Bally® Gay Time

OPERATING INSTRUCTIONS AND PARTS CATALOG

Part Numbers are marked on illustrations

FOR QUICKEST SERVICE STATE CORRECT PART NUMBER WHEN ORDERING PARTS

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.	
G-243	Back glass
M-281-14	Lock & keys (2) Keyed alike
E-122-19	Transformer

Back Cabinet Insert Assembly:

A-1739-6	Arm—Short—for plastic numbered strip
A-1739-7	Arm—Long—for plastic numbered strip
A-1709-11	Plastic numbered strip #1 is on left—facing Lite Box
A-1709-12	Plastic numbered strip #2
A-1709-13	Plastic numbered strip #3
A-1709-14	Plastic numbered strip #4
M-696-15	Plastic numbered strip #5
M-412-2	Wire wiper for Slip ring and wiper assembly

Back Door Assembly:

M-281-12	Lock and Keys (2) Keyed alike
E-300-63	Search relay bank complete
E-269	Selenium Rectifier

Front Cabinet Assembly:

M-168-15	Ball 1⅛"
AS-187-12	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-429-14	Ball trough only to ball lifter assembly
P-1900-18	Cash box
E-130-8	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-429-14 ball trough
M-497-1	Wire (short) for A-429-14 ball 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 complete 5¢
AS-277-27	Coin switch assembly complete 10¢
CA-567-21	Front door only
AS-1461	Front door complete 5¢
AS-1461-1	Front door complete 10¢
A-254-34	Hinge and bracket
M-281-6	Lock and keys
E-108-32	Micro switch—Coin switch assembly 5 or 10¢ play
P-2768-5	Ring—Red—for A-1729-4 button
P-2768-6	Ring—Yellow—for A-1729-4 button
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢

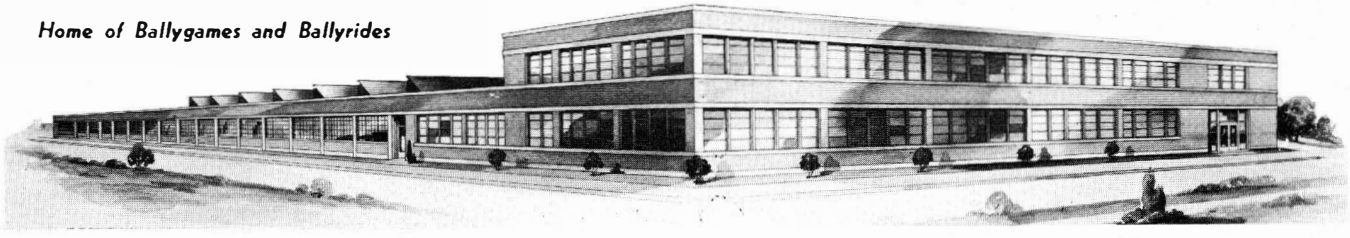
Front Moulding Assembly:

A-1272-11	Button and pin—Right
A-1272-12	Button and pin—Left
W-618	Contact plate for Selector assembly
AS-1305-6	Front moulding complete
CA-740-2	Front moulding only
A-1704-4	Knob and shaft—Selector assembly
P-2210-8	Plate—Coin Entry—5¢
P-2210-9	Plate—Coin Entry—10¢
P-2210-34	Plate—Selector assembly
P-2210-33	Plate—Left and right button
A-1707-1	Wiper assembly—Selector assembly

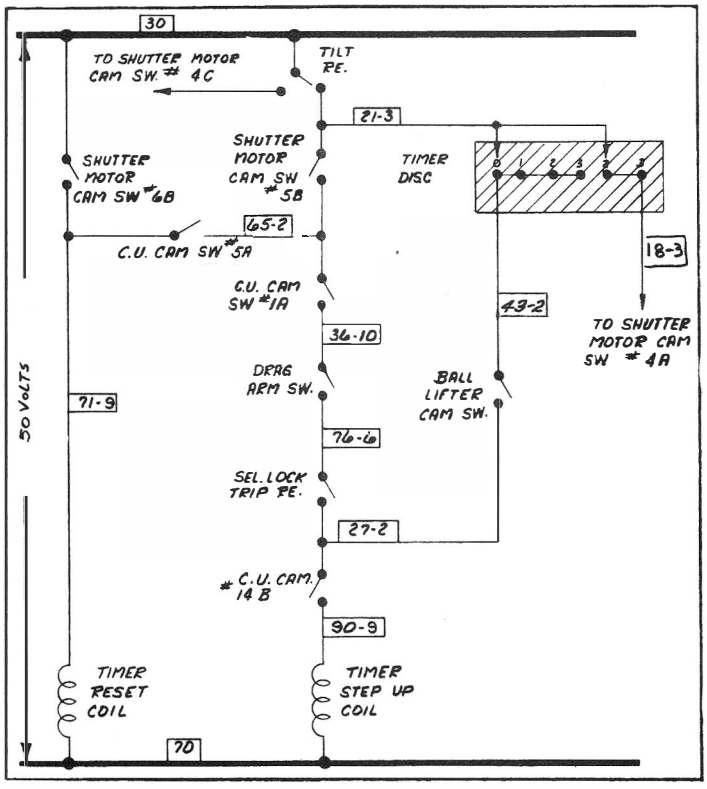
Panel Assembly Top:

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
SW-101-26	Switch for AS-1315

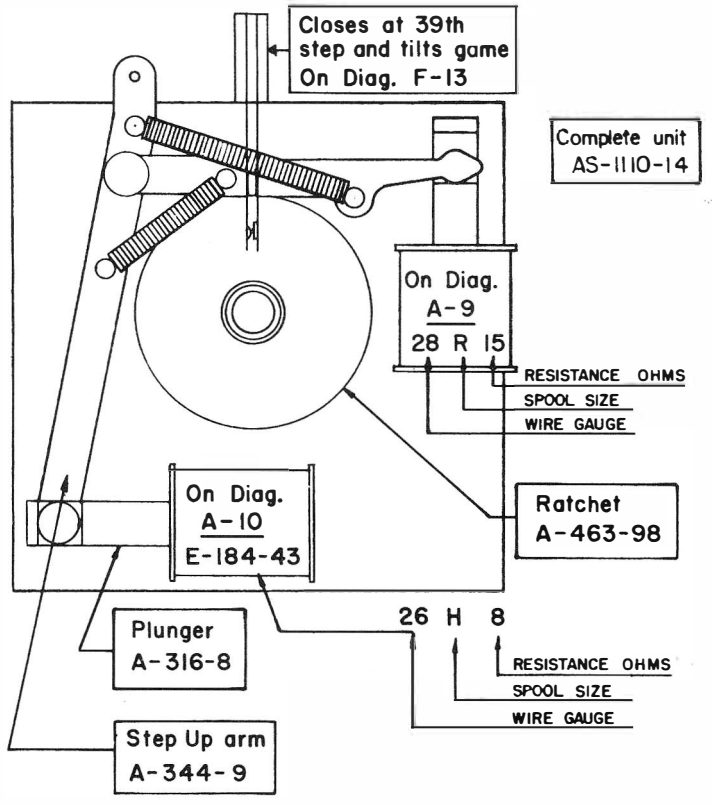
Home of Ballygames and Ballyrides



TIMER UNIT STEP-UP AND RESET CIRCUIT



TIMER UNIT viewed from COIL side



FUNCTION OF TIMER UNIT

The Timer Unit resets to zero position at the start of a new game by shutter motor cam switch No. 6B. (Diagram G-9).

Control Unit cam switch No. 5A resets this unit every time a play occurs on extra balls.

This unit steps up one position when the 1st ball comes up thru a circuit on wiper (A) and the ball lifter cam switch. (Diagram E-10).

When the 1st ball is shot the 2nd ball is raised and the timer unit is stepped to its 2nd position; at this position wiper (B) completes circuit to the shutter motor which will close the shutter board. (Diagram H-10).

At the 2nd position wiper (C) diagram E-13 keeps the circuit to the ball lifter motor alive even though the 8th ball trough switch is now open. This circuit remains closed for 38 steps.

Wiper (A) diagram H-10 keeps the timer step-up coil circuit alive for 4 steps or until the 4th ball is raised.

The three other circuits which are made at the 4th step of the unit are as follows:

Wipers (D) and (E) makes magic pocket button alive.

Wipers (F) and (G) completes circuit to selector lock trip.

Wipers (H) and (I) completes circuit to "Turn Knobs Now" and "Press Buttons Now" lites.

TIMER UNIT viewed from BUTTON or WIPER side

39 step unit. Wipers shown in zero or reset position

Completes circuit to ball lift motor at 1st step of unit to 39th step when 8th ball trough switch opens Diag.- E-13 — 38-3

Completes circuit to Left & Right Magic Pocket move button at 4th step of this unit Diag.-G-26 — 48-3

Completes circuit to "Turn Knobs" & "Press Button Now" lites at 4th step of this unit Diag.-J-4 — 61-7, 30

Completes circuit for 4 steps to this unit for ball count. Diag.-H-10 — 43-2

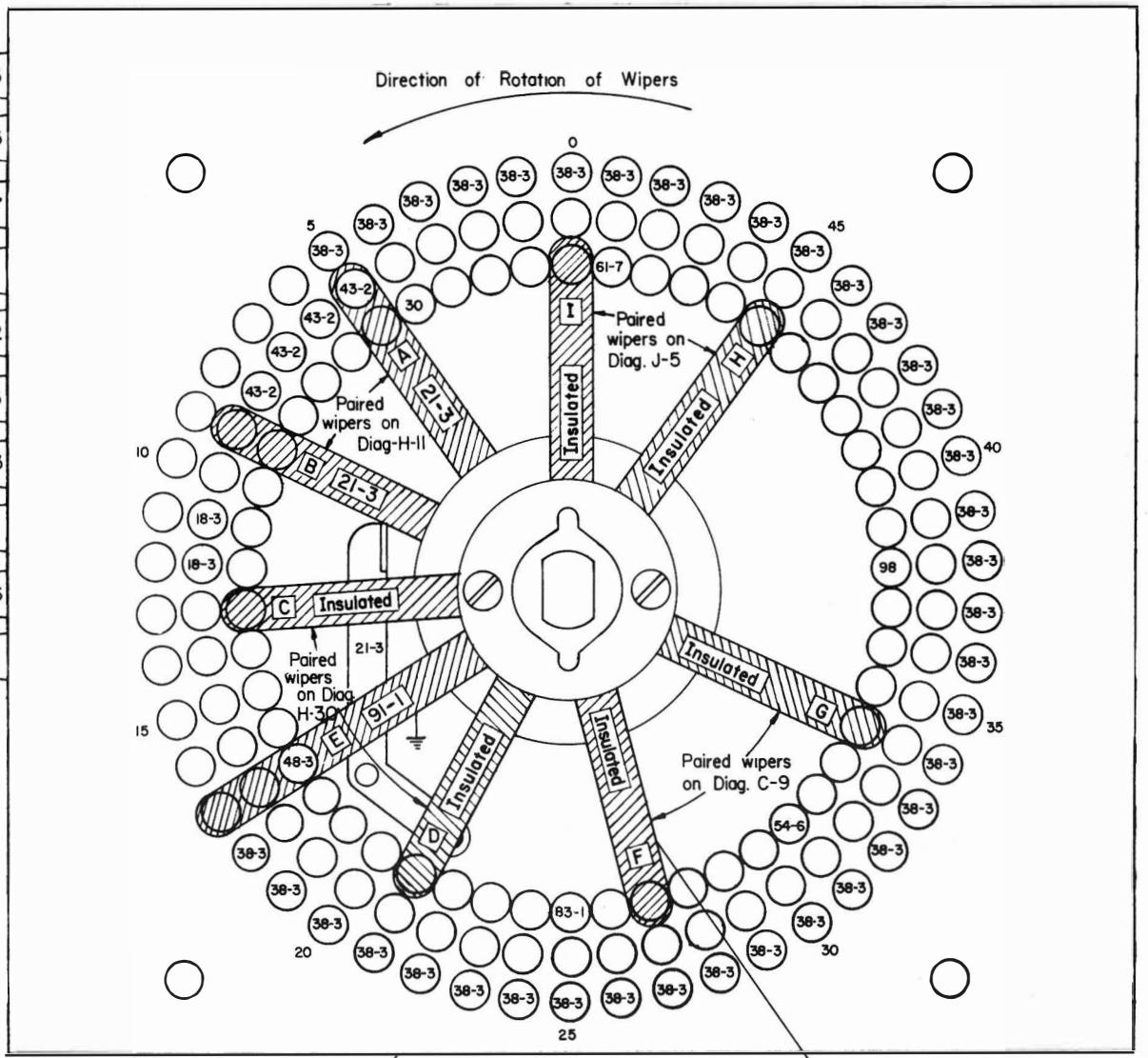
Completes circuit to shutter motor cam switch *4B and then to shutter motor. Shutter will close at 2nd step of this unit. Diag.-H-10 — 18-3

Feeds the above two circuits. Diag.-H-10 — 21-3

To normally closed switch on Selector Lock trip coil. These two wires are shorted by wipers [F] & [G] at 4th step of this unit. Diag.-B-9 — 98, 54-6, 83-1

