

Instruction Manual for **STAR POOL**



Williams® ELECTRONICS

A DIVISION OF
THE SEEBURG CORPORATION OF DELAWARE

3401 N. California Ave.
(312) 267-2240

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1974

Chicago, Ill. 60618, U.S.A.
Cable Address: Wilcoin

SEQUENCE OF OPERATION

RESET CYCLE

CREDIT RELAY IS ENERGIZED BY SWITCH ON RESET RELAY, THRU SCORE MOTOR INDEX CAM SWITCH A, CREDIT BUTTON, ZERO SWITCH ON CREDIT UNIT, AND SWITCH ON GAME-OVER RELAY.

SWITCHES ON CREDIT RELAY WILL OPEN CIRCUIT TO COIN LOCK-OUT COIL, PULSE CREDIT UNIT RESET COIL, AND ENERGIZE COIN RELAY.

SWITCHES ON COIN RELAY WILL RUN SCORE MOTOR, TRIP GAME-OVER RELAY, AND ENERGIZE RESET RELAY.

SWITCHES ON RESET RELAY WILL OPEN CIRCUITS TO PLAYFIELD SWITCHES, RUN SCORE MOTOR, ENERGIZE RESET COILS ON COIN UNIT-BALL COUNT UNIT-PLAYER UNIT AND GAME OVER RELAY, PULSE 1 & 2 AND 3 & 4 RESET RELAYS, AND ENERGIZE BONUS RELAY.

SWITCHES ON 1 & 2 AND 3 & 4 RESET RELAYS WILL PULSE THE (16) SCORING DRUM UNITS UNTIL THEY REACH ZERO.

SWITCHES ON BONUS RELAY WILL RUN SCORE MOTOR, HOLD RESET RELAY IN, PULSE ADVANCE UNIT RESET COIL, AND OPEN CIRCUIT TO OUTHOLE RELAY. (BONUS RELAY IS HELD IN BY ZERO SWITCHES ON ADVANCE UNIT.

WHEN BONUS RELAY DROPS OUT, OUTHOLE RELAY IS ENERGIZED THRU ZERO SWITCH ON ADVANCE UNIT.

SWITCHES ON OUTHOLE RELAY WILL RUN SCORE MOTOR, ENERGIZE A & B AND C & D TARGET RESET COILS, PULSE ADVANCE UNIT S.U. COIL, AND PULSE BALL RELEASE COIL TO PROPEL BALL TOWARD PLUNGER.

"STAR POOL"

4 PLAYER

GAME OPERATES AS FOLLOWS:

LARGE TOP ROLLOVER BUTTON OPENS BOTTOM GATE.

TWO TOP SMALL ROLLOVER BUTTONS ADVANCE BONUS VALUE.

CENTER SPINNER AND ALL SPINNER ADVANCE AREAS ADVANCE SPINNER LITES.

EVERY 5TH ADVANCE ON SPINNER ADVANCES BONUS VALUE.

BONUS VALUES ADVANCE FROM 1 TO 15 AND SCORE 1,000 TO 15,000 BONUS WHEN BALL LEAVES PLAYFIELD.

MAKING FOUR DROP TARGETS A,B,C AND D, LITES "DOUBLE BONUS".

MAKING FOUR DROP TARGETS A SECOND TIME LITES "SAME PLAYER SHOOT AGAIN".

WHEN GAME IS SET IN "CREDIT" POSITION, THEN LEFT LANE LITES FOR SPECIAL WHEN FOUR DROP TARGETS ARE MADE A SECOND TIME. WHEN LIT "SPECIAL" LEFT LANE SCORES A CREDIT.

WHEN GAME IS SET IN "EXTRA BALL" POSITION, THEN LEFT LANE LITES FOR "SPECIAL" WHEN NUMBER 15 IS REACHED ON BONUS ADVANCE. LEFT LANE, WHEN LIT SPECIAL, LITES "SAME PLAYER SHOOT AGAIN". MAKING FOUR DROP TARGETS A SECOND TIME ALSO LITES "SAME PLAYER SHOOT AGAIN".

1. 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 make-shift 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-up units, relays, etc., before adjustments are made or wires reconnected.

2. FUSES

IMPORTANT: Never replace fuses with any rating other than specified on the fuse block; this block is located adjacent to the transformer.

3. 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 clutches causing them to slip.

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.

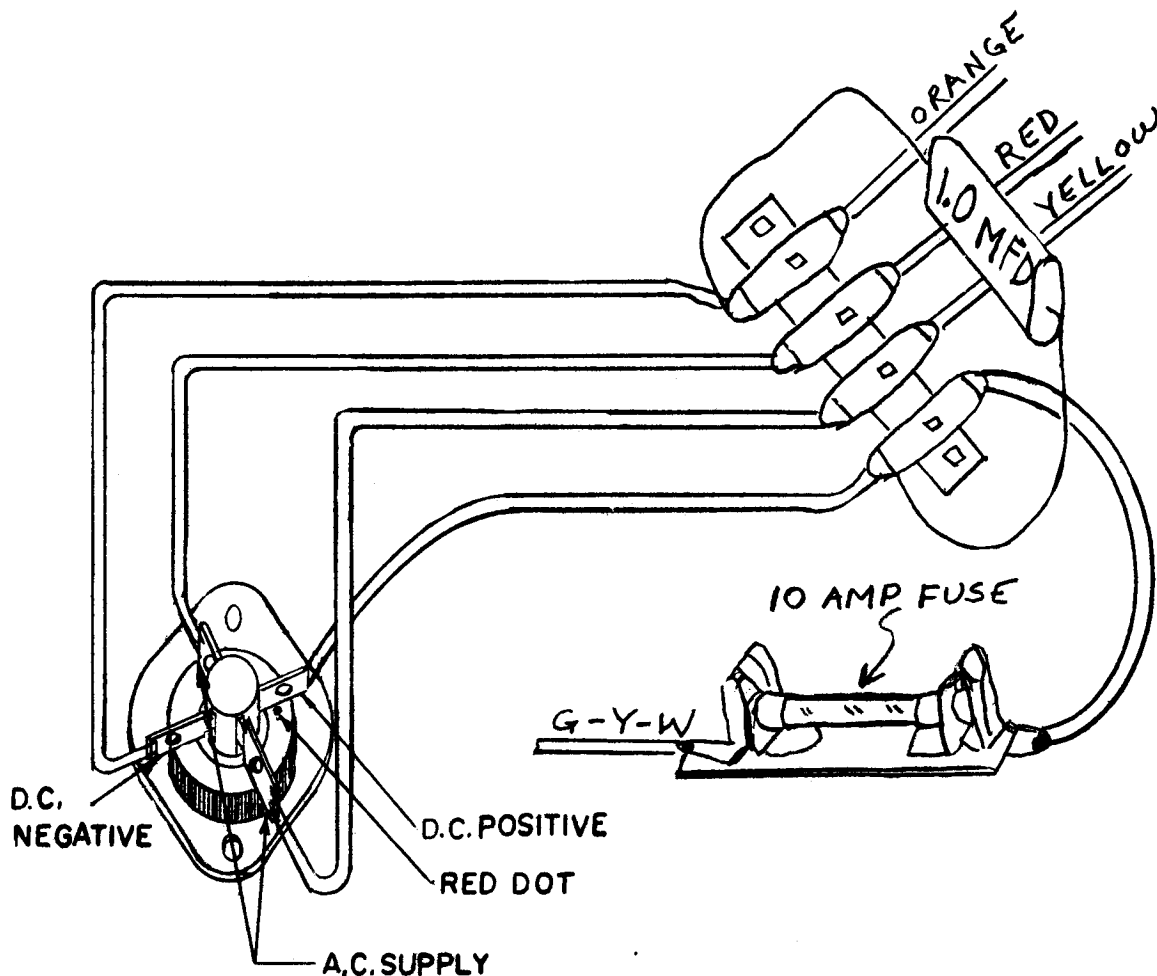
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with 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 a solvent, then apply an extremely thin coat of the special grease.

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.

SWITCH ADJUSTMENT

BEFORE ADJUSTING SWITCHES, MAKE CERTAIN THE SCREWS HOLDING THE SWITCH STACKS ARE DOWN TIGHTLY. BAKELITE SPACERS IN THE SWITCH STACKS, DUE TO EXCESSIVE MOISTURE, HAVE OCCASIONALLY SHRUNK BY DRYING OUT, CAUSING POOR ADJUSTMENT.

SILICON BRIDGE RECTIFIER



THE FUNCTION OF THE RECTIFIER AND CAPACITOR IS TO CONVERT THE ALTERNATING CURRENT (A.C.) TO DIRECT CURRENT (D.C.), SUPPLYING D.C. TO THE BUMPERS, KICKERS ETC.

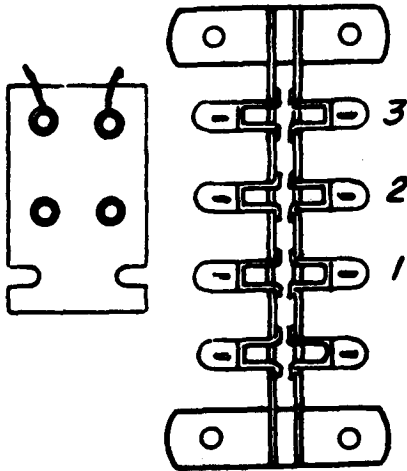
THE BRIDGE RECTIFIER SHOULD PRACTICALLY NEVER NEED REPLACING, AS IT IS RATED WELL OVER THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IT SUPPLIES.

IF, HOWEVER, THE 15 AMP 24 VOLT FUSE ON THE MECHANISM PANEL OPENS, IT COULD BE DUE TO A FAULTY RECTIFIER. DISCONNECT THE A.C. INPUT TO RECTIFIER, REPLACE FUSE, AND RECHECK.

IF THE 10 AMP FUSE LOCATED NEXT TO THE RECTIFIER OPENS, CHECK ALL D.C. COMPONENTS I.E. BUMPERS, KICKERS ETC. FOR SHORTS.

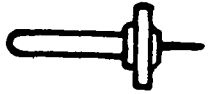
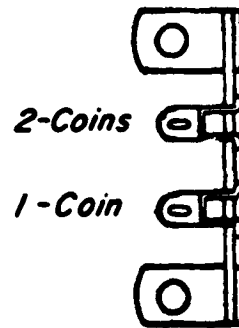
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



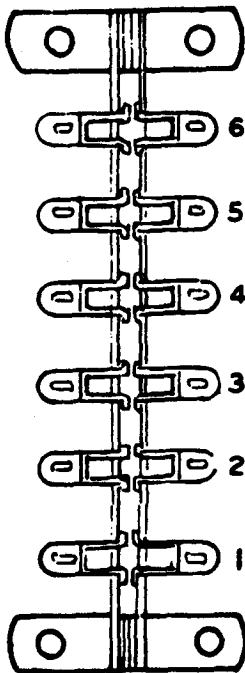
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

5¢ Adjustment

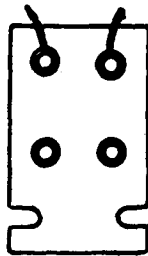


IN "2 COINS FOR
1 PLAY", CIRCUIT
TO COIN RELAY
PASSES THRU SW.
ON ALTERNATOR
UNIT.

25¢ Adjustment



PROVIDES 1, 2, 3, 4, 5
OR 6 PLAYS FOR 25¢.



