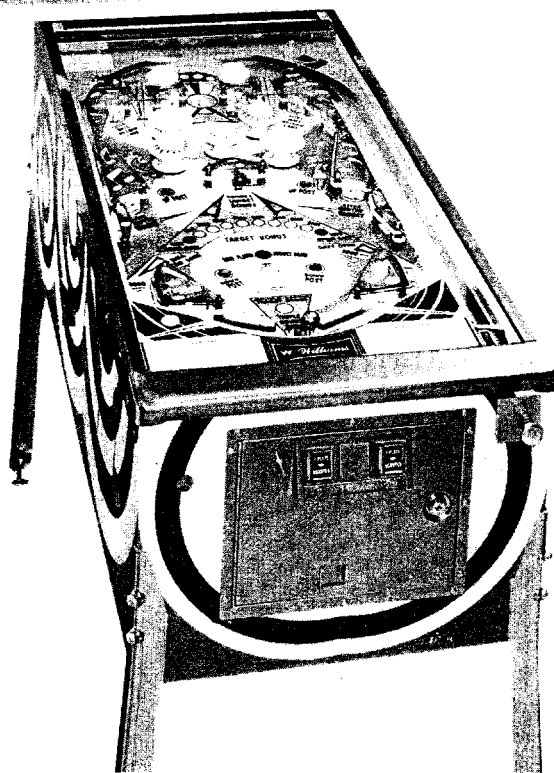


# Instruction Manual for

# FUN FEST



**Williams**® ELECTRONICS, INC.  
SUBSIDIARY OF THE SEEBURG CORPORATION

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Phone 267-2240

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Cable Address: Wilcoin

# "FUN FEST"

## 4 PLAYER

GAME OPERATES AS FOLLOWS:

TOP EJECT HOLE ADVANCES "SWING REEL" DRUM UNIT ONE STEP.  
(SEE SWING REEL ADJUSTMENT JACK).

TOP EJECT HOLE ALSO SCORES 5,000 WHEN ARROW IS LIT.  
OTHERWISE, IT SCORES 500.

TOP LEFT OR RIGHT (OUTSIDE) TARGETS WILL LITE "BALL RETURN  
LANE" AT BOTTOM LEFT OF PLAYFIELD. THEN, IF BALL GOES INTO  
BOTTOM LEFT OUTLANE, IT WILL BE EJECTED BACK ONTO PLAYFIELD.

"ON YELLOW" TARGET LITES UP YELLOW JET BUMPERS TO SCORE 100.

"ON GREEN" TARGET LITES UP GREEN JET BUMPERS TO SCORE 100.

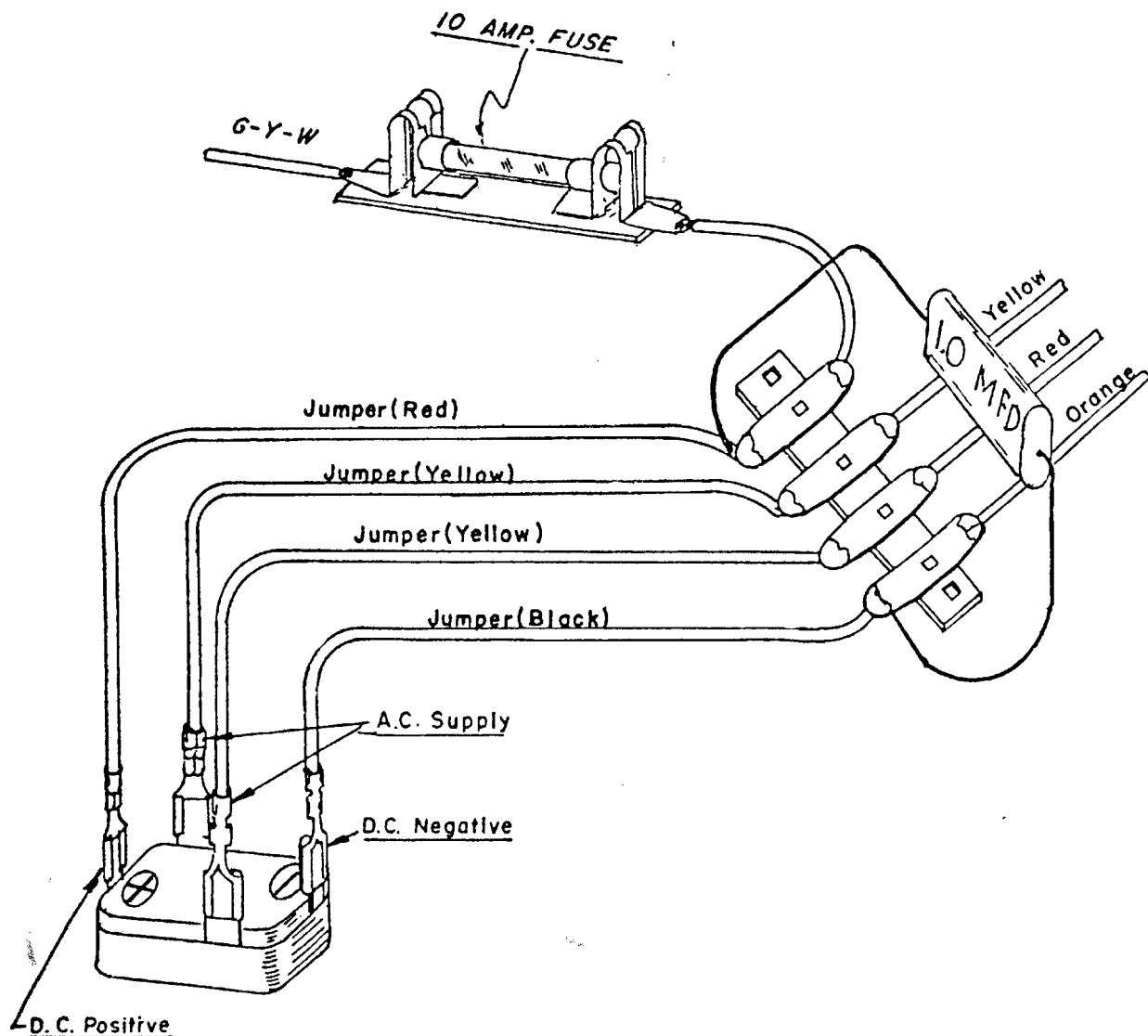
HITTING BOTTOM LEFT OR RIGHT TARGETS WILL STOP "TARGET  
BONUS" VALUE AND LITE ARROWS TO "CENTER TARGET". HITTING  
CENTER TARGET (WHEN LIT) SCORES TARGET BONUS VALUE.

WHEN BALL LEAVES PLAYFIELD AND MAKES OUTHOLE SWITCH (ON ALL  
BALLS EXCEPT PLAYERS LAST BALL), "TARGET BONUS" VALUE IS  
SCORED.

WHEN PLAYERS LAST BALL MAKES OUTHOLE SWITCH, PLAYER RECEIVES  
TRIPLE THE "TARGET BONUS" VALUE.



# 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.

## 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.

## **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.

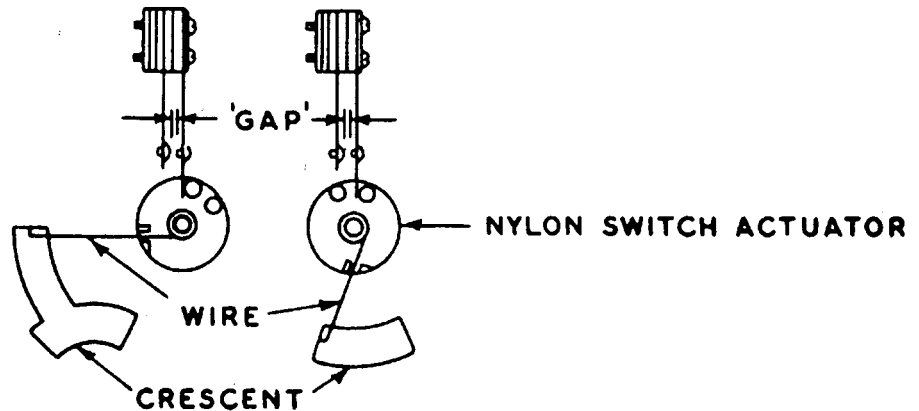
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## **SERVICEMAN TO REMOVE BACKGLASS:**

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

# 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.

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### 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.

# INSTRUCTIONS FOR ALTERING COIN CHUTES EQUIPPED WITH A FLIP-OVER DEVICE.

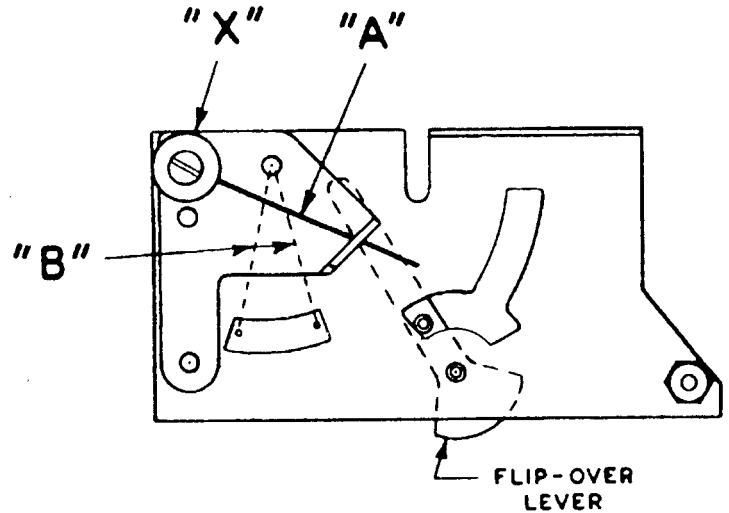
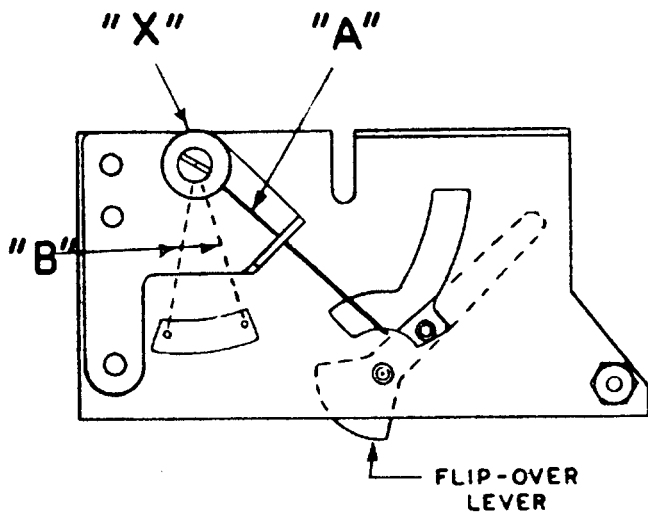
FOR 1 COIN - FOR 1 PLAY

OR

2 COINS - FOR 1 PLAY

FIGURE 1

FIGURE 2



## 1 COIN - FOR 1 PLAY (FIGURE 1):

Wire form "A" should be in position as shown in Figure 1. Flip-over lever should rebound from wire form "A" and return to position shown in Figure 1 everytime a coin is inserted. All coins pass over the coin trip switch wire "B".

