

Bally®

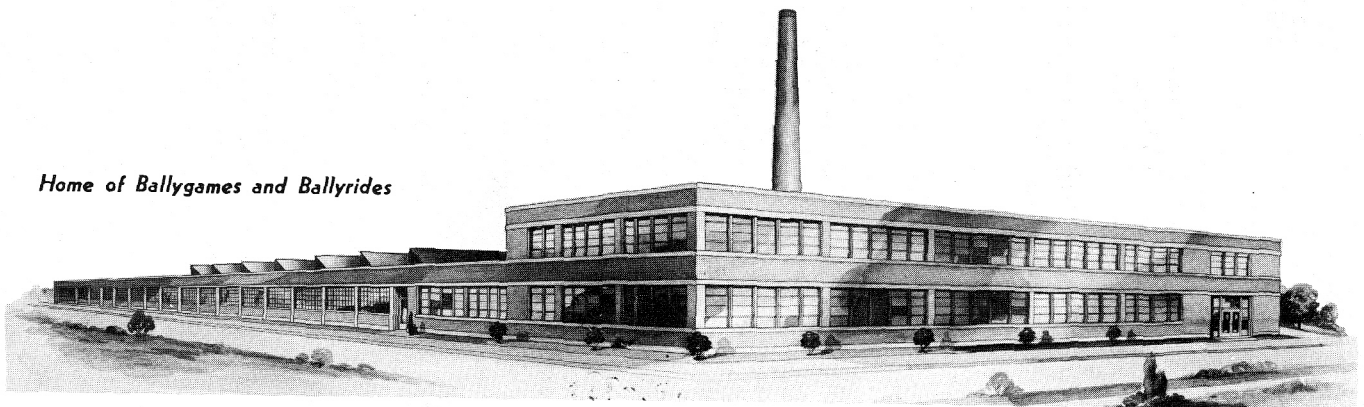
CYPRESS GARDENS

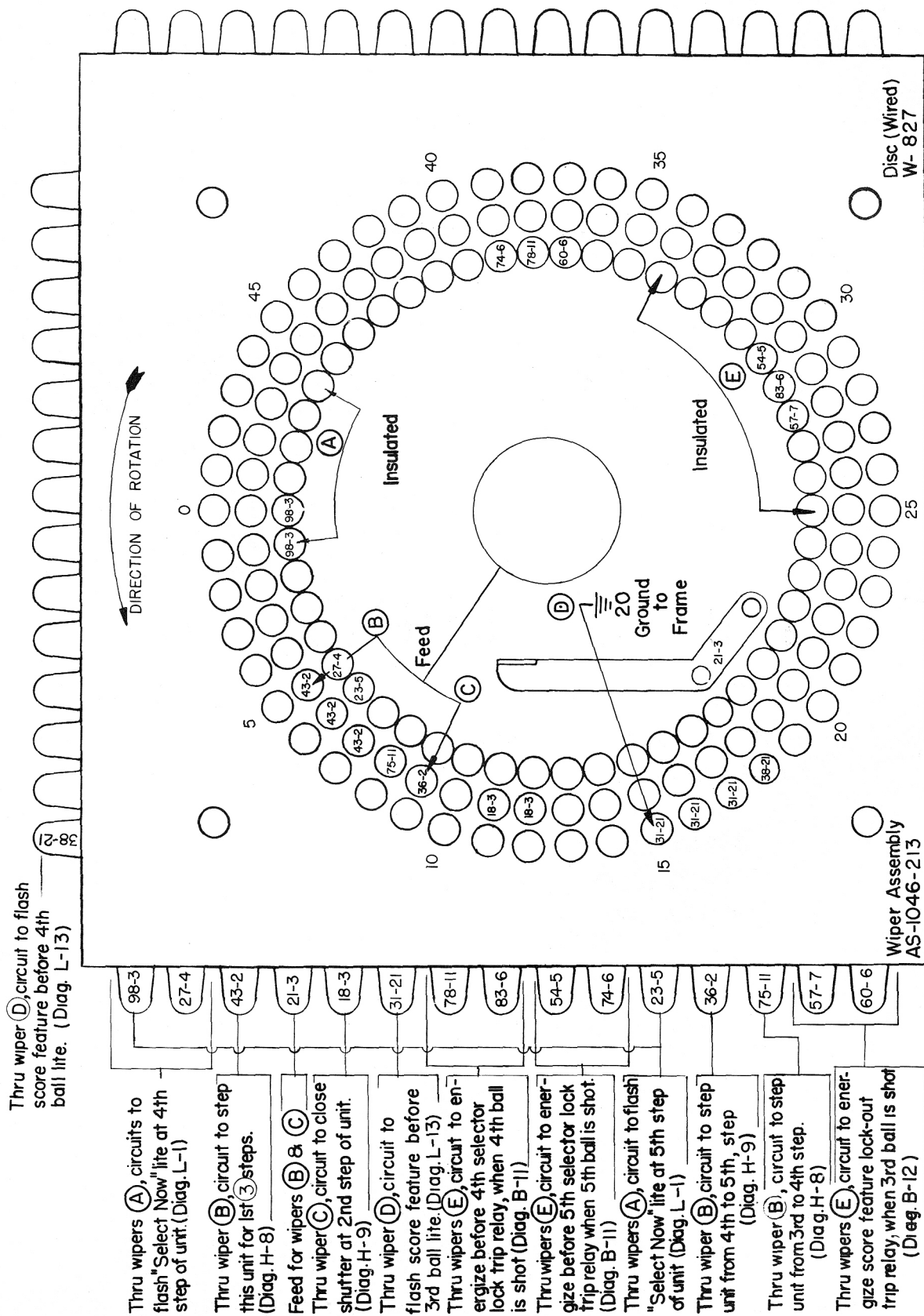
OPERATING INSTRUCTIONS AND PARTS CATALOG

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**

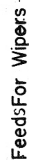
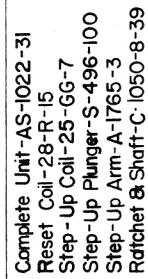
Home of Ballygames and Ballyrides

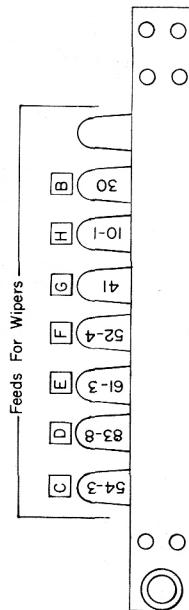
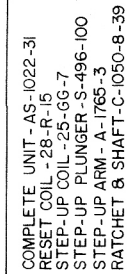




Complete Unit-AS-110-26
 Reset Coil-28-R-15
 Step-Up Coil-25-GG-7
 Step-Up Plunger-S-496-100
 Step-Up Arm-A-1765-4
 Ratchet & Shaft-C-1050-39-21

