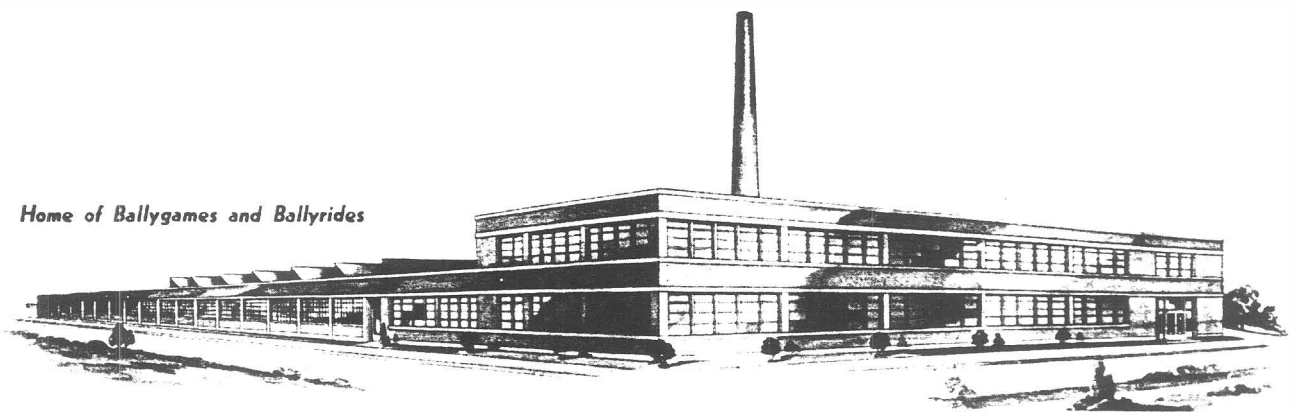


OPERATING INSTRUCTIONS AND PARTS CATALOG

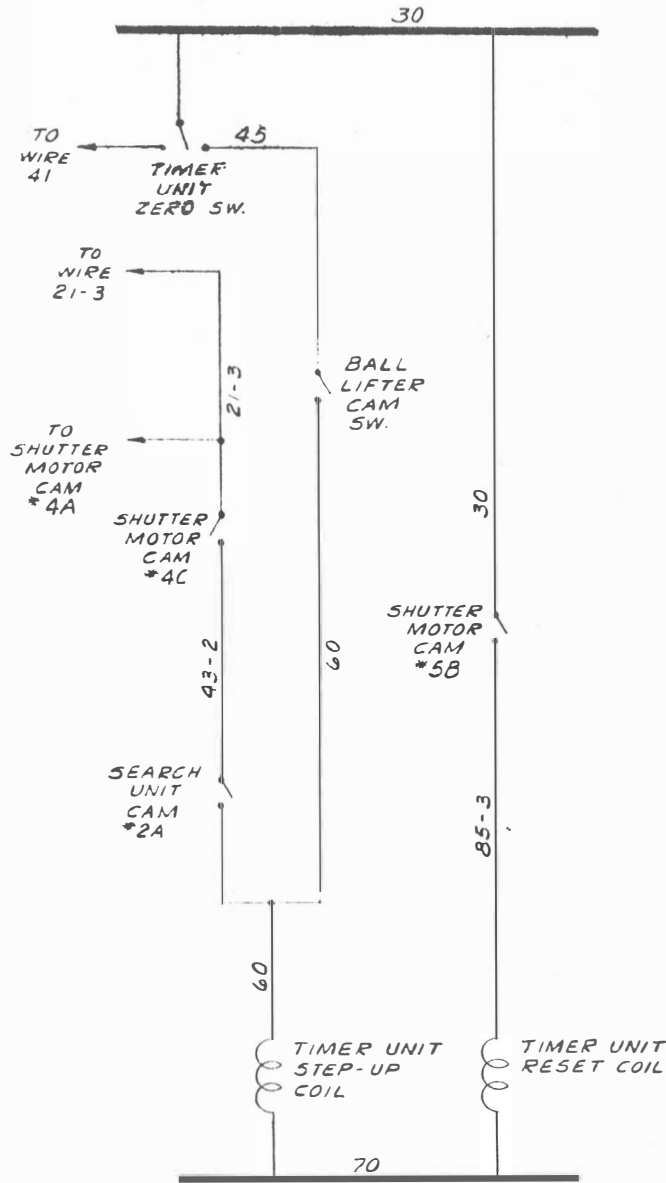
Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on Page 495

