

Instruction Manual for **SATIN DOLL**



Williams® ELECTRONICS

A SUBSIDIARY OF
THE SEEBURG CORPORATION OF DELAWARE

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(312) 267-2240

MARCH
1975

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

SATIN DOLL

2 PLAYER

GAME OPERATES AS FOLLOWS:

MAKING 1-2-3-4-5 LITES TOP ROLLOVER BUTTONS
TO SCORE 1,000 POINTS.

MAKING 1-2-3-4-5 -- 2nd TIME -- DOUBLES
BONUS VALUE.

MAKING 1-2-3-4-5 -- 3rd TIME -- LITES TARGET
SPECIAL LITE.

HITTING LIT TARGET WHEN TARGET SPECIAL IS
LIT, SCORES 1 CREDIT.

MAKING 4 STARS -- SCORES EXTRA BALL.

1 CREDIT FOR EACH PLAYER MATCHING LAST TWO
NUMBERS ON SCORE REELS TO LIT NUMBER THAT APPEARS
ON BACK GLASS WHEN GAME IS OVER.

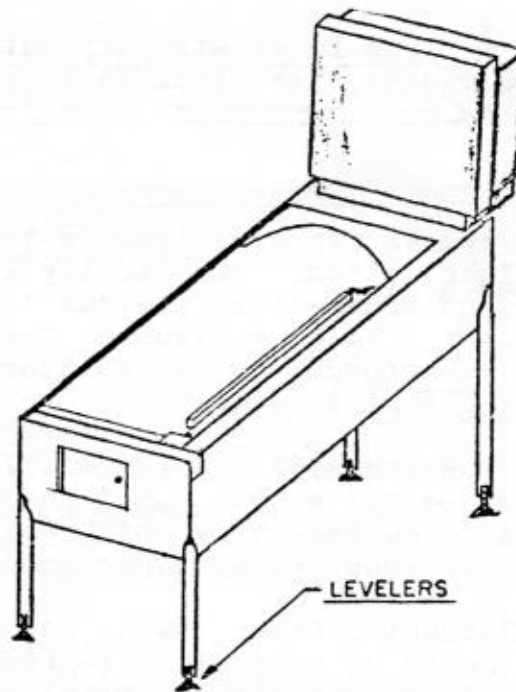
MAXIMUM 1 EXTRA BALL PER BALL IN PLAY.

TILT PENALTY--- BALL IN PLAY.

TILT DOES NOT DISQUALIFY PLAYER.

IMPORTANT NOTICE

**DUE TO THE NATURE OF THIS GAME
IT IS MOST IMPORTANT THAT THE
GAME BE LEVELED PROPERLY.**



**IF THE GAME IS SCORING TOO HIGH
(TOO LIBERAL) ADJUST LEVELERS SO
THAT PLAYFIELD PITCHES SLIGHTLY
TO THE RIGHT.**

**IF THE GAME IS SCORING TOO LOW
(TOO CONSERVATIVE) ADJUST THE
LEVELERS SO THAT PLAYFIELD
PITCHES SLIGHTLY TO THE LEFT.**

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.

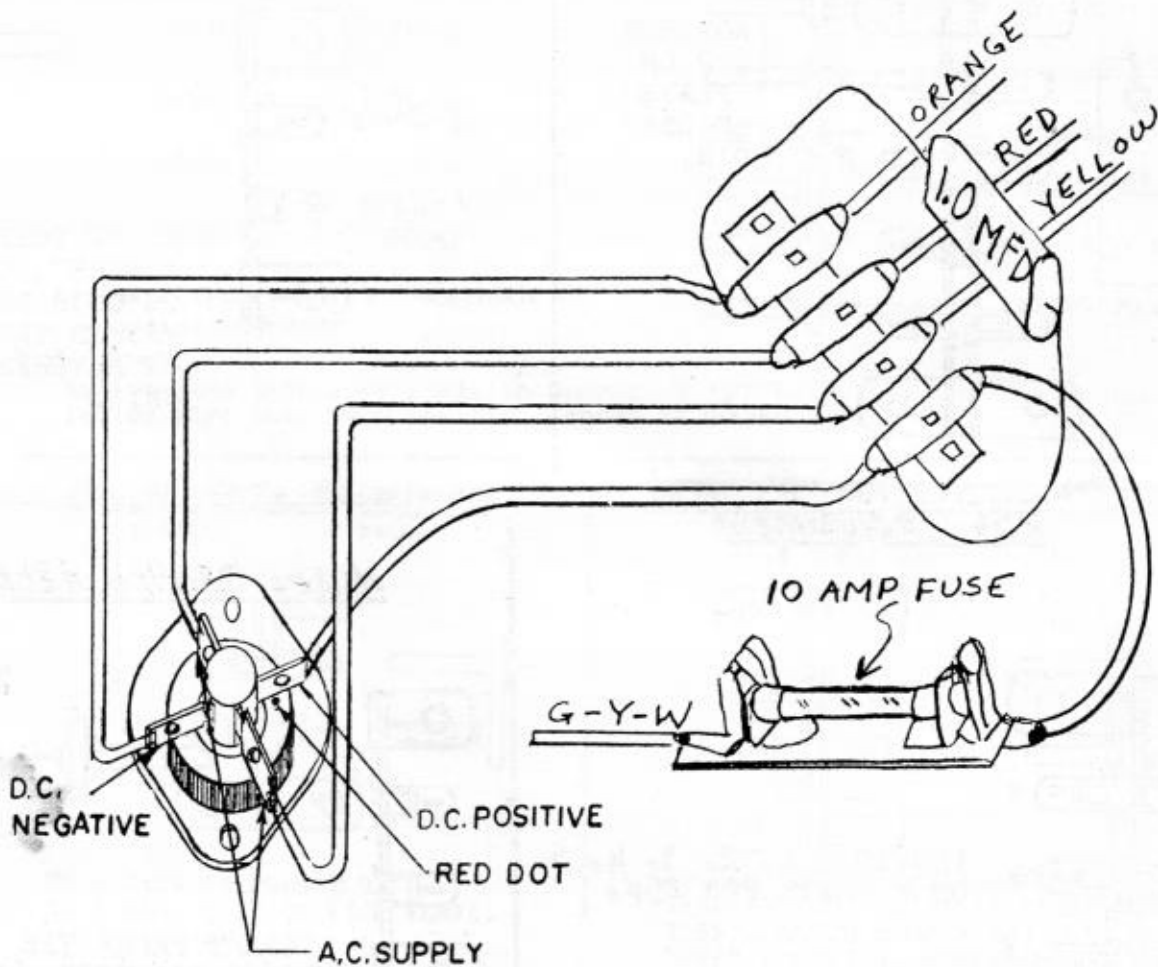
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with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

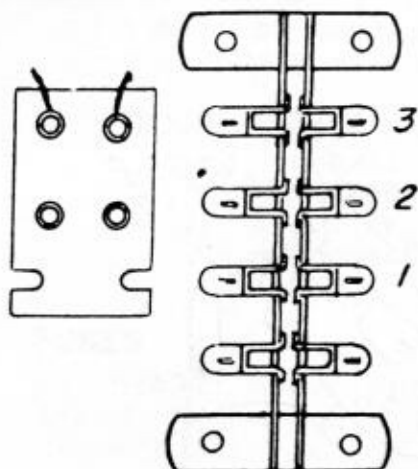
THE BRIDGE RECTIFIER SHOULD PRACTICALLY NEVER NEED REPLACING, AS IT IS RATED WELL OVER THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IT SUPPLIES.

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.

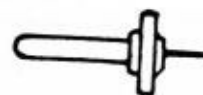
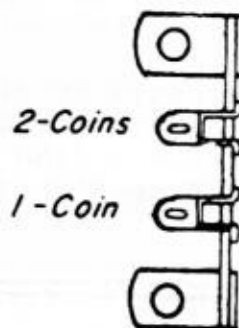
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



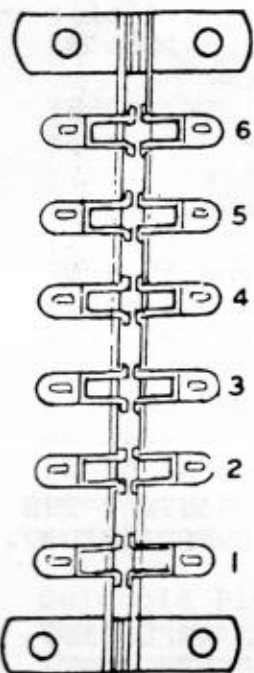
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

5¢ Adjustment

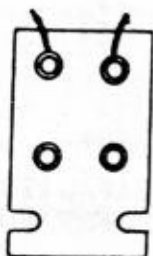


IN "2 COINS FOR
1 PLAY", CIRCUIT
TO COIN RELAY
PASSES THRU SW.
ON ALTERNATOR
UNIT.

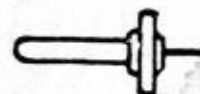
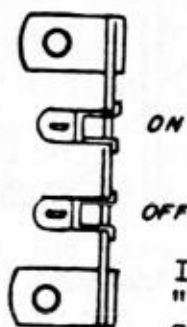
25¢ Adjustment



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



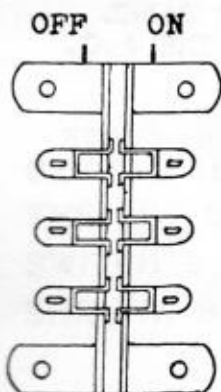
Motor Service Jack



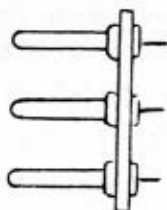
INSERT PHONE TIP IN
"OFF" POSITION - CAMS
CAN BE TURNED BY HAND
TO CHECK ADJUSTMENT OF
SWITCHES.

MASTER ON-OFF SW.

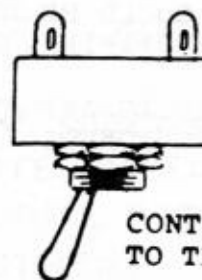
(Located under front of
Cabinet)



1 COIN- 1 PLAY
2 COINS- 3 PLAYS



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.



CONTROLS POWER
TO TRANSFORMER

ADJUSTMENTS IN BACKBOX

Hi-Score Adjustment

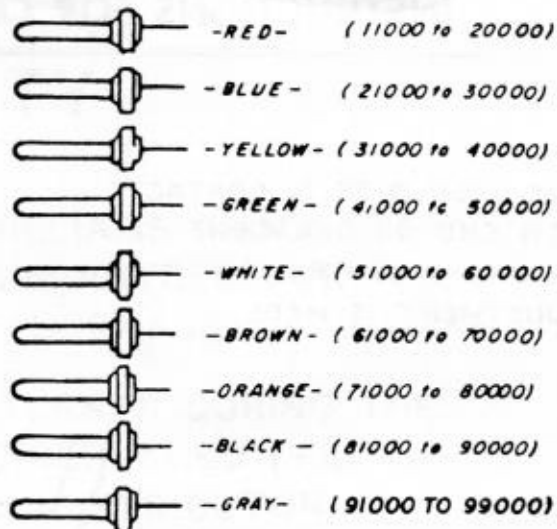
█

1000 <input type="checkbox"/>	6000 <input type="checkbox"/>
2000 <input type="checkbox"/>	7000 <input type="checkbox"/>
3000 <input type="checkbox"/>	8000 <input type="checkbox"/>
4000 <input type="checkbox"/>	9000 <input type="checkbox"/>
5000 <input type="checkbox"/>	0000 <input type="checkbox"/>

Insert plugs into 10 Point Female at desired positions.

