

Bally[®]

Parade

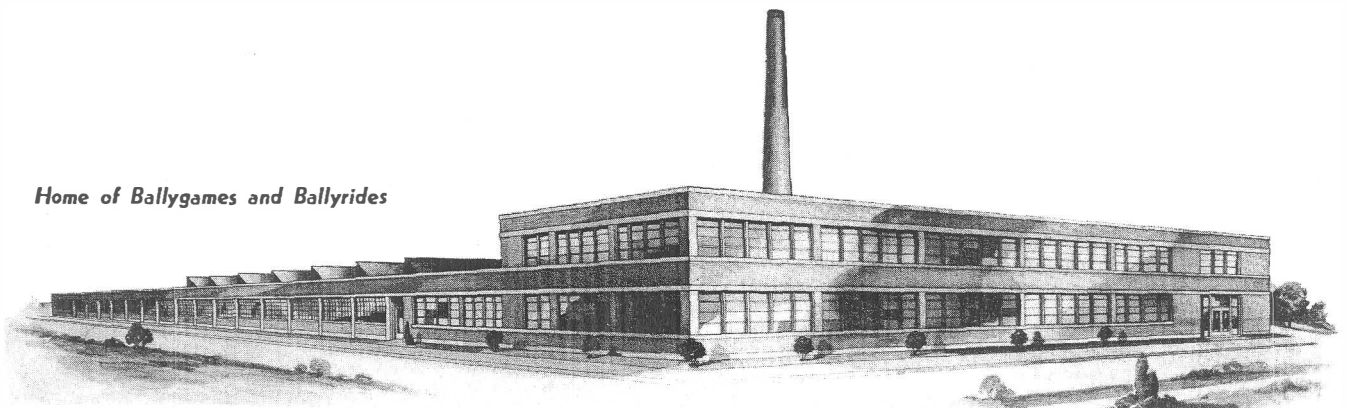
OPERATING INSTRUCTIONS

AND PARTS CATALOG

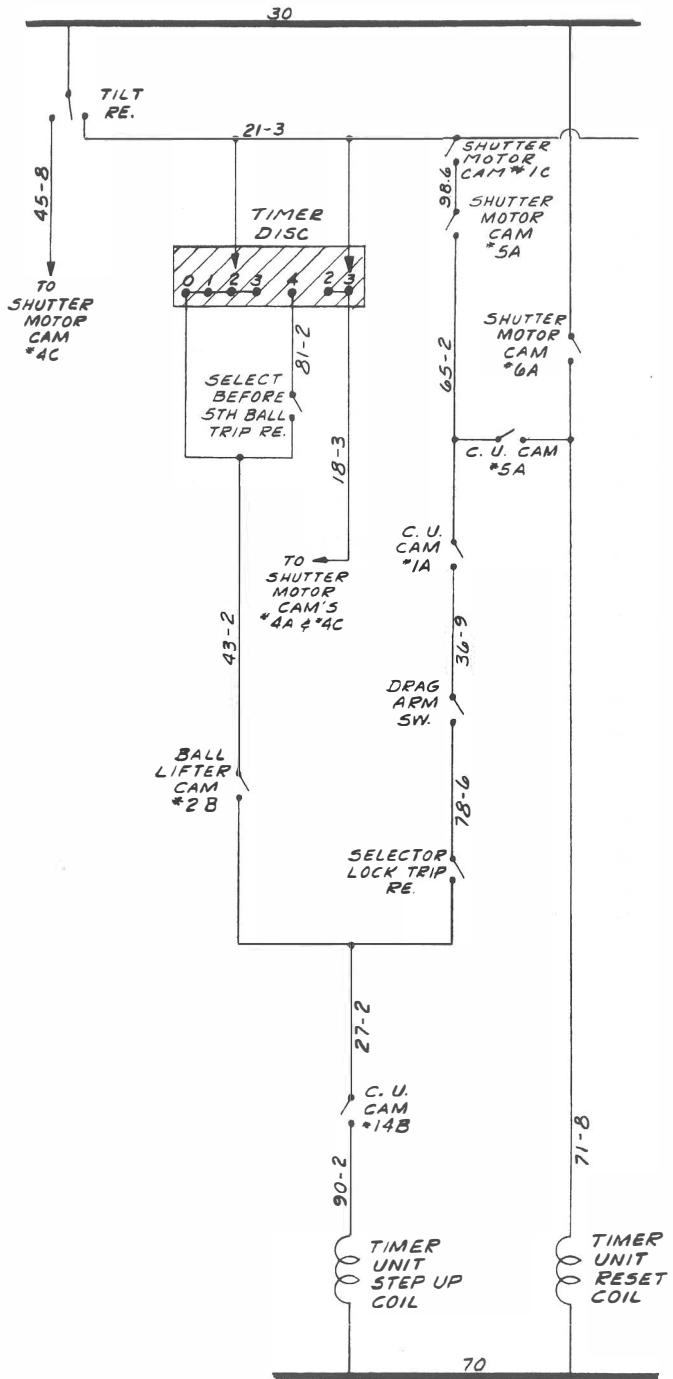
Part Numbers are marked on illustrations
and a list of miscellaneous parts appears
on back cover.

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

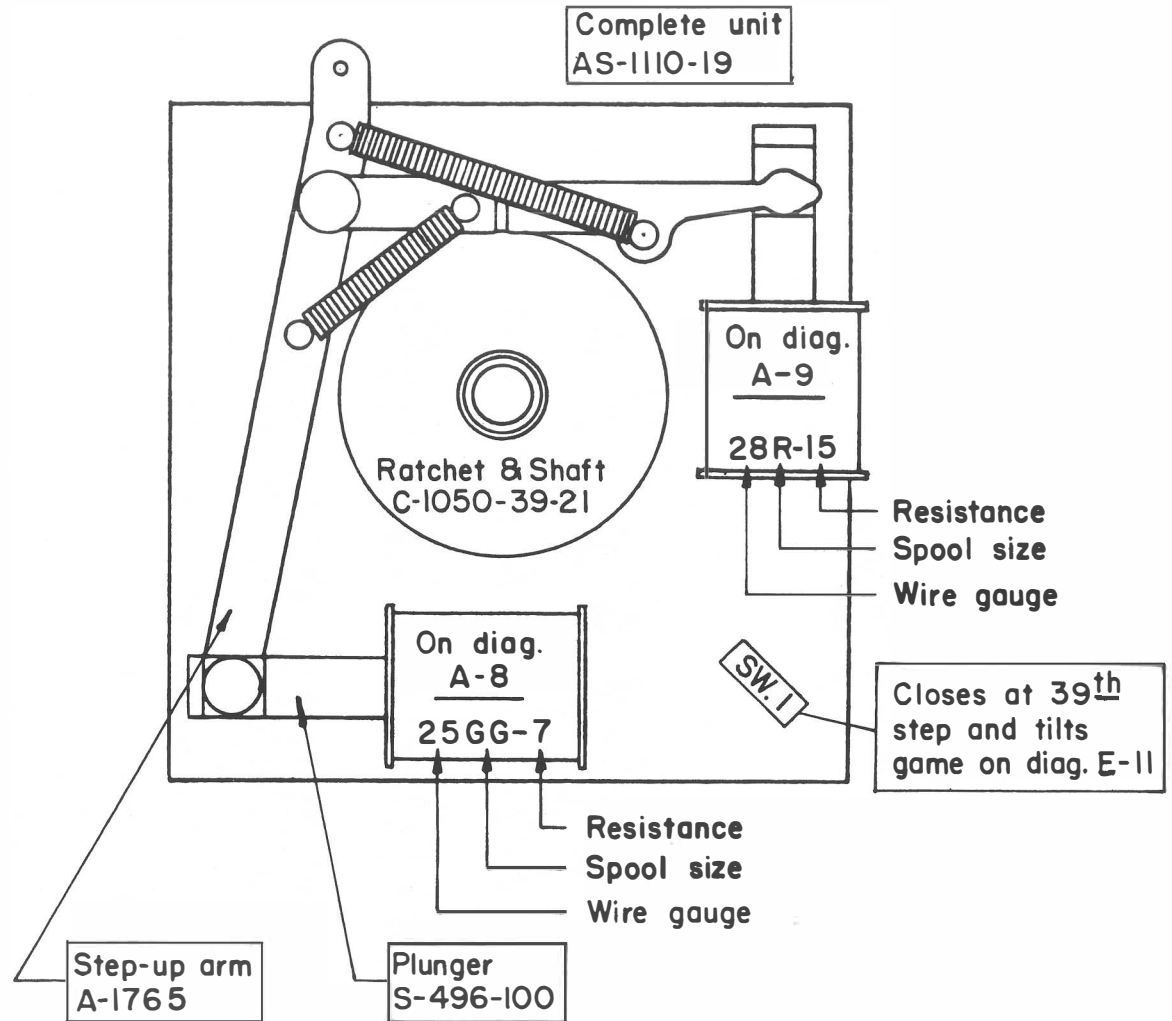
Home of Ballygames and Ballyrides



TIMER UNIT STEP-UP AND RESET CIRCUIT



TIMER UNIT viewed from COIL side



TIMER UNIT viewed from BUTTON or WIPER side

39 step unit. Wipers shown in zero or reset position

Feeds wipers (A) & (B) to complete circuit to "Select Now" lite at 4th & 5th step (Diag. L-1)

Completes circuit to "Select Now" lite at 4th step thru wipers (A) & (B) (Diag. L-1)

Timer step up circuit to ball lifter cam switch thru wiper (C) (Diag. H-7)

To feed wiper for wipers (C) & (D) (Diag. H-7)

Closes shutter at 2nd step thru wiper (D) (Diag. H-7)

Completes circuit to ball lifter motor from 1st to 39th step when 8th ball trough switch opens, thru wiper (E) (Diag. D-12)

Completes circuit to trip Selector Lock relay at 4th step. (Diag. B-9)

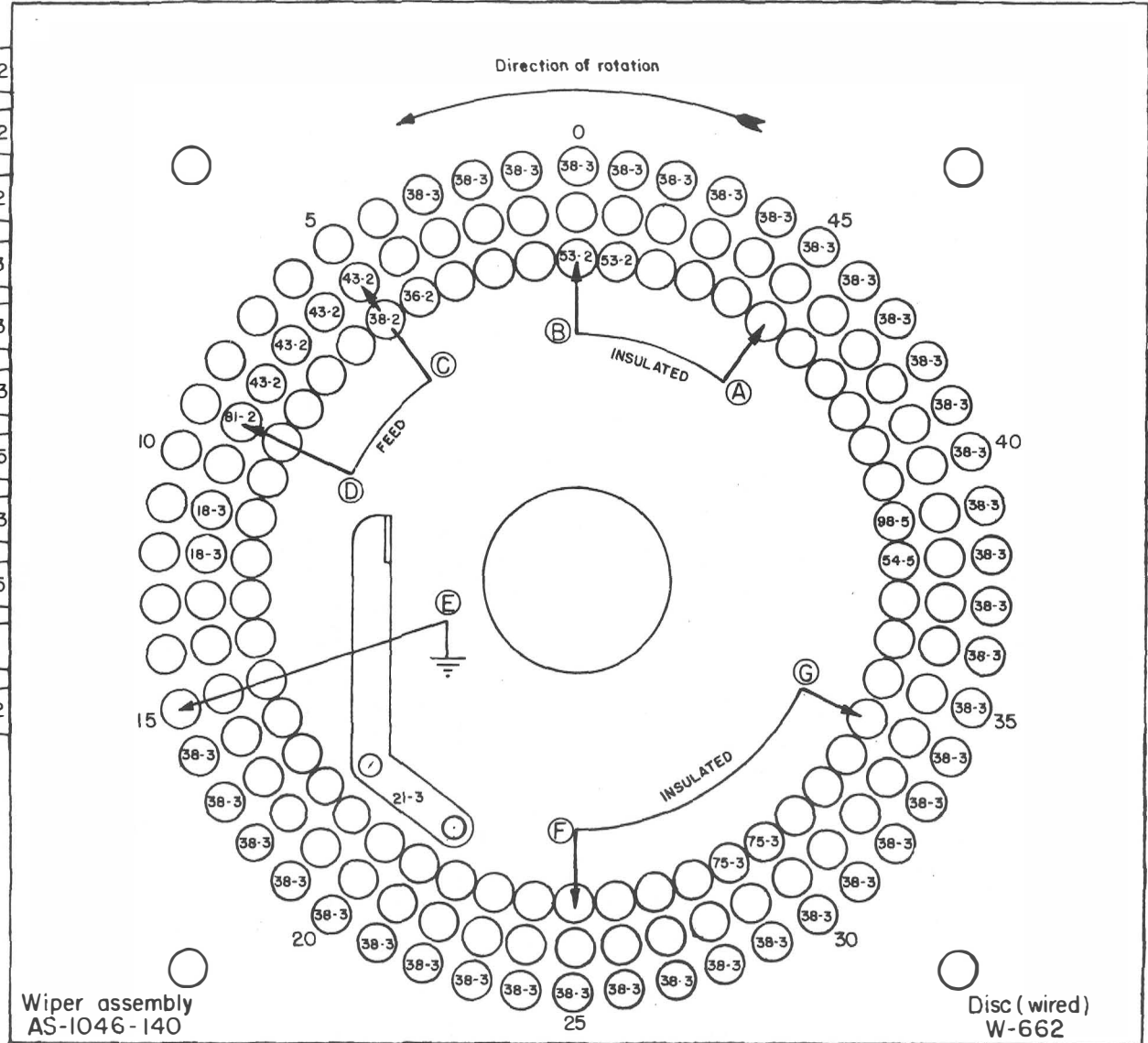
← Thru wipers (F) & (G)

Completes circuit to trip Selector Lock relay at 5th step. (Diag. B-9)

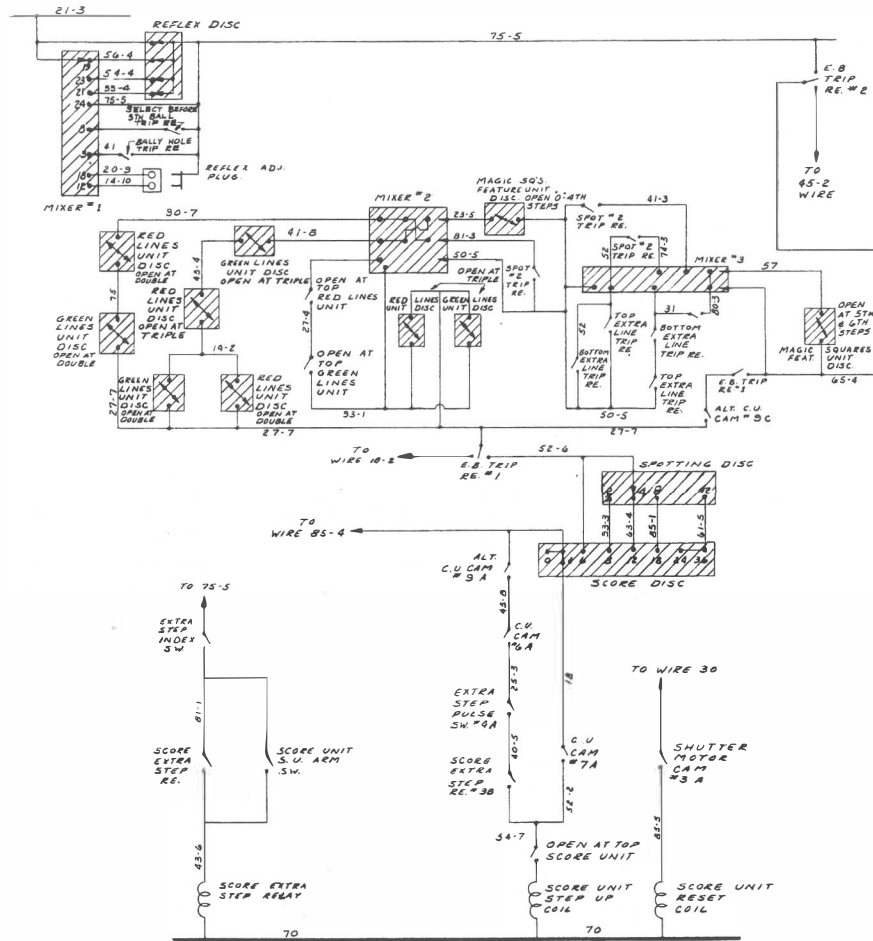
Keeps circuit to ball lifter cam switch, if Select Before 5th Ball is lit. (Diag. H-7)

