

Bally®

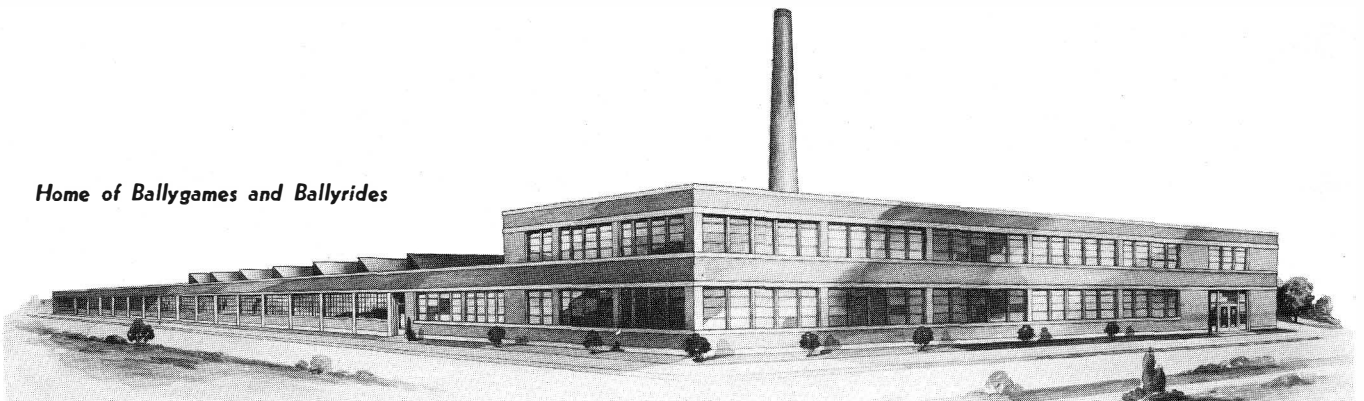
DOUBLE-HEADER

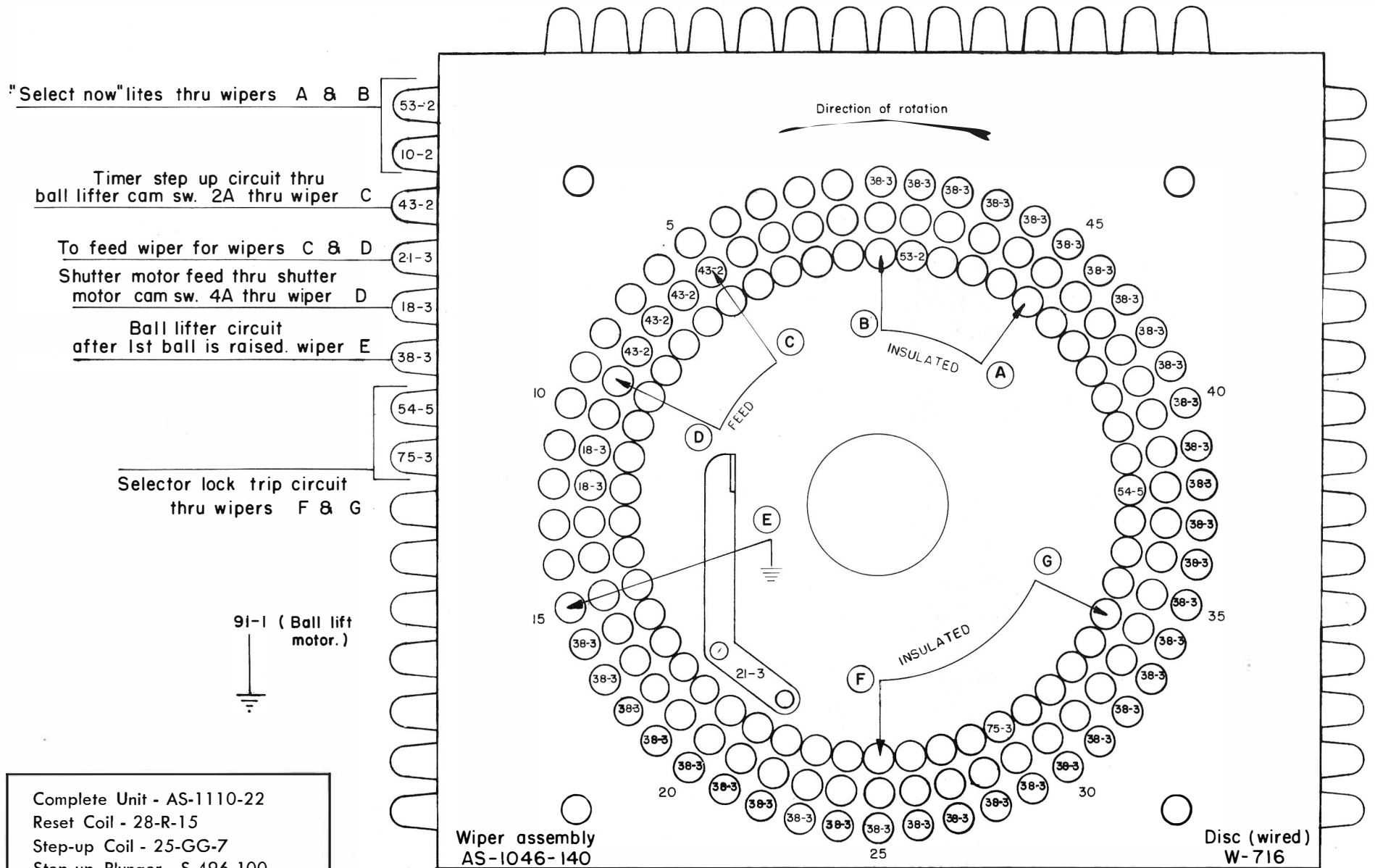
OPERATING INSTRUCTIONS AND PARTS CATALOG

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**

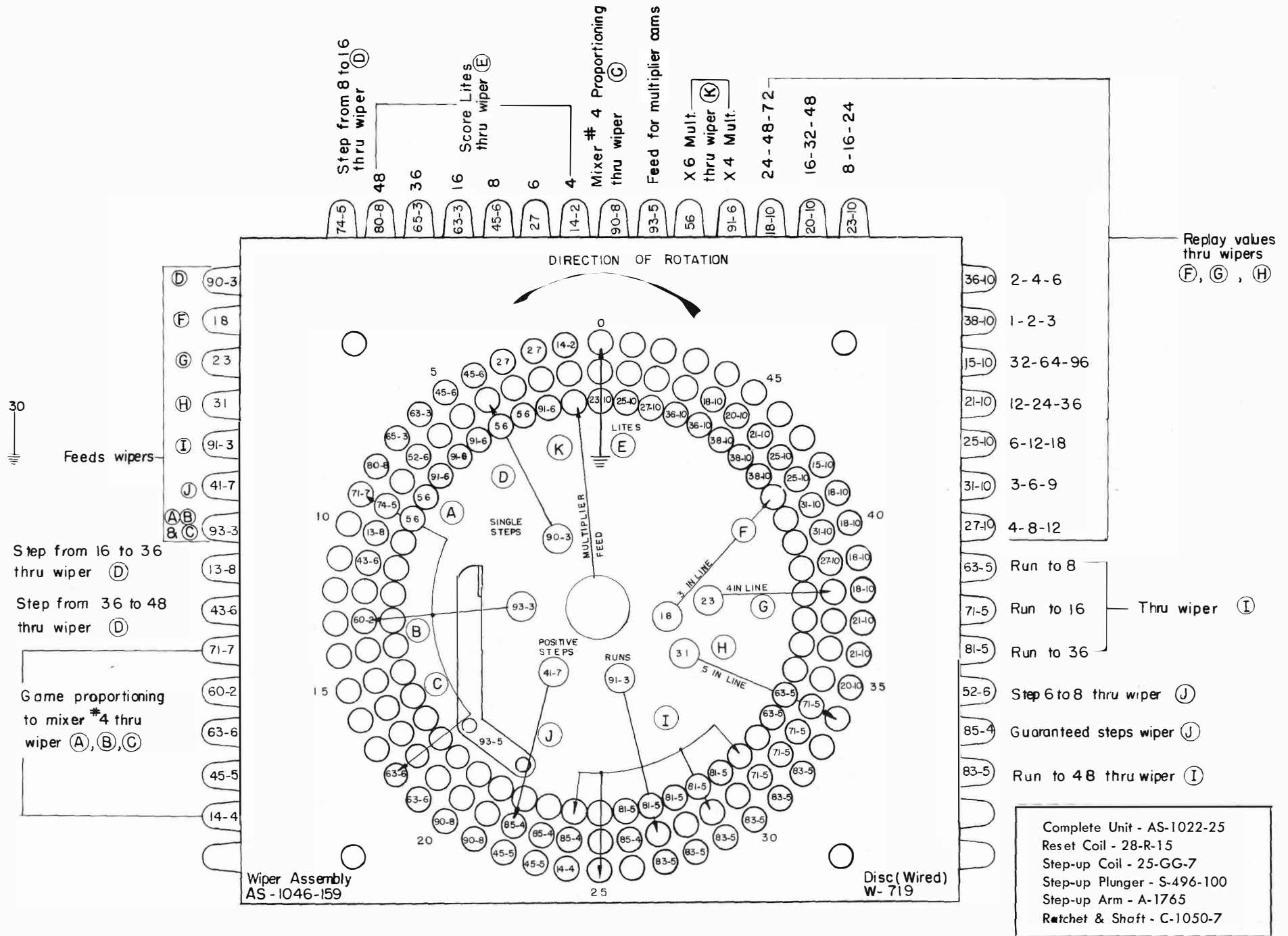
Home of Ballygames and Ballyrides

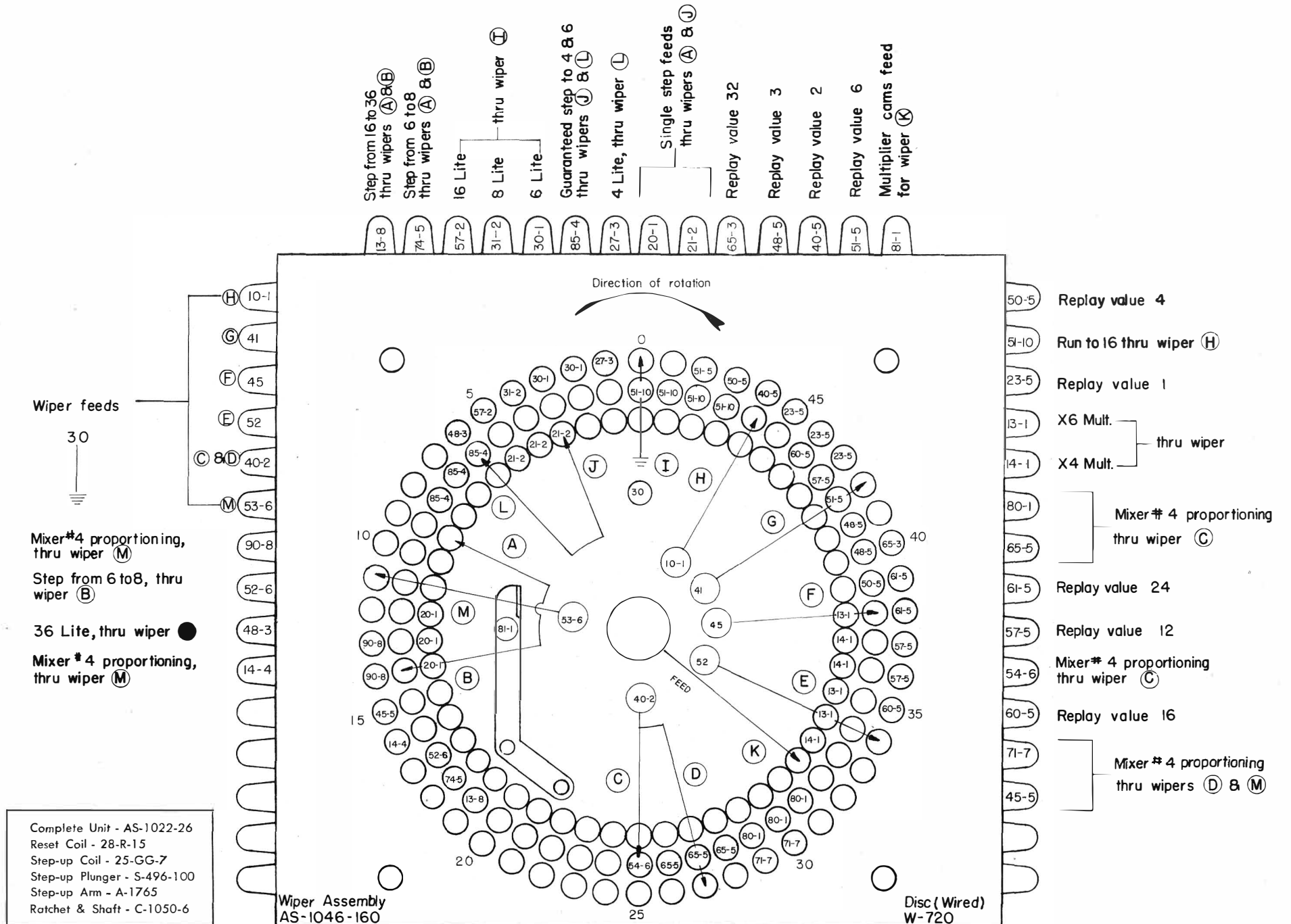




SCORE UNIT NO. 1 viewed from BUTTON or WIPER side

Wipers shown in zero or reset position





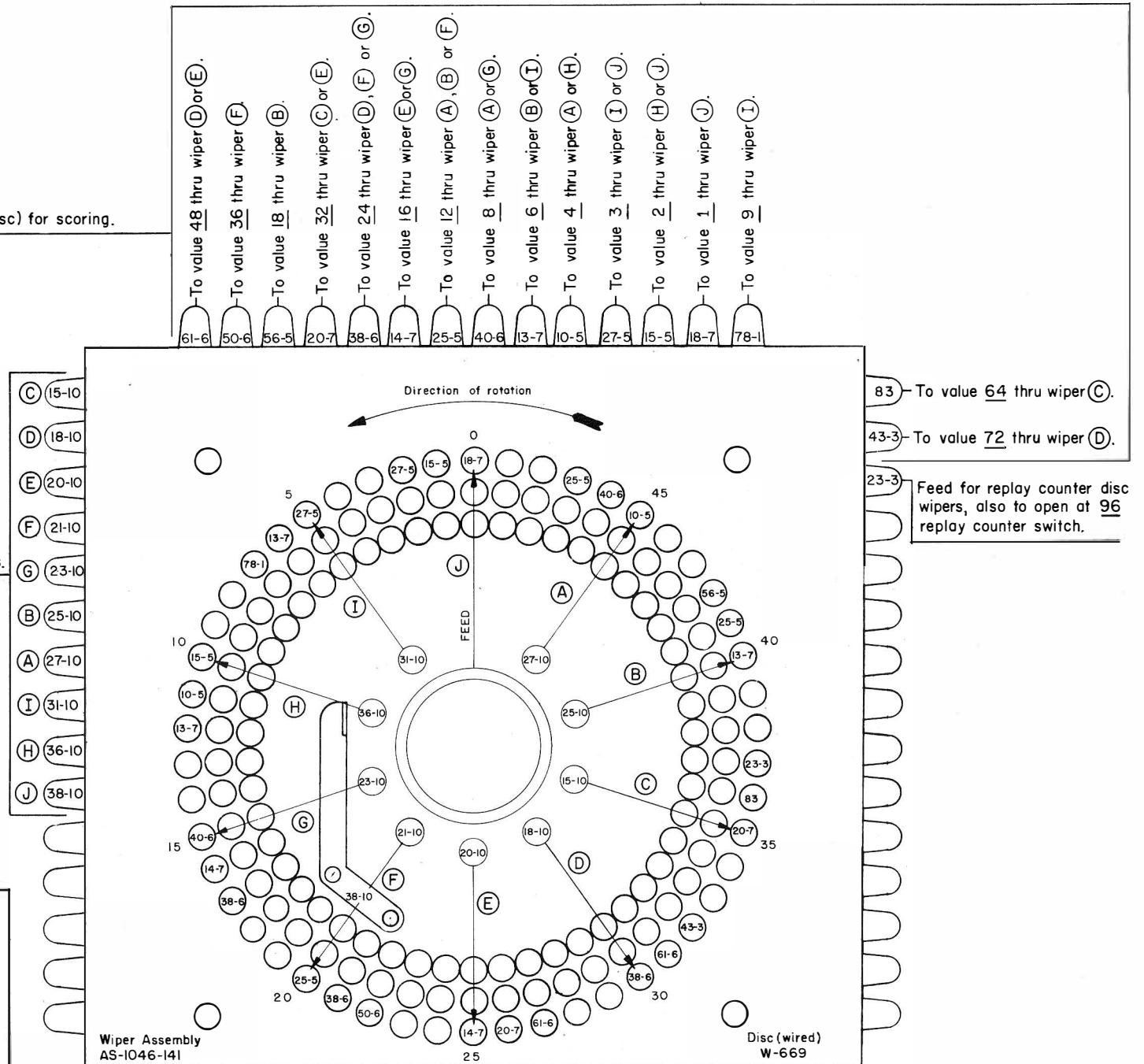
- Complete Unit - AS-1022-26
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-100
- Step-up Arm - A-1765
- Ratchet & Shaft - C-1050-6

SCORE-MULTIPLIER UNIT viewed from BUTTON or WIPER side

2 step unit. Wipers shown in zero or reset position

To replay values (Replay counter disc) for scoring.