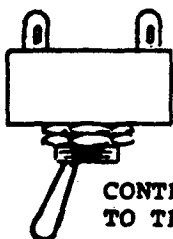
Motor Service Jack



INSERT PHONE TIP IN
"OFF" POSITION - CAMS
CAN BE TURNED BY HAND
TO CHECK ADJUSTMENT OF
SWITCHES.

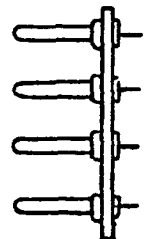
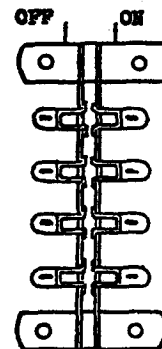
MASTER ON-OFF SW.

(Located under front of
Cabinet)



CONTROLS POWER
TO TRANSFORMER

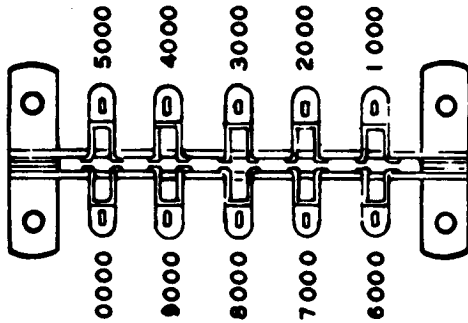
1 COIN - 1 PLAY
2 COINS - 3 PLAYS ADJ.



IN "ON" POSITION, 10¢ ADJUSTMENT
MUST BE IN #2 POSITION & 25¢ ADJUSTMENT
MUST BE IN #6 POSITION. FIRST COIN
ADVANCES CREDIT UNIT 1 STEP. SECOND
COIN WILL ADVANCE CREDIT UNIT 2 STEPS.
IN "OFF" POSITION, 25¢ ADJUSTMENT
AND/OR 10¢ ADJUSTMENT SHOULD BE PUT IN
PROPER POSITION.

ADJUSTMENTS IN BACKBOX

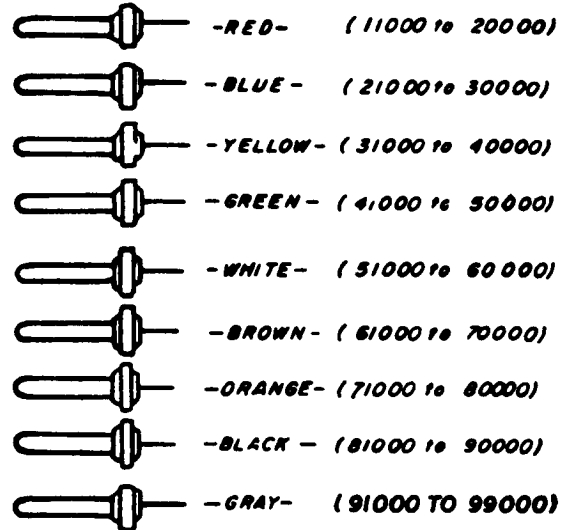
Hi-Score Adjustment



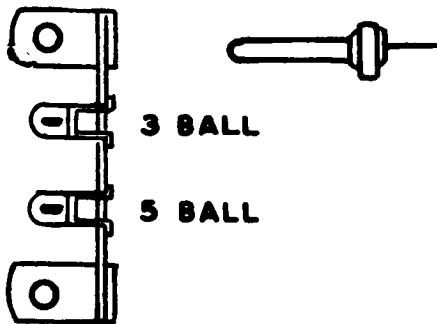
Insert plugs into 10 Point Female at desired positions.

Examples:

Yellow wire into 3000 position scores at 33000.
Yellow wire into 0000 position scores at 40000.

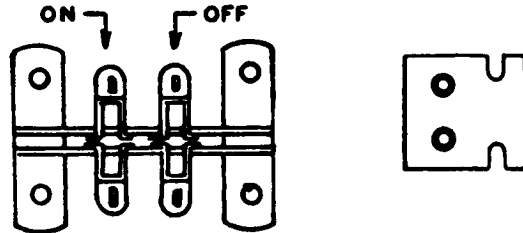


No. of Balls Adjustment



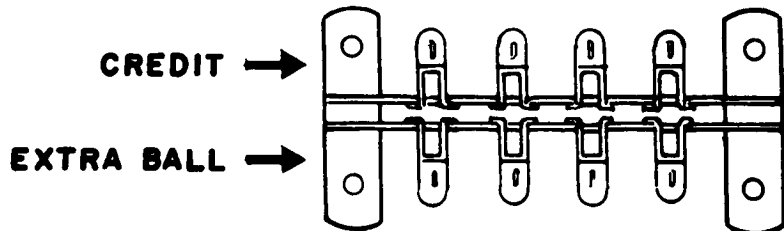
Plug changes 3 to 5 ball play, or vice versa.

NUMBER MATCH ADJUSTMENT



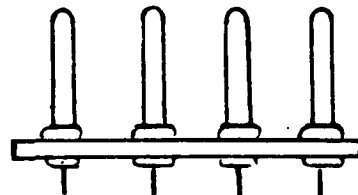
IN 'ON' POSITION, A NUMBER MATCH LITE WILL APPEAR WHEN GAME IS OVER. TO AWARD CREDITS, WHEN NUMBER IS MATCHED. PLAY ADJUSTMENT JACK MUST BE IN 'CREDIT' POSITION. IN 'OFF' POSITION, NUMBER MATCH IS INOPERATIVE.

PLAY ADJUSTMENT



IN CREDIT POSITION, HI-SCORES AND NUMBER MATCH AWARD CREDITS--- ALSO LEFT BOTTOM (OUTSIDE) ROLLOVER SWITCH, WHEN EXTRA BALL RELAY IS ENERGIZED.

IN EXTRA BALL POSITION, HI-SCORE AWARDS AN EXTRA BALL--- ALSO LEFT BOTTOM (OUTSIDE) ROLLOVER SWITCH, WHEN ADVANCE UNIT IS IN 15th POSITION.



WARRANTY

THE MOTORS IN ALL NEW WILLIAMS PRODUCTS
ARE UN-CONDITIONALLY GUARANTEED FOR
6 MONTHS FROM DATE OF PURCHASE.

ANY DEFECTIVE MOTORS RETURNED DURING THE
WARRANTY PERIOD WILL BE REPLACED FREE OF
CHARGE BY YOUR WILLIAMS DISTRIBUTOR.

IMPORTANT NOTICE

WHEN ORDERING PARTS ALWAYS SPECIFY NAME OF
UNIT, GAME AND SERIAL NUMBER, IN ADDITION TO A
CLEAR DESCRIPTION OF THE PART AND PART
NUMBER IF POSSIBLE.

UNIT PARTS LIST

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY BALL COUNT	----- C-6414	----- B-7456-6	A-6400 A-6402-5	SCORE MOTOR 14A-7883 (60 CYCLE) 14A-7884 (50 CYCLE)
(RIGHT SIDE)	B-7568	A-7614	A-7548-1	
NO. MATCH	B-7569	A-7615		
(LEFT SIDE)				
PLAYER	C-6417	C-6521	A-6404-3	
COIN	C-6414	B-7456-9	A-6402-3	
ADVANCE	C-6417	B-7456-44	A-6402-15	
10 POINT	B-7253	A-6294	3C-7272	
100 POINT	-----	-----	3C-7272	
1000 POINT	B-7253	A-6294	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	
SPINNER	B-7253	A-6294	3C-7272	

"STAR POOL" COIL CHART

NOTICE:

THIS GAME OPERATES ON 24 VOLTS. WHEN ORDERING REPLACEMENT TRANSFORMERS, MOTORS, COILS OR METERS ... MAKE SURE TO SPECIFY CORRECT PART NUMBER.

NUMBER	DESCRIPTION	LOCATION
<u>MOTORS & TRANSFORMERS</u>		
14 A-7883	CONTROL MOTOR - 60 CYCLE	MECH. PANEL
14 A-7884	CONTROL MOTOR - 50 CYCLE	MECH. PANEL
15 A-6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A-6782-1	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	24 VOLT METER	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	ADVANCE UNIT STEP UP BALL RELEASE COIL COIN UNIT STEP UP PLAYER UNIT STEP UP	PLAYFIELD PLAYFIELD MECH. PANEL INSERT
A 23-600	BALL COUNT UNIT STEP UP CREDIT UNIT STEP UP	MECH. PANEL INSERT
A2-23-750	KNOCKER	CABINET
A2-26-1300	TRIPLE CHIME COILS ... (3 req'd.)	CABINET
B1-26-800	ALTERNATOR UNIT STEP UP SCORE DRUM UNITS ... (16 req'd.) BALL COUNT UNIT RESET CREDIT UNIT RESET ADVANCE UNIT RESET SPINNER UNIT STEP UP PLAYER UNIT RESET COIN UNIT RESET	MECH. PANEL INSERT INSERT INSERT PLAYFIELD PLAYFIELD INSERT MECH. PANEL
FL 20-300/ 28-400	FLIPPERS ... (2 req'd.)	PLAYFIELD
G 22-550	DROP TARGET RESET COILS ... (4 req'd.)	PLAYFIELD
G 23-750 D.C.	D.C. JET BUMPER COILS ... (3 req'd.) D.C. KICKER COILS ... (2 req'd.)	PLAYFIELD PLAYFIELD
M 29-900	1 - 2 SCORE RESET RELAY 3 - 4 SCORE RESET RELAY	INSERT INSERT
M 29-1000	GAME OVER RELAY TRIP	MECH. PANEL
M 29-1100	5¢ RELAY 10¢ RELAY 25¢ RELAY 10 PT. RELAY 100 PT. RELAY 1000 PT. RELAY ADVANCE RELAY ADVANCE SPINNER RELAY 50 PT. RELAY SPINNER RELAY	MECH. PANEL MECH. PANEL MECH. PANEL INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	COIN SET UP RELAY	MECH. PANEL
M1-31-1500	COIN LOCKOUT COIL	FRONT DOOR
XM 27-675	TOTAL PLAY METER COIL	MECH. PANEL
XS 28-1000	MATCH UNIT STEP UP	INSERT
Z 27-1000	OUTHOLE RELAY RESET RELAY COIN RELAY GAME OVER RELAY LATCH CREDIT RELAY PLAYER RESET RELAY TARGET RELAY BONUS RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD
Z 28-1150	EXTRA BALL RELAY TILT RELAY DOUBLE BONUS RELAY GATE RELAY	MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD
Z 29-1250	BALL INDEX RELAY LOCK RELAY	MECH. PANEL MECH. PANEL

CAUTION!

The playboard on this machine has an improved finish with excellent wearing properties. Do not under any circumstances clean the board with water, water soap solutions or harsh abrasives. Avoid such things as steel wool, kitchen cleansers or abrasive hand soap. Water will weaken the adhering of the paint to the board and abrasives shorten the board life by many thousand plays. A wax base cleaner with negligible abrasive qualities used lightly, but frequently, will extend the board life to its full capabilities.