8 step unit. Wipers shown in zero or reset position

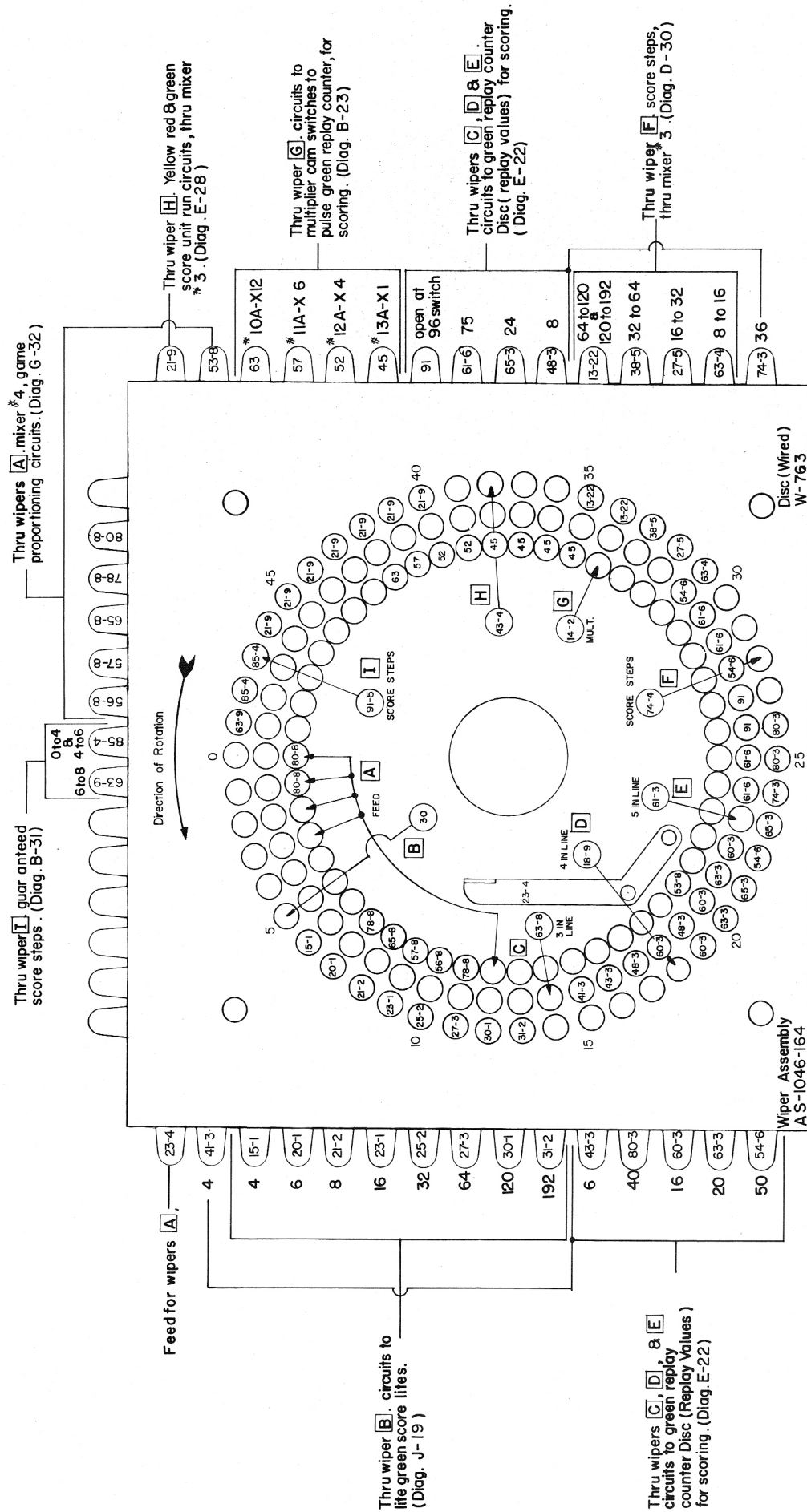




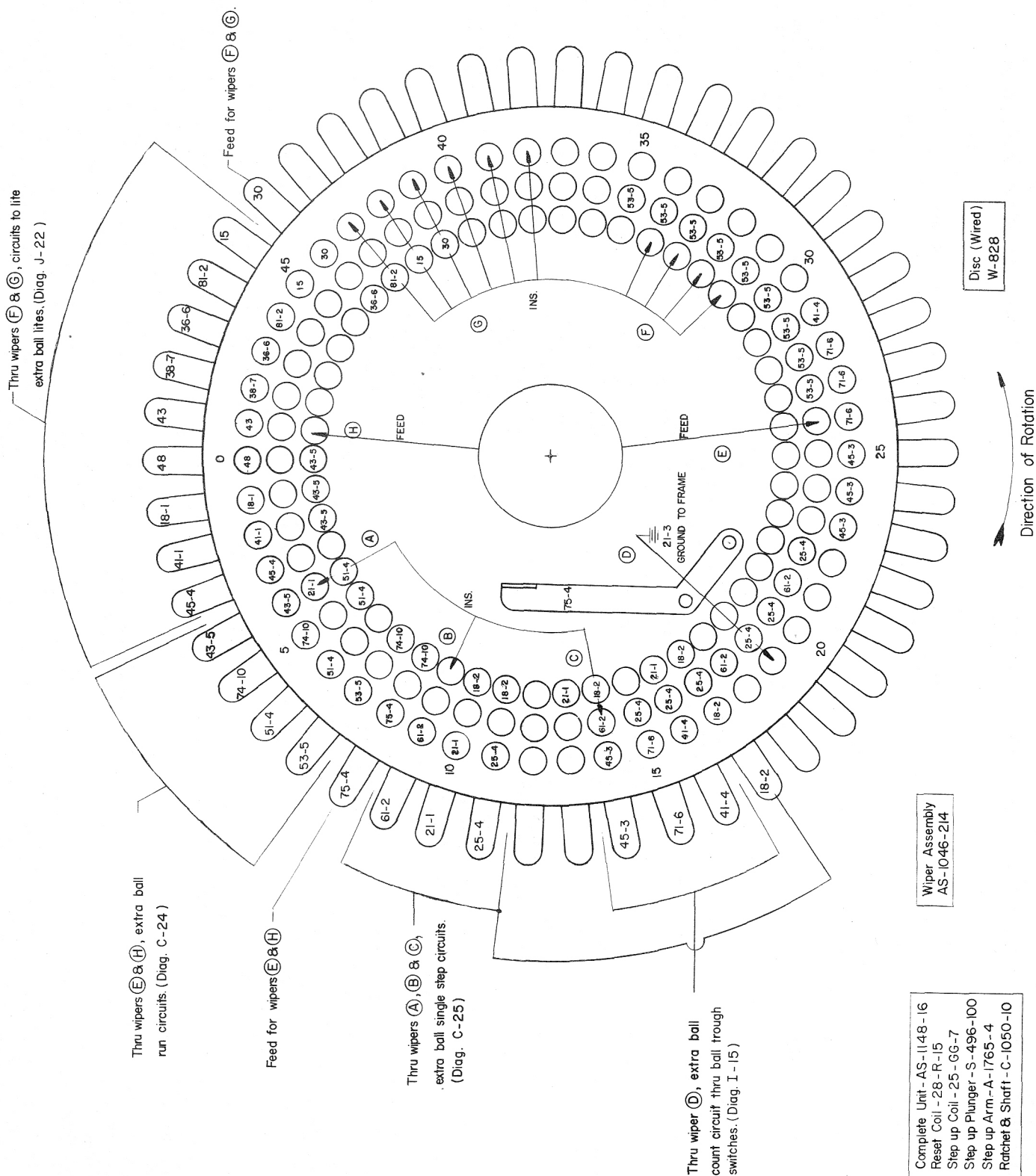
GREEN SCORE UNIT

viewed from **BUTTON** or **WIPER** side

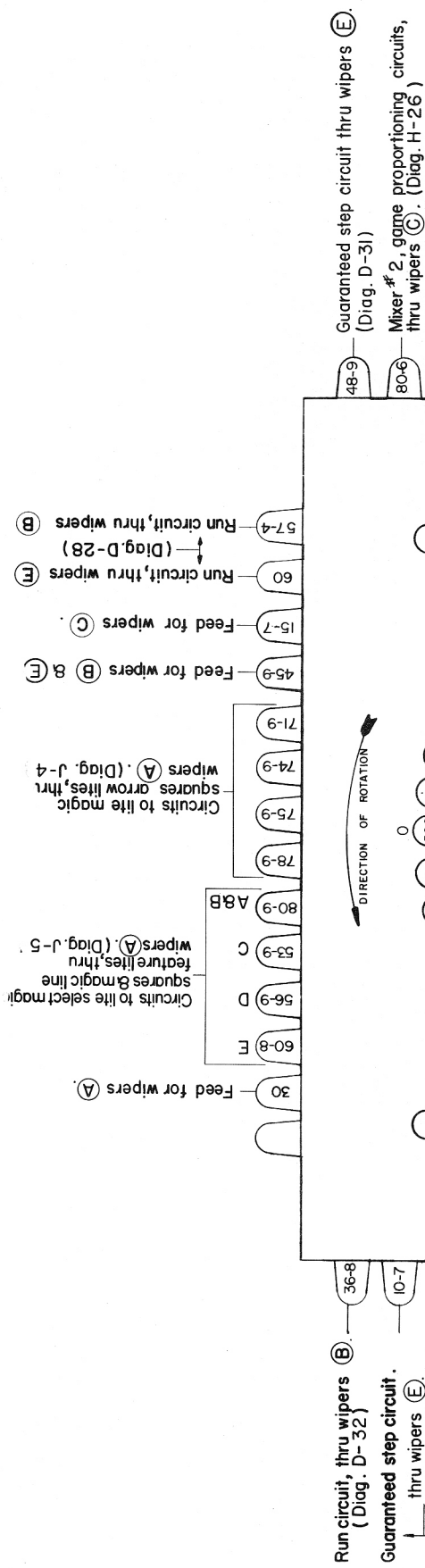
8 step unit. Wipers shown in zero or reset position



- 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

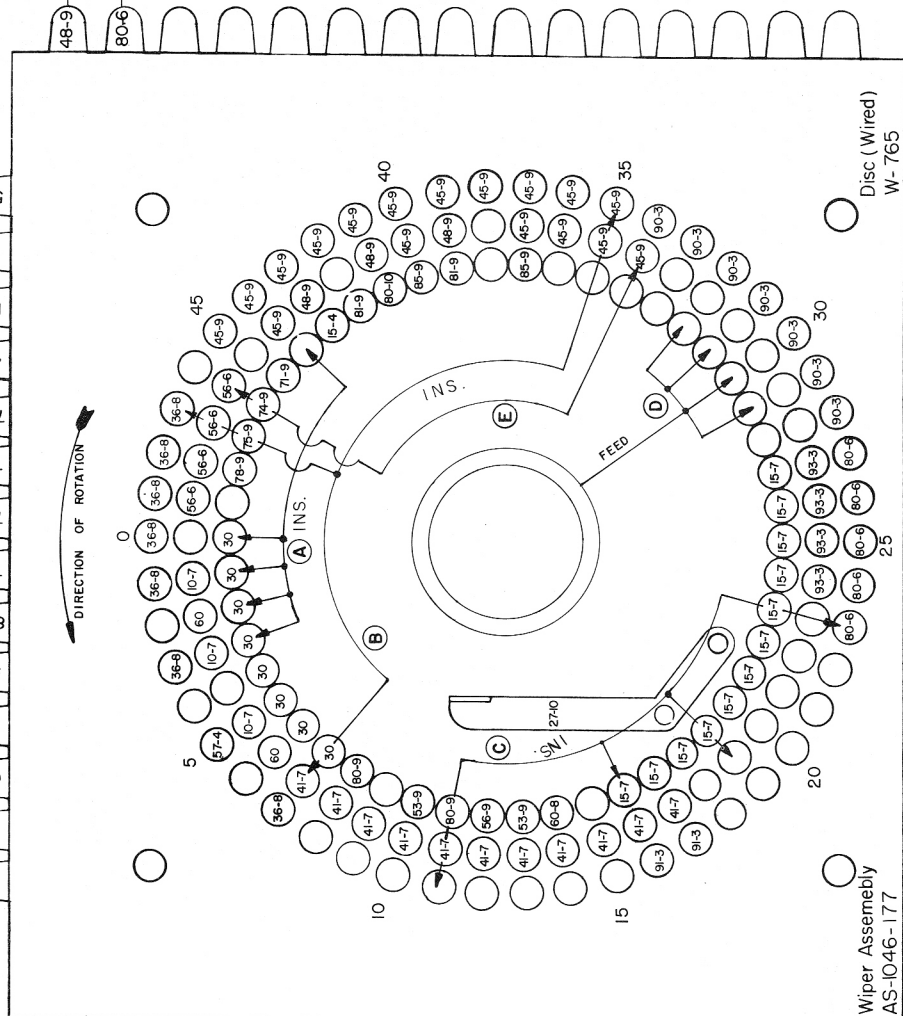


MAGIC SQUARES FEATURE UNIT viewed from BUTTON or WIPER side



- 36-8 Run circuit, thru wipers (B) (Diag. D-32)
- 10-7 Guaranteed step circuit (Diag. D-31)
- 56-6 Single steps circuit
- 41-7 Run circuit, thru wipers (B) (Diag. D-33)
- 27-10 Feed for wipers (D)
- 85-9 A8B
- 81-9 C
- 80-10 D
- 15-4 E
- 93-3
- 91-3
- 90-3