Completes circuit to "Select Now" lite at 5th step thru wipers (A) & (B) (Diag. L-1)

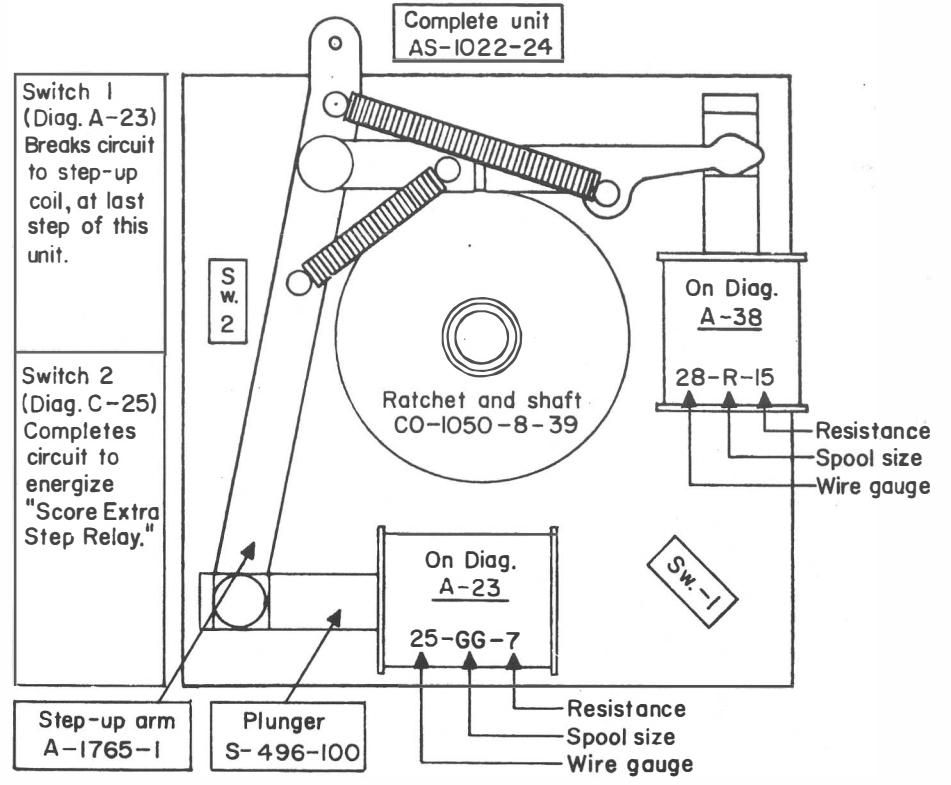
91-1 — Ground to frame of unit



SCORE UNIT STEP-UP AND RESET CIRCUIT

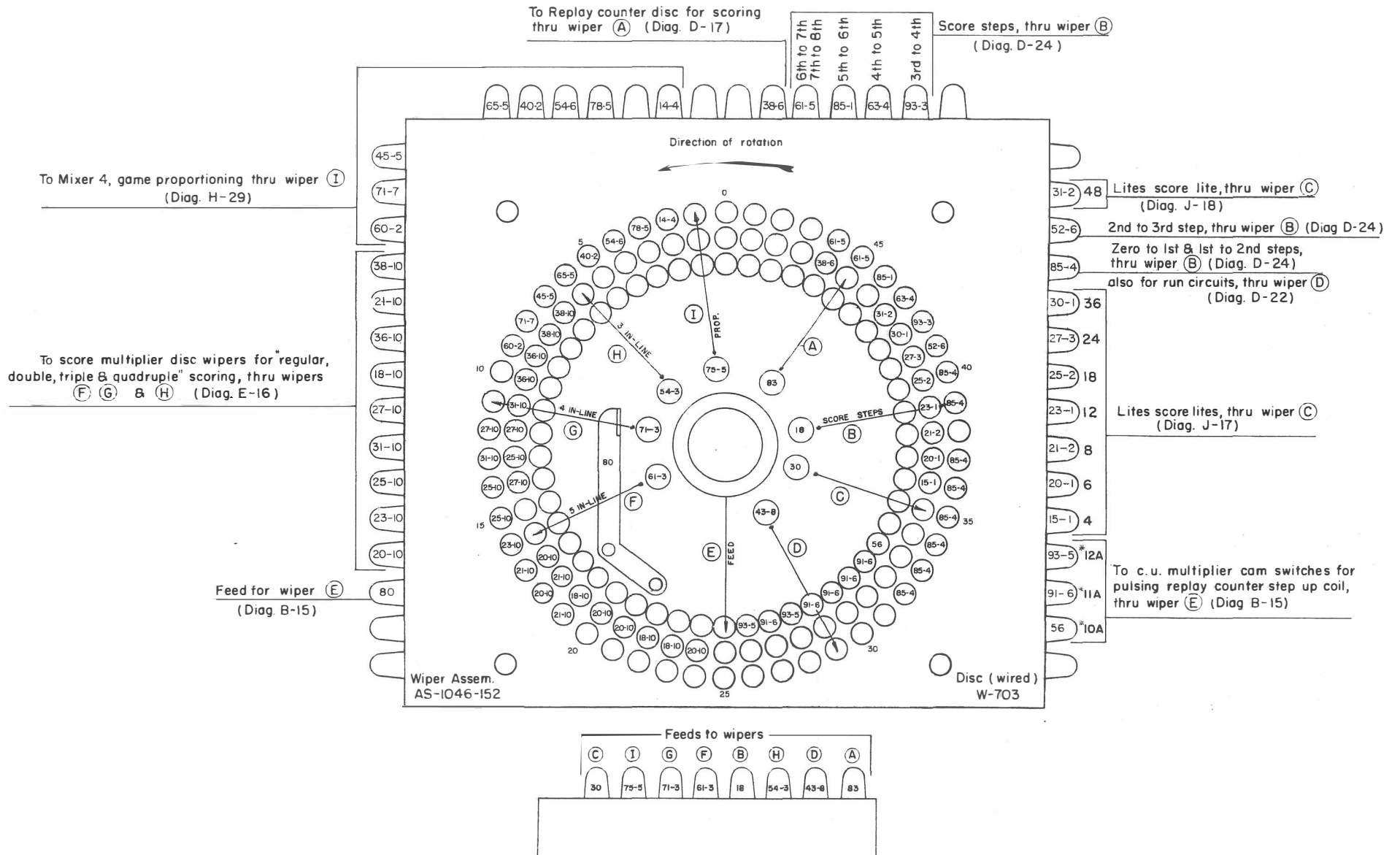


SCORE UNIT viewed from COIL side

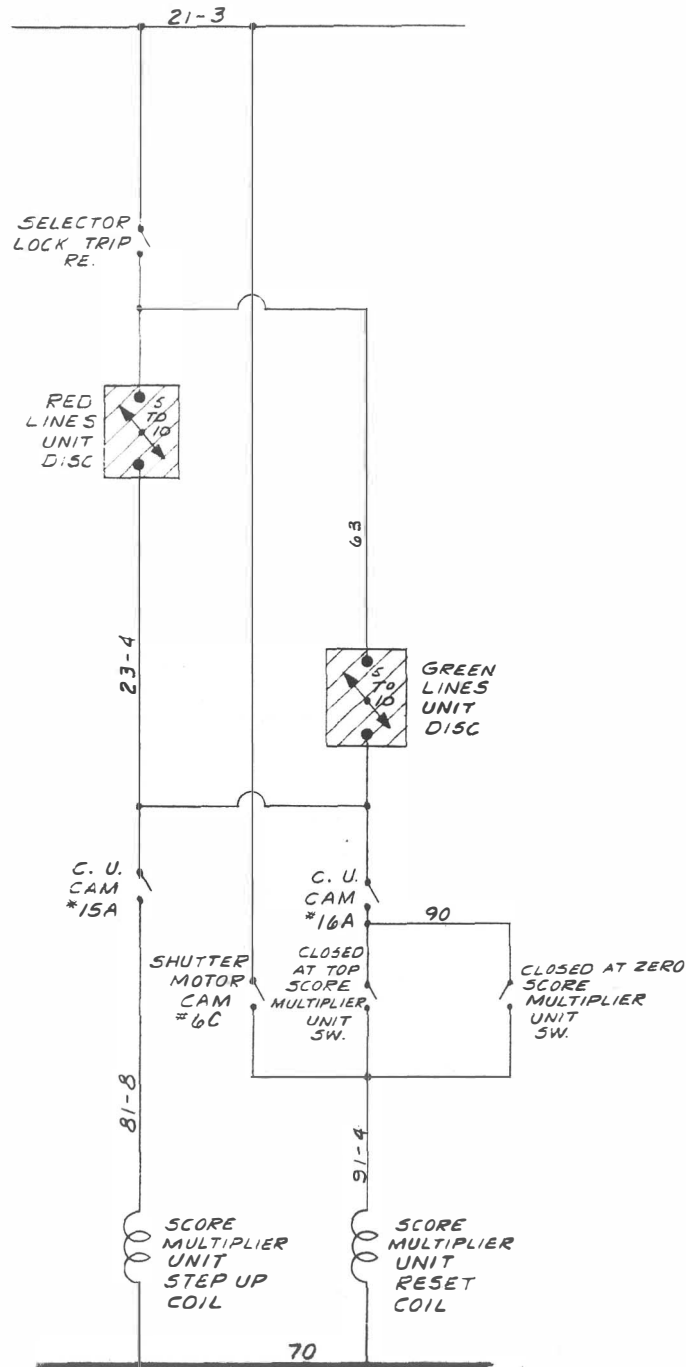


SCORE UNIT viewed from BUTTON or WIPER side

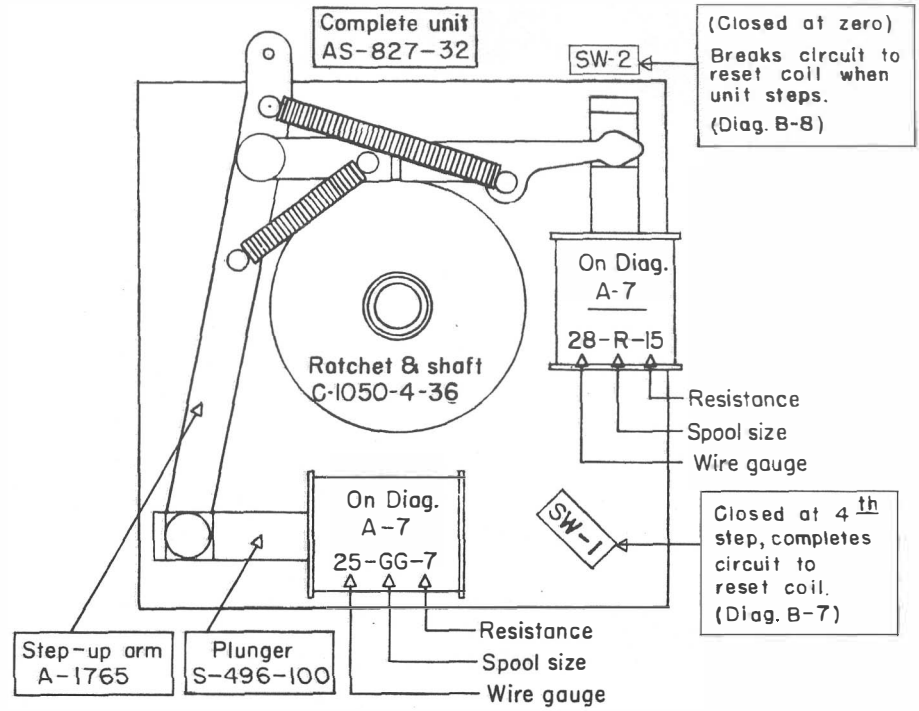
8 step unit. Wipers shown in zero or reset position



SCORE-MULTIPLIER UNIT STEP-UP AND RESET CIRCUIT



SCORE-MULTIPLIER UNIT viewed from COIL side



SCORE-MULTIPLIER UNIT viewed from BUTTON or WIPER side

4 step unit. Wipers shown in zero or reset position

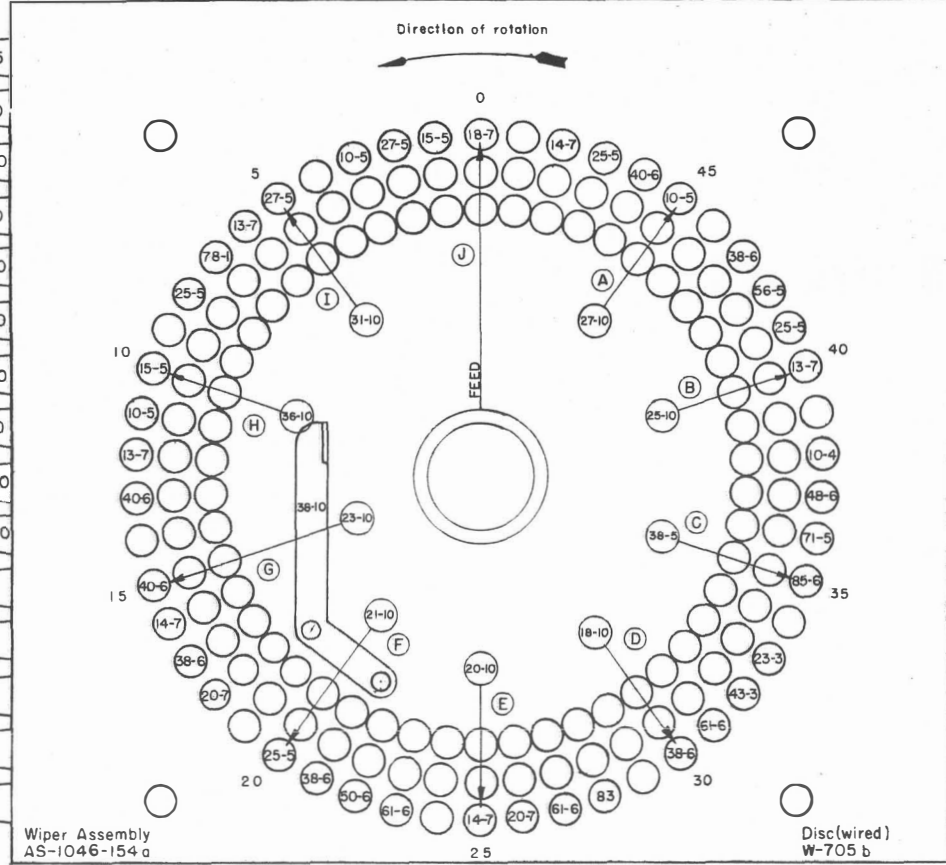
To replay values (replay counter disc) for scoring
(Diag.E-16)