SERVICEMAN TO REMOVE BACKGLASS:

- **WITH BACK DOOR REMOVED, PULL BACK ON BRACKETS AT INSIDE TOP OF LITE BOX.**
- **FROM THE FRONT OF GAME, LIFT GLASS UP AND OUT.**

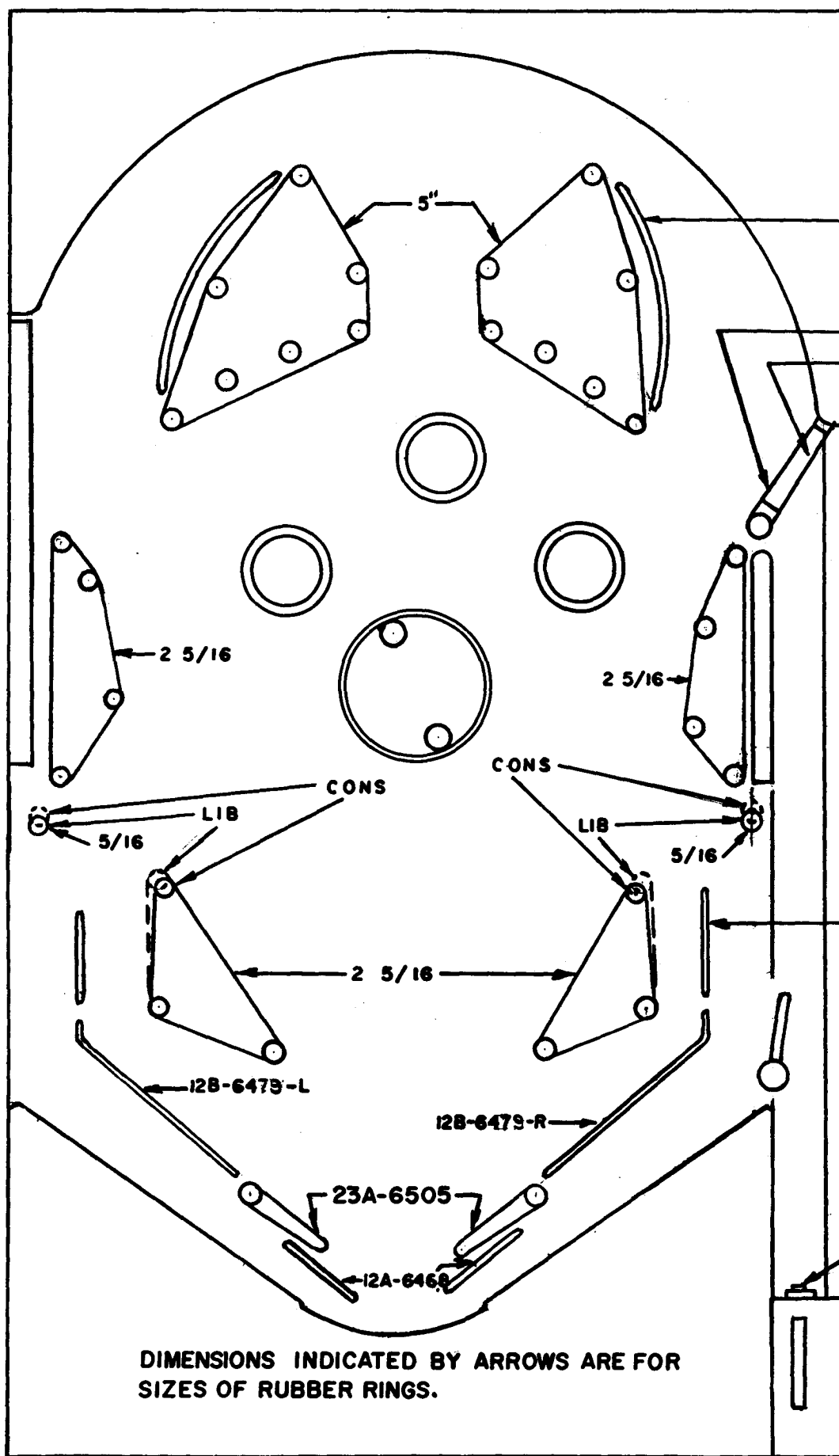
IMPORTANT NOTICE

**KINDLY INFORM LOCATIONS THAT THEY
CAN TURN DISPLAY LIGHTS ON BY PRESSING
LEFT FLIPPER BUTTON. MACHINE CAN STILL
BE SHUT OFF BY TAPPING BOTTOM OF
CABINET.**

**MASTER SWITCH (ON-OFF) IS LOCATED
UNDERNEATH FRONT PART OF CABINET.**

"STAR POOL" — POST ADJUSTMENT SHEET

TO MAKE GAME MORE "CONSERVATIVE" OR "LIBERAL"—MOVE POST $3/16$ " AS SHOWN IN SKETCH BELOW. SPOTTING HOLES ARE PROVIDED AND CAN BE SEEN ON REMOVAL OF POST.



ABBREVIATIONS —
CONS—CONSERVATIVE
LIB—LIBERAL

1B-663-H (2)

WIRE-12A-6460

GATE-1A-3208

RUBBER RING NUMBERS—

23A-6300 5/16" I.D.

23A-6306 2 5/16" I.D.

23A-6310 5" I.D.

23A-6505-6 1 1/2" I.D.

GLASS
SIZE 21 x 43

BALL DIA.—1 1/16

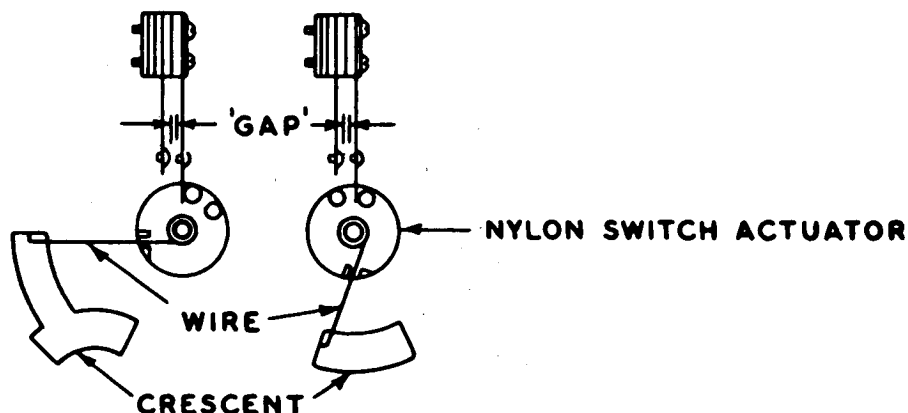
12B-6466-7 (2)

23A-6327 BALL SHOOTER
RUBBER TIP

DIMENSIONS INDICATED BY ARROWS ARE FOR
SIZES OF RUBBER RINGS.

INSTRUCTIONS FOR COIN TRIP SWITCH ADJUSTMENT

WIRE SHOULD BE IN CONTACT WITH END OF CRESCENT OPENING WHEN BLADE ADJUSTMENT IS MADE.



Long blade should be in contact with nylon switch actuator and have a maximum overtravel of $1/32$.

or

Using a gram gauge, tension of long blade should not exceed 10 grams.

SWITCH ADJUSTMENT

1. For small coins, such as dimes, adjust short blade so that the 'gap' between the silver contacts is .045 to .055.
2. For larger & heavier coins the 'gap' should be .045 to .060.
3. Do not adjust 'gap' closer than .040.

POWER TRANSFORMER:

LOCATED ON MECHANISM PANEL. IT IS EQUIPPED WITH A SECONDARY TAP. IF YOUR GAME IS ON LOCATION WITH EXTREMELY LOW LINE VOLTAGE, REMOVE LEAD FROM LUG MARKED 24 VOLTS AND SOLDER TO ALTERNATE LUG MARKED "HIGH". THIS WILL BOOST SECONDARY VOLTAGE APPROXIMATELY 2-3 VOLTS.

LEG LEVELERS:

ARE PROVIDED FOR TWO PURPOSES - 1ST TO LEVEL GAME ON LOCATION, 2ND TO INCREASE PITCH FOR GAME PERCENTAGING. IF IT IS DESIRED TO SPEED UP PLAY AND DECREASE SCORES, RAISE REAR LEG LEVELERS TO INCREASE PITCH.

JACK LAYOUT

GAME STAR POOL

POSITION PAN-PLAYF. SIZE 20

FEED	BⒶ	1	GRY/BLU-4 BONUS RE.
"	RⒶ	2	F/B-4 "
MOTOR	⓪/G	3	GRY/G-4 "
RESET RE.	BLU/BR-1	4	B/BLU-1 OUTHOLERE
BALL IND. RE.	G/B-2	5	Y/R-2 TILT RE.
ADV.U.RESET	G/O-4	6	W/BR-4 "
"	" ⓪/W-1	7	GRY/Y-2 ADV. U. STEP UP
TARGETS RESET	BLU/R	8	BLU/W-4 BALL RELEASE
"	G-3	9	R/Y-4 TARGET RE.
"	W-2	10	YⒶ FEED
PAN = PANEL			PLAYF. = PLAYFIELD

JACK LAYOUT

GAME STAR POOL _____

POSITION PAN-PLAYF. SIZE 16

FEED	R-Y-WⒶ	1	Y/B-5 EXT.BALL RE.
D.BONUS	G/W-3	2	R/W-3 "
"	R/BLU-3	3	GRY/W SPINNER RE.
1,000 PT.RE.	B/BLU-3	4	BR/B ADV. SPINNER RE.
" .	GRY/BR-3	5	O/BLU-1 50 PT.RE.
FEED	BLUⒶ	6	B/W-5Ⓐ L.FLIPPER
—		7	BR/W-5Ⓐ R. "
—		8	—
A = 16 GAUGE			

JACK LAYOUT

GAME STAR POOL

POSITION PAN. INSERT SIZE 24

FEED	BⒶ	1	R/Y-1 BALL COUNTS.U.
"	RⒶ	2	R/G-1 " "
COIN LOCKOUT	B/R-4	3	Y/BR PLAYER S.U.
REPLAY RE.	W/O	4	G/Y PLAYER RESET U.
"	W/BLU	5	GRY/Y-4 EX.BALL RE.
"	W/BR-1	6	B/O-1 1-2 RESET RE.
KNOCKER	B/W	7	GRY CREDIT U.
RESET RE.	BLU/BR-1	8	YⒶ FEED
BALL COUNT S.U.	BLU/R-1	9	W/G-4 SHOOT AGAIN LITE
NO.1 BALL LITE	W/B-5	10	B/Y-6 No.2 BALL LITE
FEED	BRⒶ	11	O/R-5 S.CHIME
3-4 RESET RE.	B/BLU	12	B/G-3 L. "
PAN = PANEL			A = 16 GAUGE

JACK LAYOUT

GAME STAR POOL

POSITION PAN. INSERT SIZE 20

No.3 BALL LITE	GRY/Y-1	1	GRY/W-3 1-CAN PLAY
1ST PLAYER MATCH	BLU-2	2	Y/G-1 2- "
2ND. "	R/BR-2	3	O/W 3 "
3RD. "	BR/O	4	O/R-3 4 "
4TH. "	BR/Y-5	5	R/W BALL COUNT S.U.
CREDIT S.UP	GRY/B-2	6	BLU/R-4 G.O.RE.TRIP
M.CHIME	O-4	7	BLU/Y-5 " "
TILT LITE	BLU/B-2	8	BLU/BR-4 " "
BALL IND. RE.	BR/G-4	9	GRY/G-2 No.4 BALL LITE
CREDIT RESET U.	R/Y	10	GRY/BR-2 No.5 " "

JACK LAYOUT

GAME STAR POOL

POSITION PLAYE-INSERT SIZE 14.

