

Bally®

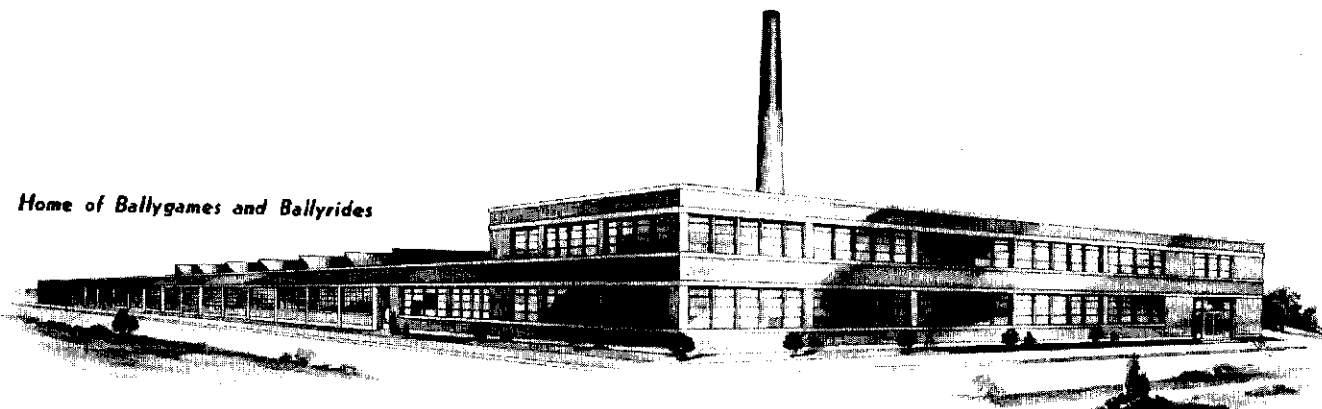
BROADWAY

OPERATING INSTRUCTIONS AND PARTS CATALOG

Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on Page 489

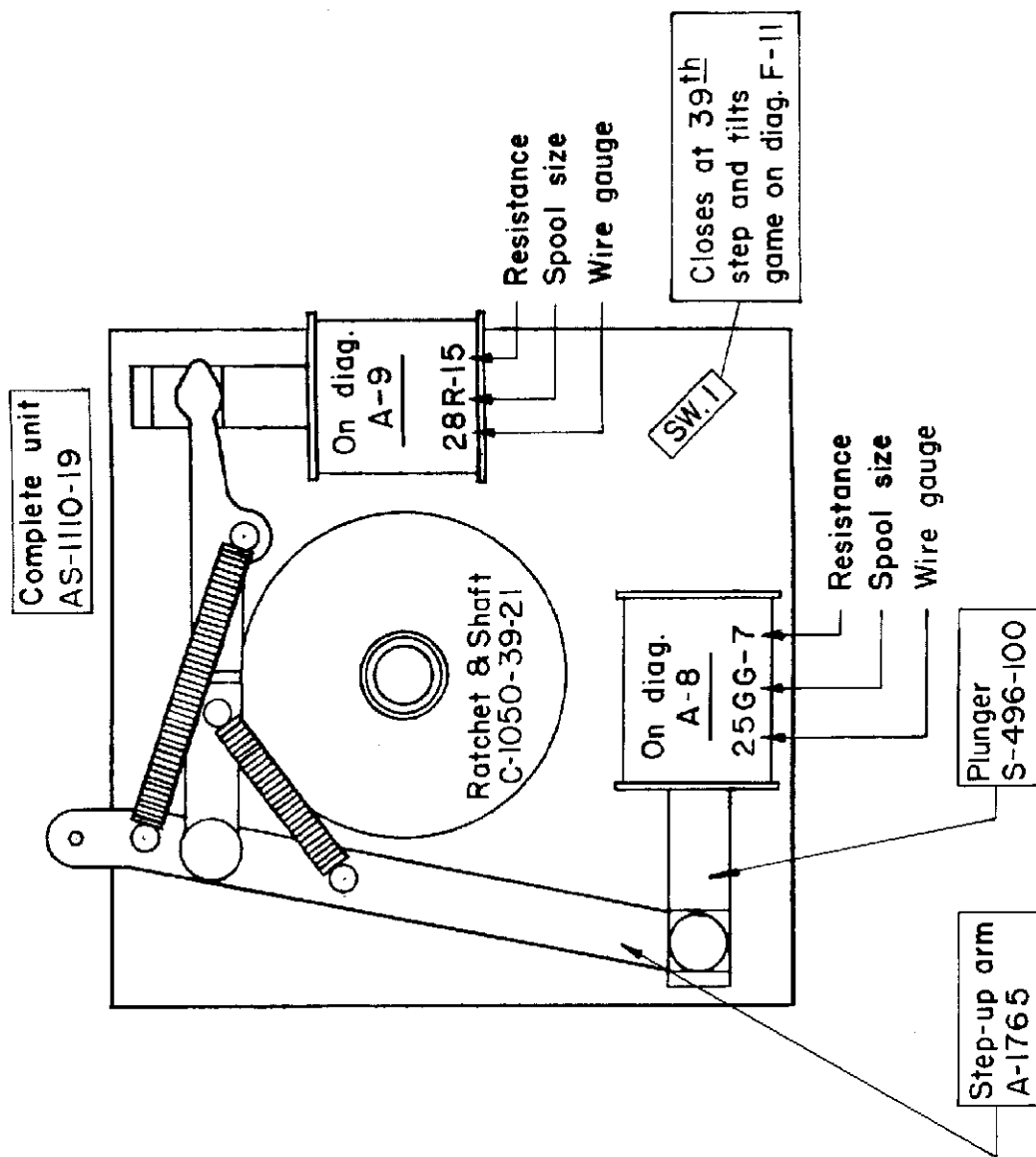
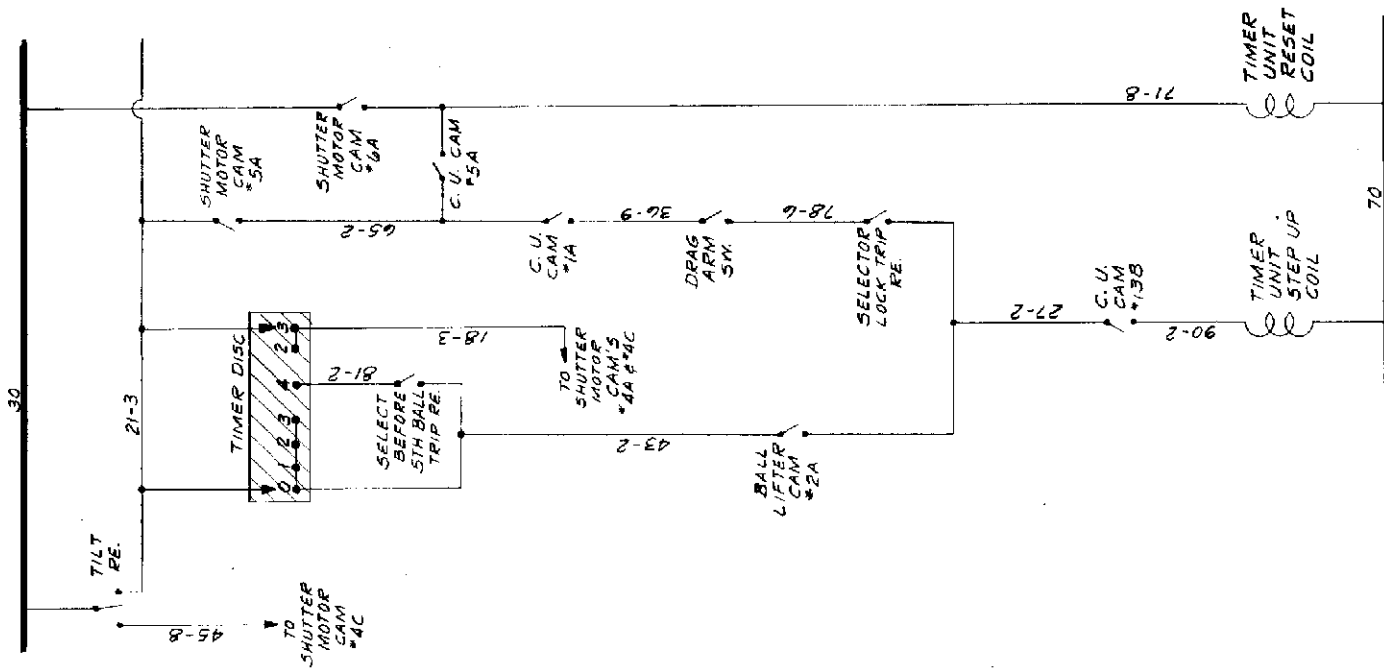
**FOR QUICKEST SERVICE
STATE CORRECT PART NUMBER
WHEN ORDERING PARTS**

Home of Ballygames and Ballyrides



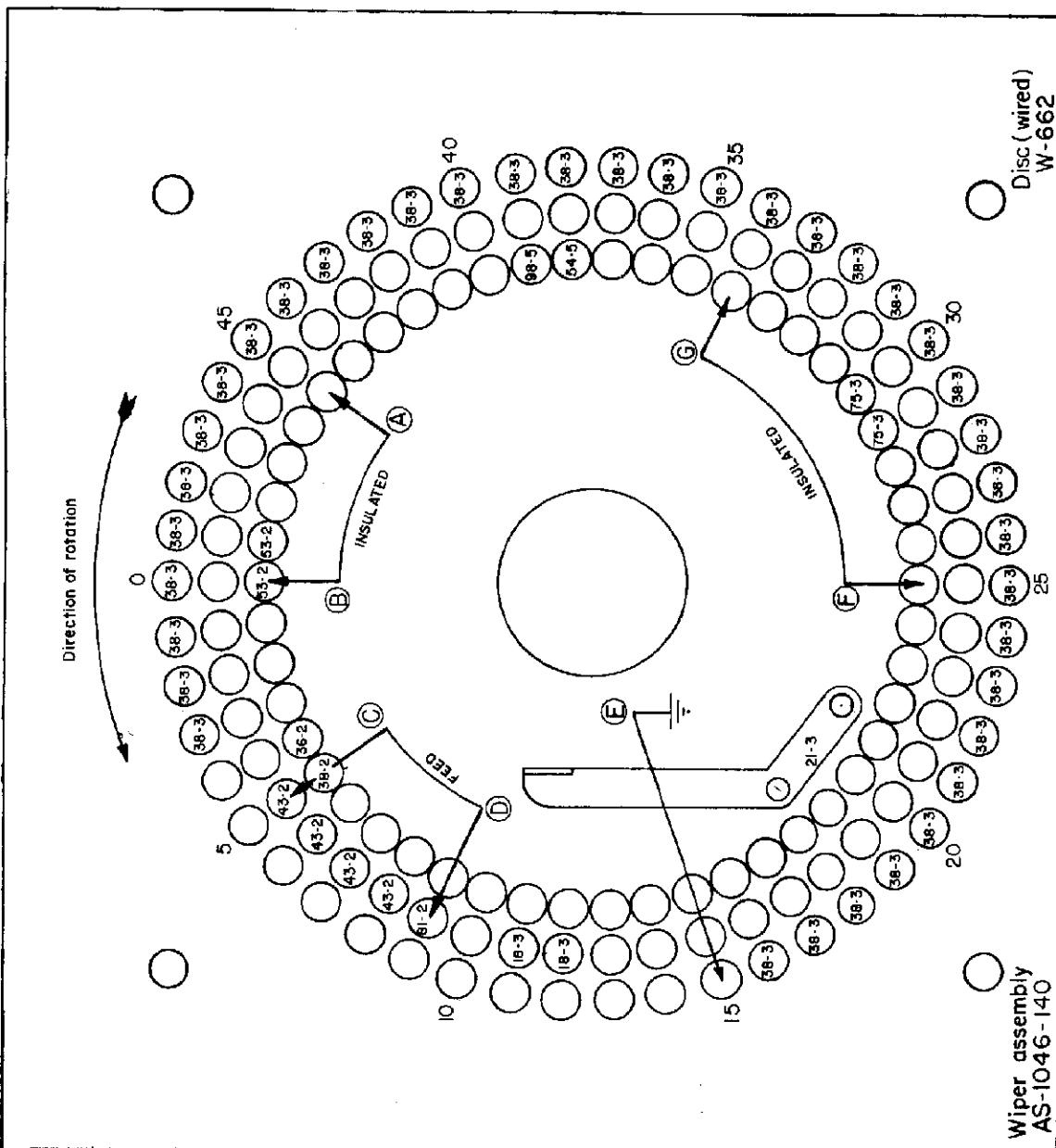
TIMER UNIT
viewed from COIL side

viewed from COLL side



TIMER UNIT viewed from BUTTON or WIPER side

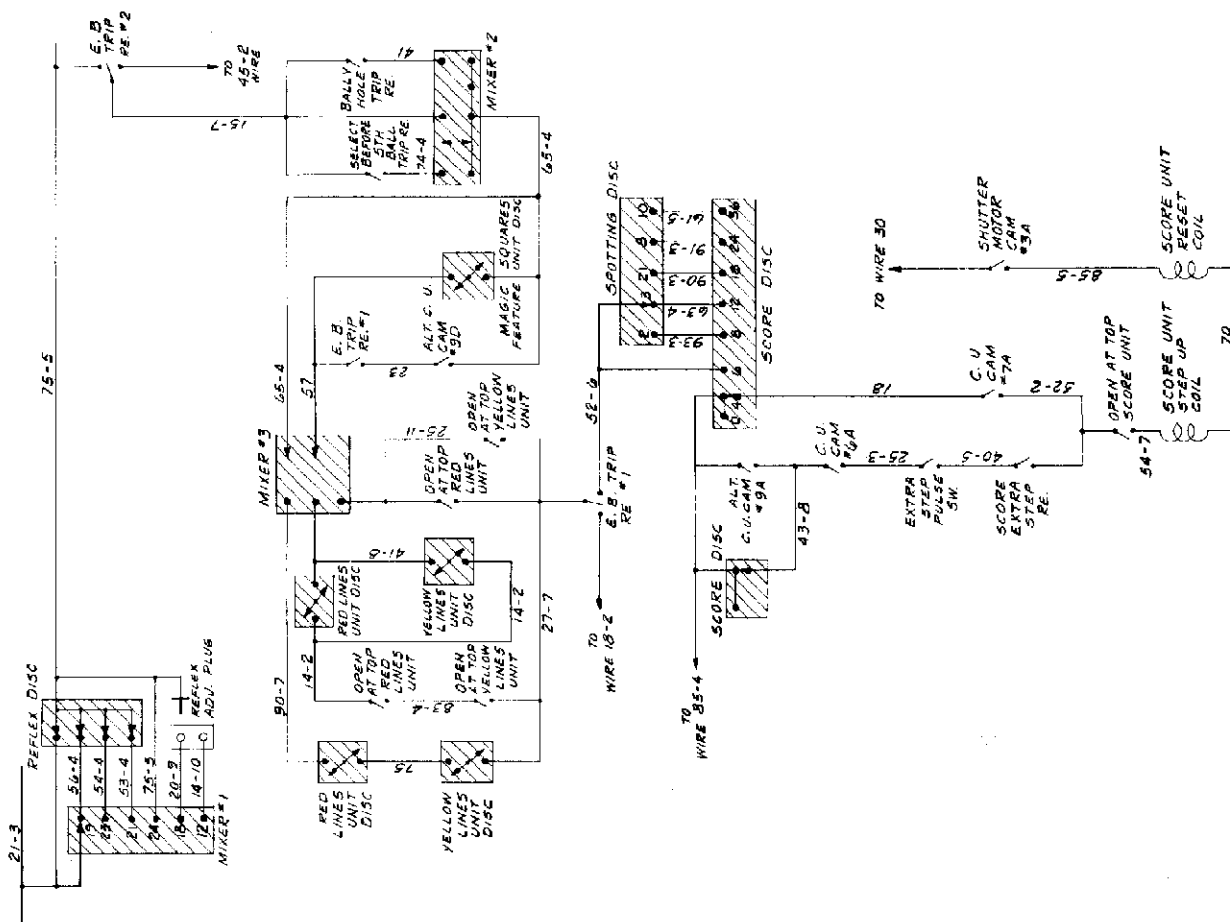
39 step unit. Wipers shown in zero or reset position



