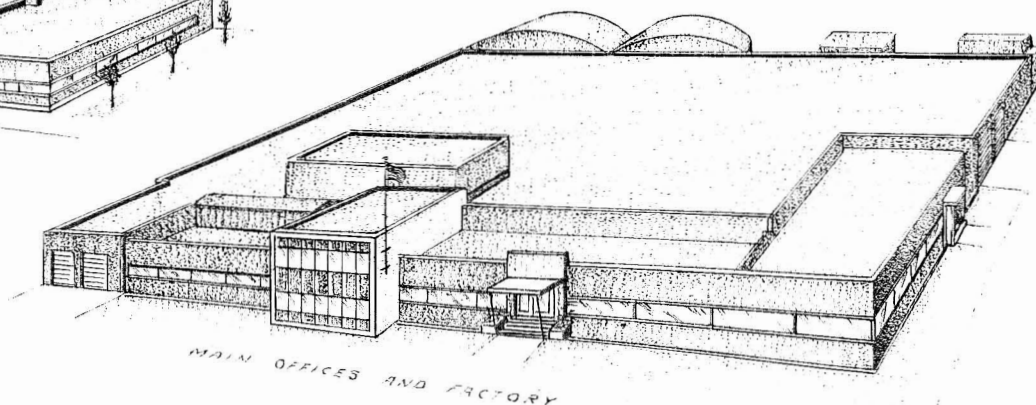
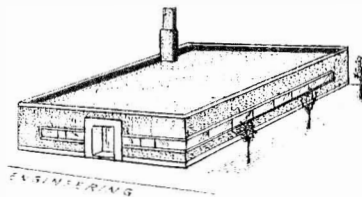


Instruction Manual for

TAHITI



United Manufacturing Company

3401 N. CALIFORNIA AV., CHICAGO 18, ILL.

CONFIDENTIAL
DO NOT LEAVE
MANUAL IN
GAME



INSTALLATION INSTRUCTIONS

Fasten 4 legs to cabinet with bolts and washers furnished. Place back-box in position. Unlock and open back-door and fasten the back-box to cabinet with bolts and washers furnished.

Plug power line into 110-115 volt 60 cycle Alternating Current only. Turn on power by turning toggle-switch on. Toggle-switch is located on bottom right front of cabinet.

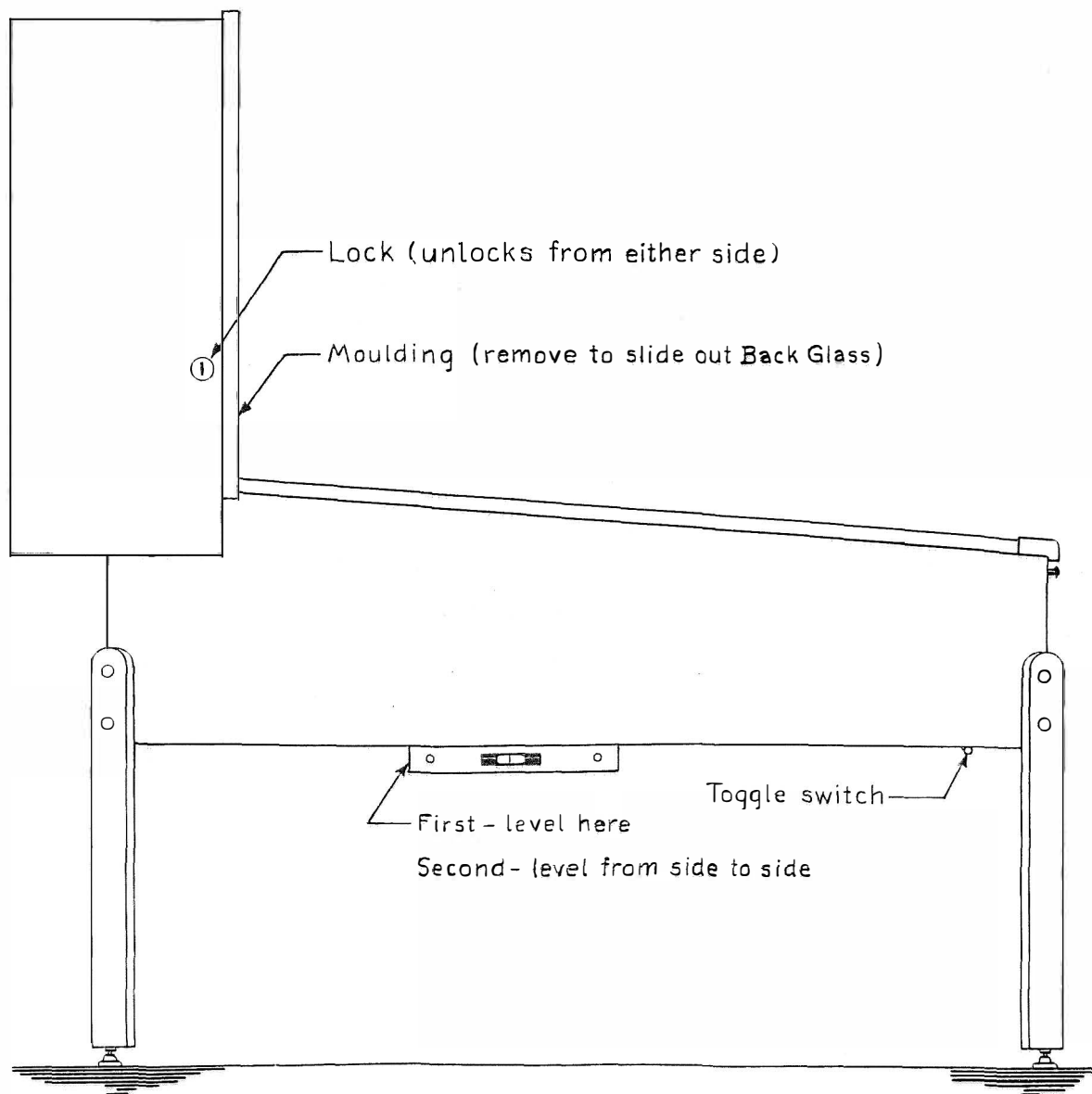
ACCESS TO MECHANISM AND LIGHT BULBS

Back-glass may be removed from either side by unlocking side desired and removing upright moulding. (Remove moulding by pulling bottom portion.)

After removing back-glass, access to mechanism may be obtained by raising 2 slide brackets on insert, located on left and right edges of insert. Insert may then be tilted forward for easy accessibility.

BE SURE TO LEVEL GAME

See instructions for leveling below. Place 8 balls in game.



TAHITI
GAME OPERATION

5-BALL

Additional coins or replays can be played:

1. To advance scores (positive advance to 2nd score position on second play).
2. To lite Super Card panels and thus qualify:
 - (a) To score 4-in-line Score by lighting 3-in-line numbers on Super Card.
 - (b) To score 5-in-line Score by lighting 4 Corner numbers on Super Card.
3. To lite Special Card panels and thus qualify:
 - (a) Any two numbers score 3-in-line Score.
 - (b) Any three numbers score 4-in-line Score.
 - (c) Four numbers score 5-in-line Score.
4. To lite "Select a Lit Selection Feature Before Shooting 4th Ball" panel and thus qualify:
 - (a) To select a "Spot" number.
 - (b) To select an "Extra Ball".
 - (c) To select "3-in-line Scores 4-in-line" on main card.
 - (d) To select both "Super Cards" and qualify as stated in #2.
 - (e) To select both "Special Cards" and qualify as stated in #3.
5. To lite "Select a Lit Selection Feature Before Shooting 5th Ball" panel and qualify:
 - (a) To shoot 4 balls before making selection.
6. To lite additional, selectable numbers.
7. To lite "4 Corners Score 5-in-line" panel and thus qualify, to score 5-in-line for lighting Corner Numbers on main card.
8. To lite Stars and thus qualify to spot numbers 2-5-8 by hitting either Star Rollover.
9. To obtain 1 to 3 additional balls.

IN-LINE SCORES:

Main card on backglass contains twenty-five numbers, 1 to 25 inclusive, arranged in a square 5 numbers wide by 5 numbers high, not in numerical order.

Two Super Cards on backglass contain nine numbers each, duplicating numbers on main card, arranged in a square 3 numbers wide by 3 numbers high, not in numerical order.

Two Special Cards on backglass contain 4 numbers each, duplicating numbers on main card, arranged in a square 2 numbers wide by 2 numbers high, not in numerical order.

The Playfield contains twenty-five Skill Holes, numbered 1 to 25 inclusive, arranged in numerical order from top to bottom of playfield and a Ball Return Hole through which balls return for free shots.

The object of the game is to shoot balls into numbered skill holes, lighting corresponding numbers on backglass.

- (a) To light 2, 3 or 4 numbers in Special Card (when lit).
- (b) To light 3 adjoining numbers connected by white line -- horizontally, vertically or diagonally -- on Super Card when Super Card panel is lit.
- (c) To lite 3, 4 or 5 adjoining numbers connected by white line -- horizontally, vertically or diagonally -- on Main Card.

In-line Scores are listed under Advancing Scores on Page 3.

CORNERS SCORES:

Further object of the game is:

- (a) To lite 4 Corner numbers of main card when Corners panel is lit (see Corners panel on Page 3).
- (b) To light 4 Corner numbers of Super Card when corresponding Super Card panel is lit (see Super Card below).

SUPER CARDS:

Arrows under Super Cards flash with each play and advance to next position at mystery intervals until the fourth arrow is lit and Super Card panel is lighted. Lighted panel or arrow will remain lit during entire game, and qualifying player to score In-line Scores and Corner score on Super Card, as described under In-line Scores and Corner Scores above.

After lighting Super Cards advantages.

SELECTION FEATURE:

Arrows above selection numbers, and selection numbers, flash with each play, and advance at mystery intervals. When lite advances to "Select a Lit Selection Feature Before Shooting 4th Ball" panel:

- (a) Selection numbers light (4 numbers guaranteed) 19, 20, 21 and 22; other numbers, 16, 25 and 10, light at mystery intervals and/or can be obtained on additional plays.
- (b) "Extra Ball, 3-in-line scores 4-in-line, Both Super Cards and Both Special Cards." These selections are guaranteed with the first 4 numbers.

Any one of the above selections can be selected, when lit, by turning the knob on the front of the cabinet.

- (c) "Select a Lit Selection Feature Before Shooting 5th Ball", when lit, player can shoot 4 balls before making selection.

NOTE: "Select Now" will flash, warning player to select before shooting next ball.

CORNERS PANEL:

Panel with words "4 Corners Score 5-in-line" flashes with each play and at mystery intervals, lights and remains lit during entire game, qualifying player for Corners Score on main card.

SPOTTEM FEATURE:

Red Star and Yellow Star on backglass flash with each play and at mystery intervals, light and remain lit during the entire game.

Each Rollover on playfield spots numbers 2-5-8 when Stars are lit.

GUARANTEED FEATURES:

Regardless of number of plays, each feature, after lighting remains lit until the end of game.

ADVANCING SCORES:

Scores appear in Fan on backglass, advancing at mystery intervals.

GUARANTEED SCORES:

First and second scores are guaranteed for the first two plays -- Additional play will advance scores or remain as high as on previous play. They never drop back regardless of number of plays.

Scores appearing on backglass are as follows:

5-In-Line	96	96	100	100	150	150	192	300
4-In-Line	16	20	24	32	48	72	100	200
3-In-Line	4	6	8	12	18	36	48	64

EXTRA BALL FEATURE:

After shooting at least 4 balls, player may press "Extra Balls Button" and play for extra balls, the "1st Extra Ball", "2nd Extra Ball", and "3rd Extra Ball" panels will flash.

At mystery intervals, after 1st play and first pointer is lit, (guaranteed on 1st play) pointers light will advance on succeeding plays at mystery intervals, until fifth pointer is lit and "1st Extra Ball" panel is lighted. Then first extra ball will be released to player. After shooting "1st Extra Ball" player may continue to play for 2nd and 3rd extra balls.

GUARANTEED ADVANCE:

Pointer lights either advance or remain as far advanced as on previous play--they never drop back to a lesser position.

MAINTENANCE AND ADJUSTMENT

I. GENERAL

NEVER EXPERIMENT with any of the mechanism. Locate any trouble with the aid of Wiring Diagrams or Operating & Servicing Information supplied with the machine, then check for proper adjustment of the units involved before making any changes. Improper adjustment or makeshift repair will only cause serious damage to other parts of the machine or repeated failure of the part.

NOTE: Always look for a possible loose wire, bad connection at a plug and socket, broken or unhooked springs on step-ups, relays, etc., before adjustments are made or wires connected.

II. FUSES

IMPORTANT: Never replace fuses with any rating other than specified on fuse block. Fuse Block is mounted on transformer board assembly in bottom of cabinet and can be reached from the side door.

III. LUBRICATION

Over-lubrication causes far more trouble in coin-operated equipment than under-lubrication. Practically all cases of poor contact on switches and wiper discs are due to oil or grease, or oil vapor which forms a film or residue on the contacts and will not allow current to pass through. Excess lubricant may also seep into the clutches, causing them to slip (Flash Motor Unit).

IMPORTANT: NEVER USE VASELINE FOR LUBRICATION OF ANY PART OF THE MACHINE. Vaseline is not a true lubricant. It leaves a dirty and gummy residue and it becomes very thick when cold. A special Coin Machine Lubricant is supplied with each machine.

STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with the special Coin Machine Lubricant only after the grease is completely evaporated (3 to 12 months, depending on climate) or when the film of grease becomes dirty. In either event, clean the parts thoroughly with Benzol, Naptha, White Gasoline or Carbon Tetrachloride, then apply an extremely thin coat of the special grease with a fine camel's hair brush.

Solenoid Plungers should not have a lubricant of any kind. Should there be a sluggish tendency or if plungers are sticking, the parts should be cleaned with a solvent and flaked graphite applied on reassembly.

IV. CONTINUITY CHECKS

Continuity of coils, contacts, wire connections, etc. may be checked with an Ohmmeter or several types of Test Lites. If regular test equipment is not available, an efficient Test Lite may be made from a few miscellaneous parts as shown on page 10. The following paragraphs describe this equipment and give information that will prove helpful to the service man.

- (a) Battery Test Lite should be used only with all current in the machine turned OFF. When the leads from the Lite are placed across the wires leading to the Coils, Switches, etc., the bulb will light if there is contact through the unit being checked. If the bulb does not light, there is a break in the circuit. However, only open circuits on coils may be located by this method since shorted coils will also show contact through the coil. If a short is suspected use the Test Prod to check the coil.
- (b) The Test Prod must be used with current turned ON. The clip on the end of the lead wire may be attached to any common ground in the machine. This would be Black wire for 17 to 30 Volt tests, or White or White-Black wire for 6 Volt tests. The Prod end of the tester may then be touched to various connections or contact points in the circuit being checked. Using the tester in this manner leaves the service man with one hand free to manually operate relays or other units.

If a particular Coil on a Relay, Solenoid, etc., is not energized, place the clip end of the Test Prod on the Black lead to the Coil. Touch the Test Prod to the opposite lead of the Coil. If the bulb lights but the Relay Coil, or other unit being checked, is not energized, then the coil is faulty and must be replaced.

Wiper Contacts may be checked by placing the Test Prod Clip on the common ground wire for the circuit (Black for 17 or 30 Volts, White-Black for 6 Volt circuits) and checking the solder lugs of the Contact Discs as follows:

- (a) Use the Test Prod to locate the "hot" wires leading into the Disc.
- (b) Check the Wiring Diagram for the wire colors of the contacts opposite the hot leads.
- (c) Place the Test Prod on the contacts, thus located, and turn the wipers or Wiper Disc of the unit by hand. The Test Lite should light before one revolution of the wiper is completed.

Broken Wires may be located by placing the leads of the Battery Test Lite on each end of the wire in question. If the bulb fails to light, a break in the circuit is indicated.

V. RELAY ADJUSTMENTS

All Relays are adjusted by the factory and should require little or no servicing in the field. Should a Relay fail to actuate the Unit or Lights to which its switches are connected, the difficulty might possibly be due to dirty Switch Contacts, loose wires or a broken wire between the Relay and other Units.

NOTE: DO NOT make any adjustments to the Relay itself until all other possibilities in the troublesome circuit have been checked.

The Gap between the Coil and the Armature of the Relay should be approximately $\frac{3}{64}$ of an inch. This allows for about $\frac{3}{32}$ of an inch movement at the end of the Armature into which the switch blades are inserted. The Gap may be adjusted (if necessary) by bending the Armature Stop Arm.