91-1 — Ground to frame unit

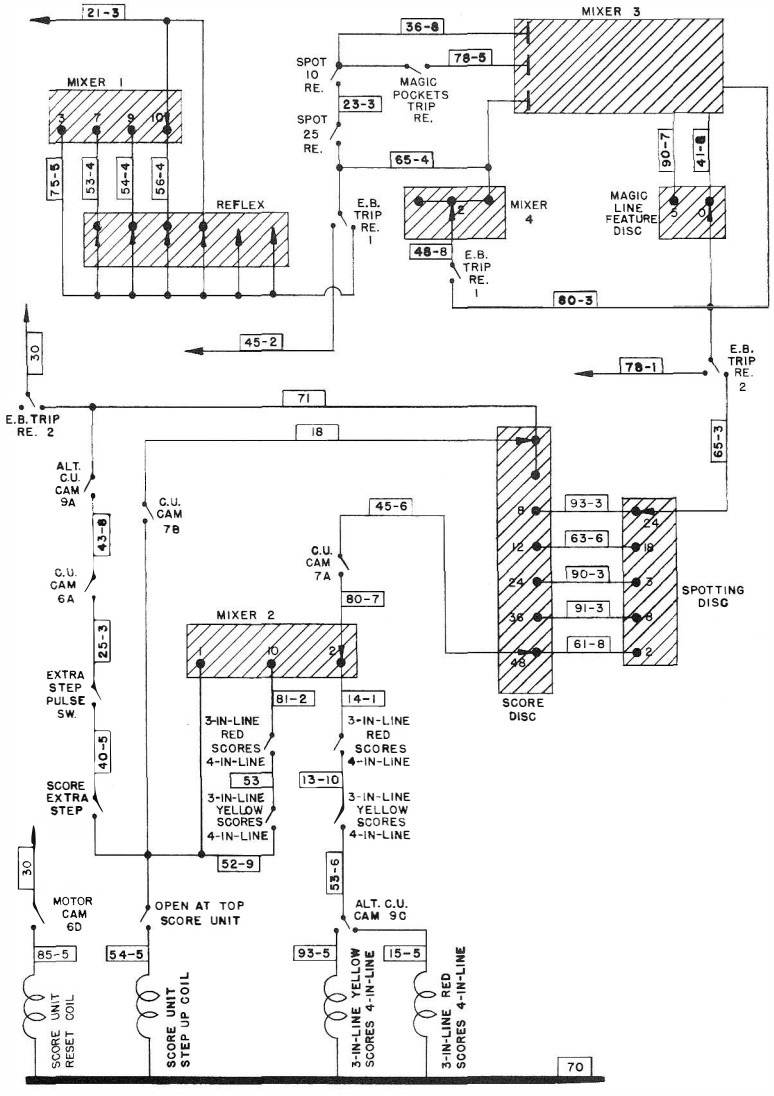
Note:- Diag.-E-13 etc. refers to location on schematic diagram



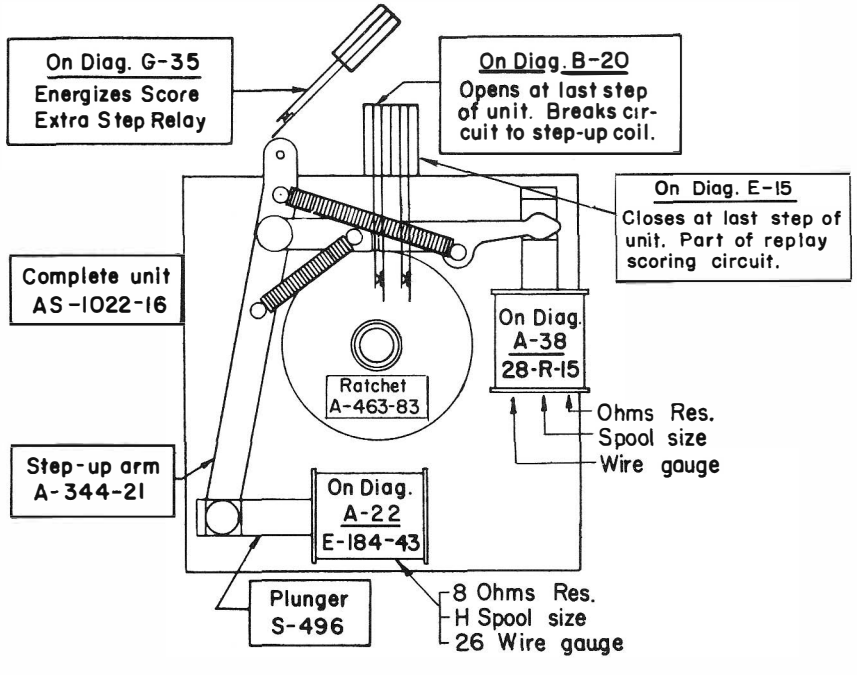
Disc (wired) W-617

Wiper Assembly AS-1046-96a

SCORE UNIT STEP-UP AND RESET AND RED AND YELLOW 3-IN-LINE SCORES 4-IN-LINE CIRCUIT



SCORE UNIT viewed from COIL side



FUNCTION OF SCORE UNIT

The score unit resets to zero position at the start of a new game when shutter motor cam switch #6D operates (diagram C-38). Near the end of the spin of the control unit, cam switch #7B closes and steps unit to 1st position (diagram D-20). When another play is made the unit will step again to its 2nd position. In other words the first two steps are guaranteed, and operate on successive spins of the control unit.

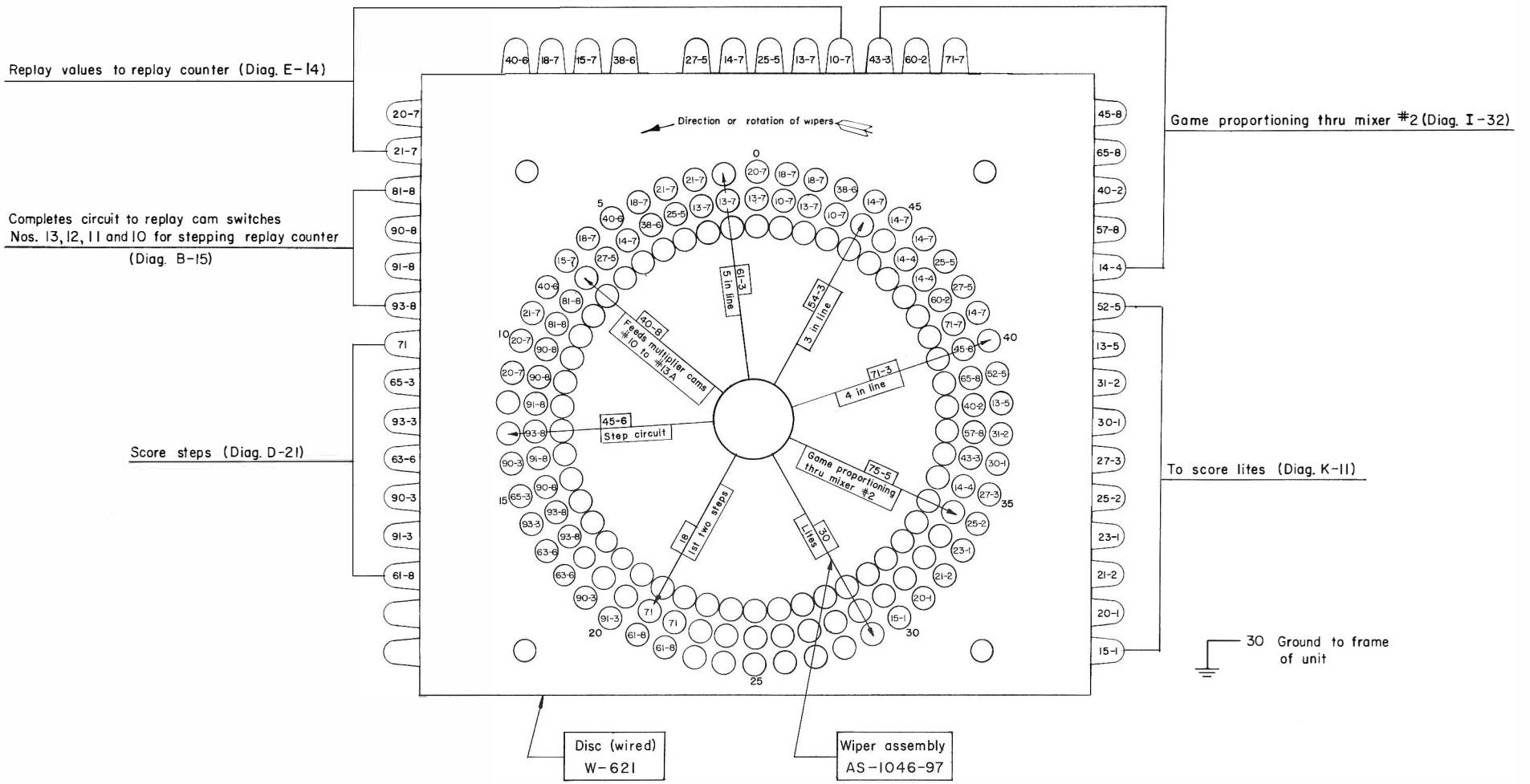
Additional single steps occur thru wires 65-3; 93-3; 63-6; 90-3; 91-3; 61-8.

Multiple steps occur on this unit when the score extra step assembly stops on one of its irregular shaped ledges at the same time that a single step occurs. (See mixer spotting unit).

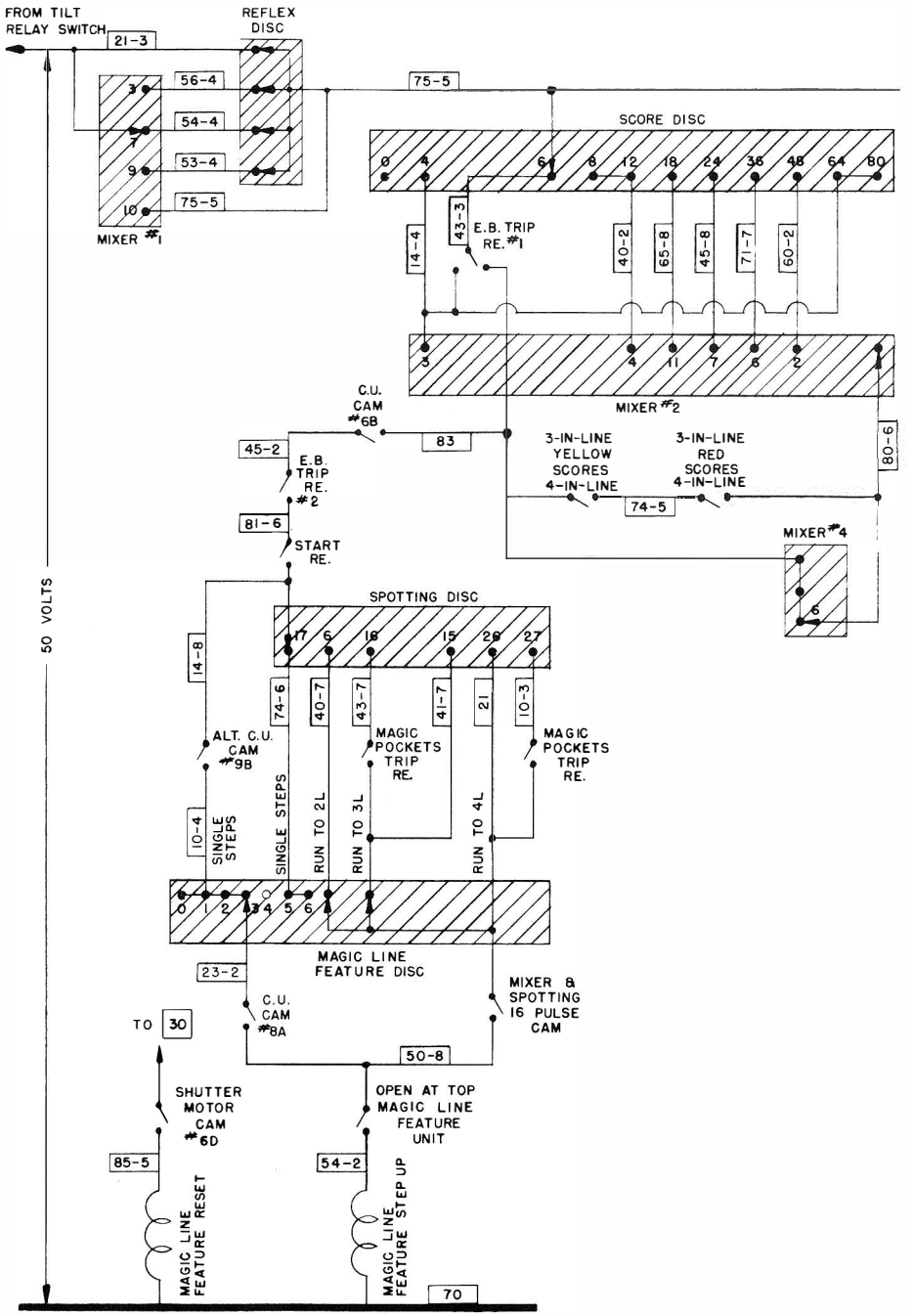
The score unit at the time it makes a single step energizes the score extra step relay and a switch on it completes the circuit for multiple steps.

SCORE UNIT viewed from BUTTON or WIPER side

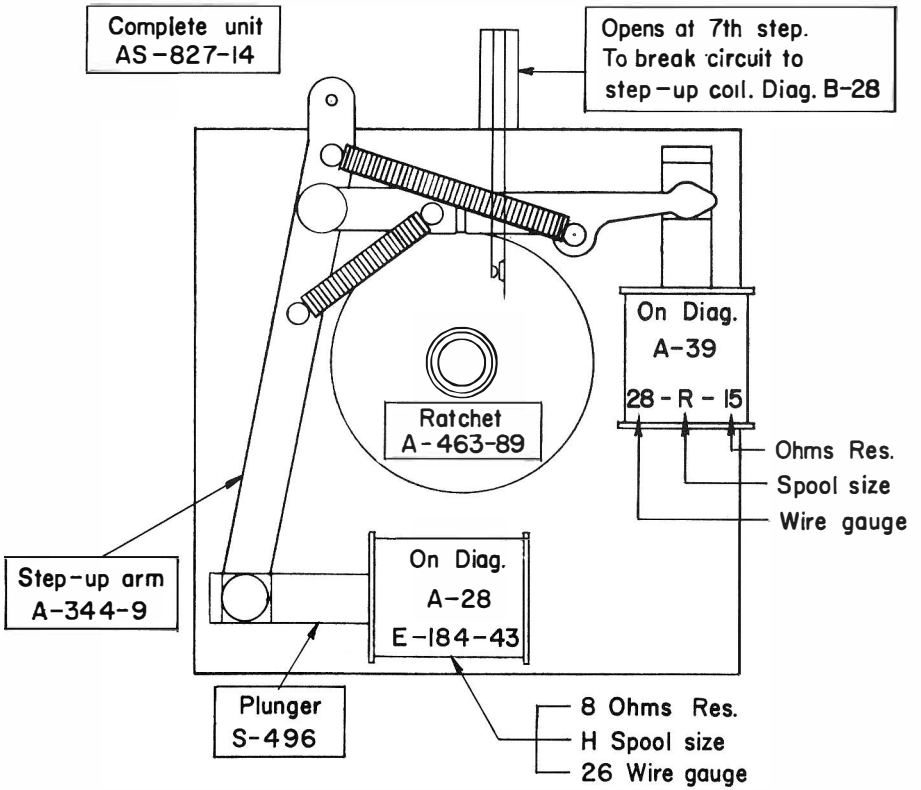
10 step unit. Wipers shown in zero or reset position



