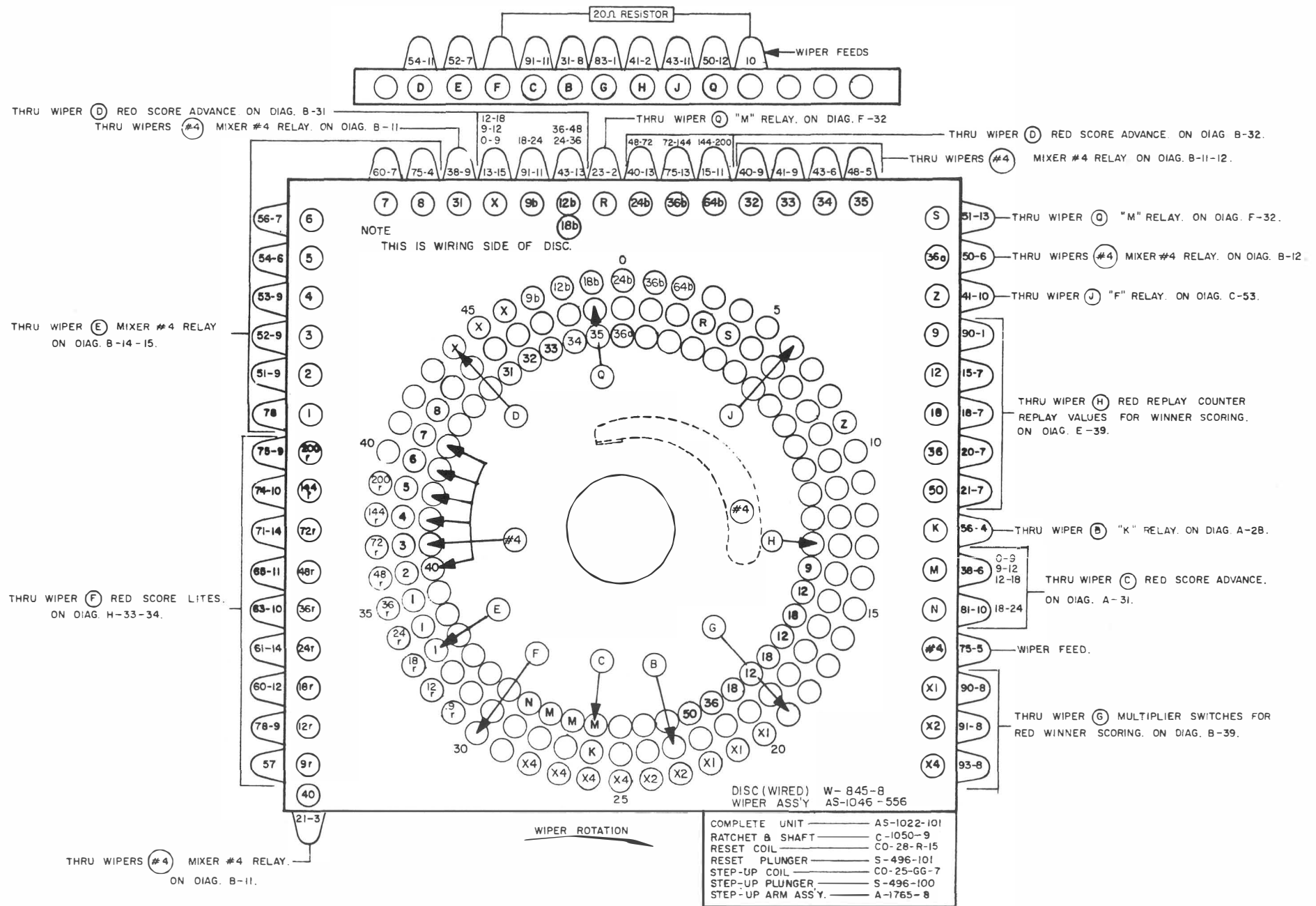
YELLOW SCORE UNIT DISC viewed from WIRING side

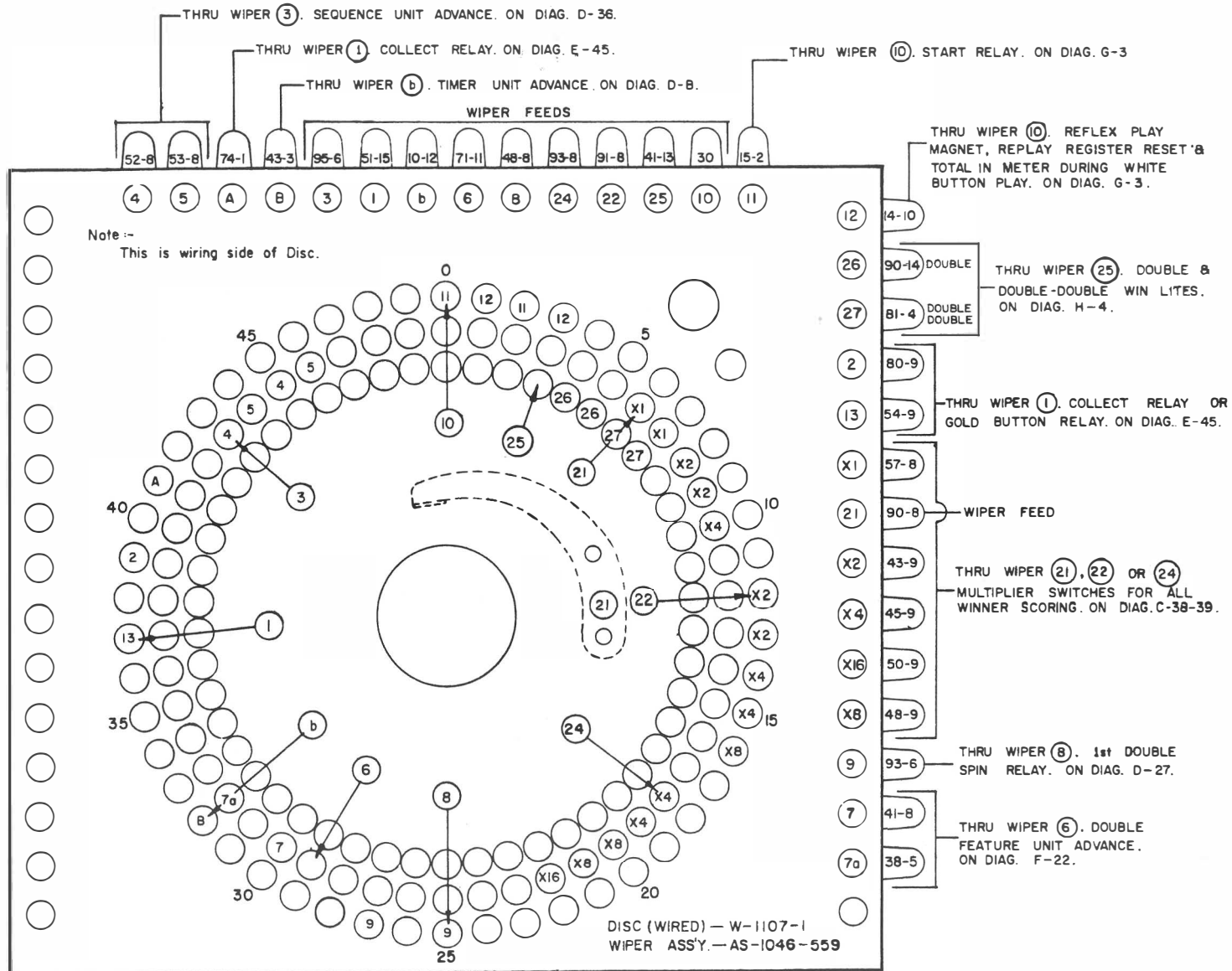
9 step unit. Wipers shown in zero or reset position



RED SCORE UNIT DISC viewed from WIRING side

9 step unit. Wipers shown in zero or reset position

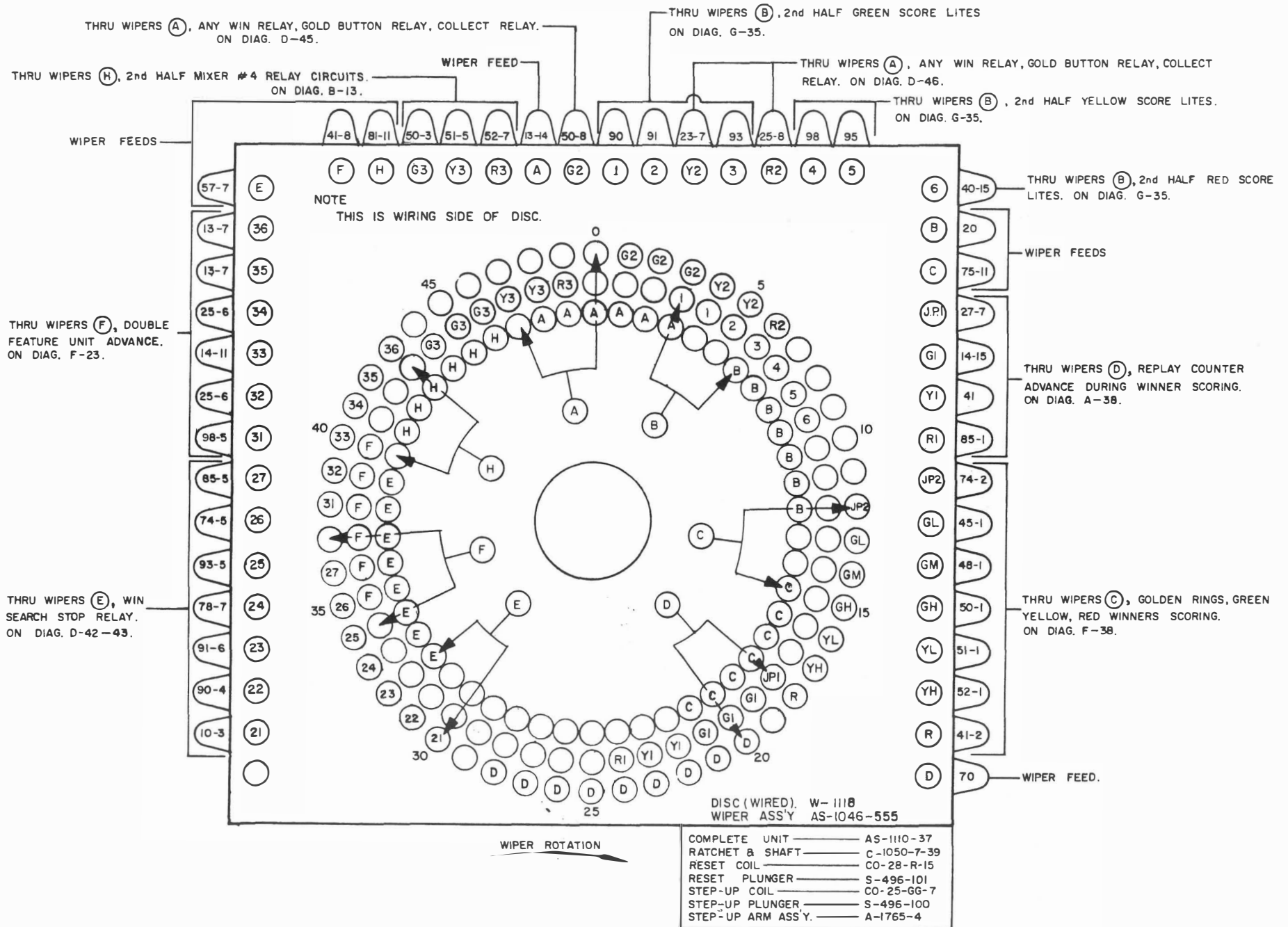




COMPLETE UNIT	AS-1022-103
RATCHET & SHAFT	C-1050-4-35
RESET COIL	CO-28-R-15
RESET PLUNGER	S-496-101
STEP-UP COIL	CO-25-GG-7
STEP-UP PLUNGER	S-496-100
STEP-UP ARM ASS'Y.	