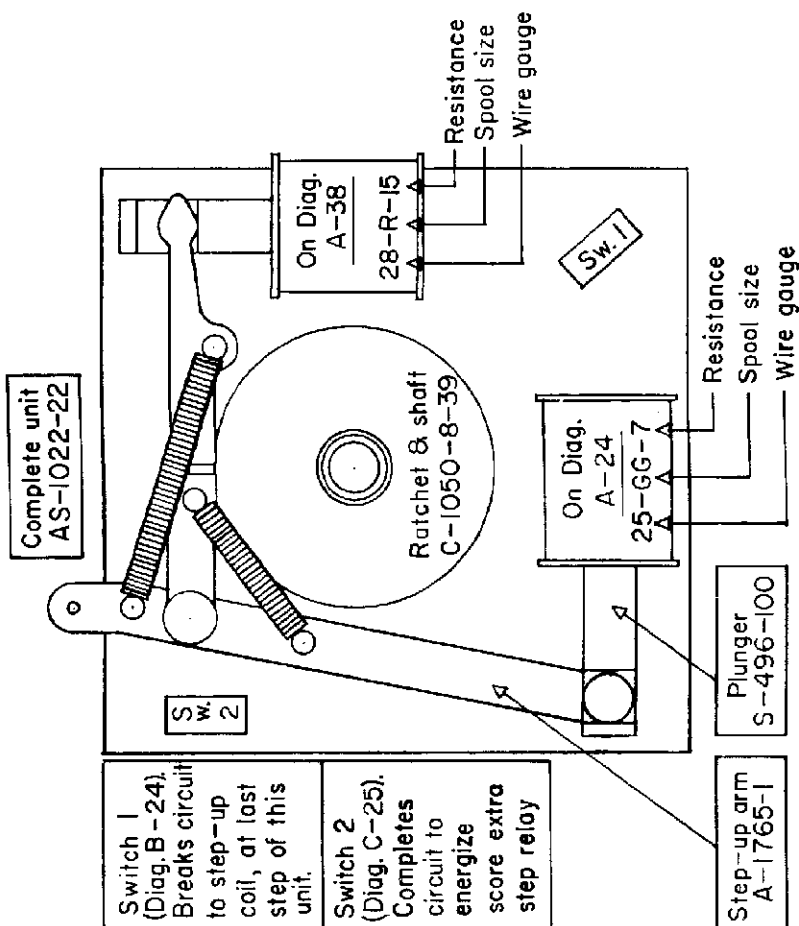
- Feeds wiper (A) to complete circuit to "Select Now" lite at 4th & 5th step (Diag. K-1) 53-2
- Completes circuit to "Select Now" lite at 4th step thru wipers (A) & (B) (Diag. K-1) 36-2
- Timer step up circuit to ball lifter cam switch thru wiper (C) (Diag. G-7) 43-2
- To feed wiper for wipers (C) & (D) (Diag. G-8) 21-3
- Closes shutter at 2nd step thru wiper (D) (Diag. G-8) 18-3
- Completes circuit to ball lifter motor from 1st to 39th step when 8th ball trough switch opens thru wiper E (Diag. D-12) 38-3
- Completes circuit to trip Selector Lock relay at 4th step. (Diag. C-10) 54-5
- Thru wipers (F) & (G) 75-3
- Completes circuit to trip Selector Lock relay at 5th step. (Diag. C-9) 98-5
- Keeps circuit to ball lifter cam switch, if Select Before 5th Ball is lit. (Diag. G-8) 81-2
- Completes circuit to "Select Now" lite at 5th step thru wipers (A) & (B) (Diag. K-1) 38-2

91-1 — Ground to frame of unit

SCORE UNIT STEP-UP AND RESET CIRCUIT

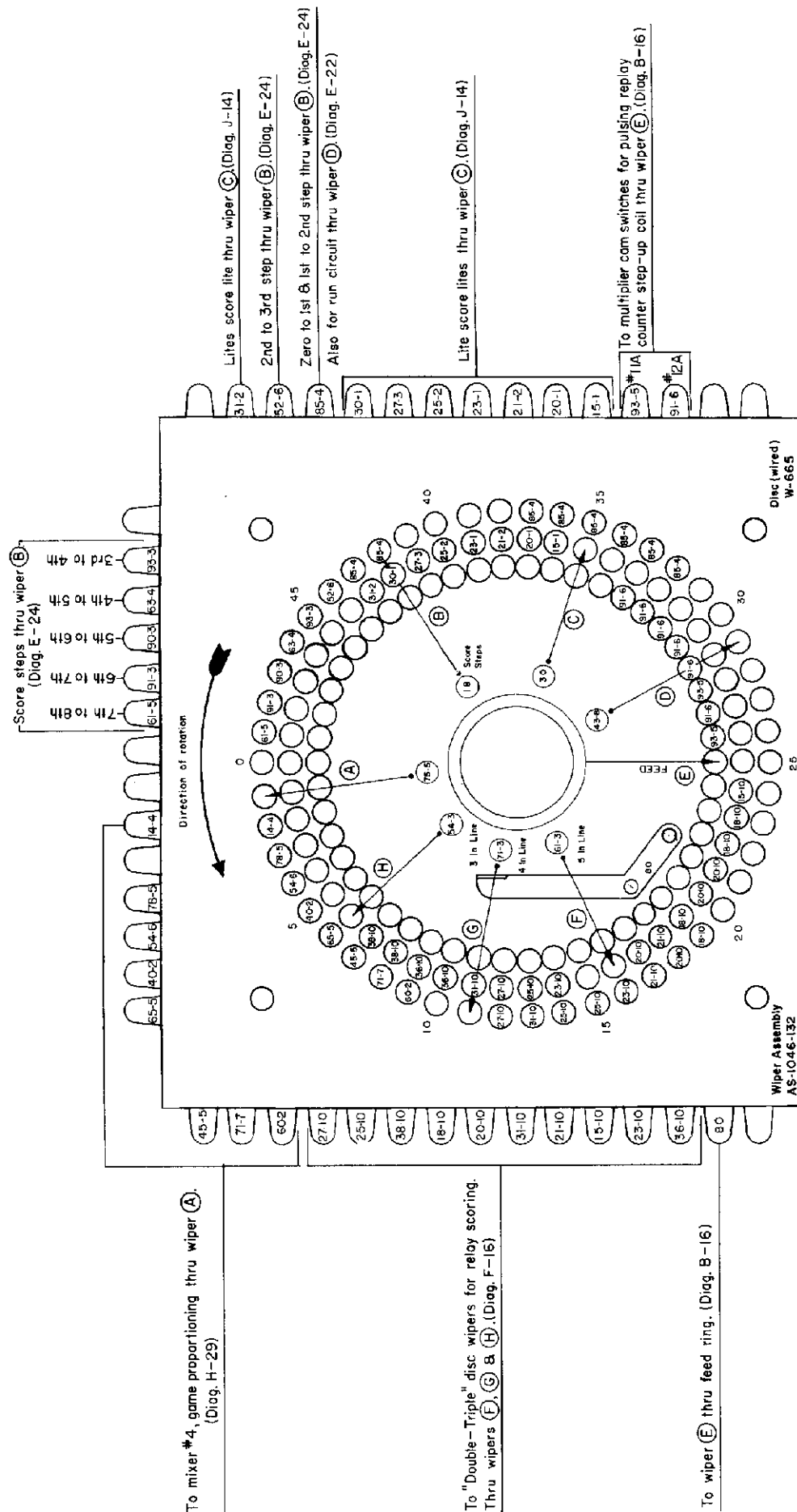


SCORE UNIT viewed from COIL side



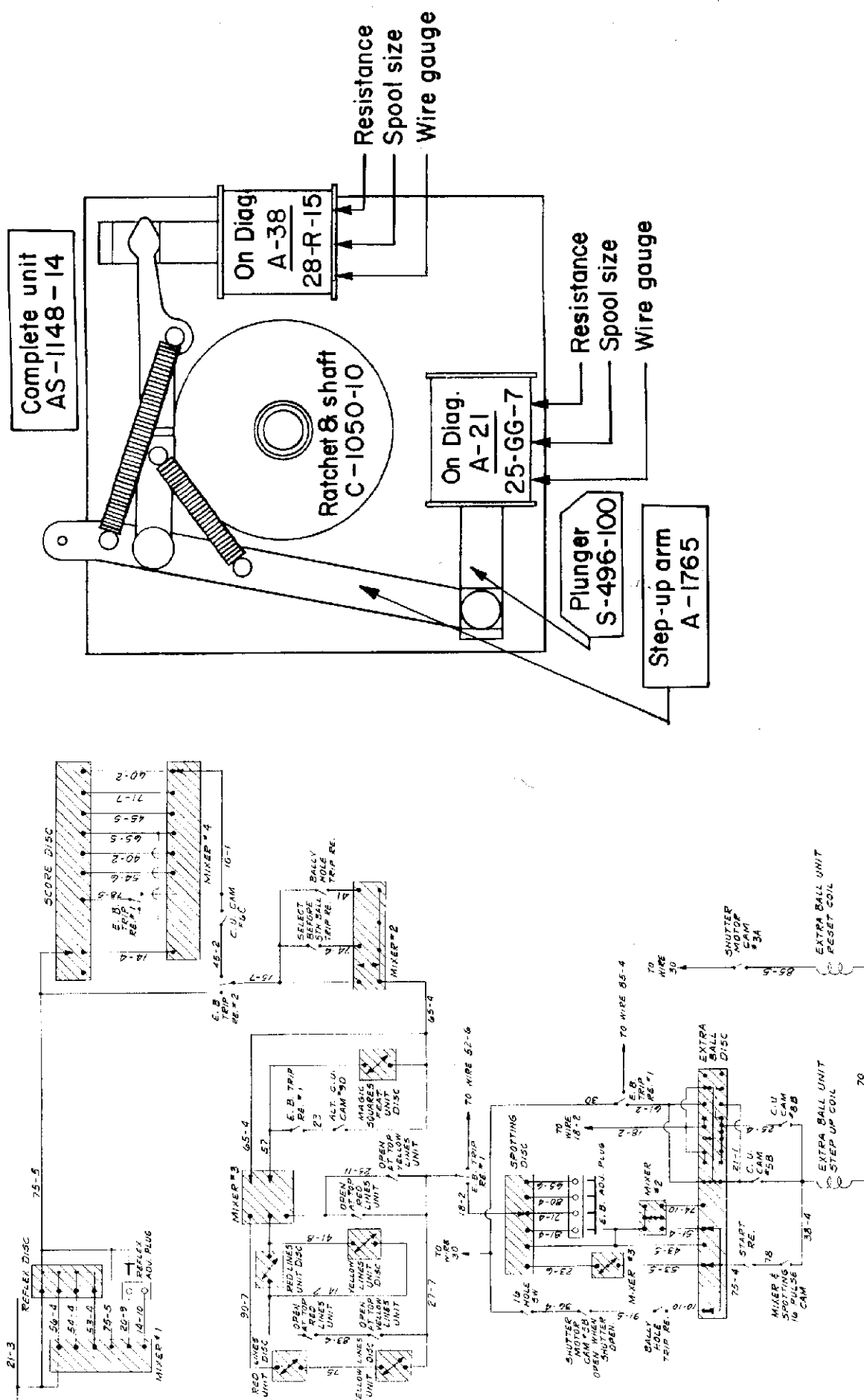
SCORE UNIT viewed from BUTTON or WIPER side