From score disc, feeds for wipers.



- Complete Unit - AS-827-25
- 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-1050-2

EXTRA BALL UNIT viewed from **BUTTON** or **WIPER** side

10 step unit. Wipers shown in zero or reset position

Extra ball runs. Thru wipers (C) & (E)

Extra ball lites. Thru wipers (A) & (B)

Feeds wipers (A) & (B) for life circuits (Diag. J-20)

Feeds wipers (C) & (E) for extra ball runs.

Feeds wipers (F), (G) & (H) for single steps.

Single steps thru wipers (F), (G) & (H)

Extra ball count circuit to ball trough switches No.3, No.2 & No.1 Thru wiper (D)

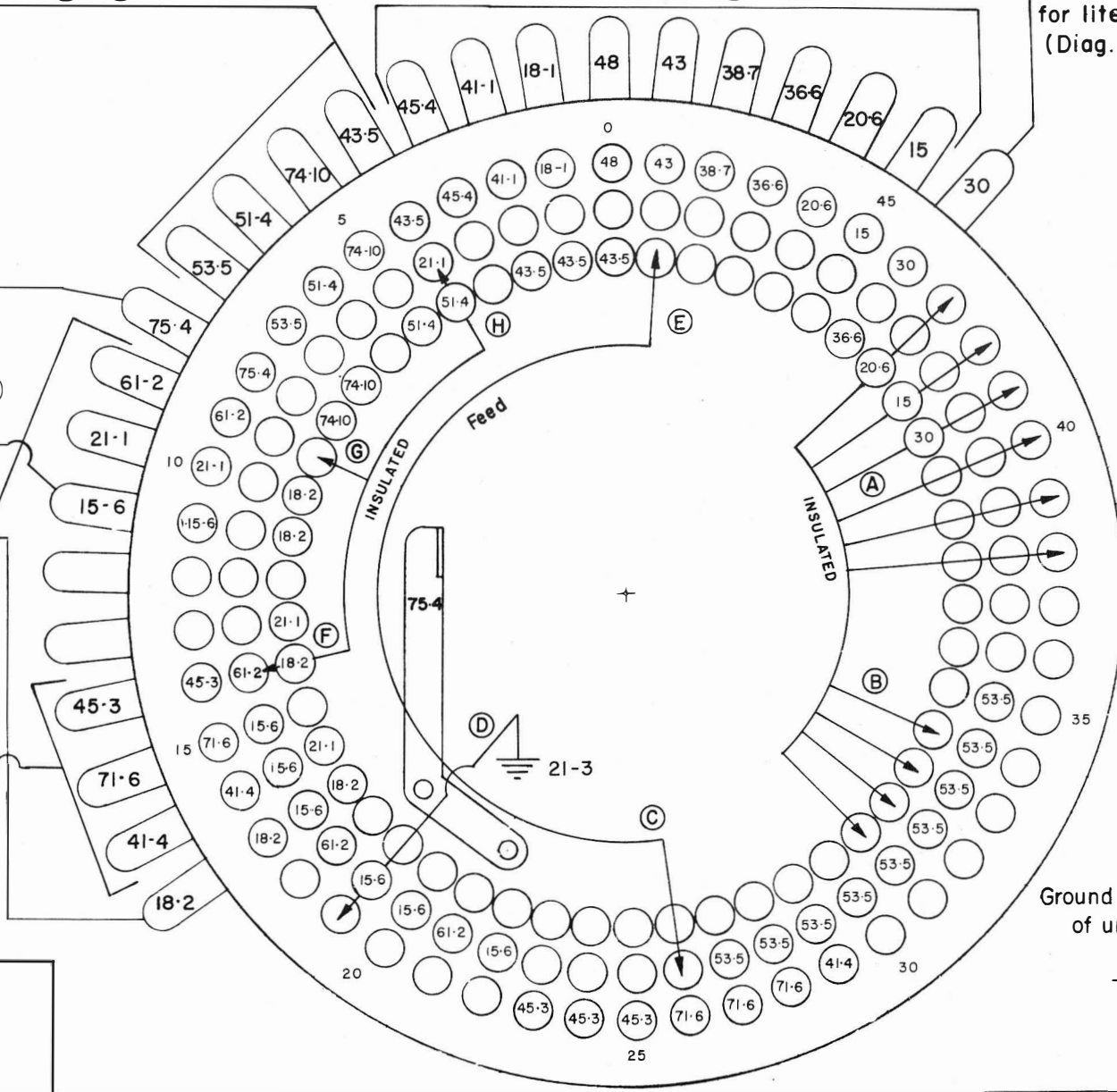
Complete Unit - AS-1148-15
 Reset Coil - 28-R-15
 Step-up Coil - 25-GG-7
 Step-up Plunger - S-496-100
 Step-up Arm - A-1765
 Ratchet & Shaft - C-1050-10