MAGIC-LINES FEATURE STEP-UP AND RESET CIRCUIT



MAGIC-LINES FEATURE UNIT viewed from COIL side



FUNCTION OF MAGIC-LINES FEATURE UNIT

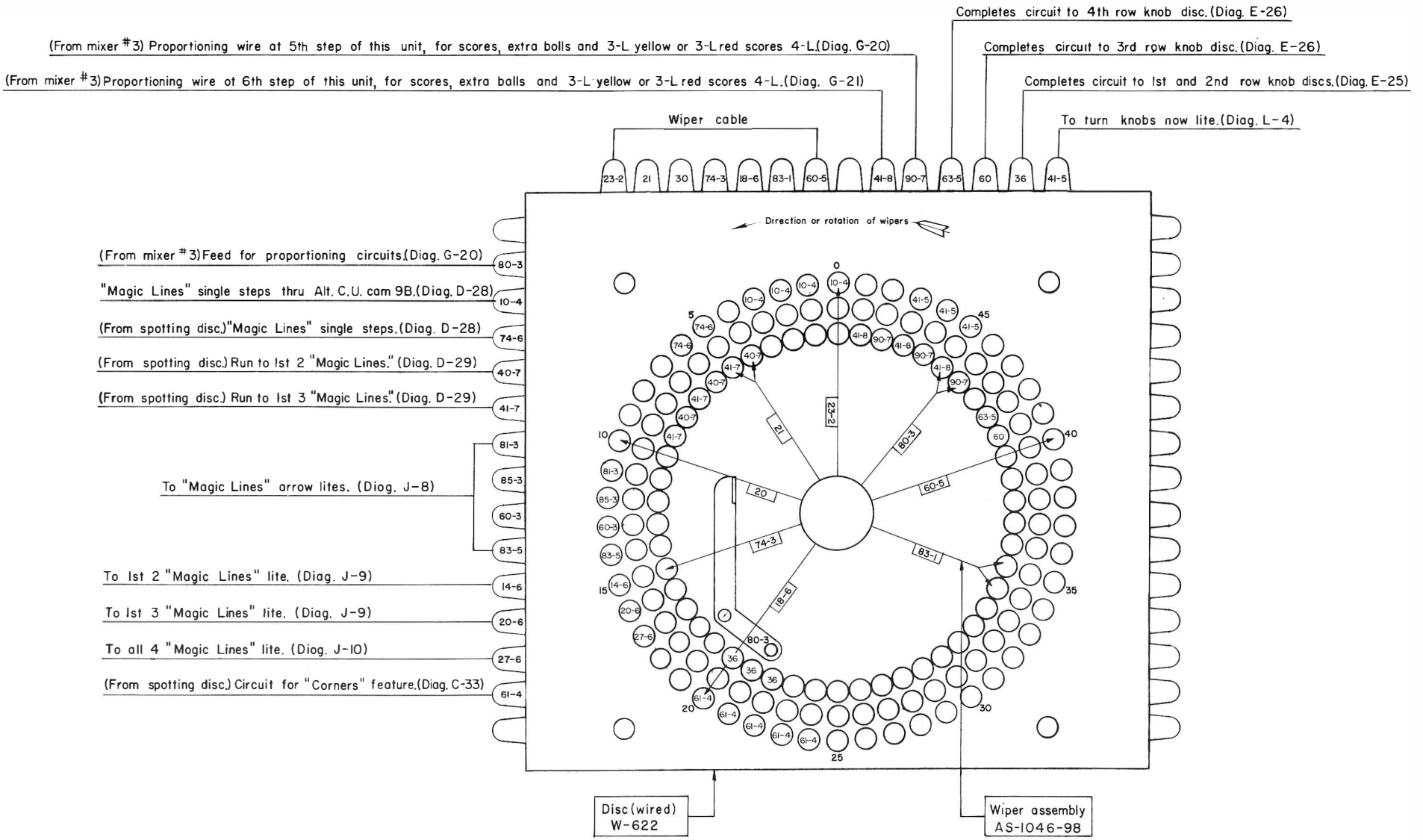
The magic line feature unit resets at the start of a new game when shutter motor cam switch 6D closes.

Single steps occur thru wires 10-4 and 74-6 completed by the wiper that connects to wire #23-2. (Diagram C-29)

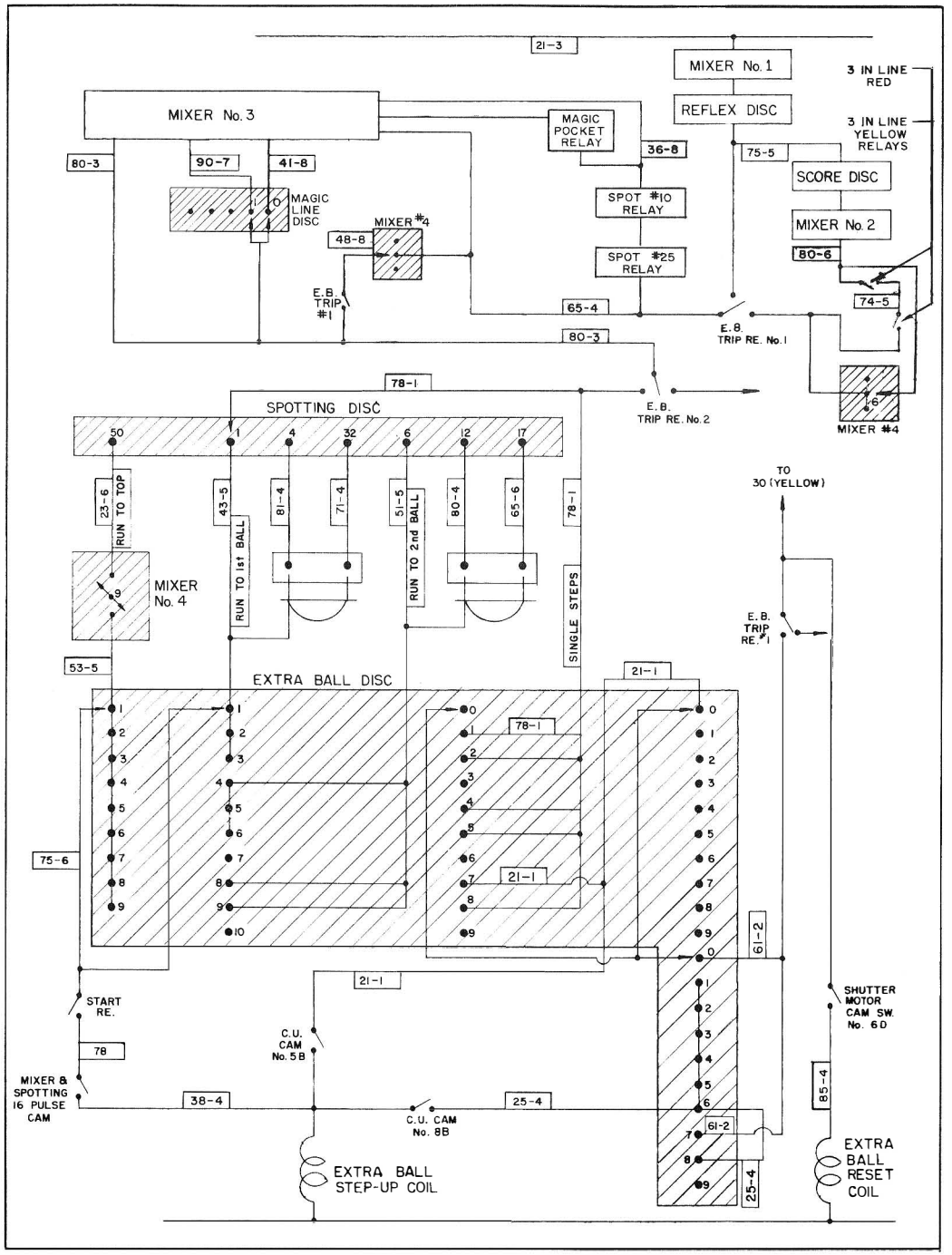
Runs to the 2nd, 3rd and 4th lines are completed by the wiper connected to wire #21. (Diagram C-30)

MAGIC-LINES FEATURE UNIT viewed from BUTTON or WIPER side

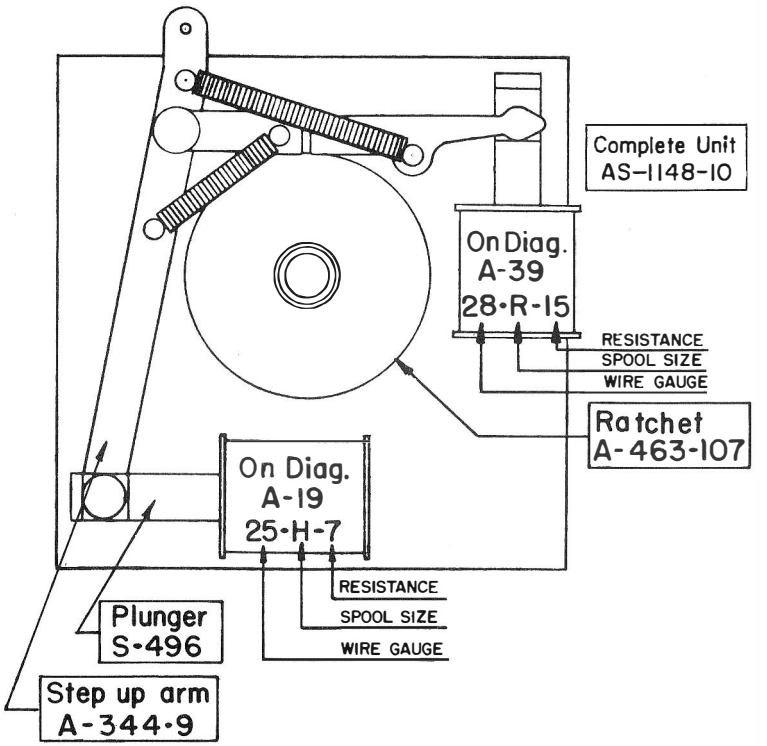
7 step unit. Wipers shown in zero or reset position



EXTRA BALL STEP-UP AND RESET CIRCUIT



EXTRA BALL UNIT viewed from COIL side



FUNCTION OF EXTRA BALL UNIT

The Extra Ball Unit resets to zero position at the start of a new game when Shutter Motor Cam Switch No. 6D operates.

The first spin that occurs on Extra Ball play will allow cam No. 5B to step the unit to its first position. (Wipers F and E).

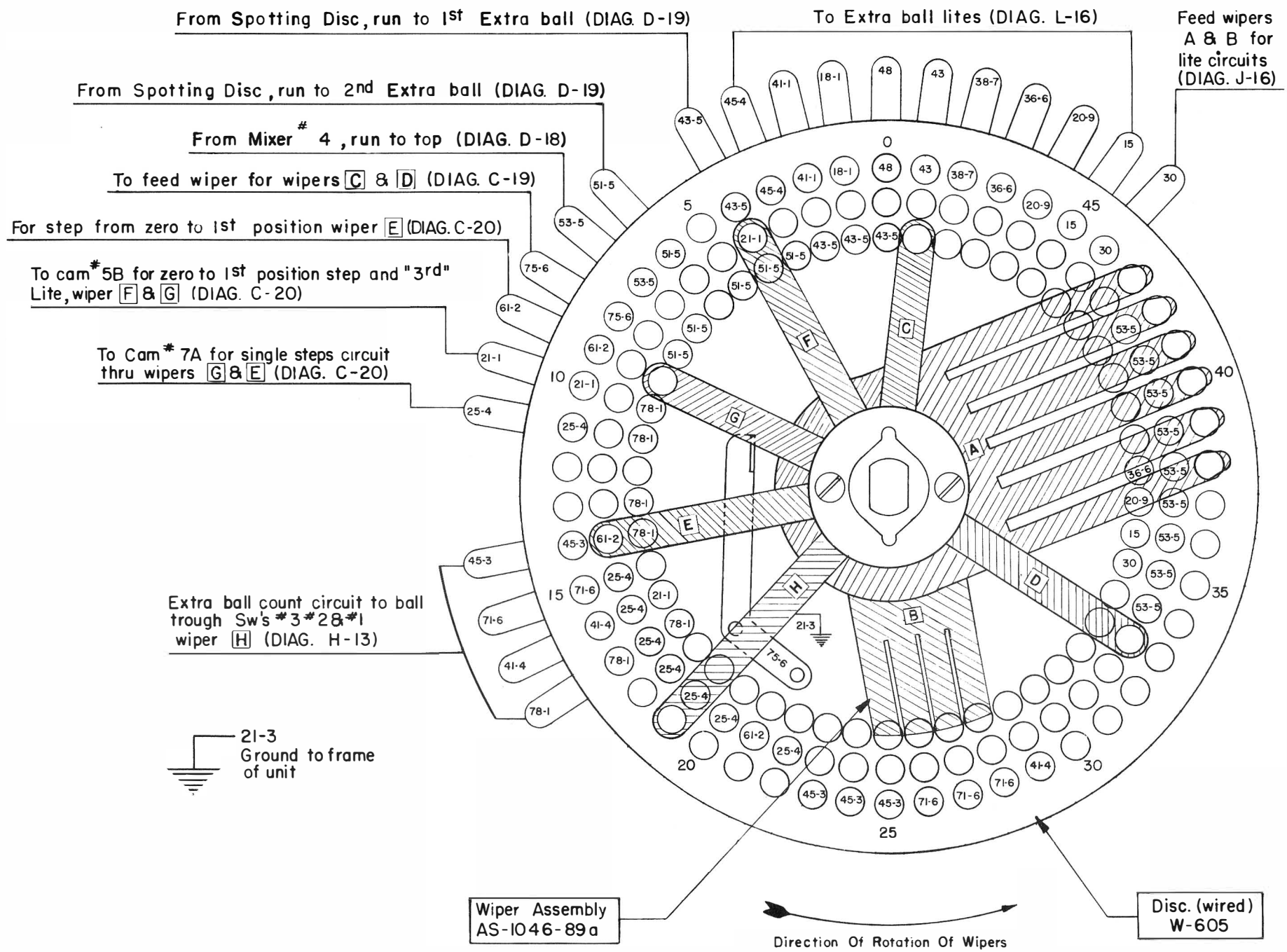
Single step circuits are made thru G and wire No. 78-1 (see next page).

The circuit to the 1st Extra Ball is made thru wiper C and wire No. 43-5 (see next page). The same wiper carries the circuit for stepping to the 2nd extra ball, and 3rd extra ball.

For a complete circuit to the top of the unit, wiper D completes a circuit thru wire No. 53-5.