WIN SEARCH UNIT DISC viewed from WIRING side

7 step unit. Wipers shown in zero or reset position

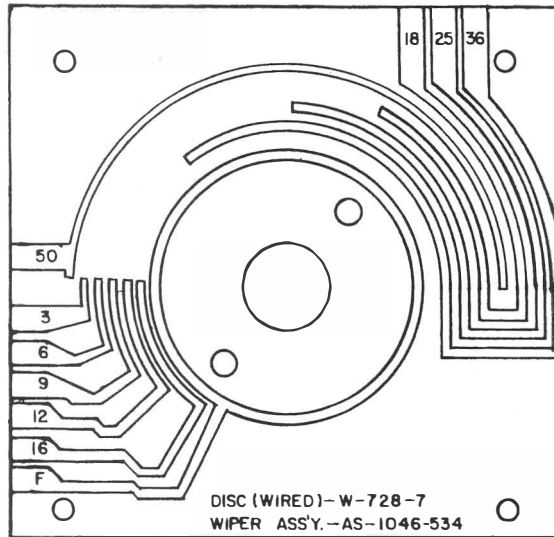


REPLAY COUNTER UNIT DISC viewed from WIPER side

3 used (see code box at left)

Lug	RED REPLAY Counter	YELLOW REPLAY Counter	GREEN REPLAY Counter
50	—	—	—
36	20-7	80-1	60-1
25	—	78-1	57-1
18	18-7	75-1	—
16	—	—	56-1
12	15-7	71-1	54-1
9	90-1	65-1	53-1
6	—	63-1	52-6
3	—	—	51-4
F	21-7	81-1	14-1

WIRE COLOR No's.
REPLAY VALUES



- COMPLETE UNIT — AS-797-157
- RATCHET & SHAFT — C-1
- RESET COIL — CO-28-R-15
- RESET PLUNGER — S-496-101
- STEP-UP COIL — CO-25-GG-7
- STEP-UP PLUNGER — S-496-116
- STEP-UP ARM ASS'Y. — A-1765-8

CONTROL UNIT MULTIPLIER CAM SWITCHES THAT PULSE RED, YELLOW AND GREEN REPLAY COUNTER UNIT STEP-UP COILS DURING REGULAR, DOUBLE AND DOUBLE-DOUBLE WINNERS. LARGE NUMBERS ARE SCORES, CIRCLED NUMBERS ARE REPLAY VALUES SCORES EFFECTIVE THRU.

REGULAR WINNERS	SW15A X1	SW15A X1	SW15A X1	SW16A X2	SW16A X2	SW17A X4	SW17A X4	SW17A X4	SW17A X4
3 IN SCORES	9 (9)	12 (12)	18 (18)	24 (12)	36 (18)	48 (12)	72 (18)	144 (56)	200 (8)
4 IN YELLOW SCORES	9 (9)	12 (12)	18 (18)	24 (12)	36 (18)	48 (12)	72 (18)	144 (56)	200 (*)
3 IN YELLOW SCORES	6 (6)	9 (9)	12 (12)	18 (9)	24 (12)	36 (9)	48 (12)	100 (25)	144 (36)
5 IN GREEN SCORES	25 (25)	36 (36)	50 (*)	100 (*)	100 (*)	144 (36)	200 (*)	200 (*)	200 (*)
4 IN GREEN SCORES	6 (6)	9 (9)	12 (12)	18 (9)	24 (12)	36 (9)	48 (12)	100 (25)	144 (36)
3 IN GREEN SCORES	3 (3)	6 (6)	9 (9)	12 (6)	18 (9)	24 (6)	36 (9)	64 (16)	100 (25)

DOUBLE WINNERS	SW16A X2	SW16A X2	SW16A X2	SW17A X4	SW17A X4	SW18A X8	SW18A X8	SW18A X8	SW18A X8
3 IN RED SCORES	18 (9)	24 (12)	36 (18)	48 (12)	72 (18)	96 (12)	144 (18)	288 (56)	400 (*)
4 IN YELLOW SCORES	18 (9)	24 (12)	36 (18)	48 (12)	72 (18)	96 (12)	144 (18)	288 (56)	400 (*)
3 IN YELLOW SCORES	12 (6)	18 (9)	24 (12)	36 (9)	48 (12)	72 (9)	96 (12)	200 (25)	288 (36)
5 IN GREEN SCORES	50 (25)	72 (36)	100 (*)	200 (*)	200 (*)	288 (36)	400 (*)	400 (*)	400 (*)
4 IN GREEN SCORES	12 (6)	18 (9)	24 (12)	36 (9)	48 (12)	72 (9)	96 (12)	200 (25)	288 (36)
3 IN GREEN SCORES	6 (3)	12 (6)	18 (9)	24 (6)	36 (9)	48 (6)	72 (9)	128 (16)	200 (25)

Double-Double WINNERS	SW17A X4	SW17A X4	SW17A X4	SW18A X8	SW18A X8	SW19A X16	SW19A X16	SW19A X16	SW19A X16
3 IN RED SCORES	36 (9)	48 (12)	72 (18)	96 (12)	144 (18)	192 (12)	288 (18)	576 (56)	800 (*)
4 IN YELLOW SCORES	36 (9)	48 (12)	72 (18)	96 (12)	144 (18)	192 (12)	288 (18)	576 (56)	800 (*)
3 IN YELLOW SCORES	24 (6)	36 (9)	48 (12)	72 (9)	96 (12)	144 (9)	192 (12)	400 (25)	576 (36)
5 IN GREEN SCORES	100 (25)	144 (36)	200 (*)	400 (*)	400 (*)	576 (36)	800 (*)	800 (*)	800 (*)
4 IN GREEN SCORES	24 (6)	36 (9)	48 (12)	72 (9)	96 (12)	144 (9)	192 (12)	400 (25)	576 (36)
3 IN GREEN SCORES	12 (3)	24 (6)	36 (9)	48 (6)	72 (9)	96 (6)	144 (9)	256 (16)	400 (25)

(*) EFFECTIVE COUNTER UNIT SWITCH.

CONTROL UNIT FLASH DISC viewed from WIPER side

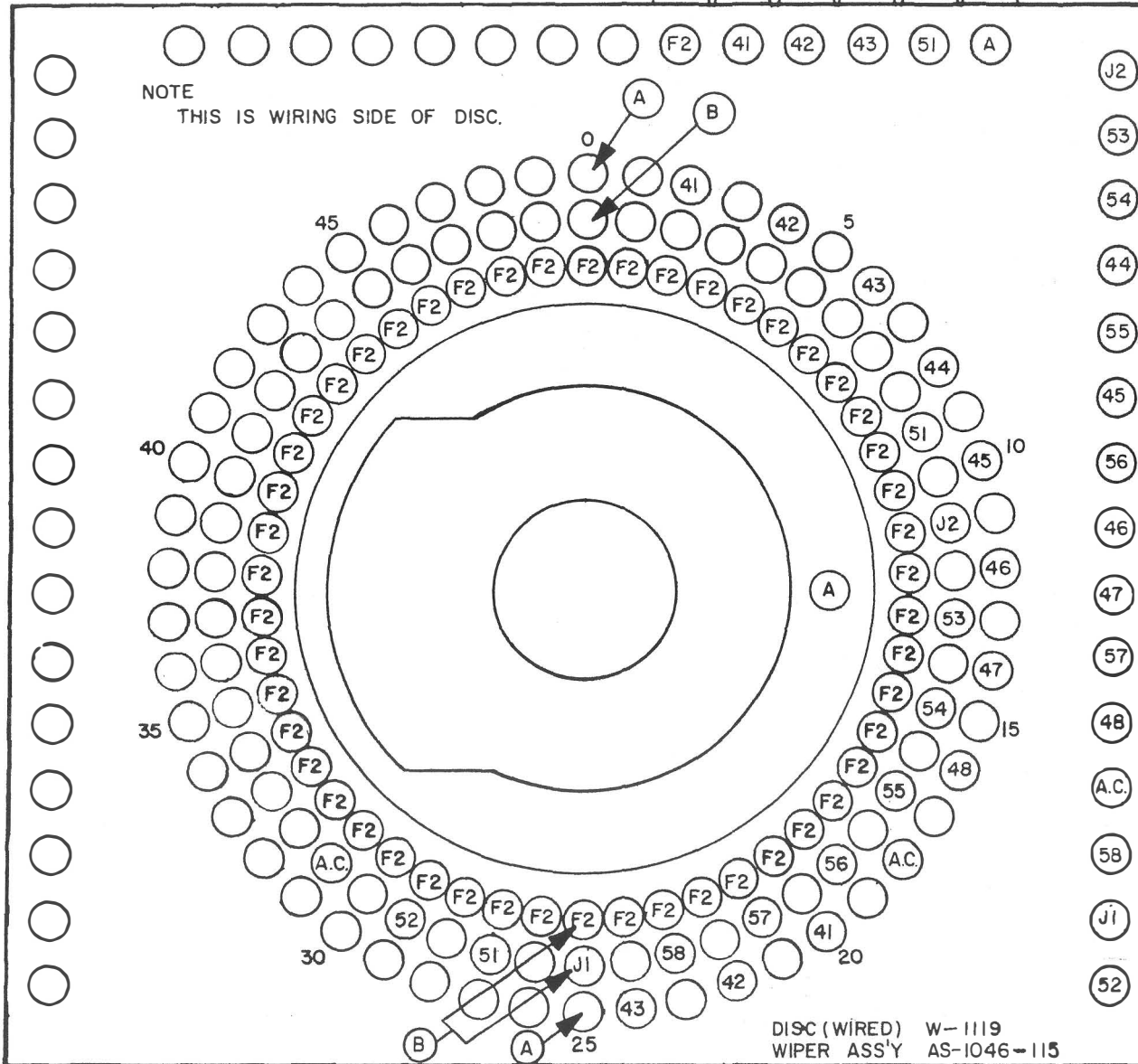
THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH ON DIAG. J-8.

THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-10.

WIPERS (B) FEED.

WIPERS (A) FEED.

57-2 78-3 75-3 74-3 13-2 98-1



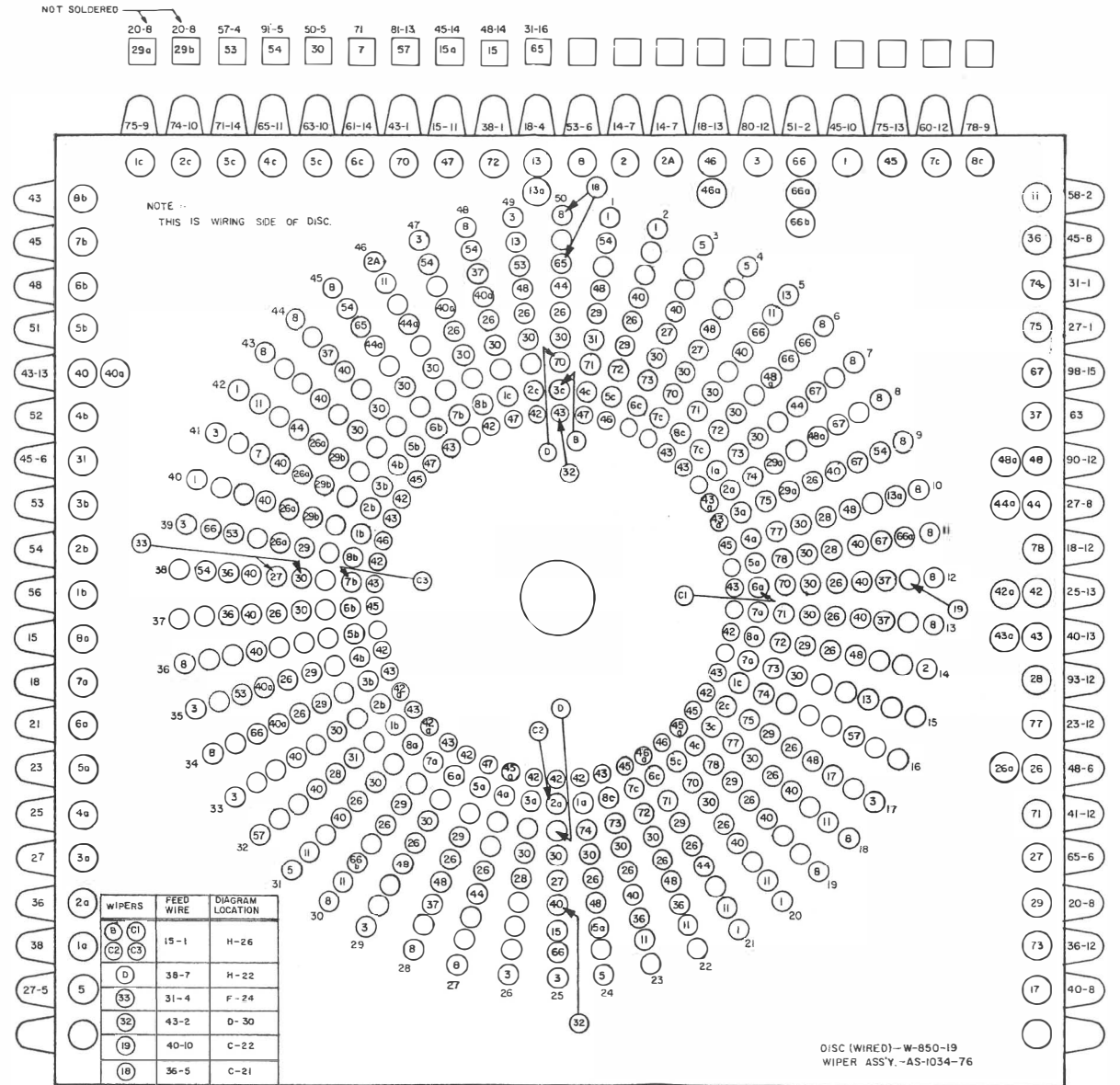
NOTE
THIS IS WIRING SIDE OF DISC.