## 2 COINS - FOR 1 PLAY (FIGURE 2):

Wire form "A" should be in position as shown in Figure 2 (see note). Flip-over lever should alternate from side to side. 1st coin should go to cash box without actuating coin trip switch wire "B", 2nd coin should pass the coin trip switch wire "B" and returns flip-over to position as shown in Figure 2.

## NOTE:

To change from 1 coin play to 2 coin play or vice versa - loosen screw "X" and move screw, bushing & wire form "A" to position as required - shown in Figure 1 position as required - shown in Figure 1 or Figure 2.

When using 1 coin for 1 play, wire form "A" should not under any circumstances be allowed to enter the "Banana" slot and cause binding of flip-over lever.

# 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.

-LJ

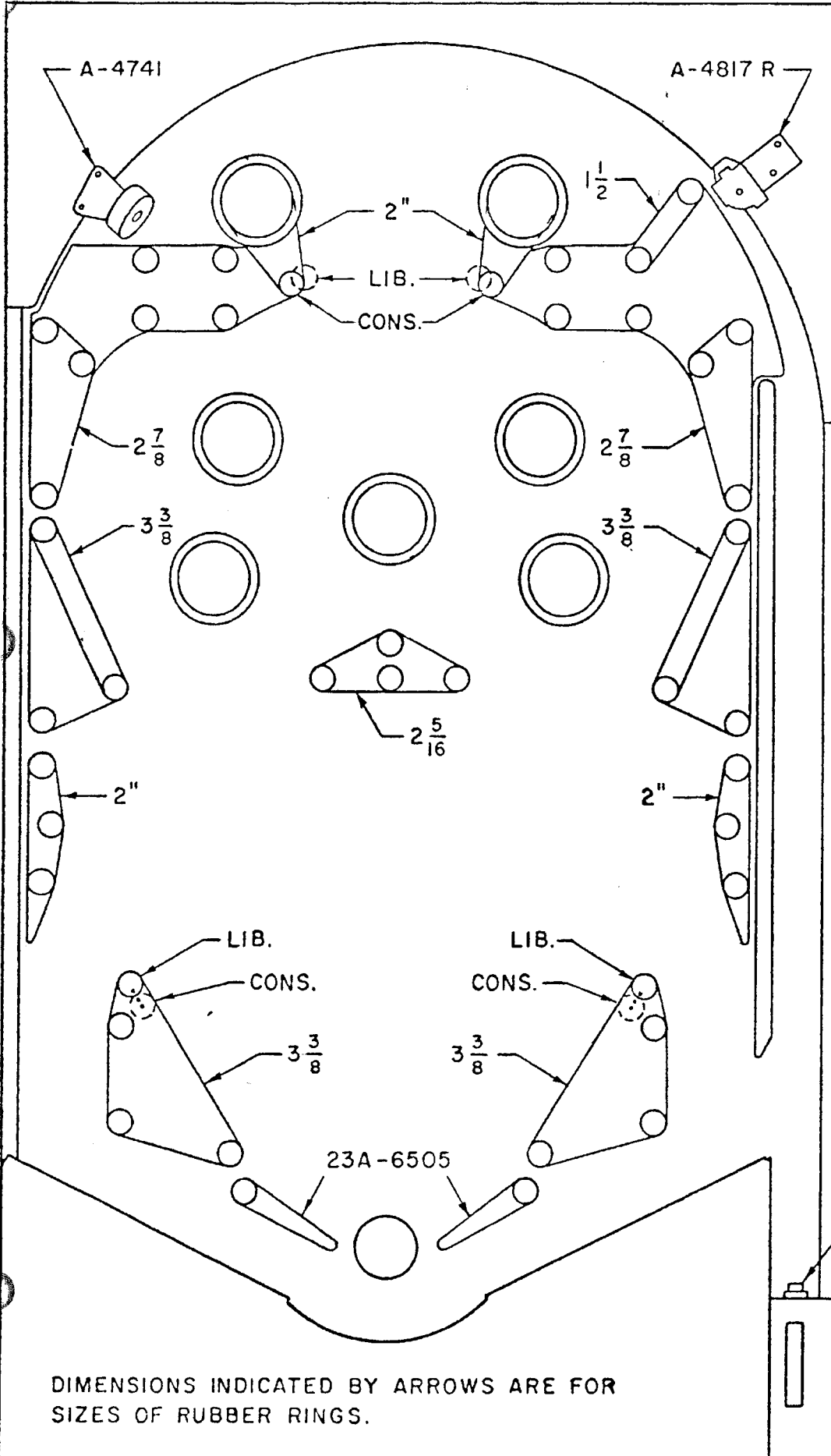
### UNIT PARTS LIST

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY	-----	-----	A-6400-1	
BALL COUNT	C-6414	B-7456-6	A-6402-5	
NO. MATCH	C-6417	C-6521	A-6403	
PLAYER	C-6417	C-6521	A-6405-3	14A-7805 (60 CYCLE) SCORE MOTOR
COIN	C-6414	B-7456-9	A-6402-3	14A-7806 (50 CYCLE) SCORE MOTOR
ADVANCE	C-6414	B-7456-2	A-6401	SWINGING TARGET MOTOR
10 POINT	B-7253	A-6294	3C-7272	
100 POINT	-----	-----	3C-7272	14A-7745 (50-60 CYCLE)
1000 POINT	B-7253	A-6294	3C-7272	
10000 POINT	B-7253	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	



# "FUN-FEST"—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-6305	2" I.D.
23A-6306	2 5/16" I.D.
23A-6307	2 7/8" I.D.
23A-6308	3 3/8" I.D.
23A-6505	1 1/2" I.D.

A-4741 REBOUND ASS'Y.  
A-4817R BALL GATE ASS'Y.

SUGGESTED 5 BALL CARD  
#419-49  
REPLAYS @ 77,000 & 98,000

SUGGESTED 3 BALL CARD  
#419-18  
REPLAYS @ 48,000, 64,000  
AND 85,000

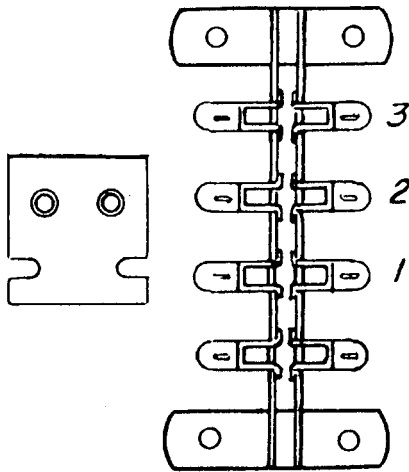
EXTRA BALL ON SWING REEL  
@ 5 CARD #419-37  
REPLAY ON SWING REEL @ 7  
CARD #419-38.

23A-6327 BALL SHOOTER  
RUBBER TIP

DIMENSIONS INDICATED BY ARROWS ARE FOR  
SIZES OF RUBBER RINGS.

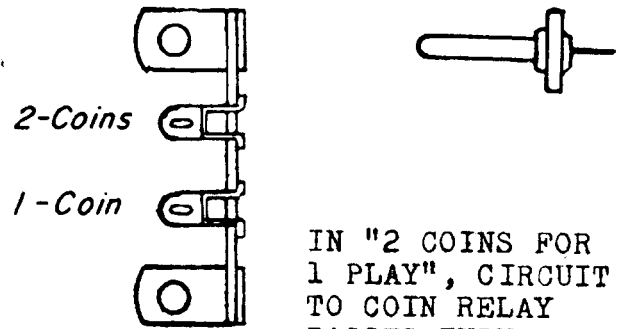
# ADJUSTMENTS ON MECHANISM PANEL

## 10¢ Adjustment



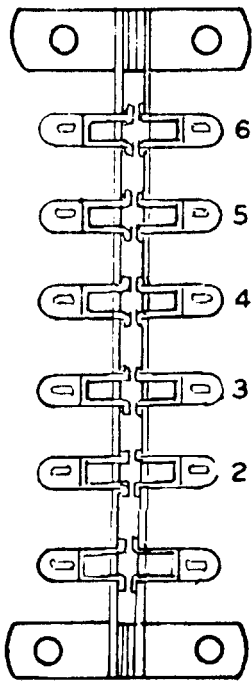
PROVIDES  
1, 2 OR  
3 PLAYS  
FOR ONE  
COIN.

## 5¢ Adjustment



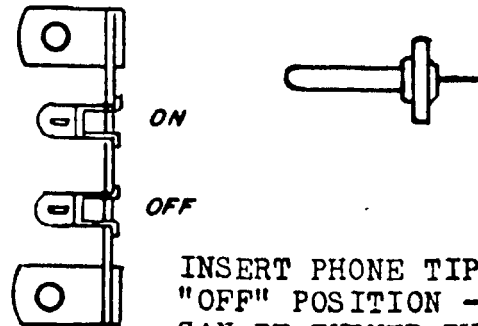
IN "2 COINS FOR  
1 PLAY", CIRCUIT  
TO COIN RELAY  
PASSES THRU SW.  
ON ALTERNATOR  
UNIT.

## 25¢ Adjustment



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

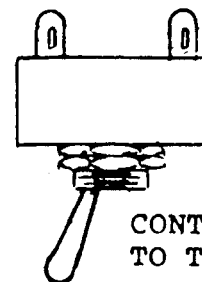
## Motor Service Jack



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

## MASTER ON-OFF SW.

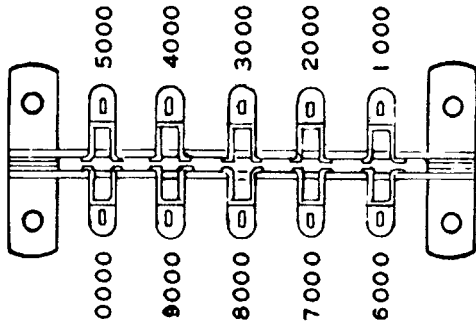
(Located under front of  
Cabinet)



CONTROLS POWER  
TO TRANSFORMER

# ADJUSTMENTS IN BACKBOX

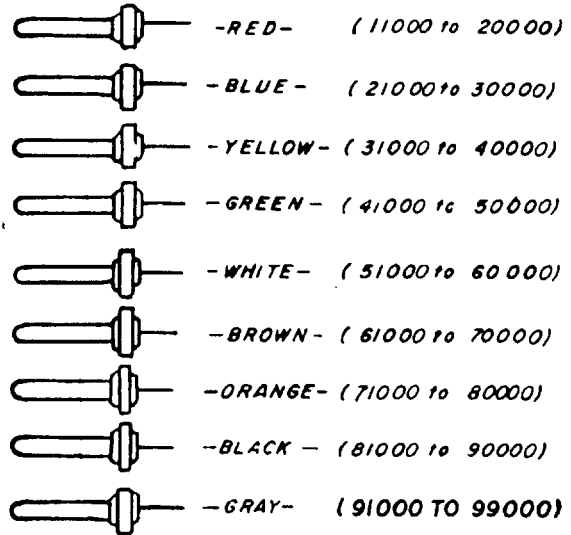
## Hi-Score Adjustment



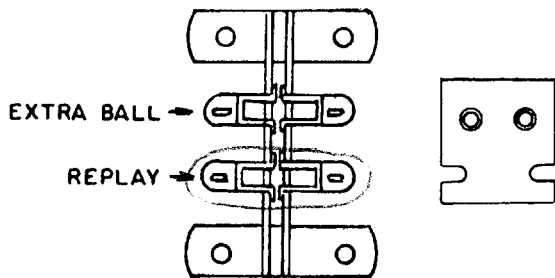
Insert plugs into 10 Point Female at desired positions.