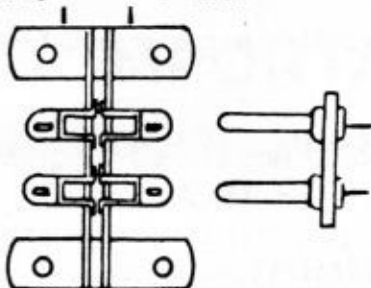
Examples:

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



No. of Balls Adjustment

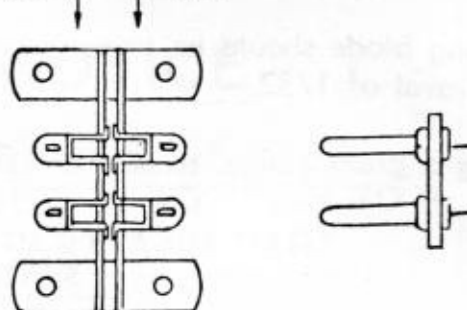
3 BALL 5 BALL



THIS JACK CHANGES 3 BALL TO 5 BALL PLAY OR VICE VERSA.

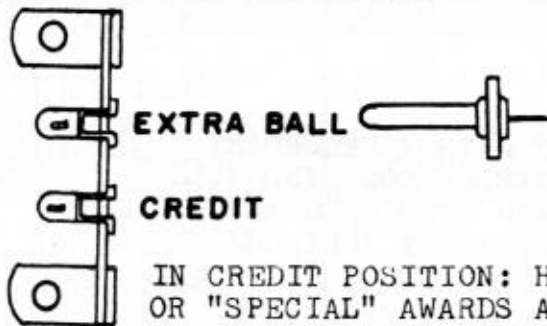
NUMBER MATCH ADJUSTMENT

ON OFF



IN "ON" POSITION, A CREDIT IS SCORED IF LAST TWO DIGITS IN POINT SCORE ARE IDENTICAL TO NUMBER MATCH LITE. IN "OFF" POSITION, NUMBER MATCH IS INOPERATIVE.

Extra Ball Jack Adj.



IN CREDIT POSITION: HI-SCORES OR "SPECIAL" AWARDS A CREDIT. IN EXTRA BALL POSITION, THEY WILL ENERGIZE EXTRA BALL RE. (TRIPPING NO. 1 THRU NO. 4 STAR RELAYS WILL ALWAYS ENERGIZE EXTRA BALL RELAY).

SUGGESTED SCORE CARDS

REPLAY

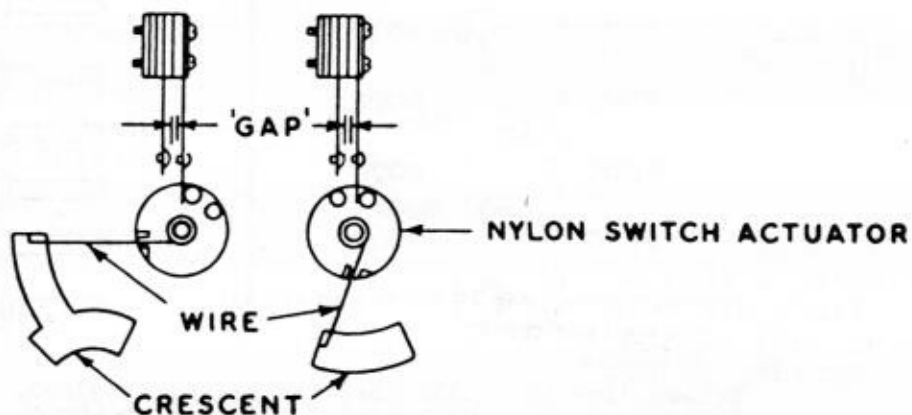
3 BALL...454-8 5 BALL...454-1

EXTRA BALL

3 BALL...454-29 5 BALL...454-35

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.

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	-----	-----	A-6400	
BALL COUNT	C-6414	B-7456-10	A-6402-10	
NO. MATCH	C-6417	C-6521	A-6403	SCORE MOTOR
BONUS	C-6417	B-7456-49	A-6402-10	14A-7883
TENS	B-7253	A-6294	3C-7272	(60) CYCLE
HUNDREDS	-----	-----	3C-7272	14A-7884
THOUSANDS	B-7253	A-6294	3C-7272	(50) CYCLE
10 THOUSANDS	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	

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.**

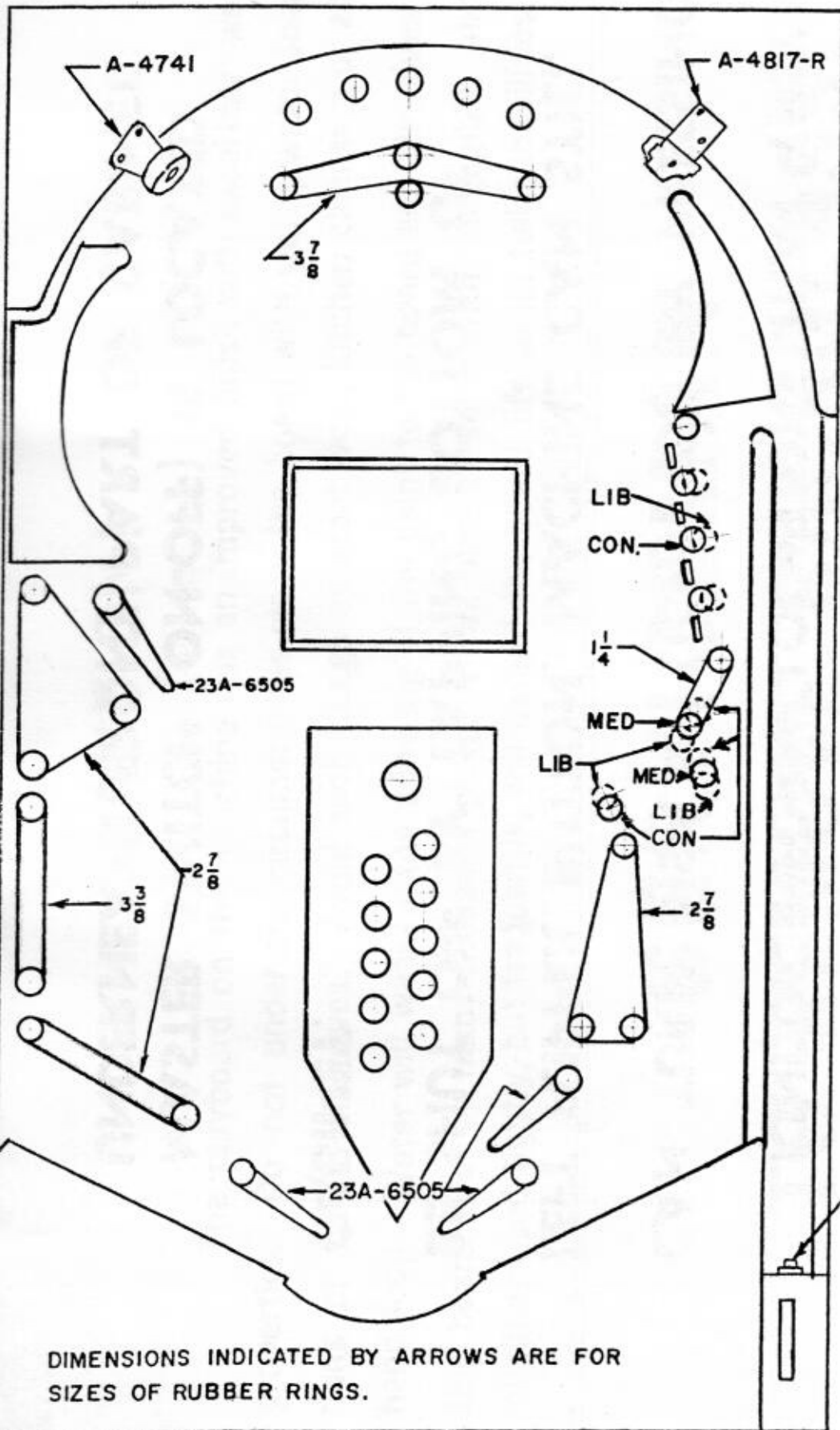
IMPORTANT NOTICE

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.

"SATIN DOLL" - 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 POSTS.



ABBREVIATIONS:

CONS.-CONSERVATIVE
LIB.-LIBERAL

RUBBER RING NUMBERS:

23A-6300	5/16 I.D.
23A-6304	1 1/2 I.D.
23A-6307	2 7/8 I.D.
23A-6308	3 3/8 I.D.
23A-6309	3 7/8 I.D.

DIMENSIONS INDICATED BY ARROWS ARE FOR SIZES OF RUBBER RINGS.

"SATIN DOLL" COIL CHART

NOTICE:

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

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>LOCATION</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	METER - 24 VOLT	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	BALL RELEASE COIL BALL COUNT UNIT STEP UP BONUS UNIT STEP UP	PLAYFIELD INSERT PLAYFIELD
A 23-600	NUMBER MATCH STEP UP CREDIT UNIT STEP UP	INSERT INSERT
A 2-23-750	KNOCKER	CABINET
A2-26-1300	CHIME COILS ... (3 req'd.)	CABINET
B1-26-800	CREDIT UNIT RESET BALL COUNT UNIT RESET ALTERNATOR UNIT STEP UP SCORE DRUM UNITS ... (8 req'd.) BONUS UNIT RESET	INSERT INSERT MECH. PANEL INSERT PLAYFIELD
FL 20-300/ 28-400	FLIPPERS ... (4 req'd.)	PLAYFIELD
G 23-750 D.C.	JET BUMPER COILS ... (2 req'd.) AUTOMATIC KICKER	PLAYFIELD PLAYFIELD
M 29-900	SCORE RESET RELAY	INSERT
M 29-1000	GAME OVER RELAY TRIP 2ND COIN RELAY TRIP	MECH. PANEL MECH. PANEL
M 29-1100	5¢ RELAY 10 ¢ RELAY 25 ¢ RELAY ADVANCE RELAY 50 PT. RELAY BONUS RELAY 10 PT. RELAY 100 PT. RELAY 1000 PT. RELAY 1 TO 5 RESET RELAY 3000 RELAY	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD INSERT INSERT INSERT PLAYFIELD PLAYFIELD
M1-31-1500	COIN LOCKOUT COIL	FRONT DOOR
XM 27-675	TOTAL PLAY METER COIL	MECH. PANEL
Z 27-1000	GAME OVER RELAY LATCH 2ND COIN RELAY LATCH CREDIT RELAY COIN RELAY RESET RELAY OUT HOLE RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	TILT RELAY BALL INDEX RELAY EXTRA BALL RELAY PLAYER RELAY	MECH. PANEL MECH. PANEL MECH. PANEL INSERT
Z 29-1250	LOCK RELAY	MECH. PANEL
D1-24-1400	1 TO 4 BANK RESET COIL	PLAYFIELD
D1-24-1600	1 TO 5 BANK RESET COIL	PLAYFIELD
S 27-500	BANK TRIP COILS ...(12 req'd.)	PLAYFIELD
M 30-1300	COIN SET UP RELAY	MECH. PANEL