CAUTION: The Armature Stop Arm on all Relays is carefully adjusted at the factory. Do not change this adjustment unless absolutely necessary.

The Armature Spring should have enough tension to bring the Armature up against the Armature Stop Arm when the Relay is not energized. SEE THAT PRESSURE, FROM POORLY ADJUSTED SWITCHES, IS NOT AFFECTING THE ARMATURE BEFORE ATTEMPTING ADJUSTMENTS ON THE SPRING.

If a Relay "chatters" or "hums" but does not pull in, check to see that switches, located on it, are not out of adjustment and causing too much tension on the Armature or that a burr on top of the Relay Coil is not interfering with action of the Armature. Burrs on the core of the Coil may be removed with a small contact file.

The Continuity of a Relay Coil may be checked with an Ohmmeter, or if one is not available, see Paragraph IV for use of Test Prod.

VI. SWITCH ADJUSTMENT - GENERAL

The majority of switches used in United machines are composed of a series of blades and spacers built up with normally open and/or normally closed contacts as required to perform the specific function for which the switch is intended. These switches may be actuated by Relays, Solenoids, or by mechanical movement of other parts of the machine. However, the adjustment of the switch contacts and blades remain fairly constant, as shown in the following paragraphs.

With the exception of a few cases, in which special adjustment instructions are given, all blade type switches should have at least 1/32" gap beyond the point at which the contacts close. This follow-thru action provides a wiping motion between the contacts, keeping them clean and insuring good contact between the points.

When adjusting blade type switches, first adjust the blade actuated by other parts of the machine with relation to the part it contacts and then set the gap and follow through. Specific instructions pertaining to each switch are given, where necessary, in other paragraphs and may be found by referring to the index.

CAUTION: NEVER BEND BLADES SHARPLY, at the spacers or otherwise. Sharp bends tend to straighten out slightly with use, and will weaken the Blade. Blades should be formed by a stroking action over the entire length of the blade, using a blade tool or duck-bill pliers.

VII. SWITCH ADJUSTMENTS - PLAYBOARD POCKET

All Pocket Switches are mounted on the Masonite Shuffle-board and can be easily serviced by removing the screws along the edge of the Playboard and raising the front end as far as desired.

The blades of the Pocket Switches should be centered in the round opening of the Shuffle-board. If they rub the side of the opening they will not function correctly and may stick in open or closed position.

The Actuator Blade should lay against the Shuffle Board with very little tension when the Ball is not in the pocket.

VII. SWITCH ADJUSTMENTS - PLAYBOARD POCKET (continued)

There should be $1/32''$ to $1/16''$ gap between contact points when the switch is open.

Check to see that combined tension of the blades does not cause the ball to bounce when it drops into the pocket. If the ball bounces enough to open the switch points, relieve tension on blades until this is corrected.

VIII. SWITCH ADJUSTMENTS - CAM

With the exception of the Replay Impulse Motor all Cam Switches should be adjusted for at least $1/32''$ gap, when open, and at least $1/32''$ follow-through after their contact points close.

Score Cam Switches should not have any more than $1/32''$ follow-through after their contact points close.

IX. SWITCH ADJUSTMENT - RELAY

GENERAL - Unless special instructions are given, all blade-type switches mounted on relays should be adjusted according to the instructions for General Switch Adjustments as given in Paragraph VI and below.

TRIP OR LATCH RELAYS - This type of Relay is locked in one position mechanically and usually assembled in banks. When this type Relay is energized, the flap that operates the switches falls down until it rests against the shoulders on the top edge of the armature. The actuator arm should snap back against the armature, but the switch blades should not have enough tension to cause the arm to bounce. Bouncing can be reduced or stopped by relieving the tension of the switch blades on the pin of the Actuator arm. These switches should be set for $1/16''$ gap and $1/32''$ follow-through.

X. SWITCH ADJUSTMENTS - TILT

SLAM TILT switches are the blade type switch with one blade weighted. Rough handling of the machine will cause the weighted blade to vibrate, closing the switch contacts and Tilting the mechanism. The gap between points on these switches may be set as close as desired (depending on how rough the Players treat the machine). Average gap for this type of switch is approximately $1/16''$. However, closer settings will soon discourage rough players.

THE PENDULUM TILT, located in the front left corner of the cabinet (alongside the cash-bow) can be set by loosening the thumb screw and sliding up or down or moving the ring forward or back.

XI. SWITCH ADJUSTMENTS - BALL SHOOTER

The Ball Shooter Switch is located directly ahead of the Ball Shooter Plunger on the Playboard and is operated by the weight of the Ball resting on the small wire form that protrudes through the Playboard. Be sure the wire form is not rubbing the sides of the opening and that its movement is great enough to operate the switch. Also, check to see that the wire form is not bent back far enough to be struck by the plunger during play. The contacts on this switch should have at least $1/32''$ gap and $1/32''$ follow-through.

XII. STEP-UP UNIT ADJUSTMENTS

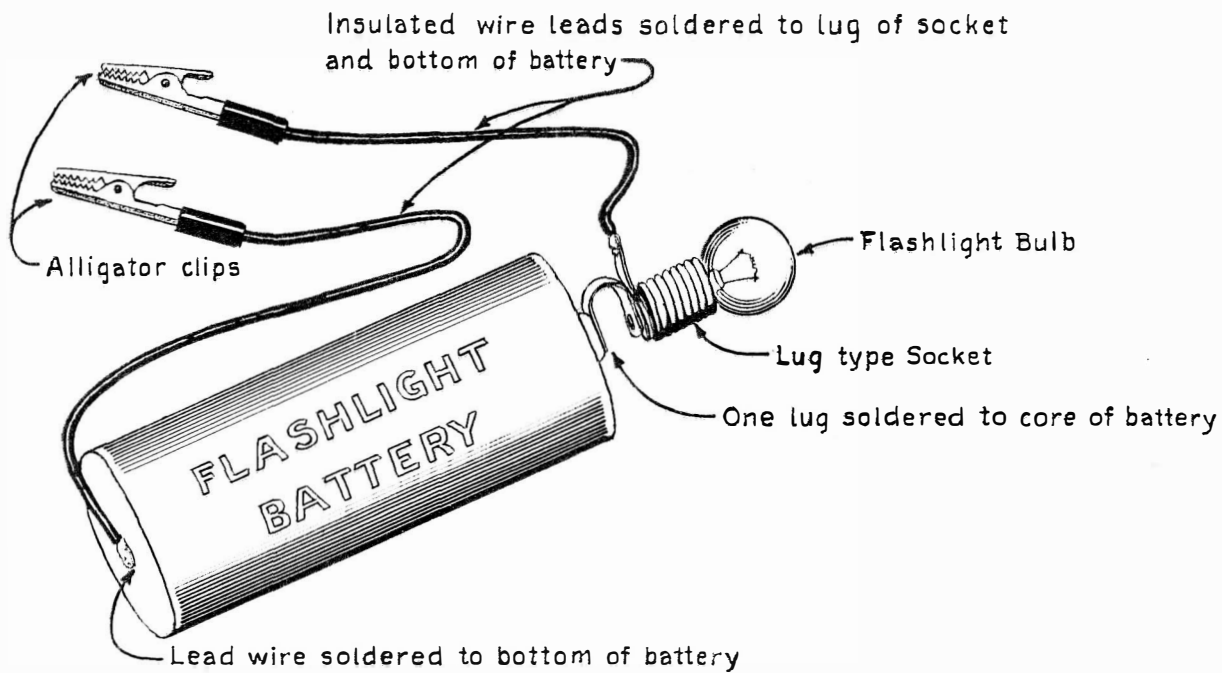
The DRIVE ARM, that moves the ratchet on the Step-up Units, should not ride more than half way up the slope of the second tooth on its return stroke. This arm should never need adjustment, however it can be changed by bending the arm slightly.

CAUTION: Excess bending of the Drive Arm will cause it to break. Check all other points thoroughly before attempting adjustments at this point.

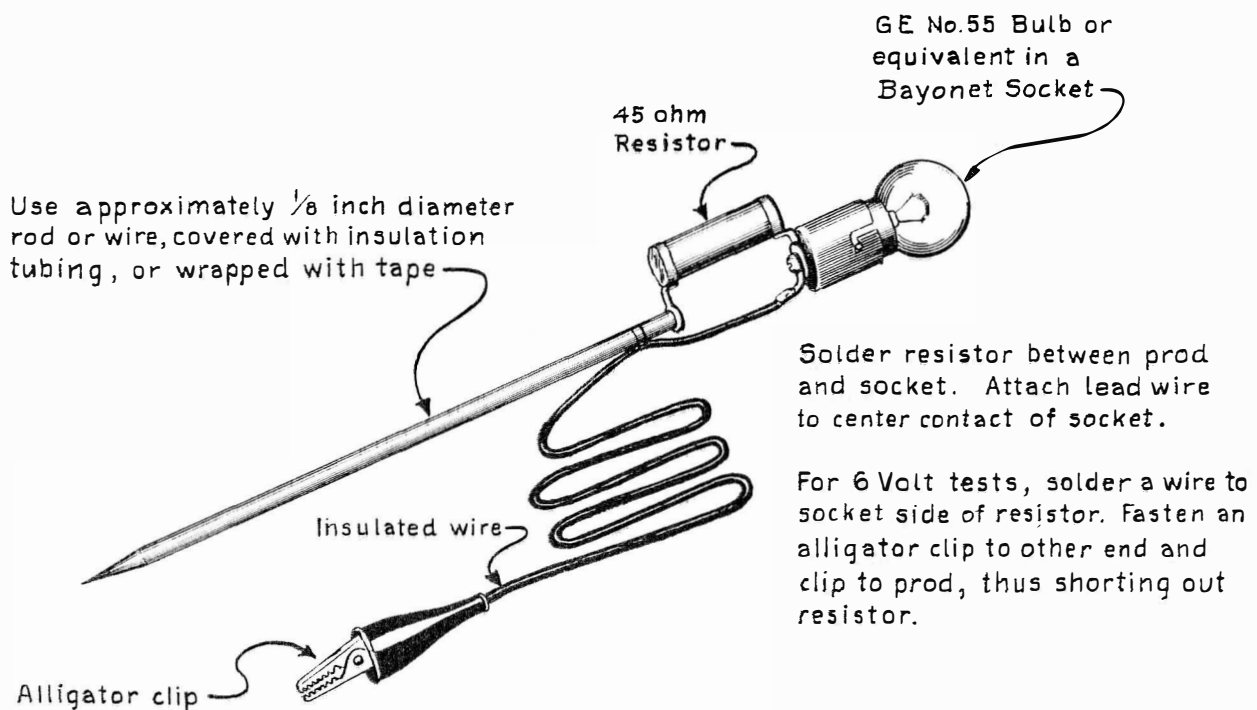
The Drive Adjustment Screw, at the solenoid end of the Drive arm, should be adjusted so that, after the unit has advanced two or three positions, there is very little play in the ratchet when manually turned in reset direction.

XIII. STEP-UP UNIT WIPER BLADE ADJUSTMENT

Where blade type Wiper Arms are used (Mixers, selector, timer, replay control) the Wiper Arm should have sufficient tension to follow the Stationary Plate for at least $1/16$ " when it is pressed toward the metal base plate of the unit.



BATTERY TEST LIGHT



What to do if:

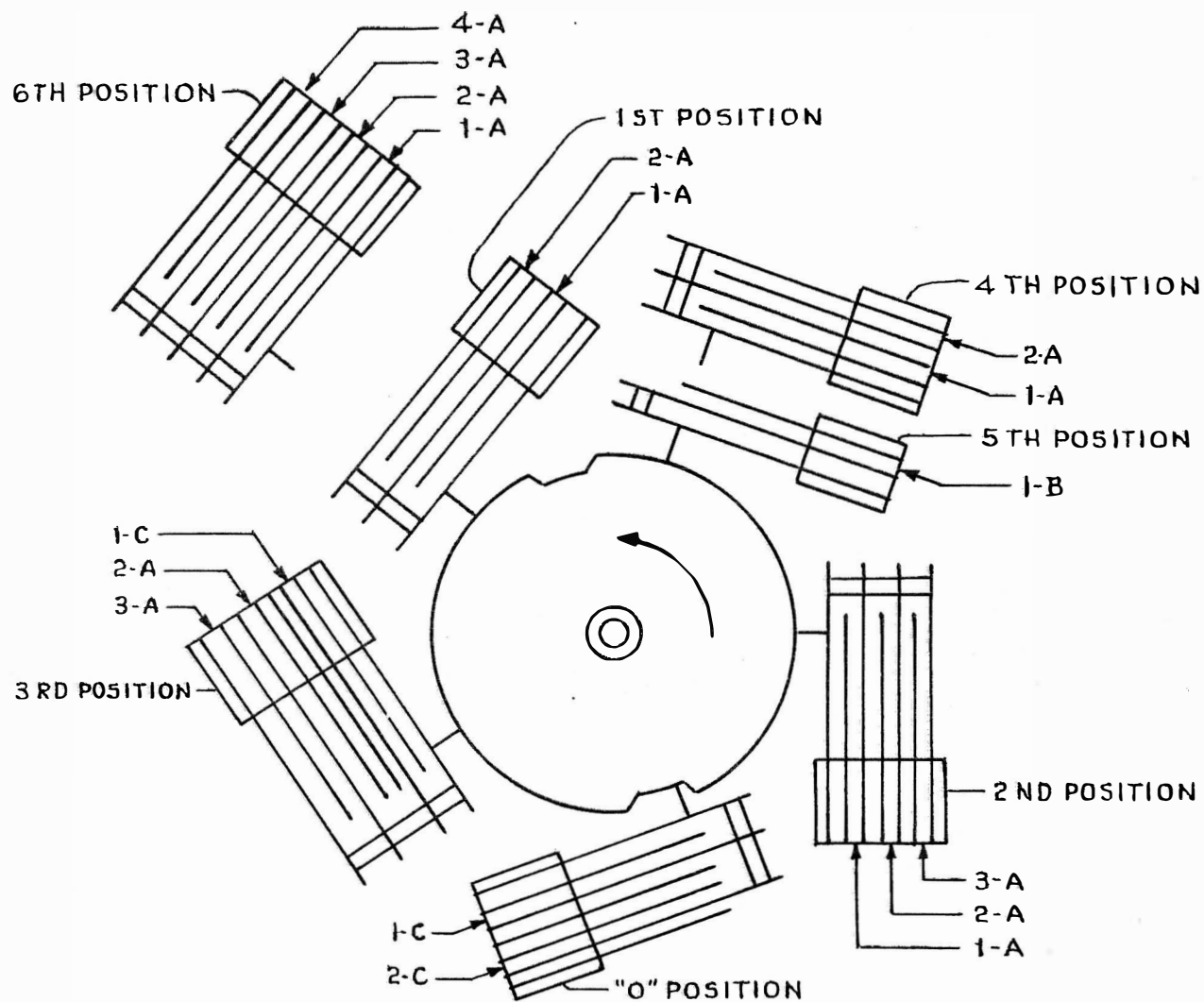
1. Lights are out, game is inoperative:
 - a. Check A. C. cord and plug for breaks, cuts or other damage.
 - b. Check fuses, located on transformer panel inside ball-lift door.
 - c. Check master switch, in cabinet bottom under right front of cabinet.
 - d. Check plugs and jacks for proper installation.
2. Lights are on, game is inoperative:
 - a. Check the 15 Amp fuse, heavy Black wire.
 - b. Check plugs and jacks.
3. Lights are out, game operates:
 - a. Check the 20 Amp fuse, heavy White wire.
 - b. Check plugs and jacks.
 - c. Check lite bulbs.
4. Number lites are out, display lites are on.
 - a. Check 10 Amp fuse, Gray-Black wire.
 - b. Check switch 2-L on Tilt Relay Gray-Black to Gray.
 - c. Check plugs and jacks.
 - d. Check bulbs.
5. Display lites lite, Flash and Feature lites do not;
 - a. Check switch 1-R on Tilt Relay, White to White-Black.
 - b. Check bulbs.
6. No Replays are shown, coin chute rejects coin.
 - a. Check coin lock-out coil, if it is not energized, check Replay Step-up Zero switch, Brown-White to White-Blue, also Sequence Zero position switch, Brown-White to Yellow.
 - b. If Coin lock-out coil is energized check coin chute for cleanliness and general maintenance.
7. Coin is accepted, game is inoperative:
 - a. Check coin switch.
 - b. Check for action of Coin Relay, if Coin Relay fails to operate, check Replay Reset Relay switch #3, Orange-White to Black.
 - c. Check Sequence Motor for proper operation, if it fails to start, check switch #2 Coin Relay, 3rd position Sequence Motor switch #1.
8. Sequence Motor operates but Shuffle Motor is inoperative:
 - a. Check connections on Shuffle Motor.
 - b. Check switch #1 on 2nd position of Shuffle Motor.
 - c. Check switch #3 on Zero position of Shuffle Motor.
 - d. Coin Relay switch #3.
9. Latch Relay Bank fails to set up;
 - a. Check connections on Relay Bank coil, Green and Brown plastic coated wires.
 - b. Check switch #3 on 1st position Shuffle Motor.
10. Lock Relay does not set up;
 - a. Check switch #1 on 1st position Sequence Motor.
 - b. Check Lock Relay switch #1.
11. Tilt Relay does not set up;
 - a. Check switch #2 on Lock Relay.
 - b. Check Timer S. U. limit switch, Red to Blue.

