

Bally®

BIG-TIME

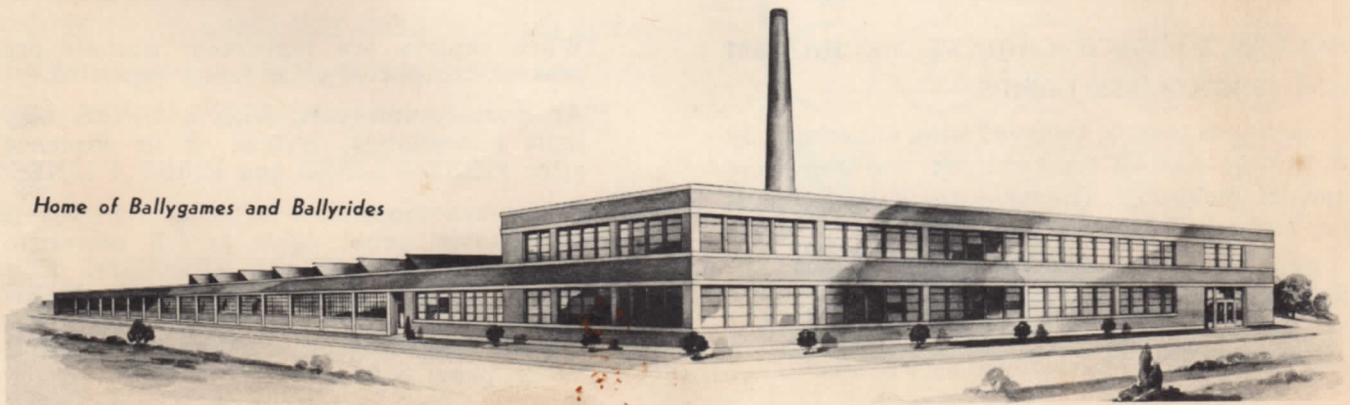
OPERATING INSTRUCTIONS

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



INSTALLATION

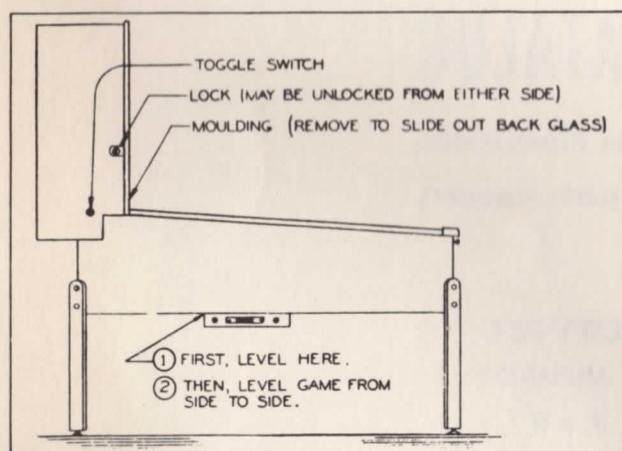
AND GENERAL INSTRUCTIONS

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.

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

BIG TIME amusement game by Bally.

1 Card (WITH 5 VARIABLE LINES), 2 Super-Cards.

ALL 5 LINES MAY BE MAGIC-LINES: Arrow-lights, pointing to panels that indicate Magic (moveable) Lines, flash for each coin* deposited and advance at mystery intervals.

When light advances to fourth arrow, panel lights to tell player that Magic (moveable) Lines are

FIRST 3 LINES

Instruction-panel directly above FIRST 3 LINES panel tells player that

LIT PANEL BELOW INDICATES MAGIC-LINES

After lighting FIRST 3 LINES, player may deposit additional coins* to light other scoring-advantages, including panel that indicates Magic (moveable) Lines as

FIRST 4 LINES

After lighting FIRST 4 LINES, player may deposit additional coins* to light other scoring-advantages, including panel that indicates Magic (moveable) Lines as

ALL 5 LINES**

When first panel indicating Magic-Lines is lit, panel lights to tell player to

TURN KNOBS BEFORE SHOOTING 4TH BALL***

Depending on panel lit, after third ball is shot, player may turn knobs on front-moulding to move (a) first 3 vertical lines of Card, (b) first 4 vertical lines or (c) all 5 vertical lines up and down, as illustrated on page 139 and explained in instruction-panel on backglass:

WHEN MAGIC-LINES PANEL IS LIT MOVE LINES INDICATED UP OR DOWN BY TURNING KNOBS

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

**At mystery intervals, ALL 5 LINES may light immediately, instead of in sequence after FIRST 3 LINES and FIRST 4 LINES.

***Knobs are inoperative after fourth ball is shot—unless panel lights to tell player to TURN KNOBS BEFORE SHOOTING 5TH BALL. Warning-panel with words TURN KNOBS NOW lights after third or fourth ball is shot, depending on whether 4TH or 5TH BALL panel is lit.

HOW MAGIC-LINES WORK

Top picture shows Card with all numbers in normal position. Player has already lit 1, 16 and 22 by shooting first 3 balls into corresponding holes, but numbers are not lined up in a scoring line up. With Magic-Lines lit, player can turn his lop-sided line-up into a scoring line-up in 3 different ways.

Middle Card shows first possible method of straightening out 3 lit numbers to score 3-in-line. First line of Card is moved DOWN. Each number in first line moves down one circle, bottom number (11) jumping to top circle. Lights transfer with movement of numbers, lining up 1-22-16 as a DIAGONAL 3-IN-LINE.

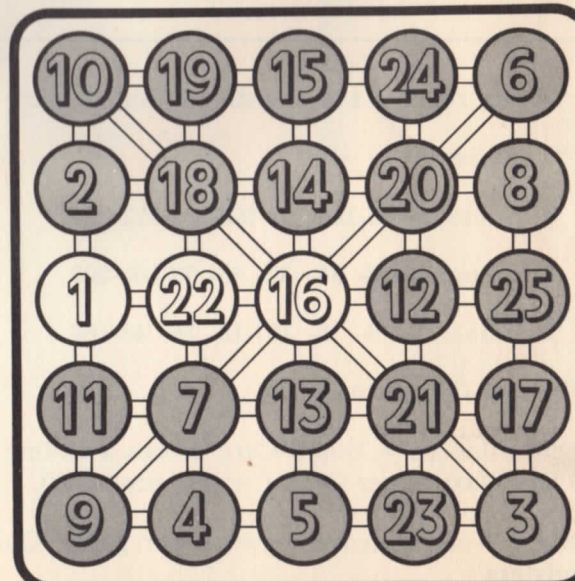
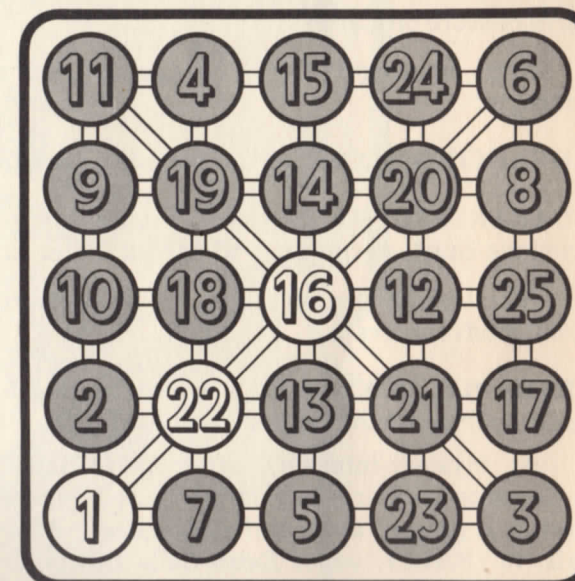
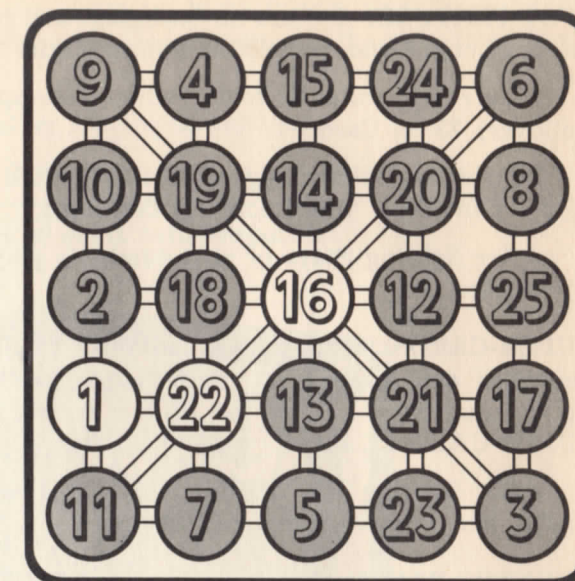
Bottom Card shows another method of lining up the 3 lit numbers. First and second lines are moved UP. Each number moves up one circle, top numbers in each line (9 and 4) dropping to bottom circles. Lit numbers 1, 22 and 16 are then lined up as HORIZONTAL 3-IN-LINE.

When FIRST 4 LINES or ALL 5 LINES is lit, first 4 lines or all 5 lines may be moved up and down to line up lit numbers.

EXTRA TIME: After panel with words "TURN KNOB BEFORE SHOOTING 4TH BALL", player may deposit additional coins* to light panel with words "TURN KNOBS BEFORE SHOOTING 5TH BALL" and other scoring advantages.

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

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



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

Player who hits Rollover, when corresponding Star is lit, lights (Red Rollover) 10 or (Yellow Rollover) 25 on Card.

In addition to spotting by hitting lit roll-overs numbers 10 or 25 are directly spotted on Card at mystery-intervals when coin* is deposited.

After lighting Stars or spot-numbers, player may deposit additional coins* to light other scoring-advantages.

SUPER-CARDS: Arrow-lights pointing to SUPER-CARD above each Super-Card flash for each coin* deposited and advance at mystery-intervals. When light advances to fourth arrow, SUPER-CARD lights, qualifying player for in-line scores and corners-scores on Super-Card with corresponding SUPER-CARD lit.

After lighting left SUPER-CARD, player may deposit additional coins* to light right SUPER-CARD 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.

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

***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 300.

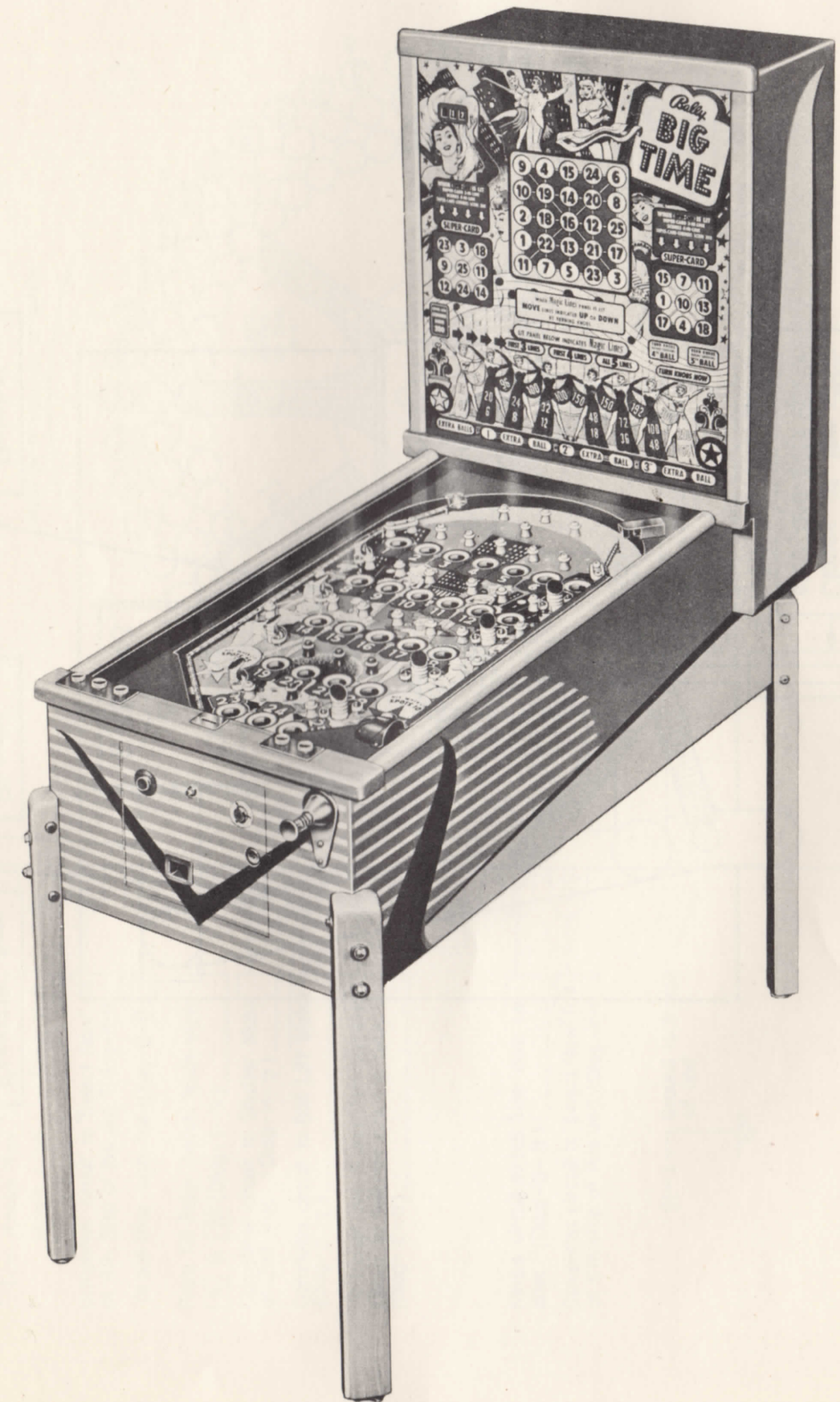
Only 1 4-in-line score registers per game. Only highest in-line score registers. Only first corners score registers.

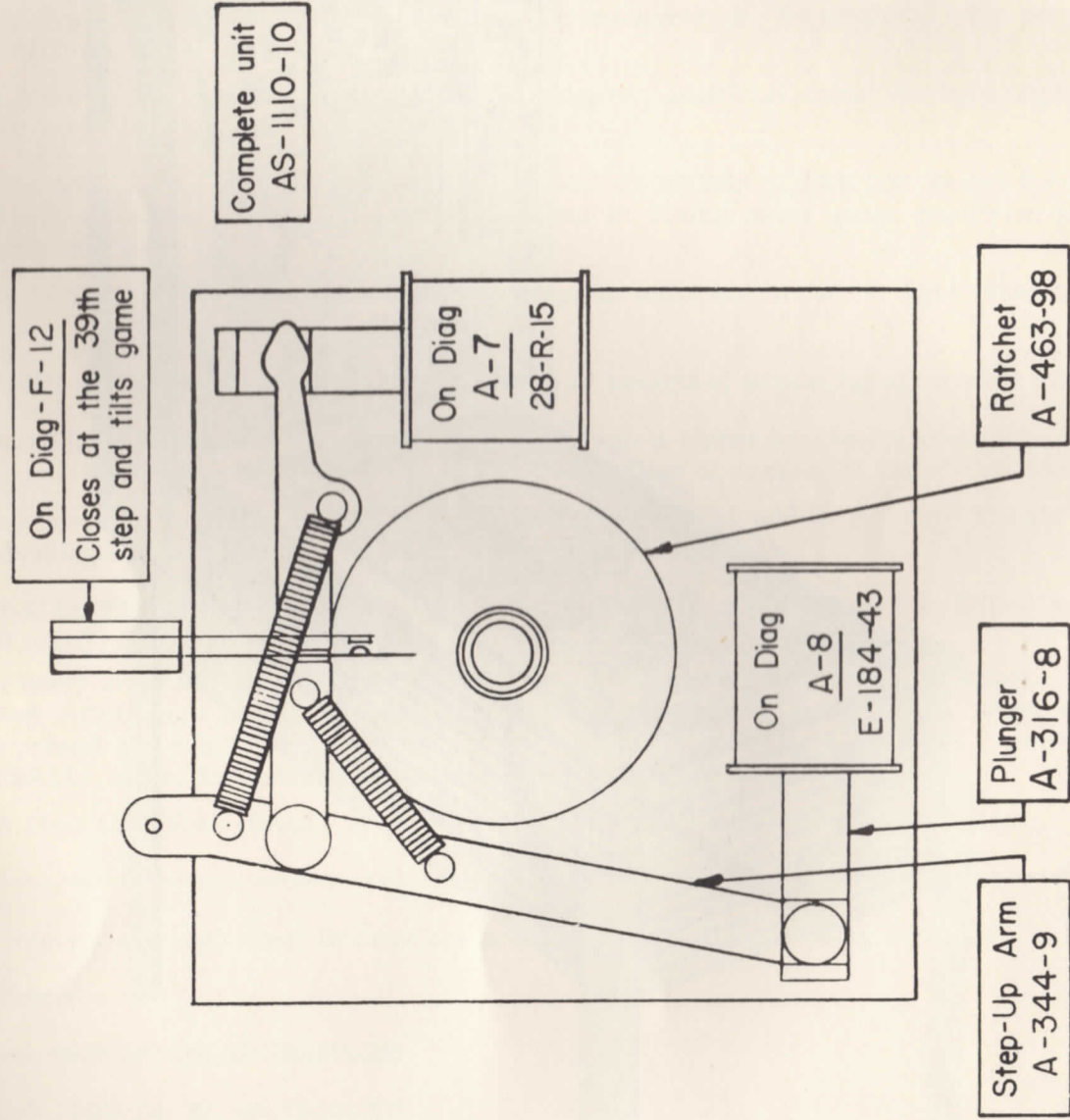
After shooting first extra ball, player may continue to press Extra-Balls Button and deposit additional coins* to light (2nd) (EXTRA) (BALL) in order to receive second extra ball and to light (3rd) (EXTRA) (BALL) in order to receive third extra ball.

