

# Bally®

# BALLERINA

## OPERATING INSTRUCTIONS AND PARTS CATALOG

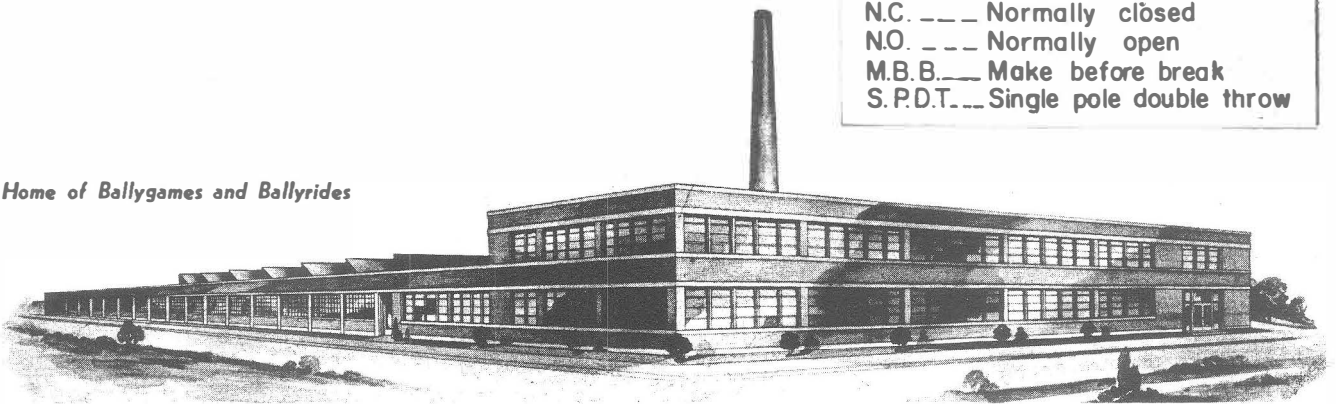
Part Numbers are marked on illustrations  
and a list of miscellaneous parts appears  
on back cover.

**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*





# BALLERINA

TOP ROW FLIPPER  
PRESS 1 & 2 WITHIN  
10 SECONDS FROM RESTARTING  
OF TOP ROW WILL REVERSE

5 BALL

PRESS 3 TO REVERSE  
APPEAR 5 BALL

ROLLERS  
LIT \*

PRESS 4 TO REVERSE  
APPEAR 4 BALL

1	2	11	15	
4	19	7	22	18
25	24	6	13	17
6	23	5	21	20
12	8	14	3	10

MAGIC-SCREEN POSITION

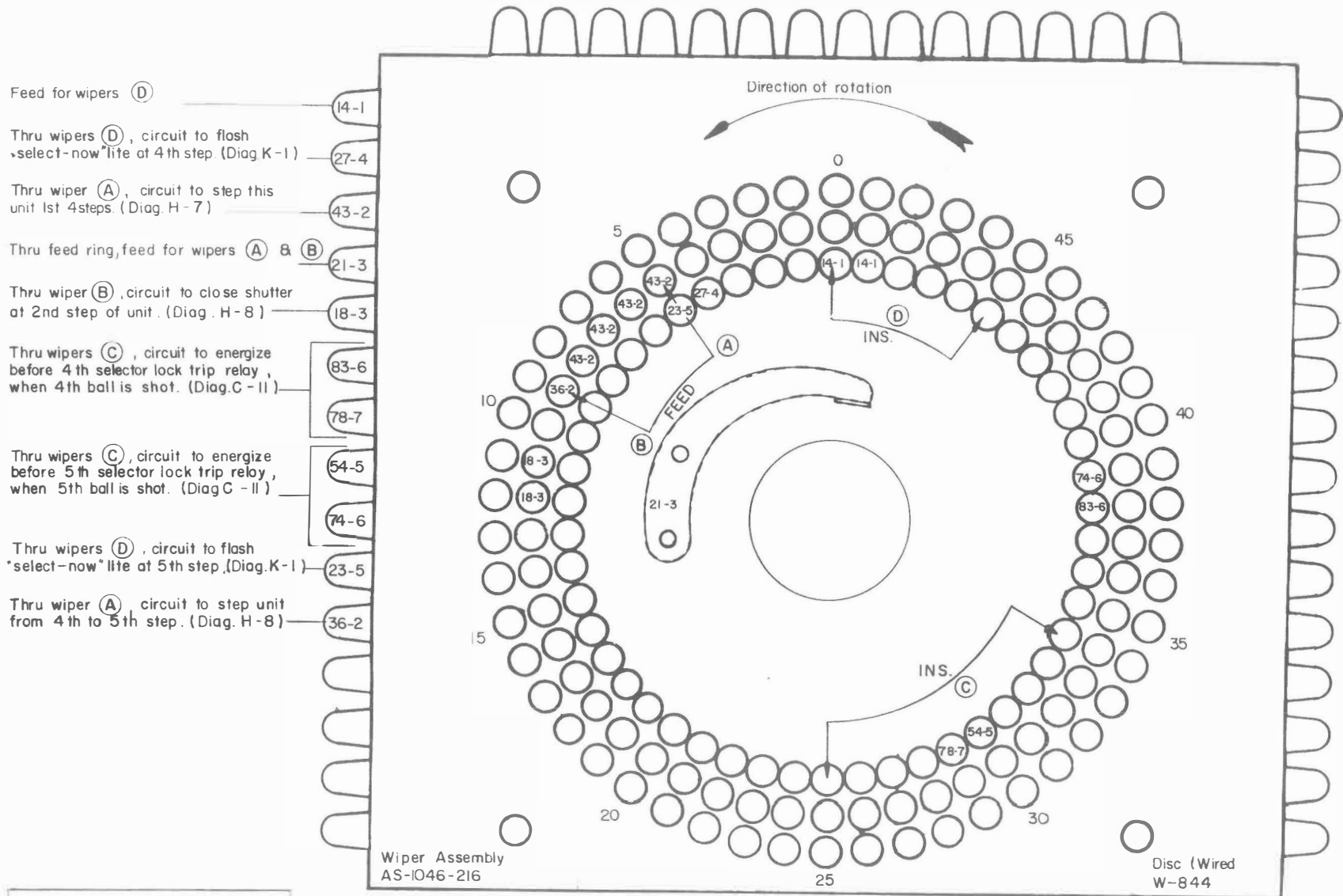
A B C D E F G H

100 200 300 400 500  
100 200 300 400 500  
100 200 300 400 500

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

# TIMER UNIT viewed from BUTTON or WIPER side

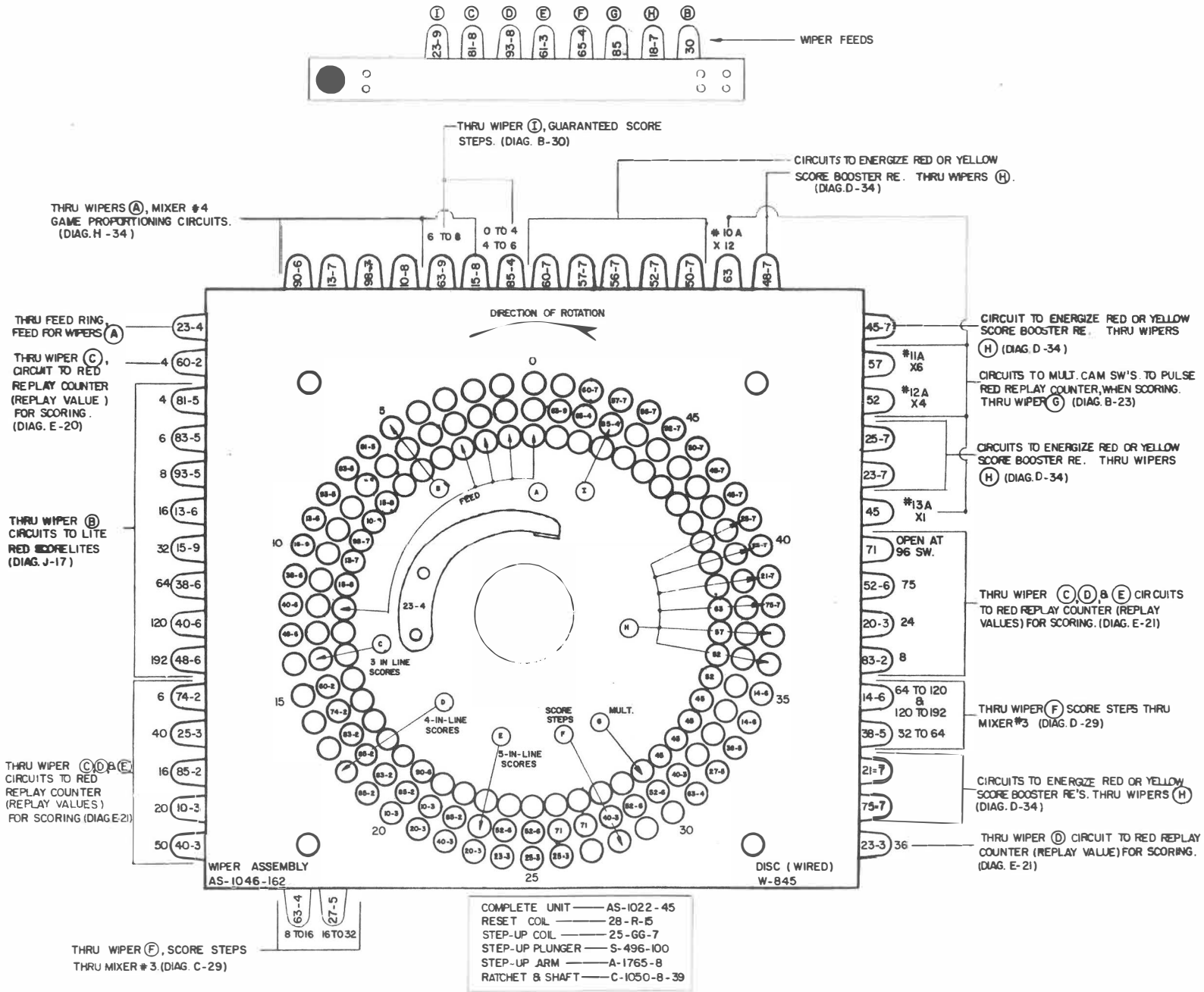
8 step unit. Wipers shown in zero or reset position



- Complete unit... AS-110-29
- Reset coil... 28-R-15
- Step-up coil... 25-GG-7
- Step-up plunger... S-496-100
- Step-up arm... A-1765-4
- Ratchet & shaft... C-1050-8-41