JACK LAYOUT

GAME SATIN DOLL

POSITION PAN. P.F. SIZE 22

FEED	-B-	1	G/W-3 BONUS RE
"	-R-	2	B/BLU-1 OUT HOLE RE
"	R/Y/W	3	Y/BLU " "
EXTRA BALL RE	Y/B-5	4	BLU/W-4 BALL RELEASE
SHOOT AGAIN LTR	W/G-4	5	Y/R-2 TILT RE
BONUS RESET	BR/W-6	6	-Y- FEED
"	R/B-4	7	O/R SPECIAL
"	R/BLU-1	8	-W- FEED
DOUBLE BONUS	W/BR	9	Y/BR-5 BONUS S.U.
FEED	BLU	10	BLU/Y/W FEED
SETUP RE	BLU/O	11	O/BLU SETUP RE
PAN. = PANEL			P.F. = PLAYFIELD

JACK LAYOUT

GAME SATIN DOLL

POSITION PAN. P.F. SIZE 20

	1	1705 BANK RESET BR (P)		BR/BR-1 RESET RE
	2	BANK RESET B (P)		W/BR-4 TILT RE
	3	1000 PT RE	GRAY	O/G MOTOR
	4	" " "	0-3	B/W-5 L. FLIPPER
	5	" " "	GRAY/Y-2	BR/W-5 R. "
	6	BANK RESET BLU (P)		W-5 CREDIT S.U.
	7	" " "	PURPLE (P)	BR/B 3000 RE
	8	1705 RESET RE	BR/R-2	O/BLU
	9	" " "	O (P)	BR/O-3
	10	" " "	O/R-1	BLANK

JACK LAYOUT

GAME SATIN DOLL

POSITION PAN-INS SIZE 20

1	FEED -B-	0/BW-2 BALL COUNT	RESET
2	" -R-	B/R COIN LOCKOUT	
3	CREDIT RE W/BW-1	R/Y/W FEED	
4	" " W/O-3	1/BR-1 PLAYER RE	
5	" " G/O-1	W/R-2 " "	
6	SMALL CHIME O/R-5	BW/R-1 G.OVER RETRIP	
7	KNOCKER B/W	BW/W-2 " "	
8	SCORE RESET RE B/BW	O/W-4 BALL INDEX RE	
9	RESET RE. BW/BR-1	B/G-3 LARGE CHIME	
10	CREDIT RESET W/BW-1	0-4 MEDIUM CHIME	
PAN = PANEL		INS = INSERT	

JACK LAYOUT

GAME SATIN DOLL

POSITION PAN-INS SIZE 18

1	CREDIT S.U. W/O-1	-Y- FEED
2	CREDIT S.U. GRAY	BR/4 1000 PT RE
3	BALL COUNT S.U. GRAY/B	W/G-4 SHOOT AGAIN LITE
4	CREDIT S.U. O/R-1	1/BW-3 EX-BALL RE
5	2 CAN PLAY LITE 7/G	7/B-5 " " "
6	1 CAN PLAY LITE GRAY/W-3	BR/4/W 1ST PLAYER UP
7	TILT LITE G/W-1	GR/O G.OVER LITE
8	BK/O-3	BR @ FEED
9	BLANK	BLANK
A = 16 GAUGE		

JACK LAYOUT

GAME SATIN DOLL

POSITION P.F. - INS. SIZE 1/6

CREDIT LIFE	<u>GRY/1-3</u>
3000 RE	<u>%BW-1</u>
3000 RE	<u>%G-1</u>
CREDIT STEPUP	<u>GRY/BR</u>
3000 RE	<u>%W-1</u>
"	<u>%B-2</u>
"	<u>%R-1</u>
"	<u>%BW-2</u>

1	<u>G/B 10 FT. RE</u>
2	<u>W/R 100 " "</u>
3	<u>BR/Y 1000 " "</u>
4	<u>R/BW-3 TOP TARGET DIE</u>
5	<u>R/Y-4 " " "</u>
6	<u>R/G-4 " " "</u>
7	<u>R/W-4 " " "</u>
8	<u>BW/Y-4 " " "</u>

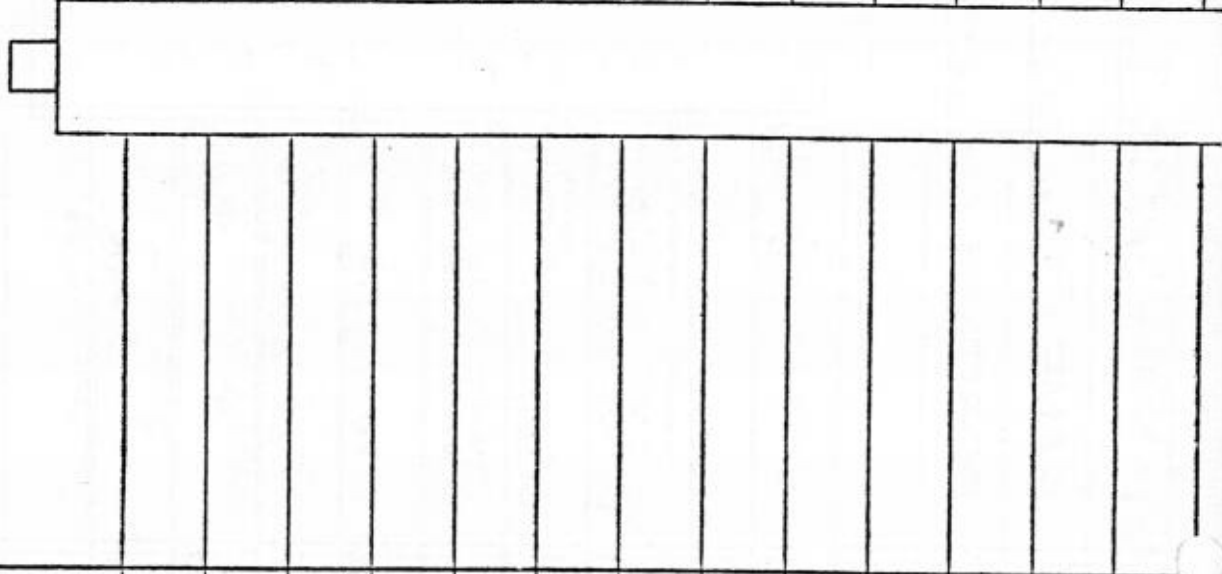
P.F. = PLAYFIELD

INS = INSERT

JACK LAYOUT

GAME _____ DATE _____

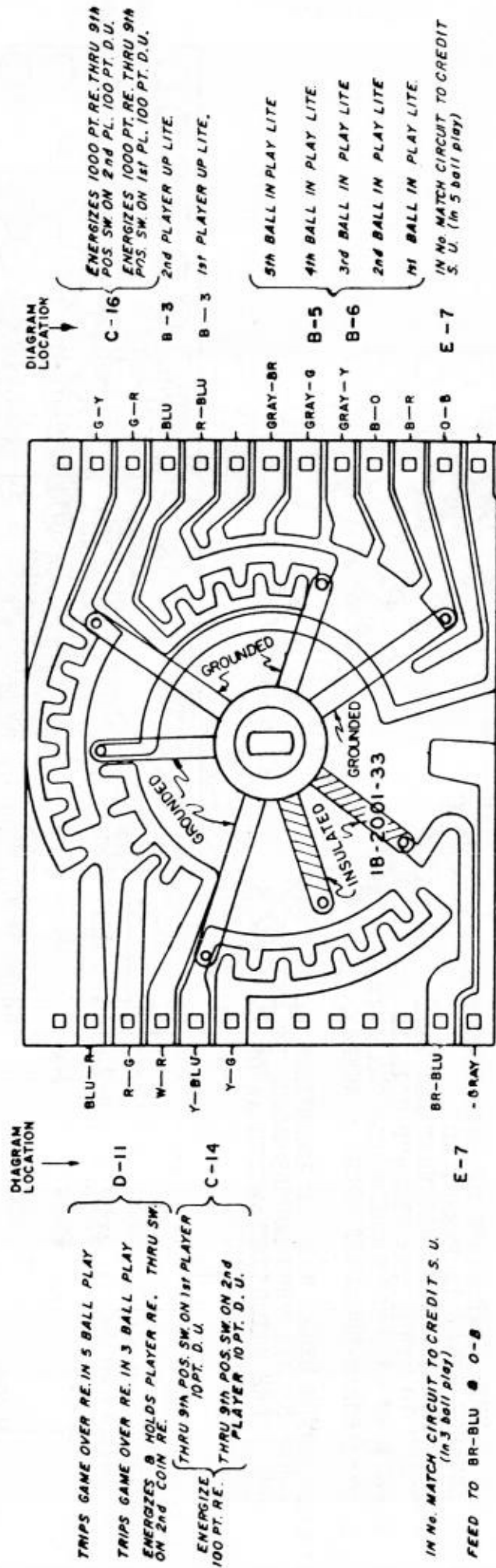
POSITION _____ SIZE _____



BALL COUNT UNIT

THIS UNIT RESETS AT THE START OF A NEW GAME.
 IT ADVANCES WHEN THE OUTHOLE RELAY IS ENERGIZED.
 IT ADVANCES ONE STEP AT A TIME WHEN TWO PEOPLE ARE PLAYING AND TWO STEPS IF ONLY ONE PERSON IS PLAYING.

VIEW LOOKING AT WIPER FINGERS, WITH WIPER IN RESET POSITION.



BONUS UNIT

THIS UNIT STEPS UP EACH TIME THE ADVANCE RELAY IS ENERGIZED.

ALSO, AFTER THIS UNIT HAS BEEN RESET TO ZERO, THE STEP-UP COIL IS ENERGIZED ONCE BY SCORE MOTOR CAM SWITCH 6A, THRU BONUS UNIT WIPER FINGERS.

THE RESET COIL IS ENERGIZED BY BONUS RELAY, THRU DOUBLE BONUS RELAY AND SCORE MOTOR CAM SWITCH 4A OR IMPULSE CAM SWITCH A.