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

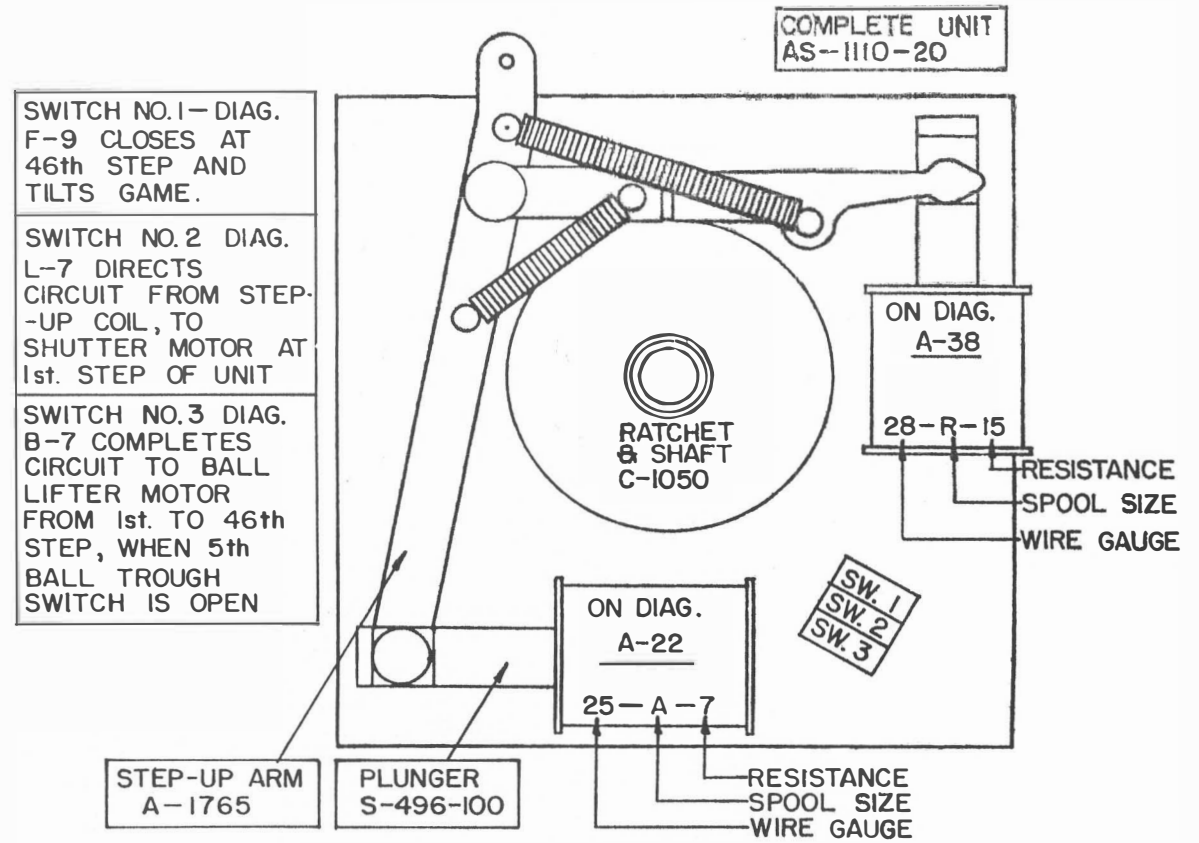
Home of Ballygames and Ballyrides



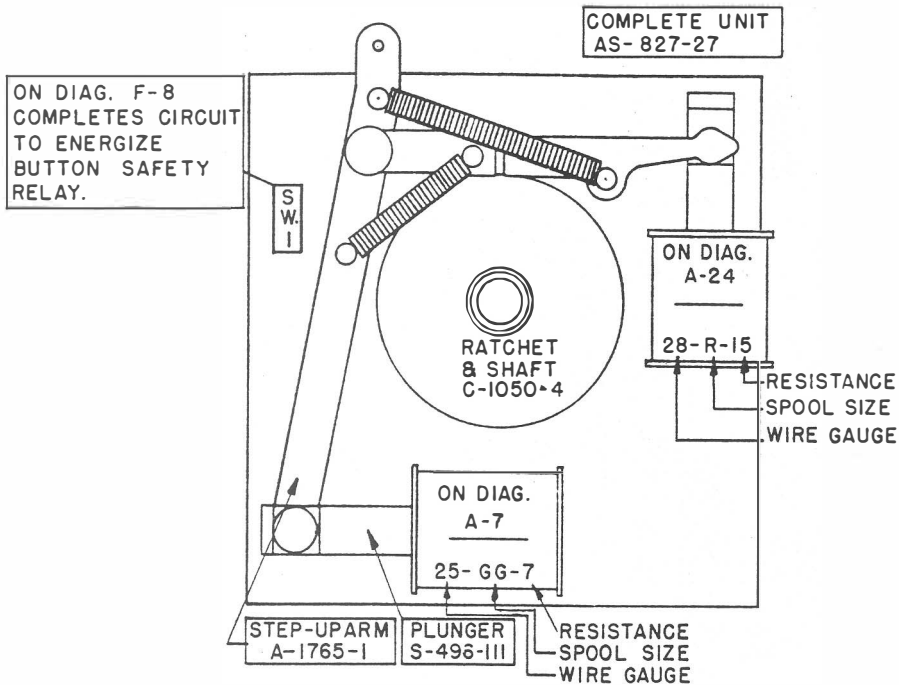
TIMER UNIT STEP-UP AND RESET CIRCUIT



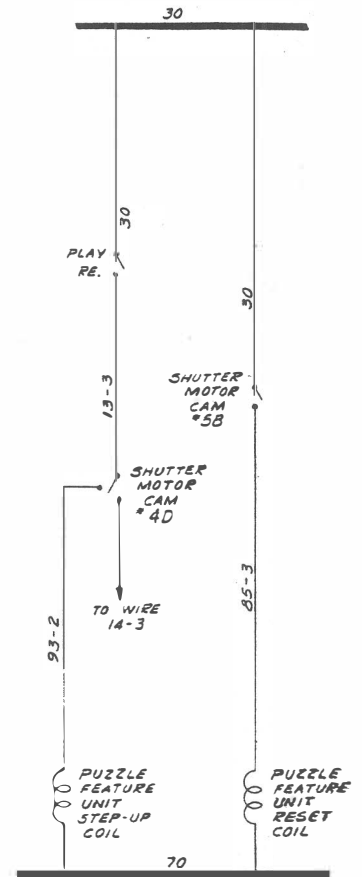
TIMER UNIT viewed from COIL side



PUZZLE FEATURE UNIT viewed from COIL side

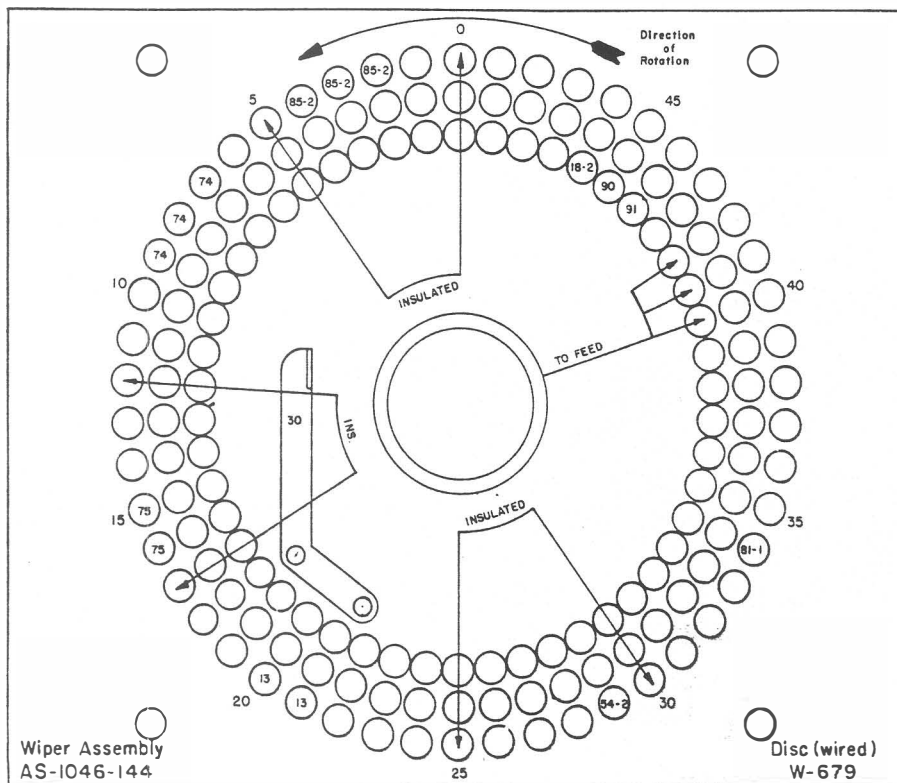


PUZZLE FEATURE UNIT STEP-UP AND RESET CIRCUIT



PUZZLE FEATURE UNIT viewed from BUTTON or WIPER side

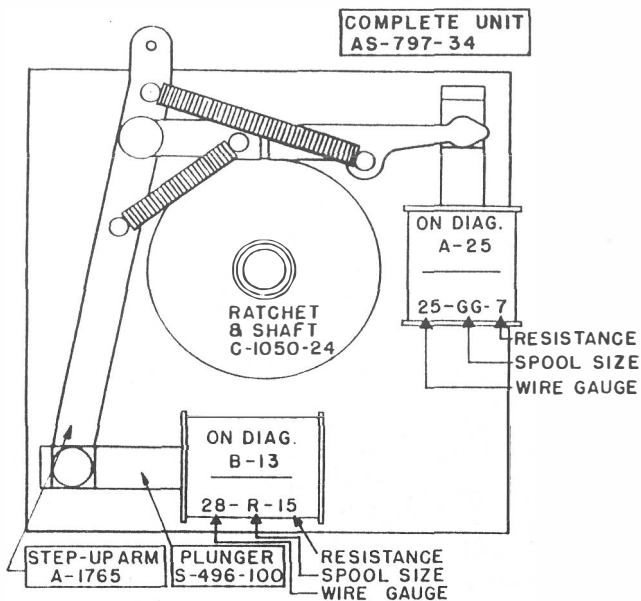
4 step unit. Wipers shown in zero or reset position



- 18-2 Lite puzzle lites thru wiper (G) (Diag. N-3)
- 90
- 91
- 85-2 Thru wipers (A) & (B), completes circuit to search disc for scoring in puzzle #2. (Diag. E-15)
- 74
- 75 Thru wipers (C) & (D), completes circuit to search disc for scoring in puzzle #3. (Diag. E-17)
- 13
- 30 To feed wiper, for wiper (G). (Diag. N-3)
- 81-1 Thru wipers (E) & (F), completes circuit to search disc for scoring in puzzle #4. (Diag. E-19)
- 54-2