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

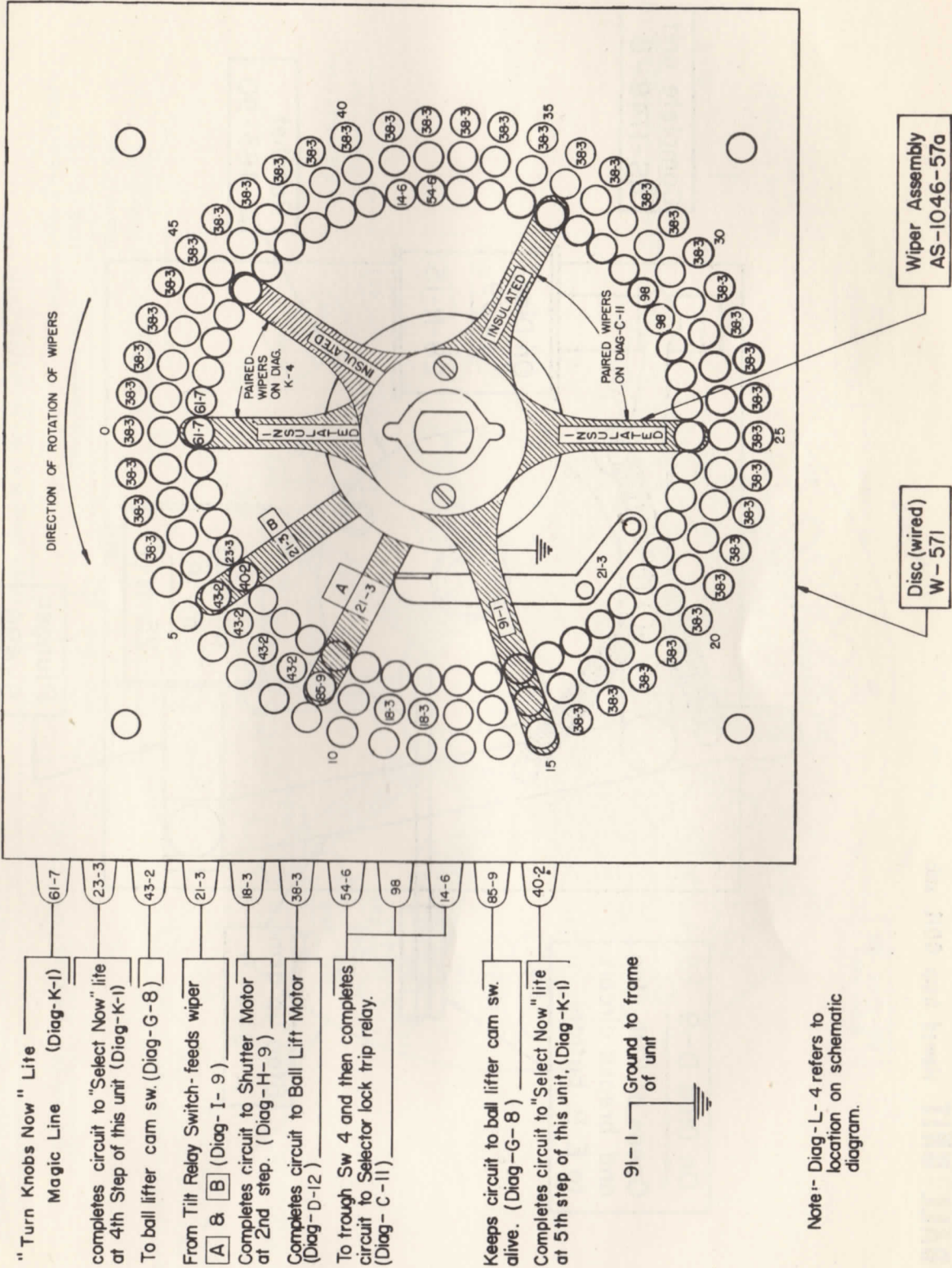
After playing for extra balls, player may not play to light other scoring-advantages.

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



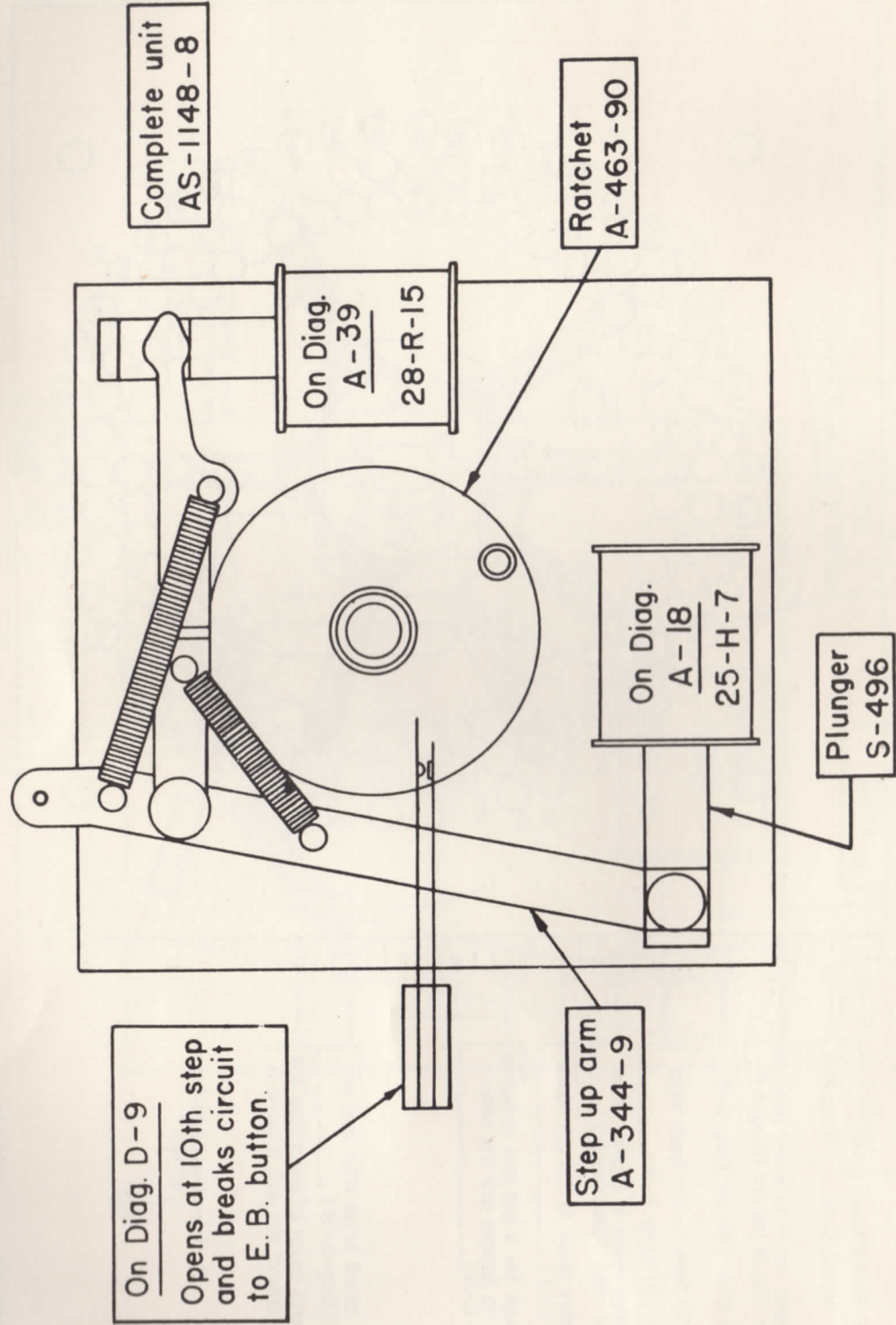


TIMER UNIT viewed from **BUTTON** or **WIPER** side
39 step unit. Wipers shown in zero or reset position

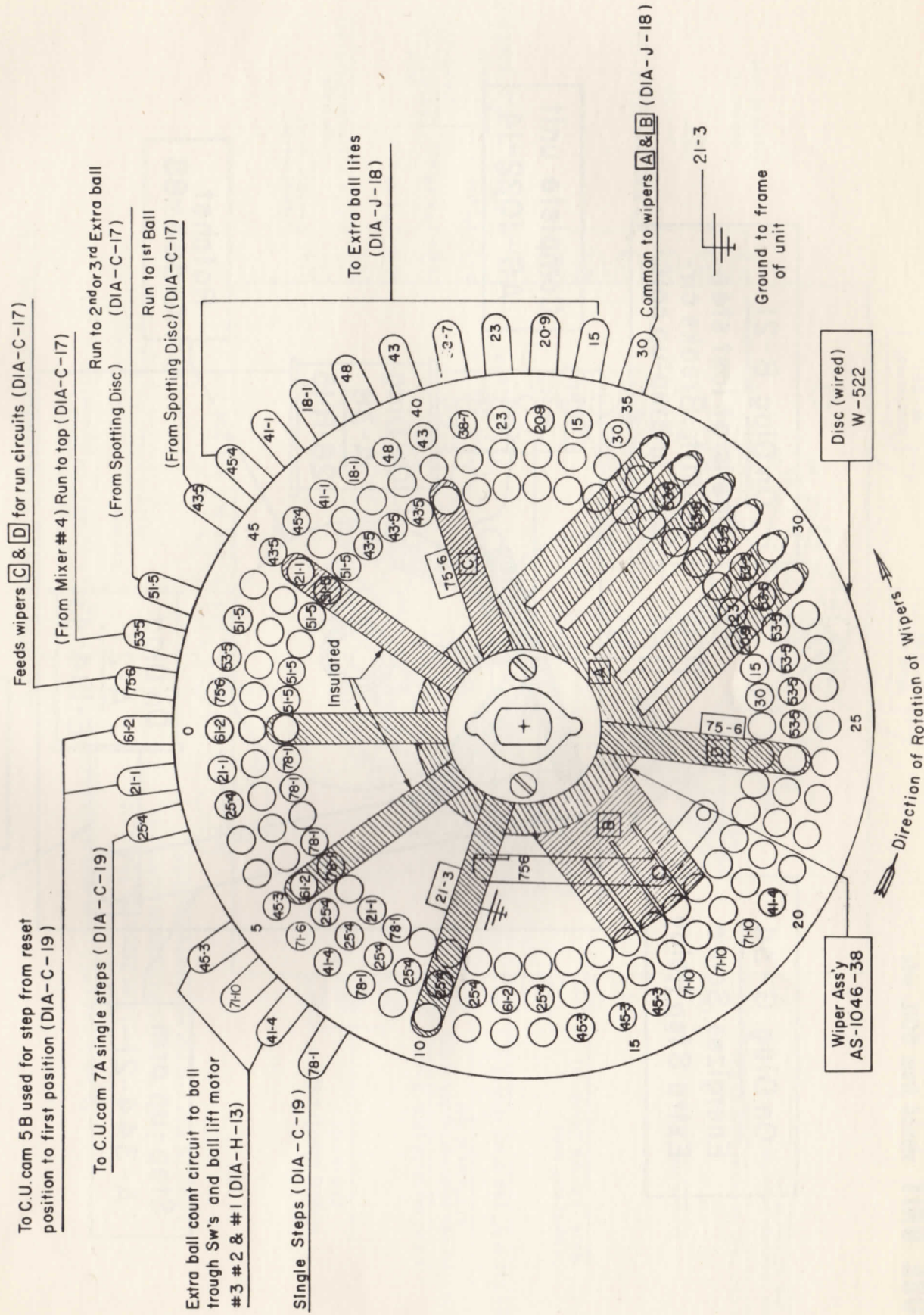


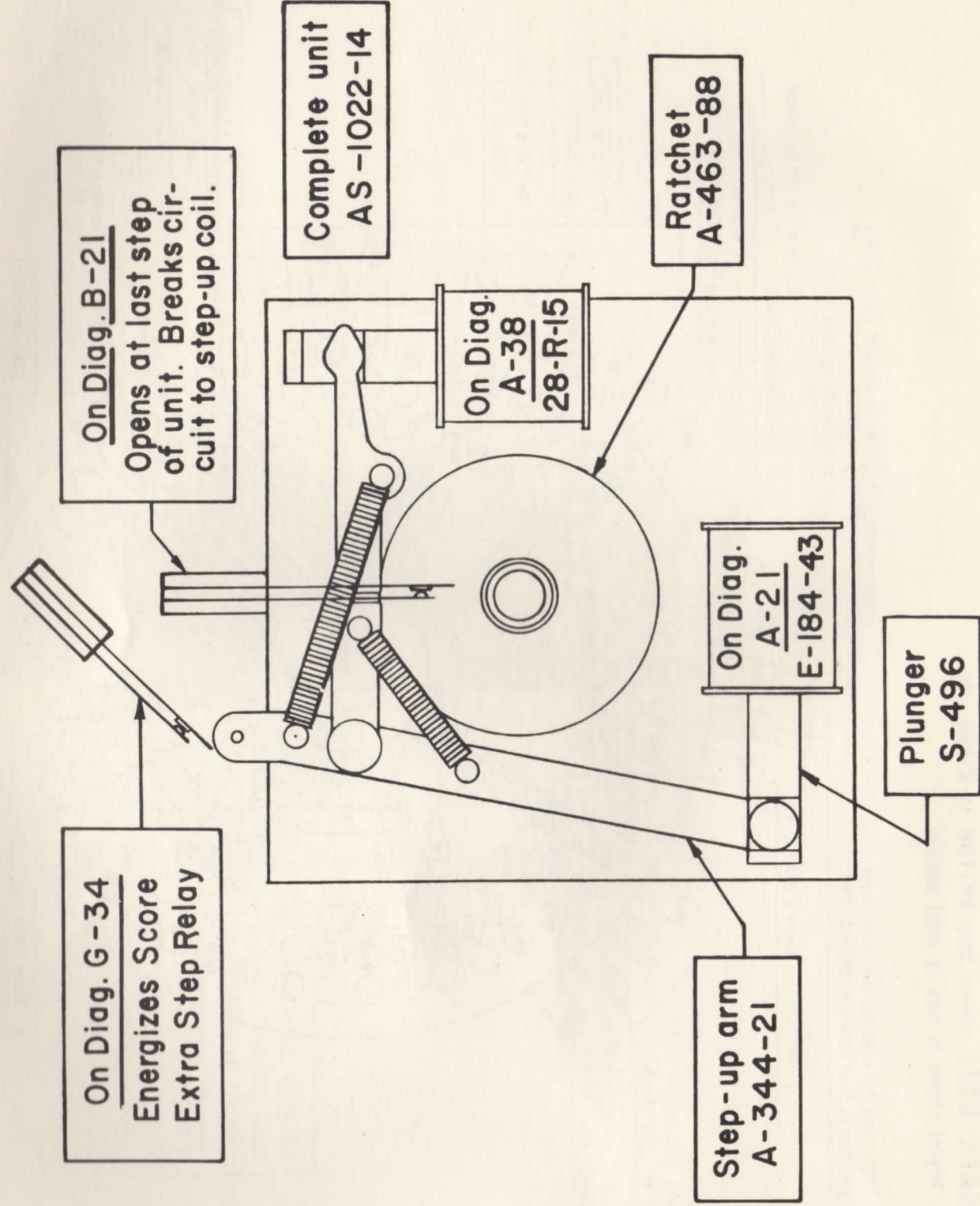
Note:- Diag-L-4 refers to location on schematic diagram.