8 step unit. Wipers shown in zero or reset position



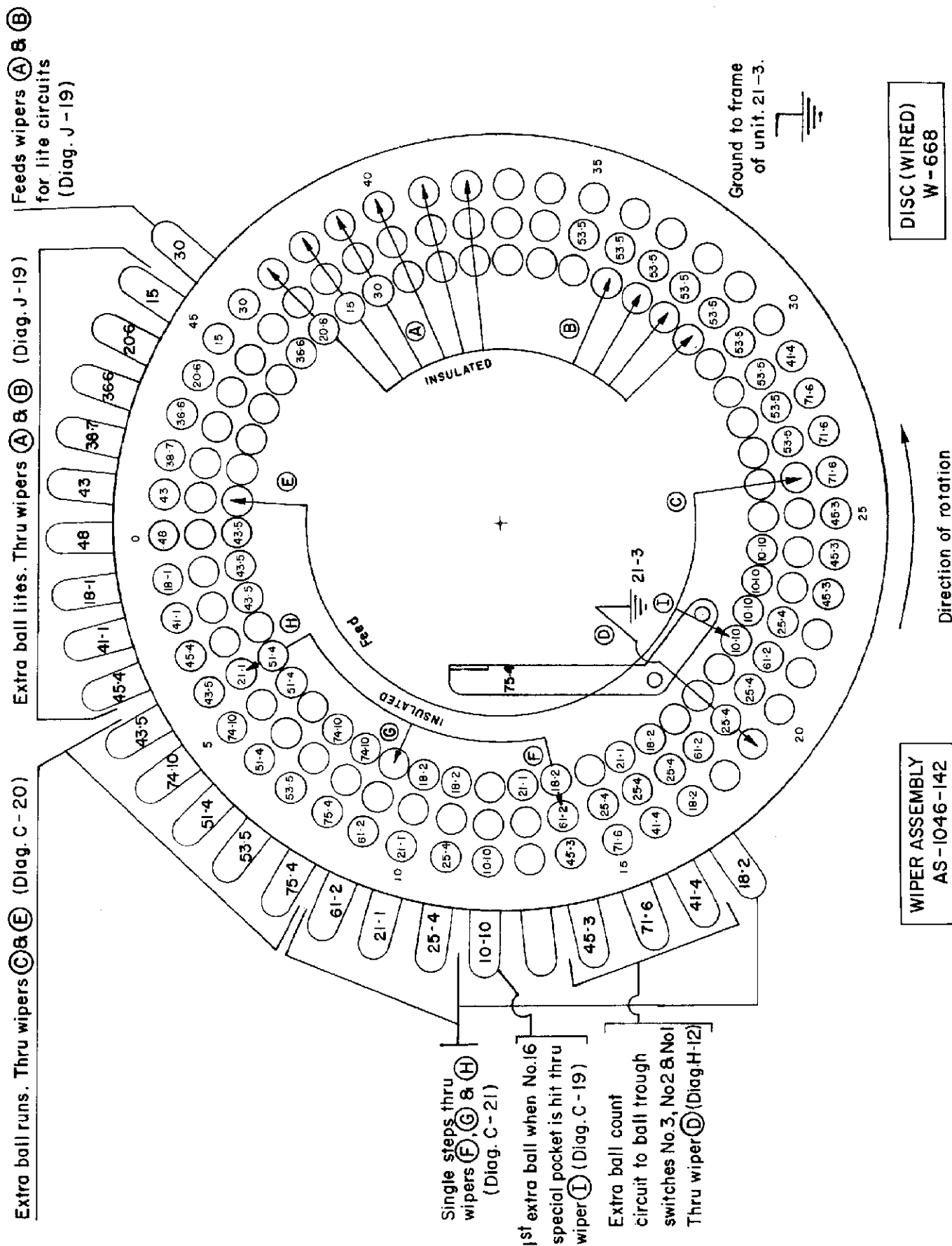
EXTRA BALL STEP-UP AND RESET CIRCUIT

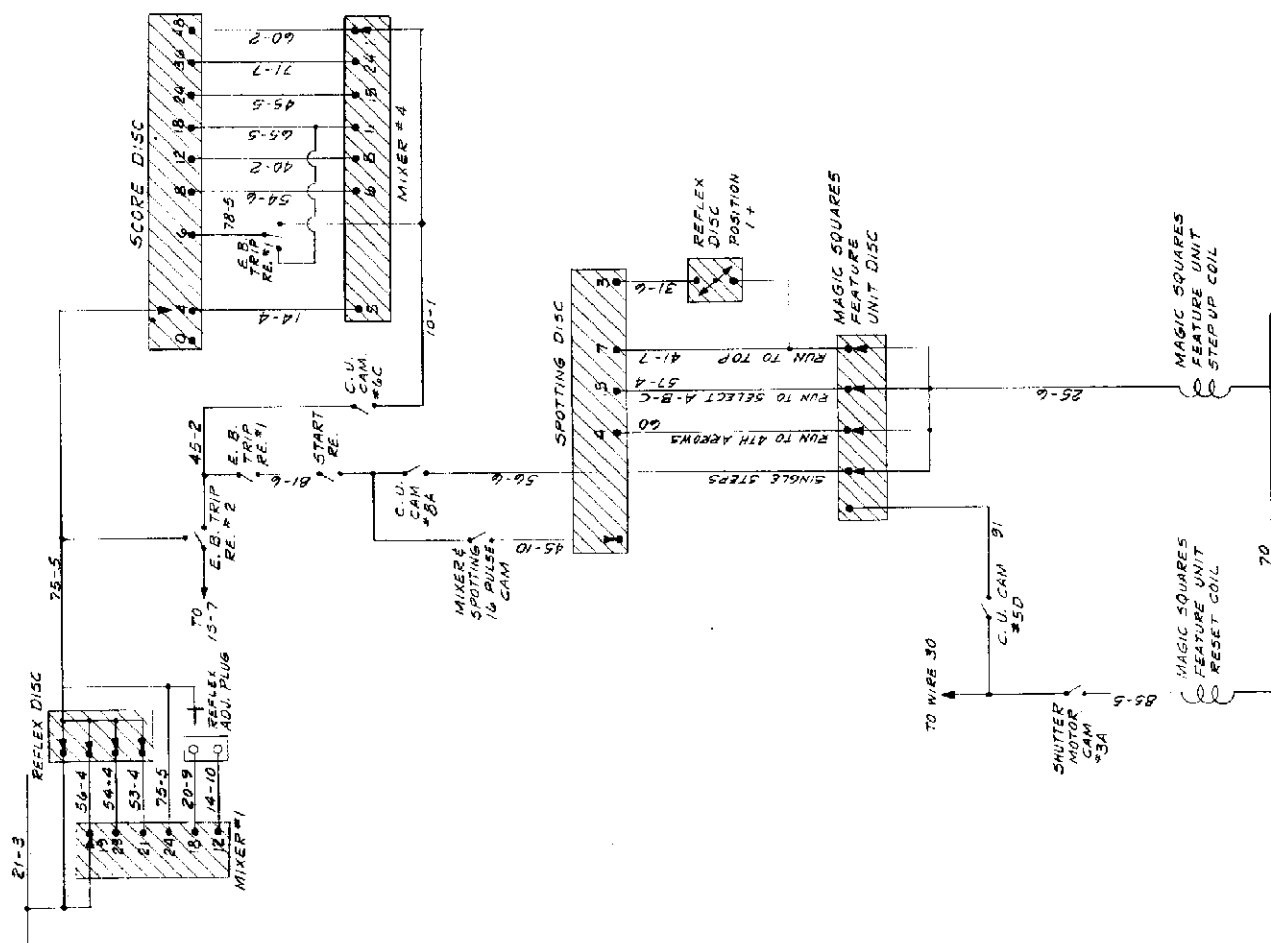
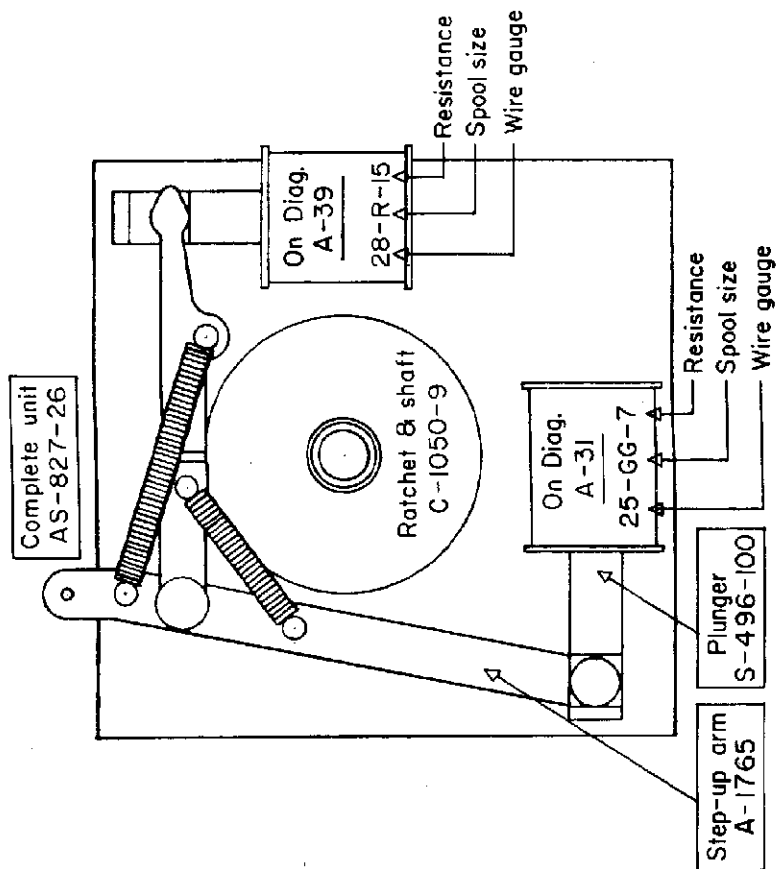
EXTRA BALL UNIT viewed from COIL side



EXTRA BALL UNIT viewed from BUTTON or WIPER side

10 step unit. Wipers shown in zero or reset position





MAGIC SQUARES FEATURE UNIT viewed from BUTTON or WIPER side

9 step unit. Wipers shown in zero or reset position

Single step at 5th & 7th steps of unit thru wiper (A). (Diag. C-30)

Run to 4th step.
Run to top.
Run to 5th step.

Thru mixer #3, game proportioning thru wipers (A) & (D). (Diag. G-24)

Lites magic squares & spots #2 or #18 feature lites thru wipers (G), (H) & (I). (Diag. J-4)

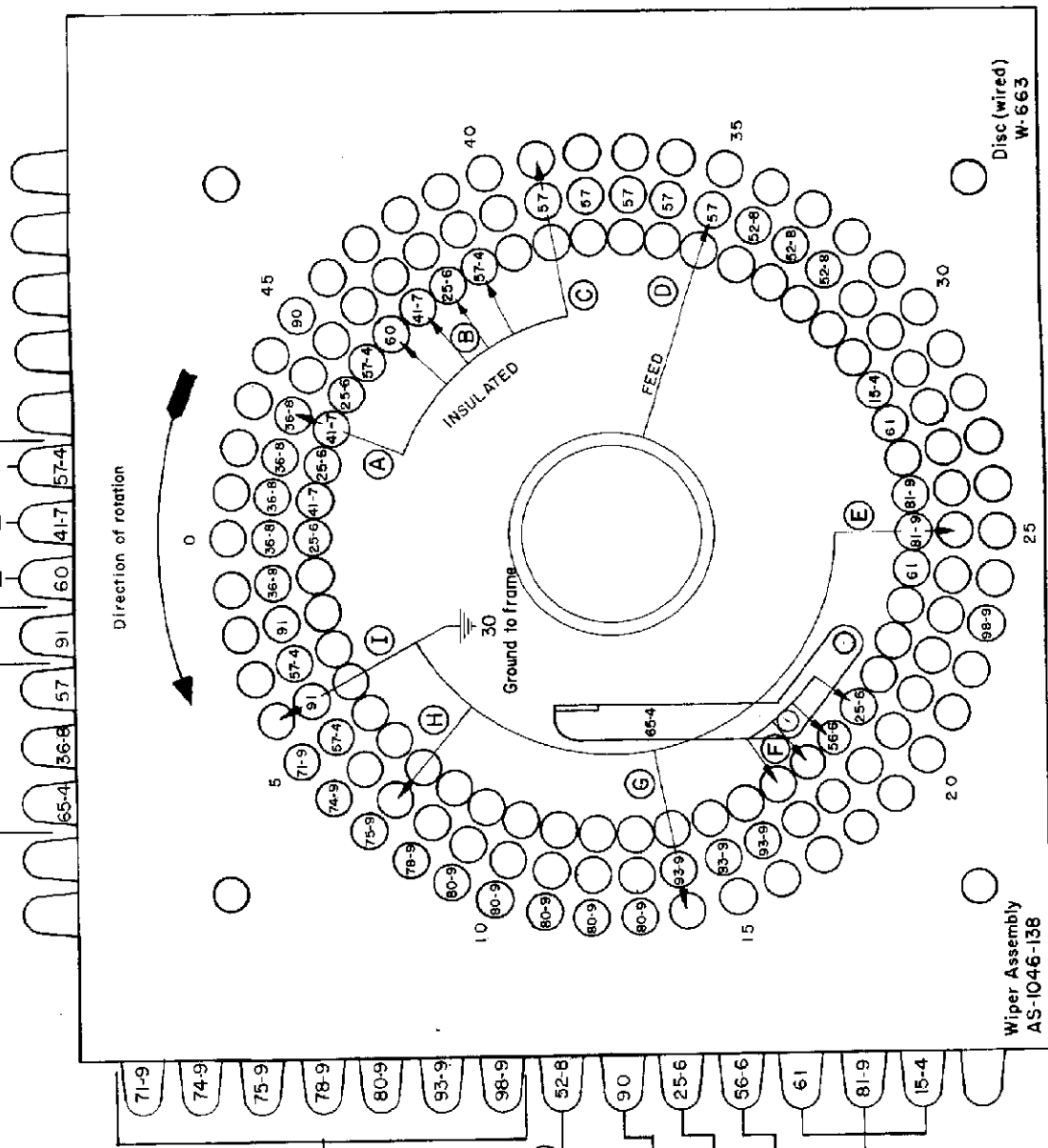
Lites #2 or #18 lite in card thru wiper (E). (Diag. J-32)

