

Bally

Hi-Fi

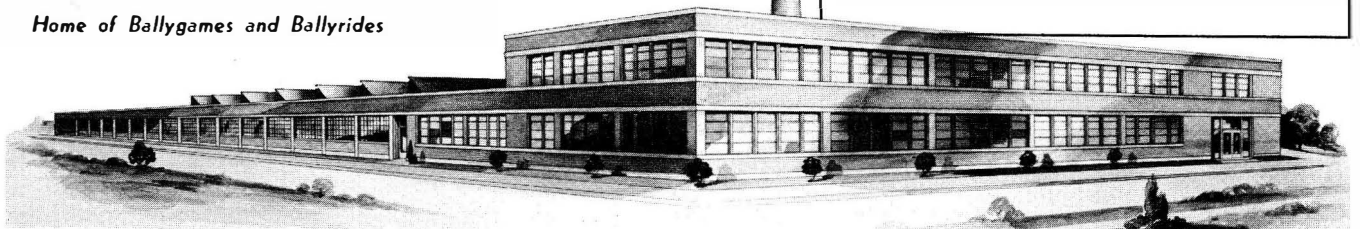
OPERATING INSTRUCTIONS

AND PARTS CATALOG

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

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

Home of Ballygames and Ballyrides



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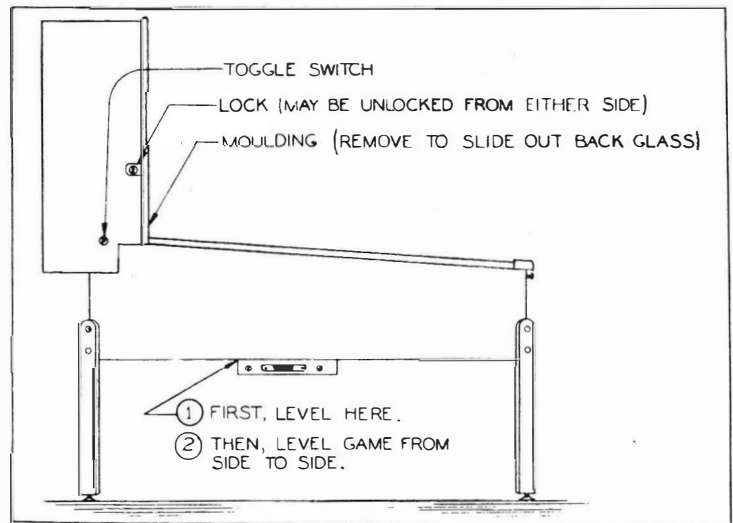
INSTALLATION AND GENERAL INSTRUCTIONS

Fasten 4 legs to cabinet with bolts and washers furnished. Place back-cabinet in position on front-cabinet. Unlock and open back-door and fasten back-cabinet to front-cabinet with bolts and washers furnished. (2 back-door locks are keyed alike.) Connect back-cabinet and front-cabinet electrically by tightly plugging male-plugs from front-cabinet and panel into corresponding female-plugs in back-cabinet.

Plug power-line into 110-115 volt 60-cycle Alternating Current only. Turn on power by turning toggle-switch on lower left side of back-box.

Place 8 balls in game.

BE SURE TO LEVEL GAME, as instructed in drawing below.



TO REMOVE TOP PANEL

Unlock front door, remove screws holding front glass-rail, remove rail and glass.

Remove screws holding sides of panel. Grasping handle at front of panel and pulling ball-shooter all the way out, pull panel up and **SLIGHTLY** forward and raise to upright position, back end of panel resting on 2 wood supporting-blocks fastened to sides of cabinet.

BE CAREFUL NOT TO ALLOW BACK END OF PANEL TO DROP INTO GAP BETWEEN WOOD SUPPORTING-BLOCKS AND FLOATING METAL RAILS.

When replacing panel, rest back end on wood supporting-blocks and lower panel into position, locating by allowing 4 pointed locating-pins on bottom of panel to slide into corresponding holes on floating rails.

ACCESS TO BACK-CABINET MECHANISM AND BACKGLASS LAMPS

Backglass may be removed from either side by unlocking side of back-cabinet and removing upright moulding. (Remove moulding by pulling lower part of moulding.)

After removing backglass, access to mechanism is by raising 2 slide-brackets on insert, located on left and right edges of insert, which may then be tilted forward for easy access.

PLAY FEATURES

NEW BUMP-FEATURE: 4 arrow-lights, pointing to (BUMP) on backglass, flash for each coin* deposited and advance at mystery-intervals. When light advances to fourth arrow, (BUMP) lights, together with a number --- 4 to 10 --- indicating as explained in instruction-card, that

WHEN (BUMP) IS LIT
 PLAYER MAY PRESS BUMP-BUTTON
 TO BUMP OR JIGGLE PLAYFIELD
 NUMBER OF BUMPS ALLOWED INDICATED
 BY LIT NUMBER
 PLAYFIELD CANNOT BE BUMPED
 WHILE REPLAYS ARE REGISTERING

EXTRA BUMPS: Minimum number of bumps allowed, when (BUMP) is lit, are 4, number 4 or a higher number always lighting when (BUMP) lights.

As additional coins* are deposited, BUMP-number advances to a maximum of 10.

Advantage of bumping playfield--to swerve ball toward a desired hole or away from a hole that is not desired--is obvious to players and results in substantial play for purpose of advancing BUMP-number to 10 before shooting balls.

BUMP-feature should not be confused with earlier devices for influencing ball-action, such as ball-flipping levers and other manually-operated mechanisms for changing the original roll of the ball.

BUMP-features--an exclusive Bally-original feature of HI-FI--is

- (1) A definite Scoring-Advantage that may be used only when player qualifies by lighting (BUMP) and BUMP-number;
- (2) Electrically operated and, therefore, not tiring to the player;
- (3) Extremely quiet and smooth, being based on a newly engineered rocker-arm that impels the



playfield forward without shock to the machine or noisy annoyance to players and other patrons.

SELECT-A-SPOT FEATURE: Arrows below Selection-numbers on backglass flash, when coins* are deposited, and advance at mystery-intervals. When light advances to fourth arrow,

- (A) Selection-numbers light (see GUARANTEED SELECTIONS on Page 423),
- (B) Panel with words "SELECT A LIT NUMBER" lights, telling player that player's choice of lit Selection-number may be lit on Card and Super-Cards** by turning Selector-Knob on front of cabinet,
- (C) Panel with words "SELECT BEFORE SHOOTING 4TH BALL" lights, warning player that Selector-Knob locks*** after fourth ball is shot--unless extra selection-time is indicated, as explained under EXTRA SELECTION-TIME on page 423.

Scoring advantages described directly above remain lit during entire game, but panel with words "SELECT BEFORE SHOOTING 4TH BALL" may be cancelled by lighting panel with words "SELECT BEFORE SHOOTING 5TH BALL", as explained under EXTRA SELECTION-TIME on page 423.

* When replays are registered, Buttons are pressed, instead of coins being deposited.

** 19, 20, 21, 22 and 16 appear on Card only, not on Super-Cards; 25 appears on Card and left Super-Card; 10 appears on Card and right Super-Card.

***Warning-panel with words "SELECT NOW" lights after third ball is shot, if panel with words "SELECT BEFORE SHOOTING 4TH BALL" is lit, or lights after fourth ball is shot, if panel with words "SELECT BEFORE SHOOTING 5TH BALL" is lit.

After lighting scoring-advantages described on page 422, player may deposit additional coins* to light additional scoring-advantages.

GUARANTEED SELECTIONS: First 4 Selection-numbers---19, 20, 21, 22---always light when fourth arrow lights below Selection-numbers; at mystery-intervals additional Selection-numbers---16, 25 and 10---light when guaranteed first 4 numbers light.

EXTRA SELECTIONS: After lighting first group of Selection-numbers, player may deposit additional coins* to light additional Selection-numbers and other scoring-advantages.

Each Selection-number lighted remains lit during entire game.

After lighting all Selection-numbers, player may deposit additional coins* to light other scoring advantages.

EXTRA SELECTION-TIME: After lighting first 4 Selection-numbers and panel with words "SELECT BEFORE SHOOTING 4TH BALL", player may deposit additional coins* to light panel with words "SELECT BEFORE SHOOTING 5TH BALL"--to delay locking*** Selector-Knob until after fifth ball is shot.

When lighted, panel with words "SELECT BEFORE SHOOTING 5TH BALL" remains lit during entire game, and player may deposit additional coins* to light other scoring-advantages.

TRIPLE-SPOTS FEATURE: 2 Discs on backglass and playfield flash for each coin* deposited and, at mystery-intervals, light and remain lit during entire game.

Player who hits Disc-Rollover, when corresponding Disc is lit, lights 2, 5 and 8 on Card---all 3 numbers.

After lighting Discs, player may deposit additional coins* to light other scoring-advantages.

SUPER-CARDS: Panel with word SUPER-CARD above each Super-Card flashes for each coin* deposited and, at mystery-intervals, lights and remains lit during entire game, qualifying player for in-line scores and corners-scores on Super-Card with corresponding SUPER-CARD panel lit.

After lighting one SUPER-CARD panel, player may deposit additional coins* to light second SUPER-CARD Panel and other scoring advantages.

CORNERS-PANEL: Panel with words "CENTER CARD CORNERS SCORE 200" flashes for each coin* deposited and, at mystery intervals, lights and remains lit during entire game, qualifying players for corners-score on card.

After lighting CORNERS-panel, player may deposit additional coins* to light other scoring advantages.

ADVANCING SCORES**:** Scores**** appear at top of backglass, advancing at mystery intervals.

GUARANTEED SCORES**:** Scores**** either advance to a higher bracket or remain as high as on previous coin*, never drop back to a lower bracket, regardless of number of coins* deposited.

After advancing scores to highest bracket, player may deposit additional coins* to light additional scoring-advantages.

EXTRA-BALLS FEATURE: After shooting 5 balls, player may press Extra-Balls Button and deposit additional coins* to play for extra balls.

At mystery-intervals, after Extra-Balls Button is pressed, (1st) lights on backglass, when coin* is deposited. After (1st) is lit, light advances, at mystery-intervals, to (EXTRA), when Extra-Balls Button is pressed and coin* is deposited. After (1st) (EXTRA) is lit, light advances, at mystery-intervals, to (BALL), when Extra-Balls Button is pressed and coin* is deposited.

When (1st) (EXTRA) (BALL) is completely lit, first extra ball is released to player.

After shooting first extra ball, player may continue to press Extra-Balls Button and deposit additional coins* to light (2nd) (EXTRA) (BALL) in order to receive second extra ball and to light (3rd) (EXTRA) (BALL) in order to receive third extra ball.

Coins* deposited to play for extra balls do not light other scoring-advantages.

After playing for extra balls, player may not play to light other scoring-advantages.

* When replays are registered, Buttons are pressed, instead of coins being deposited.

*** Warning-panel with words "SELECT NOW" lights after third ball is shot, if panel with words "SELECT BEFORE SHOOTING 4TH BALL" is lit, or lights after fourth ball is shot, if panel with words "SELECT BEFORE SHOOTING 5TH BALL" is lit.

**** Card Scores:

5-in-line: 96-96-100-100-150-150-192-300

4-in-line: 16-20- 24- 32- 48- 72-100-200

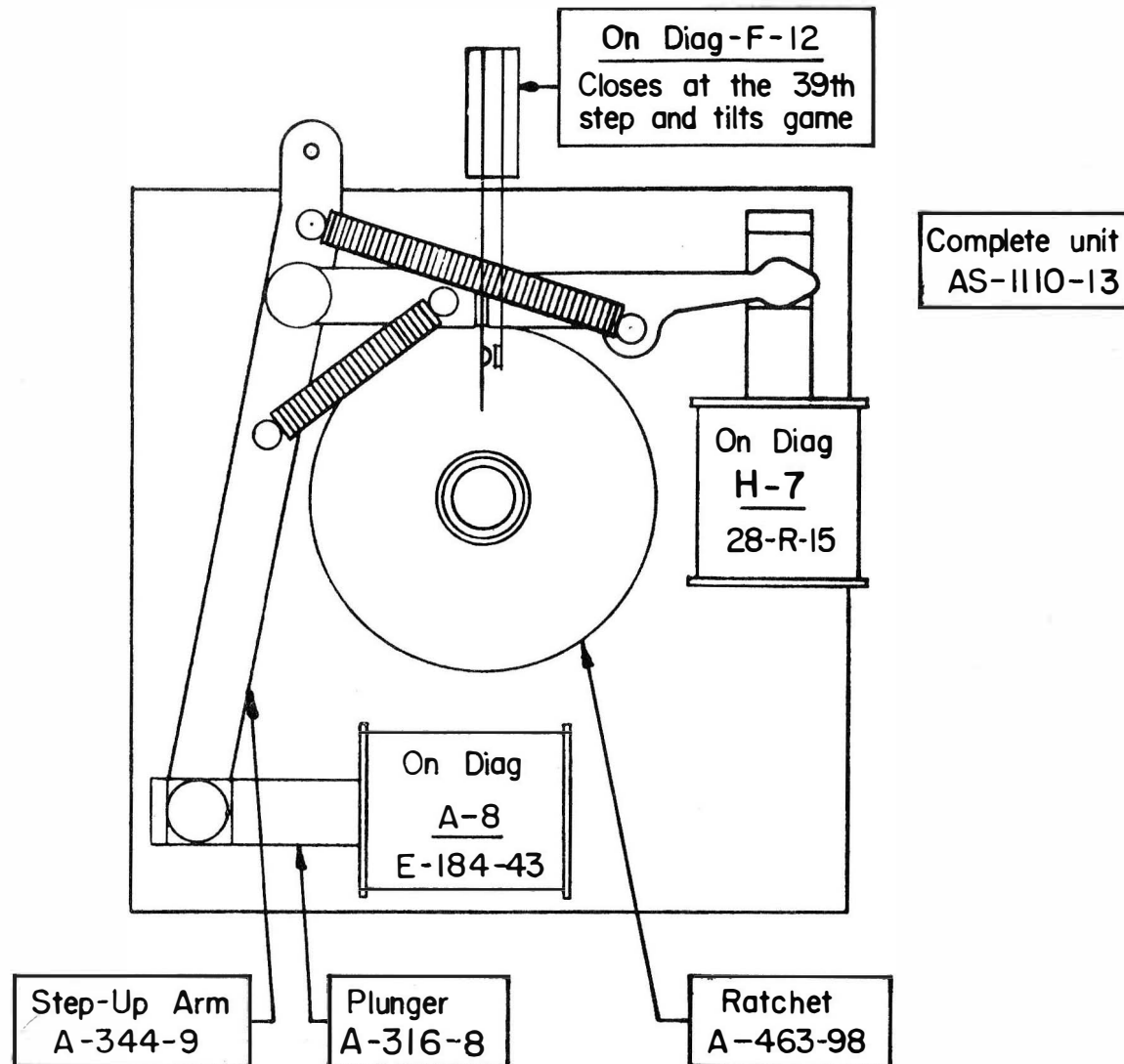
3-in-line: 3- 6- 8- 12- 18- 36- 48- 64

**** Super-Card Scores:

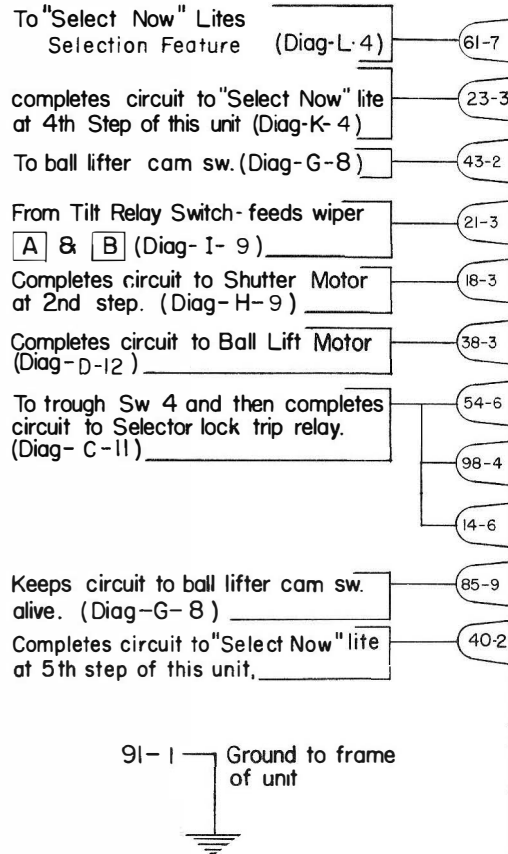
3-in-line on a Super-Card scores 4-in-line scores, when corresponding SUPER-CARD panel is lit. Qualified Super-Card Corners score 200.