# RED SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

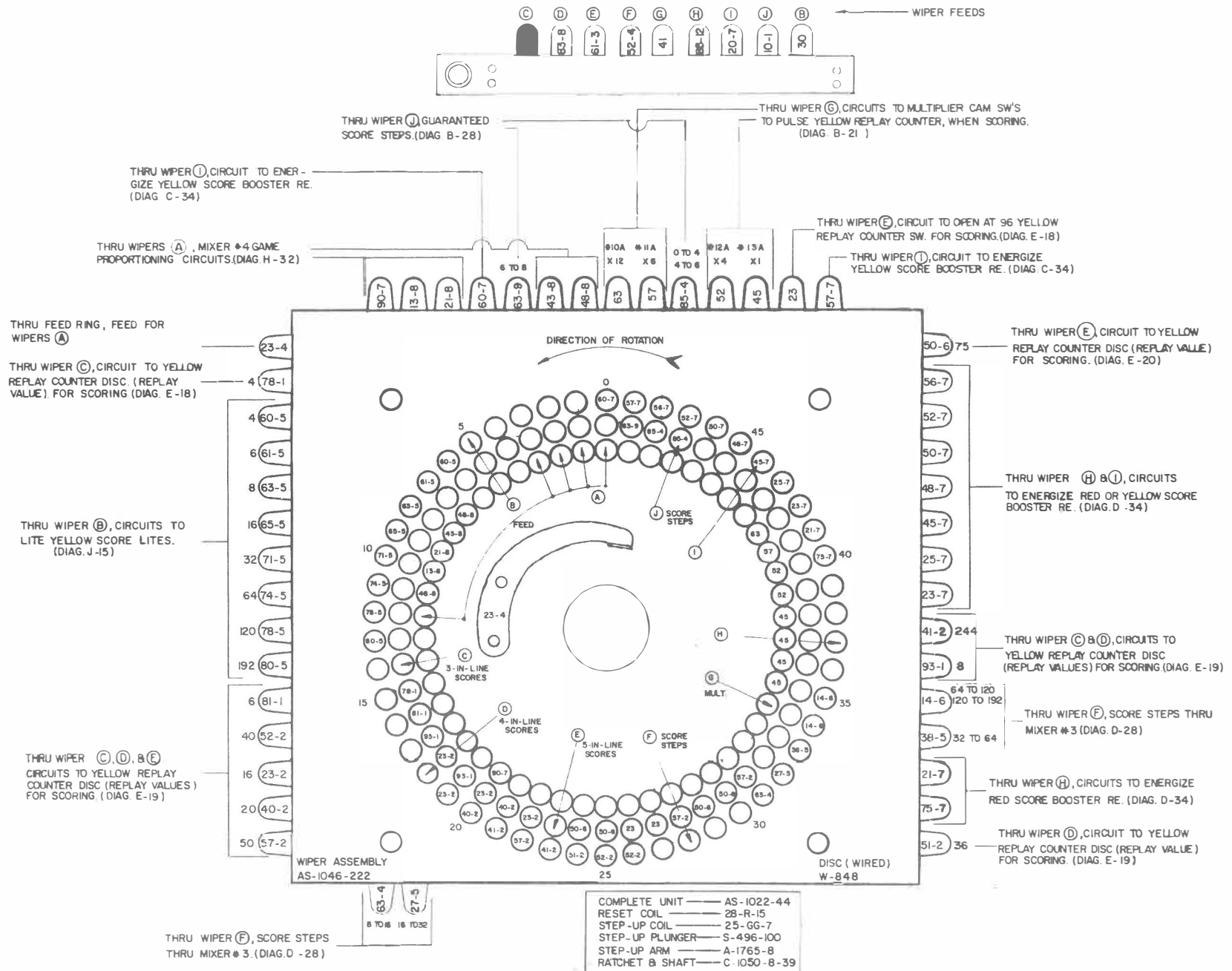


THRU WIPER (F), SCORE STEPS  
THRU MIXER #3 (DIAG. C-29)

- COMPLETE UNIT — AS-1022-45
- RESET COIL — 28-R-15
- STEP-UP COIL — 25-GG-7
- STEP-UP PLUNGER — S-496-100
- STEP-UP ARM — A-1765-8
- RATCHET & SHAFT — C-1050-8-39

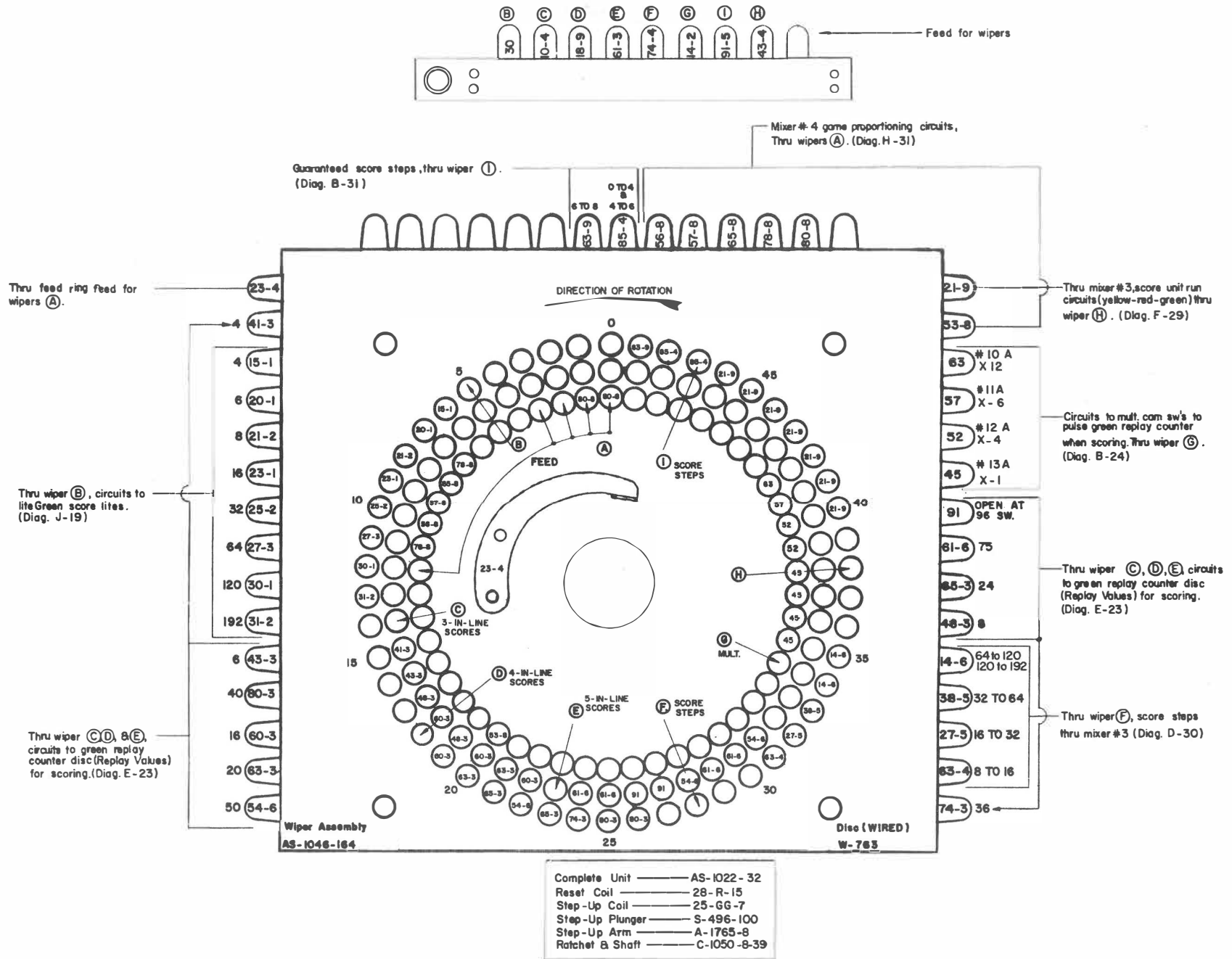
# YELLOW SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position

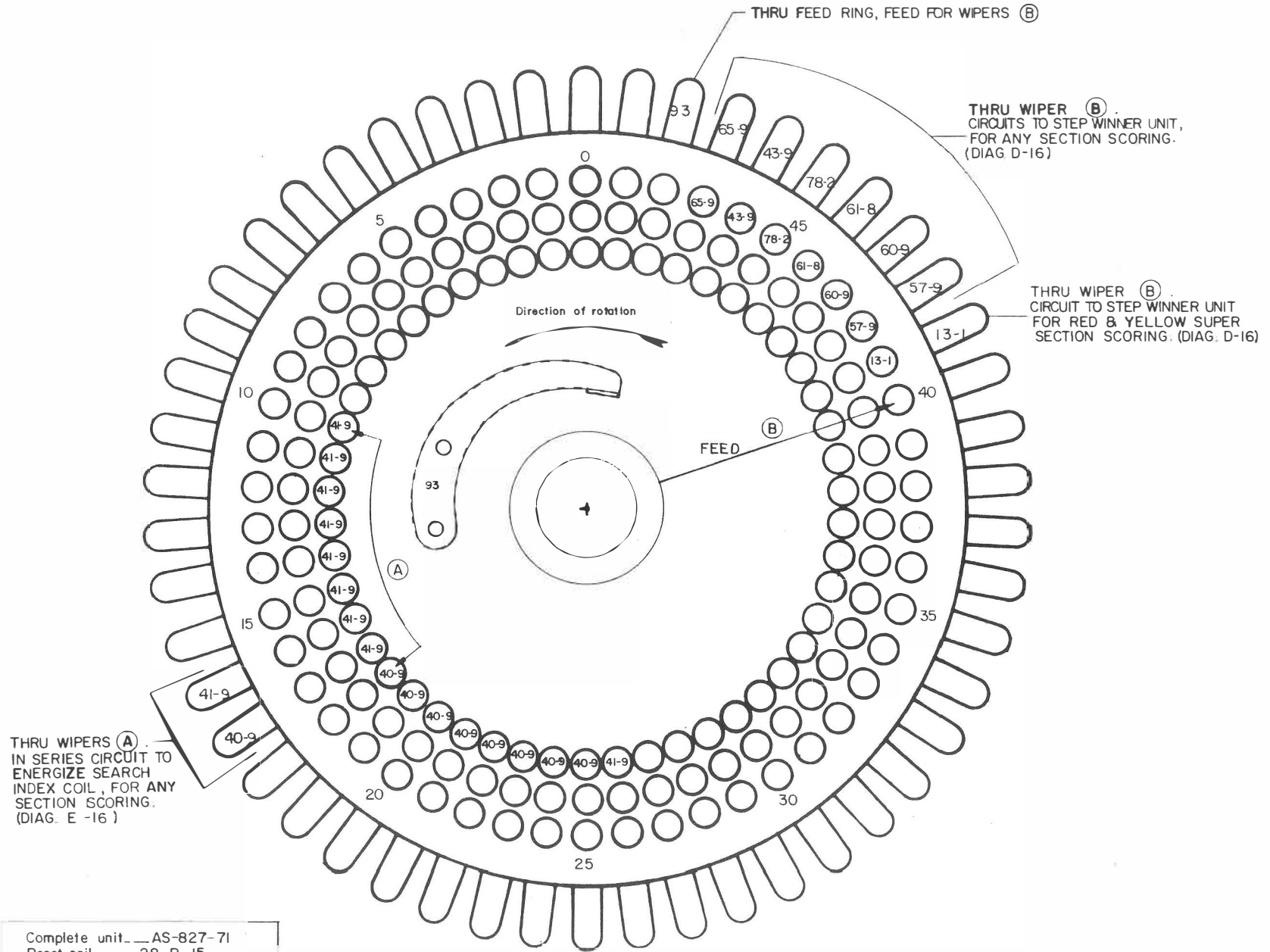


# GREEN SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position







Complete unit...AS-827-71  
 Reset coil...28-R-15  
 Step-up coil...E-184-160  
 Step-up arm...A-1765-4  
 Step-up plunger...S-496-100  
 Ratchet & shaft...C-1050-8-40