Complete unit - AS-827-45
 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-1050-11-43



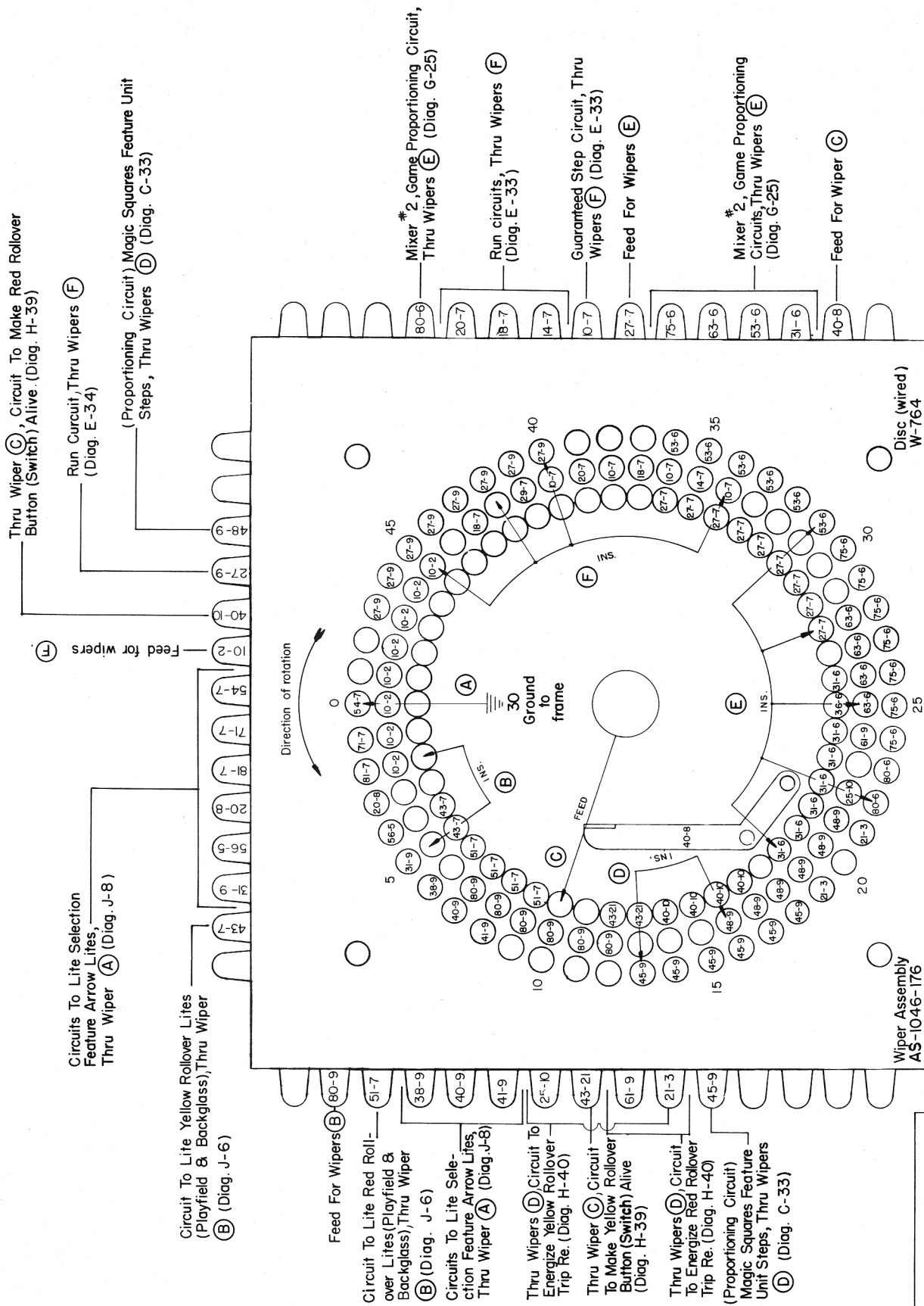
Wiper Assembly AS-1046-177

Disc (Wired) W-765

SELECTION FEATURE UNIT

viewed from BUTTON or WIPER side

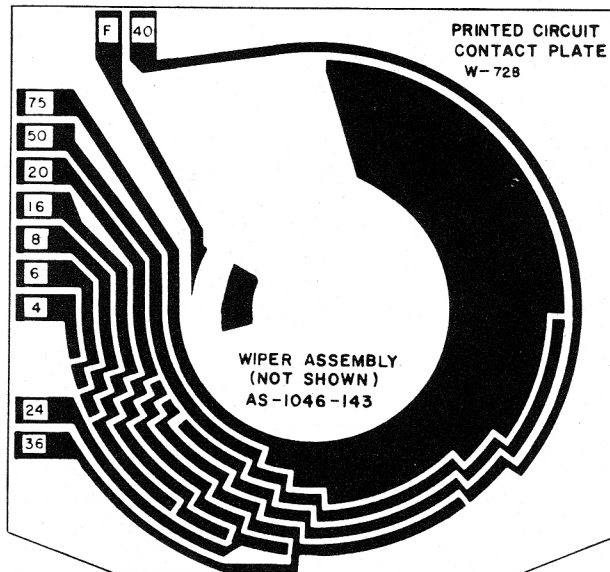
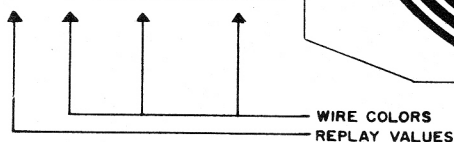
8 step unit. Wipers shown in zero or reset position



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-1765-3
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-797-36
Reset Coil - 28-R-15
Step-up Coil - 25-GG-7
Step-up Plunger - S-496-116
Step-up Arm - A-1765-4
Ratchet & Shaft - C-100

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

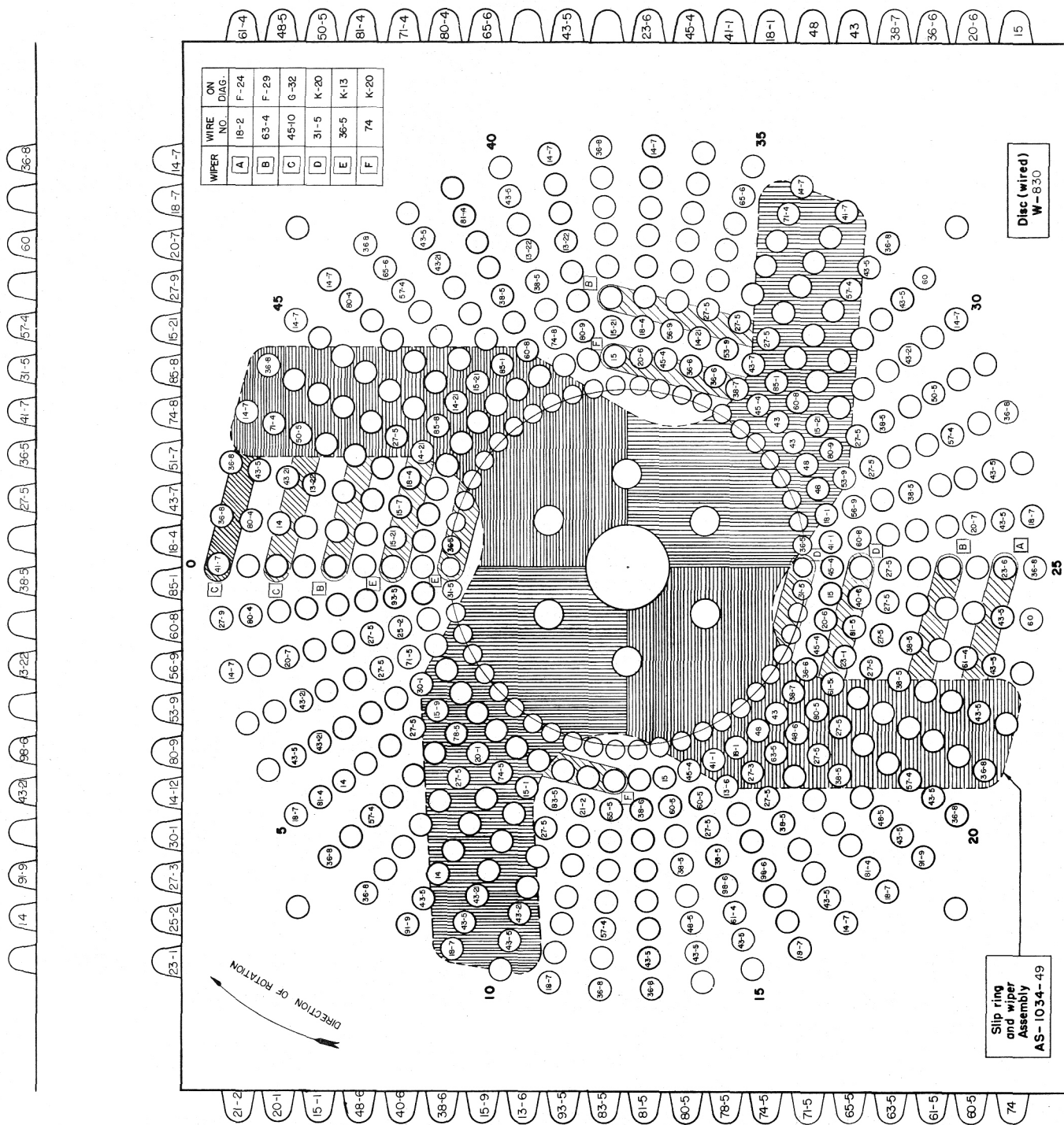
LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS.
NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF
REPLAY CIRCUIT STRIP
IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