- (J2) 18-5 THRU WIPERS (B), GOLDEN RINGS FEATURE LITES FLASH. ON DIAG. J-11.
- (53) 93-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-10.
- (54) 91-3 THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH. ON DIAG. J-8.
- (44) 71-3 THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH. ON DIAG. J-8.
- (55) 90-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-10.
- (45) 65-3 THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH. ON DIAG. J-7.
- (56) 85-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-10.
- (46) 63-3 THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH. ON DIAG. J-7.
- (47) 61-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-9.
- (57) 83-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-9.
- (48) 60-3 THRU WIPERS (A), MAGIC RING FEATURE LITES FLASH. ON DIAG. J-7.
- (A.C.) 63-11 THRU WIPERS (B), COLLECT ALL WINNERS LITE FLASH. ON DIAG. J-11.
- (58) 81-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-9.
- (J1) 54-10 THRU WIPERS (B), GOLDEN RINGS FEATURE LITE FLASH. ON DIAG. J-11.
- (52) 98-3 THRU WIPERS (B), SELECTION FEATURE LITES FLASH. ON DIAG. J-10.

DISC (WIRED) W-1119
WIPER ASS'Y AS-1046-115

WIPER ROTATION

SPOTTING DISC viewed from **WIRING** side



MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-292-31	Backglass
M-1424-9	Backglass (Plexiglass)
M-281-31	Lock & Keys (2 Keyed alike)
E-122-107	Transformer

Back Door Assembly:

M-281-24	Lock & Keys (2 Keyed Alike)
SW-100-106	Lock Switch
E-105-6	Resistor (8200 ohm 1/2 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-2790-19	Coin Box
P-3089-30	Coin Box Cover
E-130-10	Counter (total play-replay)
A-2618	Legs
M-106-1	Leg Bolt
M-168-4	Leg Adjuster
AS-2183-11	Push Button (Blue)
AS-2183-10	Push Button (Green)
E-138-3	Plumb Bob Tilt
E-146-622	Relay (Ball Detector)
C-7800-3312	Relay (Coil Only)
G-213	Top Glass
E-108-57	Toggle Switch

Front Door Assembly:

	Coin Switch & Rejector Mount Assembly*
E-101-58	Coin Lockout Magnet Coil
E-108-92	Coin Switch
	Coin Guide Assembly*
	Coin Slide Assembly*

Front Door Assembly (Continued):

Part No.	Name of Part
AS-2041-56	Front Door Assembly (Single Coin)
AS-2041-57	Front Door Assembly (Double Coin)
CA-567-172	Front Door (Wood Only)
A-254-84	Hinge & Bracket Assembly
M-281-6	Lock & Keys
S-490-18	Push Button (Reject)
A-1729-16	Push Button (Red)
A-1729-18	Push Button (White)
	Slug Rejector*

Front Moulding Assembly:

AS-1305-51	Front Moulding Assembly
CA-1119-27	Front Moulding (Wood Only)
A-3080-4	Front Moulding (Top Plate Assembly)
A-1272-50	Button (Gold)
A-1272-54	Button (Clockwise)
A-1272-55	Button (Counter clockwise)
A-1272-29	Button (R)
	Coin Entry Plate*

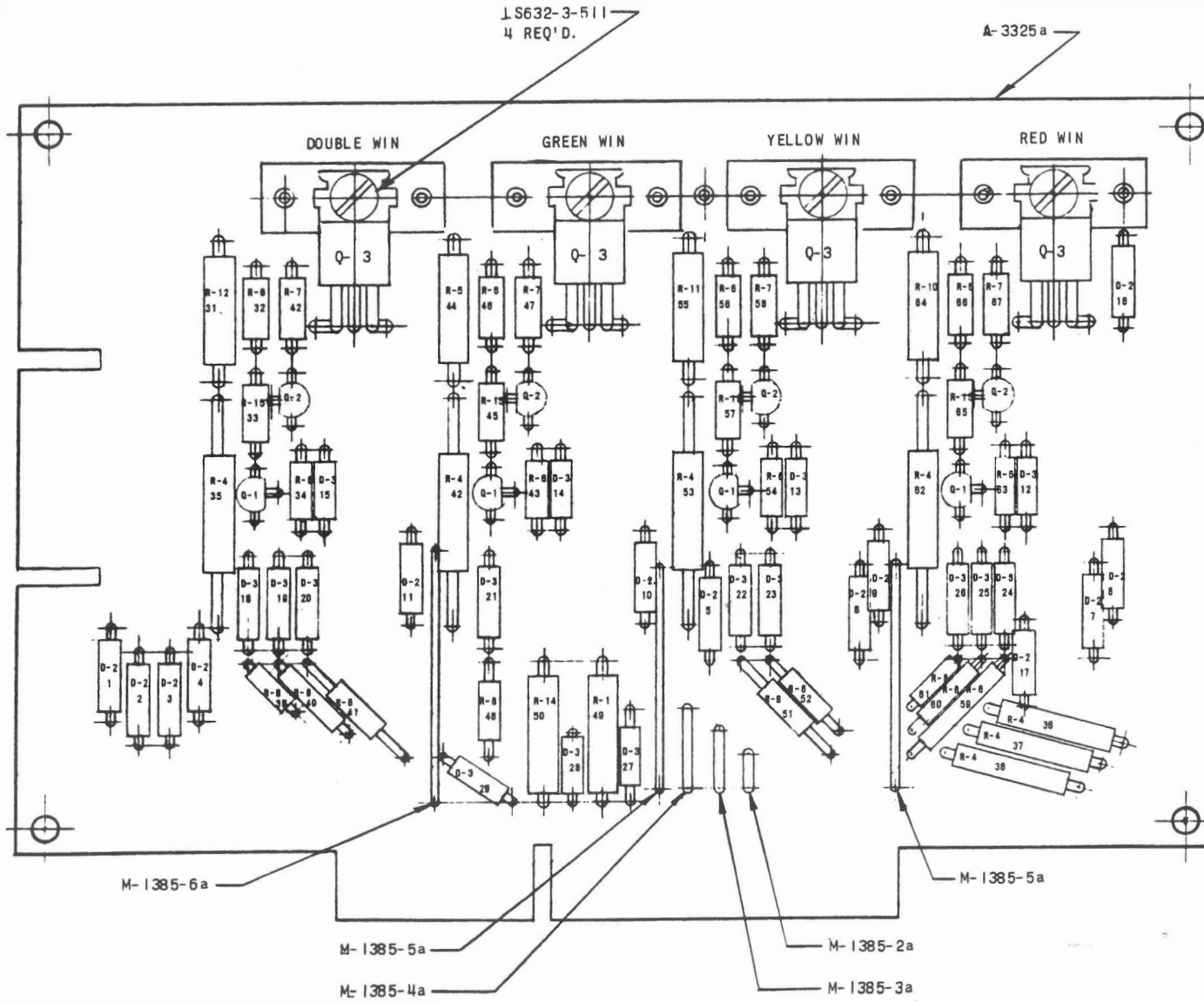
Panel Assembly:

AS-1315	Ball Gate & Switch Assembly
AS-493-2	Ball Rebound Assembly
C-153	Ball Lifter Cover
R-115-4	Ball Rebound (Rubber Only)
C-119-4	Bumper Post (Yellow)
C-119-5	Bumper Post (Red)
R-243	Rubber Ring (Yellow Post)
SP-112	Panel Spring (Long)
SP-112-1	Panel Spring (Short)
R-243-2	Rubber Ring (Red Post)
R-135	Rubber Ring (Double Post)
M-170	Rebound Spring
E-146-439	Relay (Lifter start)
C-7800-335	Relay (Coil only)
C-326-9	Light Shield Post
C-387-2	Rollover Button (Yellow)

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

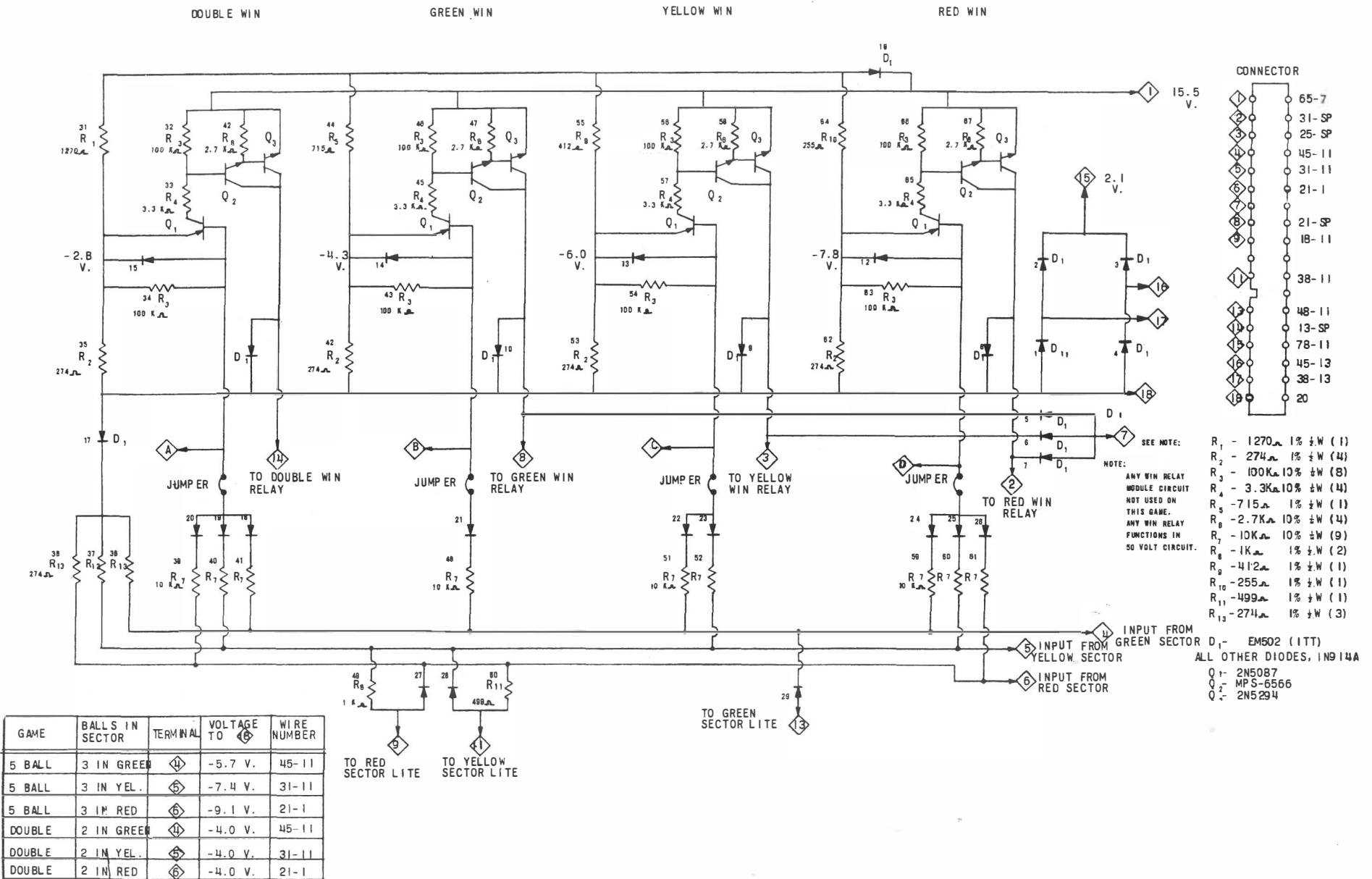
Bally Pin Game Lubricant Available in 8 oz. containers with plastic spout and screw cap.