Examples:

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

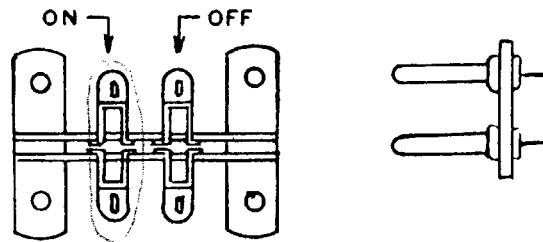


## REPLAY-EXTRA BALL ADJ.



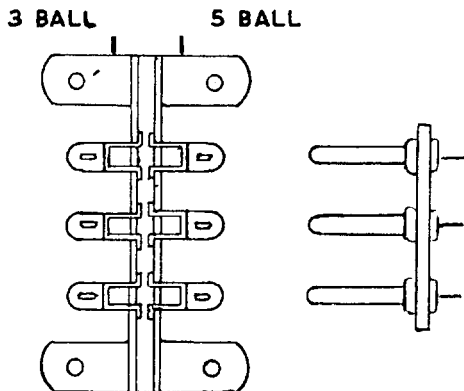
IN "REPLAY" POSITION, HI-SCORES AND NUMBER MATCH WILL AWARD REPLAYS.  
 IN "EXTRA BALL" POSITION, HI-SCORE AWARDS AN EXTRA BALL.

## NUMBER MATCH ADJUSTMENT



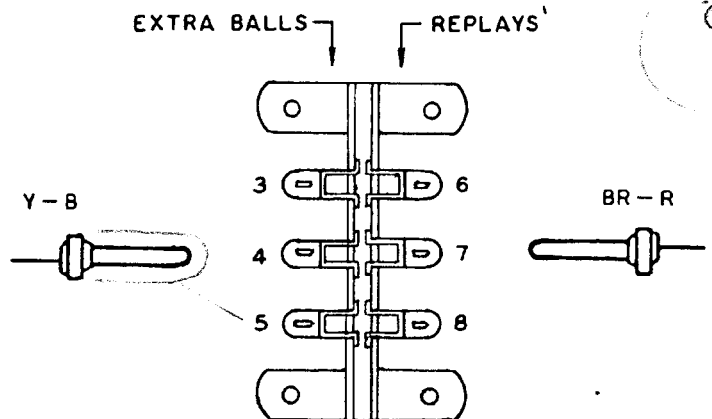
In 'ON' position, a number match lite will appear when game is over. To award replays, when number is matched, Extra Ball Adjustment Jack must be in 'Replay' position. In 'Off' position, Number Match is inoperative.

## No. of Balls Adjustment



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

## SWING REEL ADJ.



INSERT PHONE TIP WITH YELLOW-BLACK WIRE INTO DESIRED POSITION TO AWARD EXTRA BALL WHEN SWING REEL ADVANCES TO THAT NUMBER.

PHONE TIP WITH BROWN-RED WIRE WILL AWARD REPLAY.

"FUN FEST" COIL CHART  
=====

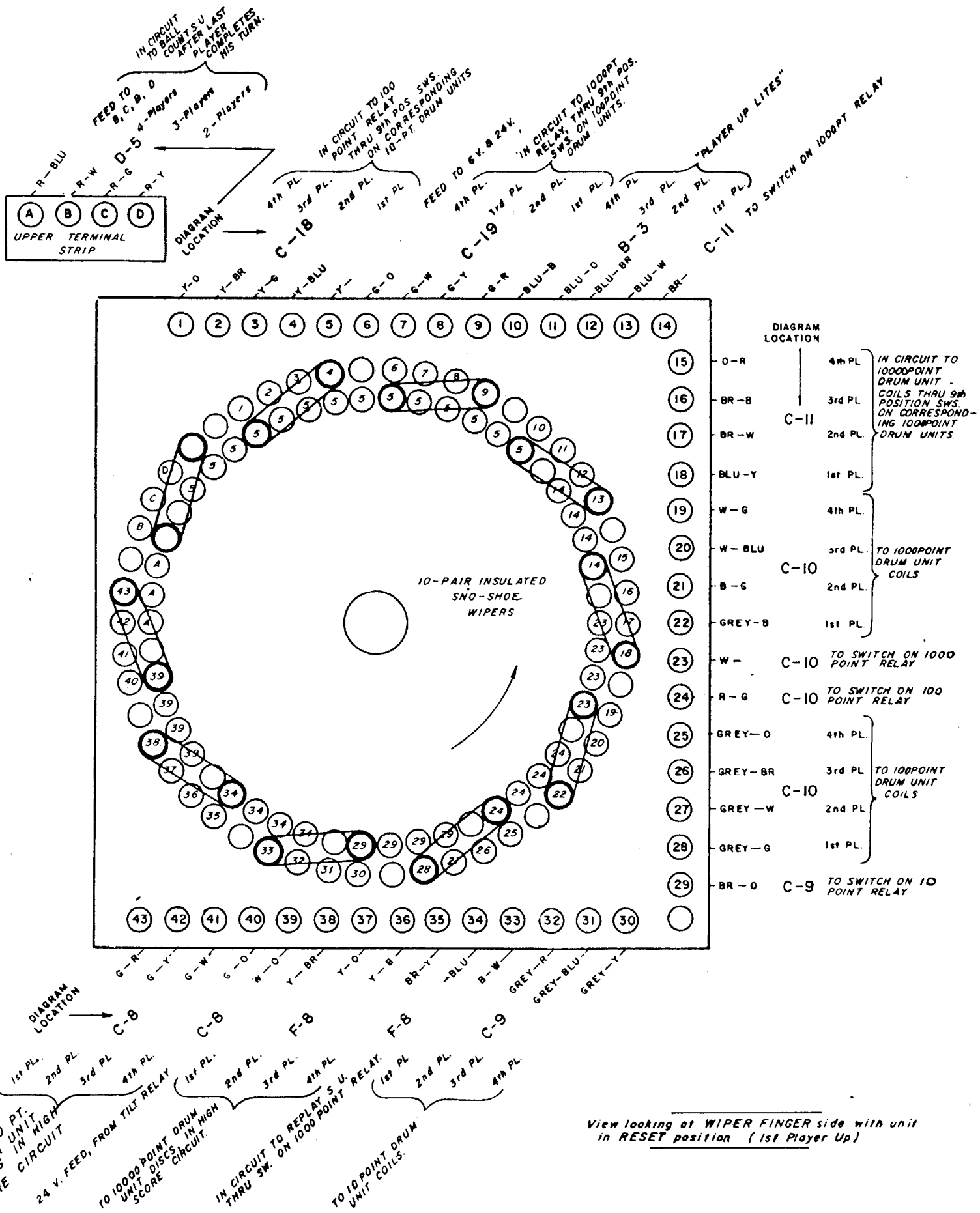
NOTICE:

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 &amp; TRANSFORMERS</u>		
14 A-7883	CONTROL MOTOR - 60 CYCLE	MECH. PANEL
14 A-7884	CONTROL MOTOR - 50 CYCLE	MECH. PANEL
14 A-7745	SWINGING TARGET MOTOR -50/60 CYCLE	PLAYFIELD
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	COIN UNIT STEP UP ADVANCE UNIT STEP UP BALL RELEASE COIL	MECH. PANEL PLAYFIELD PLAYFIELD
	PLAYER UP UNIT STEP UP	INSERT
A 23-600	BALL COUNT UNIT STEP UP REPLAY UNIT STEP UP NUMBER MATCH STEP UP	MECH. PANEL INSERT INSERT
A1-22-550	BALL RETURN COIL	PLAYFIELD
A2-23-750	KNOCKER	CABINET
A2-26-1025	TRIPLE CHIME COILS ... (3 req'd.)	CABINET
B 26-800	BALL COUNT UNIT RESET COIN UNIT RESET ALTERNATOR UNIT STEP UP REPLAY UNIT RESET PLAYER UP UNIT RESET SPECIAL SWING REEL DRUM UNIT	MECH. PANEL MECH. PANEL MECH. PANEL INSERT INSERT INSERT
B1-26-800	SCORE DRUM UNITS ... (16 req'd.) SPECIAL SWING REEL UNIT	INSERT INSERT
FL 20-300/ 28-400	FLIPPERS ... (2 req'd.)	PLAYFIELD
G 22-550	BALL RETURN COIL	PLAYFIELD
G 23-750	D.C. JET BUMPER COILS ... (5 req'd.) EJECT COIL DOWN POST COIL KICKER COILS ... (2 req'd.)	PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 24-350	TRIPLE BONUS RELAY	PLAYFIELD
M 29-900	1 - 2 RESET RELAY 3 - 4 RESET RELAY	INSERT INSERT
M 29-1000	GAME OVER RELAY TRIP UP POST COIL	MECH. PANEL PLAYFIELD
M 29-1100	5¢ RELAY 10¢ RELAY 25¢ RELAY SPECIAL REEL RESET RELAY POST RELAY CENTER TARGET RELAY 5,000 RELAY 3,000 RELAY 10 POINT RELAY 100 POINT RELAY 1,000 POINT RELAY BALL TROUGH RELAY BONUS RELAY DELAY RELAY BREAK RELAY	MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD INSERT INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD
M 30-1300	SET-UP RELAY BALL RETURN RELAY	PLAYFIELD PLAYFIELD
M 30-1400	ON GREEN RELAY ON YELLOW RELAY	PLAYFIELD PLAYFIELD
M1-31-1500	COIN LOCKOUT COIL	FRONT DOOR
XM 27-675	TOTAL PLAY METER COIL	MECH. PANEL
Z 27-1000	EJECT RELAY COIN RELAY GAME OVER RELAY LATCH OUTHOLE RELAY PLAYER RESET RELAY REPLAY RELAY RESET RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL
Z 28-1150	EXTRA BALL RELAY TILT RELAY GATE RELAY	MECH. PANEL MECH. PANEL PLAYFIELD
	BALL INDEX RELAY	MECH. PANEL
Z 29-1250	LOCK RELAY	MECH. PANEL