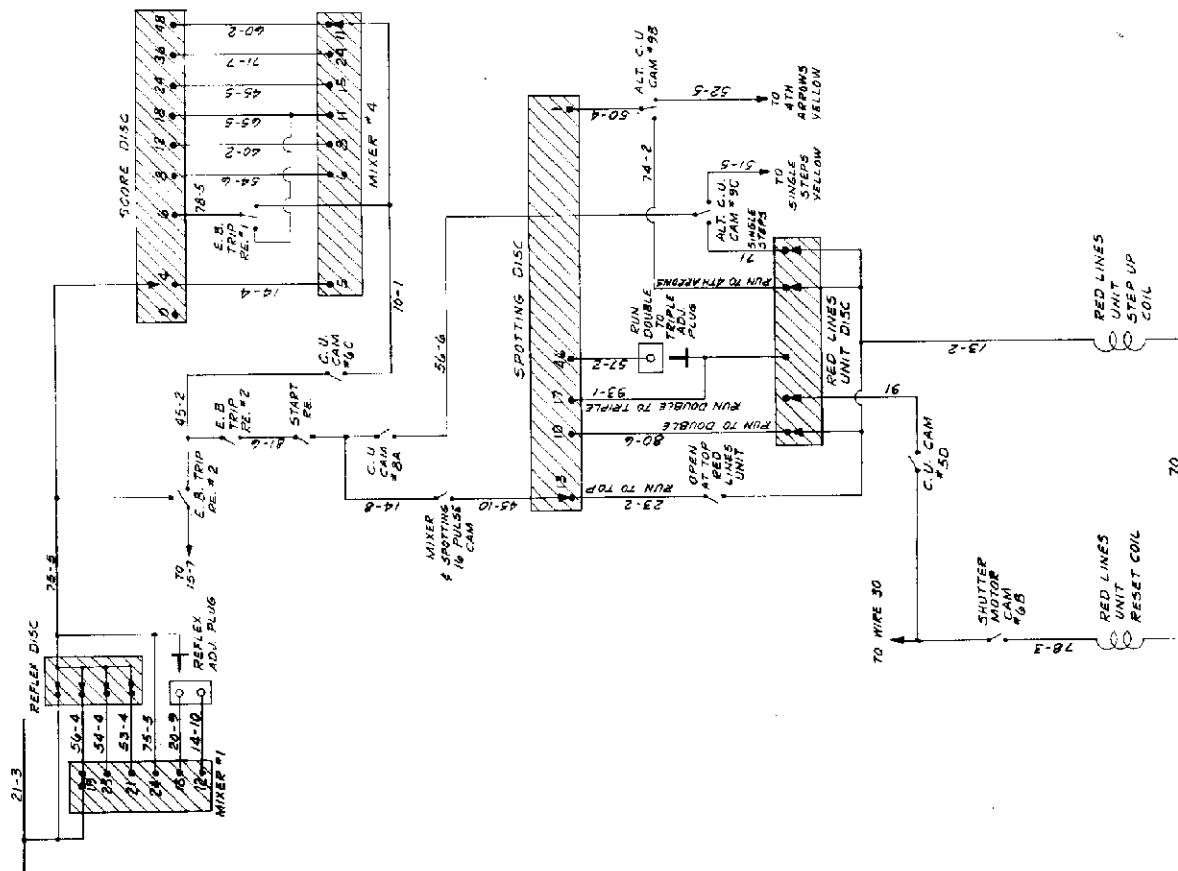
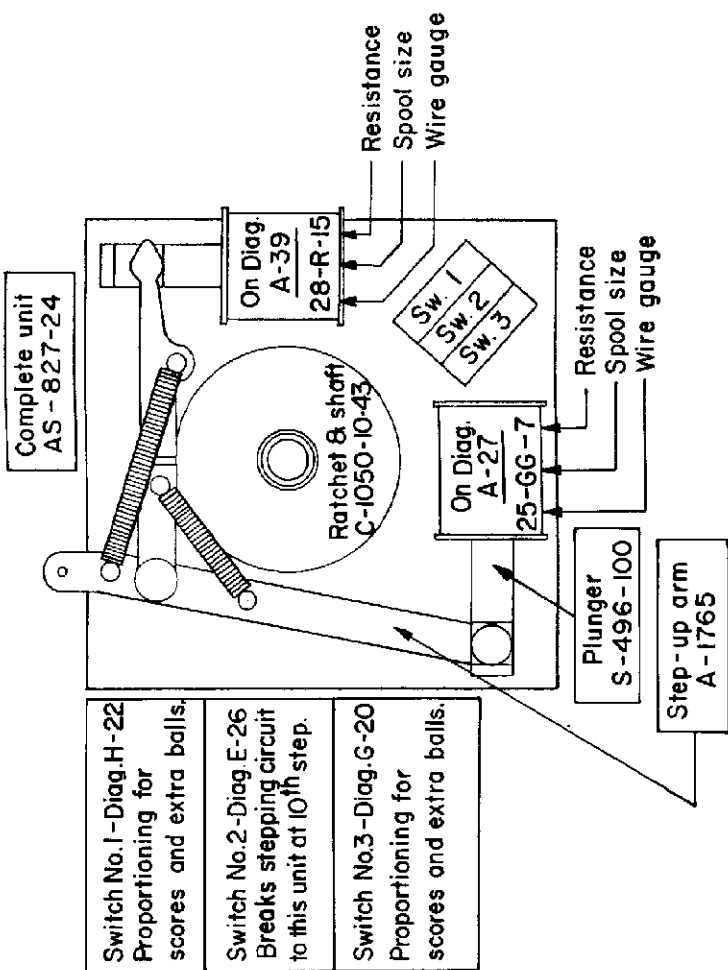
Thru mixer #2, energizes spot #2 or #18 relay thru wiper (C). (Diag. C-31)

Feed for wipers (A), (B), (C) & (F).

Single steps thru wipers (F). (Diag. C-30)

Completes circuit to magic squares buttons thru wipers (F). (Diag. F-35)

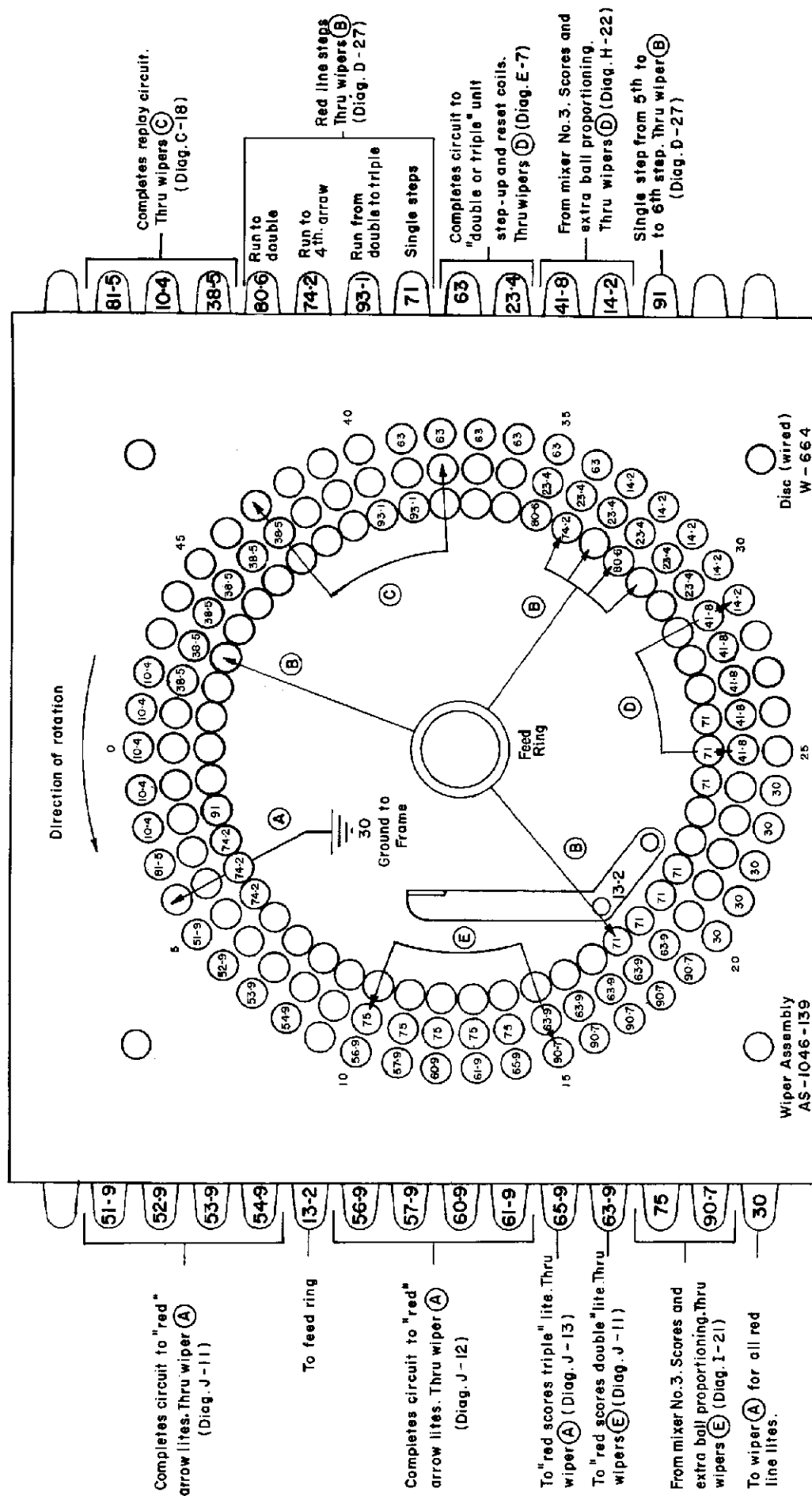




RED LINE UNIT

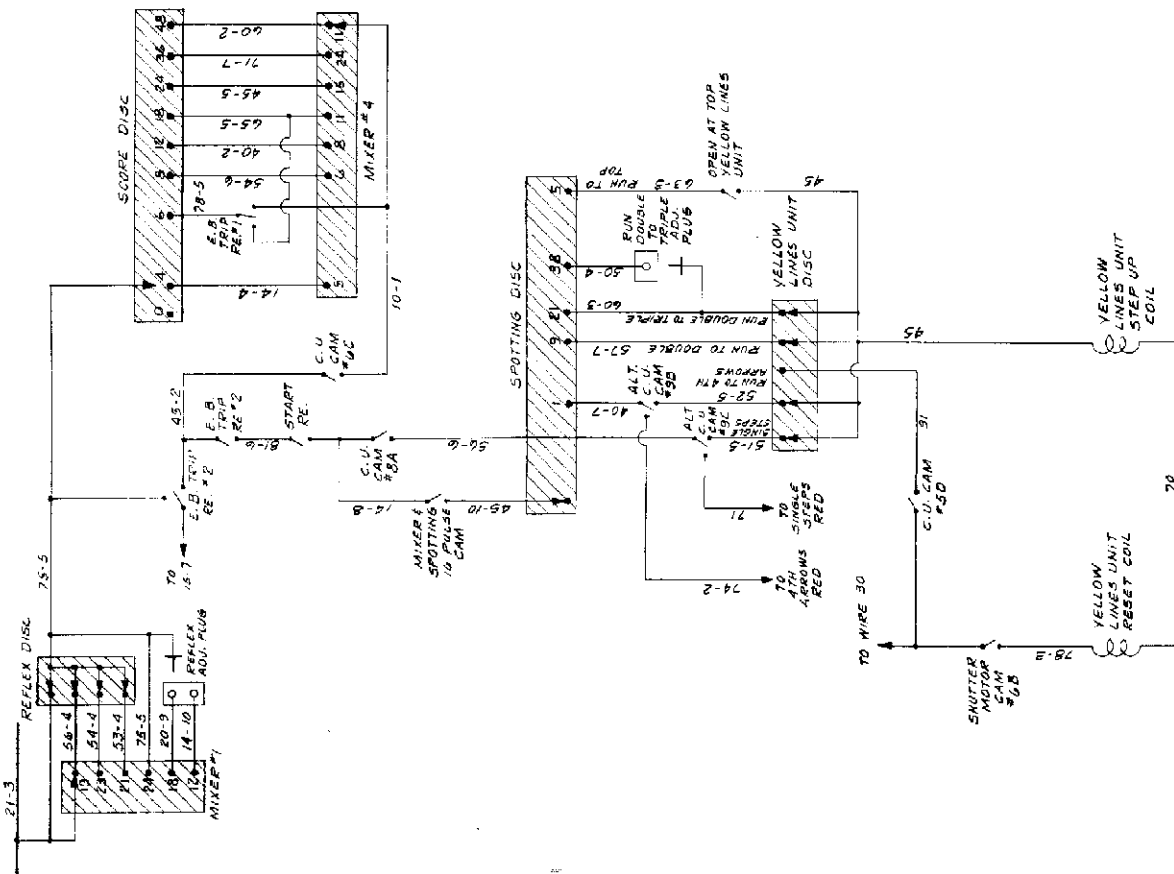
viewed from **BUTTON** or **WIPER** side