DETECTOR MODULE ASSEMBLY

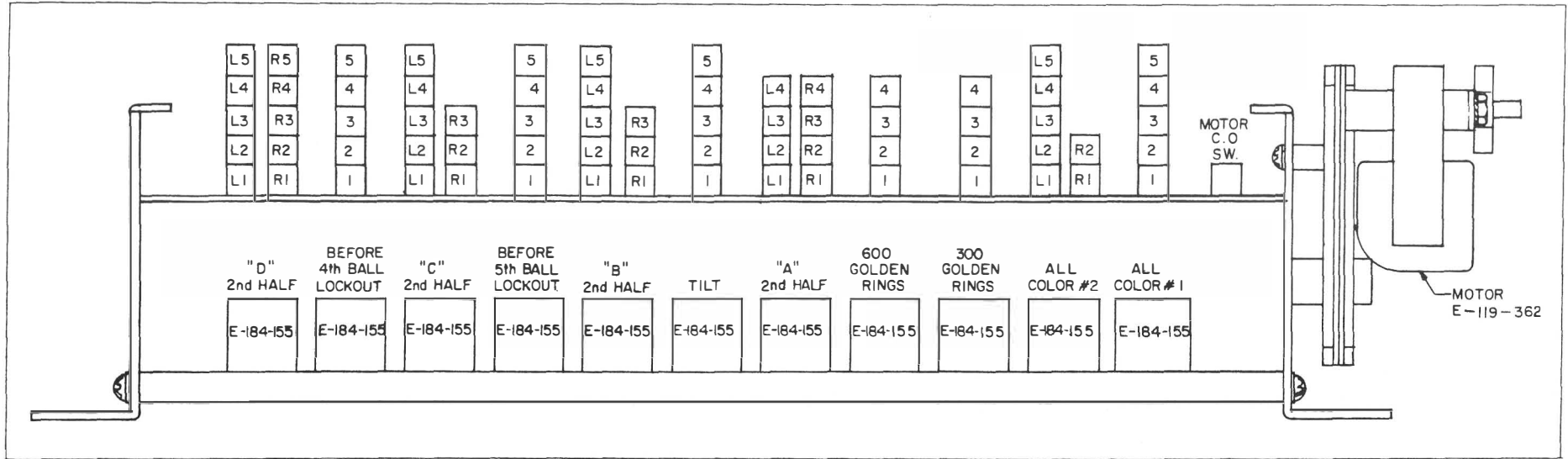


IDENT. NO.	PART NO.	NAME	SPEC'S	REQ.
R-1	E-584-3a	RESISTOR	1 K	1
R-4	E-584-5a	RESISTOR	274 OHMS	7
R-11	E-584-10a	RESISTOR	412 OHMS	1
R-6	E-105-153	RESISTOR	100 K	8
R-7	E-105-151	RESISTOR	2.7 K	4
R-8	E-105-148	RESISTOR	10 K	9
R-15	E-105-154	RESISTOR	3.3 K	4
Q-3	E-587-5 NO	DIODE	EM502(1TT)	16
D-2	E-587-6 NO	DIODE	1N914A(GE)	14
Q-3	E-593a	TRANSISTOR	2N5294	4
Q-2	E-585-2	TRANSISTOR	MP58566	4
Q-1	E-585-3a	TRANSISTOR	2N5087	4
R-10	E-584-12	RESISTOR	255 OHMS	1
R-12	E-584-6	RESISTOR	1270 OHMS	1
R-14	E-584-11	RESISTOR	499 OHMS	1
R-5	E-584-8	RESISTOR	715 OHMS	1

DETECTOR MODULE CIRCUIT



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	
"D" 2nd Half relay coil	A-47	36-11) 70	Yellow-Brown Orange	Energized thru regular game winner circuit when gold button is pressed. (Double game play)	
L1	N.C.	G-33	90 91	Gray Gray-Red	Opens 3 green or 4 green score lite circuit during 2nd half play.
L2	N.C.	G-34	93 91	Gray-Yellow Gray-Red	Opens 4 green or 5 green score lite circuit during 2nd half play.
L3	N.C.	G-34	93 98	Gray-Yellow Gray-Black	Opens 5 green or 3 yellow score lite circuit during 2nd half play.
L4	N.C.	G-34	95 98	Gray-White Gray-Black	Opens 3 yellow or 4 yellow score lite circuit during 2nd half play.
L5	N.C.	G-34	40-15 95	Green Gray-White	Opens 3 red or 4 yellow score lite circuit during 2nd half play.
R1	N.C.	A-47	36-11 36-11)	Yellow-Brown Yellow-Brown	Opens circuit to this relay.
R2	N.C.	F-28	60-6 21-3	Brown Blue-Red	Opens circuit to control relays "B" and "K".
R3	N.C.	F-52	78-8 21-3	Orange-Black Blue-Red	Opens timer unit tilt (false win) relay circuit.
R4	N.C.	G-11	25-14 30	Blue-White Yellow	Opens golden rings 300-600 feature lite and collect all winners lite circuit.
R5	N.O.	G-4	30 41-13	Yellow Green-Red	Completes double and double-double game lite circuits.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Before 4th Ball lockout relay coil	A-52	31-10) 70	Yellow-Red Orange	Energized thru timer disc ball count circuit when 4th ball is shot.	
1	N.C.	A-52	31-10 31-10)	Yellow-Red Yellow-Red	Opens circuit to this relay.
2	N.C.	H-12	23-3 27-3	Blue-Yellow Blue-Orange	Opens a circuit to press buttons now lite.
3	N.C.	E-34	74-7 81-12	Orange-Green Black-Red	Opens a selection control disc circuit to move magic ring.
4	N.C.	C-52	83-12 20-6	Black-Yellow Blue	Opens timer disc tilt (false win) relay circuit.
5	N.O.	E-8	36-3 43-3	Yellow-Brown Green-Yellow	Completes timer unit 4th to 5th step advance circuit.

CONTINUED ON NEXT PAGE

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

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
"C" 2nd half relay coil	A-47	71-6 70	Orange-Red Orange	Energized thru regular game winner circuit when gold button is pressed. (Double game play)
L1	N.C.	E-3 14-10 30	Red-Yellow Yellow	Opens reflex play magnet, replay register play reset and total in meter circuit during gold button play cycle.
L2	N.C.	G-9 78-2 85-11	Orange-Black Black-White	Opens spotting disc flash circuit to selection feature and golden ring feature lites.
L3	S.P.D.T.	A-13 75-5 61-2 81-11	Orange-White Brown-Red Black-Red	Directs 1st or 2nd half play circuits to Mixer #4 relay.
L4	S.P.D.T.	D-21 27-6 74-14 31-4	Blue-Orange Orange-Green Yellow-Red	Directs control circuits for ABCDE feature, selection feature advance, golden ring feature or double feature advance.
L5	S.P.D.T.	G-19 58-1 21-3 80-10	White-Black Blue-Red Black	Directs single step advance circuit for ABCDE feature, selection feature. Selection feature rollover advance circuit or gold button play ABCDE unit advance to top circuit.
R1	S.P.D.T.	B-47 71-6 41-5 36-11	Orange-Red Green-Red Yellow-Brown	Directs circuits from this relay to "D" 2nd half trip relay.
R2	S.P.D.T.	J-13 13-3 93-10 90-10	Red-Yellow Gray-Yellow Gray	Directs timer disc circuits to press buttons now lite before 4th, before 5th, after 5th balls or before 3rd ball.
R3	N.O.	F-36 21-3 51-8	Blue-Red White-Red	Completes 2nd half sequence unit advance circuit.
Before 5th ball lockout relay coil	A-53	36-10J 70	Yellow-Brown Orange	Energized thru timer disc ball counter circuit when 5th ball is shot.
1	N.C.	A-53 36-10 36-10J	Yellow-Brown Yellow-Brown	Opens circuit to this relay.
2	N.C.	E-35 75-7 81-12	Orange-White Black-Red	Opens a selection control disc circuit to move magic ring.
3	N.C.	E-34 74-7 31-14	Orange-Green Yellow-Red	Same function as switch L2.
4	S.P.D.T.	H-13 18-3 25-2 15-3	Red-Black Blue-White Red-White	Directs before 5th or after 5th ball circuits to press buttons now lite.
5	N.O.	E-8 57-3 71-13	White-Orange Orange-Red	Completes timer unit 5th thru 8th step advance circuit. Also completes timer unit reset circuit when winner is scored.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
"B" 2nd half relay coil	A-47	43-10 70	Green-Yellow Orange	Energized thru regular game winner circuit when gold button is pressed. (Double game play)
L1	N.C.	J-26 13-1 10	Red-Yellow Red	Opens spotting disc score lites flash circuit.
L2	N.C.	G-8 91-10 65-13	Gray-Red Brown-White	Opens spotting disc ABCDE feature lites flash circuit.
L3	S.P.D.T.	C-47 43-10 95-5 41-5	Green-Yellow Gray-Black Green-Red	Directs circuit from this relay to "C" and "D" 2nd half trip relay.
L4	S.P.D.T.	G-5 40-2 30 60-10	Green Yellow Brown	Directs red, green, blue button play lite circuits or white button play lite circuits.
L5	S.P.D.T.	F-4 51-3 53-13 52-3	White-Red White-Yellow White-Blue	Directs green and blue replay button start relay circuits or white replay button start relay circuit.
R1	N.C.	E-51 81-9 83-9	Black-Red Black-Yellow	Opens first 5 balls circuit to ball lifter motor and ball detector relay.
R2	N.C.	G-26 78-10 20	Orange-Black Blue	Opens golden ring feature numbers lite circuits.
R3	N.O.	B-41 57-7 21-3	White-Orange Blue-Red	Completes a circuit to keep win search stop relay energized.
Tilt relay coil	A-9	14-4 70	Red-Green Orange	Energized by tilt switches; anti-cheat coin switch circuits and anti-cheat ball count circuit.
1	N.C.	G-2 30P 60P	Yellow Plastic Brown Plastic	Opens timer unit circuit to control unit and Mixer-spotting unit motor.
2	N.C.	H-14 60 71-9	Brown Orange-Red	Opens 21 volt and 4.5 volt circuits.
3	S.P.D.T.	G-7 21-3 30 45-3	Blue-Red Yellow Green-White	Directs game play and scoring circuits or shutter motor (close shutter) circuit.
4	S.P.D.T.	J-3 36-13 54-3 91-2	Yellow-Brown White-Green Gray-Red	Directs collect - Shoot for double - Nothing lite flash circuit or tilt lite circuit.
5	N.O.	C-4 75-14 13-4	Orange-White Red-Yellow	Completes a safety circuit to start relay.

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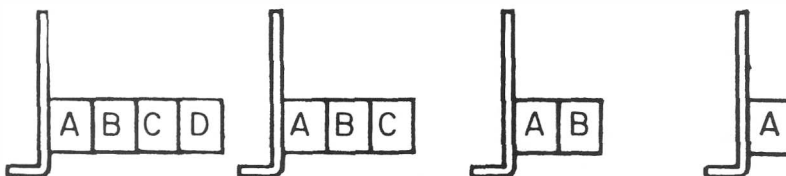
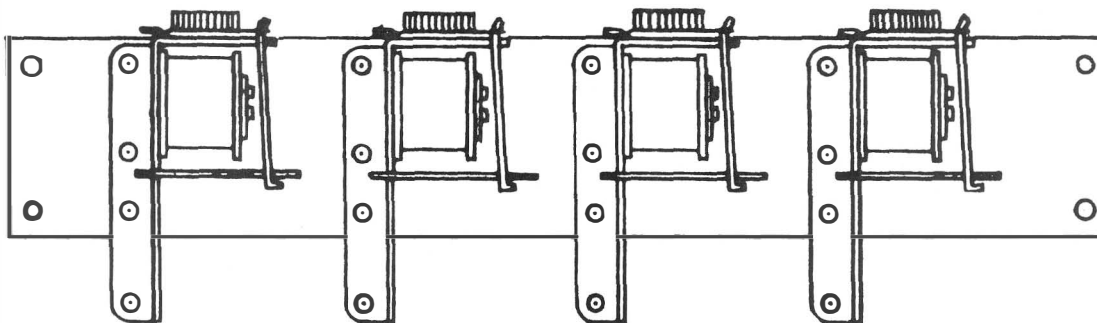
TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 25