EXTRA BALL UNIT viewed from COIL side

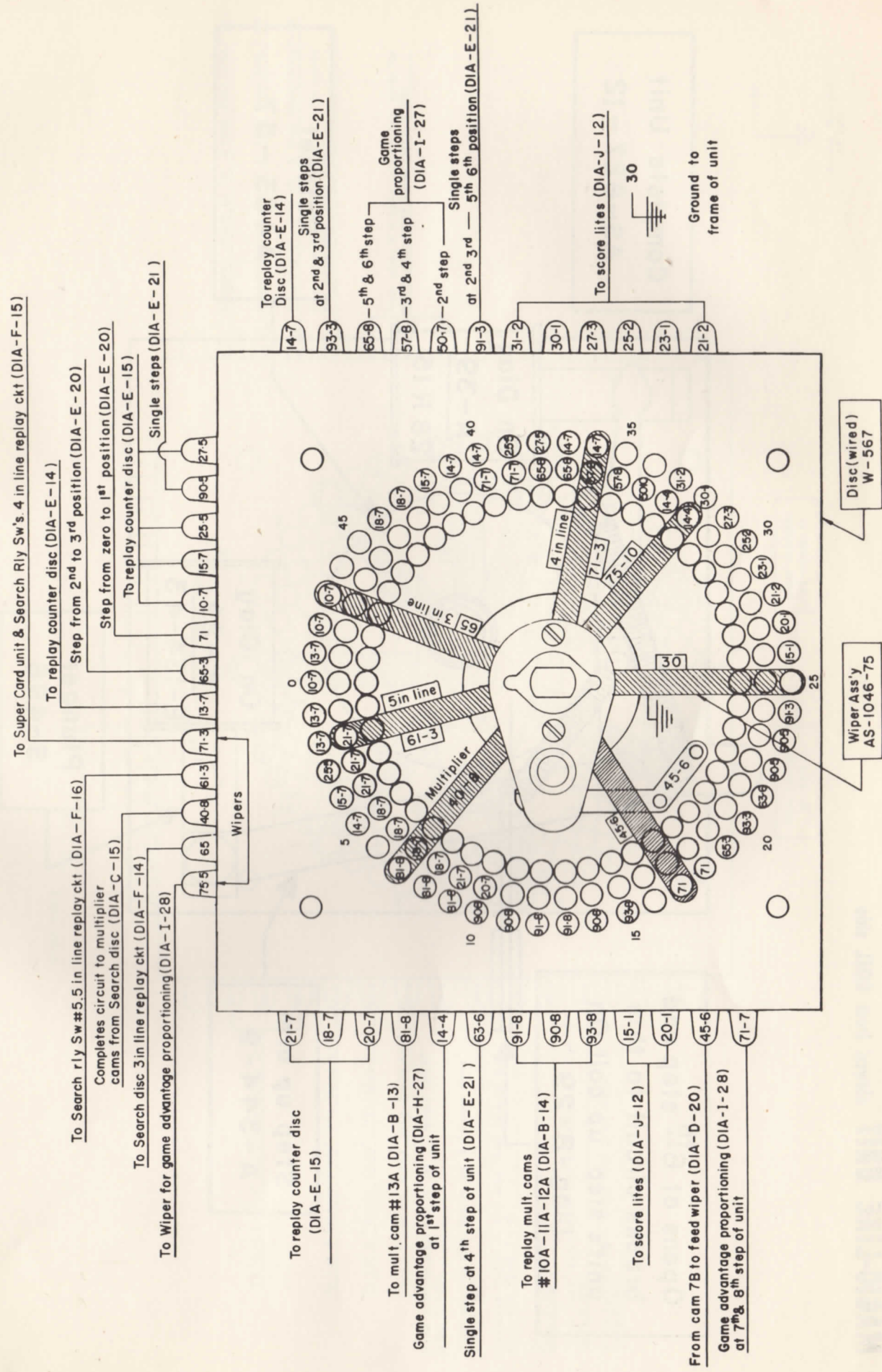


EXTRA BALL UNIT viewed from **BUTTON** or **WIPER** side 10 step unit. Wipers shown in zero or reset position

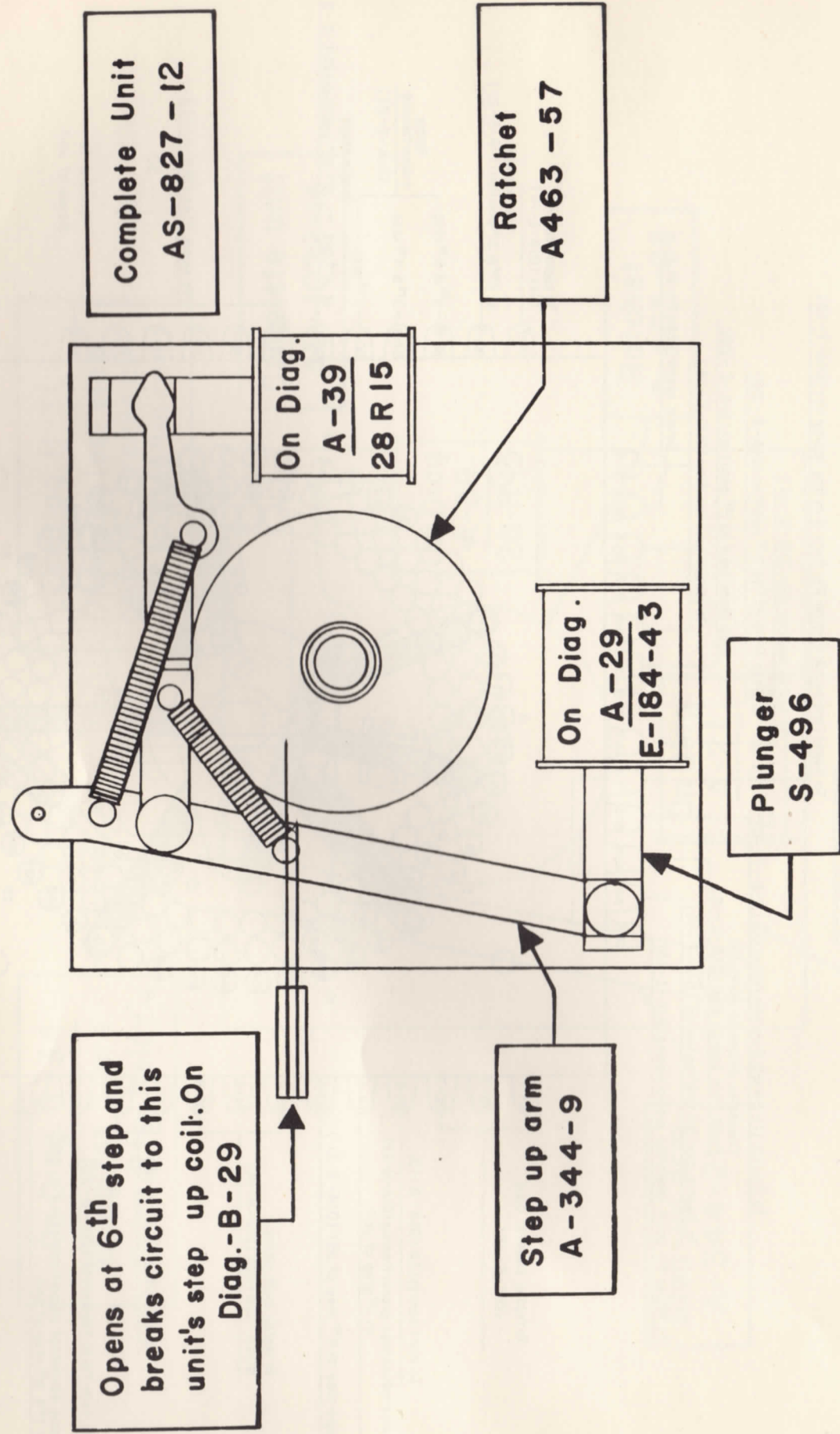




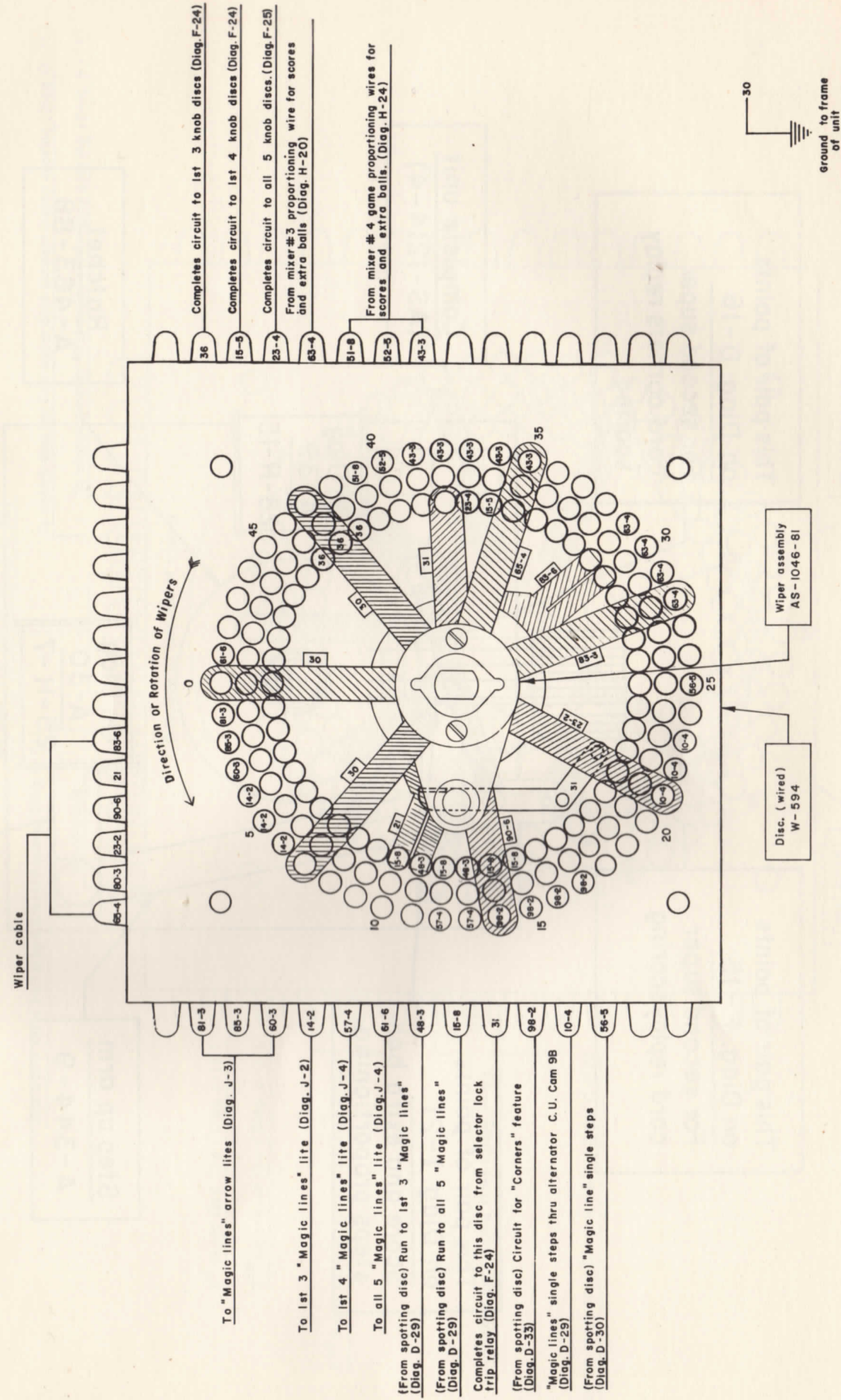
SCORE UNIT viewed from **BUTTON** or **WIPER** side
8 step unit. Wipers shown in zero or reset position

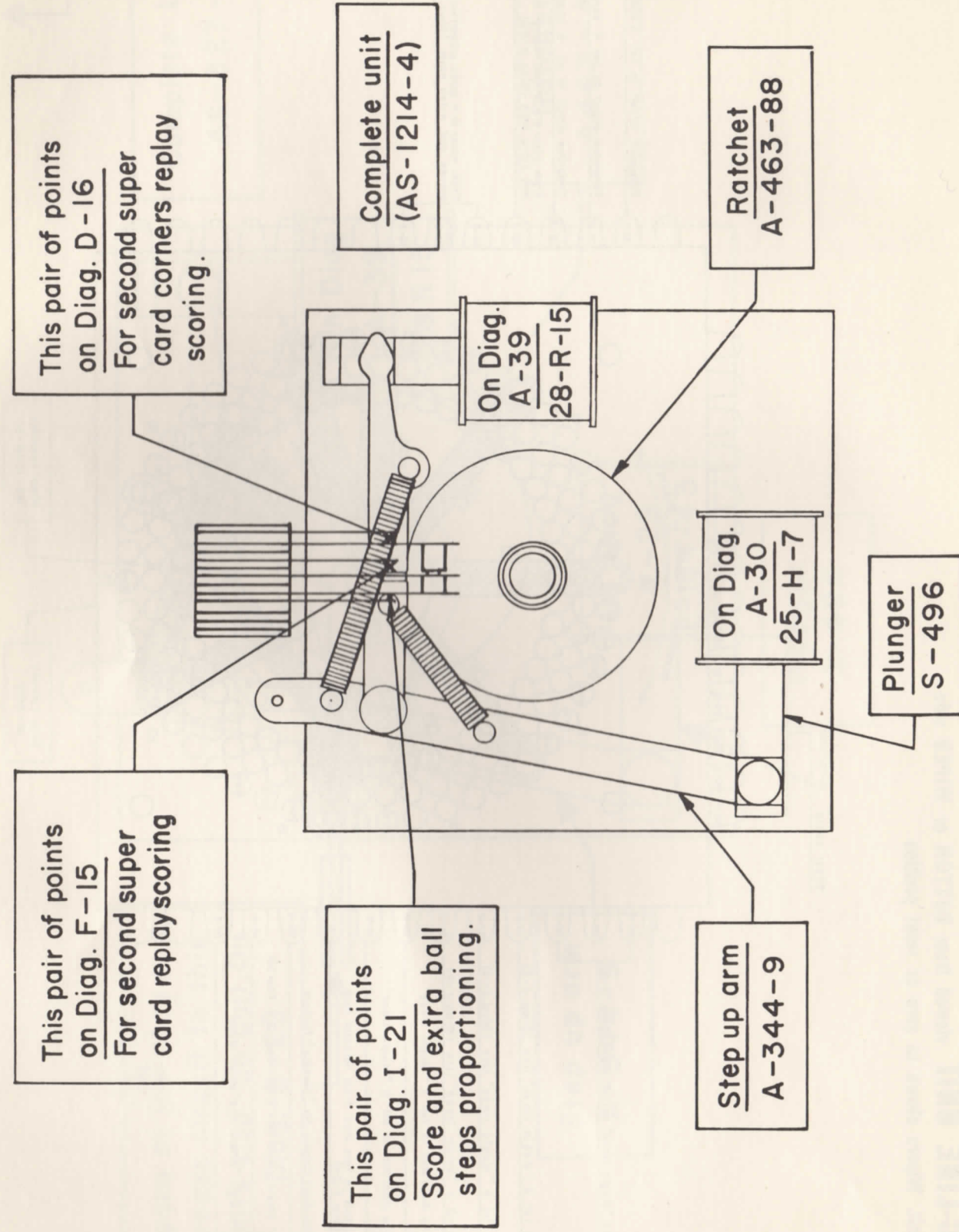
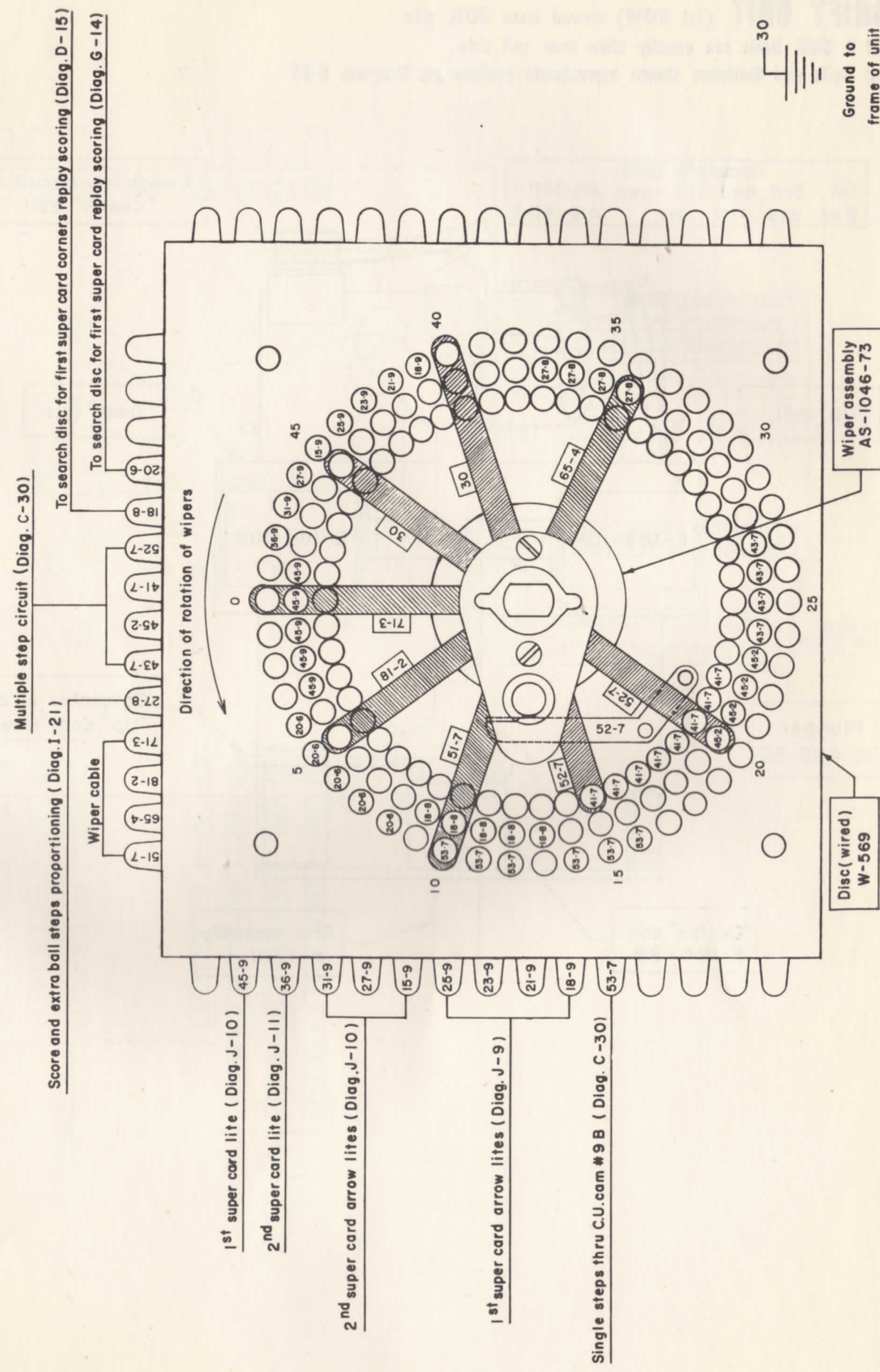


