

Bally®

SUN VALLEY

OPERATING INSTRUCTIONS AND PARTS CATALOG

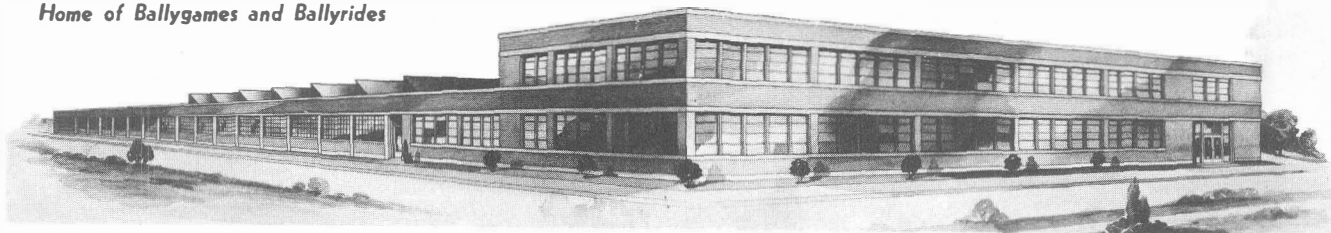
Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on back cover.

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

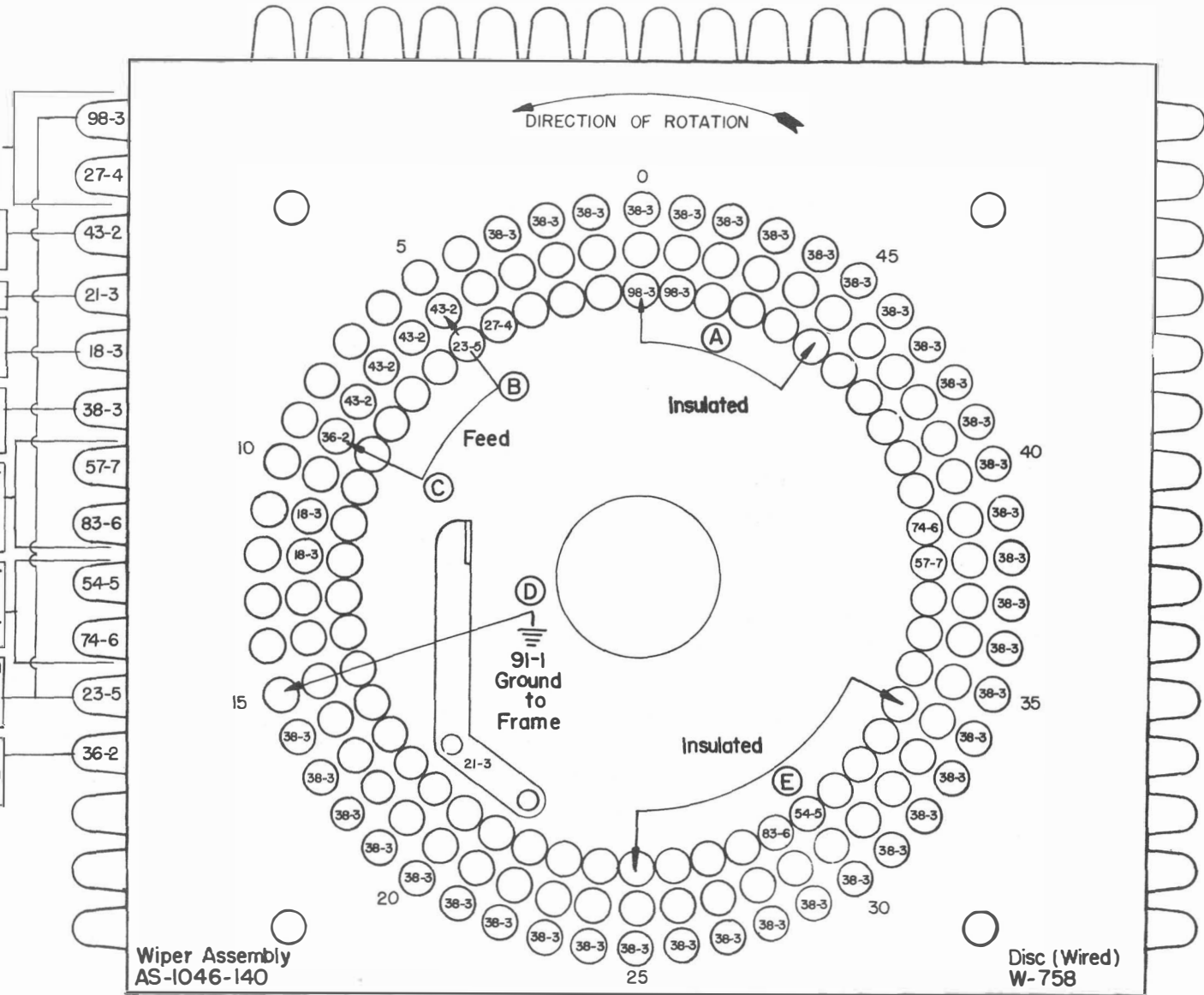
CODE

N.C. _____ NORMALLY CLOSED
N.O. _____ NORMALLY OPEN
M.B.B. _____ MAKE BEFORE BREAK
S.P.D.T. _____ SINGLE POLE DOUBLE THROW

Home of Ballygames and Ballyrides



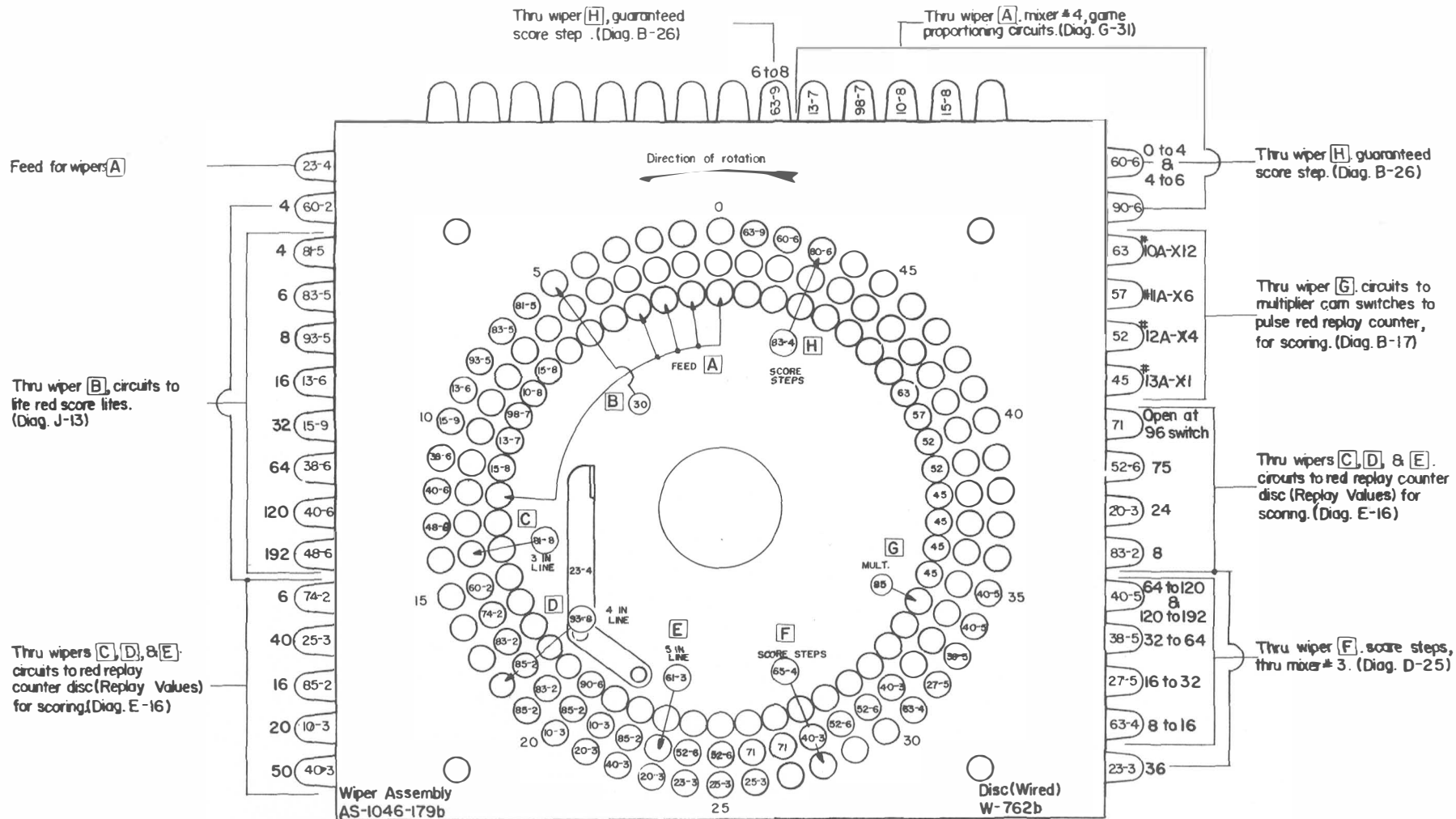
- Thru wipers (A), circuits to flash "Select Now" lite at 4th step of unit. (Diag. L-1)
- Thru wiper (B), circuit to step this unit for 1st 4 steps. (Diag. G-7)
- Feed for wipers (B) & (C)
- Thru wiper (C), circuit to close shutter at 2nd step of unit. (Diag. G-8)
- Thru wiper (D), ball lifter circuit after 1st ball is raised (Diag. E-12)
- Thru wipers (E), circuit to energize before 4th selector lock trip relay, when 4th ball is shot (Diag. B-9)
- Thru wipers (E), circuit to energize before 5th selector lock trip relay when 5th ball is shot. (Diag. B-9)
- Thru wipers (A), circuit to flash "Select Now" lite at 5th step of unit (Diag. L-1)
- Thru wiper (B), circuit to step unit from 4th to 5th, when 4th ball is shot. (Diag. G-8)



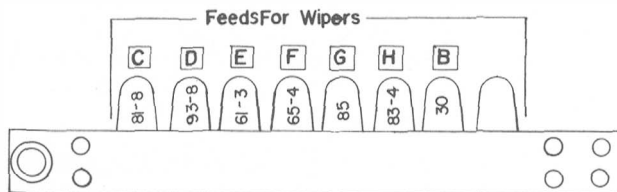
- Complete Unit - AS-110-23
 Reset Coil - 28-R-15
 Step-Up Coil - 25-GG-7
 Step-Up Plunger - S-496-100
 Step-Up Arm - A-1765
 Ratchet & Shaft - C-1050-39-21