EXTRA BALL UNIT viewed from BUTTON or WIPER side

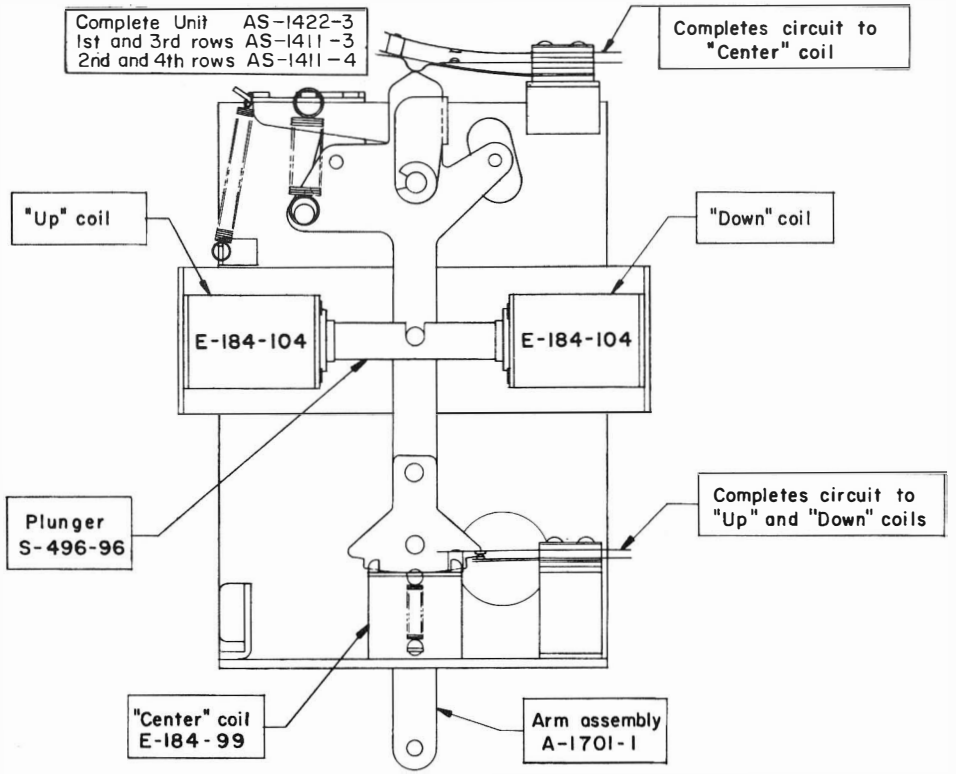
10 step unit. Wipers shown in zero or reset position



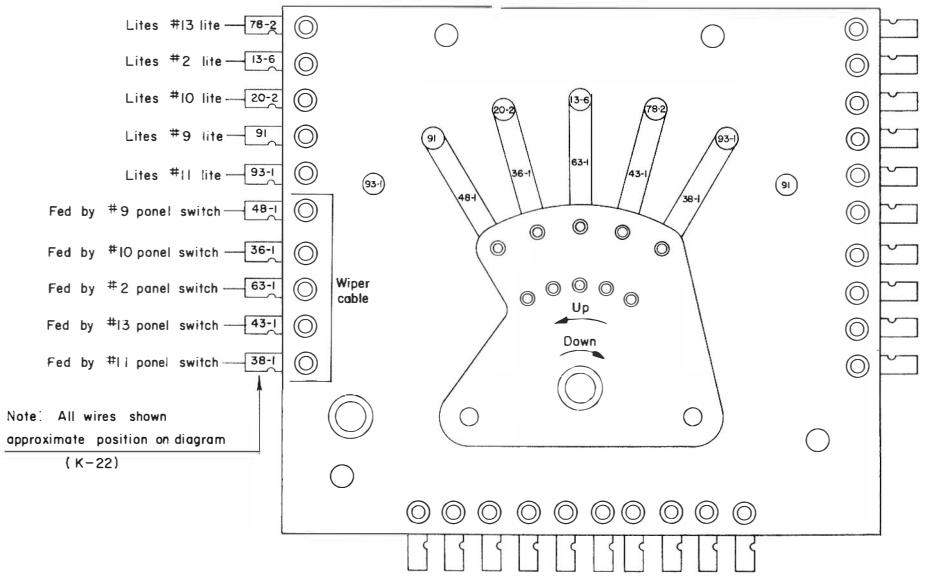
SHIFT UNIT (1st ROW) viewed from COIL side

All 4 Shift Units are exactly alike from coil side

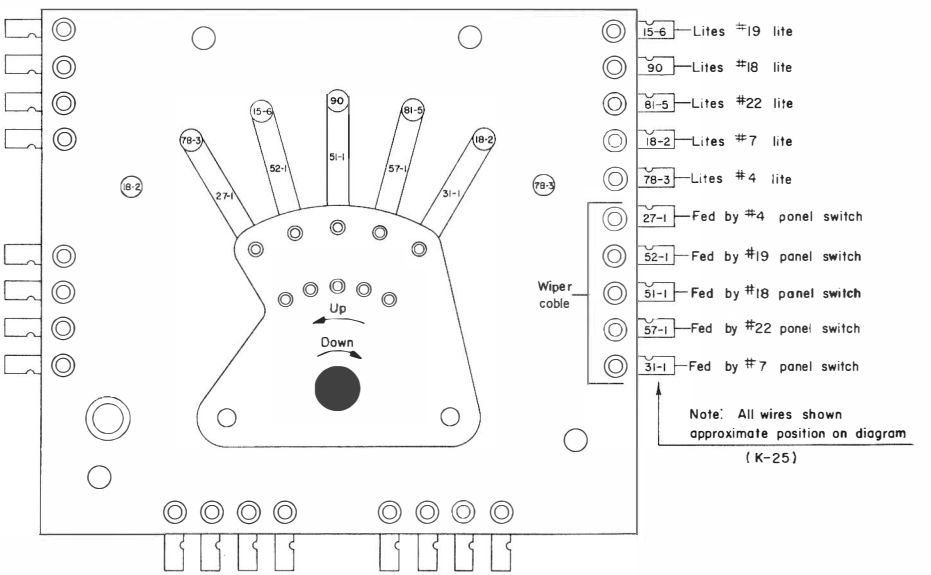
All Coils and Switches shown approximate position on Diagram B-24



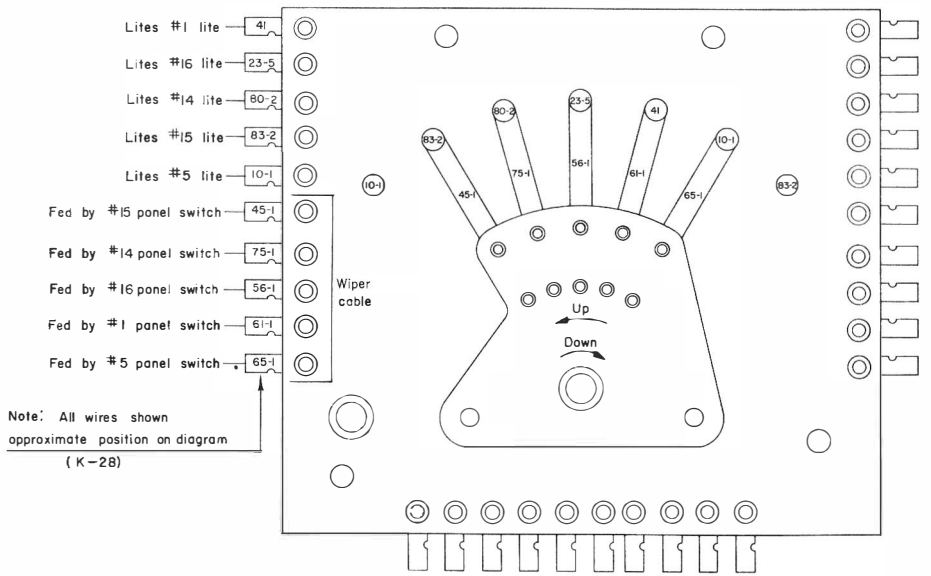
SHIFT UNIT (1st ROW) viewed from BUTTON or WIPER side



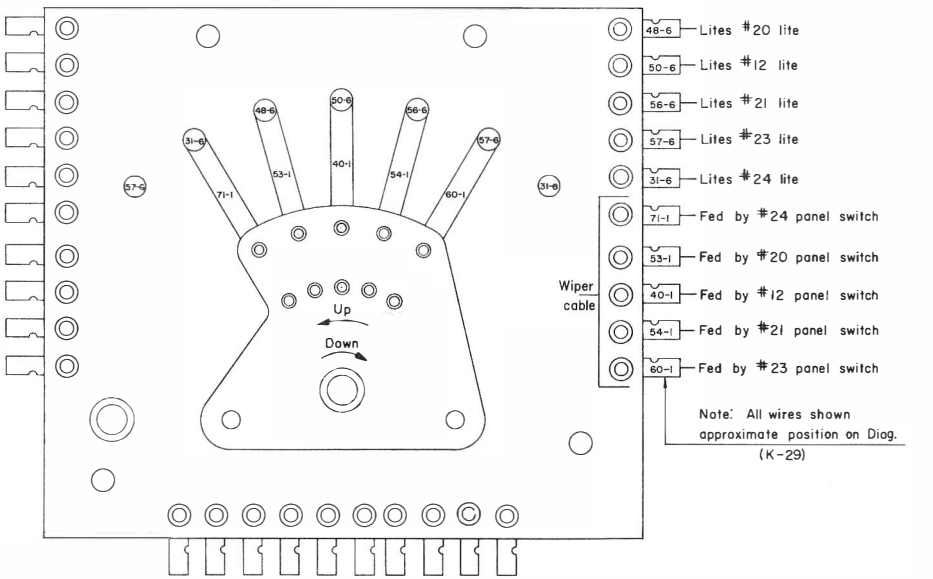
SHIFT UNIT (2nd ROW) viewed from BUTTON or WIPER side



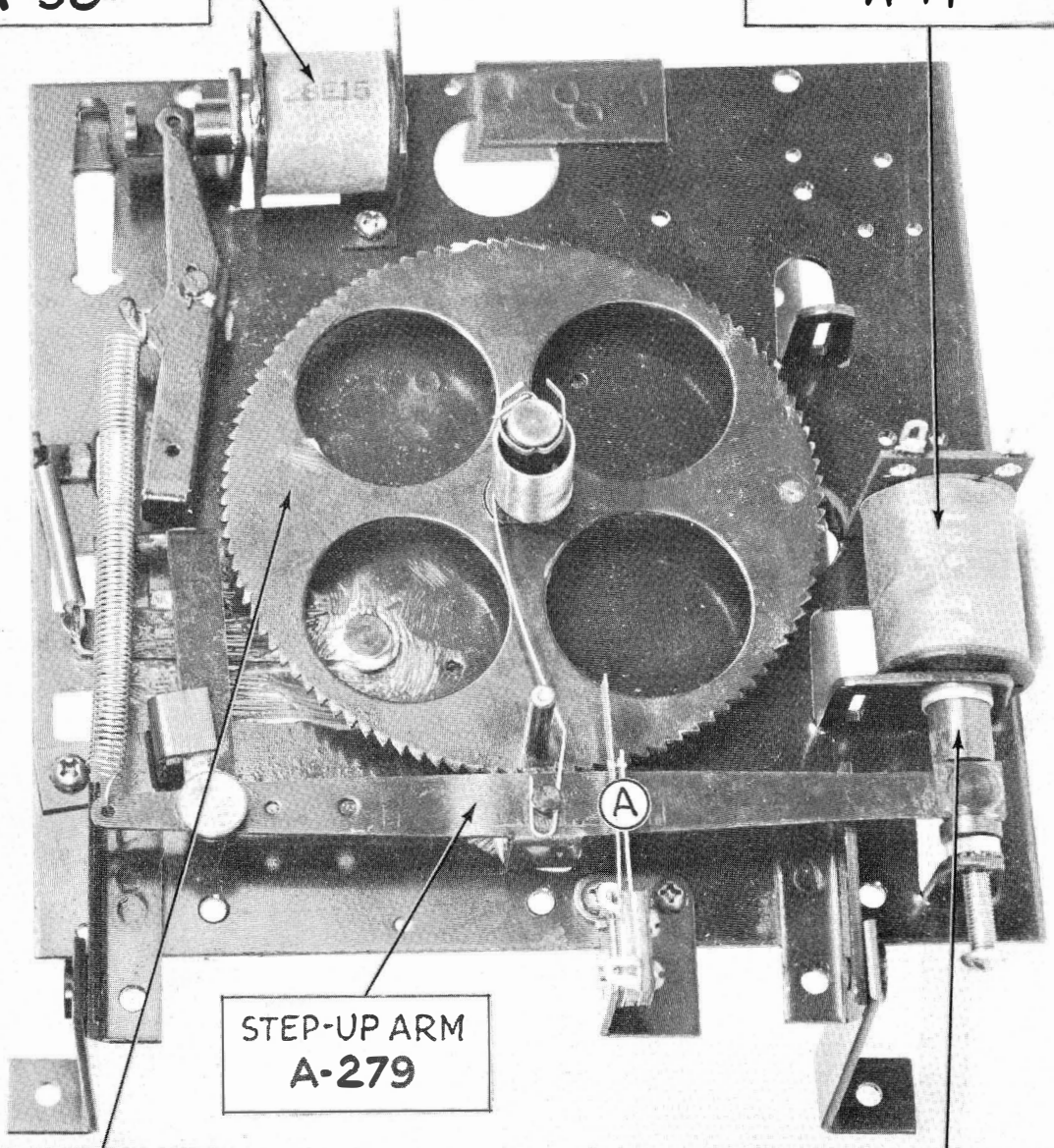
SHIFT UNIT (3rd ROW) viewed from BUTTON or WIPER side