REPLAY COUNTER viewed from COIL side

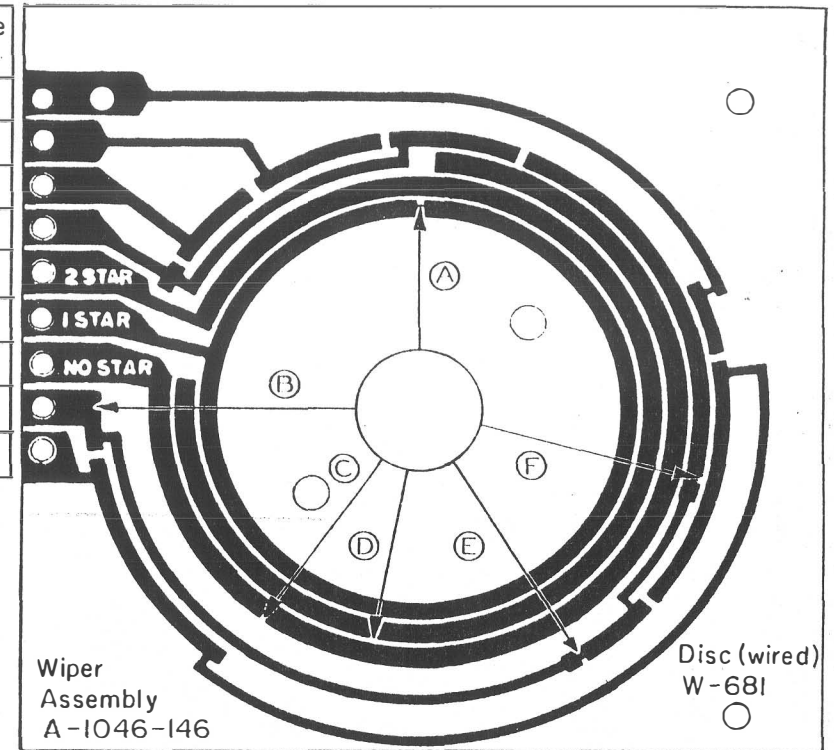
ALL 4 REPLAY COUNTERS ARE ALIKE



REPLAY COUNTER viewed from WIPER side

Puzzle #1	Puzzle #2	Puzzle #3	Puzzle #4
54	54	54	54
74-1	74-1	74-1	74-1
57-1	57-1	57-1	57-1
15	50	78	10
23	52-2	91-2	15-1
56	38-2	61	18
61-3	61-3	61-3	61-3
71-3	71-3	71-3	71-3

Wire color boxes are in line with proper segments.



3 LETTER WORDS SCORE	2 with no star	Thru wipers (B) & (C).
	3 with 1 star	Thru wipers (A) & (E).
	20 with 2 stars See note:	Thru wipers (D) & (F).
4 LETTER WORDS SCORE	8 with no star	Thru wipers (B) & (C).
	12 with 1 star	Thru wipers (A) & (E).

Note:

3 letter words with 2 stars also may score 16 or 12 (Thru wipers (D) & (F)) depending on position of score selection adjustment plug. (See instructions on back door of game.)

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	
G-254	Back glass
E-122-24	Transformer

Back Door Assembly:

Part No.	
M-281-9	Lock and Keys
E-300-74	Search Relay Bank Assembly
E-300-75	Hold Relay Bank Assembly

Front Cabinet Assembly:

Part No.	
M-168-15	Ball
AS-187-14	Ball Shooter Assembly
A-1833	Ball Shooter Housing
A-100-8	Ball Shooter Rod
SP-200-102	Ball Shooter Spring (long)
SP-439	Ball Shooter Spring (short)
R-108-3	Ball Shooter Tip
A-429-14	Ball trough only
P-1900-18	Cash Box
E-130-10	Counter—48 Volt
CA-760-2	Front Moulding only
CA-350-3	Leg
M-163-4	Leg Adjuster
E-108-28	Toggle Switch
M-497	Wire (long) for A-429-14 ball trough
M-497-1	Wire (short) for A-429-14 ball trough

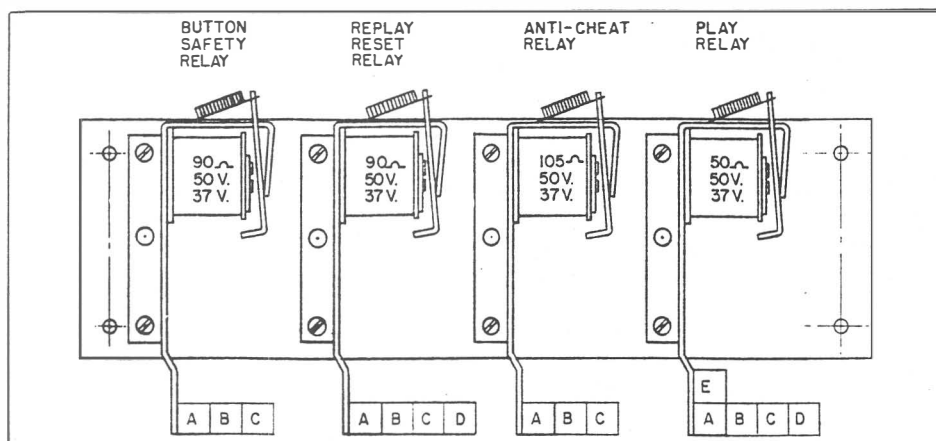
Front Door Assembly:

Part No.	
A-1729-4	Button
E-101-45	Coil for coin lock out
A-252-3	Coin Drop Assembly 5¢
A-252-4	Coin Drop Assembly 10¢
AS-277-31	Coin Switch Assembly 5¢
AS-1509	Coin Switch Assembly 10¢
CA-567-23	Front Door only
AS-1531	Front Door Assembly 5¢
AS-1531-1	Front Door Assembly 10¢
A-254-38	Hinge and Bracket
M-281-6	Lock and Keys
E-108-27	Micro Switch—5¢ and 10¢ play
P-2768-5	Ring—Red—for A-1729-4 button
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

Panel Assembly—Top:

Part No.	
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—Small
R-284-5	Rubber Ring—Large