MAGIC-LINE UNIT viewed from COIL side

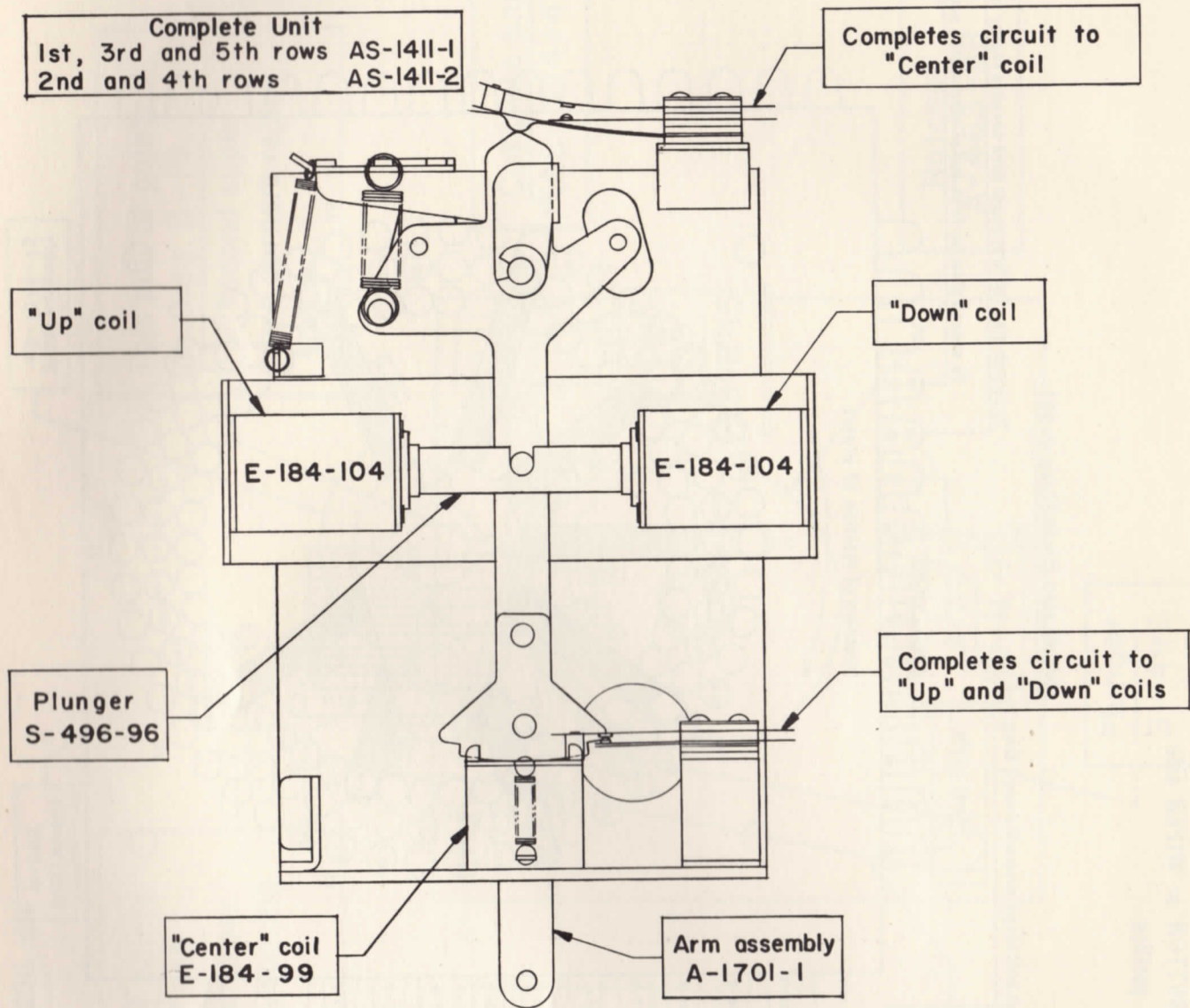


MAGIC-LINE UNIT viewed from BUTTON or WIPER side
6 step unit. Wipers shown in zero or reset position

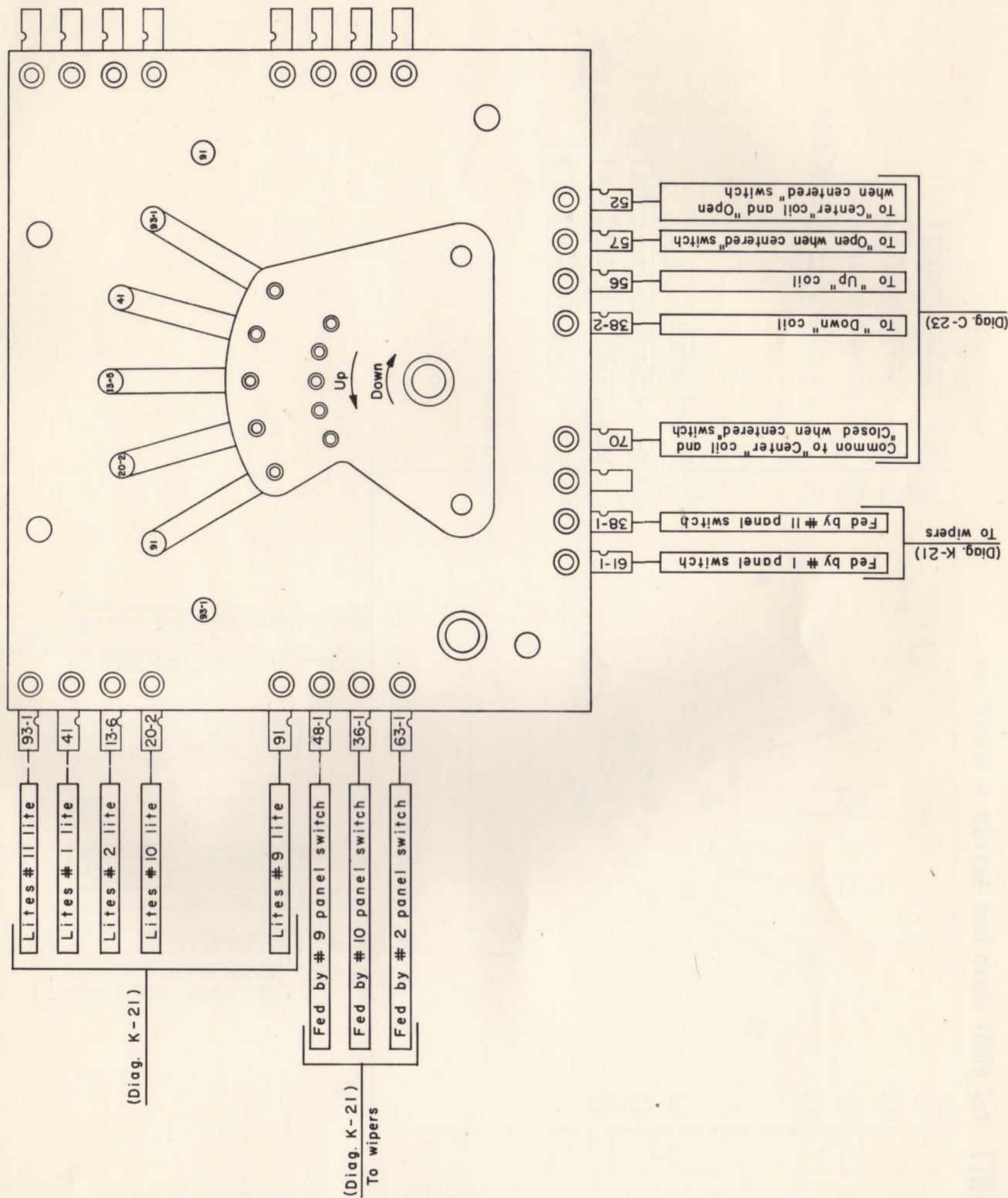


SUPER-CARD UNIT viewed from COIL side**SUPER-CARD UNIT** viewed from **BUTTON** or **WIPER** side
8 step unit. Wipers shown in zero or reset position

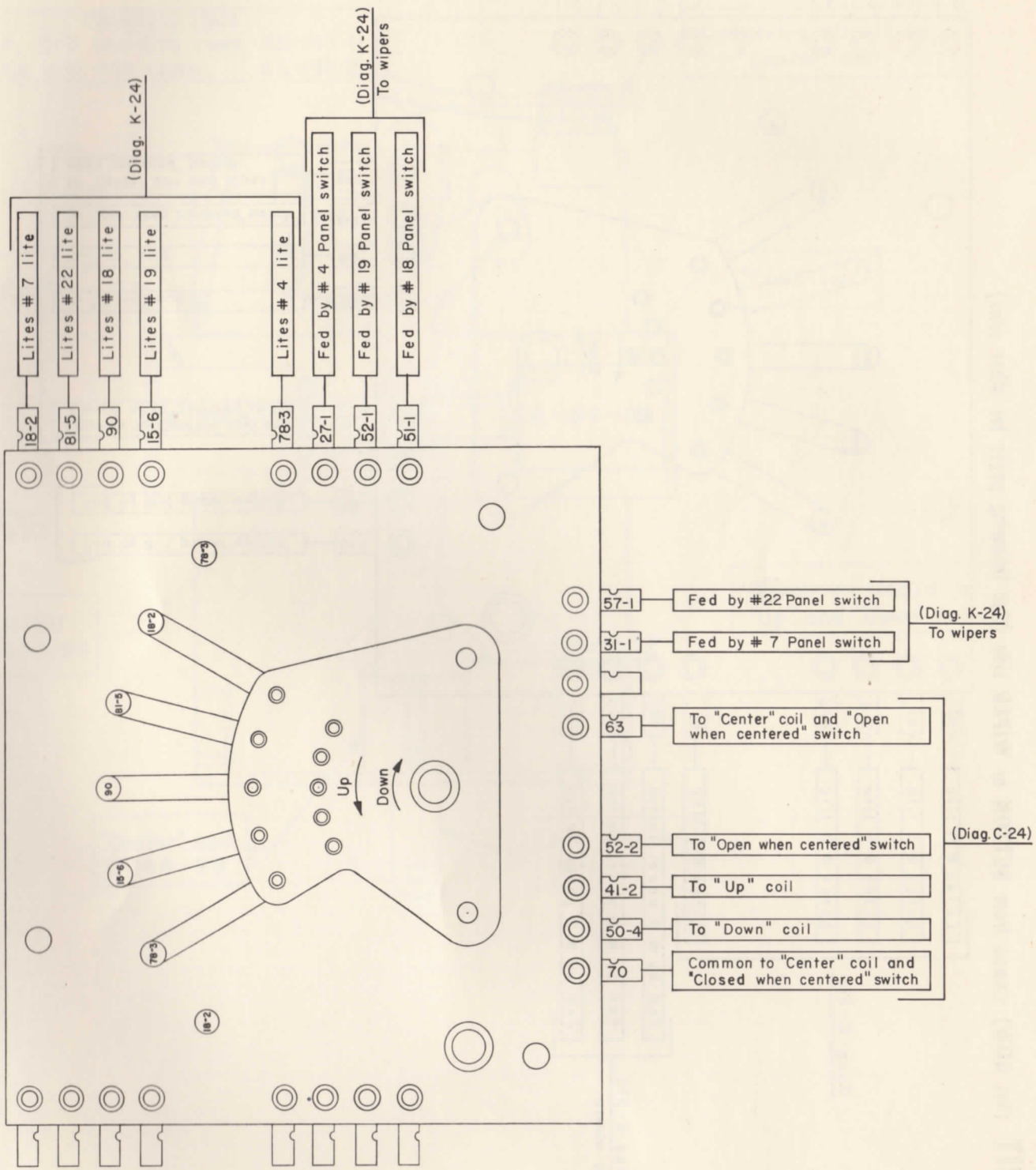
SHIFT UNIT (1st ROW) viewed from COIL side
 All 5 Shift Units are exactly alike from coil side
 All Coils and Switches shown approximate position on Diagram B-24



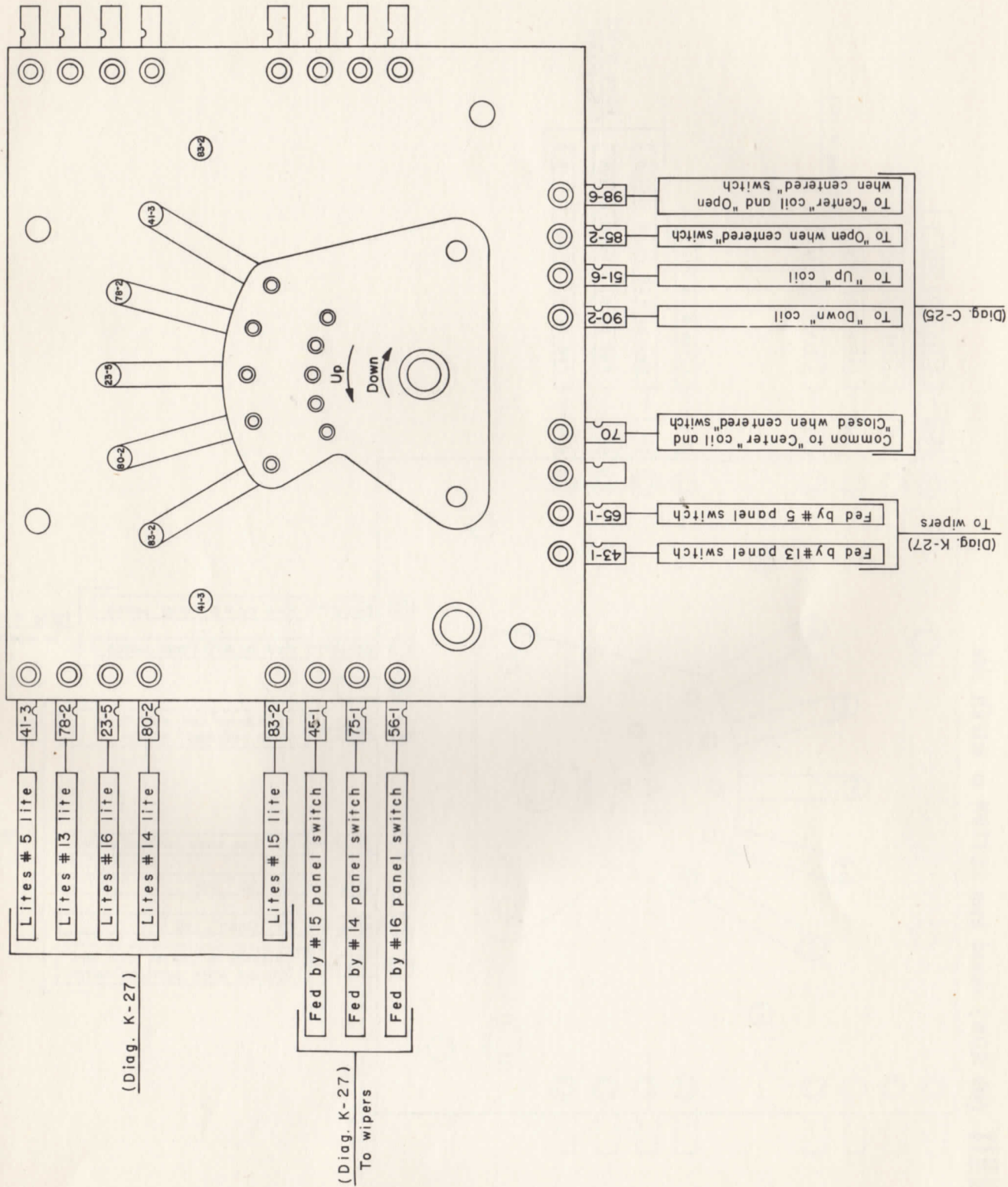
SHIFT UNIT (1st ROW) viewed from BUTTON or WIPER side (See following pages for other rows)