- To value 12, thru wiper (A)(B)(F) or (I)
- To value 8, thru wiper (A)(G) or (H)
- To value 9, thru wiper (I)
- To value 6, thru wiper (B)(H) or (I)
- To value 4, thru wiper (A)(H) or (I)
- To value 3, thru wiper (I) or (J)
- To value 2, thru wiper (H) or (J)
- To value 1, thru wiper (J)
- To value 16, thru wiper (A)(E) or (G)
- To value 24, thru wiper (B)(D)(F) or (G)
- To value 36, thru wiper (F)
- To value 32, thru wiper (E) or (G)
- To value 48, thru wiper (D)(E) or (F)
- To value 18, thru wiper (B)

- 25-5
- 40-6
- 78-1
- 13-7
- 10-5
- 27-5
- 15-5
- 18-7
- 14-7
- 38-6
- 50-6
- 20-7
- 61-6
- 56-5

From score disc, feeds for wipers (Diag.A-16)

- (C) 38-5
- (D) 18-10
- (E) 20-10
- (F) 21-10
- (G) 23-10
- (B) 25-10
- (A) 27-10
- (I) 31-10
- (H) 36-10
- (J) 38-10



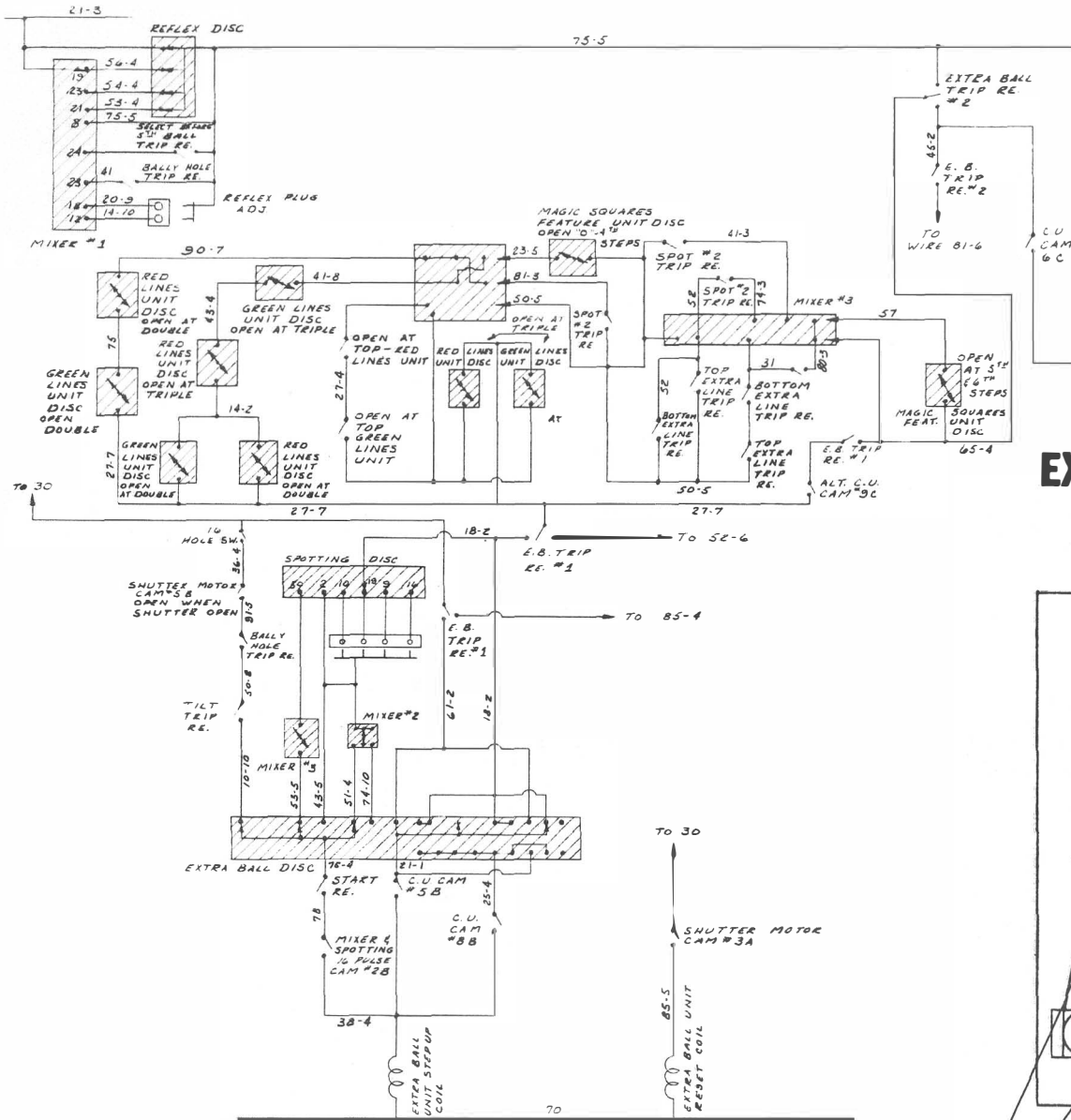
- 83 — To value 64, thru wiper (E)
- 43-3 — To value 72, thru wiper (D)
- 23-3 — Feed for replay counter disc wipers.
Also to open at 96 replay counter switch (Diag.C-19)
- 10-4 — Quadruple
- 48-6 — Triple
- 71-5 — Double
- 85-6 — To search disc thru wiper (C),
for regular replay scoring (Diag.A-19)

To "Red & Green" lines
unit discs thru wiper (C),
for replay scoring.
(Diag.A-19)