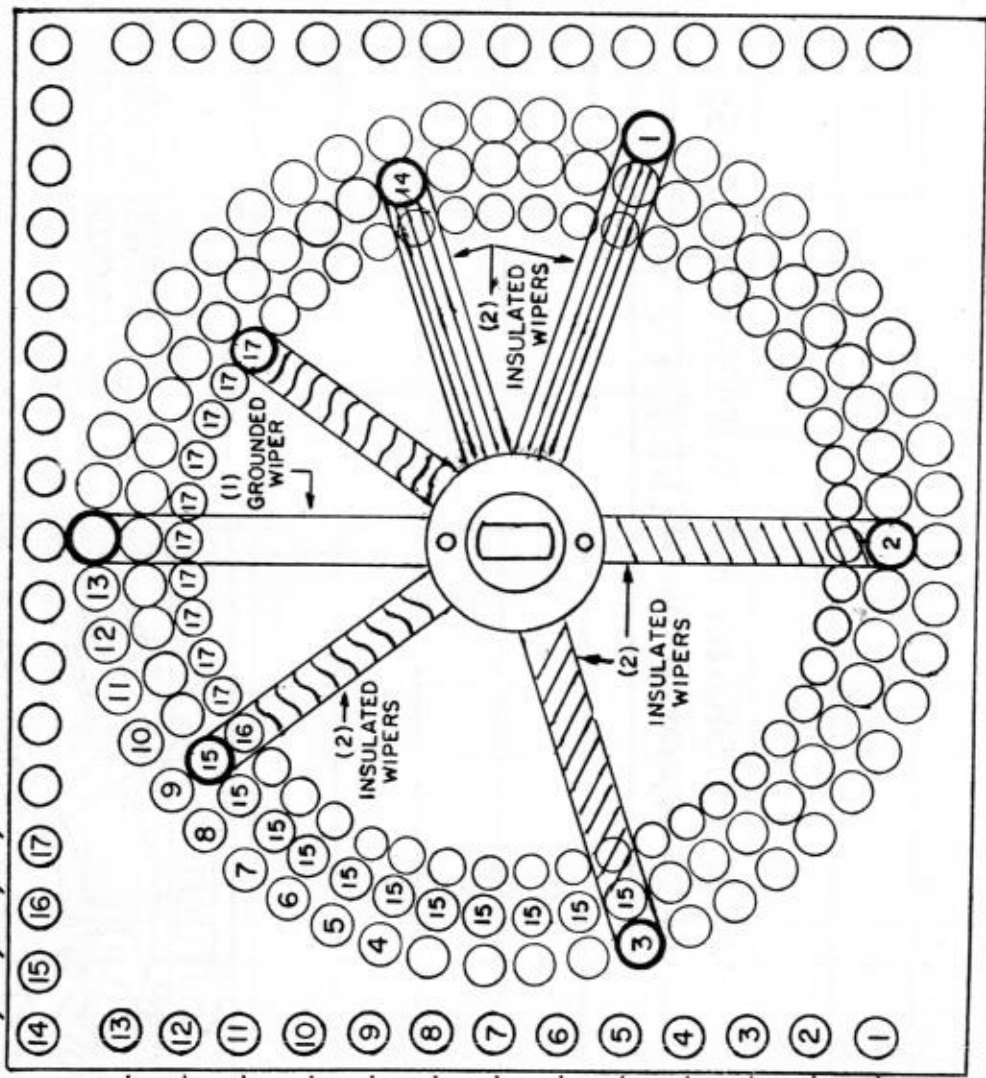
1000	A-7	R-Y-
2000		R-G-
3000		R-W-
4000		R-BR-
5000		R-O-
6000		R-B-
7000		-BLU-
8000		BLU-R-
9000		O-W-
10,000	A-8	BLU-B-
		BLU-BR-
		Y-BR-
		B-BLU-
		D-10
		L-10

TO BONUS UNIT S.U. COIL
THRU CAM SWITCH 6A.

PULSES OUTHOLE RELAY
AT CAM SWITCH 6B.

SEE #1 (B-BLU) FEED FROM SW. ON ADVANCE RE.
TO 100 POINT RELAY.
FEED FROM SW. ON ADVANCE RE.
TO 1,000 POINT RELAY.
W-R(C-15)
BR-Y(O-15)
B-Y(C-15)
Y-BLU (D-10)

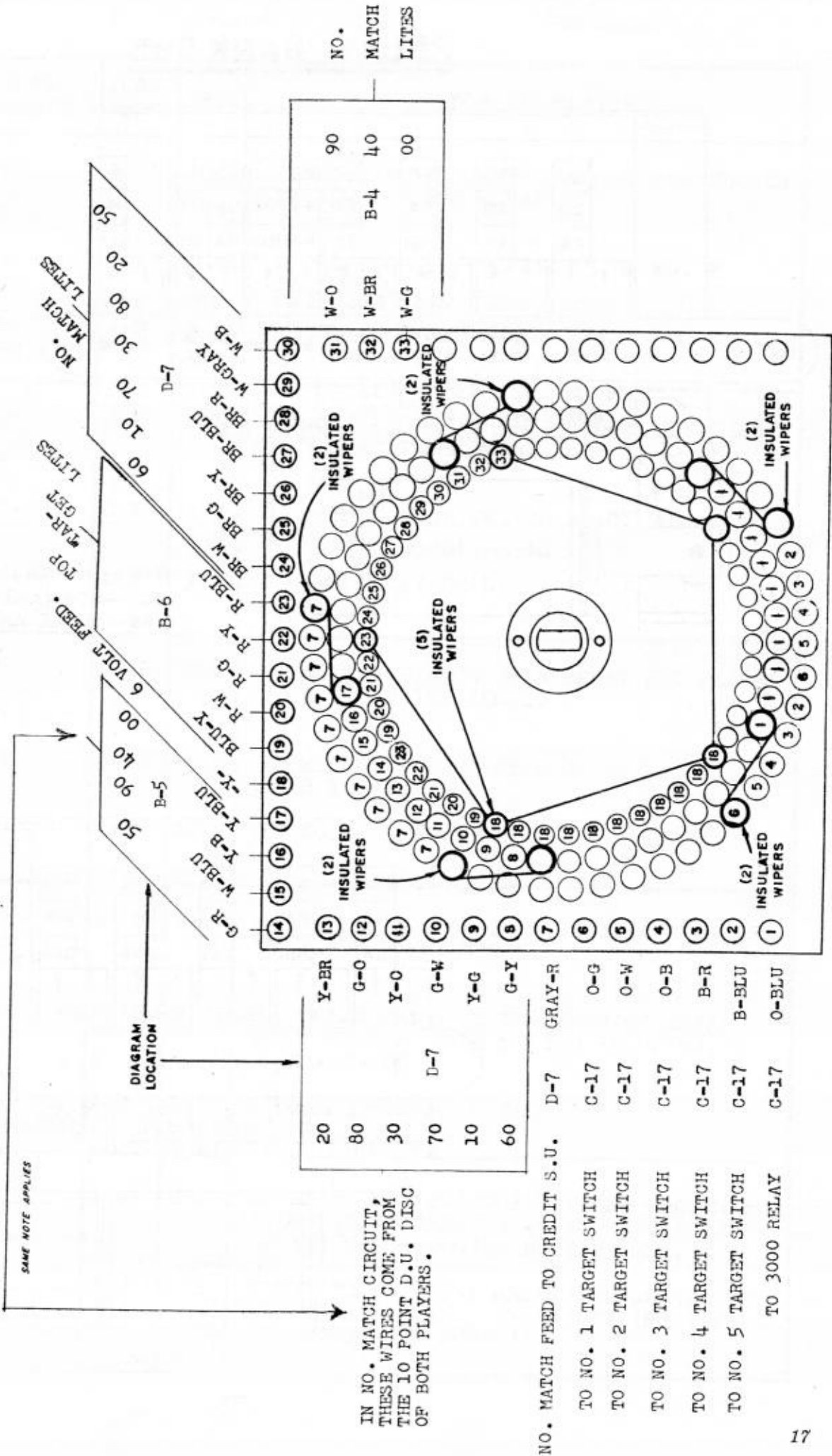
DIAGRAM LOCATION



No. MATCH UNIT

THIS IS A NON-RESETTABLE, CONTINUOUS STEPPING UNIT. IT ADVANCES EACH TIME THE 100 POINT RELAY IS PULSED.

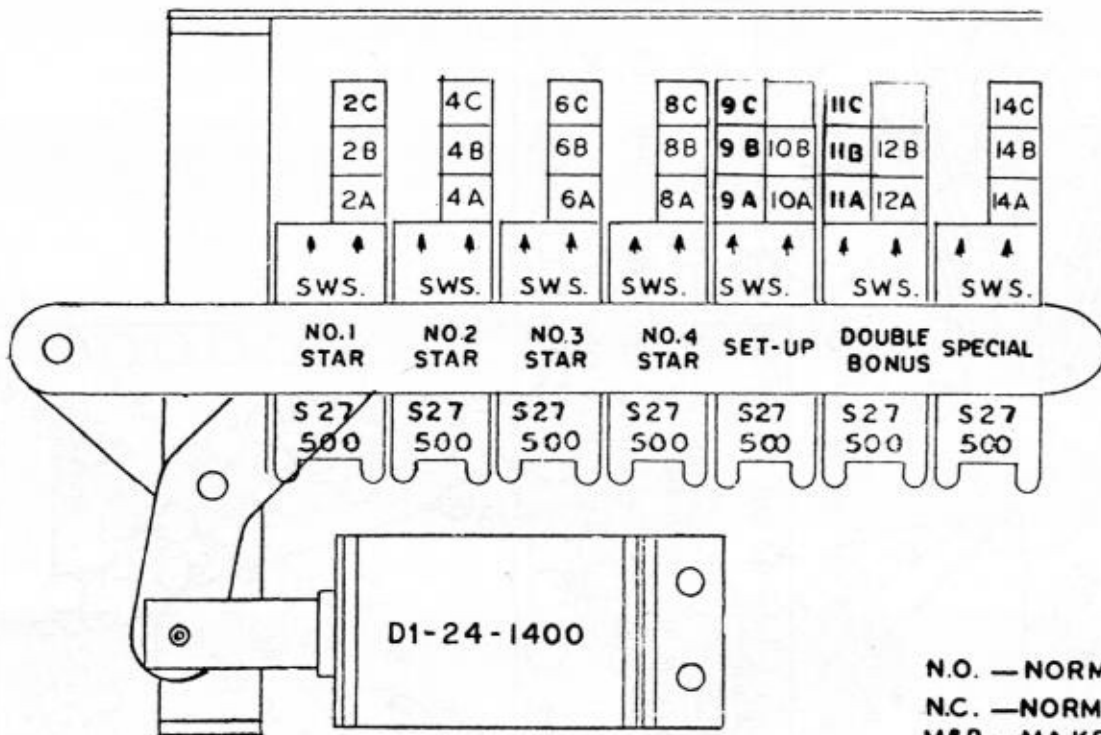
VIEW LOOKING AT WIPER FINGER SIDE



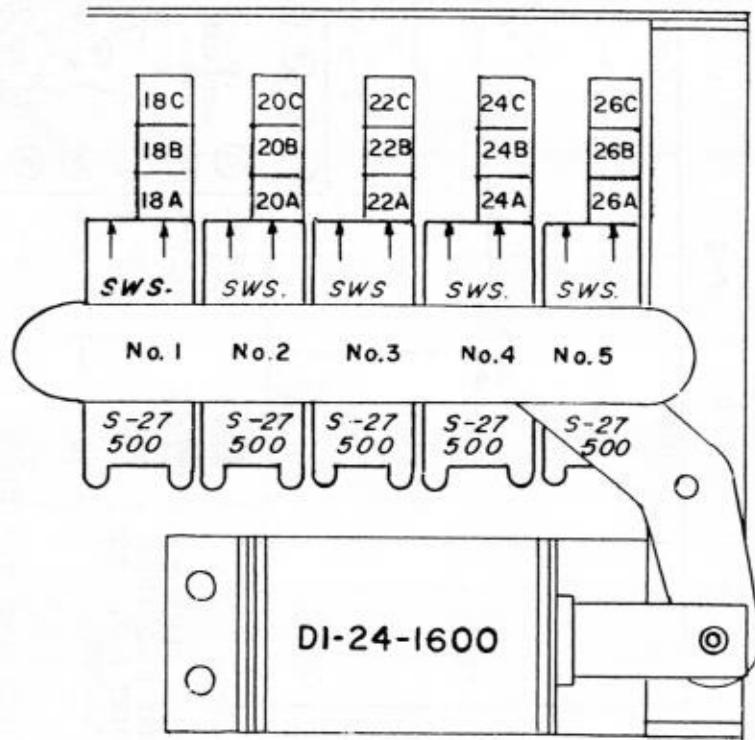
IN NO. MATCH CIRCUIT, THESE WIRES COME FROM THE 10 POINT D.U. DISC OF BOTH PLAYERS.