Wiper Assembly  
 AS-1046-224

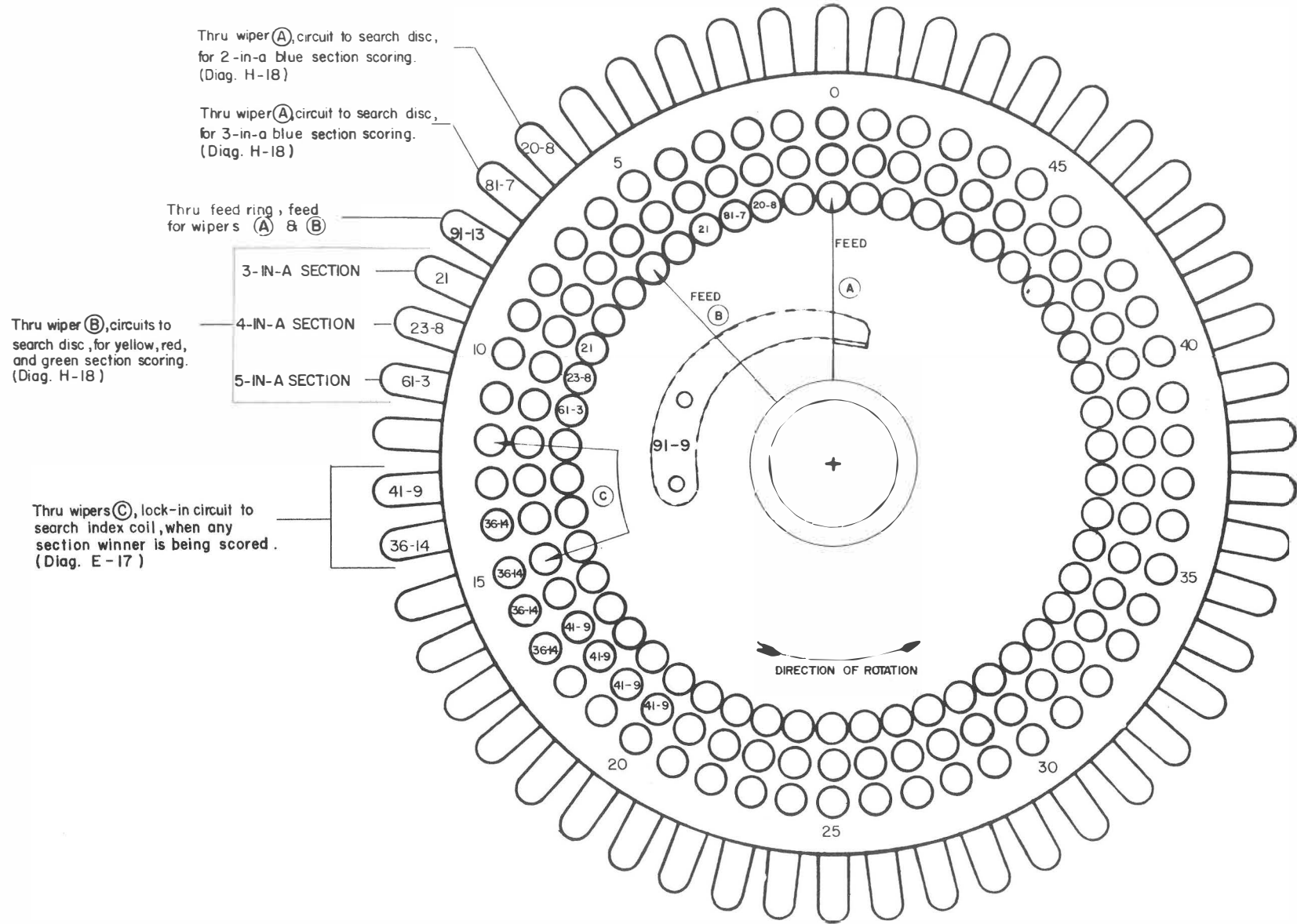
Disc (Wired)  
 W-847





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

5 step unit. Wipers shown in zero or reset position



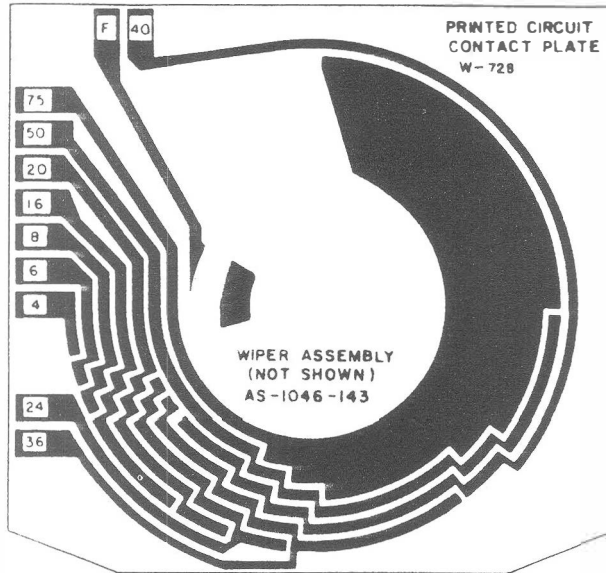
Complete unit... AS-827-72  
 Reset coil ..... 28-R-15  
 Step-up coil .... 25-GG-7  
 Step-up arm .... A-1765-4  
 Step-up plunger... S-496-100  
 Ratchet & shaft... C-1050-5

Wiper Assembly  
 AS-1046-223

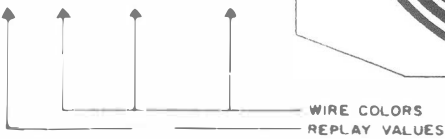
Disc (Wired)  
 W-846

**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-1765-49  
 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 12 A	SW 11 A	SW 10A
<b>5 IN LINE</b>	75 	75 	96 	96 	200 	300 	450 	600 
<b>4 IN LINE</b>	16 	20 	24 	50 	96 	144 	240 	480 
<b>3 IN LINE</b>	4 	6 	8 	16 	32 	64 	120 	192 

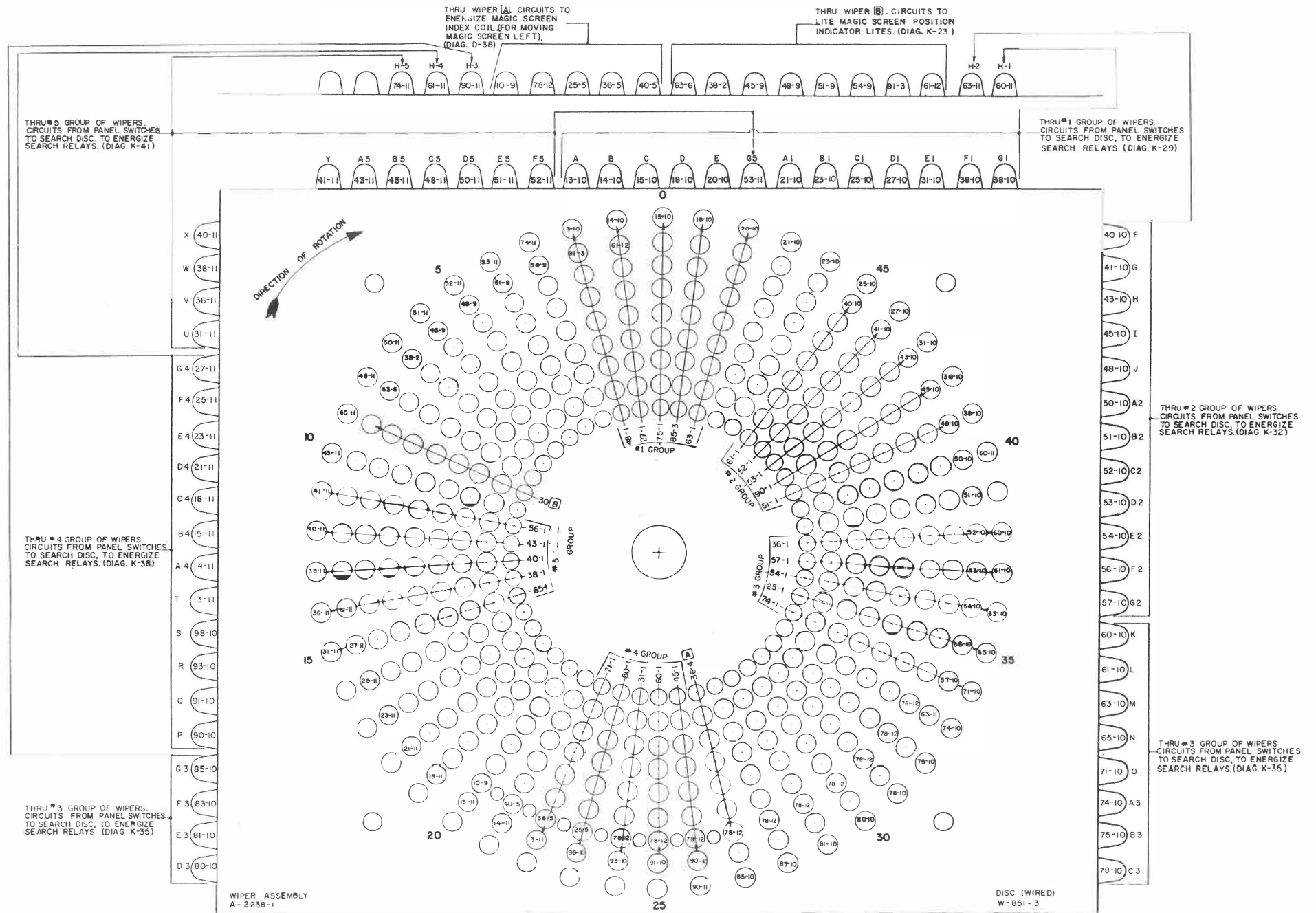
LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS.  
 NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF REPLAY CIRCUIT STRIP IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

EXAMPLE: ON A 3-IN-LINE SCORE OF 64 REPLAYS  
 THE CIRCUIT IS EFFECTIVE THRU THE 16 REPLAY CIRCUIT STRIP

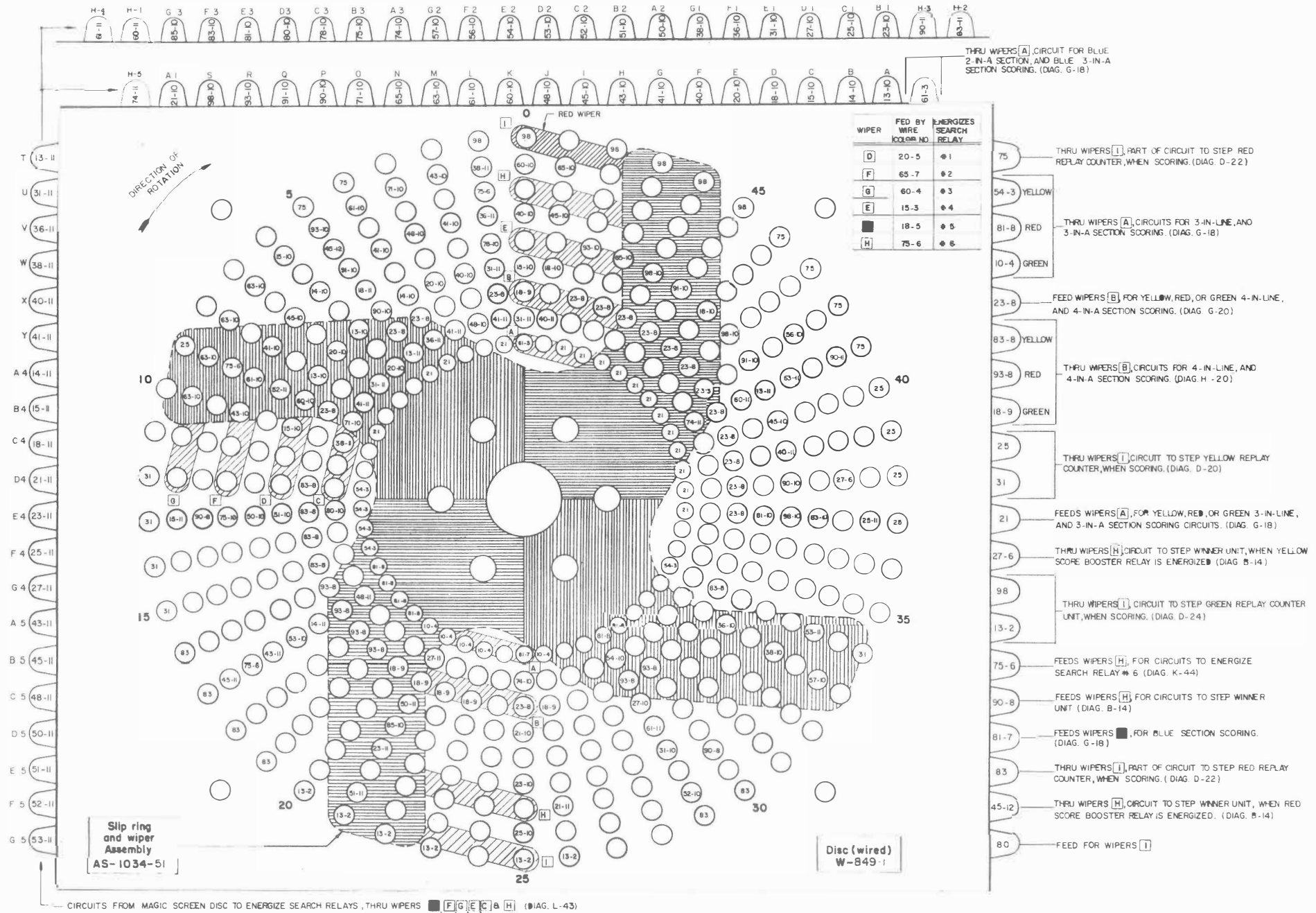
NOTE: 96 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.