Only one 4-in-line score registers per game. Only highest in-line score registers. Only first corners score registers.

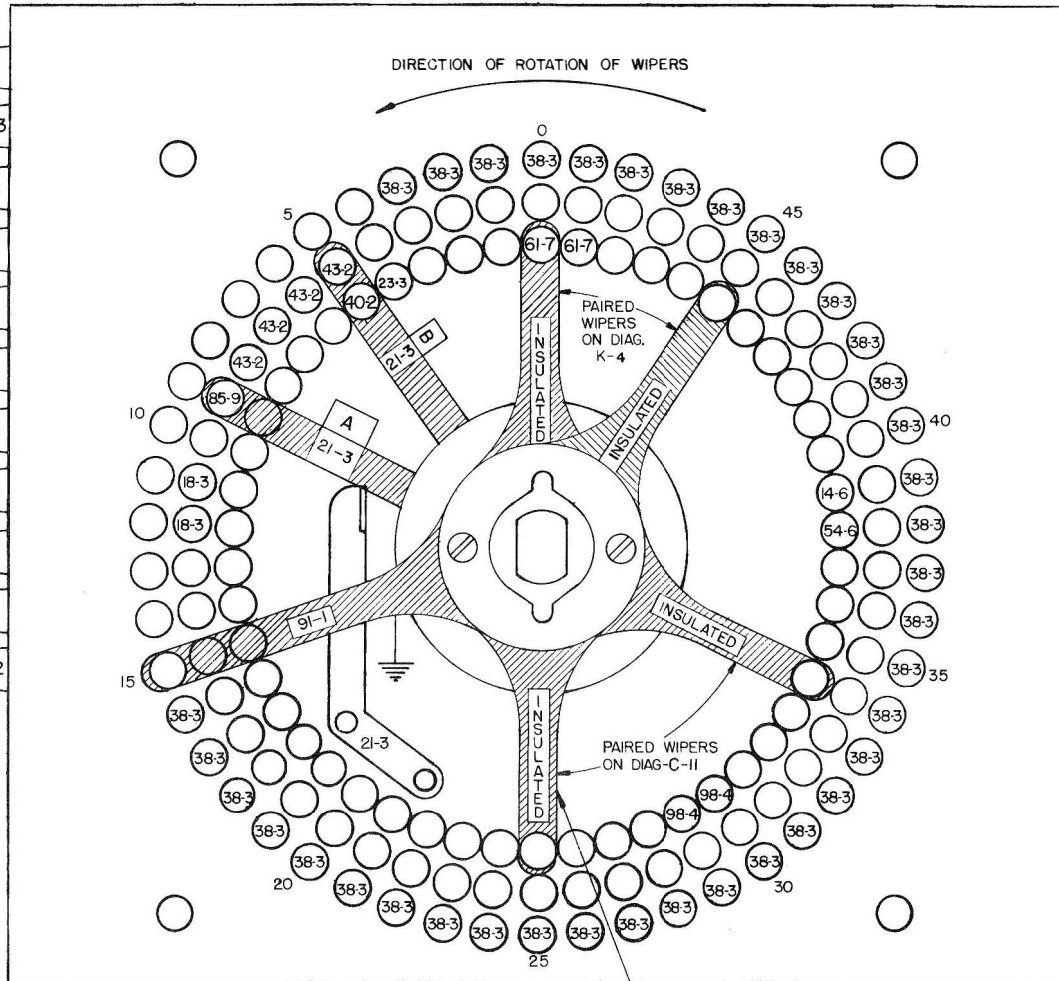
You can bank on a Bally game!

TIMER UNIT viewed from COIL side

TIMER UNIT viewed from **BUTTON** or **WIPER** side
39 step unit. Wipers shown in zero or reset position

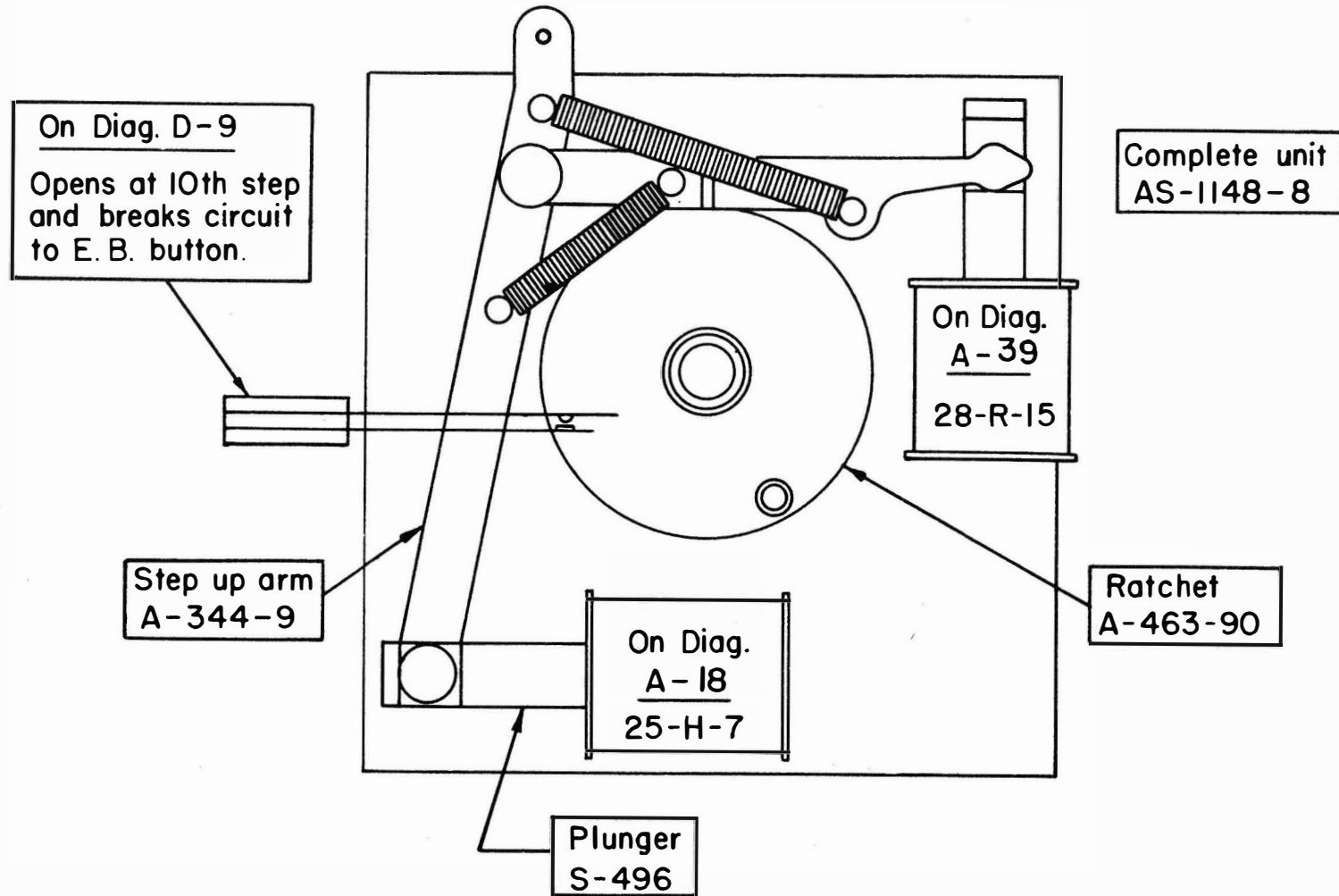


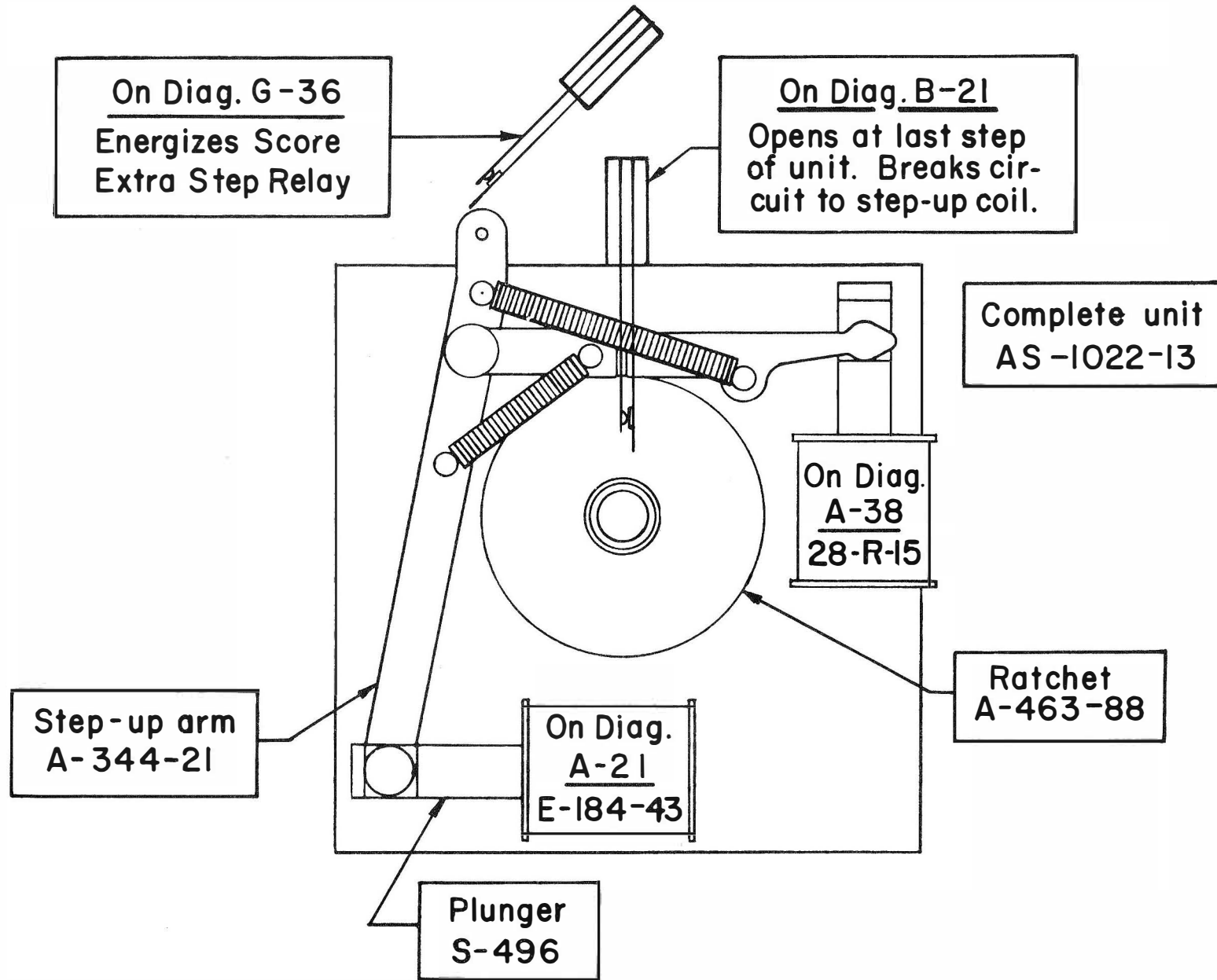
Note:- Diag-L-4 refers to location on schematic diagram.