4 RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART



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

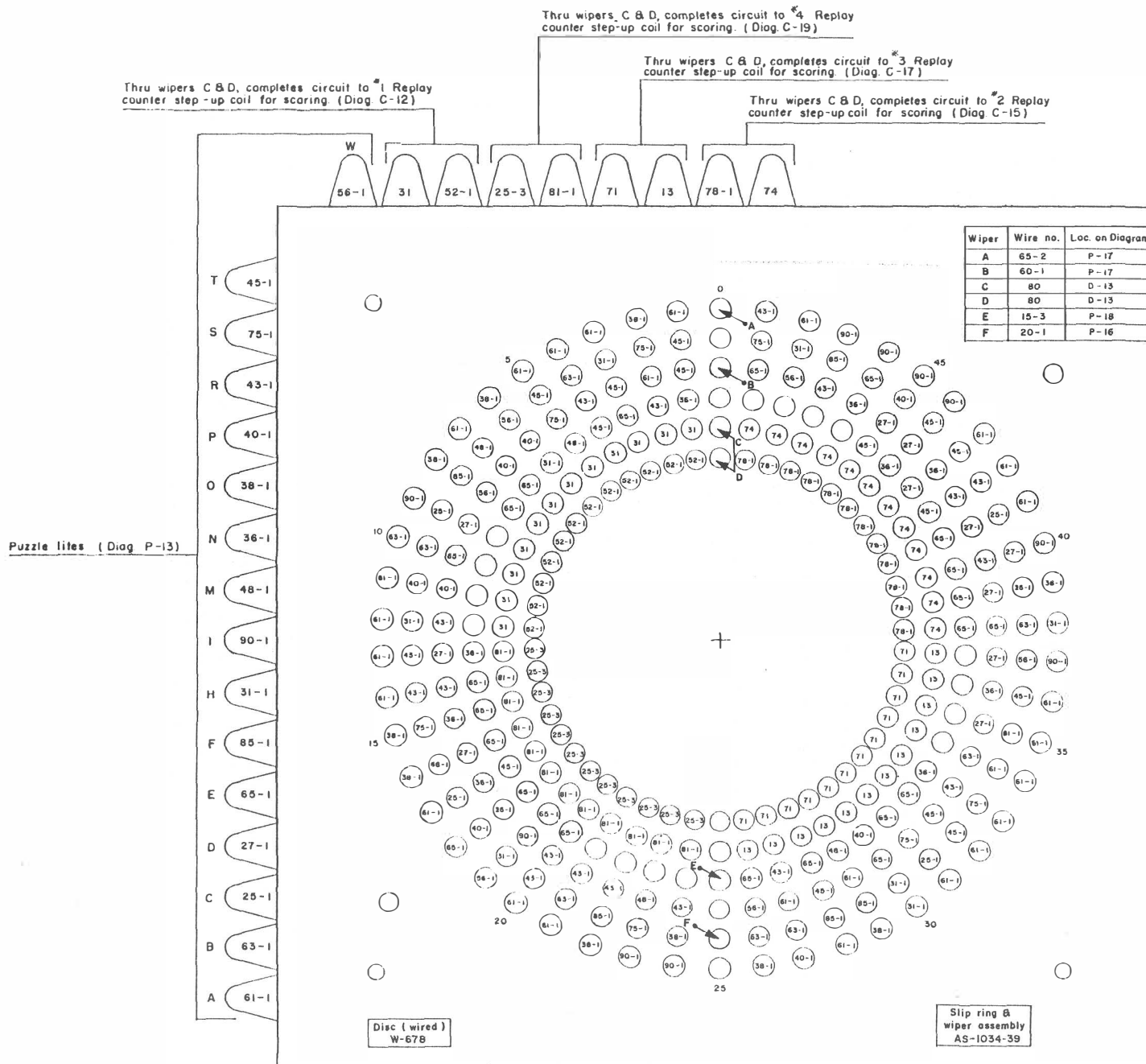
Code	
N.C.	Normally Closed
N.O.	Normally Open
M.B.B.	Make Before Break
S.P.D.T.	Single Pole Double Throw

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

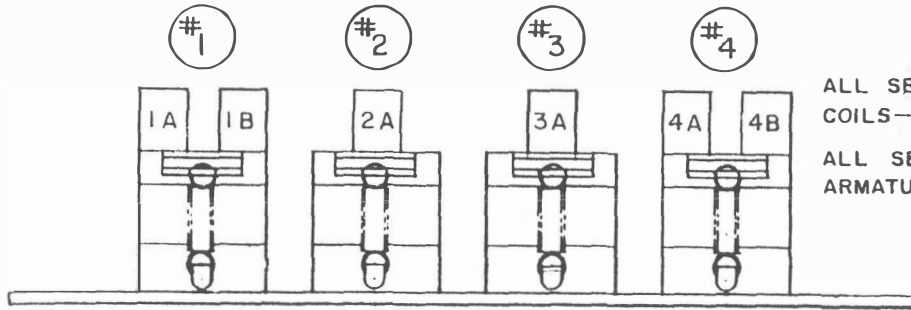
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
BUTTON SAFETY RELAY COIL	A-8	65 70	Brown-White Orange	Energized by puzzle unit step-up arm switch.
A N.C.	E-5	25 48-2	Blue-White Green-Black	Drops out play relay, and acts as safety switch. (when playing coins)
B N.C.	G-5	51-2 80-1	White-Red Black	Drops out play relay, and acts as safety switch. (When playing replays)
C N.O.	G-8	65 83-1	Brown-White Black-Yellow	Safety switch
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energized when anti-cheat relay drops out.
A S.P.D.T.	E-3	27-2 18-1 53-2	Blue-Orange Red-Black White-Yellow	Directs replay register reset circuit thru play relay switch when playing replays, or thru 16 pulse cam when cancelling replays.
B N.O.	J-4	56-2 75-2	White-Brown Orange-White	Lock-in switch for this relay.
C N.O.	J-23	13-2 30	Red-Yellow Yellow	Completes circuit to search unit motor during replay cancel.
D N.C.	B-5	50-1 51-2	White White-Red	Opens play circuit during replay cancel
ANTI-CHEAT RELAY COIL	A-24	52 70	White-Blue Orange	Energized thru shutter motor cam switch #5A, its switches protect replay, and lite circuits.
A S.P.D.T.	I-5	75-2 56-2 50-2	Orange-White White-Brown White	Breaks play relay circuit, and completes circuit to replay reset relay when this relay drops out.
B N.C.	E-10	14-1 21-3	Red-Green Blue-Red	Energizes tilt relay, when this relay drops out.
C N.O.	K-24	52 70	White-Blue Yellow	Lock-in switch for this relay.