# MAGIC SCREEN UNIT viewed from BUTTON or WIPER side

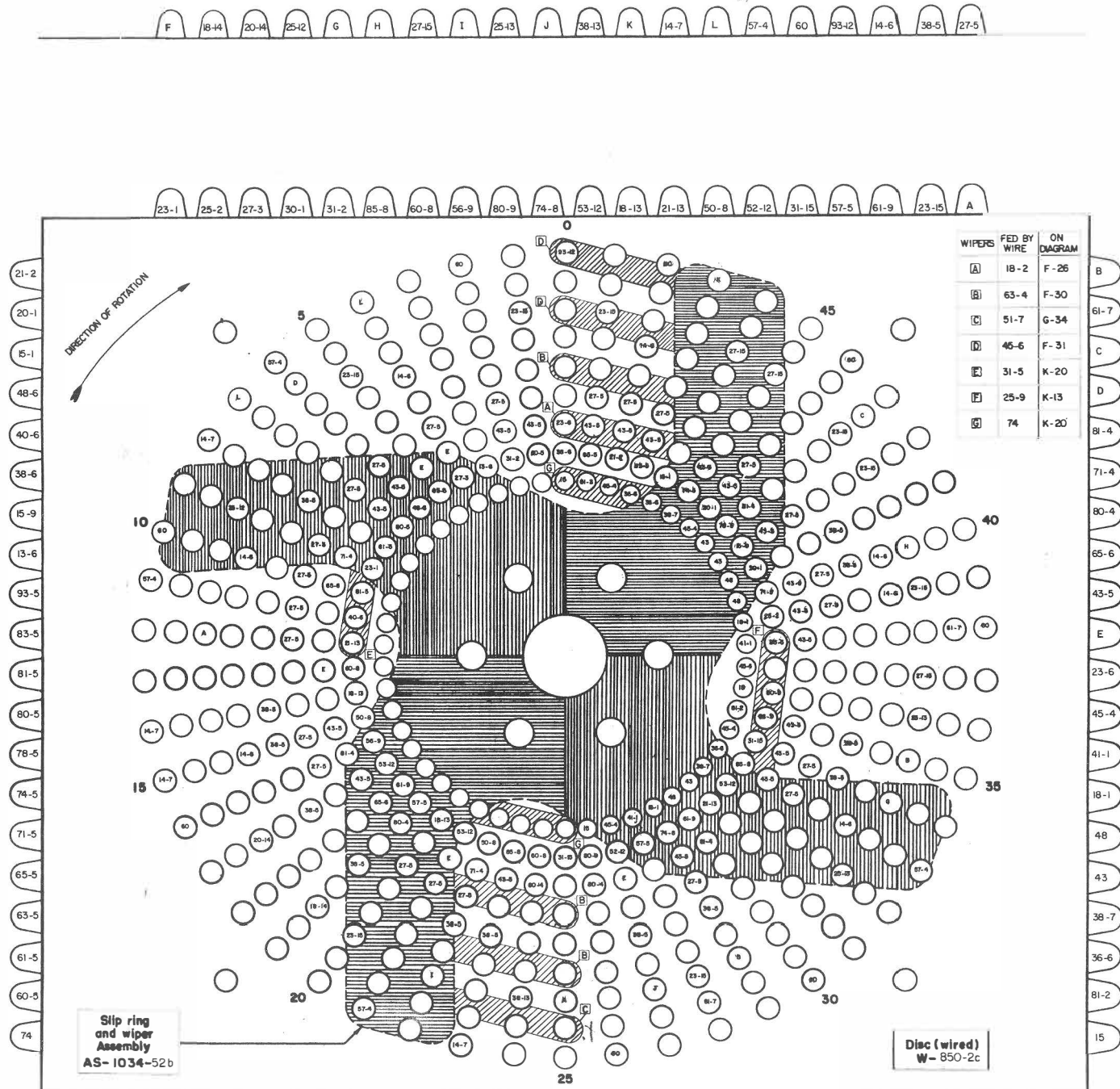
8 step unit. Wipers shown in zero or reset position



# SEARCH DISC viewed from BUTTON or WIPER side

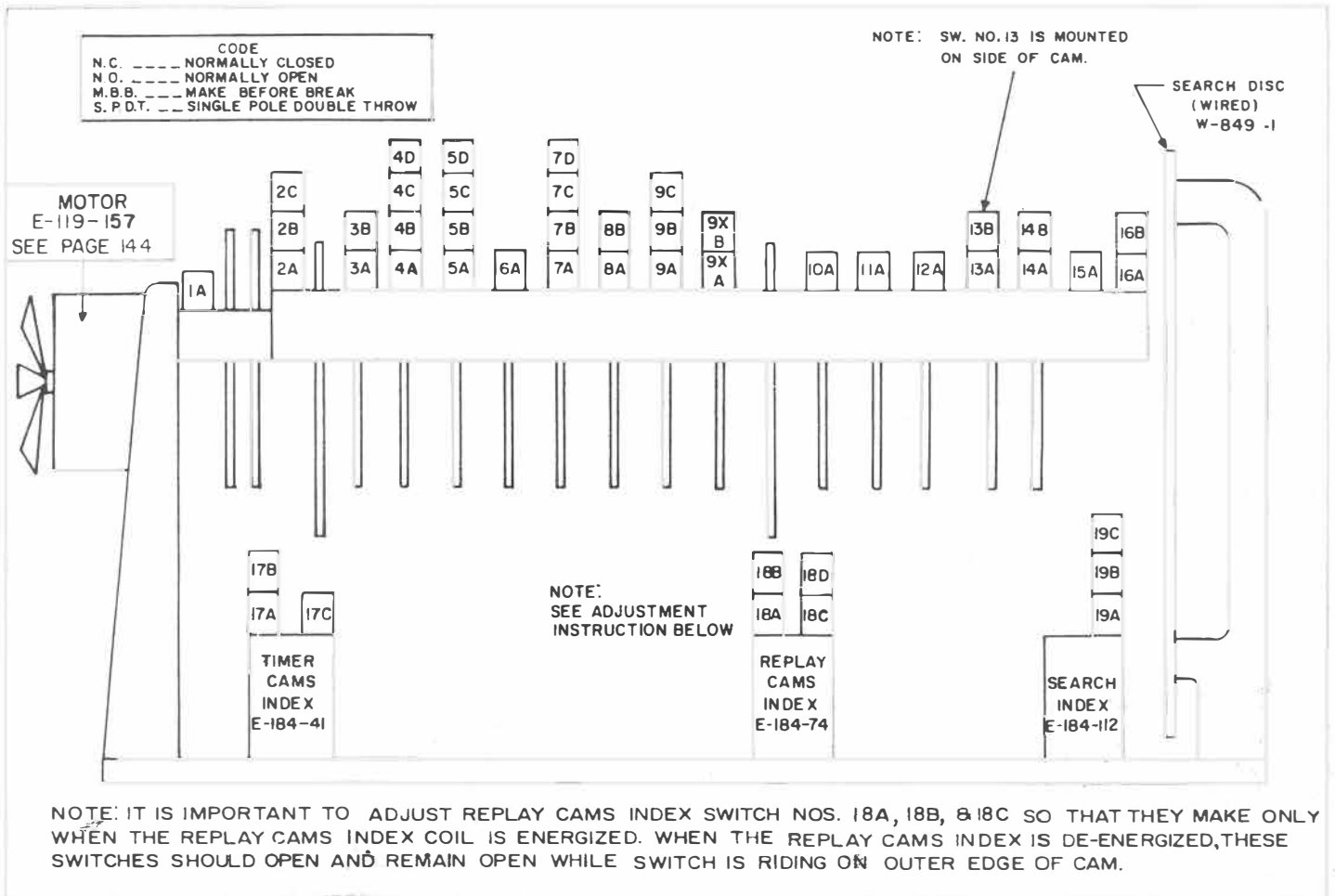


**SPOTTING DISC** viewed from **BUTTON** or **WIPER** side



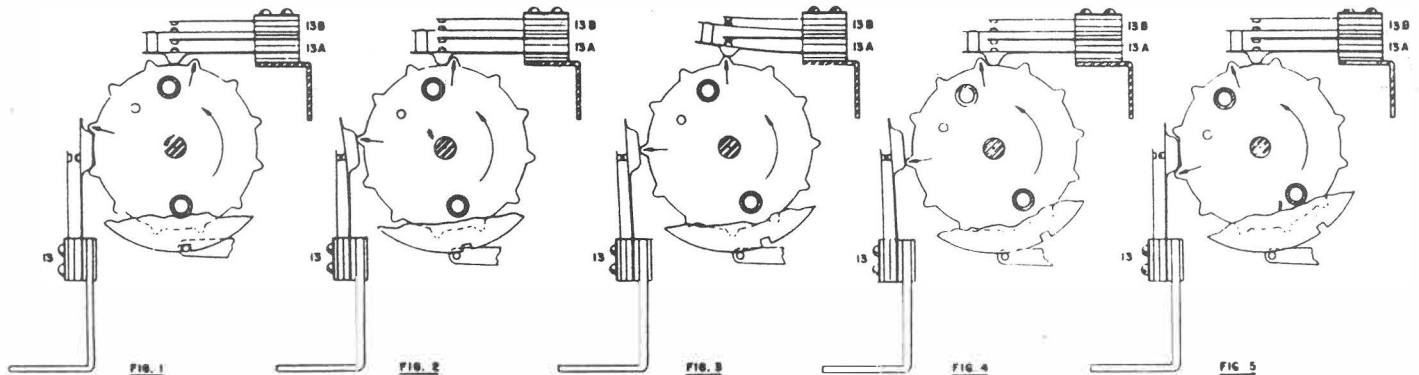
# CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART ON PAGE 136



## 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.**



REPLAY CAMS SHOWN IN THEIR NORMAL INDEXED POSITION. SWITCHES 13A, 13B, & 13 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. SWITCHES 13A, & 13B ARE STILL OPEN. SWITCH 13 IS NOW CLOSED.

SWITCHES 13A, & 13B ARE NOW CLOSED. SWITCH 13 IS STILL CLOSED.

SWITCHES 13A, & 13B ARE NOW OPEN AGAIN. SWITCH 13 IS STILL CLOSED.

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

# CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 135

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	0-8 36-9 65-2	Yellow-Brown Brown-White	Completes circuit to step timer unit, after shooting 5th ball.
2A	N.O.	H-3 90-5 30	Gray Yellow	Completes circuit to energize reflex play magnet, and replay register reset coil. Also pulses total plays meter.
2B	N.O.	E-35 10-2 61-7	Red Brown-Red	Completes circuit to energize "red" or "yellow" score booster relay.
2C	N.C.	E-12 31-7 57-6	Yellow-Red White-Orange	Breaks lock-in circuit for red button relay.
3A	N.C.	H-4 48-2 83-3	Green-Black Black-Yellow	Breaks lock-in circuit for start relay, and acts as safety switch during cycle.
3B	S.P.D.T.	B-19 93-7 98-4 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit from replay meter, to total plays meter.
4A	N.O.	D-5 27-9 80-2	Blue-Orange Black	Completes circuit to pulse coin meter.
4B	N.O.	D-45 98-1 30	Gray-Black Yellow	Completes circuit to energize spotting cams index coil.
4C	N.O.	E-43 56-5 30	White-Brown Yellow	Completes circuit to energize score extra step index coil.
4D	S.P.D.T.	G-5 13-9 90-9 14-5	Red-Yellow Gray Red-Green	(Safety circuit) breaks circuit to start relay, and completes circuit to energize tilt relay if coin switch is closed too long.
5A	N.O.	G-9 65-2 83-1	Brown-White Black-Yellow	Completes circuit to reset timer unit while playing extra-balls.
5B	N.O.	B-20 21-1 38-4	Blue-Red Yellow-Black	Completes circuit to energize extra-ball unit step-up coil, for single steps.
5C	N.O.	D-27 78-4 91-6	Orange-Black Gray-Red	Completes circuit to energize anti-cheat relay.
5D	N.O.	E-31 10-7 85-4	Red Black-White	Completes circuit to energize "magic-screen feature" unit step-up coil, for single steps.
6A	N.C.	I-29 51-5 78-15	White-Red Orange-Black	Opens game advantage circuits, during cycle.
7A	N.O.	B-28 10-1 75-8	Red Orange-White	Completes circuit to energize yellow score unit step-up coil, for single steps.
7B	N.O.	G-29 85-15 63-4	Black-White Brown-Yellow	Completes circuit to yellow, red, and green score unit step-up coils, for single steps.
7C	N.O.	B-30 23-9 83-4	Blue-Yellow Black-Yellow	Completes circuit to energize red score unit step-up coil, for single steps.
7D	N.O.	B-31 90-4 91-5	Gray Gray-Red	Completes circuit to energize green score unit step-up coil, for single steps.