Disc (wired)
W-571

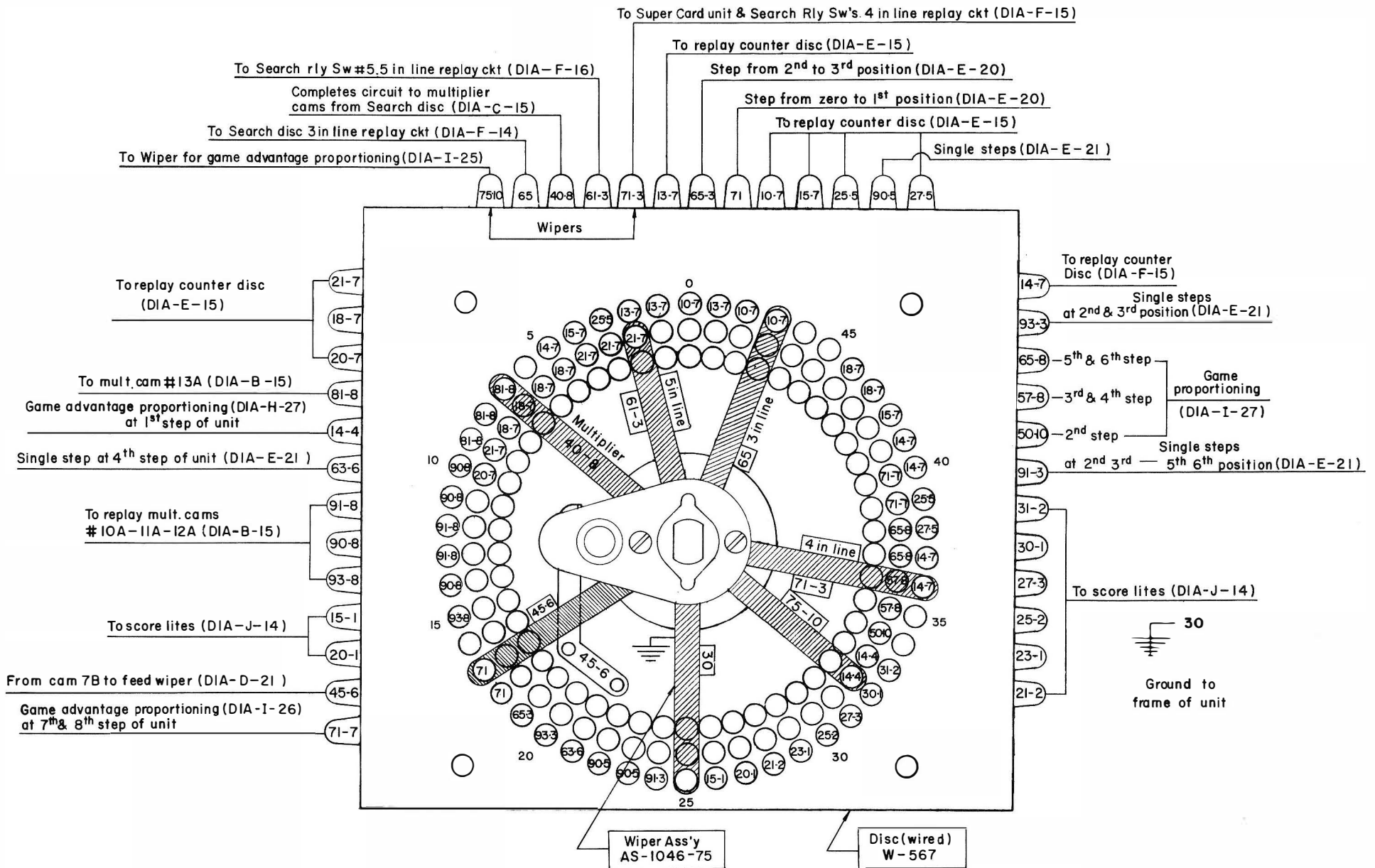
Wiper Assembly
AS-1046-57a

EXTRA BALL UNIT viewed from COIL side

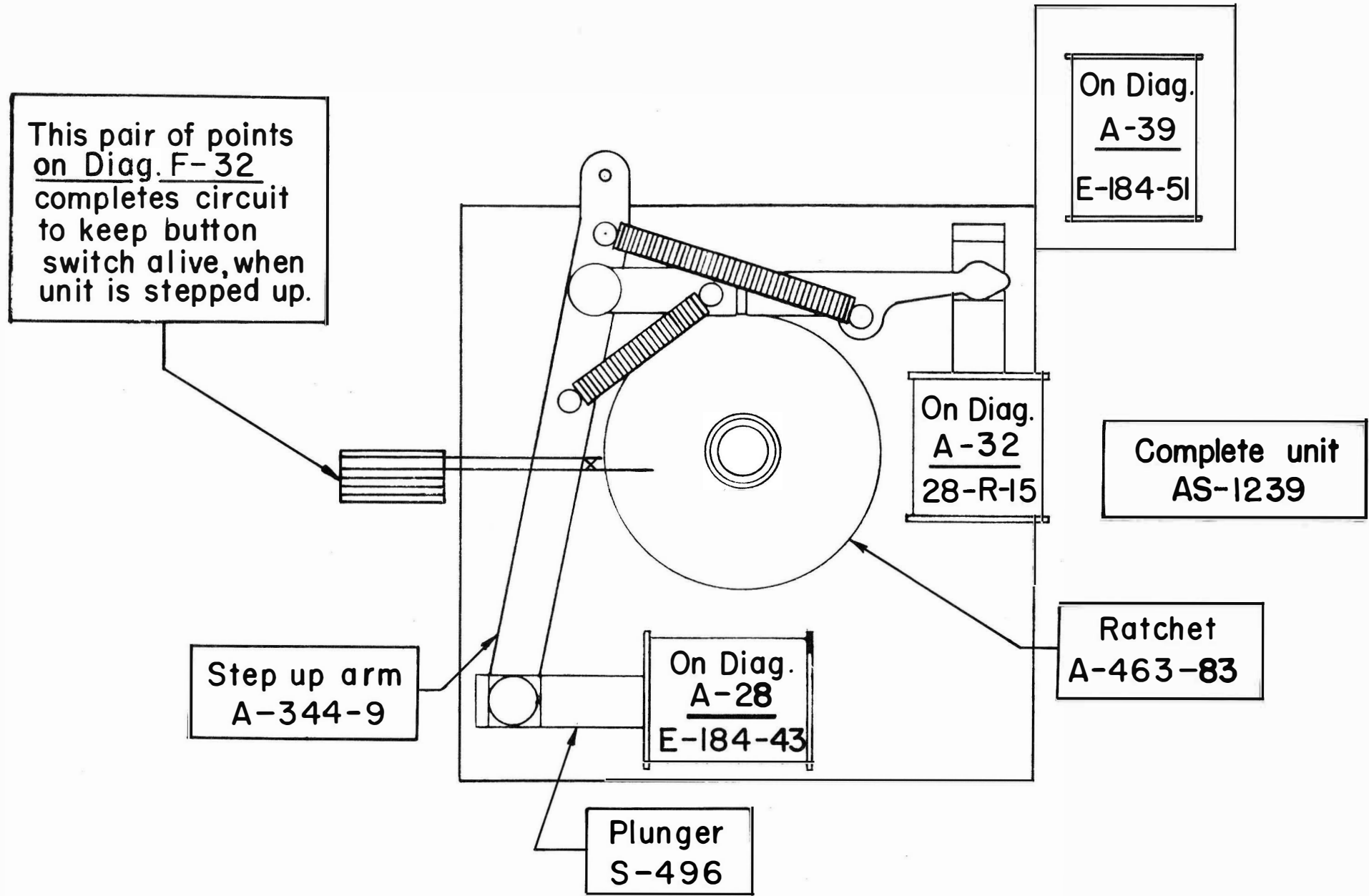
SCORE UNIT viewed from COIL side

SCORE UNIT

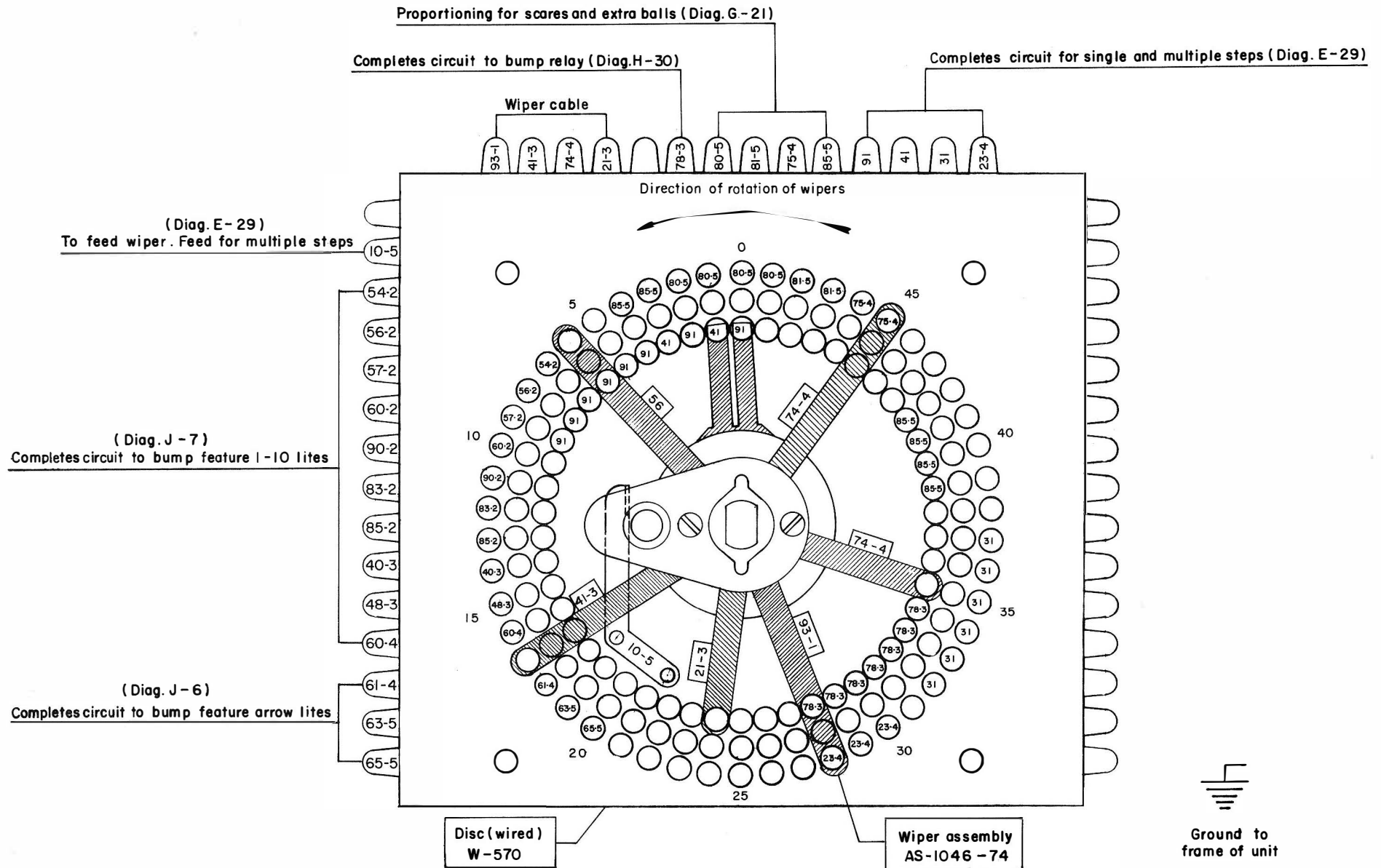
viewed from **BUTTON** or **WIPER** side
 8 step unit. Wipers shown in zero or reset position



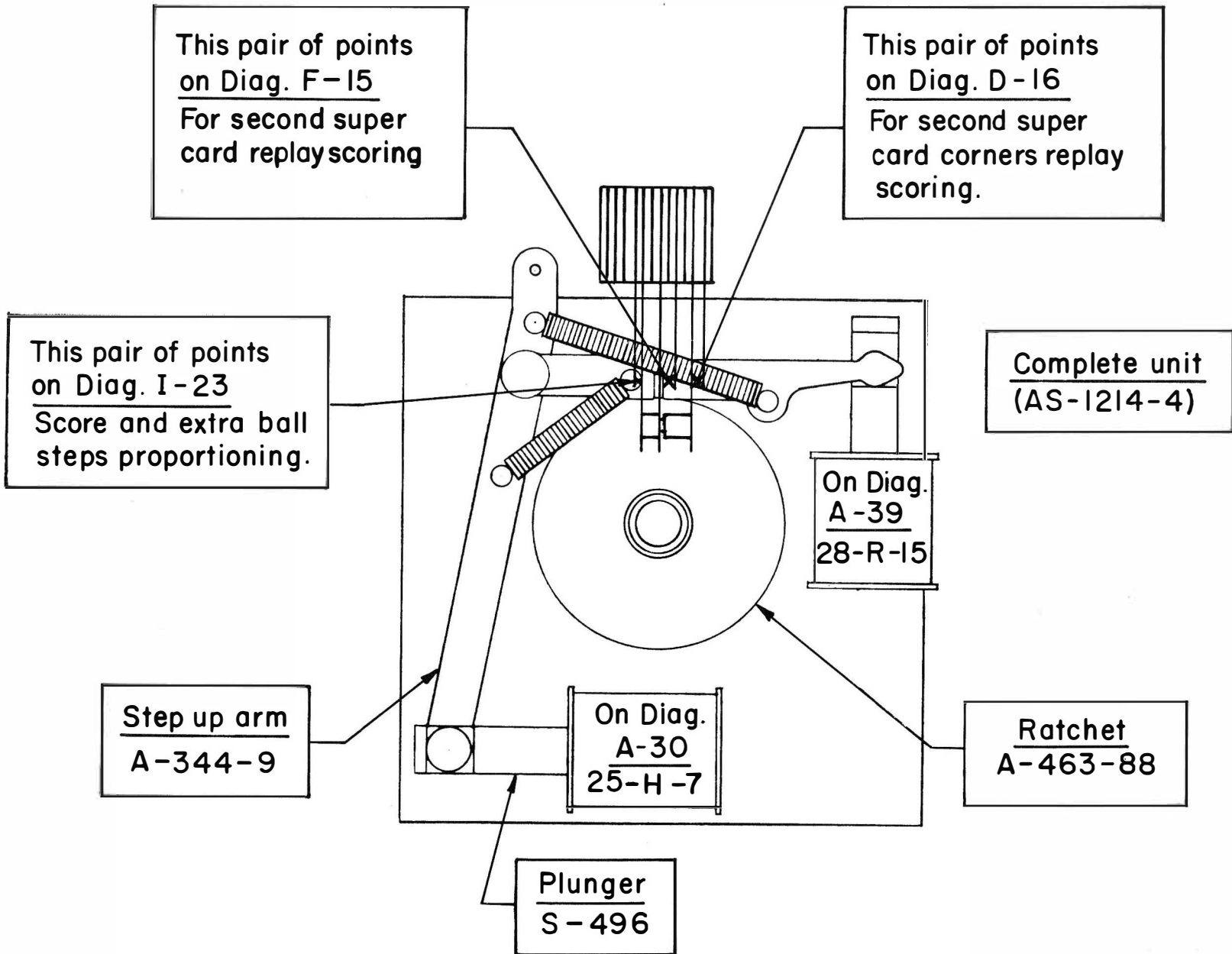
BUMP FEATURE UNIT viewed from COIL side



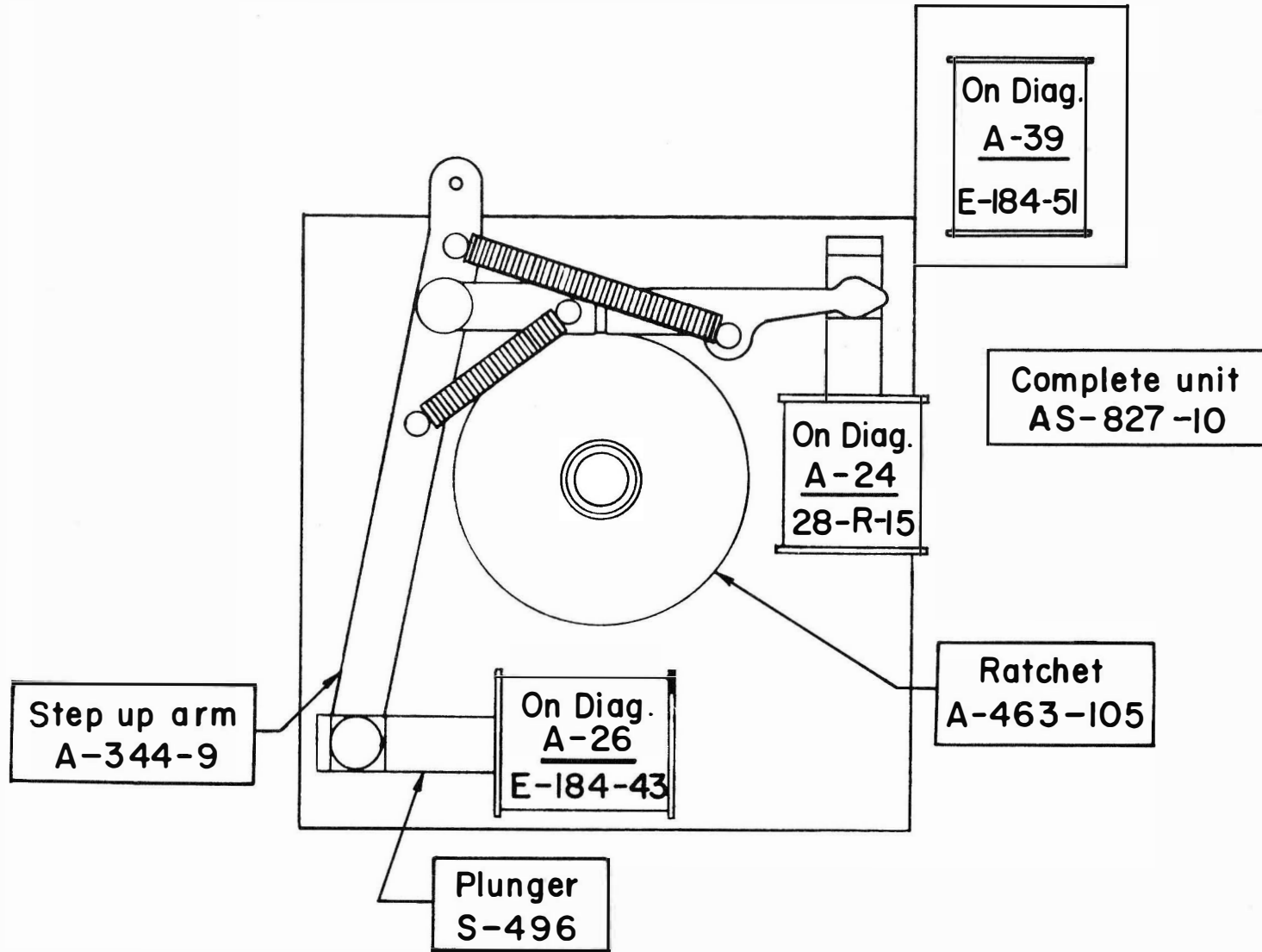
BUMP FEATURE UNIT viewed from **BUTTON** or **WIPER** side
 10 step unit. Wipers shown in zero or reset position