11. (continued)

- c. Check switch #4 Replay Reset Relay.
 - d. Check pendulum tilt.
 - e. Check shakeproof tilts, one on transformer block, one on back door near lock and one on side of lite-box.
 - f. Check Tilt Relay for mechanical locking action.
12. Card Replay Control Unit, Score S.U., Extra Ball S. U., etc. fail to reset;
- a. Check switch #1 on 1st Position of Shuffle Motor, Yellow to Orange-Green.
 - b. Check individual reset coils.
13. Replay Step-up unit fails to subtract a replay;
- a. Check Replay Step-up Zero switch - Yellow to Black-Red.
 - b. Check switch #2 on 1st position of the Sequence Motor, Black-Red to Black- Yellow.
 - c. Check switch #2 on Replay Reset Relay.
 - d. Check reset coil on Replay Step-up unit.
 - e. Check mechanical adjustment and operation of Reset assembly.
14. Flash motor fails to start;
- a. Check switch #2 on Zero position of the Sequence Motor.
 - b. Check Flash Motor connections.
 - c. Check 5th Ball Relay switch #1-L
 - d. Check Super Card Advance Relay Switch #2.
 - e. Check Extra Ball Advance Relay Switch #2.
15. Flash motor runs, extra advantage lites do not flash;
- a. Check Flash Motor Release coil switch #1.
 - b. Check switch #1 Flash Relay, Yellow to Green-white.
 - c. Check Flash Motor wiper assembly for proper adjustment.
16. Extra advantage lites flash, Extra Ball lites do not;
- a. Check switch 1-R on Extra Ball Relay - A.
 - b. Check Flash Motor wiper fingers (outer row).
17. Flash Relay does not fall out, Flash Motor continues to run; Shuffleboard opens and closes and Relay Bank resets continuously:
- a. Check coin chute switch.
 - b. Check Flash Release Coil switch #1.
 - c. Check Switch #2 Coin Relay.
 - d. Check Switch #4 Flash Relay.
18. Timer Step-up fails to reset at start of game;
- a. Check switch #2 on 1st position Shuffle Motor.
 - b. Check Timer Reset.
19. Ball Lift fails to operate;
- a. Check motor connections.
 - b. Check Switch #1 Zero position Ball Lift Motor.
 - c. Check 1st, 5th, 6th and 7th Ball Trough switches.
 - d. Check Timer Step-up Zero switch (Yellow-black to Yellow-Red).
20. Score unit fails to step up on second play;
- a. Check Score unit for free operation.
 - b. Check Wiper Contacts on disc.
 - c. Check Switch #1 Score Advance Relay (Black-White to Gray-Red).
 - d. Check Switch #3-R Extra Ball Relay (Gray-Red to Green-Yellow).

21. Super Cards are never lit;
 - a. Check Super Card lights (White 6-v. Bulbs).
 - b. Check wipers on Super Card Step-up Disc and contact rivets (White-Brown and Black-White connections).
22. Special Cards are never lit;
 - a. Check Switch #2 Left Special Card Relay.
 - b. Check Switch #2 Right Special Card Relay.
 - c. Check Special Card lights (White 6-v. Bulbs).
23. Selection Feature never lit;
 - a. Check Selection Feature light bulbs, 6-V.
 - b. Check Switch #1-L Selection Feature Relay "B," (Orange-Black to Yellow).
24. Selection Knob inoperative;
 - a. Check Switch 1-R Selection Feature Relay "A".
 - b. Check operation of Selector Release Coil.
 - c. Check Switch 1-L Selection Feature Relay "B".
 - d. Check Switch 1 Selector Lock Relay.
25. Main Card winner fails to score;
 - a. Check Scan motor disc for loose wire.
 - b. Check Scan wiper blades for proper tension.
 - c. Check Row relays for proper adjustment.
 - d. Check for loose wire or bad contact on Score S. U. Disc.
 - e. Check for loose wire or bad contact on Card Replay Control S. U.
26. Super Card winner fails to score;
 - a. Check for loose wire or bad contacts on Super Card S. U. disc.
 - b. See number 25 above, a, b, c, d, and e.
27. Special Card winner fails to score;
 - a. Check switch #3 on L or R Special Card Relay
 - b. See number 25 above, a, b, c, d, and e.
28. Main Card Corners fail to score when Corners panel is lit;
 - a. Check Switch 2-L on Corners Relay.
 - b. See number 25 above, a, b, c, d, and e.
29. Super Card Corners fail to score;
 - a. See number 26 above.
30. Replays score incorrectly;
 - a. Check impulse switches on Impulse motor; see wiring diagrams for correct switches on any given score position.
 - b. Check for loose wire or poor contact on Card Replay Control S. U.
 - c. Check Switch #1, Replay Relay (yellow to white-orange).
 - d. Check Switch #2 on 3, 4 or 5 numbers win relay, (yellow to red-black).
 - e. Check Switch #1, Zero Position Scan Motor (red-black to white-brown).

A = MAKE SWITCH
 B = BREAK SWITCH
 C = MAKE-BREAK SW.

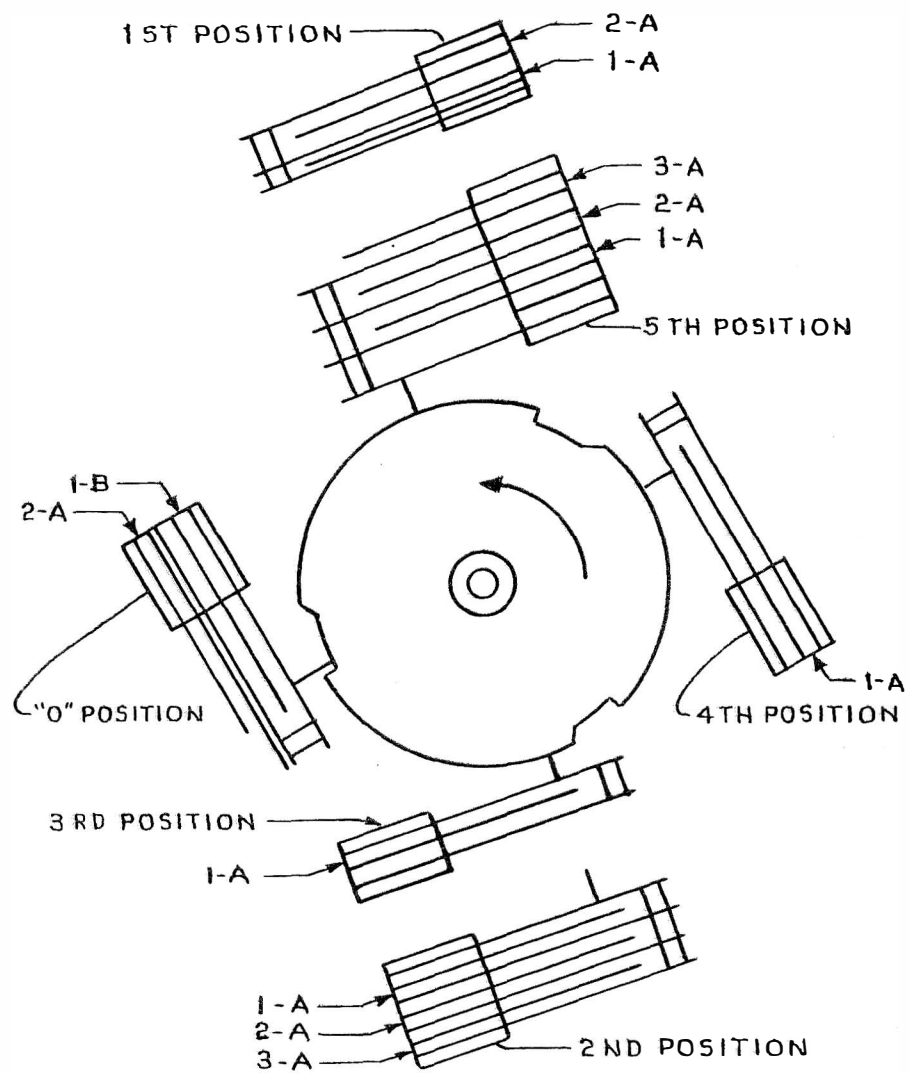


SEQUENCE MOTOR

SEQUENCE MOTOR

Switch	Diagram Location	Wire Color	Operation
Zero Position			
	2-B	Red-Black	Operates Sequence Motor - Opens circuit to Extra Ball Push Button Switch.
1-C	5-B	Jumper Brown	
	1-B	Brown- White	Opens circuit to Coin Lock-out-coil - Operates Flash Motor.
2-C	12-B	Yellow Orange- White	
1st Position			
		Black	Operates Lock Relay.
1-A	11-D	Black- White	
		Black-Red	Resets Replay Step-up Unit.
2-A	3-B	Black- Yellow	
2nd Position			
		Blue-Black	Operates Flash Motor Release coil.
1-A	6-B	Yellow	
		Yellow	Operates #1 Reflex Step-up.
2-A	14-B	Blue-Red	
		Black	Controls Lock Relay.
3-A	10-D	Red	
3rd Position			
		Jumper	Controls operation of Sequence Motor.
1-C	4-B	Jumper Yellow-Green	
		White-Red	Controls feed to Super Card Step-up.
2-A	22-F	White-Green	
		Red- White	Controls Score Step-up and Extra Ball Step-up.
3-A	21-F	Brown	
4th Position			
		Jumper	Controls feed to Selection Feature Relay.
1-A	15-F	Orange- White	
		Jumper	Controls operation of Sequence Motor.
2-A	4-C	Yellow-Red	
5th Position			
		Black-Green	Controls Coin Relay and Extra Ball Push Button Relay.
1-B	2-B	Yellow	
6th Position			
		Brown-Red	Controls operation of Extra Ball Circuit.
1-A	19-F	Brown-Black	
		Yellow-Green	Controls operation of Score Advance Relay.
2-A	20-E	Yellow-Red	
		Red-Green	Controls operation of Super Card Step-up.
3-A	22-F	White-Green	
		Green- White	Operates #1 Reflex Step-up through Adjustment Plug.
4-A	14-B	Blue-Red	

A = MAKE SWITCH
 B = BREAK SWITCH
 C = MAKE-BREAK SW.



REPLAY IMPULSE MOTOR

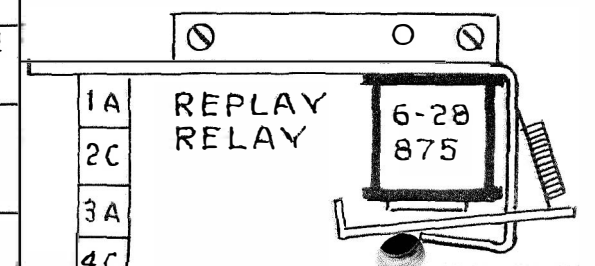
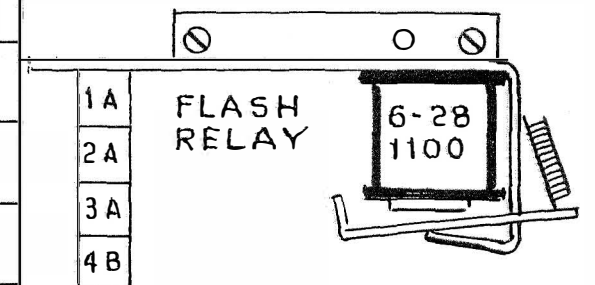
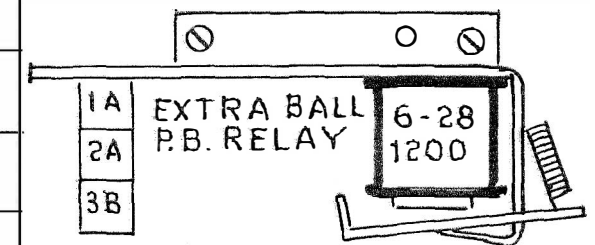
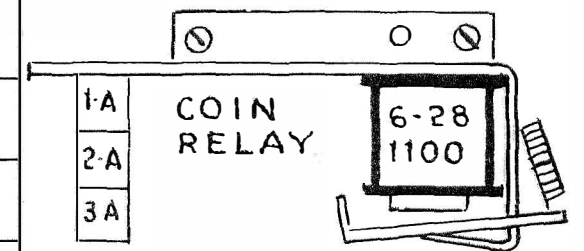
REPLAY IMPULSE MOTOR

Switch	Diagram Location	Wire Color	Operation
Zero Position	5-C	Brown-Black Blue- White	Controls operation of Scan Motor
1-B			
2-A	5-B	Blue- Yellow Yellow	Runs Replay Impulse Motor
1st Position	15-C	Orange-Green Orange	Operates Card Replay Control Step-up on 3rd, 4th and 7th Position of Score Step-up.
1-A			
2-A	14-C	White-Red Jumper	Operates #1 Reflex Step-up through Adjustment Plug.
2nd Position	16-C	Brown- Yellow White-Red	Operates #1 Reflex Step-up through Adjustment Plug.
1-A			
2-A		Red-Green Jumper	Operates Card Replay Control Step-up on 8th position of Score Step-up.
3-A		Jumper Orange	Operates Card Replay Control Step-up on 3rd, 4th, and 7th position of Score Step-up.
3rd Position	16-C	Orange-Green Brown-Red	Operates Card Replay Control Step-up on 5th and 6th position of Score Step-up.
1-A			
4th Position	16-C	Orange-Green Brown-Red	Operates Card Replay Control Step Up on 5th and 6th position of Score Step-up.
1-A			
5th Position	15-C	Jumper Blue- White	Operates Card Replay Control Step-up on "0", 1st, and 2nd position of Score Step-up.
1-A			
2-A		White-Orange Brown- Yellow	Operates Replay Step-up.
3-A		Green-Black Yellow	Operates Replay Step-up Reset coil through Replay Reset Relay.