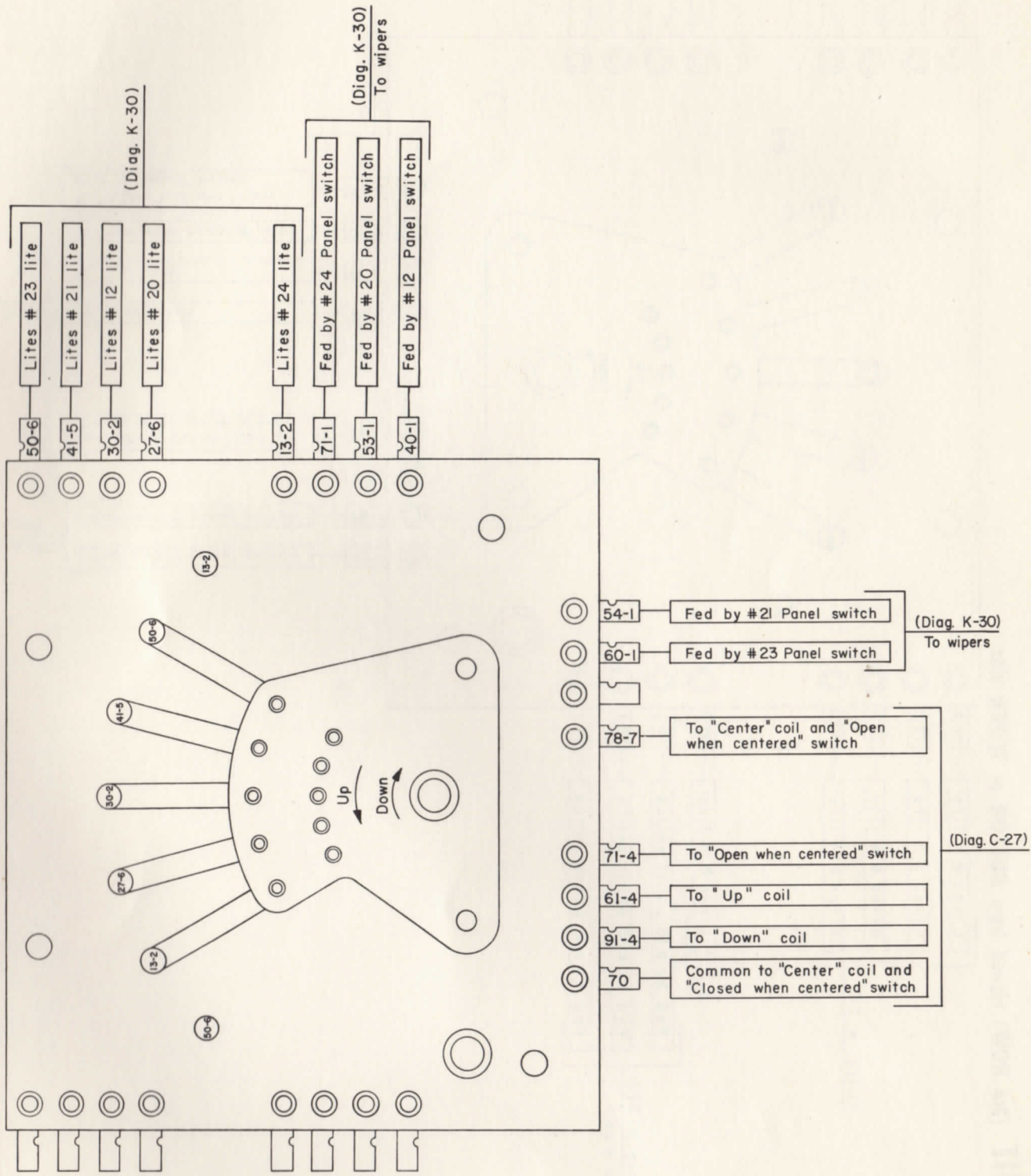
SHIFT UNIT (2nd ROW) viewed from BUTTON or WIPER side



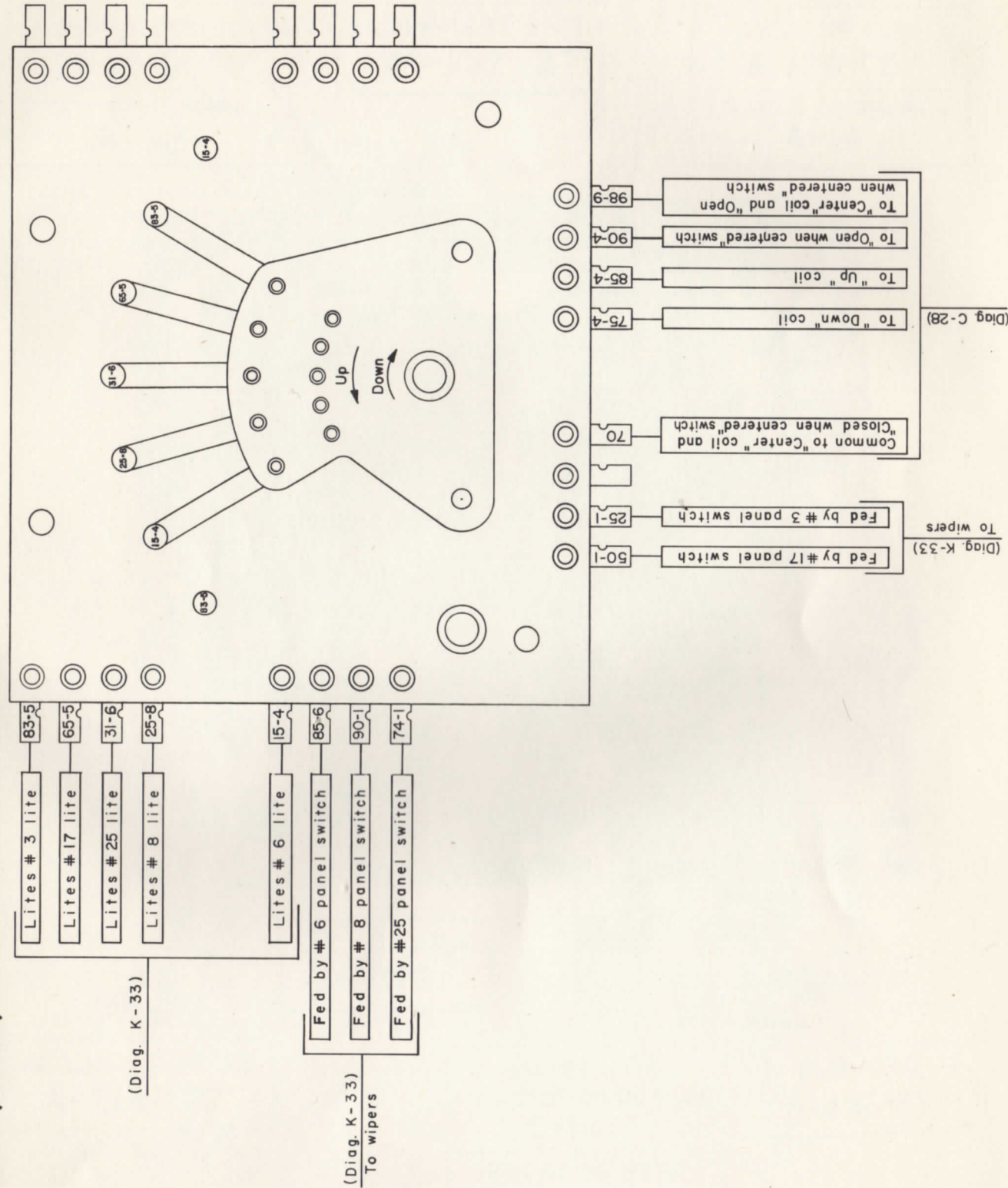
SHIFT UNIT (3rd ROW) viewed from BUTTON or WIPER side



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

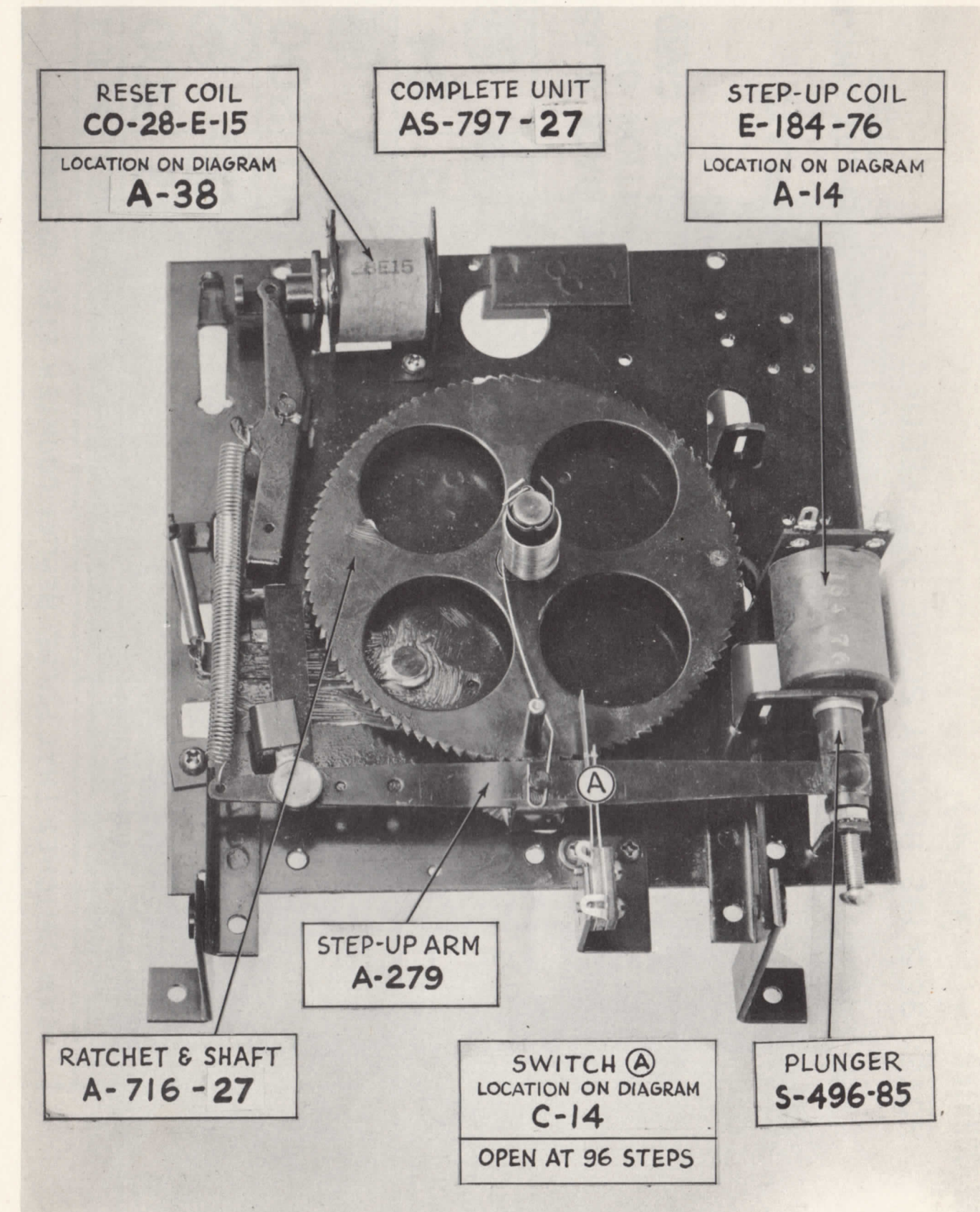


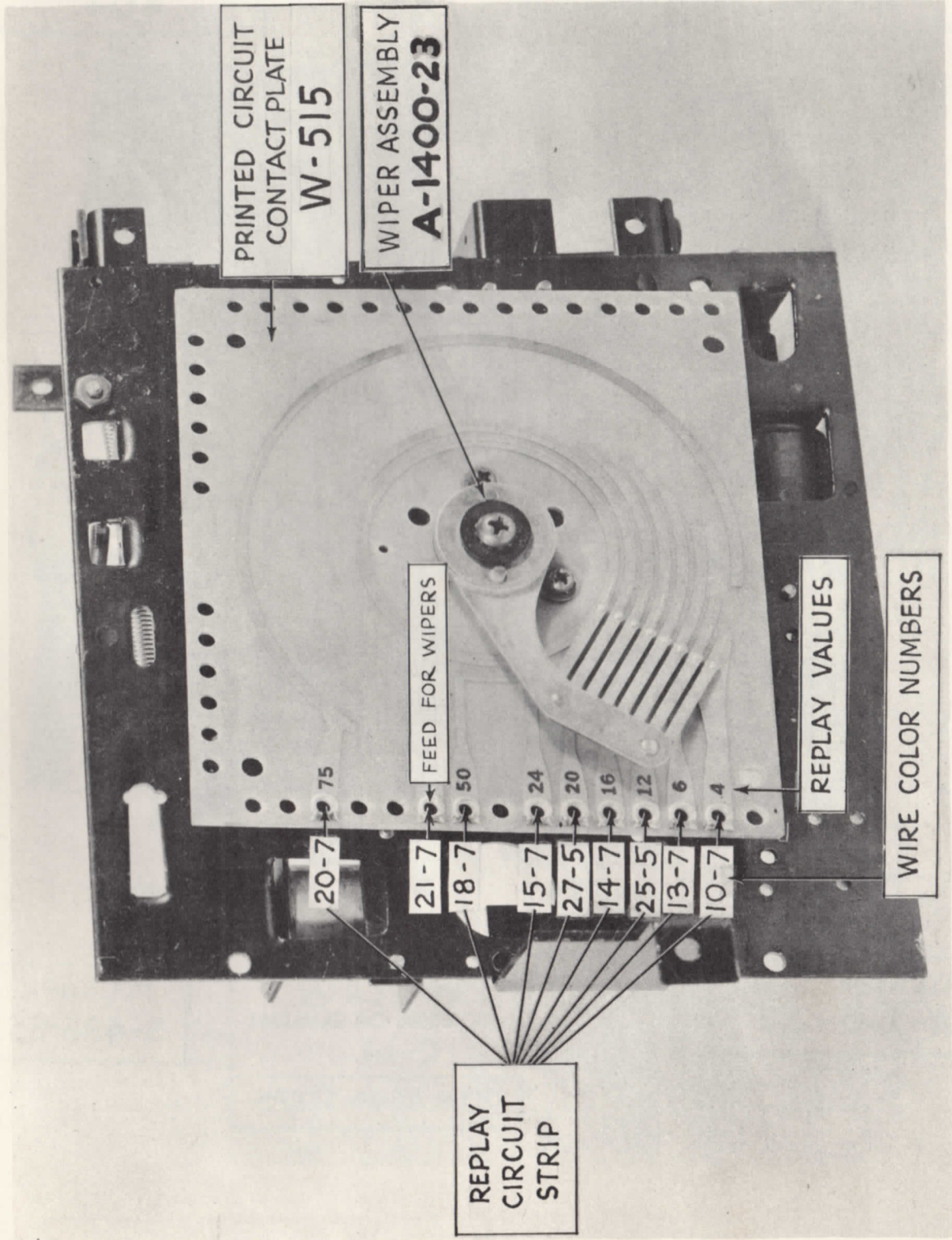
SHIFT UNIT (5th ROW) viewed from BUTTON or WIPER side



NOTES

REPLAY COUNTER viewed from COIL 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	
	X	X	50	50	50	50	X	75	
4 IN LINE	16	20	24	32	48	72	100	200	
	16	20	12	16	16	24	50	50	
3 IN LINE	4	6	8	12	18	36	48	64	
	4	6	4	6	6	12	24	16	

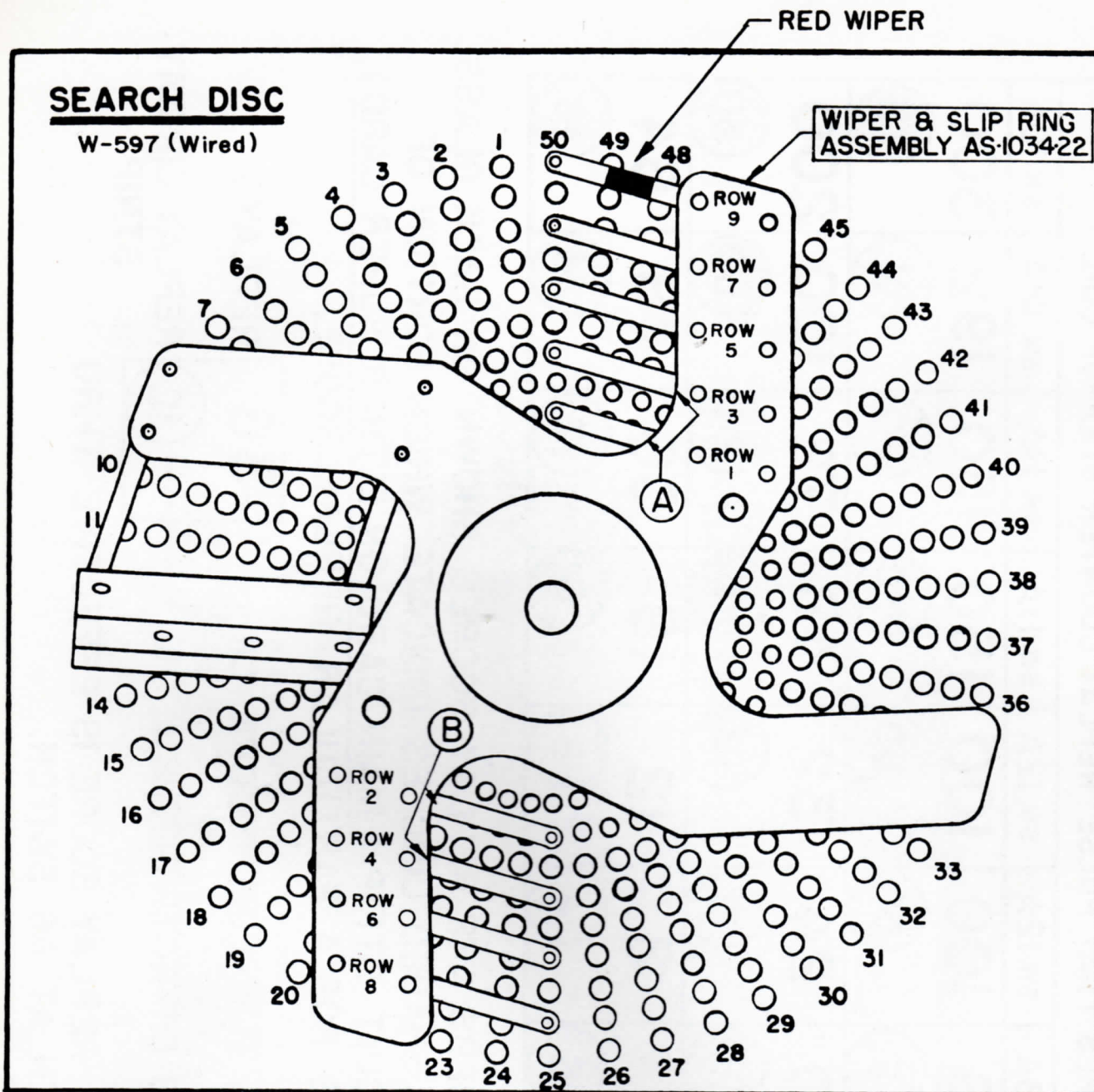
LARGE NUMBERS ARE REPLAY SCORES SHOWN ON BACK GLASS.
NUMBERS IN SHADED CIRCLES INDICATE WHICH PORTION OF
REPLAY CIRCUIT STRIP (MAIN CARD OR EITHER SUPER CARD),
IS EFFECTIVE FOR A PARTICULAR REPLAY SCORE.