CONCLUDED ON NEXT PAGE

SEARCH DISC viewed from BUTTON or WIPER side



SEARCH RELAYS



ALL SEARCH RELAY
COILS—C-2342-59
ALL SEARCH RELAY
ARMATURES—Z-44-12

3 letter word scores THRU		4 letter word scores THRU	
Switch no's.	Wire no's. & color	Switch no's.	Wire no's. & color
3A	56-3 White-brown 38 Yellow-black	3A	56-3 White-brown 38 Yellow-black
2A	38 Yellow-black 52-3 White-blue	2A	38 Yellow-black 52-3 White-blue
1A	52-3 White-blue 61-3 Brown-red	4A	52-3 White-blue 51-3 White-red
3A	56-3 White-brown 38 Yellow-black	1B	51-3 White-red 71-3 Orange-red
2A	38 Yellow-black 52-3 White-blue		
4B	52-3 White-blue 61-3 Brown-red		

ROTATION OF SEARCH DISC WIPERS
FROM 50 TO 1

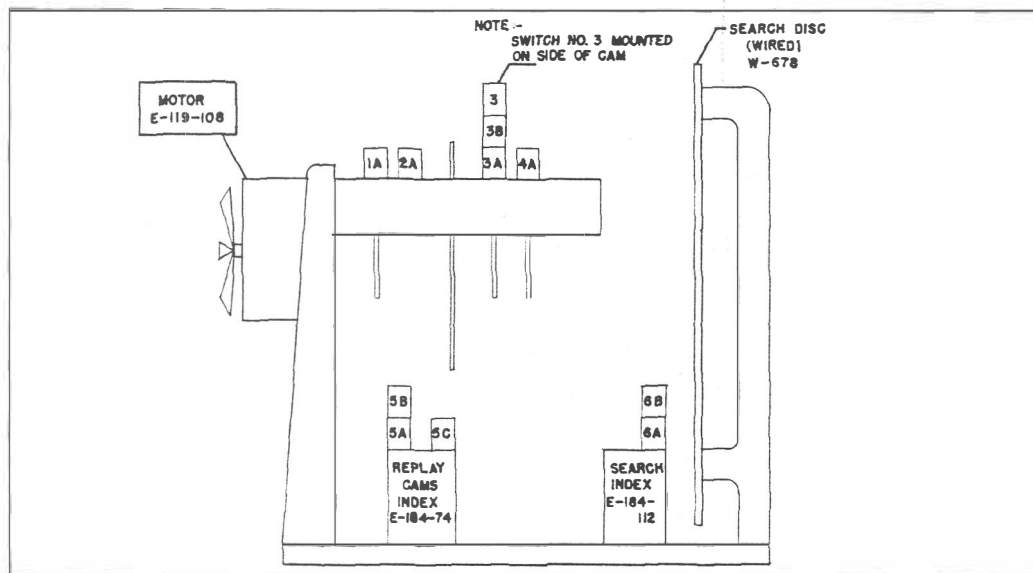
SEARCH POSITIONS					
WIPER (A) POSITION	WIPER ROW 5 (F) SEARCH RELAY 1	WIPER ROW 6 (A) SEARCH RELAY 2	WIPER ROW 4 (B) SEARCH RELAY 3	WIPER ROW 3 (E) SEARCH RELAY 4	
#1	1	B	A	T	E
	2	B	O	A	R
	3	F	A	T	E
	4	F	A	R	M
	5	H	A	S	P
	6	C	O	P	E
	7	T	A	P	E
	8	S	O	W	N
	9	A	I	D	
	10	A	B	E	
	11	T	A	B	
	12	W	A	R	
	13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

4 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
PLAY RELAY COIL	A-5	50-1 70	White Orange	Energized every time a coin is played, or when replay button is pressed.
A N.C.	D-6	14 71-2	Red-Green Orange-Red	Opens circuit to coin lock out magnet during spin.
B N.O.	C-5	25 51-2	Blue-White White-Red	Lock-in switch for this relay.
C N.O.	K-3	27-2 30	Blue-Orange Yellow	Energizes replay register reset coil.
D N.O.	K-7	13-3 30	Red-Yellow Yellow	Completes circuit thru shutter motor cam switch #4D to puzzle feature unit step-up coil during play, or to shutter motor when starting new game.
E N.O.	B-9	93-1 98	Gray-Yellow Gray-Black	Completes circuit to total plays meter.

SEARCH 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

Note-It is important to adjust Replay Cams Index Switches No. 5A and No. 5B so that they make only when Replay Cams Index Coil is energized. When Replay Cams Index is de-energized, these Switches should remain open while Switch is riding on outer edge of cam.