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

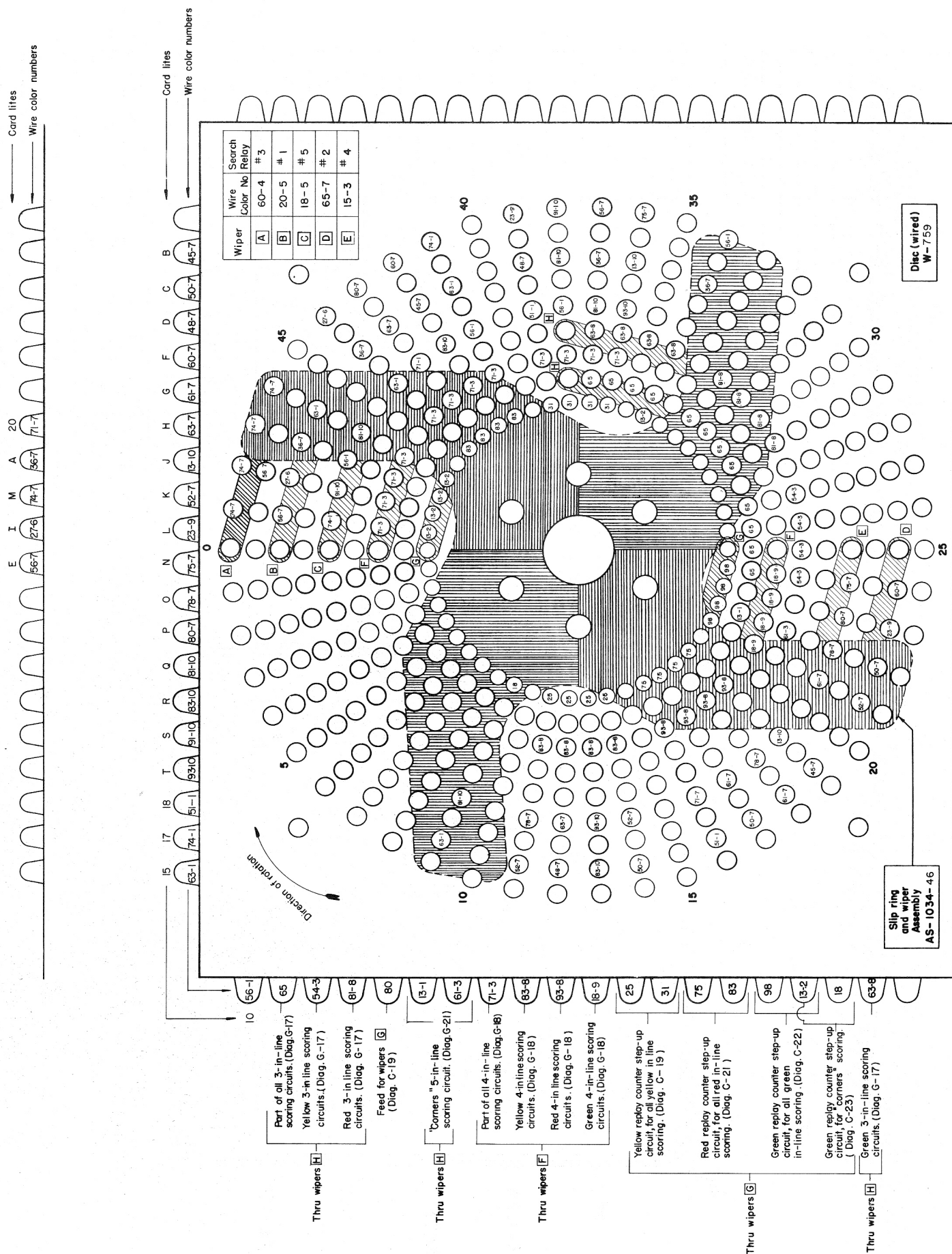
NOTE: 96 VALUE REPLAY SCORES ARE
EFFECTIVE THRU THE OPEN AT 96 SWITCH.

SPOTTING DISC

viewed from **BUTTON** or **WIPER** side



SEARCH DISC



CARD LAYOUT

NEUTRAL POSITION

GREEN

GREEN

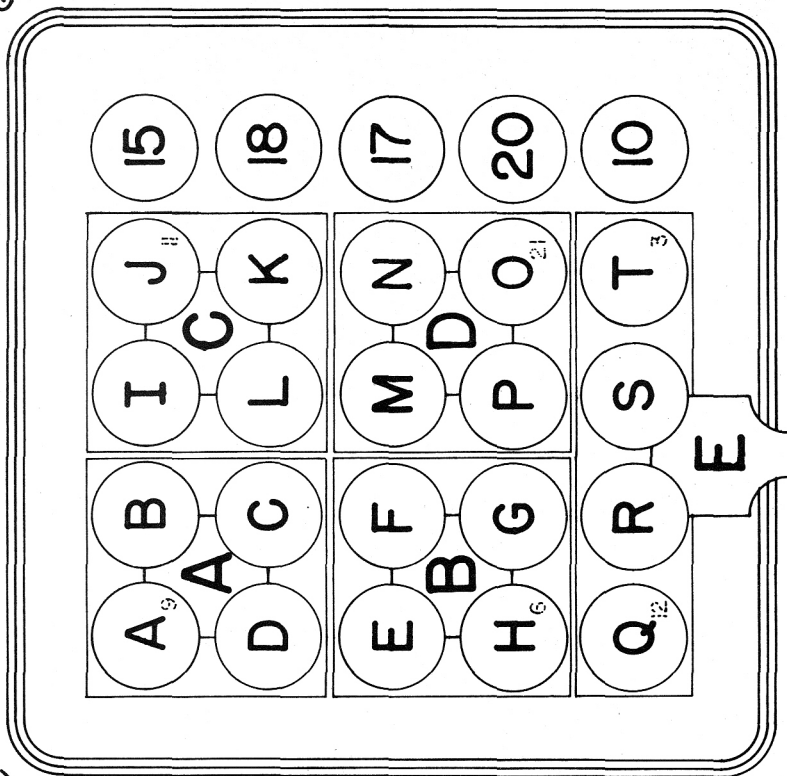
RED

YELLOW

GREEN

RED

YELLOW



YELLOW RED GREEN YELLOW RED

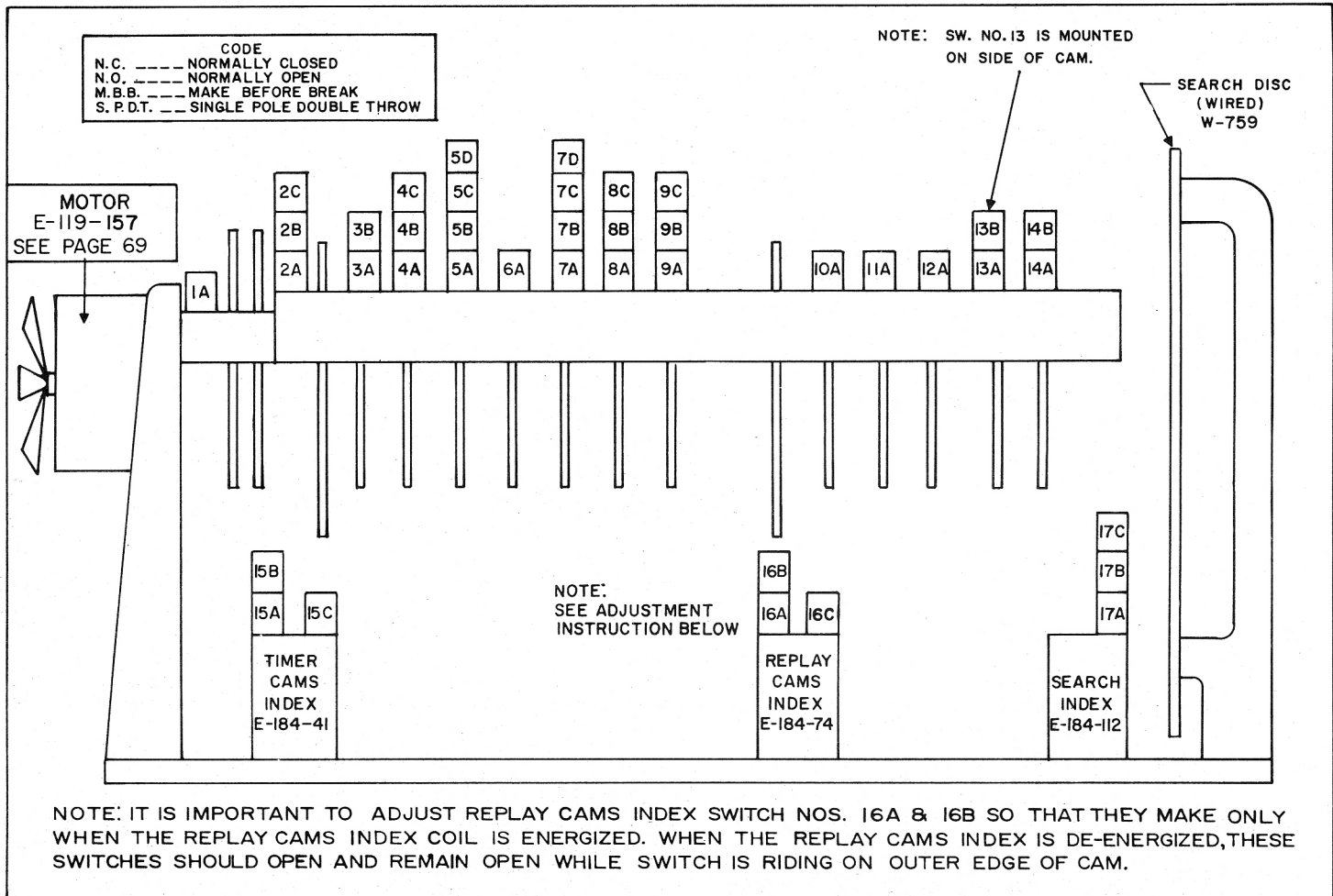
SEARCH POSITIONS									
WIPER (A) ROW 7 SEARCH RELAY #1	WIPER (B) ROW 8 SEARCH RELAY #2	WIPER (C) ROW 9 SEARCH RELAY #3	WIPER (D) ROW 10 SEARCH RELAY #4	WIPER (E) ROW 11 SEARCH RELAY #5	WIPER (F) ROW 12 SEARCH RELAY #6	WIPER (G) ROW 13 SEARCH RELAY #7	WIPER (H) ROW 14 SEARCH RELAY #8	WIPER (I) ROW 15 SEARCH RELAY #9	WIPER (J) ROW 16 SEARCH RELAY #10
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ROTATION OF SEARCH DISC WIPERS
FROM 50 TO 1