10

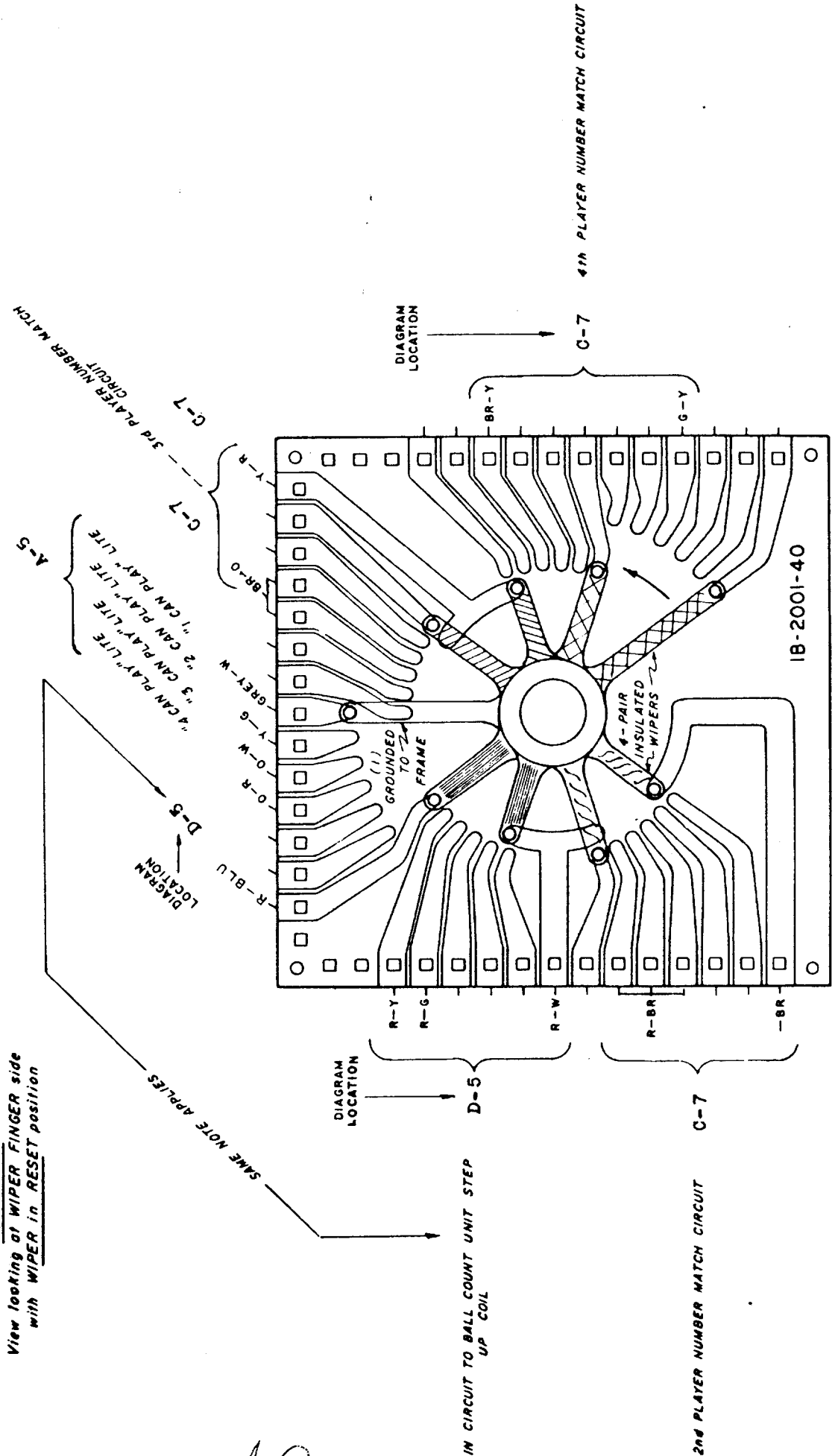
# PLAYER UNIT DISC



View looking at WIPER FINGER side with unit in RESET position (1st Player Up)

# COIN S. U. DISC

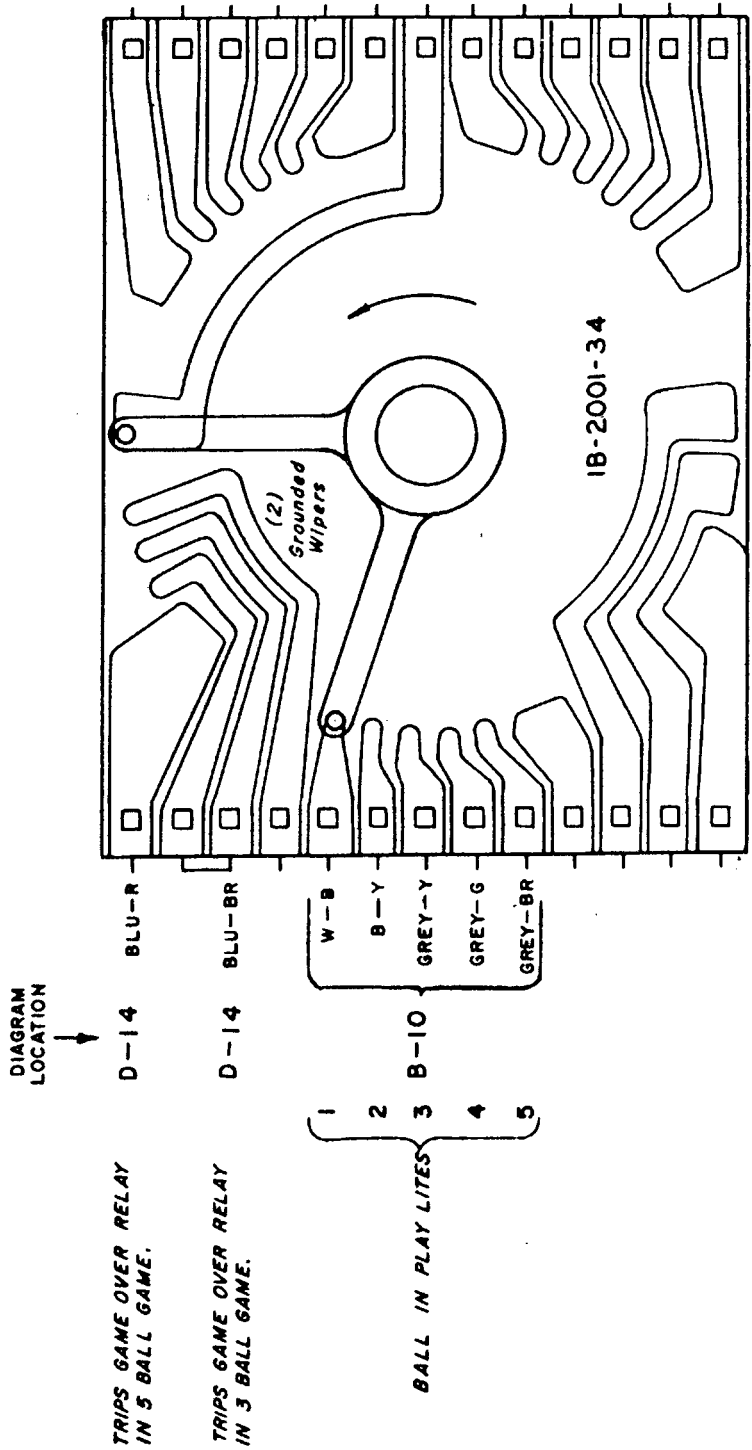
THIS UNIT RESETS AT START OF A GAME (DURING RESET CYCLE). IT THEN ADVANCES ONE STEP EACH TIME THE COIN RELAY IS PULSED.



# 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.

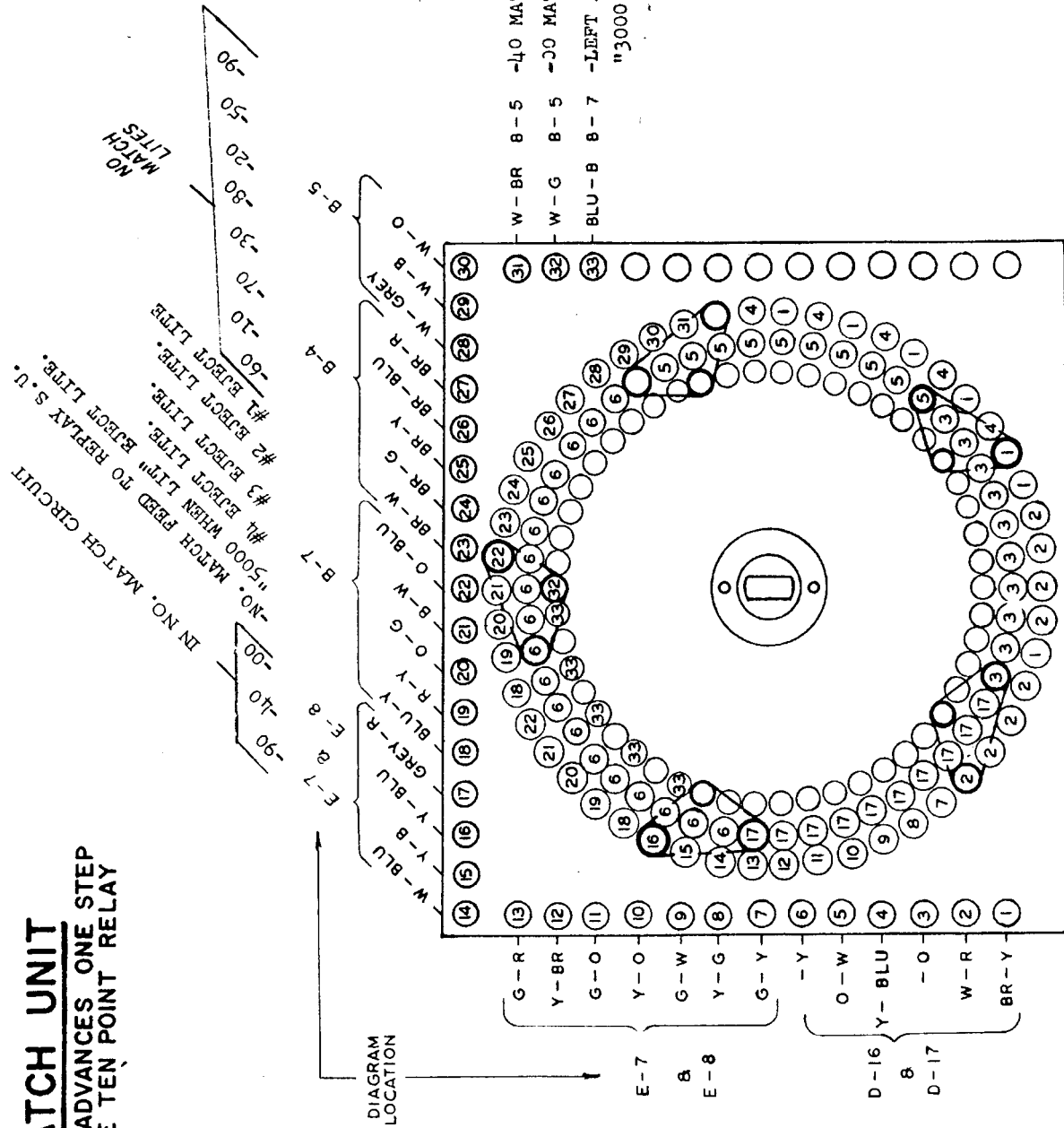
View looking at WIPER FINGER side with WIPER in ZERO position.



# No. MATCH UNIT

THIS UNIT ADVANCES ONE STEP EACH TIME THE TEN POINT RELAY IS PULSED.

View looking at  
WIPER FINGER side



- 50
- 20
- 80
- 30
- 70
- 10
- 60

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

COMMON FEED.

TO LEFT & RIGHT TOP ROLLOVER SMS.

TO 3000 RELAY.

TO SWITCH ON EJECT RELAY.

TO 100 POINT RELAY.

TO 1000 POINT RELAY.