SHIFT UNIT (4th ROW) viewed from BUTTON or WIPER side



REPLAY COUNTER viewed from COIL side



RESET COIL
CO-28-E-15
LOCATION ON DIAGRAM
A-38

COMPLETE UNIT
AS-797-29

STEP-UP COIL
E-184-76
LOCATION ON DIAGRAM
A-14

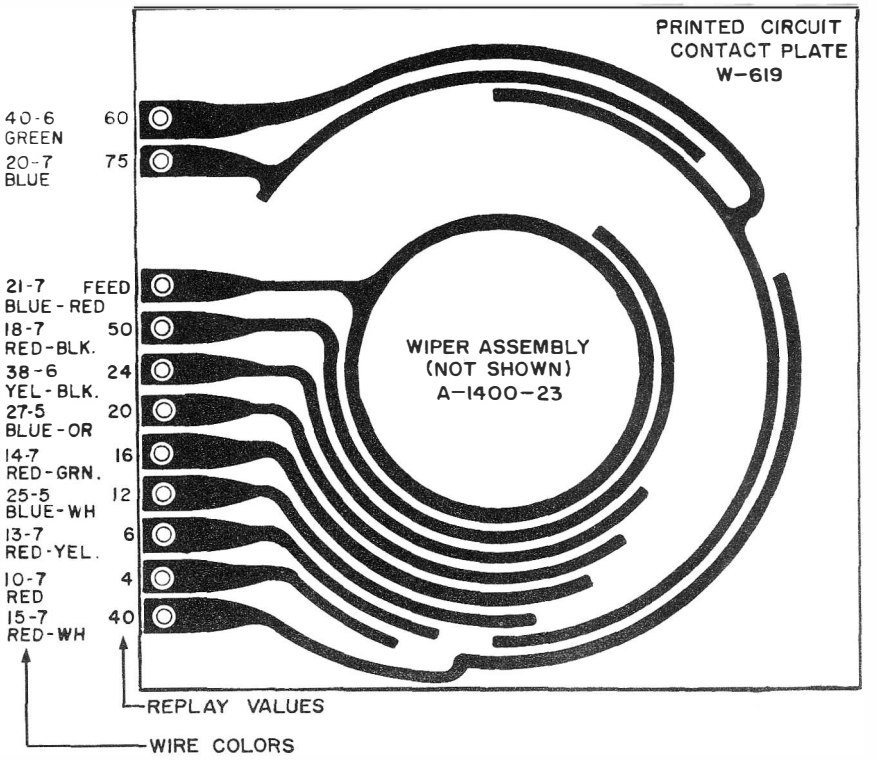
STEP-UP ARM
A-279

RATCHET & SHAFT
A-716-27

SWITCH (A)
LOCATION ON DIAGRAM
D-16
OPEN AT 96 STEPS

PLUNGER
S-496-85

REPLAY COUNTER viewed from WIPER side



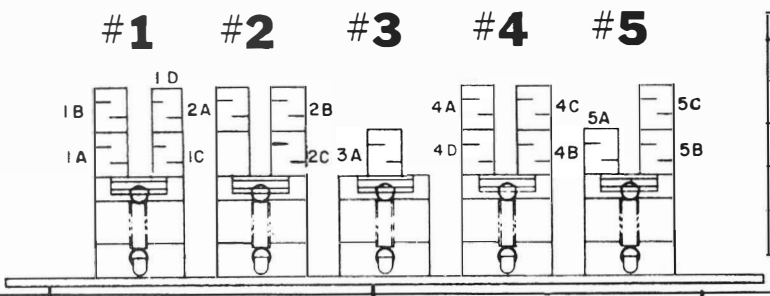
	CAM SWITCHES THAT PULSE REPLAY COUNTER STEP-UP COIL									
	SW. 13A	SW. 13A	SW. 12A	SW. 12A	SW. 11A	SW. 10A	SW. 11A	SW. 12A	SW. 10A	SW. 10A
5 IN LINE	96 (NOTE)	96 (NOTE)	100 (50)	120 (60)	150 (50)	160 (40)	180 (60)	192 (NOTE)	300 (75)	300 (75)
4 IN LINE	16 (16)	20 (20)	24 (12)	32 (16)	48 (16)	64 (16)	72 (24)	100 (50)	200 (50)	300 (75)
3 IN LINE	4 (4)	6 (6)	8 (8)	12 (6)	18 (6)	24 (6)	36 (12)	48 (24)	64 (16)	80 (20)

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 → 36 REPLAYS

THE CIRCUIT IS EFFECTIVE THRU THE → 12 REPLAY CIRCUIT STRIP

NOTE: 96 AND 192 VALUE REPLAY SCORES ARE EFFECTIVE THRU THE OPEN AT 96 SWITCH.



RELAY	COIL	ARMATURE
#1	C-2342-88	Z-44-29
#2	C-2342-59	Z-44-29
#3	C-2342-59	Z-44-12
#4	C-2342-88	Z-44-29
#5	C-2342-59	Z-44-29

Corner Scores

Thru

Switch no	Wire no's & color
3A	18-4 red-black 50-3 white
2A	50-3 white 56-3 white-brown
4D	56-3 white-brown 75-7 orange-white
1D	75-7 orange-white 23-4 blue-yellow

3 in line scores

Thru

Switch no	Wire no's & color
3A	18-4 red-black 50-3 white
2B	50-3 white 51-3 white-red
1B	51-3 white-red 54-3 white-green
3A	18-4 red-black 50-3 white
2B	50-3 white 51-3 white-red
4B	51-3 white-red 54-3 white-green
3A	18-4 red-black 50-3 white
4A	50-3 white 52-3 white-blue
5A	52-3 white-blue 54-3 white-green

4 in line scores

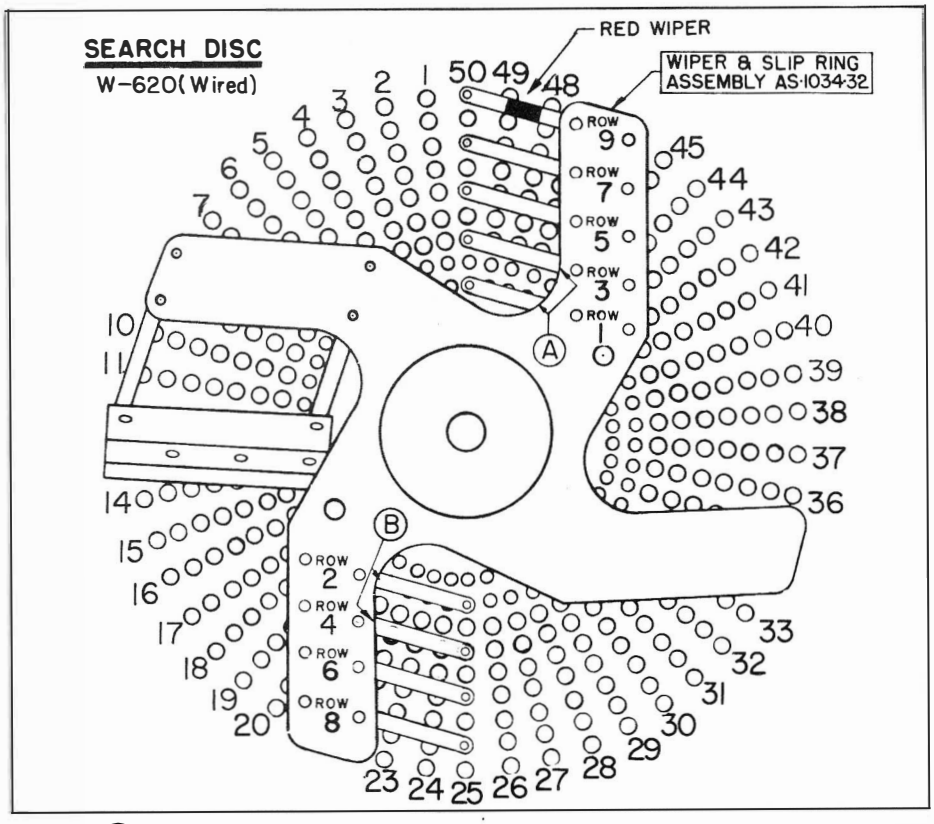
Thru

Switch no	Wire no's & color
3A	18-4 red-black 50-3 white
2C	50-3 white 74-7 orange-green
4C	74-7 orange-green 53-3 white-yellow
1A	53-3 white-yellow 71-3 orange-red
3A	18-4 red-black 50-3 white
2C	50-3 white 74-7 orange-green
4C	74-7 orange-green 53-3 white-yellow
5B	53-3 white-yellow 71-3 orange-red

5 in line scores

Thru

Switch no	Wire no's & color
3A	18-4 red-black 50-3 white
2A	50-3 white 56-3 white-brown
4D	56-3 white-brown 75-7 orange-white
5C	75-7 orange-white 57-3 white-orange
1C	57-3 white-orange 61-3 brown-red

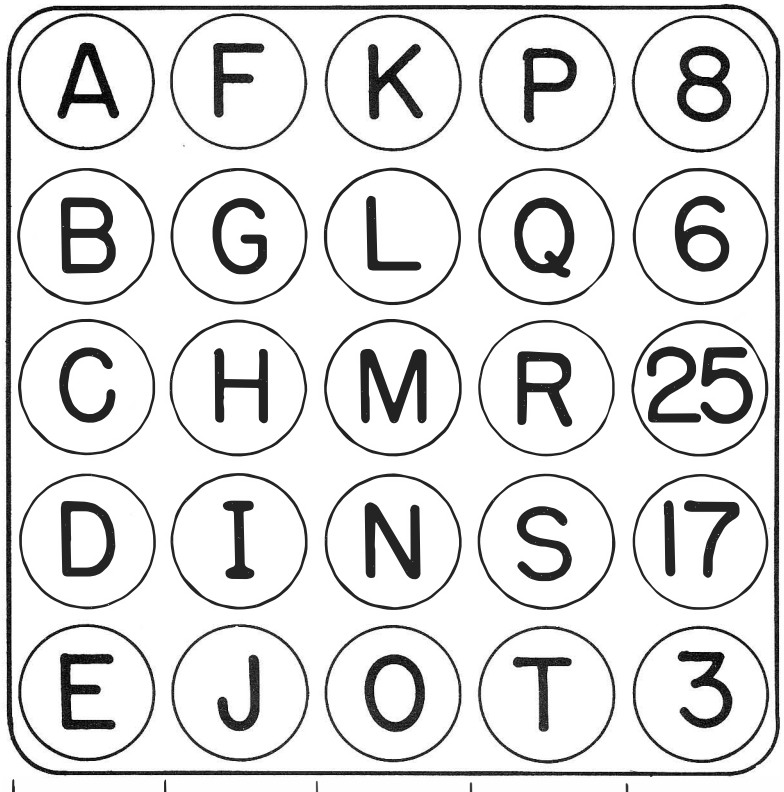


WIPERS (A) FED BY WIRE 80 (ON DIAG. C-15) THRU FEED WIPER. COMPLETES CIRCUIT TO SEARCH INDEX COIL AND REPLAY COUNTER STEP-UP COIL, WHEN SCORING REPLAYS.

WIPERS (B) (ON DIAG. F-14) COMPLETES CIRCUIT TO SCORE 4 IN LINE SCORES — FOR 3 IN LINE, WHEN "RED" OR "YELLOW" RELAYS ARE TRIPPED.

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

CENTER CARD WINDOWS



1st ROW	2nd ROW	3rd ROW	4th ROW

WINDOW	1st ROW SHIFT		
	UP	CENTER	DOWN
A	10	9	11
B	2	10	9
C	13	2	10
D	11	13	2
E	9	11	13

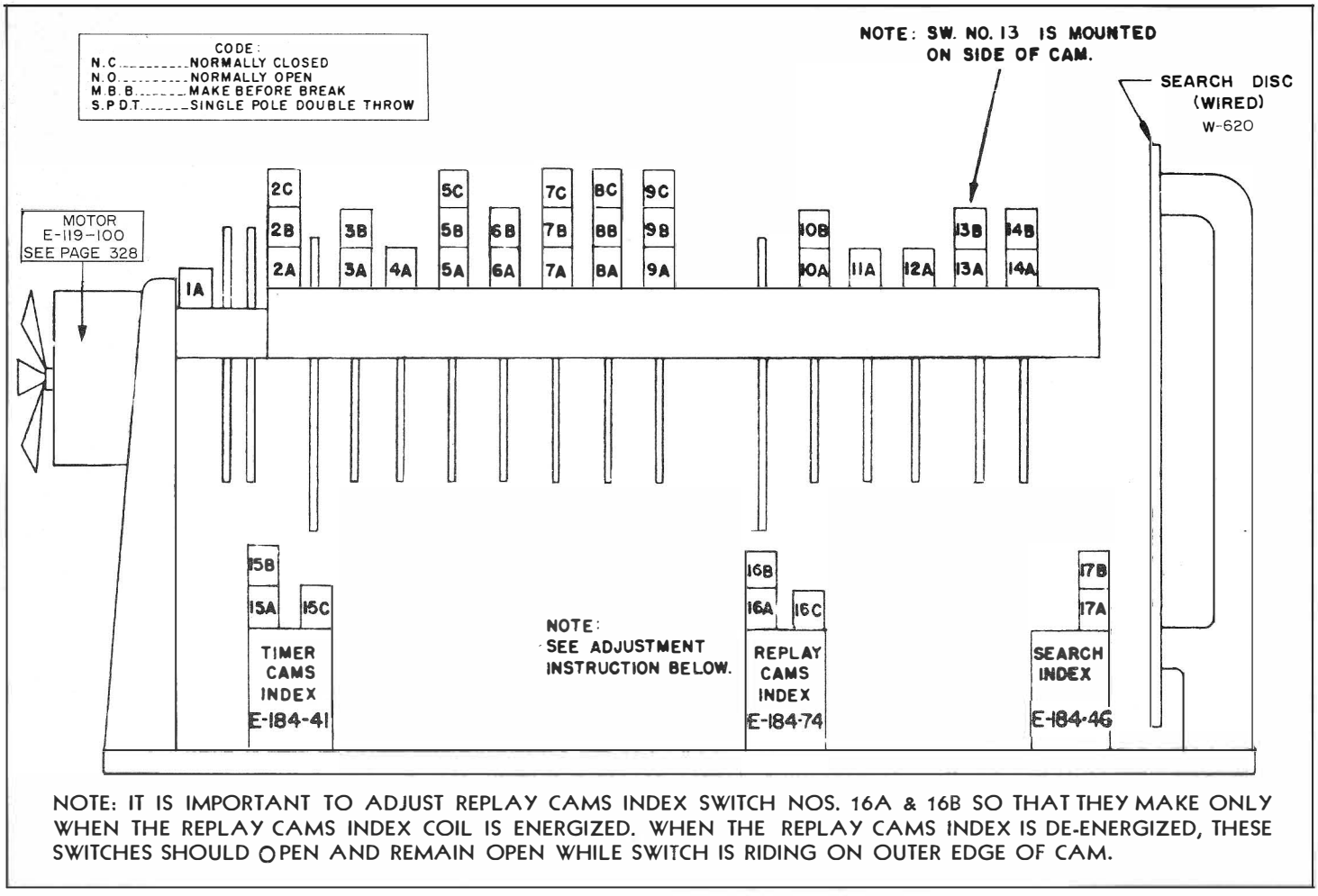
WINDOW	2nd ROW SHIFT		
	UP	CENTER	DOWN
F	19	4	7
G	18	19	4
H	22	18	19
I	7	22	18
J	4	7	22

WINDOW	3rd ROW SHIFT		
	UP	CENTER	DOWN
K	14	15	5
L	16	14	15
M	1	16	14
N	5	1	16
O	15	5	1

WINDOW	4th ROW SHIFT		
	UP	CENTER	DOWN
P	20	24	23
Q	12	20	24
R	21	12	20
S	23	21	12
T	24	23	21

CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



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

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

NOTICE: IMPORTANT PART OF ILLUSTRATION IS TO SHOW THAT SWITCH 13 CLOSES 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.