[illegible]

JACK LAYOUT

GAME STAR POOL

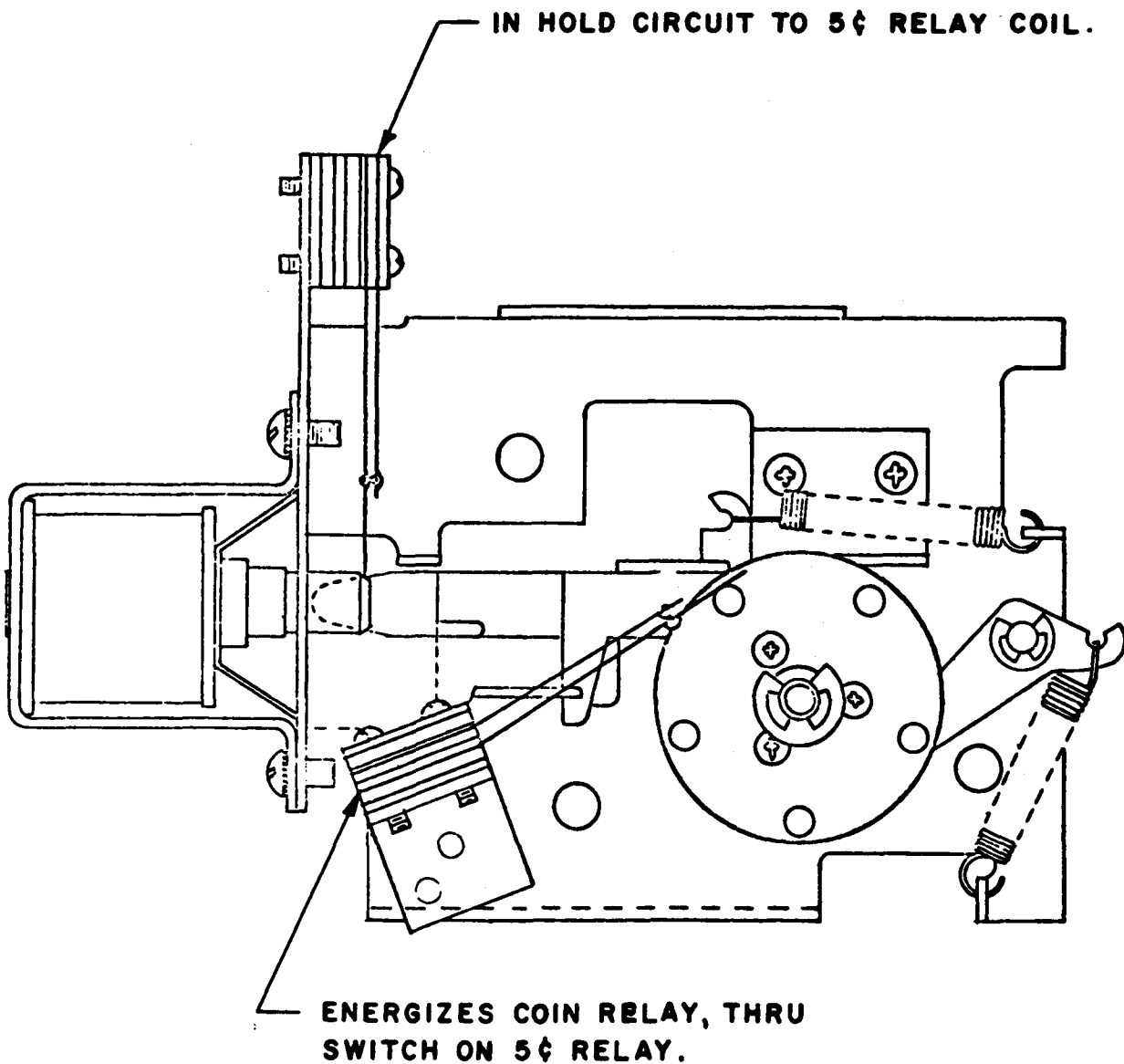
POSITION PAN - INSERT SIZE 12

[illegible]

ALTERNATOR UNIT

LOCATED ON MECHANISM PANEL.

USED IN CONJUNCTION WITH 5¢ RELAY FOR "2 COINS-1 PLAY" FEATURE.

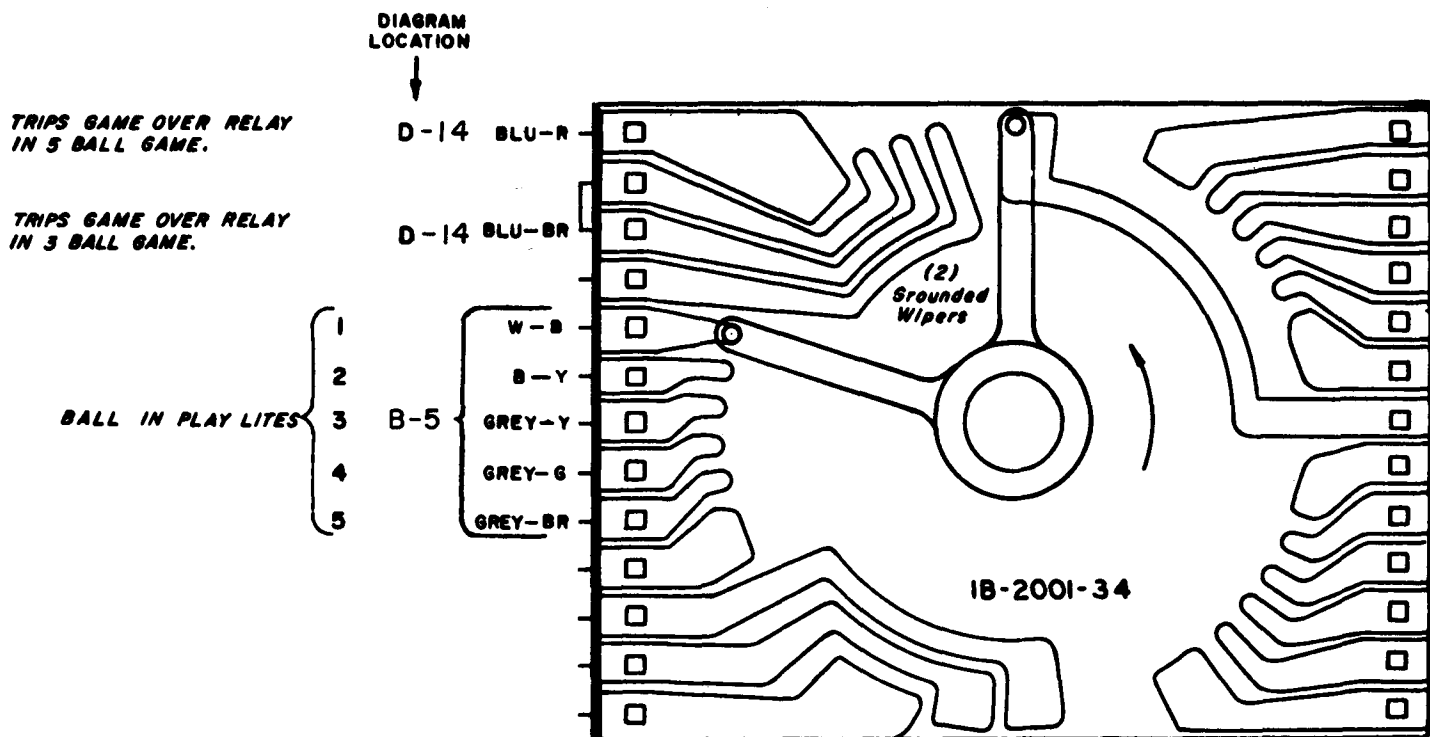


BALL COUNT UNIT DISC

THIS UNIT RESETS AT THE START
OF A NEW GAME, (DURING RESET CYCLE).

IT ADVANCES ONE STEP EACH TIME
THE LAST PLAYER COMPLETES HIS TURN.

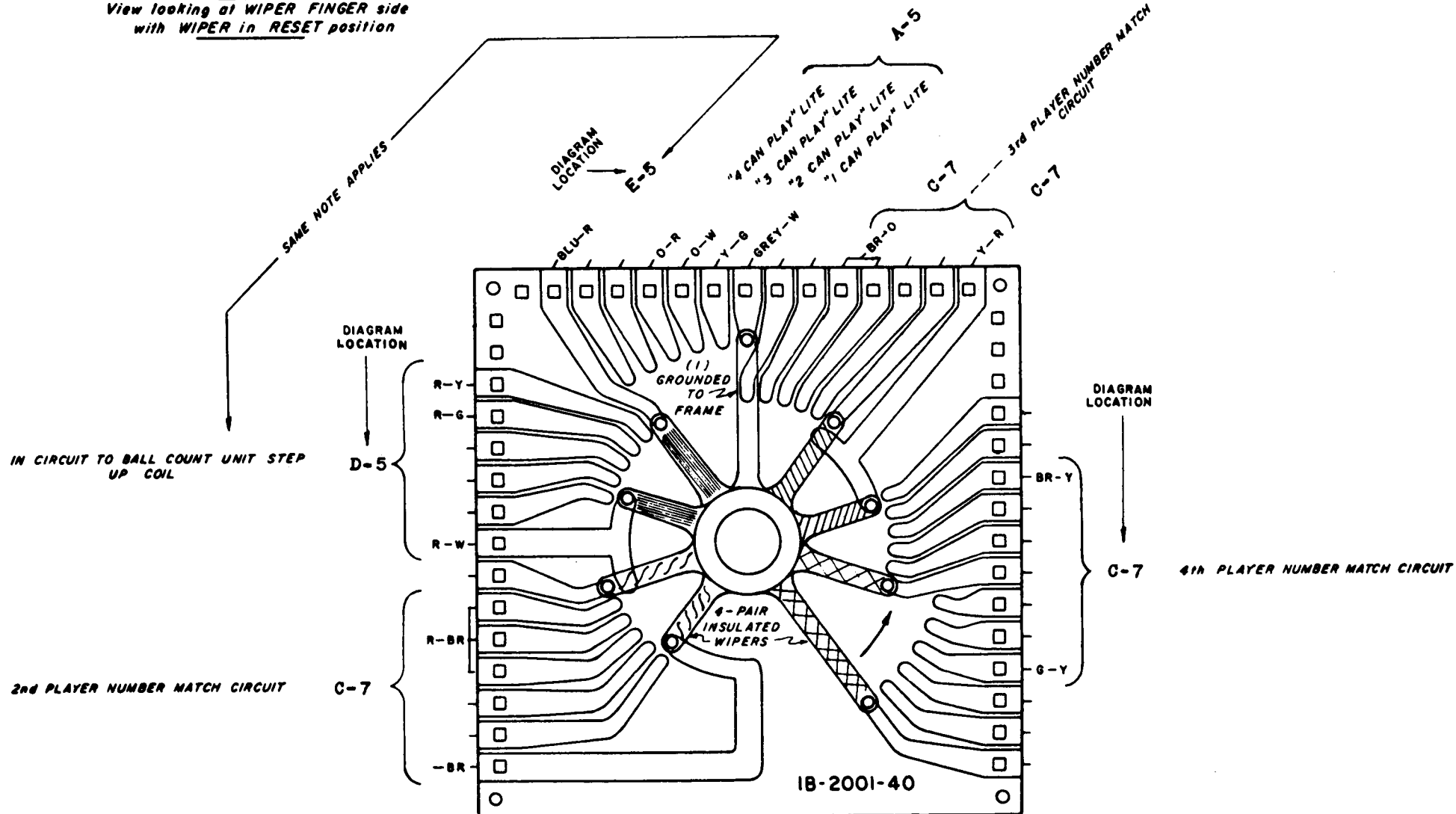
View looking at WIPER FINGER side
with WIPER in ZERO position.