SUPER-CARD UNIT viewed from COIL side

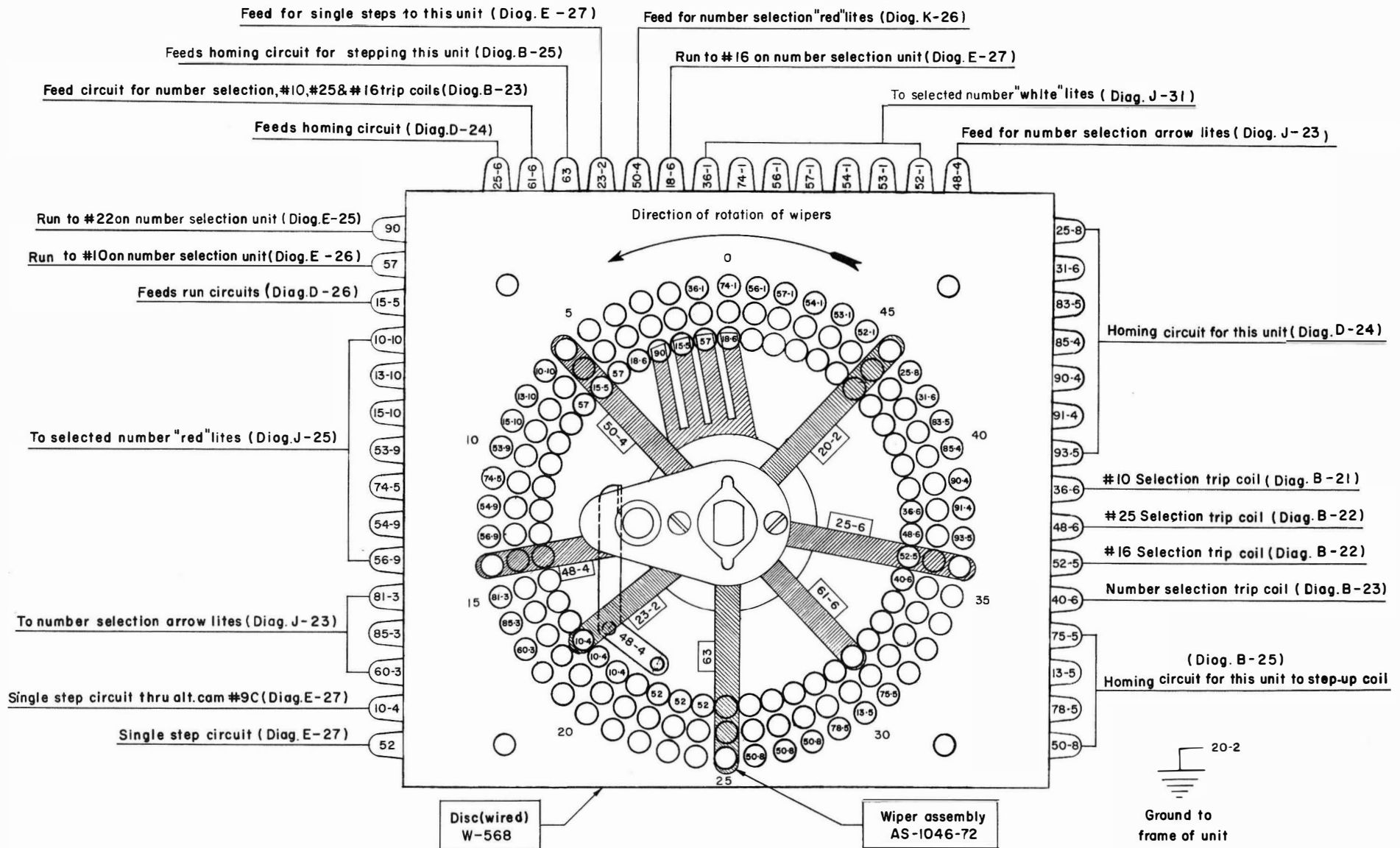


NUMBER SELECTION UNIT viewed from COIL side



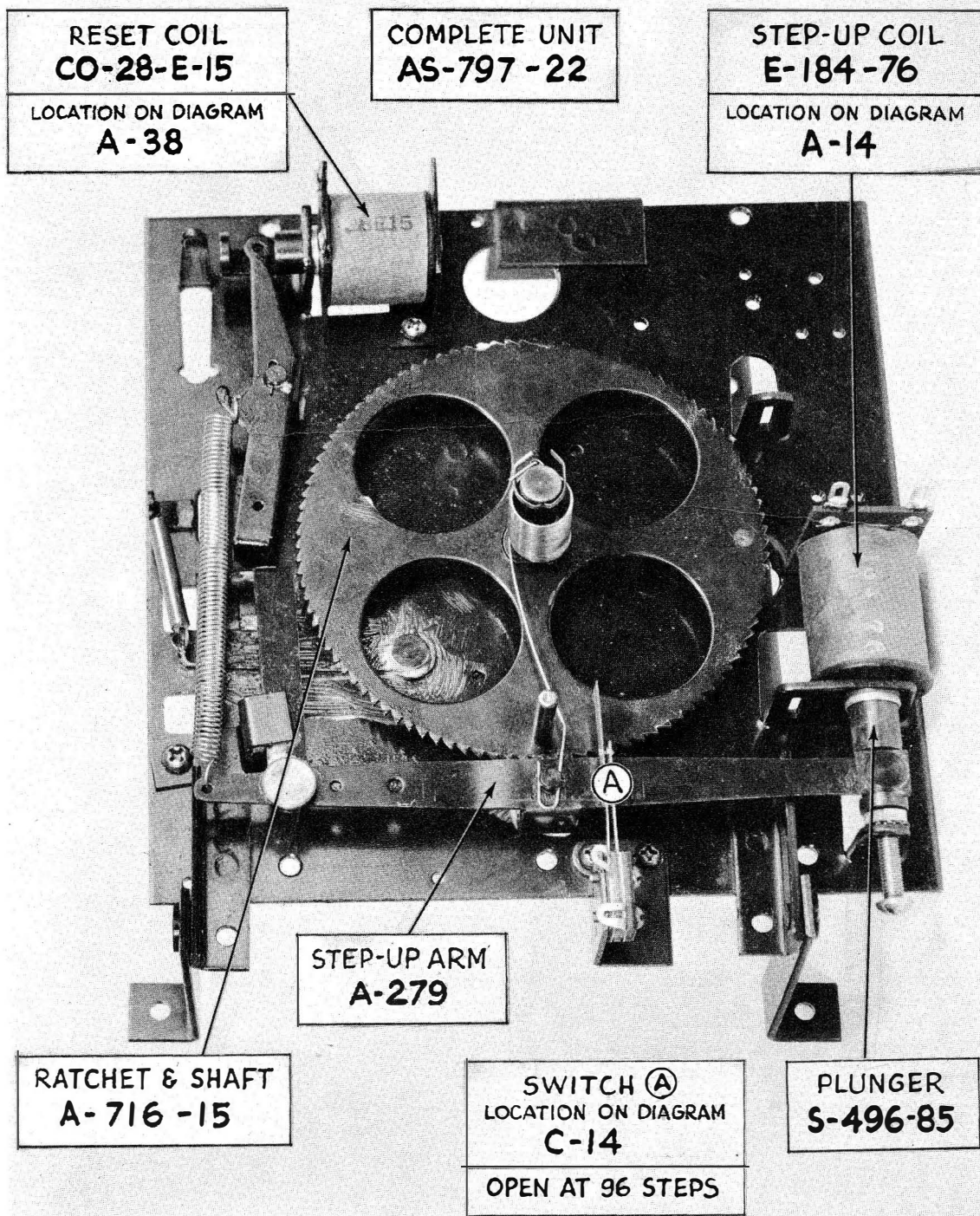
NUMBER SELECTION UNIT viewed from BUTTON or WIPER side

7 step unit. Wipers shown in zero or reset position

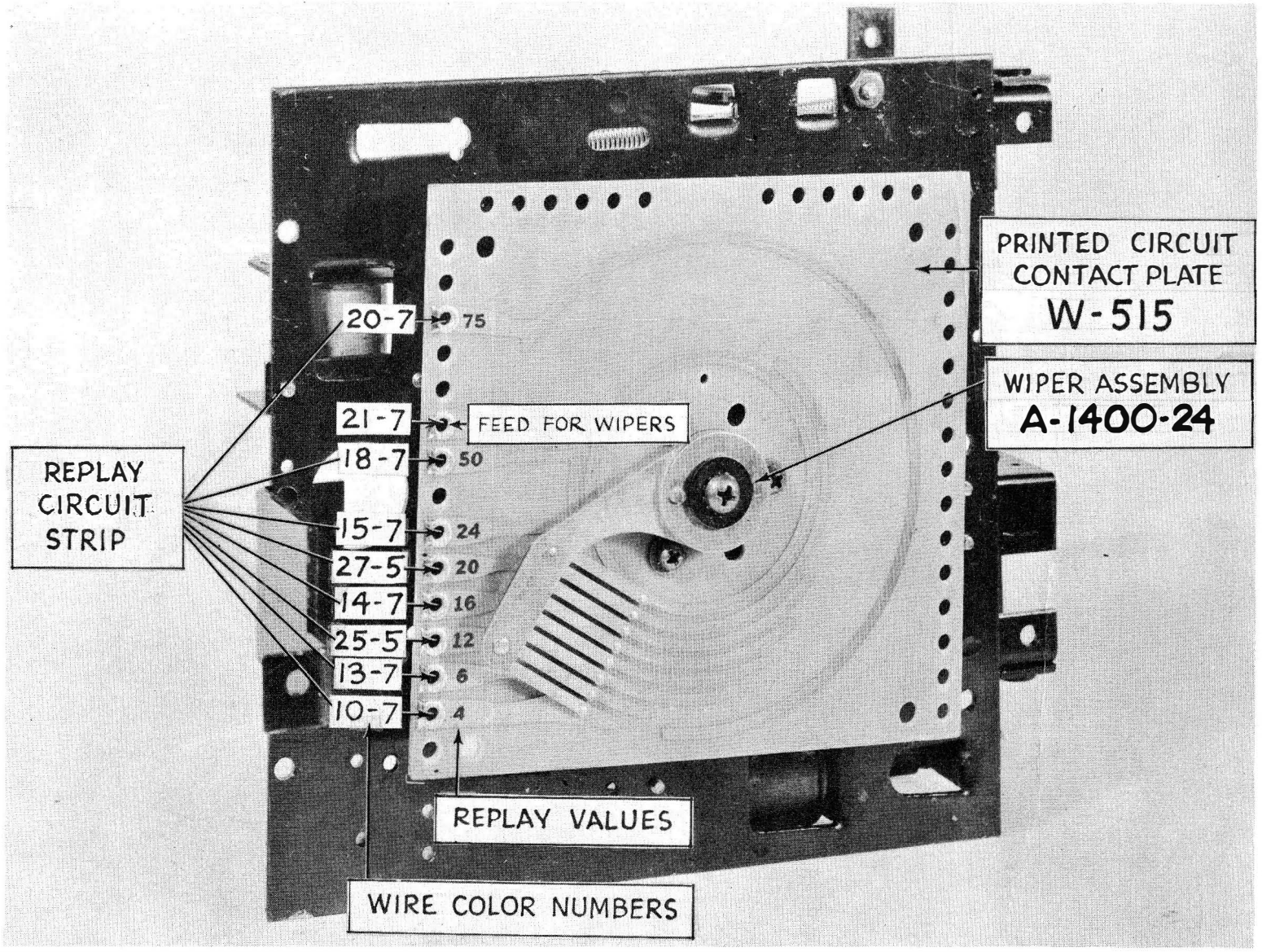


NOTES

REPLAY COUNTER viewed from COIL side


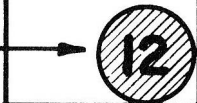


REPLAY COUNTER viewed from WIPER side

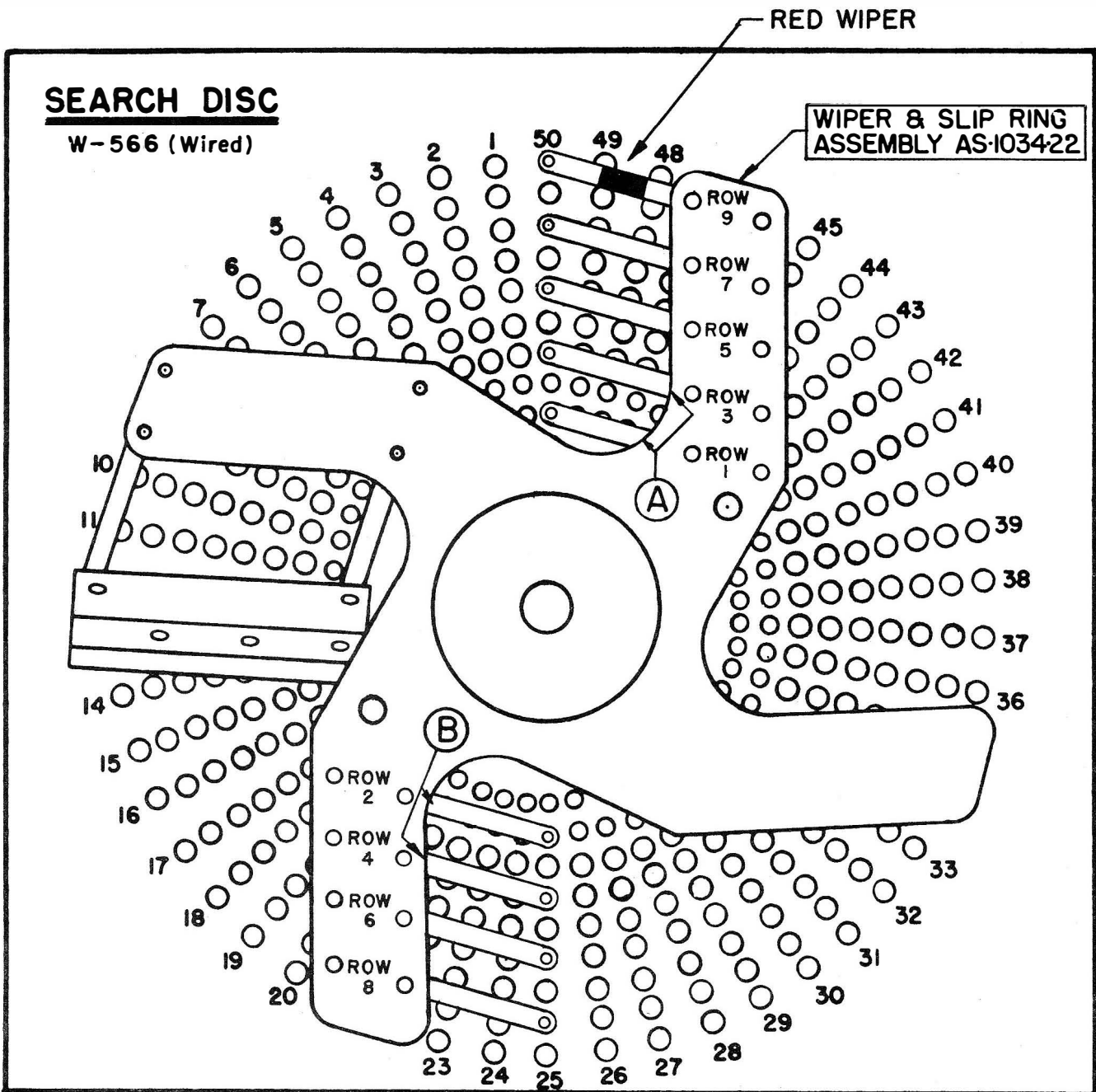


CAM SWITCHES THAT PULSE REPLAY COUNTER STEP-UP COIL								
	sw.13A	sw.13A	sw.12A	sw.12A	sw.11A	sw.11A	sw.12A	sw.10A
5 IN LINE	96	96	100	100	150	150	192	300
4 IN LINE	16	20	24	32	48	72	100	200
3 IN LINE	4	6	8	12	18	36	48	64

LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS. NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF REPLAY CIRCUIT STRIP (MAIN CARD OR EITHER SUPER CARD), IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

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

NOTE: 96 & 192 REPLAY SCORE IS EFFECTIVE THRU THE OPEN AT 96 SWITCH.