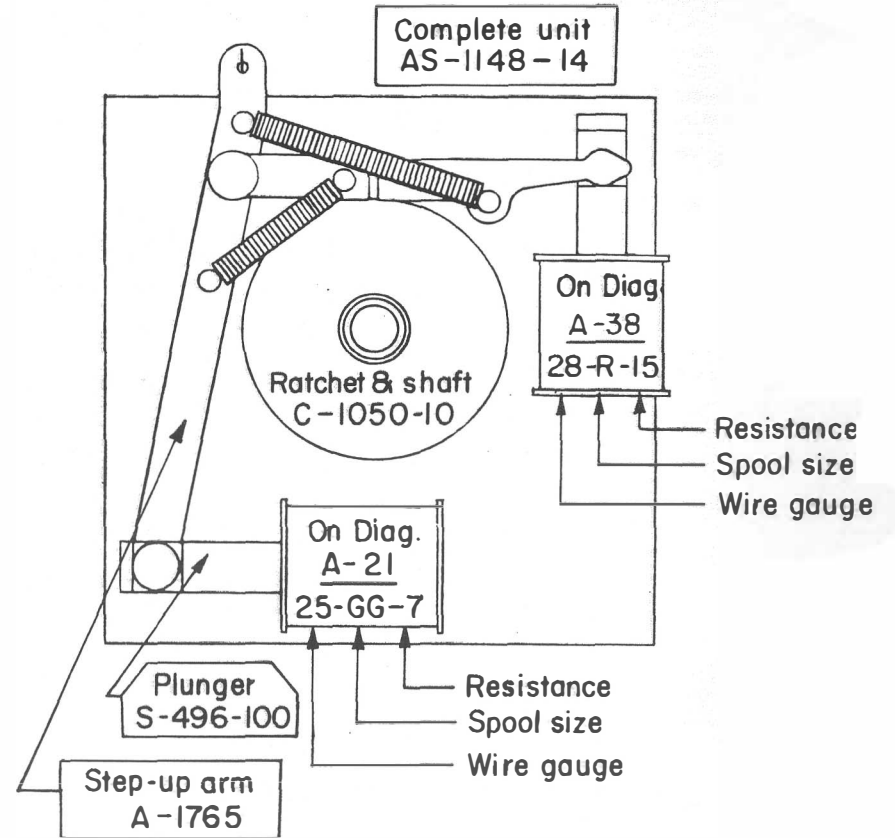
Wiper Assembly
AS-1046-154a

Disc (wired)
W-705 b

EXTRA BALL STEP-UP AND RESET CIRCUIT

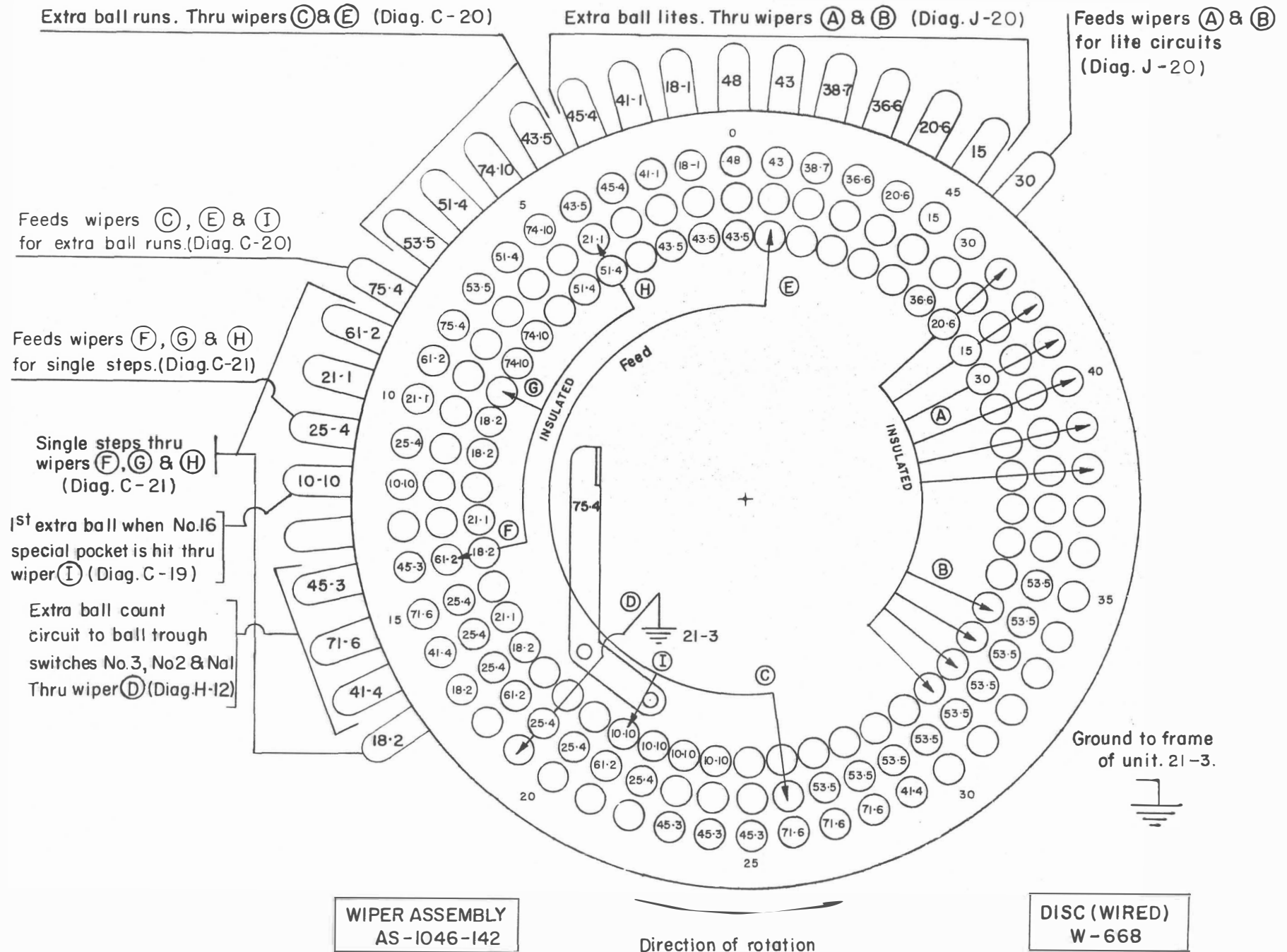


EXTRA BALL UNIT viewed from COIL side

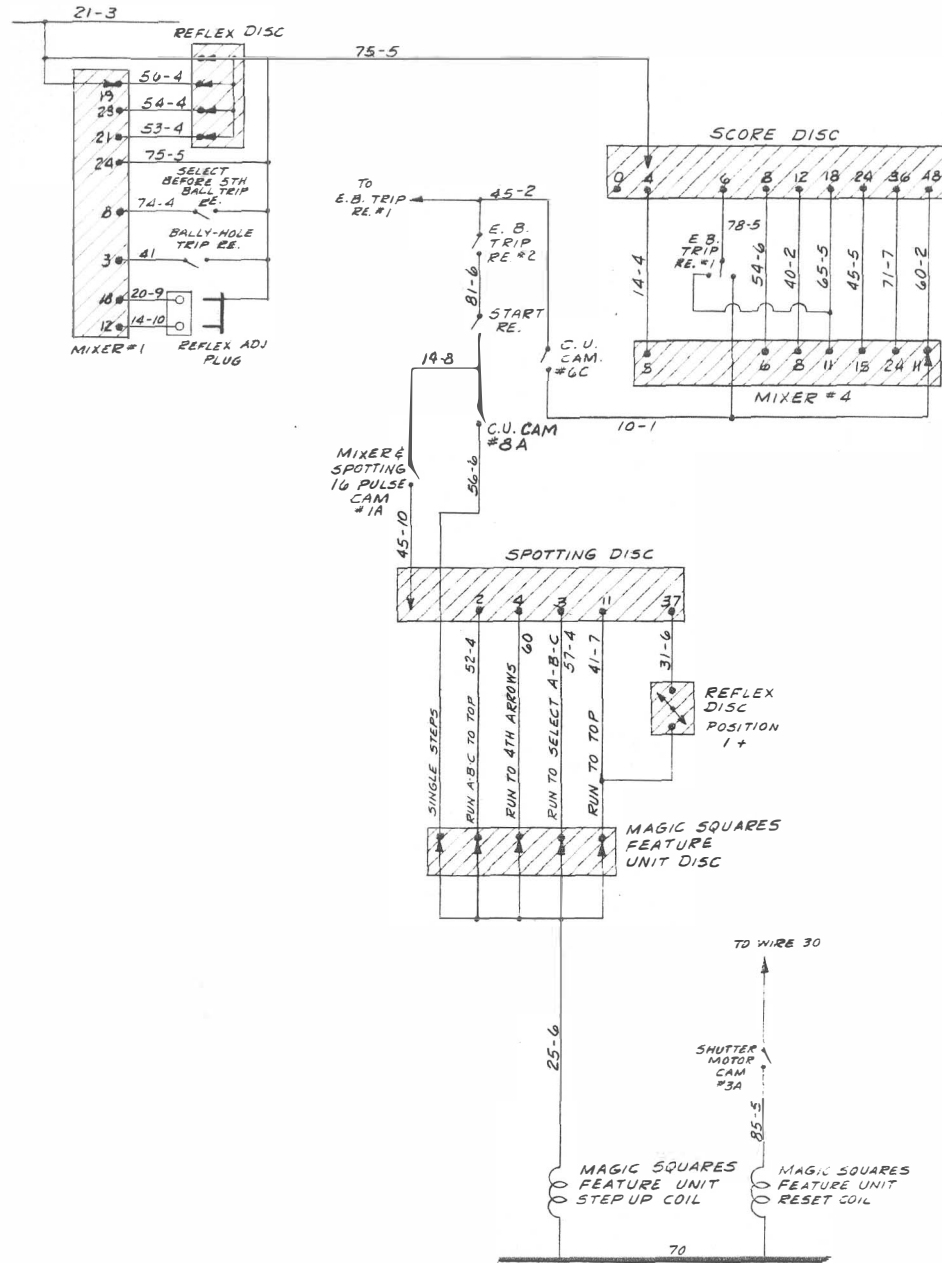


EXTRA BALL UNIT viewed from BUTTON or WIPER side

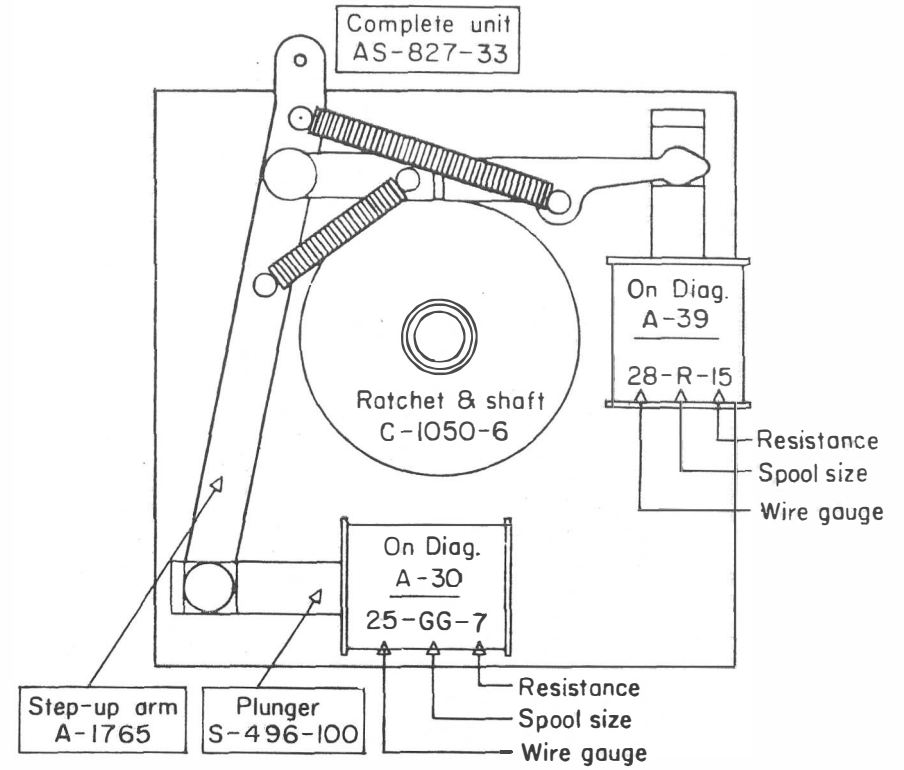
10 step unit. Wipers shown in zero or reset position



MAGIC SQUARES FEATURE UNIT STEP-UP AND RESET CIRCUIT

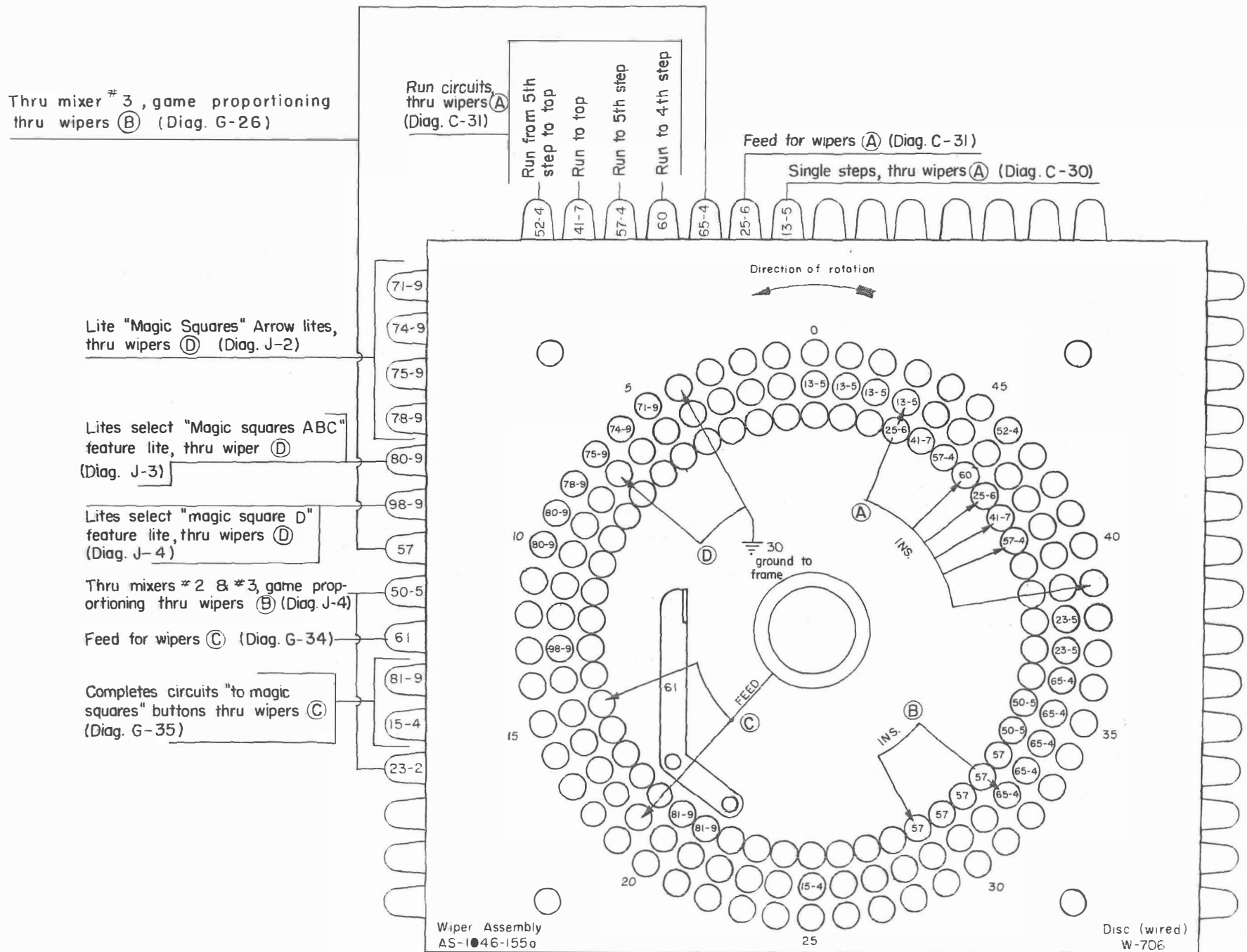


MAGIC SQUARES FEATURE UNIT viewed from COIL side

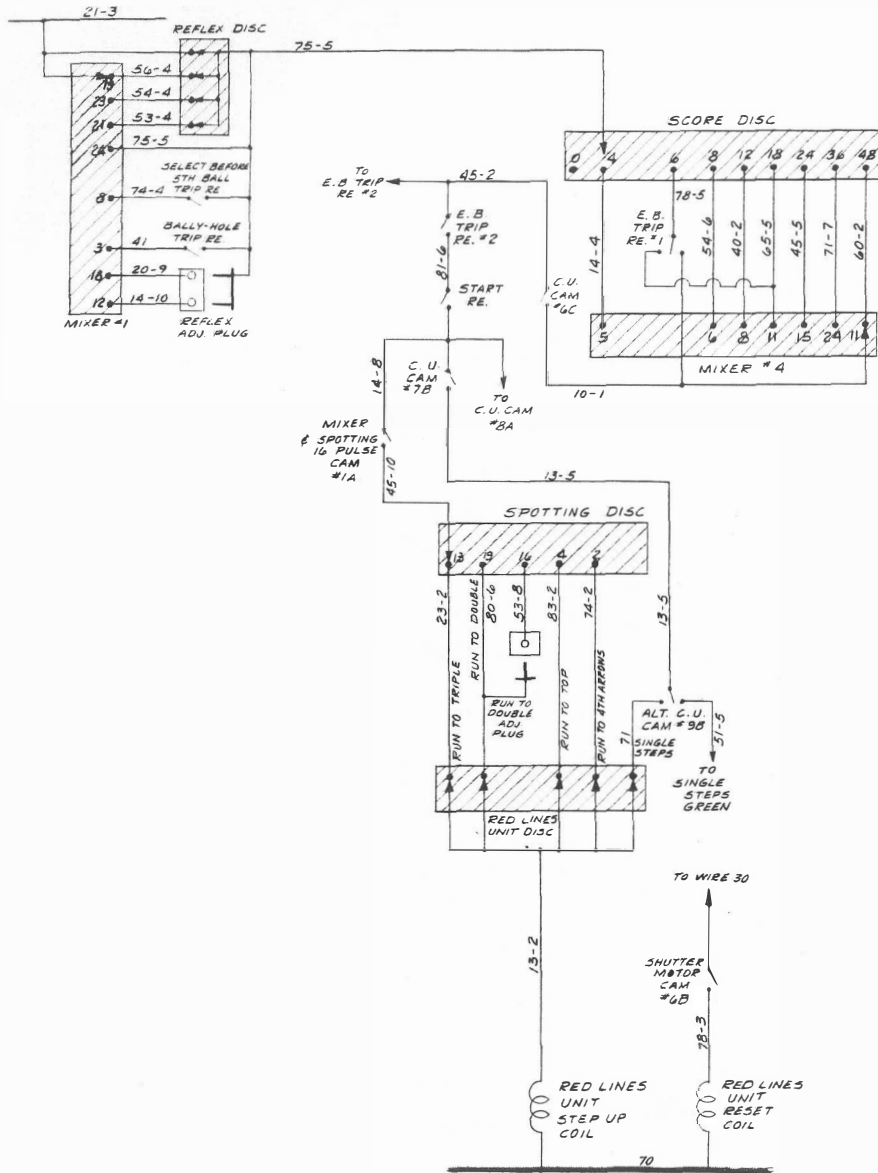


MAGIC SQUARES FEATURE UNIT viewed from BUTTON or WIPER side

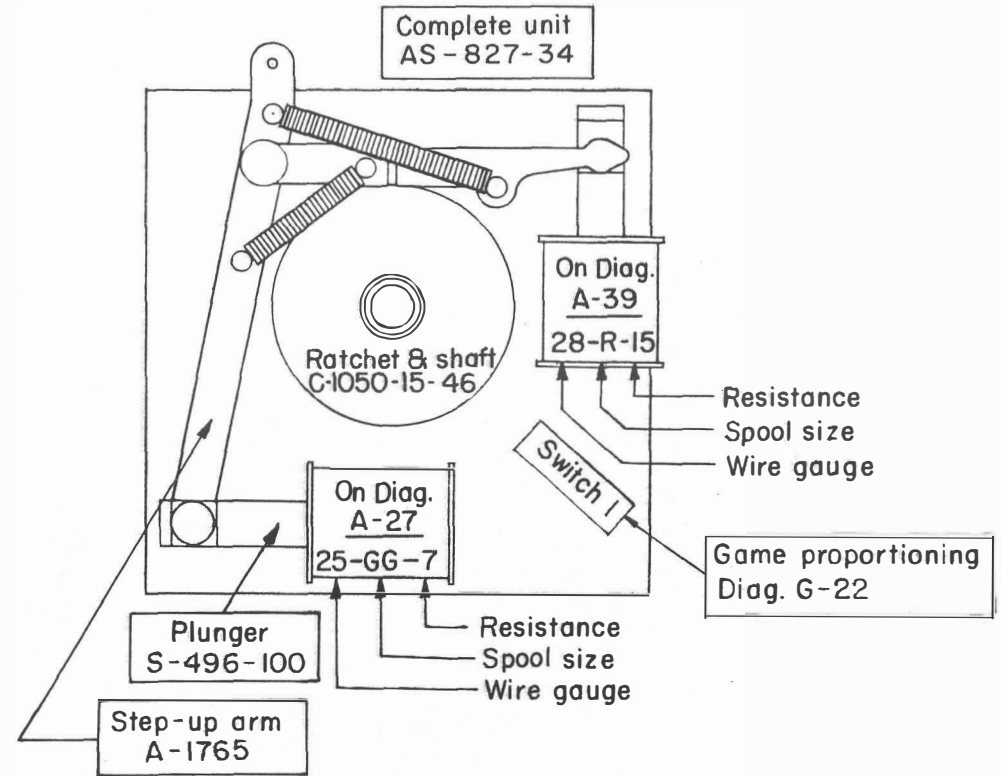
6 step unit. Wipers shown in zero or reset position