WIPER ASSEMBLY
 AS-1046-152

DISC (WIRED)
 W-712

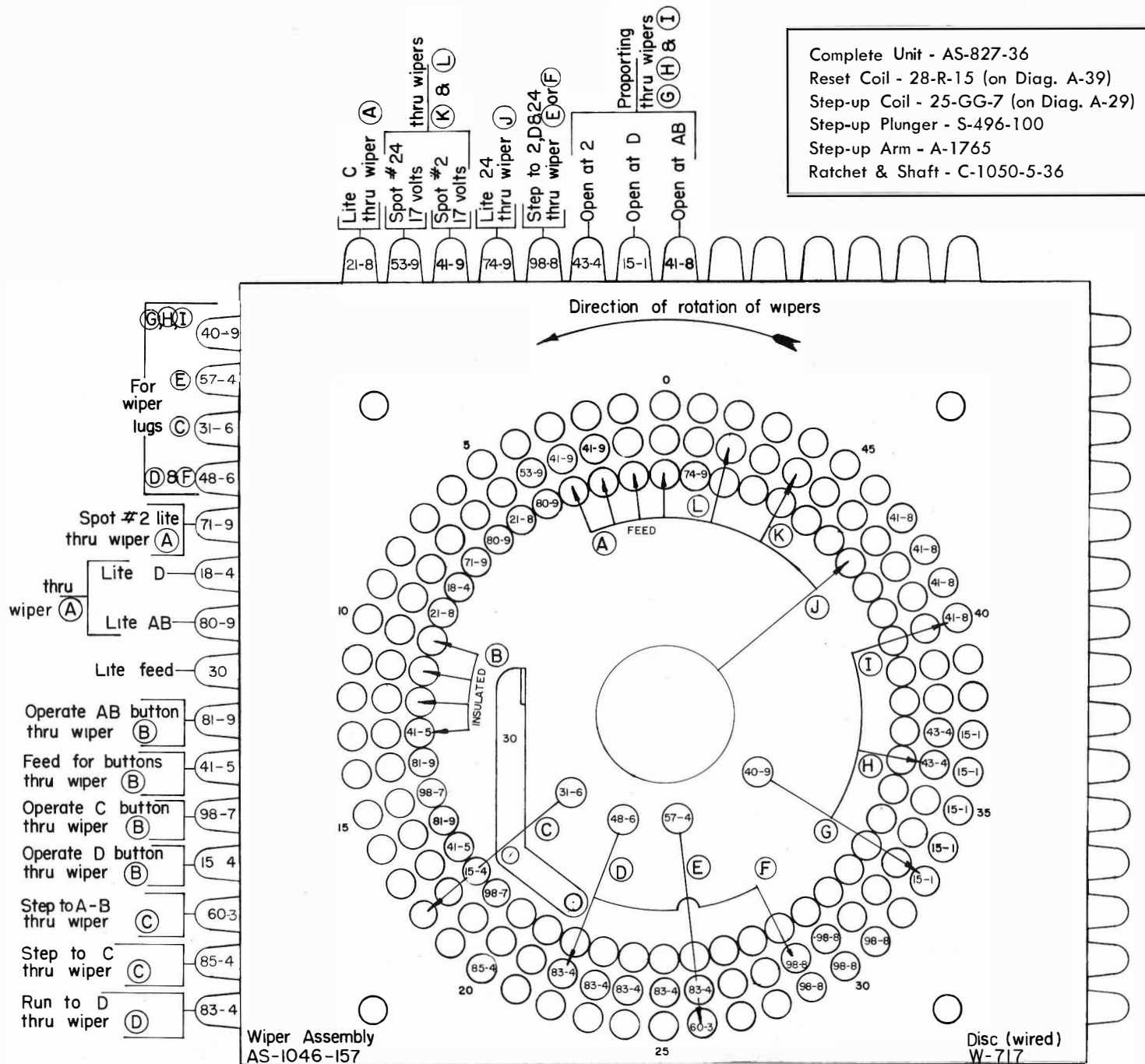
Direction of rotation

Ground to frame of unit. 21-3.



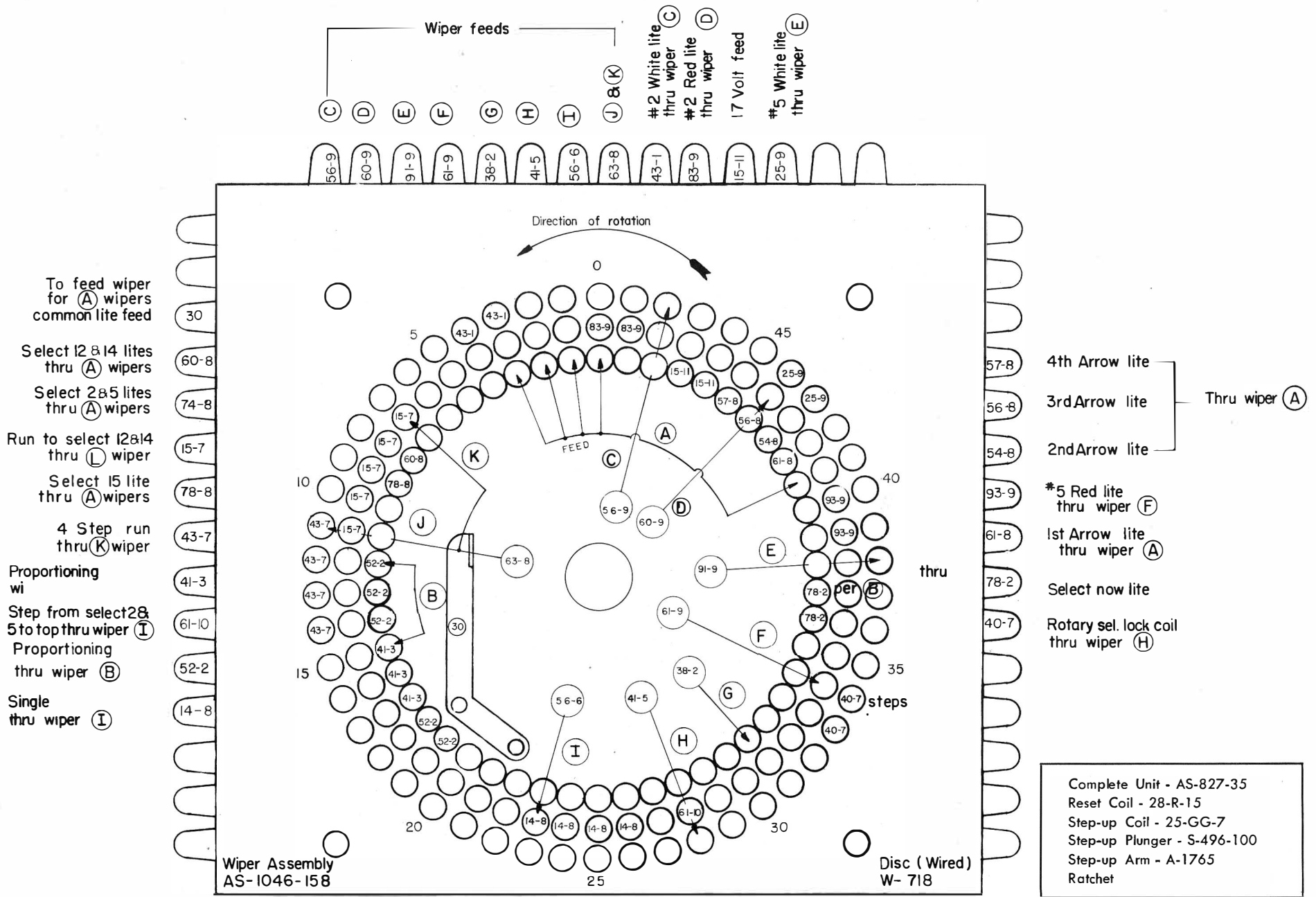
MAGIC SQUARES UNIT viewed from BUTTON or WIPER side

6 step unit. Wipers shown in zero or reset position



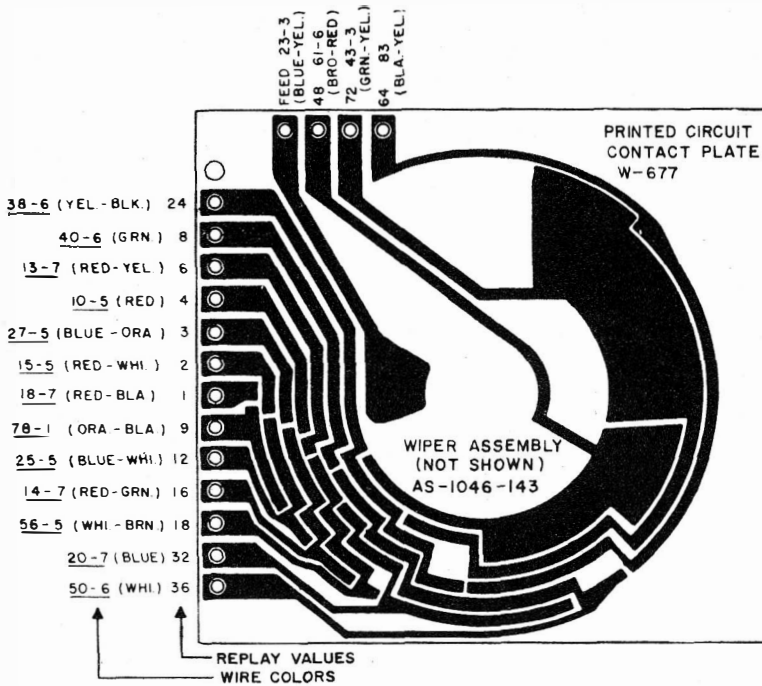
SELECTION FEATURE UNIT viewed from BUTTON or WIPER side