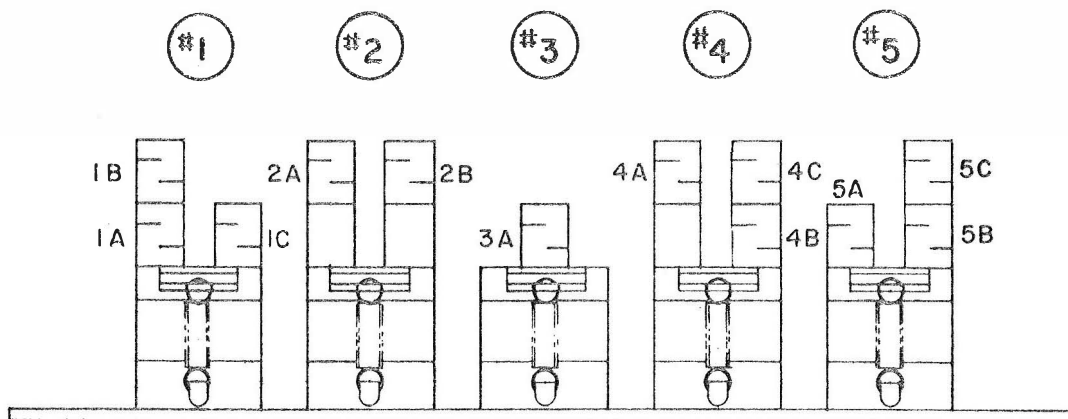
WIPERS (A) FED BY WIRE 80 (ON DIAG. C-15) THRU FEED WIPER. COMPLETES CIRCUIT TO SEARCH INDEX COIL & REPLAY COUNTER STEP-UP COIL, WHEN SCORING REPLAYS

WIPERS (B) (ON DIAG. F-14) COMPLETES CIRCUIT TO SCORE 3 IN LINE SCORES, WHEN SEARCHING THRU CENTER CARD ALSO COMPLETES CIRCUIT TO SCORE 4 IN LINE SCORES FOR 3 IN LINE, WHEN SEARCHING THRU SUPER CARD NO.1 AND SUPER CARD NO.2.

SEARCH POSITIONS

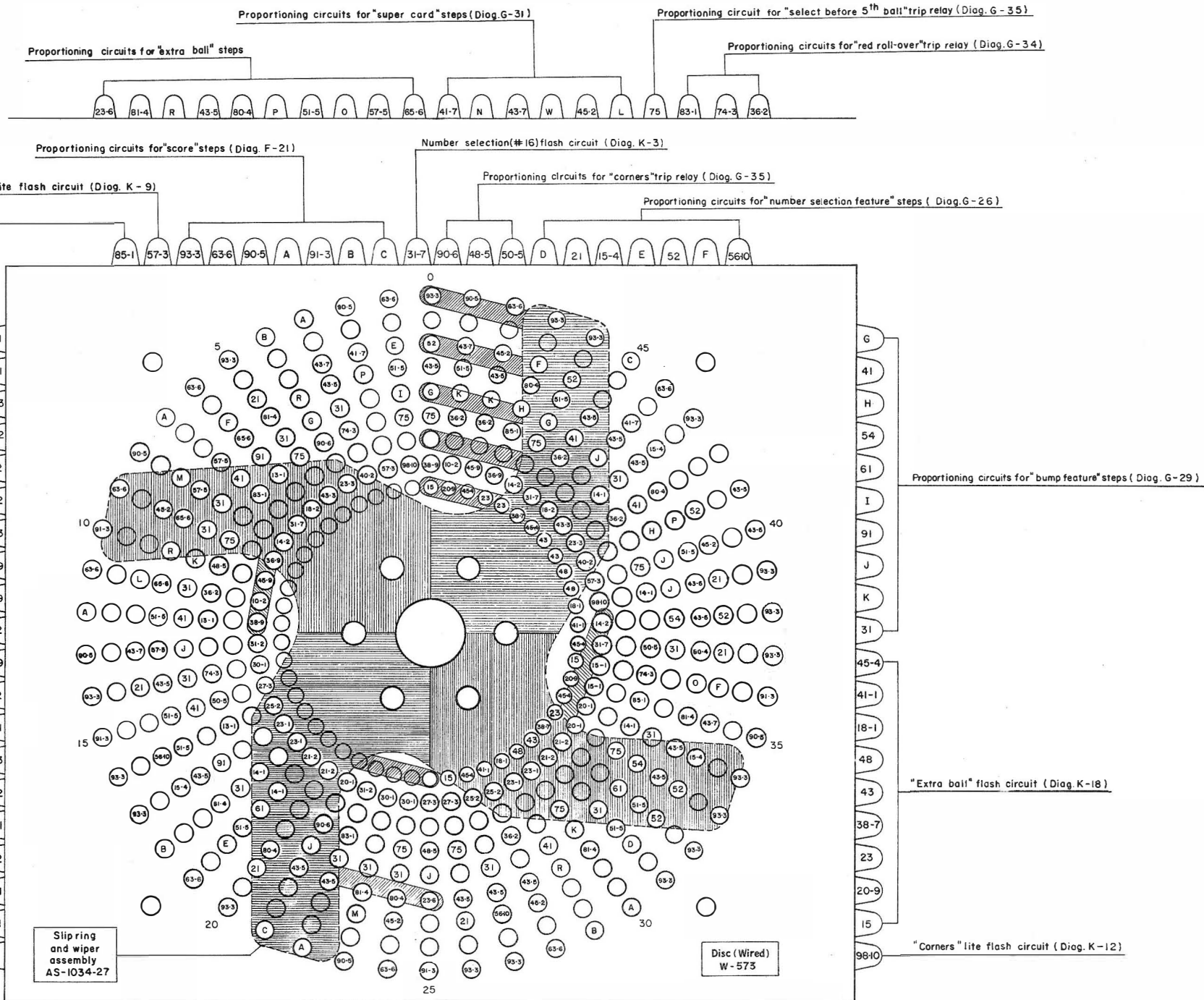
		RED WIPER POSITION	ROW 7 SEARCH RELAY#1	ROW 8 SEARCH RELAY#2	ROW 9 SEARCH RELAY#3	ROW 6 SEARCH RELAY#4	ROW 5 SEARCH RELAY#5
CENTER CARD	HORIZONTAL	1	9	4	15	24	6
		2	10	19	14	20	8
		3	2	18	16	12	25
	VERTICAL	4	1	22	13	21	17
		5	11	7	5	23	3
		6	9	10	2	1	11
		7	4	19	18	22	7
	DIAGONAL	8	15	14	16	13	5
		9	24	20	12	21	23
	CORNERS	10	6	8	25	17	3
		11	6	20	16	22	11
		12	9	19	16	21	3
		13					
		14	9	6	3	11	
		15					
		16					
SUPER CARD #2	HORIZONTAL	17	15	7	11		
		18	1	10	13		
		19	17	4	18		
	VERTICAL	20	15	1	17		
		21	7	10	4		
		22	11	13	18		
		23	11	10	17		
	DIAGONAL	24	15	10	18		
		25					
CORNERS	26	15	11	18	17		
	27						
	28						
SUPER CARD #1	HORIZONTAL	29	23	3	18		
		30	9	25	11		
		31	12	24	14		
	VERTICAL	32	23	9	12		
		33	3	25	24		
		34	18	11	14		
		35	18	25	12		
	DIAGONAL	36	23	25	14		
		37					
CORNERS	38	23	18	14	12		
	39						
	40						
		41					
		42					
		43					
		44					
		45					
		46					
		47					
		48					
		49					
		50					

SEARCH RELAYS



Corners Scores		3 in line scores		4 in line scores		5 in line scores	
Thru \rightarrow		Thru \rightarrow		Thru \rightarrow		Thru \rightarrow	
Switch no's.	Wire no's & color	Switch no's.	Wire no's & color	Switch no's.	Wire no's & color	Switch no's.	Wire no's & color
3A	18-4 red-black 50-3 white	3A	18-4 red-black 50-3 white	3A	18-4 red-black 50-3 white	3A	18-4 red-black 50-3 white
2A	50-3 white 56-3 white-brown	2B	50-3 white 51-3 white-red	2A	50-3 white 56-3 white-brown	2A	50-3 white 56-3 white-brown
4C	56-3 white-brown 53-3 white-yellow	1B	51-3 white-red 54-3 white-green	4C	56-3 white-brown 53-3 white-yellow	4C	56-3 white-brown 53-3 white-yellow
1A	53-3 white-yellow 71-3 orange-red	3A	18-4 red-black 50-3 white	1A	53-3 white-yellow 71-3 orange-red	5C	53-3 white-yellow 57-3 white-orange
		2B	50-3 white 51-3 white-red	3A	18-4 red-black 50-3 white	IC	57-3 white-orange 61-3 brown-red
		4B	51-3 white-red 54-3 white-green	2A	50-3 white 56-3 white-brown		
		3A	18-4 red-black 50-3 white	4C	56-3 white-brown 53-3 white-yellow		
		4A	50-3 white 52-3 white-blue	5B	53-3 white-yellow 71-3 orange-red		
		5A	52-3 white-blue 54-3 white-green				

SPOTTING DISC viewed from BUTTON or WIPER side



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

NOTICE:

THE IMPORTANT PART OF THIS ILLUSTRATION IS TO SHOW THAT SWITCH 13 CLOSSES FIRST AND OPENS LAST.

IF AN ADJUSTMENT IS NECESSARY, SWITCH 13 CAN BE MOVED UP OR DOWN. LOOSEN SCREWS THAT HOLD SWITCH, THEN MOVE UP OR DOWN.

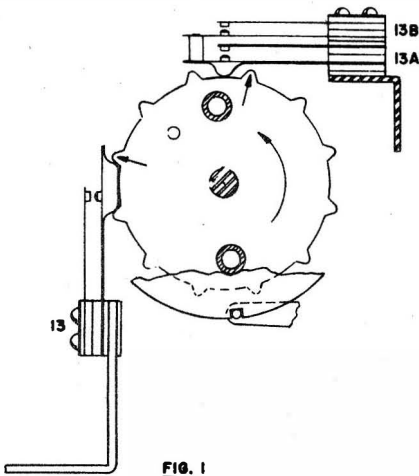


FIG. 1

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.

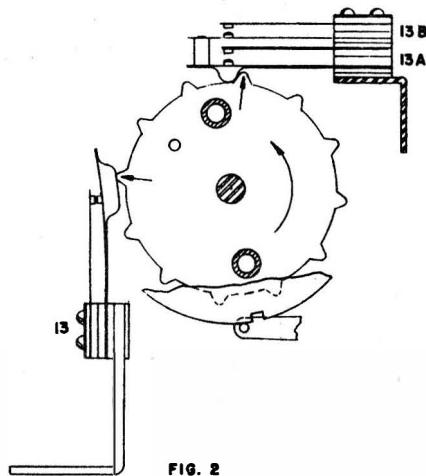


FIG. 2

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.