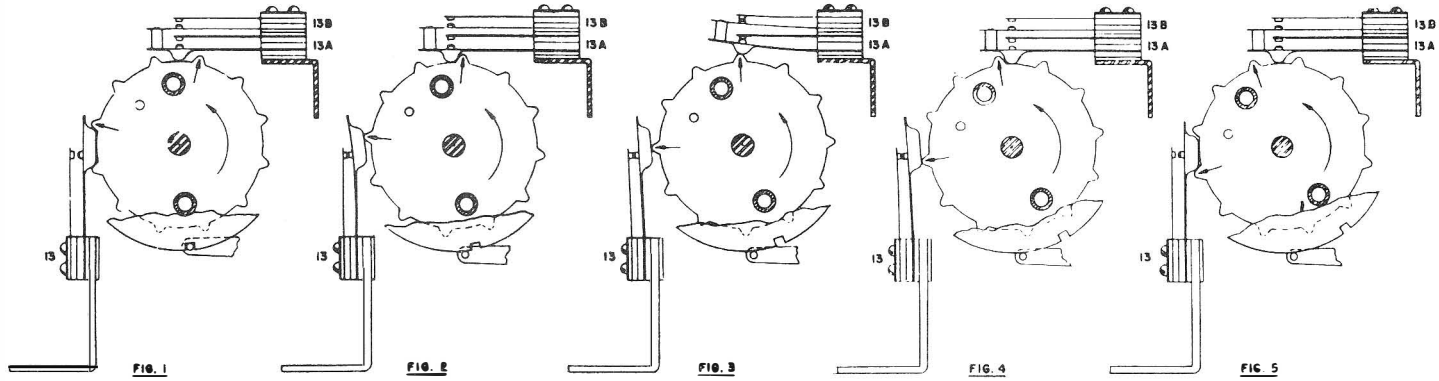


FIG. 1

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.

FIG. 2

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.

FIG. 3

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

FIG. 4

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

FIG. 5

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

CONTROL 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.	F-10	65-2 36-10	Brown-White Yellow-Brown	Energizes timer step-up coil, when drag arm switch, selector lock relay switch and cam switch #14B are closed.
2A N.O.	I-5	90-5 30	Gray Yellow	Energizes reflex play magnet, and replay register reset.
2B N.O.	C-36	93-4 30	Gray-Yellow Yellow	Energizes coin kicker magnet.
2C N.C.	G-11	31-7 74-2	Yellow-Red Orange-Green	Drops out extra ball play relay.
3A N.C.	I-6	83-3 48-2	Black-Yellow Green-Black	Drops out start relay and acts as safety switch during spin.
3B S.P.D.T.	C-6	93-10 98-10 91-10	Gray-Yellow Gray-Black Gray-Red	Directs circuit to replay meter or total plays meter.
4A N.O.	C-40	98-1 30	Gray-Black Yellow	Energizes score extra step index and control unit spotting index.
5A N.O.	F-9	65-2 71-9	Brown-White Orange-Red	Energizes timer reset coil.
5B N.O.	B-18	38-4 21-1	Yellow-Black Blue-Red	Energizes extra ball unit step-up coil. Steps unit from minus one position to zero position.
5C N.O.	D-37	78-4 30	Orange-Black Yellow	Energizes anti-cheat relay.
6A N.C.	C-20	43-8 25-3	Green-Yellow Blue-White	Score extra step safety switch.
6B N.C.	H-30	83 45-2	Black-Yellow Green-White	Opens game advantage circuits during timing cycle.
7A N.O.	C-21	45-6 80-7	Green-White Black	Energizes 3-in-line yellow or 3-in-line red scores 4-in-line relays, thru alt. control unit cam switch #9C.
7B N.O.	C-20	18 52-9	Red-Black White-Blue	Score unit steps.
7C N.O.	C-35	93-4 30	Gray-Yellow Yellow	(Safety switch) energizes coin kicker magnet.
8A N.O.	B-29	23-2 50-8	Blue-Yellow White	"Magic lines" unit steps.
8B N.O.	D-30	14-8 63-3	Red-Green Brown-Yellow	Energizes "magic pockets" relay, when circuit is complete thru all other factors.
8C N.O.	B-19	25-4 38-4	Blue-White Yellow-Black	Extra ball unit steps.
9A Alt.	C-20	71 43-8	Orange-Red Green-Yellow	Opens score extra step circuit every other time.
9B Alt.	D-29	10-4 14-8	Red Red-Green	Opens "magic lines" single step circuit every other time.
9C S.P.D.T.	B-21	15-5 53-6 93-5	Red-White White-Yellow Gray-Yellow	Completes circuit to "3-in-yellow" scores 4-in-line, or "3-in-line red" scores 4-in-line relays.

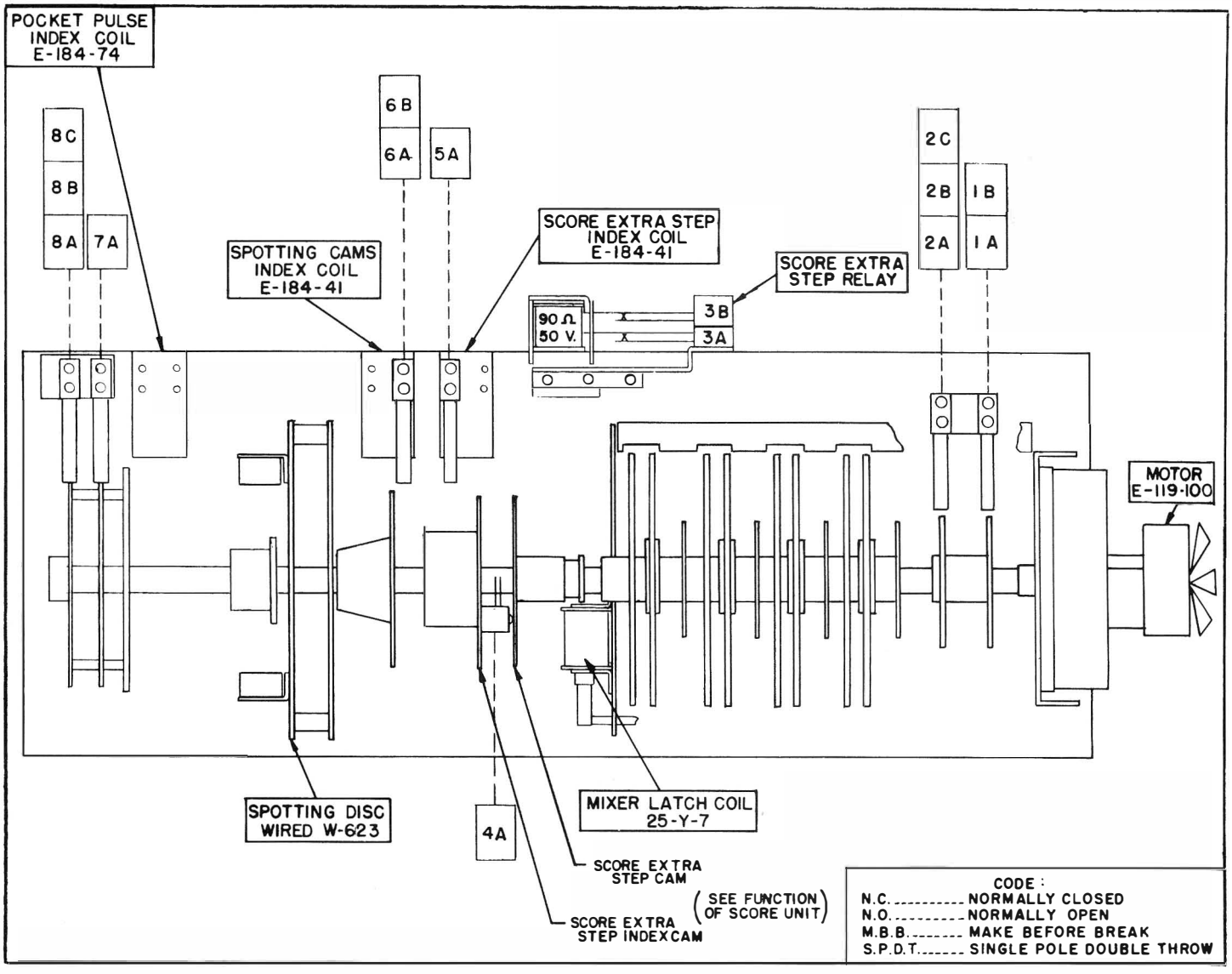
CONTINUED ON NEXT PAGE

CONTROL UNIT SWITCH CHART — CONCLUDED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
10A N.O.	B-16	54-8 93-8	White-Green Gray-Yellow	Pulses replay counter, when score unit is at 8th step.
10B N.O.	B-16	38-8 53-10	Yellow-Black White-Yellow	Pulses "corners" replay counter.
11A N.O.	B-15	54-8 91-8	White-Green Gray-Red	Pulses replay counter, when score unit is at 5th and 6th steps.
12A N.O.	B-15	54-8 90-8	White-Green Gray	Pulses replay counter, when score unit is at 3rd, 4th and 7th steps.
13A N.O.	B-14	54-8 81-8	White-Green Black-Red	Pulses replay counter, when score unit is at 1st and 2nd steps.
13B N.O.	B-13	48-4 80	Green-Black Black	Pulses replay register step-up coil, and reflex replay magnet.
13 N.O. (Backside)	H-13	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch. NOTE: See control unit pictorial view.
14A N.C.	I-15	56-7 93	White-Brown Gray-Yellow	Prevent the start of another replay scoring until cams are indexed.
14B N.C.	B-9	27-2 90-9	Blue-Orange Gray	Opens circuit to timer step-up coil, during replay winner.
TIMER CAMS INDEX COIL	A-8	93-2 70	Gray-Yellow Orange	Energized by switches on start and extra ball play relay. Also thru shutter motor cam switch #5C.
15A N.O.	G-2	20-P 60-P	Blue (Plastic) Brown (Plastic)	Operates control unit and mixer and spotting motors.
15B N.C.	G-7	14-9 71-2	Red-Green Orange-Red	Opens circuit to coin lockout magnet during spin.
15C S.P.D.T.	C-10	52-6 13 74-2	White-Blue Red-Yellow Orange-Green	Lock in safety switch for extra ball play relay.
REPLAY CAMS INDEX COIL	A-13	40-4 70	Green Orange	Energizes when winning score is made and releases replay cams.
16A N.O.	E-13	27 80	Blue-Orange Black	In series with replay lock in circuit. NOTE: See control unit pictorial view for correct adj.
16B N.O.	I-14	56-7 93	White-Brown Gray-Yellow	In series with replay winner circuit. NOTE: See control unit pictorial view for correct adj.
16C N.C.	C-12	15-2 80	Red-White Black	Opens direct 50 volt circuit to search index coil, coil then held in thru resistor.
SEARCH INDEX COIL	A-12	15-2 70	Red-White Orange	Energizes when 3-in-line or more is scored.
17A N.O.	B-13	40-4 80	Green Black	Energizes replay cams index if a score is made.
17B N.C.	J-6	83-3 30	Black-Yellow Yellow	Opens start circuit and also acts as safety switch.

MIXER AND SPOTTING UNIT ASSEMBLY PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



MIXER AND SPOTTING UNIT SWITCH CHART

FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	E-5	53-9 75-2	White-Yellow Orange-White	Pulse switch for operating replay register reset, and when replay relay is energized.
1B	N.O.	B-31	50-8 21	White Blue-Red	Pulse switch for multiple steps of "magic lines " unit.
2A	N.O.	K-4	71-5 60-5	Orange-Red Brown	Flashes "turn knobs now" lite and "press buttons now" lite.
2B	N.O.	B-17	78 38-4	Orange-Black Yellow-Black	Steps extra ball unit for multiple steps.
2C	N.O.	D-17	31-5 85-7	Yellow-Red Black-White	Steps corners replay counter to its zero position. (In series with corners unit homing switch.)