RED LINE UNIT STEP-UP AND RESET CIRCUIT

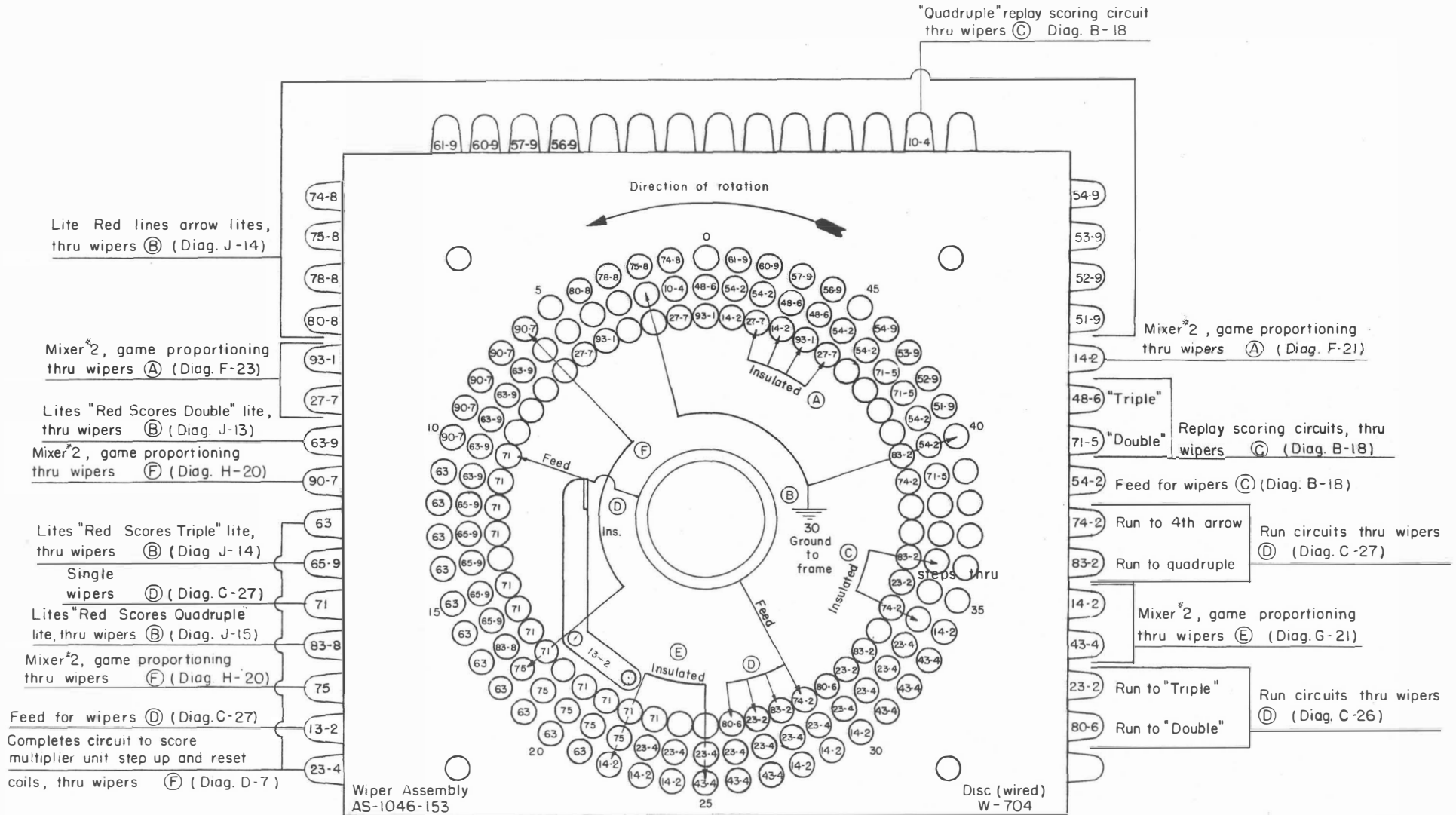


RED LINE UNIT viewed from COIL side



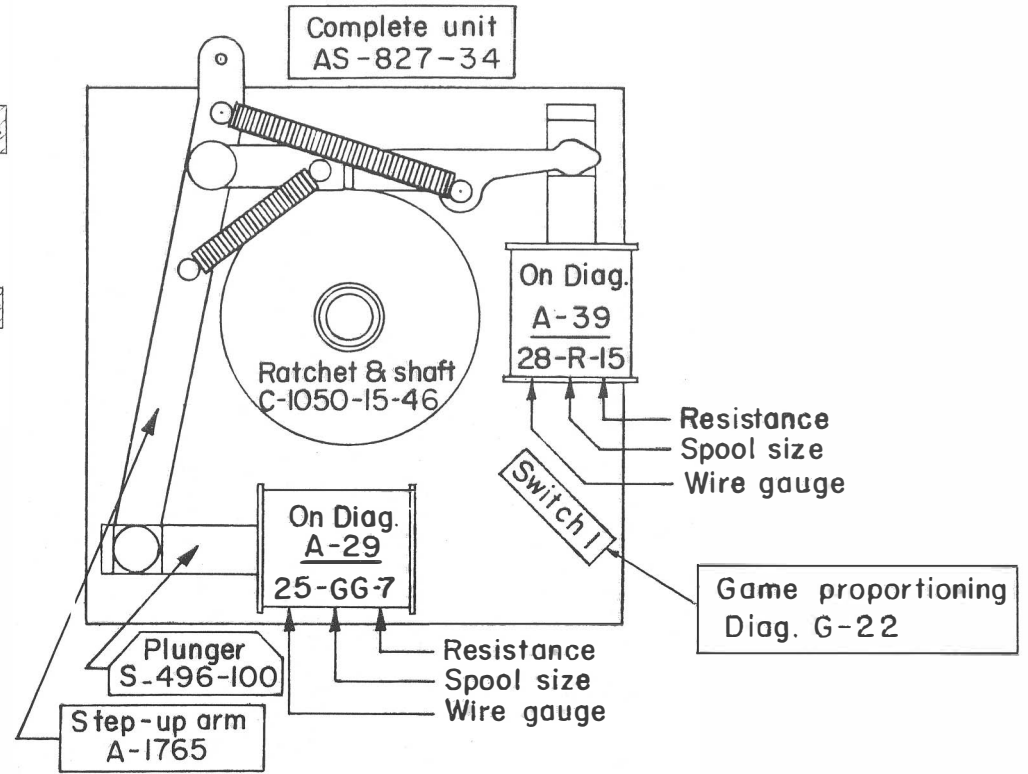
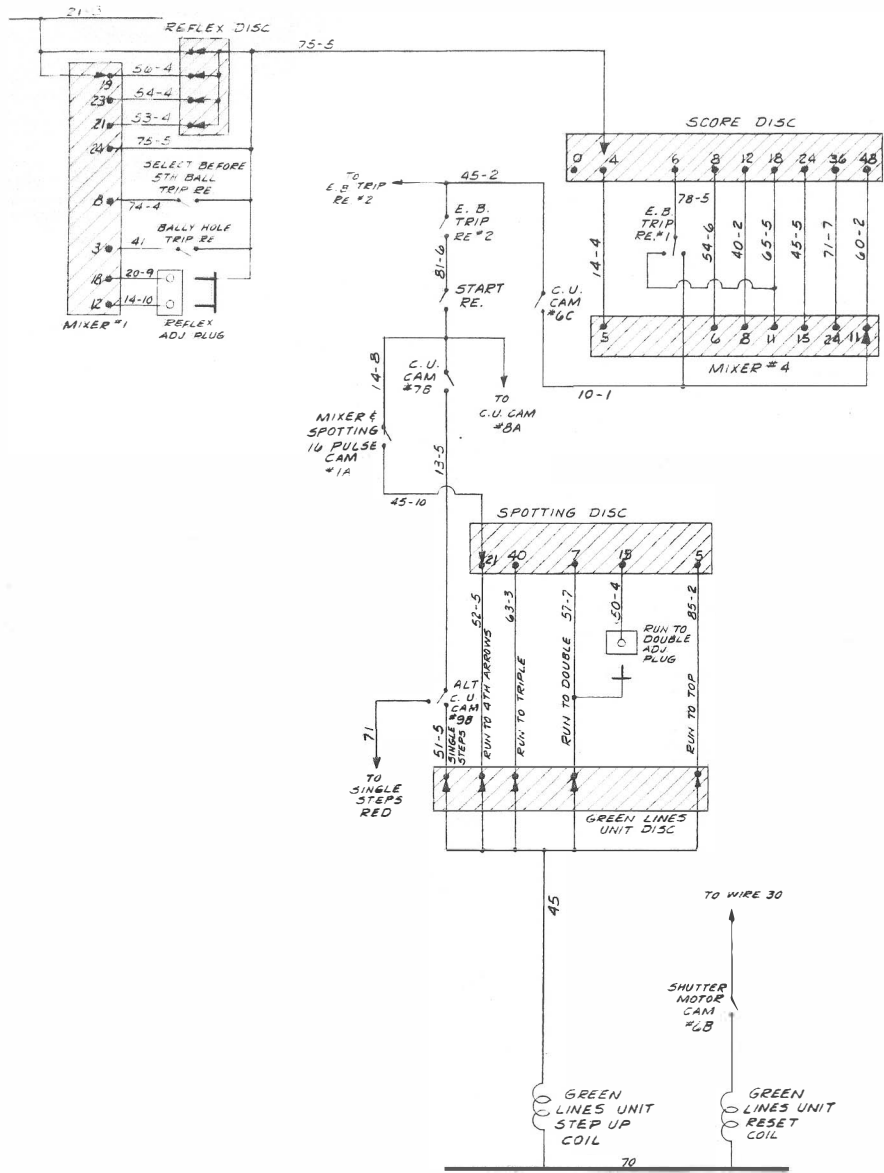
RED LINE UNIT viewed from BUTTON or WIPER side

15 step unit. Wipers shown in zero or reset position



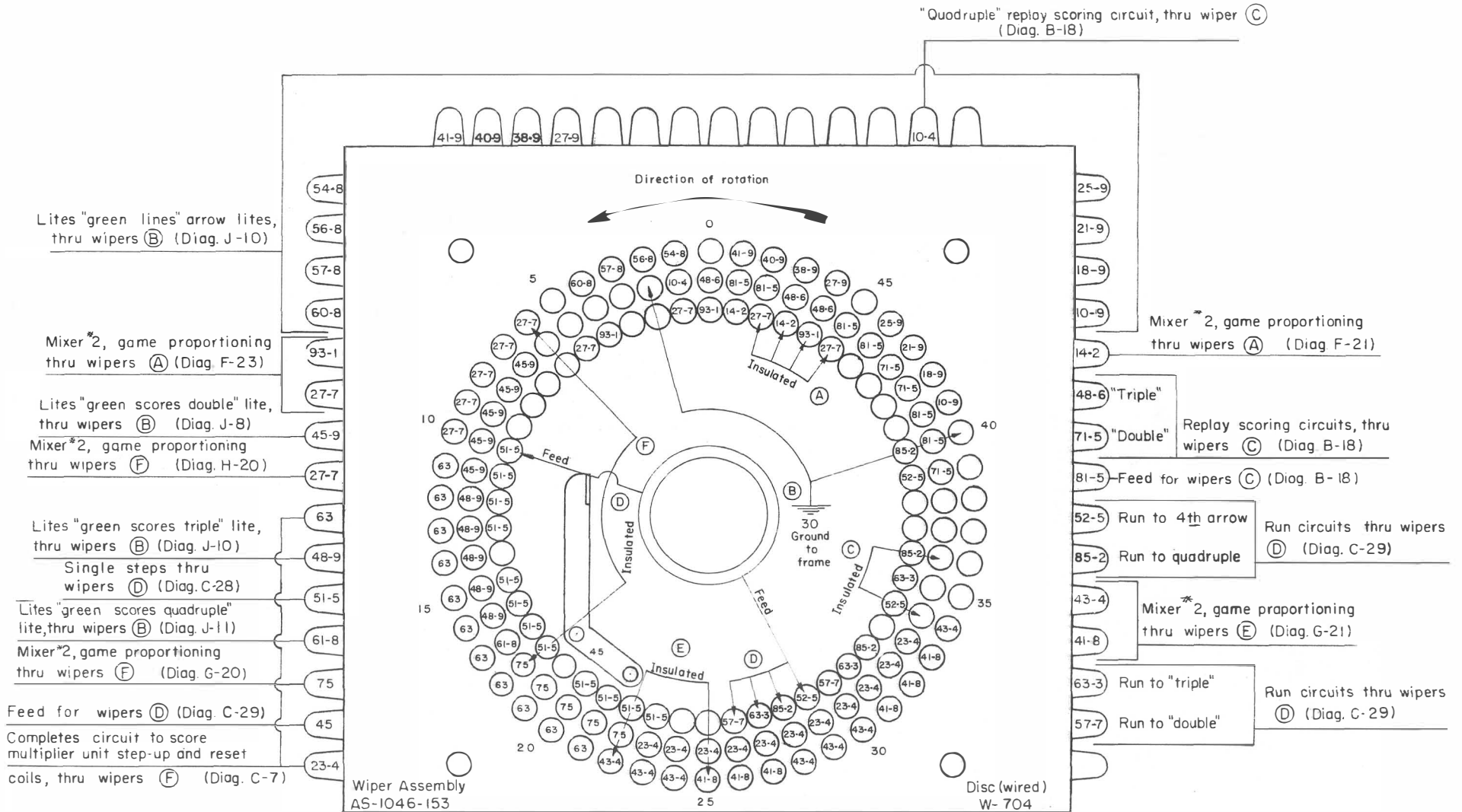
GREEN LINE UNIT STEP-UP AND RESET CIRCUIT

GREEN LINE UNIT viewed from COIL side

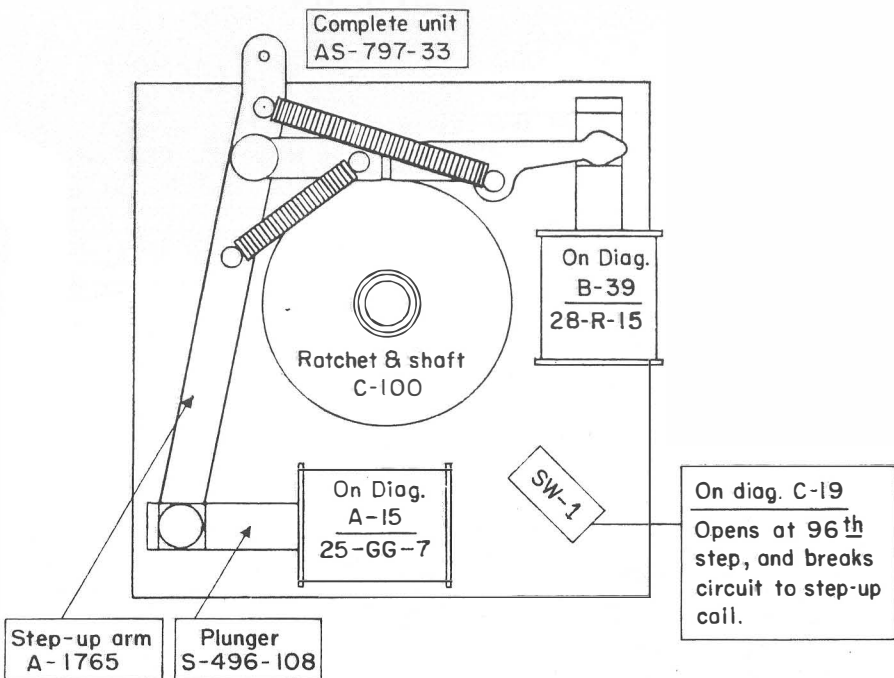


GREEN LINE UNIT viewed from BUTTON or WIPER side

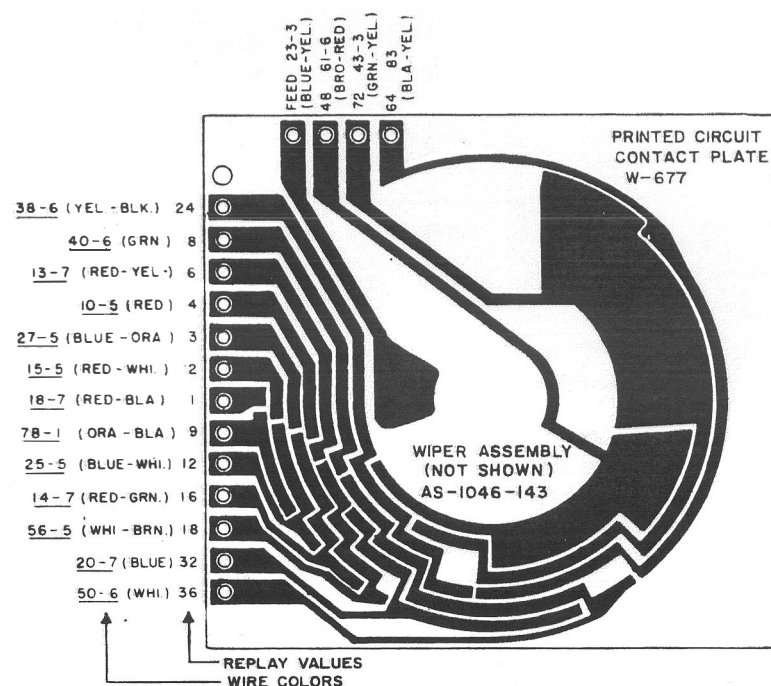
15 step unit. Wipers shown in zero or reset position