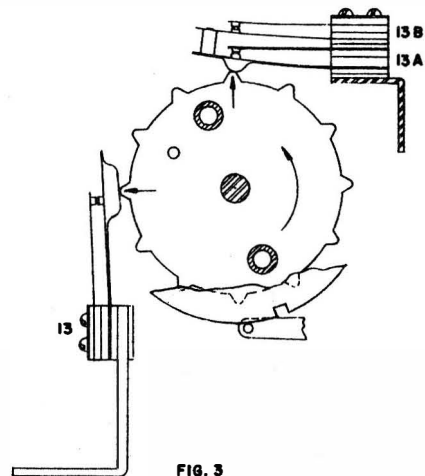


FIG. 3

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

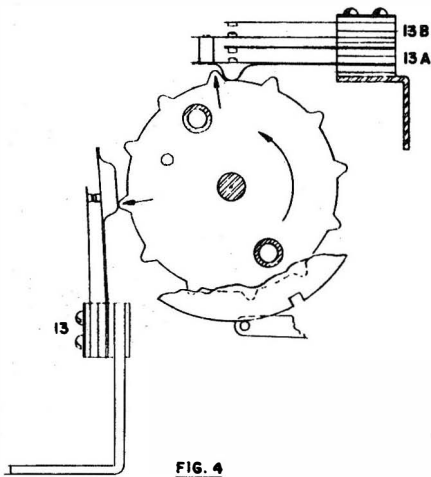


FIG. 4

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

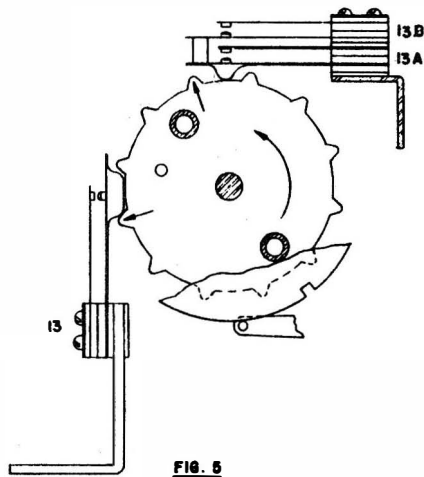
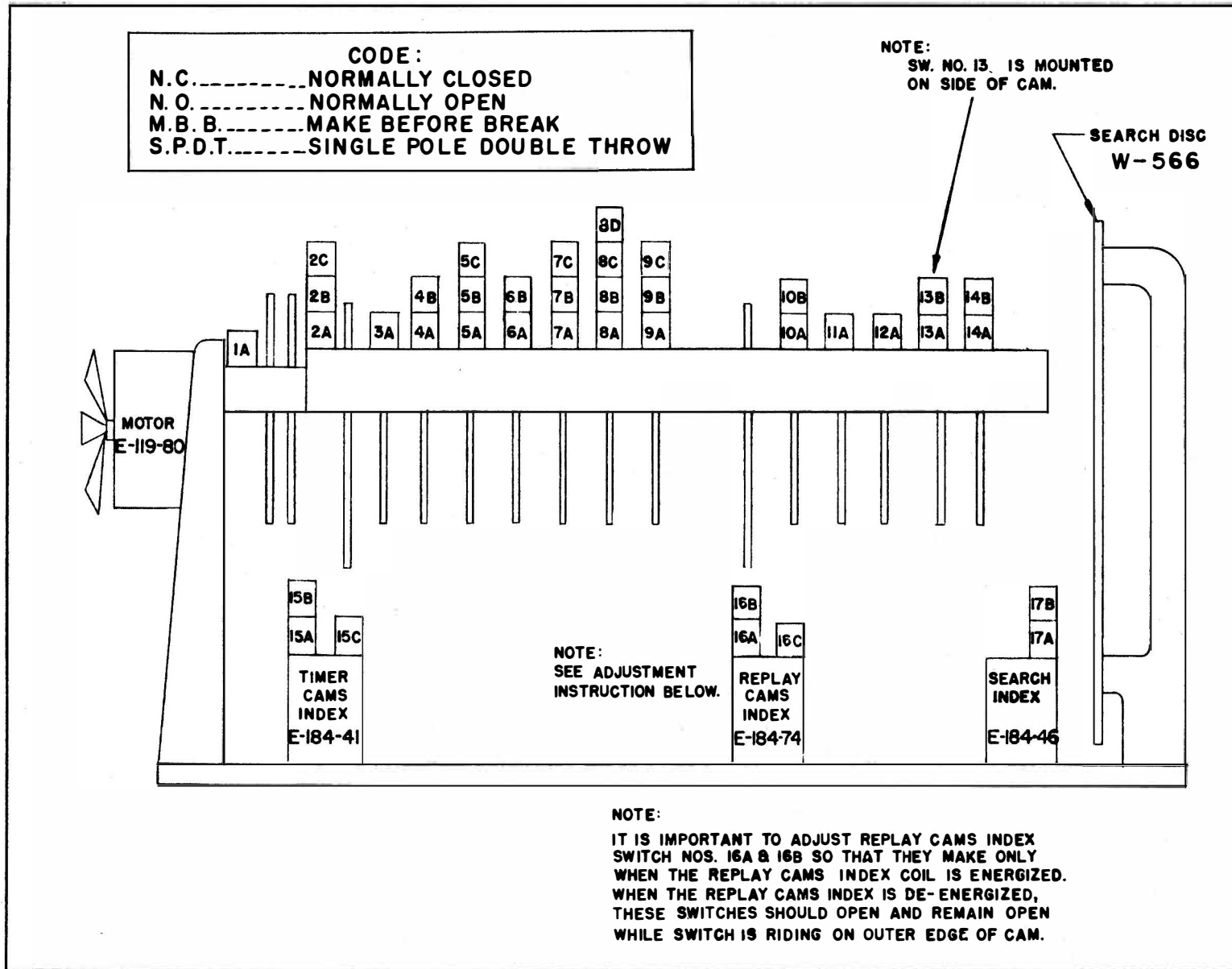


FIG. 5

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



CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART

CONTROL UNIT CAM SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A N.O.	F-8	65-2 36-10	Brown-White Yellow-Brown	Energizes timer step-up coil when drag arm switch, 5th ball relay switch and cam switch 14A are closed.
2A N.O.	H-7	30 27-4	Yellow Blue-Orange	Energizes replay register reset and reflex play magnet.
2B N.O.	B-37	30 93-4	Yellow Gray-Yellow	Energizes coin kicker magnet.
2C N.O.	G-9	30 15-2	Yellow Red-White	Drops out extra ball play relay.
3A N.C.	I-5	83-3 48-2	Black-Yellow Green-Black	Drops out start, extra ball start relays and acts as a safety switch during spin.
4A N.O.	J-16	74 60	Orange-Green Brown	Flashes extra ball lites.
4B N.O.	D-40	30 98-1	Yellow Gray-Black	Energizes score extra step index and spotting index.
5A N.O.	G-8	65-2 71-9	Brown-White Orange-Red	Energizes timer reset coil.
5B N.O.	C-19	63-10 21-1	Brown-Yellow Blue-Red	Energizes extra ball unit step-up coil. Steps unit from minus one position to zero position
5C N.O.	D-38	78-4 10-6	Orange-Black Red	Energizes anti-cheat relay.
6A N.C.	H-29	83 74-8	Black-Yellow Orange-Green	Opens game advantage circuits during timing cycle.
6B N.C.	C-20	43-8 74-6	Green-Yellow Blue-White	Score extra step safety switch.

CONTINUED ON NEXT PAGE

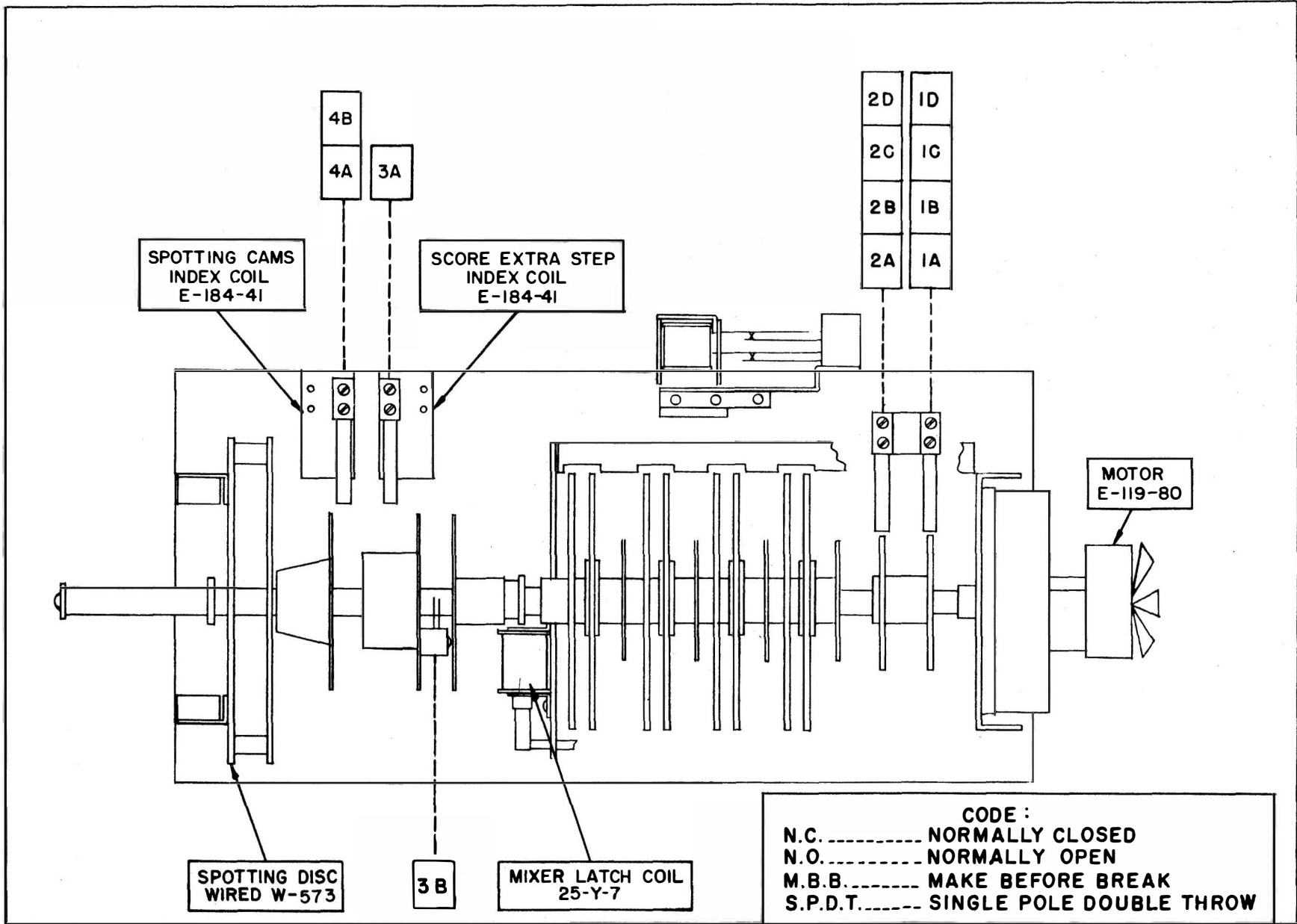
CONTROL UNIT CAM SWITCH CHART — CONTINUED

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
7A	N. O.	C-19	63-10 25-4	Brown-Yellow Blue-White	Extra ball unit steps.
7B	N. O.	D-21	45-6 52-9	Green-White White-Blue	Score unit steps.
7C	N. O.	B-36	30 93-4	Yellow Gray-Yellow	Pulses coin lock out magnet.
8A	N. O.	D-27	23-2 50-8	Blue-Yellow White	Number selection feature steps.
8B	N. O.	C-27	81-7 93-1	Black-Red Gray-Yellow	Bump feature steps.
8C	N. O.	D-29	51-7 40-7	White-Red Green	Steps super card stepper.
8D	N. O.	F-33	14-8 63-3	Red-Green Brown-Yellow	Trips corners relay when circuits are all closed on mixer and spotting disc.
9A	Alt.	D-20	71 43-8	Orange-Red Green-Yellow	Opens score extra step circuit every other time.
9B	Alt.	E-30	53-7 14-8	White-Yellow Red-Green	Directs circuit to either a bump feature or number selection feature steps.
9C	S. P. D. T.	E-30	23-4 14-8 10-4	Blue-Yellow Red-Green Red	Completes circuit for single steps to numbers selection and bump feature.
10A	N. O.	B-16	54-8 93-8	White-Green Gray-Yellow	Pulses replay counter when score unit is at last step.
10B	N. O.	B-16	38-8 53-10	Yellow-Black White-Yellow	Pulses corners replay counter.
11A	N. O.	B-15	91-8 54-8	Gray-Red White-Green	Pulses replay counter when score unit is at 5th and 6th step.
12A	N. O.	B-15	90-8 54-8	Gray White-Green	Pulses replay counter when score unit is at 3rd and 4th step.
13A	N. O.	B-15	54-8 81-8	White-Green Black-Red	Pulses replay counter when score unit is at 1st and 2nd step.
13B	N. O.	B-14	80 38-4	Black Yellow-Black	Pulses replay register and reflex play magnet.
13 (Backside) N. O.	I-14	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch. NOTE: See pictorial view page 444.	

CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONCLUDED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
14A N. C.	I-14	56-7 93	White-Brown Gray-Yellow	Prevent the start of another replay scoring until cams are indexed.
14B N. C.	B-8	27-2 90-9	Blue-Orange Gray	Opens circuit to timer step up during replay winner.
TIMER CAM INDEX COIL	A-10	93-2 70	Gray-Yellow Orange	Energized by switches on start and extra ball start relay, also thru shutter motor cam switch #5.
15A N. O.	H-2	60-P 20-P	Brown-Plastic Blue-Plastic	Lock-in safety switch for extra ball play relay.
15B N. C.	G-5	71-2 14-9	Orange-Red Red-Green	Opens circuit to coin lock-out magnet during spin.
15C N. O.	D-9	74-2 81-2	Orange-Green Black-Red	Operates mixer and control unit motor.
REPLAY CAMS INDEX	A-13	40-4 70	Green Orange	Energizes when winning score is made and releases replay cams.
16A N. O.	G-13	27 80	Blue-Orange Black	In series with replay lock in circuit. NOTE: See pictorial view Page 446 for correct adj.
16B N. O.	I-15	93 56-7	Gray-Yellow White-Brown	In series with replay winner circuit. NOTE: See pictorial view Page 446 for correct adj.
16C N. C.	F-32	60-6 10-3	Brown Red	Breaks circuit to pulse relay while replays are registering.
SEARCH INDEX COIL	A-12	80 70	Black Orange	Energizes when 3 in line or more is scored.
17A N. O.	B-12	80 40-4	Black Green	Energizes replay cams index if a score is made.
17B N. C.	J-5	83-3 30	Black-Yellow Yellow	Opens start circuit and also acts as a safety switch.

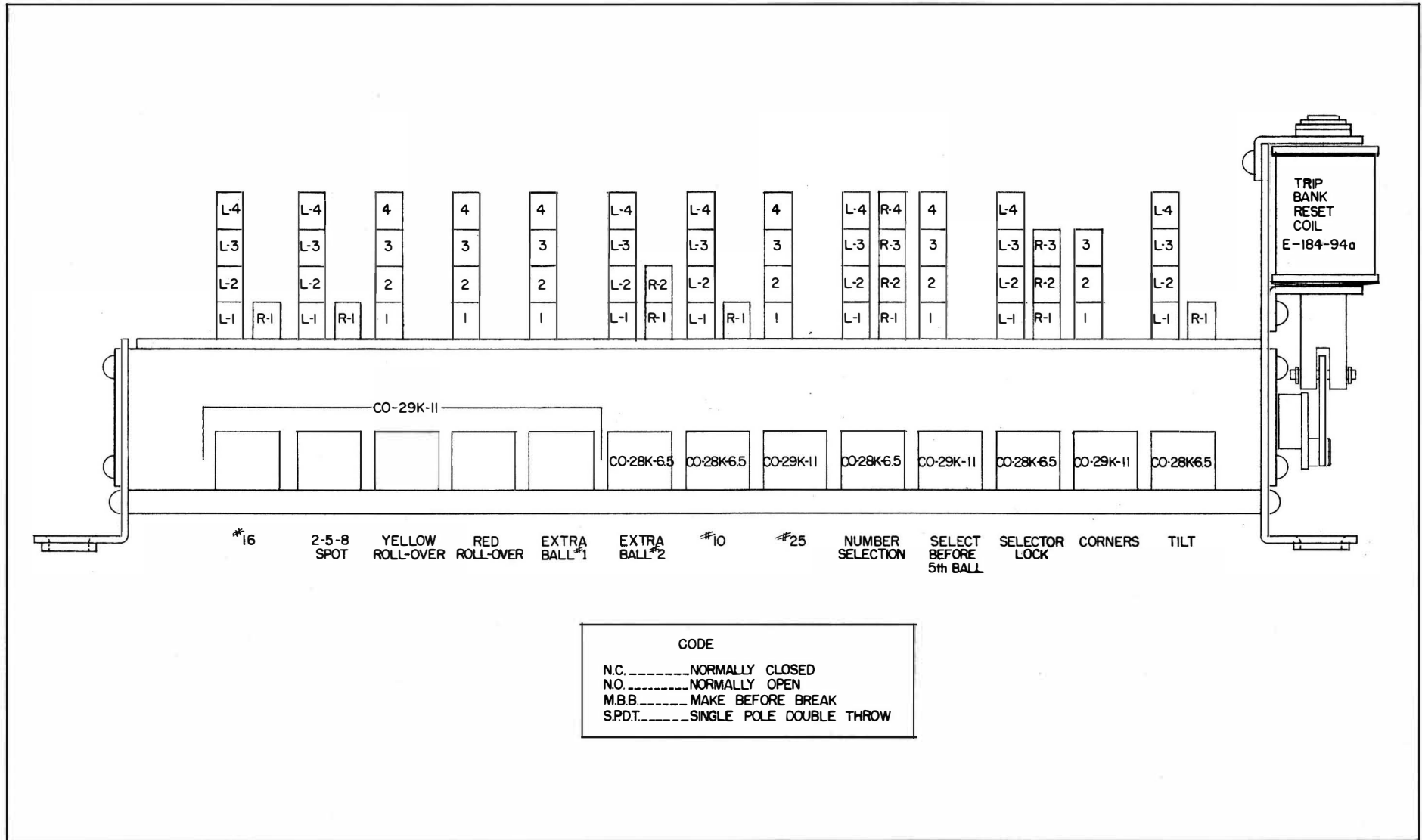


MIXER AND SPOTTING UNIT ASSEMBLY PICTORIAL VIEW

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.	D-31	40-7 52-7	Green White-Blue	Super card multiple steps.
1B N.O.	L-1	60-5 71-5	Brown Orange-Red	Flashes "select now" lite for "selection feature" advantages.
1C N.O.	B-18	78-1 63-10	Orange-Black Brown-Yellow	Steps extra ball unit.
1D N.O.	C-29	81-7 10-5	Black-Red Red	Bump feature multiple steps.
2A N.O.	E-6	75-2 53-2	Orange-White White-Yellow	Pulse switch for operating replay register reset and replay meter, when replay reset relay is energized.
2B N.O.	D-26	15-5 50-8	Red-White White	Pulse switch for numbers selection unit multiple steps.
2C N.O.	C-17	31-5 85-7	Yellow-Red Black-White	Steps corners replay counter to its zero position. (In series with corners unit homing switch)
2D N.O.	G-24	60-6 13-6	Brown Red-Yellow	Pulse switch for homing selection feature unit thru rotary selector.
SCORE EXTRA STEP 1 INDEX COIL	A-40	70 98-1	Orange Gray-Black	Energized during timing cam cycle by control unit cam switch #4B.
3A N.O.	H-36	75-10 81-1	Orange-White Black-Red	Completes lock-in circuit for score extra step relay.
3B N.O.	C-21	25-3 40-5	Blue-White Green	Pulse switch for score multiple steps.
SPOTTING CAM INDEX COIL	A-40	70 98-1	Orange Gray-Black	Energized during timing cycle by control unit cam switch #4B.
4A N.O.	K-5	36-5 83-4	Yellow-Brown Black-Yellow	Completes flash circuit for number selection lites also red and yellow rollover lites.
4B N.O.	K-15	30-5 13-4	Yellow Red-Yellow	Completes flash circuit for score lites, super card lites, red & yellow rollover lites.