6 step unit. Wipers shown in zero or reset position



- Complete Unit - AS-827-35
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-100
- Step-up Arm - A-1765
- Ratchet

REPLAY COUNTER NO. 1 viewed from WIPER side



- Complete Unit - AS-797-33
- 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

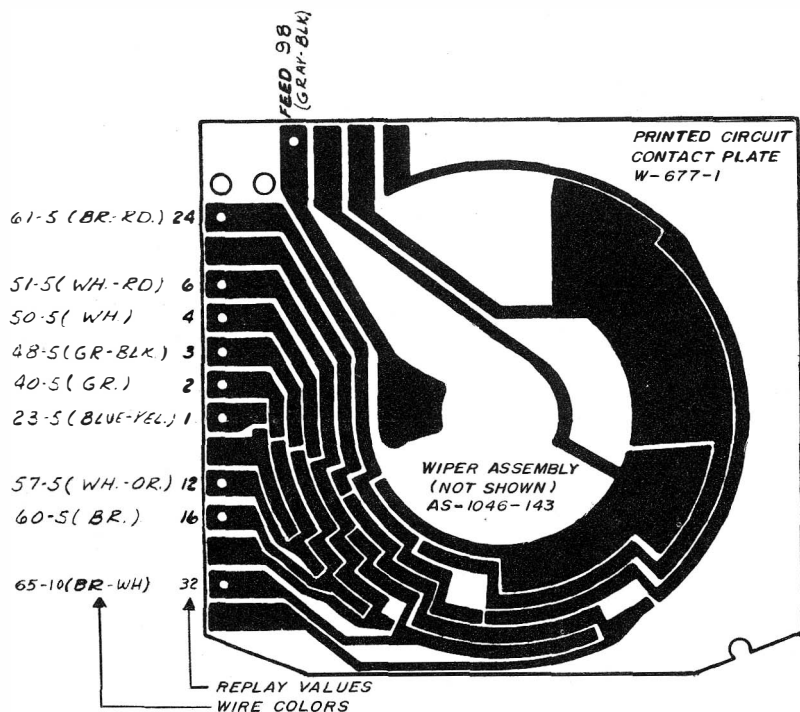
CAM SWITCHES THAT PULSE REPLAY COUNTER #1 STEP-UP COIL																		
	SW. #12B			SW. #11B			SW. #12B			SW. #12B			SW. #11B			SW. #11B		
	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE
5 IN-LINE	64 (16)	128 (32)	192 (48)	72 (12)	144 (24)	216 (36)	96 (24)	192 (48)	288 (72)	96 (24)	192 (48)	288 (72)	144 (24)	288 (48)	432 (72)	192 (32)	384 (64)	576 (Note)
4 IN-LINE	16 (4)	32 (8)	48 (12)	18 (3)	36 (6)	54 (9)	24 (6)	48 (12)	72 (18)	48 (12)	96 (24)	144 (36)	96 (16)	192 (32)	288 (48)	144 (24)	288 (48)	432 (72)
3 IN-LINE	4 (1)	8 (2)	12 (3)	6 (1)	12 (2)	18 (3)	8 (2)	16 (4)	24 (6)	16 (4)	32 (8)	48 (12)	36 (6)	72 (12)	108 (18)	48 (8)	96 (16)	144 (24)

LARGE NUMBERS ARE REPLAY SCORES FOR REGULAR, DOUBLE OR TRIPLE SCORING. NUMBERS IN CIRCLES INDICATE WHICH PORTION OF REPLAY CIRCUIT STRIP IS EFFECTIVE FOR A PARTICULAR REGULAR, DOUBLE OR TRIPLE REPLAY SCORE.

EXAMPLE :- ON A REGULAR 3 IN-LINE SCORE OF 36 REPLAYS THE CIRCUIT IS EFFECTIVE THRU THE 6 REPLAY CIRCUIT STRIP.

NOTE : EFFECTIVE THRU OPEN AT 96 REPLAY COUNTER SWITCH

REPLAY COUNTER NO. 2 viewed from WIPER side



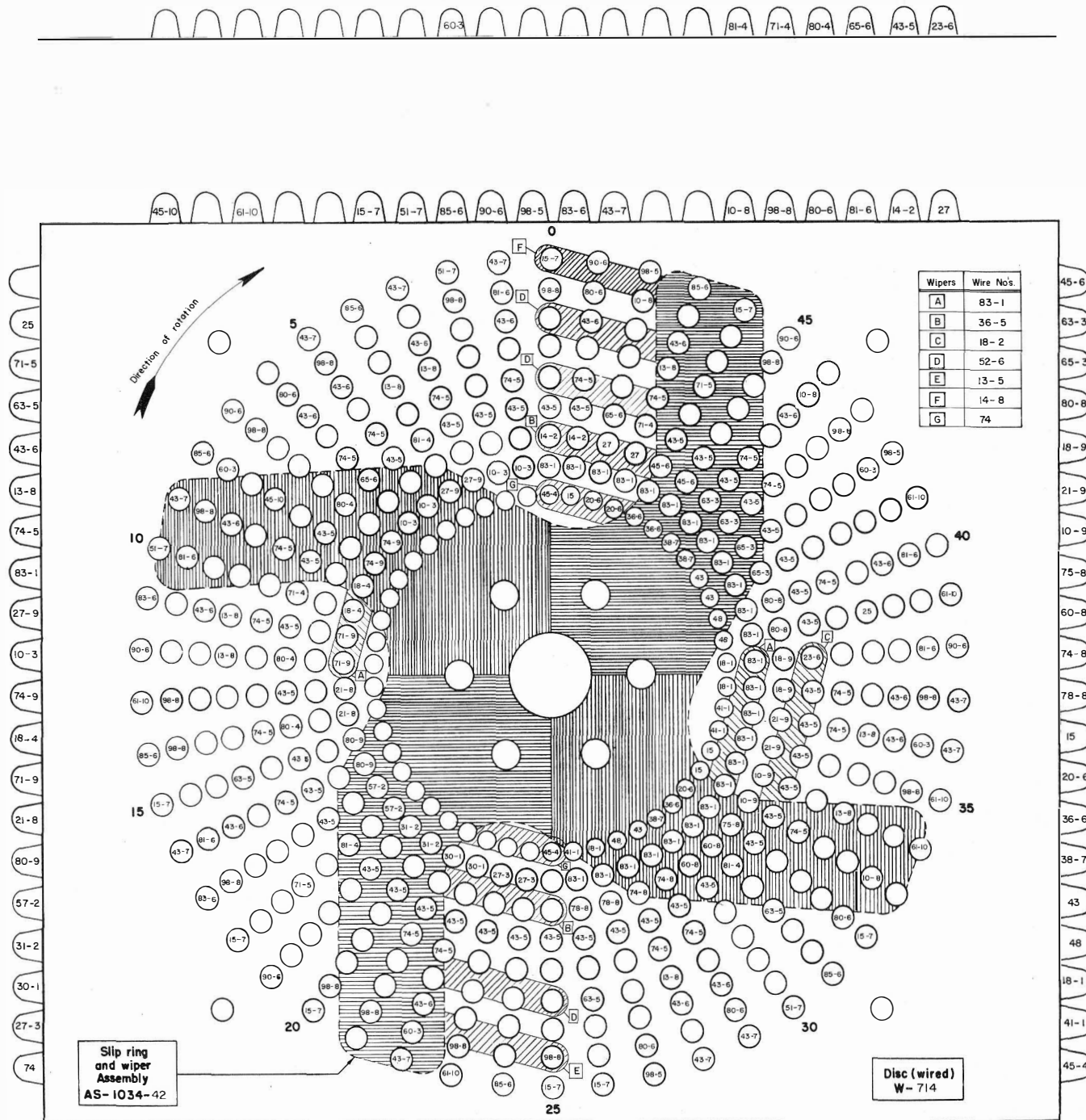
- Complete Unit - AS-797-35
- Reset Coil - 28-R-15
- Step-up Coil - 25-GG-7
- Step-up Plunger - S-496-116
- Step-up Arm - A-1765
- Ratchet & Shaft - C-100

CAM SWITCHES THAT PULSE REPLAY COUNTER #2 STEP-UP COIL					
	sw. 12A	sw. 11A	sw. 12A	sw. 12A	sw. 11A
5 IN-LINE	64 (16)	72 (12)	96 (24)	96 (24)	192 (32)
4 IN-LINE	16 (4)	18 (3)	24 (6)	48 (12)	96 (16)
3 IN-LINE	4 (1)	6 (1)	8 (2)	16 (4)	36 (6)

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

EXAMPLE :- ON A 3 IN-LINE SCORE OF 16 REPLAYS THE CIRCUIT IS EFFECTIVE THRU THE 4 REPLAY CIRCUIT STRIP.

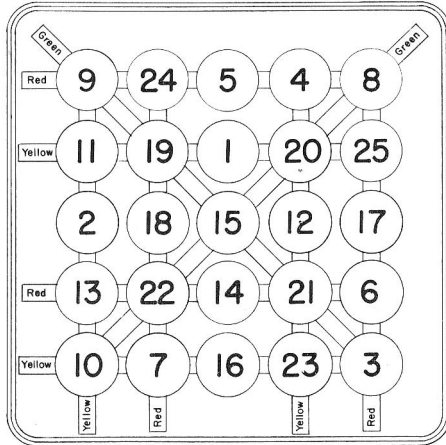
SPOTTING DISC viewed from BUTTON or WIPER side



Game #1 Card layout
(*1 button)

Feature advantages for game #1

- Selection feature no's. 12-14-2-5-15
- Corners
- Red lines score double
- Yellow lines score double
- Green lines score triple



SCORING REGULAR, DOUBLE OR TRIPLE SCORES IN GAME #1.

Regular scores are completed thru the Search disc between pos. #35 to #23. Double or Triple scores are completed thru the Search disc between pos. #17 to #3.

Double or Triple scores may be registered in (2) different ways:

- By registering Regular score first, and then the remainder to complete either the double or triple score.
- By registering either the double or triple score immediately without interruption. (See explanation below.)

EXPLANATION OF REGULAR, DOUBLE OR TRIPLE SCORING.