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
"A" 2nd Half relay coil	A-47	51-11 70	White-Red Orange	Energized thru regular game winner circuit when gold button is pressed. (Double game play)
L1	N.C.	G-9 56-3	Black-Yellow White-Brown	Opens selection control feature advance panel rollover lites circuit.
L2	S.P.D.T.	H-10 10 38-11 25-1	Red Yellow-Black Blue-White	Directs magic ring yellow scoring sector lite circuits.
L3	S.P.D.T.	G-18 10 18-11 15-12	Red Red-Black Red-White	Directs magic ring yellow scoring sector lite circuits.
L4	N.O.	J-20 13 10	Red-Yellow Red	Completes red, yellow, green, striped green double feature lite circuits.
R1	N.C.	F-18 31-5 50-4	Yellow-Red White	Opens blue button play and green button play circuits to scores relay and features relay.
R2	S.P.D.T.	D-4 51-11 80-11 95-5	White-Red Black Gray-White	Directs circuit from this relay to "B", "C", "D" 2nd half trip relays.
R3	S.P.D.T.	H-19 10 48-11 36-12	Red Green-Black Yellow-Brown	Directs magic-ring green scoring sector lite circuits.
R4	N.O.	E-35 71-7 81-12	Orange-Red Black-Red	Completes before 3rd ball circuit to move magic ring.
600 golden rings relay coil	A-25	61-11 70	Brown-Red Orange	Energized thru spotting disc control circuit during red or green button play.
1	N.C.	A-25 61-11 61-11J	Brown-Red Brown-Red	Opens circuit to this relay.
2	N.C.	B-38 60-8 23-5	Brown Blue-Yellow	Opens 300 circuit to golden rings replay counter.
3	S.P.D.T.	H-11 38-3 25-14 18-5	Yellow-Black Blue-White Red-Black	Directs golden rings 300 or 600 feature lite circuit.
4	N.O.	A-25 31-3 40-8	Yellow-Red Green	Completes a circuit to 300 golden rings trip relay.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
300 golden rings relay coil	A-25	40-8J 70	Green Orange	Energized thru spotting disc control circuit during red or green button play. Also thru 600 golden rings trip relay circuit.
1	N.C.	A-25 40-8 40-8J	Green Green	Opens circuit to this relay.
2	N.C.	B-25 31-3 21-3	Yellow-Red Blue-Red	Opens 600 golden rings relay circuit to this relay.
3	N.O.	D-37 91-1 93-1	Gray-Red Gray-Yellow	Completes 300 and 600 golden rings winner scoring circuit.
4	N.O.	H-11 54-10 38-3	White-Green Yellow-Black	Completes golden rings 300 feature lite circuit.
All color #2 relay coil	A-25	51-2J 70	White-Red Orange	Energized thru spotting disc control circuit during red or green button play.
L1	N.C.	B-24 18-4 81-13	Red-Black Black-Red	Opens a spotting disc circuit to advance selection control feature unit.
L2	N.C.	B-20 14-1 95-1	Red-Green Gray-White	Opens a spotting disc circuit to advance ABCDE feature unit.
L3	N.C.	B-23 98-15 65-5	Gray-Black Brown-White	Same function as switch L1.
L4	N.C.	D-16 45-4 41-4	Green-White Green-Red	Opens a mixer #2 disc circuit to mixer #2 relay.
L5	N.C.	D-16 74-13 54-4	Orange-Green White-Green	Same function as switch L4.
R1	N.O.	C-46 23-7 56-10	Blue-Yellow White-Brown	Completes win search disc circuit for yellow winners to any win relay, collect relay, gold (trip) relay.
R2	N.O.	C-46 25-8 31-15	Blue-White Yellow-Red	For red winners, same function as switch R1.
All color #1 relay coil	A-25	51-2J 70	White-Red Orange	Energized thru spotting disc control circuit during red or green button play.
1	N.C.	A-25 51-2 51-2J	White-Red White-Red	Opens circuit to this relay and all color #2 relay.
2	N.C.	C-24 45-8 31-16	Green-White Yellow-Red	Opens a spotting disc circuit to advance selection control feature unit.
3	S.P.D.T.	C-22 58-2 85-8 91-5	White-Black Black-White Gray-Red	Directs spotting disc circuits to advance ABCDE feature unit.
4	N.O.	C-45 50-8 48-4	White Green-Black	Completes win search disc circuit for green winners to any win relay, collect relay, gold (trip) relay.
5	N.O.	H-12 25-14 63-11	Blue-White Brown-Yellow	Completes collect all -- all but one winner feature lite circuit.
Motor carry-over S.P.D.T.	E-47	14-14 52-13 30	Red-Green White-Blue Yellow	Completes trip bank motor carry-over circuit and 2nd half sequence unit reset circuit.

4 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 29



Name	WIN SEARCH STOP	RED WIN	YELLOW WIN	GREEN WIN
Coil turns & wire gauge	2500 # 33	1980 #32	1980 # 32	1980 # 32
Coil resistance (nominal)	100 OHMS	60 OHMS	60 OHMS	60 OHMS
Operating voltage	50 VOLTS	18 VOLTS D.C.	18 VOLTS D.C.	18VOLTS D.C.
Test voltage	37 VOLTS	10 VOLTS D.C.	10 VOLTS D.C.	10VOLTS D.C.
Extension spring load	CLEAR	RED	RED	RED
Sw actuator stroke	3/32	3/32	3/32	3/32
Additional information	.0005 DURO - CHROME ON ARMATURE. MINIMUM DROP-OUT VOLTAGE = 20 VOLTS AFTER ENERGIZED AT 50 VOLTS.	NOTES N & T	NOTES N & T	NOTES N & T
COIL PART No.	C-7800-331	C-7800-332	C-7800-332	C-7800-332
SPRING CODE			NOTE N BRASS RIVET IN ARMATURE D.C. CORE PLUG. NOTE T TEST FOR D.C. RELAYS PULL-IN VOLTAGE 10 VOLT D.C. FULL WAVE D.C. UNFILTERED DIODE IN4002 ACROSS COIL.	
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		

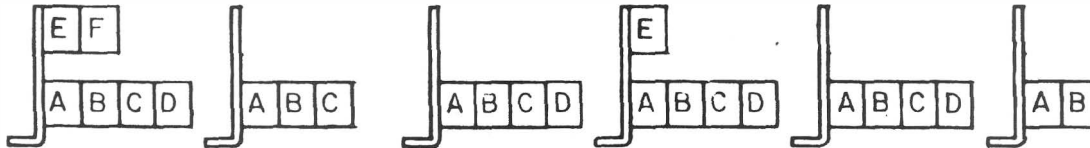
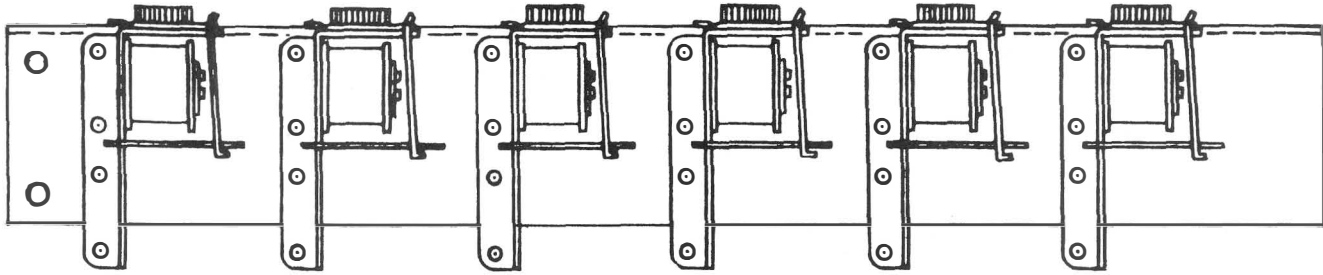
4 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 28

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Win search stop relay coil	A-42	57-7 70	White-Orange Orange	Energized thru win search disc circuits for golden rings, green, yellow, red winners.	
A	N.O.	F-44	53-7 51-15	White-Yellow White-Red	Completes winner circuits to energize any win relay, also to energize collect relay, or gold (trip) relay and 2nd half trip relay.
B	N.O.	D-30	65-9 60-8	Brown-White Brown	Completes winner replay scoring circuit.
C	N.C.	A-43	45-7 40-16	Green-White Green	Opens win search unit advance circuit.
D	N.C.	C-9	31-13 90-11	Yellow-Red Gray	Opens a timer unit reset circuit.
Red win relay coil	H-16	20 31 S.P.	Blue Yellow-Red Plastic	Energized thru detector module circuit for all regular game red section winners.	
A	S.P.D.T.	E-42	91-6 81-5 78-7	Gray-Red Black-Red Orange-Black	Directs win search disc green section winner circuits to energize win search stop relay.
B	S.P.D.T.	F-43	93-5 40-4 74-5	Gray-Yellow Green Orange-Green	Directs win search disc yellow section winner circuits to energize win search stop relay.
C	S.P.D.T.	E-43	10-3 61-4 85-5	Red Brown-Red Black-White	Directs win search disc golden rings or red section winner circuits to energize win search stop relay.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Yellow win relay coil	H-16	20 25 S.P.	Blue Blue-White Plastic	Energized thru detector module circuit for all regular game yellow section winners.	
A	S.P.D.T.	F-42	90-4 83-6 81-5	Gray Black-Yellow Black-Red	Same function as "A" switch on red win relay.
B	S.P.D.T.	F-43	61-4 18-8 40-4	Brown-Red Red-Black Green	Directs win search disc golden rings, red section, or yellow section winner circuits to energize win search stop relay.
Green win relay coil	H-15	20. 21 S.P.	Blue Blue-Red Plastic	Energized thru detector module circuit for all regular game yellow section winners.	
A	S.P.D.T.	F-42	18-8 21-3 83-6	Red-Black Blue-Red Black-Yellow	Directs all win search disc circuits to energize win search stop relay.

BACK BOX INSERT (6) RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 32



Name	REPLAY RESET	START	25¢ START	ANTI-CHEAT	ANY-WIN	DOUBLE WIN
Coil turns & wire gauge	2300 # 33	1800 # 33	1800 # 33	2300 # 33	2500 # 33	1980 # 32
Coil resistance (nominal)	85 OHMS	65 OHMS	65 OHMS	85 OHMS	100 OHMS	60 OHMS
Operating voltage	50 VOLTS	50 VOLTS	50 VOLTS	50 VOLTS	50 VOLTS	18 V. D. C.
Test voltage	37 VOLTS	32 VOLTS	32 VOLTS	39 VOLTS	37 VOLTS	10 V. D. C.
Extension spring load	CLEAR	RED	CLEAR	RED	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 "A"		NOTES "N" & "T"
Coil Part No.	C-7800-331	C-7800-334	C-7800-334	C-7800-331	C-7800-332	C-7800-322
	SPRING CODE			Note "A" Thermalze wire or equivalent. No wrap on coil	Note "N" Brass rivet in armature D.C. core plug.	Note "T" Test for D.C. relays pull in voltage 10 V. D.C. full wave D.C. unfiltered diode 1N4002 across coil.
	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			

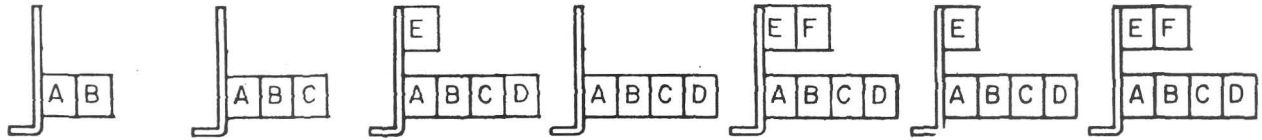
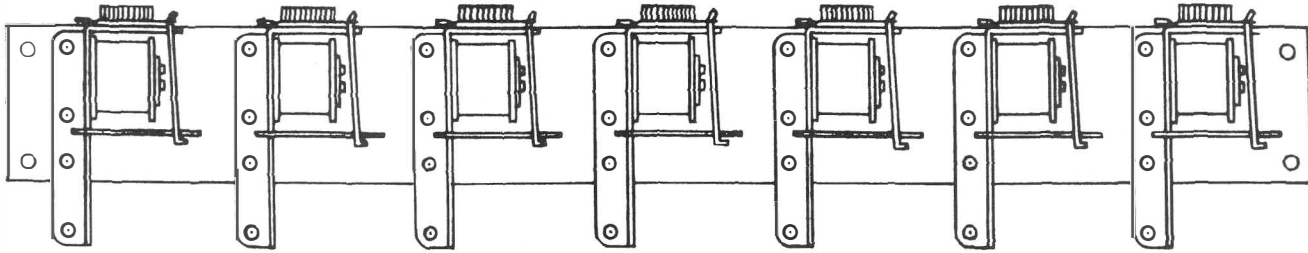
BACK BOX INSERT (6) RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 30