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 PICTORIAL VIEW
NUMBERS CORRESPOND TO SWITCH-CHART

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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
#16 TRIP COIL	A-22	70 52-5	Orange White-Blue	Energized by 5th step of numbers selection unit.
L1 N.O.	J-3	30 31-7	Yellow Yellow-Red	Lites number 16 selection lite.
L2 N.C.	B-22	52-5 Jumper	White-Blue White-Blue	Breaks circuit to this coil.
L3 N.O.	B-25	78-5 50-8	Orange-Black White	Completes circuit to numbers selection step-up coil.
L4 N.C.	I-20	41-5 74-4	Green-Red Orange-Green	Proportioning for score steps and extra ball steps.
R1 N.C.	F-27	91-6 80-6	Gray-Red Black	Breaks number selection run circuit.
2-5-8 TRIP COIL	A-23	70 98-5	Orange Gray-Black	Energized by red or yellow panel switch.
L1 N.O.	K-28	30 90-1	Yellow Gray	Lites number 8 spotted number.
L2 N.C.	B-23	98-5 Jumper	Gray-Black Gray-Black	Breaks circuit to this coil.
L3 N.O.	K-27	30 65-1	Yellow Brown-White	Lites number 5 spotted number.
L4 N.O.	K-26	30 63-1	Yellow Brown-Yellow	Lites number 2 spotted number.
R1 N.C.	G-18	51-4 18-1	White-Red Red-Black	Extra ball proportioning.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
YELLOW ROLL OVER TRIP COIL	A-34	70 13-1	Orange Red-Yellow	Energized by control unit cam switch 8D when circuit is complete thru all other factors.
1 N. O.	F-23	60-6 93-7	Brown Gray-Black	Completes circuit to energize 2-5-8 trip when yellow rollover is hit.
2 N. C.	D-34	36-2 74-3	Yellow-Brown Orange-Green	Proportioning circuit for red star trip.
3 N. O.	J-5	38-9 30	Yellow-Black Yellow	Lites yellow rollover lite.
4 N. C.	A-34	13-1 Jumper	Red-Yellow Red-Yellow	Breaks circuit to this coil.
RED ROLLOVER TRIP COIL	A-34	70 74-3	Orange Orange-Green	Energized by control unit cam switch 8D when circuit is complete thru all other factors.
1 N. O.	G-23	60-6 91-7	Brown Gray-Red	Completes circuit to energize 2-5-8 trip when red rollover is hit.
2 N. C.	A-34	74-3 Jumper	Orange-Green Orange-Green	Breaks circuit to this coil.
3 N. O.	J-4	30 10-2	Yellow Red	Lites red rollover lite.
4 N. C.	D-33	13-1 14-1	Red-Yellow Red-Green	Proportioning circuit for yellow star trip.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
E. B. #1 TRIP COIL	A-4	70 23-11	Orange Blue-Yellow	Energized by switch on extra ball play relay.
1 N. O.	D-12	91-1 38-3	Gray-Red Yellow-Black	Completes circuit to ball lifter motor when playing for extra balls.
2 N. C.	B-5	20-3 Jumper	Blue Blue	Breaks circuit to this coil.
3 S.P.D. T.	H-26	75-10 65-4 74-8	Orange-White Brown-White Orange-Green	Extra ball proportioning.
4 S.P.D. T.	H-27	83 50-10 14-4	Black-Yellow White Red-Green	Proportioning switch.
E. B. #2 TRIP COIL	A-4	70 25-11	Orange Blue-White	Energized by switch on extra ball play relay.
L1 S.P.D. T.	D-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 a minus one to a zero position.
L2 N. C.	B-4	20-3 25-11	Blue Blue-White	Breaks circuit to this coil.
L3 S.P.D. T.	F-20	65-3 75-4 51-4	Brown-White Orange-White White-Red	Shuts off score advantages and completes circuit to extra ball steps, during extra ball play.
L4 S.P.D. T.	J-15	13-4 30 60	Red-Yellow Yellow Brown	Shuts off flashing of score lites and completes circuit to flash extra ball lites.
R1 N. O.	H-21	53 74-4	White-Yellow Orange-Green	Score and extra ball proportioning.
R2 N. C.	G-29	81-6 74-6	Black-Red Orange-Green	Breaks circuit to all other game advantages when playing for extra balls.

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TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
NUMBER 10 SELECTION TRIP	A-21	70 36-6	Orange Yellow-Brown	Energized by 7th step of number selection unit.
L1 N. O.	B-24	75-5 50-8	Orange-White White	Completes circuit to numbers selection step-up coil.
L2 N. C.	B-21	36-6 Jumper	Yellow-Brown Yellow-Brown	Breaks circuit to this coil.
L3 N. O.	K-4	30 43-3	Yellow Green-Yellow	Lites number 10 selection lite.
L4 N. C.	E-26	57 56-10	White-Orange White-Brown	Breaks numbers selection run circuit.
R1 N. C.	H-21	63-4 74-4	Brown-Yellow Orange-Green	Proportioning for score and extra ball steps.
NUMBER 25 SELECTION TRIP	A-22	70 48-6	Orange Green-Black	Energized by 6th step of numbers selection unit.
1 N. O.	J-4	30 18-2	Yellow Red-Black	Lites number 25 selection lite.
2 N. C.	B-22	48-6 Jumper	Green-Black Green-Black	Breaks circuit to this coil.
3 N. O.	B-25	13-5 50-8	Red-Yellow White	Completes circuit to numbers selection step-up coil.
4 N. C.	I-22	71-4 74-4	Orange-Red Orange-Green	Proportioning for score and extra ball steps.

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TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
NUMBERS SELECTION TRIP COIL	A-23	70 40-6	Orange Green	Energized by 4th step of numbers selection unit.
L1 S.P.D.T.	J-24	48-4 30 50-4	Green-Black Yellow White	Breaks circuit to arrow lites and completes circuit to number lites.
L2 N.C.	B-23	40-6 Jumper	Green Green	Breaks circuit to this coil.
L3 N.O.	E-24	15-6 25-6	Red-White Blue-White	Completes circuit to numbers feature step-up and escapement coils.
L4 N.C.	E-25	21 90	Blue-Red Gray	Numbers feature proportioning.
R1 N.O.	J-2	30 14-2	Yellow Red-Green	Lites 19, 20, 21, 22, selection feature lites.
R2 N.C.	I-22	27-8 74-4	Blue-Orange Orange-Green	Proportioning for score steps and extra ball steps.
R3 N.O.	E-27	80-6 18-6	Black Red-Black	Completes circuit to numbers selection step-up coil for multiple steps.
R4 N.O.	C-35	75 52-4	Orange-White White-Blue	Completes circuit to "select before 5th relay."
SELECT BEFORE 5th BALL	A-35	70 52-4	Orange White-Blue	Energized by control unit cam switch 8D when number selection relay is tripped.
1 N.O.	G-9	85-9 43-2	Black-White Green-Yellow	Keeps circuit to ball lifter cam switch alive.
2 N.C.	A-35	52-4 Jumper	White-Blue White-Blue	Breaks circuit to this coil.
3 S.P.D.T.	E-11	90-3 30 98-4	Gray Yellow Gray-Black	Directs circuit to energize selector lock relay coil at 4th or 5th step of timer unit.
4 S.P.D.T.	J-1	23-3 14-2 40-2	Blue-Yellow Red-Green Green	Directs circuit to flash "select now" lite at the 4th or 5th step of timer.

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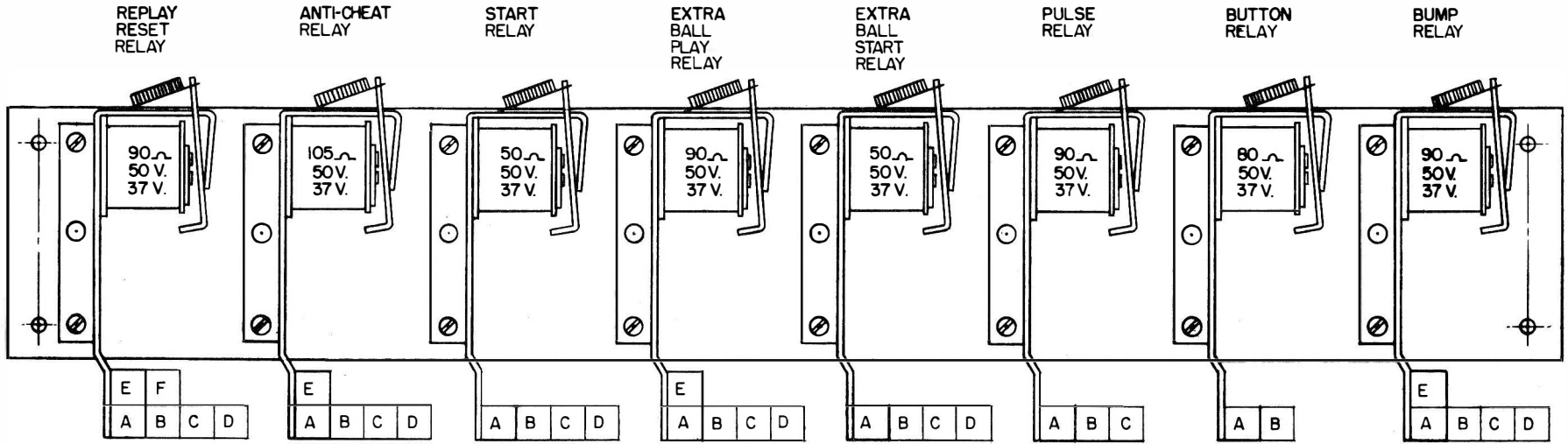
TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECTOR LOCK TRIP COIL	A-11	70 98	Orange Gray-Black	Energized by 4th or 5th step of timer unit, directed by "select before 5th" ball trip relay switch.
L1 N.O.	C-9	81-2 52-6	Black-Red White-Blue	Completes circuit to energize extra ball play relay.
L2 N.C.	B-11	98 Jumper	Gray Gray	Breaks circuit to this coil.
L3 N.O.	D-8	78-6 27-2	Orange-Black Blue-Orange	Completes circuit to timer step-up coil thru control unit cam switch 1A.
L4 N.C.	F-24	13-6 15-6	Red-Yellow Red-White	Breaks circuit to numbers selection feature step up and escapement coils.
R1 N.O.	J-31	50-4 20-2	White Blue	Completes circuit to "selected" number in center and super cards.
R2 N.O.	I-16	56-7 18-4	White-Brown Red-Black	Completes replay circuit, when relay is tripped.
R3 N.C.	L-1	71-5 61-7	Orange-Red Brown-Red	Shuts off "select now" lite.
CORNERS TRIP COIL	A-35	70 90-6	Orange Gray	Energized by control unit cam switch #8D, when spotting disc wipers stop on correct position.
1 N.O.	J-12	98-10 30	Gray-Black Yellow	Lites "corners" lite.
2 N.O.	E-16	13-8 21-8	Red-Yellow Blue-Red	Completes circuit for corners replay scoring.
3 N.C.	A-35	90-6 Jumper	Gray Gray	Breaks circuit to this coil.

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TRIP RELAY BANK CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TILT TRIP COIL	A-12	70 14-5	Orange Red-Green	Actuated by any tilt switch or plumb bob.
L1 S. P. D. T.	I-10	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.	G-2	20P 60P	Blue Brown	Opens circuit to control unit and mixer unit motors, when game is tilted.
L3 N. C.	L-23	20-4 10	Blue Red	Opens 17 volt circuit.
I4 S. P. D. T.	L-21	38 81 41-9	Yellow-Black Black-Red Green-Red	Shuts off 6 volt circuit and lites tilt lite.
R1 N. C.	B-12	14-5 Jumper	Red-Green Red-Green	Breaks circuit to this coil.



CODE

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

8 RELAY BANK PICTORIAL VIEW
 NUMBERS CORRESPOND TO SWITCH CHART

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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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-7	53-2 13-9 27-4	White-Yellow Red-Yellow Blue-Orange	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.	E-7	50-2 75-2	White Orange-White	Lock-in switch for this relay.
D N. C.	C-5	20-3 25-10	Blue Blue-White	Opens extra ball trip and extra ball start relays during cancel.
E N. C.	D-3	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
F N. O.	B-6	61-5 41-6	Brown-Red Green-Red	In series with replay meter.

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8 RELAY BANK SWITCH CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
ANTI-CHEAT RELAY COIL	A-37	78-4 70	Orange-Black Orange	Energized thru cam switch #5, its switches protect replay and light circuits.
A N. O.	L-20	54-7 38	White-Green Yellow-Black	Opens 6 volt circuit to lites.
B N. O.	L-22	20-4 80-1	Blue Black	Opens 17 volt circuit when this relay drops out.
C N. O.	C-38	10-6 78-4	Red Orange-Black	Lock-in switch for this relay.
D N. O.	B-9	91-2 93-6	Gray-Red Gray-Yellow	Completes circuit to extra ball play relay.
E N. C.	G-6	50-2 75-2	White Orange-White	Energizes replay reset relay when this relay drops out.
START RELAY COIL	A-3	21-6 70	Blue-Red Orange	Energizes every time a coin is played or when a red button is pressed.
A N. C.	H-30	81-6 14-8	Black-Red Red-Green	Opens circuit to game advantage circuits.
B N. C.	C-9	52-6 91-2	White-Blue Gray-Red	opens circuit to extra ball play relay when this relay is energized.
C N. O.	E-10	85 13-3	Black-White Red-Yellow	Completes circuit to timer cam index coil.
D N. O.	H-4	48-2 63-2	Green-Black Brown-Yellow	Lock-in switch for this relay.