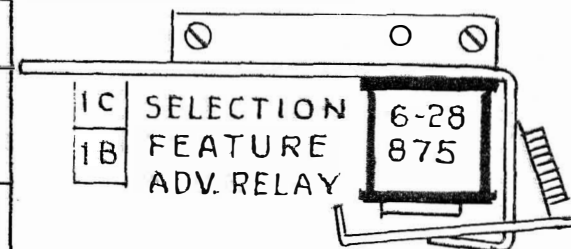
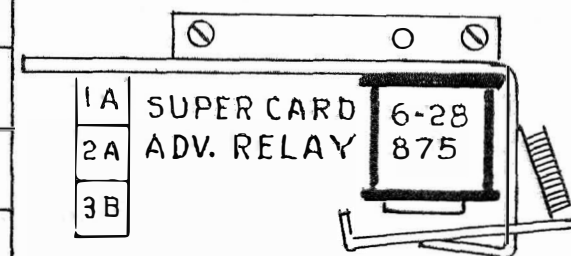
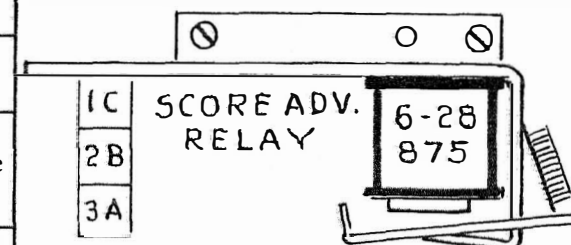
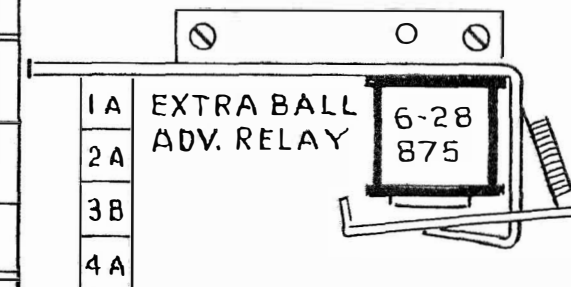
CONTROL RELAYS

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Diagram Location	Wire Color	Operation
2-D	Orange-White Jumper	Drop Chute Switch energizes coil.
2-B	Blue-White Black-Green	Lock-in Switch for this Relay.
4-B	Jumper Jumper	Starts Sequence Motor operation.
7-B	Green-Yellow Jumper	Starts Shuffle Motor operation.
2-D	Jumper Green-Black	Extra Ball Push Button Switch energizes coil.
2-B	Brown-White Orange-Red	Lock-in Switch for this Relay.
21-A	Jumper Brown-Yellow	Lites "Extra Ball" panel.
7-C	Jumper Gray-Yellow	Opens Shuffle Motor circuit.
1-D	Black Red-Yellow	Flash Motor Release Coil Switch #1 energizes coil.
11-A	Jumper Green-White	Feeds 6 volt Flash circuit.
21-B	Jumper Green	Feeds Flash Motor Mixer Step Up pulse line.
13-A	Red-Blue Gray-Black	Feeds Flash Motor, flashing Score lights.
5-B	Brown Jumper	Sequence Motor timing circuit.
13-D	Red White-Brown	Scan Motor Switch #1 Zero position, energizes coil.
15-A	Yellow White-Orange	Feeds Replay Impulse motor switches to pulse Card Replay Control Step Up.
5-B	Blue-Yellow White-Brown Orange-Red	Starts Replay Impulse motor; stops Scan motor.
	White-Red	

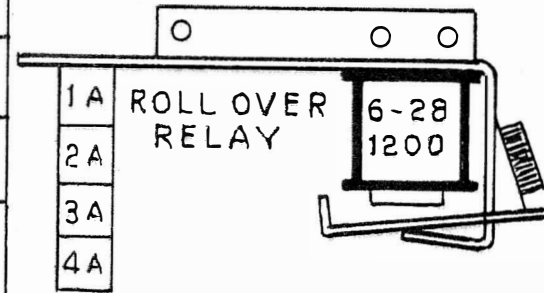


13-E	Brown-Red Red-White Brown	Feeds #2 Reflex Step-up coil or Reset Coil
19-E	Red Jumper	Extra Ball Step Up End of Stroke Switch energizes coil.
22-F	Jumper Gray-White	Feeds Pulse line from Flash Motor Switch to Extra Ball Step Up.
12-C	Jumper Jumper	Starts Flash Motor.
5-B	Yellow-Blue Jumper	Opens Sequence Motor Run circuit.
19-E	White-Brown White-Red	Lock-in Switch for this Relay.
21-E	Red Jumper	Score Step-up End of Stroke Switch energizes coil.
21-F	Jumper Gray-Red Black-White	Feeds Pulse line from Flash Motor Switch to Score S.U.; disconnects Score S.U. disc line.
5-B	Jumper Jumper	Opens Sequence Motor Run circuit.
20-E	Yellow-Black Yellow-Green	Lock-in Switch for this Relay.
24-E	Red Orange-White	#4 Mixer Disc energizes coil.
22-F	Jumper Red-Green	Feeds Pulse line from Flash Motor Switch to Super Card Step Up.
13-B	Jumper Orange-White	Starts Flash Motor.
5-C	Jumper Jumper	Opens Sequence Motor Run Circuit.
23-E	Red Green-Yellow	#4 Mixer Disc energizes coil.
22-F	Black-Green Green-Yellow Green-Black	Feeds Pulse line from Flash Motor Switch to Selection Feature Step-up; disconnects Selection Feature Step Up disc line.
5-C	Jumper Yellow-Red	Opens Sequence Motor Run circuit.

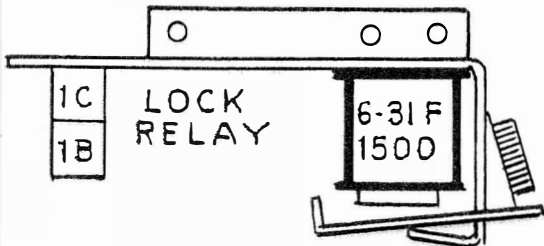
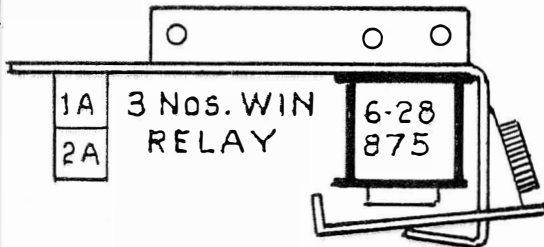
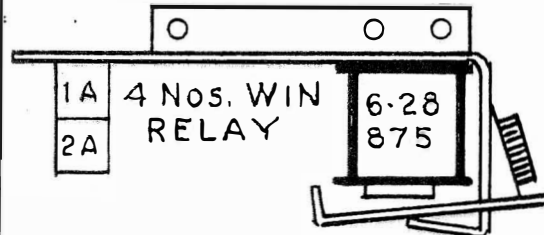
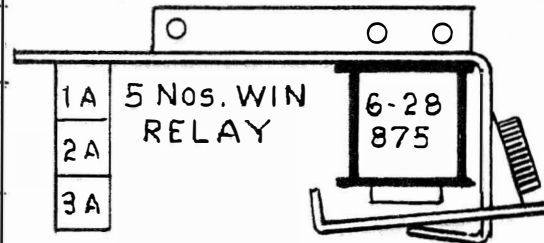


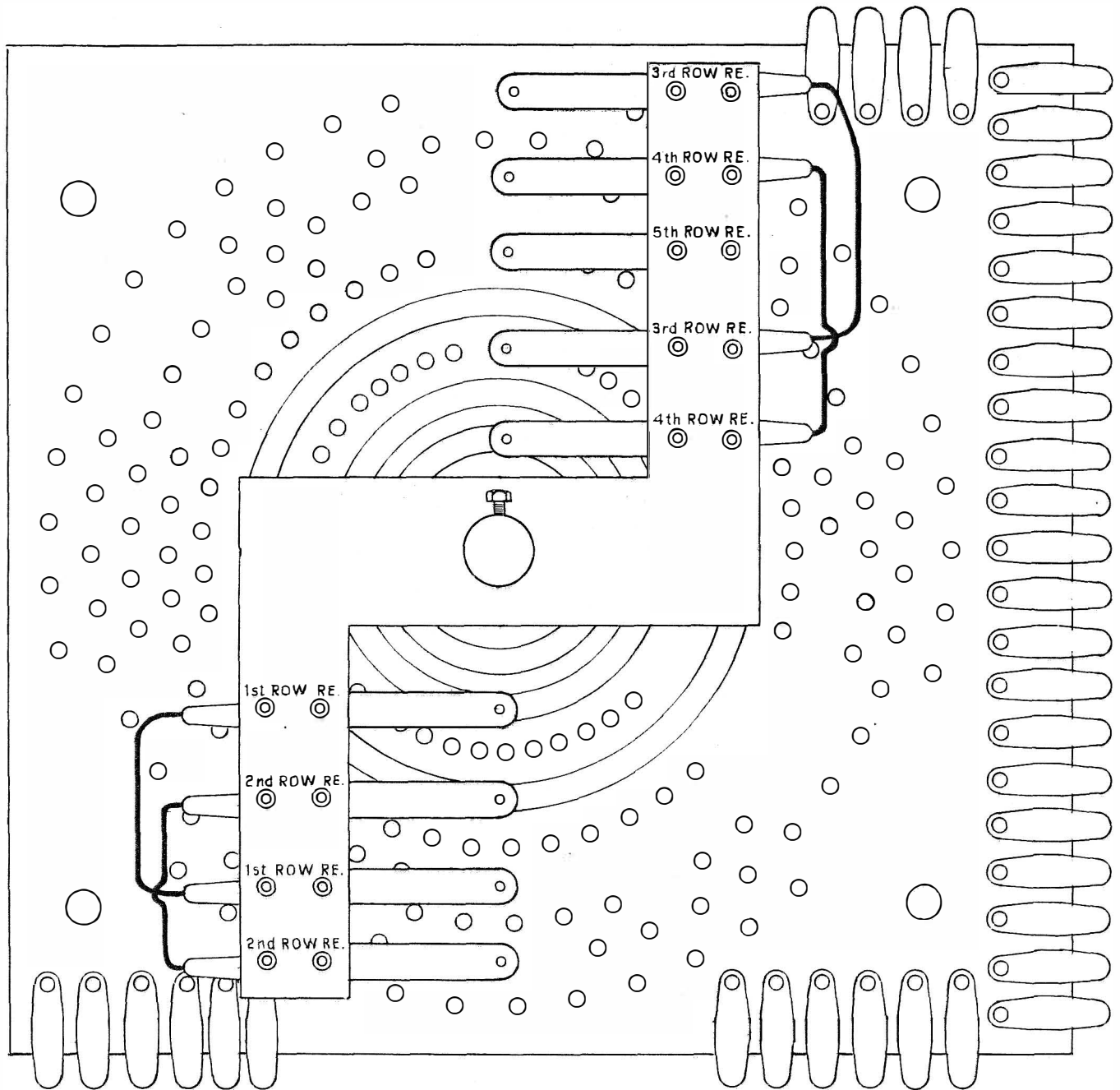
SCORE CONTROL RELAYS

Diagram Location	Wire Color	Operation
14-D	Red Yellow-Green	Playfield Rollover Switch energizes coil.
14-B	White-Blue Yellow	Lock-in Switch for this Relay.
6-C	Brown-Black Orange-Red	Starts Scan Motor when 5th Ball Relay is tripped.
8-C	Red-Green Black-Red	Starts Ball Lift Motor, fed from series trough switches.
7-C	Yellow-Green Blue-Red	Trips 5th Ball Relay when Timer Step Up is on 4th or 5th position.
19-D	Red Jumper	Row Relays energize coil.
19-D	Jumper Black-Yellow	Lock-in Switch for this Relay.
13-B	Jumper Jumper	Feeds Scan Motor Switch to energize Replay Relay
18-C	Jumper Jumper	8th Score Position, 5 numbers win replay circuit pick up.
18-D	Red Jumper	Row Relays energize coil.
18-D	Yellow-Red Gray-Yellow	Lock-in Switch for this Relay.
13-D	Red-Black Jumper	Feeds Scan Motor Switch to energize Replay Relay.
17-D	Red Jumper	Row Relays energize coil.
17-D	White-Green Blue-Yellow	Lock-in Switch for this Relay.
13-B	Jumper Jumper	Feeds Scan Motor Switch to energize Replay Relay.
12-D	Yellow Jumper	Sequence Motor Switch #1, 1st position energizes coil.
12-D 3-D	Black-White Black Black-Yellow	Lock-in Switch for this relay. Energizes Replay Reset Trip Relay in normal position.
12-D	Red Green	Energizes Tilt Trip Relay.



FOR ROW RELAYS -
SEE CHART IN-LINE
SCORES.



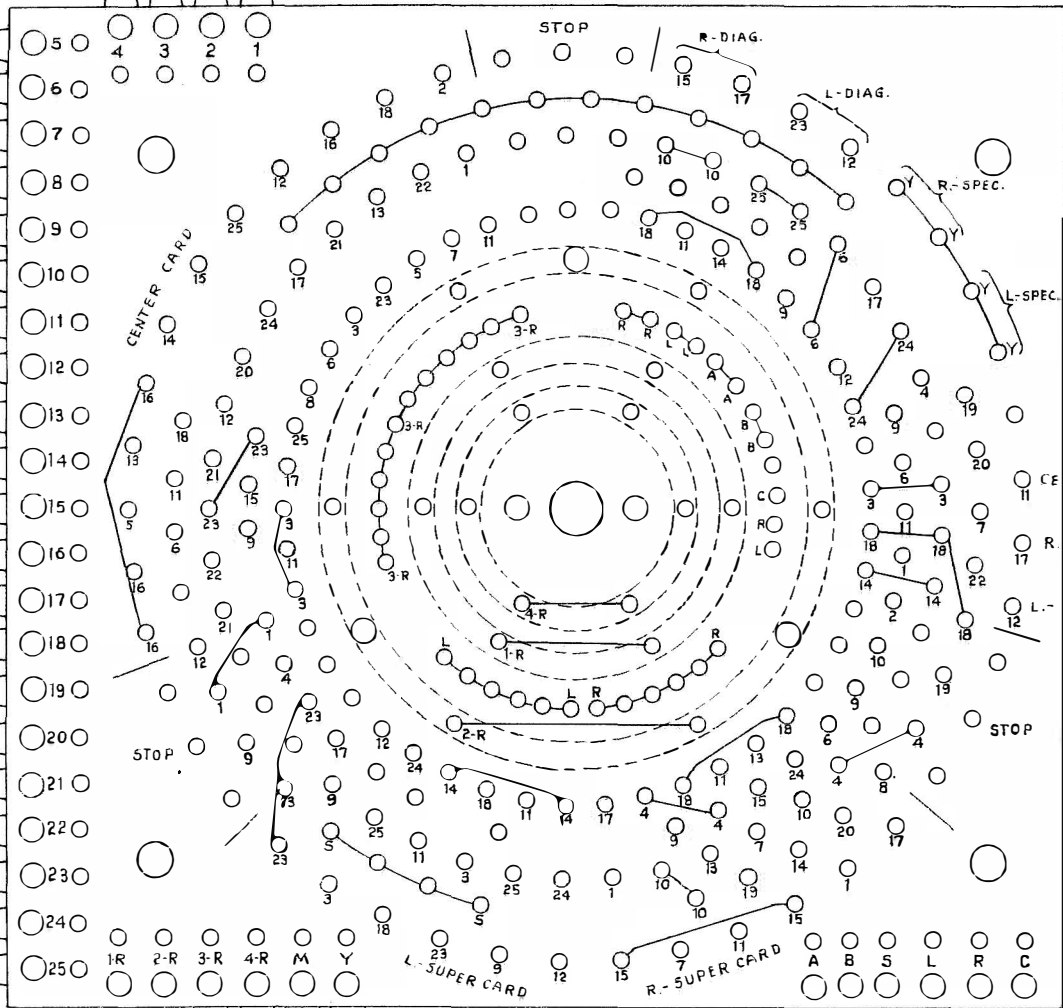


Wipers should be set in vertical position. Set screw tightened on flat of shaft. Cams on opposite end of shaft should be indexed with set screw on flat of shaft. Sketch shows wiper arrangement to feed corresponding Row Relays.

SCAN MOTOR WIPERS

FEED LINES FROM PLAYFIELD HOLE SWITCHES

FEED LINES FROM PLAYFIELD HOLE SWITCHES



SCAN DISC

VIEWED FROM THE SOLDERING SIDE

Feed line for 1st Row Relay

" " 2nd "

" " 3rd "

" " 4th "

Scan motor run lines

3rd Row Re. feed line thru R. Spec. C. Re.