REPLAY COUNTER viewed from COIL side



REPLAY COUNTER viewed from WIPER side



CAM SWITCHES THAT PULSE REPLAY COUNTER STEP-UP COIL

| | SW. #12A | | | | SW. #11A | | | | SW. #12A | | | | SW. #11A | | | | SW. #11A | | | | SW. #11A | | | | SW. #10A | | | | | | | |
|------------------|------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------|-------------|-------------|-------------------|------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|-------------|
| | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | REGULAR | DOUBLE | TRIPLE | QUADRUPLE | | | | |
| 5 In-line | 64 (16) | 128 (32) | 192 (48) | 256 (64) | 72 (12) | 144 (24) | 216 (36) | 288 (48) | 96 (24) | 192 (48) | 288 (72) | 384 (See Note) | 96 (16) | 192 (32) | 288 (48) | 384 (64) | 96 (16) | 192 (32) | 288 (48) | 384 (64) | 144 (24) | 288 (48) | 432 (72) | 576 (See Note) | 144 (24) | 288 (48) | 432 (72) | 576 (See Note) | 192 (16) | 384 (32) | 576 (48) | 768 (64) |
| 4 In-line | 16 (4) | 32 (8) | 48 (12) | 64 (16) | 18 (3) | 36 (6) | 54 (9) | 72 (12) | 24 (6) | 48 (12) | 72 (18) | 96 (24) | 36 (6) | 72 (12) | 108 (18) | 144 (24) | 48 (8) | 96 (16) | 144 (24) | 192 (32) | 72 (12) | 144 (24) | 216 (36) | 288 (48) | 96 (16) | 192 (32) | 288 (48) | 384 (64) | 144 (12) | 288 (24) | 432 (36) | 576 (48) |
| 3 In-line | 4 (1) | 8 (2) | 12 (3) | 16 (4) | 6 (1) | 12 (2) | 18 (3) | 24 (4) | 8 (2) | 16 (4) | 24 (6) | 32 (8) | 12 (2) | 24 (4) | 36 (6) | 48 (8) | 18 (3) | 36 (6) | 54 (9) | 72 (12) | 24 (4) | 48 (8) | 72 (12) | 96 (16) | 36 (6) | 72 (12) | 108 (18) | 144 (24) | 48 (4) | 96 (8) | 144 (12) | 192 (16) |

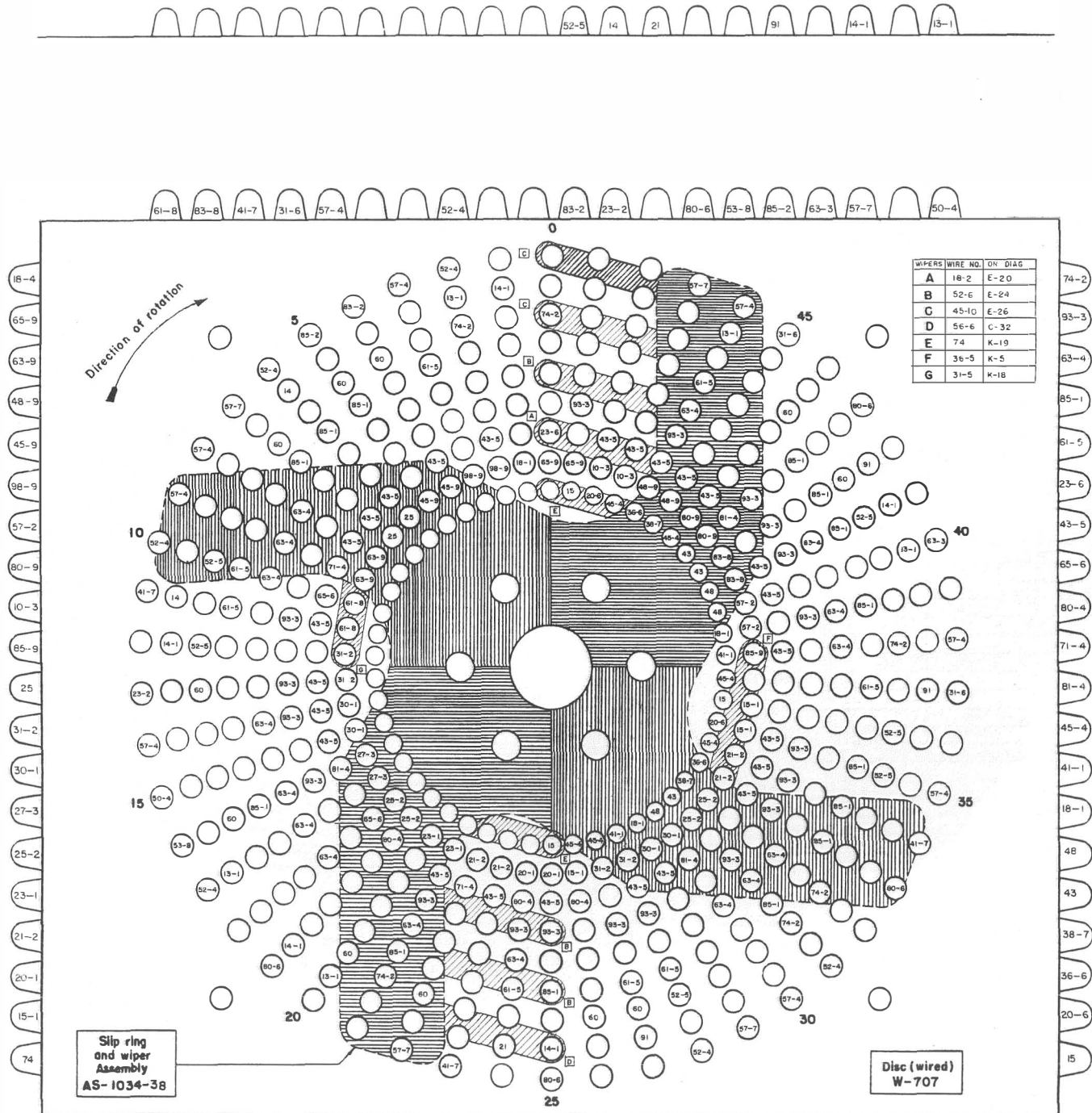
NOTE:
EFFECTIVE THRU OPEN AT 96 REPLAY COUNTER SWITCH.

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

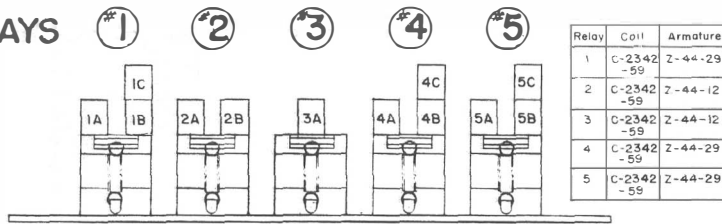
EXAMPLES: ON A REGULAR 3-IN-LINE SCORE OF 24 REPLAYS
THE CIRCUIT IS EFFECTIVE THRU THE 4 REPLAY CIRCUIT STRIP.

ON A QUADRUPLE 4-IN-LINE SCORE OF 288 REPLAYS
THE CIRCUIT IS EFFECTIVE THRU THE 48 REPLAY CIRCUIT STRIP.

SPOTTING DISC viewed from BUTTON or WIPER side



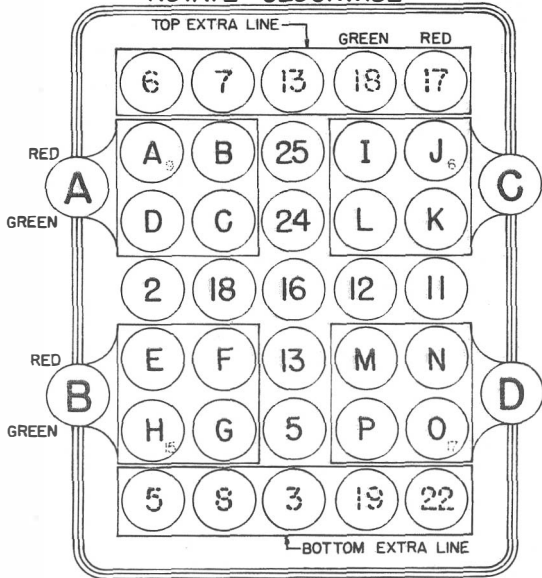
SEARCH RELAYS



| Relay | Coil | Armature |
|-------|-----------|----------|
| 1 | C-2342-59 | Z-44-29 |
| 2 | C-2342-59 | Z-44-12 |
| 3 | C-2342-59 | Z-44-12 |
| 4 | C-2342-59 | Z-44-29 |
| 5 | C-2342-59 | Z-44-29 |

| 3 in line scores | | 4 in line scores | | 5 in line scores | |
|------------------|--------------------------------------|------------------|--------------------------------------|------------------|--|
| Thru | | Thru | | Thru | |
| Switch no.s | Wire no's & color | Switch no.s | Wire no's & color | Switch no.s | Wire no's & color |
| 3A | 45-6 Green-white 50-3 White | 3A | 45-6 Green-white 50-3 White | 3A | 45-6 Green-white 50-3 White |
| 2A | 50-3 White 52-3 White-blue | 2B | 50-3 White 51-3 White-red | 2B | 50-3 White 51-3 White-red |
| 1B | 52-3 White-blue 54-3 White-green | 4B | 51-3 White-red 53-3 White-yellow | 4B | 51-3 White-red 53-3 White-yellow |
| 3A | 45-6 Green-white 50-3 White | 1C | 71-3 Orange-red | 5C | 53-3 White-yellow 57-3 White-orange |
| 2A | 50-3 White 52-3 White-blue | 3A | 45-6 Green-white 50-3 White | 1A | 57-3 White-orange 61-3 Brown-red |
| 4A | 54-3 White-green | 2B | 50-3 White 51-3 White-red | | |
| 3A | 45-6 Green-white 50-3 White | 4B | 51-3 White-red 53-3 White-yellow | | |
| 4C | 50-3 White 56-3 White-brown | 5B | 53-3 White-yellow 71-3 Orange-red | | |
| 5A | 56-3 White-brown 54-3 White-green | | | | |

CARD LAYOUT
SHOWN IN NEUTRAL
POSITION. MAGIC SQUARES
ROTATE CLOCKWISE



SCORING REGULAR, DOUBLE,
TRIPLE OR QUADRUPLE SCORES

Regular scores are completed thru the search disc between positions #38 to #15.

Double, triple, or quadruple scores are completed thru the search disc between positions #14 to #5.

Double, triple, or quadruple scores may be registered in (2) different ways.

1. By registering regular score first, and then the remainder to complete either the double, triple, or quadruple score.
2. By registering either the double, triple, or quadruple score immediately without interruption. (See explanation below.)

EXPLANATION OF
REGULAR, DOUBLE, TRIPLE OR
QUADRUPLE SCORING

Regular scores are registered with the score multiplier unit at zero.

Double scores are registered with the score multiplier unit at its 1st step.

Triple scores are registered with the score multiplier unit at its 2nd step.

Quadruple scores are registered with the score multiplier unit at its 3rd step.

NOTE: The score multiplier is a 4 step unit, it steps once for each complete cycle of the search disc wipers, thru control unit cam #15A.

After unit completes its 4th step, it resets thru control unit cam #16A.

This sequence takes place during search for a red or green lines score.

SEARCH POSITIONS

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

FOR DOUBLE TRIPLE QUADRUPLE SCORING

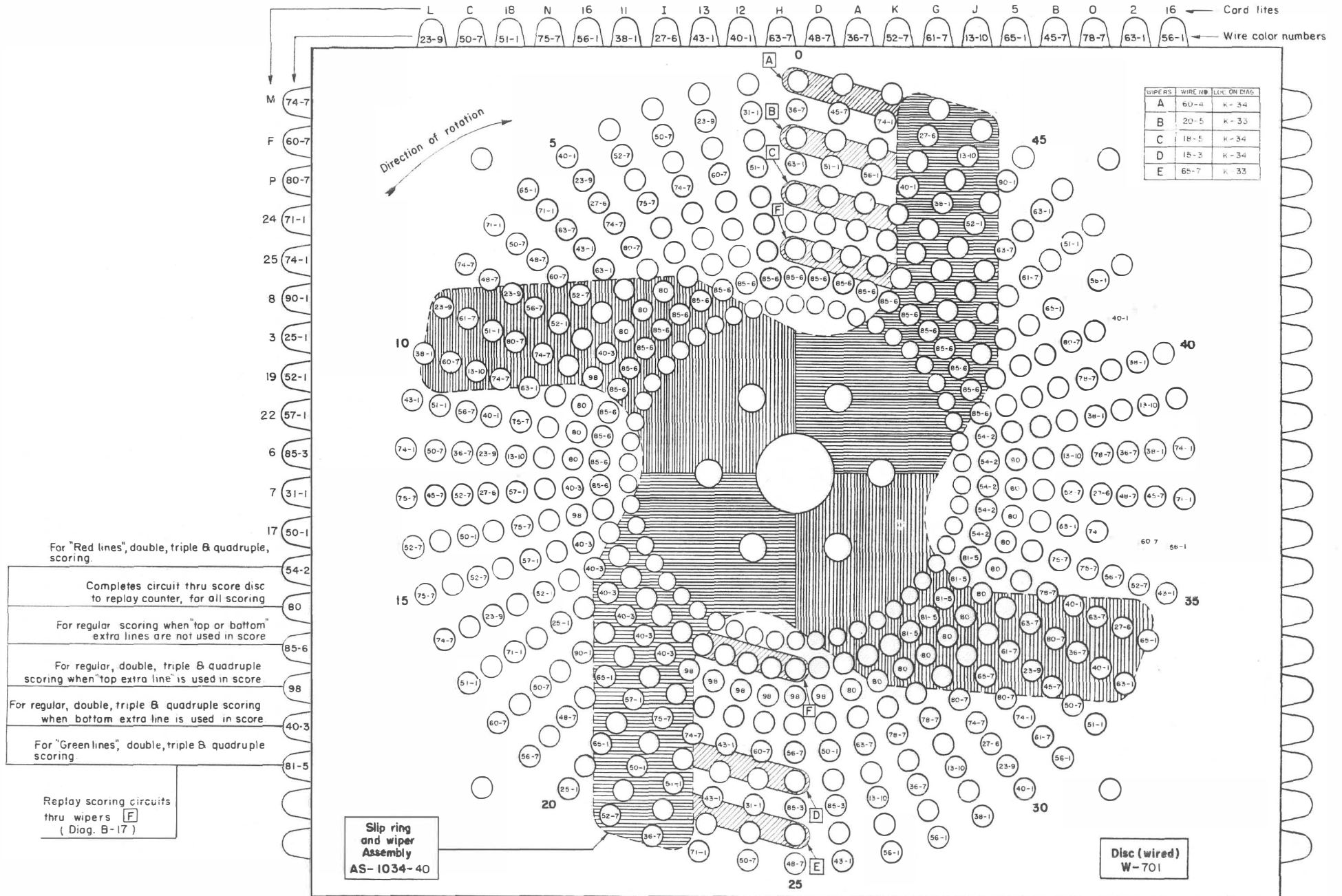
FOR REG SCORING

Rotation of search disc wipers, from 50 to 1

SCORE MULTIPLIER UNIT RESETS C. U. CAM #16A

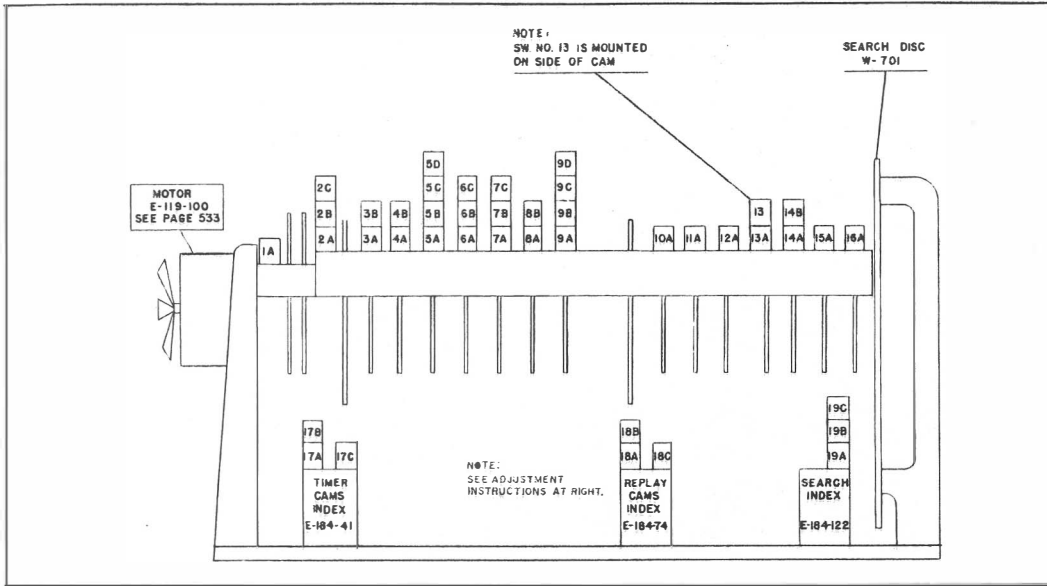
SCORE MULTIPLIER UNIT STEPS C. U. CAM #15A