10 step unit. Wipers shown in zero or reset position



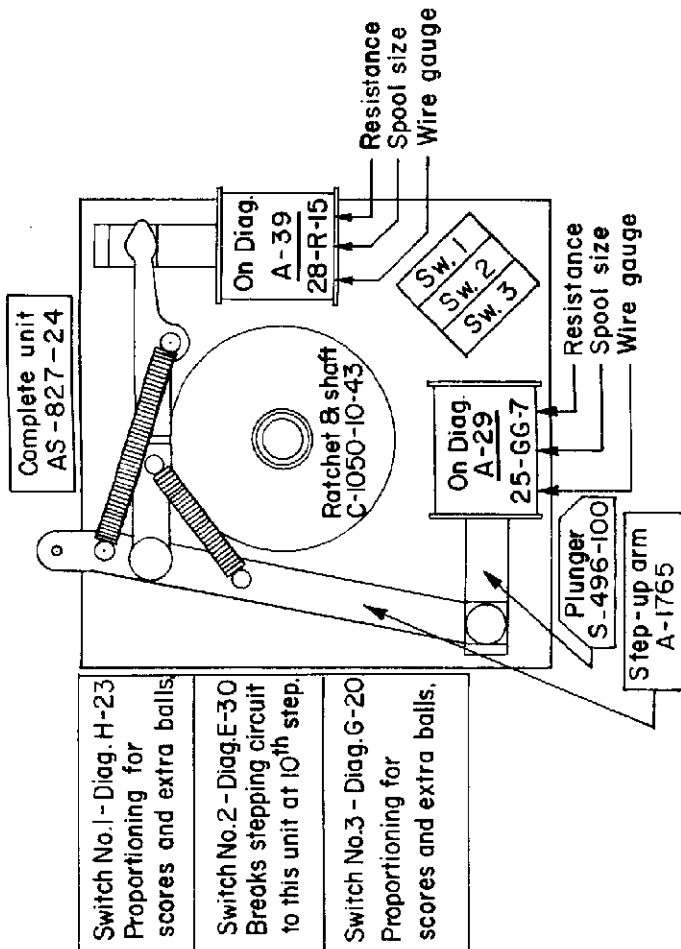
YELLOW LINE UNIT

STEP-UP AND RESET CIRCUIT



YELLOW LINE UNIT

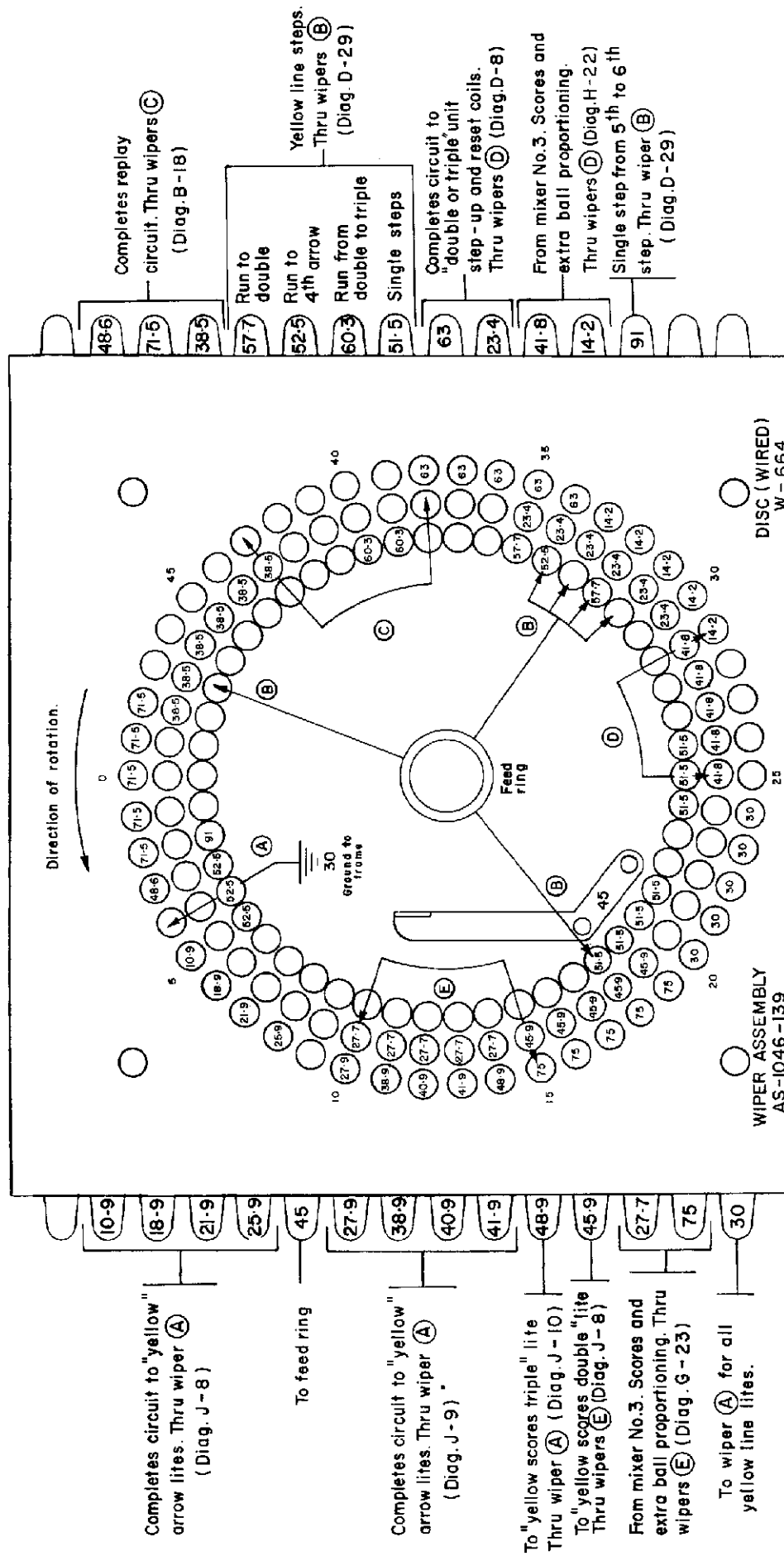
viewed from COIL side

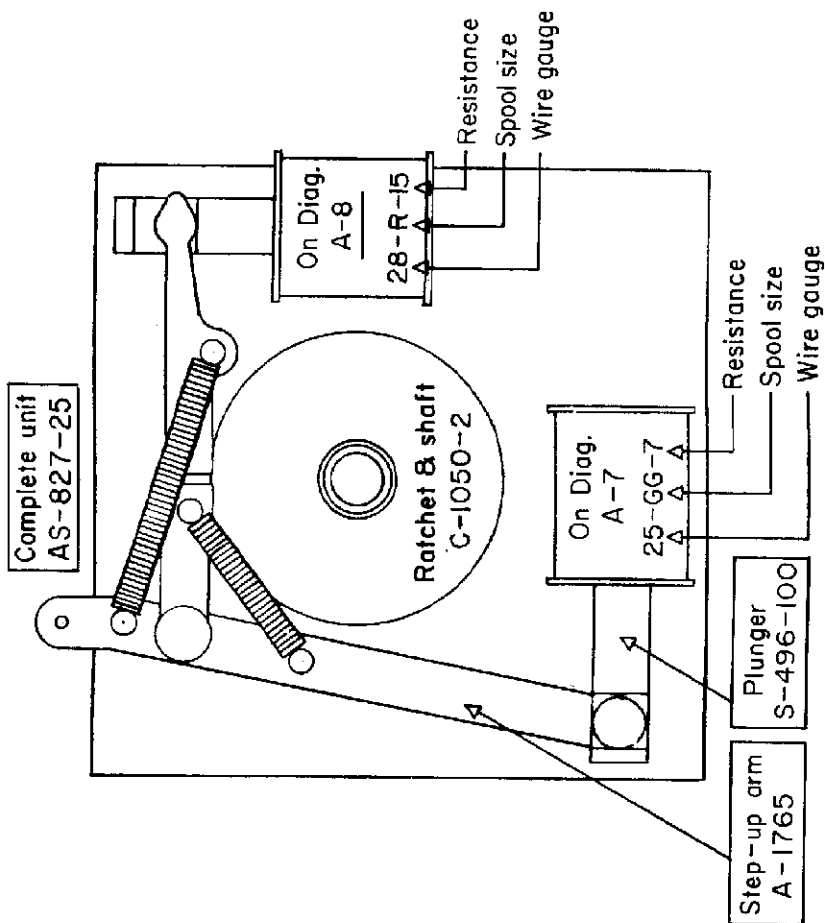
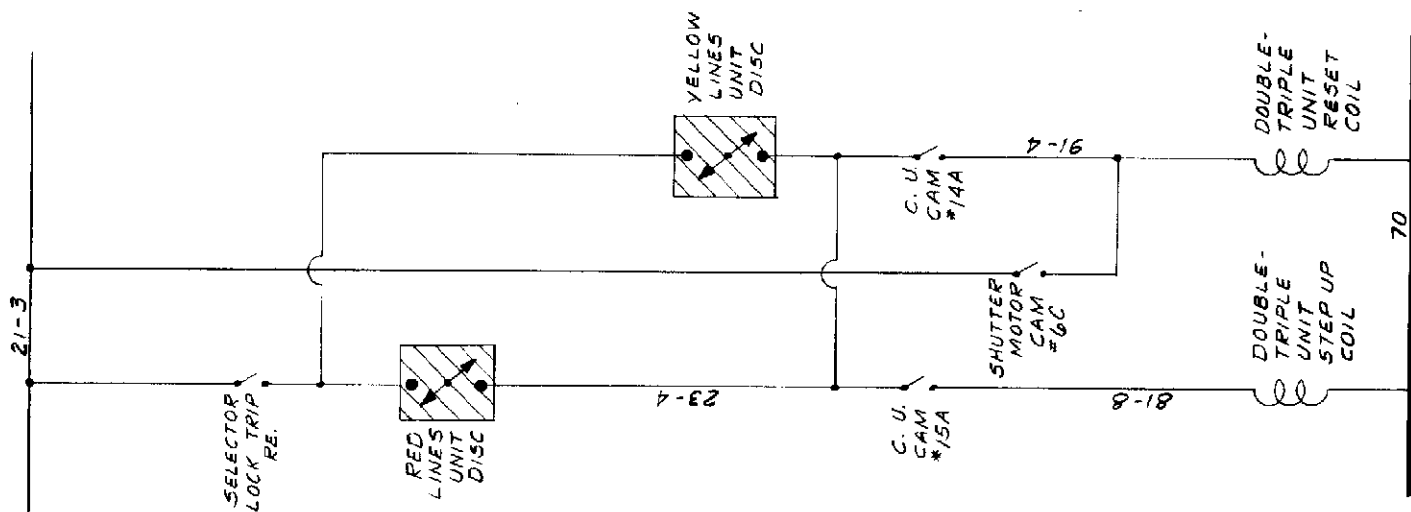


YELLOW LINE UNIT

viewed from BUTTON or WIPER side

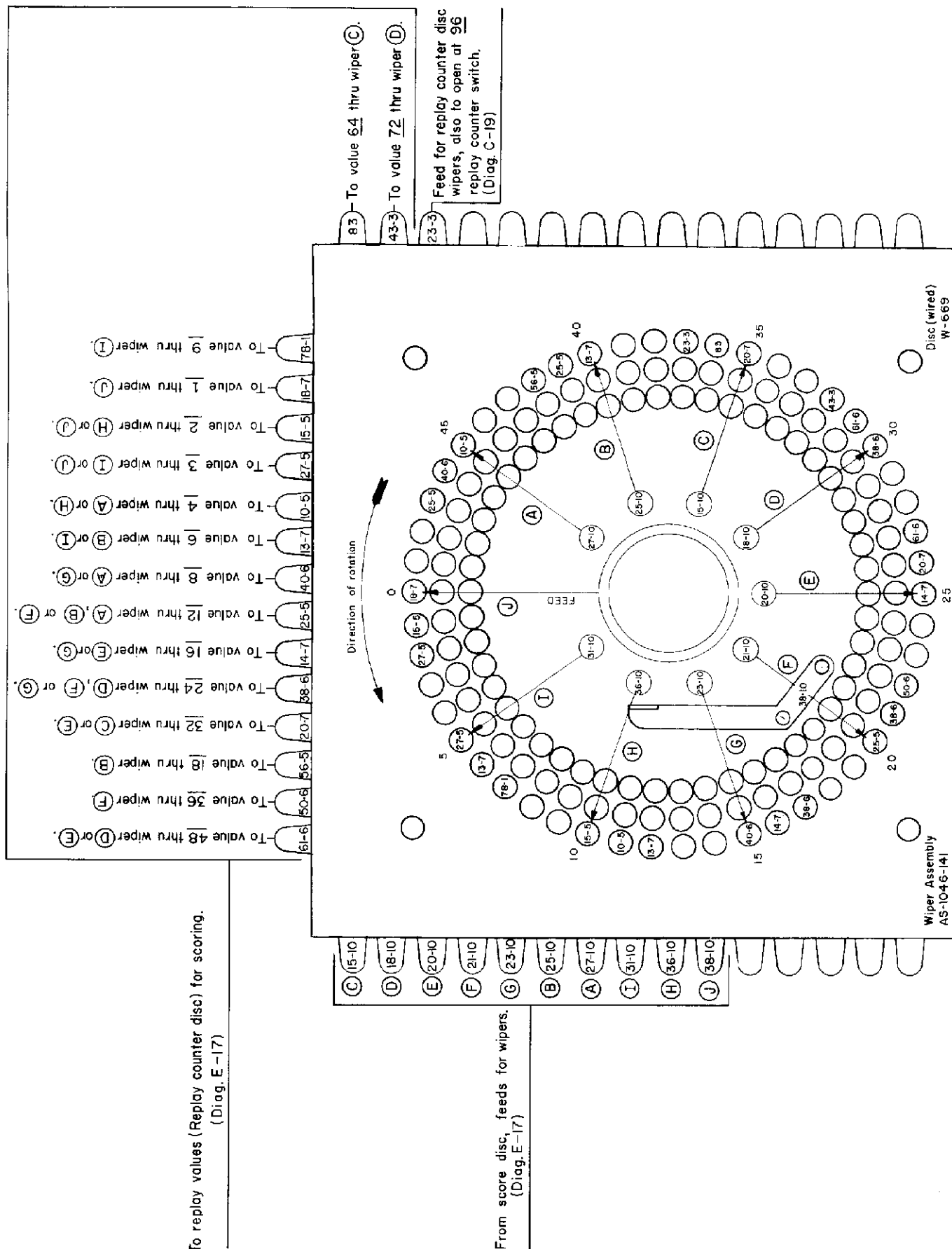
10 step unit. Wipers shown in zero or reset position



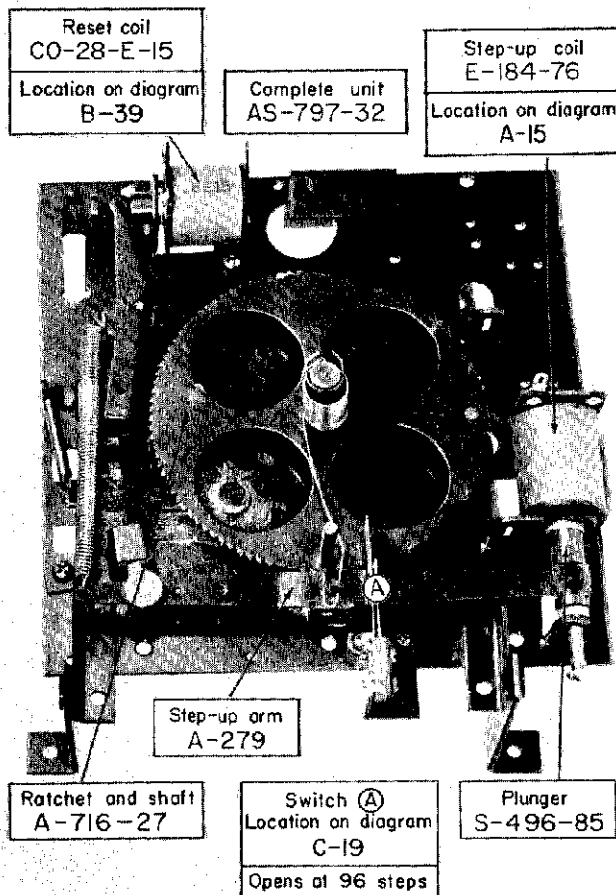


DOUBLE-TRIPLE UNIT viewed from BUTTON or WIPER side

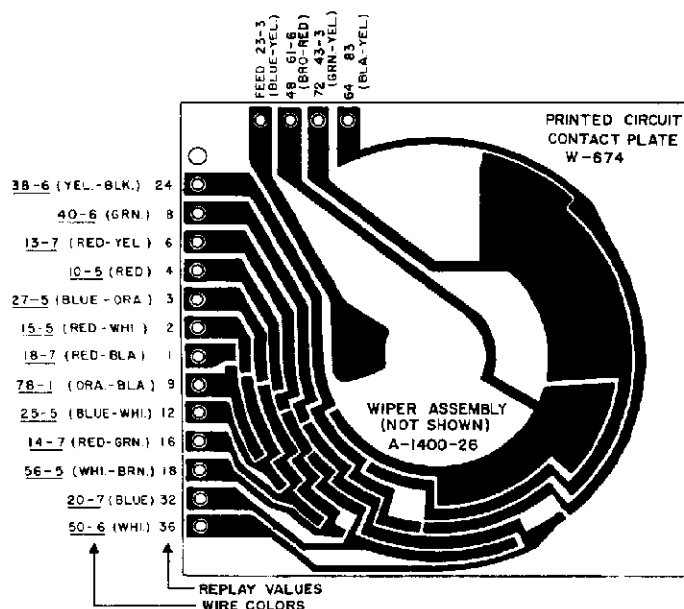
2 step unit. Wipers shown in zero or reset position