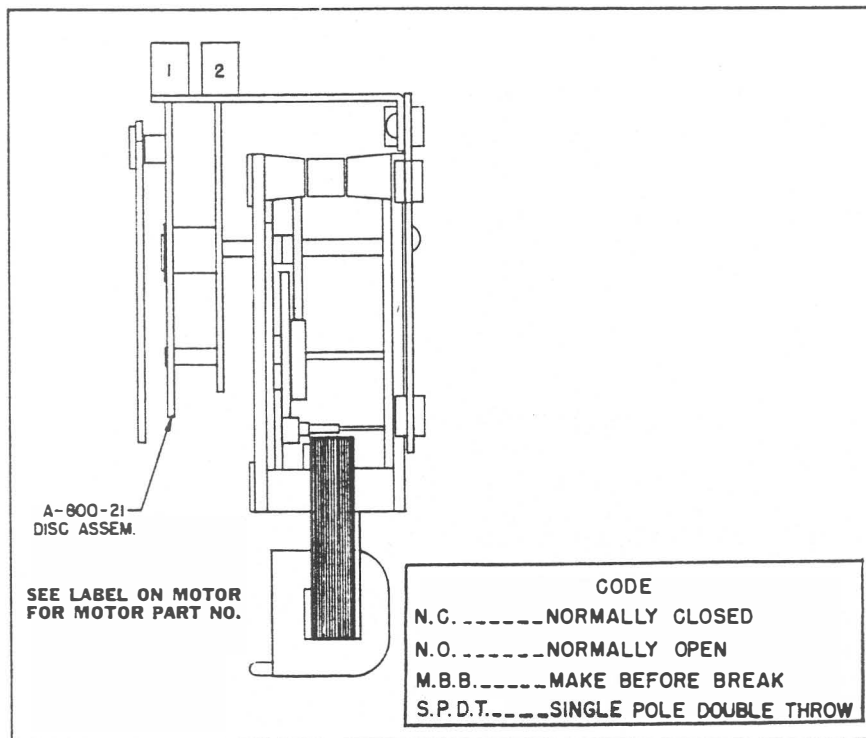
SEARCH UNIT SWITCH CHART FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.O.	G-4	53-2 75-2	White-Yellow Orange-White	Pulses replay register reset coil.
2A N.O. Switch on shaft.	B-22	43-2 90-3	Green-Yellow Gray	Energizes timer step-up coil when shutter is closed.
3A N.O.	C-10	80 91-1	Black Gray-Red	Pulses replay register step-up coil, and replays meter when scoring replay winner.
3B N.O.	A-16	40 70	Green Orange	Pulses replay counter step-up coils when scoring replay winner.
3 (Backside) N.O.	H-11	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch.

CONCLUDED ON NEXT PAGE

SEARCH UNIT CAM SWITCH CHART — CONCLUDED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
4A N.C.	L-12	53 56-3	White-Yellow White-Brown	Prevents the start of another replay scoring, when unit cams are indexed.
REPLAY CAMS INDEX COIL	A-12	40-2 70	Green Orange	Energizes when winning score is made, and releases replay cams.
5A N.O.	G-11	27 80	Blue-Orange Black	In series with replay lock-in circuit. (NOTE: See search unit pictorial view for correct adj.)
5B N.O.	K-12	53 56-3	White-Yellow White-Brown	In series with replay winner circuit. (NOTE: See search unit pictorial view for correct adj.)
5C N.C.	C-11	43 80	Green-Yellow Black	Opens direct 50 volt circuit to search index coil, coil then held in thru resistor.
SEARCH INDEX COIL	A-11	43 70	Green-Yellow Orange	Energized when 3 letter word or 4 letter word is scored.
6A N.O.	B-12	40-2 80	Green Black	Energizes replay cams index coil when score is made.
6B N.C.	L-5	48-2 80	Green-Black Yellow	Opens play circuit, and acts as safety switch.



BALL LIFT MOTOR PICTORIAL VIEW
 NUMBERS CORRESPOND TO SWITCH CHART BELOW

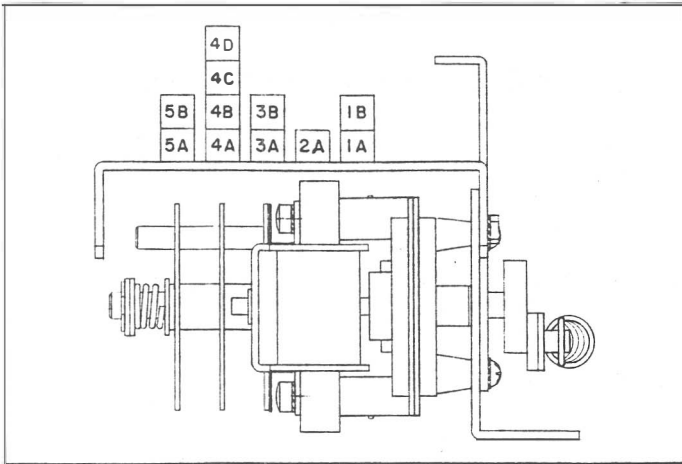
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1 N.O.	E-8	21-3 36-3	Blue-Red Yellow-Brown	Carry-over switch for ball lifter motor.
2 N.O.	G-21	45 80-3	Green-White Gray	Energizes timer unit step-up coil.