NO. MATCH FEED TO CREDIT S.U. D-7 GRAY-R
 TO NO. 1 TARGET SWITCH C-17 O-G
 TO NO. 2 TARGET SWITCH C-17 O-W
 TO NO. 3 TARGET SWITCH C-17 O-B
 TO NO. 4 TARGET SWITCH C-17 B-R
 TO NO. 5 TARGET SWITCH C-17 B-BLU
 TO 3000 RELAY C-17 O-BLU

RELAY BANK SWS.



N.O. — NORMALLY OPEN SWITCH
 N.C. — NORMALLY CLOSED SWITCH
 M&B — MAKE AND BREAK SWITCH

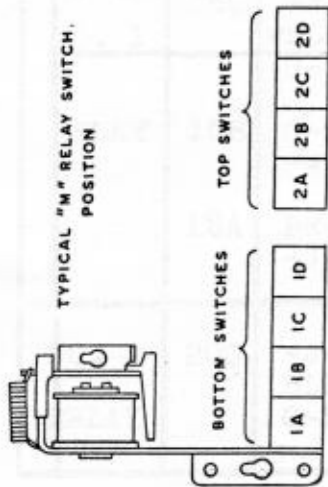


RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 1 STAR RELAY	2C	-J- R-W BR-Y	E-16	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 1,000 POINT RELAY.
	2B	-Y- -J-	C-12	N.O.	IN SERIES WITH SWITCH 4B ON NO. 2 STAR RELAY.
	2A	-W- Y-G	A-8	N.O.	TO NO. 1 "STAR" LITE.
NO. 2 STAR RELAY	4C	-J- R-BR BR-Y	E-16	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 1,000 POINT RELAY.
	4B	-J- -J-	C-12	N.O.	IN SERIES WITH SWITCH 6B ON NO. 3 STAR RELAY.
	4A	-W- Y-BR	A-8	N.O.	TO NO. 2 "STAR" LITE.
NO. 3 STAR RELAY	6C	-J- R-O BR-Y	E-16	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 1,000 POINT RELAY.
	6B	-J- -J-	D-12	N.O.	IN SERIES WITH SWITCH 8B ON NO. 4 STAR RELAY.
	6A	-W- Y-O	A-9	N.O.	TO NO. 3 "STAR" LITE.
NO. 4 STAR RELAY	8C	-J- R-B BR-Y	E-16	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 1,000 POINT RELAY.
	8B	Y-B -J-	E-12	N.O.	IN SERIES CIRCUIT TO ENERGIZE EXTRA BALL RELAY. (SEE SWITCH 2B ON NO. 1 STAR RELAY).
	8A	-W- GRAY-R	A-9	N.O.	TO NO. 4 "STAR" LITE.
SET-UP RELAY	9C	W-R B-W BR-Y	E-14	M&B	OPENS TO 100 POINT RELAY AND CLOSES TO 1,000 POINT RELAY. (WHEN HITTING ANY OF (5) TOP ROLLOVER BUTTON SWS).
	9B	G-B B-G W-R	E-14	M&B	OPENS TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY. (WHEN HITTING TOP OR BOTTOM JET BUMPER).

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
SET-UP RELAY	9A	-J- GRAY-G	E-12	N.O.	IN SERIES WITH SWITCH 12B ON DOUBLE BONUS RELAY.
	10B	BLU-O -J-	E-12	N.C.	IN CIRCUIT TO COIL ON THIS RELAY.
	10A	-W- W-G	A-9	N.O.	TO (5) TOP ROLLOVER BUTTON LITES AND (2) JET BUMPER LITES.
DOUBLE BONUS RELAY	11C	-O- O-B GRAY-Y	D-15	M&B	IN CIRCUIT TO COIL ON THIS RELAY.
	11B	R-B BLU-R R-BLU	C-9	M&B	IN CIRCUIT TO BONUS UNIT RESET COIL, THRU SWITCH ON BONUS RELAY.
	11A	-J- Y-O	E-13	N.O.	IN SERIES WITH SWITCH 14C ON SPECIAL RELAY.
	12B	-J- -J-	E-12	N.C.	TO COIL ON THIS RELAY, FROM SWITCH ON SET-UP RELAY.
	12A	-W- W-B	A-9	N.O.	TO "DOUBLE BONUS" LITE.
SPECIAL RELAY	14C	-J- -J-	E-13	N.C.	TO COIL ON THIS RELAY, FROM SWITCH ON DOUBLE BONUS RELAY.
	14B	GRAY-BR BLU-B	D-6	N.O.	IN CIRCUIT TO CREDIT S.U. COIL OR EXTRA BALL RELAY.
	14A	-W- W-GRAY	A-10	N.O.	TO "SPECIAL" LITES.
NO. 1 RELAY	18C	-J- BLU-R G-B	E-13	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 10 POINT RELAY.
	18B	G-R -W-	A-9	N.C.	TO "NO. 1" ROLLOVER BUTTON LITE.
	18A	BR-R -J-	C-12	N.O.	IN SERIES WITH SWITCH 20A ON NO. 2 RELAY.
NO. 2 RELAY	20C	-J- BLU-Y G-B	E-13	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 10 POINT RELAY.

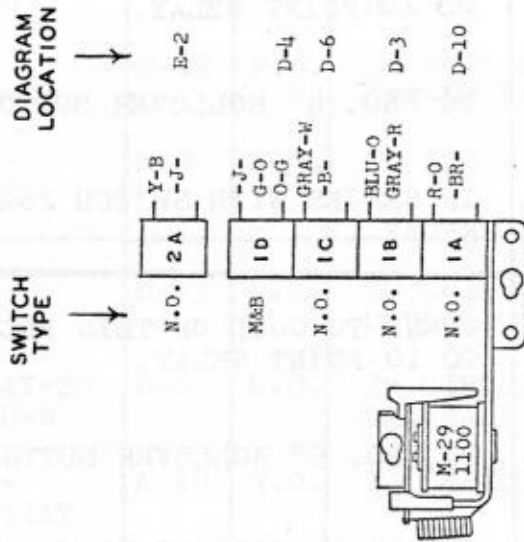
RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
NO. 2 RELAY	20B	G-Y -W-	A-9	N.C.	TO "NO. 2" ROLLOVER BUTTON LITE.
	20A	-J- -J-	D-12	N.O.	IN SERIES WITH SWITCH 22A ON NO. 3 RELAY
NO. 3 RELAY	22C	-J- BLU-BR G-B	E-13	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 10 POINT RELAY.
	22B	G-W -W-	A-9	N.C.	TO "NO. 3" ROLLOVER BUTTON LITE.
	22A	-J- -J-	D-12	N.O.	IN SERIES WITH SWITCH 24A ON NO. 4 RELAY.
NO. 4 RELAY	24C	-J- BLU-O G-B	E-13	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 10 POINT RELAY.
	24B	G-O -W-	A-9	N.C.	TO "NO. 4" ROLLOVER BUTTON LITE.
	24A	-J- -J-	D-12	N.O.	IN SERIES WITH SWITCH 26A ON NO. 5 RELAY.
NO. 5 RELAY	26C	-J- BLU-B G-B	E-13	M&B	OPENS TO COIL ON THIS RELAY AND CLOSES TO 10 POINT RELAY.
	26B	W-BLU -W-	A-9	N.C.	TO "NO. 5" ROLLOVER BUTTON LITE.
	26A	-J- R-Y	E-12	N.O.	IN SERIES CIRCUIT TO ENERGIZE "1 TO 5 RESET RELAY". (SEE SWITCH 18A ON NO. 1 RELAY).

A.C. RELAYS & SWITCHES LOCATED ON MECHANISM PANEL



25¢

IS ENERGIZED BY 25¢ COIN SWITCH, THRU SWITCH ON COIN SET-UP RELAY.



IN HOLD CIRCUIT TO THIS RELAY.

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

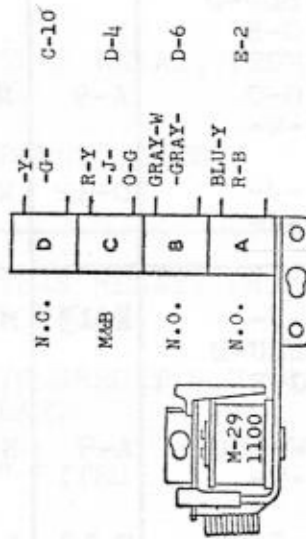
PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH D.

PULSES COIN RELAY WHEN GAME IS ADJUSTED TO "6 PLAYS" OR "1 PLAY" FOR 25¢. (THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

ENERGIZES COIN SET-UP RELAY, THRU "2 COINS FOR 3 PLAYS" ADJUSTMENT JACK.

10¢

IS ENERGIZED BY 10¢ COIN SWITCH, IF 10¢ ADJUSTMENT JACK IS IN "2" OR "3" PLAYS FOR 1 COIN POSITION---ALSO BY 25¢ COIN SWITCH, THRU SWITCH ON COIN SET-UP RELAY.



IN HOLD CIRCUIT TO COIN SET-UP RELAY.

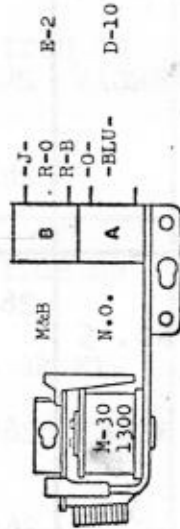
OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO RUN SCORE MOTOR.

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

IN HOLD CIRCUIT TO THIS RELAY.

COIN SET-UP

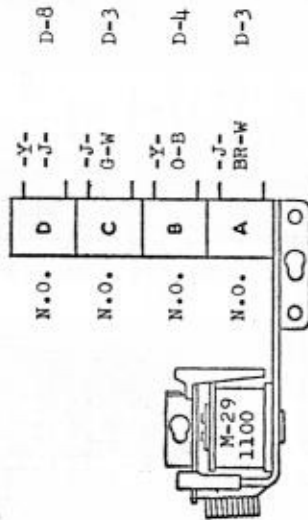
IS ENERGIZED BY 25¢ RELAY, ONLY IF "1 COIN FOR 1 PLAY - 2 COINS FOR 3 PLAYS" ADJUSTMENT JACK IS IN "ON" POSITION.



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

IN HOLD CIRCUIT TO THIS RELAY.