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
8A	N.O.	B-27 25-4 38-4	Blue-White Yellow-Black	Completes circuit to energize extra-ball unit step-up coil, for single steps.
8B	N.O.	E-33 18-7 61-7	Red-Black Brown-Red	Completes circuit to energize yellow score booster relay.
9A	Alt.	D-26 43-5 74-7	Green-Yellow Orange-Green	(Proportioning circuit) for extra-ball unit steps.
9B	Alt.	B-34 85-12 10-2 20-7	Black-White Red Blue	(Proportioning circuit) for red or yellow score booster relays.
9C	Alt.	H-28 15-7 54-8	Red-White White-Green	(Proportioning circuit) for extra-ball unit steps.
9XA	Alt.	C-35 14-13 25-12	Red-Green Blue-White	(Proportioning circuit) for blue score-booster relay.
9XB	Alt.	H-24 75-5 78-15	Orange-White Orange-Black	(Proportioning circuit) for score, and extra-ball steps.
MULT. X12 10A	N.O.	A-22 63 70	Brown-Yellow Orange	Completes circuit to step replay counters for scoring, when score units are at 8th step.
MULT. X6 11A	N.O.	A-22 57 70	White-Orange Orange	Completes circuit to step replay counters for scoring, when score units are at 7th step.
MULT. X4 12A	N.O.	A-21 52 70	White-Blue Orange	Completes circuit to step replay counters for scoring, when score units are at 5th or 6th step.
MULT. X1 13A	N.O.	A-21 45 70	Green-White Orange	Completes circuit to step replay counters for scoring, when score units are at 1st, 2nd, 3rd or 4th step.
13B	N.O.	C-18 48-4 80	Green-Black Black	Completes circuit to pulse replay register step-up coil, reflex replay magnet, and replay meter, when scoring.
13 BACKSIDE	N.O.	G-17 21-3 27	Blue-Red Blue-Orange	Completes replay scoring lock-in circuit. (Note: See control unit pictorial view for adjustment)
14A	N.C.	H-15 14 18	Red-Green Red-Black	In series circuit for in-line or section replay scoring.
14B	N.C.	B-8 27-2 90-2	Blue-Orange Gray	Breaks timer unit step-up circuit, during replay scoring.
15A	N.O.	D-44 21-3 31-6	Blue-Red Yellow-Red	Completes circuit to reset sequence unit, and winner unit.
CHANGE-OVER 16A	S.P.D.T.	H-17 56 18 54	White-Brown Red-Black White-Green	Directs in-line or section replay scoring circuit.
CHANGE-OVER 16B	S.P.D.T.	D-17 80 51-8 41-9	Black White-Red Green-Red	Directs circuit to energize search index coil for in-line or section replay scoring.

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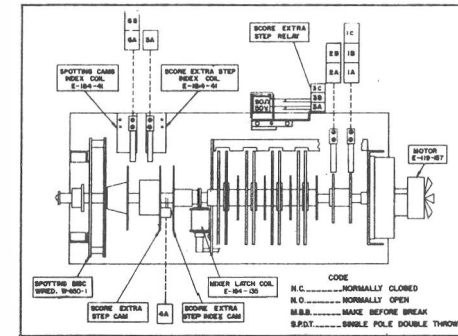
# CONTROL UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 135

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TIMER CAMS INDEX COIL	A-6	93-2 70	Gray-Yellow Orange	Energized when playing coins or replays.
17A N.O.	G-1	20P 60P	Blue (Plastic) Brown (Plastic)	Completes circuit to run control unit, and mixer and spotting unit motors.
17B N.C.	G-5	27-9 71-2	Blue-Orange Orange-Red	Breaks circuit to coin lock-out magnet, during cycle.
17C N.C.	E-12	13 30	Red-Yellow Yellow	Breaks circuit to red button relay, and extra-ball relays, during cycle.
REPLAY CAMS INDEX COIL	A-18	40-4 70	Green Orange	Energized by search index switch #19B, and releases replay cams for scoring.
18A N.O.	G-17	27 80	Blue-Orange Black	In series with replay lock-in circuit, during in-line or section scoring. (Note: See control unit pictorial view for correct adjustment)
18B N.O.	H-15	14 18	Red-Green Red-Black	In series with in-line or section replay scoring circuit. (Note: See control unit pictorial view for correct adjustment)
18C N.O.	F-17	36-14 80	Yellow-Brown Black	In series with replay lock-in circuit, during section scoring. (Note: See control unit pictorial view for correct adjustment)
18D N.C.	B-17	15-2 91-8	Red-White Gray-Red	Breaks 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 thru control unit change-over cam switch #16B, for in-line or section replay scoring.
19A N.C.	I-4	15-5 83-3	Red-White Black-Yellow	Breaks start circuit, and acts as safety switch.
19B N.O.	H-18	40-4 80	Green Black	Completes circuit to energize replay cams index coil.
19C N.O.	H-17	54 91-9	White-Green Gray-Red	Completes circuit for section replay scoring.
20A N.C.	F-38	14-4 20-2	Red-Green Blue	(Not shown on pictorial view) breaks circuit to left-right magic-screen buttons, and 1-7 - 7-1 shift buttons.

# MIXER AND SPOTTING UNIT ASSEMBLY

NUMBERS CORRESPOND TO SWITCH CHART BELOW

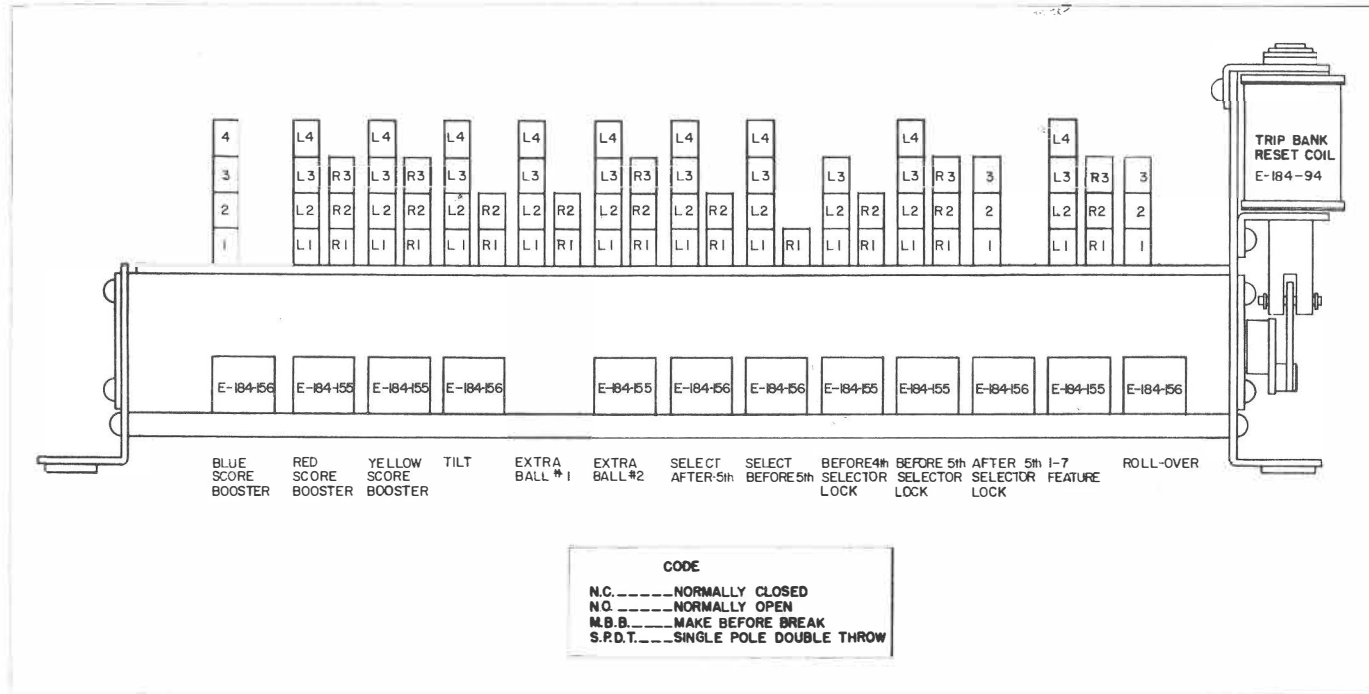


# MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
16 PULSE 1A N.O.	F-31	14-8 45-6	Red-Green Green-White	Thru spotting disc, pulses magic-screen feature unit for multiple steps. Also energizes 1-7 feature, select before 5th, select after 5th, and rollover trip relays.
16 PULSE 1B N.O.	D-3	53-7 75-2	White-Yellow Orange-White	Pulses replay register reset coil, when cancelling replays.
16 PULSE 1C N.O.	J-2	25-15 90	Blue-White Gray	Flashes "select-now" lite.
16 PULSE 2A N.O.	F-14	52-8 93	White-Blue Gray-Yellow	Pulses sequence unit, and winner unit step-up coils, when searching for section winner.
16 PULSE 2B N.O.	B-26	38-4 78	Yellow-Black Orange-Black	Pulses extra-ball unit step-up coil, for multiple steps.
SCORE EXTRA STEP RELAY COIL	A-9	43-6 70	Green-Yellow Orange	Energized by red, yellow or green score unit step-up arm switches.
3A N.O.	C-9	43-6 81-3	Green-Yellow Black-Red	Lock-in circuit for this relay.
3B N.O.	D-28	50-4 51-6	White White-Red	Completes circuit for yellow, red and green score units multiple steps.
3C N.O.	I-4	15-5 30	Red-White Yellow	(Safety circuit) opens start circuit during score unit multiple steps.
EXTRA STEP PULSE SWITCH 4A N.O.	E-28	43-4 50-4	Green-Yellow White	Pulses yellow, red, and green score units for multiple steps.
SCORE EXTRA STEP INDEX COIL	A-42	56-5 70	White-Brown Orange	Energized by control unit cam switch #4B.
5A N.O.	C-10	31-13 81-3	Yellow-Red Black-Red	In series lock-in circuit for score extra step relay.
SPOTTING CAMS INDEX COIL	A-45	98-1 70	Gray-Black Orange	Energized by control unit cam switch #5A.
6A N.O.	J-20	13-4 30	Red-Yellow Yellow	Flashes score lites. Also flashes extra-ball lites, during extra-ball play.
6B N.O.	J-13	81-6 30	Black-Red Yellow	Flashes game advantage feature lites.

# TRIP RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART BELOW



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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BLUE SCORE-BOOSTER TRIP COIL	A-36	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
1	N.C.	B-36 J	14-13 Red-Green Jumper	Breaks circuit to coil.
2	N.O.	J-14	85-1 30 Black-White Yellow	Completes circuit to lite blue 2 scores green 5 indicator lite. (To show feature is in play).
3	N.O.	G-18	20-8 81-7 Blue Black-Red	Completes replay scoring circuit for 2 in a blue section scores green 5-in-line.
4	S.P.D.T.	L-13	18-4 60-8 61-9 Red-Black Brown Brown-Red	Directs circuit from "blue 3 scores green 5" feature lite, to "blue 2 scores green 5" feature lite.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED SCORE-BOOSTER TRIP COIL	B-35	10-5 85-12	Red Black-White	Energized thru spotting disc, when circuit complete thru other factors.
L1	N.C.	A-34	10-5 53-6 Red White-Yellow	Breaks circuit to this coil. Also breaks circuit for energizing yellow score booster trip relay.
L2	N.O.	J-8	54-7 80-9 White-Green Black	Completes circuit to lite "red score booster" feature lite.
L3	S.P.D.T.	C-29	65-4 63-7 52-4 Brown-White Brown-Yellow White-Blue	(Proportioning circuit) red or yellow score steps.
L4	S.P.D.T.	B-29	83-4 25-14 75-8 Black-Yellow Blue-White Orange-White	Same as above.
R1	N.C.	L-9	21-13 43-7 Blue-Red Green-Yellow	Breaks circuit to flash "yellow score booster" feature lite.
R2	S.P.D.T.	H-26	74-12 78-11 81-9 Orange-Green Orange-Black Black-Red	(Game proportioning circuits) thru mixer #2.
R3	N.O.	B-14	13-1 45-12 Red-Yellow Green-White	Thru search disc, completes A circuit to step winner unit.