TRIP RELAY BANK CHART SWITCHES LISTED ALPHABETICALLY FROM LEFT TO RIGHT

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION
TRIP BANK RESET COIL E-184-126	G-1	50-P 70-P	White (Plastic) Orange (Plastic)	Energized by shutter motor cam switch #3A.
LEFT STAR HOLE TRIP COIL	A-20	13-1 70	Red-Yellow Orange	Energized by left star hole panel switch.
A S.P.D.T.	O-6	78-3 41-1 48	Orange-Black Green-Red Green-Black	Directs circuit from 1 star (Good) lite when right star hole is made, to 2 stars (Expert) lite when left and right star holes are made.
B S.P.D.T.	O-4	20-2 21-2 78-3	Blue Blue-Red Orange-Black	Directs circuit from No Star (Average) lite when No Star holes are made, to 1 star (Good) lite when left star hole is made.
C S.P.D.T.	G-15	52-2 63 50	White-Blue Brown-Yellow White	Directs #2 puzzle replay scoring circuit from 1 star (right) scores, to 2 stars (left and right) scores.
D S.P.D.T.	G-14	38-2 51-1 52-2	Yellow-Black White-Red White-Blue	Directs #2 puzzle replay scoring circuit from no star scores, to 1 star (left) scores.
E S.P.D.T.	G-13	23 36 15	Blue-Yellow Yellow-Brown Red-White	Directs #1 puzzle replay scoring circuit from 2 star (right) scores, to 2 stars (left and right) scores.
F S.P.D.T.	G-12	56 57 23	White-Brown White-Orange Blue-Yellow	Directs #1 puzzle replay scoring circuit from no star scores, to 1 star (left) scores.
G S.P.D.T.	F-19	83 54-2 23-2	Black-Yellow White-Green Blue-Yellow	Completes #4 puzzle replay scoring circuit for all scores, no star, 1 star (right), 1 star (left), or 2 stars (left and right).
H S.P.D.T.	F-17	85 75 90-2	Black-White Orange-White Gray	Completes #3 puzzle replay scoring circuit for all scores, no star, 1 star (right), 1 star (left) or 2 stars (left and right).
I N.C.	B-20	13-1 J	Red-Yellow Jumper to Coil	Breaks circuit to coil.
RIGHT STAR HOLE TRIP COIL	A-21	93 70	Gray-Yellow Orange	Energized by right star hole panel switch.
A S.P.D.T.	N-5	21-1 30 41-1	Blue-Red Yellow Green-Red	Completes all star lite circuits, no star, 1 star (left) 1 star (right), or 2 stars (left and right).
B S.P.D.T.	G-20	15-1 23-2 10	Red-White Blue-Yellow Red	Directs #4 puzzle replay scoring circuit from 1 star (left) scores, to 2 stars (left and right) scores.
C S.P.D.T.	G-19	18 83 15-1	Red-Black Black-Yellow Red-White	Directs #4 puzzle replay scoring circuit from no star scores, to 1 star (right) scores.
D S.P.D.T.	G-18	91-2 90-2 78	Gray-Red Gray Orange-Black	Directs #3 puzzle replay scoring circuit from 1 star (left) scores, to 2 stars (left and right) scores.
E S.P.D.T.	G-17	61 85 91-2	Brown-Yellow Black-White Gray-Red	Directs #3 puzzle replay scoring circuit from no star scores, to 1 star (right) scores.
F S.P.D.T.	F-15	51-1 85-2 63	White-Red Black-White Brown-Yellow	Completes #2 puzzle replay scoring circuit for all scores, no star, 1 star (left), 1 star (right) or 2 stars (left & right).
G S.P.D.T.	F-12	57 52-1 36	White-Orange White-Blue Yellow-Brown	Completes #1 puzzle replay scoring circuit for all scores, no star, 1 star (left), 1 star (right), or 2 stars (left and right).
H N.C.	B-21	93 J	Gray-Yellow Jumper to coil	Breaks circuit to coil.
TILT TRIP COIL	A-10	14-1 70	Red-Green Orange	Energized by any tilt switch, or the plumb bob, also by anti-cheat relay switch, or 16th step of timer unit.
A S.P.D.T.	P-1	41-2 81 20	Green-Red Black-Red Blue	Breaks 6 volt circuit and lites tilt lite.
B S.P.D.T.	J-10	21-3 30 18-3	Blue-Red Yellow Red-Black	Breaks replay scoring, and ball counting circuits, and completes circuit to shutter motor when game is tilted.
C N.C.	I-23	13-2 30	Red-Yellow Yellow	Breaks circuit to search motor.

SHUTTER MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



MOTOR PART NO. E-119-99

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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.C.	L-11	21-3 53	Blue-Red White-Yellow	Completes circuit to replay scoring circuit.
1B N.O.	K-6	14-3 30	Red-Green Yellow	Carry thru for shutter motor.
2A N.C.	D-7	23-1 53-1	Blue-Yellow White-Yellow	Completes circuit to ball lifter motor (closed normally) open during shutter cycle.
3A N.O.	I-1	20-P 70-P	Blue (Plastic) Orange (Plastic)	Resets trip relay bank.
3B N.O.	G-25	98-1 30	Gray-Black Yellow	Resets #2, #3, and #4 replay counters.
4A N.C.	D-21	21-3 91-3	Blue-Red Gray-Red	(Closed when shutter is closed) part of left star hole, right star hole trip relays circuit.
4B N.O.	I-7	14-3 18-3	Red-Green Red-Black	(Closed when shutter is open) completes circuit to shutter motor.
4C N.C.	E-22	21-3 43-2	Blue-Red Green-Yellow	Part of timer unit step-up circuit.
4D S.P.D.T.	H-7	14-3 13-3 93-2	Red-Green Red-Yellow Gray-Yellow	Directs circuit to puzzle feature unit step-up coil during play, or to shutter motor when starting new game.
5A N.O.	J-24	52 30	White-Blue Yellow	Energizes anti-cheat relay.
5B N.O.	H-25	85-3 30	Black-White Yellow	Resets timer unit, puzzle feature unit, and #1 replay counter unit.