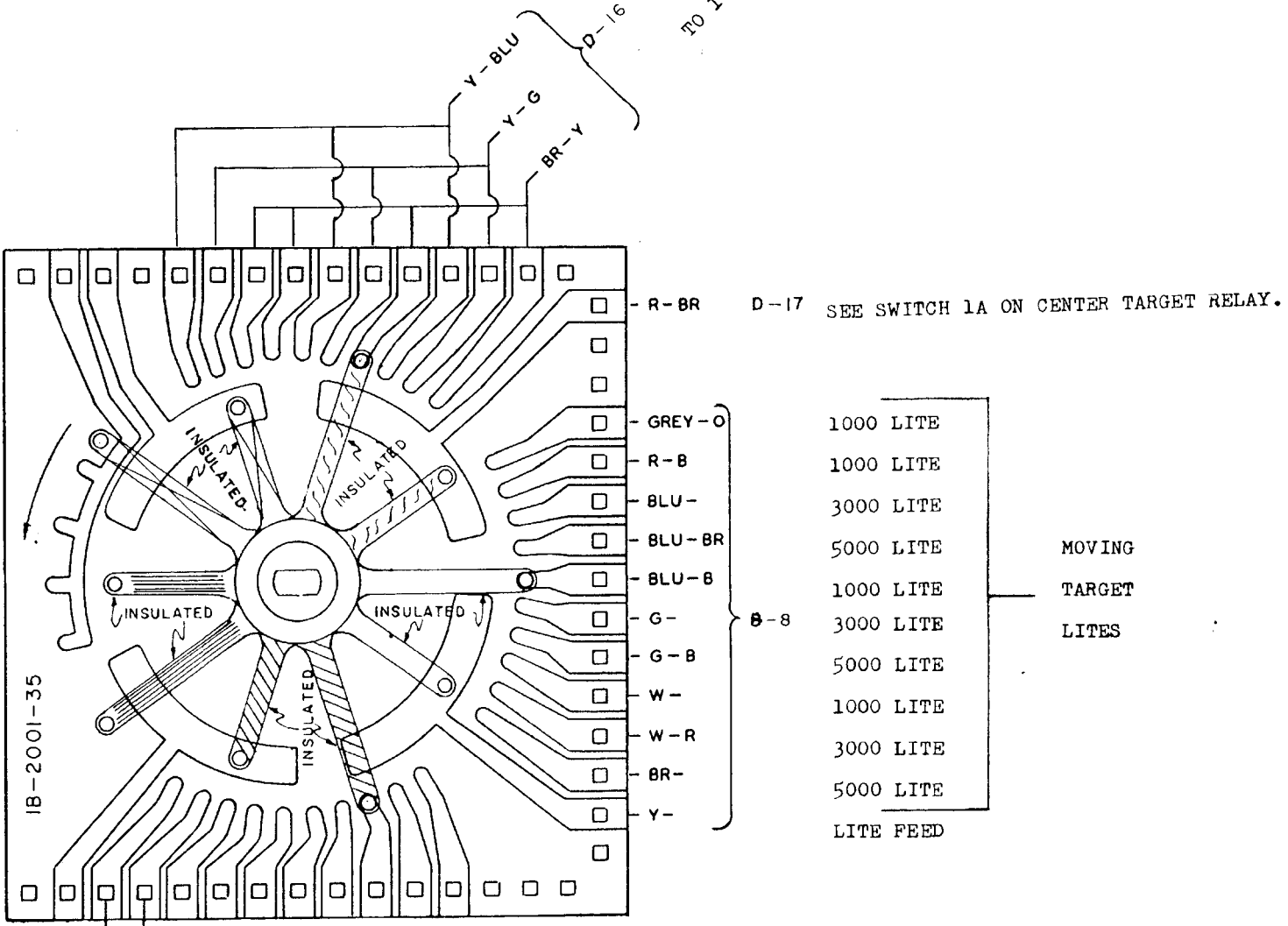
14



# ADVANCE UNIT

THE STEP-UP COIL IS ENERGIZED BY TARGET MOTOR CAM SWITCH, THRU SWITCH SET-UP RELAY.

TO 3000 RELAY COIL.  
 TO 5000 RELAY COIL.  
 TO 1000 POINT RELAY COIL.



D-17 SEE SWITCH 1A ON CENTER TARGET RELAY.

1000 LITE	MOVING TARGET LITES
1000 LITE	
3000 LITE	
5000 LITE	
1000 LITE	
3000 LITE	
5000 LITE	
1000 LITE	
3000 LITE	
5000 LITE	
LITE FEED	

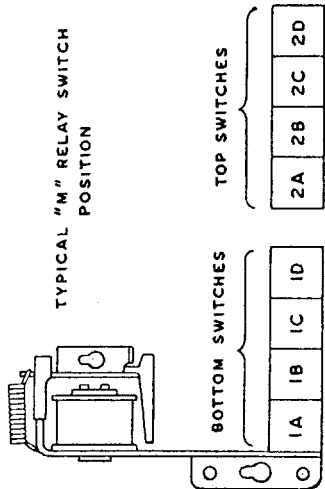
VIEW LOOKING AT WIPER FINGER SIDE.

D-21 TO GATE RELAY COIL.  
 D-21 TO SWITCH ON CENTER TARGET RELAY, THRU SET-UP RELAY.

15

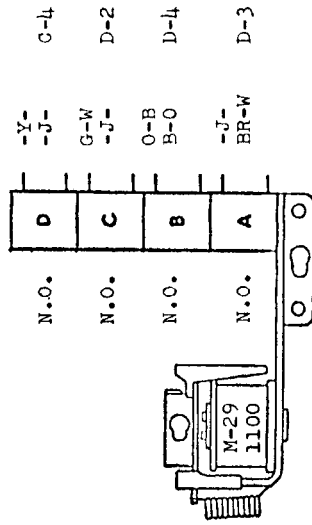
# RELAYS & SWITCHES

LOCATED ON MECHANISM PANEL



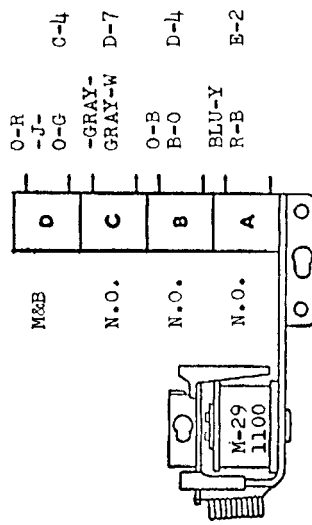
## 5¢ RELAY

IS ENERGIZED BY 5¢ COIN SWITCH (WHEN USED).



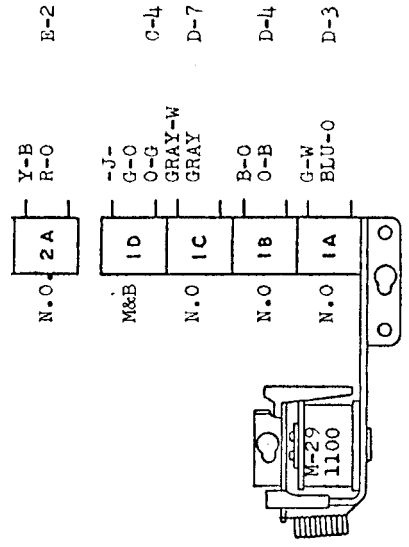
## 10¢ RELAY

IS ENERGIZED BY 10¢ COIN SWITCH, IF 10¢ ADJUSTMENT JACK IS IN "2 PLAYS" OR "3 PLAYS" POSITION.



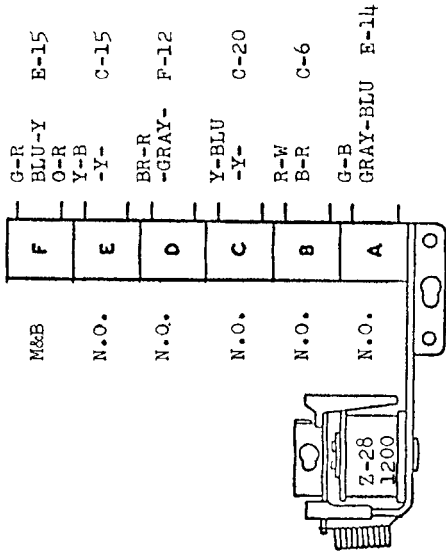
## 25¢ RELAY

IS ENERGIZED BY 25¢ COIN SWITCH.



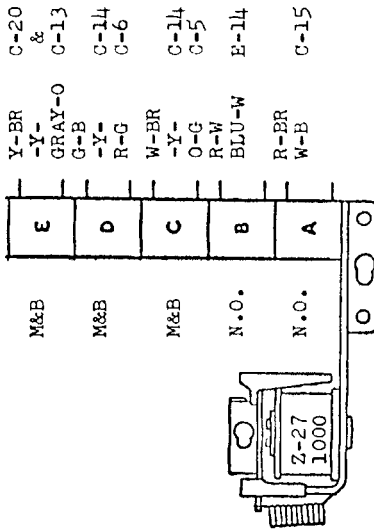
# BALL INDEX RELAY

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



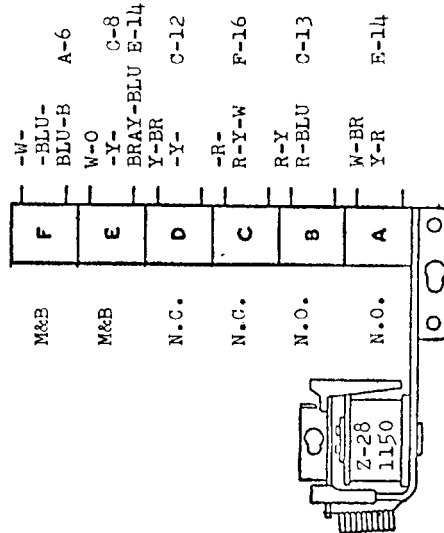
# OUTHOLE RELAY

IS ENERGIZED BY BALL TROUGH RELAY, THRU SWITCH ON BONUS RELAY AND CENTER TARGET RELAY.



# TILT RELAY

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



OPENS IN CIRCUIT TO OUTHOLE RELAY AND CLOSSES TO CENTER TARGET RELAY.

OPENS ALL CIRCUITS TO BREAK RE., DELAY RE., BONUS RE. & BALL TRIUGH RELAY.

TO REPLAY UNIT S.U. COIL, FROM DISC ON SPECIAL SWING REEL DRUM UNIT.

IN SERIES WITH SWITCH A ON EXTRA BALL R RELAY.

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

IN HOLD CIRCUIT TO THIS RELAY.

OPENS IN HOLD CIRCUIT TO "ON GREEN" AND "ON YELLOW" RELAYS, AND CLOSSES TO DOWN POST COIL.

OPENS IN HOLD CIRCUIT TO BALL INDEX RELAY AND CLOSSES IN SERIES WITH SWITCH C ON EXTRA BALL RELAY.

IN HOLD CIRCUIT TO TILT RELAY---CLOSSES TO RUN SCORE MOTOR.

PULSES BALL RELEASE COIL, AT SCORE MOTOR CAM SWITCH 4A.

IN HOLD CIRCUIT TO THIS RELAY.

OPENS IN CIRCUIT TO MOST PLAYFIELD LITES AND CLOSSES TO TILT LITE.