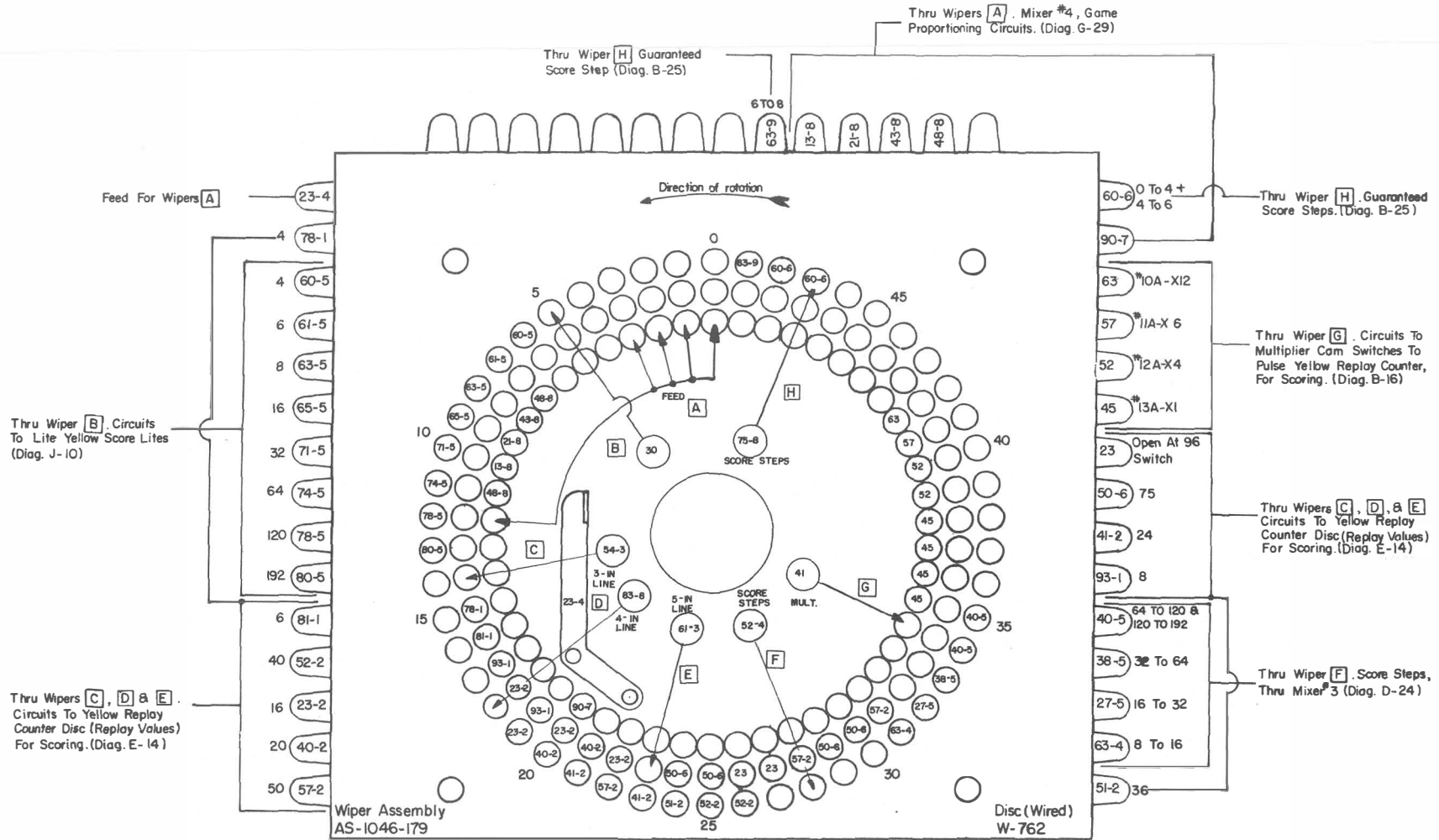
RED SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

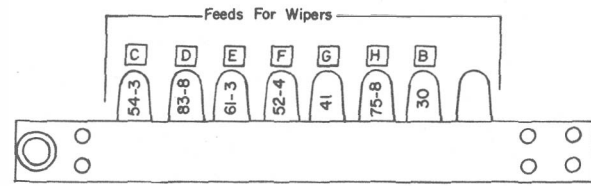


- Complete Unit-AS-1022-31
- Reset Coil-28-R-15
- Step-Up Coil-25-GG-7
- Step-Up Plunger-S-496-100
- Step-Up Arm-A-1765-3
- Ratchet & Shaft-C-1050-8-39



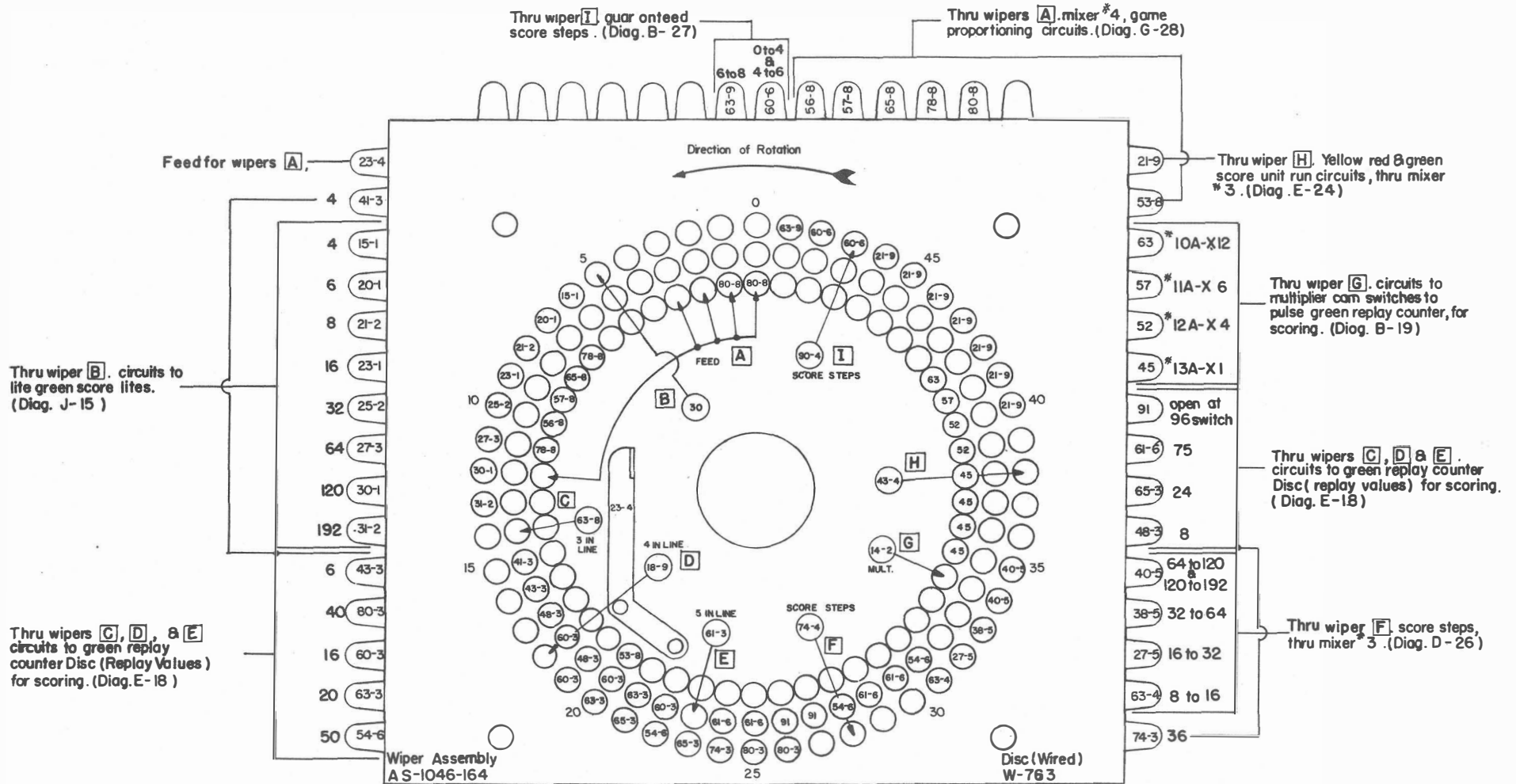


- COMPLETE UNIT - AS-1022-31
 RESET COIL - 28-R-15
 STEP-UP COIL - 25-GG-7
 STEP-UP PLUNGER - S-496-100
 STEP-UP ARM - A-1765-3
 RATCHET & SHAFT - C-1050-8-39

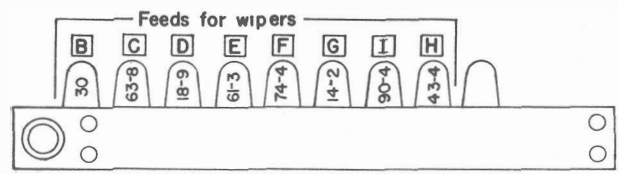


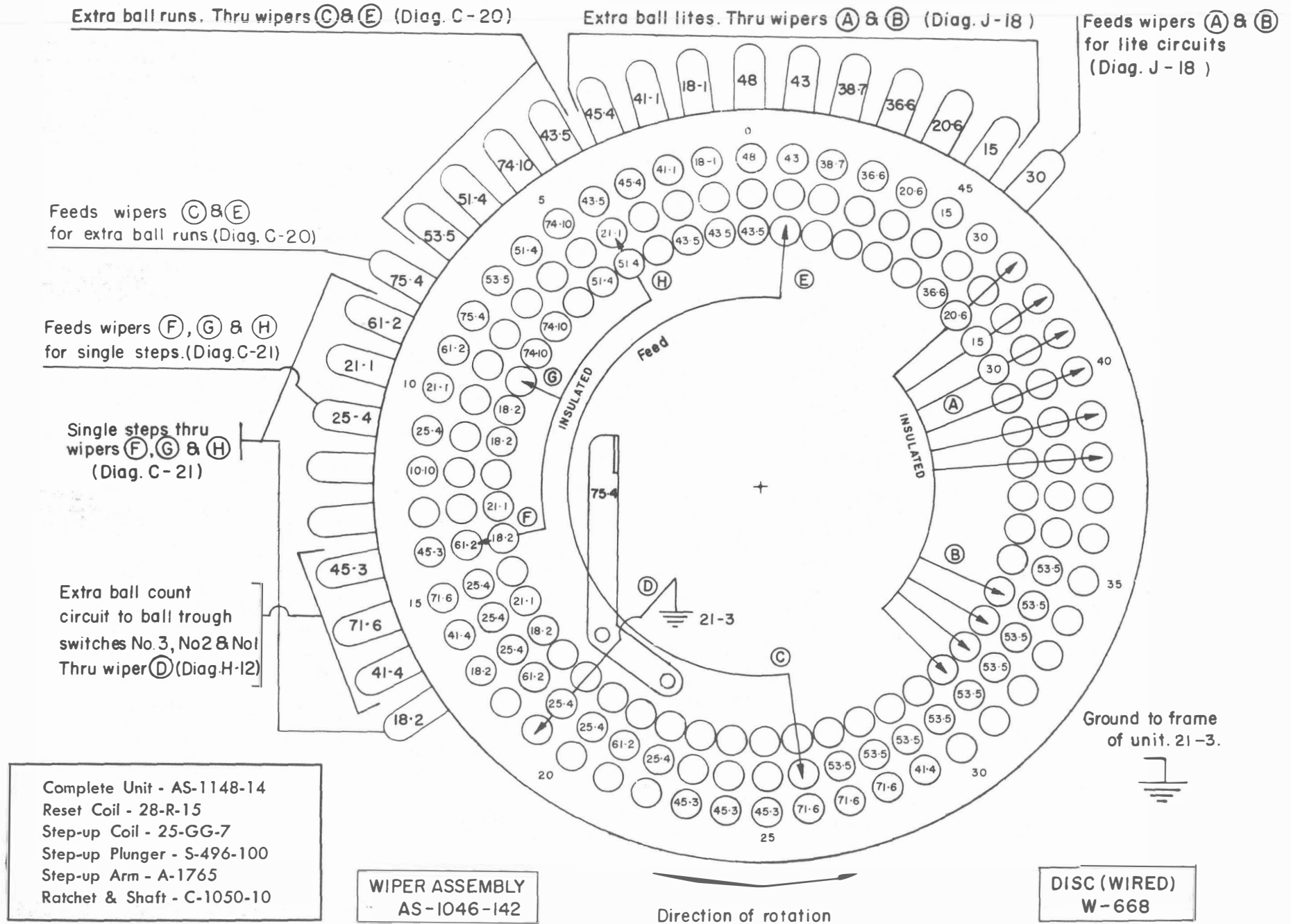
GREEN SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



- Complete unit - AS-1022-32
- Reset coil - 28-R-15
- Step-up coil - 25-GG-7
- Step-up plunger - S-496-100
- Step-up arm - A-1765-3
- Ratchet & shaft - C-1050-8-39