SEARCH DISC viewed from BUTTON or WIPER side



CONTROL UNIT PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH CHART

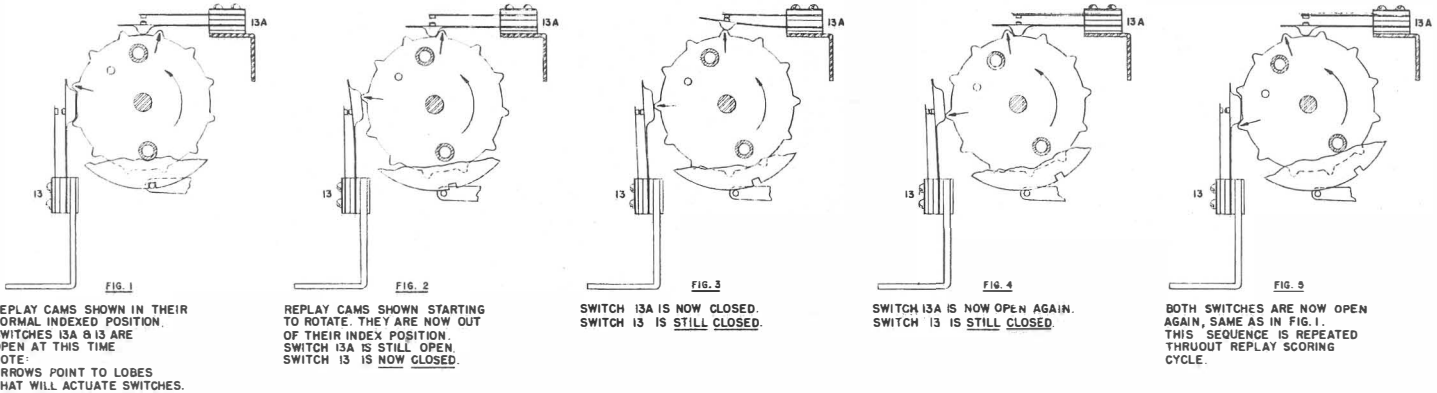


N.C.----- NORMALLY CLOSED
 N.O.----- NORMALLY OPEN
 M.B.B.----- MAKE BEFORE BREAK
 S.P.D.T.----- SINGLE POLE DOUBLE THROW

Note-It is important to adjust Replay Cams Index Switches No. 18A and No. 18B 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

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

| CAM SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|------------|---------------------|----------|---------------------------------------|--|
| 1A | N.O. | G-8 | 65-2 Brown-White 36-9 Yellow-Brown | Energizes timer step-up coil, when drag arm switch, selector lock switch, and control unit cam switch #14B are closed. |
| 2A | N.O. | I-3 | 90-5 Gray 30 Yellow | Energizes reflex play magnet, replay register reset coil. |
| 2B | N.O. | C-38 | 93-4 Gray-Yellow 30 Yellow | Energizes coin kicker magnet. |
| 2C | N.C. | E-10 | 57-6 White-Orange 31-7 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 | 48-2 83-3 | Green-Black Black-Yellow | 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 spotting cams index coils. |
| 5A N.O. | H-8 | 65-2 71-8 | Brown-White Orange-Red | Energizes timer reset coil. |
| 5B N.O. | B-21 | 21-1 38-4 | Blue-Red Yellow-Black | Energizes extra ball unit step-up coil. Steps unit from minus one to zero position. |
| 5C N.O. | B-23 | 78-4 85-4 | Orange-Black Black-White | Energizes anti-cheat relay. |
| 6A N.C. | D-23 | 25-3 43-8 | Blue-White Green-Yellow | Score extra step safety switch. |
| 6B N.C. | C-26 | 31-9 75-5 | Yellow-Red Orange-White | Drops out features run relay. |
| 6C N.C. | G-28 | 10-1 45-2 | Red Green-White | 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. | F-28 | 13-5 14-8 | Red-Yellow Red-Green | Pulse switch for "red" or "green" lines unit single steps. |
| 7C N.O. | D-38 | 93-4 30 | Gray-Yellow Yellow | (Safety switch) energizes coin kicker magnet. |
| 8A N.O. | F-30 | 14-8 56-6 | Red-Green White-Brown | Pulses "Magic Squares" unit for single steps. Also energizes "Spot #2" Relay, "Top Extra Line" Solenoid, "Bottom Extra Line" Solenoid, Select "Before 5th Ball" Relay, and "Bally-Hole" Relay, when circuit complete thru other factors. |
| 8B N.O. | B-21 | 25-4 38-4 | Blue-White Yellow-Black | Extra ball unit steps. |
| 9A Alt. | E-23 | 43-8 85-4 | Green-Yellow Black-White | Opens score extra step circuit every other time. |
| 9B Alt. | D-28 | 51-5 13-5 71 | White-Red Red-Yellow Orange-Red | Directs circuit for "red" or "green" lines unit single steps. |
| 9C Alt. | F-25 | 23 50-5 | Blue-Yellow White | Game proportioning switch. |

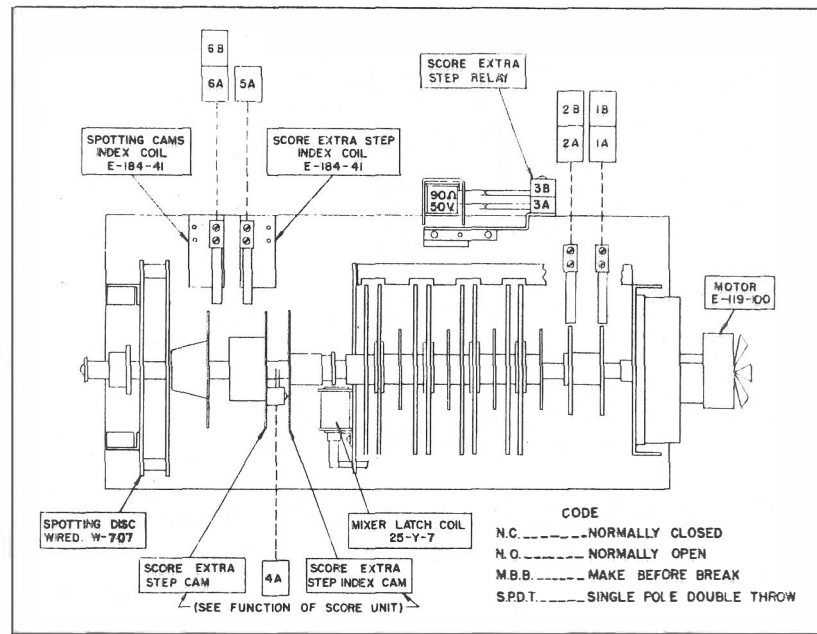
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CONTROL UNIT CAM SWITCH CHART — CONCLUDED

| CAM SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES | |
|--------------------------|---------------------|------------|-----------------------|---|---|
| 10A | N.O. | B-16 | 20-3 56 | Blue White-Brown | Pulses replay counter, when score unit is at 8th step. |
| 11A | N.O. | B-15 | 20-3 91-6 | Blue Gray-Red | Pulses replay counter, when score unit is at 2nd, 4th, 5th, 6th or 7th step. |
| 12A | N.O. | B-15 | 20-3 93-5 | Blue Gray-Yellow | Pulses replay counter, when score unit is at 1st or 3rd step. |
| 13A | N.O. | C-13 | 48-4 80 | Green-Black Black | Pulses replay register step-up coil, and reflex replay magnet. |
| 13 (Backside) | N.O. | H-13 | 21-3 27 | Blue-Red Blue-Orange | Replay lock-in switch. NOTE: See control unit pictorial view. |
| 14A | N.C. | I-14 | 56-7 93 | White-Brown Gray-Yellow | Prevents the start of another replay scoring, until control unit cams are indexed. |
| 14B | N.C. | D-8 | 27-2 90-2 | Blue-Orange Gray | Opens circuit to timer step-up coil during replay winner. |
| 15A | N.O. | C-7 | 23-4 81-8 | Blue-Yellow Black-Red | Completes circuit to "score multiplier" unit step-up coil, thru "red" or "green" lines unit disc. |
| 16A | N.O. | C-8 | 23-4 90 | Blue-Yellow Gray | Completes circuit to score "multiplier unit" reset coil, thru "red" or "green" 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. | |
| 17A | N.O. | G-1 | 20-P 60-P | Blue (plastic) Brown (plastic) | Operates control, magic squares, and mixer and spotting unit motors. |
| 17B | N.C. | G-5 | 14-9 71-2 | Red-Green Orange-Red | Opens circuit to coin lock-out magnet during spin. |
| 17C | N.C. | D-10 | 13 30 | Red-Yellow Yellow | Lock-in safety switch for red button relay. |
| RELAY CAMS INDEX COIL | A-13 | 40-4 70 | Green Orange | Energized when 3-in-line or more is scored, and releases replay cams. | |
| 18A | 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. |
| 18B | N.O. | H-14 | 56-7 93 | White-Brown Gray-Yellow | In series with replay winner circuit. NOTE: See control unit pictorial view for correct adj. |
| 18C | N.C. | B-12 | 15-2 80 | Red-White Black | Opens direct 50 volt circuit to search index coil, coil then held in thru resistor. |
| SEARCH INDEX COIL | A-13 | 15-2 70 | Red-White Orange | Energized when 3-in-line or more is scored. | |
| 19A | N.O. | B-13 | 40-4 80 | Green Black | Energizes replay cams index, if score is made. |
| 19B | N.C. | 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

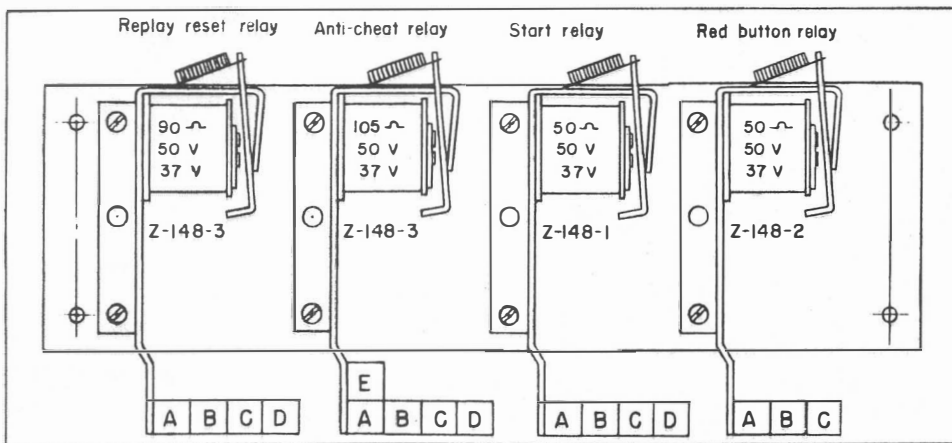


MIXER AND SPOTTING UNIT SWITCH CHART

FOR POSITION OF SWITCHES
REFER TO PICTORIAL VIEW ABOVE

| CAM SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|-----------------------------|---------------------|---------------|------------------------------|--|
| 1A | N.O. F-27 | 14-8 45-10 | Red-Green Green-White | Pulses "red-lines" "green-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 #4B. |
| 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 #4B. |
| 6A | N.O. J-5 | 83-1 30 | Black-Yellow Yellow | Completes "game advantages" flash circuit. |
| 6B | N.O. J-18 | 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 |

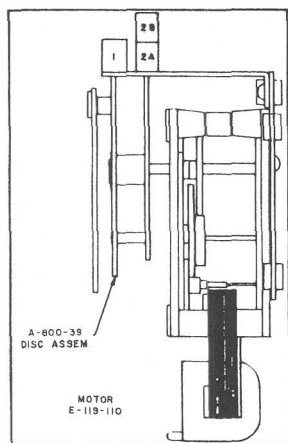
4 RELAY BANK SWITCH CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW

| 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-24 | 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. | L-22 | 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

| RELAY 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. | F-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-23 | 50-9 21-4 | White Blue-Red | Opens extra ball lite circuit. |



BALL LIFT MOTOR PICTORIAL VIEW

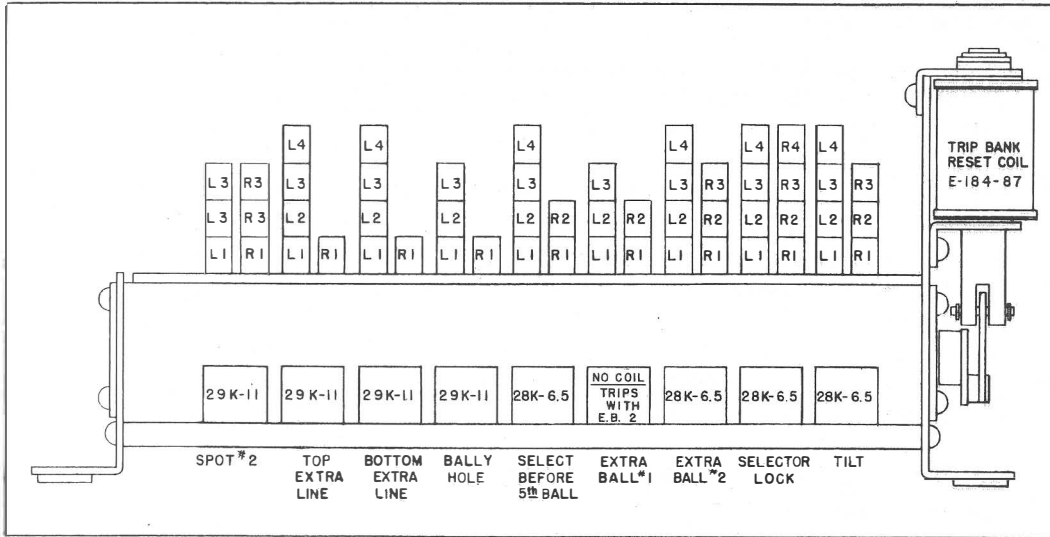
NUMBERS CORRESPOND TO SWITCH CHART BELOW

| 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. | G-12 | 30 91-1 | Yellow Grey-Red | Carry-over switch for ball lifter motor. |
| 2A N.O. | F-9 | 53-6 98-3 | White-Yellow Gray-Black | Completes circuit to selector lock trip relay. |
| 2B N.O. | F-8 | 43-2 27-2 | Green-Yellow Blue-Orange | Energizes timer unit step-up coil. |