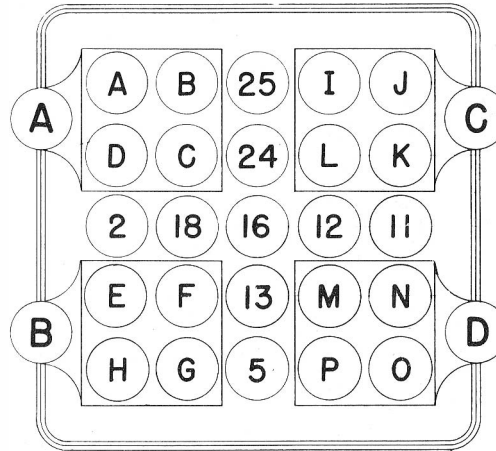
Regular scores are registered with the Score multiplier unit at zero. Double scores are registered with the Score multiplier unit at it's 1st step. Triple scores are registered with the Score multiplier unit at it's 2nd step.

Game #2 Card layout
(*2 button)

- Neutral position
- Magic squares
- rotate clockwise

Feature advantages for game #2

- Magic squares 8 spot 2 & 24
- Spot #12
- Spot #13



SCORING IN GAME #2

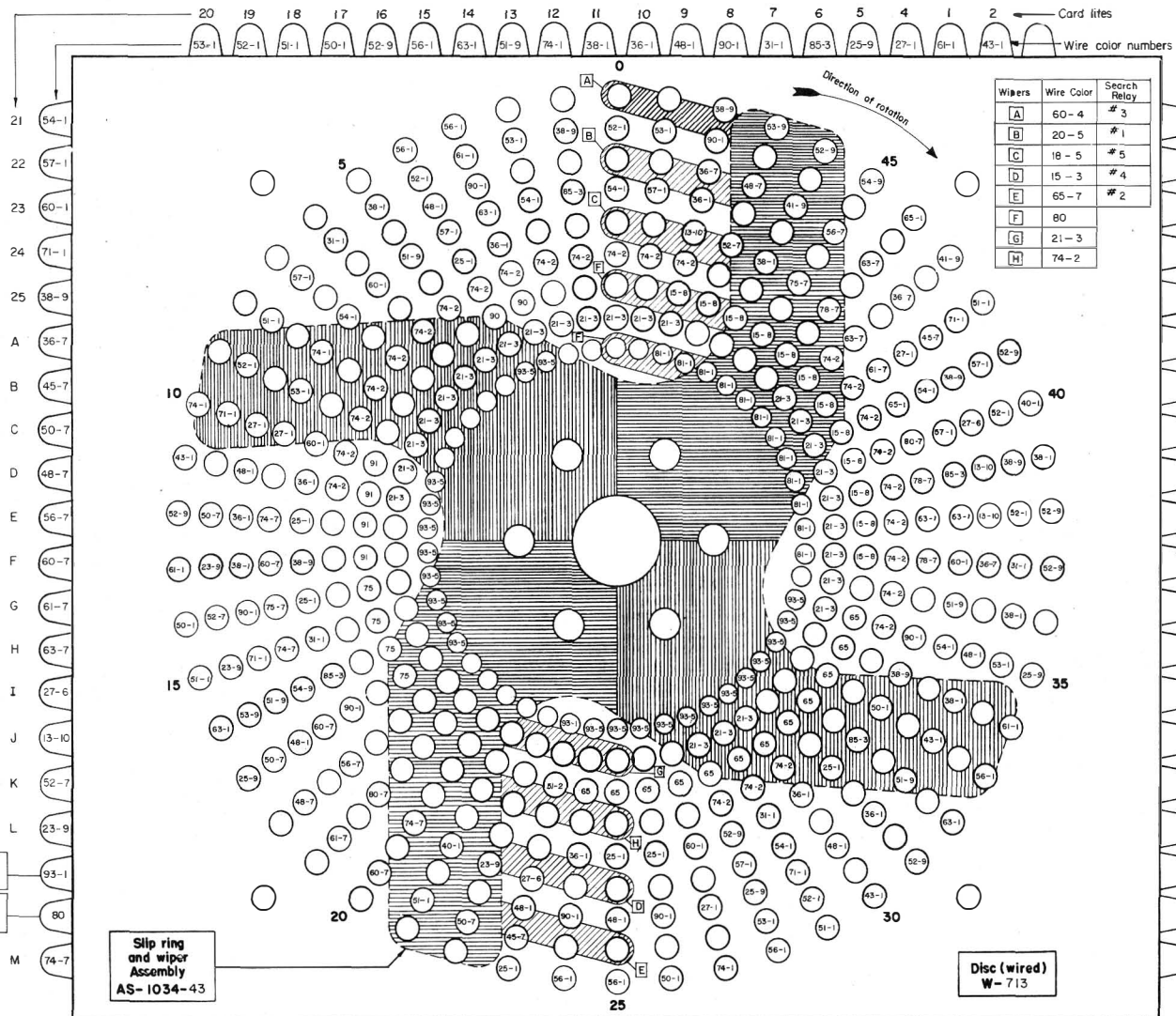
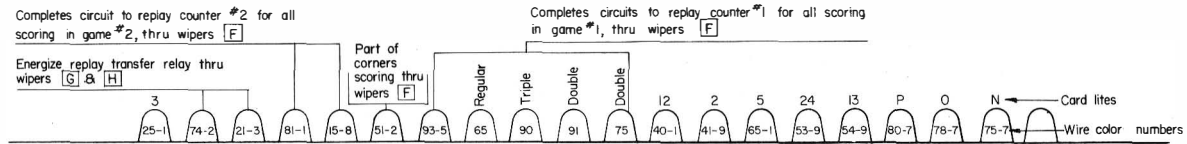
All scores are completed thru the Search disc between pos. #48 to #37.

SEARCH POSITIONS

	WIPER (A) POSITION	WIPER (B) SEARCH RELAY #1	WIPER (E) SEARCH RELAY #2	WIPER (A) SEARCH RELAY #3	WIPER (D) SEARCH RELAY #4	WIPER (C) SEARCH RELAY #5	
	1						(GAME #1) DOUBLE TRIPLE SCORING
	2						
DIAGONAL	3	8	20	15	22	10	GREEN GREEN
	4	9	19	15	21	3	
	5						
	6						
	7						
	8						
	9						
VERTICAL	10	4	20	12	21	23	YELLOW YELLOW
	11	9	11	2	13	10	YELLOW YELLOW
HORIZONTAL	12	10	7	16	23	3	YELLOW YELLOW
	13	11	19	1	20	25	RED RED
VERTICAL	14	8	25	17	6	3	RED RED
	15	24	19	18	22	7	RED RED
HORIZONTAL	16	13	22	14	21	6	RED RED
	17	9	24	5	4	8	
	18						
	19						
	20						
	21						
	22						
CORNERS--	23	9	8	3	10		
DIAGONAL	24	8	20	15	22	10	
	25	9	19	15	21	3	
	26	8	25	17	6	3	
VERTICAL	27	4	20	12	21	23	(GAME #1) REGULAR SCORING
	28	5	1	15	14	16	
	29	24	19	18	22	7	
	30	9	11	2	13	10	
	31	10	7	16	23	3	
HORIZONTAL	32	13	22	14	21	6	
	33	2	13	15	12	17	
	34	11	19	1	20	25	
	35	9	24	5	4	8	
	36						
DIAGONAL	37	A	C	16	M	O	(GAME #2) ALL SCORING
	38	J	L	16	F	H	
	39	J	K	11	N	O	
VERTICAL	40	I	L	12	M	P	
	41	25	24	16	13	5	
	42	B	C	18	F	G	
	43	A	D	2	E	H	
	44	N	G	5	P	O	
HORIZONTAL	45	E	F	13	M	N	
	46	2	18	16	12	11	
	47	D	C	24	L	K	
	48	A	B	25	I	J	
	49						
	50						

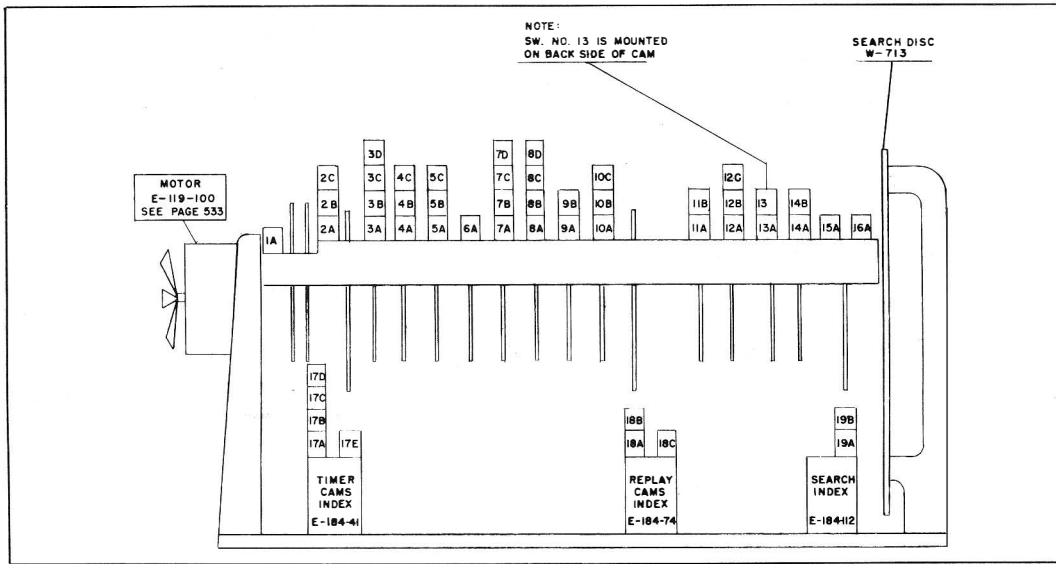
Rotation of Search Disc wipers - From 50 to 1

SEARCH DISC viewed from BUTTON or WIPER side



CONTROL UNIT PICTORIAL VIEW

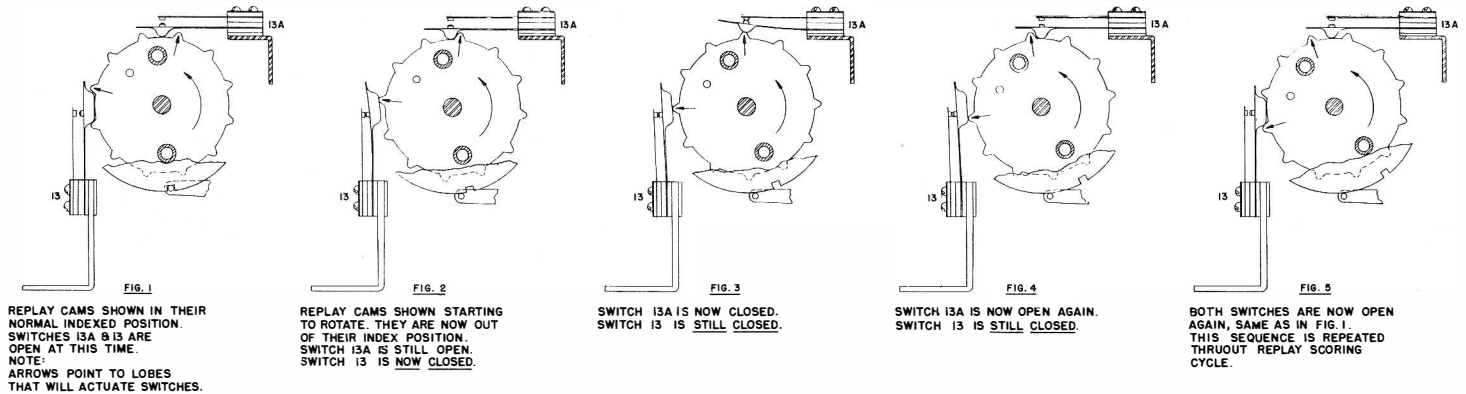
NUMBERS CORRESPOND TO SWITCH CHART



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

CORRECT ADJUSTMENT: CONTROL UNIT CAM SWITCHES 13 & 13A

Important part of illustration is to show that SWITCH 13 CLOSES FIRST AND OPENS LAST. If 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	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.O.	36-9 65-2	Yellow-Brown Brown-White	Energizes timer unit step-up coil, when drag arm switch selector lock switch and control unit cam switch #14B are closed.
2A N.O.	90-5 30	Gray Yellow	Energizes reflex play magnet, and replay register reset coil.
2B N.O.	93-4 30	Gray-Yellow Yellow	Energizes coin kicker magnet.
2C N.C.	31-7 57-6	Yellow-Red White-Orange	Drops out #1 button relay.