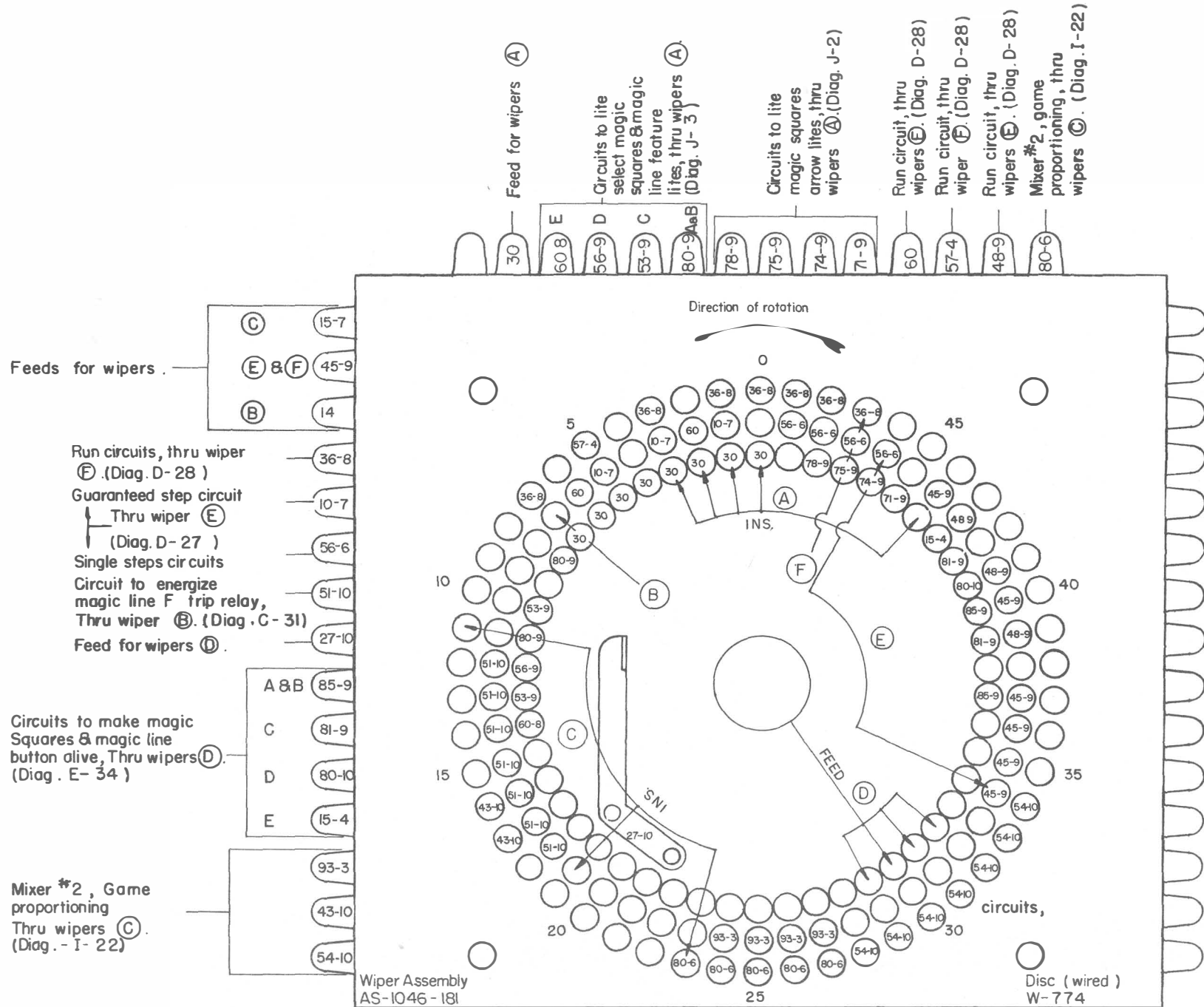




MAGIC SQUARES FEATURE UNIT

viewed from BUTTON or WIPER side

11 step unit. Wipers shown in zero or reset position



MAGIC SQUARES & LINES UNIT PARTS LIST

Complete Unit — AS-1507-6

Wiper Assemblies (wired) for A, B, C, D, E corners — W-757

Contact Plates (wired) for A, B, C, D, E corners — W-766

NOTE: When ordering replacement contact plates W-766 specify for corners A, B, C, D, E (left) or E (right)

Wiper Assembly (wired) for magic line F — W-778

Contact Plate (wired) for magic line F — W-779

Slip Ring & Index Assembly (for A, B, C, D, E corners) — AS-579-23

Slip Ring & Index Assembly (for magic line F) — AS-579-24

Plastic No. Display Discs for

A. Corners — A-1980

B. Corners — A-1980-1

C. Corners — A-1980-2

D. Corners — A-1980-3

E. Corners (left) — A-1980-4

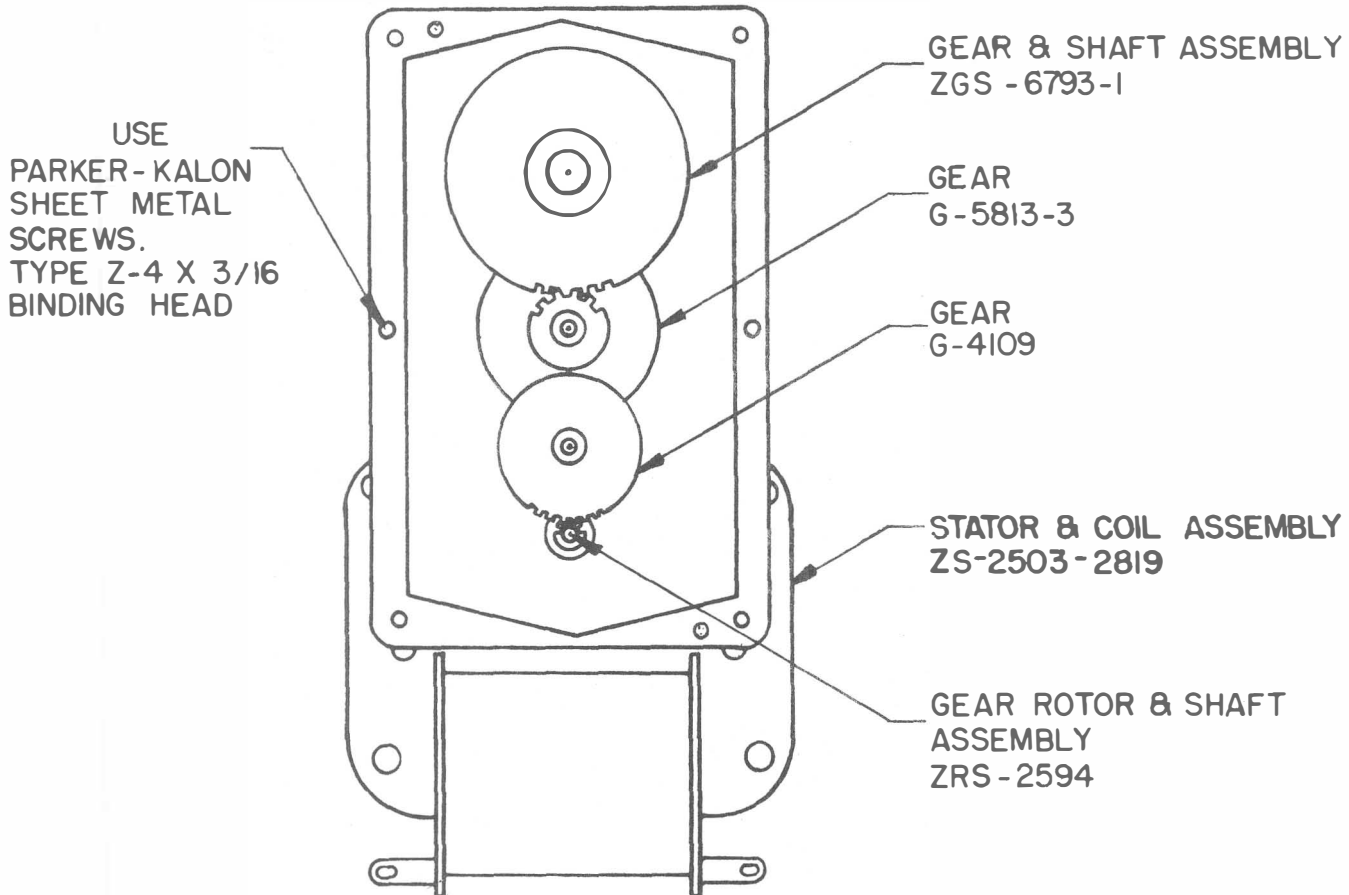
E. Corners (right) — A-1980-5

Plastic No. Display Strip (for Magic Line "F") — M-865-1

Index Coils — E-146-392

Motor E-119-130

MAGIC SQUARES UNIT MOTOR (Part No. E - 119 - 130)

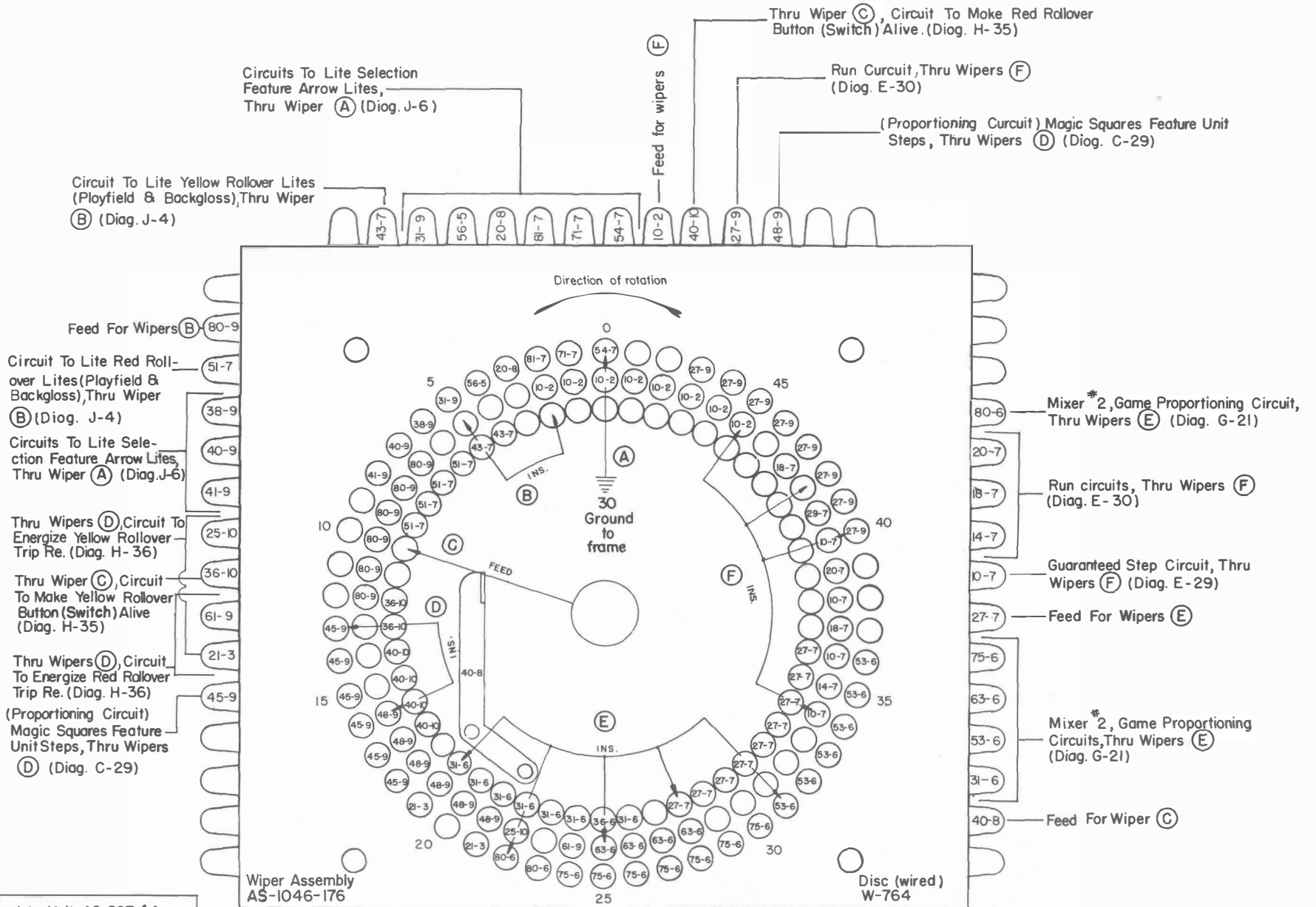


NOTE :

WHEN ORDERING GEARS FOR MAGIC SQUARES
UNIT MOTOR, REFER TO PART NUMBERS SHOWN ABOVE.