EXAMPLE: ON A 3-IN-LINE SCORE OF **36** REPLAYS
THE CIRCUIT IS EFFECTIVE THRU THE **12** REPLAY CIRCUIT STRIP

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

SEARCH DISC

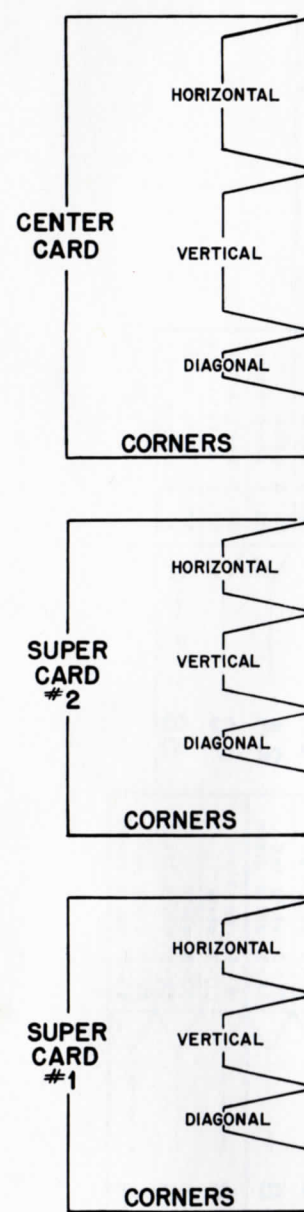
W-597 (Wired)



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
1	A	F	K	P	U
2	B	G	L	Q	V
3	C	H	M	R	W
4	D	I	N	S	X
5	E	J	O	T	Y
6	A	B	C	D	E
7	F	G	H	I	J
8	K	L	M	N	O
9	P	Q	R	S	T
10	U	V	W	X	Y
11	U	Q	M	I	E
12	A	G	M	S	Y
13					
14	A	U	Y	E	
15					
16					
17	15	7	11		
18	1	10	13		
19	17	4	18		
20	15	1	17		
21	7	10	4		
22	11	13	18		
23	11	10	17		
24	15	10	18		
25					
26	15	11	18	17	
27					
28					
29	23	3	18		
30	9	25	11		
31	12	24	14		
32	23	9	12		
33	3	25	24		
34	18	11	14		
35	18	25	12		
36	23	25	14		
37					
38	23	18	14	12	
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					



CENTER CARD WINDOWS

UP	A	F	K	P	U
	B	G	L	Q	V
	C	H	M	R	W
	D	I	N	S	X
DOWN	E	J	O	T	Y
	1st ROW	2nd ROW	3rd ROW	4th ROW	5th ROW

WINDOW	1st ROW SHIFT		
	Up	Center	Down
A	10	9	11
B	2	10	9
C	1	2	10
D	11	1	2
E	9	11	1

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	13	16	14
N	5	13	16
O	15	5	13

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

WINDOW	5th ROW SHIFT		
	Up	Center	Down
U	8	6	3
V	25	8	6
W	17	25	8
X	3	17	25
Y	6	3	17

SEARCH RELAYS

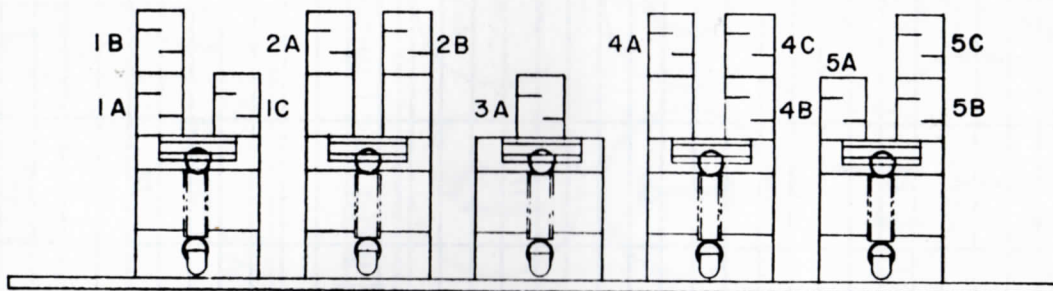
#1

#2

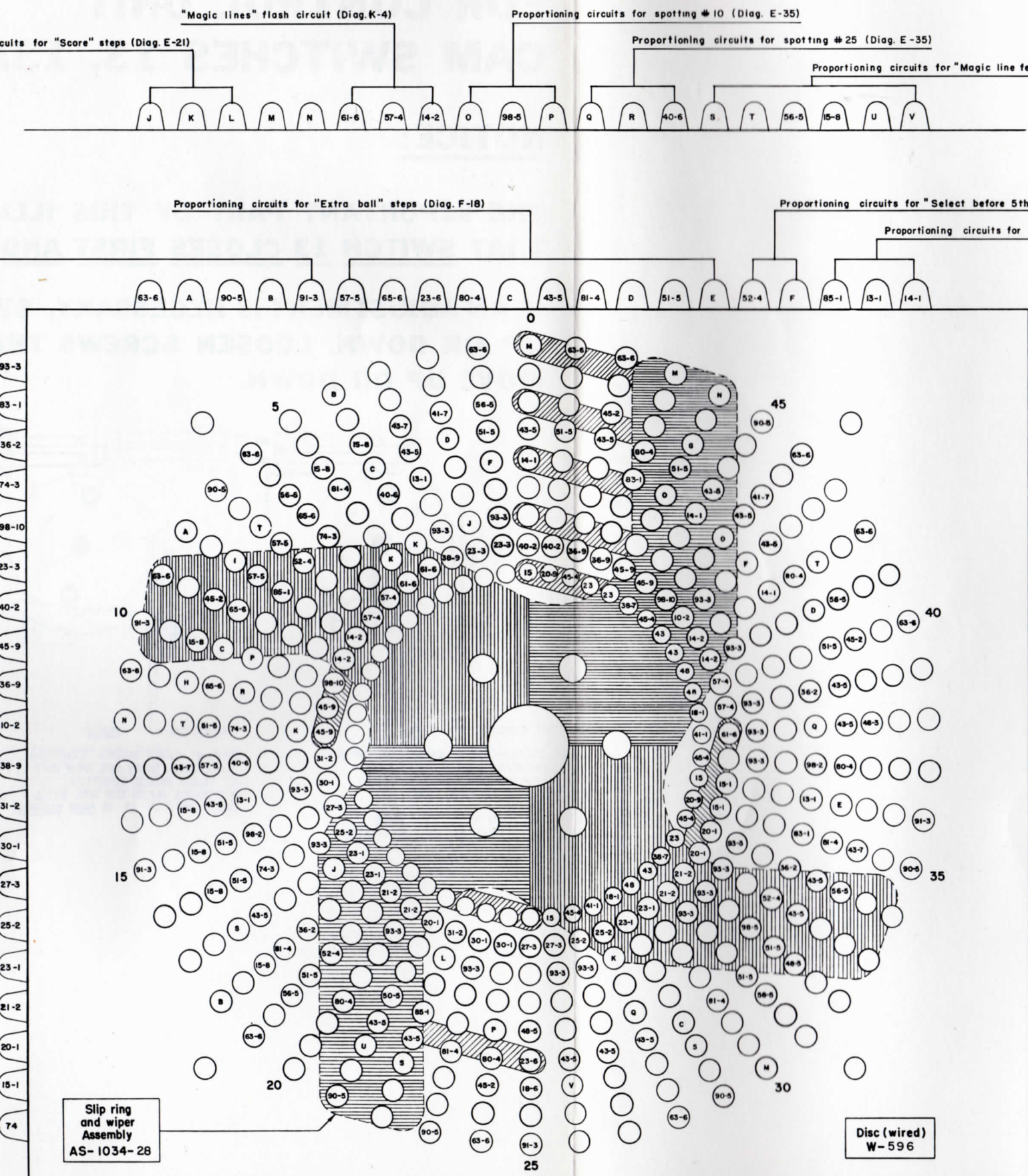
#3

#4

#5



Corners Scores		3 in line scores		4 in line scores		5 in line scores	
Thru		Thru		Thru		Thru	
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	1C	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				



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.

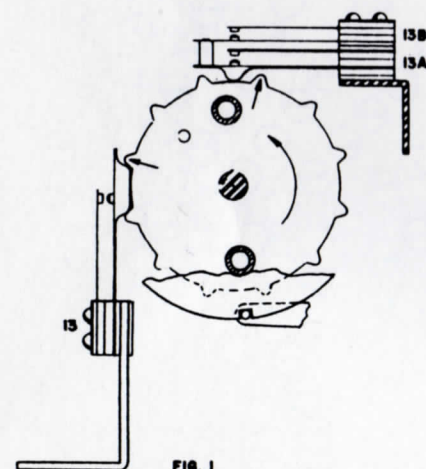


FIG. 1
REPLAY CAMS SHOWN IN THEIR
NORMAL INDEXED POSITION.
SWITCHES 13A, 13B, & 13 ARE
OPEN AT THIS TIME.
NOTE:
ARROWS POINT TO LOBES
THAT WILL ACTUATE SWITCHES.

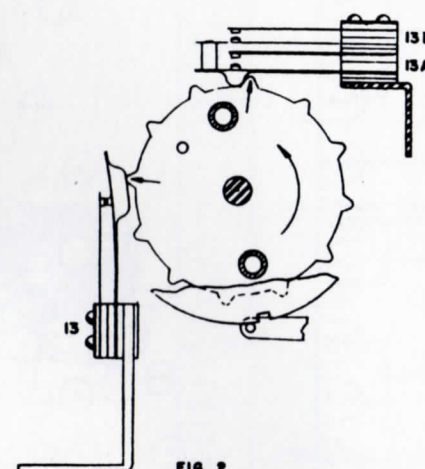


FIG. 2
REPLAY CAMS SHOWN STARTING
TO ROTATE. THEY ARE NOW OUT
OF THEIR INDEX POSITION.
SWITCHES 13A, & 13B ARE STILL
OPEN. SWITCH 13 IS NOW CLOSED.

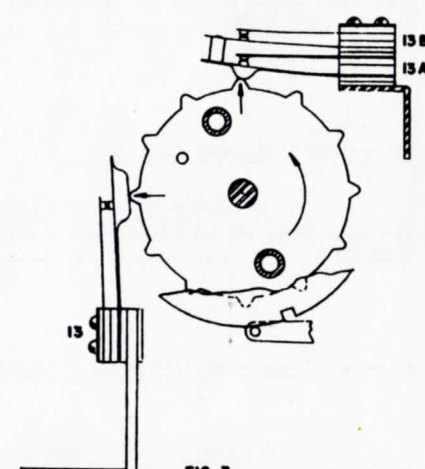


FIG. 3
SWITCHES 13A, & 13B ARE NOW
CLOSED.
SWITCH 13 IS STILL CLOSED.

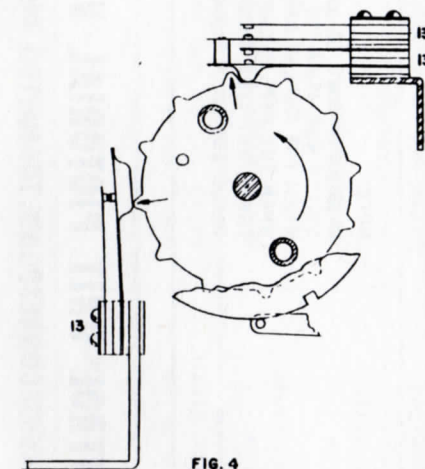


FIG. 4
SWITCHES 13A, & 13B ARE NOW
OPEN AGAIN.
SWITCH 13 IS STILL CLOSED.

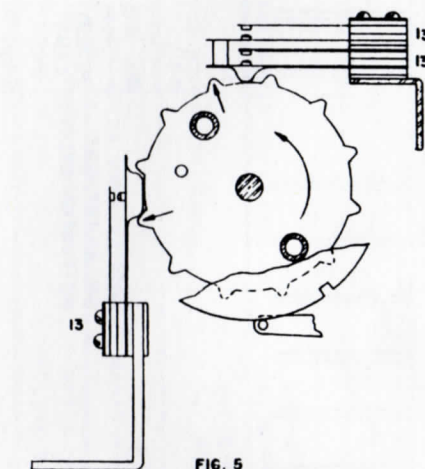
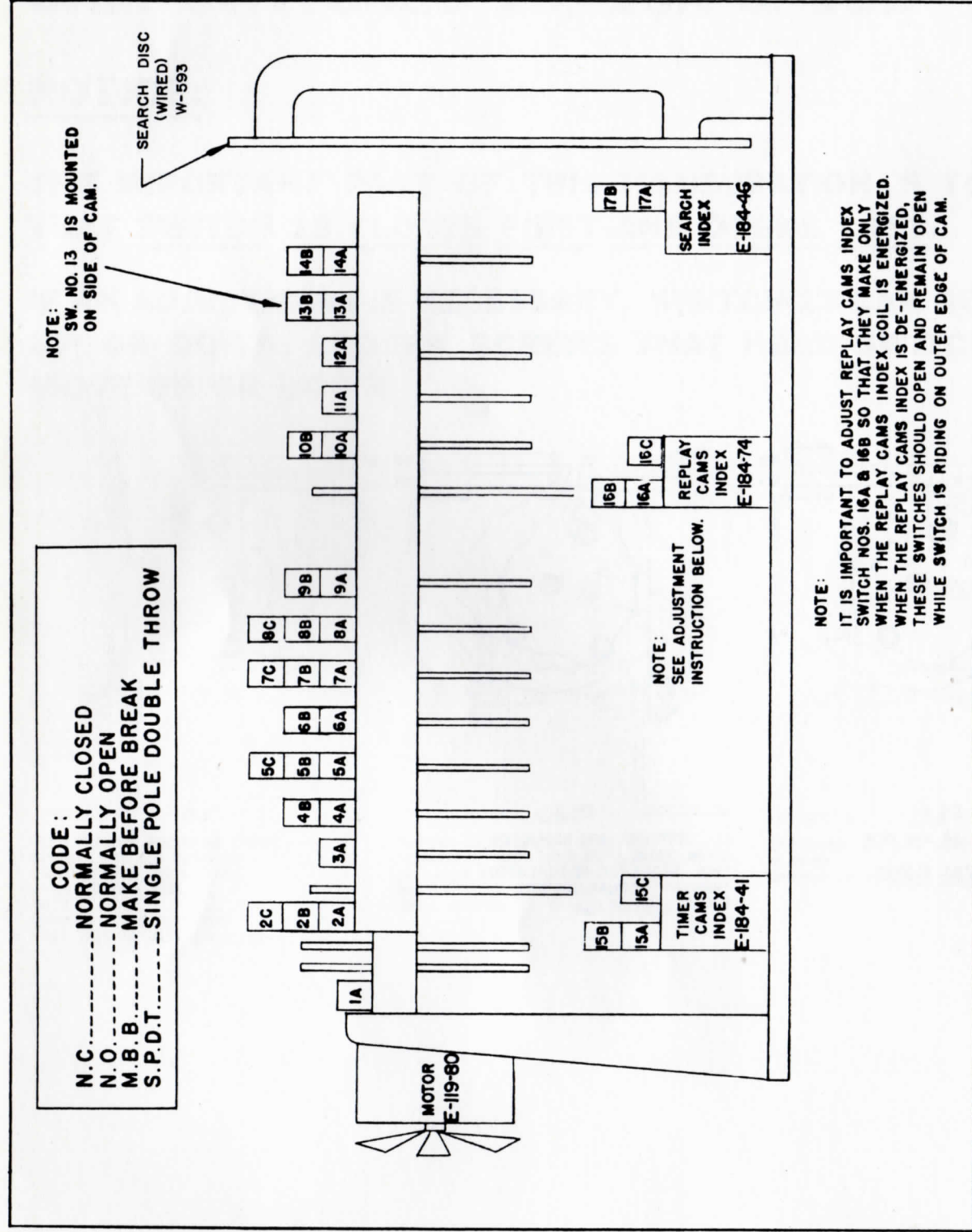


FIG. 5
ALL SWITCHES ARE NOW OPEN
AGAIN, SAME AS IN FIG. 1.
THIS SEQUENCE IS REPEATED
THRUOUT REPLAY SCORING
CYCLE.