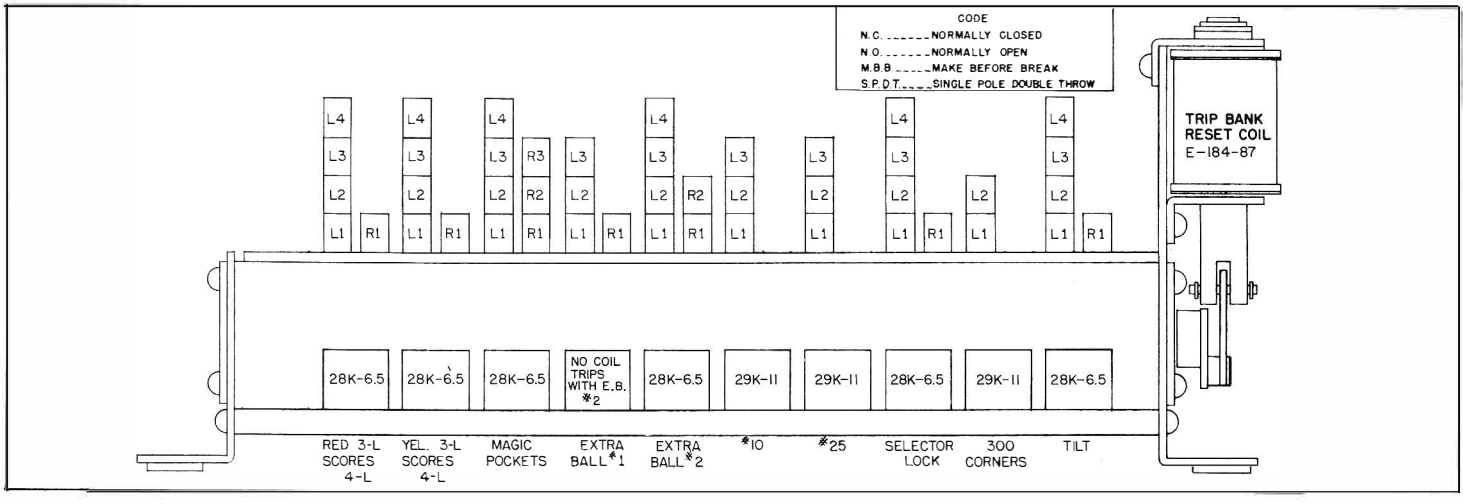
CONCLUDED ON NEXT PAGE

MIXER AND SPOTTING UNIT SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SCORE EXTRA STEP RELAY COIL	A-35	43-6 70	Green-Yellow Orange	Energized by score unit step-up arm switch.
3A N.O.	F-34	43-6 81-1	Green-Yellow Black-Red	Completes lock-in circuit to score extra step relay.
3B N.O.	B-20	52-9 40-5	White-Blue Green	Completes circuit to score unit for multiple steps.
4A N.O.	C-20	40-5 25-3	Green Blue-White	Pulse switch for multiple steps of score unit.
SCORE EXTRA STEP INDEX COIL	A-39	98-1 70	Gray-Black Orange	Energized during timing cam cycle by control unit cam switch #4A.
5A N.O.	G-34	75-5 81-1	Orange-White Black-Red	Completes lock-in circuit to score extra step relay.
SPOTTING CAM INDEX COIL	A-39	98-1 70	Gray-Black Orange	Energized during timing cam cycle by control unit cam switch #4A.
6A N.O.	J-7	30 83-4	Yellow Black-Yellow	Completes flash circuit for "magic pocket" feature lites and "magic line" feature lites, also for spot #10 and #25 and 3-L red and 3-L yellow, scores 4-L lites.
6B N.O.	J-13	30 13-4	Yellow Red-Yellow	Completes flash circuit for score lites and corners lites also for extra ball lites.
7A S.P.D.T.	G-28	13-2 21-3 90-4	Red-Yellow Blue-Red Gray	Homes pocket pulse index cams to correct index position.
8A N.C.	H-2	10-P 20-P	Red (Plastic) Blue (Plastic)	Safety switch for "move left" and "move right" solenoids.
8B N.C.	L-22	14-10 60-4	Red-Green Brown	Safety switch for #2 and #6 booster coils.
8C N.C.	C-27	18-8 21-3	Red-Black Blue-Red	Lock-in switch for "left" and "right" relays.

TRIP RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Red 3-L Scores 4-L Trip Coil	A-21	15-5 70	Red-White Orange	Energized by control unit cam switch #7, when circuit is complete thru all other factors.
L1 N.O.	K-5	27-4 30	Blue-Orange Yellow	Lites "red 3-in-line scores 4-in-line" feature lite.
L2 N.C.	C-21	14-1 13-10	Red-Green Red-Yellow	Proportioning switch.
L3 N.O.	F-15	41-3 71-3	Green-Red Orange-Red	Completes circuit to replay counter, for red 3-in-line scores 4-in-line scoring.
L4 N.C.	C-21	53 81-2	White-Yellow Black-Red	Proportioning switch for scores, and extra ball steps.
R1 N.C.	G-32	74-5 80-6	Orange-Green Black	Proportioning switch for "magic pockets" feature, and "magic lines" feature steps.
Yellow 3-L Scores 4-L Trip Coil	A-21	93-5 70	Gray-Yellow Orange	Energized by control unit cam switch #7, when circuit is complete thru all other factors.
L1 N.O.	K-6	43-4 30	Green-Yellow Yellow	Lites "yellow 3-in-line scores 4-in-line" feature lite.
L2 N.C.	B-21	13-10 53-6	Red-Yellow White-Yellow	Proportioning switch.
L3 N.O.	G-15	71-3 85-4	Orange-Red Black-White	Completes circuit to replay counter, for "yellow 3-in-line scores 4-in-line" scoring.
L4 N.C.	B-21	52-9 53	White-Blue White-Yellow	Proportioning switch for scores, and extra ball steps.
R1 N.C.	G-31	74-5 83	Orange-Green Black-Yellow	Proportioning switch for "magic pockets" feature and "magic lines" feature steps.
Magic Pockets Trip Coil	A-32	13-1 70	Red-Yellow Orange	Energized by control unit cam switch #8B, when spotting disc wipers stop on correct position.
L1 N.O.	J-5	14-2 30	Red-Green Yellow	Lites "magic pockets" feature lite.
L2 N.C.	E-31	10-3 21	Red Blue-Red	Proportioning switch for "magic lines" feature steps.
L3 N.C.	D-34	18-6 98-2	Red-Black Gray-Black	Proportioning switch for "300 corners" feature.
L4 N.C.	E-30	41-7 43-7	Green-Red Green-Yellow	Proportioning switch for "magic lines" feature steps.
R1 N.O.	L-3	53-2 60-5	White-Yellow Brown	Completes circuit to flash "turn knobs now" lite at 4th step of timer unit.
R2 N.O.	F-27	48-3 51-2	Green-Black White-Red	Proportioning switch.
R3 N.C.	H-22	36-8 78-5	Yellow-Brown Orange-Black	Proportioning switch for scores and extra balls.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Extra Ball #1				
L1 N.O.	D-12	38-3 91-1	Yellow-Black Gray-Red	Completes circuit to ball lifter motor, when playing for extra balls.
L2 S.P.D.T.	H-29	75-5 65-4 45-2	Orange-White Brown-White Green-White	Extra ball proportioning switch.
L3 S.P.D.T.	H-31	83 43-3 14-4	Black-Yellow Green-Yellow Red-Green	Proportioning switch.
R1 N.O.	F-22	48-8 80-3	Green-Black Black	Extra ball proportioning switch.
Extra Ball #2 Trip Coil	A-10	25-7 70	Blue-White Orange	Energized by switch on extra ball play button (yellow).
L1 S.P.D.T.	E-19	71 30 61-2	Orange-Red Yellow Brown-Red	Shuts off score multiple step circuit, and completes circuit to step extra ball unit from minus one to zero position.
L2 N.C.	B-10	25-7 52-6	Blue-White White-Blue	Breaks circuit to this coil.
L3 S.P.D.T.	G-20	65-3 80-3 78-1	Brown-White Black Orange-Black	Shuts off score advantages and completes circuit to extra ball steps during extra ball play.
L4 S.P.D.T.	K-13	30-5 13-4 74	Yellow Red-Yellow Orange-Green	Shuts off flashing of score lites and completes circuit to flash extra ball lites.
R1 N.C.	G-30	45-2 81-6	Green-White Black-Red	Breaks circuit to all other game advantages when playing for extra balls.
R2 N.C.	K-6	36-5 83-4	Yellow-Brown Black-Yellow	Breaks flash circuit to "magic lines" feature and "magic pockets" feature lites.
#10 Trip Coil	A-33	98-5 70	Gray-Black Orange	Energized by control unit cam switch #8B, when spotting disc wipers stop on correct position.
L1 N.O.	J-20	36-1 30	Brown-Yellow Yellow	Lites #10 in 1st row of card.
L2 N.O.	K-3	85-1 30	Black-White Yellow	Lites "spotted #10 feature" lite.
L3 N.C.	I-22	23-3 36-8	Blue-Yellow Yellow-Brown	Proportioning switch for score and extra ball steps.
#25 Trip Coil	A-33	91-7 70	Gray-Red Orange	Energized by control unit cam switch #8B, when spotting disc wipers stop on correct position.
L1 N.O.	J-30	74-1 30	Orange-Green Yellow	Lites #25 in 5th row of card.
L2 N.O.	K-3	40-3 30	Green Yellow	Lites "spotted #25 feature" lite.
L3 N.C.	I-22	23-2 65-4	Blue-Yellow Brown-White	Proportioning switch for score and extra ball steps.

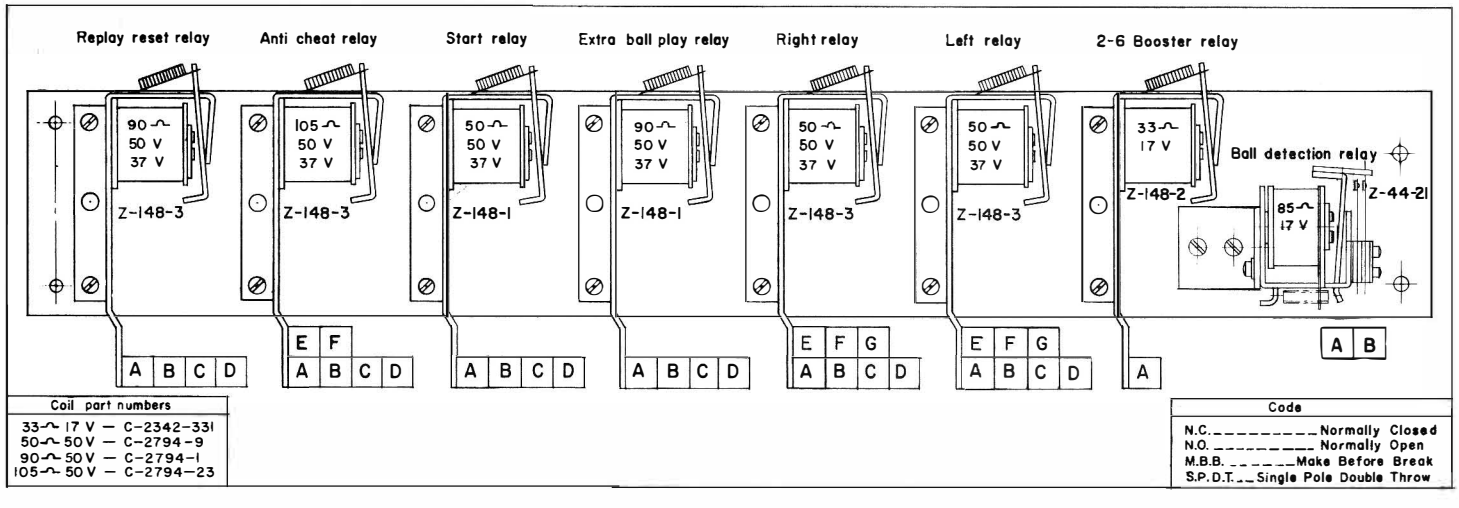
CONCLUDED ON NEXT PAGE

TRIP RELAY BANK CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
Selector Lock Trip Coil	A-8	98 70	Gray-Black Orange	Energized at 4th step of timer unit.
L1 N.O.	E-10	52-6 91-2	White-Blue Gray-Red	Completes circuit to energize extra ball play relay.
L2 N.C.	H-23	21-3 60-6	Blue-Red Brown	Opens circuit to shift unit coils.
L3 N.O.	I-15	18-4 56-7	Red-Black White-Brown	Completes replay circuit when relay is tripped.
L4 N.C.	K-3	61-7 71-5	Brown-Red Orange-Red	Shuts off "turn knobs now" lite.
R1 N.O.	D-9	27-2 78-6	Blue-Orange Orange-Black	Completes circuit to timer step-up coil thru control unit cam switch #1A.
300 Corners Trip Relay	A-34	61-4 70	Brown-Red Orange	Energized by control unit cam switch #8B, when circuit is complete thru all other factors.
L1 N.O.	J-10	90-6 30	Gray Yellow	Completes circuit to lite "300" corners lite.
L2 N.O.	F-16	14 23-4	Red-Green Blue-Yellow	Completes circuit to "corner" replay counter step-up coil for scoring.
Tilt Trip Coil	A-11	14-5 70	Red-Green Orange	Energized by any tilt switch or plumb bob.
L1 S.P.D.T.	I-8	21-3 30 36-4	Blue-Red Yellow Yellow-Brown	Breaks circuit to ball counting extra ball, replay and button circuits. Completes circuit to shutter motor when game is tilted.
L2 N.C.	M-21	20-4 10	Blue Red	Opens 17 volt circuit.
L3 N.C.	F-3	20-P 60-P	Blue (Plastic) Brown (Plastic)	Opens circuit to control unit and mixer unit motors.
L4 S.P.D.T.	M-19	38 81 41-9	Yellow-Black Black-Red Red-Green	Shuts off 6 volt circuit and lites tilt lite.
R1 N.C.	B-12	14-5 14-5	Red-Green Red-Green	Breaks circuit to this coil.

8 RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY RESET RELAY COIL	A-6	75-2 70	Orange-White Orange	Energizes when replays are cancelled by push button or if anti-cheat relay drops out.
A S.P.D.T.	D-5	90-5 13-9 53-2	Gray Red-Yellow White-Yellow	Directs circuit to replay meter during replay cancel.
B N.O.	G-2	20-P 60-P	Blue (Plastic) Brown(Plastic)	Energizes control unit motor.
C N.O.	F-5	56-2 75-2	White-Brown Orange-White	Lock-in switch for this relay.
D N.C.	C-6	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
ANTI-CHEAT RELAY COIL	A-38	78-4 70	Orange-Black Orange	Energized thru cam switch #5C, its switches protect replay and light circuits.
A N.O.	M-19	54-7 38	White-Green Yellow-Black	Opens 6 volt circuit to lites, when this relay drops out.
B N.O.	L-20	20-4 80-1	Blue Black	Opens 17 volt circuit when this relay drops out.
C N.O.	B-38	30 78-4	Yellow Orange-Black	Lock-in switch for this relay.
D N.O.	B-11	13 93-6	Red-Yellow Gray-Yellow	Completes circuit to extra ball play relay.
E N.C.	G-6	56-2 75-2	White-Brown Orange-White	Energizes replay reset relay when this relay drops out.
F N.O.	H-6	56-2 50-2	White-Brown White	Completes circuit to start relay.
START RELAY COIL	A-6	21-6 70	Blue-Red Orange	Energizes every time a coin is played or when a red or yellow button is pressed.
A N.C.	F-28	81-6 14-8	Black-Red Red-Green	Opens circuit to game advantage circuits.
B N.C.	B-19	75-6 78	Orange-White Orange-Black	Opens circuit to extra ball step-up coil during spin of control unit.
C N.O.	E-9	85 36-2	Black-White Yellow-Brown	Completes circuit to timer cam index coil.
D N.O.	H-6	48-2 63-2	Green-Black Brown-Yellow	Lock-in switch for this relay.
EXTRA BALL PLAY RELAY COIL	A-11	93-6 70	Gray-Yellow Orange	Energizes when yellow button is pressed.
A S.P.D.T.	E-4	13-3 36-2 93-2	Red-Yellow Yellow-Brown Gray-Yellow	Directs circuit to shutter motor, or to mixer latch, and timer cams index coils during extra ball play.
B N.O.	J-20	21-4 30	Blue-Red Yellow	Lites extra ball lite on back glass.
C N.O.	I-11	21-3 31-7	Blue-Red Yellow-Red	Lock-in switch for this relay.
D N.O.	G-6	50-2 63-2	White Brown-Yellow	Energizes start relay during extra ball play.