REPLAY COUNTER viewed from COIL side



REPLAY COUNTER viewed from WIPER side



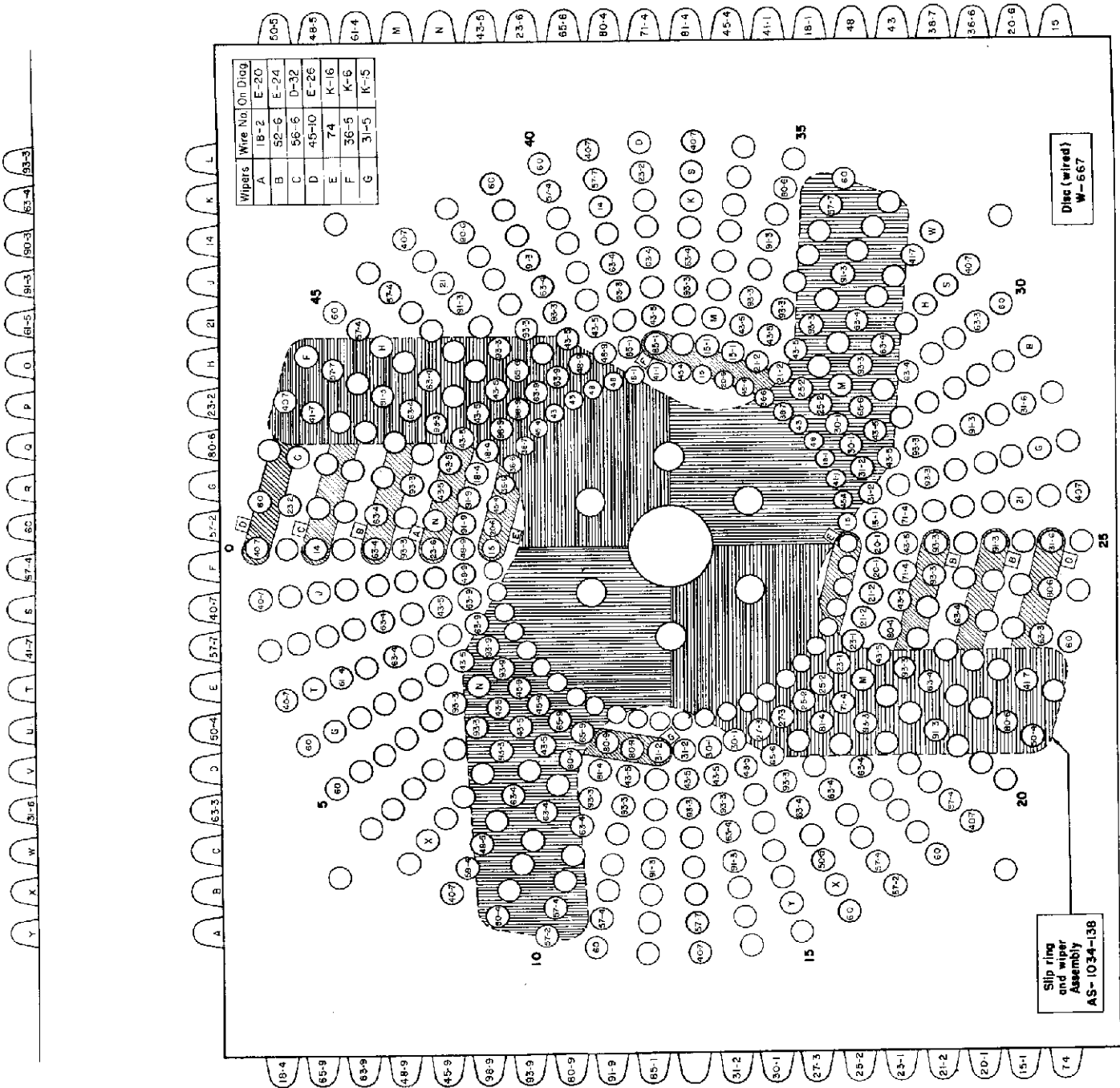
CAM SWITCHES THAT PULSE REPLAY COUNTER STEP UP COIL																								
	SW. #11A			SW. #10A			SW. #11A			SW. #10A			SW. #10A			SW. #10A			SW. #10A			SW. #10A		
	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE	REGULAR	DOUBLE	TRIPLE
5 IN LINE	64 (16)	128 (32)	192 (48)	72 (12)	144 (24)	216 (36)	96 (24)	192 (48)	288 (72)	96 (16)	192 (32)	288 (48)	96 (16)	192 (32)	288 (48)	144 (24)	288 (48)	432 (72)	144 (24)	288 (48)	432 (72)	192 (32)	384 (64)	576 Note
4 IN LINE	16 (4)	32 (8)	48 (12)	18 (3)	36 (6)	54 (9)	24 (6)	48 (12)	72 (18)	36 (6)	72 (12)	108 (18)	48 (8)	96 (16)	144 (24)	72 (12)	144 (24)	216 (36)	96 (16)	192 (32)	288 (48)	144 (24)	288 (48)	432 (72)
3 IN LINE	4 (1)	8 (2)	12 (3)	6 (1)	12 (2)	18 (3)	8 (2)	16 (4)	24 (6)	12 (2)	24 (4)	36 (6)	18 (3)	36 (6)	54 (9)	24 (4)	48 (8)	72 (12)	36 (6)	72 (12)	108 (18)	48 (8)	96 (16)	144 (24)

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

EXAMPLE: ON A REGULAR 3-IN-LINE SCORE OF **24** REPLAYS
THE CIRCUIT IS EFFECTIVE THRU THE **4** REPLAY CIRCUIT STRIP

NOTE: EFFECTIVE THRU OPEN AT 96 REPLAY COUNTER SWITCH.

SPOTTING DISC viewed from BUTTON or WIPER side



Triple Scores are registered with the Double Triple Unit at its 2nd step.

SEARCH POSITIONS

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

HORIZONTAL

VERTICAL

DOUBLE
TRIPLE UNIT
STEPS C.U.
CAM #15

HORIZONTAL

VERTICAL

DOUBLE
TRIPLE UNIT
STEPS C.U.
CAM #15

CORNERS

DIAGONAL

VERTICAL

HORIZONTAL

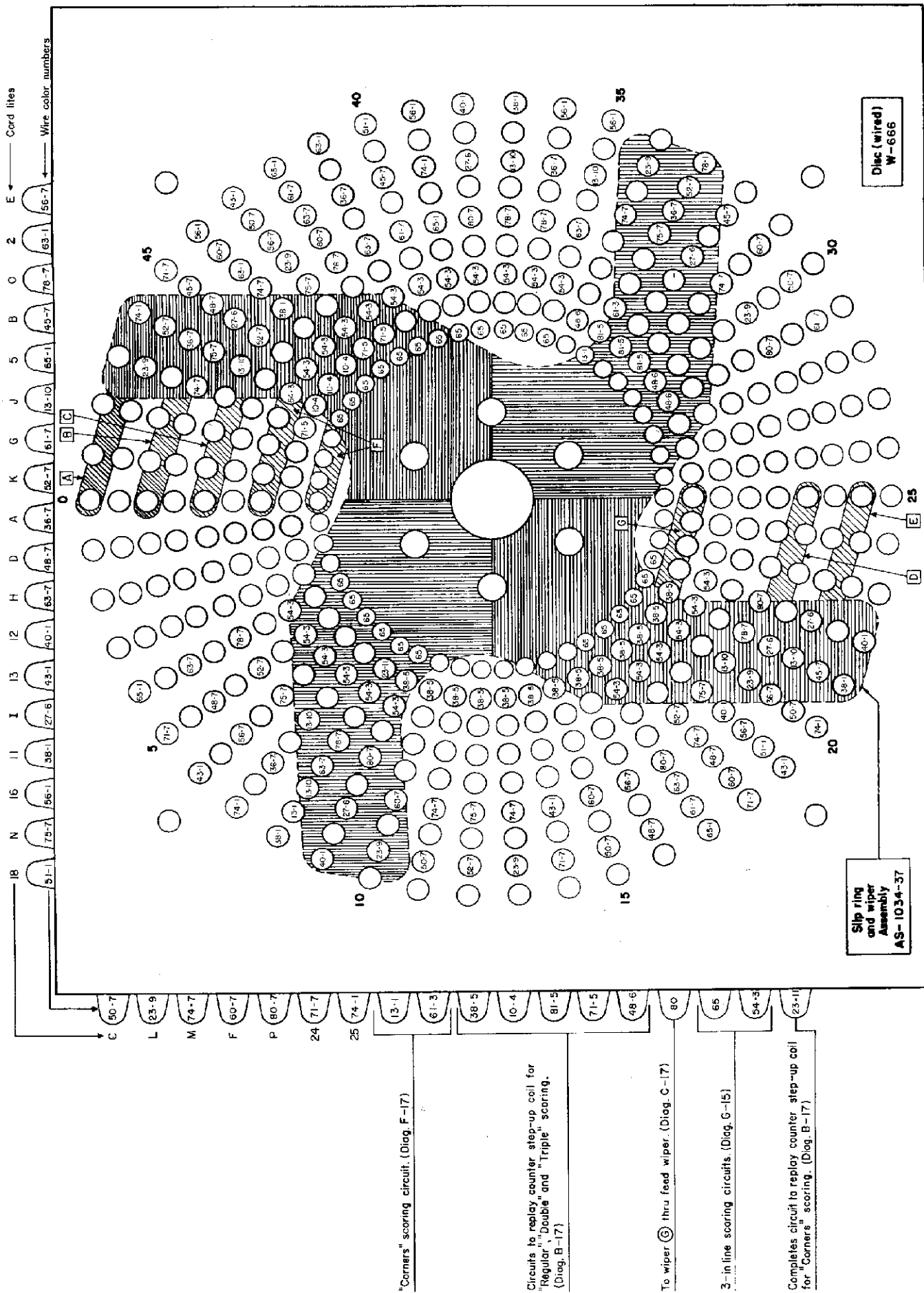
DOUBLE TRIPLE
UNIT RESETS
AT THIS POINT
U.C. CAM #14

ROTATION
FROM 50 TO 1
OR SEARCH DISC WIPERS

YELLOW
YELLOW
RED
RED
YELLOW
RED

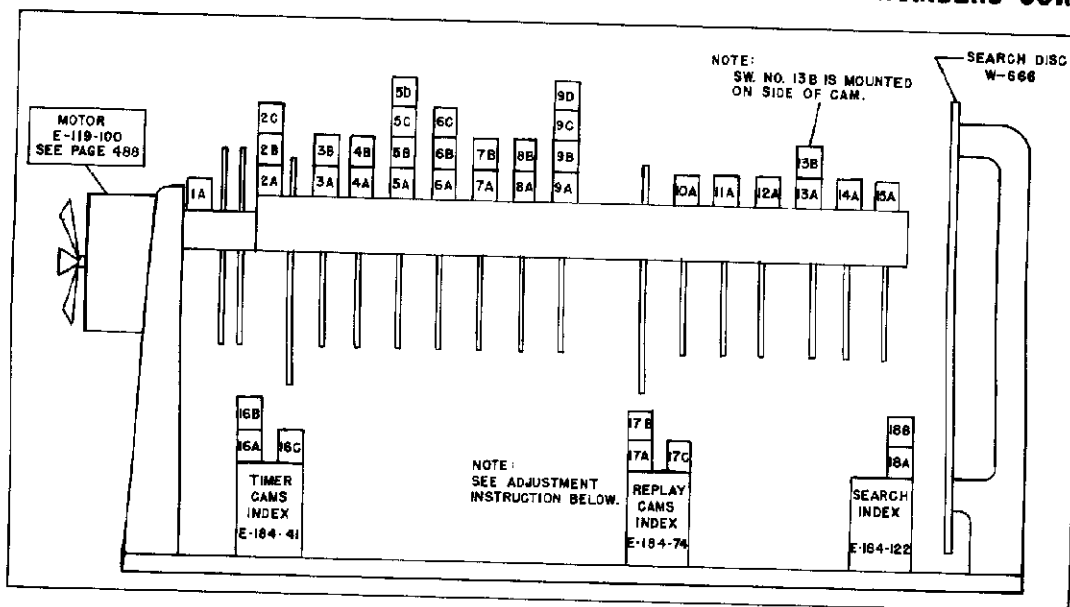
YELLOW
YELLOW
RED
RED
YELLOW
RED

SEARCH DISC



CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART

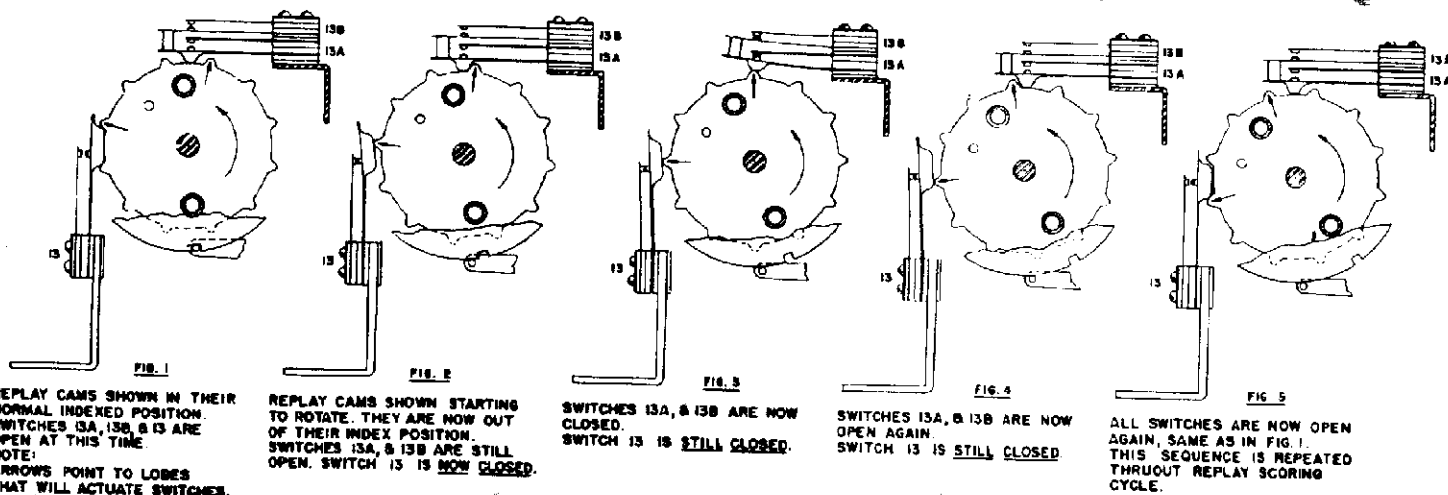


N.C.----- NORMALLY CLOSED
N.O.----- NORMALLY OPEN
M.B.B.----- MAKE BEFORE BREAK
S.P.D.T.----- SINGLE POLE DOUBLE THROW

Note-It is important to adjust Replay Cams Index Switches No. 17A and No. 17B so that they make only when Replay Cams Index Coil is energized. When Replay Cams Index is de-energized, these Switches should remain open while Switch is riding on outer edge of cam.