" " " Left " " "

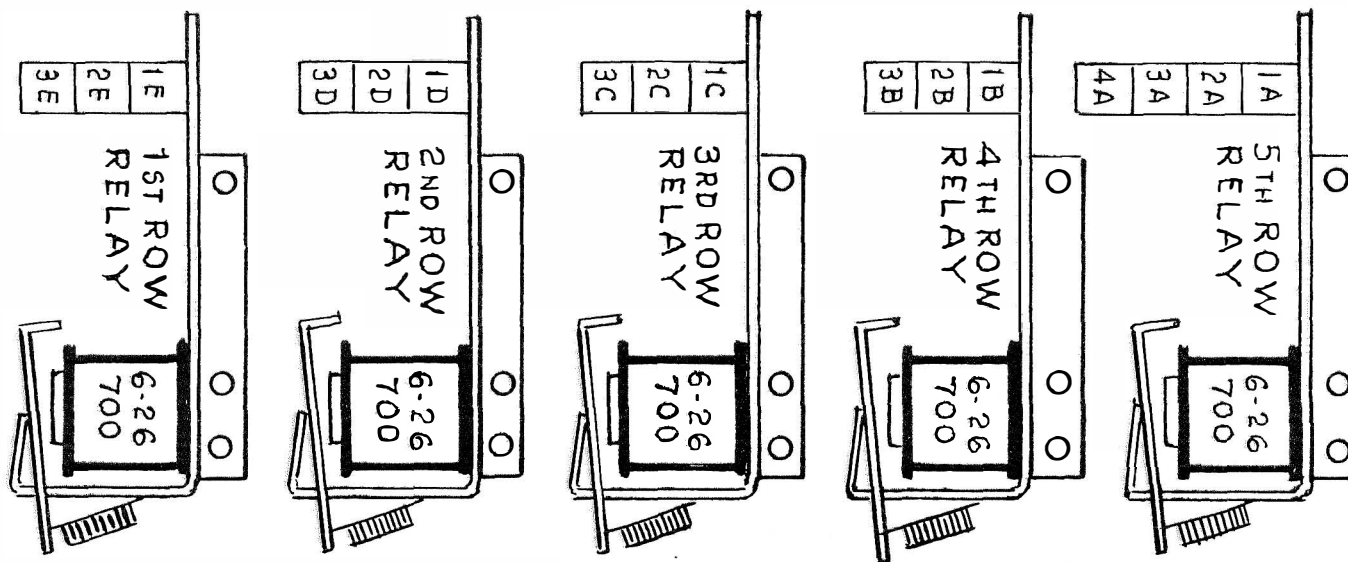
Operates 2nd Row Re. on Super Card pos.

3rd Row Re. feed line thru Super Card disc

" " " " " "

" " " " " "

Center Card corners Re. Y-R



IN LINE SCORES

3 IN-LINE SCORES THROUGH SWITCHES

2-C
3-C
3-D
1-E
1-C
3-C
3-B
1-A
1-C
2-C
3-C
1-B
1-D

4-IN-LINE SCORES THROUGH SWITCHES

1-C
2-C
3-C
2-B
3-D
2-E
1-C
2-C
3-C
2-A
3-B
2-D

5 IN-LINE SCORES THROUGH SWITCHES

1-C
2-C
3-C
3-A
3-B
3-D
3-E

CODE

All switches normally open.

Number indicates switch build-up from Frame.

Letter indicates Relay.

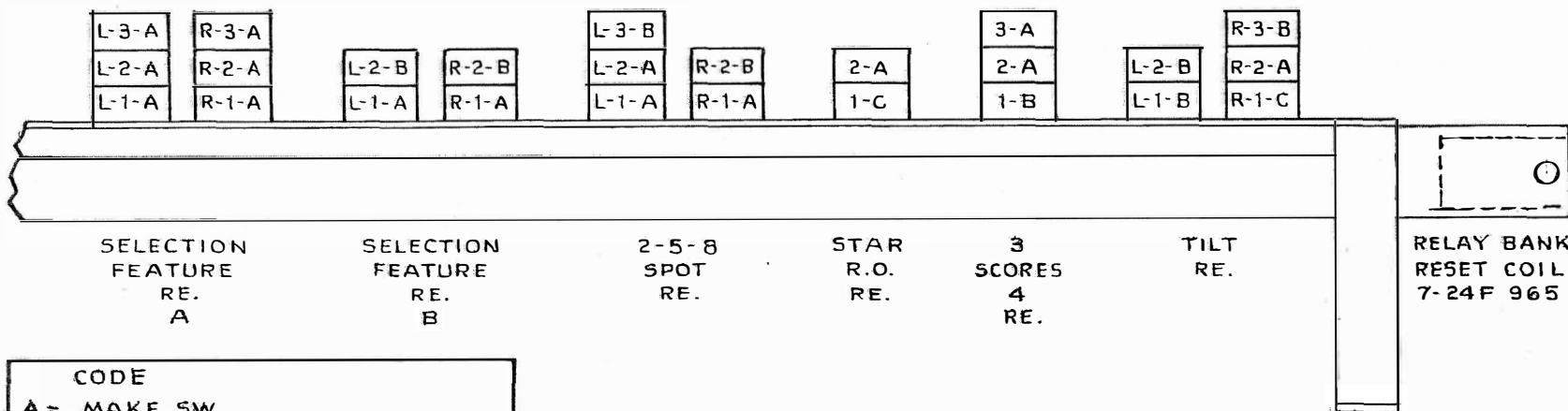
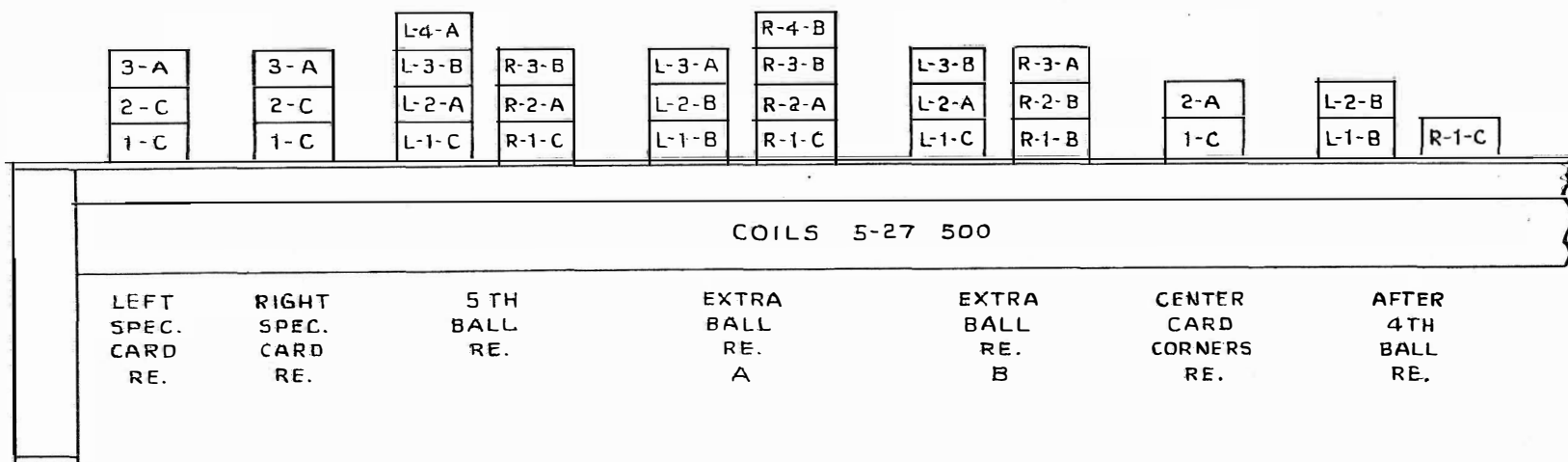
A	-	5th Row Relay
B	-	4th Row Relay
C	-	3rd Row Relay
D	-	2nd Row Relay
E	-	1st Row Relay

REPLAY IMPULSE MTR CAM SW'S.	5TH POSITION SW - 1		1ST POS. SW- 1 2ND POS. SW- 3		3RD POS. SW- 2 4TH POS. SW- 1		1ST POS. SW.1 2ND POS. SW.3	2ND POS. SW- 2
5 IN LINE	96	96	100	100	150	150	192	300
	96	96	50	50	50	50	96	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
REPLAY S.U. REPLAY CONTROL S.U.	$\frac{1}{1}$		$\frac{2}{1}$		$\frac{3}{1}$		$\frac{2}{1}$	$\frac{4}{1}$

Large numbers are replay scores shown on back glass.

Numbers in corner panels indicate number of steps pulsed on Replay Control S.U.

NOTE: 96 steps is effective thru 96th position switch on Replay Control S.U. All others on Replay Control S.U. disc.



CODE

A = MAKE SW.
 B = BREAK SW.
 C = MAKE-BREAK SW.
 L = LEFT
 R = RIGHT

EXAMPLE
 5TH BALL RE.

L-1-C
 LEFT SW. STACK — ↑ — MAKE-BREAK SW.
 1ST SW. UP FROM FRAME

TRIP RELAY BANK

RELAY BANK RELAYS

Switch	Diagram Location	Wire Color	Operation
Left Special Card Coil	27-E	Jumper Jumper	#4 Mixer Disc energizes coil.
1-C	27-F	Green-Black Jumper Yellow-Blue	Completes circuit for Right Special Card Relay when tripped.
2-C	21-A	Jumper Brown-White Gray-White	Lights Left Special Card light panel.
3-A	11-F	Jumper Gray-Black	Completes circuit from Scan Motor Disc to operate 3rd Row Relay.
Right Special Card Coil	27-E	Jumper Jumper	#4 Mixer Disc energizes coil through Left Special Card Relay, switch #1.
1-C	27-F	Green-Red Jumper Jumper	Break Switch for this Relay.
2-C	13-A	Jumper Brown-Black Red-White	Lights Right Special Card light panel.
3-A	11-F	Jumper Black-White	Completes circuit from Scan Motor Disc to operate 3rd Row Relay.
5TH Ball Coil	7-D	Jumper Jumper	Timer Step Up energizes coil on 4th or 5th step.
L-1-C	13-C	Black-Green Jumper Orange-White	Switches Timer pulse circuit from 1st position Ball Lift Motor Switch #1 to 2nd Position Scan Motor Switch #1.
L-2-A	2-C	Jumper Green-Black	Completes circuit for Extra Ball Push Button Relay.
L-3-B	11-A	Jumper Blue-White	Stops "Select Now" light flashing.
L-4-A	8-D	Black-Red Yellow-Black	Completes circuit to Ball Lift Motor on Extra Ball play.

RELAY BANK RELAYS - Continued

Switch	Diagram Location	Wire Color	Operation
R-1-C	5-B	White-Brown Jumper Jumper	Switches feed from Selector Release Coil to Scan Motor.
R-2-A	19-D	Jumper Red-White	Completes feed to Selector Unit Disc.
R-3-B	7-C	Jumper Blue-Red	Break Switch for this Relay.
Extra Ball Coil	8-D	Jumper Jumper	4th position on Timer Step up energizes coil.
L-1-B	8-C	Jumper Jumper	Break Switch for this Relay.
L-2-B	14-A	Gray- Yellow Gray-Black	Breaks circuit to Flash Motor Disc feeding Score lights.
L-3-A	21-F	Yellow-Blue Gray- White	Completes circuit to Extra Ball Step-up coil.
R-1-C	12-A	Black-Red Green- White Red-Blue	Switches flash circuit from Feature lights to Extra Ball lights.
R-2-A	6-C	Blue-Black Orange-Red	Completes circuit to reset Timer Step up on Extra Ball play.
R-3-B	21-F	Gray-Red Green- Yellow	Breaks circuit to Score Step up coil.
R-4-B	22-G	Brown- White White-Red	Breaks circuit to Super Card Step-up coil.
Extra Ball Coil	8-D	Jumper Jumper	4th position on Timer Step up energizes coil.
L-1-C	18-F	Jumper Blue- Yellow Jumper	Switches feed line from #4 mixer to #3 mixer for Extra Ball play.

RELAY BANK RELAYS - Continued

Switch	Diagram Location	Wire Color	Operation
L-2-A	17-F	Jumper Blue-Red	Controls feed line on 1st Score position for Extra Ball play.
L-3-B	27-E	Jumper Jumper	Breaks circuit to Star Rollover Relay, After 4th Ball Relay and Selection Feature Relay.
R-1-B	8-C	Jumper Jumper	Break Switch for this Relay.
R-2-B	16-A	Jumper Orange-Red	Breaks circuit to Flash Motor Disc feeding Selection lights.
R-3-A	17-F	Red-White White-Blue	Single step pulse circuit for Extra Ball Step up.
Center Card Corners Coil	26-E	Jumper Yellow-Blue	#4 Mixer energizes coil.
1-C	13-A	Jumper White-Blue Gray-Red	Lights Corners panel light.
2-A	11-G	Green-Red Yellow-Red	Completes circuit from Scan Motor Disc to operate 3rd Row Relay.
After 4th Ball Coil	26-E	Jumper Jumper	#4 Mixer, through Selection Feature Relay Switch #1, energizes coil.
L-1-B	7-B	Brown-White Red-Black	Opens circuit to "5th Ball Relay" until the 4th ball is shot.
L-2-B	11-A	Jumper Blue-Black	Breaks circuit from Timer Step-up to flash "Select Now" after 4th ball is shot.
R-1-C	16-A	Green-White Orange-Green Gray-White	Switches "Before 4th Ball" to "Before 5th Ball" light panel.
Selection Feature Coil	25-E	Jumper Jumper	#4 Mixer Disc energizes coil.
L-1-A	25-F	Jumper Blue-White	Completes circuit from #4 mixer disc to "After 4th Ball Relay"

RELAY BANK RELAYS - Continued

Switch	Diagram Location	Wire Color	Operation
L-2-A	11-A	Blue- Yellow Jumper	Completes circuit to flash "Select Now" panel.
L-3-A	19-D	Jumper Jumper	Completes circuit to Selector Unit Disc for Selection Features.
R-1-A	6-C	Jumper Orange-Red	Energizes "Selector Release Coil".
R-2-A	23-F	Green- Yellow Yellow-Red	Completes circuit from "Selection Feature Step-up Disc to Selection Feature Advance Relay."
R-3-A	23-F	Yellow-Red Yellow-Black	Completes circuit from #4 Mixer Disc to "Selection Feature Advance Relay".
Selection Feature Coil	25-E	Blue- Yellow Jumper	#4 Mixer Disc energizes coil.
L-1-A	19-A	Jumper Orange-Black	Completes circuit to light "Selection Features".
L-2-B	19-G	Jumper White-Red	Controls circuit to Score Step up and "Extra Ball Step up".
R-1-A	6-E	Jumper Yellow-Green	Completes circuit to Selector Disc to light red lights.
R-2-B	20-F	Jumper Yellow-Blue	Controls circuit to Score Step-up and Extra Ball Step-up.
2-5-8 Spot Coil	20-D	Jumper Jumper	Left and Right Rollover Switches energize coil when Star Relay is tripped.
L-1-A	2-E	Jumper White-Green	Lights #2 Card number.
L-2-A	2-E	Jumper White-Brown	Lights #5 Card number.
L-3-B	19-F	Brown-Black Brown-Red	Controls feed for Extra Ball Step-up.