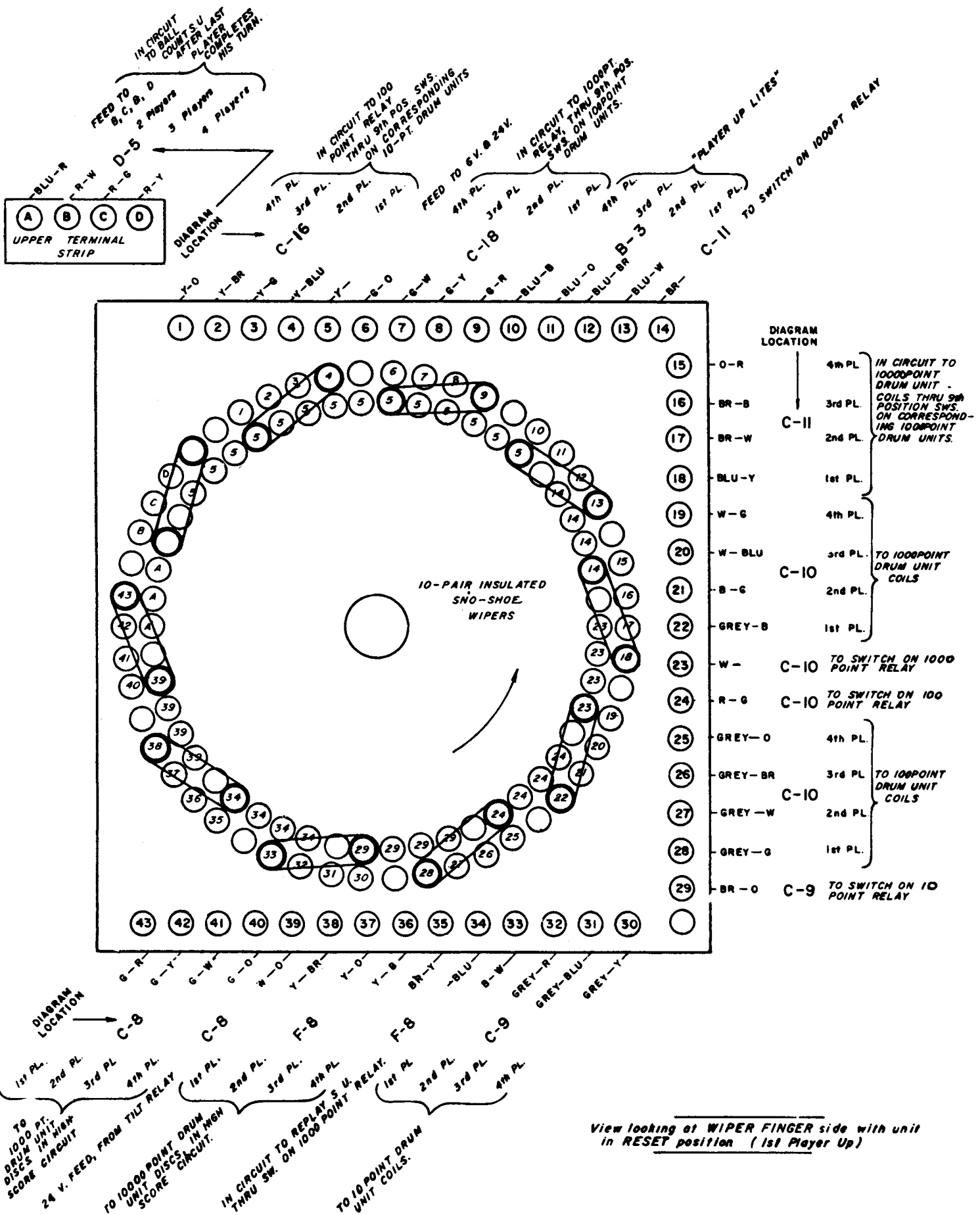
COIN S. U. DISC

THIS UNIT RESETS AT START OF
A GAME (DURING RESET CYCLE).
IT THEN ADVANCES ONE STEP EACH
TIME THE COIN RELAY IS PULSED.

View looking at WIPER FINGER side
with WIPER in RESET position



PLAYER UNIT DISC

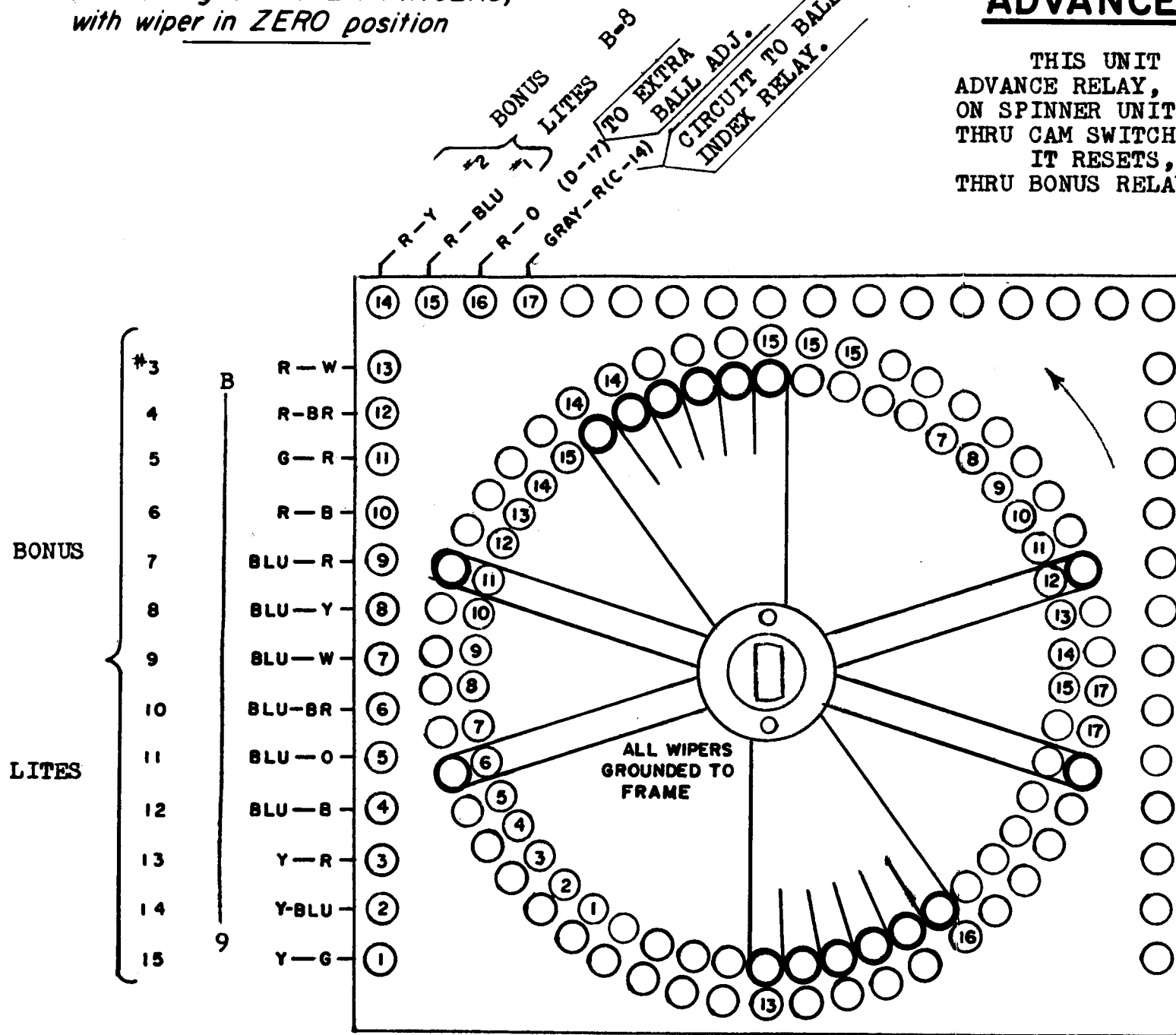


View looking at WIPER FINGERS,
with wiper in ZERO position

ADVANCE UNIT DISC

THIS UNIT IS STEPPED UP BY THE
ADVANCE RELAY, 9th POSITION SWITCH
ON SPINNER UNIT, OR BY OUTHOLE RELAY
THRU CAM SWITCH 3A.

IT RESETS, WHEN COLLECTING BONUS,
THRU BONUS RELAY AND DOUBLE BONUS RE.



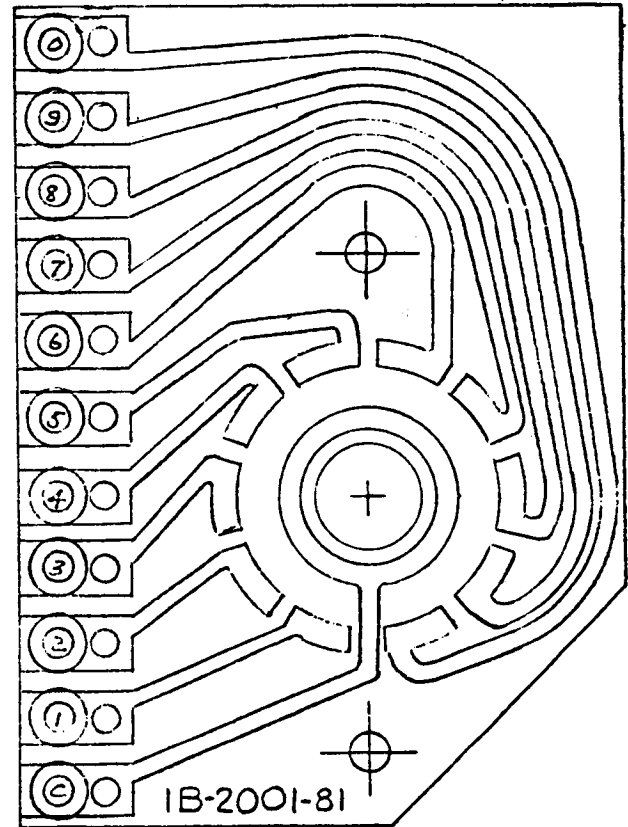
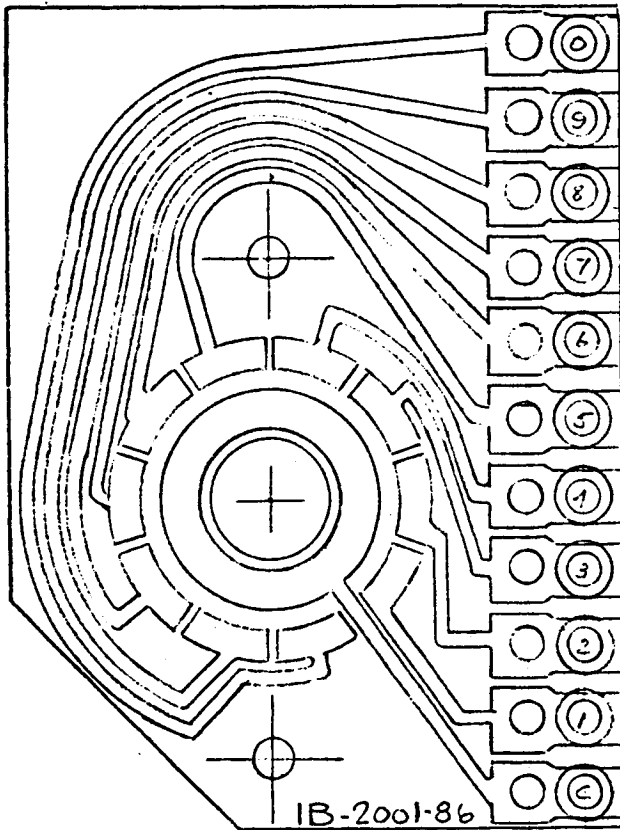
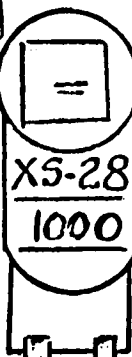


DIAGRAM
LOCATION
↓

No. MATCH UNIT

B-4

00 LITE W/G-3	①	PRINTED CIRCUIT- IB-2001-86
60 " BR/W-4	②	
10 " BR/G-3	③	
70 " BR/Y-2	④	
30 " BR/BLU-2	⑤	
80 " BR/R-2	⑥	
20 " W/GRY-3	⑦	
50 " W/B-3	⑧	
90 " W/O-3	⑨	
40 " W/BR-5	⑩	
FEED Y-	⑪	
	⑫	

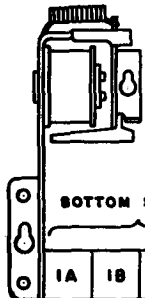


R BLU-2

DRIVE SPRING 10A-324-1

Y/BLU	00-MATCH	PRINTED CIRCUIT- IB-2001-81
G/Y-3	60 "	
Y/G	10 "	
G/W-2	70 "	
Y/O	30 "	
G/O-2	80 "	
Y/BR-2	20 "	
G/R-1	50 "	
W/BLU-2	90 "	
Y/B-1	40 "	
GRY/R-4	FEED	

E-8



TYPICAL "M" RELAY SWITCH.
POSITION

A.C. RELAYS & SWITCHES

LOCATED ON MECHANISM PANEL

BOTTOM SWITCHES

TOP SWITCHES

1A 1B 1C 1D

2A 2B 2C 2D

LOCK

IS ENERGIZED BY 5¢ RELAY, LEFT FLIPPER SWITCH OR SCORE MOTOR CAM SWITCH 1D.