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 14B 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-36	30 93-4	Yellow Gray-Yellow	Energizes coin kicker magnet.
2C N.C.	G-9	31-7 15-2	Yellow-Red 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-15	74 60	Orange-Green Brown	Flashes extra ball lites.
4B N.O.	D-39	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.	B-18	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-37	78-4 10-6	Orange-Black Red	Energizes anti-cheat relay.
6A N.C.	H-29	83 74-6	Black-Yellow Orange-Green	Opens game advantage circuits during timing cycle.
6B N.C.	C-20	43-8 25-3	Green-Yellow Blue-White	Score extra step safety switch.
7A N.O.	C-18	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.	C-35	30 93-4	Yellow Gray-Yellow	Pulses coin lock out magnet.

CONTINUED ON NEXT PAGE

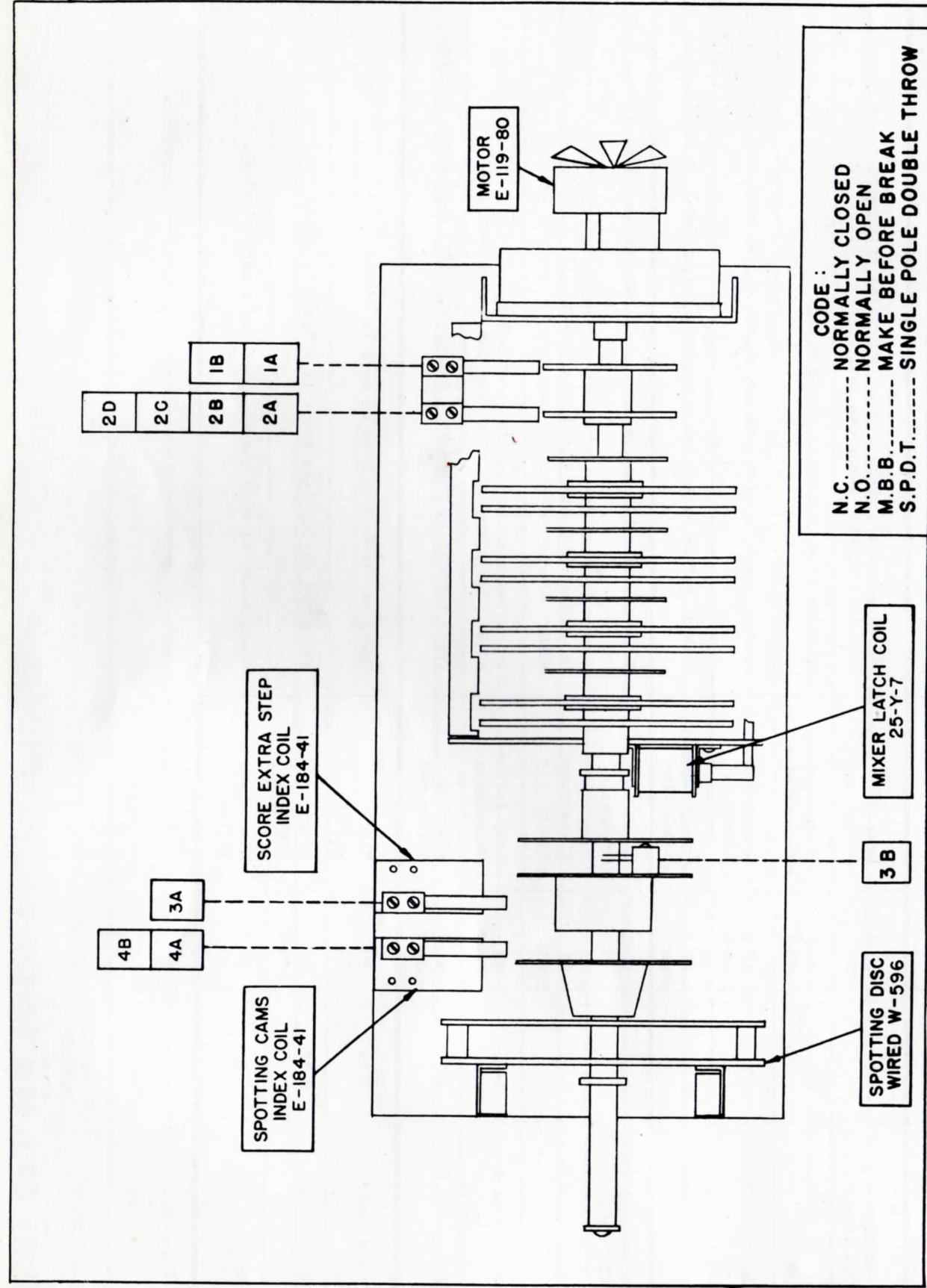
CONTROL UNIT CAM SWITCH CHART — CONTINUED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
8A N.O.	C-29	23-2 50-8	Blue-Yellow White	Magic line unit steps.
8B N.O.	C-30	51-7 40-7	White-Red Green	Steps super card stepper.
8C N.O.	F-30	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 S.P.D.T.	E-30	53-7 14-8 10-4	White-Yellow Red-Green Red	Completes circuit for single steps to magic line unit and super card unit.
10A N.O.	B-15	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-14	91-8 54-8	Gray-Red White-Green	Pulses replay counter when score unit is at 5th and 6th step.
12A N.O.	B-14	90-8 54-8	Gray White-Green	Pulses replay counter when score unit is at 3rd and 4th step.
13A N.O.	B-13	54-8 81-8	White-Green Black-Red	Pulses replay counter when score unit is at 1st and 2nd step.
13B N.O.	B-13	80 38-4	Black Yellow-Black	Pulses replay register and reflex play magnet.
13 (Backside) N.O.	H-13	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch. NOTE: See pictorial view page 166.
14A N.C.	B-8	27-2 90-9	Blue-Orange Gray	Opens circuit to timer step up during replay winner.
14B N.C.	I-14	56-7 93	White-Brown Gray-Yellow	Prevent the start of another replay scoring until cams are indexed.

CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONCLUDED

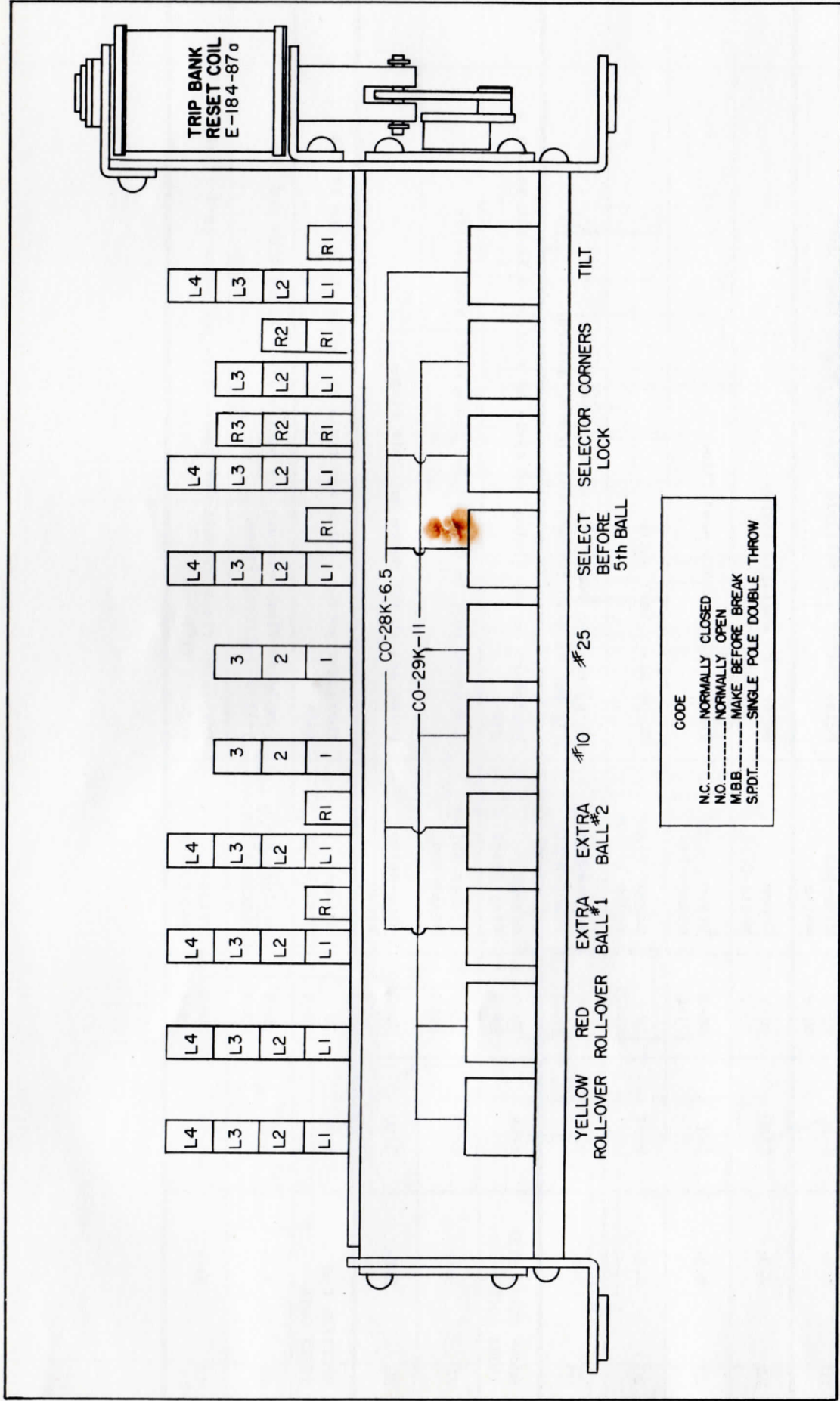
CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
TIMER CAM INDEX COIL	A-9	93-2 70	Gray-Yellow Orange	Energized by switches on start and extra ball start relay, also thru shutter motor cam switch #5.
15A N.O.	H-2	60-P 20-P	Brown-Plastic Blue-Plastic	Operates mixer and control unit motor.
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 13	Orange-Green Red-Yellow	Lock in safety switch for extra ball play relay.
REPLAY CAMS INDEX COIL	A-12	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 pictorial view Page 168 for correct adj.
16B N.O.	I-14	93 56-7	Gray-Yellow White-Brown	In series with replay winner circuit. NOTE: See pictorial view Page 168 for correct adj.
16C N.C.	I-9	21-3 31-7	Blue-Red Yellow-Red	Opens circuit to extra ball play relay, when replays are scoring.
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-4	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.	E-6	75-2 53-2	Orange-White White-Yellow	Pulse switch for operating replay register reset, and replay meter, when replay relay is energized.
1B N.O.	C-29	21 50-8	Blue-Red White	Pulse switch for multiple steps of "magic line" unit.
2A N.O.	C-30	40-7 52-7	Green White-Blue	Super card multiple steps.
2B N.O.	L-1	60-5 71-5	Brown Orange-Red	Flashes "turn knobs now" lite.
2C N.O.	B-17	78 63-10	Orange-Black Brown-Yellow	Steps extra ball unit.
2D N.O.	F-16	31-5 85-7	Yellow-Red Black-White	Steps corners replay to its zero position. (In series with corners unit homing switch)
SCORE EXTRA STEP INDEX COIL	A-39	70 98-1	Orange Gray-Black	Energized during timing cam cycle by control unit cam switch #4B.
3A N.O.	G-35	75-5 81-1	Orange-White Black-Red	Completes lock in circuit for score extra step relay.
3B N.O.	C-20	25-3 40-5	Blue-White Green	Pulse switch for score multiple steps.
SPOTTING CAM INDEX COIL	A-39	70 98-1	Orange Gray-Black	Energized during timing cam cycle by control unit cam switch #4B.
4A N.O.	K-5	36-5 83-4	Yellow-Brown Black-Yellow	Completes flash circuit for "magic line" lites also red and yellow rollover lites.
4B N.O.	J-14	30-5 13-4	Yellow Red-Yellow	Completes flash circuit for score lites and super card lites, also corners lite.



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
YELLOW ROLLOVER TRIP COIL	A-31	70 13-1	Orange Red-Yellow	Energized by control unit cam switch 8C when circuit is complete thru all other factors.
L1 N.O.	E-21	40-6 93-7	Green Gray-Yellow	Completes circuit to energize #25 trip when yellow rollover is hit.
L2 N.C.	D-32	36-2 74-3	Yellow-Brown Orange-Green	Proportioning circuit for red star trip.
L3 N.O.	J-5	38-9 30	Yellow-Black Yellow	Lites yellow rollover lite.
L4 N.C.	B-31	13-1 13-1	Red-Yellow Red-Yellow	Breaks circuit to this coil.
RED ROLLOVER TRIP COIL	A-32	70 74-3	Orange Orange-Green	Energized by control unit cam switch 8C when circuit is complete thru all other factors.
L1 N.O.	E-22	98-5 91-7	Gray-Black Gray-Red	Completes circuit to energize #10 trip when red rollover is hit.
L2 N.C.	B-32	74-3 74-3	Orange-Green Orange-Green	Breaks circuit to this coil.
L3 N.O.	J-4	30 10-2	Yellow Red	Lites red rollover lite.
L4 N.C.	D-31	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 23-7	Orange Blue-Yellow	Energized by switch on extra ball play relay.
L1 N.O.	D-11	91-1 38-3	Gray-Red Yellow-Black	Completes circuit to ball lifter motor when playing for extra balls.
L2 N.C.	B-4	20-3 23-7	Blue Blue-Yellow	Breaks circuit to this coil.
L3 S.P.D.T.	H-26	75-5 43-3 74-6	Orange-White Green-Yellow Orange-Green	Extra ball proportioning.
L4 S.P.D.T.	H-27	83 50-10 14-4	Black-Yellow White Red-Green	Proportioning switch.
R1 N.O.	G-21	80-3 15-10	Black Red-White	Extra ball proportioning switch.
E.B. #2 TRIP COIL	A-4	70 25-7	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 25-7	Blue Blue-White	Breaks circuit to this coil.
L3 S.P.D.T.	G-19	78-1 80-3 65-3	Orange-Black Black Brown-White	Shuts off score advantages and completes circuit to extra ball steps, during extra ball play.
L4 S.P.D.T.	J-14	13-4 30 60	Red-Yellow Yellow Brown	Shuts off flashing of score lites and completes circuit to flash extra ball lites.
R1 N.C.	G-27	81-6 74-6	Black-Red Orange-Green	Breaks circuit to all other game advantages when playing for extra balls.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
#10 TRIP COIL	A-22	13-5 98-5	Red-Yellow Gray-Black	Energized by red panel switch, or control unit cam switch #8C when spotting disc wipers stop on correct position.
1 N.O.	J-23	36-1 30	Yellow-Brown Yellow	Lites number 10 spotted number.
2 N.C.	B-22	98-5 98-5	Gray-Black Gray-Black	Breaks circuit to this coil.
3 N.C.	G-20	51-4 80-3	White-Red Black	Proportioning switch for extra balls.
#25 TRIP COIL	A-21	13-5 40-6	Red-Yellow Green	Energized by yellow panel switch, or control unit cam switch #8C when spotting disc wipers stop on correct position.
1 N.O.	J-34	74-1 30	Orange-Green Yellow	Lites number 25 spotted number.
2 N.C.	B-21	40-6 40-6	Green Green	Breaks circuit to this coil.
3 N.C.	G-20	80-3 78-5	Black Orange-Black	Proportioning switch for extra balls.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECT BEFORE 5th BALL TRIP COIL	A-34	70 52-4	Orange White-Blue	Energized by control unit cam switch #8C, when spotting disc wipers stop on correct position.
L1 N.O.	G-8	85-9 43-2	Black-White Green-Yellow	Keeps circuit to ball lifter cam switch alive.
L2 N.C.	B-34	52-4 52-4	White-Blue White-Blue	Breaks circuit to this coil.
L3 S.P.D.T.	E-10	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.
L4 S.P.D.T.	J-1	23-3 14-2 40-2	Blue-Yellow Red-Green Green	Directs circuit to flash "turn knobs now" lite at 4th or 5th step of timer unit.
R1 N.C.	H-20	53 80-3	White-Yellow Black	Proportioning switch for extra ball steps, and score steps.