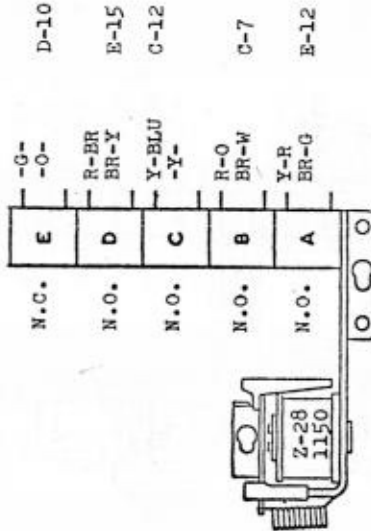
IS ENERGIZED BY 5¢ COIN SWITCH, IF "5¢ ADJUSTMENT JACK" IS IN 2 POSITION.



D-8 ENERGIZES ALTERNATOR UNIT S.U. COIL.
 D-3 ENERGIZES COIN RELAY, THRU SWITCH ON ALTERNATOR UNIT.
 D-4 ENERGIZES LOCK RELAY.
 D-3 IN HOLD CIRCUIT TO THIS RELAY.

BALL INDEX

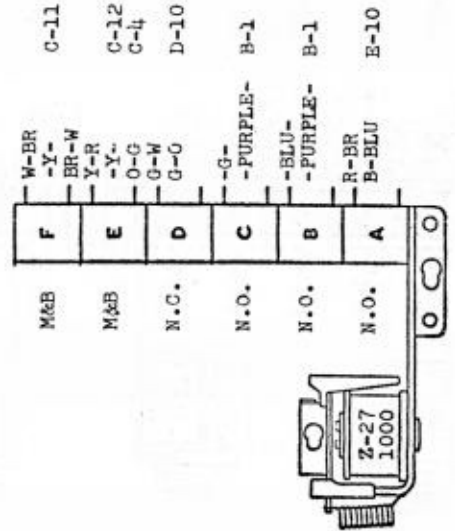
IS ENERGIZED BY 10 POINT, 100 POINT OR 1,000 POINT RELAY, THRU SWITCH ON EXTRA BALL RELAY.
 ALSO BY TILT RELAY.



D-10 IN SERIES WITH SWITCH A ON COIN SET-UP RELAY.
 E-15 IN CIRCUIT TO PULSE 1,000 POINT RELAY (WHEN COLLECTING BONUS).
 C-12 IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.
 C-7 IN SERIES WITH SWITCH D ON EXTRA BALL RELAY.
 E-12 IN HOLD CIRCUIT TO THIS RELAY.

OUTHOLE

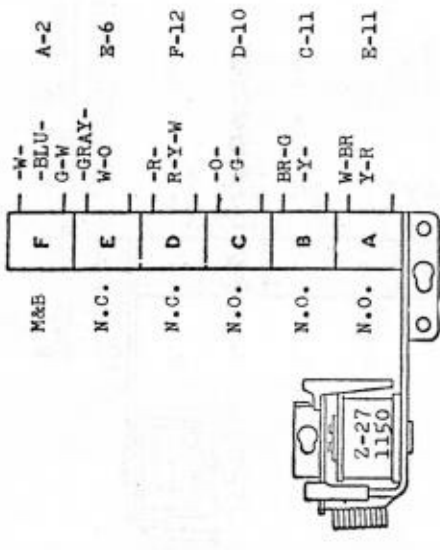
IS ENERGIZED BY CAM SWITCH 6B, THRU WIPER FINGERS ON BONUS UNIT (IN ZERO POSITION).



C-11 OPENS IN CIRCUIT TO TILT RELAY AND CLOSES IN CIRCUIT TO BALL RELEASE COIL.
 C-12 OPENS IN SERIES WITH SWITCH A ON BALL INDEX RELAY AND CLOSES TO RUN SCORE MOTOR.
 D-10 IN CIRCUIT TO ENERGIZE BONUS RELAY, THRU OUTHOLE SWITCH.
 B-1 ENERGIZES 1 TO 4 RELAY BANK RESET COIL, THRU CAM SWITCH 1A. (115 VOLTS).
 B-1 ENERGIZES 1 TO 5 RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).
 E-10 IN HOLD CIRCUIT TO THIS RELAY.

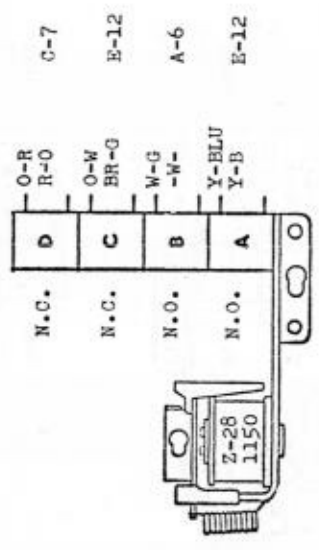
TILT

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



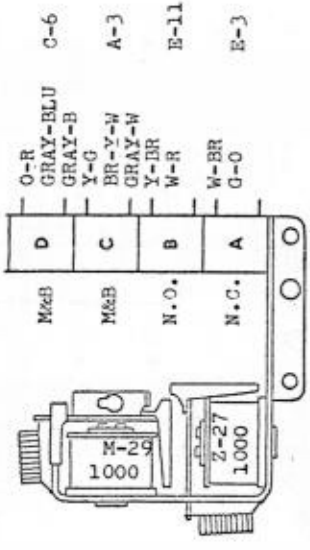
EXTRA BALL

IS ENERGIZED BY:
 1. SERIES CIRCUIT THRU NO. 1, NO. 2, NO. 3, AND NO. 4 STAR RELAYS.
 ALSO, THRU "EXTRA BALL-CREDIT" ADJUSTMENT JACK, BY:
 2. SPECIAL RELAY, THRU SWITCH ON 3000 RELAY.
 3. HI-SCORE CIRCUIT



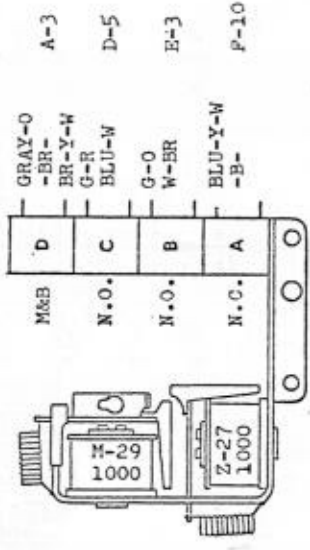
2ND COIN INTERLOCK

LATCH AND TRIP COILS ARE ENERGIZED BY SWITCH E ON COIN RELAY, THRU SWITCH F ON RESET RELAY, AT SCORE MOTOR CAM SWITCH 1C.



GAME-OVER INTERLOCK

TRIP COIL IS ENERGIZED BY LOCK RELAY OR BY WIPER ON BALL COUNT UNIT DISC---ALSO BY COIN RELAY, THRU BALL COUNT UNIT ZERO SWITCH.
 LATCH COIL IS ENERGIZED BY SWITCH E ON COIN RELAY, THRU SWITCH F ON RESET RELAY, AT SCORE MOTOR CAM SWITCH 1C.



A-2 OPENS IN CIRCUIT TO MOST PLAYFIELD LITES AND CLOSES TO "TILT" LITE.
 E-6 OPENS "HI-SCORE" AND "SPECIAL" CIRCUITS TO CREDIT UNIT S.U. COIL.
 F-12 OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.
 D-10 IN HOLD CIRCUIT TO COIN SET-UP RELAY.
 C-11 ENERGIZES BALL INDEX RELAY.
 E-11 IN HOLD CIRCUIT TO THIS RELAY.

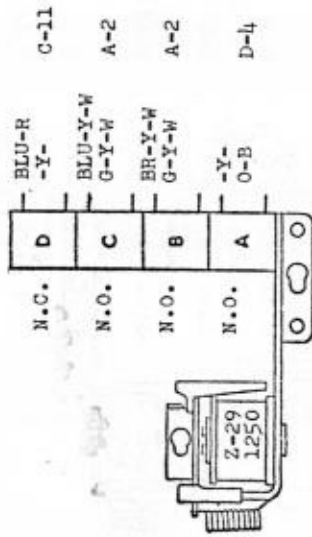
C-7 IN CIRCUIT TO BALL COUNT S.U. COIL---ALSO IN NUMBER MATCH CIRCUIT TO CREDIT UNIT S.U. COIL.
 E-12 IN CIRCUIT TO ENERGIZE BALL INDEX RELAY.
 A-6 TO "SHOOT AGAIN" LITES.
 E-12 IN HOLD CIRCUIT TO THIS RELAY.

C-6 IN CIRCUIT TO ENERGIZE BALL COUNT S.U. COIL---ALSO IN NUMBER MATCH CIRCUIT.
 A-3 OPENS TO "1 CAN PLAY" LITE AND CLOSES TO "2 CAN PLAY" LITE.
 E-11 ENERGIZES PLAYER RELAY, THRU BALL COUNT UNIT DISC.
 E-3 IN CIRCUIT TO CREDIT RELAY.

A-3 OPENS TO 1ST & 2ND "PLAYER UP" LITES AND CLOSES TO "GAME OVER" AND "NUMBER MATCH" LITES.
 D-5 ENERGIZES RESET RELAY, THRU SWITCH ON COIN RELAY.
 E-3 IN CIRCUIT TO CREDIT RELAY.
 F-10 OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

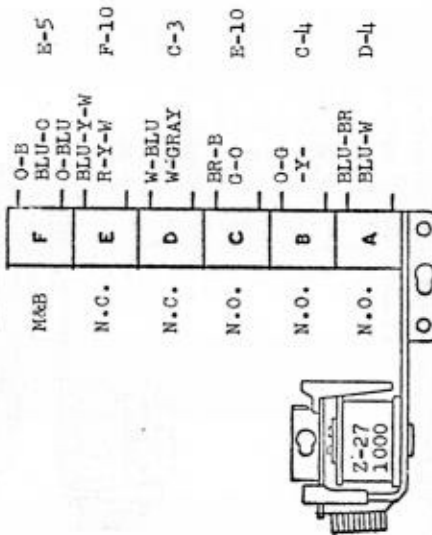
LOCK

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



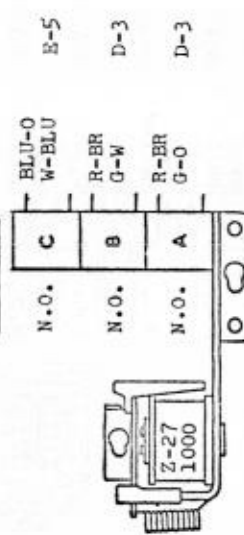
RESET

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



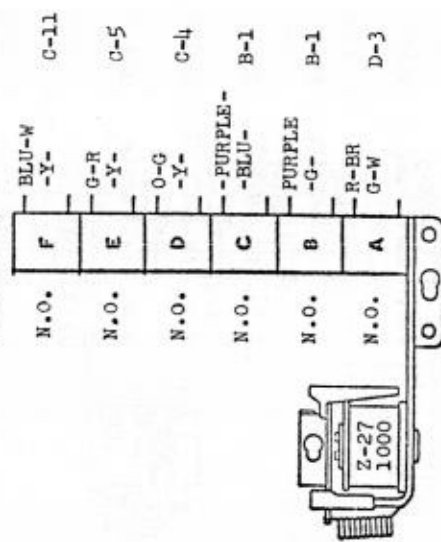
CREDIT

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



COIN

IS ENERGIZED BY COIN SWITCH OR CREDIT RELAY.



ENERGIZES GAME-OVER RELAY (TRIP COIL).