OUTHOLE

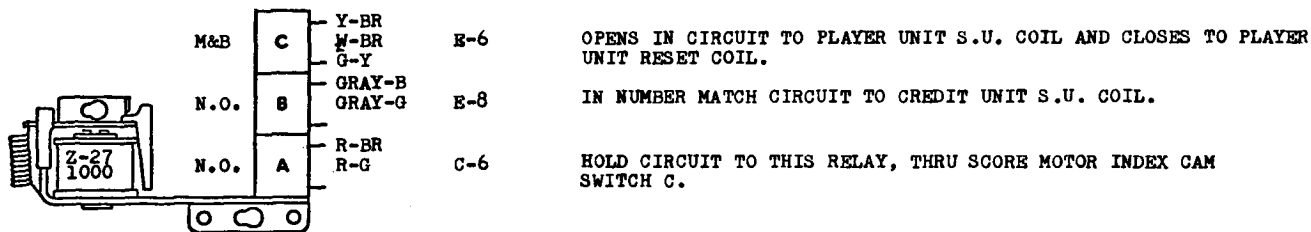
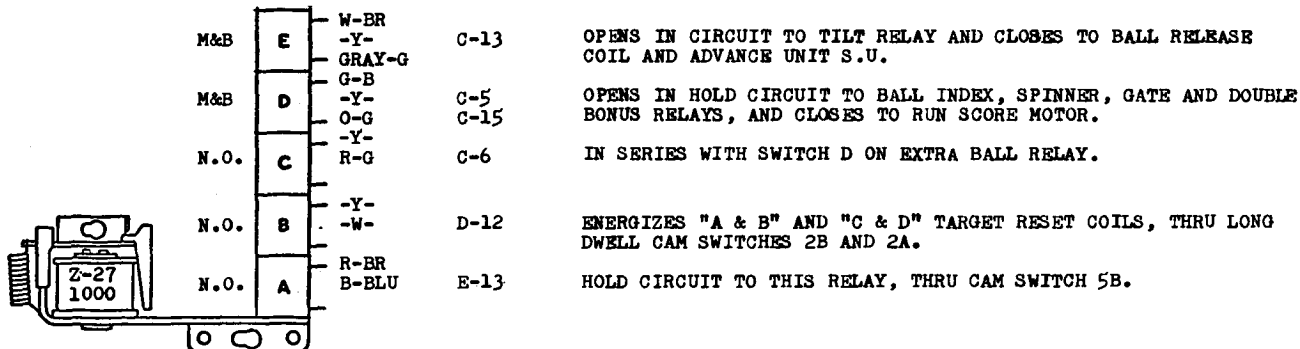
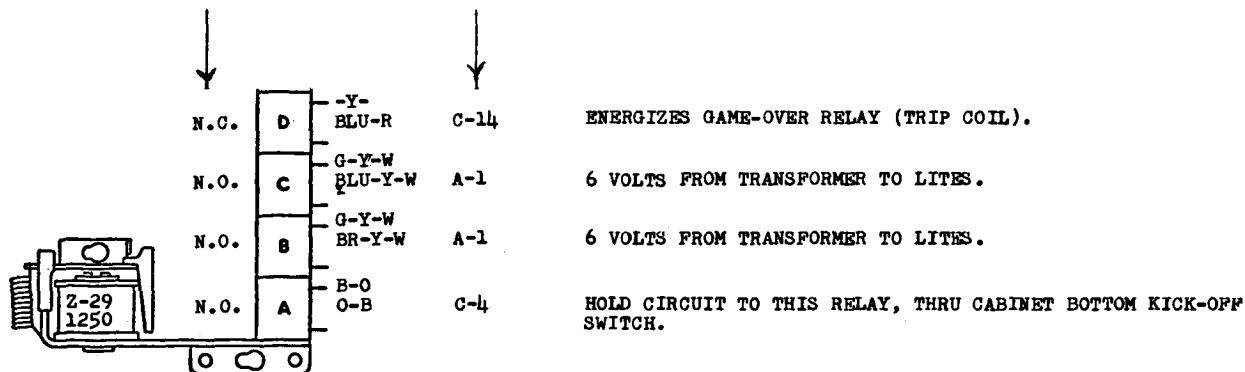
IS ENERGIZED, AT INDEX CAM SWITCH B, BY ZERO SWITCH ON ADVANCE UNIT, THRU SWITCH ON BONUS RELAY.

PLAYER RESET

IS ENERGIZED BY BALL COUNT UNIT END-OF-STROKE SWITCH. IT THEN HOLDS IN THRU SCORE MOTOR INDEX CAM SWITCH C.

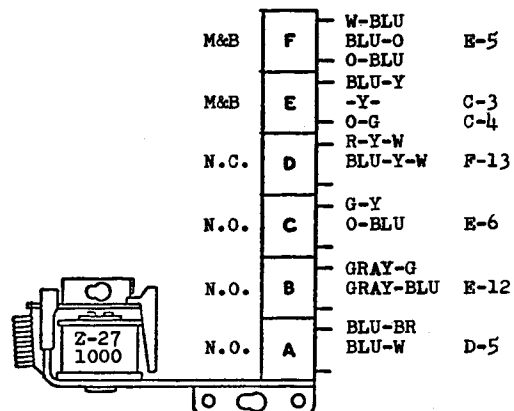
SWITCH TYPE

DIAGRAM LOCATION



RESET

IS ENERGIZED BY COIN RELAY, THRU SWITCH ON GAME-OVER RELAY.



OPEN IN CIRCUIT TO COIN UNIT S.U. COIL AND CLOSSES TO RESET COILS ON COIN, BALL COUNT AND GAME-OVER.

OPENS IN CIRCUIT TO REPLAY RELAY AND COIN LOCKOUT COILS--- CLOSSES TO RUN SCORE MOTOR.

OPENS CIRCUITS TO PLAYFIELD SWITCHES.

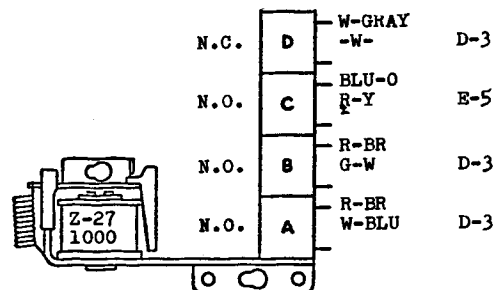
IN CIRCUIT TO PLAYER UNIT RESET COIL.

ENERGIZES BONUS RELAY, THRU ZERO SWITCH ON ADVANCE UNIT.

IN HOLD CIRCUIT TO THIS RELAY.

CREDIT

IS ENERGIZED BY CREDIT BUTTON, THRU ZERO SWITCH ON CREDIT UNIT.



OPENS CIRCUIT TO COIN LOCKOUT COIL.

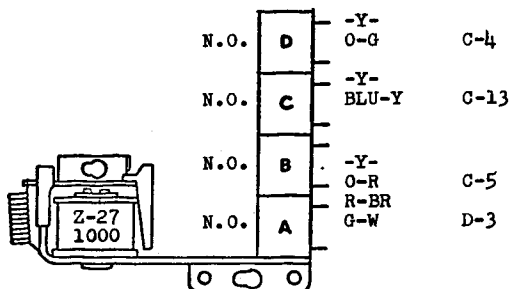
PULSES CREDIT UNIT RESET COIL AT SCORE MOTOR CAM SWITCH 1C.

ENERGIZES COIN RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

COIN

IS ENERGIZED BY COIN SWITCH OR CREDIT RELAY---ALSO BY 5¢ RELAY, THRU SWITCH ON ALTERNATOR UNIT---ALSO BY 25¢ RELAY IF GAME IS ADJUSTED TO "6 PLAYS FOR 25¢".



RUNS SCORE MOTOR.

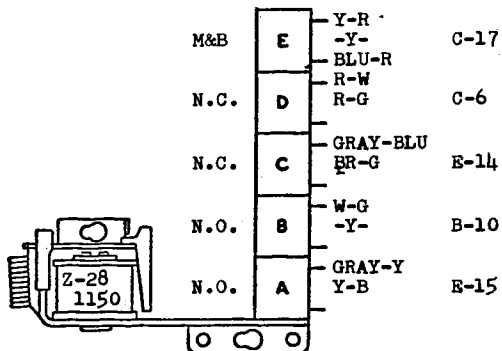
TRIPS GAME-OVER RELAY THRU ZERO SWITCH ON BALL COUNT UNIT OR PLAYER UNIT.

ENERGIZES RESET RELAY, THRU SWITCH C ON GAME-OVER RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

EXTRA BALL

IS ENERGIZED BY TARGET RELAY, THRU SWITCH ON DOUBLE BONUS RELAY---ALSO BY HI-SCORE CIRCUIT, THRU "CREDIT-EXTRA BALL" ADJUSTMENT JACK.



OPENS IN CIRCUIT TO 1,000 POINT RELAY AND CLOSSES IN CIRCUIT TO CREDIT UNIT S.U. COIL.

IN SERIES WITH SWITCH B ON BALL INDEX RELAY.

IN CIRCUIT TO BALL INDEX RELAY.

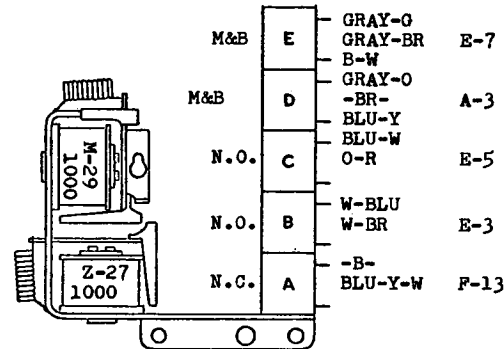
TO "SHOOT AGAIN" LITE AND LEFT BOTTOM ROLLOVER LITE FOR CREDIT.

IN HOLD CIRCUIT TO THIS RELAY.