CONTINUED ON NEXT PAGE

# TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 138

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW SCORE BOOSTER TRIP COIL	B-34	10-5 20-7	Red Blue	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	L-8	18-13 54-7	Red-Black White-Green	Breaks circuit to flash "red score booster" feature lite.
L2 N.O.	K-8	43-7 80-9	Green-Yellow Black	Completes circuit to lite "yellow score booster" feature lite.
L3 S.P.D.T.	C-29	52-4 31-9 65-4	White-Blue Yellow-Red Brown-White	(Proportioning circuit) red or yellow score steps.
L4 S.P.D.T.	B-29	75-8 38-9 83-4	Orange-White Yellow-Black Black-Yellow	Same as above.
R1 N.C.	A-34	53-6 70	White-Yellow Orange	Breaks circuit to this coil. Also breaks circuit for energizing "red score booster" relay.
R2 S.P.D.T.	H-27	78-11 15-7 81-9	Orange-Black Red-White Black-Red	(Game proportioning circuits) thru mixer #2.
R3 N.O.	B-15	13-1 27-6	Red-Yellow Blue-Orange	Thru search disc, completes a circuit to step winner unit.
TILT TRIP COIL	A-12	14-5 70	Red-Green Orange	Energized by any tilt switch. Also thru control unit cam switch #4D, if coin switch is closed too long.
L1 N.C.	M-27	10 20-4	Red Blue	Breaks 17 volt circuit.
L2 N.C.	H-38	40-8 93-3	Green Gray-Yellow	Breaks circuit to front rail collect scores, left, right, 1-7, 7-1 buttons.
L3 S.P.D.T.	I-7	21-3 30 45-8	Blue-Red Yellow Green-White	Breaks circuit to this coil. Also breaks circuit for game advantages, replay scoring, ball counting, and completes circuit to close shutter if game tilted when shutter opens.
L4 S.P.D.T.	M-25	38 54-2 91-2	Yellow-Black White-Green Gray-Red	Breaks 6 volt circuit, and lites tilt lite.
R1 N.C.	G-2	30P 60P	Yellow (Plastic) Brown (Plastic)	Breaks circuit to control unit, and mixer and spotting unit motors.
R2 N.O.	F-13	57-6 85-7	White-Orange Black-White	(Safety circuit) for energizing red button relay.
EXTRA-BALL #1 TRIP	A-13			Trips with extra-ball #2 relay.
L1 N.C.	E-27	85-4 91-6	Black-White Gray-Red	Circuit to energize anti-cheat relay.
L2 N.O.	G-9	71-8 83-1	Orange-Red Black-Yellow	Completes circuit to reset timer unit.
L3 S.P.D.T.	E-26	85-4 30 61-2	Black-White Yellow Brown-Red	Breaks guaranteed score steps circuit, and completes circuit for extra-ball unit 1st step.
L4 S.P.D.T.	G-28	60-6 27-7 18-2	Brown Blue-Orange Red-Black	Breaks circuit for other game advantages, and completes circuit for extra-ball unit steps.
R1 N.C.	K-13	25-9 81-6	Blue-White Black-Red	Breaks circuit for flashing game advantage lites.
R2 S.P.D.T.	I-28	78-15 15-7 45-2	Orange-Black Red-White Green-White	Breaks circuit for other game advantages, and further completes circuit for extra-ball unit steps.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA-BALL #2 TRIP COIL	A-13	J 70	Jumper Orange	Energized by yellow button switch (front door) when playing for extra-balls.
L1 N.C.	B-13	10-6 J	Red Jumper	Breaks circuit to coil.
L2 N.O.	D-13	38-3 91-1	Yellow-Black Gray-Red	Thru extra-ball unit disc, completes a circuit to run ball lifter motor.
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 a circuit to energize mixer latch, and timer cams index coils.
L4 S.P.D.T.	J-20	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Breaks circuit for flashing score lites, and completes circuit to flash extra-ball lites.
R1 N.C.	G-29	45-2 83-9	Green-White Black-Yellow	Breaks circuit for other game advantages.
R2 N.O.	G-28	27-7 54-8	Blue-Orange White-Green	(Proportioning circuit) completes circuit for extra-ball unit steps.
R3 N.O.	J-25	21-4 30	Blue-Red Yellow	Completes circuit to lite extra-balls lite. (Show extra-balls is being played)
SELECT AFTER 5th TRIP COIL	D-36	J 38-13	Jumper Yellow-Black	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	D-36	40-15 J	Green Jumper	Breaks circuit to coil.
L2 N.O.	G-38	21-12 93-3	Blue-Red Gray-Yellow	Completes circuit to keep "magic-screen buttons" and "1-7 - 7-1 shift buttons" alive, until 6th ball is shot.
L3 S.P.D.T.	J-1	51-12 90 52-13	White-Red Gray White-Blue	Breaks circuit to flash "select-now" lite before shooting 4th and before shooting 5th ball, and completes circuit to flash "select-now" lite before shooting 6th ball.
L4 S.P.D.T.	J-6	31-8 25-15 53-12	Yellow-Red Blue-White White-Yellow	Breaks circuit to "select before 4th" and "select before 5th ball" feature lites, and completes circuit to lite "select after 5th ball" feature lite.
R1 N.C.	I-24	75-5 78-15	Orange-White Orange-Black	(Proportioning circuit) for game advantages.
R2 N.O.	G-30	60-6 85-15	Brown Black-White	(Proportioning circuit) for score steps thru control unit cam switch #7B.
SELECT BEFORE 5th TRIP COIL	E-36	J 25-13	Jumper Blue-White	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	D-36	40-15 J	Green Jumper	Breaks circuit to coil.
L2 N.O.	H-37	93-3 98-3	Gray-Yellow Gray-Black	Completes circuit to keep "magic-screen buttons" and "1-7 - 7-1 shift buttons" until 5th ball is shot.
L3 S.P.D.T.	J-1	50-12 51-12 23-5	White White-Red 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.
L4 S.P.D.T.	K-6	57-5 31-8 74-8	White-Orange Yellow-Red Orange-Green	Breaks circuit to "select before 4th ball" feature lite, and completes circuit to lite "select before 5th ball" feature lite.
R1 N.C.	G-29	60-6 85-15	Brown Black-White	(Proportioning circuit) for score steps thru control unit cams switch #7B.

CONCLUDED ON NEXT PAGE

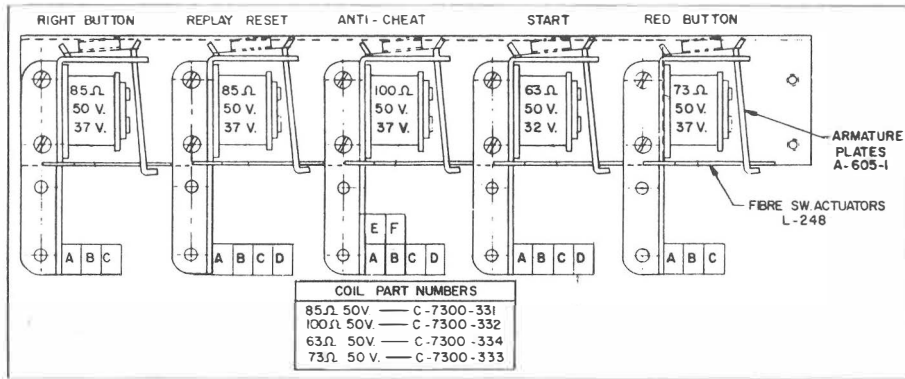
# TRIP RELAY BANK CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ON PAGE 138

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BEFORE 4th SELECTOR LOCK TRIP COIL	A-11	J 70	Jumper Orange	Energized thru timer unit disc, when 4th ball is shot.
L1 N.C.	K-1	27-4 50-12	Blue-Orange White	Breaks circuit for flashing "select-now" lite for before 4th feature.
L2 N.O.	C-17	23-13 51-8	Blue-Yellow White-Red	Completes circuit to energize search index coil.
L3 N.O.	H-8	36-2 43-2	Yellow-Brown Green-Yellow	Thru timer unit disc, completes a circuit to step timer unit.
R1 N.C.	B-13	83-6 J	Black-Yellow Jumper	Breaks circuit to coil.
R2 S.P.D.T.	H-38	98-3 93-3 53	Gray-Black Gray-Yellow White-Yellow	Breaks circuit to (left-right) magic-screen buttons, and (1-7 - 7-1) shift buttons, and completes circuit to collect scores button.
BEFORE 5th SELECTOR LOCK TRIP COIL	A-11	J 70	Jumper Orange	Energized thru timer unit disc, when 5th ball is shot.
L1 N.C.	B-11	74-6 J	Orange-Orange Jumper	Breaks circuit to coil.
L2 N.O.	E-4	18-6 50-2	Red-Black White	Completes circuit to energize start relay, during extra-ball play.
L3 N.O.	C-13	10-6 25-8	Red Blue-White	Completes circuit to energize extra-ball trip relays, during extra-ball play.
L4 S.P.D.T.	L-1	14-1 48-12 53-2	Red-Green Green-Black White-Yellow	Breaks circuit for flashing "select-now" lite for before 5th feature, and completes circuit to flash "select- now" lite for after 5th feature.
R1 N.C.	H-38	21-12 98-3	Blue-Red Gray-Black	Breaks circuit to (left-right) magic-screen buttons, and (1-7 - 7-1) shift buttons.
R2 N.O.	G-10	54-11 71-8	White-Green Orange-Red	Completes a circuit to reset timer unit, when front rail "R" button is pressed.
R3 N.O.	F-9	27-2 78-6	Blue-Orange Orange-Black	Completes circuit for stepping timer unit, after 5th ball is shot.

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
AFTER 5th SELECTOR LOCK TRIP COIL	A-11	J 70	Jumper Orange	Energized when 6th ball (1st extra-ball) is shot.
1 N.C.	G-38	14-4 21-12	Red-Green Blue-Red	Breaks circuit to (left-right) magic-screen buttons, and (1-7 - 7-1) shift buttons.
2 N.C.	E-2	52-13 53-2	White-Blue White-Yellow	Breaks circuit for flashing "select-now" lite for after 5th feature.
3 N.C.	B-11	98-11 J	Gray-Black Jumper	Breaks circuit to coil.
1-7 FEATURE TRIP COIL	B-33	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
L1 N.C.	B-33	23-15 J	Blue-Yellow Jumper	Breaks circuit to coil.
L2 N.O.	B-36	40-15 70	Green Orange	Completes circuit for energizing select before 5th, and select after 5th trip relays.
L3 S.P.D.T.	H-26	85-14 74-12 71-12	Black-White Orange-Green Orange-Red	(Game proportioning circuits) thru mixer #2.
L4 S.P.D.T.	J-7	80-9 25-15 30	Black Blue-White Yellow	Directs circuit for flashing "select-now" lite for magic-screen feature or 1-7 shift feature.
R1 N.C.	H-24	36-8 85-14	Yellow-Brown Black-White	(Game proportioning circuits) thru mixer #2.
R2 N.O.	J-5	31-15 30	Yellow-Red Yellow	Completes circuit to lite "1-7 feature" lite.
R3 N.O.	F-40	20-2 51-15	Blue White-Red	Completes circuit to (1-7 - 7-1) shift buttons.
ROLL-OVER TRIP COIL	C-36	J 70	Jumper Orange	Energized thru spotting disc, when circuit complete thru other factors.
1 N.C.	C-36	20-15 J	Blue Jumper	Breaks circuit to coil.
2 N.O.	G-37	14-4 14-12	Red-Green Red-Green	Completes circuit to make panel rollover buttons alive (for stepping magic screen feature unit).
3 N.O.	J-8	52-12 80-9	White-Blue Black	Completes circuit to lite "roll-overs" feature lite.