SELECTION FEATURE UNIT viewed from BUTTON or WIPER side

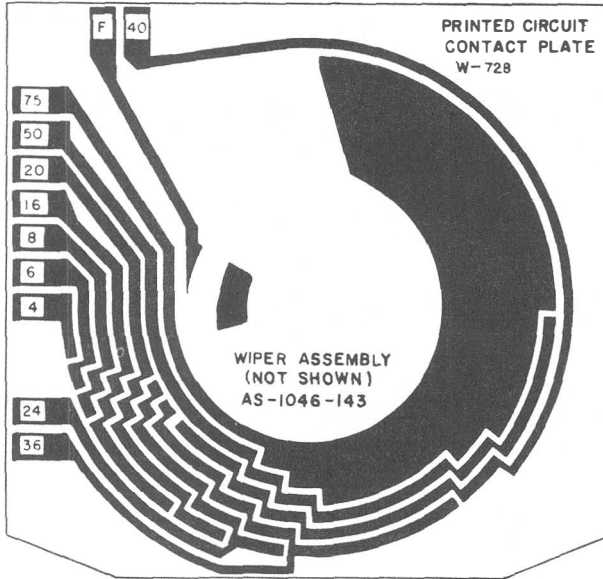
8 step unit. Wipers shown in zero or reset position



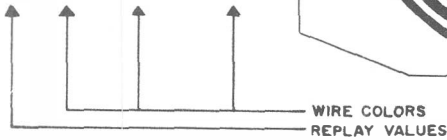
- Complete Unit-AS-827-44
- Reset Coil- 28-R-15
- Step Up Coil-25-GG-7
- Step Up Plunger-S-496-100
- Step Up Arm -A-1765
- Ratchet & Shaft-C-1050-8

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

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



- Complete Unit - AS-797-38
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-116
- Step-up Arm - A-1765
- Ratchet & Shaft - C-100



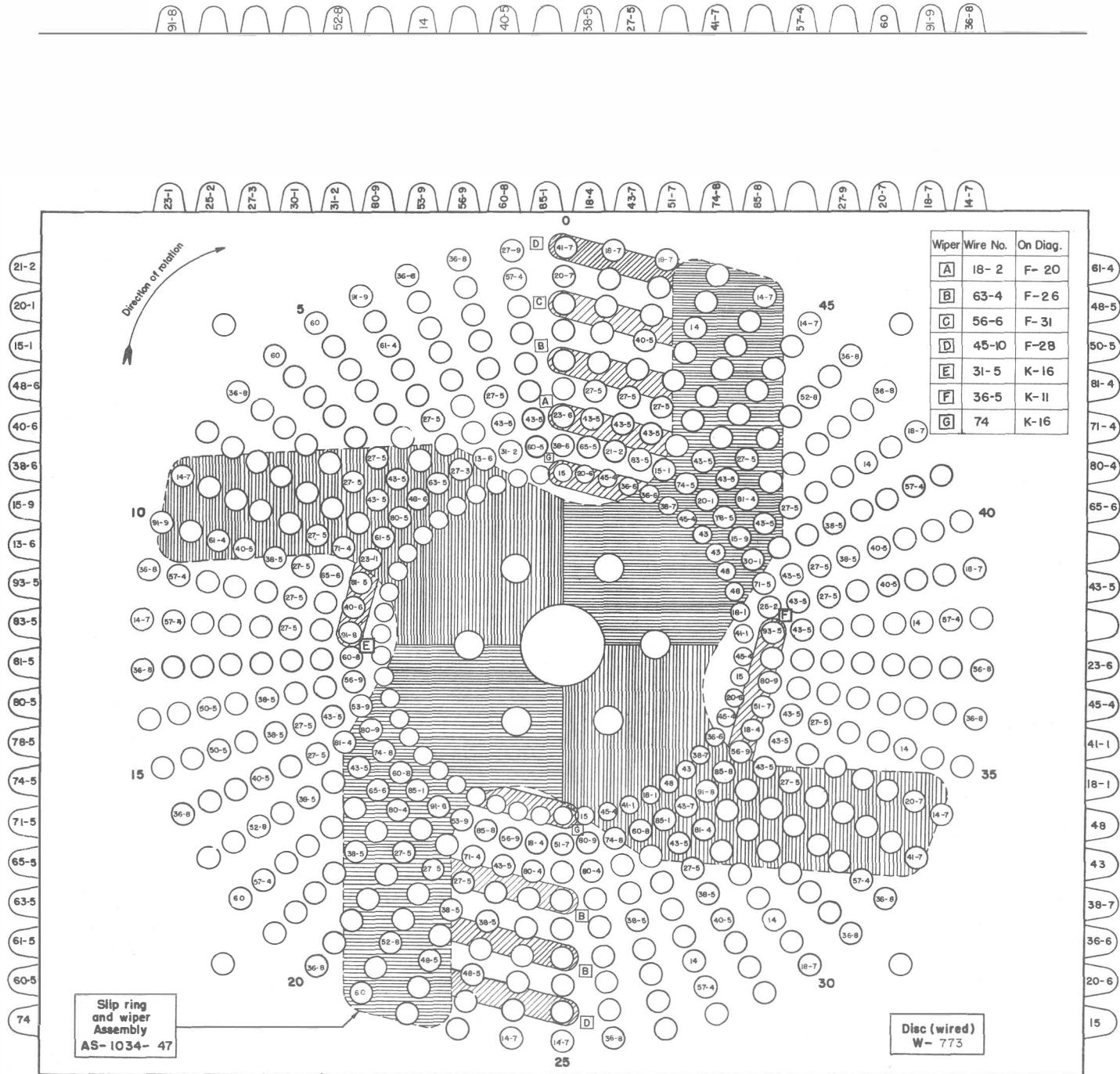
CAM SWITCHES THAT PULSE YELLOW, GREEN & RED REPLAY COUNTER STEP-UP COILS								
	sw.13A	sw.13A	sw.13A	sw.13A	sw.12A	sw.12A	sw.11A	sw.10A
5 IN LINE	75 	75 	96 	96 	200 	300 	450 	600
4 IN LINE	16 	20 	24 	50 	96 	144 	240 	480
3 IN LINE	4 	6 	8 	16 	32 	64 	120 	192

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

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

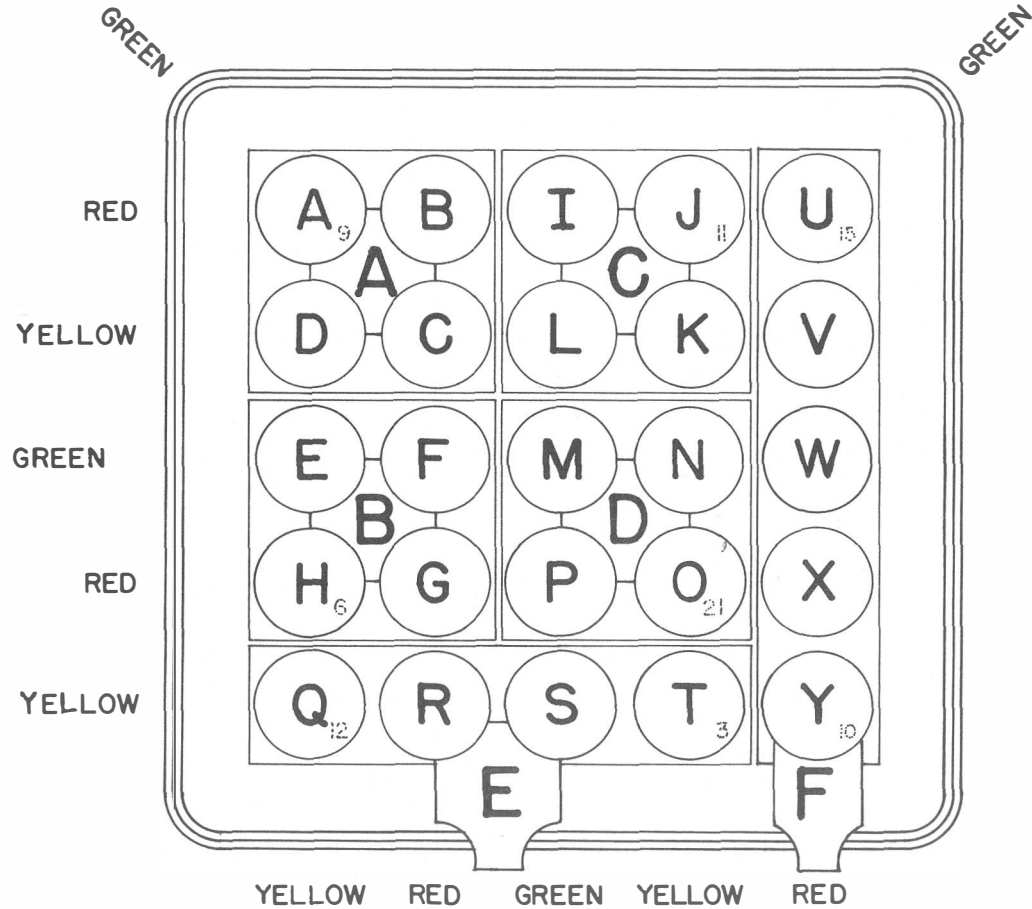
NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.

SPOTTING DISC viewed from BUTTON or WIPER side



CARD LAYOUT

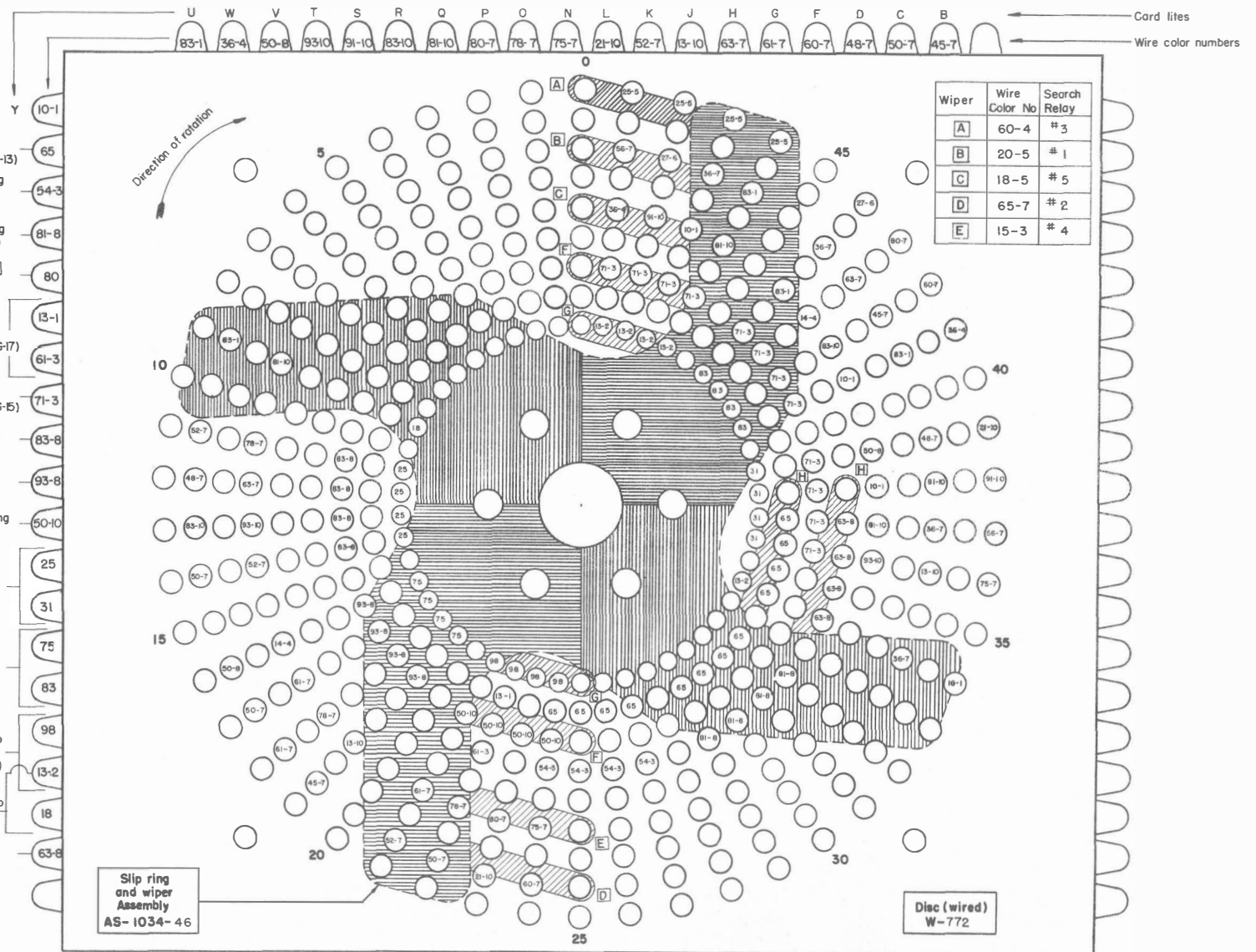
NEUTRAL POSITION



SEARCH POSITIONS						
WIPER (A) AT POSITION	WIPER (B) ROW 7 SEARCH RELAY #1	WIPER (D) ROW 8 SEARCH RELAY #2	WIPER (A) ROW 9 SEARCH RELAY #3	WIPER (E) ROW 6 SEARCH RELAY #4	WIPER (C) ROW 5 SEARCH RELAY #5	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
CORNERS	34	A	U	Y	Q	
35						
VERTICAL	36	J	K	N	O	T
37	A	D	E	H	Q	
HORIZONTAL	38	Q	R	S	T	Y
39	D	C	L	K	V	
40						
VERTICAL	41	U	V	W	X	Y
42	B	C	F	G	R	
HORIZONTAL	43	H	G	P	O	X
44	A	B	I	J	U	
45						
DIAGONAL	46	U	K	M	G	Q
47	A	C	M	O	Y	
VERTICAL	48	I	L	M	P	S
HORIZONTAL	49	E	F	M	N	W
50						