RELAY BANK RELAYS - Continued

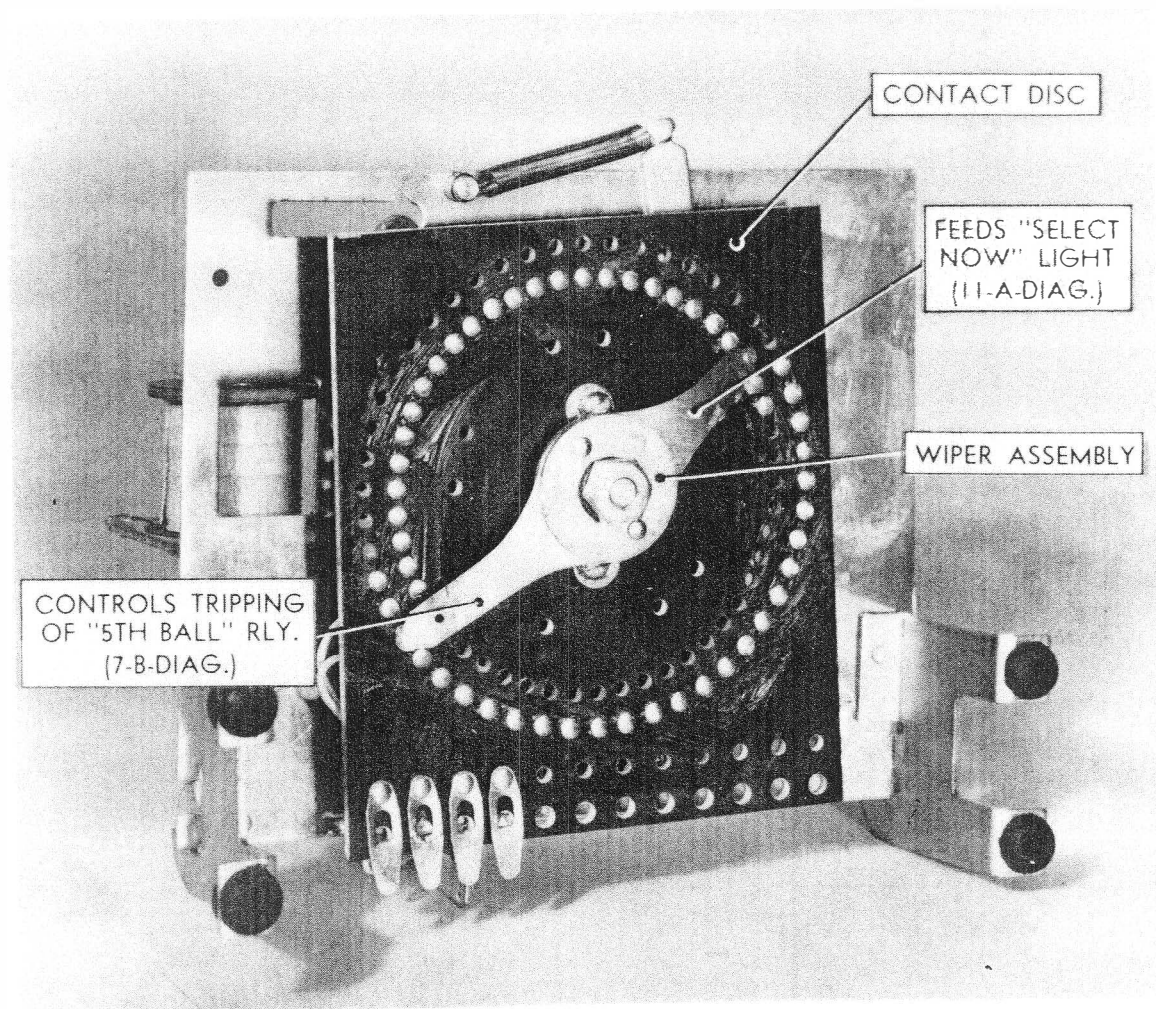
Switch	Diagram Location	Wire Color	Operation
R-1-A	3-E	Jumper Yellow-Red	Lights #8 Card number.
R-2-B	20-C	Jumper Jumper	Break Switch for this Relay.
Star Roll-over Coil	26-E	Yellow-Red Jumper	#4 Mixer Disc energizes coil.
1-C	12-A	Jumper White-Orange Jumper	Lights Star lights on Playfield & Backglass.
2-A	20-C	Black-Red Jumper	Completes circuit from Rollovers to 2-5-8 Spot Relay.
3 Scores 4 Coil	26-E	Jumper Jumper	Selector Unit Disc energizes coil.
1-B	24-E	Jumper Brown-Black	Break Switch for this Relay.
2-A	19-A	Jumper Orange-Red	Lights "3 In-Line Scores 4 In-Line" panel.
3-A	17-D	Green-Red White-Green	Energizes 4 Numbers Win Relay with 3 Numbers Winner.
Tilt Coil	12-D	Green Jumper	Lock Relay, Shakeproof Tilts, Pendulum Tilt, etc. energize coil.
L-1-B	2-C	Jumper Orange-Black	Breaks circuit to Extra Ball Push Button Relay.
L-2-B	11-E	Black Red	Breaks 30 volt circuits when this Relay is tripped.

RELAY BANK RELAYS - Continued

Switch	Diagram Location	Wire Color	Operation
R-1-C	9-A	White-Green White White-Black	Breaks 6 volt circuits and lights Tilt panel when this relay is tripped
R-2-A	7-B	Yellow Green-Yellow	Runs Shuffle Motor to Zero position if relay is tripped with Shuffleboard in UP position.
R-3-B	1-G	Gray-Black Gray	Breaks 17 volt circuits when this Relay is tripped.

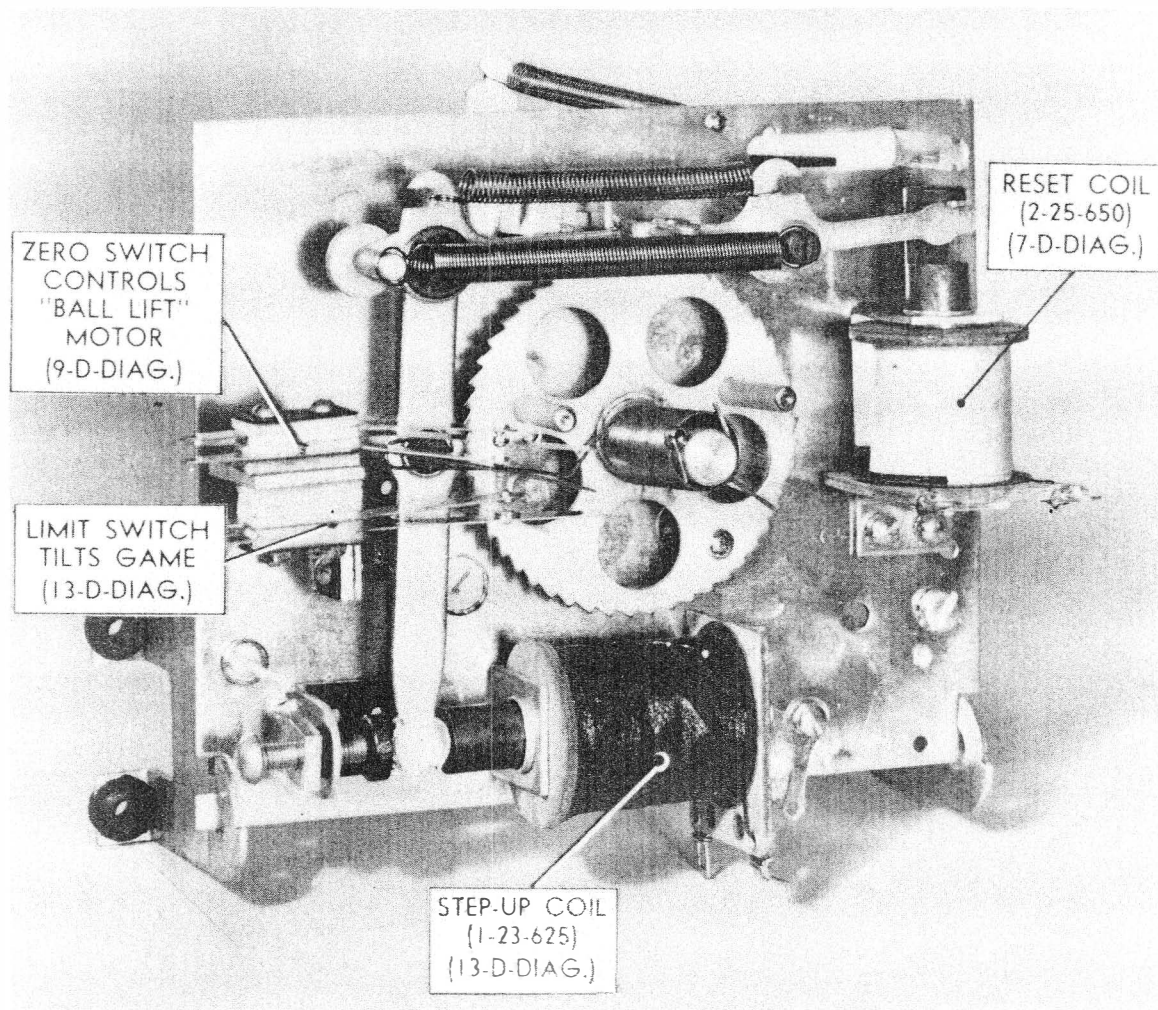
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TIMER STEP-UP UNIT—WIPER SIDE



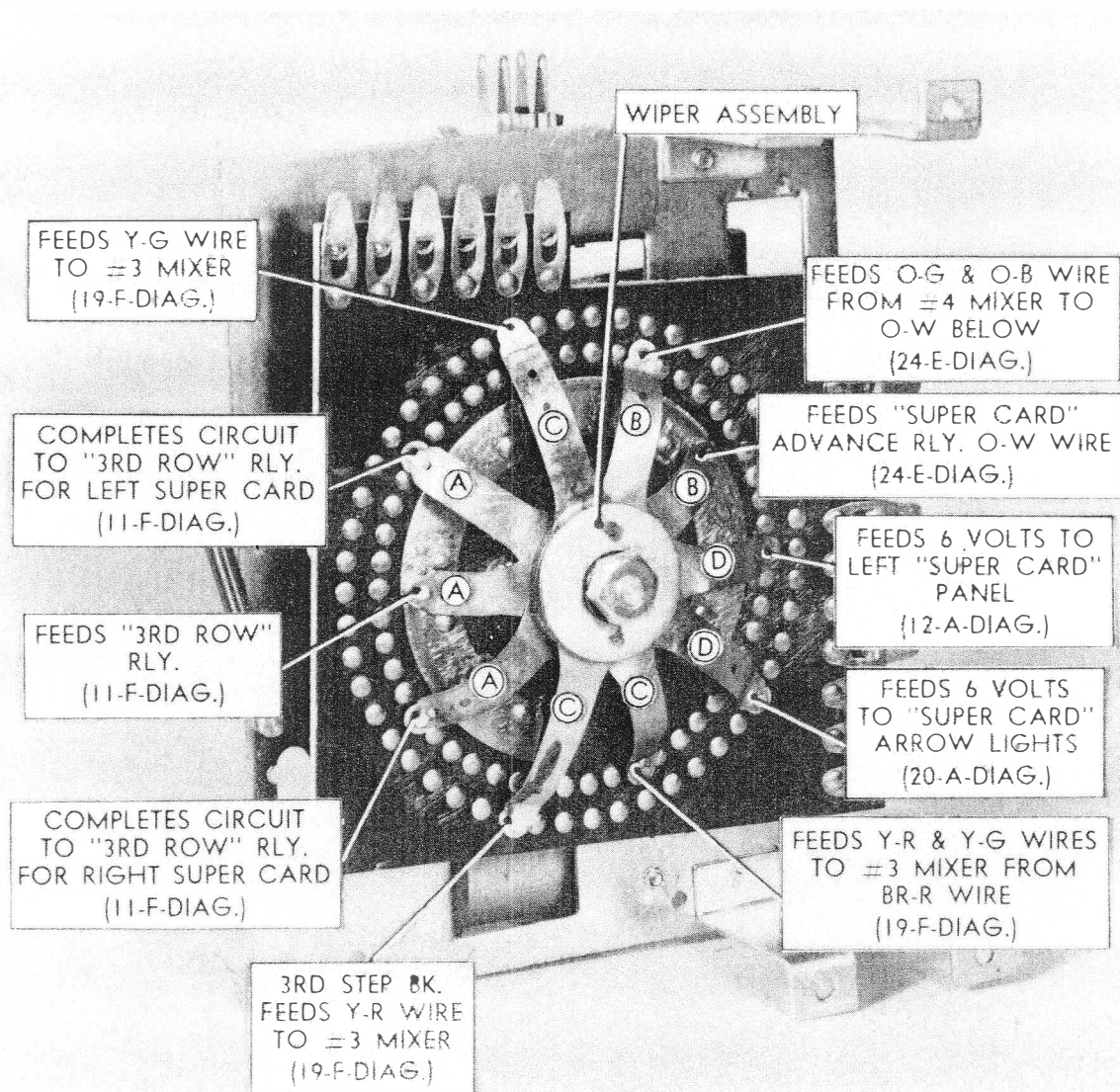
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TIMER STEP-UP UNIT—RATCHET SIDE



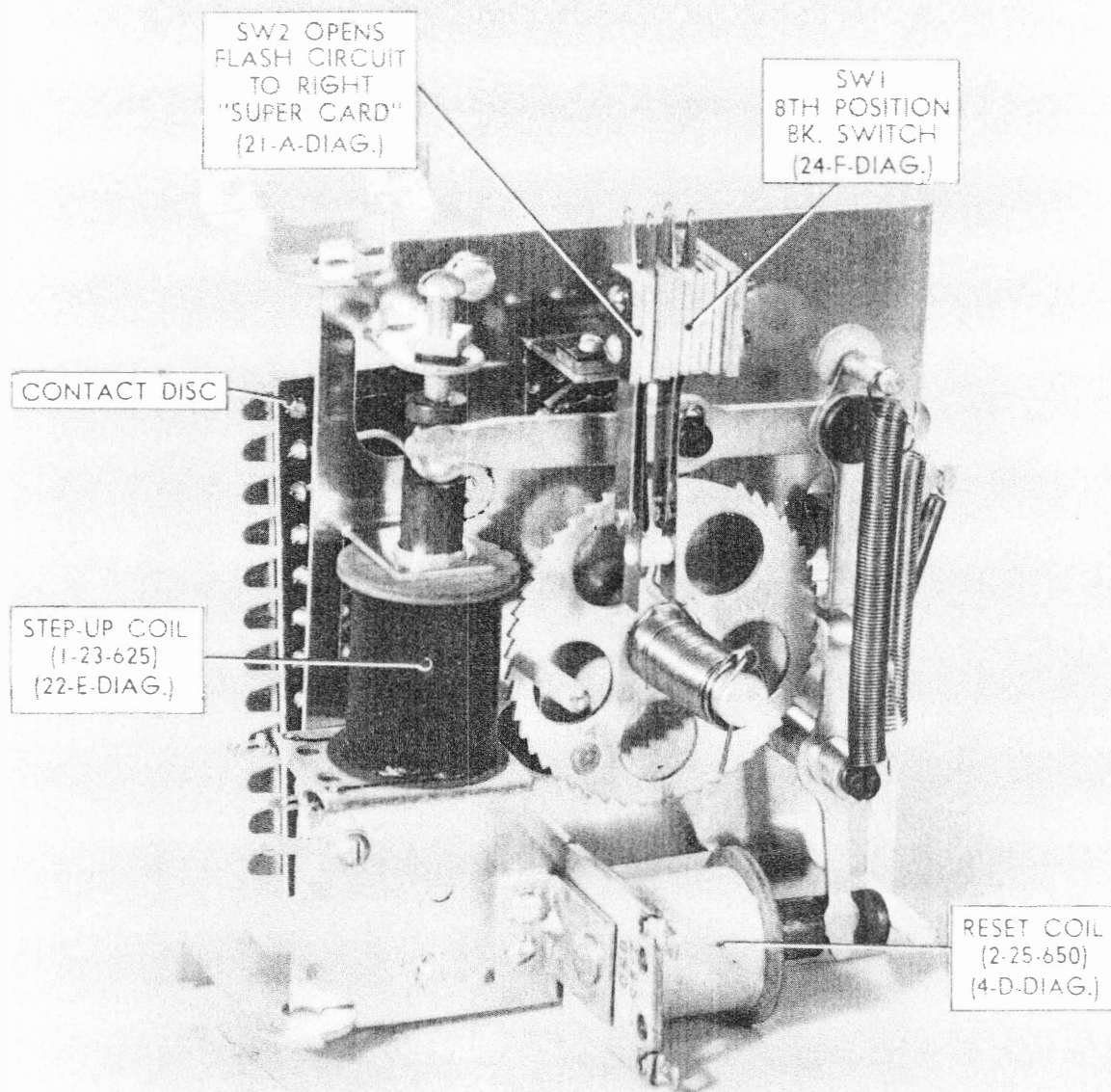
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SUPER CARD STEP-UP UNIT—WIPER SIDE



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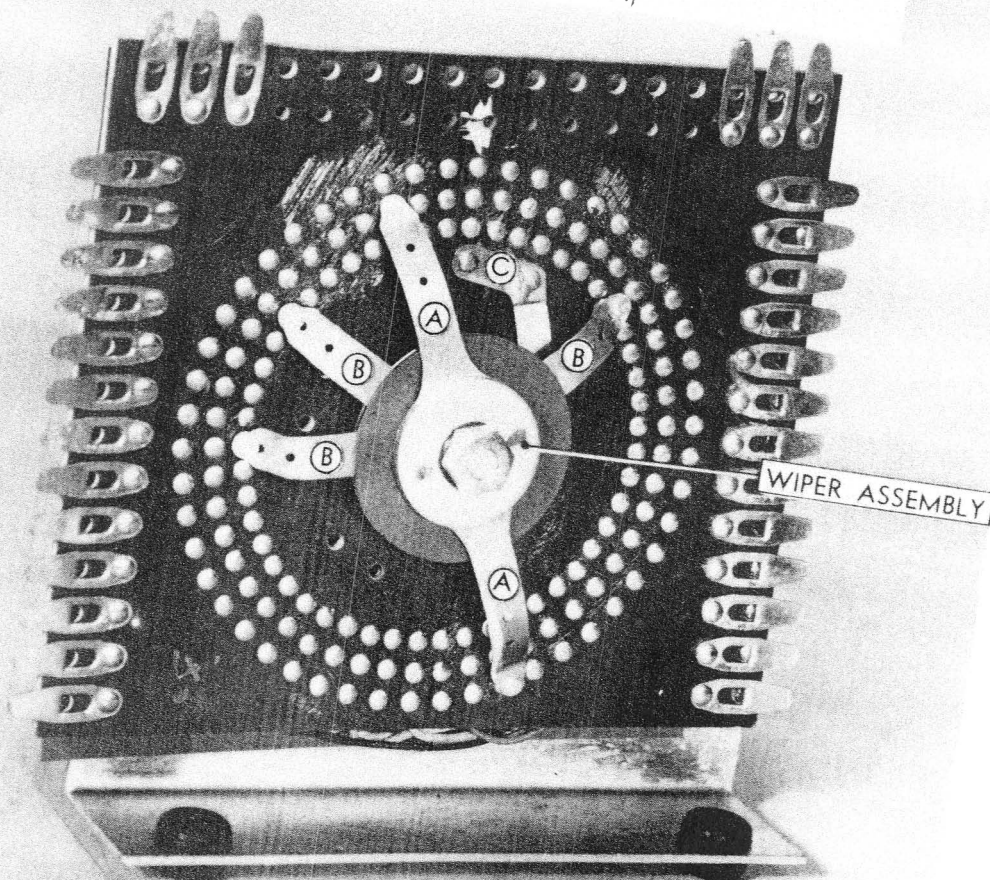
SUPER CARD STEP-UP UNIT—WIPER SIDE