OPENS IN HI-SCORE CIRCUIT TO REPLAY S.U. COIL AND CLOSSES TO ENERGIZE BALL INDEX RELAY.

IN CIRCUIT TO SPECIAL SWING REEL DRUM UNIT COIL AND DISC.

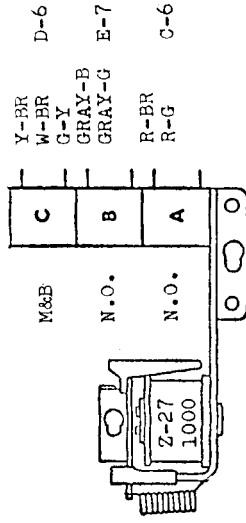
OPENS CIRCUITS TO MOST PLAYFIELD SWITCHES.

ENERGIZES POST RELAY.

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

### PLAYER RESET RELAY

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



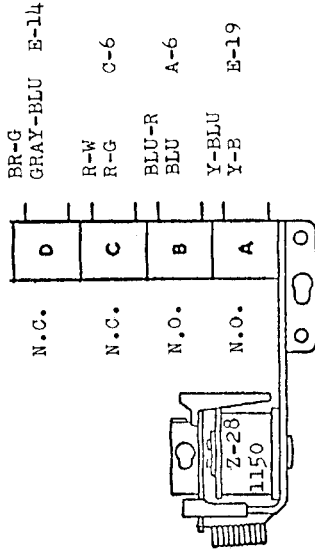
OPENS IN CIRCUIT TO PLAYER UNIT S.U. COIL AND CLOSES TO PLAYER UNIT RESET COIL.

IN NUMBER MATCH CIRCUIT TO REPLAY UNIT S.U. COIL.

IN HOLD CIRCUIT TO THIS RELAY.

### EXTRA BALL RELAY

IS ENERGIZED BY EJECT RELAY, THRU SPECIAL SWING REEL UNIT DISC---ALSO BY HIGH SCORE CIRCUIT (SEE "SWING REEL" ADJUSTMENT AND "REPLAY-EXTRA BALL" ADJUSTMENT JACKS).



TO BALL INDEX RELAY, FROM 10 PT., 100 PT. OR 1,000 POINT RELAY.

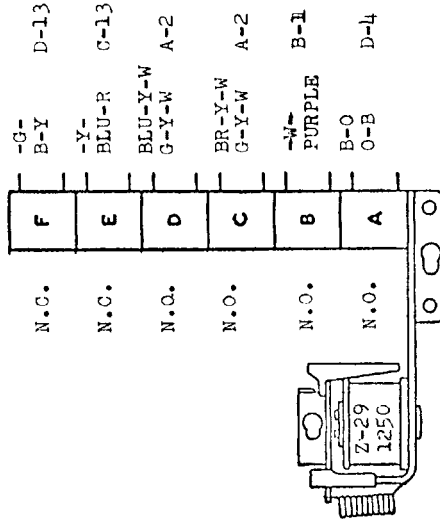
IN SERIES WITH SWITCH B ON BALL INDEX RELAY.

TO "SHOOT AGAIN" LITES.

IN HOLD CIRCUIT TO THIS RELAY.

### LOCK RELAY

IS ENERGIZED BY 5¢ RELAY, 10¢ RELAY, 25¢ RELAY, COIN RELAY OR LEFT FLIPPER BUTTON SWITCH.



IN CIRCUIT TO "SPECIAL REEL RESET RELAY".

ENERGIZES GAME-OVER RELAY (TRIP COIL).

6 VOLTS FROM TRANSFORMER TO LITES.

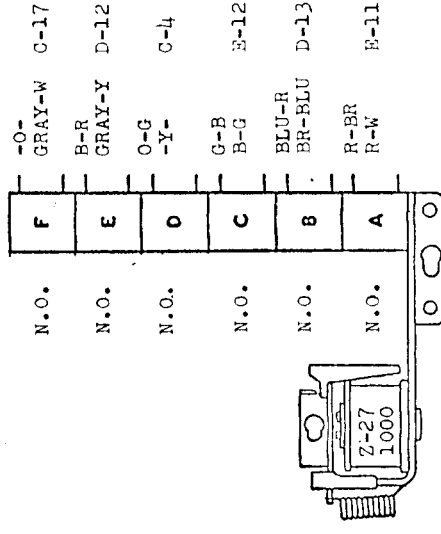
6 VOLTS FROM TRANSFORMER TO LITES.

IN SERIES WITH SWITCH B ON GAME-OVER RELAY. (115 V.)

HOLD CIRCUIT TO THIS RELAY, THRU CABINET BOTTOM KICK-OUT SWITCH.

### EJECT RELAY

IS ENERGIZED BY EJECT POCKET SWITCH, THRU SCORE MOTOR INDEX CAM SWITCH E.



IN CIRCUIT TO PULSE 100 OR 1,000 POINT RELAY, THRU NUMBER MATCH UNIT DISC.

IN CIRCUIT TO REPLAY S.U. OR EXTRA BALL RELAY, THRU SPECIAL SWING REEL UNIT DISC.

RUNS SCORE MOTOR.

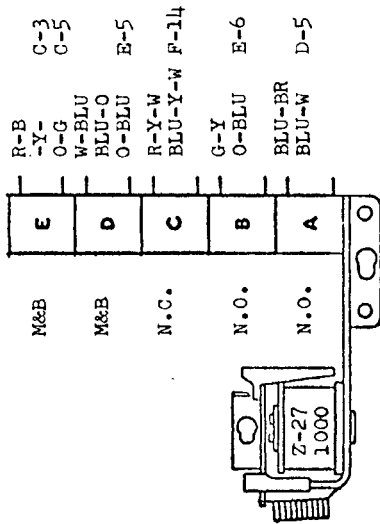
ENERGIZES SPECIAL SWING REEL DRUM UNIT COIL.

PULSES EJECT POCKET COIL AT SCORE MOTOR CAM SWITCH 4B.

IN HOLD CIRCUIT TO THIS RELAY.

## RESET RELAY

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



OPENS CIRCUIT TO REPLAY RELAY AND COIN LOCKOUT COIL, AND CLOSES TO RUN SCORE MOTOR.

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

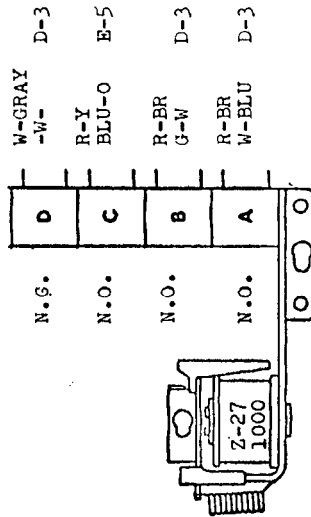
IN SERIES WITH SWITCH A ON GAME-OVER RELAY.

IN CIRCUIT TO PLAYER UNIT RESET COIL.

IN HOLD CIRCUIT TO THIS RELAY.

## REPLAY RELAY

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



OPENS CIRCUIT TO COIN LOCKOUT COIL.

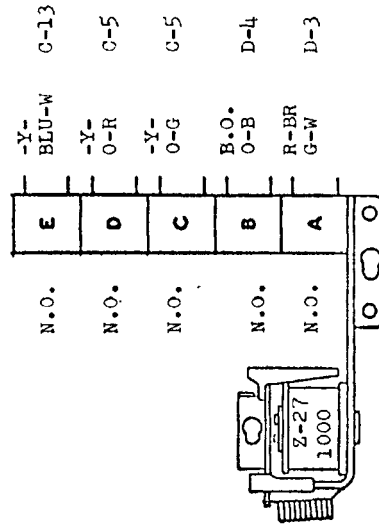
PULSES REPLAY UNIT RESET COIL, AT SCORE MOTOR CAM SWITCH 1A.

ENERGIZES COIN RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

## COIN RELAY

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



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

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

RUNS SCORE MOTOR.

ENERGIZES LOCK RELAY.

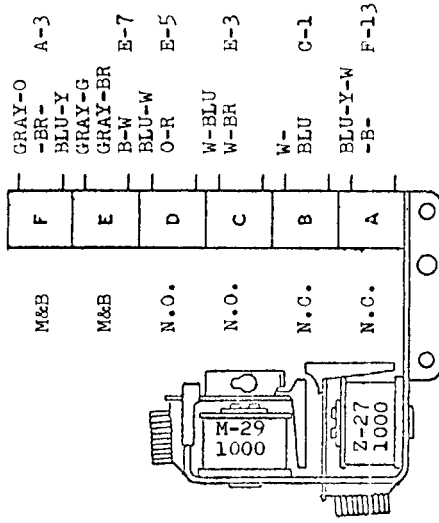
IN HOLD CIRCUIT TO THIS RELAY.

19

# GAME OVER RELAY

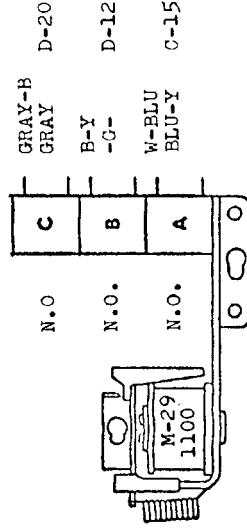
## INTERLOCK

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



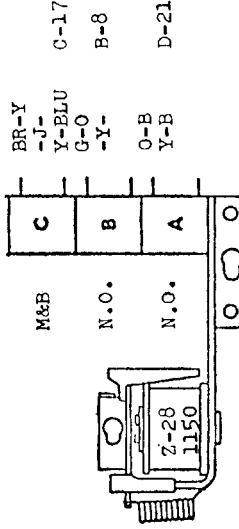
# BALL TROUGH RELAY

IS ENERGIZED, AND ALSO HELD IN, BY OUT-HOLE SWITCH.



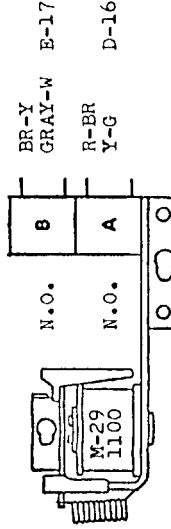
# GATE RELAY

IS ENERGIZED BY CENTER TARGET RELAY, THRU SET-UP RELAY AND ADVANCE UNIT DISC.



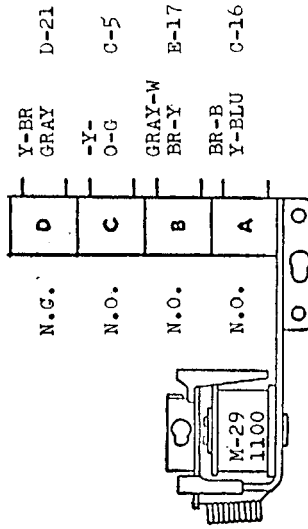
# 5000 RELAY

SEE SWITCH 1A ON CENTER TARGET RELAY.



# 3000 RELAY

IS ENERGIZED BY LEFT OR RIGHT BOTTOM ROLL-OVER, WHEN LIT---ALSO, SEE SWITCH 1A ON CENTER TARGET RELAY.



OPENS TO "PLAYER UP" LITES, AND CLOSES TO "NUMBER MATCH" AND "GAME-OVER" LITES.  
OPENS IN HI-SCORE CIRCUITS AND CLOSES IN NUMBER MATCH CIRCUITS.