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Replay reset relay coil	A-3	74-15 70	Orange-Green Orange	Energized by anti-cheat relay circuit.	
A	N.O.	F-3	52-10 74-15	White-Blue Orange-Green	Completes lock-in circuit to this relay and replay register unit (cancel) reset circuit.
B	N.O.	G-1	20P. 60P.	Blue Plastic Brown Plastic	Completes a circuit to control unit and mixer-sporting unit motor.
C	S.P.D.T.	B-3	90-5 98-4 53-3	Gray Gray-Black White-Yellow	Directs play or cancel circuit to replay register unit reset coil.
D	N.C.	D-4	10-5 83-4	Red Black-Yellow	Opens replay button and coin switch circuits to start relay.
E	N.O.				Extra switch.
F	N.C.	D-41	93-20 30	Gray-Yellow Yellow	Opens key circuit to advance replay register unit and key plays meter.
Start relay coil	A-4	98-11 70	Gray-Black Orange	Energized by replay button or coin switch circuits for regular play cycles. Energized by gold relay circuit for gold button play cycles.	
A	N.O.	C-6	13-4 45-5	Red-Yellow Green-White	Completes shutter motor (open shutter) circuit and control unit index, mixer latch coil circuits.
B	N.O.	D-6	13-3 48-2	Red-Yellow Green-Black	Completes lock-in circuit to this relay, also in series with switch A circuits.
C	N.C.	B-53	21-3 38-10	Blue-Red Yellow-Black	Opens lock-in circuit to "F" relay.
25¢ relay coil	A-5	15-4 70	Red-White Orange	Energized by 25¢ coin switch circuit.	
A	N.O.	F-5	25-3 15-4	Blue-White Red-White	Completes lock-in circuit to this relay.
B	N.O.	F-4	90-2 10-5	Gray Red	Completes a circuit to start relay.
C	S.P.D.T.	C-40	57-8 18-14 54-8	White-Orange Red-Black White-Green	Directs winner or credit circuits to advance replay register unit.
D	N.C.	A-3	98-4 45-2	Gray-Black Green-White	Opens replay register unit reset circuit.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Anti-cheat relay coil	A-10	78-5 70	Orange-Black Orange	Energized by C.U. Cam 6 switch circuit during play cycle, remains energized unless power to game is interrupted. Also energized by key switch circuit.	
A	N.O.	D-10	30 78-5	Yellow Orange-Black	Completes lock-in circuit to this relay.
B	N.O.	J-14	81 71-9	Black-Red Orange-Red	Opens 21 volt and 4.5 volt line when relay drops out.
C	S.P.D.T.	F-4	74-15 52-10 53-13	Orange-Green White-Blue White-Yellow	Opens replay circuit to start relay and completes circuit to replay reset relay when relay drops out.
D	N.C.	F-7	30 14-6	Yellow Red-Green	Completes a shutter motor (close shutter) circuit when relay drops out while shutter open.
E	S.P.D.T.	J-3	91-2 36-13 40-1	Gray-Red Yellow-Brown Green	Opens "Collect or Play Double" lite circuit flash, completes "Tilt" lite circuit when relay drops out.
Any win relay coil	A-46	27-13 70	Blue-Orange Orange	Energized thru green, yellow, red win search disc circuits.	
A	N.O.	H-3	63-7 13-11	Brown-Yellow Red-Yellow	Completes "Collect or Play Double" lite flash circuit.
B	N.O.	F-52	78-8 20-6	Orange-Black Blue	Completes timer unit (false win) tilt relay circuit.
C	N.O.	C-9	90-11 31-13	Gray Yellow-Red	Completes 3rd ball shot relay circuit to reset timer unit.
D	N.C.	D-4	83-4 75-14	Black-Yellow Orange-White	Opens replay and coin switch circuits to start relay.
Double win relay coil	G-15	20 13 S.P.	Blue Red-Yellow Plastic	Energized thru detector module winner circuit during double and double-double games.	
A	N.O.	E-45	80-9 54-9	Black White-Green	Completes double winner circuits to energize any win relay, and collect or gold (trip) relay.
B	N.O.	E-45	20-3 74-1	Blue Orange-Green	Completes double-double winner circuit to energize collect relay.

7 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 33



Name	MIXER # 2	MIXER # 4	PLAY FEATURES	FEATURES LOCK	PLAY SCORES	SCORES LOCK # 1	SCORES LOCK # 2
Coil turns & wire gauge	2500 # 33	2500 # 33	2300 # 33	2300 # 33	2300 # 33	2300 # 33	2300 # 33
Coil resistance (nominal)	100 OHMS	100 OHMS	85 OHMS	85 OHMS	85 OHMS	85 OHMS	85 OHMS
Operating voltage	50 VOLTS	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	37 VOLTS
Extension spring load	CLEAR	CLEAR	RED	RED	RED	RED	RED
Sw actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional Information	NOTES "A" & "C"	NOTES "A" & "C"					
Coil Part No.	C-7800-332	C-7800-332	C-7800-331	C-7800-331	C-7800-331	C-7800-331	C-7800-331

SPRING CODE			Note "A" Thermalize wire or equivalent. No wrap on coil.	Note "C" .0005 Durochrome on armature. Min. dropout voltage=20V. after energized at 50 Volts
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		

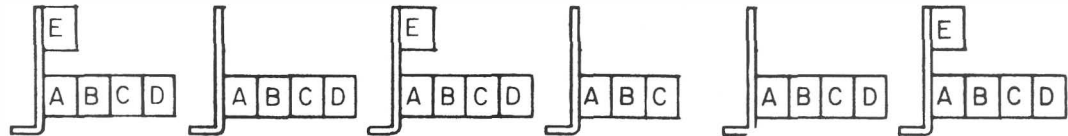
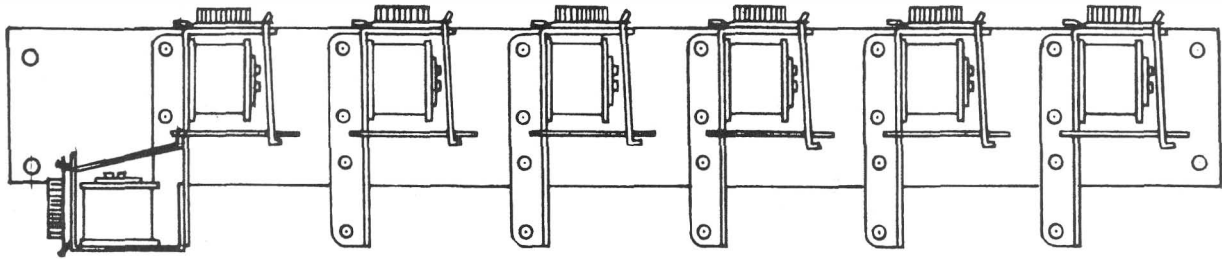
7 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 32

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Mixer #2 relay coil	A-16	41-4 70	Green-Red Orange	Energized thru Mixer #2 disc and features - score control circuit.
A	N.O.	B-16 40-11 41-4	Green Green-Red	Completes lock-in circuit to this relay.
B	N.O.	F-28 43-7 60-6	Green-Yellow Brown	Completes circuit to "K" relay and green, yellow, red score advance circuit.
Mixer #4 relay coil	A-13	61-2 70	Brown-Red Orange	Energized thru Mixer #4 and #3 discs score - features control circuits.
A	N.O.	A-16 40-11 61-2	Green Brown-Red	Completes lock-in circuit to this relay.
B	N.O.	E-24 98-5 80-6	Gray-Black Black	Completes double feature advance circuits.
C	N.C.	D-21 27-6 10-4	Blue-Orange Red	Opens features circuit.
Play features relay coil	A-17	54-5 70	White-Green Orange	Energized thru green button play circuit.
A	N.O.	B-17 53-5 54-5	White-Yellow White-Green	Completes lock-in circuit to this relay.
B	N.O.	C-18 57-5 61-5	White-Orange Brown-Red	Completes circuit to features lock relay.
C	N.C.	H-26 13-1 14-2	Red-Yellow Red-Green	Opens spotting disc circuit to flash green, yellow, red score lites.
D	N.C.	E-28 58-3 43-7	White-Black Green-Yellow	Opens circuit to "K" relay and green, yellow, red score advance circuit.
E	S.P.D.T.	H-5 83 36-1 91-13	Black-Yellow Yellow-Brown Gray-Red	Directs red button play or green button play lite circuit.
Features lock relay coil	A-18	61-5 70	Brown-Red Orange	Energized thru play features relay circuit.
A	N.O.	B-18 60-5 61-5	Brown Brown-Red	Completes lock-in circuit to this relay.
B	N.O.	C-21 53-6 56-6	White-Yellow White-Brown	Completes added spotting disc circuits for ABCDE feature unit advance.
C	N.O.	D-22 36-5 40-10	Yellow-Brown Green	Completes added spotting disc circuits for ABCDE feature unit and selection control feature unit advance, golden ring feature and all color feature.
D	N.O.	C-23 45-8 65-5	Green-White Brown-White	Completes added spotting disc circuits for selection control feature unit advance.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Play scores relay coil	A-18	56-5 70	White-Brown Orange	Energized thru blue button play circuit.
A	N.O.	B-18 52-5 56-5	White-Blue White-Brown	Completes lock-in circuit to this relay.
B	N.O.	B-19 57-5 63-5	White-Orange Brown-Yellow	Completes circuit to scores lock relay #1 and #2.
C	S.P.D.T.	H-5 36-1 40-2 93-13	Yellow-Brown Green Gray-Yellow	Directs red button play, green button play or blue button play lite circuit.
D	N.C.	E-19 23-13 58-1	Blue-Yellow White-Black	Opens single step advance circuit to ABCDE feature unit and selection control feature unit.
E	N.C.	G-9 65-13 30	Brown-White Yellow	Opens spotting disc circuit to flash ABCDE feature lites.
F	N.C.	G-9 85-11 30	Black-White Yellow	Opens spotting disc circuit to flash selection control feature lites, golden ring feature lites and all color feature lites.
Scores lock #1 relay coil	A-19	63-5 70	Brown-Yellow Orange	Energized thru play scores relay circuit.
A	N.O.	C-19 60-5 63-5	Brown Brown-Yellow	Completes lock-in circuit to this relay and scores lock #2 relay.
B	N.O.	D-30 43-13 90-12	Green-Yellow Gray	Completes added spotting disc circuits for green, yellow, red score steps.
C	N.O.	D-31 25-13 40-13	Blue-White Green	Same function as switch B.
D	N.C.	D-21 10-4 36-5	Red Yellow-Brown	Opens feature circuit.
E	S.P.D.T.	E-32 61-9 51-13 20-5	Brown-Red White-Red Blue	Directs Mixer Disc #5 circuits to "M" relay.
Scores lock #2 relay coil	A-19	63-5 70	Brown-Yellow Orange	Energized thru play scores relay circuit.
A	N.O.	C-29 57-6 13-15	White-Brown Red-Yellow	Completes added single step circuit for green, yellow, red score unit advance.
B	N.O.	C-28 91-12 31-8	Gray-Red Yellow-Red	Completes an added circuit to "K" relay.
C	N.O.	D-32 18-13 15-11	Red-Black Red-White	Completes added spotting disc circuits for green, yellow, red score unit advance.
D	N.O.	D-31 27-8 75-13	Blue-Orange Orange-White	Same function as switch C.
E	N.O.	E-31 23-2 53-10	Blue-Yellow White-Yellow	Completes green, yellow, red score disc circuits to "M" relay.
F	N.C.	A-53 41-10 85-13	Green-Red Black-White	Opens circuit to "F" relay.

(BACK DOOR) 6 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 35



Name	GOLD (LATCH)	GOLD (TRIP)	COLLECT	"K"	"A"	"F"	3rd SHOT
Coil turns & wire gauge	1800 # 33	1800 # 33	2500 # 33	2500 # 33	2300 # 33	2300 # 33	2300 # 33
Coil resistance (nominal)	65 OHMS	65 OHMS	100 OHMS	100 OHMS	85 OHMS	85 OHMS	85 OHMS
Operating voltage	50 VOLTS	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	37 VOLTS
Extension spring load	CLEAR	CLEAR	RED	RED	RED	RED	RED
Sw actuator stroke	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
Additional information				.0005 Durochrome On Armature Plate. Min. Dropout Voltage = 20 Volts After Energized At 50 Volts.			
Coil Part No.	C-7800-334	C-7800-334	C-7800-332	C-7800-332	C-7800-331	C-7800-331	C-7800-331

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

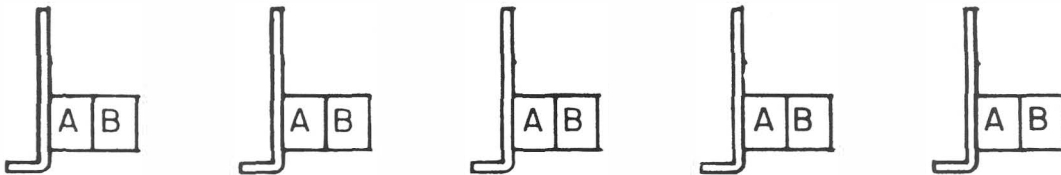
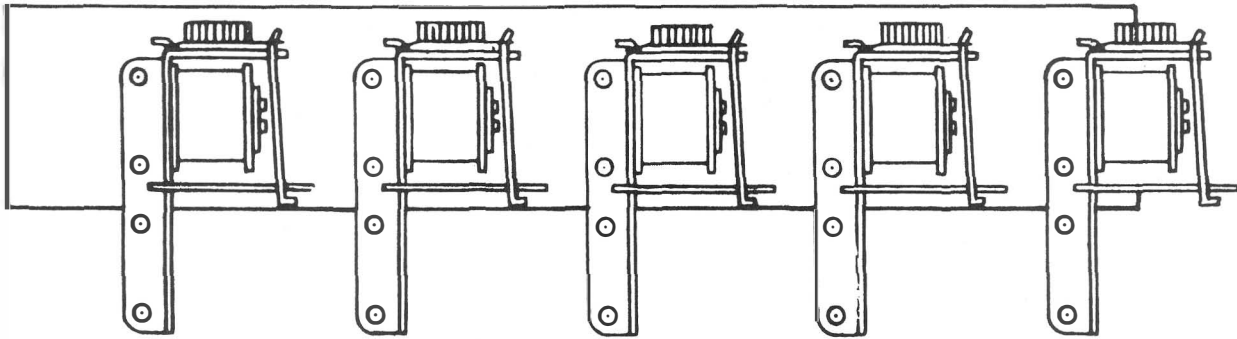
(BACK DOOR) 6 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 34