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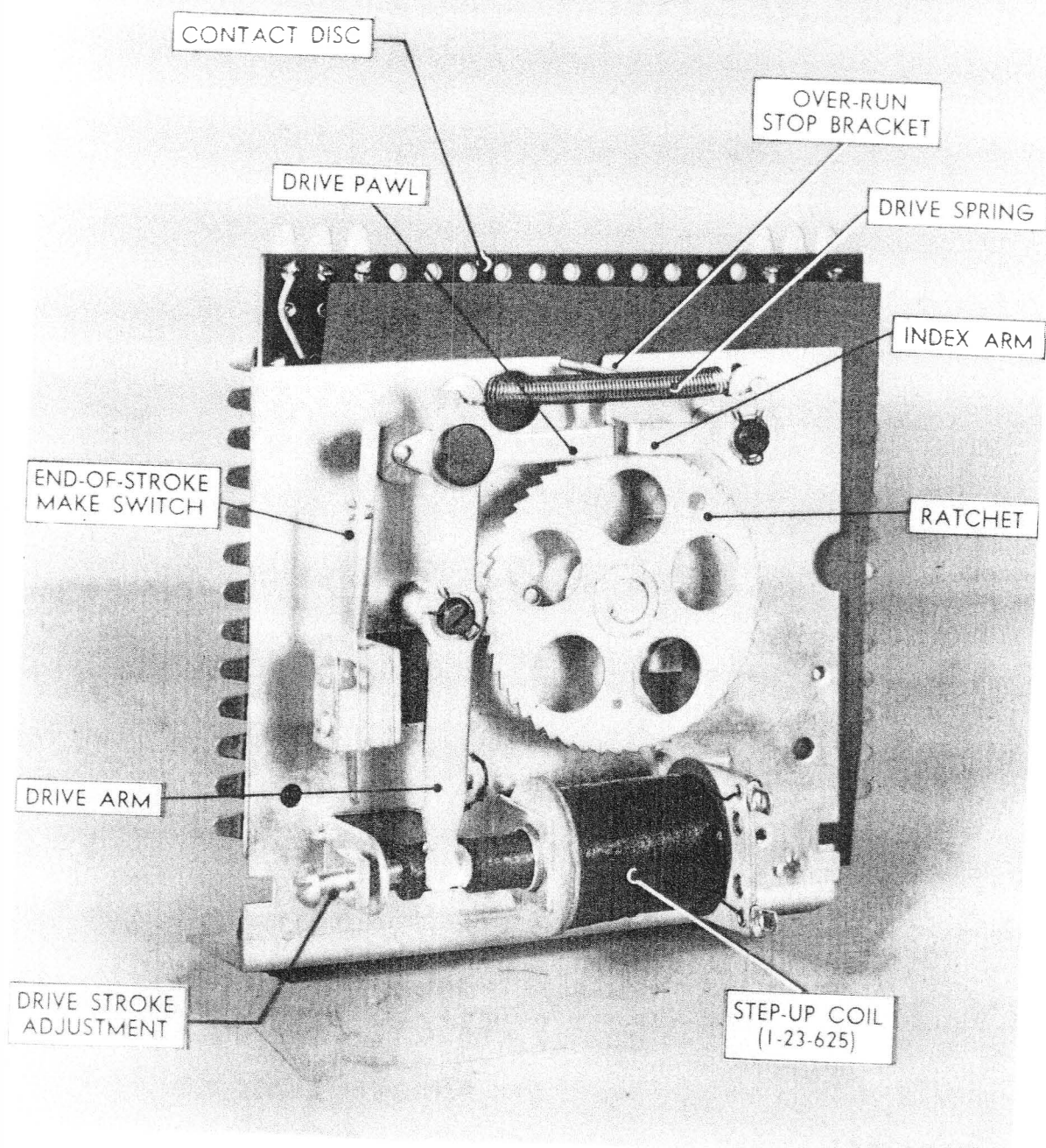
No. 4 MIXER STEP-UP UNIT—WIPER SIDE

- Ⓐ WIPERS IN SECOND AND OUTER ROW SPOTS FEATURES. (22-G TO 27-G DIAG.)
- Ⓑ SWIPERS IN INSIDE ROW ADVANCES "SCORE STEP-UP" OR "EXTRA BALL STEP-UP". (17-F DIAG.)
- Ⓒ FEED LINE FOR "B" WIPERS. (17-F DIAG.)



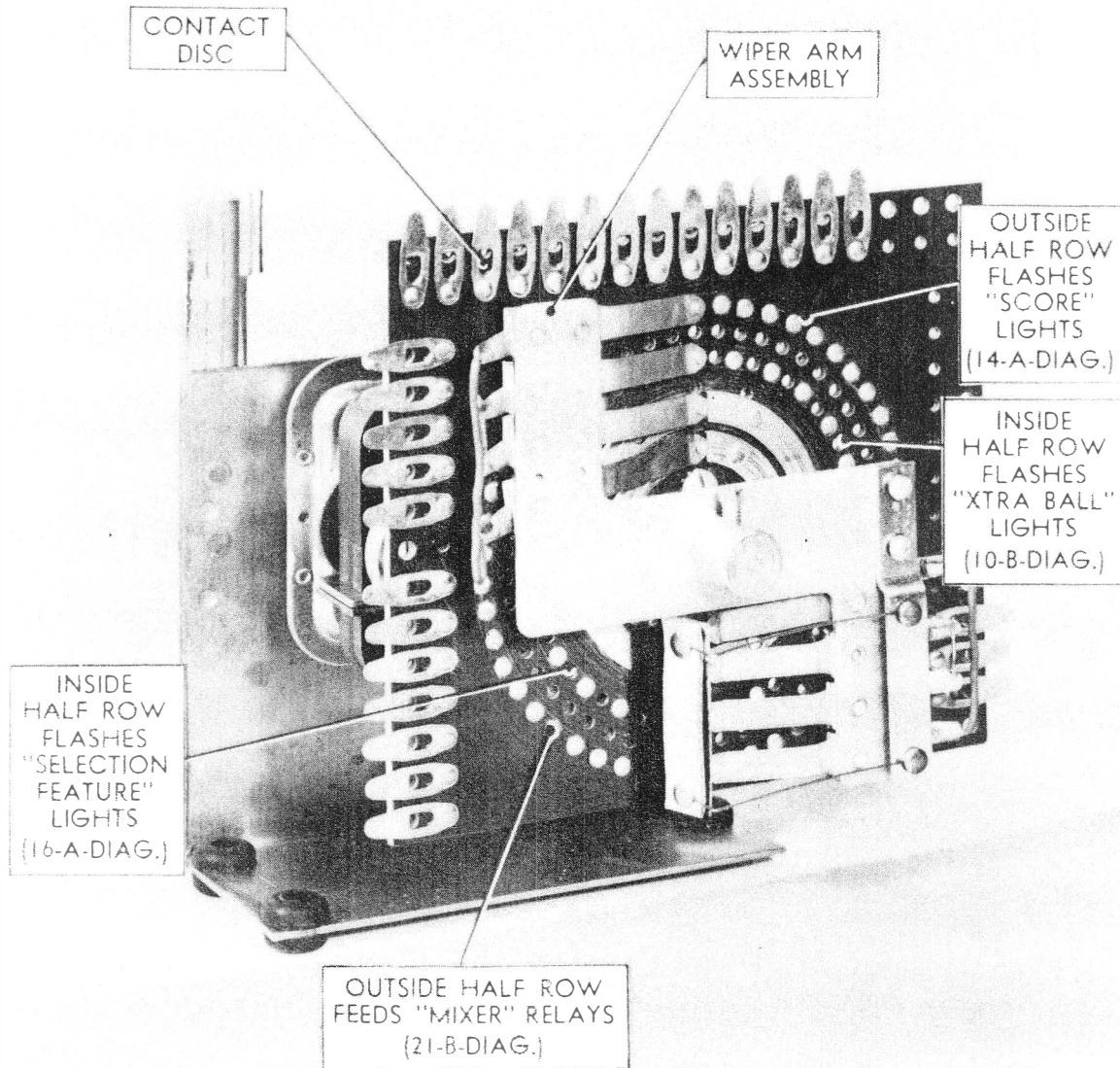
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No. 4 MIXER STEP-UP UNIT—RATCHET SIDE



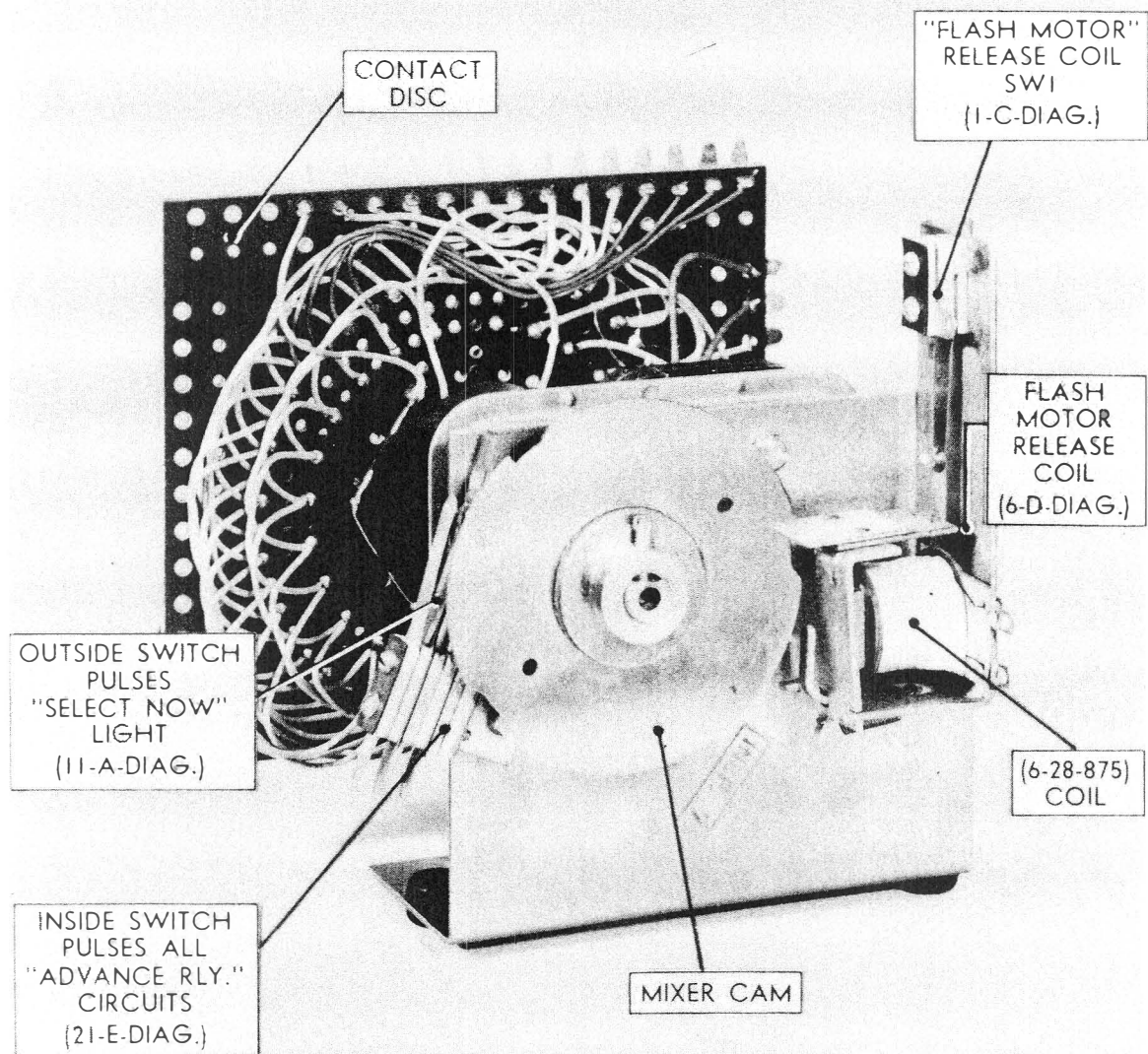
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FLASH MOTOR UNIT—WIPER SIDE



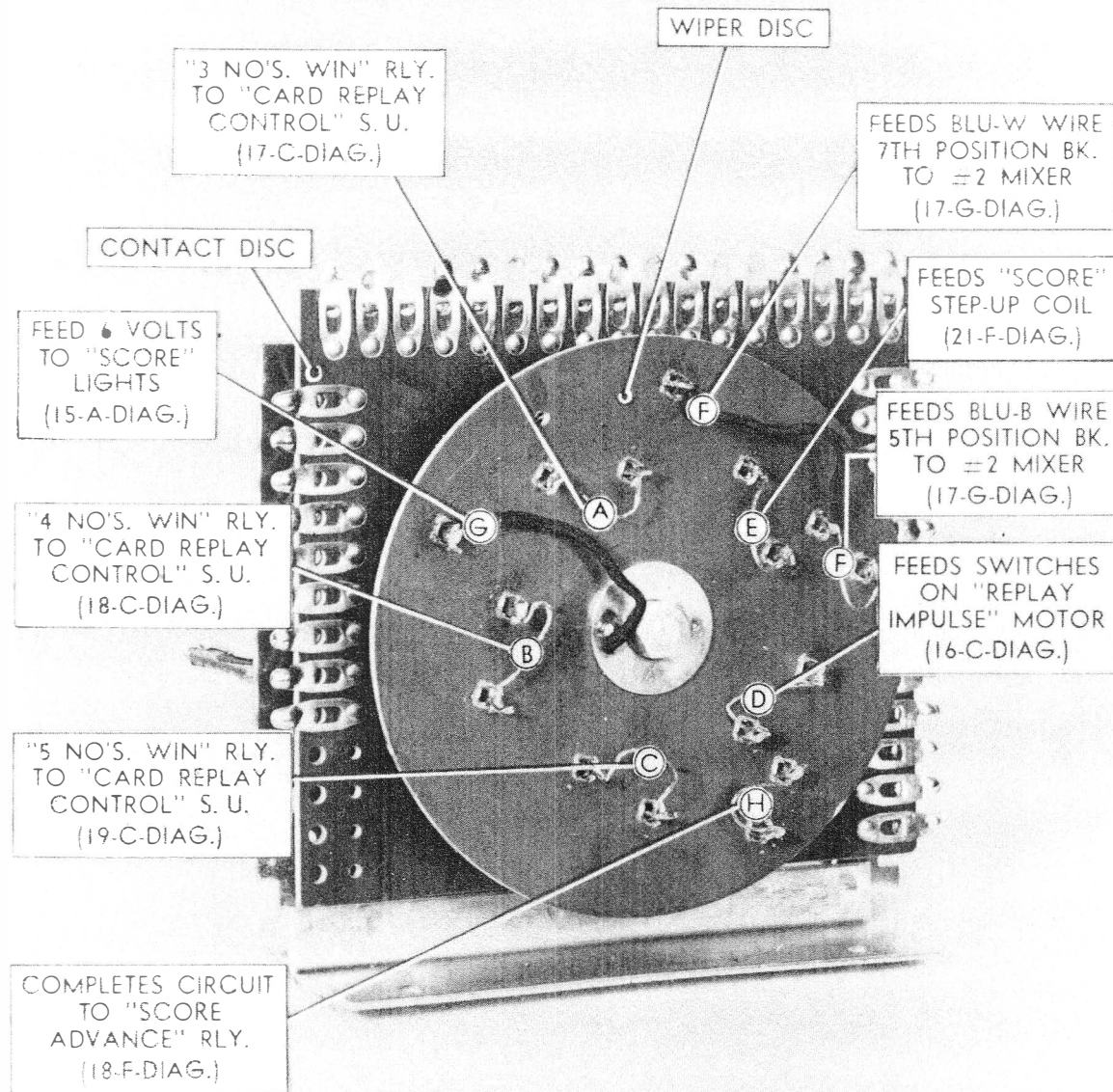
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FLASH MOTOR UNIT—MIXER SIDE