CIRCUIT TO RESET RELAY, THRU SWITCH ON COIN RELAY.

IN CIRCUIT TO REPLAY RELAY.

RUNS 115V. SWINGING TARGET MOTOR, THRU SWITCH ON LOCK RELAY.

OPENS MOST CIRCUITS TO PLAYFIELD SWITCHES.

ENERGIZES SET-UP RELAY.

IN CIRCUIT TO "SPECIAL REEL RESET RELAY".

IN SERIES WITH SWITCH F ON BALL INDEX RELAY.

OPENS TO 1,000 POINT RELAY AND CLOSES TO 3,000 RELAY. (THRU RIGHT BOTTOM ROLLOVER).

TO "3,000 WHEN LIT" GATE LIFE.

HOLD CIRCUIT TO THIS RELAY, THRU TROUGH SWITCH.

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

IN HOLD CIRCUIT TO THIS RELAY.

IN HOLD CIRCUIT TO BALL RETURN RELAY.

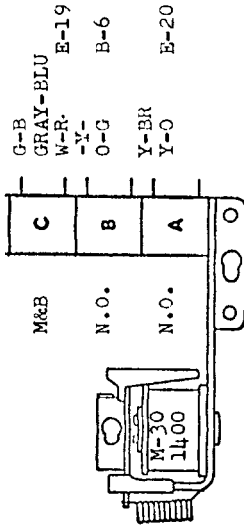
RUNS SCORE MOTOR.

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

IN HOLD CIRCUIT TO THIS RELAY.

## ON GREEN RELAY

IS ENERGIZED BY "ON GREEN" TARGET SWITCH, AS INDICATED ON PLAYFIELD.



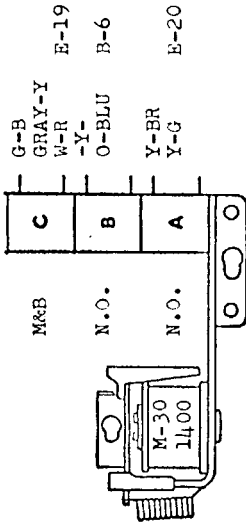
OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY (WHEN MAKING EITHER GREEN JET BUMPER SW.).

TO LEFT BOTTOM AND RIGHT TOP JET BUMPER LITES.

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

## ON YELLOW RELAY

IS ENERGIZED BY "ON YELLOW" TARGET SWITCH, AS INDICATED ON PLAYFIELD.



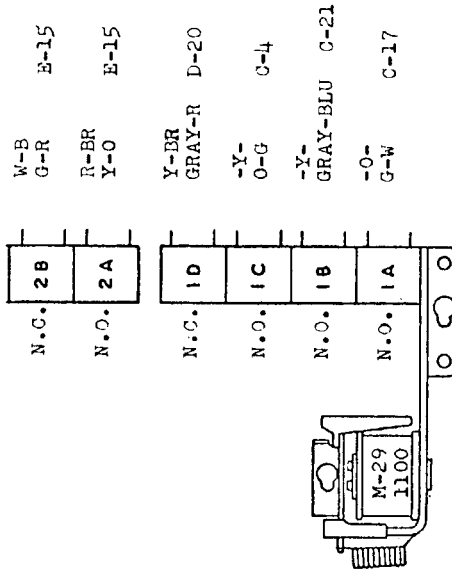
OPENS TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY (WHEN MAKING EITHER YELLOW JET BUMPER SW.).

TO LEFT TOP AND RIGHT BOTTOM JET BUMPER LITES.

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

## CENTER TARGET RELAY

IS ENERGIZED BY CENTER TARGET SWITCH. ALSO BY BALL TROUGH RELAY, THRU BALL INDEX RELAY AND BONUS RELAY.



IN CIRCUIT TO OUTHOLE RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

IN HOLD CIRCUIT TO SET-UP RELAY.

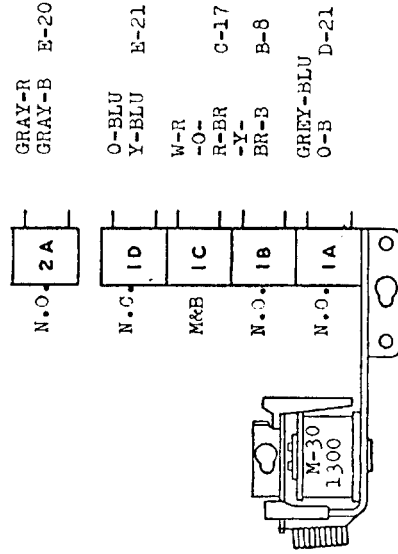
RUNS SCORE MOTOR.

IN CIRCUIT TO GATE RELAY, THRU ADVANCE UNIT DISC.

IN SERIES WITH SWITCH 1C ON SET-UP RELAY.

## SET UP RELAY

IS ENERGIZED BY LEFT AND RIGHT BOTTOM TARGET SWITCHES. ALSO BY BALL TROUGH RELAY.



IN HOLD CIRCUIT TO THIS RELAY.

PULSES ADVANCE UNIT S.U. COIL, THRU TARGET MOTOR CAM SW.

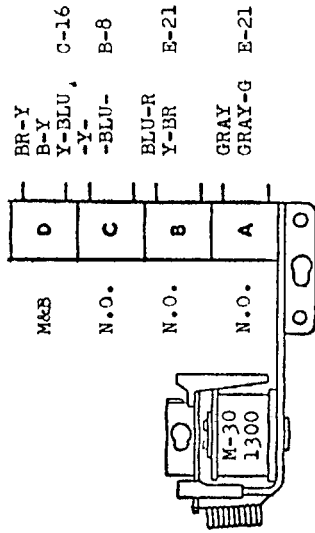
OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSES TO 1,000 3,000 OR 5,000 RELAY, THRU ADVANCE UNIT DISC.

TO "CENTER TARGET BONUS" LITE.

IN SERIES WITH SWITCH 1B ON CENTER TARGET RELAY.

## BALL RETURN RELAY

IS ENERGIZED BY LEFT OR RIGHT TOP TARGET SWITCHES.



OPENS TO 1,000 POINT RELAY AND CLOSES TO 3,000 RELAY (WHEN MAKING LEFT BOTTOM ROLLOVER).

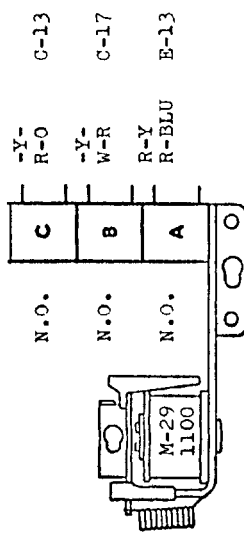
TO "3,000 WHEN LIT" BALL RETURN LANE LITE.

ENERGIZES BALL RETURN COIL (WHEN MAKING LEFT BOTTOM ROLLOVER SWITCH).

IN HOLD CIRCUIT TO THIS RELAY.

## POST RELAY

IS ENERGIZED BY (2) ROLLOVER BUTTON SWITCHES, OR BY TILT RELAY.



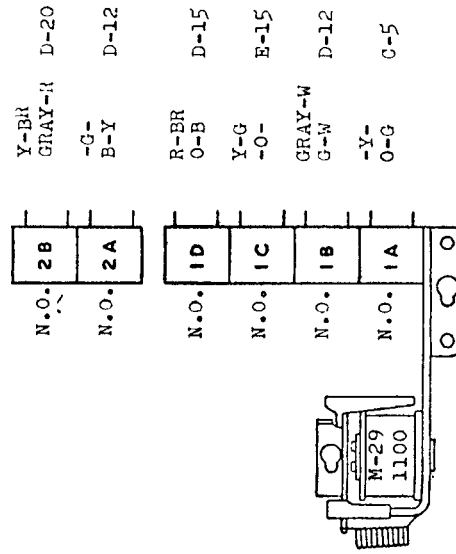
ENERGIZES "DOWN POST" COIL.

PULSES 100 POINT RELAY.

HOLD CIRCUIT TO THIS RELAY, THRU POST END-OF-STROKE SWITCH.

## SPECIAL REEL RESET RELAY

IS ENERGIZED BY LOCK RELAY OR BALL TROUGH RELAY, THRU SCORE MOTOR INDEX CAM SWITCH C OR ZERO SWITCH ON SPECIAL SWING REEL DRUM UNIT.



IN SERIES WITH SWITCH 2A ON SET-UP RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

IN SERIES WITH SWITCH 2A ON CENTER TARGET RELAY.

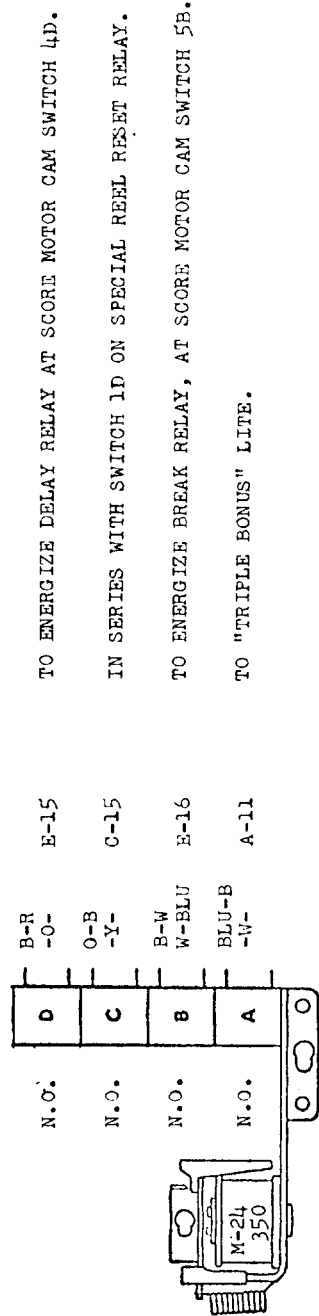
IN CIRCUIT TO BONUS RELAY.

IN CIRCUIT TO PULSE SPECIAL SWING REEL DRUM UNIT.

RUNS SCORE MOTOR.

## TRIPLE BONUS RELAY

THIS 6 VOLT COIL IS ENERGIZED BY WIPER ON BALL COUNT UNIT, THRU 3-5 BALL ADJUSTMENT JACK AND SWITCH ON BREAK RELAY.



TO ENERGIZE DELAY RELAY AT SCORE MOTOR CAM SWITCH 4D.

IN SERIES WITH SWITCH 1D ON SPECIAL REEL RESET RELAY.

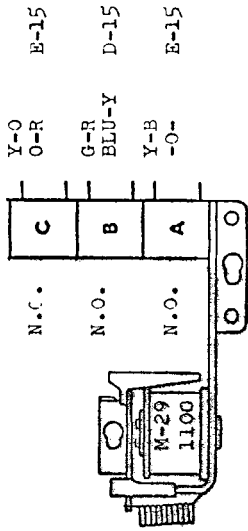
TO ENERGIZE BREAK RELAY, AT SCORE MOTOR CAM SWITCH 5B.

TO "TRIPLE BONUS" LITE.