## 5 RELAY BANK PICTORIAL VIEW

LETTERS CORRESPOND TO SWITCH CHART BELOW



## 5 RELAY BANK SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RIGHT BUTTON RELAY COIL	A-39	45-5 70	Green-White Orange	Energized by right button (on front rail) for moving magic-screen right.
A S.P.D.T.	B-39	48-5 25-6 45-5	Green-Black Blue-White Green-White	Breaks circuit to move left magic screen motor, and completes circuit to move right magic-screen motor. Also completes lock-in circuit for this relay.
B N.O.	B-38	61-4 57-14	Brown-Red White-Orange	Completes circuit to energize magic-screen unit index coil, when moving screen right.
C N.C.	E-38	36-4 36-15	Yellow-Brown Yellow-Brown	Breaks circuit for moving magic-screen left.
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energized when anti-cheat relay drops out.
A S.P.D.T.	C-4	90-5 41-6 53-7	Gray Green-Red White-Yellow	Directs replay register reset thru control unit cam switch #2A, when replays are being played, or thru 16 pulse cam #1B, when replays are being cancelled.
B N.O.	G-4	56-2 75-2	White-Brown Orange-White	Completes lock-in circuit for this relay.
C N.O.	G-1	20P 60P	Blue (Plastic) Brown (Plastic)	Completes circuit to run control unit, and mixer-spotting unit motors, when replays are being cancelled.
D N.C.	C-4	21-6 13-9	Blue-Red Red-Yellow	Breaks start circuit, when replays are being cancelled.

CONCLUDED IN NEXT COLUMN

## 5 RELAY BANK SWITCH CHART (CONCLUDED)

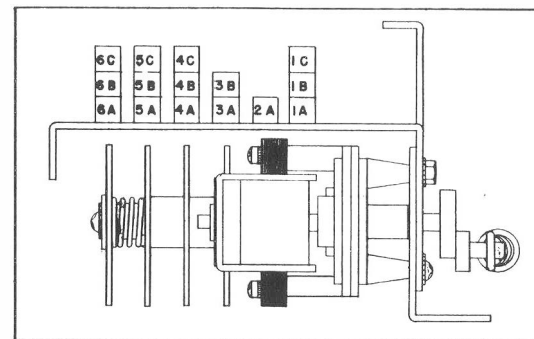
FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW AT LEFT

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
ANTI-CHEAT RELAY COIL	A-27	78-4 70	Orange-Black Orange	Energized thru control unit cam switch #5C. Switches on this relay protect replay scoring, 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 energizes replay reset relay, when this relay drops out.
B N.O.	D-27	78-4 30	Orange-Black Yellow	Completes lock-in circuit for this relay.
C N.O.	L-26	20-4 80-1	Blue Black	Breaks 17 volt circuit, when this relay drops out.
D N.C.	F-13	57-6 85-7	White-Orange Black-White	(Safety circuit) energizes red button relay, when this relay drops out.
E S.P.D.T.	L-24	91-2 38 40	Gray-Red Yellow-Black Green	Breaks 6 volt circuit to score lites, and lites tilt lite, when this relay drops out.
F N.C.	I-7	14-14 30	Red-Green Yellow	(Safety circuit) closes shutter if this relay drops out, when shutter is open.
START RELAY COIL	A-4	21-6 70	Blue-Red Orange	Energized by coin switch, or by red or yellow button (on front door) when playing replays.
A N.C.	B-25	75-4 78	Orange-White Orange-Black	Opens extra-ball step-up circuit, during spin.
B N.C.	G-30	14-8 83-9	Red-Green Black-Yellow	Opens game advantages circuit, during spin.
C N.O.	F-6	10-10 48-2	Red Green-Black	Completes circuit to energize mixer latch, and timer cams index coils.
D N.O.	F-4	48-2 13-9	Green-Black Red-Yellow	Completes lock-in circuit for this relay.
RED BUTTON RELAY COIL	A-12	85-7 70	Black-White Orange	Energized by red button (on front door).
A S.P.D.T.	C-6	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Breaks circuit to energize mixer latch, and timer cams index coils during extra-ball play, and completes circuit to open shutter when starting new game - after extra ball play.
B N.O.	D-12	27-8 31-7	Blue-Orange Yellow-Red	Completes lock-in circuit for this relay.
C N.C.	K-25	21-4 50-9	Blue-Red White	Breaks circuit to extra ball feature lite.

# MISCELLANEOUS RELAYS SWITCH CHART

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1-7 SHIFT RELAY COIL	A-40	85-16 70	Black-White Orange	Energized by 7-1 button switch (on front rail) when 1-7 feature is in play.
A S.P.D.T.	K-40	21-15 43-1 18-15	Blue-Red Green-Yellow Red-Black	(With ball in #3 hole) changes #3 to #5.
B S.P.D.T.	K-37	18-15 31-1 21-15	Red-Black Yellow-Red Blue-Red	(With ball in #5 hole) changes #5 to #3.
C S.P.D.T.	K-36	15-15 45-1 13-15	Red-White Green-White Red-Yellow	(With ball in #6 hole) changes #6 to #2.
D S.P.D.T.	K-31	14-15 53-1 10-15	Red-green White-Yellow Red	(With ball in #7 hole) changes #7 to #1.
E S.P.D.T.	K-28	13-15 75-1 15-15	Red-Yellow Orange-White Red-White	(With ball in #2 hole) changes #2 to #6.
F S.P.D.T.	K-27	10-15 27-1 14-15	Red Blue-Orange Red-Green	(With ball in #1 hole) changes #1 to #7.
G S.P.D.T.	K-4	48-15 30 50-15	Green-Black Yellow White	Breaks circuit to top row 1-2-3-4-5-6-7 lite, and completes circuit to top row 7-6-5-4-3-2-1 lite.
H N.O.	C-40	90-16 98-6	Gray Gray-Black	Completes circuit to energize 1-7 shift release coil, thru 1-7 button switch, or shutter motor cam switch #6C.
1-7 SHIFT RELEASE COIL	A-40	90-16 70	Gray Orange	Energized by 1-7 button switch (on front rail) when 1-7 feature is in play. Also by shutter motor cam switch #6C, when starting new game.
A N.C.	C-40	52-15 85-16	White-Blue Black-White	Completes circuit for energizing 1-7 shift relay, when this coil is energized.

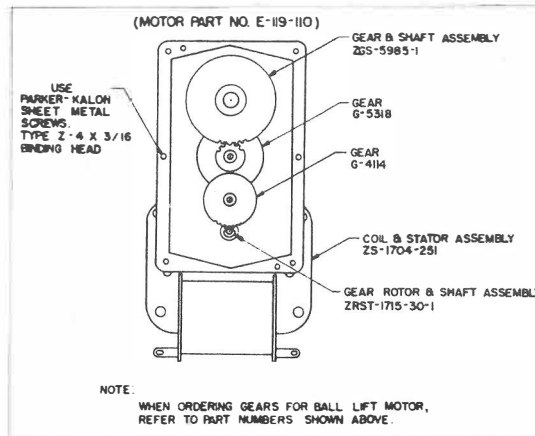
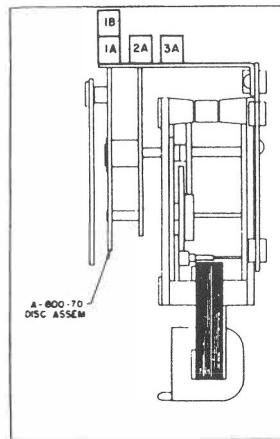
# SHUTTER MOTOR PICTORIAL VIEW



# 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.	H-14	14 21-3	Red-Green Blue-Red	Completes circuit for section or in-line replay scoring.
1B N.O.	G-6	14-3 30	Red-Green Yellow	Shutter motor carry-over circuit.
1C N.C.	H-8	21-3 98-3	Blue-Red Gray-Black	(In series with shutter motor cam switch #5B) completes circuit to reset timer unit, when playing extra-ball.
2A N.C.	F-14	31-3 36-3	Yellow-Red Yellow-Brown	Completes circuit to run ball lifter motor.
3A N.O.	C-43	85-5 30	Black-White Yellow	Resets extra-ball, yellow, red, and green replay counter units, when starting new game.
3B N.O.	H-2	20P 70P	Blue (Plastic) Orange (Plastic)	Resets trip relay bank, when starting new game.
4A N.O.	F-7	14-3 18-3	Red-Green Red-Black	(In series with shutter motor cam switch #4C). Completes circuit to close shutter, if game is tilted when shutter is open.
4B N.C.	I-38	21-3 40-8	Blue-Red Green	Completes circuit to front rail buttons for "magic-screen" feature, "shift" feature, and (R) collect scores. Also circuit to energize before 5th, and after 5th selector lock trip relays.
4C N.O.	H-7	18-3 45-8	Red-Black Green-White	See function of switch #4A above.
5A N.O.	E-42	31-4 31-4	Yellow-Red Gray-Red	(Safety circuit) lifter start relay.
5B N.C.	H-9	65-2 98-8	Brown-White Gray-Black	See function of switch #1C above.
5C S.P.D.T.	E-6	61 10-10 93-2	Brown-Red Red Gray-Yellow	Directs circuit to open shutter when starting new game, or energize mixer latch, and timer cams index coils after starting new game.
6A N.O.	H-9	71-8 30	Orange-Red Yellow	Resets timer unit, when starting new game.
6B N.O.	C-44	78-3 30	Orange-Black Yellow	Resets magic-screen feature unit, yellow, red and green score units, when starting new game.
6C N.O.	G-40	98-6 30	Gray-Black Yellow	Energizes 1-7 shift release coil, when starting new game.

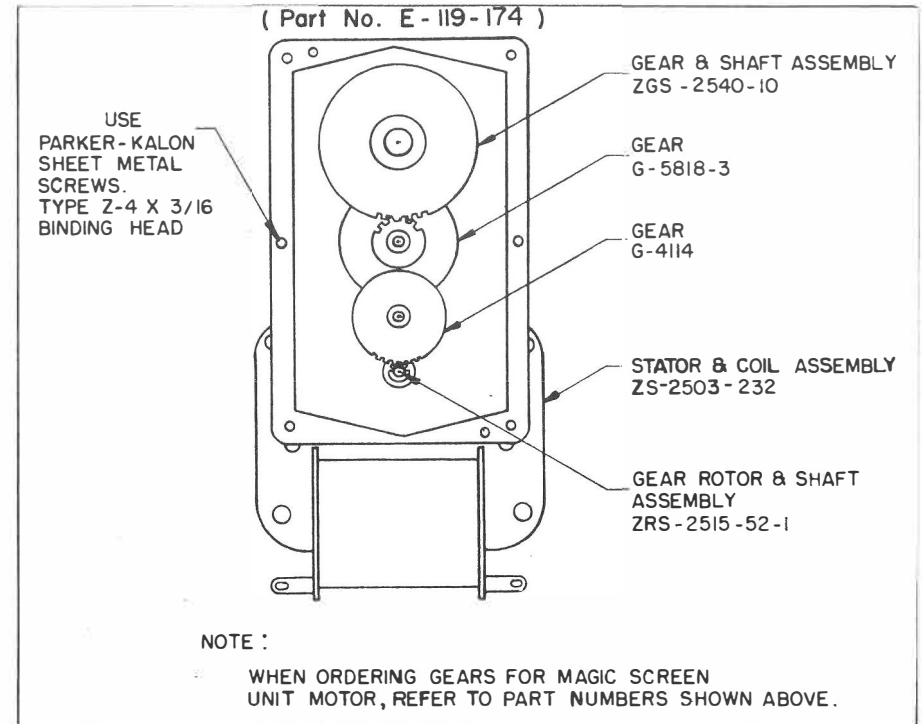
## BALL LIFT MOTOR PICTORIAL VIEW



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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	G-10 15-6 85-6	Red-White Black-White	(Safety circuit) for before 5th selector lock trip relay.
1B	N.O.	G-14 91-1 30	Gray-Red Yellow	Completes carry-over circuit to ball lift motor.
2A	N.O.	F-8 27-2 43-2	Blue-Orange Green-Yellow	Completes circuit to energize timer unit step-up coil.
3A	N.O.	H-11 21-3 83-7	Blue-Red Black-Yellow	Completes circuit to energize before 4th selector lock relay, thru timer unit disc.