CONTINUED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONTINUED

CAM SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
3A	N. C.	48-2 83-3	Green-Black Black-Yellow	Drops out start relay, and acts as safety switch during spin.
3B	N. C.	25-2 30	Blue-White Yellow	Drops out button safety relay, during spin.
3C	N. C.	20-2 30	Blue Yellow	Drops out #2 button relay, during spin.
3D	S. P. D. T.	93-7 98-4 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit to replay meter or total plays meter.
4A	N. O.	14-9 80-2	Red-Green Black	Used if coin meter is added.
4B	N. O.	98-1 30	Gray-Black Yellow	Energizes spotting cams index coil.
4C	N. C.	78-9 30	Orange-Black Yellow	(Safety switch) lock-in circuit for #2 button relay. (When playing #2 button after playing extra balls.)
5A	N. O.	65-2 71-8	Brown-White Orange-Red	Energizes timer unit reset coil.
5B	N. O.	78-4 85-4	Orange-Black Black-White	Energizes anti-cheat relay.
5C	N. O.	21-1 38-4	Blue-Red Yellow-Black	Energizes extra ball unit step-up coil to step unit from minus one to zero position.
6A	N. C.	74-4 75-5	Orange-Green Orange-White	Opens game advantage circuits, during spin.
7A	N. O.	93-4 30	Gray-Yellow Yellow	(Safety switch) energizes coin kicker magnet.
7B	N. O.	20-1 36-4	Blue Yellow-Brown	#2 score unit steps.
7C	N. O.	10-4 90-3	Red Gray	#1 score unit steps.
7D	N. O.	41-10 70	Green-Red Orange	Energizes spot #12 and spot #13 relays, when circuits complete thru other factors.
8A	N. O.	52-8 56-6	White-Blue White-Brown	Selection feature unit steps.
8B	N. O.	15-6 38-4	Red-White Yellow-Black	Extra ball unit steps.
8C	N. O.	25-6 57-4	Blue-White White-Orange	Magic squares unit steps.
8D	N. O.	43-10 70	Green-Yellow Orange	Energizes corners, red, green, and yellow lines relays, when circuits complete thru other factors.
9A	ALT.	45-10 51-10	Green-White White-Red	#2 score unit, multiple steps.
9B	Alt.	52-2 85-2 40-9	White-Blue Black-White Green	Game proportioning.
9C	Alt.	83-5 25 81-5	Black-Yellow Blue-White Black-Red	#1 score unit, multiple steps.

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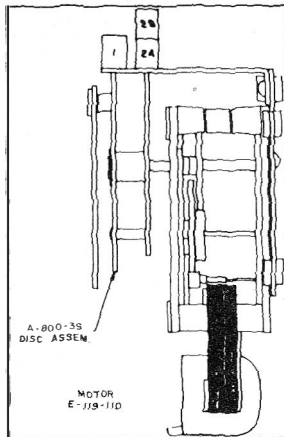
CONTROL UNIT CAM SWITCH CHART — CONTINUED

CAM SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
10A	N.O.	10-4 41-7	Red Green-Red	#1 Score unit steps.
10B	N.O.	25-6 31-6	Blue-White Yellow-Red	Magic squares unit steps.
10C	N.O.	21-2 36-4	Blue-Red Yellow-Brown	#2 score unit steps.
11A	N.O.	13-1 85-1	Red-Yellow Black-White	Pulses replay counter #2, when 3-in-line score lite (6) or (36) is lit. (#2 score lites)
11B	N.O.	20-3 56	Blue White-Brown	Pulses replay counter #1, when 3-in-line score lite (6), (36), or (48) is lit. (#1 score lites)
12A	N.O.	14-1 85-1	Red-Green Black-White	Pulses replay counter #2, when 3-in-line score lite (4), (8), or (16) is lit. (#2 score lites)
12B	N.O.	20-3 91-6	Blue Gray-Red	Pulses replay counter #1, when 3-in-line score lite (4), (8), or (16) is lit. (#1 score lites)
12C	N.O.	54-7 93-1	White-Green Gray-Yellow	Pulses corners replay counter.
13A	N.O.	48-4 80	Green-Black Black	Pulses replay register step-up coil, and reflex replay magnet.
13 (Backside)	N.O.	21-3 23-1	Blue-Red Blue-Yellow	Replay lock-in switch. NOTE: See control unit pictorial view.
14A	N.C.	56-11 93	White-Brown Gray-Yellow	Prevents the start of another replay from scoring until control unit cams are indexed.
14B	N.C.	27-3 90-2	Blue-Orange Gray	Opens circuit to timer unit step-up coil during replay winner.
15A	N.O.	23-4 81-8	Blue-Yellow Black-Red	Completes circuit to score multiplier unit step-up coil, thru red, green, or yellow lines trip relay switches.
16A	N.O.	23-4 91-4	Blue-Yellow Gray-Red	Completes circuit to score multiplier unit reset coil, thru red, green, or yellow lines trip relay switches.
TIMER CAMS INDEX COIL		93-2 70	Gray-Yellow Orange	Energized by switch on start relay. Also thru shutter motor cam switch #5C.
17A	N.O.	20-P 60-P	Blue (Plastic) Brown (Plastic)	Operates control unit, magic squares unit, and mixer and spotting unit motors.
17B	N.C.	10-P 20-P	Red (Plastic) Blue (Plastic)	Energizes mixer latch coil.
17C	N.C.	14-9 71-2	Red-Green Orange-Red	Opens circuit to coin lock-out magnet, during spin.
17D	N.O.	13 30	Red-Yellow Yellow	Lock-in safety switch for #1 button relay.
17E	N.O.	23-2 41-2	Blue-Yellow Green-Red	(Safety Switch) #2 button relay lock-in circuit.

CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART -- CONCLUDED

CAM SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY CAMS INDEX COIL		40-4 70	Green Orange	Energized when score is made, and releases replay cams.
18A	N.O.	23-1 80	Blue-Yellow Black	In series with replay lock-in circuit.
18B	N.O.	56-7 93	White-Brown Gray-Yellow	In series with replay winner circuit.
18C	N.C.	15-2 80	Red-White Black	Opens direct 50 volt circuit to search index coil, coil then held in thru resistor.
SEARCH INDEX COIL		15-2 70	Red-White Orange	Energized when score is made.
19A	N.O.	40-4 80	Green Black	Energizes replay cams, when score is made.
19B	N.C.	83-3 30	Black-Yellow Yellow	Opens start circuit and acts as safety switch.

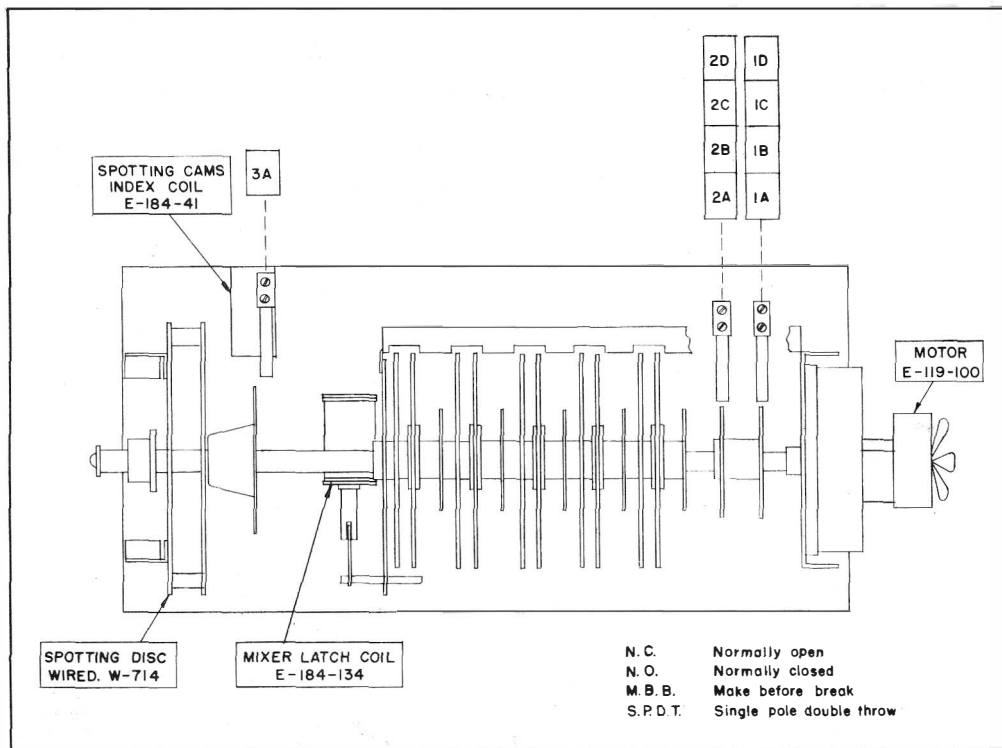


BALL LIFT MOTOR PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART BELOW

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

CAM SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCH
1A	N.O.	30 91-1	Yellow Grey-Red	Carry-over switch for ball lifter motor.
2A	N.O.	30 98-3	Yellow Gray-Black	Completes circuit to selector lock trip relay.
2B	N.O.	43-2 27-2	Green-Yellow Blue-Orange	Energizes timer unit step-up coil.