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

Important part of illustration is to show that SWITCH 13 CLOSSES FIRST AND OPENS LAST. If adjustment is necessary, Switch 13 can be moved up or down. Loosen screws that hold switch, then move up or down.



CONTROL UNIT SWITCH CHART FOR POSITION OF SWITCHES SEE PICTORIAL VIEW

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-8	65-2 36-9	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-3	90-5 30	Gray Yellow	Energizes reflex play magnet, and replay register reset.
2B	N.O.	C-38	93-4 30	Gray-Yellow Yellow	Energizes coin kicker magnet.
2C	N.C.	E-10	57-6 31-7	White-Brown Yellow-Red	Drops out red button relay.

CONTINUED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONTINUED

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
3A	N.C.	I-4	83-3 48-2	Black-Yellow Green-Black	Drops out start relay, and acts as safety switch during spin.
3B	S.P.D.T.	B-14	93-7 98-1 91-7	Gray-Yellow Gray-Black Gray-Red	Directs circuit to replay meter or total plays meter.
4A	N.O.	D-5	14-9 80-2	Red-Green Black	Used if coin meter is added in front cabinet.
4B	N.O.	D-39	98-1 30	Gray-Black Yellow	Energizes score extra step index, and control unit spotting index coils.
5A	N.O.	G-8	71-8 65-2	Orange-Red Brown-White	Energizes timer reset coil.
5B	N.O.	B-21	21-1 38-4	Blue-Red Yellow-Black	Energizes extra ball step-up coil. Steps unit from minus one to zero position.
5C	N.O.	B-23	85-4 78-4	Black-White Orange-Black	Energizes anti-cheat relay.
5D	N.O.	C-26	91 85-4	Gray-Red Black-Yellow	"Red" and "Yellow" lines unit steps.
6A	N.C.	D-23	43-8 25-3	Green-Yellow Blue-White	Score extra step safety switch.
6B	N.C.	C-26	75-5 31-9	Orange-White Yellow-Red	Drops out features run relay.
6C	N.C.	G-27	45-2 10-1	Green-White Red	Opens game advantage circuits during timing cycle.
7A	N.O.	B-24	18 52-2	Red-Black White-Blue	Score unit steps.
7B	N.O.	D-38	93-4 30	Gray-Yellow Yellow	(Safety switch) energizes coin kicker magnet.
8A	N.O.	F-27	14-8 56-6	Red-Green White-Brown	Pulses "red lines" "yellow lines" and "magic squares" units for single steps. Also energizes "corners" "Bally-hole" and select before 5th ball" relays when circuit complete thru all other factors.
8B	N.O.	B-22	25-4 38-4	Blue-White Yellow-Black	Extra ball unit steps.
9A	Alt.	E-23	85-4 43-8	Black-White Green-Yellow	Opens score extra step circuit every other time.
9B	Alt.	E-29	52-5 40-7 74-2	White-Blue Green Orange-Green	Run circuit to 4th arrow, for "red lines" or "yellow lines" unit.
9C	Alt.	D-28	51-5 56-6 71	White-Red White-Brown Orange-Red	Single step circuit for "red lines" or "yellow lines" unit.
9D	Alt.	H-24	23 65-4	Blue-Yellow Brown-White	Proportioning switch.
10A		B-16	91-6 20-3	Gray-Red Blue	Pulses replay counter, when score unit is at 2nd, 4th, 5th, 6th, 7th and 8th steps.

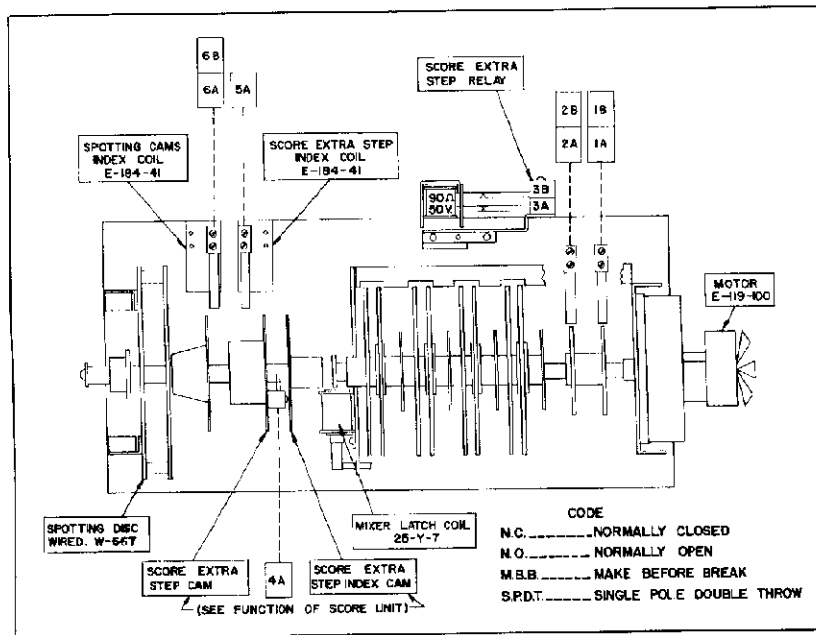
CONCLUDED ON NEXT PAGE

CONTROL UNIT CAM SWITCH CHART — CONCLUDED

CAM SWITCH		LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
11A	N.O.	B-16	93-5 20-3	Gray-Yellow Blue	Pulses replay counter, when score unit is at 1st and 3rd steps.
12A	N.O.	C-13	80 48-4	Black Green-Black	Pulses replay register step-up coil, and reflex replay magnet.
13A	N.O.	I-14	93 56-7	Gray-Yellow White-Brown	Prevents the start of another replay scoring, when unit cams are indexed.
13B	N.C.	C-8	90-2 27-2	Gray Blue-Orange	Opens circuit to timer step-up coil during replay winner.
13 (Backside) N.O.		E-13	21-3 27	Blue-Red Blue-Orange	Replay lock-in switch. NOTE: See control unit pictorial view.
14A	N.O.	C-8	91-4 23-4	Gray-Red Blue-Yellow	Completes circuit to "double triple" unit reset coil, thru "red" or "yellow" lines unit disc.
15A	N.O.	C-7	81-8 23-4	Black-Red Blue-Yellow	Completes circuit to "double triple" unit step-up coil, thru "red" or "yellow" lines unit disc.
TIMER CAMS INDEX COIL		A-6	93-2 70	Gray-Yellow Orange	Energized by switch on start relay. Also thru shutter motor cam switch #5C.
16A	N.O.	G-1	20-P 60-P	Blue (Plastic) Brown (Plastic)	Operates control, magic squares, and mixer & spotting motors.
16B	N.C.	G-5	14-9 71-2	Red-Green Orange-Red	Opens circuit to coin lock out magnet during spin.
16C	N.C.	D-10	13 30	Red-Yellow Yellow	Lock-in safety switch for red button relay.
REPLAY CAMS INDEX COIL		A-13	40-4 70	Green Orange	Energizes when winning score is made, and releases replay cams.
17A	N.O.	D-13	27 80	Blue-Orange Black	In series with replay lock-in circuit. NOTE: See control unit pictorial view for correct adj.
17B	N.O.	I-15	93 56-7	Gray-Yellow White-Brown	In series with replay winner circuit. NOTE: See control unit pictorial view for correct adj.
17C	N.C.	C-12	80 15-2	Black Red-White	Opens direct 50 volt circuit to search index coil, coil then held in thru resistor.
SEARCH INDEX COIL		A-13	15-2 70	Red-White Orange	Energized when 3-in-line or more is scored.
18A		B-13	80 40-4	Black Green	Energizes replay cams index, if a score is made.
18B		I-4	83-3 30	Black-Yellow Yellow	Opens start circuit, and acts as safety switch.

MIXER AND SPOTTING UNIT ASSEMBLY

Numbers correspond to switch chart below

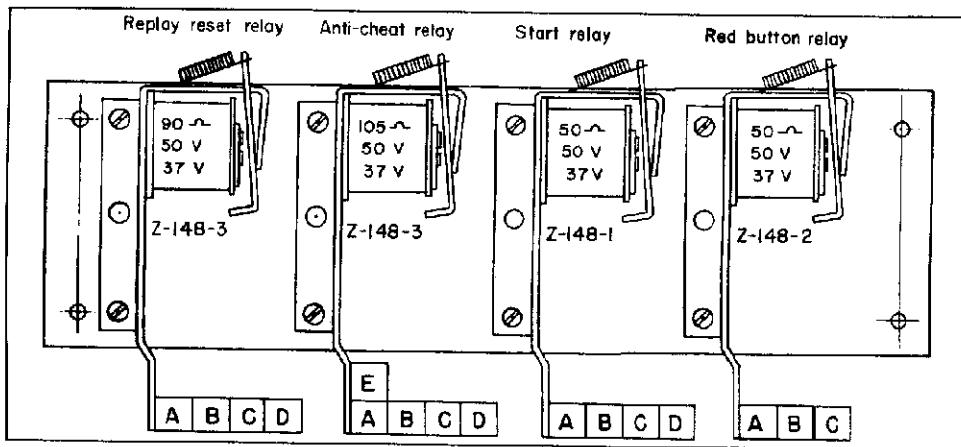


MIXER AND SPOTTING UNIT SWITCH CHART

FOR POSITION OF SWITCHES
REFER TO PICTORIAL VIEW ABOVE

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
1A	N.O.	G-26	14-8 45-10 Red-Green Green-White	Pulses "red-lines" "yellow-lines" and "magic squares" step-up coils for multiple steps.
1B	N.O.	L-1	78-2 53-2 Orange-Black White-Yellow	Flashes "select now" lite.
2A	N.O.	D-3	75-2 53-7 Orange-White White-Yellow	Pulses replay register reset coil.
2B	N.O.	B-20	78 38-4 Orange-Black Yellow-Black	Pulses extra ball step-up coil for multiple steps.
SCORE EXTRA STEP RELAY COIL	A-25	43-6 70	Green-Yellow Orange	Energized by score unit step-up arm switch.
3A	N.O.	B-25	81-1 43-6 Black-Red Green-Yellow	Part of lock-in circuit for this relay.
3B	N.O.	B-23	40-5 52-2 Green White-Blue	Completes circuit to score unit step-up coil for multiple steps.
4A	N.O.	C-23	25-3 40-5 Blue-White Green	Pulses score unit step-up coil for multiple steps.
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.	C-25	75-5 81-1 Orange-White Black-Red	Completes lock in circuit for score extra step relay.
SPOTTING CAMS 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-6	83-1 30 Black-Yellow Yellow	Completes "game advantages" flash circuit.
6B	N.O.	J-16	13-4 30 Red-Yellow Yellow	(Same as above) also flashes extra ball lites during extra ball play.

4 RELAY BANK PICTORIAL VIEW NUMBERS CORRESPOND TO SWITCH CHART



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

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

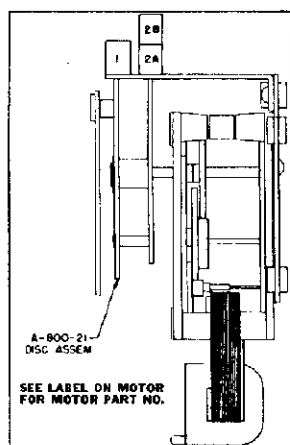
4 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
REPLAY RESET RELAY COIL	A-4	75-2 70	Orange-White Orange	Energizes when anti-cheat relay drops out.
A. S.P.D.T.	C-3	90-5 13-9 53-7	Gray Red-Yellow White-Yellow	Directs replay register reset circuit thru control unit cam switch #2A, when replays are being played, or thru 16 pulse cam when replays are being cancelled.
B. N.O.	G-3	56-2 75-2	White-Brown Orange-White	Lock-in switch for this relay.
C. N.O.	G-1	20-P 60-P	Blue (Plastic) Brown (Plastic)	Completes circuit to control unit motor during replay cancel.
D. N.C.	C-4	21-6 63-2	Blue-Red Brown-Yellow	Opens start circuit during replay cancel.
ANTI-CHEAT RELAY COIL	A-23	78-4 70	Orange-Black Orange	Energized thru control unit cam switch #5C, its switches protect replay, and lite circuits.
A. S.P.D.T.	G-4	75-2 56-2 50-2	Orange-White White-Brown White	Breaks start relay circuit, and completes circuit to replay reset relay when this relay drops out.
B. N.O.	C-23	78-4 30	Orange-Black Yellow	Lock-in switch for this relay.
C. N.O.	L-23	20-4 80-1	Blue Black	Opens 17 volt circuit when this relay drops out.
D. N.C.	E-10	57-6 85-7	White-Orange Black-White	Safety switch.
E. S.P.D.T.	M-21	91-2 38 54-2	Gray-Red Yellow-Black White-Green	Opens 6 volt circuit, and lites tilt lite, when this relay drops out.

CONCLUDED ON NEXT PAGE

4 RELAY BANK SWITCH CHART — CONCLUDED

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
START RELAY COIL	A-4	21-6 70	Blue-Red Orange	Energized every time a coin is played, or when a red or yellow button is pressed.
A N.C.	G-27	14-8 81-6	Red-Green Black-Red	Opens game advantage circuits during spin of control unit.
B N.C.	B-20	75-4 78	Orange-White Orange-Black	Opens extra ball step-up circuit during spin of control unit.
C N.O.	F-6	13-3 90-9	Red-Yellow Black-White	Completes circuit to timer cams index, and mixer latch coils.
D N.O.	F-4	48-2 63-2	Green-Black Brown-Yellow	Lock-in switch for this relay.
RED BUTTON RELAY COIL	A-10	85-7 70	Black-White Orange	Energizes when red button is pressed.
A S.P.D.T.	C-6	93-2 98-2 14-3	Gray-Yellow Gray-Black Red-Green	Directs circuit from mixer latch, and timer cams index coils during extra ball play, to shutter motor when starting new game after extra ball play.
B N.O.	D-10	31-7 27-8	Yellow-Red Blue-Orange	Lock-in switch for this relay.
C N.C.	K-22	50-9 21-4	White Blue-Red	Opens extra ball lite circuit.



BALL LIFT MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART BELOW

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

CAM SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCH
1 N.O.	H-12	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.	F-9	53-6 98-3	White-Yellow Gray-Black	Completes circuit to selector lock trip relay.