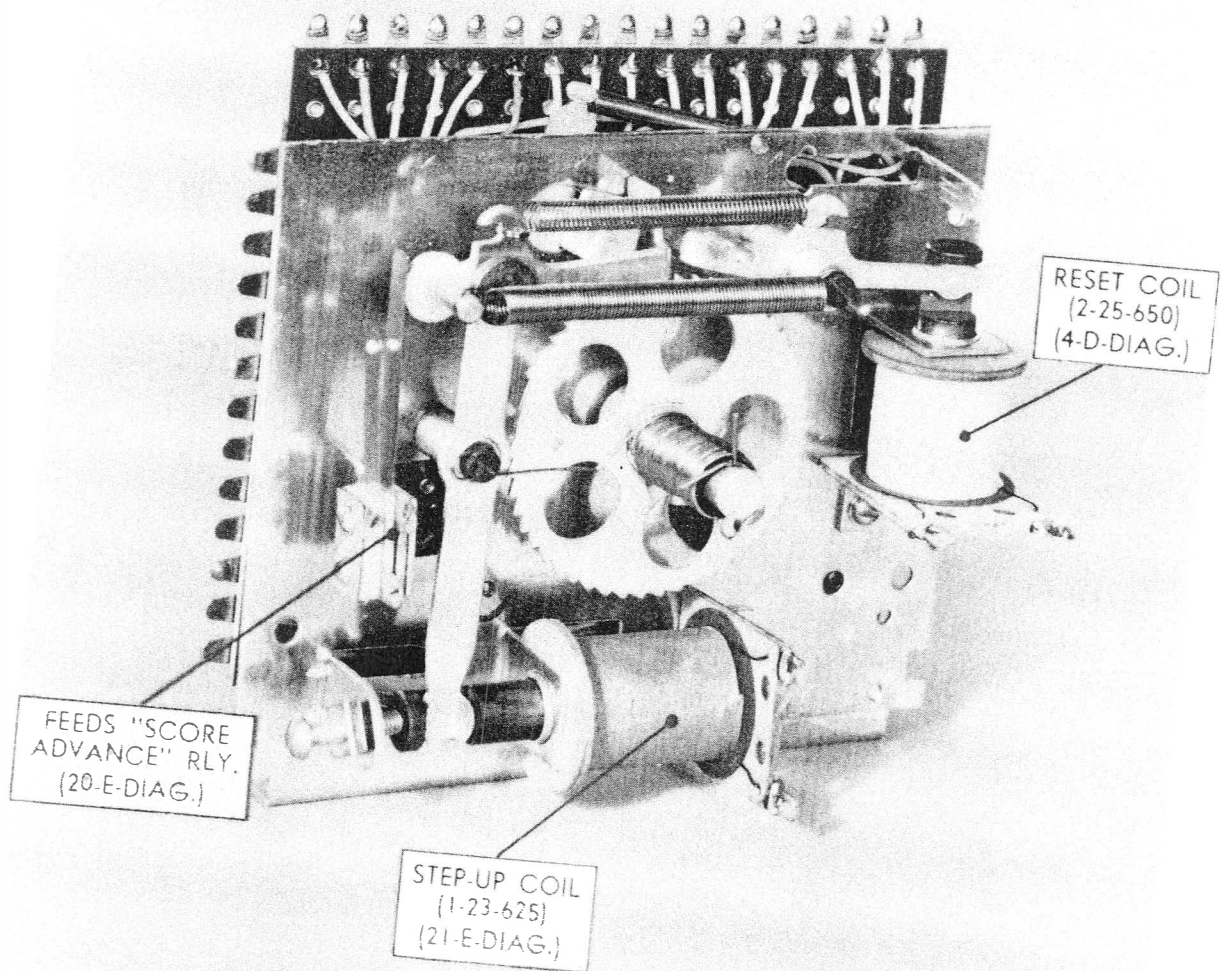
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SCORE STEP-UP UNIT—WIPER SIDE



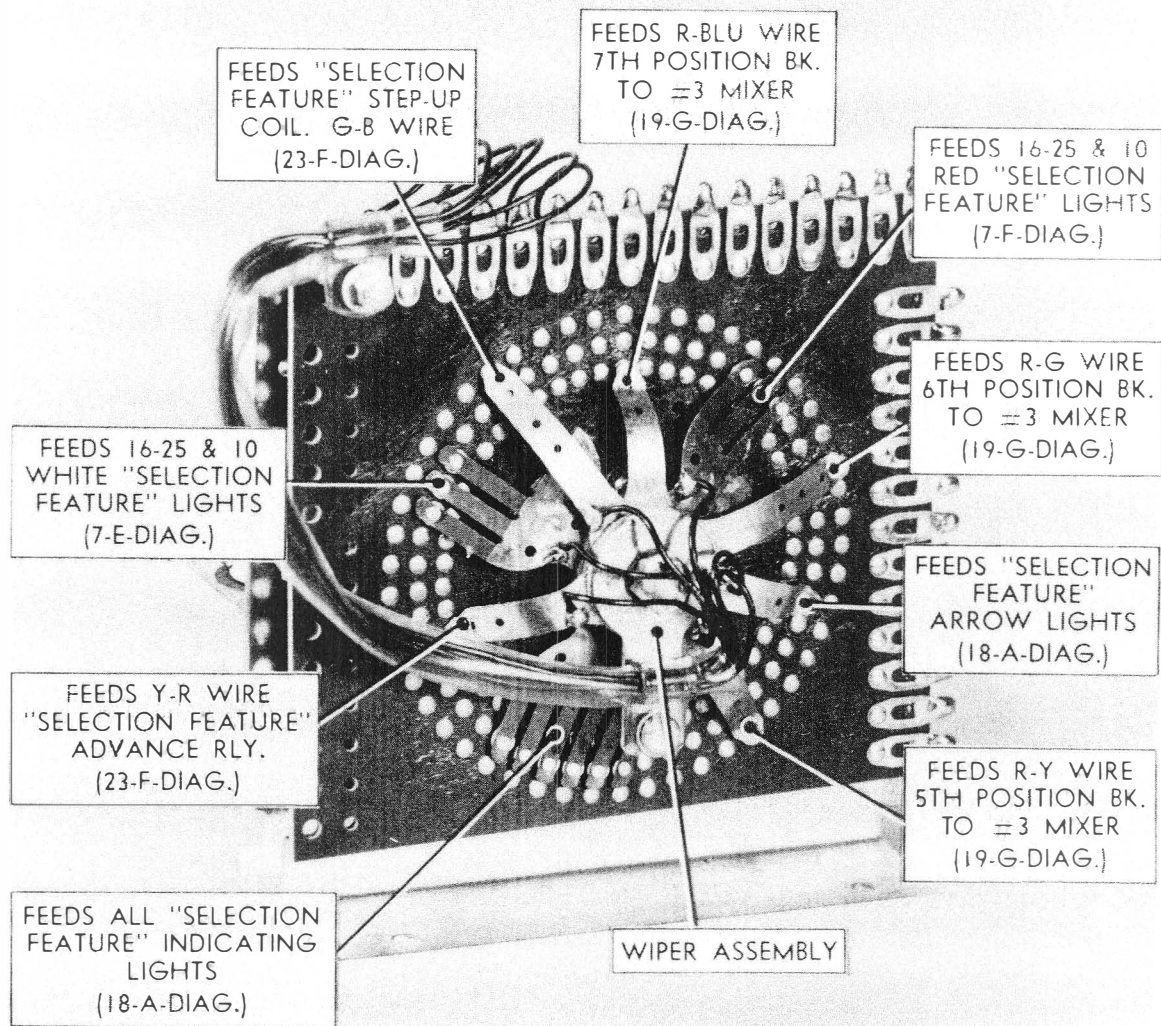
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SCORE STEP-UP UNIT—RATCHET SIDE



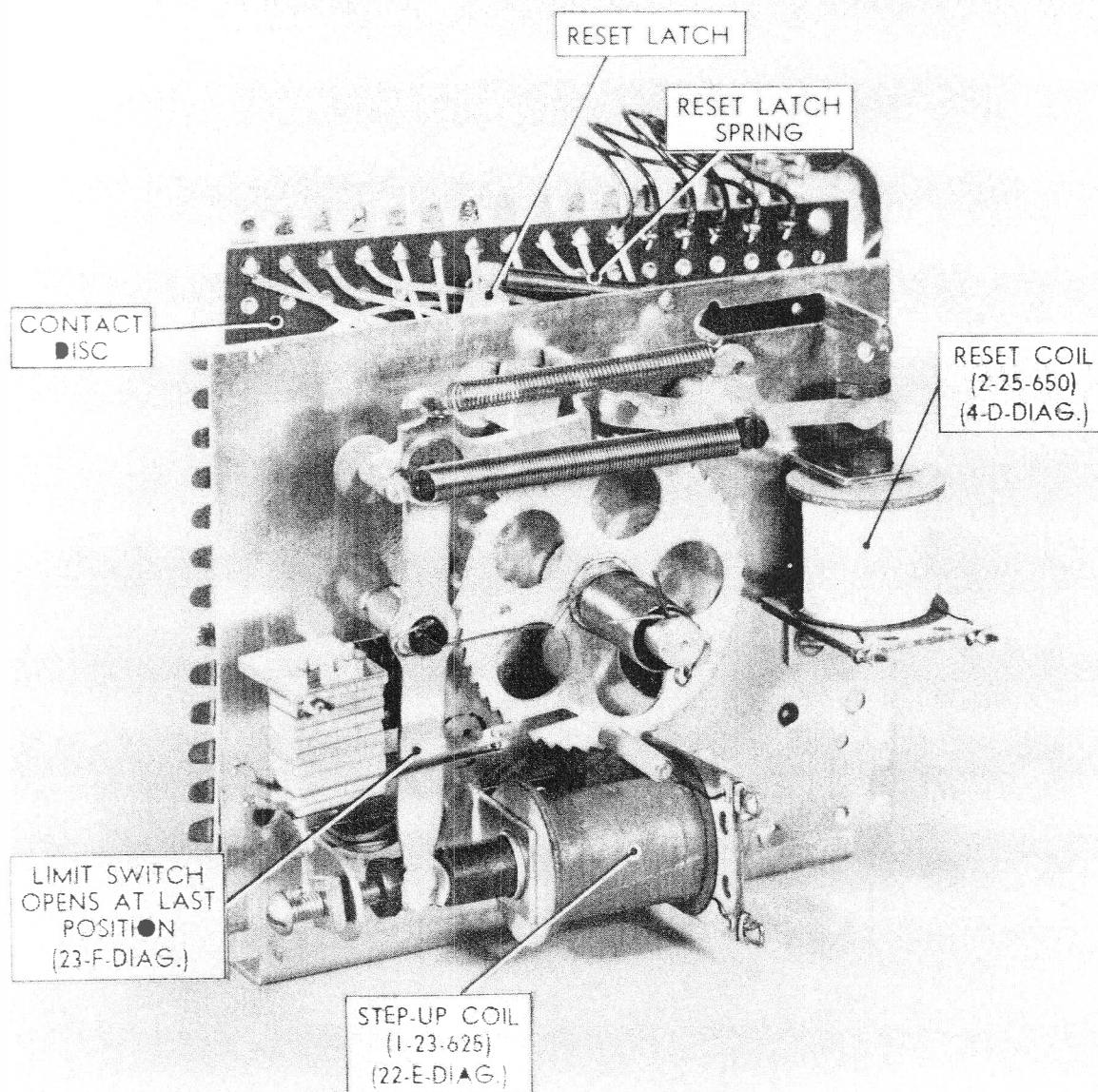
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SELECTION FEATURE STEP-UP—WIPER SIDE



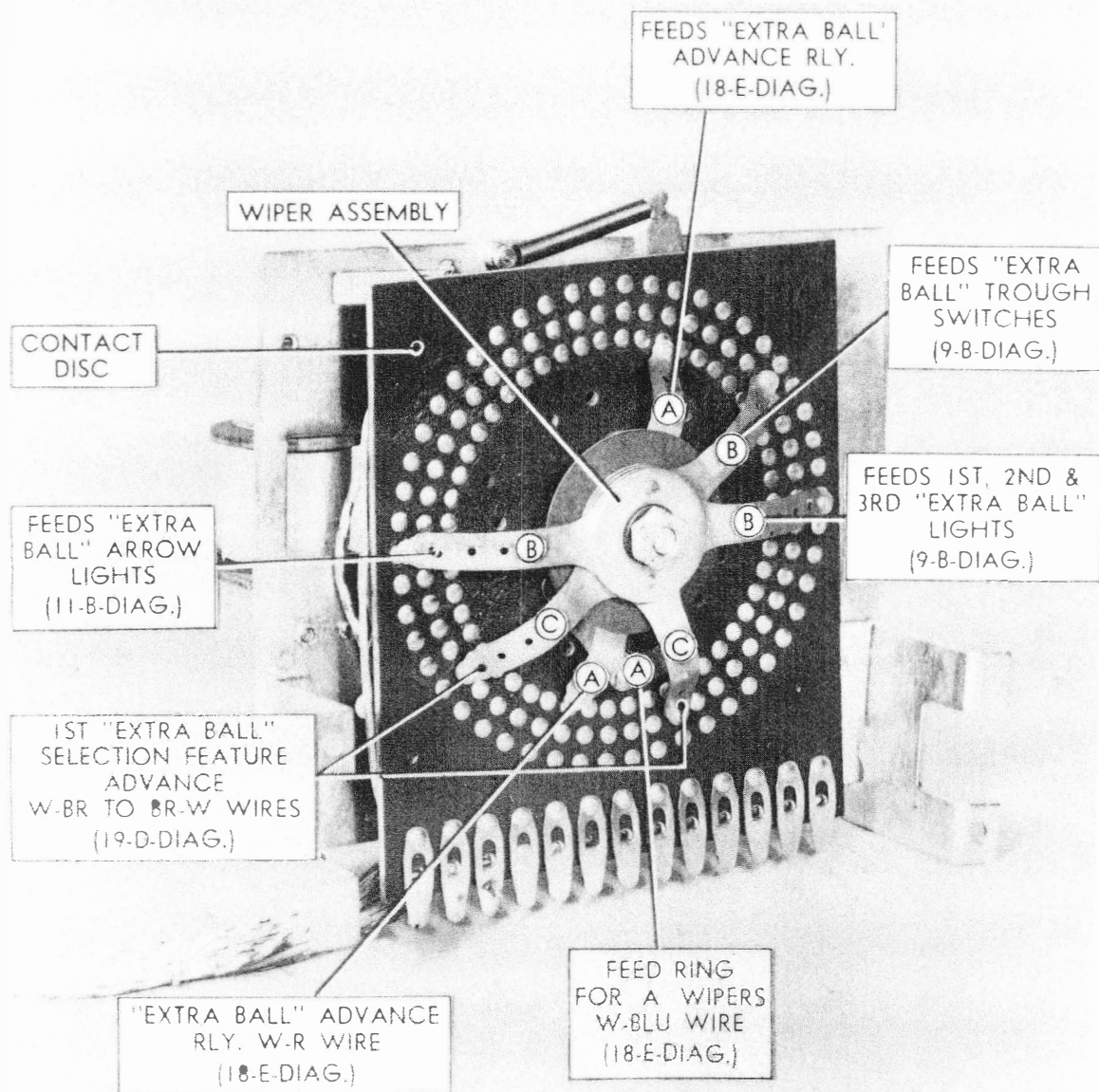
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SELECTION FEATURE STEP-UP—RATCHET SIDE



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EXTRA BALL STEP-UP—WIPER SIDE



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EXTRA BALL STEP-UP—RATCHET SIDE