CORNERS
VERTICAL
HORIZONTAL
VERTICAL
HORIZONTAL
DIAGONAL
VERTICAL
HORIZONTAL

CONTROL UNIT PICTORIAL VIEW

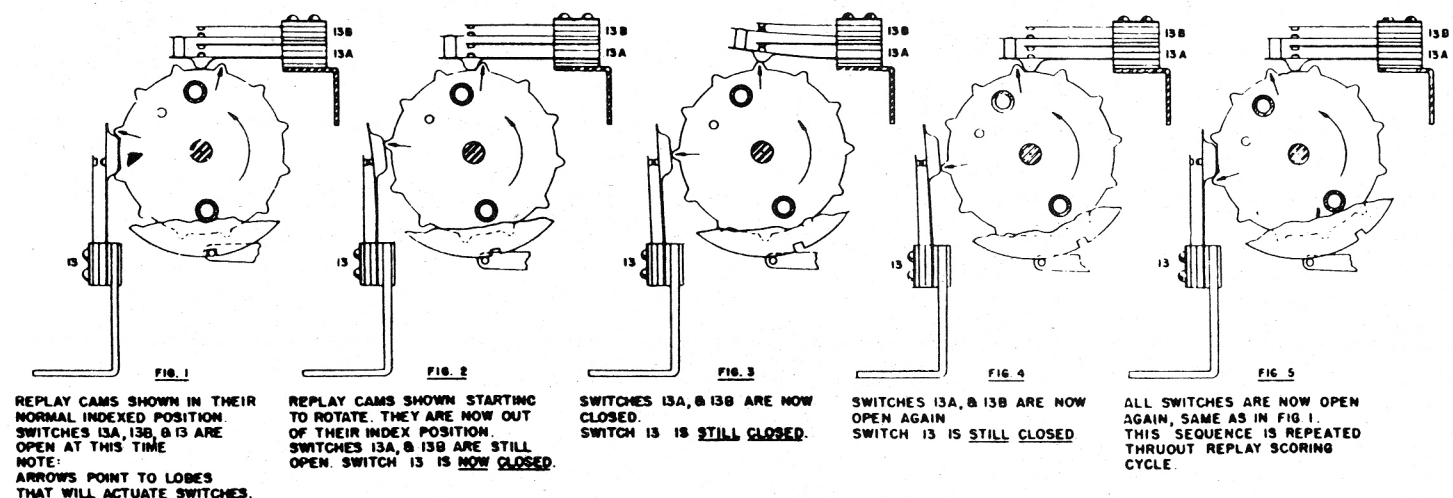
NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 62



NOTE: IT IS IMPORTANT TO ADJUST REPLAY CAMS INDEX SWITCH NOS. 16A & 16B SO THAT THEY MAKE ONLY WHEN THE REPLAY CAMS INDEX COIL IS ENERGIZED. WHEN THE REPLAY CAMS INDEX IS DE-ENERGIZED, THESE SWITCHES SHOULD OPEN AND REMAIN OPEN WHILE SWITCH IS RIDING ON OUTER EDGE OF CAM.

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 ON PAGE 61

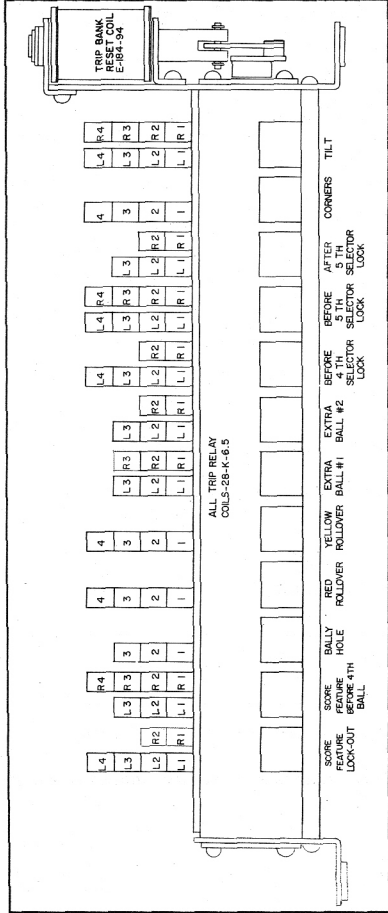
CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	F-10	65-2 36-9	Brown-White Yellow-Brown	Circuit to step timer unit, after shooting 5th ball.
2A	N.O.	I-3	90-5 30	Gray Yellow	Energizes reflex play magnet, and replay register reset coil. Also pulses total plays meter.
2B	N.O.	C-42	93-4 30	Gray-Yellow Yellow	Energizes coin kicker coil.
2C	N.C.	E-14	31-7 57-6	Yellow-Red White-Orange	Drops out red button relay.
3A	N.C.	I-4	48-2 83-3	Green-Black Black-Yellow	Drops out start relay, and acts as safety switch during spin.
3B	S.P.D.T.	B-18	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-44	98-1 30	Gray-Black Yellow	Energizes spotting cams index coil.
4B	N.O.	B-40	25-9 30	Blue-White Yellow	Energizes score extra step index coil.
4C	N.O.	C-5	14-9 80-2	Red-Green Black	Used if coin meter is added in front cabinet.
5A	N.O.	G-10	65-2 71-8	Brown-White Orange-Red	Energizes timer unit reset coil.
5B	N.O.	B-25	21-1 38-4	Blue-Red Yellow-Black	Energizes extra-ball unit step-up coil. (guaranteed step)
5C	N.O.	D-26	78-4 91-11	Orange-Black Gray-Red	Energizes anti-cheat relay.
5D	N.O.	F-31	10-7 85-4	Red Black-White	Magic squares, and selection feature unit single steps circuit.
6A	N.C.	I-30	51-5 75-5	White-Red Orange-White	Opens game advantage circuits, during spin.
7A	N.O.	B-29	10-1 75-8	Red Orange-White	Energizes yellow score unit step-up coil. (guaranteed steps)
7B	N.O.	F-29	54-21 63-4	White-Green Brown-Yellow	Yellow, red, and green score unit single steps circuit.
7C	N.O.	B-30	23-9 83-4	Blue-Yellow Black-Yellow	Energizes red score unit step-up coil. (guaranteed steps)
7D	N.O.	B-31	90-4 91-5	Gray Gray-Red	Energizes green score unit step-up coil. (guaranteed steps)
8A	N.O.	G-31	14-8 56-6	Red-Green White-Brown	Magic-squares unit steps.
8B	N.O.	B-25	25-4 38-4	Blue-White Yellow-Black	Extra ball unit steps.
8C	N.O.	C-41	93-4 30	Gray-Yellow Yellow	(Safety circuit) energizing coin kicker coil.

CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONCLUDED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
9A Alt.	C-32	45-9 48-9	Green-White Green-Black	Proportioning circuit (magic squares unit steps).
9B Alt.	H-28	15-7 54-8	Red-White White-Green	Proportioning circuit (extra ball unit steps).
9C Alt.	D-25	43-5 74-10	Green-Yellow Orange-Green	Proportioning circuit (extra ball unit steps).
10A N.O.	A-21	63 70	Brown-Yellow Orange	Pulses replay counters, when score units are at 8th step.
11A N.O.	A-20	57 70	White-Orange Orange	Pulses replay counters, when score units are at 7th step.
12A N.O.	A-20	52 70	White-Blue Orange	Pulses replay counters, when score units are at 5th and 6th steps.
13A N.O.	A-19	45 70	Green-White Orange	Pulses replay counters, when score units are at 1st, 2nd, 3rd and 4th steps.
13B N.O.	C-17	48-4 80	Green-Black Black	Pulses replay register step-up coil, and reflex replay magnet.
13 (Backside) N.O.	H-17	21-3 27	Blue-Red Blue-Orange	Replay lock-in circuit (NOTE: see control unit pictorial view)
14A N.C.	I-18	56 93	White-Brown Gray-Yellow	Prevents the start of another replay scoring, when control unit cams are indexed.
14B N.C.	C-8	27-2 90-2	Blue-Orange Gray	Opens circuit to timer unit step-up coil, during replay winner.
TIMER CAMS INDEX COIL	B-6	70 93-2	Orange Gray-Yellow	Energized when playing coins or replays.
15A N.O.	G-1	20P 60P	Blue (Plastic) Brown (Plastic)	Operates control unit, and mixer and spotting unit motors.
15B N.C.	G-5	14-9 71-2	Red-Green Orange-Red	Opens circuit to coin lock-out magnet, during spin.
15C N.C.	D-14	13 30	Red-Yellow Yellow	Lock-in safety circuit for red button relay.
REPLAY CAMS INDEX COIL	A-17	40-4 70	Green Orange	Energizes when winning score is made, and releases replay cams.
16A N.O.	D-17	27 80	Blue-Orange Black	In series with replay lock-in circuit. NOTE: See control unit pictorial view for correct adjustment.
16B N.O.	H-18	56 93	White-Brown Gray-Yellow	In series with replay winner circuit. NOTE: See control unit pictorial view for correct adjustment.
16C N.C.	B-16	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-17	15-2 70	Red-White Orange	Energized when 3-in-line or more is scored.
17A N.O.	K-36	10 71-10	Red Orange-Red	Completes circuit to energize #3 search relay.
17B N.O.	B-17	40-4 80	Green Black	Energizes replay cams index coil.
17C N.C.	I-4	83-3 30	Black-Yellow Yellow	Opens start circuit, and acts as safety switch.