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
Gold relay (trip) coil	A-46	63-9 70	Brown-Yellow Orange	Energized thru win search circuit by gold button for double and double-double play.	
Gold relay (latch) coil	A-49	43-8 70	Green-Yellow Orange	Energized thru shutter switch circuit during (shutter opening) gold button play cycles.	
A	N.O.	F-48	36-8 30	Yellow-Brown Yellow	During gold button play cycle, opens trip bank reset motor, ABCDE feature unit, yellow, red, green score unit reset circuit.
B	N.C.	D-47	51-15 80-11	White-Red Black	During gold button play cycle, completes A, B, C, D 2nd half trip relays circuit.
C	N.C.	F-3	15-2 13-4	Red-White Red-Yellow	During gold button play cycle, completes 2nd half sequence disc circuit to start relay.
D	N.C.	B-41	57-7 21-3	White-Orange Blue-Red	During gold button play cycle, completes lock-in circuit to win search stop relay.
E	N.O.	A-45	20-3 75-15	Blue Orange-White	During gold button play cycle, opens collect relay circuit.
Collect relay coil	A-45	75-15 70	Orange-White Orange	Energized thru win search circuit by R - collect button following regular and double game winners, direct thru 2nd half sequence disc following double-double game winners.	
A	N.O.	D-39	85-4 65-9	Black-White Brown-White	Completes winner relay scoring circuit.
B	N.O.	B-44	51-15 20-3	White-Red Blue	Completes lock-in circuit to this relay.
C	N.C.	A-46	56-9 60-9	White-Brown Brown	Opens gold (trip) relay circuit.
D	N.C.	A-46	61-10 27-13	Brown-Red Blue-Orange	Opens any win relay circuit.
"K" relay coil	A-28	56-4 70	White-Brown Orange	Energized thru green, yellow, red score disc circuits to proportion scores advance.	
A	N.O.	A-28	18-16 56-4	Red-Black White-Brown	Completes lock-in circuit to this relay.
B	N.O.	A-31	71-10 40-6	Orange-Red Green	Completes a yellow score unit advance circuit.
C	N.O.	A-29	63-6 41-6	Brown-Yellow Green-Red	Completes a green score unit advance circuit.
D	N.O.	A-32	81-10 38-6	Black-Red Yellow-Black	Completes a red score unit advance circuit.
E	N.C.	C-28	83-14 50-7	Black-Yellow White	Opens green, yellow, red score extra-step advance circuit.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
"A" relay coil	A-27	52-2 70	White-Blue Orange	Energized thru selection control feature unit circuit to proportion ABCDE feature advance and scores advance.	
A	S.P.D.T.	J-12	14-3 13-3 15-3	Red-Green Red-Yellow Red-White	Directs circuit to flash press buttons now lite before 4th and 5th ball or after 5th ball.
B	N.C.	C-21	80-12 51-6	Black White-Red	Opens a spotting disc circuit for ABCDE feature unit advance.
C	N.C.	D-16	54-4 41-4	White-Green Green-Red	Opens a mixer disc #2 circuit to mixer #2 relay.
"F" relay coil	A-53	85-13 70	Black-White Orange	Energized thru red score disc circuit to proportion game features and scores advance.	
A	N.O.	B-53	38-10 41-10	Yellow-Black Green-Red	Completes lock-in circuit to this relay.
B	N.O.	D-22	36-5 40-10	Yellow-Brown Green	Completes an added spotting disc circuit for selection feature advance, golden ring features and all color feature.
C	N.O.	C-21	53-6 56-6	White-Yellow White-Brown	Completes an added spotting disc circuit for ABCDE feature advance.
D	N.C.	C-29	65-15 91-11	Brown-White Gray-Red	Opens a single step circuit for green, yellow, red score advances.
3rd ball shot relay coil	A-52	48-13 70	Green-Black Orange	Energized thru timer disc ball count circuit during double and double-double game play.	
A	N.O.	C-53	15-10 48-13	Red-White Green-Black	Completes lock-in circuit to this relay.
B	N.O.	D-8	57-3 31-13	White-Orange Yellow-Red	Completes after 3rd ball circuit to advance timer unit, also completes winner circuit to reset timer unit.
C	N.O.	E-8	43-3 10-12	Green-Yellow Red	Completes timer disc circuit to advance timer unit from 3rd to 4th step.
D	N.C.	D-35	80-13 91-14	Black Gray-Red	Opens circuits to move magic ring.
E	N.C.	H-12	90-10 65	Gray Brown-White	Opens timer disc circuit to flash before 3rd ball press buttons now lite.

5 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART ON PAGE 37



NAME	1st DOUBLE SPIN	Counter Clock Motor	Counter Clock Button	" B "	" M "
Coil turns & wire gauge	2300 # 33	2500 # 33	2500 # 33	2500 # 33	2300 # 33
Coil resistance (nominal)	85 OHMS	100 OHMS	100 OHMS	100 OHMS	85 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	CLEAR	CLEAR	CLEAR	CLEAR
Switch actuator stroke	3/32	3/32	3/32	3/32	3/32
Additional information		NOTE C	NOTE C	NOTE C	
COIL PART No.	C-7800-331	C-7800-332	C-7800-332	C-7800-332	C-7800-331
SPRING CODE			NOTE C .0005 DUROCHROME ON ARMATURE. MINIMUM DROPOUT VOLTAGE = 20 VOLTS AFTER ENERGIZED AT 50 VOLTS.		
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 36

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1st double spinrelay coil	A-27	93-6 70	Gray-Yellow Orange	Energized thru 2nd half sequence unit disc circuit during double and double-double play cycles.
A N.O.	D-26	90-6 93-6	Gray Gray-Yellow	Completes lock-in circuit to this relay.
B S.P.D.T.	D-24	71-11 27-11 75-6	Orange-Red Blue-Orange Orange-White	Directs double feature unit multiple step advance circuits.
Counterclock motorrelay coil	A-35	13-8 70	Red-Yellow Orange	Energized by C.C.W. button relay circuit.
A N.C.	B-34	98-10 74-11	Gray-Black Orange-Green	Opens C.W. circuit to magic ring index relay.
B S.P.D.T.	B-36	23-8 14-8 13-8	Blue-Yellow Red-Green Red-Yellow	Directs C.W. motor or C.C.W. motor circuit and lock-in circuit to this relay.
Counterclock button relay coil	A-34	15-8 70	Red-White Orange	Energized by C.C.W. button thru ABCDE feature and magic ring motor unit circuit, also thru magic ring homing circuit.
A N.O.	B-36	13-8 14-8	Red-Yellow Red-Green	Completes C.C.W. motor relay and C.C.W. motor circuit.
B S.P.D.T.	B-35	98-10 58-6 21-3	Gray-Black White-Black Blue-Red	Directs magic ring index relay circuits for C.W. or C.C.W. movement of magic ring.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
"B" relay coil	A-27	31-7 70	Yellow-Red Orange	Energized during regular game play cycle by C.U. Cam 8 switch when green scores at "10".
A N.O.	B-27	98-2 31-7	Gray-Black Yellow-Red	Completes lock-in circuit to this relay.
B N.O.	C-29	83-11 13-15	Black-Yellow Red-Yellow	Completes a green score advance circuit.
"M" relay coil	A-32	53-10 70	White-Yellow Orange	Energized thru green, yellow, red score advance circuits to proportion scores advance.
A N.O.	E-30	40-11 53-10	Green White-Yellow	Completes lock-in circuit to this relay.
B N.O.	D-28	50-10 63-13	White Brown-Yellow	Completes a green, yellow, red score advance circuit.

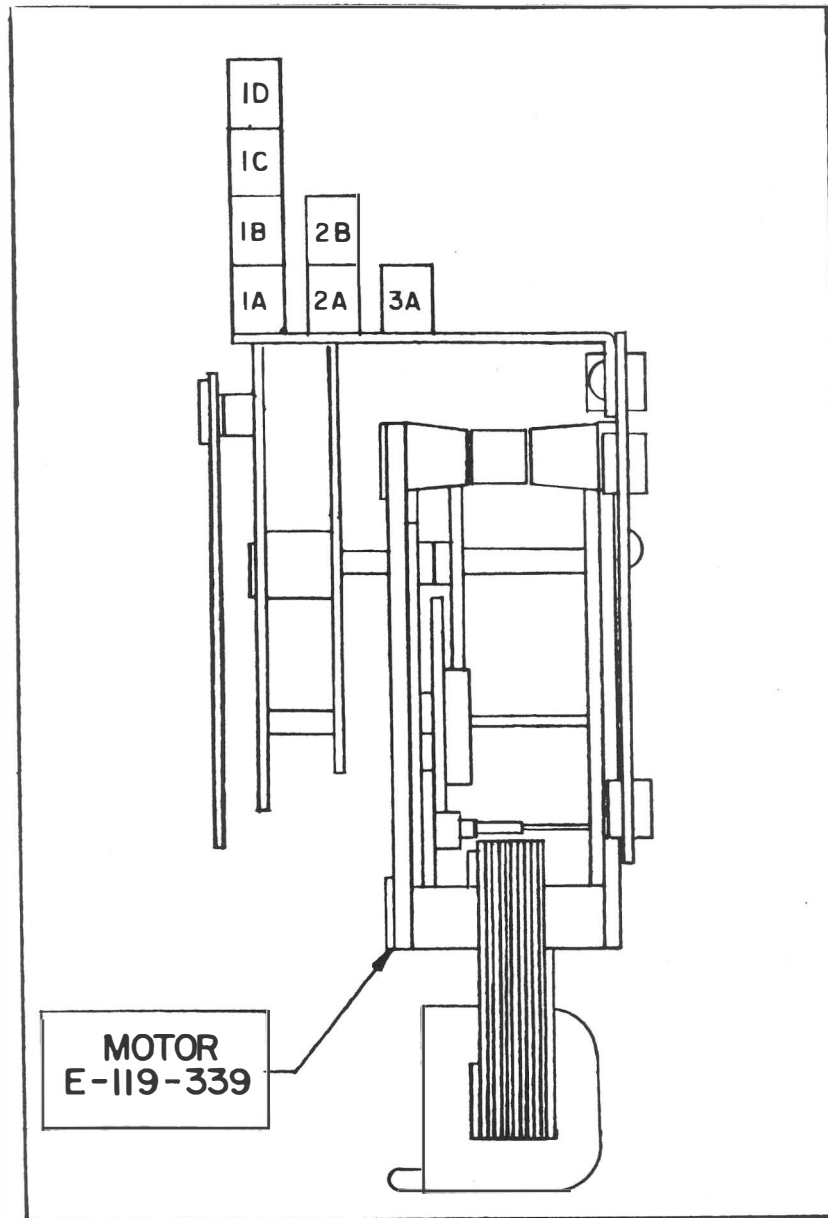
MISCELLANEOUS RELAYS

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Magic ring index relay coil	A-34	58-6 70	White-Black Orange	Energized thru ABCDE feature disc and magic ring motor disc circuit by C.W. or C.C.W. button.
A N.O.	A-35	74 30	Orange-Green Yellow	Completes circuit to magic ring index solenoid.
A-B-C-D-E safety relay coil	A-34	83-7 70	Black-Yellow Orange	Energized thru ABCDE feature disc and magic ring motor disc circuit when ring is moved clockwise. Stays energized until ring returns to "0" position.
A N.C.	G-34	80-7 21-3	Black Blue-Red	Completes a safety C.C.W. homing circuit if relay drops out when ring is out of "0" position.
B N.C.	G-34	80-7 21-3	Black Blue-Red	Same function as switch "A".
Ball lifter start relay coil	A-50	95-8 70	Gray-White Orange	Energized by ball runway switch circuit when a ball is delivered to shooter position, then de-energized by ball gate switch when a ball is shot.
A N.O.	C-50	98-8 95-8	Gray-Black Gray-White	Completes lock-in circuit to this relay.
B N.O.	E-35	75-7 81-12	Orange-White Black-Red	Safety's selection control - before 5th ball circuit to move magic ring.
C N.O.	D-35	91-14 80-13	Gray-Red Black	Safety's 2nd half - before 3rd ball circuit to move magic ring.
D N.C.	D-51	85-9 90-9	Black-White Gray	When relay drops out, completes ball lifter motor circuit.
E N.C.	F-53	15-10 18-10	Red-White Red-Black	When relay drops out, completes ball count timer disc circuits to 3rd ball shot relay and before 5th ball lock-out trip relay.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Ball detector relay coil	A-52	83-9 70	Black-Yellow Orange	Energized thru ball count circuit, de-energized when ball lifter cycle is completed.
A N.O.	F-52	83-9 13-10	Black-Yellow Red-Yellow	Completes lock-in circuit to this relay.
B N.O.	E-51	83-9 85-9	Black-Yellow Black-White	Completes ball lifter motor circuit.
C N.O.	E-34	1-14 81-12	Yellow-Red Black-Red	Safety's selection control - before 4th ball circuit to move magic ring.
D N.C.	E-9	95-9 14-4	Gray-White Red-Green	Completes a tilt relay circuit thru ball lifter Cam #2 if relay not energized during ball lift cycle.