## BONUS RELAY

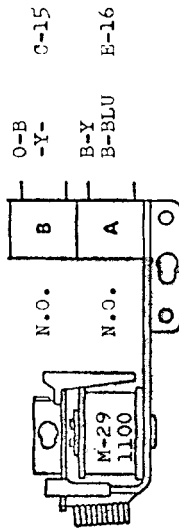
IS ENERGIZED BY SCORE MOTOR CAM SWITCH 6A, THRU SWITCHES ON "BALL INDEX RELAY" AND "SPECIAL REEL RESET RELAY".



IN CIRCUIT TO CENTER TARGET RELAY.  
 IN SERIES WITH SWITCH 2B ON CENTER TARGET RELAY.  
 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON BALL INDEX RELAY.

## DELAY RELAY

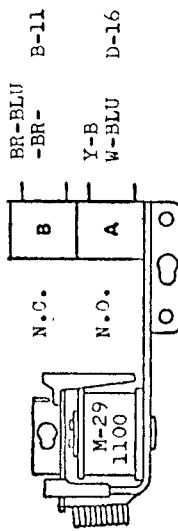
IS ENERGIZED BY SCORE MOTOR CAM SWITCH 4D, THRU SWITCHES ON TRIPLE BONUS, BONUS AND BALL INDEX RELAYS.



IN SERIES WITH SWITCH 1D ON SPECIAL REEL RESET RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY, THRU CAM SWITCH 6A AND SWITCH ON BALL INDEX RELAY.

## BREAK RELAY

IS ENERGIZED BY SCORE MOTOR CAM SWITCH 5B, THRU SWITCHES ON TRIPLE BONUS RELAY, DELAY RELAY, BALL INDEX RELAY AND SCORE MOTOR CAM SWITCH 6A.

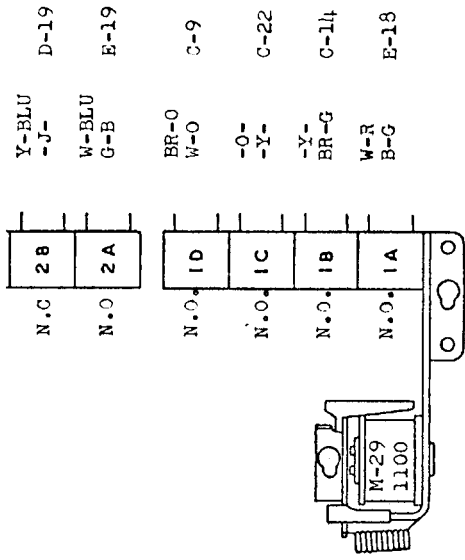


OPENS CIRCUIT TO TRIPLE BONUS RELAY.  
 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON BALL INDEX RELAY.

## 10 POINT RELAY

IS PULSED BY:

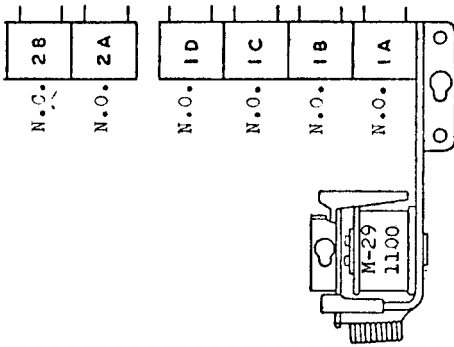
1. STAND-UP SWITCHES.
2. KICKER SWITCHES.
3. (2) TOP BUMPER SWITCHES.
4. "ON YELLOW" JET BUMPER SWITCHES, THRU ON YELLOW RELAY.
5. "ON GREEN" JET BUMPER SWITCHES, THRU ON GREEN RELAY.



IN SERIES WITH SWITCH A ON EXTRA BALL RELAY.  
 IN HOLD CIRCUIT TO THIS RELAY.  
 PULSES 10 POINT DRUM UNITS, THRU PLAYER UNIT DISC.  
 ENERGIZES NUMBER MATCH S.U. AND MEDIUM CHIME COIL.  
 ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RE.  
 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

## 100 POINT RELAY

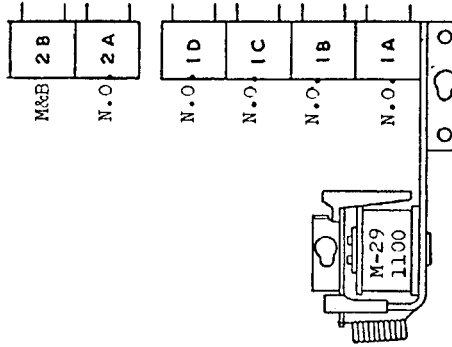
1. CENTER TARGET RELAY, THRU SET-UP RELAY.
2. EJECT RELAY, THRU NUMBER MATCH UNIT DISC.
3. (6) TARGET SWITCHES.
4. POST RELAY.
5. CENTER BOTTOM ROLLOVER BUTTON.
6. "ON YELLOW" JET BUMPER SWS., THRU ON YELLOW RELAY.
7. "ON GREEN" JET BUMPER SWS., THRU ON GREEN RELAY.



-J-	C-19	IN SERIES WITH SWITCH 2B ON 10 POINT RELAY.
-J-		
W-B	E-18	IN HOLD CIRCUIT TO THIS RELAY.
W-R		
R-G	C-10	PULSES 100 POINT DRUM UNITS, THRU PLAYER UNIT DISC.
W-O		
O-R	C-21	ENERGIZES SMALL CHIME COIL.
-Y-		
-Z-	C-14	ENERGIZES BALL INDEX RELAY, THRU SWITCH ON EXTRA BALL RELAY.
BR-G		
O-BLU	E-18	PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.
BR-Y		

## 1000 POINT RELAY

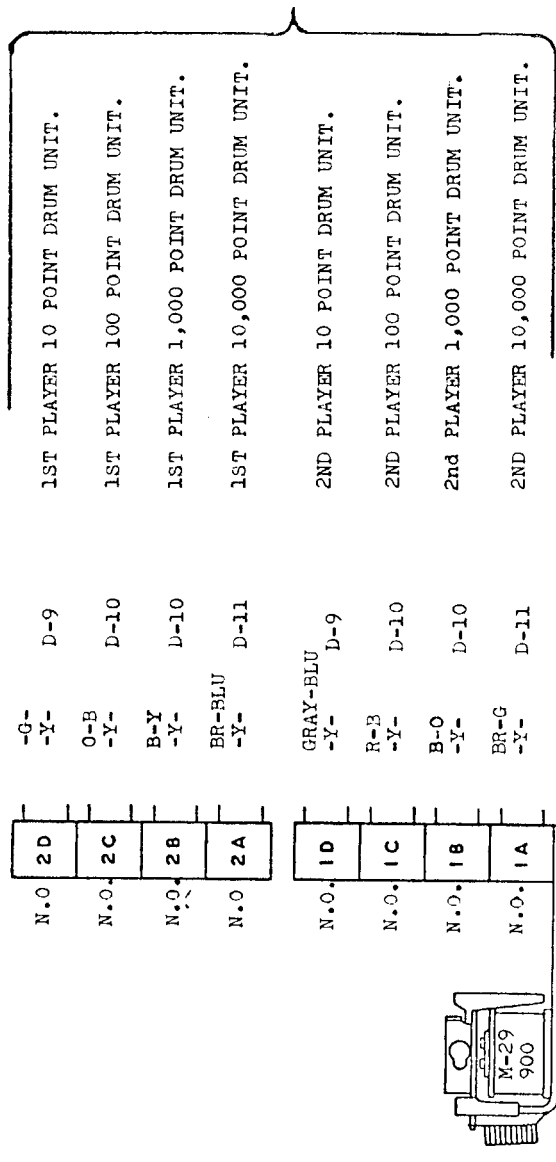
- IS PULSED BY:
1. LEFT BOTTOM ROLLOVER, THRU BALL RETURN RELAY.
  2. RIGHT BOTTOM ROLLOVER, THRU GATE RELAY.
  3. CENTER TARGET RELAY, THRU SET-UP RELAY AND ADVANCE UNIT DISC.
  4. 5,000 RELAY.
  5. 3,000 RELAY.



-J-	C-19	OPENS IN SERIES CIRCUIT WITH SWITCH 2B ON 100 POINT RELAY, AND CLOSES TO ENERGIZE BALL INDEX RELAY.
-Y-		
BR-G	C-14	IN HOLD CIRCUIT TO THIS RELAY.
BLU-W		
BR-Y	E-18	
BR		
W-O	C-11	PULSES 10,000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 1,000 POINT DRUM UNITS.
-W-		
W-O	C-10	PULSES 1,000 POINT DRUM UNITS, THRU PLAYER UNIT DISC.
-BLU-		
B-W	F-7	IN HI-SCORE CIRCUIT TO REPLAY S.U. OR EXTRA BALL RELAY.
-Y-		
B-G	C-22	ENERGIZES LARGE CHIME COIL.

## 1-2 RESET RELAY

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

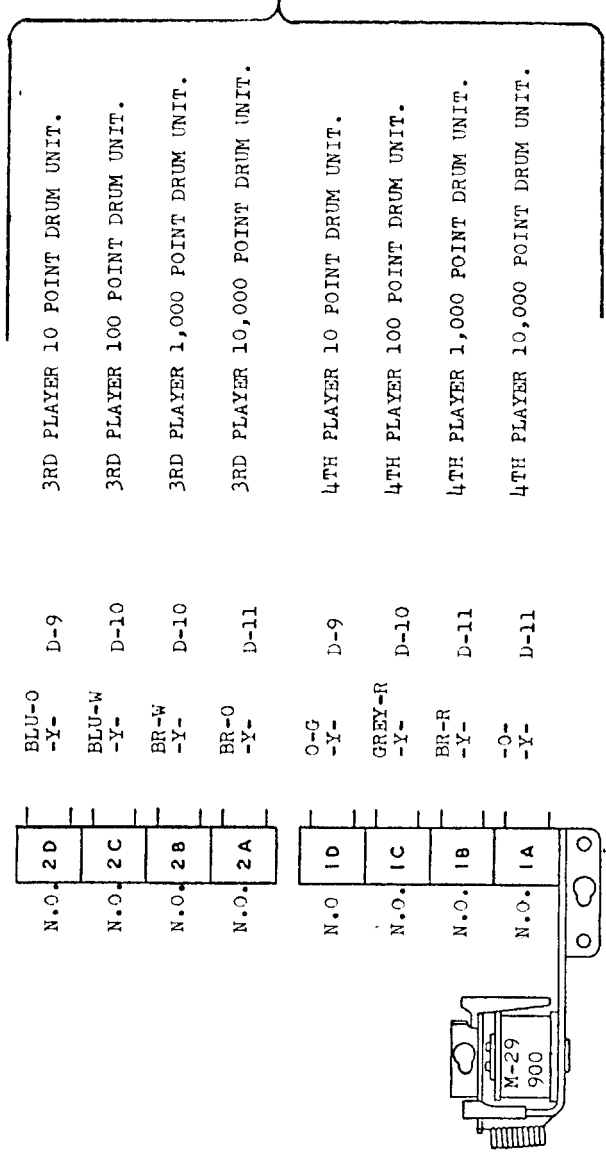


THESE SWITCHES PULSE THE INDICATED DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

(25)

## 3-4 RESET RELAY

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



THESE SWITCHES PULSE THE INDICATED DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