MIXER AND SPOTTING UNIT ASSEMBLY NUMBERS CORRESPOND TO SWITCH CHART BELOW



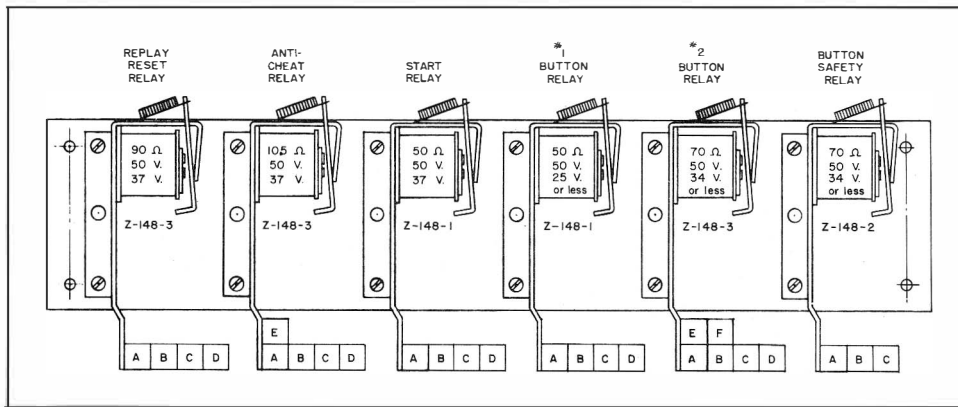
MIXER AND SPOTTING UNIT CAM SWITCH CHART

FOR POSITION OF SWITCHES
REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A 16 pulse	N.O. 53-7 75-2	White-Yellow Orange-White	Pulses replay register reset coil.
1B 16 pulse	N.O. 38-4 78	Yellow-Black Orange-Black	Pulses extra ball unit step-up coil, for multiple steps.
1C 16 pulse	N.O. 10-4 91-3	Red Gray-Red	Pulses score unit #1 step-up coil, for multiple steps.
1D 16 pulse	N.O. 52-8 63-8	White-Blue Brown-Yellow	Pulses selection feature unit step-up coil, for multiple steps.
2A 16 pulse	N.O. 53-2 78-2	White-Yellow Orange-Black	Flashes magic squares feature, and selection feature, "select now lites".
2B 16 pulse	N.O. 50-8 91-8	White Gray-Red	Pulses corners replay counter unit, for homing it to zero.
2C 16 pulse	N.O. 25-6 48-6	Blue-White Green-Black	Pulses magic squares feature unit step-up coil, for multiple steps.
2D 16 pulse	N.O. 10-1 36-4	Red Yellow-Brown	Pulses score unit #2 step-up coil, for multiple steps.
SPOTTING CAMS INDEX COIL	98-1 70	Gray-Black Orange	Energized during spin, by control unit cam switch #4B.
3A	N.O. 13-4 30	Red-Yellow Yellow	Completes flash circuit, for all game advantages.

6 RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



COIL PART NUMBERS	
50 Ω 50 V. ---	C-2794-9
70 Ω 50 V. ---	C-2794-331
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

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

RELAY SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY RESET RELAY COIL	75-2 70	Orange-White Orange	Energized when anti-cheat relay drops out.
A S.P.D.T.	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.	56-2 75-2	White-Brown Orange-White	Lock-in circuit for this relay.
C N.O.	20-P 60-P	Blue (Plastic) Brown(Plastic)	Completes circuit to run control unit, and mixer and spotting unit motors, during replay cancel.
D N.C.	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
ANTI-CHEAT RELAY COIL	78-4 70	Orange-Black Orange	Energized by control unit cam switch #5B, its switches protect replay, and lite circuits.
A S.P.D.T.	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.	78-4 30	Orange-Black Yellow	Lock-in circuit for this relay.
C N.O.	20-4 80-1	Blue Black	Opens 17 volt circuit, when this relay drops out.
D N.C.	57-6 85-7	White-Orange Black-White	Safety circuit.
E S.P.D.T.	91-2 38 54-2	Gray-Red Yellow-Black White-Green	Opens 6 volt circuit, and lites tilt lite, when this relay drops out.

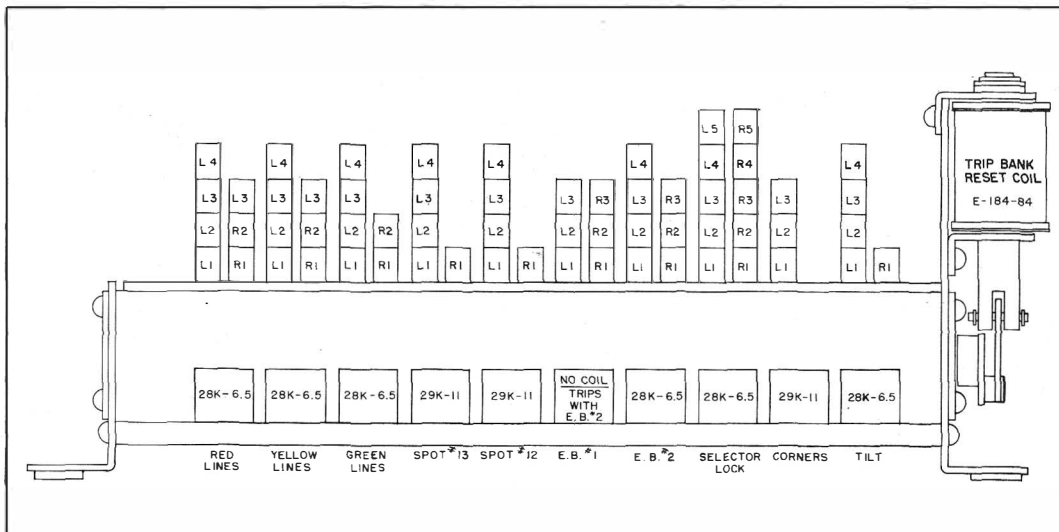
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6 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
START RELAY COIL	21-6 70	Blue-Red Orange	Energized every time a coin is played, also when #1, #2, or yellow button is pressed. (using replays)
A N.C.	75-4 78	Orange-White Orange-Black	Opens extra ball step-up circuit, during spin.
B N.C.	21 90-4	Blue-Red Gray	Opens game advantage circuits, during spin.
C N.O.	13-3 90-9	Red-Yellow Gray	Completes circuit to timer cams index coil, during spin.
D N.O.	48-2 63-2	Green-Black Brown-Yellow	Lock-in circuit for this relay.
#1 BUTTON RELAY COIL	85-7 70	Black-White Orange	Energized, when #1 or #2 button is pressed.
A S.P.D.T.	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit from timer cams index coil during extra ball play, to shutter motor when starting new game.
B N.O.	27-8 31-7	Blue-Orange Yellow-Red	Lock-in circuit for this relay.
C N.O.	25-2 90-7	Blue-White Gray	Completes circuit to energize button safety relay.
D N.C.	21-4 50-9	Blue-Red White	Opens extra ball lite circuit.
#2 BUTTON RELAY COIL	23-2 70	Blue-Yellow Orange	Energized when #2 button is pressed.
A S.P.D.T.	52-2 25-3 40-9	White-Black Blue-White Green	Directs proportioning circuits.
B S.P.D.T.	50-4 63-4 61-4	White Brown-Yellow Brown-Red	Directs score unit step-up circuit.
C S.P.D.T.	93-3 75-5 53-6	Gray-Yellow Orange-White White-Yellow	Directs proportioning circuits.
D N.O.	41-2 78-9	Green-Red Orange-Black	Lock-in circuit for this relay.
E S.P.D.T.	14-8 60-6 13-5	Red-Green Brown Red-Yellow	Directs game advantage circuits.
F S.P.D.T.	36-5 31-5 83-1	Yellow-Brown Yellow-Red Black-Yellow	Directs game advantage flash circuits.
BUTTON SAFETY RELAY COIL	90-7 70	Gray Orange	Energized when #1 button relay pulls in.
A N.C.	31-9 38-4	Yellow-Red Yellow-Black	(Safety switch) For extra ball unit steps.
B N.C.	60-6 90-4	Brown-Gray Gray	(Safety switch) For game advantages.
C N.C.	63-4 70	Brown-Yellow Orange	(Safety switch) For score unit steps.

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

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

RELAY SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RED LINES TRIP COIL	J 43-10	Jumper Green-Yellow	Energized by control unit cam switch #8D, when circuit complete thru other factors.
L1	N.O. 10-9 30	Red Yellow	Lites red lines score double feature lite.
L2	N.C. 85-6 J	Black-White Jumper	Breaks circuit to this coil.
L3	N.O. 23-4 63	Blue-Yellow Brown-Yellow	Completes circuit to score multiplier step-up and reset coils thru control unit cam switches #15A & #16A.
L4	N.C. 48-7 81-3	Green-Black Black-Red	Mixer #3, proportioning circuit.
R1	N.O. 65 75	Brown-White Orange-White	Completes circuit to search disc for red lines double replay scoring. (Replay counter #1).
R2	N.C. 27-7 80-3	Blue-Orange Black	Mixer #3 proportioning circuit.
R3	N.C. 40-3 56-12	Green White-Brown	Mixer #3, proportioning circuit.
YELLOW LINES TRIP COIL	J 43-10	Jumper Green-Yellow	Energized by control unit cam switch #8D, when circuit complete thru other factors.
L1	N.O. 18-9 30	Red-Black Yellow	Lites yellow lines score double feature lite.
L2	N.C. 90-6 J	Gray Jumper	Breaks circuit to this coil.
L3	N.O. 23-4 63	Blue-Yellow Brown-Yellow	Completes circuit to score multiplier unit step-up and reset coils, thru control unit cam switches #15A & #16A.
L4	N.C. 48-7 84-3	Green-Black Black-Green	Mixer #3, proportioning circuit.
R1	N.O. 65 91	Brown-White Gray-Red	Completes circuit to search disc, for yellow lines double replay scoring. (Replay counter #1).
R2	N.C. 27-7 53-8	Blue-Orange White-Yellow	Mixer #3, proportioning circuit.
R3	N.C. 27-7 80-3	Blue-Orange Black	Mixer #3, proportioning circuit.