BALL LIFTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART BELOW



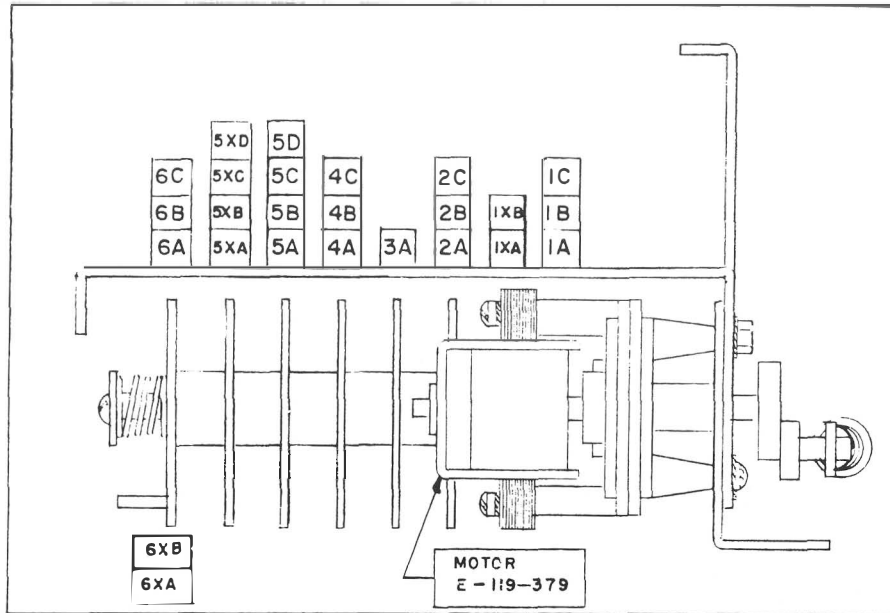
BALL LIFTER MOTOR SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW ABOVE

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	F-52	18-10 Red-Black 23-10 Blue-Yellow 93-9 Gray-Yellow 30 Yellow	During cycle, opens timer disc circuits to 3rd ball shot relay and before 5th ball lock-out relay.
1B	N.O.	D-51	80-15 Black	During cycle, completes motor carry-over circuit.
1C	N.C.	G-4	48-2 Green-Black 21-3 Blue-Red	During cycle, opens coin and replay button circuits.
1D	N.O.	F-51	13-10 Red-Yellow	During cycle, completes ball detector relay lock-in circuits.
2A	N.O.	C-7	43-3 Green-Yellow 25-11 Blue-White 95-9 Gray-White	During cycle, advance timer unit thru ball count circuits.
2B	N.O.	F-9	21-3 Blue-Red	During cycle, completes ball detector relay circuit to tilt relay.
3A	N.O.	F-52	21-3 Blue-Red 14-12 Red-Green	During cycle, completes timer disc ball count circuit to before 4th ball lockout relay.

SHUTTER MOTOR PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART



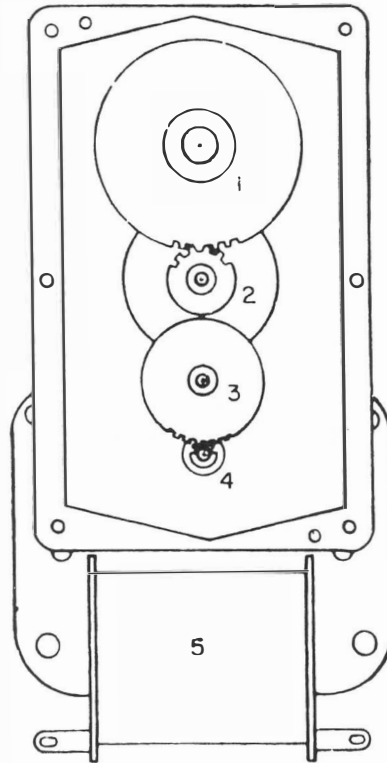
SHUTTER MOTOR SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
1A	N.O.	G-6	14-5 30	Red-Green Yellow	During shutter cycles, completes motor carry-over circuit.
1B	N.C.	F-8	48-10 21-3	Green-Black Blue-Red	When shutter closed, completes timer unit step-up and reset circuit.
1C	N.C.	E-21	74-14 13-12	Orange-Green Red-Yellow	During shutter cycle, opens features circuit.
1XA	N.C.	F-38	75-11 21-3	Orange-Green Blue-Red	When shutter cycle, completes winner replay scoring circuits.
1XB	N.C.	J-16	54-14 10	White-Green Red	When shutter closed, completes detector module win relay circuit.
2A	N.C.	D-51	91-9 90-9	Gray-Red Gray	When shutter closed, completes ball lifter motor circuit.
2B	N.O.	F-18	31-5 38-15	Yellow-Red Yellow-Black	When shutter open, completes green button play features relay circuits and blue button play scores relay circuits.
2C	N.C.	F-19	80-10 60-4	Black Brown	When shutter opens, completes 2nd half relay circuits to advance ABCDE feature unit to top. Also completes circuits for double feature unit advance and 1st double spin relay.

SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES	
3A	N.O.	E-49	78-11 30	Orange-Black Yellow	When shutter opens, completes gold (latch) relay circuit, selection control feature unit, double feature unit, red, yellow, green replay counter unit reset circuit.
4A	S.P.D.T.	F-34	71-7 21-3 80-7	Orange-Red Blue-Red Black	Directs magic ring feature C.C.W. and C.W. movement circuits when shutter closed, C.C.W. magic ring homing circuit when shutter opens.
4B	N.C.	F-52	15-10 21-3	Red-White Blue-Red	When shutter closed, completes timer disc circuits to 3rd ball shot relay and before 5th ball lock-out relay.
4C	N.O.	E-7	45-3 18-2	Green-White Red-Black	When shutter open, completes tilt relay circuit to shutter motor.
5A	S.P.D.T.	B-6	14-5 45-5 93-4	Red-Green Green-White Gray-Yellow	Directs start relay circuit to shutter motor when shutter closed, to C.U. timer cams index coil and mixer latch coils when shutter open.
5B	N.O.	E-21	13-12 23-6	Red-Yellow Blue-Yellow	When shutter open, completes features circuit.
5C	N.O.	E-7	14-5 18-2	Red-Green Red-Black	Same function as switch 4C.
5D	S.P.D.T.	H-6	83 60-11 98-13	Black-Yellow Brown Gray-Black	Directs 2nd half relay circuits to white button play lite when shutter open, red button play lite when shutter closed.
5XA	N.O.	C-37	30 75-8	Yellow Orange-White	When shutter open, completes golden ring replay counter homing circuit.
5XB	N.C.	D-49	78-11 43-8	Orange-Black Green-Yellow	When shutter closed, completes gold (latch) relay circuit.
5XC	N.C.	D-50	95-7 58-13	Gray-White White-Black	When shutter opens, opens lock-in circuit to ball lifter start relay.
5XD	N.C.	F-44	21-3 53-7	Blue-Red White-Yellow	When shutter closed, completes win search circuits to any win relay, collect relay, gold (trip) relay and 2nd half trip relays.
6A	N.O.	D-9	30 71-5	Yellow Orange-Red	When shutter opens, completes timer unit reset circuit.
6B	N.O.	C-48	36-8 74-9	Yellow-Brown Orange-Green	When shutter opens, completes ABCDE feature unit, yellow, red green score unit reset circuit.
6C	N.O.	B-48	36-8 52-13	Yellow-Brown White-Blue	When shutter opens, completes trip bank reset motor circuit.
6XA	N.O.	F-36	51-8 53-8	White-Red White-Yellow	When shutter opens, completes 2nd half sequence unit advance circuits.
6XB	N.O.	D-19	23-13 13-6	Blue-Yellow Red-Yellow	When shutter opens, completes ABCDE feature and selection control feature single step advance circuit.
Panel shutter switches					Shutter switches below are not shown in pictorial view. Switches function when shutter board opens or closes. (Normal position of shutter is closed).
A	N.C.	E-22	61 58-1	Brown-Red White-Black	When shutter closed, completes left and right panel roll-over button circuits to advance selection control feature unit.
B	N.C.	E-8	48-10 57-3	Green-Black White-Orange	Same function as shutter motor switch 1B.
C	N.O.	F-19	60-4 95-1	Brown Gray-White	Same function as shutter motor switch 2C.
D	N.O.	F-18	21-3 38-15	Blue-Red Yellow-Black	Same function as shutter motor switch 2B.

MOTOR PARTS GUIDE



SHUTTER MOTOR (E-119-379)

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

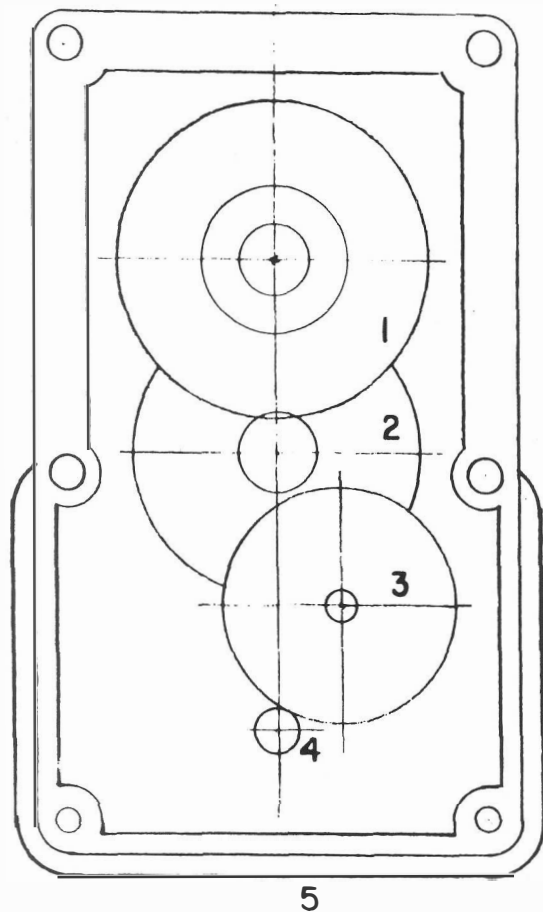
BALL LIFTER MOTOR (E-119-339)

- 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.

MOTOR FOR CONTROL UNIT AND MIXER & SPOTTING UNIT



Motor
(E -119-359)

Bearing & Bracket Assembly	—————	ZBB-7553-20
Gear Case Ass'y. (Minus Stator & Coil)	—————	ZEGB-4020-1
1. Output Gear & Shaft Ass'y.	—————	ZEGS-4020-1
2 Gear	—————	G-6712-32
3. Gear	—————	GL-6312-21
4. Gear-Rotor & Shaft Ass'y.	—————	ZRS-4038-52-1 R.H.
5 Stator & Coil Ass'y.	—————	ZS-4018-26109

Misc Parts

Fan	—————	P-1036-1
Oil Pad Retaining Plate	—————	A-1417
Oil Pad	—————	P-4010
Washer, Bottom (for ZEGS-4020-1)	—————	W-2060-2
Spacer (for ZEGS-4020-1)	—————	B-1887
Washer, Top (for ZEGS-4020-1)	—————	W-2044
Spacer (for G-6712-32)	—————	V-1309-3
Washers, Two (for G-6712-32)	—————	W-2078
Spacer (for GL-6312-21)	—————	V-1309-1
Washers, Two (for GL-6312-21)	—————	W-2077