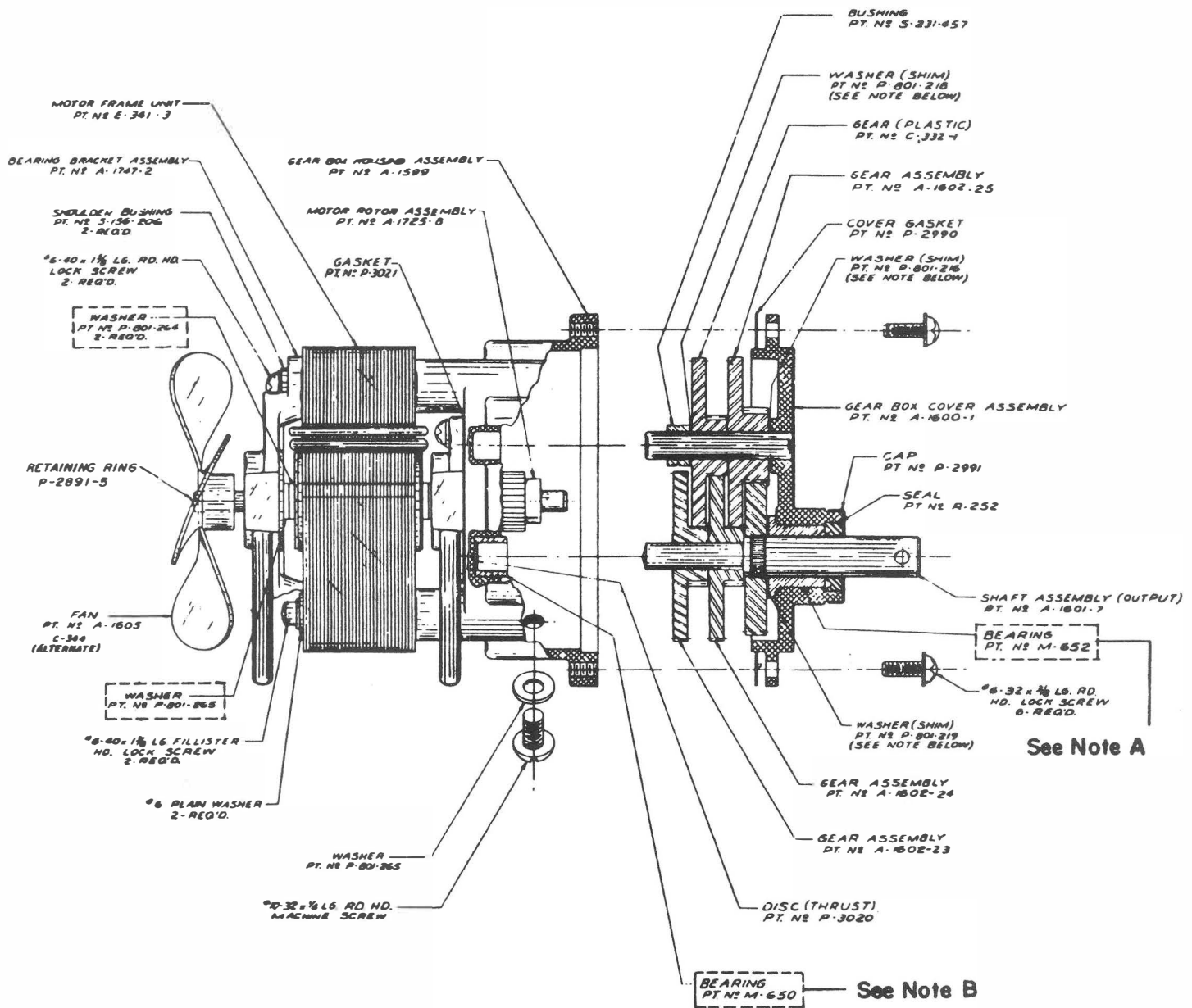
## MAGIC SCREEN UNIT MOTOR



## MAGIC SCREEN UNIT PARTS

PART No.	NAME
AS-1809-1	Complete Magic Screen Unit assembly
W-851-3	Contact plate
26-GG-10	Coil
A-613-55	Core plug
AS-1846-1	Index Arm and plunger assembly
P-163-32	Key Washer
M-943	Ladder Chain
P-801-310	Leather Washer
E-119-174	Motor
S-496-152	Plunger only for AS-1846-1

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



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.



## **NEW ANTI-CHEAT COIN SWITCH CIRCUIT**

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

The circuit is completed thru control unit cam switch #4D (on wiring diagram at G-5).

# NOTES

# NOTES

# MISCELLANEOUS PARTS

## Back Cabinet Assembly:

Part No.	Name of Part
G-292-4	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
SW-100-106	Lock switch
E-300-115	Search relay bank assembly

## Front Cabinet Assembly:

M-168-15	Ball
AS-187-17	Ball shooter assembly
AS-1835	Ball shooter housing
A-100-7	Ball shooter rod
SP-200-24	Ball shooter spring (long)
SP-243	Ball shooter spring (short)
R-108-3	Ball shooter tip
P-711-1	Cigarette holder
P-1900-47	Coin box
A-2304-2	Coin box cover
E-130-10	Counter—48 volt
P-2768-1	Cup—Button assemblies
P-4052	Legs
M-106-1	Leg bolt
M-163-4	Leg adjuster
E-108-57	Toggle switch

## Front Door Assembly:

Part No.	Name of Part
A-1538-3	Armature plate (AS-277-50)
A-1729-4	Button—metal
E-101-45	Coil for coin lock out
AS-277-50	Coin switch assembly 5¢ or 10¢
CA-567-84	Front door only
AS-1921	Front door assembly 5¢ or 10¢ (specify)
A-254-33	Hinge and bracket
M-281-6	Lock and keys
P-4005	Lock cam
E-108-14	Micro switch for coin switch assembly 5¢ & 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:

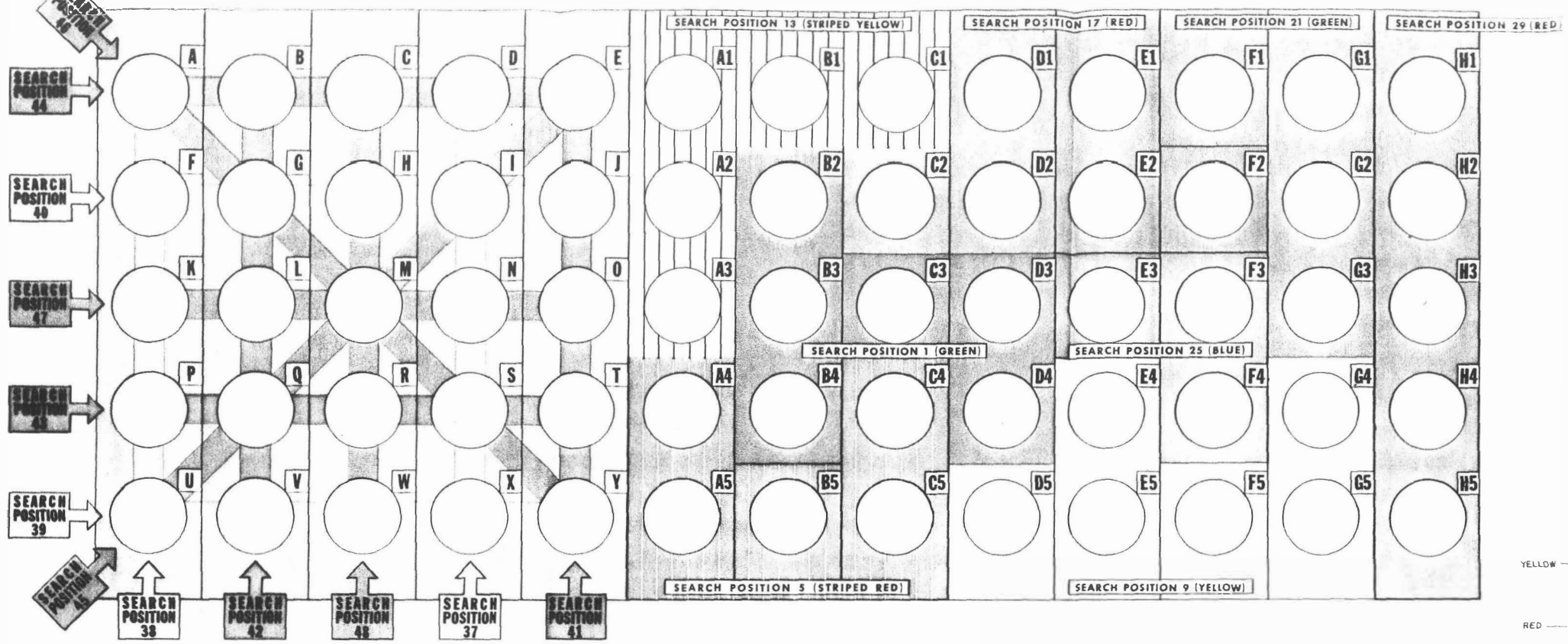
AS-1305-14	Front moulding assembly complete
A-1272-29	“R” Button
A-1272-30	Right Button
A-1272-31	Left Button
A-1272-32	1-7 button
A-1272-33	7-1 button
P-2210-8	5¢ Plate
P-2210-9	10¢ Plate
P-2210-63	Plate for Left & Right button
P-2210-38	Plate for “R” Button
P-2210-36	Plate for 1-7 & 7-1 button
CA-1005-2	Front moulding only

## Panel Assembly:

AS-1315	Ball gate and switch assembly
C-326-9	Light Shield post
R-115-4	Rebound rubber
M-170	Rebound spring—Double post
C-387-1	Roll over button—red
C-387-2	Roll over button—yellow
R-243	Rubber ring for Yellow post
R-243-2	Rubber ring for Red post

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

**MAGIC  
SCREEN  
POSITION**



YELLOW —  
RED —  
GREEN —

Place colored reproduction of Magic Screen (FORM BALLERINA 1001-B) on top of number card (FORM BALLERINA 1001-A) so that dotted lines on colored form line up with dotted lines on card form. Then slide colored form left or right until MAGIC SCREEN POSITION arrow points to desired position (START, A, B, C, D, E, F, G, H). All search position information on colored form will then be in proper relation to score-numbers that you may wish to check by reference to SEARCH POSITION CHART and pictorial view of Search Disc (in manual).

H G F E D C B A START

---

9 1 2 11 15

4 19 7 22 18

25 24 16 13 17

6 23 5 21 20

12 8 14 3 10

### SEARCH POSITIONS CHART

	RED UPPER AT POSITION	UPPER (D) ROW 4 SEARCH RE. ⊕ 1	UPPER (F) ROW 6 SEARCH RE. ⊕ 2	UPPER (G) ROW 8 SEARCH RE. ⊕ 3	UPPER (E) ROW 5 SEARCH RE. ⊕ 4	UPPER (C) ROW 2 SEARCH RE. ⊕ 5	UPPER (H) ROW 7 SEARCH RE. ⊕ 6
GREEN SECTION	1	B2	B3	B4	C3	D3	D4
	2						
	3						
	4						
RED SUPER SECTION	5	A4	A5	B5	C4	C5	
	6						
	7						
	8						
YELLOW SECTION	9	D5	E4	E5	F5	G4	G5
	10						
	11						
	12						
YELLOW SUPER SECTION	13	A1	B1	C1	A2	A3	
	14						
	15						
	16						
RED SECTION	17	D1	E1	C2	D2	E2	F2
	18						
	19						
	20						
GREEN SECTION	21	F1	G1	G2	G3		
	22						
	23						
	24						
BLUE SECTION	25	E3	F3	F-4			
	26						
	27						
	28						
RED SECTION	29	H1	H2	H3	H4	H5	
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37	D	I	N	S	X	
YELLOW	38	A	F	K	P	U	
	39	U	V	W	X	Y	
	40	F	G	H	I	J	
	41	E	J	O	T	Y	
RED	42	B	G	L	Q	V	
	43	P	Q	R	S	T	
	44	A	B	C	D	E	
	45	E	I	M	Q	U	
GREEN	46	A	G	M	S	Y	
	47	K	L	M	N	O	
	48	C	H	M	R	W	
	49						
	50						