TRIP RELAY BANK PICTORIAL VIEW

NUMBERS CORRESPOND TO SWITCH-CHART



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 CHART FOR POSITION OF SWITCHES REFER TO PICTORIAL VIEW

| RELAY SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|--------------------------|---------------------|--------------|----------------------------|--|
| SPOT #2 TRIP COIL | A-31 | J 70 | Jumper Orange | Energized by control unit cam switch #8A, when circuit complete thru other factors. |
| L1 N.O. | J-32 | 63-1 30 | Brown-Yellow Yellow | Completes circuit to lite #2 lite in card. |
| L2 N.C. | A-31 | 91 J | Gray-Red Jumper | Breaks circuit to this coil. |
| L3 N.C. | H-26 | 31 80-3 | Yellow-Red Black | Proportioning switch. |
| R1 N.O. | H-23 | 50-5 81-3 | White Black-Red | Proportioning switch. |
| R2 N.C. | I-24 | 41-3 50-5 | Green-Red White | Proportioning switch. |
| R3 N.C. | I-25 | 52 74-3 | White-Blue Orange-Green | Proportioning switch. |
| TOP EXTRA LINE TRIP COIL | A-32 | J 70 | Jumper Orange | Energized by "Top Extra Line" Switch. |
| L1 N.O. | A-16 | 80 98 | Black Gray-Black | Completes circuit to replay counter for scoring, when top extra line is used in score. |
| L2 N.C. | H-24 | 50-5 52 | White White-Blue | Proportioning switch. |
| L3 N.O. | J-6 | 10-3 30 | Red Yellow | Lites "top extra line" feature lite. |
| L4 N.C. | G-25 | 50-5 65 | White Brown-White | Proportioning switch. |
| R1 N.C. | A-32 | 90-8 J | Gray Jumper | Breaks circuit to this coil. |

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

| RELAY SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|----------------------------------|---------------------|----------------------|-------------------------------------|---|
| BOTTOM EXTRA LINE TRIP COIL | A-32 | J 70 | Jumper Orange | Energized by "Bottom Extra Line" Switch. |
| L1 N.O. | B-16 | 40-3 80 | Green Black | Completes circuit to replay counter for scoring, when bottom extra line is used in score. |
| L2 N.C. | G-24 | 50-5 52 | White White-Blue | Proportioning switch. |
| I3 N.O. | J-7 | 57-2 30 | White-Orange Yellow | Lites "bottom extra line" feature lite. |
| I4 N.C. | G-25 | 31 65 | Yellow-Red Brown-White | Proportioning switch. |
| R1 N.C. | A-32 | 91-8 J | Gray-Red Jumper | Breaks circuit to this coil. |
| BALLY-HOLE TRIP COIL | A-34 | J 70 | Jumper Orange | Energized by control unit cam switch #8A, when spotting disc wipers stop on correct position. |
| L1 N.O. | D-19 | 50-8 91-5 | White Gray-Red | Completes circuit to extra ball unit step-up coil. |
| L2 N.O. | J-6 | 18-4 30 | Red-Black Yellow | Lites Bally-hole feature lite. |
| I3 N.C. | A-34 | 14 J | Red-Green Jumper | Breaks circuit to this coil. |
| R1 N.C. | G-19 | 41 75-5 | Green-Red Orange-White | Proportioning switch. |
| SELECT BEFORE 5th BALL TRIP COIL | A-33 | J 70 | Jumper Orange | Energized by control unit cam switch #8A, when spotting disc wipers stop on correct position. |
| L1 S.P.D.T. | K-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. | H-19 | 74-4 75-5 | Orange-Green Orange-White | Proportioning switch. |
| I3 N.C. | A-33 | 21 J | Blue-Red Jumper | Breaks circuit to this coil. |
| I4 S.P.D.T. | G-9 | 53-6 30 20-2 | White-Yellow Yellow Blue | Directs circuit to energize selector lock, at either the 4th or 5th step of timer unit. |
| R1 S.P.D.T. | L-3 | 85-9 80-9 25 | Black-White Black Blue-White | Directs circuit to lite either the "select before 4th" ball feature lite, or select before 5th ball feature lite. |
| R2 N.O. | G-7 | 43-2 81-2 | Green-Yellow Black-Red | Keeps circuit to ball lifter cam switch alive. |

CONTINUED ON NEXT PAGE

TRIP RELAY BANK CHART — CONTINUED

| RELAY SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|-------------------------|---------------------|----------------------|--|--|
| EXTRA BALL #1 TRIP COIL | | | | Note: Both extra ball trip relays work off 1 coil, on extra ball trip relay #2. |
| L1 N. O. | J-23 | 21-4 30 | Blue-Red Yellow | Lites extra ball lite. |
| 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 circuit, and further completes circuit for extra ball steps. |
| R1 S.P.D.T. | H-29 | 10-1 78-5 65-5 | Red Orange-Black Brown-White | Proportioning switch. |
| R2 N. O. | G-26 | 23 65-4 | Blue-Yellow Brown-White | Proportioning switch. |
| EXTRA BALL #2 TRIP COIL | A-10 | 25-7 70 | Blue-White Orange | This relay and extra ball trip relay #1 are energized by yellow button switch when playing for extra balls. |
| 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 and mixer latch coils. |
| L2 N. C. | A-10 | 25-7 31-8 | Blue-White Yellow-Red | Breaks circuit to this coil. |
| L3 N. C. | G-27 | 45-2 81-6 | Green-White Black-Red | Breaks circuit to other game advantages, when playing for extra balls. |
| L4 S.P.D.T. | J-18 | 31-5 13-4 74 | Yellow-Red Red-Yellow Orange-Green | Breaks circuit to flash score lites and completes circuit to flash extra ball lites, when playing for extra balls. |
| R1 S.P.D.T. | H-27 | 75-5 65-4 45-2 | Orange-White Brown-White Green-White | Proportioning switch. |
| R2 N. C. | J-5 | 36-5 83-1 | Yellow-Brown Black-Yellow | Breaks circuit to flash other game advantages, when playing for extra balls. |
| R3 N. O. | D-12 | 38-3 91-1 | Yellow-Black Gray-Red | Completes circuit to ball lifter motor, when playing for extra balls. |
| 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 relay switch. |
| L1 N. O. | E-4 | 18-6 50-2 | Red-Black White | Completes circuit to make yellow button alive. |
| L2 N. C. | H-34 | 41-5 61 | Green-Red Brown-Red | Breaks circuit to "magic squares" buttons. |
| L3 N. O. | I-15 | 45-6 56-7 | Green-White White-Brown | In series circuit for replay scoring. |
| L4 N. O. | B-10 | 25-8 31-8 | Blue-White Yellow-Red | Completes circuit to extra ball trip relays. |
| R1 N. O. | F-8 | 27-2 78-6 | Blue-Orange Orange-Black | Completes circuit to timer unit step-up coil. |
| R2 N. C. | A-10 | 75-3 J | Orange-White Jumper | Breaks circuit to this coil. |
| R3 N. O. | F-7 | 21-3 63 | Blue-Red Brown-Yellow | Completes circuit to score multiplier unit step-up and reset coils, thru red or green lines unit disc. |
| R4 N. C. | J-1 | 10-2 80-9 | Red Black | Breaks "select now" lite flash circuit. |

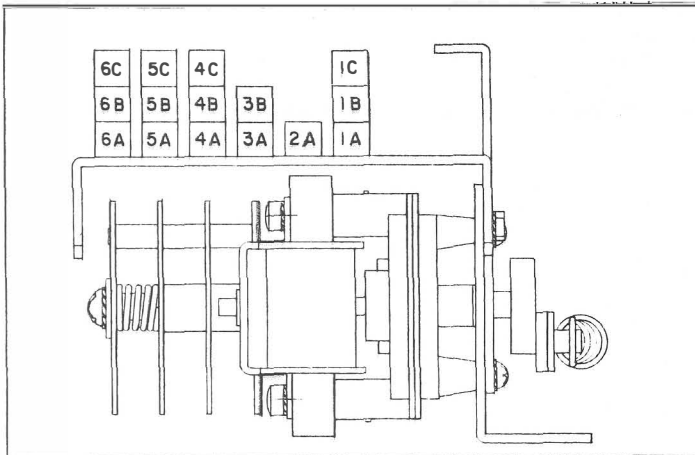
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TRIP RELAY BANK CHART — CONCLUDED

| RELAY SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|----------------|---------------------|--------------------|---------------------------------------|---|
| TILT TRIP COIL | A-11 | 14-5 70 | Red-Green Orange | Energized by any tilt switch, or the plumb bob, 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 game advantages, replay scoring, and ball counting circuits, and completes circuit to shutter motor. |
| L2 N.C. | I-34 | 40-8 41-5 | Green Green-Red | Breaks circuit to "magic squares" buttons. |
| L3 N.C. | L-24 | 10 20-4 | Red Blue | Breaks 17 volt circuit. |
| L4 S.P.D.T. | L-23 | 38 81 91-2 | Yellow-Black Black-Red Gray-Red | Breaks 6 volt circuit, and lites tilt lite. |
| R1 N.O. | D-11 | 57-6 85-7 | White-Orange Black-White | Safety circuit for red button relay. |
| R2 N.C. | F-1 | 20-P 60-P | Blue (Plastic) Brown (Plastic) | Breaks circuit to control, magic squares, and mixer & spotting motors. |
| R3 N.C. | D-19 | 10-10 50-8 | Red White | Breaks Bally-hole extra ball step-up circuit. |

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. |
| 1C N.C. | I-8 | 21-3 98-6 | Blue-Red Gray-Black | Safety switch. |
| 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. | B-38 | 30 85-5 | Yellow Black-White | Resets score, extra ball, and "magic squares" feature units. Also energizes curtain-lock magnet. |
| 3B N.O. | H-2 | 20-P 70-P | Blue (Plastic) Brown (Plastic) | Resets trip relay bank. |

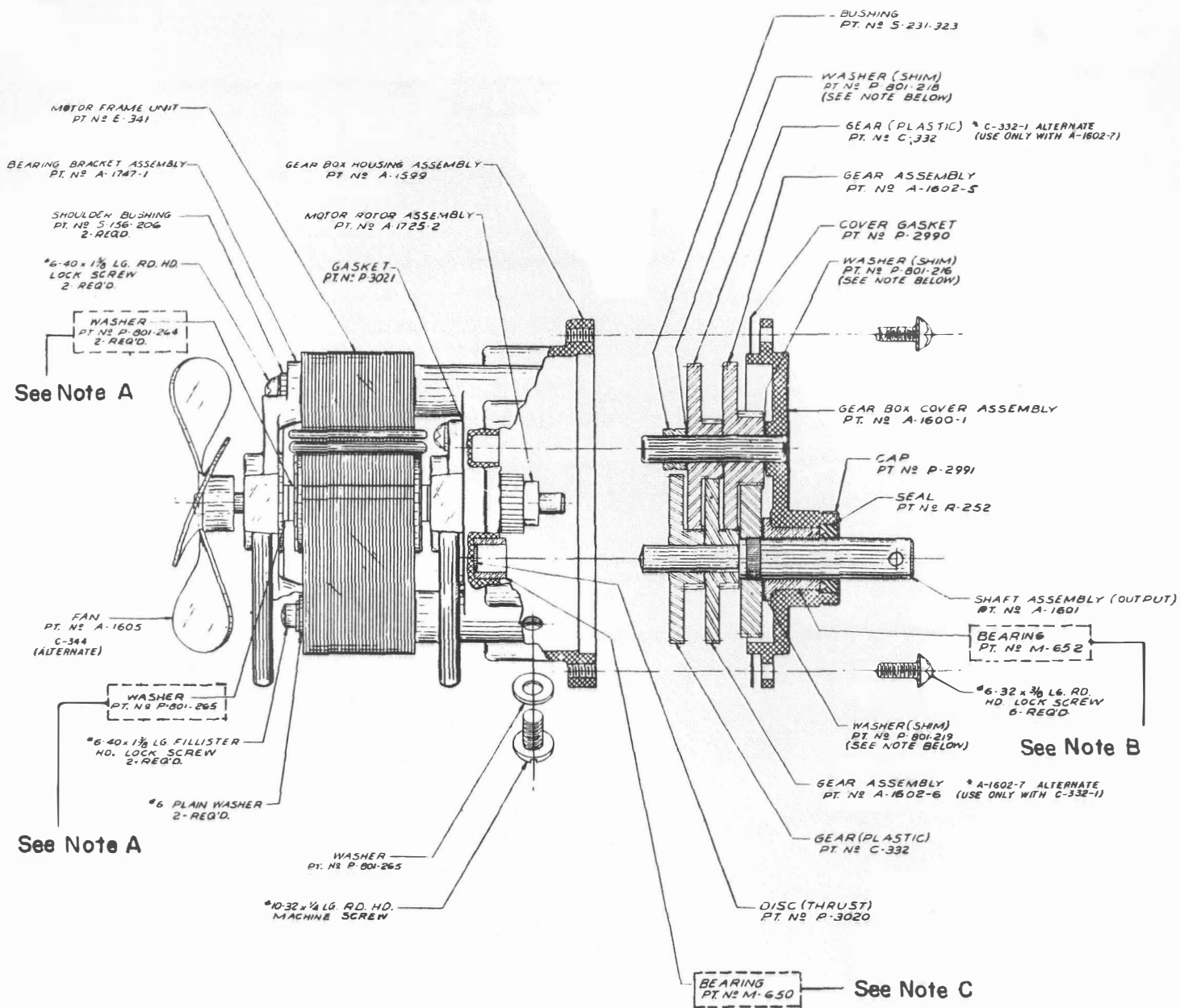
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SHUTTER MOTOR CAM SWITCH CHART

— CONCLUDED

| CAM SWITCH | LOCATION ON DIAGRAM | WIRE No. | WIRE COLORS | FUNCTION OF SWITCHES |
|-------------|---------------------|----------------------|---|--|
| 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-33 | 83-3 40-8 | Black-Yellow 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-15 | 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 "green lines" unit. |
| 6C N.O. | B-7 | 30 91-4 | Yellow Gray-Red | Resets "Score Multiplier 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-261 | Back glass |
| M-281-14 | Lock and keys (2) keyed alike |
| A-1821-4 | Magic Squares Display "A" |
| A-1821-5 | Magic Squares Display "B" |
| A-1821-6 | Magic Squares Display "C" |
| A-1821-7 | Magic Squares Display "D" |
| 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-429-15 | 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-429-15 trough |
| M-497-1 | Wire (short) for A-429-15 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-567-30 | Front door only |
| AS-1558 | Front door assembly 5¢ |
| AS-1558-1 | 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¢ |

Front Moulding Assembly:

| | |
|-----------|----------------------|
| A-1272-17 | "A" Button |
| A-1272-18 | "B" Button |
| A-1272-19 | "C" Button |
| A-1272-20 | "D" Button |
| P-2210-8 | 5¢ coin entry plate |
| P-2210-9 | 10¢ coin entry plate |
| P-2210-33 | Double plate |
| CA-773-2 | Front moulding |

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 |

Bally pin game lubricant now available in one half-pint (8 Oz.)
containers with plastic spout and screw cap.