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TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
GREEN LINES TRIP COIL		J 43-10	Jumper Green-Yellow	Energized by control unit cam switch #8D, when circuit complete thru other factors.
L1	N.O.	21-9 30	Blue-Red Yellow	Lites green lines score triple feature lite.
L2	N.C.	98-5 J	Gray-Black Jumper	Breaks circuit to this coil.
L3	N.O.	23-4 63	Blue-Yellow Brown-Yellow	Completes circuit to score multiplier step-up, and reset coils, thru control unit cam switch #15A & #16A.
I4	N.C.	53-8 56-12	White-Yellow White-Brown	Mixer #3, proportioning circuit.
R1	N.O.	65 90	Brown-White Gray	Completes circuit to search disc, for green lines triple replay scoring (Replay counter #1).
R2	N.C.	80-3 81-3	Black Black-Red	Mixer #3, proportioning circuit.
SPOT #13 TRIP COIL		J 41-10	Jumper Green-Red	Energized by control unit cam switch #7D, when circuit complete thru other factors.
L1	N.O.	27-9 30	Blue-Orange Yellow	Lites spot #13 feature lite.
L2	N.C.	81-6 J	Black-Red Jumper	Breaks circuit to this coil.
L3	N.O.	54-9 30	White-Green Yellow	Lites #13 lite in card.
I4	N.C.	27-7 81-2	Blue-Orange Black-Red	Mixer #5, proportioning circuit.
R1	N.C.	50-10 83-2	White Black-Yellow	Mixer #5, proportioning circuit.
SPOT #12 TRIP COIL		J 41-10	Jumper Green-Red	Energized by control unit cam switch #7D, when circuit complete thru other factors.
L1	N.O.	10-3 30	Red Yellow	Lites spot #12 feature lite.
L2	N.C.	80-6 J	Black Jumper	Breaks circuit to this coil.
L3	N.O.	40-1 30	Green Yellow	Lites #12 lite in card.
I4	N.C.	27-7 81-2	Blue-Orange Black-Red	Mixer #5, proportioning circuit.
R1	N.C.	27-7 50-10	Blue-Orange White	Mixer #5, proportioning circuit.

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TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL #1 TRIP COIL				NOTE: Both extra ball trip relays energized by same coil, coil is on extra ball trip relay #2.
L1	N. C.	78-9 30	Orange-Black Yellow	Breaks #2 button relay lock-in circuit.
L2	S. P. D. T.	54-6 50-10 40-2	White-Green White Green	Proportioning circuit.
L3	S. P. D. T.	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.
R1	N. O.	21-4 30	Blue-Red Yellow	Lites extra balls lite.
R2	S. P. D. T.	52-6 27-7 18-2	White-Blue Blue-Orange Red-Black	Directs circuit from score steps, to extra ball steps.
R3	S. P. D. T.	50-10 90-8 45-5	White Gray Green-White	Proportioning circuit.
EXTRA BALL #2 TRIP COIL		25-7 70	Blue-White Orange	This relay, and extra ball trip relay #1 are energized by pressing yellow button.
L1	S. P. D. T.	14-3 43-9 98-2	Red-Green Green-Yellow Gray-Black	Breaks circuit to shutter motor, and completes circuit to timer cams index coil.
L2	N. C.	25-7 31-8	Blue-White Yellow-Red	Breaks circuit to this coil.
L3	N. C.	21 50-10	Blue-Red White	Breaks circuit to other game advantages, when playing for extra balls.
L4	S. P. D. T.	75-5 65-4 50-10	Orange-White Brown-White White	Proportioning circuit.
R1	N. O.	38-3 91-1	Yellow-Black Gray-Red	Completes circuit to ball lifter motor.
R2	S. P. D. T.	25-3 65-4 85-2	Blue-White Brown-White Black-White	Proportioning circuit.
R3	S. P. D. T.	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Breaks circuit for flashing other game advantages, and completes circuit to flash extra balls lites.
SELECTOR LOCK TRIP COIL		J 70	Jumper Orange	Energized at 4th step of timer unit.
L1	N. O.	93 63	Gray-Yellow Brown-Yellow	Completes circuit to score multiplier unit step-up and reset coils.
L2	N. C.	10-2 30	Red Yellow	Breaks circuit that flashes magic squares, and selection feature "select-now" lites.
L3	N. O.	27-2 78-6	Blue-Orange Orange-Black	Completes circuit to timer unit step-up coil.
L4	N. O.	48 56-7	Green-Black White-Brown	In series circuit, for replay scoring.
L5	N. C.	40-8 41-5	Green Green-Red	Breaks circuit to rotary selector, and magic squares buttons.
R1	N. O.	18-6 50-2	Red-Black White	Completes circuit to make yellow button alive (for playing extra balls).
R2	N. C.	75-3 J	Orange-White Jumper	Breaks circuit to this coil.
R3	N. O.	25-8 31-8	Blue-White Yellow-Red	Completes circuit to extra ball trip relays.
R4	N. O.	15-11 45-9	Red-White Green-White	Completes circuit to lite selected number in card. (When selection feature was used.)
R5	N. C.	27-8 85-7	Blue-Orange Black-White	(Safety switch) Lock-in circuit for #1 button relay.

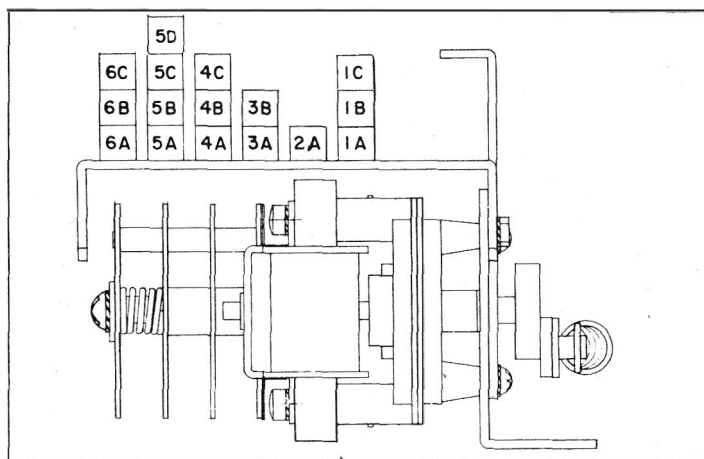
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TRIP RELAY BANK CHART — CONCLUDED

RELAY SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
CORNERS RELAY COIL	J 43-10	Jumper Green-Yellow	Energized by control unit cam switch #8D, when circuit complete thru other factors.
1 N.O.	75-8 30	Orange-White Yellow	Lites corners feature lite.
2 N.O.	57 71	White-Orange Orange-Red	(Corners) Replay scoring circuit.
3 N.C.	83-6 J	Black-Yellow Jumper	Breaks circuit to this coil.
TILT TRIP COIL	14-5 70	Red-Green Orange	Energized by any tilt switch or the plumb bob, also at 39th step of timer unit.
L1 S.P.D.T.	21-3 30 45-8	Blue-Red Yellow Green-White	Breaks game advantages, replay scoring, and ball counting circuits, and completes circuit to shutter motor.
L2 N.C.	10 20-4	Red Blue	Breaks 17 volt circuit.
L3 N.C.	20-P 60-P	Blue (Plastic) Brown (Plastic)	Breaks circuit to control unit, magic squares unit, and mixer and spotting unit motors.
I4 S.P.D.T.	38 81 91-2	Yellow-Black Black-Red Gray-Red	Breaks 6 volt circuit and lites tilt lite.
R1 N.O.	57-6 85-7	White-Orange Black-White	Safety circuit for #1 button relay.

SHUTTER MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



SEE LABEL ON MOTOR FOR MOTOR PART NO.

CODE

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

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

CAM SWITCH	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.C.	21-3 93	Blue-Red Gray-Yellow	Completes circuit for replay scoring.
1B N.O.	14-3 30	Red-Green Yellow	Carry thru circuit for shutter motor cycle.
1C N.C.	21-3 98-6	Blue-Red Gray-Black	In series with shutter motor cam switch #5A, (safety circuit for timer unit reset coil).
2A N.C.	31-3 36-3	Yellow-Red Yellow-Brown	Breaks circuit to ball lifter motor, when shutter is open.
3A N.O.	85-5 30	Black-White Yellow	Completes circuit to score unit #1, replay counter unit #1, extra ball unit, and magic squares unit reset coils.
3B N.O.	20-P 70-P	Blue (Plastic) Orange (Plastic)	Completes circuit to trip bank reset coil.

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SHUTTER MOTOR CAM SWITCH CHART — CONCLUDED

CAM SWITCH		WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
4A	N.O.	14-3 18-3	Red-Green Red-Black	In series with shutter motor cam switch #4C, completes circuit to run shutter motor.
4B	N.C.	40-8 21-3	Green Blue-Red	(Safety switch) Breaks 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.
5A	N.C.	65-2 98-6	Brown-White Gray-Black	(Safety switch) Breaks circuit to timer unit reset coil.
5B	N.O.	31-4 83-7	Yellow-Red Black-Yellow	(Safety switch) completes circuit to lifter start relay coil.
5C	N.O.	91-8 30	Gray-Red Yellow	Completes circuit to reset corners replay counter.
5D	S.P.D.T.	43-9 13-3 93-2	Green-Yellow Red-Yellow Gray-Yellow	Breaks circuit to shutter motor, and completes circuit to timer cams index coil.
6A	N.O.	71-8 30	Orange-Red Yellow	Completes circuit to timer unit reset coil.
6B	N.O.	78-3 30	Orange-Black Yellow	Completes circuit to score unit #2, replay counter unit #2, and selection feature unit reset coils.
6C	N.O.	91-4 30	Gray-Red Yellow	Completes circuit to score multiplier unit reset coil.



MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	
G-262	Back glass
M-281-14	Lock and Keys (2) keyed alike
A-1821-4	Magic Squares Display "A"
A-1821-5	Magic Squares Display "B"
A-1821-6	Magic Squares Display "C"
A-1821-7	Magic Squares Display "D"
E-122-19	Transformer

Back Door Assembly:

M-281-12	Lock and keys (2) keyed alike
E-300-63	Search relay bank assembly

Front Cabinet Assembly:

M-186-15	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-237	Ball shooter spring (short)
R-108-3	Ball shooter tip
A-429-15	Ball trough only
P-1900-18	Cash 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 lock out
AS-1316	Coin kicker assembly
AS-277-26	Coin switch assembly 5¢
AS-277-27	Coin switch assembly 10¢
CA-567-33	Front door only
AS-1571	Front door assembly 5¢
AS-1571-1	Front door assembly 10¢
A-254-39	Hinge and bracket
M-281-6	Lock and keys
E-108-32	Micro switch-Coin switch assembly for 5¢ and 10¢ play
P-2567-1	Ring for Rotary switch assembly
P-2768	Ring for A-1729-4 button
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

Front Moulding Assembly:

A-1272-17	"A" Button
A-1272-18	"B" Button
A-1272-19	"C" Button
A-1272-20	"D" Button
P-2210-8	5¢ coin entry plate
P-2210-9	10¢ coin entry plate
P-2210-33	Double plate
CA-804-2	Front moulding

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.