ROTATION OF SEARCH DISC WIPERS
FROM 50 TO 1

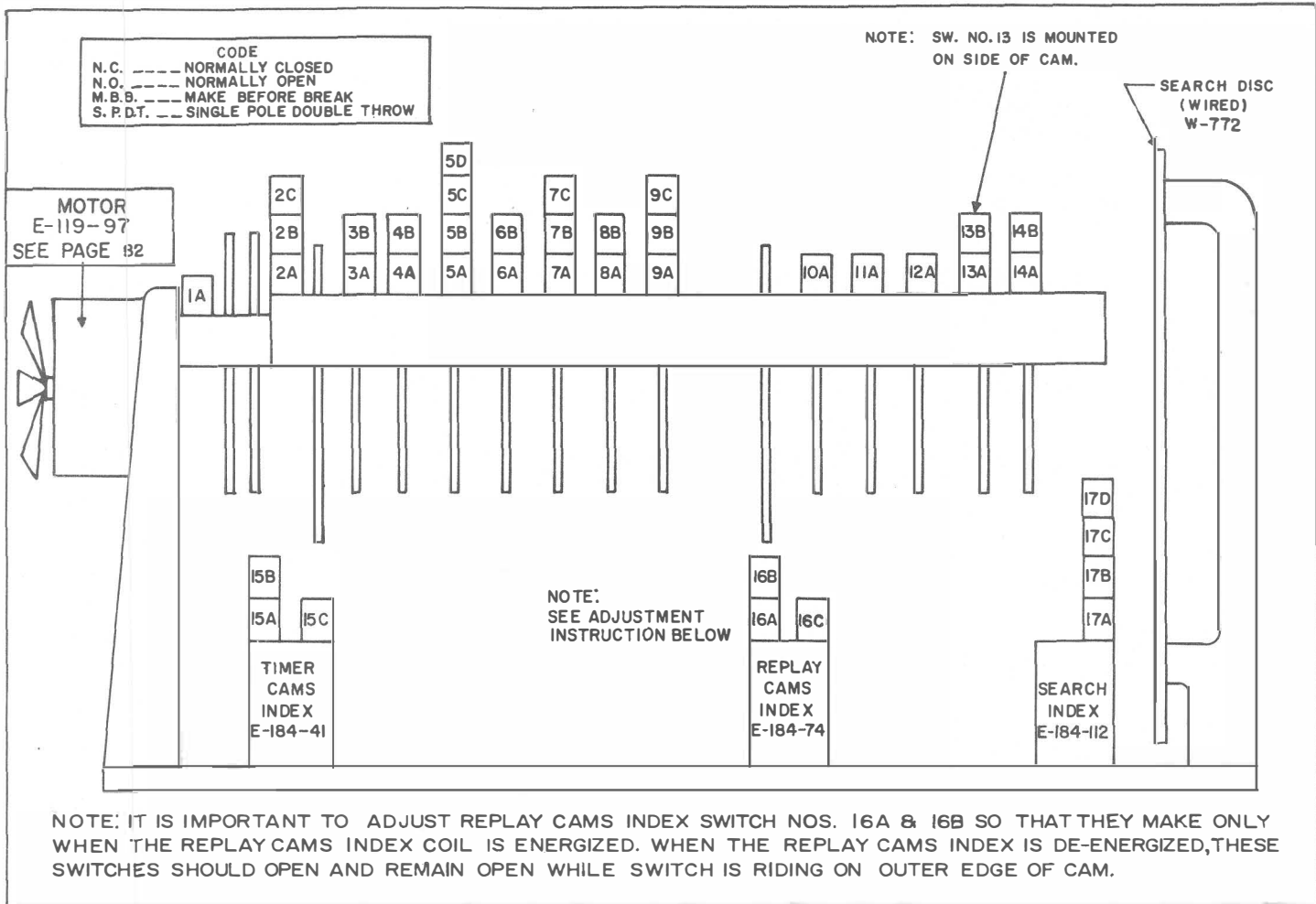
SEARCH DISC viewed from BUTTON or WIPER side



- Part of all 3-in-line scoring circuits. (Diag. G-13)
- Yellow 3-in-line scoring circuits. (Diag. G-13)
- Red 3-in-line scoring circuits. (Diag. G-13)
- Feed for wipers (Diag. C-15)
- "Corners" 5-in-line scoring circuit. (Diag. G-17)
- Part of all 4-in-line scoring circuits. (Diag. G-5)
- Yellow 4-in-line scoring circuits. (Diag. G-15)
- Red 4-in-line scoring circuits. (Diag. G-15)
- Green 4-in-line scoring circuits. (Diag. G-15)
- Yellow replay counter step-up circuit, for all yellow in-line scoring. (Diag. C-15)
- Red replay counter step-up circuit, for all red in-line scoring. (Diag. C-17)
- Green replay counter step-up circuit, for all green in-line scoring. (Diag. C-18)
- Green replay counter step-up circuit, for corners scoring. (Diag. C-19)
- Green 3-in-line scoring circuits. (Diag. G-13)

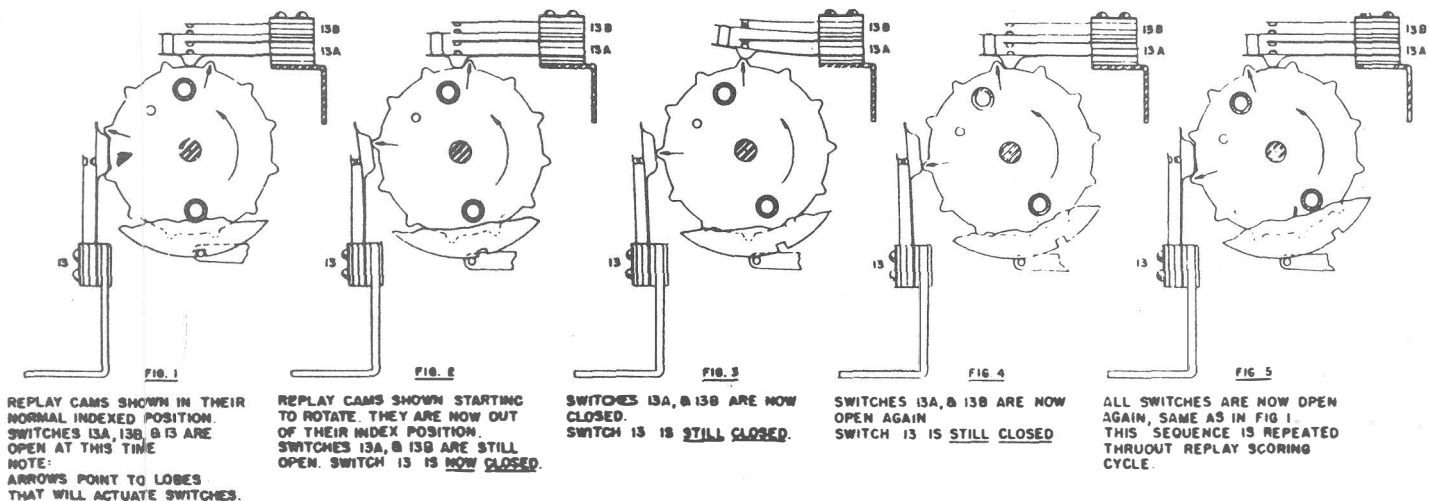
CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



CORRECT ADJUSTMENT: CONTROL UNIT CAM SWITCHES 13, 13A & 13B

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



CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW

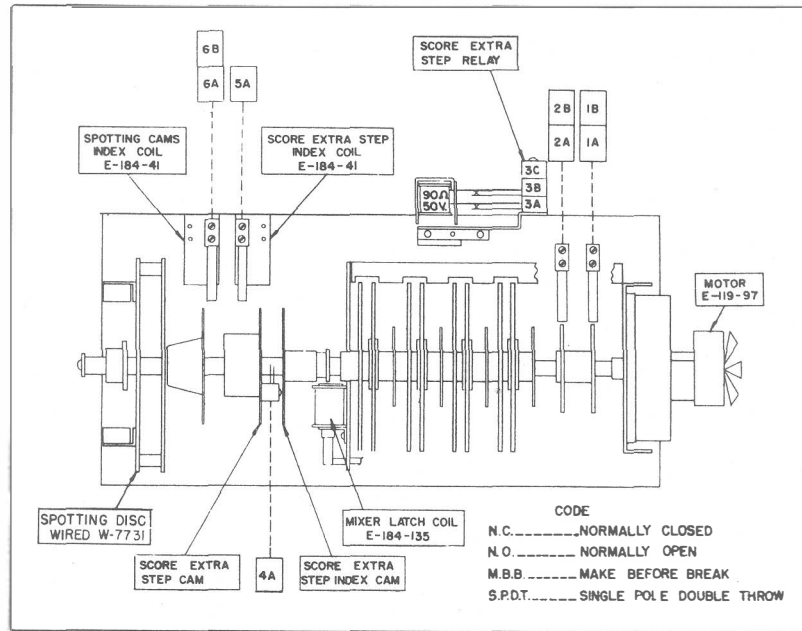
CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N. O.	F-8	65-2 36-9	Brown-White Yellow-Brown	Energizes timer step-up coil, when drag arm switch, selector lock relay switch and cam switch #14B are closed.
2A	N. O.	I-3	90-5 30	Gray Yellow	Energizes reflex play magnet, and replay register reset. Also pulses total plays meter.
2B	N. O.	C-37	93-4 30	Gray-Yellow Yellow	Energizes coin kicker magnet.
2C	N. C.	E-9	31-7 57-6	Yellow-Red White-Orange	Drops out red button relay.
3A	N. C.	I-4	83-3 48-2	Black-Yellow Green-Black	Drops out start relay and sets as safety switch during spin.
3B	S. P. D. T.	B-14	93-7 98-4 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit to replay meter or total plays meter.
4A	N. O.	C-39	98-1 30	Gray-Black Yellow	Energizes spotting cams index coil.
4B	N. O.	C-5	14-9 80-2	Red-Green Black	Used if coin meter is added in front cabinet.
5A	N. O.	G-8	65-2 71-8	Brown-White Orange-Red	Energizes timer reset coil.
5B	N. O.	B-21	38-4 21-1	Yellow-Black Blue-Red	Energizes extra ball unit step-up coil. Steps unit from minus one position to zero position.
5C	N. O.	D-22	78-4 95-11	Orange-Black Grey-Red	Energizes anti-cheat relay.
5D	N. O.	F-28	10-7 85-4	Red Black-White	Magic squares, "and selection feature" steps.
6A	N. C.	H-26	51-5 75-5	White-Red Orange-White	Opens game advantage circuits during spin.
6B	N. O.	B-36	25-9 30	Blue-White Yellow	Energizes score extra step index coil.
7A	N. O.	E-22	60-6 85-4	Brown Black-White	Guaranteed step circuit for Yellow, Red, Green score units.
7B	N. O.	F-25	52-10 63-4	White-Blue Brown-Yellow	Yellow, Red, Green score unit steps.
7C	N. O.	C-37	93-4 30	Gray-Yellow Yellow	Safety switch for coin kicker magnet.
8A	N. O.	G-26	14-8 56-6	Red-Green White-Brown	Single magic squares unit steps. Also energizes corners, Green 3 scores 4 and Magic Line F trip relay.
8B	N. O.	B-21	25-4 38-4	Blue-White Yellow-Black	Extra ball unit steps.
9A	Alt.	C-28	45-9 48-9	Green-White Green-Black	Proportioning circuit. (Magic squares steps.)
9B	Alt.	H-24	15-7 54-8	Red-White White-Green	Proportioning circuit. (Extra ball steps.)
9C	Alt.	D-21	43-5 74-10	Green-Yellow Orange-Green	Proportioning circuit. (Extra ball steps.)

CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONCLUDED

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
10A	N. O.	A-17	63 70	Brown-Yellow Orange	Pulses replay counters when score units are at 8th step.
11A	N. O.	A-16	57 70	White-Orange Orange	Pulses replay counters when score units are at 7th step.
12A	N. O.	A-16	52 70	White-Blue Orange	Pulses replay counters when score units are at 5th and 6th steps.
13A	N. O.	A-15	45 70	Green-White Orange	Pulses replay counters when score units are at 1st, 2nd, 3rd, and 4th steps.
13B	N. O.	C-13	48-4 80	Green-Black Black	Pulses replay register step-up coil, and reflex replay magnet.
13 (Backside)	N. O.	H-13	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch. NOTE: See control unit pictorial view.
14A	N. C.	I-14	56 93	White-Brown Gray-Yellow	Prevent the start of another replay scoring, when unit cams are indexed.
14B	N. C.	C-8	27-2 90-2	Blue-Orange Gray	Opens circuit to timer step-up coil, during replay winner.
TIMER CAMS INDEX COIL		B-6	15-5 93-2	Red-White Gray-Yellow	Energized by switch on start relay. Also thru shutter motor cam switch #5D.
15A	N. O.	G-1	20-P 60-P	Blue (Plastic) Brown(Plastic)	Operates control unit, mixer and spotting unit motors during spin.
15B	N. C.	G-5	14-9 71-2	Red-Green Orange-Red	Opens circuit to coin lockout magnet during spin.
15C	N. C.	D-10	13 30	Red-Yellow Yellow	Lock in safety switch for red button relay.
REPLAY CAMS INDEX COIL		A-13	40-4 70	Green Orange	Energizes when winning score is made and releases replay cams.
16A	N. O.	D-13	27 80	Blue-Orange Black	In series with replay lock in circuit. NOTE: See control unit pictorial view for correct adj.
16B	N. O.	I-14	56 93	White-Brown Gray-Yellow	In series with replay winner circuit. NOTE: See control unit pictorial view for correct adj.
16C	N. C.	C-12	15-2 80	Red-White Black	Opens direct 50 volt circuit to search index coil, coil then held in thru resistor.
SEARCH INDEX COIL		A-12	15-2 70	Red-White Orange	Energizes when 3-in-line or more is scored.
17A	N. O.	L-33	10 71-10	Red Orange-Red	Completes circuit to energize #3 search relay.
17B	N. O.	C-13	40-4 80	Green Black	Energizes replay cams index if a score is made.
17C	N. C.	I-4	83-3 30	Black-Yellow Yellow	Opens start circuit and also acts as safety switch.
17D	N. C.	F-34	45-5 91-6	Green-White Grey-Red	Opens circuit to Magic Squares and Lines Buttons during replay winner.

MIXER AND SPOTTING UNIT ASSEMBLY NUMBERS CORRESPOND TO SWITCH CHART BELOW

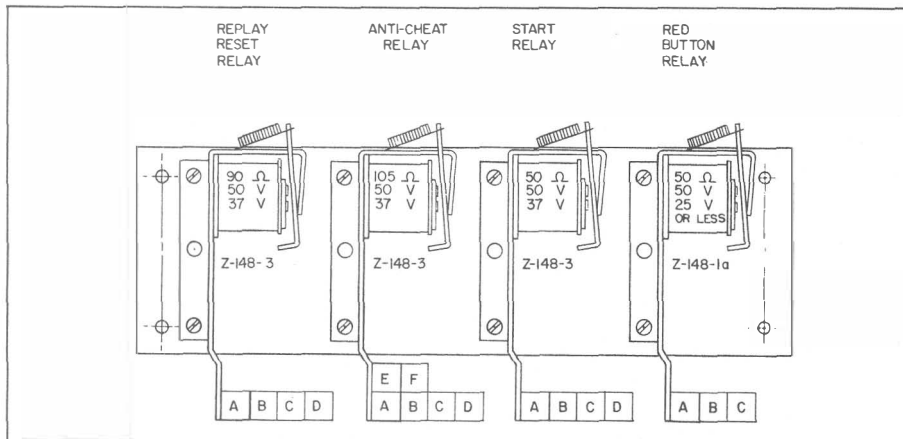


MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.O.	L-1	80-9 90	Black Gray	Flashes "select now" lite.
1B N.O.	G-26	14-8 45-10	Red-Green Green-White	Pulses magic squares, and selection feature units for multiple steps.
2A N.O.	D-3	75-2 53-7	Orange-White White-Yellow	Pulses replay register reset coil.
2B N.O.	B-20	78 38-4	Orange-Black Yellow-Black	Pulses extra ball step-up coil for multiple steps.
SCORE EXTRA STEP RELAY COIL	A-32	43-6 70	Green-Yellow Orange	Energized by Yellow, Red, or Green score unit step-up arm switch.
3A N.O.	E-32	81-3 43-6	Black-Red Green-Yellow	Part of lock-in circuit for this relay.
3B N.O.	C-23	50-4 51-6	White White-Red	Completes circuit to Yellow, Red or Green score unit step-up coil for multiple steps.
3C N.C.	A-6	15-5 70	Red-White Orange	Breaks circuit to mixer latch and timer cams index coils. (Safety switch.)
4A N.O.	D-23	43-4 50-4	Green-Yellow White	Pulses Yellow, Red or Green score unit step-up coil for multiple steps.
SCORE EXTRA STEP INDEX COIL	A-36	25-9 70	Blue-White Orange	Energized during timing cam cycle by control unit cam switch #6B.
5A N.O.	F-32	13-5 81-3	Red-Yellow Black-Red	Completes lock in circuit for score extra step relay.
SPOTTING CAMS INDEX COIL	A-39	98-1 70	Gray-Black Orange	Energized during timing cam cycle by control unit cam switch #4A.
6A N.O.	J-16	13-4 30	Red-Yellow Yellow	(Same as above) also flashes extra ball lites during extra ball play.
6B N.O.	J-11	61-9 30	Brown-Red Yellow	Completes "game advantages" flash circuit.

4 RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART



Coil part numbers	
50 Ω 50 V	C-2794-9
90 Ω 50 V	C-2794-1
105 Ω 50 V	C-2794-23

Code	
N.C.	Normally Closed
N.O.	Normally Open
M.B.B.	Make Before Break
S.P.D.T.	Single Pole Double Throw

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

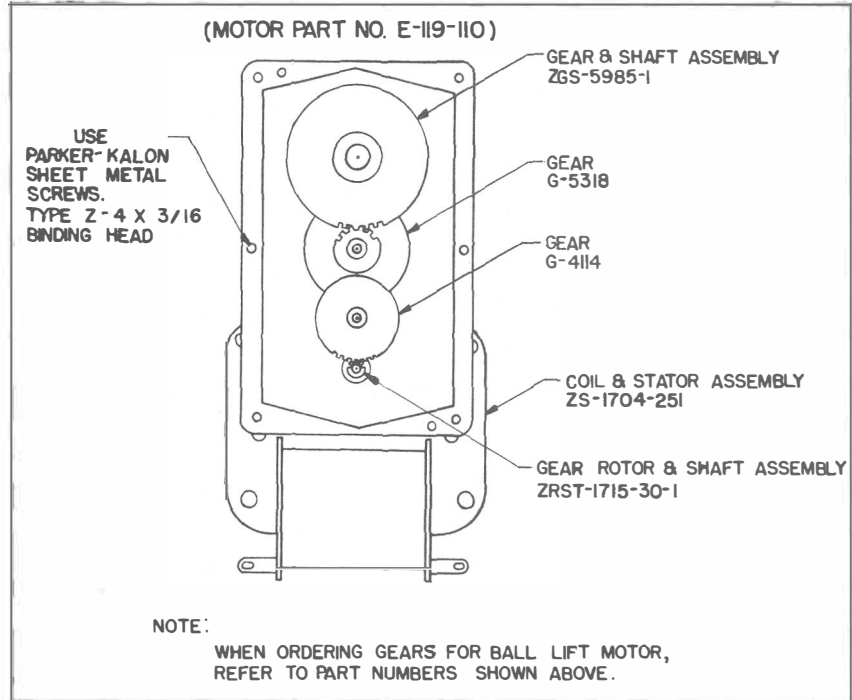
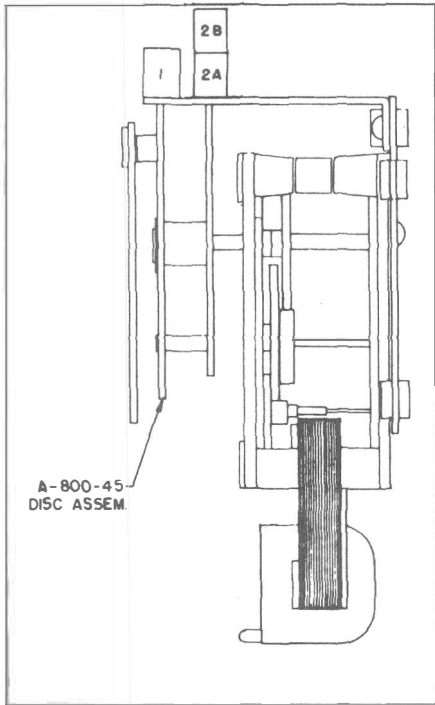
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energizes when anti-cheat relay drops out.
A S.P.D.T.	C-3	90-5 13-9 53-7	Gray Red-Yellow White-Yellow	Directs replay register reset circuit thru control unit cam switch #2A, when replays are being played, or thru 16 pulse cam when replays are being cancelled.
B N.O.	G-3	56-2 75-2	White-Brown Orange-White	Lock-in switch for this relay.
C N.O.	G-1	20-P 60-P	Blue (Plastic) Brown(Plastic)	Completes circuit to control unit, and mixer & spotting unit motors, when replays are being cancelled.
D N.C.	C-4	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
ANTI-CHEAT RELAY COIL	A-22	78-4 70	Orange-Black Orange	Energized thru control unit cam switch #5C, its switches protect replay, game advantage, and lite circuits.
A S.P.D.T.	G-4	75-2 56-2 50-2	Orange-White White-Brown White	Breaks start relay circuit, and completes circuit to replay reset relay when this relay drops out.
B N.O.	D-22	78-4 30	Orange-Black Yellow	Lock-in switch for this relay.
C N.O.	L-23	20-4 80-1	Blue Black	Breaks 17 volt circuit, when this relay drops out.
D N.C.	E-10	57-6 85-7	White-Orange Black-White	Safety switch. (Red button relay circuit.)
E S.P.D.T.	L-21	91-2 38 54-2	Gray-Red Yellow-Black White-Green	Breaks 6 volt circuit, and lites tilt lite, when this relay drops out.
F N.C.	I-7	45-8 23-9	Green-White Blue-Yellow	Safety switch. (Shutter motor circuit.)