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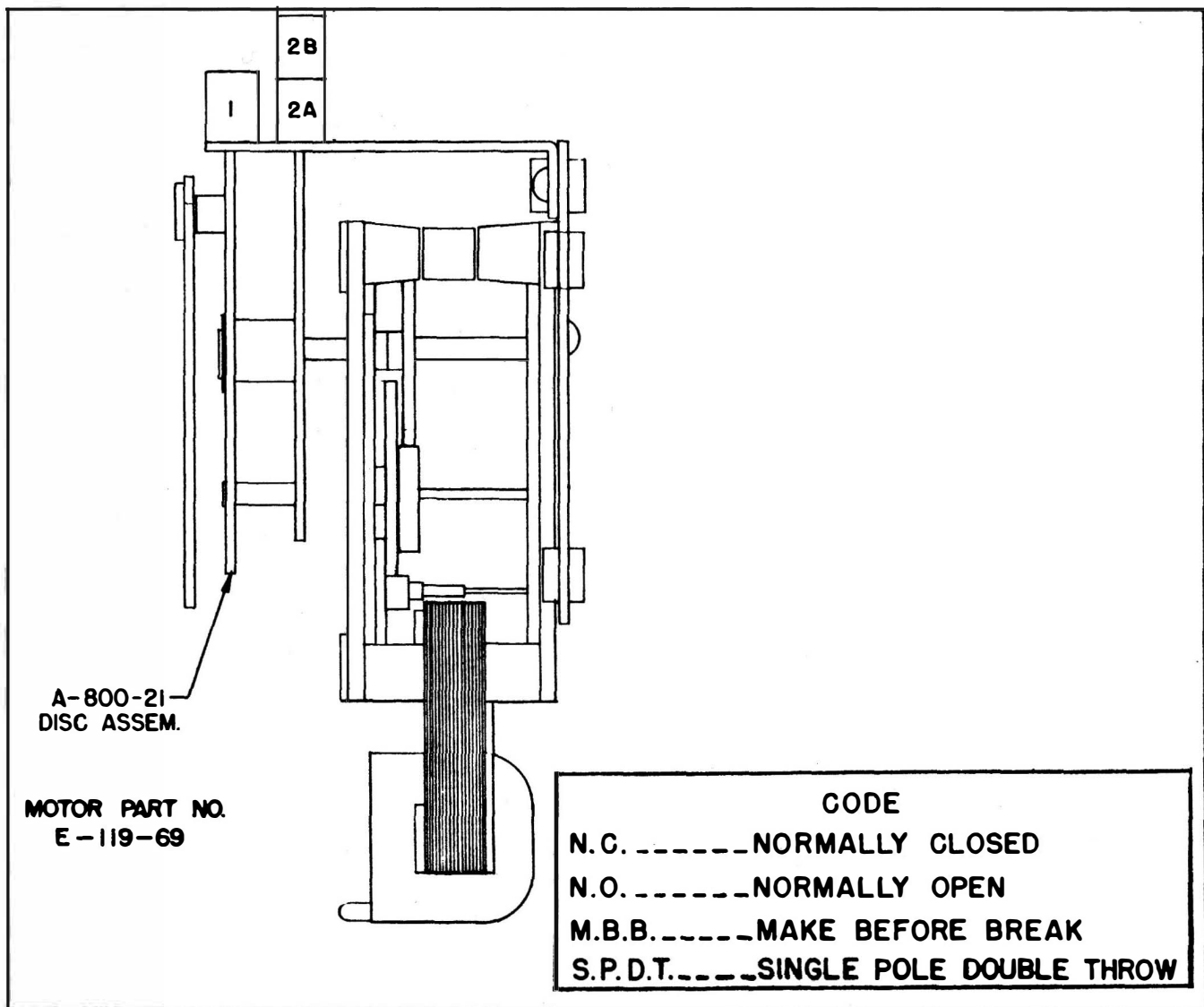
8 RELAY BANK SWITCH CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL PLAY RELAY COIL	A-8	93-6 70	Gray-Yellow Orange	Energizes when yellow button is pressed.
A S.P.D.T.	E-4	50-2 51-2 63-2	White White-Red Brown-Yellow	Directs circuit to regular start relay or extra ball start relay.
B N.O.	E-5	51-2 25-10	White-Red Blue-White	Completes circuit to extra ball start and extra ball trip relay.
C N.O.	F-9	15-2 74-2	Red-White Orange-Green	Lock-in switch for this relay.
D N.O.	K-21	21-4 30	Blue-Red Yellow	Lites extra ball light in back box.
E N.C.	J-5	83-4 30	Black-Yellow Yellow	Opens flash circuit to selection feature lites.
EXTRA BALL START RELAY COIL	A-5	20-3 70	Blue Orange	Energizes when extra ball play relay is energized.
A N.C.	C-18	78 75-6	Orange-Black Orange-White	Opens circuit to extra ball step-up coil during spin of control unit.
B N.O.	C-9	85 93-2	Black-White Gray-Yellow	Operates mixer latch coil and timer index coil during extra ball play.
C N.O.	H-5	48-2 25-10	Green-Black Blue-White	Lock-in switch for this relay.

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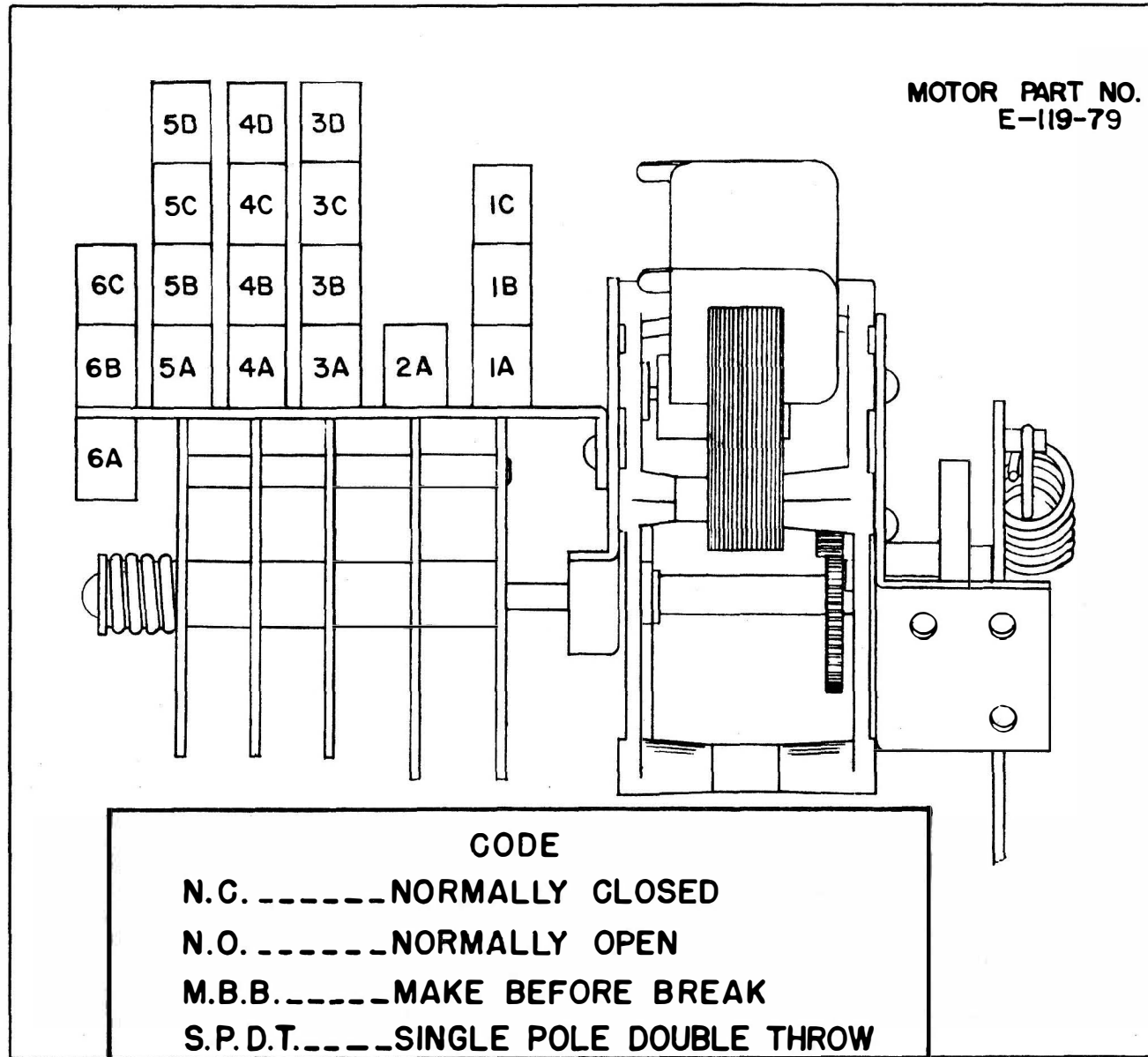
8 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
PULSE RELAY COIL	A-32	41-2 70	Green-Red Orange	Energized by bump solenoid end of stroke switch at 4th to 10th step of bump feature unit.
A S.P.D.T.	C-33	52-2 41-2 78-2	White-Blue Green-Red Orange-Black	Breaks circuit to button relay and completes circuit to this relay.
B N.C.	F-1	10P 30-P	Red (Plastic) Yellow (Plastic)	Breaks circuit to bump solenoid coils.
BUTTON RELAY COIL	A-33	78-2 70	Orange-Black Orange	Energized by button switch when bump feature unit is at the 4th to 10th step.
A N.O.	D-33	38-6 52-2	Yellow-Black White-Blue	Lock-in switch for this relay.
B N.O.	G-1	10P 80P	Red (Plastic) Black (Plastic)	Completes circuit to bump solenoid coils.
C N.O.	H-32	21-3 45-5	Blue-Red Green-White	Completes circuit to bump feature unit escapement reset coil.
BUMP RELAY COIL	A-31	78-3 70	Orange-Black Orange	Energized thru bump feature unit disc.
A S.P.D.T.	G-20	81-5 80-5 75-4	Black-Red Black Orange-White	Proportioning switch for scores and extra balls.
B N.O.	G-31	91-5 78-3	Gray-Red Orange-Black	Lock-in switch for this relay.
C N.O.	D-32	43-4 38-6	Green-Yellow Yellow-Black	Completes circuit to keep button switch alive.
D N.O.	J-9	57-3 30	White-Orange Yellow	Lites bump indicator lite.
E S.P.D.T.	J-7	30 56 41-3	Yellow White-Brown Green-Red	Completes circuit to bump feature arrow lites also 1-10 bump lites.



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-13	30 91-1	Yellow Grey-Red	Carry-over switch for ball lifter motor.
2A N.O.	E-8	43-2 27-2	Green-Yellow Blue-Orange	Energizes timer unit step-up coil.
2B N.O.	D-11	90-3 98-3	Gray Gray-Black	Completes circuit to selector lock trip relay.



SHUTTER MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART

SHUTTER MOTOR CAM 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-39	30 90-7	Yellow Gray	Safety switch for reset coils.
1B	N. O.	G-9	30 14-3	Yellow Red-Green	Carry thru switch for shutter motor.
1C	N. C.	I-14	21-3 93	Blue-Red Gray-Yellow	Completes circuit to replay scoring circuit.
2A	N. C.	F-13	31-3 36-3	Yellow-Red Yellow-Brown	Completes circuit to ball lifter motor. (closed normally) Open during shutter cycle.
3A	N. O.	D-39	85-10 90-7	Black-White Gray	Resets super card unit, extra ball unit, and numbers selection full reset.
3B	N. O.	G-2	20-P 70-P	Blue (Plastic) Orange (Plastic)	Resets trip relay banks.
3C	N. O.	D-38	90-7 98-9	Gray Gray-Black	Resets score unit, replay counter unit and bump feature unit.
3D	N. C.	G-31	21-3 91-5	Blue-Red Gray-Red	Hold in circuit for bump relay.
4A	S. P. D. T.	G-24	60-6 21-3 61-6	Brown Blue-Red Brown-Red	Completes circuit to 2, 5, 8 trip coil, numbers unit step-up and escapement coil when shutter is closed. Completes circuit to number 10, 25, 16 & numbers selection trip coils when open.
4B	N. O.	G-10	14-3 18-3	Red-Green Red-Black	(Closed when shutter is open) Completes circuit to shutter motor.
4C	N. O.	H-10	18-3 36-4	Red-Black Yellow-Brown	Starts shutter motor if game is tilted when shutter is open.
4D	N. O.	B-30	40-7 43-4	Green Green-Yellow	Completes circuit to supercard step-up coil.
5A	S. P. D. T.	D-9	14-3 13-3 93-2	Red-Green Red-Yellow Gray-Yellow	Breaks circuit to shutter motor and makes circuit to timer index coil.
5B	N. C.	H-8	21-3 65-2	Blue-Red Brown-White	Safety switch for timer reset.
5C	N. O.	E-17	30 31-5	Yellow Yellow-Red	Completes circuit to step corners replay counter to a reset position.
5D	N. O.	B-28	81-7 83-7	Black-Red Black-Yellow	Completes circuit to bump feature step-up coil.
6A	N. O.	H-32	30 45-5	Yellow Green-White	Completes circuit to bump feature escapement coil.
6B	N. O.	H-7	30 71-9	Yellow Orange-Red	Completes circuit to timer reset coil.
6C	N. O.	D-39	90-7 27-6	Gray Blue-Orange	Completes circuit to numbers selection full reset coil.

MISCELLANEOUS PARTS

<u>PART NO.</u>	<u>NAME OF PART</u>
G-233	Back glass
M-168-15	Ball 1-1/8"
AS-1315	Ball gate and switch assembly
C-178-3	Button - Red plastic
C-178-4	Button - Yellow plastic
C-178-5	Bump Button - Green plastic
P-2210-29	Bump Button Plate, Left
P-2210-30	Bump Button Plate, Right
C-274-1	Button - Top panel
P-1900-13	Cash box
E-101-51	Coil for coin kicker assembly
E-101-45	Coil for coin lock out
E-184-96	Coil for moving panel
AS-277-26	Coin switch assembly - complete 5¢
AS-277-27	Coin switch assembly - complete 10¢
E-130-8	Counter 48 volt
CA-567-16	Front door only
CA-701-2	Front moulding only
A-254-27	Hinge and bracket - Front door
AS-1316	Kicker assembly - front door
CA-350-1	Legs
M-163-4	Leg adjuster
C-258-9	Light shield post - Top panel
M-281-6	Lock and keys - Front door
M-281-12	Lock and keys - Back door - Keyed alike
M-281-14	Lock and keys - Light box - Keyed alike
P-2210-8	Plate - Coin entry - 5¢
P-2210-9	Plate - Coin entry - 10¢
R-203	Rebound rubber - Top panel
M-170	Rebound spring - Double post - Top panel
P-2567-1	Ring for Selector knob
P-2768	Ring for Yellow and Red plastic button
R-243	Rubber ring - Yellow post - Top panel
R-243-2	Rubber ring - Red post - Top panel
AS-187-12	Shooter assembly complete
A-1540	Shooter housing
A-100-7	Shooter rod
SP-200-24	Shooter spring (long)
SP-233	Shooter spring (Barrel)
R-108-3	Shooter tip
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢
SW-100-8	Switch for bump button
SW-010-26	Switch for AS-1315
E-122-19	Transformer
M-412-2	Wire wiper for Slip ring

<p>PIN-GAME LUBRICANT AVAILABLE IN ONE POUND CANS</p>