6 VOLTS FROM TRANSFORMER TO LITES.

6 VOLTS FROM TRANSFORMER TO LITES.

HOLD CIRCUIT TO THIS RELAY.

OPENS IN CIRCUIT TO 2ND COIN RELAY TRIP COIL AND CLOSSES TO BALL COUNT RESET, 2ND COIN RELAY LATCH AND GAME-OVER RE. LATCH COILS.

OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

OPENS CIRCUIT TO CREDIT RELAY.

ENERGIZES BONUS RELAY, THRU INDEX CAM SWITCH A.

RUNS SCORE MOTOR.

IN HOLD CIRCUIT TO THIS RELAY.

ENERGIZES CREDIT UNIT RESET COIL AT CAM SWITCH 1C.

ENERGIZES COIN RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

ENERGIZES GAME-OVER RELAY TRIP COIL, THRU BALL COUNT UNIT ZERO SWITCH.

ENERGIZES RESET RELAY, THRU SWITCH ON GAME-OVER RELAY--- ALSO IN SERIES WITH SWITCH C ON CREDIT RELAY OR SWITCH F ON RESET RELAY.

RUNS SCORE MOTOR.

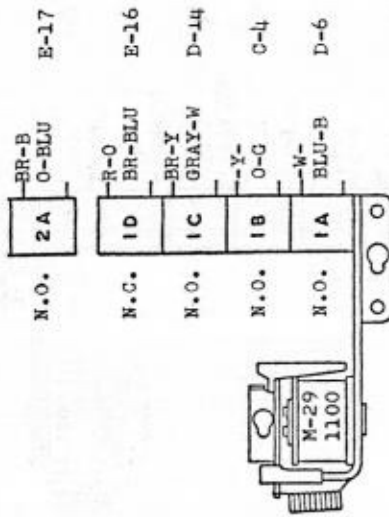
ENERGIZES 1 TO 5 RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).

ENERGIZES 1 TO 4 RELAY BANK RESET COIL, THRU CAM SWITCH 1A. (115 VOLTS).

IN HOLD CIRCUIT TO THIS RELAY.

3000

IS ENERGIZED BY NO. 1, NO. 2, NO. 3, NO. 4 OR NO. 5 TARGET SWITCH, THRU WIPER FINGERS ON NO. MATCH UNIT DISC.



IN HOLD CIRCUIT TO THIS RELAY.

OPENS CIRCUIT TO 50 POINT RELAY.

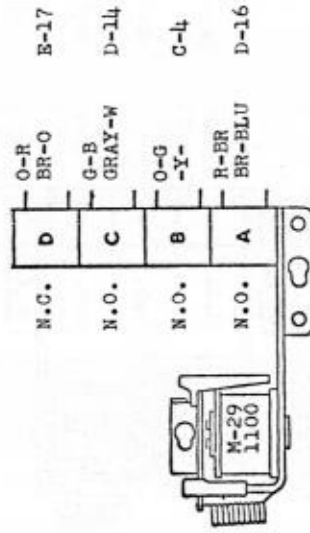
PULSES 1,000 POINT RELAY, THRU IMPULSE CAM SWITCH D.

RUNS SCORE MOTOR.

IN SERIES WITH SWITCH 14B ON SPECIAL RELAY.

50 POINT

IS ENERGIZED BY ANY 5 TOP TARGET SWITCHES, THRU SWITCH ON 3,000 RELAY.



OPENS CIRCUIT TO NUMBER MATCH S.U. COIL.

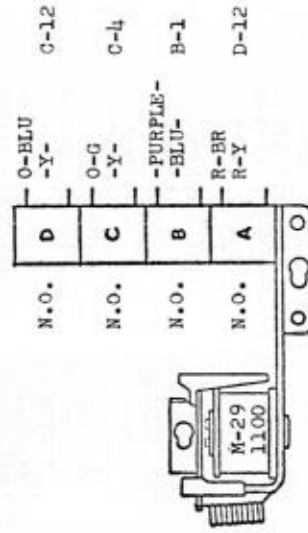
PULSES 10 POINT RELAY, THRU IMPULSE CAM SWITCH D.

RUNS SCORE MOTOR.

IN HOLD CIRCUIT TO THIS RELAY.

1 TO 5 RESET

IS ENERGIZED BY SERIES CIRCUIT THRU NO. 1, NO. 2, NO. 3, NO. 4 AND NO. 5 RELAYS AT SCORE MOTOR INDEX CAM SWITCH B.



IN CIRCUIT TO ENERGIZE SET-UP RELAY, DOUBLE BONUS RELAY AND SPECIAL RELAY.

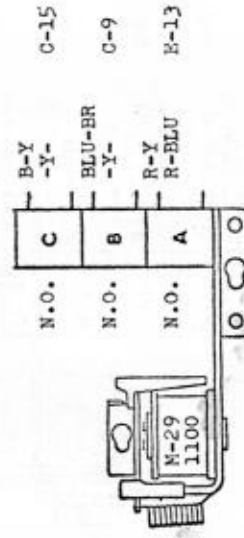
RUNS SCORE MOTOR.

ENERGIZES 1 TO 5 RELAY BANK RESET COIL, THRU CAM SWITCH 3B. (115 VOLTS).

IN HOLD CIRCUIT TO THIS RELAY.

ADVANCE

IS ENERGIZED BY ANY OF 5 SIDE ROLLOVER BUTTON SWITCHES.



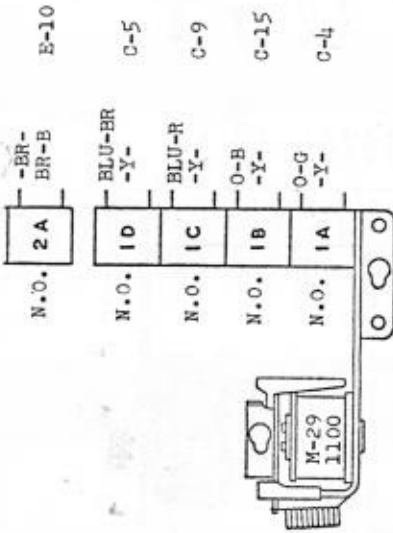
PULSES 100 OR 1,000 POINT RELAY, THRU BONUS UNIT DISC.

ENERGIZES BONUS UNIT STEP-UP COIL.

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

BONUS

IS ENERGIZED BY RESET RELAY, THRU INDEX CAM SWITCH A---ALSO BY OUTHOLE SWITCH, THRU OUTHOLE RELAY AND INDEX CAM SWITCH A.



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

IN SERIES WITH SWITCH A ON RESET RELAY.

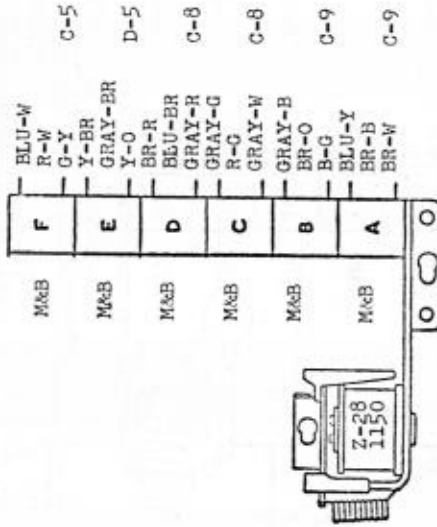
IN SERIES WITH SWITCH 11B ON DOUBLE BONUS RELAY.

IN SERIES WITH SWITCH 11C ON DOUBLE BONUS RELAY.

RUNS SCORE MOTOR.

PLAYER

IS ENERGIZED BY 2ND COIN RELAY, THRU WIPER FINGERS ON BALL COUNT UNIT.



IN HI-SCORE CIRCUIT TO CREDIT S.U. COIL OR EXTRA BALL RELAY, THRU HI-SCORE ADJUSTMENT JACK.

IN SERIES WITH SWITCH 'P' ON THIS RELAY.

OPENS IN CIRCUIT TO 1ST PLAYER 10 POINT D.U. COIL AND CLOSES TO 2ND PLAYER 10 POINT D.U. COIL.

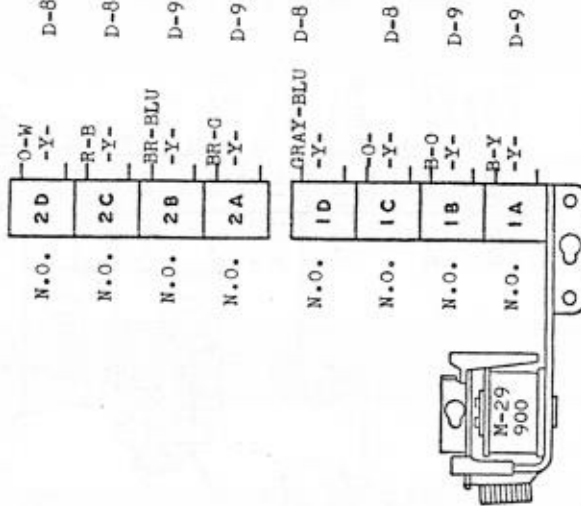
OPENS IN CIRCUIT TO 1ST PLAYER 100 POINT D.U. COIL AND CLOSES TO 2ND PLAYER 100 POINT D.U. COIL.

OPENS IN CIRCUIT TO 1ST PLAYER 1,000 POINT D.U. COIL & CLOSES TO 2ND PLAYER 1,000 POINT D.U. COIL.

TO 10,000 POINT D.U. COILS, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.

SCORE RESET

IS PULSED, DURING RESET CYCLE, BY IMPULSE CAM SWITCH C, THRU RESET RELAY, AND ZERO SWITCHES, ON (8) SCORE DRUM UNITS.



PULSES 1ST PLAYER 100 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 2ND PLAYER 100 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 1ST PLAYER 10,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 2ND PLAYER 10,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 2ND PLAYER 10 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 1ST PLAYER 10 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

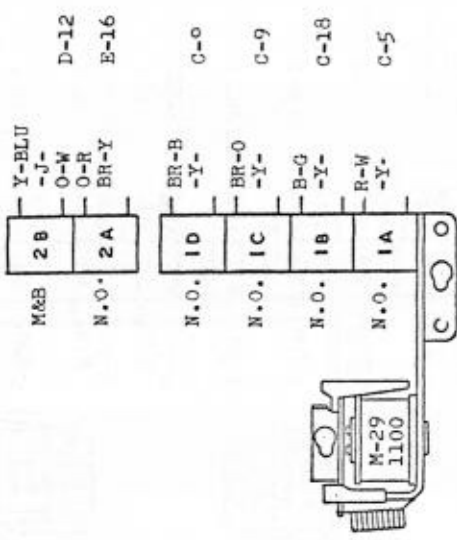
PULSES 2ND PLAYER 1,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PULSES 1ST PLAYER 1,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

1,000 POINT

IS PULSED BY:

1. SCORE MOTOR CAM SWITCHES, THRU DOUBLE BONUS RELAY AND BONUS RELAY. (WHEN COLLECTING BONUS).
2. 3,000 RELAY.
3. FIVE TOP ROLLOVER BUTTON SWITCHES, THRU SWITCH ON SET-UP RELAY.
4. ADVANCE RELAY, THRU BONUS UNIT DISC.
5. RIGHT BOTTOM ROLLOVER SWITCH.
6. NO. 1, NO. 2, NO. 3 OR NO. 4 STAR SWITCHES.