CONCLUDED ON NEXT PAGE

4 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
START RELAY COIL	A-4	21-6 70	Blue-Red Orange	Energized every time a coin is played, or when red or yellow button is pressed.
A N. C.	B-20	75-4 78	Orange-White Orange-Black	Opens extra ball step-up circuit during spin of control unit.
B N. C.	G-25	38-10 83-9	Yellow-Black Black-Yellow	Opens game advantage circuits during spin of control unit.
C N. O.	F-6	13-3 90-9	Red-Yellow Black-White	Completes circuit to timer cams index, and mixer latch coils.
D N. O.	F-4	48-2 63-2	Green-Black Brown-Yellow	Lock-in switch for this relay.
RED BUTTON RELAY COIL	A-10	85-7 70	Black-White Orange	Energizes when red button is pressed.
A S. P. D. T.	C-6	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit from mixer latch, and timer cams index coils during extra ball play, to shutter motor when starting new game after extra ball play.
B N. O.	D-10	31-7 27-8	Yellow-Red Blue-Orange	Lock-in switch for this relay.
C N. C.	K-22	50-9 21-4	White Blue-Red	Opens extra ball lite circuit.

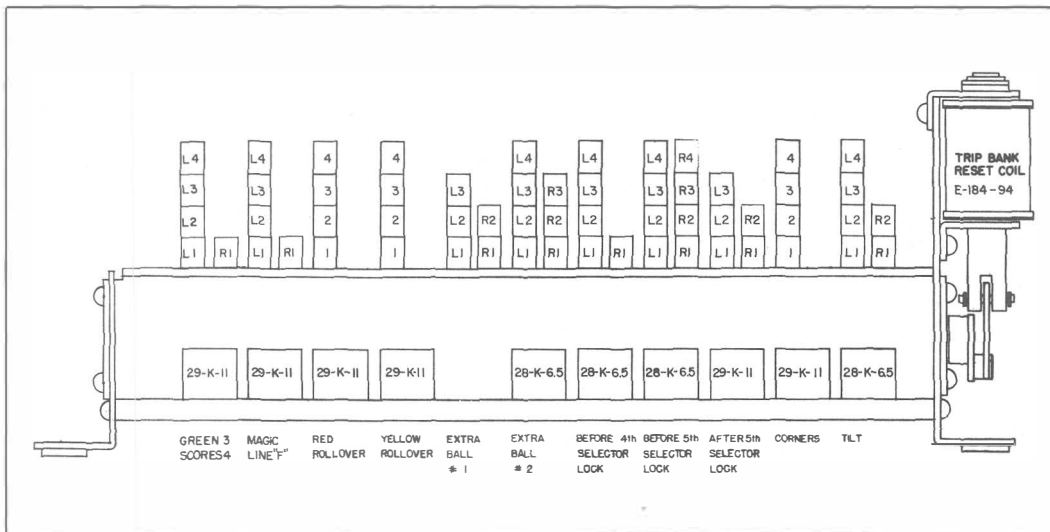
BALL LIFT MOTOR PICTORIAL VIEW



CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCH
1 N.O.	H-12	30 91-1	Yellow Grey-Red	Carry-over switch for ball lifter motor.
2A N.O.	E-7	43-2 27-2	Green-Yellow Blue-Orange	Energizes timer unit step-up coil.
2B N.O.	C-9	57-7 93-9	White-Orange Gray-Yellow	Energizes before 4th selector lock trip relay, at 4th step of timer unit.

TRIP RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH-CHART



CODE
 N.C. ----- NORMALLY CLOSED
 N.O. ----- NORMALLY OPEN
 M.B.B. ----- MAKE BEFORE BREAK
 S.P.D.T. ----- SINGLE POLE DOUBLE THROW

CHART ON NEXT PAGE

TRIP RELAY BANK CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
GREEN 3 SCORES 4 TRIP COIL	A-30	J 70	Jumper Orange	Energized by control unit cam switch #8A, when circuit complete thru other factors.
L1 N. O.	J-9	91-8 30	Gray-Red Yellow	Completes circuit to "green 3 scores 4 lite."
L2 N. C.	B-30	52-8 J	White-Blue Jumper	Breaks circuit to coil.
L3 N. O.	F-17	18-9 63-8	Red-Black Brown-Yellow	Completes replay scoring circuit for green 3-in-line, scores green 4-in-line.
L4 N. C.	G-25	14-8 38-10	Red-Green Yellow-Black	Proportioning circuit.
R1 N. C.	G-16	18-9 50-10	Red-Black White	Safety circuit (replay scoring).
MAGIC LINE "F" TRIP COIL	A-31	J 70	Jumper Orange	Energized by control unit cam switch #8A, when circuit complete thru other factors.
L1 N. O.	J-8	18-4 30	Red-Black Yellow	Completes circuit to "magic line F lite."
L2 N. C.	B-31	51-10 J	White-Red Jumper	Breaks circuit to coil.
L3 N. O.	F-35	21 27-10	Blue-Red Blue-Orange	Completes circuit to make magic line button "F" alive.
L4 N. C.	H-22	53-10 54-10	White-Yellow White-Green	Mixer #2 proportioning circuit.
R1 N. C.	H-22	43-10 91-3	Green-Yellow Gray-Red	Mixer #2 proportioning circuit.
RED ROLLOVER TRIP COIL	A-36	61-11 70	Brown-Red Orange	Energized direct thru "selection feature" unit disc, also by red rollover button switch, thru "selection feature" unit disc.
1 N. O.	H-34	45-5 98-9	Green-White Gray-Black	Completes circuit to magic squares, and magic lines buttons.
2 N. C.	B-36	18-10 61-11	Red-Black Brown-Red	Breaks circuit to coil.
3 S. P. D. T.	J-1	53-2 90 78-2	White-Yellow Gray Orange-Black	Breaks circuit to flash "select-now" lite before shooting 4th & before shooting 5th ball, and completes circuit to flash "select-now" lite after shooting 5th ball.
4 S. P. D. T.	J-8	41-8 80-9 85-8	Green-Red Black Black-White	Breaks circuit to select before 4th & select before 5th ball feature lites, and completes circuit to select after 5th ball feature lite.
YELLOW ROLL- OVER TRIP COIL	A-35	25-11 70	Blue-White Orange	Energized direct thru "selection feature" unit disc, also by yellow rollover button switch, thru "selection feature" unit disc.
1 N. O.	H-33	15-10 98-9	Red-White Gray-Black	Completes circuit to magic squares, and magic lines buttons.
2 N. C.	B-35	25-11 31-10	Blue-White Yellow-Red	Breaks circuit to coil.
3 S. P. D. T.	K-1	10-5 53-2 23-5	Red White-Yellow Blue-Yellow	Breaks circuit to flash "select-now" lite before shooting 4th ball, and completes circuit to flash "select-now" lite before shooting 5th ball.
4 S. P. D. T.	J-8	57-5 41-8 74-8	White-Orange Green-Red Orange-Green	Breaks circuit to select before 4th ball feature lite, and completes circuit to select before 5th ball feature lite.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL #1 TRIP	A-10			Energized with extra ball #2.
L1 N. O.	J-22	21-4 30	Blue-Red Yellow	Completes circuit to extra balls lite.
L2 S.P.D.T.	E-21	85-4 30 61-2	Black-White Yellow Brown-Red	Breaks guaranteed score step circuit, and completes circuit to extra ball unit for 1st step.
L3 S.P.D.T.	G-25	52-10 27-7 18-2	White-Blue Blue-Orange Red-Black	Breaks score step circuit, and completes circuit for extra ball steps.
R1 N. O.	H-25	27-7 54-8	Blue-Orange White-Green	Proportioning circuit.
R2 N. C.	D-21	85-4 91-11	Black-White Gray-Red	Safety circuit. (Anti-cheat relay)
EXTRA BALL #2 TRIP COIL	A-10	25-7 70	Blue-White Orange	Energized by yellow button switch, thru before 5th selector lock trip relay switch.
L1 S.P.D.T.	J-16	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Breaks circuit for flashing other game advantage lites, and completes circuit for flashing extra ball lites.
L2 N. C.	B-10	25-7 38-2	Blue-White Yellow-Black	Breaks circuit to coil.
L3 N. C.	K-12	36-5 61-9	Yellow-Brown Brown-Red	Breaks circuit for flashing other game advantage lites, during extra ball play.
L4 S.P.D.T.	D-6	14-3 43-9 98-2	Red-Green Green-Yellow Gray-Black	Breaks circuit to shutter motor, and completes circuit to mixer latch and timer cams index coils, during extra ball play.
R1 S.P.D.T.	I-25	75-5 15-7 45-2	Orange-White Red-White Green-White	Proportioning circuit.
R2 N. C.	H-26	45-2 83-9	Green-White Black-Yellow	Breaks circuit for getting other game advantages, during extra ball play.
R3 N. O.	D-12	38-3 91-1	Yellow-Black Gray-Red	Completes circuit to ball lifter motor, during extra ball play.
BEFORE 4th SELECTOR LOCK TRIP COIL	A-10	J 70	Jumper Orange	Energized thru timer unit disc, when 4th ball is shot.
L1 N. O.	G-8	36-2 43-2	Yellow-Brown Green-Yellow	Completes circuit to timer unit step-up coil.
L2 N. C.	A-10	83-6 J	Black-Yellow Jumper	Breaks circuit to coil.
L3 N. O.	I-16	45-6 56	Green-White White-Brown	In series circuit, for replay scoring.
L4 N. C.	H-34	15-10 98-9	Red-White Gray-Black	Breaks circuit to magic squares, and magic lines buttons.
R1 N. C.	K-1	10-5 27-4	Red Blue-Orange	Breaks circuit to flash select-now lite.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

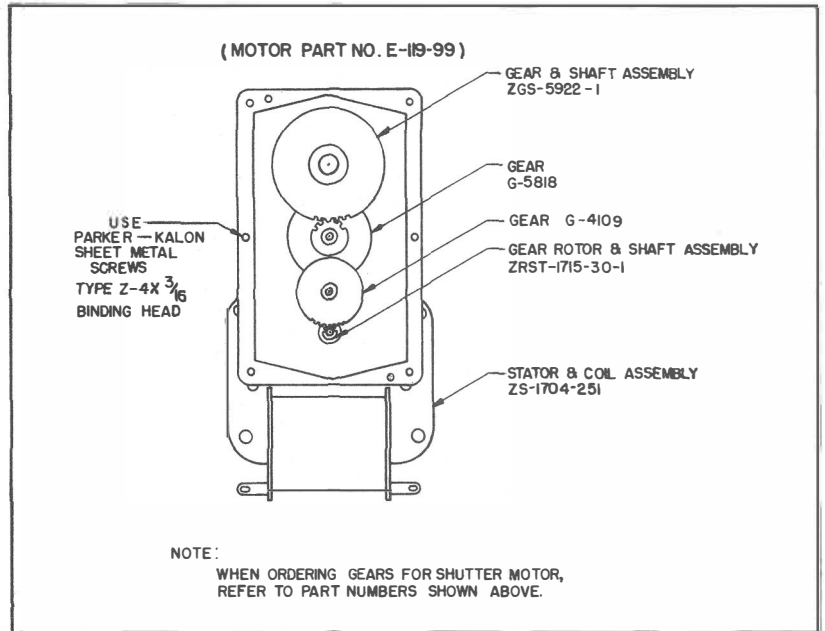
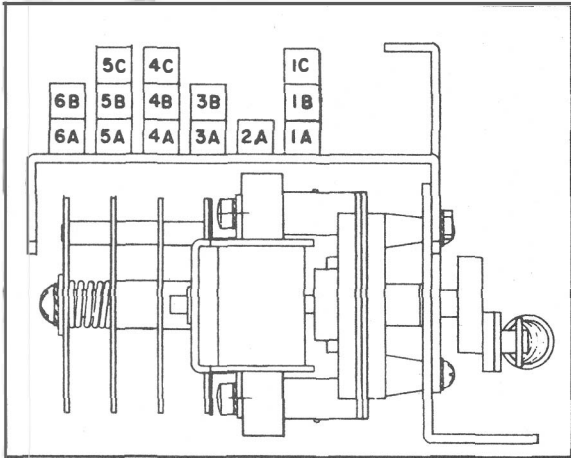
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BEFORE 5th SELECTOR LOCK TRIP COIL	A-9	J 70	Jumper Orange	Energized thru timer unit disc, when 5th ball is shot.
L1 N.O.	B-11	25-8 38-2	Blue-White Yellow-Black	Completes circuit to extra ball trip relays, for extra ball play.
L2 N.C.	B-9	74-6 J	Orange-Green Jumper	Breaks circuit to coil.
L3 N.O.	E-4	18-6 50-2	Red-Black White	Completes circuit to make yellow button alive, for extra ball play.
L4 N.C.	K-4	20-2 43-7	Blue Green-Yellow	Breaks circuit to yellow rollover lite.
R1 S.P.D.T.	L-1	98-3 14-1 75-3	Gray-Black Red-Green Orange-White	Breaks circuit to flash "select-now" lite (for select before 5th ball) and completes circuit to flash "select-now" lite (for select after 5th ball).
R2 N.C.	H-34	15-10 45-5	Red-White Green-White	Breaks circuit to magic squares, and magic lines buttons.
R3 N.O.	D-8	27-2 78-6	Blue-Orange Orange-Black	Completes circuit to timer unit step-up coil.
R4 N.C.	B-35	25-10 31-10	Blue-White Yellow-Red	Breaks circuit for energizing yellow rollover trip relay, (thru yellow rollover button switch)
AFTER 5th SELECTOR LOCK TRIP COIL	A-9	J 70	Jumper Orange	Energized when 6th ball (1st extra ball) is shot.
L1 N.C.	K-1	75-3 78-2	Orange-White Orange-Black	Breaks circuit to flash "select-now" lite.
L2 N.C.	B-9	98-5 J	Gray-Black Jumper	Breaks circuit to coil.
L3 N.C.	K-5	10-9 51-7	Red White-Red	Breaks circuit to red rollover lite.
R1 N.C.	F-34	27-10 91-6	Blue-Orange Gray-Red	Breaks circuit to magic squares, and magic lines buttons.
R2 N.C.	C-36	18-10 61-9	Red-Black Brown-Red	Breaks circuit for energizing red rollover trip relay, (thru red rollover button switch).
CORNERS TRIP COIL	A-31	J 70	Jumper Orange	Energized by control unit cam switch #8A, when circuit complete thru other factors.
1 N.O.	J-8	85-1 30	Black-White Yellow	Completes circuit to "corners" lite.
2 N.C.	B-31	61-4 J	Brown-Red Jumper	Breaks circuit to coil.
3 N.O.	G-17	13-1 71-3	Red-Yellow Orange-Red	Part of corners replay scoring circuit.
4 N.O.	C-19	18 98	Red-Black Gray-Black	Part of corners replay scoring circuit.