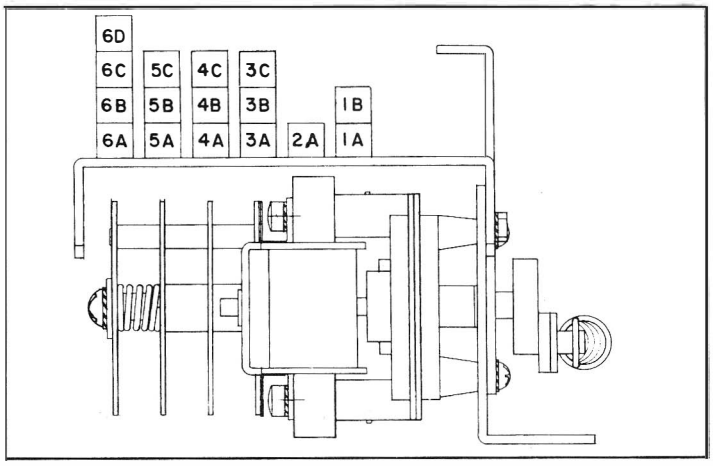
CONTINUED ON NEXT PAGE

8 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
RIGHT RELAY COIL	A-27	75 70	Orange-White Orange	Energized by "move right" button switch on front of game.
A N.C.	D-28	10-2 45-9	Red Green-White	Completes circuit to bring pocket pulse index cams to correct index position.
B N.O.	E-28	10-2 13-2	Red Red-Yellow	Completes circuit to "pocket pulse" index coil.
C N.O.	C-27	83 18	Black-Yellow Red-Black	Completes lock-in circuit to "move right" relay.
D N.O.	G-2	80-P 20-P	Black(Plastic) Blue (Plastic)	Completes circuit to "move right" solenoid.
E N.C.	B-27	81-7 41-3	Black-Red Green-Red	Breaks circuit to "move left" relay.
F N.O.	K-22	60-4 91-4	Brown Gray-Red	Completes circuit to #6 booster coil.
G N.O.	L-25	31-1 85-9	Yellow-Red Black-White	Completes circuit to #2-6 booster relay, thru #7 panel hole switch.
LEFT RELAY COIL	A-27	41-3 70	Green-Red Orange	Energized by "move left" button switch on front of game.
A N.C.	E-28	90-4 45-9	Gray Green-White	Completes circuit to bring pocket pulse index cams to correct index position.
B N.O.	D-28	10-2 13-2	Red Red-Yellow	Completes circuit to "pocket pulse" index coil.
C N.O.	C-27	81-7 18-2	Black-Red Red-Black	Completes lock-in circuit for "move left" relay.
D N.O.	H-1	30-P 20-P	Yellow (Plas.) Blue (Plastic)	Completes circuit to "move left" solenoid.
E N.C.	B-27	83-7 75	Black-Yellow Orange-White	Breaks circuit to "move right" relay.
F N.O.	K-22	98-4 60-4	Gray-Black Brown	Completes circuit to #2 booster coil.
G N.O.	L-25	61-1 85-9	Brown-Red Black-White	Completes circuit to #2-6 booster relay, thru #1 panel hole switch.
#2-6 BOOSTER RELAY COIL	M-25	85-9 10	Black-White Red	Energized by #1 or #7 panel hole switches, thru switch on left or right relays.
A N.O.	M-22	14-10 10	Green-Red Red	Completes circuit to #2 booster coil thru left relay switch, or to #6 booster coil thru right relay switch.
BALL DETECTION RELAY COIL	M-33	10 91-5	Red Gray-Red	Energized by panel hole switches #1, #2, #3, #4, #5, #6 and #7.
A N.O.	E-27	51-2 80-5	White-Red Black	Completes circuit to "move left" and "move right" relays.
B N.O.	C-28	30 74-4	Yellow Orange-Green	Completes circuit to "move right" relay when starting a new game.

SHUTTER MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



SEE LABEL ON MOTOR FOR MOTOR PART NO.

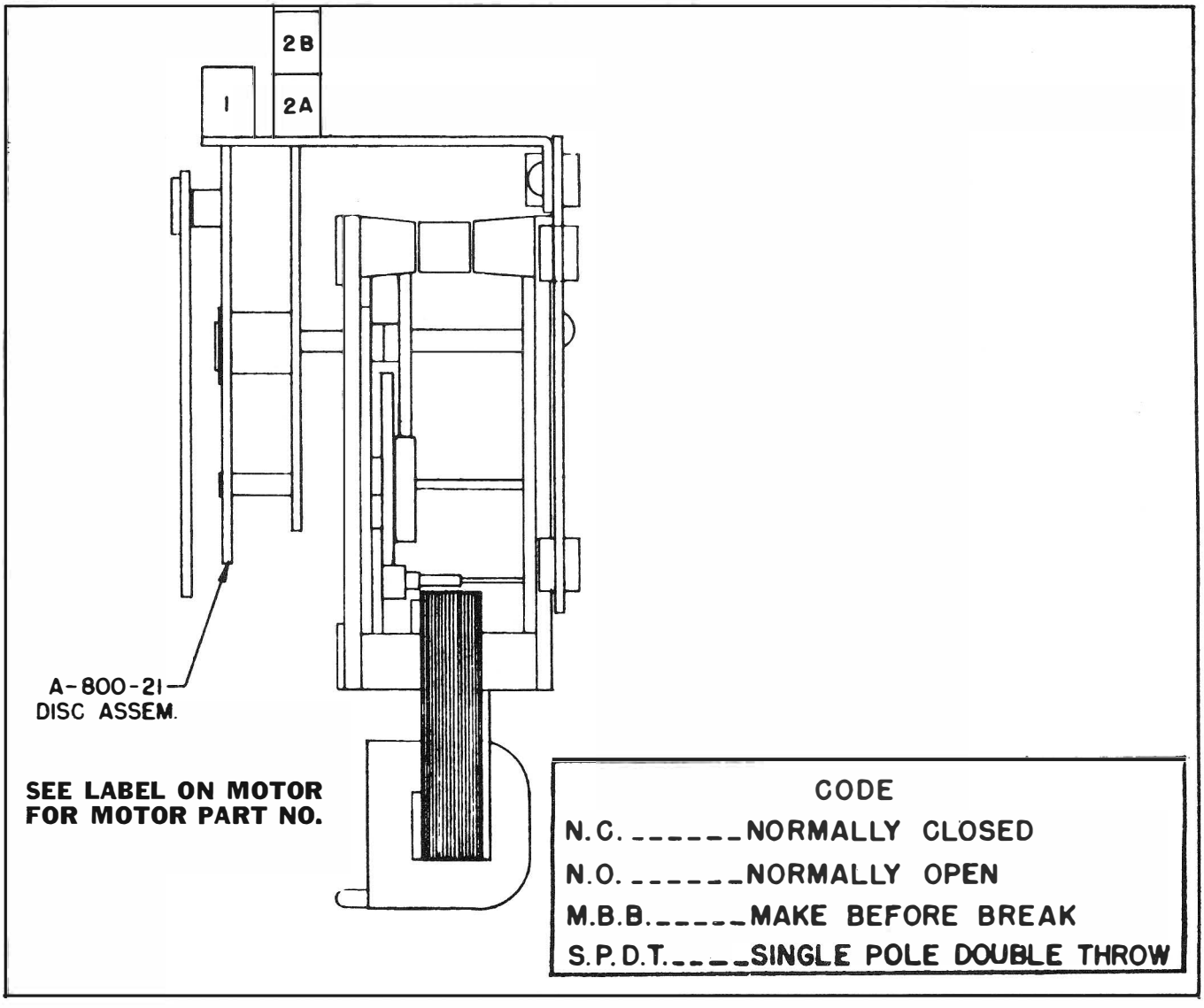
CODE

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		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.C.	I-14	93 21-3	Gray-Yellow Blue-Red	Completes circuit to replay scoring circuit.
1B	N.O.	F-8	30 14-3	Yellow Red-Green	Carry thru for shutter motor.
2A	N.C.	F-13	31-3 36-3	Yellow-Red Yellow-Brown	Completes circuit to ball lifer motor (closed normally) open during shutter cycle.
3A	N.O.	E-24	30 63	Yellow Brown-Yellow	Completes circuit to 2nd row shift latch coil.
3B	N.O.	H-3	20-P 70-P	Blue (Plastic) Brown (Plastic)	Resets trip relay bank.
3C	N.O.	E-26	30 91-6	Yellow Gray-Red	Completes circuit to 4th row shift latch coil.
4A	N.O.	F-8	18-3 14-3	Red-Black Red-Green	(Closed when shutter is open) Completes circuit to shutter motor.
4B	N.C.	G-24	83-1 60-6	Black-Yellow Brown	Opens circuit to left and right button switches, and 3rd and 4th magic line shift units when shutter is open.
4C	N.O.	H-8	36-4 18-3	Yellow-Brown Red-Black	Starts shutter motor if game is tilted when shutter is open
5A	N.O.	I-17	30 31-5	Yellow Yellow-Red	Completes circuit to step corners replay counter to reset position.
5B	N.C.	H-10	21-3 65-2	Blue-Red Brown-White	Safety switch for timer reset.
5C	S.P.D.T.	D-8	14-3 13-3 93-2	Red-Green Red-Yellow Gray-Yellow	Breaks circuit to shutter motor and makes circuit to timer index coil.
6A	N.O.	E-23	30 52	Yellow White-Blue	Completes circuit to 1st row shift latch coil.
6B	N.O.	G-9	30 71-9	Yellow Orange-Red	Completes circuit to timer reset coil.
6C	N.O.	E-25	30 98-6	Yellow Gray-Black	Completes circuit to 3rd row shift latch coil.
6D	N.O.	C-38	30 85-5	Yellow Black-White	Resets score, replay counter, extra ball, and magic line units.

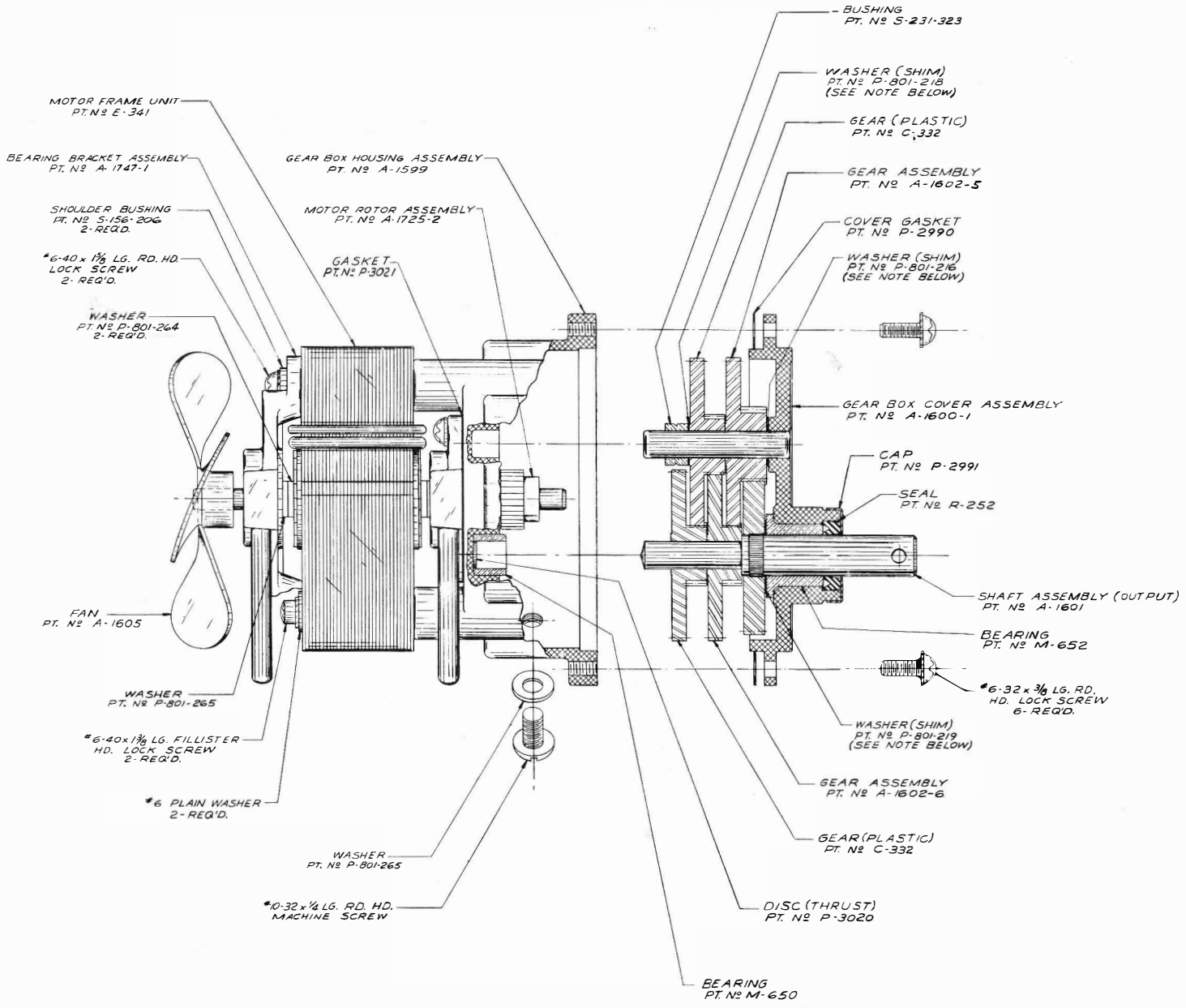


BALL LIFT MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART BELOW

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCH
1	N.O.	G-14	30 91-1	Yellow Grey-Red	Carry-over switch for ball lifter motor.
2A	N.O.	E-10	43-2 27-2	Green-Yellow Blue-Orange	Energizes timer unit step-up coil.
2B	N.O.	D-9	30 98-3	Yellow Gray-Black	Completes circuit to selector lock trip relay.

MOTOR ASSEMBLY (Part No. E-119-100)



NOTE

IN ORDER TO MAINTAIN PROPER CLEARANCES BETWEEN GEARS IT IS MOST IMORTANT THAT WHEN RE-ASSEMBLING GEAR TRAIN:

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