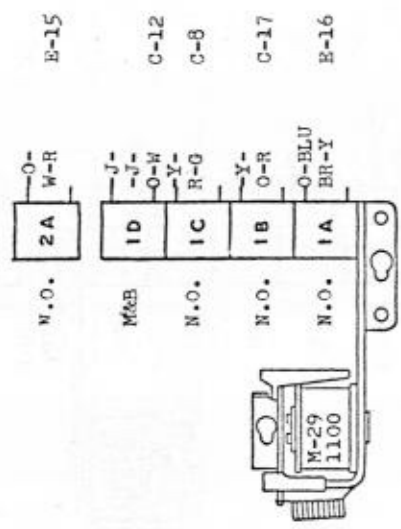
OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSSES TO ENERGIZE BALL INDEX RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

IN SERIES WITH SWITCH A ON PLAYER RELAY.
IN SERIES WITH SWITCH B ON PLAYER RELAY.
PULSES LARGE CHIME COIL.
IN SERIES WITH SWITCH F ON PLAYER RELAY.

100 POINT

IS PULSED BY:

1. ADVANCE RELAY, THRU BONUS UNIT DISC.
2. 5 TOP ROLLOVER BUTTON SWITCHES, THRU SWITCH ON SET-UP RELAY.
3. TOP AND BOTTOM JHT BUMPER SWITCHES, THRU SWITCH ON SET-UP RELAY.



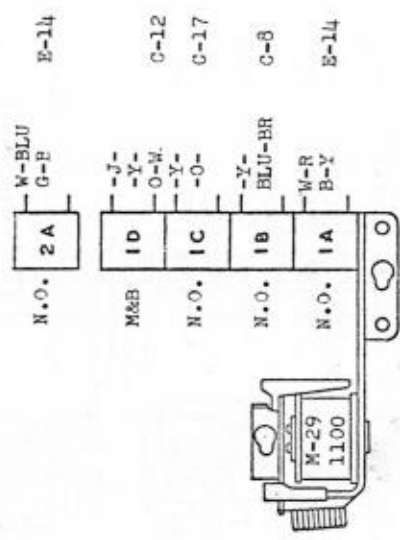
IN HOLD CIRCUIT TO THIS RELAY.

OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSSES TO ENERGIZE BALL INDEX RELAY.
IN SERIES WITH SWITCH C ON PLAYER RELAY.
PULSES SMALL CHIME COIL---ALSO IN CIRCUIT TO NUMBER MATCH S.U. COIL.
PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCH ON 100 POINT DRUM UNITS.

10 POINT

IS PULSED BY:

1. 50 POINT RELAY.
2. RIGHT BOTTOM KICKER SWITCH.
3. NO. 1, NO. 2, NO. 3, NO. 4 OR NO. 5 ROLLOVER BUTTON SWITCHES.



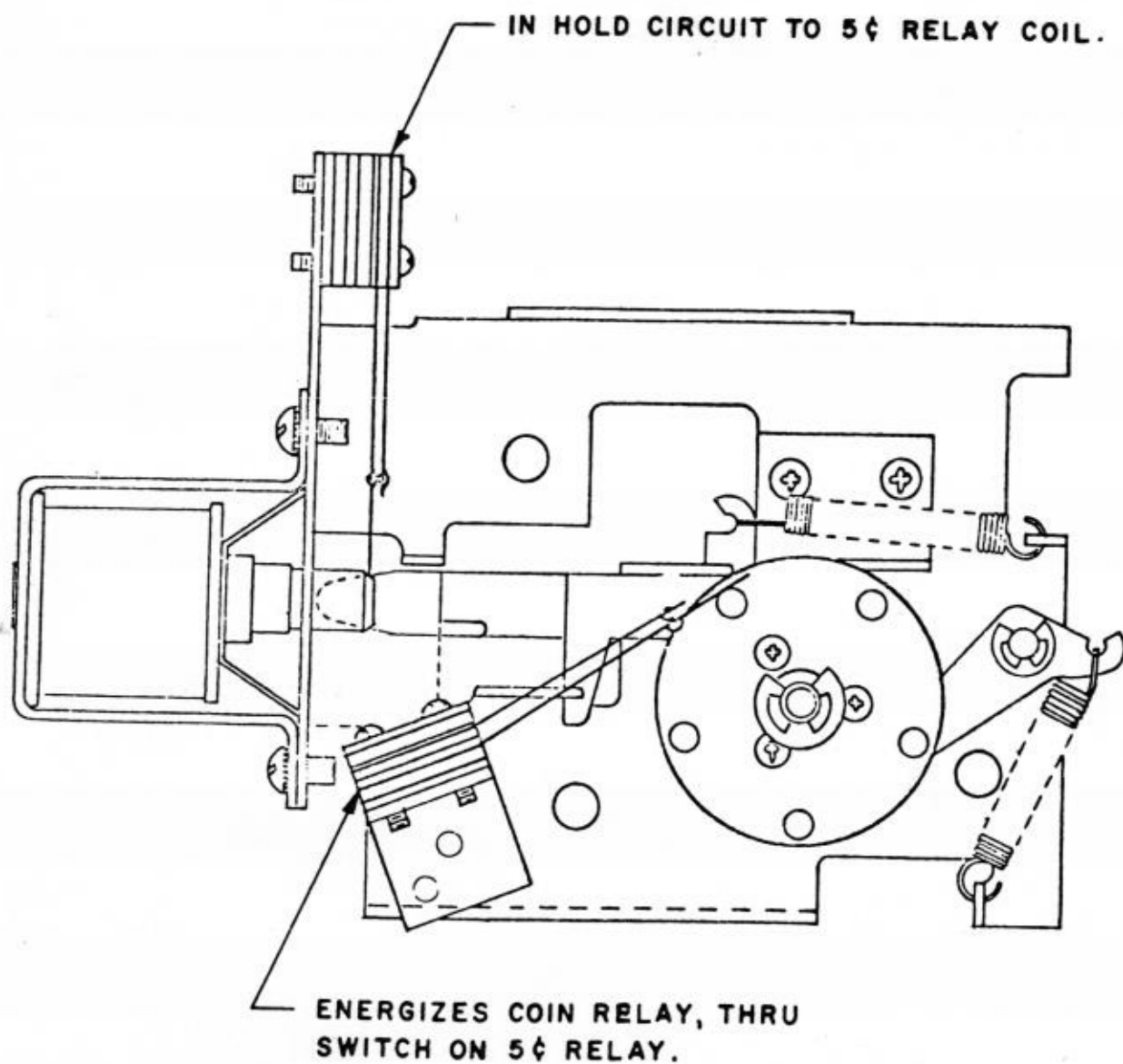
IN HOLD CIRCUIT TO THIS RELAY.

OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSSES TO ENERGIZE BALL INDEX RELAY.
PULSES MEDIUM CHIME COIL.
IN SERIES WITH SWITCH D ON PLAYER RELAY.
PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCH ON 10 POINT DRUM UNITS.

ALTERNATOR UNIT

LOCATED ON MECHANISM PANEL.

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

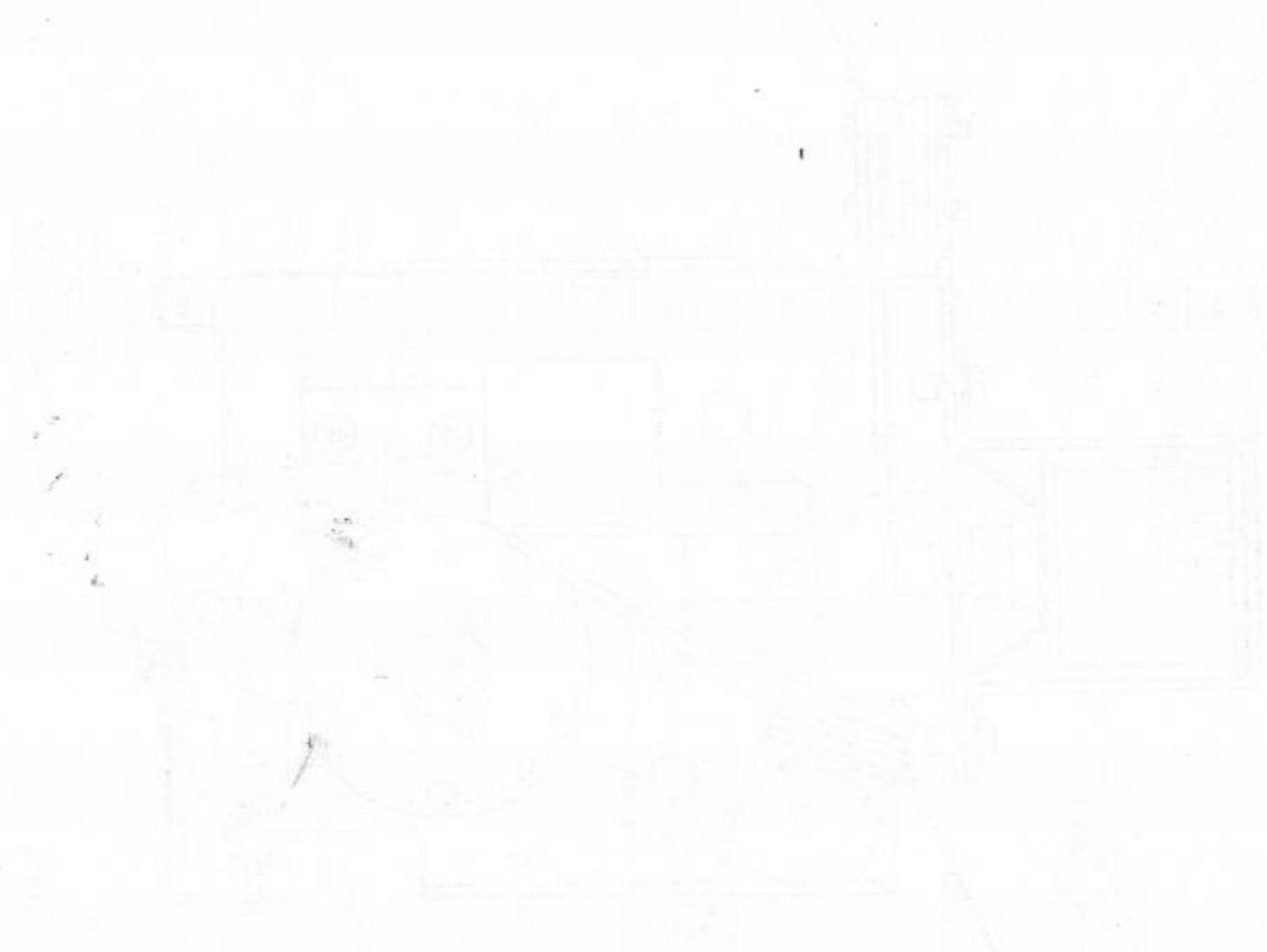


ALTERATION OF PLAN

FOR THE REPAIRS

AND RECONSTRUCTION WITH A VIEW TO IMPROVING THE
EFFICIENCY OF THE WORK

AS SHOWN IN THE ATTACHED DRAWINGS



SCALE OF 1/4" = 1'-0"

SEE PLAN