TRIP RELAY BANK PICTORIAL VIEW
NUMBERS CORRESPOND TO SWITCH CHART



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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SCORE FEATURE LOCK-OUT TRIP COIL	A-12	J 70	Jumper Orange	Energized at 3rd step of timer unit, or by before 4th selector lock trip relay switch.
L1 S.P.D.T.	E-5	61 13-3 93-2	Brown-Red Red-Yellow Gray-Yellow	Directs circuit from shutter motor, to mixer latch and timer cams index coils.
L2 N.C.	B-12	60-6 J	Brown Jumper	Breaks circuit to coil.
L3 N.O.	F-6	43-2 73-11	Green-Yellow Orange-White	Completes circuit to step timer unit.
L4 N.C.	J-12	16-21 30	Red-Black Yellow	Breaks circuit to score feature lites.
R1 N.C.	D-34	41-10 10-1	Green-Red Red	Breaks lock-in circuit to score feature before 3rd ball relay.
R2 N.C.	H-13	31-8 65-2	Yellow-Red Brown-White	Safety circuit.
SCORE FEATURE BEFORE 4th BALL TRIP COIL	A-34	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.O.	G-8	43-2 75-11	Green-Yellow Orange-White	Completes circuit to step timer unit.
L2 N.C.	B-35	48-10 J	Green-Black Jumper	Breaks circuit to coil.
L3 N.C.	F-28	54-21 63-21	White-Green Brown-Yellow	Proportioning circuit. (Scores)
R1 S.P.D.T.	J-12	81-6 16-21 13-21	Black-Red Red-Black Red-White	Directs circuit from score feature before 3rd ball lite, to score feature before 4th ball lite.
R2 N.C.	C-12	57-7 65-11	White-Orange Brown-White	Breaks circuit that energizes score feature lock-out relay at 3rd step of timer unit.
R3 N.O.	K-13	31-21 38-21	Yellow-Red Yellow-Black	Completes circuit to flash score feature before 4th ball lite.
R4 N.C.	E-31	13-22 98-6	Red-Yellow Gray-Black	Proportioning circuit. (Scores)

TRIP RELAY BANK CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BALLY-HOLE TRIP COIL	A-35	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
1	N.O.	18-4 30	Red-Black Yellow	Completes circuit to "Bally-hole" lite.
2	N.O.	50-8 90-8	White Gray	Completes circuit to "next game feature" trip relay coil, thru #16 hole switch.
3	N.C.	14	Red-Green Jumper	Breaks circuit to coil.
RED ROLLER TRIP COIL	A-40	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.	45-5 98-9	Green-White Gray-Black	Completes circuit to "magic squares" and "magic line"
2	N.C.	18-10 61-11	Red-Black Brown-Red	Breaks circuit to coil.
3 S.P.D.T.	J-1	59-2 90 78-2	White-Yellow Gray Orange-Black	Breaks circuit for flashing "select-now" lite before shooting 4th and before shooting 5th ball, and completes circuit to flash "select-now" lite after shooting 5th ball.
4 S.P.D.T.	J-10	41-8 80-9 85-8	Green-Red Black Black-White	Directs circuit from select before 4th and select before 5th ball feature lites, to select after 5th ball feature lite.
YELLOW ROLLER TRIP COIL	A-39	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.	15-10 98-9	Red-White Gray-Black	Completes circuit to magic squares, and magic line buttons.
2	N.C.	25-11 31-10	Blue-White Yellow-Red	Breaks circuit to coil.
3 S.P.D.T.	K-1	30-5 53-2 25-3	Red White-Yellow White-Yellow	Directs circuit from flashing select-now lite before shooting 4th ball, to flash select-now lite before shooting 5th ball.
4 S.P.D.T.	J-10	41-8 80-9 74-8	White-Orange Gray-Black Orange-Green	Directs circuit from select before 4th ball feature lite, to select before 5th ball feature lite.
EXTRA BALL #1 TRIP COIL	A-14	21-4 30	Blue-Red Yellow	Trips with extra ball #2 trip relay.
L1 N.C.	J-26	35-4 91-2	Black-White Brown-Red	Completes circuit to extra balls lite.
L2 S.P.D.T.	E-25	61-2	Brown-Red	Breaks guaranteed score step circuit, and completes circuit to extra ball unit for 1st step.
L3 S.P.D.T.	F-27	52-10 27-7 18-2	White-Blue Blue-Orange Red-Black	Breaks score steps circuit, and completes circuit for extra ball steps.
R1 N.O.	F-28	27-7 54-8	Blue-Orange White-Green	Proportioning circuit.
R2 N.O.	G-10	71-8 83-1	Orange-Red Black-Yellow	Completes circuit to timer unit reset coil.
R3 N.C.	D-26	85-4 91-11	Black-White Gray-Red	Breaks circuit for energizing anti-cheat relay.
EXTRA BALL #2 TRIP COIL	A-14	25-7 30	Blue-White Orange	Energized by yellow button switch, thru before 5th selector lock trip relay switch.
L1 N.O.	C-16	38-3 91-1	Yellow-Black Gray-Red	Completes circuit to ball lifter motor, during extra ball play.
L2 S.P.D.T.	J-20	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Breaks circuit for flashing other game advantage lites, and completes circuit to flash extra ball lites.
L3 S.P.D.T.	D-6	14-3 61 98-2	Red-Green Brown-Red 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-28	75-5 45-2 45-2	Orange-White Red-White Green-White	Proportioning circuit.
R2 N.C.	B-14	25-7 38-2	Blue-White Yellow-Black	Breaks circuit to coil.

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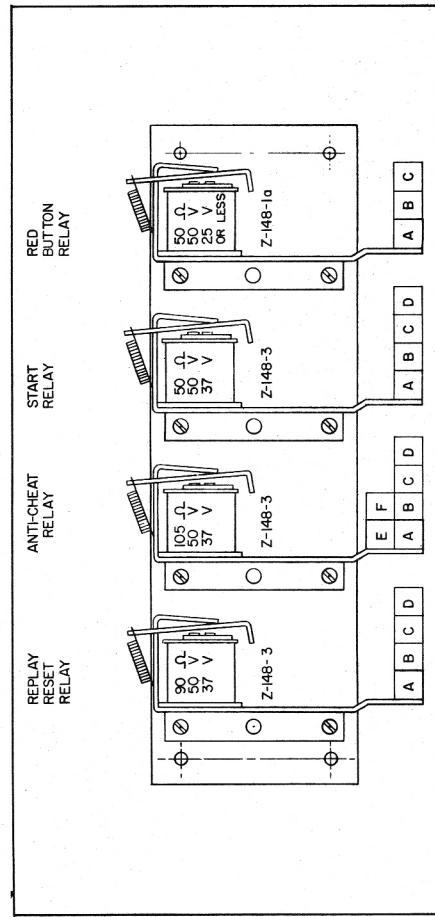
TRIP RELAY BANK CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BEFORE 4th SELECTOR LOCK TRIP COIL	A-11	J	Jumper Orange	Energized thru timer unit disc, when 4th ball is shot.
L1 N.O.	G-9	38-2 Yellow-Brown 43-2 Green-Yellow		Completes circuit to timer unit step-up coil.
L2 N.C.	B-11	83-6 Black-Yellow J		Breaks circuit to coil.
L3 N.O.	I-19	45-6 Green-White 56 White-Brown		In series circuit for replay scoring.
L4 N.C.	H-38	15-10 Red-White 98-9 Gray-Black		Breaks circuit to magic squares and magic line buttons.
R1 N.O.	F-12	40-8 Green 60-6 Brown		Completes circuit to energize score feature lock-out relay.
R2 N.C.	K-1	10-5 Red 27-4 Blue-Orange		Breaks circuit to flash select-now lite.
BEFORE 5th SELECTOR LOCK TRIP COIL	A-11	J	Jumper Orange	Energized thru timer unit disc, when 5th ball is shot.
L1 N.O.	B-14	25-8 Blue-White 38-2 Yellow-Black		Completes circuit to extra ball trip relays, for extra ball play.
L2 N.C.	B-11	74-6 Orange-Green J		Breaks circuit to coil.
L3 N.O.	E-4	18-6 Red-Black 50-2 White		Completes circuit to make yellow button alive, for extra ball play.
L4 N.C.	K-6	20-2 Blue 43-7 Green-Yellow		Breaks circuit to yellow rollover lite. (On playfield)
R1 S.P.D.T.	J-1	98-3 Gray-Black 14-1 Red-Green 75-3 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.	G-38	15-10 Red-White 45-5 Green-White		Breaks circuit to magic squares & magic line buttons.
R3 N.O.	D-10	27-2 Blue-Orange 78-6 Orange-Black		Completes circuit to timer unit step-up coil.
R4 N.C.	B-39	25-10 Blue-White 31-10 Yellow-Red		Breaks circuit for energizing yellow rollover trip relay. (Thru yellow rollover button switch)
AFTER 5th SELECTOR LOCK TRIP COIL	A-11	J	Jumper Orange	Energized when 6th ball (1st extra ball) is shot.
L1 N.C.	K-1	75-3 Orange-White 78-2 Orange-Black		Breaks circuit to flash select-now lite.
L2 N.C.	B-11	98-5 Gray-Black J		Breaks circuit to coil.
L3 N.C.	K-6	10-9 Red 51-7 White-Red		Breaks circuit to red rollover lite. (On playfield)
R1 N.C.	F-39	27-10 Blue-Orange 91-6 Gray-Red		Breaks circuit to magic squares & magic lines buttons.
R2 N.C.	C-40	18-10 Red-Black 61-9 Brown-Red		Breaks circuit for energizing red rollover trip relay (thru red rollover button switch).
CORNERS TRIP COIL	A-35	J	Jumper Orange	Energized thru spotting unit disc, when circuit complete thru other factors.
1 N.O.	J-9	85-1 Black-White 30 Yellow		Completes circuit to corners lite.
2 N.C.	B-35	61-4 Brown-Red J		Breaks circuit to coil.
3 N.O.	G-20	12-1 Red-Yellow 71-3 Orange-Red		Part of corners replay scoring circuit.
4 N.O.	C-22	18 Red-Black 98 Gray-Black		Part of corners replay scoring circuit.