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

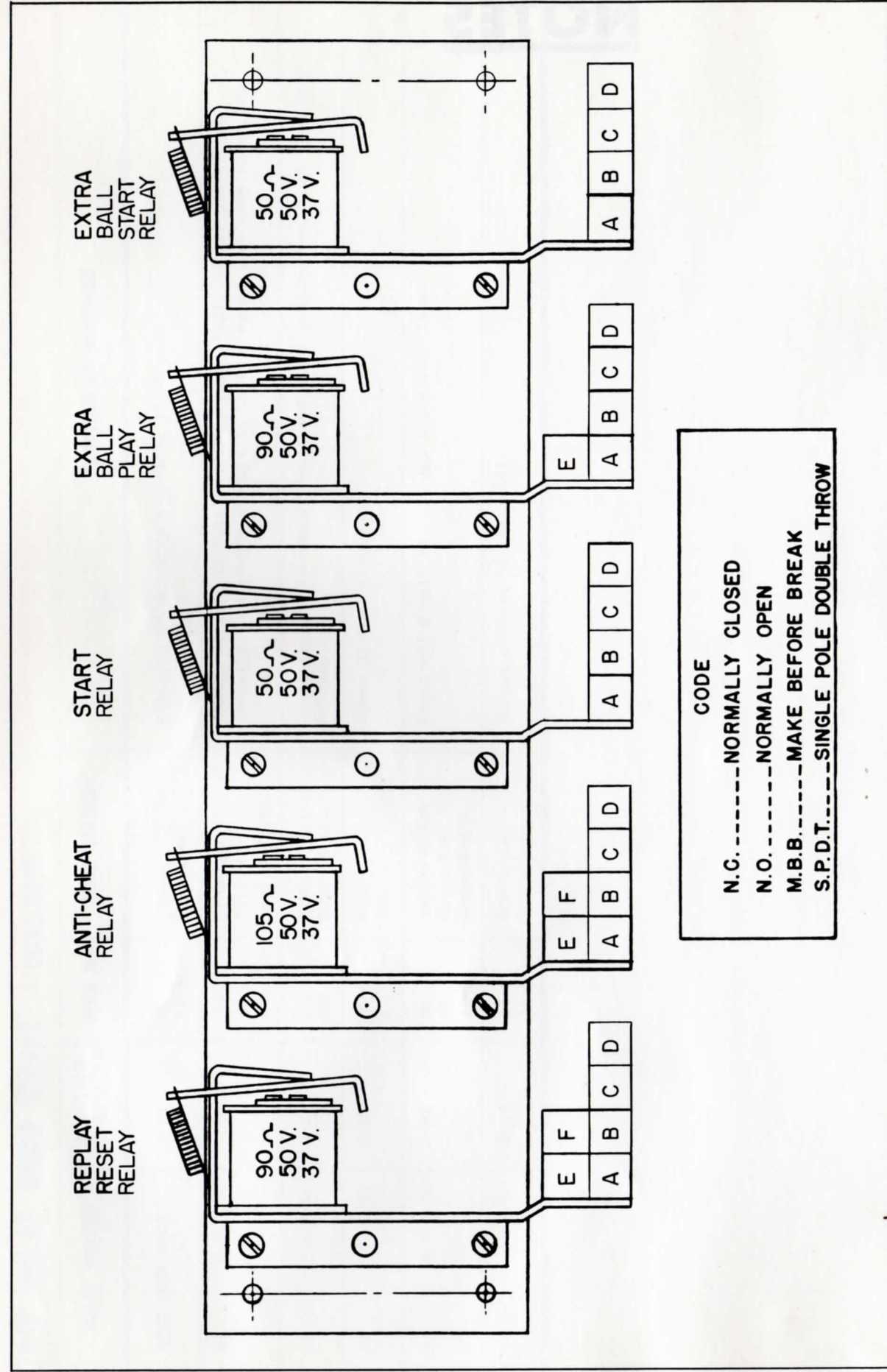
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECTOR LOCK TRIP COIL	A-11	70 98	Orange Gray-Black	Energized by 4th or 5th step of timer unit, directed by "select before 5th ball" trip relay switch.
L1 N.O.	C-8	13 52-6	Red-Yellow White-Blue	Completes circuit to energize extra ball play relay.
L2 N.C.	B-11	98 98	Gray-Black Gray-Black	Breaks circuit to this coil.
L3 N.O.	D-7	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-23	60-6 31	Brown Yellow-Red	Opens circuit to 1st, 2nd, 3rd row, shift unit coils.
R1 N.O.	I-14	56-7 18-4	White-Brown Red-Black	Completes replay circuit, when relay is tripped.
R2 N.C.	L-1	71-5 61-7	Orange-Red Brown-Red	Shuts off "turn knobs now" lite.
R3 N.C.	E-23	90-7 85-6	Gray Black-Yellow	Opens circuit to 4th, 5th, 6th row, shift unit coils.
CORNERS TRIP COIL	A-33	70 90-6	Orange Gray	Energized by control unit cam switch #8C, when spotting disc wipers stop on correct position.
L1 N.O.	J-12	98-10 30	Gray-Black Yellow	Lites "corners" lite.
L2 N.O.	D-16	13-8 21-8	Red-Yellow Blue-Red	Completes circuit for corners replay scoring.
L3 N.C.	B-32	90-6 90-6	Gray Gray	Breaks circuit to this coil.
R1 N.C.	E-29	18-6 48-3	Red-Black Green-Black	Proportioning switch for "magic line" feature steps."
R2 N.C.	G-21	25-6 15-10	Blue-White Red-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
TILT TRIP COIL	A-11	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 (Plastic) Brown(Plastic)	Opens circuit to control unit and mixer unit motors, when game is tilted.
L3 N.C.	I-23	20-4 10	Blue Red	Opens 17 volt circuit.
L4 S.P.D.T.	I-21	38 81 41-9	Yellow-Black Black-Red Green-Red	Shuts off 6 volt circuit and lites tilt lite.
R1 N.C.	B-11	14-5 14-5	Red-Green Red-Green	Breaks circuit to this coil.

NOTES



5 RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART

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

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
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-6	53-2 13-9 27-4	White-Yellow Red-Yellow Blue-Orange	Directs circuit to replay meter during replay cancel.
B N.O.	G-1	20-P 60-P	Blue* (Plastic) Brown (Plastic)	Energizes control unit motor.
C N.O.	D-6	50-2 75-2	White Orange-White	Lock-in switch for this relay.
D N.C.	D-4	20-3 25-10	Blue Blue-White	Opens extra ball trip and extra ball start relays during cancel.
E N.C.	C-3	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
F N.O.	B-6	61-5 41-5	Brown-Red Green-Red	In series with replay meter.
ANTI-CHEAT RELAY COIL	A-38	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-37	10-6 78-4	Red Orange-Black	Lock-in switch for this relay.
D N.O.	B-8	91-2 93-6	Gray-Red 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-4	56-2 50-2	White-Brown White	Completes circuit to start and extra ball start relays.

CONTINUED ON NEXT PAGE

5 RELAY BANK SWITCH CHART — CONTINUED

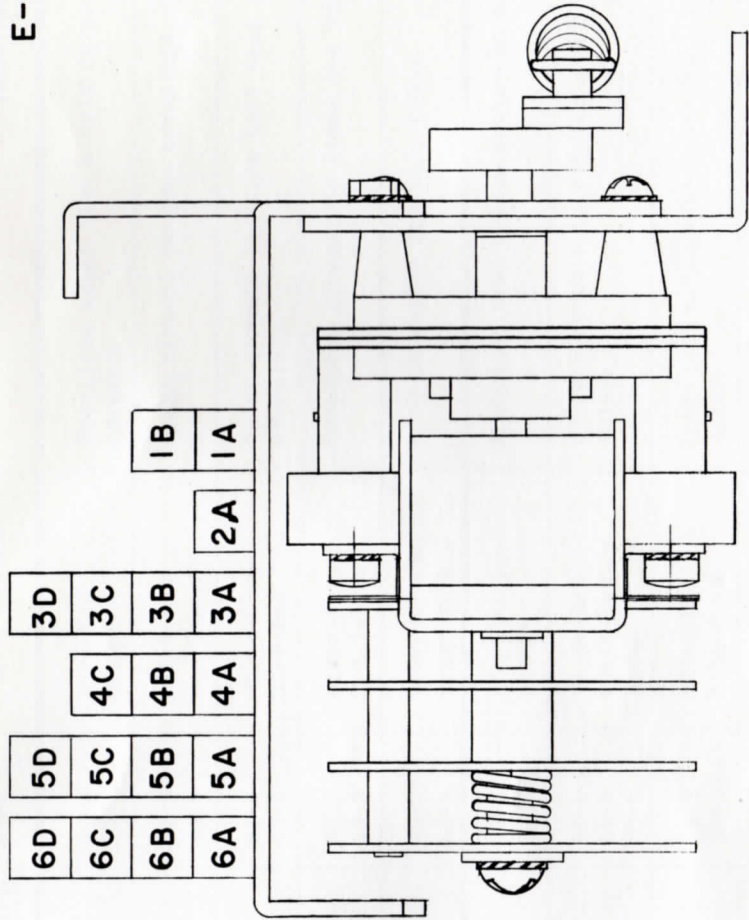
RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
START RELAY COIL	A-3	21-6 70	Blue-Red Orange	Energizes every time a coin is played or when a red button is pressed.
A N.C.	F-28	81-6 14-8	Black-Red Red-Green	Opens circuit to game advantage circuits.
B N.C.	C-8	52-6 91-2	White-Blue Gray-Red	Opens circuit to extra ball play relay when this relay is energized.
C N.O.	E-9	85 13-3	Black-White Red-Yellow	Completes circuit to timer cam index coil.
D N.O.	H-3	48-2 63-2	Green-Black Brown-Yellow	Lock-in switch for this relay.
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	56-2 51-2 63-2	White-Brown 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.	J-20	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 magic line and rollover lites.

CONCLUDED ON NEXT PAGE

5 RELAY BANK SWITCH CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
EXTRA BALL START RELAY COIL	A-4	20-3 70	Blue Orange	Energizes when extra ball play relay is energized.
A N.C.	C-17	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.

MOTOR PART NO.
E-119-95



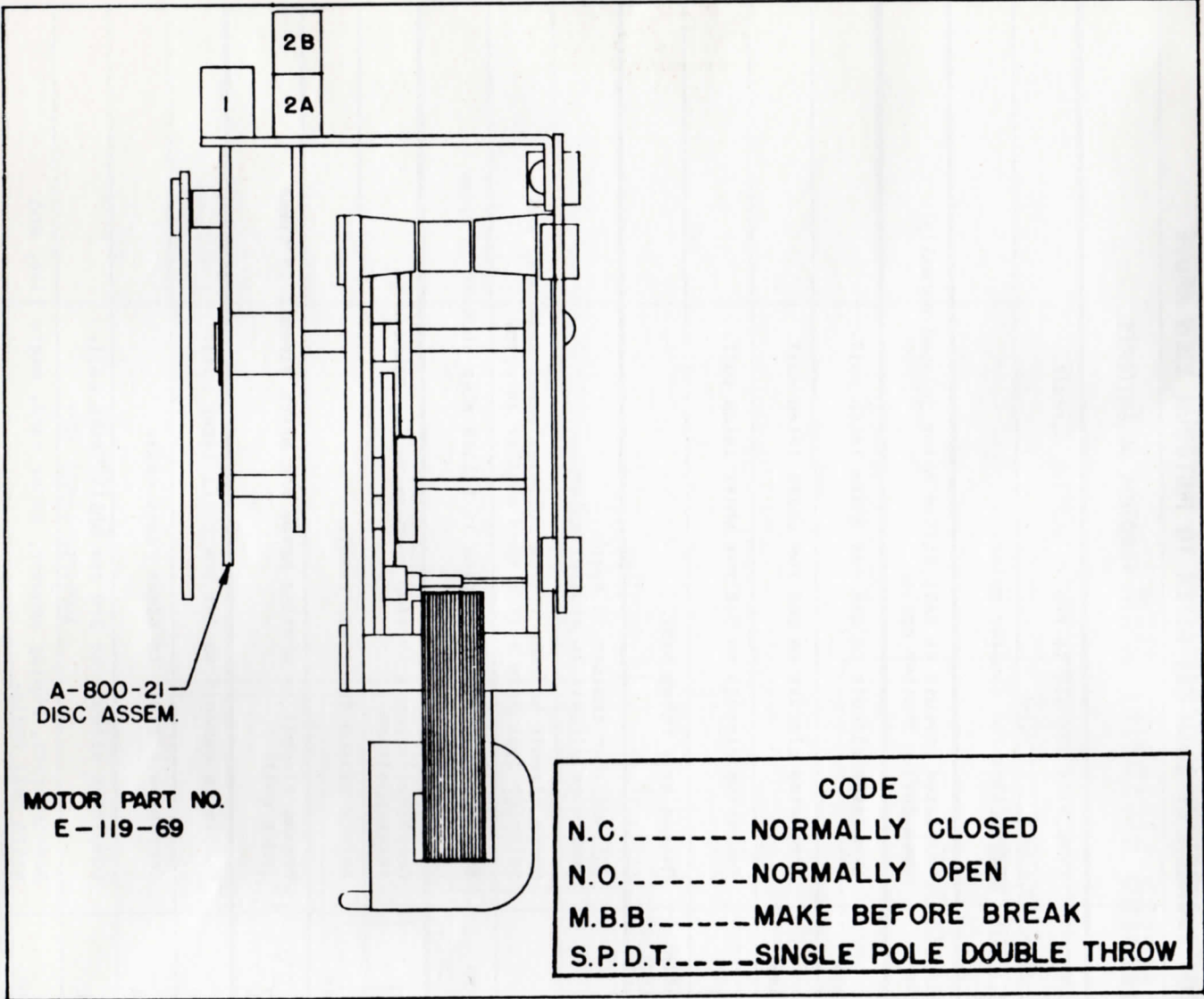
CODE

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

SHUTTER MOTOR 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.C.	I-13	93 21-3	Gray-Yellow Blue-Red	Completes circuit to replay scoring circuit.
1B N.O.	G-9	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 lifter motor (closed normally) open during shutter cycle.
3A N.O.	D-27	30 78-7	Yellow Orange-Black	Completes circuit to 4th row shift latch coil.
3B N.O.	D-24	30 63	Yellow Brown-Yellow	Completes circuit to 2nd row shift latch coil.
3C N.O.	D-28	30 98-9	Yellow Gray-Black	Completes circuit to 5th row shift latch coil.
3D N.O.	H-2	20-P 70-P	Blue (Plastic) Orange (Plastic)	Resets trip relay bank.
4A N.O.	G-10	18-3 14-3	Red-Black Red-Green	(Closed when shutter is open) Completes circuit to shutter motor.
4B N.C.	G-22	21-3 60-6	Blue-Red Brown	Opens circuit to red, yellow rollover panel switches, and selector lock trip switch when shutter is open.
4C N.O.	H-1 0	36-4 18-3	Yellow-Brown Red-Black	Starts shutter motor if game is tilted when shutter is open.
5A N.O.	H-16	30 31-5	Yellow Yellow-Red	Completes circuit to step corners replay counter to reset position.
5B N.C.	I-8	21-3 65-2	Blue-Red Brown-White	Safety switch for timer reset.
5C S.P.D.T.	D-9	14-3 13-3 98-2	Red-Green Red-Yellow Gray-Black	Breaks circuit to shutter motor and makes circuit to timer index coil.
6A N.O.	D-23	30 52	Yellow White-Blue	Completes circuit to 1st row shift latch coil.
6B N.O.	H-7	30 71-9	Yellow Orange-Red	Completes circuit to timer reset coll.
6C N.O.	D-26	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, super card, magic line, and extra ball 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-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.

NOTES

MISCELLANEOUS PARTS

G-241	Back glass
M-168-15	Ball 1-1/8"
AS-1315	Ball gate and switch assembly
A-429-14	Ball trough only to ball lifter assembly
A-1729	Button-Red-Front Door
A-1729-1	Button-1Yellow-Front Door
C-274-1	Button-Top panel
P-1900-18	Cash box
E-101-51	Coil for coin kicker assembly
E-101-45	Coil for coin lock out
AS-277-26	Coin switch assembly - complete 5¢
AS-277-27	Coin switch assembly - complete 10¢
E-130-8	Counter 48 volt
CA-567-18	Front door only
AS-1350-4	Front moulding complete
CA-726-2	Front moulding only
A-254-33	Hinge and bracket - Front door
AS-1316	Kicker assembly - Front door
A-1704-3	Knob and shaft (front moulding)
CA-350-1	Legs
M-163-4	Leg adjuster
M-106	Leg bolt and washer
C-326-9	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
E-108-32	Micro switch - Coin switch assembly 5 and 10¢
C-275-2	Panel insert (red) For C-274-1 button
C-275-3	Panel insert (yellow) For C-274-1 button
M-695-1	Plastic numbered strip - #1 is on left-facing lite box
M-695-2	Plastic numbered strip
M-695-3	Plastic number strip
M-695-4	Plastic numbered strip
M-695-5	Plastic numbered strip
P-2210-8	Plate - Coin entry - 5¢
P-2210-9	Plate - Coin entry - 10¢
P-2210-31	Plate - Triple Selector assembly
P-2210-32	Plate - Double Selector assembly
R-203	Rebound rubber - Top panel
M-170	Rebound Spring - Double post - Top panel
P-2768-5	Ring for A-1729 Red button
P-2768-6	Ring for A-1729-1 Yellow 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-237	Shooter spring (barrel)
R-108-3	Shooter tip
M-280-15	Slug rejector 5¢
M-280-16	Slug rejector 10¢
SW-101-26	Switch for AS-1315
E-122-19	Transformer
A-1707-1	Wiper assembly for Triple & Double Selector assembly
M-412-2	Wire wiper for Slip Ring
M-497	Wire (long) for A-429-14 ball trough
M-497-1	Wire (short) for A-429-14 ball trough