GAME-OVER

LATCH COIL IS ENERGIZED BY SCORE MOTOR CAM SWITCH 1G, THRU SWITCHES ON COIN RELAY AND RESET RELAY.

TRIP COIL IS ENERGIZED BY LOCK RELAY OR WIPER FINGER ON BALL COUNT UNIT---ALSO BY COIN RELAY, THRU A ZERO SWITCH ON EITHER THE BALL COUNT UNIT OR PLAYER UNIT.



OPENS IN HI-SCORE CIRCUITS AND CLOSSES IN NUMBER MATCH CIRCUITS TO "CREDIT-EXTRA BALL" ADJUSTMENT.

OPENS TO "PLAYER UP" & "BALL IN PLAY" LITES, AND CLOSSES TO "GAME OVER" & NUMBER MATCH LITES.

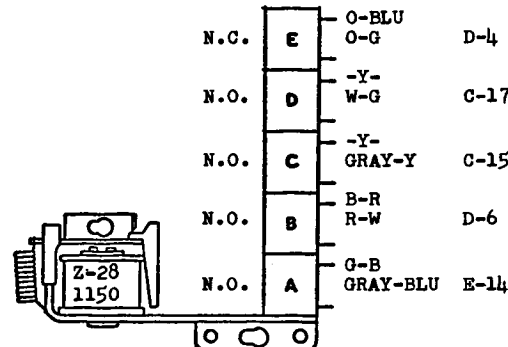
CIRCUIT TO RESET RELAY, THRU SWITCH ON COIN RELAY.

IN CIRCUIT TO CREDIT RELAY.

IN SERIES WITH SWITCH D ON RESET RELAY.

BALL INDEX

IS ENERGIZED BY 10, 100 OR 1,000 POINT RELAY, THRU SWITCH ON EXTRA BALL RELAY AND WIPER ON ADVANCE UNIT.



IN SERIES WITH SWITCH A ON COIN SET-UP RELAY.

IN CIRCUIT TO 1,000 POINT RELAY, WHEN COLLECTING BONUS.

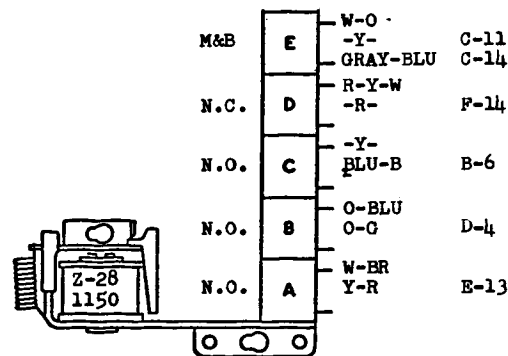
IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.

IN CIRCUIT TO BALL COUNT UNIT S.U.---ALSO IN SERIES WITH SWITCH C ON PLAYER RESET RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

TILT

IS ENERGIZED BY PLUMB BOB TILT, BALL ROLL-DOWN OR PLAYFIELD VIBRATION TILT SWITCH.



OPENS IN HI-SCORE CIRCUIT AND ALL (16) SCORE DRUM COILS, AND CLOSSES TO ENERGIZE BALL INDEX RELAY.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

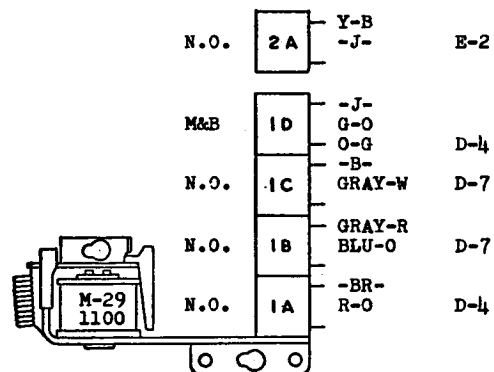
TO "TILT" LITE.

IN SERIES WITH SWITCH A ON COIN SET-UP RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

25¢

IS ENERGIZED BY 25¢ COIN SWITCH.



IN HOLD CIRCUIT TO THIS RELAY.

OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSSES TO RUN SCORE MOTOR.

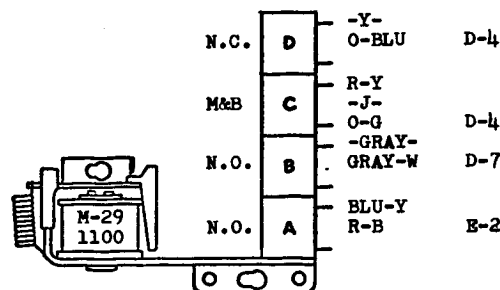
IN CIRCUIT TO CREDIT UNIT S.U., THRU "2 COINS-3 PLAYS" ADJUSTMENT JACK.

TO CREDIT UNIT S.U. COIL, THRU "2 COINS-3 PLAYS" ADJUSTMENT JACK.

IN CIRCUIT TO COIN SET-UP RELAY, THRU "2 COINS---3 PLAYS" ADJUSTMENT JACK.

10¢

IS ENERGIZED BY 10¢ COIN SWITCH, IF 10¢ ADJUSTMENT JACK IS IN "2 PLAYS" OR "3 PLAYS" POSITION---ALSO BY 25¢ COIN SWITCH, THRU SWITCH ON COIN SET-UP RELAY IF "2 COIN FOR 3 PLAYS" ADJUSTMENT IS IN "ON" POSITION.



IN HOLD CIRCUIT TO COIN SET-UP RELAY.

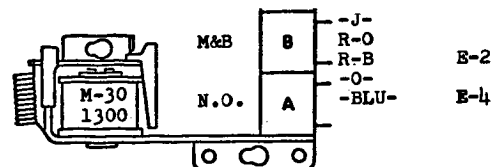
OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSSES TO RUN SCORE MOTOR.

PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH C.

IN HOLD CIRCUIT TO THIS RELAY.

COIN SET-UP

IS ENERGIZED BY 25¢ RELAY AT SCORE MOTOR CAM SWITCH 1E IF "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK IS IN "ON" POSITION.

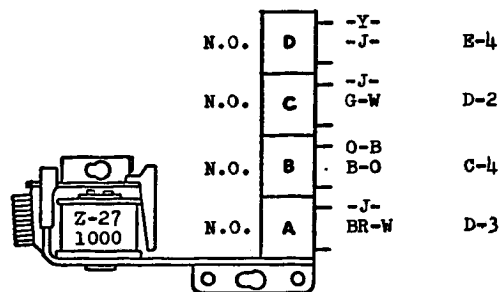


OPENS IN CIRCUIT TO 25¢ RELAY AND CLOSSES TO 10¢ RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

5¢

IS ENERGIZED BY 5¢ COIN SWITCH.



ENERGIZES ALTERNATOR UNIT COIL.

ENERGIZES COIN RELAY, THRU SWITCH ON ALTERNATOR UNIT.

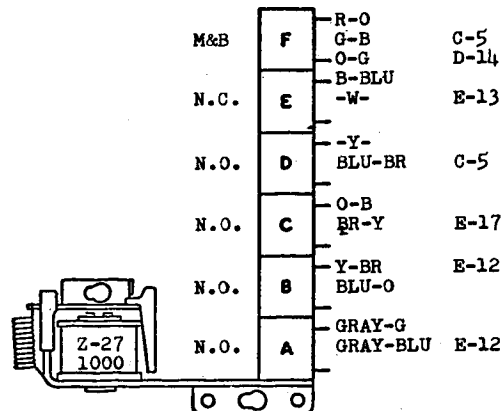
ENERGIZES LOCK RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

LOCATED ON PLAYFIELD

BONUS

IS ENERGIZED BY RESET RELAY, THRU ZERO SWITCH ON ADVANCE UNIT, OR BY OUTHOLE SWITCH THRU ANOTHER ZERO SWITCH ON ADVANCE UNIT.



OPENS IN CIRCUIT TO SPINNER RELAY AND CLOSSES IN CIRCUIT TO RUN SCORE MOTOR.

IN CIRCUIT TO OUTHOLE RELAY.

IN SERIES WITH SWITCH A ON RESET RELAY.

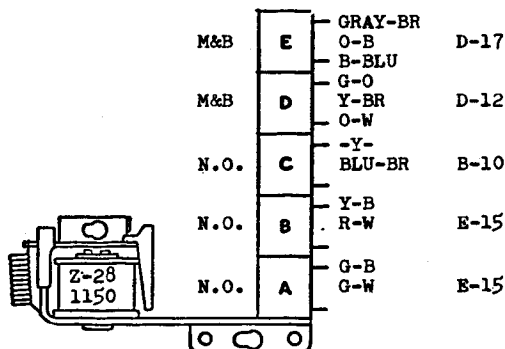
IN CIRCUIT TO 1,000 POINT RELAY, WHEN COLLECTING BONUS.

IN CIRCUIT TO ADVANCE UNIT RESET COIL.

HOLD CIRCUIT TO THIS RELAY, THRU ZERO SWITCH ON ADVANCE UNIT.

DOUBLE BONUS

IS ENERGIZED BY TARGET RELAY AT SCORE MOTOR CAM SWITCH 2A.



IN SERIES WITH SWITCH C ON BONUS RELAY.

IN SERIES WITH SWITCH B ON BONUS RELAY.

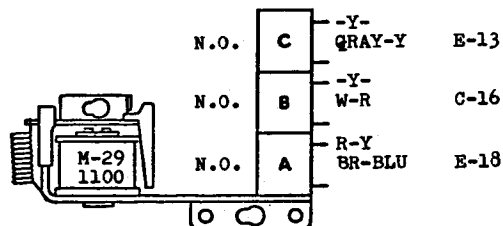
TO "DOUBLE BONUS" LITE.

ENERGIZES EXTRA BALL RELAY, THRU SWITCH ON TARGET RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

ADVANCE

IS ENERGIZED BY (2) TOP ROLLOVER BUTTONS ---ALSO BY SPINNER RELAY, THRU 4TH POSITION ON SPINNER ADVANCE UNIT.



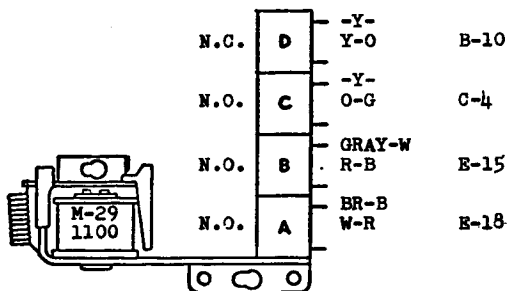
ENERGIZES ADVANCE UNIT S.U. COIL.

PULSES 100 POINT RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU END-OF STROKE SWITCH ON ADVANCE UNIT.

ADVANCE SPINNER

IS ENERGIZED BY LEFT & RIGHT TOP STAND-UP SWITCHES AND LEFT & RIGHT BOTTOM (INSIDE) ROLLOVER SWITCHES.



TO (4) SPINNER DISPLAY LITES.

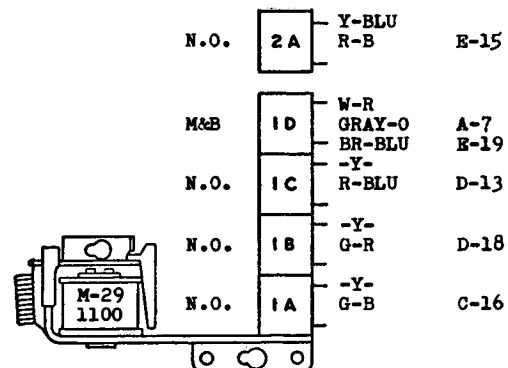
RUNS SCORE MOTOR.