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	J 70	Jumper Orange	Energized by control unit cam switch #8A, when spotting wipers stop on correct position.
L1 S.P.D.T.	J-1	36-2 10-2 38-2	Yellow-Brown Red Yellow-Black	Directs circuit to flash "select now" lite at either the 4th or 5th step of timer unit.
L2 N.C.	G-24	15-7 75-4	Red-White Orange-White	Proportioning circuit for score and extra ball steps.
L3 N.C.	B-34	21 J	Blue-Red Jumper to coil	Breaks circuit to coil.
L4 S.P.D.T.	G-9	53-6 30 20-2	White-Yellow Yellow Blue	Directs circuit to energize selector lock trip at either the 4th or 5th step of timer unit.
R1 S.P.D.T.	K-4	85-9 80-9 91-9	Black-White Black Gray-Red	Directs circuit to lite either the select before 4th or select before 5th lite on back glass.
R2 N.O.	G-8	81-2 43-2	Black-Red Green-Yellow	Keeps circuit to ball lifter cam switch alive.
EXTRA BALL TRIP				NOTE: Both extra ball trip relays work off 1 coil.
L1 N.O.	J-22	21-4 30	Blue-Red Yellow	Lites extra ball lite on back glass.
L2 S.P.D.T.	E-21	85-4 30 61-2	Black-White Yellow Brown-Red	Breaks guaranteed score step circuit, and completes circuit to extra ball unit for 1st step.
L3 S.P.D.T.	F-22	52-6 27-7 18-2	White-Blue Blue-Orange Red-Black	Shuts off score steps, and further completes circuit for extra ball steps.
R1 S.P.D.T.	G-28	10-1 78-5 65-5	Red Orange-Black Brown-White	Extra ball proportioning.
R2 N.O.	H-24	23 57-7	Blue-Yellow White-Orange	Proportioning switch.
EXTRA BALL Trip Coil	A-10	25-7 70	Blue-White Orange	Energized by yellow button.
L1 S.P.D.T.	D-6	14-3 43-9 98-2	Red-Green Green-Yellow Gray-Black	Breaks circuit to shutter motor, and completes circuit to timer cams index during extra ball play.
L2 N.C.	G-10	31-8 25-7	Yellow-Red Blue-White	Breaks circuit to coil.
L3 N.C.	H-27	45-2 81-6	Green-White Black-Red	Breaks circuit to game advantages, when playing extra balls.
L4 S.P.D.T.	J-16	31-5 13-4 74	Yellow-Red Red-Yellow Orange-Green	Directs circuit to flash score lites or extra ball lites.
R1 S.P.D.T.	H-26	75-5 15-7 45-2	Orange-White Red-White Green-White	Extra ball proportioning.
R2 N.C.	J-6	36-5 83-1	Yellow-Brown Black-Yellow	Breaks flash circuit to game advantage lites, when playing extra balls.
R3 N.O.	D-12	91-1 38-3	Gray-Red Yellow-Black	Completes circuit to ball lifter motor, when playing for extra balls.

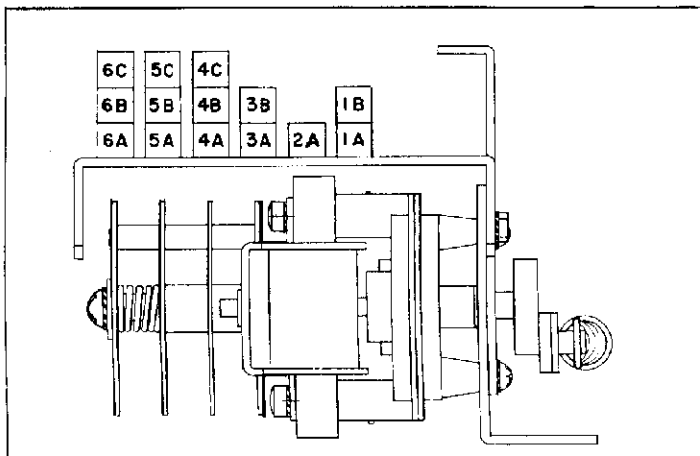
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TRIP RELAY BANK CHART — CONCLUDED

RELAY SWITCH	LOCATION ON DIAGRAM	WIRE No.	WIRE COLORS	FUNCTION OF SWITCHES
SELECTOR LOCK TRIP COIL	A-9	J 70	Jumper Orange	Energized by 4th or 5th step of timer unit, directed by select before 5th ball trip relay switch.
L1 N.O.	F-7	21-3 63	Blue-Red Brown-Yellow	Completes circuit to "double triple" unit step-up and reset coils, thru "red" or "yellow" lines unit disc.
L2 N.C.	J-1	10-2 80-9	Red Black	Breaks circuit to "select now" lite.
L3 N.C.	H-35	41-5 61	Green-Red Brown-Red	Breaks circuit to "magic squares" buttons.
L4 N.C.	B-9	75-3 J	Orange-White Jumper to coil	Breaks circuit to coil.
R1 N.O.	E-4	50-2 18-6	White Red-Black	Completes circuit for making "yellow" button alive.
R2 N.O.	D-8	78-6 27-2	Orange-Black Blue-Orange	Completes circuit to timer step-up coil.
R3 N.O.	I-15	56-7 45-6	White-Brown Green-White	In series with replay scoring circuit.
R4 N.O.	B-10	25-8 31-8	Blue-White Yellow-Red	Completes circuit to extra ball trip relays.
CORNERS TRIP COIL	A-33	J 70	Jumper Orange	Energized by control unit cam switch #8A, when spotting wipers stop on correct position.
L1 N.O.	J-6	85-1 30	Black-White Yellow	Lites "corners" lite on back glass.
L2 N.O.	G-16	13-1 71-3	Red-Yellow Orange-Red	Part of corners replay scoring circuit.
L3 N.C.	B-33	61-4 J	Brown-Red Jumper to coil	Breaks circuit to coil.
R1 N.O.	C-18	23-11 38-5	Blue-Yellow Yellow-Black	Part of corners replay scoring circuit.
TILT TRIP COIL	A-11	14-5 70	Red-Green Orange	Energized by any tilt switch, or the plumb bob, and also at 39th step of timer unit.
L1 S.P.D.T.	I-6	21-3 30 45-8	Blue-Red Yellow Green-White	Breaks circuit to game advantages, replay scoring, ball counting, and completes circuit to shutter motor when game is tilted.
L2 N.C.	H-35	40-8 41-5	Green Green-Red	Breaks circuit to "magic squares" buttons.
L3 N.C.	M-23	20-4 10	Blue Red	Breaks 17 volt circuit.
L4 S.P.D.T.	M-22	38 81 91-2	Yellow-Black Black-Red Gray-Red	Breaks 6 volt circuit, and lites tilt lite.
R1 N.O.	E-11	57-6 85-7	White-Orange Black-White	Safety circuit for red button relay.
R2 N.C.	G-1	20-P 60-P	Blue (Plastic) Brown(Plastic)	Breaks circuit to control, magic squares, and mixer unit motors.

SHUTTER MOTOR PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART



SEE LABEL ON MOTOR FOR MOTOR PART NO.

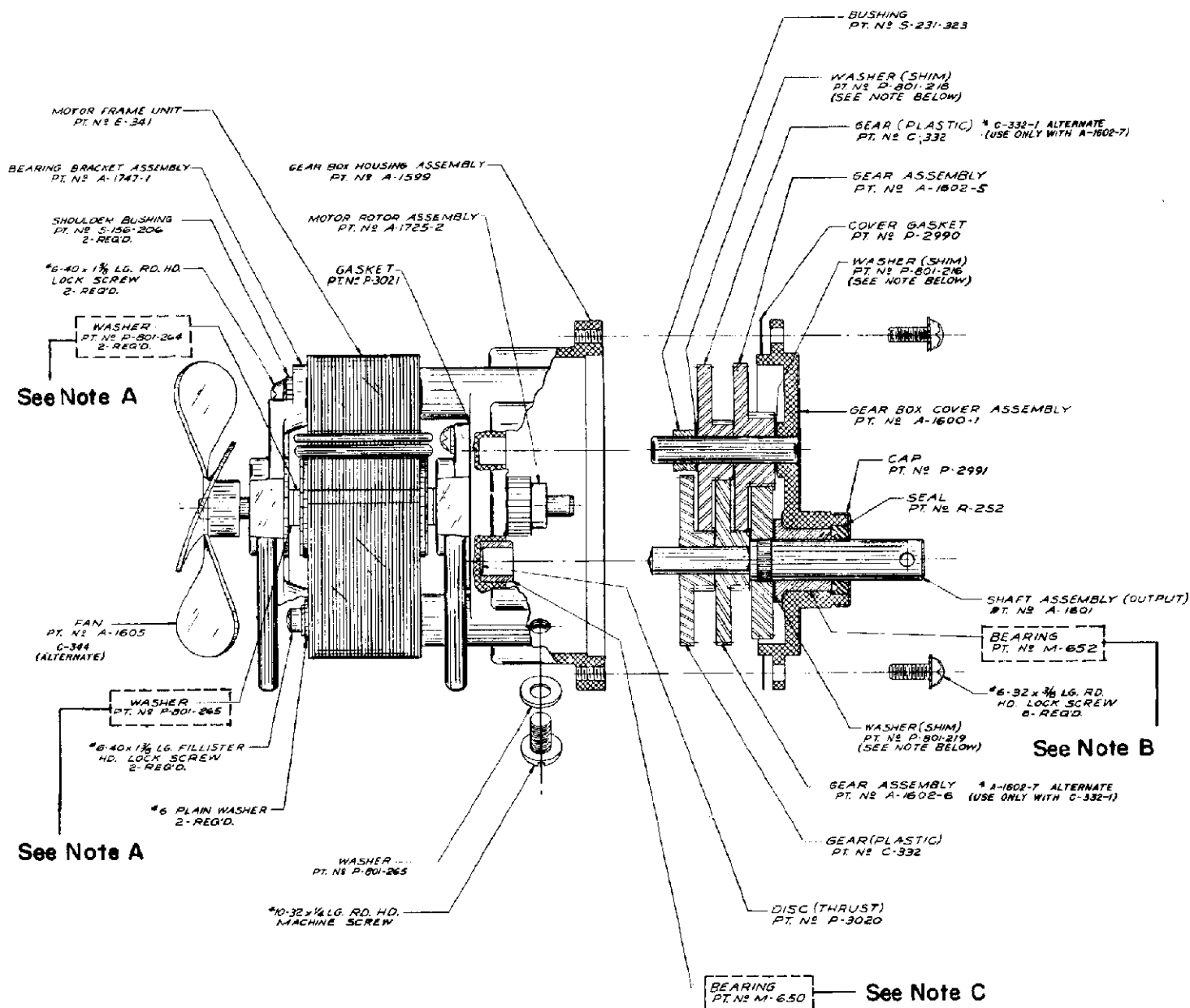
CODE

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-13	93 21-3	Gray-Yellow Blue-Red	Completes circuit to replay scoring circuit.
1B N.O.	G-6	30 14-3	Yellow Red-Green	Carry thru for shutter motor.
2A N.C.	F-12	31-3 36-3	Yellow-Red Yellow-Brown	Completes circuit to ball lifter motor (closed normally) open during shutter cycle.
3A N.O.	C-39	30 85-5	Yellow Black-White	Resets score, extra ball, and "magic squares" feature unit.
3B N.O.	H-2	20-P 70-P	Blue (Plastic) Brown (Plastic)	Resets trip relay bank.
4A N.O.	F-6	18-3 14-3	Red-Black Red-Green	(Closed when shutter is open). Completes circuit to shutter motor.
4B N.C.	I-34	21-3 40-8	Blue-Red Green	Safety switch for "magic squares" button circuits.
4C N.O.	H-6	45-8 18-3	Green-White Red-Black	Starts shutter motor if game is tilted when shutter is open.
5A N.C.	H-8	21-3 65-2	Blue-Red Brown-White	Safety switch for timer reset.
5B N.C.	E-19	91-5 36-4	Gray-Red Yellow-Brown	(Closed when shutter is closed) Part of "Bally-Hole" extra ball step-up circuit.
5C S.P.D.T.	E-6	43-9 13-3 93-2	Green-Yellow Red-Yellow Gray-Yellow	Breaks circuit to shutter motor and makes circuit to timer cams index and mixer latch coils.
6A N.O.	H-8	30 71-8	Yellow Orange-Red	Completes circuit to timer reset coil.
6B N.O.	C-39	30 78-3	Yellow Orange-Black	Resets replay counter, also "red lines" unit and "yellow lines" unit.
6C N.O.	B-7	21-3 91-4	Blue-Red Gray-Red	Reset "double triple" unit.

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



NOTE

IN ORDER TO MAINTAIN PROPER CLEARANCES BETWEEN GEARS IT IS MOST IMPORTANT THAT WHEN REASSEMBLING GEAR TRAIN:

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

CHECK PART NUMBER ON GEAR BEFORE ORDERING GEAR

NOTE A: Washers P-801-264 and P-801-265 are parts of Motor Rotor Assembly A-1725-2 and cannot be ordered separately.

NOTE B: Bearing M-652 is part of Gear Box Cover Assembly A-1600-1 and cannot be ordered separately.

NOTE C: Bearing M-650 is part of Gear Box Housing Assembly A-1599 and cannot be ordered separately.

MISCELLANEOUS PARTS

Back Cabinet Assembly:

Part No.

G-253 Back glass
M-281-14 Lock and keys (2) keyed alike
E-122-19 Transformer

Back Door Assembly:

M-281-12 Lock and keys (2) keyed alike
E-300-73 Search relay bank assembly

Front Cabinet Assembly:

M-168-15 Ball
AS-187-13 Ball shooter assembly
A-1540 Ball shooter housing
A-100-7 Ball shooter rod
SP-200-24 Ball shooter spring (long)
SP-237 Ball shooter spring (short)
R-108-3 Ball shooter tip
A-429-14 Ball trough only
P-1900-18 Cash box
E-130-10 Counter—48 Volt
CA-350-1 Leg
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 Coin for coin kicker assembly
E-101-45 Coil for coin lock out
AS-1316 Coin kicker assembly
AS-277-26 Coin switch assembly 5¢
AS-277-27 Coin switch assembly 10¢
CA-567-25 Front door only
AS-1521 Front door assembly 5¢
AS-1521-1 Front door assembly 10¢
A-254-33 Hinge and bracket
M-281-6 Lock and keys
E-108-32 Micro-switch—Coin switch assembly 5¢ and 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¢

AS-1305-7 Front Moulding Assembly:

A-1272-13 "A" Button
A-1272-14 "B" Button
A-1272-15 "C" Button
A-1272-16 "D" Button
P-2210-8 5¢ coin entry plate
P-2210-9 10¢ coin entry plate
CA-761-2 Front Moulding only

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