CONCLUDED ON NEXT PAGE

TRIP RELAY BANK CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TILT TRIP COIL	A-11	14-5 70	Red-Green Orange	Energized by any tilt switch, or the plumb-bob tilt. Also at 39th step of the timer unit.
L1 S.P.D.T.	I-7	21-3 30 45-8	Blue-Red Yellow Green-White	Breaks circuit for game advantages, replay scoring, ball counting, and completes circuit to shutter motor.
L2 N.C.	I-34	40-8 98-9	Green Gray-Black	Breaks circuit to magic squares, and magic lines buttons.
L3 N.C.	L-23	10 20-4	Red Blue	Breaks 17 volt circuit.
L4 S.P.D.T.	L-22	38 81 91-2	Yellow-Black Black-Red Gray-Red	Breaks 6 volt circuit, and completes circuit to tilt lite.
R1 N.O.	D-11	57-6 85-7	White-Orange Black-White	Safety switch, (red button relay circuit).
R2 N.C.	G-1	20-P 60-P	Blue(Plastic) Brown(Plastic)	Breaks circuit to control, magic squares, and mixer and spotting unit motors.

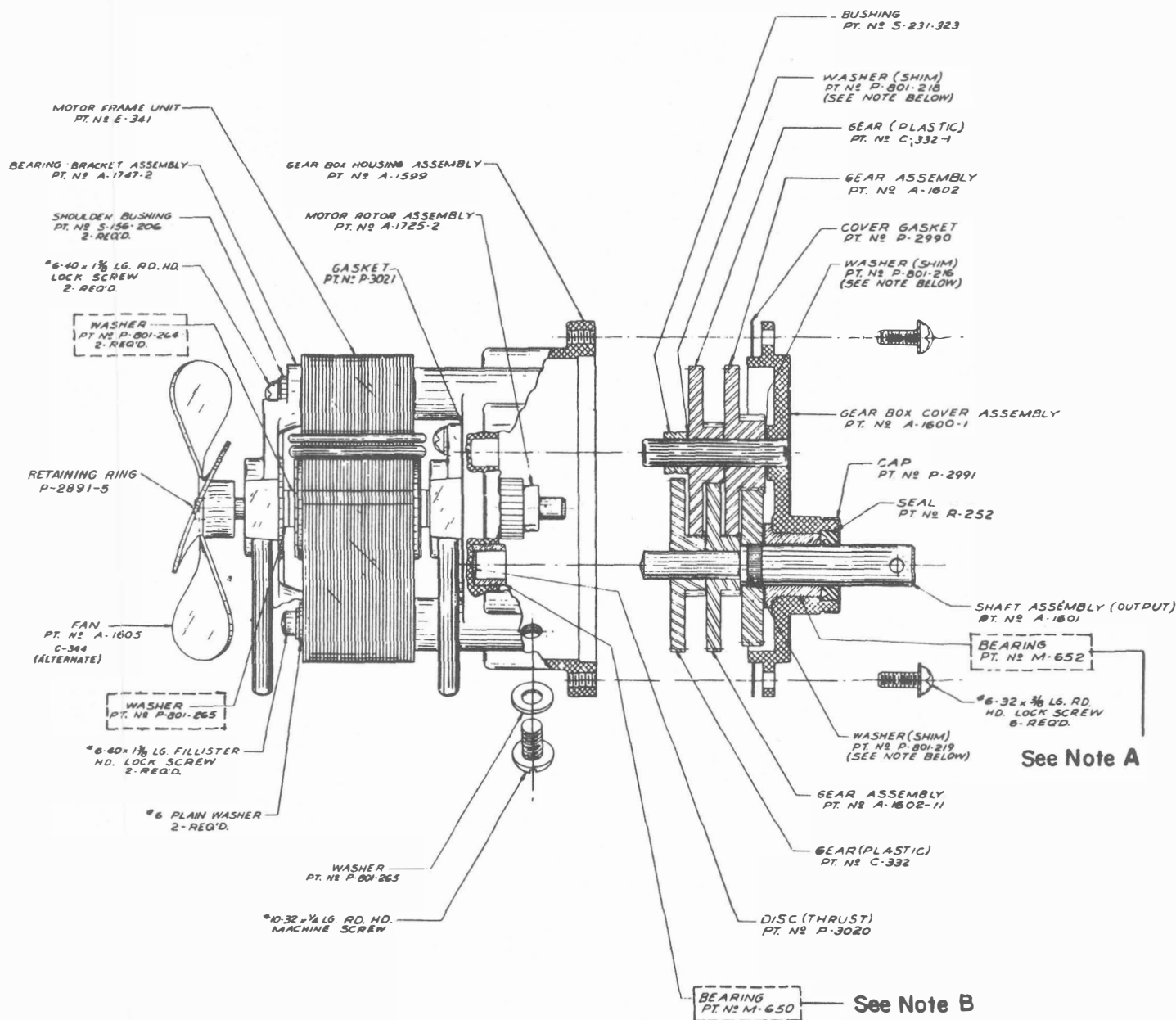
SHUTTER MOTOR PICTORIAL VIEW



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

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N. C.	I-13 93 21-3	Gray-Yellow Blue-Red	Completes circuit to replay scoring circuit.
1B	N. O.	G-6 30 14-3	Yellow Red-Green	Carry thru for shutter motor.
1C	N. C.	I-8 21-3 98-8	Blue-Red Gray-Black	Safety switch. (timer reset circuit).
2A	N. C.	F-12 31-3 36-3	Yellow-Red Yellow-Brown	Completes circuit to ball lifter motor (closed normally) open during shutter cycle.
3A	N. O.	C-38 30 85-5	Yellow Black-White	Resets extra ball, and Yellow, Red, Green replay counter units.
3B	N. O.	H-2 20-P 70-P	Blue (Plastic) Brown(Plastic)	Resets trip relay bank.
4A	N. O.	F-6 18-3 14-3	Red-Black Red-Green	(Closed when shutter is open). Completes circuit to shutter motor.
4B	N. C.	I-33 21-3 40-8	Blue-Red Green	Safety switch for "magic squares" button circuits.
4C	N. O.	H-6 45-8 18-3	Green-White Red-Black	Starts shutter motor if game is tilted when shutter is open.
5A	N. C.	H-8 98-8 65-2	Gray-Black Brown-White	Safety switch (timer reset circuit).
5B	N. O.	E-37 31-4 91-4	Yellow-Red Gray-Red	Safety circuit (lifter start relay).
5C	S. P. D. T.	E-5 43-9 13-3 93-2	Green-Yellow Red-Yellow Gray-Yellow	Breaks circuit to shutter motor and makes circuit to timer cams index and mixer latch coils.
6A	N. O.	H-8 30 71-8	Yellow Orange-Red	Completes circuit to timer reset coil.
6B	N. O.	C-39 30 78-3	Yellow Orange-Black	Resets magic squares, and Yellow, Red, Green score units. Also resets selection feature unit.

MOTOR ASSEMBLY (Part No. E-119-97)



NOTE

IN ORDER TO MAINTAIN PROPER CLEARANCES BETWEEN GEARS IT IS MOST IMPORTANT THAT WHEN REASSEMBLING GEAR TRAIN:

1. SHIMS BE REPLACED IN THEIR RESPECTIVE LOCATIONS.
2. SAME NUMBER OF SHIMS BE REPLACED IN EACH RESPECTIVE LOCATION.

CHECK PART NUMBER ON GEAR BEFORE ORDERING GEAR

NOTE A: Bearing M-652 is part of Gear Box Cover Assembly A-1600-1 and cannot be ordered separately.

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

NOTES

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	
G-272	Back glass
M-281-14	Lock and Keys (2) keyed alike
E-122-19	Transformer

Back Door Assembly:

M-281-12	Lock and Keys (2) keyed alike
E-300-73	Search relay bank assembly

Front Cabinet Assembly:

M-168-15	Ball
AS-187-13	Ball shooter assembly
A-1540	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-429-15	Ball trough only
P-1900-18	Coin Box
E-130-10	Counter—48 Volt
CA-350-1	Legs
M-163-4	Leg adjuster
M-106	Leg bolt
M-310-2	Leg-Anti-split bolt
M-497	Wire (long) for A-429-15 trough
M-497-1	Wire (short) for A-429-15 trough

Front Door Assembly:

Part No.	
A-1729-4	Button—Metal
C-2342-102	Coil for coin kicker assembly
E-101-45	Coil for coin lockout
AS-1316	Coin kicker assembly
AS-277-33	Coin switch assembly 5¢
AS-277-34	Coin switch assembly 10¢
CA-567-41	Front door only
AS-1671	Front door assembly 5¢
AS-1671-1	Front door assembly 10¢
A-254-33	Hinge and bracket
M-281-6	Lock and keys
E-108-32	Micro switch for coin switch assembly 5¢ and 10¢ play
P-2768-5	Ring-red for A-1729-4 button
P-2768-6	Ring-yellow for A-1729-4 button
P-2768-7	Ring for M-281-6 lock
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

Front Moulding Assembly:

AS-1305-11	Front moulding assembly complete
A-1272-23	“A” Button
A-1272-24	“B” Button
A-1272-25	“C” Button
A-1272-26	“D” Button
A-1272-27	“E” Button
A-1272-28	“F” Button
P-2210-8	5¢ plate—Coin Entry
P-2210-9	10¢ plate—Coin Entry
P-2210-36	Plate for A-B-C-D-E-F Buttons
CA-858-2	Front moulding only

Panel Assembly-Top:

AS-1315	Ball gate and switch assembly
C-326-9	Light Shield post
R-115-4	Rebound rubber
M-170	Rebound spring-Double post
R-243	Rubber ring for Yellow post
R-243-2	Rubber ring for Red post

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