TRIP RELAY BANK CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TIPT TRIP COIL	A-15	14-5 Red-Green 70 Orange		Energized by any tilt switch, or the plumb tilt. Also at 3rd step of timer unit.
L1 S.P.D.T.	I-17	21-3 Blue-Red 30 Yellow 45-8 Green-White		Breaks circuits for game advantages, replay scoring, ball counting, and completes circuit to shutter motor.
L2 N.C.	I-38	40-8 Green 98-9 Gray-Black		Breaks circuit to magic squares and magic line buttons.
L3 N.C.	L-27	10 Red 20-4 Blue		Breaks 17 volt circuit.
L4 S.P.D.T.	L-26	38 Yellow-Black 81 Black-Red 91-2 Gray-Red		Breaks 6 volt circuit, and completes circuit to tilt lite.
R1 N.O.	D-15	57-6 White-Orange 85-7 Black-White		(Safety circuit) red button relay.
R2 N.C.	B-9	10-10 Red 50-6 White		Breaks Bally-hole next game feature circuit.
R3 N.O.	G-13	60-6 Brown 30 Yellow		Completes circuit to score feature lock-out trip relay.
R4 N.C.	G-1	20P Blue (Plastic) 60P Brown (Plastic)		Breaks circuit to control unit, and mixer and spotting unit motors.

4 RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 66



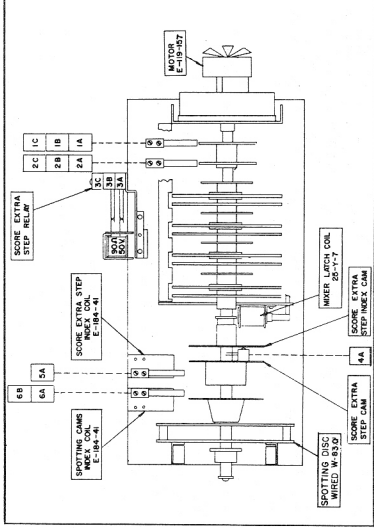
Coil part numbers

50 ~ 50 V - C-2794-9
90 ~ 50 V - C-2794-1
105 ~ 50 V - C-2794-23

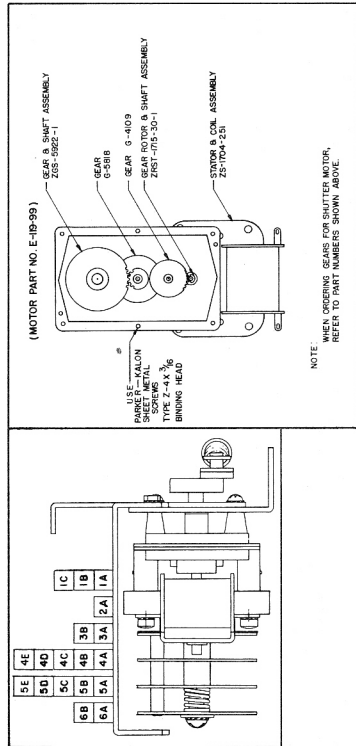
4 RELAY BANK SWITCH CHART
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 65

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-26	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-26	78-4 30	Orange-Black Yellow	Lock-in switch for this relay.
C N.O.	M-27	20-4 80-1	Blue Black	Breaks 17 volt circuit, when relay drops out.
D N.C.	D-14	57-6 85-7	White-Orange Black-White	Safety switch. (Red button relay circuit.)
E S.P.D.T.	L-25	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.	H-7	21 45-8	Blue-Red Green-White	(Safety switch) Red button relay circuit.
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-24	75-4 78	Orange-White Orange-Black	Opens extra ball step-up circuit during spin.
B N.C.	G-29	14-8 83-9	Red-Green Black-Yellow	Opens game advantage circuits during spin.
C N.O.	F-6	12-3 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-14	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-14	31-7 27-8	Yellow-Red Blue-Orange	Lock-in switch for this relay.
C N.C.	K-25	50-9 21-4	White Blue-Red	Opens extra ball lite circuit.

MIXER AND SPOTTING UNIT ASSEMBLY
NUMBERS CORRESPOND TO SWITCH CHART BELOW



SHUTTER MOTOR PICTORIAL VIEW



SHUTTER MOTOR CAM SWITCH CHART

FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

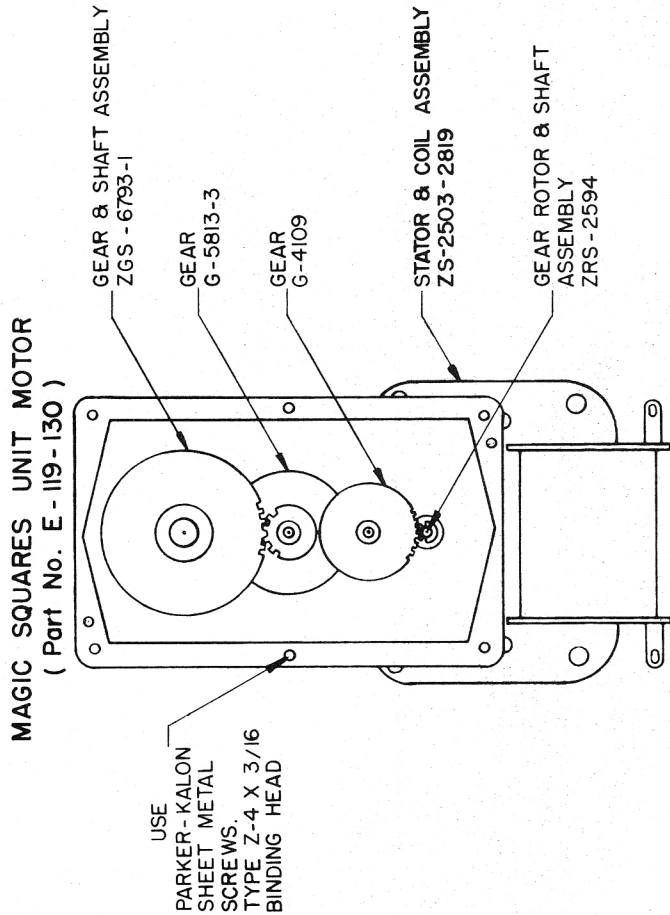
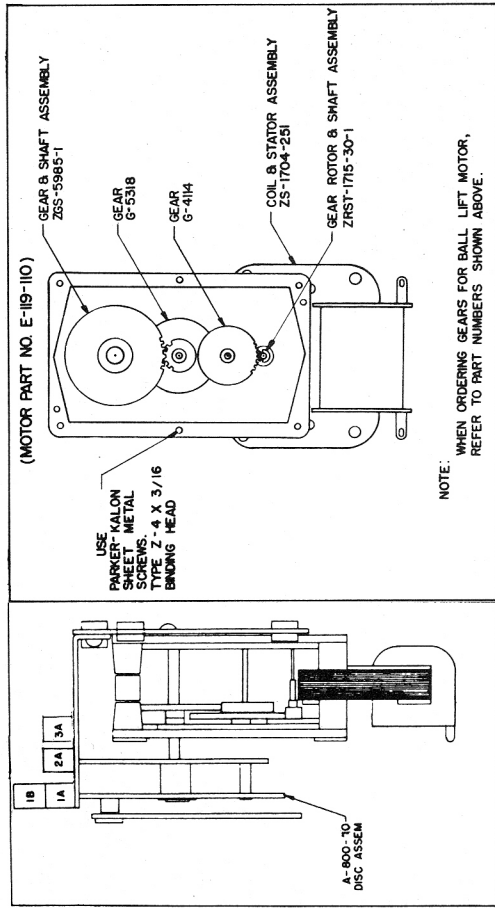
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	11-17	Blue-Red Gray-Yellow	(Closed when shutter is closed) Completes circuit for replay scoring.
1B	N.O.	6-6	Red-Green	Carry-over circuit for shutter motor.
1C	N.C.	14-3	Yellow	Safety switch. (Timer unit reset circuit)
2A	N.C.	21-3 33	Blue-Red Gray-Black	(Closed when shutter is closed) Completes circuit to ball lifter motor.
3A	N.O.	85-5 30	Black-White Yellow	Resets extra ball yellow, red, and green replay counter units.
3B	N.O.	20P 70P	Blue (Plastic) Orange (Plastic)	Resets trip relay bank.
4A	N.O.	14-3 18-3	Red-Green Red-Black	(Closed when shutter is open) Completes circuit to shutter motor.
4B	N.C.	21-3 40-8	Blue-Red Green	Completes circuit to magic squares buttons.
4C	N.O.	18-3 45-8	Red-Black Green-White	Starts shutter motor, if game is tilted, when shutter is open.
4D	N.O.	36-5 61-8	Yellow-Brown Brown-Red	(Closed when shutter is open) Completes feature lites flash circuit.
4E	N.O.	21-3 93-21	Blue-Red Gray-Yellow	(Closed when shutter is open) Completes circuit to step magic squares feature unit. (Part of next game feature circuit)
5A	N.O.	52-10 54-21	White-Blue White-Green	Proportioning circuit. (Score step)
5B	N.C.	36-4 90-8	Yellow-Brown Gray	(Closed when shutter is closed) Part of Bally-hole next game feature circuit.
5C	N.O.	31-4 91-4	Yellow-Red Gray-Red	Safety circuit. (Lifter start relay)
5D	N.C.	65-2 96-8	Brown-White Gray-Black	Safety switch. (Timer unit reset circuit)
5E	N.O.	45-2 82-9	Green-White Black-Yellow	(Closed when shutter is open) completes game advantage circuits.
6A	N.O.	71-8 30	Orange-Red Yellow	Resets timer unit.
6B	N.O.	78-3 30	Orange-Black Yellow	Resets magic squares feature unit, yellow, red, green score units, and selection feature unit.