IN CIRCUIT TO PULSE SPINNER RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU CAM SWITCH 3C.

SPINNER

IS ENERGIZED BY (4) LEFT TOP ROLLOVER
BUTTON SWITCHES, ADVANCE SPINNER RELAY,
AND SPINNER SWITCH.



IN HOLD CIRCUIT TO THIS RELAY.

OPENS TO #4 SPINNER LITE AND CLOSSES TO ENERGIZE ADVANCE RELAY.

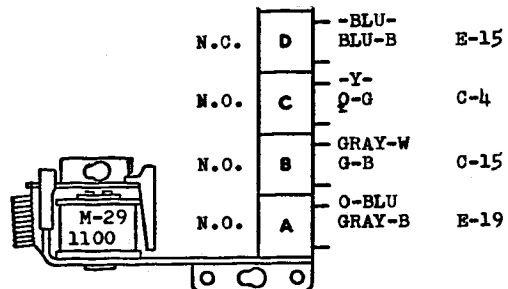
ENERGIZES ADVANCE UNIT S.U. COIL, THRU 9TH POSITION SWITCH ON
SPINNER UNIT.

ENERGIZES SPINNER UNIT S.U. COIL.

PULSES 10 POINT RELAY.

50 POINT

IS PULSED BY LEFT & RIGHT SIDE STAND-UP
SWITCHES.



IN HOLD CIRCUIT TO GATE RELAY.

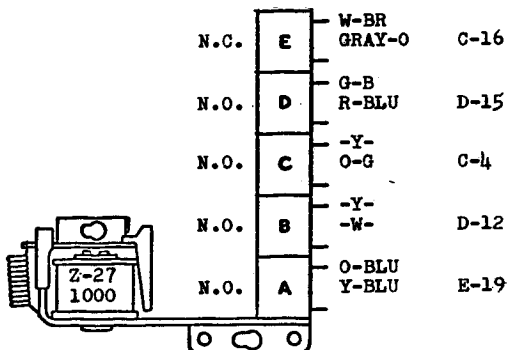
RUNS SCORE MOTOR.

PULSES 10 POINT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

TARGET

IS ENERGIZED BY SERIES CIRCUIT THRU A, B,
C AND D TARGET SWITCHES.



IN CIRCUIT TO 100 POINT RELAY.

IN CIRCUIT TO DOUBLE BONUS RELAY AND EXTRA BALL RELAY.

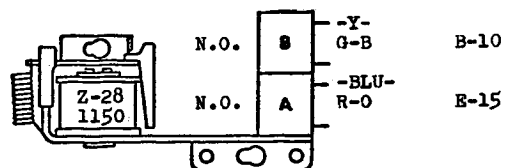
RUNS SCORE MOTOR.

ENERGIZES "A & B" AND "C & D" TARGET RESET COILS, THRU LONG
DWELL CAM SWITCHES 2B AND 2A.

IN HOLD CIRCUIT TO THIS RELAY.

GATE

IS ENERGIZED BY TOP CENTER ROLLOVER
SWITCH.



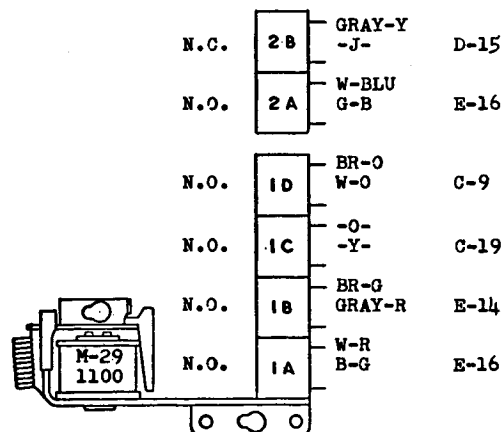
TO "GATE" LITE.

IN HOLD CIRCUIT TO THIS RELAY.

LOCATED IN BACKBOX

10 POINT

IS PULSED BY (2) KICKER SWITCHES, SPINNER RELAY AND 50 POINT RELAY.



IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

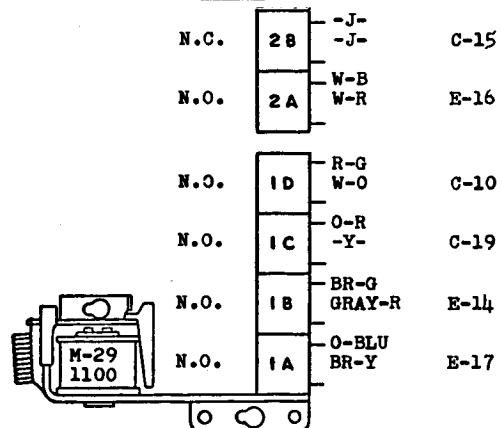
PULSES MEDIUM CHIME COIL.

IN CIRCUIT TO BALL INDEX RELAY.

PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

100 POINT

IS PULSED BY (3) JET BUMPER SWITCHES; A, B, C OR D TARGET SWITCHES; AND BY ADVANCE RELAY.



IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

PULSES 100 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

PULSES SMALL CHIME COIL.

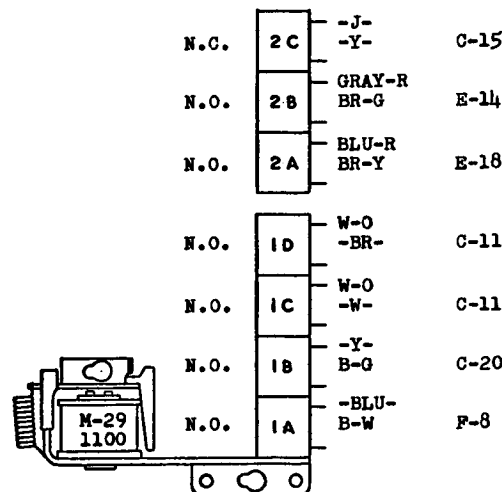
IN CIRCUIT TO BALL INDEX RELAY.

PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.

1000 POINT

IS ENERGIZED BY:

1. LEFT BOTTOM (OUTSIDE) ROLLOVER SWITCH.
2. RIGHT BOTTOM (OUTSIDE) ROLLOVER SWITCH.
3. BONUS RELAY, THRU SWITCH ON DOUBLE BONUS RELAY (WHEN COLLECTING BONUS).



IN SERIES WITH SWITCH 2B ON 100 POINT RELAY.

IN CIRCUIT TO BALL INDEX RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

PULSES 10,000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.

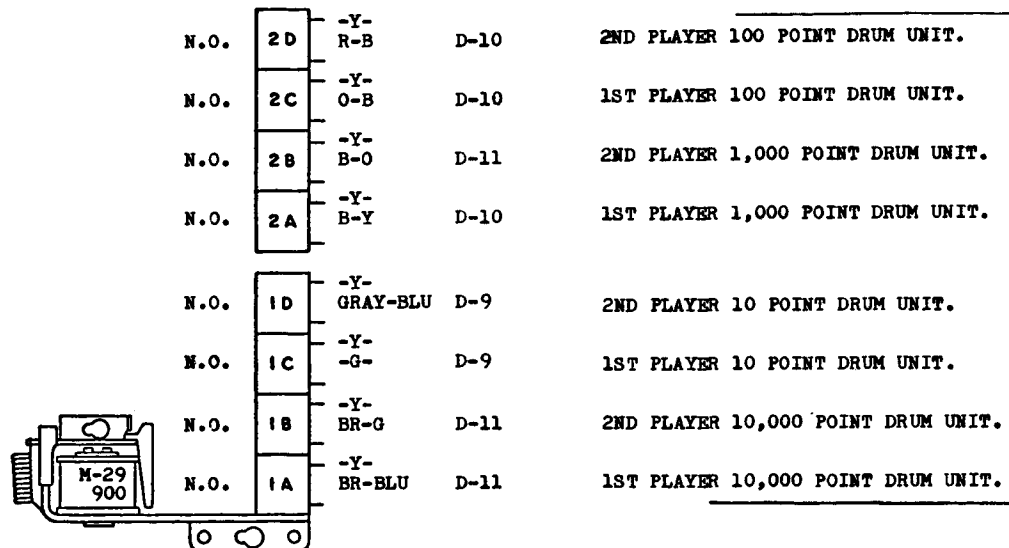
PULSES 1,000 POINT DRUM UNITS, THRU PLAYER UNIT DISC.

PULSES LARGE CHIME COIL.

IN HI-SCORE CIRCUIT TO CREDIT UNIT S.U. OR EXTRA BALL RELAY.

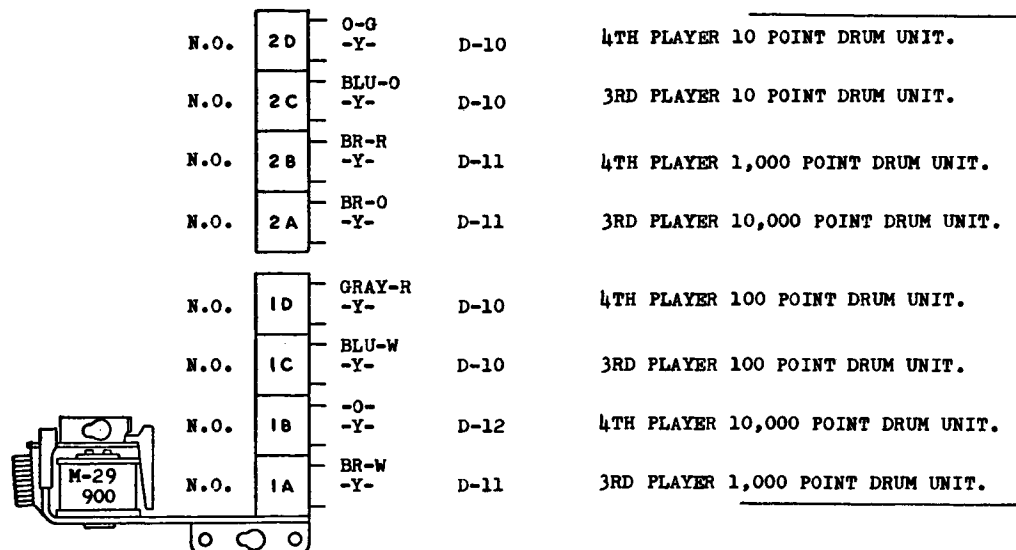
1/2 RESET

IS PULSED BY "FORWARD IMPULSE CAM"
SWITCH A, THRU SWITCH A ON RESET RELAY.



3/4 RESET

IS PULSED BY IMPULSE CAM SWITCH D, THRU
SWITCH A ON RESET RELAY.



"STAR POOL"



3401 N. CALIFORNIA AVE. CHICAGO, ILLINOIS - 60618

15B-6782 POWER TRANSFORMER

(Replaces — 15A-6773)

<i>USE TAP</i>	<i>IF LINE VOLTAGE IS</i>
105 V.	109 or LESS
117 V.	110 to 122
130 V.	123 to 135
160 V.	150 to 170

<i>USE TAP</i>	<i>IF LINE VOLTAGE IS</i>
205 V.	190 to 208
225 V.	209 to 228
240 V.	229 to 250

If game has sluggish action and dim lites, check line voltage and use proper primary tap as suggested above. For example, if line voltage is below 110V., wire may be disconnected from 117V. tap and soldered to 105V. tap. This will increase secondary voltage approximately 2-3 volts.

If action is sluggish, and proper primary tap is being used, disconnect wire from 24V. tap and solder to "high" tap. This will increase voltage to coils approximately 2-3 volts.