MISCELLANEOUS RELAYS SWITCH CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
NEXT GAME FEATURE TRIP COIL	A-9	J 70	Jumper Orange	Energized by #16 hole switch, when Bally-hole trip relay is energized.
RESET COIL	A-36	40-5 70	Green Orange	Energized thru magic-squares unit switch, when unit is at 11th step.
A	N.C.	10-10 J	Red Jumper	Breaks circuit to step-up coil.
B	N.O.	13-21 30	Red-Yellow Yellow	Completes circuit to lite "A-B-C-D-E next game feature lite."
C	N.C.	41-21 48-9	Green-Red Green-Black	Breaks regular step-up circuit to magic squares unit.
D	N.C.	40-5 45-21	Green Green-White	Breaks circuit to reset coil.
E	N.O.	51-21 92-21	White-Red Gray-Yellow	Completes circuit for stepping magic squares unit to top. Also to reset next game feature trip relay.
SCORE FEATURE BEFORE 3rd BALL COIL	A-33	10-4 70	Red Orange	Energized by mixer and spotting 16 pulse cam #1A, when circuit complete thru other factors.
A	N.O.	43-21 48-10	Green-Yellow Green-Black	Completes circuit for energizing score feature before 4th ball trip relay.
B	N.O.	14-21 81-6	Red-Green Black-Red	Completes circuit to flash score feature before 3rd ball lite.
C	N.C.	31-8 60-6	Yellow-Red Brown	Safety circuit.
D	M.B.B.	45-10 31-10 30	Green-White Green-Red Yellow	Breaks circuit for energizing this relay, and completes lock-in circuit for it.
LIFTER START COIL	A-41	38-8 70	Yellow-Black Orange	Energized when a ball is on ball runway switch. This relay controls ball lifter circuit.
A	N.C.	13-6 40-8	Red-White Green	Safety circuit. (Selector lock, and score feature lock trip relays)
B	N.C.	31-3 41-4	Yellow-Red Green-Red	Breaks ball lifter motor circuit.
C	N.O.	36 38-8	Yellow-Brown Yellow-Black	Lock-in circuit for this relay.
MAGIC SQUARES MOTOR RELAY	A-12	78-10 70	Orange-Black Orange	Energized by magic squares index coil switches, when magic squares buttons are pressed.
A	N.C.	10 71-10	Red Orange-Red	Safety circuit (Breaks circuit to #3 search relay)
B	N.O.	20-P 60-1P	Blue (Plastic) Brown (Plastic)	Completes circuit to run magic squares motor.

BALL LIFT MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART BELOW



NOTE:

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

BALL LIFT MOTOR SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

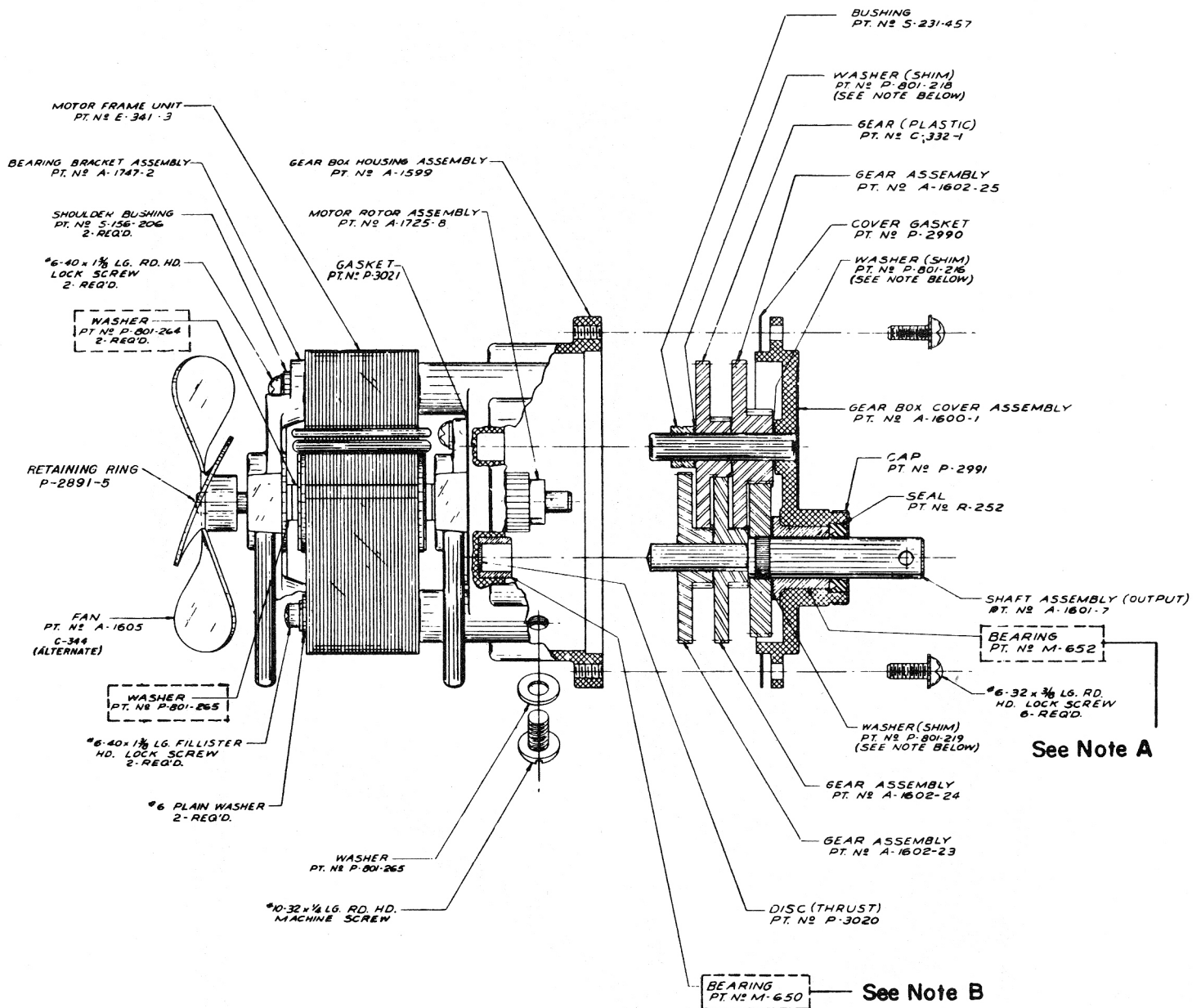
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	F-11 15-6 85-21	Red-White Black-White	(Safety circuit) before 5th and after 5th selector lock trip relays.
1B	N.O.	G-16 91-1 30	Gray-Red Yellow	Carry-over switch for ball lifter motor.
2A	N.O.	E-8 27-2 43-2	Blue-Orange Green-Yellow	Energizes timer unit step-up coil.
3A	N.O.	G-12 89-21 21-3	Black-Yellow Blue-Red	Energizes before 4th selector lock trip relay at 4th step of timer unit. Also energizes score feature lock-out relay at 3rd step of timer unit.

MAGIC SQUARES & LINE UNIT PARTS LIST

AS-1507-7 Magic Squares Unit Assembly

Part No.	Name of Part
A-1825-1	Contact Plate (Used 5 Times)
A-1825-2	Contact Plate (Used 1 Time)
A-1826-3	Coupling & Shaft
A-1827-2	Gear Base Plate Assembly
E-146-392	Magnet
E-119-130	Motor
	Plastic No. Display Discs
A-1980	"A" Corner
A-1980-1	"B" Corner
A-1980-2	"C" Corner
A-1980-3	"D" Corner
A-1980-4	"E" Corner Left
A-1980-5	"E" Corner Right
AS-579-23	Slip Ring & Index Assembly
A-1828	Wiper Assembly

MOTOR ASSEMBLY (Part No. E-119-157)



See Note A

See Note B

NOTE

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

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

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.



MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	Name of Part
G-288	Back glass
M-281-14	Lock and keys (2) keyed alike
E-122-19	Transformer

Back Door Assembly:

M-281-24	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
P-711-1	Cigarette holder
P-1900-18	Coin box
A-1726	Coin box cover
E-130-10	Counter—48 volt
CA-350-1	Legs
M-106	Leg bolt
M-163-4	Leg adjuster
M-310-2	Leg-Anti-split bolt

Front Door Assembly:

Part No.	Name of Part
A-1729-4	Button—metal
C-2342-102	Coil for coin kicker assembly
E-101-45	Coil for coin lock out
AS-1316	Coin kicker assembly
AS-277-33	Coin switch assembly 5¢
AS-277-34	Coin switch assembly 10¢
CA-567-61	Front door only
AS-1791	Front door assembly 5¢
AS-1791-1	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-1305-12	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
P-2210-8	5¢ Plate
P-2210-9	10¢ Plate
P-2210-36	Plate for A-B & D-E Buttons
P-2210-38	Plate for "C" Button
CA-892-2	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.